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USAAVLABS TECHNICAL REPORT 68-13B

TWO-DIMENSIONAL TESTS OF AIRFOILS OSCILLATING NEAR STALL

VOLUME 11

DATA REPORT

By

Lewis Gray

Jaan Liiva

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April 1968

U. S. ARMY AVIATION MATERIEL LABORATORIES
FORT EUSTIS, VIRGINIA

CONTRACT DA 44-177-AMC-438(T)

THE BOEING COMPANY
VERTOL DIVISION
PHILADELPHIA, PENNSYLVANIA

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TWO-DIMESIONAL TESTS OF AIRFOILS OSCILLATING NEAR STALL. VOLUME II: DATA REPORT

Lewis Gray, et al

Boeing Company
Philadelphia, Pennsylvania

April 1968

DEPARTMENT OF THE ARMY
U. S. ARMY AVIATION MATERIEL LABORATORIES
FORT EUSTIS, VIRGINIA 23604

This report was prepared by Vertol Division, The Boeing Company, under the terms of Contract DA 44-177-AMC-438(T). It consists of results obtained from wind tunnel tests of airfoils oscillating near the stall angle of attack. The data were obtained at conditions comparable to those existing in present-day helicopters.

The object of this contractual effort was to obtain data on airfoils undergoing harmonic motion to serve as a basis for improvement of rotor theories. The unsteady aerodynamics data can provide a more realistic stall boundary and dynamic airloads if they are incorporated into present rotor theories.

The conclusions contained herein are concurred in by this command. The recommendations are sound. The report is published for the exchange of information and the stimulation of ideas.

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Contract DA 44-177-AMC-438(T)
USAAVLABS Technical Report 68-13B
April 1968

TWO-DIMENSIONAL TESTS OF AIRFOILS OSCILLATING NEAR STALL

VOLUME II

DATA REPORT

D8-0678-2

By

Lewis Gray
and
Jaan Liiva

Prepared by

The Boeing Company
Vertol Division
Philadelphia, Pennsylvania

for

U. S. ARMY AVIATION MATERIEL LABORATORIES
FORT EUSTIS, VIRGINIA

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SUMMARY

This report presents a detailed discussion of the test facilities, models, and data gathering and reduction system that were used in the tests of the oscillating airfoils.

The computer listings of the final data, with a comprehensive index of the test conditions, are also presented.

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LIST OF SYMBOLS

a	speed of sound, feet per second
AIRFOIL CPS	computer symbol for f, airfoil drive frequency for forced pitching or translation, Hertz
ALPHA.O	computer symbol for α_o, mean angle of attack, degrees
ALPHA (STALL)	computer symbol for angle of attack at CN(MAX), degrees
A_n	nth harmonic Fourier series cosine term of C_N
B_n	nth harmonic Fourier series sine term of C_N
c,C	airfoil chord, feet
CM	computer symbol for M/Qc^2, pitching moment coefficient per foot of span, positive for nose-up
C_M	airfoil pitching moment coefficient, positive nose-up
C_n	nth harmonic Fourier series cosine term of h
CN	computer symbol for N/Qc, normal force coefficient per foot of span, positive up
C_N	airfoil normal force coefficient, positive up
CN(MAX)	computer symbol for maximum normal force coefficient attained during oscillation
CPS	computer symbol for cycles per second or Hertz
$d\alpha$	the differential of α
D.ALPHA	computer symbol for $\Delta\alpha$, magnitude of oscillatory angle of attack, degrees
DAMPING	computer symbol for $(2\pi^2 f\Delta\alpha^2)^{-1} \oint CMd\alpha$, work-per-cycle coefficient for pitch oscillation
	computer symbol for $(2\pi^2 f\Delta h^2)^{-1} \oint CNdh$, work-per-cycle coefficient for vertical translation

DEL. H	computer symbol for Δh, magnitude of translation, based on first harmonic resultant of h, measured in semichords
D_n	nth harmonic Fourier series sine term of h
E_n	nth harmonic Fourier series cosine term of C_M
EXT.DAMPING	computer symbol for damping ratio of friction and eddy-current damping, fraction of critical damping (does not include aerodynamic damping)
f	drive frequency of airfoil motion in pitch or translation oscillation, Hertz
F_n	nth harmonic Fourier series sine term of C_N
G_n	nth harmonic Fourier series cosine term of α
h	translation position in semichords, positive up
H_n	nth harmonic Fourier series sine term of α
K	computer symbol for $\pi fC/V$, reduced frequency parameter
M	computer symbol for pitching moment, foot-pounds, positive nose-up
M*	total number of pressure-measuring stations
MACH NO	computer symbol for V/a, Mach number
n	number of harmonic based on f, see RES
n PHI	computer symbol for phase lead of response with respect to forcing motion for the nth harmonic, degrees
N	computer symbol for normal force, pounds, positive up
N*	total number of harmonics of data
Q	computer symbol for $(\rho V^2)/2$, dynamic pressure, pounds per square foot
RN	computer symbol for $(\rho VC)/\mu$, Reynolds number

RES n	computer symbol for magnitude of resultant for the nth harmonic
TUNED CPS	computer symbol for nominal value of airfoil system resonant frequency, Hertz
V	computer symbol for tunnel velocity, feet per second
W	work function, foot-pounds
x	airfoil chordwise location, measured from leading edge, feet
X	computer symbol for chordwise position, feet, measured from leading edge, positive toward trailing edge
X/C	computer symbol for chordwise position measured from the leading edge as a fraction of the chord
α	instantaneous angle of attack, degrees
α_o	mean angle of attack, degrees, positive for nose-up
δW_α	instantaneous work-per-cycle coefficient for pitching oscillation
δW_h	instantaneous work-per-cycle coefficient for translation
$\Delta\alpha$	magnitude of oscillatory angle of attack, degrees, based on first harmonic resultant of α
ΔC_p	differential pressure coefficient
Δh	magnitude of translation, based on first harmonic resultant of h, measured in semichords
ΔW_α	$(1/2\pi^2 f\Delta\alpha^2) \oint C_M d\alpha$, work-per-cycle coefficient for pitching oscillation
ΔW_h	$(1/2\ \pi^2 f\Delta h^2) \oint C_N dh$, work-per-cycle coefficient for translation
Θ	pitch and translation motion reference angle, degrees
μ	viscosity of air, slugs per foot per second

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INTRODUCTION

This volume contains the detailed description of the test facilities and apparatus and the computer data listings from the oscillating airfoil tests. The test results are presented and discussed in Volume I.

These computer data show differential pressures and integrated normal force and pitching moment data in harmonic form up to the ninth harmonic. For the tuned system tests, 18 harmonics are tabulated to show responses in the higher frequency range.

DESCRIPTION OF TEST FACILITIES AND APPARATUS

This section of the report describes the wind tunnel, test equipment, models, data-gathering system, and test procedures.

BOEING TWO-DIMENSIONAL, VARIABLE-DENSITY WIND TUNNEL

To accommodate tests such as (1) low-speed, high-lift blowing flaps, (2) high-speed airfoil drag reduction programs, and (3) high-speed transient and damping derivative measurements, a two-dimensional, variable-density subsonic test section was designed and built for the Boeing 4-by-4-foot supersonic wind tunnel in 1965 (see Figure 1).

Compressed air is stored in two 38-foot-diameter spheres with a total capacity of 55,000 cubic feet. Airflow through the tunnel is controlled automatically by an electrohydraulic servo valve that maintains tunnel operating pressures within 1.0 percent of the selected pressure and within 0.5 percent of the mean value during the run. Density is varied by controlling the total pressure. Temperature stabilization, achieved by radiation from a heat sink inside the storage spheres, results in a Reynolds number variation of less than 5 percent during a run.

The subsonic two-dimensional test facility fits within the basic 4-by-4-foot supersonic tunnel working section. It provides a 1-by-3-foot test section. A perforated floor and ceiling may be used for transonic testing.

Blowing boundary layer control (BLC) slots are provided in the tunnel side walls. They are used to prevent formation of vortexes or other three-dimensional disturbances due to separation of the wall boundary layers in the presence of the pressure field created by the airfoil.

Oil flow studies (see Figure 2) indicated wall boundary layer separation only when the translating mechanism was installed. This mechanism required end plates, which could not be flush with the wall, to cover holes through which the airfoil was moved. The disturbances created by the end plates were suppressed by the BLC, as is evident from the figure.

Pitch Oscillating Mechanism

The pitch oscillating mechanism is shown in Figure 3. A flywheel with an eccentrically mounted interchangeable cam drives a crank which is connected to the airfoil by a torsion spring for the tuned system (Figure 4) or by an adapter for direct drive.

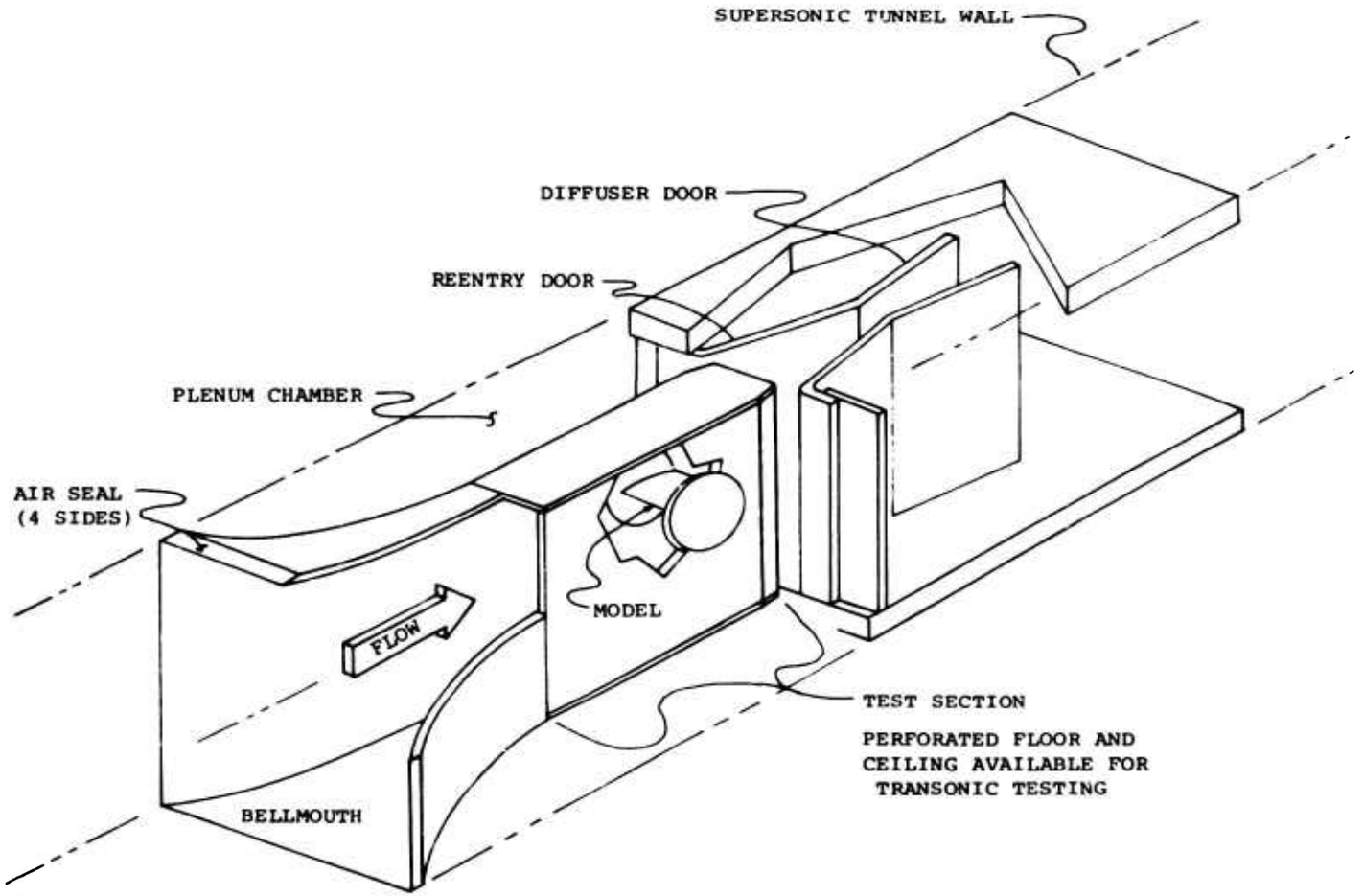
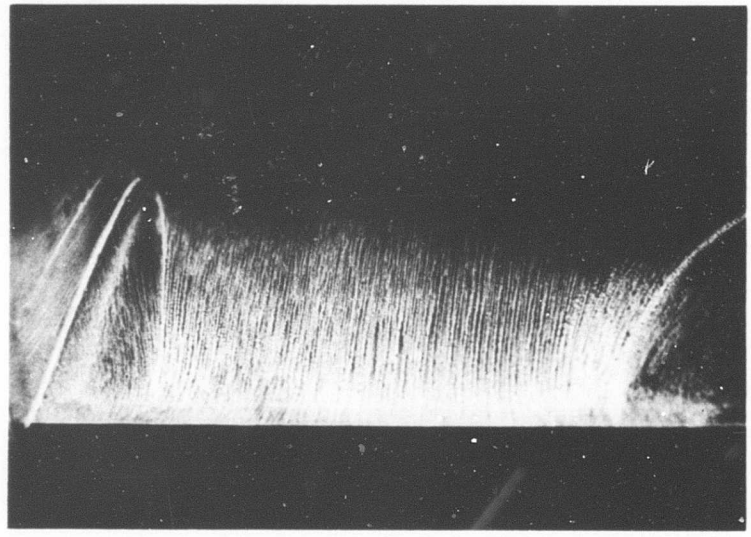
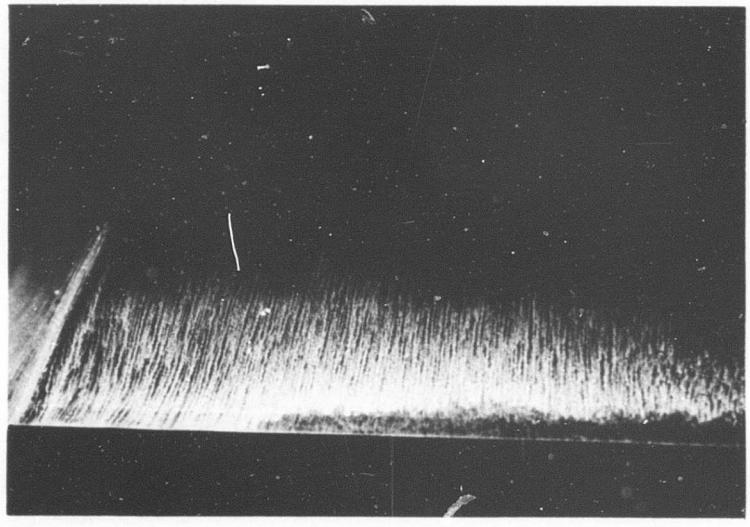


Figure 1. Schematic Drawing of the Variable-Density Test Section Installed in the 4-Foot-Square Boeing Supersonic Wind Tunnel.

NOTES: 1. M = 0.4
2. α = 12.5°
3. P_T = 50 PSI



A) NO BLOWING



B) BLOWING

Figure 2. Effect of Wall Blowing on Flow Separation at Tunnel Wall.

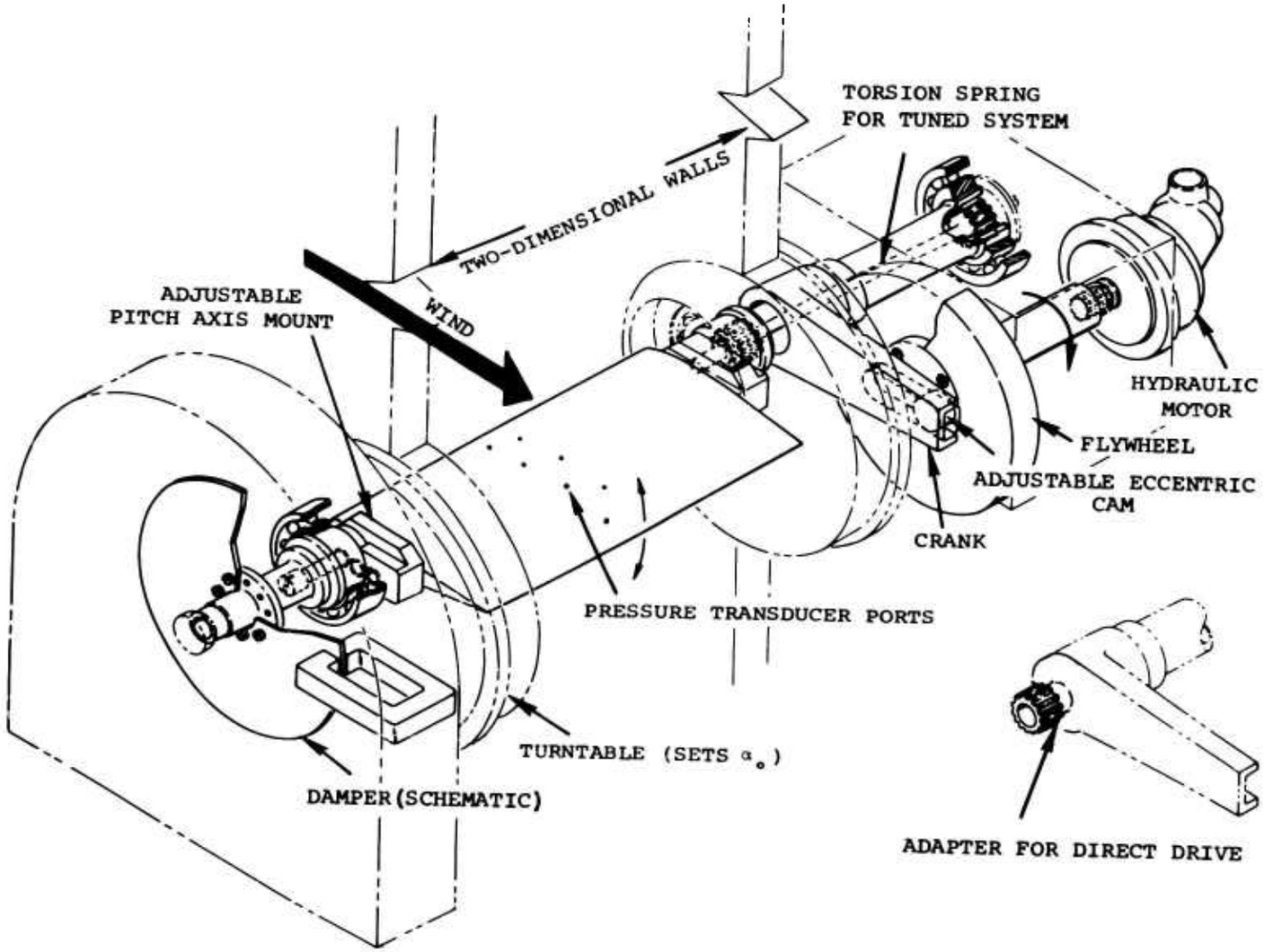


Figure 3. Pitch Oscillating Mechanism.

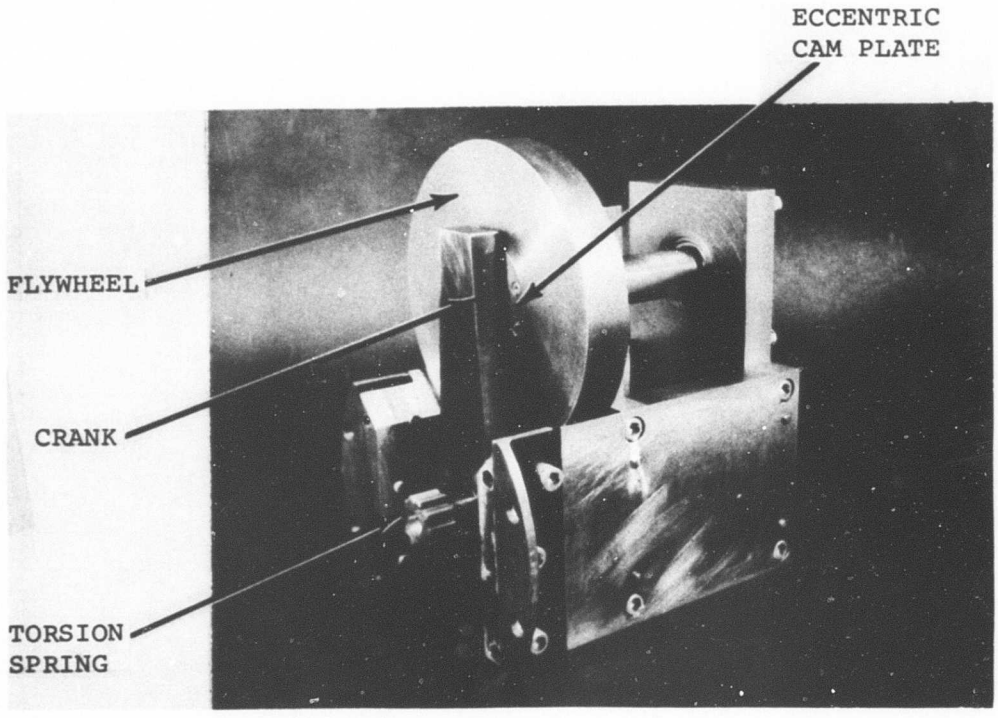


Figure 4. Detail of Flywheel and Crank for Pitch Oscillating Mechanism.

A hydraulic motor supplies drive power to the mechanism. The whole drive system is attached to a turntable, which rotates to provide the desired airfoil mean angle of attack. An eddy-current damper was attached to the airfoil as a safety control during the tuned airfoil tests. The damper was built specifically for this test and provided a maximum of 10 inch-pounds per radian per second damping at the test frequencies (see Figure 5 for damper characteristics). The dc power to the damper was supplied from storage batteries through a liquid rheostat. Full current could be applied very rapidly to the damper to give maximum damping force, if the elastic response exceeded preset limits. Simultaneously, the tunnel and the driving power to the oscillating mechanism would be shut off.

The kinematics of the drive system resulted in small deviations from a sinusoidal variation of pitch angle with flywheel rotation angle. At $\Delta\alpha$ values of 5 degrees or less, the amount of second harmonic motion so introduced was less than 5 percent of the fundamental amplitude. The waveform error is shown in Figure 6.

The mechanical amplification in the direct drive pitch system, caused by elastic deflections and inertial forces, is shown in the same figure. Since actual α values were measured deviations from the kinematic nominal can be accounted for.

Vertical Translating Mechanism

A drawing of the vertical translating mechanism is shown in Figure 7. The eccentrically mounted cams on each flywheel impart sinusoidal motion to the carriages supporting the airfoil. Rails restrict the carriages to vertical motion. By driving the airfoil from both sides, the bending deflections due to inertial forces are minimized. The flywheels are driven by toothed belts from a shaft connected to a hydraulic motor. The drive system is attached to the tunnel turntable, which is rotated to set the mean angle of attack. Airfoil end plates were required with the translating mechanism to cover the vertical slot in the test section walls. The end plates were covered with a Teflon sheet to provide a sliding fit and to seal the slot.

Airfoil Oscillation Frequency Control

The supply line to the hydraulic motor was provided with a coarse and a vernier flow control. By comparing the desired frequency with the airfoil output frequency in the form of a Lissajous figure on an oscilloscope, the vernier control could be adjusted to provide the required airfoil oscillation frequency.

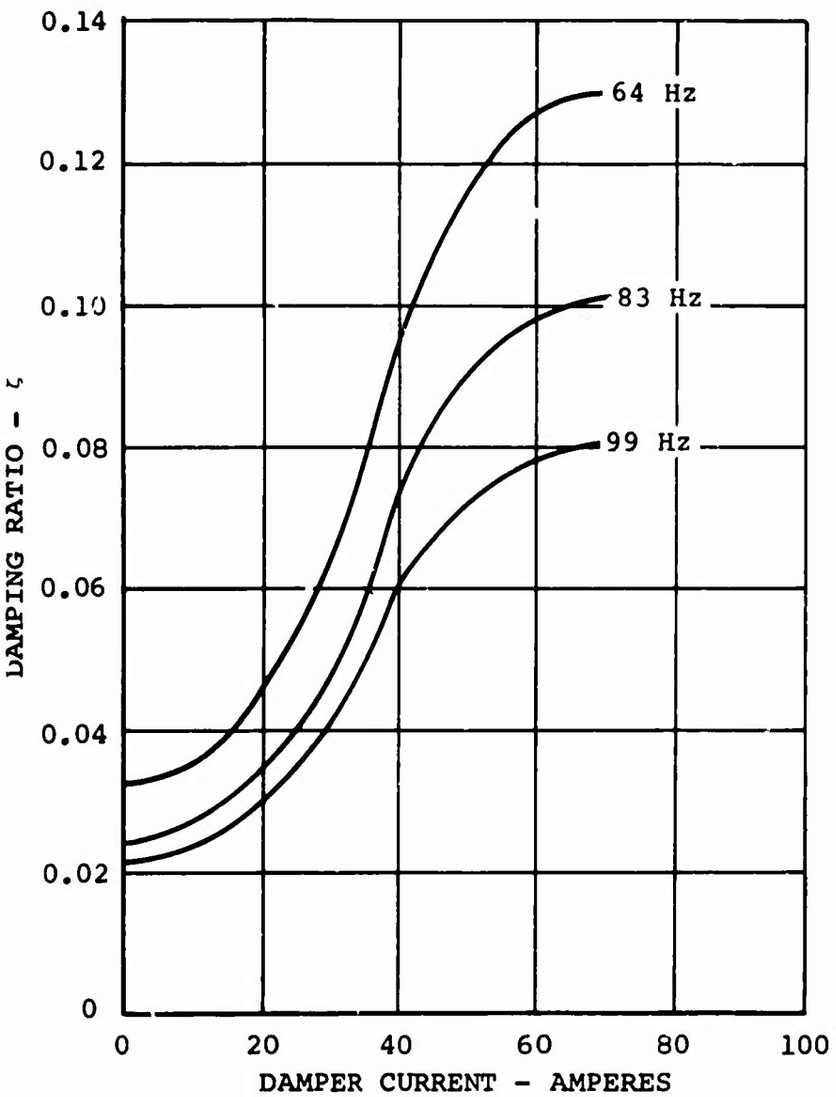
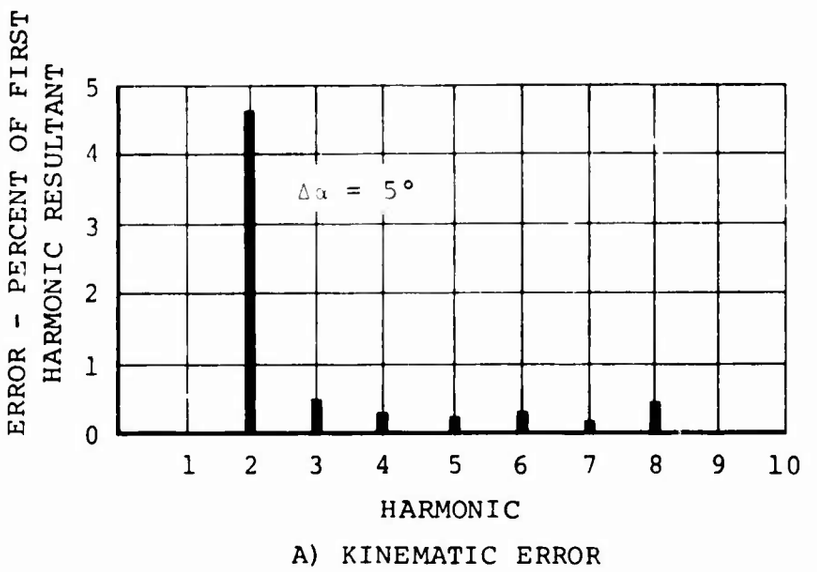
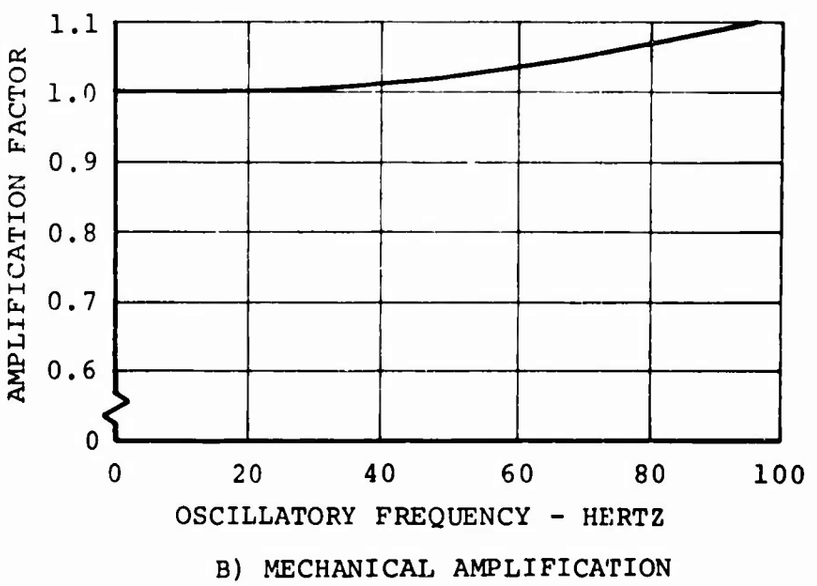


Figure 5. Characteristics of External Damper.



A) KINEMATIC ERROR



B) MECHANICAL AMPLIFICATION

Figure 6. Kinematic Error and Mechanical Amplification of Pitch Oscillating Mechanism.

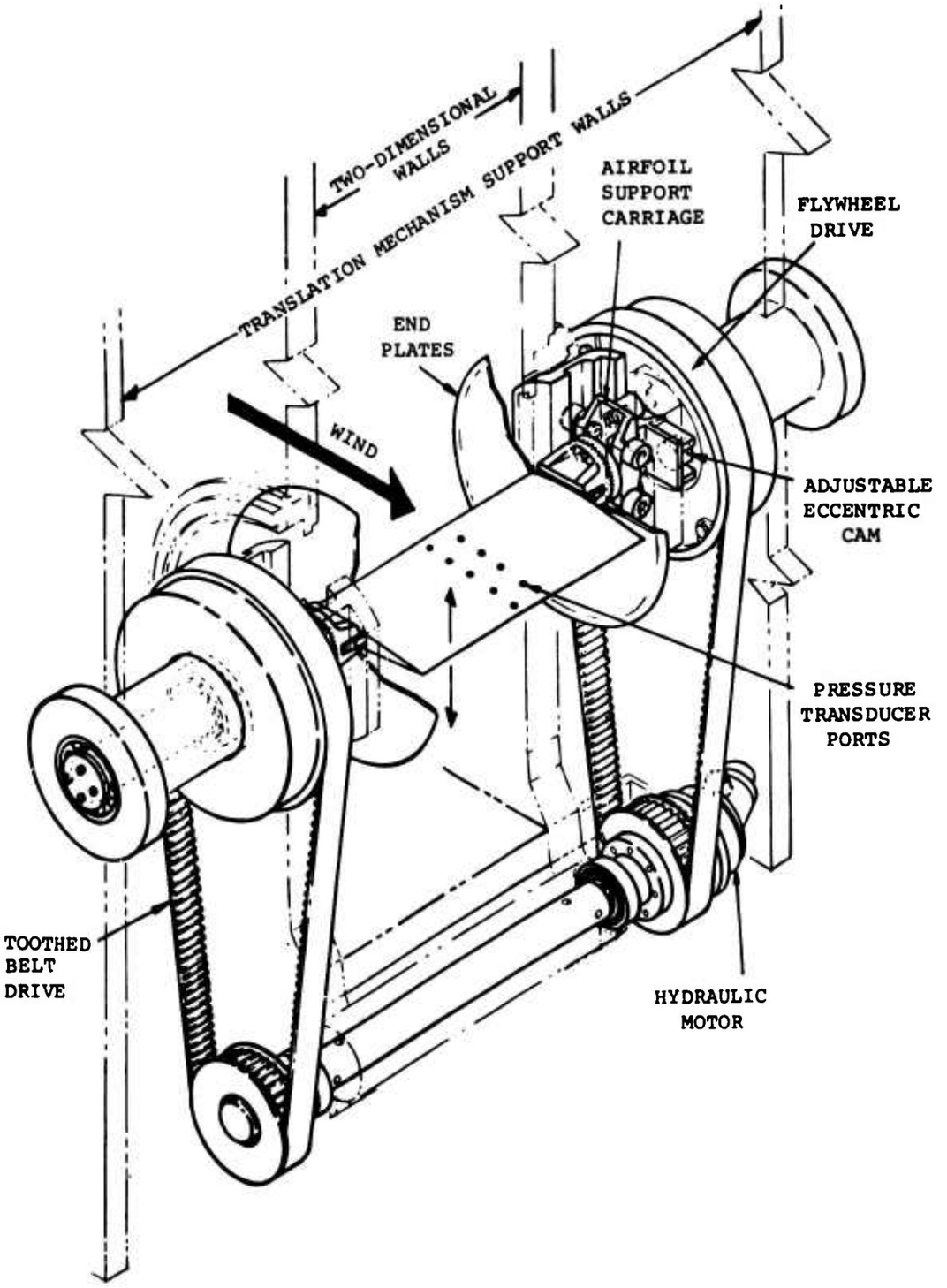


Figure 7. Vertical Translating Mechanism.

MODELS AND INSTRUMENTATION

Test Airfoil Sections

The symmetrical and the cambered airfoil contours and section ordinates are specified in Volume I. The airfoils were constructed of a steel center spar with sheet metal leading and trailing edges. The trailing edge of each airfoil ended in a flat, cusp-like piece of sheet metal.

Figure 8 shows details of the internal construction and the leading-edge transducer mounting ribs. The span of each test airfoil was nominally 12 inches, and the chord was 6.38 inches.

Transducer Installation Details

Fourteen pressure transducers were installed in 16 available pressure ports located at x/c values of 0.010, 0.025, 0.050, 0.100, 0.150, 0.200, 0.250, 0.300, 0.400, 0.500, 0.600, 0.695, 0.800, 0.831, 0.878, and 0.953. The two unused pressure-sensing locations were plugged to prevent leakage from the bottom surface to the top surface. The pressure ports were located within 3 inches of the airfoil centerline.

Surface pressures were transmitted to the transducers through 0.022-inch-i.d. Strip-A-Tubing connected between the transducer and 0.020-inch-i.d. metal tubes mounted flush to the model surface. Transducers were located in three areas: leading edge, body, and trailing edge. A typical installation for leading- and trailing-edge-mounted transducers is shown in Figure 9.

An improved method of mounting the leading- and trailing-edge transducers was adopted for the second phase of the test. This resulted in more efficient installation and removal of the transducers. A typical installation, shown in Figure 9 employed aluminum ribs with a screw-cap location for the transducer, instead of the foam ribs with adhesive location.

Transducer Static Characteristics

The pressure transducers in the airfoil were manufactured by Schaevitz-Bytrex and Scientific Advances. Each unit was temperature compensated.

Static Calibration

Each transducer was statically calibrated for linearity and hysteresis before installation. A typical calibration curve is shown in Figure 10, and the results are summarized in Figures 11 and 12.

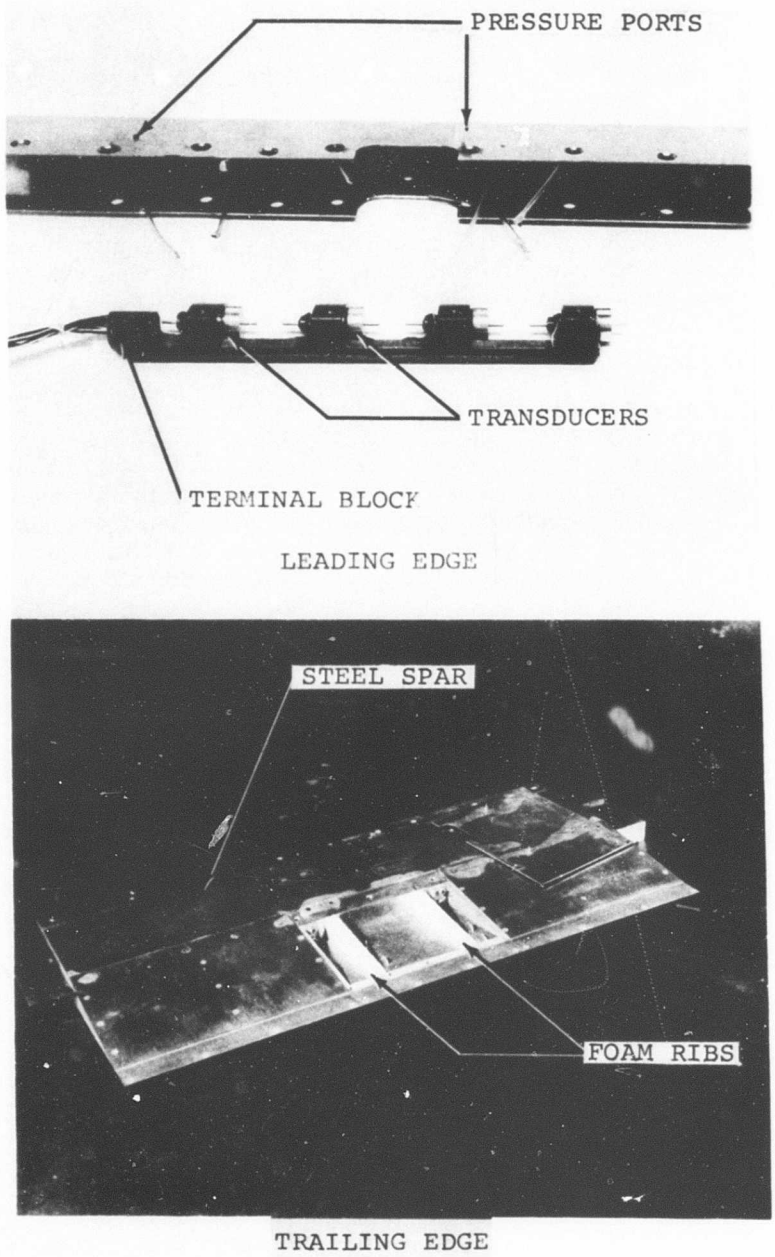
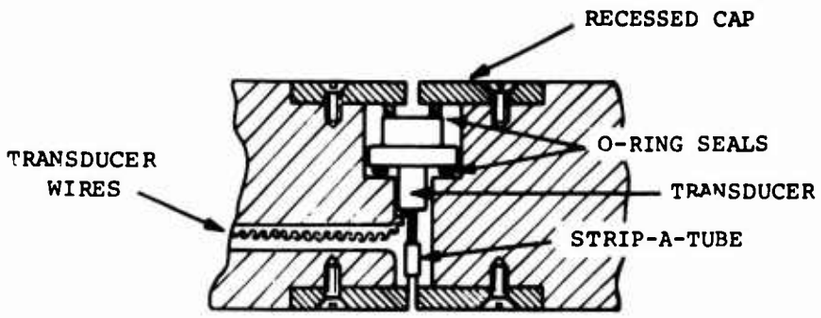
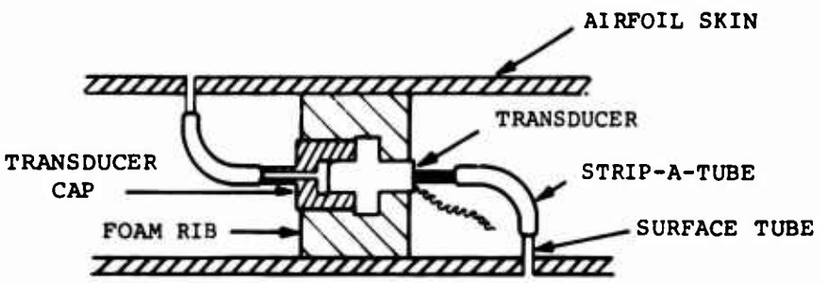


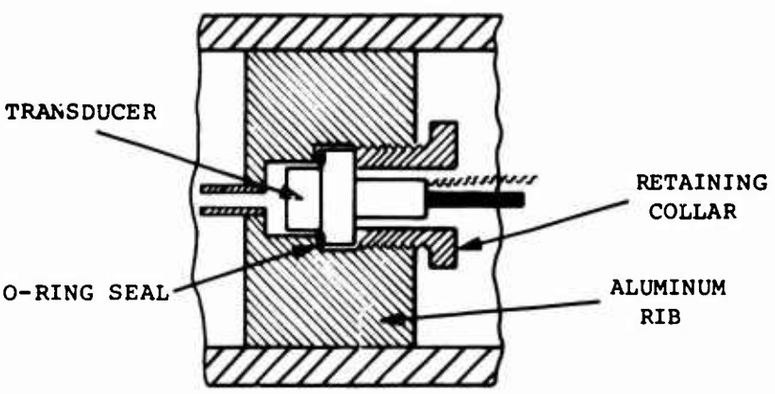
Figure 8. Details of Leading- and Trailing-Edge Construction of Test Airfoil.



A) BODY-MOUNTED TRANSDUCER INSTALLATION

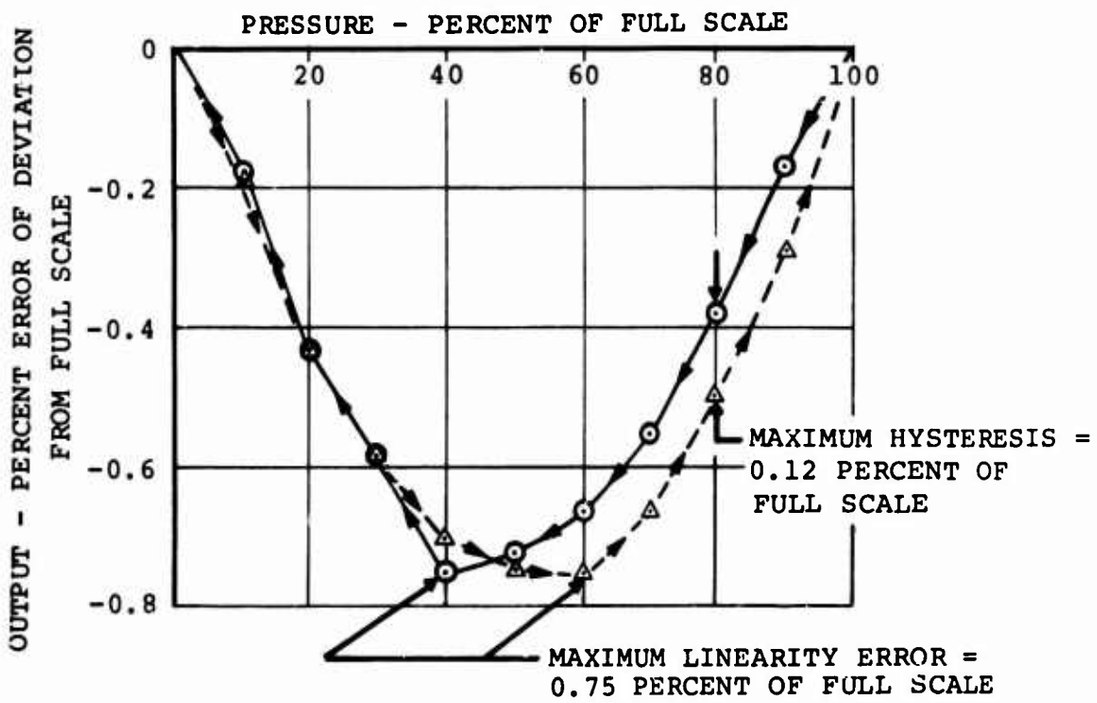


B) LEADING- AND TRAILING-EDGE TRANSDUCER INSTALLATION



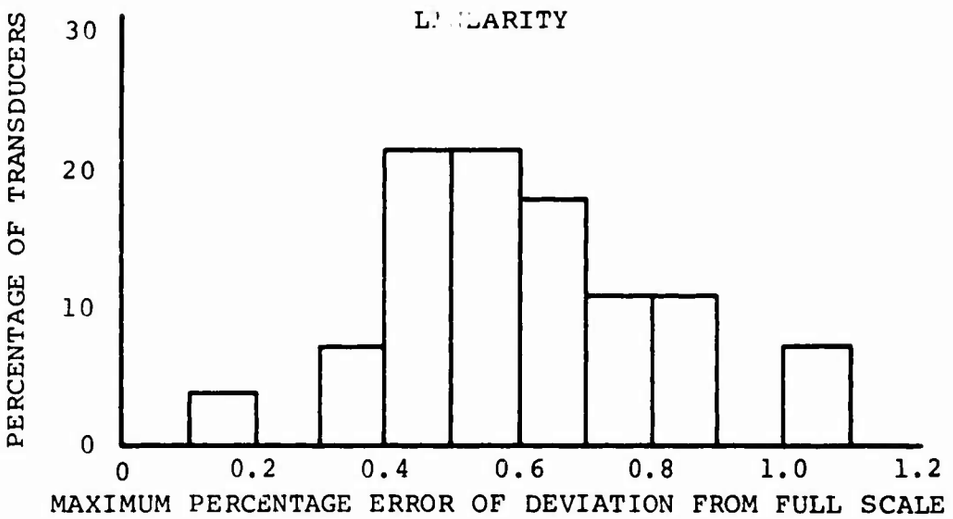
C) IMPROVED LEADING- AND TRAILING-EDGE TRANSDUCER INSTALLATION

Figure 9. Details of Pressure Transducer Installation.



NOTES: 1. SCHAEVITZ-BYTREX HFD-25 NO. 12306
2. CALIBRATION ON FRONT SIDE
3. EXCITATION VOLTS = 25

Figure 10. Typical Transducer Calibration Curve.



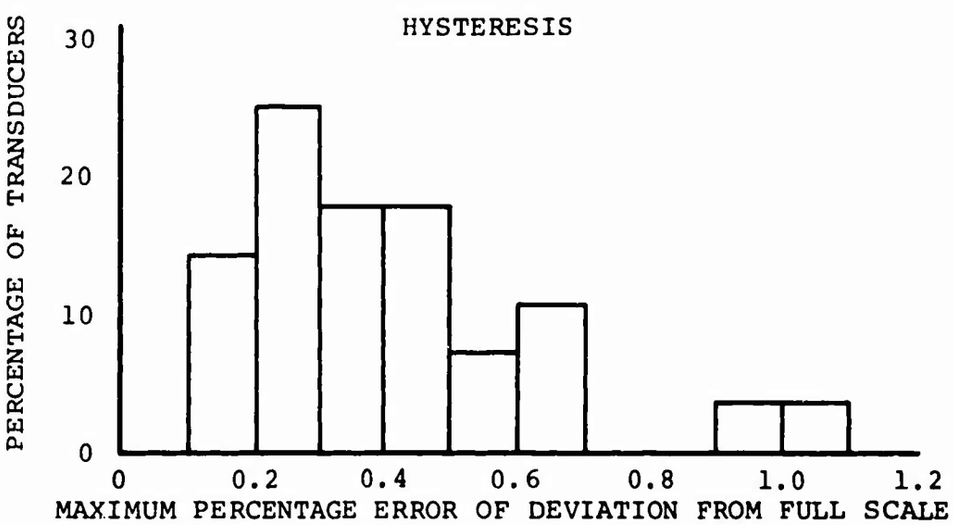
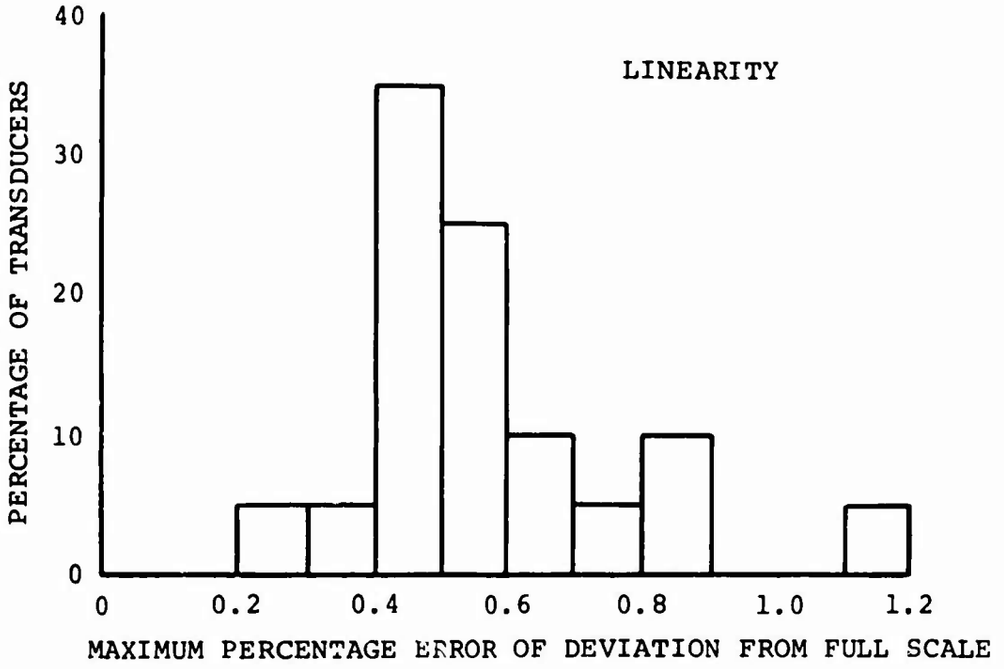


Figure 11. Summary of Transducer Calibration Data - Pressure Side.



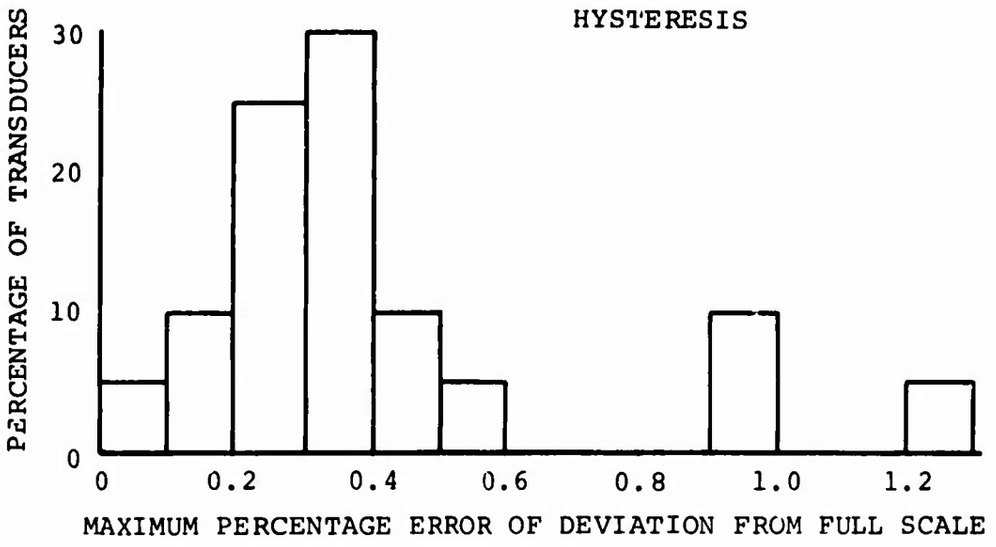


Figure 12. Summary of Transducer Calibration Data - Reference Side.

Transducer Dynamic Characteristics

The dynamic response of typical transducer installations was evaluated before the transducers were installed in the airfoil.

The following factors were investigated for their effects on the transducer installation:

1. Different lengths of Strip-A-Tubing between the pressure port and the transducer

2. Right-angle bends in the metal tubes leading from the pressure ports

A pressure step function input was applied to the transducer to evaluate its frequency response. Typical response curves are shown in Figure 13. For all transducer installations, the frequency response was at least 1030 Hertz with a damping ratio of approximately 0.45.

The frequency response of the transducer diaphragm is far too high to be measured by this technique. It is the pressure tubing and its terminating volume that limit the frequency response of the total system.

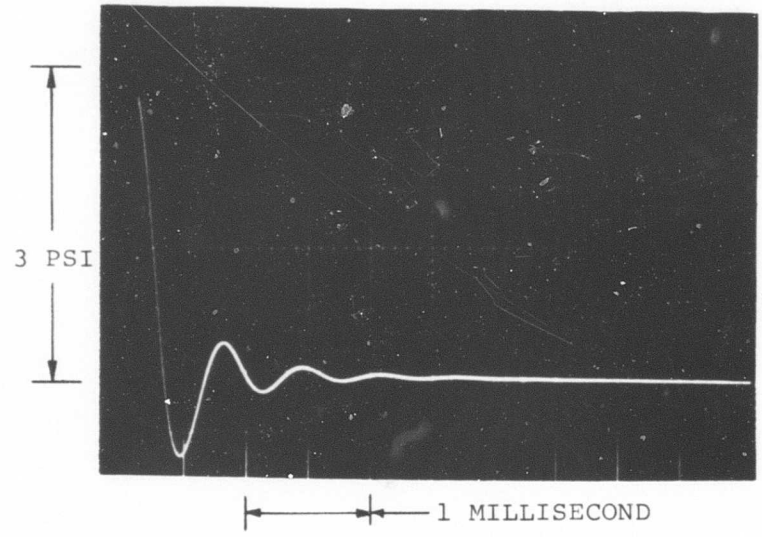
DATA RECORDING SYSTEM

The data recording system is shown in Figure 14. Data recording was controlled automatically during test runs through the tunnel operating console. The sequence of events during a typical test run is shown in Figure 15. The data recording system equipment consisted of the following:

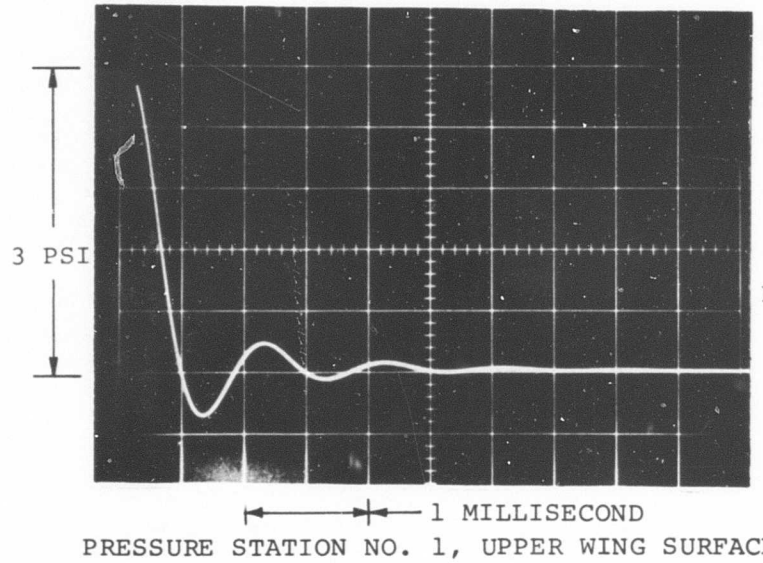
1. Amplifiers - Each channel of information was fed to Preston Model 8300 amplifiers with 2-pole critically damped filters set to 1000-Hertz cutoff frequency.

2. Tape recorders - An Ampex Model FR200 and a Sangamo Model 4784 14-channel, wideband, FM tape recorder were used to record the data. A time code was generated on one channel of each recorder to provide tape synchronization during data reduction. Tape playback was available on the Sangamo model to allow checks to be made on the recorded data quality of each tape immediately after each run.

3. Oscillographs - In addition to the data stored on tape, simultaneous oscillograph records of all parameters were provided for on-line data monitoring.



PRESSURE STATION NO. 1, LOWER WING SURFACE



PRESSURE STATION NO. 1, UPPER WING SURFACE

PRESSURE CONNECTED THROUGH
A 0.75-INCH LENGTH OF
0.022-INCH PLASTIC TUBE

Figure 13. Dynamic Response of Installed Pressure Transducer.

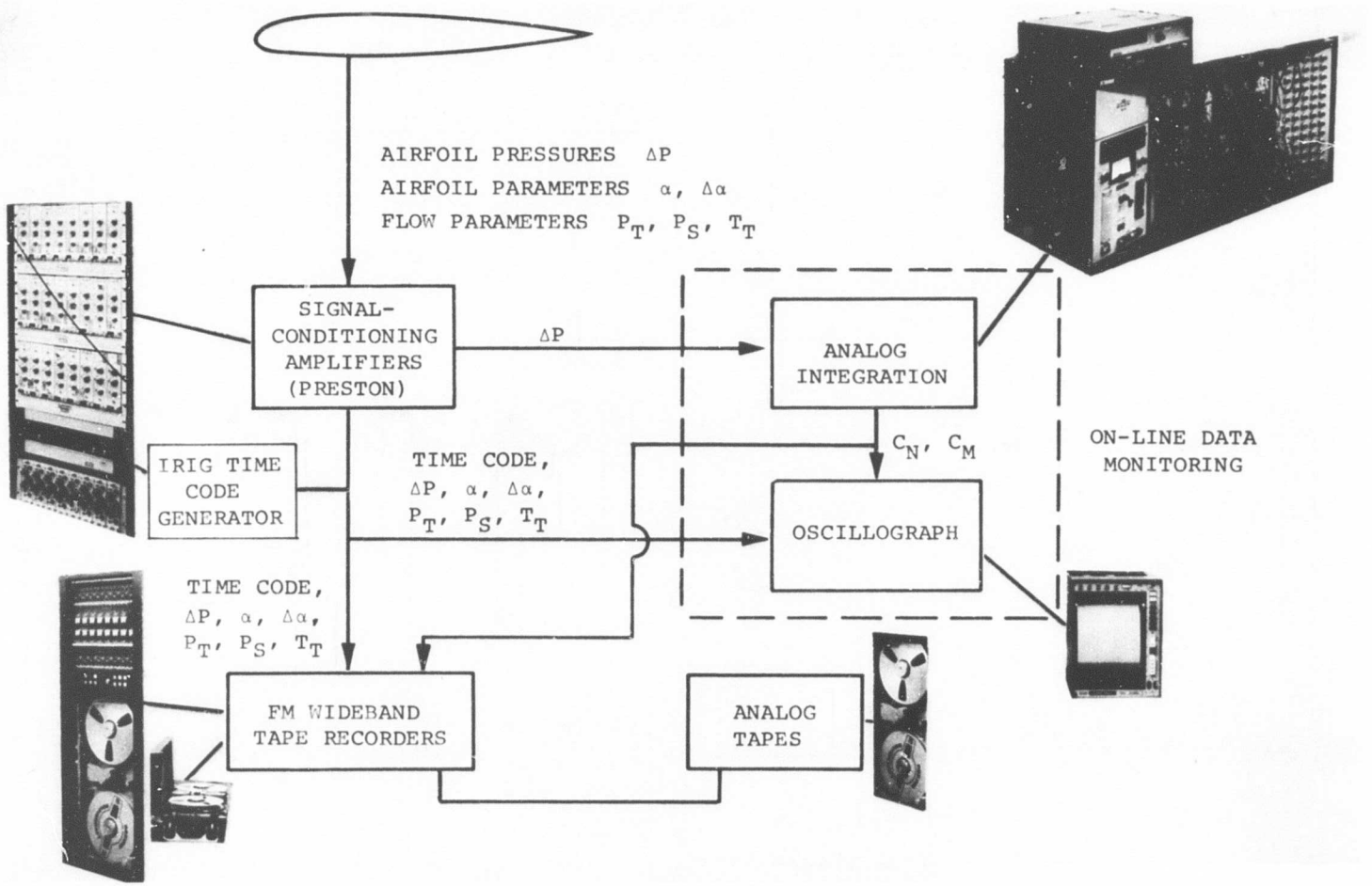


Figure 14. Data Recording System.

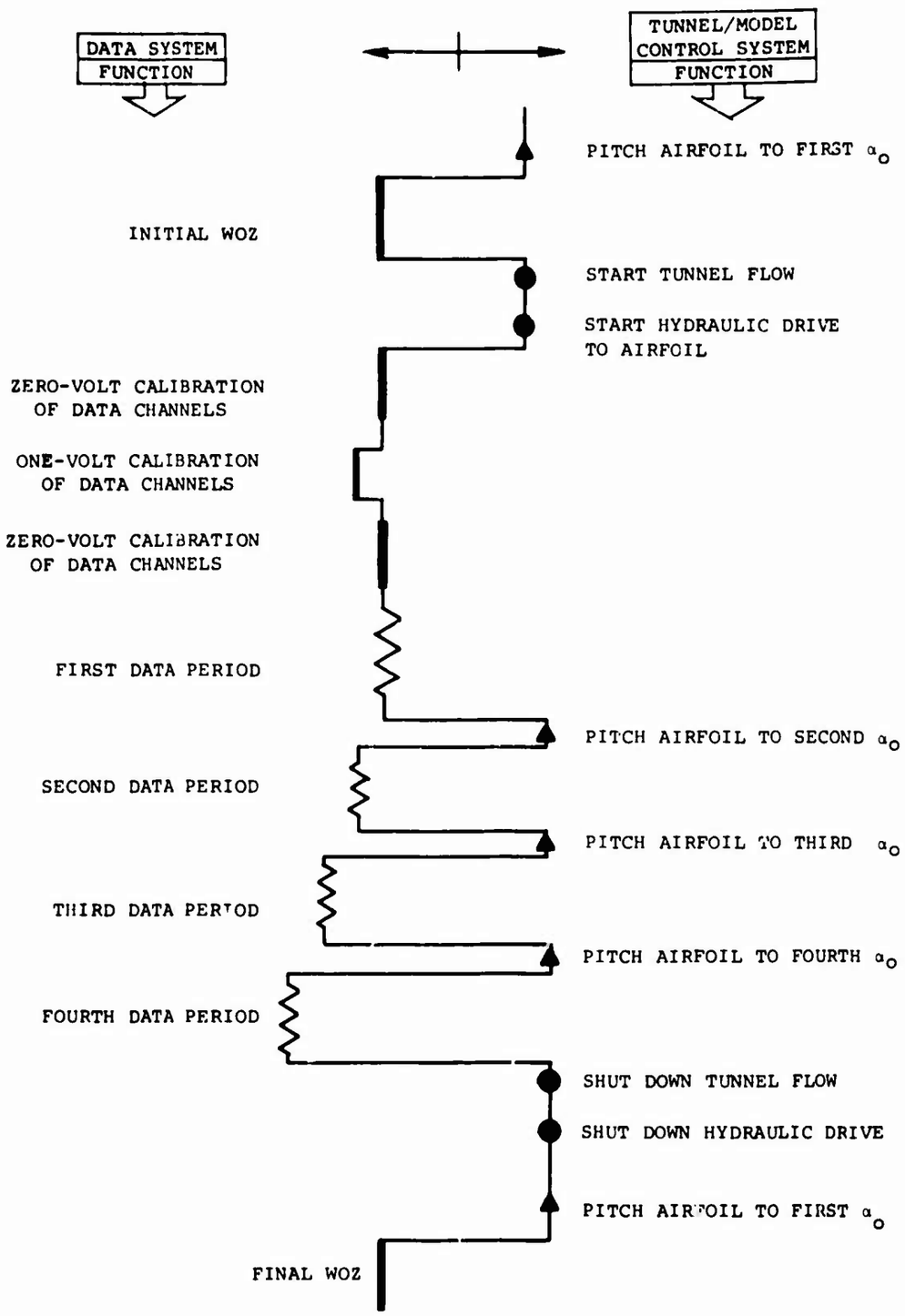


Figure 15. Data Recording Sequence.

4. Analog computer - A Pace analog computer was used on line to provide instantaneous integration of airfoil differential pressures to obtain C_N and C_M. These outputs were recorded on both magnetic tape and oscillograph records. Comparisons of analog integrated data and digital data will be discussed later.

Table I shows the parameters recorded on both magnetic tape and oscillograph paper.

TABLE I. MAGNETIC TAPE AND OSCILLOGRAPH RECORDINGS

Tape Recorder 1 Oscillograph 1		Tape Recorder 2 Oscillograph 2	
Channel	Component	Channel	Component
1	IRIG B time code	1	IRIG B time code
2	1/rev signal	2	1/rev signal
3	ΔP_1	3	ΔP_2
4	ΔP_3	4	ΔP_4
5	ΔP_5	5	ΔP_6
6	ΔP_7	6	ΔP_8
7	ΔP_9	7	ΔP_{10}
8	ΔP_{11}	8	ΔP_{12}
9	ΔP_{13}	9	ΔP_{14}
10	α_o	10	T_T
11	$\Delta\alpha / \Delta h$	11	P_T
12	C_N	12	P_S
13	C_M	13	-
14	-	14	-

DATA REDUCTION AND PLOTTING SYSTEM

Final data reduction and automatic plotting were conducted at the contractor's Vertol Division. A selection of the standard computer programs used by the flight test department for reducing data for flight programs such as that conducted by Pruyn* was adapted for use with the wind tunnel data. The computational details of these programs are adequately documented in the foregoing reference and will be omitted here except for specific changes. A new digital analysis program (M-56) was written to compute and list the aerodynamic output data in the format used in Volume II of this report. This program also produces a final digital data tape, from which data can be selected for automatic plotting.

The off-line system processing sequence is shown in Figure 16. The data were processed in two distinct phases:

1. Analog-to-digital conversion

2. Digital data processing

DIGITIZING

The analog tapes which contained chordwise pressure data and wind tunnel operating condition information were digitized at the contractor's flight test facility ground station, shown in Figure 17. The tapes were played back into the digitizing system by using an Ampex FR-100C tape drive at a tape playback speed of one-eighth of the recording speed of 60 inches per second. This enabled the system to read at least 36 data points for each airfoil oscillation cycle.

The digitizing system consists of a CDC 3100 computer and an analog-to-digital converter operating under the control of program F-02 through punched card inputs. The cards supply wind tunnel test condition and instrumentation information. Suitable areas for digitizing were selected by scanning and editing from the oscillograph records, which were obtained simultaneously with the magnetic tapes. Each set of digital

*Pruyn, Richard R., IN-FLIGHT MEASUREMENT OF ROTOR BLADE AIRLOADS, BENDING MOMENTS, AND MOTIONS, TOGETHER WITH ROTOR SHAFT LOADS AND FUSELAGE VIBRATION, ON A TANDEM ROTOR HELICOPTER, VOLUME III, DATA PROCESSING AND ANALYSIS SYSTEM, The Boeing Company, USAAVLABS Technical Report 67-9C, U.S. Army Aviation Materiel Laboratories, Fort Eustis, Virginia, November 1967.

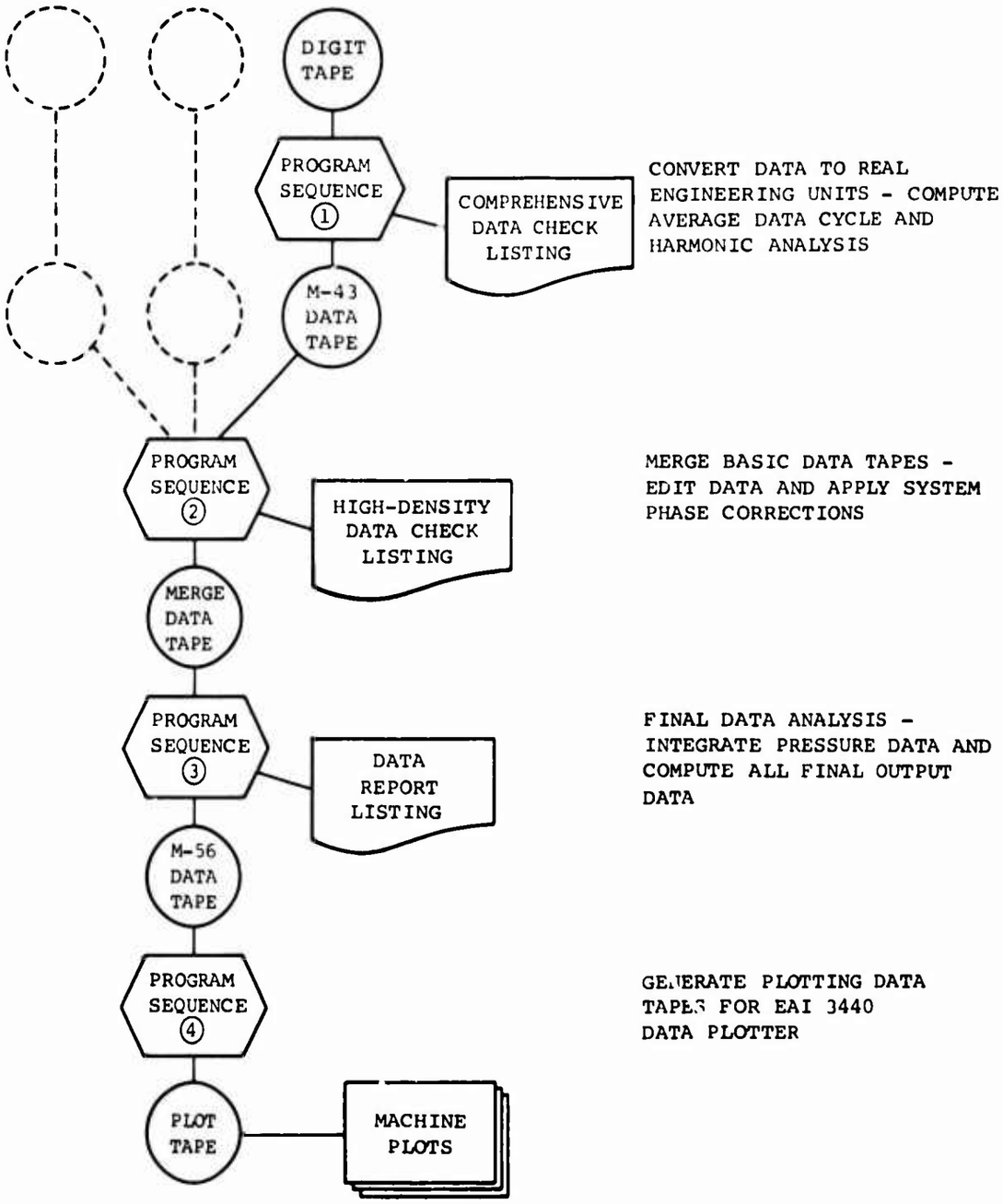


Figure 16. Digital Data Processing Flow Path.



Figure 17. Vertol Flight Test Ground Station Analog-to-Digital Converter System.

data on the output tapes contained information fed from the card input, followed by calibrations and test data. To correct for zero drift, a final wind-off zero data point was taken immediately after each tunnel run. For the oscillatory data, five to ten consecutive cycles of data were digitized for each test condition. The calibration data were an average of five samples.

DATA REDUCTION

All data reduction programs used a standard format for storing data on the input and output tapes. This format consisted of a header with run and instrumentation identification information followed by data; thus, each set of data was complete in itself. This allowed the combination of several programs in order to operate on the data in sequence or separately, as necessary, which simplified editing and checking. Because of the large quantity of data (over 750 data points in all), the data were processed in four stages with a check on data validity and quality at the end of each stage. In each stage of data reduction, up to four programs were used sequentially. A summary of the operations in each program of a sequence is presented in the following paragraphs.

Stage 1 Data Reduction: Calibration, Averaging, and Harmonic Analysis

Figure 18 shows the sequencing of programs during this stage of data reduction. Program M-40, the Primary Loads Calibration Program, converts the data from digitized analog voltage values to engineering units by using the card input information. The data are referenced to the zero level at the beginning of a data run. Since this zero does not include the drift due to temperature change, a correction was applied later. Each group of data cycles was then averaged by using Program M-31, the Data Averaging Program. This average cycle was the arithmetic mean of the cycles processed.

The averaged ordinates of every parameter were harmonically analyzed in Program M-43, the Harmonic Analysis Program. The sine and cosine coefficients, as well as the resultant and the phase lead terms, were obtained by a truncated Fourier series analysis, up to the ninth harmonic in most cases.

The data at this stage were in harmonic coefficient form in real engineering units. An output tape was saved for Stage 2 data processing, and a check listing was produced by using Program M-44, the Generalized Listing Program.

The data were checked for digitized calibration values, analog-to-digital converter band-edge limits, and sampling consistency; in addition, all input card data were checked for errors.

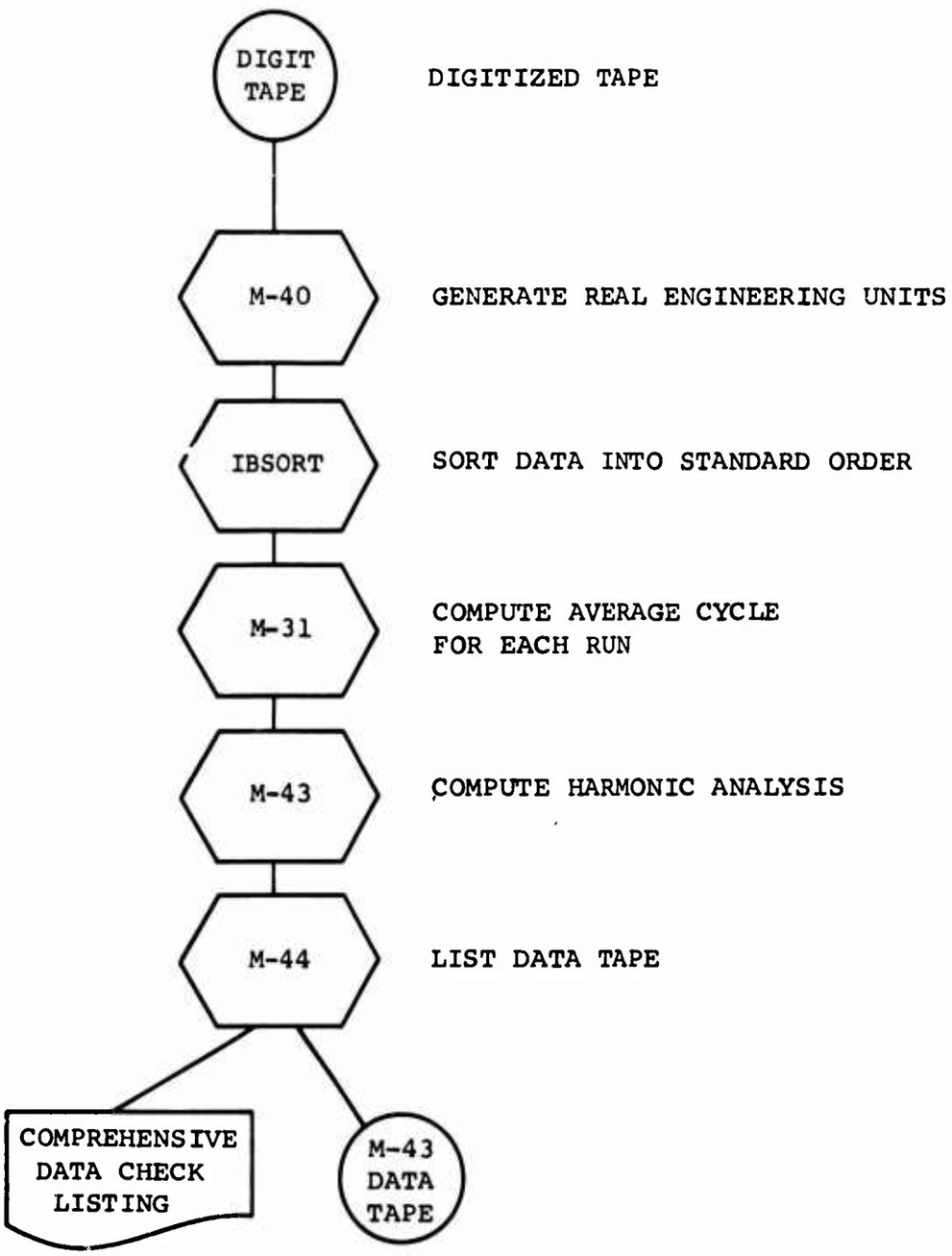


Figure 18. Stage 1 Data Reduction Sequence.

Stage 2 Data Reduction: Merging and Data Corrections

The Stage 2 data reduction program run sequence is shown in Figure 19. The complementary data from each of the two tapes were merged into a complete set at this point by using IBSORT, the IBM sort program. The data from as many as eight digital tapes were combined at one time. In addition, the merged data were further combined by the same process to produce large blocks of data. This simplified the final data integration in Stage 3 and greatly reduced the number of individual jobs on the computer.

Program M-05, the Select and Edit Program, was used next to eliminate defective pressure gage data and to correct input errors found from Stage 1 listings. In addition, the data were corrected for the phase deviation between the 1/rev signal and the $\alpha = \alpha_o$ reference point.

The outputs from Stage 2 data reduction consisted of a digital tape containing merged and corrected data and a high-density listing from Program M-44 which contained data information sufficient for a final check before integration.

Stage 3 Data Reduction: Integration and Final Data Analysis

All final integrations for C_N, C_M, and ΔW, as well as calculation of the test parameter values such as the dynamic pressure, Reynolds number, frequency, etc. (see typical listing in Volume II), were performed in the M-56 Oscillating Airfoil Data Reduction Program. The Stage 3 data reduction sequence is shown in Figure 20. The following formulas were used to integrate C_N, C_M, and damping parameters. In the case of the ΔW parameter (called damping in the data listings in this report), a different equation is given for the pitching and translating equations.

$$C_N(0) = \sum_{m=o}^{M^*} \left\{ \frac{[\Delta C_p(\theta)]_{m+1} + [\Delta C_p(\theta)]_m}{2} \left[\left(\frac{x}{c}\right)_{m+1} - \left(\frac{x}{c}\right)_m \right] \right\} \qquad (1)$$

where m = 1, 2, 3.....M*.

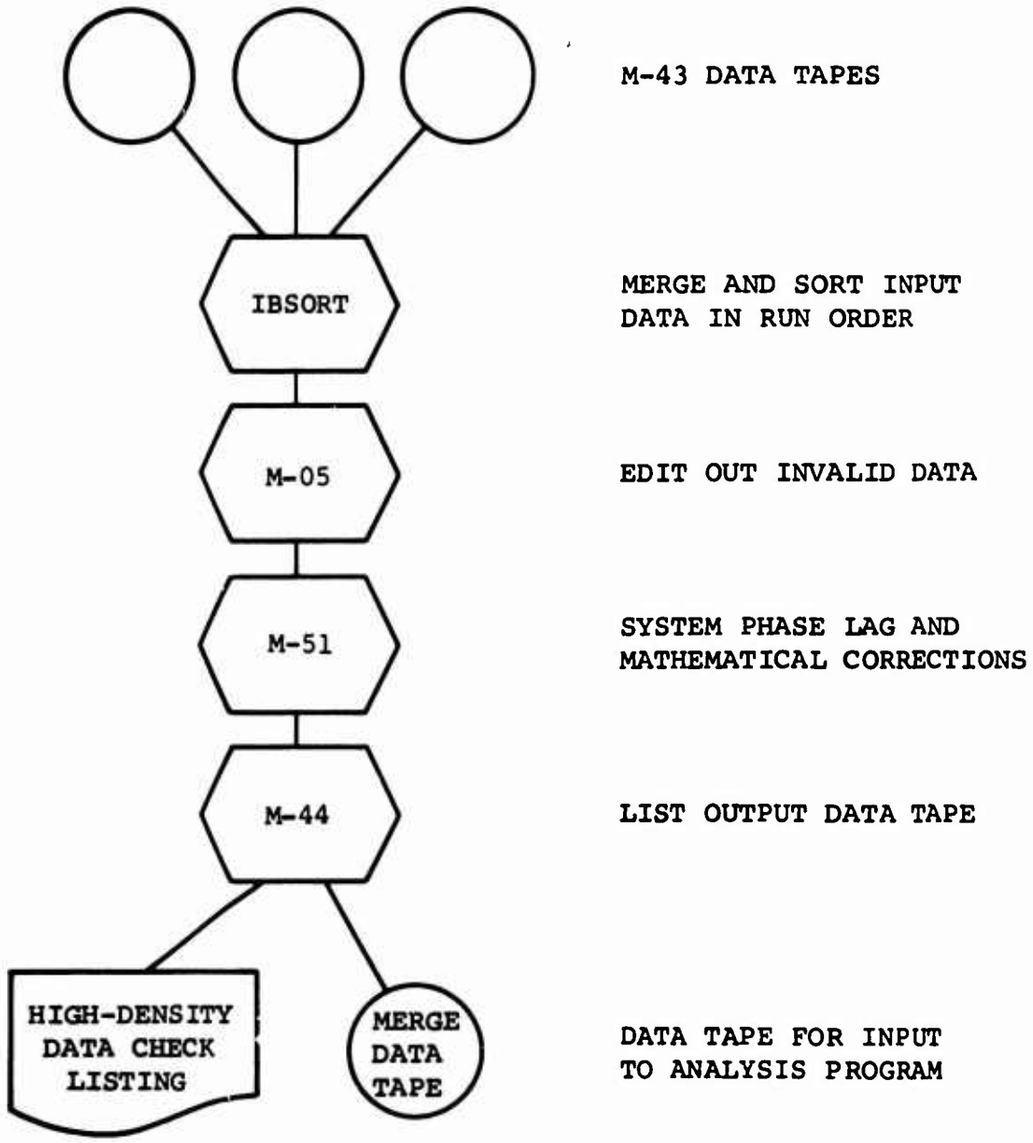


Figure 19. Stage 2 Data Reduction Sequence.

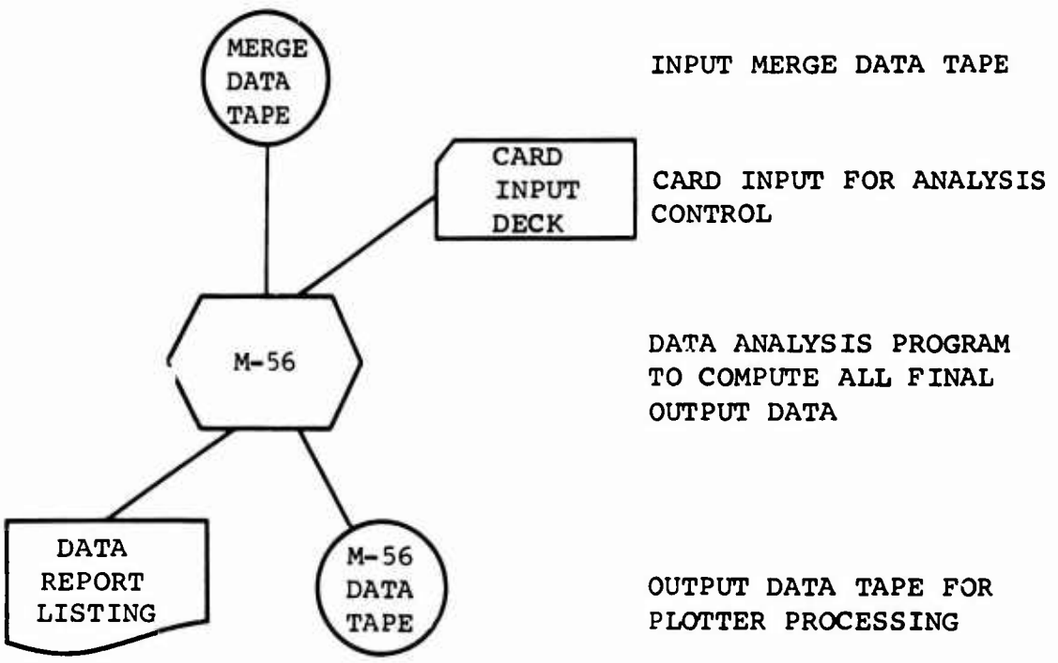


Figure 20. Stage 3 Data Reduction Sequence.

$$C_M(\Theta) = \sum_{m=1}^{M^*} \left\{ \frac{[\Delta C_p(\Theta)]_{\overline{m+1}} \left[\left(\frac{x_o}{c}\right) - \left(\frac{x}{c}\right)_{\overline{m+1}} \right]}{2} + \frac{[\Delta C_p(\Theta)]_m \left[\left(\frac{x_o}{c}\right) - \left(\frac{x}{c}\right)_m \right]}{2} \right\} \left[\left(\frac{x}{c}\right)_{\overline{m+1}} - \left(\frac{x}{c}\right)_m \right] \quad (2)$$

where $\left(\frac{x}{c}\right)_o = 0.0$

$[\Delta C_p(\Theta)]_o = 0.0$

} leading-edge boundary condition

$\left(\frac{x}{c}\right)_{\overline{M+1}} = 1.0$

$[\Delta C_p(\Theta)]_{\overline{M+1}} = 0.0$

} trailing-edge boundary condition

$$\Delta W_\alpha = \frac{180}{2\pi^3 f(\Delta\alpha)^2} \oint C_M d\alpha \quad (3)$$

Using the harmonic sine and cosine coefficients of C_M and α, an exact integral technique has been used to derive the expression

$$\Delta W_\alpha = \frac{180}{2\pi^2 f(\Delta\alpha)^2} \sum_{n=1}^{N^*} [n(E_n H_n - F_n G_n)] \quad (4)$$

$$\Delta W_h = \frac{1}{2\pi^2 f(\Delta h)^2} \oint C_N dh \quad (5)$$

$$\Delta W_h = \frac{1}{2\pi^2 f(\Delta h)^2} \sum_{n=1}^{N^*} [n(A_n D_n - B_n C_n)] \quad (6)$$

where n = 1, 2, 3.....N*.

In addition to the average cycle work function, the instantaneous work function is used in Appendix IV of Volume I. This function is defined as follows:

1. For pitching,

$$\delta W_{\alpha}(\theta) = \frac{1}{2\pi^2 f(\Delta\alpha)^2} C_M(\theta) \frac{d\alpha}{dt}(\theta) \quad (7)$$

or

$$\delta W_{\alpha}(\theta) = \frac{C_M(\theta)\,180}{\pi^2(\Delta\alpha)^2} \sum_{n=1}^{N^*} [n(H_n \cos n\theta - G_n \sin n\theta)] \quad (8)$$

2. For translation,

$$\delta W_h(\theta) = \frac{C_N(\theta)}{\pi(\Delta h)^2} \sum_{n=1}^{N^*} [n(D_n \cos n\theta - C_n \sin n\theta)] \quad (9)$$

The drift corrections from the Stage 1 listing are input data to the M-56 Program and are incorporated internally. The output from this program consisted of data listings of the sort given in this report, together with a digital data tape which could be used by the automatic plotting programs.

Stage 4 Data Reduction: Automatic Plotting

The two alternate program sequence paths for automatic data plotting are shown in Figure 21. The parameters and test points to be plotted were selected using the M-05 Program. A plotter tape was then produced with either the M-59 or the M-46 Plotting Program. The former operated on the data to produce plots of two harmonically reconstituted data, such as C_N or C_M against α or h, while the latter produced plotter tapes for time history and chordwise pressure distribution plots.

An EAI 3440 data plotter was used to plot both line and data point plots. The scales and the test parameter values were printed on prepared graph paper.

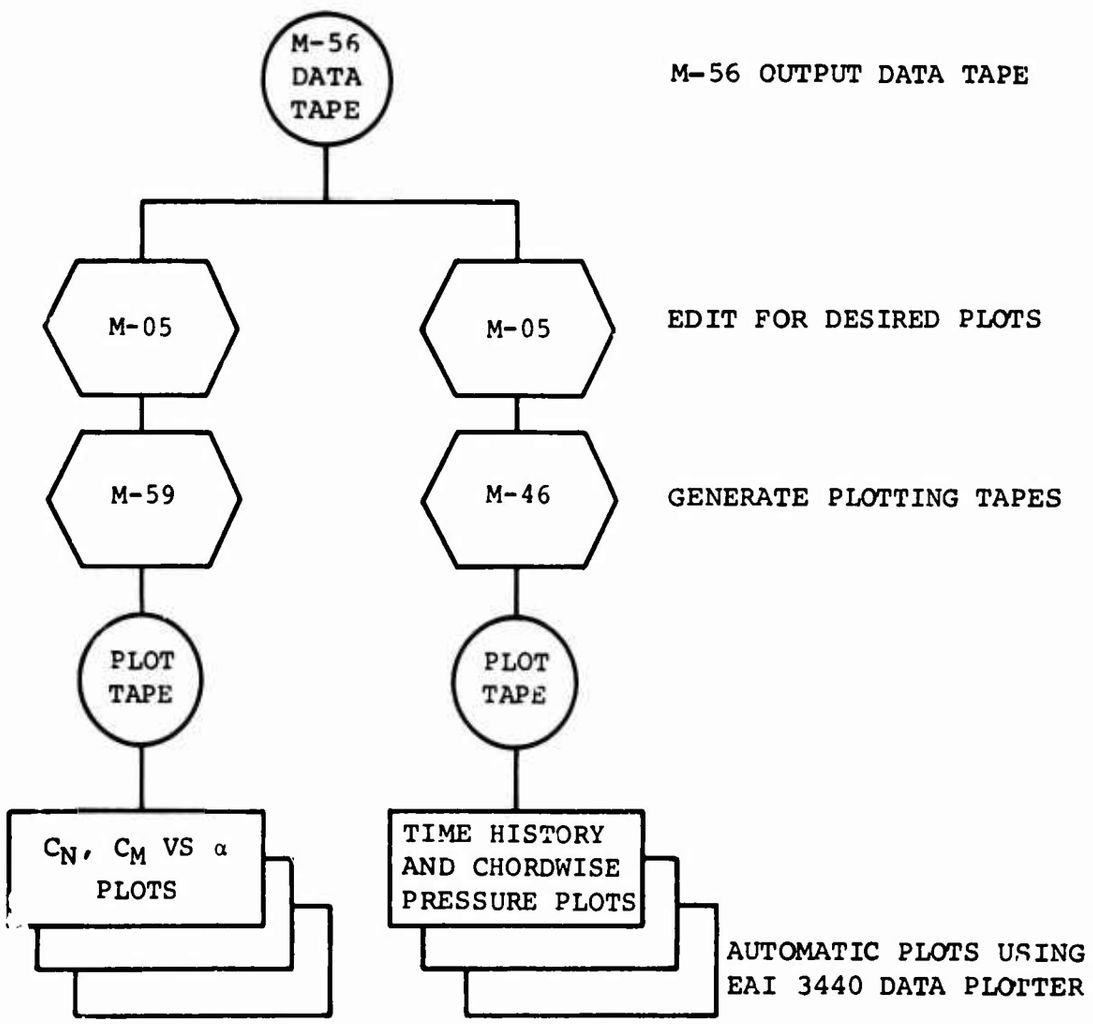


Figure 21. Stage 4 Data Reduction Sequence.

INDEX TO COMPUTER DATA

The test conditions and airfoil type are identified at the head of each set of data. Tables II through X refer these factors to the page on which the data appear. Numbers of pages containing two sets of data are followed by the letter L or R, indicating whether the data are on the left or right side of the page.

The values defining the test conditions in the tables are nominal; exact values are given in the data listings.

TABLE II. STATIC AIRFOIL DATA

Airfoil	Mach No.	R X 10^{-6}	Page
NACA 0012 (Modified) Airfoil	0.2	2.6	45
	0.4	4.8	45
	0.6	6.2	46
Vertol 23010-1.58 Airfoil	0.2	2.6	47
	0.4	4.8	47
	0.6	6.2	48
Vertol 23010-1.58 Airfoil (Reflex trailing edge)	0.4	4.8	49

TABLE III. FORCED PITCH OSCILLATION FOR THE NACA 0012 (MODIFIED) AIRFOIL

Δα (deg)	f (Hz)	Mach No.	α (degrees) 0	5	7.5	10	12.5	15	17.5	20	25	K	R X 10^{-6}
			Page Number and Location of Computer Data										
2.5	16	0.2	-	-	-	50L	50R	51L	-	-	-	0.12	2.6
		0.4	-	-	-	51R	52L	52R	-	-	-	0.06	4.8
		0.6	-	53L	53R	54	-	-	-	-	-	0.04	6.2
	32	0.2	-	-	-	55L	55R	56L	-	-	-	0.24	2.6
		0.4	-	-	-	56R	57L	57R	-	-	-	0.12	4.8
		0.6	-	58L	58R	59	-	-	-	-	-	0.08	6.2
	48	0.4	-	-	-	60L	60R	61L	-	-	-	0.18	4.8
		0.6	-	61R	62L	62R	-	-	-	-	-	0.12	6.2
	64	0.4	-	-	-	63L	63R	63L	-	-	-	0.24	4.8
		0.6	-	64R	65L	65R	-	-	-	-	-	0.16	6.2
	80	0.4	-	-	-	66L	66R	67L	-	-	-	0.30	4.8
		0.6	-	67R	-	68	-	-	-	-	-	0.20	6.2
	96	0.2	-	-	-	69L	[illegible]R	70L	-	-	-	0.72	2.6
		0.4	-	-	-	70R	[illegible]	71R	-	-	-	0.36	4.8
		0.6	-	72L	72R	73	-	-	-	-	-	0.24	6.2
5	16	0.2	-	74L	74R	75L	75R	76L	76R	-	77L	0.12	2.6
		0.4	-	-	-	77R	78L	78R	79L	-	79R	0.06	4.8
		0.6	-	80L	80R	81L	-	81R	82L	-	82R	0.04	6.2
	32	0.2	-	83L	83R	84L	84R	85L	85R	-	86L	0.24	2.6
		0.4	-	-	-	86R	87L	87R	88L	-	88R	0.12	4.8
		0.6	-	89L	89R	90L	-	90R	91L	-	91R	0.08	6.2
	48	0.2	-	-	-	-	-	92L	92R	-	93	0.36	2.6
		0.4	-	-	-	94L	94R	95L	95R	-	96L	0.18	4.8
		0.6	-	96R	97L	97R	-	-	-	-	-	0.12	6.2
	64	0.2	-	-	-	-	-	98L	98R	-	99	0.48	2.6
		0.4	100L	-	100R	101L	101R	102L	102R	-	103L	0.24	4.8
		0.6	103R	104L	104R	105	-	-	-	-	-	0.16	6.2

TABLE III - Continued

Δα (deg)	f (Hz)	Mach No.	α_o (degrees) 0	5	7.5	10	12.5	15	17.5	20	25	K	R X 10^{-6}
			Page Number and Location of Computer Data										
5	80	0.2	-	-	-	-	-	106L	106R	-	107	0.60	2.6
		0.4	108L	-	108R	109L	109R	110L	110R	-	111L	0.30	4.8
		0.6	111R	-	112L	112R	113	-	-	-	-	0.20	6.2
	96	0.2	114L	-	114R	115L	115R	116L	116R	-	117L	0.72	2.6
		0.4	117R	-	118L	118R	119L	119R	120L	-	120R	0.36	4.8
		0.6	121L	121R	122L	122R	-	123L	123R	-	124	0.24	6.2
7.5	16	0.2	-	125L	-	125R	-	-	-	-	-	0.12	2.6
		0.4	-	126L	-	126R	-	-	-	-	-	0.06	4.8
		0.6	-	127L	-	127R	-	-	-	-	-	0.04	6.2
	32	0.2	-	128L	-	128R	-	-	-	-	-	0.24	2.6
		0.4	-	129L	-	129R	-	-	-	-	-	0.12	4.8
		0.6	-	130L	-	130R	-	-	-	-	-	0.08	6.2

TABLE IV. FORCED PITCH OSCILLATION FOR THE VERTOL 23010-1.58 AIRFOIL

Δα (deg)	f (Hz)	Mach No.	α_o (degrees) Page Number and Location of Computer Data									K	R X 10^{-6}
			0	5	7.5	10	12.5	15	17.5	20	25		
2.5	16	0.2	-	-	-	131L	131R	132L	-	-	-	0.12	2.6
		0.4	-	-	-	132R	133L	133R	-	-	-	0.06	4.8
		0.6	-	-	-	134L	134R	135	-	-	-	0.04	6.2
	32	0.2	-	-	-	136L	136R	137L	-	-	-	0.24	2.6
		0.4	-	-	-	137R	138L	138R	-	-	-	0.12	4.8
		0.6	-	-	-	139L	139R	140	-	-	-	0.08	6.2
	48	0.4	-	-	-	141L	141R	142L	-	-	-	0.18	4.8
		0.6	-	-	-	142R	143L	143R	-	-	-	0.12	6.2
	64	0.4	-	-	-	144L	144R	145L	-	-	-	0.24	4.8
		0.6	-	-	-	145R	146L	146R	-	-	-	0.16	6.2
	80	0.4	-	-	-	147L	147R	148L	-	-	-	0.30	4.8
		0.6	-	-	-	148R	149L	149R	-	-	-	0.20	6.2
	96	0.2	-	-	-	150L	150R	151L	-	-	-	0.72	2.6
		0.4	-	-	-	151R	152L	152R	-	-	-	0.36	4.8
		0.6	-	-	-	153L	153R	154	-	-	-	0.24	6.2
5	16	0.2	155L	-	155R	156L	156R	157L	157R	158L	-	0.12	2.6
		0.4	158R	-	159L	159R	160L	160R	161L	-	161R	0.06	4.8
		0.6	162L	-	162R	163L	163R	164L	164R	-	165	0.04	6.2
	32	0.2	166L	-	166R	167L	167R	168L	168R	-	169L	0.24	2.6
		0.4	169R	-	170L	170R	171L	171R	172L	-	172R	0.12	4.8
		0.6	173L	-	173R	174L	174R	175L	175R	-	176	0.08	6.2
	48	0.4	177L	-	177R	178L	178R	179L	179R	-	180L	0.18	4.8
		0.6	180R	-	181L	181R	182L	182R	183L	-	183R	0.12	6.2
	64	0.4	184L	-	184R	185L	185R	186L	186R	-	187L	0.24	4.8
		0.6	187R	-	188L	188R	189L	189R	190L	-	190R	0.16	6.2

TABLE IV - Continued

$\Delta\alpha$ (deg)	f (Hz)	Mach No.	α_o (degrees) 0	5	7.5	10	12.5	15	17.5	20	25	K	$R_x 10^{-6}$
			Page Number and Location of Computer Data										
5	80	0.4	191L	-	191R	192L	192R	193L	193R	-	194L	0.30	4.8
		0.6	194R	-	195L	195R	196L	196R	197L	-	197R	0.20	6.2
	96	0.2	198L	-	198R	199L	199R	200L	200R	-	201L	0.72	2.6
		0.4	201R	-	202L	202R	203L	203R	204L	-	204R	0.36	4.8
		0.6	205L	-	205R	206L	206R	207L	207R	-	208	0.24	6.2
7.5	16	0.2	-	209L	209R	210L	210R	-	-	-	-	0.12	2.6
		0.4	-	211L	211R	212L	-	-	-	-	-	0.06	4.8
		0.6	-	212R	-	213L	213R	-	-	-	-	0.04	6.2
	32	0.2	-	214L	214R	215L	215R	-	-	-	-	2.24	2.6
		0.4	-	216L	216R	217L	217R	-	-	-	-	0.12	4.8
		0.6	-	218L	218R	219L	219R	-	-	-	-	0.08	6.2

TABLE V. FORCED PITCH OSCILLATION FOR THE VERTOL 23010-1.58 AIRFOIL AT REDUCED REYNOLDS NUMBER

$\Delta\alpha$ (deg)	f (Hz)	Mach No.	α_o (degrees) 0	5	7.5	10	12.5	15	17.5	20	25	K	R X 10^{-6}
			Page Number and Location of Computer Data										
2.5	16	0.2	-	-	-	220L	220R	221L	-	-	-	0.12	1.6
		0.4	-	-	-	221R	222L	222R	-	-	-	0.06	2.4
		0.6	-	-	-	223L	223R	224	-	-	-	0.04	3.1
	96	0.2	-	-	-	225L	225R	226L	-	-	-	0.72	1.6
		0.4	-	-	-	226R	227L	227R	-	-	-	0.36	2.4
		0.6	-	-	-	228L	228R	229	-	-	-	0.24	3.1
5	16	0.2	230L	-	230R	231L	231R	232L	232R	-	233L	0.12	1.6
		0.4	233R	-	234L	234R	235L	235R	236L	-	236R	0.06	2.4
		0.6	237L	-	237R	238L	238R	239L	239R	-	240	0.04	3.1
	96	0.2	-	241L	241R	242L	242R	243L	243R	244L	244R	0.72	1.6
		0.4	-	-	245L	245R	246L	246R	-	-	-	0.36	2.4
		0.6	-	247L	247R	248L	248R	249L	249R	-	250	0.24	3.1

TABLE VI. FORCED PITCH OSCILLATION FOR THE VERTOL 23010-1.58 AIRFOIL (REFLEX TRAILING EDGE)

$\Delta\alpha$ (deg)	f (Hz)	Mach No.	α_o (degrees) 0	5	7.5	10	12.5	15	17.5	20	25	K	R X 10^{-6}
			Page Number and Location of Computer Data										
2.5	96	0.4	-	-	-	251L	251R	252	-	-	-	0.36	4.8
5	16		253L	253R	254L	254R	255L	255R	256L	-	256R	0.06	4.8
	96		257L	257R	258L	258R	259L	259R	260L	-	260R	0.36	4.8

TABLE VII. FORCED VERTICAL TRANSLATION FOR THE NACA 0012 (MODIFIED) AIRFOIL

Δh	f (Hz)	Mach No.	α_o (degrees) 0	2.5	5	7.5	10	12.5	15	17.5	20	K	R X 10^{-6}
			Page Number and Location of Computer Data										
0.31	16	0.2	-	-	-	-	261L	261R	262L	-	-	0.12	2.6
		0.4	-	-	-	-	262R	263L	263R	-	-	0.06	4.8
		0.6	-	-	-	-	264L	264R	265	-	-	0.04	6.2
	32	0.2	-	-	-	-	266L	266R	267L	-	-	0.24	2.6
		0.4	-	-	-	-	267R	268L	268R	-	-	0.12	4.8
		0.6	-	-	-	-	269L	269R	270	-	-	0.08	6.2
0.47	32	0.2	271L	-	-	271R	272L	272R	-	-	-	0.24	2.6
		0.4	273L	-	-	273R	274L	274R	-	-	275L	0.12	4.8
		0.6	275R	-	276L	276R	-	-	-	-	277	0.08	6.2
0.62	16	0.2	278L	-	-	-	278R	279L	-	-	279R	0.12	2.6
		0.4	280L	-	-	-	280R	281L	-	-	281R	0.06	4.8
		0.6	282L	-	282R	283L	-	-	-	-	283R	0.04	6.2

TABLE VIII. FORCED VERTICAL TRANSLATION FOR THE VERTOL 23010-1.58 AIRFOIL

Δh	f (Hz)	Mach No.	α_o (degrees) 0	2.5	5	7.5	10	12.5	15	17.5	20	K	R X 10^{-6}
			Page Number and Location of Computer Data										
0.31	16	0.2	-	-	284L	-	284R	285L	285R	-	-	0.12	2.6
		0.4	-	-	286L	-	286R	287L	287R	-	-	0.06	4.8
		0.6	-	-	288L	-	288R	289L	289R	-	-	0.04	6.2
	32	0.2	-	-	290L	-	290R	291L	291R	-	-	0.24	2.6
		0.4	-	-	292L	-	292R	293L	293R	-	-	0.12	4.8
		0.6	-	-	294L	-	294R	295L	295R	-	-	0.08	6.2
0.47	32	0.2	296L	-	-	296R	297L	297R	-	-	-	0.24	2.6
		0.4	298L	-	298R	299L	299R	300L	300R	-	301L	0.12	4.8
		0.6	-	301R	-	302L	302R	303L	303R	-	304	0.08	6.2
0.62	16	0.2	305L	-	-	-	305R	306L	-	-	306R	0.12	2.6
		0.4	307L	-	-	-	307R	308L	-	-	308R	0.06	4.8
		0.6	309L	-	-	-	309R	310L	-	-	310R	0.04	6.2

TABLE IX. TUNED PITCH OSCILLATION FOR THE VERTOL 23010-1.58 AIRFOIL AT f_{DRIVE} = 16 HERTZ

$\Delta\alpha$ (deg)	f_T (Hz)	Mach No.	ζ	α_o (degrees) 0	7.5	10	12.5	15	17.5	20	22.5	25	K	R X 10^{-6}
				Page Number and Location of Computer Data										
5	64	0.4	max	-	-	311	314	317	-	-	-	-	0.06	4.8
			int	-	-	312	315	318	-	-	-	-	-	-
			min	-	-	313	316	319	-	-	-	-	-	-
		0.6	max	-	-	320	-	-	-	-	-	-	0.04	6.2
			int	-	-	321	-	-	-	-	-	-	-	-
			min	-	-	322	-	-	-	-	-	-	-	-
	80	0.4	max	-	324	-	328	331	334	-	-	337	0.06	4.8
			int	-	325	-	329	332	335	-	-	-	-	-
			min	323	326	327	330	333	336	-	-	338	-	-
		0.6	max	339	341	344	347	350	353	-	-	356	0.04	6.2
			int	-	342	345	348	351	354	-	-	357	-	-
			min	340	343	346	349	352	355	-	-	358	-	-
	96	0.4	max	-	360	363	366	369	372	-	-	375	0.06	4.8
			int	-	361	364	367	370	373	-	-	376	-	-
			min	359	362	365	368	371	374	-	-	377	-	-
		0.6	max	378	381	384	387	-	-	-	-	-	0.04	6.2
			int	379	382	385	388	-	-	-	-	-	-	-
			min	380	383	386	389	390	391	-	-	392	-	-

Table IX - Continued

$\Delta\alpha$ (deg)	f_T (Hz)	Mach No.	ζ	α_o (degrees) 0	7.5	10	12.5	15	17.5	20	22.5	25	K	R X 10^{-6}
				Page Number and Location of Computer Data										
7.5	80	0.4	max	393	396	399	402	405	-	-	-	-	0.06	4.8
			int	394	397	400	403	406	-	-	-	-	-	-
			min	395	398	401	404	407	-	-	-	-	-	-
		0.6	max	408	411	-	-	414	-	-	-	-	0.04	6.2
			int	409	412	-	-	415	-	-	-	-	-	-
			min	410	413	-	-	416	-	-	-	-	-	-
	96	0.4	max	417	420	423	426	429	-	-	-	-	0.06	4.8
			int	418	421	424	427	430	-	-	-	-	-	-
			min	419	422	425	428	431	-	-	-	-	-	-
		0.6	max	432	435	438	441	444	-	-	-	-	0.04	6.2
			int	433	436	439	442	445	-	-	-	-	-	-
			min	434	437	440	443	446	-	-	-	-	-	-

Notes: 1. Max indicates maximum external damping.

2. Int indicates intermediate external damping.

3. Min indicates minimum external damping.

TABLE X. TUNED PITCH OSCILLATION FOR THE VERTOL 23010-1.58 AIRFOIL AT f_{DRIVE} = 16 HERTZ AND REDUCED REYNOLDS NUMBER

$\Delta\alpha$ (deg)	f_T (Hz)	Mach No.	ζ	α_o (degrees) 0	7.5	10	12.5	15	17.5	20	22.5	25	K	R X 10^{-6}
				Page Number and Location of Computer Data										
5	64	0.4	max	-	-	447	-	-	-	-	-	-	0.06	4.8
			int	-	-	448	-	-	-	-	-	-	-	-
			min	-	-	449	-	-	-	-	-	-	-	-
		0.6	max	-	450	-	-	-	-	-	-	-	0.04	6.2
			int	-	451	-	-	-	-	-	-	-	-	-
			min	-	452	-	-	-	-	-	-	-	-	-
	80	0.4	min	-	-	-	453	-	-	-	-	-	0.06	4.8
		0.6	max	-	-	454	-	-	-	-	-	-	0.04	6.2
			int	-	-	455	-	-	-	-	-	-	-	-
			min	-	-	456	-	-	-	-	-	-	-	-
	96	0.4	min	457	-	-	458	459	460	461	-	462	0.06	4.8
		0.6	min	-	-	-	463	-	-	-	-	-	0.04	6.2
7.5	80	0.4	max	-	-	-	464	-	-	-	-	-	0.06	4.8
			int	-	-	-	465	-	-	-	-	-	-	-
			min	-	-	-	466	-	-	-	-	-	-	-
		0.6	max	-	467	-	-	-	-	-	-	-	0.04	6.2
			int	-	468	-	-	-	-	-	-	-	-	-
			min	-	469	-	-	-	-	-	-	-	-	-
	97	0.4	max	-	-	-	470	-	-	-	-	-	0.06	4.8
			int	-	-	-	471	-	-	-	-	-	-	-
			min	-	-		472	-	-	-	-	-	-	-
		0.6	max	-	-	473	-	-	-	-	-	-	0.04	6.2
			int	-	-	474	-	-	-	-	-	-	-	-
			min	-	-	475	-	-	-	-	-	-	-	-

STEADY FORCES AND MOMENTS — NACA 0012 AIRFOIL (MODIFIED)

MACH NO 0.200 — RN 0.26E 07 — V 220.0 — Q 198.4

DATA TYPE	X/C	TEST POINT 3130.1	3130.2	3130.3	3130.4	3131.1	3131.2	3131.3	3131.4	3132.1	3132.2	3132.3	3132.4
ALPHA.0		-3.06	-0.22	2.86	5.78	8.84	11.90	12.90	13.90	15.00	15.90	17.90	20.90
CN		-0.334	0.001	0.297	C.628	0.904	1.183	1.238	0.972	0.873	0.823	0.991	0.901
CM		0.007	-0.012	-0.010	-0.023	0.009	-0.001	-0.007	-0.150	-0.100	-0.095	-0.153	-0.132
DCP 1	.010	-2.402	-0.694	1.113	2.814	4.795	6.287	6.691	3.885	3.579	3.441	2.687	1.328
DCP 2	.050	-0.837	0.244	1.348	2.386	3.630	4.582	4.855	2.266	2.442	2.107	2.236	2.175
DCP 3	.100	-0.765	-0.040	0.732	1.441	2.115	2.693	2.843	1.187	1.385	1.076	1.198	1.095
DCP 4	.150	-0.628	-0.061	0.224	C.664	1.370	1.677	1.746	0.884	1.020	0.954	0.970	C.988
DCP 5	.200	-C.344	-0.044	C.411	0.844	1.413	1.715	1.749	0.866	1.162	0.910	1.033	1.032
DCP 6	.250	-0.372	-0.013	0.311	0.671	1.168	1.426	1.477	1.030	1.114	C.996	1.036	1.032
DCP 7	.300	-0.357	-C.092	0.306	0.571	1.046	1.284	1.252	0.937	1.216	C.987	1.092	1.102
DCP E	.400	-0.277	-0.041	0.175	0.424	0.828	C.990	1.021	1.021	1.080	1.004	1.054	1.048
DCP 9	.500	-0.135	0.086	0.303	0.521	0.692	C.886	0.911	1.027	0.930	0.903	1.010	0.968
DCP10	.695	-0.131	0.001	0.099	0.177	0.213	0.293	C.312	0.660	C.607	0.614	0.772	C.618
DCP11	.800	-0.117	-0.007	C.076	0.199	0.164	0.278	C.280	0.634	0.511	0.538	0.582	0.532
DCP12	.878	-0.125	0.017	0.111	0.222	0.129	0.249	0.290	0.660	0.377	0.398	0.498	0.545
DCP13	.953	0.025	0.086	0.154	C.197	0.201	C.289	0.325	C.557	0.477	C.486	C.590	C.605

STEADY FORCES AND MOMENTS — NACA 0012 AIRFOIL (MODIFIED)

MACH NO 0.400 — RN 0.47E 07 — V 436.0 — Q 725.8

DATA TYPE	X/C	TEST POINT 3150.1	3150.2	3150.3	3150.4	3151.1	3151.3	3151.4	3152.1	3152.2	3152.3	3152.4
ALPHA.0		-0.17	1.74	3.65	5.55	7.56	9.48	11.37	13.35	15.15	19.08	23.94
CN		-0.037	0.196	0.414	0.657	0.891	1.081	0.957	C.853	0.812	0.951	1.057
CM		-0.014	-0.018	-0.013	-0.016	-0.001	-0.002	-0.096	-0.126	-0.127	-0.152	-0.182
DCP 1	.010	-C.489	0.779	2.039	3.430	5.209	6.575	5.335	3.645	2.917	1.786	1.662
DCP 2	.050	C.034	0.788	1.547	2.341	3.101	3.674	2.546	1.543	1.575	1.687	1.883
DCP 3	.10	-0.090	0.484	1.017	1.578	2.140	2.575	1.903	1.154	1.234	1.750	1.580
DCP 4	.150	-C.150	0.226	0.632	1.020	1.473	1.782	1.428	1.017	0.966	1.096	1.339
DCP 5	.200	-0.055	0.281	0.636	C.978	1.333	1.589	1.338	C.913	0.956	1.269	1.305
DCP 6	.250	-0.086	0.206	0.501	0.787	1.108	1.327	1.230	0.937	0.872	1.013	1.239
DCP 7	.300	-C.219	C.056	C.320	C.569	C.884	1.066	1.003	0.736	0.736	0.884	1.054
DCP E	.400	-0.192	-0.011	C.187	0.379	0.598	0.748	0.764	C.707	0.597	0.717	0.900
DCP 9	.500	-0.021	0.133	0.291	0.448	0.567	0.686	0.813	0.803	0.790	C.840	1.006
DCP10	.695	0.192	C.276	C.355	C.436	0.464	C.518	0.698	C.847	0.883	C.902	C.958
DCP11	.800	-0.024	0.041	0.104	C.174	0.189	0.242	0.456	0.660	0.652	0.653	C.767
DCP12	.878	0.035	0.075	0.117	0.156	0.100	0.172	0.382	0.558	0.571	0.587	0.686
DCP13	.953	0.083	0.106	0.141	0.167	C.186	0.247	0.439	0.578	C.651	0.728	0.755

STEADY FORCES AND MOMENTS — NACA 0012 AIRFOIL (MODIFIED)

MACH NO 0.600 — RN 0.62E 07 — V 638.0 — Q 1415.7

DATA TYPE	X/C	TEST POINT 3153.1	3153.2	3153.3	3153.4	3154.1	3154.2	3154.3	3154.4	3155.1	3155.2	3155.3
ALPHA,D		-0.26	1.65	3.54	4.51	5.60	7.44	9.34	11.26	14.96	18.12	18.86
CN		-0.034	0.256	0.536	0.679	0.768	0.889	0.921	0.939	1.071	1.025	1.042
CM		-0.001	0.000	-0.001	0.006	0.008	-0.013	-0.053	-0.058	-0.123	-0.127	-0.134
DCP 1	.010	-0.201	1.049	2.228	2.618	2.932	3.260	3.328	3.522	3.325	3.234	3.158
DCP 2	.050	-0.024	0.891	1.868	2.468	2.889	3.223	3.083	2.689	2.534	2.397	2.316
DCP 3	.100	-0.073	0.830	1.585	2.850	2.708	2.174	2.172	2.211	2.051	1.895	1.891
DCP 4	.150	-0.078	0.571	1.074	1.063	1.648	1.802	1.548	1.703	1.577	1.625	1.619
DCP 5	.200	-0.037	0.368	0.785	0.920	1.119	1.542	1.405	1.363	1.165	1.419	1.399
DCP 6	.250	-0.043	0.312	0.655	0.755	0.845	1.215	1.149	1.154	1.234	1.114	1.116
DCP 7	.300	-0.119	0.203	0.514	0.634	0.707	1.063	0.997	0.968	0.978	1.137	1.121
DCP 8	.400	-0.046	0.184	0.476	0.476	0.474	0.549	0.611	0.569	0.852	0.811	0.766
DCP 9	.500	-0.037	0.147	0.320	0.393	0.448	0.558	0.614	0.640	1.000	0.888	0.878
DCP 10	.695	0.049	0.145	0.242	0.274	0.322	0.360	0.476	0.533	0.825	0.796	0.810
DCP 11	.800	-0.037	0.037	0.100	0.137	0.156	0.222	0.390	0.437	0.591	0.713	0.734
DCP 12	.878	-0.032	0.024	0.079	0.105	0.092	0.191	0.352	0.410	0.546	0.698	0.715
DCP 13	.953	0.024	0.061	0.110	0.146	0.145	0.281	0.386	0.466	0.647	0.706	0.723

STEADY FORCES AND MOMENTS — VERTOL 23010-1.58 AIRFOIL

MACH NO 0.200 — RN 0.26E 07 — V 219.6 — Q 200.9

DATA TYPE	X/C	TEST POINT 4010.1	4010.2	4010.3	4010.4	4011.1	4011.2	4011.3	4011.4	4012.1	4012.2
ALPHA.0		-0.15	2.79	5.72	8.60	11.58	14.48	17.43	20.40	23.30	26.20
CN		-0.108	0.188	0.468	0.805	1.148	1.316	0.879	0.899	1.011	1.139
CM		0.002	0.014	0.022	0.009	-0.002	0.024	-0.074	-0.075	-0.120	-0.153
DCP 1	.010	-2.345	-0.303	1.541	3.281	4.923	6.567	4.091	4.249	3.621	3.341
DCP 2	.025	-0.921	0.450	1.897	3.365	4.678	5.874	3.588	3.600	3.514	3.241
DCP 3	.050	-0.118	1.010	2.167	3.297	4.374	5.347	3.327	2.976	2.325	2.158
DCP 4	.100	-0.040	0.639	1.429	2.040	2.742	3.329	1.302	1.075	1.376	1.563
DCP 5	.150	-0.079	0.518	0.851	1.384	2.095	2.484	1.000	1.190	1.273	1.485
DCP 6	.200	-0.001	0.462	0.750	1.221	1.788	2.010	0.929	1.093	1.251	1.442
DCP 7	.250	-0.051	0.343	0.732	1.104	1.512	1.773	0.894	1.002	1.192	1.416
DCP 8	.300	-0.142	0.279	0.612	0.983	1.275	1.514	0.816	0.954	1.055	1.319
DCP 9	.400	-0.060	0.231	0.502	0.738	1.028	1.188	0.765	0.838	1.014	1.268
DCP 10	.501	-0.130	0.047	0.253	0.448	0.668	0.766	0.581	0.663	0.827	1.017
DCP 11	.600	-0.087	0.026	0.172	0.383	0.509	0.545	0.558	0.583	0.805	0.974
DCP 12	.831	0.061	0.071	0.107	0.146	0.355	0.319	0.589	0.606	0.836	0.898
DCP 13	.878	-0.082	-0.031	0.016	0.076	0.106	0.113	0.431	0.426	0.532	0.613
DCP 14	.950	-0.203	-0.180	-0.122	-0.045	0.050	0.064	0.351	0.380	0.443	0.499

STEADY FORCES AND MOMENTS — VERTOL 23010-1.58 AIRFOIL

MACH NO 0.400 — RN 0.48E 07 — V 429.5 — Q 733.6

DATA TYPE	X/C	TEST POINT 4009.1	4009.2	4009.3	4009.4	4005.1	4005.2	4005.3	4005.4	4013.1	4013.2	4013.3	4013.4
ALPHA.0		-0.00	1.95	3.92	5.81	7.97	9.91	11.91	13.83	15.82	17.77	19.75	24.63
CN		-0.088	0.150	0.369	0.624	0.855	1.098	1.304	1.211	0.964	0.887	0.910	1.018
CM		-0.005	-0.005	0.002	-0.001	0.002	0.006	0.012	0.009	-0.093	-0.086	-0.088	-0.131
DCP 1	.010	-2.385	-0.789	0.610	1.941	3.133	4.492	6.354	6.284	4.414	4.322	4.535	4.165
DCP 2	.025	-1.156	-0.179	0.962	2.070	3.299	4.533	6.107	6.142	3.778	3.578	3.563	3.199
DCP 3	.050	-0.267	0.600	1.442	2.351	3.363	4.383	4.887	5.018	3.247	2.921	2.709	2.052
DCP 4	.100	-0.009	0.552	1.126	1.690	2.328	2.875	3.355	3.157	1.642	1.299	1.288	1.467
DCP 5	.150	0.008	0.433	0.870	1.282	1.623	2.036	2.381	2.161	1.054	1.003	1.069	1.269
DCP 6	.200	0.075	0.263	0.609	0.964	1.220	1.575	1.861	1.678	0.915	0.898	0.944	1.158
DCP 7	.250	-0.047	0.260	0.573	0.882	1.090	1.373	1.617	1.455	0.912	0.875	0.935	1.149
DCP 8	.300	-0.051	0.206	0.479	0.735	1.036	1.286	1.497	1.353	0.985	0.898	0.913	1.113
DCP 9	.400	-0.056	0.157	0.359	0.560	0.734	0.920	1.073	0.985	0.857	0.798	0.841	1.036
DCP 10	.501	-0.105	0.049	0.203	0.356	0.466	0.607	0.726	0.678	0.716	0.644	0.625	0.799
DCP 11	.600	-0.043	0.074	0.193	0.326	0.408	0.524	0.603	0.632	0.746	0.634	0.652	0.793
DCP 12	.831	-0.010	0.038	0.066	0.137	0.227	0.259	0.296	0.407	0.692	0.658	0.632	0.719
DCP 13	.878	0.020	0.061	0.104	0.151	0.147	0.188	0.227	0.342	0.561	0.527	0.546	0.626
DCP 14	.950	-0.138	-0.104	-0.049	-0.004	0.013	0.063	0.118	0.266	0.444	0.470	0.469	0.536

STEADY FORCES AND MOMENTS — VERTOL 23010-1.58 AIRFOIL

MACH NO 0.600 — RN 0.63E 07 — V 628.2 — Q 1436.4

DATA TYPE	X/C	TEST POINT 4008.1	4008.2	4008.3	4308.4	4007.1	4307.2	4007.3	4007.4	4014.1	4314.2	4314.3	4014.4
ALPHA.0		0.18	2.13	4.05	6.00	7.98	9.96	11.93	13.83	15.72	17.60	19.54	24.36
CN		-0.070	0.226	0.507	C.761	0.909	C.935	0.997	1.031	1.058	1.099	1.032	1.048
CM		-0.011	-0.008	-0.006	0.000	-0.005	-0.026	-0.066	-0.082	-0.086	-0.134	-0.146	-0.159
DCP 1	.010	-2.948	-0.859	0.501	1.470	2.063	2.439	2.847	3.152	3.361	3.349	3.112	2.408
DCP 2	.025	-1.360	-0.168	0.990	1.821	2.304	2.581	2.940	3.265	3.295	3.124	2.723	2.559
DCP 3	.050	-0.369	0.650	1.650	2.464	2.913	3.118	3.019	2.877	2.949	2.535	2.374	2.260
DCP 4	.100	0.185	0.921	1.855	2.432	2.815	2.792	2.425	2.179	1.984	1.687	1.698	1.672
DCP 5	.150	0.157	0.708	1.101			1.924	1.597	1.495	1.505	1.512	1.408	1.414
DCP 6	.200	0.026	0.475	0.858	1.644	1.655	1.419	1.309	1.305	1.255	1.308	1.188	1.310
DCP 7	.250	C.020	0.401	0.748	1.077	1.473	1.358	1.197	1.227	1.253	1.256	1.169	1.259
DCP 8	.300	C.C05	0.332	0.630	0.765	1.246	1.240	1.240	1.285	1.232	1.259	1.197	1.261
DCP 9	.400	-0.017	0.226	0.451	0.586	0.733	0.821	0.973	1.003	1.011	1.075	1.023	1.095
DCP10	.501	-0.052	0.126	0.256	0.399	0.401	0.516	0.635	C.704	0.757	0.767	0.820	0.892
DCP11	.600	-0.026	0.117	0.253	0.342	0.372	0.490	0.637	0.659	0.729	0.779	0.814	0.882
DCP12	.831	0.031	0.077	0.128	0.172	0.233	0.349	C.482	C.562	0.616	0.646	0.755	0.792
DCP13	.878	0.015	0.066	0.113	0.152	0.204	0.316	0.424	0.556	0.582	0.619	0.712	0.721
DCP14	.950	-0.097	-0.042	0.014	0.051	0.141	0.259	0.334	C.403	0.452	0.498	0.589	0.676

STEADY FORCES AND MOMENTS — VERTOL 23010-1.58 AIRFOIL (REFLEX TE)

MACH NO 0.400 — RN 0.48E 07 — V 429.4 — Q 731.3

DATA TYPE	X/C	TEST POINT 4042.1	4042.2	4042.3	4042.4	4045.1	4045.2	4045.3	5008.1	5008.2	5008.3	5008.4
ALPHA,D		-0.11	1.83	3.79	5.75	7.79	9.73	11.73	13.79	14.69	17.62	24.42
CN		-0.126	C.108	0.326	0.576	0.850	1.053	1.290	1.303	1.323	C.959	1.012
CM		-0.003	-0.001	0.000	-0.002	-0.003	0.007	0.016	0.002	-0.031	-0.105	-0.136
DCP 1	.010	-2.465	-0.917	(.465	1.755	3.038	4.350	6.281	6.398	6.278	4.516	3.464
DCP 2	.025	-1.176	-0.199	0.929	2.049	3.242	4.479	5.878	6.188	5.937	3.351	2.954
DCP 3	.050	-0.272	0.403	0.967	1.813	2.868	3.596	5.078	4.835	4.718	3.346	1.980
DCP 4	.100	0.035	0.625	1.215	1.781	2.323	2.845	3.308	3.372	2.936	1.246	1.495
DCP 5	.150	-0.113	C.309	0.742	1.173	1.663	2.044	2.404	2.303	2.042	1.076	1.291
DCP 6	.200	-0.232	0.118	0.476	0.834	1.329	1.663	1.956	1.874	1.625	C.917	1.168
DCP 7	.250	-0.121	C.189	C.502	0.803	1.155	1.414	1.656	1.678	1.539	C.991	1.223
DCP 8	.300	-C.064	0.208	C.487	0.730	0.961	1.200	1.413	1.415	1.309	C.933	1.128
DCP 9	.400	-0.064	0.146	0.347	0.547	0.745	0.924	1.086	0.845	0.856	0.763	0.894
DCP10	.501	-0.154	0.003	0.157	0.313	0.539	0.655	0.759	0.595	C.640	0.717	0.788
DCP11	.600	-0.068	0.051	0.173	0.289	0.398	0.496	0.584	C.477	C.566	0.698	0.702
DCP12	.831	0.021	0.062	0.113	C.170	0.228	0.257	0.288	0.358	0.470	0.696	0.714
DCP13	.878	-0.041	0.002	0.044	C.086	C.099	0.134	C.160	0.251	0.324	0.594	0.635
DCP14	.950	-0.164	-0.118	-C.070	-C.026	C.004	0.032	C.080	0.159	0.265	0.453	0.470

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.78	0.200	9.93	2.50		3133.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.127	220.5	200.9	0.26E 07	-0.00178	1.170	12.42

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.971	0.193	352	0.006	190	0.002	243	0.006	197	0.001	232	0.005	151	0.010	112	0.006	215	0.002	282
CM		-0.001	0.009	279	0.000	263	0.001	171	0.001	4	0.001	145	0.001	317	0.003	297	0.001	97	0.001	114
DCP 1	.010	5.251	1.267	346	0.052	177	0.019	151	0.043	193	0.011	160	0.015	194	0.004	200	0.020	230	0.003	340
DCP 2	.050	3.725	0.629	345	0.025	163	0.011	226	0.015	201	0.007	222	0.009	204	0.015	135	0.020	195	0.008	292
DCP 3	.100	2.232	0.466	342	0.006	271	0.008	292	0.004	158	0.003	79	0.010	97	0.018	100	0.006	170	0.008	81
DCP 4	.150	1.304	0.345	350	0.015	181	0.011	145	0.018	213	0.011	234	0.008	198	0.004	206	0.012	198	0.006	197
DCP 5	.200	1.385	0.292	346	0.009	204	0.009	296	0.006	15	0.010	99	0.009	71	0.013	93	0.006	217	0.006	65
DCP 6	.250	1.192	0.250	353	0.009	202	0.011	144	0.018	211	0.007	256	0.011	196	0.005	311	0.015	195	0.007	142
DCP 7	.300	0.996	0.211	352	0.005	245	0.013	263	0.005	347	0.009	137	0.004	95	0.014	83	0.007	190	0.004	233
DCP 8	.400	0.831	0.156	356	0.011	265	0.009	173	0.015	198	0.008	231	0.010	179	0.003	104	0.014	197	0.008	193
DCP 9	.500	0.719	0.118	356	0.005	211	0.010	303	0.004	62	0.005	69	0.007	116	0.007	91	0.003	267	0.005	14
DCP10	.695	0.516	0.075	21	0.002	2	0.003	62	0.008	169	0.004	48	0.007	179	0.014	106	0.003	257	0.007	272
DCP11	.800	0.159	0.036	42	0.016	115	0.004	57	0.007	248	0.016	318	0.005	84	0.022	141	0.006	291	0.013	358
DCP12	.878	0.041	0.043	24	0.003	220	0.004	314	0.014	192	0.006	211	0.006	179	0.012	118	0.006	245	0.009	222
DCP13	.953	0.120	0.042	7	0.004	224	0.002	177	0.007	25	0.003	302	0.008	95	0.017	111	0.003	243	0.001	228

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.81	0.200	12.27	2.53		3133.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.127	220.4	199.8	0.26E 07	0.00391	1.349	14.90

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.105	0.243	16	0.042	196	0.012	10	0.004	32	0.007	60	0.002	189	0.001	238	0.002	69	0.002	41
CM		-0.018	0.018	96	0.018	285	0.007	101	0.002	269	0.003	232	0.000	79	0.001	25	0.001	275	0.001	211
DCP 1	.010	5.748	1.453	35	0.485	297	0.257	163	0.142	24	0.070	284	0.064	149	0.040	30	0.017	273	0.030	59
DCP 2	.050	4.022	0.771	36	0.306	273	0.160	121	0.088	316	0.031	146	0.011	175	0.007	54	0.022	225	0.015	6
DCP 3	.100	2.484	0.590	26	0.168	241	0.095	59	0.030	253	0.017	71	0.003	262	0.016	245	0.009	20	0.016	197
DCP 4	.150	1.485	0.498	16	0.165	216	0.092	39	0.040	226	0.007	20	0.019	89	0.017	282	0.012	171	0.009	224
DCP 5	.200	1.489	0.366	18	0.099	197	0.074	5	0.029	162	0.015	35	0.015	265	0.006	136	0.002	13	0.010	138
DCP 6	.250	1.351	0.373	8	0.139	185	0.077	3	0.034	180	0.005	26	0.006	90	0.011	258	0.010	87	0.016	297
DCP 7	.300	1.118	0.279	14	0.079	171	0.054	350	0.021	122	0.006	70	0.009	286	0.015	112	0.004	330	0.002	268
DCP 8	.400	0.953	0.238	3	0.100	160	0.055	326	0.015	94	0.016	172	0.009	359	0.006	199	0.011	62	0.007	279
DCP 9	.500	0.838	0.164	3	0.070	129	0.037	293	0.018	71	0.010	55	0.012	227	0.003	313	0.005	351	0.008	179
DCP10	.695	0.576	0.081	353	0.050	105	0.025	249	0.017	349	0.007	109	0.005	341	0.007	242	0.008	310	0.010	68
DCP11	.800	0.269	0.069	320	0.050	106	0.011	230	0.008	126	0.036	27	0.008	163	0.008	118	0.015	79	0.013	21
DCP12	.878	0.162	0.056	313	0.035	95	0.009	203	0.001	100	0.008	75	0.002	33	0.008	326	0.015	136	0.010	344
DCP13	.953	0.222	0.048	315	0.015	64	0.003	173	0.005	59	0.016	49	0.009	151	0.006	176	0.009	170	0.009	96

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.M	TEST POINT	CYCLES ANALYZED
	16.84	0.200	14.65	2.49		3133.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.128	219.9	200.1	0.26E 07	0.00721	1.612	17.10

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.135	0.336	55	0.110	315	0.071	203	0.035	103	0.026	3	0.020	288	0.013	181	0.006	66	0.009	47
CM		-0.060	0.066	149	0.038	62	0.026	335	0.014	254	0.013	171	0.008	99	0.005	357	0.002	276	0.002	223
DCP 1	.010	4.990	2.212	115	1.078	58	0.523	6	0.402	316	0.320	258	0.249	197	0.184	144	0.124	89	0.077	41
DCP 2	.050	3.741	1.160	102	0.498	18	0.146	295	0.070	278	0.074	220	0.048	157	0.052	111	0.036	20	0.022	123
DCP 3	.100	2.397	0.861	80	0.343	349	0.164	257	0.107	181	0.054	116	0.036	51	0.033	353	0.033	309	0.028	233
DCP 4	.150	1.401	0.762	68	0.254	334	0.156	260	0.105	184	0.068	128	0.052	51	0.030	11	0.033	312	0.022	233
DCP 5	.200	1.440	0.591	61	0.215	315	0.142	231	0.095	139	0.051	61	0.043	346	0.026	261	0.014	293	0.016	112
DCP 6	.250	1.330	0.589	53	0.201	316	0.173	233	0.099	154	0.068	93	0.043	14	0.040	335	0.029	252	0.019	152
DCP 7	.300	1.147	0.479	46	0.180	295	0.146	211	0.094	108	0.055	38	0.043	333	0.027	252	0.019	172	0.019	87
DCP 8	.400	1.030	0.410	34	0.166	295	0.152	202	0.092	125	0.073	54	0.062	330	0.048	272	0.043	181	0.030	89
DCP 9	.500	0.934	0.329	19	0.117	267	0.129	180	0.071	81	0.059	5	0.045	285	0.035	192	0.020	99	0.013	22
DCP10	.695	0.660	0.239	354	0.118	252	0.108	153	0.064	56	0.058	336	0.037	260	0.034	136	0.029	69	0.035	61
DCP11	.800	0.422	0.165	347	0.123	260	0.084	148	0.035	79	0.058	333	0.029	257	0.019	200	0.002	113	0.029	31
DCP12	.878	0.341	0.146	336	0.110	246	0.061	136	0.042	63	0.042	348	0.024	246	0.036	140	0.028	26	0.001	214
DCP13	.953	0.373	0.128	320	0.064	243	0.042	130	0.027	17	0.033	283	0.014	241	0.001	163	0.013	326	0.009	232

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.M	TEST POINT	CYCLES ANALYZED
	16.50	0.400	9.94	2.49		3135.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.064	431.8	728.7	0.47E 07	0.00031	1.191	12.21

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.980	0.157	18	0.038	9	0.010	208	0.008	224	0.009	113	0.005	346	0.003	298	0.003	252	0.003	157
CM		-0.004	0.015	172	0.013	50	0.007	311	0.003	246	0.002	215	0.003	141	0.001	58	0.001	9	0.002	311
DCP 1	.010	6.131	1.105	7	0.311	30	0.017	328	0.129	272	0.027	293	0.077	247	0.033	277	0.005	297	0.048	344
DCP 2	.050	3.223	0.273	29	0.226	43	0.071	325	0.072	268	0.055	211	0.052	153	0.044	95	0.032	34	0.021	340
DCP 3	.100	2.257	0.215	46	0.217	38	0.088	292	0.054	233	0.054	171	0.042	109	0.030	43	0.016	341	0.018	238
DCP 4	.150	1.653	0.224	25	0.112	19	0.040	272	0.035	204	0.027	121	0.017	38	0.012	335	0.010	259	0.019	132
DCP 5	.200	1.393	0.199	36	0.113	10	0.061	242	0.031	188	0.035	127	0.027	37	0.016	325	0.013	259	0.016	210
DCP 6	.250	1.228	0.173	28	0.075	13	0.025	252	0.020	187	0.016	95	0.012	12	0.008	301	0.006	259	0.009	196
DCP 7	.300	0.987	0.185	26	0.061	347	0.043	208	0.020	153	0.027	91	0.022	351	0.006	288	0.012	280	0.020	182
DCP 8	.400	0.643	0.122	26	0.036	9	0.009	221	0.012	178	0.013	93	0.015	350	0.009	251	0.003	237	0.007	141
DCP 9	.500	0.660	0.140	13	0.032	264	0.033	146	0.008	69	0.015	62	0.016	320	0.007	263	0.010	131	0.012	118
DCP10	.695	0.508	0.102	2	0.038	229	0.027	122	0.010	67	0.013	26	0.010	291	0.003	226	0.006	238	0.008	136
DCP11	.800	0.228	0.076	8	0.024	243	0.017	121	0.005	338	0.006	172	0.005	355	0.007	302	0.006	188	0.006	124
DCP12	.878	0.131	0.090	355	0.027	244	0.017	145	0.007	64	0.003	52	0.007	324	0.005	193	0.002	67	0.002	275
DCP13	.953	0.210	0.105	350	0.041	228	0.018	120	0.010	20	0.008	300	0.005	243	0.006	200	0.007	117	0.002	159

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.47	0.400	12.29	2.45		3135.2	10
K	V	Q	RN	DAMPING	CY(MAX)	ALPHA(STALL)	
0.064	432.0	727.7	0.47E 07	0.00525	1.221	12.48	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.988	0.183	90	0.017	43	0.009	72	0.018	69	0.010	38	0.007	327	0.002	262	0.004	122	0.003	48
CM		-0.056	0.065	158	0.007	166	0.010	103	0.007	139	0.003	149	0.005	83	0.002	106	0.001	329	0.001	170
DCP 1	.010	5.083	2.006	142	0.397	117	0.297	126	0.174	121	0.082	115	0.069	91	0.079	135	0.070	88	0.061	62
DCP 2	.050	2.690	1.027	132	0.026	48	0.157	112	0.076	130	0.051	13	0.017	148	0.054	184	0.023	188	0.015	130
DCP 3	.100	1.982	0.666	126	0.067	182	0.119	106	0.092	118	0.039	94	0.032	95	0.025	116	0.010	126	0.020	123
DCP 4	.150	1.510	0.510	104	0.042	357	0.067	46	0.049	90	0.033	10	0.037	28	0.017	356	0.014	335	0.010	357
DCP 5	.200	1.300	0.362	103	0.036	107	0.059	72	0.076	77	0.036	21	0.026	26	0.018	30	0.010	336	0.004	97
DCP 6	.250	1.201	0.323	89	0.043	333	0.033	335	0.029	109	0.018	9	0.016	347	0.012	313	0.003	272	0.009	259
DCP 7	.300	1.005	0.262	80	0.036	63	0.049	24	0.052	45	0.024	359	0.032	11	0.026	349	0.021	317	0.008	273
DCP 8	.400	0.706	0.179	58	0.032	335	0.039	286	0.010	88	0.010	66	0.015	333	0.010	333	0.006	313	0.008	230
DCP 9	.500	0.774	0.194	29	0.036	348	0.034	302	0.028	348	0.010	325	0.017	289	0.015	280	0.014	139	0.004	19
DCP10	.695	0.653	0.190	355	0.025	337	0.034	278	0.024	325	0.010	1	0.022	261	0.010	231	0.011	113	0.005	12
DCP11	.800	0.391	0.165	341	0.015	55	0.016	281	0.019	327	0.009	359	0.022	262	0.005	170	0.010	157	0.012	57
DCP12	.878	0.303	0.154	333	0.022	44	0.013	224	0.015	325	0.007	348	0.012	212	0.004	301	0.004	152	0.005	326
DCP13	.953	0.373	0.154	340	0.020	29	0.011	215	0.010	296	0.002	280	0.006	227	0.005	289	0.003	153	0.003	11

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.45	0.400	14.61	2.50		3135.3	10
K	V	Q	RN	DAMPING	CY(MAX)	ALPHA(STALL)	
0.064	431.4	724.3	0.47E 07	-0.00431	1.028	12.97	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.970	0.129	120	0.049	217	0.003	49	0.010	105	0.010	245	0.004	310	0.002	189	0.005	131	0.001	315
CM		-0.113	0.024	234	0.006	305	0.005	327	0.001	304	0.002	53	0.002	191	0.001	11	0.002	296	0.001	149
DCP 1	.010	3.427	1.060	179	0.325	262	0.144	338	0.038	70	0.030	5	0.028	94	0.022	166	0.024	297	0.028	62
DCP 2	.050	1.742	0.268	153	0.129	240	0.038	25	0.012	133	0.018	349	0.016	98	0.009	244	0.005	361	0.009	337
DCP 3	.100	1.356	0.165	136	0.106	234	0.026	321	0.022	90	0.012	208	0.004	276	0.002	298	0.011	218	0.013	238
DCP 4	.150	1.104	0.206	119	0.102	205	0.021	353	0.022	111	0.011	217	0.019	349	0.009	13	0.005	110	0.003	197
DCP 5	.200	0.988	0.151	130	0.078	229	0.021	279	0.008	94	0.019	246	0.008	0	0.006	41	0.013	158	0.010	225
DCP 6	.250	0.981	0.192	116	0.076	203	0.015	34	0.025	109	0.016	239	0.015	314	0.014	359	0.009	106	0.006	199
DCP 7	.300	0.841	0.155	119	0.065	230	0.020	274	0.007	186	0.027	251	0.008	357	0.015	90	0.017	145	0.007	213
DCP 8	.400	0.670	0.178	121	0.066	207	0.012	4	0.020	93	0.027	218	0.011	259	0.010	336	0.003	127	0.002	334
DCP 9	.500	0.796	0.154	101	0.055	197	0.021	152	0.021	124	0.013	217	0.005	204	0.009	175	0.014	122	0.011	90
DCP10	.695	0.795	0.118	77	0.030	158	0.024	121	0.009	44	0.015	281	0.013	337	0.008	230	0.009	85	0.009	350
DCP11	.800	0.554	0.067	83	0.008	184	0.013	175	0.004	320	0.011	156	0.017	210	0.011	201	0.006	210	0.011	313
DCP12	.878	0.454	0.058	52	0.015	64	0.015	150	0.014	178	0.006	223	0.010	280	0.003	129	0.001	139	0.006	237
DCP13	.953	0.523	0.074	24	0.014	118	0.012	137	0.006	324	0.016	349	0.011	343	0.008	141	0.004	98	0.005	253

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.75	0.600	5.01	2.49		3138.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.044	639.6	1442.1	0.63E 07	-0.00115	0.858	7.50

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.602	0.263 352	0.015 124	0.017 226	0.013 187	0.004 177	0.001 238	0.003 224	0.002 260	0.004 216
CM		-0.000	0.006 287	0.002 64	0.003 315	0.002 203	0.001 109	0.000 155	0.000 66	0.000 296	0.001 227
DCP 1	.010	2.451	0.921 349	0.158 95	0.068 193	0.022 194	0.019 207	0.01[illegible] 192	0.009 213	0.007 180	0.005 196
DCP 2	.050	2.235	0.898 346	0.120 95	0.055 232	0.020 159	0.027 208	0.010 217	0.017 197	0.010 210	0.011 192
DCP 3	.100	1.783	0.841 348	0.191 74	0.272 307	0.127 202	0.030 256	0.019 127	0.033 255	0.021 298	0.065 217
DCP 4	.150	1.145	0.658 348	0.112 228	0.031 224	0.108 204	0.061 110	0.020 177	0.039 70	0.011 314	0.016 27
DCP 5	.200	0.998	0.506 351	0.100 237	0.064 167	0.041 200	0.058 114	0.031 9	0.006 352	0.023 316	0.019 229
DCP 6	.250	0.762	0.323 354	0.029 221	0.060 165	0.019 84	0.005 82	0.014 330	0.016 247	0.011 135	0.004 179
DCP 7	.300	0.587	0.287 354	0.029 222	0.058 159	0.028 53	0.014 290	0.010 269	0.012 229	0.010 157	0.002 83
DCP 8	.400	0.373	0.179 357	0.017 88	0.019 195	0.006 107	0.006 273	0.007 234	0.006 186	0.001 279	0.002 269
DCP 9	.500	0.380	0.137 0	0.018 86	0.012 204	0.003 148	0.006 241	0.005 201	0.002 169	0.001 157	0.001 348
DCP10	.695	0.266	0.071 7	0.011 71	0.007 228	0.002 153	0.003 255	0.001 6	0.002 255	0.001 293	0.000 175
DCP11	.800	0.138	0.061 7	0.006 121	0.006 176	0.002 4	0.003 259	0.002 340	0.004 234	0.003 110	0.004 32
DCP12	.878	0.077	0.057 359	0.011 223	0.008 140	0.003 14	0.002 234	0.003 74	0.001 257	0.001 194	0.001 104
DCP13	.953	0.154	0.071 353	0.022 209	0.013 122	0.005 6	0.001 240	0.002 10	0.001 322	0.001 91	0.002 114

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.05	0.600	7.43	2.41		3138.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.042	638.9	1443.3	0.63E 07	-0.00126	0.930	8.57

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.809	0.125 12	0.044 69	0.006 124	0.004 102	0.000 317	0.006 219	0.002 194	0.002 162	0.002 280
CM		-0.013	0.025 187	0.010 93	0.004 103	0.002 352	0.001 189	0.001 172	0.001 77	0.001 185	0.001 41
DCP 1	.010	3.112	0.338 356	0.103 80	0.008 132	0.012 181	0.005 305	0.004 163	0.003 184	0.002 53	0.001 79
DCP 2	.050	2.901	0.158 349	0.190 90	0.049 63	0.030 4	0.035 289	0.019 209	0.010 177	0.012 139	0.011 344
DCP 3	.100	2.292	0.235 163	0.085 83	0.167 147	0.041 234	0.052 126	0.044 225	0.027 111	0.024 183	0.0 5 8
DCP 4	.150	1.495	0.245 9	0.314 78	0.098 157	0.012 62	0.024 153	0.030 244	0.008 342	0.009 56	0.014 326
DCP 5	.200	1.295	0.256 11	0.222 78	0.023 71	0.079 70	0.037 150	0.016 213	0.020 140	0.020 229	0.012 309
DCP 6	.250	1.015	0.218 17	0.039 68	0.047 5	0.031 73	0.010 9	0.015 81	0.003 202	0.008 136	0.003 222
DCP 7	.300	0.832	0.214 14	0.076 58	0.063 350	0.022 41	0.035 315	0.007 159	0.004 249	0.007 151	0.006 174
DCP 8	.400	0.519	0.134 20	0.020 11	0.013 356	0.008 295	0.010 302	0.004 171	0.004 305	0.001 2	0.001 136
DCP 9	.500	0.523	0.116 18	0.018 338	0.011 323	0.012 265	0.008 269	0.002 212	0.007 292	0.005 226	0.003 295
DCP10	.695	0.361	0.095 14	0.030 272	0.010 214	0.012 195	0.005 120	0.003 91	0.003 270	0.003 32	0.004 276
DCP11	.800	0.231	0.101 8	0.030 271	0.013 220	0.018 158	0.012 43	0.010 293	0.004 197	0.003 347	0.007 221
DCP12	.878	0.183	0.109 0	0.018 275	0.013 260	0.015 138	0.009 18	0.004 255	0.002 17[illegible]	0.0[illegible]6 20	0.007 290
DCP13	.953	0.256	0.118 350	0.010 251	0.011 264	0.006 115	0.002 252	0.003 269	0.005 185	0.003 125	0.003 51

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.M	TEST POINT	CYCLES ANALYZED
	15.97	0.600	9.03	2.41		3138.3	10

K	V	Q	RN	DAMPING	CY(MAX)	ALPHA(STALL)
0.042	638.1	1438.2	0.63E 07	-0.00121	0.957	10.74

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.885	0.068	35	0.008	114	0.007	184	0.006	199	0.005	166	0.002	242	0.001	188	0.003	146	0.006	331
CM		-0.028	0.031	191	0.007	249	0.002	239	0.002	258	0.001	238	0.001	177	0.001	147	0.002	195	0.002	113
DCP 1	.010	3.311	0.195	1	0.025	129	0.046	153	0.009	74	0.004	61	0.005	304	0.004	96	0.007	11	0.009	279
DCP 2	.050	2.927	0.167	168	0.067	43	0.089	232	0.057	233	0.072	234	0.075	180	0.034	45	0.038	179	0.019	47
DCP 3	.100	2.277	0.177	171	0.243	256	0.135	320	0.022	138	0.015	198	0.007	17	0.038	141	0.038	194	0.013	295
DCP 4	.150	1.703	0.077	152	0.092	234	0.034	140	0.032	251	0.012	125	0.008	291	0.009	194	0.018	127	0.004	349
DCP 5	.200	1.448	0.113	141	0.025	247	0.040	194	0.020	240	0.005	178	0.015	354	0.010	249	0.004	187	0.007	17
DCP 6	.250	1.135	0.092	40	0.059	127	0.045	172	0.034	248	0.005	106	0.017	311	0.007	176	0.010	121	0.008	7
DCP 7	.300	0.934	0.111	45	0.084	93	0.067	165	0.015	226	0.012	148	0.006	352	0.010	322	0.006	75	0.009	359
DCP 8	.400	0.555	0.105	32	0.035	92	0.013	130	0.009	139	0.011	141	0.008	354	0.004	324	0.003	93	0.010	15
DCP 9	.500	0.587	0.116	31	0.032	91	0.021	95	0.009	93	0.011	129	0.006	211	0.004	176	0.002	293	0.005	304
DCP 10	.69?	0.412	0.113	17	0.007	75	0.014	38	0.011	67	0.010	26	0.003	304	0.008	30	0.000	42	0.001	140
DCP 11	.800	0.302	0.110	12	0.024	50	0.015	324	0.007	147	0.004	55	0.001	80	0.004	299	0.011	21	0.016	310
DCP 12	.878	0.261	0.115	3	0.020	48	0.008	249	0.001	63	0.006	235	0.003	171	0.004	311	0.007	62	0.014	282
DCP 13	.953	0.346	0.111	0	0.018	49	0.009	53	0.003	82	0.003	16	0.003	83	0.006	260	0.003	12	0.002	195

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	33.90	0.200	9.96	2.69		3134.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.257	220.2	199.8	0.26E 07	-0.00181	1.181	12.74

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.997	0.179 6	0.006 175	0.000 184	0.001 254	0.005 313	0.001 275	0.004 172	0.001 259	0.001 326
CM		0.007	0.018 274	0.001 103	0.001 214	0.001 96	0.001 154	0.000 53	0.001 40	0.001 87	0.000 345
DCP 1	.010	4.997	1.148 345	0.051 135	0.020 157	0.024 110	0.003 104	0.003 54	0.008 40	0.014 93	0.025 296
DCP 2	.050	3.968	0.610 346	0.034 149	0.013 207	0.013 35	0.011 291	0.003 162	0.006 98	0.003 93	0.004 351
DCP 3	.100	2.195	0.432 350	0.009 215	0.011 291	0.011 272	0.007 295	0.011 9	0.010 143	0.002 251	0.005 174
DCP 4	.150	1.544	0.314 355	0.012 144	0.007 185	0.005 191	0.006 186	0.003 275	0.004 55	0.003 213	0.006 340
DCP 5	.200	1.490	0.269 358	0.010 199	0.002 244	0.001 38	0.006 325	0.004 18	0.007 161	0.001 308	0.002 337
DCP 6	.250	1.267	0.226 5	0.012 144	0.003 161	0.006 247	0.007 212	0.003 180	0.005 50	0.001 172	0.003 343
DCP 7	.300	1.196	0.199 8	0.005 227	0.002 287	0.001 228	0.010 334	0.005 281	0.009 154	0.000 306	0.003 32
DCP 8	.400	0.904	0.148 21	0.006 153	0.002 175	0.006 149	0.007 249	0.004 215	0.005 101	0.001 218	0.006 16
DCP 9	.500	0.684	0.125 25	0.005 237	0.002 44	0.002 249	0.008 335	0.003 99	0.008 182	0.002 258	0.003 164
DCP 10	.695	0.408	0.086 53	0.004 216	0.003 30	0.002 12	0.006 346	0.001 258	0.004 271	0.004 312	0.002 284
DCP 11	.800	0.190	0.071 53	0.010 277	0.004 317	0.012 269	0.006 318	0.007 263	0.012 195	0.005 212	0.006 198
DCP 12	.878	0.003	0.064 57	0.004 121	0.005 109	0.007 62	0.006 359	0.001 45	0.006 277	0.003 338	0.003 355
DCP 13	.953	0.144	0.054 32	0.002 65	0.004 30	0.006 253	0.003 262	0.002 106	0.004 207	0.005 224	0.003 138

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	33.78	0.200	12.30	2.69		3134.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.257	219.9	198.4	0.26E 07	-0.00092	1.337	15.07

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		1.147	0.195 0	0.005 159	0.003 302	0.007 211	0.004 273	0.001 1	0.003 125	0.003 139	0.001 176
CM		0.000	0.010 296	0.003 162	0.000 212	0.001 35	0.002 103	0.000 56	0.001 345	0.001 316	0.001 327
DCP 1	.010	5.943	1.311 352	0.099 202	0.037 56	0.032 220	0.026 145	0.012 300	0.011 169	0.008 131	0.038 293
DCP 2	.050	4.482	0.650 351	0.045 179	0.021 349	0.018 159	0.008 253	0.006 36	0.002 326	0.006 130	0.003 13
DCP 3	.100	2.548	0.461 351	0.021 156	0.011 277	0.007 201	0.007 246	0.012 58	0.010 115	0.006 161	0.005 186
DCP 4	.150	1.741	0.375 353	0.042 163	0.015 288	0.011 172	0.006 303	0.001 231	0.005 110	0.002 130	0.002 4
DCP 5	.200	1.652	0.298 356	0.012 103	0.011 234	0.009 255	0.009 294	0.009 55	0.007 138	0.007 130	0.004 196
DCP 6	.250	1.419	0.264 355	0.028 128	0.016 260	0.008 114	0.007 258	0.009 306	0.007 82	0.004 134	0.005 358
DCP 7	.300	1.277	0.220 1	0.013 54	0.007 179	0.013 239	0.008 291	0.004 6	0.006 103	0.003 241	0.004 195
DCP 8	.400	0.998	0.158 3	0.016 88	0.014 241	0.005 239	0.003 269	0.008 266	0.005 51	0.005 136	0.004 348
DCP 9	.500	0.814	0.121 17	0.013 348	0.006 6	0.009 247	0.009 293	0.006 99	0.004 125	0.002 190	0.004 148
DCP 10	.695	0.451	0.067 38	0.010 286	0.001 352	0.007 205	0.006 243	0.004 307	0.002 158	0.002 162	0.006 121
DCP 11	.800	0.243	0.040 24	0.010 8	0.003 11	0.007 211	0.009 282	0.003 321	0.003 172	0.009 133	0.008 171
DCP 12	.878	0.124	0.023 28	0.007 270	0.006 147	0.002 218	0.005 320	0.003 197	0.004 219	0.006 197	0.003 249
DCP 13	.953	0.220	0.036 26	0.004 221	0.011 11	0.007 153	0.007 267	0.003 126	0.004 155	0.002 206	0.006 129

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	33.90	0.200	14.66	2.68		3134.3	10
K	V	Q	RN	DAMPING	CY(MAX)	ALPHA(STALL)	
0.258	219.4	198.5	0.26E 07	0.00613	1.485	16.98	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.179	0.357	355	0.092	129	0.045	296	0.019	111	0.018	282	0.017	111	0.002	280	0.006	123	0.006	3
CM		-0.057	0.058	82	0.041	263	0.022	90	0.010	285	0.007	117	0.006	293	0.002	108	0.003	339	0.002	188
DCP 1	.010	4.832	2.344	55	0.905	307	0.381	183	0.215	87	0.148	337	0.088	216	0.078	110	0.061	12	0.063	241
DCP 2	.050	3.957	1.274	36	0.322	244	0.077	88	0.052	50	0.070	248	0.044	89	0.015	31	0.015	272	0.028	115
DCP 3	.100	2.397	0.968	16	0.278	198	0.098	72	0.085	331	0.065	202	0.036	101	0.043	294	0.015	161	0.009	43
DCP 4	.150	1.675	0.875	4	0.285	190	0.107	76	0.099	328	0.054	197	0.045	92	0.031	342	0.016	189	0.020	61
DCP 5	.200	1.531	0.657	353	0.216	157	0.092	354	0.045	246	0.022	148	0.023	355	0.031	187	0.023	49	0.017	347
DCP 6	.250	1.434	0.675	347	0.258	162	0.135	38	0.085	271	0.037	154	0.048	50	0.020	266	0.026	156	0.028	17
DCP 7	.300	1.317	0.506	341	0.217	127	0.132	319	0.054	192	0.011	53	0.028	282	0.037	112	0.013	4	0.013	282
DCP 8	.400	1.136	0.464	325	0.232	130	0.147	350	0.084	193	0.028	56	0.030	325	0.029	168	0.036	80	0.016	278
DCP 9	.500	0.918	0.299	317	0.184	98	0.123	277	0.059	137	0.030	325	0.038	163	0.006	337	0.007	158	0.008	120
DCP10	.695	0.613	0.197	289	0.168	77	0.108	260	0.064	85	0.046	296	0.038	125	0.022	353	0.017	205	0.009	0
DCP11	.800	0.436	0.129	288	0.116	78	0.087	265	0.061	102	0.044	298	0.047	111	0.028	261	0.016	152	0.025	15
DCP12	.878	0.332	0.112	277	0.104	71	0.083	248	0.053	64	0.050	269	0.036	99	0.015	309	0.021	149	0.026	350
DCP13	.953	0.388	0.033	255	0.049	40	0.037	185	0.018	359	0.013	172	0.019	348	0.018	154	0.004	355	0.013	23

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	33.56	0.400	9.81	2.65		3136.1	10
K	V	Q	RN	DAMPING	CY(MAX)	ALPHA(STALL)	
0.130	432.7	733.2	0.48E 07	0.00112	1.229	12.48	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.953	0.222	25	0.047	299	0.018	193	0.011	105	0.006	297	0.006	162	0.002	39	0.000	47	0.002	258
CM		-0.014	0.024	154	0.019	12	0.007	259	0.005	202	0.004	104	0.002	337	0.000	320	0.002	264	0.001	114
DCP 1	.010	5.374	0.915	49	0.738	21	0.329	282	0.170	228	0.161	169	0.044	87	0.042	287	0.059	253	0.067	201
DCP 2	.050	3.239	0.486	43	0.289	353	0.154	246	0.079	169	0.050	122	0.031	82	0.025	21	0.015	347	0.019	317
DCP 3	.100	2.223	0.406	46	0.199	346	0.107	235	0.062	148	0.026	69	0.006	109	0.014	44	0.010	351	0.010	287
DCP 4	.150	1.560	0.401	28	0.165	296	0.087	169	0.025	77	0.020	49	0.018	291	0.006	207	0.002	228	0.005	118
DCP 5	.200	1.345	0.342	36	0.141	302	0.080	187	0.046	107	0.029	9	0.011	259	0.007	190	0.006	82	0.003	298
DCP 6	.250	1.193	0.321	23	0.107	269	0.050	126	0.006	58	0.020	7	0.022	237	0.007	89	0.002	236	0.005	74
DCP 7	.300	0.940	0.298	28	0.114	275	0.065	157	0.045	80	0.036	331	0.015	213	0.006	119	0.002	225	0.012	107
DCP 8	.400	0.561	0.218	22	0.057	242	0.020	63	0.013	140	0.023	335	0.020	196	0.011	35	0.006	246	0.005	102
DCP 9	.500	0.677	0.198	18	0.078	233	0.039	108	0.023	32	0.023	277	0.010	146	0.003	72	0.006	159	0.008	5
DCP10	.695	0.530	0.127	6	0.049	196	0.016	65	0.015	30	0.015	270	0.006	159	0.001	248	0.008	79	0.015	263
DCP11	.800	0.258	0.101	353	0.044	183	0.010	51	0.011	45	0.012	270	0.005	120	0.004	130	0.007	50	0.007	244
DCP12	.878	0.142	0.101	340	0.033	168	0.003	37	0.011	23	0.011	246	0.008	99	0.004	289	0.005	88	0.003	202
DCP13	.953	0.270	0.109	330	0.030	176	0.006	131	0.010	341	0.007	215	0.005	115	0.003	152	0.006	59	0.007	292

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	33.56	0.400	12.10	2.56		3136.2	10
K	**V**	**Q**	**RN**	**DAMPING**	**CN(MAX)**	**ALPHA(STALL)**	
0.130	432.7	732.8	0.48E 07	0.00195	1.309	13.62	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.978	0.246 62	0.057 69	0.051 328	0.026 237	0.012 133	0.001 162	0.002 84	0.003 113	0.004 320
CN		-0.054	0.063 161	0.015 136	0.020 73	0.012 31	0.005 327	0.004 287	0.001 262	0.001 226	0.002 192
DCP 1	.010	4.711	1.842 137	0.830 113	0.507 78	0.153 71	0.069 46	0.065 298	0.045 283	0.018 33	0.030 30
DCP 2	.050	2.854	0.935 116	0.212 82	0.193 62	0.053 32	0.059 52	0.012 319	0.018 130	0.026 155	0.030 146
DCP 3	.100	2.084	0.642 93	0.136 75	0.164 21	0.013 311	0.036 4	0.015 341	0.013 33	0.014 56	0.012 33
DCP 4	.150	1.507	0.561 78	0.098 64	0.164 0	0.029 293	0.019 334	0.019 327	0.009 353	0.009 316	0.009 37
DCP 5	.200	1.290	0.431 69	0.098 71	0.148 345	0.036 284	0.024 259	0.022 284	0.010 187	0.007 202	0.005 338
DCP 6	.250	1.217	0.431 59	0.053 67	0.131 332	0.045 265	0.023 185	0.010 288	0.012 40	0.014 270	0.004 0
DCP 7	.300	0.984	0.372 51	0.071 63	0.125 319	0.036 277	0.031 220	0.018 247	0.008 182	0.012 175	0.009 7
DCP 8	.400	0.645	0.312 37	0.027 91	0.091 298	0.047 252	0.032 147	0.018 207	0.009 34	0.011 158	0.006 61
DCP 9	.500	0.754	0.258 24	0.046 63	0.083 290	0.060 249	0.029 157	0.014 174	0.009 151	0.003 103	0.014 254
DCP 10	.695	0.633	0.207 7	0.031 356	0.066 255	0.045 232	0.024 148	0.020 139	0.004 117	0.004 73	0.013 15
DCP 11	.800	0.386	0.178 351	0.052 334	0.062 247	0.054 184	0.016 111	0.018 70	0.002 42	0.007 33	0.021 271
DCP 12	.878	0.298	0.164 345	0.059 325	0.051 236	0.051 182	0.016 82	0.020 91	0.009 331	0.006 47	0.012 258
DCP 13	.953	0.403	0.134 331	0.050 324	0.023 237	0.024 163	0.013 126	0.007 13	0.003 77	0.005 357	0.007 234

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	33.56	0.400	14.45	2.56		3136.3	10
K	**V**	**Q**	**RN**	**DAMPING**	**CN(MAX)**	**ALPHA(STALL)**	
0.130	432.6	731.2	0.48E 07	-0.00166	1.250	14.53	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.952	0.218 82	0.055 110	0.028 97	0.018 29	0.013 253	0.001 141	0.002 119	0.003 190	0.005 114
CN		-0.101	0.053 200	0.024 214	0.015 219	0.009 197	0.002 184	0.004 223	0.002 289	0.002 287	0.002 241
DCP 1	.010	3.711	1.426 164	0.636 201	0.363 231	0.170 239	0.148 274	0.090 319	0.097 351	0.042 339	0.010 99
DCP 2	.050	2.268	0.565 136	0.251 213	0.072 198	0.040 238	0.067 231	0.050 255	0.026 293	0.020 304	0.016 49
DCP 3	.100	1.759	0.453 114	0.177 168	0.065 191	0.010 146	0.033 205	0.036 220	0.015 259	0.017 260	0.008 336
DCP 4	.150	1.295	0.379 90	0.162 146	0.043 163	0.010 91	0.032 230	0.037 209	0.014 229	0.016 240	0.007 238
DCP 5	.200	1.143	0.340 102	0.128 114	0.087 133	0.039 102	0.019 168	0.027 159	0.006 332	0.023 197	0.019 190
DCP 6	.250	1.116	0.343 79	0.137 123	0.044 125	0.018 61	0.013 218	0.036 182	0.020 181	0.015 234	0.015 208
DCP 7	.300	0.956	0.320 84	0.124 88	0.092 115	0.049 92	0.011 274	0.016 159	0.021 189	0.022 162	0.013 160
DCP 8	.400	0.684	0.293 68	0.116 89	0.064 82	0.033 47	0.004 51	0.024 127	0.006 137	0.010 208	0.019 179
DCP 9	.500	0.837	0.275 54	0.102 58	0.074 76	0.046 29	0.013 267	0.021 47	0.017 117	0.006 52	0.014 140
DCP 10	.695	0.781	0.217 31	0.062 42	0.049 51	0.034 20	0.008 277	0.015 45	0.016 76	0.008 165	0.021 66
DCP 11	.800	0.520	0.156 39	0.074 32	0.055 17	0.034 353	0.010 2	0.015 10	0.006 169	0.014 83	0.010 35
DCP 12	.878	0.434	0.131 34	0.059 25	0.042 7	0.026 354	0.010 325	0.013 339	0.004 7	0.004 45	0.005 12
DCP 13	.953	0.541	0.117 2	0.032 25	0.027 358	0.016 335	0.006 228	0.007 4	0.003 357	0.009 88	0.013 340

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	33.33	0.600	5.05	2.72		3139.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.087	639.1	1436.0	0.63E 07	-0.00094	0.889	7.81

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.613	0.264	349	0.012	340	0.011	206	0.005	86	0.001	356	0.002	327	0.001	312	0.001	266	0.003	130
CM		0.003	0.010	267	0.003	53	0.004	288	0.003	169	0.001	35	0.000	281	0.000	270	0.001	274	0.001	123
DCP 1	.010	2.497	0.919	340	0.128	50	0.028	159	0.006	8	0.003	147	0.003	220	0.003	180	0.008	52	0.015	70
DCP 2	.050	2.366	0.903	338	0.103	47	0.032	244	0.022	354	0.005	205	0.010	297	0.001	79	0.003	273	0.004	36
DCP 3	.100	1.787	0.818	343	0.215	40	0.282	287	0.082	155	0.055	264	0.022	47	0.030	255	0.040	270	0.055	150
DCP 4	.150	1.170	0.640	345	0.111	245	0.023	215	0.093	181	0.059	70	0.019	156	0.037	32	0.005	259	0.014	8
DCP 5	.200	1.003	0.507	347	0.111	248	0.065	146	0.033	155	0.064	69	0.038	325	0.006	329	0.022	277	0.019	174
DCP 6	.250	0.798	0.340	351	0.049	257	0.066	139	0.035	38	0.014	356	0.018	294	0.013	212	0.011	125	0.007	52
DCP 7	.300	0.633	0.298	351	0.040	254	0.060	133	0.040	23	0.016	294	0.009	266	0.011	190	0.012	100	0.006	21
DCP 8	.400	0.383	0.184	357	0.015	354	0.016	152	0.015	20	0.008	259	0.003	190	0.003	96	0.004	51	0.003	317
DCP 9	.500	0.376	0.141	1	0.017	4	0.010	158	0.010	9	0.006	236	0.003	125	0.003	22	0.001	274	0.001	248
DCP10	.695	0.267	0.081	15	0.010	357	0.006	172	0.007	359	0.004	206	0.003	64	0.002	347	0.001	117	0.000	223
DCP11	.800	0.132	0.066	13	0.005	299	0.007	130	0.005	347	0.003	193	0.002	58	0.000	334	0.002	131	0.000	345
DCP12	.878	0.064	0.061	5	0.014	214	0.008	100	0.007	336	0.003	212	0.001	314	0.002	130	0.002	37	0.002	235
DCP13	.953	0.132	0.073	349	0.022	194	0.012	61	0.006	288	0.002	112	0.003	280	0.001	142	0.000	279	0.001	79

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	33.22	0.600	7.47	2.58		3139.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.087	638.5	1434.6	0.63E 07	-0.00070	1.016	9.26

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.812	0.156	17	0.041	29	0.013	1	0.008	302	0.002	266	0.006	168	0.003	54	0.003	112	0.004	21
CM		-0.010	0.027	193	0.010	88	0.006	102	0.005	41	0.003	11	0.002	307	0.001	269	0.001	211	0.000	151
DCP 1	.010	3.126	0.361	352	0.088	57	0.019	28	0.006	214	0.014	293	0.001	153	0.002	74	0.006	180	0.010	161
DCP 2	.050	2.961	0.187	347	0.138	73	0.053	92	0.060	34	0.047	297	0.010	124	0.026	312	0.023	204	0.009	77
DCP 3	.100	2.325	0.197	139	0.118	54	0.182	120	0.027	76	0.072	66	0.001	321	0.046	46	0.005	114	0.030	16
DCP 4	.150	1.493	0.330	10	0.276	61	0.062	106	0.049	39	0.045	92	0.026	227	0.006	252	0.016	173	0.010	303
DCP 5	.200	1.266	0.316	13	0.168	54	0.073	1	0.089	24	0.026	22	0.021	356	0.021	67	0.010	131	0.018	50
DCP 6	.250	1.038	0.270	22	0.086	29	0.086	347	0.037	331	0.037	321	0.020	294	0.007	273	0.006	328	0.003	357
DCP 7	.300	0.860	0.254	20	0.068	14	0.085	339	0.043	297	0.044	287	0.018	246	0.021	258	0.011	183	0.002	301
DCP 8	.400	0.518	0.172	31	0.052	342	0.032	324	0.034	269	0.020	241	0.021	198	0.013	148	0.007	84	0.000	231
DCP 9	.500	0.514	0.148	27	0.038	326	0.028	306	0.034	235	0.017	197	0.019	153	0.011	121	0.012	74	0.004	40
DCP10	.695	0.361	0.109	23	0.027	281	0.013	277	0.017	211	0.010	170	0.013	114	0.005	41	0.006	24	0.002	283
DCP11	.800	0.227	0.118	11	0.036	266	0.008	235	0.011	205	0.006	189	0.012	131	0.008	49	0.003	12	0.005	33
DCP12	.878	0.173	0.123	359	0.029	255	0.015	267	0.012	193	0.008	174	0.009	104	0.005	32	0.004	9	0.004	299
DCP13	.953	0.236	0.123	346	0.018	253	0.019	238	0.006	159	0.008	126	0.006	16	0.004	346	0.004	235	0.003	114

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	33.22	0.600	9.63	2.54		3139.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.087	637.8	1429.5	0.63E 07	-0.00119	0.995	9.25

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.894	0.098 53	0.014 117	0.006 212	0.012 123	0.002 170	0.003 226	0.004 182	0.002 119	0.002 248
CM		-0.030	0.034 200	0.007 252	0.002 253	0.004 249	0.001 229	0.001 273	0.002 262	0.001 153	0.000 63
DCP 1	.010	3.407	0.241 2	0.029 260	0.043 174	0.005 343	0.007 194	0.008 294	0.001 28	0.011 278	0.014 178
DCP 2	.050	2.952	0.251 179	0.033 70	0.104 212	0.025 193	0.029 232	0.011 243	0.031 246	0.018 159	0.035 251
DCP 3	.100	2.232	0.102 145	0.120 268	0.116 323	0.039 77	0.034 136	0.032 229	0.011 235	0.017 149	0.039 97
DCP 4	.150	1.710	0.130 118	0.060 230	0.026 296	0.044 214	0.010 11	0.014 245	0.015 206	0.008 161	0.004 241
DCP 5	.200	1.423	0.179 116	0.034 235	0.015 221	0.020 207	0.006 347	0.005 327	0.007 231	0.012 129	0.012 286
DCP 6	.250	1.161	0.155 77	0.057 139	0.025 210	0.030 179	0.012 320	0.007 229	0.016 199	0.012 179	0.009 171
DCP 7	.300	0.968	0.165 71	0.070 131	0.048 170	0.034 196	0.012 212	0.015 300	0.015 213	0.007 68	0.012 306
DCP 8	.400	0.562	0.156 54	0.036 110	0.018 142	0.025 120	0.004 245	0.004 198	0.007 184	0.005 152	0.003 175
DCP 9	.500	0.383	0.144 44	0.041 100	0.015 95	0.026 116	0.011 134	0.006 144	0.010 154	0.006 367	0.009 264
DCP 10	.695	0.431	0.139 27	0.017 62	0.012 55	0.026 61	0.006 12	0.005 77	0.005 37	0.003 358	0.012 63
DCP 11	.800	0.309	0.125 18	0.024 55	0.003 267	0.014 70	0.004 152	0.005 134	0.013 93	0.005 9	0.006 195
DCP 12	.878	0.275	0.127 10	0.022 42	0.001 182	0.012 46	0.002 96	0.002 83	0.011 64	0.008 338	0.000 127
DCP 13	.953	0.344	0.112 359	0.018 48	0.010 340	0.008 17	0.005 321	0.004 297	0.003 55	0.003 251	0.002 219

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	49.50	0.400	9.79	2.72		3137.1	10

K	V	Q	RN	DAMPING	CY(MAX)	ALPHA(STALL)
0.190	434.5	735.4	0.48E 07	0.00068	1.263	12.56

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.971	0.271	16	0.051	230	0.019	104	0.005	301	0.016	153	0.007	4	0.003	352	0.003	241	0.005	94
CM		-0.016	0.020	149	0.020	341	0.010	209	0.007	102	0.004	320	0.002	124	0.002	244	0.001	137	0.001	253
DCP 1	.010	5.313	1.187	32	0.494	359	0.252	245	0.131	182	0.149	145	0.047	58	0.028	277	0.047	177	0.017	80
DCP 2	.050	3.300	0.637	33	0.257	320	0.181	197	0.095	102	0.025	75	0.024	37	0.029	328	0.018	240	0.011	177
DCP 3	.100	2.219	0.552	25	0.189	288	0.119	166	0.054	75	0.009	90	0.021	8	0.020	255	0.008	136	0.007	160
DCP 4	.150	1.590	0.469	16	0.143	249	0.073	125	0.022	73	0.012	355	0.009	216	0.002	257	0.012	146	0.010	45
DCP 5	.200	1.419	0.430	17	0.154	241	0.084	106	0.021	2	0.005	250	0.002	220	0.003	301	0.005	86	0.002	347
DCP 6	.250	1.210	0.366	15	0.111	225	0.046	88	0.008	73	0.012	270	0.008	146	0.002	115	0.006	68	0.004	0
DCP 7	.300	0.953	0.362	14	0.136	220	0.072	82	0.022	335	0.019	213	0.010	21	0.009	175	0.012	21	0.005	229
DCP 8	.400	0.648	0.259	18	0.083	206	0.030	47	0.009	11	0.024	213	0.015	50	0.002	183	0.006	338	0.005	132
DCP 9	.500	0.690	0.230	10	0.098	188	0.047	45	0.024	303	0.027	182	0.010	39	0.010	24	0.012	249	0.014	90
DCP10	.695	0.500	0.137	7	0.061	168	0.026	29	0.028	288	0.026	145	0.015	328	0.004	55	0.008	266	0.011	70
DCP11	.800	0.273	0.098	356	0.049	155	0.020	30	0.027	273	0.026	120	0.017	271	0.011	61	0.002	258	0.004	94
DCP12	.878	0.158	0.097	338	0.042	151	0.018	30	0.023	261	0.017	103	0.009	311	0.001	345	0.004	323	0.005	194
DCP13	.953	0.288	0.094	319	0.037	132	0.017	12	0.019	232	0.014	85	0.007	297	0.003	27	0.002	214	0.005	289

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	49.50	0.400	12.10	2.62		3137.2	10

K	V	Q	RN	DAMPING	CY(MAX)	ALPHA(STALL)
0.190	434.4	733.7	0.48E 07	0.00130	1.421	14.46

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.014	0.310	55	0.080	342	0.047	235	0.017	131	0.009	60	0.010	34	0.007	195	0.009	19	0.003	208
CM		-0.055	0.072	167	0.033	83	0.027	11	0.011	278	0.004	231	0.004	170	0.004	28	0.002	293	0.003	8
DCP 1	.010	4.650	1.873	134	0.948	82	0.405	49	0.067	56	0.099	70	0.030	34	0.042	135	0.050	337	0.043	290
DCP 2	.050	3.063	0.952	108	0.366	37	0.140	34	0.094	342	0.058	339	0.018	355	0.014	347	0.017	62	0.021	21
DCP 3	.100	2.136	0.694	86	0.242	20	0.107	348	0.049	272	0.028	328	0.016	355	0.014	288	0.010	339	0.013	151
DCP 4	.150	1.561	0.610	67	0.181	356	0.132	321	0.072	243	0.028	260	0.015	207	0.022	176	0.011	68	0.008	309
DCP 5	.200	1.423	0.507	62	0.166	359	0.126	295	0.053	218	0.017	217	0.009	120	0.007	134	0.010	221	0.027	105
DCP 6	.250	1.255	0.492	52	0.114	345	0.135	289	0.056	203	0.014	220	0.028	194	0.035	113	0.015	14	0.005	197
DCP 7	.300	0.986	0.446	51	0.138	344	0.123	272	0.043	212	0.040	191	0.036	111	0.015	39	0.009	199	0.026	67
DCP 8	.400	0.742	0.398	36	0.101	314	0.139	241	0.045	136	0.017	124	0.028	114	0.023	24	0.014	309	0.006	232
DCP 9	.500	0.782	0.346	31	0.110	312	0.127	228	0.039	154	0.031	112	0.030	72	0.011	292	0.026	76	0.032	309
DCP10	.695	0.605	0.274	14	0.110	278	0.121	189	0.044	100	0.027	74	0.043	5	0.036	218	0.023	15	0.031	196
DCP11	.800	0.423	0.241	354	0.112	262	0.101	169	0.056	84	0.035	13	0.025	318	0.023	179	0.016	340	0.017	177
DCP12	.878	0.305	0.209	345	0.098	254	0.079	155	0.054	71	0.030	337	0.017	304	0.024	208	0.011	60	0.035	122
DCP13	.953	0.408	0.150	335	0.065	260	0.045	151	0.025	58	0.019	39	0.026	287	0.010	136	0.012	252	0.018	102

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	49.26	0.400	14.46	2.66		3137.3	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.190	434.0	733.4	0.48E 07	-0.00095	1.445	16.06	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.017	0.305	65	0.087	30	0.008	319	0.023	325	0.021	206	0.007	205	0.008	109	0.007	240	0.008	17
CM		-0.098	0.070	191	0.039	151	0.012	97	0.013	93	0.008	359	0.003	8	0.004	277	0.002	25	0.006	197
DCP 1	.010	3.894	1.728	147	0.762	149	0.374	173	0.237	164	0.091	218	0.162	220	0.047	236	0.042	246	0.037	326
DCP 2	.050	2.607	0.791	116	0.203	141	0.111	99	0.081	110	0.038	164	0.023	129	0.024	145	0.026	235	0.012	264
DCP 3	.100	1.931	0.549	100	0.216	114	0.061	61	0.111	87	0.021	157	0.019	84	0.018	143	0.008	128	0.029	241
DCP 4	.150	1.419	0.526	69	0.185	79	0.047	41	0.066	33	0.016	16	0.014	76	0.023	49	0.010	42	0.014	290
DCP 5	.200	1.324	0.428	80	0.210	70	0.046	57	0.082	24	0.009	203	0.030	66	0.005	352	0.017	35	0.011	166
DCP 6	.250	1.195	0.457	57	0.185	48	0.058	16	0.060	7	0.031	344	0.016	9	0.022	356	0.016	333	0.016	222
DCP 7	.300	0.980	0.404	63	0.191	45	0.035	56	0.091	352	0.011	310	0.038	39	0.009	325	0.029	332	0.006	131
DCP 8	.400	0.766	0.381	48	0.190	15	0.061	347	0.074	330	0.042	282	0.020	276	0.019	262	0.017	242	0.025	159
DCP 9	.500	0.871	0.361	45	0.183	10	0.043	341	0.076	329	0.044	264	0.028	301	0.009	170	0.023	245	0.021	91
DCP10	.695	0.743	0.302	27	0.155	333	0.042	285	0.072	275	0.054	190	0.038	229	0.041	111	0.023	150	0.027	33
DCP11	.800	0.571	0.243	26	0.132	319	0.070	244	0.049	241	0.064	170	0.042	153	0.020	112	0.008	241	0.045	11
DCP12	.878	0.449	0.195	19	0.101	312	0.063	230	0.043	199	0.045	131	0.019	128	0.015	74	0.014	4	0.040	340
DCP13	.953	0.531	0.128	10	0.059	298	0.023	260	0.041	221	0.020	128	0.020	125	0.018	37	0.007	186	0.015	314

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	50.51	0.600	4.99	2.76		3140.1	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.132	640.2	1434.1	0.63E 07	-0.00094	0.889	7.70	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.613	0.256	347	0.013	264	0.008	162	0.003	82	0.003	189	0.001	267	0.002	158	0.001	202	0.002	98
CM		0.002	0.014	267	0.003	34	0.004	248	0.003	100	0.002	346	0.000	201	0.000	275	0.000	39	0.000	264
DCP 1	.010	2.468	0.907	332	0.111	37	0.012	154	0.012	345	0.010	106	0.015	239	0.003	198	0.002	42	0.003	90
DCP 2	.050	2.372	0.883	331	0.088	34	0.036	248	0.023	335	0.008	158	0.011	248	0.003	279	0.005	292	0.001	229
DCP 3	.100	1.797	0.833	340	0.131	21	0.258	261	0.120	120	0.059	253	0.013	58	0.052	195	0.013	126	0.037	93
DCP 4	.150	1.148	0.629	341	0.139	234	0.031	154	0.077	148	0.055	40	0.016	103	0.040	341	0.009	235	0.015	273
DCP 5	.200	1.025	0.500	345	0.134	226	0.083	118	0.021	97	0.046	36	0.036	276	0.007	189	0.013	210	0.014	103
DCP 6	.250	0.786	0.338	346	0.060	235	0.067	107	0.039	356	0.013	276	0.017	225	0.014	118	0.009	36	0.003	337
DCP 7	.300	0.613	0.285	352	0.049	220	0.061	102	0.039	346	0.022	231	0.009	173	0.014	102	0.010	6	0.006	281
DCP 8	.400	0.392	0.181	359	0.014	308	0.014	103	0.015	326	0.012	182	0.003	66	0.003	47	0.003	297	0.004	162
DCP 9	.500	0.383	0.140	9	0.009	310	0.008	108	0.007	281	0.010	171	0.005	45	0.001	26	0.001	217	0.002	117
DCP10	.695	0.256	0.088	22	0.010	312	0.006	85	0.006	269	0.007	150	0.004	326	0.003	159	0.002	174	0.001	81
DCP11	.800	0.143	0.068	24	0.008	243	0.007	83	0.008	273	0.008	186	0.002	17	0.002	193	0.003	173	0.004	78
DCP12	.878	0.069	0.057	9	0.011	188	0.010	39	0.007	239	0.004	124	0.001	287	0.001	127	0.002	275	0.003	86
DCP13	.953	0.147	0.061	350	0.021	164	0.011	5	0.007	204	0.001	258	0.002	133	0.000	312	0.001	107	0.001	343

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	49.75	0.600	7.46	2.60		3140.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.130	639.7	1433.7	0.63E 07	-0.00063	1.063	9.68

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.812	0.198 21	0.042 336	0.003 11	0.012 285	0.010 107	0.001 232	0.003 21	0.002 277	0.000 92
CM		-0.012	0.031 195	0.017 70	0.004 39	0.006 351	0.003 277	0.001 288	0.003 183	0.001 96	0.001 44
DCP 1	.010	3.090	0.417 351	0.062 35	0.013 102	0.010 208	0.021 348	0.010 166	0.007 190	0.002 304	0.008 76
DCP 2	.050	2.949	0.208 355	0.177 54	0.051 353	0.028 267	0.008 274	0.006 43	0.020 241	0.022 147	0.015 56
DCP 3	.100	2.364	0.153 112	0.173 42	0.164 116	0.085 5	0.048 34	0.047 334	0.018 351	0.028 259	0.036 349
DCP 4	.150	1.454	0.431 14	0.224 37	0.038 90	0.084 9	0.043 102	0.008 198	0.011 173	0.014 119	0.013 118
DCP 5	.200	1.283	0.405 20	0.132 19	0.078 348	0.094 0	0.024 319	0.031 324	0.011 124	0.017 17	0.007 56
DCP 6	.250	1.019	0.336 26	0.102 337	0.064 331	0.063 294	0.021 245	0.025 269	0.018 219	0.005 269	0.013 137
DCP 7	.300	0.825	0.313 26	0.098 325	0.063 321	0.069 274	0.037 226	0.035 208	0.024 160	0.007 108	0.006 171
DCP 8	.400	0.531	0.219 32	0.075 305	0.013 281	0.039 250	0.025 153	0.014 186	0.017 114	0.012 69	0.008 31
DCP 9	.500	0.525	0.199 30	0.073 290	0.017 233	0.036 217	0.037 129	0.020 97	0.020 31	0.009 330	0.008 313
DCP10	.695	0.349	0.139 25	0.055 255	0.012 152	0.019 169	0.022 81	0.009 29	0.017 331	0.009 232	0.003 133
DCP11	.800	0.240	0.136 13	0.053 250	0.012 184	0.021 148	0.014 65	0.004 137	0.015 7	0.012 276	0.008 219
DCP12	.878	0.181	0.130 357	0.044 236	0.017 209	0.023 128	0.009 28	0.005 171	0.011 338	0.005 268	0.005 235
DCP13	.953	0.248	0.126 343	0.034 219	0.015 195	0.017 106	0.009 23	0.003 242	0.002 345	0.003 186	0.001 27

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	49.50	0.600	9.72	2.58		3140.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.129	638.9	1431.5	0.63E 07	-0.00112	1.088	10.64

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.905	0.156 52	0.027 87	0.009 299	0.005 112	0.003 292	0.004 330	0.001 205	0.003 232	0.003 226
CM		-0.031	0.042 202	0.007 214	0.003 166	0.003 230	0.002 224	0.001 120	0.001 356	0.002 38	0.001 324
DCP 1	.010	3.387	0.301 5	0.015 319	0.039 187	0.009 245	0.014 203	0.014 76	0.003 315	0.004 308	0.001 246
DCP 2	.050	3.019	0.182 166	0.093 74	0.069 201	0.033 173	0.032 232	0.008 120	0.010 340	0.005 41	0.017 3
DCP 3	.100	2.322	0.231 128	0.119 239	0.143 316	0.066 356	0.025 351	0.030 3	0.030 20	0.014 113	0.017 267
DCP 4	.150	1.712	0.184 96	0.055 180	0.019 329	0.031 221	0.018 313	0.009 279	0.012 332	0.008 173	0.011 298
DCP 5	.200	1.448	0.259 95	0.043 132	0.023 213	0.041 237	0.018 281	0.010 303	0.003 271	0.007 316	0.011 223
DCP 6	.250	1.153	0.255 62	0.107 112	0.034 166	0.047 187	0.010 256	0.011 290	0.002 137	0.017 31	0.014 255
DCP 7	.300	0.936	0.261 62	0.106 96	0.047 157	0.046 188	0.034 217	0.008 256	0.014 224	0.013 326	0.011 222
DCP 8	.400	0.573	0.219 56	0.052 87	0.013 77	0.032 110	0.006 166	0.009 65	0.006 238	0.009 292	0.005 286
DCP 9	.500	0.605	0.206 45	0.050 78	0.023 4	0.028 101	0.012 72	0.004 142	0.011 142	0.014 212	0.005 158
DCP10	.695	0.423	0.167 30	0.021 36	0.024 325	0.017 23	0.005 35	0.010 334	0.008 133	0.003 214	0.002 195
DCP11	.800	0.327	0.172 24	0.026 8	0.016 312	0.016 20	0.014 23	0.010 313	0.009 302	0.011 226	0.009 148
DCP12	.878	0.275	0.155 12	0.024 2	0.007 319	0.013 358	0.007 347	0.009 255	0.004 190	0.011 197	0.009 116
DCP13	.953	0.360	0.137 357	0.026 350	0.010 286	0.007 330	0.001 210	0.002 329	0.002 2	0.002 150	0.001 127

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	62.50	0.400	9.93	2.87		3167.1	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.239	436.2	726.1	0.47E 07	0.00053	1.268	12.75	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.970	0.292 13	0.041 216	0.009 53	0.009 220	0.006 111	0.001 349	0.001 292	0.001 155	0.001 298
CM		-0.017	0.016 139	0.017 322	0.008 191	0.006 62	0.002 272	0.001 109	0.000 272	0.000 183	0.001 149
DCP 1	.010	5.198	1.227 33	0.697 0	0.415 247	0.185 139	0.011 115	0.052 116	0.014 219	0.046 137	0.020 57
DCP 2	.050	3.182	0.694 32	0.258 310	0.126 186	0.047 128	0.043 68	0.015 49	0.034 343	0.023 244	0.035 215
DCP 3	.100	2.216	0.668 15	0.220 259	0.100 131	0.028 92	0.036 5	0.027 280	0.022 200	0.014 106	0.032 141
DCP 4	.150	1.632	0.547 12	0.166 230	0.070 69	0.012 52	0.020 297	0.002 130	0.015 213	0.0.. 66	0.026 314
DCP 5	.200	1.434	0.495 7	0.162 216	0.061 75	0.020 21	0.023 264	0.015 167	0.014 72	0.012 303	0.026 134
DCP 6	.250	1.221	0.415 12	0.123 210	0.043 64	0.022 11	0.026 232	0.007 88	0.007 137	0.005 346	0.004 312
DCP 7	.300	0.955	0.402 8	0.131 199	0.045 54	0.024 339	0.025 215	0.010 128	0.013 31	0.010 253	0.010 144
DCP 8	.400	0.694	0.284 14	0.086 190	0.029 45	0.031 320	0.027 175	0.008 52	0.007 291	0.005 50	0.006 234
DCP 9	.500	0.702	0.248 6	0.089 163	0.038 14	0.036 257	0.026 121	0.011 341	0.003 206	0.002 189	0.006 338
DCP10	.695	0.499	0.131 8	0.053 143	0.028 10	0.033 240	0.016 84	0.005 247	0.001 314	0.002 106	0.007 279
DCP11	.800	0.265	0.089 353	0.036 120	0.019 343	0.030 204	0.013 43	0.007 281	0.002 64	0.002 151	0.006 48
DCP12	.878	0.146	0.071 331	0.026 112	0.014 3	0.022 204	0.013 38	0.006 233	0.001 349	0.003 155	0.005 321
DCP13	.953	0.277	0.075 303	0.023 86	0.016 302	0.018 140	0.007 331	0.001 296	0.002 137	0.005 317	0.007 170

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	62.50	0.400	12.37	2.73		3167.2	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.240	435.6	727.4	0.47E 07	0.00198	1.458	15.06	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		1.038	0.373 37	0.077 294	0.030 168	0.022 32	0.011 15	0.014 237	0.010 62	0.006 287	0.006 259
CM		-0.063	0.076 152	0.042 53	0.031 294	0.018 195	0.007 166	0.010 52	0.006 283	0.002 158	0.001 78
DCP 1	.010	4.547	1.904 120	1.016 68	0.295 357	0.183 23	0.126 6	0.025 172	0.033 35	0.019 329	0.035 239
DCP 2	.050	2.903	1.080 89	0.314 15	0.206 347	0.088 301	0.060 311	0.034 211	0.031 350	0.013 288	0.018 247
DCP 3	.100	2.140	0.907 62	0.223 343	0.195 298	0.026 283	0.066 226	0.009 191	0.005 52	0.024 225	0.007 155
DCP 4	.150	1.605	0.704 53	0.170 342	0.202 282	0.037 167	0.055 215	0.045 139	0.032 57	0.013 336	0.002 292
DCP 5	.200	1.453	0.632 38	0.141 316	0.153 247	0.009 206	0.070 152	0.047 95	0.042 351	0.006 293	0.015 277
DCP 6	.250	1.291	0.604 38	0.141 324	0.182 251	0.036 131	0.059 172	0.051 101	0.037 25	0.018 318	0.011 336
DCP 7	.300	1.040	0.562 27	0.145 304	0.158 216	0.016 119	0.066 120	0.048 48	0.037 326	0.021 257	0.010 290
DCP 8	.400	0.801	0.493 23	0.139 290	0.148 199	0.051 95	0.050 110	0.069 11	0.032 277	0.021 221	0.012 194
DCP 9	.500	0.858	0.431 8	0.144 269	0.139 156	0.048 93	0.073 26	0.059 247	0.024 198	0.021 149	0.010 3
DCP10	.695	0.646	0.309 356	0.155 245	0.149 115	0.044 43	0.069 6	0.088 252	0.051 143	0.020 49	0.015 336
DCP11	.800	0.426	0.256 342	0.160 220	0.151 85	0.077 343	0.042 280	0.063 194	0.050 67	0.024 321	0.021 237
DCP12	.878	0.310	0.183 333	0.130 221	0.120 85	0.070 347	0.038 270	0.055 189	0.049 65	0.029 317	0.011 198
DCP13	.953	0.407	0.105 316	0.075 206	0.063 41	0.022 281	0.026 270	0.029 134	0.018 4	0.007 279	0.011 291

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	62.50	0.400	14.66	2.66		3167.3	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.240	435.5	724.8	0.47E 07	0.00031	1.511	16.79	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.038	0.401	52	0.064	326	0.014	339	0.019	173	0.009	85	0.003	101	0.007	8	0.005	274	0.003	256
CM		-0.100	0.094	174	0.043	99	0.013	48	0.012	344	0.005	244	0.001	299	0.003	204	0.002	132	0.003	123
DCP 1	.010	3.868	2.247	147	0.602	139	0.399	163	0.156	159	0.148	191	0.101	189	0.071	198	0.040	190	0.047	165
DCP 2	.050	2.561	1.010	110	0.176	121	0.129	76	0.072	121	0.037	101	0.038	120	0.011	107	0.022	155	0.020	160
DCP 3	.100	1.908	0.847	83	0.206	76	0.120	30	0.050	89	0.034	94	0.024	62	0.014	77	0.019	118	0.012	105
DCP 4	.150	1.472	0.732	71	0.188	64	0.111	24	0.069	17	0.031	36	0.045	27	0.022	355	0.006	314	0.032	240
DCP 5	.200	1.380	0.684	59	0.197	34	0.129	8	0.038	330	0.035	21	0.021	10	0.027	324	0.011	315	0.038	302
DCP 6	.250	1.239	0.662	56	0.197	31	0.111	13	0.062	343	0.028	336	0.038	356	0.027	312	0.015	257	0.006	286
DCP 7	.300	1.027	0.651	48	0.199	6	0.116	359	0.066	308	0.029	326	0.021	314	0.015	289	0.021	292	0.017	271
DCP 8	.400	0.832	0.574	40	0.202	350	0.085	338	0.060	285	0.016	230	0.036	298	0.022	233	0.020	212	0.312	193
DCP 9	.500	0.935	0.518	24	0.180	302	0.056	295	0.040	237	0.029	234	0.023	189	0.016	54	0.010	310	0.016	66
DCP10	.695	0.753	0.368	9	0.180	280	0.079	230	0.086	175	0.042	137	0.036	142	0.024	84	0.014	6	0.020	342
DCP11	.800	0.543	0.311	2	0.186	262	0.080	191	0.082	139	0.054	52	0.009	15	0.029	357	0.010	311	0.021	271
DCP12	.878	0.440	0.225	358	0.134	254	0.064	189	0.070	132	0.049	43	0.013	24	0.013	22	0.010	273	0.015	259
DCP13	.953	0.516	0.139	345	0.085	236	0.030	149	0.033	110	0.024	34	0.014	50	0.017	313	0.008	221	0.008	241

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	64.10	0.600	5.00	2.77		3163.1	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.166	643.3	1434.6	0.63E 07	-0.00092	0.885	7.75	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.618	0.246	348	0.020	193	0.012	131	0.003	118	0.008	129	0.003	106	0.004	103	0.002	64	0.003	45
CM		-0.004	0.018	264	0.003	21	0.004	199	0.002	57	0.001	292	0.001	66	0.000	170	0.000	19	0.000	75
DCP 1	.010	2.422	0.876	331	0.110	70	0.053	148	0.009	130	0.019	89	0.016	90	0.012	81	0.009	85	0.007	62
DCP 2	.050	2.410	0.838	330	0.086	76	0.045	192	0.003	67	0.023	112	0.011	101	0.013	85	0.006	75	0.310	31
DCP 3	.100	1.785	0.798	336	0.113	359	0.232	225	0.118	80	0.061	208	0.034	43	0.054	143	0.032	21	0.030	41
DCP 4	.150	1.121	0.611	340	0.154	210	0.054	129	0.068	130	0.050	28	0.011	82	0.029	313	0.015	193	0.008	199
DCP 5	.200	0.987	0.485	339	0.150	203	0.090	94	0.015	32	0.028	350	0.030	208	0.015	115	0.013	103	0.010	24
DCP 6	.250	0.756	0.324	351	0.072	203	0.074	92	0.039	324	0.018	190	0.013	155	0.013	88	0.008	6	0.003	276
DCP 7	.300	0.587	0.282	348	0.070	188	0.062	68	0.043	284	0.033	154	0.014	94	0.011	49	0.005	286	0.007	134
DCP 8	.400	0.400	0.178	7	0.010	214	0.016	82	0.012	282	0.016	143	0.005	35	0.001	40	0.001	32	0.002	111
DCP 9	.500	0.385	0.144	11	0.010	226	0.006	60	0.010	217	0.014	111	0.002	274	0.004	132	0.004	103	0.002	74
DCP10	.695	0.296	0.098	33	0.006	256	0.008	33	0.005	221	0.004	85	0.004	254	0.001	85	0.001	228	0.002	312
DCP11	.800	0.153	0.074	31	0.012	202	0.009	19	0.007	197	0.004	129	0.002	207	0.002	58	0.001	163	0.001	343
DCP12	.878	0.107	0.059	24	0.012	171	0.010	12	0.005	214	0.002	51	0.002	275	0.001	355	0.001	227	0.002	298
DCP13	.953	0.156	0.053	348	0.022	135	0.014	299	0.009	149	0.002	226	0.004	133	0.000	115	0.002	151	0.002	115

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	64.10	0.600	9.07	2.59		3163.2	10

K	V	Q	RN	DAMPING	CY(MAX)	ALPHA(STALL)
0.167	642.4	1431.6	0.62E 07	-0.00099	1.158	10.86

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.889	0.241	45	0.022	321	0.003	167	0.013	135	0.006	208	0.008	97	0.002	130	0.002	55	0.001	76
CM		-0.032	0.049	197	0.013	95	0.005	88	0.001	14	0.004	1	0.003	278	0.003	276	0.001	215	0.001	235
DCP 1	.010	3.296	0.416	1	0.031	218	0.045	169	0.025	118	0.014	132	0.009	45	0.007	233	0.007	86	0.006	306
DCP 2	.050	3.023	0.177	114	0.177	61	0.036	179	0.070	58	0.026	296	0.019	18	0.038	276	0.015	193	0.022	276
DCP 3	.100	2.375	0.331	126	0.115	264	0.031	196	0.075	210	0.047	287	0.011	209	0.026	283	0.020	0	0.003	307
DCP 4	.150	1.589	0.362	69	0.039	163	0.024	148	0.036	181	0.009	66	0.011	311	0.011	210	0.003	281	0.008	275
DCP 5	.200	1.338	0.445	56	0.127	87	0.066	142	0.037	149	0.001	74	0.005	342	0.020	340	0.011	279	0.009	238
DCP 6	.250	1.067	0.416	53	0.070	70	0.071	93	0.048	131	0.025	130	0.011	171	0.012	244	0.012	269	0.011	216
DCP 7	.300	0.890	0.423	50	0.098	43	0.064	53	0.053	90	0.017	89	0.018	115	0.008	201	0.015	212	0.016	206
DCP 8	.400	0.596	0.331	52	0.050	353	0.047	34	0.024	62	0.019	0	0.012	103	0.007	112	0.010	112	0.016	138
DCP 9	.500	0.599	0.294	40	0.068	303	0.030	312	0.006	245	0.015	229	0.010	127	0.018	121	0.016	96	0.021	68
DCP10	.695	0.447	0.216	28	0.069	268	0.028	254	0.010	158	0.015	204	0.014	72	0.007	106	0.010	50	0.015	14
DCP11	.800	0.315	0.189	17	0.054	269	0.029	252	0.008	217	0.024	195	0.013	122	0.017	87	0.012	337	0.017	240
DCP12	.878	0.283	0.175	6	0.045	267	0.029	238	0.009	184	0.017	168	0.010	82	0.011	79	0.008	340	0.003	236
DCP13	.953	0.325	0.149	343	0.031	242	0.022	187	0.008	202	0.014	136	0.009	75	0.003	23	0.001	326	0.001	173

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	64.10	0.600	9.80	2.59		3163.3	10

K	V	Q	RN	DAMPING	CY(MAX)	ALPHA(STALL)
0.167	642.2	1436.7	0.63E 07	-0.00106	1.171	11.17

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.924	0.219	53	0.023	65	0.004	292	0.005	140	0.007	191	0.004	163	0.003	116	0.006	113	0.003	69
CM		-0.044	0.056	201	0.005	162	0.003	167	0.002	239	0.001	248	0.002	214	0.002	272	0.002	277	0.002	250
DCP 1	.010	3.362	0.350	11	0.015	335	0.030	193	0.023	206	0.026	157	0.011	45	0.004	92	0.013	99	0.014	29
DCP 2	.050	3.005	0.247	151	0.092	60	0.078	191	0.026	270	0.063	207	0.002	321	0.039	246	0.014	223	0.030	253
DCP 3	.100	2.315	0.354	125	0.082	249	0.123	297	0.028	6	0.016	354	0.032	357	0.033	23	0.033	89	0.014	101
DCP 4	.150	1.624	0.288	101	0.049	116	0.042	324	0.035	235	0.012	250	0.016	300	0.012	318	0.007	229	0.005	278
DCP 5	.200	1.408	0.335	85	0.051	110	0.047	205	0.035	197	0.016	198	0.002	204	0.004	325	0.012	319	0.006	358
DCP 6	.250	1.098	0.350	67	0.125	105	0.035	135	0.040	208	0.029	251	0.023	268	0.011	294	0.013	276	0.005	99
DCP 7	.300	0.916	0.368	57	0.110	84	0.057	132	0.033	147	0.028	205	0.021	213	0.010	264	0.012	267	0.010	334
DCP 8	.400	0.619	0.310	57	0.045	82	0.035	86	0.034	112	0.014	167	0.020	189	0.027	186	0.011	157	0.008	257
DCP 9	.500	0.653	0.298	41	0.031	43	0.033	26	0.016	46	0.013	122	0.016	124	0.019	131	0.023	111	0.009	107
DCP10	.695	0.486	0.239	30	0.022	327	0.025	311	0.006	46	0.003	19	0.011	138	0.013	85	0.012	97	0.010	71
DCP11	.800	0.369	0.219	21	0.027	328	0.015	297	0.010	28	0.008	59	0.010	85	0.017	32	0.002	28	0.015	63
DCP12	.878	0.342	0.193	14	0.034	341	0.015	291	0.011	358	0.006	344	0.003	349	0.006	20	0.000	83	0.005	110
DCP13	.953	0.366	0.146	351	0.023	281	0.013	220	0.008	188	0.007	149	0.001	106	0.008	117	0.006	51	0.007	85

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	81.97	0.400	10.01	2.98		3169.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.315	435.0	724.1	0.47E 07	0.00009	1.292	13.08

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		1.007	0.291 9	0.039 148	0.026 296	0.013 133	0.007 48	0.002 290	0.003 100	0.003 252	0.002 107
CM		-0.019	0.007 151	0.016 304	0.009 144	0.004 341	0.001 218	0.001 76	0.000 264	0.000 125	0.001 341
DCP 1	.010	5.341	1.196 15	0.534 14	0.338 248	0.137 166	0.080 76	0.019 254	0.038 114	0.018 288	0.018 219
DCP 2	.050	3.457	0.790 21	0.240 343	0.147 212	0.049 135	0.052 64	0.031 338	0.022 227	0.006 229	0.014 214
DCP 3	.100	2.283	0.673 8	0.183 229	0.066 109	0.043 77	0.057 325	0.025 191	0.008 140	0.009 171	0.016 43
DCP 4	.150	1.644	0.548 7	0.146 208	0.038 82	0.033 58	0.028 308	0.015 190	0.013 76	0.013 269	0.013 58
DCP 5	.200	1.484	0.493 359	0.148 181	0.034 18	0.026 39	0.028 250	0.022 90	0.011 352	0.010 225	0.010 51
DCP 6	.250	1.228	0.420 5	0.123 187	0.029 24	0.029 21	0.020 218	0.008 95	0.006 357	0.006 163	0.010 351
DCP 7	.300	0.983	0.389 2	0.128 165	0.038 346	0.013 359	0.016 174	0.012 65	0.009 323	0.008 127	0.007 342
DCP 8	.400	0.710	0.286 16	0.090 167	0.031 346	0.022 312	0.027 137	0.006 9	0.010 334	0.004 193	0.003 197
DCP 9	.500	0.713	0.231 6	0.094 129	0.051 305	0.014 169	0.015 83	0.014 326	0.015 136	0.011 309	0.008 93
DCP10	.695	0.515	0.130 15	0.065 120	0.046 318	0.032 180	0.019 52	0.013 267	0.011 85	0.010 244	0.005 160
DCP11	.800	0.277	0.074 4	0.047 92	0.037 300	0.030 147	0.015 357	0.003 159	0.007 251	0.012 27	0.011 172
DCP12	.878	0.195	0.043 339	0.031 84	0.024 308	0.022 144	0.010 357	0.006 191	0.003 287	0.004 156	0.005 284
DCP13	.953	0.296	0.039 285	0.023 58	0.029 272	0.022 83	0.011 288	0.007 138	0.002 310	0.003 169	0.004 350

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	81.97	0.400	12.44	2.96		3168.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.315	434.8	728.0	0.47E 07	0.00264	1.393	15.09

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		1.043	0.409 19	0.080 171	0.031 24	0.005 0	0.016 161	0.013 342	0.002 50	0.003 26	0.003 316
CM		-0.071	0.085 126	0.050 342	0.017 189	0.003 125	0.009 349	0.004 146	0.001 287	0.001 167	0.000 97
DCP 1	.010	4.243	2.115 93	0.962 30	0.174 6	0.167 316	0.067 183	0.048 36	0.023 131	0.050 47	0.016 79
DCP 2	.050	2.986	1.345 86	0.503 23	0.113 1	0.087 302	0.029 195	0.025 23	0.008 196	0.023 38	0.005 65
DCP 3	.100	2.121	1.030 40	0.169 282	0.088 263	0.045 169	0.053 110	0.013 346	0.028 22	0.016 247	0.014 311
DCP 4	.150	1.589	0.847 35	0.155 268	0.091 231	0.049 154	0.058 105	0.032 336	0.014 23	0.022 273	0.001 175
DCP 5	.200	1.444	0.767 19	0.159 230	0.072 186	0.064 138	0.065 36	0.006 37	0.031 305	0.017 148	0.022 291
DCP 6	.250	1.272	0.724 22	0.163 234	0.090 179	0.025 141	0.061 66	0.025 292	0.018 353	0.017 224	0.018 18
DCP 7	.300	1.018	0.666 9	0.170 216	0.072 147	0.064 112	0.054 344	0.009 66	0.037 240	0.023 75	0.008 239
DCP 8	.400	0.826	0.567 4	0.188 206	0.101 110	0.025 105	0.057 333	0.022 187	0.017 286	0.022 102	0.012 327
DCP 9	.500	0.867	0.498 345	0.205 176	0.080 59	0.060 23	0.066 228	0.007 10	0.033 103	0.015 290	0.006 262
DCP10	.695	0.662	0.328 330	0.205 161	0.099 23	0.050 341	0.076 194	0.026 0	0.014 53	0.006 229	0.005 173
DCP11	.800	0.446	0.246 309	0.202 141	0.114 342	0.040 231	0.061 124	0.030 321	0.002 268	0.012 359	0.005 73
DCP12	.878	0.366	0.186 304	0.160 141	0.107 342	0.036 230	0.051 139	0.036 322	0.010 168	0.013 30	0.005 352
DCP13	.953	0.429	0.103 278	0.080 114	0.040 295	0.022 234	0.036 90	0.007 295	0.004 267	0.004 15	0.001 298

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	81.97	0.400	14.72	2.88		3168.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.315	434.6	727.7	0.47E 07	0.00157	1.530	17.75

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		1.078	0.392 31	0.086 237	0.031 151	0.024 66	0.003 278	0.006 277	0.003 94	0.005 264	0.004 153
CM		-0.116	0.097 155	0.048 37	0.010 245	0.012 218	0.008 110	0.006 69	0.003 3	0.004 355	0.005 310
CCP 1	.010	3.799	2.164 125	0.538 106	0.505 149	0.117 127	0.193 150	0.054 123	0.040 99	0.058 311	0.058 305
CCP 2	.050	2.574	1.210 115	0.258 108	0.208 145	0.078 98	0.093 133	0.051 80	0.043 58	0.040 338	0.040 319
CCP 3	.100	1.923	0.964 56	0.130 48	0.003 176	0.055 337	0.037 66	0.039 53	0.033 33	0.045 351	0.034 328
CCP 4	.150	1.499	0.776 49	0.169 18	0.029 299	0.062 335	0.023 32	0.031 339	0.019 12	0.029 310	0.012 293
CCP 5	.200	1.373	0.736 31	0.177 334	0.037 300	0.038 273	0.030 272	0.008 222	0.008 190	0.018 357	0.010 259
CCP 6	.250	1.271	0.708 35	0.220 338	0.069 296	0.059 271	0.011 320	0.026 253	0.017 41	0.011 257	0.007 3
CCP 7	.300	1.032	0.641 21	0.218 303	0.079 281	0.037 21	0.021 224	0.014 176	0.011 212	0.016 352	0.010 179
CCP 8	.400	0.894	0.582 15	0.246 282	0.076 237	0.092 182	0.034 80	0.019 78	0.025 327	0.011 354	0.025 243
CCP 9	.500	0.988	0.498 357	0.264 241	0.084 201	0.085 116	0.034 49	0.031 356	0.012 287	0.034 224	0.023 133
CCP10	.695	0.827	0.360 351	0.242 220	0.090 129	0.110 64	0.051 318	0.057 273	0.030 182	0.036 140	0.026 83
CCP11	.800	0.598	0.312 344	0.218 186	0.111 59	0.099 1	0.068 251	0.030 206	0.011 145	0.019 152	0.016 150
CCP12	.878	0.508	0.241 345	0.172 186	0.099 58	0.078 359	0.050 257	0.025 224	0.012 148	0.017 237	0.020 154
CCP13	.953	0.561	0.110 325	0.090 146	0.046 0	0.026 313	0.007 153	0.027 148	0.018 59	0.027 310	0.017 141

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	80.65	0.600	5.03	2.84		3164.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.211	638.1	1423.8	0.62E 07	-0.00094	0.915	8.14

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.639	0.244 350	0.016 213	0.013 189	0.001 313	0.003 344	0.001 213	0.003 69	0.001 13	0.002 291
CM		-0.005	0.023 262	0.003 18	0.006 146	0.003 46	0.003 220	0.001 33	0.000 154	0.000 280	0.000 115
CCP 1	.010	2.407	0.849 327	0.111 45	0.073 139	0.012 167	0.007 197	0.006 35	0.006 74	0.004 4	0.004 240
CCP 2	.050	2.551	0.827 326	0.087 51	0.064 175	0.011 256	0.006 160	0.005 218	0.008 9	0.003 86	0.005 276
CCP 3	.100	1.802	0.794 334	0.141 358	0.264 214	0.111 51	0.068 204	0.033 290	0.041 106	0.017 290	0.017 341
CCP 4	.150	1.161	0.610 340	0.142 214	0.053 160	0.083 117	0.050 345	0.023 46	0.033 283	0.009 185	0.009 177
CCP 5	.200	1.024	0.491 341	0.149 206	0.081 100	0.022 38	0.047 316	0.026 196	0.005 102	0.012 79	0.010 338
CCP 6	.250	0.777	0.334 354	0.078 213	0.069 130	0.047 324	0.026 250	0.020 139	0.017 62	0.013 335	0.009 226
CCP 7	.300	0.621	0.285 353	0.069 193	0.053 66	0.052 285	0.025 174	0.018 67	0.011 347	0.004 283	0.004 187
CCP 8	.400	0.423	0.188 13	0.014 234	0.001 41	0.020 265	0.009 103	0.007 31	0.003 238	0.004 110	0.003 76
CCP 9	.500	0.391	0.155 20	0.010 241	0.015 284	0.014 213	0.014 34	0.006 258	0.005 104	0.004 25	0.002 237
CCP10	.695	0.312	0.113 40	0.012 247	0.017 308	0.010 209	0.013 30	0.006 207	0.002 43	0.002 161	0.003 310
CCP11	.800	0.150	0.082 39	0.009 204	0.020 305	0.006 208	0.010 38	0.006 231	0.001 349	0.001 142	0.005 316
CCP12	.878	0.131	0.064 31	0.012 169	0.019 318	0.008 195	0.007 37	0.002 234	0.000 206	0.002 138	0.001 293
CCP13	.953	0.152	0.048 356	0.020 100	0.026 265	0.007 93	0.002 303	0.001 34	0.002 118	0.002 329	0.001 299

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	80.65	0.600	9.83	2.78		3164.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.211	637.1	1420.6	0.62E 07	-0.00061	1.257	11.73

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.923	0.295	45	0.016	11	0.028	269	0.009	49	0.003	164	0.005	195	0.002	182	0.002	125	0.002	38
CM		-0.048	0.064	192	0.015	98	0.006	95	0.004	195	0.001	133	0.003	35	0.001	55	0.001	326	0.001	283
DCP 1	.010	3.295	0.418	3	0.037	50	0.048	231	0.020	259	0.011	213	0.008	195	0.010	122	0.007	23	0.003	278
DCP 2	.050	3.019	0.374	132	0.213	54	0.049	154	0.035	296	0.053	143	0.024	94	0.026	105	0.026	74	0.020	27
DCP 3	.100	2.250	0.486	115	0.029	241	0.104	275	0.027	250	0.074	250	0.037	290	0.017	277	0.013	235	0.019	347
DCP 4	.150	1.520	0.485	72	0.134	114	0.107	246	0.034	249	0.018	47	0.023	102	0.014	155	0.005	111	0.005	320
DCP 5	.200	1.359	0.503	60	0.141	88	0.090	199	0.043	183	0.016	193	0.009	26	0.014	67	0.012	67	0.005	198
DCP 6	.250	1.126	0.490	55	0.090	89	0.017	67	0.070	139	0.026	132	0.013	206	0.013	246	0.012	326	0.004	294
DCP 7	.300	0.958	0.498	49	0.095	49	0.025	36	0.067	90	0.038	114	0.032	145	0.020	126	0.005	203	0.007	135
DCP 8	.400	0.635	0.405	45	0.013	355	0.053	358	0.052	71	0.027	75	0.022	50	0.011	86	0.005	346	0.011	158
DCP 9	.500	0.655	0.389	33	0.056	298	0.059	307	0.034	11	0.015	344	0.013	309	0.018	312	0.009	271	0.009	288
DCP10	.695	0.506	0.274	24	0.057	270	0.040	267	0.021	13	0.012	266	0.015	216	0.010	279	0.008	153	0.008	136
DCP11	.800	0.365	0.243	17	0.060	288	0.038	248	0.020	316	0.009	241	0.024	219	0.012	188	0.012	144	0.005	36
DCP12	.878	0.371	0.208	4	0.055	288	0.025	230	0.012	304	0.011	253	0.025	201	0.016	152	0.012	88	0.004	36
DCP13	.953	0.365	0.161	341	0.033	267	0.023	194	0.004	199	0.009	106	0.004	87	0.001	211	0.005	122	0.007	42

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	96.15	0.200	10.05	3.14		3170.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.727	221.0	198.0	0.25E 07	-0.00154	1.291	12.25

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.052	0.229	52	0.012	214	0.029	300	0.010	133	0.004	74	0.003	8	0.006	335	0.014	84	0.003	222
CM		-0.002	0.053	290	0.005	88	0.007	149	0.002	317	0.000	244	0.001	225	0.002	213	0.004	278	0.004	48
DCP 1	.010	4.859	1.176	350	0.121	115	0.072	207	0.028	121	0.022	314	0.018	266	0.008	14	0.021	3	0.028	284
DCP 2	.050	4.445	0.624	1	0.030	135	0.046	215	0.020	107	0.007	112	0.007	262	0.013	291	0.019	35	0.032	247
DCP 3	.100	2.116	0.430	17	0.021	155	0.023	247	0.009	50	0.014	31	0.004	326	0.014	270	0.012	97	0.008	121
DCP 4	.150	1.750	0.363	24	0.024	166	0.039	275	0.013	108	0.008	116	0.005	298	0.005	309	0.012	41	0.015	4
DCP 5	.200	1.592	0.325	33	0.027	185	0.038	289	0.008	192	0.012	42	0.002	220	0.019	285	0.017	132	0.013	70
DCP 6	.250	1.327	0.307	46	0.018	215	0.040	296	0.013	124	0.010	104	0.004	58	0.008	306	0.014	85	0.014	34
DCP 7	.300	1.123	0.284	56	0.018	224	0.040	305	0.011	175	0.009	81	0.007	28	0.011	290	0.019	110	0.021	74
DCP 8	.400	0.852	0.268	68	0.019	246	0.044	302	0.013	118	0.010	138	0.003	210	0.003	351	0.012	40	0.014	24
DCP 9	.500	0.786	0.270	83	0.020	259	0.048	319	0.012	183	0.012	65	0.008	352	0.012	307	0.018	98	0.009	76
DCP10	.695	0.452	0.236	90	0.016	248	0.026	313	0.014	134	0.006	169	0.003	34	0.014	5	0.024	72	0.028	177
DCP11	.800	0.144	0.192	103	0.017	254	0.032	344	0.008	102	0.008	16	0.013	51	0.018	69	0.015	145	0.045	265
DCP12	.878	0.160	0.148	100	0.016	284	0.025	317	0.014	116	0.009	228	0.003	168	0.009	68	0.011	71	0.019	260
DCP13	.953	0.212	0.105	86	0.006	209	0.008	297	0.001	211	0.012	347	0.009	33	0.004	297	0.013	122	0.017	215

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	96.15	0.200	12.52	3.14		3170.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.727	220.9	198.3	0.26E 07	-0.00143	1.506	14.50

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.240	0.212	51	0.003	271	0.030	297	0.014	161	0.011	190	0.001	232	0.001	191	0.012	92	0.009	44
CM		-0.011	0.049	290	0.003	118	0.008	147	0.003	355	0.003	25	0.000	101	0.001	228	0.003	293	0.003	26
DCP 1	.010	6.045	1.126	349	0.052	82	0.077	203	0.036	79	0.014	339	0.003	272	0.016	258	0.016	152	0.041	299
DCP 2	.050	4.982	0.549	359	0.016	72	0.030	229	0.014	118	0.009	190	0.016	231	0.001	252	0.011	39	0.018	8
DCP 3	.100	2.628	0.438	17	0.018	122	0.039	224	0.003	134	0.012	248	0.010	27	0.021	160	0.011	104	0.029	59
DCP 4	.150	1.974	0.342	21	0.018	185	0.035	272	0.014	167	0.013	159	0.006	135	0.005	332	0.014	53	0.032	23
DCP 5	.200	1.814	0.320	32	0.012	192	0.036	281	0.012	158	0.011	220	0.004	65	0.012	204	0.007	71	0.041	50
DCP 6	.250	1.498	0.281	44	0.014	206	0.041	290	0.022	165	0.019	136	0.002	166	0.003	10	0.021	58	0.035	32
DCP 7	.300	1.278	0.281	55	0.001	184	0.045	303	0.017	167	0.013	185	0.007	355	0.003	195	0.016	90	0.031	43
DCP 8	.400	0.991	0.243	70	0.011	236	0.044	295	0.024	169	0.023	147	0.008	157	0.003	15	0.019	75	0.030	34
DCP 9	.500	0.902	0.260	83	0.014	304	0.047	308	0.016	165	0.007	183	0.006	292	0.010	228	0.011	78	0.019	71
DCP10	.695	0.549	0.203	90	0.007	307	0.032	323	0.010	174	0.012	175	0.009	255	0.009	343	0.019	110	0.021	153
DCP11	.800	0.211	0.178	100	0.012	287	0.039	334	0.018	155	0.025	222	0.002	63	0.013	103	0.015	132	0.036	240
DCP12	.878	0.284	0.130	106	0.011	311	0.021	331	0.017	182	0.013	186	0.006	132	0.010	62	0.008	142	0.018	256
DCP13	.953	0.292	0.109	83	0.008	330	0.014	301	0.008	173	0.020	258	0.008	34	0.003	213	0.002	58	0.004	221

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	97.09	0.200	14.79	3.13		3170.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.735	220.6	197.8	0.25E 07	-0.00081	1.401	17.24

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.228	0.155	29	0.017	247	0.031	317	0.007	114	0.008	329	0.003	313	0.003	32	0.007	70	0.004	235
CM		-0.087	0.043	323	0.014	60	0.009	168	0.001	344	0.002	137	0.001	353	0.002	232	0.002	332	0.005	49
DCP 1	.010	4.293	1.188	52	0.186	0	0.096	245	0.047	136	0.040	8	0.038	323	0.025	251	0.025	32	0.009	242
DCP 2	.050	4.037	0.727	28	0.097	144	0.065	226	0.016	7	0.020	347	0.017	278	0.012	251	0.017	11	0.013	59
DCP 3	.100	1.986	0.664	352	0.125	144	0.033	272	0.038	39	0.012	275	0.032	192	0.016	17	0.023	136	0.031	29
DCP 4	.150	1.753	0.602	351	0.033	242	0.029	243	0.012	297	0.014	92	0.014	317	0.003	134	0.027	2	0.011	126
DCP 5	.200	1.689	0.448	337	0.030	103	0.086	244	0.012	113	0.006	222	0.038	44	0.011	204	0.022	325	0.018	93
DCP 6	.250	1.553	0.369	342	0.033	100	0.025	249	0.018	234	0.009	159	0.027	336	0.002	320	0.011	121	0.023	24
DCP 7	.300	1.348	0.195	334	0.060	45	0.010	306	0.019	132	0.019	294	0.034	333	0.014	204	0.015	30	0.020	10
DCP 8	.400	1.170	0.114	339	0.053	29	0.075	3	0.018	135	0.012	347	0.003	145	0.005	24	0.016	111	0.009	70
DCP 9	.500	1.057	0.116	109	0.109	313	0.098	354	0.018	116	0.028	333	0.011	110	0.010	17	0.012	30	0.008	89
DCP10	.695	0.725	0.166	117	0.100	236	0.071	295	0.007	56	0.021	161	0.009	233	0.001	289	0.011	98	0.026	240
DCP11	.800	0.389	0.171	131	0.070	213	0.019	81	0.005	154	0.014	348	0.010	264	0.013	124	0.015	162	0.040	229
DCP12	.878	0.552	0.174	124	0.064	199	0.018	43	0.011	301	0.021	0	0.009	224	0.024	42	0.007	166	0.031	263
DCP13	.953	0.479	0.139	96	0.029	173	0.014	333	0.012	210	0.023	281	0.020	134	0.010	7	0.005	59	0.026	169

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	97.09	0.400	9.88	3.14		3169.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.374	433.4	723.7	0.47E 07	-0.00001	1.338	12.90

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.038	0.293	8	0.018	153	0.024	283	0.019	103	0.001	76	0.003	68	0.004	358	0.004	41	0.002	225
CM		-0.021	0.004	188	0.014	281	0.009	131	0.006	292	0.002	82	0.001	347	0.001	207	0.001	240	0.002	56
DCP 1	.010	5.131	1.161	19	0.621	344	0.390	220	0.089	115	0.065	95	0.047	28	0.007	105	0.014	198	0.033	30
DCP 2	.050	3.717	0.769	18	0.310	329	0.194	204	0.052	95	0.045	72	0.027	4	0.007	293	0.016	228	0.011	134
DCP 3	.100	2.309	0.693	2	0.202	231	0.079	100	0.027	45	0.035	341	0.012	244	0.020	224	0.019	77	0.012	23
DCP 4	.150	1.742	0.575	1	0.165	205	0.058	64	0.031	20	0.022	260	0.017	118	0.005	331	0.009	42	0.005	353
DCP 5	.200	1.526	0.507	356	0.157	181	0.060	11	0.015	342	0.015	202	0.014	61	0.006	290	0.012	332	0.002	174
DCP 6	.250	1.277	0.439	5	0.124	182	0.047	19	0.020	353	0.023	186	0.013	73	0.011	356	0.007	19	0.007	202
DCP 7	.300	1.013	0.407	0	0.134	165	0.060	355	0.016	292	0.023	148	0.014	35	0.006	311	0.014	343	0.008	143
DCP 8	.400	0.773	0.300	10	0.092	147	0.051	335	0.018	210	0.022	91	0.006	287	0.003	47	0.015	33	0.010	236
DCP 9	.500	0.711	0.239	5	0.083	114	0.054	299	0.030	140	0.015	359	0.007	191	0.015	15	0.006	287	0.006	133
DCP10	.695	0.556	0.126	22	0.059	83	0.047	287	0.046	117	0.015	290	0.007	130	0.009	23	0.014	152	0.010	333
DCP11	.800	0.255	0.063	16	0.041	40	0.026	278	0.030	92	0.011	220	0.004	208	0.004	72	0.010	57	0.017	250
DCP12	.878	0.229	0.021	359	0.032	39	0.026	282	0.032	97	0.012	269	0.006	126	0.001	290	0.011	96	0.009	226
DCP13	.953	0.291	0.005	260	0.019	355	0.016	217	0.016	29	0.011	207	0.004	21	0.004	226	0.021	354	0.012	178

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	97.09	0.400	12.36	3.11		3169.2	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.374	433.1	722.5	0.47E 07	0.00246	1.445	15.59	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		1.111	0.364 4	0.053 156	0.023 352	0.011 236	0.016 19	0.006 260	0.003 185	0.004 244	0.006 309
CM		-0.080	0.079 101	0.040 298	0.014 138	0.010 32	0.008 220	0.003 27	0.002 327	0.001 331	0.002 171
DCP 1	.010	4.274	2.104 86	0.735 1	0.147 351	0.082 301	0.019 17	0.096 337	0.057 314	0.082 293	0.033 267
DCP 2	.050	3.206	1.312 75	0.385 347	0.120 329	0.043 246	0.022 291	0.026 326	0.024 290	0.030 283	0.029 236
DCP 3	.100	2.198	1.040 23	0.209 253	0.130 224	0.064 111	0.013 95	0.026 49	0.017 309	0.019 303	0.012 194
DCP 4	.150	1.723	0.879 23	0.187 255	0.100 202	0.056 106	0.045 23	0.017 229	0.008 331	0.018 151	0.005 331
DCP 5	.200	1.534	0.789 2	0.176 224	0.093 140	0.069 66	0.043 305	0.029 259	0.015 104	0.007 228	0.007 329
DCP 6	.250	1.355	0.746 11	0.199 227	0.109 140	0.060 87	0.070 340	0.018 243	0.014 214	0.012 115	0.035 124
DCP 7	.300	1.083	0.680 354	0.188 209	0.092 98	0.084 38	0.054 258	0.034 220	0.025 59	0.012 134	0.009 308
DCP 8	.400	0.905	0.560 350	0.190 193	0.122 82	0.074 8	0.053 251	0.026 174	0.023 88	0.006 294	0.011 305
DCP 9	.500	0.906	0.467 324	0.190 155	0.112 24	0.112 275	0.040 131	0.036 54	0.031 239	0.003 152	0.010 2
DCP10	.695	0.749	0.268 300	0.184 126	0.108 343	0.101 238	0.089 79	0.044 314	0.047 161	0.004 333	0.023 313
DCP11	.800	0.466	0.231 273	0.203 82	0.127 275	0.080 150	0.066 352	0.043 185	0.026 12	0.007 138	0.006 129
DCP12	.878	0.422	0.162 267	0.169 85	0.110 276	0.057 167	0.066 19	0.037 206	0.017 16	0.014 217	0.015 119
DCP13	.953	0.440	0.059 238	0.076 37	0.032 217	0.040 123	0.034 293	0.015 151	0.012 292	0.007 162	0.014 331

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	96.15	0.400	14.66	3.07		3169.3	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.371	432.9	723.2	0.47E 07	0.00223	1.546	17.80	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		1.163	0.384 22	0.060 227	0.020 70	0.018 352	0.016 166	0.007 119	0.001 124	0.005 71	0.003 45
CM		-0.118	0.107 135	0.050 0	0.008 206	0.010 166	0.008 24	0.003 271	0.001 110	0.002 254	0.002 244
DCP 1	.010	3.940	2.100 123	0.565 69	0.352 96	0.108 41	0.138 106	0.060 105	0.066 111	0.026 112	0.014 44
DCP 2	.050	2.927	1.229 109	0.297 61	0.178 84	0.079 17	0.063 85	0.026 72	0.020 75	0.007 58	0.007 34
DCP 3	.100	2.067	0.975 58	0.280 349	0.105 5	0.117 300	0.037 318	0.032 254	0.003 320	0.020 288	0.007 246
DCP 4	.150	1.697	0.783 44	0.260 350	0.063 320	0.102 282	0.028 242	0.027 224	0.007 220	0.011 193	0.014 336
DCP 5	.200	1.537	0.739 33	0.274 304	0.051 304	0.098 213	0.011 216	0.033 144	0.019 211	0.010 69	0.011 166
DCP 6	.250	1.399	0.703 30	0.258 315	0.062 276	0.089 244	0.038 201	0.030 178	0.020 177	0.016 174	0.004 264
DCP 7	.300	1.160	0.700 20	0.249 281	0.081 259	0.099 170	0.046 151	0.036 74	0.013 37	0.008 333	0.007 53
DCP 8	.400	0.984	0.627 7	0.279 267	0.078 202	0.106 153	0.061 105	0.034 23	0.018 354	0.015 349	0.007 217
DCP 9	.500	1.021	0.585 349	0.232 219	0.115 174	0.142 69	0.042 5	0.040 275	0.017 257	0.017 126	0.006 337
DCP10	.695	0.887	0.406 331	0.240 183	0.092 87	0.127 4	0.051 246	0.046 175	0.024 77	0.017 30	0.003 224
DCP11	.800	0.599	0.326 317	0.259 153	0.131 17	0.107 296	0.066 173	0.037 59	0.009 256	0.006 15	0.020 81
DCP12	.878	0.553	0.240 316	0.201 148	0.120 9	0.071 284	0.053 185	0.037 74	0.017 278	0.015 135	0.013 71
DCP13	.953	0.545	0.126 293	0.112 100	0.046 299	0.036 237	0.023 196	0.018 29	0.011 247	0.009 119	0.013 36

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	97.09	0.600	5.05	2.97		3166.1	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.252	644.7	1444.1	0.63E 07	-0.00086	0.889	8.08	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.624	0.237	344	0.026	171	0.017	123	0.008	69	0.008	71	0.004	45	0.006	348	0.000	286	0.003	303
CM		-0.002	0.027	257	0.001	34	0.004	114	0.003	315	0.001	141	0.001	314	0.000	130	0.000	12	0.000	231
CCP 1	.010	2.497	0.841	320	0.107	67	0.095	127	0.030	107	0.035	81	0.023	72	0.020	50	0.016	14	0.013	5
CCP 2	.050	2.437	0.797	320	0.098	82	0.082	152	0.019	83	0.038	79	0.018	71	0.021	25	0.017	24	0.016	344
CCP 3	.100	1.782	0.814	320	0.081	315	0.210	161	0.129	354	0.082	119	0.032	320	0.052	347	0.024	214	0.031	271
CCP 4	.150	1.162	0.617	336	0.178	195	0.089	120	0.081	70	0.044	317	0.002	227	0.017	192	0.013	63	0.036	98
CCP 5	.200	0.992	0.486	328	0.162	172	0.100	41	0.022	288	0.016	242	0.022	93	0.012	336	0.008	295	0.009	233
CCP 6	.250	0.766	0.316	354	0.083	178	0.069	66	0.032	275	0.028	135	0.019	57	0.013	348	0.005	259	0.004	99
CCP 7	.300	0.567	0.279	343	0.066	153	0.058	7	0.044	203	0.037	55	0.019	301	0.008	211	0.001	155	0.003	295
CCP 8	.400	0.401	0.190	17	0.019	187	0.009	102	0.011	158	0.015	85	0.006	19	0.004	39	0.005	24	0.003	320
CCP 9	.500	0.410	0.168	12	0.010	196	0.007	240	0.017	95	0.010	334	0.004	107	0.007	308	0.004	223	0.002	315
CCP10	.695	0.293	0.124	44	0.016	221	0.007	252	0.016	125	0.005	17	0.007	108	0.007	10	0.001	59	0.004	323
CCP11	.800	0.143	0.095	36	0.004	168	0.014	265	0.009	85	0.005	288	0.002	68	0.002	297	0.003	156	0.000	174
CCP12	.878	0.091	0.066	41	0.008	145	0.012	286	0.010	125	0.004	354	0.003	131	0.002	18	0.002	259	0.001	80
CCP13	.953	0.155	0.044	357	0.017	43	0.019	196	0.011	12	0.005	137	0.002	327	0.002	292	0.001	143	0.001	263

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	96.15	0.600	7.44	2.88		3166.2	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.249	644.1	1438.2	0.63E 07	-0.00007	1.148	10.51	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.820	0.299	5	0.043	196	0.017	132	0.006	86	0.004	170	0.008	78	0.004	330	0.001	304	0.002	52
CM		-0.022	0.026	188	0.024	345	0.008	186	0.004	157	0.003	18	0.000	203	0.002	137	0.002	356	0.001	169
CCP 1	.010	3.075	0.583	333	0.077	68	0.076	112	0.009	131	0.017	166	0.024	96	0.013	78	0.008	63	0.011	63
CCP 2	.050	2.932	0.348	353	0.199	3	0.138	174	0.062	98	0.020	108	0.019	18	0.015	155	0.018	53	0.011	50
CCP 3	.100	2.180	0.582	15	0.216	18	0.154	127	0.081	222	0.022	22	0.083	120	0.016	19	0.044	339	0.016	114
CCP 4	.150	1.443	0.689	3	0.151	322	0.091	289	0.058	278	0.027	257	0.011	154	0.019	327	0.025	314	0.017	238
CCP 5	.200	1.257	0.571	2	0.108	247	0.067	216	0.061	133	0.027	96	0.040	70	0.033	35	0.022	349	0.015	16
CCP 6	.250	1.015	0.479	11	0.146	245	0.073	189	0.068	136	0.039	66	0.025	17	0.018	310	0.010	262	0.007	226
CCP 7	.300	0.803	0.452	4	0.150	224	0.079	164	0.066	95	0.030	30	0.028	340	0.021	253	0.024	213	0.019	114
CCP 8	.400	0.564	0.341	16	0.130	215	0.051	122	0.038	67	0.026	328	0.015	255	0.020	192	0.017	88	0.010	135
CCP 9	.500	0.581	0.275	11	0.119	182	0.040	64	0.023	354	0.019	223	0.006	147	0.009	115	0.003	57	0.006	312
CCP10	.695	0.394	0.177	15	0.096	162	0.037	8	0.020	313	0.023	177	0.005	339	0.006	352	0.005	241	0.003	242
CCP11	.800	0.255	0.131	1	0.085	153	0.028	355	0.013	319	0.017	190	0.010	98	0.015	350	0.008	196	0.007	16
CCP12	.878	0.208	0.100	345	0.070	139	0.023	352	0.015	323	0.017	193	0.012	67	0.020	319	0.017	188	0.009	61
CCP13	.953	0.263	0.082	312	0.050	106	0.017	329	0.008	239	0.001	178	0.007	102	0.007	262	0.008	114	0.006	285

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	96.15	0.600	9.87	2.99		3166.3	10
K	**V**	**Q**	**RN**	**DAMPING**	**CN(MAX)**	**ALPHA(STALL)**	
0.250	643.7	1445.2	0.63E 07	-0.00002	1.295	12.54	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.906	0.352	31	0.018	316	0.025	204	0.002	47	0.010	70	0.002	181	0.004	73	0.004	341	0.003	353
CM		-0.045	0.064	178	0.022	50	0.009	16	0.003	58	0.003	262	0.001	287	0.000	263	0.002	155	0.001	156
DCP 1	.010	3.356	0.440	356	0.102	27	0.060	215	0.038	164	0.018	92	0.002	196	0.009	113	0.003	215	0.006	37
DCP 2	.050	2.931	0.347	101	0.227	25	0.060	96	0.022	329	0.065	8	0.054	253	0.003	19	0.026	201	0.013	132
DCP 3	.100	2.284	0.559	80	0.039	10	0.044	208	0.059	125	0.034	154	0.034	122	0.033	71	0.023	84	0.010	346
DCP 4	.150	1.481	0.636	52	0.209	72	0.063	146	0.069	144	0.050	202	0.020	140	0.002	244	0.004	222	0.009	12
DCP 5	.200	1.333	0.617	38	0.161	33	0.032	114	0.055	59	0.039	81	0.017	95	0.014	119	0.002	90	0.003	170
DCP 6	.250	1.072	0.575	43	0.082	43	0.056	21	0.063	28	0.026	51	0.030	36	0.014	91	0.017	54	0.008	15
DCP 7	.300	0.881	0.579	34	0.104	359	0.044	320	0.065	356	0.041	356	0.028	336	0.026	350	0.018	317	0.007	344
DCP 8	.400	0.636	0.483	34	0.049	307	0.067	276	0.034	346	0.022	300	0.026	266	0.008	262	0.017	292	0.016	234
DCP 9	.500	0.673	0.435	20	0.083	245	0.058	226	0.027	242	0.019	140	0.011	175	0.013	141	0.001	124	0.003	59
DCP 10	.695	0.480	0.294	12	0.078	220	0.054	204	0.014	196	0.018	72	0.011	167	0.006	78	0.007	12	0.004	352
DCP 11	.800	0.364	0.253	358	0.083	234	0.053	170	0.016	224	0.023	85	0.011	88	0.006	26	0.011	353	0.011	15
DCP 12	.878	0.331	0.202	349	0.075	240	0.045	160	0.017	194	0.020	66	0.008	60	0.004	7	0.012	341	0.004	351
DCP 13	.953	0.366	0.152	324	0.054	211	0.020	112	0.007	92	0.004	113	0.006	358	0.005	209	0.007	346	0.007	204

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.86	0.200	5.21	5.07		3183.1	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.127	221.6	198.6	0.26E 07	-0.00152	0.985	10.35	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.538	0.422 355	0.030 172	0.010 190	0.006 131	0.008 180	0.008 167	0.009 129	0.001 282	0.003 253
CM		-0.009	0.014 269	0.001 128	0.001 63	0.000 322	0.001 13	0.001 36	0.002 308	0.001 95	0.001 33
DCP 1	.010	2.619	2.614 348	0.189 164	0.053 153	0.034 115	0.035 148	0.022 127	0.033 86	0.036 89	0.018 50
DCP 2	.050	1.969	1.381 348	0.145 167	0.045 153	0.025 116	0.017 167	0.017 141	0.024 105	0.016 59	0.009 342
DCP 3	.100	1.071	0.980 349	0.069 166	0.022 181	0.027 186	0.014 174	0.025 161	0.021 179	0.012 115	0.005 57
DCP 4	.150	0.725	0.759 352	0.049 162	0.012 189	0.013 93	0.007 217	0.008 153	0.010 93	0.002 77	0.001 312
DCP 5	.200	0.799	0.597 353	0.039 184	0.007 282	0.007 186	0.011 187	0.013 156	0.017 171	0.002 157	0.005 238
DCP 6	.250	0.695	0.546 355	0.030 171	0.014 217	0.007 59	0.005 217	0.008 204	0.002 80	0.005 264	0.005 294
DCP 7	.300	0.543	0.449 356	0.032 164	0.010 183	0.002 122	0.013 135	0.009 169	0.006 153	0.003 330	0.006 250
DCP 8	.400	0.433	0.344 355	0.021 186	0.009 175	0.009 76	0.007 238	0.009 159	0.007 77	0.006 308	0.005 315
DCP 9	.500	0.523	0.278 2	0.018 189	0.007 232	0.002 194	0.010 193	0.008 152	0.010 167	0.008 251	0.006 274
DCP 10	.695	0.312	0.157 10	0.012 216	0.012 222	0.010 125	0.008 187	0.007 218	0.007 90	0.003 227	0.012 254
DCP 11	.800	0.092	0.119 12	0.016 138	0.007 248	0.010 229	0.011 160	0.006 218	0.015 147	0.013 276	0.017 147
DCP 12	.878	0.003	0.087 23	0.004 233	0.012 189	0.011 86	0.004 235	0.003 206	0.010 102	0.002 32	0.005 198
DCP 13	.953	0.053	0.077 19	0.002 77	0.007 57	0.002 243	0.005 181	0.004 79	0.013 126	0.004 51	0.005 13

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	17.61	0.200	7.73	5.08		3183.2	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.133	221.2	198.9	0.26E 07	-0.00171	1.192	12.86	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.787	0.396 357	0.022 180	0.010 188	0.003 182	0.012 132	0.001 300	0.010 192	0.004 197	0.008 160
CM		-0.015	0.017 278	0.003 130	0.001 336	0.001 324	0.002 268	0.001 166	0.002 11	0.000 242	0.001 341
DCP 1	.010	4.053	2.530 348	0.173 164	0.064 175	0.018 228	0.048 161	0.010 288	0.032 182	0.028 187	0.019 248
DCP 2	.050	2.704	1.265 350	0.099 163	0.030 196	0.007 311	0.027 152	0.009 249	0.018 174	0.017 152	0.003 317
DCP 3	.100	1.665	0.941 350	0.056 171	0.013 215	0.012 139	0.015 168	0.010 248	0.019 175	0.013 220	0.003 174
DCP 4	.150	1.091	0.713 353	0.045 163	0.018 174	0.004 271	0.023 145	0.007 99	0.011 206	0.006 212	0.004 123
DCP 5	.200	1.151	0.580 355	0.030 165	0.010 203	0.010 172	0.007 140	0.003 53	0.012 184	0.001 213	0.008 174
DCP 6	.250	0.970	0.509 357	0.032 179	0.008 218	0.001 28	0.023 161	0.005 71	0.008 267	0.005 176	0.010 79
DCP 7	.300	0.759	0.435 358	0.025 199	0.009 233	0.009 239	0.004 170	0.013 203	0.013 203	0.008 208	0.017 156
DCP 8	.400	0.657	0.319 359	0.022 196	0.014 217	0.005 19	0.026 137	0.005 101	0.012 245	0.006 210	0.016 139
DCP 9	.500	0.722	0.256 6	0.013 201	0.009 178	0.010 174	0.011 81	0.002 47	0.010 176	0.002 348	0.007 169
DCP 10	.695	0.403	0.144 23	0.004 198	0.003 140	0.003 23	0.015 87	0.007 4	0.008 132	0.003 216	0.004 4
DCP 11	.800	0.179	0.104 25	0.015 306	0.012 182	0.010 163	0.002 279	0.008 244	0.015 209	0.005 120	0.011 164
DCP 12	.878	0.102	0.080 30	0.007 234	0.008 128	0.007 16	0.014 104	0.008 9	0.003 144	0.003 351	0.004 137
DCP 13	.953	0.112	0.073 18	0.010 296	0.005 173	0.008 203	0.007 197	0.005 265	0.013 206	0.005 152	0.009 229

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	17.27	0.200	10.14	5.12		3183.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.130	221.3	199.9	0.26E 07	-0.00037	1.422	15.31

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.989	0.406	5	0.025	234	0.011	68	0.006	182	0.006	330	0.001	74	0.002	164	0.006	85	0.004	85
CM		-0.024	0.005	236	0.007	298	0.008	148	0.006	336	0.004	163	0.001	130	0.000	240	0.001	249	0.001	256
DCP 1	.010	4.992	2.295	3	0.294	312	0.282	180	0.207	49	0.131	259	0.116	130	0.044	343	0.030	217	0.042	97
DCP 2	.050	3.398	1.213	3	0.144	288	0.142	152	0.119	2	0.077	219	0.051	79	0.036	261	0.023	117	0.019	14
DCP 3	.100	2.073	0.941	2	0.093	265	0.068	118	0.038	298	0.025	152	0.025	333	0.020	168	0.011	345	0.025	166
DCP 4	.150	1.413	0.733	2	0.087	231	0.073	83	0.051	280	0.044	122	0.030	330	0.033	172	0.009	96	0.007	62
DCP 5	.200	1.416	0.605	4	0.059	226	0.040	62	0.038	223	0.024	29	0.019	252	0.016	72	0.005	215	0.005	93
DCP 6	.250	1.226	0.549	2	0.079	198	0.065	42	0.054	242	0.041	91	0.025	288	0.026	151	0.010	73	0.004	288
DCP 7	.300	0.925	0.462	6	0.047	207	0.034	34	0.037	210	0.027	32	0.012	295	0.013	44	0.005	143	0.006	34
DCP 8	.400	0.839	0.346	4	0.052	194	0.043	17	0.033	202	0.023	38	0.009	252	0.012	133	0.010	58	0.004	242
DCP 9	.500	0.685	0.272	10	0.019	176	0.029	352	0.035	171	0.026	334	0.010	128	0.009	312	0.014	93	0.004	292
DCP10	.695	0.468	0.152	17	0.018	157	0.021	312	0.022	128	0.011	296	0.003	90	0.003	168	0.003	12	0.013	23
DCP11	.800	0.263	0.103	11	0.025	61	0.027	332	0.017	108	0.019	321	0.009	43	0.008	3	0.013	65	0.021	101
DCP12	.878	0.208	0.097	3	0.020	129	0.020	311	0.015	122	0.009	345	0.009	272	0.013	175	0.003	132	0.004	132
DCP13	.953	0.183	0.083	352	0.019	59	0.022	208	0.007	85	0.013	268	0.011	351	0.007	343	0.005	112	0.012	291

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.86	0.200	12.24	4.84		3148.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.128	219.9	196.8	0.25E 07	0.00209	1.732	16.97

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.100	0.446	28	0.149	272	0.093	131	0.056	6	0.033	245	0.022	126	0.014	346	0.008	251	0.011	128
CM		-0.017	0.052	157	0.052	18	0.034	252	0.022	139	0.016	30	0.012	277	0.009	160	0.006	59	0.005	331
DCP 1	.010	4.932	1.783	67	1.338	13	0.727	271	0.378	178	0.245	99	0.182	32	0.178	301	0.133	213	0.127	118
DCP 2	.050	3.865	0.914	51	0.518	345	0.267	212	0.111	80	0.009	337	0.025	9	0.050	247	0.029	135	0.036	74
DCP 3	.100	2.312	0.952	41	0.476	314	0.303	189	0.160	80	0.093	4	0.103	283	0.103	185	0.076	89	0.057	5
DCP 4	.150	1.953	0.777	38	0.367	303	0.231	177	0.116	73	0.081	1	0.075	267	0.050	167	0.035	53	0.020	12
DCP 5	.200	1.684	0.708	30	0.318	283	0.219	154	0.129	40	0.078	299	0.066	297	0.055	109	0.040	12	0.033	283
DCP 6	.250	1.412	0.636	31	0.298	277	0.204	150	0.116	47	0.089	325	0.075	219	0.041	122	0.037	34	0.033	332
DCP 7	.300	1.319	0.577	26	0.259	264	0.187	131	0.118	15	0.088	272	0.072	169	0.051	62	0.060	329	0.036	242
DCP 8	.400	0.946	0.489	22	0.245	247	0.169	119	0.106	17	0.086	286	0.064	174	0.035	75	0.065	5	0.042	238
DCP 9	.500	0.750	0.403	17	0.221	230	0.169	93	0.107	334	0.083	224	0.067	120	0.053	8	0.043	271	0.041	157
DCP10	.695	0.531	0.262	5	0.178	207	0.133	73	0.090	314	0.066	206	0.061	37	0.051	326	0.037	224	0.037	179
DCP11	.800	0.322	0.231	353	0.154	202	0.103	72	0.084	317	0.085	199	0.061	75	0.046	320	0.042	276	0.028	94
DCP12	.878	0.121	0.195	345	0.112	195	0.074	75	0.062	327	0.041	193	0.035	79	0.039	320	0.028	192	0.025	100
DCP13	.953	0.203	0.158	340	0.085	183	0.046	45	0.038	280	0.035	154	0.020	13	0.016	253	0.012	146	0.016	39

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.81	0.200	14.85	4.75		3172.1	10

K	V	Q	RN	DAMPING	CY(MAX)	ALPHA(STALL)
0.126	222.0	200.8	0.26E 07	0.00047	1.970	19.15

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.227	0.448	60	0.152	326	0.088	229	0.035	189	0.045	136	0.051	31	0.032	290	0.023	194	0.016	118
CM		-0.080	0.087	170	0.057	76	0.035	359	0.019	295	0.018	245	0.021	165	0.016	75	0.012	356	0.008	293
DCP 1	.010	4.836	2.525	123	1.598	63	0.545	357	0.395	330	0.423	280	0.247	212	0.134	161	0.115	134	0.113	86
DCP 2	.050	3.729	1.205	103	0.553	37	0.145	331	0.190	301	0.158	219	0.081	138	0.043	85	0.033	56	0.037	13
DCP 3	.100	2.367	1.018	82	0.414	8	0.151	294	0.164	265	0.139	187	0.087	138	0.078	78	0.066	41	0.074	1
DCP 4	.150	1.625	0.816	75	0.320	357	0.179	294	0.164	243	0.145	184	0.118	111	0.077	50	0.042	348	0.034	329
DCP 5	.200	1.626	0.753	66	0.291	335	0.170	262	0.129	218	0.125	158	0.104	79	0.063	3	0.026	295	0.022	282
DCP 6	.250	1.464	0.655	63	0.248	331	0.162	264	0.125	206	0.123	163	0.124	79	0.078	15	0.052	312	0.035	270
DCP 7	.300	1.212	0.621	55	0.265	317	0.188	243	0.112	193	0.121	138	0.130	52	0.089	331	0.053	255	0.051	211
DCP 8	.400	1.120	0.530	48	0.229	306	0.156	236	0.101	168	0.111	131	0.136	46	0.084	333	0.062	264	0.041	208
DCP 9	.500	1.147	0.457	35	0.222	286	0.162	206	0.089	141	0.096	96	0.116	14	0.101	278	0.059	205	0.063	155
DCP10	.695	0.823	0.359	14	0.221	265	0.163	181	0.086	102	0.075	53	0.096	327	0.075	233	0.067	171	0.055	96
DCP11	.800	0.453	0.294	3	0.172	263	0.116	177	0.047	119	0.061	56	0.090	343	0.080	258	0.059	164	0.041	90
DCP12	.878	0.315	0.232	356	0.121	253	0.089	166	0.031	93	0.031	66	0.049	336	0.044	238	0.348	157	0.024	91
DCP13	.953	0.378	0.199	348	0.083	243	0.073	144	0.035	49	0.029	337	0.032	270	0.031	171	0.031	93	0.029	27

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	17.36	0.200	17.36	4.88		3172.2	10

K	V	Q	RN	DAMPING	CY(MAX)	ALPHA(STALL)
0.131	221.8	201.0	0.26E 07	-0.00228	2.048	19.96

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.238	0.509	75	0.086	14	0.056	356	0.061	291	0.045	265	0.052	202	0.042	141	0.028	93	0.015	22
CM		-0.108	0.109	185	0.047	126	0.031	98	0.028	62	0.020	25	0.021	340	0.018	289	0.012	238	0.007	183
DCP 1	.010	4.283	3.152	144	1.046	119	0.713	133	0.445	94	0.194	80	0.189	61	0.067	41	0.088	43	0.050	1
DCP 2	.050	3.527	1.461	121	0.291	118	0.332	89	0.105	42	0.145	14	0.054	337	0.054	313	0.017	323	0.032	297
DCP 3	.100	2.283	1.212	101	0.292	76	0.303	53	0.152	19	0.157	352	0.087	295	0.040	289	0.036	332	0.047	289
DCP 4	.150	1.537	0.949	92	0.263	70	0.245	45	0.157	13	0.142	340	0.092	302	0.045	260	0.025	255	0.022	221
DCP 5	.200	1.574	0.826	83	0.177	46	0.175	17	0.131	333	0.114	298	0.113	258	0.081	202	0.042	194	0.031	153
DCP 6	.250	1.449	0.745	78	0.188	43	0.173	14	0.150	340	0.131	304	0.116	265	0.071	226	0.049	190	0.030	169
DCP 7	.300	1.197	0.694	69	0.164	19	0.157	345	0.155	310	0.117	273	0.130	243	0.101	188	0.049	166	0.048	126
DCP 8	.400	1.169	0.587	60	0.158	5	0.143	336	0.140	306	0.127	268	0.122	230	0.090	179	0.066	142	0.044	118
DCP 9	.500	1.201	0.540	47	0.171	330	0.122	302	0.150	261	0.082	230	0.131	190	0.098	139	0.074	99	0.057	47
DCP10	.695	0.901	0.464	29	0.154	313	0.118	272	0.118	238	0.084	194	0.111	151	0.098	93	0.080	58	0.053	1
DCP11	.800	0.522	0.343	16	0.151	298	0.096	273	0.116	239	0.092	208	0.084	148	0.072	107	0.051	38	0.034	333
DCP12	.878	0.453	0.267	13	0.108	310	0.053	268	0.053	229	0.051	197	0.055	134	0.070	89	0.059	27	0.045	334
DCP13	.953	0.466	0.229	2	0.096	279	0.049	228	0.058	187	0.035	115	0.041	89	0.014	27	0.023	345	0.023	246

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	17.27	0.200	24.78	4.92		3172.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.130	221.4	199.4	0.26E 07	-0.00366	1.346	29.20

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.161	0.191	51	0.045	171	0.031	288	0.024	44	0.021	75	0.015	120	0.016	0	0.009	252	0.015	146
CM		-0.203	0.046	231	0.012	321	0.007	62	0.004	166	0.005	214	0.005	273	0.002	165	0.004	47	0.003	286
DCP 1	.010	1.722	0.631	156	0.288	237	0.237	333	0.173	78	0.135	158	0.079	271	0.063	354	0.027	100	0.014	220
DCP 2	.050	2.324	0.167	35	0.035	205	0.024	333	0.027	70	0.027	105	0.039	126	0.012	358	0.008	355	0.012	194
DCP 3	.100	1.538	0.235	28	0.044	142	0.024	310	0.026	90	0.008	106	0.009	217	0.031	24	0.004	140	0.019	190
DCP 4	.150	1.117	0.210	41	0.044	195	0.037	317	0.035	68	0.024	110	0.017	166	0.015	358	0.008	341	0.027	168
DCP 5	.200	1.283	0.241	39	0.021	159	0.032	300	0.025	70	0.023	74	0.017	138	0.025	353	0.005	299	0.024	177
DCP 6	.250	1.302	0.230	42	0.052	190	0.037	314	0.038	66	0.024	99	0.021	148	0.019	33	0.010	6	0.027	171
DCP 7	.300	1.087	0.250	39	0.032	160	0.036	306	0.027	50	0.036	78	0.022	127	0.028	18	0.006	290	0.027	162
DCP 8	.400	1.295	0.216	49	0.065	175	0.031	285	0.039	50	0.036	73	0.031	118	0.018	0	0.022	350	0.021	148
DCP 9	.500	1.342	0.229	48	0.054	160	0.038	273	0.029	21	0.029	53	0.024	140	0.015	355	0.025	259	0.021	136
DCP10	.695	1.120	0.214	53	0.060	163	0.041	242	0.022	345	0.029	28	0.035	134	0.003	267	0.019	251	0.016	124
DCP11	.800	0.797	0.200	61	0.060	143	0.032	278	0.024	350	0.013	97	0.016	61	0.024	350	0.034	212	0.014	93
DCP12	.878	0.761	0.163	60	0.039	146	0.019	249	0.008	60	0.019	44	0.017	60	0.008	311	0.011	209	0.017	83
DCP13	.953	0.705	0.120	44	0.031	107	0.010	212	0.012	356	0.005	350	0.007	6	0.018	8	0.019	159	0.000	326

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.58	0.400	9.93	4.68		3145.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.064	433.9	726.3	0.47E 07	0.00075	1.302	13.15

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.877	0.275	29	0.093	27	0.005	45	0.038	290	0.038	192	0.018	123	0.008	45	0.002	216	0.003	179
CM		-0.029	0.055	168	0.030	57	0.002	9	0.012	12	0.010	290	0.008	232	0.006	154	0.002	74	0.002	111
DCP 1	.010	4.323	0.683	70	1.328	69	0.323	39	0.424	359	0.333	283	0.242	235	0.162	197	0.113	173	0.074	154
DCP 2	.050	2.708	0.483	78	0.636	49	0.073	323	0.136	340	0.135	251	0.077	197	0.045	162	0.032	157	0.042	128
DCP 3	.100	1.875	0.445	61	0.407	35	0.021	321	0.135	323	0.130	224	0.051	172	0.048	147	0.027	90	0.021	137
DCP 4	.150	1.455	0.439	46	0.264	18	0.039	231	0.074	303	0.089	200	0.039	140	0.035	110	0.020	46	0.036	41
DCP 5	.200	1.286	0.384	42	0.202	14	0.006	260	0.093	298	0.094	199	0.051	139	0.045	87	0.023	10	0.005	68
DCP 6	.250	1.132	0.391	37	0.157	359	0.035	190	0.054	288	0.064	179	0.028	119	0.030	75	0.016	335	0.001	275
DCP 7	.300	0.940	0.350	33	0.125	1	0.002	173	0.076	281	0.078	185	0.048	121	0.042	55	0.020	337	0.008	304
DCP 8	.400	0.646	0.315	26	0.080	322	0.032	159	0.035	261	0.044	162	0.029	104	0.032	28	0.021	287	0.015	231
DCP 9	.500	0.656	0.303	17	0.064	293	0.015	136	0.045	243	0.044	145	0.027	81	0.025	9	0.005	325	0.015	299
DCP10	.695	0.471	0.233	2	0.062	229	0.020	70	0.035	225	0.033	126	0.025	65	0.023	341	0.010	213	0.006	30
DCP11	.800	0.307	0.214	356	0.054	230	0.005	328	0.043	200	0.034	119	0.031	48	0.025	306	0.009	215	0.009	239
DCP12	.878	0.154	0.202	35	0.053	230	0.013	260	0.029	175	0.017	122	0.018	52	0.016	306	0.006	165	0.001	15
DCP13	.953	0.285	0.199	344	0.044	210	0.021	280	0.032	163	0.015	91	0.019	26	0.019	277	0.007	190	0.010	162

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.84	0.400	12.29	4.72		3145.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.065	433.6	723.8	0.47E 07	-0.00034	1.331	13.77

