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# COMBUSTION AND HEAT TRANSFER
## VOLUME 4: COMBUSTION DATA SETS

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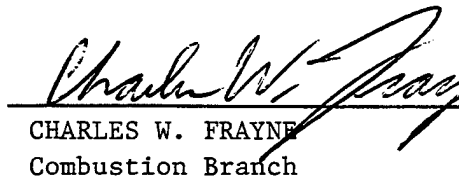

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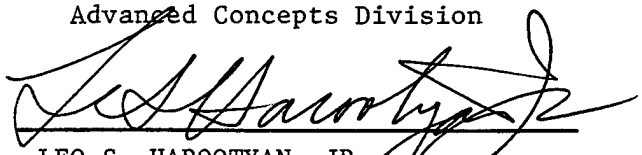

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The objective of the proposed research was to develop a fundamental understanding of the combustion process in a gas turbine combustor. Specifically, we performed WSR experiments, vortex-flame interaction studies, flame stabilization research, and studies of turbine blade film cooling.

In this report, we present the Combustion Data Sets that may be used by modelers in the industry and elsewhere for evaluating and refining computer models. More exhaustive information is available in the individual papers and reports listed here. All data sets were prepared using Microsoft Office 97 for IBM PC-compatible computers and are available on computer diskettes.

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## TABLE OF CONTENTS

## FIGURES

## TABLES

## PREFACE

The University of Dayton Research Institute (UDRI), working under Air Force Contract No. F33615-92-C-2207 submitted this final report to the U.S. Air Force Wright Laboratory, Aero Propulsion and Power Directorate, Wright-Patterson AFB, OH. Mr. Charles Frayne of WL/POSC (now AFRL/PRSC) was the Contract Monitor and Dr. D. R. Ballal of the Aerospace Mechanics Division, UDRI was the Principal Investigator. This report covers work performed during the period June 8, 1992 through December 31, 1997.

The Principal Investigator wishes to express his gratitude and appreciation to Dr. W. M. Roquemore for his encouragement and support and to Ms. Linda Nianouris for her assistance in report preparation.

# 1.0 INTRODUCTION

A long-term goal of the Air Force is to develop high-performance gas turbine engines with combustors that operate at near-stoichiometric conditions, burn broad-specification fuels, and have low maintenance and high durability. Therefore, the objective of the proposed research was to develop a fundamental understanding of the combustion process in a gas turbine combustor by designing a variety of laboratory experiments. Specifically, we completed the following key investigations.

1. WSR experiments to study combustion stability, lean blowout (LBO), and emissions.
2. Flame stabilization and lean blowout studies using a step swirl combustor (SSC).
3. Study of turbulent swirling jet diffusion flame structure and stability.

In this final report, we present the Combustion Data Sets that may be used by modelers in the industry and other laboratories for evaluating and refining computer models of gas turbine combustor. Only a sample of these data sets is presented. An exhaustive amount of information is available in the individual papers and data set reports listed in the next section. All the data sets were prepared using Microsoft Office 97 Software for IBM PC-Compatible computers. These data sets are also available on computer floppy diskettes, CDs, and by accessing the World Wide Web (WWW).

These data sets were obtained in the Fundamental Combustion Laboratory located in Building 490, Test Cells 151,152, and 153 of the Fuels and Lubrication Division (WL/POSF). This test facility is equipped with a toroidal well stirred reactor (WSR), an SSC, and a swirling jet diffusion flame combustor. A brief description of the test facility and test conditions is given. Next, selected (and sample) data sets are presented on WSR experiments, SSC tests, and turbulent swirling flame measurements. An analysis, discussion, and interpretation of these data and results are presented in a separate "combustion studies" report.

## 2.0 DESCRIPTION OF TEST FACILITY

### 2.1 Well Stirred Reactor (WSR) Experiments

#### 2.1.1 Test Facility and Instrumentation

Figure 1 shows a 250-ml toroidal WSR that was used for this experiment. This reactor was constructed of alumna cement, and featured a jet ring with 32 stainless steel jets, 1 mm I.D., to inject the fuel-air mixture at high subsonic velocity (Ma = 0.42 to 0.85). Figure 2 provides a schematic of the test facility and instrumentation.

The Horiba Emissions Analyzers comprised the following units: Model MPA-510 oxygen analyzer (0 to 50 volume percent), Model FIA-510 total hydrocarbon analyzer (0 to 10,000 ppm carbon), Model VIA-510 CO (0 to 20 volume percent) and $CO_2$ (0 to 100 volume percent) analyzer, and Model CLA-510 SS NO and $NO_X$ analyzer (0 to 2000 ppmV). These units were calibrated with gases of the following concentrations: hydrocarbon = 404 ppmV propane, NO = 92 ppmV, $NO_2$ = 1.6 ppmV, CO = 0.4 volume percent, $O_2$ = 4.03 or 5.02 volume percent and $CO_2$ = 11.06 volume percent. Water was scrubbed from the sample gas to a maximum dew point of 5C. All emissions are quoted on dry standard air basis.

A gas sample was drawn from the WSR by a water-cooled stainless steel probe. Hydrocarbon speciation at LBO conditions was performed by collecting sample gas in a Tedlar bag and directly injecting sample into a gas chromatograph-flame ionization detector (GC-FID, Hewlett-Packard HP 5890 A). Combustion temperature, $T_f$, was measured by insertion of a Type B thermocouple (platinum-6% rhodium, platinum-30% rhodium) coated with alumna ceramic. Temperature measurements were corrected for heat loss by conduction and radiation to colder reactor walls, and heat gain by convection and catalysis. A vaporizer was built to prevaporize liquid fuels, mix the vaporized fuel with air, and then supply this combustible mixture to the WSR.

#### 2.1.2 Test Conditions

Our test matrix is shown in Table 1. The WSR operated over the range of equivalence ratios $\phi$ = 0.43 to 0.88, loading parameter (LP) ~ 1.3 g-mol/sec·L·atm$^{1.75}$, residence times $\tau$ ~ 5 to 8 msec and reactor temperatures $T_f$ = 1350 to 2000 K. Hydrocarbons tested were: methane, ethane, cyclohexane, n-heptane, n-dodecane, toluene, ethylbenzene and a gaseous mix of 15 percent methane, 25 percent ethane, 60 percent ethylene by volume (a cracked fuel simulant).

Emissions measurements were performed for all test conditions shown. A volumetric mix of 13 percent $CH_4$, 22 percent $C_2H_6$, 52 percent $C_2H_4$, 13 percent $C_7H_8$ by volume, giving a carbon number, CN = 2.52 and carbon to hydrogen mole ratio, (C/H) = 0.5081 was selected as simulant for heavy, aromatic-containing fuels that are cracked using thermal or catalytic processes into light fractions with residual light aromatics. Additionally, several of the leanest conditions shown represented LBO, at which point bag sample emissions data were collected.

#### 2.1.3 Error Analysis

Gaseous fuel flow was monitored to within $\pm$2 percent of reading using a Gilmont rotameter. Airflow was monitored to within $\pm$2 percent of full scale using a Brooks rotameter. The combined error produced an uncertainty of $\pm$3.5 percent in $\phi$ during combustion of methane in air. Nozzle air was monitored to within $\pm$2 percent of full scale using a Gilmont rotameter. Liquid hydrocarbons were controlled to within $\pm$0.3 g/min by the liquid fuel delivery system. The

combined error produced an uncertainty of $\pm$3.5 percent in $\phi$ during combustion of a liquid fuel in air. The $T_f$ measurements using the calorimetric method were repeatable at a given $\phi$ from day-to-day within $\pm$30 K. Also, calibrated thermocouples agreed with the measurements using the calorimetric method within $\pm$30 K. The Horiba emissions analyzers have an accuracy within one percent of full scale. This represented an error of 2 ppmV $NO_X$, 50 ppmV CO, 10 ppmV carbon for UHC, 0.25 volume percent $O_2$, and 0.5 volume percent $CO_2$. Residence time was typically controllable to within $\pm$0.6 msec. Additionally, CO measurements were repeatable from day to day within $\pm$100 ppmV, and $NO_X$ within $\pm$1.5 ppmV. UHC measurements at very lean conditions suffered from poor repeatability due to variance in the LBO condition. This issue is discussed in detail later. Finally, the sampling system was capable of measuring approximately 90 percent of the CO concentration simulated to be the WSR product concentration at $\phi = 0.6$, $\tau = 7.0$ msec. This suggests that probe oxidation reactions are minimized by the water-cooled stainless steel probe design.

## 2.2 Step Swirl Combustor (SSC) Experiments

### 2.2.1 Test Facility and Instrumentation

Figure 3 shows a schematic diagram of SSC, which has a 150-x150-mm cross section, length of 754 mm, and a step height of 55 mm. Fuel is supplied to the combustor by the annular fuel tube (20 mm i.d. and 29 mm o.d.) coaxially sandwiched between swirling air streams; the inner air jet (20 mm dia.) and the outer annular air jet (29 mm i.d. and 40 mm o.d.). The combustor exit has a 45% blockage orifice plate on top that simulates the back pressure exerted by the dilution jets in a practical gas turbine combustor. The SSC has quartz windows on all four sides to permit visual observations and laser diagnostics measurements. Stationary helical vane swirlers were located 25 mm upstream from the burner tube exit in each of the air passages. The inner swirler had six vanes with a central 1.4 mm dia. hole to prevent the flame from anchoring to the swirler. The outer swirler had 12 vanes. Inner swirler lengths are 25, 19, and 19 mm, respectively, for 30°, 45°, and 60° swirlers; outer swirler lengths are 32, 25, and 19 mm, respectively, for 30°, 45°, and 60° swirlers. We used flow visualization, CARS system for temperature measurements, and the LDA system for velocity measurements. The CARS and LDA systems are described below.

CARS System: A Coherent Anti-Stokes Raman Spectroscopy (CARS) optics system was used for unintrusive flame temperature measurements. Briefly, the CARS signal was generated by combining two 30 mJ doubled Nd:Yag beams at 532nm and one 25 mJ broad band dye laser beam centered at 607nm and pumped by the same Nd:Yag laser. The pulse laser and detector camera run at 10 Hz. A Boxcars configuration with an ellipsoidal probe volume approximately 25$\mu$m (dia.) x 250$\mu$m (length) was used for collecting the signal. The detector is a Princeton Instruments intensified 576x384 charge coupled device (CCD). The intensifier is triggered by a Princeton PG-10 pulsar. A Princeton ST-130 controller operates the camera and the detector chiller. The collection process is controlled by Princeton's ST-130 CSMA software package running on a personal computer. Spectra are fit to a library of spectra by a nonlinear fitting routine running on a personal computer. A total of 250 samples was taken for each CARS temperature measurement.

LDA System: Unintrusive velocity measurements were made using a Dantec Fiber-Flow LDA system. Essentially, the 2-D LDA system uses the 514nm and 488nm lines from an Argon-ion laser. The laser output is directed into a Dantec Fiber flow transmitter where the colors are

separated and directed to optical fiber couplers by a Bragg cell operating at 40 MHz. The four beams are guided to the probe via polarization preserving fibers. The recollimated and focused laser beams cross to produce an ellipsoidal probe volume approximately 100μm (dia.) x 1000μm (length). A fluidized-bed seeder was used to inject submicron-sized (97% < 1μm) $ZrO_2$ particles into each burner tube passage. Velocity biasing was resolved by seeding one passage at a time. The forward scattered signal is collected and separated by diachronic mirrors before it is detected by photo multiplier tubes and processed by individual TSI burst counters. Typical coincident sampling rates exceeded 1 kHz in flames. A total of 2048 coincident samples were collected for each velocity measurement. Custom-designed software was used to reduce the data on a personal computer. Three-component noncoincident velocity measurements were made with the 2D LDA system by scanning in the transverse and radial directions to get axial and tangential velocities, and axial and radial velocities, respectively.

### 2.2.2 Test Conditions

Table 2 lists the experimental test conditions for the SSC. Since increasing the inner vane angle increases turbulent mixing and strengthens the inner recirculation zone; these changes dramatically affect the flame structure and the stability characteristics. Therefore, experiments were performed to reveal the differences in flame structure by changing the inner vane angle. Test conditions were also chosen to compare: (i) attached versus lifted flames and (ii) co versus counterswirl configurations.

Experimental measurements included flame photography, three-component mean and rms velocities, mean and rms temperatures, and LBO. The LBO data were collected by maintaining a constant airflow rate, heating the combustor to a near steady-state temperature at stoichiometric fuel-air ratio, and then gradually decreasing the fuel flow rate until blowout occurred.

### 2.2.3 Error Analysis

For obtaining flame temperature, usually, 500 samples were taken for each CARS measurement to ensure that the error in the rms temperature was less than 10 K, while 1500 samples were taken in the flame region where the rms values were expected to be large. Overall, we estimated the CARS mean temperature measurement accuracy to be within 50 K, while the precision was well within 20 K. Unlike the LDA, CARS temperature measurements are time-averaged, without the density biasing effects. We also discovered that once system parameters are optimized and the dye laser is tuned, the CARS system can run for long periods of time. For example, we obtained repeatability to within $\pm$20 K for a mean flame temperature of 1500 K after 4 days of operation.

In processing the LDA Doppler burst signal to obtain velocity measurements, typically a total of $2^5$ cycles/burst are requested and the spurious data are filtered by using the 3s test. The error in rms velocity was less than 3 percent and uncertainty in mean velocity was less than 1 percent at a 95 percent confidence limit. However, in recirculatory and reactive flows, the velocity statistical biasing was worst. We found that the mean values can be overestimated up to 7 percent and the rms values underestimated up to 5 percent for turbulence intensity levels above 20 percent. The flow rates calculated from integrating the velocity profiles were 3 percent or less than the measured flow rates. This difference is partly attributed to the plus-or-minus 1 percent measurement accuracy of the mass flow controller. To eliminate velocity biasing due to non-uniform seeding, a conditional data sampling technique was used by seeding particles into only the

fuel jet or the annular coflowing air. This type of technique allowed us to track the convection and diffusion of one (seeded) fluid into another (unseeded) fluid.

## 2.3 Turbulent Swirling Flame Experiments

### 2.3.1 Test Facility and Instrumentation

Figure 4 shows the schematic of a turbulent swirling jet diffusion flame combustor. This combustor consists of a central fuel tube (9.45-mm inner diameter, 0.2-mm lip thickness, 806-mm length) and a concentric annular-air tube (26.92-mm inner diameter), centered in a vertical test section (150 x 150-mm square cross section with rounded corners, 486-mm length), through which external air is supplied. The test section has four quartz windows for laser diagnostic measurements. A helical vane swirler unit is placed in the annulus channel 96 mm upstream from the jet exit. We used flow visualization, CARS system for temperature measurements and LDA system for velocity measurements. The CARS and LDA systems are described below.

CARS System: The CARS optics layout was used for temperature measurements. The laser source is provided by a Nd:Yag pulse laser with a 10-ns time resolution and a Boxcars configuration is used. The probe volume is approximately 25-μm by 250-μm. The CARS signal is collected by a Spex 1702 spectrometer, 2-D charge coupled diode (CCD) camera from Princeton instruments, and Tracor-Northern multi channel analyzer. A total of 250 samples were taken for each CARS temperature measurements. The raw data is processed by in-house software on a personal computer.

LDA System: A custom-made three-component LDA system was used for velocity measurements. This is a three-beam two component (axial and radial) set using a 514.5 nm line of an 18 W argon-ion laser with a component separation based on polarization. A two-beam third component (tangential) set uses a 488.0 nm line with separation by color. Since the third component is normal to the first and second components, the measurement volume had a quasi-spherical shape of 100 μm diameter and the calculated fringe spacing was 3.6 μm. The LDA system has Bragg cell frequency shifting (10 MHz for the first and second channels and 30 MHz for the third channel) for measurements in recirculatory flows, 4-$\sigma$ filtering software for spurious signals, for example, due to seed agglomeration, and a correction subroutine to account for the LDA signal biasing effects in combusting flows. A fluidized-bed seeder was used to inject sub micron-sized (0.1 μm) $ZrO_2$ particles into each passage. Counter type (TSI 1990C) signal processors and tailor-made coincidence circuit ensured valid data rate acquisition. All the LDA signals were processed using our custom-designed software which calculates intensity, shear stresses, higher moments (skewness and kurtosis), and pdfs. Typical LDA sampling rates exceeded 1 kHz for both isothermal and combusting flow measurements.

### 2.3.2 Test Conditions

Table 3 shows the test conditions employed using gaseous hydrogen as the fuel. All tests were performed at room temperature and atmospheric pressure. The fuel jet, air jet, and the external coflowing stream velocities were up to 30 m/s, 10 m/s, and 0.5 m/s, respectively. The flame stability limits were measured as follows. For a fixed annular- and coflowing-airflow rates, the fuel flow rate was increased gradually until the flame attached to the burner-rim, lifted above the burner, or simply extinguished (blowoff). Now, at the lift condition, fuel flow was: (1) decreased

until the flame reattached to the burner-rim (dropback), or (2) increased until the lifted flame extinguished (blowout). A three-component LDA, CARS, and Mie scattering systems were used for a variety of conditioned and unconditioned measurements of mean and turbulent quantities. For a set of values of jet, annulus, and external velocity, measurements extending up to 34 jet diameters were made at a large number of radial locations up to X 3.2 jet diameters.

### 2.3.3 Error Analysis

LDA Precision and Accuracy: In processing the LDA Doppler burst signal, typically a total of $2^5$ cycles/burst are requested and the spurious data are filtered by using the 3s test. The error in rms velocity was less than 3 percent and uncertainty in mean velocity was less than 1 percent at a 95 percent confidence limit. However, in recirculatory and reactive flows, the velocity statistical biasing was worst. We found that the mean values can be overestimated up to 7 percent and the rms values underestimated up to 5 percent for turbulence intensity levels above 20 percent. The flow rates calculated from integrating the velocity profiles were 3 percent or less than the measured flow rates. This difference is partly attributed to the plus-or-minus 1 percent measurement accuracy of the mass flow controller. To eliminate velocity biasing due to non-uniform seeding, a conditional data sampling technique was used by seeding particles into only the fuel jet or the annular coflowing air. This type of technique allowed us to track the convection and diffusion of one (seeded) fluid into another (unseeded) fluid.

CARS Precision and Accuracy: Usually, 500 samples were taken for each CARS measurement to ensure that the error in the rms temperature was less than 10 K, while 1500 samples were taken in the flame region where the rms values were expected to be large. Overall, we estimated the CARS mean temperature measurement accuracy to be within 50 K, while the precision was well within 20 K. Unlike the LDA, CARS temperature measurements are time-averaged, without density biasing effects. We also discovered that once system parameters are optimized and the dye laser is tuned, the CARS system can run for long periods of time. For example, we obtained repeatability to within X 20 K for a mean flame temperature of 1500 K after four days of operation.

**Table 1: Well Stirred Reactor (WSR) Test Matrix.**

| Hydrocarbon | Carbon Number | (C/H) | $\tau$ (msec) | $\phi_{min}$ | $\phi_{max}$ | $T_{f\,min}$ (K) | $T_{f\,max}$ (K) |
|---|---|---|---|---|---|---|---|
| Methane | 1 | 0.25 | 7.3 | 0.55 | 0.88 | 1507 | 1967 |
| | | | 6.32 | 0.59 | 0.83 | 1517 | 1918 |
| Ethane | 2 | 0.333 | 7.26 | 0.48 | 0.84 | 1407 | 1996 |
| Cyclohexane | 6 | 0.5 | 7.47 | 0.48 | 0.82 | 1429 | 1981 |
| | | | 5.22 | 0.51 | 0.78 | 1536 | 1922 |
| n-Heptane | 7 | 0.4375 | 7.19 | 0.53 | 0.84 | 1517 | 1975 |
| | | | 5.49 | 0.54 | 0.81 | 1595 | 1974 |
| Toluene | 7 | 0.875 | 7.32 | 0.46 | 0.79 | 1499 | 1946 |
| | | | 5.35 | 0.5 | 0.78 | 1552 | 1936 |
| Ethylbenzene | 8 | 0.8 | 7.43 | 0.48 | 0.76 | 1478 | 1958 |
| | | | 5.33 | 0.49 | 0.67 | 1546 | 1839 |
| Cracked Fuel Simulant | 2.52 | 0.5081 | 6.75 | 0.49 | 0.77 | 1530 | 2007 |
| | | | 5.17 | 0.46 | 0.76 | 1391 | 1969 |
| n-Dodecane | 12 | 0.4615 | 7.39 | 0.46 | 0.8 | 1357 | 1979 |
| | | | 5.2 | 0.55 | 0.79 | 1581 | 1983 |

**Table 2: Step Swirl Combustor (SSC) Test Conditions.**

| Variable | Range |
|---|---|
| Inner vane angle (deg.) | 0, 30 and 45 |
| Outer vane angle (deg.) | 30 |
| Vane configuration | Co- and counter-swirl |
| Inner air velocity (m/s)<br>Re | 14.4<br>18,000 |
| Outer air velocity (m/s)<br>Re | 8.6<br>14,800 |
| Fuel velocity (m/s)<br>Re | 2.5<br>3,200 |
| Equivalence ratio | 0.9 |
| Fuel | Methane |

**Table 3: Experimental Test Conditions for Turbulent Swirling Jet Diffusion Flames.**

| Case | θ (deg.) | Uj (m/s) | Ua (m/s) | Uc (m/s) |
|---|---|---|---|---|
| 1 | 0 | 25 | 4 | 1 |
| 2 | 0 | 100 | 20 | 4 |
| 3 | 30 | 100 | 20 | 4 |
| 4 | 45 | 100 | 20 | 4 |

## 3.0 LIST OF RELEVANT PUBLICATIONS

### Journal Publications


1. F. Takahashi and M. D. Vangsness, "Near-Field CARS Measurements and the Local Extinction of Turbulent Jet Diffusion Flames," *Dynamics of Heterogeneous Combustion and Reacting Systems,* AIAA Progress in Astronautics and Aeronautics Series, Vol. 152, pp. 37-55, 1993.

2. D. R. Ballal, M. D. Vangsness, S. P. Heneghan, and G. J. Sturgess, "Studies of Lean Blowout in a Research Combustor," *NATO Advisory Group on Aerodynamics Research and Development*, AGARD-CP-536, Paper Number 18, 1993.

3. M. D. Durbin and D. R. Ballal, "Studies of Lean Blowout in a Step Swirl Combustor," *Transactions of ASME, Journal of Gas Turbine and Power*, Vol. 118, pp. 72-78, Jan. 1996.

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11. M. D. Durbin and D. R. Ballal, "Optimizing the Combustion Performance of a Step Swirl Combustor," AIAA Paper No. 94-3825, *Proceedings of 29th Intersociety Energy Conversion Engineering Conference*, pp. 631-635, AIAA, Washington D.C., 1994.

12. J. Zelina, R. C. Striebich, and D. R. Ballal, "Pollutant Emissions Research Using a Well Stirred Reactor," AIAA Paper No. 94-3827, *in Proceedings of 29th Intersociety Energy Conversion Engineering Conference*, pp. 644-648, AIAA, Washington D.C., 1994.

13. M. D. Durbin and D. R. Ballal, "Studies of Combustion and Emissions in a Model Step Swirl Combustor," *Proceedings of the FACT Vol. 18, pp. 17-21, ASME (Int.) Joint Power Generation Conference,* New York, NY, 1994.

14. J. Zelina and D. R. Ballal, "Studies of Pollutant Emissions in a Well Stirred Reactor," *Proceedings of the FACT Vol. 18, pp. 12-16, ASME (Int.) Joint Power Generation Conference,* New York, NY, 1994.

15. F. Takahashi, M. D. Vangsness, and M. D. Durbin, "Stabilization of Hydrogen-Jet Diffusion Flames With and Without Swirl," *Transport Phenomenon In Combustion*, (S. H. Chan, Ed.) Vol. 1, pp. 593-604, Taylor & Francis, Washington D.C., 1996.