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.963	0.226 71	0.061 51	0.049 90	0.013 32	0.023 14	0.016 310	0.004 249	0.005 262	0.006 165
CM		-0.051	0.074 181	0.014 114	0.017 142	0.007 107	0.009 112	0.009 98	0.005 42	0.005 67	0.002 327
DCP 1	.010	4.380	1.628 153	0.727 104	0.633 139	0.251 124	0.257 113	0.161 107	0.124 101	0.104 111	0.070 103
DCP 2	.050	2.746	0.813 132	0.312 70	0.276 127	0.122 69	0.089 93	0.069 62	0.045 83	0.050 55	0.022 79
DCP 3	.100	2.029	0.527 113	0.192 62	0.192 113	0.070 53	0.078 73	0.050 15	0.028 37	0.028 -7	0.007 89
DCP 4	.150	1.538	0.454 93	0.135 43	0.148 84	0.040 15	0.074 31	0.032 333	0.034 356	0.017 321	0.015 305
DCP 5	.200	1.346	0.342 92	0.131 70	0.136 80	0.049 44	0.079 36	0.047 353	0.032 347	0.021 351	0.018 336
DCP 6	.250	1.215	0.372 74	0.083 18	0.089 67	0.016 331	0.052 5	0.021 301	0.022 300	0.007 339	0.015 251
DCP 7	.300	1.040	0.306 72	0.089 55	0.101 59	0.038 18	0.061 0	0.033 323	0.025 303	0.010 333	0.012 318
DCP 8	.400	0.727	0.284 55	0.046 344	0.047 35	0.005 234	0.033 325	0.006 347	0.021 284	0.014 293	0.02. 207
DCP 9	.500	0.739	0.281 41	0.047 345	0.055 3	0.016 267	0.038 327	0.029 291	0.025 238	0.015 263	0.015 194
DCP10	.695	0.567	0.265 18	0.040 305	0.048 332	0.021 272	0.029 303	0.036 266	0.019 192	0.019 238	0.014 142
DCP11	.800	0.384	0.217 8	0.024 328	0.035 323	0.021 325	0.023 290	0.032 283	0.020 203	0.020 215	0.315 195
DCP12	.878	0.260	0.216 3	0.025 338	0.034 319	0.026 311	0.017 260	0.028 273	0.016 200	0.025 198	0.014 106
DCP13	.953	0.383	0.223 354	0.011 8	0.028 307	0.012 321	0.010 294	0.022 252	0.002 165	0.016 206	0.005 129

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.81	0.400	14.89	4.87		3176.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.064	437.2	742.2	0.4PE 07	-0.00148	1.196	13.53

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.905	0.201 91	0.025 154	0.015 209	0.026 191	0.024 215	0.009 212	0.013 216	0.004 165	0.006 210
CM		-0.104	0.057 196	0.022 234	0.002 223	0.008 276	0.006 306	0.005 335	0.004 344	0.003 298	0.001 55
DCP 1	.050	2.601	0.963 151	0.332 230	0.097 222	0.173 250	0.126 290	0.063 307	0.039 332	0.035 66	0.027 122
DCP 2	.100	1.885	0.605 134	0.253 226	0.075 218	0.114 229	0.085 261	0.039 312	0.033 291	0.024 333	0.023 114
DCP 3	.150	1.434	0.479 120	0.140 188	0.028 186	0.075 199	0.064 243	0.046 277	0.039 248	0.027 287	0.004 324
DCP 4	.200	1.305	0.355 122	0.128 201	0.066 180	0.068 210	0.061 214	0.025 255	0.029 221	0.028 290	0.019 226
DCP 5	.250	1.213	0.342 103	0.064 157	0.013 214	0.040 176	0.049 209	0.034 243	0.033 202	0.026 219	0.010 270
DCP 6	.300	0.945	0.277 100	0.066 170	0.029 191	0.044 200	0.065 215	0.034 222	0.034 221	0.037 260	0.027 227
DCP 7	.400	0.813	0.245 79	0.047 104	0.005 352	0.023 140	0.026 192	0.024 195	0.018 199	0.019 179	0.006 221
DCP 8	.500	0.882	0.239 62	0.067 68	0.013 266	0.022 144	0.031 184	0.029 179	0.017 204	0.011 203	0.312 249
DCP 9	.695	0.673	0.212 31	0.075 55	0.012 356	0.026 111	0.023 130	0.022 106	0.004 182	0.022 91	0.004 292
DCP10	.800	0.465	0.193 20	0.060 46	0.002 237	0.022 98	0.018 126	0.013 91	0.016 138	0.011 124	0.307 234
DCP11	.878	0.354	0.186 18	0.073 51	0.013 129	0.026 105	0.012 103	0.018 113	0.021 179	0.023 95	0.310 143
DCP12	.953	0.488	0.171 7	0.055 60	0.014 117	0.010 115	0.013 101	0.012 97	0.011 150	0.010 106	0.004 260

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.69	0.400	17.47	4.93		3176.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.064	436.7	739.2	0.48E 07	-0.00355	1.155	14.01

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		C.936	C.154 110	0.041 224	0.030 245	0.016 352	0.008 214	0.007 352	0.009 6	0.010 127	0.006 262
CM		-0.125	C.037 243	0.010 285	0.007 12	0.002 114	0.003 63	0.003 165	0.002 196	0.002 292	0.001 23
DCP 1	.010	2.696	1.271 181	0.177 345	0.063 193	0.117 30	0.046 186	0.023 290	C.060 358	0.068 115	0.055 254
DCP 2	.050	1.922	0.314 148	0.184 249	0.065 311	0.055 337	0.029 45	0.009 151	0.014 243	0.014 150	0.022 284
DCP 3	.100	1.612	0.108 91	0.251 259	0.053 305	0.014 54	0.038 95	0.011 150	0.012 325	0.025 247	0.021 3
DCP 4	.150	1.149	C.203 116	0.108 218	0.059 268	0.034 333	0.003 106	0.014 327	0.009 60	0.005 138	0.009 242
DCP 5	.200	1.227	C.109 104	0.128 240	0.060 307	0.008 17	0.013 121	0.009 153	0.015 31	0.008 153	0.015 295
DCP 6	.250	1.066	C.206 113	0.092 213	0.048 252	0.026 325	0.003 223	0.012 351	0.013 35	0.009 100	0.004 289
DCP 7	.300	0.919	C.162 110	0.079 230	0.062 296	0.019 17	0.022 226	0.015 45	0.015 13	0.020 122	0.008 277
DCP 8	.400	C.792	0.156 106	0.068 200	0.034 220	0.014 287	0.015 227	0.012 321	0.005 336	0.009 51	0.010 139
DCP 9	.500	C.543	0.189 100	0.036 174	0.060 245	0.031 24	0.020 239	0.012 60	0.006 241	0.012 153	0.010 258
DCP 10	.695	C.783	0.176 74	0.041 103	0.049 180	0.010 315	0.018 202	0.020 319	0.015 22	0.014 110	0.009 196
DCP 11	.800	C.575	C.136 83	0.022 104	0.025 206	0.009 310	0.014 287	0.008 13	0.012 32	0.020 167	0.010 331
DCP 12	.878	C.472	C.1CE 65	0.018 69	0.013 151	0.004 284	0.002 311	0.006 30	0.009 20	0.014 63	0.011 247
DCP 13	.953	C.592	0.100 54	0.023 92	0.017 180	0.011 260	0.015 247	0.018 316	0.010 327	0.008 69	0.007 102

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.75	0.400	24.91	4.92		3176.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.064	436.1	734.8	0.48E 07	-0.00109	1.203	29.74

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		1.036	0.160 17	0.050 171	0.005 335	0.006 53	0.003 249	0.007 87	0.008 11	0.003 144	0.005 232
CM		-0.168	0.033 197	0.011 358	0.001 111	0.001 166	0.002 78	0.001 245	0.002 173	0.002 319	0.001 13
DCP 1	.010	1.749	0.205 166	0.099 238	0.084 320	0.038 45	0.018 128	0.011 271	0.007 37	0.004 135	0.010 249
DCP 2	.050	1.947	0.135 24	0.045 184	0.015 323	0.008 40	0.010 12	0.015 113	0.006 130	0.007 271	0.005 283
DCP 3	.100	1.575	0.244 24	0.097 120	0.046 112	0.033 116	0.019 124	0.020 123	0.013 4	0.007 311	0.013 284
DCP 4	.150	1.347	0.179 13	0.068 192	0.023 304	0.010 357	0.008 350	0.019 72	0.009 102	0.007 231	0.009 319
DCP 5	.200	1.320	0.238 17	0.074 131	0.027 108	0.022 11	0.005 156	0.013 104	0.009 5	0.004 341	0.008 253
DCP 6	.250	1.243	0.212 8	0.054 184	0.017 332	0.005 30	0.004 269	0.012 75	0.006 55	0.002 135	0.004 263
DCP 7	.300	1.041	0.233 13	0.061 151	0.009 115	0.009 99	0.004 191	0.007 102	0.013 5	0.004 85	0.004 221
DCP 8	.400	0.962	0.199 9	0.053 184	0.016 354	0.005 89	0.013 237	0.007 40	0.009 39	0.007 158	0.008 243
DCP 9	.500	1.076	0.198 16	0.058 168	0.004 178	0.003 347	0.010 284	0.007 64	0.013 5	0.002 130	0.003 223
DCP 10	.695	0.910	0.157 21	0.058 173	0.010 265	0.007 327	0.009 296	0.009 88	0.005 358	0.005 132	0.008 212
DCP 11	.800	0.749	0.124 19	0.045 190	0.017 321	0.009 43	0.005 198	0.005 41	0.015 7	0.013 141	0.007 204
DCP 12	.878	0.641	0.104 17	0.038 191	0.012 327	0.014 0	0.005 227	0.006 112	0.008 353	0.009 122	0.006 163
DCP 13	.953	0.709	0.093 23	0.029 167	0.006 156	0.001 159	0.005 181	0.001 32	0.007 286	0.001 85	0.004 222

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.84	0.600	4.89	5.02		3187.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.044	638.9	1434.1	0.63E 07	-0.00093	0.970	8.82

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.524	0.474	356	0.079	58	0.028	300	0.008	270	0.013	218	0.010	133	0.005	52	0.001	342	0.002	227
CM		-0.008	0.017	206	0.013	88	0.007	352	0.002	337	0.004	309	0.004	233	0.002	187	0.002	124	0.001	54
DCP 1	.010	2.024	1.866	352	0.493	74	0.037	278	0.029	50	0.021	188	0.007	110	0.010	149	0.002	107	0.009	112
DCP 2	.050	1.985	1.495	350	0.391	78	0.147	330	0.030	339	0.039	255	0.008	127	0.021	190	0.024	54	0.039	347
DCP 3	.100	1.367	1.092	350	0.406	71	0.205	329	0.074	32	0.172	302	0.032	200	0.097	279	0.058	169	0.062	267
DCP 4	.150	0.942	0.921	355	0.179	65	0.135	332	0.085	255	0.028	271	0.081	217	0.039	131	0.031	197	0.037	115
DCP 5	.200	0.849	0.770	355	0.119	46	0.069	314	0.063	254	0.034	201	0.055	191	0.053	109	0.007	138	0.040	90
DCP 6	.250	0.665	0.622	359	0.094	44	0.037	281	0.033	262	0.042	189	0.030	149	0.036	105	0.024	38	0.009	53
DCP 7	.300	0.514	0.558	357	0.075	33	0.030	272	0.035	251	0.042	173	0.029	116	0.031	78	0.026	15	0.010	324
DCP 8	.400	0.353	0.379	2	0.066	42	0.029	244	0.004	151	0.017	185	0.018	139	0.014	44	0.011	342	0.008	267
DCP 9	.500	0.367	0.321	1	0.041	23	0.020	225	0.006	216	0.018	156	0.018	68	0.013	15	0.011	325	0.012	245
DCP 10	.695	0.235	0.194	5	0.014	355	0.015	196	0.004	84	0.011	161	0.013	65	0.008	11	0.006	312	0.008	227
DCP 11	.800	0.135	0.161	3	0.018	278	0.018	168	0.003	343	0.011	146	0.015	50	0.010	316	0.006	232	0.002	53
DCP 12	.878	0.100	0.153	2	0.038	263	0.019	183	0.008	143	0.011	112	0.010	38	0.004	325	0.003	252	0.011	268
DCP 13	.953	0.168	0.148	355	0.037	246	0.014	176	0.009	151	0.010	88	0.008	42	0.011	339	0.008	257	0.007	196

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	17.01	0.600	7.39	4.94		3187.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.045	638.3	1431.6	0.63E 07	-0.00113	0.997	9.05

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.728	0.299	8	0.105	67	0.010	96	0.011	41	0.011	76	0.009	345	0.002	269	0.002	232	0.002	6
CM		-0.021	0.033	194	0.015	88	0.003	172	0.005	90	0.003	122	0.004	57	0.002	54	0.001	34	0.001	26
DCP 1	.010	2.842	1.026	356	0.346	78	0.131	165	0.016	81	0.027	57	0.010	327	0.005	273	0.011	129	0.014	4
DCP 2	.050	2.549	0.602	358	0.576	75	0.041	234	0.032	130	0.040	121	0.018	124	0.034	16	0.016	257	0.022	356
DCP 3	.100	1.851	0.511	0	0.472	75	0.159	163	0.094	74	0.191	142	0.014	42	0.094	128	0.046	211	0.045	68
DCP 4	.150	1.294	0.525	6	0.297	78	0.033	57	0.107	84	0.044	88	0.107	59	0.008	203	0.060	73	0.027	137
DCP 5	.200	1.139	0.456	10	0.223	68	0.071	17	0.044	61	0.047	20	0.052	44	0.024	337	0.039	61	0.021	37
DCP 6	.250	0.899	0.373	15	0.143	68	0.045	56	0.034	33	0.049	25	0.037	4	0.034	346	0.022	356	0.019	323
DCP 7	.300	0.729	0.354	13	0.130	59	0.048	18	0.023	349	0.040	8	0.029	337	0.033	320	0.011	321	0.027	326
DCP 8	.400	0.497	0.245	18	0.070	54	0.019	99	0.020	5	0.025	6	0.036	303	0.022	250	0.008	222	0.005	233
DCP 9	.500	0.504	0.227	15	0.046	37	0.009	83	0.014	324	0.011	349	0.018	286	0.012	263	0.010	253	0.011	255
DCP 10	.695	0.336	0.180	13	0.018	274	0.014	119	0.013	293	0.004	257	0.010	265	0.004	218	0.006	217	0.007	197
DCP 11	.800	0.247	0.194	9	0.027	290	0.015	328	0.027	250	0.005	181	0.019	216	0.013	152	0.006	133	0.004	56
DCP 12	.878	0.201	0.185	4	0.026	278	0.020	325	0.020	251	0.010	254	0.011	194	0.002	333	0.007	279	0.007	167
DCP 13	.953	0.263	0.193	357	0.026	264	0.015	306	0.038	229	0.006	275	0.011	225	0.008	190	0.005	154	0.007	127

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	17.12	0.600	9.76	4.93		3187.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.045	637.8	1430.5	0.63E 07	-0.00134	1.015	11.96

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.866	0.160	30	0.055	95	0.032	150	0.008	189	0.008	233	0.006	244	0.009	256	0.006	149	0.001	105
CM		-0.041	0.053	193	0.005	56	0.006	236	0.005	291	0.003	310	0.003	285	0.002	12	0.002	345	0.002	326
CCP 1	.010	3.286	0.464	3	0.162	82	0.004	350	0.058	246	0.017	201	0.024	231	0.023	171	0.004	35	0.010	170
CCP 2	.050	2.804	0.207	163	0.259	76	0.122	176	0.032	26	0.037	265	0.026	299	0.035	219	0.016	52	0.024	350
CCP 3	.100	2.117	0.347	164	0.075	39	0.053	215	0.120	296	0.109	346	0.012	359	0.071	7	0.040	103	0.015	32
CCP 4	.150	1.473	0.167	50	0.258	87	0.160	179	0.106	262	0.049	295	0.045	265	0.041	332	0.016	81	0.009	199
CCP 5	.200	1.272	0.206	54	0.202	100	0.100	183	0.008	185	0.061	245	0.057	303	0.047	334	0.004	68	0.040	49
CCP 6	.250	1.037	0.220	39	0.115	98	0.046	139	0.043	150	0.045	192	0.026	204	0.031	244	0.026	257	0.025	280
CCP 7	.300	0.872	0.221	40	0.105	107	0.058	155	0.040	136	0.050	214	0.019	251	0.042	255	0.020	284	0.017	349
CCP 8	.400	0.607	0.193	32	0.016	127	0.039	124	0.022	137	0.010	143	0.017	186	0.026	189	0.011	159	0.018	295
CCP 9	.500	0.644	0.215	24	0.029	182	0.039	129	0.029	152	0.017	132	0.014	215	0.023	208	0.013	187	0.011	202
CCP10	.695	0.446	0.208	13	0.019	240	0.019	66	0.006	93	0.008	142	0.018	79	0.006	127	0.013	96	0.006	87
CCP11	.800	0.333	0.194	16	0.014	169	0.023	48	0.014	160	0.003	143	0.007	161	0.010	243	0.021	184	0.019	157
CCP12	.878	0.293	0.205	11	0.010	60	0.031	45	0.019	38	0.008	76	0.015	52	0.004	7	0.002	158	0.009	35
CCP13	.953	0.359	0.198	8	0.023	61	0.004	88	0.021	93	0.010	122	0.008	112	0.003	139	0.015	140	0.017	85

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.95	0.600	14.50	4.62		3175.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.044	638.6	1427.2	0.62E 07	-0.00151	1.068	16.31

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.979	0.088	57	0.009	236	0.018	257	0.006	6	0.006	304	0.001	246	0.006	253	0.006	37	0.003	238
CM		-0.096	0.046	195	0.006	1	0.004	108	0.000	344	0.001	89	0.001	69	0.003	49	0.001	180	0.001	22
CCP 1	.010	3.224	0.378	163	0.201	72	0.084	225	0.054	358	0.075	287	0.065	301	0.033	317	0.057	319	0.061	327
CCP 2	.050	2.397	0.393	168	0.103	288	0.064	270	0.011	203	0.038	255	0.026	149	0.044	158	0.039	138	0.354	159
CCP 3	.100	1.992	0.162	145	0.021	316	0.029	222	0.033	338	0.033	19	0.020	70	0.025	24	0.002	20	0.019	5
CCP 4	.150	1.488	0.113	143	0.047	245	0.061	196	0.024	267	0.021	120	0.019	209	0.000	157	0.026	132	0.013	157
CCP 5	.200	1.336	0.127	137	0.055	288	0.014	189	0.015	354	0.024	30	0.023	64	0.008	334	0.007	10	0.005	270
CCP 6	.250	1.175	0.097	74	0.016	251	0.018	208	0.003	123	0.010	122	0.010	181	0.013	298	0.012	77	0.005	5
CCP 7	.300	1.011	0.108	93	0.042	273	0.008	276	0.013	39	0.009	86	0.021	74	0.006	3	0.013	23	0.014	264
CCP 8	.400	0.773	0.168	42	0.019	44	0.013	315	0.021	47	0.005	359	0.011	44	0.018	315	0.021	26	0.007	2
CCP 9	.500	0.803	0.161	34	0.016	151	0.024	323	0.015	66	0.008	287	0.009	268	0.007	270	0.012	41	0.012	2
CCP10	.695	0.670	0.174	17	0.019	171	0.018	255	0.006	36	0.007	324	0.010	286	0.010	209	0.013	314	0.002	13
CCP11	.800	0.526	0.160	16	0.024	209	0.031	271	0.011	261	0.014	246	0.009	246	0.024	233	0.007	109	0.013	17
CCP12	.878	0.484	0.136	21	0.022	194	0.029	265	0.012	255	0.019	264	0.009	161	0.018	216	0.006	178	0.004	224
CCP13	.953	0.552	0.131	14	0.028	180	0.001	197	0.010	180	0.002	17	0.008	235	0.004	139	0.006	350	0.009	65

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.72	0.600	17.03	4.83		3175.2	10

K	V	Q	RN	DAMPING	CY(MAX)	ALPHA(STALL)
0.044	638.1	1425.3	0.62E 07	-0.00203	1.098	17.14

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.966	0.106 85	0.020 10	0.013 118	0.004 339	0.002 186	0.003 40	0.007 125	0.005 41	0.001 171
CM		-0.121	0.042 206	0.007 235	0.003 297	0.002 156	0.001 284	0.001 289	0.002 289	0.001 355	
DCP 1	.010	2.947	1.002 176	0.194 89	0.141 190	0.051 73	0.021 211	0.008 324	0.046 209	0.010 291	0.017 247
DCP 2	.050	2.051	0.377 158	0.054 341	0.038 141	0.027 296	0.005 17	0.026 347	0.018 130	0.036 342	0.009 12
DCP 3	.100	1.769	0.231 144	0.112 295	0.051 349	0.010 166	0.018 249	0.008 53	0.019 144	0.008 29	0.006 109
DCP 4	.150	1.382	0.186 141	0.041 288	0.006 88	0.004 53	0.014 198	0.013 342	0.024 110	0.004 65	0.012 99
DCP 5	.200	1.240	0.161 104	0.051 284	0.030 8	0.008 156	0.013 268	0.007 87	0.019 142	0.012 96	0.005 154
DCP 6	.250	1.129	0.139 95	0.024 290	0.007 116	0.005 338	0.010 206	0.004 17	0.017 141	0.008 328	0.011 27
DCP 7	.300	0.974	0.156 76	0.024 279	0.011 79	0.005 218	0.004 245	0.006 42	0.017 122	0.008 49	0.002 77
DCP 8	.400	0.775	0.127 63	0.019 0	0.017 103	0.009 336	0.008 78	0.004 207	0.004 295	0.005 315	0.010 3
DCP 9	.500	0.851	0.154 58	0.035 33	0.032 103	0.006 232	0.003 241	0.007 185	0.004 272	0.010 26	0.002 241
DCP10	.695	0.738	0.147 39	0.039 44	0.021 132	0.012 338	0.011 69	0.006 73	0.003 71	0.006 97	0.005 171
DCP11	.800	0.620	0.139 35	0.030 66	0.012 138	0.008 11	0.005 132	0.005 78	0.012 55	0.013 132	0.009 194
DCP12	.878	0.565	0.122 32	0.024 71	0.006 125	0.005 47	0.007 171	0.007 90	0.011 85	0.009 135	0.005 154
DCP13	.953	0.621	0.110 24	0.014 45	0.007 206	0.008 322	0.005 196	0.008 319	0.008 114	0.004 249	0.003 48

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	17.18	0.600	24.33	4.82		3175.3	10

K	V	Q	RN	DAMPING	CY(MAX)	ALPHA(STALL)
0.045	637.1	1421.3	0.62E 07	0.00030	1.351	29.06

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		1.138	0.177 359	0.052 184	0.012 235	0.008 325	0.004 347	0.004 90	0.004 98	0.004 354	0.002 162
CM		-0.193	0.044 176	0.009 348	0.004 350	0.001 120	0.001 110	0.001 334	0.001 345	0.001 123	0.001 26
DCP 1	.010	2.000	0.298 157	0.197 219	0.120 284	0.062 356	0.022 85	0.008 321	0.021 56	0.009 78	0.005 120
DCP 2	.050	1.879	0.100 14	0.073 209	0.032 296	0.024 9	0.015 40	0.014 79	0.007 139	0.008 23	0.009 110
DCP 3	.100	1.729	0.165 7	0.091 193	0.034 262	0.018 295	0.018 313	0.020 15	0.019 43	0.008 35	0.005 137
DCP 4	.150	1.505	0.194 1	0.070 192	0.021 277	0.011 342	0.005 22	0.011 56	0.006 74	0.008 47	0.006 102
DCP 5	.200	1.428	0.242 356	0.050 171	0.003 225	0.005 263	0.008 311	0.010 35	0.007 59	0.004 357	0.001 291
DCP 6	.250	1.350	0.236 358	0.058 180	0.014 242	0.010 292	0.007 327	0.009 49	0.007 66	0.008 93	0.005 159
DCP 7	.300	1.221	0.260 356	0.048 168	0.006 197	0.004 292	0.005 16	0.006 74	0.005 68	0.006 3	0.000 62
DCP 8	.400	1.069	0.230 356	0.052 177	0.011 226	0.005 299	0.002 59	0.004 119	0.000 354	0.006 9	0.003 111
DCP 9	.500	1.114	0.232 354	0.044 166	0.011 184	0.008 307	0.005 55	0.005 136	0.004 90	0.003 331	0.003 213
DCP10	.695	0.994	0.197 356	0.046 176	0.014 197	0.007 334	0.005 337	0.006 147	0.005 178	0.001 255	0.005 197
DCP11	.800	0.875	0.168 359	0.051 185	0.015 197	0.002 325	0.005 266	0.006 151	0.005 144	0.007 303	0.003 255
DCP12	.878	0.804	0.131 0	0.048 185	0.015 198	0.005 322	0.004 280	0.006 164	0.009 188	0.010 325	0.003 158
DCP13	.953	0.816	0.110 2	0.031 166	0.011 161	0.007 316	0.009 291	0.004 82	0.008 98	0.007 292	0.005 175

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	33.67	0.200	5.23	5.23		3184.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.253	221.9	200.3	0.26E 07	-0.00155	0.837	10.41

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.519	0.364	4	0.017	207	0.006	159	0.005	117	0.005	68	0.007	99	0.006	203	0.006	337	0.004	102
CM		-0.004	0.030	275	0.004	122	0.002	294	0.001	196	0.002	222	0.001	334	0.002	52	0.001	155	0.000	315
DCP 1	.010	2.193	2.333	345	0.136	170	0.033	180	0.030	120	0.018	123	0.034	38	0.023	79	0.003	280	0.034	0
DCP 2	.050	2.116	1.218	349	0.069	162	0.015	180	0.025	148	0.009	134	0.013	65	0.005	77	0.007	13	0.013	63
DCP 3	.100	1.007	0.859	352	0.039	175	0.009	331	0.019	78	0.010	53	0.015	122	0.009	195	0.017	344	0.005	55
DCP 4	.150	0.775	0.653	353	0.038	180	0.004	231	0.017	144	0.006	168	0.010	71	0.011	150	0.009	317	0.009	132
DCP 5	.200	0.834	0.544	359	0.035	195	0.006	258	0.005	117	0.002	251	0.007	104	0.014	187	0.005	367	0.008	131
DCP 6	.250	0.685	0.467	1	0.028	204	0.009	217	0.013	173	0.007	118	0.008	75	0.016	194	0.006	232	0.012	145
DCP 7	.300	0.533	0.409	7	0.020	218	0.014	205	0.005	200	0.004	203	0.008	127	0.012	203	0.002	280	0.014	131
DCP 8	.400	0.476	0.292	12	0.020	242	0.009	180	0.009	191	0.004	112	0.006	95	0.010	206	0.009	313	0.006	123
DCP 9	.500	0.494	0.249	25	0.015	250	0.010	128	0.005	8	0.006	14	0.010	121	0.007	227	0.007	358	0.008	115
DCP10	.695	0.161	0.161	40	0.008	282	0.010	99	0.002	313	0.010	38	0.007	85	0.005	280	0.006	25	0.004	1
DCP11	.800	0.117	0.124	47	0.013	297	0.012	110	0.015	55	0.015	70	0.009	152	0.010	218	0.009	334	0.003	219
DCP12	.878	0.062	0.098	48	0.015	285	0.006	224	0.005	162	0.003	47	0.005	93	0.006	261	0.003	291	0.001	53
DCP13	.953	0.060	0.091	39	0.008	246	0.001	59	0.007	33	0.005	23	0.004	93	0.009	170	0.009	356	0.003	145

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	33.44	0.200	7.76	5.24		3184.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.252	221.6	199.7	0.26E 07	-0.00161	1.129	13.01

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.771	0.353	7	0.017	187	0.004	67	0.006	157	0.003	74	0.004	90	0.005	168	0.006	65	0.002	262
CM		-0.008	0.031	278	0.003	119	0.002	223	0.001	29	0.001	212	0.000	219	0.002	43	0.001	233	0.001	70
DCP 1	.010	3.624	2.297	346	0.132	158	0.008	193	0.014	139	0.016	185	0.019	51	0.021	94	0.018	63	0.069	5
DCP 2	.050	2.979	1.190	350	0.070	157	0.001	179	0.010	150	0.003	137	0.005	96	0.009	86	0.011	76	0.026	31
DCP 3	.100	1.593	0.821	355	0.047	178	0.005	277	0.014	97	0.016	160	0.007	189	0.014	115	0.005	157	0.007	166
DCP 4	.150	1.159	0.651	356	0.035	162	0.009	113	0.013	152	0.005	75	0.011	77	0.005	54	0.013	35	0.006	159
DCP 5	.200	1.166	0.521	3	0.036	187	0.006	326	0.007	100	0.004	167	0.010	169	0.013	144	0.004	71	0.005	222
DCP 6	.250	1.004	0.461	4	0.026	180	0.007	92	0.013	151	0.007	56	0.016	82	0.006	196	0.014	65	0.018	166
DCP 7	.300	0.772	0.382	12	0.022	196	0.008	107	0.006	147	0.007	57	0.010	120	0.009	139	0.005	57	0.008	220
DCP 8	.400	0.672	0.291	16	0.011	209	0.005	71	0.011	156	0.004	28	0.011	76	0.007	193	0.014	37	0.007	197
DCP 9	.500	0.675	0.234	29	0.011	247	0.006	117	0.003	189	0.004	48	0.002	219	0.010	186	0.002	131	0.005	228
DCP10	.695	0.263	0.163	44	0.005	250	0.006	60	0.003	281	0.007	37	0.005	50	0.006	223	0.008	67	0.007	258
DCP11	.800	0.185	0.126	55	0.010	294	0.014	65	0.009	198	0.001	79	0.001	34	0.002	226	0.010	324	0.009	343
DCP12	.878	0.167	0.104	50	0.008	245	0.007	356	0.005	216	0.004	46	0.004	38	0.010	243	0.008	57	0.003	233
DCP13	.953	0.111	0.085	46	0.006	243	0.011	352	0.007	123	0.001	184	0.004	239	0.004	143	0.003	221	0.002	217

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	33.44	0.200	10.15	5.24		3184.3	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.252	221.4	199.3	0.26E 07	-0.00159	1.350	15.41	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.990	0.351	9	0.017	194	0.003	79	0.001	51	0.005	48	0.004	138	0.002	254	0.006	25	0.006	49
CM		-0.012	0.030	277	0.003	100	0.001	235	0.001	153	0.001	222	0.001	51	0.001	74	0.002	225	0.002	266
DCP 1	.010	4.866	2.289	348	0.126	157	0.016	143	0.024	127	0.016	139	0.029	138	0.009	139	0.013	267	0.075	272
DCP 2	.050	3.692	1.139	351	0.066	149	0.009	190	0.008	136	0.007	81	0.014	137	0.005	156	0.007	308	0.014	54
DCP 3	.100	2.122	0.829	356	0.056	166	0.008	57	0.018	111	0.011	353	0.011	57	0.002	297	0.014	326	0.008	350
DCP 4	.150	1.501	0.635	358	0.034	190	0.003	190	0.005	317	0.008	64	0.011	86	0.002	83	0.003	335	0.010	356
DCP 5	.200	1.470	0.515	3	0.035	191	0.005	7	0.007	109	0.005	54	0.009	114	0.005	316	0.006	317	0.004	37
DCP 6	.250	1.240	0.453	8	0.023	203	0.002	78	0.005	264	0.006	61	0.006	79	0.007	71	0.007	59	0.009	61
DCP 7	.300	1.019	0.389	12	0.023	209	0.007	18	0.002	1	0.012	31	0.010	105	0.007	295	0.007	71	0.008	18
DCP 8	.400	0.863	0.292	22	0.008	247	0.006	192	0.008	239	0.011	72	0.002	96	0.002	109	0.008	28	0.014	56
DCP 9	.500	0.810	0.236	30	0.013	246	0.005	73	0.004	244	0.007	10	0.004	174	0.009	258	0.008	63	0.012	66
DCP10	.695	0.338	0.167	47	0.012	269	0.009	75	0.003	358	0.005	48	0.006	181	0.002	216	0.005	50	0.009	95
DCP11	.800	0.254	0.120	50	0.013	236	0.005	125	0.002	5	0.005	78	0.008	245	0.002	274	0.014	20	0.008	47
DCP12	.878	0.258	0.109	51	0.008	206	0.006	359	0.003	353	0.001	72	0.005	229	0.004	211	0.006	55	0.008	117
DCP13	.953	0.165	0.087	36	0.008	182	0.004	5	0.004	91	0.001	304	0.005	327	0.005	280	0.007	48	0.003	137

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	33.11	0.200	12.47	5.13		3149.2	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.253	219.0	191.6	0.25E 07	0.00133	1.515	17.03	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.066	0.472	2	0.089	151	0.034	320	0.014	91	0.019	236	0.005	77	0.012	306	0.011	137	0.003	314
CM		-0.024	0.021	83	0.035	258	0.021	77	0.013	260	0.007	88	0.001	326	0.003	142	0.003	314	0.003	133
DCP 1	.010	4.426	2.518	25	0.842	287	0.516	136	0.265	347	0.146	215	0.078	121	0.078	359	0.061	209	0.069	123
DCP 2	.050	3.658	1.380	21	0.353	254	0.208	85	0.095	273	0.027	166	0.046	115	0.057	309	0.045	147	0.014	355
DCP 3	.100	2.513	1.199	5	0.379	214	0.236	60	0.115	292	0.096	195	0.094	65	0.077	283	0.034	148	0.019	43
DCP 4	.150	1.830	0.977	2	0.337	194	0.174	34	0.057	261	0.058	182	0.059	36	0.049	246	0.031	95	0.014	314
DCP 5	.200	1.559	0.829	353	0.297	166	0.167	354	0.068	189	0.029	94	0.037	321	0.032	198	0.035	65	0.026	271
DCP 6	.250	1.267	0.701	358	0.268	161	0.154	348	0.054	198	0.034	119	0.048	323	0.035	182	0.034	35	0.025	230
DCP 7	.300	1.234	0.620	349	0.273	139	0.186	319	0.094	153	0.034	20	0.043	272	0.030	139	0.032	358	0.032	191
DCP 8	.400	0.977	0.445	353	0.218	130	0.129	313	0.057	164	0.039	34	0.047	250	0.034	97	0.027	317	0.026	170
DCP 9	.500	0.730	0.315	350	0.178	98	0.126	266	0.076	87	0.046	297	0.031	175	0.034	21	0.039	299	0.038	38
DCP10	.695	0.507	0.141	355	0.119	76	0.074	235	0.052	60	0.052	243	0.019	72	0.023	313	0.029	147	0.025	310
DCP11	.800	0.292	0.097	335	0.082	66	0.044	241	0.048	74	0.037	260	0.016	119	0.037	337	0.033	118	0.014	283
DCP12	.878	0.182	0.068	322	0.065	60	0.041	245	0.043	63	0.037	240	0.024	78	0.025	280	0.019	99	0.013	283
DCP13	.953	0.283	0.050	327	0.048	15	0.038	179	0.036	352	0.019	153	0.013	339	0.010	225	0.009	67	0.002	163

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	33.33	0.200	14.94	5.14		3179.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.252	221.3	201.3	0.26E 07	0.00378	1.906	19.49

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.253	0.608	23	0.170	224	0.090	70	0.043	256	0.036	130	0.019	23	0.017	240	0.013	147	0.006	17
CM		-0.082	0.095	136	0.077	345	0.047	210	0.024	74	0.013	321	0.008	194	0.007	55	0.005	295	0.003	183
DCP 1	.010	4.397	2.634	84	1.398	8	0.350	282	0.285	254	0.332	159	0.161	76	0.092	54	0.086	315	0.100	268
DCP 2	.050	3.658	1.519	64	0.569	327	0.128	201	0.103	198	0.133	103	0.068	6	0.040	307	0.059	222	0.046	136
DCP 3	.100	2.301	1.381	47	0.525	301	0.155	210	0.187	171	0.165	83	0.092	14	0.081	297	0.053	229	0.055	148
DCP 4	.150	1.823	1.210	35	0.524	279	0.215	178	0.142	123	0.100	45	0.074	329	0.057	229	0.036	170	0.034	97
DCP 5	.200	1.764	1.064	29	0.406	256	0.161	151	0.103	101	0.083	34	0.082	306	0.074	202	0.050	143	0.061	50
DCP 6	.250	1.659	0.981	24	0.440	249	0.226	142	0.141	63	0.091	343	0.088	262	0.066	177	0.062	142	0.078	46
DCP 7	.300	1.426	0.939	17	0.424	231	0.209	125	0.130	46	0.097	332	0.115	239	0.077	149	0.070	96	0.089	355
DCP 8	.400	1.247	0.713	10	0.348	217	0.221	102	0.145	356	0.103	263	0.100	163	0.036	64	0.034	24	0.046	266
DCP 9	.500	1.104	0.644	358	0.387	189	0.253	66	0.163	309	0.123	217	0.141	111	0.074	347	0.045	286	0.058	189
DCP10	.695	0.767	0.411	339	0.311	161	0.251	23	0.179	242	0.119	130	0.094	5	0.056	230	0.022	158	0.031	57
DCP11	.800	0.473	0.304	334	0.229	161	0.190	23	0.138	245	0.117	127	0.095	356	0.063	231	0.050	139	0.026	344
DCP12	.878	0.315	0.211	325	0.151	148	0.126	3	0.098	218	0.077	105	0.056	332	0.042	215	0.040	177	0.024	340
DCP13	.953	0.389	0.177	311	0.125	133	0.122	335	0.094	178	0.054	39	0.031	245	0.008	87	0.018	193	0.011	17

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	33.33	0.200	17.50	5.12		3179.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.252	221.1	201.5	0.26E 07	0.00294	2.113	22.64

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.291	0.631	34	0.171	275	0.104	164	0.065	25	0.050	249	0.029	153	0.013	36	0.011	352	0.009	205
CM		-0.115	0.121	151	0.080	35	0.045	290	0.027	186	0.014	75	0.006	352	0.005	223	0.005	152	0.007	23
DCP 1	.010	4.071	2.867	111	1.276	52	0.345	42	0.442	353	0.220	283	0.142	264	0.188	216	0.071	142	0.018	328
DCP 2	.050	3.440	1.595	82	0.397	18	0.158	322	0.076	287	0.112	230	0.075	151	0.042	139	0.022	97	0.034	81
DCP 3	.100	2.223	1.409	65	0.424	0	0.269	300	0.141	279	0.196	224	0.178	174	0.104	104	0.079	83	0.071	13
DCP 4	.150	1.793	1.240	51	0.448	339	0.305	260	0.107	227	0.135	193	0.120	136	0.063	64	0.052	32	0.033	349
DCP 5	.200	1.748	1.138	43	0.401	321	0.300	233	0.098	185	0.089	156	0.115	109	0.090	27	0.068	349	0.052	282
DCP 6	.250	1.697	1.059	34	0.411	310	0.333	223	0.147	173	0.121	129	0.131	77	0.101	4	0.084	320	0.066	254
DCP 7	.300	1.466	1.034	25	0.439	299	0.372	210	0.218	142	0.113	76	0.100	47	0.116	337	0.078	290	0.078	216
DCP 8	.400	1.284	0.782	18	0.396	275	0.350	174	0.199	83	0.102	10	0.082	322	0.071	267	0.085	209	0.080	128
DCP 9	.500	1.146	0.733	4	0.397	245	0.301	147	0.249	52	0.154	308	0.074	262	0.087	191	0.060	97	0.047	46
DCP10	.695	0.903	0.490	347	0.352	216	0.252	104	0.225	356	0.155	240	0.075	154	0.049	54	0.012	318	0.024	289
DCP11	.800	0.547	0.342	352	0.233	214	0.173	101	0.149	357	0.127	252	0.108	151	0.084	24	0.030	313	0.040	193
DCP12	.878	0.451	0.247	345	0.175	193	0.115	65	0.088	315	0.056	209	0.045	147	0.038	41	0.053	318	0.061	181
DCP13	.953	0.556	0.280	325	0.218	167	0.174	25	0.141	253	0.096	111	0.057	315	0.043	162	0.058	20	0.066	242

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D,ALPHA	DEL,H	TEST POINT	CYCLES ANALYZED
	33.67	0.200	24.97	5.15		3179.3	10

K	V	Q	RN	DAMPING	CY(MAX)	ALPHA(STALL)
0.255	220.8	200.6	0.26E 07	-0.00307	1.495	24.13

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		1.144	0.344 56	0.094 153	0.052 186	0.009 141	0.014 19	0.004 144	0.004 209	0.005 176	0.003 274
CM		-0.140	0.086 225	0.023 281	0.017 333	0.003 342	0.004 173	0.001 4	0.002 52	0.001 70	0.000 240
DCP 1	.010	1.543	0.772 151	0.399 225	0.185 322	0.096 82	0.047 159	0.021 161	0.034 164	0.008 150	0.020 262
DCP 2	.050	2.356	0.248 59	0.127 190	0.030 252	0.015 62	0.019 17	0.014 52	0.015 128	0.012 209	0.009 322
DCP 3	.100	1.539	0.298 60	0.145 183	0.052 232	0.026 110	0.033 85	0.023 109	0.008 93	0.017 129	0.012 168
DCP 4	.150	1.280	0.349 56	0.137 184	0.041 235	0.013 74	0.005 1	0.012 110	0.013 115	0.012 233	0.022 311
DCP 5	.200	1.335	0.350 56	0.140 179	0.075 221	0.012 253	0.024 29	0.009 69	0.009 7	0.014 115	0.004 333
DCP 6	.250	1.396	0.393 56	0.137 175	0.061 222	0.005 43	0.004 37	0.007 280	0.018 67	0.012 141	0.022 286
DCP 7	.300	1.233	0.381 57	0.141 170	0.094 206	0.024 234	0.020 37	0.011 180	0.011 353	0.011 94	0.019 282
DCP 8	.400	1.256	0.432 56	0.134 159	0.084 199	0.011 259	0.013 65	0.014 211	0.008 287	0.005 69	0.014 251
DCP 9	.500	1.200	0.446 54	0.114 140	0.092 179	0.018 191	0.028 4	0.007 154	0.015 236	0.012 199	0.009 163
DCP10	.695	1.059	0.424 50	0.119 105	0.082 143	0.019 114	0.025 343	0.008 322	0.010 220	0.004 176	0.012 94
DCP11	.800	0.798	0.308 49	0.108 106	0.059 151	0.019 114	0.026 5	0.010 159	0.016 246	0.012 250	0.009 359
DCP12	.878	0.714	0.292 44	0.065 98	0.045 152	0.019 155	0.017 16	0.003 104	0.012 173	0.010 257	0.002 356
DCP13	.953	0.665	0.180 34	0.024 80	0.028 135	0.009 207	0.016 194	0.008 98	0.005 100	0.006 36	0.013 284

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D,ALPHA	DEL,H	TEST POINT	CYCLES ANALYZED
	33.00	0.400	9.89	4.89		3146.1	10

K	V	Q	RN	DAMPING	CY(MAX)	ALPHA(STALL)
0.127	433.4	723.8	0.47E 07	0.00005	1.434	14.44

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.866	0.375 31	0.110 345	0.057 249	0.044 156	0.025 34	0.009 308	0.002 222	0.005 171	0.005 89
CM		-0.031	0.058 177	0.040 62	0.020 351	0.019 280	0.015 185	0.006 100	0.004 41	0.003 337	0.003 244
DCP 1	.010	4.095	0.846 66	1.434 58	0.612 344	0.247 299	0.184 253	0.080 208	0.029 164	0.032 181	0.030 180
DCP 2	.050	2.661	0.645 61	0.625 33	0.224 302	0.082 268	0.104 232	0.064 156	0.026 35	0.019 69	
DCP 3	.100	1.880	0.645 51	0.399 17	0.155 283	0.103 241	0.085 177	0.046 134	0.032 78	0.023 42	0.012 7
DCP 4	.150	1.454	0.592 39	0.286 353	0.120 266	0.095 216	0.071 137	0.026 54	0.029 74	0.032 1	0.020 335
DCP 5	.200	1.268	0.544 40	0.238 348	0.117 257	0.092 200	0.062 122	0.038 59	0.026 26	0.015 327	0.009 244
DCP 6	.250	1.138	0.511 33	0.193 330	0.085 255	0.103 192	0.078 91	0.034 2	0.012 25	0.018 334	0.021 271
DCP 7	.300	0.946	0.506 34	0.187 326	0.107 241	0.101 175	0.069 80	0.031 26	0.023 359	0.019 275	0.010 185
DCP 8	.400	0.629	0.425 28	0.134 299	0.057 234	0.095 162	0.076 50	0.030 333	0.020 302	0.015 240	0.015 185
DCP 9	.500	0.627	0.375 27	0.125 291	0.072 216	0.087 144	0.069 42	0.032 341	0.027 283	0.026 205	0.019 128
DCP10	.695	0.487	0.283 14	0.106 257	0.062 192	0.086 109	0.070 2	0.031 280	0.021 225	0.023 155	0.023 69
DCP11	.800	0.300	0.253 6	0.114 248	0.077 172	0.078 84	0.061 338	0.029 249	0.021 189	0.017 128	0.015 56
DCP12	.878	0.169	0.224 355	0.094 240	0.068 166	0.072 68	0.053 321	0.028 231	0.021 161	0.019 97	0.017 348
DCP13	.953	0.278	0.190 348	0.056 221	0.038 165	0.032 61	0.023 337	0.020 242	0.014 131	0.007 97	0.008 50

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	32.79	0.400	12.25	4.80		3145.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.126	433.4	724.3	0.47E 07	-0.00055	1.501	15.33

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.943	0.352 55	0.098 28	0.059 329	0.028 238	0.015 182	0.010 178	0.017 99	0.010 39	0.003 22
CM		-0.055	0.082 184	0.031 115	0.031 83	0.017 15	0.011 353	0.009 330	0.008 249	0.004 180	0.002 163
CCP 1	.010	4.155	1.496 135	1.111 101	0.518 100	0.240 70	0.212 77	0.093 19	0.030 33	0.030 100	0.023 160
CCP 2	.050	2.639	0.914 113	0.456 67	0.262 77	0.174 11	0.082 50	0.092 348	0.039 353	0.037 333	0.033 339
CCP 3	.100	1.954	0.687 91	0.280 52	0.187 43	0.093 338	0.055 7	0.048 297	0.018 329	0.019 303	0.008 258
CCP 4	.150	1.538	0.578 75	0.202 46	0.177 23	0.093 303	0.038 341	0.056 276	0.019 254	0.011 221	0.013 277
CCP 5	.200	1.328	0.540 70	0.176 32	0.141 6	0.060 308	0.064 300	0.055 243	0.028 219	0.023 171	0.019 171
CCP 6	.250	1.214	0.510 63	0.146 32	0.159 351	0.071 265	0.045 296	0.054 243	0.035 203	0.026 159	0.009 146
CCP 7	.300	1.033	0.492 58	0.143 19	0.144 339	0.068 267	0.050 260	0.048 231	0.043 182	0.029 124	0.006 95
CCP 8	.400	0.728	0.430 47	0.097 8	0.149 319	0.072 229	0.049 240	0.042 197	0.045 159	0.038 103	0.015 62
CCP 9	.500	0.719	0.399 41	0.103 342	0.123 300	0.065 226	0.058 205	0.043 179	0.057 121	0.029 56	0.015 80
CCP10	.695	0.582	0.335 24	0.101 313	0.115 268	0.066 201	0.058 176	0.045 130	0.049 77	0.023 25	0.023 9
CCP11	.800	0.396	0.302 13	0.103 303	0.113 250	0.069 177	0.059 138	0.048 84	0.045 34	0.035 339	0.016 263
CCP12	.878	0.284	0.263 4	0.086 305	0.095 242	0.061 177	0.049 128	0.047 72	0.033 16	0.026 335	0.013 272
LCP13	.953	0.359	0.210 352	0.052 290	0.049 213	0.023 147	0.017 100	0.019 81	0.025 11	0.017 293	0.035 242

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	33.56	0.400	14.88	5.00		3178.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.129	435.4	736.0	0.48E 07	-0.00194	1.457	15.64

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.900	0.357 75	0.091 75	0.036 98	0.050 52	0.012 13	0.011 45	0.010 327	0.001 162	0.006 288
CM		-0.099	0.080 210	0.033 206	0.013 188	0.021 188	0.009 172	0.008 186	0.005 150	0.002 227	0.003 136
CCP 1	.050	2.594	1.043 137	0.238 170	0.185 155	0.122 196	0.053 244	0.069 238	0.054 271	0.029 290	0.018 337
CCP 2	.100	1.878	0.749 121	0.204 155	0.155 144	0.100 164	0.033 225	0.023 187	0.029 269	0.031 319	0.021 278
CCP 3	.150	1.453	0.631 103	0.178 128	0.080 106	0.111 124	0.016 177	0.036 141	0.029 196	0.027 223	0.025 211
CCP 4	.200	1.381	0.516 100	0.168 123	0.100 132	0.101 113	0.040 159	0.036 128	0.016 197	0.022 250	0.024 240
CCP 5	.250	1.197	0.542 89	0.163 110	0.055 78	0.109 93	0.017 101	0.031 105	0.019 110	0.027 290	0.015 142
CCP 6	.300	0.989	0.471 87	0.145 101	0.078 120	0.094 89	0.042 126	0.029 123	0.018 118	0.026 290	0.017 216
CCP 7	.400	0.824	0.452 71	0.148 83	0.041 41	0.110 55	0.035 47	0.031 72	0.034 33	0.024 128	0.019 77
CCP 8	.500	0.856	0.419 65	0.125 64	0.053 70	0.099 43	0.042 66	0.029 54	0.023 57	0.029 135	0.017 118
CCP 9	.695	0.627	0.353 44	0.134 31	0.046 17	0.101 5	0.044 4	0.040 9	0.034 342	0.027 13	0.026 332
CCP10	.800	0.486	0.316 37	0.143 27	0.058 7	0.091 4	0.058 335	0.038 349	0.035 305	0.007 361	0.021 311
CCP11	.878	0.345	0.253 26	0.127 13	0.049 357	0.066 340	0.047 300	0.034 325	0.027 263	0.006 275	0.018 272
CCP12	.953	0.453	0.199 15	0.074 4	0.019 12	0.029 332	0.022 309	0.016 335	0.020 282	0.008 288	0.009 265

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	33.56	0.400	17.41	5.03		3178.2	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.129	435.1	736.4	0.48E 07	-0.00304	1.434	16.74	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.978	0.319 86	0.049 148	0.058 145	0.025 179	0.027 119	0.008 136	0.007 155	0.001 235	0.003 272
CM		-0.119	0.077 229	0.015 239	0.020 279	0.009 300	0.013 271	0.004 276	0.003 279	0.001 44	0.002 132
DCP 1	.010	2.837	1.445 177	0.250 296	0.108 235	0.097 20	0.101 194	0.062 181	0.062 240	0.013 39	0.051 346
DCP 2	.050	2.236	0.582 133	0.216 219	0.072 220	0.074 255	0.051 316	0.032 26	0.011 28	0.007 316	0.029 270
DCP 3	.100	1.652	0.436 107	0.214 191	0.088 213	0.080 232	0.018 243	0.011 269	0.009 40	0.015 131	0.024 130
DCP 4	.150	1.327	0.428 96	0.163 164	0.087 221	0.032 248	0.024 251	0.009 357	0.013 319	0.021 22	0.036 214
DCP 5	.200	1.289	0.376 89	0.142 164	0.093 187	0.076 216	0.018 216	0.014 234	0.017 288	0.014 1	0.017 80
DCP 6	.250	1.160	0.418 87	0.128 150	0.090 191	0.035 242	0.021 209	0.004 331	0.008 197	0.005 18	0.011 146
DCP 7	.300	0.963	0.391 84	0.105 155	0.093 164	0.062 204	0.031 174	0.024 206	0.023 221	0.008 259	0.002 190
DCP 8	.400	0.864	0.385 79	0.098 127	0.103 153	0.046 183	0.047 163	0.006 203	0.019 153	0.007 192	0.002 143
DCP 9	.500	0.947	0.404 72	0.062 115	0.092 130	0.042 162	0.057 124	0.030 164	0.035 167	0.019 216	0.009 157
DCP10	.695	0.737	0.349 61	0.047 50	0.082 105	0.032 128	0.064 89	0.022 140	0.008 98	0.012 143	0.021 285
DCP11	.800	0.603	0.293 59	0.058 53	0.082 98	0.043 108	0.063 90	0.026 56	0.019 70	0.012 355	0.011 356
DCP12	.878	0.471	0.248 55	0.054 44	0.071 86	0.039 99	0.050 85	0.016 56	0.014 39	0.007 10	0.008 255
DCP13	.953	0.567	0.166 42	0.020 36	0.043 69	0.017 90	0.029 38	0.025 46	0.012 42	0.004 24	0.010 281

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	32.89	0.400	24.88	5.06		3178.3	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.126	434.6	735.6	0.48E 07	-0.00158	1.186	29.27	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		1.007	0.140 36	0.030 186	0.008 273	0.009 351	0.008 64	0.003 107	0.003 334	0.003 1	0.005 210
CM		-0.160	0.043 222	0.007 356	0.003 61	0.003 146	0.003 212	0.002 254	0.000 88	0.001 52	0.001 21
DCP 1	.010	1.689	0.167 161	0.062 234	0.035 316	0.022 68	0.011 189	0.018 303	0.026 35	0.010 88	0.004 236
DCP 2	.050	1.914	0.152 37	0.053 185	0.013 261	0.013 65	0.012 135	0.013 249	0.010 349	0.013 32	0.001 130
DCP 3	.100	1.529	0.251 22	0.006 64	0.015 335	0.012 314	0.002 169	0.011 183	0.005 256	0.013 38	0.007 271
DCP 4	.150	1.311	0.209 27	0.050 193	0.008 257	0.006 84	0.011 120	0.006 198	0.004 331	0.009 29	0.004 185
DCP 5	.200	1.305	0.257 23	0.013 177	0.012 345	0.010 347	0.004 85	0.006 151	0.003 263	0.008 15	0.007 212
DCP 6	.250	1.221	0.226 28	0.045 196	0.006 281	0.009 41	0.013 107	0.005 155	0.006 319	0.010 31	0.004 224
DCP 7	.300	1.026	0.259 27	0.023 191	0.006 343	0.009 16	0.008 107	0.005 127	0.003 274	0.006 6	0.006 204
DCP 8	.400	0.959	0.220 31	0.041 195	0.007 254	0.010 15	0.012 85	0.005 150	0.006 310	0.007 16	0.007 209
DCP 9	.500	1.053	0.241 35	0.028 180	0.005 297	0.013 352	0.011 52	0.008 79	0.002 319	0.005 334	0.006 217
DCP10	.695	0.858	0.208 43	0.031 168	0.008 259	0.012 325	0.013 42	0.008 58	0.007 22	0.002 259	0.007 215
DCP11	.800	0.731	0.167 49	0.045 187	0.020 241	0.018 334	0.010 34	0.006 82	0.004 178	0.005 234	0.008 225
DCP12	.878	0.591	0.137 49	0.034 186	0.017 245	0.016 330	0.017 23	0.006 56	0.004 273	0.006 237	0.007 185
DCP13	.953	0.682	0.118 39	0.015 151	0.006 243	0.007 276	0.005 351	0.003 107	0.002 184	0.004 178	0.004 56

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	33.56	0.600	4.92	5.19		3186.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.088	640.4	1432.6	0.63E 07	-0.00079	1.015	9.87

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.497	0.464	357	0.059	13	0.037	242	0.014	133	0.006	138	0.007	64	0.003	244	0.002	148	0.002	22
CM		-0.004	0.024	216	0.018	72	0.013	329	0.007	246	0.004	195	0.003	125	0.003	46	0.001	331	0.002	277
DCP 1	.010	2.128	1.834	345	0.393	55	0.038	258	0.042	33	0.019	148	0.024	356	0.016	137	0.003	152	0.013	29
DCP 2	.050	1.901	1.361	345	0.395	61	0.215	308	0.055	232	0.047	165	0.033	24	0.018	162	0.025	345	0.029	256
DCP 3	.100	1.351	1.094	350	0.340	56	0.258	304	0.034	180	0.134	270	0.099	154	0.033	237	0.071	125	0.024	333
DCP 4	.150	0.887	0.886	355	0.156	15	0.120	292	0.093	225	0.042	162	0.051	164	0.048	88	0.014	127	0.040	49
DCP 5	.200	0.776	0.744	357	0.109	353	0.070	246	0.062	210	0.074	139	0.040	88	0.043	57	0.040	345	0.019	296
DCP 6	.250	0.630	0.604	1	0.116	355	0.077	234	0.032	174	0.048	137	0.046	68	0.029	9	0.023	313	0.016	289
DCP 7	.300	0.446	0.550	1	0.084	339	0.073	218	0.041	157	0.048	117	0.046	46	0.028	339	0.028	285	0.023	221
DCP 8	.400	0.318	0.390	6	0.079	344	0.063	216	0.032	113	0.016	100	0.027	42	0.026	314	0.017	238	0.007	174
DCP 9	.500	0.356	0.326	7	0.055	315	0.060	188	0.039	87	0.017	20	0.016	325	0.019	237	0.014	159	0.012	88
DCP10	.695	0.184	0.211	12	0.041	284	0.040	163	0.027	55	0.012	336	0.008	290	0.012	214	0.007	128	0.006	69
DCP11	.800	0.149	0.171	9	0.044	255	0.037	150	0.020	59	0.010	6	0.010	296	0.014	208	0.009	117	0.005	65
DCP12	.878	0.112	0.157	4	0.053	240	0.032	138	0.015	62	0.014	15	0.016	292	0.013	195	0.006	89	0.004	100
DCP13	.953	0.132	0.149	353	0.052	216	0.023	114	0.010	57	0.011	339	0.011	237	0.007	154	0.003	127	0.003	48

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	33.56	0.600	7.40	5.13		3186.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.088	640.3	1438.8	0.63E 07	-0.00089	1.104	10.81

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.693	0.329	15	0.090	40	0.030	347	0.024	262	0.007	153	0.005	255	0.007	105	0.005	233	0.004	73
CM		-0.018	0.041	202	0.021	91	0.007	92	0.011	36	0.003	317	0.003	348	0.002	298	0.002	315	0.002	223
DCP 1	.010	2.935	1.087	354	0.288	56	0.060	166	0.030	181	0.015	124	0.006	352	0.025	4	0.003	252	0.007	60
DCP 2	.050	2.392	0.485	355	0.575	67	0.037	34	0.089	30	0.042	287	0.022	184	0.027	7	0.018	226	0.028	235
DCP 3	.100	1.792	0.566	11	0.481	71	0.061	99	0.138	44	0.109	148	0.066	22	0.096	117	0.042	317	0.034	74
DCP 4	.150	1.198	0.558	15	0.247	58	0.154	13	0.044	339	0.040	3	0.055	27	0.038	357	0.045	10	0.015	323
DCP 5	.200	1.051	0.498	19	0.189	50	0.133	7	0.062	295	0.039	346	0.027	313	0.031	342	0.024	310	0.026	298
DCP 6	.250	0.871	0.431	20	0.129	35	0.082	5	0.068	286	0.020	334	0.049	293	0.025	260	0.028	255	0.027	233
DCP 7	.300	0.650	0.395	22	0.119	31	0.084	346	0.080	274	0.026	269	0.049	252	0.025	213	0.035	219	0.026	185
DCP 8	.400	0.479	0.322	24	0.077	3	0.033	351	0.050	270	0.007	224	0.028	257	0.018	196	0.028	200	0.024	128
DCP 9	.500	0.500	0.290	25	0.065	340	0.026	298	0.052	239	0.020	161	0.017	201	0.017	142	0.019	155	0.024	70
DCP10	.695	0.293	0.222	21	0.050	297	0.016	280	0.039	216	0.014	127	0.016	156	0.016	79	0.003	95	0.011	18
DCP11	.800	0.248	0.205	16	0.054	286	0.025	265	0.039	209	0.018	133	0.013	143	0.010	84	0.004	36	0.008	13
DCP12	.878	0.209	0.192	8	0.047	275	0.031	271	0.035	196	0.011	131	0.013	133	0.007	69	0.006	73	0.008	0
DCP13	.953	0.223	0.193	356	0.042	247	0.023	257	0.024	177	0.009	129	0.010	89	0.001	98	0.004	59	0.005	6

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	33.67	0.60[illegible]	9.75	5.01		3186.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.088	63[illegible].9	1431.7	0.63E 07	-0.00109	1.138	10.83

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.837	0.232	38	0.064	81	0.041	74	0.016	29	0.007	308	0.005	132	0.005	345	0.002	31	0.001	33
CM		-0.035	0.060	199	0.008	109	0.012	191	0.006	185	0.003	147	0.004	233	0.004	186	0.001	225	0.002	215
DCP 1	.010	3.329	0.45[illegible]	7	0.225	82	0.045	18	0.035	286	0.021	296	0.029	238	0.011	184	0.010	121	0.020	112
DCP 2	.050	2.734	0.201	153	0.287	85	0.140	153	0.045	57	0.024	164	0.013	331	0.042	187	0.011	11	0.030	192
DCP 3	.100	2.122	0.264	135	0.109	78	0.132	155	0.111	256	0.066	317	0.056	221	0.046	275	0.022	338	0.041	290
DCP 4	.150	1.407	0.344	48	0.2[illegible]8	94	0.110	147	0.025	163	0.040	229	0.067	257	0.041	329	0.005	335	0.017	19
DCP 5	.200	1.194	0.335	52	0.210	87	0.072	93	0.076	100	0.044	190	0.036	206	0.024	209	0.030	253	0.021	265
DCP 6	.250	1.041	0.356	45	0.101	87	0.085	81	0.047	95	0.020	135	0.038	165	0.022	176	0.031	195	0.014	191
DCP 7	.300	0.802	0.313	45	0.126	84	0.095	69	0.067	68	0.021	84	0.035	121	0.029	172	0.017	169	0.026	151
DCP 8	.400	0.596	0.299	40	0.017	71	0.068	70	0.023	58	0.018	54	0.025	125	0.021	71	0.017	121	0.011	130
DCP 9	.500	0.627	0.281	34	0.025	78	0.079	45	0.038	8	0.019	348	0.024	66	0.026	12	0.013	73	0.021	27
DCP10	.695	0.388	0.248	27	0.012	293	0.052	21	0.024	346	0.017	320	0.016	42	0.022	344	0.006	351	0.019	[illegible]
DCP11	.800	0.337	0.232	21	0.024	316	0.034	8	0.019	352	0.015	300	0.012	32	0.009	334	0.004	325	0.005	112
DCP12	.878	0.300	0.221	14	0.022	317	0.024	345	0.019	9	0.013	281	0.013	47	0.008	345	0.003	8	0.004	87
DCP13	.953	0.309	0.213	2	0.021	336	0.025	321	0.016	328	0.004	268	0.008	[illegible]6	0.006	341	0.004	1	0.008	337

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	33.90	0.600	14.82	4.95		3177.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.088	642.4	1452.8	0.63E 07	-0.00138	1.053	18.59

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.897	0.162	69	0.033	247	0.024	203	0.016	234	0.004	203	0.005	126	0.004	154	0.004	154	0.004	181
CM		-0.111	0.059	205	0.002	288	0.004	345	0.003	357	0.003	289	0.003	288	0.002	287	0.001	5	0.001	31
DCP 1	.050	2.536	0.526	159	0.161	256	0.077	274	0.016	168	0.073	257	0.017	354	0.021	195	0.028	50	0.035	133
DCP 2	.100	1.900	0.321	142	0.050	246	0.081	206	0.055	247	0.011	254	0.021	247	0.008	203	0.018	158	0.039	140
DCP 3	.150	1.441	0.243	120	0.076	245	0.064	190	0.033	273	0.009	203	0.015	272	0.003	287	0.004	95	0.008	185
DCP 4	.200	1.313	0.235	113	0.071	250	0.028	168	0.045	244	0.015	348	0.005	128	0.012	312	0.009	356	0.018	20
DCP 5	.250	1.135	0.228	90	0.059	255	0.039	195	0.030	286	0.003	158	0.011	196	0.007	293	0.017	165	0.009	211
DCP 6	.300	0.972	0.216	65	0.078	253	0.018	211	0.030	246	0.016	282	0.012	191	0.013	169	0.006	212	0.011	315
DCP 7	.400	0.761	0.231	55	0.024	239	0.019	240	0.021	273	0.006	303	0.010	135	0.007	158	0.011	177	0.005	53
DCP 8	.500	0.788	0.242	48	0.035	235	0.019	211	0.015	233	0.014	193	0.009	145	0.002	166	0.007	196	0.010	247
DCP 9	.695	0.638	0.230	33	0.009	237	0.020	190	0.012	188	0.016	115	0.016	120	0.008	146	0.007	176	0.009	182
DCP10	.800	0.535	0.216	30	0.007	114	0.028	175	0.020	191	0.013	117	0.007	106	0.009	79	0.004	345	0.006	176
DCP11	.878	0.493	0.192	25	0.011	88	0.018	160	0.017	163	0.012	111	0.007	60	0.010	69	0.003	41	0.006	200
DCP12	.953	0.548	0.159	19	0.009	56	0.017	140	0.012	118	0.010	72	0.007	50	0.009	134	0.006	114	0.003	147

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	34.13	0.600	17.33	4.97		3177.2	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.089	641.5	1445.4	0.63E 07	-0.00182	1.097	20.77	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.908	0.182	66	0.039	278	0.011	60	0.013	237	0.007	119	0.005	224	0.001	98	0.003	25	0.000	337
CM		-0.133	0.057	215	0.002	89	0.002	317	0.004	30	0.002	245	0.001	353	0.000	162	0.001	210	0.000	98
DCP 1	.050	2.271	0.377	157	0.127	317	0.053	103	0.044	316	0.042	159	0.034	272	0.019	143	0.020	279	0.004	322
DCP 2	.100	1.727	0.285	133	0.154	278	0.059	345	0.020	264	0.009	205	0.004	167	0.006	98	0.014	44	0.006	14
DCP 3	.150	1.403	0.219	116	0.107	279	0.030	26	0.015	278	0.009	154	0.025	188	0.005	213	0.012	116	0.003	166
DCP 4	.200	1.244	0.221	92	0.079	283	0.029	39	0.009	151	0.006	110	0.005	330	0.002	51	0.008	42	0.003	18
DCP 5	.250	1.134	0.234	78	0.062	256	0.017	24	0.011	213	0.006	172	0.002	327	0.007	114	0.006	154	0.005	189
DCP 6	.300	0.957	0.239	72	0.051	253	0.026	59	0.017	209	0.006	302	0.005	269	0.003	24	0.011	113	0.007	175
DCP 7	.400	0.792	0.247	57	0.024	254	0.009	62	0.009	267	0.012	122	0.006	258	0.003	106	0.008	264	0.006	356
DCP 8	.500	0.841	0.252	52	0.022	252	0.007	106	0.020	232	0.005	155	0.007	238	0.003	302	0.007	354	0.002	143
DCP 9	.695	0.716	0.230	42	0.018	317	0.012	106	0.022	239	0.013	86	0.004	204	0.004	17	0.008	346	0.006	339
DCP10	.800	0.601	0.219	38	0.024	293	0.005	107	0.017	209	0.011	59	0.011	172	0.001	331	0.008	63	0.004	182
DCP11	.878	0.567	0.196	37	0.016	279	0.005	156	0.013	193	0.006	72	0.005	154	0.004	328	0.008	71	0.005	169
DCP12	.953	0.619	0.159	31	0.007	279	0.004	174	0.015	180	0.008	53	0.003	171	0.007	161	0.002	61	0.003	344

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	33.78	0.600	24.77	4.96		3177.3	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.088	641.0	1450.0	0.63E 07	-0.00036	1.295	29.69	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.118	0.172	9	0.026	166	0.008	169	0.003	229	0.006	40	0.001	98	0.003	254	0.001	168	0.002	93
CM		-0.189	0.040	190	0.004	310	0.004	316	0.001	21	0.001	165	0.001	236	0.000	43	0.001	286	0.000	238
DCP 1	.010	1.887	0.196	159	0.113	227	0.078	300	0.043	9	0.028	68	0.014	175	0.018	229	0.017	270	0.005	8
DCP 2	.050	1.997	0.102	27	0.058	193	0.022	271	0.015	359	0.022	67	0.013	178	0.014	238	0.011	258	0.004	356
DCP 3	.100	1.656	0.198	4	0.043	179	0.015	213	0.015	238	0.013	353	0.009	345	0.007	50	0.002	150	0.007	131
DCP 4	.150	1.441	0.190	8	0.042	178	0.012	248	0.007	319	0.013	50	0.003	218	0.001	275	0.005	226	0.004	180
DCP 5	.200	1.391	0.236	1	0.025	158	0.010	142	0.009	166	0.003	85	0.004	260	0.004	290	0.003	294	0.005	84
DCP 6	.250	1.316	0.222	6	0.033	162	0.009	195	0.003	266	0.008	46	0.003	264	0.001	327	0.005	199	0.005	178
DCP 7	.300	1.166	0.246	3	0.026	151	0.012	143	0.007	164	0.005	90	0.003	267	0.004	312	0.003	276	0.006	76
DCP 8	.400	1.057	0.219	7	0.032	154	0.012	167	0.004	230	0.007	39	0.003	180	0.005	280	0.002	120	0.005	125
DCP 9	.500	1.115	0.222	6	0.027	150	0.016	144	0.005	182	0.005	61	0.001	119	0.003	296	0.003	79	0.004	81
DCP10	.695	0.967	0.181	10	0.021	152	0.016	154	0.006	207	0.001	64	0.004	74	0.003	207	0.006	124	0.003	84
DCP11	.800	0.864	0.153	16	0.018	143	0.010	125	0.002	283	0.010	350	0.009	51	0.004	222	0.002	284	0.005	309
DCP12	.878	0.791	0.123	18	0.016	146	0.011	127	0.003	221	0.010	346	0.004	37	0.003	271	0.003	132	0.002	262
DCP13	.953	0.802	0.107	8	0.006	141	0.010	146	0.008	207	0.001	144	0.003	94	0.005	166	0.006	111	0.004	95

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	49.50	0.200	15.02	5.08		3180.1	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.371	222.7	201.2	0.26E 07	0.00210	1.740	20.02	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.289	0.480	2	0.085	118	0.053	249	0.018	68	0.027	260	0.017	142	0.002	267	0.008	37	0.004	202
CM		-0.086	0.056	78	0.047	252	0.026	49	0.009	223	0.011	91	0.006	284	0.001	105	0.004	210	0.003	45
DCP 1	.010	4.434	2.472	58	0.895	335	0.308	235	0.315	153	0.170	60	0.104	292	0.050	291	0.030	146	0.045	53
DCP 2	.050	3.886	1.518	36	0.282	267	0.042	172	0.118	94	0.080	273	0.044	179	0.029	138	0.004	33	0.038	63
DCP 3	.100	2.366	1.377	22	0.350	243	0.165	157	0.198	58	0.107	296	0.091	219	0.049	120	0.020	29	0.023	233
DCP 4	.150	1.884	1.240	6	0.343	213	0.125	125	0.110	7	0.079	245	0.050	163	0.005	99	0.009	332	0.017	320
DCP 5	.200	1.852	1.016	1	0.294	181	0.106	72	0.129	335	0.128	217	0.065	106	0.038	31	0.054	268	0.028	176
DCP 6	.250	1.653	0.976	355	0.348	173	0.175	41	0.158	290	0.130	194	0.081	75	0.054	308	0.028	197	0.016	236
DCP 7	.300	1.412	0.820	348	0.330	152	0.174	18	0.141	275	0.134	163	0.072	21	0.037	289	0.062	152	0.029	39
DCP 8	.400	1.264	0.595	339	0.292	131	0.215	334	0.146	217	0.106	104	0.037	300	0.046	202	0.063	55	0.026	277
DCP 9	.500	1.101	0.400	322	0.292	92	0.236	281	0.134	143	0.132	6	0.096	198	0.036	81	0.058	334	0.041	158
DCP10	.695	0.820	0.186	284	0.223	57	0.195	220	0.081	59	0.107	289	0.072	104	0.013	272	0.020	146	0.021	324
DCP11	.800	0.487	0.077	271	0.153	46	0.148	201	0.095	32	0.086	254	0.034	75	0.027	305	0.024	52	0.037	240
DCP12	.878	0.383	0.032	263	0.104	37	0.122	190	0.071	20	0.067	224	0.021	56	0.011	199	0.025	3	0.009	154
DCP13	.953	0.389	0.014	102	0.060	15	0.075	148	0.043	343	0.054	206	0.022	310	0.010	67	0.009	19	0.012	160

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	49.75	0.200	17.55	5.41		3181.2	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.374	222.3	199.5	0.26E 07	0.00463	1.968	22.35	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.397	0.639	10	0.181	167	0.065	330	0.028	193	0.020	57	0.005	279	0.004	56	0.012	215	0.008	56
CM		-0.147	0.131	105	0.084	298	0.024	129	0.005	19	0.005	212	0.006	91	0.005	270	0.005	59	0.003	231
DCP 1	.010	3.948	3.265	85	0.849	25	0.364	345	0.365	259	0.145	214	0.235	150	0.040	38	0.061	132	0.040	341
DCP 2	.050	3.701	1.888	58	0.255	315	0.251	286	0.152	173	0.097	134	0.102	55	0.065	351	0.037	286	0.019	227
DCP 3	.100	2.291	1.664	45	0.287	298	0.307	272	0.194	176	0.157	127	0.113	51	0.095	342	0.075	262	0.041	181
DCP 4	.150	1.820	1.535	30	0.412	272	0.265	231	0.204	151	0.159	70	0.102	6	0.073	273	0.030	235	0.033	168
DCP 5	.200	1.872	1.375	19	0.436	239	0.187	182	0.183	106	0.155	14	0.107	294	0.078	218	0.067	173	0.075	77
DCP 6	.250	1.695	1.290	14	0.517	237	0.273	155	0.232	80	0.196	350	0.138	278	0.135	195	0.101	115	0.063	23
DCP 7	.300	1.520	1.207	5	0.580	220	0.324	120	0.220	33	0.146	305	0.124	241	0.096	142	0.065	94	0.063	341
DCP 8	.400	1.363	0.924	349	0.553	190	0.336	64	0.215	324	0.111	223	0.100	146	0.062	49	0.057	331	0.355	214
DCP 9	.500	1.312	0.760	333	0.584	163	0.351	20	0.220	267	0.134	138	0.050	51	0.054	319	0.038	218	0.039	139
DCP10	.695	1.041	0.479	301	0.473	116	0.303	310	0.180	174	0.102	11	0.006	226	0.024	144	0.004	218	0.010	297
DCP11	.800	0.662	0.278	292	0.302	104	0.176	298	0.137	165	0.107	352	0.029	187	0.020	355	0.028	165	0.011	339
DCP12	.878	0.627	0.236	271	0.279	65	0.158	236	0.024	72	0.030	72	0.050	259	0.043	45	0.043	217	0.044	19
DCP13	.953	0.642	0.288	259	0.335	49	0.243	213	0.162	24	0.119	169	0.104	318	0.076	121	0.063	288	0.046	92

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	49.50	0.200	25.00	5.34		3180.3	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.372	222.3	199.5	0.26E 07	-0.00245	1.836	26.42	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.297	0.439	60	0.110	52	0.015	292	0.006	233	0.003	60	0.011	90	0.008	338	0.001	104	0.001	32
CM		-0.231	0.106	222	0.034	191	0.004	204	0.002	49	0.001	302	0.006	292	0.004	156	0.002	298	0.002	249
DCP 1	.010	1.540	0.818	148	0.320	195	0.179	295	0.088	328	0.055	18	0.054	341	0.031	222	0.019	252	0.008	345
DCP 2	.050	2.659	0.346	81	0.114	108	0.056	316	0.011	310	0.008	44	0.012	89	0.019	173	0.006	328	0.011	243
DCP 3	.100	1.582	0.425	75	0.135	96	0.038	285	0.021	113	0.013	212	0.012	57	0.013	94	0.007	191	0.009	179
DCP 4	.150	1.308	0.465	72	0.131	106	0.053	286	0.014	323	0.026	305	0.015	3	0.016	85	0.005	97	0.005	162
DCP 5	.200	1.483	0.478	68	0.146	87	0.033	254	0.008	335	0.013	340	0.024	0	0.019	356	0.003	228	0.009	220
DCP 6	.250	1.427	0.511	69	0.148	90	0.037	258	0.008	225	0.029	267	0.021	319	0.016	24	0.004	1	0.007	136
DCP 7	.300	1.315	0.529	67	0.190	83	0.043	204	0.019	230	0.002	322	0.025	296	0.030	342	0.013	330	0.014	257
DCP 8	.400	1.457	0.555	62	0.196	66	0.035	167	0.021	157	0.018	159	0.020	214	0.014	279	0.003	278	0.010	250
DCP 9	.500	1.467	0.580	58	0.202	46	0.039	119	0.015	183	0.041	89	0.026	117	0.015	303	0.002	298	0.005	355
DCP10	.695	1.278	0.533	49	0.191	5	0.043	319	0.014	144	0.008	323	0.036	78	0.011	92	0.011	94	0.019	22
DCP11	.800	0.919	0.447	45	0.164	7	0.035	324	0.020	238	0.029	15	0.032	131	0.016	347	0.004	135	0.015	27
DCP12	.878	0.882	0.324	38	0.098	356	0.022	340	0.008	284	0.019	258	0.016	191	0.021	300	0.019	92	0.036	159
DCP13	.953	0.740	0.230	19	0.043	230	0.045	55	0.041	315	0.038	173	0.024	115	0.030	344	0.016	200	0.026	199

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	50.00	0.400	9.84	5.02		3147.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.193	433.0	724.3	0.47E 07	0.00063	1.459	14.88

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.866	0.498	22	0.106	267	0.055	139	0.015	33	0.016	222	0.007	86	0.007	77	0.005	317	0.006	121
CM		-0.040	0.062	161	0.051	22	0.029	271	0.018	150	0.008	43	0.002	317	0.004	255	0.005	124	0.004	347
DCP 1	.010	3.778	1.402	56	1.296	35	0.523	302	0.109	216	0.149	224	0.163	166	0.115	86	0.039	71	0.047	52
DCP 2	.050	2.545	1.005	49	0.529	359	0.173	246	0.081	210	0.132	160	0.075	71	0.050	36	0.030	322	0.036	9
DCP 3	.100	1.838	0.927	37	0.351	325	0.124	208	0.096	173	0.081	102	0.030	24	0.036	5	0.023	271	0.008	250
DCP 4	.150	1.445	0.816	30	0.276	303	0.122	196	0.108	148	0.059	60	0.027	33	0.053	332	0.051	214	0.023	130
DCP 5	.200	1.270	0.758	26	0.248	284	0.106	185	0.109	128	0.049	20	0.029	21	0.052	282	0.034	158	0.019	82
DCP 6	.250	1.135	0.719	26	0.237	275	0.109	177	0.102	121	0.049	0	0.028	40	0.059	287	0.052	170	0.026	59
DCP 7	.300	0.954	0.682	23	0.234	265	0.110	171	0.103	102	0.045	339	0.037	8	0.060	247	0.039	130	0.015	72
DCP 8	.400	0.648	0.570	18	0.223	245	0.112	144	0.086	67	0.053	299	0.025	320	0.059	192	0.047	79	0.025	339
DCP 9	.500	0.652	0.497	14	0.207	232	0.122	128	0.086	26	0.039	269	0.042	265	0.066	136	0.041	13	0.012	300
DCP10	.695	0.520	0.342	5	0.181	210	0.119	99	0.088	335	0.037	237	0.043	193	0.056	73	0.040	318	0.026	299
DCP11	.800	0.319	0.273	352	0.170	193	0.119	73	0.103	307	0.068	193	0.050	93	0.033	1	0.033	277	0.041	167
DCP12	.878	0.192	0.224	342	0.134	186	0.098	66	0.089	293	0.056	180	0.042	75	0.026	351	0.030	252	0.027	122
DCP13	.953	0.300	0.158	328	0.054	164	0.041	60	0.037	265	0.016	163	0.015	89	0.018	358	0.018	238	0.010	118

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	50.00	0.400	12.23	4.94		3147.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.193	433.0	722.9	0.47E 07	0.00047	1.539	16.71

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.985	0.504	38	0.056	310	0.034	266	0.026	187	0.032	64	0.014	332	0.004	69	0.005	220	0.010	47
CM		-0.072	0.105	171	0.052	60	0.027	8	0.019	287	0.015	212	0.006	132	0.001	123	0.006	25	0.005	249
DCP 1	.010	3.915	1.551	111	1.215	75	0.361	69	0.276	22	0.115	349	0.080	6	0.057	350	0.051	35	0.069	339
DCP 2	.050	2.595	1.026	89	0.487	47	0.210	35	0.175	317	0.061	4	0.033	299	0.030	253	0.027	273	0.014	283
DCP 3	.100	1.921	0.898	71	0.307	29	0.209	358	0.156	269	0.031	312	0.040	235	0.038	244	0.034	151	0.032	253
DCP 4	.150	1.554	0.784	54	0.204	10	0.184	331	0.145	249	0.034	226	0.049	196	0.043	173	0.069	111	0.020	51
DCP 5	.200	1.359	0.742	49	0.162	353	0.170	314	0.124	233	0.056	188	0.024	153	0.051	144	0.032	55	0.021	47
DCP 6	.250	1.246	0.743	45	0.155	334	0.159	306	0.123	228	0.067	172	0.027	103	0.043	160	0.053	69	0.018	352
DCP 7	.300	1.066	0.695	39	0.118	320	0.149	298	0.105	227	0.089	168	0.026	109	0.060	110	0.035	20	0.024	28
DCP 8	.400	0.772	0.651	31	0.152	287	0.138	268	0.114	191	0.102	121	0.045	44	0.039	64	0.045	364	0.021	245
DCP 9	.500	0.820	0.625	19	0.175	260	0.107	234	0.075	176	0.097	106	0.035	51	0.075	18	0.059	285	0.025	217
DCP10	.695	0.664	0.469	7	0.175	241	0.118	192	0.099	112	0.112	37	0.045	304	0.038	298	0.050	214	0.034	138
DCP11	.800	0.437	0.386	359	0.173	237	0.126	171	0.108	88	0.115	9	0.077	270	0.038	204	0.042	163	0.049	52
DCP12	.878	0.317	0.312	351	0.137	231	0.103	154	0.088	66	0.079	346	0.053	257	0.032	176	0.027	142	0.041	32
DCP13	.953	0.400	0.218	338	0.084	223	0.077	119	0.048	23	0.059	288	0.013	175	0.008	250	0.024	145	0.015	24

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	47.39	0.400	14.86	5.20		3181.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.181	437.9	734.6	0.47E 07	-0.00071	1.635	17.79

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.996	0.501	46	0.031	74	0.088	14	0.043	288	0.020	173	0.009	130	0.008	76	0.008	197	0.011	23
CM		-0.120	0.117	188	0.034	129	0.030	105	0.031	44	0.012	328	0.004	358	0.004	307	0.007	296	0.008	195
DCP 1	.050	2.696	1.040	113	0.371	135	0.309	87	0.058	85	0.049	131	0.076	147	0.034	136	0.019	159	0.030	247
DCP 2	.100	1.913	0.840	96	0.341	129	0.313	73	0.125	61	0.012	15	0.070	125	0.048	113	0.026	75	0.015	163
DCP 3	.150	1.547	0.746	74	0.248	109	0.256	47	0.146	28	0.023	333	0.059	62	0.036	47	0.036	33	0.015	352
DCP 4	.200	1.451	0.711	67	0.215	107	0.240	49	0.167	21	0.033	11	0.051	23	0.054	32	0.027	352	0.021	10
DCP 5	.250	1.331	0.721	58	0.169	95	0.213	33	0.163	10	0.042	295	0.047	27	0.036	15	0.041	355	0.012	292
DCP 6	.300	1.093	0.714	53	0.124	89	0.194	39	0.162	4	0.044	3	0.056	350	0.059	356	0.037	312	0.019	342
DCP 7	.400	0.978	0.689	38	0.056	65	0.170	12	0.176	328	0.079	247	0.016	291	0.027	318	0.050	279	0.031	182
DCP 8	.500	1.021	0.696	32	0.093	342	0.140	350	0.158	291	0.052	253	0.045	248	0.055	260	0.068	235	0.035	144
DCP 9	.695	0.732	0.538	17	0.121	311	0.152	296	0.186	227	0.088	167	0.045	163	0.047	145	0.065	113	0.058	42
DCP10	.800	0.541	0.433	12	0.130	310	0.142	272	0.172	210	0.101	136	0.033	135	0.055	99	0.050	78	0.060	357
DCP11	.878	0.396	0.332	4	0.122	299	0.101	257	0.135	187	0.080	110	0.020	94	0.036	67	0.040	52	0.054	327
DCP12	.953	0.482	0.234	354	0.096	279	0.052	223	0.081	150	0.039	56	0.002	44	0.012	156	0.019	52	0.018	0

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	49.50	0.400	17.39	5.21		3181.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.189	437.5	733.8	0.47E 07	-0.00168	1.672	18.51

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.035	0.493	54	0.088	142	0.117	68	0.037	38	0.030	313	0.009	160	0.009	329	0.007	288	0.004	212
CM		-0.141	0.121	204	0.026	194	0.041	196	0.024	145	0.013	112	0.006	252	0.009	160	0.005	112	0.001	61
DCP 1	.050	2.647	0.918	125	0.512	187	0.184	153	0.095	167	0.072	284	0.063	285	0.048	300	0.027	6	0.016	113
DCP 2	.100	1.932	0.678	104	0.448	178	0.208	147	0.148	148	0.028	257	0.072	258	0.042	262	0.016	195	0.035	328
DCP 3	.150	1.527	0.641	81	0.335	155	0.197	120	0.118	105	0.014	172	0.058	231	0.049	217	0.033	258	0.022	215
DCP 4	.200	1.449	0.620	73	0.268	157	0.198	121	0.119	117	0.034	122	0.058	202	0.036	206	0.025	204	0.023	277
DCP 5	.250	1.325	0.631	65	0.238	143	0.211	109	0.119	89	0.031	69	0.043	204	0.053	177	0.039	218	0.015	195
DCP 6	.300	1.088	0.663	60	0.178	147	0.194	108	0.112	105	0.042	69	0.069	177	0.046	176	0.038	148	0.024	245
DCP 7	.400	0.995	0.654	45	0.126	113	0.214	84	0.134	62	0.083	22	0.014	181	0.055	108	0.033	139	0.009	51
DCP 8	.500	1.072	0.699	42	0.086	83	0.210	61	0.103	42	0.053	350	0.074	96	0.056	74	0.043	53	0.023	84
DCP 9	.695	0.806	0.577	32	0.099	25	0.220	22	0.138	338	0.085	293	0.043	33	0.074	351	0.057	310	0.013	333
DCP10	.800	0.637	0.442	29	0.081	12	0.181	14	0.140	316	0.092	295	0.016	281	0.067	303	0.041	281	0.029	294
DCP11	.878	0.496	0.350	22	0.065	346	0.139	350	0.113	285	0.067	259	0.004	249	0.056	277	0.033	229	0.019	160
DCP12	.953	0.574	0.256	14	0.069	335	0.098	310	0.080	247	0.045	193	0.017	105	0.019	337	0.011	295	0.018	336

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D,ALPHA	DEL,H	TEST POINT	CYCLES ANALYZED
	49.26	0.400	24.86	5.30		3181.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.188	437.2	731.5	0.47E 07	-0.00152	1.266	29.74

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.038	0.253	44	0.048	182	0.023	245	0.018	308	0.007	45	0.006	106	0.002	295	0.003	318	0.001	9
CM		-0.167	0.060	227	0.011	336	0.008	23	0.007	92	0.002	187	0.002	265	0.001	49	0.001	117	0.000	59
CCP 1	.010	1.773	0.275	141	0.113	230	0.095	331	0.058	41	0.022	140	0.010	255	0.018	359	0.013	38	0.015	97
CCP 2	.050	2.046	0.246	44	0.044	179	0.030	342	0.029	19	0.009	37	0.003	197	0.009	318	0.009	337	0.012	19
CCP 3	.100	1.512	0.251	26	0.043	211	0.017	301	0.008	327	0.004	357	0.008	112	0.003	301	0.005	336	0.001	85
CCP 4	.150	1.382	0.282	38	0.078	190	0.028	287	0.022	9	0.007	102	0.005	259	0.007	22	0.002	251	0.006	294
CCP 5	.200	1.302	0.273	29	0.052	206	0.025	273	0.018	322	0.005	36	0.003	84	0.001	302	0.003	252	0.002	299
CCP 6	.250	1.259	0.298	37	0.068	193	0.030	291	0.027	0	0.014	95	0.006	185	0.006	317	0.004	326	0.005	32
CCP 7	.300	1.015	0.291	35	0.058	204	0.029	265	0.021	323	0.010	58	0.005	126	0.002	101	0.002	243	0.003	155
CCP 8	.400	0.991	0.296	41	0.061	185	0.033	261	0.025	338	0.015	92	0.012	167	0.005	294	0.007	331	0.005	357
CCP 9	.500	1.064	0.297	42	0.050	188	0.033	237	0.024	297	0.009	59	0.008	106	0.004	252	0.000	212	0.002	63
CCP10	.695	0.894	0.287	48	0.050	159	0.033	207	0.028	266	0.006	9	0.009	91	0.005	301	0.005	360	0.003	285
CCP11	.800	0.778	0.269	55	0.060	162	0.039	213	0.034	286	0.017	11	0.013	83	0.008	189	0.002	331	0.000	359
CCP12	.878	0.641	0.228	50	0.043	146	0.034	195	0.031	274	0.019	335	0.009	58	0.002	99	0.005	278	0.002	163
CCP13	.953	0.696	0.149	42	0.019	134	0.019	169	0.010	224	0.003	57	0.005	52	0.003	263	0.004	251	0.002	186

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D,ALPHA	DEL,H	TEST POINT	CYCLES ANALYZED
	49.50	0.600	5.13	5.34		3185.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.129	643.2	1439.5	0.63E 07	-0.00051	0.996	10.50

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.485	0.448	0	0.050	295	0.024	154	0.001	75	0.005	157	0.004	338	0.006	110	0.003	273	0.001	146
CM		-0.023	0.032	205	0.019	48	0.016	287	0.008	164	0.002	96	0.002	54	0.004	310	0.002	157	0.001	39
CCP 1	.050	1.538	1.409	344	0.254	48	0.190	292	0.088	153	0.008	130	0.015	351	0.019	274	0.021	177	0.024	131
CCP 2	.100	1.346	1.137	355	0.211	18	0.174	303	0.067	209	0.074	255	0.086	166	0.027	44	0.007	132	0.003	342
CCP 3	.150	0.896	0.913	356	0.154	322	0.069	239	0.071	202	0.072	136	0.033	77	0.046	47	0.017	337	0.019	347
CCP 4	.200	0.833	0.794	358	0.131	305	0.060	200	0.052	189	0.071	123	0.048	40	0.038	12	0.035	286	0.017	210
CCP 5	.250	0.668	0.657	2	0.122	301	0.084	179	0.038	119	0.038	91	0.047	0	0.016	298	0.020	257	0.021	220
CCP 6	.300	0.503	0.588	3	0.112	289	0.082	170	0.036	114	0.040	77	0.050	350	0.026	268	0.027	217	0.024	165
CCP 7	.400	0.352	0.423	7	0.090	286	0.073	152	0.027	52	0.012	29	0.031	317	0.022	195	0.008	155	0.012	97
CCP 8	.500	0.369	0.348	10	0.076	269	0.072	133	0.033	17	0.015	304	0.017	266	0.024	146	0.008	58	0.008	11
CCP 9	.695	0.279	0.224	15	0.060	242	0.058	104	0.035	330	0.014	236	0.008	199	0.017	108	0.011	329	0.004	339
CCP10	.800	0.152	0.180	13	0.063	230	0.054	103	0.027	336	0.007	273	0.013	217	0.021	126	0.016	349	0.007	324
CCP11	.878	0.096	0.150	2	0.061	208	0.042	81	0.021	319	0.012	263	0.012	167	0.012	85	0.009	305	0.000	215
CCP12	.953	0.173	0.143	352	0.058	190	0.034	64	0.015	310	0.011	237	0.008	134	0.005	91	0.003	340	0.003	247

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	49.50	0.600	7.62	5.28		3185.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.129	642.7	1436.0	0.63E 07	-0.00071	1.153	12.09

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.662	0.363 20	0.088 352	0.023 246	0.011 228	0.012 129	0.002 6	0.004 35	0.005 285	0.003 191
CM		-0.042	0.052 199	0.029 77	0.010 5	0.008 340	0.004 264	0.001 237	0.003 183	0.001 123	0.002 83
DCP 1	.050	2.409	0.553 1	0.578 53	0.078 300	0.038 352	0.026 269	0.042 150	0.006 301	0.036 147	0.018 36
DCP 2	.100	1.793	0.651 17	0.480 50	0.042 294	0.130 38	0.074 147	0.101 21	0.041 118	0.049 320	0.023 88
DCP 3	.150	1.184	0.644 23	0.240 22	0.110 354	0.062 300	0.039 343	0.027 322	0.024 324	0.039 327	0.021 266
DCP 4	.200	1.091	0.595 24	0.214 5	0.078 318	0.056 278	0.027 316	0.037 269	0.027 274	0.031 251	0.024 215
DCP 5	.250	0.910	0.547 23	0.152 344	0.032 299	0.075 275	0.033 204	0.034 238	0.027 180	0.010 230	0.032 175
DCP 6	.300	0.710	0.497 27	0.165 344	0.062 278	0.061 258	0.032 219	0.044 214	0.027 162	0.019 172	0.025 139
DCP 7	.400	0.530	0.417 24	0.124 310	0.032 207	0.045 243	0.042 149	0.006 180	0.015 121	0.008 198	0.017 86
DCP 8	.500	0.519	0.352 28	0.111 306	0.047 217	0.039 197	0.034 128	0.014 102	0.018 37	0.006 351	0.010 368
DCP 9	.695	0.376	0.255 25	0.089 272	0.038 179	0.028 156	0.027 77	0.012 7	0.013 343	0.007 251	0.006 263
DCP 10	.800	0.247	0.234 18	0.090 264	0.039 192	0.033 147	0.015 78	0.010 72	0.020 7	0.008 320	0.015 270
DCP 11	.878	0.196	0.207 6	0.078 249	0.036 187	0.034 124	0.016 32	0.005 49	0.013 347	0.004 296	0.011 249
DCP 12	.953	0.262	0.195 354	0.060 231	0.025 184	0.027 110	0.009 22	0.006 349	0.004 299	0.003 361	0.004 252

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	49.50	0.600	9.97	5.20		3185.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.129	642.2	1435.2	0.63E 07	-0.00096	1.182	12.67

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.791	0.305 41	0.076 44	0.023 301	0.006 116	0.012 320	0.003 118	0.004 223	0.003 198	0.001 206
CM		-0.064	0.072 200	0.021 115	0.015 115	0.001 159	0.004 98	0.002 129	0.002 69	0.002 12	0.001 189
DCP 1	.050	2.710	0.202 118	0.393 70	0.104 149	0.018 41	0.021 132	0.031 40	0.028 97	0.025 359	0.010 176
DCP 2	.100	2.038	0.344 77	0.348 80	0.170 169	0.155 244	0.097 344	0.041 184	0.054 289	0.031 21	0.037 328
DCP 3	.150	1.375	0.456 55	0.284 85	0.020 108	0.080 140	0.047 204	0.045 208	0.018 274	0.025 255	0.047 353
DCP 4	.200	1.256	0.446 52	0.235 69	0.030 31	0.082 97	0.026 177	0.034 144	0.040 166	0.023 222	0.015 231
DCP 5	.250	1.047	0.445 50	0.138 58	0.064 22	0.053 97	0.032 51	0.043 111	0.015 112	0.031 164	0.013 147
DCP 6	.300	0.869	0.426 47	0.135 49	0.057 9	0.057 64	0.035 27	0.023 72	0.027 111	0.018 128	0.021 115
DCP 7	.400	0.536	0.397 42	0.057 7	0.054 352	0.018 67	0.036 8	0.025 50	0.015 4	0.012 33	0.012 45
DCP 8	.500	0.633	0.374 38	0.066 343	0.066 324	0.019 325	0.032 305	0.006 291	0.009 316	0.006 237	0.014 334
DCP 9	.695	0.478	0.302 29	0.069 305	0.065 283	0.008 191	0.017 264	0.003 298	0.013 228	0.007 183	0.002 299
DCP 10	.800	0.357	0.290 23	0.066 308	0.059 292	0.007 325	0.021 286	0.022 295	0.018 227	0.015 237	0.001 219
DCP 11	.878	0.307	0.254 12	0.060 306	0.054 270	0.008 298	0.016 234	0.013 280	0.017 194	0.008 156	0.002 45
DCP 12	.953	0.359	0.224 358	0.049 301	0.041 244	0.010 221	0.006 186	0.004 113	0.006 322	0.005 253	0.003 232

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	62.89	0.200	14.82	5.58		3173.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.474	221.6	199.3	0.26E 07	0.00025	1.671	20.34

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.289	0.367	4	0.061	64	0.087	124	0.019	316	0.004	81	0.008	251	0.011	63	0.008	273	0.007	72
CM		-0.072	0.049	7	0.045	197	0.033	324	0.009	113	0.007	254	0.003	80	0.001	223	0.001	76	0.003	227
ECP 1	.010	5.009	2.460	49	0.984	311	0.249	148	0.152	106	0.142	10	0.068	235	0.033	148	0.065	74	0.060	271
ECP 2	.050	3.970	1.534	25	0.304	225	0.152	80	0.140	20	0.121	225	0.052	118	0.042	39	0.035	256	0.026	136
ECP 3	.100	2.518	1.507	9	0.408	207	0.247	101	0.154	359	0.105	246	0.062	123	0.064	50	0.061	253	0.044	89
ECP 4	.150	1.962	1.220	354	0.387	180	0.218	74	0.085	302	0.040	193	0.003	1	0.032	76	0.049	296	0.032	161
ECP 5	.200	1.795	0.981	347	0.308	155	0.206	50	0.101	271	0.111	151	0.057	345	0.035	296	0.051	126	0.039	345
ECP 6	.250	1.591	0.788	341	0.337	137	0.197	25	0.128	227	0.088	98	0.062	303	0.012	156	0.015	184	0.034	17
ECP 7	.300	1.354	0.640	331	0.344	117	0.167	343	0.112	207	0.149	64	0.098	259	0.021	160	0.054	32	0.031	264
ECP 8	.400	1.168	0.349	314	0.310	90	0.151	271	0.120	125	0.104	337	0.057	174	0.024	57	0.038	275	0.029	81
ECP 9	.500	1.119	0.137	275	0.310	46	0.221	194	0.377	62	0.141	269	0.076	54	0.010	279	0.005	135	0.018	71
ECP10	.695	0.839	0.125	139	0.238	1	0.240	137	0.069	312	0.079	139	0.042	271	0.032	114	0.032	259	0.015	131
ECP11	.800	0.398	0.130	125	0.177	351	0.191	132	0.092	312	0.092	94	0.040	241	0.022	35	0.007	172	0.023	48
ECP12	.878	0.308	0.138	122	0.149	332	0.168	107	0.069	276	0.072	47	0.009	186	0.019	337	0.010	72	0.020	327
ECP13	.953	0.373	0.119	86	0.094	290	0.074	78	0.040	252	0.037	7	0.012	137	0.016	293	0.005	32	0.001	9

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	63.29	0.200	17.36	5.56		3173.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.478	221.3	199.0	0.26E 07	0.00212	1.836	22.86

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.371	0.471	3	0.085	91	0.046	166	0.021	99	0.014	273	0.015	334	0.008	180	0.009	37	0.007	155
CM		-0.146	0.081	65	0.055	232	0.017	11	0.008	252	0.005	66	0.005	147	0.003	41	0.003	193	0.003	9
ECP 1	.010	4.062	2.720	71	0.814	28	0.340	329	0.118	221	0.034	208	0.060	173	0.082	113	0.025	35	0.027	55
ECP 2	.050	3.522	1.667	45	0.160	321	0.172	221	0.105	114	0.065	98	0.063	355	0.031	239	0.027	158	0.030	137
ECP 3	.100	2.321	1.599	25	0.294	292	0.245	205	0.152	133	0.082	40	0.001	303	0.026	180	0.028	246	0.040	112
ECP 4	.150	1.709	1.470	13	0.339	260	0.244	168	0.085	83	0.015	3	0.027	328	0.024	358	0.026	195	0.013	24
ECP 5	.200	1.720	1.217	3	0.354	226	0.230	138	0.147	49	0.084	313	0.099	226	0.071	145	0.097	56	0.045	336
ECP 6	.250	1.595	1.152	358	0.448	208	0.279	115	0.184	17	0.113	288	0.058	185	0.015	82	0.041	26	0.022	247
ECP 7	.300	1.443	0.973	347	0.457	186	0.251	83	0.180	316	0.069	218	0.076	133	0.039	29	0.040	319	0.027	198
ECP 8	.400	1.309	0.728	333	0.526	150	0.272	26	0.199	249	0.050	144	0.087	22	0.040	275	0.027	142	0.022	81
ECP 9	.500	1.391	0.444	301	0.458	99	0.135	307	0.171	179	0.066	342	0.058	303	0.035	135	0.016	54	0.007	229
ECP10	.695	1.116	0.220	243	0.384	38	0.128	213	0.136	83	0.055	227	0.019	8	0.025	286	0.006	17	0.015	196
ECP11	.800	0.616	0.108	241	0.281	36	0.202	212	0.115	45	0.044	184	0.026	336	0.016	192	0.013	51	0.019	191
ECP12	.878	0.522	0.072	220	0.206	10	0.151	185	0.098	23	0.019	189	0.035	357	0.013	134	0.012	319	0.010	243
ECP13	.953	0.584	0.181	182	0.264	325	0.165	113	0.058	232	0.058	343	0.039	124	0.042	210	0.029	356	0.034	125

FORCED PITCHING OSCILLATION NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	63.69	0.200	24.79	5.45		3173.3	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.481	221.2	201.7	0.26E 07	-0.00137	1.930	28.23	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.355	0.526	52	0.065	315	0.012	65	0.020	177	0.011	276	0.006	84	0.005	342	0.006	86	0.006	90
CM		-0.244	0.114	206	0.023	141	0.003	248	0.007	335	0.003	162	0.004	278	0.004	153	0.001	337	0.002	289
CCP 1	.010	1.746	0.734	139	0.316	233	0.115	330	0.058	51	0.057	254	0.070	339	0.024	108	0.015	319	0.032	51
CCP 2	.050	2.454	0.469	78	0.029	266	0.029	352	0.013	105	0.010	175	0.021	300	0.016	329	0.010	18	0.015	9
CCP 3	.100	1.674	0.541	79	0.048	273	0.029	340	0.014	155	0.008	183	0.017	227	0.012	265	0.018	128	0.010	93
CCP 4	.150	1.394	0.629	67	0.040	222	0.043	335	0.023	23	0.005	118	0.015	232	0.005	301	0.007	98	0.022	273
CCP 5	.200	1.486	0.636	71	0.016	295	0.015	256	0.013	220	0.006	188	0.019	154	0.015	183	0.011	119	0.012	134
CCP 6	.250	1.526	0.724	65	0.017	243	0.031	261	0.037	316	0.031	25	0.019	159	0.022	228	0.011	32	0.013	153
CCP 7	.300	1.372	0.745	68	0.040	45	0.036	157	0.041	227	0.020	289	0.016	156	0.008	148	0.011	72	0.010	71
CCP 8	.400	1.513	0.763	53	0.073	25	0.076	140	0.088	221	0.059	283	0.021	9	0.026	82	0.021	68	0.012	57
CCP 9	.500	1.631	0.747	50	0.152	348	0.067	88	0.068	172	0.040	232	0.013	29	0.003	77	0.010	160	0.009	163
CCP10	.695	1.391	0.641	30	0.165	306	0.044	25	0.020	85	0.013	91	0.027	98	0.015	274	0.015	55	0.012	89
CCP11	.800	0.896	0.453	24	0.150	299	0.032	150	0.009	64	0.017	36	0.017	53	0.023	344	0.009	159	0.012	134
CCP12	.878	0.826	0.287	15	0.089	297	0.020	193	0.020	112	0.016	346	0.011	135	0.015	328	0.010	78	0.009	185
CCP13	.953	0.797	0.164	336	0.094	125	0.094	319	0.060	151	0.048	348	0.021	151	0.039	1	0.029	245	0.025	53

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.M	TEST POINT	CYCLES ANALYZED
	62.50	0.400	0.38	5.46		3171.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.238	438.2	736.0	0.48E 07	-0.00094	0.389	5.87

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		-0.036	0.407	357	0.030	181	0.009	90	0.010	124	0.004	245	0.005	62	0.005	86	0.002	46	0.003	42
CM		-0.008	0.035	268	0.003	87	0.001	249	0.001	5	0.002	121	0.001	229	0.001	333	0.000	250	0.000	279
DCP 1	.010	-0.388	2.503	333	0.118	198	0.069	105	0.050	108	0.040	132	0.030	94	0.018	59	0.011	41	0.012	48
DCP 2	.050	0.190	1.363	342	0.107	152	0.018	101	0.021	103	0.020	145	0.008	64	0.014	51	0.004	37	0.007	11
DCP 3	.100	-0.112	0.999	346	0.078	158	0.009	132	0.023	111	0.015	188	0.010	70	0.012	45	0.007	32	0.009	34
DCP 4	.150	-0.214	0.744	348	0.067	163	0.011	88	0.015	102	0.008	177	0.005	51	0.009	57	0.002	56	0.003	2
DCP 5	.200	-0.054	0.619	352	0.052	165	0.009	108	0.014	122	0.008	207	0.006	89	0.008	74	0.005	88	0.005	51
DCP 6	.250	-0.095	0.535	358	0.046	174	0.009	72	0.011	104	0.008	252	0.006	31	0.006	82	0.004	334	0.003	307
DCP 7	.300	-0.222	0.464	1	0.039	178	0.010	75	0.010	119	0.007	254	0.005	57	0.008	75	0.004	38	0.005	36
DCP 8	.400	-0.150	0.342	8	0.028	188	0.008	77	0.009	127	0.009	280	0.005	34	0.007	96	0.002	369	0.001	280
DCP 9	.500	0.019	0.280	15	0.022	207	0.009	71	0.007	143	0.009	280	0.004	50	0.004	85	0.002	38	0.003	31
DCP10	.695	0.146	0.182	34	0.017	224	0.006	89	0.006	161	0.007	288	0.003	36	0.005	141	0.002	59	0.000	98
DCP11	.800	-0.038	0.138	41	0.010	247	0.005	83	0.006	157	0.007	308	0.005	77	0.004	159	0.003	44	0.005	88
DCP12	.878	-0.070	0.110	49	0.009	249	0.006	101	0.005	157	0.005	312	0.003	36	0.003	146	0.001	111	0.000	67
DCP13	.953	0.074	0.090	37	0.008	231	0.002	69	0.005	166	0.003	261	0.004	119	0.004	139	0.004	111	0.004	89

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.M	TEST POINT	CYCLES ANALYZED
	63.29	0.400	7.70	5.51		3171.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.241	437.9	738.9	0.48E 07	-0.00058	1.241	13.22

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.773	0.433	5	0.048	209	0.017	64	0.009	145	0.004	5	0.004	246	0.006	95	0.002	109	0.003	44
CM		-0.018	0.023	262	0.010	342	0.009	170	0.007	7	0.003	195	0.002	73	0.002	280	0.001	76	0.000	338
DCP 1	.010	4.089	2.530	351	0.270	357	0.370	230	0.299	104	0.102	0	0.008	212	0.039	292	0.052	150	0.047	32
DCP 2	.050	2.706	1.218	356	0.107	297	0.142	164	0.117	39	0.048	260	0.013	170	0.015	153	0.028	58	0.016	348
DCP 3	.100	1.795	1.011	358	0.147	242	0.145	120	0.095	0	0.049	214	0.016	121	0.019	75	0.009	347	0.002	101
DCP 4	.150	1.211	0.769	356	0.104	213	0.078	88	0.038	318	0.026	178	0.006	121	0.017	60	0.006	313	0.007	142
DCP 5	.200	1.114	0.660	0	0.125	210	0.089	71	0.042	281	0.024	139	0.003	272	0.013	75	0.004	272	0.003	153
DCP 6	.250	0.910	0.563	4	0.091	206	0.057	62	0.020	257	0.008	162	0.004	119	0.011	27	0.004	189	0.004	72
DCP 7	.300	0.683	0.516	6	0.110	200	0.075	48	0.039	243	0.017	104	0.005	2	0.003	350	0.010	144	0.007	11
DCP 8	.400	0.484	0.371	14	0.071	204	0.045	34	0.027	206	0.007	60	0.004	352	0.004	228	0.011	93	0.003	357
DCP 9	.500	0.570	0.307	20	0.061	192	0.042	9	0.035	186	0.015	42	0.013	300	0.016	141	0.007	2	0.006	169
DCP10	.695	0.470	0.194	31	0.038	173	0.032	338	0.031	158	0.018	356	0.012	245	0.013	88	0.006	264	0.007	39
DCP11	.800	0.202	0.140	37	0.030	173	0.020	335	0.020	165	0.010	13	0.009	272	0.010	121	0.002	249	0.001	124
DCP12	.878	0.141	0.097	22	0.024	142	0.016	302	0.014	138	0.011	347	0.010	214	0.010	65	0.006	222	0.004	73
DCP13	.953	0.234	0.076	8	0.019	116	0.007	284	0.008	127	0.012	340	0.010	169	0.005	359	0.004	108	0.006	264

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	63.69	0.400	10.05	5.16		3171.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.243	437.8	739.0	0.48E 07	0.00059	1.458	15.52

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.893	0.519	21	0.109	240	0.040	104	0.011	312	0.010	174	0.011	113	0.011	325	0.006	100	0.005	340
CM		-0.060	0.062	157	0.058	4	0.031	226	0.013	101	0.004	15	0.005	285	0.007	132	0.003	318	0.001	95
DCP 1	.010	3.657	1.508	57	1.298	31	0.476	284	0.131	266	0.193	201	0.152	130	0.069	91	0.065	96	0.089	36
DCP 2	.050	2.711	1.045	45	0.483	350	0.215	223	0.046	213	0.120	139	0.062	42	0.014	78	0.038	9	0.023	316
DCP 3	.100	1.846	0.994	36	0.354	318	0.178	202	0.053	171	0.086	111	0.048	29	0.023	343	0.022	314	0.019	264
DCP 4	.150	1.312	0.872	27	0.270	287	0.136	185	0.082	133	0.070	59	0.034	348	0.038	283	0.020	176	0.005	290
DCP 5	.200	1.215	0.808	26	0.281	275	0.143	168	0.065	101	0.048	46	0.040	333	0.034	246	0.008	151	0.014	133
DCP 6	.250	1.068	0.770	23	0.267	259	0.124	162	0.092	96	0.056	4	0.032	316	0.053	235	0.032	111	0.002	95
DCP 7	.300	0.821	0.717	23	0.270	256	0.133	151	0.081	75	0.049	355	0.042	283	0.032	190	0.011	54	0.021	92
DCP 8	.400	0.639	0.607	16	0.272	228	0.123	112	0.075	34	0.050	293	0.044	231	0.046	129	0.029	6	0.039	354
DCP 9	.500	0.760	0.533	10	0.262	215	0.124	91	0.072	13	0.069	284	0.080	186	0.065	55	0.023	302	0.018	338
DCP10	.695	0.622	0.343	359	0.226	184	0.139	45	0.082	290	0.056	195	0.064	135	0.069	332	0.032	190	0.009	130
DCP11	.800	0.366	0.258	349	0.192	172	0.133	30	0.100	263	0.060	142	0.039	50	0.048	293	0.033	129	0.011	317
DCP12	.878	0.296	0.204	337	0.149	159	0.111	15	0.087	238	0.048	108	0.033	19	0.043	255	0.031	93	0.015	282
DCP13	.953	0.342	0.138	331	0.070	143	0.051	358	0.035	211	0.008	114	0.025	41	0.029	253	0.017	74	0.004	245

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	63.29	0.400	12.53	5.39		3171.4	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.24[illegible]	437.2	731.3	0.47E 07	0.00066	1.606	17.72

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.049	0.509	30	0.056	291	0.025	224	0.021	94	0.013	291	0.002	341	0.012	188	0.014	18	0.010	286
CM		-0.096	0.110	163	0.064	43	0.033	308	0.012	223	0.008	134	0.004	112	0.000	8	0.007	235	0.004	87
DCP 1	.010	3.964	1.434	111	1.360	73	0.354	31	0.303	22	0.131	351	0.081	335	0.049	332	0.009	57	0.026	9
DCP 2	.050	2.803	1.066	84	0.591	33	0.167	351	0.078	324	0.090	327	0.079	250	0.018	279	0.025	227	0.019	270
DCP 3	.100	1.946	0.965	68	0.401	19	0.249	319	0.073	243	0.081	269	0.050	201	0.040	186	0.006	98	0.024	169
DCP 4	.150	1.457	0.802	49	0.263	2	0.233	289	0.072	186	0.088	235	0.064	154	0.055	133	0.033	51	0.024	56
DCP 5	.200	1.347	0.770	46	0.231	349	0.210	283	0.072	199	0.087	204	0.051	148	0.064	103	0.015	11	0.024	24
DCP 6	.250	1.227	0.746	38	0.195	340	0.238	272	0.103	173	0.079	186	0.050	119	0.061	91	0.035	7	0.032	3
DCP 7	.300	1.005	0.727	33	0.170	320	0.168	267	0.089	159	0.089	164	0.053	118	0.068	59	0.031	338	0.024	328
DCP 8	.400	0.799	0.664	22	0.155	281	0.171	235	0.111	145	0.081	101	0.055	34	0.052	327	0.028	286	0.034	259
DCP 9	.500	0.975	0.666	12	0.229	251	0.118	188	0.082	142	0.083	75	0.078	24	0.098	291	0.040	230	0.024	219
DCP10	.695	0.801	0.512	356	0.254	222	0.173	137	0.110	52	0.092	325	0.053	295	0.101	196	0.052	64	0.018	28
DCP11	.800	0.497	0.387	353	0.226	217	0.179	114	0.111	21	0.099	298	0.058	220	0.057	145	0.060	23	0.026	255
DCP12	.878	0.406	0.289	342	0.172	205	0.142	91	0.084	350	0.071	264	0.044	186	0.047	101	0.053	361	0.028	225
DCP13	.953	0.471	0.217	323	0.109	180	0.094	53	0.047	294	0.023	184	0.017	305	0.032	165	0.028	29	0.023	305

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	63.69	0.400	14.91	5.18		3182.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.243	438.1	741.3	0.48E 07	0.00014	1.671	19.07

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		1.068	0.519 34	0.046 65	0.076 297	0.047 140	0.010 345	0.025 74	0.012 313	0.010 121	0.006 151
CM		-0.132	0.121 173	0.041 80	0.041 25	0.024 280	0.003 90	0.012 241	0.010 128	0.003 17	0.003 2
CCP 1	.050	2.982	1.120 104	0.441 92	0.267 38	0.077 166	0.064 77	0.038 66	0.025 242	0.027 172	0.028 211
CCP 2	.100	2.051	0.997 83	0.422 85	0.325 21	0.028 119	0.059 48	0.062 29	0.012 209	0.018 133	0.020 115
CCP 3	.150	1.620	0.846 65	0.367 71	0.306 355	0.025 315	0.049 19	0.065 351	0.015 294	0.015 124	0.023 58
CCP 4	.200	1.506	0.811 57	0.282 70	0.265 349	0.033 326	0.056 355	0.048 331	0.011 224	0.026 105	0.009 325
CCP 5	.250	1.395	0.777 49	0.276 68	0.307 341	0.094 270	0.021 354	0.040 296	0.020 234	0.031 108	0.007 95
CCP 6	.300	1.119	0.762 42	0.176 65	0.230 334	0.060 273	0.052 328	0.058 251	0.042 183	0.040 87	0.008 115
CCP 7	.400	0.988	0.674 24	0.103 56	0.269 300	0.173 213	0.019 173	0.080 175	0.062 119	0.039 54	0.023 106
CCP 8	.500	1.110	0.731 14	0.066 293	0.205 271	0.129 183	0.060 243	0.123 144	0.086 76	0.037 13	0.014 33
CCP 9	.695	0.850	0.571 2	0.162 263	0.224 212	0.184 113	0.010 92	0.106 57	0.100 322	0.036 229	0.026 235
CCP10	.800	0.561	0.423 1	0.177 265	0.205 187	0.160 94	0.043 15	0.085 31	0.100 292	0.051 189	0.024 150
CCP11	.878	0.453	0.319 352	0.148 248	0.159 163	0.131 57	0.020 337	0.068 4	0.068 246	0.032 128	0.005 175
CCP12	.953	0.518	0.235 343	0.121 231	0.112 131	0.099 16	0.027 209	0.027 17	0.006 267	0.015 286	0.021 158

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	63.29	0.400	17.46	5.24		3182.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.242	437.8	741.1	0.48E 07	-0.00069	1.697	20.55

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		1.068	0.508 45	0.085 93	0.093 356	0.031 196	0.009 131	0.016 137	0.019 99	0.008 358	0.007 345
CM		-0.159	0.121 189	0.031 136	0.039 103	0.016 353	0.002 9	0.007 345	0.011 274	0.006 213	0.004 185
CCP 1	.050	2.711	0.937 116	0.473 157	0.122 100	0.114 218	0.09[illegible] 217	0.054 232	0.052 258	0.044 263	0.017 325
CCP 2	.100	1.895	0.812 96	0.463 137	0.188 83	0.048 223	0.068 198	0.066 205	0.043 257	0.045 250	0.034 276
CCP 3	.150	1.530	0.725 70	0.353 113	0.196 65	0.017 83	0.071 135	0.052 137	0.026 164	0.041 184	0.021 227
CCP 4	.200	1.406	0.659 68	0.320 111	0.219 64	0.041 160	0.065 120	0.089 125	0.032 137	0.030 165	0.031 169
CCP 5	.250	1.374	0.760 56	0.301 91	0.245 52	0.044 15	0.081 95	0.070 87	0.038 78	0.029 139	0.012 147
CCP 6	.300	1.093	0.684 53	0.249 94	0.258 49	0.023 86	0.057 74	0.090 90	0.029 80	0.027 112	0.029 132
CCP 7	.400	1.054	0.755 9	0.230 61	0.289 16	0.090 322	0.084 18	0.075 4	0.026 341	0.035 18	0.027 357
CCP 8	.500	1.183	0.741 32	0.188 41	0.291 355	0.052 335	0.092 345	0.086 338	0.026 303	0.047 327	0.024 331
CCP 9	.695	0.897	0.541 14	0.123 313	0.267 285	0.132 199	0.067 200	0.075 195	0.075 115	0.009 30	0.009 76
CCP10	.800	0.680	0.452 10	0.154 293	0.202 259	0.139 182	0.062 170	0.081 158	0.073 99	0.035 25	0.018 15
CCP11	.878	0.591	0.354 5	0.135 274	0.157 231	0.108 144	0.025 144	0.052 130	0.053 61	0.027 321	0.012 290
CCP12	.953	0.591	0.208 2	0.098 254	0.113 207	0.062 93	0.006 228	0.034 176	0.030 125	0.039 76	0.028 0

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	62.89	0.400	24.94	5.53		3182.3	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.240	437.4	740.2	0.48E 07	-0.00150	1.307	24.61	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		1.070	0.296 52	0.069 171	0.022 219	0.006 282	0.009 27	0.004 110	0.005 138	0.005 151	0.001 256
CM		-0.178	0.076 230	0.016 320	0.011 357	0.006 80	0.006 184	0.004 273	0.002 345	0.002 29	0.001 136
DCP 1	.010	1.857	0.493 151	0.183 240	0.152 347	0.070 87	0.046 216	0.035 319	0.034 94	0.016 295	0.012 336
DCP 2	.050	2.079	0.195 47	0.067 193	0.026 313	0.017 88	0.009 180	0.010 307	0.013 115	0.003 127	0.003 14
DCP 3	.100	1.539	0.261 37	0.062 193	0.024 275	0.004 143	0.009 216	0.007 74	0.014 107	0.011 136	0.003 121
DCP 4	.150	1.349	0.283 45	0.089 186	0.037 299	0.019 58	0.008 152	0.013 290	0.013 66	0.011 116	0.005 278
DCP 5	.200	1.303	0.307 40	0.081 186	0.032 251	0.004 189	0.007 154	0.006 183	0.005 33	0.012 70	0.009 115
DCP 6	.250	1.257	0.320 47	0.091 189	0.034 297	0.021 49	0.013 140	0.015 276	0.015 61	0.022 131	0.015 241
DCP 7	.300	1.022	0.336 45	0.086 188	0.036 245	0.004 273	0.007 110	0.008 174	0.003 342	0.012 55	0.010 77
DCP 8	.400	1.001	0.350 52	0.097 176	0.031 263	0.025 3	0.024 89	0.022 223	0.019 305	0.019 59	0.014 153
DCP 9	.500	1.108	0.376 50	0.077 168	0.041 206	0.012 284	0.020 51	0.014 129	0.012 225	0.005 255	0.005 5
DCP 10	.695	0.973	0.367 52	0.077 144	0.050 164	0.020 238	0.021 16	0.014 94	0.012 154	0.011 237	0.004 303
DCP 11	.800	0.795	0.323 56	0.081 143	0.047 191	0.035 284	0.037 354	0.030 90	0.020 163	0.021 239	0.009 324
DCP 12	.878	0.705	0.263 52	0.068 138	0.038 170	0.029 256	0.035 336	0.017 52	0.020 116	0.016 182	0.009 250
DCP 13	.953	0.729	0.182 43	0.018 115	0.027 163	0.021 198	0.007 316	0.006 33	0.006 137	0.007 155	0.003 197

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	63.29	0.600	0.20	5.49		3174.1	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.165	640.8	1440.8	0.63E 07	-0.00085	0.461	5.50	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		-0.048	0.493 342	0.029 171	0.001 257	0.006 112	0.006 183	0.002 74	0.003 58	0.003 36	0.001 46
CM		-0.001	0.033 258	0.002 63	0.000 111	0.000 355	0.002 79	0.000 234	0.000 291	0.000 90	0.001 114
DCP 1	.010	-0.262	2.324 318	0.243 209	0.021 329	0.023 121	0.024 64	0.012 49	0.015 68	0.008 53	0.008 64
DCP 2	.050	0.168	1.876 331	0.091 100	0.063 69	0.028 132	0.037 111	0.008 132	0.010 134	0.003 134	0.005 340
DCP 3	.100	-0.153	1.290 335	0.071 149	0.028 239	0.020 84	0.023 151	0.020 247	0.030 345	0.035 33	0.031 103
DCP 4	.150	-0.200	0.954 336	0.061 150	0.017 234	0.008 45	0.011 115	0.006 98	0.008 74	0.001 81	0.001 191
DCP 5	.200	-0.071	0.781 339	0.055 156	0.010 219	0.010 88	0.011 142	0.004 127	0.003 72	0.003 93	0.002 171
DCP 6	.250	-0.107	0.670 344	0.045 162	0.008 247	0.008 94	0.011 179	0.004 64	0.005 80	0.002 358	0.002 327
DCP 7	.300	-0.181	0.573 346	0.039 169	0.005 252	0.007 110	0.009 195	0.002 48	0.004 65	0.002 26	0.002 261
DCP 8	.400	-0.104	0.415 351	0.029 175	0.003 240	0.006 105	0.010 207	0.003 52	0.004 92	0.002 324	0.001 322
DCP 9	.500	-0.006	0.323 358	0.023 187	0.002 268	0.004 123	0.008 221	0.002 66	0.003 72	0.001 20	0.002 272
DCP 10	.695	0.040	0.189 13	0.015 203	0.001 67	0.003 144	0.008 250	0.003 46	0.002 80	0.001 19	0.002 293
DCP 11	.800	-0.028	0.136 24	0.011 222	0.001 49	0.004 169	0.007 265	0.001 66	0.002 90	0.002 56	0.003 318
DCP 12	.878	-0.046	0.104 28	0.009 226	0.001 41	0.002 126	0.005 261	0.002 68	0.002 106	0.001 49	0.002 357
DCP 13	.953	0.037	0.092 23	0.006 225	0.003 23	0.001 122	0.003 260	0.001 117	0.001 68	0.001 21	0.001 288

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	63.69	0.600	4.85	5.45		3174.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.166	640.2	1439.2	0.63E 07	-0.00056	1.063	10.22

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.524	0.488 355	0.043 241	0.016 136	0.006 23	0.010 112	0.006 130	0.004 76	0.003 224	0.002 78
CM		-0.015	0.027 225	0.020 25	0.016 237	0.007 125	0.005 32	0.004 325	0.003 173	0.002 65	0.001 272
DCP 1	.010	1.922	1.794 335	0.261 56	0.081 233	0.031 18	0.025 92	0.023 18	0.019 55	0.006 329	0.009 89
DCP 2	.050	1.973	1.392 339	0.217 56	0.211 252	0.084 112	0.041 47	0.019 317	0.038 148	0.025 54	0.017 0
DCP 3	.100	1.360	1.193 349	0.133 5	0.178 264	0.065 178	0.045 167	0.090 86	0.027 308	0.026 55	0.033 240
DCP 4	.150	0.876	0.948 353	0.135 288	0.098 210	0.064 173	0.097 94	0.047 34	0.036 347	0.024 259	0.012 232
DCP 5	.200	0.822	0.820 353	0.126 266	0.081 183	0.047 128	0.081 62	0.039 323	0.023 241	0.015 221	0.011 144
DCP 6	.250	0.631	0.669 359	0.110 266	0.078 168	0.042 81	0.052 54	0.043 302	0.031 206	0.018 159	0.021 91
DCP 7	.300	0.499	0.626 359	0.132 250	0.087 146	0.055 58	0.042 14	0.043 261	0.034 170	0.016 116	0.020 61
DCP 8	.400	0.338	0.442 5	0.101 247	0.073 120	0.048 17	0.016 298	0.038 213	0.032 116	0.016 19	0.012 335
DCP 9	.500	0.380	0.355 8	0.087 228	0.064 83	0.04[illegible] 335	0.026 220	0.031 151	0.021 39	0.013 284	0.002 212
DCP10	.695	0.265	0.220 17	0.063 210	0.058 52	0.02[illegible] 283	0.020 178	0.015 127	0.016 346	0.012 217	0.004 68
DCP11	.800	0.160	0.175 12	0.070 200	0.058 50	0.0[illegible] 248	0.022 208	0.020 118	0.019 342	0.012 227	0.004 140
DCP12	.878	0.126	0.137 1	0.065 178	0.049 31	0.0[illegible] 255	0.016 188	0.015 93	0.016 325	0.011 209	0.009 135
DCP13	.953	0.180	0.119 349	0.053 155	0.032 358	0.007 237	0.011 176	0.008 53	0.006 278	0.002 158	0.001 198

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	63.29	0.600	7.48	5.35		3174.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.165	639.2	1438.9	0.63E 07	-0.00050	1.284	12.45

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.712	0.447 17	0.077 304	0.015 225	0.023 138	0.009 11	0.001 136	0.004 298	0.005 129	0.004 197
CM		-0.032	0.049 196	0.035 54	0.014 307	0.007 286	0.005 169	0.002 159	0.003 58	0.002 320	0.001 339
DCP 1	.010	2.644	1.153 348	0.237 57	0.090 252	0.040 128	0.059 83	0.024 317	0.023 260	0.010 139	0.003 349
DCP 2	.050	2.399	0.684 5	0.460 42	0.173 276	0.032 15	0.069 171	0.030 86	0.026 62	0.022 17	0.016 316
DCP 3	.100	1.694	0.841 22	0.294 28	0.096 338	0.073 49	0.052 337	0.012 348	0.017 237	0.010 54	0.030 135
DCP 4	.150	1.185	0.774 21	0.223 357	0.123 326	0.042 271	0.046 326	0.046 246	0.018 335	0.023 259	0.013 221
DCP 5	.200	1.073	0.693 20	0.197 333	0.098 287	0.053 220	0.028 242	0.038 186	0.009 244	0.032 152	0.009 80
DCP 6	.250	0.868	0.625 23	0.169 314	0.05[illegible] 268	0.056 217	0.026 189	0.039 189	0.031 116	0.022 139	0.021 71
DCP 7	.300	0.697	0.594 24	0.187 312	0.08[illegible] 255	0.083 191	0.036 147	0.043 135	0.032 59	0.017 99	0.019 29
DCP 8	.400	0.522	0.490 23	0.160 279	0.03[illegible] 77	0.053 172	0.029 96	0.019 91	0.026 25	0.007 349	0.009 315
DCP 9	.500	0.522	0.412 24	0.143 268	0.049 [illegible]2	0.058 132	0.032 35	0.018 29	0.027 311	0.016 208	0.013 145
DCP10	.695	0.381	0.292 20	0.123 240	0.059 [illegible]7	0.031 103	0.026 349	0.013 330	0.019 225	0.010 115	0.006 150
DCP11	.800	0.267	0.253 11	0.117 234	0.050 127	0.037 94	0.031 339	0.010 304	0.018 224	0.008 119	0.004 143
DCP12	.878	0.231	0.216 0	0.098 224	0.046 130	0.035 67	0.022 316	0.007 306	0.012 213	0.005 157	0.007 103
DCP13	.953	0.270	0.183 344	0.068 193	0.029 106	0.022 29	0.010 290	0.008 275	0.008 182	0.008 35	0.0[illegible] 317

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	63.29	0.600	9.84	5.30		3174.4	10
K	**V**	**Q**	**RN**	**DAMPING**	**CY(MAX)**	**ALPHA(STALL)**	
0.166	638.7	1437.1	0.63E 07	-0.00069	1.353	13.56	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.841	0.401	42	0.071	0	0.016	2	0.009	259	0.014	188	0.009	75	0.005	99	0.005	50	0.004	88
CM		-0.052	0.075	195	0.032	84	0.010	69	0.005	16	0.007	15	0.003	244	0.002	276	0.001	158	0.002	228
DCP 1	.010	2.939	0.392	18	0.421	62	0.203	325	0.122	237	0.059	161	0.027	137	0.008	141	0.004	91	0.003	131
DCP 2	.050	2.642	0.390	98	0.415	47	0.067	127	0.090	8	0.011	79	0.042	326	0.009	258	0.026	290	0.015	190
DCP 3	.100	1.994	0.616	73	0.324	56	0.157	151	0.065	265	0.021	78	0.032	175	0.017	269	0.038	116	0.027	151
DCP 4	.150	1.305	0.658	58	0.257	58	0.128	59	0.051	93	0.053	156	0.040	166	0.029	193	0.033	178	0.037	133
DCP 5	.200	1.233	0.630	50	0.169	33	0.113	45	0.045	46	0.034	96	0.026	80	0.023	132	0.022	108	0.020	152
DCP 6	.250	1.001	0.575	51	0.128	26	0.119	34	0.037	24	0.043	31	0.020	45	0.024	59	0.033	79	0.021	47
DCP 7	.300	0.844	0.599	48	0.139	6	0.109	22	0.046	348	0.034	7	0.032	17	0.029	12	0.025	33	0.012	48
DCP 8	.400	0.629	0.511	42	0.100	321	0.064	354	0.019	290	0.037	299	0.003	330	0.015	334	0.022	357	0.023	301
DCP 9	.500	0.633	0.454	38	0.108	298	0.046	313	0.037	241	0.043	231	0.010	139	0.007	191	0.005	357	0.006	174
DCP10	.695	0.470	0.340	28	0.106	271	0.043	239	0.022	185	0.042	197	0.017	74	0.016	126	0.005	29	0.010	35
DCP11	.800	0.369	0.322	17	0.104	269	0.049	243	0.029	195	0.039	181	0.017	61	0.016	117	0.006	319	0.014	176
DCP12	.878	0.333	0.273	6	0.081	265	0.050	228	0.023	189	0.034	156	0.013	55	0.015	80	0.006	273	0.012	66
DCP13	.953	0.365	0.227	353	0.057	256	0.043	199	0.011	175	0.018	122	0.005	51	0.008	6	0.005	139	0.006	17

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	80.65	0.200	14.24	5.80		3193.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.604	223.0	199.8	0.26E 07	-0.00085	1.662	18.33

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.326	0.327	17	0.052	330	0.090	57	0.021	206	0.010	257	0.019	48	0.005	86	0.005	141	0.003	7
CM		-0.057	0.069	328	0.048	145	0.036	246	0.014	39	0.008	117	0.007	247	0.003	14	0.001	156	0.002	4
CCP 1	.010	5.318	2.464	35	0.727	302	0.224	217	0.174	88	0.081	8	0.035	350	0.023	264	0.052	15	0.028	10
CCP 2	.050	4.123	1.468	21	0.308	220	0.040	345	0.137	40	0.054	182	0.005	27	0.050	51	0.016	81	0.013	339
CCP 3	.100	2.320	1.461	5	0.431	197	0.158	74	0.135	353	0.066	175	0.023	323	0.046	23	0.074	189	0.072	4
CCP 4	.150	2.243	1.173	350	0.357	174	0.180	54	0.048	296	0.029	194	0.034	115	0.066	26	0.034	209	0.030	64
CCP 5	.200	2.019	0.877	342	0.281	141	0.199	12	0.088	218	0.081	98	0.032	326	0.022	263	0.038	99	0.032	243
CCP 6	.250	1.801	0.737	332	0.327	120	0.220	353	0.080	211	0.102	114	0.043	336	0.033	202	0.059	57	0.022	231
CCP 7	.300	1.475	0.514	322	0.334	99	0.193	326	0.132	171	0.080	18	0.019	194	0.045	139	0.038	313	0.018	97
CCP 8	.400	1.341	0.179	307	0.295	54	0.123	236	0.089	100	0.111	274	0.063	76	0.018	44	0.036	154	0.025	25
CCP 9	.500	1.090	0.134	135	0.316	7	0.203	131	0.032	344	0.091	190	0.047	332	0.017	127	0.013	230	0.017	205
CCP10	.695	0.711	0.283	102	0.301	313	0.234	63	0.069	260	0.060	15	0.046	106	0.013	323	0.009	116	0.010	337
CCP11	.800	0.428	0.275	121	0.268	305	0.226	61	0.097	225	0.072	315	0.044	70	0.024	241	0.024	24	0.026	188
CCP12	.878	0.194	0.233	110	0.215	280	0.143	43	0.085	190	0.040	258	0.032	54	0.027	155	0.014	364	0.022	76
CCP13	.953	0.368	0.217	90	0.104	231	0.084	26	0.036	183	0.022	248	0.015	13	0.004	165	0.021	244	0.014	265

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	81.30	0.200	16.71	5.82		3193.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.610	222.5	200.2	0.26E 07	0.00025	1.788	22.17

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.408	0.393	2	0.072	357	0.054	83	0.016	345	0.012	106	0.013	169	0.007	296	0.004	177	0.004	145
CM		-0.137	0.073	8	0.047	173	0.021	268	0.011	124	0.006	131	0.008	49	0.008	81	0.006	36	0.007	1
CCP 1	.010	4.162	2.369	55	0.404	336	0.236	275	0.235	177	0.349	137	0.299	88	0.260	64	0.225	35	0.231	359
CCP 2	.050	3.010	1.561	27	0.248	273	0.200	208	0.127	121	0.129	95	0.040	120	0.090	75	0.084	54	0.073	14
CCP 3	.100	2.110	1.584	11	0.321	268	0.198	181	0.170	62	0.071	3	0.085	239	0.034	126	0.039	85	0.021	12
CCP 4	.150	2.019	1.498	3	0.363	235	0.167	135	0.114	56	0.032	15	0.019	169	0.009	347	0.020	58	0.022	343
CCP 5	.200	2.055	1.153	350	0.293	190	0.153	76	0.148	339	0.056	200	0.075	114	0.049	359	0.047	257	0.047	152
CCP 6	.250	1.830	1.143	350	0.379	173	0.303	57	0.168	294	0.019	178	0.041	45	0.020	229	0.046	224	0.015	120
CCP 7	.300	1.733	0.895	330	0.391	132	0.212	45	0.146	247	0.061	140	0.059	33	0.032	276	0.026	152	0.014	67
CCP 8	.400	1.570	0.608	324	0.399	87	0.219	354	0.089	159	0.018	83	0.042	254	0.046	237	0.022	259	0.035	198
CCP 9	.500	1.501	0.270	266	0.398	30	0.069	303	0.140	62	0.016	241	0.017	151	0.010	308	0.004	229	0.023	156
CCP10	.695	0.983	0.209	173	0.351	344	0.115	147	0.103	304	0.028	13	0.046	235	0.027	237	0.030	195	0.020	220
CCP11	.800	0.581	0.239	147	0.248	321	0.175	120	0.075	262	0.024	303	0.023	193	0.008	308	0.021	223	0.013	153
CCP12	.878	0.353	0.247	134	0.167	313	0.151	102	0.073	273	0.050	317	0.009	207	0.032	281	0.024	208	0.028	168
CCP13	.953	0.528	0.295	126	0.176	253	0.114	29	0.049	69	0.024	159	0.046	203	0.039	278	0.014	29	0.012	142

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	81.30	0.200	24.00	5.80		3193.3	10
K	**V**	**Q**	**RN**	**DAMPING**	**CY(MAX)**	**ALPHA(STALL)**	
0.612	221.8	199.0	0.26E 07	0.00169	2.322	27.19	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		1.769	0.573 30	0.016 187	0.068 52	0.020 216	0.005 311	0.004 205	0.001 302	0.009 133	0.001 204
CM		-0.305	0.101 111	0.027 122	0.033 262	0.013 42	0.001 286	0.004 349	0.003 244	0.005 277	0.002 236
CCP 1	.010	2.133	1.460 124	0.467 175	0.185 285	0.170 327	0.069 295	0.072 285	0.007 303	0.052 218	0.045 179
CCP 2	.050	2.717	1.128 72	0.244 119	0.101 314	0.047 335	0.044 322	0.036 259	0.057 254	0.025 226	0.051 189
CCP 3	.100	2.258	1.330 63	0.317 111	0.048 352	0.014 129	0.039 357	0.009 345	0.020 245	0.021 288	0.014 237
CCP 4	.150	2.057	1.309 60	0.310 110	0.107 347	0.068 322	0.052 342	0.043 293	0.061 255	0.051 253	0.024 200
CCP 5	.200	2.229	1.377 48	0.241 80	0.066 11	0.019 153	0.020 334	0.035 300	0.049 244	0.045 293	0.060 223
CCP 6	.250	2.158	1.375 50	0.270 79	0.043 9	0.028 267	0.049 272	0.038 316	0.030 256	0.053 201	0.050 212
CCP 7	.300	2.078	1.421 38	0.227 7	0.066 346	0.036 121	0.018 66	0.017 290	0.007 219	0.014 94	0.010 225
CCP 8	.400	2.043	1.209 23	0.203 306	0.100 51	0.047 139	0.076 129	0.057 91	0.057 61	0.026 50	0.046 5
CCP 9	.500	2.129	1.053 1	0.377 239	0.064 96	0.049 151	0.025 187	0.041 122	0.024 76	0.033 61	0.038 29
CCP10	.695	1.571	0.547 322	0.244 191	0.096 34	0.044 122	0.032 239	0.010 328	0.016 66	0.028 121	0.009 9
CCP11	.800	1.109	0.344 257	0.058 128	0.159 37	0.074 192	0.049 285	0.023 148	0.011 191	0.022 107	0.014 128
CCP12	.878	1.020	0.505 226	0.237 6	0.204 95	0.152 246	0.062 353	0.034 161	0.027 261	0.029 50	0.041 164
CCP13	.953	1.132	0.644 213	0.472 353	0.250 118	0.149 292	0.086 90	0.078 247	0.027 42	0.039 212	0.034 315

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	80.65	0.400	0.07	5.68		3188.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.309	436.6	734.9	0.48E 07	-0.00094	0.361	6.06

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		-0.039	0.397	0	0.033	184	0.015	301	0.012	81	0.008	86	0.001	10	0.005	13	0.001	354	0.002	271
CM		0.000	0.045	266	0.006	78	0.006	151	0.002	321	0.002	317	0.000	118	0.001	249	0.000	275	0.000	57
DCP 1	.010	-0.354	2.390	325	0.109	192	0.075	113	0.053	59	0.015	359	0.013	8	0.017	342	0.009	307	0.003	331
DCP 2	.050	0.132	1.350	342	0.119	141	0.035	212	0.028	40	0.023	38	0.010	53	0.010	342	0.007	329	0.004	317
DCP 3	.100	-0.121	0.959	342	0.084	140	0.038	220	0.018	37	0.010	42	0.005	42	0.009	342	0.003	354	0.006	274
DCP 4	.150	-0.144	0.737	351	0.071	159	0.019	266	0.023	61	0.016	59	0.002	324	0.008	350	0.004	298	0.001	320
DCP 5	.200	-0.007	0.605	350	0.058	157	0.021	244	0.020	56	0.013	46	0.003	101	0.006	335	0.002	58	0.004	268
DCP 6	.250	-0.067	0.534	2	0.052	177	0.024	294	0.019	76	0.012	70	0.003	308	0.005	5	0.005	299	0.004	233
DCP 7	.300	-0.165	0.454	2	0.044	179	0.021	284	0.015	72	0.012	77	0.003	116	0.006	16	0.003	55	0.004	274
DCP 8	.400	-0.085	0.351	16	0.034	200	0.027	318	0.014	88	0.009	109	0.004	281	0.005	14	0.005	259	0.003	287
DCP 9	.500	0.014	0.290	22	0.032	212	0.025	306	0.014	93	0.011	92	0.004	139	0.005	13	0.003	58	0.003	286
DCP10	.695	0.068	0.214	44	0.025	238	0.027	334	0.009	126	0.007	143	0.004	310	0.003	62	0.001	146	0.004	197
DCP11	.800	-0.037	0.161	52	0.023	247	0.018	327	0.010	135	0.010	139	0.000	27	0.004	50	0.002	33	0.001	292
DCP12	.878	-0.127	0.133	58	0.015	257	0.023	349	0.006	153	0.006	133	0.003	335	0.005	79	0.001	146	0.002	264
DCP13	.953	0.046	0.106	43	0.014	222	0.009	279	0.006	123	0.006	108	0.002	43	0.003	53	0.003	87	0.001	304

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	80.65	0.400	7.45	5.71		3189.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.309	435.9	733.3	0.48E 07	-0.00076	1.238	13.15

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.811	0.429	5	0.053	179	0.021	338	0.013	62	0.005	93	0.002	339	0.001	2	0.005	350	0.005	255
CM		-0.007	0.036	268	0.004	354	0.010	159	0.003	285	0.003	352	0.000	223	0.000	191	0.001	232	0.001	85
DCP 1	.010	4.393	2.700	343	0.112	85	0.312	218	0.197	83	0.106	357	0.053	332	0.039	225	0.016	73	0.006	65
DCP 2	.050	2.908	1.278	351	0.066	221	0.132	160	0.115	15	0.021	280	0.009	274	0.029	129	0.033	8	0.015	265
DCP 3	.100	1.813	0.979	350	0.128	191	0.069	85	0.045	324	0.014	354	0.033	189	0.031	40	0.024	283	0.016	216
DCP 4	.150	1.380	0.783	354	0.134	175	0.061	32	0.034	275	0.033	89	0.006	285	0.014	28	0.012	283	0.007	230
DCP 5	.200	1.226	0.645	355	0.114	174	0.050	7	0.012	225	0.011	34	0.013	113	0.018	310	0.006	137	0.006	289
DCP 6	.250	1.002	0.562	5	0.097	180	0.056	2	0.014	205	0.022	74	0.001	102	0.014	349	0.006	258	0.007	291
DCP 7	.300	0.773	0.494	5	0.092	175	0.054	348	0.012	149	0.007	87	0.013	46	0.014	249	0.010	68	0.009	260
DCP 8	.400	0.577	0.376	21	0.062	194	0.049	348	0.014	136	0.011	109	0.009	25	0.005	282	0.003	362	0.006	259
DCP 9	.500	0.573	0.319	24	0.056	179	0.047	331	0.015	99	0.012	116	0.008	304	0.004	129	0.006	330	0.004	213
DCP10	.695	0.401	0.218	43	0.027	179	0.038	318	0.022	82	0.010	168	0.004	293	0.004	79	0.002	10	0.005	166
DCP11	.800	0.209	0.161	47	0.018	178	0.030	349	0.015	62	0.010	191	0.003	139	0.001	338	0.005	19	0.005	226
DCP12	.878	0.085	0.114	44	0.014	150	0.019	321	0.013	71	0.008	219	0.005	63	0.001	305	0.007	29	0.006	232
DCP13	.953	0.217	0.072	22	0.010	69	0.006	12	0.007	11	0.007	178	0.003	138	0.001	284	0.001	320	0.002	272

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	81.30	0.400	9.83	5.78		3188.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.312	435.7	732.8	0.47E 07	0.00066	1.427	15.64

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.915	0.549	15	0.096	189	0.030	8	0.017	209	0.018	113	0.007	303	0.005	131	0.007	3	0.004	321
CM		-0.056	0.049	138	0.053	328	0.023	185	0.010	59	0.007	297	0.007	128	0.004	350	0.002	178	0.000	71
DCP 1	.010	3.643	1.750	46	1.216	16	0.413	273	0.174	253	0.130	178	0.070	121	0.057	125	0.059	57	0.024	339
DCP 2	.050	2.718	1.264	36	0.391	329	0.104	233	0.123	203	0.093	91	0.036	117	0.054	19	0.016	316	0.032	298
DCP 3	.100	1.824	1.173	30	0.256	281	0.086	200	0.107	167	0.088	85	0.044	51	0.042	334	0.017	319	0.020	251
DCP 4	.150	1.438	1.012	18	0.237	255	0.076	182	0.103	116	0.068	20	0.031	310	0.029	232	0.006	292	0.022	151
DCP 5	.200	1.324	0.924	22	0.263	238	0.072	153	0.087	107	0.047	25	0.035	300	0.018	192	0.013	157	0.026	32
DCP 6	.250	1.141	0.870	14	0.262	222	0.065	130	0.080	70	0.050	344	0.056	249	0.028	146	0.011	93	0.010	8
DCP 7	.300	0.904	0.805	19	0.283	222	0.080	127	0.080	78	0.051	341	0.050	240	0.024	101	0.016	143	0.034	22
DCP 8	.400	0.741	0.639	6	0.267	189	0.094	61	0.067	350	0.054	248	0.052	156	0.026	33	0.014	307	0.006	256
DCP 9	.500	0.779	0.526	6	0.260	180	0.093	57	0.077	342	0.082	225	0.055	103	0.014	0	0.026	337	0.017	292
DCP10	.695	0.565	0.311	345	0.224	138	0.121	0	0.089	246	0.091	129	0.070	337	0.032	203	0.009	89	0.016	352
DCP11	.800	0.373	0.191	341	0.188	135	0.120	350	0.092	215	0.059	93	0.047	315	0.019	182	0.013	76	0.010	339
DCP12	.878	0.247	0.145	319	0.144	113	0.105	319	0.073	174	0.049	42	0.041	255	0.019	119	0.022	331	0.014	171
DCP13	.953	0.338	0.073	307	0.056	98	0.044	318	0.037	194	0.045	64	0.036	273	0.019	132	0.016	346	0.009	296

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	81.30	0.400	12.33	5.74		3188.4	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.312	435.4	732.1	0.47E 07	0.00132	1.635	17.89

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.073	0.556	20	0.074	210	0.012	353	0.002	125	0.011	282	0.024	68	0.013	309	0.002	141	0.002	139
CM		-0.097	0.108	141	0.064	356	0.024	220	0.003	148	0.009	79	0.014	274	0.006	121	0.002	336	0.001	287
DCP 1	.010	3.715	1.716	96	1.163	52	0.222	63	0.306	350	0.064	329	0.146	317	0.074	287	0.085	235	0.062	332
DCP 2	.050	2.826	1.243	68	0.437	5	0.075	333	0.145	286	0.062	254	0.042	231	0.034	250	0.026	179	0.018	295
DCP 3	.100	1.932	1.148	53	0.281	339	0.152	291	0.080	239	0.074	208	0.036	68	0.031	174	0.030	52	0.014	81
DCP 4	.150	1.550	1.019	40	0.267	318	0.168	261	0.085	217	0.092	177	0.047	76	0.030	93	0.020	21	0.020	68
DCP 5	.200	1.458	0.944	35	0.217	291	0.161	244	0.081	173	0.091	121	0.046	16	0.044	57	0.017	321	0.016	328
DCP 6	.250	1.283	0.923	30	0.240	287	0.184	235	0.080	165	0.088	125	0.075	43	0.055	0	0.017	258	0.024	305
DCP 7	.300	1.076	0.880	25	0.226	260	0.144	228	0.114	150	0.114	74	0.048	354	0.038	355	0.019	235	0.011	241
DCP 8	.400	0.887	0.756	14	0.241	242	0.164	186	0.096	98	0.090	29	0.056	324	0.033	250	0.015	175	0.017	147
DCP 9	.500	1.024	0.711	357	0.278	204	0.084	145	0.126	87	0.151	341	0.062	230	0.038	144	0.016	39	0.027	43
DCP10	.695	0.777	0.508	333	0.285	167	0.151	50	0.080	342	0.117	250	0.102	112	0.035	351	0.020	329	0.031	291
DCP11	.800	0.526	0.352	331	0.253	167	0.201	38	0.111	283	0.076	195	0.097	84	0.068	303	0.025	157	0.015	122
DCP12	.878	0.377	0.256	317	0.186	151	0.159	14	0.076	252	0.048	171	0.069	56	0.046	264	0.024	112	0.018	20
DCP13	.953	0.449	0.167	296	0.120	117	0.095	319	0.024	159	0.018	234	0.039	72	0.018	294	0.008	149	0.010	20

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	80.65	0.400	14.04	5.58		3194.1	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.308	438.0	730.9	0.47E 07	0.00089	1.698	19.80	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.071	0.562	28	0.092	271	0.018	220	0.019	36	0.023	37	0.026	192	0.013	38	0.001	283	0.005	258
CM		-0.134	0.129	158	0.063	38	0.022	283	0.005	264	0.011	199	0.015	31	0.005	293	0.001	299	0.004	89
CCP 1	.050	2.862	1.286	93	0.314	48	0.082	46	0.088	58	0.079	9	0.072	84	0.010	81	0.027	55	0.033	131
CCP 2	.100	1.994	1.132	75	0.300	32	0.124	336	0.124	35	0.059	330	0.040	38	0.012	31	0.013	286	0.021	66
CCP 3	.150	1.658	1.004	59	0.285	11	0.151	298	0.116	358	0.044	301	0.031	281	0.019	336	0.026	268	0.012	339
CCP 4	.200	1.534	0.965	52	0.247	358	0.159	290	0.098	328	0.031	242	0.030	178	0.030	322	0.020	196	0.009	262
CCP 5	.250	1.417	0.912	44	0.252	347	0.192	273	0.079	318	0.042	227	0.057	190	0.017	263	0.023	136	0.009	206
CCP 6	.300	1.127	0.876	40	0.216	339	0.154	279	0.105	286	0.059	202	0.068	154	0.015	309	0.007	131	0.018	233
CCP 7	.400	1.011	0.785	23	0.240	298	0.212	229	0.068	177	0.079	130	0.062	90	0.006	101	0.036	7	0.032	163
CCP 8	.500	1.129	0.771	6	0.232	266	0.141	213	0.101	164	0.134	107	0.054	359	0.025	71	0.040	291	0.012	70
CCP 9	.695	0.859	0.618	346	0.330	223	0.166	118	0.095	69	0.116	3	0.094	227	0.002	90	0.047	145	0.026	349
CCP10	.800	0.585	0.463	341	0.290	213	0.191	93	0.084	18	0.071	338	0.115	207	0.056	50	0.009	153	0.027	295
CCP11	.878	0.420	0.342	329	0.225	191	0.151	58	0.057	319	0.044	323	0.079	192	0.044	21	0.009	359	0.051	230
CCP12	.953	0.510	0.211	321	0.161	167	0.120	12	0.034	189	0.033	353	0.031	212	0.017	149	0.031	2	0.039	196

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	80.00	0.400	16.46	5.56		3194.2	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.306	437.1	731.5	0.47E 07	0.00027	1.775	21.10	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.133	0.526	36	0.089	338	0.041	239	0.029	69	0.026	83	0.028	240	0.018	61	0.010	353	0.010	279
CM		-0.163	0.129	170	0.056	80	0.022	346	0.003	348	0.017	256	0.015	86	0.007	243	0.003	193	0.004	111
CCP 1	.050	2.746	1.160	110	0.310	119	0.034	249	0.111	140	0.057	211	0.098	194	0.054	204	0.024	296	0.022	213
CCP 2	.100	1.929	0.987	88	0.351	83	0.043	330	0.095	89	0.031	108	0.083	176	0.027	177	0.029	150	0.031	179
CCP 3	.150	1.629	0.837	70	0.331	60	0.050	349	0.094	68	0.049	67	0.061	136	0.021	78	0.031	107	0.017	139
CCP 4	.200	1.534	0.829	62	0.357	44	0.100	343	0.091	50	0.058	341	0.030	106	0.023	55	0.016	331	0.010	112
CCP 5	.250	1.453	0.813	52	0.347	38	0.118	342	0.100	45	0.060	4	0.034	77	0.042	4	0.035	33	0.012	54
CCP 6	.300	1.170	0.794	48	0.357	29	0.143	332	0.111	36	0.061	315	0.016	344	0.036	31	0.031	4	0.023	353
CCP 7	.400	1.167	0.800	30	0.350	355	0.199	294	0.080	349	0.090	246	0.044	325	0.039	240	0.033	319	0.016	244
CCP 8	.500	1.220	0.772	17	0.314	320	0.198	253	0.039	295	0.096	171	0.014	203	0.043	67	0.042	348	0.039	314
CCP 9	.695	0.924	0.574	1	0.325	270	0.237	190	0.073	129	0.105	84	0.044	243	0.074	28	0.036	251	0.015	221
CCP10	.800	0.709	0.478	348	0.292	235	0.182	135	0.053	109	0.122	53	0.111	259	0.040	98	0.008	74	0.009	177
CCP11	.878	0.579	0.362	341	0.236	213	0.157	95	0.018	252	0.094	50	0.094	253	0.027	115	0.035	95	0.018	318
CCP12	.953	0.587	0.220	334	0.152	181	0.102	53	0.048	230	0.058	81	0.045	298	0.028	183	0.045	58	0.040	293

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	80.65	0.400	23.78	5.67		3194.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.308	436.7	729.2	0.47E 07	-0.00126	1.579	24.99

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		1.135	0.430 46	0.127 108	0.017 89	0.014 154	0.005 249	0.008 241	0.002 182	0.003 99	0.003 6
CM		-0.186	0.108 220	0.037 251	0.015 267	0.008 340	0.005 76	0.003 93	0.001 1	0.001 298	0.001 129
DCP 1	.010	1.882	0.596 151	0.260 228	0.203 331	0.095 64	0.074 156	0.028 184	0.033 74	0.036 74	0.019 24
DCP 2	.050	2.059	0.233 67	0.155 153	0.033 310	0.009 39	0.015 164	0.014 242	0.006 270	0.011 173	0.005 156
DCP 3	.100	1.619	0.311 42	0.148 134	0.028 254	0.013 45	0.012 71	0.008 78	0.010 339	0.004 14	0.009 47
DCP 4	.150	1.427	0.359 52	0.170 149	0.033 274	0.015 62	0.027 142	0.027 233	0.011 294	0.007 123	0.006 213
DCP 5	.200	1.436	0.413 37	0.156 131	0.035 239	0.023 284	0.023 9	0.002 57	0.014 199	0.008 257	0.014 352
DCP 6	.250	1.349	0.420 52	0.183 149	0.033 276	0.022 30	0.033 113	0.027 236	0.013 293	0.011 41	0.006 193
DCP 7	.300	1.150	0.493 41	0.172 127	0.036 198	0.029 267	0.033 331	0.007 332	0.011 146	0.006 185	0.006 342
DCP 8	.400	1.134	0.487 52	0.183 136	0.045 217	0.024 305	0.037 41	0.031 120	0.017 163	0.011 332	0.009 30
DCP 9	.500	1.220	0.563 42	0.184 93	0.059 123	0.041 169	0.034 264	0.016 263	0.003 24	0.008 112	0.006 42
DCP10	.695	1.040	0.554 46	0.188 81	0.073 78	0.034 160	0.021 250	0.016 268	0.002 93	0.007 172	0.002 178
DCP11	.800	0.806	0.427 41	0.169 65	0.080 75	0.041 147	0.026 223	0.019 295	0.006 285	0.008 56	0.010 338
DCP12	.878	0.677	0.350 44	0.137 65	0.064 77	0.042 154	0.024 248	0.020 259	0.009 193	0.010 131	0.006 312
DCP13	.953	0.695	0.226 22	0.054 16	0.026 16	0.021 114	0.008 122	0.002 116	0.004 80	0.010 317	0.005 229

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	80.65	0.600	0.04	5.68		3189.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.210	640.4	1437.8	0.63E 07	-0.00082	0.428	5.70

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		-0.042	0.459 342	0.030 175	0.011 262	0.011 61	0.012 33	0.004 26	0.003 357	0.001 336	0.003 282
CM		0.000	0.041 255	0.003 89	0.003 135	0.002 288	0.002 270	0.000 164	0.000 188	0.000 346	0.000 53
DCP 1	.010	-0.254	2.127 311	0.280 193	0.016 27	0.030 59	0.020 5	0.017 23	0.011 5	0.009 356	0.011 331
DCP 2	.050	0.215	1.773 327	0.081 113	0.045 99	0.023 97	0.012 357	0.011 355	0.010 344	0.011 336	0.011 296
DCP 3	.100	-0.158	1.208 330	0.071 156	0.064 217	0.032 352	0.041 3	0.020 59	0.010 108	0.005 255	0.010 271
DCP 4	.150	-0.196	0.915 335	0.059 151	0.028 223	0.020 35	0.023 10	0.006 43	0.006 327	0.006 342	0.006 332
DCP 5	.200	-0.040	0.743 335	0.052 154	0.026 212	0.017 39	0.017 0	0.005 51	0.003 352	0.005 2	0.003 334
DCP 6	.250	-0.100	0.647 345	0.042 166	0.022 255	0.018 50	0.019 33	0.004 347	0.007 341	0.002 29	0.006 275
DCP 7	.300	-0.162	0.544 345	0.033 168	0.021 248	0.015 51	0.016 24	0.003 24	0.003 343	0.003 13	0.002 336
DCP 8	.400	-0.105	0.398 356	0.027 181	0.018 283	0.014 69	0.015 43	0.003 353	0.005 340	0.001 136	0.003 255
DCP 9	.500	0.009	0.314 1	0.021 195	0.016 274	0.011 71	0.012 40	0.002 15	0.002 326	0.002 32	0.002 338
DCP10	.695	0.030	0.198 24	0.015 219	0.017 323	0.008 96	0.011 75	0.002 324	0.001 347	0.003 175	0.003 230
DCP11	.800	-0.013	0.145 32	0.013 241	0.010 325	0.006 118	0.007 108	0.004 29	0.002 69	0.002 159	0.001 276
DCP12	.878	-0.076	0.117 40	0.009 239	0.010 336	0.005 116	0.006 96	0.002 14	0.002 50	0.003 233	0.002 253
DCP13	.953	0.052	0.102 28	0.008 231	0.006 284	0.004 85	0.005 66	0.003 40	0.001 340	0.001 142	0.002 290

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	80.65	0.600	7.35	5.61		3189.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.211	639.6	1433.5	0.63E 07	-0.00033	1.350	13.13

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.742	0.509	10	0.051	268	0.033	194	0.028	44	0.004	262	0.002	321	0.007	98	0.005	346	0.004	317
CM		-0.031	0.046	197	0.036	24	0.011	250	0.010	206	0.004	80	0.005	53	0.005	284	0.002	135	0.001	122
DCP 1	.010	2.712	1.382	341	0.294	51	0.177	161	0.032	359	0.035	356	0.006	257	0.015	278	0.003	68	0.007	165
DCP 2	.050	2.523	0.932	357	0.446	27	0.219	207	0.060	350	0.063	96	0.040	341	0.021	332	0.013	279	0.013	132
DCP 3	.100	1.673	1.000	13	0.314	8	0.091	270	0.024	349	0.033	282	0.031	60	0.015	348	0.012	268	0.016	26
DCP 4	.200	1.144	0.824	9	0.174	309	0.121	230	0.029	164	0.028	204	0.035	90	0.011	200	0.023	62	0.003	336
DCP 5	.250	0.901	0.738	18	0.140	291	0.091	238	0.046	177	0.023	135	0.041	120	0.018	37	0.019	65	0.016	329
DCP 6	.300	0.733	0.700	14	0.169	271	0.102	208	0.057	135	0.046	100	0.046	41	0.011	333	0.022	344	0.014	263
DCP 7	.400	0.529	0.540	21	0.140	248	0.042	195	0.048	100	0.021	64	0.027	19	0.020	274	0.007	279	0.012	291
DCP 8	.500	0.548	0.470	15	0.150	223	0.037	140	0.062	53	0.030	335	0.034	265	0.026	146	0.008	92	0.008	19
DCP 9	.695	0.380	0.305	18	0.124	206	0.036	75	0.063	26	0.031	250	0.017	233	0.024	113	0.012	336	0.010	268
DCP10	.800	0.262	0.244	9	0.117	201	0.047	70	0.049	12	0.018	252	0.030	232	0.030	84	0.010	286	0.008	335
DCP11	.878	0.202	0.200	357	0.096	194	0.040	79	0.040	9	0.016	260	0.023	218	0.021	88	0.008	322	0.014	310
DCP12	.953	0.295	0.160	332	0.063	152	0.030	51	0.031	316	0.013	189	0.007	158	0.009	37	0.009	238	0.006	72

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	80.65	0.600	9.70	5.59		3189.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.211	638.7	1431.5	0.63E 07	-0.00027	1.475	14.76

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.854	0.522	29	0.043	308	0.032	294	0.018	124	0.011	73	0.007	348	0.008	340	0.005	289	0.006	279
CM		-0.054	0.076	186	0.041	51	0.008	355	0.012	279	0.003	246	0.001	182	0.003	147	0.001	33	0.002	39
DCP 1	.010	3.019	0.852	359	0.359	56	0.148	255	0.088	215	0.075	89	0.025	355	0.003	221	0.009	38	0.009	279
DCP 2	.050	2.610	0.651	53	0.465	35	0.060	207	0.113	295	0.066	127	0.035	249	0.011	61	0.013	98	0.010	336
DCP 3	.100	1.812	0.931	51	0.299	45	0.067	21	0.015	145	0.010	105	0.010	313	0.010	241	0.009	258	0.013	349
DCP 4	.200	1.245	0.827	37	0.177	358	0.125	329	0.017	4	0.045	353	0.024	10	0.021	12	0.024	350	0.013	339
DCP 5	.250	1.019	0.764	39	0.105	352	0.141	342	0.018	289	0.035	343	0.017	29	0.022	346	0.029	351	0.024	321
DCP 6	.300	0.834	0.763	35	0.129	327	0.146	317	0.031	245	0.033	291	0.019	286	0.015	253	0.024	281	0.012	258
DCP 7	.400	0.649	0.598	33	0.077	275	0.106	313	0.039	180	0.012	247	0.008	261	0.017	183	0.006	284	0.005	187
DCP 8	.500	0.666	0.560	24	0.135	245	0.070	262	0.058	136	0.035	138	0.027	80	0.029	38	0.016	297	0.013	318
DCP 9	.695	0.483	0.394	18	0.147	231	0.046	182	0.060	97	0.025	75	0.011	351	0.023	321	0.013	189	0.015	226
DCP10	.800	0.385	0.344	9	0.141	236	0.058	162	0.050	94	0.030	56	0.017	311	0.014	290	0.011	171	0.007	195
DCP11	.878	0.315	0.282	0	0.119	234	0.064	157	0.039	87	0.022	55	0.010	309	0.011	308	0.003	188	0.012	227
DCP12	.953	0.385	0.218	338	0.073	201	0.044	102	0.021	37	0.008	316	0.032	191	0.001	196	0.001	358	0.015	149

FORCED PITCHING OSCILLATION NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	80.65	0.600	12.23	5.52		3189.4	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.211	638.1	1429.1	0.63E 07	-0.00057	1.500	16.02	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.915	0.530 48	0.011 25	0.045 351	0.015 232	0.011 116	0.003 135	0.002 354	0.004 27	0.005 298
CM		-0.079	0.107 193	0.027 91	0.013 114	0.006 20	0.002 301	0.000 15	0.001 160	0.002 250	0.003 131
DCP 1	.010	2.882	0.521 98	0.578 48	0.135 285	0.086 346	0.068 241	0.036 95	0.015 318	0.012 75	0.025 7
DCP 2	.050	2.642	0.748 108	0.179 57	0.156 95	0.061 283	0.051 79	0.027 134	0.017 50	0.019 74	0.033 62
DCP 3	.100	1.888	0.897 82	0.220 137	0.016 79	0.069 287	0.036 69	0.012 166	0.006 269	0.025 298	0.038 17
DCP 4	.150	1.401	0.834 71	0.187 117	0.045 88	0.075 230	0.036 268	0.027 325	0.014 34	0.014 9	0.034 131
DCP 5	.200	1.318	0.810 58	0.134 92	0.105 41	0.052 164	0.026 163	0.017 203	0.015 270	0.018 297	0.012 20
DCP 6	.250	1.068	0.766 58	0.076 96	0.110 44	0.060 117	0.041 147	0.021 143	0.017 204	0.014 297	0.011 332
DCP 7	.300	0.907	0.791 51	0.067 57	0.146 18	0.034 79	0.038 93	0.021 102	0.020 142	0.008 218	0.007 158
DCP 8	.400	0.721	0.687 47	0.015 8	0.116 5	0.033 39	0.026 94	0.020 19	0.015 76	0.001 97	0.008 133
DCP 9	.500	0.743	0.650 36	0.060 293	0.108 323	0.028 291	0.008 334	0.016 282	0.011 290	0.003 336	0.005 295
DCP10	.695	0.562	0.496 27	0.100 272	0.062 294	0.036 231	0.010 186	0.016 267	0.009 173	0.017 86	0.019 339
DCP11	.800	0.491	0.421 14	0.098 272	0.053 262	0.047 203	0.021 117	0.011 123	0.017 359	0.013 60	0.028 287
DCP12	.878	0.417	0.340 9	0.088 282	0.041 264	0.037 198	0.013 117	0.007 61	0.017 348	0.000 101	0.022 283
DCP13	.953	0.473	0.250 350	0.078 263	0.026 178	0.021 159	0.008 107	0.012 56	0.007 317	0.008 359	0.008 245

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	97.09	0.200	-0.23	6.05		3190.1	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.730	222.3	200.1	0.26E 07	-0.00159	0.556	3.8*	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.087	0.441 49	0.048 231	0.042 313	0.019 156	0.014 198	0.009 346	0.005 39	0.007 89	0.002 69
CM		-0.013	0.104 287	0.017 91	0.012 150	0.004 356	0.005 34	0.001 226	0.001 274	0.003 278	0.001 6
DCP 1	.010	-0.480	2.311 343	0.126 68	0.060 168	0.050 113	0.022 353	0.004 233	0.018 207	0.016 14	0.019 30
DCP 2	.050	1.121	1.251 357	0.108 140	0.043 226	0.018 113	0.006 60	0.006 281	0.008 235	0.009 54	0.009 60
DCP 3	.100	-0.279	0.899 15	0.140 170	0.066 271	0.052 115	0.023 202	0.026 359	0.014 45	0.006 99	0.011 78
DCP 4	.150	-0.098	0.693 20	0.071 181	0.040 277	0.015 175	0.018 120	0.016 298	0.008 111	0.005 242	0.010 66
DCP 5	.200	0.124	0.638 36	0.079 200	0.039 305	0.016 125	0.009 155	0.023 332	0.007 7	0.008 338	0.011 346
DCP 6	.250	0.072	0.600 41	0.069 207	0.058 302	0.020 184	0.015 159	0.012 332	0.008 89	0.008 192	0.015 80
DCP 7	.300	-0.024	0.562 55	0.066 223	0.055 331	0.020 163	0.017 177	0.018 353	0.011 353	0.003 57	0.010 343
DCP 8	.400	0.100	0.508 65	0.068 235	0.064 310	0.013 182	0.016 178	0.014 297	0.011 114	0.008 210	0.012 58
DCP 9	.500	0.214	0.517 82	0.081 265	0.069 333	0.030 173	0.023 207	0.020 5	0.010 51	0.010 52	0.012 293
DCP10	.695	0.110	0.445 85	0.056 253	0.045 316	0.010 151	0.020 212	0.014 301	0.006 342	0.018 47	0.006 297
DCP11	.800	-0.004	0.360 101	0.082 277	0.045 330	0.036 171	0.026 210	0.027 112	0.023 146	0.036 130	0.029 142
DCP12	.878	0.010	0.300 97	0.039 278	0.039 329	0.007 148	0.013 228	0.034 90	0.007 50	0.010 59	0.019 49
DCP13	.953	0.016	0.217 86	0.042 260	0.022 315	0.010 156	0.013 231	0.004 36	0.004 78	0.007 135	0.006 245

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	97.09	0.200	7.03	6.03		3190.2	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.731	221.8	199.1	0.26E 07	-0.00155	1.291	11.01	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.837	0.439 48	0.037 210	0.045 308	0.017 145	0.004 95	0.014 356	0.003 202	0.011 27	0.012 28
CM		-0.023	0.100 286	0.014 85	0.013 149	0.003 350	0.001 51	0.003 202	0.001 42	0.003 202	0.002 240
DCP 1	.010	3.686	2.333 349	0.224 104	0.095 195	0.031 88	0.025 12	0.017 274	0.012 101	0.018 68	0.026 26
DCP 2	.050	3.176	1.192 358	0.108 136	0.049 220	0.020 89	0.022 74	0.008 1	0.008 135	0.006 0	0.024 34
DCP 3	.100	1.597	0.845 9	0.076 158	0.022 251	0.009 109	0.015 50	0.013 344	0.002 32	0.014 43	0.010 7
DCP 4	.150	1.235	0.715 20	0.062 160	0.047 275	0.025 135	0.020 79	0.012 312	0.006 41	0.004 76	0.013 15
DCP 5	.200	1.245	0.654 28	0.069 176	0.041 290	0.028 151	0.007 75	0.021 332	0.004 184	0.019 32	0.024 358
DCP 6	.250	1.001	0.596 42	0.068 199	0.061 296	0.024 143	0.013 95	0.019 336	0.004 324	0.002 52	0.011 49
DCP 7	.300	0.844	0.537 51	0.044 195	0.062 311	0.027 145	0.008 138	0.025 337	0.002 152	0.012 32	0.020 356
DCP 8	.400	0.684	0.503 66	0.056 230	0.067 307	0.023 137	0.012 74	0.015 6	0.008 275	0.019 28	0.016 70
DCP 9	.500	0.687	0.511 79	0.059 245	0.078 323	0.023 145	0.010 177	0.024 352	0.007 169	0.011 7	0.020 0
DCP10	.695	0.422	0.435 85	0.051 244	0.054 320	0.015 163	0.006 177	0.016 341	0.013 190	0.022 12	0.010 37
DCP11	.800	0.207	0.360 99	0.056 276	0.055 334	0.018 194	0.008 297	0.024 60	0.007 247	0.008 57	0.009 94
DCP12	.878	0.244	0.294 95	0.035 271	0.040 325	0.012 160	0.005 138	0.012 45	0.004 319	0.009 55	0.010 128
DCP13	.953	0.155	0.201 82	0.026 248	0.019 319	0.003 143	0.013 309	0.005 18	0.005 254	0.005 358	0.006 35

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	97.09	0.200	9.36	6.01		3190.3	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.732	221.6	199.6	0.26E 07	-0.00154	1.546	13.66	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		1.085	0.433 49	0.036 234	0.044 300	0.014 155	0.016 94	0.008 355	0.005 177	0.005 57	0.010 357
CM		-0.033	0.099 287	0.015 101	0.014 145	0.003 354	0.003 299	0.002 211	0.002 5	0.001 174	0.001 194
DCP 1	.010	5.209	2.295 350	0.225 113	0.123 185	0.033 84	0.055 23	0.005 246	0.011 100	0.024 91	0.013 283
DCP 2	.050	4.032	1.152 0	0.103 138	0.059 209	0.021 73	0.018 48	0.010 288	0.008 97	0.012 32	0.007 312
DCP 3	.100	2.116	0.812 13	0.059 170	0.042 236	0.014 114	0.032 93	0.002 282	0.005 76	0.013 115	0.015 23
DCP 4	.150	1.581	0.698 21	0.067 184	0.043 265	0.007 147	0.011 110	0.019 318	0.006 159	0.009 87	0.019 347
DCP 5	.200	1.517	0.616 31	0.068 203	0.046 279	0.018 172	0.033 76	0.004 297	0.003 79	0.010 45	0.015 334
DCP 6	.250	1.288	0.580 42	0.066 210	0.056 289	0.017 143	0.019 116	0.018 326	0.005 250	0.006 90	0.015 4
DCP 7	.300	0.982	0.527 52	0.051 224	0.062 306	0.027 188	0.024 94	0.010 356	0.004 218	0.001 74	0.016 351
DCP 8	.400	0.911	0.506 67	0.053 242	0.062 302	0.016 139	0.016 113	0.013 346	0.005 240	0.012 66	0.017 351
DCP 9	.500	0.921	0.501 82	0.067 270	0.076 317	0.027 165	0.023 96	0.012 30	0.004 215	0.003 67	0.012 354
DCP10	.695	0.527	0.431 84	0.050 265	0.052 310	0.010 124	0.010 137	0.015 330	0.008 164	0.009 290	0.014 30
DCP11	.800	0.300	0.362 101	0.055 291	0.060 334	0.019 194	0.013 84	0.012 80	0.016 180	0.012 68	0.012 180
DCP12	.878	0.358	0.292 95	0.044 283	0.041 322	0.010 189	0.008 155	0.008 48	0.010 190	0.005 330	0.014 14
DCP13	.953	0.225	0.199 87	0.029 265	0.022 313	0.008 145	0.013 83	0.006 93	0.009 164	0.003 90	0.009 281

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	97.09	0.200	11.88	6.04		3190.4	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.732	221.7	200.3	0.26E 07	-0.00140	1.678	16.28	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		1.280	0.390 49	0.024 208	0.039 300	0.016 146	0.004 235	0.007 313	0.003 159	0.005 338	0.003 174
CM		-0.037	0.093 289	0.012 90	0.010 142	0.003 339	0.002 69	0.002 181	0.002 350	0.003 186	0.001 30
DCP 1	.010	6.283	2.068 351	0.174 80	0.099 200	0.050 110	0.024 75	0.024 290	0.029 44	0.009 121	0.022 27
DCP 2	.050	4.706	1.001 6	0.020 77	0.054 188	0.012 82	0.014 123	0.021 279	0.009 7	0.010 174	0.032 114
DCP 3	.100	2.631	0.835 4	0.140 140	0.085 284	0.036 111	0.032 275	0.007 81	0.008 337	0.012 231	0.012 236
DCP 4	.150	1.894	0.669 13	0.124 160	0.053 310	0.033 143	0.004 266	0.014 300	0.012 262	0.009 77	0.010 197
DCP 5	.200	1.828	0.582 23	0.076 154	0.033 290	0.016 206	0.014 36	0.018 241	0.007 162	0.015 270	0.007 225
DCP 6	.250	1.504	0.508 40	0.055 169	0.050 285	0.012 114	0.017 183	0.016 300	0.004 217	0.002 255	0.015 116
DCP 7	.300	1.184	0.486 49	0.024 177	0.043 302	0.029 167	0.009 353	0.005 216	0.008 97	0.013 288	0.010 229
DCP 8	.400	1.022	0.442 71	0.038 248	0.038 295	0.016 194	0.009 167	0.008 296	0.006 280	0.005 137	0.014 105
DCP 9	.500	1.035	0.468 80	0.049 271	0.064 314	0.023 148	0.007 194	0.007 321	0.011 143	0.012 332	0.005 87
DCP10	.695	0.573	0.386 91	0.040 262	0.045 325	0.013 129	0.007 215	0.016 0	0.004 108	0.008 327	0.010 293
DCP11	.800	0.364	0.347 95	0.051 267	0.044 311	0.013 143	0.015 273	0.005 17	0.013 210	0.025 28	0.012 195
DCP12	.878	0.479	0.263 103	0.036 262	0.031 311	0.015 167	0.004 280	0.002 222	0.012 180	0.014 30	0.003 255
DCP13	.953	0.305	0.201 83	0.023 254	0.014 304	0.002 151	0.005 302	0.004 334	0.008 115	0.008 4	0.012 190

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.M	TEST POINT	CYCLES ANALYZED
	97.09	0.200	14.10	5.99		3195.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.727	223.0	199.9	0.26E 07	-0.00130	1.784	19.31

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.420	0.310	34	0.088	230	0.056	337	0.037	96	0.010	175	0.016	343	0.006	214	0.011	225	0.024	198
CM		-0.078	0.091	307	0.049	79	0.022	169	0.013	287	0.005	17	0.005	153	0.001	48	0.004	15	0.006	35
DCP 1	.010	5.451	2.488	32	0.535	283	0.339	157	0.166	30	0.045	330	0.003	103	0.030	111	0.043	308	0.031	115
DCP 2	.050	4.629	1.441	13	0.342	171	0.049	310	0.079	358	0.051	149	0.030	306	0.005	88	0.036	305	0.042	159
DCP 3	.100	3.502	1.347	352	0.551	158	0.164	11	0.110	253	0.094	83	0.017	263	0.022	99	0.021	339	0.035	184
DCP 4	.150	2.340	1.073	345	0.419	149	0.129	6	0.058	246	0.046	104	0.048	351	0.020	221	0.011	138	0.026	202
DCP 5	.200	2.066	0.686	334	0.285	105	0.173	288	0.115	116	0.053	333	0.039	136	0.036	300	0.013	186	0.018	126
DCP 6	.250	1.752	0.522	331	0.291	98	0.200	297	0.124	136	0.089	352	0.033	211	0.029	78	0.047	254	0.017	149
DCP 7	.300	1.481	0.184	318	0.195	47	0.177	240	0.113	63	0.074	244	0.072	46	0.047	211	0.016	86	0.034	209
DCP 8	.400	1.314	0.077	105	0.203	355	0.099	174	0.080	38	0.097	197	0.061	335	0.019	158	0.014	275	0.021	188
DCP 9	.500	1.071	0.379	119	0.296	298	0.130	46	0.025	200	0.041	64	0.019	203	0.033	287	0.025	157	0.032	213
DCP10	.695	0.997	0.410	94	0.316	254	0.143	350	0.075	133	0.024	224	0.031	4	0.011	158	0.036	241	0.031	226
DCP11	.800	0.439	0.346	104	0.282	238	0.105	338	0.100	114	0.038	175	0.032	336	0.012	68	0.021	189	0.027	209
DCP12	.878	0.333	0.276	100	0.204	218	0.100	342	0.077	71	0.002	138	0.027	311	0.001	96	0.023	135	0.030	201
DCP13	.953	0.444	0.249	80	0.111	175	0.053	311	0.031	349	0.015	205	0.015	278	0.010	223	0.010	317	0.015	174

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.M	TEST POINT	CYCLES ANALYZED
	97.09	0.200	16.62	6.00		3195.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.729	222.3	200.2	0.26E 07	-0.00021	1.860	22.57

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.503	0.284	4	0.069	264	0.028	43	0.026	172	0.008	319	0.012	82	0.018	162	0.007	129	0.006	29
CM		-0.152	0.094	355	0.041	111	0.017	235	0.009	12	0.005	122	0.005	278	0.005	321	0.003	0	0.001	290
DCP 1	.010	4.123	1.876	62	0.327	64	0.113	330	0.028	105	0.048	185	0.091	50	0.057	242	0.013	35	0.047	74
DCP 2	.050	3.773	1.246	27	0.189	170	0.117	224	0.024	85	0.048	71	0.023	294	0.039	239	0.035	68	0.020	62
DCP 3	.100	2.133	1.452	9	0.130	251	0.054	210	0.063	80	0.077	18	0.077	282	0.065	167	0.028	70	0.023	43
DCP 4	.150	2.188	1.429	358	0.244	229	0.049	174	0.019	34	0.034	210	0.033	126	0.010	16	0.014	197	0.014	12
DCP 5	.200	1.987	1.173	357	0.189	213	0.017	136	0.043	238	0.020	189	0.044	121	0.035	123	0.017	8	0.031	345
DCP 6	.250	2.065	1.044	342	0.249	180	0.122	115	0.027	198	0.041	272	0.042	47	0.008	144	0.013	173	0.018	26
DCP 7	.300	1.715	0.837	343	0.243	158	0.135	61	0.118	174	0.058	106	0.037	343	0.021	203	0.017	116	0.025	209
DCP 8	.400	1.645	0.514	309	0.134	80	0.192	349	0.030	99	0.034	11	0.028	13	0.019	180	0.016	209	0.019	101
DCP 9	.500	1.415	0.368	255	0.151	2	0.148	267	0.014	223	0.044	244	0.053	140	0.024	102	0.006	41	0.016	318
DCP10	.695	1.216	0.412	168	0.275	296	0.125	123	0.019	164	0.025	354	0.008	180	0.013	192	0.011	232	0.012	320
DCP11	.800	0.618	0.388	145	0.223	292	0.176	73	0.064	196	0.024	310	0.034	113	0.038	148	0.037	151	0.017	145
DCP12	.878	0.514	0.380	135	0.188	271	0.156	36	0.066	186	0.036	299	0.053	70	0.029	144	0.011	42	0.034	45
DCP13	.953	0.515	0.370	114	0.164	229	0.060	326	0.014	205	0.004	157	0.030	325	0.012	155	0.016	192	0.009	219

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	97.09	0.200	23.92	5.91		3195.3	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.731	222.0	199.5	0.26E 07	0.00136	2.715	29.72	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		2.166	0.461	13	0.075	228	0.019	269	0.047	147	0.028	52	0.022	93	0.018	94	0.016	91	0.009	275
CM		-0.391	0.094	73	0.028	127	0.013	172	0.009	348	0.010	197	0.002	275	0.002	53	0.003	16	0.004	65
CCP 1	.010	2.000	0.926	107	0.235	197	0.279	233	0.036	168	0.053	76	0.100	89	0.099	92	0.073	86	0.040	53
CCP 2	.050	3.827	0.907	54	0.226	174	0.153	189	0.074	108	0.055	113	0.076	107	0.065	89	0.071	55	0.050	27
CCP 3	.100	2.787	1.117	45	0.214	169	0.106	204	0.061	160	0.017	213	0.015	65	0.028	93	0.031	113	0.016	220
CCP 4	.150	2.374	1.228	42	0.123	163	0.139	198	0.081	162	0.053	162	0.060	118	0.081	96	0.071	89	0.013	223
CCP 5	.200	2.559	1.182	34	0.121	129	0.104	137	0.096	123	0.065	118	0.034	107	0.020	68	0.026	91	0.027	345
CCP 6	.250	2.503	1.357	33	0.014	84	0.100	155	0.120	139	0.075	107	0.047	129	0.073	85	0.081	52	0.015	26
CCP 7	.300	2.434	1.261	25	0.074	349	0.082	16	0.060	85	0.043	55	0.036	92	0.006	160	0.039	147	0.012	278
CCP 8	.400	2.390	1.115	6	0.261	254	0.091	352	0.058	151	0.083	31	0.036	345	0.035	323	0.019	289	0.017	245
CCP 9	.500	2.463	0.973	347	0.336	222	0.040	341	0.059	168	0.003	45	0.025	190	0.034	94	0.037	14	0.022	298
CCP10	.695	2.279	0.568	288	0.237	134	0.091	275	0.010	1	0.056	2	0.030	332	0.010	178	0.026	139	0.029	206
CCP11	.800	1.345	0.364	217	0.097	33	0.119	298	0.064	123	0.006	44	0.034	119	0.036	158	0.041	217	0.010	299
CCP12	.878	1.268	0.519	191	0.247	315	0.081	336	0.085	134	0.014	2	0.055	88	0.022	190	0.012	356	0.009	67
CCP13	.953	1.408	0.937	195	0.583	322	0.231	98	0.115	229	0.096	40	0.048	206	0.053	333	0.040	152	0.040	257

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	97.09	0.400	-0.21	5.89		3191.1	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.370	438.3	735.0	0.47E 07	-0.00095	0.390	5.40	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		-0.041	0.393	7	0.041	201	0.001	115	0.013	97	0.009	69	0.003	339	0.003	36	0.002	198	0.003	355
CM		-0.005	0.058	268	0.007	98	0.003	124	0.002	320	0.001	275	0.001	131	0.000	76	0.001	47	0.000	338
CCP 1	.010	-0.385	2.335	325	0.224	194	0.123	89	0.059	80	0.030	63	0.028	56	0.025	33	0.008	4	0.019	321
CCP 2	.050	0.110	1.332	341	0.136	154	0.036	136	0.028	70	0.022	42	0.009	31	0.009	22	0.000	27	0.017	333
CCP 3	.100	-0.168	0.952	348	0.092	161	0.020	165	0.023	87	0.014	78	0.006	15	0.006	50	0.005	29	0.018	342
CCP 4	.150	-0.181	0.729	353	0.085	170	0.014	156	0.018	75	0.014	63	0.006	53	0.009	62	0.006	93	0.005	336
CCP 5	.200	-0.040	0.609	358	0.066	175	0.007	164	0.017	83	0.014	56	0.002	36	0.002	19	0.005	104	0.004	343
CCP 6	.250	-0.080	0.537	7	0.062	189	0.007	198	0.014	103	0.012	87	0.003	65	0.008	69	0.005	124	0.007	25
CCP 7	.300	-0.201	0.467	13	0.046	197	0.006	319	0.015	87	0.011	66	0.004	318	0.004	332	0.003	174	0.004	31
CCP 8	.400	-0.095	0.367	25	0.045	215	0.006	257	0.011	110	0.009	81	0.002	11	0.005	92	0.005	171	0.005	7
CCP 9	.500	0.029	0.323	36	0.036	233	0.008	315	0.014	98	0.010	82	0.004	290	0.003	342	0.003	155	0.004	352
CCP10	.695	0.081	0.252	53	0.033	249	0.006	306	0.016	113	0.003	42	0.007	234	0.002	280	0.010	227	0.002	142
CCP11	.800	-0.031	0.194	65	0.028	272	0.011	322	0.011	135	0.005	83	0.004	302	0.001	7	0.004	286	0.004	144
CCP12	.878	-0.068	0.163	66	0.023	268	0.006	316	0.007	144	0.002	263	0.004	282	0.003	134	0.004	254	0.002	116
CCP13	.953	0.056	0.127	55	0.018	245	0.004	298	0.008	121	0.007	98	0.002	298	0.003	30	0.002	173	0.003	346

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	97.09	0.400	7.03	5.99		3191.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.370	437.9	735.2	0.48E 07	-0.00049	1.092	13.13

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.706	0.381	17	0.048	203	0.007	37	0.006	100	0.003	284	0.000	193	0.003	61	0.003	32	0.002	248
CM		-0.034	0.045	255	0.003	350	0.008	117	0.005	317	0.003	131	0.002	295	0.001	141	0.001	328	0.001	22
DCP 1	.050	2.778	1.281	350	0.089	272	0.145	157	0.103	28	0.042	274	0.025	223	0.028	135	0.038	39	0.027	284
DCP 2	.100	1.816	0.996	0	0.149	211	0.127	114	0.065	352	0.026	168	0.016	317	0.029	116	0.033	352	0.011	249
DCP 3	.150	1.345	0.790	356	0.104	196	0.060	71	0.036	295	0.022	157	0.005	119	0.016	23	0.010	247	0.009	82
DCP 4	.200	1.221	0.658	7	0.122	192	0.060	63	0.023	257	0.020	105	0.004	10	0.012	17	0.005	248	0.004	52
DCP 5	.250	0.968	0.568	9	0.077	196	0.034	34	0.018	243	0.012	153	0.006	50	0.009	320	0.011	146	0.011	12
DCP 6	.300	0.757	0.510	20	0.087	196	0.042	34	0.019	212	0.012	82	0.009	4	0.006	354	0.003	304	0.003	259
DCP 7	.400	0.564	0.394	25	0.056	195	0.032	334	0.024	172	0.006	51	0.012	295	0.012	138	0.008	19	0.004	148
DCP 8	.500	0.570	0.348	41	0.053	201	0.033	333	0.027	151	0.009	8	0.004	294	0.006	110	0.002	31	0.003	4
DCP 9	.695	0.394	0.249	50	0.021	188	0.033	278	0.025	105	0.015	281	0.007	144	0.007	336	0.004	84	0.007	220
DCP10	.800	0.218	0.186	64	0.011	216	0.027	294	0.017	123	0.015	335	0.011	157	0.010	359	0.007	178	0.005	243
DCP11	.878	0.136	0.128	56	0.005	151	0.019	265	0.013	105	0.016	274	0.012	104	0.008	291	0.005	111	0.000	165
DCP12	.953	0.220	0.090	48	0.010	38	0.011	225	0.006	41	0.007	290	0.009	69	0.006	280	0.002	52	0.005	178

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	97.09	0.400	9.28	6.00		3191.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.371	437.7	735.3	0.48E 07	0.00055	1.371	15.42

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.874	0.485	6	0.081	183	0.019	359	0.031	132	0.015	331	0.010	184	0.014	3	0.009	161	0.001	6
CM		-0.083	0.037	126	0.041	280	0.021	130	0.013	335	0.007	152	0.006	7	0.005	195	0.004	345	0.002	198
DCP 1	.050	2.759	1.297	31	0.421	302	0.096	205	0.122	154	0.082	69	0.045	41	0.054	322	0.026	301	0.042	218
DCP 2	.100	1.855	1.194	23	0.356	287	0.084	170	0.124	120	0.047	27	0.046	4	0.034	271	0.011	228	0.021	159
DCP 3	.150	1.487	1.037	13	0.304	241	0.103	147	0.127	76	0.046	327	0.045	290	0.035	168	0.007	63	0.013	79
DCP 4	.200	1.367	0.957	11	0.282	225	0.086	132	0.111	57	0.049	298	0.043	238	0.025	100	0.018	81	0.015	318
DCP 5	.250	1.188	0.875	10	0.283	218	0.117	117	0.107	31	0.046	274	0.051	225	0.047	88	0.002	156	0.019	5
DCP 6	.300	0.937	0.800	7	0.252	205	0.092	105	0.095	22	0.060	267	0.047	195	0.041	69	0.012	13	0.015	277
DCP 7	.400	0.772	0.609	1	0.248	180	0.145	52	0.082	276	0.029	228	0.077	116	0.060	321	0.022	140	0.009	175
DCP 8	.500	0.833	0.492	350	0.218	150	0.126	31	0.100	258	0.054	159	0.057	46	0.040	285	0.028	155	0.021	46
DCP 9	.695	0.597	0.227	334	0.194	99	0.133	313	0.113	164	0.051	40	0.070	265	0.051	84	0.008	254	0.019	221
DCP10	.800	0.397	0.111	316	0.172	80	0.136	289	0.118	137	0.077	342	0.056	192	0.033	32	0.021	232	0.019	56
DCP11	.878	0.322	0.075	285	0.134	60	0.115	262	0.099	105	0.062	305	0.051	149	0.042	327	0.024	135	0.016	35
DCP12	.953	0.332	0.033	248	0.074	30	0.057	230	0.037	87	0.033	304	0.024	129	0.018	319	0.021	144	0.023	331

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	97.09	0.400	11.80	5.98		3191.4	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.371	437.4	733.5	0.47E 07	0.00137	1.631	17.69	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.040	0.542	7	0.066	192	0.014	236	0.008	54	0.029	86	0.015	313	0.011	145	0.002	281	0.003	316
CM		-0.130	0.096	123	0.059	305	0.012	172	0.009	110	0.015	284	0.009	125	0.005	320	0.002	121	0.001	154
DCP 1	.050	2.873	1.361	60	0.433	334	0.120	351	0.125	253	0.040	292	0.050	180	0.019	195	0.027	125	0.020	155
DCP 2	.100	1.949	1.270	45	0.390	309	0.126	278	0.110	194	0.013	142	0.030	136	0.028	106	0.017	97	0.023	22
DCP 3	.150	1.593	1.109	33	0.322	288	0.127	239	0.114	158	0.056	94	0.043	76	0.038	22	0.011	316	0.023	306
DCP 4	.200	1.474	1.059	26	0.296	271	0.137	216	0.120	132	0.081	47	0.024	37	0.046	322	0.010	183	0.024	236
DCP 5	.250	1.314	1.011	24	0.311	263	0.137	199	0.119	127	0.095	54	0.036	17	0.038	314	0.016	242	0.021	204
DCP 6	.300	1.076	0.964	17	0.265	247	0.149	197	0.162	107	0.110	20	0.036	346	0.050	268	0.024	190	0.023	151
DCP 7	.400	0.943	0.806	4	0.295	216	0.160	136	0.134	46	0.067	330	0.043	286	0.044	167	0.017	114	0.024	26
DCP 8	.500	1.139	0.736	338	0.255	160	0.116	145	0.226	21	0.132	240	0.008	99	0.063	121	0.040	360	0.313	236
DCP 9	.695	0.814	0.457	313	0.297	123	0.123	14	0.149	278	0.158	121	0.044	330	0.022	308	0.034	164	0.023	364
DCP10	.800	0.563	0.288	309	0.255	120	0.174	343	0.134	220	0.124	79	0.051	285	0.031	150	0.017	331	0.013	28
DCP11	.878	0.457	0.197	293	0.189	99	0.120	313	0.080	197	0.088	61	0.042	262	0.032	111	0.025	302	0.001	42
DCP12	.953	0.468	0.168	260	0.155	52	0.075	238	0.014	109	0.018	100	0.038	340	0.035	154	0.023	319	0.021	202

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	97.09	0.400	15.00	5.98		3196.1	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.369	439.1	740.4	0.48E 07	0.00163	1.836	20.58	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.233	0.555	18	0.025	272	0.026	242	0.035	48	0.037	170	0.020	336	0.010	189	0.005	359	0.002	230
CM		-0.137	0.145	134	0.050	342	0.008	33	0.021	212	0.019	12	0.007	166	0.004	17	0.001	128	0.000	37
DCP 1	.010	3.880	1.909	120	0.674	76	0.444	78	0.112	52	0.202	78	0.069	27	0.056	104	0.079	56	0.031	81
DCP 2	.050	2.906	1.387	85	0.356	14	0.201	37	0.092	9	0.068	15	0.049	341	0.027	354	0.025	339	0.025	23
DCP 3	.100	2.039	1.223	63	0.376	355	0.160	344	0.113	315	0.022	294	0.068	274	0.025	312	0.037	237	0.026	272
DCP 4	.150	1.618	1.120	53	0.369	344	0.133	304	0.108	296	0.038	224	0.070	238	0.017	217	0.032	175	0.010	293
DCP 5	.200	1.586	1.036	39	0.295	326	0.152	294	0.160	234	0.052	132	0.050	168	0.012	216	0.029	105	0.007	231
DCP 6	.250	1.444	1.043	40	0.364	321	0.142	263	0.134	236	0.064	174	0.068	168	0.028	149	0.048	82	0.006	270
DCP 7	.300	1.204	0.985	25	0.237	303	0.165	270	0.189	195	0.080	122	0.050	98	0.020	109	0.034	32	0.004	277
DCP 8	.400	1.108	0.937	17	0.373	275	0.196	195	0.168	144	0.068	89	0.060	30	0.021	37	0.041	308	0.008	279
DCP 9	.500	1.353	0.925	346	0.236	217	0.193	191	0.260	81	0.024	313	0.103	333	0.066	220	0.005	198	0.029	172
DCP10	.695	0.891	0.630	323	0.290	164	0.092	83	0.158	12	0.092	232	0.039	193	0.027	77	0.019	334	0.007	216
DCP11	.800	0.720	0.459	309	0.278	136	0.074	0	0.132	341	0.166	173	0.079	341	0.034	163	0.022	295	0.022	99
DCP12	.878	0.510	0.316	299	0.215	121	0.073	326	0.072	335	0.103	169	0.034	329	0.004	279	0.027	175	0.031	356
DCP13	.953	0.523	0.191	278	0.167	78	0.087	256	0.031	42	0.040	203	0.035	88	0.041	257	0.024	63	0.020	282

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	97.09	0.400	17.49	5.94		3196.2	10
K	**V**	**Q**	**RN**	**DAMPING**	**CN(MAX)**	**ALPHA(STALL)**	
0.370	438.3	739.0	0.48E 07	0.00095	1.851	22.68	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.240	0.552	30	0.060	301	0.023	191	0.021	65	0.027	253	0.022	91	0.012	265	0.004	200	0.005	135
CM		-0.160	0.143	154	0.052	36	0.009	20	0.016	259	0.014	104	0.007	276	0.005	97	0.003	78	0.002	282
CCP 1	.010	3.559	2.134	135	0.571	121	0.486	145	0.181	158	0.178	169	0.102	177	0.048	188	0.044	225	0.045	241
CCP 2	.050	2.770	1.269	95	0.327	82	0.130	109	0.110	70	0.086	129	0.041	124	0.046	108	0.037	164	0.015	187
CCP 3	.100	1.944	1.092	74	0.376	49	0.111	68	0.104	10	0.055	70	0.049	53	0.019	17	0.016	92	0.014	118
CCP 4	.150	1.553	0.998	62	0.400	28	0.088	47	0.115	351	0.073	353	0.036	75	0.033	352	0.019	24	0.014	343
CCP 5	.200	1.531	0.931	48	0.343	9	0.135	3	0.124	309	0.057	277	0.033	323	0.022	259	0.016	235	0.004	296
CCP 6	.250	1.440	0.962	46	0.400	3	0.119	350	0.117	318	0.086	295	0.042	315	0.048	276	0.020	329	0.023	291
CCP 7	.300	1.151	0.909	35	0.347	348	0.164	320	0.134	266	0.097	241	0.078	226	0.026	222	0.013	153	0.016	174
CCP 8	.400	1.130	0.894	23	0.426	314	0.193	257	0.122	219	0.085	197	0.036	163	0.048	147	0.030	155	0.024	74
CCP 9	.500	1.332	0.860	3	0.374	269	0.182	222	0.145	159	0.069	125	0.092	81	0.032	336	0.018	46	0.018	311
CCP10	.695	0.929	0.644	345	0.339	215	0.159	141	0.119	66	0.048	327	0.036	7	0.042	254	0.005	10	0.012	117
CCP11	.800	0.821	0.439	331	0.260	182	0.085	102	0.133	40	0.116	279	0.042	105	0.031	269	0.016	305	0.013	132
CCP12	.878	0.670	0.328	320	0.215	151	0.050	21	0.085	46	0.089	271	0.029	125	0.014	183	0.047	263	0.033	138
CCP13	.953	0.627	0.165	312	0.151	120	0.087	306	0.053	119	0.064	305	0.049	164	0.035	356	0.033	188	0.017	9

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	97.09	0.400	25.01	5.94		3196.3	10
K	**V**	**Q**	**RN**	**DAMPING**	**CN(MAX)**	**ALPHA(STALL)**	
0.370	437.8	737.8	0.48E 07	-0.00122	1.642	26.29	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.178	0.468	53	0.070	132	0.019	99	0.013	101	0.004	207	0.003	213	0.003	175	0.002	130	0.005	258
CM		-0.196	0.122	221	0.022	229	0.014	273	0.007	322	0.003	62	0.001	34	0.002	291	0.001	120	0.002	98
CCP 1	.010	2.041	0.775	157	0.297	236	0.216	334	0.121	76	0.059	153	0.015	106	0.017	142	0.002	2	0.023	28
CCP 2	.050	2.163	0.291	69	0.143	169	0.023	285	0.028	48	0.014	121	0.003	138	0.006	182	0.011	157	0.008	174
CCP 3	.100	1.667	0.383	62	0.154	179	0.013	270	0.027	77	0.034	159	0.012	224	0.003	345	0.012	162	0.013	237
CCP 4	.150	1.421	0.439	58	0.168	165	0.016	266	0.033	38	0.018	111	0.011	228	0.003	232	0.013	110	0.005	197
CCP 5	.200	1.426	0.477	57	0.150	168	0.007	305	0.032	38	0.019	116	0.009	214	0.006	263	0.004	178	0.005	146
CCP 6	.250	1.395	0.501	57	0.186	166	0.028	236	0.037	22	0.031	79	0.014	179	0.014	245	0.006	95	0.011	325
CCP 7	.300	1.168	0.556	60	0.158	162	0.018	249	0.033	359	0.020	63	0.009	190	0.018	267	0.005	273	0.005	179
CCP 8	.400	1.150	0.553	52	0.148	148	0.062	192	0.036	285	0.038	342	0.015	53	0.030	291	0.005	181	0.003	186
CCP 9	.500	1.318	0.664	55	0.133	116	0.049	145	0.044	243	0.040	305	0.021	324	0.007	245	0.010	217	0.017	223
CCP10	.695	0.996	0.619	42	0.135	44	0.076	74	0.057	121	0.028	187	0.015	187	0.010	144	0.007	148	0.009	302
CCP11	.800	0.934	0.486	46	0.089	53	0.069	101	0.057	152	0.026	190	0.005	147	0.021	82	0.018	356	0.012	356
CCP12	.878	0.758	0.368	35	0.083	18	0.060	60	0.041	93	0.015	213	0.012	191	0.009	162	0.003	330	0.015	268
CCP13	.953	0.727	0.251	32	0.047	336	0.035	60	0.027	92	0.008	273	0.006	334	0.004	147	0.005	268	0.005	224

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	97.09	0.600	-0.35	5.97		3192.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.252	643.7	1438.4	0.63E 07	-0.00077	0.404	5.58

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		-0.066	0.449 344	0.030 193	0.007 213	0.003 113	0.001 97	0.002 350	0.003 24	0.001 17	0.001 28
CM		0.001	0.050 254	0.004 92	0.002 76	0.000 282	0.001 12	0.000 237	0.000 291	0.000 98	0.000 217
DCP 1	.010	-0.338	2.010 306	0.309 186	0.044 348	0.008 121	0.017 15	0.007 275	0.010 20	0.003 75	0.003 318
DCP 2	.050	0.242	1.775 324	0.034 119	0.063 56	0.022 98	0.021 70	0.003 68	0.011 77	0.004 143	0.004 221
DCP 3	.100	-0.217	1.223 331	0.058 150	0.049 169	0.018 192	0.018 257	0.020 298	0.026 323	0.022 24	0.021 54
DCP 4	.150	-0.257	0.898 334	0.060 168	0.025 193	0.005 309	0.009 8	0.004 46	0.003 38	0.002 118	0.001 155
DCP 5	.200	-0.098	0.737 338	0.051 171	0.018 186	0.003 43	0.003 9	0.004 61	0.003 41	0.002 139	0.002 191
DCP 6	.250	-0.148	0.636 346	0.045 187	0.018 206	0.003 75	0.004 88	0.003 28	0.004 63	0.001 91	0.002 347
DCP 7	.300	-0.228	0.538 350	0.035 192	0.015 214	0.004 95	0.004 117	0.003 54	0.003 1	0.003 296	0.003 262
DCP 8	.400	-0.121	0.400 0	0.031 204	0.014 221	0.004 86	0.003 118	0.003 348	0.004 52	0.001 101	0.002 315
DCP 9	.500	-0.024	0.326 9	0.025 219	0.011 237	0.003 108	0.002 149	0.002 81	0.003 25	0.002 321	0.003 279
DCP10	.695	0.027	0.217 30	0.020 236	0.009 255	0.003 114	0.003 158	0.001 290	0.003 29	0.001 317	0.003 57
DCP11	.800	-0.033	0.164 42	0.016 257	0.008 270	0.004 108	0.004 229	0.002 359	0.003 162	0.002 307	0.002 94
DCP12	.878	-0.037	0.130 45	0.014 250	0.006 280	0.002 131	0.000 296	0.002 347	0.002 111	0.001 231	0.001 75
DCP13	.953	0.027	0.116 34	0.012 243	0.005 263	0.002 115	0.002 218	0.001 328	0.001 112	0.001 24	0.002 243

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	97.09	0.600	4.39	5.96		3192.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.252	642.8	1435.6	0.63E 07	-0.00044	1.023	10.40

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.516	0.455 355	0.047 217	0.013 53	0.015 108	0.005 36	0.001 22	0.004 176	0.005 33	0.001 295
CM		-0.020	0.038 228	0.013 334	0.013 170	0.008 2	0.003 246	0.002 93	0.002 326	0.001 172	0.001 66
DCP 1	.050	2.158	1.412 328	0.119 31	0.137 198	0.108 27	0.033 196	0.031 57	0.025 0	0.016 213	0.019 14
DCP 2	.100	1.347	1.189 343	0.142 310	0.139 222	0.103 99	0.007 336	0.047 29	0.039 206	0.037 24	0.012 162
DCP 3	.200	0.885	0.863 348	0.174 239	0.092 122	0.054 59	0.047 347	0.021 234	0.012 207	0.015 110	0.007 13
DCP 4	.250	0.676	0.726 355	0.158 235	0.104 106	0.052 24	0.032 324	0.035 204	0.022 103	0.015 31	0.013 326
DCP 5	.300	0.528	0.662 357	0.164 223	0.116 91	0.059 358	0.029 265	0.031 171	0.014 91	0.015 48	0.016 333
DCP 6	.400	0.381	0.465 6	0.102 211	0.081 53	0.025 281	0.016 183	0.029 111	0.022 345	0.009 263	0.007 150
DCP 7	.500	0.384	0.371 13	0.071 192	0.068 18	0.037 213	0.025 106	0.014 8	0.013 243	0.006 176	0.003 154
DCP 8	.695	0.254	0.237 27	0.039 160	0.049 332	0.044 157	0.015 42	0.008 281	0.010 147	0.005 321	0.004 133
DCP 9	.800	0.167	0.164 26	0.047 144	0.052 336	0.039 179	0.018 81	0.019 304	0.014 164	0.009 15	0.006 257
DCP10	.878	0.126	0.116 15	0.049 116	0.043 309	0.032 156	0.016 50	0.016 271	0.015 120	0.008 349	0.003 297
DCP11	.953	0.162	0.092 5	0.039 84	0.030 273	0.023 130	0.010 1	0.005 222	0.001 236	0.002 97	0.004 286

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	98.04	0.600	6.91	5.90		3192.3	10

K	V	Q	RN	DAMPING	CY(MAX)	ALPHA(STALL)
0.255	642.5	1434.3	0.63E 07	-0.00019	1.286	12.96

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.697	0.521	7	0.078	243	0.029	101	0.010	348	0.008	149	0.003	346	0.004	340	0.003	314	0.002	315
CM		-0.042	0.055	192	0.039	359	0.018	226	0.008	115	0.005	5	0.002	328	0.004	187	0.002	22	0.001	265
DCP 1	.050	2.608	0.968	340	0.415	353	0.202	179	0.094	353	0.036	66	0.026	269	0.022	221	0.034	84	0.034	291
DCP 2	.100	1.691	1.086	7	0.300	334	0.097	252	0.037	117	0.008	6	0.040	345	0.023	219	0.017	276	0.001	338
DCP 3	.250	0.901	0.816	12	0.194	269	0.065	165	0.042	151	0.032	105	0.024	68	0.014	7	0.028	352	0.021	279
DCP 4	.300	0.727	0.782	11	0.210	258	0.079	163	0.055	124	0.041	69	0.027	354	0.003	294	0.021	311	0.001	230
DCP 5	.400	0.548	0.594	15	0.168	227	0.063	102	0.033	78	0.019	332	0.013	329	0.023	244	0.009	119	0.012	80
DCP 6	.500	0.556	0.531	13	0.189	210	0.093	82	0.046	2	0.027	266	0.028	216	0.024	106	0.018	352	0.007	286
DCP 7	.695	0.369	0.330	15	0.145	180	0.070	40	0.040	312	0.033	200	0.018	128	0.027	1	0.014	239	0.013	136
DCP 8	.800	0.290	0.248	6	0.132	175	0.072	42	0.053	294	0.036	162	0.005	339	0.016	0	0.014	162	0.007	73
DCP 9	.878	0.247	0.194	352	0.113	164	0.068	38	0.054	276	0.031	143	0.003	51	0.017	350	0.014	183	0.009	59
DCP10	.953	0.251	0.132	335	0.067	121	0.032	353	0.023	223	0.004	121	0.007	88	0.010	298	0.011	127	0.011	340

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	97.09	0.600	9.22	5.82		3192.4	10

K	V	Q	RN	DAMPING	CY(MAX)	ALPHA(STALL)
0.253	642.0	1433.5	0.63E 07	-0.00018	1.344	14.74

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.715	0.563	24	0.071	256	0.018	183	0.010	95	0.010	324	0.004	107	0.002	266	0.003	268	0.001	296
CM		-0.088	0.086	184	0.044	30	0.013	321	0.008	228	0.006	160	0.002	357	0.002	100	0.001	213	0.001	164
DCP 1	.100	1.811	1.037	38	0.314	14	0.057	25	0.006	307	0.031	205	0.027	96	0.016	127	0.016	125	0.005	56
DCP 2	.250	1.021	0.877	29	0.144	317	0.084	288	0.043	215	0.028	303	0.021	315	0.017	242	0.024	274	0.021	220
DCP 3	.300	0.836	0.868	28	0.163	304	0.080	278	0.060	251	0.042	221	0.007	229	0.022	145	0.019	291	0.015	246
DCP 4	.400	0.659	0.686	25	0.133	250	0.081	231	0.044	146	0.015	146	0.019	77	0.022	55	0.017	265	0.015	54
DCP 5	.500	0.686	0.658	20	0.182	237	0.079	202	0.062	136	0.055	57	0.020	16	0.032	340	0.033	249	0.013	163
DCP 6	.695	0.486	0.428	12	0.185	204	0.066	128	0.049	32	0.037	337	0.006	221	0.027	227	0.020	74	0.012	21
DCP 7	.800	0.398	0.359	7	0.170	217	0.081	137	0.053	51	0.044	333	0.029	189	0.005	288	0.012	86	0.010	347
DCP 8	.878	0.342	0.275	352	0.143	201	0.077	108	0.049	11	0.038	288	0.028	160	0.004	38	0.016	46	0.013	274
DCP 9	.953	0.346	0.187	335	0.085	172	0.040	59	0.016	334	0.013	242	0.005	87	0.002	192	0.010	357	0.005	340

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	98.04	0.600	14.83	5.75		3197.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.255	643.3	1444.9	0.63E 07	-0.00058	1.576	17.99

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.956	0.600	45	0.018	138	0.027	345	0.006	320	0.006	327	0.002	212	0.001	91	0.004	11	0.001	30
CM		-0.093	0.135	193	0.025	104	0.016	132	0.001	49	0.005	135	0.001	48	0.001	30	0.001	152	0.000	392
DCP 1	.010	2.785	0.753	128	0.493	50	0.113	111	0.197	349	0.035	231	0.032	351	0.026	196	0.040	30	0.007	300
DCP 2	.050	2.593	0.825	111	0.035	150	0.157	95	0.042	190	0.020	93	0.026	138	0.019	121	0.010	192	0.014	117
DCP 3	.100	1.864	0.919	80	0.228	160	0.067	225	0.059	285	0.043	5	0.032	104	0.009	14	0.008	2	0.019	53
DCP 4	.150	1.453	0.837	67	0.217	133	0.044	183	0.050	251	0.035	261	0.023	32	0.047	72	0.027	90	0.006	78
DCP 5	.200	1.341	0.872	55	0.165	119	0.029	118	0.036	144	0.031	207	0.017	292	0.031	327	0.015	352	0.017	17
DCP 6	.250	1.139	0.848	56	0.143	133	0.023	69	0.030	152	0.055	186	0.026	246	0.017	337	0.011	321	0.014	27
DCP 7	.300	0.955	0.874	49	0.135	101	0.061	44	0.049	93	0.052	127	0.018	167	0.013	310	0.015	261	0.025	285
DCP 8	.400	0.800	0.798	43	0.063	110	0.066	8	0.031	48	0.043	91	0.015	141	0.008	147	0.012	123	0.007	299
DCP 9	.500	0.813	0.772	31	0.021	345	0.080	341	0.037	359	0.049	353	0.025	333	0.004	290	0.006	39	0.007	178
DCP10	.695	0.618	0.618	22	0.091	279	0.064	320	0.018	266	0.032	298	0.015	278	0.013	216	0.007	208	0.009	149
DCP11	.800	0.537	0.530	16	0.118	291	0.058	299	0.017	239	0.020	304	0.015	166	0.006	234	0.014	350	0.008	40
DCP12	.878	0.466	0.424	12	0.122	290	0.055	295	0.022	213	0.018	293	0.012	166	0.006	162	0.017	333	0.009	337
DCP13	.953	0.507	0.263	358	0.091	262	0.035	262	0.011	173	0.011	225	0.007	143	0.011	107	0.005	77	0.003	317

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	97.09	0.600	17.36	5.68		3197.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.252	642.5	1443.0	0.63E 07	-0.00092	1.479	18.50

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.000	0.516	53	0.063	161	0.009	72	0.009	86	0.011	172	0.006	111	0.004	141	0.006	337	0.009	350
CM		-0.117	0.133	205	0.011	179	0.010	197	0.005	258	0.004	51	0.001	173	0.003	13	0.003	150	0.001	180
DCP 1	.010	2.716	0.989	146	0.172	70	0.264	136	0.027	292	0.097	145	0.026	191	0.056	132	0.004	357	0.009	184
DCP 2	.050	2.445	0.756	127	0.274	213	0.016	137	0.017	188	0.053	102	0.029	90	0.057	46	0.011	41	0.019	327
DCP 3	.100	1.810	0.654	87	0.227	188	0.030	290	0.039	87	0.041	136	0.029	163	0.007	61	0.018	125	0.004	152
DCP 4	.150	1.434	0.639	81	0.254	170	0.057	220	0.034	319	0.047	78	0.039	136	0.011	326	0.023	346	0.022	343
DCP 5	.200	1.365	0.675	62	0.178	158	0.031	236	0.015	324	0.002	122	0.009	174	0.007	228	0.008	149	0.009	29
DCP 6	.250	1.161	0.646	63	0.203	163	0.045	209	0.023	286	0.030	31	0.037	98	0.010	79	0.006	313	0.010	322
DCP 7	.300	1.013	0.715	55	0.153	151	0.023	207	0.007	233	0.003	211	0.008	95	0.004	81	0.012	61	0.002	291
DCP 8	.400	0.844	0.650	49	0.119	140	0.028	125	0.028	171	0.022	255	0.012	41	0.006	341	0.005	129	0.003	321
DCP 9	.500	0.902	0.679	40	0.073	120	0.019	76	0.020	114	0.023	217	0.011	317	0.007	272	0.009	340	0.010	318
DCP10	.695	0.680	0.602	33	0.020	355	0.027	29	0.024	76	0.021	198	0.011	228	0.014	205	0.012	325	0.009	9
DCP11	.800	0.629	0.512	30	0.064	347	0.068	23	0.024	71	0.016	221	0.010	77	0.019	176	0.020	312	0.005	103
DCP12	.878	0.567	0.417	28	0.068	335	0.058	18	0.019	69	0.016	228	0.012	76	0.018	153	0.020	315	0.019	17
DCP13	.953	0.605	0.299	17	0.058	308	0.030	342	0.019	29	0.008	119	0.010	349	0.005	97	0.008	229	0.004	347

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	97.09	0.600	24.81	5.86		3197.3	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.253	641.8	1437.7	0.63E 07	-0.00072	1.352	30.32	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		1.075	0.316 35	0.046 167	0.016 208	0.008 347	0.008 325	0.003 328	0.001 274	0.001 170	0.003 169
CM		-0.174	0.083 213	0.005 296	0.004 323	0.001 79	0.004 161	0.003 201	0.000 223	0.001 33	0.001 18
DCP 1	.010	2.010	0.435 135	0.138 237	0.129 313	0.066 351	0.059 267	0.064 288	0.022 12	0.022 127	0.017 159
DCP 2	.050	2.017	0.185 59	0.118 194	0.057 241	0.011 277	0.020 228	0.022 246	0.003 292	0.006 98	0.001 102
DCP 3	.100	1.575	0.259 28	0.089 166	0.036 184	0.014 117	0.015 171	0.013 157	0.008 145	0.014 87	0.012 116
DCP 4	.150	1.438	0.313 35	0.098 178	0.046 228	0.013 338	0.004 227	0.016 227	0.008 258	0.000 309	0.001 155
DCP 5	.200	1.342	0.316 21	0.076 164	0.030 194	0.009 19	0.004 344	0.002 74	0.003 9	0.005 356	0.007 41
DCP 6	.250	1.282	0.366 33	0.075 172	0.027 222	0.014 30	0.005 127	0.014 219	0.010 255	0.003 339	0.003 158
DCP 7	.300	1.090	0.361 25	0.069 162	0.027 193	0.011 21	0.006 343	0.002 82	0.002 228	0.003 323	0.006 32
DCP 8	.400	1.043	0.383 34	0.054 165	0.020 231	0.023 10	0.017 47	0.010 156	0.009 223	0.006 297	0.002 169
DCP 9	.500	1.068	0.388 28	0.044 149	0.014 187	0.014 342	0.011 340	0.005 38	0.002 175	0.004 229	0.004 217
DCP10	.695	0.873	0.386 36	0.023 148	0.006 164	0.012 317	0.020 340	0.008 25	0.002 200	0.004 160	0.006 192
DCP11	.800	0.824	0.350 38	0.032 128	0.022 150	0.008 207	0.018 321	0.018 12	0.010 40	0.004 192	0.009 227
DCP12	.878	0.746	0.299 41	0.022 116	0.023 144	0.015 203	0.016 324	0.014 2	0.007 44	0.008 158	0.008 169
DCP13	.953	0.434	0.222 32	0.008 305	0.002 191	0.004 149	0.005 264	0.009 327	0.003 305	0.005 294	0.005 113

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.18	0.200	4.65	7.49		3157.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.123	220.6	196.9	0.25E 07	-0.00145	1.156	12.24

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.521	0.637	354	0.058	160	0.012	189	0.012	185	0.003	256	0.000	253	0.005	207	0.002	179	0.008	151
CM		-0.012	0.019	269	0.002	32	0.002	40	0.002	39	0.002	133	0.001	127	0.001	42	0.000	47	0.002	2
DCP 1	.010	1.681	3.979	348	0.338	155	0.049	186	0.060	165	0.023	124	0.042	129	0.008	47	0.021	105	0.014	151
DCP 2	.050	2.353	2.021	350	0.200	147	0.041	179	0.018	150	0.020	91	0.026	106	0.002	213	0.016	83	0.012	84
DCP 3	.100	1.034	1.513	348	0.119	159	0.017	159	0.033	198	0.025	188	0.026	242	0.007	181	0.025	237	0.021	113
DCP 4	.150	0.858	1.121	352	0.102	159	0.021	175	0.014	179	0.011	301	0.012	76	0.007	240	0.004	52	0.008	127
DCP 5	.200	0.870	0.912	351	0.079	172	0.006	171	0.015	166	0.008	195	0.007	263	0.010	147	0.005	219	0.011	115
DCP 6	.250	0.647	0.810	354	0.077	156	0.016	181	0.011	170	0.004	181	0.010	69	0.009	246	0.005	93	0.010	124
DCP 7	.300	0.433	0.702	354	0.058	163	0.002	51	0.011	156	0.015	195	0.006	271	0.009	167	0.007	203	0.008	121
DCP 8	.400	0.469	0.524	337	0.047	156	0.019	182	0.017	204	0.005	296	0.008	354	0.013	243	0.008	56	0.012	180
DCP 9	.500	0.396	0.410	359	0.038	174	0.005	235	0.012	195	0.009	221	0.008	273	0.013	198	0.009	220	0.009	169
DCP10	.695	0.223	0.246	13	0.024	143	0.012	171	0.006	113	0.014	0	0.009	50	0.005	11	0.008	58	0.002	157
DCP11	.800	0.163	0.167	7	0.021	212	0.016	233	0.020	217	0.021	279	0.010	214	0.014	179	0.020	227	0.026	172
DCP12	.878	0.098	0.131	21	0.025	159	0.016	224	0.007	221	0.010	5	0.003	306	0.009	329	0.006	23	0.002	310
DCP13	.953	0.153	0.110	14	0.018	170	0.003	182	0.005	244	0.003	199	0.005	293	0.001	17	0.003	117	0.007	179

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.26	0.200	9.44	7.53		3157.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.123	220.2	195.9	0.25E 07	0.00081	1.700	16.84

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.891	0.638	14	0.127	263	0.098	126	0.067	343	0.036	207	0.028	83	0.015	290	0.010	164	0.008	80
CM		-0.047	0.041	161	0.048	11	0.037	237	0.028	113	0.019	345	0.014	224	0.011	99	0.008	335	0.005	221
DCP 1	.010	2.973	2.675	27	1.236	5	0.888	246	0.546	135	0.328	31	0.164	291	0.085	212	0.094	156	0.106	84
DCP 2	.050	3.407	1.489	24	0.485	345	0.372	215	0.215	89	0.112	331	0.041	233	0.046	170	0.050	79	0.040	319
DCP 3	.100	1.757	1.331	16	0.391	310	0.341	174	0.192	45	0.108	300	0.076	194	0.085	142	0.068	22	0.034	272
DCP 4	.150	1.343	1.091	18	0.301	294	0.266	167	0.164	41	0.084	296	0.044	210	0.053	128	0.055	20	0.047	261
DCP 5	.200	1.317	0.980	14	0.284	269	0.242	138	0.150	3	0.082	251	0.064	153	0.055	65	0.056	305	0.038	178
DCP 6	.250	1.056	0.867	15	0.254	267	0.224	139	0.150	11	0.083	265	0.063	169	0.057	73	0.050	322	0.036	212
DCP 7	.300	0.802	0.807	12	0.254	250	0.215	114	0.143	341	0.092	223	0.087	120	0.061	14	0.050	259	0.036	148
DCP 8	.400	0.821	0.610	13	0.211	241	0.186	109	0.133	343	0.078	229	0.073	127	0.059	11	0.045	268	0.041	172
DCP 9	.500	0.704	0.516	9	0.193	223	0.173	82	0.132	306	0.096	182	0.091	69	0.072	300	0.053	178	0.042	74
DCP10	.695	0.431	0.327	7	0.165	202	0.139	64	0.116	296	0.086	167	0.070	35	0.062	271	0.041	131	0.025	26
DCP11	.800	0.365	0.269	356	0.121	188	0.101	52	0.079	290	0.065	149	0.053	34	0.044	243	0.040	154	0.033	30
DCP12	.878	0.345	0.202	355	0.140	193	0.082	46	0.070	287	0.051	153	0.053	17	0.041	251	0.035	110	0.017	19
DCP13	.953	0.317	0.169	347	0.077	162	0.042	17	0.036	252	0.033	111	0.025	320	0.014	188	0.011	119	0.015	331

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.92	0.400	4.91	7.48		3159.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.065	434.1	723.0	0.47E 07	-0.00052	1.245	12.42

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.453	0.713	358	0.015	85	0.051	221	0.031	119	0.008	330	0.011	207	0.014	159	0.006	75	0.004	221
CM		-0.003	0.016	198	0.016	40	0.014	285	0.010	173	0.007	67	0.004	327	0.003	268	0.003	170	0.003	53
DCP 1	.010	2.912	4.273	354	0.255	66	0.401	272	0.380	182	0.203	101	0.076	359	0.068	251	0.083	189	0.070	127
DCP 2	.050	1.530	2.015	356	0.256	64	0.248	265	0.186	164	0.093	72	0.056	315	0.058	216	0.046	154	0.030	108
DCP 3	.100	1.082	1.536	356	0.176	50	0.208	249	0.162	143	0.091	40	0.059	287	0.062	195	0.047	117	0.027	42
DCP 4	.150	0.722	1.209	357	0.054	43	0.127	229	0.088	120	0.049	349	0.039	233	0.036	152	0.018	67	0.005	292
DCP 5	.200	0.677	0.994	358	0.060	29	0.119	224	0.093	107	0.046	344	0.033	220	0.030	150	0.019	83	0.014	5
DCP 6	.250	0.585	0.888	359	0.025	36	0.090	216	0.060	99	0.035	313	0.036	206	0.023	134	0.007	36	0.012	264
DCP 7	.300	0.392	0.790	359	0.022	347	0.088	204	0.063	83	0.042	308	0.034	191	0.021	123	0.017	51	0.012	295
DCP 8	.400	0.219	0.587	1	0.010	358	0.055	204	0.030	76	0.024	272	0.019	176	0.007	131	0.004	56	0.010	269
DCP 9	.500	0.377	0.509	0	0.034	218	0.047	156	0.035	33	0.028	260	0.022	157	0.012	113	0.014	18	0.013	258
DCP10	.695	0.082	0.312	1	0.048	210	0.037	122	0.028	349	0.028	231	0.015	143	0.008	122	0.009	359	0.015	227
DCP11	.800	0.175	0.227	2	0.037	210	0.030	109	0.019	3	0.009	246	0.010	110	0.009	114	0.006	11	0.002	128
DCP12	.878	0.160	0.182	359	0.052	214	0.027	113	0.014	350	0.008	243	0.008	207	0.010	113	0.009	355	0.012	213
DCP13	.953	0.169	0.171	354	0.061	202	0.035	86	0.014	311	0.005	216	0.005	164	0.007	128	0.008	335	0.009	157

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.81	0.400	9.73	7.51		3159.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.065	433.8	722.4	0.47E 07	-0.00077	1.374	14.09

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.731	0.407	27	0.159	44	0.019	27	0.047	331	0.029	261	0.026	218	0.022	143	0.013	95	0.011	30
CM		-0.043	0.070	185	0.033	89	0.011	92	0.018	44	0.010	353	0.010	331	0.009	275	0.008	232	0.006	180
DCP 1	.010	3.528	0.827	46	1.704	81	0.449	76	0.586	41	0.307	357	0.234	337	0.175	297	0.122	267	0.099	245
DCP 2	.050	2.053	0.602	50	0.781	64	0.076	84	0.240	31	0.139	319	0.063	302	0.077	272	0.060	224	0.039	197
DCP 3	.100	1.585	0.589	40	0.540	56	0.053	58	0.170	6	0.098	292	0.060	278	0.056	223	0.035	182	0.026	179
DCP 4	.150	1.086	0.587	41	0.379	43	0.040	58	0.144	344	0.075	267	0.060	260	0.067	191	0.028	138	0.029	131
DCP 5	.200	1.023	0.500	34	0.294	48	0.065	30	0.125	334	0.081	268	0.068	235	0.057	173	0.033	152	0.039	114
DCP 6	.250	0.905	0.531	37	0.232	29	0.018	69	0.096	324	0.044	247	0.053	244	0.052	163	0.021	133	0.034	95
DCP 7	.300	0.722	0.499	30	0.191	33	0.050	13	0.106	310	0.069	245	0.066	213	0.061	139	0.028	103	0.025	63
DCP 8	.400	0.485	0.447	31	0.128	9	0.014	32	0.069	301	0.040	244	0.054	210	0.040	139	0.032	110	0.033	45
DCP 9	.500	0.630	0.427	22	0.090	342	0.015	320	0.060	267	0.029	197	0.038	187	0.042	106	0.023	74	0.028	17
DCP10	.695	0.279	0.340	17	0.070	302	0.024	287	0.050	236	0.024	184	0.039	174	0.033	107	0.032	75	0.034	9
DCP11	.800	0.382	0.307	9	0.065	286	0.043	269	0.052	220	0.030	173	0.035	130	0.034	77	0.030	28	0.021	320
DCP12	.878	0.357	0.273	2	0.053	274	0.041	275	0.042	204	0.026	181	0.030	122	0.019	84	0.026	27	0.018	322
DCP13	.953	0.335	0.255	355	0.045	249	0.031	276	0.026	200	0.016	180	0.019	111	0.014	76	0.017	23	0.013	317

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.56	0.600	4.89	7.49		3161.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.043	639.9	1426.4	0.62E 07	-0.00094	1.046	10.12

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.423	0.676	357	0.140	62	0.039	299	0.014	314	0.019	232	0.008	176	0.012	171	0.009	93	0.001	52
CM		-0.017	0.031	199	0.018	85	0.005	1	0.005	57	0.007	328	0.003	276	0.003	276	0.003	234	0.002	166
DCP 1	.010	1.619	2.795	352	0.751	73	0.026	244	0.113	62	0.034	260	0.016	71	0.018	152	0.004	69	0.022	151
DCP 2	.050	1.443	1.900	353	0.714	76	0.206	317	0.054	53	0.099	302	0.042	276	0.019	150	0.005	331	0.026	143
DCP 3	.100	1.107	1.567	352	0.563	68	0.175	316	0.095	36	0.129	298	0.021	16	0.139	268	0.029	149	0.074	250
DCP 4	.150	0.756	1.289	356	0.280	69	0.100	333	0.060	310	0.056	288	0.053	242	0.030	233	0.055	191	0.023	176
DCP 5	.200	0.664	1.024	356	0.252	54	0.106	311	0.053	272	0.026	229	0.041	226	0.041	165	0.031	152	0.028	93
DCP 6	.250	0.539	0.875	0	0.190	62	0.051	310	0.048	300	0.045	215	0.023	203	0.039	164	0.028	139	0.016	83
DCP 7	.300	0.393	0.769	358	0.173	50	0.062	296	0.040	273	0.033	203	0.026	202	0.044	150	0.028	91	0.023	68
DCP 8	.400	0.227	0.566	3	0.133	54	0.029	272	0.018	325	0.027	211	0.008	145	0.015	172	0.013	99	0.006	106
DCP 9	.500	0.280	0.461	1	0.076	41	0.021	261	0.020	291	0.031	183	0.014	101	0.011	133	0.013	54	0.007	343
DCP10	.695	0.246	0.317	6	0.018	338	0.015	201	0.015	283	0.026	175	0.012	95	0.009	93	0.010	34	0.008	2
DCP11	.800	0.145	0.263	3	0.032	280	0.017	202	0.011	214	0.016	140	0.005	119	0.014	102	0.016	2	0.007	287
DCP12	.878	0.126	0.230	3	0.041	271	0.018	241	0.023	216	0.020	140	0.006	92	0.011	107	0.015	61	0.014	341
DCP13	.953	0.186	0.225	353	0.049	236	0.008	184	0.015	190	0.010	106	0.006	112	0.007	53	0.008	330	0.007	285

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.64	0.600	8.96	7.40		3161.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.043	638.9	1421.6	0.62E 07	-0.00190	1.089	9.97

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.737	0.370	13	0.151	79	0.038	134	0.022	93	0.019	82	0.008	102	0.012	46	0.003	249	0.003	275
CM		-0.048	0.065	189	0.018	77	0.011	204	0.003	107	0.007	206	0.004	190	0.005	187	0.003	154	0.002	159
DCP 1	.010	2.794	1.178	355	0.653	83	0.118	158	0.059	282	0.016	313	0.064	234	0.030	144	0.011	62	0.029	216
DCP 2	.050	2.144	0.389	9	0.781	77	0.208	187	0.104	87	0.032	171	0.025	155	0.003	327	0.009	188	0.028	226
DCP 3	.100	1.670	0.388	18	0.595	79	0.272	175	0.064	86	0.131	171	0.069	242	0.017	178	0.106	238	0.030	331
DCP 4	.150	1.217	0.504	19	0.416	80	0.092	158	0.122	112	0.044	161	0.063	146	0.059	180	0.043	235	0.056	194
DCP 5	.200	1.048	0.437	22	0.317	77	0.064	132	0.081	93	0.025	105	0.057	102	0.014	180	0.038	160	0.031	170
DCP 6	.250	0.915	0.455	20	0.197	75	0.060	132	0.055	106	0.045	74	0.043	98	0.029	68	0.029	106	0.011	122
DCP 7	.300	0.755	0.427	22	0.195	75	0.055	101	0.046	90	0.044	76	0.045	93	0.029	58	0.034	108	0.016	75
DCP 8	.400	0.516	0.382	18	0.085	73	0.047	108	0.013	86	0.035	66	0.013	95	0.037	63	0.016	30	0.013	54
DCP 9	.500	0.552	0.367	15	0.049	84	0.043	80	0.016	110	0.043	57	0.017	31	0.033	33	0.016	352	0.011	9
DCP10	.695	0.443	0.311	10	0.015	216	0.033	51	0.013	279	0.020	26	0.016	334	0.018	9	0.013	331	0.017	298
DCP11	.800	0.328	0.304	5	0.021	256	0.028	32	0.006	292	0.025	31	0.014	345	0.017	0	0.015	315	0.019	323
DCP12	.878	0.293	0.283	5	0.026	255	0.026	15	0.003	305	0.023	23	0.016	349	0.016	334	0.009	296	0.017	356
DCP13	.953	0.327	0.269	0	0.013	260	0.028	347	0.011	340	0.012	298	0.017	11	0.013	319	0.008	259	0.006	241

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	32.68	0.200	4.96	7.81		3158.1	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.247	220.7	197.1	0.25E 07	-0.00160	1.097	12.82	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.529	0.553	2	0.034	203	0.004	24	0.003	114	0.004	263	0.004	177	0.005	283	0.005	71	0.004	180
CM		-0.014	0.044	276	0.006	100	0.001	248	0.000	98	0.001	127	0.001	14	0.002	124	0.002	258	0.001	0
DCP 1	.010	2.300	3.614	345	0.222	156	0.014	359	0.017	164	0.012	249	0.034	108	0.014	68	0.004	27	0.010	37
DCP 2	.050	2.026	1.826	348	0.116	163	0.004	124	0.005	32	0.003	42	0.010	79	0.003	45	0.015	36	0.003	137
DCP 3	.100	1.067	1.347	345	0.089	166	0.023	292	0.020	110	0.024	210	0.002	352	0.014	124	0.016	193	0.004	122
DCP 4	.150	0.810	0.986	354	0.065	191	0.008	10	0.005	296	0.004	306	0.001	127	0.012	208	0.009	4	0.001	144
DCP 5	.200	0.770	0.814	356	0.056	200	0.016	331	0.023	124	0.013	215	0.006	200	0.006	270	0.003	79	0.007	149
DCP 6	.250	0.640	0.713	0	0.044	207	0.006	10	0.013	338	0.005	19	0.005	284	0.010	237	0.009	28	0.007	210
DCP 7	.300	0.554	0.611	4	0.041	213	0.004	329	0.020	121	0.011	234	0.013	185	0.006	272	0.002	78	0.010	203
DCP 8	.400	0.421	0.454	11	0.029	237	0.010	104	0.016	329	0.010	17	0.009	258	0.009	253	0.013	44	0.005	225
DCP 9	.500	0.404	0.362	20	0.033	238	0.002	79	0.015	141	0.004	234	0.010	186	0.004	288	0.004	55	0.009	170
DCP10	.695	0.308	0.244	39	0.026	269	0.009	72	0.006	295	0.009	284	0.001	106	0.009	265	0.009	84	0.002	257
DCP11	.800	0.149	0.190	49	0.021	229	0.005	299	0.004	335	0.001	29	0.012	143	0.025	342	0.012	114	0.008	170
DCP12	.878	0.082	0.142	48	0.017	266	0.010	78	0.007	279	0.007	301	0.002	251	0.007	238	0.005	76	0.003	28
DCP13	.953	0.106	0.132	38	0.013	217	0.006	342	0.010	125	0.000	126	0.005	230	0.006	335	0.001	32	0.007	162

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	32.79	0.200	9.83	7.81		3158.2	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.248	220.7	196.3	0.25E 07	-0.00062	1.521	17.70	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.958	0.593	5	0.077	168	0.027	336	0.013	125	0.004	245	0.005	121	0.007	232	0.006	134	0.002	221
CM		-0.029	0.021	284	0.015	258	0.014	74	0.010	245	0.006	78	0.001	247	0.002	74	0.001	253	0.001	20
DCP 1	.010	4.418	3.421	359	0.281	278	0.297	154	0.206	0	0.179	194	0.131	65	0.086	256	0.061	108	0.030	320
DCP 2	.050	3.352	1.744	5	0.221	255	0.167	108	0.122	285	0.102	122	0.043	329	0.035	190	0.027	111	0.049	360
DCP 3	.100	2.035	1.485	359	0.345	208	0.246	56	0.156	260	0.089	117	0.032	6	0.031	247	0.034	126	0.018	331
DCP 4	.150	1.520	1.162	356	0.268	188	0.163	36	0.098	231	0.051	90	0.008	272	0.026	177	0.023	57	0.034	278
DCP 5	.200	1.360	0.969	357	0.251	171	0.171	1	0.113	185	0.074	21	0.044	227	0.018	104	0.026	345	0.018	177
DCP 6	.250	1.180	0.800	0	0.197	165	0.126	350	0.097	176	0.049	20	0.032	211	0.033	119	0.023	329	0.042	175
DCP 7	.300	1.023	0.706	0	0.190	147	0.154	324	0.116	146	0.077	343	0.058	195	0.030	55	0.029	278	0.027	116
DCP 8	.400	0.774	0.489	5	0.132	138	0.098	306	0.076	126	0.039	316	0.034	175	0.026	53	0.029	223	0.013	115
DCP 9	.500	0.701	0.369	15	0.074	114	0.075	272	0.074	76	0.046	265	0.029	113	0.023	291	0.021	134	0.037	1
DCP10	.695	0.477	0.225	33	0.043	82	0.057	238	0.047	39	0.035	217	0.023	44	0.029	235	0.014	69	0.030	141
DCP11	.800	0.296	0.150	32	0.039	84	0.034	221	0.024	28	0.015	237	0.011	34	0.012	283	0.018	98	0.010	265
DCP12	.878	0.293	0.111	30	0.030	70	0.031	219	0.019	19	0.011	210	0.009	359	0.015	234	0.013	50	0.010	235
DCP13	.953	0.218	0.093	26	0.019	342	0.021	146	0.023	351	0.018	153	0.018	316	0.015	142	0.006	250	0.003	345

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	32.89	0.400	4.93	7.75		3165.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.127	434.0	724.5	0.47E 07	-0.00065	1.153	12.76

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.401	0.693	357	0.040	236	0.030	148	0.012	19	0.012	183	0.007	101	0.001	204	0.004	114	0.005	71
CM		0.011	0.020	241	0.012	17	0.011	231	0.009	97	0.006	332	0.003	196	0.002	77	0.001	311	0.000	214
DCP 1	.010	2.537	4.062	349	0.191	347	0.345	242	0.355	138	0.238	30	0.120	264	0.085	140	0.025	56	0.037	98
DCP 2	.050	1.574	2.005	353	0.114	2	0.203	216	0.160	95	0.090	329	0.069	193	0.039	100	0.012	83	0.028	39
DCP 3	.100	1.085	1.572	352	0.053	295	0.120	185	0.103	66	0.049	286	0.054	167	0.027	82	0.011	333	0.007	334
DCP 4	.150	0.815	1.228	353	0.085	235	0.086	149	0.066	17	0.052	235	0.039	115	0.012	13	0.006	39	0.001	23
DCP 5	.200	0.709	1.020	354	0.081	240	0.083	142	0.065	9	0.051	220	0.037	100	0.014	341	0.004	162	0.007	64
DCP 6	.250	0.489	0.902	357	0.073	225	0.064	123	0.048	344	0.043	194	0.027	82	0.010	298	0.005	114	0.004	131
DCP 7	.300	0.400	0.789	357	0.079	233	0.070	124	0.053	341	0.050	196	0.032	76	0.015	304	0.007	154	0.007	97
DCP 8	.400	0.248	0.587	2	0.053	232	0.045	113	0.035	325	0.033	174	0.017	61	0.006	289	0.002	198	0.010	125
DCP 9	.500	0.126	0.473	3	0.061	227	0.046	95	0.038	301	0.037	162	0.019	37	0.009	266	0.007	155	0.009	92
DCP10	.695	0.068	0.283	12	0.039	217	0.029	70	0.025	275	0.022	143	0.010	8	0.008	247	0.008	128	0.004	26
DCP11	.800	0.105	0.203	10	0.034	199	0.021	36	0.018	242	0.012	123	0.005	321	0.006	212	0.007	120	0.003	3
DCP12	.878	0.125	0.160	9	0.041	188	0.026	29	0.016	238	0.009	97	0.005	277	0.003	198	0.005	133	0.001	335
DCP13	.953	0.156	0.146	358	0.045	173	0.022	12	0.012	210	0.007	110	0.004	321	0.007	198	0.006	54	0.003	268

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	32.89	0.400	9.77	7.62		3160.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.127	433.6	724.9	0.47E 07	-0.00052	1.508	16.23

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.708	0.551	28	0.132	351	0.054	249	0.031	191	0.025	121	0.022	67	0.017	299	0.008	162	0.010	144
CM		-0.036	0.081	185	0.054	75	0.027	8	0.022	306	0.015	240	0.012	176	0.011	97	0.006	353	0.002	339
DCP 1	.010	3.185	1.214	44	1.663	69	0.609	6	0.308	341	0.247	304	0.147	247	0.142	196	0.021	179	0.089	159
DCP 2	.050	2.137	0.894	48	0.736	46	0.168	328	0.159	324	0.139	244	0.060	163	0.074	195	0.065	118	0.044	108
DCP 3	.100	1.569	0.877	41	0.496	29	0.137	310	0.140	286	0.113	206	0.065	151	0.051	130	0.022	65	0.045	130
DCP 4	.150	1.224	0.816	35	0.329	15	0.117	299	0.133	258	0.094	177	0.058	143	0.058	105	0.039	32	0.025	80
DCP 5	.200	1.060	0.739	34	0.272	3	0.107	283	0.104	240	0.078	171	0.091	126	0.053	44	0.006	8	0.031	64
DCP 6	.250	0.839	0.730	34	0.231	350	0.096	279	0.119	230	0.082	147	0.060	126	0.066	54	0.034	332	0.007	70
DCP 7	.300	0.757	0.689	31	0.214	339	0.095	260	0.089	214	0.067	152	0.079	111	0.062	17	0.010	338	0.021	342
DCP 8	.400	0.545	0.625	29	0.192	314	0.094	243	0.103	191	0.065	112	0.060	96	0.075	6	0.036	285	0.021	231
DCP 9	.500	0.421	0.566	24	0.185	294	0.095	216	0.075	164	0.059	111	0.070	58	0.060	321	0.009	290	0.031	246
DCP10	.695	0.307	0.434	18	0.175	272	0.103	195	0.082	131	0.065	73	0.074	6	0.067	273	0.024	194	0.038	185
DCP11	.800	0.343	0.377	7	0.158	255	0.095	184	0.093	112	0.071	34	0.064	328	0.067	249	0.055	150	0.035	85
DCP12	.878	0.352	0.314	1	0.129	248	0.082	181	0.075	101	0.053	24	0.051	312	0.048	233	0.044	151	0.027	72
DCP13	.953	0.323	0.246	354	0.075	234	0.053	175	0.046	77	0.026	6	0.030	284	0.026	190	0.017	108	0.017	54

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	33.00	0.600	4.91	7.62		3162.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.086	640.1	1423.2	0.62E 07	-0.00089	1.195	11.64

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.430	0.667 359	0.092 22	0.056 250	0.027 166	0.019 130	0.010 60	0.003 4	0.001 193	0.008 121
CM		-0.018	0.041 209	0.029 77	0.016 343	0.007 285	0.008 234	0.006 145	0.003 93	0.003 46	0.333 322
DCP 1	.010	1.605	2.667 346	0.566 56	0.060 288	0.087 79	0.033 183	0.027 62	0.011 141	0.009 108	0.033 107
DCP 2	.050	1.491	1.764 348	0.637 67	0.285 308	0.061 198	0.057 235	0.053 153	0.037 113	0.020 22	0.027 124
DCP 3	.100	1.095	1.517 351	0.481 50	0.276 298	0.053 206	0.094 241	0.069 123	0.052 246	0.071 110	0.020 254
DCP 4	.150	0.700	1.184 356	0.239 40	0.136 294	0.091 236	0.065 186	0.053 160	0.039 100	0.026 103	0.038 54
DCP 5	.200	0.674	1.007 357	0.194 20	0.122 273	0.079 213	0.066 151	0.041 127	0.046 70	0.013 13	0.028 43
DCP 6	.250	0.533	0.860 3	0.156 20	0.085 260	0.050 220	0.068 161	0.041 104	0.035 74	0.034 22	0.022 337
DCP 7	.300	0.408	0.780 2	0.133 4	0.089 246	0.057 195	0.064 138	0.039 81	0.037 35	0.029 324	0.016 287
DCP 8	.400	0.253	0.600 7	0.103 346	0.078 224	0.033 158	0.038 127	0.030 53	0.018 5	0.018 317	0.013 227
DCP 9	.500	0.305	0.502 6	0.087 318	0.074 203	0.038 136	0.041 85	0.032 359	0.023 297	0.021 227	0.020 144
DCP10	.695	0.248	0.335 12	0.071 281	0.057 177	0.028 100	0.025 56	0.025 326	0.013 249	0.012 202	0.014 122
DCP11	.800	0.152	0.280 8	0.078 262	0.052 171	0.029 109	0.031 45	0.026 309	0.010 239	0.012 221	0.018 143
DCP12	.878	0.116	0.240 5	0.080 248	0.043 163	0.026 110	0.027 41	0.023 311	0.011 240	0.010 196	0.010 136
DCP13	.953	0.187	0.221 354	0.071 223	0.025 143	0.022 97	0.020 1	0.011 268	0.006 240	0.009 155	0.006 94

FORCED PITCHING OSCILLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	33.00	0.600	9.71	7.52		3162.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.086	639.4	1422.6	0.62E 07	-0.00093	1.262	12.60

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.768	0.892 26	0.121 62	0.047 57	0.026 347	0.006 316	0.004 76	0.008 271	0.007 139	0.006 216
CM		-0.055	0.079 194	0.024 93	0.015 154	0.010 86	0.007 87	0.003 40	0.004 50	0.001 310	0.003 24
DCP 1	.010	2.829	0.913 0	0.578 80	0.056 97	0.060 300	0.040 310	0.029 235	0.021 219	0.013 201	0.023 163
DCP 2	.050	2.219	0.220 45	0.682 76	0.219 148	0.141 45	0.038 122	0.048 28	0.012 299	0.025 355	0.013 234
DCP 3	.100	1.667	0.420 45	0.547 74	0.193 132	0.092 51	0.091 160	0.040 217	0.021 165	0.080 213	0.010 335
DCP 4	.150	1.192	0.509 41	0.337 80	0.162 85	0.090 71	0.038 83	0.063 106	0.018 171	0.039 150	0.033 145
DCP 5	.200	1.094	0.497 40	0.285 63	0.125 63	0.084 37	0.040 31	0.050 62	0.012 62	0.035 82	0.017 116
DCP 6	.250	0.934	0.487 39	0.185 67	0.113 65	0.048 24	0.046 43	0.037 74	0.031 38	0.034 92	0.020 49
DCP 7	.300	0.798	0.504 36	0.182 53	0.116 51	0.076 12	0.050 13	0.048 32	0.042 1	0.035 23	0.022 355
DCP 8	.400	0.560	0.452 35	0.089 37	0.074 39	0.028 323	0.035 17	0.014 19	0.028 346	0.016 54	0.023 333
DCP 9	.500	0.594	0.444 25	0.043 352	0.069 22	0.048 295	0.025 303	0.012 314	0.037 278	0.014 184	0.013 244
DCP10	.695	0.473	0.357 20	0.040 285	0.055 354	0.050 264	0.021 264	0.018 234	0.021 235	0.013 193	0.020 201
DCP11	.800	0.356	0.345 13	0.063 284	0.040 320	0.033 272	0.036 246	0.016 188	0.023 199	0.004 94	0.020 147
DCP12	.878	0.316	0.318 9	0.054 282	0.040 314	0.029 283	0.039 249	0.016 194	0.018 201	0.005 111	0.013 197
DCP13	.953	0.351	0.280 357	0.025 274	0.045 287	0.015 238	0.020 228	0.018 230	0.018 141	0.003 115	0.006 114

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.56	0.200	9.99	2.42		1360.1	5

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.123	224.6	203.6	0.26E 07	-0.00177	1.356	11.95

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.973	0.197 353	0.013 111	0.006 59	0.006 233	0.005 214	0.005 297	0.003 280	0.006 54	0.002 83
CM		-0.025	0.008 288	0.002 292	0.001 211	0.002 92	0.002 76	0.001 130	0.000 142	0.001 253	0.001 199
CCP 1	.010	3.415	1.163 345	0.052 117	0.020 108	0.033 174	0.028 114	0.014 258	0.027 304	0.017 93	0.014 159
CCP 2	.050	2.867	0.712 347	0.043 100	0.029 72	0.011 161	0.024 145	0.008 13	0.002 132	0.006 87	0.018 131
CCP 3	.100	2.370	0.478 349	0.009 165	0.008 104	0.024 193	0.017 243	0.018 192	0.015 219	0.015 112	0.006 50
CCP 4	.150	1.937	0.381 349	0.021 94	0.005 178	0.003 319	0.010 149	0.009 301	0.005 315	0.010 12	0.007 189
CCP 5	.200	1.608	0.292 352	0.008 110	0.006 6	0.001 262	0.009 268	0.005 315	0.006 248	0.004 90	0.002 322
CCP 6	.250	1.252	0.238 353	0.017 105	0.008 351	0.002 12	0.009 148	0.004 29	0.004 7	0.008 18	0.007 204
CCP 7	.300	1.152	0.212 354	0.005 144	0.002 117	0.005 139	0.007 284	0.006 290	0.004 274	0.010 91	0.003 76
CCP 8	.500	0.716	0.123 0	0.014 110	0.006 60	0.009 243	0.007 134	0.007 324	0.006 312	0.008 30	0.004 70
CCP 9	.600	0.591	0.092 7	0.015 126	0.007 6	0.002 202	0.009 268	0.008 265	0.007 175	0.003 263	0.003 291
CCP10	.695	0.367	0.066 12	0.010 86	0.008 38	0.000 260	0.007 100	0.004 29	0.004 334	0.010 16	0.003 120
CCP11	.800	0.318	0.043 29	0.011 102	0.018 106	0.038 282	0.021 281	0.011 280	0.007 264	0.000 113	0.009 17
CCP12	.878	0.278	0.030 38	0.008 158	0.005 309	0.004 234	0.021 231	0.011 313	0.009 242	0.004 116	0.007 39
CCP13	.953	0.070	0.042 21	0.015 98	0.015 358	0.010 194	0.008 108	0.002 29	0.016 50	0.017 29	0.001 340

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.56	0.200	12.45	2.41		1360.2	5

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.123	224.6	202.9	0.26E 07	-0.00147	1.352	14.66

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		1.153	0.193 355	0.010 200	0.002 224	0.002 299	0.003 155	0.004 95	0.001 183	0.002 160	0.005 136
CM		-0.023	0.006 283	0.002 42	0.001 159	0.001 5	0.001 347	0.001 276	0.000 123	0.001 351	0.001 335
CCP 1	.010	4.681	1.171 347	0.053 178	0.013 188	0.037 302	0.022 156	0.007 78	0.005 206	0.001 111	0.016 182
CCP 2	.050	3.603	0.693 348	0.021 164	0.011 199	0.018 334	0.006 72	0.018 134	0.009 187	0.009 328	0.004 93
CCP 3	.100	2.871	0.492 351	0.027 207	0.010 257	0.010 18	0.008 305	0.017 35	0.002 268	0.013 117	0.016 118
CCP 4	.150	2.224	0.343 350	0.007 127	0.003 172	0.007 312	0.009 134	0.003 126	0.004 50	0.001 17	0.010 201
CCP 5	.200	1.805	0.265 352	0.012 207	0.008 14	0.008 114	0.005 306	0.003 70	0.008 125	0.005 58	0.007 68
CCP 6	.250	1.431	0.227 354	0.006 109	0.006 167	0.004 247	0.011 127	0.005 143	0.003 197	0.005 328	0.011 155
CCP 7	.300	1.279	0.198 357	0.012 216	0.008 190	0.008 3	0.003 316	0.005 70	0.002 49	0.005 145	0.010 110
CCP 8	.500	0.796	0.120 0	0.004 43	0.006 151	0.007 257	0.011 136	0.003 189	0.003 226	0.005 260	0.009 187
CCP 9	.600	0.740	0.090 12	0.019 220	0.004 273	0.006 95	0.006 298	0.009 98	0.005 83	0.004 147	0.006 101
CCP10	.695	0.406	0.066 17	0.005 47	0.004 85	0.003 312	0.010 153	0.002 213	0.003 174	0.004 279	0.004 195
CCP11	.800	0.329	0.045 25	0.019 233	0.012 312	0.015 198	0.009 252	0.002 59	0.010 275	0.008 233	0.008 112
CCP12	.878	0.362	0.041 18	0.024 214	0.014 333	0.007 73	0.006 114	0.007 68	0.002 54	0.013 75	0.011 81
CCP13	.953	0.120	0.050 346	0.011 116	0.008 133	0.008 236	0.010 154	0.007 135	0.003 39	0.012 162	0.010 279

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.61	0.200	14.67	2.40		1380.3	5

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.124	224.6	201.7	0.26E 07	-0.00189	1.514	16.90

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.327	0.176	1	0.005	287	0.003	194	0.004	218	0.005	149	0.006	11	0.004	81	0.003	300	0.003	227
CM		-0.020	0.009	289	0.002	100	0.002	347	0.001	258	0.001	323	0.002	182	0.001	232	0.001	145	0.001	141
DCP 1	.010	5.789	1.117	351	0.065	97	0.089	318	0.070	212	0.020	128	0.009	291	0.035	158	0.008	276	0.012	202
DCP 2	.050	4.265	0.679	351	0.011	157	0.020	152	0.032	237	0.011	35	0.017	46	0.018	99	0.017	39	0.018	194
DCP 3	.100	3.348	0.447	355	0.027	306	0.005	266	0.004	325	0.020	183	0.002	335	0.006	322	0.025	263	0.013	237
DCP 4	.150	2.493	0.313	354	0.009	196	0.011	187	0.007	219	0.001	353	0.005	95	0.003	120	0.005	98	0.009	243
DCP 5	.200	2.037	0.234	2	0.008	302	0.003	126	0.003	222	0.007	188	0.005	252	0.008	331	0.006	238	0.005	309
DCP 6	.250	1.633	0.213	359	0.011	227	0.004	39	0.009	195	0.008	115	0.008	14	0.007	147	0.005	111	0.007	219
DCP 7	.300	1.439	0.180	5	0.016	315	0.005	224	0.004	354	0.010	177	0.003	32	0.006	75	0.009	253	0.004	263
DCP 8	.500	0.880	0.100	13	0.007	197	0.006	148	0.009	233	0.003	98	0.007	24	0.002	125	0.003	54	0.006	147
DCP 9	.600	0.858	0.077	34	0.022	328	0.007	51	0.004	145	0.008	148	0.007	331	0.010	36	0.004	224	0.004	63
DCP10	.695	0.436	0.062	24	0.006	257	0.007	106	0.005	237	0.002	156	0.005	47	0.007	137	0.006	77	0.006	176
DCP11	.800	0.369	0.049	39	0.007	318	0.011	156	0.029	26	0.007	134	0.012	36	0.015	45	0.009	317	0.006	84
DCP12	.878	0.431	0.036	37	0.018	266	0.012	201	0.001	149	0.003	199	0.017	335	0.008	11	0.008	12	0.010	260
DCP13	.953	0.146	0.060	354	0.010	137	0.013	259	0.028	166	0.010	131	0.010	357	0.008	173	0.011	237	0.018	314

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.95	0.400	9.83	2.43		1058.1	5

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.064	444.1	752.9	0.48E 07	-0.00134	1.290	12.17

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.040	0.249	352	0.009	160	0.002	192	0.003	225	0.000	16	0.000	19	0.003	14	0.002	286	0.001	171
CM		-0.005	0.009	316	0.001	243	0.001	42	0.001	125	0.000	82	0.000	342	0.001	205	0.001	145	0.000	14
DCP 1	.010	4.507	1.829	348	0.200	226	0.069	132	0.012	205	0.031	119	0.015	349	0.017	236	0.009	172	0.009	100
DCP 2	.050	3.584	0.964	348	0.039	127	0.011	308	0.012	183	0.008	133	0.005	332	0.004	231	0.005	181	0.003	65
DCP 3	.100	2.638	0.602	351	0.019	189	0.014	287	0.019	231	0.016	320	0.005	1	0.015	358	0.005	357	0.005	159
DCP 4	.150	2.095	0.408	350	0.017	119	0.001	31	0.008	196	0.002	24	0.001	89	0.003	339	0.002	281	0.002	338
DCP 5	.200	1.715	0.331	351	0.015	106	0.005	209	0.001	142	0.002	279	0.003	144	0.004	40	0.003	218	0.005	219
DCP 6	.250	1.259	0.276	351	0.010	134	0.001	196	0.004	227	0.002	267	0.002	162	0.001	252	0.002	242	0.001	255
DCP 7	.300	1.074	0.247	353	0.012	106	0.003	205	0.002	220	0.001	206	0.002	217	0.004	61	0.003	178	0.003	179
DCP 8	.500	0.661	0.143	357	0.006	136	0.002	61	0.005	204	0.001	341	0.001	164	0.001	215	0.002	282	0.002	127
DCP 9	.600	0.536	0.104	0	0.008	110	0.002	237	0.001	23	0.003	335	0.004	23	0.007	47	0.004	285	0.001	275
DCP10	.695	0.481	0.079	4	0.004	146	0.001	94	0.003	170	0.004	209	0.003	155	0.001	14	0.002	334	0.001	170
DCP11	.800	0.271	0.048	11	0.007	106	0.008	199	0.011	311	0.004	346	0.002	301	0.013	10	0.008	307	0.003	263
DCP12	.878	0.202	0.041	13	0.002	163	0.006	230	0.003	291	0.001	174	0.002	96	0.010	27	0.003	11	0.003	187
DCP13	.953	0.105	0.042	5	0.004	282	0.004	210	0.003	176	0.005	129	0.004	199	0.002	331	0.003	41	0.004	138