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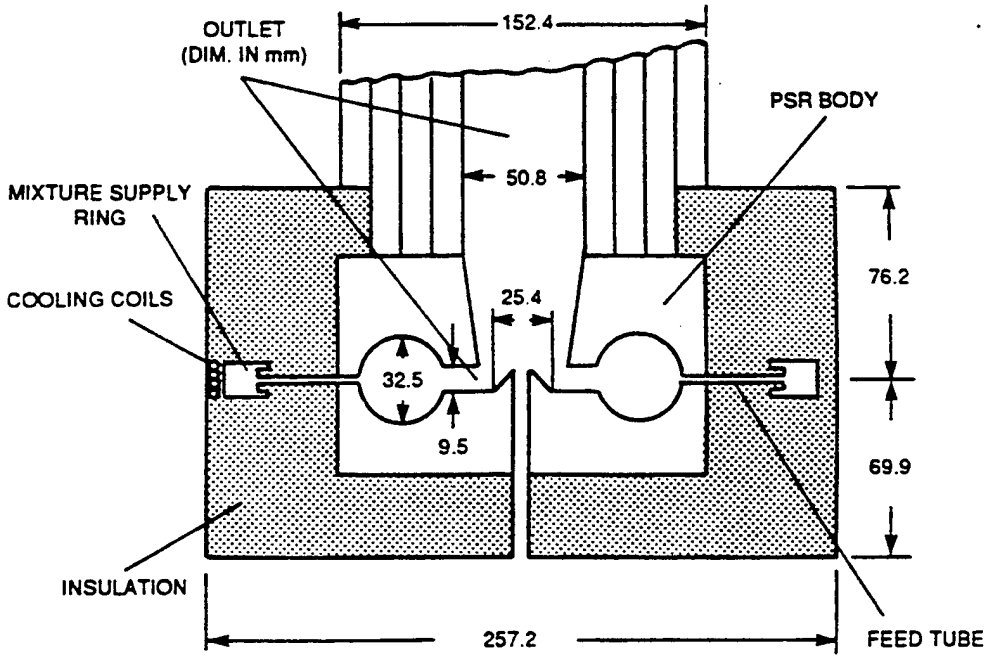


**Fig. 1: Schematic diagram of a toroidal WSR (dimensions in mms)**

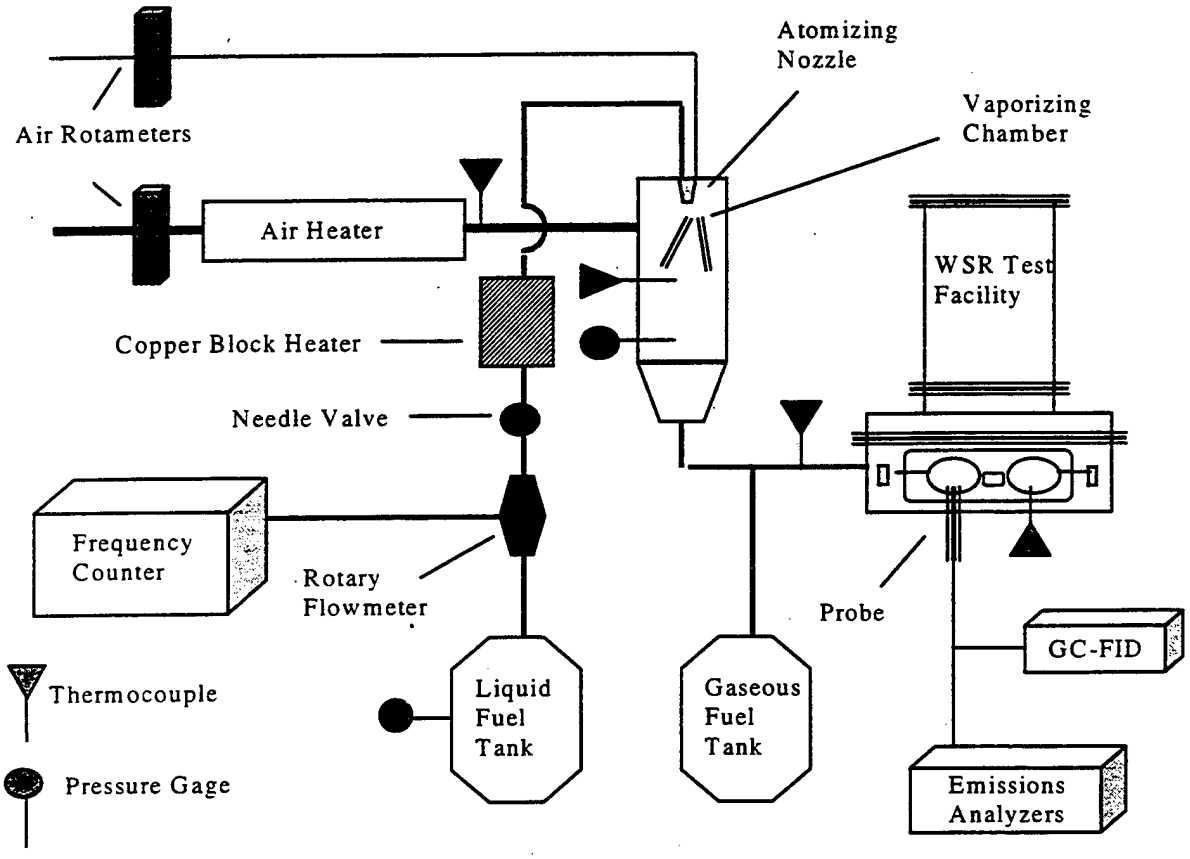


**Fig. 2: WSR test facility and associated instrumentation.**

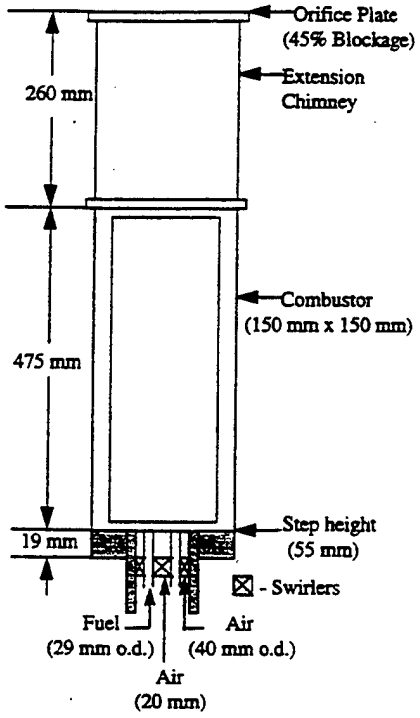


**Fig. 3. Schematic of a Step Swirl Combustor.**

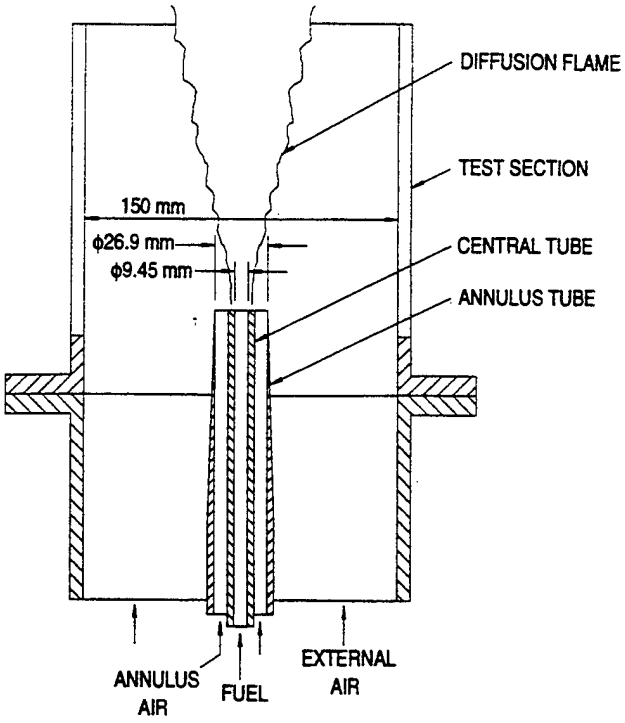


**Fig. 4. Schematic of a swirling jet diffusion flame combustor**

# APPENDIX A
# WELL STIRRED REACTOR (WSR)
# (SELECTED DATA SET)

Table 1

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **n-Heptane Data** | | | | | | | |
| | | | | | | | |
| **CO2 (vol %)** | **O2 (vol %)** | **THC (ppmC)** | Sample Temp (C) | **Fuel/Air Temp (C)** | m fuel (kg/s) | Q NOx (slpm) | m NOx (g/s) |
| **5.99** | **13.66** | **15.54** | 37.48 | **46.05** | 0.000285402 | 0.000461926 | 1.47047E-05 |
| **6.22** | **12.38** | **8.78** | 35.99 | **46.79** | 0.000287163 | 0.00079334 | 2.52547E-05 |
| **6.52** | **11.19** | **4.93** | 36.73 | **46.77** | 0.000289859 | 0.001021629 | 3.25219E-05 |
| **6.77** | **10.78** | **3.77** | 38.81 | **46.48** | 0.000293094 | 0.00073678 | 2.34542E-05 |
| **6.95** | **14.03** | **2.47** | 36.76 | **46.64** | 0.000294509 | 0.001540609 | 4.90427E-05 |
| **7.06** | **16.08** | **1.98** | 37.30 | **46.33** | 0.000295464 | 0.00166663 | 5.30544E-05 |
| **7.23** | **16.04** | **1.80** | 39.51 | **45.84** | 0.000298376 | 0.001666583 | 5.30529E-05 |
| **7.42** | **15.88** | **1.52** | 39.16 | **46.15** | 0.000297397 | 0.001986506 | 6.32371E-05 |
| **7.60** | **16.29** | **1.18** | 38.26 | **45.98** | 0.000297886 | 0.002363961 | 7.52528E-05 |
| **7.75** | **16.31** | **0.96** | 38.55 | **45.94** | 0.000298376 | 0.002902822 | 9.24065E-05 |
| **8.07** | **14.43** | **0.87** | 41.10 | **45.73** | 0.000302381 | 0.003299521 | 0.000105035 |
| **8.39** | **13.41** | **0.74** | 40.32 | **44.84** | 0.000311937 | 0.004427578 | 0.000140945 |
| **8.46** | **14.01** | **0.50** | 39.54 | **45.10** | 0.000311385 | 0.005078365 | 0.000161661 |
| **8.71** | **12.98** | **0.39** | 41.66 | **44.77** | 0.000313049 | 0.006017739 | 0.000191565 |
| **8.94** | **11.58** | **0.40** | 43.36 | **44.34** | 0.000315873 | 0.007597016 | 0.000241838 |
| **9.11** | **11.19** | **0.30** | 42.60 | **43.70** | 0.000316446 | 0.00913821 | 0.0002909 |
| **9.36** | **10.92** | **0.16** | 42.29 | **43.27** | 0.000317022 | 0.011121049 | 0.00035402 |
| **9.58** | **9.97** | **0.10** | 44.56 | **43.34** | 0.000318765 | 0.012663211 | 0.000403112 |
| **9.75** | **8.78** | **0.12** | 46.70 | **42.83** | 0.000324149 | 0.0148748 | 0.000473514 |
| **9.90** | **8.62** | **0.05** | 45.18 | **42.79** | 0.000324762 | 0.017341063 | 0.000552024 |
| **9.94** | **8.43** | **0.00** | 47.81 | **41.77** | 0.000324149 | 0.019061625 | 0.000606795 |

Table 1 cont.

**n-Heptane Data**

| EI NOx | Q CO (slpm) | m CO (g/s) | EI CO | Q THC (slpm) | m THC (g/s) | EI THC | η | AFT | From calorimetri Tf (K) |
|---|---|---|---|---|---|---|---|---|---|
| **0.05** | 1.059430055 | 0.020482314 | **71.77** | 0.006419935 | 7.11436E-05 | **0.25** | **0.983600757** | 1590 | 1570 |
| **0.09** | 0.922163828 | 0.017828501 | **62.09** | 0.003556413 | 3.9411E-05 | **0.14** | **0.985891477** | 1618 | 1600 |
| **0.11** | 0.766666559 | 0.01482222 | **51.14** | 0.001942141 | 2.15222E-05 | **0.07** | **0.988418412** | 1658 | 1643 |
| **0.08** | 0.67427854 | 0.013036052 | **44.48** | 0.001457492 | 1.61514E-05 | **0.06** | **0.989935935** | 1693 | 1680 |
| **0.17** | 0.626955919 | 0.012121148 | **41.16** | 0.000940867 | 1.04264E-05 | **0.04** | **0.990702836** | 1714 | 1701 |
| **0.18** | 0.608062694 | 0.011755879 | **39.79** | 0.000744042 | 8.24523E-06 | **0.03** | **0.991018443** | 1733 | 1720 |
| **0.18** | 0.591844621 | 0.011442329 | **38.35** | 0.000669736 | 7.42179E-06 | **0.02** | **0.991345356** | 1757 | 1744 |
| **0.21** | 0.573612066 | 0.011089833 | **37.29** | 0.000548287 | 6.07593E-06 | **0.02** | **0.991588108** | 1789 | 1777 |
| **0.25** | 0.579002354 | 0.011194046 | **37.58** | 0.000417685 | 4.62865E-06 | **0.02** | **0.991528038** | 1811 | 1798 |
| **0.31** | 0.590004965 | 0.011406763 | **38.23** | 0.000336144 | 3.72504E-06 | **0.01** | **0.99138457** | 1827 | 1814 |
| **0.35** | 0.640894491 | 0.012390627 | **40.98** | 0.000296169 | 3.28204E-06 | **0.01** | **0.990767944** | 1879 | 1865 |
| **0.45** | 0.738219998 | 0.014272253 | **45.75** | 0.000252901 | 2.80257E-06 | **0.01** | **0.989694875** | 1918 | 1902 |
| **0.52** | 0.759012258 | 0.014674237 | **47.13** | 0.000166691 | 1.84721E-06 | **0.01** | **0.989389172** | 1935 | 1918 |
| **0.61** | 0.838610228 | 0.016213131 | **51.79** | 0.000129309 | 1.43296E-06 | **0.00** | **0.988340638** | 1966 | 1947 |
| **0.77** | 0.926864394 | 0.017919378 | **56.73** | 0.000128582 | 1.4249E-06 | **0.00** | **0.987229353** | 2002 | 1981 |
| **0.92** | 1.000747963 | 0.019347794 | **61.14** | 9.68792E-05 | 1.07358E-06 | **0.00** | **0.986237794** | 2025 | 2002 |
| **1.12** | 1.11776253 | 0.021610076 | **68.17** | 5.14127E-05 | 5.69738E-07 | **0.00** | **0.984658515** | 2054 | 2028 |
| **1.26** | 1.215337339 | 0.023496522 | **73.71** | 2.98897E-05 | 3.31228E-07 | **0.00** | **0.983411422** | 2098 | 2069 |
| **1.46** | 1.337551537 | 0.02585933 | **79.78** | 3.65914E-05 | 4.05494E-07 | **0.00** | **0.982046378** | 2121 | 2089 |
| **1.70** | 1.437255479 | 0.027786939 | **85.56** | 1.44672E-05 | 1.60321E-07 | **0.00** | **0.980745331** | 2148 | 2113 |
| **1.87** | 1.45230253 | 0.028077849 | **86.62** | 1.37137E-07 | 1.51971E-09 | **0.00** | **0.980507457** | 2155 | 2119 |

Table 1 cont.

| n-Heptane Data | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | From calorimetri |
| **EI NOx** | Q CO (slpm) | m CO (g/s) | **EI CO** | Q THC (slpm) | m THC (g/s) | **EI THC** | η | AFT | Tf (K) |
| **0.09** | 0.199980338 | 0.003866287 | **51.97** | | | | **0.988304063** | 1609 | 1594 |
| **0.14** | 0.206134032 | 0.003985258 | **53.56** | | | | **0.987946816** | 1638 | 1622 |
| **0.14** | 0.177440915 | 0.003430524 | **46.12** | | | | **0.989620444** | 1665 | 1651 |
| **0.24** | 0.180691202 | 0.003493363 | **46.97** | | | | **0.98943021** | 1757 | 1741 |
| **0.29** | 0.184496759 | 0.003566937 | **47.97** | | | | **0.98920566** | 1777 | 1761 |
| **0.50** | 0.221805705 | 0.004288244 | **57.67** | | | | **0.987021801** | 1877 | 1857 |
| **0.69** | 0.256003564 | 0.004949402 | **66.57** | | | | **0.98501982** | 1925 | 1901 |
| **0.87** | 0.285354386 | 0.005516851 | **74.21** | | | | **0.983299837** | 1959 | 1932 |
| **1.19** | 0.335390468 | 0.006484216 | **87.22** | | | | **0.98037151** | 2024 | 1990 |
| **1.47** | 0.367646451 | 0.007107831 | **95.63** | | | | **0.978480798** | 2048 | 2011 |
| **1.80** | 0.411627828 | 0.007958138 | **107.07** | | | | **0.975906466** | 2106 | 2063 |

Table 2

| Methane Data | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | From CETPC | |
| EI NOx | Q CO (slpm) | m CO (g/s) | EI CO | Q THC (slpm) | m THC (g/s) | EI THC | η | Tad-Q | Tf |
| **0.11** | 1.427523187 | 0.027598782 | **114.05** | 0.19555159 | 0.002167038 | **8.96** | **0.967989737** | 1535.25 | 1495 |
| **0.03** | 1.051367361 | 0.020326436 | **82.49** | 0.06760117 | 0.000749134 | **3.04** | **0.980286054** | 1586.77 | 1561 |
| **0.05** | 0.859019275 | 0.016607706 | **66.79** | 0.027631006 | 0.000306198 | **1.23** | **0.985266762** | 1619.52 | 1600 |
| **0.09** | 0.671099161 | 0.012974584 | **51.27** | 0.00687036 | 7.6135E-05 | **0.30** | **0.989336131** | 1652.34 | 1638 |
| **0.24** | 0.596006265 | 0.011522788 | **45.13** | 0.004185381 | 4.6381E-05 | **0.18** | **0.990694899** | 1684.33 | 1671 |
| **0.21** | 0.542003872 | 0.010478742 | **40.87** | 0.001251105 | 1.38643E-05 | **0.05** | **0.991685064** | 1715.81 | 1704 |
| **0.24** | 0.52599762 | 0.010169287 | **40.36** | 0.001255174 | 1.39094E-05 | **0.06** | **0.991786622** | 1730.3 | 1718 |
| **0.28** | 0.523015258 | 0.010111628 | **40.13** | 0.001262387 | 1.39893E-05 | **0.06** | **0.991832561** | 1744.89 | 1733 |
| **0.37** | 0.550303166 | 0.010639195 | **41.49** | 0.000843583 | 9.34831E-06 | **0.04** | **0.991576184** | 1774.63 | 1762 |
| **0.47** | 0.595696147 | 0.011516792 | **43.96** | 9.64195E-05 | 1.06849E-06 | **0.00** | **0.99110907** | 1806.03 | 1792 |
| **0.59** | 0.697880309 | 0.013492353 | **50.65** | 0.000111834 | 1.23931E-06 | **0.00** | **0.989757591** | 1850.54 | 1834 |
| **0.75** | 0.795270891 | 0.015375237 | **57.48** | 0.00012912 | 1.43087E-06 | **0.01** | **0.988376604** | 1878.43 | 1860 |
| **0.87** | 0.857125657 | 0.016571096 | **61.44** | 0.000796063 | 8.82171E-06 | **0.03** | **0.987548675** | 1904.58 | 1884 |
| **1.05** | 1.026408596 | 0.0198439 | **72.09** | 0.00078427 | 8.69101E-06 | **0.03** | **0.985396947** | 1933.74 | 1910 |
| **1.38** | 1.266021044 | 0.024476407 | **88.20** | 0.000315169 | 3.49259E-06 | **0.01** | **0.982158043** | 1986.33 | 1956 |
| **1.48** | 1.414584955 | 0.027348642 | **95.87** | 0.000417878 | 4.63078E-06 | **0.02** | **0.980604783** | 2013.27 | 1980 |
| **1.69** | 1.454991767 | 0.028129841 | **100.56** | 0.000399233 | 4.42416E-06 | **0.02** | **0.979656163** | 2024.65 | 1989 |
| | | | | | | | | | |
| **0.01** | 2.081849623 | 0.040249093 | **129.04** | 0.382188713 | 0.004235288 | **44.25** | **0.929666485** | 1639 | 1544 |
| **0.05** | 1.609074163 | 0.031108767 | **100.45** | 0.148141576 | 0.001641656 | **3.33** | **0.976363527** | 1658 | 1625 |
| **0.15** | 1.038756601 | 0.020082628 | **65.55** | 0.02233 | 0.000247454 | **0.17** | **0.986579441** | 1710 | 1691 |
| **0.26** | 1.013079036 | 0.019586195 | **62.79** | 0.020247437 | 0.000224375 | **0.09** | **0.987217042** | 1725 | 1707 |
| **0.24** | 0.81889749 | 0.015832018 | **53.02** | 0.009761912 | 0.000108178 | **0.05** | **0.989234829** | 1742 | 1727 |
| **0.22** | 0.804098926 | 0.015545913 | **51.87** | 0.00629188 | 6.97245E-05 | **0.03** | **0.989481075** | 1764 | 1748 |
| **0.37** | 0.753472682 | 0.014567139 | **48.07** | 0.004207839 | 4.66299E-05 | **0.01** | **0.990269466** | 1810 | 1796 |
| **0.46** | 0.73789678 | 0.014266004 | **47.43** | 0.003174239 | 3.51759E-05 | **0.01** | **0.990405443** | 1837 | 1822 |
| **0.43** | 0.76937639 | 0.01487461 | **49.09** | 0.003433161 | 3.80451E-05 | **0.01** | **0.990068424** | 1886 | 1870 |
| **0.56** | 0.877654443 | 0.016967986 | **55.39** | 0.002509377 | 2.78081E-05 | **0.01** | **0.988799157** | 1939 | 1920 |
| **0.76** | 0.994381061 | 0.019224701 | **61.42** | 0.001894361 | 2.09927E-05 | **0.00** | **0.987582435** | 1981 | 1960 |
| **0.77** | 1.015595233 | 0.019634841 | **63.63** | 0.003499969 | 3.87855E-05 | **0.01** | **0.98713276** | 2001 | 1979 |
| **0.95** | 1.206618849 | 0.023327964 | **73.74** | 0.002248064 | 2.49123E-05 | **0.00** | **0.985091391** | 2034 | 2008 |
| **1.18** | 1.412699972 | 0.027312199 | **85.14** | 0.001635632 | 1.81255E-05 | **0.00** | **0.982788221** | 2060 | 2030 |
| | | | | | | | | | |

Table 3

| **Toluene Data** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | From calorimetri |
| **EI NOx** | Q CO (slpm) | m CO (g/s) | **EI CO** | Q THC (slpm) | m THC (g/s) | **EI THC** | η | AFT | Tf (K) |
| | 1.52282931 | 0.029441367 | **107.33** | 0.285034644 | 0.003158659 | **11.52** | **0.961744428** | | |
| **0.00** | 1.15075837 | 0.022247995 | **71.25** | | | | **0.982248081** | 1585 | 1562 |
| **0.00** | 0.954687271 | 0.018457287 | **58.34** | | | | **0.985465699** | 1625 | 1606 |
| **0.00** | 0.787585701 | 0.015226657 | **47.61** | | | | **0.988138017** | 1665 | 1649 |
| **0.01** | 0.734045583 | 0.014191548 | **44.13** | | | | **0.98900451** | 1689 | 1674 |
| **0.01** | 0.711321576 | 0.013752217 | **42.65** | | | | **0.989374102** | 1710 | 1695 |
| **0.06** | 0.703636848 | 0.013603646 | **41.78** | | | | **0.989590394** | 1743 | 1728 |
| **0.13** | 0.667873784 | 0.012912226 | **41.19** | | | | **0.989737572** | 1774 | 1759 |
| **0.16** | 0.694591677 | 0.013428772 | **42.61** | | | | **0.989383188** | 1798 | 1782 |
| **0.24** | 0.772246114 | 0.014930092 | **46.87** | | | | **0.988321759** | 1840 | 1822 |
| **0.49** | 0.825983822 | 0.015969021 | **49.80** | | | | **0.987593488** | 1878 | 1859 |
| **0.68** | 0.876777168 | 0.016951025 | **52.64** | | | | **0.98688448** | 1907 | 1886 |
| **0.84** | 1.02864168 | 0.019887072 | **60.14** | | | | **0.985017251** | 1968 | 1943 |
| **1.00** | 1.126568162 | 0.021780318 | **65.49** | | | | **0.983685087** | 1997 | 1969 |
| **1.17** | 1.263354084 | 0.024424846 | **71.62** | | | | **0.982157195** | 2040 | 2009 |
| **1.50** | 1.371607361 | 0.026517742 | **77.29** | | | | **0.98074509** | 2071 | 2037 |
| **1.63** | 1.429798214 | 0.027642765 | **79.95** | | | | **0.980080983** | 2077 | 2042 |
| **1.86** | 1.504731419 | 0.029091474 | **83.75** | | | | **0.979133879** | 2103 | 2065 |
| **1.88** | 1.485276721 | 0.02871535 | **82.80** | | | | **0.979371775** | 2115 | 2078 |
| **2.12** | 1.523663702 | 0.029457498 | **84.68** | | | | **0.978904081** | 2134 | 2095 |