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	17.32	0.400	12.36	2.41		1058.2	4

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.065	444.1	751.1	0.48E 07	0.00001	1.429	13.93

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.223	0.165	17	0.043	2	0.012	222	0.004	193	0.001	185	0.008	200	0.005	169	0.003	164	0.007	103
CM		0.000	0.001	5	0.006	19	0.003	262	0.001	191	0.001	84	0.001	250	0.003	30	0.002	355	0.001	213
DCP 1	.010	5.967	1.382	0	0.200	55	0.083	24	0.012	114	0.030	53	0.013	141	0.010	30	0.009	162	0.018	118
DCP 2	.050	4.441	0.838	16	0.369	339	0.230	244	0.130	192	0.050	201	0.090	182	0.091	119	0.053	71	0.039	75
DCP 3	.100	3.070	0.292	14	0.109	24	0.019	169	0.006	356	0.014	73	0.019	294	0.021	195	0.005	351	0.016	143
DCP 4	.150	2.376	0.218	18	0.054	29	0.006	214	0.010	249	0.011	98	0.011	271	0.009	123	0.008	277	0.010	154
DCP 5	.200	1.915	0.165	35	0.098	3	0.004	203	0.001	42	0.012	84	0.022	271	0.023	15	0.020	348	0.015	174
DCP 6	.250	1.452	0.149	26	0.050	22	0.005	219	0.009	248	0.008	104	0.014	263	0.008	109	.009	281	0.012	148
DCP 7	.300	1.211	0.138	37	0.075	355	0.028	204	0.005	107	0.004	34	0.013	218	0.007	147	0.008	259	0.008	104
DCP 8	.500	0.736	0.082	40	0.027	20	0.001	129	0.004	23	0.010	290	0.015	179	0.015	14	0.015	224	0.013	92
DCP 9	.600	0.590	0.064	52	0.022	23	0.003	240	0.006	219	0.002	349	0.006	136	0.016	254	0.003	138	0.005	6
DCP10	.695	0.538	0.056	16	0.007	198	0.014	73	0.004	340	0.004	274	0.005	162	0.013	318	0.018	185	0.007	74
DCP11	.800	0.320	0.055	13	0.005	233	0.006	25	0.004	154	0.008	184	0.009	62	0.024	224	0.015	104	0.003	65
DCP12	.878	0.276	0.071	355	0.026	232	0.012	158	0.010	11	0.006	235	0.006	358	0.019	209	0.008	81	0.007	237
DCP13	.953	0.160	0.121	335	0.047	208	0.013	85	0.003	184	0.002	236	0.003	108	0.009	325	0.005	261	0.005	113

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	17.29	0.400	14.59	2.38		1358.3	6

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.065	444.1	750.6	0.48E 07	0.00784	1.449	14.77

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.073	0.298	87	0.084	75	0.026	347	0.012	322	0.014	218	0.007	93	0.013	125	0.001	3	0.003	337
CM		-0.066	0.052	132	0.029	136	0.014	66	0.012	45	0.007	8	0.005	240	0.004	289	0.001	158	0.001	252
DCP 1	.010	5.125	1.478	90	0.557	95	0.083	9	0.061	321	0.077	238	0.044	138	0.045	98	0.052	57	0.041	349
DCP 2	.050	3.318	1.391	109	0.623	101	0.301	71	0.215	76	0.072	80	0.047	127	0.022	145	0.023	115	0.023	294
DCP 3	.100	2.114	1.168	109	0.328	104	0.177	37	0.095	24	0.088	329	0.049	296	0.030	318	0.010	246	0.021	297
DCP 4	.150	1.636	0.826	104	0.231	116	0.110	23	0.086	29	0.023	276	0.030	279	0.016	273	0.006	153	0.007	269
DCP 5	.200	1.411	0.633	94	0.180	104	0.088	10	0.063	1	0.025	271	0.037	251	0.011	247	0.013	208	0.012	193
DCP 6	.250	1.095	0.497	90	0.138	90	0.070	337	0.061	349	0.018	235	0.031	206	0.022	218	0.003	51	0.013	153
DCP 7	.300	1.002	0.387	81	0.090	88	0.047	330	0.046	321	0.010	249	0.011	168	0.014	155	0.014	274	0.019	192
DCP 8	.500	0.756	0.168	49	0.050	15	0.057	257	0.041	267	0.025	205	0.026	93	0.029	123	0.002	58	0.007	12
DCP 9	.600	0.696	0.116	26	0.083	357	0.065	264	0.040	238	0.021	209	0.027	103	0.035	125	0.003	256	0.024	331
DCP10	.695	0.700	0.104	345	0.074	319	0.036	263	0.044	222	0.027	211	0.025	41	0.019	119	0.007	51	0.003	64
DCP11	.800	0.543	0.129	328	0.102	333	0.026	255	0.050	206	0.034	194	0.019	16	0.018	98	0.005	267	0.010	174
DCP12	.878	0.493	0.140	315	0.089	331	0.023	228	0.035	199	0.027	152	0.014	31	0.022	89	0.012	303	0.013	72
DCP13	.953	0.313	0.114	315	0.078	323	0.028	223	0.009	212	0.026	184	0.018	84	0.012	322	0.016	55	0.008	228

FORCED PITCHING OSCILLATION — VERTOL 23013-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	17.14	0.600	9.92	2.34		1055.1	6

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.044	653.3	1479.8	0.64E 07	-0.00082	1.000	12.33

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.902	0.097 19	0.014 94	0.007 140	0.001 83	0.001 232	0.003 234	0.004 217	0.007 105	0.003 346
CM		-0.032	0.033 186	0.001 263	0.002 191	0.002 229	0.000 327	0.002 317	0.001 239	0.001 216	0.001 90
DCP 1	.010	2.364	0.522 359	0.025 52	0.015 153	0.006 275	0.010 145	0.006 304	0.008 168	0.006 94	0.003 137
DCP 2	.050	2.693	0.307 358	0.012 61	0.017 158	0.004 250	0.007 160	0.004 268	0.008 171	0.007 96	0.004 55
DCP 3	.100	2.434	0.238 161	0.173 77	0.049 134	0.033 59	0.011 27	0.017 274	0.019 214	0.020 147	0.019 109
DCP 4	.200	1.567	0.155 146	0.102 243	0.007 128	0.041 258	0.040 283	0.015 310	0.022 287	0.008 103	0.025 6
DCP 5	.250	1.190	0.090 124	0.071 231	0.032 214	0.021 197	0.019 4	0.004 323	0.006 200	0.023 142	0.018 70
DCP 6	.300	0.935	0.109 23	0.034 92	0.040 159	0.016 241	0.009 165	0.016 241	0.019 241	0.019 109	0.020 314
DCP 7	.500	0.562	0.141 13	0.028 88	0.007 292	0.020 128	0.012 105	0.007 298	0.020 177	0.010 82	0.008 256
DCP 8	.600	0.526	0.173 7	0.010 287	0.011 316	0.004 70	0.003 195	0.008 34	0.013 349	0.011 275	0.011 197
DCP 9	.695	0.431	0.138 13	0.011 347	0.011 320	0.005 64	0.011 181	0.011 89	0.005 169	0.013 81	0.004 23
DCP10	.800	0.327	0.139 7	0.004 100	0.020 35	0.018 333	0.007 216	0.018 156	0.022 65	0.015 336	0.007 222
DCP11	.878	0.392	0.137 2	0.003 101	0.013 104	0.028 37	0.012 325	0.009 187	0.014 7	0.007 196	0.014 32
DCP12	.953	0.102	0.113 358	0.030 91	0.019 41	0.007 117	0.010 59	0.017 137	0.003 163	0.011 77	0.015 242

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	17.24	0.600	12.37	2.37		1356.2	4

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.044	653.2	1477.4	0.64E 07	-0.00108	1.023	14.65

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.956	0.058 35	0.011 120	0.016 85	0.006 293	0.008 213	0.009 153	0.003 22	0.002 202	0.005 211
CM		-0.063	0.023 192	0.005 270	0.001 332	0.004 254	0.002 150	0.001 339	0.002 126	0.003 257	0.001 295
DCP 1	.010	2.822	0.428 357	0.031 92	0.012 127	0.011 327	0.007 124	0.003 296	0.005 11	0.008 120	0.001 295
DCP 2	.050	2.924	0.211 357	0.068 88	0.062 7	0.055 280	0.043 184	0.032 132	0.029 9	0.022 252	0.015 150
DCP 3	.100	2.157	0.450 151	0.098 243	0.124 87	0.061 258	0.039 203	0.040 130	0.037 57	0.026 304	0.064 241
DCP 4	.150	1.614	0.187 165	0.057 247	0.072 129	0.026 206	0.036 181	0.039 176	0.005 358	0.022 294	0.037 238
DCP 5	.200	1.421	0.036 210	0.035 291	0.030 320	0.062 296	0.013 151	0.020 158	0.005 215	0.051 272	0.026 227
DCP 6	.250	1.137	0.061 60	0.007 201	0.024 62	0.031 286	0.028 116	0.019 86	0.031 78	0.038 184	0.014 132
DCP 7	.300	0.987	0.032 37	0.013 130	0.015 24	0.018 271	0.017 224	0.011 243	0.019 176	0.012 280	0.012 336
DCP 8	.500	0.696	0.110 26	0.043 96	0.022 129	0.030 101	0.007 215	0.001 96	0.024 127	0.031 94	0.008 76
DCP 9	.600	0.648	0.103 15	0.018 72	0.009 77	0.016 88	0.030 308	0.014 278	0.021 356	0.024 326	0.014 154
DCP10	.695	0.570	0.133 16	0.017 149	0.033 124	0.015 359	0.004 287	0.012 228	0.033 284	0.020 208	0.008 57
DCP11	.800	0.438	0.077 13	0.014 78	0.019 332	0.006 278	0.006 339	0.018 155	0.012 278	0.016 68	0.003 299
DCP12	.878	0.509	0.075 9	0.014 105	0.005 118	0.020 46	0.012 273	0.031 125	0.020 343	0.033 90	0.022 232
DCP13	.953	0.181	0.054 12	0.029 76	0.006 203	0.013 106	0.016 66	0.009 57	0.009 1	0.007 257	0.007 40

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	17.34	0.600	14.59	2.39		1356.3	6

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.044	653.5	1474.1	0.64E 07	-0.00055	1.078	15.35

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.986	0.044 64	0.029 76	0.004 232	0.014 20	0.006 206	0.008 4	0.010 296	0.003 199	0.002 236
CM		-0.082	0.023 187	0.001 5	0.003 298	0.004 132	0.002 40	0.002 15	0.001 130	0.002 2	0.000 350
DCP 1	.010	3.140	0.304 358	0.036 79	0.010 222	0.017 354	0.012 219	0.004 358	0.010 288	0.003 9	0.007 69
DCP 2	.050	2.828	0.327 161	0.275 65	0.061 239	0.096 94	0.057 30	0.033 348	0.021 342	0.036 330	0.021 190
DCP 3	.100	1.912	0.303 147	0.090	0.051 280	0.043 79	0.034 138	0.048 317	0.017 247	0.032 56	0.019 244
DCP 4	.150	1.454	0.046 169	0.032	0.048 336	0.019 348	0.052 263	0.036 359	0.002 10	0.020 177	0.029 279
DCP 5	.200	1.458	0.112 127	0.047	0.018 240	0.016 117	0.037 149	0.048 48	0.042 289	0.018 51	0.012 163
DCP 6	.250	1.156	0.050 104	0.024 66	0.022 306	0.016 357	0.003 216	0.006 310	0.025 289	0.009 151	0.006 25
DCP 7	.300	1.040	0.052 66	0.020 129	0.013 111	0.020 6	0.010 202	0.008 26	0.021 277	0.008 274	0.008 6
DCP 8	.500	0.744	0.072 31	0.020 156	0.009 77	0.041 4	0.007 241	0.013 161	0.003 186	0.015 214	0.007 9
DCP 9	.600	0.697	0.071 31	0.022 95	0.019 161	0.012 349	0.004 87	0.002 147	0.008 327	0.001 39	0.008 129
DCP10	.695	0.638	0.078 1	0.020 47	0.024 286	0.005 97	0.002 336	0.020 209	0.017 23	0.012 324	0.013 137
DCP11	.800	0.530	0.094 20	0.022 94	0.020 127	0.018 320	0.019 227	0.007 290	0.013 330	0.019 175	0.005 195
DCP12	.878	0.603	0.091 7	0.015 61	0.024 116	0.017 285	0.013 247	0.002 337	0.019 255	0.012 196	0.011 279
DCP13	.953	0.214	0.058 5	0.011 299	0.016 108	0.012 237	0.012 148	0.005 309	0.004 242	0.016 114	0.013 237

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	33.33	0.200	9.93	2.52		1063.1	5

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.248	224.6	205.6	0.26E 07	-0.00172	1.230	12.57

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.041	0.173	6	0.006	213	0.008	139	0.002	98	0.002	188	0.004	42	0.003	239	0.003	325	0.011	5
CM		-0.051	0.016	276	0.001	92	0.001	265	0.001	255	0.000	246	0.001	210	0.001	49	0.002	127	0.005	189
DCP 1	.010	3.441	1.031	346	0.028	210	0.031	174	0.015	58	0.002	48	0.015	118	0.010	289	0.014	161	0.013	79
DCP 2	.050	2.943	0.600	346	0.020	153	0.022	159	0.012	158	0.011	39	0.004	338	0.010	8	0.012	229	0.009	257
DCP 3	.100	2.477	0.429	355	0.033	182	0.026	150	0.009	259	0.016	191	0.021	91	0.006	155	0.005	95	0.005	225
DCP 4	.150	1.772	0.337	353	0.002	289	0.006	139	0.005	182	0.009	221	0.003	5	0.003	293	0.011	72	0.004	66
DCP 5	.200	1.636	0.251	3	0.011	183	0.017	168	0.013	53	0.013	207	0.008	37	0.007	225	0.008	321	0.011	252
DCP 6	.250	1.280	0.224	359	0.003	336	0.008	158	0.004	193	0.010	216	0.008	44	0.003	249	0.003	16	0.003	40
DCP 7	.300	1.252	0.188	10	0.008	157	0.002	188	0.009	59	0.004	182	0.009	13	0.006	152	0.005	7	0.010	293
DCP 8	.500	0.729	0.113	28	0.010	289	0.005	154	0.005	172	0.005	7	0.004	36	0.004	283	0.004	66	0.009	52
DCP 9	.600	0.624	0.099	37	0.008	260	0.014	88	0.006	277	0.007	186	0.008	222	0.016	236	0.012	310	0.016	316
DCP 10	.695	0.609	0.075	44	0.010	21	0.010	133	0.007	182	0.006	61	0.009	340	0.009	348	0.012	312	0.004	31
DCP 11	.800	0.444	0.071	53	0.018	232	0.007	174	0.009	357	0.003	338	0.007	248	0.004	103	0.008	332	0.002	19
DCP 12	.878	0.382	0.058	56	0.012	142	0.013	60	0.012	66	0.001	163	0.012	64	0.003	207	0.004	210	0.013	321
DCP 13	.953	0.118	0.035	33	0.013	271	0.004	88	0.009	108	0.003	194	0.018	66	0.014	208	0.012	274	0.016	217

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	33.33	0.200	12.41	2.51		1063.2	5

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.248	224.6	205.1	0.26E 07	-0.00166	1.449	14.75

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.265	0.174	5	0.007	227	0.001	61	0.003	184	0.003	80	0.003	132	0.004	85	0.005	227	0.010	213
CM		-0.052	0.016	281	0.002	113	0.001	15	0.001	7	0.001	196	0.001	342	0.001	289	0.002	16	0.003	44
DCP 1	.010	4.721	1.082	347	0.041	197	0.030	90	0.030	100	0.030	136	0.016	58	0.017	42	0.020	243	0.021	266
DCP 2	.050	3.685	0.616	350	0.029	204	0.022	62	0.002	183	0.016	110	0.002	89	0.011	193	0.015	20	0.012	179
DCP 3	.100	3.022	0.469	351	0.014	212	0.016	276	0.012	214	0.006	163	0.002	356	0.007	356	0.006	285	0.018	154
DCP 4	.150	2.157	0.305	357	0.014	140	0.008	75	0.001	184	0.004	16	0.008	151	0.007	106	0.004	278	0.004	111
DCP 5	.200	1.959	0.258	359	0.008	254	0.014	313	0.006	210	0.006	2	0.004	147	0.011	80	0.012	258	0.009	148
DCP 6	.250	1.528	0.203	4	0.007	151	0.002	322	0.004	294	0.002	131	0.006	153	0.007	2	0.005	286	0.010	176
DCP 7	.300	1.472	0.191	6	0.010	211	0.012	332	0.003	224	0.007	30	0.001	71	0.011	79	0.003	253	0.002	182
DCP 8	.500	0.851	0.118	33	0.006	233	0.007	88	0.006	187	0.008	89	0.004	89	0.002	25	0.007	287	0.021	240
DCP 9	.600	0.844	0.083	33	0.007	352	0.014	223	0.003	202	0.004	203	0.011	165	0.011	116	0.012	142	0.008	36
DCP 10	.695	0.667	0.067	62	0.014	252	0.021	97	0.006	55	0.009	98	0.006	352	0.005	325	0.004	151	0.008	111
DCP 11	.800	0.481	0.063	45	0.010	281	0.011	262	0.006	211	0.010	297	0.010	182	0.011	178	0.019	202	0.013	229
DCP 12	.878	0.464	0.066	35	0.006	271	0.007	248	0.007	188	0.002	162	0.004	40	0.006	98	0.014	225	0.007	124
DCP 13	.953	0.126	0.038	52	0.002	320	0.011	187	0.004	141	0.013	29	0.002	184	0.009	47	0.004	168	0.013	51

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	33.33	0.200	14.63	2.51		1063.3	5

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.248	224.6	204.9	0.26E 07	-0.00150	1.608	17.16

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		1.440	0.157 6	0.005 200	0.003 346	0.004 196	0.005 349	0.008 205	0.004 227	0.002 330	0.013 132
CM		-0.046	0.014 290	0.001 77	0.000 279	0.001 316	0.001 194	0.002 21	0.000 120	0.001 228	0.005 278
DCP 1	.010	5.875	1.105 347	0.068 99	0.066 319	0.054 237	0.029 74	0.041 196	0.017 254	0.018 318	0.024 193
DCP 2	.050	4.318	0.610 348	0.031 182	0.007 193	0.015 315	0.014 356	0.008 225	0.017 221	0.023 208	0.009 95
DCP 3	.100	3.498	0.409 351	0.007 302	0.003 310	0.010 219	0.016 282	0.018 263	0.020 238	0.021 304	0.007 70
DCP 4	.150	2.465	0.263 2	0.012 162	0.003 183	0.003 49	0.005 323	0.003 202	0.008 158	0.005 58	0.008 180
DCP 5	.200	2.195	0.221 357	0.005 211	0.012 356	0.009 150	0.007 277	0.005 140	0.008 184	0.010 246	0.009 89
DCP 6	.250	1.754	0.181 10	0.012 186	0.002 161	0.001 18	0.002 358	0.005 198	0.007 145	0.006 95	0.006 112
DCP 7	.300	1.653	0.170 8	0.011 247	0.007 15	0.011 161	0.011 280	0.003 182	0.001 205	0.005 302	0.006 30
DCP 8	.500	0.948	0.103 37	0.008 195	0.004 119	0.002 359	0.010 30	0.010 189	0.003 204	0.006 329	0.003 121
DCP 9	.600	0.952	0.086 55	0.010 243	0.015 333	0.013 172	0.008 345	0.014 207	0.011 276	0.002 242	0.011 343
DCP10	.695	0.675	0.078 62	0.011 309	0.002 177	0.003 310	0.007 61	0.005 240	0.010 310	0.009 35	0.010 154
DCP11	.800	0.483	0.050 36	0.002 322	0.009 47	0.002 199	0.006 302	0.007 173	0.006 87	0.007 96	0.007 97
DCP12	.878	0.526	0.042 35	0.007 212	0.003 309	0.007 131	0.005 241	0.012 201	0.006 113	0.004 132	0.009 54
DCP13	.953	0.148	0.015 345	0.010 124	0.012 181	0.002 282	0.021 33	0.005 251	0.009 218	0.012 16	0.004 245

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	33.22	0.400	9.89	2.52		1062.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.125	443.9	754.9	0.48E 07	-0.00111	1.293	12.48

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		1.064	0.225 349	0.006 185	0.001 180	0.000 190	0.001 198	0.001 263	0.001 217	0.001 205	0.002 255
CM		-0.009	0.012 299	0.001 201	0.000 98	0.000 197	0.000 65	0.000 321	0.000 87	0.000 58	0.001 73
DCP 1	.010	4.390	1.724 342	0.193 214	0.070 116	0.006 15	0.016 84	0.017 303	0.013 195	0.011 116	0.005 266
DCP 2	.050	3.424	0.872 343	0.027 111	0.010 292	0.007 180	0.005 158	0.006 244	0.004 203	0.004 117	0.004 126
DCP 3	.100	2.831	0.546 343	0.029 205	0.018 293	0.011 213	0.019 252	0.011 312	0.003 204	0.006 298	0.007 337
DCP 4	.150	2.019	0.377 348	0.009 103	0.003 177	0.003 149	0.002 126	0.002 144	0.001 265	0.000 96	0.002 297
DCP 5	.200	1.808	0.303 347	0.007 109	0.002 328	0.001 231	0.003 134	0.001 215	0.001 243	0.001 175	0.002 136
DCP 6	.250	1.357	0.248 351	0.005 107	0.001 146	0.001 96	0.001 122	0.001 134	0.000 106	0.000 158	0.001 213
DCP 7	.300	1.163	0.217 351	0.004 131	0.000 273	0.001 12	0.001 128	0.001 138	0.001 222	0.001 166	0.002 97
DCP 8	.500	0.686	0.127 2	0.001 46	0.003 198	0.001 316	0.000 183	0.001 149	0.001 183	0.001 249	0.005 273
DCP 9	.600	0.574	0.094 5	0.004 69	0.002 357	0.002 50	0.002 222	0.001 6	0.001 337	0.003 149	0.001 238
DCP10	.695	0.458	0.069 14	0.002 255	0.004 203	0.002 29	0.002 136	0.002 301	0.001 328	0.003 359	0.000 62
DCP11	.800	0.276	0.051 20	0.002 190	0.000 123	0.001 276	0.005 262	0.002 118	0.003 242	0.003 214	0.020 252
DCP12	.878	0.244	0.041 21	0.000 126	0.003 6	0.003 117	0.001 205	0.001 346	0.001 338	0.003 241	0.000 216
DCP13	.953	0.082	0.036 13	0.003 223	0.001 247	0.002 309	0.003 58	0.004 188	0.003 149	0.003 262	0.001 82

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	33.22	0.400	12.37	2.50		1062.2	10
K	**V**	**Q**	**RN**	**DAMPING**	**CN(MAX)**	**ALPHA(STALL)**	
0.125	443.9	753.3	0.48E 07	-0.00044	1.484	14.60	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.229	0.219	19	0.026	283	0.005	258	0.009	136	0.004	249	0.008	113	0.003	24	0.002	53	0.004	290
CM		-0.007	0.004	277	0.007	8	0.004	228	0.002	135	0.002	17	0.002	174	0.001	19	0.001	112	0.002	60
DCP 1	.010	5.725	1.554	358	0.132	101	0.140	347	0.044	120	0.051	354	0.017	157	0.017	339	0.016	157	0.007	347
DCP 2	.050	4.185	0.911	11	0.259	311	0.200	233	0.106	178	0.102	162	0.120	103	0.066	31	0.028	45	0.048	355
DCP 3	.100	3.205	0.444	17	0.055	320	0.036	193	0.061	103	0.062	357	0.043	244	0.022	150	0.010	75	0.035	353
DCP 4	.150	2.256	0.287	20	0.033	3	0.021	264	0.021	135	0.008	18	0.004	275	0.004	205	0.003	104	0.031	6
DCP 5	.200	1.976	0.245	31	0.062	302	0.019	164	0.018	89	0.027	327	0.025	184	0.015	41	0.006	246	0.004	24
DCP 6	.250	1.519	0.211	30	0.038	341	0.020	243	0.020	121	0.008	332	0.005	209	0.001	223	0.003	122	0.003	275
DCP 7	.300	1.289	0.228	33	0.060	279	0.022	110	0.005	67	0.017	293	0.019	148	0.014	350	0.006	168	0.004	329
DCP 8	.500	0.747	0.151	42	0.027	253	0.013	9	0.010	133	0.017	257	0.017	92	0.010	271	0.006	73	0.009	252
DCP 9	.600	0.636	0.115	42	0.026	272	0.008	92	0.010	336	0.012	212	0.008	43	0.004	196	0.004	342	0.005	195
DCP10	.695	0.504	0.090	27	0.025	187	0.012	3	0.006	354	0.018	199	0.016	17	0.009	165	0.006	342	0.004	175
DCP11	.800	0.328	0.078	15	0.034	198	0.019	38	0.008	270	0.006	138	0.006	313	0.004	90	0.009	275	0.019	245
DCP12	.878	0.319	0.080	356	0.035	195	0.017	28	0.007	234	0.007	101	0.005	319	0.003	34	0.004	235	0.001	48
DCP13	.953	0.161	0.085	314	0.023	111	0.015	222	0.005	310	0.011	133	0.005	326	0.003	125	0.002	38	0.001	112

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	33.24	0.400	14.59	2.46		1062.3	12
K	**V**	**Q**	**RN**	**DAMPING**	**CN(MAX)**	**ALPHA(STALL)**	
0.125	443.9	752.2	0.48E 07	0.00279	1.515	16.18	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.123	0.355	73	0.082	355	0.019	266	0.010	178	0.007	92	0.008	54	0.003	28	0.002	258	0.002	152
CM		-0.057	0.050	146	0.033	90	0.015	13	0.009	320	0.004	281	0.004	212	0.001	145	0.002	95	0.000	137
DCP 1	.010	5.061	1.424	80	0.333	71	0.120	128	0.118	83	0.129	12	0.107	304	0.078	246	0.045	192	0.019	124
DCP 2	.050	3.348	1.304	104	0.602	65	0.290	33	0.154	18	0.098	27	0.059	48	0.069	54	0.040	35	0.017	93
DCP 3	.100	2.450	1.155	103	0.358	41	0.153	340	0.115	300	0.071	265	0.037	226	0.022	235	0.031	227	0.027	197
DCP 4	.150	1.738	0.839	96	0.205	29	0.094	333	0.077	276	0.032	212	0.024	183	0.012	119	0.007	155	0.031	212
DCP 5	.200	1.601	0.717	81	0.148	13	0.079	306	0.060	254	0.036	219	0.025	175	0.022	113	0.016	134	0.007	81
DCP 6	.250	1.271	0.574	77	0.139	7	0.077	300	0.066	240	0.028	199	0.027	146	0.011	117	0.010	122	0.006	129
DCP 7	.300	1.151	0.491	66	0.124	342	0.074	269	0.045	210	0.024	175	0.019	118	0.009	59	0.011	76	0.002	105
DCP 8	.500	0.774	0.281	45	0.109	303	0.059	230	0.046	164	0.027	117	0.017	76	0.010	29	0.013	348	0.011	322
DCP 9	.600	0.730	0.200	28	0.106	291	0.062	199	0.037	132	0.024	91	0.012	47	0.014	309	0.003	257	0.005	202
DCP10	.695	0.629	0.160	9	0.106	282	0.054	186	0.035	135	0.026	99	0.023	33	0.010	359	0.014	257	0.007	236
DCP11	.800	0.489	0.144	345	0.110	274	0.056	175	0.032	115	0.015	35	0.023	18	0.006	230	0.014	276	0.008	24
DCP12	.878	0.503	0.140	330	0.090	274	0.040	160	0.026	105	0.012	24	0.020	3	0.004	265	0.007	252	0.013	145
DCP13	.953	0.258	0.108	318	0.064	272	0.016	166	0.014	100	0.008	42	0.011	329	0.004	320	0.008	293	0.002	281

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	33.33	0.600	9.98	2.37		1061.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.085	653.3	1491.2	0.64E 07	-0.00086	1.026	10.34

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.907	0.125	32	0.019	78	0.007	127	0.011	78	0.003	13	0.003	293	0.004	130	0.002	90	0.004	29
CM		-0.027	0.035	192	0.003	140	0.002	185	0.004	212	0.002	143	0.001	77	0.001	270	0.001	323	0.002	196
DCP 1	.010	2.376	0.571	0	0.033	106	0.014	79	0.007	55	0.005	22	0.001	172	0.003	45	0.003	49	0.002	227
DCP 2	.050	2.602	0.329	359	0.017	104	0.010	121	0.004	45	0.002	22	0.001	263	0.002	106	0.002	58	0.001	339
DCP 3	.100	2.552	0.239	147	0.178	68	0.035	146	0.018	70	0.025	119	0.010	73	0.016	96	0.013	47	0.005	39
DCP 4	.200	1.592	0.174	128	0.057	216	0.033	202	0.041	172	0.013	313	0.018	315	0.026	216	0.004	34	0.007	165
DCP 5	.250	1.257	0.151	99	0.061	185	0.031	205	0.037	186	0.008	144	0.018	51	0.003	58	0.007	53	0.006	214
DCP 6	.300	0.968	0.169	42	0.055	86	0.034	136	0.023	102	0.010	112	0.006	238	0.008	158	0.004	146	0.004	43
DCP 7	.500	0.564	0.186	23	0.006	70	0.017	58	0.015	57	0.006	54	0.005	268	0.010	110	0.000	167	0.003	41
DCP 8	.600	0.494	0.171	23	0.017	14	0.016	352	0.034	55	0.021	333	0.006	323	0.001	25	0.002	215	0.013	31
DCP 9	.695	0.383	0.148	19	0.011	298	0.007	35	0.013	56	0.005	324	0.003	169	0.010	65	0.003	317	0.003	320
DCP10	.800	0.312	0.139	12	0.014	355	0.009	355	0.022	11	0.011	311	0.013	274	0.008	146	0.008	94	0.014	39
DCP11	.878	0.397	0.131	2	0.011	1	0.005	300	0.011	359	0.005	284	0.006	226	0.002	22	0.008	136	0.006	331
DCP12	.953	0.092	0.137	357	0.012	8	0.006	358	0.007	8	0.005	330	0.001	128	0.004	318	0.002	118	0.005	342

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	33.22	0.600	12.45	2.39		1061.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.085	653.2	1489.1	0.64E 07	-0.00131	1.057	13.50

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.959	0.098	41	0.012	160	0.004	1	0.001	226	0.003	315	0.002	157	0.007	230	0.005	328	0.005	220
CM		-0.056	0.030	202	0.003	268	0.002	347	0.000	230	0.000	35	0.000	164	0.002	4	0.001	72	0.001	20
DCP 1	.010	2.832	0.454	2	0.055	120	0.010	316	0.011	315	0.008	253	0.008	64	0.003	109	0.002	281	0.002	116
DCP 2	.050	2.856	0.280	4	0.029	109	0.021	327	0.009	251	0.001	2	0.007	39	0.003	238	0.002	252	0.005	119
DCP 3	.100	2.300	0.438	162	0.037	292	0.051	310	0.053	237	0.016	266	0.024	228	0.014	271	0.011	299	0.022	232
DCP 4	.150	1.585	0.171	144	0.068	227	0.040	90	0.005	87	0.019	162	0.038	195	0.025	305	0.026	19	0.003	99
DCP 5	.200	1.484	0.030	77	0.022	251	0.049	356	0.025	149	0.043	54	0.026	98	0.002	288	0.018	53	0.016	230
DCP 6	.250	1.222	0.108	77	0.037	153	0.027	351	0.026	49	0.027	290	0.006	254	0.020	280	0.007	334	0.006	355
DCP 7	.300	1.054	0.100	43	0.046	206	0.016	8	0.002	291	0.018	8	0.017	97	0.013	250	0.017	9	0.015	233
DCP 8	.500	0.685	0.159	41	0.032	115	0.011	169	0.006	327	0.022	266	0.009	278	0.015	194	0.007	237	0.003	82
DCP 9	.600	0.591	0.149	34	0.014	63	0.005	273	0.010	60	0.014	40	0.009	30	0.011	155	0.015	341	0.005	241
DCP10	.695	0.506	0.140	27	0.020	141	0.021	141	0.007	103	0.013	138	0.006	277	0.004	225	0.010	236	0.011	329
DCP11	.800	0.421	0.117	16	0.002	269	0.015	205	0.012	218	0.013	212	0.003	147	0.017	194	0.010	230	0.017	186
DCP12	.878	0.517	0.113	9	0.017	54	0.003	162	0.002	261	0.008	347	0.007	46	0.003	263	0.006	271	0.012	190
DCP13	.953	0.152	0.089	16	0.020	54	0.002	40	0.005	357	0.008	142	0.007	201	0.007	29	0.005	111	0.003	161

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.M	TEST POINT	CYCLES ANALYZED
	33.18	0.600	14.62	2.38		1061.3	7

K	V	Q	RN	DAMPING	CM(MAX)	ALPHA(STALL)
0.085	553.2	1485.5	0.64E 07	-0.00060	1.103	16.34

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.002	0.077	39	0.022	59	0.008	228	0.004	331	0.004	160	0.003	227	0.004	116	0.007	27	0.001	154
CM		-0.076	0.026	191	0.001	345	0.001	341	0.001	79	0.001	86	0.003	350	0.002	247	0.001	159	0.001	189
DCP 1	.010	3.134	0.289	358	0.055	92	0.010	188	0.006	191	0.014	231	0.006	156	0.001	241	0.006	291	0.019	223
DCP 2	.050	2.868	0.098	149	0.192	77	0.023	350	0.017	90	0.010	52	0.020	356	0.016	274	0.010	177	0.003	195
DCP 3	.100	2.083	0.216	142	0.079	350	0.018	163	0.027	37	0.028	124	0.021	5	0.010	193	0.044	49	0.020	212
DCP 4	.150	1.506	0.045	59	0.051	343	0.036	298	0.010	130	0.023	181	0.015	310	0.014	265	0.007	355	0.005	142
DCP 5	.200	1.474	0.107	112	0.037	31	0.018	261	0.017	11	0.018	177	0.028	294	0.016	168	0.002	203	0.014	137
DCP 6	.250	1.256	0.076	85	0.022	63	0.024	221	0.021	321	0.014	87	0.013	207	0.017	234	0.013	112	0.007	144
DCP 7	.300	1.093	0.101	55	0.015	107	0.027	247	0.012	275	0.000	20	0.011	313	0.016	113	0.021	4	0.006	108
DCP 8	.500	0.765	0.139	32	0.022	74	0.015	180	0.010	316	0.006	124	0.011	148	0.019	137	0.020	54	0.005	28
DCP 9	.600	0.647	0.096	21	0.032	84	0.004	169	0.011	49	0.013	196	0.010	135	0.022	14	0.007	317	0.009	169
DCP10	.695	0.594	0.122	16	0.006	274	0.008	162	0.007	266	0.004	335	0.015	216	0.017	117	0.008	333	0.011	217
DCP11	.800	0.514	0.092	9	0.011	109	0.005	66	0.009	219	0.012	269	0.008	184	0.015	336	0.003	293	0.020	344
DCP12	.878	0.581	0.092	357	0.008	81	0.004	347	0.004	93	0.006	95	0.011	120	0.002	247	0.005	193	0.013	31
DCP13	.953	0.220	0.079	8	0.011	289	0.008	172	0.011	242	0.003	324	0.009	197	0.013	74	0.004	283	0.005	153

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	47.39	0.400	9.93	2.61		1366.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.178	443.9	753.4	0.48E 07	-0.00104	1.272	12.62

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.063	.208	352	0.009	186	0.001	137	0.001	255	0.003	94	0.003	12	0.002	195	0.002	145	0.003	115
CM		-0.012	0.015	292	0.001	178	0.000	65	0.000	211	0.001	297	0.001	203	0.001	50	0.000	43	0.000	304
DCP 1	.010	4.356	1.629	339	0.188	202	0.063	104	0.018	249	0.029	64	0.015	297	0.011	152	0.013	102	0.012	187
DCP 2	.050	3.413	0.817	341	0.026	120	0.005	243	0.006	233	0.008	92	0.001	66	0.007	149	0.007	93	0.010	123
DCP 3	.100	2.716	0.514	342	0.031	204	0.018	289	0.006	225	0.002	246	0.012	333	0.002	239	0.003	180	0.007	59
DCP 4	.150	2.079	0.356	349	0.012	129	0.005	165	0.001	218	0.004	85	0.004	92	0.001	103	0.003	195	0.004	104
DCP 5	.200	1.802	0.281	349	0.007	138	0.001	111	0.002	236	0.003	97	0.002	31	0.002	191	0.004	122	0.005	100
DCP 6	.250	1.357	0.233	355	0.004	144	0.003	152	0.001	314	0.004	93	0.004	62	0.002	117	0.002	171	0.004	82
DCP 7	.300	1.166	0.203	355	0.006	167	0.002	61	0.000	236	0.002	109	0.001	121	0.002	230	0.002	138	0.003	99
DCP 8	.500	0.700	0.116	12	0.001	170	0.002	169	0.001	327	0.003	143	0.005	39	0.001	84	0.002	189	0.002	155
DCP 9	.600	0.559	0.092	15	0.003	219	0.002	149	0.001	19	0.006	88	0.002	67	0.003	220	0.002	158	0.005	84
DCP10	.695	0.445	0.071	32	0.002	123	0.002	178	0.001	109	0.003	123	0.003	39	0.003	169	0.002	223	0.003	156
DCP11	.800	0.278	0.052	31	0.003	197	0.001	171	0.004	357	0.004	52	0.015	347	0.006	217	0.001	185	0.003	108
DCP12	.878	0.294	0.043	36	0.005	255	0.003	6	0.002	199	0.003	83	0.002	82	0.006	254	0.001	83	0.001	145
DCP13	.953	0.081	0.035	27	0.002	217	0.001	234	0.001	248	0.002	146	0.002	69	0.001	103	0.001	279	0.003	126

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	47.39	0.400	12.36	2.58		1066.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.178	443.9	751.7	0.48E 07	-0.00007	1.493	14.67

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.239	0.237	14	0.015	250	0.007	216	0.006	114	0.005	159	0.007	110	0.002	58	0.004	31	0.002	279
CM		-0.014	0.001	267	0.011	326	0.006	176	0.002	37	0.001	252	0.000	81	0.001	21	0.001	30	0.001	311
DCP 1	.010	5.682	1.493	352	0.244	70	0.161	303	0.073	109	0.053	0	0.024	287	0.020	179	0.033	46	0.011	323
DCP 2	.050	4.131	0.899	11	0.314	318	0.262	224	0.135	156	0.100	127	0.078	78	0.055	41	0.060	5	0.049	299
DCP 3	.100	3.054	0.498	24	0.144	305	0.152	162	0.123	42	0.068	294	0.042	198	0.021	130	0.022	52	0.018	323
DCP 4	.150	2.301	0.329	23	0.057	313	0.053	165	0.035	39	0.019	272	0.016	161	0.011	59	0.003	256	0.008	139
DCP 5	.200	1.980	0.352	24	0.106	247	0.083	100	0.055	336	0.038	211	0.026	108	0.017	347	0.001	108	0.010	227
DCP 6	.250	1.526	0.264	26	0.051	271	0.038	132	0.024	356	0.017	229	0.015	113	0.009	352	0.004	194	0.001	173
DCP 7	.300	1.330	0.274	15	0.074	204	0.045	48	0.023	280	0.022	166	0.014	71	0.011	301	0.005	143	0.010	140
DCP 8	.500	0.791	0.162	23	0.039	164	0.027	333	0.017	195	0.008	91	0.031	271	0.002	177	0.006	159	0.003	335
DCP 9	.600	0.647	0.129	26	0.032	167	0.024	4	0.017	217	0.015	95	0.009	322	0.011	164	0.006	25	0.004	333
DCP10	.695	0.508	0.084	16	0.032	122	0.023	312	0.016	171	0.004	358	0.005	158	0.003	136	0.004	281	0.006	119
DCP11	.800	0.336	0.067	13	0.029	139	0.017	309	0.011	150	0.006	123	0.012	114	0.004	144	0.005	314	0.007	175
DCP12	.878	0.379	0.064	347	0.027	128	0.012	286	0.007	103	0.002	62	0.002	240	0.007	284	0.006	119	0.005	311
DCP13	.953	0.153	0.058	308	0.011	70	0.008	186	0.001	153	0.008	348	0.001	231	0.007	160	0.004	329	0.003	81

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	47.39	0.400	14.57	2.51		1066.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.171	443.9	750.4	0.48E 07	0.00283	1.550	16.18

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.113	0.440	47	0.064	288	0.016	199	0.012	73	0.010	343	0.012	267	0.005	173	0.004	171	0.002	29
CM		-0.057	0.061	143	0.038	41	0.014	313	0.011	235	0.005	158	0.004	88	0.002	340	0.001	281	0.001	266
CCP 1	.010	4.820	1.498	57	0.407	83	0.321	57	0.194	339	0.142	236	0.099	160	0.021	58	0.020	206	0.028	171
CCP 2	.050	3.230	1.383	84	0.594	31	0.262	330	0.113	309	0.090	320	0.096	299	0.089	276	0.050	234	0.013	264
CCP 3	.100	2.391	1.271	80	0.352	353	0.159	283	0.109	234	0.066	179	0.041	172	0.051	141	0.053	89	0.035	36
CCP 4	.150	1.835	0.919	72	0.207	331	0.094	269	0.074	203	0.037	120	0.006	129	0.017	114	0.023	89	0.025	19
CCP 5	.200	1.645	0.820	59	0.149	308	0.110	249	0.060	180	0.034	120	0.015	112	0.026	62	0.019	10	0.019	302
CCP 6	.250	1.308	0.711	51	0.132	299	0.096	230	0.049	173	0.021	93	0.016	103	0.021	95	0.024	26	0.020	329
CCP 7	.300	1.165	0.623	42	0.125	284	0.090	208	0.056	146	0.031	63	0.012	5	0.013	355	0.009	303	0.009	217
CCP 8	.500	0.780	0.394	23	0.112	251	0.054	149	0.049	98	0.033	24	0.024	321	0.012	229	0.004	154	0.011	205
CCP 9	.600	0.693	0.322	10	0.146	234	0.046	137	0.068	64	0.024	335	0.027	273	0.012	191	0.012	143	0.038	168
CCP10	.695	0.589	0.247	358	0.128	233	0.063	119	0.053	53	0.039	330	0.025	274	0.018	183	0.008	139	0.014	65
CCP11	.800	0.470	0.212	342	0.134	215	0.043	110	0.054	20	0.022	300	0.028	271	0.012	164	0.010	33	0.009	52
CCP12	.878	0.528	0.177	329	0.108	210	0.039	112	0.036	8	0.021	276	0.025	211	0.005	150	0.003	101	0.013	27
CCP13	.953	0.260	0.113	311	0.066	209	0.024	108	0.020	334	0.010	301	0.012	194	0.014	87	0.005	148	0.005	156

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	47.39	0.600	9.85	2.50		1064.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.121	653.2	1476.7	0.64E 07	-0.00056	1.105	11.27

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.933	0.167	32	0.022	61	0.002	147	0.005	88	0.002	273	0.001	189	0.002	86	0.001	194	0.001	119
CM		-0.026	0.038	189	0.004	98	0.005	121	0.002	92	0.002	31	0.002	36	0.002	280	0.001	2	0.001	273
DCP 1	.010	2.423	0.614	0	0.038	83	0.005	15	0.003	158	0.009	276	0.010	129	0.002	95	0.001	26	0.004	88
DCP 2	.050	2.625	0.352	359	0.020	68	0.012	147	0.003	150	0.002	229	0.004	101	0.001	27	0.001	80	0.002	64
DCP 3	.100	2.575	0.323	132	0.201	52	0.069	133	0.060	68	0.049	15	0.015	16	0.032	327	0.008	252	0.015	299
DCP 4	.150	1.754	0.183	78	0.020	138	0.022	157	0.010	140	0.014	223	0.008	244	0.012	204	0.006	133	0.014	222
DCP 5	.250	1.296	0.237	88	0.086	129	0.016	116	0.023	144	0.018	287	0.011	38	0.016	316	0.004	359	0.007	281
DCP 6	.300	1.039	0.281	31	0.057	87	0.026	107	0.011	172	0.014	145	0.006	84	0.012	141	0.004	11	0.010	117
DCP 7	.500	0.557	0.191	34	0.007	325	0.013	1	0.013	58	0.006	313	0.001	5	0.006	126	0.002	344	0.003	114
DCP 8	.600	0.474	0.220	18	0.023	312	0.029	304	0.012	325	0.020	248	0.012	186	0.014	116	0.001	191	0.009	92
DCP 9	.695	0.401	0.153	22	0.014	251	0.018	319	0.001	253	0.007	190	0.002	108	0.005	71	0.003	201	0.004	97
DCP10	.800	0.329	0.167	6	0.016	314	0.020	272	0.009	269	0.002	167	0.011	234	0.011	78	0.003	111	0.004	331
DCP11	.878	0.364	0.155	357	0.015	324	0.018	278	0.012	251	0.003	146	0.010	229	0.001	56	0.012	137	0.009	74
DCP12	.953	0.110	0.126	350	0.009	333	0.016	286	0.005	249	0.005	210	0.002	211	0.003	10	0.005	195	0.005	211

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	47.39	0.600	12.35	2.49		1064.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.121	653.2	1475.4	0.64E 07	-0.00116	1.104	13.88

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.984	0.128	45	0.013	163	0.003	17	0.004	84	0.006	304	0.004	194	0.003	114	0.002	332	0.002	322
CM		-0.055	0.036	206	0.006	271	0.002	239	0.003	245	0.001	29	0.000	347	0.001	208	0.002	139	0.001	159
DCP 1	.010	2.881	0.470	1	0.066	114	0.010	302	0.010	247	0.006	156	0.012	259	0.004	173	0.007	140	0.009	90
DCP 2	.050	2.894	0.285	2	0.032	96	0.021	308	0.009	188	0.002	66	0.007	236	0.004	78	0.003	59	0.001	51
DCP 3	.100	2.313	0.339	141	0.115	252	0.030	38	0.019	207	0.039	332	0.024	220	0.020	138	0.017	94	0.017	326
DCP 4	.150	1.632	0.175	156	0.088	246	0.026	249	0.033	263	0.040	324	0.033	128	0.013	237	0.019	193	0.026	166
DCP 5	.200	1.617	0.156	98	0.042	262	0.018	26	0.005	52	0.019	306	0.009	177	0.019	173	0.009	171	0.006	247
DCP 6	.250	1.280	0.132	74	0.034	180	0.009	255	0.018	222	0.008	275	0.010	358	0.008	131	0.011	149	0.003	119
DCP 7	.300	1.140	0.145	64	0.019	170	0.018	194	0.017	65	0.007	245	0.005	228	0.008	135	0.002	234	0.005	249
DCP 8	.500	0.673	0.172	36	0.031	119	0.002	254	0.003	104	0.001	143	0.003	339	0.005	82	0.011	49	0.018	67
DCP 9	.600	0.582	0.196	38	0.021	134	0.013	50	0.029	80	0.003	150	0.003	261	0.004	176	0.013	319	0.012	279
DCP10	.695	0.507	0.158	27	0.031	91	0.013	54	0.015	74	0.003	167	0.012	190	0.014	48	0.005	34	0.005	32
DCP11	.800	0.446	0.149	25	0.013	95	0.012	34	0.005	35	0.011	288	0.005	359	0.011	13	0.020	330	0.011	339
DCP12	.878	0.484	0.139	19	0.018	91	0.012	49	0.004	48	0.004	302	0.006	158	0.004	332	0.016	330	0.007	293
DCP13	.953	0.178	0.106	8	0.015	42	0.008	229	0.003	347	0.004	149	0.002	110	0.004	211	0.001	141	0.004	29

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	47.39	0.600	14.58	2.50		1064.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.121	653.1	1471.0	0.64E 07	-0.00107	1.150	16.36

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.016	0.116	57	0.011	87	0.000	220	0.007	246	0.005	165	0.005	208	0.008	56	0.005	44	0.003	136
CM		-0.075	0.033	205	0.000	9	0.001	10	0.003	27	0.004	264	0.001	5	0.003	228	0.002	293	0.001	223
DCP 1	.010	3.164	0.302	7	0.068	86	0.007	190	0.006	158	0.004	207	0.011	78	0.020	19	0.010	271	0.010	157
DCP 2	.050	2.871	0.149	131	0.182	67	0.003	137	0.045	34	0.032	274	0.007	122	0.002	227	0.008	38	0.016	263
DCP 3	.100	2.104	0.310	141	0.059	56	0.076	194	0.015	356	0.027	234	0.002	13	0.009	347	0.017	136	0.016	151
DCP 4	.150	1.583	0.072	72	0.031	252	0.012	318	0.007	237	0.024	253	0.020	257	0.014	272	0.002	229	0.007	95
DCP 5	.200	1.513	0.195	103	0.012	325	0.014	354	0.021	320	0.022	206	0.015	170	0.003	8	0.011	151	0.005	304
DCP 6	.250	1.298	0.129	79	0.015	182	0.012	115	0.025	266	0.013	212	0.015	206	0.020	211	0.008	221	0.029	172
DCP 7	.300	1.138	0.175	75	0.034	243	0.022	292	0.020	258	0.020	198	0.014	323	0.019	93	0.011	38	0.016	191
DCP 8	.500	0.749	0.165	38	0.030	168	0.018	246	0.019	220	0.007	108	0.018	202	0.001	207	0.012	76	0.003	47
DCP 9	.600	0.636	0.152	42	0.007	114	0.008	194	0.011	221	0.013	84	0.004	268	0.002	83	0.007	75	0.012	69
DCP10	.695	0.603	0.146	15	0.026	84	0.010	166	0.005	240	0.024	107	0.012	167	0.014	56	0.009	27	0.005	167
DCP11	.800	0.533	0.129	33	0.018	9	0.010	177	0.015	204	0.013	59	0.011	218	0.021	21	0.010	27	0.011	63
DCP12	.878	0.560	0.111	28	0.015	18	0.005	173	0.009	170	0.013	51	0.004	120	0.014	40	0.004	251	0.013	342
DCP13	.953	0.241	0.080	12	0.006	101	0.007	113	0.004	90	0.006	106	0.010	80	0.012	353	0.003	15	0.004	31

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	64.00	0.400	9.86	2.56		1069.1	16
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.241	444.0	752.6	0.48E 07	-0.00107	1.272	12.56	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		1.071	0.191 356	0.019 185	0.011 180	0.003 168	0.007 167	0.003 147	0.003 157	0.002 150	0.002 147
CM		-0.011	0.019 285	0.002 141	0.001 103	0.000 49	0.001 18	0.000 289	0.000 91	0.000 44	0.000 329
DCP 1	.010	4.345	1.517 336	0.254 186	0.107 129	0.001 358	0.033 141	0.012 169	0.026 169	0.013 116	0.009 175
DCP 2	.050	3.399	0.758 339	0.062 150	0.044 175	0.014 157	0.021 141	0.011 141	0.009 139	0.005 198	0.004 128
DCP 3	.100	2.802	0.471 342	0.062 192	0.032 215	0.014 180	0.019 188	0.004 208	0.011 134	0.012 151	0.005 118
DCP 4	.150	2.092	0.329 351	0.026 162	0.021 169	0.004 161	0.008 156	0.004 157	0.005 139	0.004 112	0.002 112
DCP 5	.200	1.807	0.258 353	0.020 163	0.015 173	0.005 174	0.009 160	0.004 162	0.003 164	0.001 149	0.001 118
DCP 6	.250	1.392	0.219 1	0.016 174	0.014 171	0.005 162	0.005 171	0.002 116	0.003 117	0.002 132	0.001 138
DCP 7	.300	1.168	0.139 2	0.015 182	0.011 191	0.003 175	0.007 176	0.005 167	0.004 165	0.003 132	0.003 155
DCP 8	.500	0.705	0.117 24	0.007 209	0.006 194	0.002 111	0.003 174	0.002 92	0.001 140	0.000 70	0.002 226
DCP 9	.600	0.594	0.097 30	0.005 216	0.004 202	0.001 167	0.005 171	0.001 96	0.001 307	0.002 314	0.002 36
DCP10	.695	0.464	0.080 45	0.004 246	0.003 211	0.002 129	0.002 188	0.002 91	0.001 240	0.001 231	0.001 319
DCP11	.800	0.281	0.058 49	0.011 242	0.009 236	0.005 212	0.009 185	0.007 173	0.006 164	0.006 150	0.006 137
DCP12	.878	0.235	0.051 52	0.003 241	0.002 257	0.002 359	0.001 212	0.002 52	0.002 275	0.002 334	0.002 163
DCP13	.953	0.084	0.040 39	0.006 230	0.001 153	0.001 143	0.003 129	0.004 101	0.001 344	0.002 149	0.003 334

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	64.00	0.400	12.35	2.62		1068.2	16
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.241	443.9	751.1	0.48E 07	-0.00032	1.500	15.05	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		1.251	0.233 12	0.026 202	0.010 184	0.008 126	0.005 130	0.002 62	0.001 19	0.001 257	0.003 206
CM		-0.011	0.007 282	0.009 301	0.004 135	0.001 309	0.002 161	0.001 70	0.001 192	0.001 332	0.001 153
DCP 1	.010	5.705	1.432 348	0.209 78	0.149 261	0.113 106	0.042 272	0.068 166	0.033 155	0.020 155	0.042 156
DCP 2	.050	4.142	0.882 6	0.279 291	0.272 194	0.138 124	0.089 101	0.079 34	0.050 319	0.039 279	0.040 216
DCP 3	.100	3.174	0.502 16	0.139 262	0.169 125	0.116 349	0.084 215	0.031 101	0.013 198	0.012 31	0.020 230
DCP 4	.150	2.359	0.348 20	0.065 253	0.058 129	0.024 338	0.028 181	0.008 94	0.006 176	0.006 75	0.005 175
DCP 5	.200	1.981	0.338 15	0.113 210	0.086 59	0.063 258	0.043 120	0.016 315	0.011 158	0.001 286	0.011 134
DCP 6	.250	1.586	0.283 22	0.072 222	0.038 84	0.021 273	0.020 153	0.002 8	0.005 109	0.002 253	0.009 115
DCP 7	.300	1.329	0.261 9	0.088 175	0.051 4	0.040 197	0.022 61	0.014 250	0.010 100	0.005 319	0.009 122
DCP 8	.500	0.793	0.162 27	0.039 150	0.028 231	0.018 121	0.004 341	0.002 240	0.005 30	0.004 213	0.006 29
DCP 9	.600	0.679	0.133 27	0.036 140	0.020 294	0.012 126	0.009 355	0.001 16	0.001 349	0.002 74	0.004 243
DCP10	.695	0.498	0.097 33	0.026 120	0.023 261	0.013 100	0.004 323	0.004 273	0.006 17	0.008 150	0.012 314
DCP11	.800	0.351	0.066 25	0.026 101	0.012 242	0.010 67	0.008 328	0.002 11	0.006 319	0.003 56	0.006 314
DCP12	.878	0.329	0.044 351	0.017 93	0.008 226	0.003 65	0.006 319	0.002 140	0.004 261	0.003 131	0.009 271
DCP13	.953	0.141	0.037 317	0.003 103	0.010 149	0.004 338	0.001 3	0.008 219	0.003 37	0.004 321	0.003 128

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	64.00	0.400	14.56	2.57		1068.3	16

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.241	443.9	749.8	0.48E 07	0.00315	1.575	17.14

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		1.142	0.430 23	0.069 217	0.019 135	0.004 255	0.019 171	0.014 109	0.003 62	0.004 146	0.007 117
CM		-0.057	0.060 117	0.032 344	0.013 240	0.007 137	0.004 24	0.003 270	0.003 169	0.002 57	0.001 327
DCP 1	.010	4.879	1.538 38	0.388 64	0.263 349	0.181 231	0.161 127	0.047 65	0.053 146	0.053 77	0.028 1
DCP 2	.050	3.298	1.347 59	0.426 341	0.217 259	0.128 220	0.091 189	0.090 165	0.075 124	0.049 77	0.030 53
DCP 3	.100	2.560	1.248 58	0.342 295	0.132 205	0.103 151	0.055 101	0.059 64	0.044 333	0.022 246	0.011 176
DCP 4	.150	1.943	0.938 48	0.227 268	0.096 200	0.072 119	0.020 88	0.027 48	0.016 299	0.013 239	0.020 164
DCP 5	.200	1.645	0.800 35	0.178 238	0.084 184	0.062 87	0.015 58	0.014 340	0.014 250	0.017 160	0.015 115
DCP 6	.250	1.385	0.708 28	0.165 237	0.099 172	0.050 81	0.010 98	0.010 15	0.013 273	0.018 192	0.026 134
DCP 7	.300	1.176	0.625 15	0.156 214	0.083 144	0.039 53	0.009 337	0.012 269	0.015 201	0.020 114	0.009 87
DCP 8	.500	0.794	0.405 352	0.130 193	0.063 115	0.034 358	0.033 240	0.029 167	0.022 110	0.009 71	0.003 94
DCP 9	.600	0.719	0.321 342	0.123 176	0.057 72	0.034 322	0.039 200	0.028 140	0.015 36	0.002 305	0.014 144
DCP10	.695	0.579	0.243 330	0.113 174	0.051 65	0.042 303	0.036 195	0.030 119	0.022 35	0.000 250	0.010 144
DCP11	.800	0.502	0.191 315	0.113 155	0.058 24	0.036 266	0.025 158	0.025 79	0.010 331	0.014 250	0.009 102
DCP12	.878	0.499	0.137 304	0.090 144	0.049 17	0.028 257	0.016 122	0.029 39	0.017 303	0.016 232	0.005 297
DCP13	.953	0.281	0.077 288	0.050 134	0.026 21	0.007 253	0.010 129	0.017 1	0.019 302	0.001 272	0.003 175

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	64.00	0.600	9.92	2.57		1067.1	16

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.164	653.3	1478.0	0.64E 07	-0.00043	1.154	11.47

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.938	0.204 34	0.022 37	0.003 70	0.004 29	0.002 168	0.001 112	0.002 62	0.000 198	0.002 142
CM		-0.029	0.040 189	0.007 80	0.005 69	0.000 257	0.001 328	0.000 262	0.001 167	0.000 96	0.000 261
DCP 1	.010	2.417	0.674 358	0.023 91	0.010 75	0.006 127	0.005 138	0.005 158	0.008 90	0.004 71	0.001 228
DCP 2	.050	2.595	0.387 357	0.005 61	0.013 146	0.005 117	0.006 126	0.003 118	0.005 111	0.003 170	0.001 169
DCP 3	.100	2.553	0.377 112	0.214 33	0.063 61	0.048 329	0.019 295	0.009 219	0.009 229	0.010 168	0.008 125
DCP 4	.200	1.750	0.268 75	0.027 92	0.021 93	0.020 127	0.010 156	0.014 359	0.013 164	0.006 7	0.005 280
DCP 5	.250	1.311	0.329 76	0.074 119	0.036 85	0.010 193	0.014 235	0.006 200	0.005 150	0.006 212	0.006 244
DCP 6	.300	1.046	0.308 35	0.088 73	0.027 85	0.013 94	0.016 103	0.007 183	0.016 93	0.005 136	0.004 187
DCP 7	.500	0.578	0.234 34	0.018 323	0.015 337	0.013 28	0.008 293	0.009 93	0.012 358	0.004 309	0.003 124
DCP 8	.600	0.507	0.254 19	0.032 291	0.031 272	0.006 64	0.005 161	0.009 14	0.006 332	0.010 296	0.006 143
DCP 9	.695	0.406	0.169 24	0.022 261	0.013 273	0.004 341	0.002 164	0.001 242	0.001 41	0.004 17	0.002 233
DCP10	.800	0.333	0.178 5	0.031 257	0.019 226	0.002 269	0.004 80	0.003 247	0.003 5	0.003 184	0.007 26
DCP11	.878	0.369	0.163 354	0.025 276	0.021 205	0.004 252	0.006 108	0.001 353	0.003 274	0.004 128	0.002 82
DCP12	.953	0.104	0.128 346	0.015 278	0.018 237	0.005 197	0.008 220	0.007 135	0.002 213	0.003 175	0.002 97

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	64.00	0.600	12.36	2.54		1367.2	16

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.164	653.2	1472.3	0.64E 07	-0.00089	1.155	13.81

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.995	0.163	46	0.023	125	0.006	243	0.008	192	0.005	190	0.005	138	0.001	83	0.003	198	0.004	144
CM		-0.057	0.041	204	0.008	223	0.002	301	0.003	299	0.003	323	0.003	295	0.000	14	0.002	15	0.002	317
DCP 1	.010	2.866	0.499	0	0.097	95	0.003	257	0.011	200	0.016	156	0.007	69	0.005	14	0.005	303	0.005	180
DCP 2	.050	2.855	0.294	1	0.058	85	0.020	316	0.015	208	0.009	160	0.008	112	0.009	58	0.007	352	0.004	134
DCP 3	.100	2.324	0.407	132	0.128	216	0.048	281	0.040	236	0.035	256	0.021	229	0.030	177	0.004	109	0.018	219
DCP 4	.150	1.649	0.235	141	0.151	209	0.053	269	0.041	258	0.008	347	0.018	348	0.020	39	0.011	159	0.016	34
DCP 5	.200	1.679	0.227	77	0.040	177	0.030	293	0.007	214	0.022	293	0.004	316	0.007	194	0.004	226	0.009	261
DCP 6	.250	1.278	0.160	75	0.092	174	0.038	236	0.020	230	0.023	275	0.015	210	0.003	186	0.016	131	0.014	58
DCP 7	.300	1.171	0.221	60	0.053	121	0.004	209	0.005	294	0.010	310	0.012	330	0.019	358	0.012	10	0.008	313
DCP 8	.500	0.678	0.218	39	0.039	95	0.019	153	0.011	162	0.010	134	0.017	191	0.003	209	0.004	158	0.005	118
DCP 9	.600	0.606	0.233	34	0.052	71	0.016	102	0.018	155	0.021	149	0.026	127	0.007	187	0.014	214	0.025	173
DCP10	.695	0.508	0.178	27	0.020	53	0.006	139	0.009	138	0.001	206	0.013	159	0.003	316	0.009	286	0.012	311
DCP11	.800	0.457	0.182	21	0.041	34	0.006	335	0.012	110	0.017	158	0.017	86	0.003	211	0.010	183	0.015	139
DCP12	.878	0.492	0.147	16	0.028	18	0.003	191	0.009	98	0.013	149	0.014	59	0.009	145	0.009	157	0.012	97
DCP13	.953	0.171	0.099	6	0.017	4	0.002	89	0.009	128	0.009	132	0.011	86	0.003	35	0.004	180	0.010	142

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	64.00	0.600	14.57	2.58		1367.3	16

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.164	653.1	1469.3	0.64E 07	-0.00101	1.174	15.83

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.021	0.139	62	0.011	31	0.006	226	0.003	333	0.005	223	0.002	279	0.004	168	0.003	336	0.001	205
CM		-0.079	0.037	209	0.002	322	0.001	358	0.002	60	0.002	68	0.001	94	0.001	262	0.002	95	0.000	253
DCP 1	.010	3.096	0.232	5	0.131	95	0.021	358	0.005	10	0.002	122	0.009	280	0.013	201	0.008	351	0.021	235
DCP 2	.050	2.774	0.226	130	0.186	55	0.027	238	0.020	60	0.012	210	0.014	103	0.013	221	0.015	113	0.009	289
DCP 3	.100	2.163	0.236	137	0.087	298	0.011	138	0.009	108	0.018	167	0.021	24	0.013	264	0.024	104	0.009	315
DCP 4	.150	1.526	0.150	113	0.076	310	0.033	311	0.018	13	0.009	150	0.037	96	0.023	238	0.010	110	0.004	258
DCP 5	.200	1.591	0.235	91	0.014	312	0.017	219	0.005	8	0.009	323	0.009	286	0.007	257	0.016	14	0.009	183
DCP 6	.250	1.277	0.178	84	0.041	282	0.004	236	0.011	354	0.008	141	0.006	231	0.018	128	0.009	36	0.015	145
DCP 7	.300	1.154	0.202	77	0.008	4	0.009	213	0.005	8	0.007	150	0.007	200	0.012	182	0.011	2	0.005	97
DCP 8	.500	0.750	0.176	48	0.010	165	0.010	205	0.011	342	0.007	316	0.008	114	0.011	107	0.008	304	0.004	315
DCP 9	.600	0.678	0.191	39	0.025	140	0.014	194	0.005	308	0.006	274	0.005	219	0.010	289	0.024	282	0.007	279
DCP10	.695	0.602	0.143	38	0.005	70	0.004	150	0.010	234	0.011	243	0.012	319	0.007	98	0.005	316	0.017	126
DCP11	.800	0.537	0.155	32	0.020	56	0.005	352	0.013	236	0.015	232	0.013	278	0.002	82	0.007	213	0.007	310
DCP12	.878	0.577	0.131	23	0.015	40	0.003	297	0.008	215	0.010	239	0.009	300	0.004	172	0.005	150	0.006	219
DCP13	.953	0.230	0.093	22	0.004	117	0.009	160	0.008	132	0.006	115	0.004	181	0.013	67	0.002	42	0.011	29

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	80.65	0.400	9.90	2.85		1071.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.303	444.0	755.7	0.48E 07	-0.00095	1.255	12.72

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.063	0.194	3	0.015	188	0.004	19	0.005	191	0.001	129	0.001	357	0.003	113	0.001	71	0.003	121
CM		-0.009	0.025	287	0.002	131	0.000	225	0.001	69	0.001	50	0.001	188	0.000	343	0.000	251	0.001	316
ECP 1	.010	4.460	1.621	335	0.239	182	0.054	57	0.026	163	0.029	61	0.010	211	0.012	117	0.00[illegible]	255	0.009	127
ECP 2	.050	3.356	0.763	340	0.041	122	0.012	277	0.016	148	0.005	92	0.005	176	0.007	149	0.003	169	0.002	211
ECP 3	.100	2.819	0.483	348	0.043	195	0.031	308	0.003	183	0.003	217	0.007	326	0.010	48	0.004	21	0.003	86
ECP 4	.150	2.077	0.345	354	0.020	160	0.004	84	0.010	161	0.005	89	0.003	214	0.003	122	0.002	56	0.002	83
ECP 5	.200	1.829	0.266	0	0.012	168	0.005	40	0.007	180	0.003	105	0.003	110	0.004	92	0.002	358	0.002	121
ECP 6	.250	1.286	0.229	6	0.012	183	0.006	96	0.007	182	0.002	111	0.001	189	0.004	110	0.003	91	0.001	55
ECP 7	.300	1.192	0.197	12	0.012	191	0.005	37	0.008	193	0.003	108	0.002	37	0.004	112	0.001	56	0.001	87
ECP 8	.500	0.662	0.131	34	0.008	218	0.003	118	0.004	194	0.002	122	0.001	283	0.003	141	0.002	97	0.003	60
ECP 9	.600	0.567	0.115	43	0.007	237	0.008	36	0.006	222	0.003	211	0.003	6	0.002	70	0.003	8	0.005	146
ECP10	.695	0.446	0.092	53	0.010	257	0.003	124	0.002	229	0.002	206	0.001	344	0.001	4	0.003	133	0.005	75
ECP11	.800	0.281	0.082	69	0.003	261	0.004	5	0.006	237	0.004	225	0.004	14	0.002	137	0.002	94	0.007	149
ECP12	.878	0.265	0.063	64	0.006	245	0.005	343	0.004	240	0.003	258	0.003	3	0.003	174	0.001	310	0.008	157

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	80.65	0.400	12.40	2.84		1071.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.303	444.0	755.2	0.48E 07	-0.00037	1.482	15.15

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.232	0.242	12	0.018	200	0.007	164	0.005	176	0.005	115	0.003	50	0.001	66	0.003	354	0.001	181
CM		-0.009	0.010	287	0.008	279	0.003	87	0.001	348	0.002	121	0.001	11	0.001	34	0.001	260	0.000	345
ECP 1	.010	5.691	1.415	344	0.252	55	0.146	263	0.113	77	0.061	288	0.021	119	0.005	104	0.011	46	0.012	116
ECP 2	.050	4.016	0.890	6	0.297	291	0.216	189	0.093	135	0.104	107	0.098	33	0.051	327	0.031	276	0.023	276
ECP 3	.100	3.152	0.553	17	0.179	254	0.183	106	0.114	328	0.055	187	0.013	337	0.029	150	0.028	24	0.012	269
ECP 4	.150	2.295	0.385	17	0.082	239	0.068	94	0.033	301	0.021	154	0.008	31	0.009	115	0.006	0	0.004	235
ECP 5	.200	2.042	0.368	12	0.128	195	0.100	34	0.068	233	0.035	92	0.013	281	0.011	87	0.010	267	0.010	96
ECP 6	.250	1.462	0.307	18	0.076	202	0.045	47	0.024	241	0.014	117	0.003	12	0.009	98	0.006	339	0.003	131
ECP 7	.300	1.372	0.279	9	0.094	158	0.059	339	0.042	171	0.020	19	0.015	208	0.014	58	0.005	222	0.011	33
ECP 8	.500	0.747	0.165	24	0.037	104	0.029	235	0.008	90	0.003	288	0.007	117	0.004	267	0.007	72	0.004	252
ECP 9	.600	0.641	0.147	28	0.030	122	0.019	263	0.008	119	0.001	319	0.003	213	0.001	344	0.003	356	0.001	281
ECP10	.695	0.498	0.098	34	0.021	68	0.021	193	0.004	255	0.003	337	0.002	83	0.002	245	0.002	232	0.006	153
ECP11	.800	0.333	0.067	41	0.017	63	0.016	212	0.004	106	0.005	244	0.004	164	0.005	231	0.006	57	0.003	136
ECP12	.878	0.347	0.032	12	0.011	48	0.007	187	0.002	124	0.006	270	0.000	351	0.006	200	0.007	16	0.003	239

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.M	TEST POINT	CYCLES ANALYZED
	80.65	0.400	14.60	2.85		1371.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.303	444.0	754.3	0.48E 07	0.00236	1.495	17.55

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.128	0.388	5	0.055	174	0.006	59	0.016	214	0.014	87	0.005	317	0.004	75	0.003	39	0.003	157
CM		-0.056	0.057	96	0.026	313	0.008	178	0.008	62	0.003	273	0.003	125	0.002	2	0.001	316	0.002	15
DCP 1	.010	4.968	1.499	20	0.346	51	0.245	333	0.126	194	0.071	83	0.038	88	0.050	30	0.027	351	0.016	317
DCP 2	.050	3.015	1.119	46	0.300	323	0.127	247	0.117	184	0.059	138	0.056	112	0.053	57	0.032	14	0.025	346
DCP 3	.100	2.563	1.096	42	0.266	260	0.084	165	0.101	126	0.064	52	0.044	350	0.012	289	0.035	280	0.042	175
DCP 4	.150	1.832	0.890	33	0.186	232	0.079	162	0.048	69	0.028	50	0.024	307	0.008	260	0.012	138	0.014	66
DCP 5	.200	1.735	0.753	18	0.147	207	0.075	159	0.041	47	0.026	8	0.024	258	0.021	166	0.021	75	0.010	44
DCP 6	.250	1.250	0.681	10	0.126	208	0.092	133	0.034	12	0.016	326	0.011	234	0.010	101	0.003	30	0.012	133
DCP 7	.300	1.249	0.591	358	0.093	180	0.069	121	0.026	357	0.023	286	0.029	212	0.026	88	0.015	338	0.013	140
DCP 8	.500	0.765	0.384	330	0.100	161	0.039	38	0.035	304	0.021	166	0.022	59	0.025	339	0.015	183	0.014	26
DCP 9	.600	0.716	0.318	320	0.128	148	0.045	13	0.061	257	0.035	140	0.012	21	0.015	253	0.019	105	0.018	227
DCP10	.695	0.620	0.204	304	0.093	139	0.034	2	0.034	236	0.022	111	0.011	322	0.009	238	0.017	82	0.018	261
DCP11	.800	0.484	0.175	289	0.104	118	0.048	322	0.056	208	0.031	66	0.027	307	0.022	172	0.004	319	0.019	174
DCP12	.878	0.520	0.117	277	0.086	110	0.042	318	0.042	186	0.028	44	0.027	281	0.023	121	0.008	257	0.011	141

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.M	TEST POINT	CYCLES ANALYZED
	80.00	0.600	9.90	2.74		1370.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.205	652.8	1477.4	0.64E 07	-0.00040	1.228	11.84

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.946	0.254	32	0.014	24	0.003	330	0.007	280	0.008	161	0.003	175	0.001	34	0.001	184	0.002	335
CM		-0.032	0.042	191	0.010	60	0.005	59	0.002	68	0.002	337	0.000	312	0.000	324	0.001	173	0.001	96
DCP 1	.010	2.422	0.761	352	0.051	111	0.008	320	0.016	168	0.010	65	0.007	140	0.002	159	0.002	72	0.004	146
DCP 2	.050	2.538	0.436	352	0.022	115	0.011	151	0.007	171	0.006	83	0.003	143	0.003	154	0.003	70	0.002	164
DCP 3	.100	2.694	0.401	97	0.246	19	0.040	46	0.066	277	0.006	170	0.023	181	0.009	62	0.006	154	0.005	299
DCP 4	.200	1.731	0.354	65	0.051	131	0.023	98	0.035	72	0.004	75	0.006	57	0.014	332	0.010	220	0.000	136
DCP 5	.250	1.195	0.445	64	0.095	100	0.037	82	0.005	186	0.001	284	0.020	185	0.022	114	0.014	44	0.010	308
DCP 6	.300	1.042	0.406	36	0.086	62	0.040	35	0.013	16	0.009	158	0.007	320	0.009	261	0.014	210	0.006	82
DCP 7	.500	0.584	0.295	32	0.037	273	0.026	320	0.011	302	0.012	234	0.010	190	0.002	98	0.003	145	0.008	37
DCP 8	.600	0.532	0.291	18	0.053	257	0.043	251	0.005	235	0.023	163	0.009	54	0.009	280	0.007	145	0.012	8
DCP 9	.695	0.429	0.199	22	0.039	235	0.018	267	0.010	283	0.020	178	0.004	34	0.003	122	0.000	181	0.007	23
DCP10	.800	0.333	0.189	3	0.036	241	0.029	210	0.013	235	0.014	109	0.005	215	0.002	41	0.006	31	0.015	251
DCP11	.878	0.371	0.174	350	0.031	245	0.023	196	0.013	227	0.008	100	0.003	160	0.005	110	0.011	331	0.011	216

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	80.32	0.600	12.40	2.72		1370.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.205	653.0	1472.4	0.64E 07	-0.00083	1.196	13.93

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.002	0.197	47	0.007	153	0.002	314	0.002	77	0.002	48	0.002	274	0.006	117	0.003	278	0.001	57
CM		-0.056	0.047	205	0.004	209	0.001	204	0.000	185	0.003	226	0.001	155	0.001	301	0.001	112	0.001	262
DCP 1	.010	2.881	0.543	358	0.093	102	0.009	332	0.004	109	0.007	299	0.010	202	0.010	121	0.006	57	0.001	259
DCP 2	.050	2.762	0.255	10	0.077	50	0.041	276	0.015	141	0.009	295	0.013	170	0.011	81	0.007	31	0.005	295
DCP 3	.100	2.507	0.368	120	0.047	286	0.025	65	0.015	287	0.039	272	0.047	198	0.018	203	0.006	38	0.018	235
DCP 4	.150	1.666	0.280	137	0.162	229	0.026	274	0.033	59	0.023	177	0.022	23	0.036	108	0.011	272	0.016	33
DCP 5	.200	1.698	0.251	79	0.039	231	0.007	179	0.009	226	0.017	211	0.002	73	0.005	137	0.010	235	0.014	191
DCP 6	.250	1.208	0.253	75	0.049	165	0.032	210	0.019	240	0.005	247	0.016	247	0.004	56	0.003	11	0.016	278
DCP 7	.300	1.181	0.270	65	0.051	171	0.010	180	0.016	102	0.007	98	0.009	317	0.007	36	0.018	217	0.007	45
DCP 8	.500	0.679	0.268	42	0.025	104	0.005	31	0.009	329	0.003	140	0.007	100	0.006	243	0.011	56	0.010	320
DCP 9	.600	0.634	0.293	33	0.037	37	0.018	35	0.009	134	0.020	73	0.012	36	0.012	97	0.010	305	0.005	24
DCP10	.695	0.521	0.210	29	0.013	60	0.005	76	0.013	242	0.019	55	0.012	286	0.013	143	0.001	334	0.008	111
DCP11	.800	0.445	0.215	20	0.023	354	0.009	339	0.007	30	0.006	6	0.005	352	0.005	124	0.010	264	0.013	138
DCP12	.878	0.477	0.178	12	0.020	349	0.007	325	0.008	44	0.013	359	0.009	270	0.010	105	0.006	293	0.009	55

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	80.32	0.600	14.50	2.74		1370.3	20

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.205	653.0	1467.7	0.63E 07	-0.00108	1.218	15.14

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.017	0.178	67	0.012	22	0.012	18	0.007	257	0.007	110	0.009	65	0.003	352	0.005	25	0.002	254
CM		-0.082	0.044	216	0.002	24	0.002	170	0.003	10	0.004	255	0.006	233	0.002	226	0.003	224	0.001	159
DCP 1	.010	2.994	0.061	17	0.263	96	0.077	17	0.015	43	0.030	340	0.019	260	0.014	210	0.005	154	0.012	314
DCP 2	.050	2.681	0.278	126	0.197	56	0.003	261	0.051	37	0.025	269	0.009	13	0.010	272	0.017	243	0.015	221
DCP 3	.100	2.202	0.226	117	0.092	298	0.022	141	0.050	266	0.025	220	0.026	247	0.004	229	0.015	224	0.015	237
DCP 4	.150	1.480	0.209	115	0.085	327	0.033	44	0.013	5	0.017	212	0.018	287	0.011	348	0.012	17	0.027	218
DCP 5	.200	1.598	0.273	91	0.050	317	0.019	80	0.029	284	0.027	179	0.016	260	0.008	270	0.013	329	0.016	183
DCP 6	.250	1.161	0.232	86	0.043	292	0.029	338	0.031	302	0.026	229	0.026	216	0.022	221	0.005	250	0.018	179
DCP 7	.300	1.172	0.262	76	0.034	277	0.023	4	0.016	264	0.015	134	0.009	140	0.012	273	0.005	349	0.004	41
DCP 8	.500	0.754	0.225	52	0.026	146	0.014	9	0.003	154	0.020	74	0.025	112	0.002	96	0.005	256	0.013	58
DCP 9	.600	0.701	0.235	48	0.016	91	0.010	84	0.012	203	0.023	100	0.028	90	0.012	10	0.009	131	0.020	56
DCP10	.695	0.634	0.191	44	0.013	69	0.012	348	0.016	172	0.013	62	0.032	66	0.021	68	0.005	74	0.011	7
DCP11	.800	0.546	0.189	36	0.005	22	0.008	7	0.016	215	0.018	70	0.027	38	0.006	57	0.028	51	0.013	289
DCP12	.878	0.579	0.165	34	0.004	330	0.008	327	0.008	180	0.011	58	0.035	10	0.009	17	0.030	27	0.012	253

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	97.56	0.200	9.90	3.01		1374.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.725	224.7	204.5	0.26E 07	-0.00139	1.152	12.37

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.931	0.215	49	0.007	207	0.017	304	0.003	326	0.007	116	0.003	333	0.003	73	0.009	312	0.006	115
CM		-0.028	0.047	292	0.004	112	0.006	146	0.000	278	0.002	331	0.001	156	0.001	290	0.003	123	0.001	285
DCP 1	.010	3.204	1.097	351	0.069	119	0.039	206	0.022	315	0.016	354	0.007	36	0.011	52	0.005	322	0.000	100
DCP 2	.050	2.588	0.601	1	0.058	110	0.028	196	0.011	303	0.009	60	0.010	159	0.009	74	0.019	17	0.004	303
DCP 3	.100	2.161	0.414	15	0.035	171	0.004	165	0.013	165	0.020	76	0.002	282	0.008	117	0.019	2	0.010	108
DCP 4	.150	1.956	0.418	19	0.029	161	0.023	232	0.007	324	0.004	27	0.003	230	0.003	357	0.006	293	0.006	87
DCP 5	.200	1.637	0.309	34	0.016	201	0.021	308	0.008	285	0.015	92	0.008	286	0.002	34	0.004	277	0.016	145
DCP 6	.250	1.261	0.297	43	0.014	181	0.025	292	0.009	330	0.009	119	0.005	328	0.005	14	0.001	233	0.005	98
DCP 7	.300	1.043	0.261	55	0.014	222	0.022	321	0.005	347	0.013	114	0.007	337	0.002	91	0.007	318	0.011	128
DCP 8	.500	0.768	0.244	79	0.009	293	0.024	301	0.007	348	0.005	142	0.005	327	0.004	73	0.009	256	0.005	118
DCP 9	.600	0.459	0.233	83	0.016	250	0.028	323	0.002	21	0.013	124	0.008	334	0.007	330	0.015	304	0.009	134
DCP10	.695	0.353	0.204	88	0.005	341	0.021	332	0.002	29	0.008	192	0.003	22	0.005	17	0.014	321	0.005	72
DCP11	.800	0.281	0.177	105	0.031	291	0.024	294	0.005	126	0.008	144	0.004	90	0.015	129	0.016	310	0.006	110
DCP12	.878	0.322	0.146	102	0.008	285	0.024	341	0.004	199	0.010	129	0.005	320	0.002	188	0.021	313	0.007	90

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	97.56	0.200	12.40	3.02		1374.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.725	224.7	204.4	0.26E 07	-0.00140	1.364	13.20

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.147	0.218	49	0.015	213	0.018	292	0.003	107	0.006	80	0.003	81	0.003	115	0.009	197	0.004	201
CM		-0.035	0.047	290	0.003	99	0.006	130	0.001	308	0.002	313	0.001	275	0.001	298	0.002	45	0.001	81
DCP 1	.010	4.462	1.116	-51	0.079	172	0.032	198	0.011	340	0.030	359	0.005	217	0.015	260	0.020	158	0.025	248
DCP 2	.050	3.322	0.605	1	0.050	166	0.016	224	0.013	102	0.018	27	0.008	332	0.004	353	0.006	236	0.007	265
DCP 3	.100	2.636	0.447	13	0.028	152	0.015	241	0.013	162	0.015	35	0.006	163	0.008	180	0.005	62	0.012	44
DCP 4	.150	2.324	0.395	23	0.036	182	0.026	231	0.009	35	0.009	57	0.004	338	0.003	339	0.015	157	0.003	188
DCP 5	.200	1.907	0.315	35	0.017	206	0.019	282	0.005	301	0.012	49	0.006	101	0.001	199	0.012	165	0.010	109
DCP 6	.250	1.503	0.288	45	0.022	215	0.016	288	0.007	331	0.010	87	0.007	353	0.004	57	0.014	186	0.008	138
DCP 7	.300	1.228	0.264	54	0.014	229	0.021	308	0.002	327	0.010	102	0.003	30	0.005	79	0.011	181	0.012	151
DCP 8	.500	0.893	0.248	83	0.018	234	0.027	301	0.003	36	0.002	130	0.002	96	0.003	67	0.01	291	0.014	188
DCP 9	.600	0.616	0.237	80	0.015	252	0.023	305	0.002	170	0.006	109	0.011	120	0.008	149	0.014	185	0.004	172
DCP10	.695	0.396	0.208	90	0.013	266	0.023	319	0.007	128	0.005	157	0.006	80	0.001	42	0.008	253	0.014	231
DCP11	.800	0.340	0.171	93	0.019	243	0.036	285	0.011	109	0.010	108	0.003	8	0.006	98	0.011	242	0.009	321
DCP12	.878	0.488	0.144	98	0.007	308	0.016	325	0.007	148	0.009	108	0.006	108	0.010	131	0.004	225	0.010	335

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	97.56	0.200	14.60	3.00		1374.3	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.725	224.7	204.1	0.26E 07	-0.00132	1.542	16.88	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		1.317	0.212 50	0.008 237	0.012 307	0.002 187	0.011 110	0.001 193	0.005 102	0.002 194	0.002 358
CM		-0.034	0.045 292	0.004 108	0.002 180	0.001 294	0.002 309	0.000 93	0.001 315	0.001 91	0.001 146
DCP 1	.010	5.525	1.136 353	0.092 87	0.100 305	0.048 211	0.021 74	0.017 123	0.013 122	0.011 106	0.006 249
DCP 2	.050	3.906	0.593 1	0.026 155	0.022 228	0.015 160	0.012 74	0.003 88	0.011 101	0.010 343	0.008 12
DCP 3	.100	3.066	0.420 15	0.024 169	0.012 231	0.002 281	0.018 83	0.007 131	0.001 81	0.008 112	0.011 343
DCP 4	.150	2.614	0.393 24	0.028 196	0.025 233	0.003 34	0.009 79	0.001 131	0.010 43	0.007 149	0.003 130
DCP 5	.200	2.155	0.298 38	0.016 218	0.016 280	0.006 299	0.018 93	0.006 228	0.001 340	0.012 157	0.009 84
DCP 6	.250	1.694	0.285 46	0.015 238	0.013 288	0.004 8	0.003 63	0.002 235	0.004 40	0.000 129	0.004 90
DCP 7	.300	1.416	0.260 56	0.014 205	0.018 312	0.006 328	0.017 119	0.001 243	0.008 11	0.006 195	0.008 146
DCP 8	.500	0.975	0.244 81	0.020 276	0.014 327	0.002 311	0.005 149	0.002 290	0.012 87	0.005 221	0.008 147
DCP 9	.600	0.732	0.222 83	0.012 294	0.020 322	0.003 176	0.017 117	0.004 197	0.010 168	0.003 149	0.007 328
DCP10	.695	0.402	0.195 91	0.022 318	0.018 346	0.011 122	0.005 144	0.002 85	0.009 159	0.005 318	0.003 195
DCP11	.800	0.363	0.167 97	0.021 228	0.012 148	0.003 210	0.014 126	0.006 273	0.005 103	0.005 296	0.013 330
DCP12	.878	0.590	0.136 100	0.008 330	0.017 350	0.003 151	0.017 113	0.001 91	0.005 142	0.003 271	0.018 332

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	96.62	0.400	9.90	3.00		1073.1	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.363	444.0	750.2	0.48E 07	-0.00094	1.270	12.91	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		1.061	0.197 11	0.013 233	0.002 268	0.002 148	0.003 40	0.001 28	0.003 64	0.001 132	0.004 303
CM		-0.016	0.031 284	0.003 139	0.001 180	0.000 285	0.001 243	0.000 240	0.001 243	0.001 67	0.002 139
DCP 1	.010	4.316	1.624 335	0.231 193	0.056 116	0.008 196	0.013 22	0.005 18	0.011 171	0.015 38	0.005 212
DCP 2	.050	3.087	0.717 342	0.020 142	0.024 215	0.010 163	0.002 291	0.004 94	0.004 131	0.007 52	0.003 37
DCP 3	.100	2.836	0.482 352	0.045 215	0.024 250	0.009 148	0.006 279	0.008 311	0.007 52	0.006 56	0.004 336
DCP 4	.150	2.041	0.352 359	0.013 208	0.011 215	0.002 134	0.004 13	0.003 66	0.000 50	0.007 94	0.003 118
DCP 5	.200	1.852	0.279 7	0.009 236	0.004 284	0.001 351	0.006 51	0.002 334	0.002 52	0.002 128	0.004 238
DCP 6	.250	1.300	0.241 14	0.010 255	0.005 261	0.002 4	0.005 33	0.001 40	0.002 53	0.005 128	0.001 263
DCP 7	.300	1.206	0.212 22	0.009 262	0.005 298	0.001 155	0.004 53	0.001 302	0.004 19	0.004 166	0.005 255
DCP 8	.500	0.713	0.151 44	0.014 272	0.004 313	0.000 104	0.003 24	0.002 132	0.003 76	0.003 178	0.004 239
DCP 9	.600	0.575	0.143 54	0.013 281	0.005 325	0.002 151	0.006 79	0.004 9	0.004 23	0.002 193	0.006 275
DCP10	.695	0.462	0.119 64	0.012 297	0.001 329	0.001 315	0.005 56	0.002 129	0.005 51	0.002 286	0.004 319
DCP11	.800	0.291	0.105 76	0.012 271	0.009 33	0.004 134	0.002 47	0.003 52	0.003 86	0.001 266	0.012 345
DCP12	.878	0.265	0.083 73	0.008 298	0.005 356	0.002 121	0.002 45	0.002 35	0.003 103	0.002 236	0.012 325

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	97.56	0.400	12.40	2.98		1073.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.367	444.0	750.0	0.48E 07	-0.00047	1.495	15.30

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.241	0.240	14	0.010	219	0.008	201	0.005	81	0.003	78	0.003	87	0.002	59	0.003	241	0.002	267
CM		-0.014	0.015	279	0.008	271	0.003	130	0.002	315	0.002	126	0.002	328	0.001	245	0.002	67	0.001	179
DCP 1	.010	5.598	1.408	339	0.250	46	0.190	253	0.093	72	0.051	298	0.005	197	0.021	142	0.021	354	0.010	124
DCP 2	.050	3.758	0.805	6	0.304	299	0.233	196	0.102	124	0.086	87	0.071	10	0.035	289	0.013	295	0.014	212
DCP 3	.100	3.221	0.566	15	0.184	258	0.182	116	0.117	345	0.040	216	0.006	229	0.032	145	0.039	25	0.016	268
DCP 4	.150	2.317	0.398	16	0.084	242	0.058	100	0.037	321	0.015	178	0.006	121	0.010	35	0.003	213	0.004	172
DCP 5	.200	2.067	0.374	15	0.118	200	0.093	36	0.058	247	0.034	98	0.014	324	0.002	157	0.009	151	0.014	225
DCP 6	.250	1.503	0.317	18	0.074	204	0.044	43	0.023	273	0.016	147	0.008	88	0.011	347	0.014	177	0.004	55
DCP 7	.300	1.399	0.273	12	0.078	154	0.054	334	0.022	165	0.010	42	0.003	256	0.008	46	0.010	222	0.004	130
DCP 8	.500	0.810	0.176	30	0.038	99	0.030	262	0.012	91	0.006	9	0.008	140	0.008	354	0.009	179	0.003	297
DCP 9	.600	0.655	0.159	37	0.031	105	0.022	263	0.012	102	0.006	334	0.012	114	0.004	236	0.011	59	0.013	232
DCP10	.695	0.506	0.113	44	0.026	58	0.014	226	0.008	117	0.005	308	0.008	127	0.006	170	0.009	274	0.003	11
DCP11	.800	0.341	0.078	46	0.023	55	0.007	242	0.009	114	0.009	299	0.009	138	0.005	93	0.009	278	0.005	95
DCP12	.878	0.343	0.037	50	0.017	14	0.007	133	0.004	67	0.005	268	0.005	161	0.011	65	0.014	224	0.015	357

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	95.69	0.400	14.60	2.97		1073.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.360	444.0	748.3	0.48E 07	0.00122	1.485	17.66

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.163	0.310	2	0.024	168	0.009	78	0.020	170	0.018	345	0.007	9	0.004	356	0.004	328	0.006	358
CM		-0.057	0.039	69	0.018	293	0.008	189	0.011	21	0.007	146	0.001	258	0.001	283	0.002	216	0.003	231
DCP 1	.010	4.978	1.136	16	0.598	26	0.419	266	0.278	120	0.111	341	0.074	180	0.083	39	0.037	274	0.044	139
DCP 2	.050	3.173	0.988	33	0.296	311	0.166	209	0.083	119	0.052	138	0.077	43	0.060	326	0.020	283	0.024	252
DCP 3	.100	2.688	1.105	35	0.314	261	0.110	145	0.080	99	0.048	28	0.066	325	0.041	233	0.017	112	0.005	252
DCP 4	.150	1.984	0.845	20	0.199	219	0.078	129	0.043	33	0.008	341	0.033	308	0.014	175	0.005	139	0.011	2
DCP 5	.200	1.718	0.703	10	0.110	201	0.076	118	0.034	17	0.017	317	0.017	292	0.007	183	0.002	190	0.013	343
DCP 6	.250	1.332	0.593	359	0.116	182	0.074	101	0.043	1	0.025	287	0.016	197	0.003	97	0.016	351	0.020	314
DCP 7	.300	1.240	0.486	348	0.099	175	0.087	78	0.058	334	0.017	243	0.011	64	0.012	35	0.019	314	0.013	286
DCP 8	.500	0.814	0.247	313	0.090	139	0.053	18	0.060	244	0.029	86	0.013	14	0.010	342	0.016	243	0.015	124
DCP 9	.600	0.734	0.193	307	0.076	116	0.036	4	0.076	213	0.044	31	0.014	131	0.006	170	0.017	192	0.024	17
DCP10	.695	0.613	0.089	298	0.055	102	0.036	356	0.053	184	0.035	2	0.006	29	0.003	10	0.014	113	0.023	355
DCP11	.800	0.512	0.079	258	0.057	86	0.030	302	0.066	168	0.069	315	0.011	339	0.004	212	0.023	49	0.008	118
DCP12	.878	0.530	0.054	241	0.055	67	0.015	282	0.058	148	0.053	291	0.004	141	0.011	72	0.028	4	0.019	2

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	97.56	0.600	9.90	2.80		1372.1	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.249	653.4	1482.2	0.64E 07	-0.00030	1.283	12.65	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.923	0.295 24	0.024 337	0.025 223	0.011 147	0.006 54	0.002 96	0.000 299	0.001 344	0.006 142
CM		-0.032	0.045 190	0.015 45	0.009 29	0.004 260	0.001 171	0.001 306	0.001 253	0.001 161	0.002 20
DCP 1	.010	2.386	0.848 343	0.037 74	0.045 186	0.016 165	0.008 191	0.002 126	0.005 117	0.006 140	0.004 132
DCP 2	.050	2.366	0.438 343	0.016 59	0.031 166	0.007 173	0.003 112	0.001 320	0.004 108	0.003 90	0.002 189
DCP 3	.100	2.657	0.367 71	0.269 358	0.042 222	0.050 216	0.011 108	0.014 138	0.010 0	0.009 153	0.010 2
DCP 4	.200	1.618	0.398 63	0.137 55	0.021 21	0.056 184	0.040 28	0.042 356	0.052 281	0.024 199	0.058 124
DCP 5	.250	1.183	0.526 47	0.114 54	0.009 77	0.026 143	0.010 45	0.016 274	0.012 200	0.006 31	0.010 320
DCP 6	.300	1.041	0.503 30	0.072 17	0.043 333	0.011 19	0.013 58	0.005 264	0.014 148	0.003 39	0.012 102
DCP 7	.500	0.608	0.351 23	0.068 255	0.057 238	0.012 149	0.008 183	0.013 157	0.013 103	0.006 36	0.009 3
DCP 8	.600	0.514	0.315 15	0.068 231	0.042 222	0.015 216	0.021 85	0.007 176	0.003 65	0.012 3	0.001 225
DCP 9	.695	0.430	0.215 17	0.042 222	0.050 222	0.018 65	0.015 157	0.007 80	0.008 54	0.008 277	0.010 143
DCP10	.800	0.311	0.203 2	0.057 230	0.046 194	0.029 96	0.018 342	0.009 113	0.008 13	0.008 313	0.022 210
DCP11	.878	0.343	0.177 347	0.053 229	0.045 173	0.029 76	0.015 315	0.004 76	0.003 255	0.003 26	0.022 197

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	97.09	0.600	12.40	2.70		1072.2	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.248	653.3	1478.5	0.64E 07	-0.00087	1.325	12.81	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		1.036	0.291 49	0.013 120	0.007 225	0.002 294	0.005 138	0.009 336	0.002 228	0.008 281	0.002 287
CM		-0.054	0.061 202	0.005 107	0.003 0	0.001 255	0.003 358	0.003 138	0.002 327	0.005 136	0.001 18
DCP 1	.010	2.841	0.620 354	0.114 108	0.037 209	0.023 189	0.029 168	0.023 129	0.014 118	0.013 103	0.010 66
DCP 2	.050	2.536	0.224 15	0.100 42	0.069 255	0.044 179	0.028 127	0.015 74	0.007 228	0.018 116	0.015 16
DCP 3	.100	2.690	0.608 109	0.079 73	0.066 32	0.028 313	0.015 354	0.032 262	0.002 324	0.003 204	0.006 20
DCP 4	.200	1.667	0.338 88	0.091 221	0.038 256	0.012 280	0.017 136	0.032 105	0.020 6	0.010 76	0.010 342
DCP 5	.250	1.266	0.404 72	0.102 155	0.036 236	0.026 277	0.014 274	0.013 192	0.028 194	0.022 116	0.028 231
DCP 6	.300	1.203	0.463 63	0.070 131	0.010 125	0.024 339	0.042 17	0.044 3	0.040 324	0.024 295	0.024 303
DCP 7	.500	0.732	0.396 35	0.026 105	0.013 84	0.015 124	0.003 196	0.009 256	0.017 211	0.014 187	0.014 112
DCP 8	.600	0.644	0.396 34	0.035 339	0.027 242	0.014 117	0.012 157	0.026 1	0.016 255	0.005 286	0.004 293
DCP 9	.695	0.523	0.274 25	0.021 298	0.023 178	0.015 80	0.019 179	0.010 222	0.035 119	0.012 31	0.004 9
DCP10	.800	0.430	0.252 22	0.024 298	0.013 200	0.003 340	0.019 173	0.022 326	0.010 116	0.045 287	0.009 170
DCP11	.878	0.460	0.200 10	0.035 281	0.006 176	0.014 274	0.024 179	0.021 305	0.008 135	0.039 283	0.012 231

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	97.09	0.600	14.60	2.68		1072.3	10
K	**V**	**Q**	**RN**	**DAMPING**	**CN(MAX)**	**ALPHA(STALL)**	
0.248	653.3	1476.3	0.64E 07	-0.00103	1.287	16.13	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.017	0.245	60	0.014	250	0.017	190	0.010	224	0.008	223	0.013	177	0.010	144	0.009	136	0.008	108
CM		-0.077	0.053	210	0.005	41	0.004	344	0.005	33	0.006	57	0.004	336	0.004	359	0.003	320	0.003	299
CGP 1	.010	3.036	0.255	13	0.213	85	0.049	282	0.038	224	0.020	200	0.025	159	0.016	124	0.007	3	0.008	239
CGP 2	.050	2.555	0.275	97	0.187	26	0.045	223	0.020	272	0.020	172	0.015	195	0.018	130	0.003	159	0.004	86
CGP 3	.100	2.250	0.484	116	0.108	293	0.042	313	0.036	345	0.038	46	0.022	243	0.011	139	0.011	233	0.023	187
CGP 4	.150	1.565	0.230	102	0.121	259	0.026	258	0.024	89	0.026	98	0.020	271	0.030	18	0.015	93	0.023	72
CGP 5	.200	1.628	0.412	85	0.047	239	0.020	234	0.005	217	0.003	5	0.011	245	0.021	95	0.012	245	0.016	49
CGP 6	.250	1.235	0.333	75	0.057	201	0.021	104	0.023	13	0.018	26	0.014	175	0.005	163	0.006	293	0.013	327
CGP 7	.300	1.168	0.343	69	0.065	220	0.059	184	0.025	198	0.019	145	0.022	176	0.035	84	0.024	105	0.021	56
CGP 8	.500	0.793	0.343	45	0.016	80	0.019	96	0.009	355	0.020	314	0.010	227	0.027	250	0.015	205	0.026	215
CGP 9	.600	0.673	0.313	45	0.021	141	0.018	147	0.007	281	0.011	242	0.017	105	0.020	105	0.022	70	0.016	55
CGP10	.695	0.609	0.230	35	0.023	242	0.026	163	0.025	176	0.019	237	0.026	117	0.022	198	0.009	94	0.008	63
CGP11	.800	0.509	0.214	31	0.023	241	0.023	195	0.033	217	0.028	226	0.021	170	0.026	143	0.021	152	0.026	90
CGP12	.878	0.547	0.181	22	0.029	258	0.023	214	0.041	223	0.044	225	0.027	189	0.028	181	0.025	155	0.028	139

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.39	0.200	0.07	4.95		1394.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.122	224.6	197.6	0.25E 07	-0.00169	0.384	5.14

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		-0.063	0.449 352	0.023 161	0.005 175	0.010 134	0.007 116	0.007 92	0.004 158	0.003 67	0.004 99
CM		-0.032	0.016 293	0.002 108	0.001 168	0.002 339	0.001 298	0.002 289	0.001 4	0.001 308	0.001 302
DCP 1	.010	-2.964	3.287 346	0.209 115	0.062 168	0.026 139	0.039 101	0.014 82	0.015 171	0.017 106	0.019 91
DCP 2	.050	-0.652	1.488 347	0.081 170	0.015 163	0.020 101	0.011 75	0.007 74	0.008 168	0.024 32	0.008 73
DCP 3	.100	-0.249	1.111 345	0.064 158	0.017 197	0.026 122	0.014 177	0.021 73	0.013 135	0.002 142	0.005 75
DCP 4	.150	0.260	0.755 350	0.045 178	0.009 142	0.011 122	0.012 100	0.007 62	0.006 130	0.004 47	0.003 63
DCP 5	.200	0.144	0.632 347	0.039 157	0.009 225	0.012 146	0.004 65	0.005 95	0.007 149	0.002 112	0.008 131
DCP 6	.250	-0.006	0.515 354	0.032 192	0.005 161	0.003 145	0.009 111	0.004 61	0.002 211	0.005 51	0.003 106
DCP 7	.300	-0.002	0.447 351	0.029 149	0.010 177	0.007 84	0.006 159	0.005 75	0.003 123	0.002 280	0.004 97
DCP 8	.500	0.189	0.272 2	0.015 200	0.006 106	0.010 105	0.010 99	0.005 137	0.001 121	0.005 2	.008 71
DCP 9	.600	0.026	0.217 355	0.013 143	0.008 221	0.009 97	0.001 272	0.008 99	0.005 138	0.004 271	0.008 168
DCP 10	.695	0.028	0.158 13	0.020 239	0.001 131	0.004 242	0.004 93	0.007 89	0.006 254	0.002 277	0.001 8
DCP 11	.800	0.030	0.111 11	0.006 87	0.007 320	0.040 164	0.009 154	0.016 122	0.008 137	0.007 137	0.008 100
DCP 12	.953	-0.048	0.060 15	0.008 287	0.003 71	0.006 2	0.009 90	0.005 62	0.007 210	0.008 94	0.003 232

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.49	0.200	7.37	4.93		1094.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.123	224.6	197.3	0.25E 07	-0.00147	1.128	12.42

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.700	0.422 352	0.025 164	0.005 211	0.010 160	0.003 157	0.005 190	0.006 132	0.003 97	0.003 173
CM		-0.027	0.013 286	0.003 57	0.001 126	0.003 8	0.001 26	0.001 37	0.001 345	0.001 332	0.001 350
DCP 1	.010	1.818	2.548 348	0.175 141	0.042 156	0.049 132	0.022 123	0.016 109	0.023 149	0.028 70	0.010 352
DCP 2	.050	1.757	1.442 348	0.088 146	0.015 234	0.029 152	0.016 149	0.014 143	0.014 104	0.013 7	0.010 119
DCP 3	.100	1.604	1.086 345	0.068 144	0.014 205	0.012 101	0.007 67	0.007 233	0.013 115	0.005 158	0.011 204
DCP 4	.150	1.583	0.760 350	0.055 176	0.011 180	0.015 152	0.008 124	0.010 156	0.009 146	0.004 73	0.004 34
DCP 5	.200	1.206	0.593 348	0.040 168	0.005 257	0.006 186	0.003 313	0.003 285	0.007 78	0.001 157	0.003 129
DCP 6	.250	0.955	0.515 354	0.035 170	0.010 178	0.007 151	0.003 215	0.005 124	0.005 165	0.007 80	0.003 296
DCP 7	.300	0.805	0.450 351	0.030 164	0.007 184	0.004 138	0.003 44	0.004 192	0.004 106	0.002 124	0.004 217
DCP 8	.500	0.682	0.266 1	0.017 177	0.002 207	0.008 124	0.004 109	0.004 174	0.005 98	0.005 72	0.002 341
DCP 9	.600	0.439	0.193 2	0.002 248	0.002 229	0.004 288	0.002 307	0.008 268	0.006 80	0.007 159	0.004 175
DCP 10	.695	0.297	0.146 14	0.012 202	0.002 237	0.003 79	0.006 245	0.005 193	0.005 189	0.007 44	0.004 218
DCP 11	.800	0.216	0.101 12	0.009 278	0.009 313	0.041 182	0.012 175	0.007 206	0.009 163	0.007 174	0.016 154
DCP 12	.953	0.043	0.064 4	0.011 210	0.003 239	0.002 216	0.006 211	0.006 195	0.008 175	0.000 244	0.004 191

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.50	0.200	9.69	4.99		1094.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.123	224.6	197.4	0.25E 07	-0.00165	1.318	14.57

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.920	0.411	354	0.012	131	0.005	60	0.005	139	0.003	211	0.001	185	0.004	344	0.002	179	0.004	52
CM		-0.025	0.015	282	0.002	159	0.002	220	0.002	356	0.001	28	0.000	18	0.000	147	0.001	311	0.001	240
DCP 1	.010	3.128	2.464	349	0.097	147	0.028	119	0.017	93	0.012	184	0.012	176	0.014	54	0.020	308	0.013	18
DCP 2	.050	2.475	1.402	349	0.056	136	0.012	148	0.017	66	0.011	295	0.013	28	0.014	322	0.013	253	0.006	256
DCP 3	.100	2.205	1.055	345	0.038	131	0.014	84	0.015	143	0.015	106	0.010	209	0.014	355	0.022	154	0.004	10
DCP 4	.150	1.959	0.753	352	0.030	152	0.008	316	0.005	94	0.005	241	0.006	56	0.002	46	0.002	333	0.009	50
DCP 5	.200	1.518	0.596	347	0.018	112	0.004	82	0.003	185	0.006	263	0.001	210	0.005	353	0.002	147	0.001	131
DCP 6	.250	1.236	0.500	356	0.020	149	0.002	153	0.004	108	0.006	330	0.002	39	0.006	343	0.001	185	0.007	63
DCP 7	.300	1.054	0.436	351	0.010	130	0.006	10	0.007	132	0.003	141	0.003	224	0.004	316	0.005	172	0.002	81
DCP 8	.500	0.808	0.256	6	0.005	102	0.002	129	0.002	145	0.004	231	0.004	195	0.005	356	0.004	273	0.005	31
DCP 9	.600	0.560	0.191	4	0.003	45	0.011	41	0.005	345	0.001	84	0.004	189	0.007	344	0.004	134	0.007	128
DCP10	.695	0.354	0.144	18	0.002	271	0.004	170	0.006	70	0.003	311	0.006	354	0.005	341	0.004	22	0.010	58
DCP11	.800	0.279	0.102	19	0.008	24	0.021	29	0.026	186	0.007	171	0.005	183	0.004	281	0.010	137	0.001	50
DCP12	.953	0.059	0.070	15	0.003	189	0.006	141	0.005	77	0.008	222	0.001	65	0.002	104	0.003	259	0.003	17

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.53	0.200	12.28	4.98		1094.4	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.123	224.6	197.1	0.25E 07	-0.00111	1.530	17.35

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.141	0.397	2	0.031	178	0.008	330	0.004	210	0.002	1	0.002	348	0.005	246	0.002	6	0.003	225
CM		-0.024	0.011	293	0.004	320	0.003	106	0.003	235	0.002	126	0.001	132	0.001	76	0.001	167	0.000	34
DCP 1	.010	4.421	2.411	354	0.141	201	0.034	343	0.087	226	0.072	125	0.045	27	0.012	279	0.004	334	0.024	282
DCP 2	.050	3.216	1.345	354	0.088	185	0.023	106	0.037	235	0.016	163	0.019	225	0.007	133	0.002	77	0.004	319
DCP 3	.100	2.768	1.020	358	0.059	188	0.019	356	0.011	235	0.016	346	0.006	18	0.024	245	0.008	75	0.011	144
DCP 4	.150	2.331	0.722	359	0.041	186	0.020	91	0.018	245	0.012	110	0.009	285	0.003	120	0.002	322	0.002	107
DCP 5	.200	1.844	0.561	1	0.030	174	0.011	10	0.005	198	0.003	333	0.002	319	0.010	253	0.004	93	0.001	313
DCP 6	.250	1.506	0.482	5	0.043	210	0.017	79	0.018	249	0.013	103	0.005	254	0.007	119	0.005	315	0.002	220
DCP 7	.300	1.288	0.423	6	0.024	183	0.010	351	0.003	199	0.007	16	0.003	185	0.008	248	0.003	119	0.007	201
DCP 8	.500	0.943	0.243	13	0.023	184	0.006	315	0.005	169	0.008	356	0.003	29	0.001	340	0.004	282	0.005	259
DCP 9	.600	0.660	0.184	11	0.028	146	0.038	327	0.021	141	0.015	319	0.004	88	0.012	259	0.006	71	0.002	219
DCP10	.695	0.426	0.137	23	0.019	160	0.009	271	0.007	125	0.004	199	0.004	101	0.005	163	0.006	1	0.005	230
DCP11	.800	0.339	0.087	10	0.028	134	0.025	270	0.025	28	0.020	304	0.006	317	0.014	284	0.006	325	0.002	218
DCP12	.953	0.103	0.077	4	0.022	176	0.005	118	0.004	309	0.009	138	0.008	349	0.005	144	0.005	0	0.002	85

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.37	0.200	14.97	4.98		1148.1	10
K	V	Q	RN	DAMPING	CY(MAX)	ALPHA(STALL)	
0.122	224.5	200.2	0.26E 07	0.00164	1.892	19.30	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.441	0.451	18	0.108	214	0.058	46	0.026	251	0.024	104	0.011	351	0.005	148	0.007	133	0.003	89
CM		-0.050	0.017	130	0.025	328	0.017	164	0.008	14	0.007	262	0.003	128	0.002	315	0.000	10	0.001	291
DCP 1	.010	5.792	2.205	15	0.199	232	0.189	73	0.086	342	0.049	341	0.041	258	0.015	48	0.033	179	0.047	149
DCP 2	.050	4.156	1.410	15	0.286	249	0.132	109	0.073	328	0.041	145	0.034	47	0.014	33	0.036	149	0.017	131
DCP 3	.100	3.329	1.092	24	0.238	266	0.126	124	0.064	343	0.034	200	0.028	91	0.005	325	0.012	187	0.019	28
DCP 4	.150	2.706	0.770	32	0.220	268	0.120	114	0.067	316	0.046	165	0.029	34	0.017	268	0.016	132	0.007	109
DCP 5	.200	2.376	0.645	32	0.203	257	0.108	100	0.052	289	0.032	130	0.011	349	0.005	198	0.004	109	0.005	210
DCP 6	.250	1.821	0.578	29	0.167	243	0.093	67	0.056	260	0.035	96	0.014	0	0.002	188	0.009	92	0.005	172
DCP 7	.300	1.663	0.532	23	0.187	225	0.107	59	0.056	243	0.038	105	0.009	332	0.010	217	0.020	95	0.007	277
DCP 8	.500	0.800	0.330	14	0.141	185	0.105	10	0.046	205	0.025	79	0.026	12	0.013	138	0.008	19	0.008	137
DCP 9	.600	0.819	0.260	7	0.131	171	0.084	3	0.036	211	0.031	99	0.012	1	0.017	163	0.008	137	0.015	0
DCP10	.695	0.859	0.194	6	0.113	165	0.071	356	0.028	203	0.033	79	0.028	320	0.013	112	0.008	194	0.007	161
DCP11	.800	0.681	0.121	350	0.081	148	0.050	340	0.012	207	0.020	114	0.013	265	0.003	18	0.005	180	0.009	8
DCP12	.953	0.161	0.128	324	0.061	135	0.024	334	0.026	196	0.033	71	0.010	262	0.007	123	0.006	208	0.005	144

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.37	0.200	17.53	4.89		1148.2	10
K	V	Q	RN	DAMPING	CY(MAX)	ALPHA(STALL)	
0.122	224.6	200.2	0.26E 07	0.00516	2.274	22.54	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.457	0.545	40	0.117	275	0.095	186	0.082	85	0.060	336	0.045	223	0.029	118	0.020	19	0.007	278
CM		-0.083	0.080	145	0.046	32	0.036	311	0.031	205	0.024	104	0.019	359	0.012	248	0.009	151	0.004	56
DCP 1	.010	5.681	1.995	60	0.655	34	0.503	282	0.533	182	0.350	96	0.163	5	0.085	245	0.068	156	0.068	125
DCP 2	.050	3.905	1.490	66	0.537	4	0.326	274	0.285	175	0.174	75	0.124	348	0.062	246	0.040	149	0.052	107
DCP 3	.100	3.055	1.398	74	0.455	344	0.191	246	0.128	184	0.088	56	0.049	290	0.020	135	0.018	3	0.038	196
DCP 4	.150	2.520	1.070	66	0.271	315	0.096	217	0.123	131	0.098	13	0.054	259	0.031	160	0.039	79	0.027	15
DCP 5	.200	2.270	0.896	56	0.258	286	0.105	206	0.129	112	0.098	0	0.074	265	0.059	176	0.027	83	0.015	344
DCP 6	.250	1.812	0.806	47	0.215	274	0.137	202	0.167	102	0.115	356	0.072	263	0.054	163	0.041	80	0.028	13
DCP 7	.300	1.662	0.755	39	0.239	265	0.151	198	0.163	91	0.107	345	0.087	256	0.058	167	0.026	64	0.018	321
DCP 8	.500	0.875	0.516	17	0.193	231	0.162	167	0.164	61	0.117	327	0.089	220	0.070	116	0.050	36	0.024	302
DCP 9	.600	0.947	0.417	6	0.164	223	0.148	157	0.130	40	0.099	309	0.095	206	0.058	106	0.046	5	0.035	287
DCP10	.695	0.966	0.339	356	0.143	218	0.135	140	0.117	39	0.078	299	0.070	183	0.062	74	0.049	0	0.029	259
DCP11	.800	0.824	0.268	343	0.125	223	0.117	135	0.091	14	0.093	272	0.082	166	0.045	49	0.048	304	0.028	218
DCP12	.953	0.242	0.239	325	0.096	210	0.101	109	0.059	0	0.059	249	0.048	136	0.039	10	0.029	266	0.024	131

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	15.11	0.200	19.78	4.80		5036.4	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.115	219.7	199.4	0.26E 07	-0.00461	1.515	21.10	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.977	0.403	67	0.071	55	0.034	36	0.021	22	0.017	15	0.008	49	0.004	313	0.018	130	0.006	274
CM		-0.075	0.071	211	0.023	169	0.012	177	0.007	188	0.003	210	0.004	291	0.002	134	0.003	343	0.003	60
DCP 1	.010	4.053	0.915	113	0.514	128	0.102	143	0.041	214	0.018	8	0.042	324	0.026	319	0.034	206	0.041	130
DCP 2	.025	3.925	0.932	113	0.288	118	0.122	128	0.069	107	0.046	7	0.021	223	0.018	218	0.076	126	0.019	33
DCP 3	.100	1.490	0.773	119	0.083	151	0.011	132	0.005	338	0.007	332	0.023	327	0.011	308	0.055	107	0.031	314
DCP 4	.150	1.099	0.565	77	0.156	126	0.012	157	0.051	336	0.031	30	0.016	60	0.011	347	0.026	156	0.020	116
DCP 5	.200	1.209	0.545	67	0.093	72	0.044	0	0.013	43	0.022	307	0.032	164	0.025	124	0.028	84	0.009	292
DCP 6	.250	1.136	0.547	58	0.135	77	0.058	83	0.039	336	0.024	337	0.016	345	0.020	295	0.021	217	0.019	139
DCP 7	.300	0.999	0.494	55	0.140	48	0.062	46	0.014	73	0.002	315	0.036	179	0.023	174	0.033	113	0.007	317
DCP 8	.400	1.010	0.556	53	0.142	54	0.062	54	0.041	18	0.019	32	0.012	66	0.003	332	0.002	187	0.007	281
DCP 9	.500	0.719	0.428	52	0.095	13	0.051	36	0.048	105	0.035	102	0.043	95	0.021	112	0.025	118	0.013	140
DCP10	.600	0.692	0.449	50	0.103	22	0.052	18	0.034	356	0.017	85	0.027	51	0.027	349	0.009	0	0.020	331
DCP11	.878	0.530	0.233	40	0.079	333	0.052	341	0.033	2	0.033	351	0.024	329	0.012	252	0.030	160	0.018	195

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.21	0.400	-0.00	4.84		1385.1	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.061	444.0	723.7	0.46E 07	-0.00106	0.459	4.98	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		-0.063	0.497	353	0.058	195	0.011	265	0.005	132	0.002	192	0.002	115	0.002	120	0.002	164	0.002	61
CM		-0.018	0.010	282	0.002	219	0.002	287	0.001	203	0.002	247	0.001	301	0.001	244	0.001	274	0.001	212
DCP 1	.010	-1.979	2.232	349	0.987	230	0.450	317	0.111	127	0.206	266	0.141	6	0.068	147	0.073	295	0.090	55
DCP 2	.050	-0.505	1.910	348	0.162	131	0.071	181	0.025	102	0.061	137	0.054	226	0.020	322	0.026	163	0.041	248
DCP 3	.100	0.053	1.399	352	0.137	142	0.066	192	0.017	265	0.019	119	0.027	202	0.012	311	0.017	119	0.009	204
DCP 4	.150	-0.070	0.941	350	0.086	149	0.053	178	0.021	231	0.008	64	0.013	161	0.003	267	0.010	195	0.012	156
DCP 5	.200	0.268	0.743	355	0.072	170	0.025	188	0.013	250	0.008	305	0.010	95	0.008	201	0.003	246	0.005	132
DCP 6	.250	-0.098	0.597	352	0.060	191	0.007	273	0.010	186	0.008	319	0.004	78	0.010	120	0.003	115	0.005	138
DCP 7	.300	-0.024	0.507	356	0.068	205	0.012	302	0.004	105	0.003	132	0.006	93	0.005	148	0.007	197	0.003	358
DCP 8	.500	-0.021	0.300	357	0.047	210	0.012	304	0.006	80	0.003	129	0.003	85	0.005	95	0.003	173	0.001	42
DCP 9	.600	-0.016	0.232	359	0.028	207	0.006	357	0.006	100	0.003	71	0.005	107	0.004	67	0.003	110	0.004	72
DCP10	.695	0.078	0.173	3	0.022	192	0.002	248	0.001	43	0.004	49	0.004	111	0.006	103	0.001	145	0.002	32
DCP11	.800	0.000	0.129	7	0.010	185	0.004	107	0.009	74	0.007	69	0.007	91	0.003	48	0.005	73	0.008	28
DCP12	.878	0.014	0.103	5	0.007	119	0.006	149	0.002	281	0.002	104	0.002	176	0.001	282	0.002	151	0.002	27
DCP13	.953	0.003	0.079	5	0.006	138	0.005	143	0.002	204	0.004	96	0.005	188	0.002	298	0.002	9	0.001	190

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.34	0.400	7.33	4.88		1385.2	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.061	444.0	721.3	0.46E 07	-0.00109	1.290	12.20	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.779	0.513	353	0.028	155	0.004	223	0.003	158	0.002	173	0.003	135	0.001	118	0.000	47	0.000	126
CM		-0.015	0.012	308	0.001	219	0.001	115	0.001	228	0.000	168	0.000	207	0.000	109	0.000	66	0.000	176
DCP 1	.010	2.643	3.297	349	0.286	199	0.152	140	0.055	40	0.023	252	0.026	156	0.014	257	0.016	197	0.016	60
DCP 2	.050	2.403	1.768	349	0.105	132	0.047	304	0.061	206	0.029	122	0.013	167	0.022	80	0.025	11	0.011	191
DCP 3	.100	2.217	1.323	351	0.064	161	0.012	283	0.012	174	0.012	176	0.010	106	0.004	167	0.008	200	0.002	77
DCP 4	.150	1.570	0.890	351	0.051	143	0.008	251	0.008	185	0.002	206	0.004	121	0.003	139	0.004	128	0.003	154
DCP 5	.200	1.381	0.735	352	0.042	136	0.006	203	0.003	172	0.005	170	0.001	30	0.005	200	0.003	131	0.003	94
DCP 6	.250	0.943	0.600	352	0.031	156	0.006	207	0.004	47	0.008	234	0.009	162	0.007	76	0.002	313	0.006	213
DCP 7	.300	0.827	0.533	354	0.028	142	0.003	267	0.004	132	0.002	197	0.003	110	0.003	167	0.001	78	0.001	209
DCP 8	.500	0.509	0.314	356	0.017	140	0.003	232	0.003	141	0.002	6	0.002	128	0.002	144	0.001	17	0.001	74
DCP 9	.600	0.412	0.234	358	0.012	135	0.005	271	0.004	224	0.002	193	0.002	244	0.003	310	0.001	227	0.003	261
DCP10	.695	0.361	0.168	2	0.010	141	0.003	227	0.003	83	0.002	332	0.001	304	0.001	55	0.001	148	0.001	39
DCP11	.800	0.224	0.117	5	0.005	105	0.004	278	0.006	60	0.003	105	0.001	128	0.002	309	0.001	85	0.002	46
DCP12	.878	0.192	0.087	8	0.002	164	0.001	338	0.002	10	0.001	288	0.002	74	0.002	290	0.001	37	0.001	317
DCP13	.953	0.136	0.073	7	0.011	172	0.002	234	0.001	91	0.003	339	0.005	84	0.007	121	0.005	259	0.005	10

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.50	0.400	9.63	4.91		1385.3	5
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.062	443.9	720.3	0.46E 07	-0.00089	1.449	14.32	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.983	0.439	0	0.033	18	0.021	223	0.005	107	0.003	178	0.003	23	0.002	255	0.005	235	0.003	176
CM		-0.010	0.012	315	0.001	353	0.002	274	0.001	131	0.001	3	0.002	243	0.001	101	0.001	343	0.001	133
DCP 1	.010	3.998	3.101	355	0.122	304	0.021	261	0.078	262	0.104	188	0.045	179	0.053	134	0.041	51	0.033	48
DCP 2	.050	3.223	1.662	356	0.166	333	0.200	207	0.148	100	0.102	9	0.055	319	0.031	342	0.076	251	0.073	199
DCP 3	.100	2.730	1.079	358	0.120	55	0.041	282	0.007	274	0.021	205	0.011	92	0.009	206	0.006	175	0.006	68
DCP 4	.150	1.932	0.716	358	0.077	44	0.035	250	0.004	141	0.003	87	0.006	267	0.006	178	0.004	171	0.003	119
DCP 5	.200	1.623	0.580	359	0.063	42	0.030	243	0.006	125	0.004	183	0.010	79	0.010	26	0.009	285	0.005	147
DCP 6	.250	1.207	0.479	2	0.064	28	0.027	241	0.007	101	0.004	28	0.010	292	0.003	203	0.008	305	0.008	235
DCP 7	.300	1.017	0.431	2	0.047	33	0.025	242	0.004	135	0.006	197	0.001	357	0.008	235	0.007	213	0.002	296
DCP 8	.500	0.619	0.241	9	0.042	23	0.018	244	0.004	163	0.008	159	0.002	22	0.003	268	0.003	185	0.002	76
DCP 9	.600	0.479	0.183	10	0.023	38	0.009	225	0.004	296	0.010	185	0.007	76	0.001	30	0.004	251	0.004	69
DCP10	.695	0.408	0.135	15	0.018	4	0.014	212	0.002	351	0.005	157	0.003	87	0.004	170	0.004	200	0.006	120
DCP11	.800	0.287	0.109	12	0.002	128	0.012	106	0.010	265	0.009	200	0.007	95	0.003	216	0.007	190	0.004	57
DCP12	.878	0.246	0.110	2	0.028	215	0.020	113	0.009	343	0.004	210	0.004	64	0.004	112	0.002	221	0.003	7
DCP13	.953	0.171	0.099	352	0.023	218	0.012	109	0.013	70	0.004	10	0.017	27	0.024	301	0.001	17	0.023	252

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.38	0.400	12.22	4.83		1385.4	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.062	443.9	721.2	0.46E 07	0.00078	1.536	15.63

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		1.059	0.283 50	0.151 22	0.036 284	0.028 238	0.019 150	0.007 100	0.006 338	0.005 199	0.004 268
CM		-0.039	0.044 166	0.029 63	0.010 18	0.012 332	0.008 257	0.006 210	0.006 133	0.001 69	0.003 45
DCP 1	.010	4.532	1.747 32	0.869 34	0.186 316	0.092 257	0.043 139	0.036 84	0.013 14	0.034 139	0.038 56
DCP 2	.050	3.240	0.678 66	0.691 50	0.191 0	0.203 325	0.163 276	0.151 241	0.136 207	0.095 180	0.071 159
DCP 3	.100	2.629	0.607 101	0.670 49	0.183 326	0.104 282	0.066 225	0.055 192	0.056 130	0.037 102	0.039 52
DCP 4	.150	1.867	0.487 95	0.434 34	0.093 298	0.074 285	0.074 203	0.053 145	0.039 74	0.012 39	0.026 346
DCP 5	.200	1.554	0.439 90	0.341 23	0.062 280	0.085 280	0.070 185	0.021 122	0.031 89	0.019 6	0.010 1
DCP 6	.250	1.247	0.371 72	0.250 16	0.055 275	0.066 255	0.066 162	0.035 110	0.035 60	0.020 350	0.018 298
DCP 7	.300	1.060	0.357 65	0.214 5	0.046 256	0.061 246	0.057 147	0.023 95	0.032 37	0.019 303	0.006 327
DCP 8	.500	0.728	0.260 40	0.092 326	0.033 226	0.047 192	0.040 96	0.021 65	0.032 341	0.013 252	0.017 255
DCP 9	.600	0.594	0.224 24	0.059 297	0.021 219	0.042 185	0.038 57	0.022 40	0.025 333	0.008 270	0.014 234
DCP10	.695	0.525	0.208 11	0.053 270	0.034 225	0.049 147	0.026 47	0.018 42	0.028 293	0.009 148	0.014 271
DCP11	.800	0.424	0.208 359	0.066 251	0.033 214	0.041 144	0.029 82	0.028 12	0.023 284	0.004 210	0.018 221
DCP12	.878	0.373	0.216 352	0.062 244	0.030 226	0.037 145	0.017 71	0.017 20	0.016 275	0.006 143	0.002 225
DCP13	.953	0.264	0.197 338	0.048 219	0.017 231	0.012 121	0.006 251	0.011 293	0.012 239	0.014 198	0.009 123

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.58	0.400	14.92	4.85		1147.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.062	443.8	737.8	0.47E 07	0.00021	1.562	16.34

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		1.090	0.294 94	0.104 60	0.063 63	0.033 0	0.011 331	0.014 284	0.008 210	0.008 189	0.005 165
CM		-0.051	0.060 175	0.019 131	0.019 109	0.012 92	0.009 38	0.007 31	0.004 339	0.003 327	0.001 275
DCP 1	.010	5.022	1.382 85	0.715 76	0.345 80	0.096 39	0.032 324	0.057 268	0.049 224	0.008 232	0.005 52
DCP 2	.050	3.162	1.034 133	0.534 102	0.410 106	0.241 85	0.204 72	0.129 65	0.108 83	0.085 91	0.069 136
DCP 3	.100	2.188	1.055 140	0.439 82	0.242 98	0.184 49	0.102 12	0.077 3	0.060 328	0.040 308	0.032 312
DCP 4	.150	1.856	0.793 125	0.170 74	0.227 83	0.077 24	0.070 15	0.051 346	0.034 286	0.027 306	0.016 232
DCP 5	.200	1.675	0.589 117	0.170 57	0.167 76	0.095 359	0.055 354	0.058 308	0.033 284	0.034 258	0.023 245
DCP 6	.250	1.184	0.512 105	0.100 61	0.154 54	0.051 0	0.061 330	0.036 311	0.036 257	0.025 259	0.014 199
DCP 7	.300	1.182	0.401 93	0.103 44	0.116 47	0.064 337	0.051 319	0.046 280	0.036 251	0.032 224	0.020 209
DCP 8	.500	0.732	0.259 61	0.053 11	0.055 356	0.029 305	0.031 263	0.025 252	0.020 202	0.020 197	0.012 136
DCP 9	.600	0.674	0.215 46	0.062 9	0.055 322	0.045 294	0.038 211	0.024 220	0.021 150	0.015 150	0.005 72
DCP10	.695	0.631	0.207 25	0.057 346	0.048 296	0.040 285	0.032 212	0.024 225	0.017 158	0.012 158	0.009 178
DCP11	.800	0.532	0.182 6	0.055 351	0.053 276	0.038 272	0.034 186	0.025 195	0.020 107	0.011 124	0.005 29
DCP12	.953	0.224	0.201 353	0.040 340	0.034 275	0.014 284	0.018 225	0.015 179	0.009 171	0.020 104	0.007 47

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.63	0.400	17.51	4.83		1146.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.063	443.7	739.0	0.47E 07	-0.00111	1.547	16.24

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		1.104	0.320 110	0.086 177	0.035 143	0.026 179	0.008 127	0.008 149	0.004 60	0.004 143	0.005 195
CM		-0.070	0.062 192	0.025 209	0.015 238	0.008 249	0.009 239	0.006 276	0.003 249	0.002 282	0.001 348
DCP 1	.010	5.288	1.501 118	0.516 165	0.141 188	0.071 203	0.073 146	0.049 135	0.012 48	0.014 313	0.012 306
DCP 2	.050	3.021	1.254 151	0.472 190	0.273 222	0.236 249	0.196 290	0.148 329	0.091 14	0.058 73	0.048 119
DCP 3	.100	2.029	1.179 151	0.344 212	0.198 183	0.135 229	0.084 210	0.078 254	0.047 293	0.051 281	0.023 315
DCP 4	.150	1.754	0.757 134	0.311 200	0.084 176	0.081 186	0.053 187	0.037 226	0.012 248	0.016 243	0.013 266
DCP 5	.200	1.556	0.600 125	0.246 199	0.050 147	0.098 177	0.040 203	0.044 184	0.029 204	0.019 228	0.015 242
DCP 6	.250	1.182	0.487 112	0.195 180	0.047 139	0.060 144	0.041 146	0.022 151	0.012 181	0.010 242	0.006 243
DCP 7	.300	1.148	0.416 102	0.150 176	0.038 128	0.059 148	0.036 160	0.034 173	0.023 178	0.017 210	0.011 235
DCP 8	.500	0.764	0.271 72	0.053 132	0.035 98	0.027 95	0.031 90	0.026 137	0.012 118	0.018 131	0.011 196
DCP 9	.600	0.730	0.228 59	0.047 73	0.042 87	0.019 87	0.036 71	0.021 119	0.012 84	0.016 143	0.014 188
DCP10	.695	0.705	0.204 41	0.063 34	0.048 69	0.014 76	0.038 44	0.025 81	0.015 57	0.012 85	0.005 95
DCP11	.800	0.609	0.184 31	0.076 30	0.052 69	0.014 73	0.030 37	0.022 78	0.009 42	0.009 64	0.010 145
DCP12	.953	0.311	0.152 14	0.083 28	0.040 64	0.018 71	0.015 46	0.014 47	0.017 19	0.007 48	0.005 352

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.41	0.400	24.57	4.86		1146.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.062	443.8	738.7	0.47E 07	-0.00202	1.112	27.63

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		1.001	0.109 50	0.023 194	0.007 308	0.009 279	0.002 219	0.005 257	0.002 75	0.002 205	0.005 34
CM		-0.126	0.041 204	0.005 31	0.002 170	0.000 186	0.001 14	0.000 63	0.000 23	0.000 244	0.001 203
DCP 1	.010	3.432	1.519 167	0.281 90	0.279 234	0.095 237	0.038 272	0.070 249	0.048 90	0.044 292	0.010 91
DCP 2	.050	1.979	0.384 167	0.143 265	0.032 88	0.050 297	0.005 103	0.010 345	0.009 336	0.002 154	0.021 10
DCP 3	.100	1.367	0.178 24	0.030 186	0.030 29	0.013 276	0.004 32	0.012 279	0.004 7	0.003 161	0.007 72
DCP 4	.150	1.441	0.195 27	0.029 176	0.016 20	0.012 317	0.003 33	0.004 272	0.002 274	0.008 234	0.006 25
DCP 5	.200	1.330	0.190 22	0.028 195	0.009 13	0.010 297	0.002 189	0.006 232	0.002 51	0.008 157	0.008 65
DCP 6	.250	1.085	0.199 27	0.028 175	0.014 25	0.007 282	0.005 56	0.003 275	0.001 37	0.003 232	0.006 42
DCP 7	.300	1.094	0.197 21	0.034 195	0.010 352	0.008 271	0.005 213	0.008 223	0.001 195	0.012 177	0.003 84
DCP 8	.500	0.846	0.181 29	0.025 197	0.012 345	0.004 258	0.003 237	0.003 263	0.002 39	0.004 296	0.006 22
DCP 9	.600	0.835	0.168 34	0.026 194	0.012 359	0.008 353	0.006 70	0.005 55	0.007 48	0.006 80	0.009 24
DCP10	.695	0.832	0.143 38	0.022 187	0.005 338	0.002 293	0.007 217	0.003 306	0.002 114	0.003 85	0.006 10
DCP11	.800	0.730	0.117 43	0.021 205	0.009 291	0.006 296	0.005 222	0.003 209	0.005 147	0.006 182	0.003 26
DCP12	.953	0.423	0.088 43	0.017 236	0.006 269	0.005 236	0.005 188	0.007 260	0.005 255	0.008 344	0.002 77

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.93	0.600	-0.01	4.90		1383.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.043	653.2	1400.6	0.61E 07	-0.00096	0.537	4.92

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		-0.093	0.600	352	0.063	193	0.014	253	0.003	200	0.003	204	0.002	188	0.002	162	0.001	214	0.001	353
CM		-0.017	0.010	288	0.004	230	0.002	301	0.001	49	0.001	179	0.000	324	0.000	77	0.000	332	0.000	340
DCP 1	.010	-1.767	1.942	343	0.934	232	0.18_	282	0.186	208	0.048	277	0.047	133	0.010	161	0.023	104	0.010	47
DCP 2	.050	-0.731	2.235	347	0.173	198	0.179	313	0.085	42	0.034	272	0.038	16	0.020	212	0.028	316	0.011	24
DCP 3	.100	-0.213	2.00?	350	0.180	178	0.022	197	0.065	49	0.056	138	0.015	350	0.020	167	0.012	204	0.014	50
DCP 4	.150	-0.062	1.325	351	0.134	130	0.067	175	0.051	40	0.033	179	0.050	203	0.043	75	0.017	280	0.022	237
DCP 5	.200	0.203	0.972	355	0.116	134	0.046	213	0.018	231	0.027	133	0.017	267	0.006	33	0.008	145	0.001	320
DCP 6	.250	-0.115	0.789	352	0.069	131	0.045	165	0.026	228	0.003	188	0.016	216	0.010	300	0.004	81	0.004	323
DCP 7	.300	-0.011	0.594	355	0.065	186	0.016	209	0.027	225	0.006	301	0.002	213	0.004	285	0.003	130	0.002	283
DCP 8	.500	-0.044	0.330	354	0.048	217	0.006	298	0.009	209	0.003	315	0.003	123	0.003	247	0.001	138	0.001	10
DCP 9	.600	0.012	0.257	357	0.032	208	0.005	277	0.007	232	0.005	342	0.003	90	0.001	108	0.001	152	0.004	155
DCP10	.695	0.021	0.189	3	0.026	190	0.004	206	0.004	245	0.008	332	0.002	29	0.001	190	0.003	129	0.003	330
DCP11	.800	-0.023	0.150	358	0.005	164	0.001	99	0.006	206	0.002	60	0.004	131	0.005	194	0.003	248	0.001	86
DCP12	.878	0.003	0.129	358	0.009	90	0.002	158	0.003	130	0.001	151	0.003	186	0.001	206	0.001	176	0.001	111
DCP13	.953	-0.004	0.111	359	0.010	111	0.004	182	0.001	2	0.001	239	0.002	303	0.002	283	0.000	111	0.002	145

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.75	0.600	7.35	4.83		1083.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.043	653.1	1396.6	0.60E 07	-0.00098	1.017	11.23

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.703	0.383	0	0 .88	67	0.003	143	0.008	28	0.005	268	0.002	215	0.002	176	0.003	308	0.004	222
CM		-0.021	0.022	195	.017	78	0.001	293	0.004	83	0.002	45	0.001	352	0.000	355	0.000	172	0.001	46
DCP 1	.010	1.541	1.822	355	0.315	76	0.091	153	0.008	343	0.020	189	0.021	176	0.004	32	0.014	172	0.008	87
DCP 2	.050	1.926	1.069	355	0.286	75	0.043	184	0.004	169	0.026	52	0.012	199	0.016	119	0.007	345	0.013	72
DCP 3	.100	2.130	0.899	348	0.424	78	0.028	141	0.042	128	0.063	38	0.035	299	0.027	296	0.017	307	0.015	223
DCP 4	.150	1.731	0.501	4	0.561	77	0.049	193	0.167	67	0.077	172	0.020	47	0.042	131	0.036	279	0.023	293
DCP 5	.200	1.309	0.481	6	0.247	59	0.053	327	0.053	71	0.021	348	0.030	44	0.016	147	0.017	61	0.026	124
DCP 6	.250	0.935	0.518	7	0.119	68	0.050	28	0.034	44	0.035	356	0.019	68	0.019	356	0.018	70	0.018	349
DCP 7	.300	0.752	0.433	5	0.107	35	0.047	335	0.035	320	0.049	291	0.020	241	0.021	261	0.010	198	0.011	221
DCP 8	.500	0.437	0.271	7	0.008	340	0.016	137	0.018	304	0.016	231	0.012	171	0.007	79	0.006	299	0.004	221
DCP 9	.600	0.363	0.206	6	0.011	346	0.007	120	0.015	250	0.008	150	0.003	244	0.006	151	0.003	57	0.004	207
DCP10	.695	0.295	0.176	7	0.028	248	0.020	137	0.012	296	0.008	181	0.002	9	0.000	184	0.007	313	0.011	197
DCP11	.800	0.234	0.169	3	0.037	258	0.011	167	0.008	241	0.008	184	0.003	152	0.004	161	0.004	54	0.004	241
DCP12	.878	0.222	0.169	358	0.036	249	0.007	261	0.014	209	0.006	116	0.002	332	0.004	156	0.005	34	0.007	283
DCP13	.953	0.156	0.186	356	0.031	249	0.005	320	0.004	232	0.015	264	0.007	164	0.006	300	0.008	235	0.003	194

FORCED PITCHING OSCILLAT' ' VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.81	0.600	9.62	4.77		1383.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.043	653.0	1397.5	0.60E 07	-0.00075	1.040	12.98

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.848	0.221	13	0.076	77	0.017	164	0.011	121	0.006	119	0.006	222	0.006	122	0.001	20	0.001	315
CM		-0.032	0.043	186	0.012	71	0.004	213	0.001	209	0.001	231	0.001	205	0.000	43	0.001	274	0.001	89
DCP 1	.010	2.327	1.249	358	0.202	96	0.054	155	0.019	164	0.003	148	0.012	179	0.005	121	0.006	278	0.018	137
DCP 2	.050	2.289	0.484	3	0.297	80	0.037	285	0.032	196	0.014	9	0.029	227	0.024	128	0.010	349	0.016	70
DCP 3	.100	2.361	0.061	36	0.428	66	0.091	249	0.048	142	0.011	271	0.038	216	0.021	187	0.015	151	0.021	328
DCP 4	.150	1.982	0.294	154	0.153	70	0.179	176	0.045	270	0.021	159	0.032	247	0.020	42	0.008	255	0.015	352
DCP 5	.200	1.473	0.193	40	0.254	77	0.118	157	0.013	238	0.011	211	0.031	240	0.011	337	0.028	38	0.007	10
DCP 6	.250	1.094	0.277	30	0.200	87	0.039	184	0.057	126	0.033	184	0.021	275	0.008	94	0.024	324	0.008	92
DCP 7	.300	0.900	0.283	21	0.136	73	0.029	104	0.058	90	0.039	127	0.020	126	0.025	126	0.010	222	0.009	188
DCP 8	.500	0.545	0.236	16	0.006	256	0.008	102	0.017	119	0.017	34	0.005	195	0.007	92	0.002	145	0.007	123
DCP 9	.600	0.448	0.212	8	0.019	228	0.013	52	0.006	218	0.007	80	0.003	112	0.004	54	0.003	70	0.007	298
DCP10	.695	0.384	0.199	12	0.042	253	0.011	98	0.006	328	0.006	344	0.005	249	0.002	80	0.009	335	0.011	235
DCP11	.800	0.323	0.192	4	0.021	252	0.011	32	0.007	355	0.003	50	0.008	358	0.000	207	0.006	35	0.006	283
DCP12	.878	0.297	0.204	357	0.016	223	0.013	0	0.005	57	0.004	27	0.012	344	0.013	231	0.011	98	0.012	324
DCP13	.953	0.209	0.209	0	0.005	191	0.014	356	0.008	325	0.013	216	0.007	59	0.005	234	0.011	157	0.009	104

FORCED PITCHING OSCILLATION VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.00	0.600	12.19	4.79		1384.1	5

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.041	653.1	1397.1	0.60E 07	-0.00092	1.090	12.19

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.954	0.102	46	0.048	102	0.009	30	0.004	285	0.000	356	0.007	167	0.008	95	0.002	218	0.007	104
CM		-0.052	0.061	186	0.010	46	0.000	326	0.003	351	0.001	226	0.003	56	0.002	294	0.002	223	0.002	145
DCP 1	.010	2.898	0.873	1	0.166	101	0.019	331	0.015	217	0.012	33	0.019	248	0.007	0	0.015	264	0.017	93
DCP 2	.050	2.308	0.262	161	0.365	85	0.045	37	0.042	15	0.023	256	0.032	123	0.021	332	0.042	274	0.036	125
DCP 3	.100	2.471	0.646	165	0.362	69	0.051	181	0.083	28	0.040	191	0.066	107	0.049	94	0.016	109	0.025	79
DCP 4	.150	1.885	0.535	167	0.082	272	0.097	13	0.046	270	0.024	328	0.029	110	0.023	104	0.019	220	0.023	91
DCP 5	.200	1.608	0.238	141	0.091	79	0.015	39	0.005	324	0.034	174	0.025	130	0.015	67	0.016	250	0.029	116
DCP 6	.250	1.263	0.180	112	0.120	91	0.032	7	0.011	248	0.007	220	0.029	136	0.013	71	0.024	217	0.024	153
DCP 7	.300	1.058	0.136	72	0.056	132	0.002	54	0.038	266	0.022	34	0.013	309	0.003	269	0.014	202	0.019	137
DCP 8	.500	0.642	0.215	15	0.032	148	0.010	28	0.007	149	0.008	10	0.005	230	0.014	83	0.011	317	0.013	232
DCP 9	.600	0.553	0.247	12	0.037	228	0.007	177	0.008	163	0.002	13	0.026	269	0.017	202	0.012	2	0.018	251
DCP10	.695	0.525	0.218	6	0.024	190	0.008	32	0.006	140	0.010	191	0.016	255	0.019	171	0.010	346	0.004	233
DCP11	.800	0.433	0.225	10	0.026	223	0.006	237	0.004	124	0.010	311	0.012	195	0.011	33	0.011	87	0.010	16
DCP12	.878	0.307	0.225	5	0.020	195	0.002	61	0.020	181	0.014	82	0.016	195	0.015	94	0.015	53	0.014	349
DCP13	.953	0.293	0.188	7	0.026	138	0.008	107	0.005	83	0.004	187	0.017	118	0.016	59	0.018	137	0.016	105

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.58	0.600	14.83	4.81		1145.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.042	653.0	1448.2	0.63E 07	-0.00140	1.080	18.99

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.983	0.084	49	0.008	246	0.002	51	0.005	197	0.004	107	0.004	39	0.007	335	0.006	11	0.008	135
CM		-0.073	0.048	195	0.006	313	0.002	61	0.002	41	0.001	340	0.002	33	0.000	300	0.002	109	0.003	271
DCP 1	.010	3.305	0.599	3	0.139	90	0.027	278	0.018	211	0.016	137	0.004	350	0.013	183	0.013	9	0.009	304
DCP 2	.050	2.464	0.251	167	0.074	53	0.082	170	0.076	43	0.025	14	0.055	30	0.025	284	0.007	70	0.019	177
DCP 3	.100	2.105	0.527	181	0.241	289	0.090	27	0.040	245	0.042	30	0.014	98	0.045	348	0.049	110	0.024	234
DCP 4	.150	1.627	0.211	157	0.116	293	0.033	64	0.017	69	0.014	89	0.035	34	0.007	250	0.024	46	0.030	181
DCP 5	.200	1.457	0.147	148	0.037	263	0.051	31	0.012	146	0.017	222	0.016	35	0.012	44	0.020	5	0.022	143
DCP 6	.250	1.207	0.121	114	0.031	236	0.006	111	0.015	205	0.006	112	0.020	315	0.019	307	0.020	19	0.011	171
DCP 7	.300	1.087	0.112	90	0.025	184	0.016	51	0.014	139	0.007	123	0.010	352	0.019	336	0.020	6	0.011	150
DCP 8	.500	0.720	0.183	29	0.022	162	0.018	235	0.016	207	0.014	157	0.011	142	0.006	26	0.003	0	0.006	64
DCP 9	.600	0.670	0.188	19	0.020	134	0.024	231	0.006	261	0.017	212	0.008	143	0.009	304	0.003	271	0.005	70
DCP 10	.695	0.614	0.199	18	0.021	123	0.012	285	0.008	274	0.002	61	0.014	155	0.011	92	0.006	138	0.015	74
DCP 11	.800	0.577	0.176	12	0.008	128	0.004	108	0.014	247	0.006	19	0.012	264	0.009	319	0.018	268	0.017	74
DCP 12	.953	0.251	0.137	12	0.021	114	0.004	211	0.009	155	0.008	98	0.006	298	0.012	169	0.015	330	0.017	170

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.58	0.600	17.38	4.82		1145.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.042	653.0	1446.3	0.63E 07	-0.00138	1.117	20.50

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.009	0.081	66	0.007	6	0.018	251	0.009	189	0.006	227	0.006	237	0.001	69	0.002	125	0.004	39
CM		-0.097	0.039	198	0.006	250	0.004	111	0.001	357	0.001	17	0.001	136	0.001	268	0.001	110	0.001	170
DCP 1	.010	3.414	0.120	18	0.261	90	0.048	311	0.018	147	0.020	344	0.023	228	0.007	149	0.008	226	0.007	56
DCP 2	.050	2.334	0.400	176	0.093	267	0.110	196	0.042	224	0.016	92	0.031	210	0.017	270	0.013	114	0.021	266
DCP 3	.100	1.895	0.302	150	0.151	299	0.012	296	0.028	76	0.046	203	0.018	260	0.017	69	0.018	207	0.019	29
DCP 4	.150	1.509	0.179	152	0.055	248	0.025	184	0.028	201	0.007	351	0.019	203	0.024	253	0.023	79	0.005	130
DCP 5	.200	1.416	0.123	115	0.027	302	0.013	198	0.004	138	0.018	206	0.018	211	0.005	144	0.002	19	0.005	42
DCP 6	.250	1.201	0.127	110	0.038	235	0.018	274	0.005	107	0.009	298	0.003	308	0.016	294	0.011	336	0.022	67
DCP 7	.300	1.092	0.114	82	0.009	238	0.032	233	0.023	235	0.021	256	0.017	212	0.005	218	0.006	152	0.012	134
DCP 8	.500	0.795	0.143	41	0.015	90	0.019	297	0.017	157	0.007	236	0.010	70	0.019	34	0.014	83	0.009	38
DCP 9	.600	0.743	0.156	22	0.025	40	0.020	276	0.004	216	0.006	147	0.013	318	0.016	113	0.009	194	0.012	188
DCP 10	.695	0.703	0.156	22	0.048	65	0.009	305	0.007	114	0.008	264	0.011	347	0.006	159	0.006	343	0.007	354
DCP 11	.800	0.675	0.140	22	0.026	45	0.022	259	0.004	226	0.003	241	0.007	284	0.005	183	0.011	273	0.015	0
DCP 12	.953	0.324	0.103	15	0.010	137	0.016	288	0.011	186	0.009	121	0.013	213	0.006	312	0.002	292	0.006	238

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.58	0.600	24.43	4.83		1145.3	10
K	V	Q	RN	DAMPING	CY(MAX)	ALPHA(STALL)	
0.042	653.1	1445.4	0.62E 07	-0.00196	1.159	26.87	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		1.085	0.086 70	0.028 216	0.006 347	0.010 350	0.006 127	0.006 236	0.002 186	0.003 40	0.003 166
CM		-0.145	0.031 211	0.009 30	0.001 177	0.000 89	0.001 332	0.002 60	0.000 160	0.001 200	0.000 301
DCP 1	.010	2.990	0.832 171	0.080 305	0.085 140	0.075 324	0.014 263	0.031 279	0.025 196	0.011 248	0.006 271
DCP 2	.050	2.004	0.224 137	0.050 67	0.026 29	0.018 33	0.001 209	0.013 340	0.009 73	0.012 38	0.010 135
DCP 3	.100	1.767	0.085 129	0.015 69	0.046 295	0.061 13	0.024 107	0.008 247	0.003 96	0.011 95	0.018 151
DCP 4	.150	1.499	0.092 113	0.046 237	0.017 15	0.022 200	0.017 332	0.019 111	0.015 215	0.005 184	0.011 259
DCP 5	.200	1.439	0.102 68	0.021 193	0.018 313	0.027 2	0.012 109	0.012 233	0.006 134	0.011 148	0.010 190
DCP 6	.250	1.278	0.094 52	0.030 205	0.005 90	0.002 315	0.009 49	0.014 99	0.011 192	0.003 345	0.002 199
DCP 7	.300	1.184	0.117 44	0.037 221	0.007 330	0.018 3	0.020 122	0.007 225	0.007 146	0.003 27	0.006 162
DCP 8	.500	0.958	0.127 42	0.045 222	0.007 356	0.009 285	0.003 88	0.004 182	0.005 179	0.005 35	0.002 82
DCP 9	.600	0.883	0.126 43	0.045 211	0.008 333	0.007 43	0.015 180	0.023 246	0.015 308	0.010 18	0.005 163
DCP 10	.695	0.864	0.112 41	0.040 218	0.015 302	0.010 355	0.012 152	0.011 238	0.003 267	0.002 306	0.004 234
DCP 11	.800	0.834	0.110 43	0.030 200	0.001 323	0.002 319	0.004 185	0.006 240	0.005 72	0.004 75	0.005 136
DCP 12	.953	0.494	0.078 51	0.025 208	0.013 64	0.003 259	0.004 43	0.003 310	0.001 106	0.007 10	0.003 26

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	32.95	0.200	-0.00	5.02		1387.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.245	224.7	195.5	0.25E 07	-0.00170	0.874	5.12

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		-0.220	0.379	2	0.026	199	0.009	168	0.013	204	0.009	232	0.012	240	0.007	191	0.009	191	0.008	191
CM		-0.040	0.031	286	0.005	64	0.001	17	0.004	43	0.002	76	0.003	72	0.002	27	0.002	12	0.003	21
DCP 1	.010	-3.878	2.867	343	0.167	110	0.072	149	0.022	144	0.026	138	0.016	193	0.019	147	0.013	139	0.015	79
DCP 2	.050	-1.152	1.257	348	0.082	171	0.022	126	0.035	124	0.016	242	0.016	169	0.006	129	0.022	155	0.006	73
DCP 3	.100	-0.840	0.969	351	0.061	201	0.028	198	0.034	223	0.017	212	0.016	231	0.013	197	0.024	295	0.012	200
DCP 4	.150	-0.203	0.650	355	0.046	192	0.010	142	0.013	158	0.006	154	0.012	240	0.013	179	0.010	218	0.005	197
DCP 5	.200	0.006	0.566	359	0.023	198	0.005	228	0.010	216	0.005	187	0.013	237	0.007	204	0.007	204	0.005	114
DCP 6	.250	-0.235	0.435	4	0.031	193	0.011	148	0.017	147	0.007	143	0.010	232	0.005	170	0.013	195	0.008	205
DCP 7	.300	-0.089	0.394	6	0.032	227	0.010	203	0.011	256	0.011	237	0.016	255	0.005	222	0.008	209	0.010	203
DCP 8	.500	0.043	0.229	24	0.025	204	0.010	148	0.008	184	0.006	241	0.013	251	0.009	167	0.003	135	0.003	189
DCP 9	.600	-0.038	0.203	25	0.015	227	0.007	260	0.033	231	0.022	236	0.019	240	0.012	198	0.019	237	0.017	184
DCP10	.695	0.085	0.154	43	0.025	248	0.008	115	0.015	172	0.002	219	0.006	215	0.005	208	0.004	114	0.008	194
DCP11	.800	-0.049	0.115	41	0.042	205	0.014	207	0.027	225	0.019	264	0.015	241	0.011	207	0.016	299	0.020	184
DCP12	.878	-0.004	0.094	44	0.011	265	0.003	270	0.018	230	0.008	262	0.012	241	0.005	211	0.008	187	0.012	230
DCP13	.953	-0.043	0.070	56	0.013	230	0.009	121	0.003	140	0.007	237	0.011	284	0.004	225	0.004	124	0.005	236

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	33.00	0.200	7.39	5.00		1087.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.245	224.6	195.0	0.25E 07	-0.00166	0.934	12.47

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.550	0.370	3	0.026	180	0.005	136	0.005	79	0.002	134	0.004	182	0.001	7	0.009	154	0.007	56
CM		-0.035	0.030	280	0.004	61	0.002	237	0.001	140	0.000	206	0.000	246	0.001	197	0.002	292	0.001	206
DCP 1	.010	1.049	2.296	345	0.137	144	0.028	177	0.017	123	0.022	159	0.023	202	0.017	229	0.028	137	0.006	49
DCP 2	.050	1.338	1.274	346	0.083	136	0.024	234	0.050	104	0.004	138	0.019	177	0.010	43	0.033	225	0.010	28
DCP 3	.100	1.136	0.956	353	0.057	150	0.024	177	0.004	141	0.009	191	0.005	325	0.007	189	0.029	204	0.018	123
DCP 4	.150	1.068	0.684	355	0.057	185	0.010	123	0.010	96	0.006	101	0.008	178	0.004	166	0.014	83	0.009	56
DCP 5	.200	0.947	0.536	0	0.039	183	0.009	282	0.005	133	0.008	174	0.018	188	0.002	78	0.021	184	0.010	96
DCP 6	.250	0.746	0.458	2	0.028	175	0.010	115	0.012	31	0.006	77	0.003	201	0.005	292	0.012	93	0.005	95
DCP 7	.300	0.714	0.414	8	0.020	181	0.010	117	0.006	94	0.006	106	0.010	125	0.007	18	0.013	188	0.017	52
DCP 8	.500	0.518	0.235	20	0.020	209	0.006	162	0.008	29	0.005	288	0.007	229	0.002	67	0.016	109	0.004	159
DCP 9	.600	0.405	0.199	35	0.026	210	0.010	42	0.003	63	0.004	117	0.005	10	0.008	292	0.016	148	0.017	43
DCP10	.695	0.323	0.137	40	0.020	243	0.006	116	0.006	20	0.004	253	0.007	208	0.006	66	0.012	73	0.007	337
DCP11	.800	0.167	0.130	48	0.030	207	0.001	59	0.006	260	0.003	177	0.006	179	0.010	261	0.018	295	0.008	114
DCP12	.878	0.162	0.114	55	0.004	145	0.009	69	0.002	117	0.010	44	0.014	46	0.008	26	0.004	39	0.013	19
DCP13	.953	0.040	0.070	39	0.011	196	0.007	17	0.005	304	0.002	120	0.008	231	0.009	112	0.010	90	0.007	336

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	33.06	0.200	9.66	5.01		1087.3	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.246	224.6	195.2	0.25E 07	-0.00160	1.123	14.69	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.767	0.355 5	0.020 187	0.002 43	0.003 154	0.006 92	0.001 310	0.002 335	0.017 305	0.005 290
CM		-0.028	0.029 281	0.002 78	0.001 149	0.000 270	0.002 245	0.001 113	0.001 154	0.004 133	0.001 48
DCP 1	.010	2.442	2.207 347	0.133 172	0.031 135	0.023 205	0.013 165	0.013 145	0.012 178	0.008 270	0.010 132
DCP 2	.050	2.083	1.225 350	0.053 155	0.026 109	0.020 62	0.007 138	0.016 54	0.011 118	0.051 343	0.018 194
DCP 3	.100	1.792	0.898 353	0.055 157	0.015 126	0.013 144	0.018 122	0.004 120	0.009 13	0.026 342	0.003 290
DCP 4	.150	1.435	0.673 357	0.032 191	0.012 354	0.002 219	0.003 94	0.007 75	0.002 74	0.010 302	0.003 104
DCP 5	.200	1.226	0.511 358	0.027 185	0.013 266	0.013 197	0.003 151	0.011 255	0.008 211	0.017 291	0.011 193
DCP 6	.250	1.077	0.440 7	0.025 193	0.012 45	0.003 77	0.008 85	0.015 63	0.006 2	0.015 322	0.006 181
DCP 7	.300	0.937	0.379 8	0.028 195	0.001 260	0.009 184	0.005 88	0.006 223	0.005 318	0.019 317	0.011 188
DCP 8	.500	0.646	0.236 27	0.019 237	0.006 333	0.007 270	0.005 108	0.004 34	0.004 185	0.012 288	0.008 285
DCP 9	.600	0.486	0.189 30	0.007 176	0.008 335	0.011 64	0.009 32	0.013 247	0.007 324	0.030 291	0.010 161
DCP10	.695	0.393	0.160 47	0.022 239	0.003 122	0.004 204	0.008 71	0.010 4	0.005 3	0.014 332	0.007 194
DCP11	.800	0.201	0.108 48	0.013 115	0.005 235	0.003 215	0.006 124	0.015 256	0.004 276	0.022 281	0.007 258
DCP12	.878	0.171	0.094 53	0.004 170	0.001 302	0.010 88	0.008 62	0.004 121	0.009 353	0.013 279	0.003 148
DCP13	.953	0.051	0.081 45	0.011 210	0.012 19	0.001 99	0.007 62	0.009 32	0.008 354	0.013 294	0.002 7

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	33.06	0.200	12.28	5.06		1087.4	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.246	224.6	194.7	0.25E 07	-0.00152	1.357	17.37	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		1.011	0.343 5	0.011 223	0.002 328	0.001 80	0.003 85	0.005 89	0.003 224	0.006 30	0.003 172
CM		-0.020	0.028 283	0.003 127	0.001 358	0.001 213	0.000 28	0.001 271	0.000 145	0.002 134	0.001 68
DCP 1	.010	3.918	2.234 347	0.094 183	0.042 324	0.043 203	0.042 94	0.032 7	0.022 189	0.015 53	0.014 117
DCP 2	.050	2.888	1.188 348	0.054 199	0.008 168	0.016 202	0.009 101	0.009 119	0.014 228	0.009 99	0.005 233
DCP 3	.100	2.436	0.904 354	0.026 191	0.021 330	0.007 71	0.010 357	0.003 245	0.005 276	0.015 146	0.010 166
DCP 4	.150	1.958	0.629 357	0.019 154	0.004 324	0.003 129	0.004 285	0.007 68	0.009 227	0.007 2	0.004 193
DCP 5	.200	1.618	0.497 1	0.017 145	0.002 22	0.008 330	0.010 21	0.010 145	0.004 299	0.009 13	0.007 150
DCP 6	.250	1.409	0.399 6	0.012 190	0.004 117	0.002 95	0.006 20	0.006 134	0.002 20	0.011 36	0.006 170
DCP 7	.300	1.191	0.375 8	0.007 226	0.008 7	0.005 5	0.003 139	0.008 113	0.006 305	0.004 232	0.011 109
DCP 8	.500	0.796	0.212 28	0.016 273	0.003 170	0.008 88	0.003 77	0.005 57	0.006 161	0.007 48	0.004 166
DCP 9	.600	0.618	0.185 36	0.011 237	0.003 187	0.010 301	0.010 105	0.003 144	0.013 185	0.019 0	0.005 143
DCP10	.695	0.419	0.142 47	0.011 273	0.006 199	0.012 71	0.007 99	0.006 75	0.003 224	0.005 20	0.008 227
DCP11	.800	0.242	0.121 50	0.021 324	0.007 16	0.005 271	0.008 257	0.008 96	0.005 2	0.009 20	0.017 334
DCP12	.878	0.187	0.100 46	0.008 219	0.005 24	0.002 310	0.005 231	0.001 26	0.002 323	0.007 14	0.008 210
DCP13	.953	0.086	0.056 28	0.007 287	0.012 219	0.004 134	0.002 312	0.012 88	0.006 344	0.005 78	0.006 159

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	32.57	0.200	15.03	5.21		1157.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.242	224.5	202.8	0.26E 07	-0.00106	1.742	20.36

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.387	0.378	4	0.019	113	0.013	240	0.007	267	0.005	247	0.008	166	0.001	254	0.003	86	0.005	190
CM		-0.049	0.020	265	0.002	180	0.002	358	0.003	88	0.001	289	0.001	46	0.001	154	0.001	250	0.001	37
DCP 1	.010	5.481	1.950	349	0.260	79	0.088	288	0.061	35	0.127	259	0.047	175	0.038	213	0.052	142	0.017	146
DCP 2	.050	4.152	1.270	350	0.081	183	0.032	255	0.018	156	0.021	233	0.012	109	0.017	125	0.012	218	0.009	136
DCP 3	.100	2.857	0.960	354	0.044	126	0.027	247	0.017	229	0.007	23	0.012	164	0.014	220	0.005	224	0.005	58
DCP 4	.150	2.343	0.658	1	0.036	128	0.015	229	0.010	161	0.013	177	0.018	105	0.010	132	0.007	310	0.009	195
DCP 5	.200	2.401	0.535	5	0.017	121	0.026	274	0.014	245	0.006	321	0.016	155	0.004	333	0.006	28	0.007	108
DCP 6	.250	2.056	0.455	7	0.021	144	0.006	206	0.002	62	0.005	184	0.010	92	0.004	127	0.008	22	0.010	210
DCP 7	.300	1.587	0.431	9	0.031	165	0.010	288	0.010	271	0.006	300	0.017	142	0.004	318	0.005	57	0.006	164
DCP 8	.500	0.846	0.271	19	0.015	97	0.017	234	0.008	302	0.003	297	0.005	204	0.001	121	0.007	10	0.011	221
DCP 9	.600	0.880	0.216	20	0.016	94	0.015	231	0.028	298	0.015	108	0.013	215	0.008	259	0.009	72	0.006	298
DCP10	.695	0.745	0.157	32	0.015	79	0.014	149	0.016	212	0.008	238	0.014	159	0.018	19	0.003	94	0.006	227
DCP11	.800	0.660	0.121	32	0.007	58	0.007	212	0.010	249	0.004	245	0.011	229	0.009	261	0.006	129	0.004	135
DCP12	.953	0.094	0.053	2	0.021	347	0.012	186	0.007	289	0.002	230	0.005	357	0.001	106	0.003	134	0.007	156

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	32.52	0.200	17.50	5.20		1157.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.242	224.5	201.9	0.26E 07	0.00275	1.985	20.33

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.457	0.543	359	0.152	145	0.075	332	0.040	164	0.028	356	0.010	153	0.009	47	0.006	197	0.004	110
CM		-0.081	0.046	99	0.044	278	0.027	113	0.015	316	0.013	150	0.008	338	0.004	204	0.004	23	0.002	242
DCP 1	.010	5.592	2.355	13	0.187	224	0.236	137	0.224	46	0.057	239	0.141	53	0.082	311	0.027	97	0.022	310
DCP 2	.050	4.185	1.565	13	0.205	233	0.073	101	0.037	28	0.027	209	0.045	77	0.019	279	0.019	180	0.015	356
DCP 3	.100	2.649	1.260	21	0.205	242	0.084	76	0.038	260	0.040	55	0.029	293	0.010	72	0.008	14	0.006	129
DCP 4	.150	2.204	0.976	23	0.218	208	0.117	27	0.079	209	0.033	41	0.008	203	0.006	67	0.010	146	0.008	131
DCP 5	.200	2.384	0.868	9	0.281	180	0.170	1	0.067	198	0.016	77	0.032	334	0.025	168	0.017	25	0.014	213
DCP 6	.250	2.151	0.809	4	0.322	173	0.158	5	0.064	218	0.024	100	0.009	340	0.010	99	0.016	174	0.006	148
DCP 7	.300	1.682	0.785	355	0.326	162	0.153	1	0.069	238	0.043	95	0.031	325	0.015	166	0.018	61	0.011	246
DCP 8	.500	0.972	0.461	344	0.264	128	0.129	328	0.096	190	0.060	25	0.030	228	0.038	118	0.019	304	0.028	166
DCP 9	.600	0.912	0.362	328	0.233	103	0.135	304	0.077	146	0.080	0	0.035	207	0.036	64	0.025	297	0.025	127
DCP10	.695	0.883	0.247	326	0.176	103	0.113	293	0.085	145	0.073	326	0.055	164	0.034	17	0.037	239	0.020	86
DCP11	.800	0.854	0.183	304	0.153	89	0.102	283	0.075	110	0.065	312	0.048	140	0.035	353	0.031	180	0.030	11
DCP12	.953	0.161	0.072	292	0.070	81	0.057	257	0.044	73	0.036	280	0.035	97	0.019	303	0.015	126	0.009	343

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	32.47	0.200	24.61	5.13		1157.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.242	224.5	202.0	0.26E 07	-0.00234	1.371	29.82

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.120	0.287	48	0.049	193	0.052	123	0.020	346	0.017	252	0.006	176	0.006	340	0.007	334	0.001	353
CM		-0.173	0.087	210	0.007	310	0.014	264	0.004	162	0.002	13	0.000	170	0.004	159	0.001	142	0.000	222
DCP 1	.010	3.143	1.183	160	0.219	118	0.270	204	0.036	8	0.084	295	0.082	303	0.059	218	0.034	347	0.009	71
DCP 2	.050	2.075	0.555	149	0.221	244	0.102	185	0.102	271	0.050	255	0.056	208	0.017	151	0.009	42	0.018	13
DCP 3	.100	1.047	0.247	82	0.187	234	0.022	351	0.049	27	0.020	307	0.015	85	0.012	62	0.021	14	0.011	257
DCP 4	.150	1.121	0.331	39	0.063	194	0.063	149	0.008	45	0.030	248	0.023	148	0.009	143	0.005	297	0.002	348
DCP 5	.200	1.605	0.354	36	0.052	194	0.071	131	0.012	30	0.021	258	0.021	146	0.000	105	0.008	332	0.006	197
DCP 6	.250	1.539	0.349	36	0.066	202	0.070	146	0.009	7	0.023	237	0.024	143	0.005	169	0.007	250	0.006	241
DCP 7	.300	1.280	0.384	35	0.053	206	0.072	133	0.024	30	0.025	257	0.021	157	0.004	61	0.006	301	0.005	217
DCP 8	.500	0.979	0.422	35	0.062	189	0.082	117	0.027	4	0.022	251	0.007	128	0.017	5	0.006	281	0.001	4
DCP 9	.600	0.860	0.387	37	0.046	159	0.085	94	0.032	347	0.013	231	0.010	63	0.020	340	0.013	17	0.011	34
DCP 10	.695	1.106	0.354	38	0.058	169	0.065	100	0.024	343	0.021	230	0.008	238	0.011	296	0.003	248	0.011	28
DCP 11	.800	1.132	0.324	42	0.040	121	0.066	63	0.022	334	0.008	101	0.013	306	0.016	339	0.016	356	0.007	269
DCP 12	.953	0.348	0.201	36	0.015	15	0.017	132	0.014	287	0.007	204	0.003	186	0.006	316	0.006	258	0.006	131

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	33.11	0.400	0.06	5.05		1088.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.125	444.1	725.6	0.47E 07	-0.00101	0.374	5.16

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		-0.102	0.465	351	0.038	186	0.011	247	0.004	216	0.003	195	0.003	240	0.002	287	0.004	100	0.003	222
CM		-0.021	0.019	276	0.002	151	0.001	251	0.000	75	0.000	231	0.000	201	0.001	198	0.002	249	0.001	346
DCP 1	.010	-2.037	2.204	344	0.801	210	0.390	277	0.043	50	0.158	208	0.135	274	0.050	342	0.029	196	0.046	267
DCP 2	.050	-0.795	1.803	342	0.124	88	0.054	135	0.014	314	0.043	68	0.053	140	0.039	221	0.004	155	0.016	182
DCP 3	.100	-0.280	1.330	345	0.082	111	0.041	138	0.040	214	0.013	9	0.016	114	0.021	201	0.004	172	0.010	74
DCP 4	.150	-0.096	0.884	347	0.041	108	0.043	126	0.036	204	0.019	290	0.008	37	0.010	174	0.011	263	0.010	332
DCP 5	.200	0.267	0.691	352	0.042	156	0.016	170	0.010	192	0.009	244	0.007	352	0.008	2	0.006	101	0.005	223
DCP 6	.250	-0.149	0.545	352	0.043	198	0.007	305	0.004	167	0.007	243	0.006	321	0.002	23	0.002	110	0.002	269
DCP 7	.300	0.004	0.471	355	0.052	200	0.019	279	0.003	41	0.005	106	0.005	238	0.003	337	0.010	104	0.004	269
DCP 8	.500	-0.042	0.281	3	0.035	195	0.010	257	0.003	282	0.001	218	0.003	287	0.002	331	0.003	32	0.003	163
DCP 9	.600	-0.018	0.219	4	0.026	194	0.010	260	0.002	332	0.005	168	0.002	188	0.004	338	0.014	87	0.005	239
DCP 10	.695	0.050	0.168	12	0.014	196	0.005	259	0.003	204	0.001	352	0.001	326	0.002	308	0.003	93	0.001	185
DCP 11	.800	-0.017	0.121	15	0.008	262	0.002	221	0.001	241	0.003	159	0.002	284	0.004	0	0.008	87	0.006	165
DCP 12	.878	0.012	0.099	15	0.000	263	0.003	110	0.002	201	0.001	170	0.001	116	0.003	13	0.008	55	0.003	206
DCP 13	.953	0.003	0.076	13	0.003	5	0.004	53	0.002	167	0.002	36	0.000	314	0.002	37	0.001	83	0.000	172

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.M	TEST POINT	CYCLES ANALYZED
	33.00	0.400	7.40	5.01		1088.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.124	444.0	721.9	0.46E 07	-0.00107	1.217	12.43

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.744	0.470	352	0.026	164	0.006	175	0.005	162	0.002	134	0.004	158	0.003	166	0.003	167	0.002	141
CM		-0.016	0.020	289	0.001	148	0.000	19	0.000	89	0.000	107	0.000	14	0.000	72	0.000	139	0.000	159
CCP 1	.010	2.626	3.084	343	0.284	190	0.138	118	0.033	4	0.033	205	0.031	121	0.012	111	0.015	139	0.012	79
CCP 2	.050	2.177	1.667	344	0.084	143	0.045	266	0.060	168	0.039	90	0.003	315	0.011	132	0.008	233	0.016	158
CCP 3	.100	1.920	1.230	346	0.075	160	0.009	222	0.012	186	0.005	124	0.008	123	0.007	157	0.007	176	0.008	137
CCP 4	.150	1.528	0.824	349	0.045	146	0.007	209	0.009	156	0.006	160	0.006	117	0.003	185	0.003	124	0.003	166
CCP 5	.200	1.381	0.667	350	0.035	144	0.014	199	0.008	174	0.002	207	0.010	185	0.009	170	0.007	174	0.011	140
CCP 6	.250	0.882	0.548	357	0.029	148	0.005	176	0.007	117	0.004	129	0.005	148	0.002	164	0.002	73	0.001	167
CCP 7	.300	0.864	0.480	353	0.027	154	0.006	183	0.007	140	0.001	11	0.004	183	0.008	215	0.009	170	0.007	135
CCP 8	.500	0.486	0.285	1	0.012	170	0.005	190	0.003	186	0.003	171	0.003	175	0.003	182	0.002	154	0.001	325
CCP 9	.600	0.400	0.215	7	0.009	156	0.004	166	0.002	139	0.001	5	0.001	175	0.006	78	0.002	53	0.002	6
CCP10	.695	0.348	0.154	11	0.005	161	0.003	185	0.003	118	0.001	209	0.004	221	0.001	260	0.001	54	0.001	280
CCP11	.800	0.203	0.115	19	0.012	185	0.003	155	0.003	206	0.002	261	0.006	173	0.002	175	0.004	206	0.002	32
CCP12	.878	0.187	0.091	24	0.005	195	0.003	148	0.002	234	0.000	312	0.001	89	0.000	334	0.000	254	0.001	144
CCP13	.953	0.122	0.075	15	0.007	225	0.001	169	0.001	257	0.002	100	0.003	111	0.001	252	0.003	329	0.002	330

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.M	TEST POINT	CYCLES ANALYZED
	33.11	0.400	9.70	5.05		1089.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.125	444.0	722.6	0.46E 07	-0.00111	1.444	14.79

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.962	0.443	359	0.012	271	0.011	185	0.007	10	0.002	301	0.000	256	0.004	243	0.004	159	0.004	63
CM		-0.011	0.022	292	0.002	85	0.002	285	0.001	15	0.001	37	0.001	289	0.000	78	0.001	237	0.000	134
CCP 1	.010	4.106	3.118	348	0.176	212	0.081	326	0.146	209	0.084	108	0.009	256	0.045	92	0.036	328	0.009	196
CCP 2	.050	3.056	1.728	350	0.149	256	0.163	166	0.139	61	0.071	322	0.040	328	0.102	260	0.106	157	0.083	70
CCP 3	.100	2.466	1.082	354	0.066	63	0.035	299	0.016	181	0.002	97	0.006	192	0.009	131	0.011	343	0.010	244
CCP 4	.150	1.888	0.729	356	0.030	54	0.016	263	0.010	145	0.002	36	0.003	227	0.003	142	0.002	337	0.000	219
CCP 5	.200	1.671	0.586	358	0.026	46	0.014	257	0.010	119	0.003	38	0.000	113	0.003	126	0.001	307	0.005	211
CCP 6	.250	1.150	0.489	1	0.010	5	0.012	232	0.010	131	0.002	335	0.005	214	0.005	83	0.003	331	0.002	159
CCP 7	.300	1.071	0.437	3	0.011	351	0.015	185	0.008	121	0.005	324	0.006	197	0.005	109	0.003	35	0.006	353
CCP 8	.500	0.603	0.258	14	0.019	324	0.015	200	0.008	100	0.004	303	0.003	169	0.002	42	0.001	316	0.005	91
CCP 9	.600	0.469	0.196	21	0.017	323	0.009	202	0.007	86	0.008	257	0.006	124	0.002	312	0.005	176	0.003	23
CCP10	.695	0.406	0.155	25	0.018	283	0.012	154	0.006	41	0.007	189	0.003	51	0.006	275	0.003	154	0.002	14
CCP11	.800	0.262	0.119	29	0.021	259	0.011	129	0.005	339	0.008	218	0.006	71	0.006	251	0.005	121	0.007	60
CCP12	.878	0.234	0.100	20	0.023	216	0.015	86	0.008	310	0.005	181	0.002	355	0.006	228	0.004	132	0.002	319
CCP13	.953	0.164	0.096	1	0.030	194	0.013	60	0.003	282	0.001	255	0.002	215	0.003	149	0.003	49	0.003	254

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	32.89	0.400	12.29	4.94		1088.4	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.124	444.0	722.5	0.46E 07	0.00052	1.577	17.13

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.003	0.438	43	0.131	321	0.043	204	0.024	130	0.010	20	0.005	261	0.006	171	0.005	128	0.006	68
CM		-0.044	0.050	167	0.044	46	0.021	310	0.013	244	0.010	162	0.006	86	0.004	359	0.002	292	0.003	296
DCP 1	.010	4.195	2.063	33	0.611	15	0.161	326	0.114	320	0.158	252	0.129	159	0.119	71	0.099	338	0.079	253
DCP 2	.050	2.827	1.003	62	0.662	29	0.305	309	0.180	247	0.146	205	0.091	158	0.070	157	0.086	137	0.083	111
DCP 3	.100	2.255	0.899	77	0.601	15	0.275	271	0.121	185	0.074	141	0.069	86	0.051	0	0.034	306	0.015	330
DCP 4	.150	1.793	0.734	70	0.402	351	0.157	238	0.073	187	0.069	125	0.051	42	0.023	331	0.008	292	0.010	284
DCP 5	.200	1.583	0.640	64	0.326	337	0.120	220	0.049	161	0.064	122	0.030	353	0.011	291	0.002	258	0.004	192
DCP 6	.250	1.149	0.586	57	0.263	322	0.098	205	0.064	169	0.060	76	0.031	353	0.017	296	0.014	216	0.004	114
DCP 7	.300	1.100	0.547	49	0.229	306	0.096	186	0.057	144	0.062	63	0.028	341	0.011	305	0.011	299	0.010	140
DCP 8	.500	0.693	0.405	35	0.174	268	0.072	148	0.050	113	0.052	2	0.019	285	0.023	231	0.015	149	0.012	102
DCP 9	.600	0.558	0.327	28	0.146	255	0.065	147	0.054	83	0.040	347	0.028	275	0.025	193	0.015	117	0.014	66
DCP10	.695	0.519	0.288	19	0.143	236	0.064	135	0.051	74	0.042	331	0.029	269	0.029	175	0.014	85	0.015	53
DCP11	.800	0.412	0.247	2	0.129	230	0.063	129	0.052	50	0.038	310	0.027	238	0.018	138	0.006	77	0.019	10
DCP12	.878	0.368	0.231	350	0.112	220	0.061	129	0.046	36	0.029	304	0.024	208	0.017	96	0.008	51	0.015	348
DCP13	.953	0.261	0.178	335	0.054	202	0.032	136	0.024	25	0.010	290	0.008	204	0.008	108	0.005	49	0.006	345

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	32.36	0.400	15.07	4.99		1155.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.122	444.0	743.8	0.48E 07	-0.00041	1.657	18.33

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.072	0.426	69	0.093	17	0.056	349	0.031	258	0.018	192	0.010	147	0.015	77	0.007	3	0.003	346
CM		-0.053	0.069	182	0.034	95	0.022	75	0.017	11	0.010	324	0.007	274	0.005	220	0.003	151	0.002	116
DCP 1	.010	4.597	1.395	71	0.681	92	0.434	79	0.254	44	0.104	357	0.091	274	0.058	224	0.035	208	0.016	237
DCP 2	.050	3.104	1.104	106	0.671	78	0.361	52	0.218	14	0.089	11	0.059	15	0.081	56	0.083	50	0.090	52
DCP 3	.100	2.320	1.093	110	0.521	51	0.164	21	0.146	337	0.091	275	0.039	257	0.024	264	0.022	287	0.040	276
DCP 4	.150	1.765	0.835	100	0.269	28	0.141	28	0.128	302	0.042	251	0.044	239	0.021	168	0.016	248	0.021	193
DCP 5	.200	1.539	0.704	89	0.212	16	0.127	12	0.118	284	0.040	243	0.049	223	0.027	150	0.011	112	0.006	170
DCP 6	.250	1.325	0.628	80	0.159	0	0.123	0	0.097	262	0.038	244	0.044	192	0.019	138	0.009	154	0.008	189
DCP 7	.300	1.146	0.566	70	0.134	351	0.116	346	0.087	251	0.041	232	0.030	184	0.022	156	0.007	117	0.014	153
DCP 8	.500	0.711	0.424	52	0.092	312	0.095	309	0.063	218	0.053	190	0.029	128	0.034	97	0.013	31	0.014	30
DCP 9	.600	0.693	0.368	39	0.105	292	0.081	275	0.063	191	0.044	156	0.027	103	0.029	64	0.019	4	0.017	333
DCP10	.695	0.583	0.318	28	0.101	291	0.075	263	0.053	197	0.048	144	0.024	102	0.034	57	0.014	14	0.017	332
DCP11	.800	0.560	0.279	16	0.099	281	0.076	244	0.055	177	0.045	122	0.030	69	0.033	9	0.019	315	0.011	252
DCP12	.953	0.219	0.191	347	0.041	282	0.035	232	0.024	180	0.016	97	0.014	65	0.013	355	0.010	288	0.005	237

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	32.36	0.400	17.57	4.98		1156.2	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.122	444.0	739.2	0.47E 07	-0.09117	1.680	18.42	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.096	0.427	83	0.097	125	0.053	76	0.035	59	0.025	354	0.011	333	0.013	296	0.007	252	0.008	242
CM		-0.075	0.086	194	0.030	178	0.020	160	0.015	157	0.012	133	0.007	111	0.003	70	0.003	21	0.002	348
DCP 1	.010	4.607	1.036	114	0.924	170	0.527	172	0.305	168	0.116	139	0.069	83	0.024	55	0.033	27	0.070	279
DCP 2	.050	2.902	1.249	137	0.542	149	0.303	148	0.182	153	0.058	187	0.069	237	0.108	288	0.084	321	0.085	341
DCP 3	.100	2.191	1.246	128	0.321	140	0.280	122	0.107	110	0.076	105	0.024	142	0.017	200	0.042	229	0.046	234
DCP 4	.150	1.703	0.890	110	0.224	150	0.194	85	0.093	100	0.057	41	0.035	88	0.005	21	0.011	127	0.020	205
DCP 5	.200	1.494	0.743	100	0.194	142	0.145	71	0.099	95	0.040	43	0.039	82	0.011	86	0.010	167	0.021	182
DCP 6	.250	1.341	0.667	88	0.173	134	0.124	56	0.103	68	0.041	34	0.035	40	0.016	37	0.003	123	0.011	178
DCP 7	.300	1.165	0.595	80	0.159	122	0.106	53	0.102	60	0.043	40	0.035	38	0.027	30	0.003	99	0.010	198
DCP 8	.500	0.781	0.468	58	0.101	79	0.075	22	0.082	16	0.061	3	0.031	358	0.033	331	0.014	335	0.002	333
DCP 9	.600	0.747	0.425	44	0.076	44	0.057	355	0.066	350	0.065	325	0.033	310	0.023	275	0.020	232	0.008	228
DCP10	.695	0.657	0.349	36	0.087	13	0.054	348	0.054	331	0.063	315	0.035	290	0.028	256	0.017	250	0.012	236
DCP11	.800	0.647	0.306	25	0.093	353	0.059	330	0.044	311	0.049	284	0.033	267	0.021	240	0.024	197	0.010	165
DCP12	.953	0.288	0.180	5	0.065	342	0.021	340	0.017	311	0.021	281	0.020	250	0.016	191	0.009	152	0.005	192

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	32.57	0.400	24.69	5.04		1156.3	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.123	444.0	741.2	0.48E 07	-0.00180	1.171	27.23	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.989	0.188	48	0.009	205	0.011	274	0.006	22	0.004	164	0.002	307	0.004	288	0.004	271	0.002	45
CM		-0.133	0.060	212	0.002	35	0.002	128	0.001	159	0.001	258	0.000	104	0.001	75	0.001	30	0.000	96
DCP 1	.010	3.068	1.539	173	0.319	94	0.285	206	0.087	90	0.083	192	0.020	192	0.043	106	0.013	346	0.053	88
DCP 2	.050	1.848	0.294	157	0.157	272	0.022	12	0.014	288	0.009	148	0.016	328	0.012	301	0.011	7	0.011	306
DCP 3	.100	1.438	0.261	34	0.026	242	0.033	0	0.014	67	0.011	167	0.009	279	0.008	327	0.011	327	0.004	67
DCP 4	.150	1.246	0.267	28	0.006	130	0.016	349	0.007	330	0.004	327	0.007	333	0.014	315	0.007	294	0.004	299
DCP 5	.200	1.254	0.280	30	0.022	222	0.012	335	0.007	354	0.004	159	0.002	58	0.007	290	0.007	321	0.004	97
DCP 6	.250	1.185	0.272	30	0.006	187	0.016	356	0.005	12	0.007	335	0.006	5	0.010	317	0.007	285	0.005	311
DCP 7	.300	1.124	0.286	31	0.018	216	0.013	307	0.006	349	0.003	156	0.001	115	0.007	288	0.008	279	0.002	93
DCP 8	.500	0.861	0.269	38	0.011	201	0.014	301	0.007	44	0.006	147	0.003	18	0.004	302	0.005	239	0.004	39
DCP 9	.600	0.817	0.267	38	0.009	175	0.013	293	0.009	331	0.001	237	0.002	244	0.008	275	0.008	239	0.004	155
DCP10	.695	0.800	0.230	42	0.008	245	0.011	269	0.009	36	0.006	97	0.004	312	0.005	246	0.003	191	0.005	352
DCP11	.800	0.786	0.213	44	0.005	180	0.009	250	0.007	317	0.002	154	0.004	288	0.004	237	0.006	202	0.005	227
DCP12	.953	0.420	0.133	40	0.006	209	0.007	284	0.004	13	0.003	134	0.002	201	0.004	249	0.002	233	0.003	338

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	33.22	0.600	0.05	5.02		1389.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.085	653.7	1264.1	0.55E 07	-0.00116	0.546	5.06

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		-0.093	0.624 349	0.056 169	0.020 205	0.006 228	0.002 118	0.002 230	0.002 195	0.001 146	0.000 145
CM		-0.019	0.021 270	0.004 204	0.003 269	0.002 8	0.001 106	0.000 239	0.000 314	0.000 233	0.001 247
CCP 1	.010	-1.977	2.097 334	0.829 209	0.130 234	0.122 153	0.031 210	0.010 89	0.016 108	0.010 79	0.007 72
CCP 2	.050	-0.822	2.314 338	0.150 182	0.169 281	0.075 345	0.022 223	0.035 310	0.012 142	0.015 235	0.003 237
DCP 3	.100	-0.116	2.093 346	0.150 163	0.055 180	0.080 356	0.043 105	0.011 268	0.004 65	0.013 147	0.009 281
DCP 4	.150	-0.076	1.340 347	0.184 92	0.068 184	0.004 178	0.059 85	0.033 195	0.005 245	0.010 116	0.008 225
CCP 5	.200	0.258	1.040 353	0.116 119	0.060 180	0.023 249	0.022 99	0.020 202	0.011 262	0.003 236	0.006 290
CCP 6	.250	-0.083	0.810 349	0.070 117	0.047 153	0.033 211	0.008 356	0.015 138	0.012 228	0.004 323	0.002 13
DCP 7	.300	-0.008	0.642 356	0.060 162	0.031 173	0.034 218	0.014 294	0.000 140	0.005 250	0.004 336	0.001 53
DCP 8	.500	-0.048	0.347 358	0.048 194	0.007 225	0.011 177	0.006 268	0.003 6	0.001 92	0.002 79	0.003 112
DCP 9	.600	0.004	0.270 4	0.031 202	0.005 246	0.004 208	0.001 246	0.001 349	0.002 164	0.001 210	0.002 268
CCP10	.695	0.045	0.211 7	0.019 163	0.006 152	0.007 164	0.002 245	0.001 12	0.002 35	0.003 77	0.002 114
CCP11	.800	-0.019	0.156 8	0.010 138	0.007 115	0.004 196	0.001 102	0.001 63	0.003 140	0.001 217	0.003 98
CCP12	.878	-0.003	0.135 5	0.008 50	0.005 118	0.003 229	0.001 254	0.001 308	0.002 179	0.002 256	0.001 257
CCP13	.953	-0.000	0.123 1	0.013 44	0.007 107	0.003 162	0.002 242	0.001 231	0.001 67	0.001 96	0.001 219

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	33.11	0.600	7.39	4.96		1389.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.085	653.4	1411.8	0.61E 07	-0.00099	1.128	10.95

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.716	0.395 6	0.070 41	0.023 333	0.014 273	0.007 213	0.002 197	0.005 138	0.003 318	0.003 169
CM		-0.024	0.028 215	0.018 83	0.003 28	0.004 42	0.002 326	0.002 326	0.002 250	0.001 198	0.000 179
CCP 1	.010	1.527	1.796 351	0.225 47	0.020 125	0.027 194	0.012 175	0.008 168	0.003 102	0.001 61	0.002 9
CCP 2	.050	1.872	1.037 350	0.225 61	0.021 313	0.019 219	0.016 147	0.007 62	0.004 18	0.003 292	0.001 69
DCP 3	.100	2.260	0.890 350	0.402 78	0.090 1	0.054 270	0.007 282	0.022 237	0.018 270	0.011 266	0.027 168
CCP 4	.150	1.670	0.543 8	0.501 64	0.063 296	0.169 54	0.059 186	0.063 30	0.061 150	0.013 271	0.014 141
DCP 5	.200	1.356	0.561 13	0.182 52	0.114 355	0.034 350	0.045 327	0.021 53	0.011 8	0.020 357	0.012 141
DCP 6	.250	0.953	0.557 11	0.087 25	0.084 357	0.047 286	0.030 333	0.030 286	0.014 277	0.013 279	0.010 258
DCP 7	.300	0.777	0.462 15	0.095 11	0.070 340	0.065 278	0.032 273	0.035 240	0.021 215	0.012 198	0.007 199
DCP 8	.500	0.434	0.291 19	0.051 327	0.011 254	0.028 246	0.018 172	0.012 162	0.015 95	0.007 12	0.002 237
DCP 9	.600	0.371	0.233 20	0.038 309	0.009 243	0.020 242	0.011 165	0.007 161	0.011 98	0.007 359	0.006 54
DCP10	.695	0.319	0.195 19	0.045 273	0.019 154	0.009 236	0.015 126	0.009 49	0.005 354	0.002 290	0.001 4
DCP11	.800	0.253	0.173 16	0.041 274	0.012 219	0.014 200	0.005 117	0.007 150	0.007 90	0.006 29	0.004 101
DCP12	.878	0.236	0.174 7	0.042 262	0.014 248	0.017 196	0.006 164	0.012 128	0.009 51	0.005 3	0.004 296
DCP13	.953	0.160	0.187 354	0.044 236	0.006 239	0.013 177	0.002 109	0.004 111	0.001 337	0.001 85	0.001 138

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	33.22	0.600	9.68	4.91		1089.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.085	653.2	1409.2	0.61E 07	-0.00100	1.156	11.45

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.866	0.264 24	0.072 65	0.018 79	0.016 43	0.009 359	0.007 211	0.006 99	0.002 275	0.003 249
CM		-0.037	0.050 198	0.015 85	0.005 189	0.003 141	0.002 97	0.000 280	0.001 182	0.001 117	0.002 94
DCP 1	.010	2.310	1.299 358	0.154 73	0.032 72	0.021 276	0.007 54	0.004 208	0.003 116	0.001 136	0.005 224
DCP 2	.050	2.209	0.433 2	0.297 70	0.032 320	0.006 97	0.034 356	0.027 256	0.016 230	0.014 150	0.003 146
DCP 3	.100	2.505	0.095 47	0.448 73	0.039 239	0.086 82	0.053 338	0.032 186	0.017 135	0.014 105	0.014 178
DCP 4	.150	1.962	0.264 137	0.207 67	0.185 157	0.030 299	0.038 86	0.038 244	0.025 133	0.009 183	0.016 37
DCP 5	.200	1.500	0.318 50	0.271 81	0.089 145	0.040 86	0.009 204	0.037 242	0.016 20	0.009 4	0.002 327
DCP 6	.250	1.111	0.382 34	0.165 75	0.053 68	0.054 88	0.022 142	0.027 163	0.013 129	0.010 [illegible]	0.004 17
DCP 7	.300	0.924	0.367 36	0.128 65	0.072 57	0.063 64	0.035 62	0.019 112	0.031 92	0.004 337	0.012 187
DCP 8	.500	0.558	0.295 27	0.030 311	0.024 42	0.016 14	0.021 345	0.007 279	0.003 108	0.008 356	0.007 271
DCP 9	.600	0.461	0.250 25	0.026 281	0.026 45	0.022 348	0.015 302	0.003 286	0.004 256	0.005 88	0.010 332
DCP10	.695	0.424	0.233 19	0.044 263	0.017 11	0.012 284	0.017 297	0.011 213	0.004 [illegible]	0.013 233	0.008 154
DCP11	.800	0.345	0.221 16	0.038 265	0.018 19	0.018 311	0.011 272	0.001 107	0.007 347	0.011 304	0.016 277
DCP12	.878	0.318	0.224 8	0.035 273	0.017 343	0.017 29[illegible]	.009 236	0.003 185	0.006 65	0.010 329	0.011 268
DCP13	.953	0.204	0.208 359	0.018 302	0.020 296	0.005 356	.008 207	0.004 44	0.003 337	0.006 211	0.004 85

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	33.22	0.600	12.24	4.88		1089.4	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.085	653.2	1404.3	0.61E 07	-0.00095	1.156	12.25

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.963	0.176 49	0.035 111	0.011 169	0.012 111	0.002 96	0.006 49	0.001 191	0.006 102	0.001 167
CM		-0.055	0.062 195	0.002 55	0.002 148	0.002 284	0.002 331	0.001 96	0.001 356	0.001 289	0.001 255
DCP 1	.010	2.893	0.939 3	0.142 98	0.006 280	0.015 111	0.009 116	0.004 299	0.011 177	0.007 107	0.003 215
DCP 2	.050	2.301	0.138 139	0.238 91	0.056 144	0.067 111	0.059 58	0.012 67	0.021 12	0.017 103	0.017 321
DCP 3	.100	2.539	0.501 160	0.204 69	0.124 151	0.081 13	0.028 111	0.035 79	0.027 58	0.033 153	0.017 189
DCP 4	.150	1.934	0.470 150	0.160 260	0.027 41	0.053 188	0.033 332	0.026 71	0.007 232	0.004 10	0.003 226
DCP 5	.200	1.613	0.277 116	0.041 143	0.019 158	0.036 93	0.023 212	0.015 26	0.025 254	0.004 101	0.002 68
DCP 6	.250	1.260	0.265 80	0.075 110	0.022 176	0.017 31	0.017 331	0.026 54	0.006 257	0.009 34	0.014 218
DCP 7	.300	1.051	0.262 67	0.088 140	0.051 205	0.027 211	0.020 309	0.015 3	0.003 245	0.016 50	0.009 207
DCP 8	.500	0.639	0.266 32	0.026 127	0.006 352	0.020 142	0.011 180	0.003 194	0.007 204	0.001 154	0.004 185
DCP 9	.600	0.531	0.257 27	0.008 164	0.013 352	0.006 86	0.012 183	0.006 137	0.004 102	0.006 116	0.006 349
DCP10	.695	0.511	0.254 21	0.005 154	0.007 288	0.032 102	0.012 96	0.003 324	0.009 143	0.009 135	0.009 89
DCP11	.800	0.444	0.238 15	0.008 161	0.008 21	0.010 63	0.010 121	0.005 339	0.003 185	0.005 123	0.011 72
DCP12	.878	0.409	0.232 9	0.004 62	0.001 289	0.007 60	0.006 111	0.002 335	0.001 239	0.007 103	0.005 26
DCP13	.953	0.297	0.198 5	0.030 38	0.003 128	0.005 14	0.003 45	0.001 191	0.001 343	0.002 299	0.003 159

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	33.73	0.600	14.92	4.90		1155.1	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.086	653.1	1456.0	0.63E 07	-0.00089	1.121	18.29	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.981	0.145 52	0.011 171	0.011 204	0.008 324	0.010 166	0.001 111	0.002 77	0.002 211	0.000 82
CM		-0.080	0.056 197	0.004 291	0.005 306	0.002 66	0.002 265	0.001 143	0.001 191	0.001 329	0.000 63
DCP 1	.010	3.157	0.650 5	0.148 103	0.016 229	0.016 217	0.011 96	0.007 61	0.009 68	0.008 35	0.007 271
DCP 2	.050	2.330	0.284 161	0.095 49	0.084 214	0.016 323	0.040 237	0.012 177	0.015 182	0.003 70	0.004 251
DCP 3	.100	1.938	0.429 160	0.136 267	0.089 321	0.072 57	0.048 195	0.015 150	0.014 291	0.019 340	0.023 39
DCP 4	.150	1.664	0.241 140	0.120 275	0.058 300	0.021 348	0.024 183	0.012 108	0.021 171	0.012 222	0.009 195
DCP 5	.200	1.398	0.239 118	0.050 208	0.015 269	0.036 23	0.027 167	0.012 8	0.001 218	0.026 283	0.003 50
DCP 6	.250	1.247	0.185 91	0.040 210	0.045 250	0.013 302	0.021 199	0.005 139	0.009 45	0.005 320	0.005 93
DCP 7	.300	1.125	0.202 81	0.048 154	0.037 166	0.027 327	0.012 111	0.004 144	0.004 44	0.016 185	0.002 355
DCP 8	.500	0.749	0.235 34	0.028 149	0.020 186	0.023 264	0.006 255	0.003 152	0.009 106	0.003 102	0.006 257
DCP 9	.600	0.699	0.254 22	0.005 113	0.023 127	0.018 270	0.015 147	0.006 8	0.007 37	0.003 122	0.008 117
DCP10	.695	0.629	0.254 19	0.018 103	0.005 139	0.009 161	0.023 119	0.004 200	0.004 22	0.005 137	0.005 172
DCP11	.800	0.587	0.214 17	0.008 59	0.019 131	0.003 192	0.003 41	0.011 287	0.003 198	0.004 224	0.002 110
DCP12	.953	0.253	0.148 12	0.021 94	0.012 107	0.003 313	0.008 64	0.009 20	0.011 332	0.003 97	0.007 323

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	33.78	0.600	17.42	4.96		1155.2	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.086	653.1	1455.0	0.63E 07	-0.00151	1.160	22.21	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		1.014	0.143 56	0.029 272	0.015 190	0.005 297	0.004 56	0.001 292	0.004 181	0.003 132	0.002 29
CM		-0.101	0.053 211	0.001 288	0.001 51	0.001 240	0.001 148	0.002 338	0.001 353	0.002 275	0.001 219
DCP 1	.010	3.292	0.277 30	0.208 73	0.063 294	0.022 127	0.019 324	0.009 242	0.002 225	0.004 234	0.007 325
DCP 2	.050	2.184	0.366 169	0.173 297	0.082 177	0.076 293	0.024 47	0.036 317	0.016 72	0.016 316	0.005 47
DCP 3	.100	1.826	0.131 176	0.101 284	0.044 172	0.035 357	0.030 140	0.014 257	0.010 302	0.017 249	0.017 25
DCP 4	.150	1.537	0.133 126	0.095 281	0.033 129	0.029 250	0.012 353	0.017 330	0.016 90	0.011 258	0.002 163
DCP 5	.200	1.407	0.117 112	0.086 255	0.022 175	0.011 156	0.025 107	0.010 34	0.011 208	0.014 199	0.014 274
DCP 6	.250	1.254	0.146 78	0.067 238	0.008 182	0.006 194	0.003 235	0.005 311	0.014 314	0.002 237	0.008 3
DCP 7	.300	1.162	0.165 75	0.078 239	0.027 188	0.001 191	0.016 70	0.013 10	0.008 246	0.001 179	0.010 198
DCP 8	.500	0.828	0.253 49	0.014 243	0.012 232	0.009 155	0.003 349	0.011 152	0.014 217	0.018 126	0.010 92
DCP 9	.600	0.750	0.231 37	0.009 303	0.006 263	0.007 329	0.006 281	0.007 186	0.016 127	0.012 124	0.007 342
DCP10	.695	0.715	0.225 36	0.006 93	0.006 176	0.008 357	0.009 341	0.007 180	0.017 173	0.006 50	0.009 47
DCP11	.800	0.682	0.195 28	0.014 11	0.011 200	0.005 307	0.006 158	0.007 153	0.005 88	0.005 58	0.006 241
DCP12	.953	0.304	0.143 26	0.006 335	0.003 195	0.003 40	0.010 356	0.004 300	0.003 309	0.004 58	0.006 24

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	33.77	0.600	24.41	4.96		1155.3	9
K	**V**	**Q**	**RN**	**DAMPING**	**CN(MAX)**	**ALPHA(STALL)**	
0.086	653.3	1452.3	0.63E 07	-0.00162	1.246	26.24	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.095	0.171	58	0.037	176	0.003	266	0.005	6	0.003	235	0.003	314	0.002	129	0.001	152	0.002	229
CM		-0.150	0.049	216	0.007	15	0.002	225	0.002	358	0.000	281	0.001	347	0.001	180	0.001	278	0.001	41
DCP 1	.010	2.683	0.846	168	0.028	358	0.164	182	0.089	335	0.081	195	0.054	325	0.039	187	0.030	335	0.011	134
DCP 2	.050	1.883	0.173	87	0.105	137	0.062	274	0.044	61	0.035	227	0.025	350	0.019	111	0.008	194	0.013	6
DCP 3	.100	1.890	0.215	106	0.033	137	0.017	301	0.029	359	0.011	326	0.015	57	0.023	137	0.004	179	0.018	127
DCP 4	.150	1.503	0.191	59	0.076	164	0.024	283	0.009	26	0.008	318	0.014	307	0.001	129	0.012	252	0.011	317
DCP 5	.200	1.458	0.189	60	0.033	155	0.004	76	0.009	31	0.005	357	0.005	292	0.003	301	0.007	208	0.014	233
DCP 6	.250	1.354	0.197	48	0.052	183	0.012	329	0.012	0	0.014	3	0.003	353	0.001	192	0.009	250	0.009	295
DCP 7	.300	1.231	0.213	45	0.040	180	0.005	107	0.009	270	0.006	14	0.007	209	0.005	324	0.006	104	0.007	188
DCP 8	.500	0.973	0.223	45	0.049	200	0.014	337	0.006	359	0.002	176	0.005	271	0.002	356	0.000	75	0.005	297
DCP 9	.600	0.903	0.217	44	0.040	184	0.006	76	0.008	159	0.008	246	0.002	196	0.002	219	0.002	120	0.006	252
DCP10	.695	0.883	0.208	49	0.042	189	0.003	340	0.002	250	0.003	281	0.003	240	0.003	315	0.007	23	0.002	219
DCP11	.890	0.846	0.186	44	0.030	183	0.006	99	0.006	136	0.004	161	0.004	101	0.006	90	0.007	155	0.008	221
DCP12	.953	0.480	0.136	41	0.015	174	0.007	63	0.004	189	0.003	165	0.002	144	0.001	21	0.005	64	0.005	113

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	49.26	0.400	0.12	5.32		1391.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.185	443.9	725.4	0.47E 07	-0.00093	0.370	5.38

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		-0.079	0.432 350	0.031 177	0.006 183	0.003 178	0.002 253	0.002 168	0.001 183	0.001 236	0.002 277
CM		-0.027	0.026 270	0.002 117	0.001 212	0.000 203	0.001 182	0.001 314	0.000 36	0.000 177	0.001 173
DCP 1	.010	-2.101	2.041 335	0.726 194	0.332 245	0.050 325	0.074 161	0.075 218	0.024 248	0.030 178	0.040 229
DCP 2	.050	-0.840	1.691 339	0.116 71	0.067 111	0.024 253	0.036 10	0.042 90	0.034 166	0.014 276	0.009 350
DCP 3	.100	-0.249	1.241 336	0.067 65	0.057 92	0.040 156	0.027 244	0.023 347	0.021 48	0.013 137	0.012 197
DCP 4	.150	0.001	0.842 346	0.024 83	0.050 89	0.040 158	0.030 229	0.014 301	0.006 23	0.002 294	0.007 257
DCP 5	.200	0.303	0.648 345	0.030 144	0.011 88	0.012 139	0.015 204	0.010 255	0.006 340	0.007 348	0.003 104
DCP 6	.250	-0.081	0.511 354	0.048 198	0.009 290	0.000 196	0.006 230	0.004 276	0.004 325	0.002 337	0.001 354
DCP 7	.300	0.012	0.442 352	0.047 182	0.013 235	0.002 35	0.001 0	0.002 112	0.001 263	0.004 335	0.002 112
DCP 8	.500	-0.005	0.273 11	0.031 191	0.005 224	0.004 251	0.005 14	0.001 158	0.004 236	0.001 350	0.003 326
DCP 9	.600	0.002	0.218 9	0.020 178	0.004 167	0.002 185	0.003 313	0.006 134	0.003 176	0.002 215	0.004 323
DCP10	.695	0.055	0.166 24	0.011 216	0.002 51	0.003 137	0.004 47	0.002 178	0.002 207	0.001 227	0.004 333
DCP11	.800	-0.018	0.121 24	0.007 240	0.003 49	0.002 11	0.004 298	0.005 172	0.002 148	0.002 141	0.002 15
DCP12	.878	0.173	0.101 23	0.007 287	0.004 27	0.002 44	0.004 329	0.004 138	0.001 157	0.001 244	0.001 271
DCP13	.953	-0.093	0.078 25	0.010 267	0.005 42	0.002 320	0.004 40	0.003 47	0.002 218	0.002 24	0.002 281

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	49.38	0.400	7.49	5.31		1091.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.186	443.9	723.3	0.46E 07	-0.00095	1.216	12.80

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.778	0.435 351	0.016 170	0.002 6	0.002 140	0.002 356	0.002 31	0.000 98	0.000 334	0.001 256
CM		-0.025	0.028 281	0.002 112	0.000 188	0.000 176	0.000 139	0.001 313	0.000 24	0.000 155	0.000 138
DCP 1	.010	2.542	2.883 340	0.191 184	0.092 88	0.032 334	0.022 222	0.015 52	0.018 10	0.007 202	0.007 170
DCP 2	.050	2.173	1.588 341	0.058 143	0.042 284	0.048 156	0.039 46	0.029 310	0.009 153	0.004 94	0.005 185
DCP 3	.100	1.923	1.137 338	0.042 135	0.003 274	0.008 144	0.004 297	0.006 351	0.003 283	0.002 340	0.003 227
DCP 4	.150	1.672	0.780 349	0.030 150	0.007 316	0.002 180	0.004 281	0.005 7	0.001 26	0.001 55	0.003 260
DCP 5	.200	1.411	0.620 344	0.023 121	0.001 333	0.002 86	0.002 253	0.006 46	0.002 49	0.002 259	0.001 3
DCP 6	.250	0.963	0.519 355	0.019 157	0.003 349	0.001 159	0.002 351	0.001 87	0.003 101	0.002 357	0.002 297
DCP 7	.300	0.877	0.449 350	0.014 155	0.001 337	0.001 323	0.002 301	0.004 67	0.001 22	0.001 234	0.001 276
DCP 8	.500	0.539	0.265 9	0.009 205	0.003 346	0.000 355	0.002 39	0.002 198	0.002 119	0.001 31	0.001 247
DCP 9	.600	0.439	0.203 10	0.008 207	0.001 160	0.001 67	0.004 310	0.004 79	0.001 113	0.001 330	0.004 8
DCP10	.695	0.349	0.157 26	0.008 241	0.002 40	0.001 107	0.002 63	0.002 149	0.001 127	0.002 131	0.003 254
DCP11	.800	0.217	0.120 26	0.005 252	0.002 7	0.005 24	0.005 313	0.004 121	0.003 254	0.001 320	0.002 28
DCP12	.878	0.365	0.094 32	0.006 245	0.002 30	0.001 44	0.005 310	0.003 86	0.002 237	0.001 4	0.000 129
DCP13	.953	0.037	0.076 30	0.007 216	0.003 33	0.003 227	0.003 83	0.002 251	0.001 207	0.003 325	0.002 240

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	49.33	0.400	9.80	5.29		1091.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.186	443.8	723.2	0.46E 07	-0.00104	1.467	15.09

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.009	0.421	359	0.014	249	0.009	162	0.008	37	0.004	324	0.002	319	0.003	181	0.003	127	0.002	333
CM		-0.019	0.031	266	0.003	92	0.002	265	0.002	124	0.001	264	0.000	5	0.001	287	0.001	149	0.001	37
DCP 1	.010	4.086	3.010	342	0.165	179	0.115	315	0.141	177	0.068	51	0.010	233	0.052	37	0.036	262	0.008	130
DCP 2	.050	3.120	1.704	346	0.161	241	0.162	145	0.149	34	0.074	288	0.052	314	0.101	221	0.105	118	0.061	8
DCP 3	.100	2.481	1.009	349	0.071	58	0.044	286	0.019	146	0.005	354	0.007	116	0.012	24	0.008	256	0.004	169
DCP 4	.150	2.087	0.706	354	0.028	62	0.014	265	0.009	93	0.005	340	0.002	57	0.006	62	0.004	233	0.002	235
DCP 5	.200	1.693	0.555	357	0.015	43	0.012	230	0.006	94	0.006	302	0.003	113	0.006	58	0.002	252	0.001	282
DCP 6	.250	1.256	0.479	1	0.006	347	0.009	201	0.007	59	0.004	318	0.003	103	0.003	65	0.004	240	0.002	242
DCP 7	.300	1.101	0.415	3	0.008	296	0.012	183	0.007	39	0.004	271	0.005	95	0.002	82	0.001	182	0.001	289
DCP 8	.500	0.673	0.255	20	0.024	297	0.015	159	0.011	19	0.002	216	0.003	61	0.002	173	0.001	135	0.001	303
DCP 9	.600	0.518	0.203	28	0.022	287	0.012	151	0.012	351	0.001	288	0.002	39	0.003	168	0.004	12	0.003	238
DCP10	.695	0.386	0.162	37	0.025	276	0.013	124	0.009	338	0.004	125	0.003	312	0.005	160	0.003	14	0.004	251
DCP11	.800	0.282	0.124	42	0.020	256	0.009	100	0.010	305	0.004	61	0.008	234	0.006	133	0.004	357	0.005	241
DCP12	.878	0.412	0.099	33	0.018	203	0.011	43	0.007	261	0.005	35	0.003	202	0.004	92	0.002	299	0.001	86
DCP13	.953	0.089	0.067	10	0.025	178	0.013	25	0.003	257	0.006	340	0.002	246	0.001	128	0.001	258	0.002	165

FORCED PITCHING OSCILLATION — VERTOL 23013-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	49.02	0.400	12.40	5.19		1091.4	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.185	443.8	722.7	0.46E 07	0.00089	1.618	17.56

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.024	0.569	26	0.106	246	0.036	99	0.018	353	0.009	245	0.008	104	0.004	320	0.003	218	0.005	89
CM		-0.056	0.052	150	0.048	1	0.018	239	0.010	149	0.006	43	0.004	331	0.002	162	0.001	133	0.002	331
DCP 1	.010	3.973	2.441	22	0.383	20	0.258	344	0.225	268	0.135	158	0.145	42	0.122	309	0.072	226	0.013	195
DCP 2	.050	2.750	1.374	46	0.582	3	0.261	270	0.124	205	0.080	169	0.082	138	0.085	99	0.062	54	0.045	17
DCP 3	.100	2.203	1.193	47	0.484	321	0.216	181	0.066	80	0.055	53	0.057	341	0.037	279	0.045	222	0.045	129
DCP 4	.150	1.928	0.953	49	0.321	309	0.129	183	0.055	133	0.064	46	0.027	326	0.017	316	0.025	249	0.019	164
DCP 5	.200	1.588	0.862	36	0.305	267	0.127	127	0.048	81	0.067	346	0.017	230	0.020	254	0.025	128	0.014	23
DCP 6	.250	1.238	0.786	39	0.261	270	0.093	150	0.058	109	0.058	14	0.025	298	0.022	255	0.021	188	0.021	132
DCP 7	.300	1.110	0.721	24	0.256	236	0.091	105	0.057	59	0.048	307	0.007	230	0.019	190	0.015	99	0.024	11
DCP 8	.500	0.754	0.522	23	0.222	218	0.071	89	0.058	29	0.039	281	0.027	222	0.026	124	0.016	51	0.018	317
DCP 9	.600	0.601	0.407	7	0.189	189	0.070	59	0.061	329	0.040	201	0.034	104	0.025	353	0.023	278	0.019	144
DCP10	.695	0.500	0.326	6	0.170	192	0.067	74	0.065	341	0.036	229	0.036	152	0.021	39	0.021	345	0.024	219
DCP11	.800	0.426	0.273	346	0.160	165	0.072	35	0.057	287	0.029	168	0.024	75	0.013	282	0.014	266	0.020	112
DCP12	.878	0.550	0.219	332	0.120	159	0.061	35	0.042	274	0.027	167	0.031	58	0.028	288	0.021	178	0.016	70
DCP13	.953	0.196	0.165	319	0.062	166	0.040	53	0.025	286	0.015	202	0.015	101	0.016	349	0.013	232	0.017	156

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	49.02	0.400	15.00	5.12		1159.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.185	443.8	741.8	0.48E 07	0.00058	1.764	19.78

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.102	0.539	47	0.065	343	0.072	278	0.053	180	0.043	62	0.016	307	0.011	215	0.014	139	0.012	57
CM		-0.061	0.087	169	0.046	62	0.031	20	0.025	289	0.016	205	0.006	105	0.004	53	0.005	340	0.003	253
DCP 1	.010	4.249	1.235	71	1.337	88	0.750	20	0.314	290	0.011	136	0.074	278	0.121	199	0.107	131	0.041	72
DCP 2	.050	3.094	1.248	84	0.752	54	0.309	359	0.157	302	0.077	351	0.094	326	0.070	315	0.046	321	0.058	331
DCP 3	.100	2.283	1.279	83	0.524	18	0.197	318	0.217	260	0.095	180	0.042	222	0.070	164	0.054	138	0.052	107
DCP 4	.150	1.921	0.952	72	0.279	356	0.143	315	0.175	234	0.056	123	0.032	175	0.028	112	0.027	121	0.022	61
DCP 5	.200	1.680	0.878	64	0.199	334	0.155	305	0.155	210	0.053	122	0.033	137	0.016	127	0.032	76	0.019	17
DCP 6	.250	1.419	0.777	55	0.167	323	0.164	299	0.161	204	0.065	125	0.042	92	0.014	96	0.025	58	0.012	12
DCP 7	.300	1.167	0.744	48	0.145	305	0.150	281	0.117	187	0.068	123	0.033	58	0.023	87	0.015	31	0.017	2
DCP 8	.500	0.747	0.583	32	0.131	267	0.138	246	0.097	154	0.093	80	0.032	352	0.018	326	0.008	251	0.011	222
DCP 9	.600	0.720	0.491	19	0.134	249	0.131	226	0.111	130	0.108	46	0.042	308	0.030	288	0.038	211	0.031	121
DCP10	.695	0.691	0.431	12	0.136	248	0.121	208	0.096	123	0.101	34	0.039	297	0.031	249	0.027	196	0.013	118
DCP11	.800	0.572	0.331	359	0.114	234	0.113	191	0.102	90	0.077	356	0.039	267	0.038	213	0.041	141	0.028	54
DCP12	.953	0.204	0.208	336	0.072	234	0.045	145	0.044	71	0.040	329	0.025	236	0.022	170	0.020	98	0.018	22

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	49.14	0.400	17.50	5.07		1159.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.185	443.8	742.1	0.48E 07	-0.00021	1.851	20.60

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.159	0.520	58	0.105	77	0.085	349	0.049	260	0.048	167	0.030	91	0.011	78	0.015	38	0.009	345
CM		-0.081	0.114	180	0.038	120	0.032	89	0.027	35	0.017	326	0.006	239	0.004	290	0.009	221	0.007	158
DCP 1	.010	4.234	1.178	127	1.384	122	0.378	99	0.172	98	0.014	245	0.110	173	0.072	77	0.055	297	0.056	186
DCP 2	.050	3.015	1.309	115	0.690	99	0.295	72	0.135	43	0.048	128	0.109	119	0.019	133	0.053	225	0.038	221
DCP 3	.100	2.304	1.341	102	0.435	83	0.321	53	0.141	354	0.038	98	0.069	88	0.057	51	0.020	95	0.042	106
DCP 4	.150	1.942	0.983	86	0.234	91	0.278	33	0.099	354	0.038	309	0.044	63	0.035	353	0.026	359	0.007	33
DCP 5	.200	1.710	0.869	77	0.199	83	0.226	13	0.084	344	0.033	262	0.045	54	0.032	339	0.020	339	0.008	58
DCP 6	.250	1.497	0.785	65	0.168	83	0.219	3	0.102	333	0.053	241	0.023	14	0.025	321	0.016	332	0.004	265
DCP 7	.300	1.234	0.747	57	0.149	68	0.184	350	0.110	319	0.060	229	0.007	113	0.015	310	0.005	285	0.012	81
DCP 8	.500	0.850	0.632	33	0.071	14	0.129	312	0.136	263	0.093	191	0.034	119	0.027	202	0.029	122	0.033	54
DCP 9	.600	0.799	0.569	24	0.068	333	0.139	295	0.153	237	0.106	163	0.045	110	0.034	133	0.050	74	0.045	10
DCP10	.695	0.771	0.488	17	0.103	320	0.138	279	0.162	216	0.113	151	0.041	78	0.031	117	0.049	52	0.036	336
DCP11	.800	0.656	0.390	10	0.107	309	0.116	264	0.131	198	0.105	127	0.052	61	0.045	55	0.054	358	0.043	287
DCP12	.953	0.239	0.216	353	0.091	277	0.053	209	0.053	127	0.029	80	0.019	320	0.009	131	0.024	34	0.020	327

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	49.38	0.400	24.55	5.19		1159.3	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.186	443.8	740.0	0.48E 07	-0.00155	1.266	27.59	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.021	0.243	49	0.023	207	0.004	62	0.009	262	0.010	268	0.005	231	0.001	327	0.001	310	0.004	103
CM		-0.134	0.074	215	0.002	39	0.004	218	0.002	39	0.001	46	0.001	352	0.001	143	0.000	242	0.001	309
DCP 1	.010	3.101	1.571	172	0.199	125	0.370	200	0.035	233	0.139	214	0.031	235	0.051	185	0.032	203	0.023	105
DCP 2	.050	2.014	0.321	158	0.179	265	0.003	270	0.033	2[illegible]	0.006	310	0.021	313	0.008	125	0.014	320	0.015	96
DCP 3	.100	1.449	0.310	39	0.037	224	0.047	18	0.006	67	0.027	307	0.011	273	0.005	349	0.003	222	0.013	38
DCP 4	.150	1.428	0.314	30	0.025	175	0.018	30	0.006	352	0.014	325	0.006	304	0.004	58	0.006	331	0.007	33
DCP 5	.200	1.337	0.335	34	0.037	179	0.023	24	0.014	279	0.017	313	0.008	238	0.002	50	0.003	239	0.003	63
DCP 6	.250	1.256	0.326	33	0.024	189	0.015	18	0.005	336	0.017	321	0.004	273	0.004	9	0.006	305	0.006	14
DCP 7	.300	1.100	0.346	36	0.030	183	0.020	27	0.010	284	0.016	318	0.007	205	0.004	309	0.002	179	0.003	344
DCP 8	.500	0.889	0.347	41	0.016	204	0.012	28	0.011	275	0.013	293	0.004	112	0.004	48	0.004	50	0.005	180
DCP 9	.600	0.814	0.322	40	0.020	212	0.006	34	0.017	258	0.010	243	0.011	227	0.001	292	0.001	48	0.009	231
DCP10	.695	0.882	0.308	43	0.017	209	0.008	45	0.008	252	0.011	236	0.003	267	0.005	37	0.006	38	0.012	139
DCP11	.800	0.750	0.258	46	0.017	187	0.010	73	0.015	231	0.009	151	0.010	191	0.007	310	0.001	166	0.009	126
DCP12	.953	0.447	0.182	41	0.016	277	0.013	53	0.012	126	0.006	233	0.002	86	0.006	249	0.003	218	0.011	29

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	49.26	0.600	0.11	5.29		1090.1	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.126	653.3	1431.0	0.62E 07	-0.00098	0.462	5.29	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		-0.065	0.516	345	0.037	150	0.012	142	0.006	186	0.001	349	0.002	100	0.001	191	0.002	333	0.000	144
CM		-0.019	0.028	264	0.002	152	0.001	214	0.002	306	0.001	96	0.000	257	0.000	324	0.001	132	0.000	238
DCP 1	.010	-1.846	1.751	325	0.595	188	0.066	190	0.057	131	0.036	157	0.010	65	0.013	6	0.012	85	0.002	156
DCP 2	.050	-0.725	1.904	332	0.103	166	0.102	256	0.061	303	0.008	178	0.027	279	0.013	327	0.004	240	0.005	230
DCP 3	.100	-0.136	1.747	335	0.065	128	0.067	103	0.053	305	0.017	50	0.006	67	0.008	278	0.007	53	0.009	274
DCP 4	.150	-0.021	1.163	343	0.162	69	0.064	139	0.014	192	0.040	41	0.021	143	0.002	223	0.006	45	0.010	171
DCP 5	.200	0.272	0.897	345	0.101	84	0.063	126	0.024	190	0.014	17	0.016	123	0.008	198	0.007	305	0.003	165
DCP 6	.250	-0.001	0.684	347	0.044	98	0.038	108	0.028	167	0.007	282	0.011	88	0.009	160	0.007	236	0.002	176
DCP 7	.300	0.030	0.526	352	0.047	155	0.017	129	0.023	163	0.012	256	0.004	54	0.004	149	0.004	299	0.002	47
DCP 8	.500	-0.000	0.294	3	0.042	179	0.004	190	0.010	146	0.004	227	0.001	65	0.001	59	0.001	321	0.001	20
DCP 9	.600	0.006	0.235	7	0.024	178	0.002	146	0.006	144	0.003	275	0.002	24	0.001	179	0.002	9	0.004	49
DCP10	.695	0.032	0.183	13	0.010	168	0.001	150	0.003	127	0.002	18	0.002	58	0.001	57	0.002	337	0.002	87
DCP11	.800	-0.021	0.130	14	0.003	254	0.005	48	0.004	109	0.003	298	0.000	103	0.001	159	0.004	313	0.002	37
DCP12	.878	0.110	0.112	11	0.007	357	0.005	47	0.002	145	0.003	289	0.001	126	0.002	152	0.001	313	0.001	217
DCP13	.953	-0.106	0.101	5	0.008	353	0.006	56	0.002	101	0.002	110	0.001	176	0.001	244	0.002	310	0.001	150

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	49.26	0.600	7.47	5.17		1090.2	10

K	V	ω	RN	DAMPING	CN(MAX)	ALPHA(STALL)
.126	653.2	1429.6	0.62E 07	-0.00086	1.189	11.80

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.721	0.416 7	0.054 357	0.008 268	0.018 224	0.003 65	0.003 285	0.001 222	0.004 328	0.004 210
CM		-0.029	0.034 217	0.023 70	0.008 347	0.003 320	0.003 245	0.002 173	0.001 65	0.000 40	0.000 72
DCP 1	.010	1.414	1.774 346	0.152 37	0.103 95	0.013 143	0.011 61	0.020 321	0.014 307	0.004 266	0.005 205
DCP 2	.050	1.808	1.024 346	0.188 52	0.022 123	0.016 162	0.015 57	0.017 334	0.008 328	0.002 320	0.007 251
DCP 3	.100	2.066	0.793 351	0.432 60	0.105 327	0.070 234	0.010 250	0.042 189	0.015 65	0.020 338	0.015 211
DCP 4	.200	1.346	0.591 17	0.174 28	0.093 338	0.025 320	0.047 303	0.007 3	0.007 31	0.032 355	0.007 236
DCP 5	.250	1.007	0.598 16	0.135 351	0.056 316	0.046 267	0.017 305	0.025 283	0.014 235	0.008 288	0.011 238
DCP 6	.300	0.813	0.525 18	0.135 333	0.061 285	0.069 247	0.038 207	0.024 178	0.016 154	0.006 140	0.008 117
DCP 7	.500	0.498	0.340 19	0.084 281	0.042 169	0.019 190	0.028 97	0.019 7	0.007 286	0.006 243	0.005 158
DCP 8	.600	0.384	0.266 24	0.071 285	0.030 183	0.017 191	0.018 100	0.008 25	0.002 68	0.007 358	0.009 280
DCP 9	.695	0.330	0.217 20	0.069 249	0.038 139	0.009 119	0.021 38	0.009 305	0.003 353	0.010 253	0.010 117
DCP10	.800	0.237	0.192 18	0.066 260	0.029 172	0.017 141	0.016 49	0.007 324	0.004 257	0.002 121	0.008 302
DCP11	.878	0.348	0.179 8	0.061 244	0.021 167	0.015 126	0.012 31	0.002 311	0.001 232	0.004 352	0.006 234
DCP12	.953	0.049	0.172 350	0.055 209	0.013 139	0.013 113	0.007 15	0.005 357	0.006 230	0.005 96	0.002 278

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	49.26	0.600	7.81	5.11		1090.3	10

K	V	ω	RN	DAMPING	CN(MAX)	ALPHA(STALL)
.126	653.1	1427.8	0.62E 07	-0.00095	1.241	12.31

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.859	0.319 27	0.062 51	0.022 339	0.013 72	0.012 348	0.005 297	0.004 247	0.001 158	0.003 244
CM		-0.042	0.055 205	0.021 89	0.004 121	0.002 93	0.002 122	0.001 101	0.002 50	0.000 329	0.001 42
DCP 1	.010	2.152	1.352 356	0.146 66	0.040 124	0.007 291	0.016 337	0.013 340	0.011 328	0.008 269	0.008 246
DCP 2	.050	2.186	0.532 0	0.287 58	0.062 292	0.044 209	0.009 50	0.009 326	0.003 260	0.004 201	0.004 118
DCP 3	.100	2.262	0.044 104	0.545 74	0.066 325	0.072 76	0.058 329	0.024 187	0.015 45	0.007 201	0.009 54
DCP 4	.200	1.456	0.415 49	0.224 74	0.026 145	0.046 95	0.033 160	0.018 312	0.017 307	0.013 339	0.014 299
DCP 5	.250	1.151	0.463 41	0.184 58	0.052 44	0.052 78	0.022 72	0.015 167	0.025 139	0.007 145	0.006 321
DCP 6	.300	0.955	0.478 39	0.129 35	0.062 23	0.056 57	0.045 41	0.031 34	0.008 54	0.011 50	0.007 248
DCP 7	.500	0.610	0.360 33	0.054 322	0.040 346	0.018 312	0.030 322	0.023 270	0.014 233	0.006 208	0.008 161
DCP 8	.600	0.470	0.291 33	0.046 301	0.026 327	0.008 256	0.017 333	0.005 320	0.015 283	0.005 236	0.010 246
DCP 9	.695	0.412	0.257 23	0.058 265	0.015 275	0.004 135	0.018 281	0.006 204	0.010 213	0.005 115	0.002 158
DCP10	.800	0.337	0.231 21	0.050 278	0.024 292	0.010 235	0.008 276	0.005 267	0.010 226	0.007 139	0.000 120
DCP11	.878	0.438	0.227 11	0.049 277	0.025 275	0.011 238	0.002 183	0.007 303	0.007 208	0.001 328	0.006 223
DCP12	.953	0.107	0.206 357	0.028 268	0.021 249	0.000 312	0.003 256	0.001 204	0.001 35	0.003 333	0.005 305

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	49.26	0.600	12.41	5.11		1390.4	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.126	653.1	1422.0	0.61E 07	-0.00050	1.228	13.51

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.952	0.252	44	0.055	87	0.008	73	0.005	40	0.002	198	0.002	130	0.002	77	0.001	25	0.002	26
CM		-0.063	0.070	190	0.005	25	0.008	172	0.002	223	0.002	286	0.002	258	0.001	225	0.001	304	0.001	246
CCP 1	.010	2.690	1.011	3	0.161	94	0.028	315	0.006	41	0.004	358	0.007	28	0.008	237	0.003	306	0.003	334
CCP 2	.050	2.176	0.265	116	0.359	64	0.007	342	0.082	36	0.055	322	0.012	277	0.020	285	0.021	182	0.007	7
CCP 3	.100	2.274	0.528	147	0.185	45	0.143	155	0.024	268	0.018	60	0.020	251	0.010	321	0.016	6	0.014	284
CCP 4	.200	1.570	0.383	92	0.049	133	0.014	190	0.006	16	0.016	220	0.013	92	0.005	131	0.013	346	0.004	313
CCP 5	.250	1.266	0.383	71	0.106	122	0.033	204	0.032	226	0.019	242	0.027	71	0.006	183	0.015	60	0.014	106
CCP 6	.300	1.059	0.426	51	0.099	97	0.029	123	0.025	186	0.029	212	0.025	240	0.018	167	0.002	313	0.006	333
CCP 7	.500	0.692	0.349	36	0.033	145	0.042	43	0.020	71	0.008	141	0.005	111	0.011	98	0.006	311	0.002	172
CCP 8	.600	0.576	0.309	18	0.032	156	0.034	2	0.014	14	0.007	352	0.005	184	0.010	340	0.012	180	0.008	122
CCP 9	.695	0.508	0.284	20	0.021	156	0.042	359	0.008	16	0.020	127	0.016	74	0.022	63	0.005	355	0.008	31
CCP10	.800	0.436	0.276	8	0.009	141	0.026	321	0.011	53	0.006	6	0.010	69	0.005	300	0.006	92	0.008	110
CCP11	.878	538	0.254	1	0.012	15	0.020	307	0.004	327	0.007	67	0.004	59	0.005	292	0.007	128	0.009	57
CCP12	.953	176	0.212	2	0.031	37	0.014	341	0.009	2	0.013	40	0.005	37	0.007	349	0.001	97	0.013	331

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	48.19	0.600	14.94	4.97		1158.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.123	653.1	1460.7	0.63E 07	-0.00102	1.182	15.91

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.985	0.211	61	0.029	188	0.009	114	0.003	310	0.003	333	0.002	11	0.005	206	0.004	348	0.001	288
CM		-0.076	0.068	204	0.006	311	0.003	321	0.003	321	0.002	37	0.001	170	0.001	344	0.002	149	0.001	236
CCP 1	.010	3.188	0.706	9	0.185	107	0.038	285	0.035	169	0.010	110	0.011	53	0.007	96	0.005	186	0.004	152
CCP 2	.050	2.283	0.376	156	0.088	67	0.096	166	0.051	342	0.026	245	0.026	304	0.008	281	0.008	281	0.026	228
CCP 3	.100	2.076	0.533	160	0.222	270	0.090	24	0.055	10	0.039	79	0.018	147	0.019	7	0.022	234	0.027	336
CCP 4	.150	1.712	0.358	137	0.128	255	0.037	62	0.053	297	0.054	14	0.005	105	0.007	110	0.027	159	0.016	274
CCP 5	.200	1.482	0.349	105	0.080	228	0.025	30	0.024	352	0.017	14	0.010	208	0.021	295	0.019	62	0.025	237
CCP 6	.250	1.299	0.293	89	0.091	214	0.023	18	0.014	287	0.021	9	0.002	261	0.019	298	0.017	347	0.001	270
CCP 7	.300	1.082	0.329	79	0.069	172	0.010	1[illegible]	0.022	259	0.008	310	0.008	131	0.011	220	0.018	41	0.012	141
CCP 8	.500	0.746	0.313	44	0.042	161	0.023	195	0.023	166	0.010	271	0.009	15	0.020	182	0.002	318	0.010	70
CCP 9	.600	0.689	0.325	35	0.027	134	0.020	77	0.008	114	0.007	18	0.012	22	0.004	359	0.014	347	0.021	346
CCP10	.695	0.620	0.299	29	0.038	147	0.014	151	0.017	104	0.018	232	0.004	329	0.016	158	0.009	334	0.002	134
CCP11	.800	0.573	0.256	21	0.019	126	0.011	157	0.006	94	0.009	201	0.001	14	0.005	68	0.008	332	0.006	62
CCP12	.953	0.241	0.174	16	0.015	74	0.015	91	0.004	173	0.008	147	0.006	271	0.005	241	0.004	231	0.006	293

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	48.31	0.600	17.45	5.04		1158.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.124	653.1	1457.6	0.63E 07	-0.00127	1.231	20.27

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.022	0.224	60	0.036	237	0.012	32	0.007	273	0.001	335	0.006	323	0.001	129	0.004	52	0.003	25
CM		-0.096	0.061	213	0.005	16	0.001	94	0.003	14	0.003	355	0.001	35	0.001	169	0.001	253	0.001	231
DCP 1	.010	3.289	0.271	42	0.283	87	0.079	308	0.021	52	0.032	316	0.025	237	0.012	167	0.003	99	0.006	219
DCP 2	.050	2.287	0.397	140	0.148	288	0.098	126	0.059	324	0.036	88	0.029	1	0.004	111	0.007	75	0.017	67
DCP 3	.100	1.966	0.172	129	0.082	297	0.038	72	0.045	339	0.037	3	0.024	333	0.011	142	0.004	3	0.029	329
DCP 4	.150	1.645	0.278	96	0.128	268	0.063	44	0.022	232	0.025	352	0.021	344	0.012	161	0.003	23	0.007	71
DCP 5	.200	1.440	0.246	86	0.096	236	0.039	39	0.026	277	0.018	340	0.013	293	0.012	189	0.010	265	0.003	232
DCP 6	.250	1.292	0.278	72	0.065	248	0.036	359	0.007	194	0.016	322	0.008	268	0.013	234	0.005	241	0.014	274
DCP 7	.300	1.108	0.292	71	0.094	222	0.033	341	0.007	266	0.010	277	0.012	332	0.006	191	0.007	295	0.003	216
DCP 8	.500	0.811	0.321	50	0.047	215	0.020	353	0.007	232	0.007	176	0.012	18	0.011	51	0.022	133	0.006	114
DCP 9	.600	0.738	0.279	42	0.024	191	0.011	131	0.007	142	0.007	188	0.004	322	0.005	235	0.012	9	0.004	140
DCP10	.695	0.704	0.278	39	0.023	206	0.010	213	0.013	278	0.009	198	0.011	154	0.005	70	0.007	95	0.008	71
DCP11	.800	0.664	0.235	34	0.008	185	0.005	74	0.006	195	0.011	145	0.009	235	0.011	1	0.007	13	0.010	354
DCP12	.953	0.312	0.159	26	0.005	250	0.003	187	0.017	199	0.008	165	0.005	274	0.006	229	0.004	151	0.005	49

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	48.19	0.600	24.50	5.08		1158.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.123	653.1	1446.7	0.63E 07	-0.00130	1.272	27.75

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.085	0.210	46	0.038	179	0.013	265	0.008	348	0.008	143	0.005	315	0.005	182	0.002	81	0.003	56
CM		-0.146	0.061	214	0.008	5	0.001	35	0.002	96	0.001	288	0.001	71	0.001	232	0.001	252	0.001	211
DCP 1	.010	2.853	0.789	164	0.039	63	0.090	180	0.021	306	0.058	159	0.019	311	0.045	178	0.004	350	0.022	115
DCP 2	.050	1.876	0.119	62	0.028	131	0.049	258	0.038	68	0.018	174	0.017	327	0.015	211	0.019	152	0.028	193
DCP 3	.100	1.871	0.174	73	0.061	152	0.041	314	0.032	43	0.021	156	0.010	15	0.015	226	0.008	8	0.006	16
DCP 4	.150	1.524	0.184	41	0.044	186	0.035	286	0.015	34	0.004	239	0.015	337	0.012	243	0.007	55	0.004	118
DCP 5	.200	1.431	0.242	44	0.049	161	0.012	268	0.021	9	0.016	109	0.014	42	0.014	184	0.008	323	0.009	32
DCP 6	.250	1.350	0.222	43	0.060	201	0.022	284	0.010	327	0.002	279	0.011	314	0.008	280	0.014	71	0.008	84
DCP 7	.300	1.172	0.265	41	0.051	170	0.013	314	0.011	5	0.011	124	0.003	323	0.014	201	0.012	239	0.007	322
DCP 8	.500	0.971	0.281	41	0.058	191	0.022	271	0.012	323	0.008	142	0.008	331	0.010	98	0.003	86	0.008	56
DCP 9	.600	0.889	0.278	38	0.046	180	0.009	272	0.007	322	0.009	136	0.007	255	0.005	188	0.003	50	0.003	347
DCP10	.695	0.869	0.261	40	0.038	175	0.014	211	0.015	282	0.005	148	0.008	264	0.008	66	0.004	47	0.010	17
DCP11	.800	0.834	0.236	38	0.026	179	0.003	161	0.008	271	0.005	86	0.001	295	0.003	41	0.005	84	0.004	88
DCP12	.953	0.474	0.165	37	0.013	166	0.005	112	0.003	254	0.004	154	0.006	238	0.003	356	0.002	96	0.003	195

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	63.62	0.400	0.06	5.42		1092.1	16

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.239	443.9	734.0	0.47E 07	-0.00092	0.310	5.50

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		-0.102	0.400	355	0.038	172	0.010	148	0.010	161	0.002	222	0.002	31	0.002	95	0.002	144	0.001	198
CM		-0.018	0.033	275	0.004	108	0.001	153	0.002	43	0.001	129	0.000	245	0.001	331	0.000	343	0.000	266
DCP 1	.010	-1.972	1.940	336	0.690	181	0.243	223	0.034	6	0.040	137	0.046	206	0.021	290	0.012	160	0.027	208
DCP 2	.050	-0.829	1.626	338	0.135	78	0.084	103	0.010	192	0.040	357	0.040	53	0.019	122	0.016	245	0.010	284
DCP 3	.100	-0.285	1.177	340	0.067	102	0.067	105	0.052	147	0.020	229	0.014	1	0.018	64	0.017	115	0.004	166
DCP 4	.150	-0.054	0.789	348	0.029	121	0.050	73	0.047	129	0.022	198	0.016	289	0.010	353	0.004	75	0.004	238
DCP 5	.200	0.283	0.601	352	0.045	166	0.011	114	0.015	136	0.014	179	0.003	270	0.009	58	0.010	69	0.006	124
DCP 6	.250	-0.115	0.481	359	0.055	184	0.004	261	0.009	130	0.002	188	0.004	313	0.003	305	0.002	307	0.001	277
DCP 7	.300	-0.019	0.413	2	0.058	184	0.013	201	0.009	165	0.002	182	0.002	140	0.002	163	0.003	60	0.003	54
DCP 8	.500	-0.032	0.270	20	0.028	189	0.004	165	0.007	184	0.003	312	0.003	23	0.002	115	0.001	203	0.001	315
DCP 9	.600	0.022	0.214	26	0.027	199	0.005	166	0.010	187	0.002	234	0.002	80	0.003	111	0.003	172	0.002	98
DCP10	.695	0.072	0.177	36	0.012	240	0.003	91	0.005	194	0.003	329	0.004	17	0.002	139	0.004	164	0.002	303
DCP11	.800	-0.011	0.093	38	0.014	249	0.004	219	0.009	213	0.001	262	0.003	107	0.004	134	0.003	151	0.003	128
DCP12	.953	-0.071	0.083	37	0.007	283	0.003	8	0.006	233	0.002	308	0.002	43	0.002	162	0.002	166	0.002	199

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	63.74	0.400	7.42	5.39		1092.2	16

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.240	443.9	734.0	0.47E 07	-0.00089	1.174	12.86

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.760	0.409	357	0.025	177	0.003	82	0.006	136	0.001	326	0.003	353	0.002	41	0.001	4	0.001	164
CM		-0.012	0.034	284	0.004	110	0.000	131	0.001	63	0.001	107	0.001	230	0.001	255	0.000	324	0.000	311
DCP 1	.010	2.743	2.787	338	0.243	167	0.111	76	0.035	25	0.017	175	0.015	14	0.022	314	0.011	297	0.005	246
DCP 2	.050	2.257	1.522	340	0.099	144	0.021	256	0.057	117	0.042	35	0.026	287	0.004	167	0.010	347	0.005	248
DCP 3	.100	1.972	1.098	347	0.071	166	0.012	174	0.021	141	0.010	156	0.002	137	0.002	74	0.005	43	0.007	126
DCP 4	.150	1.584	0.741	351	0.046	150	0.005	3	0.014	97	0.004	247	0.007	345	0.004	330	0.002	275	0.003	258
DCP 5	.200	1.396	0.584	356	0.033	163	0.006	189	0.011	153	0.005	189	0.001	59	0.006	51	0.001	104	0.002	129
DCP 6	.250	0.926	0.485	0	0.028	159	0.005	50	0.007	114	0.005	284	0.004	0	0.004	358	0.001	280	0.003	270
DCP 7	.300	0.853	0.423	5	0.025	187	0.003	175	0.008	158	0.002	206	0.002	24	0.004	74	0.002	89	0.004	129
DCP 8	.500	0.504	0.258	19	0.014	208	0.003	44	0.004	177	0.005	300	0.004	9	0.002	1	0.002	303	0.001	202
DCP 9	.600	0.458	0.210	29	0.014	230	0.003	57	0.004	171	0.001	279	0.004	29	0.004	65	0.005	87	0.002	138
DCP10	.695	0.367	0.165	39	0.010	245	0.002	95	0.005	189	0.004	319	0.003	41	0.004	73	0.000	62	0.000	91
DCP11	.800	0.212	0.095	42	0.011	252	0.002	286	0.002	244	0.003	289	0.002	4	0.002	77	0.001	100	0.002	167
DCP12	.953	0.050	0.083	41	0.009	235	0.002	38	0.003	244	0.002	307	0.001	31	0.000	158	0.002	258	0.001	88

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.M	TEST POINT	CYCLES ANALYZED
	63.49	0.400	9.73	5.39		1092.3	16
K	V	ω	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.239	444.0	729.0	0.47E 07	-0.00091	1.428	15.13	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.001	0.396	2	0.020	211	0.009	135	0.004	114	0.003	294	0.002	294	0.002	125	0.003	98	0.002	329
CM		-0.006	0.035	288	0.004	85	0.002	247	0.003	64	0.001	232	0.000	179	0.001	243	0.001	76	0.001	322
DCP 1	.010	4.364	2.948	340	0.251	162	0.103	306	0.145	148	0.062	42	0.017	134	0.056	355	0.024	249	0.011	329
DCP 2	.050	3.180	1.615	344	0.141	221	0.158	135	0.148	24	0.060	269	0.048	289	0.094	195	0.098	80	0.058	328
DCP 3	.100	2.594	0.963	352	0.061	82	0.040	262	0.029	141	0.006	195	0.015	145	0.009	29	0.004	222	0.007	150
DCP 4	.150	1.975	0.678	356	0.028	95	0.009	241	0.018	98	0.004	256	0.002	303	0.007	4	0.003	258	0.002	272
DCP 5	.200	1.722	0.522	2	0.009	157	0.013	220	0.013	148	0.005	249	0.004	191	0.004	58	0.004	134	0.002	92
DCP 6	.250	1.217	0.457	5	0.007	188	0.008	162	0.009	100	0.006	272	0.004	358	0.005	357	0.002	224	0.002	297
DCP 7	.300	1.093	0.395	11	0.019	233	0.010	157	0.004	156	0.007	250	0.002	171	0.004	62	0.003	161	0.002	93
DCP 8	.500	0.637	0.258	27	0.024	262	0.013	119	0.004	265	0.002	218	0.006	358	0.002	77	0.000	235	0.002	318
DCP 9	.600	0.540	0.212	38	0.029	259	0.014	105	0.009	248	0.003	48	0.005	308	0.005	137	0.003	107	0.003	223
DCP10	.695	0.433	0.176	44	0.025	256	0.014	87	0.009	245	0.001	1	0.004	292	0.006	90	0.003	259	0.003	158
DCP11	.800	0.275	0.094	57	0.023	241	0.012	98	0.014	239	0.007	33	0.004	240	0.008	75	0.002	303	0.001	111
DCP12	.953	0.096	0.082	20	0.017	168	0.010	346	0.006	197	0.003	291	0.004	57	0.003	342	0.002	196	0.002	52

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.M	TEST POINT	CYCLES ANALYZED
	63.37	0.400	12.32	5.31		1092.4	16
K	V	ω	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.238	444.1	729.0	0.47E 07	0.00077	1.619	17.45	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.023	0.577	21	0.090	226	0.025	117	0.010	317	0.016	184	0.018	38	0.010	237	0.004	19	0.002	153
CM		-0.042	0.047	145	0.045	347	0.018	229	0.012	120	0.009	19	0.007	223	0.005	67	0.001	255	0.001	295
DCP 1	.010	4.078	2.304	18	0.562	26	0.444	293	0.290	191	0.206	72	0.149	305	0.079	183	0.028	4	0.041	224
DCP 2	.050	2.815	1.409	35	0.479	348	0.233	239	0.088	174	0.099	145	0.093	103	0.103	57	0.083	356	0.065	319
DCP 3	.100	2.379	1.228	44	0.425	318	0.223	187	0.045	103	0.064	104	0.056	0	0.023	278	0.039	245	0.047	170
DCP 4	.150	1.800	1.033	38	0.312	276	0.129	146	0.048	102	0.043	17	0.013	325	0.035	281	0.023	179	0.012	105
DCP 5	.200	1.669	0.883	34	0.283	260	0.113	138	0.047	95	0.034	345	0.014	304	0.036	241	0.029	142	0.017	87
DCP 6	.250	1.219	0.828	28	0.265	239	0.081	127	0.076	73	0.052	307	0.011	283	0.022	201	0.010	117	0.017	43
DCP 7	.300	1.143	0.735	24	0.246	230	0.081	120	0.061	54	0.043	285	0.012	265	0.029	184	0.022	88	0.015	0
DCP 8	.500	0.728	0.522	12	0.212	189	0.056	83	0.068	352	0.048	233	0.032	140	0.021	40	0.022	317	0.012	196
DCP 9	.600	0.632	0.403	7	0.185	176	0.063	62	0.072	311	0.057	197	0.048	74	0.026	272	0.011	4	0.019	185
DCP10	.695	0.554	0.304	359	0.154	164	0.058	54	0.062	291	0.043	187	0.048	62	0.028	292	0.015	196	0.015	68
DCP11	.800	0.412	0.279	344	0.142	155	0.066	35	0.065	259	0.041	160	0.051	12	0.027	219	0.009	23	0.009	178
DCP12	.953	0.186	0.119	310	0.052	138	0.035	3	0.020	222	0.017	130	0.027	357	0.024	223	0.013	96	0.011	6

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	63.74	0.400	14.97	5.38		1161.1	16

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.240	444.0	740.5	0.48E 07	0.00074	1.762	20.18

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.123	0.566	35	0.084	318	0.055	204	0.054	64	0.032	287	0.023	213	0.022	103	0.009	334	0.007	281
CM		-0.073	0.087	157	0.050	38	0.039	313	0.020	211	0.010	104	0.005	50	0.007	286	0.004	168	0.002	109
DCP 1	.010	3.915	1.312	67	1.397	57	0.606	329	0.091	341	0.091	303	0.137	198	0.096	98	0.047	35	0.017	69
DCP 2	.050	2.839	1.268	72	0.771	29	0.268	309	0.103	350	0.117	297	0.097	235	0.034	256	0.046	234	0.050	237
DCP 3	.100	2.275	1.331	69	0.581	358	0.209	284	0.074	257	0.070	212	0.083	196	0.072	133	0.042	102	0.027	71
DCP 4	.150	1.913	1.008	58	0.320	334	0.155	273	0.094	172	0.034	174	0.060	134	0.041	57	0.024	31	0.020	327
DCP 5	.200	1.761	0.939	50	0.238	309	0.144	262	0.122	143	0.018	202	0.044	98	0.033	46	0.026	335	0.012	276
DCP 6	.250	1.484	0.840	43	0.206	305	0.161	249	0.122	131	0.021	176	0.044	82	0.043	25	0.030	333	0.021	272
DCP 7	.300	1.277	0.806	36	0.173	286	0.154	239	0.123	119	0.019	110	0.026	35	0.029	11	0.016	277	0.016	263
DCP 8	.500	0.830	0.632	16	0.160	245	0.168	180	0.123	79	0.072	352	0.039	284	0.033	212	0.013	148	0.006	89
DCP 9	.600	0.767	0.530	9	0.157	236	0.174	156	0.131	48	0.068	312	0.057	268	0.064	155	0.018	41	0.005	39
DCP10	.695	0.668	0.428	358	0.145	223	0.172	135	0.109	30	0.079	286	0.041	226	0.049	175	0.018	2	0.009	325
DCP11	.800	0.597	0.314	351	0.137	218	0.164	115	0.109	3	0.080	260	0.056	191	0.066	80	0.037	316	0.015	258
DCP12	.953	0.229	0.178	317	0.071	190	0.066	72	0.038	318	0.023	187	0.013	155	0.020	38	0.008	335	0.015	289

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	63.74	0.400	17.51	5.23		1161.2	16

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL
0.240	444.0	741.4	0.48E 07	0.00071	1.877	21.95

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.226	0.469	41	0.151	34	0.093	281	0.061	135	0.018	41	0.023	18	0.023	303	0.004	311	0.004	204
CM		-0.095	0.123	168	0.055	100	0.049	15	0.020	276	0.002	18	0.009	235	0.011	127	0.005	35	0.005	333
DCP 1	.010	4.245	0.870	140	1.645	95	0.444	11	0.319	116	0.177	61	0.063	14	0.032	153	0.053	27	0.030	325
DCP 2	.050	2.867	1.181	111	0.751	69	0.282	13	0.103	91	0.122	57	0.094	32	0.056	89	0.080	56	0.051	72
DCP 3	.100	2.340	1.186	95	0.557	55	0.342	6	0.043	294	0.087	19	0.065	334	0.044	318	0.042	3	0.044	345
DCP 4	.150	1.953	0.920	74	0.337	53	0.332	341	0.037	219	0.057	317	0.060	315	0.041	254	0.037	331	0.026	265
DCP 5	.200	1.855	0.785	62	0.280	51	0.288	330	0.065	235	0.024	306	0.064	298	0.046	234	0.008	249	0.019	268
DCP 6	.250	1.576	0.756	50	0.292	46	0.295	315	0.089	238	0.009	287	0.062	273	0.039	229	0.017	251	0.037	214
DCP 7	.300	1.411	0.706	40	0.245	46	0.270	311	0.106	228	0.009	330	0.063	253	0.035	182	0.009	353	0.025	233
DCP 8	.500	0.974	0.648	15	0.173	354	0.234	254	0.151	163	0.015	200	0.071	126	0.055	34	0.016	342	0.007	18
DCP 9	.600	0.892	0.570	7	0.192	328	0.242	226	0.173	136	0.040	100	0.079	69	0.081	343	0.015	276	0.025	288
DCP10	.695	0.784	0.494	2	0.200	303	0.229	207	0.163	114	0.046	67	0.076	32	0.069	300	0.016	191	0.006	328
DCP11	.800	0.730	0.384	356	0.192	285	0.214	186	0.137	87	0.060	40	0.078	352	0.083	267	0.036	156	0.012	162
DCP12	.953	0.228	0.280	337	0.166	234	0.167	123	0.134	359	0.081	234	0.033	106	0.022	339	0.034	258	0.053	138

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	63.62	0.400	24.63	5.36		1161.3	16

K	V	ω	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.239	444.0	741.1	0.48E 07	-0.00137	1.303	27.79

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.031	0.264	50	0.025	224	0.009	100	0.009	257	0.006	278	0.004	202	0.001	66	0.001	313	0.002	335
CM		-0.147	0.085	216	0.003	115	0.004	233	0.003	35	0.002	183	0.001	307	0.001	317	0.001	289	0.001	94
DCP 1	.010	2.956	1.[illegible]35	171	0.331	144	0.402	190	0.050	186	0.153	197	0.040	242	0.026	211	0.018	266	0.012	46
DCP 2	.050	1.757	0.355	153	0.215	266	0.025	309	0.048	295	0.013	4	0.019	297	0.018	59	0.019	308	0.017	41
DCP 3	.100	1.370	0.330	42	0.050	256	0.058	12	0.020	43	0.009	326	0.009	203	0.006	359	0.007	287	0.009	14
DCP 4	.150	1.362	0.338	32	0.038	194	0.019	46	0.011	17	0.007	316	0.006	327	0.008	5	0.007	346	0.007	336
DCP 5	.200	1.384	0.379	35	0.025	186	0.020	42	0.010	343	0.016	301	0.006	214	0.008	350	0.002	256	0.003	278
DCP 6	.250	1.252	0.357	35	0.030	205	0.017	57	0.012	353	0.012	287	0.005	307	0.006	329	0.004	313	0.005	310
DCP 7	.300	1.175	0.401	38	0.021	198	0.015	46	0.014	313	0.016	287	0.007	184	0.006	331	0.002	41	0.005	214
DCP 8	.500	0.936	0.408	43	0.017	252	0.014	85	0.016	249	0.009	261	0.003	161	0.001	194	0.002	344	0.001	205
DCP 9	.600	0.870	0.379	39	0.024	218	0.016	81	0.017	263	0.003	20	0.011	185	0.007	172	0.007	145	0.001	161
DCP10	.695	0.851	0.364	46	0.018	262	0.017	79	0.018	218	0.004	16	0.005	155	0.005	204	0.004	207	0.003	70
DCP11	.800	0.798	0.296	44	0.012	225	0.020	84	0.019	218	0.013	358	0.008	118	0.006	114	0.004	99	0.002	60
DCP12	.953	0.490	0.209	41	0.018	306	0.007	337	0.010	144	0.002	73	0.003	338	0.005	76	0.004	358	0.013	289

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	63.74	0.600	0.05	5.38		1093.1	16

K	V	ω	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.163	653.4	1439.8	0.62E 07	-0.00089	0.405	5.22

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		-0.083	0.480	344	0.039	142	0.019	111	0.011	146	0.003	94	0.003	26	0.001	195	0.001	332	0.001	246
CM		-0.011	0.033	261	0.003	111	0.002	168	0.001	337	0.001	37	0.001	157	0.000	70	0.000	49	0.000	42
DCP 1	.010	-1.753	1.587	318	0.542	170	0.059	140	0.053	107	0.026	87	0.010	47	0.011	11	0.010	13	0.007	341
DCP 2	.050	-0.737	1.801	326	0.106	144	0.050	210	0.022	323	0.019	32	0.014	291	0.012	333	0.014	280	0.010	276
DCP 3	.100	-0.132	1.640	330	0.064	142	0.066	100	0.019	265	0.020	69	0.012	79	0.004	140	0.015	49	0.001	29
DCP 4	.150	-0.043	1.109	340	0.153	66	0.075	112	0.023	129	0.036	37	0.013	116	0.006	255	0.011	4	0.005	149
DCP 5	.200	0.259	0.850	343	0.098	83	0.075	115	0.039	165	0.008	27	0.012	85	0.009	165	0.002	338	0.005	102
DCP 6	.250	-0.014	0.643	347	0.047	96	0.044	93	0.036	143	0.003	244	0.009	30	0.008	150	0.007	228	0.006	248
DCP 7	.300	0.020	0.506	353	0.046	148	0.025	107	0.033	142	0.013	183	0.003	358	0.007	138	0.003	217	0.001	12
DCP 8	.500	-0.032	0.289	8	0.039	167	0.005	95	0.009	126	0.003	174	0.003	313	0.002	252	0.000	173	0.002	220
DCP 9	.600	0.014	0.226	12	0.029	179	0.002	90	0.009	152	0.005	181	0.003	306	0.002	248	0.003	336	0.002	252
DCP10	.695	0.033	0.181	19	0.009	186	0.008	72	0.005	145	0.002	156	0.003	3	0.001	327	0.001	39	0.001	285
DCP11	.800	-0.017	0.120	16	0.008	242	0.003	5	0.003	189	0.004	244	0.002	25	0.002	280	0.002	299	0.001	245
DCP12	.953	-0.096	0.095	11	0.008	308	0.004	18	0.001	238	0.001	251	0.002	349	0.001	5	0.001	81	0.001	216

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	63.62	0.600	7.33	5.29		1093.2	16

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.163	653.3	1434.5	0.62E 07	-0.00061	1.226	12.39

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.694	0.436	9	0.048	309	0.011	239	0.019	167	0.013	42	0.003	353	0.001	303	0.002	181	0.004	116
CM		-0.021	0.034	215	0.025	54	0.009	303	0.004	302	0.005	190	0.001	71	0.001	5	0.000	55	0.001	314
DCP 1	.010	1.489	1.827	342	0.065	68	0.025	83	0.028	116	0.019	26	0.014	294	0.015	338	0.008	288	0.006	281
DCP 2	.050	1.771	1.065	343	0.128	60	0.035	231	0.029	84	0.012	5	0.013	304	0.008	326	0.002	198	0.006	342
DCP 3	.100	2.044	0.763	357	0.425	43	0.216	267	0.090	169	0.056	134	0.043	58	0.049	303	0.035	163	0.013	83
DCP 4	.150	1.603	0.782	20	0.245	31	0.085	348	0.076	34	0.014	301	0.044	28	0.024	138	0.014	64	0.023	81
DCP 5	.200	1.317	0.670	23	0.183	348	0.084	320	0.049	245	0.023	351	0.018	315	0.019	304	0.011	247	0.004	72
DCP 6	.250	0.972	0.645	18	0.149	319	0.051	300	0.054	244	0.003	288	0.020	255	0.009	185	0.005	247	0.010	245
DCP 7	.300	0.803	0.564	18	0.149	297	0.049	248	0.070	211	0.032	138	0.021	144	0.022	103	0.011	73	0.006	71
DCP 8	.500	0.464	0.373	21	0.113	260	0.038	139	0.031	156	0.035	43	0.006	319	0.010	353	0.008	247	0.003	198
DCP 9	.600	0.403	0.299	23	0.092	252	0.029	128	0.027	161	0.027	44	0.007	352	0.006	314	0.008	272	0.014	184
DCP10	.695	0.340	0.245	20	0.089	235	0.034	112	0.023	107	0.030	352	0.008	221	0.005	239	0.002	139	0.006	157
DCP11	.800	0.241	0.171	20	0.075	232	0.027	125	0.021	123	0.022	2	0.007	255	0.010	198	0.003	158	0.013	131
DCP12	.953	0.061	0.161	343	0.052	192	0.018	138	0.020	45	0.006	291	0.004	312	0.002	155	0.002	152	0.010	31