Table 3 cont

| **Toluene Data** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | From calorimetri |
| **EI NOx** | Q CO (slpm) | m CO (g/s) | **EI CO** | | | | η | AFT | Tf (K) |
| **0.00** | 1.672386825 | 0.032332812 | **84.81** | | | | **0.978870992** | 1566 | 1540 |
| **0.00** | 1.518894954 | 0.029365302 | **75.09** | | | | **0.981293258** | 1593 | 1569 |
| **0.00** | 1.424239061 | 0.027535289 | **69.09** | | | | **0.982786106** | 1613 | 1591 |
| **0.00** | 1.337902538 | 0.025866116 | **63.54** | | | | **0.984170813** | 1637 | 1616 |
| **0.01** | 1.264854858 | 0.024453861 | **57.68** | | | | **0.985629974** | 1687 | 1667 |
| **0.12** | 1.261544361 | 0.024389858 | **56.68** | | | | **0.985877857** | 1704 | 1684 |
| **0.12** | 1.270685854 | 0.024566593 | **56.24** | | | | **0.985988698** | 1721 | 1702 |
| **0.11** | 1.282212796 | 0.024789447 | **55.76** | | | | **0.986109154** | 1737 | 1718 |
| **0.13** | 1.307017662 | 0.025269008 | **56.20** | | | | **0.985999107** | 1774 | 1754 |
| **0.24** | 1.269026634 | 0.024534515 | **55.55** | | | | **0.986159912** | 1802 | 1782 |
| **0.22** | 1.369081331 | 0.026468906 | **58.73** | | | | **0.985367611** | 1847 | 1825 |
| **0.31** | 1.426483912 | 0.027578689 | **61.06** | | | | **0.984788873** | 1878 | 1854 |
| **0.59** | 1.472452046 | 0.028467406 | **63.17** | | | | **0.984262811** | 1903 | 1878 |
| **0.73** | 1.608998141 | 0.031107297 | **67.92** | | | | **0.983078713** | 1945 | 1917 |
| **0.86** | 1.742971917 | 0.033697457 | **71.85** | | | | **0.98209916** | 1985 | 1955 |
| **1.00** | 1.818164453 | 0.035151179 | **74.23** | | | | **0.981507267** | 2017 | 1985 |
| **1.09** | 1.912084282 | 0.036966963 | **77.49** | | | | **0.980694725** | 2046 | 2013 |
| **1.31** | 1.975032016 | 0.038183952 | **79.45** | | | | **0.980207021** | 2069 | 2035 |
| **1.51** | 2.090147773 | 0.040409524 | **83.66** | | | | **0.979157932** | 2093 | 2057 |
| **1.63** | 2.08991328 | 0.04040499 | **83.23** | | | | **0.979265012** | 2124 | 2087 |

Table 4

| Ethylbenzene data | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | From calorimetr |
| EI NOx | Q CO (slpm) | m CO (g/s) | EI CO | | | | η | Tad-Q | Tf |
| **0.25** | 1.07023932 | 0.020691294 | **74.88** | | | | **0.981680273** | 1496.28 | 1475 |
| **0.05** | 0.947243176 | 0.018313368 | **64.41** | | | | **0.984242422** | 1516.15 | 1497 |
| **0.03** | 0.846799007 | 0.016371447 | **57.58** | | | | **0.98591333** | 1535.02 | 1518 |
| **0.02** | 0.796446658 | 0.015397969 | **54.79** | | | | **0.986595981** | 1534.65 | 1518 |
| **0.05** | 0.746781736 | 0.01443778 | **50.88** | | | | **0.987552801** | 1553.7 | 1538 |
| **0.04** | 0.721026572 | 0.013939847 | **48.40** | | | | **0.988159441** | 1554.22 | 1540 |
| **0.06** | 0.657076728 | 0.012703483 | **43.66** | | | | **0.9893187** | 1591.53 | 1578 |
| **0.04** | 0.639391602 | 0.012361571 | **43.18** | | | | **0.989436845** | 1590.96 | 1578 |
| **0.13** | 0.608776113 | 0.011769672 | **40.37** | | | | **0.990124198** | 1609.89 | 1597 |
| **0.15** | 0.592720133 | 0.011459256 | **39.18** | | | | **0.990414435** | 1628.1 | 1616 |
| **0.12** | 0.598117336 | 0.011563602 | **39.74** | | | | **0.990277131** | 1627.97 | 1615 |
| **0.15** | 0.590994319 | 0.01142589 | **38.58** | | | | **0.99056197** | 1664.4 | 1652 |
| **0.19** | 0.600333595 | 0.011606449 | **39.36** | | | | **0.990372158** | 1681.77 | 1669 |
| **0.30** | 0.601091553 | 0.011621103 | **39.15** | | | | **0.99042114** | 1699.66 | 1687 |
| **0.21** | 0.609136626 | 0.011776641 | **39.30** | | | | **0.990386572** | 1717.26 | 1704 |
| **0.33** | 0.666759479 | 0.012890683 | **42.73** | | | | **0.98954601** | 1734.9 | 1720 |
| **0.38** | 0.686175258 | 0.013266055 | **43.05** | | | | **0.98946881** | 1752.96 | 1738 |
| **0.44** | 0.727608422 | 0.014067096 | **46.37** | | | | **0.988654927** | 1769.08 | 1753 |
| **0.47** | 0.754120274 | 0.014579659 | **46.93** | | | | **0.988519234** | 1787.11 | 1770 |
| **0.54** | 0.819295006 | 0.015839703 | **50.81** | | | | **0.987570638** | 1820.34 | 1802 |
| **0.58** | 0.846161503 | 0.016359122 | **53.15** | | | | **0.986998512** | 1819.69 | 1800 |
| **0.73** | 0.913035177 | 0.017652013 | **56.75** | | | | **0.986116096** | 1836.76 | 1816 |
| **0.79** | 0.962089077 | 0.018600389 | **59.24** | | | | **0.985507273** | 1837.71 | 1816 |
| **0.84** | 0.93663301 | 0.018108238 | **58.08** | | | | **0.985790527** | 1868.76 | 1847 |
| **1.11** | 1.123731527 | 0.021725476 | **67.87** | | | | **0.983396586** | 1902.66 | 1877 |
| **1.24** | 1.18011037 | 0.022815467 | **71.19** | | | | **0.982585045** | 1918.37 | 1891 |
| **1.38** | 1.257966352 | 0.024320683 | **76.35** | | | | **0.981321921** | 1933.58 | 1904 |
| **1.41** | 1.279640007 | 0.024739707 | **76.33** | | | | **0.981326903** | 1935.04 | 1905 |
| **1.71** | 1.407638441 | 0.027214343 | **85.02** | | | | **0.97920179** | 1950.17 | 1916 |
| **1.92** | 1.448391582 | 0.028002237 | **85.52** | | | | **0.979078194** | 1981.77 | 1947 |
| | | | | | | | | | |
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| | | | | | | | | | |

Table 4 cont

| **Ethylbenzene data** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | **From calorimet** |
| **EI NOx** | Q CO (slpm) | m CO (g/s) | **EI CO** | | | | η | Tad-Q | Tf |
| **0.03** | 1.452267943 | 0.02807718 | **75.60** | | | | **0.981504155** | 1523.66 | 1502 |
| **0.09** | 1.431794889 | 0.027681368 | **73.34** | | | | **0.982057964** | 1543.45 | 1522 |
| **0.09** | 1.228189258 | 0.023744992 | **61.87** | | | | **0.984863552** | 1582.14 | 1563 |
| **0.08** | 1.196335015 | 0.023129144 | **58.62** | | | | **0.985658017** | 1601.9 | 1584 |
| **0.06** | 1.153693299 | 0.022304737 | **55.33** | | | | **0.986464466** | 1640.1 | 1622 |
| **0.13** | 1.158119413 | 0.022390309 | **54.42** | | | | **0.986687756** | 1677.74 | 1660 |
| **0.20** | 1.217472473 | 0.023537801 | **56.12** | | | | **0.986271674** | 1732.79 | 1714 |
| **0.33** | 1.298497938 | 0.025104293 | **59.27** | | | | **0.985501178** | 1768.73 | 1748 |
| **0.45** | 1.416507585 | 0.027385813 | **64.01** | | | | **0.984340559** | 1804.22 | 1781 |
| **0.69** | 1.571621388 | 0.03038468 | **69.73** | | | | **0.982941969** | 1856.65 | 1831 |

Table 5

| Cyclohexane data | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | From calorimetr |
| EI NOx | Q CO (slpm) | m CO (g/s) | EI CO | Q THC (slpm) | m THC (g/s) | EI THC | η | Tad-Q | Tf (K) |
| | 1.018134583 | 0.019683935 | **67.16** | 0.131071291 | 0.001452488 | **4.96** | **0.97955362** | | |
| **0.04** | 1.728010909 | 0.033408211 | **122.08** | 0.094836805 | 0.00105095 | **3.84** | **0.968001745** | 1471.36 | 1435 |
| **0.05** | 1.335671095 | 0.025822975 | **93.46** | 0.024192425 | 0.000268092 | **0.97** | **0.977472811** | 1489.58 | 1463 |
| **0.06** | 1.08775057 | 0.021029844 | **75.75** | 0.01022801 | 0.000113343 | **0.41** | **0.982121772** | 1507.87 | 1487 |
| **0.07** | 0.835781675 | 0.016158446 | **57.75** | 0.003093479 | 3.42809E-05 | **0.12** | **0.986558656** | 1526.15 | 1510 |
| **0.10** | 0.59310364 | 0.01146667 | **41.07** | 0.000809443 | 8.96998E-06 | **0.03** | **0.990496017** | 1561.91 | 1550 |
| **0.12** | 0.478071072 | 0.009242707 | **33.38** | 0.000506604 | 5.61402E-06 | **0.02** | **0.992280058** | 1579.32 | 1570 |
| **0.14** | 0.452784081 | 0.008753826 | **31.46** | 0.000444292 | 4.92349E-06 | **0.02** | **0.992725647** | 1597.09 | 1588 |
| **0.18** | 0.415268198 | 0.008028519 | **29.26** | 0.000370812 | 4.10921E-06 | **0.01** | **0.993236632** | 1613.99 | 1605 |
| **0.22** | 0.409510256 | 0.007917198 | **28.58** | 0.000316772 | 3.51036E-06 | **0.01** | **0.993396487** | 1648.62 | 1640 |
| **0.29** | 0.430100047 | 0.008315268 | **29.70** | 0.000269685 | 2.98856E-06 | **0.01** | **0.993140264** | 1699.32 | 1690 |
| **0.35** | 0.457893086 | 0.0088526 | **31.39** | 0.000249904 | 2.76935E-06 | **0.01** | **0.992751185** | 1716.23 | 1706 |
| **0.40** | 0.477427491 | 0.009230265 | **32.56** | 0.000226754 | 2.51282E-06 | **0.01** | **0.992482111** | 1748.82 | 1738 |
| **0.55** | 0.587467367 | 0.011357702 | **38.22** | 0.000206818 | 2.29189E-06 | **0.01** | **0.991177706** | 1799.33 | 1786 |
| **0.66** | 0.645379013 | 0.012477328 | **41.74** | 0.000188113 | 2.08461E-06 | **0.01** | **0.990366144** | 1815.57 | 1801 |
| **0.81** | 0.715540362 | 0.01383378 | **45.96** | 0.000176522 | 1.95616E-06 | **0.01** | **0.989392431** | 1831.85 | 1816 |
| **0.95** | 0.780932888 | 0.015098036 | **49.91** | 0.000164278 | 1.82048E-06 | **0.01** | **0.988483831** | 1862.76 | 1845 |
| **1.03** | 0.820912651 | 0.015870978 | **52.00** | 0.000157147 | 1.74146E-06 | **0.01** | **0.988000537** | 1878.46 | 1860 |
| **1.23** | 0.914414393 | 0.017678678 | **57.51** | 0.00015051 | 1.6679E-06 | **0.01** | **0.986729893** | 1908.87 | 1888 |
| **1.40** | 1.012644203 | 0.019577788 | **62.41** | 0.000146328 | 1.62155E-06 | **0.01** | **0.985600265** | 1939.7 | 1916 |
| **1.60** | 1.109310004 | 0.02144666 | **67.19** | 0.000140966 | 1.56214E-06 | **0.00** | **0.984497365** | 1955.91 | 1931 |
| **1.71** | 1.15231874 | 0.022278162 | **69.39** | 0.000136555 | 1.51326E-06 | **0.00** | **0.983991873** | 1970.74 | 1944 |
| **1.96** | 1.24011397 | 0.023975537 | **74.38** | 0.000127556 | 1.41353E-06 | **0.00** | **0.982841611** | 1985.85 | 1957 |
| **2.30** | 1.357410162 | 0.026243263 | **80.84** | 0.000122669 | 1.35938E-06 | **0.00** | **0.981351808** | 2028.49 | 1997 |
| | | | | | | | | | |
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Table 5 cont

| Cyclohexane data | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | |
| **EI NOx** | Q CO (slpm) | m CO (g/s) | **EI CO** | Q THC (slpm) | m THC (g/s) | **EI THC** | **η** | | |
| | 1.150241659 | 0.022238005 | **64.67** | 0.01377443 | 0.000152644 | **0.44** | **0.984640248** | | |
| | 0.992307483 | 0.019184611 | **53.08** | 0.005794448 | 6.42121E-05 | **0.18** | **0.987579872** | | |
| | 0.955428599 | 0.01847162 | **48.63** | 0.002435723 | 2.69919E-05 | **0.07** | **0.988713282** | | |
| | 0.986346086 | 0.019069358 | **47.81** | 0.002127873 | 2.35804E-05 | **0.06** | **0.988914084** | | |
| | 1.13254914 | 0.02189595 | **51.93** | 0.00203182 | 2.2516E-05 | **0.05** | **0.98796886** | | |
| | 1.171171581 | 0.022642651 | **53.61** | 0.001601567 | 1.7748E-05 | **0.04** | **0.987593074** | | |
| | 1.392010714 | 0.026912207 | **61.15** | 0.00137872 | 1.52785E-05 | **0.03** | **0.985861117** | | |
| | 1.477260974 | 0.028560379 | **65.26** | 0.001294794 | 1.43485E-05 | **0.03** | **0.984916117** | | |
| | 1.804795419 | 0.034892711 | **78.40** | 0.001246989 | 1.38187E-05 | **0.03** | **0.981886859** | | |
| | 2.00275312 | 0.038719894 | **85.34** | 0.001183098 | 1.31107E-05 | **0.03** | **0.980288285** | | |
| | 2.080035739 | 0.040214024 | **87.06** | 0.001138017 | 1.26111E-05 | **0.03** | **0.979892924** | | |
| | 2.203588279 | 0.042602707 | **92.60** | 0.001105311 | 1.22487E-05 | **0.03** | **0.978615088** | | |
| | 2.25393804 | 0.043576135 | **93.00** | 0.001069115 | 1.18476E-05 | **0.03** | **0.978525315** | | |

Table 6

| Ethane data | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | |
| **EI NOx** | Q CO (slpm) | m CO (g/s) | **EI CO** | Q THC (slpm) | m THC (g/s) | **EI THC** | **η** | AFT | Tf |
| **0.00** | 1.747128478 | 0.033777817 | **128.88** | 0.151877866 | 0.00168306 | **6.42** | **0.96613968** | | |
| **0.04** | 1.761047142 | 0.034046911 | **133.08** | 0.131811214 | 0.001460688 | **5.71** | **0.96595908** | | |
| **0.05** | 1.108776696 | 0.021436349 | **83.79** | 0.010317853 | 0.000114339 | **0.45** | **0.981715202** | | |
| **0.07** | 0.722175995 | 0.013962069 | **53.27** | 0.00185912 | 2.06021E-05 | **0.08** | **0.988579725** | | |
| **0.10** | 0.522414371 | 0.010100011 | **37.94** | 0.000867873 | 9.61748E-06 | **0.04** | **0.991887632** | | |
| **0.12** | 0.442023781 | 0.008545793 | **32.35** | 0.000618939 | 6.85888E-06 | **0.03** | **0.993086779** | | |
| **0.14** | 0.398042466 | 0.007695488 | **29.36** | 0.000523008 | 5.7958E-06 | **0.02** | **0.993726689** | | |
| **0.20** | 0.376183563 | 0.007272882 | **27.32** | 0.000449581 | 4.98211E-06 | **0.02** | **0.994165692** | | |
| **0.27** | 0.376407366 | 0.007277209 | **27.55** | 0.000362923 | 4.02179E-06 | **0.02** | **0.994119901** | | |
| **0.36** | 0.417292917 | 0.008067663 | **29.84** | 0.000325502 | 3.60711E-06 | **0.01** | **0.993634785** | | |
| **0.42** | 0.430769095 | 0.008328203 | **31.04** | 0.000303481 | 3.36307E-06 | **0.01** | **0.993379632** | | |
| **0.53** | 0.507510296 | 0.009811866 | **35.47** | 0.000282268 | 3.128E-06 | **0.01** | **0.992437814** | | |
| **0.64** | 0.54927239 | 0.010619266 | **38.68** | 0.000264998 | 2.93662E-06 | **0.01** | **0.991755166** | | |
| **0.80** | 0.643967657 | 0.012450041 | **44.34** | 0.000250288 | 2.77361E-06 | **0.01** | **0.990550935** | | |
| **0.91** | 0.680285389 | 0.013152184 | **46.84** | 0.000232937 | 2.58133E-06 | **0.01** | **0.99001928** | | |
| **1.11** | 0.778085678 | 0.01504299 | **52.41** | 0.000214723 | 2.37949E-06 | **0.01** | **0.988834577** | | |
| **1.29** | 0.855255642 | 0.016534942 | **58.03** | 0.000203854 | 2.25905E-06 | **0.01** | **0.987638866** | | |
| **1.50** | 0.977076857 | 0.018890153 | **64.41** | 0.000196207 | 2.1743E-06 | **0.01** | **0.986280172** | | |
| **1.78** | 1.126209477 | 0.021773383 | **73.20** | 0.000190764 | 2.11399E-06 | **0.01** | **0.984408588** | | |
| **2.05** | 1.244480706 | 0.02405996 | **80.33** | 0.000182589 | 2.02339E-06 | **0.01** | **0.982891911** | | |
| **2.27** | 1.355660373 | 0.026209434 | **86.31** | 0.000176448 | 1.95534E-06 | **0.01** | **0.981619619** | | |

Table 7

| **POSF 2926 Neat data** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | From calorimetri |
| m NOx (g/ | **EI NOx** | Q CO (slpm) | m CO (g/s) | **EI CO** | Q THC (slpm) | m THC (g/s) | **EI THC** | η | Tad-Q |
| 4.37E-05 | **0.19** | 3.238634235 | 0.062614 | **277.66** | 1.723903871 | 0.019103728 | **84.72** | **0.850147865** | |
| 1.09E-05 | **0.05** | 2.253203628 | 0.043562 | **199.13** | 0.20592265 | 0.002281966 | **10.43** | **0.942853624** | |
| 2.19E-05 | **0.10** | 1.733723266 | 0.033519 | **147.08** | 0.066336188 | 0.000735116 | **3.23** | **0.962271381** | |
| 1.65E-05 | **0.07** | 1.380051604 | 0.026681 | **110.49** | 0.016708883 | 0.000185162 | **0.77** | **0.973313649** | |
| 1.68E-05 | **0.07** | 1.304054844 | 0.025212 | **106.68** | 0.011780532 | 0.000130548 | **0.55** | **0.974421812** | |
| 3.13E-05 | **0.13** | 1.07501896 | 0.020784 | **85.74** | 0.006901937 | 7.6485E-05 | **0.32** | **0.979569927** | |
| 4.16E-05 | **0.17** | 0.874463884 | 0.016906 | **67.05** | 0.007369393 | 8.16652E-05 | **0.32** | **0.983947455** | |
| 7.05E-05 | **0.27** | 0.813386248 | 0.015725 | **60.21** | 0.005106055 | 5.65836E-05 | **0.22** | **0.985657762** | |
| 9.26E-05 | **0.35** | 0.808957661 | 0.01564 | **58.60** | 0.005054539 | 5.60127E-05 | **0.21** | **0.986044194** | |
| 0.000107 | **0.40** | 0.80129035 | 0.015492 | **58.36** | 0.005047319 | 5.59327E-05 | **0.21** | **0.986099594** | |
| 0.000116 | **0.44** | 0.791314992 | 0.015299 | **58.23** | 0.004772192 | 5.28838E-05 | **0.20** | **0.986139046** | |
| 0.000156 | **0.58** | 0.852596928 | 0.016484 | **61.46** | 0.004656299 | 5.15996E-05 | **0.19** | **0.985389025** | |
| 0.000198 | **0.73** | 0.910885885 | 0.01761 | **64.88** | 0.004555943 | 5.04874E-05 | **0.19** | **0.98459366** | |
| 0.000241 | **0.89** | 0.967644447 | 0.018708 | **68.69** | 0.004439428 | 4.91963E-05 | **0.18** | **0.983704415** | |
| 0.000325 | **1.17** | 1.07793366 | 0.02084 | **75.24** | 0.004324863 | 4.79267E-05 | **0.17** | **0.982175427** | |
| 0.000456 | **1.58** | 1.242317485 | 0.024018 | **83.11** | 0.004326513 | 4.7945E-05 | **0.17** | **0.980337953** | |
| 0.000598 | **2.04** | 1.374072653 | 0.026565 | **90.61** | 0.004209006 | 4.66428E-05 | **0.16** | **0.978584503** | |
| 0.000676 | **2.28** | 1.440013554 | 0.02784 | **93.71** | 0.004209544 | 4.66488E-05 | **0.16** | **0.977860165** | |