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	63.62	0.600	9.63	5.26		1093.3	16

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.163	653.3	1434.4	0.62E 07	-0.00071	1.295	13.08

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.831	0.370	30	0.073	5	0.014	308	0.007	197	0.003	229	0.006	93	0.001	237	0.005	88	0.002	271
CM		-0.032	0.060	201	0.026	73	0.003	54	0.004	5	0.001	38	0.001	217	0.002	30	0.002	271	0.001	128
DCP 1	.010	2.196	1.434	352	0.061	56	0.027	30	0.007	124	0.009	76	0.003	341	0.007	313	0.006	306	0.007	275
DCP 2	.050	2.055	0.493	4	0.327	42	0.151	281	0.031	168	0.032	75	0.004	180	0.018	50	0.026	326	0.022	234
DCP 3	.100	2.308	0.257	66	0.509	47	0.107	288	0.057	21	0.066	227	0.036	105	0.001	148	0.019	57	0.011	342
DCP 4	.150	1.902	0.425	81	0.317	39	0.152	160	0.076	249	0.040	50	0.035	133	0.019	14	0.011	145	0.008	214
DCP 5	.200	1.450	0.571	50	0.217	48	0.038	55	0.042	90	0.040	171	0.022	192	0.018	178	0.010	227	0.009	170
DCP 6	.250	1.103	0.566	44	0.162	26	0.070	24	0.042	56	0.018	29	0.023	86	0.009	17	0.018	151	0.008	60
DCP 7	.300	0.932	0.558	40	0.135	2	0.079	18	0.052	352	0.025	331	0.013	359	0.005	62	0.012	72	0.007	79
DCP 8	.500	0.574	0.410	33	0.092	288	0.027	349	0.034	241	0.009	261	0.003	259	0.009	275	0.001	174	0.009	264
DCP 9	.600	0.491	0.349	31	0.097	276	0.015	269	0.028	200	0.013	214	0.014	105	0.010	277	0.018	148	0.009	51
DCP10	.695	0.418	0.296	25	0.089	262	0.022	256	0.040	176	0.005	126	0.012	64	0.006	261	0.005	44	0.010	226
DCP11	.800	0.331	0.273	18	0.083	259	0.028	226	0.021	158	0.010	216	0.006	75	0.014	160	0.015	66	0.005	0
DCP12	.953	0.108	0.207	351	0.043	235	0.025	213	0.009	119	0.004	115	0.006	338	0.004	200	0.006	67	0.005	271

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	63.62	0.600	12.22	5.21		1393.4	16
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.163	653.3	1428.7	0.62E 07	-0.00055	1.299	13.97	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.936	0.313	43	0.050	53	0.017	54	0.011	73	0.009	15	0.004	36	0.004	328	0.001	77	0.003	332
CM		-0.050	0.075	195	0.007	88	0.004	130	0.003	183	0.001	177	0.002	176	0.002	100	0.001	218	0.002	130
DCP 1	.010	2.704	1.003	2	0.228	75	0.068	343	0.020	179	0.009	89	0.004	153	0.009	71	0.008	311	0.006	246
DCP 2	.050	2.220	0.185	83	0.360	59	0.039	321	0.058	40	0.049	305	0.017	215	0.005	3	0.006	252	0.006	282
DCP 3	.100	2.367	0.470	128	0.196	29	0.175	102	0.011	160	0.056	46	0.029	121	0.036	347	0.012	232	0.008	157
DCP 4	.150	1.950	0.598	128	0.049	297	0.029	73	0.034	211	0.048	289	0.014	342	0.013	139	0.015	291	0.009	21
DCP 5	.200	1.591	0.483	72	0.077	89	0.020	106	0.022	146	0.023	55	0.006	83	0.005	10	0.009	156	0.013	70
DCP 6	.250	1.212	0.491	69	0.131	100	0.062	148	0.026	178	0.014	269	0.016	311	0.008	263	0.007	289	0.009	180
DCP 7	.300	1.048	0.515	40	0.110	60	0.061	69	0.050	99	0.032	97	0.021	106	0.015	88	0.014	119	0.015	52
DCP 8	.500	0.672	0.422	39	0.019	72	0.028	25	0.038	67	0.016	29	0.011	5	0.005	258	0.005	115	0.008	16
DCP 9	.600	0.563	0.373	19	0.011	238	0.022	316	0.019	343	0.006	322	0.006	345	0.016	297	0.010	110	0.012	336
DCP10	.695	0.509	0.328	27	0.013	311	0.034	328	0.013	1	0.017	23	0.009	331	0.007	18	0.007	353	0.006	352
DCP11	.800	0.432	0.292	9	0.031	268	0.017	261	0.016	307	0.007	281	0.005	319	0.010	251	0.010	0	0.020	244
DCP12	.953	0.189	0.209	3	0.036	346	0.012	311	0.003	341	0.009	316	0.008	29	0.007	301	0.002	316	0.009	267

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	63.49	0.600	14.98	5.18		1160.1	16
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.162	653.3	1455.0	0.63E 07	-0.00092	1.249	14.82	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.990	0.260	61	0.039	159	0.012	148	0.007	186	0.012	157	0.004	85	0.002	145	0.001	61	0.001	353
CM		-0.080	0.074	207	0.007	278	0.005	288	0.003	358	0.003	282	0.001	217	0.001	273	0.000	236	0.001	144
DCP 1	.010	3.027	0.734	5	0.263	96	0.042	314	0.008	162	0.015	152	0.003	141	0.007	7	0.006	258	0.004	146
DCP 2	.050	2.136	0.358	151	0.108	61	0.127	179	0.010	307	0.057	187	0.008	112	0.021	172	0.008	13	0.008	137
DCP 3	.100	2.001	0.576	153	0.206	259	0.043	333	0.013	284	0.008	214	0.027	87	0.014	82	0.005	296	0.004	271
DCP 4	.150	1.771	0.385	115	0.126	224	0.007	95	0.044	207	0.038	265	0.008	330	0.003	232	0.004	293	0.022	163
DCP 5	.200	1.553	0.395	99	0.097	207	0.022	351	0.022	82	0.027	174	0.009	174	0.003	333	0.002	323	0.007	297
DCP 6	.250	1.395	0.384	85	0.115	198	0.031	281	0.013	72	0.018	158	0.018	217	0.003	175	0.007	54	0.004	134
DCP 7	.300	1.143	0.401	74	0.115	165	0.022	179	0.005	42	0.011	140	0.009	153	0.005	207	0.004	112	0.005	82
DCP 8	.500	0.748	0.389	45	0.059	137	0.016	156	0.016	232	0.016	183	0.009	26	0.006	252	0.007	151	0.008	52
DCP 9	.600	0.659	0.340	36	0.052	135	0.028	129	0.018	167	0.015	117	0.004	94	0.003	298	0.002	191	0.013	328
DCP10	.695	0.600	0.326	33	0.031	102	0.021	138	0.011	167	0.017	127	0.006	26	0.008	153	0.006	94	0.008	335
DCP11	.800	0.596	0.278	27	0.030	76	0.025	96	0.010	160	0.018	87	0.007	65	0.006	86	0.004	38	0.010	286
DCP12	.953	0.259	0.185	16	0.026	25	0.017	91	0.009	194	0.007	103	0.001	349	0.009	76	0.007	333	0.004	142

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	63.29	0.600	17.55	5.21		1160.2	10
K	V	Q	RN	DAMPING	CY(MAX)	ALPHA(STALL)	
0.162	653.3	1453.9	0.63E 07	-0.00117	1.215	18.96	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		1.003	0.250 61	0.047 186	0.006 338	0.018 190	0.011 332	0.005 189	0.005 339	0.001 274	0.004 340
CM		-0.102	0.070 217	0.008 316	0.000 147	0.005 340	0.004 108	0.002 306	0.002 92	0.002 111	0.002 140
DCP 1	.010	3.103	0.304 36	0.293 81	0.064 266	0.029 147	0.008 163	0.019 285	0.006 144	0.013 43	0.006 280
DCP 2	.050	2.094	0.328 161	0.126 282	0.049 138	0.079 310	0.027 60	0.041 288	0.027 71	0.019 211	0.013 70
DCP 3	.100	1.741	0.225 131	0.127 240	0.017 72	0.025 245	0.037 102	0.051 243	0.023 309	0.011 180	0.012 276
DCP 4	.150	1.571	0.276 96	0.128 240	0.039 14	0.025 73	0.025 21	0.016 197	0.023 3	0.026 111	0.013 293
DCP 5	.200	1.446	0.289 85	0.128 204	0.029 28	0.042 197	0.016 14	0.009 189	0.009 295	0.004 102	0.005 232
DCP 6	.250	1.325	0.321 75	0.114 202	0.023 348	0.023 169	0.024 347	0.024 156	0.007 105	0.017 83	0.004 247
DCP 7	.300	1.148	0.332 76	0.125 193	0.021 299	0.030 202	0.027 354	0.020 53	0.013 70	0.005 186	0.004 183
DCP 8	.500	0.829	0.365 50	0.064 145	0.014 314	0.020 174	0.023 312	0.008 163	0.008 329	0.006 36	0.014 99
DCP 9	.600	0.714	0.328 46	0.061 155	0.006 254	0.034 172	0.016 271	0.006 158	0.011 346	0.010 327	0.008 286
DCP10	.695	0.688	0.320 41	0.027 126	0.002 247	0.019 186	0.019 269	0.014 139	0.005 298	0.021 308	0.022 359
DCP11	.800	0.693	0.274 38	0.028 131	0.001 220	0.022 150	0.014 278	0.005 165	0.011 236	0.015 286	0.010 16
DCP12	.953	0.314	0.166 29	0.006 4	0.010 86	0.002 120	0.009 329	0.003 149	0.010 274	0.012 173	0.019 292

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	63.29	0.600	24.57	5.21		1150.3	10
K	V	Q	RN	DAMPING	CY(MAX)	ALPHA(STALL)	
0.162	653.3	1454.2	0.63E 07	-0.00107	1.291	28.02	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		1.085	0.233 53	0.025 167	0.018 227	0.003 71	0.007 102	0.006 184	0.001 37	0.003 142	0.002 189
CM		-0.151	0.066 215	0.005 350	0.001 340	0.002 92	0.004 194	0.002 298	0.001 127	0.001 254	0.001 134
DCP 1	.010	2.580	0.865 170	0.060 279	0.198 191	0.056 233	0.104 189	0.048 209	0.037 156	0.040 183	0.023 156
DCP 2	.050	1.780	0.179 92	0.067 134	0.068 230	0.040 95	0.043 185	0.019 245	0.022 59	0.013 139	0.014 230
DCP 3	.100	1.778	0.282 84	0.022 69	0.038 307	0.037 81	0.008 144	0.013 328	0.015 37	0.016 152	0.017 189
DCP 4	.150	1.516	0.211 59	0.035 171	0.019 239	0.006 114	0.014 121	0.016 201	0.010 25	0.007 113	0.005 242
DCP 5	.200	1.509	0.274 57	0.036 136	0.028 244	0.017 70	0.023 131	0.010 246	0.009 224	0.007 244	0.011 167
DCP 6	.250	1.413	0.237 52	0.043 198	0.017 273	0.016 69	0.017 114	0.015 185	0.008 284	0.002 326	0.006 131
DCP 7	.300	1.224	0.289 46	0.030 196	0.024 272	0.010 54	0.014 105	0.011 215	0.001 234	0.001 207	0.007 105
DCP 8	.500	0.978	0.321 41	0.037 159	0.019 232	0.006 17	0.014 63	0.011 132	0.003 55	0.006 310	0.011 343
DCP 9	.600	0.869	0.297 42	0.029 179	0.005 217	0.003 354	0.017 49	0.009 137	0.005 302	0.005 137	0.004 119
DCP10	.695	0.857	0.287 42	0.031 150	0.014 177	0.004 278	0.012 24	0.006 137	0.004 58	0.002 200	0.008 254
DCP11	.800	0.847	0.249 46	0.021 171	0.009 165	0.011 264	0.014 4	0.008 125	0.005 222	0.008 107	0.004 226
DCP12	.953	0.500	0.179 34	0.008 201	0.009 190	0.010 229	0.007 304	0.002 281	0.006 0	0.006 86	0.000 109

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	80.00	0.400	0.10	5.75		1098.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.301	444.2	730.9	0.47E 07	-0.00096	0.330	5.62

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		-0.078	0.406	2	0.035	175	0.016	85	0.005	148	0.006	177	0.003	117	0.002	151	0.002	188	0.001	104
CM		-0.016	0.047	270	0.007	89	0.002	245	0.001	57	0.002	45	0.001	322	0.000	45	0.000	68	0.001	231
DCP 1	.010	-1.916	1.975	333	0.546	164	0.151	196	0.006	289	0.045	112	0.027	170	0.012	215	0.014	127	0.017	160
DCP 2	.050	-0.806	1.578	337	0.124	77	0.077	82	0.014	167	0.020	343	0.024	17	0.011	105	0.011	230	0.008	256
DCP 3	.100	-0.205	1.164	343	0.057	105	0.055	64	0.021	141	0.009	165	0.006	46	0.009	74	0.005	134	0.004	298
DCP 4	.150	0.013	0.829	350	0.042	108	0.061	64	0.033	124	0.015	191	0.008	337	0.006	85	0.008	154	0.005	210
DCP 5	.200	0.352	0.600	0	0.062	175	0.010	21	0.001	44	0.018	139	0.008	123	0.004	166	0.002	120	0.003	80
DCP 6	.250	-0.048	0.493	5	0.060	184	0.013	37	0.012	83	0.017	163	0.006	224	0.005	265	0.003	270	0.001	200
DCP 7	.300	0.024	0.429	12	0.055	186	0.007	76	0.004	154	0.012	154	0.007	124	0.003	151	0.005	159	0.002	91
DCP 8	.500	-0.025	0.302	28	0.034	203	0.013	91	0.004	142	0.007	193	0.001	108	0.002	151	0.002	230	0.001	87
DCP 9	.600	0.052	0.257	38	0.031	221	0.014	76	0.004	170	0.006	209	0.007	155	0.002	161	0.004	204	0.005	63
DCP10	.695	0.069	0.203	46	0.023	239	0.012	94	0.005	137	0.006	232	0.002	125	0.003	232	0.005	306	0.001	239
DCP11	.800	-0.019	0.169	55	0.023	255	0.014	72	0.008	259	0.007	235	0.006	138	0.002	200	0.002	172	0.004	43
DCP12	.953	-0.084	0.097	47	0.016	263	0.006	87	0.002	173	0.004	207	0.002	75	0.001	342	0.002	181	0.001	112

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	80.00	0.400	7.35	5.73		1098.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.301	444.2	730.2	0.47E 07	-0.00094	1.166	12.89

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.771	0.400	3	0.031	179	0.014	60	0.003	125	0.003	181	0.002	333	0.001	242	0.001	178	0.000	330
CM		-0.015	0.047	281	0.007	88	0.003	294	0.001	27	0.001	46	0.000	86	0.000	27	0.000	322	0.000	319
DCP 1	.010	2.708	2.760	336	0.265	151	0.122	30	0.027	341	0.012	62	0.020	354	0.009	319	0.006	265	0.009	247
DCP 2	.050	2.155	1.473	340	0.122	129	0.037	339	0.022	63	0.018	45	0.013	10	0.007	310	0.004	1	0.009	269
DCP 3	.100	1.961	1.069	349	0.071	148	0.011	64	0.015	44	0.010	95	0.003	323	0.003	120	0.007	220	0.001	163
DCP 4	.150	1.602	0.728	353	0.066	161	0.028	351	0.011	101	0.003	197	0.006	313	0.002	293	0.004	225	0.003	318
DCP 5	.200	1.448	0.562	1	0.042	164	0.013	74	0.010	117	0.006	165	0.001	218	0.002	130	0.004	122	0.003	56
DCP 6	.250	0.951	0.494	4	0.038	165	0.019	35	0.008	117	0.005	141	0.004	339	0.002	9	0.001	143	0.000	164
DCP 7	.300	0.886	0.427	12	0.030	189	0.016	82	0.007	143	0.008	190	0.001	213	0.002	160	0.004	162	0.003	20
DCP 8	.500	0.523	0.276	29	0.026	215	0.016	67	0.006	149	0.002	153	0.002	319	0.001	332	0.002	132	0.001	19
DCP 9	.600	0.495	0.233	42	0.028	236	0.015	92	0.006	184	0.008	216	0.001	149	0.004	142	0.002	210	0.003	88
DCP10	.695	0.376	0.192	51	0.023	234	0.015	82	0.005	182	0.004	186	0.003	326	0.002	248	0.003	45	0.001	1
DCP11	.800	0.215	0.153	67	0.023	253	0.021	124	0.006	259	0.008	241	0.001	281	0.004	234	0.003	191	0.003	197
DCP12	.953	0.047	0.095	51	0.011	220	0.006	58	0.003	149	0.001	249	0.002	316	0.001	339	0.002	232	0.001	198

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	80.00	0.400	9.70	5.70		1098.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.301	444.2	727.4	0.47E 07	-0.00094	1.413	15.29

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.017	0.400	7	0.033	188	0.017	65	0.002	170	0.005	198	0.001	78	0.002	257	0.001	114	0.003	218
CM		-0.011	0.047	281	0.007	85	0.003	257	0.003	27	0.000	41	0.001	88	0.000	35	0.000	27	0.001	318
DCP 1	.010	4.322	2.938	338	0.317	142	0.146	304	0.131	132	0.071	7	0.022	89	0.047	325	0.023	210	0.013	276
DCP 2	.050	3.118	1.601	342	0.218	182	0.179	88	0.156	342	0.074	209	0.019	66	0.022	161	0.038	27	0.044	263
DCP 3	.100	2.574	0.945	354	0.062	93	0.037	279	0.032	146	0.009	139	0.010	133	0.010	256	0.006	148	0.006	194
DCP 4	.150	1.979	0.695	358	0.044	121	0.015	11	0.012	75	0.005	117	0.003	3	0.003	310	0.002	171	0.002	209
DCP 5	.200	1.773	0.536	6	0.025	168	0.004	49	0.011	132	0.007	185	0.002	103	0.003	15	0.004	111	0.003	106
DCP 6	.250	1.240	0.473	10	0.025	172	0.014	57	0.004	114	0.008	161	0.002	6	0.001	218	0.001	113	0.001	239
DCP 7	.300	1.129	0.409	17	0.032	209	0.015	77	0.005	149	0.010	180	0.001	145	0.001	293	0.003	110	0.002	103
DCP 8	.500	0.663	0.290	35	0.033	230	0.023	84	0.006	233	0.005	161	0.002	313	0.001	254	0.002	181	0.002	153
DCP 9	.600	0.613	0.241	47	0.037	244	0.026	70	0.010	214	0.004	204	0.001	74	0.002	221	0.001	181	0.006	115
DCP10	.695	0.447	0.205	54	0.032	234	0.022	81	0.012	209	0.001	188	0.002	25	0.002	295	0.002	187	0.003	115
DCP11	.800	0.283	0.154	61	0.032	244	0.013	57	0.008	220	0.005	272	0.005	221	0.002	245	0.005	228	0.005	232
DCP12	.953	0.088	0.092	39	0.015	151	0.004	12	0.007	171	0.003	213	0.002	359	0.004	209	0.003	44	0.003	184

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	80.32	0.400	12.28	5.63		1098.4	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.302	444.1	727.3	0.47E 07	0.00051	1.622	17.76

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.072	0.561	13	0.077	178	0.020	42	0.015	176	0.020	62	0.009	225	0.002	355	0.004	146	0.002	54
CM		-0.043	0.028	123	0.038	311	0.015	192	0.010	49	0.006	272	0.006	37	0.000	251	0.002	255	0.001	186
DCP 1	.010	4.259	2.318	4	0.554	33	0.464	285	0.243	150	0.200	356	0.080	210	0.079	23	0.093	245	0.061	133
DCP 2	.050	2.862	1.492	24	0.443	319	0.240	202	0.095	123	0.068	88	0.109	55	0.100	334	0.052	252	0.038	216
DCP 3	.100	2.457	1.356	32	0.407	281	0.201	147	0.064	108	0.094	32	0.055	321	0.045	253	0.051	156	0.033	84
DCP 4	.150	1.942	1.044	26	0.249	242	0.099	94	0.040	74	0.042	346	0.004	254	0.031	205	0.027	90	0.013	343
DCP 5	.200	1.760	0.903	22	0.239	219	0.071	84	0.044	65	0.012	282	0.007	316	0.027	177	0.020	100	0.022	22
DCP 6	.250	1.303	0.816	16	0.229	197	0.054	64	0.062	40	0.032	259	0.016	170	0.016	155	0.020	72	0.027	315
DCP 7	.300	1.223	0.744	12	0.230	191	0.055	87	0.054	21	0.018	237	0.028	204	0.025	123	0.022	32	0.011	298
DCP 8	.500	0.770	0.480	3	0.196	150	0.063	32	0.051	276	0.036	143	0.010	54	0.012	92	0.017	289	0.014	170
DCP 9	.600	0.733	0.356	0	0.166	137	0.063	26	0.065	241	0.055	111	0.021	286	0.010	76	0.006	255	0.004	95
DCP10	.695	0.543	0.258	352	0.142	126	0.066	2	0.053	211	0.038	88	0.021	238	0.015	355	0.031	187	0.025	35
DCP11	.800	0.406	0.154	338	0.123	116	0.061	354	0.065	195	0.052	62	0.042	226	0.007	320	0.017	128	0.015	15
DCP12	.953	0.176	0.061	278	0.044	88	0.020	294	0.023	148	0.027	349	0.024	168	0.011	270	0.032	41	0.020	209

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	80.65	0.400	15.04	5.70		1166.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.303	443.9	741.8	0.48E 07	0.00122	1.742	21.02

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		1.121	0.620 26	0.094 244	0.038 102	0.023 329	0.018 209	0.013 45	0.006 292	0.009 113	0.005 316
CM		-0.079	0.096 140	0.062 2	0.032 245	0.012 129	0.008 33	0.008 249	0.004 131	0.003 325	0.002 184
DCP 1	.010	3.949	1.721 59	1.193 37	0.448 299	0.108 241	0.023 185	0.049 355	0.061 14	0.014 287	0.022 27
DCP 2	.050	2.867	1.576 65	0.699 6	0.108 278	0.135 296	0.048 244	0.077 259	0.077 219	0.042 155	0.029 172
DCP 3	.100	2.415	1.494 61	0.531 327	0.106 248	0.091 247	0.072 166	0.052 184	0.035 134	0.053 112	0.052 30
DCP 4	.150	1.856	1.153 46	0.322 287	0.090 210	0.071 165	0.041 108	0.048 32	0.008 36	0.047 11	0.036 281
DCP 5	.200	1.606	1.028 41	0.294 276	0.107 220	0.102 135	0.045 96	0.063 15	0.006 304	0.024 344	0.023 272
DCP 6	.250	1.313	0.964 33	0.291 261	0.144 192	0.100 93	0.041 69	0.064 331	0.010 149	0.022 338	0.032 233
DCP 7	.300	1.210	0.885 27	0.259 251	0.134 194	0.115 88	0.035 35	0.051 332	0.011 247	0.002 317	0.017 227
DCP 8	.500	0.831	0.686 3	0.253 206	0.159 122	0.101 10	0.063 295	0.034 230	0.020 69	0.018 160	0.014 44
DCP 9	.600	0.816	0.583 357	0.257 199	0.194 91	0.108 334	0.083 247	0.057 111	0.014 11	0.011 6	0.007 164
DCP10	.695	0.722	0.474 342	0.241 183	0.187 66	0.100 305	0.066 212	0.046 99	0.035 316	0.034 157	0.017 299
DCP11	.800	0.685	0.316 337	0.188 176	0.180 44	0.106 279	0.091 172	0.084 43	0.037 255	0.019 135	0.021 299
DCP12	.953	0.173	0.180 295	0.109 125	0.092 329	0.056 178	0.028 37	0.003 282	0.016 347	0.027 232	0.029 63

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	80.65	0.400	17.55	5.52		1166.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.303	443.9	742.1	0.48E 07	0.00102	1.905	23.08

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		1.255	0.564 40	0.136 284	0.077 157	0.046 23	0.025 356	0.016 136	0.014 325	0.005 230	0.010 227
CM		-0.096	0.139 156	0.079 40	0.031 276	0.004 161	0.012 184	0.012 19	0.003 192	0.003 92	0.004 10
DCP 1	.010	4.285	1.877 114	1.237 57	0.205 219	0.102 65	0.106 253	0.115 114	0.077 34	0.019 46	0.057 40
DCP 2	.050	3.105	1.505 102	0.603 28	0.123 171	0.116 30	0.040 87	0.142 84	0.088 104	0.085 92	0.036 93
DCP 3	.100	2.622	1.386 87	0.455 4	0.035 140	0.120 357	0.068 12	0.062 21	0.053 3	0.044 348	0.041 332
DCP 4	.150	2.041	1.089 70	0.361 339	0.101 255	0.043 1	0.039 314	0.031 36	0.042 298	0.019 262	0.014 267
DCP 5	.200	1.760	0.982 59	0.303 330	0.142 264	0.036 31	0.051 284	0.020 63	0.047 287	0.029 247	0.036 241
DCP 6	.250	1.475	0.897 52	0.312 322	0.182 236	0.057 37	0.038 235	0.035 44	0.050 262	0.011 193	0.035 252
DCP 7	.300	1.362	0.876 41	0.289 312	0.195 237	0.036 47	0.037 210	0.020 60	0.039 260	0.025 206	0.031 219
DCP 8	.500	0.956	0.721 12	0.321 256	0.218 163	0.062 56	0.080 71	0.042 350	0.031 288	0.025 233	0.012 192
DCP 9	.600	0.949	0.704 4	0.393 244	0.259 137	0.096 38	0.076 8	0.049 208	0.017 344	0.026 117	0.036 305
DCP10	.695	0.847	0.576 352	0.342 230	0.232 115	0.099 9	0.051 334	0.062 191	0.019 348	0.012 159	0.009 301
DCP11	.800	0.830	0.434 347	0.283 218	0.189 85	0.093 345	0.068 282	0.083 152	0.032 327	0.010 118	0.018 193
DCP12	.953	0.156	0.289 313	0.204 154	0.182 358	0.129 202	0.092 28	0.066 222	0.060 96	0.059 304	0.040 151

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	80.32	0.400	24.70	5.61		1166.3	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.302	443.9	738.8	0.47E 07	-0.00145	1.550	27.99	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		1.112	0.403 56	0.008 91	0.028 0	0.022 196	0.007 219	0.001 172	0.008 165	0.003 337	0.002 141
CM		-0.161	0.117 217	0.013 181	0.013 181	0.013 342	0.003 97	0.002 313	0.002 12	0.001 210	0.000 288
DCP 1	.010	3.137	2.019 163	0.361 180	0.609 188	0.166 274	0.166 181	0.087 299	0.053 174	0.061 294	0.032 224
DCP 2	.050	2.012	0.550 148	0.208 247	0.054 323	0.068 293	0.027 66	0.018 4	0.014 91	0.022 353	0.006 138
DCP 3	.100	1.626	0.388 60	0.064 181	0.107 5	0.038 76	0.017 137	0.024 223	0.011 183	0.012 236	0.010 131
DCP 4	.150	1.463	0.415 47	0.074 115	0.048 35	0.008 351	0.022 97	0.002 96	0.008 128	0.006 351	0.004 73
DCP 5	.200	1.314	0.494 44	0.067 102	0.052 8	0.008 342	0.009 282	0.018 145	0.011 181	0.017 154	0.005 149
DCP 6	.250	1.231	0.449 47	0.063 106	0.045 44	0.010 327	0.025 76	0.005 252	0.014 86	0.010 258	0.004 90
DCP 7	.300	1.193	0.530 47	0.056 90	0.051 3	0.024 317	0.018 266	0.016 116	0.016 138	0.021 98	0.004 vv
DCP 8	.500	1.033	0.581 45	0.027 57	0.024 1	0.035 213	0.005 11	0.016 353	0.005 19	0.007 298	0.006 195
DCP 9	.600	0.957	0.536 46	0.044 357	0.068 357	0.071 208	0.032 284	0.014 193	0.022 242	0.015 332	0.007 93
DCP10	.695	0.966	0.522 45	0.038 348	0.032 18	0.064 176	0.012 249	0.007 148	0.008 332	0.009 328	0.012 7
DCP11	.800	0.963	0.412 50	0.053 353	0.065 1	0.068 154	0.034 224	0.010 155	0.020 166	0.009 213	0.001 19
DCP12	.953	0.436	0.281 34	0.032 324	0.019 321	0.037 122	0.020 54	0.004 96	0.010 164	0.015 56	0.009 193

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	80.32	0.600	0.12	5.71		1097.1	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.205	653.6	1430.0	0.62E 07	-0.00091	0.395	5.44	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		-0.098	0.469 342	0.027 164	0.025 64	0.010 99	0.005 74	0.002 26	0.001 98	0.002 263	0.001 199
CM		-0.011	0.046 259	0.004 105	0.002 229	0.002 279	0.002 331	0.000 32	0.000 4	0.001 61	0.000 81
DCP 1	.010	-1.927	1.641 308	0.437 166	0.045 29	0.032 89	0.021 35	0.006 304	0.002 285	0.003 214	0.008 153
DCP 2	.050	-0.774	1.765 321	0.117 161	0.013 152	0.023 292	0.016 2	0.017 288	0.011 310	0.012 252	0.007 226
DCP 3	.100	-0.209	1.665 322	0.097 198	0.085 61	0.028 246	0.018 80	0.011 51	0.006 117	0.012 5	0.003 240
DCP 4	.150	-0.073	1.138 338	0.153 41	0.055 83	0.014 13	0.050 6	0.019 67	0.009 258	0.020 315	0.008 79
DCP 5	.200	0.262	0.834 340	0.054 64	0.067 74	0.027 118	0.010 10	0.010 77	0.009 96	0.004 133	0.003 20
DCP 6	.250	-0.016	0.633 348	0.020 94	0.057 63	0.035 104	0.003 109	0.009 18	0.009 101	0.006 196	0.001 189
DCP 7	.300	0.025	0.501 353	0.039 165	0.028 62	0.027 104	0.011 132	0.001 167	0.005 68	0.004 154	0.001 277
DCP 8	.500	-0.037	0.307 14	0.032 180	0.016 62	0.014 79	0.007 118	0.002 263	0.001 178	0.003 202	0.001 101
DCP 9	.600	0.006	0.246 18	0.021 197	0.019 52	0.013 89	0.008 127	0.001 200	0.000 85	0.002 281	0.002 287
DCP10	.695	0.016	0.192 28	0.013 236	0.013 59	0.006 90	0.003 136	0.003 328	0.000 255	0.003 277	0.001 144
DCP11	.800	-0.022	0.141 32	0.018 264	0.015 50	0.007 132	0.005 153	0.001 116	0.001 213	0.004 235	0.002 232
DCP12	.953	-0.100	0.095 20	0.014 274	0.005 37	0.003 102	0.004 110	0.001 28	0.001 236	0.004 273	0.001 287

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	80.32	0.600	7.35	5.58		1097.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.205	653.5	1431.6	0.62E 07	-0.00059	1.272	12.64

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.700	0.492	6	0.039	283	0.009	169	0.021	93	0.007	338	0.002	241	0.003	191	0.005	108	0.002	35
CM		-0.024	0.042	215	0.031	31	0.012	265	0.004	267	0.004	124	0.002	53	0.001	323	0.001	334	0.001	170
DCP 1	.010	1.432	1.935	335	0.139	41	0.025	61	0.022	35	0.027	34	0.008	319	0.012	309	0.011	263	0.006	256
DCP 2	.050	1.738	1.166	337	0.181	57	0.027	207	0.038	356	0.025	37	0.006	251	0.005	300	0.005	336	0.008	281
DCP 3	.100	1.927	0.778	358	0.522	18	0.257	220	0.065	54	0.064	137	0.044	45	0.029	293	0.018	137	0.002	56
DCP 4	.150	1.623	0.905	14	0.197	24	0.098	321	0.083	47	0.023	326	0.047	21	0.007	169	0.016	18	0.030	93
DCP 5	.200	1.340	0.730	15	0.130	346	0.060	304	0.015	135	0.018	331	0.013	26	0.024	294	0.003	279	0.005	282
DCP 6	.250	0.961	0.709	18	0.130	323	0.053	299	0.025	256	0.028	238	0.024	200	0.016	185	0.009	81	0.016	210
DCP 7	.300	0.865	0.689	12	0.151	276	0.046	242	0.061	178	0.019	143	0.029	153	0.019	97	0.022	63	0.002	7
DCP 8	.500	0.497	0.445	19	0.134	235	0.047	125	0.054	113	0.036	12	0.016	294	0.009	248	0.009	195	0.010	148
DCP 9	.600	0.409	0.343	23	0.104	226	0.035	89	0.034	103	0.016	337	0.010	288	0.012	216	0.017	144	0.009	24
DCP10	.695	0.341	0.279	21	0.113	214	0.050	88	0.034	84	0.032	314	0.016	229	0.016	142	0.004	358	0.008	39
DCP11	.800	0.245	0.212	19	0.103	207	0.046	80	0.020	50	0.019	274	0.007	250	0.011	156	0.005	93	0.012	1
DCP12	.953	0.048	0.152	341	0.060	165	0.030	84	0.024	344	0.011	222	0.007	168	0.011	16	0.008	199	0.011	287

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	80.32	0.600	9.65	5.52		1097.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.205	653.5	1428.8	0.62E 07	-0.00052	1.363	14.18

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.827	0.467	24	0.031	344	0.018	316	0.015	145	0.010	117	0.005	30	0.007	53	0.004	327	0.002	160
CM		-0.037	0.062	199	0.032	52	0.003	34	0.008	325	0.003	316	0.002	221	0.001	182	0.001	144	0.002	34
DCP 1	.010	2.104	1.623	346	0.167	76	0.026	343	0.011	123	0.024	354	0.005	342	0.007	282	0.003	182	0.005	210
DCP 2	.050	2.055	0.771	352	0.244	44	0.085	230	0.029	119	0.031	49	0.016	4	0.014	271	0.006	189	0.002	139
DCP 3	.100	2.151	0.431	58	0.470	30	0.035	174	0.119	316	0.020	114	0.049	267	0.045	127	0.010	327	0.023	114
DCP 4	.150	1.718	0.807	47	0.216	61	0.058	158	0.032	153	0.061	164	0.035	312	0.034	49	0.021	340	0.015	74
DCP 5	.200	1.438	0.631	45	0.168	46	0.103	5	0.033	96	0.024	67	0.036	153	0.035	86	0.019	228	0.016	146
DCP 6	.250	1.085	0.692	39	0.104	11	0.107	21	0.029	28	0.044	28	0.013	32	0.017	30	0.006	92	0.015	70
DCP 7	.300	0.990	0.672	32	0.106	359	0.114	344	0.012	11	0.031	345	0.013	33	0.019	359	0.012	356	0.006	313
DCP 8	.500	0.622	0.528	27	0.118	263	0.050	302	0.049	197	0.033	198	0.024	127	0.003	256	0.014	157	0.008	47
DCP 9	.600	0.496	0.405	25	0.103	231	0.023	295	0.043	143	0.020	152	0.009	52	0.019	113	0.022	6	0.007	300
DCP10	.695	0.437	0.350	22	0.118	240	0.028	228	0.049	159	0.036	133	0.030	40	0.009	313	0.010	16	0.022	254
DCP11	.800	0.334	0.280	13	0.106	225	0.034	177	0.032	112	0.016	116	0.006	0	0.020	27	0.021	275	0.011	198
DCP12	.953	0.099	0.200	344	0.060	211	0.035	157	0.021	103	0.015	50	0.016	314	0.014	212	0.005	40	0.014	148

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	80.32	0.600	12.21	5.45		1097.4	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.205	653.5	1424.2	0.62E 07	-0.00066	1.438	15.03

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.941	0.434 45	0.028 60	0.034 24	0.015 347	0.006 242	0.004 279	0.001 279	0.001 78	0.004 275
CM		-0.053	0.084 201	0.014 87	0.011 134	0.002 123	0.003 21	0.001 97	0.001 49	0.001 275	0.001 97
DCP 1	.010	2.644	1.196 358	0.235 83	0.070 297	0.024 147	0.027 18	0.007 5	0.005 69	0.008 322	0.011 236
DCP 2	.050	2.258	0.331 26	0.276 56	0.032 264	0.050 355	0.035 268	0.007 130	0.007 227	0.006 120	0.008 272
DCP 3	.100	2.242	0.731 114	0.293 36	0.215 105	0.099 328	0.053 55	0.029 242	0.020 63	0.010 136	0.024 324
DCP 4	.150	1.956	0.660 98	0.059 215	0.080 56	0.022 287	0.040 245	0.019 330	0.014 74	0.020 209	0.019 20
DCP 5	.200	1.538	0.663 72	0.069 122	0.030 100	0.017 328	0.020 46	0.014 83	0.041 214	0.018 104	0.019 224
DCP 6	.250	1.201	0.654 60	0.100 120	0.081 85	0.030 208	0.023 195	0.011 183	0.011 51	0.012 65	0.002 171
DCP 7	.300	1.097	0.700 53	0.108 99	0.111 60	0.044 95	0.014 332	0.007 211	0.016 2	0.027 316	0.019 184
DCP 8	.500	0.710	0.544 37	0.012 245	0.093 1	0.041 15	0.008 288	0.017 358	0.009 305	0.010 185	0.016 61
DCP 9	.600	0.593	0.455 34	0.027 257	0.060 336	0.028 5	0.020 249	0.002 222	0.006 355	0.008 45	0.017 315
DCP10	.695	0.531	0.400 28	0.038 294	0.059 316	0.032 319	0.017 223	0.016 273	0.008 239	0.009 5	0.013 244
DCP11	.800	0.416	0.349 22	0.071 275	0.042 276	0.020 266	0.018 172	0.010 259	0.015 209	0.013 102	0.012 272
DCP12	.953	0.179	0.222 357	0.038 313	0.026 267	0.020 223	0.015 179	0.008 129	0.006 108	0.005 159	0.002 252

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	80.32	0.600	14.82	5.36		1162.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.205	653.4	1463.9	0.63E 07	-0.00090	1.401	17.25

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		1.014	0.401 55	0.020 165	0.009 54	0.002 265	0.003 55	0.007 148	0.002 35	0.002 108	0.002 200
CM		-0.081	0.093 207	0.001 65	0.006 247	0.002 241	0.003 249	0.003 350	0.001 134	0.001 319	0.001 32
DCP 1	.010	2.903	0.681 10	0.332 81	0.096 292	0.008 57	0.027 226	0.025 90	0.031 326	0.022 196	0.014 26
DCP 2	.050	2.303	0.322 106	0.208 46	0.058 171	0.035 13	0.012 162	0.011 33	0.007 53	0.015 339	0.009 269
DCP 3	.100	2.124	0.793 123	0.186 302	0.049 47	0.100 274	0.061 291	0.027 98	0.006 98	0.025 50	0.008 116
DCP 4	.150	1.840	0.480 94	0.082 262	0.065 27	0.063 160	0.011 243	0.019 49	0.021 29	0.011 252	0.012 175
DCP 5	.200	1.512	0.462 88	0.185 214	0.064 293	0.018 284	0.019 269	0.008 166	0.031 163	0.014 119	0.011 144
DCP 6	.250	1.434	0.590 75	0.161 191	0.047 283	0.014 318	0.017 27	0.005 232	0.006 104	0.017 336	0.001 156
DCP 7	.300	1.152	0.577 64	0.141 171	0.030 211	0.026 238	0.005 286	0.006 321	0.016 145	0.009 49	0.005 255
DCP 8	.500	0.789	0.590 45	0.060 120	0.044 101	0.032 104	0.029 114	0.009 209	0.018 353	0.011 252	0.008 130
DCP 9	.600	0.669	0.472 36	0.013 188	0.006 81	0.011 48	0.006 33	0.020 187	0.007 218	0.006 142	0.004 275
DCP10	.695	0.633	0.447 33	0.020 21	0.024 54	0.010 330	0.013 99	0.021 175	0.008 247	0.017 150	0.007 285
DCP11	.800	0.585	0.344 27	0.025 327	0.017 58	0.004 331	0.007 45	0.016 141	0.002 319	0.009 125	0.003 204
DCP12	.953	0.265	0.217 12	0.027 348	0.029 38	0.010 34	0.018 29	0.007 55	0.007 0	0.007 20	0.004 187

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	80.65	0.600	17.40	5.37		1162.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.206	653.4	1463.2	0.63E 07	-0.00102	1.326	19.24

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		1.017	0.319 59	0.032 192	0.021 27	0.008 159	0.007 279	0.003 56	0.002 329	0.002 243	0.002 323
CM		-0.102	0.081 216	0.003 6	0.003 186	0.003 326	0.003 117	0.004 231	0.001 204	0.001 74	0.001 96
DCP 1	.010	3.071	0.303 44	0.338 70	0.079 275	0.023 29	0.013 211	0.015 115	0.008 248	0.008 82	0.010 293
DCP 2	.050	2.217	0.306 141	0.091 281	0.093 146	0.046 271	0.026 110	0.035 260	0.009 244	0.008 129	0.017 358
DCP 3	.100	1.824	0.416 116	0.053 211	0.099 72	0.023 275	0.005 203	0.040 263	0.013 155	0.048 151	0.012 329
DCP 4	.150	1.625	0.384 87	0.104 234	0.065 39	0.053 142	0.029 213	0.026 224	0.020 272	0.012 67	0.008 184
DCP 5	.200	1.432	0.337 82	0.104 217	0.048 359	0.029 203	0.009 292	0.010 18	0.019 0	0.019 340	0.014 260
DCP 6	.250	1.371	0.426 71	0.109 198	0.042 3	0.029 68	0.003 206	0.017 181	0.018 205	0.011 43	0.004 108
DCP 7	.300	1.142	0.405 68	0.083 194	0.045 8	0.008 135	0.006 260	0.003 326	0.009 352	0.015 311	0.011 132
DCP 8	.500	0.824	0.442 50	0.046 153	0.034 356	0.009 85	0.013 336	0.017 152	0.013 179	0.005 278	0.013 57
DCP 9	.600	0.718	0.408 43	0.034 186	0.009 316	0.018 189	0.005 296	0.032 58	0.008 337	0.017 287	0.007 343
DCP10	.695	0.706	0.381 41	0.021 133	0.011 10	0.010 90	0.015 307	0.025 68	0.014 39	0.004 149	0.006 323
DCP11	.800	0.680	0.324 38	0.008 246	0.005 51	0.023 168	0.013 261	0.017 18	0.006 58	0.019 197	0.014 282
DCP12	.953	0.333	0.187 28	0.014 318	0.017 71	0.003 151	0.019 292	0.011 356	0.010 335	0.007 8	0.009 302

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	80.97	0.600	24.47	5.39		1162.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.207	653.4	1458.1	0.63E 07	-0.00086	1.325	26.30

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		1.089	0.259 46	0.015 200	0.023 75	0.012 155	0.001 55	0.004 8	0.002 151	0.004 273	0.001 72
CM		-0.153	0.073 212	0.006 44	0.006 215	0.003 326	0.002 136	0.003 177	0.001 9	0.001 87	0.000 210
DCP 1	.010	2.784	0.850 156	0.053 333	0.126 162	0.015 182	0.030 132	0.018 198	0.029 186	0.023 192	0.028 142
DCP 2	.050	1.838	0.181 86	0.058 32	0.030 100	0.025 138	0.018 141	0.023 26	0.008 34	0.021 352	0.013 359
DCP 3	.100	1.636	0.204 61	0.028 97	0.028 120	0.015 118	0.035 171	0.012 144	0.021 71	0.005 53	0.008 202
DCP 4	.150	1.549	0.254 52	0.013 199	0.030 78	0.016 142	0.011 86	0.008 98	0.004 150	0.011 291	0.009 23
DCP 5	.200	1.459	0.262 46	0.024 133	0.034 88	0.008 203	0.003 121	0.011 223	0.005 139	0.017 151	0.012 158
DCP 6	.250	1.439	0.304 48	0.044 186	0.016 79	0.005 202	0.007 49	0.003 93	0.011 113	0.011 231	0.005 333
DCP 7	.300	1.215	0.301 42	0.034 186	0.025 84	0.009 207	0.006 79	0.009 245	0.011 14	0.002 151	0.007 48
DCP 8	.500	0.963	0.342 37	0.023 188	0.033 80	0.020 179	0.008 3	0.006 104	0.012 271	0.012 314	0.004 254
DCP 9	.600	0.898	0.355 35	0.023 189	0.037 57	0.020 138	0.010 319	0.013 11	0.008 243	0.005 273	0.001 211
DCP10	.695	0.859	0.314 40	0.025 233	0.028 50	0.020 143	0.005 340	0.012 19	0.006 215	0.011 281	0.003 192
DCP11	.800	0.873	0.294 40	0.018 249	0.031 25	0.011 114	0.011 305	0.015 346	0.006 139	0.006 258	0.008 91
DCP12	.953	0.498	0.188 33	0.028 239	0.008 13	0.006 161	0.005 251	0.012 344	0.011 130	0.005 168	0.007 347

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	96.62	0.200	0.13	5.89		1104.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.718	224.8	199.7	0.25E 07	-0.00162	0.406	3.99

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		-0.026	0.443	44	0.047	220	0.031	326	0.020	74	0.010	136	0.009	108	0.006	112	0.013	125	0.007	197
CM		-0.036	0.102	287	0.018	85	0.012	164	0.005	271	0.004	323	0.001	280	0.003	250	0.003	330	0.002	41
DCP 1	.010	-2.003	2.832	340	0.299	72	0.131	151	0.045	254	0.014	235	0.044	62	0.013	141	0.021	84	0.012	236
DCP 2	.050	-0.166	1.192	356	0.122	142	0.054	211	0.030	297	0.022	121	0.032	101	0.018	180	0.002	193	0.031	251
DCP 3	.100	0.064	0.906	10	0.107	142	0.033	212	0.016	6	0.014	39	0.044	104	0.045	163	0.003	153	0.023	66
DCP 4	.150	-0.296	0.797	20	0.122	184	0.045	270	0.028	49	0.011	127	0.007	149	0.013	220	0.024	89	0.011	128
DCP 5	.200	-0.128	0.639	31	0.063	199	0.041	293	0.046	58	0.001	99	0.012	173	0.008	37	0.018	114	0.014	169
DCP 6	.250	-0.182	0.584	42	0.084	210	0.047	319	0.033	71	0.005	210	0.002	127	0.017	288	0.010	121	0.012	168
DCP 7	.300	-0.000	0.531	53	0.067	215	0.047	331	0.038	68	0.006	68	0.007	212	0.006	38	0.017	131	0.016	149
DCP 8	.500	0.037	0.492	77	0.067	249	0.061	347	0.027	86	0.004	134	0.009	109	0.002	42	0.015	109	0.007	181
DCP 9	.600	0.007	0.478	79	0.079	240	0.051	324	0.034	87	0.011	164	0.006	110	0.005	349	0.025	165	0.018	319
DCP 10	.695	0.374	0.431	89	0.072	256	0.043	350	0.026	105	0.021	149	0.014	103	0.015	118	0.020	186	0.028	213
DCP 11	.953	-0.090	0.219	93	0.048	276	0.029	334	0.008	53	0.020	133	0.003	46	0.017	67	0.025	79	0.002	44

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	97.09	0.200	7.51	5.88		1104.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.721	224.8	200.4	0.26E 07	-0.00151	1.144	11.73

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.706	0.441	47	0.027	216	0.033	319	0.012	83	0.011	151	0.003	28	0.007	95	0.009	141	0.015	206
CM		-0.027	0.094	288	0.013	90	0.010	164	0.004	310	0.002	22	0.003	162	0.004	214	0.003	310	0.005	52
DCP 1	.010	2.645	2.283	349	0.244	99	0.077	187	0.033	341	0.022	41	0.023	75	0.042	152	0.045	337	0.036	104
DCP 2	.050	2.309	1.219	357	0.122	113	0.080	214	0.029	242	0.044	104	0.023	154	0.045	154	0.013	198	0.026	185
DCP 3	.100	1.787	0.900	10	0.056	114	0.033	257	0.041	310	0.042	161	0.037	161	0.070	176	0.006	358	0.010	4
DCP 4	.150	1.052	0.786	23	0.097	177	0.032	268	0.037	73	0.014	119	0.013	40	0.008	351	0.009	148	0.014	117
DCP 5	.200	0.829	0.623	32	0.056	195	0.052	302	0.041	45	0.009	162	0.009	318	0.006	317	0.020	155	0.016	203
DCP 6	.250	0.710	0.592	41	0.055	197	0.047	320	0.041	73	0.007	160	0.004	355	0.011	315	0.015	165	0.016	157
DCP 7	.300	0.757	0.526	51	0.045	216	0.045	328	0.022	74	0.014	170	0.005	208	0.010	153	0.016	147	0.018	209
DCP 8	.500	0.489	0.499	77	0.046	269	0.055	341	0.028	79	0.007	121	0.005	84	0.013	34	0.008	165	0.023	180
DCP 9	.600	0.454	0.458	81	0.051	252	0.049	327	0.006	54	0.026	167	0.021	345	0.009	320	0.009	118	0.018	217
DCP 10	.695	0.615	0.433	90	0.052	265	0.043	342	0.024	139	0.018	165	0.005	40	0.028	63	0.023	138	0.022	232
DCP 11	.953	-0.026	0.206	96	0.024	265	0.023	332	0.008	181	0.010	313	0.013	329	0.010	37	0.005	84	0.018	246

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	97.09	0.200	9.81	5.86		1104.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.721	224.8	199.7	0.25E 07	-0.00148	1.343	14.00

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.913	0.431 47	0.027 228	0.026 327	0.013 90	0.004 155	0.009 81	0.010 88	0.009 163	0.010 216
CM		-0.023	0.004 288	0.012 106	0.012 167	0.003 315	0.001 63	0.001 246	0.003 229	0.003 340	0.003 59
DCP 1	.010	3.908	2.243 349	0.176 118	0.093 189	0.024 353	0.023 117	0.036 58	0.030 115	0.011 31	0.021 142
DCP 2	.050	3.042	1.184 357	0.090 121	0.057 182	0.021 313	0.036 88	0.022 115	0.056 149	0.040 232	0.025 215
DCP 3	.100	2.276	0.889 11	0.076 138	0.024 147	0.020 53	0.022 85	0.038 97	0.042 106	0.030 1	0.032 341
DCP 4	.150	1.446	0.772 22	0.099 187	0.064 262	0.026 51	0.007 195	0.006 359	0.010 262	0.011 135	0.020 147
DCP 5	.200	1.104	0.606 32	0.035 188	0.015 290	0.033 96	0.009 255	0.005 19	0.007 333	0.019 130	0.013 158
DCP 6	.250	0.979	0.576 42	0.057 209	0.039 317	0.031 74	0.008 203	0.008 67	0.004 277	0.010 174	0.018 160
DCP 7	.300	0.966	0.515 52	0.052 223	0.032 336	0.021 80	0.004 206	0.009 136	0.006 345	0.015 142	0.014 194
DCP 8	.500	0.632	0.484 78	0.045 277	0.053 335	0.019 94	0.006 199	0.008 65	0.011 74	0.018 163	0.022 194
DCP 9	.600	0.602	0.463 82	0.056 259	0.037 346	0.019 113	0.006 254	0.010 69	0.017 42	0.005 148	0.011 291
DCP10	.695	0.642	0.414 90	0.053 272	0.037 341	0.018 138	0.012 136	0.010 60	0.028 94	0.011 196	0.011 258
DCP11	.953	0.002	0.205 94	0.020 316	0.039 349	0.004 264	0.009 288	0.006 86	0.007 341	0.014 149	0.015 237

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	97.56	0.200	12.41	5.89		1104.4	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.725	224.8	199.6	0.25E 07	-0.00139	1.576	16.61

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		1.140	0.417 48	0.020 231	0.030 322	0.015 97	0.011 150	0.004 58	0.013 55	0.003 189	0.003 201
CM		-0.014	0.090 288	0.011 109	0.011 167	0.005 279	0.001 350	0.002 161	0.005 202	0.001 32	0.001 282
DCP 1	.010	5.218	2.120 350	0.170 97	0.098 253	0.022 266	0.042 89	0.036 79	0.012 141	0.012 346	0.006 183
DCP 2	.050	3.866	1.127 358	0.091 142	0.043 194	0.027 187	0.046 131	0.046 113	0.043 127	0.024 189	0.037 270
DCP 3	.100	2.841	0.831 12	0.038 172	0.033 225	0.028 227	0.048 178	0.021 102	0.054 98	0.021 24	0.031 322
DCP 4	.150	2.050	0.760 22	0.067 171	0.039 265	0.019 36	0.008 181	0.001 287	0.010 321	0.001 136	0.005 152
DCP 5	.200	1.340	0.605 32	0.034 178	0.028 286	0.033 63	0.014 143	0.011 223	0.004 309	0.009 78	0.011 135
DCP 6	.250	1.372	0.560 43	0.044 208	0.043 313	0.025 69	0.007 169	0.004 355	0.007 19	0.009 184	0.012 166
DCP 7	.300	1.190	0.508 52	0.032 218	0.029 323	0.030 69	0.008 150	0.007 238	0.007 42	0.008 83	0.019 162
DCP 8	.500	0.815	0.468 80	0.033 272	0.052 343	0.016 86	0.005 181	0.006 105	0.014 38	0.005 159	0.007 210
DCP 9	.600	0.678	0.449 79	0.046 256	0.040 334	0.014 133	0.013 138	0.016 323	0.006 177	0.007 304	0.008 255
DCP10	.695	0.654	0.397 91	0.044 282	0.046 352	0.024 125	0.017 148	0.014 73	0.026 58	0.015 317	0.011 9
DCP11	.953	0.021	0.189 94	0.025 309	0.031 331	0.020 84	0.003 305	0.016 327	0.027 9	0.003 138	0.009 123

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	96.62	0.200	14.98	5.91		1165.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.719	224.6	200.3	0.26E 07	-0.00141	1.797	18.03

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.406	0.402	47	0.059	218	0.026	300	0.007	80	0.010	316	0.007	256	0.005	264	0.002	68	0.018	137
CM		-0.068	0.085	284	0.023	80	0.006	148	0.002	295	0.002	161	0.004	111	0.002	122	0.001	190	0.006	327
DCP 1	.010	5.557	1.759	354	0.388	80	0.137	267	0.052	2	0.090	246	0.015	99	0.028	173	0.007	203	0.022	10
DCP 2	.050	3.681	1.051	0	0.157	138	0.015	228	0.027	359	0.021	304	0.024	191	0.008	107	0.037	140	0.041	98
DCP 3	.100	3.042	0.825	9	0.122	149	0.037	166	0.029	46	0.040	291	0.051	133	0.011	70	0.015	173	0.009	261
DCP 4	.150	2.580	0.711	22	0.136	175	0.028	240	0.000	107	0.003	178	0.013	272	0.012	237	0.004	172	0.026	110
DCP 5	.200	2.299	0.568	32	0.074	198	0.039	293	0.012	175	0.019	26	0.006	300	0.012	234	0.016	359	0.013	127
DCP 6	.250	1.817	0.535	42	0.086	211	0.045	312	0.005	140	0.005	20	0.017	250	0.011	247	0.003	138	0.029	110
DCP 7	.300	1.578	0.475	48	0.079	213	0.042	309	0.011	128	0.010	5	0.001	170	0.009	220	0.011	24	0.021	169
DCP 8	.500	0.967	0.434	77	0.101	251	0.035	309	0.012	122	0.006	93	0.011	258	0.007	327	0.008	114	0.021	177
DCP 9	.600	0.846	0.408	75	0.093	236	0.023	298	0.004	353	0.023	330	0.013	302	0.016	207	0.023	264	0.033	74
DCP 10	.695	0.726	0.382	89	0.098	260	0.027	343	0.013	113	0.003	358	0.027	271	0.021	334	0.008	98	0.037	165
DCP 11	.800	0.693	0.321	91	0.071	251	0.028	324	0.002	31	0.028	298	0.004	299	0.007	252	0.013	3	0.026	137
DCP 12	.953	0.276	0.192	87	0.053	261	0.012	296	0.014	86	0.006	83	0.015	299	0.010	323	0.005	65	0.019	146

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	97.09	0.200	17.48	5.96		1165.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.722	224.6	200.7	0.26E 07	-0.00122	1.805	22.00

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.482	0.327	47	0.059	230	0.027	303	0.006	95	0.001	238	0.003	14	0.002	25	0.011	67	0.013	160
CM		-0.096	0.078	295	0.030	87	0.011	140	0.003	333	0.001	338	0.001	274	0.001	214	0.003	246	0.004	359
DCP 1	.010	5.830	1.667	358	0.284	111	0.149	115	0.083	11	0.038	58	0.034	305	0.045	84	0.035	281	0.014	2
DCP 2	.050	3.795	1.096	5	0.146	149	0.040	145	0.026	342	0.023	322	0.013	207	0.010	287	0.015	51	0.003	39
DCP 3	.100	2.972	0.823	24	0.108	180	0.046	235	0.038	7	0.025	244	0.030	170	0.011	340	0.019	109	0.034	28
DCP 4	.150	2.397	0.734	24	0.143	167	0.039	237	0.019	348	0.009	346	0.009	334	0.007	238	0.006	14	0.023	136
DCP 5	.200	2.252	0.540	28	0.105	161	0.073	291	0.007	88	0.001	234	0.023	357	0.016	256	0.014	83	0.026	161
DCP 6	.250	1.845	0.448	22	0.083	148	0.041	283	0.011	77	0.008	55	0.018	324	0.006	297	0.009	14	0.015	177
DCP 7	.300	1.692	0.273	21	0.076	125	0.062	279	0.009	133	0.005	74	0.016	12	0.001	244	0.009	100	0.022	164
DCP 8	.500	1.036	0.239	94	0.146	300	0.031	6	0.021	156	0.005	266	0.009	147	0.003	157	0.024	37	0.018	140
DCP 9	.600	0.999	0.347	94	0.136	264	0.024	14	0.015	189	0.021	222	0.015	27	0.013	175	0.012	67	0.019	168
DCP 10	.695	0.784	0.353	99	0.167	256	0.054	325	0.027	149	0.004	249	0.020	313	0.027	33	0.022	80	0.022	212
DCP 11	.800	0.940	0.347	97	0.125	253	0.072	317	0.016	75	0.010	153	0.009	126	0.004	107	0.024	57	0.017	148
DCP 12	.953	0.286	0.213	82	0.059	230	0.023	252	0.007	291	0.013	56	0.012	141	0.012	349	0.015	251	0.013	235

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	97.56	0.200	24.57	6.03		1165.3	10

K	V	Q	RN	DAMPING	CY(MAX)	ALPHA(STALL)
0.725	224.6	200.7	0.26E 07	0.00025	2.366	30.70

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.818	0.377	5	0.100	228	0.033	221	0.030	57	0.022	23	0.015	253	0.007	155	0.004	36	0.018	238
CM		-0.297	0.106	12	0.026	100	0.015	64	0.010	217	0.005	262	0.002	12	0.001	16	0.002	120	0.011	72
DCP 1	.010	3.239	2.374	74	0.268	9	0.454	302	0.231	222	0.105	119	0.105	346	0.023	167	0.020	126	0.043	20
DCP 2	.050	2.263	1.250	41	0.261	146	0.030	330	0.102	35	0.046	319	0.010	276	0.018	265	0.031	129	0.313	334
DCP 3	.100	1.875	1.282	17	0.262	227	0.132	173	0.075	79	0.082	26	0.071	276	0.031	122	0.048	234	0.055	61
DCP 4	.150	2.498	1.401	1	0.366	209	0.063	115	0.030	141	0.088	31	0.053	232	0.012	166	0.025	51	0.021	164
DCP 5	.200	2.335	1.206	6	0.265	226	0.076	187	0.061	73	0.064	0	0.034	238	0.010	140	0.033	67	0.012	273
DCP 6	.250	2.362	1.366	1	0.363	210	0.162	107	0.026	320	0.018	312	0.048	211	0.026	118	0.037	306	0.021	177
DCP 7	.300	2.303	1.243	356	0.268	211	0.136	102	0.066	40	0.047	315	0.012	171	0.005	179	0.018	22	0.035	225
DCP 8	.500	2.041	0.770	303	0.071	123	0.136	311	0.023	80	0.008	53	0.027	260	0.014	154	0.033	84	0.318	150
DCP 9	.600	2.027	0.470	276	0.174	67	0.169	234	0.077	103	0.042	342	0.025	5	0.020	311	0.016	311	0.030	158
DCP10	.695	1.490	0.427	188	0.182	352	0.183	182	0.010	155	0.018	292	0.005	317	0.031	75	0.014	110	0.023	247
DCP11	.800	1.364	0.516	161	0.191	329	0.114	158	0.023	208	0.014	155	0.011	225	0.007	198	0.003	352	0.048	254
DCP12	.953	0.655	0.779	143	0.450	235	0.205	312	0.145	19	0.097	85	0.021	173	0.025	220	0.039	268	0.090	271

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	97.09	0.400	0.14	5.81		1102.1	10

K	V	Q	RN	DAMPING	CY(MAX)	ALPHA(STALL)
0.365	444.3	735.7	0.47E 07	-0.00095	0.310	6.29

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		-0.116	0.402	8	0.033	213	0.004	248	0.008	74	0.001	294	0.003	25	0.003	20	0.006	60	0.006	239
CM		-0.021	0.056	273	0.009	100	0.007	132	0.002	215	0.002	178	0.001	197	0.001	193	0.002	253	0.002	45
DCP 1	.010	-1.615	1.918	330	0.562	169	0.200	169	0.015	222	0.049	112	0.030	106	0.005	4	0.004	333	0.002	133
DCP 2	.050	-0.809	1.596	336	0.063	58	0.105	106	0.032	166	0.016	223	0.012	34	0.016	56	0.008	272	0.310	313
DCP 3	.100	-0.385	1.163	345	0.016	72	0.051	109	0.024	134	0.021	224	0.012	17	0.005	64	0.007	324	0.015	282
DCP 4	.150	-0.207	0.830	354	0.022	97	0.034	118	0.037	136	0.021	226	0.017	318	0.012	57	0.006	82	0.312	227
DCP 5	.200	0.047	0.605	6	0.054	203	0.023	259	0.020	24	0.006	187	0.001	125	0.004	245	0.009	30	0.006	241
DCP 6	.250	-0.067	0.496	12	0.069	208	0.026	266	0.022	47	0.007	123	0.006	208	0.004	282	0.012	8	0.033	188
DCP 7	.300	-0.058	0.447	21	0.054	214	0.021	269	0.016	37	0.002	277	0.001	45	0.004	257	0.010	54	0.003	216
DCP 8	.500	-0.085	0.323	39	0.038	237	0.019	291	0.010	23	0.006	346	0.003	334	0.002	356	0.008	54	0.007	191
DCP 9	.600	0.075	0.290	49	0.044	248	0.025	293	0.011	46	0.006	343	0.003	29	0.003	271	0.011	75	0.007	264
DCP10	.695	0.041	0.237	58	0.035	274	0.021	320	0.011	60	0.007	1	0.007	53	0.005	19	0.010	95	0.311	265
DCP11	.953	-0.019	0.111	60	0.022	270	0.013	324	0.002	156	0.005	2	0.002	347	0.006	35	0.008	79	0.008	294

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	97.09	0.400	7.51	5.81		1102.2	10

K	V	Q	RN	DAMPING	CY(MAX)	ALPHA(STALL)
0.365	444.3	744.9	0.48E 07	-0.00090	1.168	13.51

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.746	0.404	8	0.032	213	0.012	257	0.007	55	0.002	26	0.004	35	0.003	353	0.004	19	0.003	199
CM		-0.015	0.055	279	0.007	107	0.005	125	0.002	259	0.001	212	0.000	226	0.001	121	0.001	244	0.002	14
DCP 1	.010	3.051	2.775	335	0.288	177	0.133	107	0.032	325	0.028	173	0.026	34	0.011	350	0.009	306	0.014	313
DCP 2	.050	2.222	1.471	340	0.110	158	0.044	179	0.007	62	0.003	29	0.012	54	0.018	60	0.012	306	0.003	280
DCP 3	.100	1.858	1.065	348	0.054	165	0.034	174	0.007	34	0.012	344	0.002	333	0.017	55	0.007	275	0.004	28
DCP 4	.150	1.426	0.725	357	0.069	193	0.037	231	0.008	40	0.001	273	0.007	2	0.002	354	0.008	325	0.005	3
DCP 5	.200	1.208	0.575	3	0.032	195	0.024	236	0.008	39	0.004	314	0.002	49	0.004	274	0.007	357	0.003	68
DCP 6	.250	0.955	0.505	10	0.040	209	0.023	251	0.010	37	0.005	65	0.003	28	0.002	330	0.007	7	0.002	63
DCP 7	.300	0.832	0.435	16	0.030	223	0.016	261	0.007	62	0.004	25	0.002	49	0.004	307	0.009	32	0.002	125
DCP 8	.500	0.464	0.303	40	0.036	250	0.021	286	0.009	57	0.005	32	0.002	14	0.005	343	0.004	34	0.005	182
DCP 9	.600	0.513	0.270	49	0.035	253	0.023	288	0.012	63	0.004	327	0.007	51	0.002	211	0.006	25	0.008	237
DCP10	.695	0.330	0.228	61	0.033	271	0.020	305	0.009	83	0.002	60	0.002	24	0.003	354	0.008	58	0.008	230
DCP11	.953	0.102	0.111	60	0.013	253	0.010	308	0.006	73	0.002	46	0.001	58	0.006	308	0.002	53	0.006	173

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	97.09	0.400	9.80	5.80		1102.3	10

K	V	Q	RN	DAMPING	CY(MAX)	ALPHA(STALL)
0.365	444.4	744.6	0.48E 07	-0.00087	1.409	15.82

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.987	0.403	10	0.032	216	0.008	240	0.008	39	0.001	307	0.003	82	0.004	338	0.005	30	0.004	255
CM		-0.010	0.053	279	0.005	101	0.006	143	0.001	284	0.002	256	0.001	114	0.001	150	0.001	179	0.002	25
DCP 1	.010	4.597	2.908	336	0.300	155	0.080	252	0.137	151	0.053	16	0.028	110	0.044	353	0.020	233	0.017	343
DCP 2	.050	3.170	1.609	341	0.228	207	0.220	127	0.150	359	0.094	241	0.045	114	0.014	147	0.043	47	0.043	294
DCP 3	.100	2.440	0.944	352	0.037	74	0.055	224	0.030	138	0.005	205	0.033	86	0.006	313	0.007	219	0.012	55
DCP 4	.150	1.805	0.691	1	0.020	154	0.037	225	0.011	22	0.003	51	0.005	93	0.004	323	0.007	6	0.004	13
DCP 5	.200	1.529	0.538	7	0.018	218	0.024	230	0.013	30	0.003	313	0.001	20	0.002	295	0.007	31	0.001	26
DCP 6	.250	1.235	0.481	15	0.026	227	0.021	243	0.009	2	0.002	31	0.006	38	0.005	340	0.011	28	0.001	225
DCP 7	.300	1.069	0.425	20	0.032	231	0.012	260	0.010	6	0.002	355	0.005	351	0.002	312	0.008	53	0.001	38
DCP 8	.500	0.604	0.312	43	0.041	253	0.013	321	0.005	343	0.004	79	0.003	294	0.003	321	0.005	12	0.005	196
DCP 9	.600	0.625	0.284	50	0.043	246	0.020	313	0.006	64	0.009	42	0.005	247	0.007	332	0.004	28	0.006	212
DCP10	.695	0.409	0.233	60	0.034	257	0.023	337	0.003	125	0.006	54	0.001	208	0.008	350	0.005	52	0.007	240
DCP11	.953	0.139	0.093	51	0.008	149	0.015	294	0.008	75	0.005	155	0.005	331	0.002	180	0.004	320	0.007	213

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	94.34	0.400	12.45	5.65		1102.4	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.355	444.3	737.8	0.47E 07	0.00042	1.655	18.25

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.081	0.539	9	0.062	194	0.009	49	0.015	176	0.023	2	0.009	224	0.006	90	0.006	318	0.005	41
CM		-0.040	0.021	111	0.030	297	0.014	165	0.008	36	0.009	204	0.004	39	0.003	282	0.003	129	0.001	216
DCP 1	.010	4.613	2.079	2	0.510	13	0.442	266	0.337	147	0.102	348	0.082	179	0.064	30	0.047	223	0.064	91
DCP 2	.050	3.063	1.428	19	0.461	311	0.256	203	0.151	128	0.024	84	0.058	60	0.078	351	0.050	283	0.017	227
DCP 3	.100	2.440	1.305	24	0.430	270	0.208	139	0.082	67	0.053	332	0.047	298	0.037	234	0.054	135	0.040	54
DCP 4	.150	1.785	1.065	23	0.321	240	0.116	107	0.049	80	0.071	310	0.015	247	0.040	184	0.027	72	0.018	17
DCP 5	.200	1.606	0.913	16	0.267	220	0.094	108	0.071	29	0.061	277	0.019	204	0.026	131	0.017	39	0.018	334
DCP 6	.250	1.354	0.837	14	0.259	204	0.073	96	0.079	8	0.054	255	0.019	179	0.023	104	0.020	26	0.017	279
DCP 7	.300	1.226	0.738	7	0.223	187	0.075	91	0.091	341	0.048	229	0.023	116	0.017	38	0.009	309	0.009	304
DCP 8	.500	0.757	0.458	356	0.165	143	0.068	33	0.084	261	0.039	112	0.032	354	0.011	199	0.003	287	0.008	139
DCP 9	.600	0.770	0.350	351	0.149	121	0.072	355	0.091	214	0.073	43	0.037	251	0.006	121	0.002	350	0.006	129
DCP10	.695	0.543	0.204	344	0.110	104	0.092	334	0.076	187	0.089	36	0.048	233	0.020	144	0.026	341	0.004	54
DCP11	.953	0.203	0.015	237	0.031	52	0.037	256	0.036	97	0.043	309	0.023	129	0.022	43	0.016	251	0.008	20

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	88.50	0.400	14.93	5.94		1167.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.333	443.9	743.5	0.48E 07	0.00101	1.740	20.24

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.141	0.629	20	0.046	207	0.022	89	0.024	309	0.016	158	0.006	98	0.005	301	0.001	316	0.003	143
CM		-0.086	0.083	136	0.057	353	0.026	233	0.011	106	0.005	347	0.003	268	0.003	134	0.001	133	0.001	168
DCP 1	.010	3.823	1.713	45	1.323	35	0.393	288	0.017	198	0.080	304	0.079	131	0.063	343	0.040	177	0.056	28
DCP 2	.050	2.706	1.496	56	0.657	13	0.081	316	0.114	295	0.053	222	0.033	260	0.070	221	0.056	152	0.050	145
DCP 3	.100	2.318	1.514	51	0.456	329	0.122	261	0.136	232	0.064	153	0.063	142	0.051	111	0.049	76	0.019	33
DCP 4	.150	1.896	1.217	39	0.219	287	0.106	236	0.066	152	0.050	130	0.032	78	0.026	95	0.037	349	0.014	294
DCP 5	.200	1.710	1.052	31	0.191	261	0.111	215	0.064	103	0.058	114	0.048	4	0.020	304	0.013	276	0.023	230
DCP 6	.250	1.557	1.003	28	0.195	250	0.143	200	0.067	84	0.055	90	0.032	335	0.019	323	0.018	312	0.020	216
DCP 7	.300	1.274	0.894	19	0.187	232	0.141	181	0.079	61	0.055	57	0.052	303	0.022	224	0.011	273	0.029	158
DCP 8	.500	0.861	0.659	1	0.205	193	0.142	118	0.087	6	0.059	283	0.044	196	0.021	68	0.004	119	0.005	13
DCP 9	.600	0.811	0.588	352	0.237	180	0.166	77	0.114	320	0.067	202	0.054	116	0.037	339	0.005	219	0.003	328
DCP10	.695	0.709	0.407	343	0.200	177	0.164	56	0.090	300	0.061	196	0.052	130	0.028	314	0.011	304	0.006	122
DCP11	.800	0.696	0.301	329	0.192	158	0.156	23	0.107	249	0.055	121	0.033	25	0.016	210	0.016	356	0.017	248
DCP12	.953	0.215	0.130	287	0.102	114	0.083	316	0.052	169	0.019	46	0.008	285	0.013	296	0.011	175	0.029	28

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	97.09	0.400	17.47	5.94		1167.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.365	443.9	743.0	0.48E 07	0.00140	1.926	23.69

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.263	0.605	30	0.129	267	0.061	108	0.027	340	0.029	205	0.009	332	0.010	182	0.012	99	0.011	268
CM		-0.127	0.141	141	0.073	8	0.017	242	0.007	216	0.014	46	0.004	228	0.001	73	0.007	335	0.005	89
DCP 1	.010	3.889	1.966	98	1.222	36	0.189	15	0.094	328	0.044	235	0.112	134	0.048	19	0.027	15	0.064	290
DCP 2	.050	2.002	1.592	93	0.571	8	0.191	80	0.092	4	0.057	57	0.063	9	0.041	18	0.051	18	0.066	359
DCP 3	.100	2.468	1.533	73	0.541	342	0.067	20	0.085	280	0.053	340	0.053	291	0.077	277	0.044	236	0.045	245
DCP 4	.150	2.001	1.256	59	0.384	318	0.041	266	0.063	302	0.059	237	0.042	233	0.036	176	0.008	176	0.014	198
DCP 5	.200	1.891	1.087	46	0.348	309	0.134	234	0.025	291	0.090	195	0.011	174	0.056	186	0.045	110	0.017	141
DCP 6	.250	1.708	1.049	44	0.378	307	0.171	215	0.042	275	0.086	166	0.018	236	0.041	136	0.018	133	0.038	95
DCP 7	.300	1.470	0.978	31	0.358	290	0.186	194	0.038	243	0.106	129	0.032	326	0.035	138	0.010	2	0.017	115
DCP 8	.500	1.087	0.828	2	0.393	242	0.242	132	0.045	77	0 079	19	0.049	260	0.020	208	0.026	67	0.025	240
DCP 9	.600	1.035	0.769	348	0.409	216	0.278	96	0.079	1	0.077	276	0.008	214	0.031	156	0.005	34	0.022	97
DCP 10	.695	0.947	0.578	339	0.358	202	0.222	74	0.086	340	0.093	236	0.023	57	0.035	160	0.028	311	0.022	150
DCP 11	.800	0.900	0.408	323	0.286	167	0.181	18	0.057	288	0.116	190	0.060	11	0.025	141	0.017	134	0.038	313
DCP 12	.953	0.141	0.267	288	0.231	103	0.182	283	0.094	95	0.066	246	0.055	113	0.081	324	0.084	131	0.082	270

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	95.24	0.400	24.59	5.81		1167.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.358	443.9	743.2	0.48E 07	-0.00120	1.753	27.07

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.173	0.497	57	0.072	24	0.023	310	0.005	87	0.012	97	0.002	125	0.008	233	0.002	130	0.007	241
CM		-0.194	0.136	211	0.039	156	0.012	177	0.003	290	0.004	302	0.002	258	0.004	68	0.002	292	0.002	105
DCP 1	.010	2.934	2.036	152	0.464	177	0.658	194	0.333	263	0.076	222	0.141	290	0.010	87	0.043	300	0.001	214
DCP 2	.050	1.117	0.717	138	0.156	180	0.093	281	0.021	216	0.068	358	0.017	292	0.018	280	0.024	271	0.015	233
DCP 3	.100	1.697	0.645	84	0.178	137	0.075	331	0.061	80	0.043	143	0.052	180	0.017	175	0.015	250	0.015	321
DCP 4	.150	1.455	0.543	54	0.197	89	0.022	16	0.067	76	0.033	54	0.027	109	0.010	137	0.008	192	0.015	237
DCP 5	.200	1.481	0.598	56	0.179	83	0.034	26	0.049	66	0.016	92	0.027	99	0.019	187	0.016	141	0.017	215
DCP 6	.250	1.522	0.578	52	0.163	70	0.043	351	0.041	57	0.033	24	0.028	71	0.013	103	0.018	97	0.007	114
DCP 7	.300	1.326	0.631	56	0.157	67	0.048	358	0.040	32	0.011	56	0.033	47	0.014	108	0.017	66	0.021	142
DCP 8	.500	1.142	0.662	45	0.182	14	0.017	263	0.031	270	0.010	119	0.039	248	0.027	310	0.021	264	0.018	297
DCP 9	.600	1.158	0.683	41	0.167	355	0.043	314	0.036	195	0.035	184	0.024	221	0.026	218	0.010	347	0.026	243
DCP 10	.695	1.096	0.645	46	0.218	336	0.029	350	0.049	130	0.029	59	0.026	136	0.014	249	0.015	174	0.021	173
DCP 11	.800	1.130	0.508	39	0.148	333	0.058	328	0.037	132	0.045	91	0.016	77	0.017	181	0.028	72	0.015	256
DCP 12	.953	0.366	0.271	23	0.093	266	0.044	29	0.040	354	0.024	220	0.034	33	0.025	268	0.017	154	0.025	16

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	96.62	0.600	0.12	5.81		1100.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.247	653.8	1452.7	0.63E 07	-0.00086	0.375	5.85

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		-0.083	0.434	343	0.023	192	0.013	68	0.004	85	0.001	20	0.002	317	0.001	14	0.002	216	0.000	311
CM		-0.011	0.053	256	0.007	104	0.003	79	0.001	183	0.000	267	0.000	232	0.000	258	0.000	342	0.001	239
DCP 1	.010	-1.687	1.495	303	0.392	155	0.042	44	0.035	91	0.020	14	0.001	111	0.004	321	0.004	245	0.004	197
DCP 2	.050	-0.647	1.682	315	0.111	170	0.032	78	0.017	227	0.008	19	0.011	232	0.007	289	0.008	224	0.004	180
DCP 3	.100	-0.198	1.546	320	0.110	206	0.106	51	0.026	258	0.008	94	0.010	319	0.009	184	0.007	284	0.012	175
DCP 4	.150	-0.094	1.068	336	0.116	25	0.073	93	0.018	142	0.031	302	0.020	21	0.004	114	0.012	260	0.005	279
DCP 5	.200	0.121	0.778	341	0.034	46	0.059	80	0.028	129	0.009	264	0.005	298	0.004	24	0.002	161	0.002	238
DCP 6	.250	0.042	0.601	349	0.009	187	0.033	74	0.027	103	0.009	173	0.007	302	0.005	22	0.003	133	0.004	243
DCP 7	.300	0.027	0.485	357	0.035	186	0.010	98	0.014	86	0.007	138	0.006	257	0.004	343	0.001	72	0.003	243
DCP 8	.500	-0.013	0.312	18	0.027	203	0.004	199	0.006	12	0.003	69	0.001	239	0.001	345	0.002	150	0.003	326
DCP 9	.600	0.003	0.260	25	0.025	225	0.007	247	0.007	5	0.002	75	0.001	336	0.003	89	0.003	158	0.004	347
DCP10	.695	0.049	0.201	35	0.021	265	0.007	288	0.006	2	0.001	37	0.001	29	0.000	24	0.004	202	0.004	36
DCP11	.800	-0.006	0.157	42	0.026	277	0.009	290	0.005	3	0.002	41	0.003	52	0.001	150	0.002	280	0.004	64
DCP12	.953	-0.112	0.097	28	0.020	269	0.007	280	0.002	331	0.002	38	0.001	337	0.000	86	0.001	157	0.002	71

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	98.04	0.600	7.45	5.78		1100.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.250	653.8	1444.4	0.62E 07	-0.00041	1.295	13.22

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.711	0.510	4	0.050	259	0.021	116	0.022	355	0.013	247	0.004	215	0.003	111	0.002	171	0.002	73
CM		-0.028	0.047	209	0.033	11	0.013	241	0.007	151	0.006	29	0.002	283	0.002	227	0.001	357	0.001	116
DCP 1	.010	1.606	1.869	326	0.062	17	0.076	50	0.018	9	0.032	345	0.011	240	0.014	230	0.012	164	0.008	143
DCP 2	.050	1.827	1.120	329	0.161	34	0.040	138	0.022	345	0.031	329	0.014	189	0.005	242	0.004	239	0.008	146
DCP 3	.100	1.853	0.753	355	0.518	3	0.236	198	0.042	55	0.061	56	0.040	279	0.030	189	0.005	331	0.035	123
DCP 4	.150	1.519	0.922	12	0.181	357	0.040	284	0.087	12	0.027	284	0.038	315	0.017	80	0.016	280	0.020	19
DCP 5	.200	1.183	0.811	18	0.196	323	0.037	284	0.029	301	0.040	282	0.035	240	0.019	228	0.026	199	0.037	108
DCP 6	.250	1.024	0.777	14	0.164	294	0.043	233	0.027	230	0.020	203	0.012	155	0.006	228	0.010	181	0.009	113
DCP 7	.300	0.896	0.746	12	0.169	273	0.049	221	0.034	176	0.012	195	0.021	132	0.004	304	0.015	104	0.037	9
DCP 8	.500	0.535	0.491	13	0.169	216	0.078	108	0.059	37	0.034	290	0.012	267	0.016	176	0.013	54	0.033	181
DCP 9	.600	0.436	0.367	18	0.133	204	0.051	78	0.034	10	0.023	255	0.007	226	0.016	112	0.009	50	0.010	330
DCP10	.695	0.388	0.304	15	0.140	194	0.069	68	0.054	340	0.040	217	0.014	135	0.029	50	0.020	264	0.007	110
DCP11	.800	0.270	0.224	15	0.111	184	0.053	50	0.039	327	0.032	203	0.014	106	0.020	39	0.019	250	0.005	178
DCP12	.953	0.018	0.127	333	0.063	134	0.035	30	0.036	270	0.020	129	0.009	16	0.012	276	0.017	123	0.016	303

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL-H	TEST POINT	CYCLES ANALYZED
	98.04	0.600	9.71	5.70		1139.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.251	653.7	1442.8	0.62E 07	-0.00037	1.430	15.17

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.828	0.521	19	0.043	307	0.024	212	0.017	71	0.010	5	0.006	297	0.003	273	0.002	131	0.003	298
CM		-0.042	0.068	195	0.037	34	0.008	346	0.009	240	0.004	163	0.002	60	0.001	100	0.001	325	0.001	53
DCP 1	.010	2.229	1.660	337	0.168	43	0.023	82	0.012	112	0.007	297	0.013	260	0.015	192	0.003	146	0.004	114
DCP 2	.050	2.112	0.788	343	0.271	22	0.091	189	0.028	111	0.022	9	0.012	315	0.021	206	0.012	109	0.012	357
DCP 3	.100	2.002	0.528	51	0.546	12	0.050	198	0.105	260	0.024	151	0.018	167	0.010	87	0.021	47	0.024	298
DCP 4	.150	1.606	0.849	38	0.210	41	0.065	153	0.055	95	0.047	131	0.022	257	0.011	307	0.008	265	0.014	305
DCP 5	.200	1.281	0.800	39	0.147	9	0.048	15	0.030	52	0.017	44	0.026	58	0.025	63	0.016	39	0.003	76
DCP 6	.250	1.150	0.805	32	0.145	343	0.066	322	0.029	343	0.029	327	0.022	345	0.009	321	0.008	0	0.003	330
DCP 7	.300	1.011	0.792	29	0.123	330	0.097	313	0.026	298	0.034	312	0.022	320	0.008	307	0.018	287	0.004	147
DCP 8	.500	0.646	0.601	21	0.138	244	0.079	239	0.050	147	0.024	104	0.010	27	0.000	268	0.013	183	0.011	76
DCP 9	.600	0.517	0.467	21	0.134	224	0.048	202	0.041	93	0.021	40	0.005	335	0.014	319	0.004	177	0.008	268
DCP10	.695	0.479	0.386	14	0.148	218	0.070	174	0.067	71	0.038	16	0.025	281	0.020	240	0.019	133	0.010	329
DCP11	.800	0.358	0.303	9	0.129	211	0.054	150	0.053	46	0.027	328	0.012	234	0.015	245	0.017	196	0.008	240
DCP12	.953	0.078	0.172	333	0.066	183	0.049	96	0.031	353	0.020	261	0.016	164	0.017	68	0.010	303	0.008	214

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL-H	TEST POINT	CYCLES ANALYZED
	98.04	0.600	12.31	5.67		1100.4	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.251	653.7	1436.0	0.62E 07	-0.00048	1.524	16.29

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.931	0.532	36	0.022	31	0.031	324	0.019	239	0.004	110	0.003	173	0.002	209	0.003	258	0.004	255
CM		-0.060	0.097	196	0.021	69	0.015	101	0.004	25	0.000	351	0.001	80	0.002	20	0.002	25	0.001	22
DCP 1	.010	2.707	1.256	351	0.323	56	0.118	267	0.043	127	0.029	315	0.011	284	0.002	192	0.002	310	0.004	201
DCP 2	.050	2.286	0.442	22	0.299	26	0.046	203	0.075	299	0.047	193	0.004	84	0.015	125	0.011	357	0.004	242
DCP 3	.100	2.056	0.692	100	0.241	22	0.217	93	0.073	271	0.078	57	0.004	160	0.030	12	0.011	16	0.021	347
DCP 4	.150	1.731	0.817	71	0.100	148	0.015	163	0.079	256	0.015	22	0.022	127	0.008	103	0.019	251	0.016	299
DCP 5	.200	1.327	0.787	59	0.109	104	0.048	64	0.049	200	0.013	332	0.007	26	0.018	326	0.011	346	0.005	197
DCP 6	.250	1.242	0.813	50	0.095	91	0.087	44	0.039	150	0.023	139	0.016	137	0.017	263	0.012	295	0.009	232
DCP 7	.300	1.112	0.803	45	0.101	86	0.097	27	0.040	102	0.023	125	0.018	125	0.015	182	0.002	175	0.003	241
DCP 8	.500	0.753	0.679	30	0.016	315	0.124	320	0.050	312	0.021	282	0.018	280	0.008	350	0.006	353	0.013	271
DCP 9	.600	0.597	0.555	28	0.051	245	0.082	302	0.034	257	0.004	90	0.012	260	0.009	278	0.009	226	0.019	236
DCP10	.695	0.575	0.495	22	0.069	273	0.098	277	0.052	237	0.025	191	0.024	154	0.010	154	0.005	182	0.004	207
DCP11	.800	0.459	0.406	17	0.094	265	0.064	252	0.039	192	0.008	64	0.005	171	0.015	180	0.005	185	0.005	101
DCP12	.953	0.154	0.224	345	0.068	243	0.033	183	0.027	120	0.010	57	0.017	346	0.003	255	0.012	214	0.005	129

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	97.09	0.600	14.93	5.75		1164.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.248	653.4	1459.3	0.63E 07	-0.00069	1.549	18.19

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.023	0.502	47	0.013	138	0.012	14	0.014	277	0.009	318	0.002	127	0.004	199	0.003	67	0.002	58
CM		-0.084	0.109	201	0.010	97	0.010	161	0.003	182	0.003	143	0.003	286	0.001	90	0.001	258	0.001	347
DCP 1	.010	2.799	0.859	4	0.387	62	0.124	269	0.029	126	0.020	326	0.008	204	0.004	43	0.003	210	0.004	79
DCP 2	.050	2.257	0.344	76	0.247	29	0.075	151	0.057	333	0.028	155	0.021	347	0.009	169	0.002	170	0.015	99
DCP 3	.100	2.148	0.767	109	0.113	302	0.102	105	0.114	252	0.038	244	0.025	231	0.022	217	0.007	42	0.021	279
DCP 4	.200	1.549	0.663	75	0.205	176	0.021	209	0.035	275	0.031	31	0.012	14	0.020	194	0.006	48	0.013	20
DCP 5	.250	1.433	0.752	62	0.162	156	0.040	180	0.051	217	0.022	311	0.008	352	0.020	95	0.007	47	0.016	5
DCP 6	.300	1.176	0.750	56	0.140	142	0.026	120	0.038	179	0.015	285	0.034	292	0.012	156	0.011	77	0.016	64
DCP 7	.500	0.800	0.702	35	0.027	77	0.053	1	0.026	31	0.019	75	0.029	152	0.017	54	0.011	269	0.007	191
DCP 8	.600	0.665	0.579	33	0.020	242	0.042	342	0.029	5	0.009	347	0.016	102	0.003	297	0.009	42	0.003	186
DCP 9	.695	0.650	0.519	26	0.033	308	0.044	358	0.025	338	0.027	358	0.021	41	0.016	308	0.013	153	0.016	46
DCP 10	.800	0.625	0.420	24	0.064	294	0.021	346	0.021	322	0.023	289	0.016	104	0.010	270	0.004	84	0.008	220
DCP 11	.953	0.252	0.231	3	0.061	300	0.041	316	0.017	211	0.017	278	0.003	201	0.018	205	0.007	35	0.007	147

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	97.09	0.600	17.50	5.74		1164.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.248	653.3	1456.5	0.63E 07	-0.00087	1.442	19.95

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.035	0.432	55	0.037	171	0.007	46	0.008	73	0.008	193	0.001	191	0.003	238	0.004	198	0.002	314
CM		-0.101	0.104	210	0.003	189	0.005	282	0.006	287	0.006	9	0.001	154	0.001	59	0.001	311	0.001	129
DCP 1	.010	2.913	0.328	47	0.514	64	0.089	267	0.007	290	0.023	310	0.019	210	0.024	106	0.018	15	0.012	312
DCP 2	.050	2.192	0.433	115	0.041	320	0.136	112	0.073	257	0.038	81	0.027	251	0.015	44	0.035	222	0.012	115
DCP 3	.100	1.992	0.572	114	0.180	225	0.133	17	0.056	35	0.064	89	0.015	142	0.017	142	0.035	276	0.012	199
DCP 4	.150	1.677	0.557	92	0.180	212	0.064	344	0.024	115	0.015	324	0.019	102	0.020	226	0.009	131	0.014	66
DCP 5	.200	1.516	0.510	73	0.145	202	0.076	304	0.024	2	0.001	260	0.009	135	0.011	34	0.008	266	0.009	37
DCP 6	.250	1.404	0.594	66	0.165	180	0.066	266	0.042	8	0.027	340	0.010	103	0.005	190	0.004	58	0.007	325
DCP 7	.300	1.194	0.589	63	0.125	178	0.063	265	0.030	315	0.020	331	0.007	126	0.006	30	0.020	170	0.008	295
DCP 8	.500	0.823	0.586	43	0.073	121	0.029	139	0.010	163	0.027	256	0.013	282	0.026	267	0.005	36	0.005	214
DCP 9	.600	0.708	0.535	41	0.025	157	0.036	126	0.021	131	0.033	213	0.005	333	0.007	284	0.014	9	0.010	343
DCP 10	.695	0.705	0.475	35	0.021	64	0.040	102	0.038	112	0.035	196	0.007	103	0.013	218	0.008	217	0.012	321
DCP 11	.800	0.716	0.409	35	0.044	349	0.024	79	0.036	105	0.036	175	0.001	57	0.006	95	0.006	192	0.013	264
DCP 12	.953	0.291	0.241	20	0.034	321	0.027	41	0.012	48	0.024	114	0.006	305	0.009	99	0.015	141	0.014	96

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	97.56	0.600	24.51	5.78		1164.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.249	653.3	1456.4	0.63E 07	-0.00084	1.410	28.17

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.096	0.324	47	0.028	222	0.011	237	0.010	257	0.006	325	0.003	274	0.001	21	0.004	136	0.004	173
CM		-0.158	0.090	215	0.006	26	0.001	316	0.003	20	0.004	124	0.001	173	0.000	173	0.002	338	0.002	42
DCP 1	.010	2.832	0.763	147	0.063	347	0.071	156	0.064	223	0.011	134	0.030	162	0.025	105	0.006	58	0.002	48
DCP 2	.050	1.773	0.155	105	0.043	305	0.019	302	0.030	101	0.032	197	0.023	3	0.012	103	0.008	0	0.004	201
DCP 3	.100	1.590	0.252	64	0.042	262	0.040	292	0.035	356	0.020	157	0.021	257	0.010	319	0.014	329	0.021	87
DCP 4	.150	1.474	0.297	51	0.054	231	0.034	283	0.027	341	0.011	128	0.011	247	0.013	47	0.011	102	0.015	175
DCP 5	.200	1.485	0.326	49	0.043	205	0.032	245	0.035	305	0.020	73	0.014	212	0.011	200	0.007	203	0.008	92
DCP 6	.250	1.416	0.350	45	0.056	225	0.025	274	0.008	330	0.019	142	0.017	230	0.002	326	0.007	184	0.010	120
DCP 7	.300	1.254	0.387	45	0.045	207	0.031	246	0.034	294	0.022	49	0.011	197	0.001	19	0.008	136	0.004	41
DCP 8	.500	0.982	0.437	41	0.032	191	0.021	182	0.027	240	0.025	336	0.002	208	0.008	305	0.008	87	0.008	184
DCP 9	.600	0.885	0.438	36	0.037	195	0.012	256	0.006	184	0.015	336	0.012	59	0.003	222	0.001	204	0.010	197
DCP10	.695	0.901	0.404	42	0.024	217	0.017	123	0.018	190	0.020	310	0.007	10	0.008	285	0.003	316	0.003	350
DCP11	.800	0.912	0.354	39	0.022	234	0.003	88	0.011	178	0.021	283	0.013	337	0.002	82	0.014	160	0.011	225
DCP12	.953	0.488	0.228	35	0.015	243	0.006	356	0.011	181	0.013	243	0.004	292	0.010	74	0.005	180	0.006	219

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	17.95	0.200	5.29	7.64		5031.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.136	221.0	199.5	0.26E 07	-0.00160	1.143	13.08

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.490	0.663 354	0.041 346	0.020 359	0.004 145	0.009 255	0.010 279	0.006 340	0.000 197	0.005 126
CM		-0.020	0.026 294	0.004 256	0.004 238	0.002 53	0.001 132	0.004 47	0.005 140	0.004 235	0.003 353
DCP 1	.010	0.846	4.086 345	0.308 349	0.094 0	0.056 138	0.063 248	0.052 326	0.027 130	0.016 219	0.049 19
DCP 2	.025	1.401	3.188 346	0.201 311	0.100 322	0.046 51	0.028 220	0.024 336	0.018 59	0.029 241	0.004 272
DCP 3	.100	1.190	1.666 349	0.093 338	0.035 354	0.011 60	0.018 260	0.004 315	0.018 111	0.014 237	0.006 232
DCP 4	.150	1.091	1.080 352	0.079 327	0.028 344	0.017 161	0.018 260	0.016 326	0.012 99	0.007 255	0.012 40
DCP 5	.200	0.973	0.942 351	0.048 342	0.019 336	0.014 57	0.010 227	0.011 328	0.002 207	0.007 286	0.008 153
DCP 6	.250	0.800	0.822 356	0.061 341	0.024 337	0.015 168	0.014 212	0.015 326	0.007 63	0.011 153	0.012 9
DCP 7	.300	0.574	0.689 354	0.043 25	0.022 354	0.004 99	0.006 306	0.006 301	0.007 158	0.014 211	0.004 136
DCP 8	.400	0.454	0.543 2	0.041 352	0.018 356	0.013 180	0.013 263	0.015 317	0.009 81	0.007 217	0.014 56
DCP 9	.500	0.353	0.401 0	0.029 26	0.011 344	0.008 54	0.011 277	0.009 3	0.003 313	0.013 255	0.003 56
DCP10	.600	0.243	0.310 10	0.017 345	0.009 17	0.013 191	0.011 230	0.014 268	0.015 277	0.008 269	0.018 69
DCP11	.878	0.172	0.128 22	0.021 41	0.028 46	0.008 263	0.006 339	0.026 219	0.033 332	0.035 57	0.030 194

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	17.76	0.200	7.72	7.64		5031.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.134	220.7	199.5	0.26E 07	-0.00147	1.292	15.30

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.647	0.635 357	0.047 342	0.017 25	0.006 199	0.009 326	0.007 108	0.010 169	0.013 335	0.006 308
CM		0.003	0.026 305	0.003 295	0.002 323	0.003 96	0.002 198	0.003 300	0.001 120	0.006 157	0.003 84
DCP 1	.010	2.239	3.848 349	0.297 330	0.061 14	0.071 93	0.021 249	0.030 355	0.048 114	0.036 145	0.027 22
DCP 2	.025	2.443	3.144 350	0.254 337	0.093 9	0.047 157	0.051 290	0.006 192	0.054 148	0.012 289	0.013 215
DCP 3	.100	1.725	1.620 353	0.125 331	0.047 357	0.023 146	0.007 52	0.012 58	0.023 154	0.013 349	0.007 251
DCP 4	.150	1.275	1.073 353	0.085 327	0.023 28	0.005 103	0.008 303	0.012 20	0.013 159	0.005 85	0.004 17
DCP 5	.200	1.067	0.908 355	0.065 338	0.026 5	0.008 153	0.009 330	0.009 178	0.017 180	0.011 284	0.010 22
DCP 6	.250	0.564	0.779 356	0.054 340	0.019 11	0.007 222	0.011 318	0.010 50	0.012 185	0.006 35	0.009 316
DCP 7	.300	0.655	0.658 359	0.056 346	0.031 12	0.006 115	0.011 348	0.006 135	0.014 159	0.009 277	0.005 282
DCP 8	.400	0.625	0.518 3	0.032 357	0.017 57	0.005 344	0.010 319	0.008 71	0.005 135	0.003 76	0.010 5
DCP 9	.500	0.398	0.380 6	0.035 6	0.017 20	0.010 259	0.005 328	0.009 136	0.010 188	0.010 325	0.010 41
DCP10	.600	0.240	0.284 11	0.020 20	0.019 92	0.014 220	0.017 314	0.013 137	0.022 188	0.012 350	0.027 26
DCP11	.878	0.119	0.106 24	0.006 332	0.004 211	0.011 283	0.010 55	0.014 109	0.014 342	0.041 335	0.036 240

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	17.67	0.200	10.20	7.59		5031.3	10

K	V	Q	RN	DAMPING	CN(MAX.	ALPHA(STALL)
0.134	220.1	199.1	0.26E 07	-0.00164	1.529	17.85

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		C.E15	C.634 1	0.047 350	0.019 50	0.013 87	0.005 272	0.013 275	0.003 86	0.018 291	0.018 17
CM		0.006	0.024 277	0.011 329	0.007 260	0.005 241	0.004 225	0.010 90	0.001 185	0.009 120	0.006 206
DCP 1	.010	3.496	3.524 352	0.349 353	0.152 10	0.092 229	0.118 198	0.060 86	0.021 100	0.005 318	0.043 30
DCP 2	.025	3.559	3.021 353	0.315 335	0.030 17	0.059 99	0.052 279	0.022 80	0.023 86	0.032 246	0.041 350
DCP 3	.100	2.277	1.559 357	0.157 336	0.028 350	0.021 108	0.029 288	0.005 29	0.021 77	0.023 268	0.024 20
DCP 4	.150	1.700	1.000 357	0.115 349	0.018 342	0.020 134	0.010 240	0.007 206	0.009 171	0.012 353	0.006 265
DCP 5	.200	1.304	C.857 359	0.105 358	0.010 52	0.016 142	0.035 295	0.003 32	0.004 88	0.007 279	0.025 71
DCP 6	.250	1.265	0.755 1	0.080 350	0.008 30	0.007 167	0.016 236	0.004 139	0.010 201	0.005 272	0.008 335
DCP 7	.300	1.115	C.621 5	0.063 351	0.012 12	0.019 111	0.015 256	0.007 323	0.003 53	0.015 250	0.013 56
DCP 8	.400	0.759	0.521 7	0.038 0	0.017 75	0.005 334	0.019 165	0.005 112	0.006 192	0.004 89	0.007 306
DCP 9	.500	0.507	C.365 11	0.046 1	0.013 32	0.001 214	0.003 344	0.005 93	0.002 212	0.006 106	0.011 27
DCP 10	.600	0.351	C.325 14	0.013 310	0.018 83	0.013 334	0.025 169	0.007 3	0.007 296	0.003 280	0.019 292
DCP 11	.878	0.174	0.174 25	0.058 144	0.041 72	0.042 78	0.037 18	0.076 268	0.009 64	0.072 298	0.056 34

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	17.64	0.200	12.60	7.49		5031.4	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.134	220.1	199.7	0.26E 07	0.00084	1.719	19.88

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		1.029	0.622 11	0.106 298	0.050 100	0.023 333	0.018 252	0.009 182	0.006 358	0.005 317	0.015 94
CM		-0.022	0.022 148	0.032 352	0.015 224	0.009 136	0.010 34	0.005 359	0.008 172	0.003 119	0.007 255
DCP 1	.010	4.045	2.850 7	0.710 351	0.081 287	0.096 175	0.121 26	0.083 309	0.078 220	0.021 144	0.042 186
DCP 2	.025	4.028	2.577 6	0.695 333	0.169 211	0.114 129	0.087 4	0.031 256	0.056 187	0.023 84	0.037 131
DCP 3	.100	2.404	1.293 19	0.505 333	0.162 199	0.069 86	0.043 332	0.029 285	0.027 174	0.019 17	0.021 63
DCP 4	.150	1.779	0.863 27	0.371 334	0.107 179	0.035 22	0.001 263	0.020 350	0.025 189	0.022 64	0.017 239
DCP 5	.200	1.436	0.841 19	0.271 314	0.136 136	0.065 345	0.042 235	0.011 76	0.011 112	0.016 260	0.023 292
DCP 6	.250	1.380	0.801 20	0.236 298	0.148 119	0.066 342	0.008 287	0.022 231	0.023 122	0.008 314	0.038 99
DCP 7	.300	1.299	0.715 17	0.184 273	0.144 98	0.082 321	0.030 227	0.022 127	0.030 36	0.030 274	0.018 134
DCP 8	.400	0.935	0.637 13	0.166 248	0.140 87	0.041 325	0.039 306	0.039 174	0.018 48	0.006 132	0.012 313
DCP 9	.500	0.631	0.461 12	0.103 217	0.106 51	0.046 284	0.022 205	0.027 72	0.018 295	0.012 166	0.010 137
DCP 10	.600	0.504	0.409 6	0.133 197	0.110 46	0.024 267	0.019 252	0.025 83	0.004 176	0.008 340	0.016 99
DCP 11	.878	0.338	0.175 336	0.060 144	0.009 295	0.040 343	0.056 211	0.043 214	0.050 349	0.019 335	0.051 74

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.47	0.400	4.94	6.88		5028.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.063	437.2	743.9	0.48E 07	-0.00103	1.237	11.92

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.518	0.702	354	0.071	0	0.024	193	0.018	357	0.006	195	0.007	6	0.008	182	0.004	277	0.004	137
CM		-0.010	0.021	323	0.004	351	0.000	357	0.002	189	0.002	107	0.002	236	0.000	285	0.004	26	0.001	171
DCP 1	.010	1.170	4.462	351	0.541	1	0.201	156	0.067	17	0.014	145	0.054	286	0.053	152	0.028	324	0.028	113
DCP 2	.025	1.744	3.502	352	0.324	343	0.127	197	0.076	2	0.032	198	0.019	349	0.051	201	0.047	2	0.020	169
DCP 3	.100	1.501	1.756	353	0.183	4	0.062	206	0.031	352	0.025	162	0.016	1	0.021	203	0.016	0	0.015	174
DCP 4	.150	0.997	1.120	352	0.130	1	0.027	208	0.019	338	0.015	120	0.014	321	0.009	125	0.007	266	0.011	113
DCP 5	.200	0.807	0.996	352	0.116	12	0.025	194	0.021	335	0.023	143	0.010	40	0.019	189	0.012	334	0.009	106
DCP 6	.250	0.728	0.851	354	0.099	4	0.022	212	0.015	340	0.008	120	0.012	325	0.004	124	0.005	306	0.008	99
DCP 7	.300	0.629	0.719	355	0.085	10	0.022	196	0.018	348	0.009	171	0.004	26	0.007	191	0.006	4	0.004	168
DCP 8	.400	0.477	0.564	356	0.063	6	0.014	196	0.013	349	0.003	167	0.007	302	0.003	146	0.002	285	0.006	136
DCP 9	.500	0.313	0.407	357	0.045	2	0.018	185	0.010	22	0.008	205	0.004	67	0.002	189	0.002	40	0.003	172
DCP 10	.600	0.275	0.318	1	0.031	8	0.007	160	0.012	0	0.002	354	0.003	310	0.001	138	0.004	356	0.004	156
DCP 11	.878	0.129	0.109	14	0.009	216	0.013	197	0.017	7	0.016	274	0.016	50	0.006	171	0.029	210	0.007	353

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.42	0.400	7.38	7.49		5028.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.063	436.4	740.6	0.48E 07	-0.00100	1.486	14.73

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.727	0.655	359	0.123	10	0.030	291	0.027	175	0.019	53	0.007	225	0.002	208	0.009	17	0.009	273
CM		-0.004	0.022	325	0.006	281	0.004	258	0.000	306	0.004	252	0.002	57	0.003	101	0.001	285	0.003	143
DCP 1	.010	2.609	4.345	354	0.650	347	0.101	248	0.124	172	0.038	294	0.076	142	0.052	99	0.063	5	0.014	226
DCP 2	.025	2.900	3.832	356	0.640	336	0.243	250	0.157	156	0.087	50	0.046	225	0.044	112	0.088	8	0.060	254
DCP 3	.100	1.986	1.691	357	0.304	19	0.097	317	0.057	211	0.024	70	0.009	35	0.013	304	0.010	251	0.023	183
DCP 4	.150	1.331	1.049	355	0.192	21	0.061	329	0.034	201	0.010	24	0.008	107	0.005	169	0.009	8	0.004	210
DCP 5	.200	1.082	0.913	357	0.192	25	0.063	313	0.053	172	0.026	49	0.017	300	0.011	192	0.013	59	0.010	1
DCP 6	.250	0.972	0.792	358	0.158	24	0.044	317	0.031	196	0.009	43	0.004	98	0.003	148	0.007	3	0.006	258
DCP 7	.300	0.826	0.667	0	0.151	20	0.047	291	0.036	168	0.025	40	0.014	278	0.009	170	0.010	55	0.005	270
DCP 8	.400	0.636	0.525	1	0.110	24	0.031	305	0.025	186	0.009	45	0.001	126	0.005	169	0.007	359	0.006	224
DCP 9	.500	0.413	0.385	3	0.079	20	0.021	280	0.012	142	0.012	343	0.016	208	0.016	102	0.012	341	0.007	261
DCP 10	.600	0.361	0.300	5	0.066	29	0.013	267	0.017	166	0.013	38	0.005	215	0.002	211	0.003	329	0.005	220
DCP 11	.878	0.179	0.144	14	0.025	7	0.018	77	0.007	173	0.036	77	0.012	237	0.023	284	0.011	80	0.025	320

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.47	0.400	9.75	7.32		5028.3	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.063	435.6	740.7	0.48E 07	-0.00021	1.610	16.38	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.846	0.463	7	0.248	21	0.079	295	0.031	222	0.020	185	0.019	103	0.005	57	0.011	20	0.007	251
CM		-0.021	0.023	197	0.026	62	0.016	354	0.012	292	0.007	233	0.008	178	0.005	69	0.003	79	0.005	348
DCP 1	.010	3.390	2.978	0	1.090	25	0.304	333	0.156	277	0.097	277	0.086	205	0.040	218	0.053	121	0.020	174
DCP 2	.025	3.288	2.271	356	1.187	27	0.506	326	0.295	270	0.217	227	0.183	172	0.129	120	0.139	67	0.096	4
DCP 3	.100	2.082	0.704	6	0.855	38	0.367	321	0.178	248	0.100	192	0.090	132	0.059	59	0.049	7	0.027	292
DCP 4	.150	1.417	0.488	13	0.514	43	0.189	326	0.069	253	0.037	236	0.051	163	0.028	86	0.033	43	0.027	314
DCP 5	.200	1.179	0.457	15	0.508	23	0.189	286	0.061	204	0.048	198	0.063	105	0.052	24	0.020	280	0.015	271
DCP 6	.250	1.073	0.475	19	0.372	29	0.115	296	0.031	226	0.033	232	0.049	139	0.024	52	0.028	33	0.035	315
DCP 7	.300	0.933	0.439	16	0.336	9	0.124	260	0.043	174	0.044	155	0.055	66	0.034	331	0.014	291	0.018	223
DCP 8	.400	0.775	0.431	16	0.207	9	0.060	250	0.012	190	0.026	174	0.036	76	0.017	339	0.013	7	0.024	269
DCP 9	.500	0.505	0.338	11	0.148	347	0.052	214	0.018	146	0.028	105	0.028	10	0.012	277	0.010	295	0.019	194
DCP 10	.600	0.476	0.321	13	0.094	346	0.043	212	0.018	170	0.032	104	0.029	30	0.014	311	0.010	269	0.014	218
DCP 11	.878	0.273	0.219	356	0.064	247	0.026	200	0.048	123	0.025	15	0.020	334	0.027	206	0.003	321	0.025	144

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.56	0.600	5.09	7.43		5032.1	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.043	640.2	1149.8	0.50E 07	-0.00114	1.299	12.67	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.518	0.636	356	0.110	14	0.034	4	0.037	316	0.005	269	0.018	17	0.009	39	0.033	170	0.030	340
CM		-0.025	0.021	238	0.024	104	0.006	15	0.007	71	0.006	346	0.006	263	0.006	222	0.004	19	0.006	164
DCP 1	.010	0.202	4.290	351	0.543	33	0.509	326	0.367	30	0.120	111	0.019	88	0.050	82	0.027	145	0.009	2
DCP 2	.025	0.834	3.186	351	0.296	30	0.142	118	0.100	10	0.115	74	0.046	340	0.016	305	0.066	144	0.074	325
DCP 3	.100	1.610	2.127	349	0.343	72	0.247	44	0.166	298	0.025	311	0.177	5	0.054	207	0.103	135	0.112	351
DCP 4	.150	1.335	1.357	353	0.646	49	0.326	325	0.062	97	0.245	314	0.108	200	0.115	349	0.107	219	0.048	291
DCP 5	.200	0.902	1.122	356	0.067	356	0.089	41	0.093	315	0.036	15	0.085	305	0.020	163	0.065	186	0.011	347
DCP 6	.250	0.903	1.197	358	0.232	22	0.154	349	0.091	303	0.059	227	0.040	263	0.050	171	0.025	135	0.017	179
DCP 7	.300	0.629	0.913	0	0.129	332	0.026	80	0.076	324	0.023	297	0.039	321	0.046	202	0.064	154	0.029	349
DCP 8	.400	0.554	0.798	359	0.130	4	0.036	322	0.027	325	0.048	210	0.029	108	0.020	65	0.005	121	0.006	6
DCP 9	.500	0.284	0.484	1	0.114	303	0.037	181	0.018	312	0.014	78	0.035	41	0.030	37	0.039	162	0.049	335
DCP 10	.600	0.301	0.440	3	0.074	6	0.021	279	0.008	9	0.014	191	0.014	65	0.007	11	0.011	157	0.012	22
DCP 11	.878	0.161	0.231	9	0.112	287	0.019	151	0.050	263	0.028	144	0.034	71	0.037	40	0.033	197	0.045	338

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.61	0.600	9.78	7.29		5032.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.043	639.9	1437.6	0.63E 07	-0.00102	1.239	16.19

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		C.E49	0.392	6	0.168	52	0.035	75	0.023	96	0.003	85	0.029	79	0.011	16	0.011	65	0.008	0
CM		-0.043	C.044	200	0.014	101	0.006	141	0.003	122	0.003	140	0.001	328	0.003	170	0.002	159	0.004	81
DCP 1	.010	2.096	1.952	354	0.538	49	0.176	83	0.020	157	0.013	341	0.010	101	0.008	240	0.018	30	0.016	219
DCP 2	.025	2.286	1.567	354	0.557	55	0.151	53	0.091	218	0.047	135	0.057	33	0.031	287	0.018	231	0.010	118
DCP 3	.100	2.237	C.296	352	0.658	61	0.194	142	0.106	107	0.061	185	0.119	84	0.013	2	0.040	92	0.065	58
DCP 4	.200	1.243	0.402	13	0.321	67	0.064	87	0.106	81	0.028	130	0.039	93	0.056	119	0.027	139	0.042	53
DCP 5	.250	1.15E	C.468	14	0.261	62	0.086	64	0.083	79	0.031	92	0.082	74	0.037	68	0.044	56	0.026	53
DCP 6	.300	1.034	C.474	14	0.197	58	0.080	52	0.062	89	0.048	44	0.049	69	0.029	39	0.039	68	0.021	14
DCP 7	.400	0.783	0.416	10	0.142	45	0.050	12	0.020	86	0.026	347	0.028	76	0.028	341	0.018	61	0.023	315
DCP 8	.500	0.536	0.336	10	0.064	32	0.034	51	0.006	347	0.019	10	0.009	313	0.003	342	0.011	21	0.013	269
DCP 9	.600	0.483	0.313	11	0.055	5	0.016	52	0.011	18	0.012	312	0.009	102	0.017	344	0.007	345	0.017	280
DCP 10	.87E	0.362	C.259	10	0.043	332	0.024	308	0.015	251	0.011	263	0.014	108	0.014	350	0.006	320	0.016	248

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.47	0.600	12.21	7.22		5032.4	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.043	639.1	1436.9	0.63E 07	-0.00095	1.254	16.89

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.977	0.247	15	0.120	55	0.043	102	0.006	179	0.016	137	0.007	186	0.009	188	0.006	166	0.006	95
CM		-0.056	0.055	193	0.006	146	0.008	173	0.003	194	0.003	192	0.002	140	0.001	227	0.001	185	0.001	193
DCP 1	.010	2.655	1.256	355	0.428	63	0.130	63	0.045	168	0.039	43	0.021	20	0.030	291	0.012	230	0.022	171
DCP 2	.025	2.769	0.949	353	0.404	58	0.117	44	0.015	157	0.040	315	0.023	182	0.008	338	0.023	148	0.020	90
DCP 3	.100	2.393	0.312	168	0.231	51	0.254	147	0.043	244	0.103	162	0.046	201	0.060	178	0.036	152	0.097	174
DCP 4	.200	1.373	0.178	50	0.254	65	0.146	124	0.080	206	0.038	190	0.008	157	0.050	219	0.021	333	0.027	113
DCP 5	.250	1.330	0.263	23	0.229	74	0.120	137	0.038	154	0.066	140	0.056	182	0.038	254	0.030	153	0.021	242
DCP 6	.300	1.154	0.327	29	0.198	64	0.071	95	0.028	99	0.065	136	0.031	178	0.027	169	0.045	139	0.015	155
DCP 7	.400	C.909	0.340	19	0.129	61	0.046	52	0.031	57	0.020	112	0.021	51	0.012	154	0.013	127	0.012	64
DCP 8	.500	0.646	0.306	11	0.057	52	0.037	4	0.023	110	0.017	21	0.020	80	0.022	19	0.004	10	0.016	32
DCP 9	.600	0.574	0.281	20	0.068	29	0.027	9	0.009	298	0.012	99	0.009	340	0.010	60	0.010	256	0.013	82
DCP 10	.878	0.446	0.262	4	0.031	344	0.023	27	0.015	349	0.018	345	0.014	259	0.004	186	0.010	65	0.006	291

FORCED PITCHING OSCILLATION — VERTOL 23010-1.59 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	31.95	0.200	5.15	7.32		5030.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.241	221.3	198.9	0.26E 07	-0.00164	0.993	12.42

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		C.480	0.532 2	0.058 26	0.020 71	0.008 34	0.010 52	0.012 298	0.015 97	0.011 60	0.007 180
CM		-0.011	0.043 285	0.016 215	0.013 180	0.003 170	0.010 230	0.004 97	0.008 278	0.004 224	0.002 24
DCP 1	.010	0.972	3.485 346	0.249 12	0.047 118	0.025 153	0.051 228	0.000 203	0.043 38	0.021 79	0.012 161
DCP 2	.025	1.489	2.603 346	0.128 331	0.027 359	0.032 78	0.025 189	0.046 297	0.007 274	0.033 81	0.018 93
DCP 3	.100	1.194	1.283 351	0.080 352	0.020 69	0.023 68	0.028 193	0.019 322	0.015 110	0.019 58	0.008 167
DCP 4	.150	1.010	0.913 354	0.057 28	0.030 153	0.004 86	0.015 255	0.004 74	0.018 49	0.005 211	0.010 142
DCP 5	.200	0.856	0.723 357	0.036 17	0.014 49	0.022 69	0.004 86	0.021 306	0.012 142	0.014 70	0.006 241
DCP 6	.250	0.770	0.706 2	0.064 38	0.028 150	0.004 335	0.023 255	0.008 353	0.007 52	0.012 125	0.008 162
DCP 7	.300	0.621	0.537 7	0.039 55	0.009 130	0.013 49	0.012 237	0.009 326	0.012 131	0.009 71	0.011 174
DCP 8	.400	0.478	0.481 14	0.049 47	0.025 151	0.005 265	0.012 302	0.005 55	0.004 58	0.008 221	0.005 167
DCP 9	.500	0.318	0.291 21	0.036 79	0.017 48	0.014 72	0.003 32	0.015 323	0.008 175	0.004 90	0.005 237
DCP10	.600	0.246	0.302 27	0.042 65	0.016 126	0.008 292	0.007 30	0.002 282	0.007 304	0.003 351	0.004 165
DCP11	.878	0.106	0.149 60	0.120 19	0.114 356	0.021 7	0.071 54	0.033 277	0.065 97	0.036 48	0.016 29[illegible]

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	32.05	0.200	7.61	7.88		5030.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.243	220.6	199.5	0.26E 07	-0.00149	1.316	15.62

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.686	0.610 1	0.044 352	0.015 298	0.015 2	0.000 276	0.022 189	0.013 237	0.011 124	0.001 28
CM		-0.005	0.043 284	0.001 56	0.002 70	0.006 200	0.003 276	0.007 8	0.006 91	0.004 309	0.004 172
DCP 1	.010	2.360	3.583 347	0.206 347	0.039 314	0.045 350	0.033 230	0.036 146	0.027 134	0.020 58	0.007 149
DCP 2	.025	2.559	3.066 345	0.217 349	0.067 281	0.016 313	0.037 284	0.041 185	0.038 116	0.037 114	0.008 252
DCP 3	.100	1.765	1.619 350	0.134 345	0.024 303	0.011 44	0.016 296	0.013 198	0.018 199	0.008 137	0.018 175
DCP 4	.150	1.287	0.958 356	0.050 345	0.022 330	0.011 274	0.017 234	0.012 181	0.017 167	0.007 65	0.011 151
DCP 5	.200	1.098	0.877 356	0.060 350	0.025 311	0.016 352	0.012 33	0.018 197	0.013 228	0.008 147	0.012 125
DCP 6	.250	1.005	0.706 4	0.035 9	0.023 309	0.012 314	0.006 276	0.015 192	0.007 214	0.007 304	0.009 123
DCP 7	.300	0.868	0.670 4	0.065 5	0.010 3	0.008 290	0.003 340	0.008 187	0.008 238	0.011 146	0.011 163
DCP 8	.400	0.661	0.483 17	0.027 18	0.016 333	0.012 315	0.008 231	0.009 211	0.017 210	0.005 350	0.015 145
DCP 9	.500	0.404	0.405 13	0.042 10	0.008 298	0.006 54	0.003 197	0.018 209	0.019 227	0.011 136	0.013 172
DCP10	.600	0.307	0.289 36	0.022 31	0.015 329	0.019 352	0.005 75	0.017 190	0.015 230	0.001 311	0.008 208
DCP11	.878	0.157	0.166 36	0.024 287	0.019 237	0.037 26	0.015 95	0.052 185	0.035 281	0.037 127	0.041 354

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	32.05	0.200	10.08	7.82		5030.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.243	220.5	199.5	0.26E 07	-0.00147	1.509	18.02

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.896	0.622	3	0.066	27	0.010	319	0.006	341	0.007	327	0.009	132	0.016	204	0.004	45	0.011	4
CM		0.005	0.039	272	0.011	247	0.004	313	0.005	188	0.003	66	0.006	318	0.006	4	0.006	188	0.005	155
DCP 1	.010	3.685	3.503	347	0.243	7	0.114	315	0.093	247	0.036	119	0.021	67	0.002	146	0.027	221	0.023	349
DCP 2	.025	3.673	2.943	347	0.226	355	0.044	294	0.019	123	0.018	273	0.028	37	0.026	231	0.025	121	0.014	355
DCP 3	.100	2.327	1.568	354	0.121	9	0.050	319	0.025	159	0.013	16	0.013	140	0.012	206	0.015	145	0.012	66
DCP 4	.150	1.645	0.979	356	0.091	16	0.027	311	0.025	299	0.022	355	0.012	229	0.011	171	0.011	182	0.012	52
DCP 5	.200	1.388	0.862	359	0.087	14	0.029	327	0.013	166	0.014	22	0.015	24	0.017	248	0.017	139	0.005	164
DCP 6	.250	1.269	0.732	3	0.072	30	0.020	337	0.028	292	0.022	350	0.012	228	0.008	237	0.007	231	0.013	24
DCP 7	.300	1.084	0.662	8	0.061	35	0.028	327	0.010	164	0.019	31	0.010	277	0.014	268	0.015	171	0.008	115
DCP 8	.400	0.839	0.509	14	0.058	32	0.009	311	0.016	317	0.019	359	0.007	262	0.014	229	0.016	192	0.009	44
DCP 9	.500	0.509	0.405	20	0.052	32	0.017	326	0.006	153	0.009	21	0.008	355	0.017	242	0.012	134	0.002	230
DCP10	.600	0.399	0.308	26	0.041	48	0.008	313	0.006	347	0.015	23	0.004	18	0.011	236	0.010	247	0.004	98
DCP11	.878	0.165	0.205	33	0.067	53	0.030	136	0.031	10	0.035	234	0.052	138	0.048	175	0.052	13	0.043	343

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	31.95	0.200	12.45	7.81		5030.4	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.242	220.5	199.6	0.26E 07	-0.00081	1.632	20.36

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.073	0.573	7	0.035	105	0.036	337	0.011	124	0.011	61	0.010	193	0.010	227	0.013	157	0.006	111
CM		0.001	0.023	301	0.023	304	0.014	119	0.005	271	0.004	233	0.002	21	0.001	272	0.003	348	0.000	317
DCP 1	.010	4.502	3.137	354	0.196	359	0.051	350	0.022	32	0.122	324	0.103	200	0.037	167	0.031	198	0.049	113
DCP 2	.025	4.533	2.809	354	0.165	339	0.045	49	0.020	84	0.028	135	0.024	126	0.037	177	0.033	117	0.023	82
DCP 3	.100	2.745	1.399	359	0.070	3	0.049	12	0.008	174	0.024	137	0.015	173	0.028	242	0.022	137	0.012	104
DCP 4	.150	1.869	0.947	9	0.084	303	0.048	108	0.026	317	0.007	261	0.006	139	0.020	237	0.010	185	0.013	57
DCP 5	.200	1.648	0.774	6	0.039	37	0.045	15	0.012	143	0.017	123	0.003	195	0.022	239	0.021	145	0.009	113
DCP 6	.250	1.450	0.758	17	0.058	251	0.053	63	0.026	237	0.011	66	0.012	232	0.016	231	0.007	192	0.006	84
DCP 7	.300	1.257	0.589	17	0.011	17	0.037	16	0.013	209	0.020	120	0.013	228	0.015	269	0.018	157	0.011	116
DCP 8	.400	0.989	0.551	18	0.078	154	0.063	2	0.033	173	0.024	6	0.009	206	0.013	235	0.006	160	0.005	186
DCP 9	.500	0.607	0.339	26	0.044	109	0.045	354	0.024	137	0.012	94	0.003	13	0.026	255	0.021	155	0.007	135
DCP10	.600	0.467	0.316	21	0.107	125	0.047	314	0.020	142	0.021	11	0.011	215	0.004	311	0.005	256	0.007	174
DCP11	.878	0.254	0.069	17	0.091	111	0.082	290	0.033	61	0.024	73	0.015	184	0.012	114	0.025	159	0.006	65

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	32.47	0.400	4.93	7.85		5029.1	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.124	436.3	740.8	0.48E 07	-0.00079	1.267	12.74	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.525	0.739	352	0.045	343	0.011	335	0.008	301	0.003	282	0.007	301	0.003	251	0.005	2	0.006	44
CM		-0.011	0.028	309	0.002	290	0.003	145	0.004	103	0.002	157	0.004	133	0.002	104	0.001	166	0.004	220
DCP 1	.010	1.137	4.655	345	0.304	343	0.120	124	0.057	65	0.045	276	0.034	201	0.027	130	0.022	343	0.002	331
DCP 2	.025	1.679	3.756	347	0.235	306	0.006	311	0.020	294	0.029	170	0.014	295	0.004	58	0.010	30	0.014	319
DCP 3	.100	1.520	1.899	349	0.115	340	0.026	313	0.008	312	0.008	161	0.003	233	0.006	172	0.004	342	0.005	167
DCP 4	.150	1.048	1.174	349	0.082	347	0.021	323	0.004	322	0.007	236	0.006	171	0.006	187	0.004	346	0.005	103
DCP 5	.200	0.832	1.046	351	0.069	355	0.019	349	0.003	345	0.008	234	0.007	311	0.007	354	0.010	18	0.006	190
DCP 6	.250	0.762	0.887	353	0.067	356	0.015	327	0.004	351	0.004	258	0.003	202	0.004	197	0.006	16	0.004	116
DCP 7	.300	0.611	0.759	356	0.058	5	0.013	326	0.004	350	0.002	293	0.001	331	0.003	175	0.003	347	0.001	214
DCP 8	.400	0.488	0.579	357	0.043	0	0.011	348	0.003	339	0.004	261	0.002	232	0.006	201	0.004	357	0.003	113
DCP 9	.500	0.344	0.422	1	0.030	19	0.008	19	0.005	345	0.003	266	0.001	325	0.001	299	0.002	50	0.001	103
DCP10	.600	0.280	0.320	5	0.023	8	0.008	6	0.004	334	0.003	273	0.002	322	0.004	185	0.007	33	0.003	174
DCP11	.878	0.130	0.127	11	0.009	272	0.021	314	0.029	280	0.015	338	0.031	310	0.015	293	0.009	330	0.032	35

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	32.36	0.400	7.36	7.80		5029.2	10
K	V	C	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.124	435.4	739.7	0.48E 07	-0.00092	1.504	15.14	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.748	0.715	358	0.068	337	0.008	185	0.008	71	0.004	290	0.003	156	0.002	165	0.003	299	0.003	138
CM		-0.002	0.032	309	0.005	279	0.002	261	0.001	162	0.001	149	0.001	350	0.001	4	0.001	91	0.001	308
DCP 1	.010	2.697	4.463	348	0.389	306	0.074	134	0.034	277	0.099	170	0.068	63	0.028	344	0.004	63	0.027	343
DCP 2	.025	2.998	4.009	351	0.460	293	0.119	179	0.055	66	0.044	170	0.059	79	0.074	344	0.056	261	0.039	159
DCP 3	.100	2.067	1.762	354	0.198	353	0.046	269	0.044	108	0.042	354	0.046	255	0.044	155	0.030	62	0.015	329
DCP 4	.150	1.358	1.067	356	0.122	357	0.027	313	0.004	205	0.002	253	0.004	258	0.006	192	0.002	82	0.003	31
DCP 5	.200	1.123	0.959	357	0.111	2	0.014	248	0.019	42	0.027	290	0.020	181	0.012	131	0.013	353	0.008	86
DCP 6	.250	1.002	0.813	359	0.098	357	0.011	298	0.003	104	0.002	296	0.002	189	0.005	157	0.001	205	0.002	355
DCP 7	.300	0.850	0.714	1	0.075	356	0.010	121	0.013	21	0.013	252	0.006	120	0.000	276	0.001	247	0.002	159
DCP 8	.400	0.658	0.541	3	0.063	352	0.003	185	0.006	84	0.006	287	0.001	288	0.005	201	0.004	96	0.002	70
DCP 9	.500	0.435	0.395	8	0.038	5	0.004	104	0.001	148	0.003	155	0.002	269	0.009	170	0.005	53	0.010	252
DCP10	.600	0.359	0.311	13	0.036	0	0.002	153	0.002	120	0.006	326	0.001	234	0.005	169	0.002	138	0.001	231
DCP11	.878	0.177	0.144	22	0.003	255	0.013	117	0.007	30	0.005	328	0.009	146	0.002	315	0.013	274	0.014	123

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	32.26	0.400	9.85	7.67		5029.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.124	434.6	738.9	0.48E 07	-0.00033	1.668	17.32

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		C.620	0.576 22	C.222 349	0.059 233	0.023 157	0.014 66	0.003 275	0.001 320	0.CC7 155	0.004 257
CM		-0.023	0.032 204	0.035 56	0.025 315	0.012 258	0.009 186	0.007 88	0.003 58	0.006 334	0.002 62
DCP 1	.010	3.084	2.971 4	0.865 9	0.217 314	0.166 301	0.205 250	0.193 174	0.135 99	0.088 12	0.054 277
DCP 2	.025	3.002	2.270 10	1.086 22	0.488 316	0.273 257	0.179 213	0.141 153	0.108 90	0.070 30	0.027 3
DCP 3	.10C	2.035	1.010 31	0.826 18	0.370 284	0.163 196	0.069 131	0.052 98	0.046 33	0.030 319	0.012 269
DCP 4	.150	1.373	C.735 31	0.499 4	0.203 256	0.067 160	0.036 127	0.052 66	0.035 330	0.015 268	0.010 276
DCP 5	.200	1.171	0.717 31	0.436 356	0.174 243	0.058 164	0.054 116	0.058 40	0.031 315	0.018 265	0.018 229
DCP 6	.250	1.066	C.656 31	0.361 345	0.138 220	0.033 123	0.042 106	0.043 16	0.023 266	0.009 272	0.014 222
DCP 7	.300	0.938	0.645 30	0.307 339	0.120 209	0.035 137	0.049 94	0.044 357	0.024 276	0.011 234	0.015 171
DCP 8	.400	C.765	C.590 27	0.232 316	0.105 181	0.033 117	0.054 66	0.037 327	0.017 261	0.022 225	0.016 122
DCP 9	.500	0.519	0.457 26	0.169 305	0.086 167	0.036 9[illegible]	0.048 34	0.036 297	0.021 235	0.017 168	0.009 72
DCP 10	.60C	C.45C	0.395 26	0.130 291	0.073 154	0.035 97	0.049 20	0.033 274	0.022 214	0.025 139	0.018 22
DCP 11	.87E	C.27C	0.238 7	0.077 236	0.068 128	0.039 80	0.030 318	0.029 211	0.010 54	0.027 144	0.026 241

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	32.36	0.400	12.24	7.66		5029.4	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.125	434.0	737.2	0.48E 07	-0.00021	1.802	19.20

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		C.922	0.496 36	0.241 358	0.050 305	0.043 253	0.032 178	0.021 118	0.013 43	0.006 313	0.005 238
CM		-0.040	0.058 192	0.041 76	0.021 14	0.020 322	0.012 255	0.008 190	0.006 137	0.004 79	0.004 17
DCP 1	.010	3.483	1.795 13	0.868 48	0.512 40	0.519 351	0.337 288	0.215 227	0.089 168	0.019 126	0.031 189
DCP 2	.025	3.245	1.246 25	1.185 41	0.568 5	0.449 319	0.283 267	0.199 209	0.101 161	0.070 136	0.055 84
DCP 3	.100	2.144	0.808 64	0.849 22	0.250 323	0.182 291	0.154 214	0.086 145	0.047 103	0.030 75	0.028 42
DCP 4	.150	1.490	0.628 61	0.531 18	0.115 312	0.118 302	0.119 215	0.067 149	0.044 131	0.051 83	0.026 19
DCP 5	.200	1.270	0.656 54	0.451 359	0.090 307	0.133 260	0.107 161	0.049 107	0.044 64	0.027 355	0.010 330
DCP 6	.250	1.186	0.656 51	0.400 359	0.078 293	0.119 265	0.110 178	0.057 127	0.[illegible] 38	0.043 16	0.018 325
DCP 7	.300	1.033	0.630 43	0.323 342	0.076 289	0.117 227	0.086 145	0.062 97	0.049 28	0.023 314	0.006 330
DCP 8	.400	0.872	0.592 40	0.281 334	0.075 261	0.104 219	0.082 139	0.057 99	0.053 38	0.035 329	0.031 277
DCP 9	.500	0.608	0.499 31	0.198 310	0.064 232	0.090 172	0.058 99	0.050 51	0.042 328	0.029 266	0.025 213
DCP 10	.600	C.539	0.436 32	0.170 309	0.054 224	0.076 180	0.045 106	0.042 69	0.036 355	0.032 297	0.033 233
DCP 11	.878	0.369	0.284 1	0.095 256	0.060 186	0.064 100	0.029 [illegible]6	0.040 309	0.023 249	0.021 189	0.011 122

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	31.95	0.600	5.13	7.62		5033.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.083	642.0	1441.0	0.63E 07	-0.00087	1.296	12.39

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.463	0.741	351	0.148	10	0.058	290	0.024	224	0.019	149	0.007	79	0.010	62	0.011	332	0.006	241
CM		-0.026	0.026	260	0.016	83	0.009	356	0.005	308	0.003	241	0.002	155	0.001	122	0.001	75	0.002	57
DCP 1	.010	0.185	3.396	346	0.403	17	0.332	293	0.235	4	0.103	56	0.019	50	0.046	23	0.025	75	0.019	79
DCP 2	.025	0.617	3.068	342	0.566	20	0.085	289	0.071	15	0.056	44	0.046	119	0.034	224	0.017	283	0.021	147
DCP 3	.100	1.478	1.921	341	0.572	42	0.262	322	0.121	223	0.093	196	0.035	341	0.015	88	0.040	353	0.026	277
DCP 4	.200	0.872	1.048	351	0.237	7	0.139	305	0.099	243	0.039	175	0.046	170	0.041	75	0.003	139	0.020	59
DCP 5	.250	0.753	0.979	356	0.194	3	0.112	313	0.095	257	0.059	179	0.040	160	0.056	99	0.025	9	0.039	60
DCP 6	.300	0.785	0.785	357	0.201	355	0.092	278	0.061	234	0.058	159	0.041	104	0.041	58	0.031	353	0.018	336
DCP 7	.400	0.443	0.644	359	0.121	350	0.044	269	0.028	228	0.035	153	0.027	85	0.027	51	0.027	343	0.021	277
DCP 8	.500	0.306	0.431	0	0.096	343	0.045	233	0.011	151	0.011	113	0.016	58	0.015	351	0.012	277	0.019	219
DCP 9	.600	0.242	0.367	8	0.078	341	0.041	234	0.021	142	0.015	91	0.015	24	0.009	344	0.009	299	0.009	240
DCP10	.878	0.181	0.195	4	0.046	282	0.024	173	0.021	120	0.015	42	0.018	301	0.009	219	0.006	222	0.006	218

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	31.95	0.600	7.48	7.57		5033.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.083	640.0	1436.5	0.63E 07	-0.00079	1.391	13.47

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.665	0.598	359	0.183	22	0.052	338	0.038	289	0.013	244	0.021	215	0.017	134	0.008	87	0.003	72
CM		-0.034	0.038	220	0.021	92	0.006	59	0.009	22	0.006	319	0.002	298	0.003	251	0.003	164	0.000	69
DCP 1	.010	1.078	2.977	347	0.731	31	0.112	80	0.036	198	0.009	240	0.011	318	0.030	83	0.012	340	0.014	348
DCP 2	.025	1.546	2.320	345	0.492	27	0.074	15	0.090	340	0.010	356	0.021	170	0.041	77	0.023	54	0.007	0
DCP 3	.100	1.867	1.111	345	0.759	47	0.147	334	0.136	1	0.083	308	0.066	236	0.023	170	0.052	138	0.019	45
DCP 4	.200	1.059	0.787	1	0.314	30	0.168	359	0.099	301	0.068	289	0.046	236	0.036	224	0.019	147	0.013	230
DCP 5	.250	0.957	0.750	6	0.267	30	0.140	1	0.095	310	0.068	301	0.073	250	0.044	196	0.021	176	0.010	181
DCP 6	.300	0.824	0.688	5	0.209	15	0.105	355	0.105	291	0.051	249	0.054	226	0.050	171	0.030	134	0.019	100
DCP 7	.400	0.631	0.587	8	0.166	3	0.072	329	0.081	262	0.039	190	0.030	209	0.046	143	0.020	88	0.021	81
DCP 8	.500	0.425	0.414	9	0.114	352	0.023	319	0.044	263	0.029	177	0.018	166	0.030	112	0.019	31	0.012	28
DCP 9	.600	0.371	0.382	14	0.100	342	0.031	287	0.040	236	0.029	152	0.014	154	0.028	100	0.019	356	0.003	150
DCP10	.878	0.270	0.250	5	0.061	289	0.030	230	0.035	171	0.018	107	0.009	93	0.017	14	0.010	324	0.007	248

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	31.85	0.600	9.87	7.49		5033.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.083	640.2	1438.9	0.63E 07	-0.00102	1.424	14.07

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.837	0.426	11	0.170	43	0.068	34	0.047	338	0.013	306	0.012	346	0.013	266	0.010	274	0.005	216
CM		-0.049	0.061	209	0.023	113	0.012	125	0.010	78	0.005	46	0.005	32	0.003	345	0.003	324	0.002	271
DCP 1	.010	2.033	2.092	352	0.463	37	0.100	52	0.051	290	0.015	98	0.010	149	0.012	173	0.010	233	0.005	267
DCP 2	.025	2.058	1.426	347	0.554	65	0.257	44	0.123	309	0.005	173	0.015	333	0.032	273	0.033	258	0.032	214
DCP 3	.100	2.145	0.287	346	0.716	63	0.210	97	0.165	27	0.019	3	0.100	37	0.069	292	0.052	317	0.044	261
DCP 4	.200	1.228	0.446	20	0.334	62	0.152	46	0.119	29	0.040	29	0.072	12	0.017	344	0.032	290	0.011	120
DCP 5	.250	1.147	0.501	20	0.275	61	0.159	38	0.115	21	0.058	349	0.058	17	0.037	319	0.030	322	0.011	234
DCP 6	.300	0.989	0.511	21	0.199	47	0.133	37	0.085	7	0.064	356	0.049	346	0.042	320	0.033	302	0.011	311
DCP 7	.400	0.750	0.504	20	0.144	22	0.100	10	0.076	315	0.039	302	0.034	274	0.029	244	0.017	233	0.018	217
DCP 8	.500	0.579	0.428	20	0.106	353	0.044	5	0.051	307	0.029	283	0.036	235	0.021	190	0.007	198	0.006	220
DCP 9	.600	0.512	0.410	22	0.106	340	0.044	333	0.054	277	0.020	237	0.026	229	0.020	184	0.01.	179	0.010	120
DCP10	.878	0.361	0.281	13	0.058	319	0.043	310	0.035	254	0.026	200	0.014	160	0.005	156	0.012	127	0.009	78

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	32.05	0.600	12.29	7.46		5033.4	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.084	638.4	1427.7	0.62E 07	-0.00087	1.424	14.43

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.964	0.307	28	0.147	44	0.043	67	0.041	48	0.018	59	0.005	57	0.015	57	0.010	303	0.005	47
CM		-0.058	0.065	201	0.011	151	0.011	146	0.005	195	0.007	133	0.002	146	0.004	153	0.004	59	0.002	233
DCP 1	.010	2.631	1.365	355	0.418	53	0.132	25	0.018	295	0.035	103	0.025	328	0.017	302	0.010	333	0.015	290
DCP 2	.025	2.653	0.911	349	0.430	60	0.144	27	0.042	47	0.061	3	0.037	265	0.007	37	0.022	332	0.029	272
DCP 3	.100	2.344	0.387	143	0.356	47	0.228	127	0.066	49	0.100	110	0.029	123	0.069	99	0.037	32	0.021	130
DCP 4	.200	1.325	0.317	52	0.278	59	0.138	114	0.058	78	0.072	110	0.048	130	0.019	109	0.042	333	0.016	239
DCP 5	.250	1.303	0.391	44	0.259	66	0.124	107	0.108	70	0.081	127	0.034	101	0.040	102	0.004	159	0.013	240
DCP 6	.300	1.146	0.460	38	0.216	49	0.085	69	0.101	61	0.060	78	0.038	59	0.042	71	0.005	42	0.009	25
DCP 7	.400	0.904	0.425	32	0.155	39	0.064	36	0.063	39	0.028	25	0.021	353	0.024	84	0.005	6	0.023	77
DCP 8	.500	0.662	0.382	24	0.080	19	0.049	8	0.037	24	0.020	329	0.017	14	0.025	5	0.025	288	0.013	7
DCP 9	.600	0.590	0.348	25	0.083	22	0.052	0	0.028	44	0.037	345	0.018	309	0.014	352	0.015	282	0.012	33
DCP10	.878	0.438	0.286	9	0.054	353	0.037	312	0.020	355	0.024	296	0.003	218	0.020	326	0.023	227	0.005	86

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.95	0.200	9.90	2.41		1078.1	5

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.126	224.5	120.5	0.15E 07	-0.00132	1.311	12.35

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.065	0.209	356	0.010	167	0.007	302	0.006	86	0.018	21	0.008	140	0.022	251	0.011	98	0.005	86
CM		-0.046	0.006	290	0.001	3	0.003	148	0.003	246	0.005	188	0.001	358	0.007	83	0.003	303	0.002	304
DCP 1	.010	3.353	1.191	349	0.047	192	0.020	200	0.046	186	0.022	80	0.045	122	0.057	198	0.011	317	0.022	248
DCP 2	.050	2.766	0.774	348	0.019	209	0.032	271	0.018	187	0.011	324	0.014	107	0.020	155	0.021	327	0.039	299
DCP 3	.100	2.421	0.495	354	0.042	158	0.011	183	0.017	345	0.050	57	0.008	143	0.065	273	0.025	46	0.031	73
DCP 4	.150	2.260	0.403	351	0.019	85	0.003	332	0.008	96	0.017	35	0.030	147	0.018	176	0.005	72	0.006	212
DCP 5	.200	1.830	0.307	354	0.033	140	0.019	343	0.009	266	0.019	72	0.008	66	0.029	284	0.019	97	0.013	47
DCP 6	.250	1.359	0.261	355	0.005	37	0.008	92	0.012	138	0.012	352	0.020	141	0.020	158	0.008	352	0.011	133
DCP 7	.300	1.282	0.213	358	0.020	160	0.006	320	0.006	271	0.020	33	0.002	352	0.036	269	0.027	97	0.014	41
DCP 8	.500	0.761	0.134	7	0.010	304	0.011	218	0.018	84	0.020	332	0.015	154	0.014	158	0.007	69	0.003	13
DCP 9	.600	0.660	0.108	6	0.016	157	0.022	351	0.008	354	0.023	73	0.019	108	0.039	277	0.030	156	0.023	117
DCP10	.695	0.552	0.070	27	0.008	298	0.022	206	0.007	84	0.030	301	0.015	268	0.030	144	0.013	70	0.005	71
DCP11	.800	0.384	0.052	352	0.020	232	0.028	298	0.024	75	0.041	31	0.007	91	0.067	267	0.031	111	0.014	133
DCP12	.878	0.345	0.044	3	0.023	122	0.032	5	0.012	66	0.031	24	0.011	183	0.050	275	0.004	168	0.006	188

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.95	0.200	12.40	2.41		1078.2	5

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.126	224.6	120.3	0.15E 07	-0.00230	1.419	14.82

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.212	0.181	4	0.016	178	0.013	212	0.002	336	0.023	150	0.002	176	0.025	230	0.011	146	0.006	252
CM		-0.044	0.010	288	0.003	5	0.004	55	0.000	16	0.005	299	0.001	91	0.007	73	0.003	306	0.001	279
DCP 1	.010	4.494	1.131	351	0.023	207	0.022	205	0.043	358	0.085	181	0.010	294	0.049	155	0.036	216	0.008	312
DCP 2	.050	3.432	0.637	350	0.023	165	0.053	163	0.030	353	0.064	180	0.033	105	0.054	123	0.036	190	0.003	75
DCP 3	.100	2.810	0.502	358	0.037	149	0.018	198	0.012	266	0.014	76	0.012	201	0.091	263	0.009	140	0.023	273
DCP 4	.150	2.502	0.331	357	0.010	196	0.002	98	0.007	26	0.043	167	0.007	344	0.030	141	0.005	255	0.011	246
DCP 5	.200	1.947	0.252	1	0.033	189	0.013	50	0.017	167	0.008	113	0.010	279	0.058	244	0.011	103	0.011	274
DCP 6	.250	1.487	0.215	3	0.016	198	0.015	206	0.001	13	0.041	167	0.001	155	0.032	139	0.006	245	0.021	241
DCP 7	.300	1.356	0.180	10	0.021	148	0.005	170	0.012	140	0.005	98	0.010	159	0.054	242	0.010	153	0.027	251
DCP 8	.500	0.826	0.118	19	0.009	227	0.017	252	0.008	344	0.044	177	0.004	130	0.029	127	0.009	85	0.011	237
DCP 9	.600	0.734	0.086	33	0.016	161	0.019	154	0.027	247	0.028	102	0.001	264	0.061	264	0.024	124	0.012	16
DCP10	.695	0.589	0.081	43	0.028	209	0.015	241	0.014	290	0.028	189	0.010	2	0.023	91	0.008	139	0.004	205
DCP11	.800	0.421	0.052	44	0.010	258	0.060	246	0.050	71	0.048	96	0.009	167	0.051	259	0.020	153	0.014	107
DCP12	.878	0.452	0.046	0	0.029	151	0.013	164	0.019	242	0.018	103	0.014	275	0.057	251	0.017	138	0.007	66

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.95	0.200	14.60	2.41		1378.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.126	224.5	120.1	0.15E 07	-0.00114	1.536	16.96

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.343	0.190	14	0.016	205	0.003	353	0.008	102	0.010	134	0.000	199	0.008	83	0.005	207	0.002	355
CM		-0.048	0.005	279	0.005	330	0.002	146	0.004	298	0.004	263	0.001	349	0.003	253	0.002	68	0.001	238
DCP 1	.010	5.493	1.297	358	0.114	234	0.017	181	0.007	109	0.073	207	0.012	155	0.019	105	0.010	152	0.012	137
DCP 2	.050	3.896	0.653	1	0.047	219	0.005	346	0.024	59	0.049	202	0.010	21	0.011	50	0.017	131	0.010	337
DCP 3	.100	3.151	0.452	9	0.014	169	0.006	158	0.026	346	0.042	62	0.007	293	0.018	73	0.006	256	0.014	218
DCP 4	.150	2.656	0.295	12	0.020	245	0.014	236	0.014	120	0.034	200	0.003	82	0.006	94	0.010	193	0.002	347
DCP 5	.200	2.110	0.239	20	0.011	312	0.010	103	0.008	356	0.019	68	0.007	247	0.006	36	0.004	18	0.002	345
DCP 6	.250	1.569	0.206	26	0.028	283	0.010	143	0.011	177	0.028	193	0.008	115	0.003	215	0.011	179	0.012	320
DCP 7	.300	1.452	0.200	31	0.015	312	0.015	80	0.011	5	0.014	58	0.010	314	0.007	142	0.004	241	0.005	243
DCP 8	.500	0.870	0.131	37	0.028	223	0.014	334	0.010	171	0.025	207	0.007	88	0.002	125	0.007	192	0.007	35
DCP 9	.600	0.809	0.118	35	0.035	193	0.018	53	0.011	211	0.015	16	0.017	284	0.007	74	0.010	354	0.004	240
DCP10	.695	0.628	0.065	21	0.029	166	0.023	338	0.015	199	0.016	210	0.005	101	0.002	230	0.011	147	0.002	52
DCP11	.800	0.478	0.060	4	0.028	155	0.040	280	0.076	99	0.043	83	0.019	132	0.033	108	0.016	170	0.012	8
DCP12	.878	0.591	0.070	343	0.026	110	0.020	127	0.006	4	0.034	81	0.008	233	0.028	35	0.023	264	0.007	56

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.95	0.400	9.90	2.43		1376.1	5

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.064	443.8	370.3	0.24E 07	-0.00131	1.312	12.37

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.067	0.243	352	0.005	165	0.005	239	0.004	187	0.006	129	0.002	243	0.006	213	0.000	331	0.001	157
CM		-0.010	0.009	319	0.001	190	0.002	98	0.001	272	0.000	15	0.001	33	0.002	45	0.000	158	0.000	0
DCP 1	.010	4.275	1.680	348	0.127	221	0.043	140	0.009	65	0.005	138	0.013	50	0.007	132	0.004	206	0.008	216
DCP 2	.050	3.346	0.977	348	0.009	175	0.039	293	0.041	207	0.042	104	0.020	6	0.008	242	0.002	113	0.005	257
DCP 3	.100	2.830	0.570	350	0.022	112	0.050	145	0.015	241	0.046	127	0.011	238	0.017	151	0.005	357	0.016	63
DCP 4	.150	2.087	0.432	350	0.019	96	0.002	279	0.005	199	0.002	0	0.003	327	0.003	73	0.002	217	0.006	213
DCP 5	.200	1.857	0.331	350	0.013	119	0.007	270	0.002	174	0.009	174	0.004	219	0.011	235	0.001	126	0.001	174
DCP 6	.250	1.345	0.272	353	0.003	139	0.005	268	0.002	227	0.004	123	0.002	288	0.007	104	0.002	314	0.004	232
DCP 7	.300	1.197	0.243	353	0.010	146	0.004	210	0.004	250	0.004	170	0.004	224	0.011	234	0.002	55	0.003	164
DCP 8	.500	0.702	0.137	357	0.002	104	0.008	297	0.005	145	0.002	320	0.002	101	0.005	43	0.004	234	0.003	130
DCP 9	.600	0.552	0.104	3	0.003	117	0.006	304	0.003	141	0.005	184	0.007	216	0.017	228	0.005	83	0.004	126
DCP10	.695	0.464	0.077	6	0.002	57	0.004	256	0.003	179	0.008	54	0.004	212	0.003	93	0.005	199	0.002	289
DCP11	.800	0.261	0.050	4	0.004	263	0.014	255	0.011	77	0.006	135	0.003	246	0.015	225	0.005	356	0.002	300
DCP12	.878	0.249	0.047	6	0.003	250	0.003	220	0.003	200	0.010	169	0.004	231	0.016	221	0.003	358	0.001	221

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.89	0.400	12.40	2.42		1076.2	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.064	443.8	367.3	0.24E 07	0.00100	1.445	14.29	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		1.216	0.153 34	0.070 2	0.022 213	0.002 42	0.006 153	0.002 169	0.006 149	0.001 343	0.002 160
CM		-0.013	0.006 130	0.013 26	0.008 258	0.004 120	0.002 311	0.001 153	0.001 316	0.001 133	0.001 15
DCP 1	.010	5.520	1.260 12	0.319 1	0.065 199	0.058 40	0.038 333	0.023 224	0.018 161	0.007 315	0.003 149
DCP 2	.050	4.008	0.713 32	0.474 2	0.269 252	0.110 180	0.054 161	0.036 147	0.039 145	0.025 118	0.016 114
DCP 3	.100	3.110	0.293 39	0.217 28	0.070 230	0.040 93	0.003 185	0.014 217	0.003 134	0.004 13	0.009 149
DCP 4	.150	2.290	0.200 51	0.155 14	0.063 227	0.025 98	0.018 345	0.009 194	0.004 117	0.002 111	0.002 332
DCP 5	.200	1.952	0.182 79	0.178 14	0.079 235	0.033 97	0.012 272	0.013 129	0.008 347	0.007 237	0.009 114
DCP 6	.250	1.448	0.152 69	0.126 11	0.049 223	0.020 79	0.005 333	0.000 57	0.003 198	0.004 157	0.004 6
DCP 7	.300	1.277	0.146 68	0.111 4	0.041 213	0.016 34	0.015 194	0.007 73	0.005 225	0.001 34	0.003 211
DCP 8	.500	0.762	0.089 53	0.030 339	0.028 125	0.019 323	0.011 96	0.006 319	0.012 157	0.003 22	0.003 255
DCP 9	.600	0.652	0.070 32	0.012 269	0.029 89	0.019 301	0.015 164	0.005 9	0.006 184	0.006 334	0.002 216
DCP10	.695	0.524	0.077 9	0.030 219	0.028 86	0.010 290	0.012 48	0.008 248	0.011 111	0.004 258	0.006 195
DCP11	.800	0.339	0.086 353	0.039 219	0.020 77	0.014 293	0.012 157	0.001 34	0.005 151	0.005 351	0.002 215
DCP12	.878	0.364	0.112 347	0.047 217	0.019 68	0.013 258	0.009 160	0.003 95	0.006 114	0.008 297	0.007 129

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.89	0.400	14.60	2.41		1376.3	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.064	443.6	384.7	0.23E 07	0.00200	1.447	14.26	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		1.160	0.266 113	0.039 52	0.039 55	0.017 359	0.012 251	0.012 290	0.009 201	0.006 187	0.004 176
CM		-0.042	0.050 167	0.011 121	0.015 109	0.007 89	0.008 42	0.005 28	0.005 328	0.004 307	0.001 264
DCP 1	.010	5.420	1.153 115	0.235 97	0.165 104	0.074 78	0.059 68	0.072 32	0.047 354	0.040 335	0.026 297
DCP 2	.050	3.685	1.149 135	0.356 107	0.387 115	0.243 100	0.180 105	0.103 53	0.060 19	0.075 342	0.040 319
DCP 3	.100	2.724	0.953 144	0.187 75	0.144 86	0.102 41	0.075 7	0.087 344	0.050 310	0.040 287	0.043 257
DCP 4	.150	1.884	0.808 137	0.152 52	0.139 79	0.088 7	0.044 330	0.049 311	0.041 281	0.031 242	0.034 196
DCP 5	.200	1.677	0.640 129	0.087 38	0.134 60	0.067 343	0.056 317	0.048 287	0.036 243	0.031 211	0.023 183
DCP 6	.250	1.258	0.504 119	0.062 14	0.119 44	0.058 316	0.056 296	0.043 255	0.041 224	0.031 196	0.033 156
DCP 7	.300	1.155	0.393 110	0.035 354	0.101 33	0.042 317	0.053 284	0.032 266	0.036 202	0.021 197	0.018 141
DCP 8	.500	0.767	0.177 74	0.027 291	0.053 339	0.027 281	0.040 230	0.018 227	0.020 171	0.021 155	0.013 75
DCP 9	.600	0.727	0.132 43	0.029 318	0.058 300	0.023 273	0.039 219	0.013 237	0.020 157	0.023 133	0.007 38
DCP10	.695	0.600	0.129 13	0.029 317	0.037 284	0.025 282	0.025 189	0.019 198	0.015 124	0.022 136	0.009 46
DCP11	.800	0.447	0.163 357	0.030 337	0.043 282	0.011 238	0.021 208	0.010 220	0.013 140	0.005 189	0.004 168
DCP12	.878	0.502	0.169 348	0.032 1	0.038 252	0.011 308	0.019 201	0.009 185	0.015 122	0.011 59	0.006 249

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.89	0.600	9.90	2.40		1377.1	5
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.043	652.8	708.9	0.31E 07	-0.00026	1.035	11.60	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.947	0.079 25	0.005 133	0.004 343	0.006 236	0.007 136	0.002 354	0.004 163	0.004 137	0.003 9
CM		-0.042	0.037 182	0.005 319	0.003 223	0.002 18	0.000 242	0.001 75	0.001 68	0.002 253	0.002 145
DCP 1	.010	2.530	0.541 358	0.019 116	0.006 258	0.012 161	0.005 51	0.004 314	0.003 228	0.008 137	0.009 179
DCP 2	.050	2.526	0.090 26	0.098 67	0.006 210	0.011 343	0.019 172	0.014 60	0.003 20	0.003 38	0.008 135
DCP 3	.100	2.547	0.344 153	0.090 4	0.027 305	0.024 322	0.042 140	0.020 47	0.026 148	0.013 242	0.016 58
DCP 4	.150	1.967	0.421 170	0.146 262	0.060 322	0.017 32	0.015 144	0.013 353	0.015 134	0.036 241	0.017 256
DCP 5	.200	1.659	0.110 157	0.073 256	0.020 270	0.023 262	0.004 129	0.013 209	0.029 131	0.014 128	0.017 55
DCP 6	.250	1.225	0.061 84	0.014 350	0.034 225	0.025 237	0.001 284	0.006 177	0.006 17	0.013 175	0.019 171
DCP 7	.300	1.094	0.098 22	0.019 135	0.024 191	0.007 235	0.007 143	0.001 308	0.008 210	0.016 149	0.007 74
DCP 8	.500	0.588	0.165 20	0.022 116	0.022 87	0.010 221	0.018 131	0.010 10	0.012 347	0.007 240	0.004 36
DCP 9	.600	0.509	0.168 12	0.011 142	0.017 54	0.006 183	0.017 96	0.004 187	0.019 144	0.026 74	0.015 4
DCP10	.695	0.475	0.149 4	0.028 125	0.020 0	0.006 186	0.009 294	0.009 257	0.011 217	0.006 160	0.005 71
DCP11	.800	0.404	0.160 0	0.022 143	0.019 21	0.014 206	0.013 314	0.017 230	0.013 190	0.011 33	0.012 247
DCP12	.878	0.407	0.156 355	0.017 134	0.005 319	0.004 202	0.008 150	0.013 53	0.011 329	0.010 72	0.016 311

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.92	0.600	12.40	2.41		1377.2	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.043	653.1	707.9	0.31E 07	-0.00090	1.061	13.27	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.993	0.063 32	0.011 146	0.006 61	0.009 306	0.004 143	0.005 306	0.002 275	0.008 331	0.002 89
CM		-0.068	0.023 190	0.002 281	0.003 357	0.003 163	0.001 331	0.003 59	0.001 83	0.002 89	0.001 296
DCP 1	.010	2.965	0.392 357	0.073 97	0.019 10	0.016 276	0.011 237	0.003 95	0.006 124	0.004 217	0.011 31
DCP 2	.050	2.542	0.068 132	0.031 191	0.019 39	0.022 286	0.010 136	0.015 346	0.011 216	0.012 180	0.012 43
DCP 3	.100	2.355	0.236 154	0.057 201	0.021 33	0.011 274	0.004 108	0.017 10	0.016 63	0.047 321	0.009 147
DCP 4	.150	1.657	0.067 141	0.024 278	0.049 0	0.023 317	0.013 338	0.033 337	0.004 338	0.021 192	0.019 46
DCP 5	.200	1.533	0.054 126	0.026 211	0.022 86	0.014 220	0.022 101	0.016 56	0.005 278	0.023 27	0.005 200
DCP 6	.250	1.240	0.075 50	0.008 13	0.033 351	0.016 270	0.006 253	0.024 355	0.009 328	0.012 273	0.004 310
DCP 7	.300	1.135	0.073 39	0.006 71	0.024 50	0.015 276	0.007 36	0.006 109	0.008 245	0.007 27	0.014 296
DCP 8	.500	0.700	0.100 24	0.034 120	0.005 213	0.007 128	0.014 220	0.006 2	0.006 93	0.028 328	0.006 258
DCP 9	.600	0.643	0.103 15	0.032 159	0.026 161	0.008 228	0.011 86	0.013 190	0.008 346	0.007 124	0.013 134
DCP10	.695	0.599	0.101 10	0.015 104	0.017 156	0.014 14	0.012 179	0.005 296	0.002 306	0.013 304	0.004 185
DCP11	.800	0.496	0.093 8	0.006 197	0.017 185	0.024 339	0.007 120	0.021 229	0.006 218	0.017 215	0.014 134
DCP12	.878	0.500	0.097 12	0.015 9	0.009 345	0.028 327	0.007 120	0.030 274	0.012 257	0.018 250	0.013 77

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.92	0.600	14.60	2.41		1377.3	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.043	653.1	704.2	0.30E 07	0.00014	1.085	15.48	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.997	0.053 95	0.028 31	0.006 155	0.009 45	0.004 318	0.008 336	0.006 229	0.005 215	0.006 59
CM		-0.101	0.030 177	0.005 49	0.003 118	0.005 298	0.002 138	0.002 15	0.003 50	0.004 344	0.001 243
DCP 1	.010	3.220	0.188 341	0.086 124	0.017 98	0.007 251	0.006 227	0.008 294	0.006 194	0.008 252	0.008 240
DCP 2	.050	2.147	0.500 151	0.186 30	0.042 135	0.058 343	0.012 155	0.046 8	0.005 342	0.026 330	0.009 87
DCP 3	.100	1.994	0.330 151	0.133 21	0.080 133	0.043 321	0.018 175	0.030 323	0.015 126	0.024 292	0.010 45
DCP 4	.150	1.436	0.215 151	0.080 21	0.016 121	0.032 344	0.011 357	0.028 340	0.019 312	0.038 324	0.012 122
DCP 5	.200	1.396	0.188 139	0.076 32	0.024 139	0.022 348	0.011 173	0.029 346	0.002 39	0.018 260	0.010 265
DCP 6	.250	1.158	0.120 134	0.051 35	0.019 126	0.029 20	0.009 25	0.017 19	0.012 294	0.019 287	0.015 76
DCP 7	.300	1.089	0.111 117	0.052 45	0.009 275	0.003 58	0.004 278	0.016 333	0.002 80	0.006 192	0.007 38
DCP 8	.500	0.789	0.075 30	0.010 338	0.014 178	0.019 47	0.017 334	0.008 62	0.012 203	0.010 230	0.005 34
DCP 9	.600	0.747	0.096 18	0.028 166	0.005 14	0.031 111	0.022 22	0.007 350	0.022 161	0.030 116	0.017 39
DCP10	.695	0.721	0.117 1	0.011 222	0.008 275	0.018 139	0.015 239	0.017 298	0.016 304	0.010 166	0.010 58
DCP11	.800	0.634	0.119 359	0.015 250	0.014 332	0.023 134	0.013 330	0.006 197	0.013 234	0.012 169	0.017 83
DCP12	.878	0.633	0.110 354	0.016 307	0.020 289	0.011 86	0.007 211	0.012 215	0.022 239	0.021 200	0.012 226

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	94.34	0.200	10.00	2.97		1082.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.701	224.6	119.8	0.15E 07	-0.00153	1.210	11.91

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.962	0.222	50	0.009	279	0.009	334	0.001	54	0.006	190	0.001	32	0.007	80	0.012	88	0.012	266
CM		-0.035	0.048	288	0.005	147	0.002	171	0.002	31	0.003	7	0.001	212	0.003	293	0.004	270	0.005	97
DCP 1	.010	2.971	0.988	351	0.037	206	0.026	321	0.025	134	0.015	356	0.031	239	0.011	313	0.027	106	0.025	88
DCP 2	.050	2.657	0.588	4	0.010	177	0.004	23	0.004	299	0.031	277	0.027	157	0.033	84	0.021	86	0.022	104
DCP 3	.100	2.335	0.433	16	0.014	141	0.026	162	0.013	228	0.023	29	0.024	324	0.020	302	0.023	291	0.007	133
DCP 4	.150	2.081	0.435	20	0.024	218	0.015	261	0.025	18	0.009	27	0.002	144	0.012	75	0.031	113	0.005	192
DCP 5	.200	1.663	0.332	31	0.016	223	0.015	314	0.009	60	0.009	140	0.013	19	0.005	352	0.013	20	0.022	238
DCP 6	.250	1.277	0.290	49	0.027	276	0.009	347	0.025	39	0.014	251	0.007	215	0.011	353	0.018	110	0.012	252
DCP 7	.300	1.066	0.267	52	0.019	247	0.011	3	0.010	44	0.018	125	0.007	39	0.006	353	0.003	279	0.021	245
DCP 8	.500	0.773	0.261	87	0.013	125	0.038	327	0.009	315	0.017	201	0.019	165	0.023	84	0.0[illegible]		0.020	316
DCP 9	.600	0.515	0.230	75	0.019	275	0.004	55	0.006	136	0.004	182	0.017	333	0.012	272	0.01[illegible]		0.029	231
DCP10	.695	0.359	0.225	98	0.023	341	0.008	31	0.001	1	0.010	246	0.003	37	0.021	74	0.017	[illegible]	0.027	311
DCP11	.800	0.312	0.132	84	0.032	323	0.015	215	0.021	184	0.017	170	0.007	28	0.019	193	0.003	[illegible]	0.016	257
DCP12	.878	0.357	0.149	93	0.017	323	0.002	343	0.013	215	0.014	166	0.020	339	0.012	146	0.015	[illegible]	0.016	246
DCP13	.953	0.150	0.118	94	0.018	326	0.028	23	0.007	265	0.007	262	0.016	131	0.033	88	0.041	94	0.021	291

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	95.24	0.200	12.47	3.00		1082.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.708	224.6	120.2	0.15E 07	-0.00138	1.424	13.64

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.207	0.201	51	0.014	226	0.012	338	0.013	68	0.008	140	0.014	304	0.010	266	0.008	157	0.009	246
CM		-0.037	0.046	292	0.005	114	0.005	155	0.003	265	0.003	4	0.002	147	0.002	76	0.001	53	0.004	116
DCP 1	.010	4.352	1.042	347	0.084	180	0.038	178	0.043	99	0.044	11	0.075	297	0.072	236	0.056	116	0.055	116
DCP 2	.050	3.506	0.522	2	0.046	148	0.018	165	0.032	216	0.031	129	0.035	175	0.009	81	0.041	103	0.022	43
DCP 3	.100	2.868	0.430	13	0.015	172	0.006	271	0.012	27	0.019	124	0.016	284	0.024	298	0.005	347	0.010	48
DCP 4	.150	2.536	0.398	21	0.062	170	0.022	182	0.035	44	0.018	94	0.032	293	0.035	266	0.014	161	0.023	174
DCP 5	.200	2.011	0.322	38	0.013	255	0.026	331	0.031	24	0.005	243	0.028	299	0.008	293	0.028	194	0.032	191
DCP 6	.250	1.588	0.260	48	0.027	171	0.010	347	0.012	42	0.024	83	0.012	290	0.020	284	0.016	207	0.017	205
DCP 7	.300	1.299	0.268	57	0.017	255	0.020	335	0.020	47	0.002	135	0.013	308	0.010	265	0.014	184	0.034	218
DCP 8	.500	0.927	0.223	91	0.018	219	0.035	29	0.020	76	0.010	108	0.019	317	0.010	265	0.007	84	0.019	255
DCP 9	.600	0.619	0.232	81	0.025	262	0.016	327	0.019	90	0.003	204	0.026	0	0.010	3	0.031	177	0.010	256
DCP10	.695	0.475	0.180	101	0.004	61	0.024	342	0.012	20	0.014	167	0.016	254	0.005	176	0.011	12	0.019	353
DCP11	.800	0.359	0.146	83	0.062	297	0.036	278	0.023	121	0.024	180	0.017	26	0.006	341	0.006	265	0.022	312
DCP12	.878	0.451	0.139	100	0.012	265	0.007	10	0.006	141	0.007	171	0.014	270	0.021	254	0.016	171	0.016	306
DCP13	.953	0.205	0.087	101	0.009	100	0.015	329	0.006	358	0.018	199	0.011	266	0.021	230	0.015	339	0.007	265

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	94.34	0.200	14.73	2.93		1082.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.702	224.6	118.8	0.15E 07	-0.00144	1.572	17.20

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.365	0.212	50	0.026	259	0.007	311	0.012	64	0.009	73	0.002	167	0.006	206	0.006	321	0.003	323
CM		-0.033	0.047	293	0.006	132	0.004	178	0.002	265	0.002	8	0.001	333	0.001	20	0.002	45	0.001	339
DCP 1	.010	5.404	1.230	352	0.161	238	0.071	146	0.065	20	0.076	39	0.061	274	0.054	227	0.071	4	0.020	348
DCP 2	.050	3.954	0.599	1	0.030	147	0.033	218	0.031	28	0.055	41	0.014	243	0.032	207	0.021	10	0.047	324
DCP 3	.100	3.352	0.419	18	0.042	199	0.029	243	0.020	187	0.005	166	0.020	87	0.014	59	0.015	31	0.022	106
DCP 4	.150	2.790	0.402	25	0.054	216	0.016	210	0.032	62	0.036	47	0.013	320	0.015	252	0.021	351	0.007	16
DCP 5	.200	2.304	0.319	40	0.027	233	0.014	347	0.024	68	0.014	137	0.006	92	0.010	81	0.000	106	0.022	248
DCP 6	.250	1.764	0.276	48	0.043	265	0.009	335	0.019	54	0.026	44	0.001	82	0.016	202	0.006	276	0.013	348
DCP 7	.300	1.507	0.262	54	0.031	238	0.008	315	0.014	114	0.016	148	0.015	102	0.006	76	0.009	3	0.006	287
DCP 8	.500	1.000	0.228	67	0.040	275	0.025	288	0.026	40	0.023	32	0.007	226	0.015	241	0.015	294	0.013	353
DCP 9	.600	0.697	0.199	75	0.029	305	0.007	357	0.016	171	0.019	165	0.012	141	0.003	130	0.004	245	0.019	207
DCP10	.695	0.443	0.177	98	0.041	305	0.015	29	0.007	70	0.014	102	0.010	347	0.020	120	0.007	12	0.015	78
DCP11	.800	0.387	0.197	91	0.024	68	0.024	9	0.008	344	0.025	271	0.012	258	0.025	289	0.032	208	0.017	175
DCP12	.878	0.536	0.121	102	0.028	280	0.013	1	0.018	131	0.022	169	0.014	98	0.001	177	0.010	233	0.006	204
DCP13	.953	0.238	0.113	104	0.039	292	0.007	12	0.017	29	0.010	46	0.015	182	0.020	171	0.011	29	0.022	352

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	96.62	0.400	10.00	2.94		1080.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.363	444.0	365.6	0.23E 07	-0.00092	1.327	13.19

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.077	0.216	6	0.016	257	0.005	273	0.006	126	0.008	21	0.002	293	0.003	263	0.002	228	0.001	168
CM		-0.011	0.029	279	0.003	129	0.002	142	0.000	222	0.000	88	0.001	356	0.001	278	0.000	57	0.000	144
DCP 1	.010	4.292	1.615	335	0.184	210	0.063	152	0.026	133	0.029	36	0.022	325	0.044	275	0.014	185	0.026	156
DCP 2	.050	3.504	0.887	339	0.054	262	0.061	233	0.063	149	0.038	44	0.025	308	0.031	236	0.004	216	0.005	101
DCP 3	.100	2.933	0.470	350	0.011	157	0.044	93	0.016	87	0.051	7	0.009	359	0.018	305	0.010	304	0.009	250
DCP 4	.150	2.100	0.424	357	0.008	263	0.014	231	0.007	181	0.009	37	0.008	331	0.008	283	0.002	355	0.005	147
DCP 5	.200	1.808	0.295	3	0.008	234	0.008	270	0.004	4	0.009	9	0.003	57	0.004	292	0.003	147	0.004	187
DCP 6	.250	1.379	0.262	10	0.016	271	0.010	276	0.007	317	0.002	20	0.004	243	0.003	256	0.002	296	0.004	356
DCP 7	.300	1.192	0.217	18	0.009	268	0.008	308	0.001	0	0.005	31	0.002	329	0.003	38	0.003	139	0.002	136
DCP 8	.500	0.622	0.148	38	0.018	275	0.012	335	0.005	133	0.004	11	0.003	184	0.001	51	0.005	233	0.006	115
DCP 9	.600	0.524	0.149	48	0.013	254	0.007	275	0.004	52	0.010	33	0.002	179	0.004	160	0.005	216	0.011	209
DCP10	.695	0.480	0.106	54	0.012	293	0.011	332	0.006	103	0.003	219	0.003	251	0.005	209	0.003	226	0.007	57
DCP11	.800	0.348	0.100	62	0.027	291	0.010	279	0.001	120	0.005	342	0.003	151	0.006	84	0.003	35	0.006	312
DCP12	.878	0.256	0.083	66	0.010	288	0.005	319	0.004	130	0.004	4	0.001	215	0.004	93	0.003	296	0.004	315
DCP13	.953	0.128	0.055	29	0.006	303	0.003	286	0.003	101	0.001	15	0.003	224	0.002	294	0.003	200	0.003	309

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	97.56	0.400	12.46	2.96		1080.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.367	444.0	363.9	0.23E 07	0.00003	1.528	15.56

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.231	0.254	12	0.021	270	0.005	204	0.008	102	0.004	62	0.009	51	0.008	356	0.003	307	0.004	126
CM		-0.019	0.006	8	0.012	243	0.003	104	0.004	274	0.004	55	0.005	267	0.001	182	0.002	182	0.002	203
DCP 1	.010	5.142	1.188	355	0.303	344	0.263	233	0.125	109	0.097	354	0.032	293	0.037	310	0.035	205	0.036	156
DCP 2	.050	3.957	0.900	20	0.477	306	0.292	189	0.108	100	0.097	41	0.084	339	0.060	287	0.034	213	0.041	172
DCP 3	.100	3.198	0.605	22	0.266	258	0.186	100	0.166	328	0.055	161	0.010	119	0.023	82	0.024	346	0.014	180
DCP 4	.150	2.290	0.540	22	0.220	240	0.127	87	0.061	298	0.013	92	0.011	152	0.028	29	0.007	352	0.010	206
DCP 5	.200	2.028	0.429	11	0.167	190	0.134	20	0.070	221	0.041	68	0.007	264	0.009	31	0.006	290	0.014	177
DCP 6	.250	1.543	0.416	9	0.112	192	0.096	19	0.035	237	0.018	128	0.015	31	0.015	29	0.009	228	0.007	101
DCP 7	.300	1.392	0.325	3	0.138	152	0.096	338	0.037	161	0.015	100	0.011	341	0.008	81	0.008	237	0.002	79
DCP 8	.500	0.709	0.177	3	0.082	79	0.050	250	0.015	104	0.006	63	0.006	61	0.012	23	0.007	30	0.014	72
DCP 9	.600	0.638	0.123	13	0.072	52	0.032	223	0.030	115	0.023	304	0.029	123	0.017	322	0.013	95	0.016	264
DCP10	.695	0.523	0.063	13	0.058	17	0.014	197	0.023	139	0.023	312	0.025	125	0.011	332	0.008	34	0.003	170
DCP11	.800	0.414	0.027	32	0.063	355	0.020	183	0.030	64	0.036	229	0.032	51	0.015	138	0.020	293	0.012	54
DCP12	.878	0.363	0.024	116	0.033	316	0.007	82	0.025	42	0.033	198	0.026	25	0.009	118	0.014	250	0.020	2
DCP13	.953	0.172	0.010	84	0.017	303	0.006	191	0.012	333	0.008	97	0.012	114	0.028	306	0.029	27	0.011	92

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	95.24	0.400	14.71	2.99		1080.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.358	444.0	363.8	0.23E 07	0.00178	1.552	17.84

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.198	0.317	13	0.041	231	0.023	44	0.031	203	0.026	358	0.009	241	0.014	106	0.003	12	0.006	327
CM		-0.065	0.054	97	0.028	326	0.016	196	0.013	30	0.011	184	0.003	67	0.005	304	0.002	152	0.001	185
DCP 1	.010	4.595	0.840	54	0.755	29	0.491	298	0.189	173	0.069	324	0.115	196	0.102	79	0.051	1	0.039	307
DCP 2	.050	3.356	1.029	71	0.527	344	0.196	267	0.132	182	0.063	208	0.113	130	0.079	67	0.061	25	0.042	344
DCP 3	.100	2.871	1.021	47	0.407	286	0.152	156	0.070	119	0.028	38	0.055	353	0.045	272	0.032	182	0.022	150
DCP 4	.150	1.976	0.892	42	0.292	272	0.109	201	0.098	118	0.049	40	0.054	347	0.030	310	0.040	224	0.037	156
DCP 5	.200	1.845	0.760	23	0.238	224	0.085	123	0.061	39	0.032	321	0.043	278	0.029	163	0.010	117	0.008	1
DCP 6	.250	1.418	0.705	15	0.194	249	0.140	166	0.076	79	0.059	353	0.021	317	0.019	251	0.037	184	0.016	71
DCP 7	.300	1.304	0.589	2	0.158	195	0.128	101	0.067	325	0.031	300	0.030	232	0.020	120	0.019	71	0.034	307
DCP 8	.500	0.758	0.379	331	0.135	189	0.134	76	0.083	315	0.036	218	0.005	145	0.024	92	0.009	355	0.020	288
DCP 9	.600	0.730	0.293	305	0.108	136	0.104	12	0.114	227	0.062	62	0.018	327	0.011	204	0.016	169	0.008	75
DCP10	.695	0.665	0.187	302	0.113	162	0.134	22	0.128	235	0.070	75	0.015	305	0.006	199	0.017	302	0.028	138
DCP11	.800	0.566	0.114	273	0.076	98	0.088	318	0.100	173	0.099	357	0.029	221	0.025	111	0.012	34	0.015	10
DCP12	.878	0.553	0.085	248	0.066	87	0.065	285	0.082	149	0.084	335	0.031	189	0.031	74	0.015	359	0.007	8
DCP13	.953	0.298	0.044	210	0.045	102	0.053	298	0.067	143	0.054	327	0.006	9	0.043	139	0.020	316	0.018	328

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.M	TEST POINT	CYCLES ANALYZED
	97.09	0.600	9.90	2.95		1379.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.248	653.5	719.4	0.31E 07	-0.00035	1.244	12.64

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.921	0.282 29	0.015 357	0.014 244	0.007 146	0.006 111	0.005 98	0.001 340	0.001 210	0.001 311
CM		-0.040	0.051 190	0.013 79	0.010 56	0.004 3	0.003 317	0.004 282	0.002 156	0.001 0	0.001 149
DCP 1	.010	2.360	0.811 342	0.067 59	0.043 246	0.025 157	0.009 15	0.004 8	0.006 134	0.006 25	0.001 124
DCP 2	.050	2.351	0.280 354	0.095 31	0.027 131	0.017 330	0.000 118	0.010 252	0.003 124	0.008 259	0.008 134
DCP 3	.100	2.485	0.246 91	0.099 34	0.052 115	0.017 106	0.013 134	0.016 10	0.013 168	0.010 224	0.012 82
DCP 4	.150	2.002	0.520 108	0.113 105	0.101 49	0.055 92	0.037 24	0.024 9	0.016 340	0.005 184	0.013 12
DCP 5	.200	1.539	0.483 67	0.108 103	0.062 120	0.005 327	0.006 258	0.013 318	0.014 143	0.004 251	0.003 226
DCP 6	.250	1.296	0.444 39	0.125 48	0.033 341	0.027 89	0.013 39	0.002 93	0.011 214	0.009 24	0.010 275
DCP 7	.300	1.029	0.526 31	0.068 19	0.040 3	0.030 19	0.009 54	0.015 281	0.025 171	0.011 43	0.008 204
DCP 8	.500	0.658	0.366 20	0.039 273	0.052 270	0.013 266	0.011 238	0.020 172	0.009 357	0.008 180	0.006 53
DCP 9	.600	0.546	0.337 17	0.072 261	0.051 238	0.026 219	0.018 144	0.028 141	0.019 28	0.006 247	0.002 61
DCP10	.695	0.467	0.234 14	0.029 257	0.060 255	0.037 182	0.017 150	0.022 98	0.007 71	0.029 353	0.035 245
DCP11	.800	0.338	0.202 9	0.057 267	0.052 207	0.023 157	0.012 120	0.022 78	0.017 315	0.005 157	0.006 347
DCP12	.878	0.318	0.164 356	0.048 257	0.038 196	0.023 149	0.017 99	0.019 39	0.019 307	0.024 177	0.022 43

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.M	TEST POINT	CYCLES ANALYZED
	97.09	0.600	12.40	2.86		1379.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.248	653.5	717.8	0.31E 07	-0.00084	1.245	13.02

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.974	0.268 54	0.010 172	0.013 91	0.007 244	0.003 22	0.004 84	0.009 266	0.004 226	0.003 255
CM		-0.071	0.069 202	0.001 283	0.011 225	0.003 45	0.001 258	0.004 297	0.002 57	0.003 325	0.001 216
DCP 1	.010	2.816	0.632 356	0.137 99	0.007 26	0.011 109	0.003 155	0.006 344	0.005 299	0.004 306	0.003 226
DCP 2	.050	2.357	0.201 112	0.088 33	0.051 203	0.028 131	0.017 30	0.050 356	0.045 287	0.018 277	0.008 295
DCP 3	.100	2.176	0.503 135	0.102 322	0.020 183	0.024 358	0.046 334	0.034 340	0.026 286	0.035 312	0.020 269
DCP 4	.150	1.731	0.397 114	0.133 244	0.034 226	0.017 11	0.013 307	0.018 37	0.018 239	0.033 294	0.010 244
DCP 5	.200	1.446	0.414 99	0.101 226	0.055 208	0.017 257	0.017 188	0.020 255	0.018 89	0.014 200	0.010 11
DCP 6	.250	1.332	0.385 80	0.058 182	0.060 220	0.013 351	0.013 221	0.005 253	0.019 116	0.007 177	0.009 182
DCP 7	.300	1.075	0.422 67	0.059 165	0.044 190	0.027 271	0.003 203	0.008 289	0.013 352	0.005 244	0.011 259
DCP 8	.500	0.774	0.414 39	0.047 101	0.040 83	0.009 191	0.002 310	0.017 173	0.030 267	0.011 213	0.019 214
DCP 9	.600	0.660	0.366 31	0.014 105	0.062 72	0.026 246	0.023 107	0.031 161	0.016 82	0.017 4	0.012 128
DCP10	.695	0.581	0.315 29	0.006 1	0.044 71	0.014 138	0.012 66	0.020 96	0.015 173	0.012 113	0.020 90
DCP11	.800	0.471	0.264 18	0.009 251	0.060 25	0.026 222	0.008 66	0.015 102	0.012 234	0.029 190	0.015 56
DCP12	.878	0.469	0.235 13	0.018 336	0.051 13	0.006 324	0.012 311	0.024 45	0.025 262	0.018 118	0.025 336

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	97.09	0.600	14.60	2.87		1079.3	10
K	**V**	**Q**	**RN**	**DAMPING**	**CN(MAX)**	**ALPHA(STALL)**	
0.248	653.5	719.7	0.31E 07	-0.00120	1.273	15.23	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.992	0.271	64	0.015	288	0.007	92	0.006	191	0.009	34	0.005	282	0.003	39	0.006	278	0.007	242
CM		-0.092	0.067	212	0.009	34	0.007	255	0.004	11	0.005	206	0.003	319	0.002	227	0.001	128	0.001	61
DCP 1	.010	2.814	0.159	87	0.337	66	0.104	275	0.059	117	0.043	0	0.027	243	0.009	325	0.020	243	0.008	181
DCP 2	.050	2.275	0.395	134	0.192	27	0.049	259	0.050	50	0.022	315	0.026	347	0.018	253	0.028	320	0.041	242
DCP 3	.100	2.060	0.432	119	0.127	330	0.018	74	0.043	7	0.044	280	0.062	346	0.029	216	0.041	264	0.032	240
DCP 4	.150	1.524	0.352	101	0.058	311	0.025	6	0.036	28	0.017	257	0.038	312	0.015	273	0.016	271	0.008	271
DCP 5	.200	1.438	0.376	83	0.070	281	0.007	261	0.035	255	0.050	170	0.039	276	0.019	192	0.017	193	0.020	182
DCP 6	.250	1.320	0.390	76	0.043	275	0.019	215	0.017	353	0.012	73	0.012	341	0.014	332	0.016	307	0.015	331
DCP 7	.300	1.088	0.355	69	0.062	245	0.026	175	0.020	232	0.045	136	0.024	236	0.010	74	0.021	148	0.025	110
DCP 8	.500	0.811	0.355	51	0.042	204	0.011	228	0.033	214	0.027	36	0.014	183	0.016	47	0.017	2	0.029	315
DCP 9	.600	0.710	0.370	45	0.024	205	0.049	85	0.005	229	0.041	10	0.019	4	0.013	328	0.015	10	0.021	323
DCP10	.695	0.664	0.288	39	0.046	220	0.021	142	0.032	167	0.019	344	0.027	177	0.017	192	0.017	197	0.034	194
DCP11	.800	0.570	0.271	35	0.010	222	0.040	65	0.021	157	0.015	68	0.021	111	0.020	73	0.007	7	0.002	63
DCP12	.878	0.571	0.243	28	0.007	331	0.043	41	0.003	169	0.022	358	0.006	34	0.016	12	0.020	263	0.015	203

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.60	0.200	0.01	4.93		1152.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.123	224.5	120.1	0.15E 07	-0.00188	0.457	4.99

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		-0.036	0.449 352	0.062 176	0.011 209	0.008 119	0.009 195	0.007 68	0.010 21	0.011 292	0.008 300
CM		-0.043	0.018 285	0.001 339	0.003 192	0.002 207	0.001 166	0.004 228	0.004 215	0.003 132	0.002 147
DCP 1	.010	-2.491	2.374 351	0.871 194	0.468 258	0.198 339	0.090 95	0.118 194	0.092 297	0.041 34	0.037 118
DCP 2	.050	-0.775	1.690 345	0.110 142	0.107 119	0.077 137	0.034 213	0.011 158	0.015 167	0.019 203	0.036 277
DCP 3	.100	-0.084	1.302 344	0.128 94	0.120 120	0.107 158	0.083 217	0.032 325	0.022 78	0.013 238	0.027 280
DCP 4	.150	0.118	0.841 342	0.052 206	0.020 109	0.038 142	0.028 180	0.012 218	0.005 7	0.019 226	0.007 232
DCP 5	.200	-0.002	0.661 350	0.085 155	0.025 167	0.020 161	0.016 191	0.012 46	0.009 18	0.016 310	0.010 331
DCP 6	.250	0.019	0.495 351	0.083 198	0.032 255	0.009 37	0.004 78	0.010 138	0.005 331	0.014 254	0.011 227
DCP 7	.300	0.081	0.449 353	0.070 181	0.015 230	0.007 174	0.010 255	0.020 48	0.006 36	0.019 290	0.011 341
DCP 8	.500	0.035	0.268 4	0.056 195	0.015 237	0.004 206	0.001 190	0.009 152	0.005 332	0.010 252	0.010 245
DCP 9	.600	0.096	0.731 4	0.039 140	0.012 176	0.016 66	0.008 167	0.026 64	0.022 51	0.028 330	0.020 339
DCP10	.695	0.266	0.152 19	0.039 192	0.010 46	0.010 22	0.010 27	0.009 10	0.012 33	0.006 258	0.006 282
DCP11	.800	0.052	0.113 19	0.022 104	0.016 0	0.005 12	0.012 212	0.023 48	0.025 30	0.017 331	0.014 330
DCP12	.953	0.006	0.069 17	0.024 213	0.009 340	0.008 65	0.004 20	0.010 41	0.009 13	0.008 353	0.001 130

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.16	0.200	7.38	5.01		1152.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.120	224.6	120.5	0.15E 07	-0.00137	1.157	12.47

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.727	0.437 353	0.040 123	0.005 192	0.004 313	0.008 214	0.003 200	0.005 126	0.006 16	0.003 340
CM		-0.043	0.014 291	0.004 261	0.001 160	0.001 143	0.001 77	0.001 68	0.000 359	0.002 176	0.000 231
DCP 1	.010	1.836	2.650 347	0.224 122	0.037 177	0.014 106	0.018 197	0.023 134	0.039 118	0.017 72	0.011 195
DCP 2	.050	1.813	1.585 348	0.155 119	0.023 130	0.013 62	0.010 147	0.019 345	0.033 136	0.004 29	0.017 278
DCP 3	.100	1.911	1.130 348	0.071 158	0.031 212	0.019 302	0.042 237	0.027 158	0.009 282	0.022 91	0.024 11
DCP 4	.150	1.604	0.744 351	0.077 120	0.023 142	0.016 83	0.019 112	0.006 30	0.021 89	0.012 353	0.005 99
DCP 5	.200	0.988	0.617 350	0.057 195	0.008 237	0.026 238	0.024 235	0.011 192	0.014 231	0.003 17	0.001 4
DCP 6	.250	0.905	0.526 353	0.063 104	0.007 148	0.013 58	0.007 82	0.011 324	0.018 98	0.007 336	0.003 259
DCP 7	.300	0.820	0.461 354	0.029 198	0.011 239	0.018 257	0.017 193	0.011 172	0.010 338	0.004 219	0.004 48
DCP 8	.500	0.473	0.268 1	0.051 97	0.003 12	0.015 58	0.004 259	0.008 355	0.014 120	0.011 343	0.007 286
DCP 9	.600	0.521	0.193 2	0.027 211	0.001 17	0.024 282	0.013 230	0.019 192	0.016 243	0.009 73	0.007 282
DCP10	.695	0.514	0.157 9	0.061 80	0.004 188	0.009 42	0.010 225	0.014 302	0.016 103	0.012 59	0.006 30
DCP11	.800	0.323	0.095 16	0.011 204	0.010 263	0.018 274	0.006 172	0.012 179	0.008 323	0.008 350	0.007 45
DCP12	.953	0.121	0.074 9	0.050 92	0.010 72	0.012 75	0.008 334	0.007 10	0.008 169	0.019 340	0.003 165

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.27	0.200	9.77	5.04		1152.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.121	224.6	120.1	0.15E 07	-0.00158	1.379	15.00

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.938	0.421 355	0.024 225	0.004 229	0.005 86	0.010 147	0.006 359	0.005 169	0.002 359	0.001 81
CM		-0.040	0.014 280	0.006 89	0.001 184	0.000 228	0.002 300	0.001 187	0.001 351	0.001 150	0.000 49
DCP 1	.010	3.203	2.512 349	0.117 182	0.045 181	0.020 117	0.038 213	0.018 309	0.014 252	0.026 102	0.013 80
DCP 2	.050	2.528	1.462 349	0.066 186	0.004 151	0.028 77	0.017 212	0.006 79	0.017 250	0.026 141	0.012 39
DCP 3	.100	2.543	1.081 349	0.030 149	0.014 179	0.007 23	0.037 119	0.014 344	0.025 88	0.018 352	0.006 357
DCP 4	.150	1.927	0.726 352	0.061 220	0.017 253	0.018 146	0.007 228	0.015 342	0.007 258	0.005 90	0.007 100
DCP 5	.200	1.250	0.607 352	0.016 139	0.009 262	0.008 116	0.018 149	0.001 84	0.008 93	0.010 334	0.002 260
DCP 6	.250	1.155	0.513 356	0.038 203	0.015 226	0.012 65	0.010 135	0.003 7	0.003 160	0.011 162	0.010 97
DCP 7	.300	1.052	0.443 355	0.010 195	0.009 321	0.002 202	0.008 133	0.005 60	0.005 117	0.009 331	0.002 334
DCP 8	.500	0.589	0.258 4	0.044 247	0.007 241	0.003 312	0.007 155	0.011 327	0.014 226	0.004 350	0.013 195
DCP 9	.600	0.557	0.197 9	0.021 308	0.009 158	0.011 97	0.024 156	0.013 15	0.019 142	0.003 330	0.011 18
DCP10	.695	0.573	0.148 13	0.033 243	0.003 301	0.009 16	0.008 110	0.003 37	0.010 163	0.009 252	0.004 156
DCP11	.800	0.425	0.103 20	0.004 328	0.008 57	0.002 231	0.002 129	0.006 32	0.006 104	0.009 17	0.010 322
DCP12	.953	0.144	0.086 3	0.046 248	0.004 303	0.008 91	0.010 105	0.006 343	0.006 266	0.001 51	0.005 128

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.21	0.200	12.32	4.99		1152.4	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.121	224.6	120.1	0.15E 07	-0.00149	1.591	17.53

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		1.152	0.387 3	0.040 275	0.014 137	0.002 148	0.009 77	0.002 3	0.012 76	0.003 92	0.003 81
CM		-0.038	0.015 279	0.007 87	0.003 226	0.001 53	0.002 222	0.001 229	0.003 256	0.002 103	0.001 145
DCP 1	.010	4.653	2.553 352	0.236 241	0.135 145	0.059 96	0.062 87	0.012 62	0.044 85	0.024 86	0.017 92
DCP 2	.050	3.281	1.339 354	0.061 269	0.052 160	0.022 124	0.024 103	0.014 155	0.038 90	0.012 102	0.025 102
DCP 3	.100	3.133	0.941 349	0.054 281	0.005 337	0.016 334	0.016 84	0.030 263	0.038 346	0.048 94	0.027 146
DCP 4	.150	2.195	0.667 0	0.072 307	0.041 180	0.018 139	0.015 136	0.005 72	0.009 56	0.009 99	0.002 194
DCP 5	.200	1.565	0.519 2	0.029 353	0.013 272	0.006 102	0.004 13	0.003 324	0.004 103	0.006 176	0.008 16
DCP 6	.250	1.403	0.430 7	0.052 303	0.035 183	0.011 177	0.001 316	0.003 157	0.011 42	0.010 97	0.001 206
DCP 7	.300	1.259	0.394 10	0.033 317	0.016 189	0.012 34	0.005 309	0.006 316	0.013 116	0.005 182	0.004 43
DCP 8	.500	0.707	0.244 19	0.061 286	0.031 125	0.009 337	0.019 107	0.010 23	0.014 93	0.013 354	0.006 82
DCP 9	.600	0.639	0.180 21	0.048 262	0.024 71	0.024 262	0.017 93	0.011 353	0.016 111	0.010 229	0.011 30
DCP10	.695	0.649	0.148 21	0.055 271	0.020 81	0.014 212	0.017 21	0.003 263	0.012 125	0.013 76	0.004 287
DCP11	.800	0.492	0.100 17	0.027 208	0.019 10	0.006 236	0.010 12	0.002 122	0.014 39	0.016 231	0.005 34
DCP12	.953	0.194	0.102 351	0.023 281	0.008 215	0.016 113	0.005 68	0.010 91	0.019 55	0.009 337	0.008 242

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.43	0.200	15.02	5.01		1151.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.122	224.5	119.0	0.15E 07	0.00417	1.893	19.83

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.324	0.478	30	0.130	254	0.066	109	0.036	345	0.037	221	0.034	96	0.018	321	0.019	195	0.007	42
CM		-0.078	0.059	144	0.054	5	0.031	240	0.020	133	0.016	18	0.012	249	0.008	125	0.007	22	0.002	234
DCP 1	.010	4.877	2.302	33	0.664	331	0.341	233	0.161	135	0.040	19	0.052	165	0.031	97	0.021	39	0.023	279
DCP 2	.050	3.265	1.246	54	0.564	348	0.398	231	0.262	123	0.156	15	0.099	264	0.072	148	0.056	40	0.034	324
DCP 3	.100	2.627	1.025	64	0.531	337	0.238	223	0.118	121	0.003	285	0.029	47	0.070	248	0.064	152	0.027	16
DCP 4	.150	2.475	0.811	63	0.318	327	0.124	185	0.028	31	0.035	151	0.017	77	0.010	30	0.007	205	0.021	135
DCP 5	.200	1.958	0.674	49	0.242	286	0.137	118	0.067	315	0.032	207	0.031	121	0.025	8	0.026	218	0.020	95
DCP 6	.250	1.631	0.637	45	0.235	273	0.145	120	0.057	11	0.032	294	0.047	144	0.036	47	0.011	170	0.016	49
DCP 7	.300	1.511	0.614	29	0.284	245	0.177	101	0.074	339	0.064	259	0.063	135	0.024	345	0.013	150	0.011	4
DCP 8	.500	1.099	0.494	10	0.313	217	0.178	89	0.093	353	0.089	242	0.057	115	0.028	29	0.031	271	0.022	208
DCP 9	.600	0.978	0.369	7	0.222	204	0.136	74	0.092	337	0.091	222	0.078	97	0.051	346	0.054	229	0.021	90
DCP10	.695	0.816	0.308	353	0.214	191	0.125	61	0.082	316	0.088	194	0.069	64	0.044	311	0.052	204	0.016	51
DCP11	.800	0.484	0.223	344	0.145	178	0.076	40	0.071	303	0.075	189	0.057	59	0.058	292	0.054	162	0.032	38
DCP12	.953	0.275	0.169	322	0.086	148	0.032	22	0.040	257	0.039	106	0.032	356	0.029	224	0.005	25	0.011	266

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.42	0.200	17.60	4.96		1151.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.122	224.6	118.9	0.15E 07	0.00267	2.138	22.40

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.359	0.515	52	0.097	311	0.064	246	0.082	157	0.073	66	0.065	308	0.033	215	0.020	135	0.015	61
CM		-0.109	0.108	163	0.056	65	0.041	5	0.036	281	0.028	191	0.022	92	0.010	2	0.004	286	0.004	237
DCP 1	.010	4.542	2.078	92	1.266	62	0.767	352	0.454	259	0.340	149	0.160	37	0.040	301	0.016	0	0.034	252
DCP 2	.050	3.091	1.453	101	0.677	42	0.361	345	0.277	267	0.208	185	0.041	171	0.060	159	0.081	76	0.032	9
DCP 3	.100	2.592	1.266	96	0.421	32	0.138	353	0.147	267	0.064	142	0.076	310	0.084	209	0.088	128	0.060	52
DCP 4	.150	2.402	0.955	88	0.183	0	0.080	0	0.104	220	0.093	105	0.057	326	0.021	240	0.023	174	0.034	77
DCP 5	.200	1.925	0.800	73	0.169	322	0.064	293	0.143	193	0.124	83	0.081	339	0.038	273	0.022	172	0.005	71
DCP 6	.250	1.625	0.743	63	0.176	300	0.102	287	0.159	178	0.098	96	0.068	8	0.024	272	0.000	248	0.004	62
DCP 7	.300	1.531	0.732	49	0.198	298	0.146	271	0.180	177	0.119	96	0.085	3	0.025	299	0.015	254	0.021	237
DCP 8	.500	1.154	0.615	25	0.246	268	0.186	225	0.180	143	0.150	81	0.116	336	0.062	278	0.049	216	0.037	157
DCP 9	.600	1.116	0.537	14	0.213	258	0.195	212	0.165	125	0.154	38	0.124	302	0.064	235	0.060	153	0.028	94
DCP10	.695	0.904	0.426	3	0.205	253	0.163	192	0.160	105	0.162	21	0.144	282	0.104	200	0.071	124	0.062	56
DCP11	.800	0.634	0.341	353	0.126	239	0.120	171	0.118	92	0.136	0	0.104	259	0.059	165	0.034	114	0.050	40
DCP12	.953	0.338	0.243	340	0.085	239	0.094	144	0.083	56	0.074	299	0.080	211	0.063	119	0.066	6	0.034	273

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.35	0.200	24.69	4.95		1151.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.122	224.6	119.3	0.15E 07	-0.00324	1.353	29.52

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.129	0.209	65	0.080	251	0.022	81	0.029	159	0.023	85	0.014	326	0.007	291	0.023	100	0.000	80
CM		-0.178	0.048	214	0.010	46	0.001	265	0.004	313	0.004	240	0.002	160	0.001	34	0.007	244	0.000	265
DCP 1	.010	2.761	1.971	134	0.173	263	0.302	79	0.121	210	0.047	56	0.093	175	0.025	3	0.016	101	0.042	316
DCP 2	.050	1.692	0.600	143	0.353	247	0.079	54	0.122	169	0.031	73	0.045	5	0.034	283	0.012	194	0.014	141
DCP 3	.100	1.440	0.184	53	0.170	285	0.038	37	0.082	133	0.043	158	0.057	335	0.025	18	0.053	137	0.017	99
DCP 4	.150	1.541	0.258	31	0.073	252	0.020	233	0.027	171	0.041	107	0.030	356	0.013	308	0.016	215	0.013	262
DCP 5	.200	1.427	0.243	35	0.053	276	0.026	161	0.012	180	0.033	104	0.016	315	0.020	282	0.036	140	0.012	43
DCP 6	.250	1.202	0.247	35	0.067	246	0.020	192	0.017	160	0.038	101	0.034	338	0.004	275	0.010	197	0.004	93
DCP 7	.300	1.268	0.247	41	0.053	267	0.023	123	0.017	175	0.028	103	0.017	289	0.008	285	0.043	120	0.012	10
DCP 8	.500	1.115	0.237	49	0.091	249	0.013	99	0.023	158	0.029	62	0.022	281	0.019	253	0.027	112	0.022	220
DCP 9	.600	1.089	0.226	51	0.063	255	0.030	69	0.019	130	0.018	79	0.018	23	0.009	17	0.046	89	0.006	171
DCP10	.695	1.068	0.223	55	0.080	232	0.026	58	0.036	150	0.016	36	0.029	293	0.012	262	0.034	48	0.001	254
DCP11	.800	0.893	0.196	61	0.046	236	0.023	53	0.022	139	0.017	57	0.010	30	0.003	189	0.037	65	0.015	88
DCP12	.953	0.490	0.129	52	0.043	217	0.012	197	0.016	153	0.022	81	0.011	71	0.007	85	0.010	9	0.013	337

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.69	0.400	-0.07	4.89		1153.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.063	443.9	364.4	0.23E 07	-0.00105	0.438	4.82

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		-0.112	0.521	352	0.067	179	0.018	201	0.008	181	0.009	175	0.005	173	0.007	191	0.002	270	0.005	133
CM		-0.017	0.010	291	0.002	197	0.002	302	0.001	63	0.000	64	0.001	228	0.000	11	0.001	145	0.001	334
DCP 1	.010	-1.652	1.946	347	1.001	227	0.211	314	0.202	179	0.173	268	0.037	82	0.102	220	0.072	334	0.050	126
DCP 2	.050	-0.532	1.850	348	0.210	182	0.070	300	0.103	64	0.072	151	0.005	283	0.047	108	0.046	175	0.036	133
DCP 3	.100	-0.312	1.652	351	0.195	122	0.053	187	0.069	58	0.102	137	0.063	216	0.017	108	0.046	170	0.022	2
DCP 4	.150	-0.200	1.144	348	0.164	118	0.115	173	0.032	247	0.031	135	0.041	220	0.024	312	0.008	90	0.008	21
DCP 5	.200	0.045	0.898	355	0.154	120	0.088	182	0.044	240	0.022	95	0.026	204	0.020	282	0.021	15	0.016	134
DCP 6	.250	-0.134	0.655	350	0.068	145	0.060	161	0.040	231	0.015	306	0.011	113	0.011	240	0.006	15	0.013	125
DCP 7	.300	-0.118	0.536	356	0.081	171	0.041	188	0.029	250	0.016	344	0.018	103	0.018	183	0.005	303	0.009	113
DCP 8	.500	-0.047	0.287	356	0.055	211	0.005	269	0.010	171	0.008	232	0.004	56	0.006	173	0.005	256	0.006	132
DCP 9	.600	-0.027	0.231	359	0.034	201	0.001	15	0.006	154	0.009	187	0.001	15	0.008	178	0.008	336	0.002	69
DCP10	.695	0.060	0.165	0	0.026	203	0.002	160	0.007	142	0.007	198	0.005	27	0.002	214	0.003	229	0.006	153
DCP11	.800	0.070	0.120	7	0.016	181	0.001	167	0.001	130	0.007	178	0.003	132	0.004	151	0.005	342	0.004	89
DCP12	.953	-0.074	0.087	0	0.004	141	0.008	159	0.002	187	0.004	127	0.001	226	0.003	270	0.002	306	0.003	192

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.34	0.400	7.38	4.97		1153.2	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.061	443.9	362.9	0.23E 07	-0.00112	1.278	12.59	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.739	0.533 352	0.030 150	0.008 192	0.006 117	0.001 259	0.003 214	0.005 198	0.003 152	0.001 91
CM		-0.007	0.014 312	0.003 222	0.001 119	0.001 357	0.000 168	0.001 41	0.000 355	0.001 134	0.000 323
DCP 1	.010	2.790	3.349 348	0.239 186	0.133 139	0.040 41	0.014 210	0.005 157	0.010 189	0.025 138	0.016 22
DCP 2	.050	2.481	2.048 348	0.143 195	0.057 162	0.023 92	0.005 97	0.011 281	0.013 209	0.017 127	0.008 314
DCP 3	.100	2.063	1.374 350	0.095 120	0.018 251	0.027 68	0.021 276	0.007 204	0.028 234	0.022 157	0.014 87
DCP 4	.150	1.617	0.879 350	0.051 149	0.019 199	0.020 201	0.007 162	0.015 212	0.004 184	0.013 174	0.007 282
DCP 5	.200	1.191	0.724 351	0.043 148	0.013 286	0.008 144	0.002 296	0.009 63	0.008 160	0.001 10	0.005 118
DCP 6	.250	0.950	0.612 352	0.036 138	0.008 225	0.007 156	0.004 194	0.003 252	0.002 239	0.004 135	0.002 256
DCP 7	.300	0.683	0.548 353	0.035 133	0.007 227	0.009 119	0.002 136	0.006 177	0.007 176	0.001 139	0.004 87
DCP 8	.500	0.468	0.315 356	0.020 120	0.007 240	0.005 137	0.001 313	0.004 256	0.003 156	0.002 175	0.002 219
DCP 9	.600	0.368	0.240 358	0.020 109	0.005 252	0.011 126	0.002 31	0.005 157	0.007 201	0.007 349	0.003 134
DCP 10	.695	0.359	0.170 1	0.009 98	0.003 193	0.003 194	0.004 270	0.003 249	0.003 141	0.003 170	0.002 139
DCP 11	.800	0.256	0.111 5	0.007 108	0.003 246	0.003 131	0.001 287	0.004 220	0.004 185	0.001 287	0.003 113
DCP 12	.953	0.057	0.085 2	0.006 201	0.002 233	0.002 211	0.003 1	0.002 246	0.003 258	0.002 277	0.001 314

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.57	0.400	9.72	4.99		1153.3	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.062	443.9	364.1	0.23E 07	-0.00042	1.410	14.36	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.925	0.432 2	0.060 15	0.047 229	0.018 103	0.005 260	0.008 142	0.005 88	0.005 291	0.002 138
CM		-0.007	0.004 285	0.009 27	0.009 272	0.006 157	0.003 30	0.002 238	0.002 78	0.000 336	0.001 171
DCP 1	.010	4.037	2.899 356	0.202 354	0.214 232	0.048 133	0.045 219	0.068 151	0.049 72	0.013 330	0.013 173
DCP 2	.050	3.205	1.777 0	0.339 354	0.330 245	0.186 148	0.072 51	0.029 220	0.040 73	0.048 338	0.348 210
DCP 3	.100	2.551	0.997 359	0.213 45	0.097 235	0.036 114	0.020 139	0.013 164	0.035 112	0.001 205	0.032 100
DCP 4	.150	1.871	0.619 3	0.153 26	0.112 259	0.060 122	0.039 347	0.009 198	0.025 111	0.012 306	0.011 148
DCP 5	.200	1.399	0.528 3	0.139 33	0.087 244	0.044 124	0.022 335	0.016 192	0.007 84	0.007 276	0.004 122
DCP 6	.250	1.145	0.424 8	0.131 25	0.090 242	0.051 116	0.026 335	0.019 190	0.007 62	0.009 249	0.008 107
DCP 7	.300	0.857	0.399 7	0.097 23	0.068 237	0.036 107	0.019 309	0.013 154	0.005 20	0.007 233	0.007 35
DCP 8	.500	0.562	0.239 11	0.046 14	0.032 209	0.019 44	0.015 227	0.014 86	0.007 297	0.005 99	0.009 324
DCP 9	.600	0.451	0.202 10	0.018 338	0.028 148	0.029 4	0.027 213	0.011 96	0.008 265	0.005 199	0.003 37
DCP 10	.695	0.422	0.160 7	0.011 262	0.019 130	0.020 349	0.011 197	0.004 34	0.006 213	0.006 5	0.007 304
DCP 11	.800	0.341	0.135 0	0.036 216	0.030 99	0.023 321	0.014 184	0.005 59	0.005 190	0.007 320	0.002 217
DCP 12	.953	0.101	0.136 351	0.044 209	0.022 94	0.008 316	0.003 235	0.003 110	0.003 48	0.005 233	0.006 113

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.56	0.400	12.28	4.88		1153.4	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.062	443.9	364.6	0.23E 07	-0.00016	1.467	15.19	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.981	0.250 54	0.168 33	0.037 318	0.029 279	0.009 236	0.015 190	0.007 73	0.004 52	0.006 324
CM		-0.029	0.045 177	0.030 82	0.015 51	0.017 354	0.010 288	0.007 259	0.006 191	0.005 141	0.005 94
DCP 1	.010	4.427	1.272 28	0.836 56	0.194 27	0.186 13	0.163 341	0.124 298	0.104 257	0.097 207	0.082 165
DCP 2	.050	3.173	0.569 67	0.832 66	0.325 34	0.328 6	0.294 321	0.214 270	0.155 237	0.138 189	0.096 139
DCP 3	.100	2.504	0.495 116	0.640 62	0.190 8	0.181 314	0.116 278	0.107 223	0.055 170	0.093 110	0.076 61
DCP 4	.150	1.740	0.447 107	0.494 45	0.099 328	0.105 314	0.092 245	0.067 187	0.046 136	0.038 83	0.033 31
DCP 5	.200	1.368	0.417 97	0.387 32	0.080 306	0.099 297	0.092 217	0.060 168	0.055 118	0.050 59	0.041 11
DCP 6	.250	1.158	0.370 83	0.294 20	0.055 299	0.097 284	0.079 195	0.044 152	0.053 100	0.037 33	0.026 347
DCP 7	.300	0.902	0.345 71	0.245 13	0.058 289	0.089 267	0.075 180	0.046 148	0.057 89	0.042 23	0.037 339
DCP 8	.500	0.643	0.255 44	0.111 338	0.039 257	0.063 213	0.043 116	0.025 108	0.039 31	0.028 320	0.025 279
DCP 9	.600	0.526	0.229 31	0.068 317	0.041 251	0.056 184	0.039 80	0.011 99	0.023 357	0.006 23	0.018 292
DCP10	.695	0.527	0.214 13	0.058 288	0.044 247	0.057 169	0.033 75	0.020 60	0.025 335	0.023 272	0.019 227
DCP11	.800	0.451	0.203 5	0.057 269	0.045 247	0.052 166	0.026 90	0.022 69	0.021 337	0.009 313	0.018 259
DCP12	.953	0.171	0.203 346	0.038 246	0.032 234	0.025 128	0.004 36	0.003 32	0.005 328	0.005 256	0.006 266

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.33	0.400	14.94	4.91		1150.1	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.061	443.7	363.9	0.23E 07	-0.00144	1.580	15.93	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		1.127	0.273 100	0.099 62	0.068 86	0.025 32	0.006 22	0.012 343	0.008 276	0.010 300	0.008 238
CM		-0.054	0.061 188	0.021 140	0.022 143	0.014 116	0.011 85	0.008 77	0.006 38	0.006 51	0.005 6
DCP 1	.010	5.028	0.801 88	0.502 98	0.415 136	0.212 132	0.178 137	0.130 117	0.100 107	0.088 94	0.070 50
DCP 2	.050	3.376	0.923 138	0.559 107	0.475 136	0.321 120	0.253 123	0.193 99	0.119 102	0.113 77	0.061 66
DCP 3	.100	2.397	0.995 149	0.425 88	0.231 123	0.184 85	0.087 68	0.087 45	0.089 18	0.070 14	0.056 351
DCP 4	.150	1.902	0.768 138	0.230 73	0.240 111	0.118 46	0.080 58	0.081 13	0.049 352	0.049 339	0.036 316
DCP 5	.200	1.577	0.598 128	0.171 61	0.186 96	0.100 22	0.068 32	0.070 350	0.052 327	0.053 317	0.045 283
DCP 6	.250	1.346	0.484 115	0.116 56	0.175 78	0.061 7	0.080 19	0.048 330	0.058 322	0.033 295	0.039 279
DCP 7	.300	1.117	0.409 102	0.105 41	0.138 65	0.062 350	0.064 357	0.045 315	0.049 297	0.040 295	0.037 254
DCP 8	.500	0.798	0.273 69	0.069 14	0.089 21	0.046 312	0.052 297	0.033 284	0.041 245	0.028 256	0.033 237
DCP 9	.600	0.710	0.235 53	0.060 342	0.075 355	0.040 306	0.054 274	0.031 254	0.037 220	0.019 240	0.030 185
DCP10	.695	0.645	0.213 32	0.063 1	0.061 325	0.042 306	0.045 241	0.028 258	0.030 194	0.021 217	0.020 157
DCP11	.800	0.522	0.203 17	0.056 346	0.057 309	0.032 300	0.035 236	0.024 258	0.026 188	0.015 220	0.013 157
DCP12	.953	0.277	0.201 357	0.048 352	0.036 280	0.021 277	0.022 193	0.015 172	0.013 75	0.005 156	0.006 32

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.29	0.400	17.51	4.92		1150.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.061	443.9	362.5	0.23E 07	-0.00232	1.557	15.73

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.126	0.298	124	0.095	195	0.035	135	0.028	188	0.008	175	0.012	207	0.004	231	0.007	225	0.007	242
CM		-0.071	0.066	201	0.025	243	0.018	250	0.015	284	0.011	276	0.009	300	0.005	314	0.004	323	0.004	1
DCP 1	.010	5.335	0.983	134	0.455	212	0.122	253	0.157	276	0.096	329	0.076	329	0.078	5	0.058	21	0.044	36
DCP 2	.050	3.202	1.419	165	0.489	221	0.326	253	0.357	279	0.235	316	0.194	324	0.157	359	0.079	22	0.079	39
DCP 3	.100	2.177	1.211	164	0.339	233	0.201	197	0.163	253	0.099	247	0.106	282	0.060	295	0.064	312	0.043	355
DCP 4	.150	1.765	0.802	151	0.291	224	0.130	163	0.144	219	0.049	227	0.077	240	0.041	274	0.049	271	0.044	305
DCP 5	.200	1.459	0.622	139	0.256	211	0.090	143	0.129	193	0.055	215	0.058	215	0.047	251	0.040	254	0.037	287
DCP 6	.250	1.297	0.480	128	0.205	201	0.076	127	0.114	176	0.051	204	0.053	197	0.046	224	0.041	246	0.038	259
DCP 7	.300	1.094	0.413	115	0.183	184	0.075	121	0.111	153	0.066	186	0.050	179	0.053	201	0.038	221	0.031	233
DCP 8	.500	0.811	0.266	80	0.076	146	0.055	80	0.064	105	0.043	120	0.029	141	0.023	129	0.025	172	0.021	202
DCP 9	.600	0.757	0.238	63	0.076	118	0.064	75	0.059	87	0.047	105	0.028	117	0.019	113	0.018	146	0.016	166
DCP 10	.695	0.698	0.205	46	0.062	75	0.060	76	0.036	74	0.041	77	0.026	122	0.014	133	0.016	127	0.021	176
DCP 11	.800	0.602	0.190	32	0.072	67	0.045	73	0.028	59	0.028	79	0.018	125	0.010	131	0.012	163	0.013	178
DCP 12	.953	0.335	0.153	18	0.077	36	0.038	80	0.016	62	0.024	43	0.026	87	0.016	77	0.019	55	0.007	74

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.27	0.400	24.60	4.95		1150.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.061	443.9	363.7	0.23E 07	-0.00220	1.184	25.03

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.050	0.138	88	0.040	242	0.029	31	0.016	87	0.008	194	0.018	294	0.014	28	0.010	101	0.006	187
CM		-0.154	0.028	221	0.004	122	0.004	195	0.000	236	0.002	320	0.004	53	0.002	154	0.003	243	0.002	324
DCP 1	.010	3.061	1.948	155	0.316	219	0.238	115	0.056	66	0.120	84	0.080	342	0.123	48	0.011	107	0.058	348
DCP 2	.050	1.720	0.311	126	0.179	222	0.080	318	0.039	49	0.025	279	0.038	336	0.023	83	0.018	166	0.026	242
DCP 3	.100	1.532	0.184	63	0.038	225	0.051	37	0.034	100	0.024	256	0.043	327	0.022	28	0.019	113	0.011	193
DCP 4	.150	1.410	0.156	50	0.028	247	0.045	33	0.023	73	0.012	210	0.022	282	0.013	26	0.010	158	0.010	233
DCP 5	.200	1.273	0.160	49	0.027	241	0.039	32	0.028	104	0.021	234	0.025	312	0.015	29	0.013	98	0.014	167
DCP 6	.250	1.240	0.158	50	0.034	252	0.046	22	0.018	101	0.018	241	0.017	306	0.008	71	0.009	176	0.011	238
DCP 7	.300	1.105	0.158	51	0.036	252	0.040	27	0.030	109	0.025	219	0.024	303	0.014	59	0.013	126	0.007	171
DCP 8	.500	0.976	0.145	62	0.041	262	0.040	8	0.021	75	0.013	205	0.021	296	0.015	18	0.012	114	0.008	213
DCP 9	.600	0.946	0.132	67	0.043	265	0.032	28	0.016	131	0.009	182	0.019	280	0.014	359	0.009	77	0.007	172
DCP 10	.695	0.916	0.127	74	0.026	254	0.024	13	0.007	103	0.011	209	0.020	272	0.017	11	0.010	81	0.009	146
DCP 11	.800	0.833	0.106	79	0.026	275	0.023	40	0.007	147	0.009	92	0.009	227	0.012	358	0.009	72	0.011	143
DCP 12	.953	0.476	0.085	67	0.007	143	0.004	132	0.020	337	0.016	82	0.019	212	0.007	285	0.010	24	0.006	121

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.95	0.600	-0.03	4.83		1154.1	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.043	653.3	717.8	0.31E 07	-0.00087	0.563	5.01	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		-0.069	0.581 351	0.095 186	0.017 232	0.007 122	0.014 177	0.008 216	0.002 154	0.002 151	0.001 29
CM		-0.010	0.011 243	0.009 257	0.007 354	0.005 85	0.003 196	0.001 340	0.001 80	0.001 196	0.001 175
DCP 1	.010	-1.408	1.653 342	0.845 226	0.048 35	0.182 168	0.043 123	0.060 132	0.017 28	0.027 65	0.019 68
DCP 2	.050	-0.463	1.883 345	0.369 216	0.190 322	0.054 119	0.086 245	0.014 10	0.041 214	0.003 149	0.036 197
DCP 3	.100	-0.026	1.888 348	0.277 197	0.086 342	0.122 69	0.078 176	0.026 346	0.042 161	0.015 207	0.009 93
DCP 4	.150	0.030	1.357 348	0.199 185	0.041 138	0.118 58	0.094 190	0.031 209	0.031 84	0.040 239	0.013 80
DCP 5	.200	0.101	0.977 354	0.162 136	0.056 258	0.044 105	0.071 166	0.040 260	0.015 104	0.014 205	0.023 355
DCP 6	.250	-0.074	0.779 352	0.130 146	0.064 202	0.007 264	0.036 154	0.036 243	0.016 11	0.013 140	0.036 274
DCP 7	.300	-0.058	0.628 355	0.118 161	0.058 211	0.018 279	0.018 142	0.029 235	0.017 351	0.012 110	0.036 286
DCP 8	.500	-0.054	0.342 354	0.057 178	0.028 200	0.022 252	0.011 22	0.009 150	0.005 250	0.004 53	0.002 228
DCP 9	.600	-0.029	0.272 356	0.042 171	0.018 182	0.015 243	0.008 14	0.009 134	0.003 179	0.001 324	0.004 48
DCP 10	.695	0.030	0.198 359	0.030 157	0.019 175	0.013 239	0.008 7	0.006 92	0.004 148	0.002 0	0.003 10
DCP 11	.800	0.080	0.153 3	0.023 143	0.015 179	0.011 248	0.003 328	0.004 191	0.003 201	0.005 22	0.002 60
DCP 12	.953	-0.093	0.116 357	0.017 118	0.013 174	0.007 259	0.002 62	0.003 186	0.006 237	0.003 311	0.004 353

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.09	0.600	7.37	4.81		1154.2	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.041	653.3	714.9	0.31E 07	-0.00050	0.973	10.42	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.693	0.348 2	0.101 69	0.010 127	0.013 17	0.005 159	0.001 0	0.001 260	0.001 195	0.002 95
CM		-0.028	0.037 182	0.021 76	0.001 150	0.005 67	0.001 47	0.001 45	0.001 64	0.001 5	0.001 248
DCP 1	.010	1.584	1.719 353	0.339 74	0.093 150	0.018 265	0.024 140	0.010 213	0.005 140	0.007 168	0.008 169
DCP 2	.050	1.853	0.865 354	0.417 72	0.004 288	0.024 19	0.012 274	0.023 200	0.005 212	0.019 165	0.011 77
DCP 3	.100	1.963	0.395 4	0.579 73	0.076 161	0.057 41	0.010 80	0.009 307	0.005 43	0.019 31	0.013 177
DCP 4	.150	1.672	0.291 21	0.549 73	0.146 156	0.141 50	0.077 152	0.027 16	0.028 85	0.019 328	0.023 1
DCP 5	.200	1.200	0.389 11	0.290 75	0.042 55	0.125 60	0.042 137	0.054 64	0.039 137	0.006 22	0.026 154
DCP 6	.250	0.925	0.416 6	0.138 66	0.034 346	0.022 40	0.025 332	0.019 59	0.026 322	0.010 36	0.016 292
DCP 7	.300	0.711	0.438 5	0.100 56	0.046 350	0.017 330	0.019 336	0.009 12	0.021 317	0.002 237	0.001 253
DCP 8	.500	0.458	0.318 5	0.018 302	0.006 111	0.020 281	0.003 217	0.013 250	0.006 193	0.003 249	0.004 288
DCP 9	.600	0.403	0.271 3	0.033 265	0.017 104	0.023 278	0.006 162	0.010 248	0.004 164	0.005 244	0.006 122
DCP 10	.695	0.365	0.229 1	0.039 246	0.014 122	0.012 270	0.005 169	0.008 244	0.005 169	0.004 347	0.005 222
DCP 11	.800	0.295	0.174 1	0.035 264	0.006 201	0.015 230	0.008 161	0.006 80	0.010 287	0.013 166	0.011 42
DCP 12	.953	0.110	0.203 351	0.025 246	0.013 280	0.005 210	0.007 256	0.009 203	0.004 175	0.005 170	0.007 136

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.37	0.600	9.69	4.81		1154.3	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.042	653.3	715.2	0.31E 07	-0.00086	1.001	13.33	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.842	0.206	14	0.069	90	0.028	138	0.006	183	0.006	135	0.002	143	0.003	157	0.003	33	0.003	256
CM		-0.044	0.055	187	0.003	116	0.008	175	0.003	267	0.000	229	0.003	286	0.001	291	0.002	285	0.002	348
DCP 1	.010	2.312	1.173	357	0.194	89	0.037	144	0.032	197	0.012	108	0.004	173	0.007	213	0.012	159	0.006	72
DCP 2	.050	2.175	0.284	3	0.302	83	0.072	140	0.022	50	0.015	154	0.008	26	0.019	153	0.025	51	0.008	317
DCP 3	.100	2.206	0.224	157	0.180	92	0.100	150	0.018	320	0.022	119	0.032	272	0.002	118	0.021	357	0.025	325
DCP 4	.150	1.864	0.365	163	0.087	108	0.173	161	0.093	243	0.010	330	0.038	239	0.025	304	0.010	346	0.030	313
DCP 5	.200	1.353	0.105	70	0.146	103	0.165	172	0.134	264	0.044	339	0.032	338	0.022	332	0.027	340	0.016	307
DCP 6	.250	1.077	0.238	19	0.139	93	0.052	152	0.022	138	0.045	155	0.028	282	0.010	204	0.019	268	0.009	347
DCP 7	.300	0.864	0.291	14	0.129	91	0.028	129	0.027	128	0.042	166	0.007	289	0.014	229	0.020	281	0.012	298
DCP 8	.500	0.571	0.272	14	0.038	87	0.026	34	0.029	111	0.016	87	0.019	99	0.011	147	0.015	130	0.018	142
DCP 9	.600	0.519	0.270	12	0.004	153	0.027	35	0.006	71	0.005	333	0.018	144	0.020	81	0.009	15	0.015	206
DCP10	.695	0.464	0.235	10	0.004	194	0.024	22	0.010	111	0.009	343	0.014	161	0.005	80	0.013	188	0.012	156
DCP11	.800	0.410	0.218	8	0.007	356	0.025	355	0.005	63	0.002	301	0.015	88	0.007	139	0.022	59	0.004	331
DCP12	.953	0.176	0.210	357	0.022	36	0.012	326	0.011	57	0.003	132	0.008	56	0.002	296	0.004	120	0.003	208

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.42	0.600	12.25	4.79		1154.4	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.042	653.3	714.0	0.31E 07	-0.00126	1.016	15.29	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.928	0.095	28	0.030	118	0.013	297	0.008	183	0.005	47	0.005	161	0.004	342	0.005	128	0.003	163
CM		-0.068	0.059	191	0.005	285	0.003	356	0.001	11	0.001	355	0.001	302	0.001	327	0.002	338	0.002	300
DCP 1	.010	2.662	0.498	6	0.351	82	0.112	322	0.022	213	0.010	226	0.010	120	0.009	200	0.015	100	0.013	27
DCP 2	.050	2.282	0.143	201	0.152	115	0.007	256	0.044	219	0.056	33	0.024	287	0.018	50	0.025	37	0.015	313
DCP 3	.100	2.166	0.423	185	0.101	235	0.051	342	0.035	207	0.012	35	0.024	243	0.037	301	0.014	118	0.024	259
DCP 4	.150	1.704	0.402	173	0.140	264	0.084	346	0.047	75	0.021	150	0.019	229	0.036	303	0.008	247	0.015	229
DCP 5	.200	1.395	0.178	161	0.039	246	0.051	336	0.020	119	0.010	57	0.021	179	0.010	350	0.001	74	0.009	266
DCP 6	.250	1.212	0.079	109	0.018	119	0.015	241	0.011	212	0.007	18	0.025	134	0.007	350	0.016	264	0.011	271
DCP 7	.300	0.997	0.100	64	0.065	98	0.025	260	0.002	133	0.018	27	0.025	125	0.019	49	0.008	39	0.013	63
DCP 8	.500	0.676	0.224	18	0.054	113	0.015	246	0.012	189	0.005	297	0.009	56	0.002	217	0.009	55	0.009	214
DCP 9	.600	0.602	0.234	11	0.034	116	0.019	254	0.012	197	0.005	301	0.010	237	0.005	209	0.018	173	0.027	158
DCP10	.695	0.571	0.247	12	0.016	146	0.007	187	0.010	216	0.010	106	0.005	333	0.003	246	0.007	149	0.001	134
DCP11	.800	0.520	0.217	8	0.014	119	0.012	164	0.002	303	0.010	183	0.009	162	0.002	241	0.018	187	0.014	121
DCP12	.953	0.264	0.171	9	0.028	79	0.011	130	0.005	142	0.006	42	0.001	260	0.007	104	0.009	73	0.011	36

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.81	0.600	14.92	4.88		1149.1	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.043	653.5	711.6	0.31E 07	-0.00166	1.116	16.78	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.998	0.075	87	0.045	71	0.020	298	0.014	106	0.010	342	0.005	193	0.007	304	0.005	145	0.002	131
CM		-0.097	0.050	197	0.004	315	0.002	38	0.002	333	0.004	183	0.001	327	0.003	88	0.002	297	0.001	175
CCP 1	.010	2.890	0.162	139	0.436	82	0.008	145	0.041	51	0.017	126	0.024	30	0.020	200	0.036	58	0.012	307
CCP 2	.050	2.286	0.472	174	0.136	66	0.083	268	0.032	75	0.044	295	0.030	188	0.032	135	0.020	231	0.008	104
CCP 3	.100	1.939	0.473	171	0.063	38	0.123	340	0.068	75	0.057	305	0.015	302	0.019	47	0.052	192	0.033	128
CCP 4	.150	1.733	0.288	155	0.039	342	0.010	326	0.020	68	0.019	193	0.016	324	0.014	15	0.007	75	0.011	313
CCP 5	.200	1.421	0.159	162	0.061	55	0.055	346	0.045	110	0.018	78	0.024	196	0.030	35	0.011	344	0.020	104
CCP 6	.250	1.221	0.133	121	0.046	40	0.014	270	0.004	268	0.008	266	0.014	317	0.017	19	0.002	238	0.011	351
CCP 7	.300	1.039	0.086	112	0.039	49	0.038	304	0.025	137	0.010	110	0.022	191	0.015	26	0.004	318	0.014	138
CCP 8	.500	0.778	0.133	47	0.042	63	0.021	240	0.011	203	0.006	33	0.012	95	0.028	264	0.016	81	0.022	216
CCP 9	.600	0.755	0.165	35	0.037	83	0.006	309	0.017	147	0.023	21	0.028	192	0.010	262	0.012	172	0.016	283
CCP10	.695	0.734	0.177	19	0.034	93	0.028	265	0.003	110	0.015	298	0.017	351	0.014	256	0.013	281	0.010	53
CCP11	.800	0.625	0.188	22	0.023	116	0.004	269	0.014	56	0.031	344	0.004	253	0.020	289	0.017	152	0.022	40
CCP12	.953	0.325	0.143	12	0.026	145	0.006	126	0.015	134	0.008	34	0.009	126	0.004	172	0.011	75	0.006	212

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.86	0.600	17.46	4.88		1149.2	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.043	653.5	715.2	0.31E 07	-0.00197	1.110	15.99	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.982	0.098	121	0.021	21	0.035	146	0.016	2	0.010	136	0.009	275	0.006	238	0.006	243	0.003	26
CM		-0.114	0.040	206	0.002	231	0.003	198	0.002	190	0.002	233	0.000	331	0.000	35	0.002	21	0.002	196
CCP 1	.010	2.785	0.681	173	0.190	92	0.202	179	0.039	119	0.055	207	0.031	163	0.019	237	0.025	176	0.017	239
CCP 2	.050	2.065	0.539	175	0.073	10	0.136	170	0.074	3	0.045	163	0.037	349	0.032	169	0.021	320	0.018	162
CCP 3	.100	1.720	0.364	169	0.104	13	0.117	145	0.051	353	0.036	135	0.042	277	0.004	232	0.038	287	0.016	118
CCP 4	.150	1.589	0.245	163	0.048	290	0.065	152	0.011	287	0.023	209	0.018	315	0.016	207	0.016	299	0.010	332
CCP 5	.200	1.331	0.197	146	0.028	345	0.050	139	0.028	351	0.009	126	0.017	286	0.015	278	0.015	314	0.009	160
CCP 6	.250	1.183	0.163	148	0.027	305	0.052	147	0.016	306	0.008	190	0.021	296	0.006	323	0.005	206	0.012	305
CCP 7	.300	1.019	0.149	125	0.015	333	0.043	131	0.017	353	0.014	147	0.020	271	0.013	277	0.003	141	0.012	184
CCP 8	.500	0.804	0.114	79	0.021	18	0.027	109	0.019	27	0.016	97	0.021	200	0.015	279	0.012	168	0.011	334
CCP 9	.600	0.783	0.130	52	0.027	47	0.037	105	0.011	13	0.018	103	0.019	267	0.005	55	0.010	194	0.007	32
CCP10	.695	0.776	0.136	39	0.007	92	0.006	158	0.006	38	0.006	359	0.007	83	0.005	254	0.002	220	0.004	43
CCP11	.800	0.686	0.130	27	0.018	42	0.005	234	0.023	354	0.013	69	0.008	55	0.017	165	0.020	255	0.016	26
CCP12	.953	0.380	0.108	24	0.005	76	0.010	334	0.002	148	0.005	257	0.006	2	0.006	19	0.006	136	0.002	279

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.O	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.95	0.600	24.53	4.87		1149.3	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.043	653.5	715.7	0.31E 07	-0.00185	1.159	29.09	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.032	0.133	25	0.031	213	0.014	339	0.002	167	0.003	301	0.003	135	0.002	148	0.003	235	0.001	35
CM		-0.158	0.026	218	0.008	33	0.001	182	0.000	62	0.001	220	0.001	298	0.002	311	0.001	50	0.000	147
DCP 1	.010	2.139	0.122	143	0.066	326	0.047	333	0.011	222	0.030	245	0.010	251	0.012	333	0.007	125	0.021	240
DCP 2	.050	1.728	0.150	14	0.020	187	0.037	333	0.016	151	0.017	308	0.005	150	0.015	331	0.010	129	0.009	277
DCP 3	.100	1.576	0.194	15	0.028	196	0.023	345	0.006	77	0.009	283	0.007	270	0.005	293	0.008	310	0.004	116
DCP 4	.150	1.560	0.190	13	0.029	199	0.022	326	0.007	151	0.007	289	0.005	148	0.009	306	0.006	138	0.003	123
DCP 5	.200	1.354	0.178	15	0.031	208	0.016	347	0.004	112	0.008	263	0.001	348	0.001	303	0.003	309	0.002	103
DCP 6	.250	1.227	0.193	13	0.033	200	0.017	316	0.003	159	0.003	337	0.007	168	0.006	282	0.004	294	0.004	125
DCP 7	.300	1.091	0.189	16	0.035	206	0.012	324	0.003	1	0.004	239	0.003	51	0.001	132	0.004	327	0.004	133
DCP 8	.500	0.928	0.153	23	0.045	215	0.018	352	0.003	70	0.004	10	0.003	139	0.005	172	0.008	234	0.004	37
DCP 9	.600	0.899	0.144	27	0.038	215	0.008	318	0.005	228	0.005	211	0.009	152	0.014	155	0.011	275	0.007	356
DCP 10	.695	0.924	0.115	36	0.044	219	0.011	351	0.004	216	0.006	359	0.009	91	0.006	150	0.007	228	0.002	133
DCP 11	.800	0.823	0.100	40	0.031	220	0.005	310	0.004	261	0.003	149	0.006	147	0.009	110	0.002	263	0.003	5
DCP 12	.953	0.532	0.085	57	0.020	196	0.009	27	0.003	131	0.009	13	0.004	90	0.003	39	0.008	170	0.005	233

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	99.01	0.200	5.08	6.30		5144.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.745	222.0	118.7	0.15E 07	-0.00151	1.123	9.71

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.490	0.497	37	0.076	25	0.026	308	0.019	226	0.016	289	0.017	144	0.021	225	0.010	185	0.012	22
CM		-0.021	0.100	283	0.021	250	0.008	150	0.005	98	0.002	91	0.002	286	0.007	74	0.003	28	0.003	339
CCP 1	.010	0.800	2.672	348	0.289	321	0.117	135	0.058	275	0.067	299	0.055	160	0.051	346	0.021	159	0.029	336
CCP 2	.025	1.384	2.054	344	0.200	301	0.052	123	0.068	136	0.017	53	0.029	260	0.030	36	0.018	355	0.026	352
CCP 3	.100	1.148	1.110	4	0.157	323	0.092	279	0.086	147	0.053	295	0.041	110	0.029	161	0.023	99	0.043	298
CCP 4	.150	1.071	0.824	19	0.128	3	0.032	254	0.039	247	0.048	298	0.043	149	0.064	209	0.023	236	0.035	45
CCP 5	.200	0.931	0.652	24	0.066	2	0.046	312	0.047	172	0.032	317	0.007	302	0.038	177	0.029	133	0.017	227
CCP 6	.250	0.804	0.711	38	0.136	28	0.034	287	0.036	253	0.020	279	0.065	159	0.045	210	0.033	212	0.052	27
CCP 7	.300	0.604	0.613	45	0.086	23	0.039	279	0.019	178	0.018	300	0.020	191	0.016	204	0.007	137	0.019	336
CCP 8	.400	0.436	0.576	58	0.100	40	0.034	293	0.058	275	0.012	335	0.036	168	0.027	221	0.017	215	0.024	45
CCP 9	.500	0.325	0.485	70	0.088	54	0.030	307	0.019	205	0.003	91	0.008	326	0.019	161	0.019	139	0.033	318
CCP10	.600	0.264	0.488	74	0.107	53	0.036	12	0.037	272	0.039	234	0.046	149	0.025	234	0.019	217	0.033	31
CCP11	.878	0.173	0.329	87	0.071	63	0.041	315	0.006	244	0.016	348	0.016	9	0.041	265	0.010	210	0.027	143

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	99.01	0.200	7.55	6.30		5144.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.746	221.7	116.5	0.15E 07	-0.00149	1.388	11.73

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.814	0.472	40	0.082	46	0.060	283	0.009	145	0.031	256	0.027	50	0.037	239	0.007	37	0.019	242
CM		-0.026	0.097	288	0.024	266	0.013	118	0.003	1	0.008	81	0.005	236	0.012	79	0.004	159	0.008	32
CCP 1	.010	2.400	2.447	345	0.269	330	0.126	203	0.085	45	0.043	246	0.058	39	0.058	144	0.046	29	0.053	234
CCP 2	.025	2.790	2.081	346	0.185	310	0.088	210	0.060	56	0.038	168	0.058	21	0.017	5	0.024	13	0.013	343
CCP 3	.100	1.920	1.107	6	0.151	3	0.116	276	0.025	108	0.066	244	0.050	26	0.031	172	0.030	131	0.048	317
CCP 4	.150	1.519	0.719	21	0.131	8	0.078	273	0.013	129	0.025	308	0.015	79	0.050	216	0.012	94	0.032	334
CCP 5	.200	1.356	0.667	28	0.088	25	0.064	268	0.014	182	0.027	234	0.040	41	0.031	214	0.007	231	0.014	256
CCP 6	.250	1.153	0.645	40	0.128	39	0.074	278	0.016	126	0.035	240	0.029	94	0.058	205	0.024	178	0.029	241
CCP 7	.300	1.005	0.618	48	0.086	45	0.063	297	0.019	201	0.018	284	0.031	54	0.022	178	0.023	210	0.022	341
CCP 8	.400	0.665	0.537	68	0.114	53	0.064	306	0.005	308	0.026	258	0.024	39	0.043	228	0.012	133	0.006	339
CCP 9	.500	0.532	0.471	71	0.099	80	0.067	288	0.003	133	0.028	256	0.024	14	0.027	257	0.008	302	0.021	216
CCP10	.600	0.485	0.486	79	0.106	67	0.060	305	0.027	210	0.045	257	0.039	118	0.072	243	0.012	130	0.035	223
CCP11	.878	0.252	0.297	92	0.092	82	0.065	281	0.018	125	0.040	257	0.040	26	0.053	270	0.038	349	0.043	215

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	99.01	0.200	9.89	6.29		5144.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.746	221.8	119.3	0.15E 07	-0.00147	1.603	16.28

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.054	0.463	37	0.070	28	0.027	255	0.025	219	0.010	287	0.016	75	0.020	264	0.016	228	0.015	323
CM		-0.028	0.097	283	0.020	260	0.005	93	0.006	63	0.002	26	0.003	195	0.003	31	0.007	57	0.005	184
DCP 1	.010	3.829	2.443	345	0.225	296	0.102	175	0.064	125	0.009	262	0.026	134	0.023	170	0.018	74	0.054	264
DCP 2	.025	3.876	1.936	339	0.283	306	0.091	185	0.067	139	0.040	5	0.038	46	0.101	313	0.040	283	0.031	269
DCP 3	.100	2.489	1.112	3	0.159	319	0.034	259	0.018	162	0.023	340	0.064	90	0.041	274	0.038	161	0.068	246
DCP 4	.150	1.836	0.726	18	0.125	17	0.042	274	0.040	225	0.046	283	0.015	161	0.045	224	0.022	226	0.043	352
DCP 5	.200	1.818	0.636	21	0.090	347	0.059	244	0.051	193	0.029	316	0.041	56	0.007	31	0.009	24	0.031	220
DCP 6	.250	1.441	0.641	40	0.123	41	0.041	273	0.041	239	0.019	236	0.017	207	0.028	236	0.033	204	0.012	327
DCP 7	.300	1.164	0.645	44	0.111	17	0.020	268	0.022	215	0.032	325	0.044	194	0.013	258	0.013	116	0.004	273
DCP 8	.400	0.901	0.518	64	0.117	57	0.040	309	0.033	244	0.015	301	0.019	94	0.039	233	0.019	301	0.033	326
DCP 9	.500	0.641	0.476	66	0.068	54	0.031	259	0.034	215	0.009	288	0.017	38	0.006	110	0.017	199	0.006	32
DCP10	.600	0.593	0.471	81	0.120	63	0.017	265	0.045	247	0.022	191	0.015	148	0.055	294	0.006	176	0.029	22
DCP11	.878	0.341	0.305	84	0.049	77	0.031	253	0.014	213	0.004	255	0.027	9	0.024	160	0.050	[illegible]	0.024	336

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	96.15	0.200	12.46	6.14		5144.4	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.724	221.8	119.0	0.15E 07	-0.00150	1.851	17.12

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.292	0.435	49	0.100	47	0.026	339	0.029	224	0.021	18	0.014	222	0.013	8	0.029	220	0.047	25
CM		-0.023	0.096	290	0.026	279	0.013	198	0.009	33	0.006	178	0.006	49	0.007	163	0.007	69	0.012	298
DCP 1	.010	5.258	2.371	347	0.559	314	0.188	200	0.089	99	0.021	161	0.032	343	0.042	73	0.058	12	0.089	321
DCP 2	.025	4.893	1.686	352	0.358	335	0.117	168	0.037	253	0.048	66	0.052	243	0.064	57	0.041	186	0.053	30
DCP 3	.100	3.005	1.014	12	0.200	11	0.067	264	0.053	252	0.046	56	0.046	116	0.012	233	0.037	232	0.072	9
DCP 4	.150	2.281	0.600	27	0.180	13	0.062	295	0.013	189	0.029	319	0.011	309	0.025	141	0.052	213	0.056	28
DCP 5	.200	2.060	0.603	39	0.132	33	0.028	343	0.064	242	0.032	43	0.008	257	0.043	56	0.060	213	0.057	15
DCP 6	.250	1.762	0.601	46	0.117	42	0.039	291	0.017	177	0.015	45	0.013	46	0.028	202	0.034	175	0.025	33
DCP 7	.300	1.448	0.567	54	0.157	51	0.045	295	0.036	241	0.024	57	0.008	97	0.010	254	0.018	229	0.036	23
DCP 8	.400	1.091	0.487	73	0.154	68	0.064	333	0.016	320	0.023	261	0.005	280	0.005	275	0.027	242	0.035	30
DCP 9	.500	0.772	0.486	80	0.122	82	0.045	1	0.058	246	0.021	28	0.015	210	0.035	30	0.043	249	0.036	27
DCP10	.600	0.843	0.435	83	0.117	86	0.046	354	0.030	149	0.029	7	0.025	224	0.009	326	0.013	225	0.047	43
DCP11	.878	0.292	0.334	97	0.079	84	0.055	36	0.060	221	0.036	4	0.035	231	0.045	347	0.045	222	0.070	20

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	98.04	0.200	15.05	6.05		5145.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.736	222.5	119.7	0.15E 07	-0.00129	1.978	20.73

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.457	0.393	44	0.073	40	0.032	317	0.027	222	0.009	95	0.022	105	0.005	256	0.009	356	0.019	43
CM		-0.036	0.083	292	0.022	264	0.007	138	0.003	84	0.004	1	0.004	284	0.002	269	0.006	152	0.008	245
DCP 1	.010	6.019	1.934	345	0.238	335	0.197	333	0.218	219	0.020	55	0.072	98	0.069	178	0.075	141	0.029	343
DCP 2	.025	5.547	1.733	350	0.258	299	0.084	138	0.138	191	0.074	58	0.038	114	0.050	312	0.068	132	0.026	248
DCP 3	.100	3.189	0.954	13	0.204	347	0.030	295	0.078	234	0.063	63	0.023	181	0.050	294	0.050	128	0.044	275
DCP 4	.150	2.467	0.611	34	0.132	348	0.059	295	0.020	97	0.032	318	0.024	87	0.041	164	0.038	274	0.032	37
DCP 5	.200	2.354	0.628	36	0.071	34	0.037	303	0.054	201	0.008	124	0.016	103	0.012	219	0.020	175	0.033	346
DCP 6	.250	2.097	0.592	39	0.051	60	0.088	333	0.022	240	0.017	169	0.028	108	0.018	189	0.019	250	0.007	54
DCP 7	.300	1.619	0.581	44	0.070	78	0.039	348	0.053	265	0.041	60	0.020	175	0.028	307	0.007	170	0.039	316
DCP 8	.400	1.276	0.358	66	0.116	75	0.074	319	0.012	185	0.036	324	0.023	112	0.036	143	0.033	311	0.044	51
DCP 9	.500	0.905	0.373	72	0.138	72	0.023	246	0.060	243	0.025	75	0.026	151	0.022	315	0.033	109	0.012	304
DCP10	.600	0.856	0.347	96	0.128	44	0.040	321	0.036	69	0.038	199	0.058	62	0.013	272	0.047	348	0.064	83
DCP11	.878	0.427	0.310	90	0.062	95	0.025	323	0.042	240	0.018	142	0.022	174	0.015	87	0.008	312	0.027	45

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	98.04	0.200	17.39	5.84		5145.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.736	222.5	121.8	0.16E 07	-0.00096	1.891	20.29

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.513	0.275	38	0.081	16	0.007	169	0.027	328	0.026	84	0.042	290	0.014	356	0.024	203	0.026	332
CM		-0.107	0.079	314	0.011	283	0.007	168	0.008	238	0.004	98	0.008	178	0.006	67	0.003	163	0.010	339
DCP 1	.010	5.158	1.504	18	0.724	354	0.178	203	0.305	313	0.225	95	0.257	256	0.216	44	0.324	187	0.282	352
DCP 2	.025	4.792	1.370	29	0.589	328	0.274	195	0.058	298	0.219	96	0.216	258	0.131	50	0.192	181	0.219	333
DCP 3	.100	2.559	0.967	43	0.243	342	0.009	84	0.096	303	0.100	68	0.102	244	0.033	72	0.092	183	0.133	332
DCP 4	.150	1.925	0.809	11	0.129	17	0.068	147	0.051	302	0.082	85	0.090	247	0.091	15	0.090	194	0.107	349
DCP 5	.200	2.392	0.609	357	0.084	120	0.075	77	0.067	259	0.043	47	0.049	247	0.031	45	0.024	217	0.037	312
DCP 6	.250	2.061	0.833	344	0.059	192	0.033	121	0.053	34	0.049	79	0.029	245	0.065	320	0.040	193	0.101	321
DCP 7	.300	1.910	0.676	332	0.168	188	0.124	71	0.083	293	0.059	117	0.061	274	0.012	3	0.034	225	0.030	10
DCP 8	.400	1.691	0.360	316	0.140	90	0.032	8	0.074	319	0.024	200	0.038	252	0.024	214	0.041	0	0.038	310
DCP 9	.500	1.221	0.229	169	0.253	46	0.083	211	0.021	242	0.034	97	0.024	215	0.039	357	0.023	181	0.023	1
DCP10	.600	1.004	0.288	124	0.256	16	0.077	310	0.040	112	0.068	289	0.072	358	0.038	242	0.068	351	0.057	173
DCP11	.878	0.649	0.497	105	0.107	198	0.022	73	0.053	28	0.027	93	0.033	307	0.008	274	0.049	195	0.021	145

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	99.01	0.200	19.79	6.28		5145.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.743	222.5	121.9	0.16E 07	-0.00027	2.045	26.64

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.558	0.450	12	0.003	355	0.004	8	0.030	254	0.035	1	0.034	229	0.035	348	0.045	194	0.031	359
CM		-0.168	0.064	346	0.018	303	0.003	179	0.004	36	0.007	125	0.001	359	0.019	126	0.009	23	0.033	176
DCP 1	.010	4.523	1.955	44	0.849	357	0.147	192	0.062	44	0.119	31	0.159	349	0.092	216	0.083	262	0.028	223
DCP 2	.025	3.736	2.025	38	0.583	338	0.265	235	0.156	212	0.182	76	0.139	295	0.032	92	0.056	55	0.034	343
DCP 3	.100	1.887	1.397	14	0.032	281	0.039	19	0.019	84	0.048	333	0.050	194	0.056	55	0.096	173	0.047	296
DCP 4	.150	1.806	1.138	9	0.138	283	0.044	129	0.065	250	0.067	20	0.094	222	0.054	74	0.045	192	0.051	4
DCP 5	.200	2.245	1.080	350	0.215	236	0.101	111	0.035	309	0.045	11	0.091	203	0.087	18	0.082	202	0.039	341
DCP 6	.250	2.150	1.165	2	0.164	247	0.128	114	0.022	26	0.131	357	0.146	205	0.096	8	0.053	214	0.038	9
DCP 7	.300	2.160	1.069	349	0.302	234	0.232	84	0.100	32	0.081	13	0.121	211	0.090	1	0.091	168	0.053	356
DCP 8	.400	1.992	0.863	339	0.326	171	0.258	25	0.188	281	0.017	303	0.033	221	0.046	330	0.085	182	0.110	19
DCP 9	.500	1.506	0.342	290	0.189	93	0.155	315	0.149	186	0.039	47	0.036	253	0.076	352	0.055	237	0.043	359
DCP10	.600	1.341	0.125	224	0.292	50	0.249	235	0.076	32	0.040	286	0.026	0	0.034	284	0.033	123	0.017	134
DCP11	.878	0.699	0.519	121	0.094	222	0.101	69	0.055	204	0.034	332	0.016	192	0.035	302	0.060	220	0.021	339

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	99.01	0.200	24.84	6.38		5145.4	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.745	222.0	121.9	0.16E 07	-0.00025	2.415	31.23

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.746	0.609	359	0.042	166	0.014	210	0.019	200	0.053	251	0.028	301	0.030	77	0.015	278	0.034	320
CM		-0.265	0.090	353	0.040	282	0.015	30	0.015	73	0.013	88	0.013	111	0.013	194	0.006	3	0.008	126
DCP 1	.010	3.046	2.220	56	0.558	26	0.191	299	0.156	157	0.212	136	0.039	44	0.147	101	0.132	70	0.128	301
DCP 2	.025	3.040	1.908	39	0.399	0	0.205	332	0.036	315	0.242	248	0.140	159	0.186	92	0.241	330	0.081	187
DCP 3	.100	1.558	1.632	9	0.359	267	0.031	148	0.151	107	0.068	249	0.080	21	0.137	172	0.150	338	0.067	18
DCP 4	.150	1.766	1.510	1	0.280	260	0.101	170	0.079	99	0.051	201	0.024	272	0.046	70	0.076	207	0.065	333
DCP 5	.200	2.601	1.495	357	0.438	253	0.131	119	0.051	128	0.020	95	0.050	8	0.070	251	0.013	189	0.047	48
DCP 6	.250	2.384	1.913	357	0.471	245	0.249	128	0.047	9	0.046	140	0.039	343	0.014	232	0.075	208	0.052	339
DCP 7	.300	2.513	1.853	350	0.612	232	0.213	97	0.052	4	0.109	310	0.026	269	0.040	207	0.025	121	0.030	320
DCP 8	.400	2.218	1.599	336	0.508	169	0.218	354	0.061	259	0.050	216	0.045	271	0.084	93	0.049	214	0.089	324
DCP 9	.500	1.783	0.732	297	0.423	86	0.170	292	0.097	191	0.040	336	0.036	53	0.010	326	0.031	305	0.031	210
DCP10	.600	1.463	0.376	257	0.476	55	0.112	241	0.065	125	0.098	224	0.068	298	0.063	81	0.031	160	0.069	318
DCP11	.878	1.229	0.887	132	0.110	187	0.100	172	0.120	269	0.082	280	0.060	282	0.084	3	0.013	260	0.022	293

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	98.04	0.400	7.39	6.00		5143.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.373	439.4	368.5	0.24E 07	-0.00093	1.313	13.99

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.868	0.422	3	0.071	16	0.010	217	0.022	290	0.006	121	0.007	333	0.007	147	0.011	310	0.004	103
CM		-0.015	0.057	282	0.012	266	0.004	169	0.003	96	0.001	207	0.001	328	0.001	10	0.002	147	0.001	259
DCP 1	.010	2.936	2.744	335	0.293	328	0.193	158	0.063	341	0.048	172	0.055	319	0.068	124	0.030	320	0.017	163
DCP 2	.025	3.014	2.412	333	0.267	317	0.133	163	0.049	328	0.037	147	0.046	296	0.033	109	0.011	297	0.008	77
DCP 3	.100	2.270	1.139	347	0.208	352	0.024	182	0.055	271	0.013	79	0.013	328	0.009	206	0.009	263	0.004	312
DCP 4	.150	1.703	0.675	354	0.124	6	0.034	249	0.028	283	0.012	138	0.017	351	0.008	164	0.014	298	0.005	145
DCP 5	.200	1.419	0.588	356	0.105	9	0.024	247	0.032	278	0.002	120	0.010	335	0.011	134	0.012	275	0.009	78
DCP 6	.250	1.274	0.521	9	0.116	23	0.034	247	0.027	302	0.010	159	0.010	15	0.014	169	0.020	329	0.014	142
DCP 7	.300	0.916	0.460	14	0.086	21	0.019	256	0.027	276	0.003	105	0.006	8	0.004	317	0.012	260	0.004	35
DCP 8	.400	0.765	0.353	25	0.085	42	0.017	278	0.029	299	0.009	155	0.011	353	0.004	142	0.014	321	0.007	159
DCP 9	.500	0.579	0.281	33	0.055	38	0.007	285	0.018	273	0.005	85	0.008	348	0.006	71	0.008	273	0.005	113
DCP10	.600	0.465	0.268	49	0.075	54	0.013	280	0.016	305	0.008	136	0.009	35	0.016	176	0.019	328	0.004	94
DCP11	.878	0.216	0.159	65	0.029	72	0.014	32	0.017	273	0.009	16	0.008	220	0.002	36	0.007	328	0.004	58

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	98.04	0.400	9.92	6.00		5143.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.374	438.4	369.4	0.24E 07	-0.00085	1.581	16.62

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.111	0.453	4	0.058	357	0.013	149	0.017	321	0.010	169	0.007	324	0.001	42	0.009	306	0.003	54
CM		-0.012	0.048	281	0.020	275	0.007	137	0.001	52	0.001	248	0.001	74	0.002	236	0.004	132	0.002	310
DCP 1	.010	4.339	2.789	335	0.325	332	0.079	218	0.107	219	0.119	107	0.083	318	0.066	129	0.023	294	0.024	6
DCP 2	.025	4.341	2.554	334	0.435	306	0.193	175	0.021	205	0.076	116	0.057	327	0.030	306	0.034	195	0.012	41
DCP 3	.100	2.798	1.081	356	0.354	325	0.201	161	0.165	32	0.127	268	0.051	149	0.009	342	0.036	99	0.057	347
DCP 4	.150	2.046	0.675	1	0.144	348	0.032	186	0.033	353	0.016	257	0.019	246	0.016	135	0.012	314	0.016	254
DCP 5	.200	1.713	0.646	4	0.118	285	0.126	80	0.117	291	0.056	161	0.031	41	0.034	275	0.023	117	0.023	311
DCP 6	.250	1.547	0.582	14	0.071	349	0.031	94	0.047	324	0.020	196	0.004	45	0.005	293	0.011	310	0.002	185
DCP 7	.300	1.217	0.534	11	0.024	134	0.096	30	0.082	250	0.039	102	0.018	326	0.015	235	0.008	304	0.007	86
DCP 8	.400	0.943	0.402	23	0.039	65	0.042	17	0.033	296	0.019	148	0.018	25	0.005	157	0.019	278	0.013	142
DCP 9	.500	0.702	0.281	28	0.091	58	0.043	276	0.007	356	0.012	135	0.017	293	0.011	120	0.025	277	0.015	98
DCP10	.600	0.581	0.283	41	0.068	77	0.017	308	0.010	38	0.009	146	0.021	322	0.007	137	0.038	329	0.019	159
DCP11	.878	0.279	0.127	57	0.058	66	0.018	246	0.004	222	0.006	347	0.012	172	0.017	29	0.003	249	0.009	6

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	97.09	0.400	12.53	6.07		5143.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.370	437.9	363.9	0.24E 07	0.00023	1.815	19.31

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		1.149	0.574 19	0.072 308	0.018 54	0.021 201	0.019 350	0.011 51	0.004 240	0.016 22	0.026 186
CM		-0.057	0.030 148	0.039 322	0.024 223	0.010 85	0.006 218	0.004 136	0.005 334	0.004 226	0.017 21
DCP 1	.010	3.983	1.495 1	0.890 5	0.470 294	0.342 195	0.055 65	0.032 167	0.033 300	0.006 146	0.027 93
DCP 2	.025	3.755	1.452 21	1.054 351	0.464 276	0.247 184	0.073 231	0.135 109	0.027 344	0.081 9	0.037 238
DCP 3	.100	2.552	1.396 41	0.626 315	0.143 231	0.190 147	0.027 310	0.137 55	0.065 276	0.102 337	0.118 188
DCP 4	.150	1.933	1.052 32	0.380 291	0.050 194	0.101 152	0.061 37	0.052 17	0.050 296	0.021 262	0.043 171
DCP 5	.200	1.676	1.012 27	0.303 274	0.093 171	0.095 94	0.070 352	0.034 305	0.020 264	0.019 153	0.016 37
DCP 6	.250	1.553	0.979 24	0.232 254	0.061 140	0.071 81	0.072 351	0.028 300	0.041 224	0.049 88	0.017 101
DCP 7	.300	1.275	0.860 20.	0.170 245	0.116 146	0.098 53	0.093 334	0.042 231	0.031 183	0.039 84	0.023 86
DCP 8	.400	1.106	0.671 8	0.097 205	0.132 113	0.083 346	0.054 318	0.040 214	0.026 99	0.018 18	0.010 198
DCP 9	.500	0.845	0.473 1	0.075 158	0.150 107	0.152 325	0.057 200	0.022 154	0.057 42	0.016 257	0.017 261
DCP 10	.600	0.716	0.388 2	0.142 139	0.130 50	0.090 284	0.045 162	0.025 73	0.039 349	0.018 176	0.031 154
DCP 11	.878	0.433	0.080 350	0.086 102	0.114 349	0.098 185	0.068 23	0.035 335	0.061 177	0.046 25	0.052 239

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	98.04	0.400	15.00	6.16		5143.4	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.374	437.6	365.5	0.24E 07	0.00075	2.031	21.44