Table 8

| **Dodecane** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | From CETPC |
| m NOx (g/s | **EI NOx** | Q CO (slpm) | m CO (g/s) | **EI CO** | Q THC (slpm) | m THC (g/s) | **EI THC** | η | Tad-Q |
| 1.37E-05 | **0.05** | 1.975340027 | 0.03819 | **148.80** | 0.407863464 | 0.004519807 | **17.61** | **0.948540792** | |
| 1.15E-05 | **0.04** | 1.810783343 | 0.035008 | **132.29** | 0.166925868 | 0.001849817 | **6.99** | **0.962915205** | |
| 1.31E-05 | **0.05** | 1.531864542 | 0.029616 | **109.18** | 0.063235198 | 0.000700751 | **2.58** | **0.972581** | |
| 1.72E-05 | **0.06** | 1.168090805 | 0.022583 | **82.61** | 0.015642833 | 0.000173349 | **0.63** | **0.980572496** | |
| 2.17E-05 | **0.08** | 0.975187779 | 0.018854 | **68.44** | 0.005855718 | 6.48911E-05 | **0.24** | **0.984196278** | |
| 2.68E-05 | **0.10** | 0.85370205 | 0.016505 | **59.28** | 0.003549685 | 3.93364E-05 | **0.14** | **0.986373021** | |
| 3.42E-05 | **0.12** | 0.724297523 | 0.014003 | **49.76** | 0.002400159 | 2.65978E-05 | **0.09** | **0.988586472** | |
| 4.48E-05 | **0.16** | 0.64547474 | 0.012479 | **43.86** | 0.001939268 | 2.14903E-05 | **0.08** | **0.989947485** | |
| 5.47E-05 | **0.20** | 0.600279968 | 0.011605 | **41.46** | 0.001683186 | 1.86525E-05 | **0.07** | **0.990501554** | |
| 6.59E-05 | **0.23** | 0.591315656 | 0.011432 | **40.51** | 0.001560544 | 1.72934E-05 | **0.06** | **0.990723038** | |
| 8.49E-05 | **0.30** | 0.601103208 | 0.011621 | **40.84** | 0.001473108 | 1.63245E-05 | **0.06** | **0.990651483** | |
| 9.93E-05 | **0.35** | 0.613088431 | 0.011853 | **41.31** | 0.001389335 | 1.53961E-05 | **0.05** | **0.99054913** | |
| 0.000114 | **0.40** | 0.625842902 | 0.0121 | **42.05** | 0.001312291 | 1.45424E-05 | **0.05** | **0.99038383** | |
| 0.00015 | **0.52** | 0.684758108 | 0.013239 | **45.48** | 0.001267903 | 1.40505E-05 | **0.05** | **0.989604856** | |
| 0.000188 | **0.65** | 0.737584396 | 0.01426 | **48.99** | 0.00118466 | 1.3128E-05 | **0.05** | **0.988809806** | |
| 0.000263 | **0.89** | 0.863526916 | 0.016695 | **56.69** | 0.001120855 | 1.24209E-05 | **0.04** | **0.98706161** | |
| 0.000326 | **1.10** | 0.95356205 | 0.018436 | **62.42** | 0.001071436 | 1.18733E-05 | **0.04** | **0.985761177** | |
| 0.000403 | **1.32** | 1.089733388 | 0.021068 | **68.85** | 0.001054902 | 1.16901E-05 | **0.04** | **0.984299476** | |
| 0.000444 | **1.45** | 1.139429304 | 0.022029 | **71.65** | 0.001022005 | 1.13255E-05 | **0.04** | **0.983664853** | |
| 0.000527 | **1.71** | 1.237141126 | 0.023918 | **77.54** | 0.001001128 | 1.10942E-05 | **0.04** | **0.982324909** | |
| 0.000602 | **1.92** | 1.337481562 | 0.025858 | **82.47** | 0.000977361 | 1.08308E-05 | **0.03** | **0.981205599** | |
| 0.00069 | **2.19** | 1.433930462 | 0.027723 | **87.82** | 0.000929244 | 1.02976E-05 | **0.03** | **0.979988943** | |
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Table 8 cont

| **Dodecane** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | From CETPC |
| m NOx (g/s | **EI NOx** | Q CO (slpm) | m CO (g/s) | **EI CO** | Q THC (slpm) | m THC (g/s) | **EI THC** | η | Tad-Q |
| 1.54E-05 | **0.05** | 3.104254418 | 0.060016 | **193.93** | 0.531750048 | 0.005892677 | **19.04** | **0.936841046** | |
| 1.67E-05 | **0.05** | 1.87056285 | 0.036164 | **112.23** | 0.092367778 | 0.001023589 | **3.18** | **0.971293173** | |
| 2.11E-05 | **0.06** | 1.508280786 | 0.02916 | **88.25** | 0.029129489 | 0.000322803 | **0.98** | **0.978947282** | |
| 2.56E-05 | **0.08** | 1.297598116 | 0.025087 | **74.52** | 0.01211212 | 0.000134222 | **0.40** | **0.982649095** | |
| 3.11E-05 | **0.09** | 1.122932965 | 0.02171 | **63.01** | 0.006747196 | 7.47702E-05 | **0.22** | **0.985450271** | |
| 4.05E-05 | **0.11** | 1.010566917 | 0.019538 | **55.11** | 0.00465625 | 5.1599E-05 | **0.15** | **0.98731826** | |
| 5.38E-05 | **0.15** | 0.911158577 | 0.017616 | **48.21** | 0.00386486 | 4.28291E-05 | **0.12** | **0.988914655** | |
| 7.21E-05 | **0.19** | 0.877345771 | 0.016962 | **45.18** | 0.003529423 | 3.91119E-05 | **0.10** | **0.989617904** | |
| 0.000109 | **0.28** | 0.910982158 | 0.017612 | **44.46** | 0.003220177 | 3.56849E-05 | **0.09** | **0.989795516** | |
| 0.000161 | **0.39** | 1.028638383 | 0.019887 | **48.11** | 0.003126886 | 3.46511E-05 | **0.08** | **0.988972154** | |
| 0.000207 | **0.50** | 1.103809539 | 0.02134 | **51.05** | 0.003020334 | 3.34703E-05 | **0.08** | **0.988306929** | |
| 0.000271 | **0.63** | 1.23523187 | 0.023881 | **55.82** | 0.002971868 | 3.29333E-05 | **0.08** | **0.987224221** | |
| 0.000345 | **0.80** | 1.385787027 | 0.026792 | **62.26** | 0.002908762 | 3.22339E-05 | **0.07** | **0.985762792** | |
| 0.000402 | **0.92** | 1.491342782 | 0.028833 | **66.19** | 0.002883617 | 3.19553E-05 | **0.07** | **0.984868309** | |
| 0.000439 | **1.00** | 1.548825605 | 0.029944 | **68.33** | 0.002858338 | 3.16752E-05 | **0.07** | **0.98438458** | |
| 0.000537 | **1.21** | 1.736735288 | 0.033577 | **75.67** | 0.002802828 | 3.106E-05 | **0.07** | **0.982717131** | |
| 0.000607 | **1.36** | 1.825884679 | 0.0353 | **79.05** | 0.002759577 | 3.05807E-05 | **0.07** | **0.981949518** | |
| 0.000676 | **1.50** | 1.937720309 | 0.037463 | **83.35** | 0.002728108 | 3.0232E-05 | **0.07** | **0.980971411** | |
| 0.000822 | **1.81** | 2.140092976 | 0.041375 | **90.86** | 0.002685019 | 2.97545E-05 | **0.07** | **0.979264843** | |

Table 9

| Endothermic Simulant data | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | |
| **Phi** | A | M | R | B | **Tau (ms)** | Vaporizer (C) | **NOx (ppmV)** | **CO (ppmV)** | **CO2 (vol %)** |
| **0.49** | 25381.09013 | 29.17075741 | 285.0252 | 3651.49346 | **6.95** | 20.72 | **1.92** | **1392.68** | **7.01** |
| **0.51** | 25374.33618 | 29.16894971 | 285.0428 | 3675.94377 | **6.90** | 18.70 | **2.21** | **1237.11** | **7.20** |
| **0.53** | 25368.12582 | 29.16683779 | 285.0635 | 3748.496897 | **6.77** | 17.10 | **3.47** | **1084.26** | **7.60** |
| **0.56** | 25356.29172 | 29.17907602 | 284.9439 | 3773.574634 | **6.72** | 18.28 | **5.68** | **1087.45** | **8.04** |
| **0.57** | 25346.66643 | 29.17746377 | 284.9597 | 3735.191425 | **6.79** | 18.87 | **6.74** | **1043.40** | **8.16** |
| **0.59** | 25340.28372 | 29.18099276 | 284.9252 | 3750.898493 | **6.76** | 19.37 | **8.70** | **1130.86** | **8.41** |
| **0.60** | 25340.80826 | 29.17841609 | 284.9504 | 3832.502751 | **6.61** | 19.16 | **11.84** | **1322.35** | **8.75** |
| **0.62** | 25333.26032 | 29.1799896 | 284.935 | 3818.718018 | **6.63** | 19.29 | **14.16** | **1452.19** | **8.91** |
| **0.62** | 25318.7955 | 29.18583705 | 284.8779 | 3753.038527 | **6.75** | 19.42 | **17.40** | **1609.91** | **9.13** |
| **0.64** | 25310.30413 | 29.19016405 | 284.8357 | 3745.294954 | **6.76** | 19.29 | **23.05** | **1925.68** | **9.49** |
| **0.67** | 25298.20382 | 29.19627249 | 284.7761 | 3739.9597 | **6.76** | 19.27 | **33.84** | **2359.23** | **9.78** |
| **0.69** | 25292.71301 | 29.19825556 | 284.7567 | 3765.909924 | **6.72** | 19.14 | **46.37** | **2930.84** | **10.17** |
| **0.73** | 25286.38445 | 29.21682255 | 284.5758 | 3779.72681 | **6.69** | 19.44 | **63.28** | **3584.73** | **10.53** |
| **0.74** | 25280.60839 | 29.2180977 | 284.5634 | 3775.537234 | **6.70** | 19.93 | **77.45** | **4052.81** | **10.79** |
| **0.75** | 25272.77807 | 29.22680487 | 284.4786 | 3746.994204 | **6.74** | 20.58 | **92.59** | **4462.56** | **10.99** |
| **0.77** | 25267.54693 | 29.22227303 | 284.5227 | 3742.901239 | **6.75** | 19.27 | **107.82** | **4847.14** | **11.12** |
| | | | | | | | | | |
| **0.46** | 25323.53453 | 29.12669119 | 285.4564 | 4247.634363 | **5.96** | 20.00 | | **4377.68** | **5.97** |
| **0.48** | 25814.28275 | 29.13314839 | 285.3931 | 4552.759129 | **5.67** | 18.42 | **1.22** | **2418.28** | **6.70** |
| **0.50** | 25809.57344 | 29.135608 | 285.369 | 4723.18894 | **5.46** | 18.53 | **1.52** | **1884.72** | **6.97** |
| **0.51** | 25801.27945 | 29.1380721 | 285.3449 | 4788.73923 | **5.39** | 18.53 | **2.06** | **1614.41** | **7.12** |
| **0.54** | 25796.79204 | 29.15045514 | 285.2237 | 4976.808272 | **5.18** | 19.41 | **3.91** | **1363.10** | **7.79** |
| **0.56** | 25778.65769 | 29.15756667 | 285.1541 | 4980.823181 | **5.18** | 19.31 | **6.12** | **1366.62** | **8.07** |
| **0.61** | 25761.51536 | 29.16806968 | 285.0514 | 5060.800233 | **5.09** | 19.25 | **9.25** | **1575.82** | **8.57** |
| **0.63** | 25748.23011 | 29.17795479 | 284.9549 | 5120.118309 | **5.03** | 19.25 | **13.41** | **1875.61** | **9.02** |
| **0.66** | 25736.74373 | 29.18859127 | 284.851 | 5216.390563 | **4.93** | 19.36 | **22.26** | **2432.12** | **9.46** |
| **0.69** | 25723.51203 | 29.19861571 | 284.7532 | 5265.548344 | **4.89** | 19.04 | **34.08** | **3167.15** | **10.05** |
| **0.72** | 25708.76383 | 29.20547094 | 284.6864 | 5274.576775 | **4.87** | 19.54 | **43.55** | **3620.30** | **10.34** |
| **0.75** | 25706.5941 | 29.21821238 | 284.5622 | 5342.857184 | **4.81** | 20.06 | **56.30** | **4205.11** | **10.62** |
| **0.76** | 25707.03194 | 29.2246321 | 284.4997 | 5428.400955 | **4.74** | 19.91 | **70.96** | **4726.33** | **10.85** |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

Table 10

**n-Heptane Data**

| P Lab (Pa) | A | M | R | B | **Tau (ms)** | Vaporizer (C) | **NOx (ppmV)** | **CO (ppmV)** |
|---|---|---|---|---|---|---|---|---|
| 99161 | 25043.53727 | 29.68129032 | 280.1225927 | 3598.188235 | **6.96** | 55.19 | **1.12** | **2563.84** |
| 99148 | 25028.94317 | 29.699942 | 279.9466747 | 3588.342965 | **6.98** | 57.79 | **1.96** | **2276.13** |
| 99135 | 25010.7048 | 29.72728513 | 279.6891799 | 3554.617129 | **7.04** | 57.65 | **2.59** | **1944.95** |
| 99122 | 24996.86983 | 29.7515021 | 279.4615201 | 3538.323046 | **7.06** | 56.78 | **1.91** | **1745.79** |
| 99109 | 24986.98476 | 29.76574249 | 279.3278213 | 3544.297251 | **7.05** | 56.05 | **4.04** | **1644.90** |
| 99096 | 24977.31933 | 29.77890237 | 279.2043809 | 3536.797326 | **7.06** | 56.55 | **4.43** | **1616.48** |
| 99083 | 24969.04374 | 29.79556262 | 279.0482632 | 3525.222547 | **7.08** | 55.79 | **4.48** | **1590.10** |
| 99070 | 24951.90658 | 29.81841415 | 278.8344128 | 3462.527898 | **7.21** | 55.94 | **5.50** | **1588.99** |
| 99057 | 24941.4313 | 29.83415385 | 278.6873073 | 3449.876377 | **7.23** | 55.39 | **6.66** | **1630.99** |
| 99043 | 24933.32385 | 29.84567323 | 278.5797437 | 3438.301502 | **7.25** | 55.58 | **8.27** | **1681.37** |
| 99030 | 24918.56232 | 29.88330252 | 278.2289539 | 3417.216265 | **7.29** | 55.62 | **9.68** | **1879.65** |
| 99017 | 24915.45835 | 29.91178318 | 277.9640368 | 3483.213013 | **7.15** | 54.27 | **12.98** | **2164.22** |
| 99004 | 24906.5479 | 29.92412508 | 277.8493933 | 3455.224811 | **7.21** | 55.11 | **15.11** | **2258.33** |
| 98991 | 24896.45455 | 29.94717724 | 277.6355158 | 3448.546695 | **7.22** | 54.91 | **18.24** | **2541.87** |
| 98978 | 24886.7421 | 29.97413041 | 277.3858619 | 3425.308791 | **7.27** | 54.14 | **23.45** | **2861.05** |
| 98965 | 24878.18375 | 29.99169406 | 277.22342 | 3420.134462 | **7.27** | 53.78 | **28.65** | **3137.46** |
| 98952 | 24868.58981 | 30.01348067 | 277.0221852 | 3401.511903 | **7.31** | 52.89 | **35.54** | **3572.54** |
| 98939 | 24857.15735 | 30.04701451 | 276.7130157 | 3362.714653 | **7.39** | 53.67 | **41.55** | **3987.31** |
| 98926 | 24853.9739 | 30.06492515 | 276.548169 | 3403.823893 | **7.30** | 53.02 | **48.79** | **4387.16** |
| 98913 | 24845.78781 | 30.08525255 | 276.3613164 | 3385.971771 | **7.34** | 53.46 | **57.83** | **4792.65** |
| 98900 | 24840.57207 | 30.09065472 | 276.3117014 | 3376.969453 | **7.36** | 52.07 | **63.99** | **4875.48** |

Table 10 cont

| n-Heptane Data | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| P Lab (Pa) | A | M | R | B | **Tau (ms)** | Vaporizer (C) | **NOx (ppmV)** | **CO (ppmV)** |
| 101800 | 25860.00415 | 29.69405054 | 280.0022176 | 4674.587902 | **5.53** | 53.41 | **2.43628936** | **2271.577146** |
| 101800 | 25922.63694 | 29.71318218 | 279.8219305 | 5025.820495 | **5.16** | 51.33 | **3.578662** | **2276.9165** |
| 101800 | 25834.87896 | 29.73167028 | 279.6479283 | 4712.859838 | **5.48** | 52.48 | **3.7911134** | **2038.732912** |
| 101800 | 25813.2125 | 29.79551691 | 279.0486913 | 4718.190991 | **5.47** | 53.85 | **6.5161628** | **2088.128663** |
| 101800 | 25801.30135 | 29.80987277 | 278.9143068 | 4728.440525 | **5.46** | 52.51 | **8.0082035** | **2144.500733** |
| 101800 | 25762.53154 | 29.88169086 | 278.2439601 | 4644.471346 | **5.55** | 53.54 | **13.80015624** | **2639.560558** |
| 101800 | 25743.71564 | 29.91669049 | 277.9184416 | 4674.248842 | **5.51** | 53.20 | **19.31249992** | **3083.232435** |
| 101800 | 25731.55017 | 29.94203812 | 277.683168 | 4638.487865 | **5.55** | 52.37 | **24.7279296** | **3457.558598** |
| 101800 | 25709.68036 | 29.9904481 | 277.2349374 | 4610.375171 | **5.58** | 53.19 | **34.119727** | **4113.701172** |
| 101800 | 25703.8928 | 30.00895717 | 277.063943 | 4625.020883 | **5.56** | 54.92 | **42.01110775** | **4509.350579** |
| 101800 | 25691.4279 | 30.05275788 | 276.6601333 | 4586.125995 | **5.60** | 52.61 | **51.8168985** | **5080** |

Table 11

| **Methane Data** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| P lab (Pa) | A | M | R | B | **Tau (ms)** | Vaporizer (C) | **NOx (ppmV)** | **CO (ppmV)** |
| 99574 | 25128.00691 | 28.26512606 | 294.1575418 | 3458.581965 | **7.27** | 17.92 | **2.14** | **3570.59** |
| 99582 | 25115.9423 | 28.23264286 | 294.4959862 | 3489.773914 | **7.20** | 18.15 | **0.69** | **2701.35** |
| 99591 | 25104.05941 | 28.20476533 | 294.7870654 | 3466.798899 | **7.24** | 17.82 | **1.10** | **2270.14** |
| 99565 | 25090.3157 | 28.17940021 | 295.0524119 | 3507.523508 | **7.15** | 18.03 | **2.01** | **1800.16** |
| 99556 | 25078.38815 | 28.15542192 | 295.3036905 | 3486.52641 | **7.19** | 18.11 | **5.22** | **1632.89** |
| 99547 | 25066.57797 | 28.13378129 | 295.5308394 | 3476.669526 | **7.21** | 18.65 | **4.75** | **1517.79** |
| 99538 | 25052.09982 | 28.12361148 | 295.6377066 | 3427.166024 | **7.31** | 18.92 | **5.37** | **1517.15** |
| 99529 | 25043.00578 | 28.1087059 | 295.7944784 | 3385.46248 | **7.40** | 18.68 | **6.49** | **1535.12** |
| 99521 | 25034.4977 | 28.07888183 | 296.1086574 | 3374.070249 | **7.42** | 18.81 | **8.80** | **1642.21** |
| 99512 | 25032.84955 | 28.06094994 | 296.2978808 | 3419.56762 | **7.32** | 18.67 | **11.44** | **1775.02** |
| 99503 | 25024.45293 | 28.02985455 | 296.6265839 | 3438.292468 | **7.28** | 18.70 | **15.03** | **2114.79** |
| 99494 | 25014.78746 | 28.00577623 | 296.8816123 | 3416.48789 | **7.32** | 18.81 | **19.50** | **2461.38** |
| 99485 | 25004.37273 | 27.97372312 | 297.2217879 | 3372.030817 | **7.42** | 18.71 | **23.38** | **2718.44** |
| 99476 | 25002.68595 | 27.95483344 | 297.422627 | 3431.770842 | **7.29** | 18.68 | **28.72** | **3250.19** |
| 99468 | 24989.48486 | 27.91040984 | 297.8960198 | 3386.209378 | **7.38** | 18.72 | **39.52** | **4150.89** |
| 99459 | 24987.97784 | 27.88323553 | 298.1863418 | 3430.843443 | **7.28** | 18.51 | **43.29** | **4627.36** |
| 99450 | 24978.38371 | 27.87757746 | 298.246862 | 3367.215793 | **7.42** | 18.84 | **49.92** | **4879.25** |
| | | | | | | | | |
| 100500 | 25487.03118 | 28.21808797 | 294.6478871 | 4206.943483 | **6.06** | 17.58 | **0.20** | **4309.36** |
| 100500 | 25468.32522 | 28.20572092 | 294.7770782 | 4198.81045 | **6.07** | 17.19 | **1.04** | **3409.78** |
| 100500 | 25427.87165 | 28.17110793 | 295.1392619 | 4173.680611 | **6.09** | 16.67 | **3.26** | **2325.92** |
| 100500 | 25431.75782 | 28.16116299 | 295.2434884 | 4222.828814 | **6.02** | 16.83 | **5.57** | **2255.80** |
| 100500 | 25393.70143 | 28.14967374 | 295.3639916 | 4051.582408 | **6.27** | 16.35 | **5.41** | **1931.82** |
| 100500 | 25385.14943 | 28.13500239 | 295.5180129 | 4033.589101 | **6.29** | 16.24 | **4.96** | **1923.68** |
| 100500 | 25369.98645 | 28.10354505 | 295.8487972 | 4016.859098 | **6.32** | 16.12 | **8.57** | **1849.92** |
| 100500 | 25354.59351 | 28.08557258 | 296.0381162 | 3949.612353 | **6.42** | 16.28 | **11.06** | **1862.91** |
| 100500 | 25338.90552 | 28.05168852 | 296.3957051 | 3900.353197 | **6.50** | 16.12 | **10.65** | **2002.02** |
| 100500 | 25325.14972 | 28.01500749 | 296.7837864 | 3888.280333 | **6.51** | 16.22 | **14.35** | **2349.18** |
| 100500 | 25320.87226 | 27.98528525 | 297.0989906 | 3925.161325 | **6.45** | 15.92 | **20.32** | **2686.06** |
| 100500 | 25308.06831 | 27.97119344 | 297.2486683 | 3823.159336 | **6.62** | 15.95 | **20.86** | **2822.67** |
| 100500 | 25308.91687 | 27.9480319 | 297.4950089 | 3909.246597 | **6.47** | 15.68 | **26.22** | **3347.07** |
| 100500 | 25306.98012 | 27.92906854 | 297.6970029 | 3951.65241 | **6.40** | 15.93 | **33.05** | **3936.19** |
| | | | | | | | | |

Table 12

| **Toluene Data** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| P lab (Pa) | A | M | R | B | **Tau (ms)** | Vaporizer (C) | **NOx (ppmV)** | **CO (ppmV)** |
| 99500 | 25112.7913 | 29.64735811 | 280.4432006 | 3321.402551 | **7.56** | 50.28 | | **3787.11** |
| 102300 | 25838.3296 | 29.70782816 | 279.8723607 | 3733.785861 | **6.92** | 53.16 | **0.00** | **2738.56** |
| 102300 | 25824.15056 | 29.73572814 | 279.6097665 | 3702.029273 | **6.98** | 52.39 | **0.00** | **2326.97** |
| 102300 | 25810.20428 | 29.76344149 | 279.349416 | 3705.569617 | **6.97** | 51.78 | **0.06** | **1967.86** |
| 102300 | 25802.09982 | 29.77986493 | 279.1953563 | 3718.163359 | **6.94** | 53.67 | **0.23** | **1861.87** |
| 102300 | 25794.11661 | 29.794611 | 279.0571758 | 3697.368169 | **6.98** | 53.02 | **0.38** | **1832.05** |
| 102300 | 25784.76369 | 29.81827346 | 278.8357284 | 3673.028231 | **7.02** | 53.49 | **1.51** | **1846.26** |
| 102300 | 25755.44304 | 29.84035097 | 278.6294306 | 3516.433997 | **7.32** | 52.09 | **3.71** | **1867.53** |
| 102300 | 25749.5108 | 29.85729546 | 278.4713039 | 3510.036276 | **7.34** | 52.16 | **4.39** | **1969.63** |
| 102300 | 25740.23332 | 29.88750734 | 278.1898104 | 3488.321157 | **7.38** | 51.20 | **6.99** | **2240.32** |
| 102300 | 25731.06873 | 29.91588029 | 277.9259684 | 3453.0727 | **7.45** | 51.74 | **14.56** | **2453.63** |
| 102300 | 25724.4389 | 29.93694365 | 277.7304223 | 3427.803134 | **7.50** | 50.88 | **20.67** | **2651.61** |
| 102300 | 25717.85823 | 29.98159735 | 277.3167787 | 3417.117766 | **7.53** | 51.48 | **26.80** | **3169.00** |
| 102300 | 25712.57127 | 30.00325808 | 277.1165711 | 3388.648711 | **7.59** | 49.71 | **32.81** | **3524.66** |
| 102300 | 25710.60976 | 30.03571886 | 276.8170803 | 3403.508101 | **7.55** | 50.26 | **39.48** | **3975.84** |
| 102300 | 25705.45799 | 30.05921065 | 276.600743 | 3386.211136 | **7.59** | 50.01 | **51.58** | **4385.07** |
| 102300 | 25706.42686 | 30.06427215 | 276.5541756 | 3414.410714 | **7.53** | 49.52 | **56.43** | **4557.40** |
| 102300 | 25702.35936 | 30.08345616 | 276.377819 | 3412.047794 | **7.53** | 49.25 | **65.60** | **4857.79** |
| 102300 | 25699.32177 | 30.09263848 | 276.2934864 | 3394.756473 | **7.57** | 49.50 | **66.78** | **4842.01** |
| 102300 | 25696.34462 | 30.10717992 | 276.1600396 | 3393.129045 | **7.57** | 50.43 | **76.30** | **5015.93** |
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Table 12 cont

| **Toluene Data** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| P lab (Pa) | A | M | R | B | **Tau (ms)** | Vaporizer (C) | **NOx (ppmV)** | **CO (ppmV)** |
| 102300 | 26005.78342 | 29.69522661 | 279.9911282 | 4650.185365 | **5.59** | 53.78 | **0.00** | **3203.87** |
| 102300 | 26006.0686 | 29.71373283 | 279.8167449 | 4729.490038 | **5.50** | 54.71 | **0.02** | **2908.96** |
| 102300 | 26006.28392 | 29.7276943 | 279.6853303 | 4790.504601 | **5.43** | 54.33 | **0.03** | **2727.07** |
| 102300 | 26006.53291 | 29.74382693 | 279.533633 | 4842.719581 | **5.37** | 54.28 | **0.00** | **2561.09** |
| 102300 | 26003.33662 | 29.77854834 | 279.2077003 | 4931.238078 | **5.27** | 52.82 | **0.26** | **2429.33** |
| 102300 | 26003.51896 | 29.79043088 | 279.0963324 | 4982.994547 | **5.22** | 54.34 | **3.04** | **2422.51** |
| 102300 | 26003.7081 | 29.80274874 | 278.9809784 | 5016.867184 | **5.18** | 54.34 | **3.10** | **2439.58** |
| 102300 | 26007.62062 | 29.81415009 | 278.8742921 | 5046.315588 | **5.15** | 54.39 | **2.83** | **2451.72** |
| 102300 | 25989.48217 | 29.8402248 | 278.6306087 | 5056.611526 | **5.14** | 53.90 | **3.70** | **2547.48** |
| 102300 | 25953.17418 | 29.86036703 | 278.4426591 | 4908.035044 | **5.29** | 53.91 | **6.72** | **2576.51** |
| 102300 | 25939.70882 | 29.89328537 | 278.1360395 | 4913.19447 | **5.28** | 53.91 | **6.43** | **2824.71** |
| 102300 | 25922.61709 | 29.91525663 | 277.9317624 | 4861.712048 | **5.33** | 53.36 | **9.15** | **3006.32** |
| 102300 | 25906.03958 | 29.93364579 | 277.7610204 | 4798.046083 | **5.40** | 53.73 | **17.89** | **3170.79** |
| 102300 | 25894.66737 | 29.96449443 | 277.4750637 | 4785.21967 | **5.41** | 53.46 | **22.87** | **3518.51** |
| 102300 | 25890.18364 | 29.99468556 | 277.1957714 | 4828.678454 | **5.36** | 53.83 | **27.82** | **3835.20** |
| 102300 | 25880.88401 | 30.01835388 | 276.9772132 | 4814.612583 | **5.38** | 53.08 | **33.29** | **4053.52** |
| 102300 | 25871.5423 | 30.04053196 | 276.7727286 | 4790.36659 | **5.40** | 53.63 | **36.77** | **4321.15** |
| 102300 | 25865.52423 | 30.05822774 | 276.6097879 | 4792.982347 | **5.40** | 54.16 | **45.12** | **4503.55** |
| 102300 | 25857.88904 | 30.07645842 | 276.4421224 | 4772.494629 | **5.42** | 50.93 | **52.85** | **4821.70** |
| 102300 | 25847.5521 | 30.10019804 | 276.2240962 | 4739.921182 | **5.45** | 53.17 | **58.41** | **4899.84** |