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		1.242	0.680 22	0.090 293	0.008 29	0.011 256	0.022 143	0.002 69	0.009 77	0.003 34	0.009 275
CM		-0.085	0.081 148	0.052 342	0.017 250	0.010 209	0.006 9	0.004 174	0.003 343	0.002 237	0.002 63
DCP 1	.010	3.963	1.069 40	0.902 18	0.430 348	0.314 286	0.170 232	0.053 128	0.013 104	0.008 232	0.020 219
DCP 2	.025	3.657	1.636 58	1.103 351	0.306 326	0.318 267	0.103 184	0.099 224	0.087 112	0.033 258	0.033 155
DCP 3	.100	2.574	1.579 54	0.645 327	0.192 284	0.205 221	0.135 123	0.054 106	0.077 23	0.023 231	0.045 340
DCP 4	.150	1.997	1.130 42	0.372 318	0.147 269	0.125 205	0.099 124	0.051 82	0.047 29	0.014 65	0.047 322
DCP 5	.200	1.714	1.210 32	0.297 291	0.173 240	0.101 153	0.086 95	0.034 44	0.036 350	0.033 325	0.033 289
DCP 6	.250	1.667	1.120 25	0.258 281	0.117 201	0.066 162	0.086 89	0.039 12	0.028 306	0.022 264	0.027 152
DCP 7	.300	1.436	1.038 19	0.215 272	0.135 190	0.102 128	0.105 38	0.022 23	0.041 251	0.020 312	0.025 154
DCP 8	.400	1.239	0.893 8	0.196 235	0.127 145	0.077 86	0.073 19	0.050 291	0.025 215	0.017 153	0.031 185
DCP 9	.500	1.004	0.761 355	0.203 196	0.122 116	0.126 44	0.089 296	0.070 186	0.029 62	0.014 150	0.037 5
DCP 10	.600	0.833	0.564 355	0.170 190	0.165 82	0.104 1	0.094 234	0.021 162	0.020 92	0.006 56	0.038 260
DCP 11	.878	0.544	0.186 341	0.159 126	0.096 341	0.043 239	0.076 134	0.046 3	0.020 166	0.016 236	0.034 122

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	101.01	0.600	4.98	6.41		5145.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.261	645.5	760.4	0.33E 07	-0.00055	1.086	11.38

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.538	0.536 347	0.043 328	0.010 68	0.002 226	0.004 239	0.004 165	0.003 16	0.005 131	0.009 15
CM		-0.027	0.040 248	0.016 328	0.011 194	0.007 44	0.001 230	0.001 260	0.001 72	0.002 274	0.003 182
DCP 1	.010	0.458	2.427 326	0.395 0	0.039 349	0.049 359	0.021 114	0.017 274	0.032 71	0.012 177	0.015 14
DCP 2	.025	0.910	2.087 321	0.380 1	0.014 74	0.024 43	0.031 142	0.026 251	0.017 103	0.016 235	0.013 327
DCP 3	.100	1.678	1.304 331	0.303 351	0.174 208	0.098 34	0.046 270	0.050 194	0.052 29	0.035 214	0.029 70
DCP 4	.150	1.321	1.012 346	0.203 326	0.126 254	0.071 158	0.025 160	0.024 67	0.013 8	0.010 190	0.015 63
DCP 5	.200	0.971	0.862 349	0.210 293	0.091 181	0.056 93	0.014 329	0.015 58	0.011 272	0.011 74	0.009 271
DCP 6	.250	0.863	0.835 355	0.147 279	0.063 150	0.032 102	0.013 3	0.012 2	0.021 295	0.010 155	0.008 332
DCP 7	.300	0.700	0.704 353	0.128 243	0.107 107	0.058 13	0.035 267	0.008 187	0.011 178	0.017 70	0.008 296
DCP 8	.400	0.503	0.498 0	0.043 228	0.061 77	0.024 346	0.025 280	0.024 205	0.019 101	0.017 7	0.008 271
DCP 9	.500	0.336	0.363 2	0.049 169	0.072 26	0.042 243	0.021 126	0.015 355	0.005 175	0.005 332	0.014 111
DCP10	.600	0.257	0.313 19	0.029 134	0.055 31	0.042 244	0.012 142	0.009 53	0.011 308	0.008 155	0.022 21
DCP11	.878	0.216	0.136 19	0.050 102	0.041 331	0.025 197	0.010 10	0.006 153	0.004 250	0.014 137	0.017 351

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	100.00	0.600	7.50	6.16		5146.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.259	645.5	759.9	0.33E 07	-0.00029	1.377	14.23

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.747	0.511 2	0.117 342	0.040 199	0.018 51	0.008 227	0.010 20	0.017 191	0.006 56	0.004 132
CM		-0.047	0.047 206	0.025 1	0.012 302	0.015 194	0.008 67	0.002 297	0.003 3	0.001 155	0.002 317
DCP 1	.010	1.435	1.968 330	0.423 357	0.092 81	0.010 257	0.020 109	0.017 330	0.023 152	0.009 322	0.003 202
DCP 2	.025	1.759	1.610 327	0.421 356	0.046 126	0.028 140	0.023 68	0.039 343	0.031 196	0.007 88	0.007 249
DCP 3	.100	1.973	0.702 351	0.691 1	0.143 232	0.070 204	0.056 109	0.082 29	0.059 243	0.026 137	0.016 328
DCP 4	.150	1.496	0.730 14	0.442 1	0.129 288	0.070 262	0.022 91	0.036 254	0.008 290	0.032 120	0.026 308
DCP 5	.200	1.199	0.796 12	0.329 340	0.124 271	0.059 222	0.048 171	0.006 13	0.030 171	0.009 95	0.019 141
DCP 6	.250	1.061	0.762 14	0.256 344	0.123 261	0.045 189	0.033 182	0.018 51	0.051 174	0.045 52	0.026 237
DCP 7	.300	0.920	0.738 13	0.202 318	0.116 231	0.080 160	0.044 91	0.018 24	0.018 112	0.019 8	0.015 108
DCP 8	.400	0.711	0.608 12	0.134 302	0.105 205	0.077 120	0.040 41	0.017 20	0.019 31	0.039 273	0.036 131
DCP 9	.500	0.502	0.469 8	0.062 236	0.062 161	0.071 61	0.036 316	0.017 286	0.024 188	0.013 90	0.006 87
DCP10	.600	0.423	0.421 15	0.071 220	0.079 142	0.097 42	0.057 287	0.012 250	0.039 186	0.023 131	0.014 29
DCP11	.878	0.345	0.184 356	0.070 140	0.049 89	0.075 335	0.051 207	0.025 93	0.007 220	0.011 313	0.012 183

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	*****	0.600	9.99	6.11		5146.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.259	645.4	767.8	0.33E 07	-0.00015	1.575	16.51

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.879	0.521	17	0.143	354	0.041	238	0.015	187	0.007	20	0.008	177	0.005	127	0.012	327	0.000	158
CM		-0.064	0.073	195	0.029	43	0.018	340	0.004	288	0.009	188	0.003	13	0.004	22	0.005	187	0.001	29
DCP 1	.010	1.995	1.596	333	0.406	13	0.021	48	0.044	192	0.056	111	0.009	278	0.010	356	0.008	271	0.013	359
DCP 2	.025	2.117	1.041	337	0.572	17	0.131	277	0.112	174	0.045	85	0.021	153	0.037	8	0.023	236	0.023	10
DCP 3	.100	2.142	0.467	42	0.622	16	0.135	322	0.045	206	0.080	236	0.048	157	0.035	121	0.031	352	0.019	65
DCP 4	.150	1.587	0.725	40	0.428	19	0.099	340	0.040	22	0.038	284	0.020	33	0.016	133	0.018	243	0.020	80
DCP 5	.200	1.366	0.796	34	0.386	16	0.138	320	0.052	356	0.048	301	0.020	321	0.028	8	0.028	299	0.018	284
DCP 6	.250	1.165	0.790	32	0.292	5	0.111	294	0.035	327	0.057	258	0.013	178	0.006	63	0.011	119	0.010	343
DCP 7	.300	1.062	0.786	29	0.250	353	0.142	284	0.057	246	0.038	234	0.032	219	0.014	98	0.032	267	0.013	216
DCP 8	.400	0.883	0.701	18	0.192	330	0.126	228	0.049	249	0.074	161	0.009	118	0.025	117	0.008	99	0.010	161
DCP 9	.500	0.645	0.590	16	0.107	289	0.104	213	0.038	176	0.061	116	0.022	44	0.022	42	0.024	301	0.009	91
DCP 10	.600	0.525	0.526	18	0.112	265	0.102	173	0.037	178	0.082	62	0.013	320	0.017	304	0.014	293	0.008	328
DCP 11	.878	0.438	0.257	0	0.077	201	0.064	128	0.038	76	0.076	325	0.031	182	0.034	191	0.035	21	0.005	193

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	100.00	0.600	12.44	6.13		5146.4	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.259	644.0	745.3	0.32E 07	0.00002	1.654	17.74

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.952	0.572	27	0.094	358	0.036	328	0.027	231	0.011	301	0.009	198	0.006	298	0.012	122	0.001	356
CM		-0.086	0.094	183	0.017	66	0.015	20	0.007	5	0.008	226	0.005	76	0.004	182	0.004	351	0.001	0
DCP 1	.010	2.402	1.233	337	0.338	42	0.067	0	0.056	279	0.037	259	0.059	195	0.023	100	0.020	73	0.027	322
DCP 2	.025	2.322	0.560	348	0.550	20	0.123	295	0.064	227	0.047	206	0.040	134	0.010	222	0.031	55	0.019	358
DCP 3	.100	2.049	0.888	76	0.208	354	0.264	13	0.021	283	0.120	278	0.036	135	0.052	260	0.030	114	0.025	178
DCP 4	.150	1.631	0.821	59	0.221	44	0.160	61	0.045	138	0.015	281	0.014	159	0.017	196	0.023	123	0.006	32
DCP 5	.200	1.291	0.944	46	0.226	34	0.170	21	0.049	41	0.012	322	0.053	69	0.018	169	0.036	99	0.029	314
DCP 6	.250	1.220	0.914	43	0.147	22	0.128	18	0.025	0	0.048	330	0.024	180	0.004	84	0.011	327	0.011	117
DCP 7	.300	1.120	0.913	34	0.177	8	0.143	334	0.080	311	0.050	275	0.012	318	0.049	262	0.031	136	0.021	339
DCP 8	.400	0.966	0.833	25	0.124	342	0.102	310	0.072	283	0.055	265	0.026	254	0.021	237	0.006	302	0.008	26
DCP 9	.500	0.697	0.666	17	0.092	328	0.093	258	0.098	228	0.047	149	0.005	178	0.034	134	0.017	7	0.019	70
DCP 10	.600	0.652	0.631	17	0.073	286	0.078	252	0.086	212	0.029	137	0.023	125	0.027	39	0.006	53	0.006	343
DCP 11	.878	0.545	0.316	348	0.056	239	0.085	160	0.040	104	0.065	22	0.044	260	0.031	335	0.040	168	0.016	192

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	97.09	0.600	15.09	5.37		1169.1	10

K	V	Q	RN	DAMPING	CY(MAX)	ALPHA(STALL)
0.248	653.3	715.4	0.31E 07	-0.00098	1.507	16.50

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.986	0.494	59	0.003	321	0.013	41	0.009	314	0.015	14	0.005	25	0.001	67	0.003	75	0.004	307
CM		-0.081	0.114	207	0.017	96	0.014	176	0.004	320	0.012	186	0.003	270	0.002	148	0.001	317	0.001	118
DCP 1	.010	2.414	0.385	40	0.504	47	0.057	192	0.118	13	0.041	226	0.023	68	0.012	226	0.017	36	0.013	243
DCP 2	.100	2.275	0.768	132	0.063	6	0.127	174	0.090	323	0.052	240	0.041	15	0.024	175	0.023	44	0.020	265
DCP 3	.150	1.788	0.780	104	0.201	194	0.060	192	0.061	228	0.083	170	0.060	249	0.017	20	0.028	227	0.014	82
DCP 4	.200	1.555	0.789	91	0.153	201	0.060	231	0.071	315	0.040	167	0.036	333	0.022	118	0.023	330	0.009	164
DCP 5	.250	1.246	0.710	67	0.085	134	0.074	84	0.041	194	0.013	117	0.027	243	0.018	60	0.026	150	0.007	1
DCP 6	.300	1.115	0.804	70	0.085	149	0.069	134	0.044	248	0.024	177	0.029	308	0.018	129	0.019	308	0.007	320
DCP 7	.500	0.710	0.625	42	0.003	196	0.082	12	0.028	79	0.073	34	0.018	113	0.004	75	0.026	123	0.015	31
DCP 8	.600	0.657	0.668	45	0.035	280	0.056	33	0.016	140	0.065	56	0.024	145	0.014	6	0.007	177	0.007	99
DCP 9	.695	0.548	0.492	30	0.051	285	0.080	349	0.011	40	0.093	338	0.030	55	0.020	253	0.030	359	0.029	302
DCP10	.800	0.613	0.470	36	0.090	315	0.058	17	0.008	314	0.066	9	0.014	128	0.041	334	0.014	103	0.016	294
DCP11	.953	0.323	0.257	357	0.079	274	0.053	269	0.024	147	0.035	235	0.017	15	0.027	151	0.017	221	0.020	156

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	96.62	0.600	17.58	5.90		1169.2	10

K	V	Q	RN	DAMPING	CY(MAX)	ALPHA(STALL)
0.247	653.3	716.4	0.31E 07	-0.00120	1.420	19.37

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.021	0.457	61	0.054	210	0.018	107	0.008	154	0.010	272	0.001	61	0.005	157	0.002	284	0.002	330
CM		-0.112	0.130	214	0.007	352	0.009	209	0.002	315	0.009	83	0.005	250	0.003	59	0.000	225	0.002	82
DCP 1	.010	2.474	0.427	125	0.413	66	0.255	167	0.043	355	0.058	140	0.020	8	0.033	113	0.042	348	0.012	249
DCP 2	.100	2.042	0.499	145	0.285	277	0.079	94	0.064	328	0.050	172	0.038	318	0.087	157	0.057	288	0.052	104
DCP 3	.150	1.523	0.518	99	0.257	233	0.021	357	0.024	316	0.035	85	0.054	250	0.035	35	0.024	175	0.019	327
DCP 4	.200	1.468	0.520	90	0.201	234	0.015	352	0.050	335	0.053	85	0.035	249	0.043	61	0.031	154	0.023	33
DCP 5	.250	1.265	0.603	74	0.180	206	0.034	259	0.036	295	0.045	35	0.046	196	0.030	318	0.013	104	0.017	288
DCP 6	.300	1.133	0.617	72	0.154	211	0.025	261	0.052	304	0.062	41	0.028	218	0.030	41	0.024	131	0.011	334
DCP 7	.500	0.837	0.684	47	0.100	170	0.018	155	0.045	199	0.065	294	0.024	72	0.018	277	0.010	305	0.009	23
DCP 8	.600	0.741	0.647	48	0.059	159	0.034	83	0.052	161	0.066	275	0.013	113	0.009	260	0.005	37	0.009	316
DCP 9	.695	0.673	0.585	39	0.048	147	0.054	77	0.078	135	0.054	233	0.007	38	0.037	232	0.009	246	0.027	239
DCP10	.800	0.711	0.480	42	0.020	24	0.045	50	0.067	126	0.026	238	0.034	71	0.024	227	0.008	329	0.015	220
DCP11	.953	0.429	0.310	16	0.031	312	0.037	355	0.031	70	0.016	191	0.014	5	0.025	101	0.006	66	0.012	50

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	97.09	0.600	24.67	5.98		1169.3	10

K	V	W	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.248	633.3	723.0	0.31E 07	-0.00091	1.416	29.65

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.117	0.367	55	0.093	189	0.066	224	0.021	297	0.012	324	0.004	22	0.007	84	0.002	209	0.001	193
CM		-0.159	0.102	217	0.015	301	0.021	10	0.009	73	0.010	185	0.004	272	0.003	20	0.001	96	0.001	50
DCP 1	.010	2.270	0.696	148	0.265	244	0.048	331	0.036	212	0.076	262	0.060	12	0.055	104	0.005	232	0.011	93
DCP 2	.100	1.936	0.301	73	0.217	225	0.042	310	0.021	38	0.091	250	0.021	2	0.052	99	0.035	250	0.016	48
DCP 3	.150	1.466	0.367	61	0.192	194	0.113	251	0.045	10	0.044	168	0.044	271	0.043	7	0.027	98	0.016	209
DCP 4	.200	1.512	0.379	63	0.161	207	0.096	279	0.040	37	0.047	214	0.040	305	0.044	55	0.028	153	0.016	265
DCP 5	.250	1.335	0.397	56	0.159	164	0.107	247	0.058	6	0.050	136	0.050	233	0.048	327	0.035	45	0.024	128
DCP 6	.300	1.252	0.423	57	0.144	199	0.098	271	0.045	21	0.029	182	0.038	286	0.041	25	0.021	107	0.010	238
DCP 7	.500	0.988	0.480	42	0.112	155	0.113	206	0.052	290	0.038	39	0.026	130	0.024	234	0.018	306	0.011	1
DCP 8	.800	0.910	0.493	48	0.104	165	0.113	215	0.055	291	0.048	26	0.035	134	0.028	228	0.018	287	0.005	283
DCP 9	.895	0.852	0.451	43	0.082	137	0.101	187	0.058	255	0.056	350	0.038	74	0.026	153	0.013	198	0.004	144
DCP10	.800	0.906	0.403	51	0.053	136	0.080	196	0.044	245	0.053	359	0.032	90	0.024	185	0.013	218	0.011	168
DCP11	.953	0.564	0.284	27	0.021	9	0.047	145	0.030	164	0.031	294	0.031	325	0.022	54	0.013	52	0.005	299

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL (REFLEX TE)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	91.74	0.400	9.88	3.18		5022.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.349	438.9	744.4	0.48E 07	-0.00031	1.236	13.22

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.009	0.220	5	0.010	37	0.007	291	0.002	170	0.002	304	0.001	240	0.004	256	0.002	195	0.004	158
CM		0.007	0.030	285	0.003	234	0.002	137	0.001	39	0.000	218	0.001	115	0.002	96	0.000	29	0.001	349
DCP 1	.010	4.188	1.549	335	0.101	219	0.060	121	0.039	18	0.024	256	0.015	87	0.010	307	0.016	196	0.013	103
DCP 2	.025	4.231	1.315	336	0.033	206	0.015	201	0.017	86	0.018	260	0.014	112	0.011	60	0.013	275	0.010	220
DCP 3	.100	2.697	0.564	349	0.025	4	0.021	274	0.006	252	0.009	274	0.010	179	0.008	178	0.010	36	0.006	179
DCP 4	.150	1.907	0.344	357	0.029	20	0.011	256	0.002	136	0.002	334	0.003	202	0.004	203	0.003	188	0.005	73
DCP 5	.200	1.530	0.292	2	0.018	25	0.003	313	0.005	204	0.004	111	0.004	203	0.006	216	0.004	295	0.005	140
DCP 6	.250	1.367	0.271	10	0.024	35	0.010	293	0.007	110	0.007	31	0.002	233	0.010	228	0.010	140	0.007	67
DCP 7	.300	1.169	0.227	18	0.017	37	0.011	300	0.003	163	0.002	7	0.001	258	0.009	255	0.009	177	0.001	176
DCP 8	.400	0.883	0.191	25	0.019	33	0.012	301	0.005	154	0.002	287	0.004	267	0.006	219	0.003	154	0.001	228
DCP 9	.500	0.590	0.139	36	0.011	42	0.006	311	0.003	209	0.001	190	0.001	295	0.004	271	0.004	172	0.003	222
DCP10	.600	0.465	0.130	46	0.013	43	0.010	310	0.002	150	0.003	357	0.006	327	0.008	289	0.006	251	0.009	97
DCP11	.830	0.244	0.085	71	0.007	80	0.009	313	0.006	222	0.002	3	0.002	263	0.006	299	0.001	294	0.011	220
DCP12	.878	0.157	0.070	69	0.008	56	0.005	279	0.004	315	0.004	286	0.004	3	0.003	245	0.007	217	0.010	130
DCP13	.953	0.039	0.067	54	0.007	36	0.003	49	0.004	204	0.004	88	0.007	186	0.009	249	0.006	56	0.011	166

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL (REFLEX TE)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	91.74	0.400	12.33	3.23		5022.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.350	438.2	738.5	0.48E 07	-0.00097	1.461	15.67

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.198	0.245	7	0.013	347	0.003	236	0.005	213	0.007	64	0.005	218	0.005	15	0.007	156	0.001	259
CM		0.014	0.030	279	0.003	313	0.002	198	0.001	212	0.001	235	0.000	292	0.002	134	0.003	334	0.002	28
DCP 1	.010	5.498	1.689	333	0.071	61	0.085	276	0.014	261	0.035	187	0.015	277	0.021	104	0.017	267	0.011	86
DCP 2	.025	5.545	1.678	336	0.116	259	0.017	231	0.095	212	0.067	80	0.037	212	0.050	65	0.037	212	0.036	7
DCP 3	.100	3.110	0.475	357	0.089	13	0.029	206	0.013	82	0.019	327	0.011	217	0.013	83	0.008	15	0.008	290
DCP 4	.150	2.132	0.318	8	0.066	12	0.008	240	0.001	307	0.003	125	0.007	274	0.002	130	0.007	26	0.004	149
DCP 5	.200	1.743	0.285	11	0.036	1	0.016	200	0.004	111	0.009	10	0.014	205	0.006	88	0.006	103	0.007	357
DCP 6	.250	1.551	0.281	20	0.029	354	0.006	185	0.003	331	0.005	87	0.005	274	0.005	9	0.004	65	0.001	90
DCP 7	.300	1.343	0.246	23	0.023	347	0.009	168	0.002	297	0.007	38	0.007	165	0.009	347	0.007	147	0.005	13
DCP 8	.400	1.004	0.219	31	0.014	334	0.001	62	0.002	229	0.003	110	0.005	286	0.003	283	0.006	103	0.002	106
DCP 9	.500	0.664	0.169	40	0.011	328	0.006	94	0.006	219	0.009	80	0.002	126	0.008	256	0.008	142	0.002	263
DCP10	.600	0.540	0.168	43	0.005	282	0.007	52	0.009	249	0.010	73	0.004	250	0.008	336	0.014	136	0.008	195
DCP11	.830	0.272	0.096	58	0.010	159	0.011	6	0.006	142	0.005	34	0.008	211	0.012	33	0.013	175	0.003	240
DCP12	.878	0.216	0.075	42	0.013	123	0.007	328	0.003	233	0.004	55	0.004	249	0.008	14	0.007	185	0.006	176
DCP13	.953	0.117	0.048	11	0.024	105	0.011	260	0.016	30	0.004	222	0.015	75	0.024	278	0.019	162	0.019	226

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL (REFLEX TE)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	92.59	0.400	14.70	3.02		5022.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.353	438.0	737.9	0.48E 07	0.00125	1.609	18.07

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.216	0.339	3	0.015	233	0.017	148	0.008	163	0.022	113	0.009	290	0.004	107	0.009	165	0.016	356
CM		-0.037	0.038	69	0.016	293	0.019	239	0.003	61	0.007	279	0.006	92	0.003	275	0.002	324	0.008	144
DCP 1	.010	5.460	1.420	356	0.259	65	0.250	294	0.129	163	0.042	78	0.036	66	0.041	303	0.025	165	0.043	98
DCP 2	.025	4.854	1.285	30	0.570	338	0.286	240	0.145	202	0.137	150	0.087	61	0.029	307	0.009	354	0.021	137
DCP 3	.100	2.785	1.098	36	0.326	265	0.141	161	0.103	109	0.080	39	0.055	308	0.025	240	0.046	189	0.067	85
DCP 4	.150	1.970	0.792	24	0.204	216	0.062	158	0.065	72	0.029	10	0.036	245	0.016	157	0.015	133	0.022	27
DCP 5	.200	1.640	0.716	11	0.133	205	0.107	151	0.058	43	0.028	305	0.030	231	0.036	133	0.005	99	0.012	62
DCP 6	.250	1.520	0.663	4	0.134	180	0.093	131	0.031	20	0.022	274	0.017	182	0.013	90	0.007	114	0.021	2
DCP 7	.300	1.373	0.551	351	0.068	151	0.098	117	0.044	1	0.022	233	0.034	168	0.030	54	0.020	306	0.010	119
DCP 8	.400	1.087	0.413	335	0.061	120	0.041	61	0.018	345	0.034	176	0.026	92	0.010	309	0.003	238	0.005	354
DCP 9	.500	0.738	0.271	319	0.021	112	0.051	59	0.038	273	0.028	139	0.018	53	0.011	338	0.013	125	0.021	314
DCP10	.600	0.646	0.175	308	0.016	132	0.028	351	0.035	232	0.042	126	0.024	347	0.019	213	0.019	157	0.038	336
DCP11	.830	0.466	0.070	255	0.056	102	0.026	341	0.031	177	0.043	106	0.061	276	0.025	100	0.037	209	0.064	328
DCP12	.878	0.404	0.025	185	0.044	87	0.010	83	0.014	180	0.027	58	0.024	290	0.018	140	0.043	39	0.021	90
DCP13	.953	0.278	0.016	199	0.037	81	0.008	39	0.023	57	0.044	40	0.032	199	0.033	44	0.027	84	0.015	242

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL (REFLEX TE)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D,ALPHA	DEL,H	TEST POINT	CYCLES ANALYZED
	16.03	0.400	0.21	4.94		5023.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.061	437.8	742.3	0.48E 07	-0.00077	0.435	5.04

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		-0.103	0.531	353	0.012	343	0.010	202	0.009	316	0.003	89	0.003	201	0.003	204	0.002	326	0.001	119
CM		-0.003	0.008	306	0.002	318	0.001	308	0.001	249	0.001	95	0.001	99	0.001	38	0.000	249	0.001	19
DCP 1	.010	-1.880	2.644	353	0.590	255	0.448	315	0.183	18	0.067	344	0.171	44	0.212	140	0.172	246	0.124	350
DCP 2	.025	-0.995	2.276	351	0.102	256	0.106	241	0.083	334	0.036	123	0.031	245	0.052	339	0.044	31	0.016	103
DCP 3	.100	-0.081	1.539	349	0.199	40	0.095	136	0.027	292	0.064	78	0.069	162	0.033	236	0.002	19	0.029	170
DCP 4	.150	0.007	0.952	351	0.079	30	0.067	135	0.046	212	0.024	265	0.015	321	0.008	93	0.001	154	0.004	343
DCP 5	.200	-0.033	0.815	351	0.063	48	0.053	143	0.035	225	0.020	273	0.008	36	0.005	172	0.016	225	0.006	1
DCP 6	.250	-0.039	0.651	352	0.034	295	0.037	281	0.005	7	0.007	167	0.008	245	0.001	19	0.005	27	0.004	99
DCP 7	.300	0.027	0.552	354	0.014	339	0.006	239	0.006	254	0.004	139	0.004	256	0.004	43	0.005	197	0.005	316
DCP 8	.400	0.002	0.414	357	0.022	255	0.012	262	0.013	331	0.004	127	0.005	204	0.003	224	0.003	354	0.002	67
DCP 9	.500	-0.075	0.291	356	0.007	211	0.015	258	0.009	309	0.002	117	0.002	306	0.002	28	0.003	75	0.003	125
DCP10	.600	-0.057	0.228	358	0.016	241	0.010	271	0.008	350	0.002	256	0.002	231	0.003	186	0.004	14	0.002	248
DCP11	.830	0.006	0.118	0	0.010	73	0.013	166	0.014	266	0.001	180	0.003	230	0.003	227	0.001	175	0.005	159
DCP12	.878	-0.039	0.096	1	0.005	227	0.002	244	0.003	353	0.002	76	0.004	175	0.003	238	0.005	348	0.003	229
DCP13	.953	-0.171	0.113	352	0.023	90	0.027	130	0.019	54	0.014	314	0.017	235	0.013	207	0.003	95	0.003	328

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL (REFLEX TE)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D,ALPHA	DEL,H	TEST POINT	CYCLES ANALYZED
	16.08	0.400	5.05	4.95		5023.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.061	437.1	742.0	0.48E 07	-0.00033	0.936	9.94

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.653	0.525	353	0.044	338	0.005	190	0.004	314	0.003	165	0.004	304	0.004	88	0.001	142	0.002	138
CM		0.002	0.011	339	0.001	124	0.000	317	0.001	12	0.001	123	0.001	92	0.001	256	0.001	332	0.000	119
DCP 1	.010	1.061	3.022	351	0.256	2	0.057	156	0.021	325	0.016	165	0.014	7	0.017	120	0.016	351	0.016	156
DCP 2	.025	1.528	2.563	350	0.133	323	0.016	224	0.041	357	0.033	168	0.015	345	0.015	114	0.012	163	0.015	132
DCP 3	.100	1.422	1.315	351	0.105	337	0.015	197	0.012	339	0.005	143	0.008	333	0.003	103	0.005	349	0.007	154
DCP 4	.150	0.960	0.850	351	0.072	345	0.008	196	0.010	325	0.007	189	0.003	307	0.005	114	0.003	349	0.005	130
DCP 5	.200	0.716	0.759	351	0.065	357	0.008	225	0.006	324	0.006	120	0.011	298	0.007	13	0.007	76	0.010	101
DCP 6	.250	0.674	0.642	354	0.054	350	0.006	231	0.008	328	0.006	227	0.012	349	0.005	130	0.002	278	0.006	139
DCP 7	.300	0.606	0.550	352	0.046	350	0.005	231	0.003	318	0.006	122	0.013	317	0.006	77	0.002	53	0.003	95
DCP 8	.400	0.445	0.426	355	0.037	343	0.004	170	0.004	314	0.003	195	0.011	299	0.003	70	0.001	228	0.003	89
DCP 9	.500	0.245	0.307	355	0.026	339	0.004	152	0.011	239	0.002	133	0.006	249	0.004	35	0.002	108	0.002	51
DCP10	.600	0.200	0.238	359	0.022	332	0.002	179	0.005	267	0.002	270	0.004	237	0.003	111	0.005	211	0.002	35
DCP11	.830	0.122	0.113	3	0.015	326	0.001	225	0.010	110	0.005	59	0.005	259	0.004	97	0.006	138	0.003	133
DCP12	.878	0.052	0.091	7	0.015	299	0.001	181	0.002	229	0.002	293	0.003	150	0.002	105	0.002	262	0.001	298
DCP13	.953	-0.245	0.077	5	0.027	321	0.010	155	0.015	185	0.015	266	0.016	337	0.011	70	0.006	151	0.015	253

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL (REFLEX TE)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.08	0.470	7.47	4.91		5023.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.062	436.5	741.8	0.49E 07	-0.00092	1.223	12.45

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.718	0.500	354	0.046	357	0.007	191	0.004	303	0.002	112	0.001	277	0.002	70	0.004	227	0.002	36
CM		0.004	0.011	315	0.002	292	0.001	110	0.001	147	0.001	130	0.000	155	0.000	346	0.001	86	0.000	53
DCP 1	.010	2.598	2.897	352	0.308	343	0.118	183	0.030	96	0.042	48	0.024	263	0.005	43	0.012	232	0.016	58
DCP 2	.025	2.797	2.548	351	0.217	333	0.038	196	0.022	269	0.025	135	0.013	353	0.013	9	0.014	295	0.018	55
DCP 3	.100	2.063	1.250	352	0.106	348	0.014	184	0.012	312	0.011	133	0.006	195	0.005	77	0.009	240	0.006	51
DCP 4	.150	1.397	0.783	352	0.095	11	0.007	215	0.006	261	0.005	47	0.006	230	0.005	54	0.005	239	0.002	52
DCP 5	.200	1.081	0.701	352	0.063	2	0.010	147	0.005	323	0.005	217	0.002	215	0.002	117	0.006	176	0.005	343
DCP 6	.250	0.998	0.584	355	0.074	18	0.007	174	0.003	249	0.004	74	0.003	217	0.006	84	0.002	244	0.001	22
DCP 7	.300	0.874	0.514	354	0.062	0	0.006	233	0.001	77	0.001	312	0.003	26	0.003	58	0.005	233	0.003	29
DCP 8	.400	0.650	0.393	357	0.053	16	0.006	152	0.005	230	0.002	33	0.003	218	0.003	69	0.002	234	0.002	335
DCP 9	.500	0.402	0.283	357	0.022	351	0.003	199	0.003	36	0.001	256	0.002	342	0.004	357	0.003	159	0.002	334
DCP10	.600	0.325	0.223	0	0.029	24	0.003	138	0.003	272	0.001	346	0.001	120	0.003	113	0.001	101	0.005	88
DCP11	.830	0.186	0.107	7	0.004	303	0.001	325	0.005	326	0.005	78	0.001	96	0.001	126	0.005	200	0.006	303
DCP12	.878	0.107	0.096	5	0.014	36	0.006	141	0.004	258	0.003	97	0.001	145	0.002	42	0.001	193	0.004	92
DCP13	.953	0.009	0.088	352	0.006	270	0.022	252	0.003	33	0.018	257	0.010	306	0.008	208	0.017	292	0.012	192

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL (REFLEX TE)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.08	0.400	9.90	4.84		5023.4	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.062	436.2	738.3	0.48E 07	-0.00093	1.425	14.54

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.957	0.440	1	0.080	6	0.011	252	0.015	115	0.010	286	0.005	173	0.006	46	0.003	22	0.004	283
CM		0.007	0.012	320	0.001	179	0.003	281	0.007	293	0.003	125	0.001	319	0.002	155	0.002	347	0.001	184
DCP 1	.010	4.025	2.805	357	0.424	341	0.087	220	0.042	315	0.078	221	0.051	160	0.027	82	0.008	56	0.012	163
DCP 2	.025	4.150	2.631	358	0.429	331	0.167	224	0.047	121	0.026	286	0.040	150	0.044	76	0.041	352	0.022	242
DCP 3	.100	2.591	1.004	358	0.188	27	0.045	334	0.016	298	0.014	264	0.007	271	0.008	116	0.008	9	0.005	16
DCP 4	.150	1.753	0.630	358	0.138	29	0.014	318	0.007	1	0.006	276	0.004	220	0.003	103	0.005	32	0.009	257
DCP 5	.200	1.405	0.546	359	0.118	26	0.031	294	0.011	166	0.002	2	0.011	322	0.001	121	0.008	63	0.011	277
DCP 6	.250	1.264	0.470	2	0.111	29	0.012	311	0.004	46	0.003	290	0.005	228	0.004	104	0.006	45	0.006	253
DCP 7	.300	1.102	0.400	3	0.094	18	0.020	286	0.008	146	0.005	328	0.010	283	0.007	103	0.009	357	0.008	267
DCP 8	.400	0.820	0.317	6	0.081	26	0.012	287	0.003	98	0.004	272	0.007	183	0.002	33	0.004	10	0.008	260
DCP 9	.500	0.526	0.230	7	0.054	11	0.010	281	0.003	108	0.010	298	0.005	182	0.009	32	0.007	299	0.007	214
DCP10	.600	0.420	0.183	10	0.050	27	0.008	301	0.001	131	0.005	266	0.007	169	0.006	46	0.005	1	0.006	256
DCP11	.830	0.258	0.106	10	0.025	309	0.024	125	0.091	118	0.030	294	0.021	129	0.016	345	0.023	154	0.014	359
DCP12	.878	0.160	0.100	9	0.018	358	0.006	189	0.006	92	0.003	313	0.003	247	0.001	260	0.001	175	0.002	274
DCP13	.953	0.072	0.120	8	0.048	290	0.017	139	0.012	0	0.009	5	0.022	319	0.004	285	0.008	294	0.015	56

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL (REFLEX TE)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	15.24	0.400	12.23	4.77		5026.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.059	437.1	736.1	0.68E 07	0.00069	1.539	16.22

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		1.114	0.277 21	0.154 30	0.065 292	0.036 147	0.005 185	0.001 125	0.002 195	0.004 144	0.002 351
CM		-0.019	0.034 176	0.030 54	0.013 360	0.022 311	0.002 269	0.003 245	0.002 157	0.002 55	0.001 61
DCP 1	.010	4.957	1.892 9	0.776 32	0.246 335	0.139 147	0.089 31	0.091 315	0.033 230	0.013 90	0.033 337
DCP 2	.025	4.697	1.393 16	1.020 35	0.423 314	0.119 242	0.028 41	0.101 296	0.079 234	0.048 210	0.037 161
DCP 3	.100	2.447	0.243 64	0.635 56	0.274 334	0.058 305	0.075 266	0.063 215	0.069 155	0.062 131	0.048 52
DCP 4	.150	1.877	0.185 61	0.366 55	0.135 326	0.021 283	0.017 233	0.035 231	0.018 175	0.013 87	0.010 338
DCP 5	.200	1.689	0.241 62	0.366 37	0.127 290	0.067 246	0.050 206	0.045 136	0.041 88	0.033 44	0.029 342
DCP 6	.250	1.424	0.240 42	0.224 39	0.059 289	0.011 283	0.022 198	0.019 124	0.009 66	0.011 27	0.013 295
DCP 7	.300	1.208	0.263 36	0.215 19	0.078 273	0.022 211	0.037 183	0.038 95	0.025 33	0.017 346	0.021 293
DCP 8	.400	0.981	0.272 23	0.192 4	0.050 210	0.022 130	0.035 138	0.013 92	0.008 0	0.006 330	0.010 252
DCP 9	.500	0.696	0.232 17	0.071 331	0.036 187	0.009 125	0.014 118	0.016 34	0.014 316	0.010 226	0.006 160
DCP10	.600	0.583	0.212 12	0.034 308	0.032 171	0.015 73	0.007 59	0.022 171	0.007 316	0.011 223	0.013 131
DCP11	.830	0.383	0.208 1	0.084 265	0.030 182	0.237 135	0.019 93	0.017 13	0.008 306	0.019 198	0.035 150
DCP12	.878	0.276	0.178 355	0.066 229	0.016 127	0.015 28	0.007 346	0.013 221	0.009 102	0.003 297	0.013 172
DCP13	.953	0.180	0.215 358	0.067 255	0.013 210	0.062 165	0.026 328	0.010 82	0.012 270	0.019 69	0.007 329

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL (REFLEX TE)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	15.53	0.400	14.45	4.79		5026.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.060	435.9	736.3	0.68E 07	0.00172	1.563	16.41

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		1.100	0.267 86	0.128 28	0.068 68	0.015 0	0.021 318	0.008 321	0.013 215	0.005 336	0.003 145
CM		-0.039	0.041 168	0.015 107	0.024 89	0.017 31	0.011 28	0.003 293	0.006 332	0.003 216	0.003 287
DCP 1	.010	5.016	1.172 59	0.745 36	0.320 65	0.087 14	0.061 350	0.026 295	0.034 156	0.001 12	0.016 170
DCP 2	.025	4.562	1.059 104	0.778 60	0.479 72	0.238 63	0.102 17	0.136 7	0.062 360	0.071 342	0.067 297
DCP 3	.100	2.410	1.025 136	0.626 54	0.253 87	0.130 28	0.111 2	0.071 331	0.057 303	0.042 285	0.032 284
DCP 4	.150	1.677	0.667 124	0.199 24	0.193 88	0.061 332	0.059 20	0.068 279	0.016 305	0.018 236	0.007 339
DCP 5	.200	1.493	0.571 113	0.196 27	0.164 53	0.065 323	0.066 343	0.053 262	0.038 256	0.038 198	0.014 173
DCP 6	.250	1.325	0.449 103	0.150 5	0.110 56	0.035 285	0.050 347	0.028 243	0.031 260	0.016 171	0.010 221
DCP 7	.300	1.174	0.381 91	0.117 13	0.110 36	0.028 289	0.045 322	0.029 234	0.038 239	0.024 159	0.012 188
DCP 8	.400	0.970	0.300 71	0.116 347	0.060 356	0.033 224	0.023 283	0.011 175	0.026 213	0.005 97	0.015 130
DCP 9	.500	0.693	0.232 52	0.067 348	0.053 335	0.022 194	0.046 258	0.016 110	0.031 192	0.012 86	0.010 87
DCP10	.600	0.574	0.211 34	0.082 346	0.052 281	0.016 182	0.039 217	0.005 45	0.040 159	0.018 349	0.028 114
DCP11	.830	0.456	0.212 356	0.031 345	0.070 255	0.039 174	0.043 278	0.021 90	0.016 117	0.010 38	0.014 343
DCP12	.878	0.383	0.211 356	0.053 344	0.062 260	0.037 181	0.021 151	0.016 352	0.005 76	0.010 290	0.011 175
DCP13	.953	0.260	0.208 338	0.060 11	0.058 263	0.025 332	0.009 212	0.013 322	0.010 153	0.030 25	0.010 146

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL (REFLEX TE)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	15.70	0.400	17.11	4.77		5324.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.060	435.1	733.0	0.48E 07	0.00031	1.592	17.15

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.125	0.348	98	0.054	109	0.027	83	0.016	56	0.012	92	0.004	83	0.011	133	0.006	351	0.009	96
CM		-0.061	0.063	174	0.030	185	0.011	158	0.012	157	0.010	154	0.007	174	0.002	121	0.008	129	0.003	142
DCP 1	.010	5.251	1.519	98	0.303	114	0.153	154	0.059	173	0.051	173	0.047	157	0.070	108	0.058	111	0.052	88
DCP 2	.025	4.556	1.571	129	0.562	160	0.286	156	0.213	170	0.199	181	0.166	153	0.156	164	0.116	153	0.137	131
DCP 3	.100	2.237	1.232	137	0.244	177	0.213	135	0.130	127	0.141	135	0.051	147	0.089	131	0.042	143	0.050	135
DCP 4	.150	1.591	0.772	116	0.182	173	0.041	36	0.087	95	0.030	152	0.024	352	0.028	80	0.004	218	0.008	63
DCP 5	.200	1.374	0.658	113	0.176	165	0.091	87	0.085	105	0.078	93	0.050	119	0.034	63	0.056	88	0.017	76
DCP 6	.250	1.306	0.545	99	0.171	163	0.046	15	0.068	55	0.036	92	0.014	337	0.031	36	0.015	27	0.011	52
DCP 7	.300	1.167	0.458	93	0.092	161	0.056	49	0.068	62	0.054	71	0.024	191	0.018	37	0.036	55	0.013	58
DCP 8	.400	1.006	0.359	76	0.065	70	0.033	0	0.050	1	0.034	64	0.018	27	0.016	319	0.037	3	0.009	96
DCP 9	.500	0.731	0.278	64	0.054	52	0.046	16	0.041	355	0.048	5	0.022	22	0.016	317	0.027	351	0.023	355
DCP10	.600	0.667	0.220	50	0.082	18	0.025	331	0.039	290	0.032	336	0.032	34	0.016	256	0.023	292	0.033	269
DCP11	.830	0.575	0.191	8	0.116	10	0.034	8	0.022	4	0.024	336	0.043	337	0.015	130	0.049	297	0.005	40
DCP12	.878	0.469	0.165	5	0.099	5	0.036	182	0.029	251	0.016	331	0.036	33	0.019	159	0.008	329	0.009	317
DCP13	.953	0.342	0.170	1	0.086	24	0.034	31	0.009	309	0.027	297	0.016	17	0.009	270	0.011	252	0.037	264

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL (REFLEX TE)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	15.82	0.400	24.45	4.79		5326.6	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.061	434.5	732.0	0.48E 07	-0.00207	1.142	26.77

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.017	0.111	48	0.030	191	0.011	339	0.014	138	0.009	336	0.003	259	0.003	178	0.003	254	0.003	329
CM		-0.127	0.041	204	0.001	187	0.002	127	0.005	329	0.002	179	0.001	187	0.000	341	0.002	330	0.002	152
DCP 1	.010	3.617	1.317	179	0.336	113	0.238	191	0.077	145	0.109	295	0.052	211	0.049	221	0.040	264	0.026	139
DCP 2	.025	2.817	0.869	167	0.258	112	0.039	337	0.133	120	0.076	343	0.020	197	0.031	329	0.022	290	0.011	225
DCP 3	.100	1.466	0.187	28	0.038	96	0.027	333	0.036	268	0.002	332	0.011	236	0.007	160	0.014	272	0.008	143
DCP 4	.150	1.261	0.188	26	0.020	41	0.020	349	0.016	44	0.009	337	0.004	7	0.005	145	0.007	328	0.004	8
DCP 5	.200	1.205	0.204	19	0.027	193	0.015	339	0.017	230	0.002	349	0.012	314	0.010	163	0.008	278	0.002	345
DCP 6	.250	1.202	0.204	25	0.018	32	0.022	341	0.014	7	0.005	356	0.013	333	0.005	196	0.008	22	0.014	342
DCP 7	.300	1.140	0.196	26	0.021	191	0.011	311	0.014	252	0.005	273	0.015	284	0.010	151	0.007	294	0.005	123
DCP 8	.400	1.036	0.200	27	0.012	35	0.010	355	0.013	322	0.005	298	0.009	329	0.007	134	0.006	51	0.004	183
DCP 9	.500	0.820	0.176	28	0.026	130	0.014	338	0.016	310	0.001	175	0.013	222	0.005	188	0.003	330	0.005	356
DCP10	.600	0.777	0.165	32	0.013	28	0.013	336	0.016	336	0.010	289	0.008	344	0.007	15:	0.003	256	0.005	314
DCP11	.830	0.728	0.115	41	0.027	124	0.012	252	0.002	142	0.018	315	0.016	161	0.010	353	0.020	170	0.019	341
DCP12	.878	0.616	0.115	43	0.013	350	0.015	340	0.016	332	0.004	315	0.011	279	0.004	157	0.013	37	0.012	125
DCP13	.953	0.509	0.069	38	0.031	96	0.011	330	0.008	241	0.024	267	0.017	7	0.013	212	0.006	214	0.014	281

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL (REFLEX TE)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	90.00	0.420	0.17	5.13		5325.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.346	434.5	733.8	0.48E 07	-0.00081	0.340	6.24

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		-0.079	0.467	3	0.037	64	0.005	222	0.005	239	0.001	126	0.002	170	0.004	84	0.000	158	0.004	45
CM		-0.013	0.050	284	0.015	324	0.006	117	0.002	147	0.001	138	0.001	27	0.002	311	0.000	218	0.001	186
DCP 1	.010	-1.984	2.680	342	0.189	185	0.311	261	0.111	338	0.091	118	0.073	215	0.066	303	0.048	70	0.069	154
DCP 2	.025	-1.023	2.210	342	0.172	62	0.161	146	0.088	295	0.015	85	0.016	73	0.031	256	0.025	332	0.038	61
DCP 3	.100	-0.070	1.341	344	0.228	16	0.101	65	0.068	140	0.027	224	0.035	343	0.047	41	0.029	116	0.008	87
DCP 4	.150	0.074	0.736	352	0.062	38	0.006	17	0.005	128	0.013	134	0.007	125	0.003	346	0.004	252	0.004	69
DCP 5	.200	0.059	0.646	355	0.066	25	0.015	351	0.011	36	0.024	117	0.028	135	0.004	303	0.014	255	0.007	3
DCP 6	.250	-0.008	0.559	7	0.060	75	0.017	244	0.010	259	0.001	55	0.001	11	0.005	28	0.003	259	0.003	346
DCP 7	.300	0.014	0.466	12	0.022	106	0.028	255	0.011	288	0.006	21	0.005	127	0.008	104	0.007	232	0.005	350
DCP 8	.400	-0.006	0.381	21	0.044	91	0.015	256	0.011	272	0.002	347	0.006	176	0.004	108	0.003	196	0.001	273
DCP 9	.500	-0.043	0.289	30	0.035	92	0.010	241	0.010	287	0.003	327	0.007	137	0.003	156	0.005	273	0.002	283
DCP10	.600	-0.036	0.264	43	0.035	95	0.012	278	0.013	293	0.007	336	0.005	207	0.008	110	0.002	11	0.003	337
DCP11	.830	0.016	0.164	61	0.018	130	0.011	251	0.008	45	0.004	4	0.007	232	0.012	130	0.005	56	0.012	37
DCP12	.878	-0.034	0.135	65	0.019	127	0.012	313	0.014	290	0.004	258	0.004	218	0.005	140	0.003	43	0.003	96

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL (REFLEX TE)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	90.00	0.420	5.04	5.87		5325.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.347	433.5	732.4	0.48E 07	-0.00099	0.930	11.09

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.681	0.429	7	0.020	92	0.009	239	0.004	3	0.008	77	0.003	83	0.002	178	0.001	11	0.003	258
CM		-0.005	0.052	283	0.013	258	0.006	122	0.003	131	0.001	12	0.001	68	0.000	27	0.000	255	0.001	344
DCP 1	.010	1.125	2.654	338	0.098	107	0.119	128	0.062	91	0.027	42	0.022	47	0.018	1	0.011	21	0.007	267
DCP 2	.025	1.576	2.247	342	0.041	161	0.054	161	0.037	59	0.050	66	0.031	82	0.009	164	0.020	323	0.021	287
DCP 3	.100	1.419	1.195	352	0.025	73	0.029	197	0.013	108	0.020	72	0.010	40	0.002	108	0.006	15	0.015	263
DCP 4	.150	0.996	0.692	354	0.020	85	0.010	189	0.008	120	0.013	66	0.005	71	0.001	285	0.002	334	0.004	306
DCP 5	.200	0.753	0.617	2	0.037	82	0.012	214	0.012	52	0.007	32	0.007	104	0.002	298	0.011	155	0.010	13
DCP 6	.250	0.706	0.539	8	0.028	75	0.014	218	0.012	134	0.013	58	0.000	229	0.001	189	0.002	292	0.005	292
DCP 7	.300	0.617	0.462	17	0.025	77	0.015	264	0.012	169	0.008	80	0.006	128	0.002	112	0.000	131	0.010	325
DCP 8	.400	0.464	0.376	22	0.022	91	0.017	256	0.014	326	0.007	138	0.002	70	0.003	179	0.002	67	0.002	180
DCP 9	.500	0.289	0.290	36	0.022	76	0.017	284	0.016	310	0.006	93	0.003	127	0.002	165	0.001	10	0.004	328
DCP10	.600	0.226	0.271	44	0.020	87	0.017	275	0.017	332	0.005	111	0.001	244	0.005	161	0.002	91	0.004	190
DCP11	.830	0.136	0.181	69	0.014	96	0.018	313	0.017	319	0.002	66	0.004	239	0.005	302	0.003	341	0.006	175
DCP12	.878	0.082	0.155	64	0.011	133	0.010	296	0.017	336	0.005	199	0.002	347	0.004	176	0.002	196	0.008	176

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL (REFLEX TE)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	90.09	0.430	7.43	5.99		5325.3	10

K	V	Q	RN	DAMPING	CM(MAX)	ALPHA(STALL)
0.348	432.9	731.2	0.48E 07	-0.00092	1.170	13.55

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.767	0.418	358	0.024	75	0.006	312	0.005	339	0.006	12	0.005	281	0.003	230	0.006	294	0.002	355
CM		-0.001	0.054	277	0.032	255	0.333	34	0.330	56	0.332	269	0.331	134	0.001	101	0.001	94	0.331	133
DCP 1	.010	2.742	2.673	336	0.122	136	0.093	88	0.069	3	0.031	307	0.020	249	0.009	191	0.018	162	0.010	125
DCP 2	.025	2.974	2.332	328	0.092	130	0.059	59	0.028	337	0.038	326	0.034	252	0.006	125	0.021	160	0.013	59
DCP 3	.100	2.105	1.108	330	0.043	39	0.009	60	0.012	345	0.015	328	0.007	265	0.009	208	0.007	158	0.007	119
DCP 4	.150	1.683	0.683	356	0.063	55	0.010	302	0.007	16	0.002	348	0.009	266	0.003	213	0.006	158	0.003	278
DCP 5	.200	1.150	0.505	350	0.043	37	0.007	136	0.006	251	0.008	198	0.016	281	0.010	225	0.008	94	0.006	82
DCP 6	.250	1.061	0.532	8	0.035	64	0.010	299	0.005	350	0.005	54	0.009	274	0.006	252	0.005	232	0.007	285
DCP 7	.300	0.931	0.455	5	0.032	66	0.007	262	0.007	333	0.003	0	0.003	362	0.001	135	0.001	195	0.005	357
DCP 8	.400	0.682	0.372	22	0.028	68	0.015	287	0.005	9	0.003	51	0.005	255	0.003	170	0.003	197	0.006	281
DCP 9	.500	0.453	0.280	24	0.024	55	0.007	252	0.006	214	0.005	53	0.005	335	0.002	213	0.002	230	0.002	83
DCP10	.600	0.365	0.266	43	0.023	73	0.014	286	0.006	357	0.002	10	0.008	271	0.004	247	0.005	214	0.001	306
DCP11	.830	0.211	0.144	55	0.013	120	0.009	285	0.005	266	0.013	78	0.008	60	0.004	290	0.009	270	0.011	339
DCP12	.878	0.118	0.150	62	0.012	130	0.007	285	0.004	69	0.002	46	0.003	301	0.003	279	0.005	267	0.007	172

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL (REFLEX TE)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	90.09	0.430	9.85	5.94		5325.4	10

K	V	Q	RN	DAMPING	CM(MAX)	ALPHA(STALL)
0.348	432.3	731.7	0.48E 07	-0.00092	1.628	15.88

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.015	0.423	0	0.024	71	0.015	336	0.006	205	0.004	78	0.001	283	0.005	306	0.003	231	0.001	170
CM		0.336	0.055	285	0.035	277	0.334	154	0.332	114	0.331	12	0.331	256	0.332	121	0.331	156	0.331	83
DCP 1	.010	4.317	2.952	334	0.113	152	0.093	298	0.129	175	0.062	62	0.022	159	0.037	29	0.012	275	0.010	214
DCP 2	.025	4.485	2.814	331	0.201	200	0.030	104	0.042	143	0.072	34	0.069	265	0.011	39	0.049	212	0.060	80
DCP 3	.100	2.650	1.010	346	0.123	22	0.053	265	0.014	157	0.005	192	0.032	178	0.003	158	0.006	137	0.007	158
DCP 4	.150	1.858	0.635	357	0.081	35	0.026	281	0.011	207	0.006	109	0.331	347	0.003	222	0.002	93	0.334	256
DCP 5	.200	1.457	0.551	357	0.052	20	0.006	259	0.334	344	0.008	191	0.010	86	0.011	313	0.013	175	0.008	130
DCP 6	.250	1.332	0.504	10	0.059	65	0.020	285	0.008	236	0.006	80	0.333	322	0.004	236	0.001	215	0.005	228
DCP 7	.300	1.160	0.437	12	0.061	63	0.008	317	0.336	259	0.007	162	0.335	26	0.005	258	0.004	135	0.001	284
DCP 8	.400	0.853	0.363	24	0.041	59	0.016	292	0.339	246	0.002	112	0.335	356	0.004	213	0.005	339	0.009	227
DCP 9	.500	0.576	0.276	32	0.027	60	0.014	325	0.335	242	0.005	86	0.331	297	0.002	197	0.333	35	0.005	243
DCP10	.600	0.468	0.254	44	0.031	76	0.015	335	0.338	246	0.333	73	0.331	133	0.006	327	0.338	334	0.338	245
DCP11	.830	0.282	0.143	63	0.025	157	0.030	360	0.333	317	0.007	181	0.333	171	0.330	306	0.004	192	0.336	21
DCP12	.878	0.171	0.132	55	0.033	113	0.014	327	0.335	233	0.001	192	0.332	46	0.336	313	0.006	315	0.337	223

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL (REFLEX TE)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	86.96	0.400	12.36	5.87		5026.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.332	436.9	741.6	0.48E 07	0.00003	1.653	18.57

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.072	0.546	14	0.014	302	0.003	60	0.005	228	0.006	163	0.015	63	0.018	286	0.018	158	0.015	346
CM		-0.026	0.018	168	0.033	316	0.012	229	0.007	122	0.002	343	0.002	259	0.007	97	0.007	316	0.008	155
DCP 1	.010	4.344	2.262	350	0.309	10	0.404	316	0.313	201	0.135	96	0.062	300	0.031	97	0.028	15	0.004	309
DCP 2	.025	4.136	1.765	6	0.758	357	0.348	273	0.197	204	0.140	152	0.108	77	0.077	14	0.037	329	0.056	273
DCP 3	.100	2.504	1.188	32	0.489	319	0.178	198	0.067	120	0.037	78	0.082	28	0.086	290	0.061	191	0.011	88
DCP 4	.150	1.847	0.882	24	0.272	285	0.113	141	0.043	93	0.044	15	0.021	280	0.020	233	0.029	163	0.021	88
DCP 5	.200	1.555	0.879	21	0.172	260	0.041	165	0.092	94	0.048	334	0.028	329	0.039	232	0.039	159	0.031	77
DCP 6	.250	1.385	0.824	19	0.184	239	0.071	103	0.049	79	0.048	319	0.016	254	0.037	199	0.022	119	0.023	38
DCP 7	.300	1.277	0.755	13	0.142	198	0.033	126	0.071	49	0.045	313	0.041	223	0.026	119	0.007	94	0.006	29
DCP 8	.400	0.570	0.614	12	0.144	177	0.065	68	0.045	1	0.039	245	0.033	146	0.016	69	0.008	339	0.010	276
DCP 9	.500	0.650	0.432	5	0.131	133	0.034	80	0.049	319	0.026	228	0.029	108	0.014	347	0.014	266	0.010	152
DCP10	.600	0.547	0.370	11	0.122	142	0.055	43	0.047	267	0.029	188	0.034	52	0.014	259	0.031	234	0.027	49
DCP11	.830	0.426	0.091	1	0.092	90	0.033	7	0.016	325	0.022	134	0.026	58	0.067	292	0.087	135	0.085	324
DCP12	.878	0.288	0.126	340	0.080	105	0.035	24	0.054	230	0.041	70	0.012	270	0.030	249	0.033	88	0.022	318

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL (REFLEX TE)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	86.21	0.400	14.71	5.79		5025.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.330	436.2	735.5	0.48E 07	0.00000	1.771	20.46

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.143	0.621	17	0.017	246	0.016	84	0.020	263	0.008	94	0.011	192	0.002	242	0.012	359	0.013	215
CM		-0.065	0.079	138	0.050	353	0.021	252	0.019	161	0.011	298	0.003	349	0.003	114	0.005	170	0.005	28
DCP 1	.010	3.910	1.255	60	1.175	37	0.537	319	0.060	271	0.236	280	0.236	157	0.155	29	0.094	244	0.076	89
DCP 2	.025	3.929	1.476	42	0.897	21	0.389	332	0.254	261	0.081	212	0.037	270	0.073	218	0.100	150	0.062	69
DCP 3	.100	2.427	1.419	50	0.450	333	0.170	236	0.148	221	0.073	169	0.094	121	0.060	49	0.041	9	0.028	287
DCP 4	.150	1.835	1.091	37	0.297	291	0.057	231	0.089	197	0.066	145	0.069	56	0.015	96	0.036	344	0.018	295
DCP 5	.200	1.547	1.052	30	0.169	274	0.111	228	0.078	136	0.069	97	0.050	349	0.009	281	0.016	351	0.037	272
DCP 6	.250	1.452	1.023	26	0.168	262	0.128	216	0.068	138	0.097	86	0.057	337	0.018	261	0.017	335	0.028	242
DCP 7	.300	1.348	0.926	19	0.128	250	0.156	138	0.085	107	0.087	63	0.052	304	0.029	196	0.036	322	0.041	190
DCP 8	.400	1.098	0.806	9	0.114	219	0.152	157	0.064	87	0.093	14	0.075	289	0.050	184	0.009	90	0.022	150
DCP 9	.500	0.812	0.629	356	0.169	193	0.133	115	0.057	11	0.039	286	0.043	231	0.023	118	0.010	1	0.036	324
DCP10	.600	0.687	0.523	356	0.132	182	0.106	122	0.065	346	0.033	293	0.074	193	0.027	31	0.025	36	0.019	243
DCP11	.830	0.596	0.291	314	0.185	169	0.110	14	0.064	275	0.035	163	0.043	88	0.028	291	0.026	326	0.040	198
DCP12	.878	0.440	0.253	322	0.169	163	0.122	38	0.034	264	0.045	141	0.033	63	0.031	285	0.016	346	0.011	221

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL (REFLEX TE)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	86.21	0.630	17.12	5.56		5326.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.330	436.1	739.7	0.685 07	0.00096	1.920	22.99

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.252	0.696	37	0.097	305	0.051	162	0.014	57	0.030	339	0.013	232	0.002	300	0.007	339	0.006	245
CM		-0.086	0.112	150	0.054	52	0.028	317	0.017	290	0.013	145	0.008	9	0.001	228	0.002	37	0.006	296
DCP 1	.010	4.140	1.371	93	1.156	55	0.166	60	0.226	18	0.036	217	0.089	6	0.126	239	0.008	119	0.101	316
DCP 2	.025	3.076	1.665	97	1.063	52	0.226	45	0.233	32	0.115	359	0.118	15	0.076	329	0.060	39	0.099	333
DCP 3	.100	2.537	1.413	79	0.697	13	0.168	2	0.170	310	0.155	300	0.086	225	0.060	329	0.089	254	0.075	208
DCP 4	.150	1.946	1.050	55	0.290	336	0.125	317	0.073	275	0.072	239	0.055	284	0.086	300	0.039	138	0.010	295
DCP 5	.200	1.478	0.903	69	0.173	363	0.175	284	0.143	228	0.085	261	0.064	193	0.021	165	0.018	135	0.011	39
DCP 6	.250	1.603	0.888	39	0.296	317	0.181	265	0.137	268	0.091	183	0.028	34	0.036	158	0.030	56	0.038	258
DCP 7	.300	1.473	0.974	34	0.195	326	0.215	250	0.153	214	0.078	186	0.060	110	0.036	126	0.051	63	0.039	250
DCP 8	.400	1.263	0.811	21	0.223	331	0.207	138	0.145	198	0.084	113	0.065	347	0.066	82	0.050	313	0.034	167
DCP 9	.500	0.967	0.726	11	0.267	347	0.186	176	0.153	160	0.120	72	0.065	324	0.016	17	0.027	230	0.016	247
DCP10	.600	0.831	0.603	6	0.251	358	0.176	167	0.078	115	0.123	11	0.051	263	0.029	310	0.017	230	0.031	217
DCP11	.830	0.667	0.342	365	0.235	214	0.161	83	0.156	29	0.108	313	0.083	142	0.025	206	0.016	232	0.046	87
DCP12	.878	0.532	0.332	366	0.229	210	0.131	76	0.135	11	0.080	283	0.030	100	0.043	110	0.026	336	0.019	5

FORCED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL (REFLEX TE)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	85.67	0.630	24.51	5.52		5326.6	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.327	437.0	739.8	0.685 07	-0.00109	1.577	28.82

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.137	0.416	59	0.117	322	0.034	262	0.020	256	0.004	123	0.010	35	0.004	6	0.010	98	0.015	196
CM		-0.155	0.081	220	0.035	114	0.035	59	0.016	18	0.003	210	0.002	232	0.002	97	0.001	310	0.005	333
DCP 1	.010	3.471	1.024	152	0.572	82	0.438	129	0.226	55	0.116	69	0.139	31	0.081	8	0.032	11	0.061	336
DCP 2	.025	2.932	0.904	141	0.157	28	0.132	172	0.088	33	0.060	164	0.061	76	0.036	46	0.061	132	0.066	132
DCP 3	.100	1.529	0.350	50	0.160	368	0.068	294	0.041	285	0.021	278	0.017	258	0.006	45	0.024	72	0.017	66
DCP 4	.150	1.375	0.376	43	0.126	350	0.037	307	0.047	276	0.029	245	0.015	256	0.018	146	0.033	135	0.025	67
DCP 5	.200	1.283	0.387	55	0.110	335	0.057	282	0.044	252	0.023	213	0.035	10	0.012	351	0.010	235	0.009	22
DCP 6	.250	1.326	0.432	66	0.133	363	0.067	232	0.050	280	0.022	270	0.007	28	0.016	126	0.028	78	0.020	30
DCP 7	.300	1.269	0.426	66	0.123	336	0.074	271	0.061	265	0.015	214	0.009	72	0.016	329	0.014	129	0.016	37
DCP 8	.400	1.106	0.450	66	0.161	328	0.060	256	0.053	267	0.018	154	0.007	30	0.013	66	0.014	3	0.003	296
DCP 9	.500	0.976	0.403	65	0.131	310	0.072	226	0.026	252	0.021	115	0.017	10	0.006	280	0.007	187	0.006	263
DCP10	.600	0.852	0.444	64	0.176	303	0.036	229	0.060	230	0.015	63	0.009	24	0.009	331	0.007	58	0.033	121
DCP11	.830	0.676	0.277	66	0.157	296	0.012	129	0.022	150	0.010	30	0.016	63	0.013	247	0.030	122	0.039	135
DCP12	.878	0.735	0.297	68	0.131	296	0.026	239	0.027	150	0.015	329	0.006	10	0.013	27	0.017	286	0.019	147

FORCED VERTICAL TRANSLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.34	0.200	9.90		0.305	3085.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.121	224.9	202.2	0.26E 07	-0.00522	0.996	9.90

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.819	0.168 262	0.005 16	0.011 288	0.003 296	0.007 203	0.005 191	0.002 103	0.001 149	0.005 58
CM		-0.013	0.001 232	0.003 290	0.003 311	0.002 218	0.002 221	0.001 191	0.002 116	0.002 79	0.001 44
DCP 1	.010	5.106	1.217 254	0.040 88	0.010 11	0.000 35	0.012 303	0.009 168	0.013 327	0.012 37	0.004 110
DCP 2	.025	3.128	0.938 250	0.024 151	0.007 296	0.005 41	0.011 102	0.013 271	0.017 72	0.009 204	0.013 357
DCP 3	.050	1.735	0.461 287	0.138 316	0.161 294	0.088 237	0.117 208	0.067 159	0.083 123	0.046 82	0.066 55
DCP 4	.150	1.575	0.313 256	0.016 63	0.007 285	0.016 32	0.004 243	0.005 62	0.007 354	0.006 85	0.009 34
DCP 5	.200	1.554	0.249 254	0.007 143	0.002 8	0.007 36	0.004 250	0.006 299	0.003 240	0.002 199	0.004 168
DCP 6	.250	1.316	0.211 258	0.011 55	0.004 255	0.012 33	0.003 179	0.002 36	0.007 357	0.006 119	0.007 3
DCP 7	.300	1.009	0.194 255	0.009 166	0.001 14	0.005 18	0.001 195	0.004 222	0.006 318	0.007 280	0.006 137
DCP 8	.500	0.573	0.107 261	0.010 161	0.003 288	0.004 20	0.002 358	0.005 270	0.003 283	0.003 193	0.004 216
DCP 9	.695	0.237	0.073 269	0.014 49	0.002 95	0.002 243	0.004 68	0.008 221	0.007 277	0.004 253	0.007 23
DCP10	.800	0.230	0.032 280	0.020 124	0.011 173	0.009 31	0.011 131	0.003 223	0.006 357	0.012 262	0.011 217
DCP11	.878	0.178	0.043 269	0.014 46	0.001 34	0.008 50	0.004 51	0.002 134	0.003 210	0.005 329	0.005 41
DCP12	.953	0.210	0.008 22	0.001 12	0.008 193	0.007 273	0.009 278	0.003 288	0.007 309	0.008 198	0.007 190

FORCED VERTICAL TRANSLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.37	0.200	12.29		0.305	3085.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.121	225.1	201.8	0.26E 07	-0.00443	1.113	12.29

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.964	0.143 270	0.003 317	0.007 266	0.008 250	0.004 224	0.001 158	0.006 134	0.009 171	0.004 32
CM		-0.004	0.003 211	0.003 293	0.004 301	0.000 179	0.002 196	0.000 129	0.001 75	0.003 14	0.001 52
DCP 1	.010	6.398	1.124 256	0.040 149	0.011 100	0.019 298	0.008 338	0.006 42	0.004 111	0.009 260	0.003 208
DCP 2	.025	4.012	0.794 254	0.037 169	0.007 51	0.013 284	0.007 176	0.016 280	0.009 301	0.010 29	0.009 138
DCP 3	.050	2.578	0.405 294	0.150 308	0.146 291	0.094 223	0.098 208	0.047 145	0.065 120	0.031 95	0.055 34
DCP 4	.150	1.737	0.304 258	0.013 107	0.008 280	0.010 333	0.008 9	0.001 296	0.006 103	0.007 114	0.002 65
DCP 5	.200	1.712	0.217 261	0.012 103	0.005 244	0.003 345	0.011 182	0.008 313	0.007 125	0.006 155	0.006 96
DCP 6	.250	1.466	0.187 264	0.014 129	0.004 231	0.011 332	0.009 18	0.007 31	0.011 98	0.005 173	0.004 330
DCP 7	.300	1.120	0.161 263	0.005 129	0.004 207	0.004 333	0.005 200	0.006 303	0.003 229	0.011 182	0.002 3
DCP 8	.500	0.558	0.074 286	0.008 131	0.009 211	0.005 275	0.006 261	0.006 345	0.003 266	0.014 197	0.006 123
DCP 9	.695	0.284	0.051 290	0.012 168	0.011 145	0.005 20	0.015 49	0.008 161	0.011 115	0.015 237	0.011 311
DCP10	.800	0.272	0.035 277	0.016 85	0.013 105	0.011 233	0.013 303	0.006 251	0.011 249	0.017 152	0.004 48
DCP11	.878	0.224	0.047 260	0.004 358	0.013 106	0.005 317	0.008 42	0.004 86	0.001 244	0.002 232	0.005 246
DCP12	.953	0.306	0.023 307	0.015 344	0.003 358	0.011 177	0.003 265	0.002 351	0.006 244	0.006 132	0.005 167

FORCED VERTICAL TRANSLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.37	0.200	14.62		0.305	3385.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.122	224.3	201.2	0.26E 07	-0.00576	1.293	14.62

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.889	0.306	322	0.112	123	0.077	250	0.045	31	0.039	193	0.023	16	0.025	143	0.017	309	0.003	72
CM		-0.073	0.067	47	0.039	219	0.031	13	0.028	180	0.016	353	0.012	156	0.009	338	0.007	125	0.004	357
DCP 1	.010	4.611	2.310	25	1.291	202	0.549	30	0.280	235	0.185	80	0.091	304	0.133	109	0.085	340	0.034	114
DCP 2	.025	2.556	1.757	6	0.709	188	0.244	15	0.152	226	0.178	61	0.091	244	0.061	61	0.052	238	0.019	151
DCP 3	.050	1.586	1.367	7	0.394	197	0.218	330	0.175	209	0.071	170	0.054	171	0.105	100	0.029	336	0.053	41
DCP 4	.150	1.438	0.649	336	0.322	151	0.188	323	0.142	147	0.084	331	0.054	154	0.044	26	0.026	189	0.038	49
DCP 5	.200	1.487	0.550	319	0.271	125	0.183	283	0.124	106	0.075	291	0.058	109	0.035	295	0.038	53	0.029	347
DCP 6	.250	1.332	0.449	324	0.212	139	0.160	295	0.125	114	0.067	289	0.053	113	0.036	330	0.022	148	0.036	7
DCP 7	.300	1.081	0.436	301	0.209	108	0.182	255	0.134	71	0.082	253	0.085	80	0.046	257	0.020	152	0.034	317
DCP 8	.500	0.639	0.297	277	0.147	67	0.156	209	0.130	14	0.095	191	0.087	6	0.066	165	0.035	315	0.030	196
DCP 9	.695	0.460	0.221	254	0.124	56	0.128	201	0.146	359	0.100	168	0.061	341	0.049	141	0.039	318	0.038	150
DCP10	.800	0.426	0.163	249	0.120	39	0.079	188	0.097	351	0.065	148	0.052	307	0.042	136	0.046	293	0.022	129
DCP11	.878	0.411	0.129	244	0.077	52	0.058	195	0.053	337	0.039	165	0.034	310	0.034	162	0.018	335	0.019	162
DCP12	.953	0.519	0.058	220	0.060	31	0.063	168	0.046	282	0.017	100	0.038	245	0.021	48	0.020	262	0.004	51

FORCED VERTICAL TRANSLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.34	0.400	10.00		0.306	3086.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.063	434.3	738.1	0.48E 07	-0.00164	1.158	10.00

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.086	0.058	295	0.024	206	0.009	334	0.005	71	0.004	240	0.001	251	0.002	123	0.001	184	0.001	16
CM		0.006	0.001	282	0.003	256	0.003	49	0.001	223	0.001	26	0.000	177	0.001	219	0.001	67	0.000	325
DCP 1	.010	6.654	0.835	274	0.157	173	0.126	51	0.120	46	0.024	60	0.010	115	0.046	209	0.044	214	0.018	189
DCP 2	.025	4.877	0.425	266	0.476	248	0.264	82	0.033	0	0.040	40	0.104	243	0.022	74	0.018	109	0.040	350
DCP 3	.050	4.018	0.167	316	0.045	212	0.083	323	0.041	221	0.013	237	0.008	192	0.017	153	0.007	123	0.006	71
DCP 4	.150	1.721	0.086	288	0.041	195	0.017	346	0.006	131	0.005	259	0.002	77	0.001	341	0.001	59	0.001	243
DCP 5	.200	1.533	0.074	293	0.037	179	0.021	311	0.015	103	0.011	279	0.008	50	0.001	200	0.003	324	0.002	61
DCP 6	.250	1.271	0.056	296	0.031	205	0.011	332	0.005	88	0.006	255	0.001	316	0.001	101	0.000	163	0.002	302
DCP 7	.300	1.096	0.054	295	0.026	176	0.018	290	0.018	85	0.012	254	0.014	68	0.006	234	0.006	53	0.005	237
DCP 8	.400	0.817	0.027	316	0.021	196	0.007	304	0.007	64	0.005	231	0.003	327	0.003	81	0.001	276	0.003	3
DCP 9	.500	0.647	0.021	327	0.017	186	0.009	284	0.008	66	0.006	234	0.004	81	0.002	124	0.002	16	0.001	180
DCP10	.695	0.542	0.019	320	0.006	165	0.013	243	0.007	76	0.006	224	0.003	356	0.003	356	0.004	208	0.002	150
DCP11	.800	0.209	0.019	296	0.006	131	0.008	253	0.006	8	0.005	197	0.008	234	0.003	132	0.003	203	0.002	198
DCP12	.878	0.159	0.029	272	0.008	66	0.005	199	0.002	24	0.002	172	0.003	292	0.004	51	0.004	245	0.003	28
DCP13	.953	0.205	0.037	262	0.009	74	0.005	185	0.008	359	0.004	88	0.003	249	0.006	66	0.003	257	0.002	59

FORCED VERTICAL TRANSLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.47	0.400	12.31		0.308	3086.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.063	434.1	736.0	0.48E 07	0.00174	1.132	12.31

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.996	0.116	29	0.013	259	0.009	175	0.015	216	0.005	75	0.006	136	0.006	158	0.003	164	0.005	320
CM		-0.075	0.044	73	0.007	27	0.004	219	0.002	294	0.003	202	0.003	37	0.000	173	0.001	315	0.003	127
DCP 1	.010	5.136	1.545	54	0.138	19	0.021	220	0.017	334	0.022	177	0.079	171	0.082	99	0.094	232	0.024	105
DCP 2	.025	2.760	1.039	84	0.095	82	0.168	232	0.089	213	0.074	165	0.025	340	0.051	146	0.026	150	0.047	96
DCP 3	.050	2.930	0.825	53	0.090	6	0.054	265	0.039	223	0.027	126	0.068	107	0.027	156	0.020	265	0.030	122
DCP 4	.150	1.338	0.309	39	0.010	351	0.036	176	0.031	239	0.003	0	0.023	74	0.001	197	0.010	120	0.003	157
DCP 5	.200	1.216	0.257	36	0.048	292	0.046	170	0.017	193	0.005	280	0.014	35	0.006	184	0.010	108	0.005	328
DCP 6	.250	1.113	0.187	25	0.024	245	0.031	160	0.038	236	0.008	254	0.018	38	0.012	239	0.016	50	0.004	336
DCP 7	.300	1.019	0.166	18	0.041	270	0.043	158	0.020	217	0.025	126	0.008	322	0.009	186	0.011	332	0.022	268
DCP 8	.400	0.795	0.086	344	0.043	253	0.021	121	0.016	213	0.005	48	0.002	190	0.013	280	0.008	54	0.015	25
DCP 9	.500	0.758	0.091	307	0.028	232	0.017	86	0.013	237	0.015	1	0.017	256	0.010	162	0.007	115	0.010	297
DCP10	.695	0.762	0.127	268	0.018	162	0.012	16	0.024	237	0.004	51	0.004	129	0.009	93	0.012	293	0.011	293
DCP11	.800	0.425	0.098	250	0.026	210	0.013	32	0.025	90	0.012	35	0.035	172	0.010	12	0.003	22	0.017	321
DCP12	.878	0.386	0.099	246	0.031	216	0.012	314	0.029	88	0.021	20	0.009	193	0.009	243	0.011	77	0.008	288
DCP13	.953	0.425	0.076	259	0.012	187	0.012	351	0.003	227	0.009	124	0.006	293	0.011	152	0.012	222	0.011	326

FORCED VERTICAL TRANSLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.53	0.400	14.62		0.308	3086.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.064	434.3	734.3	0.48E 07	0.00112	0.961	14.62

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.844	0.060	36	0.009	67	0.014	213	0.026	222	0.013	197	0.007	196	0.006	121	0.009	342	0.002	229
CM		-0.122	0.011	153	0.001	262	0.003	321	0.005	22	0.001	326	0.001	12	0.000	197	0.002	103	0.000	12
DCP 1	.010	3.262	0.455	93	0.096	148	0.040	224	0.032	305	0.065	43	0.033	10	0.028	139	0.039	65	0.017	175
DCP 2	.025	1.670	0.164	66	0.043	2	0.024	305	0.009	309	0.034	225	0.016	222	0.005	145	0.040	9	0.032	354
DCP 3	.050	1.913	0.134	42	0.016	344	0.052	258	0.050	225	0.050	206	0.020	173	0.023	125	0.020	13	0.008	346
DCP 4	.150	0.961	0.076	57	0.018	120	0.025	228	0.029	235	0.018	207	0.008	202	0.007	109	0.015	336	0.009	257
DCP 5	.200	0.880	0.064	52	0.022	36	0.018	224	0.029	232	0.021	229	0.014	132	0.013	145	0.010	26	0.006	215
DCP 6	.250	0.855	0.062	54	0.013	93	0.023	235	0.035	238	0.023	209	0.012	209	0.006	97	0.015	356	0.008	170
DCP 7	.300	0.800	0.076	50	0.023	60	0.027	227	0.040	239	0.033	202	0.015	196	0.010	153	0.008	3	0.009	171
DCP 8	.400	0.735	0.088	40	0.013	42	0.014	183	0.035	223	0.010	226	0.011	230	0.008	89	0.012	331	0.010	185
DCP 9	.500	0.739	0.067	34	0.013	59	0.017	164	0.031	219	0.016	189	0.006	214	0.011	149	0.013	8	0.001	325
DCP10	.695	0.846	0.054	354	0.010	99	0.012	179	0.027	187	0.008	144	0.008	180	0.003	49	0.005	359	0.006	284
DCP11	.800	0.555	0.057	344	0.012	139	0.005	90	0.019	228	0.002	200	0.003	89	0.004	78	0.013	298	0.002	104
DCP12	.878	0.525	0.042	329	0.009	314	0.015	157	0.017	206	0.012	164	0.002	53	0.004	338	0.020	245	0.005	121
DCP13	.953	0.508	0.015	306	0.005	301	0.005	71	0.009	183	0.006	90	0.003	251	0.005	326	0.014	290	0.005	346

FORCED VERTICAL TRANSLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.39	0.600	9.92		0.308	3089.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.044	628.8	1433.9	0.63E 07	-0.00017	0.963	9.92

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.929	0.018 342	0.004 301	0.001 135	0.001 348	0.008 153	0.005 149	0.002 28	0.007 204	0.000 348
CM		-0.031	0.008 124	0.003 78	0.002 44	0.001 256	0.002 261	0.002 219	0.001 116	0.002 358	0.001 341
DCP 1	.010	3.456	0.021 284	0.004 280	0.005 101	0.004 209	0.002 239	0.000 85	0.006 74	0.007 116	0.003 159
DCP 2	.025	3.884	0.070 250	0.003 78	0.017 53	0.014 261	0.033 189	0.028 156	0.022 94	0.009 354	0.005 55
DCP 3	.150	1.412	0.106 72	0.025 80	0.020 91	0.007 271	0.023 224	0.018 258	0.005 109	0.015 193	0.018 348
DCP 4	.200	1.241	0.018 95	0.015 61	0.013 32	0.017 313	0.015 229	0.022 183	0.012 101	0.010 271	0.007 295
DCP 5	.250	1.042	0.044 50	0.009 22	0.008 88	0.003 346	0.016 151	0.014 196	0.001 59	0.006 177	0.013 324
DCP 6	.300	0.939	0.035 47	0.011 321	0.009 40	0.007 286	0.013 221	0.011 163	0.010 60	0.014 238	0.002 291
DCP 7	.400	0.619	0.035 311	0.007 330	0.004 274	0.006 3	0.014 71	0.021 149	0.002 311	0.010 151	0.004 218
DCP 8	.500	0.619	0.031 14	0.014 297	0.017 279	0.013 96	0.015 120	0.011 142	0.005 271	0.018 230	0.009 129
DCP 9	.695	0.445	0.040 322	0.015 273	0.014 168	0.004 250	0.016 126	0.016 359	0.014 304	0.007 234	0.002 282
DCP10	.800	0.389	0.046 282	0.010 223	0.006 7	0.002 5	0.011 68	0.019 77	0.004 188	0.011 197	0.010 180
DCP11	.878	0.376	0.037 270	0.006 258	0.022 246	0.009 118	0.007 30	0.005 329	0.001 268	0.021 130	0.005 100
DCP12	.953	0.356	0.038 292	0.014 213	0.012 132	0.011 33	0.003 298	0.002 338	0.007 36	0.012 28	0.002 17

FORCED VERTICAL TRANSLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.50	0.600	12.31		0.308	3089.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.044	628.1	1430.7	0.63E 07	-0.00034	0.959	12.31

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.915	0.024 332	0.010 212	0.006 53	0.001 326	0.002 151	0.004 288	0.002 199	0.005 22	0.003 154
CM		-0.054	0.002 157	0.002 349	0.001 246	0.001 201	0.000 152	0.002 123	0.001 133	0.001 225	0.001 331
DCP 1	.010	3.579	0.153 271	0.010 162	0.021 65	0.003 245	0.006 0	0.003 198	0.010 156	0.008 326	0.009 89
DCP 2	.025	3.285	0.034 309	0.033 324	0.033 295	0.010 139	0.008 119	0.011 339	0.010 215	0.013 265	0.011 128
DCP 3	.150	1.417	0.063 287	0.038 249	0.026 108	0.008 320	0.012 147	0.016 152	0.016 169	0.015 62	0.012 50
DCP 4	.200	1.256	0.062 19	0.038 177	0.021 44	0.003 138	0.019 236	0.005 300	0.005 30	0.001 107	0.014 226
DCP 5	.250	1.020	0.035 10	0.017 246	0.022 118	0.010 298	0.008 71	0.015 151	0.010 119	0.010 53	0.004 68
DCP 6	.300	0.937	0.058 13	0.033 179	0.017 42	0.009 172	0.013 210	0.001 235	0.005 33	0.004 104	0.010 221
DCP 7	.400	0.615	0.032 25	0.008 250	0.015 103	0.016 311	0.012 6	0.015 236	0.006 311	0.017 343	0.011 269
DCP 8	.500	0.642	0.026 330	0.014 143	0.016 325	0.002 1	0.019 153	0.009 81	0.007 147	0.016 18	0.007 149
DCP 9	.695	0.483	0.019 304	0.006 212	0.002 153	0.006 235	0.007 23	0.023 326	0.008 251	0.004 141	0.002 80
DCP10	.800	0.476	0.014 322	0.011 219	0.008 87	0.010 92	0.001 209	0.014 258	0.010 17	0.006 331	0.008 228
DCP11	.878	0.462	0.014 2	0.008 152	0.013 32	0.012 28	0.006 34	0.015 309	0.007 260	0.014 99	0.014 72
DCP12	.953	0.405	0.020 227	0.005 182	0.006 161	0.001 5	0.017 279	0.007 160	0.003 26	0.010 246	0.011 162

FORCED VERTICAL TRANSLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS

AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.M	TEST POINT	CYCLES ANALYZED
16.37	0.600	14.63		0.306	3089.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.044	627.7	1427.2	0.63E 07	-0.00027	0.986	14.63

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.958	0.009 249	0.015 181	0.007 165	0.003 44	0.004 199	0.009 308	0.003 164	0.007 340	0.002 33
CM		-0.079	0.015 51	0.001 212	0.001 51	0.001 125	0.000 259	0.001 30	0.002 125	0.002 231	0.000 8
DCP 1	.010	3.757	0.043 49	0.030 242	0.013 99	0.032 336	0.052 220	0.020 346	0.025 293	0.026 22	0.012 311
DCP 2	.025	3.158	0.263 62	0.104 213	0.036 141	0.045 92	0.036 85	0.058 325	0.059 102	0.035 296	0.016 332
DCP 3	.150	1.374	0.044 351	0.038 128	0.023 192	0.024 261	0.022 254	0.011 287	0.016 227	0.015 301	0.010 57
DCP 4	.200	1.155	0.029 350	0.020 121	0.013 104	0.009 291	0.015 216	0.011 299	0.021 172	0.007 246	0.008 300
DCP 5	.250	1.075	0.034 329	0.038 156	0.009 99	0.011 315	0.016 199	0.009 268	0.015 169	0.006 204	0.015 88
DCP 6	.300	0.931	0.035 264	0.021 186	0.006 96	0.005 114	0.020 245	0.012 278	0.019 200	0.001 128	0.015 30
DCP 7	.400	0.682	0.025 243	0.024 164	0.006 254	0.011 61	0.009 241	0.008 301	0.007 164	0.010 357	0.014 112
DCP 8	.500	0.752	0.065 226	0.004 192	0.010 155	0.009 52	0.005 180	0.008 356	0.007 79	0.011 316	0.003 263
DCP 9	.695	0.597	0.064 220	0.011 257	0.011 252	0.000 131	0.006 138	0.010 338	0.016 303	0.019 48	0.007 135
DCP10	.800	0.535	0.041 234	0.002 113	0.008 143	0.004 304	0.013 42	0.009 195	0.018 356	0.015 18	0.008 278
DCP11	.878	0.532	0.028 246	0.016 36	0.002 155	0.009 345	0.006 330	0.007 260	0.005 309	0.011 94	0.010 336
DCP12	.953	0.486	0.010 225	0.011 164	0.003 133	0.011 200	0.007 156	0.008 214	0.013 221	0.004 237	0.003 294

FORCED VERTICAL TRANSLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	32.69	0.200	10.00		0.309	3090.1	10
K	V	Q	RN		DAMPING	CN(MAX)	ALPHA(STALL)
0.243	226.5	202.6	0.26E 07		-0.00479	1.249	10.00

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.931	0.311 269	0.010 159	0.009 260	0.007 86	0.015 151	0.001 25	0.007 49	0.005 218	0.004 15
CM		0.005	0.019 186	0.001 259	0.002 242	0.003 233	0.002 15	0.001 157	0.001 224	0.001 68	0.000 332
DCP 1	.010	5.376	2.213 251	0.093 115	0.025 161	0.009 357	0.038 64	0.021 318	0.014 262	0.009 163	0.018 237
DCP 2	.025	3.615	1.612 254	0.057 122	0.022 36	0.023 43	0.048 50	0.004 149	0.005 230	0.012 59	0.010 131
DCP 3	.050	3.016	0.988 264	0.099 256	0.103 251	0.065 177	0.071 151	0.028 105	0.032 77	0.021 61	0.037 5
DCP 4	.150	2.047	0.577 258	0.035 114	0.014 242	0.008 3	0.019 124	0.011 282	0.001 249	0.011 186	0.005 46
DCP 5	.200	1.561	0.440 266	0.016 135	0.011 268	0.007 127	0.020 150	0.006 99	0.007 43	0.013 236	0.004 356
DCP 6	.250	1.255	0.393 267	0.028 136	0.012 250	0.009 11	0.015 140	0.011 262	0.001 59	0.016 196	0.006 29
DCP 7	.300	0.946	0.339 271	0.016 185	0.011 282	0.004 41	0.017 157	0.006 95	0.008 30	0.009 224	0.006 352
DCP 8	.400	0.663	0.242 279	0.020 120	0.008 292	0.013 31	0.016 149	0.012 281	0.005 21	0.016 204	0.005 51
DCP 9	.500	0.491	0.188 293	0.014 164	0.007 305	0.007 80	0.022 157	0.007 77	0.012 14	0.006 259	0.005 53
DCP10	.695	0.351	0.126 293	0.004 71	0.009 101	0.013 56	0.012 221	0.003 319	0.008 73	0.011 263	0.008 239
DCP11	.800	0.214	0.099 306	0.008 105	0.004 246	0.017 69	0.007 155	0.004 328	0.008 33	0.005 154	0.011 45
DCP12	.876	0.145	0.094 288	0.005 8	0.008 65	0.007 67	0.005 181	0.003 333	0.006 105	0.002 316	0.003 267
DCP13	.953	0.263	0.058 321	0.002 301	0.007 15	0.006 102	0.008 105	0.004 87	0.006 49	0.003 45	0.004 85

FORCED VERTICAL TRANSLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	32.47	0.200	12.36		0.306	3090.2	10
K	V	Q	RN		DAMPING	CN(MAX)	ALPHA(STALL)
0.242	224.3	201.3	0.26E 07		-0.00690	1.357	12.36

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.954	0.447 264	0.071 290	0.036 343	0.028 85	0.021 143	0.001 196	0.011 18	0.005 163	0.004 218
CM		-0.028	0.040 347	0.030 63	0.018 152	0.013 230	0.007 345	0.003 94	0.003 212	0.003 11	0.002 65
DCP 1	.010	4.767	2.351 298	1.000 126	0.407 269	0.223 80	0.114 251	0.131 43	0.104 210	0.081 14	0.066 154
DCP 2	.025	3.369	1.767 292	0.494 128	0.113 246	0.062 130	0.061 290	0.079 31	0.013 296	0.030 17	0.048 130
DCP 3	.050	2.533	1.362 298	0.209 85	0.188 217	0.058 131	0.137 145	0.050 295	0.101 35	0.005 218	0.045 326
DCP 4	.150	2.098	1.053 262	0.321 5	0.125 128	0.048 309	0.090 84	0.051 202	0.033 334	0.029 126	.019 240
DCP 5	.200	1.645	0.859 259	0.307 342	0.100 88	0.037 301	0.063 78	0.051 177	0.036 347	0.037 140	.031 226
DCP 6	.250	1.323	0.778 254	0.276 323	0.109 77	0.073 231	0.095 24	0.078 135	0.051 275	0.051 51	.047 158
DCP 7	.300	1.022	0.634 252	0.285 309	0.149 46	0.056 186	0.043 352	0.046 121	0.031 281	0.031 44	.028 149
DCP 8	.400	0.734	0.477 245	0.229 282	0.094 14	0.084 161	0.055 285	0.055 66	0.063 171	0.045 296	0.049 64
DCP 9	.500	0.502	0.295 248	0.213 263	0.140 343	0.082 95	0.069 208	0.034 346	0.026 102	0.034 235	0.023 342
DCP10	.695	0.411	0.168 225	0.117 218	0.073 303	0.068 41	0.047 143	0.019 232	0.035 22	0.035 157	0.030 223
DCP11	.800	0.332	0.118 206	0.095 217	0.063 326	0.071 57	0.037 149	0.035 306	0.028 47	0.016 166	0.015 262
DCP12	.876	0.274	0.094 192	0.046 186	0.053 298	0.057 21	0.033 117	0.026 247	0.025 339	0.010 31	0.010 229
DCP13	.953	0.419	0.022 111	0.044 190	0.039 280	0.034 17	0.026 144	0.021 226	0.016 294	0.003 317	0.002 271

FORCED VERTICAL TRANSLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	31.75	0.200	14.67		0.307	3090.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.237	224.2	200.6	0.26E 07	-0.00813	1.531	14.67

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.995	0.532 285	0.114 19	0.074 104	0.035 170	0.008 25	0.017 80	0.016 274	0.015 116	0.010 251
CM		-0.074	0.103 29	0.070 146	0.041 261	0.006 8	0.009 248	0.006 297	0.004 79	0.001 343	0.002 68
DCP 1	.010	3.935	2.775 359	1.485 183	0.359 49	0.411 259	0.268 69	0.131 310	0.160 170	0.059 6	0.048 244
DCP 2	.025	2.894	1.811 332	0.464 147	0.366 46	0.386 202	0.267 324	0.057 130	0.019 258	0.019 157	0.010 15
DCP 3	.050	2.280	1.706 335	0.569 157	0.153 300	0.232 173	0.063 2	0.049 152	0.058 30	0.023 151	0.030 356
DCP 4	.150	1.878	1.132 309	0.493 111	0.237 291	0.192 124	0.122 319	0.110 128	0.045 304	0.059 150	0.029 317
DCP 5	.200	1.570	1.029 291	0.370 56	0.189 232	0.110 59	0.085 283	0.092 56	0.045 279	0.058 96	0.046 234
DCP 6	.250	1.258	0.914 295	0.359 81	0.210 248	0.142 87	0.143 267	0.126 76	0.087 278	0.111 135	0.073 284
DCP 7	.300	1.124	0.926 275	0.382 25	0.264 177	0.137 1	0.144 202	0.166 352	0.071 197	0.055 9	0.071 140
DCP 8	.400	0.814	0.769 266	0.391 28	0.252 176	0.092 359	0.162 184	0.111 341	0.059 195	0.078 16	0.083 153
DCP 9	.500	0.738	0.667 243	0.421 333	0.308 106	0.095 268	0.116 108	0.124 240	0.073 24	0.063 185	0.074 333
DCP10	.695	0.617	0.427 225	0.324 330	0.294 85	0.120 202	0.118 32	0.072 134	0.051 300	0.013 137	0.046 259
DCP11	.800	0.396	0.235 220	0.171 295	0.183 38	0.081 147	0.037 350	0.068 84	0.036 201	0.008 179	0.037 123
DCP12	.878	0.338	0.150 225	0.110 297	0.111 46	0.058 166	0.047 7	0.079 102	0.045 200	0.010 283	0.017 108
DCP13	.953	0.563	0.078 186	0.077 263	0.118 348	0.066 78	0.005 151	0.011 37	0.008 338	0.010 83	0.014 117

FORCED VERTICAL TRANSLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	32.79	0.400	9.92		0.309	3091.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.126	435.3	734.4	0.48E 07	-0.00262	1.189	9.92

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.929	0.198 301	0.066 131	0.016 275	0.008 91	0.013 205	0.008 48	0.004 213	0.001 348	0.002 229
CM		-0.013	0.032 58	0.022 200	0.009 5	0.006 214	0.004 19	0.002 143	0.002 300	0.001 88	0.000 172
DCP 1	.010	5.537	0.915 320	0.670 187	0.213 357	0.071 235	0.113 140	0.091 46	0.062 274	0.006 182	0.065 174
DCP 2	.025	3.705	0.798 9	0.936 206	0.436 35	0.100 254	0.092 181	0.083 58	0.039 318	0.037 206	0.015 199
DCP 3	.050	2.894	0.491 335	0.339 180	0.170 340	0.082 190	0.030 91	0.010 310	0.017 189	0.026 63	0.023 273
DCP 4	.150	1.533	0.363 311	0.202 134	0.078 279	0.022 144	0.026 350	0.026 143	0.013 291	0.005 133	0.008 245
DCP 5	.200	1.396	0.337 305	0.187 119	0.078 266	0.039 111	0.030 307	0.028 118	0.015 299	0.007 118	0.003 274
DCP 6	.250	1.158	0.283 305	0.128 110	0.052 222	0.002 251	0.016 305	0.016 98	0.007 240	0.001 17	0.005 193
DCP 7	.300	1.027	0.279 296	0.136 98	0.064 237	0.037 74	0.034 245	0.023 59	0.014 232	0.005 8	0.001 202
DCP 8	.400	0.780	0.196 298	0.078 81	0.035 175	0.007 176	0.021 252	0.009 36	0.004 229	0.006 7	0.008 150
DCP 9	.500	0.643	0.181 286	0.079 63	0.041 197	0.028 40	0.032 192	0.015 351	0.009 158	0.007 301	0.004 89
DCP10	.695	0.413	0.134 269	0.058 37	0.023 181	0.016 58	0.019 205	0.005 357	0.002 118	0.006 340	0.003 146
DCP11	.800	0.263	0.121 252	0.045 8	0.011 179	0.021 39	0.019 172	0.008 328	0.013 124	0.012 211	0.010 336
DCP12	.878	0.160	0.124 243	0.034 4	0.009 218	0.016 19	0.010 184	0.003 358	0.005 126	0.004 224	0.005 319
DCP13	.953	0.238	0.105 237	0.027 349	0.009 222	0.013 8	0.010 133	0.006 289	0.006 84	0.001 270	0.002 297

FORCED VERTICAL TRANSLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	34.01	0.400	12.34		0.309	3091.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.131	434.9	733.4	0.48E 07	-0.00160	1.353	12.34

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.944	0.255 334	0.085 227	0.064 56	0.039 224	0.010 56	0.014 24	0.011 181	0.004 14	0.005 80
CM		-0.057	0.070 72	0.021 322	0.026 174	0.016 25	0.006 230	0.004 152	0.005 333	0.002 111	0.001 256
DCP 1	.010	4.696	1.702 49	0.671 300	0.566 180	0.202 90	0.144 10	0.094 322	0.033 176	0.042 58	0.033 272
DCP 2	.025	3.279	1.542 47	0.606 288	0.452 178	0.096 163	0.155 31	0.018 37	0.049 277	0.008 292	0.040 128
DCP 3	.050	2.532	0.948 26	0.369 245	0.200 144	0.103 34	0.073 235	0.019 88	0.010 133	0.030 49	0.036 24
DCP 4	.150	1.447	0.567 350	0.110 229	0.169 93	0.034 295	0.028 235	0.023 116	0.013 344	0.005 346	0.003 229
DCP 5	.200	1.316	0.460 342	0.147 243	0.188 78	0.079 280	0.025 161	0.026 84	0.005 273	0.004 117	0.015 199
DCP 6	.250	1.141	0.446 334	0.068 231	0.136 67	0.041 279	0.018 129	0.024 92	0.011 310	0.006 222	0.009 74
DCP 7	.300	1.016	0.385 325	0.114 230	0.157 57	0.085 256	0.019 111	0.031 63	0.021 252	0.015 91	0.016 182
DCP 8	.400	0.799	0.319 317	0.067 232	0.114 42	0.067 259	0.028 84	0.026 7	0.005 268	0.008 95	0.005 20
DCP 9	.500	0.714	0.291 298	0.076 197	0.107 9	0.069 218	0.008 50	0.031 17	0.026 188	0.008 131	0.014 83
DCP10	.695	0.539	0.238 275	0.083 181	0.094 0	0.074 209	0.017 77	0.030 6	0.037 183	0.012 14	0.010 112
DCP11	.800	0.427	0.212 257	0.072 151	0.079 351	0.077 187	0.034 27	0.019 267	0.025 116	0.025 282	0.007 45
DCP12	.878	0.324	0.191 251	0.074 156	0.062 353	0.062 187	0.030 37	0.012 243	0.021 135	0.020 286	0.007 80
DCP13	.953	0.391	0.134 241	0.061 128	0.033 336	0.019 156	0.022 26	0.014 291	0.016 68	0.008 269	0.017 331

FORCED VERTICAL TRANSLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	34.48	0.400	14.64		0.309	3091.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.133	434.3	733.2	0.48E 07	-0.00096	1.275	14.64

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.855	0.247 343	0.079 247	0.045 134	0.025 319	0.009 158	0.003 64	0.006 269	0.004 4	0.006 237
CM		-0.099	0.050 107	0.023 6	0.015 262	0.012 109	0.004 19	0.002 333	0.002 22	0.001 257	0.002 357
DCP 1	.010	3.631	1.272 57	0.608 332	0.309 258	0.157 174	0.181 120	0.116 2	0.108 318	0.075 327	0.055 248
DCP 2	.025	2.338	1.133 50	0.288 346	0.152 241	0.013 8	0.067 44	0.052 40	0.015 301	0.014 142	0.030 58
DCP 3	.050	1.521	0.573 25	0.125 316	0.094 202	0.071 108	0.040 80	0.015 348	0.039 341	0.042 309	0.047 300
DCP 4	.150	1.265	0.405 348	0.168 284	0.071 185	0.040 38	0.015 44	0.011 329	0.010 302	0.009 31	0.002 297
DCP 5	.200	1.131	0.355 349	0.160 257	0.092 160	0.047 359	0.013 304	0.004 73	0.010 99	0.005 71	0.009 301
DCP 6	.250	1.064	0.349 343	0.137 270	0.074 163	0.043 26	0.006 94	0.009 97	0.003 352	0.005 25	0.009 35
DCP 7	.300	0.951	0.327 342	0.154 244	0.088 137	0.042 336	0.015 268	0.003 176	0.007 233	0.006 193	0.024 247
DCP 8	.400	0.826	0.300 337	0.116 249	0.082 135	0.051 8	0.008 224	0.007 138	0.008 193	0.007 105	0.013 37
DCP 9	.500	0.764	0.277 320	0.107 219	0.075 99	0.046 280	0.023 184	0.007 351	0.019 217	0.002 4	0.024 176
DCP10	.695	0.657	0.227 310	0.094 212	0.066 106	0.067 318	0.034 216	0.017 169	0.017 309	0.005 37	0.021 223
DCP11	.800	0.530	0.181 294	0.092 165	0.053 52	0.062 248	0.013 118	0.015 82	0.016 195	0.005 32	0.017 119
DCP12	.878	0.435	0.145 301	0.079 189	0.043 85	0.049 298	0.007 185	0.013 170	0.004 285	0.009 0	0.016 266
DCP13	.953	0.467	0.091 269	0.044 143	0.020 45	0.026 222	0.022 109	0.008 356	0.018 149	0.011 106	0.018 32

FORCED VERTICAL TRANSLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	33.44	0.600	9.82		0.312	3092.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.087	643.8	1433.8	0.62E 07	-0.00035	0.976	9.82

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.882	0.063 337	0.016 278	0.009 171	0.014 135	0.004 238	0.006 215	0.002 328	0.001 175	0.001 19
CM		-0.031	0.028 105	0.004 35	0.002 328	0.002 255	0.002 262	0.001 358	0.001 113	0.000 8	0.000 24
DCP 1	.010	3.302	0.085 278	0.021 277	0.009 259	0.018 128	0.001 171	0.002 200	0.002 201	0.003 15	0.003 180
DCP 2	.025	3.280	0.252 88	0.215 272	0.046 87	0.060 122	0.056 277	0.023 115	0.003 267	0.002 240	0.018 54
DCP 3	.150	1.545	0.157 45	0.090 71	0.026 239	0.028 206	0.007 209	0.018 319	0.011 17	0.005 237	0.002 204
DCP 4	.200	1.308	0.075 1	0.061 70	0.029 293	0.029 192	0.016 197	0.020 265	0.008 192	0.003 7	0.003 280
DCP 5	.250	1.080	0.128 9	0.038 38	0.018 219	0.027 188	0.010 219	0.016 273	0.007 172	0.006 129	0.008 12
DCP 6	.300	0.989	0.102 342	0.022 48	0.026 248	0.023 148	0.006 192	0.025 251	0.008 137	0.010 26	0.006 260
DCP 7	.400	0.607	0.110 323	0.027 319	0.023 163	0.020 136	0.009 227	0.015 213	0.006 354	0.004 112	0.013 338
DCP 8	.500	0.545	0.115 327	0.024 257	0.023 175	0.020 77	0.006 195	0.019 187	0.008 1	0.002 29	0.002 92
DCP 9	.695	0.422	0.105 296	0.037 238	0.015 132	0.010 102	0.009 113	0.005 39	0.008 287	0.012 198	0.002 99
DCP10	.800	0.336	0.106 273	0.019 239	0.008 118	0.010 125	0.006 26	0.005 157	0.003 288	0.004 352	0.005 179
DCP11	.878	0.328	0.098 268	0.019 226	0.005 109	0.008 103	0.010 42	0.007 193	0.005 147	0.002 319	0.004 172
DCP12	.953	0.358	0.050 269	0.019 203	0.007 82	0.006 21	0.005 28	0.008 126	0.002 202	0.003 87	0.003 328

FORCED VERTICAL TRANSLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	33.22	0.600	12.39		0.312	3092.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.086	642.0	1427.6	0.62E 07	-0.00042	0.982	12.39

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.896	0.065 334	0.006 182	0.007 56	0.008 290	0.006 46	0.004 161	0.004 311	0.003 171	0.008 285
CM		-0.058	0.019 115	0.005 40	0.002 87	0.001 86	0.003 188	0.001 346	0.001 64	0.001 333	0.003 43
DCP 1	.010	3.478	0.193 277	0.028 176	0.062 73	0.017 288	0.007 223	0.004 96	0.009 282	0.006 156	0.001 81
DCP 2	.025	3.084	0.265 64	0.195 49	0.101 74	0.032 286	0.050 197	0.025 191	0.005 243	0.012 261	0.023 24
DCP 3	.150	1.415	0.089 317	0.062 212	0.023 18	0.008 214	0.018 84	0.009 75	0.016 12	0.002 19	0.027 339
DCP 4	.200	1.225	0.116 359	0.054 240	0.013 243	0.024 44	0.018 53	0.007 357	0.007 40	0.011 136	0.019 347
DCP 5	.250	1.023	0.065 331	0.024 184	0.003 51	0.021 248	0.022 81	0.008 25	0.015 1	0.005 255	0.013 291
DCP 6	.300	0.938	0.101 342	0.037 241	0.024 228	0.023 44	0.019 46	0.010 292	0.004 52	0.014 113	0.013 316
DCP 7	.400	0.632	0.067 332	0.015 159	0.008 120	0.017 285	0.010 64	0.006 122	0.006 319	0.013 205	0.017 284
DCP 8	.500	0.588	0.084 313	0.020 225	0.008 301	0.018 300	0.011 353	0.006 144	0.014 302	0.003 30	0.011 226
DCP 9	.695	0.519	0.075 302	0.005 254	0.007 329	0.011 244	0.009 25	0.012 137	0.005 284	0.006 161	0.009 212
DCP10	.800	0.448	0.072 317	0.011 200	0.004 55	0.001 310	0.014 7	0.008 268	0.010 216	0.003 165	0.017 247
DCP11	.878	0.454	0.068 306	0.010 215	0.004 28	0.006 231	0.013 1	0.007 167	0.005 172	0.005 173	0.014 232
DCP12	.953	0.439	0.045 275	0.010 157	0.004 138	0.001 34	0.007 345	0.005 230	0.005 209	0.003 136	0.003 255

FORCED VERTICAL TRANSLATION NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	33.11	0.600	14.73		0.311	3092.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.086	639.8	1420.8	0.62E 07	-0.00043	0.983	14.73

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.916	0.041	316	0.018	214	0.003	143	0.008	38	0.000	167	0.003	330	0.007	33	0.006	169	0.005	338
CM		-0.084	0.026	83	0.003	297	0.000	328	0.003	195	0.002	294	0.002	104	0.001	129	0.002	257	0.002	114
DCP 1	.010	3.468	0.185	87	0.100	283	0.040	141	0.035	321	0.055	156	0.016	297	0.017	50	0.031	257	0.031	65
DCP 2	.025	2.641	0.406	65	0.094	234	0.047	231	0.050	121	0.048	299	0.011	100	0.035	61	0.041	192	0.024	31
DCP 3	.150	1.447	0.066	354	0.027	208	0.019	47	0.013	320	0.011	161	0.004	24	0.015	4	0.005	224	0.011	338
DCP 4	.200	1.181	0.071	354	0.026	225	0.014	51	0.003	127	0.005	292	0.009	109	0.012	144	0.009	252	0.011	213
DCP 5	.250	1.055	0.078	328	0.036	217	0.011	85	0.010	350	0.009	121	0.007	14	0.013	3	0.009	174	0.003	97
DCP 6	.300	0.953	0.080	298	0.037	220	0.015	57	0.004	43	0.013	319	0.018	61	0.012	105	0.005	259	0.010	174
DCP 7	.400	0.692	0.074	290	0.010	218	0.005	80	0.010	69	0.012	37	0.006	182	0.013	345	0.005	154	0.003	359
DCP 8	.500	0.680	0.090	272	0.002	144	0.008	144	0.020	25	0.009	164	0.014	308	0.013	61	0.005	186	0.005	36
DCP 9	.695	0.611	0.097	267	0.020	111	0.011	142	0.025	13	0.016	60	0.011	327	0.005	329	0.015	94	0.018	326
DCP10	.800	0.514	0.071	268	0.013	217	0.009	279	0.008	75	0.010	214	0.007	266	0.004	351	0.002	147	0.009	306
DCP11	.878	0.509	0.061	268	0.015	189	0.008	293	0.006	28	0.007	178	0.007	225	0.003	303	0.003	173	0.009	255
DCP12	.953	0.504	0.043	273	0.007	141	0.005	223	0.004	320	0.005	141	0.007	232	0.006	271	0.008	99	0.005	239

FORCED VERTICAL TRANSLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	28.01	0.200	0.0		0.464	3102.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.208	224.8	202.5	0.26E 07	-0.00495	0.232	0.0

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		-0.172	0.404 269	0.015 242	0.008 273	0.005 276	0.011 230	0.002 191	0.005 187	0.004 145	0.007 155
CM		0.059	0.016 185	0.001 115	0.000 322	0.001 213	0.001 63	0.000 53	0.000 86	0.001 42	0.001 14
DCP 1	.010	-1.818	2.933 257	0.113 182	0.057 213	0.022 175	0.037 179	0.006 352	0.007 88	0.012 53	0.012 66
DCP 2	.025	0.221	2.398 257	0.092 198	0.023 180	0.020 241	0.031 154	0.011 73	0.022 93	0.006 292	0.010 148
DCP 3	.050	0.409	0.865 268	0.037 298	0.058 302	0.035 265	0.039 247	0.012 224	0.028 194	0.013 155	0.027 125
DCP 4	.150	0.081	0.753 263	0.035 222	0.025 238	0.007 318	0.021 214	0.002 12	0.001 312	0.003 190	0.004 70
DCP 5	.200	-0.096	0.602 266	0.010 227	0.009 257	0.009 250	0.007 259	0.005 108	0.011 194	0.007 198	0.013 182
DCP 6	.250	-0.264	0.562 268	0.019 239	0.017 236	0.014 281	0.014 228	0.003 211	0.007 222	0.002 279	0.303 96
DCP 7	.300	-0.332	0.484 268	0.026 241	0.007 352	0.002 290	0.008 237	0.003 164	0.007 183	0.005 172	0.009 176
DCP 8	.500	-0.221	0.262 281	0.018 258	0.003 281	0.005 243	0.012 235	0.002 124	0.009 182	0.007 156	0.009 161
DCP 9	.800	-0.193	0.109 292	0.005 262	0.007 5	0.005 18	0.008 219	0.007 197	0.005 11	0.008 242	0.004 193
DCP10	.878	-0.374	0.109 294	0.005 238	0.023 232	0.005 25	0.006 259	0.006 300	0.008 229	0.001 258	0.004 148
DCP11	.953	-0.086	0.047 321	0.009 55	0.004 127	0.002 340	0.002 291	0.008 359	0.002 102	0.004 53	0.003 227

FORCED VERTICAL TRANSLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	28.25	0.200	7.22		0.461	3102.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.211	223.8	202.6	0.26E 07	-0.00475	0.965	7.22

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.561	0.395 264	0.018 194	0.007 265	0.005 324	0.010 219	0.001 212	0.006 149	0.003 358	0.002 52
CM		0.044	0.018 172	0.001 347	0.001 220	0.001 222	0.001 90	0.001 52	0.000 14	0.001 164	0.000 202
DCP 1	.010	2.785	2.508 251	0.097 174	0.018 202	0.028 300	0.040 126	0.020 162	0.024 60	0.008 47	0.012 343
DCP 2	.025	3.568	2.230 253	0.074 187	0.025 215	0.006 27	0.023 132	0.009 282	0.018 143	0.003 289	0.021 299
DCP 3	.050	2.107	0.868 259	0.024 215	0.046 271	0.019 238	0.047 193	0.008 112	0.018 131	0.011 86	0.009 81
DCP 4	.150	1.278	0.768 257	0.035 189	0.009 236	0.021 312	0.012 200	0.006 6	0.012 163	0.004 326	0.005 309
DCP 5	.200	1.028	0.591 262	0.022 199	0.010 214	0.002 20	0.011 237	0.003 308	0.009 126	0.002 63	0.006 62
DCP 6	.250	0.700	0.538 261	0.030 205	0.007 211	0.012 303	0.014 217	0.004 71	0.014 158	0.003 352	0.004 3
DCP 7	.300	0.510	0.452 265	0.022 212	0.009 260	0.005 306	0.013 239	0.001 15	0.008 135	0.001 255	0.007 104
DCP 8	.500	0.271	0.243 281	0.019 194	0.007 325	0.008 17	0.016 248	0.005 210	0.007 177	0.004 338	0.004 82
DCP 9	.800	0.048	0.113 290	0.008 164	0.006 294	0.000 49	0.004 257	0.003 212	0.002 279	0.005 338	0.003 79
DCP10	.878	-0.165	0.120 280	0.001 281	0.011 118	0.006 330	0.007 149	0.002 90	0.007 100	0.004 344	0.012 289
DCP11	.953	0.061	0.095 289	0.005 111	0.002 172	0.005 104	0.001 225	0.006 290	0.004 177	0.008 26	0.001 319

FORCED VERTICAL TRANSLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	28.49	0.200	9.69		0.461	3102.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.214	222.7	199.9	0.26E 07	-0.00454	1.164	9.69

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		C.770	0.382 266	0.014 162	0.005 258	0.005 273	0.010 204	0.001 55	0.012 132	0.006 208	0.005 80
CM		0.038	0.018 168	0.001 230	0.002 306	0.002 153	0.002 73	0.000 211	0.002 330	0.001 30	0.001 288
DCP 1	.010	4.145	2.863 251	0.101 154	0.006 338	0.010 193	0.026 142	0.013 57	0.024 111	0.013 136	0.009 317
DCP 2	.025	5.C81	2.114 252	0.088 173	0.007 353	0.032 197	0.027 150	0.009 41	0.010 61	0.014 255	0.011 9
DCP 3	.050	2.566	C.800 261	0.028 251	0.053 294	0.026 218	0.035 180	0.010 146	0.035 116	0.017 114	0.016 41
DCP 4	.150	1.649	C.765 257	0.024 142	0.017 239	0.006 338	0.019 169	0.003 277	0.013 154	0.007 253	0.001 114
DCP 5	.20C	1.315	C.568 263	0.028 143	0.011 251	0.009 265	0.012 209	0.004 337	0.011 125	0.008 224	0.001 67
DCP 6	.25C	0.975	0.532 264	0.018 168	0.010 246	0.004 67	0.016 194	0.003 310	0.012 150	0.007 291	0.003 135
DCP 7	.300	C.730	0.432 266	0.027 172	0.006 202	0.007 301	0.006 220	0.002 82	0.010 125	0.008 209	0.003 36
DCP 8	.500	C.399	0.242 286	0.020 155	0.003 322	0.008 251	0.009 224	0.001 33	0.014 127	0.009 222	0.008 90
DCP 9	.800	0.122	C.118 291	0.007 51	0.007 137	0.010 330	0.007 228	0.006 55	0.008 140	0.005 202	0.006 131
DCP10	.878	-0.064	0.135 274	0.012 343	0.003 292	0.001 113	0.014 256	0.007 248	0.006 178	0.005 207	0.005 72
DCP11	.952	0.138	0.064 281	0.005 240	0.012 136	0.008 349	0.008 215	0.003 52	0.008 161	0.005 150	0.006 72

FORCED VERTICAL TRANSLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	27.86	0.200	12.15		0.463	3102.4	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.209	222.8	197.4	0.25E 07	-0.00654	1.508	12.15

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.890	0.548 279	0.134 26	0.085 131	0.029 228	0.011 246	0.006 300	0.008 99	0.004 170	0.006 295
CM		-0.009	0.058 36	0.054 142	0.034 258	0.017 13	0.008 137	0.004 3	0.003 125	0.003 281	0.002 86
DCP 1	.010	2.982	2.458 321	1.535 158	0.458 312	0.168 181	0.241 23	0.190 171	0.119 8	0.143 207	0.143 14
DCP 2	.025	4.649	1.787 314	0.837 172	0.225 345	0.139 193	0.135 345	0.121 117	0.115 243	0.063 17	0.030 194
DCP 3	.050	2.479	1.010 312	0.355 130	0.202 249	0.033 109	0.064 222	0.070 57	0.042 143	0.010 39	0.018 292
DCP 4	.150	1.753	1.150 286	0.481 75	0.255 211	0.121 39	0.128 203	0.087 14	0.063 169	0.036 330	0.012 175
DCP 5	.20C	1.443	0.988 285	0.369 65	0.181 208	0.089 42	0.093 225	0.063 30	0.060 211	0.058 2	0.031 144
DCP 6	.250	1.C62	C.879 282	0.343 44	0.220 170	0.098 339	0.109 154	0.079 312	0.095 109	0.073 255	0.034 49
DCP 7	.300	0.941	0.812 273	0.361 29	0.243 159	0.119 321	0.079 149	0.080 315	0.083 125	0.074 275	0.047 71
DCP 8	.500	C.645	0.506 259	0.333 344	0.244 104	0.134 236	0.061 26	0.073 227	0.088 8	0.088 136	0.059 272
DCP 9	.800	0.265	C.217 239	0.151 312	0.119 62	0.091 181	0.070 306	0.039 120	0.045 249	0.039 15	0.015 134
DCP10	.878	0.069	0.173 230	0.082 276	0.070 19	0.077 123	0.045 225	0.026 38	0.036 155	0.029 247	0.020 8
DCP11	.953	0.218	0.C81 239	0.058 271	0.055 21	0.046 123	0.026 261	0.015 97	0.022 210	0.010 325	0.000 104

FORCED VERTICAL TRANSLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	28.74	0.400	0.0		0.462	3106.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.112	429.4	719.3	0.47E 07	-0.00365	0.103	0.0

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		-0.212	0.308 260	0.012 182	0.003 232	0.002 278	0.004 195	0.002 344	0.003 145	0.002 6	0.002 195
CM		0.040	0.005 208	0.000 112	0.000 297	0.000 251	0.001 60	0.000 223	0.000 37	0.001 218	0.000 70
DCP 1	.010	-0.935	1.877 256	0.112 159	0.019 185	0.006 230	0.024 131	0.014 331	0.013 107	0.007 290	0.003 81
DCP 2	.025	-0.318	1.615 255	0.090 167	0.014 169	0.011 235	0.019 120	0.008 337	0.011 92	0.007 257	0.005 162
DCP 3	.050	-0.110	0.975 261	0.021 188	0.023 298	0.017 263	0.020 210	0.008 271	0.015 153	0.005 238	0.009 107
DCP 4	.150	-0.208	0.535 259	0.028 191	0.011 212	0.003 355	0.003 164	0.002 319	0.006 149	0.003 323	0.003 189
DCP 5	.200	-0.219	0.457 260	0.019 164	0.005 234	0.005 241	0.005 154	0.000 100	0.004 115	0.002 20	0.003 164
DCP 6	.250	-0.273	0.404 261	0.017 181	0.003 188	0.003 327	0.007 201	0.002 359	0.002 143	0.003 332	0.003 223
DCP 7	.300	-0.241	0.353 260	0.014 195	0.002 203	0.002 229	0.006 185	0.002 32	0.003 153	0.004 29	0.004 198
DCP 8	.400	-0.376	0.260 261	0.011 131	0.003 190	0.002 319	0.004 217	0.001 333	0.002 180	0.003 355	0.003 266
DCP 9	.500	-0.216	0.195 264	0.005 195	0.003 242	0.001 290	0.004 203	0.002 32	0.002 161	0.004 27	0.003 204
DCP 10	.600	-0.143	0.125 258	0.007 212	0.001 94	0.003 21	0.002 210	0.002 346	0.000 124	0.002 7	0.001 316
DCP 11	.800	-0.223	0.082 269	0.003 169	0.001 128	0.002 127	0.004 210	0.002 26	0.002 149	0.004 35	0.001 215
DCP 12	.878	-0.186	0.063 275	0.003 223	0.002 175	0.002 358	0.002 257	0.002 13	0.001 142	0.002 43	0.001 234
DCP 13	.953	-0.051	0.038 295	0.003 156	0.001 287	0.003 215	0.002 236	0.000 70	0.000 224	0.002 54	0.003 231

FORCED VERTICAL TRANSLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	28.99	0.400	7.24		0.460	3106.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.113	426.9	716.6	0.47E 07	-0.00331	0.976	7.24

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.694	0.288 255	0.019 176	0.005 284	0.002 265	0.006 168	0.001 0	0.002 37	0.002 175	0.002 344
CM		0.044	0.005 205	0.000 86	0.001 92	0.000 81	0.000 155	0.000 313	0.000 250	0.001 118	0.000 336
DCP 1	.010	4.426	2.209 251	0.092 138	0.010 38	0.030 29	0.097 176	0.056 350	0.020 335	0.008 152	0.005 320
DCP 2	.025	4.144	1.656 251	0.130 109	0.115 224	0.060 36	0.068 174	0.023 339	0.036 342	0.008 157	0.003 329
DCP 3	.050	2.845	0.868 254	0.059 203	0.026 350	0.025 233	0.018 154	0.009 166	0.008 112	0.011 133	0.008 43
DCP 4	.150	1.370	0.497 253	0.037 177	0.005 352	0.007 239	0.007 137	0.002 305	0.002 316	0.003 205	0.002 335
DCP 5	.200	1.126	0.406 255	0.032 184	0.003 312	0.003 241	0.006 150	0.001 16	0.003 45	0.003 208	0.002 343
DCP 6	.250	0.890	0.358 256	0.029 179	0.004 291	0.003 234	0.005 155	0.003 251	0.001 23	0.002 256	0.000 313
DCP 7	.300	0.767	0.305 256	0.027 192	0.004 308	0.001 239	0.004 163	0.000 349	0.003 55	0.002 215	0.002 329
DCP 8	.400	0.362	0.224 257	0.020 181	0.005 293	0.002 218	0.003 189	0.001 296	0.001 5	0.001 248	0.002 52
DCP 9	.500	0.383	0.168 261	0.018 200	0.005 315	0.001 74	0.005 211	0.002 69	0.004 70	0.002 217	0.002 347
DCP 10	.600	0.200	0.108 255	0.013 180	0.005 292	0.002 217	0.001 152	0.001 135	0.000 332	0.002 274	0.001 130
DCP 11	.800	0.033	0.074 266	0.005 175	0.004 241	0.002 341	0.002 177	0.001 172	0.004 68	0.001 311	0.001 300
DCP 12	.878	0.004	0.080 263	0.006 69	0.004 276	0.002 219	0.001 266	0.002 89	0.001 88	0.001 272	0.000 106
DCP 13	.953	0.122	0.065 262	0.007 357	0.002 203	0.003 304	0.002 110	0.001 166	0.004 30	0.002 235	0.001 146

FORCED VERTICAL TRANSLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	29.85	0.400	9.74		0.458	3106.3	10

K	V	Q	RN	DAMPING	CY(MAX)	ALPHA(STALL)
0.117	426.9	713.7	0.47E 07	-0.00229	1.196	9.74

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.825	0.227	298	0.114	158	0.030	318	0.025	171	0.013	287	0.011	49	0.011	246	0.008	24	0.002	90
CM		0.016	0.046	70	0.030	229	0.013	46	0.007	267	0.009	85	0.006	251	0.003	57	0.003	149	0.000	253
DCP 1	.010	4.688	0.576	338	1.065	223	0.408	73	0.213	293	0.239	146	0.161	349	0.119	226	0.047	102	0.033	37
DCP 2	.025	4.220	0.557	7	1.035	218	0.458	57	0.188	263	0.140	168	0.126	35	0.105	253	0.035	119	0.014	31
DCP 3	.050	3.067	0.464	343	0.560	200	0.240	12	0.125	201	0.049	109	0.048	311	0.031	161	0.012	78	0.034	334
DCP 4	.150	1.535	0.400	309	0.285	159	0.108	316	0.046	177	0.046	44	0.042	230	0.011	52	0.011	343	0.016	187
DCP 5	.200	1.257	0.357	310	0.256	154	0.093	318	0.046	187	0.057	14	0.036	196	0.007	2	0.015	346	0.017	170
DCP 6	.250	1.039	0.336	305	0.199	141	0.069	277	0.021	184	0.034	17	0.024	189	0.006	26	0.014	315	0.013	133
DCP 7	.300	0.904	0.321	301	0.196	138	0.074	294	0.054	169	0.052	343	0.034	162	0.018	340	0.004	318	0.018	129
DCP 8	.400	0.456	0.263	297	0.138	116	0.054	248	0.025	157	0.037	315	0.020	110	0.010	310	0.002	58	0.012	127
DCP 9	.500	0.507	0.237	289	0.110	104	0.041	249	0.037	148	0.049	291	0.033	96	0.023	279	0.018	44	0.019	135
DCP10	.600	0.281	0.172	275	0.077	82	0.033	233	0.030	117	0.037	268	0.026	66	0.015	260	0.010	61	0.013	113
DCP11	.800	0.187	0.188	259	0.067	54	0.030	227	0.022	83	0.036	235	0.026	46	0.019	220	0.016	2	0.005	51
DCP12	.878	0.168	0.207	250	0.064	42	0.024	243	0.030	83	0.032	237	0.027	46	0.017	207	0.004	5	0.008	340
DCP13	.953	0.242	0.133	247	0.023	45	0.017	251	0.007	27	0.013	223	0.017	42	0.013	201	0.009	9	0.006	306

FORCED VERTICAL TRANSLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	30.37	0.400	12.18		0.458	3107.1	10

K	V	Q	RN	DAMPING	CY(MAX)	ALPHA(STALL)
0.118	427.4	719.0	0.47E 07	-0.00128	1.373	12.18

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.906	0.252	332	0.104	227	0.087	65	0.044	242	0.022	81	0.015	316	0.008	188	0.009	54	0.003	203
CM		-0.007	0.068	76	0.024	330	0.030	180	0.020	28	0.009	256	0.008	118	0.003	338	0.004	195	0.002	25
DCP 1	.010	-.359	1.612	56	0.949	297	0.692	171	0.246	43	0.225	344	0.127	217	0.039	112	0.047	116	0.042	17
DCP 2	.025	4.063	1.467	51	0.709	274	0.438	177	0.178	68	0.177	22	0.101	262	0.052	227	0.073	122	0.022	76
DCP 3	.050	3.392	0.929	24	0.329	249	0.255	144	0.072	5	0.074	308	0.056	175	0.043	74	0.021	40	0.012	290
DCP 4	.150	1.591	0.540	344	0.150	229	0.211	99	0.086	297	0.042	194	0.033	75	0.017	331	0.013	237	0.012	124
DCP 5	.200	1.266	0.445	346	0.185	240	0.212	83	0.070	301	0.059	172	0.030	69	0.019	314	0.015	163	0.009	223
DCP 6	.250	1.107	0.443	330	0.100	229	0.172	77	0.074	279	0.048	152	0.038	38	0.016	259	0.012	159	0.011	134
DCP 7	.300	0.966	0.387	326	0.136	227	0.193	61	0.078	265	0.056	130	0.034	35	0.022	258	0.019	121	0.012	281
DCP 8	.400	0.574	0.349	310	0.065	224	0.141	49	0.070	255	0.047	121	0.046	1	0.027	221	0.016	70	0.007	53
DCP 9	.500	0.464	0.314	295	0.083	202	0.148	27	0.081	231	0.044	84	0.029	7	0.029	222	0.016	59	0.009	3
DCP10	.600	0.389	0.207	283	0.070	195	0.104	18	0.070	222	0.039	79	0.039	307	0.018	178	0.015	34	0.015	251
DCP11	.800	0.318	0.217	265	0.105	166	0.095	356	0.088	203	0.041	50	0.044	274	0.019	115	0.022	359	0.013	182
DCP12	.878	0.259	0.199	257	0.096	165	0.075	357	0.073	194	0.034	48	0.042	253	0.012	81	0.014	333	0.011	167
DCP13	.953	0.346	0.125	252	0.070	165	0.038	352	0.038	186	0.014	39	0.015	302	0.015	135	0.011	8	0.006	240

FORCED VERTICAL TRANSLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	32.15	0.400	18.91		0.458	3107.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.126	426.0	718.?	0.47E 07	-0.00127	0.993	18.91

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.756	0.154 306	0.012 126	0.013 284	0.009 243	0.016 358	0.002 255	0.004 44	0.004 355	0.003 111
CM		-0.077	0.034 121	0.003 353	0.004 25	0.002 46	0.005 134	0.000 302	0.001 224	0.000 68	0.000 206
DCP 1	.010	2.141	0.735 73	0.115 78	0.077 297	0.025 302	0.048 102	0.004 214	0.009 45	0.022 73	0.040 175
DCP 2	.025	2.474	0.172 334	0.050 92	0.039 30	0.035 228	0.028 29	0.012 331	0.031 99	0.020 344	0.015 209
DCP 3	.050	2.283	0.185 309	0.004 138	0.046 320	0.008 260	0.030 71	0.001 358	0.012 354	0.015 39	0.008 199
DCP 4	.150	1.205	0.155 290	0.021 146	0.041 323	0.016 288	0.030 60	0.008 237	0.002 7	0.011 358	0.010 108
DCP 5	.200	1.025	0.184 298	0.028 74	0.008 319	0.020 222	0.026 328	0.011 277	0.008 99	0.010 328	0.006 225
DCP 6	.250	0.916	0.158 299	0.020 148	0.030 313	0.019 274	0.027 51	0.006 240	0.000 300	0.008 354	0.015 99
DCP 7	.300	0.879	0.164 300	0.026 68	0.003 318	0.011 207	0.032 320	0.009 276	0.007 59	0.010 9	0.005 113
DCP 8	.400	0.586	0.200 308	0.015 143	0.024 291	0.013 261	0.029 35	0.002 221	0.005 290	0.006 260	0.013 62
DCP 9	.500	0.557	0.204 306	0.014 67	0.008 172	0.011 132	0.024 311	0.001 101	0.010 21	0.006 6	0.001 347
DCP 10	.600	0.460	0.147 307	0.015 196	0.022 257	0.010 267	0.026 11	0.004 187	0.008 181	0.006 211	0.014 14
DCP 11	.800	0.529	0.155 298	0.017 147	0.022 195	0.017 209	0.028 276	0.004 52	0.019 27	0.004 10	0.018 163
DCP 12	.E7E	0.453	0.124 308	0.020 178	0.012 254	0.016 282	0.022 351	0.001 194	0.014 129	0.001 127	0.014 301
DCP 13	.953	0.527	0.074 306	0.002 15	0.007 133	0.008 81	0.010 298	0.005 301	0.010 342	0.001 343	0.003 262

FORCED VERTICAL TRANSLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	23.92	0.600	0.0		0.462	3108.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.063	633.7	1416.8	0.62E 07	-0.00314	-0.010	0.0

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		-0.231	0.224 257	0.010 176	0.001 120	0.001 265	0.001 244	0.001 284	0.001 219	0.001 138	0.001 92
CM		0.047	0.002 213	0.000 156	0.000 321	0.000 310	0.000 171	0.000 225	0.000 139	0.000 301	0.000 288
DCP 1	.010	-0.645	1.103 255	0.069 147	0.009 135	0.002 301	0.010 187	0.002 305	0.004 174	0.002 43	0.002 22
DCP 2	.025	-0.361	1.068 253	0.068 159	0.008 127	0.002 293	0.007 83	0.001 245	0.004 136	0.002 99	0.002 35
DCP 3	.050	-0.148	0.731 258	0.028 181	0.006 268	0.007 291	0.012 237	0.006 255	0.009 206	0.002 220	0.004 117
DCP 4	.150	-0.259	0.411 254	0.029 202	0.008 75	0.004 223	0.004 220	0.001 302	0.003 211	0.001 79	0.001 60
DCP 5	.200	-0.254	0.350 256	0.017 164	0.001 148	0.001 346	0.003 81	0.001 301	0.001 185	0.001 144	0.001 56
DCP 6	.250	-0.262	0.307 257	0.013 163	0.003 153	0.000 176	0.004 217	0.000 290	0.002 209	0.001 79	0.001 105
DCP 7	.300	-0.223	0.265 257	0.012 173	0.001 108	0.001 335	0.002 57	0.000 349	0.000 223	0.001 163	0.001 79
DCP 8	.400	-0.302	0.195 257	0.008 160	0.001 172	0.000 188	0.003 227	0.001 257	0.002 257	0.000 137	0.000 137
DCP 9	.500	-0.274	0.144 258	0.006 181	0.001 89	0.001 81	0.002 45	0.001 327	0.000 141	0.001 169	0.001 97
DCP 10	.600	-0.185	0.090 257	0.003 175	0.001 153	0.000 31	0.003 237	0.000 286	0.001 239	0.000 220	0.000 47
DCP 11	.800	-0.202	0.055 264	0.002 203	0.001 351	0.001 122	0.003 358	0.001 81	0.001 296	0.001 121	0.001 126
DCP 12	.E7E	-0.242	0.041 271	0.001 202	0.001 231	0.001 204	0.003 238	0.001 314	0.001 307	0.001 12	0.000 49
DCP 13	.953	-0.149	0.027 263	0.000 298	0.000 94	0.002 275	0.004 32	0.001 64	0.001 292	0.000 119	0.001 293

FORCED VERTICAL TRANSLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	23.47	0.600	4.63		0.458	3108.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.062	634.2	1419.8	0.62E 07	-0.00285	0.669	4.63

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.472	0.200 254	0.015 159	0.005 215	0.003 253	0.003 37	0.001 98	0.001 127	0.000 311	0.001 330
CM		0.057	0.005 233	0.001 63	0.000 278	0.001 200	0.001 15	0.000 289	0.000 178	0.000 206	0.000 256
DCP 1	.010	2.322	0.703 252	0.095 207	0.012 147	0.003 281	0.008 103	0.005 359	0.006 316	0.003 171	0.003 42
DCP 2	.025	2.927	0.934 250	0.182 216	0.015 164	0.026 2	0.017 9	0.003 18	0.003 88	0.004 120	0.003 56
DCP 3	.050	2.436	0.687 252	0.084 211	0.015 19	0.012 308	0.010 165	0.010 135	0.003 159	0.005 243	0.001 6
DCP 4	.150	1.121	0.642 255	0.176 71	0.015 215	0.082 210	0.052 22	0.015 326	0.027 160	0.008 17	0.013 330
DCP 5	.200	0.840	0.327 256	0.083 83	0.084 228	0.038 34	0.005 8	0.017 183	0.016 3	0.007 192	0.002 54
DCP 6	.250	0.601	0.169 256	0.044 214	0.007 192	0.008 19	0.003 179	0.002 58	0.001 357	0.001 217	0.000 262
DCP 7	.300	0.531	0.155 255	0.039 218	0.004 95	0.004 6	0.003 172	0.003 33	0.001 87	0.001 287	0.000 163
DCP 8	.400	0.240	0.132 255	0.024 206	0.001 152	0.003 9	0.002 159	0.001 67	0.001 342	0.000 335	0.000 66
DCP 9	.500	0.151	0.101 257	0.018 207	0.003 67	0.002 332	0.001 184	0.001 45	0.001 41	0.000 219	0.001 132
DCP 10	.600	0.076	0.066 253	0.010 202	0.000 173	0.001 5	0.001 138	0.001 104	0.001 335	0.000 13	0.000 79
DCP 11	.800	-0.036	0.046 263	0.006 200	0.000 126	0.001 0	0.000 24	0.001 61	0.001 79	0.001 67	0.000 20
DCP 12	.878	-0.111	0.044 261	0.003 173	0.002 232	0.002 348	0.001 186	0.001 125	0.001 28	0.000 8	0.000 315
DCP 13	.953	-0.023	0.043 262	0.003 38	0.003 157	0.006 349	0.002 151	0.003 150	0.002 337	0.001 323	0.003 44

FORCED VERTICAL TRANSLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	25.84	0.600	7.17		0.458	3108.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.067	643.4	1410.1	0.61E 07	-0.00138	0.891	7.17

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.722	0.107 281	0.047 221	0.021 118	0.013 310	0.005 179	0.004 80	0.004 333	0.004 181	0.003 38
CM		0.043	0.026 100	0.011 294	0.005 190	0.003 63	0.001 272	0.001 263	0.002 103	0.002 298	0.001 119
DCP 1	.010	3.083	0.318 264	0.066 207	0.021 109	0.013 271	0.002 268	0.003 72	0.003 36	0.004 152	0.003 27
DCP 2	.025	3.843	0.297 261	0.078 240	0.051 137	0.027 338	0.015 187	0.010 39	0.003 228	0.002 16	0.005 130
DCP 3	.050	3.196	0.094 242	0.146 273	0.085 141	0.051 353	0.050 221	0.029 66	0.009 207	0.004 252	0.017 106
DCP 4	.150	1.723	0.096 69	0.196 248	0.088 183	0.013 185	0.026 136	0.005 36	0.017 16	0.021 262	0.010 99
DCP 5	.200	1.204	0.156 272	0.246 245	0.087 184	0.035 34	0.030 12	0.022 330	0.007 27	0.011 227	0.019 109
DCP 6	.250	0.876	0.190 287	0.101 231	0.086 95	0.048 344	0.016 243	0.020 191	0.021 58	0.010 234	0.010 28
DCP 7	.300	0.758	0.198 288	0.079 227	0.072 97	0.042 359	0.017 246	0.016 193	0.011 80	0.003 183	0.009 6
DCP 8	.400	0.360	0.113 296	0.049 175	0.028 66	0.029 282	0.012 128	0.006 109	0.010 334	0.009 178	0.003 22
DCP 9	.500	0.279	0.126 294	0.048 150	0.024 57	0.027 272	0.011 148	0.010 75	0.011 311	0.012 172	0.010 352
DCP 10	.600	0.168	0.078 287	0.033 136	0.009 16	0.015 245	0.007 77	0.001 106	0.002 304	0.004 138	0.002 326
DCP 11	.800	0.095	0.115 278	0.036 118	0.012 14	0.011 229	0.001 236	0.007 73	0.011 275	0.010 119	0.006 292
DCP 12	.878	0.050	0.133 267	0.033 107	0.013 358	0.006 211	0.005 204	0.009 49	0.008 255	0.007 84	0.002 268
DCP 13	.953	0.128	0.115 265	0.012 166	0.010 24	0.007 300	0.003 144	0.001 208	0.002 306	0.004 61	0.003 233

FORCED VERTICAL TRANSLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	30.67	0.600	19.97		0.456	3110.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.382	622.4	1418.9	0.63E 07	-0.00057	0.976	19.97

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.850	0.106 329	0.021 236	0.001 87	0.006 53	0.003 41	0.004 348	0.003 354	0.002 174	0.004 337
CM		-0.100	0.025 122	0.003 356	0.001 224	0.001 94	0.001 161	0.001 175	0.000 299	0.001 259	0.000 247
DCP 1	.025	2.088	0.340 29	0.113 248	0.059 160	0.076 35	0.027 290	0.022 189	0.019 336	0.005 185	0.014 32
DCP 2	.050	2.149	0.216 45	0.072 276	0.011 269	0.029 76	0.026 117	0.015 2	0.024 25	0.017 240	0.015 311
DCP 3	.150	1.412	0.134 350	0.049 246	0.007 289	0.022 59	0.009 14	0.007 347	0.008 356	0.008 247	0.013 344
DCP 4	.200	1.082	0.149 306	0.025 191	0.008 9	0.010 45	0.004 231	0.005 339	0.007 239	0.003 154	0.006 290
DCP 5	.250	1.061	0.150 329	0.027 249	0.005 190	0.005 120	0.005 75	0.004 28	0.003 84	0.007 197	0.008 341
DCP 6	.300	0.936	0.148 305	0.016 200	0.005 330	0.002 115	0.002 132	0.007 11	0.005 255	0.003 180	0.005 278
DCP 7	.400	0.691	0.147 321	0.020 250	0.010 179	0.004 149	0.003 37	0.006 304	0.004 261	0.003 189	0.007 309
DCP 8	.500	0.658	0.136 313	0.003 239	0.012 337	0.002 6	0.007 46	0.012 350	0.008 260	0.002 150	0.004 5
DCP 9	.600	0.682	0.091 307	0.014 215	0.007 121	0.004 89	0.005 10	0.003 326	0.005 85	0.004 78	0.002 7
DCP10	.800	0.555	0.100 314	0.018 200	0.008 50	0.004 8	0.003 10	0.001 3	0.003 60	0.006 89	0.004 47
DCP11	.878	0.470	0.081 310	0.013 184	0.008 38	0.009 299	0.003 211	0.004 55	0.006 358	0.004 112	0.002 128
DCP12	.953	0.494	0.080 325	0.016 202	0.002 343	0.003 302	0.006 290	0.002 334	0.003 283	0.001 259	0.003 254

FORCED VERTICAL TRANSLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.26	0.200	0.0		0.611	3113.1	10

K	V	Q	RN	DAMPING	CY(MAX)	ALPHA(STALL)
0.124	219.1	199.7	0.26E 07	-0.00602	0.178	0.0

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		-0.188	0.378 266	0.009 253	0.002 28	0.004 297	0.009 161	0.009 229	0.007 287	0.001 195	0.005 208
CM		0.038	0.008 211	0.001 68	0.000 143	0.000 254	0.002 301	0.001 59	0.002 140	0.001 59	0.001 64
DCP 1	.010	-1.112	2.521 261	0.038 202	0.037 122	0.006 195	0.048 159	0.016 190	0.013 223	0.007 27	0.011 239
DCP 2	.025	-0.161	2.105 261	0.058 187	0.010 33	0.008 345	0.011 173	0.018 121	0.011 259	0.010 196	0.004 74
DCP 3	.050	-0.135	1.138 266	0.028 303	0.030 356	0.037 278	0.033 233	0.031 231	0.030 211	0.009 130	0.025 169
DCP 4	.150	0.253	0.648 263	0.024 271	0.006 121	0.006 345	0.030 171	0.005 207	0.007 332	0.007 52	0.018 191
DCP 5	.200	-0.053	0.527 264	0.014 180	0.011 209	0.004 93	0.006 39	0.012 223	0.012 290	0.006 177	0.001 58
DCP 6	.250	-0.301	0.491 265	0.012 312	0.005 195	0.004 285	0.017 144	0.013 229	0.006 292	0.006 85	0.008 228
DCP 7	.300	-0.380	0.454 265	0.013 211	0.008 91	0.004 54	0.003 10	0.007 236	0.005 312	0.005 176	0.007 205
DCP 8	.400	-0.436	0.320 266	0.012 309	0.002 131	0.011 313	0.020 154	0.013 236	0.011 298	0.007 69	0.006 236
DCP 9	.500	-0.424	0.241 270	0.017 209	0.007 144	0.006 173	0.005 27	0.008 223	0.011 293	0.007 225	0.007 269
DCP10	.600	-0.185	0.154 266	0.011 297	0.003 309	0.002 275	0.013 138	0.010 258	0.006 309	0.004 328	0.002 210
DCP11	.800	-0.006	0.097 279	0.009 137	0.012 9	0.002 78	0.001 4	0.006 236	0.014 297	0.005 232	0.012 245
DCP12	.878	-0.273	0.088 279	0.013 300	0.002 237	0.001 256	0.021 145	0.004 210	0.003 21	0.002 182	0.005 117
DCP13	.953	0.069	0.041 332	0.016 239	0.007 243	0.005 341	0.002 220	0.007 199	0.006 336	0.010 239	0.006 104

FORCED VERTICAL TRANSLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.47	0.200	9.75		0.609	3113.2	10

K	V	Q	RN	DAMPING	CY(MAX)	ALPHA(STALL)
0.126	218.3	199.3	0.26E 07	-0.00521	1.222	9.75

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.877	0.338 260	0.019 157	0.008 302	0.003 264	0.003 297	0.003 272	0.006 175	0.001 353	0.002 57
CM		0.038	0.009 208	0.001 326	0.002 60	0.000 243	0.001 145	0.001 95	0.001 58	0.001 51	0.001 20
DCP 1	.010	4.962	2.392 254	0.105 136	0.019 33	0.021 294	0.016 104	0.024 359	0.012 167	0.009 328	0.009 45
DCP 2	.025	4.763	1.818 256	0.082 132	0.025 47	0.012 166	0.008 97	0.014 224	0.014 95	0.014 3	0.023 322
DCP 3	.050	3.821	1.035 259	0.043 191	0.040 339	0.028 221	0.019 229	0.009 155	0.028 127	0.011 36	0.033 56
DCP 4	.150	1.886	0.643 256	0.029 137	0.011 351	0.009 287	0.007 138	0.002 284	0.012 174	0.004 100	0.006 26
DCP 5	.200	1.418	0.487 258	0.033 158	0.016 279	0.012 67	0.010 308	0.003 340	0.004 156	0.006 322	0.007 256
DCP 6	.250	0.988	0.440 259	0.023 160	0.012 336	0.020 302	0.004 73	0.003 255	0.014 169	0.002 64	0.007 24
DCP 7	.300	0.730	0.388 261	0.021 170	0.008 316	0.006 117	0.008 320	0.005 350	0.007 198	0.001 212	0.002 136
DCP 8	.400	0.445	0.258 263	0.019 140	0.011 310	0.017 300	0.005 114	0.003 291	0.013 202	0.00[illegible] [illegible]	0.003 32
DCP 9	.500	0.197	0.201 269	0.022 167	0.016 260	0.012 112	0.009 324	0.004 309	0.004 166	0.00	0.003 247
DCP10	.600	0.267	0.116 262	0.022 174	0.003 351	0.015 282	0.004 225	0.006 232	0.004 211	0.002	0.002 52
DCP11	.800	0.296	0.080 288	0.005 313	0.017 248	0.015 130	0.013 317	0.012 294	0.002 54	0.009 [illegible]	0.012 190
DCP12	.878	0.034	0.109 263	0.008 86	0.008 121	0.015 331	0.003 156	0.005 176	0.010 216	0.002 31	0.002 335
DCP13	.953	0.267	0.046 276	0.010 105	0.017 270	0.007 118	0.005 4	0.004 284	0.008 238	0.005 196	0.002 171

FORCED VERTICAL TRANSLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.31	0.200	12.10		0.612	3113.3	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.125	218.2	197.9	0.26E 07	-0.00583	1.508	12.10	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.932	0.405 293	0.133 90	0.071 211	0.059 350	0.039 140	0.019 266	0.008 94	0.003 337	0.006 63
CM		-0.000	0.054 41	0.043 177	0.028 321	0.021 118	0.016 262	0.009 49	0.005 210	0.004 25	0.005 185
DCP 1	.010	4.533	1.856 325	1.349 171	0.668 335	0.340 135	0.169 303	0.110 137	0.088 315	0.091 128	0.076 310
DCP 2	.025	4.236	1.575 336	1.175 171	0.475 327	0.171 134	0.103 348	0.101 162	0.085 337	0.055 112	0.036 279
DCP 3	.050	3.552	1.083 330	0.610 152	0.300 296	0.080 73	0.067 241	0.056 142	0.045 252	0.054 75	0.008 338
DCP 4	.150	1.981	0.803 299	0.396 103	0.210 244	0.120 46	0.096 222	0.060 29	0.047 192	0.034 29	0.033 213
DCP 5	.200	1.410	0.690 302	0.362 100	0.199 239	0.132 48	0.113 219	0.086 22	0.049 188	0.047 13	0.042 186
DCP 6	.250	1.086	0.634 293	0.291 79	0.174 217	0.132 19	0.120 184	0.078 335	0.055 158	0.048 346	0.053 161
DCP 7	.300	0.820	0.577 289	0.273 74	0.179 208	0.135 17	0.121 177	0.081 338	0.059 153	0.051 342	0.047 136
DCP 8	.400	0.523	0.445 281	0.217 45	0.140 181	0.127 342	0.111 138	0.072 284	0.046 101	0.040 290	0.041 111
DCP 9	.500	0.318	0.380 275	0.193 30	0.151 167	0.129 330	0.109 117	0.076 267	0.060 55	0.040 235	0.036 49
DCP10	.600	0.342	0.257 259	0.144 13	0.095 147	0.093 314	0.076 95	0.051 235	0.029 54	0.027 223	0.039 25
DCP11	.800	0.428	0.204 243	0.114 357	0.087 142	0.076 286	0.070 62	0.046 202	0.024 343	0.021 143	0.032 334
DCP12	.878	0.207	0.208 237	0.069 349	0.056 129	0.058 276	0.041 33	0.036 181	0.019 314	0.017 126	0.017 284
DCP13	.953	0.376	0.055 209	0.008 17	0.026 112	0.040 244	0.021 19	0.022 145	0.018 326	0.010 109	0.011 287

FORCED VERTICAL TRANSLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	17.73	0.200	19.47		0.612	3113.4	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.136	217.8	198.0	0.26E 07	-0.00105	1.244	19.47	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.922	0.270 343	0.025 41	0.051 167	0.036 161	0.009 273	0.021 287	0.007 36	0.010 74	0.008 188
CM		-0.111	0.062 138	0.005 69	0.014 315	0.008 291	0.003 82	0.008 85	0.004 111	0.003 190	0.004 344
DCP 1	.010	2.055	1.359 74	0.368 73	0.193 249	0.205 264	0.061 314	0.014 137	0.070 141	0.048 137	0.060 34
DCP 2	.025	2.498	0.437 47	0.286 76	0.019 301	0.088 237	0.078 334	0.034 357	0.034 54	0.043 230	0.051 181
DCP 3	.050	2.431	0.377 22	0.099 46	0.055 232	0.077 190	0.045 171	0.009 179	0.028 86	0.015 138	0.021 345
DCP 4	.150	1.590	0.288 342	0.053 30	0.059 212	0.055 193	0.005 95	0.011 337	0.026 100	0.012 115	0.036 328
DCP 5	.200	1.168	0.313 352	0.062 46	0.055 193	0.057 180	0.006 150	0.017 1	0.007 97	0.027 135	0.019 224
DCP 6	.250	0.963	0.331 341	0.044 18	0.069 196	0.058 186	0.011 39	0.020 339	0.030 82	0.014 97	0.010 336
DCP 7	.300	0.842	0.331 341	0.043 55	0.076 180	0.066 169	0.013 277	0.032 316	0.017 23	0.038 199	0.014 186
DCP 8	.400	0.760	0.358 339	0.032 330	0.074 174	0.049 154	0.021 13	0.038 322	0.027 73	0.023 43	0.016 270
DCP 9	.500	0.538	0.392 334	0.014 288	0.092 144	0.045 126	0.031 245	0.025 285	0.024 11	0.045 45	0.003 56
DCP10	.600	0.538	0.279 326	0.030 262	0.060 146	0.037 113	0.028 316	0.041 298	0.005 334	0.010 36	0.019 209
DCP11	.800	0.794	0.258 325	0.005 75	0.064 144	0.032 123	0.023 242	0.044 248	0.027 291	0.005 10	0.030 153
DCP12	.878	0.575	0.207 314	0.016 184	0.045 135	0.028 119	0.013 205	0.024 247	0.016 258	0.017 266	0.025 133
DCP13	.953	0.666	0.128 342	0.024 57	0.025 69	0.010 156	0.006 155	0.008 223	0.019 258	0.011 331	0.035 290

FORCED VERTICAL TRANSLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	14.95	0.400	0.0		0.607	3114.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.058	428.7	728.7	0.48E 07	-0.00394	0.012	0.0

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		-0.210	0.225	265	0.004	161	0.003	77	0.002	279	0.001	181	0.003	153	0.001	264	0.002	299	0.001	137
CM		0.031	0.002	248	0.000	356	0.000	87	0.000	17	0.000	77	0.000	12	0.000	125	0.001	107	0.000	230
DCP 1	.010	-0.758	1.361	264	0.044	147	0.017	94	0.011	329	0.008	126	0.013	137	0.007	173	0.003	127	0.003	100
DCP 2	.025	-1.052	1.178	264	0.033	167	0.011	106	0.009	182	0.008	136	0.002	132	0.003	265	0.006	295	0.004	88
DCP 3	.050	-0.272	0.704	267	0.007	90	0.013	32	0.016	324	0.002	13	0.007	136	0.002	219	0.002	83	0.005	149
DCP 4	.150	-0.123	0.385	263	0.015	216	0.010	92	0.004	332	0.004	167	0.008	134	0.001	249	0.001	185	0.003	175
DCP 5	.200	-0.214	0.333	265	0.007	153	0.001	135	0.004	163	0.003	192	0.002	170	0.001	343	0.002	258	0.001	110
DCP 6	.250	-0.238	0.296	265	0.008	137	0.004	101	0.005	315	0.002	146	0.005	160	0.001	286	0.002	7	0.003	186
DCP 7	.300	-0.205	0.262	265	0.006	175	0.002	86	0.004	166	0.000	223	0.000	163	0.002	296	0.002	311	0.001	301
DCP 8	.400	-0.331	0.199	265	0.006	127	0.003	107	0.004	314	0.003	137	0.006	160	0.002	269	0.003	0	0.001	186
DCP 9	.500	-0.293	0.147	266	0.001	195	0.002	47	0.006	202	0.000	35	0.001	265	0.003	288	0.005	307	0.003	70
DCP10	.600	-0.035	0.096	264	0.002	117	0.002	108	0.005	304	0.002	187	0.003	150	0.001	223	0.002	42	0.001	210
DCP11	.800	-0.208	0.058	267	0.003	201	0.002	302	0.005	157	0.004	296	0.002	314	0.001	52	0.007	264	0.001	116
DCP12	.878	-0.134	0.047	274	0.000	8	0.002	126	0.006	296	0.004	187	0.006	157	0.000	169	0.002	27	0.002	303
DCP13	.953	-0.133	0.009	284	0.002	128	0.003	28	0.005	135	0.001	358	0.000	259	0.000	282	0.006	281	0.003	58

FORCED VERTICAL TRANSLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.45	0.400	9.71		0.607	3114.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.064	428.1	728.0	0.48E 07	-0.00170	1.077	9.71

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.879	0.121	297	0.079	183	0.020	328	0.004	36	0.001	185	0.003	70	0.004	226	0.003	241	0.004	70
CM		0.018	0.032	65	0.022	219	0.010	15	0.003	206	0.001	85	0.001	186	0.001	316	0.002	64	0.001	193
DCP 1	.010	3.719	0.719	304	0.851	193	0.356	350	0.184	176	0.101	334	0.088	99	0.094	320	0.076	176	0.036	31
DCP 2	.025	3.740	0.521	35	0.935	230	0.414	70	0.195	313	0.176	191	0.116	53	0.067	303	0.047	172	0.014	121
DCP 3	.050	3.194	0.327	6	0.477	205	0.223	4	0.076	200	0.026	82	0.036	290	0.033	162	0.013	55	0.007	205
DCP 4	.150	1.711	0.184	318	0.196	186	0.072	334	0.016	110	0.007	65	0.004	216	0.004	243	0.005	18	0.007	137
DCP 5	.200	1.354	0.192	311	0.172	172	0.079	324	0.024	132	0.020	37	0.019	221	0.005	58	0.007	341	0.012	167
DCP 6	.250	1.129	0.154	304	0.112	172	0.040	294	0.019	56	0.004	311	0.012	111	0.015	253	0.009	17	0.006	121
DCP 7	.300	0.999	0.192	292	0.107	145	0.062	281	0.027	77	0.012	335	0.015	163	0.005	296	0.009	337	0.013	114
DCP 8	.400	0.551	0.133	288	0.059	130	0.047	235	0.031	17	0.006	180	0.011	93	0.017	245	0.009	14	0.003	138
DCP 9	.500	0.420	0.148	275	0.062	90	0.050	224	0.021	24	0.013	353	0.017	147	0.007	322	0.013	232	0.016	44
DCP10	.600	0.425	0.087	266	0.028	68	0.030	193	0.014	340	0.002	187	0.006	53	0.011	189	0.005	302	0.002	35
DCP11	.800	0.156	0.123	253	0.046	32	0.015	178	0.007	67	0.008	242	0.011	358	0.005	94	0.007	202	0.006	7
DCP12	.878	0.191	0.135	252	0.040	38	0.016	183	0.007	14	0.007	180	0.005	296	0.008	94	0.011	217	0.007	340
DCP13	.953	0.146	0.094	258	0.017	41	0.017	97	0.008	208	0.003	93	0.009	341	0.010	135	0.009	240	0.002	28

FORCED VERTICAL TRANSLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	18.28	0.400	12.06		0.609	3114.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.071	427.2	731.4	0.48E 07	0.00033	1.149	12.06

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.886	0.182	7	0.050	226	0.009	116	0.029	55	0.020	224	0.011	69	0.001	67	0.008	229	0.004	63
CM		-0.024	0.062	70	0.013	332	0.013	180	0.009	148	0.008	340	0.004	196	0.002	141	0.003	15	0.001	158
DCP 1	.010	4.926	1.729	53	0.519	268	0.358	192	0.205	152	0.131	351	0.030	286	0.024	171	0.012	102	0.013	160
DCP 2	.025	3.335	1.613	64	0.554	317	0.422	229	0.391	140	0.100	17	0.062	340	0.035	194	0.048	348	0.029	136
DCP 3	.050	2.854	1.078	46	0.195	262	0.201	172	0.093	88	0.115	309	0.031	210	0.043	156	0.030	25	0.028	70
DCP 4	.150	1.587	0.501	17	0.108	210	0.090	122	0.048	52	0.059	256	0.024	119	0.018	54	0.012	265	0.014	148
DCP 5	.200	1.268	0.361	13	0.054	252	0.074	132	0.093	59	0.067	251	0.051	140	0.020	32	0.033	261	0.010	97
DCP 6	.250	1.082	0.337	4	0.073	194	0.052	74	0.037	47	0.041	206	0.021	68	0.003	298	0.007	207	0.007	309
DCP 7	.300	0.984	0.243	349	0.052	220	0.044	87	0.070	42	0.050	229	0.055	111	0.009	16	0.035	245	0.012	151
DCP 8	.400	0.592	0.201	332	0.062	182	0.067	14	0.031	47	0.037	170	0.014	61	0.006	268	0.007	191	0.006	336
DCP 9	.500	0.481	0.185	303	0.048	180	0.056	11	0.046	19	0.048	185	0.043	50	0.005	172	0.022	190	0.001	242
DCP10	.600	0.489	0.128	279	0.034	173	0.047	349	0.023	14	0.018	149	0.011	34	0.005	346	0.007	204	0.008	39
DCP11	.800	0.303	0.173	254	0.033	177	0.014	353	0.032	321	0.020	161	0.011	344	0.013	340	0.012	182	0.012	15
DCP12	.878	0.360	0.175	252	0.044	175	0.030	329	0.023	314	0.016	160	0.018	355	0.003	175	0.004	76	0.011	190
DCP13	.953	0.311	0.102	246	0.049	195	0.009	1	0.013	314	0.024	184	0.012	326	0.009	236	0.014	238	0.006	304

FORCED VERTICAL TRANSLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	17.48	0.400	19.42		0.609	3114.4	10

K	V	C	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.069	425.2	728.5	0.48E 07	-0.00087	0.816	19.42

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.732	0.062	284	0.015	99	0.007	34	0.002	147	0.006	37	0.000	17	0.001	126	0.002	28	0.002	36
CM		-0.088	0.012	107	0.003	265	0.002	223	0.001	208	0.001	201	0.001	83	0.001	70	0.000	176	0.000	117
DCP 1	.010	2.162	0.401	74	0.049	7	0.053	217	0.020	278	0.030	335	0.017	70	0.024	102	0.011	245	0.001	108
DCP 2	.025	1.457	0.083	324	0.069	74	0.051	3	0.030	120	0.036	8	0.000	252	0.016	38	0.015	287	0.012	82
DCP 3	.050	1.702	0.086	297	0.009	166	0.012	294	0.014	220	0.010	143	0.008	88	0.013	92	0.007	110	0.005	358
DCP 4	.150	1.212	0.107	264	0.021	170	0.009	34	0.003	309	0.015	34	0.011	52	0.010	108	0.008	74	0.005	8
DCP 5	.200	0.984	0.083	273	0.036	86	0.015	27	0.010	113	0.006	36	0.006	252	0.006	258	0.008	299	0.005	107
DCP 6	.250	0.881	0.100	271	0.018	152	0.010	77	0.004	212	0.007	46	0.003	31	0.005	88	0.011	66	0.007	12
DCP 7	.300	0.849	0.050	269	0.033	93	0.014	40	0.015	110	0.007	45	0.005	198	0.008	345	0.005	322	0.010	55
DCP 8	.400	0.563	0.091	278	0.014	133	0.008	98	0.009	237	0.003	35	0.001	319	0.003	103	0.006	96	0.002	205
DCP 9	.500	0.521	0.071	282	0.027	79	0.013	38	0.010	100	0.005	38	0.004	158	0.004	206	0.006	233	0.003	119
DCP10	.600	0.513	0.055	291	0.010	114	0.004	100	0.006	201	0.008	100	0.001	74	0.002	56	0.007	31	0.003	205
DCP11	.800	0.482	0.057	286	0.011	70	0.007	7	0.006	65	0.005	15	0.005	282	0.007	219	0.004	2	0.007	12
DCP12	.878	0.553	0.049	299	0.007	68	0.009	65	0.004	251	0.001	110	0.004	221	0.005	268	0.002	85	0.001	53
DCP13	.953	0.440	0.021	322	0.020	88	0.021	18	0.015	352	0.016	342	0.005	292	0.009	266	0.007	254	0.008	233

FORCED VERTICAL TRANSLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	15.72	0.600	0.0		0.609	3115.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.042	623.8	1436.5	0.64E 07	-0.00334	-0.020	0.0

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		-0.223	0.203 260	0.005 151	0.003 88	0.001 40	0.002 106	0.000 323	0.000 354	0.001 277	0.000 190
CM		0.028	0.002 229	0.000 182	0.000 358	0.000 251	0.001 284	0.000 179	0.000 243	0.000 130	0.000 287
DCP 1	.010	-0.643	0.995 259	0.043 139	0.013 88	0.003 30	0.006 116	0.002 169	0.002 308	0.003 342	0.000 208
DCP 2	.025	-0.881	0.962 259	0.037 142	0.012 82	0.006 347	0.005 [illegible]	0.001 58	0.001 118	0.002 339	0.004 119
DCP 3	.050	-0.247	0.664 260	0.017 168	0.006 58	0.004 353	0.001 237	0.002 254	0.004 247	0.001 206	0.004 196
DCP 4	.150	-0.401	0.379 258	0.012 189	0.009 82	0.001 119	0.003 123	0.001 309	0.001 350	0.002 178	0.002 270
DCP 5	.200	-0.253	0.323 260	0.010 155	0.004 110	0.002 336	0.001 40	0.001 241	0.002 238	0.001 237	0.001 152
DCP 6	.250	-0.270	0.281 260	0.010 145	0.003 95	0.000 100	0.002 115	0.001 19	0.001 20	0.002 226	0.001 292
DCP 7	.300	-0.220	0.241 261	0.007 143	0.003 87	0.003 10	0.002 60	0.001 329	0.001 297	0.001 317	0.000 130
DCP 8	.400	-0.287	0.178 262	0.004 124	0.002 105	0.001 193	0.003 118	0.001 79	0.001 70	0.003 247	0.002 335
DCP 9	.500	-0.255	0.130 262	0.003 134	0.002 107	0.002 40	0.001 111	0.001 328	0.001 24	0.001 38	0.001 156
DCP10	.600	-0.085	0.079 261	0.002 114	0.002 103	0.001 50	0.004 124	0.001 [illegible]	0.001 91	0.002 311	0.001 58
DCP11	.800	-0.164	0.051 266	0.000 75	0.001 339	0.001 62	0.001 14	0.002 324	0.001 214	0.002 231	0.002 210
DCP12	.878	-0.152	0.035 270	0.000 104	0.002 122	0.002 112	0.003 117	0.001 132	0.001 36	0.001 338	0.001 15
DCP13	.953	-0.118	0.018 269	0.001 338	0.000 0	0.006 54	0.003 86	0.001 294	0.001 30	0.002 22	0.002 85

FORCED VERTICAL TRANSLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	15.36	0.600	4.63		0.610	3115.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.041	621.9	1434.2	0.64E 07	-0.00292	0.666	4.63

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.493	0.176 257	0.016 168	0.000 248	0.003 300	0.003 33	0.002 42	0.000 192	0.001 188	0.000 119
CM		0.037	0.004 244	0.001 60	0.000 76	0.001 210	0.000 356	0.000 233	0.000 196	0.000 12	0.000 358
DCP 1	.010	2.329	0.632 255	0.081 207	0.013 93	0.005 316	0.001 119	0.006 39	0.003 310	0.001 321	0.002 105
DCP 2	.025	2.465	0.852 254	0.160 218	0.018 125	0.028 19	0.018 356	0.005 327	0.003 150	0.005 128	0.003 102
DCP 3	.050	2.391	0.621 255	0.070 212	0.026 42	0.015 340	0.006 232	0.010 162	0.003 201	0.002 273	0.002 305
DCP 4	.150	1.040	0.544 259	0.138 84	0.004 213	0.060 231	0.032 45	0.020 20	0.020 203	0.005 130	0.011 348
DCP 5	.200	0.834	0.271 260	0.064 103	0.063 250	0.032 62	0.006 325	0.011 217	0.010 32	0.005 228	0.002 85
DCP 6	.250	0.608	0.137 257	0.045 229	0.006 115	0.008 28	0.003 248	0.004 75	0.003 350	0.001 140	0.001 171
DCP 7	.300	0.555	0.140 257	0.031 221	0.005 92	0.004 6	0.001 170	0.001 0	0.001 80	0.001 307	0.001 174
DCP 8	.400	0.265	0.120 258	0.020 216	0.004 64	0.003 358	0.002 53	0.002 45	0.003 54	0.001 293	0.003 161
DCP 9	.500	0.187	0.092 259	0.014 210	0.003 81	0.002 325	0.001 74	0.002 0	0.001 27	0.001 311	0.001 178
DCP10	.600	0.188	0.060 257	0.009 206	0.001 38	0.002 5	0.001 59	0.001 51	0.002 34	0.001 200	0.002 163
DCP11	.800	0.008	0.041 263	0.006 171	0.000 347	0.001 291	0.001 49	0.001 67	0.002 255	0.001 33	0.001 303
DCP12	.878	-0.018	0.040 263	0.003 180	0.002 259	0.002 344	0.000 297	0.002 54	0.002 20	0.001 220	0.002 145
DCP13	.953	0.001	0.032 254	0.005 130	0.001 241	0.004 12	0.001 280	0.001 156	0.001 57	0.002 117	0.001 254

FORCED VERTICAL TRANSLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	19.05	0.600	7.18		0.609	3115.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.051	619.5	1432.3	0.64E 07	-0.00145	0.862	7.18

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.731	0.107 272	0.042 224	0.016 106	0.011 26	0.014 237	0.008 27	0.003 150	0.002 354	0.000 289
CM		0.025	0.023 96	0.009 298	0.004 189	0.002 114	0.003 339	0.003 148	0.001 304	0.000 98	0.001 53
DCP 1	.010	3.020	0.302 262	0.058 205	0.024 111	0.012 355	0.011 198	0.008 357	0.003 76	0.002 282	0.001 213
DCP 2	.025	3.328	0.301 259	0.079 224	0.027 130	0.027 25	0.033 222	0.026 22	0.011 215	0.006 45	0.008 351
DCP 3	.050	3.116	0.115 250	0.134 258	0.065 112	0.014 329	0.028 275	0.036 119	0.040 317	0.031 142	0.018 341
DCP 4	.150	1.621	0.016 153	0.156 254	0.057 186	0.027 91	0.034 297	0.023 91	0.005 245	0.007 335	0.005 33
DCP 5	.200	1.206	0.150 263	0.209 247	0.079 184	0.045 75	0.041 309	0.022 15	0.012 221	0.013 330	0.011 95
DCP 6	.250	0.886	0.190 278	0.098 239	0.063 96	0.055 43	0.041 282	0.011 147	0.019 145	0.014 15	0.002 270
DCP 7	.300	0.795	0.170 275	0.068 238	0.059 87	0.041 35	0.042 253	0.009 115	0.017 132	0.014 345	0.004 227
DCP 8	.400	0.371	0.100 288	0.035 183	0.022 77	0.015 1	0.028 216	0.023 23	0.012 159	0.010 337	0.011 192
DCP 9	.500	0.305	0.114 285	0.032 139	0.015 64	0.011 302	0.021 186	0.021 346	0.015 319	0.011 282	0.006 141
DCP10	.600	0.267	0.073 282	0.027 129	0.004 338	0.004 356	0.011 190	0.015 357	0.004 110	0.002 239	0.002 88
DCP11	.800	0.129	0.102 274	0.027 129	0.015 31	0.010 269	0.014 145	0.010 317	0.000 114	0.005 137	0.002 298
DCP12	.878	0.136	0.124 267	0.030 135	0.018 15	0.008 272	0.012 125	0.008 293	0.002 347	0.001 256	0.002 6
DCP13	.953	0.163	0.108 258	0.022 175	0.017 354	0.008 10	0.010 184	0.001 39	0.005 292	0.009 106	0.011 274

FORCED VERTICAL TRANSLATION — NACA 0012 AIRFOIL (MODIFIED)

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	21.98	0.600	19.40		0.613	3115.4	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.060	616.8	1430.6	0.64E 07	-0.00031	0.990	19.40

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.884	0.055 343	0.009 198	0.003 136	0.001 237	0.002 39	0.004 309	0.002 263	0.001 358	0.001 71
CM		-0.095	0.019 130	0.002 299	0.001 45	0.001 319	0.000 141	0.001 181	0.000 78	0.001 27	0.001 268
DCP 1	.010	2.604	0.555 56	0.067 282	0.036 230	0.023 282	0.022 0	0.052 282	0.023 80	0.038 347	0.036 273
DCP 2	.025	1.511	0.218 25	0.089 228	0.013 136	0.015 107	0.008 26	0.016 280	0.009 172	0.016 267	0.021 253
DCP 3	.050	2.475	0.254 30	0.019 262	0.019 91	0.016 285	0.009 98	0.006 357	0.002 221	0.020 50	0.011 64
DCP 4	.150	1.415	0.185 359	0.023 211	0.014 97	0.013 272	0.003 152	0.018 295	0.010 268	0.010 13	0.004 48
DCP 5	.200	1.052	0.103 313	0.016 204	0.006 227	0.005 258	0.005 52	0.004 342	0.003 275	0.009 257	0.008 271
DCP 6	.250	1.105	0.153 330	0.028 201	0.011 157	0.003 117	0.005 43	0.007 227	0.009 282	0.012 47	0.013 116
DCP 7	.300	0.914	0.100 311	0.009 181	0.004 179	0.005 102	0.005 62	0.003 325	0.003 286	0.010 260	0.006 257
DCP 8	.400	0.662	0.103 315	0.014 122	0.011 86	0.014 76	0.001 344	0.005 261	0.004 199	0.011 59	0.008 67
DCP 9	.500	0.635	0.103 322	0.005 229	0.002 317	0.006 294	0.004 99	0.006 61	0.011 52	0.003 348	0.003 159
DCP10	.600	0.566	0.075 315	0.003 123	0.001 87	0.003 72	0.004 356	0.001 82	0.001 111	0.002 180	0.005 291
DCP11	.800	0.613	0.094 341	0.005 139	0.007 247	0.008 232	0.004 240	0.006 302	0.009 225	0.008 213	0.003 97
DCP12	.878	0.607	0.082 316	0.009 122	0.009 179	0.009 128	0.009 10	0.006 316	0.011 307	0.007 280	0.005 131
DCP13	.953	0.486	0.064 350	0.012 176	0.003 95	0.003 116	0.002 178	0.007 23	0.006 124	0.007 148	0.006 45

FORCED VERTICAL TRANSLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.86	0.200	5.10		0.307	4026.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.130	217.0	199.1	0.26E 07	-0.00587	0.668	5.10

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.456	0.204	250	0.009	3	0.003	77	0.003	144	0.011	279	0.002	353	0.005	176	0.002	290	0.002	298
CM		0.014	0.006	219	0.002	188	0.001	264	0.001	349	0.001	58	0.001	184	0.002	6	0.000	4	0.000	172
DCP 1	.010	0.983	1.259	247	0.019	265	0.007	58	0.023	356	0.032	280	0.015	236	0.019	61	0.026	321	0.007	308
DCP 2	.025	1.421	1.014	247	0.034	317	0.005	192	0.006	11	0.019	175	0.014	351	0.008	230	0.006	184	0.013	304
DCP 3	.050	1.801	0.796	247	0.007	325	0.007	41	0.005	130	0.041	300	0.005	223	0.003	0	0.019	308	0.006	254
DCP 4	.150	1.463	0.321	248	0.019	26	0.002	77	0.006	122	0.022	293	0.003	41	0.004	138	0.004	293	0.007	293
DCP 5	.200	0.343	0.286	248	0.017	349	0.005	145	0.004	156	0.008	196	0.008	328	0.007	240	0.001	136	0.003	335
DCP 6	.250	0.641	0.239	249	0.004	33	0.011	341	0.002	152	0.022	308	0.005	293	0.007	114	0.001	227	0.007	237
DCP 7	.300	0.477	0.229	252	0.018	340	0.008	151	0.004	215	0.004	91	0.006	42	0.005	237	0.004	141	0.006	343
DCP 8	.400	0.442	0.176	256	0.007	82	0.003	347	0.001	107	0.022	288	0.001	130	0.007	155	0.005	323	0.003	262
DCP 9	.501	0.221	0.127	249	0.011	4	0.001	96	0.002	20	0.002	168	0.003	309	0.006	200	0.001	153	0.002	110
DCP10	.600	0.190	0.078	248	0.007	69	0.011	84	0.008	136	0.019	266	0.005	42	0.010	136	0.003	302	0.000	15
DCP11	.831	0.168	0.039	267	0.018	342	0.001	114	0.003	210	0.007	149	0.004	356	0.010	214	0.004	218	0.001	275
DCP12	.878	-0.050	0.031	273	0.009	73	0.007	120	0.002	139	0.021	278	0.002	19	0.004	175	0.000	232	0.000	337
DCP13	.950	-0.175	0.023	304	0.012	333	0.006	319	0.003	188	0.005	89	0.006	306	0.007	194	0.005	137	0.003	14

FORCED VERTICAL TRANSLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.89	0.200	10.01		0.307	4026.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.130	216.6	198.7	0.26E 07	-0.00566	1.132	10.01

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.951	0.189	260	0.009	242	0.004	196	0.003	258	0.008	17	0.004	329	0.002	182	0.003	334	0.001	309
CM		0.031	0.008	216	0.001	1	0.001	17	0.000	73	0.001	235	0.001	158	0.000	15	0.001	153	0.000	109
DCP 1	.010	3.888	1.126	255	0.024	272	0.008	171	0.019	253	0.039	16	0.010	316	0.009	93	0.002	358	0.004	165
DCP 2	.025	3.838	0.937	257	0.067	239	0.017	33	0.021	202	0.009	84	0.007	53	0.006	200	0.016	304	0.002	163
DCP 3	.050	3.716	0.737	254	0.036	252	0.023	211	0.010	321	0.035	6	0.002	218	0.008	187	0.006	317	0.004	207
DCP 4	.150	2.265	0.325	256	0.013	236	0.009	57	0.006	271	0.019	1	0.006	312	0.001	140	0.003	84	0.006	21
DCP 5	.200	1.124	0.270	258	0.007	267	0.009	221	0.003	55	0.004	125	0.004	295	0.002	130	0.005	319	0.003	195
DCP 6	.250	1.269	0.225	259	0.008	265	0.006	11	0.009	258	0.013	0	0.005	311	0.003	240	0.006	33	0.006	284
DCP 7	.300	1.057	0.220	264	0.003	256	0.008	193	0.003	201	0.004	194	0.003	326	0.003	117	0.006	342	0.002	195
DCP 8	.400	0.873	0.162	267	0.008	261	0.006	66	0.008	239	0.017	14	0.007	327	0.004	175	0.001	247	0.002	305
DCP 9	.501	0.514	0.115	261	0.006	211	0.008	234	0.002	53	0.004	142	0.003	54	0.003	260	0.002	0	0.003	67
DCP10	.600	0.385	0.069	271	0.005	261	0.001	201	0.004	254	0.009	13	0.008	324	0.003	166	0.004	331	0.008	358
DCP11	.831	0.207	0.033	292	0.005	167	0.010	197	0.001	214	0.005	121	0.004	315	0.003	247	0.008	316	0.007	208
DCP12	.878	0.013	0.039	295	0.009	264	0.006	101	0.004	241	0.018	357	0.007	330	0.007	150	0.001	18	0.004	333
DCP13	.950	-0.119	0.017	301	0.012	195	0.009	224	0.003	342	0.004	121	0.006	35	0.000	45	0.003	89	0.001	272

FORCED VERTICAL TRANSLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.34	0.200	12.42		0.306	4026.3	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.126	216.3	198.9	0.26E 07	-0.00556	1.371	12.42	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		1.185	0.181 261	0.005 313	0.004 116	0.002 336	0.003 241	0.003 337	0.003 251	0.002 136	0.004 224
CM		0.036	0.008 222	0.002 112	0.001 306	0.001 178	0.000 330	0.000 148	0.001 55	0.001 277	0.001 80
DCP 1	.010	5.259	1.226 256	0.029 48	0.009 316	0.018 197	0.027 219	0.014 254	0.018 267	0.007 238	0.011 60
DCP 2	.025	4.885	0.840 256	0.033 58	0.033 229	0.031 229	0.008 347	0.016 21	0.009 202	0.016 158	0.013 250
DCP 3	.050	4.586	0.752 255	0.008 20	0.023 69	0.016 48	0.006 292	0.006 20	0.008 268	0.006 216	0.010 167
DCP 4	.150	2.665	0.305 258	0.002 287	0.006 120	0.006 265	0.006 229	0.004 312	0.006 300	0.002 76	0.001 128
DCP 5	.200	1.486	0.252 257	0.010 312	0.005 144	0.008 4	0.004 44	0.004 17	0.007 198	0.003 130	0.006 234
DCP 6	.250	1.554	0.207 260	0.003 229	0.008 96	0.006 249	0.007 257	0.003 327	0.004 340	0.002 256	0.006 169
DCP 7	.300	1.340	0.199 263	0.008 262	0.003 177	0.006 286	0.006 312	0.007 323	0.009 202	0.001 117	0.008 237
DCP 8	.400	1.061	0.152 268	0.005 256	0.007 107	0.003 163	0.008 241	0.005 318	0.005 303	0.004 164	0.008 158
DCP 9	.501	0.641	0.104 263	0.006 294	0.002 229	0.005 9	0.002 30	0.001 285	0.006 221	0.002 337	0.006 224
DCP10	.600	0.488	0.054 271	0.004 354	0.003 191	0.002 0	0.012 229	0.002 322	0.003 21	0.001 50	0.008 228
DCP11	.831	0.225	0.039 286	0.011 282	0.005 101	0.005 340	0.007 76	0.004 36	0.009 228	0.006 119	0.007 291
DCP12	.878	0.047	0.036 281	0.006 345	0.008 98	0.002 282	0.008 209	0.002 269	0.005 342	0.003 65	0.002 243
DCP13	.950	-0.056	0.022 317	0.009 309	0.001 213	0.008 23	0.007 65	0.002 212	0.002 150	0.001 202	0.006 271

FORCED VERTICAL TRANSLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.89	0.200	14.87		0.306	4026.4	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.131	216.1	198.0	0.26E 07	-0.00502	1.550	14.87	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		1.388	0.169 273	0.005 237	0.004 187	0.005 303	0.002 345	0.003 264	0.001 133	0.002 146	0.003 328
CM		0.039	0.008 216	0.001 213	0.001 351	0.002 103	0.001 94	0.001 125	0.000 345	0.001 276	0.001 130
DCP 1	.010	6.305	0.770 264	0.255 257	0.043 68	0.054 73	0.025 268	0.026 201	0.024 17	0.024 243	0.009 226
DCP 2	.025	5.847	0.943 266	0.005 215	0.019 230	0.004 24	0.002 66	0.016 281	0.007 83	0.002 341	0.006 52
DCP 3	.050	5.372	0.731 264	0.005 201	0.005 153	0.000 351	0.010 61	0.008 247	0.003 164	0.007 227	0.001 170
DCP 4	.150	3.031	0.273 268	0.004 208	0.005 206	0.006 285	0.007 6	0.001 232	0.003 175	0.006 214	0.008 332
DCP 5	.200	1.813	0.218 270	0.009 226	0.006 284	0.007 3	0.003 303	0.006 293	0.001 134	0.003 47	0.004 32
DCP 6	.250	1.812	0.194 274	0.002 201	0.006 218	0.008 247	0.007 80	0.002 230	0.001 88	0.010 221	0.004 359
DCP 7	.300	1.551	0.191 281	0.012 231	0.006 286	0.006 7	0.005 264	0.007 267	0.001 72	0.004 43	0.007 19
DCP 8	.400	1.211	0.143 283	0.008 151	0.008 212	0.004 289	0.012 29	0.002 244	0.002 20	0.004 232	0.001 196
DCP 9	.501	0.754	0.089 283	0.006 177	0.004 234	0.004 309	0.004 289	0.005 311	0.003 203	0.003 1	0.003 345
DCP10	.600	0.545	0.049 305	0.008 180	0.005 141	0.012 294	0.001 21	0.006 132	0.002 279	0.008 118	0.006 281
DCP11	.831	0.258	0.046 295	0.009 345	0.011 150	0.006 282	0.006 225	0.007 319	0.004 113	0.007 102	0.003 299
DCP12	.878	0.105	0.053 272	0.006 335	0.006 145	0.008 278	0.009 13	0.003 186	0.005 282	0.005 100	0.006 282
DCP13	.950	0.036	0.025 283	0.008 348	0.008 260	0.002 256	0.009 256	0.010 283	0.006 143	0.002 320	0.007 56

FORCED VERTICAL TRANSLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	17.12	0.400	5.02		0.304	4025.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.067	427.7	735.2	0.48E 07	-0.00385	0.658	5.02

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.524	0.133	251	0.005	262	0.002	85	0.003	256	0.003	102	0.001	86	0.003	2	0.001	315	0.003	71
CM		-0.000	0.003	238	0.001	79	0.001	264	0.001	109	0.001	285	0.000	254	0.001	190	0.000	148	0.001	249
DCP 1	.010	1.271	0.754	251	0.027	285	0.004	201	0.010	233	0.004	115	0.005	70	0.005	331	0.003	237	0.004	21
DCP 2	.025	1.615	0.638	251	0.025	284	0.007	174	0.009	217	0.007	98	0.004	225	0.006	43	0.003	242	0.005	12
DCP 3	.050	1.922	0.519	250	0.018	297	0.002	17	0.007	200	0.001	115	0.004	97	0.002	254	0.003	260	0.002	38
DCP 4	.150	1.125	0.220	249	0.006	296	0.002	70	0.003	246	0.002	104	0.002	66	0.002	330	0.001	6	0.001	228
DCP 5	.200	0.826	0.167	249	0.006	282	0.002	97	0.004	257	0.005	84	0.003	222	0.005	30	0.000	23	0.002	54
DCP 6	.250	0.744	0.155	250	0.003	278	0.002	76	0.003	240	0.001	75	0.002	77	0.001	293	0.000	308	0.002	122
DCP 7	.300	0.644	0.138	251	0.004	275	0.003	68	0.001	260	0.004	112	0.003	273	0.005	25	0.001	0	0.003	52
DCP 8	.400	0.488	0.107	253	0.002	260	0.001	90	0.002	276	0.002	72	0.003	74	0.002	296	0.000	354	0.003	138
DCP 9	.501	0.312	0.078	249	0.005	270	0.002	63	0.002	285	0.004	103	0.002	219	0.004	30	0.002	29	0.003	82
DCP10	.600	0.242	0.059	250	0.001	271	0.001	149	0.004	279	0.002	109	0.003	71	0.003	266	0.002	315	0.005	95
DCP11	.831	0.152	0.027	257	0.007	271	0.005	83	0.003	267	0.007	107	0.001	33	0.009	18	0.002	284	0.008	47
DCP12	.878	0.086	0.020	260	0.002	293	0.001	106	0.002	266	0.002	114	0.002	61	0.001	257	0.002	320	0.004	89
DCP13	.950	-0.032	0.016	260	0.003	284	0.004	74	0.002	289	0.005	96	0.002	194	0.007	23	0.001	17	0.003	62

FORCED VERTICAL TRANSLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	17.04	0.400	9.82		0.304	4025.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.067	427.0	733.4	0.48E 07	-0.00385	1.258	9.82

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.127	0.131	256	0.001	19	0.002	269	0.001	227	0.000	45	0.000	139	0.002	27	0.001	202	0.001	125
CM		0.013	0.007	247	0.001	9	0.000	129	0.001	78	0.000	209	0.000	90	0.001	210	0.000	58	0.000	274
DCP 1	.010	4.602	0.819	255	0.036	21	0.018	238	0.005	49	0.003	112	0.003	154	0.001	212	0.003	103	0.002	59
DCP 2	.025	4.565	0.705	257	0.013	300	0.004	74	0.003	123	0.006	318	0.006	353	0.004	98	0.001	51	0.004	97
DCP 3	.050	4.384	0.656	254	0.034	42	0.009	253	0.002	174	0.003	96	0.004	153	0.006	354	0.004	112	0.001	27
DCP 4	.150	2.103	0.193	255	0.006	284	0.005	262	0.002	113	0.002	64	0.004	92	0.001	48	0.000	247	0.003	207
DCP 5	.200	1.694	0.161	255	0.004	227	0.000	202	0.001	145	0.003	234	0.001	13	0.004	170	0.001	323	0.003	73
DCP 6	.250	1.437	0.132	256	0.004	300	0.002	290	0.002	160	0.001	125	0.003	102	0.002	46	0.001	198	0.003	186
DCP 7	.300	1.247	0.118	257	0.002	238	0.004	253	0.002	51	0.005	287	0.001	229	0.003	137	0.001	319	0.001	76
DCP 8	.400	0.952	0.089	258	0.002	236	0.000	23	0.002	163	0.003	97	0.002	112	0.003	0	0.003	219	0.002	201
DCP 9	.501	0.654	0.066	257	0.002	213	0.000	176	0.001	354	0.003	262	0.001	65	0.001	131	0.001	31	0.002	89
DCP10	.600	0.504	0.043	256	0.002	232	0.000	127	0.003	161	0.003	88	0.002	95	0.003	333	0.003	162	0.002	192
DCP11	.831	0.271	0.023	271	0.004	140	0.008	288	0.011	271	0.002	7	0.006	267	0.011	35	0.004	294	0.003	73
DCP12	.878	0.181	0.014	265	0.001	194	0.002	84	0.002	165	0.003	80	0.002	115	0.004	331	0.003	169	0.001	229
DCP13	.950	0.070	0.018	268	0.003	171	0.000	355	0.001	137	0.004	259	0.003	306	0.004	114	0.001	265	0.002	48

FORCED VERTICAL TRANSLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	17.24	0.400	12.25		0.306	4025.3	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.068	426.1	731.5	0.48E 07	-0.00276	1.545	12.25	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		1.376	0.116 306	0.060 170	0.021 318	0.013 64	0.011 237	0.005 58	0.005 159	0.005 300	0.005 74
CM		0.020	0.009 330	0.010 184	0.006 358	0.004 123	0.003 292	0.002 95	0.001 311	0.002 66	0.002 253
DCP 1	.010	6.448	0.485 284	0.183 202	0.103 267	0.029 72	0.021 208	0.017 29	0.028 174	0.022 297	0.012 65
DCP 2	.025	6.249	0.753 294	0.303 194	0.112 290	0.078 67	0.021 209	0.024 31	0.026 151	0.013 335	0.021 94
DCP 3	.050	5.534	0.950 305	0.529 157	0.209 356	0.111 79	0.117 256	0.051 81	0.005 74	0.023 12	0.021 283
DCP 4	.150	2.425	0.037 316	0.059 191	0.026 314	0.012 103	0.008 264	0.009 84	0.005 213	0.004 329	0.002 108
DCP 5	.200	1.937	0.082 1	0.092 201	0.041 331	0.022 127	0.013 274	0.008 86	0.005 176	0.005 13	0.004 112
DCP 6	.250	1.666	0.065 327	0.051 192	0.023 315	0.013 104	0.008 268	0.009 77	0.006 211	0.003 338	0.003 111
DCP 7	.300	1.429	0.075 358	0.078 197	0.036 327	0.021 117	0.012 266	0.007 83	0.006 191	0.007 349	0.004 125
DCP 8	.400	1.099	0.054 337	0.038 184	0.020 299	0.014 82	0.009 250	0.008 36	0.008 195	0.005 318	0.002 114
DCP 9	.501	0.750	0.041 343	0.033 169	0.023 271	0.013 46	0.007 192	0.003 266	0.009 125	0.006 273	0.004 78
DCP10	.600	0.581	0.028 351	0.014 175	0.010 250	0.010 17	0.007 182	0.005 24	0.005 188	0.003 250	0.002 29
DCP11	.831	0.351	0.062 253	0.035 28	0.029 173	0.025 316	0.014 126	0.012 265	0.006 79	0.016 259	0.016 43
DCP12	.878	0.232	0.026 293	0.007 93	0.003 201	0.004 284	0.004 76	0.001 157	0.005 230	0.001 250	0.001 192
DCP13	.950	0.185	0.090 255	0.035 40	0.019 164	0.010 295	0.004 179	0.003 342	0.012 124	0.004 283	0.010 74

FORCED VERTICAL TRANSLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	17.24	0.400	14.65		0.306	4025.4	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.068	425.6	730.6	0.48E 07	0.00311	1.573	14.65	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		1.250	0.225 27	0.065 15	0.057 307	0.014 37	0.008 94	0.006 81	0.009 252	0.010 47	0.007 243
CM		-0.040	0.056 63	0.014 25	0.006 48	0.001 182	0.005 233	0.003 30	0.001 343	0.002 211	0.001 29
DCP 1	.010	5.851	1.152 30	0.107 19	0.082 301	0.078 56	0.021 120	0.039 34	0.037 220	0.020 108	0.023 335
DCP 2	.025	5.452	1.535 40	0.298 6	0.127 297	0.153 67	0.141 247	0.189 70	0.156 271	0.133 99	0.080 259
DCP 3	.050	4.646	1.397 45	0.587 8	0.365 316	0.097 311	0.044 212	0.056 36	0.028 303	0.030 0	0.024 279
DCP 4	.150	1.791	0.682 41	0.096 19	0.018 321	0.039 103	0.009 127	0.018 13	0.017 197	0.009 69	0.002 345
DCP 5	.200	1.425	0.507 40	0.131 54	0.050 355	0.016 70	0.030 157	0.016 121	0.022 307	0.008 259	0.012 155
DCP 6	.250	1.286	0.375 31	0.111 21	0.049 318	0.035 75	0.021 94	0.006 63	0.012 227	0.003 93	0.007 296
DCP 7	.300	1.200	0.251 23	0.109 48	0.074 337	0.020 110	0.013 89	0.009 170	0.010 221	0.012 39	0.011 227
DCP 8	.400	1.000	0.164 356	0.050 32	0.032 315	0.013 47	0.025 74	0.006 214	0.008 200	0.004 227	0.004 43
DCP 9	.501	0.752	0.103 311	0.028 20	0.068 311	0.019 103	0.022 44	0.006 152	0.013 168	0.014 42	0.010 189
DCP10	.600	0.682	0.111 283	0.026 186	0.036 303	0.019 6	0.017 77	0.016 256	0.001 39	0.012 30	0.006 199
DCP11	.831	0.572	0.132 253	0.046 247	0.048 239	0.012 24	0.011 80	0.014 155	0.004 268	0.017 42	0.013 240
DCP12	.878	0.457	0.134 244	0.030 188	0.019 222	0.014 305	0.010 13	0.011 167	0.012 265	0.015 29	0.003 260
DCP13	.950	0.372	0.096 243	0.035 245	0.029 235	0.011 276	0.013 12	0.002 316	0.007 250	0.008 183	0.003 310

FORCED VERTICAL TRANSLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.M	TEST POINT	CYCLES ANALYZED
	16.58	0.600	4.96		0.306	4024.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.044	632.4	1447.5	0.64E 07	-0.00250	0.713	4.96

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.629	0.086	248	0.003	284	0.002	218	0.003	190	0.001	141	0.001	189	0.001	64	0.001	275	0.001	203
CM		-0.000	0.003	240	0.000	244	0.000	205	0.000	157	0.000	190	0.000	101	0.000	230	0.000	126	0.000	94
DCP 1	.010	0.992	0.357	250	0.018	276	0.002	230	0.002	21	0.003	16	0.001	186	0.000	116	0.002	291	0.003	167
DCP 2	.025	1.413	0.298	249	0.018	256	0.001	359	0.001	346	0.003	21	0.001	113	0.003	352	0.001	329	0.004	150
DCP 3	.050	2.061	0.289	248	0.011	282	0.003	329	0.002	129	0.002	70	0.001	130	0.001	294	0.002	247	0.003	141
DCP 4	.150	2.018	0.273	247	0.067	234	0.042	210	0.029	188	0.017	172	0.011	156	0.006	158	0.005	172	0.007	144
DCP 5	.200	1.049	0.290	245	0.095	38	0.026	30	0.023	169	0.003	177	0.002	245	0.001	8	0.001	245	0.002	195
DCP 6	.250	0.808	0.051	252	0.011	31	0.012	201	0.004	313	0.000	30	0.002	89	0.001	0	0.001	334	0.001	297
DCP 7	.300	0.703	0.040	251	0.008	226	0.002	328	0.001	181	0.000	2	0.000	349	0.003	1	0.001	292	0.001	268
DCP 8	.400	0.529	0.047	253	0.004	245	0.000	341	0.001	277	0.001	13	0.001	294	0.001	26	0.001	286	0.001	327
DCP 9	.501	0.324	0.038	246	0.002	258	0.001	39	0.001	301	0.001	279	0.001	5	0.002	3	0.001	249	0.001	209
DCP10	.600	0.287	0.029	251	0.002	262	0.000	22	0.001	273	0.002	55	0.001	281	0.001	116	0.002	322	0.002	256
DCP11	.831	0.157	0.015	257	0.001	51	0.001	9	0.000	300	0.001	343	0.001	227	0.001	92	0.002	276	0.002	254
DCP12	.878	0.130	0.012	265	0.001	28	0.001	229	0.000	244	0.001	115	0.001	297	0.001	154	0.001	327	0.001	325
DCP13	.950	0.009	0.009	252	0.001	321	0.001	1	0.001	163	0.001	36	0.001	178	0.002	326	0.001	278	0.001	222

FORCED VERTICAL TRANSLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.M	TEST POINT	CYCLES ANALYZED
	17.21	0.600	9.75		0.307	4024.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.046	631.7	1461.1	0.64E 07	-0.00045	0.977	9.75

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.948	0.018	297	0.006	39	0.004	209	0.004	286	0.003	10	0.005	95	0.007	248	0.001	62	0.001	294
CM		-0.036	0.008	99	0.002	181	0.000	205	0.001	93	0.001	183	0.000	85	0.001	30	0.001	47	0.000	71
DCP 1	.010	2.419	0.134	265	0.007	46	0.004	170	0.002	270	0.003	19	0.009	52	0.013	181	0.007	318	0.005	39
DCP 2	.025	2.541	0.099	267	0.005	300	0.004	140	0.003	299	0.001	289	0.006	52	0.009	212	0.003	309	0.002	340
DCP 3	.050	3.069	0.044	264	0.013	47	0.015	212	0.008	355	0.005	253	0.010	123	0.005	258	0.004	309	0.310	64
DCP 4	.150	1.855	0.027	78	0.006	30	0.011	210	0.012	245	0.006	190	0.008	289	0.015	231	0.011	43	0.018	191
DCP 5	.200	1.423	0.047	71	0.020	201	0.005	79	0.005	285	0.016	22	0.021	87	0.017	325	0.010	88	0.017	288
DCP 6	.250	1.362	0.067	66	0.028	81	0.007	171	0.002	339	0.008	19	0.024	144	0.016	260	0.016	346	0.008	136
DCP 7	.300	1.260	0.040	59	0.021	96	0.013	248	0.007	224	0.012	81	0.018	87	0.013	289	0.010	96	0.008	10
DCP 8	.400	0.864	0.028	344	0.005	147	0.006	181	0.016	347	0.007	14	0.023	92	0.013	242	0.004	133	0.008	64
DCP 9	.501	0.506	0.026	290	0.017	18	0.012	220	0.003	205	0.004	247	0.002	53	0.012	212	0.008	78	0.004	163
DCP10	.600	0.476	0.037	274	0.005	268	0.002	179	0.008	262	0.005	320	0.010	23	0.007	264	0.010	213	0.004	340
DCP11	.831	0.362	0.040	270	0.023	2	0.006	4	0.004	267	0.007	39	0.011	197	0.001	332	0.001	308	0.007	204
DCP12	.878	0.328	0.030	281	0.004	142	0.006	118	0.002	155	0.008	331	0.010	285	0.009	115	0.008	327	0.008	260
DCP13	.950	0.266	0.041	274	0.002	61	0.001	270	0.004	55	0.003	178	0.008	296	0.006	180	0.004	220	0.005	22

FORCED VERTICAL TRANSLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.M	TEST POINT	CYCLES ANALYZED
	17.24	0.600	12.21		0.306	4024.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.046	631.3	1440.0	0.63E 07	-0.00016	1.028	12.21

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		1.007	0.006 295	0.002 55	0.008 1	0.010 237	0.002 268	0.004 97	0.001 123	0.005 268	0.002 40
CM		-0.068	0.006 100	0.002 141	0.002 124	0.001 40	0.001 322	0.001 135	0.000 16	0.002 61	0.001 152
DCP 1	.010	2.897	0.125 265	0.002 294	0.007 338	0.008 154	0.002 186	0.009 58	0.006 320	0.004 265	0.004 73
DCP 2	.025	2.978	0.135 265	0.004 252	0.005 338	0.007 193	0.001 2	0.008 47	0.004 153	0.002 222	0.007 71
DCP 3	.050	3.027	0.087 111	0.037 55	0.028 92	0.040 281	0.020 226	0.016 151	0.027 352	0.008 52	0.020 224
DCP 4	.150	1.592	0.066 86	0.050 117	0.067 60	0.025 265	0.006 278	0.025 114	0.019 284	0.015 307	0.023 175
DCP 5	.200	1.312	0.029 53	0.009 179	0.025 303	0.012 186	0.012 350	0.010 34	0.023 110	0.007 295	0.023 52
DCP 6	.250	1.221	0.035 112	0.016 92	0.020 33	0.018 235	0.005 310	0.013 36	0.015 244	0.011 335	0.013 93
DCP 7	.300	1.252	0.018 1	0.022 234	0.014 293	0.015 175	0.014 1	0.015 41	0.017 99	0.007 288	0.026 86
DCP 8	.400	0.987	0.017 313	0.016 243	0.028 294	0.017 162	0.015 46	0.005 236	0.018 160	0.009 313	0.016 15
DCP 9	.501	0.627	0.023 283	0.009 239	0.012 351	0.011 269	0.009 225	0.017 124	0.010 80	0.007 223	0.014 306
DCP10	.600	0.626	0.043 287	0.023 332	0.020 244	0.009 246	0.012 236	0.013 138	0.002 146	0.007 354	0.011 300
DCP11	.831	0.489	0.019 237	0.010 22	0.019 45	0.014 225	0.011 75	0.019 313	0.013 258	0.024 206	0.035 132
DCP12	.878	0.481	0.015 288	0.007 158	0.016 302	0.010 48	0.017 172	0.010 188	0.018 32	0.005 230	0.005 48
DCP13	.950	0.338	0.012 294	0.007 94	0.004 111	0.008 276	0.006 296	0.013 6	0.003 191	0.005 253	0.008 261

FORCED VERTICAL TRANSLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.M	TEST POINT	CYCLES ANALYZED
	17.27	0.600	14.58		0.306	4024.4	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.046	630.1	1450.7	0.64E 07	-0.00036	1.070	14.58

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		1.047	0.014 297	0.005 0	0.003 261	0.005 319	0.004 205	0.004 117	0.004 212	0.004 191	0.004 117
CM		-0.089	0.008 105	0.001 348	0.001 176	0.002 99	0.003 270	0.001 278	0.000 111	0.001 6	0.001 299
DCP 1	.010	3.260	0.094 270	0.013 333	0.003 198	0.001 187	0.007 258	0.004 30	0.005 269	0.004 159	0.002 289
DCP 2	.025	3.308	0.060 280	0.007 253	0.003 135	0.005 274	0.004 273	0.006 186	0.005 233	0.009 77	0.008 194
DCP 3	.050	2.841	0.100 96	0.053 328	0.011 218	0.044 19	0.030 243	0.018 41	0.033 231	0.012 245	0.007 327
DCP 4	.150	1.528	0.029 69	0.028 13	0.037 205	0.020 4	0.017 220	0.004 202	0.013 164	0.008 315	0.012 124
DCP 5	.200	1.280	0.024 261	0.007 108	0.015 143	0.027 178	0.015 248	0.008 280	0.006 232	0.013 174	0.009 47
DCP 6	.250	1.213	0.016 9	0.014 78	0.011 249	0.005 260	0.006 203	0.016 125	0.028 130	0.003 16	0.009 155
DCP 7	.300	1.262	0.034 272	0.008 109	0.005 123	0.016 204	0.026 236	0.015 131	0.016 212	0.005 249	0.013 204
DCP 8	.400	1.029	0.037 286	0.008 345	0.023 330	0.007 140	0.011 127	0.012 205	0.012 102	0.010 70	0.004 205
DCP 9	.501	0.704	0.014 315	0.009 75	0.006 16	0.019 347	0.013 312	0.010 180	0.003 19	0.010 218	0.006 168
DCP10	.600	0.692	0.022 311	0.011 321	0.010 333	0.014 283	0.012 319	0.009 51	0.019 318	0.017 161	0.019 47
DCP11	.831	0.584	0.029 282	0.009 131	0.006 173	0.008 245	0.033 110	0.003 157	0.018 176	0.002 15	0.006 99
DCP12	.878	0.573	0.027 279	0.009 178	0.004 115	0.007 342	0.024 68	0.005 84	0.010 349	0.014 276	0.019 205
DCP13	.950	0.414	0.034 274	0.014 228	0.009 350	0.010 334	0.014 244	0.009 39	0.005 281	0.006 193	0.011 150

FORCED VERTICAL TRANSLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	32.68	0.200	4.99		0.306	4029.1	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.248	219.8	200.4	0.26E 07	-0.00522	0.858	4.99	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.499	0.342 254	0.005 331	0.004 316	0.006 356	0.015 102	0.005 8	0.003 61	0.003 51	0.003 59
CM		-0.019	0.018 187	0.002 307	0.001 179	0.001 204	0.002 318	0.001 167	0.001 267	0.001 249	0.001 197
DCP 1	.010	0.993	2.152 246	0.091 277	0.028 243	0.015 349	0.056 65	0.017 20	0.016 328	0.012 179	0.016 139
DCP 2	.025	1.312	1.751 245	0.046 293	0.034 229	0.007 51	0.033 55	0.007 220	0.012 144	0.009 280	0.001 173
DCP 3	.050	1.763	1.329 243	0.049 334	0.010 293	0.025 333	0.033 54	0.009 325	0.006 9	0.009 73	0.011 135
DCP 4	.150	0.967	0.547 250	0.013 332	0.002 340	0.009 343	0.022 91	0.013 32	0.005 12	0.003 59	0.006 137
DCP 5	.200	0.788	0.474 252	0.013 345	0.012 300	0.007 23	0.020 120	0.005 78	0.011 79	0.004 270	0.006 338
DCP 6	.250	0.639	0.387 256	0.010 289	0.007 77	0.012 342	0.025 112	0.010 19	0.003 351	0.005 83	0.004 150
DCP 7	.300	0.481	0.376 258	0.005 20	0.009 302	0.012 7	0.025 121	0.007 84	0.007 135	0.004 180	0.004 343
DCP 8	.400	0.400	0.290 262	0.005 51	0.004 41	0.006 25	0.022 104	0.007 9	0.007 37	0.002 52	0.003 94
DCP 9	.501	0.349	0.197 262	0.002 53	0.010 323	0.003 155	0.016 133	0.005 237	0.005 110	0.001 206	0.004 319
DCP10	.600	0.321	0.135 269	0.003 192	0.002 337	0.003 354	0.013 94	0.011 4	0.004 302	0.010 30	0.006 46
DCP11	.831	0.271	0.091 287	0.006 94	0.005 333	0.007 0	0.010 147	0.003 239	0.007 103	0.003 87	0.005 10
DCP12	.878	0.130	0.067 278	0.004 139	0.007 18	0.001 247	0.008 95	0.010 12	0.005 23	0.007 53	0.006 64
DCP13	.950	-0.057	0.072 299	0.007 136	0.002 312	0.003 23	0.005 134	0.002 217	0.003 111	0.004 159	0.005 3

FORCED VERTICAL TRANSLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	32.68	0.200	10.12		0.304	4029.2	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.249	219.2	200.5	0.26E 07	-0.00499	1.307	10.12	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.981	0.320 261	0.001 15	0.006 299	0.003 342	0.011 130	0.003 252	0.003 18	0.003 37	0.002 57
CM		-0.001	0.019 198	0.002 284	0.001 208	0.001 210	0.002 357	0.001 132	0.001 159	0.000 290	0.001 263
DCP 1	.010	3.966	2.006 251	0.064 320	0.030 261	0.015 260	0.043 57	0.025 170	0.028 13	0.008 238	0.007 276
DCP 2	.025	3.735	1.610 251	0.062 266	0.032 259	0.036 24	0.035 112	0.013 261	0.010 336	0.010 158	0.005 84
DCP 3	.050	3.696	1.289 250	0.036 279	0.023 251	0.003 354	0.030 39	0.017 151	0.011 61	0.007 279	0.005 292
DCP 4	.150	1.723	0.526 257	0.007 334	0.010 304	0.014 270	0.021 116	0.006 247	0.001 86	0.010 19	0.004 353
DCP 5	.200	1.477	0.452 259	0.007 46	0.017 284	0.008 74	0.020 118	0.008 322	0.007 33	0.008 22	0.004 42
DCP 6	.250	1.223	0.366 264	0.006 340	0.012 269	0.010 275	0.021 140	0.005 241	0.005 216	0.015 13	0.006 58
DCP 7	.300	1.051	0.363 266	0.017 134	0.008 283	0.000 261	0.010 163	0.013 300	0.003 102	0.006 28	0.006 87
DCP 8	.400	0.844	0.272 273	0.013 77	0.005 328	0.008 308	0.016 132	0.005 269	0.001 333	0.009 50	0.006 55
DCP 9	.501	0.618	0.176 271	0.007 85	0.004 332	0.008 64	0.015 164	0.004 183	0.005 350	0.006 67	0.003 95
DCP10	.600	0.509	0.120 288	0.002 2	0.006 331	0.005 314	0.009 150	0.003 310	0.005 20	0.002 109	0.002 31
DCP11	.831	0.298	0.079 294	0.008 111	0.005 37	0.005 70	0.010 173	0.002 320	0.001 234	0.003 212	0.003 113
DCP12	.878	0.187	0.065 302	0.005 97	0.008 19	0.007 297	0.006 117	0.002 200	0.004 17	0.003 102	0.001 241
DCP13	.950	-0.007	0.059 295	0.003 161	0.002 346	0.009 59	0.005 190	0.001 283	0.007 329	0.002 325	0.004 59

FORCED VERTICAL TRANSLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	32.79	0.200	12.61		0.305	4029.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.250	219.2	199.9	0.26E 07	-0.00496	1.511	12.61

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		1.195	0.320 267	0.003 75	0.005 349	0.002 169	0.009 112	0.006 257	0.001 292	0.004 155	0.002 10
CM		0.007	0.020 194	0.002 309	0.001 222	0.000 251	0.001 344	0.001 96	0.001 186	0.001 347	0.001 239
DCP 1	.010	5.162	1.885 254	0.145 263	0.140 24	0.078 202	0.048 51	0.016 154	0.015 212	0.015 306	0.012 81
DCP 2	.025	4.822	1.587 254	0.045 6	0.069 328	0.018 212	0.051 54	0.010 320	0.018 162	0.017 119	0.018 262
DCP 3	.050	4.514	1.300 254	0.031 6	0.010 312	0.012 187	0.021 99	0.017 204	0.011 350	0.007 12	0.011 300
DCP 4	.150	2.093	0.518 262	0.007 306	0.005 326	0.004 90	0.013 88	0.004 205	0.003 306	0.003 153	0.005 274
DCP 5	.200	1.839	0.433 265	0.003 73	0.010 272	0.007 50	0.018 132	0.007 342	0.013 179	0.003 143	0.003 245
DCP 6	.250	1.492	0.370 270	0.003 351	0.004 338	0.003 27	0.013 109	0.004 268	0.003 208	0.006 135	0.003 356
DCP 7	.300	1.326	0.353 274	0.003 103	0.005 275	0.006 269	0.013 140	0.009 279	0.009 186	0.001 130	0.006 128
DCP 8	.400	1.013	0.281 277	0.016 89	0.008 350	0.002 70	0.010 120	0.008 258	0.002 224	0.007 171	0.003 336
DCP 9	.501	0.745	0.167 282	0.009 109	0.010 338	0.003 97	0.010 164	0.007 244	0.002 335	0.003 154	0.003 101
DCP10	.600	0.565	0.133 292	0.014 124	0.004 34	0.001 149	0.006 136	0.006 275	0.004 357	0.007 159	0.007 21
DCP11	.831	0.315	0.090 305	0.007 79	0.005 41	0.002 210	0.005 133	0.009 269	0.003 31	0.004 150	0.004 95
DCP12	.878	0.197	0.083 289	0.002 129	0.010 66	0.004 134	0.004 34	0.005 286	0.004 18	0.007 152	0.003 295
DCP13	.950	0.067	0.061 300	0.014 210	0.005 12	0.005 87	0.004 120	0.001 231	0.003 322	0.003 194	0.004 47

FORCED VERTICAL TRANSLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	32.68	0.200	15.10		0.305	4029.4	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.249	219.1	199.4	0.26E 07	-0.00517	1.719	15.10

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		1.376	0.336 273	0.005 9	0.004 270	0.005 86	0.010 160	0.004 255	0.002 266	0.001 88	0.001 147
CM		0.008	0.015 188	0.001 222	0.001 287	0.001 325	0.002 35	0.001 172	0.001 70	0.001 11	0.001 294
DCP 1	.010	6.102	1.615 260	0.196 265	0.104 241	0.171 49	0.033 151	0.063 231	0.029 22	0.013 284	0.015 230
DCP 2	.025	5.765	1.673 260	0.058 40	0.028 45	0.039 130	0.023 119	0.033 210	0.025 208	0.014 27	0.004 253
DCP 3	.050	5.212	1.346 261	0.020 9	0.028 267	0.017 57	0.024 107	0.006 180	0.001 223	0.003 53	0.008 312
DCP 4	.150	2.368	0.511 269	0.008 268	0.011 311	0.008 140	0.023 144	0.013 273	0.004 29	0.004 226	0.003 235
DCP 5	.200	2.120	0.437 274	0.005 272	0.013 325	0.006 57	0.017 130	0.012 291	0.005 203	0.014 47	0.005 232
DCP 6	.250	1.703	0.375 278	0.005 93	0.012 265	0.005 292	0.016 134	0.011 232	0.004 20	0.002 157	0.005 98
DCP 7	.300	1.524	0.393 278	0.009 139	0.012 293	0.003 178	0.009 139	0.008 267	0.001 300	0.009 51	0.005 175
DCP 8	.400	1.158	0.299 286	0.022 77	0.004 182	0.003 155	0.014 165	0.004 266	0.001 356	0.001 136	0.004 89
DCP 9	.501	0.834	0.201 288	0.006 51	0.005 230	0.004 243	0.009 238	0.007 317	0.003 284	0.004 78	0.007 137
DCP10	.600	0.612	0.157 298	0.014 3	0.003 82	0.007 101	0.011 194	0.002 86	0.004 320	0.003 137	0.001 3
DCP11	.831	0.359	0.097 290	0.003 33	0.004 107	0.006 112	0.010 190	0.005 224	0.006 216	0.002 265	0.005 121
DCP12	.878	0.254	0.088 272	0.010 340	0.000 192	0.006 81	0.008 172	0.007 35	0.003 59	0.004 198	0.004 335
DCP13	.950	0.159	0.050 281	0.006 218	0.003 141	0.004 112	0.005 266	0.006 300	0.005 247	0.004 241	0.003 157

FORCED VERTICAL TRANSLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	33.11	0.400	5.12		0.307	4028.1	10

K	V	Q	RN	DAMPING	CN'MAX)	ALPHA(STALL)
0.129	429.4	736.3	0.48E 07	-0.00316	0.746	5.12

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.528	0.222 245	0.008 316	0.002 249	0.004 145	0.001 51	0.002 163	0.001 234	0.001 359	0.000 285
CM		-0.002	0.006 219	0.001 297	0.000 144	0.000 10	0.000 353	0.000 24	0.000 105	0.000 230	0.000 202
DCP 1	.010	1.259	1.285 245	0.063 299	0.014 225	0.022 134	0.022 7	0.010 122	0.005 205	0.008 258	0.003 178
DCP 2	.025	1.583	1.100 244	0.056 307	0.016 210	0.013 93	0.013 18	0.009 138	0.005 160	0.005 357	0.002 241
DCP 3	.050	1.923	0.881 243	0.041 318	0.008 243	0.011 131	0.010 8	0.008 127	0.002 187	0.002 312	0.003 229
DCP 4	.150	1.126	0.359 244	0.013 314	0.004 262	0.005 137	0.001 94	0.003 148	0.001 240	0.002 267	0.001 341
DCP 5	.200	0.834	0.317 244	0.015 308	0.004 203	0.004 103	0.004 50	0.003 177	0.002 207	0.003 42	0.004 303
DCP 6	.250	0.759	0.255 246	0.009 308	0.004 284	0.004 167	0.004 122	0.002 149	0.001 199	0.002 272	0.001 57
DCP 7	.300	0.630	0.233 247	0.008 306	0.003 224	0.004 109	0.003 66	0.003 188	0.001 189	0.002 49	0.001 333
DCP 8	.400	0.485	0.176 248	0.004 340	0.003 275	0.004 159	0.001 125	0.002 178	0.002 255	0.001 329	0.000 209
DCP 9	.501	0.328	0.127 244	0.004 316	0.002 236	0.002 123	0.001 109	0.003 174	0.000 165	0.003 38	0.001 236
DCP10	.600	0.255	0.090 248	0.002 5	0.001 307	0.005 199	0.001 120	0.002 198	0.002 269	0.001 333	0.000 154
DCP11	.831	0.159	0.048 256	0.000 342	0.001 287	0.001 155	0.001 119	0.002 179	0.001 6	0.001 42	0.001 26
DCP12	.878	0.092	0.035 263	0.002 67	0.002 308	0.004 180	0.002 204	0.001 201	0.002 241	0.001 252	0.001 158
DCP13	.950	-0.041	0.033 259	0.001 276	0.001 177	0.003 99	0.000 3	0.002 176	0.001 244	0.001 50	0.001 308

FORCED VERTICAL TRANSLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	31.06	0.400	10.01		0.306	4028.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.121	428.8	737.3	0.48E 07	-0.00336	1.346	10.01

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		1.138	0.213 252	0.009 280	0.004 325	0.004 153	0.005 114	0.002 293	0.003 95	0.001 95	0.001 308
CM		0.013	0.010 230	0.001 308	0.001 47	0.000 32	0.000 280	0.001 278	0.000 62	0.000 290	0.000 326
DCP 1	.010	4.787	1.580 248	0.165 14	0.023 201	0.051 165	0.042 343	0.025 148	0.014 88	0.007 255	0.005 66
DCP 2	.025	4.688	1.336 248	0.122 9	0.060 200	0.014 32	0.018 35	0.018 161	0.013 345	0.012 107	0.006 333
DCP 3	.050	4.357	0.899 249	0.103 239	0.068 6	0.016 129	0.044 136	0.046 299	0.029 87	0.003 115	0.010 299
DCP 4	.150	2.121	0.315 251	0.017 270	0.005 314	0.006 177	0.003 86	0.003 227	0.003 81	0.002 52	0.001 272
DCP 5	.200	1.721	0.270 250	0.013 283	0.003 263	0.003 154	0.004 65	0.002 146	0.002 99	0.003 104	0.001 11
DCP 6	.250	1.456	0.221 253	0.010 285	0.004 301	0.004 183	0.003 120	0.001 75	0.003 146	0.001 353	0.001 118
DCP 7	.300	1.241	0.202 254	0.009 303	0.003 257	0.003 143	0.003 64	0.001 109	0.002 119	0.000 269	0.001 337
DCP 8	.400	0.957	0.155 256	0.004 279	0.006 287	0.003 183	0.004 138	0.001 340	0.001 144	0.002 59	0.002 114
DCP 9	.501	0.673	0.108 252	0.004 286	0.002 242	0.002 157	0.002 98	0.001 43	0.002 136	0.001 129	0.000 221
DCP10	.600	0.514	0.076 256	0.004 241	0.005 313	0.003 169	0.004 136	0.001 15	0.001 178	0.002 78	0.001 156
DCP11	.831	0.273	0.038 271	0.000 336	0.001 217	0.001 76	0.002 85	0.001 141	0.001 222	0.001 216	0.001 310
DCP12	.878	0.191	0.034 275	0.003 230	0.004 302	0.003 188	0.003 119	0.001 359	0.001 335	0.002 113	0.001 185
DCP13	.950	0.056	0.035 260	0.005 313	0.001 179	0.001 101	0.001 83	0.001 114	0.001 159	0.001 73	0.000 351

FORCED VERTICAL TRANSLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	30.96	0.400	12.46		0.306	4028.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.121	428.1	734.6	0.48E 07	-0.00363	1.587	12.46

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.279	0.275	305	0.074	94	0.028	156	0.020	282	0.011	142	0.003	20	0.003	315	0.003	36	0.003	199
CM		0.010	0.016	14	0.020	175	0.009	298	0.004	17	0.002	176	0.001	39	0.001	157	0.001	312	0.001	136
DCP 1	.010	5.717	1.514	294	0.192	69	0.237	166	0.065	305	0.084	45	0.040	192	0.038	299	0.023	94	0.023	175
DCP 2	.025	5.694	1.557	292	0.296	98	0.204	164	0.143	320	0.082	87	0.066	231	0.029	340	0.049	93	0.027	238
DCP 3	.050	5.080	1.333	311	0.555	143	0.131	340	0.092	320	0.162	181	0.101	38	0.026	198	0.062	335	0.048	149
DCP 4	.150	2.235	0.341	320	0.104	109	0.051	205	0.025	318	0.019	105	0.012	250	0.010	26	0.007	153	0.005	284
DCP 5	.200	1.804	0.296	327	0.111	121	0.051	229	0.021	348	0.018	121	0.007	261	0.003	14	0.002	128	0.002	72
DCP 6	.250	1.530	0.285	325	0.107	104	0.056	199	0.029	304	0.017	95	0.007	235	0.007	38	0.006	194	0.007	336
DCP 7	.300	1.326	0.254	324	0.101	110	0.051	216	0.022	311	0.014	78	0.002	177	0.002	237	0.002	22	0.000	44
DCP 8	.400	1.013	0.224	318	0.088	76	0.055	157	0.032	252	0.007	11	0.003	315	0.006	40	0.005	154	0.004	329
DCP 9	.501	0.714	0.153	309	0.073	59	0.053	154	0.029	257	0.007	29	0.002	86	0.003	325	0.004	97	0.002	231
DCP10	.600	0.561	0.122	296	0.070	22	0.060	114	0.030	216	0.004	321	0.005	164	0.012	292	0.007	55	0.004	231
DCP11	.831	0.357	0.113	256	0.071	11	0.034	120	0.012	219	0.004	145	0.002	272	0.002	13	0.002	123	0.004	334
DCP12	.878	0.285	0.107	241	0.052	339	0.025	58	0.011	151	0.003	237	0.003	77	0.004	201	0.001	334	0.002	219
DCP13	.950	0.173	0.125	242	0.042	7	0.005	112	0.004	319	0.011	112	0.007	279	0.005	52	0.005	133	0.006	271

FORCED VERTICAL TRANSLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	32.89	0.400	14.88		0.306	4028.4	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.128	427.7	735.9	0.48E 07	-0.00028	1.616	14.88

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.244	0.333	357	0.054	242	0.021	76	0.025	253	0.021	127	0.005	14	0.004	24	0.003	254	0.004	274
CM		-0.032	0.065	80	0.022	319	0.017	202	0.007	88	0.003	301	0.002	188	0.003	94	0.002	325	0.001	117
DCP 1	.010	5.720	1.290	357	0.142	281	0.077	334	0.036	216	0.053	28	0.069	249	0.046	112	0.012	304	0.001	276
DCP 2	.025	5.062	1.247	30	0.474	319	0.344	262	0.244	157	0.161	35	0.103	263	0.026	180	0.063	158	0.071	47
DCP 3	.050	4.538	1.413	33	0.541	297	0.321	218	0.168	170	0.156	119	0.048	31	0.057	66	0.037	329	0.031	251
DCP 4	.150	1.889	0.738	28	0.131	246	0.109	132	0.041	358	0.028	252	0.009	181	0.018	117	0.015	310	0.009	258
DCP 5	.200	1.586	0.660	17	0.140	218	0.109	115	0.074	328	0.016	230	0.016	170	0.017	82	0.019	345	0.018	255
DCP 6	.250	1.413	0.551	5	0.083	220	0.122	99	0.057	320	0.035	197	0.008	89	0.008	33	0.008	311	0.014	212
DCP 7	.300	1.292	0.485	354	0.097	208	0.107	87	0.068	305	0.014	195	0.015	96	0.008	63	0.011	313	0.009	239
DCP 8	.400	1.042	0.385	338	0.050	194	0.091	67	0.050	300	0.034	176	0.014	46	0.018	336	0.010	223	0.009	81
DCP 9	.501	0.743	0.272	321	0.039	166	0.058	44	0.042	272	0.021	162	0.007	50	0.017	294	0.007	214	0.004	263
DCP10	.600	0.634	0.221	307	0.039	173	0.067	19	0.040	264	0.023	118	0.006	6	0.013	296	0.010	204	0.008	34
DCP11	.831	0.509	0.211	271	0.064	142	0.052	6	0.033	225	0.027	96	0.009	328	0.004	215	0.010	130	0.008	279
DCP12	.878	0.433	0.193	266	0.076	150	0.046	332	0.023	219	0.014	79	0.005	9	0.007	228	0.011	124	0.006	293
DCP13	.950	0.311	0.173	258	0.054	148	0.028	344	0.016	181	0.006	51	0.011	346	0.006	256	0.010	93	0.007	242

FORCED VERTICAL TRANSLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	29.85	0.600	5.09		0.306	4027.1	10

K	V	Q	RN	DAMPING	CY(MAX)	ALPHA(STALL)
0.079	631.2	1450.2	0.64E 07	-0.00261	0.793	5.09

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.628	0.168	243	0.009	247	0.005	200	0.000	348	0.004	303	0.003	273	0.001	189	0.002	3	0.002	353
CM		-0.001	0.006	225	0.001	239	0.000	261	0.001	54	0.000	296	0.000	284	0.000	5	0.001	86	0.000	316
DCP 1	.010	0.971	0.633	244	0.044	257	0.008	202	0.010	155	0.004	147	0.001	57	0.002	89	0.003	131	0.002	236
DCP 2	.025	1.397	0.534	242	0.047	247	0.009	210	0.005	176	0.002	120	0.001	91	0.003	94	0.004	362	0.004	255
DCP 3	.050	2.050	0.518	242	0.033	251	0.006	207	0.009	134	0.003	134	0.001	278	0.001	320	0.002	133	0.002	259
DCP 4	.150	1.862	0.628	240	0.166	216	0.037	194	0.042	332	0.065	306	0.039	278	0.000	326	0.024	42	0.022	5
DCP 5	.200	1.266	0.415	238	0.110	19	0.052	344	0.047	127	0.021	123	0.018	240	0.008	226	0.011	347	0.002	329
DCP 6	.250	0.897	0.258	241	0.095	18	0.046	169	0.006	130	0.016	269	0.008	35	0.003	63	0.006	156	0.005	304
DCP 7	.300	0.686	0.088	253	0.007	209	0.011	180	0.006	288	0.003	82	0.000	336	0.003	176	0.003	296	0.002	26
DCP 8	.400	0.514	0.086	249	0.008	196	0.003	216	0.001	197	0.001	303	0.001	32	0.002	202	0.001	190	0.001	47
DCP 9	.501	0.327	0.067	244	0.005	211	0.002	238	0.002	251	0.001	253	0.001	68	0.002	162	0.002	318	0.001	291
DCP10	.600	0.279	0.051	250	0.002	179	0.001	213	0.001	116	0.001	11	0.001	129	0.001	204	0.001	189	0.001	44
DCP11	.831	0.158	0.028	258	0.000	255	0.001	276	0.004	237	0.000	13	0.001	228	0.001	192	0.005	286	0.000	232
DCP12	.878	0.126	0.025	260	0.002	81	0.001	153	0.000	325	0.000	252	0.000	243	0.000	209	0.001	189	0.001	35
DCP13	.950	0.012	0.026	249	0.004	288	0.003	132	0.003	244	0.001	125	0.001	227	0.001	169	0.004	284	0.001	316

FORCED VERTICAL TRANSLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	32.05	0.600	9.95		0.306	4027.2	10

K	V	Q	RN	DAMPING	CY(MAX)	ALPHA(STALL)
0.085	630.5	1450.7	0.64E 07	-0.00082	1.029	9.95

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.957	0.063	305	0.010	355	0.005	239	0.006	197	0.009	24	0.001	40	0.004	318	0.005	153	0.004	48
CM		-0.037	0.023	95	0.002	191	0.002	21	0.001	310	0.001	104	0.001	203	0.001	62	0.000	143	0.002	324
DCP 1	.010	2.437	0.306	271	0.031	335	0.005	266	0.003	133	0.006	349	0.003	272	0.006	181	0.003	169	0.002	306
DCP 2	.025	2.568	0.236	269	0.022	353	0.015	240	0.005	110	0.005	354	0.005	264	0.003	186	0.004	118	0.003	12
DCP 3	.050	3.030	0.061	275	0.050	283	0.014	6	0.012	216	0.007	349	0.012	94	0.011	280	0.013	163	0.011	17
DCP 4	.150	1.935	0.205	50	0.015	162	0.009	240	0.040	244	0.074	63	0.022	176	0.027	357	0.026	145	0.051	21
DCP 5	.200	1.502	0.122	59	0.019	34	0.015	307	0.013	31	0.017	47	0.008	315	0.015	95	0.007	164	0.015	19
DCP 6	.250	1.323	0.100	27	0.031	91	0.014	28	0.006	120	0.015	348	0.017	8	0.016	144	0.012	144	0.013	299
DCP 7	.300	1.264	0.083	25	0.024	25	0.014	252	0.012	225	0.021	28	0.012	304	0.016	355	0.002	220	0.012	278
DCP 8	.400	0.844	0.108	292	0.014	24	0.011	284	0.008	165	0.007	308	0.005	322	0.007	12	0.005	100	0.011	194
DCP 9	.501	0.537	0.111	294	0.014	314	0.008	174	0.014	179	0.009	278	0.007	130	0.008	306	0.008	142	0.003	258
DCP10	.600	0.473	0.099	281	0.023	354	0.008	193	0.006	193	0.013	6	0.001	21	0.010	272	0.001	279	0.007	142
DCP11	.831	0.376	0.103	275	0.006	22	0.010	219	0.007	107	0.007	239	0.006	52	0.006	212	0.003	323	0.011	122
DCP12	.878	0.331	0.088	269	0.009	342	0.007	178	0.004	93	0.007	299	0.003	119	0.004	259	0.004	155	0.006	126
DCP13	.950	0.257	0.084	264	0.003	171	0.007	197	0.002	129	0.001	44	0.006	321	0.005	177	0.002	75	0.008	85

FORCED VERTICAL TRANSLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	32.36	0.600	12.34		0.306	4027.3	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.086	630.0	1445.5	0.64E 07	-0.00045	1.071	12.34	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		1.016	0.048 324	0.010 282	0.006 271	0.010 213	0.006 34	0.006 241	0.005 354	0.003 126	0.004 193
CM		-0.067	0.018 95	0.002 121	0.001 163	0.002 351	0.002 167	0.001 87	0.001 108	0.001 202	0.002 337
DCP 1	.010	2.893	0.272 275	0.027 316	0.008 253	0.009 161	0.005 84	0.005 263	0.001 233	0.002 291	0.001 216
DCP 2	.025	2.986	0.286 273	0.030 289	0.004 189	0.011 163	0.007 49	0.005 226	0.002 4	0.002 69	0.004 267
DCP 3	.050	2.994	0.149 59	0.035 293	0.030 196	0.008 137	0.015 115	0.023 240	0.034 69	0.015 155	0.010 254
DCP 4	.150	1.635	0.158 49	0.002 176	0.038 217	0.022 256	0.010 64	0.011 226	0.010 286	0.014 132	0.011 346
DCP 5	.200	1.461	0.075 58	0.017 150	0.026 343	0.032 267	0.006 64	0.002 289	0.020 30	0.00[illegible]	0.004 259
DCP 6	.250	1.243	0.119 21	0.007 275	0.011 238	0.016 234	0.016 117	0.024 157	0.010 283	0.00[illegible]	0.016 300
DCP 7	.300	1.263	0.065 354	0.020 244	0.024 325	0.020 265	0.012 24	0.012 259	0.021 336	0.016 [illegible]	0.007 57
DCP 8	.400	0.969	0.084 322	0.010 246	0.008 297	0.010 228	0.008 77	0.005 131	0.008 273	0.006 [illegible]	0.009 299
DCP 9	.501	0.645	0.083 295	0.032 286	0.007 312	0.025 192	0.009 351	0.006 183	0.006 310	0.013 1[illegible]	0.016 279
DCP10	.600	0.610	0.064 278	0.008 315	0.002 39	0.011 176	0.010 345	0.009 353	0.007 15	0.011 33	0.021 170
DCP11	.831	0.492	0.074 282	0.009 294	0.005 318	0.008 139	0.006 3	0.016 247	0.002 213	0.002 334	0.005 189
DCP12	.878	0.471	0.067 261	0.003 261	0.007 342	0.007 197	0.009 358	0.014 296	0.006 6	0.006 352	0.009 91
DCP13	.950	0.346	0.062 274	0.008 34	0.004 234	0.003 127	0.001 273	0.009 193	0.006 198	0.001 3	0.010 127

FORCED VERTICAL TRANSLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	32.57	0.600	14.77		0.305	4027.4	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.087	628.6	1442.6	0.64E 07	-0.00048	1.104	14.77	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		1.048	0.041 308	0.016 29	0.005 41	0.004 232	0.013 151	0.000 300	0.006 106	0.005 15	0.004 250
CM		-0.090	0.019 109	0.004 213	0.001 116	0.001 245	0.002 315	0.002 167	0.000 335	0.004 158	0.003 16
DCP 1	.010	3.236	0.172 280	0.057 298	0.015 70	0.002 237	0.007 135	0.003 47	0.003 265	0.007 109	0.013 314
DCP 2	.025	3.235	0.067 317	0.072 268	0.027 66	0.332 239	0.030 52	0.027 189	0.031 1	0.033 159	0.034 319
DCP 3	.050	2.831	0.128 106	0.021 94	0.015 357	0.017 54	0.024 210	0.019 278	0.034 169	0.023 206	0.012 182
DCP 4	.150	1.475	0.039 51	0.013 337	0.035 90	0.024 247	0.020 135	0.023 153	0.010 157	0.032 131	0.017 354
DCP 5	.200	1.434	0.022 1	0.020 36	0.011 251	0.017 274	0.014 172	0.007 239	0.022 91	0.006 98	0.013 33
DCP 6	.250	1.202	0.042 356	0.025 49	0.025 84	0.036 215	0.012 171	0.018 110	0.009 72	0.027 135	0.018 321
DCP 7	.300	1.258	0.043 352	0.019 33	0.004 125	0.017 261	0.022 177	0.010 174	0.019 62	0.013 340	0.011 7
DCP 8	.400	1.016	0.077 306	0.040 39	0.016 55	0.022 166	0.021 149	0.033 191	0.017 62	0.006 336	0.007 298
DCP 9	.501	0.705	0.053 320	0.025 35	0.002 327	0.015 217	0.013 139	0.010 39	0.005 2	0.014 333	0.008 249
DCP10	.600	0.699	0.072 299	0.023 38	0.010 304	0.017 13	0.018 140	0.005 14	0.006 33	0.015 10	0.013 209
DCP11	.831	0.578	0.081 283	0.009 12	0.004 334	0.007 63	0.010 115	0.013 340	0.011 184	0.016 338	0.010 207
DCP12	.878	0.584	0.065 285	0.008 313	0.011 283	0.008 205	0.006 154	0.005 302	0.006 186	0.020 357	0.017 179
DCP13	.950	0.418	0.064 272	0.011 41	0.000 140	0.006 80	0.003 214	0.008 292	0.006 189	0.006 336	0.010 159

FORCED VERTICAL TRANSLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	32.89	0.200	0.26		0.466	4037.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.249	220.3	202.3	0.26E 07	-0.00504	0.426	0.26

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		-0.110	0.516 250	0.016 330	0.016 244	0.005 110	0.018 93	0.005 346	0.005 316	0.001 54	0.001 289
CM		0.002	0.027 185	0.003 271	0.002 129	0.001 359	0.004 303	0.000 166	0.001 191	0.002 242	0.001 139
DCP 1	.010	-2.567	3.906 242	0.281 241	0.127 210	0.042 50	0.083 24	0.034 338	0.022 273	0.015 303	0.005 294
DCP 2	.025	-1.035	2.489 239	0.100 308	0.060 185	0.005 168	0.043 2	0.010 83	0.001 276	0.016 251	0.011 154
DCP 3	.050	-0.092	1.925 240	0.086 330	0.051 211	0.004 30	0.016 19	0.011 290	0.019 254	0.003 213	0.006 297
DCP 4	.150	0.044	0.821 247	0.042 324	0.024 228	0.017 72	0.025 81	0.009 343	0.009 313	0.005 248	0.005 74
DCP 5	.200	0.023	0.708 247	0.023 299	0.022 249	0.011 111	0.035 85	0.011 42	0.003 272	0.009 257	0.006 197
DCP 6	.250	-0.040	0.614 253	0.030 328	0.017 239	0.017 79	0.023 96	0.008 340	0.005 322	0.001 274	0.007 74
DCP 7	.300	-0.214	0.561 252	0.012 328	0.019 261	0.015 172	0.030 97	0.014 53	0.006 275	0.009 229	0.002 33
DCP 8	.400	-0.071	0.449 260	0.022 38	0.012 269	0.007 59	0.023 112	0.010 305	0.008 339	0.005 25	0.005 352
DCP 9	.501	-0.136	0.287 256	0.010 349	0.015 280	0.007 142	0.030 96	0.008 21	0.007 350	0.004 321	0.003 227
DCP 10	.600	-0.078	0.215 267	0.015 28	0.013 273	0.007 93	0.017 116	0.008 291	0.012 318	0.012 94	0.004 204
DCP 11	.831	0.158	0.122 282	0.005 80	0.010 281	0.008 208	0.015 121	0.003 107	0.005 76	0.005 55	0.006 320
DCP 12	.878	-0.076	0.118 282	0.007 78	0.008 293	0.001 132	0.012 128	0.007 283	0.006 333	0.007 32	0.006 313
DCP 13	.950	-0.365	0.089 291	0.009 181	0.005 231	0.004 183	0.010 89	0.006 65	0.002 107	0.004 28	0.004 174

FORCED VERTICAL TRANSLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	32.89	0.200	7.54		0.465	4037.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.250	220.0	201.7	0.26E 07	-0.00509	1.161	7.54

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.632	0.501 260	0.010 6	0.010 262	0.007 114	0.020 133	0.003 31	0.007 65	0.005 42	0.006 56
CM		0.017	0.029 195	0.004 295	0.001 185	0.001 17	0.004 341	0.001 215	0.002 258	0.001 274	0.001 226
DCP 1	.010	2.257	3.079 249	0.097 296	0.112 219	0.044 50	0.058 68	0.015 53	0.004 142	0.042 322	0.003 351
DCP 2	.025	2.477	2.511 251	0.090 306	0.024 300	0.019 133	0.070 80	0.012 354	0.008 71	0.024 321	0.006 35
DCP 3	.050	2.659	2.002 247	0.059 317	0.054 228	0.032 56	0.024 103	0.011 17	0.011 319	0.011 5	0.008 270
DCP 4	.150	1.181	0.837 255	0.035 349	0.015 268	0.018 97	0.031 114	0.005 152	0.005 26	0.010 9	0.007 37
DCP 5	.200	1.019	0.682 259	0.023 21	0.015 303	0.009 106	0.025 129	0.001 52	0.012 95	0.008 81	0.011 60
DCP 6	.250	0.857	0.555 261	0.019 330	0.014 271	0.021 101	0.026 133	0.001 301	0.005 343	0.010 342	0.012 31
DCP 7	.300	0.673	0.536 265	0.016 34	0.012 312	0.007 223	0.023 160	0.005 181	0.014 72	0.013 82	0.017 88
DCP 8	.400	0.588	0.446 269	0.019 82	0.013 247	0.016 129	0.029 135	0.002 103	0.011 26	0.008 66	0.013 76
DCP 9	.501	0.322	0.271 269	0.012 53	0.010 312	0.007 189	0.026 155	0.005 344	0.013 87	0.004 100	0.005 62
DCP 10	.600	0.252	0.204 281	0.006 114	0.012 250	0.004 141	0.016 150	0.005 349	0.011 84	0.008 66	0.002 199
DCP 11	.831	0.270	0.115 296	0.014 108	0.011 10	0.005 213	0.014 153	0.009 47	0.006 81	0.004 22	0.008 37
DCP 12	.878	0.037	0.124 293	0.011 106	0.003 201	0.007 145	0.013 133	0.004 69	0.008 58	0.006 97	0.006 16
DCP 13	.950	-0.281	0.080 301	0.005 270	0.002 102	0.001 150	0.010 147	0.005 29	0.005 76	0.005 190	0.008 31

FORCED VERTICAL TRANSLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	33.00	0.200	9.99		0.465	4037.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.251	219.5	201.4	0.26E 07	-0.00503	1.365	9.99

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.850	0.499 261	0.008 31	0.013 263	0.009 121	0.019 129	0.005 170	0.005 68	0.003 173	0.004 56
CM		0.026	0.028 193	0.003 312	0.002 155	0.002 353	0.004 349	0.001 38	0.002 279	0.001 348	0.001 233
DCP 1	.010	3.634	3.018 251	0.095 335	0.054 261	0.089 143	0.084 32	0.037 156	0.050 284	0.009 132	0.016 319
DCP 2	.025	3.642	2.497 249	0.076 305	0.057 224	0.053 23	0.054 59	0.013 139	0.040 314	0.005 350	0.013 116
DCP 3	.050	3.535	1.991 250	0.064 337	0.055 222	0.025 58	0.043 76	0.011 161	0.009 302	0.016 232	0.010 298
DCP 4	.150	1.515	0.812 258	0.021 3	0.017 274	0.007 101	0.029 122	0.011 128	0.008 90	0.002 347	0.012 70
DCP 5	.200	1.310	0.689 259	0.012 62	0.019 266	0.017 99	0.019 118	0.003 137	0.005 34	0.007 325	0.012 131
DCP 6	.250	1.124	0.565 264	0.014 330	0.014 275	0.013 157	0.033 137	0.009 116	0.008 75	0.011 142	0.009 61
DCP 7	.300	0.944	0.556 266	0.022 95	0.015 273	0.017 106	0.021 145	0.003 282	0.012 54	0.003 45	0.012 78
DCP 8	.400	0.794	0.422 271	0.025 94	0.011 282	0.012 131	0.031 133	0.008 147	0.010 81	0.007 120	0.003 33
DCP 9	.501	0.444	0.280 270	0.008 93	0.017 283	0.010 134	0.020 156	0.004 234	0.007 80	0.006 132	0.008 98
DCP10	.600	0.315	0.199 283	0.004 115	0.004 287	0.013 173	0.023 142	0.009 239	0.005 96	0.004 175	0.009 320
DCP11	.831	0.289	0.131 295	0.012 100	0.009 318	0.002 118	0.014 175	0.002 215	0.008 91	0.007 137	0.007 70
DCP12	.878	0.047	0.110 289	0.011 120	0.001 306	0.007 158	0.016 154	0.011 129	0.007 115	0.004 155	0.003 45
DCP13	.950	-0.237	0.099 292	0.013 244	0.007 285	0.002 135	0.006 152	0.002 180	0.004 99	0.005 189	0.009 85

FORCED VERTICAL TRANSLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	33.11	0.200	12.45		0.468	4037.4	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.252	219.5	201.3	0.26E 07	-0.00488	1.570	12.45

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		1.073	0.487 267	0.012 32	0.013 265	0.005 151	0.017 154	0.006 273	0.005 54	0.008 111	0.005 47
CM		0.028	0.029 191	0.003 266	0.002 199	0.001 14	0.003 1	0.001 94	0.001 279	0.001 298	0.001 220
DCP 1	.010	4.771	2.632 255	0.239 261	0.030 9	0.053 17	0.113 175	0.074 4	0.021 340	0.048 160	0.045 336
DCP 2	.025	4.736	2.445 252	0.085 346	0.095 220	0.016 77	0.071 48	0.006 150	0.024 127	0.023 50	0.025 339
DCP 3	.050	4.379	1.965 254	0.048 345	0.064 240	0.005 179	0.025 82	0.018 210	0.023 357	0.015 95	0.011 169
DCP 4	.150	1.856	0.798 264	0.017 1	0.026 288	0.013 119	0.026 154	0.010 286	0.006 344	0.012 122	0.006 78
DCP 5	.200	1.679	0.642 265	0.011 101	0.027 262	0.015 70	0.030 130	0.005 235	0.011 85	0.007 59	0.008 66
DCP 6	.250	1.371	0.570 272	0.017 22	0.023 289	0.015 152	0.023 161	0.011 253	0.007 33	0.016 143	0.003 269
DCP 7	.300	1.221	0.526 270	0.028 63	0.014 255	0.012 151	0.027 148	0.009 293	0.009 87	0.008 130	0.017 97
DCP 8	.400	0.973	0.438 280	0.034 79	0.010 289	0.007 216	0.022 177	0.007 264	0.005 65	0.011 134	0.004 56
DCP 9	.501	0.560	0.271 281	0.020 71	0.012 276	0.001 205	0.021 149	0.003 299	0.007 112	0.006 135	0.010 37
DCP10	.600	0.395	0.210 297	0.009 94	0.005 237	0.011 173	0.014 213	0.006 247	0.007 25	0.013 75	0.007 31
DCP11	.831	0.337	0.138 299	0.012 60	0.009 23	0.005 177	0.018 153	0.009 276	0.004 91	0.005 192	0.008 31
DCP12	.878	0.100	0.133 290	0.018 21	0.009 359	0.005 207	0.012 204	0.006 240	0.002 99	0.009 134	0.002 157
DCP13	.950	-0.159	0.087 287	0.017 253	0.006 254	0.004 340	0.008 123	0.000 52	0.005 130	0.004 93	0.003 13

FORCED VERTICAL TRANSLATION VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	30.12	0.400	0.26		0.466	4038.1	10

K	V	ω	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.116	433.0	736.4	0.48E 07	-0.00336	0.246	0.26

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		-0.066	0.333 243	0.019 290	0.005 203	0.006 136	0.007 38	0.001 232	0.004 308	0.001 326	0.002 314
Cm		-0.011	0.007 207	0.001 227	0.001 109	0.001 329	0.001 304	0.000 43	0.001 158	0.001 180	0.000 201
DCP 1	.010	-2.495	2.514 242	0.257 244	0.047 190	0.031 65	0.066 2	0.018 282	0.019 255	0.021 194	0.009 213
DCP 2	.025	-1.143	1.507 240	0.083 291	0.029 167	0.013 44	0.030 24	0.014 83	0.020 241	0.007 305	0.014 301
DCP 3	.050	-0.266	1.194 240	0.063 291	0.013 184	0.017 138	0.024 3	0.003 216	0.008 286	0.004 214	0.005 227
DCP 4	.150	0.043	0.531 242	0.033 293	0.006 189	0.006 147	0.011 46	0.000 48	0.002 327	0.002 213	0.002 264
DCP 5	.200	-0.062	0.467 242	0.027 308	0.008 202	0.006 119	0.010 54	0.001 193	0.003 284	0.005 344	0.003 284
DCP 6	.250	-0.018	0.396 243	0.024 291	0.007 205	0.007 168	0.008 60	0.001 8	0.005 336	0.001 212	0.002 320
DCP 7	.300	-0.017	0.350 244	0.019 311	0.007 190	0.007 130	0.007 54	0.001 238	0.005 323	0.004 349	0.003 317
DCP 8	.400	-0.034	0.274 244	0.013 293	0.006 205	0.006 165	0.006 47	0.002 275	0.005 327	0.002 184	0.002 9
DCP 9	.501	-0.067	0.199 241	0.013 314	0.003 255	0.008 139	0.005 78	0.002 227	0.004 319	0.005 348	0.002 313
DCP10	.600	-0.031	0.143 245	0.008 281	0.004 220	0.004 161	0.004 40	0.000 118	0.006 315	0.002 164	0.002 350
DCP11	.831	0.060	0.074 255	0.005 345	0.002 285	0.006 117	0.003 97	0.001 202	0.002 336	0.006 349	0.002 22
DCP12	.878	0.069	0.059 260	0.005 255	0.002 221	0.004 179	0.001 46	0.001 255	0.002 356	0.002 150	0.001 61
DCP13	.950	-0.131	0.051 259	0.005 325	0.002 265	0.006 119	0.002 99	0.002 222	0.002 289	0.007 356	0.001 324

FORCED VERTICAL TRANSLATION VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	30.30	0.400	5.09		0.467	4038.2	10

K	V	ω	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.117	432.4	733.4	0.48E 07	-0.00342	0.851	5.09

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.514	0.331 247	0.019 314	0.004 191	0.005 150	0.006 67	0.000 180	0.003 324	0.001 11	0.001 338
Cm		-0.005	0.008 217	0.000 8	0.000 105	0.001 70	0.001 331	0.000 141	0.001 224	0.001 292	0.000 213
DCP 1	.010	1.192	1.897 246	0.111 297	0.039 199	0.029 122	0.035 38	0.001 251	0.018 293	0.013 320	0.006 290
DCP 2	.025	1.567	1.629 245	0.089 322	0.023 170	0.024 162	0.030 41	0.008 115	0.019 285	0.012 309	0.003 252
DCP 3	.050	1.863	1.304 244	0.082 326	0.013 153	0.025 112	0.021 29	0.003 154	0.015 279	0.010 302	0.003 229
DCP 4	.150	1.056	0.533 246	0.031 305	0.008 180	0.007 140	0.011 57	0.002 153	0.006 303	0.004 356	0.003 298
DCP 5	.200	0.809	0.467 246	0.024 313	0.007 206	0.007 190	0.008 82	0.001 110	0.004 330	0.002 5	0.002 11
DCP 6	.250	0.720	0.387 247	0.023 304	0.004 179	0.008 144	0.007 68	0.001 172	0.004 314	0.004 344	0.001 262
DCP 7	.300	0.629	0.348 249	0.017 321	0.005 186	0.007 187	0.007 97	0.002 150	0.003 338	0.002 353	0.003 41
DCP 8	.400	0.467	0.269 248	0.015 304	0.004 200	0.005 130	0.006 85	0.001 217	0.004 343	0.003 6	0.002 294
DCP 9	.501	0.302	0.187 246	0.009 324	0.002 214	0.005 205	0.005 98	0.002 56	0.004 15	0.001 12	0.001 7
DCP10	.600	0.252	0.144 248	0.011 303	0.003 257	0.005 99	0.002 83	0.002 269	0.002 355	0.003 77	0.001 336
DCP11	.831	0.183	0.068 260	0.002 351	0.001 245	0.006 248	0.003 131	0.002 352	0.003 27	0.004 114	0.002 40
DCP12	.878	0.101	0.056 260	0.008 286	0.002 194	0.003 115	0.003 104	0.001 285	0.002 38	0.001 81	0.002 64
DCP13	.950	-0.035	0.047 262	0.005 303	0.002 148	0.005 240	0.002 89	0.002 33	0.001 334	0.004 144	0.000 233

FORCED VERTICAL TRANSLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	30.21	0.400	7.53		0.466	4038.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.117	431.5	736.3	0.48E 07	-0.00344	1.146	7.53

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.813	0.328 245	0.014 319	0.006 201	0.005 140	0.005 80	0.003 212	0.003 316	0.004 325	0.002 264
CM		0.001	0.010 222	0.001 5	0.000 123	0.001 230	0.001 345	0.000 30	0.000 194	0.001 115	0.000 148
DCP 1	.010	2.826	1.860 248	0.094 332	0.045 190	0.025 161	0.033 66	0.009 240	0.019 293	0.013 4	0.010 226
DCP 2	.025	3.014	1.701 245	0.107 336	0.034 176	0.021 107	0.033 24	0.008 131	0.013 264	0.021 334	0.007 298
DCP 3	.050	3.022	1.393 246	0.081 343	0.031 183	0.017 150	0.020 46	0.008 209	0.013 273	0.011 348	0.007 230
DCP 4	.150	1.564	0.519 249	0.021 297	0.008 222	0.010 173	0.008 93	0.004 230	0.005 328	0.004 12	0.002 315
DCP 5	.200	1.246	0.444 247	0.020 307	0.009 211	0.007 81	0.007 63	0.002 168	0.003 321	0.006 316	0.004 241
DCP 6	.250	1.073	0.367 250	0.015 287	0.007 218	0.010 186	0.008 101	0.003 234	0.005 334	0.004 13	0.002 330
DCP 7	.300	0.946	0.334 250	0.013 306	0.005 222	0.006 100	0.003 121	0.001 225	0.003 329	0.004 334	0.001 218
DCP 8	.400	0.709	0.254 252	0.006 271	0.003 217	0.008 193	0.007 117	0.003 237	0.005 339	0.003 49	0.001 352
DCP 9	.501	0.476	0.179 247	0.008 321	0.005 226	0.006 68	0.003 93	0.002 168	0.003 354	0.004 299	0.003 275
DCP 10	.600	0.378	0.127 252	0.005 240	0.003 205	0.007 191	0.002 104	0.003 233	0.002 322	0.002 30	0.003 266
DCP 11	.831	0.242	0.069 262	0.002 328	0.002 227	0.006 51	0.002 137	0.003 189	0.002 343	0.008 292	0.002 7
DCP 12	.878	0.145	0.053 269	0.006 221	0.001 155	0.005 214	0.004 155	0.003 267	0.002 352	0.003 57	0.001 136
DCP 13	.950	0.016	0.052 263	0.008 329	0.003 217	0.009 47	0.003 33	0.003 161	0.002 343	0.009 296	0.002 291

FORCED VERTICAL TRANSLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	30.03	0.400	9.92		0.467	4038.4	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.116	431.1	734.9	0.48E 07	-0.00360	1.493	9.92

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		1.115	0.336 253	0.026 34	0.018 212	0.010 339	0.008 127	0.003 204	0.006 306	0.010 73	0.002 276
CM		0.011	0.019 233	0.004 14	0.003 177	0.002 68	0.000 35	0.000 57	0.001 275	0.001 242	0.001 244
DCP 1	.010	4.596	2.154 251	0.199 23	0.027 168	0.092 185	0.071 3	0.026 140	0.008 146	0.020 307	0.013 38
DCP 2	.025	4.662	2.041 248	0.251 23	0.112 196	0.016 219	0.052 15	0.048 140	0.034 284	0.024 18	0.016 81
DCP 3	.050	4.359	1.695 249	0.281 33	0.209 197	0.143 358	0.089 143	0.007 237	0.070 293	0.083 86	0.049 243
DCP 4	.150	2.017	0.461 255	0.007 282	0.006 256	0.004 132	0.008 107	0.004 217	0.003 4	0.004 36	0.001 21
DCP 5	.200	1.656	0.390 253	0.011 244	0.011 266	0.005 232	0.006 96	0.003 202	0.002 329	0.008 51	0.003 27
DCP 6	.250	1.399	0.325 256	0.003 298	0.006 253	0.002 152	0.005 133	0.002 154	0.003 11	0.002 30	0.001 152
DCP 7	.300	1.232	0.294 257	0.005 198	0.011 268	0.004 228	0.004 129	0.002 247	0.002 355	0.009 56	0.001 50
DCP 8	.400	0.925	0.226 259	0.008 88	0.005 255	0.004 45	0.006 128	0.004 245	0.002 14	0.003 79	0.001 136
DCP 9	.501	0.630	0.152 255	0.005 171	0.010 282	0.006 296	0.005 146	0.002 237	0.002 1	0.008 73	0.001 84
DCP 10	.600	0.498	0.113 262	0.006 110	0.006 265	0.005 356	0.005 170	0.003 247	0.002 41	0.001 119	0.002 44
DCP 11	.831	0.297	0.059 273	0.005 85	0.006 272	0.011 286	0.004 118	0.001 234	0.001 4	0.011 59	0.002 130
DCP 12	.878	0.197	0.052 276	0.013 64	0.003 171	0.006 351	0.003 124	0.003 245	0.002 17	0.002 135	0.001 138
DCP 13	.950	0.076	0.061 255	0.013 22	0.005 164	0.013 274	0.003 66	0.001 154	0.001 263	0.010 60	0.002 118

FORCED VERTICAL TRANSLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	30.12	0.400	12.45		0.472	4041.1	10

K	V	Q	RN	DAMPING	CY(MAX)	ALPHA(STALL)
0.116	435.5	744.0	0.48E 07	-0.00268	1.602	12.45

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		1.179	0.341 314	0.125 130	0.039 248	0.013 348	0.019 162	0.002 331	0.011 307	0.008 137	0.004 322
CM		-0.015	0.037 46	0.034 204	0.015 5	0.005 211	0.005 80	0.003 227	0.003 28	0.001 216	0.003 76
DCP 1	.010	5.189	1.769 295	0.353 144	0.117 217	0.105 17	0.074 147	0.033 251	0.053 72	0.029 276	0.018 355
DCP 2	.025	4.899	1.291 306	0.475 193	0.222 72	0.237 287	0.269 125	0.184 303	0.164 109	0.163 291	0.099 117
DCP 3	.050	4.042	1.690 340	0.883 167	0.125 345	0.204 290	0.281 128	0.101 296	0.063 313	0.065 167	0.104 356
DCP 4	.150	2.060	0.450 340	0.264 170	0.132 321	0.068 147	0.035 351	0.045 182	0.043 0	0.028 158	0.017 340
DCP 5	.200	1.690	0.407 329	0.239 149	0.140 298	0.080 120	0.046 323	0.061 165	0.064 341	0.049 156	0.028 334
DCP 6	.250	1.484	0.382 323	0.205 133	0.123 275	0.052 94	0.032 286	0.037 127	0.034 304	0.028 134	0.013 286
DCP 7	.300	1.257	0.364 312	0.195 120	0.119 265	0.058 86	0.040 284	0.044 128	0.042 303	0.032 117	0.021 292
DCP 8	.400	1.004	0.320 305	0.166 94	0.098 230	0.029 43	0.032 254	0.030 74	0.024 249	0.020 73	0.009 267
DCP 9	.501	0.730	0.224 298	0.121 78	0.073 207	0.024 17	0.026 227	0.019 41	0.016 239	0.012 56	0.012 211
DCP10	.600	0.597	0.188 292	0.105 59	0.063 187	0.013 331	0.024 227	0.020 15	0.010 195	0.010 16	0.005 239
DCP11	.831	0.402	0.163 261	0.092 33	0.044 170	0.024 352	0.017 175	0.008 333	0.005 194	0.007 229	0.005 242
DCP12	.878	0.295	0.161 253	0.089 21	0.036 171	0.019 339	0.018 150	0.010 286	0.006 217	0.010 21	0.008 180
DCP13	.950	0.165	0.162 246	0.066 19	0.025 167	0.018 339	0.010 112	0.009 290	0.005 121	0.010 225	0.004 216

FORCED VERTICAL TRANSLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	32.79	0.400	14.88		0.472	4041.2	10

K	V	Q	RN	DAMPING	CY(MAX)	ALPHA(STALL)
0.126	434.5	741.0	0.48E 07	-0.00036	1.653	14.88

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		1.153	0.443 355	0.087 183	0.033 104	0.023 231	0.023 80	0.016 270	0.006 304	0.009 169	0.006 60
CM		-0.041	0.074 82	0.030 284	0.020 189	0.011 47	0.004 261	0.001 257	0.002 22	0.002 252	0.000 268
DCP 1	.010	5.241	1.516 349	0.301 253	0.106 228	0.070 154	0.081 25	0.109 185	0.093 58	0.047 317	0.013 118
DCP 2	.025	4.629	1.201 26	0.618 293	0.425 206	0.234 105	0.179 29	0.087 278	0.048 167	0.045 55	0.061 328
DCP 3	.050	3.621	2.210 24	0.423 245	0.311 185	0.230 118	0.110 45	0.241 275	0.064 328	0.102 183	0.040 43
DCP 4	.150	1.871	0.808 24	0.249 215	0.109 143	0.117 343	0.028 194	0.042 147	0.016 5	0.015 303	0.009 150
DCP 5	.200	1.599	0.680 13	0.234 198	0.096 118	0.112 320	0.034 168	0.035 129	0.021 354	0.013 285	0.018 160
DCP 6	.250	1.402	0.609 3	0.178 185	0.109 108	0.095 295	0.025 167	0.022 83	0.010 7	0.016 214	0.007 125
DCP 7	.300	1.234	0.542 353	0.175 171	0.103 95	0.099 283	0.026 154	0.025 61	0.013 316	0.013 192	0.011 105
DCP 8	.400	0.996	0.475 339	0.137 147	0.094 70	0.079 245	0.034 126	0.019 336	0.008 279	0.012 126	0.004 86
DCP 9	.501	0.741	0.346 328	0.109 127	0.070 49	0.062 231	0.034 113	0.017 312	0.015 245	0.011 96	0.006 26
DCP10	.600	0.624	0.300 317	0.088 117	0.074 36	0.055 210	0.025 81	0.008 297	0.007 204	0.008 159	0.006 51
DCP11	.831	0.500	0.263 280	0.089 106	0.060 346	0.030 192	0.030 61	0.009 218	0.012 221	0.007 110	0.002 36
DCP12	.878	0.387	0.241 275	0.077 112	0.058 337	0.037 183	0.023 20	0.005 259	0.007 132	0.004 156	0.005 27
DCP13	.950	0.266	0.214 262	0.047 122	0.040 324	0.015 193	0.019 20	0.009 241	0.004 163	0.009 54	0.003 221

FORCED VERTICAL TRANSLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	33.56	0.400	19.79		0.470	4041.3	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.129	434.1	740.9	0.48E 07	0.00014	1.460	19.79	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		1.037	0.317 2	0.086 349	0.032 290	0.018 221	0.018 163	0.005 286	0.004 348	0.002 132	0.001 128
CM		-0.111	0.058 135	0.022 121	0.015 70	0.006 6	0.005 285	0.003 298	0.001 167	0.002 327	0.002 197
DCP 1	.010	4.944	0.823 1	0.362 359	0.063 10	0.122 310	0.061 137	0.015 312	0.010 228	0.016 351	0.010 77
DCP 2	.025	3.827	0.625 63	0.298 24	0.115 346	0.069 292	0.053 204	0.044 154	0.038 125	0.026 58	0.023 32
DCP 3	.050	2.131	1.357 47	0.271 99	0.179 71	0.043 227	0.162 213	0.129 308	0.033 311	0.039 358	0.064 214
DCP 4	.150	1.303	0.299 7	0.131 25	0.036 10	0.019 57	0.017 79	0.004 266	0.001 118	0.006 197	0.005 133
DCP 5	.200	1.230	0.350 0	0.140 3	0.041 328	0.009 97	0.024 78	0.003 310	0.006 320	0.007 255	0.004 185
DCP 6	.250	1.122	0.311 351	0.120 355	0.052 310	0.016 281	0.002 109	0.013 249	0.005 35	0.004 163	0.009 67
DCP 7	.300	1.095	0.363 351	0.143 341	0.065 293	0.014 254	0.012 74	0.012 290	0.007 354	0.007 257	0.000 233
DCP 8	.400	0.978	0.352 346	0.136 339	0.071 292	0.028 249	0.015 165	0.014 195	0.007 82	0.008 192	0.011 93
DCP 9	.501	0.819	0.317 347	0.118 327	0.066 264	0.029 210	0.013 131	0.008 227	0.004 179	0.008 154	0.011 58
DCP 10	.600	0.763	0.304 344	0.125 328	0.068 271	0.031 230	0.019 146	0.013 126	0.010 18	0.003 237	0.008 47
DCP 11	.831	0.715	0.246 332	0.070 293	0.047 237	0.030 171	0.023 139	0.013 98	0.003 318	0.015 115	0.006 354
DCP 12	.878	0.577	0.207 330	0.057 306	0.037 252	0.023 187	0.022 114	0.008 58	0.007 334	0.005 237	0.007 288
DCP 13	.950	0.468	0.138 314	0.033 264	0.031 212	0.019 147	0.016 104	0.002 70	0.009 263	0.014 133	0.006 279

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FORCED VERTICAL TRANSLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	26.88	0.600	2.61		0.464	4039.1	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.071	633.1	1443.6	0.63E 07	-0.00259	0.452	2.61	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.220	0.233 241	0.015 290	0.009 212	0.008 195	0.006 184	0.009 165	0.009 147	0.008 119	0.009 107
CM		-0.011	0.005 212	0.000 223	0.000 348	0.000 49	0.000 252	0.000 225	0.000 153	0.000 227	0.000 191
DCP 1	.010	-0.767	0.996 241	0.163 0	0.034 226	0.089 176	0.059 199	0.058 184	0.048 139	0.038 113	0.046 111
DCP 2	.025	-0.156	1.001 239	0.074 283	0.060 319	0.046 187	0.062 137	0.048 168	0.047 158	0.035 121	0.036 85
DCP 3	.050	0.639	0.911 235	0.106 233	0.031 229	0.022 264	0.035 224	0.037 161	0.047 141	0.040 130	0.048 139
DCP 4	.150	0.631	0.444 239	0.034 279	0.016 167	0.009 132	0.001 58	0.002 48	0.001 269	0.002 239	0.001 168
DCP 5	.200	0.594	0.414 241	0.048 359	0.011 241	0.043 162	0.012 163	0.019 204	0.015 138	0.011 97	0.016 108
DCP 6	.250	0.439	0.333 243	0.050 15	0.038 197	0.015 190	0.009 255	0.019 142	0.013 145	0.010 133	0.016 135
DCP 7	.300	0.327	0.236 243	0.023 325	0.029 183	0.011 255	0.009 165	0.011 141	0.011 163	0.009 94	0.011 110
DCP 8	.400	0.243	0.169 245	0.015 265	0.008 215	0.008 201	0.008 167	0.008 167	0.008 145	0.008 122	0.008 110
DCP 9	.501	0.129	0.118 241	0.011 270	0.005 229	0.006 204	0.004 165	0.006 161	0.005 140	0.005 115	0.005 136
DCP 10	.600	0.117	0.088 246	0.007 277	0.003 235	0.004 192	0.002 190	0.004 171	0.004 147	0.005 109	0.004 113
DCP 11	.831	0.082	0.047 253	0.003 298	0.002 230	0.002 212	0.002 144	0.002 162	0.001 128	0.002 131	0.003 98
DCP 12	.878	0.079	0.043 253	0.002 293	0.001 201	0.001 194	0.001 138	0.002 189	0.001 163	0.002 123	0.001 120
DCP 13	.950	-0.062	0.047 245	0.004 277	0.004 174	0.002 210	0.002 167	0.002 152	0.002 150	0.002 94	0.002 94

FORCED VERTICAL TRANSLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	29.50	0.600	7.48		0.466	4039.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.078	631.6	1434.6	0.63E 07	-0.00195	0.987	7.48

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.811	0.170 269	0.026 195	0.002 351	0.005 186	0.002 358	0.002 122	0.001 268	0.002 16	0.000 73
CM		-0.007	0.011 88	0.007 237	0.001 50	0.001 35	0.001 140	0.000 246	0.001 2	0.000 188	0.000 307
DCP 1	.010	1.8	0.601 260	0.043 225	0.012 231	0.017 182	0.005 148	0.008 75	0.002 299	0.006 353	0.002 299
DCP 2	.025	2.102	0.495 256	0.040 223	0.006 213	0.013 177	0.003 178	0.005 76	0.003 326	0.004 326	0.001 289
DCP 3	.050	2.618	0.427 263	0.060 207	0.008 235	0.019 151	0.012 126	0.001 294	0.006 30	0.008 308	0.007 336
DCP 4	.200	1.586	0.195 277	0.153 218	0.026 13	0.017 229	0.023 151	0.009 132	0.014 334	0.006 64	0.003 140
DCP 5	.250	1.214	0.267 283	0.176 230	0.027 158	0.024 35	0.007 54	0.003 0	0.010 308	0.005 296	0.001 296
DCP 6	.300	0.994	0.292 275	0.055 192	0.026 72	0.016 50	0.039 337	0.015 185	0.021 172	0.020 32	0.007 268
DCP 7	.400	0.710	0.180 271	0.036 124	0.022 9	0.016 213	0.002 356	0.004 127	0.003 317	0.001 130	0.005 81
DCP 8	.501	0.420	0.108 270	0.035 87	0.015 259	0.003 152	0.002 283	0.005 70	0.005 247	0.005 30	0.002 127
DCP 9	.600	0.362	0.071 276	0.018 83	0.007 230	0.009 206	0.005 335	0.003 70	0.003 161	0.002 323	0.003 94
DCP10	.831	0.224	0.074 265	0.025 53	0.007 210	0.002 220	0.003 321	0.001 72	0.002 174	0.002 290	0.000 112
DCP11	.878	0.213	0.074 259	0.016 51	0.003 248	0.005 169	0.003 295	0.001 48	0.001 237	0.002 95	0.002 186
DCP12	.950	0.096	0.111 251	0.024 30	0.003 140	0.004 191	0.003 307	0.002 307	0.002 55	0.001 177	0.001 177

FORCED VERTICAL TRANSLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	32.36	0.600	9.85		0.465	4039.4	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.086	630.2	1422.7	0.63E 07	-0.00107	1.076	9.85

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.948	0.119 300	0.015 242	0.009 233	0.009 113	0.004 26	0.004 204	0.002 32	0.002 132	0.006 353
CM		-0.030	0.034 86	0.005 215	0.001 312	0.002 295	0.001 149	0.001 2	0.000 67	0.001 237	0.001 52
DCP 1	.010	2.441	0.509 272	0.036 330	0.025 200	0.006 93	0.010 54	0.014 190	0.003 70	0.007 90	0.006 298
DCP 2	.025	2.580	0.414 269	0.030 353	0.024 213	0.006 69	0.008 53	0.012 180	0.002 52	0.006 55	0.005 309
DCP 3	.050	2.925	0.172 311	0.151 231	0.051 16	0.020 141	0.006 126	0.002 273	0.017 77	0.016 223	0.028 15
DCP 4	.200	1.541	0.265 42	0.028 194	0.061 238	0.003 345	0.005 160	0.007 143	0.011 358	0.013 173	0.018 30
DCP 5	.250	1.350	0.188 31	0.029 258	0.038 232	0.005 37	0.015 83	0.011 170	0.007 322	0.007 122	0.010 42
DCP 6	.300	1.184	0.176 331	0.040 254	0.048 215	0.031 57	0.012 49	0.005 237	0.004 315	0.007 161	0.020 349
DCP 7	.400	0.880	0.168 296	0.007 201	0.027 232	0.007 150	0.009 19	0.006 294	0.010 215	0.011 0	0.004 115
DCP 8	.501	0.523	0.173 283	0.011 59	0.008 86	0.015 151	0.010 57	0.017 230	0.008 6	0.012 91	0.012 275
DCP 9	.600	0.462	0.145 278	0.018 55	0.002 128	0.016 130	0.007 334	0.005 254	0.007 104	0.004 235	0.005 331
DCP10	.831	0.351	0.155 264	0.017 4	0.010 77	0.011 117	0.007 297	0.006 110	0.004 225	0.006 39	0.006 291
DCP11	.878	0.335	0.133 267	0.015 51	0.002 172	0.004 89	0.002 60	0.005 238	0.005 327	0.009 109	0.010 258
DCP12	.950	0.220	0.147 256	0.021 266	0.004 79	0.008 56	0.007 314	0.006 116	0.003 305	0.003 55	0.002 200

FORCED VERTICAL TRANSLATION VERTOL 23010-1.58 AIRFOIL

TUNEC CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	32.68	0.600	12.38		0.468	4040.1	10
K	V	Q	RN	DAMPING	CY(MAX)	ALPHA(STALL)	
0.086	636.9	1453.4	0.64E 07	-0.00057	1.119	12.38	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		1.015	0.090 321	0.005 308	0.003 45	0.007 0	0.004 126	0.008 235	0.001 357	0.009 40	0.008 244
CM		-0.066	0.027 94	0.003 145	0.001 131	0.001 226	0.000 123	0.002 298	0.000 114	0.002 177	0.004 19
DCP 1	.010	2.859	0.453 275	0.044 337	0.005 21	0.008 68	0.007 94	0.008 219	0.001 182	0.005 9	0.008 277
DCP 2	.025	2.940	0.376 273	0.038 280	0.025 49	0.010 171	0.006 23	0.008 238	0.009 103	0.007 320	0.001 198
DCP 3	.050	3.002	0.295 16	0.026 221	0.059 201	0.060 358	0.049 135	0.048 270	0.015 14	0.015 67	0.014 334
DCP 4	.150	1.728	0.195 48	0.015 179	0.011 231	0.017 285	0.006 37	0.013 258	0.005 174	0.021 102	0.009 26
DCP 5	.200	1.363	0.104 39	0.038 106	0.053 26	0.035 295	0.016 303	0.029 255	0.012 106	0.016 114	0.018 343
DCP 6	.250	1.300	0.153 20	0.018 92	0.030 99	0.012 178	0.004 90	0.025 285	0.006 230	0.015 69	0.016 309
DCP 7	.300	1.234	0.094 351	0.007 250	0.030 27	0.003 249	0.002 163	0.022 223	0.002 47	0.009 96	0.021 309
DCP 8	.400	0.969	0.121 320	0.018 5	0.033 30	0.019 31	0.007 166	0.019 231	0.007 291	0.009 10	0.014 269
DCP 9	.501	0.669	0.112 308	0.024 276	0.002 178	0.012 185	0.005 137	0.003 88	0.021 283	0.021 9	0.019 238
DCP10	.600	0.589	0.124 280	0.011 6	0.004 242	0.013 357	0.005 49	0.009 159	0.013 116	0.019 31	0.018 224
DCP11	.831	0.492	0.113 284	0.014 290	0.002 175	0.004 32	0.002 190	0.008 120	0.004 323	0.006 328	0.013 186
DCP12	.878	0.461	0.116 270	0.011 27	0.016 258	0.011 35	0.005 311	0.005 52	0.004 71	0.012 339	0.012 186
DCP13	.950	0.336	0.083 270	0.015 305	0.007 200	0.008 38	0.004 232	0.007 109	0.001 323	0.005 195	0.011 158

FORCED VERTICAL TRANSLATION VERTOL 23010-1.58 AIRFOIL

TUNEC CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	33.00	0.600	14.80		0.473	4040.2	10
K	V	Q	RN	DAMPING	CY(MAX)	ALPHA(STALL)	
0.087	636.1	1451.8	0.64E 07	-0.00034	1.118	14.80	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		1.045	0.068 329	0.017 358	0.006 341	0.009 148	0.006 173	0.009 308	0.009 218	0.002 190	0.006 279
CM		-0.091	0.026 106	0.003 203	0.001 18	0.002 297	0.002 236	0.003 92	0.002 332	0.001 189	0.002 59
DCP 1	.010	3.231	0.339 281	0.066 314	0.014 338	0.012 142	0.002 152	0.010 247	0.006 169	0.004 179	0.002 92
DCP 2	.025	3.137	0.067 282	0.165 292	0.026 116	0.032 318	0.026 165	0.010 23	0.014 215	0.008 49	0.008 232
DCP 3	.050	2.788	0.371 52	0.032 164	0.079 5	0.012 143	0.053 220	0.007 354	0.024 268	0.029 193	0.013
DCP 4	.150	1.561	0.057 50	0.034 344	0.016 258	0.011 109	0.021 190	0.008 29	0.013 224	0.008 340	0.006 315
DCP 5	.200	1.304	0.037 27	0.023 4	0.017 307	0.033 161	0.007 146	0.017 320	0.019 270	0.011 80	0.015 333
DCP 6	.250	1.244	0.075 0	0.040 21	0.020 316	0.022 189	0.009 215	0.014 343	0.014 224	0.003 185	0.008 331
DCP 7	.300	1.232	0.050 358	0.040 30	0.002 192	0.013 181	0.004 207	0.003 359	0.016 246	0.011 184	0.006 243
DCP 8	.400	1.018	0.112 322	0.027 5	0.004 315	0.012 185	0.008 197	0.023 325	0.017 220	0.008 295	0.008 318
DCP 9	.501	0.743	0.086 310	0.033 0	0.011 163	0.009 103	0.014 98	0.011 8	0.016 224	0.010 187	0.004 146
DCP10	.600	0.689	0.111 301	0.009 60	0.004 53	0.016 155	0.004 85	0.013 281	0.011 206	0.005 154	0.022 279
DCP11	.831	0.584	0.101 289	0.014 332	0.002 292	0.005 54	0.012 55	0.012 280	0.011 127	0.005 10	0.005 212
DCP12	.878	0.564	0.093 288	0.008 112	0.005 16	0.017 96	0.005 142	0.022 240	0.009 123	0.011 24	0.014 217
DCP13	.950	0.416	0.074 280	0.007 346	0.010 260	0.002 1	0.004 325	0.009 245	0.007 109	0.004 269	0.005 187

FORCED VERTICAL TRANSLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	34.01	0.600	19.70		0.471	4340.3	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.089	534.9	1444.3	0.63E 07	0.00018	1.124	19.70	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.035	0.107	10	0.028	113	0.008	284	0.004	3	0.003	258	0.010	327	0.005	330	0.003	137	0.003	4
CM		-0.138	0.026	112	0.003	184	0.001	131	0.003	92	0.002	191	0.002	85	0.000	281	0.002	256	0.002	50
DCP 1	.010	3.068	0.498	87	0.138	261	0.041	271	0.043	58	0.040	297	0.031	127	0.027	37	0.017	206	0.008	222
DCP 2	.025	2.631	0.413	89	0.083	209	0.047	318	0.067	129	0.056	118	0.067	352	0.041	289	0.011	134	0.015	65
DCP 3	.050	2.010	0.570	44	0.243	130	0.062	261	0.057	57	0.055	215	0.041	336	0.036	353	0.029	225	0.036	8
DCP 4	.150	1.381	0.143	74	0.031	111	0.012	237	0.018	48	0.016	322	0.014	329	0.014	246	0.007	241	0.004	42
DCP 5	.200	1.257	0.131	34	0.032	107	0.014	76	0.015	348	0.013	313	0.008	331	0.008	331	0.005	137	0.011	44
DCP 6	.250	1.192	0.147	8	0.037	76	0.002	100	0.015	356	0.010	304	0.007	14	0.004	343	0.003	93	0.005	33
DCP 7	.300	1.233	0.121	5	0.038	96	0.014	9	0.005	323	0.008	243	0.005	67	0.004	280	0.009	241	0.010	81
DCP 8	.400	1.044	0.133	353	0.035	73	0.011	67	0.008	327	0.004	310	0.016	349	0.005	24	0.014	80	0.007	324
DCP 9	.501	0.828	0.112	340	0.011	42	0.013	315	0.006	258	0.013	139	0.009	333	0.003	168	0.016	124	0.011	39
DCP 10	.600	0.814	0.091	329	0.020	75	0.010	237	0.017	201	0.004	139	0.009	308	0.002	317	0.004	80	0.003	182
DCP 11	.831	0.730	0.084	304	0.008	148	0.007	320	0.019	323	0.012	354	0.008	260	0.007	41	0.006	57	0.011	262
DCP 12	.878	0.693	0.084	310	0.005	59	0.009	262	0.013	239	0.000	324	0.013	288	0.014	241	0.006	97	0.005	153
DCP 13	.950	0.575	0.068	284	0.006	243	0.006	263	0.013	313	0.012	329	0.009	249	0.006	31	0.003	276	0.018	229

FORCED VERTICAL TRANSLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	15.50	0.200	-0.07		0.620	4033.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.117	220.7	199.5	0.26E 07	-0.00584	0.316	-0.07

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		-0.068	0.383 246	0.016 288	0.006 144	0.004 104	0.006 177	0.007 11	0.006 299	0.003 312	0.002 171
CM		-0.009	0.011 205	0.001 152	0.001 313	0.002 280	0.002 8	0.001 199	0.002 102	0.001 60	0.001 20
DCP 1	.010	-2.269	2.817 244	0.181 250	0.009 155	0.004 174	0.002 134	0.020 349	0.007 105	0.014 299	0.018 5
DCP 2	.025	-1.039	1.793 243	0.041 315	0.017 201	0.016 355	0.019 300	0.003 54	0.009 28	0.010 209	0.009 293
DCP 3	.050	-0.122	1.396 243	0.051 291	0.014 157	0.004 352	0.013 127	0.023 347	0.007 7	0.012 24	0.009 71
DCP 4	.150	0.178	0.621 243	0.024 299	0.004 105	0.009 157	0.012 184	0.007 11	0.007 350	0.004 24	0.001 347
DCP 5	.200	-0.039	0.531 244	0.012 291	0.006 153	0.006 71	0.003 256	0.005 308	0.004 275	0.009 5	0.003 197
DCP 6	.250	0.033	0.453 246	0.026 297	0.006 174	0.009 169	0.014 193	0.007 18	0.011 4	0.005 6	0.008 144
DCP 7	.300	-0.202	0.413 248	0.018 298	0.012 70	0.003 154	0.002 42	0.005 66	0.010 264	0.016 338	0.010 80
DCP 8	.400	-0.026	0.331 252	0.014 263	0.005 162	0.005 169	0.007 181	0.007 33	0.005 12	0.003 78	0.004 163
DCP 9	.501	-0.082	0.239 245	0.004 0	0.002 102	0.006 9	0.006 147	0.003 8	0.007 256	0.004 23	0.003 77
DCP10	.600	-0.023	0.151 248	0.012 264	0.012 182	0.004 62	0.005 125	0.009 30	0.006 249	0.014 267	0.010 249
DCP11	.831	0.140	0.079 275	0.007 304	0.008 33	0.006 134	0.011 210	0.001 166	0.015 306	0.006 164	0.013 185
DCP12	.878	-0.022	0.072 260	0.012 249	0.007 181	0.003 113	0.004 155	0.006 30	0.006 303	0.004 216	0.002 0
DCP13	.950	-0.213	0.054 273	0.020 1	0.020 137	0.029 94	0.011 195	0.020 351	0.015 267	0.005 288	0.010 31

FORCED VERTICAL TRANSLATION — VERTOL 23013-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	15.48	0.200	10.02		0.616	4033.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.118	219.7	198.6	0.26E 07	-0.00577	1.293	10.02

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.934	0.361 256	0.001 200	0.002 91	0.004 227	0.001 123	0.002 40	0.001 184	0.004 184	0.005 188
CM		0.012	0.013 224	0.001 345	0.001 284	0.002 42	0.000 357	0.001 285	0.001 26	0.001 64	0.002 15
DCP 1	.010	3.821	2.204 253	0.040 17	0.021 217	0.022 190	0.017 277	0.023 327	0.024 249	0.030 133	0.018 146
DCP 2	.025	3.790	1.734 252	0.025 265	0.025 53	0.033 19	0.021 167	0.025 324	0.008 43	0.014 131	0.015 321
DCP 3	.050	3.665	1.447 252	0.016 289	0.006 237	0.010 299	0.009 79	0.002 138	0.009 101	0.013 97	0.008 171
DCP 4	.150	1.734	0.626 254	0.001 165	0.006 301	0.004 146	0.002 40	0.006 326	0.004 248	0.006 130	0.001 123
DCP 5	.200	1.282	0.505 252	0.016 45	0.006 83	0.002 42	0.004 35	0.003 60	0.002 190	0.008 260	0.003 148
DCP 6	.250	1.265	0.430 256	0.007 263	0.006 271	0.003 130	0.003 136	0.004 155	0.002 103	0.005 115	0.002 161
DCP 7	.300	0.975	0.379 260	0.016 44	0.003 307	0.005 346	0.007 27	0.005 26	0.005 183	0.012 228	0.006 214
DCP 8	.400	0.844	0.302 261	0.015 175	0.003 285	0.005 186	0.004 357	0.004 326	0.003 217	0.006 255	0.003 117
DCP 9	.501	0.539	0.216 255	0.004 52	0.004 67	0.001 61	0.001 22	0.003 68	0.005 231	0.004 216	0.003 159
DCP10	.600	0.421	0.130 260	0.012 222	0.010 81	0.015 210	0.007 228	0.005 57	0.004 27	0.003 125	0.011 188
DCP11	.831	0.301	0.067 284	0.008 97	0.008 133	0.010 245	0.010 144	0.005 113	0.004 166	0.006 219	0.014 238
DCP12	.878	0.112	0.065 275	0.005 186	0.004 221	0.005 221	0.002 346	0.002 277	0.005 310	0.006 244	0.012 232
DCP13	.950	-0.092	0.031 287	0.006 273	0.005 59	0.001 249	0.006 347	0.006 125	0.002 127	0.011 277	0.004 188

FORCED VERTICAL TRANSLATION VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	15.53	0.200	12.60		0.620	4033.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.118	219.8	197.8	0.26E 07	-0.00548	1.492	12.60

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		1.144	0.342 263	0.003 313	0.002 137	0.005 116	0.003 351	0.006 21	0.005 318	0.005 55	0.006 96
CM		0.024	0.015 221	0.001 115	0.001 356	0.002 271	0.001 130	0.002 195	0.001 162	0.002 231	0.001 236
DCP 1	.010	5.138	2.104 258	0.055 284	0.129 52	0.082 233	0.069 42	0.004 109	0.028 235	0.011 337	0.029 118
DCP 2	.025	4.891	1.710 261	0.041 52	0.034 233	0.009 206	0.021 55	0.022 30	0.019 196	0.002 47	0.021 10
DCP 3	.050	4.550	1.391 257	0.022 38	0.006 175	0.019 181	0.005 129	0.017 1	0.018 294	0.010 54	0.024 120
DCP 4	.150	2.110	0.580 260	0.010 256	0.004 112	0.010 99	0.003 54	0.002 243	0.007 349	0.004 91	0.010 163
DCP 5	.200	1.599	0.477 260	0.006 24	0.008 26	0.003 45	0.005 306	0.009 52	0.003 318	0.008 51	0.008 73
DCP 6	.250	1.515	0.402 263	0.004 290	0.006 258	0.012 92	0.005 334	0.007 222	0.004 302	0.006 84	0.013 141
DCP 7	.300	1.241	0.367 268	0.004 171	0.004 122	0.011 133	0.007 315	0.007 27	0.007 324	0.001 121	0.005 53
DCP 8	.400	1.022	0.280 270	0.006 233	0.006 231	0.011 72	0.005 359	0.001 347	0.006 341	0.001 101	0.010 130
DCP 9	.501	0.649	0.202 267	0.002 99	0.002 257	0.001 333	0.001 291	0.004 70	0.004 333	0.004 32	0.005 37
DCP 10	.600	0.467	0.105 269	0.014 247	0.004 357	0.009 48	0.013 313	0.013 51	0.005 111	0.004 44	0.003 80
DCP 11	.831	0.301	0.076 300	0.010 75	0.011 158	0.001 269	0.008 223	0.014 349	0.016 324	0.011 69	0.011 50
DCP 12	.878	0.115	0.069 278	0.010 336	0.010 165	0.006 75	0.004 1	0.003 80	0.002 183	0.001 200	0.005 111
DCP 13	.950	-0.049	0.049 296	0.024 313	0.003 350	0.032 134	0.021 72	0.005 332	0.006 327	0.013 24	0.007 83

FORCED VERTICAL TRANSLATION VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	15.90	0.200	20.14		0.618	4033.4	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.121	219.5	198.5	0.26E 07	-0.00155	1.616	20.14

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		1.100	0.399 344	0.097 266	0.027 129	0.011 90	0.008 267	0.018 103	0.015 308	0.007 165	0.004 356
CM		-0.083	0.085 126	0.028 26	0.009 288	0.003 192	0.005 338	0.005 208	0.004 56	0.002 243	0.003 110
DCP 1	.010	4.240	0.814 44	0.564 330	0.051 343	0.086 225	0.084 297	0.144 164	0.081 33	0.009 302	0.008 75
DCP 2	.025	3.983	0.800 31	0.375 327	0.158 225	0.090 137	0.112 335	0.094 177	0.049 30	0.009 14	0.020 228
DCP 3	.050	3.301	1.008 58	0.339 324	0.049 325	0.025 225	0.067 294	0.098 162	0.060 19	0.025 231	0.011 63
DCP 4	.150	1.384	0.508 9	0.058 19	0.045 126	0.036 111	0.019 319	0.007 84	0.038 323	0.022 178	0.011 86
DCP 5	.200	1.318	0.592 347	0.116 297	0.052 111	0.036 50	0.007 321	0.034 86	0.014 292	0.011 113	0.008 10
DCP 6	.250	1.192	0.542 339	0.124 275	0.009 185	0.015 129	0.009 193	0.027 91	0.036 330	0.024 195	0.018 78
DCP 7	.300	1.097	0.630 333	0.192 262	0.068 142	0.026 64	0.011 271	0.040 100	0.028 303	0.005 133	0.010 194
DCP 8	.400	1.049	0.587 332	0.144 252	0.025 147	0.017 113	0.015 211	0.035 97	0.030 313	0.017 193	0.019 79
DCP 9	.501	0.846	0.539 323	0.176 242	0.068 127	0.020 65	0.003 352	0.028 39	0.030 237	0.019 122	0.020 14
DCP 10	.600	0.697	0.413 327	0.113 243	0.026 169	0.026 124	0.013 311	0.009 34	0.007 236	0.017 198	0.006 63
DCP 11	.831	0.692	0.302 313	0.103 203	0.048 107	0.037 355	0.034 158	0.023 36	0.030 250	0.018 54	0.024 291
DCP 12	.878	0.483	0.225 313	0.059 187	0.008 40	0.016 177	0.013 260	0.015 171	0.014 124	0.008 42	0.022 285
DCP 13	.950	0.315	0.136 314	0.064 191	0.050 53	0.025 296	0.027 146	0.021 35	0.011 9	0.019 347	0.021 235

FORCED VERTICAL TRANSLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	16.31	0.400	-0.06		0.618	4032.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.063	435.0	733.6	0.48E 07	-0.00325	0.131	-0.06

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		-0.093	0.222	247	0.011	317	0.001	55	0.001	60	0.001	135	0.000	356	0.001	162	0.001	23	0.001	295
CM		-0.009	0.004	239	0.001	219	0.000	179	0.000	306	0.000	345	0.000	175	0.000	0	0.000	159	0.000	130
DCP 1	.010	-2.499	1.668	249	0.124	266	0.009	231	0.010	106	0.010	47	0.009	95	0.004	309	0.003	180	0.008	279
DCP 2	.025	-1.164	0.969	248	0.053	279	0.013	70	0.023	2	0.024	142	0.002	265	0.009	284	0.011	42	0.001	21
DCP 3	.050	-0.289	0.794	247	0.036	332	0.003	90	0.006	19	0.001	74	0.003	158	0.003	87	0.003	94	0.006	290
DCP 4	.150	0.073	0.360	245	0.016	316	0.002	68	0.000	48	0.002	38	0.001	285	0.003	156	0.001	173	0.002	282
DCP 5	.200	-0.069	0.319	246	0.014	320	0.005	83	0.003	97	0.002	69	0.001	2	0.001	108	0.003	318	0.001	46
DCP 6	.250	-0.009	0.266	246	0.011	323	0.002	58	0.002	80	0.001	262	0.001	199	0.004	118	0.004	123	0.000	345
DCP 7	.300	-0.023	0.237	248	0.014	324	0.005	45	0.002	135	0.001	150	0.003	6	0.001	329	0.004	0	0.002	283
DCP 8	.400	-0.026	0.183	248	0.008	328	0.001	36	0.001	64	0.003	163	0.002	196	0.002	84	0.001	136	0.001	7
DCP 9	.501	-0.066	0.136	245	0.007	337	0.000	111	0.002	141	0.001	180	0.001	24	0.001	184	0.002	350	0.001	237
DCP10	.600	-0.045	0.090	246	0.004	328	0.002	266	0.001	232	0.003	161	0.002	279	0.002	183	0.002	237	0.003	9
DCP11	.831	0.025	0.047	252	0.004	345	0.002	32	0.002	38	0.002	34	0.004	71	0.003	174	0.002	330	0.002	241
DCP12	.878	0.014	0.036	255	0.001	4	0.002	321	0.001	215	0.003	134	0.000	289	0.002	167	0.002	217	0.002	14
DCP13	.950	-0.120	0.028	262	0.006	346	0.004	85	0.005	73	0.002	260	0.004	293	0.001	264	0.007	44	0.004	269

FORCED VERTICAL TRANSLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	13.37	0.400	10.00		0.618	4032.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)
0.051	434.1	731.8	0.48E 07	-0.00393	1.338	10.00

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.132	0.210	259	0.002	203	0.006	20	0.002	143	0.001	58	0.003	347	0.002	174	0.002	285	0.001	4
CM		0.010	0.009	254	0.001	100	0.001	113	0.001	185	0.001	269	0.000	66	0.000	176	0.000	115	0.000	21
DCP 1	.010	4.661	1.447	256	0.157	83	0.039	237	0.008	95	0.016	31	0.014	218	0.007	342	0.007	156	0.009	27
DCP 2	.025	4.587	1.165	257	0.040	52	0.013	209	0.022	65	0.010	204	0.018	344	0.006	343	0.014	187	0.018	338
DCP 3	.050	4.348	0.953	259	0.032	201	0.007	32	0.036	181	0.008	303	0.029	7	0.029	174	0.011	318	0.008	27
DCP 4	.150	2.109	0.313	259	0.009	239	0.005	47	0.002	51	0.002	13	0.002	35	0.001	15	0.003	189	0.001	1
DCP 5	.200	1.705	0.264	257	0.007	248	0.003	30	0.003	97	0.004	45	0.005	5	0.002	115	0.001	266	0.003	284
DCP 6	.250	1.448	0.217	259	0.006	256	0.003	36	0.001	32	0.001	0	0.001	24	0.001	69	0.003	227	0.003	356
DCP 7	.300	1.241	0.199	260	0.004	238	0.004	18	0.001	150	0.002	67	0.000	347	0.001	123	0.003	156	0.003	173
DCP 8	.400	0.949	0.149	262	0.003	242	0.003	34	0.001	32	0.002	107	0.001	32	0.002	253	0.001	209	0.003	10
DCP 9	.501	0.656	0.110	256	0.002	214	0.004	2	0.001	70	0.001	40	0.002	7	0.001	95	0.002	246	0.002	255
DCP10	.600	0.509	0.076	259	0.001	273	0.001	57	0.004	328	0.002	172	0.005	286	0.002	211	0.003	305	0.003	74
DCP11	.831	0.280	0.035	266	0.001	267	0.004	340	0.001	39	0.003	77	0.002	334	0.001	14	0.003	251	0.004	212
DCP12	.878	0.210	0.031	272	0.002	344	0.002	303	0.001	340	0.001	124	0.001	314	0.003	225	0.002	323	0.002	36
DCP13	.950	0.078	0.030	256	0.001	103	0.010	333	0.005	106	0.008	67	0.002	121	0.005	35	0.002	31	0.005	355

FORCED VERTICAL TRANSLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	15.13	0.400	12.53		0.616	4032.3	10

K	V	Q	RN	DAMPING	CY(MAX)	ALPHA(STALL)
0.058	434.1	731.2	0.47E 07	-0.00155	1.563	12.53

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.315	0.137	318	0.104	196	0.042	9	0.027	159	0.022	290	0.014	98	0.004	281	0.005	74	0.005	241
CM		0.009	0.017	37	0.020	214	0.012	41	0.007	240	0.006	42	0.004	198	0.002	17	0.001	292	0.001	119
DCP 1	.010	5.959	0.823	291	0.506	217	0.167	353	0.174	134	0.111	322	0.069	93	0.050	261	0.033	104	0.028	248
DCP 2	.025	5.844	0.916	298	0.614	194	0.316	2	0.202	131	0.170	297	0.091	115	0.058	270	0.075	96	0.057	268
DCP 3	.050	5.174	0.833	333	0.748	199	0.396	47	0.265	243	0.056	55	0.056	212	0.075	55	0.048	339	0.036	154
DCP 4	.150	2.283	0.167	4	0.200	207	0.100	3	0.072	159	0.055	329	0.043	130	0.030	292	0.022	86	0.017	233
DCP 5	.200	1.865	0.134	1	0.166	204	0.082	354	0.060	154	0.049	312	0.036	112	0.024	278	0.013	75	0.011	213
DCP 6	.250	1.569	0.130	4	0.144	205	0.069	1	0.055	156	0.040	322	0.029	122	0.013	288	0.006	128	0.004	297
DCP 7	.300	1.359	0.106	350	0.115	202	0.056	354	0.044	153	0.033	309	0.027	113	0.014	280	0.009	135	0.001	271
DCP 8	.400	1.054	0.090	335	0.067	191	0.025	332	0.033	126	0.029	281	0.020	76	0.008	217	0.004	173	0.003	5
DCP 9	.501	0.731	0.057	312	0.029	175	0.019	281	0.021	103	0.026	260	0.016	59	0.003	202	0.007	145	0.009	292
DCP10	.600	0.597	0.063	285	0.020	99	0.028	259	0.036	83	0.035	244	0.021	42	0.013	193	0.003	58	0.006	273
DCP11	.831	0.356	0.082	260	0.035	48	0.024	213	0.009	97	0.016	224	0.009	22	0.001	328	0.008	88	0.007	238
DCP12	.878	0.305	0.104	256	0.044	49	0.020	227	0.020	72	0.028	220	0.012	11	0.009	205	0.007	43	0.003	199
DCP13	.950	0.173	0.121	259	0.040	50	0.018	221	0.013	340	0.008	174	0.008	320	0.003	36	0.003	262	0.006	336

FORCED VERTICAL TRANSLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	15.31	0.400	20.07		0.618	4032.4	10

K	V	Q	RN	DAMPING	CY(MAX)	ALPHA(STALL)
0.063	433.8	731.1	0.47E 07	-0.00015	1.010	20.07

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		0.700	0.037	349	0.026	52	0.008	52	0.004	44	0.001	322	0.002	36	0.002	141	0.001	189	0.002	83
CM		-0.009	0.015	153	0.006	320	0.002	217	0.001	137	0.000	99	0.000	72	0.000	52	0.000	330	0.000	350
DCP 1	.010	4.983	0.339	306	0.098	79	0.022	57	0.019	26	0.011	78	0.021	46	0.019	126	0.003	238	0.019	49
DCP 2	.025	3.492	0.107	65	0.042	67	0.017	9	0.009	116	0.005	109	0.013	6	0.013	150	0.008	244	0.007	117
DCP 3	.050	2.743	0.091	84	0.029	126	0.017	96	0.023	38	0.004	331	0.005	347	0.018	81	0.006	308	0.012	0
DCP 4	.150	1.097	0.002	312	0.025	46	0.008	89	0.007	44	0.004	6	0.005	23	0.004	193	0.002	187	0.004	113
DCP 5	.200	1.012	0.002	317	0.033	32	0.006	73	0.006	131	0.005	150	0.007	57	0.002	135	0.000	60	0.006	104
DCP 6	.250	0.957	0.003	315	0.024	56	0.007	58	0.008	62	0.005	5	0.004	42	0.003	138	0.001	353	0.003	29
DCP 7	.300	0.952	0.001	322	0.030	45	0.007	26	0.004	131	0.005	139	0.007	104	0.000	142	0.001	180	0.004	125
DCP 8	.400	0.839	0.000	325	0.030	49	0.008	39	0.007	76	0.004	346	0.002	62	0.004	102	0.002	299	0.003	114
DCP 9	.501	0.668	0.007	330	0.031	40	0.007	65	0.001	107	0.008	169	0.006	115	0.004	189	0.004	148	0.003	66
DCP10	.600	0.642	0.001	339	0.027	60	0.011	38	0.005	0	0.005	305	0.006	334	0.006	271	0.003	108	0.007	182
DCP11	.831	0.445	0.003	1	0.031	37	0.009	39	0.005	25	0.006	275	0.003	239	0.002	243	0.001	246	0.003	315
DCP12	.878	0.357	0.000	350	0.023	50	0.006	1	0.001	173	0.007	345	0.004	338	0.002	169	0.002	330	0.005	48
DCP13	.950	0.407	0.004	340	0.012	46	0.007	109	0.012	292	0.009	118	0.004	130	0.010	92	0.005	183	0.003	24

FORCED VERTICAL TRANSLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	12.20	0.600	0.02		0.616	4331.1	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.032	640.8	1439.0	0.63E 07	-0.00314	0.068	0.02	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		-0.097	0.162 246	0.011 325	0.002 50	0.001 86	0.001 75	0.001 338	0.000 352	0.000 155	0.001 250
CM		-0.014	0.005 242	0.001 229	0.000 353	0.000 229	0.000 326	0.000 237	0.000 203	0.000 29	0.000 55
DCP 1	.010	-2.576	0.600 242	0.309 37	0.016 114	0.080 181	0.019 219	0.017 291	0.009 328	0.003 262	0.007 231
DCP 2	.025	-1.505	0.904 244	0.069 12	0.129 17	0.013 123	0.065 143	0.008 260	0.036 274	0.018 13	0.007 36
DCP 3	.050	-0.519	0.732 247	0.120 248	0.029 209	0.020 8	0.023 347	0.006 345	0.007 119	0.004 125	0.003 234
DCP 4	.150	0.141	0.268 244	0.018 329	0.003 88	0.002 128	0.001 40	0.001 326	0.001 99	0.000 291	0.001 257
DCP 5	.200	0.046	0.213 245	0.022 350	0.004 38	0.002 80	0.001 64	0.000 114	0.002 77	0.001 26	0.002 324
DCP 6	.250	0.009	0.185 245	0.014 347	0.003 72	0.001 68	0.000 311	0.002 326	0.001 148	0.001 135	0.000 246
DCP 7	.300	0.011	0.161 247	0.014 340	0.004 82	0.002 87	0.000 58	0.001 305	0.000 308	0.001 242	0.001 243
DCP 8	.400	-0.018	0.122 246	0.010 348	0.002 68	0.001 137	0.000 305	0.001 314	0.001 62	0.001 278	0.000 216
DCP 9	.501	-0.063	0.086 243	0.007 345	0.001 54	0.002 72	0.001 94	0.000 108	0.001 23	0.000 38	0.000 290
DCP10	.600	-0.037	0.063 246	0.008 356	0.001 162	0.002 117	0.001 202	0.000 189	0.001 117	0.002 185	0.000 165
DCP11	.831	0.024	0.030 251	0.003 356	0.001 128	0.002 64	0.002 84	0.003 24	0.002 334	0.000 153	0.002 277
DCP12	.878	0.017	0.028 248	0.002 306	0.002 161	0.001 223	0.001 185	0.001 113	0.001 54	0.001 214	0.000 224
DCP13	.950	-0.114	0.034 247	0.002 329	0.003 338	0.002 335	0.000 267	0.000 30	0.004 354	0.001 324	0.003 232

FORCED VERTICAL TRANSLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	14.51	0.600	9.99		0.618	4331.2	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.038	639.7	1439.2	0.63E 07	-0.00057	0.994	9.99	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
CN		0.955	0.035 290	0.001 295	0.005 168	0.002 255	0.004 58	0.002 213	0.005 25	0.004 170	0.002 200
CM		-0.034	0.016 102	0.001 41	0.001 244	0.001 300	0.000 156	0.001 116	0.001 221	0.002 339	0.001 126
DCP 1	.010	2.432	0.231 265	0.002 321	0.005 123	0.001 94	0.004 7	0.006 197	0.006 276	0.008 118	0.006 47
DCP 2	.025	2.577	0.172 267	0.002 67	0.003 161	0.003 115	0.005 343	0.004 113	0.002 320	0.005 127	0.003 137
DCP 3	.050	3.064	0.068 252	0.025 287	0.011 114	0.005 242	0.009 352	0.007 136	0.005 1	0.003 291	0.010 163
DCP 4	.200	1.413	0.128 81	0.006 51	0.031 212	0.017 326	0.017 114	0.009 179	0.007 30	0.018 287	0.007 193
DCP 5	.250	1.228	0.085 86	0.021 82	0.005 107	0.007 353	0.010 57	0.020 153	0.013 359	0.017 295	0.001 230
DCP 6	.300	1.256	0.072 56	0.018 75	0.017 206	0.029 283	0.016 116	0.009 330	0.004 80	0.009 236	0.014 171
DCP 7	.400	0.839	0.060 290	0.002 206	0.013 92	0.010 224	0.012 20	0.003 298	0.003 287	0.004 155	0.001 26
DCP 8	.501	0.553	0.077 283	0.002 2	0.013 106	0.003 171	0.004 31	0.005 63	0.002 332	0.018 144	0.001 143
DCP 9	.600	0.480	0.065 288	0.001 91	0.015 243	0.015 142	0.005 54	0.003 145	0.005 40	0.006 120	0.004 239
DCP10	.831	0.381	0.077 277	0.012 238	0.018 76	0.002 323	0.005 287	0.014 291	0.018 25	0.014 139	0.006 316
DCP11	.878	0.349	0.064 271	0.003 298	0.013 255	0.008 77	0.006 112	0.005 266	0.004 103	0.007 316	0.007 357
DCP12	.950	0.260	0.070 273	0.009 233	0.010 18	0.009 78	0.008 285	0.008 55	0.007 171	0.007 61	0.002 206

FORCED VERTICAL TRANSLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	14.75	0.600	12.51		0.619	4031.3	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.038	640.0	1437.2	0.63E 07	-0.00019	1.033	12.51	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.007	0.018	321	0.004	229	0.008	200	0.002	97	0.004	79	0.004	164	0.004	24	0.003	162	0.002	155
CM		-0.069	0.012	108	0.002	146	0.001	273	0.002	286	0.002	152	0.001	42	0.001	257	0.001	330	0.002	333
DCP 1	.010	2.887	0.204	270	0.016	246	0.008	196	0.005	16	0.005	74	0.008	123	0.006	269	0.005	131	0.002	259
DCP 2	.025	2.582	0.216	269	0.019	257	0.012	158	0.005	355	0.009	84	0.004	43	0.009	300	0.006	151	0.003	315
DCP 3	.050	2.032	0.185	83	0.020	96	0.046	270	0.009	359	0.013	157	0.007	205	0.007	29	0.013	227	0.006	136
DCP 4	.150	1.649	0.139	82	0.042	148	0.034	226	0.009	310	0.023	138	0.021	176	0.017	339	0.017	338	0.022	317
DCP 5	.200	1.391	0.015	138	0.011	182	0.027	108	0.008	264	0.025	82	0.006	90	0.011	326	0.013	246	0.014	191
DCP 6	.250	1.170	0.020	26	0.023	205	0.026	202	0.010	312	0.011	36	0.013	69	0.011	303	0.010	348	0.009	335
DCP 7	.300	1.252	0.013	343	0.011	222	0.016	134	0.009	220	0.021	88	0.007	209	0.011	316	0.011	225	0.006	260
DCP 8	.400	0.940	0.030	308	0.013	289	0.009	144	0.014	214	0.016	47	0.006	177	0.007	159	0.014	228	0.006	129
DCP 9	.501	0.662	0.029	344	0.017	275	0.027	236	0.009	71	0.009	186	0.011	223	0.007	254	0.024	135	0.010	9
DCP10	.600	0.603	0.051	284	0.025	297	0.006	149	0.018	98	0.006	225	0.018	274	0.021	64	0.017	93	0.019	158
DCP11	.831	0.504	0.035	292	0.018	60	0.009	61	0.003	88	0.017	334	0.007	108	0.010	83	0.002	189	0.011	137
DCP12	.878	0.496	0.060	285	0.006	14	0.007	251	0.009	348	0.005	21	0.008	314	0.011	288	0.007	210	0.009	249
DCP13	.950	0.347	0.047	279	0.008	240	0.012	329	0.008	148	0.005	10	0.012	343	0.002	172	0.003	2	0.008	212

FORCED VERTICAL TRANSLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
	15.17	0.600	20.00		0.616	4031.4	10
K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	
0.040	638.8	1441.2	0.63E 07	0.00039	1.092	20.00	

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
CN		1.047	0.033	45	0.006	149	0.008	118	0.001	264	0.000	270	0.005	214	0.005	303	0.004	250	0.006	283
CM		-0.137	0.013	97	0.002	351	0.001	354	0.002	17	0.001	26	0.000	6	0.001	38	0.002	35	0.002	36
DCP 1	.010	3.105	0.280	86	0.044	302	0.043	148	0.018	172	0.024	280	0.031	328	0.036	103	0.037	129	0.016	123
DCP 2	.025	2.611	0.228	83	0.038	48	0.084	17	0.034	32	0.039	139	0.046	147	0.044	304	0.028	289	0.032	4
DCP 3	.050	2.319	0.261	78	0.056	140	0.028	134	0.037	348	0.044	319	0.024	272	0.005	245	0.007	103	0.030	335
DCP 4	.150	1.320	0.054	47	0.030	325	0.015	57	0.015	227	0.005	108	0.021	158	0.008	119	0.008	269	0.007	317
DCP 5	.200	1.220	0.075	81	0.007	167	0.011	299	0.005	1	0.019	112	0.007	169	0.020	299	0.002	215	0.016	355
DCP 6	.250	1.155	0.061	50	0.018	346	0.012	67	0.008	130	0.004	34	0.010	236	0.014	292	0.006	256	0.008	0
DCP 7	.300	1.205	0.050	52	0.005	111	0.003	336	0.006	103	0.018	99	0.006	34	0.014	314	0.008	297	0.014	319
DCP 8	.400	1.044	0.049	38	0.014	100	0.025	106	0.011	14	0.012	30	0.015	240	0.016	305	0.016	20	0.016	349
DCP 9	.501	0.821	0.017	20	0.016	188	0.022	166	0.010	177	0.001	260	0.009	232	0.012	333	0.017	331	0.012	269
DCP10	.600	0.809	0.023	320	0.018	181	0.025	134	0.012	233	0.002	225	0.008	208	0.009	36	0.011	228	0.009	182
DCP11	.831	0.746	0.052	277	0.008	143	0.008	297	0.008	115	0.016	229	0.006	89	0.012	180	0.014	276	0.016	227
DCP12	.878	0.707	0.025	291	0.005	312	0.007	298	0.022	250	0.005	208	0.010	162	0.005	159	0.001	246	0.008	243
DCP13	.950	0.592	0.058	265	0.006	109	0.004	212	0.004	55	0.004	118	0.010	332	0.010	256	0.013	147	0.010	11

TUNED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
64.0	15.85	0.400	9.96	4.66		5135.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.760	438.0	739.2	0.48E 07	-0.00067	1.495	13.62	0.1300

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		9.956	4.658	0	0.307	36	0.065	338	0.058	246	0.064	238	0.068	71	0.039	322	0.017	195	0.010	44
CN		1.081	0.350	9	0.098	41	0.035	316	0.012	269	0.013	228	0.034	115	0.007	314	0.004	295	0.001	68
CM		0.017	0.008	309	0.006	59	0.005	352	0.003	267	0.001	249	0.001	186	0.002	119	0.001	26	0.001	312
DCP 1	.010	4.630	2.449	1	0.368	19	0.168	340	0.095	289	0.059	260	0.042	303	0.045	255	0.016	209	0.011	230
DCP 2	.025	4.688	2.219	3	0.436	28	0.205	321	0.111	280	0.097	239	0.018	243	0.054	229	0.051	145	0.029	71
DCP 3	.100	2.752	0.649	8	0.253	65	0.152	343	0.063	287	0.059	236	0.045	169	0.041	100	0.040	49	0.044	342
DCP 4	.150	2.079	0.430	7	0.182	52	0.090	346	0.021	299	0.025	256	0.011	180	0.009	79	0.011	356	0.009	281
DCP 5	.200	1.718	0.369	15	0.230	50	0.108	313	0.057	228	0.039	173	0.039	91	0.038	10	0.025	297	0.015	227
DCP 6	.250	1.519	0.341	13	0.135	44	0.065	328	0.016	259	0.012	231	0.037	99	0.013	357	0.008	271	0.006	195
DCP 7	.300	1.198	0.318	18	0.149	39	0.070	287	0.139	193	0.022	135	0.026	72	0.030	348	0.023	268	0.014	196
DCP 8	.400	0.919	0.256	16	0.078	29	0.022	294	0.036	214	0.002	207	0.008	25	0.014	306	0.012	229	0.007	160
DCP 9	.500	0.744	0.205	16	0.048	35	0.022	212	0.022	74	0.013	319	0.002	198	0.012	309	0.013	204	0.010	122
DCP10	.600	0.506	0.165	18	0.034	6	0.006	270	0.005	340	0.004	264	0.004	342	0.011	281	0.007	212	0.003	101
DCP11	.878	0.112	0.112	10	0.008	224	0.009	188	0.004	55	0.005	184	0.001	225	0.005	269	0.006	138	0.003	23

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.012	77	0.008	17	0.003	48	0.009	33	0.006	133	0.004	127	0.005	62	0.008	200	0.007	227
CN		0.002	16	0.001	117	0.002	61	0.001	105	0.001	5	0.001	140	0.002	114	0.001	136	0.002	107
CM		0.001	238	0.000	224	0.001	183	0.001	104	0.001	88	0.000	17	0.001	309	0.000	331	0.000	277
DCP 1	.010	0.010	226	0.011	118	0.009	150	0.012	110	0.003	353	0.007	96	0.005	75	0.003	80	0.007	73
DCP 2	.025	0.013	32	0.007	82	0.010	108	0.022	92	0.018	74	0.006	323	0.006	174	0.011	114	0.011	70
DCP 3	.100	0.032	288	0.023	212	0.011	146	0.008	123	0.012	141	0.016	114	0.013	49	0.008	347	0.008	300
DCP 4	.150	0.006	268	0.005	149	0.003	88	0.002	79	0.002	339	0.001	126	0.001	160	0.001	127	0.003	145
DCP 5	.200	0.008	142	0.008	116	0.005	78	0.003	107	0.005	19	0.002	184	0.003	21	0.008	277	0.008	195
DCP 6	.250	0.002	98	0.005	65	0.006	351	0.006	244	0.002	133	0.002	74	0.001	23	0.006	318	0.006	204
DCP 7	.300	0.012	110	0.008	62	0.005	345	0.001	285	0.002	99	0.002	103	0.002	308	0.005	192	0.006	149
DCP 8	.400	0.007	46	0.005	4	0.001	217	0.006	111	0.005	348	0.003	270	0.003	161	0.001	146	0.002	141
DCP 9	.500	0.008	48	0.003	324	0.001	328	0.001	277	0.002	356	0.001	252	0.007	176	0.005	114	0.005	38
DCP10	.600	0.007	26	0.001	172	0.002	61	0.003	300	0.002	225	0.000	96	0.003	144	0.004	149	0.004	86
DCP11	.878	0.001	245	0.003	84	0.006	18	0.002	275	0.003	281	0.003	171	0.003	85	0.000	355	0.001	117

TUNED PITCHING OSCILLATION VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
64.0	15.88	0.600	0.95	4.73		5136.2	10

K	V	Q	CN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.960	496.4	736.8	0.48E 07	-0.00070	1.493	14.09	0.1130

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		9.947	4.734	359	0.329	82	0.050	318	0.059	222	0.052	334	0.014	41	0.013	310	0.006	60	0.013	319
CN		1.073	0.884	9	0.091	80	0.058	310	0.012	242	0.010	308	0.014	212	0.004	94	0.004	334	0.003	283
CM		0.005	0.009	313	0.009	66	0.004	240	0.001	235	0.001	292	0.001	286	0.001	149	0.001	87	0.001	13
DCP 1	.010	4.676	2.466	1	0.392	18	0.167	295	0.069	271	0.083	316	0.072	244	0.018	196	0.020	269	0.018	209
DCP 2	.025	4.673	2.246	3	0.458	16	0.207	326	0.066	252	0.091	300	0.094	235	0.051	178	0.025	109	0.018	94
DCP 3	.100	2.749	0.678	7	0.908	57	0.184	350	0.042	263	0.032	287	0.044	214	0.041	119	0.042	47	0.043	347
DCP 4	.150	1.948	0.439	7	0.179	52	0.064	341	0.012	249	0.020	327	0.026	220	0.016	120	0.011	21	0.009	301
DCP 5	.200	1.568	0.372	15	0.213	41	0.099	303	0.051	205	0.010	106	0.010	153	0.022	37	0.023	325	0.016	267
DCP 6	.250	1.433	0.337	13	0.137	46	0.068	327	0.014	238	0.012	319	0.019	194	0.013	74	0.011	318	0.008	256
DCP 7	.300	1.183	0.312	17	0.128	28	0.057	281	0.029	196	0.003	82	0.010	121	0.023	2	0.020	289	0.013	220
DCP 8	.400	0.907	0.250	16	0.080	30	0.022	300	0.006	215	0.005	322	0.011	173	0.008	3	0.011	263	0.005	212
DCP 9	.500	0.671	0.199	16	0.040	5	0.012	198	0.011	35	0.014	303	0.008	204	0.006	343	0.006	261	0.004	177
DCP10	.600	0.501	0.163	20	0.034	16	0.005	288	0.004	312	0.006	310	0.010	198	0.002	249	0.003	250	0.002	242
DCP11	.878	0.222	0.112	11	0.037	268	0.007	197	0.005	255	0.004	109	0.004	247	0.001	172	0.003	346	0.001	172

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.006	91	0.015	18	0.005	25	0.015	52	0.002	81	0.004	124	0.003	87	0.004	187	0.002	209
CN		0.002	84	0.001	178	0.004	98	0.001	98	0.002	355	0.002	223	0.002	185	0.002	84	0.000	285
CM		0.001	289	0.001	224	0.000	116	0.001	56	0.000	14	0.001	48	0.000	13	0.000	252	0.000	81
DCP 1	.010	0.004	127	0.010	175	0.017	93	0.012	140	0.003	6	0.009	118	0.004	84	0.002	205	0.006	143
DCP 2	.025	0.028	92	0.009	331	0.023	89	0.017	75	0.014	358	0.003	106	0.003	56	0.007	332	0.006	298
DCP 3	.100	0.034	298	0.032	237	0.027	156	0.025	99	0.015	29	0.008	302	0.008	208	0.008	135	0.005	43
DCP 4	.150	0.001	287	0.003	181	0.006	164	0.005	103	0.005	10	0.003	259	0.001	211	0.001	56	0.001	170
DCP 5	.200	0.010	201	0.013	194	0.018	81	0.012	15	0.011	291	0.010	198	0.008	142	0.008	49	0.004	333
DCP 6	.250	0.004	154	0.004	139	0.007	94	0.002	12	0.002	320	0.002	240	0.003	243	0.003	179	0.003	61
DCP 7	.300	0.008	146	0.010	109	0.013	43	0.011	314	0.006	221	0.005	118	0.001	64	0.001	23	0.001	188
DCP 8	.400	0.009	124	0.006	99	0.005	13	0.005	249	0.002	126	0.001	231	0.002	189	0.003	153	0.001	316
DCP 9	.500	0.009	102	0.006	17	0.003	319	0.005	224	0.004	142	0.003	54	0.003	318	0.003	221	0.002	143
DCP10	.600	0.002	90	0.001	89	0.000	133	0.003	185	0.004	345	0.004	237	0.001	146	0.004	69	0.003	234
DCP11	.878	0.003	74	0.001	315	0.002	178	0.001	138	0.000	359	0.004	229	0.003	190	0.002	51	0.001	1

TUNED PITCHING OSCILLATION VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
64.0	15.75	0.400	9.97	4.79		5136.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.060	435.3	735.5	0.488 07	-0.00068	1.503	13.85	0.0340

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		9.969	4.789	359	0.194	48	0.129	291	0.147	205	0.161	327	0.051	33	0.045	13	0.014	34	0.025	72
CN		1.076	0.351	8	0.093	24	0.040	286	0.039	197	0.018	295	0.004	126	0.007	9	0.001	85	0.003	46
CM		-0.007	0.007	302	0.010	63	0.006	330	0.002	223	0.001	285	0.001	250	0.001	108	0.001	335	0.000	184
DCP 1	.010	4.545	2.444	0	0.396	11	0.187	300	0.046	244	0.135	297	0.045	273	0.023	326	0.010	215	0.020	79
DCP 2	.025	4.615	2.214	1	0.449	15	0.254	296	0.074	216	0.112	291	0.049	210	0.029	97	0.021	32	0.022	64
DCP 3	.100	2.718	0.662	6	0.345	52	0.148	321	0.047	240	0.045	268	0.038	130	0.038	49	0.025	2	0.018	304
DCP 4	.150	1.903	0.428	7	0.179	46	0.059	318	0.013	256	0.031	291	0.003	323	0.009	22	0.004	19	0.002	42
DCP 5	.200	1.551	0.367	14	0.220	36	0.114	287	0.057	185	0.010	39	0.021	71	0.028	351	0.016	269	0.010	150
DCP 6	.250	1.290	0.334	13	0.141	37	0.047	293	0.011	178	0.024	308	0.004	314	0.008	358	0.003	178	0.003	109
DCP 7	.300	1.190	0.321	17	0.136	19	0.077	260	0.041	146	0.021	358	0.010	66	0.020	338	0.013	221	0.011	111
DCP 8	.400	0.887	0.255	16	0.089	18	0.030	260	0.007	104	0.018	303	0.006	350	0.008	324	0.006	150	0.002	35
DCP 9	.500	0.641	0.204	15	0.038	354	0.024	187	0.019	37	0.021	291	0.011	117	0.009	305	0.009	147	0.009	43
DCP10	.600	0.505	0.173	17	0.046	351	0.016	227	0.008	30	0.014	285	0.005	15	0.005	339	0.003	121	0.003	314
DCP11	.878	0.310	0.115	6	0.035	247	0.008	156	0.007	230	0.004	116	0.006	145	0.002	89	0.001	83	0.001	44

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.018	108	0.005	214	0.014	196	0.011	265	0.013	280	0.015	324	0.011	324	0.012	46	0.017	62
CN		0.001	83	0.002	142	0.000	88	0.002	228	0.002	134	0.000	320	0.002	348	0.001	24	0.001	347
CM		0.000	324	0.000	79	0.000	127	0.000	30	0.000	336	0.000	199	0.001	162	0.001	87	0.000	6
DCP 1	.010	0.014	310	0.018	166	0.008	89	0.003	236	0.001	122	0.002	98	0.005	69	0.013	43	0.007	335
DCP 2	.025	0.018	358	0.021	174	0.019	118	0.014	356	0.008	317	0.004	233	0.006	115	0.017	45	0.013	20
DCP 3	.100	0.011	191	0.018	95	0.012	6	0.015	272	0.010	187	0.006	153	0.004	122	0.011	97	0.011	16
DCP 4	.150	0.003	96	0.003	51	0.004	284	0.006	183	0.005	63	0.003	333	0.002	283	0.002	61	0.004	347
DCP 5	.200	0.013	77	0.005	19	0.007	277	0.008	196	0.007	120	0.006	42	0.006	339	0.002	157	0.001	296
DCP 6	.250	0.002	37	0.002	342	0.003	299	0.006	177	0.005	64	0.003	278	0.002	130	0.004	30	0.004	315
DCP 7	.300	0.010	46	0.006	296	0.008	225	0.006	131	0.005	69	0.003	352	0.007	322	0.002	266	0.003	158
DCP 8	.400	0.002	185	0.002	79	0.001	254	0.001	163	0.001	85	0.003	198	0.002	357	0.004	318	0.004	247
DCP 9	.500	0.003	310	0.007	196	0.005	138	0.002	35	0.001	345	0.003	272	0.001	56	0.002	337	0.001	192
DCP10	.600	0.004	151	0.002	61	0.002	58	0.002	197	0.003	155	0.001	305	0.003	293	0.003	250	0.003	228
DCP11	.878	0.001	108	0.003	220	0.001	342	0.003	246	0.003	170	0.002	56	0.005	3	0.001	328	0.002	73

TUNED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
64.0	15.82	0.400	12.42	4.24		5137.1	10

K	V	Q	RN	DAMPING	CM(MAX)	ALPHA(STALL)	EXT DAMPING
0.060	438.4	736.2	0.48E 07	0.00038	1.032	14.60	0.1300

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
ALPHA		12.417	4.263 0	0.235 48	0.088 105	0.130 349	0.051 249	0.099 253	0.021 229	0.023 45	0.028 19
CN		1.196	0.192 58	0.150 38	0.030 65	0.037 354	0.014 326	0.019 291	0.006 237	0.005 280	0.001 168
CM		-0.006	0.045 179	0.026 76	0.015 62	0.008 43	0.003 8	0.004 358	0.003 292	0.001 195	0.001 310
DCP 1	.010	5.165	1.247 27	0.834 47	0.115 27	0.115 3	0.036 44	0.030 317	0.019 153	0.034 53	0.021 32
DCP 2	.025	4.772	0.662 62	0.934 62	0.240 57	0.241 30	0.156 13	0.119 329	0.056 327	0.052 340	0.059 337
DCP 3	.100	2.639	0.585 145	0.623 73	0.141 78	0.182 37	0.106 350	0.090 325	0.076 301	0.053 270	0.031 280
DCP 4	.150	2.208	0.322 124	0.340 59	0.048 88	0.[illegible] 22	0.032 329	0.030 320	0.031 267	0.015 226	0.010 200
DCP 5	.200	1.918	0.377 114	0.336 48	0.076 66	0.[illegible] 357	0.064 293	0.065 287	0.060 237	0.034 214	0.032 188
DCP 6	.250	1.670	0.260 86	0.214 39	0.031 89	0.[illegible] 340	0.027 248	0.015 287	0.021 219	0.010 169	0.012 132
DCP 7	.300	1.242	0.281 80	0.198 32	0.048 39	0.[illegible] 324	0.043 266	0.058 263	0.045 198	0.023 170	0.024 138
DCP 8	.400	1.050	0.261 43	0.114 6	0.008 27	0.055 289	0.026 193	0.011 207	0.015 140	0.005 80	0.009 110
DCP 9	.500	0.916	0.220 36	0.057 346	0.005 315	0.034 247	0.015 170	0.015 211	0.016 123	0.008 68	0.008 44
DCP10	.600	0.665	0.224 22	0.051 321	0.008 172	0.024 255	0.012 144	0.008 138	0.015 80	0.010 338	0.002 85
DCP11	.878	0.181	0.197 359	0.045 236	0.008 255	0.009 165	0.009 321	0.011 236	0.006 110	0.005 299	0.003 168

DATA TYPE	X/C	RES 10 PHI	RES 11 PHI	RES 12 PHI	RES 13 PHI	RES 14 PHI	RES 15 PHI	RES 16 PHI	RES 17 PHI	RES 18 PHI
ALPHA		0.021 19	0.013 59	0.015 32	0.005 22	0.011 127	0.006 138	0.009 143	0.008 175	0.007 215
CN		0.002 293	0.002 315	0.005 174	0.002 17	0.002 94	0.001 271	0.001 95	0.002 52	0.001 272
CM		0.002 274	0.003 213	0.002 145	0.002 108	0.001 74	0.002 101	0.001 15	0.001 219	0.001 82
DCP 1	.010	0.010 63	0.016 66	0.024 63	0.004 29	0.012 130	0.011 118	0.006 50	0.003 116	0.003 203
DCP 2	.025	0.057 289	0.048 226	0.042 134	0.029 102	0.040 81	0.031 66	0.037 28	0.025 356	0.021 294
DCP 3	.100	0.055 262	0.057 221	0.048 175	0.030 153	0.025 142	0.023 145	0.020 106	0.014 113	0.019 109
DCP 4	.150	0.010 167	0.007 112	0.012 100	0.013 25	0.003 288	0.003 173	0.001 239	0.008 131	0.007 39
DCP 5	.200	0.028 160	0.020 132	0.025 107	0.019 65	0.017 44	0.011 10	0.011 20	0.010 353	0.004 332
DCP 6	.250	0.011 97	0.009 57	0.011 56	0.008 357	0.003 331	0.007 252	0.001 279	0.003 193	0.002 128
DCP 7	.300	0.022 117	0.021 87	0.021 62	0.017 14	0.009 351	0.010 316	0.007 285	0.006 274	0.004 257
DCP 8	.400	0.011 67	0.011 15	0.004 346	0.012 319	0.003 299	0.005 234	0.002 262	0.004 222	0.004 144
DCP 9	.500	0.002 85	0.009 51	0.011 12	0.016 325	0.011 276	0.010 249	0.008 205	0.010 130	0.006 46
DCP10	.600	0.002 83	0.008 76	0.[illegible] 60	0.005 314	0.005 241	0.002 247	0.002 255	0.001 212	0.004 245
DCP11	.878	0.004 108	0.009 4	0.[illegible] 281	0.006 245	0.005 112	0.006 304	0.006 155	0.008 24	0.005 272

TUNED PITCHING OSCILLATION VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
64.0	15.87	0.400	12.42	4.34		5137.2	10

K	V	Q	RN	DAMPING	CY(MAX)	ALPHA(STALL)	EXT DAMPING
0.061	436.4	739.3	0.49E 07	0.00091	1.535	14.73	0.1190

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		12.415	4.343	0	0.316	50	0.073	131	0.149	340	0.090	3	0.131	228	0.021	149	0.033	16	0.019	354
CN		1.144	0.218	61	0.164	37	0.033	73	0.032	343	0.020	14	0.016	245	0.002	305	0.004	146	0.005	269
CM		-0.013	0.045	174	0.023	71	0.006	69	0.006	10	0.002	51	0.007	5	0.005	298	0.003	245	0.000	147
DCP 1	.010	5.056	1.320	33	0.790	36	0.104	49	0.195	359	0.102	41	0.028	351	0.010	319	0.034	109	0.025	42
DCP 2	.025	4.706	0.920	61	0.966	53	0.218	62	0.159	20	0.189	35	0.111	5	0.130	331	0.062	299	0.047	293
DCP 3	.100	2.593	0.632	137	0.611	66	0.149	75	0.144	16	0.084	12	0.054	335	0.088	311	0.059	259	0.052	252
DCP 4	.150	2.000	0.382	120	0.295	47	0.082	100	0.080	4	0.035	26	0.036	312	0.018	279	0.022	218	0.007	162
DCP 5	.200	1.607	0.423	111	0.313	40	0.097	75	0.134	342	0.062	310	0.066	272	0.048	233	0.036	195	0.029	180
DCP 6	.250	1.530	0.307	87	0.198	24	0.055	92	0.075	328	0.006	303	0.033	252	0.020	182	0.024	158	0.012	91
DCP 7	.300	1.224	0.311	80	0.187	24	0.058	56	0.097	309	0.016	268	0.061	237	0.033	178	0.032	152	0.019	112
DCP 8	.400	1.022	0.276	48	0.118	347	0.016	67	0.043	281	0.002	17	0.036	214	0.026	136	0.023	115	0.010	56
DCP 9	.500	0.840	0.231	36	0.057	343	0.008	2	0.040	236	0.012	104	0.034	187	0.018	113	0.027	83	0.011	352
DCP10	.600	0.668	0.226	23	0.070	308	0.009	181	0.014	190	0.011	25	0.021	182	0.017	100	0.016	64	0.011	310
DCP11	.878	0.228	0.200	354	0.023	216	0.016	256	0.015	109	0.012	322	0.016	190	0.008	82	0.009	354	0.006	233

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.009	312	0.007	32	0.014	31	0.005	359	0.005	106	0.005	32	0.003	123	0.008	100	0.006	168
CN		0.005	148	0.006	102	0.004	79	0.004	42	0.002	334	0.001	280	0.001	153	0.002	137	0.001	29
CM		0.001	243	0.001	235	0.002	165	0.002	114	0.002	46	0.000	303	0.001	107	0.001	26	0.001	317
DCP 1	.010	0.016	59	0.022	63	0.021	62	0.017	53	0.004	70	0.011	101	0.007	62	0.010	248	0.010	178
DCP 2	.025	0.034	249	0.030	184	0.037	177	0.025	80	0.030	32	0.008	330	0.015	74	0.017	21	0.016	317
DCP 3	.100	0.057	214	0.036	174	0.036	178	0.040	133	0.021	89	0.008	165	0.023	125	0.024	80	0.017	35
DCP 4	.150	0.037	149	0.010	91	0.037	134	0.010	51	0.006	336	0.001	4	0.002	106	0.004	115	0.001	310
DCP 5	.200	0.033	149	0.025	119	0.021	101	0.024	66	0.016	36	0.016	10	0.011	340	0.008	322	0.008	281
DCP 6	.250	0.016	89	0.017	18	0.026	92	0.013	7	0.008	299	0.005	280	0.008	222	0.005	142	0.002	95
DCP 7	.300	0.022	110	0.023	58	0.014	43	0.010	17	0.015	324	0.013	300	0.008	265	0.009	261	0.010	222
DCP 8	.400	0.010	50	0.011	341	0.008	2	0.008	308	0.006	314	0.009	251	0.008	198	0.006	159	0.004	98
DCP 9	.500	0.016	52	0.013	316	0.006	335	0.011	283	0.009	241	0.009	196	0.006	117	0.003	177	0.004	131
DCP10	.600	0.004	340	0.009	137	0.008	9	0.006	269	0.002	238	0.002	115	0.003	288	0.006	141	0.004	334
DCP11	.878	0.006	177	0.009	81	0.006	348	0.006	341	0.008	210	0.006	80	0.003	321	0.004	238	0.004	132

TUNED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
64.0	15.70	0.400	12.44	4.55		5137.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.060	435.0	734.2	0.48E 07	0.00324	1.680	17.42	0.0340

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		12.436	4.548	0	0.291	35	0.086	185	0.670	50	2.189	152	0.599	8	0.150	308	0.033	355	0.046	336
CN		1.201	0.209	38	0.139	44	0.011	99	0.093	359	0.228	165	0.081	49	0.022	348	0.008	356	0.019	343
CM		-0.016	0.031	171	0.021	57	0.001	131	0.022	20	0.015	299	0.024	178	0.012	78	0.001	53	0.007	78
DCP 1	.010	5.141	1.162	20	0.811	56	0.263	85	0.931	9	0.819	156	0.109	301	0.118	124	0.061	140	0.174	64
DCP 2	.025	4.988	0.853	39	1.033	53	0.240	80	0.980	7	0.784	170	0.236	153	0.264	78	0.028	226	0.231	65
DCP 3	.100	2.840	0.360	100	0.517	47	0.041	217	0.336	16	0.465	191	0.278	139	0.186	61	0.046	356	0.055	57
DCP 4	.150	2.104	0.238	74	0.251	46	0.029	243	0.164	10	0.343	181	0.158	100	0.095	14	0.026	312	0.024	326
DCP 5	.200	1.619	0.263	88	0.307	39	0.037	259	0.124	358	0.343	172	0.179	77	0.078	6	0.038	30	0.078	343
DCP 6	.250	1.575	0.234	54	0.157	39	0.024	247	0.076	1	0.313	149	0.157	59	0.066	326	0.014	34	0.043	317
DCP 7	.300	1.319	0.245	56	0.181	27	0.015	243	0.070	342	0.289	165	0.171	49	0.070	324	0.031	7	0.071	316
DCP 8	.400	1.034	0.225	32	0.052	32	0.002	342	0.026	306	0.252	157	0.160	29	0.064	284	0.015	29	0.041	287
DCP 9	.500	0.805	0.209	23	0.036	336	0.022	98	0.040	272	0.200	154	0.142	21	0.065	274	0.007	268	0.035	279
DCP10	.600	0.660	0.182	15	0.011	215	0.012	95	0.024	242	0.166	151	0.119	8	0.047	252	0.006	37	0.022	258
DCP11	.878	0.309	0.164	357	0.016	266	0.008	17	0.032	212	0.060	135	0.056	348	0.015	263	0.008	229	0.008	274

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.043	98	0.057	87	0.020	5	0.033	111	0.009	178	0.009	74	0.020	188	0.016	172	0.015	188
CN		0.017	215	0.013	63	0.002	48	0.005	243	0.007	102	0.000	252	0.001	79	0.002	279	0.003	282
CM		0.008	337	0.006	233	0.004	125	0.003	40	0.000	329	0.002	4	0.003	288	0.002	201	0.001	93
DCP 1	.010	0.109	6	0.182	288	0.155	185	0.099	143	0.054	100	0.067	80	0.108	319	0.085	223	0.041	187
DCP 2	.025	0.154	323	0.118	244	0.122	137	0.011	33	0.078	140	0.067	65	0.055	295	0.058	204	0.018	126
DCP 3	.100	0.031	320	0.040	83	0.040	64	0.034	31	0.040	63	0.039	13	0.054	23	0.051	305	0.017	342
DCP 4	.150	0.031	221	0.033	88	0.009	50	0.011	56	0.014	339	0.010	279	0.011	254	0.018	196	0.009	62
DCP 5	.200	0.044	258	0.018	23	0.006	23	0.024	340	0.021	342	0.030	297	0.029	271	0.024	195	0.015	280
DCP 6	.250	0.042	208	0.032	81	0.009	6	0.009	309	0.008	245	0.012	259	0.019	201	0.014	117	0.007	326
DCP 7	.300	0.049	238	0.006	166	0.003	41	0.019	280	0.007	252	0.021	246	0.030	212	0.014	138	0.011	227
DCP 8	.400	0.045	188	0.033	84	0.015	351	0.025	252	0.013	157	0.013	246	0.027	152	0.019	46	0.010	281
DCP 9	.500	0.046	193	0.037	90	0.020	345	0.017	210	0.012	61	0.011	247	0.017	150	0.005	51	0.002	164
DCP10	.600	0.033	158	0.029	58	0.014	304	0.015	212	0.003	56	0.015	184	0.017	71	0.013	356	0.005	339
DCP11	.878	0.016	136	0.018	18	0.010	271	0.006	203	0.006	136	0.010	108	0.008	62	0.005	334	0.004	234

TUNED PITCHING OSCILLATION VERTOL 23010-1.59 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
64.0	15.85	0.400	14.78	4.22		5138.1	10

K	V	Q	RN	DAMPING	CYC(MAX)	ALPHA(STALL)	EXT DAMPING
0.051	436.6	734.7	0.48E 07	0.00099	1.691	15.48	0.1300

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		14.777	4.224	0	0.143	46	0.170	114	0.085	140	0.032	8	0.144	3	0.037	331	0.042	241	0.008	175
CN		1.163	0.287	96	0.068	49	0.042	92	0.031	119	0.008	104	0.021	13	0.006	8	0.000	274	0.001	14
CM		-0.021	0.057	175	0.011	149	0.014	108	0.006	152	0.001	65	0.006	124	0.002	139	0.003	59	0.001	90
DCP 1	.010	5.252	1.359	81	0.477	36	0.237	95	0.142	154	0.031	183	0.040	331	0.020	307	0.021	20	0.028	324
DCP 2	.025	4.767	1.254	121	0.462	89	0.374	120	0.255	144	0.152	161	0.120	134	0.098	138	0.103	117	0.064	95
DCP 3	.100	2.501	1.067	147	0.236	90	0.235	130	0.140	117	0.073	111	0.099	78	0.041	84	0.055	85	0.030	115
DCP 4	.150	1.926	0.698	123	0.039	8	0.106	89	0.064	146	0.048	26	0.037	44	0.022	321	0.016	24	0.007	279
DCP 5	.200	1.638	0.588	122	0.088	69	0.168	93	0.063	89	0.065	51	0.070	35	0.041	25	0.040	13	0.022	17
DCP 6	.250	1.504	0.496	101	0.059	358	0.111	57	0.046	127	0.050	348	0.051	4	0.030	291	0.028	302	0.014	253
DCP 7	.300	1.272	0.402	97	0.064	55	0.107	59	0.037	84	0.049	13	0.058	22	0.038	348	0.038	331	0.019	332
DCP 8	.400	1.029	0.333	71	0.076	359	0.061	2	0.015	99	0.023	294	0.050	337	0.016	279	0.028	264	0.011	257
DCP 9	.500	0.885	0.233	57	0.046	34	0.053	346	0.014	25	0.028	298	0.033	323	0.014	294	0.030	265	0.014	259
DCP10	.600	0.700	0.226	38	0.061	353	0.042	288	0.007	103	0.021	194	0.033	320	0.002	349	0.014	218	0.003	276
DCP11	.878	0.269	0.186	357	0.041	21	0.035	239	0.013	343	0.016	127	0.010	275	0.006	9	0.010	139	0.001	106

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.006	25	0.003	309	0.003	41	0.004	12	0.002	95	0.005	136	0.001	137	0.006	215	0.002	169
CN		0.006	100	0.004	73	0.005	28	0.001	35	0.001	130	0.002	334	0.001	349	0.001	153	0.001	157
CM		0.001	38	0.001	53	0.001	99	0.001	23	0.000	82	0.001	128	0.001	62	0.001	345	0.000	66
DCP 1	.010	0.020	301	0.009	161	0.007	335	0.008	346	0.010	227	0.016	186	0.006	141	0.005	40	0.004	121
DCP 2	.025	0.081	66	0.061	42	0.049	31	0.036	10	0.007	29	0.017	21	0.010	8	0.012	323	0.008	193
DCP 3	.100	0.047	102	0.047	103	0.041	83	0.023	88	0.024	110	0.021	108	0.022	96	0.015	118	0.021	106
DCP 4	.150	0.009	233	0.002	127	0.002	241	0.004	351	0.004	138	0.004	284	0.004	79	0.003	31	0.003	310
DCP 5	.200	0.025	5	0.022	32	0.025	6	0.016	1	0.013	0	0.017	0	0.017	354	0.009	352	0.011	324
DCP 6	.250	0.018	242	0.005	230	0.004	177	0.005	228	0.001	201	0.005	216	0.002	266	0.002	85	0.002	139
DCP 7	.300	0.020	303	0.015	339	0.017	315	0.014	294	0.008	295	0.010	306	0.011	309	0.010	288	0.012	255
DCP 8	.400	0.016	209	0.012	216	0.011	259	0.008	162	0.005	202	0.002	324	0.006	171	0.002	179	0.006	97
DCP 9	.500	0.016	212	0.009	250	0.008	219	0.009	193	0.007	222	0.003	271	0.007	230	0.007	208	0.001	147
DCP10	.600	0.008	153	0.004	183	0.010	234	0.004	97	0.002	86	0.006	317	0.001	61	0.002	150	0.003	99
DCP11	.878	0.005	50	0.002	90	0.007	21	0.002	262	0.002	298	0.002	327	0.003	249	0.003	125	0.004	245

TUNED PITCHING OSCILLATION VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
44.0	15.77	0.400	14.79	4.25		5139.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.041	435.0	732.8	0.498 07	0.00069	1.615	15.40	0.1170

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		14.790	4.247	0	0.070	112	0.159	136	0.120	142	0.048	108	0.221	343	0.077	290	0.020	256	0.009	4
CN		1.148	0.297	102	0.061	53	0.043	87	0.033	106	0.016	139	0.028	33	0.012	346	0.008	309	0.003	0
CM		-0.042	0.056	175	0.016	151	0.015	102	0.008	126	0.002	33	0.006	124	0.003	79	0.003	60	0.001	33
DCP 1	.010	5.190	1.304	87	0.443	53	0.232	92	0.116	124	0.035	151	0.058	350	0.071	304	0.033	278	0.005	113
DCP 2	.025	4.447	1.310	124	0.480	93	0.293	110	0.283	122	0.150	136	0.129	107	0.050	90	0.040	84	0.016	86
DCP 3	.100	2.396	1.147	147	0.198	108	0.241	123	0.173	117	0.077	107	0.127	86	0.057	56	0.061	78	0.040	69
DCP 4	.150	1.796	0.712	126	0.017	76	0.157	89	0.177	135	0.037	51	0.053	63	0.023	354	0.029	1	0.007	22
DCP 5	.200	1.447	0.627	123	0.062	97	0.175	86	0.073	96	0.069	56	0.080	39	0.041	9	0.040	6	0.025	14
DCP 6	.250	1.407	0.500	107	0.068	25	0.106	57	0.044	110	0.029	8	0.052	28	0.029	333	0.035	317	0.014	321
DCP 7	.300	1.231	0.414	102	0.055	65	0.112	57	0.049	70	0.042	21	0.070	16	0.039	342	0.042	321	0.025	323
DCP 8	.400	0.999	0.320	78	0.078	11	0.056	0	0.022	64	0.014	292	0.040	357	0.020	316	0.032	278	0.010	298
DCP 9	.500	0.818	0.223	63	0.069	22	0.044	341	0.020	8	0.011	253	0.040	340	0.020	296	0.025	257	0.020	275
DCP10	.600	0.712	0.212	43	0.083	359	0.050	283	0.009	339	0.024	183	0.021	328	0.009	274	0.020	236	0.008	184
DCP11	.878	0.416	0.186	358	0.047	352	0.038	243	0.017	287	0.016	120	0.010	297	0.006	230	0.005	166	0.006	118

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.018	337	0.007	48	0.019	53	0.011	59	0.011	107	0.010	110	0.005	107	0.006	173	0.005	179
CN		0.003	62	0.007	52	0.003	72	0.006	45	0.001	110	0.004	36	0.001	50	0.001	336	0.001	253
CM		0.001	59	0.001	76	0.002	33	0.000	140	0.001	348	0.000	280	0.001	159	0.001	110	0.001	72
DCP 1	.010	0.023	52	0.021	60	0.015	87	0.015	121	0.004	21	0.008	138	0.011	203	0.007	199	0.003	290
DCP 2	.025	0.036	77	0.049	53	0.047	60	0.041	63	0.027	59	0.034	68	0.022	68	0.023	36	0.018	349
DCP 3	.100	0.038	85	0.047	84	0.040	70	0.035	72	0.016	56	0.024	91	0.017	92	0.019	90	0.018	85
DCP 4	.150	0.015	357	0.010	57	0.005	340	0.007	50	0.003	310	0.002	272	0.005	216	0.005	265	0.006	202
DCP 5	.200	0.021	1	0.028	32	0.024	2	0.025	4	0.017	334	0.016	342	0.013	323	0.011	305	0.011	298
DCP 6	.250	0.011	293	0.009	334	0.008	260	0.008	253	0.007	238	0.011	197	0.004	199	0.008	179	0.003	177
DCP 7	.300	0.021	279	0.017	347	0.012	286	0.018	320	0.011	279	0.012	278	0.010	272	0.014	261	0.014	250
DCP 8	.400	0.008	219	0.004	261	0.004	195	0.006	197	0.007	211	0.011	151	0.008	174	0.004	128	0.005	181
DCP 9	.500	0.018	197	0.007	243	0.010	175	0.006	257	0.006	156	0.006	177	0.001	192	0.006	196	0.006	155
DCP10	.600	0.009	90	0.005	98	0.005	274	0.008	73	0.006	219	0.007	117	0.001	212	0.000	287	0.001	253
DCP11	.878	0.004	348	0.002	336	0.007	170	0.004	32	0.007	102	0.006	41	0.007	10	0.005	333	0.004	305

TUNED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
64.0	15.97	0.400	14.82	4.20		5139.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.062	433.8	726.8	0.475 07	0.00039	1.639	15.99	0.0340

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
ALPHA		14.825	4.200 0	0.177 208	0.331 296	0.369 305	0.575 14	0.314 256	0.144 252	0.050 274	0.026 279
CN		1.210	0.278 100	0.073 18	0.049 120	0.034 294	0.059 31	0.037 309	0.022 294	0.012 273	0.006 279
CM		-0.051	0.059 176	0.017 91	0.016 118	0.014 347	0.004 131	0.008 77	0.005 23	0.004 5	0.003 333
DCP 1	.010	5.351	1.139 91	0.394 35	0.423 153	0.299 272	0.303 29	0.045 281	0.036 341	0.029 38	0.033 327
DCP 2	.025	4.871	1.274 126	0.486 72	0.494 131	0.335 263	0.298 51	0.148 49	0.137 353	0.081 356	0.066 351
DCP 3	.100	2.572	1.120 144	0.310 53	0.273 123	0.130 350	0.156 52	0.119 10	0.075 330	0.055 328	0.050 306
DCP 4	.150	1.892	0.867 128	0.167 20	0.152 116	0.121 325	0.116 40	0.079 313	0.037 315	0.042 276	0.010 303
DCP 5	.200	1.526	0.570 126	0.146 33	0.146 99	0.096 326	0.112 32	0.080 313	0.034 307	0.044 297	0.027 279
DCP 6	.250	1.448	0.447 108	0.121 353	0.074 33	0.075 300	0.102 29	0.067 293	0.042 288	0.033 243	0.010 266
DCP 7	.300	1.284	0.363 101	0.100 6	0.077 67	0.074 300	0.093 21	0.070 230	0.034 285	0.042 266	0.022 252
DCP 8	.400	1.015	0.293 76	0.080 332	0.025 5	0.065 271	0.067 14	0.047 240	0.033 276	0.019 218	0.007 223
DCP 9	.500	0.812	0.210 57	0.066 324	0.045 334	0.044 251	0.044 1	0.044 262	0.023 229	0.012 210	0.011 203
DCP10	.600	0.717	0.215 41	0.053 289	0.033 290	0.024 208	0.040 15	0.033 240	0.022 262	0.009 178	0.005 160
DCP11	.978	0.524	0.203 1	0.035 284	0.035 257	0.013 121	0.016 11	0.028 226	0.015 138	0.012 199	0.010 144

DATA TYPE	X/C	RES 10 PHI	RES 11 PHI	RES 12 PHI	RES 13 PHI	RES 14 PHI	RES 15 PHI	RES 16 PHI	RES 17 PHI	RES 18 PHI
ALPHA		0.025 349	0.043 13	0.045 64	0.028 69	0.020 83	0.022 135	0.017 183	0.017 185	0.013 213
CN		0.004 299	0.002 23	0.004 353	0.004 5	0.002 228	0.003 76	0.001 64	0.002 335	0.001 274
CM		0.002 339	0.003 295	0.001 273	0.002 249	0.001 154	0.001 176	0.001 23	0.001 356	0.002 290
DCP 1	.010	0.061 6	0.048 359	0.054 330	0.027 260	0.033 208	0.029 132	0.023 154	0.006 34	0.012 249
DCP 2	.025	0.094 355	0.033 337	0.041 311	0.033 286	0.030 174	0.024 95	0.022 61	0.021 336	0.023 292
DCP 3	.100	0.022 298	0.028 301	0.014 329	0.035 305	0.021 259	0.010 266	0.010 280	0.015 285	0.022 270
DCP 4	.150	0.019 265	0.009 154	0.008 125	0.014 100	0.010 80	0.014 63	0.006 353	0.005 345	0.001 277
DCP 5	.200	0.026 276	0.016 230	0.005 260	0.008 244	0.008 230	0.010 181	0.004 157	0.003 153	0.001 269
DCP 6	.250	0.014 272	0.007 143	0.011 136	0.013 78	0.011 66	0.007 28	0.005 30	0.003 37	0.006 25
DCP 7	.300	0.010 228	0.011 195	0.008 142	0.004 85	0.007 144	0.010 111	0.008 71	0.001 329	0.003 190
DCP 8	.400	0.007 133	0.010 113	0.011 91	0.011 68	0.006 4	0.006 54	0.007 22	0.005 26	0.004 343
DCP 9	.500	0.010 156	0.008 124	0.010 81	0.006 58	0.006 51	0.011 77	0.011 29	0.007 347	0.002 35
DCP10	.600	0.005 70	0.008 85	0.007 33	0.006 38	0.005 323	0.003 343	0.003 334	0.002 314	0.001 329
DCP11	.978	0.006 176	0.010 93	0.002 349	0.005 29	0.004 329	0.001 331	0.003 187	0.009 182	0.010 113

TUNED PITCHING OSCILLATION VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
64.0	15.53	0.600	9.90	4.30		5141.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.040	642.8	713.3	0.31E 07	-0.00059	1.140	11.78	0.1300

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		9.901	4.301	0	0.193	356	0.082	176	0.076	241	0.037	264	0.021	264	0.013	198	0.019	238	0.022	298
CN		0.998	0.155	15	0.056	76	0.035	153	0.035	209	0.008	219	0.008	285	0.007	272	0.004	260	0.002	257
CM		-0.047	0.047	185	0.000	149	0.006	153	0.002	273	0.001	240	0.001	244	0.001	264	0.000	185	0.001	88
DCP 1	.010	2.636	0.919	359	0.148	78	0.034	65	0.042	249	0.024	230	0.005	250	0.012	114	0.009	7	0.011	280
DCP 2	.025	2.700	0.752	356	0.096	66	0.035	97	0.029	236	0.014	217	0.012	310	0.005	190	0.002	102	0.005	186
DCP 3	.100	2.344	0.469	170	0.108	61	0.198	163	0.031	261	0.042	226	0.041	271	0.030	259	0.022	266	0.015	248
DCP 4	.250	1.439	0.172	37	0.152	91	0.111	154	0.033	249	0.005	178	0.026	295	0.016	298	0.005	177	0.006	105
DCP 5	.300	1.183	0.207	17	0.156	88	0.104	142	0.018	158	0.019	212	0.017	247	0.036	297	0.011	255	0.001	327
DCP 6	.400	0.900	0.261	13	0.059	73	0.014	11	0.014	77	0.008	302	0.010	278	0.009	230	0.006	255	0.007	4
DCP 7	.500	0.715	0.248	12	0.047	80	0.017	44	0.023	104	0.011	114	0.011	85	0.002	221	0.010	176	0.005	101
DCP 8	.600	0.586	0.205	11	0.009	22	0.013	308	0.003	126	0.007	243	0.003	90	0.002	89	0.002	288	0.003	327
DCP 9	.878	0.376	0.200	359	0.004	359	0.016	318	0.004	106	0.004	74	0.005	2	0.003	93	0.005	355	0.008	245

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.020	269	0.011	248	0.015	281	0.012	304	0.014	259	0.005	303	0.006	294	0.008	273	0.009	237
CN		0.003	294	0.001	196	0.000	295	0.002	41	0.001	218	0.005	98	0.006	13	0.004	316	0.003	248
CM		0.001	46	0.001	347	0.001	282	0.000	201	0.001	331	0.002	250	0.001	178	0.001	107	0.001	23
DCP 1	.010	0.010	217	0.004	114	0.002	308	0.002	319	0.003	290	0.002	30	0.006	339	0.006	304	0.001	112
DCP 2	.025	0.002	32	0.003	308	0.003	172	0.005	50	0.003	291	0.003	151	0.002	350	0.003	337	0.003	243
DCP 3	.100	0.007	322	0.018	332	0.013	285	0.006	325	0.003	331	0.004	289	0.008	29	0.013	318	0.010	302
DCP 4	.250	0.008	27	0.005	98	0.007	271	0.011	99	0.007	299	0.008	165	0.008	73	0.006	16	0.003	21
DCP 5	.300	0.008	65	0.005	65	0.003	284	0.014	183	0.002	189	0.013	160	0.008	330	0.004	181	0.008	251
DCP 6	.400	0.015	289	0.004	221	0.002	59	0.010	355	0.007	234	0.010	102	0.006	25	0.002	38	0.003	179
DCP 7	.500	0.007	317	0.006	186	0.005	83	0.008	82	0.002	357	0.012	105	0.005	47	0.007	43	0.004	248
DCP 8	.600	0.005	237	0.008	177	0.008	98	0.004	358	0.004	144	0.008	48	0.010	352	0.005	257	0.001	100
DCP 9	.878	0.004	193	0.002	151	0.001	175	0.001	318	0.004	147	0.006	61	0.005	359	0.007	296	0.007	217

TUNED PITCHING OSCILLATION VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL C.S	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
64.0	15.59	0.600	9.89	4.37		5141.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.041	640.6	719.4	0.31E 07	-0.00074	1.178	12.18	0.1150

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
ALPHA		9.892	4.373 359	0.161 354	0.101 180	0.052 233	0.025 297	0.029 259	0.027 195	0.013 245	0.010 209
CN		1.001	0.173 14	0.061 75	0.021 155	0.019 244	0.009 159	0.012 282	0.011 262	0.007 271	0.007 231
CM		-0.044	0.043 187	0.001 132	0.005 160	0.002 231	0.000 323	0.001 246	0.000 346	0.001 38	0.002 325
DCP 1	.010	2.653	0.978 359	0.150 73	0.015 111	0.049 252	0.008 224	0.022 226	0.016 163	0.004 6	0.002 223
DCP 2	.025	2.696	0.761 357	0.117 65	0.017 42	0.058 239	0.013 135	0.008 246	0.009 184	0.006 176	0.008 119
DCP 3	.100	2.429	0.348 169	0.107 71	0.136 162	0.077 247	0.029 187	0.041 293	0.045 265	0.029 296	0.034 281
DCP 4	.250	1.417	0.207 30	0.174 87	0.093 159	0.056 245	0.009 108	0.045 274	0.024 306	0.001 183	0.011 244
DCP 5	.300	1.186	0.228 19	0.172 85	0.061 137	0.039 220	0.041 151	0.035 273	0.027 274	0.019 295	0.007 276
DCP 6	.400	0.897	0.262 14	0.068 69	0.025 349	0.033 32	0.004 171	0.006 258	0.008 234	0.013 292	0.020 228
DCP 7	.500	0.673	0.249 12	0.041 77	0.024 53	0.016 71	0.015 88	0.004 278	0.010 196	0.014 193	0.008 190
DCP 8	.600	0.588	0.210 12	0.015 35	0.015 309	0.024 247	0.003 233	0.003 92	0.001 214	0.006 285	0.009 167
DCP 9	.878	0.372	0.187 1	0.009 303	0.010 335	0.005 336	0.005 179	0.005 21	0.003 236	0.005 212	0.006 121

DATA TYPE	X/C	RES 10 PHI	RES 11 PHI	RES 12 PHI	RES 13 PHI	RES 14 PHI	RES 15 PHI	RES 16 PHI	RES 17 PHI	RES 18 PHI
ALPHA		0.009 223	0.006 192	0.011 308	0.001 187	0.006 190	0.002 118	0.004 63	0.002 199	0.002 46
CN		0.003 234	0.003 106	0.002 325	0.001 326	0.002 22	0.001 328	0.002 305	0.001 85	0.004 307
CM		0.000 279	0.002 315	0.001 251	0.000 288	0.000 97	0.001 315	0.000 211	0.001 260	0.001 136
DCP 1	.010	0.009 249	0.010 125	0.007 119	0.006 19	0.003 313	0.004 217	0.001 218	0.003 23	0.003 290
DCP 2	.025	0.005 249	0.003 122	0.004 70	0.002 81	0.002 8	0.004 240	0.006 188	0.003 100	0.004 24
DCP 3	.100	0.024 266	0.016 310	0.012 299	0.019 302	0.005 101	0.027 340	0.021 268	0.008 245	0.011 289
DCP 4	.250	0.004 176	0.010 63	0.009 289	0.000 64	0.016 38	0.011 280	0.003 78	0.007 55	0.012 324
DCP 5	.300	0.003 99	0.008 58	0.003 157	0.009 187	0.006 143	0.007 218	0.007 199	0.007 161	0.001 313
DCP 6	.400	0.007 167	0.004 181	0.004 180	0.003 72	0.007 343	0.004 145	0.010 23	0.007 314	0.007 247
DCP 7	.500	0.007 165	0.003 52	0.006 282	0.008 141	0.002 329	0.011 156	0.008 99	0.009 75	0.001 198
DCP 8	.600	0.001 105	0.013 133	0.006 66	0.008 21	0.007 304	0.009 116	0.010 358	0.002 162	0.005 343
DCP 9	.878	0.002 303	0.004 148	0.002 55	0.003 207	0.003 145	0.001 352	0.005 217	0.005 78	0.004 305

TUNED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
44.0	15.72	0.600	9.99	4.53		5141.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.041	639.9	713.8	0.315 07	-0.00020	1.141	12.78	0.0340

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
ALPHA		9.899	4.533 0	0.239 10	0.122 198	0.051 189	0.143 248	0.016 251	0.048 209	0.025 213	0.024 246
CN		0.392	0.167 14	0.070 69	0.023 155	0.017 255	0.018 242	0.008 248	0.009 286	0.008 334	0.009 286
CM		-0.051	0.049 182	0.005 43	0.004 183	0.002 204	0.001 42	0.001 180	0.002 38	0.001 36	0.002 24
DCP 1	.010	2.628	0.989 357	0.114 62	0.028 99	0.023 236	0.042 236	0.026 278	0.020 202	0.002 0	0.013 188
DCP 2	.025	2.705	0.791 357	0.128 66	0.018 131	0.041 236	0.042 212	0.009 176	0.017 154	0.009 80	0.002 296
DCP 3	.100	2.333	0.506 194	0.239 57	0.133 171	0.030 273	0.042 267	0.028 236	0.036 354	0.033 338	0.035 326
DCP 4	.250	1.355	0.203 37	0.163 76	0.086 166	0.041 211	0.026 239	0.032 252	0.023 297	0.018 22	0.020 307
DCP 5	.300	1.178	0.222 26	0.202 79	0.055 153	0.020 192	0.040 234	0.034 204	0.030 325	0.018 328	0.014 341
DCP 6	.400	0.891	0.266 11	0.045 59	0.014 15	0.019 41	0.017 255	0.012 9	0.013 264	0.014 313	0.015 258
DCP 7	.500	0.675	0.266 10	0.052 81	0.018 23	0.005 70	0.022 270	0.015 136	0.017 207	0.007 185	0.011 251
DCP 8	.600	0.597	0.223 8	0.018 271	0.011 16	0.010 309	0.010 266	0.016 334	0.017 265	0.009 285	0.014 222
DCP 9	.878	0.407	0.208 357	0.010 171	0.008 18	0.006 6	0.004 224	0.003 220	0.009 180	0.002 137	0.002 154

DATA TYPE	X/C	RES 10 PHI	RES 11 PHI	RES 12 PHI	RES 13 PHI	RES 14 PHI	RES 15 PHI	RES 16 PHI	RES 17 PHI	RES 18 PHI
ALPHA		0.022 218	0.008 195	0.012 247	0.018 194	0.012 189	0.002 169	0.009 234	0.007 191	0.005 186
CN		0.006 327	0.003 278	0.001 234	0.002 11	0.002 224	0.003 342	0.002 185	0.002 287	0.002 163
CM		0.000 41	0.001 30	0.000 302	0.001 50	0.000 224	0.001 58	0.001 288	0.001 123	0.000 6
DCP 1	.010	0.005 297	0.006 205	0.006 59	0.007 288	0.005 183	0.005 260	0.006 128	0.003 192	0.004 287
DCP 2	.025	0.003 31	0.003 134	0.007 70	0.003 9	0.003 347	0.004 346	0.000 92	0.001 275	0.002 13
DCP 3	.100	0.011 349	0.025 15	0.009 310	0.020 54	0.009 297	0.017 48	0.016 275	0.007 119	0.009 282
DCP 4	.250	0.013 333	0.011 199	0.011 262	0.008 8	0.024 228	0.010 52	0.009 227	0.003 235	0.006 144
DCP 5	.300	0.021 55	0.013 337	0.019 131	0.010 26	0.007 102	0.016 330	0.004 203	0.006 302	0.007 130
DCP 6	.400	0.010 296	0.011 292	0.010 248	0.012 270	0.014 163	0.011 343	0.008 176	0.005 292	0.011 155
DCP 7	.500	0.012 268	0.016 227	0.005 233	0.005 222	0.008 2	0.011 263	0.006 125	0.002 279	0.007 86
DCP 8	.600	0.002 178	0.009 224	0.004 158	0.006 201	0.007 97	0.009 266	0.009 114	0.003 276	0.005 69
DCP 9	.878	0.001 69	0.003 136	0.003 29	0.002 21	0.005 295	0.004 147	0.001 48	0.003 319	0.007 245

TUNED PITCHING OSCILLATION VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
80.0	16.00	0.620	0.37	4.26		5363.1	12

V	V	Q	RN	DAMPING	CM(MAX)	ALPHA(STALL)	EXT DAMPING
0.060	441.0	763.5	0.485 07	-0.00095	0.647	5.26	0.0220

HARMONIC ANALYSIS

DATA TYPE	K/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
ALPHA		0.363	4.957 0	0.158 24	0.194 224	0.063 232	0.027 216	0.027 196	0.024 128	0.027 218	0.011 245
CN		0.072	0.562 354	0.014 310	0.015 275	0.010 35	0.007 135	0.005 170	0.002 180	0.004 171	0.006 172
CM		-0.022	0.016 331	0.003 282	0.003 283	0.003 1	0.002 99	0.001 174	0.000 312	0.001 73	0.001 169
DCP 1	.010	-1.181	3.161 352	0.267 229	0.250 233	0.202 14	0.207 93	0.123 170	0.038 256	0.046 80	0.020 143
DCP 2	.100	0.454	1.427 352	0.072 58	0.073 139	0.072 181	0.052 250	0.033 338	0.021 58	0.016 136	0.018 230
DCP 3	.150	0.367	0.887 351	0.027 308	0.012 155	0.011 187	0.007 233	0.006 316	0.003 137	0.005 149	0.006 206
DCP 4	.200	0.227	0.770 354	0.016 180	0.015 260	0.013 126	0.003 236	0.005 166	0.003 172	0.004 170	0.004 211
DCP 5	.250	0.237	0.684 352	0.028 270	0.009 265	0.012 260	0.001 140	0.002 104	0.004 170	0.004 172	0.003 196
DCP 6	.300	0.196	0.573 356	0.016 137	0.008 251	0.005 133	0.003 175	0.005 141	0.002 215	0.000 356	0.001 156
DCP 7	.400	0.160	0.450 355	0.023 273	0.006 228	0.001 317	0.002 60	0.002 101	0.004 171	0.003 167	0.002 182
DCP 8	.500	0.076	0.323 357	0.018 133	0.006 257	0.005 118	0.001 6	0.003 112	0.002 231	0.001 251	0.001 272
DCP 9	.600	0.066	0.247 359	0.021 263	0.006 256	0.002 331	0.002 133	0.001 54	0.005 150	0.004 130	0.002 92
DCP10	.878	0.046	0.026 6	0.021 126	0.003 110	0.008 135	0.001 13	0.001 262	0.001 5	0.001 226	0.002 101

DATA TYPE	K/C	RES 10 PHI	RES 11 PHI	RES 12 PHI	RES 13 PHI	RES 14 PHI	RES 15 PHI	RES 16 PHI	RES 17 PHI	RES 18 PHI
ALPHA		0.018 223	0.010 287	0.011 212	0.006 245	0.014 230	0.010 263	0.012 233	0.011 248	0.008 227
CN		0.006 216	0.006 261	0.002 13	0.002 161	0.002 251	0.002 208	0.003 98	0.002 173	0.002 190
CM		0.001 263	0.001 327	0.000 350	0.000 338	0.000 286	0.001 16	0.000 293	0.000 136	0.000 74
DCP 1	.010	0.103 228	0.078 282	0.056 3	0.021 98	0.016 227	0.012 27	0.028 101	0.037 176	0.031 238
DCP 2	.100	0.030 182	0.027 173	0.010 182	0.012 260	0.006 236	0.006 219	0.003 82	0.003 27	0.006 123
DCP 3	.150	0.004 215	0.002 105	0.001 121	0.003 215	0.004 257	0.000 258	0.003 38	0.003 206	0.000 99
DCP 4	.200	0.005 262	0.003 265	0.001 60	0.001 137	0.003 230	0.006 233	0.005 278	0.003 231	0.008 93
DCP 5	.250	0.003 177	0.002 161	0.001 187	0.001 223	0.001 275	0.001 164	0.002 108	0.001 135	0.002 145
DCP 6	.300	0.001 230	0.002 171	0.001 217	0.001 261	0.001 304	0.003 223	0.002 146	0.002 131	0.001 117
DCP 7	.400	0.002 165	0.006 137	0.001 158	0.003 197	0.000 280	0.001 145	0.002 80	0.000 187	0.002 93
DCP 8	.500	0.001 144	0.002 170	0.000 88	0.001 82	0.001 241	0.006 233	0.001 178	0.000 335	0.001 50
DCP 9	.600	0.004 128	0.002 174	0.001 128	0.002 176	0.001 3	0.001 15	0.003 81	0.001 235	0.002 186
DCP10	.878	0.002 107	0.006 215	0.001 12	0.003 132	0.002 223	0.006 121	0.003 113	0.002 71	0.001 208

TUNED PITCHING OSCILLATION — VERTOL 23010-1-58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
90.0	15.22	0.430	7.55	4.70		5364.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.057	444.2	755.4	0.485 07	-0.00098	1.416	12.11	0.0803

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
ALPHA		7.553	4.695 359	0.170 1	0.079 193	0.053 235	0.033 246	0.021 197	0.011 278	0.020 227	0.019 292
CN		0.938	0.469 358	0.042 16	0.012 238	0.012 184	0.003 158	0.002 291	0.001 278	0.003 268	0.004 276
CM		-0.005	0.016 335	0.003 311	0.001 225	0.001 288	0.001 215	0.001 117	0.000 61	0.001 5	0.000 189
DCP 1	.010	3.561	2.030 356	0.286 331	0.145 211	0.062 173	0.026 165	0.030 120	0.015 37	0.019 307	0.021 264
DCP 2	.100	2.490	1.138 356	0.038 33	0.019 288	0.004 208	0.017 224	0.018 215	0.004 248	0.009 215	0.012 265
DCP 3	.150	1.869	0.702 356	0.003 33	0.017 288	0.013 208	0.004 160	0.000 141	0.006 271	0.002 264	0.004 297
DCP 4	.200	1.562	0.636 356	0.051 33	0.014 276	0.017 197	0.004 208	0.006 256	0.002 197	0.004 278	0.002 230
DCP 5	.250	1.365	0.529 359	0.075 34	0.014 281	0.014 202	0.003 136	0.002 70	0.002 232	0.003 226	0.004 279
DCP 6	.300	1.019	0.441 358	0.063 32	0.009 262	0.012 191	0.004 223	0.006 239	0.001 243	0.004 268	0.005 265
DCP 7	.400	0.797	0.350 7	0.051 33	0.011 274	0.011 191	0.006 131	0.001 14	0.003 215	0.001 269	0.001 306
DCP 8	.500	0.642	0.256 1	0.026 35	0.006 268	0.009 175	0.002 232	0.005 256	0.001 286	0.003 265	0.002 293
DCP 9	.600	0.448	0.202 6	0.020 34	0.007 241	0.008 177	0.005 79	0.003 43	0.003 259	0.001 261	0.003 294
DCP10	.878	0.190	0.086 9	0.005 218	0.005 142	0.006 125	0.001 344	0.003 246	0.001 44	0.003 292	0.001 289

DATA TYPE	X/C	RES 10 PHI	RES 11 PHI	RES 12 PHI	RES 13 PHI	RES 14 PHI	RES 15 PHI	RES 16 PHI	RES 17 PHI	RES 18 PHI
ALPHA		0.011 253	0.006 253	0.005 258	0.006 324	0.005 283	0.011 320	0.005 352	0.004 293	0.002 37
CN		0.003 251	0.002 318	0.001 282	0.001 271	0.001 1	0.001 292	0.001 134	0.002 139	0.001 293
CM		0.000 140	0.001 198	0.000 309	0.000 138	0.000 329	0.000 315	0.000 340	0.000 321	0.000 10
DCP 1	.010	0.012 229	0.007 251	0.006 231	0.003 233	0.008 353	0.009 289	0.004 359	0.002 57	0.004 279
DCP 2	.100	0.007 237	0.005 269	0.002 353	0.005 270	0.003 335	0.002 338	0.002 226	0.004 65	0.001 99
DCP 3	.150	0.003 259	0.001 282	0.003 297	0.002 273	0.003 322	0.001 328	0.003 21	0.001 99	0.002 292
DCP 4	.200	0.002 310	0.006 336	0.008 277	0.002 183	0.002 358	0.003 298	0.003 150	0.006 94	0.005 52
DCP 5	.250	0.003 260	0.001 309	0.002 285	0.002 311	0.001 285	0.001 293	0.002 22	0.002 132	0.001 303
DCP 6	.300	0.003 260	0.001 252	0.002 361	0.001 333	0.001 338	0.001 54	0.000 102	0.002 76	0.001 22
DCP 7	.400	0.002 260	0.001 277	0.001 10	0.001 281	0.001 268	0.001 328	0.001 16	0.001 117	0.001 332
DCP 8	.500	0.002 270	0.002 10	0.000 335	0.001 85	0.001 78	0.001 7	0.001 142	0.003 133	0.001 97
DCP 9	.600	0.003 270	0.002 334	0.001 16	0.001 282	0.001 90	0.002 127	0.001 148	0.002 156	0.001 281
DCP10	.878	0.000 318	0.003 19	0.002 158	0.001 272	0.002 151	0.001 220	0.003 161	0.002 126	0.002 186

TUNED PITCHING OSCILLATION VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
80.0	15.29	0.400	7.55	4.80		5064.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.058	441.3	746.9	0.48E 07	-0.00090	1.397	12.20	0.0590

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
ALPHA		7.554	4.801 359	0.213 15	0.049 195	0.038 242	0.028 216	0.040 138	0.019 223	0.024 223	0.008 297
CN		0.915	0.478 358	0.045 5	0.009 264	0.004 230	0.002 259	0.008 99	0.002 344	0.002 253	0.001 312
CM		-0.008	0.017 334	0.002 334	0.001 207	0.000 185	0.001 184	0.001 152	0.000 37	0.000 41	0.000 193
DCP 1	.010	3.553	2.991 355	0.309 326	0.118 212	0.031 164	0.033 189	0.070 109	0.027 22	0.012 284	0.004 308
DCP 2	.100	2.484	1.163 356	0.117 28	0.032 337	0.024 264	0.011 217	0.014 116	0.003 339	0.004 227	0.003 258
DCP 3	.150	1.723	0.709 356	0.089 25	0.017 307	0.006 246	0.003 253	0.010 112	0.002 266	0.001 184	0.001 303
DCP 4	.200	1.376	0.653 356	0.070 29	0.013 327	0.010 250	0.003 224	0.008 81	0.001 329	0.004 236	0.001 191
DCP 5	.250	1.265	0.538 358	0.069 24	0.013 296	0.005 233	0.002 235	0.009 110	0.001 259	0.001 206	0.002 317
DCP 6	.300	1.022	0.474 359	0.050 28	0.011 315	0.005 243	0.003 166	0.008 80	0.003 325	0.001 285	0.002 229
DCP 7	.400	0.796	0.356 0	0.047 18	0.010 287	0.004 215	0.001 35	0.007 113	0.002 302	0.000 322	0.000 320
DCP 8	.500	0.576	0.262 1	0.027 28	0.007 312	0.004 268	0.002 202	0.004 70	0.002 301	0.001 331	0.001 207
DCP 9	.600	0.463	0.202 4	0.025 9	0.007 270	0.004 184	0.004 352	0.005 95	0.002 279	0.000 128	0.001 301
DCP10	.878	0.224	0.090 10	0.010 257	0.004 176	0.003 0	0.000 263	0.003 5	0.001 184	0.003 240	0.003 8

DATA TYPE	X/C	RES 10 PHI	RES 11 PHI	RES 12 PHI	RES 13 PHI	RES 14 PHI	RES 15 PHI	RES 16 PHI	RES 17 PHI	RES 18 PHI
ALPHA		0.004 211	0.005 343	0.004 294	0.003 227	0.006 228	0.006 308	0.004 333	0.001 289	0.004 286
CN		0.002 195	0.001 233	0.000 181	0.000 122	0.001 73	0.001 283	0.001 171	0.001 82	0.001 178
CM		0.000 323	0.000 176	0.000 241	0.000 315	0.000 174	0.000 151	0.001 334	0.000 276	0.000 323
DCP 1	.010	0.010 255	0.011 234	0.007 169	0.003 65	0.005 134	0.004 217	0.006 349	0.005 359	0.004 227
DCP 2	.100	0.003 182	0.004 250	0.002 56	0.003 264	0.002 10	0.002 277	0.002 293	0.002 72	0.001 205
DCP 3	.150	0.003 231	0.001 344	0.002 282	0.002 78	0.002 165	0.003 256	0.002 179	0.000 190	0.001 180
DCP 4	.200	0.003 111	0.001 291	0.002 243	0.005 310	0.003 21	0.002 196	0.003 213	0.001 310	0.002 12
DCP 5	.250	0.002 210	0.001 335	0.001 289	0.001 347	0.002 139	0.003 257	0.001 154	0.002 112	0.001 230
DCP 6	.300	0.001 189	0.001 180	0.002 279	0.000 160	0.002 70	0.001 273	0.001 142	0.002 136	0.000 249
DCP 7	.400	0.002 209	0.001 119	0.001 110	0.001 38	0.001 120	0.003 286	0.000 118	0.002 74	0.001 215
DCP 8	.500	0.001 259	0.001 127	0.002 268	0.001 108	0.001 44	0.000 313	0.001 234	0.001 191	0.001 321
DCP 9	.600	0.003 180	0.002 143	0.001 326	0.001 207	0.002 191	0.004 324	0.002 171	0.001 151	0.002 140
DCP10	.878	0.002 130	0.002 293	0.002 107	0.003 132	0.003 2	0.000 212	0.002 144	0.002 53	0.001 160

TUNED PITCHING OSCILLATION VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
90.0	15.38	0.400	7.53	4.91		5366.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.058	440.6	743.6	0.48E 07	-0.00093	1.405	12.28	0.0220

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
ALPHA		7.527	4.906 0	0.214 12	0.048 200	0.047 278	0.038 196	0.029 4	0.017 194	0.012 208	0.008 293
CN		0.911	0.482 359	0.058 9	0.007 246	0.005 227	0.008 179	0.003 35	0.000 196	0.001 121	0.002 261
CM		-0.008	0.017 333	0.003 267	0.000 239	0.001 275	0.001 190	0.000 117	0.001 346	0.000 290	0.000 56
DCP 1	.010	3.534	3.009 355	0.350 329	0.107 211	0.032 199	0.068 167	0.034 56	0.017 23	0.010 342	0.009 312
DCP 2	.100	2.484	1.171 359	0.138 36	0.019 337	0.025 259	0.023 199	0.007 204	0.003 196	0.003 178	0.005 264
DCP 3	.150	1.697	0.717 355	0.104 19	0.017 320	0.011 260	0.013 191	0.006 26	0.001 297	0.001 1	0.001 281
DCP 4	.200	1.384	0.650 359	0.080 34	0.006 338	0.005 256	0.011 206	0.004 301	0.006 208	0.004 145	0.003 217
DCP 5	.250	1.246	0.543 358	0.085 19	0.011 307	0.008 254	0.011 186	0.006 20	0.002 262	0.000 20	0.001 177
DCP 6	.300	1.026	0.472 2	0.062 33	0.007 272	0.004 227	0.006 185	0.001 63	0.003 247	0.003 198	0.002 226
DCP 7	.400	0.782	0.362 1	0.060 13	0.008 293	0.006 248	0.007 187	0.006 15	0.002 255	0.002 102	0.003 259
DCP 8	.500	0.565	0.263 4	0.041 34	0.003 272	0.004 214	0.005 170	0.002 98	0.001 227	0.002 175	0.001 287
DCP 9	.600	0.455	0.207 4	0.037 5	0.004 269	0.003 200	0.002 163	0.004 21	0.001 229	0.002 118	0.003 235
DCP10	.878	0.231	0.090 11	0.010 18	0.005 178	0.003 112	0.002 61	0.001 278	0.003 138	0.002 70	0.001 283

DATA TYPE	X/C	RES 10 PHI	RES 11 PHI	RES 12 PHI	RES 13 PHI	RES 14 PHI	RES 15 PHI	RES 16 PHI	RES 17 PHI	RES 18 PHI
ALPHA		0.004 165	0.008 348	0.002 231	0.006 131	0.002 306	0.008 293	0.004 348	0.005 275	0.004 284
CN		0.002 223	0.001 164	0.000 283	0.001 229	0.001 233	0.001 278	0.000 298	0.000 325	0.001 193
CM		0.000 326	0.000 285	0.000 331	0.000 331	0.000 260	0.000 109	0.000 2	0.000 218	0.000 17
DCP 1	.010	0.014 257	0.011 199	0.005 111	0.005 344	0.007 241	0.005 60	0.005 317	0.005 234	0.006 109
DCP 2	.100	0.006 202	0.001 219	0.001 337	0.003 255	0.003 250	0.002 263	0.001 81	0.002 238	0.004 260
DCP 3	.150	0.003 260	0.001 15	0.001 341	0.001 157	0.002 256	0.001 130	0.001 117	0.001 286	0.002 172
DCP 4	.200	0.003 155	0.001 98	0.002 335	0.003 207	0.002 167	0.001 284	0.002 86	0.002 148	0.005 254
DCP 5	.250	0.003 266	0.001 61	0.001 344	0.001 182	0.003 280	0.001 210	0.001 101	0.002 285	0.002 158
DCP 6	.300	0.002 169	0.001 180	0.001 260	0.003 221	0.001 211	0.002 258	0.002 278	0.001 92	0.000 211
DCP 7	.400	0.003 227	0.001 349	0.001 293	0.001 254	0.001 263	0.001 204	0.001 130	0.002 305	0.002 125
DCP 8	.500	0.001 205	0.001 164	0.001 250	0.001 196	0.001 113	0.001 203	0.000 151	0.000 356	0.001 185
DCP 9	.600	0.002 191	0.001 96	0.002 255	0.001 225	0.000 83	0.002 277	0.002 315	0.003 32	0.001 208
DCP10	.878	0.001 282	0.001 159	0.002 94	0.001 94	0.000 120	0.002 322	0.001 165	0.000 133	0.002 197

TUNED PITCHING OSCILLATION VERTOL 23010-1.59 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
80.0	14.16	0.400	9.91	4.69		5365.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.061	438.9	739.9	0.48E 07	-0.00039	1.560	14.09	0.0229

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		9.915	4.486	0	0.174	51	0.079	234	0.089	221	0.244	274	0.128	75	0.050	233	0.059	220	0.023	225
CN		1.079	0.342	12	0.116	29	0.029	276	0.035	195	0.020	235	0.017	74	0.003	298	0.002	246	0.006	222
CM		-0.008	0.004	269	0.010	67	0.006	315	0.001	269	0.004	275	0.003	218	0.002	101	0.001	347	0.001	306
DCP 1	.010	4.670	2.370	3	0.474	11	0.133	286	0.039	275	0.163	257	0.022	8	0.051	223	0.032	219	0.048	203
DCP 2	.130	2.768	0.595	15	0.439	41	0.166	306	0.036	296	0.071	239	0.054	125	0.057	75	0.041	6	0.033	307
DCP 3	.150	1.915	0.389	16	0.230	42	0.061	301	0.014	181	0.039	261	0.021	139	0.012	90	0.009	333	0.011	243
DCP 4	.200	1.578	0.352	22	0.265	29	0.107	280	0.037	178	0.027	215	0.040	86	0.023	3	0.014	299	0.013	257
DCP 5	.250	1.418	0.327	20	0.168	33	0.038	284	0.006	152	0.029	252	0.024	109	0.006	41	0.002	291	0.008	237
DCP 6	.300	1.192	0.319	27	0.162	14	0.056	269	0.020	136	0.018	222	0.038	71	0.020	330	0.013	226	0.006	174
DCP 7	.400	0.912	0.264	19	0.090	15	0.017	225	0.004	57	0.016	222	0.021	64	0.013	277	0.005	162	0.005	227
DCP 8	.500	0.664	0.224	17	0.060	345	0.028	141	0.018	26	0.009	227	0.019	40	0.015	255	0.009	154	0.004	126
DCP 9	.600	0.531	0.178	17	0.038	353	0.009	153	0.004	318	0.012	162	0.019	41	0.014	259	0.006	158	0.006	185
DCP10	.878	0.295	0.125	5	0.031	282	0.007	159	0.008	186	0.010	97	0.007	57	0.002	22	0.002	253	0.004	150

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.020	201	0.008	215	0.022	228	0.013	225	0.014	239	0.013	255	0.009	240	0.009	256	0.006	253
CN		0.006	193	0.002	161	0.003	189	0.006	130	0.002	81	0.002	219	0.003	81	0.000	99	0.001	74
CM		0.001	280	0.001	220	0.000	116	0.000	230	0.000	58	0.001	6	0.001	282	0.000	14	0.001	259
DCP 1	.010	0.027	174	0.011	216	0.010	182	0.015	172	0.008	111	0.005	279	0.003	330	0.006	68	0.002	265
DCP 2	.130	0.031	254	0.022	218	0.018	194	0.025	162	0.019	83	0.009	50	0.012	22	0.013	361	0.015	272
DCP 3	.150	0.010	225	0.008	193	0.007	158	0.011	142	0.002	72	0.005	291	0.003	264	0.007	193	0.004	102
DCP 4	.200	0.022	205	0.017	162	0.008	84	0.005	101	0.005	55	0.003	254	0.006	77	0.004	32	0.003	156
DCP 5	.250	0.009	204	0.004	139	0.006	129	0.003	73	0.004	356	0.004	267	0.003	155	0.005	134	0.002	69
DCP 6	.300	0.006	198	0.008	156	0.009	97	0.005	35	0.002	332	0.005	253	0.005	139	0.003	112	0.003	140
DCP 7	.400	0.006	189	0.003	36	0.005	308	0.001	120	0.002	35	0.004	235	0.004	123	0.003	14	0.002	78
DCP 8	.500	0.006	115	0.004	14	0.003	216	0.005	130	0.001	72	0.003	200	0.002	82	0.004	168	0.005	60
DCP 9	.600	0.007	117	0.008	21	0.009	258	0.004	120	0.001	170	0.003	142	0.004	89	0.003	207	0.006	66
DCP10	.878	0.002	165	0.003	78	0.002	95	0.001	76	0.001	176	0.004	193	0.003	84	0.000	276	0.001	120

TUNED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
80.0	16.64	0.400	12.29	4.37		5066.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.063	440.1	739.1	0.4RE 07	0.00098	1.634	14.75	0.0800

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		12.198	4.366	0	0.289	35	0.091	141	0.070	7	0.030	56	0.093	268	0.049	191	0.025	124	0.021	355
CN		1.199	0.728	60	0.143	32	0.028	73	0.024	345	0.013	356	0.016	263	0.012	211	0.010	134	0.003	115
CM		-0.028	0.042	171	0.021	67	0.006	91	0.007	20	0.002	19	0.003	316	0.000	261	0.002	248	0.001	225
DCP 1	.010	5.182	1.261	39	0.819	36	0.125	92	0.131	39	0.097	42	0.035	294	0.032	170	0.035	112	0.012	60
DCP 2	.100	2.687	0.688	135	0.627	59	0.147	63	0.157	11	0.082	335	0.082	300	0.069	255	0.031	214	0.023	231
DCP 3	.150	2.035	0.436	120	0.330	43	0.076	105	0.100	8	0.033	316	0.039	292	0.042	219	0.022	151	0.011	153
DCP 4	.200	1.756	0.401	111	0.293	39	0.085	75	0.096	344	0.027	312	0.056	274	0.036	209	0.020	180	0.016	157
DCP 5	.250	1.574	0.333	92	0.205	25	0.063	94	0.070	327	0.005	357	0.042	264	0.030	172	0.018	155	0.018	99
DCP 6	.300	1.224	0.300	79	0.174	19	0.051	60	0.064	309	0.008	298	0.039	251	0.021	189	0.020	155	0.011	99
DCP 7	.400	1.025	0.265	54	0.107	355	0.024	76	0.035	271	0.009	47	0.025	219	0.012	130	0.015	131	0.009	51
DCP 8	.500	0.870	0.223	37	0.065	333	0.009	16	0.035	222	0.009	68	0.020	194	0.009	96	0.013	92	0.010	31
DCP 9	.600	0.679	0.219	25	0.047	311	0.003	14	0.022	201	0.011	28	0.009	134	0.004	297	0.006	108	0.006	192
DCP10	.878	0.370	0.209	354	0.030	257	0.027	272	0.011	147	0.010	233	0.004	97	0.006	217	0.010	65	0.004	36

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.006	258	0.004	324	0.005	308	0.003	254	0.003	308	0.007	326	0.005	335	0.007	188	0.004	286
CN		0.003	343	0.003	197	0.001	269	0.003	164	0.001	35	0.002	173	0.001	66	0.000	23	0.002	166
CM		0.001	154	0.001	234	0.001	126	0.001	304	0.001	176	0.000	121	0.001	122	0.000	336	0.000	328
DCP 1	.010	0.018	268	0.023	174	0.015	157	0.014	129	0.006	100	0.006	133	0.008	31	0.014	304	0.014	246
DCP 2	.100	0.018	231	0.025	229	0.024	197	0.023	191	0.022	152	0.010	151	0.021	139	0.016	88	0.010	136
DCP 3	.150	0.015	82	0.007	358	0.002	358	0.009	302	0.008	203	0.007	164	0.004	106	0.002	43	0.004	73
DCP 4	.200	0.011	150	0.003	153	0.004	140	0.004	95	0.007	81	0.007	14	0.005	82	0.006	351	0.003	204
DCP 5	.250	0.015	29	0.009	350	0.006	307	0.008	283	0.007	218	0.008	143	0.004	94	0.003	47	0.004	343
DCP 6	.300	0.008	76	0.003	101	0.006	58	0.003	22	0.008	11	0.035	315	0.003	320	0.005	225	0.003	116
DCP 7	.400	0.011	12	0.008	251	0.003	58	0.004	246	0.002	351	0.006	170	0.005	40	0.004	298	0.003	229
DCP 8	.500	0.010	320	0.005	201	0.003	323	0.006	115	0.011	334	0.004	209	0.003	350	0.005	236	0.004	142
DCP 9	.600	0.008	40	0.006	129	0.009	2	0.003	190	0.006	323	0.005	295	0.001	350	0.003	251	0.004	133
DCP10	.878	0.007	262	0.003	30	0.009	252	0.007	127	0.004	59	0.004	358	0.005	290	0.005	113	0.001	248

TUNED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
80.0	16.50	0.400	12.26	4.45		5366.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.063	438.1	736.7	0.48E 07	0.00066	1.611	14.84	0.0610

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
ALPHA		12.264	4.446 0	0.288 34	0.065 144	0.084 15	0.003 80	0.070 237	0.014 231	0.013 160	0.008 331
CN		1.187	0.233 54	0.143 29	0.013 83	0.017 327	0.006 13	0.014 260	0.004 280	0.010 293	0.003 119
CM		-0.029	0.040 174	0.024 69	0.004 61	0.009 16	0.002 272	0.001 8	0.001 210	0.001 46	0.002 173
DCP 1	.010	5.299	1.371 30	0.811 35	0.039 50	0.095 45	0.060 56	0.014 72	0.015 358	0.013 164	0.027 138
DCP 2	.100	2.700	0.676 133	0.452 59	0.109 52	0.152 4	0.085 313	0.076 277	0.059 259	0.047 210	0.013 182
DCP 3	.150	1.923	0.376 117	0.334 45	0.038 115	0.077 5	0.025 274	0.021 291	0.021 228	0.008 139	0.007 197
DCP 4	.200	1.556	0.407 110	0.306 36	0.056 83	0.117 339	0.032 275	0.055 271	0.028 205	0.023 226	0.027 162
DCP 5	.250	1.498	0.294 87	0.207 26	0.040 119	0.053 332	0.011 178	0.023 278	0.011 177	0.004 185	0.010 115
DCP 6	.300	1.247	0.310 78	0.181 17	0.026 70	0.059 309	0.023 228	0.040 240	0.017 146	0.013 196	0.014 127
DCP 7	.400	1.029	0.264 47	0.107 347	0.021 148	0.028 244	0.025 105	0.008 276	0.012 28	0.011 249	0.006 123
DCP 8	.500	0.790	0.232 39	0.080 329	0.006 267	0.045 229	0.018 121	0.017 175	0.016 46	0.007 118	0.011 341
DCP 9	.600	0.697	0.230 23	0.058 306	0.012 195	0.032 189	0.023 68	0.003 216	0.013 354	0.010 181	0.005 43
DCP10	.878	0.388	0.210 357	0.043 253	0.016 268	0.022 175	0.007 332	0.005 259	0.003 248	0.006 252	0.007 344

DATA TYPE	X/C	RES 10 PHI	RES 11 PHI	RES 12 PHI	RES 13 PHI	RES 14 PHI	RES 15 PHI	RES 16 PHI	RES 17 PHI	RES 18 PHI
ALPHA		0.006 327	0.005 333	0.004 327	0.004 244	0.004 303	0.002 193	0.001 155	0.002 205	0.000 349
CN		0.002 129	0.001 131	0.003 35	0.001 334	0.002 262	0.001 147	0.001 108	0.002 58	0.001 355
CM		0.000 35	0.000 215	0.001 198	0.001 176	0.002 106	0.000 97	0.000 53	0.000 0	0.000 192
DCP 1	.010	0.021 90	0.001 196	0.013 40	0.009 318	0.006 149	0.007 148	0.011 79	0.003 33	0.003 281
DCP 2	.100	0.018 245	0.021 222	0.030 198	0.027 163	0.026 150	0.027 110	0.018 85	0.016 45	0.008 37
DCP 3	.150	0.008 107	0.002 9	0.005 29	0.005 293	0.004 135	0.003 300	0.003 134	0.006 57	0.002 29
DCP 4	.200	0.012 117	0.012 90	0.008 51	0.004 62	0.007 47	0.009 356	0.002 336	0.009 343	0.005 311
DCP 5	.250	0.008 44	0.003 296	0.004 10	0.004 283	0.004 122	0.001 270	0.006 122	0.008 4	0.001 352
DCP 6	.300	0.009 131	0.011 66	0.009 35	0.005 357	0.008 17	0.012 326	0.007 277	0.009 257	0.006 205
DCP 7	.400	0.002 89	0.004 142	0.009 33	0.005 353	0.007 334	0.007 233	0.002 24	0.006 178	0.004 54
DCP 8	.500	0.003 116	0.004 311	0.007 77	0.008 339	0.007 305	0.008 243	0.006 189	0.002 162	0.003 140
DCP 9	.600	0.002 212	0.006 81	0.006 330	0.003 338	0.008 263	0.003 142	0.006 260	0.009 93	0.006 293
DCP10	.878	0.000 171	0.003 262	0.005 35	0.001 64	0.008 275	0.002 25	0.004 87	0.003 263	0.004 45

TUNED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
80.0	15.29	0.400	12.22	4.43		5066.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.042	437.1	734.4	0.48E 07	0.00083	1.575	14.18	0.0220

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		12.215	4.434	0	0.152	82	0.127	161	0.026	334	0.052	340	0.073	115	0.101	288	0.025	229	0.035	319
CN		1.153	0.246	64	0.147	31	0.014	44	0.012	315	0.011	341	0.014	175	0.018	297	0.007	192	0.011	20
CM		-0.037	0.043	169	0.021	64	0.008	86	0.008	354	0.002	28	0.004	313	0.001	151	0.003	283	0.001	170
DCP 1	.010	5.069	1.280	41	0.863	38	0.045	29	0.058	28	0.057	339	0.060	101	0.028	321	0.016	261	0.017	87
DCP 2	.100	2.560	0.814	133	0.609	58	0.157	75	0.141	5	0.082	14	0.070	294	0.046	269	0.043	260	0.032	228
DCP 3	.150	1.875	0.480	116	0.347	38	0.036	92	0.063	343	0.028	296	0.015	217	0.009	240	0.015	221	0.010	129
DCP 4	.200	1.469	0.466	109	0.296	35	0.087	73	0.090	335	0.030	347	0.052	242	0.008	234	0.027	224	0.012	176
DCP 5	.250	1.431	0.370	91	0.222	19	0.031	104	0.052	305	0.009	237	0.016	182	0.006	259	0.012	178	0.004	124
DCP 6	.300	1.213	0.333	83	0.182	22	0.051	44	0.062	301	0.015	318	0.055	219	0.011	154	0.020	176	0.011	95
DCP 7	.400	0.984	0.277	57	0.124	354	0.096	278	0.034	238	0.003	180	0.029	146	0.008	356	0.009	142	0.005	24
DCP 8	.500	0.758	0.227	44	0.064	350	0.030	327	0.045	217	0.003	16	0.042	181	0.013	74	0.015	122	0.013	44
DCP 9	.600	0.492	0.219	24	0.053	312	0.015	252	0.033	177	0.004	76	0.027	110	0.016	325	0.009	122	0.010	333
DCP10	.878	0.427	0.214	353	0.030	235	0.036	269	0.024	132	0.011	260	0.009	116	0.007	269	0.008	98	0.003	319

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.022	308	0.024	287	0.014	321	0.005	337	0.003	357	0.007	319	0.004	123	0.003	322	0.005	255
CN		0.003	205	0.001	31	0.001	303	0.001	297	0.003	211	0.003	133	0.001	246	0.002	170	0.002	88
CM		0.001	344	0.001	162	0.000	206	0.001	111	0.001	12	0.000	244	0.000	114	0.001	82	0.000	286
DCP 1	.010	0.020	331	0.006	28	0.013	360	0.012	9	0.010	260	0.023	142	0.009	107	0.011	122	0.009	129
DCP 2	.100	0.029	206	0.017	153	0.012	238	0.011	151	0.005	148	0.012	56	0.015	227	0.017	152	0.006	96
DCP 3	.150	0.001	186	0.004	352	0.003	261	0.003	133	0.003	171	0.006	122	0.001	128	0.006	36	0.002	46
DCP 4	.200	0.021	177	0.013	109	0.006	132	0.006	69	0.003	290	0.006	182	0.005	140	0.007	115	0.006	18
DCP 5	.250	0.007	76	0.008	318	0.003	19	0.005	256	0.004	76	0.005	215	0.004	83	0.002	284	0.003	75
DCP 6	.300	0.009	127	0.008	58	0.004	337	0.003	7	0.003	295	0.004	196	0.003	95	0.002	225	0.003	73
DCP 7	.400	0.005	300	0.003	287	0.007	309	0.003	161	0.005	292	0.006	151	0.006	329	0.001	190	0.003	293
DCP 8	.500	0.008	26	0.006	325	0.004	334	0.006	286	0.005	244	0.006	186	0.001	170	0.005	180	0.003	39
DCP 9	.600	0.010	238	0.002	179	0.003	297	0.002	119	0.003	83	0.007	9	0.009	281	0.004	209	0.000	158
DCP10	.878	0.005	137	0.005	357	0.002	44	0.009	297	0.010	195	0.005	115	0.003	121	0.003	278	0.005	113

TUNED PITCHING OSCILLATION VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
80.0	16.72	0.400	14.87	4.27		5067.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.063	442.4	739.7	0.48E 07	0.00076	1.638	15.71	0.0800

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		14.872	4.271	0	0.083	53	0.167	146	0.119	169	0.005	357	0.130	60	0.046	320	0.077	246	0.030	212
CN		1.192	0.316	95	0.051	41	0.048	74	0.016	93	0.006	349	0.025	27	0.012	346	0.013	278	0.006	232
CM		-0.039	0.052	173	0.012	153	0.014	103	0.005	142	0.003	34	0.003	106	0.002	80	0.004	41	0.001	1
DCP 1	.010	5.269	1.318	91	0.279	58	0.258	111	0.112	179	0.029	228	0.033	53	0.035	31	0.004	276	0.002	185
DCP 2	.100	2.477	1.192	142	0.207	91	0.273	137	0.137	96	0.070	78	0.135	61	0.041	53	0.030	38	0.014	169
DCP 3	.150	1.912	0.741	126	0.020	42	0.183	90	0.035	147	0.065	35	0.040	63	0.044	353	0.023	331	0.028	284
DCP 4	.200	1.728	0.631	118	0.058	90	0.187	73	0.058	82	0.057	27	0.068	31	0.036	353	0.032	335	0.019	308
DCP 5	.250	1.503	0.521	107	0.020	16	0.124	58	0.031	122	0.056	342	0.044	42	0.030	304	0.034	315	0.018	253
DCP 6	.300	1.219	0.427	97	0.049	71	0.123	45	0.046	61	0.041	341	0.059	14	0.026	328	0.038	333	0.010	268
DCP 7	.400	1.004	0.337	79	0.038	359	0.064	11	0.017	76	0.031	289	0.033	11	0.008	295	0.031	280	0.006	273
DCP 8	.500	0.902	0.239	59	0.038	21	0.052	336	0.023	11	0.026	238	0.031	330	0.009	307	0.031	248	0.013	219
DCP 9	.600	0.686	0.225	46	0.047	349	0.065	302	0.010	330	0.027	219	0.012	348	0.002	33	0.021	233	0.006	267
DCP10	.878	0.433	0.192	357	0.061	0	0.037	232	0.014	304	0.012	110	0.007	244	0.010	279	0.010	172	0.011	155

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.011	192	0.014	215	0.017	253	0.013	227	0.011	216	0.011	226	0.001	323	0.008	279	0.009	192
CN		0.001	120	0.002	23	0.002	110	0.002	330	0.001	246	0.001	248	0.001	349	0.002	296	0.002	290
CM		0.000	208	0.000	343	0.001	112	0.000	54	0.001	17	0.001	297	0.000	250	0.000	38	0.000	292
DCP 1	.010	0.019	82	0.011	337	0.006	111	0.018	22	0.012	359	0.017	341	0.018	330	0.018	309	0.021	275
DCP 2	.100	0.022	110	0.021	138	0.031	179	0.011	91	0.009	198	0.007	212	0.004	153	0.005	173	0.004	7
DCP 3	.150	0.009	263	0.010	239	0.003	271	0.005	313	0.010	245	0.007	225	0.008	194	0.004	128	0.008	120
DCP 4	.200	0.016	342	0.011	347	0.006	1	0.011	304	0.008	1	0.004	303	0.008	322	0.002	338	0.015	316
DCP 5	.250	0.017	262	0.005	293	0.011	223	0.009	314	0.008	203	0.004	260	0.003	146	0.002	348	0.001	320
DCP 6	.300	0.011	286	0.012	309	0.015	291	0.004	295	0.008	287	0.007	295	0.010	278	0.003	270	0.007	276
DCP 7	.400	0.012	206	0.008	315	0.013	172	0.003	329	0.004	316	0.003	220	0.003	87	0.005	349	0.002	352
DCP 8	.500	0.007	173	0.009	201	0.003	144	0.002	132	0.005	204	0.001	150	0.004	161	0.001	297	0.005	172
DCP 9	.600	0.007	110	0.006	231	0.006	3	0.005	178	0.002	251	0.005	136	0.006	56	0.006	334	0.002	270
DCP10	.878	0.006	13	0.006	98	0.003	229	0.003	317	0.003	169	0.002	53	0.001	301	0.006	198	0.002	85

TUNED PITCHING OSCILLATION VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DFL.H	TEST POINT	CYCLES ANALYZED
80.0	16.37	0.600	14.86	4.35		3967.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.069	440.2	737.1	0.4RE 07	0.00104	1.641	15.88	0.0620

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		14.857	4.354	0	0.109	22	0.146	131	0.128	146	0.053	294	0.280	41	0.073	317	0.066	238	0.023	221
CN		1.167	0.307	93	0.058	41	0.035	75	0.025	97	0.002	300	0.042	37	0.021	0	0.012	296	0.038	327
CM		-0.042	0.051	172	0.012	171	0.014	97	0.008	158	0.003	8	0.004	146	0.003	113	0.00[illegible]	66	0.002	61
DCP 1	.010	5.193	1.286	88	0.273	62	0.258	100	0.156	144	0.089	240	0.077	66	0.041	57	0.017	86	0.023	55
DCP 2	.100	2.467	1.177	141	0.195	85	0.251	112	0.153	104	0.087	70	0.131	59	0.087	25	0.029	34	0.042	12
DCP 3	.150	1.759	0.729	123	0.012	309	0.145	86	0.073	153	0.061	27	0.068	73	0.045	4	0.024	11	0.017	320
DCP 4	.200	1.587	0.611	119	0.050	74	0.160	83	0.062	89	0.063	36	0.084	40	0.054	4	0.031	346	0.029	331
DCP 5	.250	1.414	0.501	104	0.024	342	0.095	50	0.057	132	0.038	325	0.075	52	0.020	327	0.033	327	0.001	257
DCP 6	.300	1.234	0.410	96	0.045	57	0.095	50	0.052	79	0.037	350	0.075	30	0.040	338	0.036	323	0.022	307
DCP 7	.400	1.002	0.322	75	0.055	9	0.062	341	0.025	82	0.035	260	0.050	28	0.003	28	0.028	275	0.008	51
DCP 8	.500	0.891	0.236	58	0.043	21	0.048	326	0.026	26	0.026	240	0.039	0	0.017	301	0.026	250	0.017	253
DCP 9	.600	0.688	0.222	43	0.058	14	0.055	230	0.021	15	0.032	209	0.029	12	0.014	33	0.019	255	0.006	336
DCP10	.878	0.453	0.185	358	0.062	12	0.037	229	0.027	329	0.016	112	0.012	324	0.018	307	0.010	224	0.009	238

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.008	207	0.003	233	0.016	215	0.019	218	0.010	191	0.006	141	0.002	162	0.003	217	0.008	139
CN		0.002	318	0.003	288	0.003	165	0.001	27	0.002	243	0.000	124	0.002	283	0.002	218	0.002	180
CM		0.001	349	0.001	49	0.001	360	0.001	73	0.001	34	0.001	31	0.001	73	0.001	17	0.001	325
DCP 1	.010	0.012	55	0.006	72	0.018	121	0.023	70	0.019	354	0.010	323	0.005	56	0.004	51	0.011	17
DCP 2	.100	0.006	36	0.017	27	0.017	166	0.018	74	0.013	145	0.015	95	0.006	144	0.011	139	0.010	190
DCP 3	.150	0.015	331	0.005	303	0.008	279	0.009	248	0.005	238	0.005	146	0.004	45	0.002	334	0.003	344
DCP 4	.200	0.016	336	0.013	319	0.005	24	0.009	355	0.009	353	0.011	11	0.012	335	0.009	327	0.009	298
DCP 5	.250	0.017	280	0.009	353	0.010	212	0.005	286	0.004	209	0.005	297	0.005	75	0.004	303	0.001	239
DCP 6	.300	0.015	303	0.012	281	0.005	336	0.010	317	0.009	285	0.010	295	0.004	287	0.011	279	0.005	250
DCP 7	.400	0.006	235	0.013	298	0.014	220	0.005	227	0.006	249	0.005	106	0.001	214	0.003	319	0.003	294
DCP 8	.500	0.006	172	0.011	290	0.000	6	0.004	193	0.005	215	0.004	194	0.002	199	0.002	150	0.000	206
DCP 9	.600	0.005	85	0.002	221	0.006	236	0.003	149	0.005	201	0.004	60	0.006	308	0.008	228	0.009	169
DCP10	.878	0.003	177	0.005	212	0.008	122	0.004	296	0.000	251	0.005	226	0.005	229	0.007	168	0.004	97

TUNED PITCHING OSCILLATION VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
80.0	16.58	0.400	14.79	4.39		5067.3	10

K	V	Q	RN	DAMPING	CY(MAX)	ALPHA(STALL)	EXT DAMPING
0.063	439.5	736.9	0.48E 07	0.00091	1.696	16.22	0.0220

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
ALPHA		14.794	4.389 0	0.075 53	0.174 151	0.153 167	0.046 239	0.406 351	0.103 289	0.077 231	0.011 194
CN		1.176	0.278 94	0.064 47	0.042 83	0.024 84	0.016 241	0.040 6	0.015 326	0.016 257	0.004 244
CM		-0.045	0.051 172	0.011 150	0.014 202	0.007 129	0.002 16	0.004 124	0.002 74	0.005 41	0.002 7
DCP 1	.010	5.264	1.094 88	0.349 68	0.280 119	0.176 139	0.136 192	0.121 17	0.066 13	0.025 8	0.033 31
DCP 2	.100	2.446	1.154 142	0.220 85	0.270 135	0.158 89	0.049 36	0.085 46	0.028 4	0.035 48	0.005 313
DCP 3	.150	1.787	0.689 127	0.059 60	0.157 88	0.051 116	0.037 12	0.075 38	0.051 333	0.033 331	0.025 277
DCP 4	.200	1.575	0.600 119	0.074 75	0.173 74	0.059 74	0.056 14	0.064 4	0.034 337	0.026 311	0.020 296
DCP 5	.250	1.424	0.462 108	0.041 39	0.101 60	0.033 100	0.035 319	0.073 24	0.035 304	0.042 302	0.017 231
DCP 6	.300	1.241	0.380 97	0.070 55	0.096 49	0.044 61	0.029 332	0.057 357	0.016 311	0.026 291	0.007 254
DCP 7	.400	1.006	0.284 76	0.049 18	0.046 4	0.020 47	0.030 269	0.056 2	0.020 293	0.043 266	0.009 226
DCP 8	.500	0.816	0.204 55	0.048 28	0.038 324	0.022 7	0.025 245	0.037 322	0.008 226	0.029 240	0.010 195
DCP 9	.600	0.690	0.201 40	0.046 355	0.036 287	0.017 340	0.025 196	0.036 351	0.010 319	0.034 239	0.006 227
DCP10	.878	0.483	0.195 359	0.056 1	0.037 249	0.019 295	0.011 128	0.012 297	0.009 286	0.013 177	0.006 160

DATA TYPE	X/C	RES 10 PHI	RES 11 PHI	RES 12 PHI	RES 13 PHI	RES 14 PHI	RES 15 PHI	RES 16 PHI	RES 17 PHI	RES 18 PHI
ALPHA		0.000 281	0.007 30	0.004 45	0.007 93	0.010 102	0.002 61	0.002 190	0.004 184	0.009 165
CN		0.005 75	0.002 274	0.000 142	0.002 237	0.001 37	0.002 171	0.001 356	0.001 287	0.002 250
CM		0.001 304	0.001 43	0.001 315	0.001 295	0.001 230	0.000 301	0.000 114	0.000 345	0.001 114
DCP 1	.010	0.048 47	0.043 25	0.027 329	0.036 300	0.031 280	0.023 237	0.005 296	0.012 292	0.005 196
DCP 2	.100	0.022 37	0.008 162	0.004 79	0.012 191	0.014 138	0.014 133	0.011 125	0.007 98	0.011 179
DCP 3	.150	0.010 305	0.009 246	0.009 228	0.005 251	0.005 161	0.006 321	0.002 193	0.008 288	0.007 184
DCP 4	.200	0.018 322	0.013 302	0.009 271	0.008 285	0.003 316	0.002 195	0.004 52	0.006 339	0.005 329
DCP 5	.250	0.017 235	0.005 151	0.011 179	0.004 186	0.008 103	0.002 120	0.007 49	0.004 25	0.002 261
DCP 6	.300	0.008 338	0.008 301	0.004 320	0.009 282	0.003 335	0.005 248	0.007 9	0.005 296	0.009 289
DCP 7	.400	0.017 184	0.004 251	0.009 136	0.005 170	0.007 78	0.004 96	0.006 13	0.002 317	0.002 47
DCP 8	.500	0.006 128	0.005 215	0.002 189	0.003 162	0.001 20	0.005 302	0.008 218	0.005 260	0.004 142
DCP 9	.600	0.018 132	0.006 216	0.007 59	0.005 116	0.003 9	0.008 99	0.005 339	0.003 120	0.006 286
DCP10	.878	0.009 30	0.002 250	0.003 191	0.001 105	0.002 48	0.004 221	0.002 227	0.001 228	0.002 269

TUNED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
80.0	16.29	0.400	17.22	4.30		5069.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.061	444.5	741.7	0.498E 07	0.00027	1.616	16.63	0.0800

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
ALPHA		17.225	4.304 0	0.023 240	0.145 201	0.050 198	0.056 179	0.054 216	0.051 231	0.029 211	0.026 171
CN		1.192	0.335 98	0.065 160	0.023 59	0.008 140	0.006 174	0.011 147	0.003 197	0.007 147	0.003 221
CM		-0.054	0.045 177	0.023 180	0.008 195	0.002 111	0.001 92	0.001 326	0.002 327	0.001 292	0.000 69
DCP 1	.010	5.359	1.402 112	0.393 176	0.035 230	0.028 294	0.056 161	0.029 140	0.007 56	0.025 66	0.037 8
DCP 2	.100	2.182	1.177 129	0.388 180	0.139 115	0.124 155	0.032 184	0.055 151	0.060 216	0.026 138	0.037 236
DCP 3	.150	1.752	0.666 125	0.245 198	0.052 283	0.021 322	0.016 248	0.033 274	0.037 311	0.010 301	0.015 283
DCP 4	.200	1.625	0.598 104	0.246 156	0.062 122	0.004 106	0.045 123	0.042 103	0.034 137	0.033 135	0.019 128
DCP 5	.250	1.448	0.487 106	0.154 171	0.019 276	0.019 352	0.004 176	0.019 235	0.030 273	0.015 265	0.011 258
DCP 6	.300	1.171	0.411 86	0.139 129	0.052 100	0.046 89	0.026 92	0.032 81	0.030 108	0.027 114	0.018 100
DCP 7	.400	1.022	0.336 95	0.075 118	0.026 83	0.013 308	0.010 11	0.021 185	0.024 241	0.015 231	0.012 231
DCP 8	.500	0.920	0.241 56	0.050 43	0.047 28	0.013 11	0.013 312	0.009 14	0.011 73	0.016 85	0.006 26
DCP 9	.600	0.735	0.211 61	0.058 68	0.040 70	0.016 259	0.014 327	0.015 172	0.017 207	0.014 212	0.010 224
DCP10	.878	0.498	0.141 10	0.085 333	0.040 352	0.006 184	0.018 195	0.006 123	0.010 125	0.012 77	0.004 17

DATA TYPE	X/C	RES 10 PHI	RES 11 PHI	RES 12 PHI	RES 13 PHI	RES 14 PHI	RES 15 PHI	RES 16 PHI	RES 17 PHI	RES 18 PHI
ALPHA		0.017 174	0.014 121	0.005 157	0.008 130	0.010 115	0.010 93	0.005 116	0.006 74	0.005 106
CN		0.002 186	0.003 171	0.003 154	0.002 148	0.001 119	0.003 113	0.003 130	0.000 51	0.001 13
CM		0.000 129	0.001 27	0.002 352	0.001 326	0.001 270	0.001 266	0.001 230	0.001 165	0.001 163
DCP 1	.010	0.024 31	0.025 50	0.023 22	0.023 357	0.011 336	0.002 248	0.005 176	0.013 153	0.011 156
DCP 2	.100	0.019 253	0.011 240	0.013 314	0.008 347	0.014 323	0.011 346	0.003 174	0.008 333	0.004 173
DCP 3	.150	0.010 230	0.012 207	0.017 151	0.018 169	0.015 152	0.019 145	0.016 143	0.011 125	0.012 114
DCP 4	.200	0.016 155	0.010 199	0.007 186	0.009 199	0.009 226	0.006 206	0.007 197	0.007 246	0.004 302
DCP 5	.250	0.015 210	0.012 195	0.011 156	0.014 167	0.008 178	0.013 137	0.010 146	0.006 103	0.006 81
DCP 6	.300	0.015 197	0.010 126	0.007 141	0.007 160	0.006 180	0.008 182	0.010 157	0.006 153	0.000 121
DCP 7	.400	0.013 190	0.007 137	0.007 117	0.005 155	0.003 158	0.004 149	0.002 136	0.003 115	0.002 101
DCP 8	.500	0.013 40	0.005 70	0.002 189	0.330 163	0.006 117	0.002 127	0.004 91	0.006 58	0.003 3
DCP 9	.600	0.005 214	0.005 201	0.002 226	0.002 346	0.001 176	0.004 49	0.003 42	0.003 328	0.004 292
DCP10	.878	0.004 333	0.003 244	0.000 167	0.005 137	0.008 69	0.008 86	0.003 58	0.004 310	0.007 355

TUNED PITCHING OSCILLATION VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	0.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
80.0	16.39	0.600	17.25	4.28		5063.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.062	441.4	739.5	0.68E 07	0.00041	1.609	16.76	0.0600

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
ALPHA		17.247	4.281 0	0.193 199	0.214 215	0.118 184	0.178 198	0.161 214	0.028 192	0.012 199	0.003 202
CN		1.171	0.332 96	0.057 157	0.012 143	0.035 89	0.022 116	0.017 152	0.002 71	0.008 234	0.005 269
CM		-0.057	0.046 175	0.026 185	0.007 230	0.002 100	0.003 162	0.002 283	0.001 276	0.001 133	0.001 155
DCP 1	.010	5.375	1.357 111	0.362 187	0.101 272	0.067 11	0.070 107	0.043 328	0.075 337	0.057 333	0.003 319
DCP 2	.100	2.178	1.166 129	0.418 174	0.146 153	0.132 153	0.127 136	0.139 157	0.042 143	0.033 178	0.022 229
DCP 3	.150	1.639	0.677 125	0.258 205	0.078 278	0.014 162	0.075 222	0.069 274	0.029 271	0.037 273	0.031 283
DCP 4	.200	1.470	0.589 106	0.248 159	0.056 158	0.053 105	0.078 106	0.075 125	0.032 113	0.013 59	0.010 109
DCP 5	.250	1.394	0.501 106	0.146 173	0.044 254	0.025 42	0.053 172	0.056 246	0.029 273	0.018 277	0.023 249
DCP 6	.300	1.194	0.414 95	0.135 129	0.037 139	0.014 67	0.052 76	0.055 107	0.030 83	0.008 68	0.008 25
DCP 7	.400	1.045	0.353 83	0.077 100	0.016 148	0.022 2	0.034 109	0.031 200	0.019 246	0.012 278	0.009 206
DCP 8	.500	0.850	0.241 53	0.041 45	0.030 59	0.016 266	0.030 359	0.035 72	0.025 32	0.018 354	0.008 306
DCP 9	.600	0.743	0.220 59	0.082 62	0.027 115	0.019 308	0.022 71	0.024 166	0.018 185	0.015 215	0.008 179
DCP10	.878	0.524	0.142 4	0.096 337	0.032 26	0.011 153	0.009 264	0.010 67	0.011 33	0.013 337	0.013 337

DATA TYPE	X/C	RES 10 PHI	RES 11 PHI	RES 12 PHI	RES 13 PHI	RES 14 PHI	RES 15 PHI	RES 16 PHI	RES 17 PHI	RES 18 PHI
ALPHA		0.010 21	0.003 27	0.005 356	0.005 112	0.010 135	0.012 117	0.014 106	0.015 122	0.013 105
CN		0.006 219	0.004 208	0.001 238	0.002 224	0.002 181	0.003 253	0.004 246	0.001 227	0.001 181
CM		0.001 13	0.001 327	0.000 161	0.000 92	0.001 350	0.001 49	0.001 351	0.000 66	0.001 228
DCP 1	.010	0.004 318	0.015 172	0.021 109	0.019 91	0.012 40	0.020 0	0.035 305	0.019 276	0.019 268
DCP 2	.100	0.028 223	0.023 259	0.014 221	0.016 230	0.006 7	0.004 241	0.007 330	0.010 58	0.014 250
DCP 3	.150	0.017 311	0.011 281	0.013 330	0.014 311	0.007 285	0.001 79	0.005 173	0.006 217	0.006 193
DCP 4	.200	0.025 176	0.017 195	0.007 165	0.015 185	0.008 205	0.005 190	0.009 244	0.001 71	0.006 152
DCP 5	.250	0.021 301	0.011 344	0.008 346	0.010 338	0.009 323	0.004 9	0.004 286	0.003 220	0.003 224
DCP 6	.300	0.011 134	0.015 162	0.004 149	0.008 157	0.008 165	0.007 203	0.007 196	0.005 144	0.007 163
DCP 7	.400	0.007 244	0.006 298	0.008 316	0.009 312	0.009 224	0.011 259	0.007 242	0.004 127	0.004 188
DCP 8	.500	0.004 287	0.007 121	0.007 116	0.015 75	0.005 89	0.002 116	0.004 97	0.007 119	0.005 75
DCP 9	.600	0.003 119	0.005 176	0.010 268	0.015 245	0.006 175	0.006 210	0.008 210	0.006 265	0.006 77
DCP10	.878	0.012 305	0.003 177	0.005 45	0.001 200	0.002 149	0.003 297	0.001 171	0.004 273	0.004 325

TUNED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
80.0	16.39	0.400	17.28	4.37		5068.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.062	440.5	737.6	0.48E 07	-0.00010	1.653	16.94	0.0220

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
ALPHA		17.281	4.369 0	0.155 200	0.227 191	0.120 170	0.158 164	0.269 105	0.100 325	0.070 299	0.037 287
CN		1.153	0.329 102	0.062 163	0.018 137	0.014 170	0.012 116	0.037 145	0.007 203	0.003 20	0.005 285
CM		-0.058	0.045 182	0.025 197	0.010 227	0.001 347	0.003 195	0.008 267	0.003 240	0.003 184	0.001 181
DCP 1	.010	5.294	1.320 114	0.376 191	0.060 266	0.072 295	0.114 292	0.097 226	0.102 234	0.026 217	0.018 250
DCP 2	.100	2.154	1.159 137	0.388 188	0.153 166	0.095 186	0.121 143	0.135 190	0.032 176	0.043 167	0.015 259
DCP 3	.150	1.604	0.689 124	0.242 202	0.047 283	0.037 176	0.051 218	0.038 224	0.032 281	0.021 295	0.029 293
DCP 4	.200	1.456	0.594 112	0.261 167	0.066 158	0.030 131	0.080 120	0.097 143	0.034 181	0.022 123	0.019 175
DCP 5	.250	1.347	0.491 106	0.141 178	0.023 289	0.026 103	0.033 175	0.025 198	0.019 289	0.020 292	0.027 294
DCP 6	.300	1.194	0.418 94	0.150 142	0.048 119	0.042 107	0.058 92	0.085 123	0.029 143	0.025 85	0.015 112
DCP 7	.400	1.012	0.335 84	0.063 114	0.017 53	0.013 49	0.028 107	0.033 159	0.014 291	0.010 303	0.019 269
DCP 8	.500	0.819	0.236 64	0.062 67	0.053 57	0.037 130	0.036 29	0.066 95	0.020 104	0.022 39	0.013 38
DCP 9	.600	0.713	0.216 60	0.065 48	0.026 74	0.011 280	0.019 55	0.038 133	0.007 288	0.010 0	0.003 288
DCP10	.878	0.547	0.139 14	0.089 359	0.040 42	0.019 184	0.015 287	0.026 83	0.015 74	0.010 349	0.006 340

DATA TYPE	X/C	RES 10 PHI	RES 11 PHI	RES 12 PHI	RES 13 PHI	RES 14 PHI	RES 15 PHI	RES 16 PHI	RES 17 PHI	RES 18 PHI
ALPHA		0.029 264	0.024 271	0.013 261	0.010 296	0.018 224	0.016 243	0.010 245	0.008 223	0.005 215
CN		0.011 272	0.012 245	0.007 239	0.009 240	0.006 214	0.008 238	0.006 228	0.008 239	0.006 228
CM		0.001 58	0.001 17	0.001 55	0.001 9	0.001 359	0.002 47	0.001 351	0.000 48	0.001 314
DCP 1	.010	0.041 276	0.042 225	0.051 193	0.032 193	0.026 139	0.016 93	0.013 311	0.019 277	0.014 244
DCP 2	.100	0.002 319	0.016 289	0.011 349	0.018 289	0.009 325	0.006 283	0.015 250	0.004 238	0.015 261
DCP 3	.150	0.033 308	0.024 287	0.027 282	0.024 271	0.024 257	0.027 253	0.029 254	0.031 245	0.031 245
DCP 4	.200	0.011 261	0.012 253	0.010 270	0.016 298	0.007 310	0.010 286	0.008 282	0.005 270	0.004 299
DCP 5	.250	0.027 295	0.028 272	0.021 266	0.019 260	0.018 247	0.023 242	0.027 248	0.024 239	0.023 237
DCP 6	.300	0.004 133	0.007 226	0.002 290	0.008 295	0.006 248	0.007 290	0.005 255	0.002 255	0.003 322
DCP 7	.400	0.026 269	0.023 260	0.012 250	0.020 235	0.014 250	0.013 219	0.019 213	0.016 235	0.011 223
DCP 8	.500	0.008 358	0.009 152	0.008 185	0.016 264	0.009 156	0.010 202	0.009 164	0.006 178	0.001 127
DCP 9	.600	0.015 230	0.019 244	0.015 233	0.015 195	0.016 202	0.019 246	0.010 172	0.014 217	0.010 175
DCP10	.878	0.006 260	0.005 146	0.013 222	0.011 72	0.005 74	0.006 219	0.002 261	0.006 348	0.001 61

TUNED PITCHING OSCILLATION VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
80.0	16.16	0.400	24.87	4.58		5069.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.061	441.5	745.1	0.48E 07	-0.00195	1.151	25.61	0.0610

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		24.870	4.576	0	0.123	19	0.106	171	0.059	163	0.028	117	0.020	157	0.020	132	0.021	96	0.015	129
CN		1.040	0.088	57	0.035	93	0.013	187	0.013	230	0.007	232	0.005	270	0.001	327	0.004	29	0.005	359
CM		-0.110	0.045	200	0.003	242	0.004	197	0.002	244	0.001	168	0.000	257	0.001	171	0.001	246	0.000	214
DCP 1	.010	3.457	1.550	176	0.226	112	0.315	188	0.086	253	0.107	213	0.073	280	0.023	243	0.045	286	0.023	328
DCP 2	.100	1.459	0.150	26	0.050	134	0.012	338	0.011	176	0.008	280	0.007	167	0.001	112	0.005	74	0.007	353
DCP 3	.150	1.326	0.184	25	0.035	83	0.009	34	0.007	86	0.005	29	0.003	345	0.005	124	0.002	77	0.006	19
DCP 4	.200	1.305	0.191	18	0.023	78	0.007	301	0.009	177	0.005	87	0.010	229	0.002	36	0.007	68	0.007	10
DCP 5	.250	1.284	0.210	24	0.031	80	0.010	35	0.004	96	0.003	355	0.003	357	0.006	127	0.005	46	0.006	10
DCP 6	.300	1.215	0.189	22	0.023	70	0.006	311	0.007	187	0.002	263	0.006	203	0.002	50	0.008	58	0.004	342
DCP 7	.400	1.067	0.202	27	0.031	79	0.007	39	0.005	58	0.002	295	0.003	11	0.004	77	0.006	58	0.006	34
DCP 8	.500	0.897	0.165	27	0.022	74	0.000	347	0.001	42	0.002	338	0.003	187	0.003	29	0.009	68	0.002	356
DCP 9	.600	0.814	0.164	33	0.029	78	0.003	32	0.004	353	0.005	260	0.004	232	0.002	348	0.002	92	0.003	25
DCP10	.878	0.637	0.110	39	0.026	95	0.003	93	0.004	89	0.004	251	0.004	319	0.005	320	0.006	39	0.003	1

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.008	129	0.019	130	0.012	79	0.004	86	0.006	86	0.008	40	0.005	62	0.006	103	0.003	119
CN		0.004	328	0.003	267	0.002	19	0.005	100	0.003	276	0.001	343	0.002	12	0.002	348	0.003	272
CM		0.000	88	0.001	20	0.000	298	0.001	254	0.001	23	0.000	5	0.000	299	0.000	84	0.001	30
DCP 1	.010	0.030	349	0.031	318	0.027	343	0.017	219	0.010	321	0.007	337	0.022	358	0.001	303	0.016	348
DCP 2	.100	0.003	359	0.001	334	0.009	94	0.008	112	0.008	292	0.008	41	0.003	327	0.002	73	0.006	3
DCP 3	.150	0.004	342	0.004	235	0.004	117	0.005	92	0.004	291	0.004	345	0.001	202	0.003	358	0.007	260
DCP 4	.200	0.006	327	0.001	319	0.003	336	0.008	140	0.002	328	0.003	275	0.004	46	0.004	22	0.002	259
DCP 5	.250	0.004	318	0.002	272	0.003	108	0.005	99	0.005	297	0.005	357	0.003	182	0.004	359	0.008	266
DCP 6	.300	0.004	12	0.004	282	0.002	11	0.008	127	0.002	275	0.001	233	0.004	43	0.004	5	0.005	265
DCP 7	.400	0.005	308	0.001	235	0.002	20	0.006	87	0.003	291	0.003	344	0.003	290	0.006	342	0.006	258
DCP 8	.500	0.008	320	0.004	294	0.002	342	0.004	91	0.004	246	0.003	307	0.001	296	0.004	334	0.004	214
DCP 9	.600	0.004	275	0.004	210	0.001	139	0.007	97	0.004	290	0.002	165	0.002	94	0.002	346	0.003	203
DCP10	.878	0.001	341	0.005	215	0.002	16	0.005	64	0.004	182	0.001	172	0.002	51	0.002	193	0.002	247

TUNED PITCHING OSCILLATION VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
80.0	15.24	0.400	24.82	4.54		5069.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.062	440.8	746.8	0.48E 07	-0.00191	1.164	25.50	0.0220

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
ALPHA		24.820	4.665 0	0.080 43	0.134 174	0.056 167	0.028 153	0.054 118	0.030 118	0.028 145	0.014 105
CN		1.034	0.092 53	0.023 93	0.010 129	0.016 220	0.007 195	0.003 270	0.005 13	0.002 342	0.004 357
CM		-0.112	0.043 202	0.002 234	0.005 204	0.002 257	0.001 199	0.002 250	0.002 191	0.002 243	0.001 253
DCP 1	.010	3.490	1.495 174	0.167 116	0.259 180	0.142 242	0.070 199	0.093 271	0.022 248	0.064 295	0.039 304
DCP 2	.100	1.434	0.143 35	0.015 160	0.013 37	0.031 75	0.005 322	0.008 185	0.009 70	0.015 151	0.006 348
DCP 3	.150	1.304	0.176 28	0.024 65	0.017 41	0.009 104	0.002 327	0.004 133	0.005 355	0.002 199	0.002 37
DCP 4	.200	1.280	0.176 21	0.010 168	0.017 43	0.012 125	0.003 55	0.004 211	0.005 77	0.006 109	0.001 115
DCP 5	.250	1.273	0.203 27	0.031 61	0.016 43	0.003 131	0.001 301	0.003 125	0.003 1	0.004 247	0.003 90
DCP 6	.300	1.187	0.179 25	0.013 115	0.014 57	0.004 71	0.001 93	0.002 135	0.007 68	0.005 98	0.005 35
DCP 7	.400	1.050	0.195 29	0.032 58	0.013 41	0.007 113	0.002 66	0.002 104	0.005 12	0.002 296	0.003 27
DCP 8	.500	0.868	0.157 29	0.013 133	0.007 66	0.004 221	0.002 169	0.001 199	0.007 37	0.005 85	0.003 49
DCP 9	.600	0.809	0.163 36	0.035 59	0.008 68	0.006 112	0.004 69	0.003 46	0.006 8	0.002 351	0.006 16
DCP10	.878	0.669	0.107 45	0.012 124	0.012 59	0.002 110	0.004 347	0.005 47	0.009 1	0.009 66	0.002 65

DATA TYPE	X/C	RES 10 PHI	RES 11 PHI	RES 12 PHI	RES 13 PHI	RES 14 PHI	RES 15 PHI	RES 16 PHI	RES 17 PHI	RES 18 PHI
ALPHA		0.009 100	0.022 143	0.006 105	0.012 107	0.013 102	0.010 80	0.011 68	0.010 92	0.001 52
CN		0.005 57	0.005 285	0.004 292	0.004 244	0.002 262	0.004 8	0.001 272	0.004 315	0.001 76
CM		0.001 202	0.001 74	0.000 69	0.001 38	0.000 264	0.001 169	0.000 115	0.001 65	0.000 169
DCP 1	.010	0.018 307	0.030 307	0.037 306	0.016 310	0.039 289	0.016 352	0.024 268	0.026 5	0.007 13
DCP 2	.100	0.012 38	0.004 283	0.005 286	0.009 250	0.005 292	0.008 97	0.002 312	0.006 341	0.006 208
DCP 3	.150	0.007 116	0.007 285	0.001 157	0.006 227	0.002 199	0.002 354	0.003 122	0.004 3	0.004 111
DCP 4	.200	0.012 78	0.005 283	0.002 272	0.007 244	0.005 156	0.002 349	0.003 95	0.008 328	0.003 165
DCP 5	.250	0.005 133	0.008 274	0.002 142	0.006 234	0.004 156	0.003 14	0.002 143	0.005 36	0.006 79
DCP 6	.300	0.013 83	0.004 301	0.003 299	0.007 236	0.002 215	0.002 297	0.003 81	0.005 334	0.003 198
DCP 7	.400	0.007 90	0.004 268	0.001 287	0.005 210	0.001 224	0.003 23	0.001 131	0.004 313	0.004 73
DCP 8	.500	0.006 61	0.004 269	0.002 228	0.006 213	0.004 140	0.005 55	0.003 34	0.004 302	0.001 293
DCP 9	.600	0.005 48	0.005 279	0.002 306	0.004 226	0.003 274	0.003 24	0.003 253	0.007 290	0.002 73
DCP10	.878	0.006 352	0.003 279	0.005 275	0.003 263	0.002 20	0.008 340	0.002 279	0.005 234	0.002 314

TUNED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
20.0	15.60	0.600	0.38	4.74		5371.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.040	652.2	1465.8	0.63E 07	-0.00092	0.784	5.11	0.1010

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		0.384	4.738	0	0.248	5	0.055	268	0.033	299	0.038	25	0.029	16	0.033	310	0.025	328	0.043	0
CN		0.171	0.626	355	0.015	27	0.020	305	0.014	245	0.003	70	0.007	246	0.004	170	0.001	6	0.009	192
CM		-0.019	0.017	336	0.002	254	0.001	336	0.001	108	0.001	136	0.000	220	0.001	141	0.000	36	0.000	132
DCP 1	.010	-1.002	2.505	353	0.376	267	0.316	329	0.034	259	0.109	306	0.041	335	0.055	309	0.042	350	0.034	319
DCP 2	.025	-0.515	2.551	354	0.063	291	0.211	330	0.001	65	0.029	169	0.038	35	0.050	139	0.011	12	0.047	120
DCP 3	.100	0.716	2.069	354	0.114	64	0.034	188	0.060	254	0.070	129	0.062	220	0.013	183	0.004	137	0.021	266
DCP 4	.200	0.536	0.914	356	0.031	9	0.059	293	0.031	117	0.060	350	0.036	255	0.024	183	0.003	59	0.009	115
DCP 5	.250	0.395	0.728	354	0.043	27	0.031	319	0.020	256	0.013	324	0.008	324	0.001	220	0.004	355	0.009	359
DCP 6	.300	0.232	0.605	357	0.030	44	0.027	315	0.013	255	0.000	36	0.003	195	0.003	176	0.001	226	0.002	198
DCP 7	.400	0.188	0.461	356	0.014	316	0.027	311	0.009	301	0.002	338	0.003	290	0.002	332	0.003	331	0.003	10
DCP 8	.500	0.181	0.329	358	0.005	50	0.016	310	0.003	295	0.001	178	0.001	234	0.001	196	0.000	255	0.001	266
DCP 9	.600	0.093	0.248	359	0.013	294	0.012	310	0.005	295	0.002	302	0.003	265	0.001	329	0.001	323	0.001	20
DCP10	.878	0.060	0.115	3	0.019	70	0.002	151	0.002	291	0.001	113	0.001	244	0.001	223	0.000	295	0.002	261

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.032	1	0.023	7	0.026	22	0.025	26	0.023	36	0.024	29	0.021	49	0.022	55	0.021	81
CN		0.004	15	0.001	50	0.001	257	0.001	335	0.001	130	0.000	108	0.001	107	0.001	52	0.001	251
CM		0.000	43	0.000	49	0.000	222	0.000	109	0.000	198	0.000	294	0.000	268	0.000	287	0.000	82
DCP 1	.010	0.051	348	0.044	37	0.009	65	0.014	353	0.017	24	0.002	45	0.019	7	0.025	56	0.015	117
DCP 2	.025	0.013	193	0.037	108	0.027	193	0.025	5	0.018	167	0.006	290	0.012	146	0.012	225	0.005	268
DCP 3	.100	0.022	11	0.004	267	0.010	333	0.005	23	0.004	136	0.002	288	0.005	185	0.004	335	0.004	147
DCP 4	.200	0.015	62	0.011	329	0.006	264	0.010	245	0.006	181	0.006	107	0.006	42	0.003	354	0.007	308
DCP 5	.250	0.005	6	0.003	64	0.005	356	0.005	7	0.005	56	0.001	45	0.003	42	0.003	55	0.003	76
DCP 6	.300	0.002	255	0.001	304	0.002	31	0.002	214	0.001	244	0.001	252	0.001	232	0.001	252	0.002	336
DCP 7	.400	0.003	349	0.003	17	0.003	13	0.003	28	0.002	28	0.002	103	0.003	66	0.001	120	0.001	113
DCP 8	.500	0.001	205	0.001	253	0.000	169	0.001	229	0.001	192	0.000	76	0.000	216	0.000	12	0.001	335
DCP 9	.600	0.002	11	0.001	111	0.001	353	0.001	50	0.001	25	0.001	233	0.002	77	0.003	76	0.002	207
DCP10	.878	0.001	352	0.001	159	0.002	202	0.001	300	0.002	67	0.001	83	0.001	151	0.001	177	0.001	282

TUNED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
80.0	15.55	0.600	0.44	4.90		5071.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.041	648.1	1446.7	0.63E 07	-0.00092	0.785	5.37	0.0250

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
ALPHA		0.437	4.899 0	0.218 334	0.103 245	0.065 267	0.027 339	0.060 273	0.062 282	0.045 301	0.047 306
CN		C.150	0.086 270	0.013 314	0.017 275	0.002 218	0.003 347	0.005 276	0.001 302	0.004 298	0.001 134
CM		-C.020	0.0C8 27C	0.003 264	0.001 284	0.000 84	0.000 64	0.001 110	0.001 91	0.0C1 118	0.000 74
DCP 1	.010	-1.C44	2.525 351	0.410 262	0.336 317	0.070 270	0.117 304	0.057 286	0.095 292	0.066 324	0.045 306
DCP 2	.025	-0.517	2.547 349	0.103 256	0.226 314	0.078 47	0.010 144	0.062 13	0.058 100	0.013 343	0.048 91
DCP 3	.1CC	C.689	2.106 349	C.088 60	0.032 180	0.056 226	0.072 105	0.062 197	0.013 130	0.0C4 99	0.019 221
DCP 4	.150	0.636	1.432 351	0.145 288	0.179 166	0.018 104	0.020 274	0.024 51	0.050 322	0.026 256	0.005 261
DCP 5	.200	C.387	C.951 351	0.022 350	0.065 186	0.038 110	0.065 328	0.042 245	0.025 149	0.0C5 85	0.013 78
DCP 6	.250	0.277	C.738 352	0.046 26	0.030 304	0.024 243	0.016 304	0.013 300	0.007 264	0.0C8 300	0.009 307
DCP 7	.30C	0.234	0.614 353	0.020 67	0.029 301	0.013 219	0.002 140	0.001 217	0.003 138	0.0C2 273	0.001 72
DCP 8	.400	0.166	0.463 354	0.012 338	0.029 300	0.012 280	0.006 299	0.005 313	0.004 273	0.0C7 286	0.005 288
DCP 9	.500	0.117	C.333 354	0.008 214	0.017 295	0.001 155	0.002 142	0.003 311	0.000 328	0.0C2 270	0.001 198
DCP 10	.600	0.C86	0.252 358	0.007 334	0.013 303	0.005 272	0.004 293	0.004 318	0.004 291	0.004 280	0.003 277
DCP 11	.878	0.083	C.117 357	0.009 85	0.002 114	0.002 73	0.002 130	0.003 274	0.003 270	0.004 328	0.002 121

DATA TYPE	X/C	RES 10 PHI	RES 11 PHI	RES 12 PHI	RES 13 PHI	RES 14 PHI	RES 15 PHI	RES 16 PHI	RES 17 PHI	RES 18 PHI
ALPHA		C.C48 299	0.044 313	0.035 304	0.030 303	0.026 320	0.023 308	0.018 325	0.017 318	0.013 313
CN		0.003 299	0.002 264	0.002 240	0.002 291	0.000 212	0.000 283	0.002 309	0.0C1 270	0.000 200
CM		C.000 331	0.001 53	0.000 144	0.000 182	0.000 171	0.000 197	0.000 62	0.0C0 166	0.000 40
DCP 1	.C10	0.043 345	0.004 95	0.027 233	0.038 258	0.036 285	0.028 295	0.029 290	0.024 305	0.018 308
DCP 2	.025	0.022 190	0.021 45	0.024 131	0.003 11	0.026 120	0.014 188	0.010 136	0.014 195	0.004 153
DCP 3	.10C	C.020 306	0.008 217	0.011 267	0.008 278	0.002 321	0.002 314	0.005 52	0.001 335	0.008 82
DCP 4	.15C	C.015 295	0.006 256	0.004 340	0.008 318	0.004 230	0.006 30	0.015 329	0.004 298	0.001 7
DCP 5	.200	0.013 13	0.006 275	0.007 210	0.005 197	0.005 158	0.005 110	0.007 313	0.0C7 274	0.001 17
DCP 6	.250	0.007 303	0.005 310	0.005 314	0.004 290	0.005 287	0.004 302	0.005 329	0.0C4 340	0.001 308
DCP 7	.3C0	0.0C0 1C8	0.002 212	0.002 237	0.003 305	0.000 92	0.003 155	0.002 199	0.001 223	0.001 290
DCP 8	.400	0.003 302	0.004 287	0.003 290	0.004 306	0.004 302	0.001 334	0.003 287	0.002 314	0.001 273
DCP 9	.500	0.002 313	0.001 209	0.001 216	0.001 341	0.000 2	0.001 178	0.001 175	0.0C0 108	0.000 325
DCP 10	.600	C.003 313	0.001 291	0.001 296	0.001 239	0.002 273	0.001 306	0.001 290	0.001 297	0.002 178
DCP 11	.878	0.002 175	0.003 221	0.001 300	0.002 330	0.002 53	0.001 30	0.000 253	0.0C1 239	0.002 228

TUNED PITCHING OSCILLATION VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
80.0	15.80	0.600	7.50	4.24		5072.1	10

K	V	C	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.040	652.5	1458.8	0.63E 07	-0.00115	1.096	10.24	0.1010

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		7.495	4.238	359	0.141	39	0.138	177	0.056	187	0.039	177	0.062	146	0.036	146	0.040	45	0.058	329
CN		0.863	0.068	90	0.079	85	0.013	106	0.018	143	0.004	89	0.004	122	0.005	208	0.007	143	0.005	53
CM		-0.020	0.005	270	0.012	113	0.001	186	0.002	140	0.000	200	0.000	167	0.001	299	0.002	268	0.002	185
DCP 1	.010	1.566	1.263	357	0.251	62	0.082	132	0.030	171	0.005	153	0.014	62	0.006	101	0.018	12	0.022	291
DCP 2	.025	2.230	1.062	9	0.196	82	0.086	178	0.026	196	0.009	192	0.015	165	0.010	182	0.022	119	0.016	29
DCP 3	.100	2.558	0.241	12	0.402	98	0.032	121	0.060	147	0.036	50	0.007	91	0.012	259	0.029	212	0.030	151
DCP 4	.200	1.435	0.321	25	0.252	108	0.047	157	0.111	144	0.065	208	0.031	220	0.058	238	0.033	264	0.008	112
DCP 5	.250	1.324	0.423	11	0.198	76	0.067	31	0.070	93	0.020	83	0.053	80	0.019	154	0.032	107	0.012	98
DCP 6	.300	1.038	0.377	22	0.112	90	0.061	49	0.043	129	0.036	68	0.032	147	0.015	143	0.045	163	0.029	114
DCP 7	.400	0.770	0.311	5	0.043	32	0.022	15	0.010	250	0.015	8	0.011	16	0.009	11	0.019	39	0.028	335
DCP 8	.500	0.597	0.241	23	0.027	13	0.014	76	0.012	339	0.007	69	0.009	23	0.002	312	0.013	128	0.014	60
DCP 9	.600	0.418	0.179	11	0.017	347	0.014	154	0.006	221	0.002	213	0.002	144	0.007	98	0.009	33	0.012	329
DCP10	.878	0.235	0.146	18	0.031	301	0.002	242	0.002	326	0.001	42	0.002	280	0.005	196	0.008	132	0.006	48

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.031	272	0.007	268	0.011	323	0.007	291	0.007	273	0.009	303	0.010	7	0.005	354	0.006	18
CN		0.002	335	0.001	142	0.002	106	0.003	344	0.002	250	0.000	194	0.001	9	0.003	224	0.003	125
CM		0.001	98	0.000	343	0.000	202	0.001	150	0.000	131	0.000	150	0.000	110	0.001	60	0.001	329
DCP 1	.010	0.004	260	0.009	307	0.002	311	0.004	280	0.002	27	0.005	319	0.002	346	0.004	339	0.002	14
DCP 2	.025	0.002	6	0.003	25	0.005	322	0.003	330	0.000	29	0.005	83	0.005	147	0.002	170	0.003	313
DCP 3	.100	0.013	69	0.004	183	0.010	113	0.010	17	0.007	233	0.013	143	0.009	63	0.008	210	0.009	117
DCP 4	.200	0.014	353	0.008	130	0.013	129	0.003	242	0.008	214	0.005	254	0.008	343	0.003	264	0.006	52
DCP 5	.250	0.003	187	0.005	217	0.009	216	0.004	285	0.004	283	0.010	328	0.006	278	0.003	7	0.003	327
DCP 6	.300	0.013	141	0.006	134	0.008	154	0.002	151	0.009	194	0.009	152	0.005	157	0.010	173	0.005	153
DCP 7	.400	0.008	292	0.009	337	0.005	310	0.007	331	0.006	325	0.007	300	0.002	327	0.009	285	0.008	194
DCP 8	.500	0.004	56	0.009	62	0.004	15	0.006	50	0.003	296	0.006	125	0.003	82	0.006	106	0.005	40
DCP 9	.600	0.006	287	0.003	251	0.001	76	0.002	310	0.003	30	0.005	306	0.002	235	0.004	219	0.007	115
DCP10	.878	0.003	282	0.005	163	0.003	43	0.003	323	0.002	230	0.002	41	0.002	327	0.004	251	0.003	185

TUNED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
80.0	15.90	0.600	7.51	4.32		5972.2	10

K	V	Q	RN	DAMPING	CY(MAX)	ALPHA(STALL)	EXT DAMPING
0.041	647.7	1449.3	0.63E 07	-0.00083	1.102	11.55	0.0680

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		7.511	4.320	0	0.247	17	0.083	201	0.022	250	0.018	253	0.022	288	0.071	40	0.075	332	0.032	310
CN		0.855	0.281	6	0.084	71	0.017	69	0.017	96	0.017	81	0.010	57	0.009	67	0.008	. 6	0.004	286
CM		-0.026	0.024	108	0.012	86	0.001	132	0.002	82	0.001	282	0.001	177	0.001	222	0.002	156	0.001	57
DCP 1	.010	1.958	1.303	356	0.243	50	0.059	128	0.005	109	0.007	80	0.009	313	0.033	18	0.025	325	0.012	27
DCP 2	.025	2.229	1.099	357	0.213	54	0.087	135	0.029	137	0.013	153	0.021	103	0.027	48	0.021	341	0.014	239
DCP 3	.100	2.544	0.257	354	0.434	80	0.055	49	0.056	102	0.027	22	0.027	22	0.001	54	0.014	69	0.003	58
DCP 4	.200	1.357	0.329	13	0.261	84	0.057	111	0.121	91	0.079	143	0.051	99	0.051	132	0.024	178	0.007	207
DCP 5	.250	1.245	0.421	9	0.176	74	0.064	21	0.062	71	0.024	12	0.020	48	0.025	94	0.035	32	0.014	0
DCP 6	.300	1.029	0.384	10	0.102	68	0.063	21	0.038	65	0.037	355	0.030	70	0.029	33	0.031	37	0.021	343
DCP 7	.400	0.755	0.313	9	0.041	25	0.021	349	0.010	230	0.015	20	0.011	329	0.015	15	0.018	341	0.012	296
DCP 8	.500	0.539	0.242	12	0.021	20	0.020	41	0.014	296	0.005	284	0.001	126	0.008	35	0.008	353	0.011	337
DCP 9	.600	0.415	0.185	13	0.020	337	0.010	186	0.019	226	0.012	120	0.010	1	0.005	12	0.008	324	0.009	201
DCP10	.878	0.292	0.151	5	0.028	254	0.003	76	0.004	216	0.002	114	0.003	86	0.006	82	0.007	342	0.004	221

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.030	355	0.046	9	0.032	356	0.020	26	0.020	48	0.029	34	0.019	41	0.016	36	0.019	63
CN		0.001	316	0.004	353	0.003	5	0.003	354	0.002	0	0.002	342	0.001	265	0.000	175	0.001	251
CM		0.001	189	0.001	137	0.001	39	0.000	294	0.000	289	0.001	320	0.001	213	0.001	143	0.001	116
DCP 1	.010	0.003	311	0.014	325	0.011	6	0.015	26	0.009	29	0.007	59	0.008	32	0.006	21	0.003	84
DCP 2	.025	0.001	197	0.003	260	0.003	157	0.005	106	0.003	307	0.004	202	0.003	280	0.002	246	0.001	354
DCP 3	.100	0.007	102	0.012	36	0.010	2	0.011	288	0.004	341	0.016	307	0.020	232	0.007	154	0.009	180
DCP 4	.200	0.024	197	0.004	324	0.013	42	0.012	359	0.013	43	0.017	351	0.012	219	0.013	142	0.015	125
DCP 5	.250	0.010	310	0.008	21	0.008	47	0.010	64	0.011	78	0.015	97	0.012	62	0.016	83	0.009	11
DCP 6	.300	0.009	34	0.010	28	0.015	16	0.012	333	0.011	324	0.012	285	0.012	244	0.009	204	0.007	116
DCP 7	.400	0.011	260	0.002	63	0.003	18	0.009	32	0.007	329	0.002	108	0.005	54	0.012	358	0.007	269
DCP 8	.500	0.011	305	0.006	270	0.006	264	0.007	245	0.003	228	0.004	232	0.005	192	0.003	134	0.008	14
DCP 9	.600	0.005	77	0.008	345	0.002	262	0.005	4	0.005	205	0.007	72	0.006	359	0.007	276	0.004	190
DCP10	.878	0.005	18	0.002	296	0.004	193	0.004	152	0.004	42	0.003	197	0.004	41	0.003	357	0.010	296

TUNED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
80.0	15.58	0.600	7.49	4.37		5072.3	10

K	V	Q	RN	DAMPING	CY(MAX)	ALPHA(STALL)	EXT DAMPING
0.040	646.4	1447.3	0.63E 07	-0.00079	1.110	11.40	0.0259

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
ALPHA		7.486	4.369 359	0.271 68	0.115 180	0.050 161	0.011 17	0.151 117	0.047 32	0.052 338	0.038 282
CN		0.857	0.284 5	0.082 59	0.019 73	0.018 88	0.005 350	0.015 112	0.008 85	0.009 39	0.007 330
CM		-0.027	0.023 195	0.012 81	0.001 136	0.002 99	0.001 28	0.001 304	0.001 323	0.002 183	0.002 124
DCP 1	.010	1.962	1.311 355	0.240 58	0.082 128	0.024 152	0.004 306	0.040 97	0.010 347	0.018 303	0.013 238
DCP 2	.025	2.230	1.105 356	0.212 61	0.090 136	0.032 143	0.006 157	0.042 102	0.023 32	0.019 332	0.014 246
DCP 3	.100	2.548	0.277 355	0.436 78	0.059 59	0.044 94	0.039 342	0.034 74	0.020 160	0.019 79	0.005 68
DCP 4	.200	1.351	0.331 14	0.252 82	0.063 108	0.127 86	0.049 134	0.050 129	0.061 138	0.028 151	0.015 193
DCP 5	.250	1.250	0.435 11	0.182 72	0.062 25	0.081 80	0.020 344	0.059 96	0.015 109	0.036 79	0.006 55
DCP 6	.300	1.027	0.383 9	0.102 65	0.051 15	0.044 72	0.045 343	0.027 89	0.025 27	0.031 39	0.021 338
DCP 7	.400	0.761	0.324 8	0.036 12	0.019 27	0.010 316	0.015 319	0.008 100	0.012 359	0.018 9	0.020 311
DCP 8	.500	0.533	0.247 10	0.021 11	0.013 36	0.007 268	0.007 326	0.008 174	0.010 55	0.012 8	0.012 311
DCP 9	.600	0.412	0.181 10	0.017 295	0.016 127	0.010 267	0.009 162	0.009 175	0.006 50	0.009 357	0.012 288
DCP10	.878	0.306	0.145 3	0.023 254	0.014 317	0.005 217	0.002 232	0.005 123	0.005 38	0.005 11	0.006 300

DATA TYPE	X/C	RES 10 PHI	RES 11 PHI	RES 12 PHI	RES 13 PHI	RES 14 PHI	RES 15 PHI	RES 16 PHI	RES 17 PHI	RES 18 PHI
ALPHA		0.020 219	0.003 333	0.009 291	0.004 215	0.005 317	0.011 289	0.004 139	0.005 76	0.006 336
CN		0.001 252	0.002 255	0.005 351	0.003 290	0.001 92	0.005 329	0.004 265	0.002 199	0.001 7
CM		0.001 77	0.000 102	0.000 124	0.001 322	0.001 294	0.001 128	0.001 40	0.001 311	0.001 203
DCP 1	.010	0.003 295	0.006 213	0.007 322	0.002 270	0.004 100	0.005 247	0.001 164	0.001 151	0.001 173
DCP 2	.025	0.002 123	0.006 189	0.006 336	0.002 327	0.002 87	0.006 279	0.004 231	0.001 194	0.002 259
DCP 3	.100	0.008 93	0.010 49	0.013 1	0.014 302	0.013 207	0.008 100	0.008 343	0.004 345	0.006 287
DCP 4	.200	0.011 190	0.009 240	0.008 22	0.016 341	0.002 135	0.017 28	0.010 19	0.001 337	0.005 95
DCP 5	.250	0.002 6	0.015 189	0.002 122	0.003 224	0.005 195	0.009 321	0.011 270	0.011 258	0.007 238
DCP 6	.300	0.000 4	0.003 276	0.014 30	0.010 318	0.003 303	0.011 315	0.010 255	0.004 264	0.005 269
DCP 7	.400	0.008 314	0.009 277	0.009 353	0.009 246	0.005 99	0.007 313	0.005 259	0.004 217	0.004 170
DCP 8	.500	0.004 342	0.011 321	0.011 281	0.007 222	0.001 190	0.005 234	0.007 263	0.010 225	0.006 151
DCP 9	.600	0.008 216	0.004 150	0.002 15	0.003 170	0.005 51	0.006 309	0.006 233	0.007 148	0.007 47
DCP10	.878	0.002 260	0.000 316	0.001 336	0.003 98	0.004 1	0.004 315	0.003 195	0.004 55	0.004 339

TUNED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
80.0	16.00	0.600	9.89	4.13		5373.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.041	649.4	1451.9	0.63E 07	-0.00154	1.134	12.12	0.1010

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		9.895	4.130	359	0.187	4	0.097	187	0.054	242	0.018	331	0.017	281	0.054	218	0.015	275	0.015	122
CN		0.980	0.156	26	0.056	91	0.018	193	0.010	265	0.004	224	0.005	345	0.008	289	0.003	1	0.001	299
CM		-0.031	0.039	197	0.004	124	0.005	191	0.000	226	0.001	162	0.001	104	0.001	34	0.000	317	0.001	4
DCP 1	.010	2.592	0.924	358	0.118	69	0.024	141	0.027	242	0.013	257	0.012	256	0.015	191	0.009	285	0.003	153
DCP 2	.025	2.738	0.750	12	0.090	95	0.026	192	0.054	308	0.016	274	0.005	27	0.016	316	0.012	352	0.009	236
DCP 3	.100	2.603	0.354	174	0.225	93	0.150	209	0.030	207	0.009	208	0.014	84	0.026	323	0.007	289	0.011	34
DCP 4	.200	1.598	0.133	135	0.056	130	0.092	214	0.063	299	0.021	59	0.024	69	0.022	327	0.013	77	0.005	219
DCP 5	.250	1.456	0.180	43	0.196	81	0.110	158	0.055	230	0.015	314	0.027	324	0.026	271	0.018	20	0.008	113
DCP 6	.300	1.171	0.238	34	0.162	112	0.053	167	0.024	239	0.034	214	0.038	325	0.027	325	0.012	6	0.013	343
DCP 7	.400	0.889	0.249	16	0.076	72	0.012	24	0.027	86	0.015	98	0.012	324	0.015	198	0.010	298	0.010	217
DCP 8	.500	0.695	0.214	25	0.031	108	0.025	52	0.010	152	0.002	97	0.008	204	0.008	259	0.004	173	0.007	289
DCP 9	.600	0.519	0.190	13	0.007	340	0.017	340	0.009	262	0.006	312	0.005	291	0.007	218	0.002	322	0.006	151
DCP10	.878	0.300	0.179	18	0.020	321	0.013	0	0.005	317	0.004	277	0.001	29	0.003	280	0.003	118	0.003	181

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.007	274	0.009	255	0.002	351	0.009	32	0.008	254	0.004	320	0.003	347	0.001	288	0.004	56
CN		0.001	267	0.000	226	0.001	325	0.001	232	0.002	33	0.004	285	0.002	313	0.002	289	0.001	144
CM		0.001	246	0.000	317	0.001	278	0.000	309	0.000	234	0.001	78	0.000	90	0.001	10	0.000	307
DCP 1	.010	0.003	294	0.000	328	0.002	223	0.004	40	0.001	151	0.002	283	0.001	354	0.002	243	0.001	351
DCP 2	.025	0.001	96	0.005	281	0.008	296	0.006	236	0.000	133	0.003	274	0.005	267	0.003	213	0.004	139
DCP 3	.100	0.013	283	0.010	92	0.014	334	0.003	270	0.012	353	0.011	283	0.008	20	0.007	327	0.006	226
DCP 4	.200	0.010	232	0.010	268	0.004	287	0.009	284	0.002	14	0.009	345	0.009	334	0.010	341	0.001	92
DCP 5	.250	0.003	218	0.002	358	0.011	228	0.009	92	0.003	357	0.003	292	0.004	146	0.007	32	0.005	269
DCP 6	.300	0.009	127	0.004	219	0.005	153	0.021	251	0.014	184	0.010	276	0.007	271	0.005	276	0.004	35
DCP 7	.400	0.003	259	0.006	300	0.007	188	0.009	90	0.008	56	0.006	319	0.007	105	0.005	358	0.003	58
DCP 8	.500	0.002	210	0.003	148	0.004	57	0.007	182	0.006	124	0.008	192	0.005	217	0.014	192	0.008	130
DCP 9	.600	0.005	22	0.002	278	0.004	92	0.005	23	0.004	340	0.003	331	0.002	305	0.000	347	0.001	313
DCP10	.878	0.003	75	0.004	114	0.002	22	0.003	192	0.002	42	0.004	257	0.003	303	0.004	207	0.003	150

TUNED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
80.0	16.08	0.600	9.92	4.18		5073.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXP DAMPING
0.042	646.6	1447.3	0.63E 07	-0.00149	1.156	13.31	0.0720

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
ALPHA		9.924	4.177 0	0.189 5	0.105 195	0.077 241	0.033 335	0.050 169	0.072 236	0.020 206	0.007 160
CN		0.985	0.169 24	0.060 92	0.023 293	0.012 256	0.006 258	0.004 195	0.010 306	0.003 34	0.005 296
CM		-0.037	0.039 196	0.004 122	0.004 190	0.001 305	0.001 157	0.000 102	0.001 91	0.000 359	0.002 106
DCP 1	.010	2.587	0.933 358	0.119 71	0.027 140	0.035 234	0.011 272	0.022 164	0.020 197	0.004 63	0.006 202
DCP 2	.025	2.737	0.761 12	0.114 35	0.012 155	0.054 289	0.014 265	0.007 234	0.028 298	0.010 290	0.016 263
DCP 3	.100	2.636	0.293 176	0.249 96	0.146 212	0.025 227	0.038 223	0.013 132	0.018 343	0.020 0	0.008 317
DCP 4	.200	1.554	0.119 125	0.074 121	0.096 227	0.046 297	0.024 66	0.019 122	0.029 14	0.013 69	0.005 97
DCP 5	.250	1.423	0.186 37	0.198 82	0.125 155	0.054 233	0.008 253	0.019 198	0.020 288	0.012 45	0.012 54
DCP 6	.300	1.166	0.260 36	0.149 107	0.066 191	0.026 190	0.039 242	0.022 297	0.025 351	0.020 16	0.017 30
DCP 7	.400	0.892	0.279 16	0.057 68	0.027 38	0.017 59	0.007 76	0.001 155	0.022 246	0.016 152	0.012 255
DCP 8	.500	0.648	0.219 26	0.032 104	0.012 59	0.014 198	0.012 233	0.016 196	0.015 300	0.010 246	0.013 320
DCP 9	.600	0.526	0.196 12	0.009 280	0.006 324	0.005 159	0.010 344	0.007 229	0.009 229	0.005 162	0.008 203
DCP10	.878	0.354	0.178 16	0.013 0	0.011 325	0.004 277	0.006 314	0.004 20	0.008 316	0.003 357	0.011 300

DATA TYPE	X/C	RES 10 PHI	RES 11 PHI	RES 12 PHI	RES 13 PHI	RES 14 PHI	RES 15 PHI	RES 16 PHI	RES 17 PHI	RES 18 PHI
ALPHA		0.006 260	0.005 328	0.006 301	0.002 309	0.003 146	0.003 243	0.004 16	0.004 297	0.004 28
CN		0.002 209	0.003 164	0.003 126	0.003 152	0.003 147	0.002 93	0.001 340	0.002 26	0.003 342
CM		0.001 35	0.000 335	0.001 315	0.001 258	0.000 191	0.000 187	0.001 110	0.001 198	0.001 107
DCP 1	.010	0.002 208	0.005 100	0.001 93	0.004 210	0.004 277	0.002 86	0.003 118	0.002 211	0.002 281
DCP 2	.025	0.006 189	0.006 132	0.011 30	0.010 350	0.003 218	0.004 112	0.005 10	0.002 46	0.004 15
DCP 3	.100	0.007 346	0.010 166	0.010 106	0.008 150	0.017 134	0.015 107	0.015 54	0.009 27	0.014 39
DCP 4	.200	0.001 268	0.003 215	0.008 274	0.007 196	0.008 173	0.008 110	0.004 26	0.008 50	0.007 316
DCP 5	.250	0.006 194	0.006 334	0.011 154	0.007 253	0.010 204	0.001 220	0.004 249	0.016 237	0.010 144
DCP 6	.300	0.010 40	0.008 156	0.008 169	0.015 183	0.013 194	0.005 233	0.007 236	0.006 343	0.006 348
DCP 7	.400	0.005 149	0.008 201	0.002 57	0.007 201	0.005 98	0.001 334	0.005 254	0.008 180	0.001 12
DCP 8	.500	0.009 271	0.003 179	0.005 116	0.012 121	0.012 70	0.004 30	0.004 275	0.004 168	0.004 1
DCP 9	.600	0.007 119	0.004 119	0.002 225	0.003 99	0.003 306	0.001 266	0.002 196	0.004 51	0.005 334
DCP10	.878	0.009 235	0.001 191	0.004 112	0.004 24	0.001 173	0.004 57	0.004 346	0.008 9	0.006 273

TUNED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
80.0	15.00	0.600	9.95	4.24		5073.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.041	665.7	1444.1	0.63E 07	-0.00158	1.138	12.03	0.0250

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
ALPHA		9.956	4.239 0	0.196 23	0.096 197	0.050 263	0.007 190	0.139 259	0.091 211	0.044 213	0.014 146
CN		0.989	0.167 24	0.054 98	0.024 210	0.015 187	0.008 258	0.004 318	0.007 301	0.001 333	0.002 88
CM		-0.038	0.037 199	0.005 125	0.003 198	0.001 330	0.001 71	0.000 78	0.002 52	0.000 287	0.001 157
DCP 1	.010	2.584	0.947 357	0.105 70	0.024 148	0.027 245	0.014 201	0.027 223	0.015 191	0.012 196	0.005 208
DCP 2	.025	2.751	0.788 14	0.076 97	0.021 191	0.037 310	0.028 272	0.023 299	0.011 299	0.014 346	0.010 304
DCP 3	.100	2.644	0.293 181	0.262 105	0.129 216	0.038 157	0.020 240	0.008 83	0.027 352	0.013 256	0.016 135
DCP 4	.200	1.561	0.105 124	0.073 146	0.093 231	0.046 313	0.029 44	0.019 37	0.016 352	0.013 141	0.007 141
DCP 5	.250	1.425	0.218 32	0.196 85	0.101 157	0.028 272	0.011 250	0.026 259	0.030 301	0.009 275	0.008 110
DCP 6	.300	1.176	0.259 35	0.161 113	0.069 198	0.027 163	0.034 252	0.034 345	0.024 359	0.022 17	0.012 52
DCP 7	.400	0.884	0.263 15	0.064 73	0.013 21	0.032 92	0.007 163	0.004 157	0.017 206	0.011 209	0.004 255
DCP 8	.500	0.635	0.219 31	0.025 60	0.007 85	0.010 138	0.008 266	0.014 2 3	0.008 325	0.013 4	0.010 351
DCP 9	.600	0.523	0.193 13	0.018 275	0.008 319	0.005 252	0.010 262	0.015 -46	0.012 200	0.006 185	0.007 133
DCP10	.878	0.370	0.168 19	0.013 336	0.007 355	0.004 210	0.005 250	0.011 355	0.007 284	0.003 82	0.005 317

DATA TYPE	X/C	RES 10 PHI	RES 11 PHI	RES 12 PHI	RES 13 PHI	RES 14 PHI	RES 15 PHI	RES 16 PHI	RES 17 PHI	RES 18 PHI
ALPHA		0.022 262	0.017 287	0.010 241	0.006 51	0.007 279	0.003 258	0.003 342	0.008 3	0.005 345
CN		0.002 221	0.002 205	0.005 180	0.002 43	0.003 227	0.002 97	0.001 70	0.001 59	0.002 63
CM		0.001 83	0.000 326	0.000 15	0.001 189	0.001 86	0.001 176	0.001 61	0.001 254	0.000 139
DCP 1	.010	0.001 189	0.002 119	0.003 324	0.003 155	0.002 184	0.002 65	0.001 105	0.001 138	0.001 98
DCP 2	.025	0.005 238	0.001 65	0.003 114	0.003 345	0.001 281	0.002 297	0.000 167	0.002 220	0.000 184
DCP 3	.100	0.013 115	0.006 154	0.018 167	0.010 95	0.008 270	0.017 148	0.011 62	0.007 203	0.017 88
DCP 4	.200	0.011 193	0.011 245	0.013 172	0.006 14	0.011 188	0.017 114	0.016 54	0.006 252	0.009 82
DCP 5	.250	0.003 327	0.007 80	0.006 351	0.005 180	0.005 159	0.005 326	0.009 239	0.008 172	0.003 232
DCP 6	.300	0.008 149	0.009 191	0.013 168	0.005 272	0.007 152	0.012 66	0.022 27	0.011 330	0.003 301
DCP 7	.400	0.017 296	0.013 267	0.011 269	0.006 247	0.007 237	0.013 297	0.012 190	0.010 78	0.002 19
DCP 8	.500	0.007 355	0.003 136	0.006 137	0.008 119	0.005 25	0.002 129	0.006 359	0.007 279	0.003 222
DCP 9	.600	0.004 182	0.005 30	0.007 194	0.003 15	0.007 198	0.001 77	0.009 160	0.010 51	0.003 322
DCP10	.878	0.004 265	0.004 165	0.002 97	0.006 10	0.005 303	0.005 352	0.008 275	0.004 149	0.002 40

TUNED PITCHING OSCILLATION — VERTOL 23010-1.5R AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	0.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
80.0	15.19	0.600	12.32	4.15		5076.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.041	650.1	1452.3	0.63E 07	-0.00237	1.173	14.83	0.1010

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
ALPHA		12.317	4.150 359	0.175 357	0.060 193	0.010 237	0.023 290	0.035 99	0.025 156	0.018 43	0.019 103
CN		1.053	0.102 61	0.031 89	0.016 180	0.035 327	0.002 166	0.032 210	0.002 249	0.005 176	0.001 61
CM		-0.051	0.041 203	0.006 262	0.000 127	0.001 358	0.001 20	0.001 334	0.001 45	0.001 286	0.000 283
DCP 1	.010	2.912	0.664 359	0.159 76	0.039 4	0.006 241	0.011 40	0.025 16	0.009 313	0.010 216	0.006 134
DCP 2	.025	3.009	0.513 20	0.165 122	0.055 78	0.038 82	0.012 44	0.015 224	0.009 243	0.008 29	0.010 296
DCP 3	.100	2.534	0.534 188	0.044 355	0.036 196	0.071 339	0.020 131	0.010 52	0.021 49	0.005 343	0.007 113
DCP 4	.150	1.906	0.177 155	0.019 54	0.033 196	0.014 199	0.013 190	0.011 182	0.002 128	0.015 127	0.012 315
DCP 5	.200	1.622	0.136 170	0.017 289	0.024 60	0.005 355	0.009 79	0.010 291	0.014 351	0.013 171	0.015 13
DCP 6	.250	1.573	0.144 125	0.015 46	0.029 190	0.008 83	0.012 302	0.008 153	0.013 152	0.012 45	0.003 239
DCP 7	.300	1.300	0.096 103	0.033 151	0.030 238	0.015 319	0.016 40	0.017 248	0.019 299	0.012 134	0.007 29
DCP 8	.400	0.998	0.189 25	0.057 70	0.018 170	0.004 303	0.008 337	0.011 347	0.010 131	0.007 358	0.009 146
DCP 9	.500	0.814	0.185 43	0.061 108	0.025 215	0.008 209	0.009 179	0.008 146	0.013 246	0.015 167	0.013 185
DCP10	.600	0.595	0.205 14	0.024 57	0.012 345	0.005 309	0.003 234	0.005 248	0.005 204	0.007 61	0.002 27
DCP11	.878	0.385	0.177 27	0.031 90	0.006 83	0.003 120	0.008 180	0.006 135	0.003 247	0.006 178	0.003 18

DATA TYPE	X/C	RES 10 PHI	RES 11 PHI	RES 12 PHI	RES 13 PHI	RES 14 PHI	RES 15 PHI	RES 16 PHI	RES 17 PHI	RES 18 PHI
ALPHA		0.008 230	0.006 261	0.003 122	0.009 67	0.001 251	0.008 147	0.006 126	0.002 214	0.005 184
CN		0.003 214	0.001 245	0.003 327	0.003 5	0.004 259	0.001 77	0.002 207	0.002 283	0.000 218
CM		0.001 215	0.001 74	0.000 112	0.001 117	0.001 30	0.000 160	0.001 42	0.001 66	0.000 122
DCP 1	.010	0.002 76	0.010 199	0.005 93	0.012 15	0.002 295	0.002 337	0.005 203	0.005 214	0.005 153
DCP 2	.025	0.007 190	0.006 85	0.002 34	0.001 232	0.005 164	0.004 134	0.006 116	0.005 51	0.005 108
DCP 3	.100	0.003 230	0.019 143	0.018 356	0.015 34	0.018 328	0.004 156	0.007 280	0.003 335	0.004 147
DCP 4	.150	0.011 144	0.019 347	0.003 86	0.006 345	0.009 357	0.009 309	0.005 236	0.012 59	0.014 296
DCP 5	.200	0.014 232	0.011 64	0.017 352	0.007 0	0.011 333	0.013 72	0.004 334	0.008 133	0.002 2
DCP 6	.250	0.006 234	0.003 349	0.008 342	0.006 135	0.007 37	0.003 332	0.008 151	0.005 8	0.007 205
DCP 7	.300	0.006 227	0.013 62	0.008 341	0.008 359	0.015 247	0.007 149	0.005 1	0.002 170	0.002 346
DCP 8	.400	0.003 167	0.012 251	0.012 250	0.016 105	0.007 279	0.002 76	0.003 69	0.009 311	0.008 73
DCP 9	.500	0.010 144	0.009 227	0.005 174	0.007 295	0.014 290	0.003 122	0.003 217	0.007 297	0.004 333
DCP10	.600	0.006 331	0.008 270	0.004 185	0.005 6	0.007 217	0.001 90	0.008 159	0.003 260	0.007 183
DCP11	.878	0.006 40	0.001 156	0.006 353	0.007 285	0.000 340	0.003 318	0.006 260	0.004 213	0.003 339

TUNED PITCHING OSCILLATION VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
80.0	16.05	0.600	12.27	4.21		5376.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.041	646.8	1445.9	0.63E 07	-0.00190	1.161	15.50	0.0690

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		12.275	4.205	359	0.195	11	0.057	210	0.027	196	0.011	90	0.018	13	0.070	135	0.035	91	0.016	254
CN		1.041	0.104	38	0.018	83	0.006	216	0.005	344	0.002	174	0.002	177	0.005	159	0.003	54	0.002	275
CM		-0.055	0.042	198	0.003	245	0.001	293	0.001	321	0.001	50	0.000	34	0.000	245	0.000	205	0.001	116
DCP 1	.010	2.929	0.704	358	0.129	79	0.040	17	0.009	340	0.014	281	0.007	87	0.020	93	0.006	28	0.007	190
DCP 2	.025	3.015	0.522	20	0.152	113	0.047	49	0.012	196	0.012	95	0.014	237	0.020	206	0.008	25	0.016	338
DCP 3	.100	2.524	0.556	188	0.070	316	0.027	226	0.027	350	0.026	20	0.015	51	0.015	134	0.003	322	0.009	241
DCP 4	.150	1.827	0.167	146	0.019	173	0.023	236	0.017	199	0.008	167	0.007	143	0.019	174	0.012	237	0.012	195
DCP 5	.200	1.521	0.156	161	0.032	291	0.018	10	0.010	27	0.007	39	0.012	243	0.011	238	0.008	362	0.008	254
DCP 6	.250	1.491	0.156	125	0.027	137	0.017	295	0.019	211	0.006	253	0.008	28	0.027	150	0.010	112	0.014	314
DCP 7	.300	1.302	0.119	98	0.023	133	0.022	272	0.022	335	0.009	349	0.021	177	0.009	266	0.011	7	0.009	110
DCP 8	.400	0.983	0.186	20	0.051	67	0.043	156	0.018	175	0.006	214	0.001	98	0.016	117	0.021	125	0.006	99
DCP 9	.500	0.736	0.207	36	0.026	96	0.023	229	0.015	167	0.016	313	0.004	273	0.010	349	0.006	340	0.010	44
DCP10	.600	0.602	0.206	9	0.012	52	0.009	38	0.011	353	0.006	233	0.005	103	0.010	139	0.014	72	0.007	282
DCP11	.878	0.426	0.180	22	0.014	78	0.003	36	0.007	143	0.004	180	0.003	250	0.004	270	0.007	285	0.005	268

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.020	272	0.011	201	0.009	267	0.009	297	0.008	244	0.003	329	0.009	276	0.009	323	0.005	301
CN		0.003	6	0.002	345	0.003	18	0.004	14	0.002	59	0.004	72	0.002	63	0.003	44	0.001	55
CM		0.001	206	0.001	133	0.001	192	0.001	144	0.001	268	0.002	217	0.001	201	0.001	248	0.002	236
DCP 1	.010	0.002	251	0.003	67	0.006	184	0.006	37	0.004	304	0.005	199	0.002	121	0.002	322	0.005	154
DCP 2	.025	0.005	142	0.014	30	0.005	4	0.006	55	0.010	59	0.006	55	0.004	97	0.008	48	0.004	287
DCP 3	.100	0.014	251	0.010	129	0.011	51	0.004	42	0.016	320	0.018	164	0.010	125	0.004	335	0.004	253
DCP 4	.150	0.012	150	0.014	192	0.007	0	0.010	244	0.002	128	0.011	191	0.005	153	0.005	78	0.005	317
DCP 5	.200	0.017	301	0.003	1	0.003	250	0.009	26	0.006	308	0.004	155	0.005	249	0.004	145	0.009	226
DCP 6	.250	0.010	81	0.014	90	0.009	83	0.009	72	0.001	191	0.005	141	0.001	37	0.004	57	0.003	183
DCP 7	.300	0.011	282	0.011	277	0.004	320	0.005	3	0.002	143	0.005	13	0.004	290	0.011	13	0.003	81
DCP 8	.400	0.008	55	0.009	8	0.004	93	0.009	55	0.002	6	0.004	88	0.003	142	0.004	5	0.004	207
DCP 9	.500	0.015	64	0.012	29	0.005	1	0.004	337	0.008	152	0.007	63	0.006	52	0.004	21	0.012	62
DCP10	.600	0.006	327	0.006	227	0.005	232	0.004	183	0.008	126	0.009	35	0.005	125	0.001	78	0.006	113
DCP11	.878	0.004	32	0.007	317	0.007	35	0.011	335	0.006	26	0.008	43	0.010	8	0.005	76	0.008	28

TUNED PITCHING OSCILLATION — VERTOL 23010-1.59 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
80.0	15.72	0.600	12.33	4.24		5074.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.041	645.9	1442.2	0.63E 07	-0.00215	1.164	11.90	0.0250

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
ALPHA		12.327	4.242 359	0.195 16	0.060 198	0.027 213	0.018 14	0.062 326	0.081 171	0.014 251	0.010 206
CN		1.055	0.109 39	0.025 174	0.005 164	0.003 20	0.004 37	0.004 162	0.005 172	0.004 71	0.002 108
CM		-0.059	0.042 201	0.004 281	0.001 208	0.001 43	0.002 67	0.001 59	0.001 40	0.001 175	0.001 358
DCP 1	.010	2.943	0.714 358	0.121 71	0.029 1	0.012 150	0.007 4	0.012 24	0.017 149	0.005 347	0.008 229
DCP 2	.025	3.024	0.517 17	0.170 127	0.037 87	0.031 142	0.030 64	0.004 260	0.009 257	0.026 16	0.030 330
DCP 3	.100	2.565	0.536 182	0.054 353	0.075 206	0.068 357	0.016 111	0.028 151	0.052 130	0.023 95	0.017 109
DCP 4	.150	1.367	0.143 138	0.014 291	0.017 138	0.013 143	0.016 52	0.034 172	0.010 197	0.012 161	0.014 245
DCP 5	.200	1.524	0.162 169	0.005 17	0.044 24	0.034 39	0.017 42	0.015 124	0.022 39	0.009 144	0.011 86
DCP 6	.250	1.529	0.154 112	0.022 138	0.011 108	0.016 213	0.013 322	0.017 83	0.020 213	0.003 94	0.006 146
DCP 7	.300	1.311	0.080 98	0.039 152	0.009 291	0.021 4	0.031 43	0.013 173	0.022 336	0.009 69	0.016 58
DCP 8	.400	0.990	0.194 23	0.056 63	0.020 132	0.035 205	0.009 287	0.019 356	0.012 179	0.008 120	0.001 145
DCP 9	.500	0.740	0.204 39	0.060 133	0.030 180	0.015 183	0.012 37	0.016 298	0.016 272	0.004 143	0.009 146
DCP10	.600	0.600	0.207 12	0.011 52	0.008 12	0.004 39	0.005 208	0.006 151	0.011 138	0.005 357	0.003 165
DCP11	.878	0.457	0.177 25	0.023 107	0.005 20	0.035 245	0.009 239	0.017 192	0.006 218	0.004 12	0.002 267

DATA TYPE	X/C	RES 10 PHI	RES 11 PHI	RES 12 PHI	RES 13 PHI	RES 14 PHI	RES 15 PHI	RES 16 PHI	RES 17 PHI	RES 18 PHI
ALPHA		0.014 277	0.020 256	0.011 323	0.012 304	0.003 337	0.005 330	0.009 340	0.005 317	0.004 289
CN		0.001 258	0.004 291	0.001 114	0.003 188	0.001 103	0.001 58	0.002 180	0.002 7	0.004 235
CM		0.001 132	0.001 30	0.001 167	0.001 82	0.000 149	0.002 178	0.001 129	0.002 156	0.000 68
DCP 1	.010	0.011 232	0.006 124	0.005 55	0.006 326	0.003 244	0.005 33	0.006 322	0.003 304	0.003 156
DCP 2	.025	0.013 330	0.009 308	0.005 329	0.004 320	0.002 50	0.003 71	0.001 123	0.006 86	0.005 81
DCP 3	.100	0.019 158	0.023 172	0.025 165	0.029 177	0.006 134	0.030 234	0.020 215	0.019 238	0.022 246
DCP 4	.150	0.007 229	0.002 25	0.005 252	0.001 46	0.012 153	0.002 47	0.008 330	0.002 71	0.003 26
DCP 5	.200	0.005 206	0.015 178	0.018 119	0.014 132	0.016 108	0.018 150	0.013 137	0.010 142	0.018 241
DCP 6	.250	0.006 188	0.012 47	0.007 289	0.004 278	0.004 120	0.012 117	0.006 182	0.009 108	0.006 190
DCP 7	.300	0.003 233	0.014 201	0.018 96	0.011 95	0.010 45	0.012 92	0.006 122	0.017 121	0.011 222
DCP 8	.400	0.014 85	0.007 345	0.005 9	0.004 105	0.011 332	0.008 91	0.014 111	0.009 75	0.003 347
DCP 9	.500	0.001 63	0.009 196	0.007 290	0.009 252	0.009 246	0.007 339	0.015 268	0.005 323	0.007 201
DCP10	.600	0.010 359	0.007 274	0.004 149	0.007 41	0.005 254	0.002 127	0.011 97	0.005 340	0.001 112
DCP11	.878	0.008 256	0.005 160	0.009 324	0.011 242	0.005 85	0.011 343	0.010 290	0.010 324	0.003 265

TUNED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
80.0	15.92	0.600	14.77	4.21		5375.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.041	650.7	1451.9	0.63E 07	-0.00207	1.181	15.25	0.1010

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		14.772	4.213	0	0.201	0	0.068	240	0.070	282	0.028	251	0.096	293	0.039	66	0.043	13	0.081	290
CN		1.078	0.067	61	0.022	89	0.008	172	0.007	168	0.004	10	0.004	252	0.006	58	0.002	5	0.007	310
CM		-0.076	0.035	205	0.003	236	0.002	359	0.000	332	0.000	278	0.001	206	0.001	108	0.001	163	0.002	97
DCP 1	.010	3.167	0.603	358	0.184	93	0.022	30	0.004	202	0.006	204	0.022	276	0.007	279	0.026	167	0.031	136
DCP 2	.025	3.098	0.161	19	0.247	113	0.033	336	0.036	147	0.021	340	0.032	298	0.008	108	0.022	17	0.017	323
DCP 3	.100	2.324	0.490	181	0.095	316	0.072	69	0.027	229	0.046	29	0.028	246	0.031	18	0.027	328	0.017	10
DCP 4	.150	1.799	0.137	139	0.042	230	0.025	157	0.005	25	0.023	207	0.024	161	0.050	105	0.028	139	0.010	76
DCP 5	.200	1.448	0.136	164	0.031	72	0.008	31	0.022	173	0.014	338	0.016	299	0.019	45	0.003	63	0.011	77
DCP 6	.250	1.494	0.120	121	0.039	196	0.019	133	0.013	134	0.008	148	0.020	146	0.035	123	0.029	127	0.015	232
DCP 7	.300	1.307	0.082	126	0.026	93	0.012	353	0.006	159	0.016	308	0.011	233	0.016	86	0.006	225	0.011	36
DCP 8	.400	1.073	0.107	39	0.030	42	0.004	156	0.018	161	0.003	192	0.006	152	0.013	44	0.011	123	0.022	313
DCP 9	.500	0.851	0.128	48	0.017	120	0.015	69	0.015	341	0.007	243	0.015	306	0.016	305	0.017	289	0.010	334
DCP10	.600	0.679	0.154	23	0.026	67	0.009	197	0.010	142	0.010	63	0.007	9	0.002	326	0.008	4	0.019	258
DCP11	.878	0.491	0.146	27	0.021	73	0.009	151	0.006	197	0.002	35	0.012	21	0.006	283	0.005	324	0.006	304

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.035	328	0.035	17	0.043	349	0.039	357	0.033	21	0.030	30	0.026	10	0.027	21	0.023	36
CN		0.002	164	0.005	353	0.002	125	0.001	10	0.000	38	0.003	53	0.003	294	0.002	123	0.002	37
CM		0.001	311	0.001	104	0.001	36	0.000	198	0.000	141	0.001	270	0.001	113	0.001	263	0.001	203
DCP 1	.010	0.030	28	0.013	271	0.019	90	0.014	353	0.007	18	0.008	38	0.004	315	0.006	121	0.011	79
DCP 2	.025	0.005	273	0.012	27	0.019	346	0.018	277	0.014	193	0.007	335	0.008	39	0.010	39	0.016	344
DCP 3	.100	0.014	270	0.030	15	0.004	125	0.001	170	0.008	15	0.020	17	0.006	312	0.013	288	0.009	211
DCP 4	.150	0.008	181	0.008	141	0.027	125	0.015	148	0.014	190	0.018	238	0.013	152	0.025	176	0.016	240
DCP 5	.200	0.006	108	0.017	44	0.008	156	0.007	61	0.009	332	0.011	126	0.011	173	0.015	241	0.011	180
DCP 6	.250	0.012	146	0.006	158	0.011	135	0.019	39	0.008	226	0.011	301	0.007	0	0.010	159	0.012	142
DCP 7	.300	0.013	192	0.012	47	0.007	133	0.006	87	0.006	239	0.006	205	0.008	140	0.020	249	0.004	100
DCP 8	.400	0.005	157	0.007	150	0.006	21	0.016	315	0.013	137	0.006	271	0.005	308	0.007	17	0.014	101
DCP 9	.500	0.006	267	0.002	298	0.006	68	0.005	78	0.007	227	0.001	277	0.008	354	0.011	125	0.010	27
DCP10	.600	0.010	68	0.019	309	0.010	282	0.009	185	0.006	27	0.018	80	0.015	284	0.013	62	0.010	354
DCP11	.878	0.005	183	0.003	282	0.008	170	0.005	2	0.004	311	0.002	48	0.002	298	0.005	126	0.002	20

TUNED PITCHING OSCILLATION VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
80.0	15.87	0.600	14.79	4.26		5375.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.041	647.9	1447.1	0.638 07	-0.00147	1.199	16.01	0.0720

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		14.789	4.261	0	0.115	359	0.100	246	0.178	274	0.059	300	0.102	309	0.028	332	0.116	284	0.057	292
CN		1.073	0.070	65	0.031	77	0.008	67	0.310	123	0.033	246	0.008	209	0.004	359	0.017	337	0.003	189
CM		-0.080	0.038	199	0.002	196	0.003	356	0.002	334	0.002	16	0.002	27	0.001	221	0.004	99	0.001	81
DCP 1	.010	3.166	0.450	355	0.158	92	0.038	92	0.022	54	0.008	329	0.010	218	0.020	6	0.033	272	0.018	242
DCP 2	.025	3.074	0.124	51	0.321	172	0.038	59	0.330	69	0.044	270	0.044	190	0.035	123	0.022	39	0.024	17
DCP 3	.100	2.297	0.569	179	0.080	304	0.060	49	0.023	253	0.005	266	0.033	235	0.029	343	0.022	0	0.027	123
DCP 4	.150	1.735	0.184	160	0.025	54	0.052	319	0.017	59	0.026	32	0.028	34	0.025	320	0.013	6	0.016	197
DCP 5	.200	1.419	0.143	160	0.034	56	0.012	4	0.011	139	0.007	7	0.006	247	0.017	342	0.016	10	0.014	127
DCP 6	.250	1.433	0.164	127	0.009	53	0.023	302	0.029	98	0.018	357	0.020	331	0.014	287	0.033	337	0.015	266
DCP 7	.300	1.299	0.105	108	0.041	92	0.012	16	0.025	123	0.007	120	0.007	123	0.014	293	0.018	352	0.018	96
DCP 8	.400	1.067	0.108	49	0.042	52	0.025	113	0.025	156	0.004	109	0.019	231	0.004	223	0.042	300	0.014	228
DCP 9	.500	0.810	0.138	43	0.027	94	0.005	24	0.012	148	0.013	149	0.007	102	0.013	209	0.014	311	0.017	19
DCP10	.600	0.685	0.162	13	0.032	65	0.021	130	0.017	96	0.009	241	0.020	165	0.019	69	0.028	278	0.023	213
DCP11	.878	0.539	0.155	22	0.005	54	0.008	213	0.008	214	0.008	216	0.011	251	0.005	318	0.012	279	0.006	356

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.039	316	0.050	337	0.045	345	0.048	357	0.040	9	0.024	14	0.026	356	0.021	2	0.025	22
CN		0.004	321	0.003	323	0.004	223	0.003	136	0.003	209	0.002	233	0.006	301	0.001	6	0.004	284
CM		0.001	73	0.002	99	0.002	15	0.001	351	0.001	22	0.001	60	0.003	82	0.001	229	0.001	44
DCP 1	.010	0.011	187	0.011	69	0.014	39	0.018	19	0.007	305	0.006	136	0.016	45	0.022	3	0.020	306
DCP 2	.025	0.013	28	0.019	5	0.010	292	0.013	335	0.007	298	0.012	221	0.002	78	0.004	353	0.004	346
DCP 3	.100	0.025	350	0.011	331	0.034	262	0.006	193	0.006	289	0.012	320	0.013	22	0.005	208	0.012	312
DCP 4	.150	0.007	84	0.019	111	0.009	326	0.014	3	0.007	65	0.014	310	0.012	85	0.005	47	0.011	21
DCP 5	.200	0.014	317	0.001	263	0.009	219	0.015	273	0.006	323	0.006	276	0.013	32	0.011	257	0.015	295
DCP 6	.250	0.013	296	0.011	113	0.035	265	0.012	44	0.007	238	0.019	243	0.019	0	0.005	302	0.012	357
DCP 7	.300	0.009	5	0.005	285	0.016	149	0.010	97	0.006	66	0.003	91	0.006	80	0.002	122	0.005	26
DCP 8	.400	0.014	250	0.010	107	0.008	237	0.007	125	0.020	206	0.017	153	0.014	341	0.008	271	0.007	278
DCP 9	.500	0.003	301	0.003	249	0.011	58	0.003	274	0.003	163	0.007	21	0.006	253	0.016	24	0.004	313
DCP10	.600	0.010	90	0.014	318	0.014	196	0.015	133	0.006	134	0.011	120	0.016	263	0.008	147	0.007	192
DCP11	.878	0.011	272	0.008	264	0.009	224	0.005	252	0.007	235	0.012	277	0.013	260	0.005	9	0.008	244

TUNED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
80.0	16.00	0.600	14.83	4.37		5975.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.061	646.9	1444.1	0.635 07	-0.00189	1.196	16.23	0.0250

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
ALPHA		14.805	4.367 0	0.259 9	0.070 0	0.094 328	0.064 328	0.009 132	0.075 1	0.080 4	0.031 328
CN		1.082	0.067 53	0.036 83	0.011 31	0.039 189	0.003 87	0.006 161	0.001 159	0.008 24	0.004 285
CM		-0.082	0.039 201	0.005 216	0.001 3	0.002 49	0.001 99	0.003 314	0.001 288	0.002 214	0.001 92
DCP 1	.010	3.121	0.414 342	0.184 95	0.066 80	0.015 40	0.017 109	0.020 117	0.008 317	0.013 358	0.010 236
DCP 2	.025	3.147	0.293 5	0.246 119	0.052 144	0.041 117	0.018 28	0.024 298	0.029 249	0.017 219	0.016 178
DCP 3	.100	2.274	0.573 176	0.046 318	0.080 30	0.035 200	0.025 70	0.015 275	0.007 91	0.012 302	0.003 282
DCP 4	.150	1.757	0.126 171	0.065 139	0.044 3	0.009 20	0.015 122	0.010 304	0.031 79	0.028 75	0.000 214
DCP 5	.200	1.424	0.149 161	0.051 64	0.025 339	0.020 160	0.021 130	0.009 253	0.009 221	0.014 1	0.010 334
DCP 6	.250	1.477	0.133 130	0.041 114	0.019 355	0.012 1	0.016 94	0.003 156	0.007 86	0.012 71	0.002 232
DCP 7	.300	1.290	0.079 126	0.034 87	0.019 308	0.019 294	0.016 210	0.011 243	0.020 256	0.015 306	0.018 331
DCP 8	.400	1.067	0.136 39	0.041 64	0.028 38	0.028 229	0.009 105	0.018 119	0.009 325	0.008 40	0.007 279
DCP 9	.500	0.819	0.137 42	0.030 79	0.015 329	0.018 289	0.014 260	0.005 158	0.006 134	0.009 19	0.013 312
DCP10	.600	0.677	0.182 15	0.035 30	0.004 81	0.017 160	0.012 15	0.021 145	0.001 18	0.011 27	0.003 258
DCP11	.878	0.562	0.156 22	0.025 79	0.010 157	0.033 216	0.004 225	0.037 127	0.006 119	0.011 38	0.004 228

DATA TYPE	X/C	RES 10 PHI	RES 11 PHI	RES 12 PHI	RES 13 PHI	RES 14 PHI	RES 15 PHI	RES 16 PHI	RES 17 PHI	RES 18 PHI
ALPHA		0.039 328	0.050 349	0.027 338	0.027 312	0.029 316	0.021 321	0.026 316	0.025 333	0.021 298
CN		0.002 356	0.005 334	0.001 32	0.003 111	0.003 351	0.006 89	0.004 299	0.004 335	0.003 230
CM		0.001 174	0.001 109	0.000 40	0.000 116	0.001 159	0.002 208	0.001 131	0.002 102	0.001 347
DCP 1	.010	0.016 173	0.002 65	0.020 153	0.016 104	0.008 92	0.018 76	0.013 353	0.004 25	0.011 14
DCP 2	.025	0.019 102	0.014 39	0.013 28	0.007 20	0.009 225	0.009 100	0.003 347	0.003 109	0.014 7
DCP 3	.100	0.017 291	0.015 3	0.024 78	0.009 155	0.007 112	0.025 123	0.013 261	0.011 35	0.012 295
DCP 4	.150	0.005 76	0.024 92	0.014 223	0.002 66	0.011 183	0.008 15	0.011 74	0.008 54	0.016 240
DCP 5	.200	0.013 246	0.023 336	0.018 355	0.015 207	0.008 69	0.023 176	0.015 234	0.005 137	0.005 323
DCP 6	.250	0.014 66	0.006 239	0.006 212	0.010 112	0.007 56	0.004 174	0.007 53	0.006 155	0.017 227
DCP 7	.300	0.012 195	0.015 301	0.018 321	0.015 194	0.007 22	0.015 154	0.011 211	0.006 280	0.009 296
DCP 8	.400	0.003 87	0.007 65	0.011 180	0.004 127	0.008 347	0.018 145	0.009 316	0.004 294	0.011 151
DCP 9	.500	0.004 27	0.009 264	0.012 316	0.009 70	0.016 335	0.021 13	0.006 62	0.009 331	0.007 287
DCP10	.600	0.009 332	0.016 310	0.012 86	0.006 329	0.013 335	0.011 47	0.008 317	0.011 303	0.004 111
DCP11	.878	0.003 24	0.003 143	0.005 240	0.002 159	0.005 157	0.005 26	0.005 289	0.007 259	0.007 180

TUNED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
80.0	15.87	0.600	17.08	4.30		5076.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.041	647.1	1444.8	0.63E 07	-0.00211	1.175	14.64	0.0960

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
ALPHA		17.083	4.302 0	0.122 18	0.071 190	0.024 239	0.003 164	0.056 323	0.045 192	0.034 313	0.035 132
CN		1.076	0.056 90	0.022 83	0.014 234	0.005 168	0.005 259	0.001 252	0.003 79	0.005 307	0.004 105
CM		-0.101	0.016 270	0.003 260	0.001 151	0.001 10	0.000 165	0.002 85	0.001 334	0.003 95	0.002 13
DCP 1	.010	3.405	0.191 355	0.167 91	0.027 88	0.012 54	0.012 293	0.015 172	0.014 87	0.027 331	0.008 30
DCP 2	.025	2.878	0.566 191	0.206 107	0.115 252	0.023 230	0.021 358	0.021 84	0.047 43	0.022 55	0.011 47
DCP 3	.100	1.585	0.457 175	0.088 271	0.033 244	0.003 17	0.023 272	0.015 50	0.009 353	0.005 128	0.041 34
DCP 4	.150	1.610	0.236 158	0.049 32	0.032 155	0.031 157	0.017 200	0.013 140	0.010 200	0.014 40	0.014 171
DCP 5	.200	1.366	0.186 164	0.017 10	0.026 189	0.011 108	0.009 223	0.009 34	0.008 8	0.008 52	0.021 40
DCP 6	.250	1.367	0.179 135	0.007 73	0.028 151	0.020 170	0.027 196	0.012 226	0.008 227	0.014 8	0.019 188
DCP 7	.300	1.264	0.115 148	0.025 82	0.023 226	0.016 95	0.011 290	0.008 103	0.012 353	0.008 151	0.019 349
DCP 8	.400	1.091	0.097 86	0.023 71	0.021 193	0.009 314	0.015 178	0.013 256	0.008 125	0.015 318	0.025 143
DCP 9	.500	0.892	0.093 65	0.026 83	0.015 294	0.009 5	0.010 304	0.009 305	0.006 1	0.004 38	0.016 290
DCP 10	.600	0.791	0.132 24	0.025 58	0.006 286	0.002 141	0.009 304	0.004 125	0.018 154	0.024 264	0.023 121
DCP 11	.878	0.595	0.139 27	0.023 107	0.008 293	0.015 192	0.003 68	0.010 269	0.004 15	0.006 302	0.009 255

DATA TYPE	X/C	RES 10 PHI	RES 11 PHI	RES 12 PHI	RES 13 PHI	RES 14 PHI	RES 15 PHI	RES 16 PHI	RES 17 PHI	RES 18 PHI
ALPHA		0.004 248	0.006 74	0.016 341	0.004 308	0.003 197	0.010 349	0.004 3	0.005 349	0.004 84
CN		0.001 311	0.003 105	0.002 253	0.002 126	0.003 250	0.004 131	0.003 182	0.002 349	0.003 47
CM		0.001 126	0.000 241	0.001 22	0.001 67	0.001 140	0.001 1	0.000 78	0.000 64	0.001 131
DCP 1	.010	0.009 78	0.013 304	0.005 223	0.011 61	0.007 264	0.001 135	0.003 44	0.002 308	0.004 43
DCP 2	.025	0.005 61	0.024 63	0.010 255	0.012 72	0.018 226	0.022 144	0.019 130	0.022 73	0.016 93
DCP 3	.100	0.027 154	0.014 182	0.007 285	0.010 155	0.006 220	0.004 135	0.007 222	0.015 339	0.007 51
DCP 4	.150	0.012 340	0.014 236	0.013 67	0.005 62	0.016 315	0.010 58	0.005 91	0.011 112	0.013 156
DCP 5	.200	0.020 128	0.006 117	0.003 340	0.011 95	0.009 118	0.012 72	0.017 133	0.008 290	0.015 93
DCP 6	.250	0.021 320	0.006 44	0.012 101	0.003 199	0.015 273	0.012 145	0.001 219	0.006 45	0.011 64
DCP 7	.300	0.010 151	0.001 351	0.011 301	0.006 51	0.007 144	0.005 359	0.017 152	0.014 254	0.012 86
DCP 8	.400	0.017 292	0.008 84	0.006 89	0.008 121	0.008 211	0.005 144	0.010 313	0.004 14	0.010 345
DCP 9	.500	0.008 7	0.004 96	0.017 238	0.005 328	0.002 253	0.007 267	0.005 191	0.008 246	0.007 22
DCP 10	.600	0.005 333	0.013 116	0.006 355	0.001 133	0.003 159	0.006 99	0.011 251	0.015 4	0.009 305
DCP 11	.878	0.002 215	0.006 305	0.007 183	0.007 242	0.008 320	0.006 181	0.004 86	0.007 177	0.002 143

TUNED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
80.0	15.97	0.600	17.13	4.37		5076.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.041	646.2	1443.6	0.63E 07	-0.00165	1.176	16.75	0.0570

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		17.129	4.373	359	0.248	14	0.059	150	0.023	205	0.050	67	0.007	302	0.059	311	0.010	48	0.003	346
CN		1.084	0.067	90	0.028	69	0.014	252	0.003	226	0.009	180	0.005	345	0.005	74	0.004	95	0.003	117
CM		-0.100	0.012	270	0.005	240	0.001	155	0.002	257	0.001	94	0.001	307	0.001	161	0.001	290	0.000	69
DCP 1	.010	3.255	0.025	207	0.260	93	0.030	68	0.016	106	0.016	155	0.016	46	0.014	284	0.011	90	0.013	75
DCP 2	.025	3.001	0.428	177	0.223	101	0.040	242	0.100	249	0.044	146	0.058	291	0.034	128	0.013	354	0.019	100
DCP 3	.100	2.063	0.415	172	0.120	276	0.055	279	0.029	273	0.047	181	0.026	37	0.029	123	0.009	244	0.014	117
DCP 4	.150	1.609	0.211	137	0.046	83	0.025	250	0.024	130	0.028	116	0.016	249	0.022	48	0.006	61	0.004	70
DCP 5	.200	1.369	0.147	154	0.043	341	0.039	223	0.018	259	0.016	164	0.013	32	0.021	112	0.009	190	0.012	127
DCP 6	.250	1.390	0.180	126	0.008	83	0.032	222	0.006	197	0.016	118	0.012	274	0.012	17	0.008	37	0.004	98
DCP 7	.300	1.261	0.117	123	0.027	13	0.033	212	0.017	267	0.008	181	0.016	31	0.014	96	0.003	138	0.002	123
DCP 8	.400	1.092	0.097	77	0.027	61	0.016	276	0.015	91	0.015	242	0.010	9	0.005	310	0.008	88	0.003	236
DCP 9	.500	0.878	0.113	67	0.038	86	0.005	311	0.013	103	0.008	301	0.005	330	0.013	30	0.009	91	0.006	36
DCP10	.600	0.775	0.124	21	0.045	62	0.009	287	0.014	61	0.014	232	0.007	44	0.009	275	0.006	95	0.005	193
DCP11	.878	0.612	0.134	22	0.024	75	0.002	291	0.003	211	0.005	120	0.005	204	0.007	44	0.003	131	0.000	153

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.002	316	0.012	326	0.005	115	0.003	312	0.007	349	0.004	180	0.005	139	0.008	193	0.006	12
CN		0.002	99	0.001	127	0.002	226	0.003	87	0.002	76	0.002	264	0.001	318	0.001	106	0.001	222
CM		0.001	266	0.001	154	0.001	267	0.001	124	0.001	305	0.001	118	0.000	139	0.001	124	0.001	85
DCP 1	.010	0.011	51	0.011	45	0.004	317	0.007	95	0.011	299	0.006	114	0.006	351	0.003	303	0.007	238
DCP 2	.025	0.027	313	0.008	177	0.030	266	0.029	128	0.029	330	0.023	218	0.006	192	0.011	161	0.010	99
DCP 3	.100	0.005	302	0.020	136	0.015	276	0.027	117	0.013	316	0.009	145	0.006	107	0.013	120	0.014	152
DCP 4	.150	0.007	85	0.004	173	0.011	166	0.014	20	0.010	135	0.011	31	0.009	8	0.006	323	0.005	335
DCP 5	.200	0.014	167	0.013	169	0.012	253	0.011	99	0.010	198	0.006	113	0.008	292	0.011	62	0.008	214
DCP 6	.250	0.002	139	0.009	39	0.015	163	0.015	343	0.017	88	0.002	301	0.010	321	0.005	277	0.006	345
DCP 7	.300	0.011	175	0.003	207	0.001	263	0.017	111	0.014	201	0.006	56	0.003	163	0.011	85	0.006	170
DCP 8	.400	0.002	14	0.002	70	0.012	131	0.010	299	0.010	68	0.004	41	0.005	298	0.000	329	0.003	35
DCP 9	.500	0.003	117	0.006	345	0.013	349	0.011	77	0.003	160	0.001	26	0.002	145	0.012	321	0.005	325
DCP10	.600	0.005	152	0.002	250	0.004	163	0.007	261	0.009	32	0.008	254	0.003	138	0.010	188	0.004	263
DCP11	.878	0.008	51	0.002	353	0.001	81	0.002	5	0.006	167	0.008	302	0.005	323	0.005	354	0.003	221

TUNED PITCHING OSCILLATION VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
EC.C	15.92	0.600	17.05	4.38		5076.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.041	645.6	1440.3	0.63E 07	-0.00134	1.218	15.83	0.0250

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
ALPHA		17.C55	4.378 359	0.184 6	0.071 190	0.021 300	0.058 260	0.056 346	0.C25 76	0.030 185	0.004 102
CN		1.099	C.065 9C	0.028 69	0.015 186	0.008 143	0.007 132	0.006 336	0.007 142	0.0C8 219	0.003 109
CM		-0.1C3	C.01C 27C	0.005 262	0.001 87	0.002 346	0.002 344	C.000 48	0.003 3C3	0.CC0 104	0.003 311
DCP 1	.010	3.283	C.051 299	0.216 100	0.033 153	0.043 125	0.015 94	0.022 3C9	0.016 123	0.013 191	0.022 147
DCP 2	.025	3.C48	0.351 171	0.200 73	0.103 211	0.014 104	0.023 307	0.028 348	0.030 278	0.033 167	0.036 334
DCP 3	.1CC	2.1C8	C.426 164	0.075 302	0.022 110	0.012 295	0.026 75	0.005 336	0.022 276	0.015 250	0.018 318
DCP 4	.150	1.627	C.2C9 152	0.024 9	0.028 188	0.030 90	0.006 237	0.031 344	0.013 1C8	0.023 225	0.009 168
DCP 5	.200	1.3EE	C.155 153	0.023 353	0.030 167	0.009 293	0.008 118	0.004 278	0.009 247	0.018 252	0.006 14
DCP 6	.250	1.358	C.173 128	0.026 250	0.022 125	0.023 127	0.020 114	0.012 339	0.017 91	0.020 206	0.003 199
DCP 7	.3CC	1.285	C.117 131	0.021 73	0.027 175	0.003 185	0.005 134	0.007 1	0.006 233	0.016 241	0.005 18
DCP 8	.4CC	1.C91	0.110 80	0.031 109	0.022 164	0.016 115	0.030 125	0.004 46	0.025 108	0.0C5 155	0.009 71
DCP 9	.5CC	0.E74	C.C5C 57	0.039 96	0.004 237	0.015 197	0.013 197	0.010 278	0.014 159	0.018 231	0.005 253
DCP 10	.6CC	0.786	0.131 2C	0.038 66	0.012 204	0.014 158	0.007 118	0.002 348	0.016 147	0.0C2 206	0.014 135
DCP 11	.E7E	C.E34	0.139 16	0.028 73	0.007 263	0.005 154	0.006 192	0.001 339	0.007 1CC	0.0C0 354	0.013 125

DATA TYPE	X/C	RES 10 PHI	RES 11 PHI	RES 12 PHI	RES 13 PHI	RES 14 PHI	RES 15 PHI	RES 16 PHI	RES 17 PHI	RES 18 PHI
ALPHA		0.01E 347	0.011 346	0.008 28	0.016 319	0.002 61	0.005 333	0.008 43	0.0C6 146	0.003 310
CN		0.004 334	0.002 177	0.003 209	0.004 301	0.003 212	0.003 221	0.003 69	0.0C2 324	0.002 67
CM		C.002 161	0.002 332	0.001 267	0.001 116	0.001 11	0.002 341	0.001 327	0.0C1 93	0.000 140
DCP 1	.010	C.CC8 69	0.007 153	0.010 127	0.009 106	0.013 61	0.001 181	0.C12 129	0.009 91	0.014 72
DCP 2	.025	0.C12 227	0.030 322	0.031 249	0.007 216	0.009 198	0.003 137	0.013 9%	0.008 46	0.012 77
DCP 3	.1CC	0.016 155	0.031 299	0.025 259	0.017 264	0.016 327	0.010 253	0.019 357	0.0C6 29	0.007 289
DCP 4	.150	0.012 1	0.002 40	0.009 6	0.002 187	0.004 168	0.019 322	0.003 55	0.014 297	0.006 139
DCP 5	.2CC	0.011 137	0.006 250	0.007 278	0.005 244	0.012 243	0.012 249	0.014 351	0.011 68	0.002 80
DCP 6	.250	0.013 47	0.007 155	0.001 193	0.017 29	0.005 164	0.011 332	0.003 135	0.012 269	0.006 125
DCP 7	.3CC	C.CC1 213	0.006 229	0.007 254	0.004 285	0.009 239	0.008 294	0.006 356	0.012 47	0.012 89
DCP 8	.4CC	0.017 27	0.011 116	0.011 153	0.008 32	0.009 73	0.002 199	0.010 66	0.0C3 151	0.010 86
DCP 9	.5CC	0.004 216	0.005 69	0.013 161	0.003 236	0.002 3	0.003 157	0.003 340	0.0C8 341	0.004 77
DCP 10	.6CC	0.012 316	0.016 132	0.004 158	0.013 325	0.004 202	0.007 183	0.005 97	0.0C8 243	0.010 307
DCP 11	.87E	0.009 344	0.008 203	0.007 42	0.005 213	0.008 198	0.008 157	0.008 157	0.0C3 325	0.003 137

TUNED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
80.0	16.16	0.600	24.35	4.45		5077.1	10

K	ν	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.042	649.0	1451.2	0.63E 07	-0.00238	1.251	22.07	0.1010

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
ALPHA		24.346	4.451 0	0.178 54	0.081 248	0.054 260	0.079 312	0.074 320	0.084 345	0.060 344	0.051 358
CN		1.126	0.079 90	0.023 176	0.016 268	0.002 35	0.012 281	0.002 20	0.004 344	0.004 34	0.003 88
CM		-0.137	0.020 270	0.005 73	0.002 344	0.001 85	0.002 14	0.002 77	0.002 125	0.002 203	0.001 300
DCP 1	.010	2.672	0.862 168	0.042 320	0.016 19	0.024 54	0.022 240	0.015 167	0.013 253	0.027 256	0.033 284
DCP 2	.025	2.486	0.153 183	0.149 154	0.121 306	0.045 90	0.055 348	0.012 54	0.020 34	0.023 144	0.009 243
DCP 3	.100	1.890	0.070 30	0.055 122	0.054 324	0.035 94	0.047 317	0.031 77	0.015 79	0.013 135	0.006 327
DCP 4	.150	1.590	0.099 90	0.069 170	0.057 251	0.010 347	0.027 281	0.019 60	0.005 209	0.007 26	0.007 9
DCP 5	.200	1.485	0.103 52	0.029 108	0.020 292	0.011 62	0.019 277	0.010 41	0.008 56	0.008 318	0.008 95
DCP 6	.250	1.436	0.119 51	0.036 139	0.042 228	0.023 289	0.027 287	0.012 18	0.004 273	0.007 336	0.008 43
DCP 7	.300	1.255	0.117 55	0.020 147	0.019 246	0.006 94	0.014 281	0.008 103	0.002 261	0.006 26	0.006 83
DCP 8	.400	1.185	0.118 59	0.029 188	0.031 225	0.022 292	0.014 259	0.005 288	0.005 341	0.007 271	0.007 357
DCP 9	.500	1.032	0.114 63	0.022 221	0.007 237	0.003 344	0.008 266	0.010 36	0.004 147	0.010 35	0.010 142
DCP 10	.600	0.933	0.103 64	0.024 232	0.005 204	0.005 248	0.011 220	0.012 259	0.011 328	0.007 32	0.006 83
DCP 11	.878	0.708	0.085 78	0.017 230	0.003 217	0.001 182	0.006 200	0.006 241	0.006 305	0.011 31	0.005 144

DATA TYPE	X/C	RES 10 PHI	RES 11 PHI	RES 12 PHI	RES 13 PHI	RES 14 PHI	RES 15 PHI	RES 16 PHI	RES 17 PHI	RES 18 PHI
ALPHA		0.053 0	0.042 30	0.029 16	0.038 19	0.025 52	0.017 44	0.019 43	0.019 34	0.028 28
CN		0.003 56	0.005 108	0.003 187	0.002 78	0.003 208	0.004 230	0.003 320	0.004 1	
CM		0.001 119	0.001 233	0.000 318	0.000 260	0.001 16	0.002 49	0.001 94	0.001 115	0.001 151
DCP 1	.010	0.032 268	0.028 308	0.021 297	0.026 28	0.017 290	0.017 48	0.011 261	0.016 111	0.008 144
DCP 2	.025	0.045 100	0.027 149	0.022 210	0.017 164	0.011 155	0.010 248	0.005 37	0.007 225	0.010 115
DCP 3	.100	0.014 25	0.018 138	0.008 103	0.005 150	0.005 260	0.008 155	0.006 286	0.003 70	0.002 166
DCP 4	.150	0.017 92	0.005 159	0.007 230	0.011 332	0.002 44	0.007 3	0.005 98	0.003 26	0.006 164
DCP 5	.200	0.008 301	0.007 110	0.003 100	0.009 110	0.002 355	0.008 136	0.001 176	0.004 347	0.007 6
DCP 6	.250	0.003 96	0.010 10	0.004 263	0.011 17	0.003 211	0.007 343	0.007 15	0.013 39	0.011 75
DCP 7	.300	0.002 218	0.008 109	0.004 174	0.007 90	0.001 147	0.005 201	0.006 287	0.004 274	0.009 335
DCP 8	.400	0.003 37	0.006 45	0.003 203	0.005 327	0.001 349	0.004 271	0.003 303	0.005 16	0.009 60
DCP 9	.500	0.006 284	0.005 59	0.005 122	0.004 210	0.007 317	0.002 213	0.003 289	0.001 260	0.003 303
DCP 10	.600	0.006 100	0.010 120	0.009 202	0.001 320	0.010 194	0.009 249	0.013 251	0.011 318	0.016 347
DCP 11	.878	0.006 310	0.002 5	0.003 57	0.006 96	0.004 183	0.008 213	0.004 317	0.004 256	0.003 272

TUNED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
8C.0	16.13	0.600	24.37	4.55		5077.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.042	645.6	1436.0	0.62E 07	-0.00210	1.237	24.30	0.0680

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
ALPHA		24.368	4.551 C	0.282 27	0.070 276	0.035 231	0.071 316	0.082 18	0.094 332	0.1C1 339	0.049 333
CN		1.133	0.096 90	0.026 178	0.009 343	0.012 82	0.003 220	0.002 4	0.007 319	0.0C7 38	0.004 147
CM		-0.142	0.C18 270	0.006 63	0.002 353	0.001 97	0.002 349	0.001 76	0.002 131	0.0C3 196	0.001 282
DCP 1	.C10	2.723	C.887 169	0.135 83	0.061 130	0.090 79	0.018 157	0.069 128	C.053 169	0.043 149	0.022 154
DCP 2	.025	2.575	0.307 139	0.202 143	0.123 354	0.099 100	0.048 9	0.027 82	0.039 13	0.033 151	0.009 247
DCP 3	.100	1.891	C.1CC 52	0.026 198	0.052 356	0.028 131	0.016 287	0.008 171	0.018 253	0.006 296	0.022 219
DCP 4	.150	1.556	0.136 77	0.057 146	0.029 308	0.043 40	0.003 160	0.026 9	0.014 14	0.014 83	0.006 107
DCP 5	.200	1.410	0.115 52	0.004 187	0.006 1	0.015 127	0.007 263	0.007 57	0.006 227	0.0C6 354	0.006 234
DCP 6	.250	1.407	0.133 53	0.030 139	0.013 290	0.033 31	0.010 188	0.020 7	0.012 54	0.013 97	0.009 153
DCP 7	.300	1.306	C.130 53	0.020 198	0.005 192	0.005 128	0.006 256	0.005 56	0.007 250	0.009 32	0.002 137
DCP 8	.400	1.174	0.123 52	0.025 187	0.010 275	0.013 25	0.012 224	0.008 315	0.017 306	0.015 13	0.005 151
DCP 9	.500	1.009	0.114 6C	0.021 217	0.009 161	0.011 228	0.004 272	0.003 221	0.011 275	0.012 0	0.007 83
DCP10	.60C	C.548	0.109 67	0.028 207	0.007 343	0.012 60	0.016 187	0.014 281	0.014 344	0.015 12	0.009 107
DCP11	.87E	0.754	0.C87 78	0.026 226	0.005 148	0.003 200	0.005 83	0.005 142	0.007 300	0.0C8 46	0.005 126

DATA TYPE	X/C	RES 10 PHI	RES 11 PHI	RES 12 PHI	RES 13 PHI	RES 14 PHI	RES 15 PHI	RES 16 PHI	RES 17 PHI	RES 18 PHI
ALPHA		0.046 331	0.064 341	0.042 7	0.041 359	0.044 1	0.045 16	0.037 20	0.038 24	0.031 38
CN		0.004 224	0.000 55	0.004 205	0.001 71	0.001 196	0.002 21	0.001 234	0.0C1 134	0.003 25
CM		C.0C1 6	0.001 187	0.001 355	0.001 66	0.0C2 138	0.001 161	0.001 205	0.000 29	0.001 58
DCP 1	.010	0.CC8 31	0.010 276	0.005 190	0.010 232	0.037 172	0.005 173	0.016 166	0.015 98	0.003 144
DCP 2	.025	0.018 233	0.012 172	0.008 132	0.016 137	0.015 171	0.007 83	0.017 251	0.012 120	0.023 38
DCP 3	.100	0.007 170	0.008 171	0.002 38	0.013 75	0.010 175	0.002 1	0.010 271	0.010 307	0.012 336
DCP 4	.150	0.016 322	0.013 4	0.006 319	0.002 344	0.003 171	0.003 181	0.007 146	0.017 156	0.011 141
DCP 5	.200	0.002 194	0.004 166	0.006 288	0.014 50	0.007 138	0.004 151	0.007 206	0.0C5 346	0.007 26
DCP 6	.250	C.006 288	0.007 64	0.010 215	0.011 22	0.017 103	0.012 130	0.011 153	0.009 145	0.012 121
DCP 7	.30C	0.008 214	0.007 284	0.006 263	0.007 40	0.004 155	0.004 70	0.004 234	0.0C2 34	0.005 21
DCP 8	.4CC	0.006 254	0.006 221	0.013 274	0.006 357	0.007 60	0.007 72	0.007 43	0.0C9 70	0.011 39
DCP 9	.500	0.006 155	0.004 295	0.004 252	0.006 26	0.004 53	0.004 16	0.003 145	0.0C4 278	0.005 349
DCP10	.600	C.006 204	0.008 79	0.015 179	0.013 219	0.010 239	0.007 265	0.007 294	0.0C6 295	0.005 328
DCP11	.878	0.001 200	0.004 321	0.005 131	0.002 258	0.010 330	0.005 358	0.006 49	0.0C5 150	0.005 201