Table 13

| Ethylbenzene data | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| P lab (Pa) | A | M | R | B | **Tau (ms)** | Vaporizer (C) | **NOx (ppmV)** | **CO (ppmV)** |
| 99500 | 25105.78633 | 29.70579983 | 279.8914706 | 3364.232806 | **7.46** | 53.93 | **5.36** | **2695.95** |
| 100700 | 25411.39172 | 29.71937346 | 279.7636367 | 3463.669962 | **7.34** | 55.44 | **1.13** | **2361.67** |
| 100700 | 25401.61454 | 29.7330713 | 279.6347514 | 3437.568947 | **7.39** | 55.00 | **0.75** | **2149.83** |
| 99500 | 25093.56203 | 29.73600386 | 279.6071738 | 3406.923864 | **7.37** | 54.78 | **0.38** | **2053.52** |
| 99500 | 25093.61139 | 29.74337462 | 279.5378838 | 3447.34831 | **7.28** | 57.26 | **1.14** | **1925.28** |
| 100700 | 25393.6882 | 29.75484233 | 279.4301481 | 3476.881849 | **7.30** | 57.09 | **0.85** | **1858.60** |
| 100700 | 25385.88662 | 29.77522887 | 279.2388276 | 3467.289328 | **7.32** | 56.09 | **1.33** | **1720.18** |
| 99500 | 25076.81924 | 29.7772468 | 279.2199042 | 3415.895093 | **7.34** | 55.10 | **0.94** | **1705.42** |
| 100700 | 25373.99973 | 29.79700392 | 279.0347655 | 3440.575554 | **7.37** | 55.97 | **3.17** | **1633.47** |
| 100700 | 25369.00176 | 29.80854461 | 278.9267343 | 3433.344882 | **7.39** | 55.02 | **3.66** | **1607.59** |
| 99500 | 25063.0426 | 29.81528183 | 278.8637064 | 3407.151592 | **7.36** | 54.61 | **2.92** | **1643.72** |
| 100700 | 25356.80214 | 29.84272391 | 278.6072754 | 3418.860762 | **7.42** | 56.59 | **3.81** | **1647.36** |
| 99500 | 25051.03427 | 29.85086492 | 278.5312928 | 3387.082549 | **7.40** | 54.84 | **4.92** | **1696.17** |
| 100700 | 25344.8229 | 29.86989759 | 278.3538168 | 3398.577044 | **7.46** | 55.43 | **7.92** | **1724.00** |
| 100700 | 25344.86909 | 29.87856041 | 278.2731124 | 3403.034485 | **7.45** | 60.12 | **5.79** | **1746.88** |
| 99500 | 25039.226 | 29.89750589 | 278.0967761 | 3394.908792 | **7.38** | 54.87 | **9.05** | **1939.23** |
| 100700 | 25342.67646 | 29.90935292 | 277.9866225 | 3446.494061 | **7.35** | 55.57 | **10.51** | **1978.49** |
| 99500 | 25030.07655 | 29.92508967 | 277.8404373 | 3372.87231 | **7.42** | 54.91 | **12.42** | **2167.11** |
| 100700 | 25332.43132 | 29.94211137 | 277.6824886 | 3421.306085 | **7.40** | 54.89 | **13.59** | **2232.11** |
| 100700 | 25323.57091 | 29.96913811 | 277.4320693 | 3397.138672 | **7.45** | 55.23 | **15.93** | **2483.72** |
| 99500 | 25015.95065 | 29.97804876 | 277.3496056 | 3328.018918 | **7.52** | 53.92 | **17.52** | **2621.22** |
| 99500 | 25015.99761 | 29.98844693 | 277.2534376 | 3361.880996 | **7.44** | 54.10 | **21.97** | **2827.99** |
| 99500 | 25016.04057 | 29.99795448 | 277.1655649 | 3388.300702 | **7.38** | 53.92 | **24.15** | **2979.56** |
| 100700 | 25306.35954 | 30.02074036 | 276.955195 | 3307.474307 | **7.65** | 57.67 | **26.38** | **2986.08** |
| 100700 | 25306.4773 | 30.04847967 | 276.6995232 | 3375.479191 | **7.50** | 54.35 | **35.54** | **3581.27** |
| 100700 | 25300.36539 | 30.07084015 | 276.4937713 | 3333.884695 | **7.59** | 53.87 | **40.46** | **3834.20** |
| 99500 | 24997.33262 | 30.07497537 | 276.4557542 | 3330.719658 | **7.51** | 52.73 | **45.24** | **4127.74** |
| 100700 | 25300.41526 | 30.08307918 | 276.3812823 | 3375.121468 | **7.50** | 53.55 | **46.61** | **4156.90** |
| 99500 | 24991.35007 | 30.10300241 | 276.1983634 | 3325.918028 | **7.51** | 52.88 | **57.48** | **4712.86** |
| 100700 | 25290.37988 | 30.13281195 | 275.9251282 | 3342.293591 | **7.57** | 54.01 | **66.43** | **4865.59** |
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Table 13 cont

| **Ethylbenzene data** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| P lab (Pa) | A | M | R | B | **Tau (ms)** | Vaporizer (C) | **NOx (ppmV)** | **CO (ppmV)** |
| 99500 | 25300.43947 | 29.72633857 | 279.698086 | 4604.695129 | **5.49** | 59.87 | **0.63** | **2797.76** |
| 99500 | 25304.26495 | 29.73562129 | 279.6107712 | 4647.241478 | **5.45** | 60.51 | **2.04** | **2747.30** |
| 99500 | 25289.64123 | 29.76063524 | 279.375757 | 4667.191112 | **5.42** | 59.82 | **2.20** | **2393.42** |
| 99500 | 25289.90755 | 29.78255874 | 279.1701033 | 4751.256643 | **5.32** | 60.15 | **1.98** | **2330.68** |
| 99500 | 25272.21248 | 29.81658279 | 278.8515391 | 4787.080599 | **5.28** | 60.13 | **1.59** | **2291.73** |
| 99500 | 25259.58469 | 29.84659906 | 278.5711023 | 4818.611587 | **5.24** | 60.51 | **3.41** | **2333.83** |
| 99500 | 25238.79236 | 29.88591196 | 278.2046608 | 4812.525519 | **5.24** | 60.87 | **5.41** | **2514.71** |
| 99500 | 25220.46522 | 29.91634649 | 277.9216374 | 4771.731234 | **5.29** | 59.84 | **9.28** | **2744.10** |
| 99500 | 25204.05897 | 29.94656233 | 277.6412167 | 4747.655633 | **5.31** | 59.23 | **13.03** | **3058.39** |
| 99500 | 25185.29656 | 29.99064953 | 277.2330753 | 4764.286255 | **5.29** | 60.43 | **20.83** | **3481.95** |

Table 14

| Cyclohexane data | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| P Lab (Pa) | A | M | R | B | **Tau (ms)** | Vaporizer (C) | **NOx (ppmV)** | **CO (ppmV)** |
| 99700 | 25196.68555 | 29.62337352 | 280.6702617 | 3687.166894 | **6.83** | 51.45 | | **2390.34** |
| 100850 | 25483.84196 | 29.58039048 | 281.0781016 | 3479.728456 | **7.32** | 53.63 | **0.71** | **4059.19** |
| 100866 | 25482.18942 | 29.59190438 | 280.968737 | 3530.266403 | **7.22** | 53.64 | **1.04** | **3166.24** |
| 100882 | 25478.98384 | 29.60241168 | 280.8690079 | 3524.302279 | **7.23** | 52.50 | **1.25** | **2609.32** |
| 100898 | 25473.07428 | 29.61819337 | 280.7193503 | 3540.359502 | **7.20** | 54.45 | **1.51** | **2038.94** |
| 100914 | 25457.46014 | 29.64003261 | 280.5125119 | 3503.171506 | **7.27** | 54.16 | **2.12** | **1498.88** |
| 100930 | 25440.3985 | 29.66227462 | 280.302172 | 3426.582018 | **7.42** | 53.57 | **2.82** | **1258.88** |
| 100945 | 25439.0273 | 29.67342043 | 280.196886 | 3425.326456 | **7.43** | 53.21 | **3.34** | **1205.55** |
| 100961 | 25427.81295 | 29.68695074 | 280.0691817 | 3363.637817 | **7.56** | 54.02 | **4.22** | **1142.68** |
| 100977 | 25422.05065 | 29.71031735 | 279.8489125 | 3329.552217 | **7.64** | 51.72 | **5.30** | **1152.38** |
| 100993 | 25414.34642 | 29.73977633 | 279.5717059 | 3309.158042 | **7.68** | 52.53 | **7.40** | **1245.18** |
| 101009 | 25413.54818 | 29.75483862 | 279.430183 | 3306.255257 | **7.69** | 51.05 | **9.13** | **1341.82** |
| 101025 | 25408.57042 | 29.77777087 | 279.2149902 | 3268.747618 | **7.77** | 51.37 | **10.71** | **1432.54** |
| 101041 | 25412.80807 | 29.81613501 | 278.8557268 | 3357.545284 | **7.57** | 50.72 | **15.34** | **1761.48** |
| 101057 | 25411.32558 | 29.83398698 | 278.6888661 | 3350.601061 | **7.58** | 50.48 | **19.00** | **1964.40** |
| 101073 | 25410.90898 | 29.8507837 | 278.5320508 | 3359.168185 | **7.56** | 51.90 | **23.67** | **2205.24** |
| 101089 | 25408.54672 | 29.87195861 | 278.3346117 | 3337.220359 | **7.61** | 51.07 | **28.48** | **2451.91** |
| 101105 | 25410.48017 | 29.88552111 | 278.2082993 | 3336.708739 | **7.62** | 50.85 | **31.27** | **2593.35** |
| 101120 | 25410.25642 | 29.90407612 | 278.0356754 | 3336.703187 | **7.62** | 51.70 | **37.94** | **2926.29** |
| 101136 | 25412.2994 | 29.92902771 | 277.8038793 | 3355.827137 | **7.57** | 50.37 | **44.53** | **3260.38** |
| 101152 | 25416.37272 | 29.9454958 | 277.651105 | 3394.452155 | **7.49** | 51.23 | **51.51** | **3570.52** |
| 101168 | 25419.36588 | 29.95436261 | 277.5689174 | 3403.426079 | **7.47** | 50.05 | **55.66** | **3720.54** |
| 101184 | 25419.33482 | 29.97116369 | 277.4133192 | 3403.317768 | **7.47** | 49.18 | **65.05** | **4056.10** |
| 101200 | 25415.476 | 30.00523321 | 277.0983295 | 3372.373211 | **7.54** | 49.14 | **78.88** | **4558.44** |
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Table 14 cont

| **Cyclohexane data** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| P Lab (Pa) | A | M | R | B | **Tau (ms)** | Vaporizer (C) | **NOx (ppmV)** | **CO (ppmV)** |
| 99650 | 25306.16605 | 29.62119762 | 280.6908791 | 4410.866177 | **5.74** | 58.70 | | **2294.02** |
| 99650 | 25312.18781 | 29.64984808 | 280.4196493 | 4594.900012 | **5.51** | 58.94 | | **1965.70** |
| 99650 | 25314.53067 | 29.68264975 | 280.1097635 | 4741.146141 | **5.34** | 60.81 | | **1887.72** |
| 99650 | 25315.11304 | 29.71782837 | 279.7781822 | 4785.740046 | **5.29** | 58.70 | | **1947.55** |
| 99650 | 25315.81094 | 29.75989317 | 279.3827234 | 4964.829833 | **5.10** | 60.02 | | **2234.50** |
| 99650 | 25289.50105 | 29.78536393 | 279.143811 | 4840.401566 | **5.22** | 58.46 | | **2381.11** |
| 99650 | 25274.30054 | 29.83525142 | 278.6770549 | 4928.030793 | **5.13** | 57.70 | | **2882.23** |
| 99650 | 25260.65807 | 29.84522532 | 278.5839245 | 4923.654577 | **5.13** | 57.98 | | **3111.19** |
| 99650 | 25260.86944 | 29.85980225 | 278.4479257 | 5017.932271 | **5.03** | 59.18 | | **3799.98** |
| 99650 | 25242.76014 | 29.89870699 | 278.0856042 | 4954.67311 | **5.09** | 58.31 | | **4317.23** |
| 99650 | 25238.15251 | 29.92133909 | 277.875264 | 4980.045011 | **5.07** | 58.84 | | **4511.63** |
| 99650 | 25228.53668 | 29.93007861 | 277.794125 | 4972.108375 | **5.07** | 57.86 | | **4842.98** |
| 99650 | 25219.18475 | 29.96080789 | 277.5092057 | 4948.633179 | **5.10** | 60.49 | | **5019.31** |

Table 15

| **Ethane data** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| P lab (Pa) | A | M | R | B | **Tau (ms)** | Vaporizer (C) | **NOx (ppmV)** | **CO (ppmV)** |
| 99700 | 25232.53798 | 29.0008274 | 286.6952685 | 3631.261216 | **6.95** | 21.41 | | **3885.96** |
| 100600 | 25432.60727 | 29.00122548 | 286.6913333 | 3489.665256 | **7.29** | 18.92 | **0.67** | **4064.27** |
| 100600 | 25416.36882 | 29.00203883 | 286.6832931 | 3551.376904 | **7.16** | 19.42 | **0.86** | **2625.57** |
| 100600 | 25398.20808 | 29.00383789 | 286.6655107 | 3580.959007 | **7.09** | 19.40 | **1.32** | **1763.12** |
| 100600 | 25383.25953 | 29.00530592 | 286.6510018 | 3594.144004 | **7.06** | 19.16 | **2.05** | **1309.97** |
| 100600 | 25367.05228 | 29.0061262 | 286.6428955 | 3545.034088 | **7.16** | 19.35 | **2.58** | **1143.07** |
| 100600 | 25352.68695 | 29.00690096 | 286.6352394 | 3488.5588 | **7.27** | 19.58 | **3.16** | **1059.75** |
| 100600 | 25336.71844 | 29.00880926 | 286.6163835 | 3452.989648 | **7.34** | 19.37 | **4.69** | **1036.89** |
| 100600 | 25324.56959 | 29.00960873 | 286.6084847 | 3419.630798 | **7.41** | 19.29 | **6.24** | **1067.22** |
| 100600 | 25317.88904 | 29.01121037 | 286.5926617 | 3436.085522 | **7.37** | 19.50 | **8.74** | **1202.57** |
| 100600 | 25310.88012 | 29.01162511 | 286.5885647 | 3410.90882 | **7.42** | 19.55 | **10.28** | **1263.62** |
| 100600 | 25309.06575 | 29.01311818 | 286.5738163 | 3455.289097 | **7.32** | 19.80 | **13.62** | **1495.76** |
| 100600 | 25302.24014 | 29.01357743 | 286.5692802 | 3437.164767 | **7.36** | 19.31 | **16.46** | **1648.48** |
| 100600 | 25302.57243 | 29.01452774 | 286.5598943 | 3495.784498 | **7.24** | 19.75 | **21.09** | **1930.94** |
| 100600 | 25294.91048 | 29.01548239 | 286.550466 | 3458.026836 | **7.31** | 19.64 | **24.60** | **2083.57** |
| 100600 | 25288.81272 | 29.0173192 | 286.5323272 | 3452.915115 | **7.32** | 19.57 | **31.10** | **2425.45** |
| 100600 | 25282.42749 | 29.01788688 | 286.5267218 | 3428.812009 | **7.37** | 19.72 | **36.74** | **2717.69** |
| 100600 | 25280.77672 | 29.01953689 | 286.5104303 | 3456.323572 | **7.31** | 19.83 | **44.05** | **3120.65** |
| 100600 | 25280.98252 | 29.02020747 | 286.5038098 | 3507.095427 | **7.21** | 19.75 | **53.14** | **3594.67** |
| 100600 | 25273.97261 | 29.02169713 | 286.4891038 | 3477.356336 | **7.27** | 19.96 | **63.06** | **4061.62** |
| 100600 | 25272.17449 | 29.02272489 | 286.4789586 | 3490.157476 | **7.24** | 19.88 | **71.24** | **4450.62** |

Table 16

| **POSF 2926 Neat data** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| P Lab (Pa) | A | M | R | B | **Tau (ms)** | Fuel Temp (C) | Vaporizer (C) | **NOx (ppmV)** |
| 101100 | 25522.43242 | 29.62566956 | 280.6485094 | 3070.144258 | **8.31** | 194.43 | 222.75 | **3.36** |
| 100500 | 25353.35534 | 29.62836881 | 280.6229412 | 3182.368665 | **7.97** | 169.45 | 202.19 | **0.87** |
| 100500 | 25350.78203 | 29.6592248 | 280.3309951 | 3265.352458 | **7.76** | 177.24 | 203.35 | **1.75** |
| 100500 | 25343.10586 | 29.7112003 | 279.840596 | 3350.767258 | **7.56** | 183.66 | 204.38 | **1.34** |
| 100500 | 25335.19887 | 29.70689938 | 279.8811109 | 3320.35476 | **7.63** | 191.19 | 208.20 | **1.38** |
| 100500 | 25322.63872 | 29.74583106 | 279.5147993 | 3317.780234 | **7.63** | 196.52 | 209.39 | **2.64** |
| 100500 | 25312.82204 | 29.79463388 | 279.0569615 | 3370.232664 | **7.51** | 200.46 | 211.48 | **3.60** |
| 100500 | 25301.80933 | 29.8460612 | 278.5761225 | 3405.730356 | **7.43** | 201.53 | 211.70 | **6.25** |
| 100500 | 25294.68372 | 29.88089806 | 278.2513425 | 3425.602948 | **7.38** | 202.99 | 211.80 | **8.35** |
| 100500 | 25284.4371 | 29.89975709 | 278.0758377 | 3369.143098 | **7.50** | 203.52 | 211.34 | **9.86** |
| 100500 | 25275.25619 | 29.91304821 | 277.9522816 | 3317.942246 | **7.62** | 204.97 | 212.43 | **10.97** |
| 100500 | 25266.52936 | 29.95657968 | 277.5483747 | 3309.651251 | **7.63** | 206.69 | 210.71 | **15.11** |
| 100500 | 25259.17672 | 29.99051614 | 277.2343084 | 3292.722672 | **7.67** | 208.28 | 208.55 | **19.61** |
| 100500 | 25250.87786 | 30.02081113 | 276.9545421 | 3257.991311 | **7.75** | 209.68 | 205.72 | **24.59** |
| 100500 | 25242.96706 | 30.06701145 | 276.5289798 | 3242.766988 | **7.78** | 211.19 | 205.11 | **34.02** |
| 100500 | 25243.07928 | 30.11427153 | 276.0950067 | 3328.391336 | **7.58** | 218.02 | 207.10 | **47.71** |
| 100500 | 25235.21829 | 30.16325568 | 275.6466374 | 3299.959972 | **7.65** | 223.69 | 206.12 | **64.29** |
| 100500 | 25235.25364 | 30.17905087 | 275.5023687 | 3332.219568 | **7.57** | 230.85 | 208.70 | **72.65** |
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Table 17

| **Dodecane** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| P lab | A | M | R | B | **Tau (ms)** | Fuel Temp (C) | Vaporizer (C) | **NOx** |
| 100600 | 25417.35887 | 29.69934609 | 279.9522917 | 3294.701551 | **7.71** | 260.02 | 135.16 | **1.01** |
| 99950 | 25246.42518 | 29.73251069 | 279.6400239 | 3280.401506 | **7.70** | 159.92 | 132.35 | **0.87** |
| 99917.5 | 25237.95082 | 29.75210294 | 279.4558763 | 3378.995073 | **7.47** | 170.07 | 133.41 | **0.99** |
| 99885 | 25216.96551 | 29.77567367 | 279.2346562 | 3443.499054 | **7.32** | 177.49 | 133.77 | **1.32** |
| 99852.5 | 25200.54612 | 29.79405226 | 279.0624091 | 3455.26899 | **7.29** | 182.37 | 133.70 | **1.69** |
| 99820 | 25187.12238 | 29.8109027 | 278.9046707 | 3476.772797 | **7.24** | 183.73 | 132.96 | **2.11** |
| 99787.5 | 25169.20895 | 29.83583025 | 278.6716485 | 3500.682868 | **7.19** | 184.82 | 133.33 | **2.75** |
| 99755 | 25147.99916 | 29.86832784 | 278.3684458 | 3489.990679 | **7.21** | 185.17 | 131.96 | **3.69** |
| 99722.5 | 25124.34736 | 29.88307192 | 278.231101 | 3439.132431 | **7.31** | 185.43 | 130.51 | **4.67** |
| 99690 | 25107.62858 | 29.90830571 | 277.996356 | 3421.706676 | **7.34** | 185.93 | 129.31 | **5.72** |
| 99657.5 | 25091.1005 | 29.93471687 | 277.751082 | 3428.896624 | **7.32** | 185.61 | 129.65 | **7.52** |
| 99625 | 25077.21403 | 29.95642323 | 277.5498241 | 3425.854344 | **7.32** | 185.75 | 129.02 | **8.92** |
| 99592.5 | 25062.14002 | 29.97646708 | 277.3642397 | 3402.638692 | **7.37** | 185.95 | 128.98 | **10.44** |
| 99560 | 25044.98888 | 30.01224384 | 277.0336015 | 3400.777405 | **7.36** | 185.73 | 127.84 | **14.06** |
| 99527.5 | 25027.94664 | 30.03801559 | 276.7959147 | 3371.363557 | **7.42** | 186.94 | 127.30 | **18.06** |
| 99495 | 25008.1521 | 30.08803986 | 276.3357147 | 3347.502242 | **7.47** | 193.60 | 126.20 | **26.13** |
| 99462.5 | 24993.64757 | 30.1137338 | 276.0999368 | 3317.663282 | **7.53** | 199.75 | 125.73 | **33.03** |
| 99430 | 24985.61454 | 30.15456756 | 275.7260565 | 3386.357505 | **7.38** | 209.69 | 127.56 | **40.79** |
| 99397.5 | 24974.46429 | 30.1718195 | 275.5683992 | 3374.957561 | **7.40** | 222.02 | 126.35 | **45.40** |
| 99365 | 24961.36236 | 30.19558667 | 275.3514973 | 3365.324449 | **7.42** | 236.00 | 126.61 | **54.75** |
| 99332.5 | 24951.4109 | 30.22352678 | 275.0969488 | 3379.187639 | **7.38** | 237.87 | 126.84 | **62.91** |
| 99300 | 24939.41407 | 30.24888743 | 274.8663077 | 3370.19593 | **7.40** | 238.35 | 126.60 | **73.04** |
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Table 17 cont

| **Dodecane** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| P lab | A | M | R | B | **Tau (ms)** | Fuel Temp (C) | Vaporizer (C) | **NOx** |
| 100000 | 25402.0307 | 29.70492797 | 279.8996856 | 3861.021386 | **6.58** | 192.25 | 130.50 | **0.96** |
| 100000 | 25395.12601 | 29.74119553 | 279.5583651 | 4061.966448 | **6.25** | 196.93 | 131.41 | **1.05** |
| 100000 | 25388.21214 | 29.76702206 | 279.3158141 | 4164.613679 | **6.10** | 198.78 | 131.96 | **1.33** |
| 100000 | 25386.90471 | 29.78325397 | 279.1635866 | 4255.475101 | **5.97** | 199.45 | 132.72 | **1.62** |
| 100000 | 25381.79388 | 29.80734416 | 278.9379676 | 4298.534866 | **5.90** | 199.83 | 132.99 | **1.98** |
| 100000 | 25388.92141 | 29.82448941 | 278.7776141 | 4419.911891 | **5.74** | 199.12 | 132.46 | **2.55** |
| 100000 | 25390.83787 | 29.84865675 | 278.5518984 | 4535.740322 | **5.60** | 200.65 | 133.26 | **3.38** |
| 100000 | 25390.98813 | 29.87271106 | 278.3276008 | 4642.685323 | **5.47** | 204.11 | 132.86 | **4.53** |
| 100000 | 25387.78847 | 29.92596133 | 277.8323446 | 4777.269271 | **5.31** | 215.67 | 133.01 | **6.89** |
| 100000 | 25388.22014 | 29.96710554 | 277.4508866 | 4945.536519 | **5.13** | 220.12 | 134.05 | **10.18** |
| 100000 | 25368.91688 | 30.00143537 | 277.133407 | 4913.071497 | **5.16** | 223.35 | 133.70 | **13.35** |
| 100000 | 25355.68597 | 30.04276239 | 276.7521805 | 4960.802203 | **5.11** | 226.04 | 134.42 | **17.75** |
| 100000 | 25338.81561 | 30.07255773 | 276.4779795 | 4947.02589 | **5.12** | 228.33 | 133.97 | **23.11** |
| 100000 | 25332.20614 | 30.09566742 | 276.2656792 | 4981.684054 | **5.09** | 231.46 | 134.64 | **27.18** |
| 100000 | 25325.62617 | 30.11260706 | 276.1102678 | 4972.415712 | **5.09** | 233.91 | 134.63 | **29.89** |
| 100000 | 25311.40475 | 30.14986009 | 275.7691073 | 4971.863141 | **5.09** | 241.04 | 135.22 | **37.34** |
| 100000 | 25300.54087 | 30.1759781 | 275.5304226 | 4933.465543 | **5.13** | 246.26 | 133.73 | **42.82** |
| 100000 | 25292.75592 | 30.19774275 | 275.3318375 | 4922.67188 | **5.14** | 252.32 | 135.13 | **48.26** |
| 100000 | 25282.25935 | 30.2338485 | 275.0030318 | 4929.442443 | **5.13** | 206.69 | 133.85 | **59.65** |