TUNED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
80.0	15.87	0.600	24.35	4.57		5077.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.041	644.7	1429.7	0.62E 07	-0.00207	1.238	24.08	0.0250

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		24.351	4.567	0	0.238	33	0.113	250	0.097	283	0.071	289	0.149	342	0.156	335	0.109	1	0.058	10
CN		1.129	0.096	90	0.028	166	0.010	323	0.003	110	0.010	305	0.003	31	0.004	354	0.011	60	0.006	139
CM		-0.144	0.016	270	0.002	59	0.003	353	0.003	94	0.000	149	0.001	133	0.002	180	0.003	194	0.001	272
DCP 1	.010	2.767	0.995	171	0.048	136	0.058	117	0.061	125	0.041	324	0.037	149	0.029	208	0.059	175	0.028	195
DCP 2	.025	2.574	0.298	118	0.186	141	0.114	346	0.088	56	0.048	312	0.030	87	0.034	182	0.058	116	0.035	170
DCP 3	.100	1.837	0.078	37	0.057	173	0.066	337	0.054	133	0.028	318	0.025	107	0.003	319	0.002	25	0.001	271
DCP 4	.150	1.565	0.152	84	0.070	166	0.025	274	0.010	241	0.023	262	0.018	323	0.021	28	0.040	89	0.013	156
DCP 5	.200	1.375	0.115	46	0.013	126	0.018	346	0.025	104	0.010	278	0.007	37	0.006	261	0.009	326	0.001	51
DCP 6	.250	1.395	0.137	54	0.032	172	0.017	307	0.005	357	0.008	277	0.007	296	0.005	315	0.014	45	0.004	296
DCP 7	.300	1.302	0.124	50	0.009	156	0.001	86	0.015	110	0.007	229	0.009	47	0.001	226	0.005	356	0.003	111
DCP 8	.400	1.168	0.136	51	0.023	187	0.001	267	0.011	257	0.005	342	0.002	249	0.005	345	0.015	50	0.005	150
DCP 9	.500	0.995	0.115	57	0.015	182	0.005	189	0.001	151	0.005	238	0.007	6	0.011	34	0.010	61	0.006	166
DCP 10	.600	0.943	0.119	60	0.030	197	0.014	252	0.018	274	0.017	326	0.010	323	0.014	348	0.022	42	0.014	122
DCP 11	.878	0.776	0.083	65	0.007	149	0.007	123	0.006	288	0.001	276	0.001	75	0.003	6	0.007	3	0.005	70

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.065	341	0.042	349	0.037	342	0.034	5	0.024	18	0.011	343	0.009	340	0.010	321	0.007	330
CN		0.002	70	0.001	251	0.002	124	0.000	146	0.003	136	0.001	202	0.001	257	0.002	238	0.001	335
CM		0.001	275	0.001	336	0.000	217	0.000	308	0.000	186	0.000	24	0.000	187	0.001	356	0.000	124
DCP 1	.010	0.049	144	0.011	196	0.028	122	0.011	227	0.012	13	0.026	319	0.017	288	0.014	326	0.018	242
DCP 2	.025	0.010	124	0.008	100	0.007	137	0.016	83	0.030	156	0.014	154	0.012	272	0.007	358	0.010	285
DCP 3	.100	0.008	305	0.007	318	0.011	61	0.013	335	0.019	118	0.004	260	0.003	187	0.002	295	0.009	152
DCP 4	.150	0.002	257	0.019	299	0.013	232	0.005	205	0.006	264	0.009	5	0.003	67	0.004	349	0.008	35
DCP 5	.200	0.006	342	0.001	40	0.003	129	0.009	298	0.005	43	0.006	105	0.006	177	0.004	235	0.002	228
DCP 6	.250	0.011	39	0.007	271	0.009	241	0.006	200	0.007	267	0.009	293	0.010	339	0.001	0	0.006	355
DCP 7	.300	0.004	87	0.002	110	0.004	155	0.009	314	0.005	69	0.005	108	0.005	171	0.004	300	0.005	114
DCP 8	.400	0.009	13	0.003	24	0.006	131	0.007	138	0.003	228	0.005	329	0.005	332	0.005	23	0.008	44
DCP 9	.500	0.006	8	0.005	93	0.005	106	0.005	219	0.005	26	0.004	74	0.003	125	0.006	253	0.007	355
DCP 10	.600	0.003	162	0.009	244	0.001	181	0.004	147	0.005	180	0.006	187	0.009	211	0.011	209	0.005	266
DCP 11	.878	0.005	113	0.005	118	0.003	31	0.003	60	0.002	77	0.001	264	0.005	12	0.004	101	0.001	200

TUNED PITCHING OSCILLATION VERTOL 23013-1.59 AIRFOIL

TUNED FRS	AIRFOIL FRS	MACH NO	ALPHA,0	0.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
34.0	14.42	0.620	0.22	5.26		5343.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.263	436.7	733.6	0.675 07	-0.00026	0.549	5.26	0.0229

HARMONIC ANALYSIS

DATA TYPE	K/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
ALPHA		0.222	5.041 0	0.428 357	0.106 327	0.286 329	0.065 343	0.259 336	0.068 320	0.030 302	0.046 324
CN		0.129	0.646 356	0.043 356	0.022 356	0.315 350	0.014 318	0.326 339	0.028 312	0.002 255	0.011 326
CM		-0.028	0.013 191	0.003 206	0.002 183	0.332 92	0.330 352	0.332 150	0.002 91	0.001 27	0.001 357
DCP 1	.010	-1.148	0.867 355	0.061 33	0.135 7	0.130 17	0.119 313	0.050 206	0.033 329	0.038 186	0.117 311
DCP 2	.100	0.454	1.372 352	0.130 335	0.335 339	0.316 339	0.314 327	0.314 324	0.315 342	0.307 354	0.339 314
DCP 3	.150	0.487	0.917 350	0.084 352	0.227 345	0.217 337	0.219 330	0.210 335	0.210 329	0.210 319	0.210 301
DCP 4	.200	0.293	0.691 352	0.066 344	0.026 328	0.218 312	0.212 322	0.226 321	0.225 322	0.213 353	0.223 0
DCP 5	.250	0.343	0.708 353	0.060 358	0.022 340	0.215 330	0.217 334	0.227 335	0.227 342	0.220 313	0.227 301
DCP 6	.300	0.203	0.582 354	0.050 346	0.023 335	0.211 343	0.229 352	0.224 326	0.226 322	0.225 319	0.225 296
DCP 7	.400	0.183	0.443 354	0.068 4	0.015 350	0.211 336	0.213 329	0.222 327	0.225 338	0.227 328	0.226 292
DCP 8	.500	0.140	0.325 356	0.036 342	0.012 330	0.227 350	0.206 324	0.225 311	0.225 336	0.226 0	0.234 274
DCP 9	.600	0.105	0.257 358	0.031 9	0.011 356	0.218 331	0.210 324	0.225 309	0.223 340	0.222 289	0.226 331
DCP10	.878	0.085	0.175 4	0.017 31	0.010 9	0.212 318	0.224 262	0.211 330	0.217 275	0.210 193	0.206 285

DATA TYPE	K/C	RES 10 PHI	RES 11 PHI	RES 12 PHI	RES 13 PHI	RES 14 PHI	RES 15 PHI	RES 16 PHI	RES 17 PHI	RES 18 PHI
ALPHA		0.033 302	0.033 312	0.027 321	0.032 313	0.025 296	0.025 285	0.028 303	0.018 324	0.017 281
CN		0.005 259	0.003 275	0.005 316	0.333 113	0.332 88	0.334 330	0.001 107	0.008 234	0.007 284
CM		0.002 24	0.002 291	0.001 357	0.331 325	0.001 98	0.331 334	0.001 159	0.002 328	0.001 256
DCP 1	.010	0.028 276	0.061 265	0.086 336	0.330 97	0.089 93	0.052 346	0.062 139	0.143 310	0.097 280
DCP 2	.100	0.005 280	0.006 301	0.006 296	0.336 4	0.337 278	0.006 255	0.012 279	0.305 286	0.333 313
DCP 3	.150	0.000 332	0.000 313	0.004 313	0.335 320	0.005 280	0.007 300	0.002 256	0.003 255	0.006 248
DCP 4	.200	0.003 298	0.008 327	0.003 62	0.333 225	0.006 237	0.335 6	0.005 280	0.008 255	0.009 273
DCP 5	.250	0.006 327	0.005 319	0.003 295	0.333 301	0.005 278	0.337 299	0.003 225	0.003 330	0.005 247
DCP 6	.300	0.003 277	0.003 333	0.002 235	0.331 358	0.006 275	0.336 295	0.006 288	0.002 217	0.333 272
DCP 7	.400	0.005 311	0.004 319	0.003 262	0.331 279	0.002 259	0.333 315	0.003 267	0.001 301	0.003 279
DCP 8	.500	0.001 313	0.002 305	0.001 331	0.333 56	0.003 332	0.001 289	0.003 296	0.004 248	0.002 260
DCP 9	.600	0.003 296	0.000 17	0.003 262	0.332 61	0.002 281	0.001 14	0.002 286	0.001 159	0.005 283
DCP10	.878	0.014 298	0.008 130	0.003 226	0.328 136	0.000 31	0.332 143	0.005 17	0.006 191	0.006 50

TUNED PITCHING OSCILLATION VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
56.0	15.70	0.400	7.62	4.83		5048.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.059	441.7	741.0	0.48E 07	-0.00067	1.355	11.89	0.0800

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		7.623	4.832	0	0.334	354	0.055	0	0.061	327	0.044	324	0.029	290	0.020	6	0.050	300	0.040	310
CN		0.999	0.006	90	0.061	31	0.015	343	0.003	312	0.009	332	0.005	244	0.006	61	0.006	318	0.001	258
CM		-0.008	0.005	270	0.003	238	0.001	29	0.001	195	0.001	248	0.001	235	0.001	61	0.000	164	0.001	60
DCP 1	.010	3.637	0.666	358	0.132	20	0.050	355	0.042	168	0.089	304	0.115	228	0.077	76	0.037	293	0.024	98
DCP 2	.100	2.524	1.132	358	0.176	33	0.056	359	0.022	310	0.011	334	0.004	307	0.010	36	0.016	338	0.012	302
DCP 3	.150	2.128	0.717	357	0.117	27	0.029	336	0.013	323	0.009	356	0.006	331	0.005	348	0.008	310	0.003	308
DCP 4	.200	1.806	0.639	358	0.104	28	0.029	346	0.006	347	0.006	3	0.005	86	0.006	10	0.010	5	0.004	313
DCP 5	.250	1.532	0.538	0	0.092	29	0.019	333	0.011	322	0.007	345	0.007	339	0.003	25	0.008	323	0.004	278
DCP 6	.300	1.030	0.465	1	0.075	31	0.019	345	0.006	318	0.007	27	0.004	325	0.004	32	0.006	332	0.003	288
DCP 7	.400	0.825	0.357	2	0.061	29	0.012	318	0.008	307	0.006	354	0.005	339	0.002	1	0.006	322	0.003	232
DCP 8	.500	0.732	0.256	4	0.053	37	0.012	333	0.001	339	0.003	10	0.002	62	0.002	68	0.005	333	0.004	241
DCP 9	.600	0.490	0.203	5	0.034	37	0.007	317	0.002	327	0.007	5	0.005	336	0.002	330	0.002	281	0.003	152
DCP10	.878	0.209	0.084	12	0.018	49	0.001	154	0.004	45	0.004	339	0.004	149	0.004	103	0.003	320	0.002	277

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.022	326	0.037	320	0.022	293	0.031	307	0.021	321	0.025	309	0.021	312	0.017	310	0.022	307
CN		0.006	13	0.002	279	0.002	268	0.005	49	0.003	333	0.005	350	0.008	332	0.003	145	0.006	269
CM		0.001	324	0.001	170	0.000	240	0.000	49	0.000	221	0.000	31	0.001	307	0.001	165	0.001	252
DCP 1	.010	0.075	351	0.045	181	0.034	214	0.053	75	0.016	310	0.059	357	0.127	321	0.075	156	0.097	262
DCP 2	.100	0.011	19	0.010	317	0.008	341	0.010	355	0.010	336	0.007	16	0.008	349	0.005	47	0.004	336
DCP 3	.150	0.006	354	0.007	290	0.007	321	0.005	339	0.005	346	0.004	332	0.003	342	0.005	313	0.002	298
DCP 4	.200	0.004	77	0.005	316	0.003	325	0.004	48	0.003	352	0.002	87	0.004	13	0.008	6	0.003	179
DCP 5	.250	0.004	22	0.005	292	0.004	333	0.004	340	0.004	342	0.007	318	0.002	346	0.003	297	0.002	310
DCP 6	.300	0.002	32	0.005	322	0.004	349	0.005	0	0.003	304	0.002	342	0.003	11	0.003	15	0.002	294
DCP 7	.400	0.003	50	0.004	321	0.003	308	0.001	353	0.002	298	0.004	317	0.003	329	0.004	296	0.002	299
DCP 8	.500	0.002	68	0.003	322	0.002	66	0.004	62	0.001	329	0.001	323	0.003	0	0.003	91	0.003	262
DCP 9	.600	0.002	58	0.002	298	0.001	291	0.002	6	0.002	339	0.003	340	0.001	65	0.001	329	0.003	260
DCP10	.878	0.003	54	0.003	348	0.002	204	0.003	91	0.003	17	0.002	343	0.003	27	0.003	138	0.002	22

TUNED PITCHING OSCILLATION VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
96.0	15.55	0.400	7.69	4.89		5368.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.059	438.3	736.6	0.47E 07	-0.00035	1.322	12.35	0.0620

HARMONIC ANALYSIS

DATA TYPE	Y/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		7.597	4.894	0	0.402	7	0.197	4	0.075	333	0.067	354	0.050	355	0.055	338	0.026	348	0.039	350
CN		0.066	0.354	2	0.074	12	0.020	331	0.015	19	0.004	313	0.006	16	0.007	338	0.006	325	0.005	31
CM		-0.012	0.014	192	0.004	170	0.002	6	0.000	193	0.002	257	0.000	285	0.001	18	0.000	169	0.000	49
DCP 1	.010	3.539	0.623	15	0.184	5	0.105	325	0.065	88	0.087	263	0.026	359	0.053	341	0.021	304	0.035	67
DCP 2	.100	2.532	1.135	358	0.217	21	0.066	357	0.028	317	0.013	336	0.012	352	0.015	345	0.011	347	0.014	347
DCP 3	.150	1.823	0.705	357	0.130	15	0.038	333	0.010	350	0.008	29	0.010	34	0.008	336	0.007	324	0.005	22
DCP 4	.200	1.439	0.632	358	0.117	21	0.025	345	0.013	349	0.007	349	0.007	25	0.011	346	0.007	9	0.013	22
DCP 5	.250	1.351	0.533	0	0.103	13	0.031	329	0.006	9	0.007	41	0.008	39	0.007	339	0.006	327	0.005	354
DCP 6	.300	1.041	0.457	1	0.083	21	0.025	335	0.007	349	0.001	48	0.007	5	0.008	0	0.006	308	0.005	33
DCP 7	.400	0.821	0.354	2	0.072	8	0.021	318	0.002	43	0.005	58	0.007	43	0.003	316	0.002	277	0.002	329
DCP 8	.500	0.619	0.257	3	0.063	20	0.017	332	0.006	337	0.003	49	0.006	3	0.005	351	0.003	314	0.003	18
DCP 9	.600	0.488	0.206	6	0.063	357	0.011	298	0.006	64	0.004	65	0.006	43	0.002	310	0.002	326	0.003	15
DCP10	.878	0.234	0.089	10	0.026	358	0.004	178	0.003	16	0.002	30	0.002	265	0.002	279	0.003	361	0.002	88

DATA TYPE	Y/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.032	354	0.020	351	0.024	348	0.028	5	0.017	343	0.024	350	0.031	354	0.022	358	0.021	346
CN		0.005	333	0.008	19	0.002	137	0.002	259	0.004	80	0.002	174	0.005	336	0.005	87	0.001	263
CM		0.001	271	0.001	15	0.000	90	0.002	160	0.002	147	0.000	257	0.000	224	0.000	69	0.001	342
DCP 1	.010	0.083	276	0.105	26	0.042	158	0.071	104	0.106	118	0.035	100	0.052	311	0.098	101	0.030	280
DCP 2	.100	0.038	350	0.007	338	0.016	343	0.010	357	0.005	336	0.006	328	0.009	355	0.006	1	0.004	331
DCP 3	.150	0.007	332	0.005	347	0.005	321	0.004	345	0.007	356	0.003	352	0.004	339	0.007	329	0.001	11
DCP 4	.200	0.004	0	0.003	322	0.010	330	0.003	45	0.003	8	0.005	131	0.006	327	0.005	334	0.007	12
DCP 5	.250	0.005	353	0.005	352	0.003	358	0.004	354	0.005	347	0.002	322	0.003	8	0.006	333	0.001	11
DCP 6	.300	0.004	20	0.003	24	0.001	9	0.004	346	0.003	298	0.002	61	0.004	32	0.003	323	0.002	37
DCP 7	.400	0.002	331	0.003	5	0.003	252	0.002	344	0.003	22	0.002	332	0.002	60	0.003	311	0.002	107
DCP 8	.500	0.003	61	0.003	9	0.001	19	0.002	359	0.005	272	0.001	67	0.004	15	0.001	1	0.000	50
DCP 9	.600	0.001	355	0.002	330	0.001	150	0.003	8	0.002	20	0.001	79	0.001	359	0.002	7	0.002	157
DCP10	.878	0.000	62	0.003	63	0.003	213	0.008	337	0.007	12	0.003	141	0.006	341	0.007	171	0.007	187

TUNED PITCHING OSCILLATION VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D,ALPHA	DEL,H	TEST POINT	CYCLES ANALYZED
26.0	15.53	0.600	7.61	4.38		5968.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.059	637.6	733.6	0.67E 07	-0.03059	1.290	12.37	0.0220

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
ALPHA		7.413	4.979 0	0.364 8	0.068 334	0.053 339	0.048 336	0.015 14	0.059 330	0.024 291	0.032 298
CN		0.026	0.354 359	0.061 25	0.021 339	0.011 274	0.011 4	0.004 12	0.006 351	0.004 238	0.007 290
CM		-0.011	0.015 199	0.003 189	0.002 28	0.001 255	0.001 32	0.002 319	0.002 203	0.002 193	0.002 347
DCP 1	.010	3.369	0.542 359	0.124 50	0.138 357	0.119 247	0.046 78	0.060 356	0.007 175	0.021 76	0.102 306
DCP 2	.100	2.525	1.148 356	0.177 32	0.058 352	0.033 335	0.016 298	0.002 247	0.014 315	0.006 325	0.012 288
DCP 3	.150	1.797	0.709 355	0.117 15	0.038 335	0.013 326	0.008 325	0.007 340	0.009 333	0.006 313	0.005 326
DCP 4	.200	1.445	0.665 355	0.105 10	0.031 327	0.012 287	0.008 20	0.006 8	0.007 344	0.012 270	0.002 218
DCP 5	.250	1.327	0.535 358	0.092 14	0.027 332	0.008 320	0.005 352	0.007 346	0.008 343	0.005 280	0.002 336
DCP 6	.300	1.037	0.466 359	0.081 30	0.017 343	0.010 337	0.004 326	0.005 342	0.005 312	0.002 331	0.002 295
DCP 7	.400	0.813	0.357 1	0.066 0	0.018 325	0.012 353	0.005 332	0.006 336	0.006 341	0.003 280	0.003 341
DCP 8	.500	0.599	0.259 1	0.051 38	0.012 332	0.006 335	0.001 238	0.000 136	0.006 341	0.002 237	0.003 242
DCP 9	.600	0.469	0.205 6	0.039 355	0.008 331	0.003 61	0.002 309	0.005 341	0.006 335	0.003 256	0.002 287
DCP10	.878	0.225	0.089 10	0.019 41	0.005 263	0.007 250	0.008 190	0.013 129	0.013 32	0.010 295	0.008 214

DATA TYPE	X/C	RES 10 PHI	RES 11 PHI	RES 12 PHI	RES 13 PHI	RES 14 PHI	RES 15 PHI	RES 16 PHI	RES 17 PHI	RES 18 PHI
ALPHA		0.023 318	0.029 321	0.016 304	0.015 298	0.019 279	0.023 291	0.014 312	0.011 297	0.015 254
CN		0.001 131	0.003 251	0.003 283	0.005 322	0.004 256	0.002 276	0.001 182	0.004 330	0.006 276
CM		0.000 293	0.001 149	0.000 272	0.000 89	0.001 41	0.001 251	0.001 122	0.001 3	0.001 326
DCP 1	.010	0.017 193	0.038 206	0.027 271	0.040 326	0.027 302	0.060 220	0.046 139	0.074 358	0.082 295
DCP 2	.100	0.005 331	0.017 289	0.013 312	0.015 317	0.016 291	0.014 319	0.007 263	0.006 274	0.004 217
DCP 3	.150	0.002 354	0.004 335	0.006 306	0.006 332	0.002 175	0.002 341	0.003 328	0.005 274	0.003 250
DCP 4	.200	0.004 72	0.002 283	0.006 326	0.009 301	0.004 163	0.003 276	0.003 215	0.003 298	0.005 260
DCP 5	.250	0.002 2	0.002 347	0.004 281	0.006 344	0.000 252	0.002 257	0.002 41	0.003 297	0.003 279
DCP 6	.300	0.002 25	0.004 306	0.002 210	0.002 331	0.003 275	0.001 233	0.001 349	0.004 290	0.003 265
DCP 7	.400	0.002 108	0.003 358	0.004 282	0.004 357	0.001 219	0.001 26	0.002 41	0.003 310	0.002 228
DCP 8	.500	0.002 156	0.002 334	0.001 261	0.002 316	0.002 292	0.001 210	0.002 266	0.002 253	0.002 223
DCP 9	.600	0.003 60	0.003 5	0.003 274	0.002 305	0.003 235	0.003 41	0.002 37	0.003 317	0.002 217
DCP10	.878	0.003 154	0.004 267	0.003 89	0.004 309	0.007 238	0.006 102	0.005 269	0.004 171	0.003 255

TUNED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
96.0	15.55	0.400	10.00	4.56		5353.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.058	446.1	735.9	0.47E 07	-0.00036	1.536	13.21	0.0807

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
ALPHA		10.001	4.644 0	0.375 16	0.038 337	0.032 308	0.075 333	0.055 277	0.042 27	0.043 286	0.043 295
CN		1.204	0.219 17	0.115 34	0.036 333	0.035 306	0.016 319	0.019 213	0.005 352	0.011 339	0.013 362
CM		-0.011	0.025 191	0.009 93	0.005 353	0.002 161	0.003 15	0.003 255	0.002 173	0.002 68	0.002 16
DCP 1	.010	4.788	0.430 14	0.203 21	0.071 196	0.133 17	0.142 338	0.058 257	0.109 267	0.062 322	0.152 7
DCP 2	.100	2.875	0.473 16	0.498 57	0.295 327	0.166 335	0.148 345	0.175 253	0.055 157	0.041 85	0.062 14
DCP 3	.150	2.484	0.320 17	0.276 69	0.115 315	0.023 199	0.032 359	0.031 247	0.015 92	0.018 319	0.006 260
DCP 4	.200	2.250	0.280 26	0.322 65	0.161 310	0.041 221	0.019 207	0.038 187	0.052 72	0.054 351	0.036 287
DCP 5	.250	1.756	0.273 23	0.196 63	0.080 305	0.010 172	0.023 336	0.023 206	0.026 54	0.027 317	0.010 248
DCP 6	.300	1.152	0.267 25	0.204 36	0.033 231	0.038 296	0.009 229	0.028 135	0.040 44	0.038 325	0.025 258
DCP 7	.400	0.947	0.235 21	0.097 24	0.035 260	0.009 55	0.012 338	0.013 152	0.020 7	0.021 276	0.009 218
DCP 8	.500	0.901	0.201 18	0.077 11	0.027 226	0.013 61	0.016 275	0.016 73	0.026 335	0.025 252	0.007 147
DCP 9	.600	0.576	0.170 18	0.031 360	0.013 198	0.010 14	0.010 274	0.014 121	0.013 300	0.013 212	0.004 72
DCP10	.878	0.296	0.132 5	0.020 282	0.013 137	0.013 303	0.008 296	0.006 69	0.002 295	0.003 336	0.005 299

DATA TYPE	X/C	RES 10 PHI	RES 11 PHI	RES 12 PHI	RES 13 PHI	RES 14 PHI	RES 15 PHI	RES 16 PHI	RES 17 PHI	RES 18 PHI
ALPHA		0.029 287	0.026 313	0.031 291	0.030 307	0.028 301	0.031 297	0.027 290	0.018 298	0.023 272
CN		0.007 18	0.003 10	0.005 315	0.001 215	0.006 3	0.005 332	0.006 293	0.003 271	0.003 233
CM		0.003 31	0.001 280	0.000 169	0.000 142	0.000 143	0.001 66	0.001 331	0.002 268	0.002 183
DCP 1	.010	0.147 59	0.056 56	0.068 1	0.027 141	0.068 23	0.056 344	0.090 306	0.093 272	0.095 195
DCP 2	.100	0.047 345	0.049 337	0.041 257	0.024 221	0.011 189	0.011 127	0.012 57	0.014 352	0.015 331
DCP 3	.150	0.011 346	0.016 269	0.011 191	0.010 7	0.011 306	0.006 263	0.004 339	0.008 321	0.010 286
DCP 4	.200	0.022 263	0.014 228	0.006 211	0.002 73	0.003 166	0.010 56	0.018 309	0.020 237	0.013 215
DCP 5	.250	0.006 284	0.005 197	0.006 76	0.010 343	0.006 299	0.007 318	0.007 282	0.006 196	0.003 345
DCP 6	.300	0.010 244	0.018 176	0.012 91	0.012 19	0.011 353	0.011 326	0.016 267	0.009 211	0.008 149
DCP 7	.400	0.009 147	0.008 92	0.010 5	0.007 290	0.002 276	0.001 78	0.003 300	0.005 219	0.002 11
DCP 8	.500	0.002 349	0.002 8	0.006 322	0.005 9	0.006 321	0.006 281	0.002 250	0.000 317	0.006 63
DCP 9	.600	0.003 162	0.002 55	0.002 332	0.002 194	0.006 50	0.002 300	0.008 205	0.003 176	0.006 338
DCP10	.878	0.002 228	0.003 28	0.003 323	0.001 35	0.003 323	0.001 315	0.002 102	0.003 23	0.005 332

TUNED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D,ALPHA	DEL,H	TEST POINT	CYCLES ANALYZED
96.0	15.97	0.400	10.02	4.73		5050.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.061	435.3	732.5	0.47E 07	-0.00010	1.467	13.57	0.0540

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
ALPHA		10.017	4.727 0	0.437 3	0.117 343	0.075 329	0.064 320	0.072 348	0.032 301	0.029 320	0.047 311
CN		1.105	0.230 21	0.134 27	0.021 320	0.016 331	0.015 274	0.016 71	0.005 46	0.009 53	0.010 306
CM		-0.017	0.029 187	0.012 91	0.005 10	0.002 316	0.002 298	0.002 114	0.003 142	0.002 73	0.001 31
DCP 1	.010	4.731	0.470 15	0.304 35	0.171 70	0.127 310	0.112 339	0.137 62	0.018 63	0.079 117	0.039 267
DCP 2	.100	2.796	0.431 28	0.560 49	0.199 338	0.173 312	0.051 250	0.052 229	0.057 157	0.075 95	0.058 18
DCP 3	.150	1.973	0.329 20	0.287 45	0.083 329	0.021 305	0.016 338	0.023 255	0.018 149	0.025 42	0.020 317
DCP 4	.200	1.457	0.291 44	0.355 30	0.125 297	0.038 253	0.051 209	0.040 122	0.038 63	0.048 15	0.040 298
DCP 5	.250	1.439	0.293 28	0.223 33	0.053 296	0.018 332	0.010 245	0.012 162	0.015 56	0.020 356	0.017 284
DCP 6	.300	1.174	0.307 32	0.227 14	0.080 270	0.035 220	0.042 164	0.031 79	0.032 26	0.038 335	0.036 262
DCP 7	.400	0.950	0.270 22	0.113 13	0.020 227	0.015 359	0.008 186	0.013 92	0.019 357	0.014 285	0.005 217
DCP 8	.500	0.709	0.227 19	0.087 344	0.034 171	0.017 51	0.007 20	0.013 325	0.005 299	0.005 281	0.006 240
DCP 9	.600	0.581	0.192 15	0.037 356	0.017 168	0.013 7	0.005 55	0.004 349	0.009 297	0.007 160	0.010 356
DCP10	.878	0.329	0.137 2	0.033 296	0.004 251	0.012 223	0.005 97	0.007 307	0.010 327	0.005 133	0.004 229

DATA TYPE	X/C	RES 10 PHI	RES 11 PHI	RES 12 PHI	RES 13 PHI	RES 14 PHI	RES 15 PHI	RES 16 PHI	RES 17 PHI	RES 18 PHI
ALPHA		0.038 300	0.021 333	0.027 329	0.030 303	0.024 292	0.019 279	0.020 309	0.020 338	0.025 291
CN		0.008 213	0.004 13	0.002 217	0.007 2	0.002 270	0.005 290	0.001 65	0.003 4	0.005 112
CM		0.002 78	0.002 294	0.002 269	0.002 108	0.002 58	0.001 178	0.002 81	0.002 43	0.001 85
DCP 1	.010	0.100 146	0.063 16	0.047 215	0.113 23	0.036 29	0.054 234	0.087 75	0.082 25	0.111 114
DCP 2	.100	0.054 343	0.041 330	0.051 265	0.038 188	0.029 128	0.018 37	0.036 336	0.007 326	0.010 326
DCP 3	.150	0.004 245	0.013 297	0.011 232	0.006 94	0.006 350	0.008 314	0.004 236	0.002 323	0.005 237
DCP 4	.200	0.024 250	0.021 233	0.020 150	0.016 98	0.011 19	0.020 329	0.012 281	0.008 250	0.012 244
DCP 5	.250	0.010 231	0.007 208	0.007 70	0.010 347	0.004 290	0.008 326	0.011 237	0.006 112	0.006 337
DCP 6	.300	0.026 201	0.016 133	0.017 55	0.014 1	0.012 298	0.010 256	0.007 199	0.002 61	0.005 332
DCP 7	.400	0.008 215	0.011 131	0.015 30	0.011 322	0.007 264	0.005 239	0.005 189	0.004 90	0.005 14
DCP 8	.500	0.013 192	0.013 92	0.009 354	0.007 347	0.011 249	0.014 173	0.003 350	0.004 235	0.003 101
DCP 9	.600	0.011 225	0.012 97	0.007 358	0.005 311	0.009 275	0.007 215	0.002 185	0.002 58	0.005 78
DCP10	.878	0.006 283	0.004 0	0.010 150	0.008 320	0.008 294	0.009 353	0.006 285	0.009 249	0.005 190

TUNED PITCHING OSCILLATION VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
96.0	15.82	0.400	9.99	4.77		5357.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.061	434.9	728.7	0.67E 07	-0.00028	1.497	14.92	0.0220

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
ALPHA		9.992	4.770 0	0.310 15	0.068 339	0.087 303	0.068 271	0.116 71	0.088 242	0.022 252	0.035 306
CN		1.117	0.239 18	0.111 14	0.029 310	0.014 254	0.037 156	0.038 325	0.010 265	0.008 61	0.003 358
CM		-0.014	0.027 186	0.009 98	0.004 326	0.003 293	0.002 200	0.002 80	0.004 71	0.002 158	0.000 332
DCP 1	.010	4.846	0.462 14	0.175 326	0.094 282	0.093 247	0.025 141	0.151 312	0.037 283	0.09[illegible] 98	0.018 11
DCP 2	.100	2.839	0.487 21	0.483 66	0.192 339	0.287 303	0.087 236	0.377 147	0.049 88	0.03[illegible] [illegible]	0.330 18
DCP 3	.150	1.995	0.342 16	0.254 42	0.085 338	0.136 278	0.019 191	0.012 57	0.013 240	0.009 [illegible]	0.014 356
DCP 4	.200	1.484	0.317 35	0.315 26	0.109 296	0.142 237	0.045 181	0.041 93	0.020 29	0.034 [illegible]	0.026 277
DCP 5	.250	1.453	0.301 23	0.194 30	0.056 316	0.020 254	0.016 151	0.011 50	0.018 273	0.012 [illegible]	0.011 276
DCP 6	.300	1.189	0.314 26	0.195 9	0.058 271	0.026 217	0.036 137	0.038 46	0.028 313	0.019 275	0.013 237
DCP 7	.400	0.947	0.263 20	0.109 10	0.019 289	0.008 203	0.021 89	0.018 344	0.017 253	0.002 220	0.007 134
DCP 8	.500	0.703	0.231 15	0.070 340	0.017 155	0.013 86	0.020 78	0.025 338	0.029 256	0.015 151	0.038 56
DCP 9	.600	0.583	0.183 16	0.055 350	0.014 132	0.016 82	0.014 45	0.018 287	0.014 227	0.006 98	0.035 92
DCP10	.878	0.326	0.140 2	0.038 279	0.006 127	0.010 151	0.012 297	0.014 233	0.015 261	0.019 3	0.002 310

DATA TYPE	X/C	RES 10 PHI	RES 11 PHI	RES 12 PHI	RES 13 PHI	RES 14 PHI	RES 15 PHI	RES 16 PHI	RES 17 PHI	RES 18 PHI
ALPHA		0.030 278	0.019 269	0.021 280	0.017 289	0.015 257	0.019 265	0.011 262	0.017 219	0.011 264
CN		0.010 317	0.002 297	0.009 191	0.006 291	0.001 133	0.008 245	0.006 279	0.002 295	0.005 283
CM		0.002 268	0.002 295	0.001 60	0.003 223	0.001 40	0.001 125	0.001 251	0.002 301	0.002 281
DCP 1	.010	0.107 324	0.053 151	0.072 158	0.128 255	0.063 92	0.054 231	0.116 286	0.075 300	0.103 287
DCP 2	.100	0.059 321	0.057 250	0.065 199	0.124 114	0.014 15	0.017 246	0.013 132	0.013 359	0.015 252
DCP 3	.150	0.017 256	0.005 171	0.002 248	0.020 357	0.007 319	0.008 223	0.002 122	0.004 268	0.002 182
DCP 4	.200	0.022 234	0.017 177	0.010 89	0.018 70	0.011 345	0.021 270	0.009 174	0.004 293	0.002 158
DCP 5	.250	0.011 184	0.007 50	0.006 277	0.001 41	0.007 297	0.006 233	0.002 175	0.003 219	0.001 325
DCP 6	.300	0.020 205	0.018 118	0.013 21	0.010 339	0.012 275	0.014 232	0.009 169	0.006 153	0.004 125
DCP 7	.400	0.005 55	0.009 332	0.005 227	0.012 344	0.004 195	0.006 80	0.006 298	0.004 216	0.002 76
DCP 8	.500	0.005 219	0.004 25	0.004 299	0.014 310	0.008 292	0.001 318	0.002 319	0.007 205	0.005 55
DCP 9	.600	0.006 7	0.006 317	0.001 127	0.013 20	0.002 288	0.001 203	0.004 214	0.002 137	0.001 56
DCP10	.878	0.011 23	0.006 67	0.016 293	0.011 28	0.006 170	0.011 268	0.007 11	0.000 131	0.002 132

TUNED PITCHING OSCILLATION VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
96.0	15.99	0.400	12.39	4.53		5951.1	10

K	V	Q	RN	DAMPING	CM(MAX)	ALPHA(STALL)	EXT DAMPING
0.060	441.3	736.8	0.47E 07	-0.00008	1.549	15.15	0.0809

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		12.393	4.532	0	0.348	17	0.038	37	0.064	336	0.050	0	0.079	283	0.054	335	0.010	69	0.044	291
CN		1.222	0.184	50	0.081	32	0.041	39	0.039	301	0.019	338	0.014	219	0.007	300	0.009	39	0.008	289
CM		-0.034	0.047	184	0.016	90	0.007	79	0.004	23	0.003	46	0.003	287	0.002	166	0.001	153	0.003	70
DCP 1	.010	5.218	0.522	46	0.161	350	0.189	20	0.098	198	0.030	94	0.048	168	0.034	196	0.115	82	0.041	26
DCP 2	.100	2.701	0.542	142	0.521	76	0.296	54	0.331	32	0.173	14	0.376	300	0.037	326	0.024	239	0.018	332
DCP 3	.150	2.085	0.369	120	0.272	54	0.072	66	0.167	8	0.047	358	0.046	254	0.014	98	0.011	338	0.006	196
DCP 4	.200	1.735	0.383	111	0.275	44	0.090	57	0.094	1	0.084	332	0.059	259	0.022	282	0.042	221	0.011	167
DCP 5	.250	1.509	0.276	86	0.158	36	0.055	51	0.063	322	0.028	321	0.038	225	0.006	185	0.022	130	0.014	344
DCP 6	.300	1.231	0.300	78	0.166	22	0.049	35	0.054	326	0.041	310	0.062	233	0.017	252	0.034	179	0.011	294
DCP 7	.400	1.058	0.254	46	0.073	355	0.033	15	0.031	259	0.014	339	0.027	189	0.006	298	0.021	120	0.012	317
DCP 8	.500	0.884	0.216	37	0.060	333	0.029	339	0.029	237	0.024	264	0.035	148	0.004	68	0.032	78	0.022	304
DCP 9	.600	0.697	0.214	25	0.067	299	0.016	303	0.022	189	0.006	337	0.018	121	0.014	312	0.009	82	0.015	255
DCP10	.878	0.410	0.202	1	0.069	249	0.024	277	0.012	175	0.005	272	0.009	55	0.007	356	0.011	321	0.009	240

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.027	276	0.019	320	0.027	311	0.021	289	0.019	280	0.014	296	0.024	287	0.024	289	0.011	287
CN		0.002	66	0.005	281	0.002	139	0.012	295	0.011	263	0.004	341	0.002	345	0.001	36	0.003	332
CM		0.002	14	0.002	314	0.002	250	0.001	191	0.002	15	0.001	201	0.001	15	0.001	173	0.000	27
DCP 1	.010	0.084	35	0.088	302	0.036	188	0.098	305	0.095	7	0.045	308	0.066	12	0.016	347	0.038	314
DCP 2	.100	0.040	331	0.032	270	0.025	269	0.036	223	0.017	187	0.011	250	0.024	199	0.022	153	0.039	139
DCP 3	.150	0.010	300	0.007	202	0.003	311	0.008	281	0.006	261	0.004	263	0.005	197	0.009	137	0.002	61
DCP 4	.200	0.019	182	0.013	57	0.004	237	0.006	347	0.006	217	0.007	63	0.004	66	0.009	60	0.010	18
DCP 5	.250	0.002	105	0.012	298	0.008	185	0.005	282	0.007	184	0.007	108	0.005	40	0.002	345	0.006	328
DCP 6	.300	0.033	137	0.017	65	0.015	77	0.013	336	0.004	152	0.008	20	0.005	3	0.004	320	0.007	330
DCP 7	.400	0.002	110	0.007	225	0.006	81	0.009	330	0.002	206	0.002	85	0.006	349	0.007	265	0.007	237
DCP 8	.500	0.006	66	0.005	312	0.005	20	0.011	267	0.009	188	0.007	25	0.004	296	0.001	75	0.003	330
DCP 9	.600	0.004	89	0.005	214	0.003	8	0.009	292	0.010	200	0.006	70	0.005	262	0.002	269	0.005	232
DCP10	.878	0.007	237	0.008	160	0.010	100	0.008	352	0.002	222	0.009	323	0.006	154	0.007	19	0.002	9

TUNED PITCHING OSCILLATION — VERTOL 23013-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	0.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
26.0	16.10	0.400	12.37	4.57		5351.2	11

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.061	438.6	730.4	0.675 07	0.00015	1.573	15.19	0.0610

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
ALPHA		12.373	4.574 0	0.336 22	0.056 32	0.085 343	0.063 12	0.028 266	0.162 326	0.036 235	0.009 28
CN		1.189	0.213 64	0.123 20	0.025 29	0.336 1	0.014 351	0.336 94	0.020 332	0.015 251	0.014 162
CM		-0.036	0.048 181	0.016 100	0.006 83	0.006 6	0.003 98	0.001 101	0.002 40	0.003 309	0.001 114
DCP 1	.010	5.262	0.674 39	0.363 359	0.188 332	0.382 164	0.040 126	0.157 101	0.078 356	0.162 303	0.157 141
DCP 2	.100	2.600	0.495 160	0.560 54	0.175 80	0.134 36	0.088 21	0.356 354	0.088 350	0.073 292	0.028 236
DCP 3	.150	1.936	0.633 119	0.281 41	0.075 93	0.055 20	0.034 28	0.025 338	0.030 336	0.031 256	0.018 187
DCP 4	.200	1.590	0.660 110	0.231 37	0.110 72	0.110 353	0.060 329	0.346 283	0.033 297	0.045 220	0.018 187
DCP 5	.250	1.506	0.369 80	0.185 15	0.057 77	0.060 322	0.010 338	0.026 240	0.014 350	0.021 213	0.008 164
DCP 6	.300	1.224	0.336 70	0.108 19	0.045 66	0.045 318	0.032 318	0.031 255	0.027 314	0.029 216	0.010 224
DCP 7	.400	1.036	0.295 53	0.130 344	0.025 9	0.336 239	0.006 11	0.019 184	0.015 326	0.019 170	0.008 151
DCP 8	.500	0.917	0.239 41	0.086 348	0.034 342	0.344 232	0.012 241	0.025 156	0.335 3	0.015 111	0.003 232
DCP 9	.600	0.685	0.234 24	0.078 315	0.023 272	0.335 161	0.014 350	0.016 120	0.023 332	0.011 104	0.009 148
DCP10	.878	0.430	0.211 357	0.027 315	0.028 274	0.312 131	0.013 281	0.015 350	0.014 218	0.002 348	0.006 172

DATA TYPE	X/C	RES 10 PHI	RES 11 PHI	RES 12 PHI	RES 13 PHI	RES 14 PHI	RES 15 PHI	RES 16 PHI	RES 17 PHI	RES 18 PHI
ALPHA		0.023 9	0.033 321	0.025 309	0.015 304	0.014 338	0.019 321	0.015 288	0.014 337	0.012 309
CN		0.004 267	0.006 67	0.011 322	0.337 141	0.332 345	0.336 247	0.331 327	0.003 320	0.036 179
CM		0.002 254	0.002 302	0.001 222	0.331 39	0.002 242	0.331 243	0.331 248	0.001 214	0.002 132
DCP 1	.010	0.131 264	0.028 356	0.109 338	0.375 94	0.034 294	0.191 240	0.023 2	0.014 292	0.071 144
DCP 2	.100	0.016 319	0.016 293	0.019 331	0.339 260	0.016 295	0.034 255	0.018 221	0.025 251	0.039 193
DCP 3	.150	0.003 110	0.011 19	0.007 306	0.339 310	0.011 323	0.002 133	0.005 306	0.000 8	0.004 106
DCP 4	.200	0.024 196	0.016 82	0.009 268	0.333 138	0.005 241	0.007 161	0.003 310	0.003 158	0.335 92
DCP 5	.250	0.009 72	0.011 344	0.003 29	0.311 309	0.004 102	0.339 298	0.005 202	0.002 294	0.004 103
DCP 6	.300	0.020 169	0.006 109	0.009 180	0.339 142	0.007 99	0.038 99	0.005 31	0.008 53	0.010 357
DCP 7	.400	0.013 56	0.002 341	0.010 41	0.334 236	0.009 33	0.006 316	0.006 301	0.002 259	0.001 302
DCP 8	.500	0.010 87	0.005 96	0.012 351	0.331 188	0.006 258	0.015 82	0.009 332	0.012 358	0.014 265
DCP 9	.600	0.009 15	0.006 47	0.010 312	0.338 187	0.006 113	0.336 349	0.005 196	0.001 299	0.038 359
DCP10	.878	0.001 232	0.010 129	0.009 6	0.332 114	0.009 26	0.335 211	0.007 63	0.005 28	0.335 222

TUNED PITCHING OSCILLATION VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
96.0	15.03	0.400	12.39	4.64		5351.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.061	437.6	732.6	0.47E 07	-0.00004	1.610	15.22	0.0220

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		12.394	4.440	0	0.352	22	0.042	32	0.083	352	0.060	17	0.169	8	0.113	242	0.015	187	0.022	328
CN		1.185	0.193	62	0.114	26	0.036	50	0.026	336	0.012	12	0.339	317	0.013	240	0.004	87	0.010	247
CM		-0.029	0.049	183	0.013	102	0.004	126	0.005	19	0.002	55	0.002	10	0.001	58	0.001	128	0.001	255
DCP 1	.010	5.379	0.473	44	0.153	347	0.110	4	0.081	306	0.085	57	0.035	172	0.028	110	0.113	95	0.077	252
DCP 2	.100	2.433	0.621	138	0.594	54	0.157	91	0.163	32	0.069	13	0.098	14	0.068	310	0.039	331	0.032	277
DCP 3	.150	1.921	0.602	119	0.310	42	0.079	92	0.090	6	0.006	277	0.045	5	0.038	254	0.016	247	0.014	203
DCP 4	.200	1.624	0.384	108	0.293	39	0.098	78	0.115	358	0.037	330	0.067	314	0.045	237	0.022	270	0.024	230
DCP 5	.250	1.484	0.308	89	0.207	22	0.054	82	0.053	331	0.002	216	0.020	307	0.024	206	0.007	186	0.008	152
DCP 6	.300	1.223	0.305	76	0.195	23	0.073	53	0.079	322	0.025	333	0.052	289	0.042	218	0.014	167	0.016	210
DCP 7	.400	1.022	0.271	51	0.124	352	0.032	43	0.045	272	0.006	93	0.017	231	0.020	154	0.010	96	0.003	356
DCP 8	.500	0.800	0.228	37	0.074	359	0.034	7	0.037	258	0.010	295	0.022	200	0.015	158	0.013	62	0.006	203
DCP 9	.600	0.654	0.227	28	0.076	318	0.010	351	0.028	212	0.014	60	0.015	165	0.003	178	0.009	70	0.014	304
DCP10	.878	0.412	0.208	357	0.021	286	0.022	323	0.011	102	0.011	252	0.004	18	0.015	283	0.010	296	0.005	141

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.020	301	0.027	309	0.021	291	0.019	273	0.012	320	0.022	276	0.014	266	0.012	248	0.009	264
CN		0.010	158	0.006	114	0.008	70	0.002	282	0.008	30	0.008	0	0.004	279	0.005	239	0.003	301
CM		0.003	208	0.003	218	0.003	122	0.002	349	0.002	354	0.002	5	0.003	327	0.001	293	0.001	66
DCP 1	.010	0.185	172	0.103	130	0.135	86	0.350	14	0.147	10	0.106	15	0.092	331	0.086	271	0.043	315
DCP 2	.100	0.020	275	0.025	256	0.031	257	0.032	265	0.015	180	0.021	314	0.034	234	0.022	184	0.019	174
DCP 3	.150	0.003	161	0.004	174	0.001	22	0.008	295	0.006	80	0.003	333	0.001	220	0.002	333	0.004	212
DCP 4	.200	0.007	186	0.013	236	0.019	130	0.036	78	0.014	96	0.011	44	0.008	42	0.005	36	0.015	24
DCP 5	.250	0.010	48	0.010	290	0.009	147	0.026	337	0.004	20	0.011	318	0.010	204	0.002	150	0.008	142
DCP 6	.300	0.016	159	0.007	123	0.007	121	0.025	164	0.013	84	0.016	42	0.010	65	0.009	17	0.011	5
DCP 7	.400	0.010	35	0.012	259	0.012	125	0.024	356	0.009	2	0.004	285	0.004	336	0.008	221	0.007	26
DCP 8	.500	0.007	103	0.012	90	0.014	343	0.025	206	0.004	40	0.003	29	0.006	322	0.006	263	0.002	32
DCP 9	.600	0.004	153	0.004	66	0.010	353	0.018	299	0.004	315	0.006	316	0.009	243	0.006	97	0.006	294
DCP10	.878	0.009	69	0.018	60	0.006	317	0.011	154	0.007	137	0.006	150	0.015	138	0.005	175	0.008	238

TUNED PITCHING OSCILLATION VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,)	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
96.0	16.26	0.400	14.98	4.44		5052.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.061	442.6	749.5	0.48E 07	-0.00025	1.698	14.86	0.0809

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		14.981	4.436	0	0.056	20	0.139	164	0.088	185	0.028	223	0.068	137	0.050	180	0.051	287	0.034	285
CN		1.199	0.304	96	0.042	39	0.051	66	0.019	68	0.007	239	0.015	359	0.011	111	0.006	269	0.006	136
CM		-0.039	0.046	180	0.010	172	0.011	92	0.007	152	0.004	11	0.004	89	0.001	80	0.002	68	0.002	99
DCP 1	.010	5.408	0.855	78	0.175	31	0.197	58	0.044	126	0.124	308	0.113	319	0.100	107	0.060	186	0.125	115
DCP 2	.100	2.454	1.261	160	0.176	95	0.399	138	0.127	130	0.078	88	0.090	82	0.037	99	0.046	137	0.018	104
DCP 3	.150	1.921	0.765	125	0.014	157	0.176	82	0.046	160	0.038	10	0.035	105	0.006	350	0.027	15	0.006	271
DCP 4	.200	1.725	0.660	119	0.047	95	0.189	76	0.059	97	0.064	32	0.056	49	0.021	13	0.029	10	0.012	357
DCP 5	.250	1.490	0.528	106	0.005	127	0.117	49	0.036	135	0.041	304	0.027	67	0.015	196	0.023	338	0.006	122
DCP 6	.300	1.217	0.441	100	0.032	73	0.107	51	0.043	87	0.029	349	0.043	28	0.006	10	0.024	340	0.015	340
DCP 7	.400	1.031	0.337	80	0.030	24	0.063	5	0.017	51	0.035	254	0.022	346	0.017	156	0.020	285	0.005	15
DCP 8	.500	0.854	0.235	64	0.032	1	0.041	336	0.020	24	0.029	242	0.020	328	0.007	176	0.014	268	0.007	284
DCP 9	.600	0.694	0.213	49	0.040	17	0.034	297	0.029	359	0.030	210	0.025	295	0.014	126	0.013	223	0.002	47
DCP10	.878	0.446	0.177	2	0.055	4	0.028	229	0.030	327	0.011	120	0.018	258	0.004	345	0.009	293	0.006	219

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.021	234	0.015	214	0.021	266	0.011	270	0.015	258	0.013	276	0.011	272	0.008	258	0.010	288
CN		0.012	143	0.008	315	0.008	126	0.013	161	0.004	129	0.004	296	0.005	71	0.008	294	0.006	156
CM		0.002	111	0.003	338	0.001	97	0.003	173	0.001	91	0.001	286	0.002	66	0.002	317	0.000	192
DCP 1	.010	0.171	134	0.206	329	0.098	102	0.237	165	0.054	99	0.097	306	0.138	56	0.160	309	0.071	181
DCP 2	.100	0.035	132	0.016	165	0.029	166	0.010	160	0.011	174	0.013	224	0.013	187	0.020	232	0.011	162
DCP 3	.150	0.009	316	0.002	178	0.008	233	0.001	118	0.007	200	0.006	182	0.009	177	0.003	147	0.005	119
DCP 4	.200	0.011	339	0.002	48	0.002	168	0.005	79	0.008	161	0.007	112	0.010	110	0.004	134	0.009	87
DCP 5	.250	0.012	244	0.006	38	0.010	172	0.002	310	0.006	131	0.007	142	0.005	135	0.004	127	0.002	92
DCP 6	.300	0.008	337	0.011	297	0.004	232	0.007	251	0.001	251	0.007	161	0.002	145	0.006	133	0.006	106
DCP 7	.400	0.010	187	0.009	260	0.007	116	0.006	178	0.004	71	0.006	192	0.002	257	0.001	295	0.003	100
DCP 8	.500	0.002	187	0.009	216	0.002	216	0.003	155	0.004	270	0.002	193	0.006	218	0.004	127	0.002	197
DCP 9	.600	0.008	134	0.006	150	0.000	174	0.007	56	0.003	152	0.005	336	0.002	309	0.005	280	0.004	256
DCP10	.878	0.004	192	0.006	155	0.004	131	0.001	168	0.001	142	0.002	88	0.002	253	0.003	150	0.005	147

TUNED PITCHING OSCILLATION VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
96.0	16.26	0.620	14.99	4.51		5352.2	12

K	V	Q	RN	DAMPING	CM(MAX)	ALPHA(STALL)	EXT DAMPING
0.062	660.7	739.8	0.685E 07	-0.00053	1.586	16.69	0.0620

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		14.996	4.506	359	0.116	36	0.126	159	0.090	185	0.025	127	0.068	130	0.038	114	0.083	269	0.032	246
CN		1.189	0.291	95	0.052	21	0.045	71	0.011	69	0.010	65	0.009	22	0.010	72	0.023	311	0.009	295
CM		-0.038	0.067	186	0.010	177	0.011	100	0.003	148	0.005	60	0.006	89	0.002	32	0.003	16	0.009	119
DCP 1	.010	5.660	0.692	79	0.145	348	0.112	67	0.110	13	0.142	72	0.036	68	0.132	38	0.279	301	0.129	197
DCP 2	.100	2.663	1.262	163	0.196	87	0.321	113	0.117	31	0.097	91	0.087	75	0.053	99	0.050	75	0.018	77
DCP 3	.150	1.957	0.754	126	0.037	14	0.180	85	0.032	183	0.065	25	0.023	128	0.003	22	0.011	34	0.006	309
DCP 4	.200	1.454	0.653	119	0.061	46	0.187	80	0.164	94	0.059	37	0.141	47	0.021	25	0.029	5	0.004	325
DCP 5	.250	1.141	0.519	106	0.037	353	0.116	52	0.026	150	0.063	326	0.018	73	0.017	225	0.020	323	0.011	189
DCP 6	.300	1.228	0.433	99	0.050	65	0.136	56	0.031	79	0.038	355	0.004	24	0.004	350	0.036	336	0.012	293
DCP 7	.400	1.028	0.360	79	0.056	353	0.054	6	0.039	56	0.035	275	0.016	335	0.017	176	0.024	278	0.005	274
DCP 8	.500	0.811	0.244	64	0.060	10	0.063	337	0.019	5	0.030	257	0.020	208	0.012	145	0.022	279	0.010	303
DCP 9	.600	0.688	0.223	48	0.053	351	0.060	301	0.017	356	0.023	224	0.018	295	0.006	120	0.020	256	0.010	231
DCP10	.878	0.453	0.187	2	0.057	13	0.032	335	0.019	349	0.039	110	0.013	247	0.003	6	0.010	224	0.008	143

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.016	199	0.006	266	0.015	270	0.008	183	0.010	216	0.006	272	0.005	310	0.007	211	0.005	260
CN		0.005	77	0.007	156	0.005	88	0.007	218	0.001	122	0.008	78	0.007	120	0.005	122	0.007	273
CM		0.003	21	0.002	189	0.001	79	0.002	197	0.001	34	0.002	26	0.002	178	0.001	195	0.001	276
DCP 1	.010	0.137	29	0.142	185	0.066	74	0.140	227	0.056	19	0.125	58	0.105	142	0.092	117	0.140	274
DCP 2	.100	0.031	106	0.016	96	0.010	136	0.017	216	0.032	176	0.013	163	0.021	165	0.014	155	0.017	132
DCP 3	.150	0.008	28	0.006	17	0.005	200	0.006	336	0.009	217	0.007	156	0.011	136	0.006	99	0.010	88
DCP 4	.200	0.003	27	0.010	88	0.012	61	0.018	62	0.010	62	0.012	34	0.010	35	0.008	335	0.006	331
DCP 5	.250	0.005	220	0.008	56	0.005	157	0.017	360	0.005	153	0.006	154	0.006	82	0.003	95	0.003	56
DCP 6	.300	0.013	260	0.002	85	0.006	113	0.016	356	0.002	86	0.003	41	0.006	21	0.005	0	0.006	320
DCP 7	.400	0.015	158	0.003	28	0.008	31	0.013	20	0.007	25	0.006	36	0.003	318	0.004	335	0.003	257
DCP 8	.500	0.012	204	0.006	284	0.007	353	0.008	260	0.005	224	0.006	154	0.001	12	0.002	25	0.006	247
DCP 9	.600	0.010	145	0.010	164	0.003	313	0.003	111	0.001	135	0.003	58	0.002	66	0.003	220	0.001	228
DCP10	.878	0.002	214	0.006	33	0.002	178	0.006	322	0.005	214	0.007	154	0.008	66	0.002	238	0.001	281

TUNED PITCHING OSCILLATION VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
96.0	14.29	0.400	15.02	4.55		5352.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.062	439.8	739.4	0.48E 07	-0.00076	1.578	15.96	0.0229

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
ALPHA		15.022	4.551 0	0.104 27	0.162 161	0.065 172	0.016 146	0.050 107	0.175 65	0.075 291	0.049 264
CN		1.175	0.276 91	0.057 25	0.050 52	0.017 31	0.003 259	0.016 25	0.024 64	0.018 356	0.003 261
CM		-0.060	0.050 185	0.012 168	0.011 90	0.006 110	0.003 317	0.003 58	0.002 275	0.004 170	0.004 105
DCP 1	.010	5.243	0.578 48	0.184 4	0.360 27	0.113 79	0.290 257	0.090 8	0.127 27	0.088 37	0.136 143
DCP 2	.100	2.467	1.176 143	0.212 44	0.278 118	0.137 102	0.092 130	0.036 71	0.075 91	0.067 55	0.017 97
DCP 3	.150	1.944	0.736 123	0.063 60	0.160 88	0.066 147	0.068 62	0.029 66	0.028 44	0.030 10	0.027 328
DCP 4	.200	1.642	0.615 119	0.051 80	0.122 80	0.047 176	0.050 37	0.018 51	0.037 53	0.037 359	0.012 352
DCP 5	.250	1.437	0.521 103	0.044 24	0.106 51	0.031 139	0.031 341	0.029 38	0.006 79	0.032 346	0.017 298
DCP 6	.300	1.224	0.423 87	0.048 59	0.114 69	0.037 86	0.038 355	0.033 24	0.024 54	0.036 336	0.015 332
DCP 7	.400	1.031	0.349 75	0.042 11	0.042 1	0.024 76	0.019 269	0.024 336	0.014 106	0.028 332	0.012 304
DCP 8	.500	0.793	0.240 60	0.050 11	0.051 337	0.012 1	0.017 260	0.020 300	0.018 86	0.023 290	0.015 301
DCP 9	.600	0.575	0.235 44	0.060 356	0.060 336	0.017 295	0.020 291	0.018 265	0.020 94	0.012 253	0.009 296
DCP10	.878	0.460	0.196 0	0.062 359	0.026 267	0.016 299	0.017 122	0.006 127	0.017 49	0.016 366	0.013 239

DATA TYPE	X/C	RES 10 PHI	RES 11 PHI	RES 12 PHI	RES 13 PHI	RES 14 PHI	RES 15 PHI	RES 16 PHI	RES 17 PHI	RES 18 PHI
ALPHA		0.023 213	0.013 196	0.013 238	0.014 211	0.013 236	0.008 262	0.006 237	0.003 294	0.008 197
CN		0.015 294	0.012 80	0.009 353	0.010 118	0.006 297	0.008 47	0.006 231	0.009 188	0.006 174
CM		0.002 192	0.002 37	0.001 74	0.002 130	0.002 82	0.002 39	0.001 249	0.002 272	0.001 197
DCP 1	.010	0.240 127	0.200 65	0.197 3	0.174 121	0.065 139	0.156 42	0.106 235	0.152 185	0.102 184
DCP 2	.100	0.026 56	0.026 130	0.016 55	0.021 148	0.009 127	0.013 167	0.009 195	0.009 195	0.015 155
DCP 3	.150	0.011 295	0.007 271	0.002 334	0.003 276	0.003 145	0.003 121	0.004 56	0.001 277	0.005 67
DCP 4	.200	0.012 326	0.011 50	0.005 302	0.010 39	0.001 139	0.010 14	0.005 15	0.008 335	0.005 316
DCP 5	.250	0.015 260	0.005 188	0.001 160	0.002 346	0.001 10	0.002 191	0.004 16	0.003 236	0.000 166
DCP 6	.300	0.015 276	0.010 354	0.006 285	0.006 321	0.005 270	0.003 310	0.001 327	0.006 231	0.006 274
DCP 7	.400	0.015 224	0.003 253	0.002 4	0.004 210	0.006 365	0.002 73	0.008 290	0.003 211	0.001 188
DCP 8	.500	0.012 214	0.006 272	0.002 296	0.003 308	0.006 322	0.000 8	0.003 356	0.006 237	0.001 162
DCP 9	.600	0.009 170	0.007 131	0.010 348	0.008 78	0.012 269	0.003 321	0.005 212	0.006 179	0.005 130
DCP10	.878	0.002 358	0.003 120	0.007 303	0.002 157	0.006 272	0.004 112	0.003 136	0.005 175	0.002 38

TUNED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	0.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED	
96.0	15.82	0.600	17.35	4.67		5953.1	10	
	K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
	0.059	445.4	746.9	0.4RE 07	-0.00179	1.558	15.98	0.0809

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		17.346	4.670	0	0.052	38	0.099	211	0.041	221	0.034	156	0.056	275	0.032	285	0.015	245	0.006	263
CN		1.187	0.284	102	0.058	154	0.012	133	0.012	270	0.005	65	0.014	188	0.012	256	0.004	331	0.004	3
CM		-0.055	0.038	202	0.021	211	0.011	258	0.002	108	0.003	174	0.003	329	0.002	305	0.001	64	0.001	56
DCP 1	.010	5.351	0.603	81	0.127	117	0.125	360	0.087	72	0.110	77	0.121	115	0.136	229	0.044	110	0.067	39
DCP 2	.100	2.211	1.141	149	0.434	213	0.120	238	0.129	255	0.035	283	0.080	297	0.051	19	0.030	27	0.051	62
DCP 3	.150	1.769	0.673	175	0.294	199	0.074	273	0.019	75	0.044	219	0.038	280	0.013	336	0.015	271	0.015	324
DCP 4	.200	1.656	0.566	173	0.269	190	0.073	216	0.065	217	0.068	230	0.056	249	0.044	286	0.033	315	0.029	323
DCP 5	.250	1.436	0.473	197	0.174	174	0.069	230	0.025	8	0.022	165	0.060	215	0.027	281	0.012	287	0.009	279
DCP 6	.300	1.175	0.407	193	0.176	162	0.061	185	0.033	214	0.033	190	0.054	229	0.040	267	0.030	280	0.026	295
DCP 7	.400	1.026	0.332	86	0.085	122	0.038	135	0.014	354	0.018	59	0.036	164	0.019	235	0.014	263	0.010	290
DCP 8	.500	0.919	0.240	72	0.075	89	0.043	96	0.016	309	0.028	63	0.020	150	0.009	218	0.012	256	0.008	279
DCP 9	.600	0.725	0.208	61	0.073	63	0.047	90	0.016	335	0.027	22	0.027	116	0.011	165	0.000	191	0.006	26
DCP10	.878	0.511	0.129	27	0.079	17	0.065	56	0.015	268	0.009	304	0.018	183	0.002	162	0.005	91	0.010	211

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.028	245	0.008	194	0.003	274	0.009	155	0.007	137	0.007	155	0.011	136	0.006	143	0.008	135
CN		0.007	74	0.002	266	0.005	269	0.010	280	0.006	11	0.005	65	0.005	290	0.002	56	0.001	59
CM		0.004	83	0.001	111	0.002	220	0.001	217	0.002	113	0.003	78	0.003	295	0.003	70	0.001	193
DCP 1	.010	0.183	70	0.038	265	0.112	233	0.145	256	0.071	89	0.157	77	0.272	294	0.247	62	0.011	201
DCP 2	.100	0.037	107	0.032	115	0.024	150	0.026	233	0.011	342	0.025	316	0.013	358	0.013	27	0.021	54
DCP 3	.150	0.013	324	0.004	187	0.006	317	0.006	303	0.008	286	0.013	264	0.008	260	0.005	276	0.004	170
DCP 4	.200	0.030	340	0.014	30	0.010	70	0.013	59	0.003	106	0.006	241	0.006	239	0.005	256	0.006	330
DCP 5	.250	0.022	283	0.003	239	0.003	314	0.007	327	0.005	309	0.008	267	0.007	247	0.004	227	0.005	297
DCP 6	.300	0.027	312	0.015	341	0.014	17	0.011	41	0.008	29	0.006	86	0.009	167	0.007	274	0.006	216
DCP 7	.400	0.013	276	0.008	27	0.007	348	0.013	336	0.009	343	0.004	334	0.003	255	0.005	54	0.004	101
DCP 8	.500	0.014	249	0.013	35	0.008	293	0.005	317	0.009	294	0.006	296	0.002	332	0.003	259	0.004	234
DCP 9	.600	0.007	296	0.002	133	0.002	68	0.008	349	0.004	346	0.002	324	0.002	75	0.003	60	0.006	69
DCP10	.878	0.005	276	0.005	299	0.003	310	0.006	251	0.006	299	0.005	258	0.002	232	0.004	304	0.003	0

TUNED PITCHING OSCILLATION VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
96.0	15.99	0.400	17.34	4.50		5353.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.060	439.9	737.0	0.498E 07	-0.00134	1.549	15.78	0.0580

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
ALPHA		17.339	4.502 0	0.054 61	0.120 206	0.077 194	0.066 178	0.084 260	0.067 280	0.064 291	0.045 157
CN		1.162	0.299 95	0.044 175	0.009 136	0.038 347	0.004 207	0.020 214	0.013 271	0.024 229	0.016 271
CM		-0.060	0.040 198	0.019 199	0.010 256	0.002 140	0.004 207	0.006 286	0.004 347	0.002 294	0.004 317
DCP 1	.010	5.173	0.644 77	0.169 35	0.040 256	0.055 87	0.033 246	0.072 227	0.127 15	0.156 218	0.205 299
DCP 2	.100	2.159	1.127 142	0.177 214	0.092 235	0.039 251	0.004 254	0.135 280	0.086 295	0.068 298	0.030 337
DCP 3	.150	1.669	0.665 120	0.295 201	0.109 286	0.038 26	0.057 223	0.069 275	0.033 307	0.036 260	0.026 267
DCP 4	.200	1.503	0.590 115	0.278 184	0.051 213	0.030 151	0.065 192	0.064 229	0.049 259	0.048 269	0.039 271
DCP 5	.250	1.380	0.497 102	0.168 175	0.044 255	0.060 18	0.032 162	0.056 223	0.042 273	0.032 236	0.028 232
DCP 6	.300	1.189	0.437 97	0.167 158	0.044 165	0.021 87	0.065 144	0.052 193	0.038 231	0.035 222	0.025 232
DCP 7	.400	1.044	0.368 82	0.083 116	0.039 120	0.023 24	0.036 90	0.047 167	0.031 224	0.033 216	0.021 208
DCP 8	.500	0.862	0.249 67	0.053 82	0.040 92	0.022 2	0.029 51	0.030 123	0.017 157	0.020 185	0.007 158
DCP 9	.600	0.747	0.233 57	0.068 39	0.039 86	0.022 337	0.032 33	0.031 120	0.016 191	0.013 199	0.012 147
DCP10	.878	0.531	0.140 19	0.089 352	0.038 62	0.011 232	0.017 297	0.019 81	0.006 198	0.004 124	0.002 256

DATA TYPE	X/C	RES 10 PHI	RES 11 PHI	RES 12 PHI	RES 13 PHI	RES 14 PHI	RES 15 PHI	RES 16 PHI	RES 17 PHI	RES 18 PHI
ALPHA		0.027 144	0.010 127	0.014 149	0.019 135	0.012 127	0.015 127	0.013 143	0.007 135	0.009 112
CN		0.011 276	0.006 295	0.007 152	0.018 274	0.010 155	0.013 259	0.007 194	0.007 177	0.007 170
CM		0.004 338	0.001 296	0.001 255	0.002 297	0.002 182	0.001 289	0.003 229	0.001 269	0.002 244
DCP 1	.010	0.169 311	0.120 307	0.088 181	0.188 286	0.137 160	0.090 311	0.124 219	0.052 210	0.078 194
DCP 2	.100	0.016 358	0.019 96	0.022 136	0.025 158	0.030 180	0.035 207	0.030 229	0.029 238	0.030 252
DCP 3	.150	0.007 265	0.012 194	0.009 232	0.019 193	0.015 210	0.017 218	0.015 193	0.015 222	0.009 224
DCP 4	.200	0.028 300	0.014 324	0.013 1	0.015 39	0.013 87	0.014 122	0.010 132	0.017 161	0.015 178
DCP 5	.250	0.022 260	0.007 245	0.002 321	0.014 205	0.005 170	0.008 176	0.008 144	0.009 159	0.009 171
DCP 6	.300	0.020 257	0.011 289	0.014 354	0.014 5	0.017 14	0.011 50	0.011 38	0.012 74	0.011 78
DCP 7	.400	0.019 206	0.014 222	0.002 299	0.012 106	0.003 146	0.007 126	0.012 112	0.009 128	0.013 108
DCP 8	.500	0.011 174	0.006 202	0.000 222	0.014 231	0.006 327	0.004 341	0.004 322	0.004 3	0.004 40
DCP 9	.600	0.010 168	0.003 132	0.008 132	0.014 145	0.006 115	0.005 143	0.009 96	0.013 136	0.010 125
DCP10	.878	0.005 201	0.006 30	0.008 169	0.014 219	0.003 131	0.001 55	0.003 24	0.001 203	0.003 72

TUNED PITCHING OSCILLATION VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
94.0	15.87	0.400	17.31	6.56		5353.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.060	439.0	735.6	0.475 07	-0.00158	1.533	16.33	0.0223

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
ALPHA		17.306	4.543 0	0.081 313	0.134 298	0.222 214	0.076 173	0.095 230	0.071 238	0.052 187	0.021 175
CN		1.150	0.295 96	0.052 150	0.010 162	0.226 297	0.010 57	0.015 211	0.015 236	0.013 262	0.005 135
CM		-0.060	0.036 199	0.020 212	0.008 260	0.027 46	0.006 162	0.005 251	0.000 52	0.001 166	0.002 98
DCP 1	.010	5.060	0.658 66	0.073 336	0.136 88	0.262 18	0.124 78	0.147 213	0.157 178	0.186 211	0.102 156
DCP 2	.100	2.191	1.138 144	0.430 211	0.139 213	0.121 260	0.066 260	0.132 275	0.072 323	0.041 335	0.030 352
DCP 3	.150	1.650	0.703 117	0.203 192	0.087 273	0.020 21	0.045 192	0.053 255	0.023 270	0.017 210	0.017 239
DCP 4	.200	1.506	0.580 110	0.266 188	0.063 226	0.035 231	0.031 102	0.044 237	0.038 282	0.016 313	0.005 238
DCP 5	.250	1.362	0.519 100	0.106 153	0.037 233	0.031 358	0.042 109	0.040 135	0.026 255	0.008 161	0.018 185
DCP 6	.300	1.177	0.424 90	0.150 162	0.044 206	0.025 284	0.021 138	0.034 219	0.034 271	0.016 317	0.003 264
DCP 7	.400	1.022	0.364 80	0.126 138	0.035 122	0.020 317	0.043 56	0.035 130	0.016 215	0.003 116	0.007 128
DCP 8	.500	0.824	0.253 71	0.060 91	0.034 135	0.029 281	0.022 34	0.025 135	0.023 207	0.017 259	0.004 244
DCP 9	.600	0.727	0.214 57	0.083 52	0.037 89	0.025 250	0.033 7	0.025 81	0.009 196	0.007 261	0.003 251
DCP10	.878	0.537	0.125 31	0.079 0	0.036 65	0.028 232	0.012 282	0.009 26	0.010 173	0.007 251	0.009 264

DATA TYPE	X/C	RES 10 PHI	RES 11 PHI	RES 12 PHI	RES 13 PHI	RES 14 PHI	RES 15 PHI	RES 16 PHI	RES 17 PHI	RES 18 PHI
ALPHA		0.010 156	0.013 168	0.007 210	0.010 167	0.008 165	0.007 138	0.010 192	0.005 188	0.004 203
CN		0.010 225	0.003 46	0.005 131	0.008 230	0.002 153	0.008 266	0.006 310	0.006 118	
CM		0.003 319	0.004 41	0.003 61	0.003 6	0.001 58	0.002 339	0.003 350	0.002 10	0.003 37
DCP 1	.010	0.132 260	0.113 65	0.162 65	0.060 275	0.060 127	0.114 264	0.105 310	0.109 328	0.118 80
DCP 2	.100	0.017 330	0.018 30	0.030 315	0.017 340	0.020 67	0.014 28	0.017 51	0.013 59	0.022 138
DCP 3	.150	0.003 211	0.001 340	0.006 286	0.008 295	0.005 272	0.005 232	0.003 127	0.002 293	0.006 32
DCP 4	.200	0.002 272	0.010 68	0.004 173	0.011 276	0.005 340	0.005 235	0.005 317	0.005 347	0.004 296
DCP 5	.250	0.012 108	0.001 130	0.005 210	0.007 274	0.004 281	0.007 271	0.004 294	0.003 250	0.001 356
DCP 6	.300	0.010 228	0.005 332	0.003 175	0.010 251	0.003 287	0.005 253	0.006 264	0.006 333	0.003 282
DCP 7	.400	0.010 153	0.005 100	0.005 238	0.008 211	0.005 272	0.006 211	0.005 245	0.006 279	0.003 215
DCP 8	.500	0.017 187	0.011 238	0.006 221	0.007 236	0.005 260	0.005 227	0.011 213	0.004 232	0.006 189
DCP 9	.600	0.009 163	0.007 214	0.012 108	0.013 223	0.003 178	0.010 179	0.009 236	0.006 237	0.009 213
DCP10	.878	0.009 177	0.010 220	0.007 106	0.010 138	0.006 210	0.009 213	0.010 176	0.006 223	0.009 165

TUNED PITCHING OSCILLATION VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
96.0	16.23	0.600	24.58	6.59		5354.1	12

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.063	432.2	743.9	0.695 07	-0.00102	1.296	27.74	0.0803

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
ALPHA		24.678	4.592 0	0.185 35	0.061 172	0.021 178	0.017 189	0.010 190	0.021 169	0.024 313	0.015 118
CN		1.198	0.151 29	0.030 21	0.033 76	0.336 338	0.009 23	0.337 173	0.003 83	0.002 259	0.335 345
CM		-0.113	0.028 213	0.002 238	0.002 125	0.332 17	0.001 336	0.000 283	0.002 163	0.002 139	0.003 312
OCP 1	.010	3.709	0.078 26	0.230 0	0.113 166	0.147 6	0.132 4	0.076 165	0.066 143	0.088 166	0.181 328
OCP 2	.100	1.576	0.191 33	0.037 16	0.025 60	0.316 275	0.011 165	0.339 312	0.006 196	0.004 295	0.010 178
OCP 3	.150	1.466	0.185 26	0.020 65	0.017 22	0.009 184	0.010 17	0.009 200	0.007 71	0.007 278	0.007 143
OCP 4	.200	1.471	0.196 23	0.029 68	0.013 352	0.336 217	0.003 172	0.332 133	0.006 38	0.011 328	0.007 158
OCP 5	.250	1.382	0.207 25	0.017 60	0.017 7	0.336 213	0.010 6	0.010 212	0.006 56	0.006 285	0.005 140
OCP 6	.300	1.215	0.196 27	0.028 69	0.009 337	0.333 242	0.006 111	0.001 316	0.003 345	0.012 315	0.008 153
OCP 7	.400	1.109	0.202 26	0.016 45	0.012 354	0.337 192	0.007 10	0.009 196	0.007 24	0.005 301	0.006 39
OCP 8	.500	1.012	0.169 28	0.025 39	0.008 332	0.332 251	0.006 162	0.001 140	0.006 45	0.009 311	0.010 127
OCP 9	.600	0.869	0.166 31	0.015 24	0.033 284	0.333 221	0.005 55	0.336 180	0.006 14	0.005 327	0.005 89
OCP10	.878	0.663	0.106 37	0.025 21	0.002 184	0.333 297	0.003 77	0.336 136	0.006 343	0.005 338	0.002 62

DATA TYPE	X/C	RES 10 PHI	RES 11 PHI	RES 12 PHI	RES 13 PHI	RES 14 PHI	RES 15 PHI	RES 16 PHI	RES 17 PHI	RES 18 PHI
ALPHA		0.026 226	0.006 114	0.006 175	0.338 198	0.003 156	0.002 174	0.006 170	0.002 118	0.005 137
CN		0.001 347	0.011 72	0.338 259	0.339 337	0.021 6	0.333 93	0.339 337	0.338 138	0.314 82
CM		0.005 60	0.001 92	0.001 57	0.334 335	0.003 45	0.001 356	0.001 28	0.002 86	0.003 96
OCP 1	.010	0.196 67	0.164 67	0.042 261	0.242 332	0.290 20	0.052 32	0.132 340	0.161 111	0.230 83
OCP 2	.100	0.011 288	0.338 116	0.310 236	0.311 193	0.011 357	0.336 116	0.333 247	0.002 250	0.338 81
OCP 3	.150	0.012 258	0.338 133	0.337 286	0.339 201	0.338 358	0.331 336	0.331 115	0.338 288	0.336 156
OCP 4	.200	0.338 289	0.336 147	0.334 226	0.338 196	0.311 344	0.331 96	0.332 32	0.335 261	0.335 99
OCP 5	.250	0.313 258	0.336 122	0.339 280	0.339 293	0.311 5	0.333 276	0.334 108	0.339 280	0.339 152
OCP 6	.300	0.339 246	0.336 164	0.334 234	0.337 293	0.311 352	0.331 246	0.331 313	0.338 262	0.336 125
OCP 7	.400	0.314 258	0.335 113	0.310 280	0.310 187	0.314 351	0.336 174	0.337 25	0.338 240	0.336 99
OCP 8	.500	0.316 265	0.335 59	0.336 272	0.338 170	0.312 323	0.333 161	0.334 327	0.337 177	0.332 115
OCP 9	.600	0.313 262	0.337 52	0.337 272	0.335 158	0.338 336	0.334 147	0.337 344	0.336 134	0.335 23
OCP10	.878	0.339 222	0.333 359	0.336 219	0.334 162	0.336 279	0.334 176	0.336 283	0.334 135	0.333 332

TUNED PITCHING OSCILLATION VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
96.0	16.42	0.600	24.65	4.66		5356.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.062	440.7	735.9	0.67E 07	-0.00162	1.276	25.40	0.0530

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
ALPHA		24.651	4.663 0	0.171 25	0.072 176	0.034 174	0.015 186	0.024 185	0.038 171	0.014 238	0.007 113
CN		1.073	0.155 26	0.023 70	0.007 171	0.006 17	0.011 64	0.010 36	0.006 3	0.011 17	0.007 255
CM		-0.117	0.023 216	0.007 235	0.002 347	0.002 30	0.001 25	0.002 4	0.002 335	0.003 74	0.003 233
DCP 1	.010	3.377	0.367 16	0.105 186	0.058 19	0.141 20	0.116 49	0.147 24	0.156 345	0.202 51	0.195 249
DCP 2	.100	1.560	0.183 30	0.035 67	0.018 115	0.036 272	0.012 99	0.010 71	0.037 178	0.010 319	0.033 114
DCP 3	.150	1.387	0.175 23	0.035 63	0.017 63	0.011 158	0.009 69	0.001 19	0.006 128	0.009 321	0.007 131
DCP 4	.200	1.343	0.185 19	0.026 52	0.008 136	0.014 280	0.012 66	0.006 115	0.006 166	0.009 323	0.002 117
DCP 5	.250	1.324	0.197 23	0.031 59	0.015 65	0.008 144	0.007 57	0.014 43	0.005 123	0.008 333	0.007 132
DCP 6	.300	1.218	0.193 23	0.032 61	0.008 119	0.014 303	0.011 73	0.012 52	0.004 134	0.008 325	0.006 72
DCP 7	.400	1.104	0.190 24	0.031 58	0.009 126	0.014 127	0.005 77	0.005 10	0.007 124	0.010 314	0.005 99
DCP 8	.500	0.955	0.157 25	0.028 56	0.006 157	0.014 313	0.016 78	0.003 179	0.006 83	0.007 292	0.006 13
DCP 9	.600	0.874	0.154 31	0.027 60	0.006 154	0.012 137	0.014 64	0.004 65	0.004 131	0.005 332	0.007 39
DCP10	.878	0.651	0.099 37	0.027 67	0.010 152	0.013 288	0.003 167	0.004 87	0.001 336	0.005 318	0.003 334

DATA TYPE	X/C	RES 10 PHI	RES 11 PHI	RES 12 PHI	RES 13 PHI	RES 14 PHI	RES 15 PHI	RES 16 PHI	RES 17 PHI	RES 18 PHI
ALPHA		0.001 301	0.015 152	0.011 172	0.005 193	0.002 102	0.009 111	0.005 137	0.006 133	0.006 98
CN		0.011 2	0.005 271	0.011 284	0.007 25	0.015 1	0.010 311	0.019 346	0.004 79	0.006 114
CM		0.000 346	0.001 299	0.001 318	0.003 37	0.003 21	0.003 320	0.003 331	0.001 67	0.001 119
DCP 1	.010	0.117 352	0.109 277	0.138 282	0.169 32	0.265 6	0.192 315	0.306 338	0.002 85	0.102 114
DCP 2	.100	0.014 23	0.001 10	0.009 332	0.012 222	0.001 135	0.003 2	0.005 23	0.008 325	0.003 222
DCP 3	.150	0.006 53	0.003 170	0.009 323	0.003 245	0.001 90	0.003 276	0.006 46	0.006 18	0.002 315
DCP 4	.200	0.008 2	0.007 89	0.008 284	0.005 64	0.005 245	0.001 147	0.004 347	0.002 33	0.002 179
DCP 5	.250	0.007 53	0.001 343	0.007 313	0.002 291	0.001 1	0.001 3	0.004 33	0.005 31	0.001 287
DCP 6	.300	0.009 359	0.005 42	0.006 273	0.005 53	0.005 252	0.002 341	0.004 60	0.006 313	0.002 154
DCP 7	.400	0.004 7	0.000 291	0.005 291	0.001 294	0.002 68	0.003 278	0.003 48	0.004 310	0.004 136
DCP 8	.500	0.005 5	0.001 324	0.003 216	0.005 335	0.003 48	0.004 298	0.005 25	0.006 252	0.003 28
DCP 9	.600	0.004 65	0.003 50	0.005 270	0.004 251	0.004 10	0.002 211	0.006 8	0.006 259	0.003 54
DCP10	.878	0.006 343	0.006 194	0.005 272	0.005 210	0.006 290	0.005 137	0.003 358	0.007 123	0.004 139

TUNED PITCHING OSCILLATION VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D,ALPHA	DEL,H	TEST POINT	CYCLES ANALYZED
96.0	16.31	0.420	24.69	4.72		5354.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.062	439.3	736.9	0.47E 07	-0.00178	1.227	27.43	0.0220

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
ALPHA		24.689	4.721 0	0.127 23	0.100 173	0.054 165	0.007 147	0.019 185	0.058 168	0.014 193	0.027 127
CN		1.038	0.147 30	0.015 95	0.005 37	0.005 283	0.009 352	0.005 352	0.005 117	0.002 232	0.010 172
CM		-0.119	0.026 215	0.005 200	0.001 84	0.001 210	0.002 317	0.002 349	0.001 72	0.001 152	0.003 233
DCP 1	.010	3.090	0.131 38	0.214 155	0.055 95	0.077 246	0.184 325	0.131 346	0.084 80	0.071 186	0.183 202
DCP 2	.100	1.525	0.179 31	0.050 252	0.019 32	0.012 332	0.012 92	0.002 354	0.012 196	0.009 355	0.008 135
DCP 3	.150	1.349	0.177 25	0.041 64	0.012 29	0.005 120	0.010 37	0.003 126	0.001 209	0.003 56	0.005 128
DCP 4	.200	1.305	0.189 22	0.004 285	0.006 2	0.005 60	0.006 74	0.005 111	0.008 198	0.006 22	0.003 175
DCP 5	.250	1.281	0.201 25	0.037 53	0.010 44	0.002 88	0.007 41	0.003 111	0.003 202	0.003 50	0.006 160
DCP 6	.300	1.196	0.195 24	0.005 11	0.010 348	0.005 333	0.006 89	0.002 319	0.009 162	0.006 348	0.008 126
DCP 7	.400	1.078	0.195 27	0.035 53	0.006 13	0.001 305	0.004 53	0.003 124	0.003 140	0.004 293	0.006 122
DCP 8	.500	0.918	0.166 28	0.001 298	0.010 329	0.005 339	0.007 84	0.001 119	0.006 163	0.004 337	0.006 97
DCP 9	.600	0.946	0.158 32	0.031 52	0.002 306	0.002 307	0.004 87	0.004 120	0.002 121	0.005 273	0.004 139
DCP10	.878	0.655	0.100 41	0.005 61	0.003 298	0.003 335	0.001 346	0.003 216	0.001 294	0.001 257	0.003 98

DATA TYPE	X/C	RES 10 PHI	RES 11 PHI	RES 12 PHI	RES 13 PHI	RES 14 PHI	RES 15 PHI	RES 16 PHI	RES 17 PHI	RES 18 PHI
ALPHA		0.011 296	0.014 142	0.007 293	0.009 162	0.007 132	0.010 123	0.006 97	0.010 74	0.006 144
CN		0.025 19	0.004 1	0.021 31	0.004 46	0.004 340	0.006 339	0.007 140	0.007 214	0.008 3
CM		0.003 35	0.001 1	0.003 33	0.002 59	0.001 56	0.000 285	0.002 73	0.002 252	0.002 25
DCP 1	.010	0.330 19	0.102 8	0.317 27	0.135 58	0.054 346	0.068 319	0.121 112	0.137 235	0.148 19
DCP 2	.100	0.012 36	0.005 219	0.007 83	0.004 281	0.005 61	0.004 316	0.004 206	0.005 230	0.007 353
DCP 3	.150	0.009 47	0.003 328	0.008 76	0.004 302	0.001 208	0.006 20	0.001 220	0.003 203	0.005 317
DCP 4	.200	0.013 44	0.005 269	0.007 85	0.006 244	0.005 82	0.004 339	0.003 313	0.004 185	0.002 252
DCP 5	.250	0.011 46	0.003 290	0.012 60	0.004 281	0.002 3	0.005 9	0.002 252	0.003 151	0.007 308
DCP 6	.300	0.011 22	0.001 159	0.007 64	0.006 252	0.004 85	0.003 333	0.004 195	0.002 157	0.003 258
DCP 7	.400	0.013 25	0.001 268	0.012 66	0.004 278	0.004 351	0.003 350	0.003 223	0.004 158	0.006 332
DCP 8	.500	0.012 358	0.003 182	0.006 36	0.004 230	0.005 13	0.001 236	0.003 221	0.005 196	0.003 220
DCP 9	.600	0.011 17	0.001 341	0.009 29	0.003 231	0.005 299	0.002 347	0.004 214	0.004 199	0.004 289
DCP10	.878	0.005 333	0.002 155	0.003 280	0.001 7	0.004 257	0.004 346	0.006 181	0.003 116	0.003 182

TUNED PITCHING OSCILLATION VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
96.0	14.58	0.600	0.63	4.74		5355.1	17

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.037	654.0	1469.7	0.635 07	-0.00058	0.761	5.22	0.0800

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
ALPHA		0.402	4.743 0	0.139 354	0.107 291	0.068 215	0.029 207	0.032 214	0.041 260	0.021 263	0.022 288
CN		0.196	0.562 355	0.007 91	0.016 265	0.010 229	0.004 149	0.013 214	0.003 271	0.006 6	0.002 319
CM		-0.023	0.005 236	0.000 39	0.001 135	0.001 340	0.001 110	0.002 192	0.001 330	0.002 17	0.000 36
DCP 1	.010	-0.776	1.089 356	0.038 352	0.065 7	0.060 28	0.060 128	0.110 150	0.064 318	0.121 11	0.032 68
DCP 2	.100	0.746	2.017 353	0.073 110	0.076 276	0.086 241	0.058 141	0.056 229	0.035 191	0.006 9	0.023 270
DCP 3	.200	0.567	0.898 355	0.011 314	0.021 270	0.027 127	0.063 331	0.063 255	0.026 179	0.002 181	0.009 75
DCP 4	.250	0.400	0.722 353	0.026 44	0.028 298	0.010 219	0.008 286	0.038 252	0.010 181	0.002 130	0.006 325
DCP 5	.300	0.233	0.507 356	0.018 85	0.027 292	0.020 231	0.007 229	0.033 231	0.006 182	0.006 236	0.006 252
DCP 6	.400	0.185	0.460 356	0.006 267	0.025 226	0.017 242	0.006 175	0.032 208	0.003 216	0.002 279	0.002 258
DCP 7	.500	0.196	0.321 357	0.010 221	0.017 232	0.015 215	0.006 211	0.033 256	0.002 252	0.002 253	0.001 330
DCP 8	.600	0.096	0.269 359	0.009 252	0.011 230	0.016 206	0.002 242	0.001 234	0.002 206	0.001 192	0.001 277
DCP 9	.878	0.088	0.113 2	0.011 80	0.006 155	0.013 205	0.002 223	0.002 260	0.001 153	0.001 251	0.001 16

DATA TYPE	X/C	RES 10 PHI	RES 11 PHI	RES 12 PHI	RES 13 PHI	RES 14 PHI	RES 15 PHI	RES 16 PHI	RES 17 PHI	RES 18 PHI
ALPHA		0.008 211	0.013 319	0.017 292	0.010 316	0.013 319	0.012 329	0.007 337	0.003 322	0.003 352
CN		0.009 309	0.008 215	0.003 12	0.001 354	0.003 265	0.001 357	0.002 120	0.002 13	0.004 174
CM		0.001 293	0.001 291	0.001 30	0.000 99	0.001 254	0.000 349	0.001 96	0.000 26	0.001 173
DCP 1	.010	0.119 286	0.124 199	0.071 33	0.013 75	0.070 260	0.013 50	0.030 117	0.028 33	0.071 105
DCP 2	.100	0.023 354	0.006 253	0.008 323	0.004 340	0.002 172	0.006 333	0.001 73	0.001 331	0.003 159
DCP 3	.200	0.015 1	0.014 272	0.007 257	0.004 310	0.002 27	0.005 351	0.001 357	0.006 331	0.001 268
DCP 4	.250	0.006 280	0.003 214	0.002 108	0.003 348	0.002 299	0.002 279	0.001 295	0.002 0	0.001 342
DCP 5	.300	0.002 271	0.002 272	0.002 230	0.001 333	0.001 319	0.001 330	0.001 298	0.001 320	0.001 329
DCP 6	.400	0.002 305	0.002 263	0.001 198	0.001 276	0.001 357	0.001 317	0.001 310	0.001 347	0.001 317
DCP 7	.500	0.002 275	0.001 291	0.001 309	0.001 336	0.000 6	0.001 25	0.001 296	0.001 333	0.001 349
DCP 8	.600	0.001 343	0.001 282	0.002 237	0.001 253	0.001 61	0.001 69	0.002 112	0.000 26	0.001 38
DCP 9	.878	0.001 341	0.001 165	0.000 291	0.001 28	0.001 56	0.000 57	0.002 241	0.001 147	0.001 109

TUNED PITCHING OSCILLATION — VERTOL 23010-1.53 AIRFOIL

TUNED FRQ	AIRFOIL FRQ	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
96.0	14.58	0.600	0.33	4.84		5356.2	12

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.037	650.0	1455.0	0.63E 07	-0.00059	0.721	5.26	0.0573

HARMONIC ANALYSIS

DATA TYPE	K/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
ALPHA		0.300	4.836 350	0.182 8	0.057 196	0.037 196	0.012 179	0.017 244	0.018 208	0.016 189	0.007 304
CN		0.156	0.566 355	0.016 9	0.006 333	0.005 213	0.006 176	0.012 241	0.006 206	0.003 171	0.003 137
CM		-0.026	0.006 234	0.002 151	0.002 84	0.003 36	0.002 146	0.002 253	0.001 242	0.000 158	0.001 109
DCP 1	.010	-1.068	1.104 352	0.013 327	0.154 51	0.072 52	0.114 176	0.084 277	0.054 262	0.050 179	0.093 102
DCP 2	.100	0.758	2.324 353	0.062 56	0.043 103	0.174 238	0.053 133	0.150 213	0.016 182	0.005 322	0.013 256
DCP 3	.200	0.427	0.904 355	0.036 337	0.058 196	0.038 117	0.058 333	0.041 253	0.028 167	0.012 195	0.007 66
DCP 4	.250	0.330	0.730 353	0.040 26	0.027 338	0.013 326	0.011 310	0.036 291	0.010 160	0.005 85	0.006 335
DCP 5	.300	0.245	0.603 355	0.023 35	0.028 330	0.016 331	0.006 250	0.033 192	0.006 170	0.003 291	0.002 189
DCP 6	.400	0.184	0.464 355	0.014 337	0.025 336	0.005 272	0.002 195	0.031 141	0.002 169	0.001 260	0.002 277
DCP 7	.500	0.143	0.325 357	0.013 301	0.014 331	0.003 215	0.003 215	0.001 228	0.001 205	0.001 183	0.001 191
DCP 8	.600	0.096	0.253 358	0.013 305	0.01 303	0.003 316	0.002 262	0.001 192	0.001 212	0.001 333	0.001 253
DCP 9	.878	0.096	0.114 2	0.015 18	0.004 160	0.002 179	0.002 226	0.001 198	0.000 17	0.001 227	0.001 3

DATA TYPE	K/C	RES 10 PHI	RES 11 PHI	RES 12 PHI	RES 13 PHI	RES 14 PHI	RES 15 PHI	RES 16 PHI	RES 17 PHI	RES 18 PHI
ALPHA		0.004 41	0.002 14	0.001 337	0.003 340	0.006 179	0.004 288	0.005 357	0.006 143	0.003 271
CN		0.008 246	0.003 166	0.002 337	0.004 33	0.006 339	0.001 202	0.002 165	0.003 280	0.005 139
CM		0.001 233	0.001 108	0.000 301	0.001 43	0.001 306	0.001 213	0.001 122	0.000 285	0.001 193
DCP 1	.010	0.149 228	0.068 111	0.015 286	0.088 35	0.007 313	0.032 202	0.045 130	0.030 286	0.108 196
DCP 2	.100	0.016 350	0.007 233	0.010 347	0.016 37	0.005 151	0.003 236	0.003 183	0.007 253	0.001 32
DCP 3	.200	0.007 7	0.008 256	0.008 211	0.002 214	0.003 148	0.002 146	0.003 292	0.006 296	0.002 1
DCP 4	.250	0.006 247	0.005 170	0.001 72	0.002 269	0.002 278	0.001 325	0.001 55	0.000 210	0.001 232
DCP 5	.300	0.003 245	0.003 231	0.001 246	0.001 287	0.001 223	0.001 13	0.001 272	0.001 288	0.001 292
DCP 6	.400	0.003 246	0.002 189	0.001 232	0.001 228	0.001 232	0.001 249	0.001 323	0.001 250	0.000 244
DCP 7	.500	0.002 249	0.002 227	0.000 195	0.000 322	0.001 31	0.001 76	0.000 243	0.001 319	0.000 309
DCP 8	.600	0.001 216	0.001 127	0.001 302	0.002 285	0.001 242	0.001 343	0.001 244	0.001 190	0.001 263
DCP 9	.878	0.001 226	0.000 229	0.001 316	0.000 226	0.001 14	0.001 54	0.001 187	0.000 99	0.000 87

TUNED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	0.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
96.0	16.58	0.600	0.40	4.91		5356.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.038	468.7	1453.1	0.63E 07	-0.00065	0.793	5.45	0.0220

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
ALPHA		0.602	4.912 0	0.274 359	0.104 293	0.059 205	0.018 138	0.022 229	0.031 213	0.025 209	0.019 245
CN		0.166	0.550 353	0.012 319	0.010 215	0.336 148	0.033 218	0.038 167	0.004 256	0.002 225	0.031 295
CM		-0.027	0.008 216	0.001 297	0.002 112	0.331 94	0.001 125	0.002 149	0.001 290	0.000 168	0.001 337
DCP 1	.010	-1.248	0.377 340	0.104 309	0.091 19	0.115 79	0.027 224	0.110 131	0.042 266	0.015 222	0.037 336
DCP 2	.100	0.756	2.031 351	0.060 45	0.065 197	0.375 236	0.057 123	0.058 218	0.027 203	0.007 27	0.013 232
DCP 3	.150	0.693	1.419 351	0.143 269	0.214 142	0.325 113	0.020 226	0.069 57	0.062 309	0.035 214	0.014 116
DCP 4	.200	0.417	0.918 353	0.028 318	0.062 190	0.335 119	0.052 324	0.066 252	0.024 161	0.010 77	0.010 77
DCP 5	.250	0.309	0.729 352	0.031 45	0.027 296	0.319 210	0.008 291	0.307 245	0.009 170	0.002 95	0.003 365
DCP 6	.300	0.242	0.607 356	0.020 42	0.028 332	0.316 229	0.004 226	0.332 219	0.003 159	0.001 134	0.002 294
DCP 7	.400	0.178	0.465 356	0.002 255	0.026 339	0.296 240	0.002 198	0.332 188	0.003 199	0.002 222	0.002 229
DCP 8	.500	0.129	0.327 355	0.011 269	0.017 293	0.293 227	0.002 222	0.331 255	0.001 228	0.001 315	0.002 187
DCP 9	.600	0.091	0.254 357	0.006 237	0.012 288	0.293 214	0.003 258	0.331 205	0.001 203	0.002 333	0.001 183
DCP10	.878	0.093	0.115 1	0.007 24	0.006 147	0.302 230	0.001 227	0.331 94	0.001 176	0.001 297	0.000 181

DATA TYPE	X/C	RES 10 PHI	RES 11 PHI	RES 12 PHI	RES 13 PHI	RES 14 PHI	RES 15 PHI	RES 16 PHI	RES 17 PHI	RES 18 PHI
ALPHA		0.014 225	0.011 230	0.008 187	0.038 212	0.016 217	0.006 255	0.002 329	0.007 220	0.008 241
CN		0.010 267	0.003 134	0.001 290	0.333 166	0.336 20	0.331 231	0.001 248	0.005 133	0.002 16
CM		0.002 245	0.001 121	0.000 354	0.001 173	0.001 30	0.330 123	0.000 235	0.001 99	0.000 30
DCP 1	.010	0.145 240	0.074 119	0.011 255	0.380 169	0.114 29	0.017 109	0.018 270	0.106 98	0.037 21
DCP 2	.100	0.019 323	0.005 258	0.035 330	0.331 32	0.333 238	0.036 259	0.006 108	0.006 215	0.332 146
DCP 3	.150	0.028 212	0.029 112	0.019 10	0.336 309	0.010 358	0.016 255	0.013 190	0.001 177	0.001 181
DCP 4	.200	0.007 2	0.016 269	0.009 290	0.335 63	0.001 147	0.035 192	0.005 306	0.007 293	0.001 62
DCP 5	.250	0.007 260	0.005 219	0.001 0	0.331 359	0.003 256	0.333 241	0.001 247	0.002 286	0.002 311
DCP 6	.300	0.002 230	0.002 273	0.002 241	0.330 63	0.001 239	0.332 259	0.000 245	0.002 171	0.332 222
DCP 7	.400	0.001 270	0.002 283	0.001 235	0.330 282	0.001 288	0.001 275	0.001 291	0.001 335	0.001 298
DCP 8	.500	0.001 260	0.002 300	0.001 260	0.330 155	0.000 179	0.001 263	0.001 301	0.001 214	0.001 333
DCP 9	.600	0.002 268	0.001 264	0.001 329	0.331 338	0.002 283	0.001 262	0.001 359	0.001 325	0.000 16
DCP10	.878	0.001 339	0.001 327	0.001 293	0.331 62	0.001 172	0.000 2	0.000 167	0.001 179	0.000 222

TUNED PITCHING OSCILLATION VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
96.0	14.58	0.600	7.63	4.35		5957.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.037	553.0	1456.5	0.635 07	-0.00069	1.174	9.90	0.0809

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		7.599	4.369	0	0.071	56	0.176	192	0.067	202	0.058	223	0.051	187	0.027	178	0.056	11	0.050	303
CN		0.868	0.261	11	0.079	54	0.011	33	0.317	84	0.334	319	0.338	62	0.032	38	0.009	2	0.339	231
CM		-0.030	0.031	196	0.011	82	0.001	64	0.334	62	0.002	284	0.000	69	0.001	118	0.001	91	0.001	29
DCP 1	.010	1.039	0.816	11	0.139	352	0.089	9	0.394	25	0.080	259	0.043	10	0.023	112	0.056	63	0.064	306
DCP 2	.100	2.459	0.102	11	0.473	76	0.001	157	0.382	191	0.058	351	0.019	16	0.016	18	0.021	329	0.011	337
DCP 3	.200	1.495	0.303	10	0.263	85	0.053	125	0.111	89	0.052	155	0.016	120	0.028	142	0.014	293	0.016	319
DCP 4	.250	1.359	0.391	18	0.217	77	0.027	29	0.092	86	0.007	229	0.069	87	0.010	168	0.020	33	0.016	259
DCP 5	.300	1.071	0.359	13	0.096	69	0.057	24	0.023	49	0.023	345	0.019	74	0.013	17	0.019	29	0.015	323
DCP 6	.600	0.793	0.312	10	0.061	34	0.026	358	0.016	330	0.013	330	0.018	353	0.016	296	0.017	343	0.019	265
DCP 7	.500	0.621	0.243	11	0.026	346	0.013	358	0.023	258	0.033	131	0.005	338	0.005	343	0.012	340	0.014	283
DCP 8	.600	0.634	0.198	10	0.016	289	0.010	162	0.015	229	0.008	127	0.033	344	0.001	221	0.004	359	0.006	253
DCP 9	.878	0.269	0.153	4	0.028	270	0.026	276	0.027	213	0.003	58	0.031	146	0.003	323	0.003	231	0.032	160

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.016	255	0.002	283	0.009	358	0.004	127	0.005	113	0.008	71	0.002	99	0.008	198	0.004	132
CN		0.006	259	0.007	338	0.002	58	0.334	317	0.007	159	0.036	65	0.006	256	0.000	226	0.036	33
CM		0.001	300	0.001	302	0.002	98	0.332	349	0.001	190	0.000	96	0.001	208	0.001	17	0.001	16
DCP 1	.010	0.063	252	0.025	39	0.05[illegible]	90	0.125	343	0.102	166	0.087	36	0.086	277	0.024	3	0.065	24
DCP 2	.100	0.017	330	0.015	339	0.009	269	0.036	279	0.010	243	0.039	158	0.004	155	0.005	122	0.001	38
DCP 3	.200	0.015	287	0.016	13	0.011	1	0.008	310	0.005	173	0.034	135	0.004	55	0.002	293	0.007	3
DCP 4	.250	0.006	266	0.005	236	0.004	134	0.335	315	0.008	189	0.037	150	0.006	80	0.005	291	0.010	246
DCP 5	.300	0.009	307	0.003	175	0.010	357	0.330	253	0.005	158	0.008	109	0.008	32	0.002	114	0.007	27
DCP 6	.600	0.000	265	0.009	259	0.005	175	0.333	223	0.003	146	0.003	50	0.006	335	0.005	217	0.005	76
DCP 7	.500	0.008	246	0.006	224	0.005	176	0.336	160	0.005	97	0.006	1	0.006	252	0.006	130	0.005	0
DCP 8	.600	0.003	156	0.002	97	0.003	331	0.009	295	0.012	39	0.339	4	0.005	326	0.004	268	0.003	172
DCP 9	.878	0.002	149	0.005	58	0.336	299	0.332	23	0.005	296	0.332	97	0.006	308	0.003	175	0.331	14

TUNED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
96.0	14.58	0.600	7.61	4.46		5357.2	10

K	V	Q	RN	DAMPING	CY(MAX)	ALPHA(STALL)	EXT DAMPING
0.037	649.4	1451.3	0.635 07	-0.00053	1.131	9.78	0.0539

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		7.611	4.460	0	0.181	36	0.113	179	0.060	184	0.031	179	0.030	159	0.049	175	0.040	49	0.046	297
CN		0.859	0.250	10	0.093	51	0.017	58	0.017	53	0.011	353	0.007	26	0.006	96	0.010	3	0.011	333
CM		-0.034	0.032	187	0.011	79	0.002	152	0.003	56	0.003	334	0.001	337	0.002	16	0.002	263	0.001	70
DCP 1	.010	1.958	0.875	8	0.214	19	0.107	47	0.214	310	0.159	326	0.096	295	0.099	50	0.144	322	0.088	319
DCP 2	.100	2.442	0.100	6	0.686	72	0.021	157	0.113	93	0.054	0	0.034	49	0.026	345	0.007	332	0.019	353
DCP 3	.200	1.401	0.322	15	0.265	79	0.066	121	0.127	86	0.069	138	0.021	81	0.061	154	0.020	186	0.021	211
DCP 4	.250	1.276	0.388	14	0.222	74	0.044	66	0.111	81	0.068	45	0.058	83	0.029	162	0.024	190	0.015	163
DCP 5	.300	1.083	0.377	10	0.099	52	0.050	21	0.037	68	0.029	9	0.026	50	0.017	77	0.033	56	0.010	4
DCP 6	.400	0.785	0.322	12	0.061	27	0.028	8	0.017	345	0.023	324	0.008	343	0.011	316	0.013	1	0.015	297
DCP 7	.500	0.559	0.242	10	0.025	7	0.018	38	0.016	298	0.009	287	0.007	216	0.002	120	0.009	37	0.016	315
DCP 8	.600	0.433	0.195	12	0.016	336	0.007	96	0.012	269	0.006	164	0.002	244	0.006	165	0.009	33	0.011	278
DCP 9	.878	0.313	0.160	3	0.023	272	0.007	343	0.012	247	0.008	133	0.002	329	0.005	140	0.006	33	0.005	280

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.023	231	0.003	337	0.008	263	0.004	316	0.012	238	0.013	269	0.001	215	0.005	284	0.002	291
CN		0.010	259	0.004	198	0.006	306	0.004	8	0.003	15	0.005	231	0.002	295	0.007	20	0.001	262
CM		0.001	307	0.001	157	0.001	310	0.001	4	0.000	357	0.001	194	0.001	327	0.001	10	0.001	68
DCP 1	.010	0.110	289	0.057	176	0.068	309	0.099	13	0.048	16	0.091	221	0.026	320	0.127	20	0.022	106
DCP 2	.100	0.026	241	0.003	130	0.015	271	0.010	193	0.005	218	0.012	97	0.019	341	0.014	261	0.006	37
DCP 3	.200	0.013	210	0.013	270	0.012	359	0.013	327	0.003	359	0.009	15	0.004	300	0.002	71	0.006	317
DCP 4	.250	0.017	209	0.013	163	0.013	245	0.013	271	0.007	183	0.009	318	0.009	242	0.001	276	0.003	280
DCP 5	.300	0.012	33	0.004	115	0.010	29	0.003	117	0.009	48	0.008	348	0.007	246	0.004	47	0.002	257
DCP 6	.400	0.006	281	0.006	240	0.002	62	0.001	138	0.007	354	0.008	231	0.007	120	0.007	44	0.005	295
DCP 7	.500	0.009	245	0.004	255	0.005	216	0.003	160	0.001	341	0.004	236	0.007	139	0.006	38	0.004	279
DCP 8	.600	0.007	192	0.001	309	0.003	130	0.002	15	0.002	240	0.002	264	0.006	201	0.004	120	0.002	166
DCP 9	.878	0.001	196	0.001	313	0.004	294	0.002	177	0.002	76	0.001	226	0.002	67	0.004	330	0.004	237

TUNED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
56.0	14.58	0.600	7.61	4.50		5057.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.038	648.3	1450.7	0.63E 07	-0.00048	1.113	10.98	0.0220

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		7.607	4.502	0	0.184	38	0.126	183	0.066	167	0.037	185	0.053	96	0.140	130	0.083	352	0.058	292
CN		0.860	0.046	90	0.089	64	0.020	40	0.024	67	0.004	21	0.006	79	0.018	146	0.018	46	0.004	325
CM		-0.036	0.004	269	0.012	87	0.002	359	0.003	69	0.000	80	0.001	76	0.001	264	0.001	179	0.002	131
DCP 1	.010	1.575	0.883	9	0.133	28	0.168	358	0.083	353	0.036	151	0.071	151	0.063	163	0.123	30	0.055	165
DCP 2	.100	2.431	0.058	5	0.503	76	0.042	77	0.097	86	0.056	356	0.032	0	0.017	132	0.020	88	0.029	14
DCP 3	.200	1.391	0.323	15	0.259	80	0.053	111	0.129	84	0.058	151	0.023	84	0.079	163	0.028	149	0.011	171
DCP 4	.250	1.270	0.387	15	0.226	68	0.044	43	0.105	70	0.006	52	0.048	70	0.041	138	0.031	63	0.007	126
DCP 5	.300	1.072	0.369	10	0.101	63	0.045	25	0.042	71	0.027	2	0.024	48	0.023	144	0.044	63	0.010	43
DCP 6	.400	0.780	0.324	11	0.056	28	0.033	11	0.019	327	0.025	317	0.012	285	0.006	141	0.021	12	0.020	303
DCP 7	.500	0.548	0.242	11	0.027	5	0.013	54	0.007	281	0.008	15	0.006	293	0.010	124	0.012	17	0.009	347
DCP 8	.600	0.437	0.201	10	0.018	301	0.011	141	0.006	237	0.005	189	0.009	170	0.011	106	0.011	16	0.009	299
DCP 9	.878	0.332	0.163	3	0.027	279	0.003	331	0.006	262	0.001	140	0.000	145	0.006	143	0.008	37	0.008	310

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.030	222	0.007	250	0.014	260	0.010	240	0.012	226	0.005	259	0.006	253	0.005	185	0.004	28
CN		0.009	323	0.005	132	0.006	82	0.005	343	0.002	151	0.006	147	0.003	68	0.004	279	0.004	110
CM		0.001	22	0.001	98	0.002	87	0.001	8	0.001	130	0.001	143	0.001	122	0.001	33	0.001	43
DCP 1	.010	0.083	355	0.129	112	0.147	79	0.098	354	0.082	138	0.091	138	0.040	107	0.029	274	0.096	80
DCP 2	.100	0.027	302	0.010	249	0.011	202	0.010	132	0.012	337	0.013	217	0.015	97	0.017	15	0.013	300
DCP 3	.200	0.006	197	0.019	335	0.009	325	0.012	317	0.006	2	0.003	123	0.014	93	0.008	38	0.007	213
DCP 4	.250	0.012	246	0.014	181	0.014	192	0.002	302	0.010	268	0.008	263	0.004	300	0.012	306	0.006	239
DCP 5	.300	0.022	44	0.006	97	0.011	45	0.003	116	0.001	291	0.011	127	0.012	35	0.007	297	0.006	183
DCP 6	.400	0.011	299	0.007	240	0.001	270	0.008	273	0.009	208	0.005	114	0.003	303	0.009	233	0.008	164
DCP 7	.500	0.013	328	0.009	262	0.003	179	0.002	335	0.003	244	0.004	96	0.006	350	0.008	279	0.005	205
DCP 8	.600	0.006	251	0.005	159	0.002	304	0.005	183	0.002	50	0.004	358	0.007	266	0.009	181	0.002	99
DCP 9	.878	0.003	226	0.001	88	0.002	286	0.001	311	0.003	315	0.003	193	0.003	26	0.004	270	0.002	163

TUNED PITCHING OSCILLATION VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
96.0	14.58	0.600	9.99	4.29		5358.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.037	452.6	1463.3	0.63E 07	-0.00063	1.127	10.67	0.0800

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		9.987	4.294	0	0.153	29	0.107	180	0.031	233	0.007	44	0.032	205	0.029	202	0.039	319	0.031	211
CN		0.984	0.141	23	0.061	77	0.033	154	0.008	198	0.033	110	0.032	181	0.033	194	0.010	315	0.038	211
CM		-0.039	0.045	185	0.005	82	0.006	148	0.001	338	0.001	333	0.001	131	0.001	48	0.001	45	0.002	20
DCP 1	.010	2.512	0.718	12	0.203	47	0.095	151	0.052	0	0.103	357	0.041	153	0.075	32	0.115	289	0.047	157
DCP 2	.100	2.546	0.450	172	0.237	80	0.174	157	0.03	50	0.053	170	0.023	132	0.023	170	0.018	49	0.016	329
DCP 3	.200	1.670	0.137	136	0.084	114	0.069	169	0.0	43	0.012	295	0.037	62	0.022	218	0.024	14	0.004	248
DCP 4	.250	1.519	0.162	42	0.166	81	0.130	156	0.36	26	0.013	323	0.010	279	0.033	290	0.021	2	0.003	134
DCP 5	.300	1.156	0.240	17	0.137	90	0.039	143	0.027	172	0.028	154	0.024	265	0.022	211	0.015	13	0.018	255
DCP 6	.400	0.910	0.255	16	0.071	77	0.025	80	0.330	92	0.015	110	0.037	176	0.002	150	0.009	291	0.015	265
DCP 7	.500	0.732	0.233	13	0.028	74	0.018	26	0.312	98	0.009	83	0.008	328	0.012	196	0.009	277	0.016	199
DCP 8	.600	0.529	0.203	12	0.015	289	0.012	7	0.031	177	0.002	36	0.005	27	0.003	249	0.001	30	0.009	203
DCP 9	.878	0.323	0.185	4	0.008	312	0.014	327	0.335	254	0.002	258	0.004	261	0.003	247	0.011	258	0.012	181

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.017	196	0.010	131	0.005	26	0.003	165	0.004	153	0.005	233	0.007	137	0.007	149	0.002	156
CN		0.001	60	0.004	330	0.004	287	0.002	315	0.006	17	0.004	276	0.006	151	0.003	327	0.007	277
CM		0.002	306	0.000	326	0.002	331	0.001	242	0.001	94	0.002	59	0.001	85	0.000	294	0.001	3
DCP 1	.010	0.071	330	0.041	281	0.107	314	0.096	241	0.080	59	0.016	327	0.094	148	0.031	286	0.080	292
DCP 2	.100	0.006	247	0.011	359	0.005	258	0.315	28	0.009	287	0.009	61	0.008	28	0.015	355	0.009	303
DCP 3	.200	0.005	115	0.003	214	0.009	179	0.006	34	0.004	93	0.004	335	0.002	135	0.005	7	0.004	355
DCP 4	.250	0.014	177	0.013	336	0.004	197	0.310	14	0.009	357	0.008	285	0.002	128	0.005	268	0.002	114
DCP 5	.300	0.009	136	0.003	176	0.014	121	0.312	48	0.001	153	0.002	74	0.008	186	0.005	119	0.006	143
DCP 6	.400	0.006	210	0.006	10	0.004	264	0.310	70	0.014	351	0.008	265	0.001	191	0.002	53	0.005	310
DCP 7	.500	0.004	180	0.003	144	0.005	348	0.008	276	0.005	17	0.011	295	0.005	258	0.003	329	0.006	260
DCP 8	.600	0.010	192	0.003	347	0.005	97	0.006	26	0.008	351	0.010	249	0.004	80	0.006	323	0.006	250
DCP 9	.878	0.002	72	0.004	262	0.008	139	0.002	93	0.005	252	0.005	220	0.007	185	0.002	142	0.005	222

TUNED PITCHING OSCILLATION VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
96.0	14.58	0.600	9.98	4.35		5358.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.038	648.1	1453.3	0.63E 07	-0.00037	1.134	11.42	0.0550

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		9.978	4.350	359	0.094	15	0.130	181	0.044	209	0.025	172	0.040	244	0.048	43	0.080	198	0.019	56
CN		0.965	0.145	27	0.047	62	0.038	147	0.036	96	0.005	158	0.014	246	0.010	30	0.012	219	0.006	136
CM		-0.044	0.045	183	0.003	71	0.007	163	0.002	92	0.000	103	0.003	295	0.001	54	0.002	336	0.002	199
DCP 1	.010	2.396	0.659	18	0.275	26	0.078	116	0.146	98	0.051	315	0.098	236	0.158	27	0.067	276	0.055	188
DCP 2	.100	2.547	0.436	165	0.223	70	0.224	158	0.036	42	0.055	159	0.335	289	0.039	180	0.010	237	0.026	128
DCP 3	.200	1.564	0.145	127	0.073	102	0.099	170	0.046	248	0.019	269	0.029	279	0.006	52	0.017	237	0.010	134
DCP 4	.250	1.422	0.186	45	0.194	81	0.141	158	0.346	251	0.008	99	0.045	280	0.029	356	0.007	190	0.020	92
DCP 5	.300	1.159	0.236	18	0.135	75	0.065	147	0.076	13	0.032	146	0.036	261	0.017	340	0.026	224	0.016	28
DCP 6	.400	0.898	0.263	19	0.074	65	0.027	83	0.018	91	0.020	108	0.014	214	0.003	298	0.029	196	0.005	357
DCP 7	.500	0.661	0.230	14	0.030	45	0.018	17	0.038	128	0.011	80	0.027	151	0.014	59	0.009	214	0.006	57
DCP 8	.600	0.527	0.201	12	0.011	346	0.016	357	0.037	221	0.005	343	0.018	152	0.010	25	0.009	293	0.006	42
DCP 9	.878	0.361	0.183	3	0.009	356	0.013	344	0.035	10	0.010	252	0.008	137	0.001	244	0.008	149	0.004	53

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.015	211	0.013	201	0.011	143	0.011	176	0.007	176	0.008	191	0.013	139	0.008	164	0.004	123
CN		0.010	275	0.005	177	0.004	292	0.005	294	0.005	116	0.005	81	0.007	283	0.005	186	0.002	49
CM		0.002	250	0.002	82	0.001	295	0.001	52	0.001	223	0.002	108	0.002	317	0.001	200	0.001	290
DCP 1	.010	0.139	255	0.067	114	0.043	290	0.038	118	0.074	110	0.104	92	0.139	303	0.075	185	0.058	348
DCP 2	.100	0.026	314	0.014	144	0.024	313	0.017	228	0.018	231	0.015	136	0.005	352	0.007	255	0.014	186
DCP 3	.200	0.018	277	0.010	178	0.007	242	0.011	266	0.005	266	0.006	3	0.009	226	0.005	118	0.004	314
DCP 4	.250	0.005	272	0.001	56	0.013	136	0.003	306	0.002	66	0.003	85	0.003	309	0.009	239	0.008	128
DCP 5	.300	0.003	23	0.008	125	0.008	56	0.006	103	0.002	107	0.006	13	0.005	232	0.007	79	0.007	347
DCP 6	.400	0.001	202	0.013	278	0.003	255	0.007	252	0.005	186	0.004	290	0.009	219	0.006	231	0.006	170
DCP 7	.500	0.001	188	0.004	259	0.004	45	0.009	276	0.006	105	0.008	347	0.002	329	0.002	278	0.007	72
DCP 8	.600	0.002	284	0.009	268	0.013	221	0.008	169	0.009	27	0.010	266	0.005	173	0.002	80	0.006	107
DCP 9	.878	0.004	16	0.007	224	0.004	97	0.005	222	0.006	118	0.003	58	0.003	146	0.001	71	0.004	66

TUNED PITCHING OSCILLATION VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D,ALPHA	DEL,H	TEST POINT	CYCLES ANALYZED
98.0	14.53	0.620	10.91	4.35		5358.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.038	667.1	1445.3	0.63E 07	-0.00006	1.151	12.72	0.0220

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
ALPHA		10.910	4.356 0	0.079 85	0.169 182	0.059 293	0.057 180	0.046 201	0.032 241	0.020 332	0.011 181
CN		0.974	0.158 25	0.078 75	0.024 136	0.035 58	0.015 189	0.009 157	0.008 168	0.006 65	0.007 57
CM		-0.045	0.043 190	0.007 91	0.006 137	0.002 12	0.001 136	0.001 13	0.001 319	0.001 151	0.001 13
DCP 1	.010	2.681	0.813 17	0.288 76	0.105 62	0.132 56	0.065 201	0.061 169	0.032 128	0.020 113	0.105 34
DCP 2	.100	2.548	0.438 163	0.293 70	0.163 151	0.121 319	0.071 [illegible]	0.016 98	0.024 186	0.003 271	0.016 117
DCP 3	.200	1.542	0.142 112	0.112 98	0.036 159	0.054 255	0.018 275	0.016 106	0.013 247	0.027 353	0.003 101
DCP 4	.250	1.406	0.210 68	0.188 87	0.126 157	0.063 262	0.010 235	0.022 281	0.019 347	0.021 13	0.004 27
DCP 5	.300	1.155	0.250 71	0.148 81	0.069 131	0.014 132	0.068 175	0.025 211	0.016 193	0.015 327	0.008 295
DCP 6	.400	0.902	0.266 70	0.088 72	0.025 38	0.019 94	0.011 167	0.012 180	0.008 202	0.006 259	0.013 220
DCP 7	.500	0.651	0.221 0	0.033 86	0.023 35	0.014 87	0.007 77	0.006 102	0.003 83	0.007 218	0.006 69
DCP 8	.600	0.527	0.202 11	0.011 339	0.014 330	0.025 228	0.010 261	0.012 175	0.011 169	0.008 88	0.006 118
DCP 9	.878	0.387	0.184 0	0.015 311	0.018 279	0.026 128	0.004 298	0.005 177	0.003 128	0.004 8	0.003 51

DATA TYPE	X/C	RES 10 PHI	RES 11 PHI	RES 12 PHI	RES 13 PHI	RES 14 PHI	RES 15 PHI	RES 16 PHI	RES 17 PHI	RES 18 PHI
ALPHA		0.030 250	0.000 214	0.004 87	0.011 211	0.007 154	0.005 179	0.002 214	0.006 168	0.003 140
CN		0.012 346	0.005 250	0.006 17	0.002 28	0.000 153	0.002 216	0.001 2	0.003 226	0.002 272
CM		0.002 33	0.001 310	0.002 29	0.002 56	0.001 55	0.001 290	0.001 224	0.001 223	0.002 218
DCP 1	.010	0.153 355	0.065 265	0.001 0	0.126 60	0.044 132	0.030 192	0.031 244	0.103 219	0.094 206
DCP 2	.100	0.021 25	0.038 329	0.010 36	0.012 1	0.012 346	0.017 247	0.011 96	0.015 19	0.019 357
DCP 3	.200	0.015 13	0.003 265	0.015 43	0.018 353	0.002 341	0.005 355	0.005 24	0.003 299	0.003 96
DCP 4	.250	0.006 52	0.010 324	0.009 250	0.011 305	0.009 315	0.013 293	0.009 281	0.000 35	0.003 326
DCP 5	.300	0.018 345	0.011 271	0.010 62	0.015 331	0.006 294	0.007 312	0.009 307	0.002 181	0.006 62
DCP 6	.400	0.006 283	0.006 53	0.001 78	0.010 18	0.003 6	0.005 324	0.001 35	0.006 6	0.001 232
DCP 7	.500	0.010 247	0.006 221	0.005 236	0.005 241	0.007 252	0.013 172	0.009 49	0.006 37	0.005 318
DCP 8	.600	0.003 276	0.008 148	0.005 56	0.002 356	0.003 54	0.002 257	0.003 106	0.002 136	0.006 51
DCP 9	.878	0.006 279	0.002 225	0.006 252	0.002 194	0.006 196	0.006 114	0.001 322	0.000 278	0.002 86

TUNED PITCHING OSCILLATION VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
96.0	14.58	0.600	12.48	4.32		5359.1	13

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.037	653.6	1462.1	2.635 07	-0.00091	1.172	15.93	0.0809

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		12.481	4.325	0	0.137	36	0.062	169	0.020	173	0.013	128	0.016	141	0.016	136	0.014	267	0.046	72
CN		1.056	0.088	60	0.012	360	0.006	61	0.317	265	0.006	30	0.333	339	0.003	322	0.006	211	0.008	130
CM		-0.056	0.044	187	0.010	242	0.001	19	0.000	237	0.002	313	0.001	10	0.000	298	0.001	214	0.002	239
DCP 1	.010	3.017	0.316	14	0.025	28	0.110	70	0.078	154	0.051	63	0.062	352	0.072	318	0.080	221	0.015	308
DCP 2	.100	2.628	0.481	171	0.263	272	0.021	256	0.126	266	0.045	351	0.318	220	0.024	65	0.028	165	0.325	135
DCP 3	.150	1.965	0.190	143	0.020	29	0.013	99	0.315	293	0.005	213	0.008	295	0.006	326	0.013	322	0.017	165
DCP 4	.200	1.660	0.114	151	0.060	252	0.030	336	0.333	283	0.007	239	0.336	275	0.016	197	0.010	212	0.023	143
DCP 5	.250	1.586	0.166	110	0.020	226	0.021	338	0.017	247	0.016	334	0.335	347	0.020	162	0.009	251	0.026	97
DCP 6	.300	1.297	0.087	95	0.016	181	0.018	263	0.331	257	0.023	316	0.331	241	0.021	209	0.008	270	0.039	139
DCP 7	.400	1.005	0.170	25	0.036	60	0.006	162	0.318	258	0.003	119	0.003	82	0.012	55	0.011	181	0.012	66
DCP 8	.500	0.830	0.181	22	0.060	76	0.018	178	0.326	183	0.003	160	0.038	322	0.010	276	0.004	351	0.013	67
DCP 9	.600	0.602	0.198	12	0.025	91	0.006	14	0.335	275	0.011	122	0.003	29	0.003	19	0.002	277	0.006	87
DCP10	.878	0.406	0.172	6	0.036	39	0.006	97	0.333	191	0.008	83	0.007	205	0.003	360	0.003	70	0.007	53

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.020	292	0.018	193	0.007	158	0.008	137	0.003	178	0.007	96	0.003	163	0.002	296	0.005	31
CN		0.003	18	0.012	213	0.001	262	0.337	189	0.332	332	0.333	90	0.005	331	0.001	192	0.331	136
CM		0.001	153	0.000	180	0.001	177	0.331	87	0.001	322	0.331	218	0.002	162	0.001	324	0.002	135
DCP 1	.010	0.039	334	0.122	197	0.060	192	0.330	118	0.063	333	0.026	314	0.062	237	0.038	327	0.078	148
DCP 2	.100	0.026	135	0.011	258	0.035	276	0.331	266	0.008	270	0.017	188	0.029	62	0.010	165	0.001	130
DCP 3	.150	0.006	121	0.005	280	0.011	54	0.007	335	0.015	55	0.035	199	0.007	231	0.003	178	0.006	335
DCP 4	.200	0.008	95	0.010	260	0.012	359	0.332	267	0.005	62	0.315	139	0.010	44	0.007	125	0.011	337
DCP 5	.250	0.012	73	0.008	236	0.006	182	0.012	198	0.005	348	0.013	158	0.012	76	0.012	198	0.005	91
DCP 6	.300	0.005	181	0.016	227	0.006	21	0.017	226	0.009	272	0.010	136	0.015	341	0.007	189	0.000	124
DCP 7	.400	0.003	10	0.009	260	0.002	39	0.339	230	0.014	215	0.014	193	0.007	20	0.005	136	0.011	64
DCP 8	.500	0.006	321	0.014	183	0.007	271	0.019	186	0.006	186	0.010	54	0.002	335	0.009	12	0.007	299
DCP 9	.600	0.008	17	0.009	223	0.007	328	0.011	169	0.008	58	0.010	40	0.010	356	0.002	336	0.011	323
DCP10	.878	0.005	310	0.002	177	0.002	137	0.337	350	0.003	148	0.336	313	0.007	301	0.005	153	0.333	295

TUNED PITCHING OSCILLATION VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	0.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
96.0	14.58	0.600	12.49	4.34		5253.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.038	668.7	1450.0	0.635 07	-0.00078	1.197	16.02	0.0580

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
ALPHA		12.485	4.364 0	0.146 30	0.053 164	0.042 209	0.015 161	0.023 171	0.019 266	0.071 6	0.024 301
CN		1.066	0.096 66	0.022 52	0.031 153	0.038 238	0.007 291	0.038 279	0.014 48	0.009 10	0.016 32
CM		-0.056	0.044 186	0.006 252	0.009 68	0.033 238	0.002 277	0.000 159	0.001 327	0.001 291	0.002 169
DCP 1	.010	3.378	0.456 26	0.170 34	0.049 136	0.095 138	0.137 261	0.063 279	0.030 309	0.032 306	0.069 141
DCP 2	.100	2.481	0.561 171	0.132 245	0.018 232	0.086 265	0.035 356	0.018 339	0.018 65	0.018 51	0.019 73
DCP 3	.150	1.835	0.188 160	0.033 355	0.028 2	0.053 270	0.016 122	0.026 177	0.025 26	0.010 327	0.025 334
DCP 4	.200	1.557	0.179 156	0.038 186	0.035 332	0.039 165	0.017 8	0.015 246	0.014 77	0.015 66	0.026 72
DCP 5	.250	1.510	0.172 123	0.009 128	0.026 12	0.044 221	0.004 303	0.009 148	0.011 101	0.010 28	0.009 346
DCP 6	.300	1.299	0.091 83	0.061 108	0.006 227	0.026 233	0.008 331	0.003 157	0.014 24	0.011 34	0.017 358
DCP 7	.400	1.013	0.173 28	0.040 79	0.033 169	0.013 181	0.005 268	0.017 314	0.006 84	0.016 17	0.006 44
DCP 8	.500	0.768	0.183 21	0.054 72	0.037 173	0.010 234	0.003 206	0.003 333	0.009 286	0.010 322	0.006 278
DCP 9	.600	0.606	0.206 10	0.022 12	0.037 135	0.024 74	0.006 30	0.008 287	0.007 117	0.011 14	0.007 353
DCP10	.878	0.456	0.178 8	0.030 65	0.032 31	0.006 56	0.004 155	0.003 242	0.002 151	0.005 22	0.003 352

DATA TYPE	X/C	RES 10 PHI	RES 11 PHI	RES 12 PHI	RES 13 PHI	RES 14 PHI	RES 15 PHI	RES 16 PHI	RES 17 PHI	RES 18 PHI
ALPHA		0.024 211	0.016 205	0.009 154	0.025 161	0.007 160	0.007 150	0.010 160	0.002 166	0.008 121
CN		0.004 112	0.004 185	0.007 256	0.004 282	0.003 69	0.006 43	0.004 246	0.002 257	0.009 218
CM		0.001 157	0.002 135	0.001 282	0.001 344	0.001 355	0.001 48	0.002 258	0.001 229	0.003 260
DCP 1	.010	0.072 134	0.124 168	0.095 253	0.069 331	0.070 15	0.109 44	0.118 259	0.055 253	0.166 232
DCP 2	.100	0.013 52	0.020 62	0.007 253	0.016 59	0.014 130	0.007 35	0.013 113	0.011 217	0.011 310
DCP 3	.150	0.005 233	0.017 358	0.005 174	0.006 301	0.012 317	0.006 171	0.007 96	0.007 255	0.007 263
DCP 4	.200	0.003 120	0.008 132	0.010 321	0.006 15	0.011 165	0.002 131	0.007 142	0.008 235	0.002 237
DCP 5	.250	0.007 293	0.006 316	0.007 170	0.003 321	0.006 216	0.010 192	0.003 25	0.010 81	0.005 310
DCP 6	.300	0.009 25	0.004 129	0.006 242	0.005 308	0.006 278	0.002 17	0.007 73	0.008 167	0.002 147
DCP 7	.400	0.008 161	0.006 147	0.005 335	0.008 250	0.008 164	0.008 329	0.010 273	0.001 318	0.008 179
DCP 8	.500	0.013 223	0.004 331	0.005 101	0.007 209	0.002 212	0.006 109	0.004 36	0.005 53	0.007 149
DCP 9	.600	0.006 46	0.011 283	0.002 282	0.010 232	0.004 78	0.004 280	0.006 102	0.005 31	0.006 122
DCP10	.878	0.004 19	0.004 302	0.004 190	0.005 93	0.002 129	0.004 64	0.004 61	0.002 351	0.005 106

TUNED PITCHING OSCILLATION VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	0.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
96.0	14.58	0.600	12.51	4.38		5353.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.038	647.7	1645.1	0.635 07	-0.03096	1.156	15.30	0.0220

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		12.508	4.381	0	0.139	17	0.107	183	0.049	196	0.021	133	0.027	131	0.028	12	0.043	197	0.019	288
CN		1.044	0.093	39	0.012	99	0.037	228	0.016	238	0.011	293	0.018	336	0.007	227	0.005	327	0.014	35
CM		-0.067	0.068	186	0.007	246	0.001	83	0.001	323	0.002	339	0.001	70	0.001	5	0.003	356	0.003	75
DCP 1	.010	2.821	0.347	27	0.097	85	0.020	22	0.044	63	0.020	268	0.016	318	0.013	255	0.181	333	0.190	52
DCP 2	.130	2.459	0.529	177	0.198	251	0.060	177	0.051	269	0.283	339	0.163	345	0.034	335	0.023	57	0.015	57
DCP 3	.150	1.836	0.224	150	0.053	50	0.020	336	0.013	227	0.008	62	0.022	217	0.012	169	0.011	211	0.008	322
DCP 4	.200	1.569	0.154	154	0.047	231	0.035	279	0.011	246	0.022	337	0.013	356	0.006	247	0.008	189	0.027	81
DCP 5	.250	1.503	0.156	129	0.016	150	0.017	318	0.016	247	0.028	320	0.011	276	0.015	182	0.006	171	0.011	42
DCP 6	.300	1.297	0.095	85	0.038	99	0.026	226	0.026	228	0.032	286	0.013	310	0.015	104	0.021	180	0.016	357
DCP 7	.400	1.010	0.195	23	0.036	93	0.021	180	0.038	179	0.006	280	0.016	6	0.025	149	0.008	54	0.014	34
DCP 8	.500	0.751	0.195	20	0.045	81	0.006	87	0.016	158	0.015	239	0.019	331	0.008	203	0.009	132	0.007	296
DCP 9	.600	0.616	0.225	13	0.018	48	0.006	287	0.022	131	0.014	167	0.037	345	0.022	225	0.008	210	0.011	19
DCP10	.878	0.477	0.185	4	0.021	51	0.015	256	0.021	111	0.003	177	0.028	254	0.023	246	0.005	269	0.011	257

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.035	229	0.008	208	0.010	217	0.009	293	0.017	202	0.004	125	0.006	217	0.006	122	0.002	205
CN		0.022	20	0.006	9	0.023	279	0.021	155	0.023	256	0.012	245	0.016	322	0.004	251	0.022	28
CM		0.001	21	0.001	306	0.000	36	0.001	52	0.001	60	0.003	268	0.001	36	0.002	302	0.000	66
DCP 1	.010	0.029	336	0.006	343	0.058	286	0.010	5	0.013	78	0.215	252	0.089	347	0.074	285	0.037	46
DCP 2	.130	0.029	64	0.014	234	0.021	117	0.114	70	0.138	350	0.117	312	0.010	302	0.024	231	0.037	239
DCP 3	.150	0.012	291	0.006	154	0.009	342	0.017	81	0.010	32	0.003	347	0.008	164	0.008	151	0.006	36
DCP 4	.200	0.008	76	0.008	186	0.012	78	0.019	248	0.019	278	0.009	222	0.007	59	0.006	190	0.036	345
DCP 5	.250	0.006	129	0.007	95	0.002	258	0.018	66	0.011	352	0.010	258	0.002	185	0.006	151	0.007	286
DCP 6	.330	0.015	50	0.016	74	0.008	7	0.014	176	0.015	188	0.021	180	0.005	36	0.009	165	0.007	351
DCP 7	.400	0.006	222	0.006	69	0.010	180	0.006	189	0.016	200	0.017	254	0.007	285	0.000	76	0.015	86
DCP 8	.570	0.009	261	0.013	83	0.006	1	0.022	174	0.005	119	0.004	97	0.007	342	0.006	227	0.006	167
DCP 9	.600	0.002	258	0.010	14	0.008	252	0.014	330	0.010	253	0.006	155	0.007	256	0.003	186	0.001	251
DCP10	.878	0.003	172	0.006	251	0.001	233	0.013	221	0.005	179	0.002	124	0.006	259	0.006	128	0.002	344

TUNED PITCHING OSCILLATION VERTOL 23010-1.58 AIRFOIL

TUNED FRQ	AIRFOIL FRQ	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
96.0	16.21	0.600	14.98	6.60		5353.1	12

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.042	648.7	1660.9	0.665 07	-0.22067	1.174	17.44	0.0220

HARMONIC ANALYSIS

DATA TYPE	K/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
ALPHA		14.983	6.606 0	0.054 62	0.126 179	0.056 165	0.059 161	0.035 177	0.022 289	0.009 208	0.007 222
CN		1.355	0.074 56	0.033 71	0.016 281	0.015 128	0.003 331	0.003 131	0.001 237	0.002 157	0.004 308
CM		-0.091	0.038 186	0.006 221	0.001 233	0.002 1	0.001 92	0.001 353	0.001 162	0.002 270	0.001 198
DCP 1	.010	3.083	0.253 7	0.303 76	0.041 326	0.015 195	0.018 179	0.026 157	0.026 61	0.007 238	0.007 191
DCP 2	.100	2.125	0.437 161	0.134 220	0.133 286	0.037 58	0.010 86	0.024 50	0.018 156	0.003 179	0.004 281
DCP 3	.150	1.631	0.258 166	0.031 26	0.012 252	0.032 58	0.017 135	0.009 291	0.006 136	0.008 335	0.010 31
DCP 4	.200	1.307	0.151 166	0.010 118	0.021 266	0.022 56	0.018 8	0.017 9	0.006 291	0.009 173	0.002 271
DCP 5	.250	1.069	0.166 130	0.011 117	0.046 263	0.013 352	0.016 36	0.006 134	0.015 266	0.008 256	0.014 331
DCP 6	.300	1.280	0.006 107	0.023 58	0.026 217	0.011 60	0.018 322	0.007 250	0.010 240	0.006 158	0.011 188
DCP 7	.400	1.063	0.121 68	0.062 61	0.016 256	0.012 214	0.017 318	0.005 336	0.016 285	0.013 227	0.017 290
DCP 8	.500	0.795	0.124 21	0.036 60	0.013 235	0.016 232	0.015 251	0.015 158	0.013 170	0.006 120	0.005 178
DCP 9	.600	0.712	0.170 20	0.047 56	0.013 336	0.015 175	0.012 280	0.008 129	0.005 244	0.013 166	0.007 329
DCP10	.978	0.501	0.161 0	0.026 60	0.009 28	0.038 126	0.006 150	0.002 186	0.010 28	0.014 56	0.008 38

DATA TYPE	K/C	RES 10 PHI	RES 11 PHI	RES 12 PHI	RES 13 PHI	RES 14 PHI	RES 15 PHI	RES 16 PHI	RES 17 PHI	RES 18 PHI
ALPHA		0.015 140	0.006 128	0.013 103	0.002 164	0.015 92	0.016 113	0.008 46	0.000 58	0.006 25
CN		0.002 59	0.006 25	0.003 138	0.001 284	0.006 356	0.003 349	0.002 226	0.003 315	0.006 253
CM		0.001 312	0.000 269	0.001 256	0.001 223	0.001 133	0.002 106	0.001 96	0.001 335	0.002 77
DCP 1	.010	0.017 352	0.016 305	0.018 229	0.011 136	0.006 120	0.010 89	0.006 18	0.008 30	0.007 295
DCP 2	.100	0.022 339	0.018 10	0.016 36	0.021 249	0.016 355	0.018 51	0.017 207	0.024 314	0.015 65
DCP 3	.150	0.012 36	0.006 35	0.026 26	0.006 100	0.008 231	0.008 133	0.002 265	0.003 362	0.011 345
DCP 4	.200	0.002 208	0.007 363	0.035 256	0.018 261	0.016 344	0.035 3	0.006 242	0.015 296	0.006 258
DCP 5	.250	0.007 78	0.008 363	0.006 330	0.035 85	0.010 144	0.033 176	0.006 76	0.006 131	0.009 301
DCP 6	.300	0.010 210	0.010 71	0.010 218	0.015 214	0.010 338	0.014 35	0.008 136	0.016 289	0.008 194
DCP 7	.400	0.009 120	0.002 93	0.010 167	0.013 356	0.014 97	0.035 85	0.006 346	0.005 75	0.003 286
DCP 8	.500	0.013 176	0.005 88	0.005 111	0.013 130	0.035 260	0.036 47	0.011 124	0.006 182	0.010 119
DCP 9	.600	0.011 81	0.005 54	0.012 67	0.016 306	0.010 26	0.011 283	0.009 256	0.006 363	0.009 227
DCP10	.978	0.003 300	0.001 322	0.002 80	0.011 76	0.006 273	0.010 283	0.002 303	0.006 125	0.011 284

TUNED PITCHING OSCILLATION VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
96.0	15.50	0.600	17.27	4.50		5351.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.0 0	668.0	1452.7	2.635 07	-0.00102	1.223	17.77	0.0229

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
ALPHA		17.276	4.499 0	0.143 21	0.083 164	0.032 136	0.015 130	0.022 185	0.023 251	0.020 342	0.041 117
CN		1.067	0.070 90	0.064 62	0.021 155	0.017 51	0.005 31	0.008 19	0.006 125	0.009 259	0.005 52
CM		-0.107	0.033 194	0.004 189	0.001 79	0.001 60	0.002 70	0.000 34	0.000 32	0.001 61	0.002 146
DCP 1	.010	3.062	0.329 172	0.316 86	0.066 129	0.026 81	0.060 56	0.023 348	0.016 86	0.021 316	0.023 51
DCP 2	.100	1.053	0.357 165	0.068 73	0.032 173	0.051 46	0.024 7	0.360 37	0.032 138	0.023 273	0.027 111
DCP 3	.150	1.519	0.338 167	0.035 37	0.058 165	0.016 231	0.009 88	0.002 149	0.014 104	0.010 296	0.013 245
DCP 4	.200	1.377	0.164 164	0.025 21	0.043 168	0.016 55	0.015 28	0.022 32	0.018 153	0.026 257	0.036 76
DCP 5	.250	1.369	0.181 132	0.023 60	0.047 163	0.011 265	0.002 175	0.336 6	0.006 327	0.018 334	0.006 174
DCP 6	.300	1.258	0.116 116	0.026 31	0.036 150	0.011 127	0.018 12	0.318 9	0.005 133	0.016 255	0.004 19
DCP 7	.400	1.075	0.111 86	0.043 58	0.033 148	0.011 54	0.012 113	0.337 17	0.007 82	0.008 282	0.013 96
DCP 8	.500	0.861	0.102 35	0.029 62	0.016 137	0.017 94	0.007 86	0.007 341	0.009 28	0.013 181	0.017 26
DCP 9	.600	0.779	0.120 37	0.043 59	0.013 151	0.033 356	0.001 170	0.008 30	0.002 125	0.007 347	0.013 72
DCP10	.878	0.651	0.121 12	0.024 35	0.011 278	0.015 269	0.011 271	0.005 296	0.006 182	0.012 229	0.011 313

DATA TYPE	X/C	RES 10 PHI	RES 11 PHI	RES 12 PHI	RES 13 PHI	RES 14 PHI	RES 15 PHI	RES 16 PHI	RES 17 PHI	RES 18 PHI
ALPHA		0.022 138	0.010 136	0.011 141	0.012 130	0.015 103	0.005 127	0.010 46	0.003 12	0.001 64
CN		0.003 15	0.007 137	0.004 55	0.002 53	0.004 72	0.006 261	0.005 335	0.004 355	0.004 247
CM		0.000 254	0.002 227	0.002 273	0.001 266	0.002 308	0.001 343	0.001 207	0.000 70	0.001 56
DCP 1	.010	0.006 341	0.010 86	0.022 31	0.024 352	0.017 311	0.016 320	0.015 253	0.011 30	0.017 273
DCP 2	.100	0.016 28	0.029 152	0.005 64	0.004 236	0.004 67	0.012 259	0.024 313	0.017 29	0.017 237
DCP 3	.150	0.010 243	0.007 148	0.008 183	0.013 264	0.012 255	0.015 319	0.011 102	0.008 354	0.008 21
DCP 4	.200	0.016 333	0.012 168	0.016 286	0.014 295	0.012 4	0.020 258	0.019 322	0.009 3	0.010 13
DCP 5	.250	0.012 272	0.007 223	0.008 212	0.010 277	0.010 213	0.017 335	0.002 164	0.002 169	0.006 303
DCP 6	.300	0.006 34	0.014 160	0.008 324	0.010 194	0.007 323	0.021 274	0.019 327	0.010 362	0.003 42
DCP 7	.400	0.008 167	0.006 68	0.007 56	0.003 51	0.008 118	0.002 267	0.003 17	0.009 62	0.009 255
DCP 8	.500	0.009 55	0.014 122	0.003 169	0.007 55	0.011 223	0.010 216	0.010 231	0.015 276	0.012 326
DCP 9	.600	0.004 59	0.008 52	0.005 50	0.002 96	0.013 99	0.004 208	0.010 82	0.004 262	0.010 194
DCP10	.878	0.002 324	0.009 68	0.013 93	0.008 71	0.005 135	0.006 147	0.008 342	0.003 78	0.007 264

TUNED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
96.0	15.92	0.600	24.75	4.65		5062.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.041	650.5	1468.6	0.64E 07	-0.00209	1.20E	25.76	0.0220

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		24.746	4.655	0	0.205	55	0.071	165	0.029	70	0.042	121	0.061	85	0.084	123	0.044	324	0.020	122
CN		1.103	0.065	90	0.006	70	0.012	303	0.009	65	0.003	64	0.005	7	0.004	33	0.006	351	0.003	106
CM		-0.151	0.017	270	0.002	264	0.002	340	0.002	55	0.001	169	0.001	129	0.001	277	0.001	177	0.001	269
DCP 1	.010	2.350	0.648	178	0.080	268	0.070	278	0.067	55	0.025	191	0.008	221	0.020	257	0.018	226	0.013	249
DCP 2	.100	1.800	0.117	22	0.068	82	0.074	345	0.055	83	0.022	61	0.036	56	0.025	32	0.027	7	0.010	129
DCP 3	.150	1.447	0.066	44	0.007	332	0.028	303	0.023	49	0.005	113	0.005	27	0.004	29	0.010	40	0.010	131
DCP 4	.200	1.417	0.129	28	0.029	65	0.028	349	0.029	56	0.005	93	0.017	23	0.012	21	0.018	353	0.006	135
DCP 5	.250	1.366	0.105	37	0.002	264	0.018	285	0.010	28	0.005	54	0.003	12	0.005	16	0.008	352	0.007	70
DCP 6	.300	1.303	0.123	36	0.012	35	0.013	333	0.013	59	0.005	105	0.007	352	0.009	13	0.013	12	0.006	88
DCP 7	.400	1.163	0.121	41	0.008	137	0.017	255	0.011	329	0.013	38	0.004	29	0.005	121	0.010	313	0.008	47
DCP 8	.500	0.996	0.116	47	0.004	73	0.004	126	0.006	180	0.002	248	0.011	306	0.007	37	0.005	15	0.002	124
DCP 9	.600	0.924	0.114	47	0.008	98	0.008	210	0.006	228	0.005	345	0.005	309	0.002	40	0.006	334	0.003	30
DCP10	.878	0.759	0.088	54	0.007	62	0.002	191	0.005	209	0.001	136	0.004	342	0.003	106	0.001	47	0.004	141

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.016	81	0.013	94	0.013	90	0.014	110	0.005	112	0.008	43	0.009	63	0.008	38	0.005	98
CN		0.004	13	0.004	130	0.004	246	0.001	170	0.006	291	0.002	91	0.003	247	0.003	17	0.002	276
CM		0.001	218	0.001	291	0.001	6	0.001	320	0.001	67	0.000	154	0.000	290	0.001	94	0.000	118
DCP 1	.010	0.019	253	0.004	214	0.041	248	0.022	290	0.027	296	0.003	293	0.028	287	0.026	9	0.006	282
DCP 2	.100	0.017	0	0.011	139	0.006	341	0.007	16	0.007	2	0.008	152	0.011	225	0.010	48	0.007	326
DCP 3	.150	0.001	1	0.003	33	0.005	35	0.009	162	0.008	299	0.010	83	0.004	146	0.005	96	0.005	250
DCP 4	.200	0.006	56	0.006	132	0.002	107	0.002	346	0.004	356	0.008	129	0.004	255	0.005	66	0.004	339
DCP 5	.250	0.005	62	0.004	118	0.004	350	0.005	180	0.008	287	0.008	70	0.003	188	0.009	45	0.003	162
DCP 6	.300	0.004	24	0.005	122	0.001	132	0.003	147	0.004	353	0.005	144	0.006	270	0.004	53	0.003	281
DCP 7	.400	0.004	68	0.006	164	0.011	285	0.004	17	0.008	305	0.007	53	0.002	92	0.004	28	0.005	177
DCP 8	.500	0.005	4	0.003	149	0.002	324	0.006	179	0.005	314	0.004	132	0.002	200	0.002	143	0.003	272
DCP 9	.600	0.008	18	0.006	116	0.006	215	0.001	186	0.006	266	0.002	41	0.001	175	0.001	310	0.003	137
DCP10	.878	0.004	34	0.003	100	0.006	192	0.006	140	0.007	246	0.003	304	0.000	271	0.005	304	0.004	318

TUNED PITCHING OSCILLATION VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	0.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
80.0	15.80	0.400	0.01	7.14		5379.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.059	443.7	728.7	0.475 07	-0.00044	0.856	7.16	0.1010

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
ALPHA		0.011	7.144 0	0.292 5	0.100 224	0.034 224	0.059 152	0.056 187	0.052 225	0.044 234	0.027 243
CN		0.070	0.762 357	0.023 243	0.026 239	0.011 285	0.014 139	0.005 139	0.006 181	0.005 214	0.005 244
CM		-0.012	0.005 267	0.012 237	0.008 302	0.005 21	0.003 91	0.001 157	0.001 222	0.000 125	0.000 83
DCP 1	.010	-0.862	2.858 356	1.214 252	0.431 325	0.163 216	0.247 304	0.074 64	0.129 260	0.098 358	0.028 202
DCP 2	.025	-0.615	3.100 355	0.436 250	0.224 234	0.081 19	0.051 117	0.038 179	0.055 173	0.026 219	0.012 151
DCP 3	.100	0.078	1.980 356	0.099 216	0.164 283	0.137 26	0.098 125	0.015 220	0.043 97	0.056 189	0.012 282
DCP 4	.150	0.529	1.464 356	0.092 88	0.089 298	0.050 330	0.054 106	0.040 190	0.015 270	0.016 156	0.021 238
DCP 5	.200	0.815	1.217 357	0.052 97	0.077 297	0.039 314	0.046 98	0.050 173	0.017 253	0.014 26	0.015 238
DCP 6	.250	0.906	1.068 355	0.060 73	0.078 178	0.055 251	0.017 344	0.014 117	0.016 225	0.005 305	0.001 43
DCP 7	.300	-0.073	0.890 357	0.059 70	0.057 179	0.040 250	0.013 357	0.020 145	0.021 221	0.011 284	0.004 261
DCP 8	.400	0.020	0.619 358	0.025 226	0.028 276	0.028 247	0.015 289	0.012 31	0.009 144	0.010 293	0.006 290
DCP 9	.500	0.171	0.467 0	0.016 68	0.027 159	0.030 211	0.021 270	0.009 344	0.002 60	0.002 213	0.004 179
DCP10	.600	0.001	0.349 1	0.015 259	0.014 170	0.018 224	0.012 257	0.005 357	0.005 138	0.002 143	0.002 304
DCP11	.878	0.036	0.172 359	0.007 62	0.020 103	0.012 172	0.006 243	0.001 303	0.002 36	0.004 274	0.005 235

DATA TYPE	X/C	RES 10 PHI	RES 11 PHI	RES 12 PHI	RES 13 PHI	RES 14 PHI	RES 15 PHI	RES 16 PHI	RES 17 PHI	RES 18 PHI
ALPHA		0.022 238	0.023 269	0.023 239	0.018 292	0.022 272	0.018 262	0.010 263	0.013 312	0.010 280
CN		0.004 247	0.003 233	0.000 166	0.002 282	0.002 34	0.332 298	0.001 201	0.002 358	0.002 268
CM		0.000 333	0.000 201	0.001 313	0.000 120	0.000 252	0.000 204	0.000 354	0.001 156	0.000 304
DCP 1	.010	0.080 328	0.054 84	0.036 247	0.054 6	0.024 141	0.037 314	0.042 64	0.019 201	0.023 36
DCP 2	.025	0.039 257	0.013 253	0.002 351	0.013 314	0.031 40	0.018 268	0.006 233	0.023 97	0.043 272
DCP 3	.100	0.031 156	0.039 241	0.015 342	0.013 185	0.018 285	0.014 36	0.014 332	0.014 334	0.005 137
DCP 4	.150	0.007 316	0.006 181	0.005 238	0.002 328	0.001 128	0.003 241	0.002 80	0.001 173	0.005 157
DCP 5	.200	0.013 309	0.006 67	0.003 30	0.010 213	0.009 136	0.002 198	0.006 328	0.004 336	0.003 232
DCP 6	.250	0.003 169	0.003 182	0.005 155	0.004 259	0.004 10	0.000 92	0.002 78	0.001 279	0.004 135
DCP 7	.300	0.008 283	0.006 20	0.004 98	0.003 215	0.002 289	0.001 296	0.004 204	0.006 276	0.006 328
DCP 8	.400	0.002 21	0.004 165	0.003 194	0.003 303	0.002 24	0.001 223	0.001 185	0.004 317	0.002 12
DCP 9	.500	0.004 232	0.003 300	0.003 27	0.002 314	0.001 157	0.001 104	0.001 20	0.002 111	0.003 190
DCP10	.600	0.003 169	0.004 213	0.003 167	0.001 5	0.002 91	0.001 210	0.002 130	0.003 322	0.002 42
DCP11	.878	0.002 241	0.002 6	0.002 123	0.002 292	0.002 22	0.003 340	0.002 200	0.003 18	0.003 242

TUNED PITCHING OSCILLATION VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
80.0	16.23	0.400	-0.02	7.29		5379.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.062	439.6	743.8	0.48E 07	-0.00058	0.779	7.31	0.0950

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		-0.019	7.293	359	0.397	1	0.036	231	0.024	334	0.039	110	0.024	148	0.026	220	0.025	250	0.009	239
CN		-0.011	0.780	357	0.017	316	0.017	260	0.013	314	0.007	155	0.003	173	0.005	244	0.004	263	0.002	167
CM		-0.020	0.008	301	0.010	232	0.006	301	0.002	18	0.001	113	0.000	61	0.001	119	0.002	155	0.001	234
DCP 1	.010	-0.856	2.909	358	1.198	251	0.511	320	0.137	226	0.304	304	0.133	39	0.104	260	0.133	7	0.062	138
DCP 2	.025	-0.732	3.283	356	0.357	243	0.202	310	0.166	60	0.064	154	0.029	47	0.047	175	0.043	214	0.012	139
DCP 3	.100	0.006	2.139	356	0.040	79	0.096	274	0.100	32	0.093	134	0.015	231	0.042	98	0.057	196	0.019	289
DCP 4	.150	0.110	1.493	353	0.127	57	0.067	196	0.044	346	0.062	99	0.051	183	0.023	270	0.007	127	0.018	212
DCP 5	.200	0.108	1.211	358	0.053	98	0.066	220	0.027	311	0.034	114	0.038	206	0.028	319	0.016	82	0.024	226
DCP 6	.250	0.019	1.068	356	0.082	38	0.048	162	0.037	232	0.010	308	0.039	148	0.014	241	0.010	302	0.001	1
DCP 7	.300	-0.019	0.879	358	0.042	56	0.042	181	0.033	242	0.007	320	0.008	178	0.013	268	0.011	13	0.010	141
DCP 8	.400	0.032	0.629	358	0.013	347	0.015	293	0.018	219	0.013	260	0.005	332	0.002	235	0.003	267	0.002	354
DCP 9	.500	0.003	0.457	1	0.003	18	0.012	176	0.017	206	0.013	262	0.004	306	0.005	243	0.004	308	0.004	74
DCP10	.600	0.018	0.347	1	0.017	338	0.004	195	0.010	192	0.008	237	0.001	336	0.002	230	0.005	279	0.003	355
DCP11	.878	0.076	0.169	3	0.038	33	0.014	93	0.005	72	0.002	66	0.003	121	0.007	288	0.003	330	0.006	77

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.008	171	0.007	246	0.011	232	0.005	319	0.006	286	0.004	272	0.008	176	0.007	285	0.007	275
CN		0.004	224	0.002	218	0.005	218	0.001	309	0.002	16	0.001	66	0.003	257	0.001	251	0.002	316
CM		0.002	295	0.000	331	0.001	80	0.001	221	0.000	180	0.001	232	0.001	2	0.000	88	0.000	163
DCP 1	.010	0.075	309	0.078	76	0.074	202	0.068	341	0.069	119	0.048	262	0.044	21	0.022	156	0.030	324
DCP 2	.025	0.060	245	0.016	283	0.020	178	0.026	251	0.030	53	0.021	240	0.043	303	0.012	120	0.020	351
DCP 3	.100	0.024	151	0.033	225	0.005	355	0.014	187	0.021	292	0.013	78	0.019	236	0.014	326	0.008	139
DCP 4	.150	0.012	282	0.007	317	0.001	261	0.007	78	0.008	182	0.004	272	0.004	318	0.002	27	0.002	4
DCP 5	.200	0.022	268	0.012	51	0.004	121	0.007	350	0.007	1	0.010	136	0.005	170	0.010	284	0.004	29
DCP 6	.250	0.001	220	0.002	355	0.005	150	0.002	133	0.003	231	0.002	66	0.002	144	0.002	215	0.003	318
DCP 7	.300	0.010	236	0.003	353	0.004	157	0.001	197	0.001	282	0.003	11	0.001	54	0.004	218	0.002	280
DCP 8	.400	0.002	143	0.001	255	0.005	201	0.001	302	0.001	279	0.002	63	0.002	148	0.001	202	0.001	255
DCP 9	.500	0.006	212	0.004	249	0.003	290	0.002	35	0.001	144	0.002	61	0.001	186	0.003	170	0.001	287
DCP10	.600	0.003	139	0.002	203	0.005	229	0.000	134	0.003	12	0.002	63	0.003	137	0.000	196	0.003	174
DCP11	.878	0.008	118	0.002	134	0.010	252	0.004	13	0.002	32	0.004	44	0.006	234	0.003	288	0.006	360

TUNED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	0.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
80.0	15.82	0.400	-0.02	7.51		5379.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.060	438.2	743.4	0.49E 07	-0.00051	0.784	7.55	0.0250

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		-0.020	7.512	0	0.379	4	0.136	234	0.038	172	0.074	124	0.041	202	0.059	215	0.053	216	0.027	220
CN		-0.031	0.787	356	0.027	249	0.027	247	0.016	265	0.006	150	0.004	198	0.007	194	0.004	229	0.003	226
CM		-0.016	0.006	287	0.010	238	0.006	308	0.005	32	0.002	111	0.001	148	0.000	357	0.000	264	0.001	115
DCP 1	.010	-0.899	2.986	356	1.312	249	0.551	317	0.197	212	0.262	301	0.105	28	0.088	258	0.118	9	0.073	135
DCP 2	.025	-0.692	3.257	355	0.443	253	0.195	236	0.074	63	0.041	143	0.020	95	0.056	171	0.024	256	0.025	129
DCP 3	.100	0.020	2.108	355	0.041	214	0.122	281	0.109	44	0.111	137	0.026	251	0.053	96	0.069	186	0.024	270
DCP 4	.150	0.051	1.488	353	0.081	79	0.077	210	0.042	344	0.063	111	0.052	202	0.022	287	0.013	131	0.022	227
DCP 5	.200	0.029	1.255	356	0.074	96	0.088	203	0.037	295	0.041	98	0.050	182	0.036	261	0.007	359	0.018	207
DCP 6	.250	-0.037	1.092	353	0.051	48	0.058	173	0.041	240	0.009	353	0.013	145	0.020	220	0.012	292	0.001	332
DCP 7	.300	-0.034	0.916	357	0.055	77	0.065	181	0.047	241	0.015	338	0.014	147	0.017	227	0.012	303	0.006	31
DCP 8	.400	0.022	0.632	357	0.027	233	0.023	208	0.022	226	0.012	270	0.008	345	0.005	156	0.005	260	0.003	348
DCP 9	.500	-0.060	0.456	1	0.009	215	0.015	199	0.020	203	0.011	256	0.003	350	0.005	189	0.004	250	0.001	45
DCP10	.600	-0.001	0.351	1	0.024	246	0.011	237	0.012	232	0.008	253	0.005	328	0.003	249	0.005	329	0.002	71
DCP11	.878	0.058	0.180	359	0.034	38	0.011	195	0.015	190	0.003	291	0.002	298	0.005	147	0.005	154	0.008	261

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.021	227	0.027	233	0.019	214	0.014	245	0.015	247	0.021	246	0.019	238	0.016	277	0.013	222
CN		0.004	195	0.001	290	0.003	240	0.003	267	0.002	285	0.001	247	0.002	174	0.000	186	0.002	279
CM		0.000	33	0.001	202	0.001	208	0.000	272	0.001	136	0.000	144	0.001	332	0.000	245	0.000	163
DCP 1	.010	0.041	279	0.036	103	0.071	233	0.044	349	0.042	177	0.054	293	0.040	59	0.032	211	0.035	343
DCP 2	.025	0.026	196	0.012	277	0.019	214	0.033	279	0.011	40	0.024	209	0.021	317	0.013	134	0.023	259
DCP 3	.100	0.026	143	0.035	229	0.012	300	0.016	206	0.021	283	0.007	55	0.013	224	0.017	332	0.009	149
DCP 4	.150	0.014	309	0.006	61	0.010	223	0.008	311	0.001	63	0.004	136	0.005	186	0.004	230	0.001	313
DCP 5	.200	0.008	296	0.005	17	0.005	223	0.008	272	0.001	40	0.006	14	0.001	246	0.006	106	0.007	132
DCP 6	.250	0.002	265	0.006	27	0.006	142	0.003	256	0.001	193	0.004	154	0.004	206	0.004	270	0.002	4
DCP 7	.300	0.005	111	0.004	130	0.003	214	0.002	275	0.003	151	0.003	130	0.006	218	0.007	285	0.004	356
DCP 8	.400	0.002	110	0.003	57	0.004	185	0.002	191	0.003	245	0.002	61	0.004	113	0.003	182	0.002	284
DCP 9	.500	0.003	201	0.002	301	0.002	38	0.003	181	0.002	261	0.004	18	0.004	120	0.004	173	0.004	247
DCP10	.600	0.005	191	0.002	314	0.002	280	0.000	166	0.001	304	0.001	293	0.006	78	0.004	139	0.002	177
DCP11	.878	0.003	225	0.004	25	0.002	355	0.002	341	0.004	319	0.002	243	0.006	196	0.004	26	0.004	338

TUNED PITCHING OSCILLATION VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
80.0	15.92	0.400	7.62	7.23		5381.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.060	445.3	750.7	0.48E 07	-0.00093	1.526	14.90	0.1010

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		7.623	7.225	0	0.408	18	0.079	199	0.161	217	0.132	166	0.049	332	0.088	216	0.030	200	0.027	224
CN		0.770	0.697	357	0.095	16	0.037	267	0.031	181	0.016	106	0.011	312	0.011	198	0.005	126	0.003	232
CM		-0.004	0.020	322	0.003	358	0.004	326	0.004	239	0.004	149	0.002	65	0.002	340	0.002	243	0.001	141
DCP 1	.010	2.519	4.338	355	0.514	4	0.177	236	0.173	194	0.096	155	0.005	275	0.046	157	0.014	61	0.025	270
DCP 2	.025	2.775	3.771	353	0.445	339	0.249	253	0.178	174	0.117	107	0.036	320	0.019	173	0.012	333	0.044	230
DCP 3	.100	1.913	1.683	354	0.253	30	0.103	301	0.084	209	0.061	131	0.033	353	0.026	243	0.030	196	0.031	137
DCP 4	.150	1.694	1.040	356	0.193	38	0.067	317	0.058	225	0.040	154	0.016	34	0.015	271	0.012	209	0.012	176
DCP 5	.200	1.517	0.942	354	0.171	30	0.064	293	0.055	188	0.040	93	0.033	326	0.023	213	0.022	143	0.012	81
DCP 6	.250	1.203	0.792	359	0.157	36	0.049	305	0.044	212	0.030	141	0.013	16	0.014	246	0.009	182	0.005	165
DCP 7	.300	0.775	0.689	357	0.115	25	0.044	271	0.039	175	0.024	78	0.025	305	0.024	207	0.017	114	0.008	343
DCP 8	.400	0.618	0.537	2	0.101	29	0.030	279	0.028	189	0.014	112	0.011	319	0.013	210	0.006	123	0.004	278
DCP 9	.500	0.557	0.384	0	0.061	27	0.022	264	0.014	155	0.005	29	0.008	247	0.012	137	0.008	30	0.009	249
DCP10	.600	0.333	0.310	5	0.052	19	0.021	241	0.019	153	0.010	42	0.013	287	0.014	196	0.008	98	0.006	320
DCP11	.878	0.174	0.144	6	0.018	259	0.021	173	0.016	74	0.012	330	0.007	242	0.007	145	0.006	52	0.003	284

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.028	211	0.023	215	0.028	207	0.021	241	0.018	240	0.012	237	0.022	237	0.013	235	0.009	265
CN		0.005	232	0.003	222	0.003	203	0.001	178	0.000	230	0.003	276	0.001	203	0.002	219	0.002	249
CM		0.001	69	0.001	351	0.000	226	0.001	176	0.001	106	0.001	58	0.001	275	0.000	200	0.000	135
DCP 1	.010	0.027	234	0.026	233	0.028	213	0.017	182	0.006	175	0.013	255	0.005	248	0.010	252	0.011	262
DCP 2	.025	0.040	218	0.020	163	0.014	94	0.005	258	0.007	203	0.004	272	0.012	266	0.018	226	0.013	206
DCP 3	.100	0.017	59	0.022	320	0.028	239	0.020	178	0.017	101	0.016	2	0.015	275	0.014	209	0.008	164
DCP 4	.150	0.004	108	0.007	294	0.009	227	0.007	189	0.003	181	0.000	216	0.004	262	0.007	219	0.003	132
DCP 5	.200	0.009	301	0.011	206	0.012	154	0.008	100	0.007	45	0.003	274	0.004	174	0.005	118	0.005	358
DCP 6	.250	0.003	287	0.004	259	0.004	227	0.003	196	0.001	156	0.003	298	0.003	235	0.004	200	0.000	51
DCP 7	.300	0.012	251	0.009	197	0.005	168	0.004	5	0.005	314	0.007	236	0.005	156	0.003	71	0.009	303
DCP 8	.400	0.008	228	0.004	228	0.001	267	0.001	314	0.001	266	0.003	267	0.000	302	0.002	237	0.003	264
DCP 9	.500	0.006	181	0.003	84	0.003	230	0.001	342	0.001	266	0.002	210	0.002	73	0.001	289	0.004	247
DCP10	.600	0.007	246	0.005	223	0.001	44	0.001	52	0.003	303	0.003	262	0.003	122	0.003	251	0.001	72
DCP11	.878	0.004	251	0.003	169	0.001	78	0.002	329	0.002	253	0.003	250	0.004	90	0.001	37	0.002	279

TUNED PITCHING OSCILLATION VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
80.0	15.92	0.400	7.57	7.34		5081.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.060	440.8	742.9	0.48E 07	-0.00098	1.488	14.96	0.0970

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		7.571	7.343	0	0.534	13	0.040	203	0.126	220	0.096	152	0.053	310	0.042	190	0.018	217	0.019	220
CN		0.728	0.707	356	0.101	13	0.034	274	0.023	177	0.012	97	0.005	305	0.004	177	0.003	194	0.003	173
CM		-0.005	0.022	326	0.004	320	0.002	301	0.002	238	0.001	142	0.001	87	0.001	14	0.001	290	0.001	188
DCP 1	.010	2.543	4.436	355	0.553	1	0.150	234	0.115	189	0.050	161	0.032	187	0.053	104	0.024	24	0.020	296
DCP 2	.025	2.810	3.858	352	0.506	336	0.225	251	0.142	163	0.092	92	0.016	249	0.032	83	0.034	329	0.051	239
DCP 3	.100	1.929	1.720	353	0.270	23	0.104	306	0.063	209	0.047	123	0.024	5	0.019	295	0.041	213	0.042	136
DCP 4	.150	1.436	1.071	355	0.184	32	0.053	313	0.032	226	0.018	148	0.004	359	0.003	245	0.007	210	0.005	159
DCP 5	.200	1.155	0.955	353	0.172	21	0.062	284	0.042	170	0.029	77	0.024	324	0.018	217	0.016	159	0.009	77
DCP 6	.250	1.045	0.814	358	0.150	33	0.040	306	0.028	210	0.015	135	0.006	12	0.004	240	0.008	189	0.005	118
DCP 7	.300	0.799	0.705	356	0.123	18	0.042	267	0.035	153	0.020	51	0.023	282	0.019	182	0.013	106	0.007	10
DCP 8	.400	0.619	0.543	1	0.100	31	0.028	290	0.019	196	0.009	114	0.004	347	0.004	212	0.005	179	0.001	77
DCP 9	.500	0.464	0.387	359	0.067	21	0.020	274	0.012	153	0.002	35	0.005	218	0.006	120	0.002	1	0.003	240
DCP10	.600	0.334	0.306	5	0.055	33	0.015	286	0.011	184	0.004	107	0.002	333	0.003	215	0.003	215	0.001	13
DCP11	.878	0.184	0.136	6	0.013	292	0.013	181	0.010	101	0.006	9	0.004	274	0.003	167	0.003	101	0.001	291

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.017	181	0.013	180	0.018	191	0.010	228	0.007	240	0.006	233	0.013	220	0.007	225	0.008	221
CN		0.001	228	0.001	283	0.002	165	0.003	127	0.001	168	0.002	284	0.001	168	0.001	157	0.000	159
CM		0.001	49	0.001	304	0.001	212	0.001	115	0.001	31	0.000	344	0.001	281	0.000	168	0.000	319
DCP 1	.010	0.016	253	0.022	264	0.011	209	0.020	174	0.016	170	0.004	230	0.004	46	0.003	234	0.007	300
DCP 2	.025	0.032	189	0.006	84	0.012	90	0.011	104	0.006	125	0.009	329	0.013	256	0.016	190	0.006	246
DCP 3	.100	0.036	56	0.037	327	0.038	238	0.034	152	0.026	80	0.024	344	0.018	260	0.015	165	0.011	70
DCP 4	.150	0.003	87	0.006	295	0.005	188	0.005	130	0.001	136	0.005	277	0.003	112	0.000	67	0.002	229
DCP 5	.200	0.011	330	0.011	251	0.014	158	0.018	83	0.010	344	0.018	256	0.008	162	0.011	72	0.007	25
DCP 6	.250	0.002	322	0.005	279	0.005	174	0.005	114	0.001	325	0.004	271	0.004	146	0.002	147	0.001	301
DCP 7	.300	0.012	269	0.010	190	0.011	108	0.010	7	0.012	265	0.010	182	0.009	76	0.007	2	0.006	263
DCP 8	.400	0.004	286	0.004	209	0.005	107	0.003	24	0.004	244	0.003	228	0.005	124	0.001	339	0.003	217
DCP 9	.500	0.004	109	0.004	107	0.003	29	0.003	272	0.004	166	0.003	65	0.002	8	0.002	181	0.002	124
DCP10	.600	0.003	274	0.003	151	0.004	65	0.002	277	0.005	210	0.001	145	0.003	150	0.001	234	0.002	197
DCP11	.878	0.003	160	0.004	89	0.002	336	0.002	224	0.002	155	0.001	269	0.001	89	0.000	60	0.001	66

TUNED PITCHING OSCILLATION — VERTOL 23010-1.59 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
R0.0	15.92	0.400	7.65	7.58		5381.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.061	438.8	742.1	0.48E 07	-0.00096	1.492	15.18	0.0250

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
ALPHA		7.655	7.580 0	0.538 14	0.062 229	0.131 252	0.165 169	0.046 305	0.036 232	0.022 204	0.021 226
CN		0.704	0.721 357	0.107 13	0.030 277	0.023 207	0.020 148	0.005 0	0.005 272	0.006 197	0.004 194
CM		-0.004	0.022 325	0.002 252	0.001 304	0.002 250	0.002 173	0.002 123	0.001 45	0.001 295	0.001 189
DCP 1	.010	2.525	4.544 354	0.539 357	0.108 231	0.093 224	0.126 176	0.031 144	0.015 85	0.015 68	0.021 341
DCP 2	.025	2.791	3.939 353	0.465 334	0.196 245	0.125 195	0.128 147	0.025 121	0.019 39	0.023 283	0.052 240
DCP 3	.100	1.894	1.730 354	0.274 29	0.097 312	0.088 235	0.081 158	0.024 64	0.026 319	0.038 235	0.044 173
DCP 4	.150	1.347	1.085 354	0.190 30	0.058 324	0.032 248	0.032 175	0.006 89	0.006 336	0.006 246	0.006 215
DCP 5	.200	1.084	0.965 355	0.172 26	0.059 286	0.048 199	0.033 119	0.020 339	0.026 242	0.026 185	0.011 109
DCP 6	.250	0.981	0.829 357	0.155 29	0.043 310	0.027 228	0.024 160	0.009 32	0.008 299	0.009 205	0.004 146
DCP 7	.300	0.789	0.719 357	0.128 29	0.041 266	0.033 180	0.021 102	0.019 321	0.022 231	0.020 151	0.011 71
DCP 8	.400	0.607	0.556 0	0.105 25	0.029 294	0.017 200	0.013 148	0.008 354	0.008 267	0.006 176	0.004 70
DCP 9	.500	0.417	0.398 0	0.075 21	0.019 265	0.011 185	0.003 151	0.006 264	0.007 187	0.004 102	0.003 308
DCP10	.600	0.314	0.314 4	0.063 26	0.015 292	0.010 205	0.007 146	0.006 4	0.003 297	0.003 198	0.000 276
DCP11	.878	0.185	0.139 9	0.024 335	0.011 182	0.007 102	0.003 64	0.007 292	0.001 260	0.004 131	0.003 255

DATA TYPE	X/C	RES 10 PHI	RES 11 PHI	RES 12 PHI	RES 13 PHI	RES 14 PHI	RES 15 PHI	RES 16 PHI	RES 17 PHI	RES 18 PHI
ALPHA		0.018 127	0.009 210	0.015 196	0.006 251	0.009 225	0.003 292	0.016 228	0.007 247	0.006 247
CN		0.003 252	0.001 196	0.003 214	0.003 194	0.002 134	0.001 203	0.003 254	0.002 247	0.001 229
CM		0.001 114	0.001 319	0.000 324	0.001 186	0.000 145	0.001 349	0.001 312	0.000 251	0.000 159
DCP 1	.010	0.033 271	0.016 251	0.014 219	0.022 198	0.010 155	0.003 173	0.002 37	0.004 287	0.009 268
DCP 2	.025	0.042 215	0.018 175	0.014 115	0.010 200	0.008 149	0.008 325	0.020 279	0.020 240	0.011 195
DCP 3	.100	0.033 103	0.032 10	0.032 283	0.037 209	0.029 140	0.016 57	0.020 322	0.016 254	0.013 189
DCP 4	.150	0.004 217	0.006 36	0.006 250	0.005 209	0.006 140	0.001 27	0.005 261	0.004 281	0.003 204
DCP 5	.200	0.013 6	0.010 273	0.013 235	0.009 147	0.008 52	0.009 292	0.014 235	0.002 133	0.005 34
DCP 6	.250	0.004 299	0.003 313	0.007 228	0.006 154	0.003 59	0.004 296	0.005 223	0.001 205	0.001 308
DCP 7	.300	0.012 317	0.013 230	0.014 158	0.008 72	0.005 330	0.008 241	0.007 171	0.003 82	0.002 343
DCP 8	.400	0.008 285	0.004 233	0.006 167	0.003 75	0.003 343	0.004 240	0.004 183	0.003 78	0.003 319
DCP 9	.500	0.007 250	0.006 180	0.004 109	0.005 343	0.004 265	0.004 188	0.002 96	0.003 354	0.001 240
DCP10	.600	0.008 259	0.002 171	0.001 27	0.002 355	0.002 229	0.004 188	0.001 244	0.001 141	0.001 223
DCP11	.878	0.000 12	0.005 106	0.002 235	0.001 261	0.004 113	0.004 125	0.001 158	0.001 224	0.001 306

TUNED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
80.0	16.05	0.400	9.94	7.04		5082.1	10

K	V	Q	RN	DAMPING	CY(MAX)	ALPHA(STALL)	EXT DAMPING
0.061	441.3	743.6	0.48E 07	-0.00008	1.648	16.32	0.1010

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		9.935	7.039	0	0.486	33	0.028	201	0.100	234	0.139	251	0.207	165	0.045	58	0.048	272	0.056	224
CN		0.885	0.487	7	0.218	31	0.069	296	0.031	237	0.033	210	0.029	138	0.009	67	0.006	340	0.008	256
CM		-0.024	0.024	191	0.031	68	0.018	339	0.006	273	0.005	259	0.005	194	0.004	143	0.004	83	0.003	11
DCP 1	.010	3.372	3.128	1	1.016	35	0.317	312	0.158	246	0.129	244	0.098	183	0.039	215	0.052	204	0.061	184
DCP 2	.025	3.189	2.354	359	1.122	40	0.499	324	0.241	265	0.217	237	0.176	181	0.129	157	0.107	102	0.062	45
DCP 3	.100	2.059	0.711	9	0.848	50	0.374	325	0.164	250	0.107	219	0.105	165	0.065	119	0.060	60	0.049	341
DCP 4	.150	1.655	0.519	14	0.501	50	0.190	324	0.073	247	0.054	233	0.066	172	0.046	106	0.030	36	0.028	319
DCP 5	.200	1.369	0.497	16	0.471	33	0.194	291	0.066	217	0.072	207	0.091	126	0.056	40	0.034	328	0.027	275
DCP 6	.250	1.251	0.508	17	0.335	35	0.106	288	0.027	218	0.049	229	0.060	144	0.036	49	0.022	328	0.020	270
DCP 7	.300	0.905	0.477	16	0.291	19	0.108	268	0.041	202	0.057	187	0.066	102	0.044	13	0.028	305	0.030	253
DCP 8	.400	0.777	0.457	15	0.171	12	0.060	237	0.011	163	0.030	205	0.034	112	0.023	13	0.020	307	0.022	246
DCP 9	.500	0.651	0.355	10	0.106	350	0.043	202	0.005	150	0.024	153	0.024	46	0.015	295	0.010	253	0.017	200
DCP10	.600	0.492	0.336	10	0.071	331	0.046	190	0.009	116	0.014	157	0.016	52	0.011	314	0.015	282	0.019	214
DCP11	.878	0.269	0.225	357	0.074	251	0.036	155	0.011	128	0.013	72	0.007	343	0.008	323	0.012	236	0.009	136

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.048	176	0.022	194	0.015	239	0.020	249	0.022	241	0.021	236	0.023	204	0.017	237	0.015	245
CN		0.004	243	0.003	208	0.007	188	0.002	153	0.000	187	0.001	345	0.003	250	0.003	249	0.003	204
CM		0.002	289	0.001	268	0.002	209	0.002	131	0.001	59	0.001	317	0.001	317	0.000	307	0.000	293
DCP 1	.010	0.041	128	0.037	57	0.028	274	0.032	231	0.018	215	0.007	215	0.006	204	0.004	0	0.011	313
DCP 2	.025	0.048	352	0.063	303	0.067	228	0.051	175	0.030	117	0.022	1	0.029	282	0.033	238	0.024	189
DCP 3	.100	0.048	289	0.044	250	0.051	199	0.040	147	0.019	102	0.017	56	0.019	355	0.018	317	0.016	286
DCP 4	.150	0.027	268	0.016	197	0.021	188	0.015	125	0.007	50	0.004	345	0.005	273	0.001	234	0.004	243
DCP 5	.200	0.027	224	0.023	170	0.019	128	0.016	70	0.009	10	0.010	316	0.009	265	0.007	268	0.011	200
DCP 6	.250	0.018	245	0.013	172	0.011	170	0.008	101	0.007	16	0.004	308	0.008	264	0.006	201	0.003	164
DCP 7	.300	0.027	198	0.021	136	0.014	98	0.012	39	0.013	330	0.012	266	0.010	209	0.006	166	0.006	139
DCP 8	.400	0.011	203	0.012	145	0.007	141	0.007	37	0.007	330	0.007	278	0.008	226	0.004	176	0.003	158
DCP 9	.500	0.010	121	0.004	92	0.005	73	0.008	320	0.006	251	0.005	201	0.006	150	0.004	29	0.002	223
DCP10	.600	0.010	101	0.004	26	0.002	84	0.009	328	0.009	250	0.006	202	0.006	160	0.003	55	0.001	233
DCP11	.878	0.004	44	0.002	63	0.004	311	0.008	251	0.006	164	0.008	76	0.003	352	0.004	232	0.002	140

TUNED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
80.0	16.05	0.400	9.99	7.20		5082.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.061	438.0	740.7	0.48E 07	-0.00011	1.611	16.29	0.0720

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		9.991	7.204	0	0.595	28	0.068	357	0.071	241	0.213	286	0.334	131	0.087	18	0.067	270	0.037	229
CN		0.847	0.491	7	0.238	33	0.073	332	0.016	247	0.037	247	0.045	133	0.017	49	0.010	337	0.008	251
CM		-0.023	0.023	196	0.029	69	0.018	339	0.004	276	0.006	280	0.006	206	0.006	136	0.004	87	0.003	23
DCP 1	.010	3.342	3.149	0	1.105	34	0.340	311	0.052	251	0.198	282	0.124	147	0.030	249	0.065	211	0.075	167
DCP 2	.025	3.161	2.362	359	1.224	41	0.531	327	0.159	282	0.283	264	0.188	171	0.132	149	0.101	100	0.068	53
DCP 3	.100	2.054	0.756	7	0.884	50	0.377	328	0.120	259	0.133	252	0.149	159	0.110	97	0.081	19	0.048	303
DCP 4	.150	1.465	0.525	13	0.528	48	0.203	319	0.045	235	0.066	271	0.092	157	0.057	79	0.033	355	0.019	283
DCP 5	.200	1.203	0.505	13	0.479	37	0.183	301	0.054	217	0.064	232	0.099	130	0.065	46	0.039	331	0.022	275
DCP 6	.250	1.131	0.512	16	0.358	35	0.119	290	0.020	187	0.052	258	0.086	137	0.049	41	0.022	323	0.018	287
DCP 7	.300	0.917	0.483	13	0.298	25	0.105	277	0.026	194	0.045	214	0.081	111	0.052	11	0.028	294	0.016	248
DCP 8	.400	0.760	0.458	14	0.182	13	0.060	239	0.013	83	0.033	236	0.057	115	0.031	9	0.014	309	0.018	266
DCP 9	.500	0.559	0.357	10	0.122	0	0.042	209	0.010	66	0.021	190	0.040	79	0.027	322	0.015	247	0.013	193
DCP10	.600	0.470	0.329	11	0.073	340	0.041	185	0.011	59	0.010	187	0.022	87	0.014	327	0.008	287	0.017	217
DCP11	.878	0.276	0.221	359	0.057	259	0.029	153	0.009	167	0.013	96	0.009	15	0.011	310	0.011	280	0.007	174

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.037	152	0.016	139	0.004	165	0.008	274	0.010	229	0.009	238	0.015	201	0.002	322	0.007	217
CN		0.002	288	0.003	230	0.003	191	0.001	26	0.003	230	0.000	54	0.000	193	0.001	231	0.001	288
CM		0.001	285	0.001	294	0.002	225	0.002	156	0.002	52	0.001	336	0.000	242	0.001	13	0.000	190
DCP 1	.010	0.054	95	0.040	27	0.033	292	0.019	238	0.021	181	0.019	154	0.024	95	0.022	19	0.023	322
DCP 2	.025	0.068	8	0.057	310	0.063	237	0.042	182	0.027	97	0.014	357	0.014	290	0.025	241	0.020	178
DCP 3	.100	0.019	275	0.022	260	0.034	218	0.030	171	0.021	121	0.016	52	0.008	37	0.010	7	0.015	340
DCP 4	.150	0.018	271	0.017	209	0.009	147	0.018	119	0.007	66	0.005	294	0.007	243	0.003	157	0.004	231
DCP 5	.200	0.021	240	0.019	201	0.015	142	0.013	96	0.008	43	0.010	323	0.004	247	0.001	91	0.002	357
DCP 6	.250	0.022	240	0.014	153	0.002	157	0.008	102	0.006	9	0.007	249	0.003	167	0.003	335	0.003	248
DCP 7	.300	0.013	213	0.012	157	0.008	113	0.008	55	0.008	338	0.006	294	0.006	225	0.005	204	0.006	128
DCP 8	.400	0.015	195	0.005	129	0.005	113	0.011	39	0.010	291	0.005	219	0.004	213	0.005	158	0.003	91
DCP 9	.500	0.010	111	0.002	54	0.003	72	0.007	340	0.008	263	0.005	193	0.004	138	0.002	145	0.003	106
DCP10	.600	0.006	106	0.002	208	0.010	72	0.015	334	0.012	225	0.006	149	0.005	105	0.008	40	0.009	287
DCP11	.878	0.007	6	0.003	92	0.005	347	0.015	292	0.007	192	0.003	39	0.004	345	0.008	221	0.003	88

TUNED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	0.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
80.0	15.87	0.400	9.99	7.29		5082.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.061	437.2	739.7	0.48E 07	-0.00021	1.584	16.62	0.0250

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
ALPHA		9.992	7.293 0	0.559 30	0.054 347	0.101 268	0.275 272	0.286 100	0.025 316	0.065 239	0.051 209
CN		0.631	0.490 7	0.235 32	0.075 298	0.026 240	0.038 228	0.034 109	0.008 47	0.006 323	0.005 229
CM		-0.021	0.021 197	0.026 67	0.016 337	0.006 292	0.007 263	0.006 207	0.006 130	0.004 68	0.003 332
DCP 1	.010	3.342	3.230 0	1.026 33	0.330 314	0.145 261	0.205 252	0.076 111	0.036 199	0.054 205	0.066 171
DCP 2	.025	3.158	2.428 358	1.153 39	0.492 323	0.193 279	0.303 252	0.137 179	0.155 147	0.102 89	0.054 48
DCP 3	.100	2.006	0.729 8	0.898 49	0.375 322	0.130 254	0.142 241	0.101 149	0.082 108	0.068 33	0.049 316
DCP 4	.150	1.446	0.539 11	0.496 48	0.185 321	0.057 250	0.068 248	0.059 146	0.041 97	0.026 14	0.022 293
DCP 5	.200	1.179	0.502 15	0.492 34	0.191 292	0.058 216	0.081 218	0.095 111	0.057 33	0.031 323	0.028 283
DCP 6	.250	1.104	0.512 15	0.343 36	0.115 295	0.034 234	0.059 226	0.071 115	0.035 31	0.019 312	0.016 270
DCP 7	.300	0.897	0.475 15	0.308 22	0.116 271	0.037 206	0.054 199	0.076 90	0.038 2	0.026 307	0.029 253
DCP 8	.400	0.750	0.453 14	0.175 16	0.057 254	0.014 207	0.035 195	0.055 86	0.031 347	0.020 264	0.014 218
DCP 9	.500	0.543	0.362 9	0.114 0	0.041 210	0.007 134	0.019 160	0.037 54	0.020 305	0.015 268	0.020 188
DCP10	.600	0.451	0.321 11	0.066 345	0.035 194	0.006 121	0.009 143	0.022 61	0.015 304	0.013 238	0.010 169
DCP11	.878	0.268	0.213 359	0.049 259	0.029 151	0.016 153	0.016 75	0.012 26	0.014 300	0.011 243	0.015 120

DATA TYPE	X/C	RES 10 PHI	RES 11 PHI	RES 12 PHI	RES 13 PHI	RES 14 PHI	RES 15 PHI	RES 16 PHI	RES 17 PHI	RES 18 PHI
ALPHA		0.042 185	0.017 184	0.018 215	0.017 213	0.016 214	0.019 222	0.016 217	0.007 215	0.016 228
CN		0.004 217	0.003 205	0.004 186	0.003 168	0.003 299	0.002 210	0.002 322	0.001 256	0.000 33
CM		0.001 318	0.001 278	0.003 215	0.002 103	0.001 85	0.001 24	0.000 158	0.001 256	0.001 245
DCP 1	.010	0.051 196	0.024 20	0.031 245	0.019 197	0.016 177	0.022 108	0.019 10	0.017 292	0.015 248
DCP 2	.025	0.055 9	0.020 296	0.022 216	0.043 147	0.011 82	0.007 30	0.014 303	0.019 246	0.020 213
DCP 3	.100	0.033 263	0.027 252	0.041 211	0.033 148	0.009 94	0.009 100	0.011 42	0.011 352	0.020 312
DCP 4	.150	0.016 227	0.012 196	0.014 193	0.013 123	0.007 24	0.005 312	0.004 234	0.005 262	0.003 290
DCP 5	.200	0.031 230	0.024 147	0.015 148	0.012 99	0.014 357	0.006 300	0.005 286	0.009 245	0.008 210
DCP 6	.250	0.016 213	0.014 170	0.009 133	0.006 44	0.005 301	0.003 282	0.004 284	0.006 238	0.006 214
DCP 7	.300	0.023 190	0.014 132	0.008 90	0.007 13	0.009 302	0.006 255	0.004 253	0.007 224	0.004 168
DCP 8	.400	0.010 156	0.009 133	0.003 55	0.002 353	0.006 317	0.003 252	0.003 241	0.007 231	0.007 122
DCP 9	.500	0.011 95	0.006 87	0.010 20	0.011 287	0.007 224	0.004 217	0.003 109	0.001 32	0.001 121
DCP10	.600	0.003 95	0.004 161	0.005 71	0.003 332	0.008 290	0.007 213	0.004 144	0.004 138	0.008 36
DCP11	.878	0.002 271	0.003 25	0.006 22	0.009 235	0.004 241	0.004 172	0.006 334	0.006 50	0.003 77

TUNED PITCHING OSCILLATION — VERTOL 23010-1.59 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
80.0	15.97	0.400	12.45	6.95		5083.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.060	445.6	744.9	0.48E 07	-0.00028	1.757	16.83	0.1010

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		12.449	6.951	0	0.574	30	0.113	99	0.123	46	0.071	350	0.174	319	0.142	216	0.099	164	0.035	101
CN		1.046	0.277	34	0.253	44	0.050	46	0.059	3	0.025	324	0.039	300	0.027	242	0.028	200	0.017	134
CM		-0.032	0.046	191	0.028	91	0.010	92	0.014	46	0.007	2	0.007	357	0.006	325	0.006	299	0.006	241
DCP 1	.010	4.071	1.859	10	1.185	51	0.202	56	0.245	41	0.124	21	0.149	349	0.070	326	0.028	293	0.036	3
DCP 2	.025	3.615	0.967	11	1.294	62	0.378	61	0.394	36	0.241	10	0.253	337	0.186	311	0.164	272	0.110	245
DCP 3	.100	2.163	0.335	118	0.884	62	0.184	63	0.274	34	0.163	336	0.132	314	0.108	277	0.096	233	0.061	194
DCP 4	.150	2.063	0.278	88	0.532	55	0.086	71	0.165	28	0.080	320	0.066	316	0.067	265	0.055	209	0.038	184
DCP 5	.200	2.036	0.312	76	0.466	43	0.101	60	0.171	358	0.071	286	0.082	296	0.081	228	0.055	187	0.046	157
DCP 6	.250	1.540	0.326	62	0.367	41	0.064	70	0.124	359	0.045	281	0.061	307	0.064	230	0.044	190	0.041	158
DCP 7	.300	0.973	0.320	54	0.304	34	0.071	44	0.113	334	0.043	263	0.067	279	0.063	204	0.044	180	0.048	132
DCP 8	.400	0.851	0.341	41	0.217	25	0.038	35	0.071	317	0.017	232	0.046	279	0.039	199	0.035	191	0.038	126
DCP 9	.500	0.832	0.279	31	0.131	11	0.031	3	0.050	276	0.013	184	0.033	241	0.027	156	0.031	158	0.036	74
DCP10	.600	0.566	0.288	25	0.098	0	0.016	331	0.035	261	0.008	151	0.020	247	0.013	168	0.025	166	0.028	80
DCP11	.878	0.336	0.247	1	0.048	284	0.037	285	0.033	200	0.010	211	0.016	156	0.009	175	0.019	110	0.014	28

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.019	323	0.023	319	0.009	294	0.010	353	0.011	20	0.009	51	0.007	136	0.011	148	0.012	183
CN		0.007	95	0.004	50	0.004	39	0.001	263	0.003	121	0.004	70	0.001	0	0.001	324	0.001	248
CM		0.003	204	0.004	182	0.003	131	0.002	94	0.001	41	0.001	344	0.001	346	0.000	300	0.000	3
DCP 1	.010	0.064	321	0.077	278	0.030	242	0.033	223	0.027	164	0.026	120	0.023	79	0.019	43	0.011	351
DCP 2	.025	0.076	274	0.077	216	0.054	171	0.045	147	0.044	119	0.034	70	0.019	7	0.015	310	0.011	230
DCP 3	.100	0.045	168	0.033	159	0.028	118	0.021	128	0.025	104	0.023	90	0.017	69	0.016	43	0.017	41
DCP 4	.150	0.031	148	0.019	117	0.019	93	0.014	47	0.009	29	0.007	9	0.006	332	0.002	194	0.003	277
DCP 5	.200	0.032	100	0.020	103	0.029	56	0.018	34	0.014	46	0.014	340	0.009	318	0.013	297	0.011	255
DCP 6	.250	0.029	106	0.019	78	0.024	56	0.015	2	0.009	359	0.010	328	0.007	263	0.001	221	0.003	223
DCP 7	.300	0.026	76	0.022	71	0.024	29	0.009	13	0.013	0	0.008	313	0.011	315	0.011	264	0.008	256
DCP 8	.400	0.018	76	0.018	70	0.015	27	0.010	341	0.009	318	0.005	301	0.005	266	0.005	203	0.002	128
DCP 9	.500	0.018	12	0.020	1	0.014	298	0.008	268	0.008	231	0.005	169	0.004	194	0.005	190	0.007	167
DCP10	.600	0.009	24	0.013	11	0.006	323	0.009	295	0.006	180	0.004	348	0.004	232	0.002	125	0.003	215
DCP11	.878	0.009	15	0.011	323	0.009	282	0.010	230	0.008	179	0.011	134	0.006	106	0.004	56	0.003	10

TUNED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
80.0	16.05	0.400	12.45	7.06		5083.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.061	436.5	739.1	0.48E 07	0.00014	1.679	16.85	0.0690

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		12.446	7.064	0	0.541	32	0.122	126	0.114	27	0.024	134	0.371	273	0.149	168	0.075	113	0.022	58
CN		0.957	0.342	34	0.247	36	0.029	32	0.046	341	0.008	317	0.051	275	0.027	196	0.017	175	0.010	104
CM		-0.038	0.045	184	0.028	86	0.012	80	0.015	16	0.004	286	0.005	358	0.007	286	0.003	257	0.005	206
DCP 1	.010	3.995	2.105	14	1.144	39	0.112	55	0.178	29	0.136	54	0.190	312	0.069	311	0.060	302	0.072	288
DCP 2	.025	3.559	1.264	21	1.264	55	0.317	52	0.337	12	0.134	355	0.244	302	0.175	278	0.154	241	0.115	214
DCP 3	.100	2.140	0.459	91	0.890	55	0.159	52	0.260	7	0.118	292	0.131	282	0.119	237	0.088	183	0.044	157
DCP 4	.150	1.570	0.373	77	0.530	44	0.061	67	0.160	4	0.061	269	0.079	288	0.079	219	0.045	158	0.029	148
DCP 5	.200	1.274	0.378	69	0.442	39	0.063	72	0.148	347	0.058	249	0.084	272	0.076	198	0.034	153	0.041	135
DCP 6	.250	1.233	0.394	56	0.356	32	0.040	69	0.136	338	0.031	217	0.078	285	0.069	185	0.019	137	0.032	125
DCP 7	.300	1.009	0.380	50	0.294	28	0.034	42	0.097	318	0.043	223	0.068	261	0.063	174	0.031	139	0.035	96
DCP 8	.400	0.848	0.384	37	0.206	14	0.015	355	0.054	288	0.020	143	0.059	268	0.045	150	0.012	146	0.032	83
DCP 9	.500	0.643	0.314	30	0.130	4	0.017	319	0.053	251	0.028	131	0.035	247	0.035	126	0.015	86	0.025	27
DCP10	.600	0.590	0.320	22	0.093	347	0.021	291	0.040	216	0.026	77	0.034	261	0.024	120	0.008	143	0.023	37
DCP11	.878	0.363	0.255	0	0.052	289	0.043	274	0.044	172	0.010	15	0.020	179	0.009	113	0.009	110	0.009	350

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.006	211	0.012	284	0.013	201	0.008	154	0.011	224	0.017	187	0.011	188	0.006	266	0.006	266
CN		0.002	237	0.001	139	0.001	169	0.001	292	0.001	206	0.005	285	0.002	157	0.001	275	0.003	284
CM		0.004	132	0.002	132	0.002	65	0.001	69	0.001	25	0.002	85	0.001	289	0.000	132	0.001	119
DCP 1	.010	0.071	249	0.071	212	0.043	177	0.038	140	0.036	90	0.031	25	0.024	330	0.021	275	0.023	244
DCP 2	.025	0.099	187	0.071	159	0.050	136	0.030	117	0.017	74	0.012	328	0.013	228	0.012	201	0.009	190
DCP 3	.100	0.044	141	0.024	103	0.019	80	0.010	50	0.005	35	0.009	4	0.007	0	0.015	5	0.024	324
DCP 4	.150	0.036	98	0.017	48	0.018	41	0.019	334	0.007	266	0.009	307	0.008	199	0.000	216	0.001	238
DCP 5	.200	0.024	73	0.010	86	0.019	28	0.006	320	0.011	339	0.009	273	0.004	291	0.008	255	0.005	273
DCP 6	.250	0.025	40	0.006	57	0.015	1	0.007	283	0.005	313	0.003	231	0.001	293	0.005	193	0.001	62
DCP 7	.300	0.016	25	0.010	35	0.013	340	0.008	317	0.013	268	0.004	226	0.007	223	0.003	188	0.007	236
DCP 8	.400	0.016	340	0.008	36	0.012	303	0.004	267	0.007	221	0.000	336	0.006	181	0.002	73	0.004	202
DCP 9	.500	0.017	290	0.008	289	0.007	229	0.007	271	0.009	203	0.003	211	0.006	138	0.002	167	0.006	62
DCP10	.600	0.014	299	0.004	305	0.005	212	0.004	300	0.007	148	0.002	240	0.008	148	0.001	294	0.002	157
DCP11	.878	0.010	275	0.008	282	0.010	219	0.004	182	0.002	4	0.014	279	0.006	72	0.002	310	0.009	299

TUNED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
80.0	16.13	0.400	12.48	7.19		5083.3	10

K	V	Q	RN	DAMPING	CY(MAX)	ALPHA(STALL)	EXT DAMPING
0.062	436.0	738.5	0.48E 07	-0.00007	1.661	17.39	0.0250

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		12.477	7.186	0	0.573	30	0.155	95	0.156	19	0.298	44	0.444	213	0.093	149	0.060	73	0.028	13
CN		0.941	0.336	33	0.246	40	0.047	19	0.034	333	0.033	10	0.054	240	0.019	200	0.022	171	0.011	98
CM		-0.036	0.042	187	0.026	87	0.016	66	0.015	358	0.004	350	0.007	343	0.005	266	0.005	268	0.005	190
DCP 1	.010	3.962	2.124	11	1.134	43	0.225	40	0.160	31	0.318	29	0.095	272	0.079	310	0.061	287	0.051	276
DCP 2	.025	3.549	1.290	17	1.261	59	0.446	42	0.298	7	0.316	12	0.205	285	0.196	272	0.158	234	0.120	202
DCP 3	.100	2.112	0.420	87	0.868	60	0.250	43	0.221	352	0.108	347	0.146	266	0.114	223	0.072	192	0.065	162
DCP 4	.150	1.581	0.345	72	0.508	47	0.096	47	0.124	355	0.056	346	0.086	258	0.055	210	0.035	182	0.040	138
DCP 5	.200	1.215	0.382	70	0.446	39	0.087	47	0.136	334	0.033	304	0.106	243	0.066	182	0.041	175	0.049	113
DCP 6	.250	1.208	0.394	55	0.351	33	0.056	44	0.088	326	0.014	21	0.079	247	0.042	171	0.026	176	0.037	102
DCP 7	.300	0.994	0.373	51	0.296	31	0.059	18	0.089	306	0.013	272	0.094	230	0.052	156	0.035	152	0.042	82
DCP 8	.400	0.830	0.382	37	0.210	17	0.035	340	0.066	267	0.016	55	0.069	226	0.029	129	0.026	153	0.034	55
DCP 9	.500	0.618	0.305	31	0.132	14	0.034	311	0.042	232	0.010	72	0.055	205	0.026	103	0.020	120	0.023	25
DCP10	.600	0.580	0.307	23	0.102	355	0.041	279	0.042	191	0.018	47	0.040	208	0.011	86	0.022	129	0.021	21
DCP11	.978	0.355	0.244	0	0.039	277	0.050	250	0.046	149	0.005	12	0.017	163	0.004	88	0.016	89	0.010	334

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.017	3	0.011	283	0.008	199	0.007	259	0.009	264	0.004	127	0.004	187	0.007	337	0.007	248
CN		0.003	71	0.003	303	0.003	302	0.002	281	0.002	240	0.002	230	0.002	198	0.002	153	0.001	271
CM		0.002	151	0.003	113	0.001	78	0.002	58	0.002	354	0.002	350	0.002	310	0.001	293	0.001	288
DCP 1	.010	0.059	258	0.067	206	0.047	169	0.044	99	0.037	42	0.035	349	0.034	312	0.024	266	0.018	246
DCP 2	.025	0.063	172	0.056	159	0.019	139	0.026	87	0.017	16	0.016	292	0.021	261	0.022	211	0.016	188
DCP 3	.100	0.038	116	0.030	124	0.021	49	0.028	67	0.015	53	0.014	13	0.014	1	0.017	339	0.023	327
DCP 4	.150	0.025	92	0.019	53	0.017	348	0.017	3	0.008	314	0.006	289	0.004	274	0.004	231	0.001	177
DCP 5	.200	0.018	39	0.015	68	0.018	332	0.009	4	0.017	308	0.004	257	0.012	280	0.007	233	0.008	239
DCP 6	.250	0.012	22	0.012	38	0.014	321	0.005	339	0.009	273	0.001	271	0.007	254	0.006	144	0.004	278
DCP 7	.300	0.018	30	0.021	359	0.015	293	0.011	328	0.015	249	0.003	231	0.009	229	0.005	173	0.004	215
DCP 8	.400	0.006	322	0.015	351	0.009	260	0.005	331	0.007	240	0.004	282	0.006	205	0.003	157	0.004	114
DCP 9	.500	0.008	11	0.019	306	0.006	262	0.012	269	0.010	198	0.008	185	0.009	130	0.005	101	0.003	49
DCP10	.600	0.004	328	0.018	293	0.003	210	0.009	278	0.005	215	0.007	188	0.007	135	0.009	84	0.005	0
DCP11	.878	0.004	309	0.010	241	0.001	277	0.012	202	0.007	125	0.004	156	0.005	123	0.004	174	0.005	157

TUNED PITCHING OSCILLATION VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
80.0	15.92	0.400	14.91	6.86		5084.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.060	446.0	741.7	0.47E 07	-0.00085	1.783	17.26	0.1010

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		14.911	6.862	0	0.424	33	0.206	152	0.098	137	0.131	105	0.138	55	0.166	328	0.102	258	0.065	221
CN		1.110	0.230	80	0.188	57	0.110	99	0.051	51	0.041	42	0.026	37	0.037	349	0.021	314	0.022	285
CM		-0.038	0.053	194	0.015	130	0.018	137	0.009	107	0.010	102	0.005	90	0.008	83	0.007	55	0.007	36
DCP 1	.010	4.495	0.986	38	0.907	62	0.433	122	0.222	94	0.150	111	0.151	112	0.088	86	0.043	93	0.042	141
DCP 2	.025	3.930	0.423	98	0.983	75	0.594	115	0.342	91	0.263	87	0.230	87	0.204	60	0.146	46	0.124	28
DCP 3	.100	2.193	0.796	147	0.576	73	0.423	121	0.232	69	0.155	69	0.125	49	0.112	17	0.080	359	0.073	344
DCP 4	.150	2.118	0.519	129	0.316	62	0.268	119	0.114	51	0.096	76	0.069	27	0.066	20	0.063	340	0.040	328
DCP 5	.200	2.126	0.441	114	0.270	55	0.258	100	0.107	31	0.104	49	0.072	358	0.076	355	0.056	310	0.054	299
DCP 6	.250	1.603	0.393	102	0.216	54	0.198	100	0.066	33	0.090	50	0.037	359	0.072	3	0.047	309	0.044	305
DCP 7	.300	1.037	0.335	90	0.195	51	0.174	83	0.073	21	0.087	19	0.045	340	0.075	333	0.048	287	0.052	281
DCP 8	.400	0.895	0.307	72	0.146	43	0.108	75	0.035	22	0.063	15	0.018	352	0.060	333	0.034	292	0.044	279
DCP 9	.500	0.899	0.246	54	0.103	37	0.070	50	0.030	349	0.047	331	0.015	313	0.048	292	0.027	246	0.041	235
DCP10	.600	0.610	0.246	44	0.083	29	0.041	30	0.014	1	0.032	324	0.007	39	0.039	301	0.018	272	0.034	244
DCP11	.878	0.376	0.230	9	0.061	10	0.053	300	0.023	303	0.027	250	0.010	276	0.016	234	0.020	231	0.019	184

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.040	184	0.018	154	0.022	195	0.018	190	0.018	205	0.010	162	0.008	209	0.006	239	0.008	239
CN		0.016	242	0.009	177	0.002	224	0.002	130	0.001	286	0.002	167	0.001	211	0.003	276	0.002	209
CM		0.006	357	0.004	326	0.002	316	0.002	280	0.001	309	0.001	270	0.001	279	0.001	198	0.000	231
DCP 1	.010	0.048	141	0.071	118	0.052	83	0.046	57	0.048	33	0.037	3	0.036	341	0.037	310	0.025	294
DCP 2	.025	0.075	357	0.053	26	0.055	355	0.037	335	0.031	329	0.021	271	0.021	239	0.031	222	0.028	201
DCP 3	.100	0.054	310	0.025	317	0.031	315	0.022	303	0.023	318	0.015	294	0.016	322	0.018	300	0.014	324
DCP 4	.150	0.042	302	0.019	272	0.022	281	0.014	265	0.009	250	0.008	229	0.004	269	0.006	261	0.004	247
DCP 5	.200	0.047	257	0.017	235	0.018	233	0.012	245	0.007	266	0.013	214	0.008	242	0.010	248	0.009	240
DCP 6	.250	0.035	265	0.023	243	0.015	231	0.012	227	0.006	193	0.009	196	0.002	29	0.005	240	0.002	323
DCP 7	.300	0.045	239	0.028	213	0.021	211	0.017	193	0.009	205	0.012	182	0.010	170	0.010	177	0.008	153
DCP 8	.400	0.030	243	0.026	217	0.011	224	0.015	196	0.010	197	0.011	180	0.008	181	0.006	181	0.009	165
DCP 9	.500	0.031	194	0.029	154	0.013	135	0.017	114	0.007	85	0.009	103	0.007	83	0.006	51	0.003	19
DCP10	.600	0.021	207	0.023	176	0.012	158	0.012	117	0.010	139	0.009	86	0.006	89	0.004	25	0.006	99
DCP11	.878	0.019	155	0.018	97	0.008	75	0.010	42	0.004	13	0.004	40	0.001	309	0.007	333	0.004	313

TUNED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
80.0	16.08	0.400	14.92	6.97		5084.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.061	437.4	737.9	0.48E 07	-0.00072	1.690	17.42	0.0920

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		14.915	6.974	0	0.463	28	0.180	145	0.120	127	0.110	77	0.270	40	0.166	294	0.099	245	0.047	197
CN		1.021	0.256	72	0.190	52	0.088	91	0.050	45	0.027	33	0.043	34	0.030	322	0.019	311	0.018	250
CM		-0.042	0.053	193	0.018	126	0.018	121	0.010	100	0.009	66	0.004	102	0.008	59	0.005	53	0.007	4
DCP 1	.010	4.450	1.184	36	0.910	57	0.365	110	0.191	89	0.126	110	0.187	84	0.082	84	0.057	93	0.047	111
DCP 2	.025	3.874	0.532	76	1.010	72	0.522	173	0.352	79	0.205	70	0.247	64	0.168	46	0.134	35	0.102	13
DCP 3	.100	2.187	0.755	139	0.602	70	0.355	113	0.254	66	0.127	43	0.147	41	0.111	349	0.058	342	0.070	320
DCP 4	.150	1.651	0.506	121	0.324	60	0.235	109	0.105	51	0.089	56	0.076	26	0.070	355	0.047	312	0.040	305
DCP 5	.200	1.359	0.446	108	0.264	52	0.228	96	0.102	29	0.085	36	0.083	5	0.062	329	0.049	315	0.048	278
DCP 6	.250	1.304	0.401	95	0.212	49	0.170	93	0.046	31	0.071	41	0.043	26	0.064	338	0.029	302	0.044	285
DCP 7	.300	1.066	0.351	82	0.186	44	0.150	77	0.066	12	0.068	11	0.050	352	0.060	309	0.038	286	0.047	252
DCP 8	.400	0.896	0.323	65	0.149	37	0.077	61	0.024	9	0.035	352	0.029	37	0.049	301	0.021	300	0.043	241
DCP 9	.500	0.700	0.269	51	0.097	27	0.059	39	0.029	339	0.032	312	0.021	354	0.040	269	0.024	266	0.036	206
DCP10	.600	0.634	0.265	41	0.099	22	0.033	351	0.014	340	0.022	264	0.026	42	0.029	264	0.022	301	0.033	204
DCP11	.878	0.397	0.239	9	0.066	353	0.055	285	0.027	304	0.028	219	0.012	321	0.021	230	0.021	214	0.021	154

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.021	151	0.004	194	0.014	223	0.009	165	0.007	206	0.008	119	0.006	241	0.007	269	0.004	235
CN		0.009	207	0.003	119	0.001	206	0.003	214	0.001	242	0.003	153	0.001	226	0.001	286	0.002	256
CM		0.003	334	0.003	320	0.002	287	0.001	328	0.001	266	0.002	302	0.001	257	0.000	254	0.000	257
DCP 1	.010	0.066	113	0.072	64	0.051	53	0.045	9	0.040	332	0.037	295	0.024	266	0.022	266	0.016	245
DCP 2	.025	0.048	9	0.064	10	0.037	1	0.020	339	0.013	336	0.005	268	0.004	338	0.002	290	0.009	62
DCP 3	.100	0.027	273	0.037	317	0.023	277	0.022	291	0.020	277	0.009	271	0.017	297	0.018	296	0.023	277
DCP 4	.150	0.030	254	0.013	319	0.017	247	0.011	286	0.010	237	0.008	303	0.010	228	0.009	290	0.008	247
DCP 5	.200	0.024	249	0.024	260	0.013	243	0.021	229	0.014	219	0.016	183	0.009	195	0.009	180	0.006	175
DCP 6	.250	0.020	229	0.014	258	0.006	210	0.014	246	0.005	225	0.008	231	0.005	237	0.008	239	0.008	226
DCP 7	.300	0.025	215	0.018	201	0.011	199	0.015	191	0.008	185	0.014	148	0.005	147	0.005	134	0.002	165
DCP 8	.400	0.016	204	0.018	175	0.004	197	0.008	159	0.004	200	0.006	134	0.004	165	0.003	129	0.002	150
DCP 9	.500	0.023	185	0.022	129	0.010	167	0.012	97	0.005	128	0.011	95	0.005	75	0.007	29	0.001	303
DCP10	.600	0.009	217	0.018	123	0.005	215	0.010	111	0.003	129	0.004	84	0.003	121	0.002	39	0.003	44
DCP11	.878	0.016	121	0.006	109	0.013	70	0.005	239	0.008	53	0.006	147	0.003	30	0.002	268	0.001	247

TUNED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
80.0	16.23	0.400	15.00	7.97		5084.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.062	436.6	737.3	0.48E 07	-0.00101	1.693	17.90	0.0250

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		15.002	7.072	0	0.411	42	0.261	162	0.169	114	0.227	134	0.362	323	0.173	243	0.100	195	0.062	173
CN		1.025	0.276	69	0.207	42	0.082	91	0.045	18	0.022	92	0.044	350	0.028	295	0.019	274	0.017	229
CM		-0.039	0.056	194	0.023	113	0.019	122	0.013	67	0.007	55	0.003	90	0.008	36	0.004	13	0.005	328
DCP 1	.010	4.486	1.213	37	0.989	55	0.393	116	0.205	67	0.240	133	0.099	58	0.078	85	0.069	69	0.039	54
DCP 2	.025	3.917	0.579	76	1.096	66	0.555	105	0.360	60	0.256	94	0.188	43	0.180	26	0.127	3	0.099	339
DCP 3	.100	2.217	0.755	135	0.683	61	0.338	114	0.274	48	0.099	55	0.146	5	0.123	322	0.073	303	0.077	283
DCP 4	.150	1.686	0.498	117	0.384	54	0.203	112	0.134	32	0.044	77	0.115	354	0.061	311	0.048	330	0.047	257
DCP 5	.200	1.352	0.442	105	0.316	42	0.203	96	0.119	10	0.060	54	0.107	329	0.057	296	0.060	274	0.045	229
DCP 6	.250	1.308	0.420	90	0.253	39	0.151	93	0.076	354	0.042	63	0.078	328	0.049	311	0.052	266	0.035	237
DCP 7	.300	1.090	0.366	78	0.218	32	0.131	77	0.072	342	0.035	27	0.071	312	0.053	284	0.046	244	0.041	213
DCP 8	.400	0.896	0.364	64	0.168	22	0.075	59	0.049	306	0.012	18	0.040	319	0.042	288	0.030	239	0.034	222
DCP 9	.500	0.691	0.291	49	0.121	11	0.055	36	0.043	288	0.012	268	0.029	302	0.039	242	0.021	203	0.029	179
DCP10	.600	0.626	0.290	41	0.101	0	0.032	351	0.037	259	0.018	213	0.016	355	0.027	255	0.011	199	0.023	190
DCP11	.878	0.389	0.244	10	0.064	338	0.061	290	0.014	244	0.028	194	0.013	346	0.029	205	0.010	216	0.019	111

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.027	174	0.019	133	0.017	174	0.018	161	0.013	170	0.012	155	0.010	207	0.007	187	0.010	238
CN		0.010	173	0.005	170	0.007	196	0.005	132	0.001	307	0.003	159	0.001	38	0.001	303	0.004	245
CM		0.003	278	0.004	280	0.001	291	0.002	243	0.002	199	0.002	210	0.002	181	0.001	145	0.001	98
DCP 1	.010	0.030	59	0.037	342	0.034	288	0.028	260	0.034	261	0.033	225	0.020	175	0.003	62	0.011	274
DCP 2	.025	0.050	312	0.050	310	0.044	275	0.025	236	0.035	235	0.036	193	0.023	176	0.013	168	0.039	189
DCP 3	.100	0.043	245	0.034	265	0.034	230	0.015	235	0.027	246	0.026	224	0.027	222	0.024	202	0.026	195
DCP 4	.150	0.025	216	0.024	232	0.017	205	0.016	212	0.009	169	0.008	204	0.009	152	0.003	186	0.007	201
DCP 5	.200	0.028	218	0.025	204	0.018	183	0.016	156	0.006	187	0.012	169	0.008	132	0.007	126	0.006	99
DCP 6	.250	0.036	198	0.019	194	0.020	172	0.015	146	0.010	107	0.005	95	0.004	100	0.002	20	0.004	244
DCP 7	.300	0.029	171	0.015	158	0.014	145	0.013	134	0.006	122	0.010	124	0.007	91	0.007	66	0.002	63
DCP 8	.400	0.028	164	0.016	169	0.017	147	0.016	133	0.012	93	0.008	73	0.008	64	0.008	6	0.009	315
DCP 9	.500	0.016	137	0.017	114	0.010	69	0.011	72	0.002	11	0.007	55	0.005	10	0.007	1	0.007	302
DCP10	.600	0.020	119	0.008	116	0.006	98	0.010	104	0.010	34	0.006	58	0.012	12	0.011	328	0.012	282
DCP11	.878	0.011	43	0.014	79	0.006	238	0.009	31	0.009	334	0.003	329	0.007	331	0.004	228	0.005	183

TUNED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
80.0	15.87	0.600	-0.04	7.00		5086.1	10

I	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.041	652.7	1462.5	0.63E 07	-0.00059	0.926	7.26	0.1010

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
ALPHA		-0.043	7.004 0	0.361 336	0.127 298	0.025 180	0.056 158	0.122 322	0.047 351	0.033 145	0.021 182
CN		0.061	0.819 356	0.043 270	0.061 298	0.008 153	0.003 108	0.018 299	0.002 240	0.003 118	0.002 146
CM		-0.014	0.006 251	0.019 246	0.009 323	0.002 30	0.001 293	0.001 335	0.001 108	0.000 216	0.001 219
DCP 1	.010	-1.026	2.522 355	0.904 259	0.379 322	0.216 236	0.069 320	0.083 239	0.017 250	0.078 189	0.053 246
DCP 2	.025	-0.756	2.831 353	0.506 257	0.396 321	0.062 233	0.062 311	0.025 276	0.038 269	0.011 169	0.052 273
DCP 3	.100	0.359	2.469 354	0.217 248	0.280 313	0.037 38	0.023 184	0.080 345	0.053 107	0.042 22	0.038 103
DCP 4	.200	0.491	1.339 357	0.084 273	0.131 249	0.092 88	0.033 99	0.054 296	0.034 19	0.040 217	0.020 180
DCP 5	.250	0.222	1.160 356	0.039 323	0.099 238	0.066 104	0.042 62	0.073 283	0.015 243	0.028 148	0.004 136
DCP 6	.300	0.046	0.870 357	0.027 61	0.057 285	0.035 134	0.017 107	0.031 271	0.007 271	0.016 130	0.006 14
DCP 7	.400	0.027	0.644 356	0.025 40	0.029 302	0.021 219	0.014 179	0.014 260	0.012 304	0.005 54	0.003 49
DCP 8	.500	0.112	0.461 358	0.020 48	0.013 294	0.019 208	0.006 171	0.006 241	0.009 292	0.004 58	0.002 125
DCP 9	.600	0.012	0.357 0	0.017 53	0.011 262	0.014 225	0.003 181	0.003 258	0.006 304	0.004 23	0.003 102
DCP10	.878	0.047	0.216 357	0.050 53	0.013 149	0.003 197	0.004 31	0.002 77	0.002 213	0.000 231	0.002 335

DATA TYPE	X/C	RES 10 PHI	RES 11 PHI	RES 12 PHI	RES 13 PHI	RES 14 PHI	RES 15 PHI	RES 16 PHI	RES 17 PHI	RES 18 PHI
ALPHA		0.010 219	0.004 238	0.013 205	0.009 202	0.014 183	0.007 197	0.014 193	0.008 209	0.006 184
CN		0.003 61	0.002 236	0.001 355	0.002 241	0.002 206	0.001 218	0.001 108	0.002 151	0.000 122
CM		0.000 49	0.000 334	0.000 338	0.000 267	0.000 108	0.000 269	0.000 198	0.000 137	0.000 143
DCP 1	.010	0.027 213	0.005 146	0.040 182	0.010 283	0.034 147	0.017 212	0.019 127	0.019 184	0.012 133
DCP 2	.025	0.021 44	0.044 236	0.027 331	0.025 232	0.019 304	0.018 227	0.013 331	0.025 183	0.019 293
DCP 3	.100	0.012 352	0.020 34	0.011 143	0.009 357	0.016 137	0.005 356	0.012 88	0.008 84	0.012 105
DCP 4	.200	0.025 105	0.000 64	0.021 24	0.010 240	0.017 257	0.002 214	0.012 164	0.008 93	0.003 35
DCP 5	.250	0.011 84	0.009 330	0.013 299	0.013 201	0.009 148	0.006 69	0.004 332	0.003 300	0.004 222
DCP 6	.300	0.005 2	0.010 231	0.003 275	0.005 126	0.002 231	0.003 342	0.001 209	0.003 222	0.004 178
DCP 7	.400	0.001 31	0.004 185	0.002 176	0.001 40	0.001 353	0.001 233	0.002 170	0.001 154	0.001 334
DCP 8	.500	0.002 302	0.001 172	0.001 201	0.002 353	0.001 70	0.002 154	0.002 213	0.001 243	0.002 274
DCP 9	.600	0.002 187	0.002 190	0.000 51	0.001 34	0.001 209	0.003 127	0.001 179	0.001 334	0.000 86
DCP10	.878	0.001 8	0.002 167	0.001 147	0.001 217	0.001 257	0.002 284	0.002 40	0.002 162	0.001 335

TUNED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
80.0	15.90	0.600	-0.05	7.22		5086.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.041	645.9	1447.7	0.63E 07	-0.00050	0.919	7.47	0.0300

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
ALPHA		-0.054	7.223 0	0.316 326	0.142 284	0.111 184	0.150 221	0.273 242	0.078 269	0.038 104	0.045 144
CN		0.031	0.825 357	0.062 253	0.056 290	0.025 178	0.016 230	0.029 249	0.006 261	0.005 100	0.008 152
CM		-0.015	0.006 249	0.018 247	0.009 326	0.001 89	0.002 281	0.002 61	0.002 113	0.001 186	0.001 224
DCP 1	.010	-1.040	2.576 353	0.951 255	0.358 311	0.277 225	0.088 273	0.180 215	0.023 319	0.105 151	0.043 202
DCP 2	.025	-0.770	2.815 354	0.603 254	0.376 315	0.154 230	0.119 295	0.070 199	0.056 249	0.024 139	0.044 244
DCP 3	.100	0.345	2.503 355	0.262 240	0.248 314	0.064 144	0.095 214	0.042 304	0.058 135	0.030 44	0.044 132
DCP 4	.200	0.255	1.345 358	0.113 258	0.126 243	0.108 110	0.028 178	0.071 267	0.026 15	0.037 232	0.031 172
DCP 5	.250	0.100	1.187 355	0.043 280	0.100 218	0.069 104	0.014 356	0.094 252	0.012 238	0.022 129	0.010 157
DCP 6	.300	0.067	0.858 359	0.017 173	0.060 282	0.015 172	0.020 189	0.054 254	0.008 297	0.021 115	0.004 127
DCP 7	.400	0.026	0.647 356	0.011 45	0.031 278	0.034 216	0.013 227	0.025 241	0.012 283	0.008 68	0.003 68
DCP 8	.500	0.034	0.459 0	0.001 330	0.018 279	0.022 209	0.011 197	0.022 240	0.015 296	0.007 55	0.005 106
DCP 9	.600	0.013	0.360 359	0.009 36	0.014 246	0.021 217	0.004 227	0.014 245	0.012 290	0.005 29	0.005 76
DCP10	.878	0.055	0.220 0	0.041 60	0.016 157	0.003 205	0.003 160	0.009 231	0.008 262	0.003 12	0.002 123

DATA TYPE	X/C	RES 10 PHI	RES 11 PHI	RES 12 PHI	RES 13 PHI	RES 14 PHI	RES 15 PHI	RES 16 PHI	RES 17 PHI	RES 18 PHI
ALPHA		0.039 180	0.013 173	0.024 137	0.023 131	0.018 164	0.008 185	0.017 171	0.006 118	0.014 154
CN		0.003 96	0.002 172	0.004 164	0.002 226	0.003 162	0.003 206	0.003 168	0.002 181	0.002 248
CM		0.000 129	0.001 274	0.001 332	0.001 186	0.001 239	0.000 297	0.000 134	0.000 179	0.001 90
DCP 1	.010	0.042 157	0.013 194	0.035 125	0.018 153	0.022 132	0.006 101	0.022 97	0.007 201	0.007 28
DCP 2	.025	0.004 341	0.031 249	0.010 78	0.028 219	0.007 152	0.029 211	0.002 279	0.027 179	0.007 210
DCP 3	.100	0.005 18	0.012 136	0.018 201	0.005 217	0.023 194	0.004 253	0.017 180	0.007 261	0.002 153
DCP 4	.200	0.025 115	0.002 308	0.009 90	0.008 279	0.011 267	0.008 249	0.008 164	0.011 155	0.004 356
DCP 5	.250	0.017 65	0.014 310	0.015 258	0.013 130	0.010 96	0.001 211	0.005 107	0.002 118	0.008 220
DCP 6	.300	0.003 269	0.003 201	0.004 141	0.004 170	0.001 178	0.002 188	0.003 195	0.002 188	0.001 283
DCP 7	.400	0.001 37	0.006 137	0.003 137	0.002 331	0.002 163	0.003 182	0.002 109	0.002 79	0.001 256
DCP 8	.500	0.002 121	0.004 160	0.003 192	0.002 319	0.002 140	0.002 189	0.001 218	0.000 154	0.002 271
DCP 9	.600	0.003 94	0.004 140	0.003 170	0.001 337	0.003 89	0.003 170	0.002 126	0.002 91	0.003 231
DCP10	.878	0.002 291	0.004 86	0.004 144	0.002 331	0.003 79	0.001 158	0.002 276	0.002 292	0.003 280

TUNED PITCHING OSCILLATION VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
80.0	15.92	0.600	-0.02	7.23		5086.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.041	645.3	1446.7	0.63E 07	-0.00047	0.894	7.38	0.0250

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
ALPHA		-0.016	7.232 0	0.393 334	0.183 294	0.128 170	0.141 210	0.346 233	0.086 268	0.039 65	0.031 126
CN		0.034	0.820 354	0.055 262	0.060 288	0.017 170	0.017 194	0.031 229	0.010 294	0.001 134	0.004 121
CM		-0.014	0.007 219	0.018 243	0.009 312	0.001 144	0.002 249	0.002 37	0.002 64	0.001 137	0.001 229
DCP 1	.010	-1.048	2.564 352	1.009 256	0.432 314	0.263 225	0.133 283	0.145 212	0.018 43	0.084 151	0.027 162
DCP 2	.025	-0.754	2.829 352	0.570 253	0.407 311	0.119 220	0.122 279	0.077 202	0.033 269	0.028 120	0.041 237
DCP 3	.100	0.353	2.519 353	0.232 241	0.268 306	0.036 122	0.076 204	0.045 267	0.048 109	0.034 6	0.040 91
DCP 4	.150	0.369	1.725 356	0.132 269	0.141 271	0.057 134	0.207 164	0.020 71	0.108 338	0.047 224	0.003 359
DCP 5	.200	0.259	1.349 356	0.105 268	0.145 242	0.099 100	0.025 121	0.074 242	0.026 357	0.028 240	0.023 170
DCP 6	.250	0.098	1.186 355	0.065 280	0.104 224	0.069 97	0.024 30	0.097 246	0.016 227	0.024 114	0.007 177
DCP 7	.300	0.067	0.863 355	0.004 80	0.063 285	0.010 116	0.017 158	0.065 232	0.013 263	0.015 88	0.003 16
DCP 8	.400	0.019	0.655 355	0.016 42	0.030 286	0.029 217	0.010 199	0.033 220	0.016 265	0.008 26	0.006 50
DCP 9	.500	0.025	0.465 357	0.012 2	0.017 292	0.018 190	0.010 177	0.027 217	0.016 261	0.005 334	0.002 12
DCP10	.600	0.019	0.368 359	0.010 30	0.011 260	0.018 214	0.006 213	0.022 232	0.013 285	0.007 14	0.005 91
DCP11	.878	0.057	0.225 356	0.045 48	0.015 134	0.004 346	0.002 88	0.009 201	0.008 225	0.005 248	0.002 86

DATA TYPE	X/C	RES 10 PHI	RES 11 PHI	RES 12 PHI	RES 13 PHI	RES 14 PHI	RES 15 PHI	RES 16 PHI	RES 17 PHI	RES 18 PHI
ALPHA		0.043 169	0.005 126	0.029 93	0.022 81	0.011 116	0.001 181	0.009 160	0.009 46	0.003 357
CN		0.002 42	0.003 101	0.002 117	0.004 196	0.001 272	0.001 10	0.001 4	0.002 172	0.001 102
CM		0.000 335	0.000 240	0.000 317	0.000 316	0.001 91	0.001 155	0.000 271	0.000 141	0.000 183
DCP 1	.010	0.042 154	0.012 119	0.039 136	0.008 119	0.032 110	0.002 280	0.030 66	0.014 107	0.016 77
DCP 2	.025	0.021 353	0.019 211	0.013 262	0.031 212	0.015 336	0.030 172	0.020 275	0.010 133	0.003 105
DCP 3	.100	0.011 358	0.016 36	0.004 112	0.002 70	0.008 163	0.005 331	0.010 87	0.007 18	0.009 79
DCP 4	.150	0.026 260	0.023 141	0.012 64	0.015 213	0.012 101	0.026 38	0.025 337	0.029 218	0.018 208
DCP 5	.200	0.029 97	0.005 73	0.010 61	0.003 302	0.012 274	0.008 224	0.007 185	0.007 134	0.008 56
DCP 6	.250	0.011 66	0.012 346	0.011 262	0.013 163	0.007 57	0.005 19	0.006 140	0.004 95	0.002 227
DCP 7	.300	0.001 12	0.005 173	0.004 256	0.012 196	0.001 42	0.004 0	0.001 144	0.004 160	0.001 146
DCP 8	.400	0.001 46	0.005 133	0.002 121	0.000 240	0.001 235	0.001 137	0.002 70	0.001 41	0.002 60
DCP 9	.500	0.003 347	0.005 64	0.003 115	0.003 168	0.003 206	0.003 268	0.003 308	0.002 9	0.001 43
DCP10	.600	0.001 133	0.003 70	0.005 128	0.006 191	0.004 266	0.001 358	0.001 110	0.001 250	0.004 28
DCP11	.878	0.001 156	0.001 83	0.003 319	0.000 3	0.002 307	0.003 337	0.001 49	0.001 157	0.002 184

TUNED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
80.0	15.87	0.600	7.04	6.84		5087.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.040	657.9	1466.3	0.63E 07	-0.00087	1.253	10.26	0.1010

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		7.044	6.835	0	0.622	40	0.133	124	0.059	93	0.031	51	0.090	55	0.087	343	0.094	271	0.058	215
CN		0.713	0.573	359	0.199	58	0.030	61	0.019	47	0.011	13	0.037	20	0.019	6	0.024	279	0.018	242
CM		-0.031	0.021	219	0.019	96	0.002	114	0.005	92	0.001	33	0.001	111	0.002	91	0.002	88	0.002	3
DCP 1	.010	1.093	2.820	353	0.851	55	0.220	115	0.037	110	0.004	280	0.073	15	0.030	310	0.036	255	0.019	149
DCP 2	.025	1.494	2.288	355	0.656	59	0.168	123	0.049	90	0.015	252	0.042	27	0.036	72	0.061	234	0.057	222
DCP 3	.100	1.891	1.089	352	0.802	73	0.070	61	0.143	73	0.048	56	0.019	78	0.061	42	0.047	293	0.029	270
DCP 4	.250	1.237	0.737	2	0.279	56	0.101	23	0.040	36	0.065	350	0.018	60	0.077	356	0.050	304	0.046	293
DCP 5	.300	0.786	0.647	4	0.190	54	0.064	39	0.030	331	0.022	0	0.012	326	0.039	2	0.051	300	0.038	267
DCP 6	.400	0.622	0.541	4	0.129	36	0.036	35	0.026	305	0.005	324	0.013	311	0.014	311	0.028	275	0.026	236
DCP 7	.500	0.605	0.401	7	0.095	31	0.013	56	0.018	329	0.006	289	0.008	303	0.010	311	0.023	272	0.025	210
DCP 8	.600	0.344	0.308	6	0.062	23	0.010	114	0.005	323	0.005	138	0.006	23	0.005	335	0.016	279	0.015	198
DCP 9	.878	0.245	0.206	8	0.031	323	0.003	242	0.008	259	0.002	182	0.003	307	0.006	287	0.010	236	0.009	176

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.032	179	0.015	142	0.012	194	0.012	174	0.005	211	0.012	110	0.005	175	0.003	248	0.006	225
CN		0.009	212	0.006	242	0.004	199	0.006	217	0.006	209	0.006	160	0.003	99	0.003	110	0.004	71
CM		0.001	319	0.001	1	0.001	327	0.001	273	0.001	287	0.001	264	0.001	232	0.000	205	0.001	205
DCP 1	.010	0.018	124	0.017	185	0.001	189	0.004	201	0.004	274	0.002	125	0.002	9	0.001	338	0.002	277
DCP 2	.025	0.023	325	0.009	70	0.020	100	0.016	173	0.013	186	0.006	321	0.013	229	0.009	84	0.003	142
DCP 3	.100	0.020	222	0.024	267	0.013	266	0.027	238	0.020	239	0.025	185	0.011	144	0.012	134	0.016	117
DCP 4	.250	0.023	236	0.015	311	0.017	290	0.018	270	0.010	264	0.012	232	0.007	29	0.014	283	0.002	272
DCP 5	.300	0.027	240	0.016	247	0.015	241	0.016	250	0.026	218	0.017	158	0.004	186	0.014	169	0.008	103
DCP 6	.400	0.022	202	0.012	195	0.017	187	0.014	146	0.009	150	0.012	126	0.007	98	0.012	97	0.010	32
DCP 7	.500	0.015	174	0.012	170	0.012	124	0.006	107	0.005	121	0.003	122	0.009	117	0.011	66	0.007	16
DCP 8	.600	0.006	110	0.005	242	0.006	149	0.001	202	0.004	172	0.005	120	0.004	62	0.002	78	0.004	58
DCP 9	.878	0.003	122	0.002	175	0.003	136	0.004	112	0.002	98	0.005	79	0.005	38	0.002	322	0.002	48

TUNED PITCHING OSCILLATION VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
80.0	15.90	0.600	7.10	6.91		5387.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.041	646.9	1444.3	0.63E 07	-0.00091	1.197	10.73	0.0940

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		7.098	6.509	0	0.561	41	0.123	137	0.070	122	0.070	78	0.078	63	0.121	326	0.157	246	0.081	169
CN		0.654	0.573	358	0.194	53	0.035	50	0.016	31	0.016	19	0.005	0	0.023	359	0.027	253	0.017	202
CM		-0.031	0.022	218	0.018	91	0.002	59	0.004	94	0.002	36	0.000	35	0.002	119	0.004	53	0.004	331
DCP 1	.010	1.036	2.926	352	0.895	55	0.232	119	0.036	138	0.006	45	0.006	161	0.046	290	0.047	231	0.034	114
DCP 2	.025	1.456	2.354	352	0.673	52	0.142	112	0.039	72	0.022	312	0.050	25	0.042	27	0.068	188	0.037	189
DCP 3	.100	1.900	1.156	349	0.811	68	0.119	17	0.094	65	0.077	45	0.016	252	0.060	54	0.052	297	0.034	242
DCP 4	.200	1.047	0.700	359	0.336	62	0.108	49	0.082	61	0.082	23	0.049	49	0.084	4	0.057	334	0.038	292
DCP 5	.250	0.994	0.747	2	0.284	57	0.114	20	0.023	6	0.071	1	0.018	285	0.063	354	0.060	285	0.035	271
DCP 6	.300	0.779	0.636	2	0.188	45	0.055	35	0.019	321	0.025	22	0.015	324	0.043	345	0.062	271	0.028	217
DCP 7	.400	0.617	0.544	4	0.149	37	0.042	23	0.036	305	0.010	279	0.014	258	0.015	314	0.041	257	0.037	195
DCP 8	.500	0.447	0.401	4	0.091	25	0.018	52	0.020	330	0.010	308	0.008	284	0.019	306	0.038	240	0.025	171
DCP 9	.600	0.347	0.316	7	0.063	23	0.016	132	0.010	356	0.008	173	0.008	82	0.014	332	0.023	249	0.022	166
DCP10	.878	0.254	0.206	5	0.036	306	0.005	222	0.009	244	0.004	227	0.001	323	0.007	344	0.014	214	0.012	136

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.033	141	0.018	150	0.017	189	0.025	146	0.011	138	0.006	88	0.004	204	0.004	201	0.018	199
CN		0.003	225	0.008	210	0.004	166	0.004	155	0.002	152	0.004	93	0.003	29	0.001	322	0.002	328
CM		0.001	285	0.001	310	0.001	296	0.002	238	0.001	191	0.001	228	0.001	168	0.001	99	0.001	85
DCP 1	.010	0.012	148	0.015	167	0.007	244	0.004	84	0.003	131	0.003	120	0.008	167	0.008	217	0.004	230
DCP 2	.025	0.024	278	0.010	84	0.007	79	0.010	116	0.010	263	0.011	243	0.006	68	0.001	248	0.007	28
DCP 3	.100	0.008	236	0.042	244	0.024	174	0.020	209	0.028	176	0.021	109	0.005	40	0.006	60	0.007	6
DCP 4	.200	0.036	345	0.038	277	0.008	6	0.023	256	0.007	263	0.002	291	0.005	109	0.008	47	0.006	1
DCP 5	.250	0.027	236	0.007	269	0.018	270	0.018	240	0.009	196	0.009	270	0.008	196	0.007	264	0.006	174
DCP 6	.300	0.024	249	0.027	199	0.015	193	0.019	180	0.015	148	0.010	125	0.008	97	0.005	80	0.004	33
DCP 7	.400	0.020	162	0.012	143	0.015	188	0.024	129	0.011	83	0.013	97	0.011	42	0.002	15	0.008	46
DCP 8	.500	0.015	176	0.024	124	0.009	62	0.009	99	0.007	24	0.006	75	0.011	356	0.005	274	0.003	305
DCP 9	.600	0.011	86	0.003	153	0.006	117	0.008	65	0.003	358	0.004	61	0.005	348	0.005	299	0.005	282
DCP10	.878	0.004	43	0.003	192	0.001	161	0.007	26	0.004	349	0.004	33	0.002	327	0.002	262	0.005	258

TUNED PITCHING OSCILLATION VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
80.0	16.19	0.600	7.07	7.06		5087.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.042	645.3	1442.1	0.63E 07	-0.00091	1.218	10.99	0.0250

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
ALPHA		7.072	7.061 0	0.587 44	0.102 152	0.101 101	0.044 171	0.329 11	0.205 263	0.146 198	0.065 157
CN		0.653	0.588 357	0.194 51	0.025 50	0.027 47	0.010 318	0.028 1	0.026 307	0.024 234	0.014 198
CM		-0.037	0.022 217	0.018 84	0.002 15	0.004 88	0.001 1	0.001 210	0.005 80	0.003 27	0.002 336
DCP 1	.010	1.007	2.967 352	0.871 55	0.198 117	0.056 89	0.048 183	0.066 339	0.072 238	0.035 221	0.034 69
DCP 2	.025	1.425	2.430 351	0.699 51	0.142 107	0.055 85	0.062 230	0.130 346	0.021 39	0.071 160	0.039 157
DCP 3	.100	1.877	1.187 349	0.816 64	0.085 351	0.146 64	0.035 20	0.034 357	0.061 24	0.068 268	0.023 213
DCP 4	.200	1.027	0.718 356	0.365 60	0.083 44	0.120 61	0.079 348	0.077 26	0.089 329	0.035 312	0.037 284
DCP 5	.250	0.969	0.766 2	0.288 53	0.098 4	0.030 24	0.052 332	0.041 10	0.083 314	0.047 248	0.034 273
DCP 6	.300	0.778	0.649 2	0.190 41	0.048 46	0.036 2	0.024 327	0.036 333	0.044 297	0.043 247	0.030 224
DCP 7	.400	0.609	0.565 4	0.133 30	0.025 22	0.026 312	0.012 253	0.023 339	0.035 273	0.039 228	0.034 186
DCP 8	.500	0.419	0.405 4	0.094 25	0.017 52	0.023 328	0.012 233	0.020 354	0.030 262	0.026 204	0.019 159
DCP 9	.600	0.348	0.323 6	0.051 23	0.015 138	0.007 30	0.005 166	0.020 25	0.022 283	0.019 222	0.017 182
DCP10	.878	0.298	0.211 3	0.032 298	0.008 166	0.004 233	0.004 184	0.008 358	0.015 266	0.014 199	0.009 125

DATA TYPE	X/C	RES 10 PHI	RES 11 PHI	RES 12 PHI	RES 13 PHI	RES 14 PHI	RES 15 PHI	RES 16 PHI	RES 17 PHI	RES 18 PHI
ALPHA		0.041 143	0.027 132	0.020 171	0.014 129	0.019 133	0.021 120	0.002 346	0.016 182	0.012 139
CN		0.008 184	0.006 190	0.004 174	0.007 147	0.004 93	0.005 57	0.004 339	0.003 255	0.001 172
CM		0.002 294	0.002 260	0.001 238	0.001 247	0.001 208	0.001 186	0.001 147	0.001 51	0.001 285
DCP 1	.010	0.030 111	0.028 142	0.015 204	0.007 290	0.005 2	0.004 69	0.010 111	0.009 169	0.009 196
DCP 2	.025	0.021 207	0.002 87	0.007 344	0.002 11	0.001 231	0.003 81	0.002 173	0.008 178	0.006 307
DCP 3	.100	0.026 211	0.032 213	0.022 168	0.032 175	0.024 113	0.015 82	0.010 46	0.018 1	0.016 255
DCP 4	.200	0.030 320	0.035 272	0.031 264	0.017 195	0.005 8	0.008 73	0.021 282	0.005 288	0.003 249
DCP 5	.250	0.027 229	0.023 255	0.023 218	0.017 202	0.008 194	0.011 221	0.008 191	0.009 190	0.003 208
DCP 6	.300	0.025 210	0.025 199	0.025 168	0.021 137	0.013 109	0.011 82	0.009 25	0.004 225	0.007 120
DCP 7	.400	0.021 155	0.019 145	0.017 112	0.009 88	0.006 115	0.011 78	0.009 19	0.003 242	0.005 71
DCP 8	.500	0.012 148	0.016 124	0.015 68	0.009 26	0.004 347	0.005 34	0.008 338	0.006 261	0.003 207
DCP 9	.600	0.013 123	0.009 73	0.002 313	0.007 153	0.006 77	0.005 18	0.006 331	0.005 230	0.002 123
DCP10	.878	0.003 44	0.003 56	0.001 33	0.006 66	0.003 12	0.005 0	0.002 297	0.003 235	0.005 110

TUNED PITCHING OSCILLATION VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
80.0	15.85	0.600	14.77	6.36		5090.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.041	646.8	1487.1	0.65E 07	-0.00070	1.300	17.52	0.1G10

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		14.769	6.365	0	0.227	33	0.161	169	0.079	198	0.019	202	0.023	149	0.079	178	0.053	195	0.050	143
CN		1.086	0.130	39	0.088	75	0.013	118	0.012	254	0.018	312	0.012	280	0.004	168	0.006	286	0.004	197
CM		-0.065	0.060	187	0.004	223	0.001	153	0.002	237	0.003	331	0.002	34	0.001	313	0.002	35	0.001	331
DCP 1	.010	2.830	0.691	358	0.407	83	0.056	36	0.034	199	0.027	211	0.037	89	0.018	42	0.010	297	0.012	247
DCP 2	.025	2.769	0.334	6	0.435	80	0.044	26	0.042	94	0.044	317	0.002	268	0.018	118	0.022	345	0.033	238
DCP 3	.100	2.362	0.683	154	0.110	62	0.098	138	0.084	257	0.074	334	0.053	296	0.041	321	0.034	307	0.014	233
DCP 4	.200	1.926	0.191	126	0.059	92	0.044	348	0.086	312	0.077	322	0.025	285	0.053	139	0.029	89	0.030	44
DCP 5	.250	1.746	0.198	107	0.065	68	0.055	151	0.038	248	0.058	309	0.024	9	0.015	216	0.019	304	0.011	200
DCP 6	.300	1.175	0.151	55	0.161	83	0.066	154	0.033	242	0.034	311	0.019	345	0.014	307	0.013	349	0.010	201
DCP 7	.400	0.984	0.240	29	0.131	75	0.038	144	0.024	175	0.020	251	0.019	295	0.018	231	0.012	256	0.002	326
DCP 8	.500	0.940	0.243	17	0.070	79	0.006	109	0.008	202	0.017	249	0.021	238	0.012	248	0.017	250	0.008	160
DCP 9	.600	0.434	0.255	14	0.049	68	0.013	8	0.013	97	0.005	118	0.009	231	0.013	136	0.004	261	0.009	207
DCP10	.878	0.439	0.244	5	0.028	47	0.009	343	0.001	91	0.007	125	0.007	213	0.008	87	0.009	213	0.005	140

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.021	143	0.026	168	0.019	120	0.007	130	0.005	76	0.011	168	0.008	124	0.007	165	0.009	164
CN		0.002	37	0.006	283	0.007	127	0.009	330	0.004	209	0.003	322	0.003	65	0.002	294	0.004	116
CM		0.002	327	0.001	56	0.002	282	0.001	132	0.001	62	0.001	35	0.001	181	0.001	65	0.001	2
DCP 1	.010	0.021	175	0.012	42	0.005	311	0.005	288	0.017	224	0.023	123	0.025	15	0.022	284	0.014	199
DCP 2	.025	0.009	183	0.028	243	0.015	138	0.015	280	0.026	164	0.015	51	0.014	223	0.019	131	0.015	74
DCP 3	.100	0.017	18	0.016	274	0.012	142	0.016	42	0.014	151	0.020	33	0.014	135	0.012	2	0.005	231
DCP 4	.200	0.045	348	0.029	35	0.003	217	0.051	336	0.032	290	0.021	298	0.008	130	0.022	355	0.036	77
DCP 5	.250	0.015	296	0.008	345	0.010	224	0.012	26	0.004	202	0.008	309	0.014	154	0.002	35	0.005	95
DCP 6	.300	0.006	73	0.010	286	0.005	173	0.006	283	0.007	172	0.008	236	0.011	115	0.006	210	0.008	151
DCP 7	.400	0.009	141	0.018	284	0.015	134	0.017	318	0.008	56	0.010	298	0.013	44	0.005	351	0.004	6
DCP 8	.500	0.005	272	0.006	255	0.006	155	0.007	281	0.004	238	0.008	264	0.005	248	0.004	173	0.007	233
DCP 9	.600	0.007	115	0.008	224	0.014	90	0.009	297	0.005	113	0.003	358	0.010	344	0.006	228	0.003	106
DCP10	.878	0.008	149	0.001	270	0.004	123	0.007	343	0.009	238	0.004	154	0.005	22	0.007	261	0.007	173

TUNED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
80.0	15.95	0.600	14.78	6.61		5390.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.041	646.8	1450.9	0.63E 07	-0.00098	1.242	17.42	0.0450

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		14.783	6.606	0	0.435	14	0.095	172	0.039	259	0.027	42	0.073	19	0.046	242	0.030	222	0.008	88
CN		1.028	0.141	38	0.086	79	0.019	146	0.007	174	0.017	313	0.002	345	0.004	287	0.003	256	0.006	6
CM		-0.062	0.060	190	0.007	227	0.003	179	0.003	242	0.001	293	0.001	67	0.001	301	0.001	78	0.001	192
DCP 1	.010	2.856	0.754	354	0.386	83	0.064	69	0.034	131	0.026	11	0.031	28	0.006	350	0.006	223	0.014	83
DCP 2	.025	2.813	0.608	1	0.430	86	0.067	69	0.042	54	0.051	299	0.019	88	0.021	266	0.037	153	0.025	40
DCP 3	.100	2.600	0.624	162	0.071	79	0.152	163	0.081	218	0.058	308	0.016	230	0.034	310	0.006	347	0.017	3
DCP 4	.200	1.509	0.246	142	0.030	182	0.037	243	0.009	323	0.054	334	0.043	45	0.006	90	0.007	44	0.007	332
DCP 5	.250	1.434	0.182	105	0.108	95	0.070	162	0.063	221	0.063	305	0.034	30	0.017	149	0.005	256	0.006	328
DCP 6	.300	1.175	0.190	46	0.161	87	0.055	163	0.015	249	0.022	303	0.038	331	0.012	324	0.011	310	0.009	289
DCP 7	.400	0.979	0.256	28	0.144	76	0.037	138	0.024	154	0.016	213	0.021	220	0.013	268	0.014	288	0.012	350
DCP 8	.500	0.740	0.243	21	0.082	83	0.009	37	0.009	136	0.007	257	0.016	245	0.009	256	0.013	274	0.005	205
DCP 9	.600	0.636	0.267	15	0.056	54	0.021	1	0.017	52	0.011	3	0.005	295	0.003	129	0.005	228	0.007	39
DCP10	.878	0.454	0.242	8	0.038	59	0.008	30	0.014	65	0.004	103	0.002	98	0.004	95	0.004	121	0.007	15

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.011	197	0.008	174	0.002	15	0.005	121	0.009	110	0.007	111	0.006	84	0.006	202	0.006	195
CN		0.003	342	0.003	341	0.005	278	0.003	154	0.005	229	0.006	120	0.002	93	0.002	78	0.003	11
CM		0.001	33	0.000	12	0.001	78	0.001	292	0.000	66	0.001	303	0.001	269	0.001	326	0.001	253
DCP 1	.010	0.027	17	0.012	282	0.004	219	0.007	31	0.010	303	0.008	313	0.010	229	0.006	210	0.008	175
DCP 2	.025	0.007	36	0.013	18	0.025	330	0.024	231	0.018	200	0.017	161	0.013	95	0.013	12	0.007	325
DCP 3	.100	0.022	20	0.017	348	0.007	308	0.003	352	0.007	217	0.013	86	0.009	351	0.011	32	0.022	343
DCP 4	.200	0.002	306	0.003	294	0.011	273	0.003	166	0.007	230	0.012	130	0.006	350	0.000	214	0.005	278
DCP 5	.250	0.016	293	0.006	310	0.003	185	0.004	210	0.005	277	0.004	131	0.006	172	0.008	61	0.003	330
DCP 6	.300	0.007	263	0.006	302	0.010	237	0.005	164	0.006	233	0.002	132	0.005	252	0.004	109	0.006	283
DCP 7	.400	0.004	53	0.008	19	0.008	347	0.005	77	0.006	249	0.006	41	0.013	176	0.004	269	0.006	140
DCP 8	.500	0.003	296	0.008	229	0.010	209	0.009	179	0.006	179	0.004	174	0.001	143	0.002	337	0.003	176
DCP 9	.600	0.003	193	0.004	70	0.006	298	0.004	107	0.004	281	0.005	128	0.005	86	0.006	198	0.006	46
DCP10	.878	0.002	237	0.002	298	0.004	264	0.004	113	0.003	224	0.009	122	0.006	63	0.006	100	0.007	50

TUNED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
80.0	16.00	0.600	14.79	6.61		5390.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.044	646.1	1448.4	0.63E 07	-0.00110	1.265	17.87	0.0250

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		14.795	6.605	0	0.321	27	0.144	170	0.065	236	0.028	135	0.041	157	0.127	231	0.035	200	0.056	139
CN		1.032	0.148	37	0.086	76	0.016	153	0.016	192	0.013	336	0.006	194	0.020	281	0.009	248	0.007	203
CM		-0.064	0.061	192	0.007	206	0.002	138	0.006	265	0.002	298	0.001	178	0.003	53	0.002	37	0.003	344
DCP 1	.010	2.840	0.733	356	0.400	81	0.053	82	0.027	124	0.011	305	0.056	114	0.015	25	0.032	324	0.006	347
DCP 2	.025	2.845	0.455	357	0.443	84	0.097	17	0.026	240	0.020	245	0.052	108	0.008	340	0.015	315	0.014	185
DCP 3	.100	2.402	0.630	163	0.100	76	0.130	145	0.113	239	0.063	334	0.059	228	0.055	309	0.017	232	0.027	315
DCP 4	.200	1.500	0.243	140	0.054	157	0.037	263	0.021	222	0.067	333	0.007	72	0.039	221	0.003	188	0.003	302
DCP 5	.250	1.451	0.174	94	0.091	77	0.103	180	0.082	234	0.041	340	0.012	63	0.032	266	0.015	271	0.014	232
DCP 6	.300	1.176	0.186	42	0.161	87	0.055	169	0.036	184	0.023	338	0.021	212	0.032	291	0.009	263	0.013	249
DCP 7	.400	0.985	0.273	30	0.138	71	0.041	143	0.030	141	0.014	213	0.013	213	0.037	269	0.018	291	0.015	189
DCP 8	.500	0.737	0.255	19	0.072	66	0.008	204	0.019	145	0.013	142	0.004	187	0.022	272	0.007	281	0.013	226
DCP 9	.600	0.635	0.270	18	0.050	51	0.011	344	0.024	93	0.006	52	0.005	254	0.014	239	0.015	227	0.013	169
DCP10	.878	0.467	0.248	9	0.036	43	0.012	344	0.016	77	0.005	78	0.006	47	0.011	235	0.010	200	0.013	154

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.023	138	0.018	109	0.010	106	0.021	114	0.008	91	0.010	140	0.012	103	0.004	160	0.003	98
CN		0.003	92	0.007	158	0.005	74	0.003	112	0.003	74	0.001	212	0.002	138	0.001	219	0.004	53
CM		0.001	358	0.002	285	0.001	257	0.001	260	0.001	170	0.001	52	0.001	283	0.001	123	0.001	229
DCP 1	.010	0.024	295	0.025	199	0.013	169	0.005	159	0.009	142	0.010	71	0.006	294	0.007	198	0.004	103
DCP 2	.025	0.016	98	0.001	103	0.013	232	0.012	165	0.004	22	0.007	252	0.007	117	0.012	23	0.011	357
DCP 3	.100	0.025	48	0.016	274	0.022	57	0.002	357	0.012	50	0.007	61	0.009	295	0.011	144	0.007	51
DCP 4	.200	0.011	78	0.022	184	0.010	73	0.002	234	0.011	158	0.002	118	0.010	244	0.006	205	0.009	226
DCP 5	.250	0.004	356	0.021	191	0.008	343	0.005	156	0.002	134	0.008	79	0.008	143	0.004	153	0.004	89
DCP 6	.300	0.003	28	0.008	177	0.008	27	0.002	172	0.002	121	0.006	121	0.002	177	0.007	128	0.006	33
DCP 7	.400	0.007	271	0.014	153	0.009	127	0.005	137	0.008	113	0.002	328	0.005	139	0.002	300	0.008	101
DCP 8	.500	0.004	17	0.003	216	0.002	104	0.007	90	0.008	43	0.001	285	0.004	2	0.000	341	0.004	84
DCP 9	.600	0.008	198	0.008	127	0.005	127	0.002	109	0.006	118	0.004	245	0.006	117	0.005	233	0.009	54
DCP10	.878	0.008	136	0.012	94	0.007	52	0.006	74	0.008	326	0.008	226	0.003	96	0.006	331	0.002	342

TUNED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
96.0	16.42	0.400	0.48	7.22		5092.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.062	444.7	761.1	0.49E 07	-0.00042	0.892	7.75	0.0800

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
ALPHA		0.478	7.217 0	0.358 359	0.078 216	0.017 214	0.048 137	0.042 194	0.040 211	0.022 219	0.014 219
CN		0.122	0.755 356	0.009 252	0.026 241	0.010 285	0.001 342	0.002 171	0.005 166	0.002 220	0.002 147
CM		-0.010	0.005 275	0.012 236	0.007 300	0.005 19	0.002 79	0.001 134	0.001 126	0.000 155	0.000 135
DCP 1	.010	-0.839	2.863 357	1.135 250	0.507 319	0.087 212	0.057 302	0.118 44	0.098 245	0.129 357	0.065 117
DCP 2	.025	-0.548	3.122 355	0.391 250	0.202 286	0.083 21	0.026 107	0.021 136	0.051 146	0.005 199	0.040 123
DCP 3	.100	0.173	2.030 355	0.034 165	0.126 268	0.107 17	0.081 120	0.017 255	0.047 84	0.054 174	0.022 273
DCP 4	.150	0.728	1.421 353	0.110 70	0.073 200	0.036 323	0.042 92	0.037 180	0.020 256	0.003 142	0.007 221
DCP 5	.200	1.033	1.182 356	0.061 88	0.060 217	0.039 302	0.035 64	0.052 183	0.010 234	0.011 254	0.010 103
DCP 6	.250	0.448	1.027 355	0.066 65	0.065 182	0.049 250	0.025 329	0.011 70	0.009 196	0.003 240	0.001 182
DCP 7	.300	0.026	0.852 357	0.039 72	0.045 188	0.032 257	0.011 358	0.010 147	0.013 229	0.007 311	0.002 143
DCP 8	.400	0.046	0.614 359	0.011 132	0.030 204	0.026 235	0.019 287	0.009 5	0.004 140	0.004 226	0.001 318
DCP 9	.500	0.236	0.452 0	0.009 78	0.017 179	0.021 218	0.013 277	0.007 353	0.004 174	0.005 267	0.004 320
DCP10	.600	0.019	0.343 1	0.006 23	0.010 191	0.015 213	0.014 266	0.008 346	0.001 62	0.000 307	0.001 94
DCP11	.878	0.012	0.177 357	0.037 41	0.017 109	0.009 178	0.005 201	0.004 245	0.001 249	0.002 4	0.001 188

DATA TYPE	X/C	RES 10 PHI	RES 11 PHI	RES 12 PHI	RES 13 PHI	RES 14 PHI	RES 15 PHI	RES 16 PHI	RES 17 PHI	RES 18 PHI
ALPHA		0.013 191	0.009 211	0.013 203	0.007 254	0.007 263	0.009 262	0.013 202	0.007 259	0.008 269
CN		0.004 222	0.003 261	0.001 232	0.002 192	0.002 280	0.000 257	0.001 295	0.001 113	0.002 213
CM		0.000 109	0.001 118	0.000 167	0.000 312	0.000 38	0.000 145	0.000 267	0.000 50	0.000 111
DCP 1	.010	0.060 290	0.074 54	0.052 178	0.039 326	0.042 104	0.037 223	0.020 17	0.029 160	0.027 275
DCP 2	.025	0.045 210	0.019 271	0.018 159	0.024 232	0.021 346	0.006 218	0.034 304	0.039 72	0.026 182
DCP 3	.100	0.022 130	0.034 224	0.014 336	0.018 157	0.024 268	0.013 11	0.013 174	0.011 291	0.003 49
DCP 4	.150	0.001 203	0.004 213	0.006 307	0.004 60	0.005 178	0.002 231	0.002 66	0.001 114	0.001 109
DCP 5	.200	0.027 289	0.016 60	0.008 210	0.013 151	0.002 59	0.005 128	0.008 101	0.008 110	0.003 245
DCP 6	.250	0.002 200	0.002 277	0.003 325	0.004 33	0.004 117	0.004 163	0.002 186	0.003 218	0.003 297
DCP 7	.300	0.003 267	0.001 144	0.002 149	0.002 254	0.001 357	0.002 159	0.002 252	0.001 264	0.001 167
DCP 8	.400	0.001 176	0.002 215	0.003 222	0.002 265	0.001 286	0.002 167	0.002 235	0.002 280	0.001 222
DCP 9	.500	0.002 342	0.001 347	0.002 98	0.003 208	0.002 297	0.001 27	0.001 265	0.000 276	0.001 160
DCP10	.600	0.004 184	0.005 278	0.001 272	0.001 355	0.002 260	0.000 197	0.002 90	0.004 208	0.003 272
DCP11	.878	0.003 240	0.004 291	0.002 353	0.003 171	0.002 232	0.003 313	0.001 12	0.001 98	0.001 166

TUNED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
96.0	16.58	0.400	0.48	7.33		5392.2	10

K	V	Q	RN	DAMPING	CY(MAX)	ALPHA(STALL)	EXT DAMPING
0.062	444.7	743.3	0.4RE 07	-0.00046	0.807	7.85	0.0760

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		0.476	7.334	0	0.491	2	0.030	260	0.016	344	0.030	102	0.025	138	0.020	219	0.013	278	0.003	333
CN		0.018	0.773	358	0.013	296	0.019	252	0.013	299	0.005	140	0.012	171	0.004	199	0.005	253	0.002	196
CM		-0.013	0.006	297	0.010	238	0.006	302	0.004	18	0.001	69	0.001	119	0.001	159	0.000	30	0.000	169
DCP 1	.010	-0.912	2.911	358	1.193	251	0.515	321	0.127	216	0.301	305	0.145	43	0.106	245	0.143	357	0.073	126
DCP 2	.025	-0.472	3.216	357	0.381	258	0.198	300	0.089	39	0.057	116	0.042	94	0.062	169	0.023	268	0.019	107
DCP 3	.100	0.149	2.069	357	0.019	193	0.119	288	0.115	38	0.101	141	0.023	269	0.053	92	0.061	194	0.019	303
DCP 4	.150	0.190	1.492	353	0.132	60	0.064	193	0.038	335	0.058	95	0.048	186	0.023	271	0.006	148	0.019	237
DCP 5	.200	0.255	1.234	359	0.070	83	0.087	193	0.027	296	0.035	79	0.039	184	0.028	277	0.019	341	0.023	207
DCP 6	.250	0.096	1.071	354	0.087	44	0.056	155	0.044	227	0.020	311	0.006	63	0.009	200	0.009	251	0.004	306
DCP 7	.300	0.014	0.898	358	0.063	62	0.056	176	0.041	249	0.013	352	0.015	143	0.021	261	0.015	346	0.008	114
DCP 8	.400	0.066	0.623	358	0.002	341	0.016	208	0.018	220	0.012	277	0.009	340	0.003	85	0.005	219	0.001	322
DCP 9	.500	0.097	0.446	3	0.001	240	0.011	188	0.019	215	0.013	262	0.007	344	0.002	140	0.003	248	0.001	327
DCP10	.600	0.016	0.342	1	0.009	301	0.003	225	0.011	184	0.010	259	0.005	315	0.001	188	0.004	242	0.001	355
DCP11	.878	0.017	0.175	1	0.034	39	0.012	104	0.006	147	0.008	151	0.002	279	0.001	247	0.001	224	0.002	155

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.009	146	0.003	329	0.008	225	0.005	30	0.002	335	0.004	10	0.011	196	0.002	238	0.003	187
CN		0.001	219	0.002	56	0.001	94	0.001	300	0.001	231	0.002	247	0.001	257	0.002	38	0.002	329
CM		0.000	224	0.000	302	0.001	77	0.000	237	0.000	128	0.000	214	0.001	318	0.000	297	0.000	321
DCP 1	.010	0.080	290	0.069	47	0.047	226	0.078	338	0.044	94	0.044	279	0.061	26	0.028	132	0.028	318
DCP 2	.025	0.022	207	0.010	103	0.030	129	0.012	307	0.014	114	0.041	234	0.030	314	0.018	98	0.018	326
DCP 3	.100	0.032	134	0.036	236	0.014	7	0.022	193	0.027	290	0.010	59	0.019	242	0.023	351	0.013	90
DCP 4	.150	0.019	327	0.015	53	0.004	121	0.015	334	0.004	58	0.005	124	0.005	169	0.003	256	0.003	301
DCP 5	.200	0.001	342	0.018	41	0.014	38	0.004	227	0.022	191	0.007	243	0.004	158	0.010	331	0.019	310
DCP 6	.250	0.005	323	0.009	30	0.007	70	0.002	66	0.004	145	0.003	196	0.003	233	0.004	2	0.002	72
DCP 7	.300	0.005	241	0.004	352	0.006	52	0.003	119	0.001	237	0.003	91	0.006	165	0.008	239	0.010	302
DCP 8	.400	0.002	319	0.002	39	0.002	106	0.002	346	0.002	45	0.001	132	0.003	139	0.001	251	0.003	316
DCP 9	.500	0.002	77	0.002	149	0.001	248	0.002	340	0.001	355	0.001	62	0.003	140	0.002	120	0.003	273
DCP10	.600	0.001	154	0.002	131	0.003	249	0.002	358	0.001	296	0.004	320	0.002	9	0.003	117	0.001	164
DCP11	.878	0.000	64	0.001	84	0.002	215	0.000	277	0.001	290	0.001	221	0.001	197	0.002	63	0.002	99

TUNED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
96.0	16.61	0.400	0.46	7.47		5092.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.063	443.6	742.1	0.48E 07	-0.00052	0.809	8.01	0.0220

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
ALPHA		0.464	7.473 0	0.351 357	0.155 224	0.061 220	0.049 189	0.058 202	0.043 224	0.038 242	0.020 255
CN		0.010	0.781 355	0.016 261	0.023 244	0.007 265	0.006 174	0.005 203	0.005 214	0.002 268	0.003 241
CM		-0.016	0.007 294	0.011 237	0.006 300	0.004 17	0.002 95	0.001 161	0.000 7	0.000 277	0.001 98
DCP 1	.010	-0.944	2.939 356	1.265 247	0.517 312	0.161 222	0.307 25[illegible]	0.118 31	0.101 258	0.130 356	0.047 125
DCP 2	.025	-0.673	3.251 353	0.414 252	0.204 298	0.080 35	0.066 139	0.005 44	0.045 156	0.017 229	0.013 117
DCP 3	.100	0.112	2.153 353	0.028 70	0.098 267	0.092 22	0.094 127	0.027 232	0.034 65	0.049 170	0.023 274
DCP 4	.150	0.147	1.681 352	0.098 71	0.074 204	0.032 336	0.056 109	0.053 191	0.024 273	0.004 137	0.020 222
DCP 5	.200	0.193	1.230 354	0.066 90	0.077 186	0.048 277	0.008 66	0.041 175	0.014 249	0.023 353	0.011 212
DCP 6	.250	0.049	1.080 353	0.066 69	0.058 166	0.042 221	0.010 257	0.014 196	0.019 252	0.015 321	0.003 43
DCP 7	.300	0.036	0.880 355	0.037 58	0.042 194	0.035 241	0.004 333	0.014 171	0.016 241	0.012 324	0.005 46
DCP 8	.400	0.057	0.626 357	0.012 203	0.025 205	0.023 221	0.014 264	0.004 319	0.004 193	0.006 261	0.002 288
DCP 9	.500	0.065	0.451 359	0.004 192	0.013 203	0.017 215	0.014 258	0.003 317	0.004 231	0.003 299	0.001 0
DCP10	.600	0.015	0.348 0	0.007 240	0.009 223	0.012 207	0.009 260	0.005 324	0.003 211	0.005 254	0.002 297
DCP11	.878	0.037	0.176 357	0.037 35	0.015 98	0.006 169	0.004 235	0.002 354	0.003 142	0.005 104	0.005 246

DATA TYPE	X/C	RES 10 PHI	RES 11 PHI	RES 12 PHI	RES 13 PHI	RES 14 PHI	RES 15 PHI	RES 16 PHI	RES 17 PHI	RES 18 PHI
ALPHA		0.019 234	0.015 254	0.015 221	0.009 290	0.009 298	0.010 289	0.009 280	0.006 301	0.006 246
CN		0.002 259	0.001 261	0.003 97	0.002 243	0.002 289	0.000 124	0.002 231	0.001 71	0.002 256
CM		0.001 61	0.001 102	0.001 274	0.000 4	0.001 52	0.001 154	0.001 245	0.001 313	0.001 77
DCP 1	.010	0.055 306	0.061 74	0.046 215	0.049 341	0.035 125	0.037 266	0.034 32	0.022 160	0.026 305
DCP 2	.025	0.009 312	0.018 11	0.031 134	0.024 236	0.026 26	0.024 147	0.035 261	0.018 49	0.012 126
DCP 3	.100	0.020 101	0.028 211	0.016 340	0.015 134	0.013 255	0.010 46	0.013 170	0.011 273	0.008 57
DCP 4	.150	0.013 289	0.002 330	0.005 319	0.007 4	0.006 96	0.007 155	0.006 212	0.005 292	0.000 318
DCP 5	.200	0.017 249	0.010 3	0.015 104	0.002 189	0.016 294	0.009 219	0.006 347	0.006 54	0.006 218
DCP 6	.250	0.004 161	0.004 206	0.003 257	0.005 328	0.002 53	0.005 160	0.003 228	0.005 342	0.005 52
DCP 7	.300	0.003 171	0.000 174	0.003 158	0.005 241	0.003 314	0.001 125	0.002 142	0.003 186	0.003 268
DCP 8	.400	0.000 58	0.003 195	0.001 114	0.002 271	0.003 254	0.001 237	0.002 213	0.002 308	0.001 311
DCP 9	.500	0.003 195	0.004 269	0.001 91	0.002 264	0.000 148	0.001 99	0.002 202	0.001 186	0.002 278
DCP10	.600	0.001 335	0.002 198	0.002 133	0.003 284	0.004 329	0.004 22	0.002 94	0.001 184	0.002 244
DCP11	.878	0.005 255	0.005 311	0.006 89	0.003 163	0.006 218	0.005 314	0.002 25	0.004 112	0.006 256

TUNED PITCHING OSCILLATION VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
96.0	15.77	0.400	7.67	7.24		5093.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.059	444.5	809.8	0.52E 07	-0.00066	1.657	14.84	0.0800

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		7.665	7.244	0	0.446	16	0.047	218	0.115	224	0.089	175	0.050	127	0.037	279	0.063	217	0.019	166
CN		0.900	0.698	358	0.126	30	0.050	237	0.033	205	0.016	116	0.008	354	0.006	287	0.005	221	0.003	196
CM		-0.013	0.013	310	0.008	85	0.010	352	0.009	264	0.007	178	0.005	100	0.003	17	0.002	315	0.002	236
DCP 1	.010	2.791	4.337	354	0.510	15	0.151	280	0.159	221	0.097	166	0.032	98	0.024	222	0.037	138	0.018	34
DCP 2	.025	2.969	3.736	355	0.474	20	0.256	314	0.237	243	0.145	175	0.090	122	0.059	42	0.033	348	0.035	269
DCP 3	.100	2.051	1.560	356	0.436	54	0.239	339	0.168	251	0.114	173	0.072	95	0.053	12	0.044	299	0.040	233
DCP 4	.150	2.030	0.975	354	0.262	49	0.131	328	0.088	236	0.052	151	0.031	56	0.019	314	0.016	252	0.015	200
DCP 5	.200	2.157	0.917	357	0.245	37	0.122	303	0.093	208	0.067	116	0.052	21	0.040	306	0.025	235	0.024	199
DCP 6	.250	1.448	0.785	358	0.187	39	0.083	301	0.059	199	0.037	99	0.027	351	0.022	266	0.015	210	0.013	157
DCP 7	.300	0.828	0.718	0	0.166	25	0.081	276	0.073	175	0.054	83	0.038	350	0.031	277	0.026	209	0.018	144
DCP 8	.400	0.665	0.568	1	0.109	18	0.050	257	0.041	149	0.032	45	0.029	305	0.019	228	0.013	157	0.008	87
DCP 9	.500	0.759	0.498	2	0.085	19	0.035	246	0.031	138	0.026	23	0.025	285	0.014	204	0.010	140	0.006	51
DCP10	.600	0.362	0.332	4	0.051	9	0.028	228	0.023	109	0.022	8	0.019	277	0.012	177	0.008	113	0.006	41
DCP11	.878	0.243	0.165	5	0.027	300	0.029	166	0.017	76	0.012	335	0.011	266	0.003	194	0.001	171	0.002	28

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.012	206	0.010	232	0.019	204	0.011	197	0.008	236	0.011	236	0.017	218	0.006	209	0.010	205
CN		0.003	293	0.003	237	0.002	270	0.004	232	0.001	261	0.005	289	0.003	344	0.004	258	0.001	328
CM		0.002	155	0.001	72	0.001	32	0.000	158	0.001	193	0.001	140	0.001	337	0.000	161	0.000	166
DCP 1	.010	0.024	291	0.022	254	0.019	245	0.025	183	0.015	236	0.028	240	0.008	304	0.002	214	0.010	338
DCP 2	.025	0.038	241	0.022	197	0.010	54	0.022	250	0.019	206	0.019	262	0.028	354	0.028	289	0.012	272
DCP 3	.100	0.030	176	0.021	99	0.017	14	0.011	287	0.016	263	0.012	251	0.006	353	0.008	288	0.004	273
DCP 4	.150	0.008	138	0.006	25	0.012	291	0.011	213	0.005	146	0.006	327	0.006	306	0.006	226	0.004	347
DCP 5	.200	0.008	92	0.007	100	0.010	337	0.014	185	0.006	331	0.005	242	0.010	354	0.012	189	0.007	14
DCP 6	.250	0.010	52	0.011	316	0.013	238	0.009	177	0.003	37	0.007	290	0.002	222	0.004	238	0.000	264
DCP 7	.300	0.012	49	0.011	330	0.007	281	0.011	235	0.005	180	0.002	338	0.006	359	0.006	248	0.004	115
DCP 8	.400	0.009	340	0.011	254	0.006	175	0.001	238	0.002	292	0.003	286	0.003	342	0.005	254	0.002	4
DCP 9	.500	0.010	333	0.009	269	0.006	222	0.006	214	0.004	50	0.008	333	0.005	311	0.006	250	0.004	118
DCP10	.600	0.007	308	0.007	198	0.001	181	0.001	32	0.001	51	0.006	326	0.003	206	0.003	242	0.004	352
DCP11	.878	0.005	305	0.004	254	0.003	239	0.003	294	0.003	319	0.005	278	0.002	103	0.005	351	0.002	249

TUNED PITCHING OSCILLATION VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D,ALPHA	DEL,H	TEST POINT	CYCLES ANALYZED
96.0	15.80	0.400	7.69	7.32		5093.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.059	444.5	743.4	0.48E 07	-0.00080	1.509	14.97	0.0760

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		7.691	7.322	0	0.526	11	0.013	237	0.068	244	0.042	159	0.026	3	0.036	211	0.009	225	0.008	286
CN		0.761	0.697	359	0.109	16	0.031	280	0.021	178	0.009	104	0.005	176	0.002	194	0.004	274	0.002	201
CM		-0.003	0.021	331	0.002	346	0.002	321	0.002	282	0.002	187	0.001	55	0.001	58	0.001	358	0.001	219
DCP 1	.010	2.629	4.381	355	0.617	358	0.134	235	0.064	177	0.036	195	0.056	149	0.044	100	0.030	13	0.010	326
DCP 2	.025	2.885	3.810	357	0.499	342	0.226	251	0.134	168	0.061	113	0.026	180	0.029	107	0.049	339	0.043	277
DCP 3	.100	2.059	1.693	358	0.268	32	0.086	317	0.053	226	0.030	151	0.012	125	0.007	309	0.027	244	0.031	171
DCP 4	.150	1.504	1.059	356	0.205	29	0.054	322	0.017	230	0.010	153	0.011	124	0.001	15	0.006	290	0.005	190
DCP 5	.200	1.197	0.931	358	0.178	34	0.053	308	0.036	198	0.016	115	0.010	321	0.011	249	0.017	207	0.014	133
DCP 6	.250	1.087	0.798	359	0.168	30	0.043	317	0.017	212	0.010	143	0.010	119	0.002	322	0.007	285	0.003	185
DCP 7	.300	0.837	0.679	1	0.131	28	0.045	287	0.032	183	0.016	76	0.008	275	0.010	224	0.007	172	0.003	96
DCP 8	.400	0.655	0.535	1	0.117	25	0.030	300	0.015	178	0.009	97	0.005	140	0.004	241	0.001	276	0.002	89
DCP 9	.500	0.508	0.382	3	0.068	28	0.018	280	0.012	169	0.003	329	0.011	198	0.005	121	0.003	333	0.005	272
DCP10	.600	0.366	0.307	6	0.066	20	0.016	281	0.013	152	0.007	68	0.004	167	0.003	218	0.001	181	0.003	86
DCP11	.878	0.162	0.134	11	0.020	287	0.014	190	0.013	128	0.007	23	0.004	229	0.004	232	0.003	238	0.003	0

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.011	172	0.005	202	0.007	196	0.004	103	0.002	284	0.002	358	0.011	209	0.005	343	0.004	210
CN		0.001	96	0.001	184	0.003	238	0.001	116	0.002	9	0.001	0	0.001	325	0.001	243	0.003	172
CM		0.001	143	0.001	18	0.000	252	0.001	199	0.001	143	0.000	31	0.000	232	0.000	138	0.000	112
DCP 1	.010	0.010	316	0.009	277	0.014	239	0.008	205	0.006	114	0.002	128	0.006	42	0.002	58	0.003	347
DCP 2	.025	0.029	195	0.020	173	0.024	195	0.023	128	0.021	14	0.011	330	0.006	48	0.014	251	0.027	166
DCP 3	.100	0.025	107	0.022	25	0.026	286	0.023	210	0.020	136	0.019	61	0.014	318	0.011	241	0.011	183
DCP 4	.150	0.002	66	0.002	42	0.002	277	0.002	299	0.001	69	0.001	346	0.001	334	0.002	214	0.003	181
DCP 5	.200	0.009	38	0.006	345	0.013	247	0.005	174	0.002	334	0.004	359	0.012	269	0.012	144	0.012	102
DCP 6	.250	0.003	46	0.001	8	0.001	284	0.001	341	0.001	355	0.001	342	0.002	96	0.001	219	0.002	199
DCP 7	.300	0.003	342	0.005	261	0.005	193	0.005	93	0.008	357	0.006	270	0.007	188	0.004	78	0.004	321
DCP 8	.400	0.004	321	0.003	196	0.003	106	0.004	7	0.004	291	0.003	213	0.003	99	0.002	359	0.001	243
DCP 9	.500	0.003	207	0.003	141	0.000	26	0.002	349	0.004	308	0.004	181	0.002	73	0.003	300	0.005	215
DCP10	.600	0.005	329	0.003	218	0.002	174	0.005	40	0.005	334	0.002	210	0.001	245	0.001	18	0.002	161
DCP11	.878	0.001	309	0.002	176	0.001	17	0.001	46	0.001	43	0.001	20	0.002	359	0.003	255	0.001	165

TUNED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
96.0	15.97	0.400	7.68	7.36		5393.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.060	442.8	746.2	0.48E 07	-0.00086	1.530	15.20	0.0220

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		7.683	7.363	0	0.222	16	0.231	206	0.202	218	0.134	189	0.015	116	0.180	221	0.047	232	0.046	262
CN		0.754	0.701	357	0.094	11	0.045	245	0.034	173	0.010	139	0.006	247	0.019	216	0.004	182	0.005	249
CM		-0.008	0.013	323	0.002	37	0.004	316	0.004	239	0.004	137	0.003	46	0.001	305	0.002	233	0.001	123
DCP 1	.010	2.602	4.367	354	0.417	356	0.257	218	0.172	192	0.110	182	0.043	151	0.057	189	0.016	319	0.041	274
DCP 2	.025	2.850	3.801	354	0.450	336	0.270	240	0.185	175	0.118	135	0.036	70	0.056	233	0.037	266	0.060	247
DCP 3	.100	2.040	1.681	355	0.263	30	0.113	285	0.104	206	0.067	142	0.033	23	0.059	250	0.054	207	0.042	138
DCP 4	.150	1.433	1.044	355	0.176	34	0.070	280	0.064	207	0.034	161	0.003	322	0.031	237	0.015	204	0.003	168
DCP 5	.200	1.146	0.936	356	0.164	28	0.073	263	0.052	176	0.030	82	0.025	298	0.060	208	0.023	145	0.012	30
DCP 6	.250	1.044	0.797	358	0.141	31	0.056	265	0.047	191	0.017	152	0.039	261	0.025	227	0.007	186	0.002	176
DCP 7	.300	0.848	0.692	359	0.119	20	0.058	246	0.046	159	0.019	53	0.025	277	0.036	207	0.017	122	0.012	344
DCP 8	.400	0.651	0.543	1	0.091	22	0.039	242	0.028	165	0.001	207	0.015	233	0.015	196	0.004	44	0.005	274
DCP 9	.500	0.476	0.388	1	0.068	18	0.028	241	0.018	142	0.007	298	0.013	208	0.008	180	0.003	327	0.008	255
DCP10	.600	0.365	0.315	5	0.049	16	0.023	222	0.019	140	0.006	298	0.015	222	0.008	182	0.008	37	0.006	276
DCP11	.878	0.196	0.143	7	0.026	289	0.020	168	0.017	76	0.009	312	0.009	226	0.004	186	0.004	79	0.006	278

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.033	238	0.036	245	0.027	254	0.021	275	0.019	274	0.015	282	0.011	254	0.011	288	0.006	272
CN		0.006	254	0.006	219	0.003	180	0.003	277	0.002	265	0.002	314	0.003	264	0.002	274	0.001	300
CM		0.001	48	0.001	321	0.001	224	0.001	171	0.001	356	0.000	102	0.000	335	0.001	223	0.00	193
DCP 1	.010	0.040	251	0.033	235	0.023	223	0.015	236	0.005	295	0.011	297	0.009	317	0.011	315	0.009	287
DCP 2	.025	0.044	209	0.034	128	0.012	134	0.024	247	0.023	289	0.013	20	0.016	272	0.029	218	0.039	223
DCP 3	.100	0.032	36	0.041	304	0.044	232	0.031	162	0.020	60	0.021	328	0.020	255	0.009	186	0.003	330
DCP 4	.150	0.010	298	0.015	255	0.008	292	0.003	309	0.007	300	0.007	247	0.002	337	0.003	319	0.004	276
DCP 5	.200	0.014	327	0.026	232	0.013	193	0.007	347	0.004	264	0.006	195	0.005	187	0.014	307	0.002	322
DCP 6	.250	0.009	289	0.012	246	0.006	164	0.005	332	0.008	287	0.004	238	0.003	39	0.004	322	0.001	276
DCP 7	.300	0.018	273	0.018	205	0.010	110	0.012	345	0.012	266	0.007	184	0.004	64	0.006	319	0.006	260
DCP 8	.400	0.006	247	0.005	209	0.004	102	0.006	323	0.003	260	0.000	104	0.002	343	0.002	315	0.001	75
DCP 9	.500	0.007	223	0.006	160	0.004	30	0.007	274	0.005	179	0.004	41	0.005	296	0.003	230	0.000	344
DCP10	.600	0.004	218	0.004	186	0.004	79	0.006	324	0.001	163	0.002	344	0.002	201	0.003	62	0.003	2
DCP11	.878	0.008	229	0.004	128	0.003	28	0.002	133	0.003	179	0.003	294	0.001	234	0.002	39	0.001	343

TUNED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	0.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
96.0	16.05	0.400	10.00	7.12		5094.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.060	448.0	726.0	0.46E 07	-0.00022	1.700	16.04	0.0800

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
ALPHA		10.004	7.118 0	0.480 24	0.022 94	0.046 273	0.068 275	0.106 210	0.119 143	0.063 6	0.052 265
CN		0.951	0.463 9	0.242 39	0.079 322	0.033 267	0.030 218	0.020 159	0.017 129	0.014 40	0.009 300
CM		-0.018	0.024 196	0.028 81	0.015 459	0.006 328	0.008 298	0.007 233	0.005 191	0.005 142	0.005 68
DCP 1	.010	3.369	2.992 1	1.125 38	0.373 323	0.147 263	0.095 245	0.061 222	0.059 185	0.027 220	0.053 186
DCP 2	.025	3.251	2.249 1	1.198 52	0.529 369	0.242 306	0.198 272	0.159 232	0.160 190	0.115 149	0.096 101
DCP 3	.100	2.138	0.671 9	0.873 61	0.387 350	0.164 287	0.101 249	0.095 209	0.101 161	0.083 97	0.058 36
DCP 4	.150	1.959	0.475 15	0.527 51	0.195 329	0.062 269	0.057 242	0.052 177	0.042 125	0.033 57	0.025 349
DCP 5	.200	1.929	0.474 17	0.498 45	0.201 317	0.067 249	0.057 241	0.066 171	0.065 105	0.044 33	0.036 337
DCP 6	.250	1.631	0.472 20	0.374 36	0.172 297	0.023 243	0.054 229	0.056 142	0.030 75	0.025 33	0.031 318
DCP 7	.300	0.935	0.448 20	0.316 31	0.114 293	0.039 227	0.053 213	0.059 136	0.042 75	0.035 15	0.035 317
DCP 8	.400	0.779	0.428 17	0.200 17	0.062 262	0.016 231	0.045 190	0.040 97	0.013 39	0.023 11	0.031 279
DCP 9	.500	0.765	0.341 15	0.132 7	0.041 238	0.006 166	0.026 175	0.026 83	0.013 37	0.025 343	0.028 257
DCP10	.600	0.480	0.315 12	0.074 350	0.022 214	0.010 238	0.028 157	0.018 57	0.003 74	0.016 359	0.019 250
DCP11	.878	0.238	0.224 1	0.059 271	0.020 181	0.021 185	0.025 110	0.011 41	0.010 26	0.015 304	0.010 214

DATA TYPE	X/C	RES 10 PHI	RES 11 PHI	RES 12 PHI	RES 13 PHI	RES 14 PHI	RES 15 PHI	RES 16 PHI	RES 17 PHI	RES 18 PHI
ALPHA		0.023 188	0.015 179	0.008 198	0.007 218	0.007 256	0.006 304	0.019 212	0.010 221	0.004 148
CN		0.004 219	0.003 189	0.001 157	0.002 233	0.001 125	0.001 118	0.001 122	0.001 0	0.002 271
CM		0.003 6	0.002 336	0.002 285	0.002 244	0.002 197	0.001 143	0.002 76	0.001 4	0.001 336
DCP 1	.010	0.048 138	0.035 84	0.019 359	0.015 289	0.018 242	0.017 185	0.009 127	0.006 67	0.009 19
DCP 2	.025	0.072 62	0.066 19	0.054 326	0.060 275	0.050 219	0.040 147	0.039 89	0.028 5	0.026 310
DCP 3	.100	0.042 344	0.031 314	0.036 282	0.036 240	0.032 189	0.027 142	0.023 112	0.023 60	0.015 9
DCP 4	.150	0.022 283	0.018 244	0.014 199	0.011 155	0.007 90	0.005 38	0.005 344	0.006 286	0.004 256
DCP 5	.200	0.029 301	0.030 213	0.012 156	0.014 179	0.024 98	0.011 65	0.005 53	0.011 357	0.013 275
DCP 6	.250	0.025 236	0.012 188	0.009 184	0.013 124	0.010 33	0.003 291	0.004 333	0.004 276	0.003 224
DCP 7	.300	0.029 250	0.019 198	0.012 170	0.013 112	0.013 57	0.007 19	0.008 326	0.010 267	0.009 214
DCP 8	.400	0.022 194	0.007 154	0.008 133	0.007 64	0.003 15	0.003 342	0.005 293	0.003 246	0.005 236
DCP 9	.500	0.016 166	0.006 147	0.009 114	0.010 39	0.006 344	0.003 350	0.005 283	0.006 246	0.007 194
DCP10	.600	0.009 182	0.008 184	0.010 109	0.005 45	0.006 31	0.008 287	0.005 219	0.003 133	0.001 144
DCP11	.878	0.005 151	0.007 116	0.004 38	0.001 8	0.002 339	0.002 21	0.005 240	0.003 141	0.001 88

TUNED PITCHING OSCILLATION VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
96.0	16.00	0.400	10.02	7.17		5094.2	10

X	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.060	443.7	744.1	0.48E 07	-0.00019	1.625	15.12	0.0760

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		10.024	7.170	0	0.509	19	0.004	143	0.057	262	0.036	255	0.070	212	0.102	152	0.050	346	0.041	256
CN		0.893	0.497	8	0.219	34	0.069	304	0.020	245	0.020	229	0.015	177	0.015	139	0.012	40	0.006	291
CM		-0.014	0.020	196	0.027	68	0.016	304	0.006	284	0.004	253	0.003	196	0.002	169	0.003	136	0.003	41
DCP 1	.010	3.503	3.237	0	0.993	32	0.292	309	0.070	242	0.079	287	0.106	243	0.101	176	0.022	142	0.034	173
DCP 2	.025	3.382	2.497	2	1.134	41	0.506	327	0.190	273	0.119	260	0.130	230	0.140	181	0.102	133	0.086	75
DCP 3	.100	2.176	0.768	11	0.830	53	0.357	335	0.149	271	0.100	231	0.083	178	0.067	135	0.060	70	0.050	3
DCP 4	.150	1.625	0.531	12	0.486	49	0.173	322	0.045	254	0.044	242	0.042	177	0.038	124	0.031	48	0.025	323
DCP 5	.200	1.309	0.508	18	0.468	36	0.182	303	0.058	234	0.065	212	0.058	140	0.044	76	0.046	17	0.033	307
DCP 6	.250	1.234	0.517	15	0.329	37	0.104	293	0.020	204	0.031	230	0.034	145	0.023	85	0.024	8	0.021	275
DCP 7	.300	0.973	0.483	16	0.288	24	0.107	278	0.032	210	0.041	203	0.043	122	0.027	63	0.033	1	0.030	284
DCP 8	.400	0.803	0.455	13	0.161	16	0.052	241	0.016	117	0.015	210	0.016	103	0.004	56	0.010	351	0.013	240
DCP 9	.500	0.637	0.357	11	0.102	358	0.037	212	0.019	97	0.008	130	0.012	8	0.006	211	0.014	348	0.018	234
DCP10	.600	0.494	0.324	10	0.058	346	0.035	191	0.017	97	0.004	94	0.007	350	0.008	201	0.004	28	0.007	206
DCP11	.878	0.210	0.210	2	0.061	260	0.028	169	0.011	150	0.009	59	0.006	286	0.004	89	0.009	327	0.008	210

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.026	193	0.019	171	0.008	151	0.013	257	0.010	216	0.002	231	0.012	196	0.009	232	0.009	196
CN		0.003	273	0.002	192	0.002	177	0.002	114	0.001	117	0.002	342	0.003	194	0.001	332	0.000	234
CM		0.001	328	0.001	302	0.001	211	0.001	107	0.001	347	0.001	217	0.000	183	0.001	142	0.001	63
DCP 1	.010	0.033	131	0.036	56	0.015	314	0.020	240	0.023	175	0.019	125	0.017	61	0.015	334	0.013	308
DCP 2	.025	0.059	13	0.033	323	0.030	226	0.024	120	0.025	27	0.036	305	0.024	236	0.023	214	0.021	135
DCP 3	.100	0.037	304	0.019	274	0.024	233	0.015	157	0.005	317	0.016	220	0.027	154	0.027	95	0.030	44
DCP 4	.150	0.021	247	0.008	193	0.012	182	0.010	97	0.007	347	0.008	248	0.006	154	0.003	2	0.002	269
DCP 5	.200	0.023	246	0.013	210	0.012	162	0.010	104	0.004	133	0.008	74	0.007	10	0.009	323	0.011	275
DCP 6	.250	0.011	215	0.005	192	0.009	160	0.004	56	0.002	205	0.002	32	0.003	327	0.005	276	0.005	205
DCP 7	.300	0.019	221	0.011	176	0.011	134	0.009	60	0.003	2	0.004	50	0.005	299	0.006	266	0.005	209
DCP 8	.400	0.005	176	0.005	143	0.005	68	0.005	296	0.006	185	0.003	52	0.002	262	0.001	310	0.003	278
DCP 9	.500	0.010	140	0.006	143	0.012	67	0.012	337	0.007	244	0.003	174	0.005	157	0.003	-1	0.002	331
DCP10	.600	0.002	37	0.004	208	0.003	81	0.003	272	0.002	129	0.005	8	0.004	234	0.002	347	0.003	231
DCP11	.878	0.001	82	0.007	93	0.005	324	0.004	173	0.003	125	0.006	18	0.002	86	0.002	293	0.002	225

TUNED PITCHING OSCILLATION VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
96.0	15.95	0.400	10.04	7.24		5094.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.060	442.2	740.8	0.48E 07	-0.00009	1.628	16.18	0.0220

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		10.041	7.240	0	0.379	27	0.103	216	0.132	238	0.114	246	0.182	220	0.181	44	0.074	272	0.066	232
CN		0.875	0.490	9	0.221	33	0.067	292	0.022	248	0.033	219	0.024	178	0.017	67	0.006	330	0.006	290
CM		-0.020	0.022	191	0.028	69	0.016	339	0.006	277	0.006	283	0.006	198	0.002	134	0.003	111	0.002	39
DCP 1	.010	3.403	3.135	1	1.013	32	0.349	294	0.137	235	0.106	255	0.160	224	0.015	65	0.064	197	0.036	141
DCP 2	.025	3.281	2.385	2	1.127	44	0.473	327	0.216	282	0.232	257	0.245	212	0.108	150	0.117	114	0.069	42
DCP 3	.100	2.144	0.765	12	0.838	52	0.342	325	0.135	257	0.107	233	0.120	183	0.072	88	0.038	30	0.031	330
DCP 4	.150	1.542	0.519	15	0.505	45	0.188	304	0.056	229	0.049	235	0.060	182	0.051	68	0.022	342	0.020	302
DCP 5	.200	1.233	0.510	18	0.458	37	0.168	293	0.057	228	0.069	216	0.072	141	0.058	51	0.035	320	0.024	293
DCP 6	.250	1.169	0.505	18	0.340	32	0.118	274	0.021	196	0.048	223	0.044	147	0.047	38	0.022	301	0.015	274
DCP 7	.300	0.966	0.485	18	0.290	23	0.104	269	0.029	204	0.052	204	0.050	126	0.043	35	0.024	322	0.023	274
DCP 8	.400	0.782	0.449	14	0.165	11	0.067	229	0.003	80	0.034	198	0.019	96	0.022	18	0.017	286	0.012	248
DCP 9	.500	0.595	0.356	13	0.116	357	0.048	211	0.012	102	0.020	172	0.016	57	0.013	337	0.012	267	0.009	223
DCP10	.600	0.490	0.326	11	0.059	336	0.040	177	0.008	33	0.015	163	0.011	356	0.003	51	0.007	276	0.005	189
DCP11	.878	0.254	0.218	359	0.056	260	0.026	164	0.013	143	0.018	108	0.007	322	0.001	216	0.007	320	0.006	242

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.025	225	0.009	208	0.013	297	0.010	287	0.010	212	0.007	269	0.005	224	0.004	71	0.001	138
CN		0.006	270	0.003	230	0.002	250	0.000	225	0.002	257	0.002	219	0.003	11	0.003	318	0.001	196
CM		0.001	338	0.001	287	0.001	244	0.001	233	0.001	110	0.001	71	0.000	279	0.000	60	0.001	301
DCP 1	.010	0.014	100	0.023	29	0.017	285	0.010	230	0.008	145	0.007	135	0.012	6	0.016	332	0.016	289
DCP 2	.025	0.060	345	0.050	319	0.050	265	0.031	217	0.020	117	0.010	44	0.027	322	0.024	286	0.022	199
DCP 3	.100	0.028	312	0.031	276	0.028	235	0.017	201	0.017	178	0.016	145	0.020	75	0.024	29	0.022	350
DCP 4	.150	0.024	256	0.019	189	0.014	115	0.010	11	0.005	268	0.006	192	0.002	318	0.003	5	0.005	312
DCP 5	.200	0.017	251	0.014	204	0.010	194	0.005	9	0.005	253	0.003	84	0.005	328	0.007	300	0.007	277
DCP 6	.250	0.019	232	0.015	158	0.008	77	0.006	7	0.003	320	0.005	244	0.002	269	0.002	38	0.001	305
DCP 7	.300	0.014	227	0.011	186	0.007	130	0.006	71	0.005	36	0.007	327	0.006	306	0.003	236	0.002	203
DCP 8	.400	0.010	211	0.008	138	0.005	30	0.001	340	0.003	346	0.005	257	0.002	311	0.005	271	0.007	158
DCP 9	.500	0.006	207	0.009	136	0.009	36	0.006	327	0.004	300	0.008	254	0.002	164	0.003	149	0.004	77
DCP10	.600	0.002	232	0.003	105	0.004	9	0.001	9	0.003	275	0.005	174	0.005	9	0.004	285	0.007	158
DCP11	.878	0.003	113	0.004	341	0.003	204	0.004	95	0.008	277	0.005	266	0.003	100	0.002	338	0.002	2

TUNED PITCHING OSCILLATION — VERTOL 23010-1.5R AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
96.0	15.72	0.400	12.45	7.02		5395.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.059	443.2	740.2	0.48E 07	-0.00043	1.753	16.56	0.0220

HARMONIC ANALYSIS.

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		12.448	7.022	0	0.438	25	0.108	142	0.046	80	0.055	12	0.060	285	0.094	290	0.172	193	0.074	109
CN		1.040	0.271	39	0.263	50	0.056	30	0.049	357	0.033	315	0.025	271	0.018	273	0.033	210	0.019	148
CM		-0.028	0.042	192	0.024	99	0.014	97	0.014	49	0.009	21	0.009	339	0.004	320	0.007	314	0.006	248
DCP 1	.010	3.996	1.736	13	1.233	54	0.228	42	0.196	36	0.124	0	0.078	349	0.105	343	0.049	254	0.028	335
DCP 2	.025	3.700	1.030	17	1.317	66	0.390	53	0.351	36	0.261	3	0.182	331	0.174	321	0.152	276	0.129	246
DCP 3	.100	2.233	0.347	115	0.902	68	0.203	50	0.214	37	0.176	348	0.114	298	0.071	291	0.099	250	0.086	203
DCP 4	.150	2.007	0.311	93	0.539	55	0.097	62	0.149	17	0.083	312	0.065	297	0.056	258	0.063	214	0.047	169
DCP 5	.200	1.929	0.309	81	0.450	49	0.087	62	0.135	6	0.071	304	0.055	284	0.048	251	0.059	213	0.054	160
DCP 6	.250	1.889	0.331	68	0.364	44	0.076	62	0.112	348	0.042	283	0.057	289	0.040	229	0.049	211	0.044	153
DCP 7	.300	1.022	0.312	59	0.300	40	0.066	41	0.096	340	0.051	284	0.049	259	0.038	228	0.055	201	0.047	144
DCP 8	.400	0.460	0.319	46	0.213	31	0.049	20	0.067	306	0.026	254	0.040	251	0.020	187	0.044	192	0.038	116
DCP 9	.500	0.427	0.266	36	0.129	23	0.036	0	0.044	285	0.021	257	0.038	206	0.010	151	0.035	177	0.033	90
DCP10	.600	0.550	0.265	28	0.103	18	0.034	334	0.037	259	0.018	234	0.021	196	0.001	167	0.032	177	0.024	88
DCP11	.878	0.316	0.240	4	0.042	314	0.061	288	0.037	212	0.024	218	0.032	145	0.003	152	0.019	125	0.014	50

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.022	35	0.014	314	0.011	202	0.008	246	0.013	221	0.010	182	0.012	199	0.008	252	0.009	222
CN		0.015	95	0.008	355	0.002	195	0.004	357	0.006	237	0.002	102	0.002	242	0.001	171	0.002	167
CM		0.004	271	0.004	167	0.002	125	0.002	124	0.002	59	0.000	83	0.001	61	0.001	351	0.001	347
DCP 1	.010	0.050	328	0.082	281	0.065	233	0.046	211	0.048	177	0.030	119	0.017	79	0.016	38	0.014	342
DCP 2	.025	0.064	211	0.061	230	0.065	181	0.039	133	0.027	172	0.023	103	0.013	82	0.007	283	0.009	286
DCP 3	.100	0.049	151	0.028	188	0.043	147	0.023	96	0.012	156	0.025	98	0.016	83	0.021	70	0.023	40
DCP 4	.150	0.034	124	0.018	94	0.017	74	0.011	21	0.008	356	0.004	321	0.003	312	0.003	319	0.002	185
DCP 5	.200	0.040	106	0.021	83	0.019	76	0.014	45	0.005	13	0.005	27	0.001	346	0.005	339	0.003	344
DCP 6	.250	0.030	105	0.017	71	0.011	37	0.011	26	0.009	329	0.004	331	0.008	312	0.007	282	0.003	253
DCP 7	.300	0.033	101	0.023	69	0.017	43	0.015	11	0.011	338	0.009	302	0.005	282	0.008	285	0.007	224
DCP 8	.400	0.024	76	0.021	27	0.009	334	0.010	344	0.010	286	0.003	278	0.007	286	0.005	243	0.005	228
DCP 9	.500	0.018	50	0.018	8	0.013	320	0.009	307	0.010	266	0.007	225	0.005	215	0.006	194	0.007	162
DCP10	.600	0.017	66	0.020	2	0.009	302	0.010	329	0.012	257	0.005	262	0.011	230	0.006	168	0.009	170
DCP11	.878	0.015	34	0.020	309	0.009	240	0.006	268	0.010	192	0.005	90	0.002	243	0.003	126	0.003	135

TUNED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
96.9	15.85	0.400	12.49	7.07		5095.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.060	443.2	740.5	0.48E 07	-0.00053	1.678	16.71	0.0220

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		12.494	7.073	0	0.470	26	0.096	139	0.063	65	0.084	344	0.035	299	0.160	264	0.133	168	0.053	74
CN		0.974	0.297	37	0.264	43	0.040	31	0.057	356	0.025	289	0.018	309	0.026	265	0.025	185	0.014	122
CM		-0.026	0.044	194	0.030	97	0.010	77	0.014	51	0.010	351	0.005	330	0.004	309	0.006	294	0.005	233
DCP 1	.010	4.057	1.933	12	1.218	48	0.160	27	0.190	16	0.094	354	0.094	19	0.131	316	0.030	259	0.031	338
DCP 2	.025	3.698	1.114	18	1.332	62	0.348	48	0.379	33	0.252	353	0.182	345	0.199	308	0.130	272	0.103	248
DCP 3	.100	2.216	0.372	109	0.928	63	0.177	45	0.257	30	0.180	328	0.095	305	0.098	277	0.093	225	0.068	177
DCP 4	.150	1.695	0.286	82	0.550	53	0.062	38	0.136	22	0.094	298	0.031	268	0.061	264	0.061	188	0.034	135
DCP 5	.200	1.391	0.328	78	0.467	46	0.081	63	0.162	1	0.077	277	0.047	298	0.076	240	0.060	178	0.039	142
DCP 6	.250	1.302	0.336	60	0.376	40	0.038	52	0.105	354	0.061	258	0.022	290	0.050	240	0.041	169	0.031	132
DCP 7	.300	1.035	0.332	56	0.308	36	0.053	43	0.115	337	0.051	254	0.035	294	0.047	224	0.043	177	0.040	130
DCP 8	.400	0.872	0.341	41	0.221	23	0.019	13	0.065	311	0.040	213	0.016	254	0.024	205	0.031	155	0.030	96
DCP 9	.500	0.707	0.293	34	0.139	14	0.026	1	0.058	288	0.029	192	0.009	223	0.012	171	0.028	150	0.030	74
DCP10	.600	0.561	0.288	27	0.105	359	0.012	283	0.037	258	0.028	168	0.006	188	0.003	181	0.022	143	0.019	67
DCP11	.878	0.287	0.246	7	0.065	302	0.039	280	0.033	219	0.015	180	0.014	118	0.000	345	0.017	120	0.011	27

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.014	358	0.005	262	0.009	177	0.008	231	0.011	211	0.003	178	0.012	205	0.006	244	0.003	206
CN		0.006	63	0.006	304	0.004	163	0.002	13	0.001	196	0.002	303	0.001	231	0.001	239	0.002	109
CM		0.003	193	0.002	155	0.001	141	0.002	114	0.000	35	0.001	102	0.001	346	0.000	329	0.001	294
DCP 1	.010	0.068	308	0.084	254	0.054	202	0.030	165	0.025	133	0.015	69	0.013	352	0.008	338	0.009	347
DCP 2	.025	0.062	222	0.069	227	0.059	174	0.031	131	0.017	135	0.004	42	0.009	255	0.021	248	0.010	198
DCP 3	.100	0.034	143	0.021	165	0.027	128	0.016	98	0.010	132	0.016	109	0.017	72	0.016	54	0.019	52
DCP 4	.150	0.020	109	0.014	57	0.014	41	0.010	39	0.006	315	0.001	355	0.008	313	0.003	208	0.004	3
DCP 5	.200	0.028	107	0.014	67	0.014	85	0.014	15	0.007	303	0.003	283	0.005	279	0.003	227	0.003	260
DCP 6	.250	0.022	75	0.008	10	0.004	81	0.007	30	0.004	350	0.006	339	0.009	305	0.004	285	0.005	258
DCP 7	.300	0.024	78	0.014	48	0.013	44	0.013	4	0.009	320	0.007	318	0.006	288	0.006	286	0.004	258
DCP 8	.400	0.017	39	0.011	341	0.005	280	0.004	3	0.004	307	0.006	308	0.008	256	0.005	224	0.006	175
DCP 9	.500	0.016	15	0.016	353	0.011	312	0.010	283	0.008	241	0.006	221	0.004	181	0.004	161	0.002	145
DCP10	.600	0.009	12	0.014	322	0.008	231	0.003	284	0.004	180	0.001	270	0.003	152	0.002	272	0.004	112
DCP11	.878	0.007	358	0.008	280	0.003	102	0.004	287	0.002	135	0.006	293	0.004	149	0.002	116	0.003	86

TUNED PITCHING OSCILLATION VERTOL 23010-1.59 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
96.0	15.80	0.400	12.53	7.14		5095.3	10

K	V	Q	RN	DAMPING	CY(MAX)	ALPHA(STALL)	EXT DAMPING
0.060	442.3	739.8	0.48E 07	-0.00052	1.659	17.32	0.0220

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		12.529	7.142	0	0.398	30	0.123	158	0.066	103	0.056	295	0.072	170	0.486	255	0.144	123	0.063	73
CN		0.973	0.290	34	0.277	45	0.029	13	0.052	353	0.027	265	0.008	266	0.044	258	0.022	171	0.016	119
CM		-0.029	0.043	193	0.029	94	0.010	68	0.014	49	0.010	337	0.003	249	0.003	287	0.007	289	0.006	229
DCP 1	.010	4.002	1.848	10	1.217	50	0.108	44	0.219	35	0.072	331	0.112	38	0.210	277	0.051	297	0.052	271
DCP 2	.025	3.698	1.107	16	1.395	61	0.285	46	0.361	31	0.197	341	0.118	355	0.244	281	0.143	273	0.113	221
DCP 3	.100	2.240	0.341	103	0.990	62	0.150	24	0.226	30	0.181	314	0.059	260	0.134	267	0.096	221	0.071	160
DCP 4	.150	1.651	0.286	91	0.569	52	0.057	26	0.139	12	0.101	285	0.030	238	0.092	248	0.057	169	0.034	128
DCP 5	.200	1.361	0.292	73	0.498	48	0.051	33	0.132	8	0.086	272	0.013	238	0.083	255	0.046	164	0.022	123
DCP 6	.250	1.272	0.320	58	0.383	42	0.030	32	0.105	346	0.067	248	0.018	263	0.073	236	0.042	146	0.030	126
DCP 7	.300	1.050	0.309	52	0.326	39	0.034	15	0.095	337	0.068	240	0.016	235	0.063	238	0.040	148	0.028	115
DCP 8	.400	0.865	0.326	40	0.223	26	0.013	336	0.064	309	0.043	205	0.012	245	0.032	226	0.029	138	0.029	99
DCP 9	.500	0.676	0.274	33	0.146	19	0.012	359	0.056	294	0.043	188	0.008	232	0.024	218	0.024	127	0.022	85
DCP10	.600	0.560	0.283	26	0.103	2	0.018	276	0.040	259	0.031	164	0.007	197	0.006	262	0.022	131	0.020	64
DCP11	.878	0.317	0.248	5	0.057	305	0.040	263	0.037	212	0.018	145	0.011	157	0.006	299	0.020	122	0.017	44

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.011	306	0.022	306	0.012	228	0.014	235	0.012	211	0.004	207	0.003	190	0.006	246	0.002	217
CN		0.007	71	0.004	359	0.002	333	0.003	273	0.005	207	0.003	159	0.003	112	0.001	92	0.003	93
CM		0.003	182	0.003	153	0.002	111	0.001	86	0.002	38	0.001	12	0.001	279	0.000	89	0.001	295
DCP 1	.010	0.058	260	0.081	226	0.055	173	0.038	153	0.031	112	0.020	59	0.011	349	0.002	354	0.006	270
DCP 2	.025	0.061	196	0.040	198	0.031	158	0.020	156	0.024	166	0.022	121	0.016	128	0.014	87	0.004	53
DCP 3	.100	0.033	134	0.031	131	0.030	66	0.004	322	0.010	100	0.008	24	0.008	95	0.017	34	0.013	354
DCP 4	.150	0.027	101	0.017	52	0.008	55	0.010	18	0.004	319	0.005	358	0.008	290	0.004	207	0.001	300
DCP 5	.200	0.017	96	0.018	32	0.005	333	0.006	16	0.006	316	0.004	105	0.008	332	0.005	335	0.005	13
DCP 6	.250	0.026	79	0.013	24	0.009	32	0.010	329	0.003	290	0.003	297	0.007	257	0.005	207	0.006	168
DCP 7	.300	0.026	74	0.016	8	0.006	348	0.008	324	0.007	275	0.002	228	0.003	278	0.003	204	0.001	197
DCP 8	.400	0.017	32	0.009	18	0.010	324	0.006	287	0.009	254	0.009	184	0.004	180	0.007	142	0.004	94
DCP 9	.500	0.017	24	0.011	353	0.011	317	0.010	269	0.007	221	0.005	200	0.004	181	0.003	162	0.004	123
DCP10	.600	0.007	352	0.010	356	0.008	286	0.006	262	0.010	212	0.008	168	0.006	110	0.003	140	0.008	110
DCP11	.878	0.008	350	0.010	294	0.004	256	0.004	238	0.006	188	0.003	193	0.007	86	0.005	323	0.004	104

TUNED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
96.0	15.82	0.400	14.85	7.01		5096.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.060	443.3	740.4	0.48E 07	-0.00103	1.766	16.50	0.0800

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		14.848	7.006	0	0.448	19	0.143	158	0.057	137	0.088	117	0.078	71	0.083	40	0.107	329	0.081	266
CN		1.119	0.249	83	0.191	61	0.109	101	0.043	41	0.034	59	0.017	53	0.018	21	0.015	12	0.015	322
CM		-0.035	0.054	196	0.015	141	0.021	152	0.013	120	0.011	116	0.007	90	0.007	80	0.005	81	0.005	60
DCP 1	.010	4.570	1.007	40	0.863	61	0.414	120	0.151	94	0.163	128	0.140	136	0.153	121	0.121	101	0.075	106
DCP 2	.025	4.013	0.557	103	1.029	83	0.610	127	0.330	104	0.279	109	0.236	106	0.184	93	0.161	90	0.131	74
DCP 3	.100	2.316	0.850	146	0.594	77	0.427	133	0.231	76	0.141	94	0.156	70	0.089	36	0.090	43	0.079	6
DCP 4	.150	2.070	0.533	126	0.302	60	0.265	115	0.104	42	0.093	79	0.063	19	0.068	34	0.056	356	0.037	326
DCP 5	.200	2.038	0.468	116	0.276	61	0.252	110	0.098	34	0.107	74	0.068	25	0.067	29	0.054	349	0.045	338
DCP 6	.250	1.567	0.410	100	0.208	52	0.196	93	0.060	15	0.084	47	0.033	339	0.052	5	0.034	327	0.044	312
DCP 7	.300	1.088	0.350	93	0.186	56	0.172	95	0.059	17	0.077	50	0.037	358	0.050	4	0.038	324	0.044	319
DCP 8	.400	0.933	0.324	71	0.145	43	0.116	66	0.045	352	0.060	4	0.023	298	0.037	321	0.019	312	0.037	280
DCP 9	.500	0.901	0.253	59	0.099	41	0.072	61	0.033	331	0.036	1	0.011	307	0.026	310	0.014	301	0.027	280
DCP10	.600	0.615	0.249	45	0.090	32	0.055	23	0.033	328	0.036	313	0.021	251	0.018	265	0.006	274	0.018	252
DCP11	.878	0.360	0.229	14	0.068	25	0.058	324	0.036	315	0.030	273	0.011	271	0.018	231	0.012	257	0.011	207

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.051	209	0.021	151	0.008	157	0.002	282	0.012	219	0.006	96	0.009	248	0.005	223	0.001	336
CN		0.012	263	0.007	197	0.002	226	0.001	233	0.001	228	0.002	181	0.001	147	0.001	33	0.001	197
CM		0.005	35	0.004	355	0.003	327	0.001	302	0.002	321	0.001	282	0.001	275	0.001	270	0.001	332
DCP 1	.010	0.066	109	0.086	100	0.056	66	0.050	51	0.054	25	0.043	10	0.042	353	0.046	334	0.039	313
DCP 2	.025	0.074	59	0.048	67	0.027	8	0.036	349	0.028	355	0.019	252	0.011	275	0.018	289	0.005	238
DCP 3	.100	0.037	1	0.042	350	0.020	335	0.025	359	0.013	341	0.011	14	0.006	14	0.015	43	0.011	18
DCP 4	.150	0.037	311	0.018	271	0.023	302	0.015	260	0.011	285	0.011	217	0.004	241	0.003	225	0.003	278
DCP 5	.200	0.039	303	0.020	254	0.009	296	0.011	264	0.013	263	0.008	256	0.007	272	0.001	185	0.007	242
DCP 6	.250	0.033	272	0.021	253	0.015	261	0.012	245	0.011	242	0.009	187	0.008	219	0.002	180	0.005	228
DCP 7	.300	0.036	275	0.026	262	0.017	247	0.017	249	0.015	222	0.014	212	0.012	197	0.006	193	0.009	189
DCP 8	.400	0.026	254	0.021	209	0.009	231	0.009	188	0.007	207	0.008	164	0.004	191	0.001	180	0.005	177
DCP 9	.500	0.022	246	0.024	216	0.009	195	0.014	198	0.011	165	0.012	174	0.010	129	0.007	122	0.007	105
DCP10	.600	0.020	221	0.015	159	0.006	144	0.005	97	0.005	159	0.005	111	0.004	111	0.004	56	0.001	197
DCP11	.878	0.018	194	0.014	145	0.013	123	0.008	77	0.006	89	0.005	32	0.005	43	0.002	13	0.002	172

TUNED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
96.0	15.92	0.600	14.85	7.02		5096.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.060	443.3	739.9	0.48E 07	-0.00095	1.697	17.03	0.0760

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		14.851	7.016	0	0.386	27	0.183	162	0.074	151	0.085	122	0.061	67	0.091	32	0.137	292	0.102	222
CN		1.049	0.262	76	0.187	54	0.107	-94	0.040	35	0.031	48	0.020	6	0.018	18	0.024	331	0.021	264
CM		-0.032	0.055	194	0.018	129	0.019	138	0.011	98	0.010	98	0.006	78	0.005	70	0.005	83	0.007	31
DCP 1	.010	4.579	1.172	40	0.841	56	0.455	112	0.160	80	0.187	112	0.105	109	0.160	97	0.076	52	0.017	107
DCP 2	.025	4.004	0.588	87	0.988	77	0.622	114	0.310	90	0.278	94	0.182	77	0.181	80	0.141	59	0.092	34
DCP 3	.100	2.319	0.807	141	0.622	72	0.390	121	0.230	66	0.128	68	0.126	39	0.092	19	0.075	4	0.068	338
DCP 4	.150	1.743	0.544	120	0.308	55	0.266	108	0.110	27	0.096	67	0.074	350	0.047	19	0.071	320	0.043	284
DCP 5	.200	1.486	0.448	114	0.278	57	0.232	103	0.097	29	0.078	59	0.073	357	0.041	9	0.051	331	0.035	287
DCP 6	.250	1.372	0.417	95	0.207	46	0.189	90	0.060	3	0.080	43	0.040	317	0.047	2	0.047	304	0.050	284
DCP 7	.300	1.094	0.351	87	0.200	49	0.162	83	0.067	0	0.061	30	0.049	323	0.031	348	0.038	305	0.035	275
DCP 8	.400	0.943	0.333	67	0.140	32	0.103	62	0.034	338	0.046	4	0.018	279	0.029	327	0.028	303	0.046	258
DCP 9	.500	0.766	0.264	55	0.103	34	0.074	51	0.035	319	0.034	328	0.021	288	0.019	280	0.016	290	0.031	240
DCP10	.600	0.620	0.268	42	0.083	15	0.047	18	0.017	303	0.026	307	0.009	220	0.014	272	0.019	305	0.034	225
DCP11	.878	0.333	0.237	12	0.066	8	0.052	308	0.025	292	0.030	255	0.014	293	0.010	210	0.017	275	0.027	193

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.058	162	0.023	128	0.008	245	0.019	217	0.018	189	0.010	149	0.013	212	0.005	200	0.007	210
CN		0.011	214	0.007	130	0.003	196	0.003	93	0.002	302	0.003	13	0.002	241	0.001	314	0.002	262
CM		0.004	353	0.004	313	0.001	311	0.001	274	0.001	229	0.001	250	0.001	308	0.001	237	0.000	268
DCP 1	.010	0.038	118	0.060	61	0.035	32	0.038	342	0.034	307	0.040	286	0.033	259	0.027	237	0.016	221
DCP 2	.025	0.043	28	0.051	39	0.010	50	0.015	30	0.013	290	0.011	318	0.013	246	0.023	193	0.015	177
DCP 3	.100	0.029	320	0.037	343	0.020	307	0.025	354	0.020	326	0.026	357	0.025	331	0.026	329	0.025	316
DCP 4	.150	0.041	263	0.015	231	0.019	235	0.009	227	0.008	238	0.007	253	0.006	224	0.006	238	0.005	250
DCP 5	.200	0.022	272	0.015	252	0.010	218	0.014	225	0.006	224	0.006	251	0.006	253	0.014	264	0.007	249
DCP 6	.250	0.037	228	0.016	221	0.018	193	0.010	192	0.007	154	0.002	250	0.002	226	0.004	220	0.004	242
DCP 7	.300	0.023	245	0.014	224	0.011	232	0.008	206	0.007	256	0.006	202	0.004	225	0.009	208	0.006	195
DCP 8	.400	0.028	209	0.021	183	0.015	173	0.012	144	0.008	141	0.006	95	0.004	123	0.005	82	0.002	120
DCP 9	.500	0.015	195	0.017	163	0.006	161	0.009	131	0.003	17	0.005	107	0.002	220	0.004	164	0.002	170
DCP10	.600	0.017	184	0.024	139	0.004	144	0.011	110	0.002	121	0.008	56	0.005	137	0.011	56	0.004	327
DCP11	.878	0.014	153	0.016	89	0.003	63	0.008	25	0.005	350	0.004	17	0.002	134	0.002	350	0.002	132

TUNED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
96.0	15.90	0.400	14.86	7.12		5396.3	10

K	V	Q	RN	DAMPING	CY(MAX)	ALPHA(STALL)	EXT DAMPING
0.060	441.1	736.6	0.47E 07	-0.00075	1.719	17.21	0.0220

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		14.860	7.121	359	0.414	23	0.193	163	0.074	146	0.118	118	0.033	286	0.419	357	0.1.7	239	0.127	202
CN		1.041	0.283	75	0.184	48	0.108	87	0.331	22	0.037	36	0.009	303	0.044	10	0.013	313	0.022	267
CM		-0.037	0.055	191	0.017	126	0.021	134	0.009	94	0.012	94	0.005	37	0.004	71	0.005	46	0.007	30
DCP 1	.010	4.549	1.185	40	0.839	56	0.447	103	0.111	93	0.202	102	0.125	136	0.194	47	0.096	48	0.032	48
DCP 2	.025	3.988	0.705	86	0.991	72	0.624	117	0.279	80	0.285	79	0.100	74	0.221	42	0.164	60	0.094	5
DCP 3	.100	2.291	0.860	135	0.575	64	0.427	116	0.201	51	0.159	70	0.096	6	0.121	18	0.094	350	0.058	318
DCP 4	.150	1.671	0.561	118	0.299	52	0.269	103	0.089	12	0.101	64	0.062	323	0.081	12	0.063	299	0.029	283
DCP 5	.200	1.424	0.485	109	0.270	48	0.244	98	0.084	18	0.104	50	0.063	321	0.084	12	0.055	303	0.039	302
DCP 6	.250	1.326	0.425	94	0.200	43	0.183	87	0.048	340	0.078	40	0.036	281	0.077	4	0.040	271	0.041	283
DCP 7	.300	1.102	0.376	85	0.199	40	0.155	78	0.052	356	0.074	20	0.042	290	0.067	357	0.035	276	0.043	280
DCP 8	.400	0.937	0.340	65	0.136	30	0.100	56	0.036	303	0.048	351	0.025	232	0.044	340	0.023	250	0.038	247
DCP 9	.500	0.736	0.276	53	0.106	23	0.068	40	0.023	298	0.042	325	0.022	226	0.028	336	0.013	242	0.034	243
DCP10	.600	0.614	0.274	41	0.076	15	0.055	12	0.024	268	0.035	307	0.017	192	0.020	325	0.015	252	0.030	219
DCP11	.878	0.373	0.242	11	0.070	3	0.060	307	0.018	285	0.036	257	0.008	223	0.001	186	0.011	251	0.019	207

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.052	169	0.023	136	0.016	173	0.024	161	0.018	189	0.014	221	0.011	197	0.004	126	0.009	220
CN		0.014	208	0.008	143	0.001	201	0.003	108	0.002	250	0.001	175	0.002	226	0.001	86	0.003	265
CM		0.005	340	0.004	312	0.002	283	0.002	274	0.001	229	0.001	262	0.001	219	0.001	187	0.000	114
DCP 1	.010	0.035	53	0.052	41	0.044	340	0.043	325	0.048	279	0.046	261	0.051	226	0.037	199	0.024	190
DCP 2	.025	0.054	350	0.031	12	0.017	345	0.011	0	0.013	261	0.014	243	0.016	210	0.019	155	0.009	163
DCP 3	.100	0.049	306	0.014	287	0.025	308	0.018	309	0.020	309	0.018	318	0.023	297	0.014	295	0.023	302
DCP 4	.150	0.042	244	0.010	184	0.023	232	0.006	165	0.014	215	0.004	152	0.011	207	0.006	164	0.007	195
DCP 5	.200	0.043	247	0.010	269	0.021	248	0.005	231	0.016	235	0.007	257	0.013	237	0.006	268	0.011	230
DCP 6	.250	0.035	208	0.013	222	0.015	179	0.009	226	0.009	157	0.009	208	0.008	142	0.007	168	0.004	123
DCP 7	.300	0.036	217	0.014	215	0.014	190	0.010	200	0.009	161	0.008	183	0.007	188	0.006	170	0.004	222
DCP 8	.400	0.023	176	0.019	167	0.007	124	0.013	144	0.003	95	0.008	119	0.003	141	0.007	81	0.001	231
DCP 9	.500	0.024	178	0.017	165	0.007	150	0.012	139	0.007	131	0.008	119	0.007	116	0.007	70	0.004	51
DCP10	.600	0.018	161	0.021	128	0.005	88	0.010	99	0.003	126	0.009	69	0.006	82	0.009	29	0.006	326
DCP11	.878	0.017	158	0.014	110	0.007	77	0.010	57	0.007	348	0.002	51	0.006	340	0.004	277	0.004	241

TUNED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
96.0	16.18	0.600	0.18	7.10		5398.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.041	651.7	1488.5	0.64E 07	-0.00042	0.912	7.46	0.0770

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
ALPHA		0.184	7.099 0	0.386 348	0.079 270	0.046 188	0.057 184	0.050 340	0.031 11	0.039 184	0.025 219
CN		0.046	0.831 358	0.043 269	0.061 310	0.009 162	0.005 152	0.009 295	0.002 198	0.006 131	0.004 174
CM		-0.006	0.004 265	0.020 248	0.011 330	0.001 26	0.002 282	0.002 10	0.001 110	0.000 331	0.001 348
DCP 1	.010	-1.035	2.520 355	0.898 257	0.379 317	0.217 238	0.072 310	0.095 229	0.058 302	0.042 169	0.031 242
DCP 2	.025	-0.707	2.759 356	0.524 264	0.381 333	0.063 214	0.079 302	0.014 318	0.046 310	0.018 150	0.053 299
DCP 3	.100	0.443	2.415 357	0.238 246	0.284 320	0.049 62	0.037 187	0.064 13	0.065 134	0.023 39	0.032 123
DCP 4	.250	0.211	1.123 356	0.027 357	0.091 251	0.044 114	0.039 95	0.043 279	0.012 306	0.026 181	0.010 198
DCP 5	.300	0.052	0.910 359	0.040 58	0.050 284	0.010 102	0.024 110	0.027 263	0.004 260	0.019 158	0.004 221
DCP 6	.400	0.042	0.651 356	0.023 31	0.021 287	0.022 201	0.006 193	0.012 245	0.005 264	0.009 111	0.001 145
DCP 7	.500	0.110	0.466 1	0.024 52	0.008 290	0.019 211	0.008 193	0.009 224	0.007 304	0.003 107	0.004 182
DCP 8	.600	0.013	0.359 0	0.017 53	0.007 248	0.015 211	0.006 163	0.008 199	0.006 280	0.002 34	0.004 155
DCP 9	.978	-0.007	0.222 359	0.047 57	0.013 145	0.003 47	0.006 73	0.004 168	0.002 229	0.003 139	0.002 197

DATA TYPE	X/C	RES 10 PHI	RES 11 PHI	RES 12 PHI	RES 13 PHI	RES 14 PHI	RES 15 PHI	RES 16 PHI	RES 17 PHI	RES 18 PHI
ALPHA		0.016 239	0.013 272	0.012 220	0.007 232	0.009 235	0.016 262	0.015 229	0.008 285	0.008 293
CN		0.003 23	0.003 293	0.002 301	0.001 328	0.003 195	0.002 254	0.000 355	0.001 304	0.001 54
CM		0.001 72	0.000 139	0.000 18	0.000 234	0.001 258	0.000 30	0.000 102	0.001 212	0.000 303
DCP 1	.010	0.028 207	0.008 232	0.032 173	0.012 249	0.022 162	0.012 250	0.024 116	0.021 204	0.003 83
DCP 2	.025	0.030 25	0.034 276	0.037 5	0.018 273	0.024 340	0.012 277	0.023 356	0.015 237	0.021 339
DCP 3	.100	0.012 46	0.011 91	0.008 199	0.008 45	0.019 190	0.003 297	0.013 179	0.007 289	0.008 123
DCP 4	.250	0.016 79	0.002 318	0.009 298	0.007 207	0.012 222	0.004 254	0.008 46	0.005 21	0.002 297
DCP 5	.300	0.006 341	0.008 299	0.005 353	0.003 140	0.005 182	0.003 239	0.003 338	0.003 286	0.002 254
DCP 6	.400	0.004 271	0.005 238	0.003 213	0.002 47	0.001 16	0.002 228	0.002 230	0.001 219	0.001 2
DCP 7	.500	0.003 279	0.003 288	0.003 304	0.003 17	0.002 74	0.000 210	0.001 148	0.001 204	0.002 350
DCP 8	.600	0.003 241	0.003 327	0.002 188	0.002 257	0.002 26	0.001 175	0.001 302	0.002 75	0.002 129
DCP 9	.978	0.003 292	0.001 313	0.000 52	0.001 36	0.003 124	0.003 247	0.003 284	0.004 6	0.001 89

TUNED PITCHING OSCILLATION VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
96.0	16.34	0.600	0.17	7.17		5098.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.042	650.3	1490.0	0.65E 07	-0.00049	0.903	7.52	0.0770

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
ALPHA		0.172	7.171 359	0.438 349	0.074 290	0.021 161	0.052 180	0.060 347	0.065 11	0.031 148	0.022 170
CN		0.044	0.829 357	0.046 272	0.064 311	0.037 184	0.003 186	0.011 321	0.002 1	0.008 88	0.005 129
CM		-0.008	0.005 293	0.019 248	0.010 334	0.002 54	0.001 260	0.002 6	0.001 117	0.000 241	0.001 276
DCP 1	.010	-1.041	2.575 354	0.877 259	0.389 325	0.196 224	0.073 278	0.100 236	0.061 308	0.060 178	0.063 254
DCP 2	.025	-0.683	2.746 357	0.546 261	0.403 330	0.073 226	0.107 [illegible]	0.047 18	0.036 315	0.019 71	0.046 301
DCP 3	.100	0.429	2.457 356	0.221 255	0.278 323	0.057 56	0.046 177	0.068 6	0.053 121	0.037 43	0.041 113
DCP 4	.250	0.155	1.108 356	0.029 7	0.086 252	0.036 117	0.034 95	0.043 282	0.016 330	0.025 161	0.016 180
DCP 5	.300	0.067	0.893 359	0.035 62	0.051 281	0.003 287	0.014 98	0.026 270	0.004 358	0.022 139	0.003 222
DCP 6	.400	0.051	0.640 356	0.017 18	0.029 293	0.018 208	0.006 166	0.012 234	0.010 281	0.008 63	0.006 75
DCP 7	.500	0.081	0.451 2	0.010 48	0.016 285	0.020 226	0.006 229	0.006 249	0.009 331	0.006 80	0.005 142
DCP 8	.600	0.024	0.351 0	0.011 42	0.011 268	0.016 222	0.003 220	0.004 163	0.005 298	0.003 32	0.004 109
DCP 9	.878	0.006	0.219 0	0.047 54	0.013 156	0.003 268	0.004 33	0.001 66	0.001 296	0.002 54	0.004 91

DATA TYPE	X/C	RES 10 PHI	RES 11 PHI	RES 12 PHI	RES 13 PHI	RES 14 PHI	RES 15 PHI	RES 16 PHI	RES 17 PHI	RES 18 PHI
ALPHA		0.014 214	0.009 267	0.011 196	0.004 250	0.009 238	0.013 265	0.014 228	0.006 299	0.005 341
CN		0.004 62	0.001 311	0.002 274	0.002 295	0.001 197	0.001 199	0.001 98	0.000 261	0.001 8
CM		0.001 6	0.001 42	0.001 104	0.000 232	0.000 349	0.000 106	0.000 149	0.000 234	0.000 317
DCP 1	.010	0.036 264	0.024 341	0.034 153	0.018 239	0.022 140	0.019 214	0.018 [illegible]	0.023 179	0.012 193
DCP 2	.025	0.039 33	0.023 289	0.035 9	0.017 288	0.032 5	0.009 230	0.021 [illegible]	0.011 266	0.029 353
DCP 3	.100	0.013 59	0.019 72	0.018 172	0.004 291	0.014 199	0.005 39	0.015 145	0.005 191	0.002 74
DCP 4	.250	0.014 75	0.006 323	0.014 292	0.008 263	0.003 226	0.008 119	0.005 100	0.004 326	0.005 292
DCP 5	.300	0.005 337	0.006 273	0.006 324	0.005 68	0.002 100	0.001 252	0.001 299	0.002 6	0.004 81
DCP 6	.400	0.001 261	0.005 232	0.002 198	0.002 80	0.001 255	0.002 271	0.001 30	0.001 51	0.000 214
DCP 7	.500	0.001 249	0.001 43	0.001 251	0.001 315	0.002 349	0.001 16	0.002 123	0.002 126	0.001 54
DCP 8	.600	0.002 140	0.002 213	0.001 271	0.001 318	0.002 129	0.002 195	0.002 291	0.003 352	0.001 129
DCP 9	.878	0.004 164	0.004 235	0.003 292	0.001 7	0.001 220	0.003 303	0.002 348	0.002 99	0.001 40

TUNED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
96.9	16.37	0.600	0.19	7.30		5098.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.042	646.9	1465.6	0.64E 07	-0.00047	0.928	7.88	0.0220

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		0.194	7.304	0	0.378	345	0.116	269	0.045	207	0.090	200	0.118	338	0.134	282	0.048	192	0.028	176
CN		0.041	0.838	356	0.049	271	0.061	335	0.010	183	0.008	179	0.012	298	0.014	257	0.003	94	0.005	127
CM		-0.010	0.005	272	0.019	245	0.010	328	0.001	12	0.002	273	0.003	354	0.002	116	0.000	115	0.001	244
DCP 1	.010	-1.038	2.590	353	0.906	257	0.379	318	0.232	233	0.080	295	0.090	233	0.071	273	0.069	155	0.047	219
DCP 2	.025	-0.710	2.796	354	0.549	263	0.400	329	0.075	224	0.097	296	0.035	1	0.074	255	0.008	66	0.037	262
DCP 3	.100	0.436	2.453	355	0.236	248	0.266	315	0.033	53	0.056	190	0.071	346	0.038	153	0.029	20	0.032	100
DCP 4	.250	0.119	1.119	355	0.032	349	0.087	248	0.038	117	0.034	100	0.043	278	0.032	283	0.023	180	0.016	144
DCP 5	.300	0.070	0.904	358	0.027	44	0.055	276	0.010	107	0.018	107	0.029	264	0.015	263	0.022	148	0.003	219
DCP 6	.400	0.044	0.650	355	0.023	1	0.025	291	0.020	187	0.010	166	0.013	235	0.018	256	0.004	128	0.003	0
DCP 7	.500	0.051	0.458	0	0.010	37	0.017	280	0.019	216	0.009	199	0.006	225	0.014	310	0.003	79	0.004	154
DCP 8	.600	0.019	0.361	359	0.017	35	0.007	247	0.018	212	0.007	199	0.005	186	0.013	288	0.003	348	0.003	79
DCP 9	.878	0.030	0.228	358	0.048	52	0.014	148	0.031	29	0.010	76	0.006	168	0.010	260	0.003	333	0.003	90

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.023	194	0.014	244	0.021	185	0.016	200	0.018	212	0.013	264	0.017	216	0.013	254	0.012	203
CN		0.003	6	0.002	234	0.002	242	0.001	261	0.001	182	0.001	230	0.001	30	0.001	198	0.002	239
CM		0.001	58	0.000	47	0.001	313	0.000	274	0.000	317	0.000	190	0.000	215	0.001	275	0.001	38
DCP 1	.010	0.038	189	0.030	232	0.019	166	0.016	229	0.010	113	0.014	204	0.009	103	0.011	199	0.010	0
DCP 2	.025	0.026	357	0.019	227	0.027	327	0.024	220	0.026	319	0.021	226	0.018	317	0.013	234	0.016	276
DCP 3	.100	0.012	48	0.012	74	0.011	187	0.008	351	0.015	180	0.006	304	0.005	137	0.001	267	0.006	91
DCP 4	.250	0.014	63	0.009	294	0.014	296	0.003	215	0.009	156	0.006	126	0.004	11	0.004	311	0.005	246
DCP 5	.300	0.011	323	0.008	256	0.004	225	0.003	13	0.004	40	0.003	135	0.004	199	0.004	266	0.002	274
DCP 6	.400	0.008	310	0.004	228	0.002	123	0.003	33	0.002	4	0.001	184	0.001	225	0.002	168	0.001	214
DCP 7	.500	0.002	286	0.002	207	0.003	202	0.002	287	0.003	350	0.001	45	0.002	130	0.002	209	0.002	239
DCP 8	.600	0.002	355	0.002	204	0.001	111	0.001	274	0.002	44	0.001	80	0.002	88	0.004	138	0.004	224
DCP 9	.878	0.003	217	0.003	321	0.003	141	0.003	127	0.003	194	0.003	302	0.004	11	0.002	74	0.001	225

TUNED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
26.0	15.75	0.600	7.38	6.91		5099.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.040	653.0	1475.4	0.64E 07	-0.00093	1.197	10.33	0.0800

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		7.379	6.912	0	0.511	30	0.106	155	0.052	149	0.025	153	0.037	95	0.017	208	0.123	340	0.118	252
CN		0.707	0.561	0	0.189	60	0.029	61	0.016	41	0.013	36	0.007	318	0.002	298	0.014	340	0.021	271
CM		-0.026	0.023	216	0.019	93	0.002	116	0.005	85	0.001	95	0.002	102	0.001	70	0.002	149	0.003	53
DCP 1	.010	1.111	2.792	353	0.808	56	0.225	122	0.033	152	0.013	229	0.007	19	0.016	214	0.045	30	0.036	187
DCP 2	.025	1.538	2.250	355	0.611	58	0.114	123	0.059	65	0.026	116	0.015	81	0.021	131	0.018	281	0.050	237
DCP 3	.100	1.961	1.045	351	0.796	75	0.085	61	0.117	70	0.054	67	0.009	21	0.007	82	0.012	23	0.038	321
DCP 4	.250	1.123	0.693	1	0.261	61	0.082	27	0.036	43	0.049	351	0.016	33	0.033	335	0.033	2	0.046	296
DCP 5	.300	0.804	0.634	5	0.187	52	0.061	44	0.030	347	0.036	3	0.028	300	0.013	334	0.036	340	0.042	297
DCP 6	.400	0.636	0.522	4	0.114	39	0.030	42	0.019	290	0.009	23	0.019	274	0.008	177	0.022	333	0.029	252
DCP 7	.500	0.569	0.402	8	0.093	32	0.018	38	0.023	319	0.007	312	0.013	286	0.008	252	0.013	323	0.022	257
DCP 8	.600	0.360	0.314	7	0.051	21	0.006	119	0.037	245	0.010	107	0.007	335	0.004	199	0.012	331	0.019	234
DCP 9	.878	0.219	0.211	7	0.028	311	0.003	282	0.011	268	0.001	328	0.005	268	0.004	252	0.004	321	0.010	237

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.055	188	0.026	178	0.012	221	0.014	239	0.015	221	0.005	149	0.005	206	0.007	269	0.010	248
CN		0.009	245	0.008	231	0.002	217	0.005	243	0.003	237	0.003	187	0.002	139	0.001	232	0.002	199
CM		0.002	354	0.001	1	0.001	320	0.001	320	0.001	281	0.000	300	0.001	255	0.001	137	0.001	343
DCP 1	.010	0.011	145	0.018	197	0.005	239	0.002	202	0.006	234	0.004	255	0.003	301	0.005	242	0.002	252
DCP 2	.025	0.022	325	0.007	144	0.008	133	0.004	294	0.005	307	0.009	138	0.005	171	0.006	235	0.008	216
DCP 3	.100	0.030	265	0.017	241	0.010	313	0.015	282	0.021	271	0.008	205	0.009	251	0.012	167	0.004	40
DCP 4	.250	0.009	289	0.021	289	0.006	335	0.016	299	0.009	273	0.005	321	0.012	325	0.010	290	0.013	290
DCP 5	.300	0.028	276	0.029	260	0.017	253	0.022	248	0.015	221	0.013	215	0.013	181	0.009	150	0.001	167
DCP 6	.400	0.014	295	0.008	213	0.005	225	0.009	214	0.007	185	0.007	204	0.009	161	0.005	119	0.004	154
DCP 7	.500	0.014	216	0.013	197	0.008	190	0.012	172	0.009	114	0.006	155	0.013	103	0.007	29	0.002	151
DCP 8	.600	0.007	183	0.008	176	0.004	94	0.005	188	0.006	103	0.001	25	0.004	116	0.002	326	0.003	154
DCP 9	.878	0.006	181	0.004	181	0.006	135	0.004	84	0.002	326	0.003	122	0.005	34	0.005	281	0.004	170

TUNED PITCHING OSCILLATION VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA:C	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
96.0	15.92	0.600	7.39	6.97		5099.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.041	649.2	1464.9	0.64E 07	-0.00084	1.175	10.84	0.0770

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		7.387	6.965	0	0.505	27	0.103	158	0.047	148	0.031	150	0.048	78	0.021	223	0.133	313	0.106	232
CN		0.685	0.568	359	0.184	59	0.028	57	0.015	39	0.014	47	0.014	314	0.002	210	0.018	339	0.019	247
CM		-0.023	0.022	215	0.019	87	0.001	121	0.005	96	0.002	82	0.002	80	0.001	32	0.002	141	0.003	30
DCP 1	.010	1.099	2.826	353	0.830	56	0.216	121	0.035	167	0.018	241	0.016	328	0.016	184	0.052	277	0.033	165
DCP 2	.025	1.533	2.280	355	0.604	57	0.102	119	0.063	65	0.028	126	0.015	26	0.023	114	0.039	248	0.042	208
DCP 3	.100	1.457	1.080	351	0.790	73	0.069	39	0.119	76	0.073	71	0.032	357	0.012	97	0.016	328	0.037	307
DCP 4	.250	1.010	0.699	1	0.247	58	0.084	27	0.016	16	0.053	14	0.032	323	0.023	324	0.035	322	0.035	282
DCP 5	.300	0.796	0.624	4	0.178	51	0.059	44	0.032	339	0.024	11	0.029	314	0.019	309	0.037	313	0.039	272
DCP 6	.400	0.625	0.519	3	0.116	39	0.029	47	0.020	303	0.011	20	0.028	288	0.013	210	0.025	299	0.028	216
DCP 7	.500	0.483	0.401	6	0.082	36	0.022	43	0.022	316	0.003	341	0.018	288	0.008	203	0.023	315	0.028	226
DCP 8	.600	0.356	0.316	6	0.047	20	0.013	135	0.006	318	0.003	198	0.005	280	0.007	168	0.016	329	0.021	223
DCP 9	.878	0.218	0.214	6	0.029	293	0.002	347	0.010	279	0.002	237	0.007	266	0.003	190	0.007	293	0.009	203

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.049	168	0.020	177	0.013	258	0.017	247	0.014	210	0.005	154	0.011	255	0.009	285	0.011	260
CN		0.008	226	0.007	224	0.002	209	0.005	228	0.002	223	0.002	213	0.001	325	0.001	258	0.001	192
CM		0.002	303	0.002	355	0.002	280	0.001	245	0.001	262	0.001	198	0.001	138	0.001	43	0.000	234
DCP 1	.010	0.009	188	0.017	197	0.005	256	0.004	281	0.007	231	0.005	262	0.009	283	0.008	274	0.001	219
DCP 2	.025	0.026	293	0.009	110	0.004	130	0.002	187	0.010	264	0.003	216	0.007	54	0.003	122	0.011	237
DCP 3	.100	0.031	227	0.015	323	0.030	281	0.028	223	0.012	272	0.019	216	0.010	163	0.007	59	0.006	194
DCP 4	.250	0.016	268	0.018	265	0.005	261	0.010	291	0.012	282	0.007	265	0.008	309	0.010	288	0.010	264
DCP 5	.300	0.028	252	0.025	235	0.017	218	0.017	222	0.016	203	0.014	187	0.011	164	0.012	133	0.010	91
DCP 6	.400	0.003	218	0.019	218	0.010	156	0.007	195	0.009	146	0.006	103	0.006	48	0.005	296	0.004	156
DCP 7	.500	0.009	177	0.016	196	0.013	127	0.006	173	0.010	120	0.007	63	0.005	24	0.003	335	0.001	57
DCP 8	.600	0.007	128	0.007	173	0.009	76	0.004	330	0.002	182	0.003	51	0.006	333	0.004	246	0.001	91
DCP 9	.878	0.005	141	0.004	127	0.003	87	0.003	105	0.005	30	0.004	313	0.003	260	0.002	160	0.001	18

TUNED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
96.0	16.00	0.600	7.39	7.04		5099.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.041	646.0	1463.7	0.64E 07	-0.00089	1.176	10.72	0.0220

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		7.388	7.043	0	0.357	41	0.206	182	0.077	187	0.061	187	0.032	328	0.104	50	0.260	262	0.153	198
CN		0.682	0.574	359	0.177	61	0.022	69	0.035	8	0.005	7	0.020	274	0.010	77	0.031	277	0.026	218
CM		-0.027	0.021	215	0.021	88	0.001	85	0.004	80	0.001	41	0.002	2	0.000	154	0.004	102	0.005	346
DCP 1	.010	1.079	2.856	352	0.819	58	0.227	133	0.061	199	0.046	232	0.047	272	0.029	31	0.075	230	0.035	155
DCP 2	.025	1.516	2.324	355	0.592	61	0.130	139	0.031	114	0.030	223	0.029	305	0.061	75	0.081	228	0.056	206
DCP 3	.100	1.946	1.087	352	0.786	76	0.075	45	0.092	68	0.043	61	0.054	285	0.034	98	0.036	298	0.065	277
DCP 4	.250	0.976	0.711	0	0.238	60	0.077	24	0.018	315	0.044	355	0.042	281	0.016	2	0.050	297	0.043	250
DCP 5	.300	0.798	0.638	4	0.163	52	0.048	46	0.033	316	0.023	337	0.044	284	0.005	262	0.049	285	0.046	232
DCP 6	.400	0.620	0.526	3	0.115	38	0.009	32	0.017	251	0.007	15	0.028	263	0.010	105	0.042	280	0.038	199
DCP 7	.500	0.452	0.403	6	0.076	31	0.009	19	0.020	275	0.006	231	0.016	258	0.006	127	0.033	274	0.036	190
DCP 8	.600	0.356	0.320	5	0.043	24	0.017	142	0.036	296	0.006	187	0.005	245	0.005	91	0.025	276	0.026	176
DCP 9	.878	0.246	0.211	6	0.034	284	0.002	216	0.013	244	0.007	212	0.007	182	0.006	38	0.016	270	0.015	174

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.030	157	0.013	202	0.031	282	0.031	260	0.012	273	0.013	284	0.013	274	0.011	292	0.017	300
CN		0.007	188	0.004	222	0.004	263	0.008	203	0.002	134	0.002	229	0.002	327	0.001	181	0.001	49
CM		0.002	262	0.002	327	0.002	218	0.000	54	0.001	252	0.001	165	0.000	135	0.000	185	0.001	173
DCP 1	.010	0.009	237	0.011	211	0.015	276	0.011	305	0.004	273	0.007	240	0.007	270	0.003	342	0.005	339
DCP 2	.025	0.029	307	0.013	85	0.006	133	0.014	223	0.012	223	0.011	292	0.009	339	0.008	223	0.002	341
DCP 3	.100	0.041	197	0.025	309	0.038	254	0.028	203	0.010	209	0.016	165	0.006	41	0.004	10	0.007	134
DCP 4	.250	0.012	221	0.019	284	0.020	250	0.010	208	0.010	273	0.011	249	0.012	258	0.014	204	0.005	165
DCP 5	.300	0.020	217	0.021	214	0.013	205	0.018	196	0.017	159	0.008	124	0.002	111	0.007	138	0.006	68
DCP 6	.400	0.009	172	0.018	177	0.011	111	0.005	122	0.005	101	0.002	58	0.003	87	0.007	66	0.005	17
DCP 7	.500	0.010	99	0.007	197	0.005	146	0.009	138	0.010	57	0.004	331	0.006	12	0.004	301	0.001	342
DCP 8	.600	0.007	96	0.008	139	0.011	27	0.005	236	0.006	83	0.005	314	0.001	244	0.003	39	0.004	349
DCP 9	.878	0.003	89	0.004	121	0.006	358	0.003	245	0.004	78	0.000	34	0.003	321	0.002	254	0.001	3

TUNED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
96.0	16.08	0.600	9.96	6.82		5100.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.041	655.2	1468.0	0.63E 07	-0.00096	1.210	15.06	0.0800

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		9.956	6.816	0	0.544	23	0.114	156	0.033	195	0.043	175	0.044	186	0.063	142	0.113	142	0.099	44
CN		0.861	0.381	5	0.155	67	0.045	92	0.014	117	0.018	121	0.015	77	0.006	107	0.021	143	0.024	67
CM		-0.037	0.041	197	0.014	95	0.007	156	0.001	96	0.003	169	0.001	52	0.001	261	0.002	287	0.004	209
DCP 1	.010	2.012	1.916	355	0.535	59	0.179	102	0.020	152	0.014	121	0.004	202	0.006	109	0.034	117	0.020	341
DCP 2	.025	2.132	1.514	357	0.467	66	0.143	133	0.035	222	0.038	153	0.021	30	0.026	287	0.043	184	0.015	75
DCP 3	.100	2.260	0.302	351	0.672	75	0.202	136	0.065	123	0.060	159	0.076	85	0.016	324	0.038	159	0.053	97
DCP 4	.200	1.447	0.364	10	0.310	78	0.120	103	0.041	85	0.130	136	0.033	53	0.063	133	0.053	175	0.055	101
DCP 5	.250	1.309	0.442	11	0.259	69	0.065	78	0.070	88	0.038	116	0.049	70	0.028	136	0.036	129	0.039	92
DCP 6	.300	0.996	0.457	12	0.186	75	0.089	56	0.025	106	0.034	80	0.035	71	0.011	117	0.042	125	0.040	83
DCP 7	.400	0.792	0.425	10	0.108	52	0.047	49	0.013	70	0.017	21	0.012	70	0.009	7	0.022	125	0.030	46
DCP 8	.500	0.696	0.345	12	0.059	47	0.031	62	0.009	102	0.017	34	0.005	83	0.012	48	0.013	107	0.026	31
DCP 9	.600	0.477	0.303	10	0.037	19	0.015	31	0.013	216	0.006	54	0.009	197	0.008	92	0.015	125	0.024	36
DCP10	.878	0.281	0.237	8	0.022	316	0.018	343	0.004	275	0.006	319	0.001	240	0.002	247	0.011	131	0.015	43

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.042	337	0.014	3	0.003	260	0.015	25	0.011	316	0.005	132	0.003	174	0.005	313	0.012	303
CN		0.003	55	0.005	59	0.001	346	0.001	109	0.003	348	0.002	277	0.001	250	0.005	73	0.006	332
CM		0.002	151	0.001	159	0.001	105	0.001	304	0.001	216	0.001	115	0.001	11	0.001	260	0.001	173
DCP 1	.010	0.011	83	0.009	338	0.003	274	0.007	252	0.005	237	0.002	243	0.002	224	0.004	63	0.003	323
DCP 2	.025	0.008	81	0.009	78	0.002	329	0.014	306	0.015	284	0.006	206	0.008	169	0.011	167	0.004	25
DCP 3	.100	0.029	85	0.016	94	0.017	69	0.008	69	0.008	20	0.008	2	0.006	10	0.005	69	0.009	340
DCP 4	.200	0.025	205	0.011	221	0.015	259	0.019	247	0.016	291	0.012	211	0.017	337	0.013	11	0.021	328
DCP 5	.250	0.007	199	0.018	153	0.012	162	0.007	197	0.002	268	0.015	265	0.009	252	0.010	289	0.014	273
DCP 6	.300	0.019	192	0.020	96	0.011	192	0.012	106	0.007	106	0.004	116	0.003	101	0.005	356	0.009	270
DCP 7	.400	0.003	37	0.016	72	0.010	15	0.003	29	0.004	153	0.006	86	0.002	177	0.008	132	0.007	131
DCP 8	.500	0.008	325	0.007	25	0.001	346	0.007	91	0.009	29	0.006	320	0.003	223	0.007	100	0.008	9
DCP 9	.600	0.006	355	0.011	337	0.015	278	0.006	43	0.007	323	0.005	274	0.004	208	0.011	73	0.011	321
DCP10	.878	0.009	338	0.006	305	0.003	281	0.005	189	0.004	55	0.003	293	0.002	166	0.004	79	0.005	17

TUNED PITCHING OSCILLATION VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
96.0	16.16	0.600	10.01	6.85		5100.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.042	648.2	1454.4	0.63E 07	-0.00086	1.187	15.89	0.0750

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
ALPHA		10.005	6.855 0	0.487 31	0.143 163	0.053 185	0.071 176	0.064 149	0.076 142	0.128 111	0.084 15
CN		0.829	0.379 5	0.160 57	0.041 95	0.017 116	0.013 116	0.018 88	0.006 84	0.019 110	0.016 34
CM		-0.035	0.039 198	0.012 90	0.007 159	0.002 90	0.003 173	0.001 107	0.001 178	0.002 270	0.003 173
DCP 1	.010	2.027	1.941 355	0.531 57	0.172 108	0.029 175	0.017 143	0.010 162	0.004 313	0.030 82	0.020 295
DCP 2	.025	2.153	1.582 354	0.488 54	0.144 93	0.061 239	0.059 147	0.023 82	0.012 277	0.021 83	0.019 320
DCP 3	.100	2.241	0.304 352	0.647 63	0.214 143	0.099 110	0.048 153	0.079 99	0.015 32	0.032 85	0.041 61
DCP 4	.200	1.263	0.377 11	0.291 70	0.124 117	0.072 97	0.091 142	0.066 108	0.062 133	0.069 171	0.037 105
DCP 5	.250	1.180	0.438 14	0.260 65	0.055 72	0.072 98	0.028 101	0.049 83	0.017 120	0.031 115	0.016 98
DCP 6	.300	0.989	0.447 10	0.195 63	0.078 44	0.028 80	0.021 42	0.038 72	0.015 42	0.042 99	0.040 54
DCP 7	.400	0.782	0.413 11	0.116 48	0.043 40	0.004 127	0.012 27	0.013 97	0.005 42	0.031 102	0.024 23
DCP 8	.500	0.604	0.340 10	0.074 39	0.036 46	0.004 33	0.015 20	0.006 47	0.007 21	0.022 71	0.027 350
DCP 9	.600	0.464	0.288 10	0.038 19	0.014 53	0.011 225	0.006 64	0.004 146	0.005 32	0.012 121	0.018 22
DCP10	.878	0.282	0.232 6	0.025 331	0.020 345	0.005 233	0.009 352	0.005 323	0.002 305	0.008 80	0.011 337

DATA TYPE	X/C	RES 10 PHI	RES 11 PHI	RES 12 PHI	RES 13 PHI	RES 14 PHI	RES 15 PHI	RES 16 PHI	RES 17 PHI	RES 18 PHI
ALPHA		0.030 300	0.006 275	0.004 197	0.003 344	0.010 243	0.006 156	0.010 231	0.004 209	0.004 238
CN		0.004 76	0.002 324	0.003 121	0.004 355	0.001 9	0.002 14	0.005 311	0.002 217	0.002 49
CM		0.001 137	0.002 132	0.001 140	0.001 101	0.000 137	0.001 92	0.000 263	0.000 124	0.000 156
DCP 1	.010	0.007 119	0.006 305	0.003 204	0.010 309	0.006 258	0.006 236	0.007 214	0.004 155	0.002 87
DCP 2	.025	0.010 51	0.012 260	0.006 195	0.010 355	0.006 170	0.004 80	0.016 303	0.013 164	0.014 77
DCP 3	.100	0.012 31	0.014 103	0.018 93	0.016 56	0.009 72	0.027 42	0.022 320	0.002 223	0.001 62
DCP 4	.200	0.049 155	0.024 192	0.028 160	0.013 247	0.007 315	0.003 177	0.012 295	0.007 230	0.002 302
DCP 5	.250	0.015 178	0.012 150	0.020 199	0.010 155	0.007 219	0.006 288	0.016 262	0.007 239	0.010 294
DCP 6	.300	0.029 49	0.019 32	0.014 67	0.019 38	0.008 3	0.003 80	0.002 295	0.011 159	0.011 100
DCP 7	.400	0.010 71	0.008 20	0.010 95	0.009 56	0.008 55	0.000 2	0.007 84	0.003 289	0.008 148
DCP 8	.500	0.008 8	0.016 333	0.005 341	0.010 330	0.003 273	0.003 350	0.003 311	0.001 124	0.005 10
DCP 9	.600	0.006 347	0.009 329	0.001 357	0.006 344	0.005 321	0.004 254	0.002 28	0.002 317	0.004 343
DCP10	.878	0.006 286	0.007 263	0.005 302	0.008 250	0.003 145	0.003 324	0.002 317	0.002 271	0.001 337

TUNED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
96.0	14.21	0.600	10.00	6.96		5100.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.042	645.7	1452.2	0.63E 07	-0.00098	1.20	15.57	0.0220

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		10.002	6.958	0	0.471	31	0.179	171	0.073	175	0.073	157	0.092	162	0.143	162	0.143	62	0.089	341
CN		0.831	0.386	7	0.154	61	0.044	112	0.019	112	0.013	139	0.017	90	0.013	176	0.025	90	0.014	8
CM		-0.038	0.039	198	0.013	92	0.007	162	0.002	103	0.003	166	0.001	72	0.001	254	0.004	243	0.004	156
DCP 1	.010	2.007	1.943	354	0.555	58	0.173	104	0.031	204	0.028	165	0.018	116	0.028	176	0.026	26	0.022	261
DCP 2	.025	2.149	1.531	356	0.466	63	0.137	110	0.046	226	0.044	162	0.037	24	0.036	213	0.020	86	0.011	284
DCP 3	.100	2.249	0.332	2	0.674	67	0.237	149	0.088	101	0.045	169	0.075	83	0.029	222	0.040	87	0.028	58
DCP 4	.200	1.247	0.399	17	0.284	77	0.160	126	0.097	113	0.104	148	0.050	117	0.081	160	0.064	151	0.031	126
DCP 5	.250	1.175	0.468	11	0.247	64	0.050	96	0.082	91	0.027	125	0.053	70	0.039	180	0.050	97	0.012	86
DCP 6	.300	0.998	0.460	11	0.177	67	0.061	72	0.038	94	0.022	85	0.051	74	0.002	183	0.054	95	0.032	39
DCP 7	.400	0.778	0.421	10	0.110	46	0.038	50	0.007	123	0.012	47	0.012	85	0.009	150	0.040	78	0.028	359
DCP 8	.500	0.580	0.344	11	0.073	47	0.031	49	0.006	17	0.014	347	0.005	73	0.007	334	0.020	66	0.029	345
DCP 9	.600	0.462	0.295	11	0.041	16	0.013	61	0.010	239	0.003	28	0.010	186	0.010	114	0.020	64	0.022	343
DCP10	.878	0.312	0.234	8	0.020	319	0.016	350	0.006	265	0.005	322	0.003	320	0.004	201	0.013	69	0.013	327

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.036	260	0.019	218	0.007	163	0.009	289	0.018	254	0.012	221	0.010	197	0.003	263	0.011	257
CN		0.001	91	0.003	313	0.003	130	0.004	310	0.005	225	0.002	103	0.004	316	0.002	191	0.002	3
CM		0.001	129	0.001	120	0.001	156	0.002	123	0.001	43	0.001	7	0.001	358	0.001	333	0.000	219
DCP 1	.010	0.012	21	0.011	286	0.009	186	0.003	192	0.003	200	0.009	249	0.007	217	0.003	128	0.003	19
DCP 2	.025	0.011	41	0.007	346	0.014	196	0.009	248	0.003	156	0.004	268	0.008	244	0.007	125	0.004	130
DCP 3	.100	0.010	97	0.016	80	0.013	97	0.009	46	0.007	253	0.018	79	0.024	350	0.009	256	0.005	9
DCP 4	.200	0.037	180	0.015	228	0.015	157	0.006	255	0.008	274	0.009	82	0.017	343	0.002	264	0.006	0
DCP 5	.250	0.010	171	0.014	165	0.023	180	0.010	150	0.015	174	0.005	32	0.011	292	0.017	268	0.014	219
DCP 6	.300	0.020	59	0.004	39	0.017	92	0.016	359	0.009	254	0.001	270	0.006	324	0.009	281	0.007	281
DCP 7	.400	0.006	49	0.008	36	0.008	52	0.006	13	0.001	10	0.003	152	0.004	70	0.003	69	0.004	8
DCP 8	.500	0.011	302	0.009	293	0.008	280	0.009	248	0.004	229	0.004	234	0.004	235	0.005	125	0.005	341
DCP 9	.600	0.007	316	0.009	301	0.003	342	0.010	288	0.006	186	0.004	332	0.007	243	0.009	134	0.006	37
DCP10	.878	0.002	290	0.005	300	0.000	27	0.006	320	0.009	236	0.007	158	0.003	116	0.004	205	0.001	104

TUNED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
96.0	15.95	0.600	12.36	6.70		5101.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.041	651.6	1460.4	0.63E 07	-0.00107	1.264	16.20	0.0800

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
ALPHA		12.364	6.701 0	0.444 19	0.094 161	0.049 248	0.005 271	0.040 256	0.063 284	0.036 315	0.059 218
CN		0.994	0.221 17	0.122 77	0.036 110	0.020 231	0.010 165	0.014 257	0.013 248	0.010 313	0.016 227
CM		-0.049	0.056 193	0.006 135	0.007 151	0.004 268	0.000 168	0.002 261	0.000 332	0.000 60	0.002 3
DCP 1	.010	2.589	1.192 357	0.410 73	0.095 84	0.024 197	0.021 324	0.024 224	0.008 183	0.027 325	0.015 195
DCP 2	.025	2.625	0.827 356	0.437 85	0.141 54	0.038 249	0.036 351	0.042 282	0.038 240	0.012 293	0.016 205
DCP 3	.100	2.394	0.380 169	0.304 83	0.189 135	0.096 253	0.078 156	0.049 261	0.035 239	0.029 290	0.042 267
DCP 4	.200	1.685	0.107 66	0.241 92	0.158 149	0.149 242	0.038 305	0.075 278	0.038 287	0.067 1	0.030 201
DCP 5	.250	1.460	0.239 34	0.241 74	0.103 139	0.024 224	0.034 147	0.047 239	0.041 292	0.012 12	0.026 263
DCP 6	.300	1.113	0.256 24	0.205 83	0.069 118	0.017 133	0.051 160	0.046 223	0.029 237	0.031 246	0.045 267
DCP 7	.400	0.909	0.326 19	0.120 67	0.031 61	0.011 85	0.023 167	0.010 90	0.012 187	0.013 299	0.026 216
DCP 8	.500	0.794	0.293 20	0.069 64	0.019 65	0.032 107	0.007 111	0.015 112	0.004 193	0.006 234	0.021 191
DCP 9	.600	0.573	0.283 14	0.040 37	0.030 349	0.011 244	0.008 272	0.002 69	0.007 229	0.004 290	0.014 188
DCP10	.878	0.364	0.254 8	0.017 12	0.018 349	0.009 100	0.005 46	0.005 22	0.002 213	0.003 353	0.004 201

DATA TYPE	X/C	RES 10 PHI	RES 11 PHI	RES 12 PHI	RES 13 PHI	RES 14 PHI	RES 15 PHI	RES 16 PHI	RES 17 PHI	RES 18 PHI
ALPHA		0.017 136	0.010 48	0.001 276	0.008 59	0.010 242	0.010 140	0.002 95	0.002 115	0.004 233
CN		0.002 176	0.003 298	0.002 280	0.005 26	0.007 317	0.003 144	0.005 25	0.004 327	0.005 281
CM		0.001 230	0.001 133	0.001 96	0.000 186	0.001 83	0.001 316	0.000 222	0.000 183	0.001 16
DCP 1	.010	0.005 307	0.015 291	0.021 242	0.020 153	0.015 93	0.014 24	0.007 313	0.009 230	0.008 172
DCP 2	.025	0.015 214	0.018 163	0.009 75	0.019 55	0.004 69	0.009 55	0.004 210	0.005 131	0.008 8
DCP 3	.100	0.023 231	0.017 300	0.013 255	0.006 2	0.022 303	0.014 184	0.020 29	0.022 334	0.024 301
DCP 4	.200	0.018 173	0.009 240	0.006 144	0.008 8	0.025 349	0.006 127	0.022 23	0.023 282	0.015 313
DCP 5	.250	0.023 81	0.019 86	0.007 122	0.011 151	0.004 107	0.011 238	0.008 278	0.004 229	0.006 288
DCP 6	.300	0.015 280	0.014 323	0.018 315	0.019 46	0.015 338	0.004 157	0.006 55	0.003 223	0.008 199
DCP 7	.400	0.004 85	0.008 335	0.008 322	0.009 4	0.006 300	0.006 93	0.005 150	0.014 81	0.005 323
DCP 8	.500	0.006 101	0.005 219	0.005 47	0.010 347	0.010 292	0.003 341	0.006 264	0.004 104	0.002 69
DCP 9	.600	0.005 53	0.004 269	0.003 159	0.007 24	0.005 296	0.001 58	0.005 31	0.014 341	0.013 243
DCP10	.878	0.002 37	0.004 334	0.005 267	0.002 187	0.002 235	0.008 147	0.004 39	0.002 209	0.002 104

TUNED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
96.0	16.05	0.600	12.38	6.75		5101.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.042	645.0	1452.9	0.63E 07	-0.00102	1.215	15.68	0.0720

HARMONIC ANALYSIS

DATA TYPE	Y/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
ALPHA		12.381	6.747 0	0.426 26	0.126 170	0.077 222	0.033 207	0.042 238	0.010 245	0.108 255	0.057 182
CN		0.063	0.229 18	0.121 73	0.027 121	0.017 188	0.011 155	0.011 256	0.007 253	0.014 269	0.006 211
CM		-0.047	0.054 194	0.005 119	0.005 162	0.004 256	0.001 128	0.003 284	0.001 195	0.002 53	0.002 345
DCP 1	.010	2.614	1.217 358	0.429 71	0.090 58	0.058 238	0.028 211	0.028 194	0.015 81	0.018 247	0.013 185
DCP 2	.025	2.652	0.873 357	0.455 79	0.136 34	0.065 228	0.037 62	0.052 308	0.033 236	0.025 185	0.014 14
DCP 3	.100	2.427	0.340 168	0.327 72	0.197 156	0.033 216	0.046 145	0.051 288	0.033 220	0.031 275	0.024 251
DCP 4	.200	1.439	0.149 61	0.234 88	0.143 159	0.133 219	0.047 281	0.061 260	0.057 296	0.057 359	0.024 23
DCP 5	.250	1.324	0.248 29	0.215 77	0.088 156	0.032 187	0.060 146	0.049 248	0.018 340	0.029 284	0.021 297
DCP 6	.300	1.120	0.300 25	0.195 78	0.034 86	0.033 116	0.037 160	0.035 297	0.029 167	0.024 258	0.026 250
DCP 7	.400	0.898	0.326 20	0.093 67	0.027 45	0.016 149	0.019 140	0.004 182	0.006 211	0.027 253	0.020 214
DCP 8	.500	0.703	0.294 18	0.075 66	0.031 47	0.021 77	0.007 119	0.013 113	0.012 78	0.015 262	0.015 174
DCP 9	.600	0.563	0.268 15	0.027 45	0.017 15	0.037 132	0.004 261	0.010 107	0.001 279	0.012 238	0.016 156
DCP10	.878	0.368	0.246 8	0.022 22	0.014 336	0.012 84	0.002 358	0.004 62	0.007 292	0.010 226	0.005 164

DATA TYPE	Y/C	RES 10 PHI	RES 11 PHI	RES 12 PHI	RES 13 PHI	RES 14 PHI	RES 15 PHI	RES 16 PHI	RES 17 PHI	RES 18 PHI
ALPHA		0.036 131	0.023 102	0.012 226	0.017 172	0.016 153	0.009 106	0.014 201	0.006 132	0.008 121
CN		0.005 232	0.004 80	0.003 358	0.005 290	0.001 196	0.004 27	0.002 243	0.002 199	0.004 72
CM		0.001 311	0.001 158	0.001 43	0.001 72	0.001 302	0.000 180	0.001 345	0.000 18	0.001 199
DCP 1	.010	0.011 182	0.010 24	0.006 159	0.003 137	0.006 256	0.004 200	0.010 129	0.007 96	0.006 27
DCP 2	.025	0.025 261	0.013 166	0.001 73	0.016 168	0.004 93	0.003 18	0.019 298	0.013 230	0.004 22
DCP 3	.100	0.029 251	0.027 1	0.004 29	0.018 338	0.009 304	0.010 29	0.009 310	0.003 174	0.012 136
DCP 4	.200	0.039 353	0.017 [illegible]	0.011 37	0.009 349	0.002 5	0.003 142	0.010 90	0.002 40	0.003 165
DCP 5	.250	0.013 60	0.010 88	0.013 77	0.002 129	0.012 224	0.004 74	0.016 265	0.005 183	0.007 128
DCP 6	.300	0.019 258	0.011 273	0.013 290	0.011 298	0.012 257	0.003 82	0.002 261	0.005 6	0.002 344
DCP 7	.400	0.008 320	0.008 336	0.007 276	0.007 334	0.004 258	0.004 38	0.004 228	0.006 157	0.012 98
DCP 8	.500	0.013 181	0.010 70	0.008 280	0.005 260	0.002 292	0.004 287	0.004 177	0.002 3	0.006 39
DCP 9	.600	0.003 109	0.002 9	0.005 197	0.007 301	0.007 241	0.005 218	0.002 216	0.009 196	0.014 56
DCP10	.878	0.003 158	0.001 349	0.001 190	0.009 231	0.012 97	0.004 27	0.002 155	0.003 343	0.005 283

TUNED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED FRQ	AIRFOIL FRQ	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
96.0	14.13	0.630	12.40	6.84		5101.3	10

V	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.042	644.0	1453.4	0.635 07	-0.00085	1.187	16.32	0.0220

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	HI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		12.335	6.842	0	0.372	26	0.168	175	0.078	225	0.066	222	0.061	262	0.080	328	0.201	294	0.069	140
CN		0.015	0.227	16	0.122	57	0.027	133	0.015	199	0.019	143	0.014	231	0.005	356	0.024	232	0.007	167
CM		-0.053	0.054	191	0.006	118	0.006	156	0.002	273	0.001	179	0.002	254	0.001	93	0.003	15	0.002	279
DCP 1	.010	2.609	1.243	356	0.411	76	0.118	76	0.037	266	0.048	239	0.049	292	0.025	40	0.013	168	0.017	273
DCP 2	.025	2.430	0.862	357	0.469	70	0.120	22	0.053	230	0.032	284	0.054	215	0.039	20	0.048	247	0.051	183
DCP 3	.100	2.388	0.393	160	0.369	64	0.171	144	0.073	235	0.097	139	0.071	250	0.036	107	0.058	273	0.037	192
DCP 4	.200	0.821	0.103	31	0.175	83	0.127	144	0.051	195	0.036	131	0.035	243	0.048	321	0.028	259	0.020	341
DCP 5	.250	1.302	0.253	34	0.238	75	0.091	144	0.011	167	0.051	155	0.045	255	0.026	4	0.031	257	0.025	7
DCP 6	.300	1.113	0.288	21	0.188	76	0.050	93	0.024	106	0.050	147	0.024	188	0.007	146	0.044	219	0.015	245
DCP 7	.400	0.809	0.325	19	0.107	71	0.033	49	0.016	151	0.026	142	0.002	94	0.010	251	0.037	214	0.010	177
DCP 8	.500	0.682	0.295	17	0.069	58	0.031	41	0.013	106	0.016	120	0.014	86	0.005	28	0.023	191	0.011	118
DCP 9	.600	0.566	0.278	14	0.032	30	0.025	346	0.016	211	0.002	311	0.005	263	0.008	251	0.020	209	0.007	144
DCP10	.878	0.398	0.245	6	0.029	5	0.015	342	0.007	87	0.005	354	0.006	108	0.005	345	0.012	223	0.011	112

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.022	117	0.017	169	0.016	190	0.024	166	0.016	144	0.013	134	0.011	179	0.007	134	0.017	180
CN		0.004	164	0.004	300	0.004	47	0.004	234	0.005	71	0.004	355	0.001	107	0.003	352	0.001	54
CM		0.001	66	0.002	39	0.000	14	0.002	354	0.001	182	0.001	27	0.002	328	0.001	189	0.000	338
DCP 1	.010	0.023	195	0.012	170	0.010	96	0.002	40	0.002	242	0.008	156	0.007	113	0.005	348	0.006	273
DCP 2	.025	0.036	100	0.021	1	0.010	333	0.021	234	0.023	145	0.027	50	0.014	306	0.009	212	0.002	188
DCP 3	.100	0.013	228	0.006	70	0.007	337	0.013	321	0.005	140	0.022	358	0.007	320	0.015	307	0.006	99
DCP 4	.200	0.036	92	0.037	15	0.040	58	0.028	9	0.031	66	0.025	25	0.021	37	0.008	120	0.020	34
DCP 5	.250	0.019	47	0.014	7	0.024	47	0.011	304	0.014	122	0.011	338	0.005	329	0.011	333	0.011	338
DCP 6	.300	0.017	221	0.018	279	0.012	278	0.013	247	0.001	78	0.002	4	0.006	280	0.010	52	0.010	314
DCP 7	.400	0.005	211	0.013	269	0.008	69	0.007	273	0.013	49	0.004	315	0.005	344	0.006	178	0.003	189
DCP 8	.500	0.005	139	0.010	217	0.004	192	0.007	204	0.004	18	0.006	242	0.006	194	0.005	27	0.006	225
DCP 9	.600	0.007	243	0.009	233	0.007	227	0.010	197	0.003	5	0.008	252	0.008	164	0.005	359	0.005	173
DCP10	.878	0.006	236	0.004	196	0.001	43	0.012	168	0.003	17	0.005	145	0.008	131	0.005	347	0.003	85

TUNED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
96.0	15.08	0.600	14.75	6.72		5102.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.042	644.6	1452.9	0.638 07	-0.00105	1.254	16.63	0.0760

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		14.754	6.723	0	0.414	18	0.074	154	0.051	229	0.025	155	0.017	149	0.037	106	0.045	145	0.029	206
CN		1.025	0.119	51	0.191	71	0.010	135	0.011	154	0.014	331	0.007	129	0.016	356	0.004	81	0.002	271
CM		-0.062	0.063	191	0.008	208	0.001	120	0.001	242	0.001	299	0.001	357	0.001	255	0.001	263	0.001	47
DCP 1	.010	2.836	0.572	352	0.478	89	0.083	44	0.052	137	0.034	56	0.024	10	0.005	67	0.024	64	0.006	167
DCP 2	.025	2.738	0.183	0	0.602	90	0.140	2	0.051	96	0.055	329	0.026	139	0.036	37	0.007	283	0.024	123
DCP 3	.100	2.369	0.735	164	0.083	68	0.126	143	0.079	230	0.049	329	0.004	156	0.072	331	0.006	36	0.028	320
DCP 4	.200	1.498	0.289	147	0.010	108	0.042	276	0.016	47	0.041	345	0.028	33	0.037	3	0.009	139	0.008	280
DCP 5	.250	1.447	0.190	132	0.111	75	0.029	134	0.043	178	0.031	309	0.027	87	0.008	58	0.010	275	0.011	284
DCP 6	.300	1.216	0.151	64	0.171	78	0.072	167	0.042	188	0.033	309	0.009	125	0.033	344	0.021	55	0.018	96
DCP 7	.400	0.971	0.244	34	0.130	68	0.018	147	0.016	142	0.007	261	0.013	147	0.007	14	0.013	129	0.006	208
DCP 8	.500	0.786	0.237	23	0.094	67	0.016	191	0.022	134	0.010	245	0.016	178	0.010	311	0.004	306	0.003	183
DCP 9	.600	0.650	0.254	17	0.066	58	0.012	340	0.017	75	0.006	60	0.007	151	0.009	42	0.007	172	0.007	265
DCP10	.878	0.424	0.244	9	0.046	42	0.008	32	0.010	38	0.006	60	0.005	183	0.006	32	0.004	45	0.003	226

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.009	166	0.010	91	0.013	165	0.010	177	0.008	177	0.014	158	0.009	208	0.007	157	0.006	211
CN		0.001	77	0.000	219	0.004	265	0.001	120	0.005	243	0.002	357	0.001	197	0.001	51	0.004	68
CM		0.001	262	0.000	76	0.001	329	0.001	180	0.000	340	0.001	114	0.001	232	0.001	118	0.001	167
DCP 1	.010	0.013	131	0.013	90	0.005	11	0.005	76	0.015	5	0.016	293	0.005	191	0.011	7	0.016	265
DCP 2	.025	0.009	12	0.009	149	0.009	16	0.008	278	0.006	78	0.011	328	0.010	236	0.009	136	0.004	68
DCP 3	.100	0.002	346	0.006	338	0.017	284	0.003	55	0.026	248	0.015	103	0.015	225	0.015	117	0.014	128
DCP 4	.200	0.008	319	0.003	273	0.012	313	0.001	59	0.012	244	0.004	57	0.006	191	0.004	79	0.009	74
DCP 5	.250	0.020	262	0.020	299	0.008	261	0.002	159	0.003	62	0.008	60	0.002	138	0.010	70	0.005	161
DCP 6	.300	0.012	95	0.010	130	0.009	189	0.004	185	0.013	228	0.003	136	0.005	104	0.005	298	0.004	77
DCP 7	.400	0.010	194	0.005	180	0.004	259	0.008	144	0.008	290	0.008	49	0.005	1	0.008	300	0.004	85
DCP 8	.500	0.004	359	0.004	43	0.006	208	0.005	162	0.005	113	0.004	254	0.005	53	0.004	253	0.008	39
DCP 9	.600	0.007	124	0.006	110	0.002	328	0.005	72	0.005	290	0.003	321	0.003	252	0.004	112	0.006	23
DCP10	.878	0.006	42	0.006	278	0.005	123	0.007	330	0.005	160	0.009	294	0.004	68	0.006	302	0.003	279

TUNED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
96.0	16.42	0.600	14.75	6.79		5102.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.043	643.7	1444.1	0.63E 07	-0.00086	1.262	15.74	0.0220

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		14.754	6.789	0	0.284	21	0.154	178	0.072	206	0.072	177	0.072	118	0.053	107	0.016	215	0.036	228
CN		1.022	0.138	52	0.104	67	0.008	189	0.011	188	0.012	357	0.003	47	0.009	21	0.007	72	0.009	331
CM		-0.063	0.062	189	0.007	229	0.001	100	0.003	278	0.003	268	0.001	29	0.002	251	0.001	172	0.002	154
DCP 1	.010	2.824	0.536	356	0.552	85	0.128	26	0.029	311	0.043	281	0.007	200	0.011	178	0.034	141	0.026	68
DCP 2	.025	2.735	0.204	17	0.591	74	0.119	355	0.016	84	0.023	331	0.028	30	0.011	45	0.025	41	0.016	334
DCP 3	.100	2.387	0.701	156	0.118	32	0.084	149	0.091	235	0.055	329	0.014	254	0.041	321	0.010	128	0.022	290
DCP 4	.200	1.475	0.282	138	0.015	148	0.056	256	0.036	66	0.039	1	0.031	51	0.019	39	0.024	116	0.004	322
DCP 5	.250	1.411	0.196	98	0.125	69	0.045	169	0.033	232	0.025	344	0.033	78	0.006	146	0.003	180	0.008	279
DCP 6	.300	1.210	0.188	58	0.158	75	0.073	178	0.043	193	0.018	302	0.035	34	0.023	338	0.019	59	0.018	8
DCP 7	.400	0.964	0.244	35	0.138	70	0.015	183	0.010	113	0.003	18	0.012	41	0.014	65	0.017	89	0.007	39
DCP 8	.500	0.765	0.234	22	0.095	70	0.016	187	0.018	141	0.013	160	0.006	205	0.004	268	0.005	24	0.011	298
DCP 9	.600	0.648	0.257	19	0.062	63	0.015	349	0.015	90	0.014	54	0.005	319	0.015	65	0.008	39	0.014	357
DCP10	.878	0.437	0.245	8	0.049	51	0.007	322	0.007	122	0.011	56	0.008	198	0.007	51	0.005	318	0.008	308

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.043	183	0.029	186	0.030	189	0.032	177	0.021	171	0.024	164	0.011	193	0.011	168	0.013	197
CN		0.001	117	0.002	300	0.002	174	0.002	90	0.003	14	0.003	219	0.006	80	0.002	27	0.001	340
CM		0.001	238	0.001	118	0.001	311	0.001	210	0.001	219	0.001	215	0.001	197	0.001	141	0.001	296
DCP 1	.010	0.022	324	0.009	183	0.013	333	0.025	254	0.019	184	0.004	138	0.008	191	0.008	131	0.003	275
DCP 2	.025	0.025	267	0.023	177	0.005	314	0.018	222	0.003	285	0.023	250	0.023	162	0.016	60	0.011	304
DCP 3	.100	0.018	148	0.009	51	0.009	305	0.005	81	0.007	269	0.007	202	0.017	136	0.013	132	0.005	36
DCP 4	.200	0.007	91	0.009	36	0.003	125	0.015	106	0.002	351	0.010	186	0.012	81	0.008	193	0.011	341
DCP 5	.250	0.016	261	0.004	289	0.012	199	0.002	126	0.001	110	0.006	265	0.012	126	0.003	1	0.003	240
DCP 6	.300	0.004	24	0.008	35	0.009	225	0.004	54	0.005	332	0.010	213	0.011	66	0.005	135	0.008	310
DCP 7	.400	0.007	117	0.012	244	0.011	158	0.002	205	0.008	70	0.003	158	0.011	61	0.009	34	0.007	320
DCP 8	.500	0.001	106	0.008	302	0.008	188	0.000	46	0.004	237	0.008	120	0.004	319	0.008	47	0.007	221
DCP 9	.600	0.004	43	0.003	274	0.005	82	0.002	88	0.014	15	0.005	314	0.016	24	0.012	308	0.003	117
DCP10	.878	0.003	63	0.005	309	0.002	125	0.006	20	0.003	93	0.002	38	0.003	164	0.001	333	0.005	97

TUNED PITCHING OSCILLATION VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
96.0	16.21	0.600	14.75	6.81		5102.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.042	643.1	1443.9	0.63E 07	-0.00082	1.253	16.63	0.0220

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
ALPHA		14.745	6.806 0	0.318 21	0.157 177	0.074 192	0.035 164	0.027 140	0.017 81	0.121 359	0.065 243
CN		1.025	0.134 47	0.096 66	0.016 162	0.004 176	0.010 280	0.002 306	0.009 282	0.017 25	0.011 284
CM		-0.065	0.061 189	0.007 235	0.002 143	0.003 282	0.003 323	0.001 8	0.001 294	0.003 151	0.002 71
DCP 1	.010	2.827	0.563 354	0.500 83	0.071 33	0.032 157	0.011 112	0.012 16	0.021 224	0.018 53	0.021 31
DCP 2	.025	2.771	0.277 14	0.538 71	0.060 335	0.067 90	0.038 329	0.029 16	0.052 256	0.027 128	0.015 35
DCP 3	.100	2.374	0.695 159	0.093 30	0.114 141	0.076 270	0.063 308	0.017 306	0.034 286	0.048 56	0.020 321
DCP 4	.200	1.670	0.285 139	0.021 136	0.036 266	0.019 358	0.035 313	0.014 348	0.021 336	0.032 59	0.022 291
DCP 5	.250	1.418	0.175 92	0.098 51	0.079 170	0.032 225	0.025 293	0.018 93	0.016 242	0.025 19	0.011 268
DCP 6	.300	1.210	0.168 56	0.159 76	0.081 168	0.029 203	0.037 270	0.009 232	0.036 299	0.030 28	0.019 300
DCP 7	.400	0.960	0.246 32	0.117 66	0.034 166	0.014 122	0.019 233	0.005 222	0.007 327	0.025 7	0.012 276
DCP 8	.500	0.754	0.238 21	0.089 69	0.017 146	0.015 197	0.014 180	0.010 152	0.006 320	0.024 5	0.014 277
DCP 9	.600	0.668	0.255 16	0.058 64	0.017 341	0.005 90	0.010 196	0.008 220	0.007 123	0.019 356	0.013 258
DCP10	.878	0.458	0.246 8	0.054 56	0.009 336	0.011 99	0.014 109	0.003 11	0.004 176	0.007 312	0.008 252

DATA TYPE	X/C	RES 10 PHI	RES 11 PHI	RES 12 PHI	RES 13 PHI	RES 14 PHI	RES 15 PHI	RES 16 PHI	RES 17 PHI	RES 18 PHI
ALPHA		0.030 190	0.026 145	0.017 123	0.016 166	0.012 148	0.020 132	0.003 189	0.010 173	0.011 196
CN		0.004 357	0.005 172	0.002 106	0.003 210	0.001 241	0.001 188	0.004 316	0.002 264	0.003 312
CM		0.001 87	0.001 296	0.001 250	0.000 289	0.000 120	0.001 41	0.001 160	0.001 34	0.002 90
DCP 1	.010	0.021 294	0.012 136	0.012 335	0.018 253	0.013 181	0.006 166	0.001 162	0.004 171	0.007 94
DCP 2	.025	0.011 344	0.011 347	0.010 256	0.006 295	0.014 253	0.014 193	0.006 164	0.013 207	0.027 113
DCP 3	.100	0.029 46	0.017 221	0.015 67	0.005 230	0.005 197	0.016 38	0.005 254	0.016 14	0.008 76
DCP 4	.200	0.009 99	0.016 195	0.008 164	0.008 222	0.003 90	0.005 39	0.007 214	0.007 9	0.009 7
DCP 5	.250	0.011 306	0.010 248	0.002 77	0.013 299	0.007 46	0.004 302	0.005 63	0.003 329	0.007 13
DCP 6	.300	0.001 107	0.012 112	0.013 293	0.007 136	0.010 189	0.002 38	0.005 272	0.005 348	0.007 278
DCP 7	.400	0.004 57	0.006 238	0.004 164	0.006 192	0.007 13	0.003 53	0.014 329	0.007 352	0.009 333
DCP 8	.500	0.006 301	0.006 98	0.002 239	0.002 203	0.001 256	0.012 201	0.005 21	0.008 223	0.007 293
DCP 9	.600	0.006 323	0.011 184	0.003 81	0.007 187	0.004 292	0.010 199	0.008 294	0.008 205	0.008 305
DCP10	.878	0.005 262	0.009 90	0.007 59	0.004 38	0.002 212	0.002 324	0.006 2	0.004 218	0.007 232

TUNED PITCHING OSCILLATION VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
44.0	15.60	0.400	9.91	4.47		5135.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.050	439.1	371.4	0.24E 07	-0.00035	1.616	13.77	0.1300

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
ALPHA		9.906	4.669 0	0.200 29	0.083 284	0.076 241	0.080 294	0.005 252	0.040 347	0.029 346	0.012 2
CN		1.132	0.311 14	0.144 35	0.045 296	0.010 264	0.022 266	0.011 154	0.009 85	0.011 10	0.007 299
CM		-0.014	0.014 292	0.017 87	0.012 355	0.003 304	0.004 295	0.005 231	0.004 156	0.004 92	0.003 31
DCP 1	.010	4.643	2.131 4	0.527 31	0.236 318	0.082 295	0.131 280	0.068 216	0.032 135	0.036 18	0.027 321
DCP 2	.025	4.508	1.782 3	0.626 47	0.296 345	0.165 349	0.273 294	0.212 238	0.169 176	0.133 110	0.130 59
DCP 3	.100	2.755	0.397 17	0.563 65	0.223 347	0.105 286	0.106 266	0.078 195	0.085 131	0.093 60	0.080 7
DCP 4	.150	2.119	0.308 22	0.289 53	0.118 325	0.037 263	0.033 266	0.031 193	0.031 99	0.037 22	0.029 317
DCP 5	.200	1.655	0.266 37	0.381 46	0.187 305	0.092 219	0.046 188	0.058 125	0.044 59	0.059 350	0.051 290
DCP 6	.250	1.565	0.292 29	0.217 35	0.107 293	0.045 296	0.017 174	0.033 106	0.039 32	0.038 327	0.031 259
DCP 7	.300	1.184	0.291 31	0.243 28	0.130 275	0.062 185	0.023 171	0.049 96	0.053 23	0.046 316	0.040 256
DCP 8	.400	0.975	0.273 22	0.117 0	0.064 248	0.023 152	0.010 123	0.031 68	0.031 347	0.027 283	0.024 216
DCP 9	.500	0.735	0.230 20	0.092 2	0.057 209	0.024 98	0.001 237	0.028 46	0.026 314	0.016 249	0.017 202
DCP10	.600	0.606	0.197 17	0.060 313	0.037 186	0.018 41	0.007 269	0.010 55	0.005 325	0.008 273	0.009 184
DCP11	.878	0.290	0.158 2	0.024 290	0.020 153	0.006 255	0.005 170	0.004 75	0.002 122	0.003 354	0.003 304

DATA TYPE	X/C	RES 10 PHI	RES 11 PHI	RES 12 PHI	RES 13 PHI	RES 14 PHI	RES 15 PHI	RES 16 PHI	RES 17 PHI	RES 18 PHI
ALPHA		0.022 94	0.016 59	0.008 111	0.009 84	0.010 115	0.003 216	0.011 217	0.011 207	0.011 274
CN		0.004 248	0.003 105	0.006 122	0.003 141	0.002 106	0.002 13	0.001 132	0.001 335	0.002 196
CM		0.002 317	0.002 255	0.002 220	0.002 134	0.002 71	0.001 25	0.001 322	0.001 251	0.000 235
DCP 1	.010	0.016 285	0.005 157	0.020 124	0.024 122	0.012 51	0.006 356	0.004 283	0.007 202	0.002 258
DCP 2	.025	0.028 0	0.021 304	0.062 221	0.076 162	0.062 105	0.050 48	0.043 3	0.034 297	0.032 232
DCP 3	.100	0.020 306	0.041 249	0.046 190	0.043 151	0.035 99	0.022 34	0.013 339	0.015 301	0.010 233
DCP 4	.150	0.022 249	0.016 159	0.018 111	0.016 80	0.009 6	0.008 286	0.007 218	0.007 194	0.010 150
DCP 5	.200	0.040 224	0.029 158	0.030 103	0.018 65	0.017 14	0.015 319	0.010 235	0.012 209	0.008 147
DCP 6	.250	0.025 187	0.023 113	0.018 74	0.009 24	0.012 319	0.009 267	0.009 208	0.007 142	0.011 59
DCP 7	.300	0.038 195	0.034 122	0.025 68	0.014 24	0.016 330	0.016 270	0.015 198	0.011 152	0.011 110
DCP 8	.400	0.020 143	0.020 77	0.012 26	0.011 293	0.010 227	0.008 178	0.007 117	0.006 30	0.008 301
DCP 9	.500	0.019 126	0.016 54	0.006 21	0.009 311	0.011 235	0.007 176	0.011 145	0.011 75	0.009 12
DCP10	.600	0.008 79	0.005 23	0.002 76	0.004 297	0.005 198	0.004 116	0.003 82	0.001 290	0.007 199
DCP11	.878	0.003 301	0.001 68	0.004 91	0.002 248	0.001 224	0.002 335	0.002 124	0.002 12	0.002 70

TUNED PITCHING OSCILLATION VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.M	TEST POINT	CYCLES ANALYZED
64.0	15.80	0.400	9.92	4.74		5135.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.060	437.8	367.1	0.24E 07	-0.00056	1.546	13.93	0.1170

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		9.923	4.744	359	0.222	21	0.079	285	0.128	272	0.065	245	0.022	343	0.046	352	0.022	314	0.018	46
CN		1.117	0.314	14	0.117	51	0.053	312	0.019	247	0.014	230	0.005	64	0.002	6	0.006	9	0.003	307
CM		-0.015	0.015	209	0.018	72	0.012	9	0.007	308	0.005	272	0.006	216	0.005	147	0.004	92	0.004	21
DCP 1	.010	4.590	2.100	4	0.502	43	0.300	331	0.154	269	0.087	263	0.019	252	0.020	168	0.036	56	0.020	343
DCP 2	.025	4.467	1.739	7	0.586	60	0.284	357	0.238	329	0.226	287	0.238	248	0.186	184	0.160	120	0.135	58
DCP 3	.100	2.760	0.633	14	0.520	74	0.237	353	0.122	293	0.107	249	0.074	200	0.080	129	0.085	60	0.083	2
DCP 4	.150	2.018	0.304	21	0.289	64	0.143	339	0.033	261	0.035	219	0.025	120	0.022	90	0.035	25	0.026	318
DCP 5	.200	1.565	0.272	32	0.336	54	0.178	313	0.095	231	0.063	175	0.042	109	0.047	49	0.043	346	0.037	290
DCP 6	.250	1.513	0.298	28	0.192	46	0.111	306	0.070	219	0.035	157	0.045	76	0.031	12	0.030	340	0.027	277
DCP 7	.300	1.201	0.304	28	0.198	35	0.123	282	0.061	195	0.041	154	0.044	79	0.049	14	0.044	334	0.032	244
DCP 8	.400	0.965	0.281	23	0.087	10	0.064	263	0.041	177	0.026	115	0.046	53	0.033	327	0.021	281	0.021	219
DCP 9	.500	0.706	0.228	19	0.067	13	0.048	220	0.028	113	0.010	93	0.025	10	0.027	309	0.025	266	0.020	177
DCP10	.600	0.604	0.207	19	0.062	304	0.032	223	0.018	130	0.009	52	0.028	43	0.019	310	0.010	277	0.013	192
DCP11	.878	0.391	0.155	4	0.060	220	0.021	175	0.008	116	0.004	126	0.009	331	0.003	287	0.004	274	0.007	188

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.029	76	0.017	81	0.016	108	0.012	91	0.008	190	0.012	205	0.008	225	0.008	253	0.012	280
CN		0.001	211	0.005	115	0.002	93	0.004	110	0.002	103	0.003	187	0.004	69	0.001	342	0.002	187
CM		0.003	306	0.003	247	0.002	184	0.001	148	0.001	70	0.002	10	0.002	293	0.001	243	0.000	9
DCP 1	.010	0.017	294	0.013	204	0.018	127	0.024	110	0.018	78	0.001	165	0.007	10	0.004	186	0.008	130
DCP 2	.025	0.135	357	0.066	292	0.069	215	0.068	157	0.056	109	0.036	68	0.047	351	0.037	313	0.032	232
DCP 3	.100	0.061	302	0.042	232	0.033	177	0.029	136	0.017	112	0.008	71	0.016	38	0.012	333	0.007	301
DCP 4	.150	0.021	249	0.018	176	0.017	114	0.017	72	0.013	26	0.006	284	0.006	232	0.010	174	0.009	107
DCP 5	.200	0.034	221	0.035	157	0.025	90	0.012	67	0.014	14	0.016	292	0.007	268	0.005	204	0.007	166
DCP 6	.250	0.024	200	0.022	138	0.017	70	0.012	15	0.009	343	0.010	270	0.006	189	0.009	145	0.008	106
DCP 7	.300	0.029	181	0.034	120	0.021	54	0.011	11	0.011	306	0.013	249	0.005	215	0.008	141	0.007	125
DCP 8	.400	0.017	150	0.017	70	0.011	3	0.005	317	0.002	323	0.006	201	0.008	137	0.005	69	0.002	133
DCP 9	.500	0.020	114	0.019	51	0.010	351	0.009	270	0.007	221	0.008	193	0.008	132	0.007	61	0.009	27
DCP10	.600	0.014	96	0.009	49	0.006	6	0.003	6	0.004	231	0.008	163	0.010	83	0.003	220	0.003	180
DCP11	.878	0.003	79	0.005	69	0.003	340	0.001	34	0.003	205	0.008	180	0.006	86	0.005	7	0.006	216

TUNED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
64.0	15.87	0.400	9.96	4.91		5135.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.061	436.9	368.0	0.24E 07	-0.00035	1.590	13.99	0.0340

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		9.963	4.912	359	0.192	36	0.096	284	0.085	310	0.048	181	0.036	358	0.062	335	0.024	323	0.024	14
CN		1.092	0.302	15	0.157	36	0.052	239	0.027	298	0.022	203	0.006	118	0.006	56	0.015	7	0.005	309
CM		-0.018	0.019	194	0.020	75	0.012	357	0.004	303	0.005	278	0.004	210	0.003	150	0.003	123	0.002	12
DCP 1	.010	4.505	2.046	4	0.600	34	0.287	323	0.183	298	0.095	239	0.068	270	0.017	154	0.032	5	0.019	335
DCP 2	.025	4.379	1.647	2	0.759	49	0.292	347	0.267	326	0.171	269	0.162	229	0.144	173	0.111	99	0.084	44
DCP 3	.100	2.666	0.339	22	0.663	63	0.246	341	0.142	296	0.090	227	0.077	169	0.059	120	0.078	49	0.063	359
DCP 4	.150	1.945	0.266	28	0.329	52	0.132	327	0.062	287	0.050	221	0.014	166	0.026	65	0.031	4	0.022	303
DCP 5	.200	1.496	0.262	44	0.402	42	0.177	298	0.066	240	0.062	184	0.071	121	0.062	44	0.055	344	0.033	276
DCP 6	.250	1.457	0.278	33	0.235	32	0.106	289	0.032	235	0.031	184	0.021	61	0.030	17	0.029	323	0.016	244
DCP 7	.300	1.174	0.293	33	0.257	27	0.120	269	0.031	199	0.050	166	0.060	90	0.048	10	0.040	319	0.025	257
DCP 8	.400	0.944	0.279	25	0.135	356	0.069	242	0.013	151	0.020	146	0.032	14	0.027	334	0.019	286	0.014	218
DCP 9	.500	0.685	0.236	19	0.077	6	0.047	209	0.010	56	0.030	128	0.025	45	0.018	311	0.014	295	0.017	206
DCP10	.600	0.598	0.219	16	0.079	311	0.036	194	0.007	12	0.010	147	0.027	344	0.009	294	0.008	322	0.006	188
DCP11	.878	0.314	0.171	359	0.023	218	0.012	167	0.008	312	0.009	115	0.009	139	0.003	99	0.012	15	0.003	81

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.020	24	0.022	44	0.017	80	0.011	82	0.012	124	0.012	145	0.007	204	0.006	233	0.008	252
CN		0.002	291	0.001	223	0.003	126	0.005	79	0.003	51	0.001	354	0.001	194	0.001	155	0.001	345
CM		0.002	318	0.001	234	0.001	186	0.001	169	0.000	101	0.001	45	0.001	338	0.000	334	0.000	205
DCP 1	.010	0.012	46	0.012	272	0.011	161	0.017	117	0.013	110	0.011	36	0.003	276	0.013	32	0.003	188
DCP 2	.025	0.065	353	0.046	285	0.033	299	0.039	134	0.038	98	0.037	34	0.016	350	0.012	246	0.005	274
DCP 3	.100	0.052	305	0.038	253	0.035	187	0.031	118	0.019	65	0.015	25	0.003	328	0.004	330	0.013	288
DCP 4	.150	0.010	221	0.005	163	0.009	132	0.011	89	0.010	9	0.006	330	0.010	253	0.009	124	0.010	40
DCP 5	.200	0.023	219	0.019	174	0.022	104	0.020	51	0.011	342	0.009	295	0.007	227	0.008	196	0.003	135
DCP 6	.250	0.017	173	0.015	122	0.011	66	0.006	13	0.006	328	0.009	231	0.008	179	0.008	59	0.002	312
DCP 7	.300	0.028	190	0.022	124	0.017	74	0.015	37	0.013	334	0.007	286	0.008	223	0.008	183	0.003	115
DCP 8	.400	0.023	136	0.018	65	0.013	356	0.008	305	0.010	234	0.012	166	0.009	73	0.009	18	0.002	266
DCP 9	.500	0.012	135	0.010	74	0.012	36	0.012	313	0.008	216	0.002	242	0.006	148	0.005	88	0.006	0
DCP10	.600	0.008	81	0.005	352	0.002	234	0.001	220	0.003	103	0.003	140	0.002	287	0.004	224	0.005	148
DCP11	.878	0.002	268	0.003	303	0.001	234	0.002	77	0.004	44	0.004	304	0.004	165	0.003	157	0.005	353

TUNED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
64.0	16.13	0.600	7.50	4.41		5139.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.042	663.0	714.0	0.31E 07	-0.00081	1.092	11.72	0.1300

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		7.505	4.412	0	0.234	31	0.115	184	0.016	201	0.024	109	0.061	4	0.034	341	0.025	331	0.025	4
CN		0.853	0.767	6	0.086	67	0.020	118	0.010	114	0.007	97	0.008	77	0.012	20	0.003	29	0.005	23
CM		-0.034	0.032	193	0.014	94	0.004	164	0.003	103	0.001	160	0.001	210	0.001	137	0.000	207	0.001	145
DCP 1	.010	1.032	1.336	357	0.231	69	0.075	137	0.022	175	0.006	302	0.014	6	0.019	353	0.008	355	0.006	306
DCP 2	.025	2.213	1.394	352	0.215	56	0.075	147	0.019	158	0.007	330	0.019	3	0.023	357	0.011	340	0.006	60
DCP 3	.100	2.306	1.076	313	0.119	92	0.075	143	0.020	124	0.019	66	0.037	82	0.041	53	0.007	350	0.038	111
DCP 4	.150	1.995	0.159	15	0.421	76	0.232	154	0.018	176	0.083	140	0.088	214	0.041	14	0.013	229	0.009	77
DCP 5	.200	1.325	0.254	14	0.266	84	0.067	150	0.096	110	0.078	152	0.018	204	0.018	144	0.033	230	0.021	335
DCP 6	.250	1.272	0.362	13	0.174	76	0.047	38	0.076	84	0.019	20	0.058	81	0.018	55	0.029	75	0.012	139
DCP 7	.300	1.034	0.368	11	0.159	66	0.059	19	0.057	80	0.043	23	0.049	65	0.029	30	0.033	68	0.023	27
DCP 8	.400	0.769	0.313	8	0.024	33	0.023	27	0.017	266	0.006	335	0.008	23	0.010	352	0.008	30	0.009	327
DCP 9	.500	0.606	0.278	12	0.041	353	0.022	24	0.016	320	0.008	359	0.018	29	0.023	350	0.012	334	0.011	313
DCP10	.600	0.468	0.211	11	0.018	303	0.005	87	0.014	247	0.004	165	0.006	76	0.008	26	0.004	38	0.007	3
DCP11	.978	0.284	0.174	4	0.040	289	0.006	328	0.006	267	0.003	12	0.002	329	0.004	288	0.001	239	0.002	318

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.015	358	0.010	16	0.011	58	0.011	73	0.007	122	0.010	137	0.004	153	0.004	174	0.006	213
CN		0.007	72	0.006	37	0.003	57	0.001	52	0.002	74	0.003	181	0.001	294	0.003	234	0.001	212
CM		0.001	215	0.001	144	0.001	113	0.001	103	0.000	72	0.001	300	0.000	100	0.000	270	0.001	145
DCP 1	.010	0.000	69	0.006	32	0.004	82	0.003	140	0.002	190	0.006	184	0.003	92	0.004	209	0.005	144
DCP 2	.025	0.008	73	0.006	3	0.008	84	0.004	66	0.004	126	0.008	133	0.003	278	0.011	239	0.003	145
DCP 3	.100	0.003	56	0.001	55	0.003	47	0.002	20	0.000	12	0.005	121	0.003	5	0.013	265	0.010	152
DCP 4	.150	0.014	130	0.005	104	0.006	169	0.003	195	0.001	152	0.009	237	0.003	161	0.006	240	0.016	170
DCP 5	.200	0.008	227	0.011	44	0.005	30	0.000	160	0.001	106	0.007	201	0.007	202	0.004	298	0.009	237
DCP 6	.250	0.004	106	0.003	90	0.001	151	0.003	111	0.002	208	0.008	168	0.002	143	0.007	240	0.009	219
DCP 7	.300	0.000	84	0.007	84	0.004	79	0.005	107	0.000	65	0.002	29	0.005	125	0.001	14	0.005	195
DCP 8	.400	0.007	81	0.000	28	0.000	5	0.008	342	0.008	327	0.010	245	0.004	153	0.001	205	0.002	89
DCP 9	.500	0.008	39	0.003	326	0.002	165	0.008	25	0.008	334	0.001	206	0.000	313	0.003	217	0.005	69
DCP10	.600	0.004	38	0.002	315	0.004	42	0.007	307	0.004	219	0.001	111	0.005	275	0.004	185	0.005	345
DCP11	.978	0.003	54	0.008	336	0.007	278	0.003	204	0.002	133	0.006	120	0.000	8	0.004	61	0.005	296

TUNED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
64.0	16.19	0.600	7.52	4.52		5139.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.042	641.1	716.9	0.31E 07	-0.00093	1.095	11.70	0.1080

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		7.515	4.523	359	0.248	23	0.127	175	0.029	179	0.098	81	0.050	25	0.028	345	0.017	327	0.022	28
CN		0.947	0.279	5	0.098	69	0.029	117	0.010	86	0.016	111	0.009	84	0.010	60	0.007	39	0.006	7
CM		-0.035	0.031	196	0.011	100	0.005	165	0.002	99	0.002	207	0.002	175	0.002	180	0.001	159	0.002	133
DCP 1	.010	1.928	1.362	356	0.269	62	0.098	130	0.005	59	0.029	65	0.015	21	0.017	4	0.015	327	0.006	269
DCP 2	.025	2.217	1.142	357	0.252	58	0.092	143	0.037	168	0.021	75	0.021	27	0.018	355	0.013	319	0.010	310
DCP 3	.100	2.302	0.135	316	0.423	85	0.122	142	0.055	128	0.029	139	0.052	93	0.040	116	0.036	89	0.028	94
DCP 4	.150	1.854	0.174	11	0.442	73	0.240	150	0.018	73	0.116	134	0.089	216	0.012	29	0.012	191	0.007	264
DCP 5	.200	1.295	0.297	8	0.252	84	0.088	140	0.081	91	0.090	156	0.028	152	0.044	152	0.036	206	0.009	274
DCP 6	.250	1.244	0.383	11	0.173	77	0.049	62	0.071	78	0.027	101	0.066	78	0.029	93	0.043	64	0.018	113
DCP 7	.300	1.052	0.401	9	0.137	70	0.063	36	0.050	63	0.024	30	0.054	77	0.035	59	0.037	63	0.026	61
DCP 8	.400	0.767	0.323	7	0.030	54	0.026	43	0.013	283	0.009	57	0.002	40	0.018	39	0.014	342	0.010	1
DCP 9	.500	0.580	0.276	13	0.050	24	0.031	28	0.013	308	0.016	38	0.015	18	0.022	8	0.020	343	0.023	325
DCP10	.600	0.462	0.209	11	0.011	15	0.009	79	0.007	266	0.009	102	0.003	333	0.006	37	0.004	30	0.009	6
DCP11	.878	0.290	0.170	6	0.027	311	0.026	325	0.005	241	0.006	61	0.006	0	0.005	341	0.004	317	0.008	313

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.014	305	0.007	58	0.011	62	0.014	63	0.005	169	0.007	173	0.010	128	0.004	98	0.005	179
CN		0.007	5	0.002	53	0.015	45	0.014	341	0.001	100	0.001	338	0.001	143	0.002	91	0.001	49
CM		0.002	112	0.001	63	0.001	127	0.001	64	0.000	297	0.001	150	0.001	30	0.001	282	0.000	213
DCP 1	.010	0.006	303	0.006	278	0.003	98	0.004	283	0.003	118	0.003	57	0.002	15	0.001	192	0.001	175
DCP 2	.025	0.010	332	0.002	299	0.004	36	0.004	335	0.004	11	0.002	1	0.003	108	0.001	111	0.003	66
DCP 3	.100	0.038	79	0.044	72	0.041	49	0.032	14	0.022	342	0.004	344	0.018	41	0.018	354	0.011	327
DCP 4	.150	0.019	74	0.021	64	0.041	169	0.012	71	0.026	165	0.018	210	0.003	131	0.008	254	0.008	171
DCP 5	.200	0.007	325	0.011	329	0.025	19	0.014	353	0.005	21	0.003	90	0.010	124	0.003	210	0.007	157
DCP 6	.250	0.026	64	0.003	149	0.006	113	0.004	225	0.009	187	0.005	131	0.002	298	0.008	239	0.006	187
DCP 7	.300	0.028	47	0.013	71	0.018	57	0.018	62	0.009	78	0.007	61	0.003	143	0.007	138	0.006	152
DCP 8	.400	0.013	324	0.004	249	0.006	1	0.006	333	0.004	310	0.002	170	0.001	141	0.004	114	0.008	41
DCP 9	.500	0.017	302	0.010	282	0.006	281	0.005	288	0.001	216	0.005	1	0.003	298	0.001	321	0.003	202
DCP10	.600	0.010	313	0.004	245	0.004	358	0.006	258	0.003	190	0.001	8	0.005	199	0.004	103	0.004	334
DCP11	.878	0.006	277	0.003	215	0.003	320	0.003	250	0.004	81	0.006	318	0.003	195	0.004	85	0.002	63

TUNED PITCHING OSCILLATION VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
64.0	16.29	0.600	7.52	4.67		5139.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.042	640.3	712.9	0.31E 07	-0.00074	1.111	11.94	0.0340

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		7.522	4.671	0	0.292	36	0.124	171	0.050	163	0.242	40	0.072	334	0.037	309	0.020	291	0.010	352
CN		0.941	0.293	4	0.100	58	0.026	110	0.037	139	0.026	81	0.012	13	0.007	48	0.005	3	0.002	310
CM		-0.037	0.032	193	0.014	94	0.005	164	0.002	86	0.002	217	0.003	148	0.002	137	0.001	84	0.000	51
DCP 1	.010	1.913	1.391	355	0.282	52	0.106	123	0.016	181	0.056	22	0.020	338	0.009	1	0.009	282	0.002	280
DCP 2	.025	2.306	1.170	356	0.259	52	0.094	139	0.022	160	0.050	30	0.030	330	0.011	317	0.010	317	0.004	262
DCP 3	.100	2.255	0.977	325	0.480	74	0.086	147	0.063	153	0.035	93	0.051	65	0.037	93	0.034	39	0.011	60
DCP 4	.150	1.841	0.182	4	0.426	68	0.263	143	0.022	49	0.125	121	0.071	205	0.002	228	0.015	120	0.014	316
DCP 5	.200	1.265	0.290	12	0.277	72	0.058	134	0.057	97	0.103	134	0.016	85	0.043	140	0.026	188	0.023	256
DCP 6	.250	1.291	0.378	11	0.102	69	0.058	44	0.059	79	0.043	61	0.058	58	0.026	83	0.042	48	0.007	227
DCP 7	.300	1.072	0.407	11	0.140	59	0.069	23	0.026	79	0.052	57	0.051	42	0.031	46	0.036	37	0.017	43
DCP 8	.400	0.761	0.326	7	0.042	24	0.027	23	0.024	252	0.021	67	0.016	351	0.010	12	0.011	318	0.004	295
DCP 9	.500	0.572	0.289	9	0.037	359	0.025	45	0.015	321	0.028	35	0.023	339	0.022	351	0.021	299	0.008	270
DCP10	.600	0.463	0.219	9	0.027	320	0.011	112	0.011	243	0.018	76	0.009	316	0.004	58	0.007	291	0.001	140
DCP11	.878	0.308	0.175	4	0.031	302	0.010	338	0.008	234	0.009	61	0.014	328	0.009	288	0.005	208	0.001	229

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.007	312	0.005	340	0.006	327	0.004	84	0.002	65	0.003	90	0.002	1	0.004	222	0.005	274
CN		0.003	34	0.001	57	0.004	65	0.005	28	0.002	27	0.001	201	0.001	107	0.002	286	0.001	159
CM		0.000	105	0.000	35	0.001	182	0.001	133	0.001	96	0.001	36	0.000	127	0.001	56	0.001	274
DCP 1	.010	0.001	284	0.004	181	0.003	355	0.002	346	0.003	181	0.004	98	0.000	113	0.002	303	0.003	178
DCP 2	.025	0.000	339	0.001	229	0.003	312	0.001	33	0.004	43	0.003	116	0.002	96	0.004	328	0.003	92
DCP 3	.100	0.010	55	0.004	115	0.020	96	0.025	39	0.014	55	0.014	36	0.007	303	0.006	48	0.007	330
DCP 4	.150	0.013	279	0.024	76	0.036	167	0.023	80	0.027	141	0.018	165	0.009	116	0.001	248	0.012	220
DCP 5	.200	0.014	214	0.015	242	0.004	13	0.009	75	0.017	43	0.007	352	0.009	138	0.004	135	0.007	233
DCP 6	.250	0.022	94	0.006	115	0.016	101	0.005	107	0.004	71	0.006	203	0.003	112	0.007	289	0.010	215
DCP 7	.300	0.023	43	0.008	26	0.017	60	0.011	60	0.012	60	0.004	344	0.011	144	0.012	62	0.003	140
DCP 8	.400	0.005	8	0.005	324	0.006	341	0.004	301	0.004	335	0.002	208	0.004	28	0.007	290	0.002	156
DCP 9	.500	0.004	321	0.008	318	0.008	297	0.008	342	0.009	307	0.005	247	0.005	351	0.014	286	0.007	217
DCP10	.600	0.002	356	0.001	185	0.006	31	0.004	344	0.005	314	0.007	237	0.003	151	0.002	178	0.005	79
DCP11	.878	0.002	232	0.003	143	0.002	23	0.005	330	0.004	237	0.003	124	0.003	299	0.003	209	0.003	83

TUNED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
80.0	16.23	0.400	12.52	4.71		5070.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.061	441.5	371.0	0.24E 07	0.00027	1.670	15.17	0.0250

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
ALPHA		12.516	4.707 0	0.211 12	0.040 194	0.039 310	0.087 9	0.078 255	0.049 235	0.012 277	0.035 316
CN		1.146	0.198 56	0.186 41	0.034 38	0.023 326	0.020 343	0.020 275	0.021 242	0.014 177	0.006 162
CM		-0.033	0.047 180	0.021 101	0.011 79	0.008 32	0.005 29	0.005 338	0.004 337	0.006 275	0.004 199
DCP 1	.010	4.982	0.958 27	0.764 53	0.144 59	0.102 45	0.137 34	0.090 349	0.078 324	0.082 305	0.062 285
DCP 2	.025	4.524	0.450 69	0.983 89	0.348 67	0.224 55	0.299 29	0.233 348	0.194 311	0.160 273	0.132 221
DCP 3	.100	2.652	0.648 140	0.697 64	0.167 53	0.124 10	0.100 343	0.092 288	0.078 261	0.064 227	0.059 190
DCP 4	.150	1.879	0.397 128	0.368 54	0.065 59	0.083 9	0.048 343	0.056 304	0.047 262	0.040 226	0.029 179
DCP 5	.200	1.500	0.448 109	0.349 34	0.070 45	0.116 319	0.056 274	0.075 241	0.061 189	0.045 158	0.043 125
DCP 6	.250	1.478	0.328 93	0.266 30	0.044 65	0.085 324	0.025 293	0.054 277	0.045 228	0.046 194	0.032 132
DCP 7	.300	1.223	0.341 80	0.242 19	0.051 16	0.095 288	0.036 243	0.068 215	0.044 156	0.039 124	0.027 78
DCP 8	.400	1.037	0.271 56	0.167 5	0.027 345	0.059 285	0.021 260	0.032 226	0.025 210	0.042 161	0.029 68
DCP 9	.500	0.716	0.224 43	0.097 359	0.018 326	0.046 [illegible]	0.012 210	0.041 159	0.018 93	0.027 75	0.018 357
DCP10	.600	0.658	0.220 27	0.089 342	0.028 285	0.029 217	0.004 262	0.009 226	0.026 218	0.030 121	0.019 21
DCP11	.878	0.400	0.204 354	0.018 352	0.024 256	0.016 154	0.005 260	0.007 95	0.007 197	0.009 51	0.006 285

DATA TYPE	X/C	RES 10 PHI	RES 11 PHI	RES 12 PHI	RES 13 PHI	RES 14 PHI	RES 15 PHI	RES 16 PHI	RES 17 PHI	RES 18 PHI
ALPHA		0.046 305	0.037 292	0.036 308	0.029 293	0.025 305	0.033 319	0.029 318	0.023 302	0.025 336
CN		0.004 109	0.005 152	0.005 34	0.004 320	0.002 1	0.000 107	0.003 304	0.004 311	0.005 284
CM		0.003 178	0.002 128	0.002 124	0.001 58	0.001 69	0.001 35	0.001 50	0.001 322	0.001 204
DCP 1	.010	0.063 271	0.042 220	0.007 183	0.032 338	0.036 321	0.019 289	0.016 323	0.034 339	0.029 321
DCP 2	.025	0.102 183	0.095 158	0.061 111	0.024 104	0.035 93	0.045 71	0.038 23	0.038 339	0.037 261
DCP 3	.100	0.053 164	0.046 147	0.035 108	0.022 89	0.031 72	0.027 51	0.028 11	0.029 327	0.023 281
DCP 4	.150	0.009 67	0.003 208	0.005 2	0.008 336	0.006 332	0.002 222	0.005 35	0.012 334	0.007 317
DCP 5	.200	0.027 97	0.021 67	0.020 32	0.018 356	0.017 330	0.009 293	0.017 249	0.014 239	0.012 202
DCP 6	.250	0.014 58	0.008 71	0.005 5	0.013 348	0.007 300	0.003 282	0.000 304	0.004 8	0.004 326
DCP 7	.300	0.021 54	0.017 14	0.017 353	0.019 311	0.014 276	0.014 237	0.015 208	0.010 190	0.008 144
DCP 8	.400	0.016 45	0.009 318	0.012 21	0.021 331	0.010 303	0.012 273	0.010 272	0.004 255	0.003 298
DCP 9	.500	0.010 336	0.007 273	0.011 283	0.013 224	0.010 175	0.006 151	0.008 145	0.003 92	0.004 35
DCP10	.600	0.014 7	0.007 285	0.014 338	0.011 278	0.006 267	0.006 220	0.004 243	0.006 61	0.007 275
DCP11	.878	0.003 296	0.004 196	0.003 236	0.007 152	0.005 72	0.003 102	0.004 288	0.003 225	0.004 0

TUNED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
80.0	15.70	0.600	10.07	4.35		5078.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.040	654.8	723.4	0.31E 07	-0.00115	1.150	10.85	0.1010

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		10.071	4.345	0	0.156	347	0.067	198	0.049	262	0.021	324	0.065	286	0.025	6	0.043	299	0.016	327
CN		1.015	0.052	90	0.052	97	0.013	151	0.015	266	0.005	251	0.006	10	0.004	46	0.010	345	0.002	275
CM		-0.055	0.005	270	0.003	225	0.003	195	0.004	261	0.001	146	0.001	350	0.001	266	0.003	111	0.003	43
DCP 1	.010	2.612	0.934	358	0.164	78	0.039	45	0.046	274	0.011	283	0.017	221	0.002	210	0.013	86	0.013	10
DCP 2	.025	2.789	0.760	7	0.140	79	0.024	76	0.045	275	0.011	243	0.012	353	0.008	185	0.008	305	0.001	306
DCP 3	.100	2.347	0.490	183	0.108	99	0.125	189	0.096	279	0.025	257	0.038	3	0.032	356	0.023	38	0.031	34
DCP 4	.150	2.169	0.380	162	0.085	202	0.027	149	0.060	236	0.034	251	0.058	21	0.014	135	0.027	25	0.033	54
DCP 5	.200	1.633	0.189	161	0.043	171	0.011	253	0.056	274	0.008	105	0.036	74	0.006	162	0.015	65	0.017	25
DCP 6	.250	1.466	0.155	38	0.181	92	0.079	143	0.057	1	0.023	107	0.030	280	0.020	341	0.014	20	0.013	251
DCP 7	.300	1.172	0.186	33	0.179	104	0.064	186	0.052	8	0.028	211	0.022	344	0.015	46	0.024	51	0.018	49
DCP 8	.400	0.891	0.258	12.	0.062	78	0.016	33	0.014	21	0.015	36	0.012	276	0.003	225	0.015	297	0.017	243
DCP 9	.500	0.767	0.254	20	0.068	90	0.020	77	0.010	4	0.024	199	0.009	166	0.011	168	0.012	320	0.003	301
DCP10	.600	0.574	0.225	9	0.016	130	0.015	46	0.013	49	0.010	342	0.008	145	0.016	49	0.021	316	0.020	232
DCP11	.678	0.421	0.213	9	0.019	15	0.006	327	0.006	73	0.007	305	0.002	119	0.002	207	0.008	272	0.006	197

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.018	357	0.034	5	0.019	352	0.023	33	0.018	28	0.016	24	0.012	71	0.014	54	0.011	60
CN		0.004	121	0.007	32	0.003	318	0.003	30	0.003	262	0.002	28	0.003	319	0.002	278	0.002	12
CM		0.001	339	0.001	171	0.002	76	0.001	307	0.000	210	0.002	165	0.001	114	0.001	160	0.001	136
DCP 1	.010	0.025	307	0.021	203	0.016	65	0.011	6	0.013	279	0.005	179	0.002	322	0.002	79	0.004	16
DCP 2	.025	0.004	273	0.003	355	0.004	25	0.006	337	0.003	248	0.001	241	0.001	325	0.001	328	0.000	292
DCP 3	.100	0.025	70	0.029	64	0.026	78	0.031	31	0.017	246	0.018	151	0.014	86	0.009	256	0.022	115
DCP 4	.150	0.018	142	0.007	45	0.021	49	0.021	254	0.008	260	0.006	91	0.015	317	0.008	196	0.013	53
DCP 5	.200	0.016	15	0.014	76	0.011	57	0.008	17	0.011	227	0.003	53	0.001	245	0.011	196	0.012	104
DCP 6	.250	0.007	319	0.017	86	0.022	320	0.004	323	0.009	252	0.006	44	0.015	313	0.013	283	0.013	275
DCP 7	.300	0.002	3	0.011	40	0.005	337	0.011	15	0.004	296	0.007	127	0.004	5	0.011	153	0.011	59
DCP 8	.400	0.013	149	0.022	12	0.029	279	0.020	204	0.010	130	0.014	352	0.012	234	0.001	7	0.006	198
DCP 9	.500	0.008	326	0.007	319	0.001	90	0.007	348	0.008	245	0.007	136	0.006	4	0.004	96	0.005	341
DCP10	.600	0.016	143	0.003	11	0.011	176	0.015	83	0.011	343	0.002	273	0.005	22	0.009	329	0.012	293
DCP11	.678	0.003	174	0.006	3	0.008	297	0.003	261	0.003	148	0.010	347	0.007	276	0.002	320	0.004	30

TUNED PITCHING OSCILLATION VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	0.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
80.0	15.87	0.600	10.02	4.41		5378.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.041	569.6	716.8	0.315 07	-0.00104	1.175	13.34	0.0760

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
ALPHA		10.020	4.407 0	0.153 338	0.100 225	0.094 274	0.080 301	0.026 271	0.067 250	0.074 287	0.048 288
CN		1.009	0.151 20	0.055 80	0.014 156	0.019 238	0.007 226	0.008 255	0.006 213	0.009 20	0.005 251
CM		-0.055	0.048 189	0.006 216	0.005 168	0.001 263	0.001 339	0.000 351	0.001 11	0.000 196	0.001 4
DCP 1	.010	2.589	0.880 358	0.186 71	0.033 359	0.058 232	0.021 314	0.041 313	0.026 213	0.022 316	0.015 295
DCP 2	.025	2.779	0.718 0	0.170 85	0.023 56	0.038 263	0.007 243	0.032 221	0.009 187	0.003 178	0.002 214
DCP 3	.100	2.402	0.433 175	0.097 76	0.167 179	0.064 270	0.039 245	0.033 255	0.015 297	0.040 357	0.019 311
DCP 4	.150	2.087	0.436 163	0.045 200	0.053 160	0.058 222	0.042 346	0.026 341	0.003 196	0.034 80	0.011 302
DCP 5	.200	1.561	0.167 150	0.033 143	0.026 227	0.046 269	0.021 309	0.008 219	0.016 177	0.006 67	0.008 275
DCP 6	.250	1.439	0.189 35	0.163 83	0.090 158	0.054 225	0.020 180	0.033 96	0.018 246	0.013 48	0.012 234
DCP 7	.300	1.197	0.209 27	0.173 93	0.079 165	0.045 232	0.029 217	0.037 249	0.006 329	0.024 17	0.006 17
DCP 8	.400	0.906	0.267 14	0.070 65	0.029 358	0.016 221	0.019 290	0.004 89	0.014 199	0.014 21	0.010 270
DCP 9	.500	0.733	0.263 16	0.059 88	0.015 55	0.013 142	0.023 151	0.010 187	0.003 236	0.015 296	0.011 270
DCP10	.600	0.574	0.218 13	0.026 27	0.010 354	0.007 197	0.004 305	0.011 339	0.015 191	0.012 41	0.015 209
DCP11	.878	0.424	0.204 5	0.016 43	0.013 326	0.006 358	0.004 173	0.008 193	0.000 281	0.001 196	0.005 111

DATA TYPE	X/C	RES 10 PHI	RES 11 PHI	RES 12 PHI	RES 13 PHI	RES 14 PHI	RES 15 PHI	RES 16 PHI	RES 17 PHI	RES 18 PHI
ALPHA		0.045 310	0.049 317	0.041 319	0.038 323	0.042 316	0.029 326	0.029 345	0.029 339	0.021 343
CN		0.003 319	0.003 296	0.002 250	0.001 179	0.002 192	0.001 271	0.003 229	0.002 97	0.002 30
CM		0.001 153	0.001 63	0.001 36	0.001 301	0.000 69	0.001 90	0.002 27	0.000 313	0.001 328
DCP 1	.010	0.024 249	0.012 88	0.025 340	0.019 297	0.003 204	0.012 346	0.006 267	0.007 356	0.015 336
DCP 2	.025	0.003 250	0.008 156	0.002 291	0.007 258	0.009 192	0.008 142	0.007 45	0.004 347	0.004 268
DCP 3	.100	0.027 8	0.004 291	0.023 52	0.015 352	0.002 188	0.015 125	0.019 53	0.005 65	0.012 27
DCP 4	.150	0.028 162	0.029 140	0.009 198	0.015 159	0.006 134	0.010 279	0.006 255	0.005 147	0.012 51
DCP 5	.200	0.003 48	0.004 201	0.009 42	0.013 345	0.004 160	0.011 89	0.004 6	0.006 116	0.014 32
DCP 6	.250	0.014 223	0.005 89	0.002 49	0.009 106	0.003 121	0.012 64	0.014 304	0.003 251	0.012 356
DCP 7	.300	0.003 27	0.006 115	0.002 54	0.008 294	0.008 188	0.009 90	0.010 8	0.009 56	0.007 2
DCP 8	.400	0.012 310	0.009 306	0.020 287	0.016 222	0.005 144	0.013 318	0.022 232	0.014 100	0.008 308
DCP 9	.500	0.016 297	0.010 263	0.013 278	0.009 212	0.001 231	0.006 290	0.013 255	0.011 226	0.009 218
DCP10	.600	0.006 121	0.008 273	0.014 182	0.011 102	0.003 288	0.008 238	0.014 175	0.006 58	0.005 136
DCP11	.878	0.006 342	0.003 209	0.009 138	0.002 44	0.003 221	0.003 268	0.001 214	0.001 240	0.004 196

TUNED PITCHING OSCILLATION VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
80.0	15.77	0.600	10.00	4.49		5378.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.041	648.0	715.3	0.31E 07	-0.00056	1.172	13.45	0.0250

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		9.998	4.488	0	0.249	1	0.089	227	0.089	273	0.075	310	0.038	303	0.064	240	0.051	304	0.050	282
CN		0.998	0.153	18	0.051	66	0.012	158	0.017	222	0.011	218	0.004	99	0.006	257	0.002	353	0.004	289
CM		-0.055	0.049	185	0.002	180	0.004	168	0.003	262	0.001	179	0.001	354	0.002	307	0.001	114	0.001	78
DCP 1	.010	2.608	0.939	356	0.132	81	0.042	48	0.041	273	0.033	269	0.017	201	0.022	221	0.005	241	0.012	260
DCP 2	.025	2.784	0.757	358	0.173	58	0.020	1	0.055	234	0.018	187	0.009	316	0.011	192	0.005	189	0.006	77
DCP 3	.100	2.355	0.480	170	0.129	54	0.159	167	0.077	263	0.026	209	0.027	26	0.047	291	0.022	336	0.023	300
DCP 4	.150	2.081	0.406	157	0.081	211	0.058	117	0.099	230	0.037	288	0.015	85	0.025	323	0.009	147	0.040	52
DCP 5	.200	1.502	0.197	146	0.037	84	0.021	228	0.055	253	0.028	262	0.032	38	0.008	297	0.003	55	0.009	196
DCP 6	.250	1.385	0.193	38	0.176	78	0.064	149	0.040	226	0.036	172	0.037	139	0.034	289	0.038	132	0.001	46
DCP 7	.300	1.169	0.197	27	0.193	76	0.058	165	0.050	204	0.034	183	0.015	279	0.027	286	0.016	319	0.002	339
DCP 8	.400	0.897	0.263	12	0.056	57	0.020	315	0.023	82	0.014	244	0.015	128	0.014	205	0.012	66	0.009	258
DCP 9	.500	0.716	0.262	12	0.071	67	0.019	358	0.023	138	0.018	114	0.006	54	0.005	175	0.011	228	0.003	308
DCP10	.600	0.577	0.228	10	0.016	282	0.012	284	0.013	126	0.006	358	0.006	215	0.010	175	0.014	11	0.016	261
DCP11	.878	0.428	0.210	1	0.017	20	0.013	339	0.006	336	0.007	277	0.004	151	0.010	102	0.007	234	0.001	313

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.052	279	0.054	291	0.041	283	0.045	283	0.046	276	0.038	273	0.039	279	0.036	291	0.035	294
CN		0.003	330	0.003	10	0.004	317	0.003	285	0.001	330	0.001	3	0.001	79	0.001	231	0.001	215
CM		0.001	71	0.001	30	0.001	69	0.001	114	0.001	76	0.001	358	0.001	279	0.000	292	0.001	158
DCP 1	.010	0.006	276	0.006	17	0.021	330	0.023	269	0.016	206	0.005	5	0.011	325	0.017	278	0.014	213
DCP 2	.025	0.007	25	0.007	226	0.002	193	0.013	238	0.004	94	0.004	37	0.001	211	0.002	293	0.008	124
DCP 3	.100	0.030	2	0.017	354	0.031	345	0.019	273	0.015	96	0.020	348	0.005	247	0.011	314	0.021	181
DCP 4	.150	0.009	88	0.027	56	0.012	113	0.020	92	0.008	95	0.015	124	0.006	52	0.015	151	0.015	164
DCP 5	.200	0.014	47	0.013	324	0.011	337	0.017	279	0.012	109	0.014	5	0.004	265	0.011	286	0.013	177
DCP 6	.250	0.006	98	0.011	33	0.013	317	0.014	45	0.015	324	0.012	63	0.011	332	0.005	110	0.004	179
DCP 7	.300	0.014	42	0.008	31	0.005	291	0.009	167	0.007	96	0.005	5	0.004	225	0.007	344	0.006	175
DCP 8	.400	0.009	307	0.005	310	0.013	277	0.006	242	0.004	222	0.004	309	0.003	61	0.006	339	0.009	296
DCP 9	.500	0.009	244	0.007	284	0.006	233	0.012	222	0.007	340	0.009	233	0.004	116	0.007	198	0.008	65
DCP10	.600	0.012	221	0.006	106	0.009	11	0.014	312	0.013	248	0.007	235	0.004	86	0.002	25	0.009	330
DCP11	.878	0.005	322	0.004	242	0.005	227	0.012	215	0.002	214	0.006	112	0.003	104	0.002	137	0.001	220

TUNED PITCHING OSCILLATION VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	0.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
95.0	15.67	0.600	0.11	5.22		5065.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.060	438.3	379.0	0.24E 07	-0.00042	0.566	5.06	0.0220

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
ALPHA		0.109	5.025 0	0.333 1	0.059 319	0.081 322	0.046 329	0.035 298	0.020 320	0.029 337	0.036 310
CN		0.089	0.456 354	0.055 25	0.034 267	0.012 274	0.008 332	0.018 299	0.010 280	0.006 31	0.008 26
CM		-0.032	0.015 195	0.003 277	0.000 127	0.003 260	0.001 272	0.002 325	0.003 353	0.003 286	0.003 152
DCP 1	.010	-1.342	0.682 346	0.277 18	0.123 258	0.147 282	0.065 2	0.239 291	0.124 306	0.061 5	0.086 104
DCP 2	.100	0.450	1.677 351	0.253 37	0.112 115	0.153 222	0.053 290	0.013 14	0.024 219	0.040 288	0.038 364
DCP 3	.150	0.419	0.971 350	0.111 5	0.021 36	0.023 181	0.017 230	0.029 312	0.024 325	0.008 25	0.004 97
DCP 4	.200	0.296	0.789 354	0.052 19	0.012 323	0.020 332	0.011 317	0.016 331	0.013 347	0.014 33	0.009 20
DCP 5	.250	0.291	0.711 353	0.046 347	0.028 311	0.013 316	0.008 16	0.010 355	0.009 296	0.003 284	0.004 317
DCP 6	.300	0.209	0.575 355	0.037 25	0.025 322	0.024 344	0.008 359	0.003 319	0.005 337	0.006 13	0.004 1
DCP 7	.400	0.174	0.463 355	0.048 359	0.020 331	0.016 275	0.002 37	0.012 346	0.006 304	0.001 281	0.002 265
DCP 8	.500	0.064	0.326 357	0.036 46	0.011 310	0.014 334	0.006 14	0.002 186	0.004 313	0.005 2	0.007 7
DCP 9	.600	0.076	0.259 358	0.043 2	0.008 298	0.017 225	0.001 278	0.009 0	0.007 313	0.006 162	0.003 268
DCP10	.878	0.105	0.000 1	0.038 73	0.000 162	0.009 80	0.006 24	0.015 241	0.021 193	0.022 87	0.021 5

DATA TYPE	X/C	RES 10 PHI	RES 11 PHI	RES 12 PHI	RES 13 PHI	RES 14 PHI	RES 15 PHI	RES 16 PHI	RES 17 PHI	RES 18 PHI
ALPHA		0.024 296	0.022 320	0.017 331	0.018 295	0.021 256	0.015 279	0.022 296	0.016 268	0.020 270
CN		0.021 359	0.004 277	0.011 358	0.015 294	0.006 332	0.002 256	0.012 29	0.008 283	0.007 92
CM		0.007 23	0.003 291	0.001 106	0.003 64	0.004 281	0.002 70	0.005 31	0.002 297	0.002 51
DCP 1	.010	0.447 11	0.086 300	0.134 14	0.054 47	0.188 324	0.056 55	0.298 35	0.134 287	0.146 76
DCP 2	.100	0.012 20	0.012 223	0.014 318	0.011 31	0.018 127	0.018 235	0.015 302	0.003 235	0.013 193
DCP 3	.150	0.011 221	0.012 251	0.010 288	0.012 327	0.002 347	0.006 182	0.005 210	0.009 278	0.001 311
DCP 4	.200	0.009 298	0.009 235	0.008 30	0.011 275	0.006 35	0.004 302	0.001 247	0.005 253	0.004 57
DCP 5	.250	0.006 272	0.007 292	0.005 282	0.005 298	0.002 282	0.002 247	0.002 276	0.006 270	0.001 293
DCP 6	.300	0.005 261	0.006 274	0.002 231	0.005 281	0.003 70	0.003 215	0.006 290	0.003 345	0.003 58
DCP 7	.400	0.003 251	0.006 260	0.001 199	0.005 288	0.006 272	0.003 244	0.001 221	0.005 277	0.001 297
DCP 8	.500	0.002 318	0.007 274	0.002 8	0.007 302	0.006 83	0.005 219	0.002 256	0.003 324	0.002 158
DCP 9	.600	0.003 282	0.006 360	0.002 271	0.006 230	0.006 251	0.003 259	0.001 277	0.003 83	0.002 296
DCP10	.878	0.018 237	0.017 114	0.016 351	0.019 268	0.022 80	0.019 258	0.012 293	0.006 219	0.006 196

TUNED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
9E.0	16.13	0.400	12.52	4.83		5041.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.061	440.2	364.6	0.24E 07	-0.00017	1.641	15.60	0.0220

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
ALPHA		12.516	4.835 C	0.428 13	0.075 355	0.082 349	0.076 346	0.181 350	0.051 252	0.021 266	0.030 321
CN		1.206	0.184 90	0.097 34	0.036 49	0.042 344	0.022 13	0.021 306	0.026 239	0.004 273	0.013 173
CM		-C.C3C	0.005 270	0.013 97	0.009 126	0.007 44	0.006 57	0.003 11	0.002 300	0.004 273	0.002 197
DCP 1	.010	6.C76	C.915 34	0.164 12	0.182 356	0.298 302	0.187 72	0.056 2C7	0.192 199	0.074 312	0.189 153
DCP 2	.100	2.581	0.613 150	0.528 79	0.207 110	0.235 65	0.154 34	0.144 7	0.109 322	0.064 316	0.049 303
DCP 3	.150	1.836	0.413 130	0.299 52	0.097 116	0.151 40	0.068 346	0.059 350	0.070 283	0.031 236	0.023 250
DCP 4	.200	1.451	0.427 117	0.289 45	0.118 88	0.150 14	0.069 349	0.099 320	0.065 263	0.026 243	0.034 237
DCP 5	.250	1.436	C.329 95	0.193 25	0.074 87	0.105 1	0.034 324	0.059 309	0.051 249	0.024 242	0.029 223
DCP 6	.300	1.240	0.327 86	0.181 29	0.099 63	0.098 341	0.062 341	0.084 290	0.051 246	0.042 220	0.024 193
DCP 7	.400	1.01E	C.298 57	0.131 349	0.049 32	0.075 308	0.017 278	0.036 251	0.035 209	0.018 177	0.022 156
DCP 8	.500	0.686	0.230 46	0.054 347	0.039 10	0.038 258	0.011 288	0.024 223	0.027 201	0.032 128	0.021 100
DCP 9	.600	0.647	0.244 33	0.080 310	0.027 344	0.041 266	0.015 198	0.020 188	0.015 187	0.013 87	0.009 104
DCP 10	.878	C.499	0.214 357	0.014 222	0.047 302	0.015 191	0.012 266	0.005 54	0.004 93	0.018 47	0.004 326

DATA TYPE	X/C	RES 10 PHI	RES 11 PHI	RES 12 PHI	RES 13 PHI	RES 14 PHI	RES 15 PHI	RES 16 PHI	RES 17 PHI	RES 18 PHI
ALPHA		0.027 331	0.024 327	0.028 313	0.027 320	0.014 320	0.021 294	0.023 319	0.012 300	0.013 287
CN		0.005 222	0.015 285	0.004 79	0.005 60	0.006 235	0.008 325	0.005 218	0.009 216	0.013 253
CM		0.003 253	0.002 903	0.003 40	0.006 126	0.004 238	0.001 9	0.003 93	0.002 6	0.004 294
DCP 1	.010	C.C95 272	0.227 301	0.153 31	0.196 111	0.180 238	0.143 334	0.061 163	0.064 239	0.274 265
DCP 2	.100	0.027 263	0.034 283	0.026 246	0.020 279	0.025 270	0.035 222	0.020 207	0.033 202	0.021 152
DCP 3	.150	C.025 208	0.017 215	0.026 174	0.011 106	0.003 123	0.010 123	0.008 83	0.009 35	0.013 346
DCP 4	.200	0.028 211	0.022 201	0.027 158	0.002 6	0.010 191	0.018 152	0.014 119	0.007 83	0.007 51
DCP 5	.250	C.025 196	0.022 173	0.022 133	0.009 82	0.009 108	0.009 95	0.014 68	0.012 13	0.011 353
DCP 6	.300	0.030 173	0.021 159	0.026 135	0.016 77	0.012 114	0.018 92	0.017 66	0.013 38	0.020 4
DCP 7	.400	0.017 113	0.009 112	0.018 72	0.010 348	0.003 36	0.008 340	0.006 345	0.008 284	0.001 75
DCP 8	.500	0.020 58	0.012 27	0.013 15	0.012 325	0.004 11	0.012 338	0.013 277	0.009 243	0.011 217
DCP 9	.600	0.012 35	0.012 299	0.035 349	0.007 228	0.004 72	0.008 3	0.014 294	0.013 208	0.010 134
DCP 10	.878	0.002 95	0.008 268	0.021 222	0.028 319	0.010 52	0.008 255	0.015 227	0.015 188	0.010 185

TUNED PITCHING OSCILLATION VERTOL 23010-1.58 AIRFOIL

TUNED FRS	AIRFOIL FRS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
96.0	16.58	0.600	16.85	6.85		5142.1	10

K	V	Q	RV	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.063	430.8	373.3	3.26E-07	-0.00105	1.624	16.60	0.0227

HARMONIC ANALYSIS

DATA TYPE	Y/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
ALPHA		16.364	4.859 0	0.441 4	0.068 351	0.051 321	0.066 326	0.121 61	0.071 25	0.051 328	0.052 322
CN		1.151	0.267 102	0.045 33	0.024 87	0.041 41	0.029 57	0.014 23	0.024 76	0.014 13	0.023 341
CM		-0.049	0.050 102	0.015 103	0.007 152	0.010 156	0.002 143	0.003 143	0.004 175	0.004 133	0.001 108
DCP 1	.010	4.089	0.601 97	0.139 85	0.134 290	0.220 52	0.095 334	0.178 295	0.081 134	0.088 332	0.079 307
DCP 2	.100	2.459	1.139 157	0.213 125	0.248 152	0.158 131	0.114 150	0.127 121	0.130 110	0.089 110	0.076 99
DCP 3	.150	1.762	0.729 132	0.054 132	0.153 108	0.170 154	0.048 99	0.056 116	0.044 81	0.038 98	0.030 66
DCP 4	.200	1.423	0.587 132	0.078 166	0.157 115	0.170 117	0.050 130	0.061 95	0.062 96	0.043 59	0.042 53
DCP 5	.250	1.209	0.517 130	0.050 153	0.116 50	0.176 108	0.020 16	0.041 55	0.036 56	0.028 35	0.041 24
DCP 6	.300	1.213	0.386 107	0.059 125	0.090 74	0.152 87	0.027 56	0.047 52	0.036 68	0.031 31	0.024 22
DCP 7	.400	1.045	0.358 81	0.042 67	0.068 16	0.175 67	0.019 338	0.045 8	0.033 37	0.027 327	0.036 359
DCP 8	.500	0.734	0.226 59	0.052 73	0.060 12	0.153 34	0.013 14	0.033 351	0.032 28	0.026 335	0.028 330
DCP 9	.600	0.695	0.235 51	0.059 38	0.035 326	0.116 12	0.027 313	0.027 310	0.016 16	0.015 323	0.019 296
DCP10	.878	0.498	0.179 7	0.072 15	0.017 276	0.134 325	0.009 6	0.038 259	0.010 24	0.011 319	0.009 298

DATA TYPE	Y/C	RES 10 PHI	RES 11 PHI	RES 12 PHI	RES 13 PHI	RES 14 PHI	RES 15 PHI	RES 16 PHI	RES 17 PHI	RES 18 PHI
ALPHA		0.036 316	0.032 329	0.026 330	0.023 328	0.025 326	0.023 313	0.023 315	0.018 317	0.018 299
CN		0.005 20	0.010 7	0.009 8	0.009 8	0.005 1	0.014 295	0.008 226	0.010 53	0.011 279
CM		0.006 130	0.004 27	0.002 63	0.002 150	0.003 62	0.001 233	0.002 92	0.000 331	0.002 298
DCP 1	.010	0.150 96	0.108 356	0.003 10	0.027 340	0.002 25	0.139 295	0.106 201	0.120 29	0.267 274
DCP 2	.100	0.065 126	0.070 111	0.067 137	0.051 109	0.036 101	0.062 134	0.036 117	0.062 126	0.063 113
DCP 3	.150	0.016 61	0.010 18	0.013 50	0.006 8	0.008 85	0.007 236	0.006 47	0.005 162	0.012 61
DCP 4	.200	0.026 58	0.027 61	0.026 54	0.023 60	0.021 51	0.020 27	0.021 14	0.018 58	0.016 57
DCP 5	.250	0.029 326	0.023 358	0.015 327	0.019 349	0.009 347	0.015 322	0.008 317	0.002 336	0.008 29
DCP 6	.300	0.018 9	0.020 18	0.016 16	0.021 13	0.016 16	0.016 9	0.010 349	0.010 12	0.011 6
DCP 7	.400	0.027 311	0.015 295	0.022 330	0.021 319	0.013 285	0.021 306	0.016 276	0.009 297	0.008 289
DCP 8	.500	0.023 303	0.012 310	0.013 319	0.013 332	0.017 290	0.013 325	0.017 279	0.007 333	0.009 273
DCP 9	.600	0.010 292	0.007 233	0.011 276	0.007 306	0.010 230	0.007 299	0.011 237	0.006 110	0.005 158
DCP10	.878	0.011 249	0.011 199	0.005 130	0.007 21	0.007 247	0.006 296	0.009 205	0.012 57	0.007 295

TUNED PITCHING OSCILLATION VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
96.0	16.65	0.600	17.35	4.83		5343.1	12

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.063	439.6	365.6	2.24E 07	-0.03215	1.554	15.86	0.0220

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
ALPHA		17.365	4.829 0	0.342 350	0.061 316	0.072 293	0.066 368	0.072 13	0.072 273	0.049 262	0.044 275
CN		1.210	0.265 99	0.052 137	0.036 157	0.046 172	0.021 169	0.019 165	0.021 236	0.016 314	0.013 290
CM		-0.061	0.065 199	0.023 227	0.013 224	0.011 242	0.013 235	0.006 233	0.003 267	0.004 365	0.003 27
DCP 1	.010	5.603	0.507 72	0.163 89	0.611 208	0.173 148	0.064 93	0.161 214	0.171 243	0.323 343	0.117 29
DCP 2	.100	2.273	1.165 152	0.357 229	0.151 186	0.164 217	0.063 262	0.089 256	0.077 291	0.075 311	0.081 326
DCP 3	.150	1.682	0.690 130	0.252 197	0.030 295	0.098 141	0.072 202	0.034 172	0.037 237	0.027 246	0.026 280
DCP 4	.200	1.417	0.601 119	0.268 187	0.078 163	0.121 146	0.066 173	0.062 177	0.061 230	0.034 230	0.048 259
DCP 5	.250	1.423	0.686 106	0.197 155	0.029 174	0.086 116	0.078 154	0.050 172	0.026 212	0.039 230	0.036 254
DCP 6	.300	1.255	0.606 98	0.156 156	0.059 159	0.032 126	0.074 167	0.059 159	0.047 192	0.032 210	0.035 241
DCP 7	.400	1.105	0.393 91	0.141 105	0.038 112	0.070 95	0.042 113	0.066 129	0.019 187	0.023 158	0.028 221
DCP 8	.500	0.799	0.222 61	0.059 87	0.029 135	0.051 94	0.035 82	0.041 104	0.022 133	0.024 146	0.011 197
DCP 9	.600	0.762	0.205 50	0.112 68	0.037 76	0.055 76	0.024 70	0.036 73	0.008 77	0.014 90	0.010 258
DCP10	.878	0.579	0.169 26	0.095 14	0.033 45	0.032 56	0.008 335	0.016 329	0.009 271	0.020 297	0.002 393

DATA TYPE	X/C	RES 10 PHI	RES 11 PHI	RES 12 PHI	RES 13 PHI	RES 14 PHI	RES 15 PHI	RES 16 PHI	RES 17 PHI	RES 18 PHI
ALPHA		0.028 274	0.022 280	0.023 295	0.020 276	0.016 286	0.025 282	0.016 276	0.018 253	0.018 257
CN		0.020 236	0.010 130	0.013 369	0.013 261	0.018 136	0.013 146	0.028 299	0.009 328	0.003 171
CM		0.003 336	0.001 300	0.004 369	0.003 338	0.004 104	0.004 145	0.001 305	0.003 335	0.004 213
DCP 1	.010	0.102 260	0.258 174	0.198 359	0.065 273	0.317 119	0.269 136	0.156 320	0.224 341	0.102 229
DCP 2	.100	0.060 327	0.061 10	0.043 15	0.032 144	0.017 144	0.020 175	0.029 195	0.028 216	0.038 234
DCP 3	.150	0.046 254	0.008 239	0.011 331	0.023 292	0.005 258	0.003 304	0.008 262	0.003 50	0.008 117
DCP 4	.200	0.033 264	0.010 310	0.023 322	0.026 281	0.010 24	0.003 7	0.018 139	0.020 120	0.022 118
DCP 5	.250	0.053 236	0.025 231	0.014 282	0.027 272	0.013 253	0.011 312	0.011 272	0.007 317	0.011 83
DCP 6	.300	0.038 225	0.025 254	0.019 295	0.023 250	0.016 263	0.036 199	0.009 49	0.010 65	0.007 58
DCP 7	.400	0.036 205	0.030 177	0.018 254	0.028 230	0.016 195	0.015 229	0.005 285	0.009 264	0.002 72
DCP 8	.500	0.028 158	0.021 145	0.013 230	0.018 202	0.016 191	0.010 232	0.011 195	0.006 199	0.005 96
DCP 9	.600	0.014 184	0.021 117	0.017 198	0.010 227	0.010 91	0.014 179	0.006 263	0.013 254	0.011 63
DCP10	.878	0.006 195	0.015 31	0.006 114	0.012 135	0.005 228	0.015 13	0.005 29	0.009 80	0.014 11

TUNED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
56.0	15.87	0.400	19.86	4.87		5044.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.060	438.9	371.0	0.24E 07	-0.00259	1.221	22.65	0.0220

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		19.856	4.871	0	0.407	9	0.083	345	0.040	284	0.070	302	0.043	289	0.154	32	0.042	355	0.048	0
CN		1.088	0.115	90	0.014	268	0.029	280	0.023	44	0.007	192	0.009	293	0.003	314	0.002	182	0.007	352
CM		-0.109	0.021	270	0.008	245	0.007	78	0.002	204	0.003	7	0.004	94	0.003	243	0.004	7	0.004	347
DCP 1	.010	4.215	0.267	59	0.149	10	0.096	247	0.097	55	0.025	134	0.087	37	0.055	279	0.022	79	0.241	342
DCP 2	.100	1.690	0.191	154	0.100	299	0.104	32	0.050	104	0.026	19	0.026	154	0.052	238	0.044	348	0.006	192
DCP 3	.150	1.293	0.143	71	0.083	272	0.037	293	0.029	331	0.016	267	0.015	284	0.021	62	0.019	163	0.021	130
DCP 4	.200	1.127	0.167	57	0.017	112	0.035	322	0.032	71	0.008	235	0.012	330	0.013	208	0.018	312	0.014	253
DCP 5	.250	1.222	0.152	58	0.056	277	0.032	257	0.032	343	0.011	214	0.019	256	0.017	42	0.011	120	0.023	113
DCP 6	.300	1.132	0.159	60	0.028	112	0.034	307	0.036	61	0.014	269	0.020	320	0.014	192	0.008	295	0.023	261
DCP 7	.400	1.078	0.138	63	0.061	270	0.045	267	0.034	1	0.011	167	0.029	224	0.016	348	0.007	76	0.029	99
DCP 8	.500	0.851	0.134	71	0.030	131	0.035	289	0.031	73	0.023	226	0.034	327	0.015	118	0.010	312	0.023	242
DCP 9	.600	0.823	0.127	66	0.039	257	0.047	250	0.028	3	0.010	150	0.020	223	0.017	338	0.005	150	0.029	83
DCP 10	.878	0.719	0.102	80	0.047	139	0.026	268	0.012	80	0.014	183	0.018	311	0.015	85	0.024	186	0.016	241

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.041	320	0.037	322	0.023	308	0.026	315	0.023	287	0.028	294	0.025	293	0.026	269	0.022	279
CN		0.007	84	0.011	78	0.012	201	0.003	84	0.007	123	0.008	273	0.003	69	0.003	159	0.002	278
CM		0.001	297	0.001	70	0.004	216	0.000	329	0.004	333	0.002	144	0.002	113	0.001	199	0.002	164
DCP 1	.010	0.112	32	0.171	79	0.247	214	0.056	58	0.096	43	0.077	242	0.055	59	0.099	173	0.050	241
DCP 2	.100	0.020	177	0.022	269	0.022	99	0.022	199	0.008	191	0.014	152	0.013	182	0.014	294	0.004	170
DCP 3	.150	0.011	116	0.008	66	0.001	318	0.011	348	0.010	203	0.014	325	0.001	234	0.014	62	0.012	98
DCP 4	.200	0.025	202	0.010	240	0.015	83	0.014	146	0.011	218	0.006	297	0.006	173	0.006	181	0.003	224
DCP 5	.250	0.015	104	0.007	101	0.003	236	0.008	318	0.009	223	0.009	331	0.009	108	0.014	56	0.007	76
DCP 6	.300	0.017	198	0.003	241	0.005	120	0.011	165	0.010	202	0.007	223	0.000	293	0.003	201	0.008	14
DCP 7	.400	0.009	82	0.011	86	0.013	265	0.002	346	0.004	282	0.003	348	0.013	107	0.010	359	0.003	138
DCP 8	.500	0.009	176	0.010	155	0.008	62	0.004	168	0.018	143	0.002	7	0.006	268	0.006	172	0.001	138
DCP 9	.600	0.002	81	0.016	39	0.021	195	0.008	322	0.005	161	0.008	318	0.012	92	0.017	331	0.002	130
DCP 10	.878	0.014	72	0.004	148	0.016	33	0.007	103	0.021	131	0.012	285	0.015	298	0.011	131	0.013	319

TUNED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
94.0	16.08	0.620	24.76	6.91		5145.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.341	649.2	368.2	3.26E 07	-0.00160	1.356	27.52	0.2220

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
ALPHA		24.760	6.913 0	0.324 0	0.061 277	0.080 303	0.063 328	0.017 287	0.017 23	0.029 315	0.018 297
CN		1.159	0.162 30	0.018 56	0.026 10	0.026 92	0.035 216	0.032 353	0.013 93	0.003 221	0.016 198
CM		-0.135	0.019 224	0.005 141	0.009 214	0.006 262	0.003 356	0.001 136	0.002 1	0.003 333	0.001 208
DCP 1	.010	3.613	0.351 19	0.160 105	0.171 259	0.075 130	0.136 338	0.065 105	0.165 51	0.171 313	0.086 197
DCP 2	.100	1.676	0.191 30	0.072 33	0.030 66	0.026 66	0.016 130	0.035 268	0.015 140	0.016 135	0.019 132
DCP 3	.1	1.435	0.156 20	0.026 17	0.022 58	0.035 123	0.020 159	0.005 309	0.016 162	0.022 157	0.006 316
DCP 4	.2	1.327	0.100 22	0.038 87	0.011 15	0.016 77	0.012 187	0.006 250	0.011 155	0.011 150	0.006 176
DCP 5	.250	1.414	0.178 24	0.029 355	0.033 67	0.035 119	0.016 101	0.011 332	0.017 141	0.013 160	0.005 292
DCP 6	.300	1.301	0.185 26	0.035 92	0.027 27	0.027 68	0.009 170	0.002 222	0.013 141	0.010 113	0.007 111
DCP 7	.400	1.223	0.170 30	0.029 326	0.044 27	0.034 113	0.010 170	0.012 317	0.011 123	0.016 130	0.007 310
DCP 8	.500	0.971	0.150 33	0.027 83	0.034 10	0.032 63	0.010 30	0.007 77	0.010 125	0.008 123	0.006 27
DCP 9	.600	0.975	0.121 40	0.036 310	0.056 22	0.030 96	0.015 186	0.011 303	0.007 161	0.015 136	0.005 15
DCP10	.878	0.755	0.087 62	0.009 30	0.019 28	0.010 74	0.006 216	0.006 106	0.008 102	0.010 236	0.006 173

DATA TYPE	X/C	RES 10 PHI	RES 11 PHI	RES 12 PHI	RES 13 PHI	RES 14 PHI	RES 15 PHI	RES 16 PHI	RES 17 PHI	RES 18 PHI
ALPHA		0.028 224	0.020 270	0.035 287	0.025 276	0.020 278	0.022 252	0.021 226	0.027 253	0.019 235
CN		0.013 157	0.010 156	0.025 359	0.018 85	0.007 132	0.005 290	0.013 306	0.005 156	0.009 238
CM		0.006 210	0.002 93	0.003 175	0.001 77	0.002 215	0.002 309	0.002 132	0.001 265	0.003 186
DCP 1	.010	0.248 196	0.172 138	0.120 213	0.074 82	0.033 135	0.151 202	0.083 306	0.033 155	0.214 227
DCP 2	.100	0.212 179	0.038 325	0.026 62	0.016 142	0.013 136	0.015 141	0.018 209	0.010 250	0.027 111
DCP 3	.150	0.023 87	0.012 189	0.010 74	0.016 112	0.005 95	0.016 82	0.006 196	0.006 264	0.016 68
DCP 4	.200	0.025 268	0.008 208	0.009 25	0.009 105	0.010 88	0.006 153	0.008 209	0.010 216	0.003 88
DCP 5	.250	0.020 96	0.006 150	0.007 81	0.013 113	0.012 102	0.015 75	0.003 133	0.007 258	0.011 61
DCP 6	.300	0.007 87	0.006 318	0.012 61	0.013 85	0.010 77	0.007 106	0.005 162	0.008 183	0.009 109
DCP 7	.400	0.018 105	0.006 175	0.016 67	0.016 82	0.010 105	0.010 67	0.010 63	0.013 185	0.015 316
DCP 8	.500	0.015 65	0.006 307	0.018 350	0.016 32	0.012 56	0.006 3	0.011 353	0.012 126	0.015 55
DCP 9	.600	0.017 35	0.006 277	0.018 7	0.017 53	0.009 193	0.005 328	0.015 346	0.008 118	0.006 313
DCP10	.878	0.005 331	0.010 179	0.010 230	0.009 188	0.003 341	0.009 196	0.021 286	0.005 59	0.012 316

TUNED PITCHING OSCILLATION VERTOL 23010-1.58 AIRFOIL

TUNED FRS	AIRFOIL FRS	MACH NO	ALPHA,0	0.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
94.0	14.58	0.600	12.51	4.59		5355.1	10

K	V	Q	PN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.038	668.9	731.6	0.325 07	-0.00027	1.133	14.69	0.2229

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
ALPHA		12.511	4.592 0	0.230 358	0.048 253	0.049 262	0.033 310	0.048 297	0.047 302	0.168 362	0.057 248
CN		1.029	0.086 50	0.021 52	0.012 29	0.319 347	0.338 268	0.336 176	0.006 2	0.019 69	0.321 237
CM		-0.080	0.047 182	0.010 238	0.002 78	0.331 42	0.002 350	0.001 58	0.001 93	0.007 131	0.003 112
DCP 1	.010	2.077	0.566 31	0.100 20	0.247 82	0.223 12	0.086 321	0.061 66	0.001 93	0.271 117	0.268 157
DCP 2	.100	2.135	0.620 172	0.155 258	0.051 310	0.241 298	0.103 123	0.139 129	0.018 323	0.136 56	0.128 257
DCP 3	.150	1.759	0.312 150	0.063 154	0.047 340	0.096 275	0.018 312	0.136 238	0.010 355	0.026 51	0.031 262
DCP 4	.200	1.330	0.102 150	0.036 217	0.065 307	0.120 342	0.004 224	0.103 331	0.018 326	0.032 31	0.127 251
DCP 5	.250	1.411	0.162 136	0.025 159	0.0 316	0.110 309	0.014 253	0.011 211	0.013 317	0.045 29	0.023 223
DCP 6	.300	1.275	0.097 128	0.064 100	0.037 295	0.123 336	0.013 262	0.101 196	0.022 305	0.033 10	0.017 255
DCP 7	.600	1.000	0.160 26	0.057 65	0.027 134	0.112 0	0.020 222	0.015 144	0.005 338	0.028 350	0.017 250
DCP 8	.500	0.766	0.159 26	0.067 57	0.028 93	0.117 320	0.010 239	0.003 176	0.014 220	0.025 350	0.011 214
DCP 9	.600	0.669	0.216 11	0.036 68	0.026 35	0.098 347	0.013 211	0.011 139	0.005 358	0.023 0	0.019 226
DCP10	.878	0.541	0.193 3	0.037 63	0.023 8	0.096 342	0.005 50	0.007 293	0.001 311	0.017 296	0.010 260

DATA TYPE	X/C	RES 10 PHI	RES 11 PHI	RES 12 PHI	RES 13 PHI	RES 14 PHI	RES 15 PHI	RES 16 PHI	RES 17 PHI	RES 18 PHI
ALPHA		0.028 260	0.020 311	0.021 336	0.016 305	0.022 302	0.018 339	0.020 296	0.018 291	0.018 307
CN		0.013 177	0.005 233	0.003 131	0.334 24	0.004 17	0.012 69	0.007 255	0.008 335	0.007 62
CM		0.002 239	0.002 226	0.003 262	0.332 111	0.002 7	0.003 77	0.001 246	0.002 328	0.003 65
DCP 1	.010	0.175 175	0.121 245	0.084 223	0.096 99	0.077 43	0.214 68	0.118 232	0.183 330	0.156 71
DCP 2	.100	0.023 285	0.025 130	0.334 32	0.330 338	0.020 349	0.312 15	0.009 32	0.017 58	0.019 76
DCP 3	.150	0.006 296	0.005 186	0.013 268	0.313 219	0.003 332	0.011 179	0.010 57	0.006 267	0.003 76
DCP 4	.200	0.015 260	0.008 117	0.006 150	0.312 21	0.015 318	0.333 56	0.010 318	0.006 333	0.010 344
DCP 5	.250	0.005 215	0.006 86	0.005 164	0.335 237	0.002 331	0.009 135	0.013 317	0.009 121	0.008 321
DCP 6	.300	0.014 189	0.003 82	0.007 52	0.310 355	0.007 333	0.333 170	0.012 330	0.001 250	0.003 346
DCP 7	.400	0.008 209	0.005 92	0.006 65	0.334 23	0.012 314	0.337 141	0.005 359	0.006 251	0.003 320
DCP 8	.500	0.011 123	0.009 14	0.007 76	0.334 265	0.006 209	0.334 138	0.006 259	0.007 211	0.337 244
DCP 9	.600	0.010 125	0.007 65	0.011 67	0.310 335	0.006 150	0.336 23	0.006 249	0.005 113	0.036 287
DCP10	.878	0.006 139	0.002 279	0.008 76	0.336 280	0.005 134	0.336 237	0.336 137	0.334 25	0.007 295

TUNED PITCHING OSCILLATION VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
80.0	15.60	0.400	12.55	7.09		5085.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.058	446.4	379.2	0.24E 07	-0.00071	1.700	16.71	0.0

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		12.551	7.086	0	0.481	27	0.078	134	0.044	125	0.023	305	0.092	330	0.110	231	0.068	175	0.026	125
CN		1.017	0.280	27	0.239	52	0.053	42	0.053	354	0.017	305	0.033	332	0.039	255	0.032	197	0.017	142
CM		-0.038	0.054	195	0.032	96	0.010	88	0.016	59	0.008	3	0.007	17	0.010	333	0.008	290	0.006	248
DCP 1	.010	3.963	1.675	4	1.131	65	0.272	62	0.203	48	0.102	55	0.219	30	0.152	338	0.082	318	0.084	323
DCP 2	.025	3.366	0.698	356	1.389	78	0.485	57	0.347	37	0.237	29	0.351	358	0.291	308	0.192	268	0.127	253
DCP 3	.100	2.177	0.193	114	0.866	71	0.188	60	0.222	39	0.138	345	0.116	339	0.151	292	0.119	235	0.062	206
DCP 4	.150	1.968	0.244	77	0.546	58	0.078	53	0.174	32	0.101	315	0.040	323	0.081	276	0.077	213	0.037	169
DCP 5	.200	1.770	0.281	66	0.466	48	0.061	42	0.141	9	0.085	289	0.055	318	0.096	254	0.078	192	0.047	162
DCP 6	.250	1.508	0.336	51	0.362	43	0.055	50	0.126	357	0.077	271	0.030	316	0.078	243	0.061	184	0.043	156
DCP 7	.300	1.001	0.336	45	0.303	36	0.044	15	0.102	335	0.062	250	0.036	296	0.072	229	0.061	176	0.048	136
DCP 8	.400	0.872	0.373	34	0.206	21	0.033	27	0.085	316	0.040	236	0.030	287	0.057	211	0.040	176	0.049	137
DCP 9	.500	0.744	0.319	27	0.127	9	0.025	334	0.063	276	0.037	178	0.015	270	0.033	181	0.032	150	0.039	93
DCP10	.600	0.572	0.318	22	0.098	348	0.013	358	0.053	275	0.023	188	0.015	247	0.031	181	0.028	147	0.031	83
DCP11	.878	0.363	0.254	2	0.043	263	0.029	301	0.040	217	0.011	133	0.008	212	0.016	163	0.020	104	0.014	10

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.006	85	0.010	286	0.010	220	0.011	234	0.007	235	0.002	230	0.012	213	0.009	248	0.009	232
CN		0.007	118	0.009	66	0.003	56	0.003	100	0.004	1	0.002	231	0.002	115	0.005	5	0.004	265
CM		0.005	211	0.004	187	0.002	137	0.002	135	0.002	102	0.002	44	0.001	20	0.001	21	0.002	349
DCP 1	.010	0.103	290	0.094	267	0.082	224	0.083	194	0.062	158	0.045	141	0.045	107	0.057	52	0.048	2
DCP 2	.025	0.115	229	0.084	204	0.056	170	0.064	173	0.053	138	0.046	114	0.038	100	0.058	40	0.051	349
DCP 3	.100	0.058	194	0.048	151	0.037	124	0.042	117	0.032	87	0.030	75	0.033	65	0.039	20	0.029	353
DCP 4	.150	0.034	164	0.031	106	0.016	111	0.025	84	0.024	37	0.010	16	0.014	4	0.013	324	0.016	288
DCP 5	.200	0.047	132	0.034	90	0.033	79	0.036	51	0.027	4	0.019	349	0.016	322	0.013	306	0.015	262
DCP 6	.250	0.039	114	0.026	70	0.020	82	0.020	29	0.015	357	0.014	340	0.014	300	0.009	272	0.011	260
DCP 7	.300	0.040	99	0.030	66	0.028	43	0.022	11	0.022	336	0.017	299	0.017	275	0.012	244	0.012	213
DCP 8	.400	0.034	74	0.025	53	0.020	8	0.013	327	0.014	338	0.019	285	0.014	248	0.007	262	0.016	241
DCP 9	.500	0.027	38	0.025	13	0.021	330	0.012	286	0.013	280	0.018	230	0.015	184	0.003	135	0.009	183
DCP10	.600	0.016	21	0.019	16	0.017	295	0.007	223	0.004	302	0.012	258	0.008	195	0.003	330	0.017	190
DCP11	.878	0.007	346	0.008	321	0.003	197	0.002	17	0.008	252	0.012	144	0.008	68	0.003	121	0.005	64

TUNED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
80.0	15.87	0.400	12.57	7.19		5085.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.060	440.3	371.4	0.24E 07	-0.00081	1.666	16.83	0.0

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		12.565	7.194	0	0.499	27	0.091	125	0.034	111	0.052	23	0.167	296	0.083	207	0.061	163	0.029	98
CN		0.949	0.301	36	0.261	41	0.031	48	0.046	5	0.023	328	0.038	299	0.027	242	0.026	200	0.019	136
CM		-0.037	0.048	199	0.029	108	0.015	81	0.013	47	0.008	21	0.008	2	0.009	318	0.007	291	0.008	242
DCP 1	.010	3.930	1.824	8	1.032	56	0.185	84	0.221	68	0.160	51	0.167	19	0.162	354	0.121	317	0.089	299
DCP 2	.025	3.414	0.950	6	1.225	69	0.419	70	0.367	44	0.289	25	0.314	347	0.260	314	0.207	280	0.179	250
DCP 3	.100	2.112	0.303	108	0.909	64	0.181	62	0.226	37	0.159	350	0.142	317	0.129	280	0.104	241	0.081	198
DCP 4	.150	1.700	0.318	83	0.545	52	0.065	61	0.154	26	0.086	312	0.065	303	0.083	261	0.074	205	0.053	171
DCP 5	.200	1.314	0.342	74	0.489	41	0.064	70	0.147	3	0.076	292	0.083	296	0.092	233	0.067	188	0.062	153
DCP 6	.250	1.310	0.386	63	0.384	36	0.040	56	0.119	351	0.059	268	0.063	294	0.080	226	0.056	182	0.060	152
DCP 7	.300	0.966	0.366	54	0.335	29	0.037	41	0.130	332	0.036	262	0.070	279	0.067	203	0.049	178	0.063	126
DCP 8	.400	0.836	0.396	45	0.244	14	0.024	341	0.077	302	0.037	231	0.051	255	0.052	185	0.045	167	0.052	110
DCP 9	.500	0.626	0.320	35	0.171	7	0.019	296	0.045	255	0.012	166	0.033	230	0.028	137	0.026	144	0.041	68
DCP10	.600	0.560	0.300	30	0.120	349	0.025	281	0.040	253	0.013	198	0.029	221	0.024	160	0.031	144	0.032	66
DCP11	.878	0.368	0.246	4	0.045	329	0.047	263	0.026	182	0.011	234	0.013	157	0.015	133	0.013	88	0.014	43

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.002	242	0.005	244	0.010	182	0.006	208	0.010	209	0.006	159	0.009	175	0.005	225	0.005	222
CN		0.010	93	0.003	8	0.002	81	0.001	315	0.003	216	0.002	148	0.003	11	0.002	345	0.002	285
CM		0.006	194	0.004	156	0.002	103	0.003	79	0.002	49	0.002	22	0.001	344	0.001	295	0.001	318
DCP 1	.010	0.083	288	0.109	258	0.073	233	0.083	201	0.069	168	0.055	131	0.040	87	0.031	53	0.026	27
DCP 2	.025	0.139	216	0.114	195	0.077	166	0.063	131	0.044	111	0.025	83	0.028	39	0.032	9	0.028	330
DCP 3	.100	0.054	163	0.043	152	0.037	121	0.039	95	0.031	84	0.035	67	0.038	30	0.029	352	0.025	334
DCP 4	.150	0.050	135	0.024	89	0.021	79	0.017	36	0.013	358	0.011	5	0.015	334	0.010	288	0.007	301
DCP 5	.200	0.048	113	0.028	98	0.034	66	0.026	34	0.018	17	0.018	336	0.015	314	0.018	287	0.014	254
DCP 6	.250	0.049	95	0.024	55	0.028	36	0.016	348	0.011	339	0.012	306	0.010	298	0.012	273	0.008	237
DCP 7	.300	0.039	73	0.028	59	0.031	18	0.018	348	0.022	317	0.013	278	0.017	270	0.015	236	0.015	227
DCP 8	.400	0.033	60	0.028	28	0.021	351	0.019	328	0.021	271	0.009	257	0.012	248	0.010	208	0.009	192
DCP 9	.500	0.018	5	0.020	344	0.013	293	0.014	289	0.016	218	0.009	183	0.006	187	0.006	171	0.009	146
DCP10	.600	0.020	32	0.025	335	0.009	285	0.017	287	0.016	229	0.011	202	0.010	155	0.005	133	0.005	97
DCP11	.878	0.015	342	0.012	272	0.012	220	0.015	191	0.007	160	0.006	140	0.007	49	0.010	59	0.003	339

TUNED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED	
80.0	16.16	0.400	12.62	7.38		5085.3	10	
K	**V**	**Q**	**RN**	**DAMPING**	**CN(MAX)**	**ALPHA(STALL)**		**EXT DAMPING**
0.062	438.3	372.5	0.24E 07	-0.00051	1.649	17.36		0.0

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		12.618	7.382	0	0.442	25	0.150	145	0.059	95	0.243	23	0.226	212	0.112	190	0.046	157	0.014	97
CN		0.935	0.326	32	0.232	37	0.045	31	0.040	335	0.035	345	0.041	261	0.028	230	0.027	188	0.011	128
CM		-0.035	0.044	194	0.029	100	0.015	87	0.012	44	0.006	48	0.010	3	0.007	298	0.008	272	0.007	200
DCP 1	.010	3.890	1.939	7	1.026	55	0.214	69	0.176	63	0.236	31	0.094	12	0.156	339	0.147	295	0.116	259
DCP 2	.025	3.457	1.158	6	1.085	63	0.372	58	0.240	44	0.358	30	0.298	347	0.307	299	0.263	260	0.205	224
DCP 3	.100	2.122	0.312	83	0.774	61	0.229	56	0.185	12	0.151	356	0.125	301	0.133	255	0.092	223	0.077	195
DCP 4	.150	1.633	0.351	76	0.528	48	0.074	64	0.135	13	0.079	320	0.078	279	0.084	235	0.058	190	0.051	161
DCP 5	.200	1.258	0.379	69	0.441	36	0.098	52	0.150	340	0.071	296	0.096	258	0.090	200	0.059	177	0.056	131
DCP 6	.250	1.268	0.410	58	0.373	33	0.056	57	0.112	338	0.049	288	0.088	262	0.078	202	0.054	171	0.058	124
DCP 7	.300	0.973	0.392	50	0.298	22	0.048	26	0.110	312	0.042	284	0.096	236	0.067	179	0.058	161	0.057	94
DCP 8	.400	0.820	0.394	41	0.226	16	0.037	3	0.074	291	0.027	258	0.077	236	0.050	173	0.048	155	0.048	90
DCP 9	.500	0.597	0.319	32	0.137	357	0.032	332	0.057	250	0.001	141	0.055	205	0.024	129	0.034	130	0.040	45
DCP10	.600	0.544	0.312	27	0.110	356	0.029	304	0.041	235	0.007	263	0.050	213	0.026	130	0.030	123	0.034	45
DCP11	.878	0.366	0.247	0	0.070	290	0.055	273	0.021	196	0.020	317	0.014	151	0.004	324	0.015	66	0.026	311

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.004	339	0.026	244	0.019	208	0.017	206	0.015	223	0.011	248	0.010	212	0.010	238	0.013	227
CN		0.002	60	0.004	300	0.003	313	0.005	316	0.001	280	0.010	231	0.002	267	0.002	339	0.002	288
CM		0.006	158	0.005	121	0.003	84	0.004	97	0.002	354	0.004	35	0.000	64	0.001	207	0.001	279
DCP 1	.010	0.090	235	0.078	215	0.052	206	0.060	171	0.047	138	0.029	78	0.018	330	0.021	217	0.011	105
DCP 2	.025	0.142	191	0.106	173	0.067	151	0.058	120	0.050	77	0.021	26	0.017	341	0.015	339	0.032	285
DCP 3	.100	0.050	150	0.037	146	0.032	110	0.033	76	0.032	58	0.017	15	0.026	4	0.023	340	0.028	309
DCP 4	.150	0.030	122	0.016	86	0.024	59	0.018	18	0.016	334	0.011	292	0.007	254	0.005	282	0.010	290
DCP 5	.200	0.032	79	0.023	74	0.030	16	0.021	341	0.024	310	0.020	264	0.015	268	0.016	254	0.016	236
DCP 6	.250	0.028	77	0.024	59	0.029	14	0.020	355	0.028	311	0.022	258	0.013	239	0.009	211	0.005	193
DCP 7	.300	0.027	58	0.032	30	0.028	345	0.028	326	0.027	270	0.021	240	0.013	222	0.010	200	0.011	198
DCP 8	.400	0.018	50	0.028	15	0.019	330	0.016	325	0.020	271	0.016	240	0.014	197	0.009	181	0.008	138
DCP 9	.500	0.027	4	0.031	317	0.016	283	0.019	261	0.017	223	0.023	199	0.016	136	0.012	107	0.011	55
DCP10	.600	0.018	345	0.024	308	0.012	269	0.009	251	0.010	228	0.011	179	0.006	134	0.003	98	0.004	29
DCP11	.878	0.024	305	0.022	254	0.012	232	0.012	276	0.017	105	0.018	229	0.011	327	0.014	356	0.004	120

TUNED PITCHING OSCILLATION VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	0.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
80.0	16.18	0.600	7.65	6.99		5091.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.041	657.4	732.1	0.32E 07	-0.00092	1.165	10.6	0.1010

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		7.647	6.990	0	0.521	24	0.092	160	0.064	131	0.010	170	0.078	26	0.069	279	0.062	231	0.038	201
CN		0.682	0.543	358	0.188	57	0.034	62	0.027	40	0.007	343	0.020	25	0.014	340	0.013	302	0.011	234
CM		-0.040	0.030	207	0.018	91	0.003	133	0.007	93	0.002	65	0.003	56	0.002	46	0.002	84	0.003	29
DCP 1	.010	1.123	2.754	353	0.767	55	0.163	104	0.038	53	0.030	181	0.016	359	0.025	242	0.019	261	0.017	158
DCP 2	.025	1.433	2.362	352	0.722	55	0.175	112	0.021	130	0.045	255	0.048	2	0.025	30	0.021	162	0.033	189
DCP 3	.100	1.737	0.864	346	0.790	71	0.064	89	0.173	72	0.055	81	0.074	54	0.056	24	0.014	345	0.036	342
DCP 4	.150	1.565	0.702	353	0.564	70	0.066	68	0.224	63	0.023	37	0.143	44	0.020	42	0.078	8	0.025	127
DCP 5	.200	1.231	0.649	358	0.364	66	0.083	43	0.094	71	0.048	10	0.085	51	0.061	353	0.035	20	0.021	324
DCP 6	.250	1.097	0.668	2	0.261	58	0.082	36	0.041	25	0.043	357	0.033	10	0.058	329	0.034	287	0.034	284
DCP 7	.300	0.793	0.636	2	0.203	54	0.082	33	0.039	7	0.045	352	0.032	347	0.053	330	0.043	287	0.032	272
DCP 8	.400	0.613	0.517	4	0.125	41	0.060	40	0.034	313	0.010	247	0.012	323	0.013	287	0.022	266	0.021	214
DCP 9	.500	0.541	0.428	6	0.090	24	0.030	32	0.032	320	0.013	294	0.020	299	0.017	268	0.021	256	0.023	213
DCP10	.600	0.369	0.329	7	0.054	23	0.012	74	0.018	310	0.010	209	0.003	4	0.004	256	0.007	286	0.015	219
DCP11	.878	0.277	0.235	5	0.036	300	0.008	281	0.015	253	0.005	243	0.006	215	0.003	158	0.007	277	0.009	193

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.021	168	0.008	203	0.016	201	0.012	189	0.009	172	0.007	162	0.014	199	0.006	229	0.005	204
CN		0.007	227	0.003	133	0.004	314	0.006	203	0.003	207	0.003	151	0.001	242	0.003	203	0.001	72
CM		0.002	336	0.001	309	0.001	346	0.001	324	0.001	264	0.001	222	0.000	255	0.000	204		
DCP 1	.010	0.008	213	0.016	176	0.004	167	0.004	188	0.005	253	0.005	265	0.002	118	0.001	212	0.003	247
DCP 2	.025	0.022	252	0.009	28	0.014	36	0.030	159	0.003	139	0.008	288	0.012	202	0.019	275	0.020	350
DCP 3	.100	0.028	249	0.010	295	0.019	310	0.026	260	0.024	262	0.020	208	0.014	260	0.022	201	0.008	170
DCP 4	.150	0.040	342	0.025	116	0.013	290	0.017	83	0.017	244	0.009	159	0.014	165	0.007	213	0.009	183
DCP 5	.200	0.024	19	0.024	34	0.041	2	0.007	337	0.013	327	0.015	87	0.018	328	0.006	17	0.008	131
DCP 6	.250	0.019	243	0.015	293	0.016	278	0.022	261	0.015	197	0.003	298	0.008	242	0.007	229	0.002	228
DCP 7	.300	0.024	253	0.016	265	0.018	270	0.025	250	0.023	217	0.013	195	0.012	230	0.018	199	0.013	158
DCP 8	.400	0.012	196	0.012	162	0.001	256	0.013	186	0.010	111	0.003	76	0.003	61	0.003	256	0.004	141
DCP 9	.500	0.015	191	0.013	176	0.009	164	0.012	156	0.010	126	0.009	119	0.009	99	0.011	73	0.012	28
DCP10	.600	0.010	161	0.006	116	0.001	358	0.002	192	0.004	167	0.005	108	0.003	54	0.003	103	0.005	3
DCP11	.878	0.007	152	0.005	91	0.001	143	0.005	128	0.005	26	0.001	338	0.003	358	0.001	260	0.000	325

TUNED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
90.0	16.73	0.690	7.63	7.07		5091.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.047	649.4	728.9	0.32E 07	-0.00092	1.158	10.63	0.0900

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		7.628	7.074	0	0.518	28	0.117	171	0.067	134	0.022	167	0.125	8	0.090	265	0.074	212	0.037	192
CN		0.662	0.557	359	0.189	57	0.031	68	0.027	44	0.010	351	0.019	5	0.013	307	0.008	256	0.006	237
CM		-0.041	0.031	208	0.020	95	0.003	128	0.006	98	0.001	48	0.003	77	0.004	70	0.003	57	0.003	0
DCP 1	.010	1.098	2.810	353	0.762	54	0.163	110	0.035	54	0.032	183	0.013	293	0.033	242	0.020	243	0.014	153
DCP 2	.025	1.423	2.425	353	0.740	57	0.187	120	0.033	169	0.043	257	0.069	0	0.008	56	0.045	162	0.032	235
DCP 3	.100	1.723	0.869	347	0.814	74	0.072	92	0.178	74	0.044	70	0.047	64	0.049	49	0.016	37	0.042	358
DCP 4	.150	1.474	0.718	353	0.574	70	0.065	68	0.235	63	0.033	74	0.140	39	0.022	16	0.073	355	0.027	138
DCP 5	.200	1.059	0.683	0	0.369	70	0.093	50	0.094	65	0.052	5	0.063	60	0.051	7	0.037	49	0.037	10
DCP 6	.250	1.010	0.683	2	0.260	56	0.079	33	0.039	20	0.047	345	0.022	344	0.048	323	0.022	274	0.034	307
DCP 7	.300	0.808	0.657	4	0.211	54	0.079	27	0.036	0	0.046	349	0.029	330	0.046	327	0.034	277	0.026	301
DCP 8	.400	0.619	0.533	4	0.126	31	0.028	37	0.026	313	0.007	296	0.022	302	0.026	253	0.021	232	0.019	211
DCP 9	.500	0.488	0.439	7	0.096	27	0.029	28	0.029	320	0.011	332	0.030	316	0.031	273	0.029	245	0.023	212
DCP10	.600	0.382	0.341	7	0.056	5	0.012	112	0.012	326	0.002	208	0.012	316	0.018	242	0.009	205	0.011	192
DCP11	.878	0.280	0.235	6	0.037	305	0.007	285	0.014	272	0.006	205	0.007	233	0.008	251	0.006	246	0.010	154

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.017	203	0.019	214	0.018	189	0.016	197	0.010	189	0.010	167	0.015	222	0.008	253	0.006	260
CN		0.008	238	0.003	179	0.005	260	0.007	204	0.004	182	0.002	131	0.003	231	0.003	222	0.000	191
CM		0.002	338	0.001	30	0.001	334	0.002	312	0.001	266	0.001	240	0.001	180	0.000	240	0.001	226
DCP 1	.010	0.021	171	0.010	129	0.010	234	0.008	220	0.009	189	0.005	205	0.002	283	0.007	241	0.007	267
DCP 2	.025	0.027	257	0.029	59	0.004	185	0.018	212	0.005	112	0.013	184	0.019	207	0.019	302	0.012	334
DCP 3	.100	0.026	273	0.018	314	0.025	298	0.033	266	0.024	264	0.025	229	0.020	255	0.026	216	0.015	181
DCP 4	.150	0.036	328	0.027	108	0.033	280	0.014	154	0.028	207	0.011	149	0.016	182	0.016	204	0.008	155
DCP 5	.200	0.021	10	0.011	79	0.035	358	0.010	194	0.016	343	0.011	24	0.002	41	0.006	37	0.012	242
DCP 6	.250	0.025	250	0.021	291	0.023	248	0.017	255	0.015	218	0.008	261	0.010	225	0.006	230	0.008	258
DCP 7	.300	0.030	265	0.019	262	0.022	269	0.026	253	0.025	219	0.013	206	0.014	213	0.013	197	0.009	172
DCP 8	.400	0.018	185	0.014	150	0.006	143	0.004	174	0.008	154	0.005	113	0.005	106	0.006	43	0.004	306
DCP 9	.500	0.016	205	0.017	195	0.015	182	0.017	163	0.017	123	0.012	81	0.005	96	0.011	82	0.010	30
DCP10	.600	0.009	157	0.006	148	0.004	165	0.007	134	0.008	96	0.007	32	0.005	347	0.004	245	0.001	114
DCP11	.878	0.005	158	0.004	264	0.001	148	0.005	142	0.004	32	0.004	84	0.003	302	0.003	261	0.004	51

TUNED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
80.0	16.39	0.600	7.65	7.25		5091.3	10

K	V	Q	RN	DAMPING	CY(MAX)	ALPHA(STALL)	EXT DAMPING
0.042	647.2	727.9	0.32E 07	-0.00079	1.166	11.35	0.0250

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		7.651	7.253	0	0.530	29	0.128	175	0.044	100	0.091	121	0.183	294	0.094	237	0.055	196	0.039	188
CN		0.655	0.567	359	0.188	56	0.033	77	0.028	37	0.007	77	0.020	335	0.016	293	0.014	248	0.012	198
CM		-0.043	0.032	204	0.022	93	0.003	126	0.006	82	0.001	357	0.003	108	0.003	49	0.003	29	0.003	359
DCP 1	.010	1.061	2.873	352	0.802	52	0.161	104	0.050	22	0.079	133	0.054	228	0.042	244	0.024	245	0.018	164
DCP 2	.025	1.406	2.476	353	0.733	58	0.195	125	0.022	151	0.050	208	0.041	294	0.010	101	0.048	181	0.036	185
DCP 3	.100	1.705	0.870	348	0.822	75	0.083	109	0.198	73	0.066	75	0.026	32	0.053	2	0.038	262	0.015	305
DCP 4	.150	1.459	0.747	353	0.588	66	0.056	69	0.239	54	0.016	79	0.135	33	0.020	353	0.077	350	0.015	163
DCP 5	.200	1.023	0.648	1	0.383	71	0.100	54	0.099	56	0.033	10	0.050	53	0.057	349	0.036	28	0.012	23
DCP 6	.250	0.976	0.686	1	0.267	55	0.089	37	0.043	9	0.041	13	0.036	326	0.061	314	0.040	259	0.024	281
DCP 7	.300	0.792	0.644	4	0.209	57	0.090	34	0.053	337	0.027	331	0.035	310	0.050	312	0.045	263	0.020	267
DCP 8	.400	0.614	0.550	2	0.119	30	0.030	52	0.027	316	0.007	122	0.034	300	0.033	241	0.021	202	0.015	175
DCP 9	.500	0.478	0.453	7	0.091	17	0.016	25	0.028	302	0.004	205	0.030	307	0.030	258	0.026	232	0.023	202
DCP10	.600	0.382	0.355	5	0.057	2	0.012	119	0.010	313	0.010	115	0.021	312	0.018	239	0.011	235	0.018	194
DCP11	.878	0.293	0.244	5	0.043	294	0.003	215	0.016	246	0.005	175	0.009	282	0.006	207	0.012	196	0.016	166

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.020	153	0.011	221	0.015	197	0.007	207	0.011	213	0.004	169	0.008	224	0.007	271	0.011	220
CN		0.005	259	0.003	195	0.002	208	0.007	226	0.006	150	0.005	158	0.004	174	0.002	85	0.001	58
CM		0.002	292	0.002	275	0.001	274	0.001	19	0.001	274	0.001	261	0.000	270	0.002	213	0.001	100
DCP 1	.010	0.006	203	0.008	73	0.004	214	0.008	219	0.004	206	0.004	195	0.004	236	0.007	216	0.010	241
DCP 2	.025	0.017	257	0.004	36	0.014	232	0.018	258	0.018	52	0.018	154	0.019	212	0.014	296	0.004	138
DCP 3	.100	0.026	283	0.040	266	0.014	241	0.036	266	0.034	221	0.025	187	0.015	190	0.018	159	0.008	112
DCP 4	.150	0.034	314	0.016	116	0.009	292	0.011	260	0.021	180	0.019	218	0.019	135	0.028	216	0.020	134
DCP 5	.200	0.035	12	0.014	327	0.024	11	0.006	254	0.007	359	0.007	152	0.005	216	0.008	106	0.015	40
DCP 6	.250	0.030	250	0.013	255	0.018	6	0.011	243	0.015	221	0.005	210	0.010	235	0.010	197	0.003	233
DCP 7	.300	0.035	263	0.025	225	0.018	241	0.025	211	0.016	173	0.011	190	0.012	187	0.011	164	0.006	116
DCP 8	.400	0.008	202	0.007	167	0.008	194	0.013	155	0.012	119	0.008	66	0.002	86	0.007	75	0.008	359
DCP 9	.500	0.017	188	0.017	163	0.011	152	0.014	143	0.010	111	0.013	108	0.014	61	0.008	18	0.007	26
DCP10	.600	0.009	146	0.007	135	0.008	77	0.011	63	0.005	108	0.007	0	0.003	240	0.003	71	0.005	339
DCP11	.878	0.011	72	0.009	48	0.004	81	0.008	262	0.005	86	0.006	165	0.003	170	0.014	27	0.006	223

TUNED PITCHING OSCILLATION VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
96.0	16.39	0.400	12.33	7.13		5097.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.061	445.5	363.2	0.23E 07	-0.00092	1.662	16.35	0.0800

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		12.329	7.131	359	0.414	20	0.099	163	0.033	167	0.011	253	0.016	333	0.126	263	0.093	180	0.019	127
CN		1.047	0.276	29	0.246	62	0.068	32	0.043	350	0.018	300	0.016	321	0.025	274	0.023	207	0.013	127
CM		-0.048	0.063	195	0.036	104	0.011	98	0.017	72	0.010	19	0.006	32	0.009	356	0.010	318	0.008	256
DCP 1	.010	3.869	1.337	3	1.363	72	0.391	32	0.140	31	0.071	37	0.160	45	0.188	342	0.133	307	0.105	282
DCP 2	.025	3.272	0.352	358	1.643	89	0.525	57	0.339	64	0.311	37	0.234	16	0.217	354	0.196	321	0.137	282
DCP 3	.100	2.288	0.229	123	0.897	81	0.190	64	0.212	63	0.169	2	0.062	339	0.126	338	0.110	284	0.073	244
DCP 4	.150	1.825	0.252	72	0.548	60	0.097	27	0.122	20	0.093	302	0.025	289	0.078	273	0.077	207	0.042	155
DCP 5	.250	1.595	0.348	49	0.364	45	0.072	19	0.111	342	0.083	263	0.024	279	0.078	243	0.068	183	0.051	137
DCP 6	.300	1.068	0.351	47	0.284	48	0.075	40	0.120	346	0.074	269	0.028	287	0.057	266	0.062	214	0.050	171
DCP 7	.400	0.955	0.384	31	0.193	24	0.052	8	0.092	304	0.057	224	0.022	241	0.040	209	0.047	164	0.047	112
DCP 8	.500	0.840	0.341	28	0.107	18	0.041	15	0.078	296	0.045	206	0.011	276	0.025	227	0.043	185	0.040	119
DCP 9	.600	0.606	0.329	19	0.079	350	0.029	358	0.059	268	0.030	189	0.013	264	0.032	204	0.037	133	0.036	64
DCP10	.878	0.388	0.273	9	0.044	298	0.044	303	0.043	229	0.012	186	0.018	211	0.017	152	0.021	137	0.021	52

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.003	161	0.011	270	0.019	243	0.019	252	0.016	236	0.002	259	0.011	218	0.010	269	0.008	276
CN		0.003	2	0.002	199	0.006	60	0.005	328	0.006	268	0.005	219	0.004	226	0.002	145	0.004	177
CM		0.003	203	0.003	242	0.004	197	0.004	150	0.003	109	0.003	68	0.001	25	0.001	354	0.001	5
DCP 1	.010	0.102	264	0.108	232	0.066	186	0.061	179	0.061	136	0.054	79	0.039	22	0.039	335	0.032	293
DCP 2	.025	0.076	277	0.113	274	0.103	223	0.064	195	0.039	196	0.031	171	0.022	176	0.029	136	0.027	117
DCP 3	.100	0.062	249	0.059	226	0.053	188	0.048	163	0.034	155	0.038	139	0.025	127	0.030	93	0.018	111
DCP 4	.150	0.029	154	0.032	111	0.031	67	0.019	29	0.016	352	0.010	331	0.015	315	0.012	300	0.012	246
DCP 5	.250	0.033	98	0.020	84	0.033	54	0.027	1	0.019	321	0.012	313	0.019	298	0.017	258	0.012	203
DCP 6	.300	0.030	138	0.026	136	0.032	105	0.030	59	0.018	33	0.012	20	0.016	3	0.011	326	0.008	302
DCP 7	.400	0.030	52	0.019	43	0.026	16	0.024	323	0.019	280	0.013	245	0.015	232	0.009	170	0.006	156
DCP 8	.500	0.019	73	0.018	91	0.026	47	0.027	349	0.015	291	0.002	305	0.009	314	0.007	283	0.013	252
DCP 9	.600	0.019	352	0.015	356	0.014	333	0.015	283	0.010	263	0.012	237	0.012	193	0.010	112	0.006	108
DCP10	.878	0.010	317	0.004	161	0.010	18	0.008	323	0.009	270	0.012	228	0.006	172	0.003	179	0.007	177

TUNED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
96.0	16.50	0.400	12.36	7.18		5397.2	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.062	445.2	380.4	0.74E 07	-0.00081	1.658	15.84	0.0800

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1 PHI	RES 2 PHI	RES 3 PHI	RES 4 PHI	RES 5 PHI	RES 6 PHI	RES 7 PHI	RES 8 PHI	RES 9 PHI
ALPHA		12.357	7.177 359	0.446 17	0.088 159	0.023 134	0.020 337	0.039 341	0.147 238	0.068 172	0.011 95
CN		1.019	0.301 32	0.247 51	0.046 32	0.041 0	0.011 332	0.025 322	0.026 262	0.018 200	0.010 137
CM		-0.044	0.055 196	0.032 107	0.012 108	0.018 69	0.010 18	0.009 22	0.008 331	0.007 301	0.007 257
DCP 1	.010	4.027	1.747 5	1.066 59	0.170 76	0.231 67	0.162 48	0.217 21	0.155 328	0.100 315	0.104 298
DCP 2	.025	3.438	0.740 11	1.372 79	0.375 69	0.389 70	0.332 47	0.336 17	0.263 339	0.205 311	0.148 280
DCP 3	.100	2.765	0.259 110	0.874 73	0.168 67	0.227 58	0.160 5	0.110 351	0.142 309	0.097 266	0.071 243
DCP 4	.150	1.665	0.293 80	0.551 55	0.064 46	0.155 24	0.099 306	0.047 299	0.089 260	0.078 195	0.041 157
DCP 5	.250	1.464	0.371 55	0.373 40	0.052 25	0.122 345	0.070 263	0.050 287	0.088 224	0.063 167	0.048 143
DCP 6	.300	1.068	0.361 49	0.304 39	0.066 32	0.112 342	0.054 262	0.050 308	0.077 241	0.049 193	0.045 173
DCP 7	.400	0.946	0.398 36	0.218 19	0.045 352	0.093 299	0.068 217	0.040 251	0.057 187	0.040 148	0.045 105
DCP 8	.500	0.756	0.324 32	0.138 16	0.043 3	0.071 286	0.038 189	0.024 258	0.031 188	0.029 165	0.038 103
DCP 9	.600	0.586	0.323 23	0.096 354	0.028 325	0.058 264	0.022 178	0.029 216	0.028 144	0.020 120	0.029 72
DCP10	.878	0.390	0.265 9	0.058 312	0.044 299	0.040 219	0.014 177	0.016 189	0.004 111	0.016 111	0.014 39

DATA TYPE	X/C	RES 10 PHI	RES 11 PHI	RES 12 PHI	RES 13 PHI	RES 14 PHI	RES 15 PHI	RES 16 PHI	RES 17 PHI	RES 18 PHI
ALPHA		0.005 43	0.009 289	0.015 270	0.018 264	0.007 240	0.004 350	0.013 246	0.012 266	0.010 313
CN		0.005 87	0.003 2	0.002 292	0.002 265	0.003 262	0.003 178	0.002 183	0.002 75	0.001 115
CM		0.005 222	0.004 194	0.002 151	0.003 112	0.001 58	0.001 18	0.001 80	0.001 2	0.000 293
DCP 1	.010	0.117 266	0.117 230	0.075 201	0.057 172	0.044 156	0.057 109	0.057 47	0.043 349	0.026 297
DCP 2	.025	0.086 259	0.090 255	0.074 227	0.055 194	0.043 198	0.039 165	0.050 134	0.044 66	0.026 341
DCP 3	.100	0.054 217	0.049 195	0.038 177	0.051 141	0.020 106	0.025 139	0.034 119	0.026 85	0.027 96
DCP 4	.150	0.036 139	0.028 90	0.015 67	0.020 35	0.018 339	0.006 340	0.011 325	0.010 296	0.006 236
DCP 5	.250	0.042 91	0.022 55	0.024 45	0.024 348	0.017 314	0.013 293	0.011 269	0.010 271	0.008 199
DCP 6	.300	0.036 132	0.024 117	0.029 88	0.023 60	0.020 35	0.020 9	0.020 335	0.017 301	0.008 286
DCP 7	.400	0.028 44	0.018 29	0.021 355	0.018 318	0.017 288	0.011 268	0.013 242	0.008 182	0.008 171
DCP 8	.500	0.020 53	0.020 54	0.021 6	0.011 325	0.011 313	0.010 291	0.016 259	0.011 205	0.006 160
DCP 9	.600	0.015 18	0.019 344	0.014 285	0.011 267	0.007 225	0.005 192	0.009 176	0.007 96	0.005 121
DCP10	.878	0.010 27	0.010 345	0.007 257	0.010 254	0.008 183	0.009 145	0.002 47	0.002 91	0.004 16

TUNED PITCHING OSCILLATION VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
96.0	16.89	0.400	12.32	7.74		5097.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.064	443.6	381.7	0.24E 07	-0.00090	1.636	16.30	0.0470

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		12.319	7.240	0	0.338	21	0.161	185	0.056	195	0.037	268	0.148	312	0.166	196	0.049	172	0.027	303
CN		0.992	0.316	37	0.231	46	0.031	41	0.051	351	0.023	283	0.025	302	0.025	222	0.015	182	0.005	95
CM		-0.039	0.050	198	0.032	104	0.011	93	0.014	64	0.008	21	0.009	8	0.009	324	0.007	287	0.006	238
DCP 1	.010	3.980	1.803	8	0.976	56	0.175	83	0.196	45	0.098	33	0.215	1	0.156	317	0.141	282	0.116	265
DCP 2	.025	3.507	0.960	14	1.189	77	0.354	73	0.319	49	0.226	38	0.323	8	0.236	328	0.197	300	0.165	275
DCP 3	.100	2.261	0.325	102	0.855	72	0.159	60	0.203	41	0.160	344	0.108	321	0.102	287	0.088	249	0.055	221
DCP 4	.150	1.556	0.339	80	0.536	51	0.046	32	0.140	14	0.107	287	0.053	275	0.077	231	0.068	177	0.029	124
DCP 5	.250	1.393	0.393	60	0.372	35	0.027	24	0.119	339	0.085	250	0.046	271	0.088	203	0.061	143	0.038	113
DCP 6	.300	1.047	0.377	55	0.303	36	0.035	35	0.115	343	0.069	264	0.045	287	0.077	223	0.047	173	0.042	151
DCP 7	.400	0.908	0.389	42	0.222	13	0.018	343	0.087	305	0.056	225	0.045	243	0.065	171	0.037	124	0.039	82
DCP 8	.500	0.706	0.329	39	0.146	7	0.018	330	0.068	291	0.033	206	0.027	255	0.040	175	0.026	147	0.034	96
DCP 9	.600	0.569	0.321	27	0.103	344	0.012	278	0.045	266	0.025	192	0.029	200	0.034	127	0.016	107	0.025	35
DCP10	.878	0.372	0.252	8	0.052	294	0.036	293	0.030	223	0.011	226	0.014	168	0.013	160	0.016	102	0.012	14

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.025	282	0.022	286	0.027	266	0.022	266	0.016	289	0.012	325	0.007	281	0.008	329	0.009	329
CN		0.004	313	0.003	270	0.005	260	0.003	282	0.006	227	0.003	130	0.002	20	0.001	35	0.002	342
CM		0.004	208	0.004	185	0.003	126	0.003	95	0.003	42	0.001	339	0.001	261	0.001	286	0.001	178
DCP 1	.010	0.111	241	0.093	203	0.066	188	0.049	134	0.041	79	0.035	15	0.026	333	0.018	274	0.006	262
DCP 2	.025	0.146	248	0.122	221	0.089	199	0.067	149	0.040	115	0.033	75	0.021	347	0.012	266	0.015	212
DCP 3	.100	0.035	221	0.051	192	0.030	159	0.031	123	0.021	125	0.027	94	0.025	77	0.027	44	0.029	22
DCP 4	.150	0.020	120	0.021	76	0.014	34	0.024	5	0.022	311	0.010	276	0.009	284	0.006	245	0.005	231
DCP 5	.250	0.036	59	0.018	11	0.017	14	0.022	324	0.015	285	0.014	261	0.007	224	0.004	235	0.008	186
DCP 6	.300	0.025	106	0.017	98	0.024	67	0.021	29	0.018	352	0.016	324	0.012	311	0.015	292	0.016	271
DCP 7	.400	0.029	14	0.015	357	0.023	322	0.018	308	0.022	262	0.016	202	0.008	166	0.007	119	0.004	142
DCP 8	.500	0.016	17	0.012	27	0.018	344	0.016	318	0.018	273	0.009	235	0.012	226	0.005	187	0.004	195
DCP 9	.600	0.014	344	0.018	330	0.020	253	0.013	233	0.016	182	0.008	116	0.006	90	0.004	120	0.009	98
DCP10	.878	0.004	350	0.006	353	0.008	276	0.013	255	0.009	202	0.007	119	0.007	30	0.003	44	0.012	337

TUNED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA,0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
96.9	16.34	0.600	10.05	7.94		5103.1	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.042	654.5	730.1	0.32E 07	-0.00128	1.219	10.29	0.0800

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		10.053	7.038	0	0.456	18	0.126	164	0.046	184	0.051	173	0.045	189	0.080	174	0.086	106	0.039	356
CN		0.901	0.358	4	0.158	67	0.049	96	0.014	134	0.023	140	0.025	86	0.008	11	0.021	156	0.010	73
CM		-0.084	0.053	159	0.015	122	0.010	150	0.000	82	0.004	173	0.004	201	0.002	97	0.006	272	0.006	173
DCP 1	.010	1.991	1.806	354	0.612	63	0.159	79	0.055	226	0.028	128	0.011	93	0.003	104	0.020	23	0.034	245
DCP 2	.025	2.113	1.410	355	0.609	68	0.165	61	0.077	280	0.070	181	0.030	93	0.041	16	0.045	196	0.030	188
DCP 3	.100	2.004	0.192	301	0.517	84	0.332	138	0.061	151	0.112	159	0.078	119	0.050	34	0.098	242	0.111	152
DCP 4	.200	1.392	0.275	1	0.318	84	0.160	129	0.061	115	0.140	152	0.058	114	0.007	59	0.113	210	0.018	108
DCP 5	.250	1.276	0.413	12	0.259	73	0.082	71	0.059	100	0.039	110	0.041	82	0.051	157	0.061	104	0.030	84
DCP 6	.300	0.961	0.392	9	0.233	79	0.072	66	0.068	103	0.038	110	0.078	81	0.020	350	0.064	163	0.049	101
DCP 7	.400	0.795	0.420	10	0.118	51	0.047	34	0.013	101	0.028	17	0.009	65	0.005	42	0.035	80	0.036	356
DCP 8	.500	0.656	0.365	16	0.109	39	0.038	26	0.017	47	0.019	337	0.012	67	0.005	77	0.041	104	0.040	20
DCP 9	.600	0.513	0.328	11	0.051	10	0.019	4	0.015	198	0.016	53	0.010	57	0.009	336	0.015	79	0.021	324
DCP10	.878	0.616	0.280	9	0.042	341	0.029	342	0.010	267	0.005	226	0.024	33	0.014	287	0.019	124	0.017	4

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.008	262	0.005	153	0.008	178	0.002	21	0.009	239	0.008	144	0.005	171	0.004	242	0.005	246
CN		0.008	130	0.004	109	0.007	98	0.005	149	0.002	58	0.002	59	0.002	92	0.005	75	0.001	310
CM		0.001	3	0.002	187	0.001	195	0.000	280	0.002	178	0.003	116	0.001	57	0.001	330	0.001	240
DCP 1	.010	0.012	146	0.014	81	0.017	37	0.021	296	0.020	217	0.018	132	0.009	27	0.011	287	0.009	191
DCP 2	.025	0.057	50	0.024	20	0.018	53	0.019	333	0.026	246	0.038	160	0.047	101	0.041	48	0.048	305
DCP 3	.100	0.034	108	0.031	151	0.023	163	0.050	168	0.039	123	0.012	123	0.028	122	0.015	56	0.010	227
DCP 4	.200	0.032	214	0.035	232	0.013	65	0.011	300	0.012	319	0.037	37	0.016	339	0.019	57	0.019	156
DCP 5	.250	0.008	206	0.029	149	0.015	154	0.009	116	0.005	246	0.006	265	0.008	250	0.010	279	0.006	229
DCP 6	.300	0.028	132	0.020	132	0.038	147	0.024	106	0.011	197	0.022	133	0.012	322	0.014	199	0.009	242
DCP 7	.400	0.009	274	0.006	110	0.010	57	0.007	358	0.003	271	0.004	118	0.001	289	0.005	167	0.006	81
DCP 8	.500	0.007	88	0.017	39	0.010	50	0.015	95	0.020	56	0.024	17	0.019	330	0.005	276	0.002	86
DCP 9	.600	0.009	166	0.007	66	0.010	19	0.009	293	0.002	195	0.003	115	0.001	56	0.007	75	0.010	5
DCP10	.878	0.004	111	0.011	345	0.001	205	0.008	150	0.015	352	0.019	278	0.010	169	0.006	122	0.003	81

TUNED PITCHING OSCILLATION VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
96.0	16.39	0.600	10.03	7.08		5103.2	10

K	V	Q	RN	DAMPING	CY(MAX)	ALPHA(STALL)	EXT DAMPING
0.042	651.7	726.6	0.31E 07	-0.00095	1.222	15.16	0.0760

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		10.029	7.079	0	0.515	16	0.103	164	0.020	166	0.027	173	0.042	178	0.073	177	0.080	95	0.040	1
CN		0.896	0.363	6	0.156	66	0.049	100	0.013	116	0.014	136	0.015	93	0.011	189	0.021	138	0.008	39
CM		-0.084	0.050	196	0.014	102	0.009	170	0.002	159	0.004	178	0.001	183	0.002	202	0.004	228	0.004	149
DCP 1	.010	2.005	1.845	354	0.599	60	0.159	87	0.042	188	0.028	68	0.014	3	0.021	239	0.002	131	0.020	161
DCP 2	.025	2.116	1.433	356	0.601	67	0.140	73	0.073	254	0.027	177	0.011	128	0.015	187	0.006	59	0.004	181
DCP 3	.100	2.022	0.137	331	0.533	74	0.297	149	0.060	151	0.094	165	0.039	104	0.062	217	0.054	150	0.033	122
DCP 4	.200	1.327	0.304	10	0.323	81	0.123	131	0.070	112	0.091	158	0.034	189	0.065	181	0.064	182	0.006	53
DCP 5	.250	1.249	0.402	12	0.259	71	0.069	74	0.069	94	0.025	119	0.050	88	0.040	163	0.060	109	0.034	96
DCP 6	.300	0.981	0.414	13	0.232	77	0.078	72	0.070	97	0.034	106	0.064	92	0.027	148	0.061	119	0.041	101
DCP 7	.400	0.792	0.416	10	0.106	51	0.052	50	0.008	36	0.011	28	0.022	70	0.009	348	0.027	12	0.020	359
DCP 8	.500	0.646	0.363	16	0.100	48	0.048	39	0.017	67	0.022	40	0.032	67	0.016	12	0.032	80	0.029	26
DCP 9	.600	0.518	0.331	11	0.041	7	0.031	55	0.010	313	0.008	355	0.003	151	0.003	67	0.017	53	0.015	323
DCP10	.878	0.609	0.267	7	0.030	319	0.026	349	0.010	287	0.011	354	0.008	316	0.002	256	0.015	47	0.014	309

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.008	310	0.005	137	0.006	91	0.008	23	0.004	284	0.004	94	0.009	221	0.002	259	0.001	325
CN		0.005	121	0.001	74	0.002	164	0.003	182	0.003	102	0.003	31	0.001	277	0.003	172	0.004	151
CM		0.000	217	0.001	205	0.001	172	0.001	111	0.001	275	0.001	203	0.001	171	0.001	211	0.001	130
DCP 1	.010	0.021	34	0.010	280	0.016	115	0.014	3	0.018	304	0.015	238	0.009	148	0.008	77	0.005	289
DCP 2	.025	0.015	39	0.009	332	0.006	249	0.015	193	0.007	120	0.009	4	0.013	254	0.022	184	0.016	78
DCP 3	.100	0.034	169	0.022	149	0.032	163	0.017	142	0.014	181	0.011	139	0.006	196	0.020	214	0.035	167
DCP 4	.200	0.012	192	0.034	289	0.022	289	0.005	230	0.026	3	0.010	23	0.012	39	0.009	125	0.017	134
DCP 5	.250	0.012	120	0.021	126	0.015	147	0.003	148	0.011	209	0.011	250	0.014	207	0.005	195	0.004	95
DCP 6	.300	0.023	96	0.013	139	0.019	175	0.020	156	0.008	158	0.004	216	0.013	264	0.022	222	0.016	152
DCP 7	.400	0.007	21	0.004	62	0.011	33	0.007	281	0.005	110	0.004	129	0.009	86	0.008	64	0.006	2
DCP 8	.500	0.016	23	0.003	54	0.015	55	0.004	14	0.010	59	0.008	339	0.009	235	0.014	135	0.009	52
DCP 9	.600	0.004	144	0.005	16	0.003	291	0.004	181	0.008	103	0.011	34	0.004	342	0.007	15	0.006	271
DCP10	.878	0.003	194	0.004	18	0.005	319	0.003	287	0.001	224	0.003	29	0.003	357	0.002	358	0.005	293

TUNED PITCHING OSCILLATION — VERTOL 23010-1.58 AIRFOIL

TUNED CPS	AIRFOIL CPS	MACH NO	ALPHA.0	D.ALPHA	DEL.H	TEST POINT	CYCLES ANALYZED
96.0	16.69	0.600	10.07	7.17		5103.3	10

K	V	Q	RN	DAMPING	CN(MAX)	ALPHA(STALL)	EXT DAMPING
0.043	647.4	725.4	0.31E 07	-0.00092	1.222	16.07	0.0220

HARMONIC ANALYSIS

DATA TYPE	X/C	RES 0	RES 1	PHI	RES 2	PHI	RES 3	PHI	RES 4	PHI	RES 5	PHI	RES 6	PHI	RES 7	PHI	RES 8	PHI	RES 9	PHI
ALPHA		10.070	7.174	0	0.373	22	0.224	183	0.094	201	0.088	175	0.075	206	0.112	84	0.042	325	0.064	249
CN		0.890	0.370	5	0.162	67	0.065	130	0.015	110	0.009	136	0.006	160	0.014	125	0.018	53	0.039	315
CM		-0.084	0.051	194	0.018	104	0.009	138	0.002	311	0.004	172	0.001	119	0.003	213	0.005	172	0.004	79
DCP 1	.010	2.003	1.883	354	0.583	62	0.133	94	0.066	215	0.024	139	0.037	268	0.015	255	0.007	205	0.005	117
DCP 2	.025	2.119	1.460	355	0.584	69	0.124	75	0.088	253	0.036	188	0.045	248	0.022	182	0.020	122	0.010	49
DCP 3	.100	2.024	0.134	333	0.615	78	0.297	138	0.052	97	0.066	167	0.045	141	0.038	156	0.070	99	0.053	45
DCP 4	.200	1.260	0.303	11	0.361	82	0.127	122	0.059	93	0.076	153	0.028	191	0.057	160	0.026	165	0.020	322
DCP 5	.250	1.220	0.425	12	0.264	74	0.082	72	0.059	84	0.022	110	0.023	82	0.053	137	0.045	69	0.012	64
DCP 6	.300	0.995	0.426	14	0.258	76	0.088	66	0.069	77	0.019	96	0.043	96	0.045	125	0.047	75	0.006	142
DCP 7	.400	0.791	0.423	9	0.111	54	0.048	29	0.004	233	0.012	2	0.002	78	0.014	65	0.029	19	0.023	299
DCP 8	.500	0.616	0.375	12	0.081	42	0.035	26	0.001	225	0.018	30	0.015	13	0.012	19	0.027	15	0.025	292
DCP 9	.600	0.521	0.340	9	0.038	358	0.008	1	0.012	173	0.011	4	0.005	214	0.012	58	0.019	354	0.019	274
DCP10	.878	0.615	0.268	6	0.046	312	0.025	305	0.011	132	0.010	330	0.010	256	0.006	42	0.017	1	0.009	241

DATA TYPE	X/C	RES 10	PHI	RES 11	PHI	RES 12	PHI	RES 13	PHI	RES 14	PHI	RES 15	PHI	RES 16	PHI	RES 17	PHI	RES 18	PHI
ALPHA		0.034	218	0.017	235	0.018	246	0.022	238	0.022	228	0.005	247	0.016	265	0.007	236	0.005	254
CN		0.006	212	0.004	320	0.002	291	0.003	297	0.004	301	0.000	315	0.004	296	0.001	348	0.003	332
CM		0.001	326	0.001	145	0.001	144	0.001	129	0.001	101	0.000	57	0.001	80	0.000	50	0.000	273
DCP 1	.010	0.019	291	0.027	226	0.007	175	0.008	279	0.012	268	0.012	242	0.007	242	0.012	245	0.005	188
DCP 2	.025	0.046	297	0.034	233	0.014	127	0.002	59	0.013	252	0.010	224	0.005	129	0.015	27	0.011	316
DCP 3	.100	0.013	242	0.010	83	0.013	166	0.009	90	0.008	166	0.022	81	0.008	348	0.011	97	0.017	38
DCP 4	.200	0.020	204	0.025	315	0.019	326	0.011	274	0.018	348	0.009	65	0.009	48	0.007	37	0.001	327
DCP 5	.250	0.009	195	0.009	97	0.012	264	0.011	216	0.002	291	0.011	262	0.003	48	0.013	317	0.006	287
DCP 6	.300	0.017	131	0.010	112	0.003	141	0.006	165	0.008	349	0.012	246	0.003	3	0.008	309	0.006	308
DCP 7	.400	0.009	207	0.004	45	0.011	307	0.012	228	0.008	99	0.008	344	0.010	271	0.006	229	0.004	249
DCP 8	.500	0.003	109	0.013	342	0.004	293	0.012	16	0.016	319	0.009	314	0.018	293	0.006	255	0.012	281
DCP 9	.600	0.007	164	0.006	10	0.004	321	0.007	339	0.007	303	0.005	244	0.002	272	0.002	308	0.006	275
DCP10	.878	0.002	231	0.009	278	0.001	85	0.006	291	0.007	245	0.005	122	0.004	230	0.003	104	0.008	82

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Volume II Data Report

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13. ABSTRACT

This report presents a discussion of the test facility, models, and data gathering and reduction system used in the tests of oscillating airfoils. It also contains the actual computer data that resulted from the wind tunnel tests of the airfoils. A set of tables provides a quick cross-reference between the various test factors and the page on which the data appear.

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14. KEY WORDS	LINK A		LINK B		LINK C	
	ROLE	WT	ROLE	WT	ROLE	WT
Airfoil Blade Stall Blade Damping Cambered Profile Symmetrical Profile Translatory Oscillation Computer Data						

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