# APPENDIX B
# STEP SWIRL COMBUSTOR (SSC)
# (SELECTED DATA SET)

**Table 1 Swirler Vane Angles and Swirler Vane Lengths for the SSC**

Inner swirler (6 vanes)

| Vane angle (degrees) | Direction | Length (mm) |
|---|---|---|
| 30 | clockwise | 25 |
| 30 | counter-clockwise | 25 |
| 45 | clockwise | 19 |
| 45 | counter-clockwise | 19 |
| 60 | clockwise | 19 |
| 60 | counter-clockwise | 19 |

Outer swirler (12 vanes)

| Vane angle (degrees) | Direction | Length (mm) |
|---|---|---|
| 30 | clockwise | 32 |
| 45 | clockwise | 25 |
| 60 | clockwise | 25 |

**Table 2 Flame Length Measurements in the SSC**
(stoichiometric conditions using propane fuel)

| Vane angle combination ($\theta_i/\theta_o$), degrees | Air velocity combination ($U_i/U_o$), m/s | | | | | |
|---|---|---|---|---|---|---|
| **Co-swirl** | **16/8** | **32/8** | **48/8** | **16/16** | **32/16** | **48/16** |
| **30/30** | 150 | 127 | 162 | 66 | 86 | 122 |
| **45/30** | 56 | 81 | 111 | 71 | 76 | 117 |
| **60/30** | 66 | 86 | 127 | 71 | 91 | 152 |
| **30/60** | 51 | 127 | 193 | 41 | 56 | 76 |
| **45/60** | 35 | 56 | 71 | 41 | 46 | 51 |
| **60/60** | 25 | 71 | 132 | 46 | 51 | 61 |
| **Counter-swirl** | | | | | | |
| **30/30** | 86 | 182 | 238 | 66 | 101 | 172 |
| **45/30** | 61 | 147 | 127 | 71 | 86 | 182 |
| **60/30** | 117 | 111 | 127 | 76 | 182 | 203 |
| **30/60** | 76 | 162 | 213 | 41 | 56 | 117 |
| **45/60** | 35 | 61 | 127 | 41 | 51 | 66 |
| **60/60** | 41 | 157 | 122 | 51 | 51 | 76 |

**Table 3 Lean Blowouts (Equivalence Ratios) in the SSC**
(propane fuel)

| Vane angle combination ($\theta_i/\theta_o$), degrees | Air velocity combination ($U_i/U_o$), m/s | | | | | |
|---|---|---|---|---|---|---|
| **Co-swirl** | **16/8** | **32/8** | **48/8** | **16/16** | **32/16** | **48/16** |
| **30/30** | 0.38 | 0.42 | 0.45 | 0.43 | 0.44 | 0.45 |
| **45/30** | 0.41 | 0.42 | 0.43 | 0.44 | 0.45 | 0.46 |
| **60/30** | 0.42 | 0.43 | 0.46 | 0.44 | 0.45 | 0.49 |
| **30/45** | 0.10 | 0.41 | 0.44 | 0.43 | 0.44 | 0.47 |
| **45/45** | 0.34 | 0.39 | 0.41 | 0.41 | 0.41 | 0.45 |
| **60/45** | 0.36 | 0.42 | 0.44 | 0.41 | 0.43 | 0.44 |
| **30/60** | 0.37 | 0.37 | 0.39 | 0.41 | 0.41 | 0.43 |
| **45/60** | 0.36 | 0.36 | 0.38 | 0.39 | 0.38 | 0.40 |
| **60/60** | 0.35 | 0.39 | 0.41 | 0.38 | 0.40 | 0.41 |
| **Counter-swirl** | | | | | | |
| **30/30** | 0.29 | 0.42 | 0.46 | 0.41 | 0.46 | 0.46 |
| **45/30** | 0.44 | 0.43 | 0.44 | 0.43 | 0.49 | 0.47 |
| **60/30** | 0.45 | 0.42 | 0.45 | 0.43 | 0.49 | 0.50 |
| **30/45** | 0.10 | 0.43 | 0.46 | 0.44 | 0.43 | 0.48 |
| **60/45** | 0.36 | 0.43 | 0.46 | 0.42 | 0.43 | 0.44 |
| **30/60** | 0.17 | 0.41 | 0.44 | 0.39 | 0.41 | 0.46 |
| **45/60** | 0.36 | 0.42 | 0.43 | 0.41 | 0.41 | 0.44 |
| **60/60** | 0.35 | 0.41 | 0.42 | 0.39 | 0.41 | 0.43 |

**Table 4 Rich Blowouts (Equivalence Ratios) in the SSC**
(propane fuel)

| Vane angle combination ($\theta_i/\theta_o$), degrees | Air velocity combination ($U_i/U_o$), m/s | | | | | |
|---|---|---|---|---|---|---|
| **Co-swirl** | **16/8** | **32/8** | **48/8** | **16/16** | **32/16** | **48/16** |
| **30/45** | 2.07 | 1.86 | 2.02 | 2.13 | 2.16 | |
| **45/45** | 1.98 | 1.91 | 1.79 | 2.07 | 2.07 | 1.97 |
| **60/45** | | | 1.70 | | 2.02 | |
| **45/60** | 2.04 | 1.97 | | 2.02 | 2.07 | |
| **Counter-swirl** | | | | | | |
| **30/45** | 2.08 | 1.90 | 2.05 | | | |

**Table 5 Test Conditions for the Swirl Combustor for PDF Model Validation**

| LDA | | |
|---|---|---|
| **Annulus** | **Swirl Angle** | **$U_j$** |
| Air jet | 45° swirl | 100 m/s |
| Air jet | 45° swirl | 25 m/s |
| Air jet | 60° swirl | 25 m/s |
| Hydrogen jet | No swirl | 25 m/s |
| Hydrogen jet | No swirl | 100 m/s |
| Hydrogen jet | 30° swirl | 100 m/s |
| Hydrogen jet | 45° swirl | 100 m/s |
| **CARS** | | |
| **Annulus** | **Swirl Angle** | **$U_j$** |
| Hydrogen jet | No swirl | 25 m/s |
| Hydrogen jet | No swirl | 100 m/s |
| Hydrogen jet | 30° swirl | 100 m/s |
| Hydrogen jet | 45° swirl | 100 m/s |

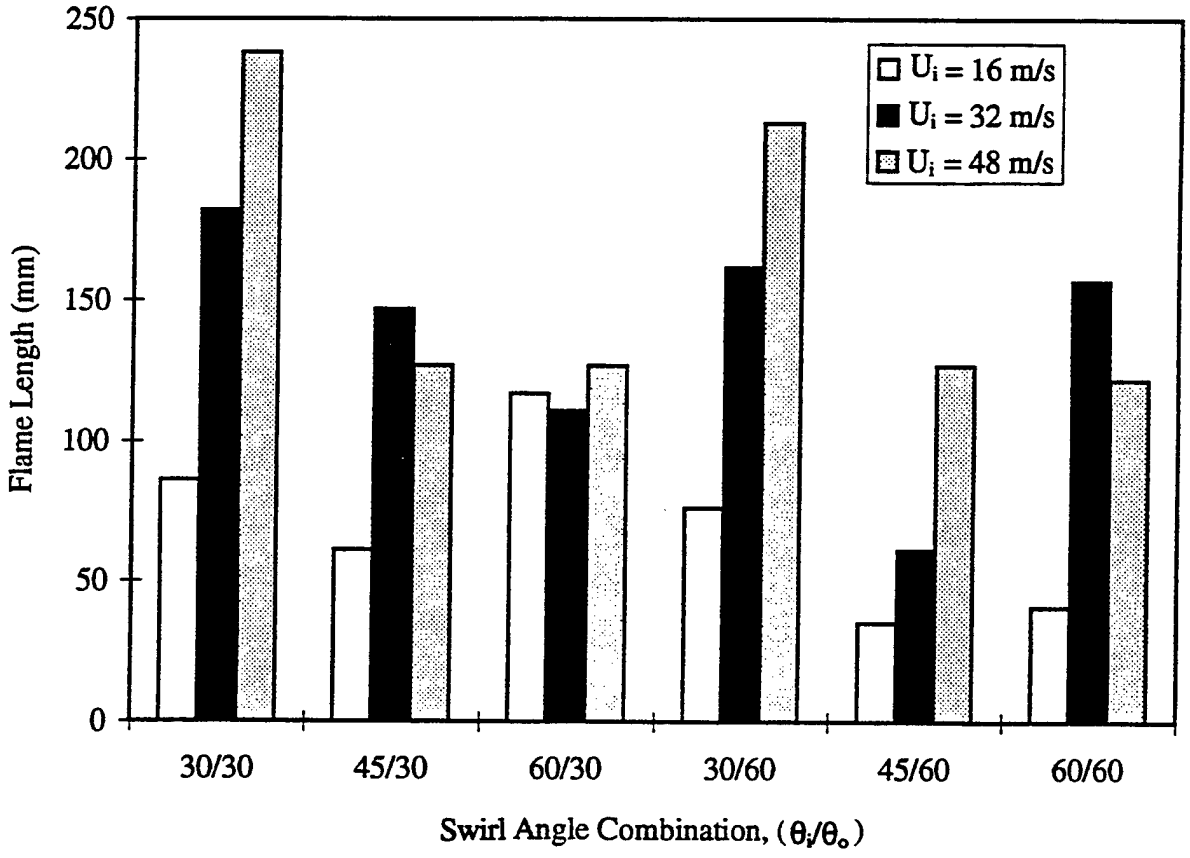



**Figure** 1 Variation of flame length with swirl angle combinations at three different values of inner air velocity ($U_o$ = 8 m/s, counter-swirl, propane, stoichiometric conditions).

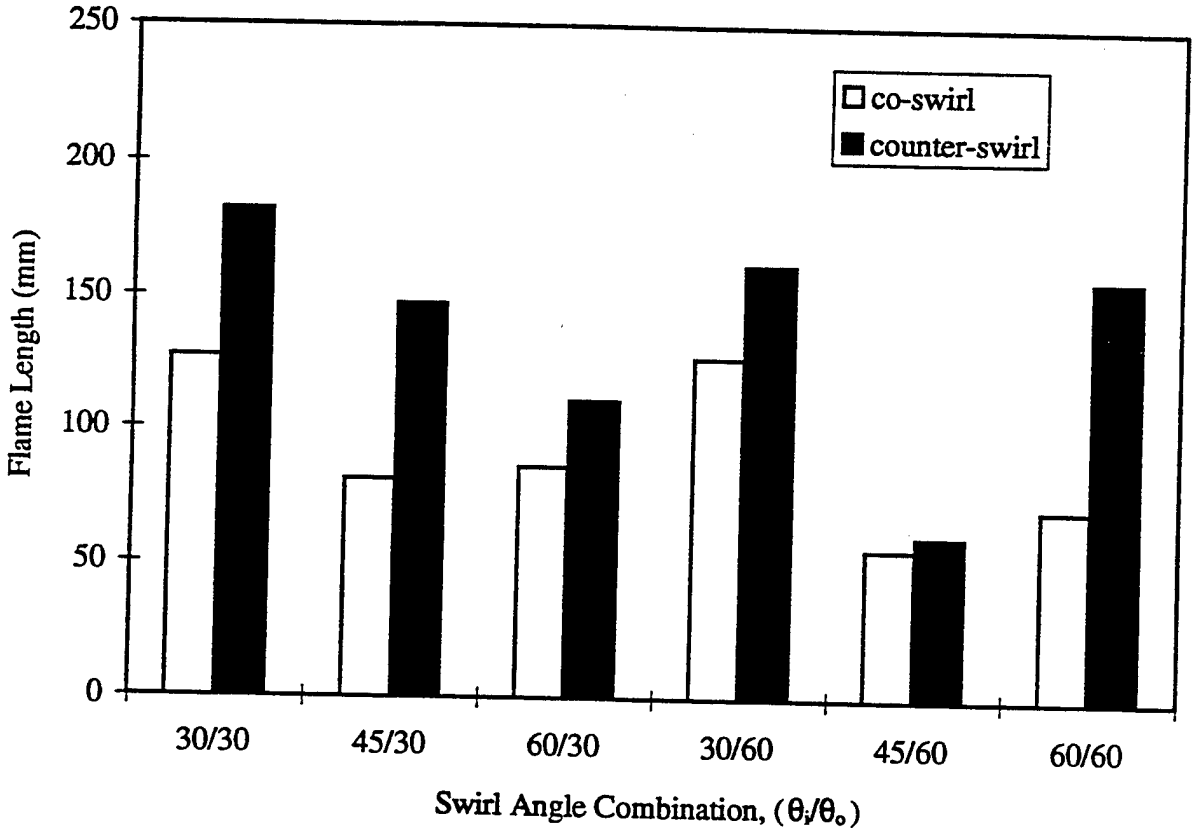



**Figure** 2 A comparison of flame lengths with co- and counter-swirl arrangements for a variety of swirl angle combinations ($U_i$ = 32 m/s, $U_o$ = 8 m/s, propane, stoichiometric conditions).

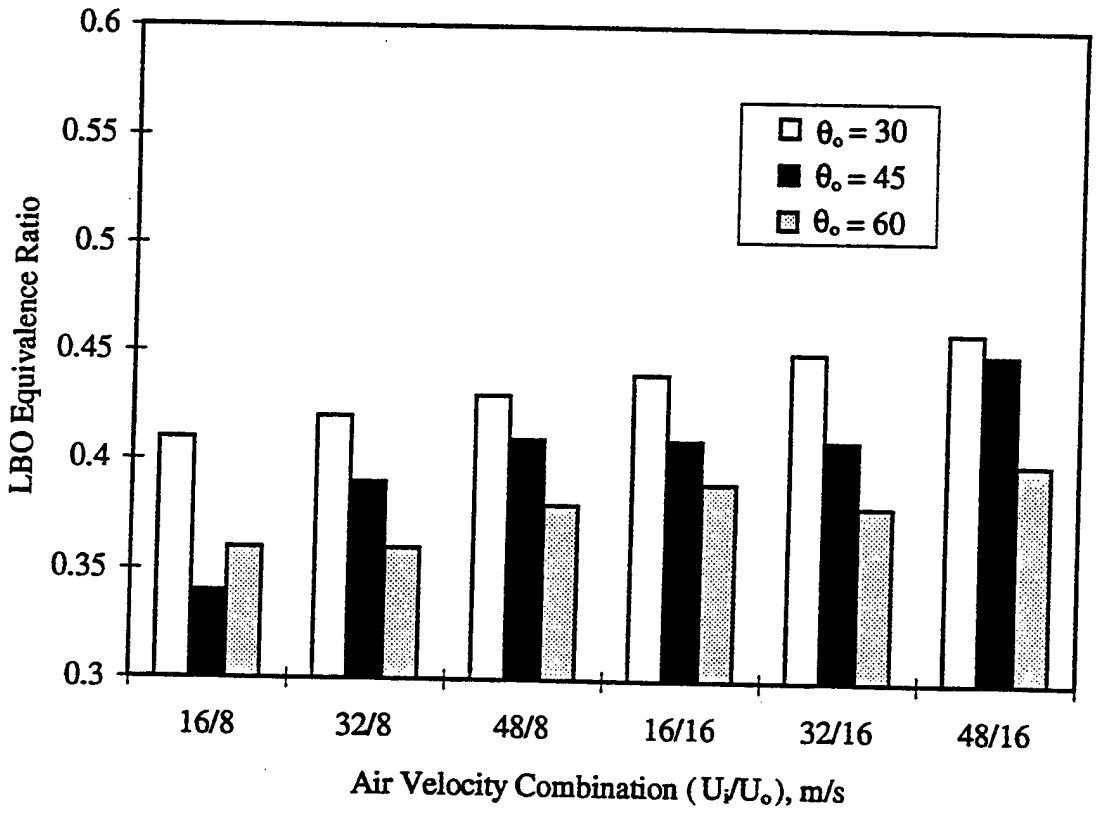



**Figure** 3 Effect of outer swirl angle on LBO for a variety of air velocity combinations ($\theta_i = 45°$, co-swirl, propane).

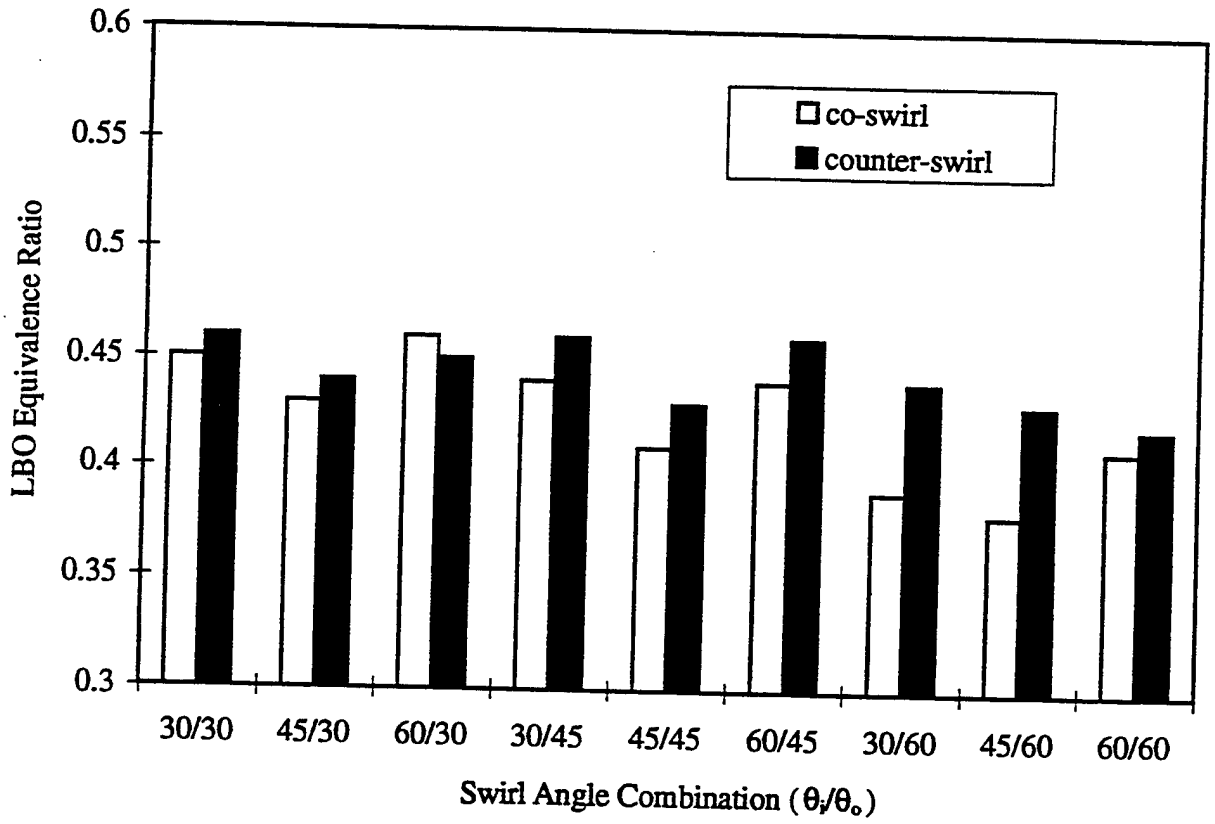



**Figure** 4 A comparison of LBO data for co- and counter-swirl arrangements for a variety of swirl angle combinations ($U_i = 48$ m/s, $U_o = 8$ m/s, propane).

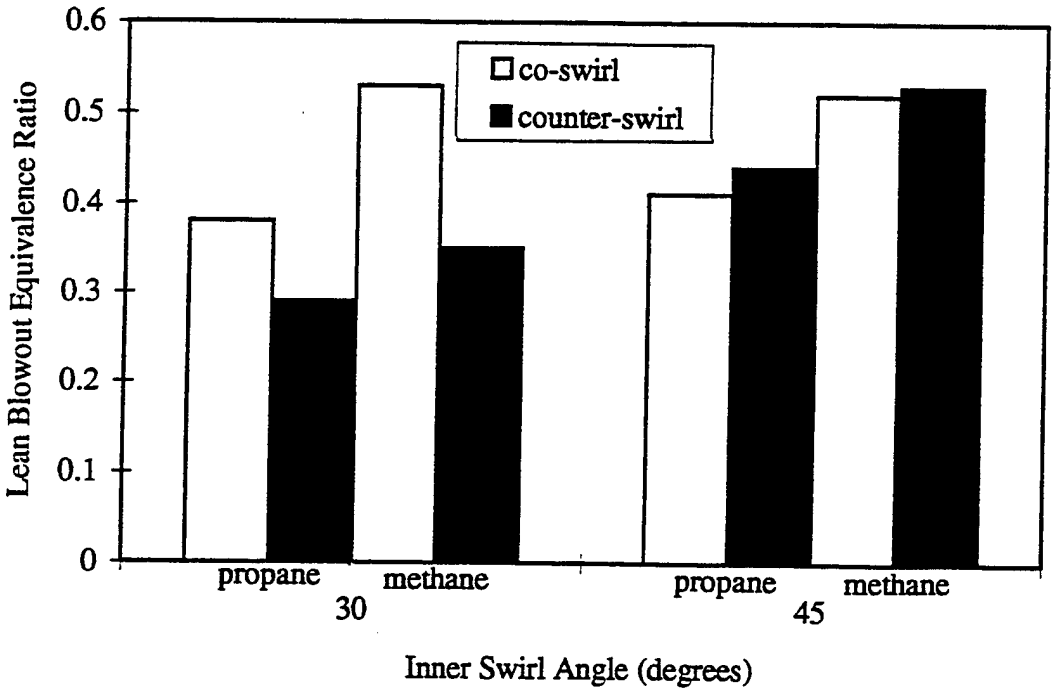



**Figure** 5 LBO data comparing inner swirl angle ($\theta_i$), co-swirl and counter-swirl, and methane with propane ($\theta_o = 30°$, $U_i = 14.4$ m/s, $U_o = 8.6$ m/s).

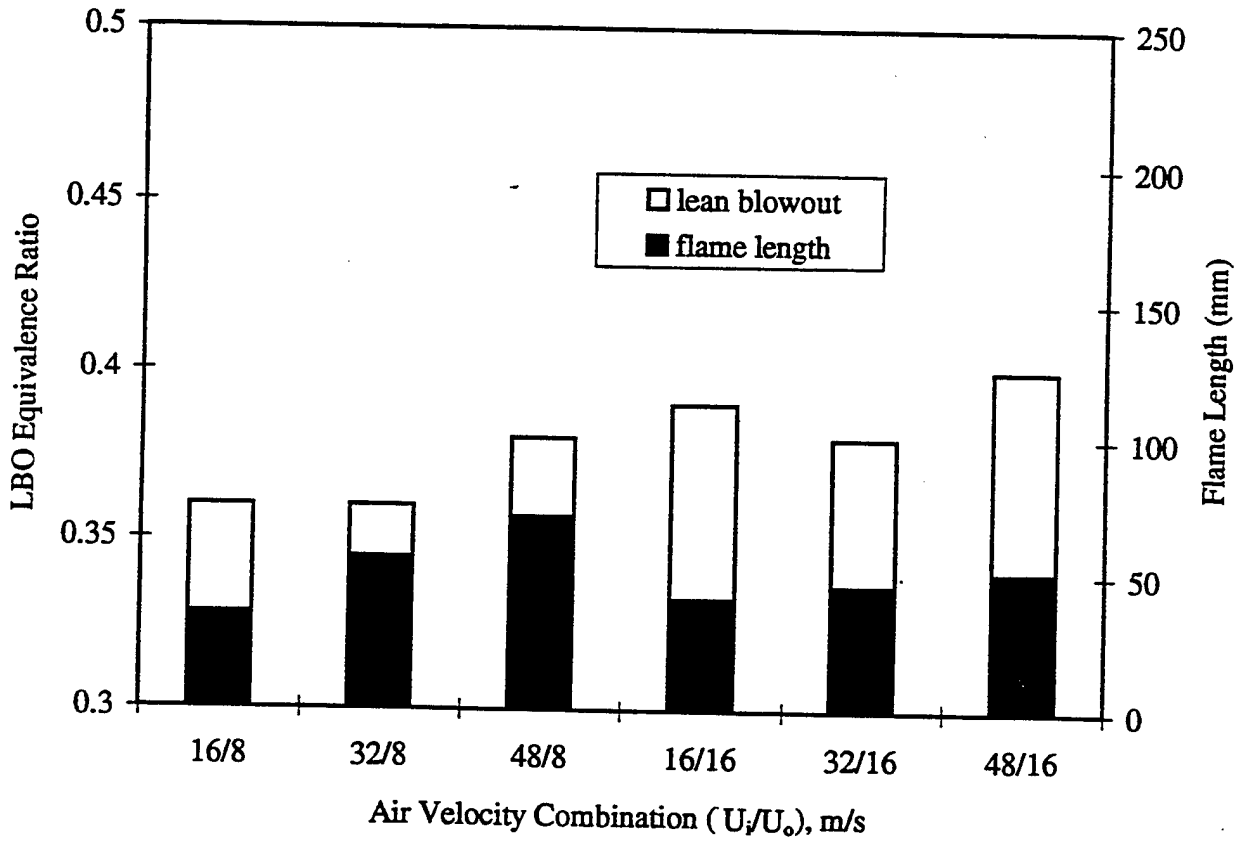



**Figure** 6 Variation of LBO and flame length with air velocity combinations for an optimum swirl angle configuration, $\theta_i = 45°$, $\theta_o = 60°$, co-swirl (propane, flame length at stoichiometric conditions).

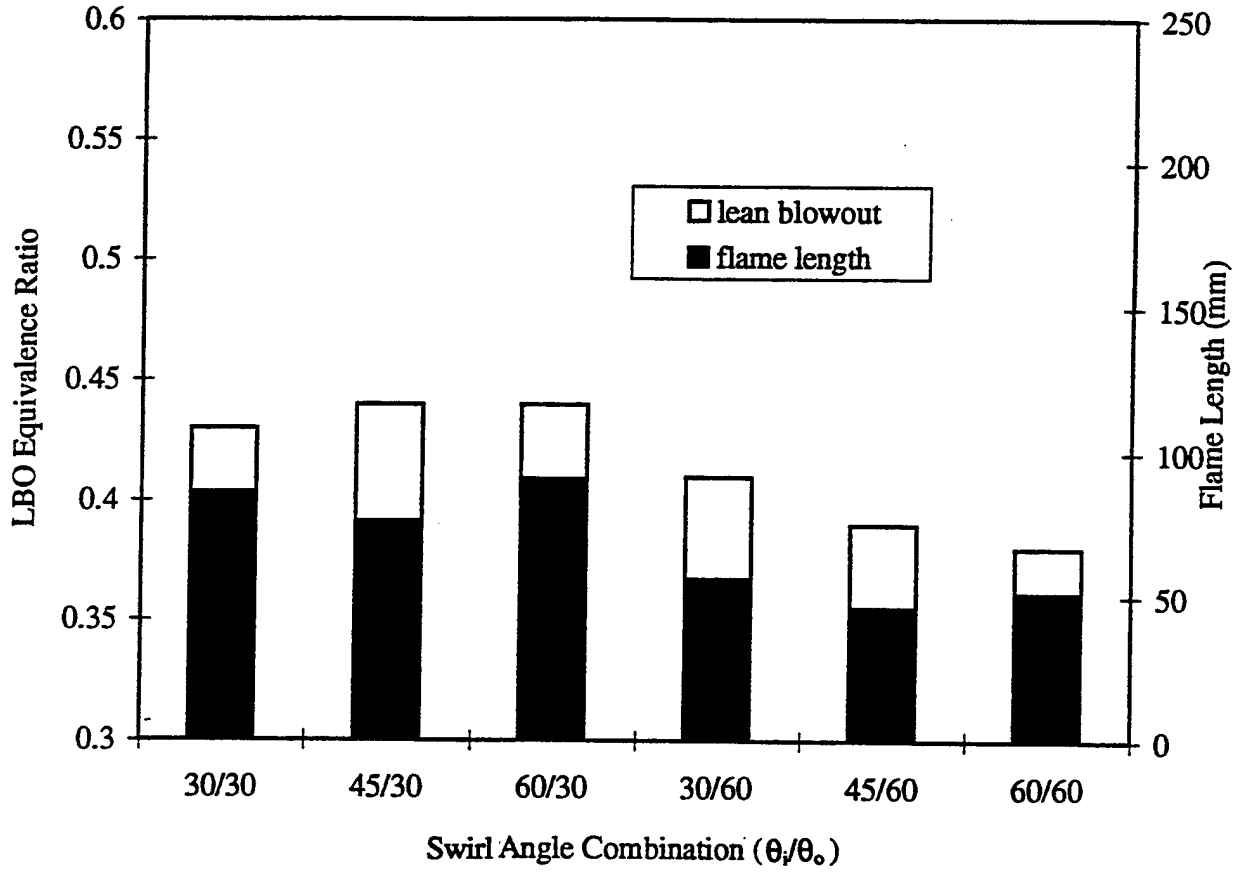



**Figure 7** : Variation of LBO and flame length with swirl angle combinations for an optimum air velocity split, $U_i = U_o = 16$ m/s (co-swirl, propane, flame length at stoichiometric conditions).

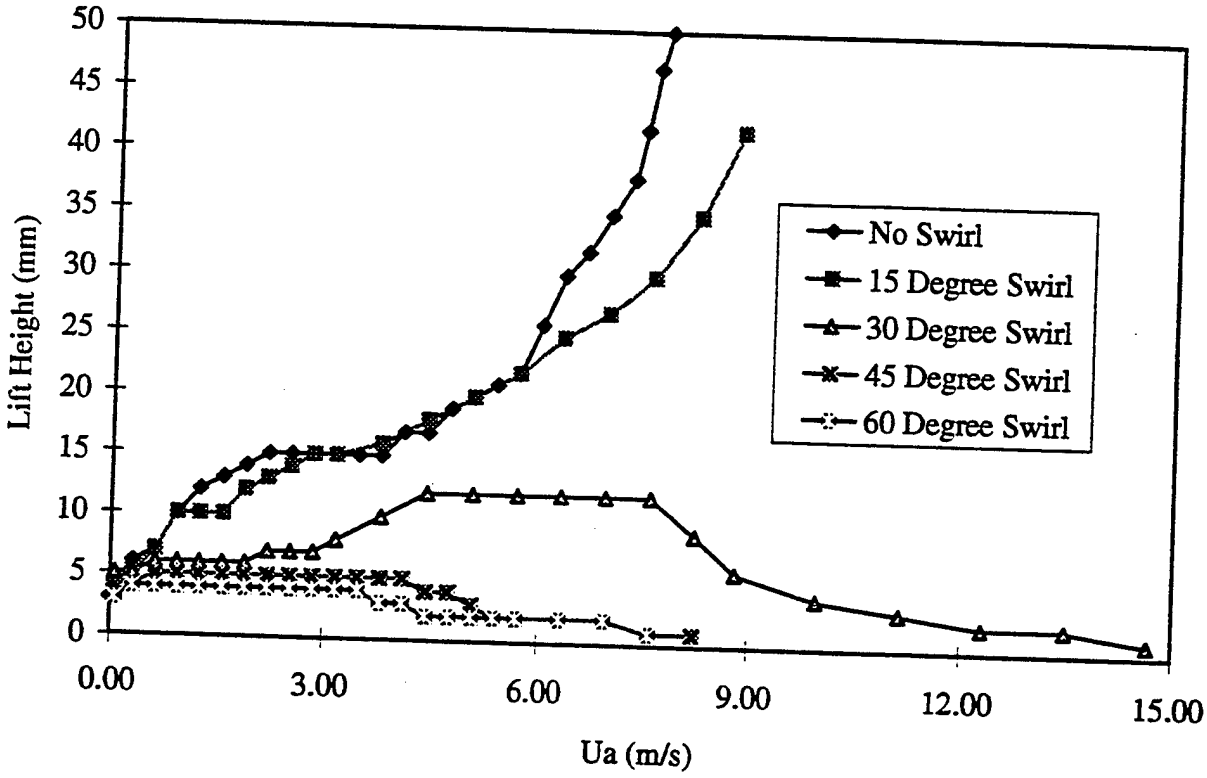



**Figure** 8 Lift heights at critical points in a double-concentric hydrogen-air jet diffusion flame for jet tube diameter of 2.39 mm for no swirl, 15°, 30°, 45°, and 60° swirl.

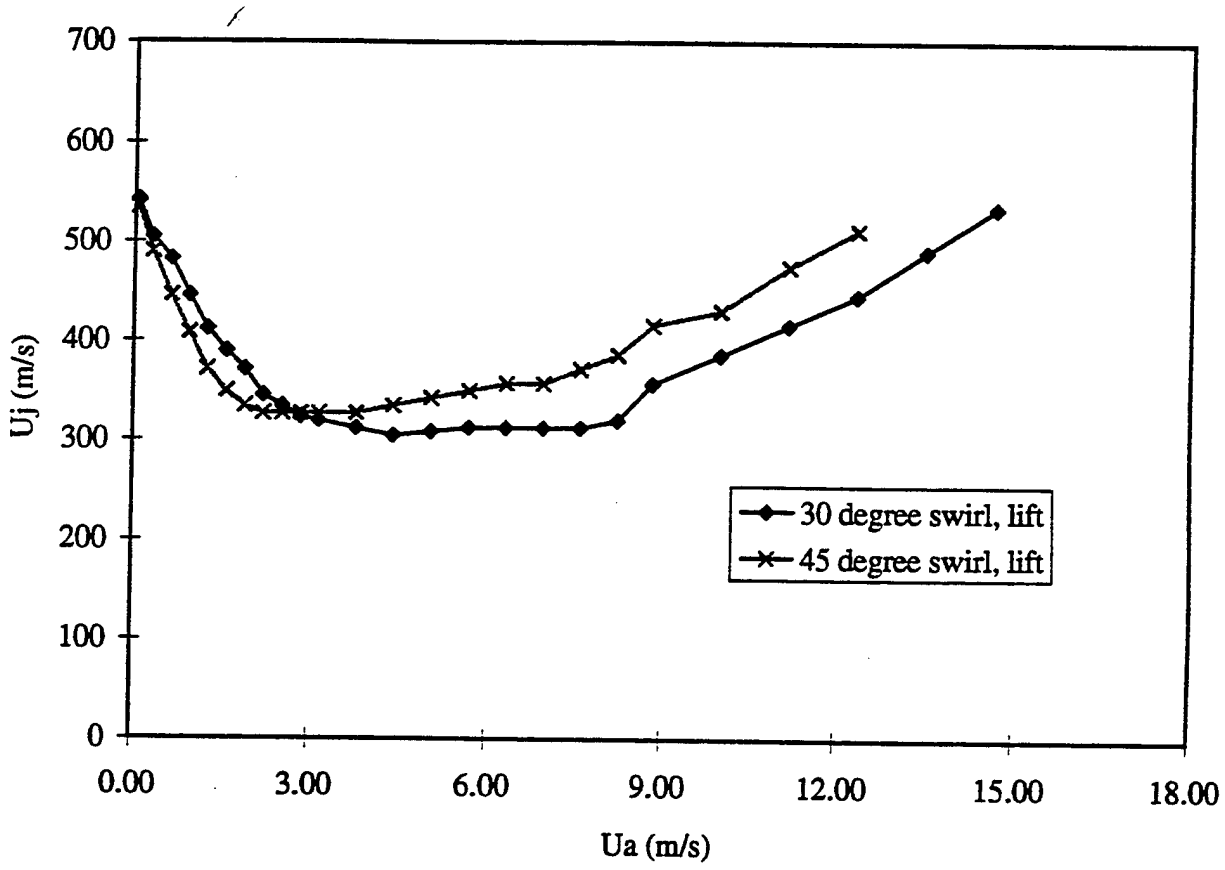



**Figure** 9 Stabilization effects of swirl in a double-concentric hydrogen-air jet diffusion flame for jet tube diameter of 2.39 mm.

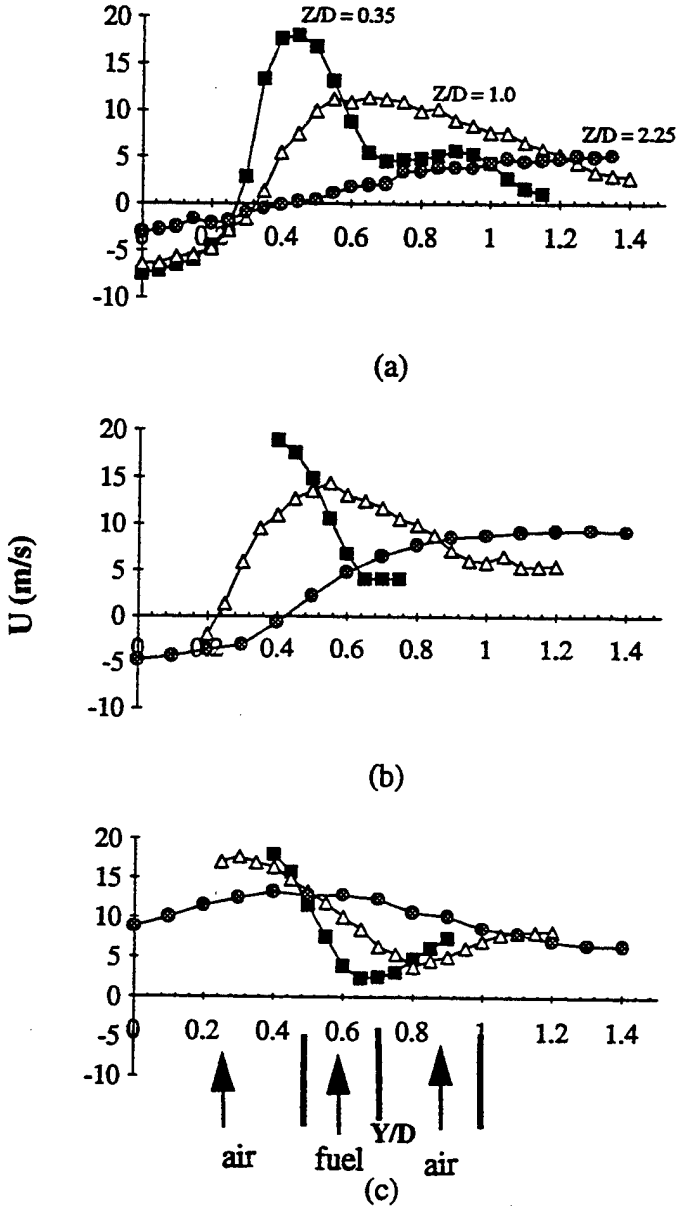



**Figure** 10a-c Radial variation of mean axial velocity at three different locations downstream of the fuel nozzle: (a) cold flow co-swirl, (b) hot flow co-swirl, (c) hot flow counter-swirl.

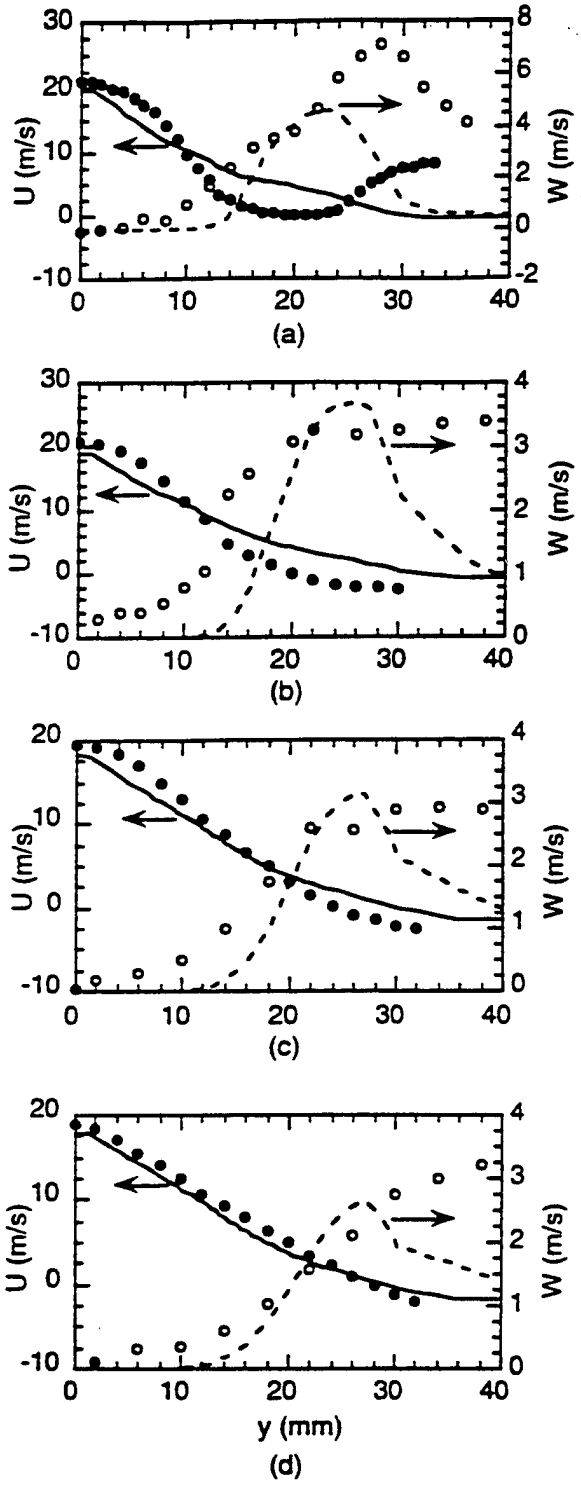



**Figure** 11 Calculated (lines) and measured (symbols) axial and swirl velocities for $\theta_i = 0°$ case at axial locations (a) 20 mm, (b) 40 mm, (c) 60 mm, and (d) 80 mm.

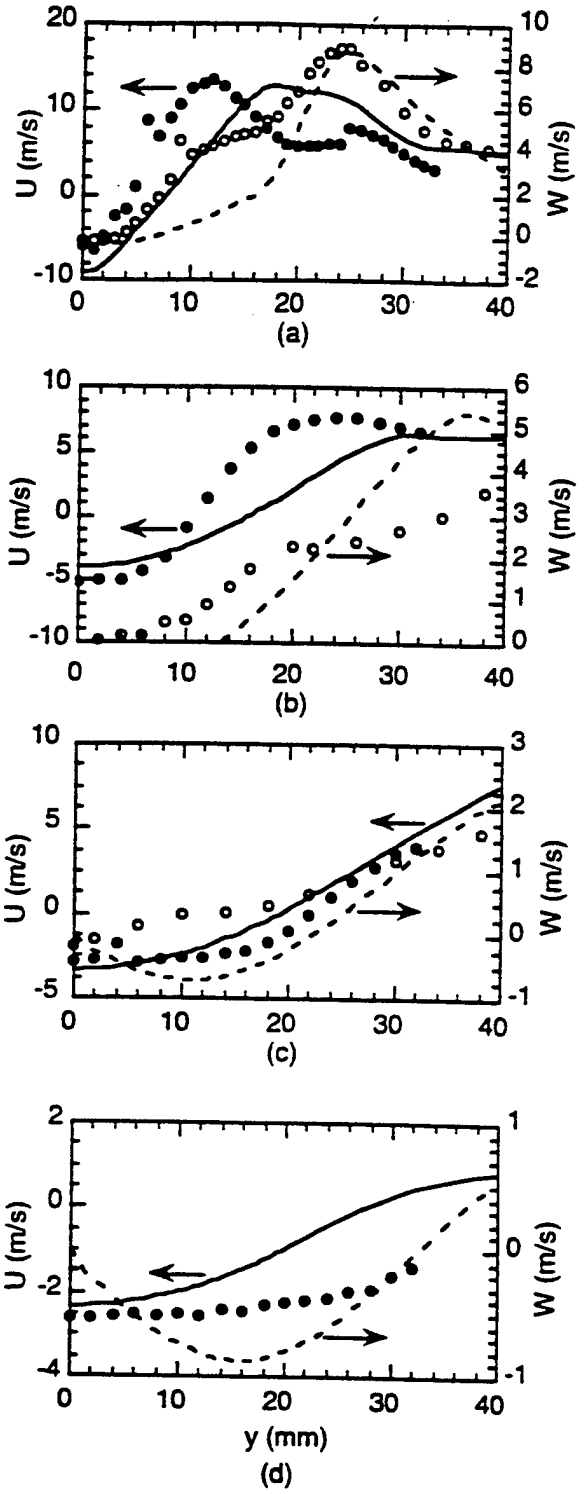



**Figure** 12. Calculated (lines) and measured (symbols) axial and swirl velocities for $\theta_i = 30°$ case at axial locations (a) 20 mm, (b) 40 mm, (c) 60 mm, and (d) 80 mm.

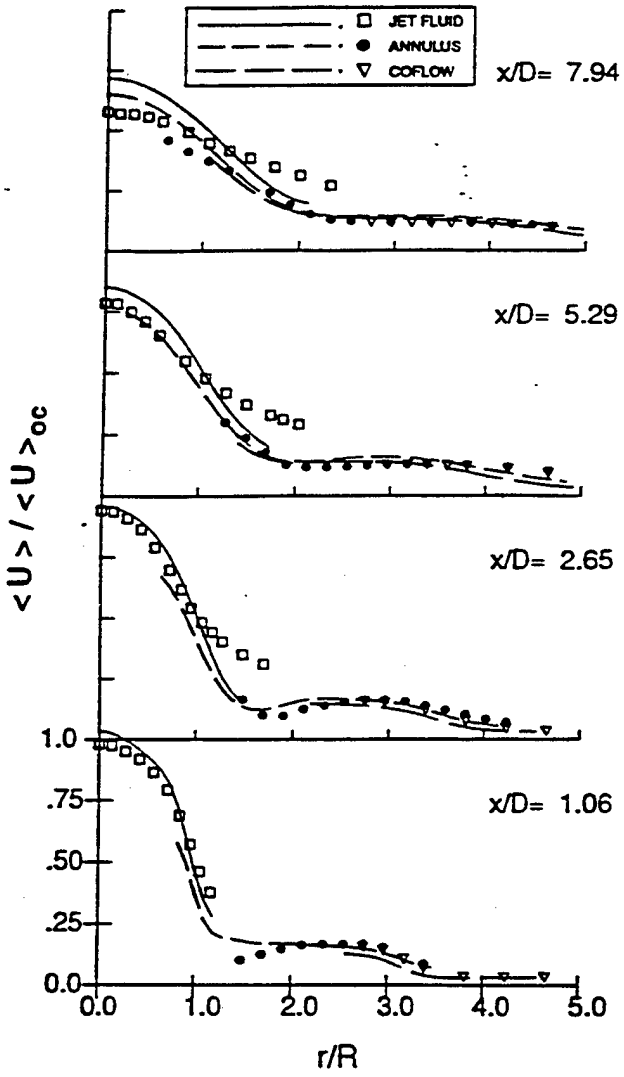



**Figure** 13 Radial profiles of computed conditional mean axial velocity (lines) compared against data (symbols) for the 30° swirl case.

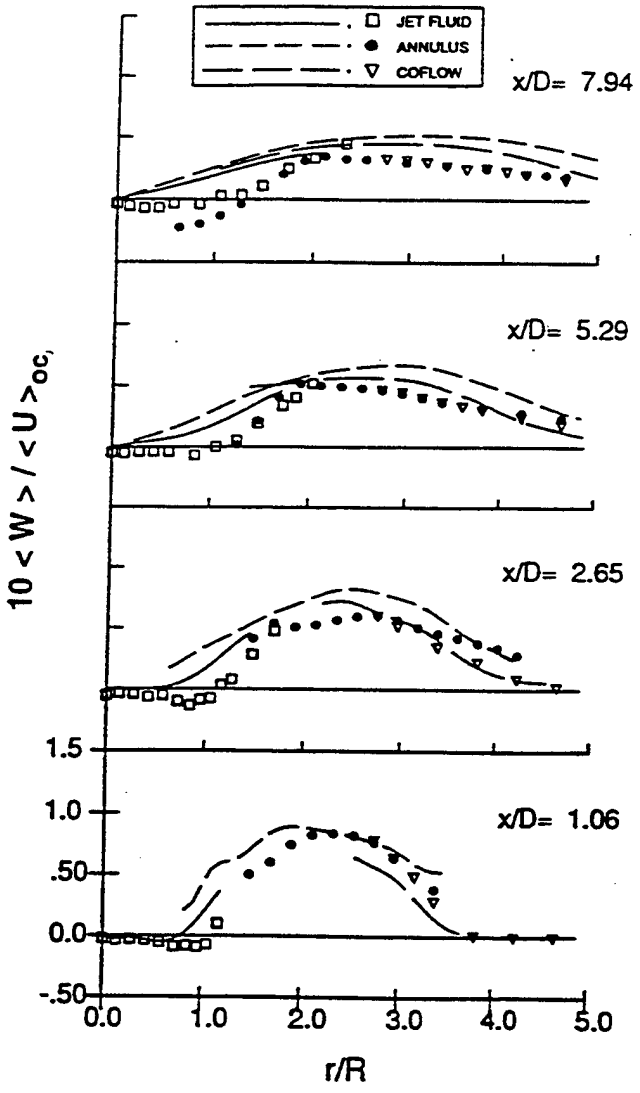
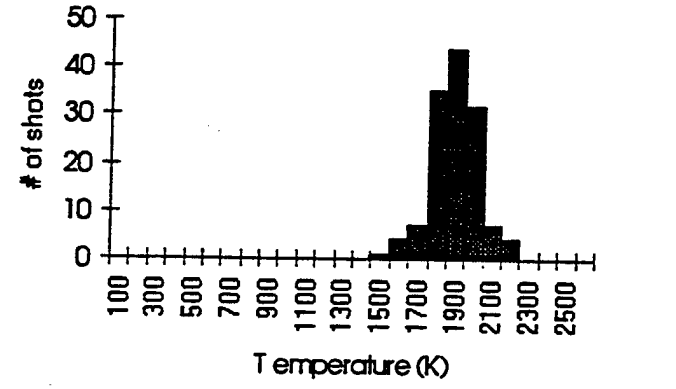
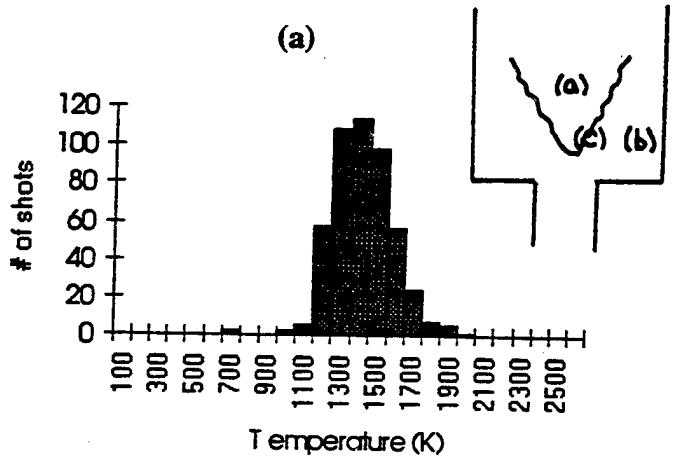


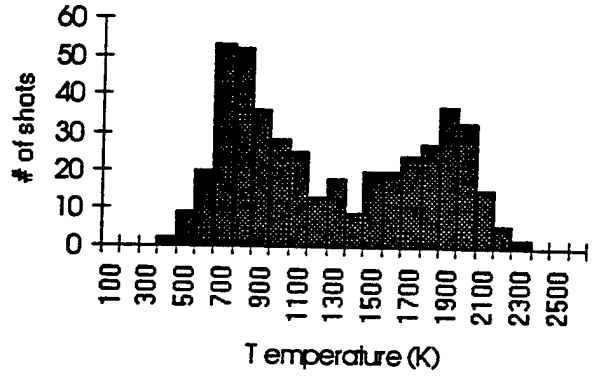

**Figure** 14 Radial profiles of computed conditional mean tangential velocity (lines) compared against data (symbols) for the 30° swirl case.




(a)

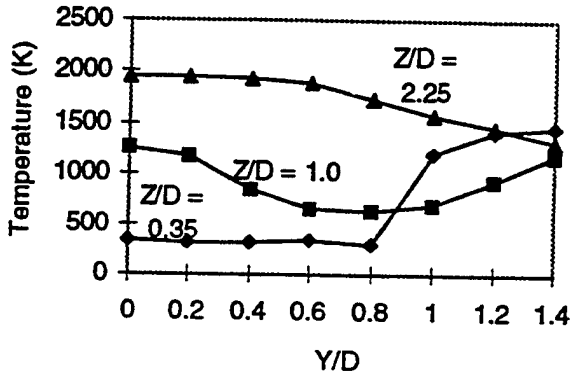



(b)

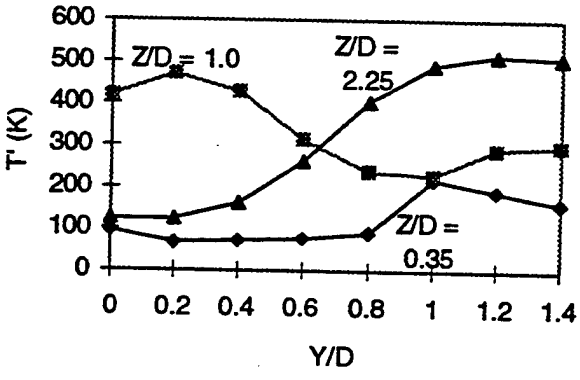



(c)

**Figure** 15a-c : PDF of CARS temperatures for (a) hot gas state, (b) intermediate gas state, and (c) bimodal gas state.

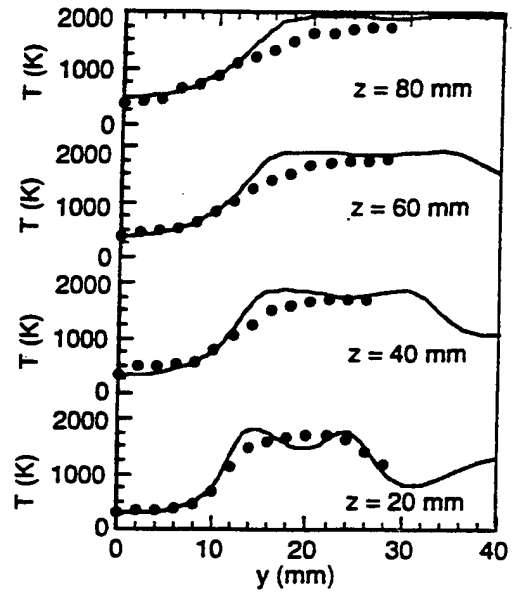



**(a)**

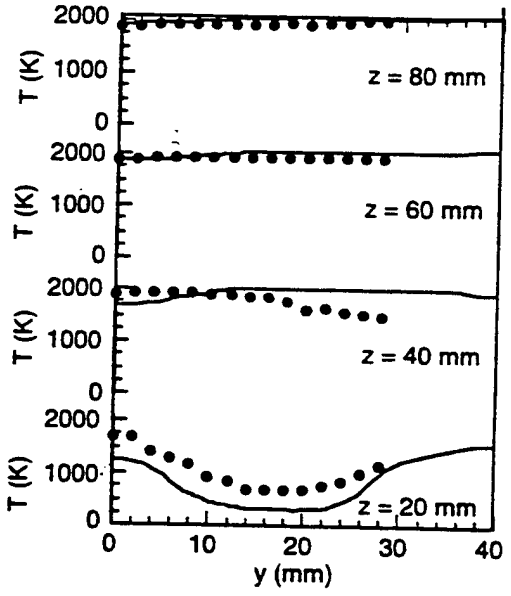



**(b)**

**Figure** 16a-b Radial variation of CARS (a) mean temperature and (b) rms temperature at three different downstream locations in the SSC.




(a)




(b)

**Figure** 17a-b Radial temperature profiles at different axial locations for (a) $\theta_i = 0°$, and (b) $\theta_i = 30°$ co-swirl [calculated (lines), data (symbols)].

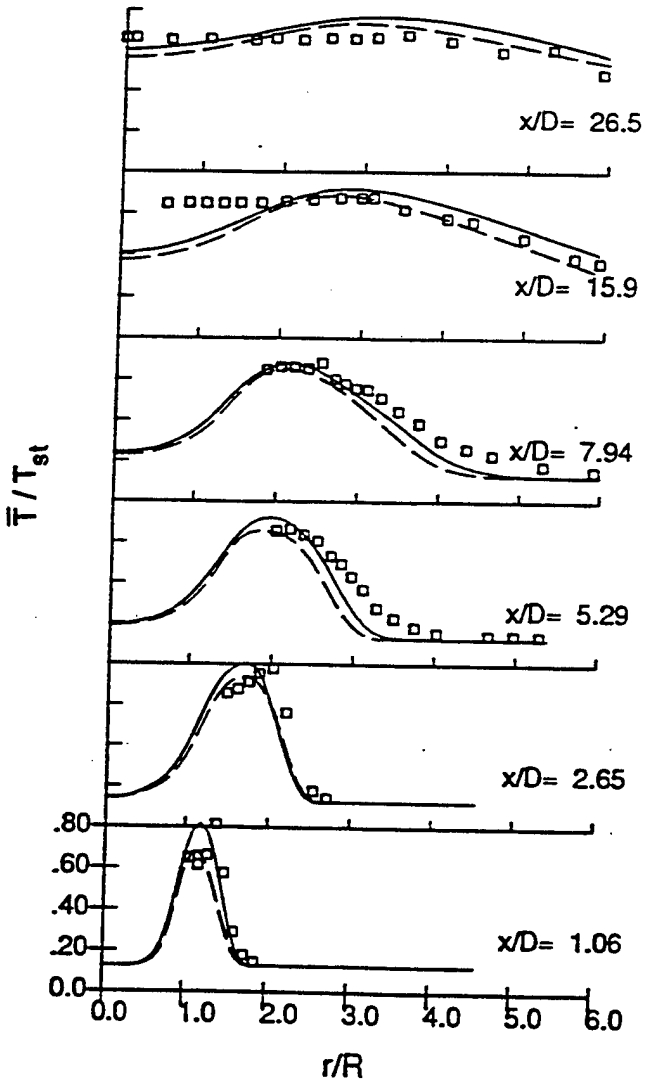
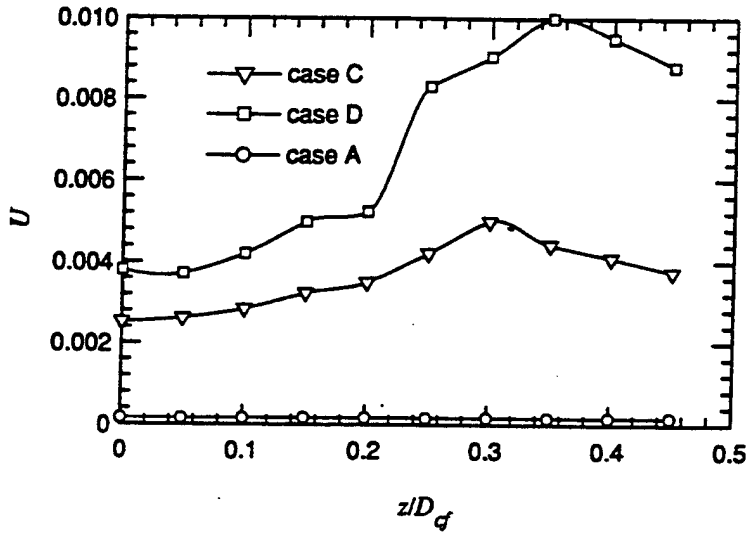



**Figure** 18 Computed radial profiles of Reynolds-averaged mean temperature with (solid lines) and without (dotted lines) the inclusion of molecular diffusion compared against CARS data (symbols) for the 30° swirl case.



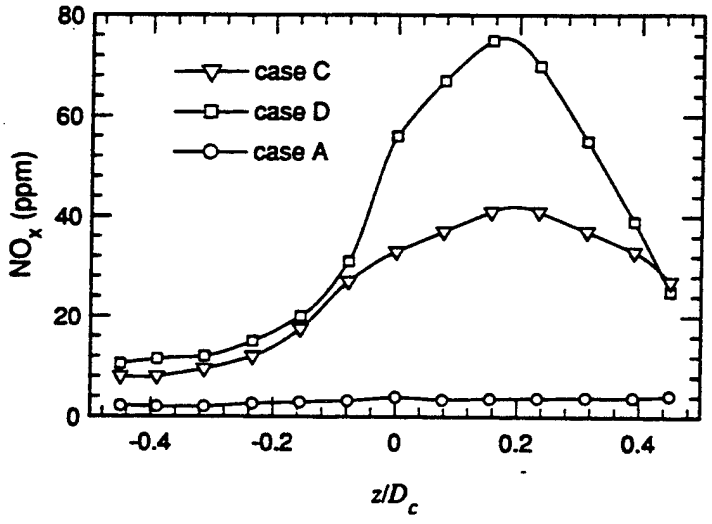




**Figure** 19 Profiles of unmixedness parameter U and corresponding profiles of $NO_x$ emissions.

# APPENDIX C
# SWIRLING JET DIFFUSION FLAME (SELECTED DATA SET)

**Filename Format**

The data set for the measurements of swirling and nonswirling turbulent hydrogen jet diffusion flames is stored in an electronic form (ASCII format) and available on request from Dr. F. Takahashi (e-mail: ftakahas@engr.udayton.edu). A brief description of the measurements is also available on the World Wide Web page (http://www.ca.sandia.gov/tdf/DataSums/TakahashH2.html). Each data file is headed with a FILENAME. The FILENAMEs have the following format for the velocity and temperature data: *JdtsVzzz.PPn* (upper case: letter, lower case: number). The definitions of these characters are listed below.

*J*: type of jet fluid
- If *J* = A, air
- = H, hydrogen

*d*: fuel tube diameter (*d*)
- If *d* = 9, $d = 9.45$ mm

*t*: fuel tube lip thickness ($\delta$)
- If *t* = 0, $\delta = 0.2$ mm
- = 1, $\delta = 1.2$ mm

*s*: swirler helix angle ($\theta$)
- If *s* = 0, $\theta = 0$
- = 1, $\theta = 15$
- = 3, $\theta = 30$
- = 4, $\theta = 45$
- = 6, $\theta = 60$

*V*: average velocities at the jet exit plane
- If *V* = A, $U_j = 100$, $U_a = 20$, $U_e = 4$ m/s
- = B, $U_j = 25$, $U_a = 4$, $U_e = 1$ m/s

*zzz*: radial profile's axial position ($x$) or axial profile
- If *zzz* = a number, the file is a radial profile at axial position *zzz*
  - e.g., 001, $x = 1.5$ mm
  - 010, $x = 10$ mm
  - 025, $x = 25$ mm
  - 050, $x = 50$ mm
  - 075, $x = 75$ mm
  - 150, $x = 150$ mm
  - 225, $x = 225$ mm
- = AX, the file is an axial profile along the jet centerline ($y = 0$).

*PP*: LDV particle seeding method.
- If *PP* = J_, the velocity data with particles added to jet fluid only
- = A_, the velocity data with particles added to annulus fluid only
- = E_, the velocity data with particles added to external fluid only
- = T, the temperature data

*n*: file ID number, 1 or 2.
- If *n* = 1, the file includes $r$, $z$, $U$, $V$, $W$, $(u')$, $(v')$, $(w')$, $u'v'$, $v'w'$, $w'u'$
- = 2, the file includes $r$, $z$, $u'^3$, $v'^3$, $w'^3$, $u'^2v'$, $v'^2u'$, $v'^2w'$, $w'^2v'$, $w'^2u'$, $u'^2w'$, $u'^4$, $v'^4$, $w'^4$

## Table C1 Data Filenames and Test Conditions

| Filename | Extension | | $\theta$ | $U_j$ (m/s) | $U_a$ (m/s) | $U_e$ (m/s) | $x$ (mm) | Seed |
|---|---|---|---|---|---|---|---|---|
| H900B001 | .J_1 | .j_2 | 0° | 25 | 4 | 1 | 1.5 | Jet |
| H900B001 | .A_1 | .A_2 | 0° | 25 | 4 | 1 | 1.5 | Annulus |
| H900B001 | .E_1 | .E_2 | 0° | 25 | 4 | 1 | 1.5 | External |
| H900B010 | .J_1 | .j_2 | 0° | 25 | 4 | 1 | 10 | Jet |
| H900B010 | .A_1 | .A_2 | 0° | 25 | 4 | 1 | 10 | Annulus |
| H900B010 | .E_1 | .E_2 | 0° | 25 | 4 | 1 | 10 | External |
| H900B025 | .J_1 | .j_2 | 0° | 25 | 4 | 1 | 25 | Jet |
| H900B025 | .A_1 | .A_2 | 0° | 25 | 4 | 1 | 25 | Annulus |
| H900B025 | .E_1 | .E_2 | 0° | 25 | 4 | 1 | 25 | External |
| H900B050 | .J_1 | .j_2 | 0° | 25 | 4 | 1 | 50 | Jet |
| H900B050 | .A_1 | .A_2 | 0° | 25 | 4 | 1 | 50 | Annulus |
| H900B050 | .E_1 | .E_2 | 0° | 25 | 4 | 1 | 50 | External |
| H900B075 | .J_1 | .j_2 | 0° | 25 | 4 | 1 | 75 | Jet |
| H900B075 | .A_1 | .A_2 | 0° | 25 | 4 | 1 | 75 | Annulus |
| H900B075 | .E_1 | .E_2 | 0° | 25 | 4 | 1 | 75 | External |
| H900B150 | .J_1 | .j_2 | 0° | 25 | 4 | 1 | 150 | Jet |
| H900B150 | .A_1 | .A_2 | 0° | 25 | 4 | 1 | 150 | Annulus |
| H900B150 | .E_1 | .E_2 | 0° | 25 | 4 | 1 | 150 | External |
| H900B225 | .J_1 | .j_2 | 0° | 25 | 4 | 1 | 225 | Jet |
| H900B225 | .A_1 | .A_2 | 0° | 25 | 4 | 1 | 225 | Annulus |
| H900B225 | .E_1 | .E_2 | 0° | 25 | 4 | 1 | 225 | External |
| H900BAX | .J_1 | .j_2 | 0° | 25 | 4 | 1 | 1.5-225 | Jet |
| H910A001 | .J_1 | .j_2 | 0° | 100 | 20 | 4 | 1.5 | Jet |
| H910A001 | .A_1 | .A_2 | 0° | 100 | 20 | 4 | 1.5 | Annulus |
| H910A001 | .E_1 | .E_2 | 0° | 100 | 20 | 4 | 1.5 | External |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| H910A010 | .J_1 | .j_2 | 0° | 100 | 20 | 4 | 10 | Jet |
| H910A010 | .A_1 | .A_2 | 0° | 100 | 20 | 4 | 10 | Annulus |
| H910A010 | .E_1 | .E_2 | 0° | 100 | 20 | 4 | 10 | External |
| H910A025 | .J_1 | .j_2 | 0° | 100 | 20 | 4 | 25 | Jet |
| H910A025 | .A_1 | .A_2 | 0° | 100 | 20 | 4 | 25 | Annulus |
| H910A025 | .E_1 | .E_2 | 0° | 100 | 20 | 4 | 25 | External |
| H910A050 | .J_1 | .j_2 | 0° | 100 | 20 | 4 | 50 | Jet |
| H910A050 | .A_1 | .A_2 | 0° | 100 | 20 | 4 | 50 | Annulus |
| H910A050 | .E_1 | .E_2 | 0° | 100 | 20 | 4 | 50 | External |
| H910A075 | .J_1 | .j_2 | 0° | 100 | 20 | 4 | 75 | Jet |
| H910A075 | .A_1 | .A_2 | 0° | 100 | 20 | 4 | 75 | Annulus |
| H910A075 | .E_1 | .E_2 | 0° | 100 | 20 | 4 | 75 | External |
| H910A150 | .J_1 | .j_2 | 0° | 100 | 20 | 4 | 150 | Jet |
| H910A150 | .A_1 | .A_2 | 0° | 100 | 20 | 4 | 150 | Annulus |
| H910A150 | .E_1 | .E_2 | 0° | 100 | 20 | 4 | 150 | External |
| H910A225 | .J_1 | .j_2 | 0° | 100 | 20 | 4 | 225 | Jet |
| H910A225 | .A_1 | .A_2 | 0° | 100 | 20 | 4 | 225 | Annulus |
| H910A225 | .E_1 | .E_2 | 0° | 100 | 20 | 4 | 225 | External |
| H910AAX | .J_1 | .j_2 | 0° | 100 | 20 | 4 | 1.5-225 | Jet |
| | | | | | | | | |
| H903A001 | .J_1 | .j_2 | 30° | 100 | 20 | 4 | 1.5 | Jet |
| H903A001 | .A_1 | .A_2 | 30° | 100 | 20 | 4 | 1.5 | Annulus |
| H903A001 | .E_1 | .E_2 | 30° | 100 | 20 | 4 | 1.5 | External |
| H903A010 | .J_1 | .j_2 | 30° | 100 | 20 | 4 | 10 | Jet |
| H903A010 | .A_1 | .A_2 | 30° | 100 | 20 | 4 | 10 | Annulus |
| H903A010 | .E_1 | .E_2 | 30° | 100 | 20 | 4 | 10 | External |
| H903A025 | .J_1 | .j_2 | 30° | 100 | 20 | 4 | 25 | Jet |
| H903A025 | .A_1 | .A_2 | 30° | 100 | 20 | 4 | 25 | Annulus |
| H903A025 | .E_1 | .E_2 | 30° | 100 | 20 | 4 | 25 | External |
| H903A050 | .J_1 | .j_2 | 30° | 100 | 20 | 4 | 50 | Jet |
| H903A050 | .A_1 | .A_2 | 30° | 100 | 20 | 4 | 50 | Annulus |
| H903A050 | .E_1 | .E_2 | 30° | 100 | 20 | 4 | 50 | External |
| H903A075 | .J_1 | .j_2 | 30° | 100 | 20 | 4 | 75 | Jet |
| H903A075 | .A_1 | .A_2 | 30° | 100 | 20 | 4 | 75 | Annulus |
| H903A075 | .E_1 | .E_2 | 30° | 100 | 20 | 4 | 75 | External |
| H903A150 | .J_1 | .j_2 | 30° | 100 | 20 | 4 | 150 | Jet |
| H903A150 | .A_1 | .A_2 | 30° | 100 | 20 | 4 | 150 | Annulus |
| H903A150 | .E_1 | .E_2 | 30° | 100 | 20 | 4 | 150 | External |
| H903A225 | .J_1 | .j_2 | 30° | 100 | 20 | 4 | 225 | Jet |
| H903A225 | .A_1 | .A_2 | 30° | 100 | 20 | 4 | 225 | Annulus |
| H903A225 | .E_1 | .E_2 | 30° | 100 | 20 | 4 | 225 | External |
| H903AAX | .J_1 | .j_2 | 30° | 100 | 20 | 4 | 1.5-225 | Jet |
| | | | | | | | | |
| H904A001 | .J_1 | .j_2 | 45° | 100 | 20 | 4 | 1.5 | Jet |
| H904A001 | .A_1 | .A_2 | 45° | 100 | 20 | 4 | 1.5 | Annulus |
| H904A001 | .E_1 | .E_2 | 45° | 100 | 20 | 4 | 1.5 | External |
| H904A010 | .J_1 | .j_2 | 45° | 100 | 20 | 4 | 10 | Jet |
| H904A010 | .A_1 | .A_2 | 45° | 100 | 20 | 4 | 10 | Annulus |
| H904A010 | .E_1 | .E_2 | 45° | 100 | 20 | 4 | 10 | External |
| H904A025 | .J_1 | .j_2 | 45° | 100 | 20 | 4 | 25 | Jet |
| H904A025 | .A_1 | .A_2 | 45° | 100 | 20 | 4 | 25 | Annulus |
| H904A025 | .E_1 | .E_2 | 45° | 100 | 20 | 4 | 25 | External |
| H904A050 | .J_1 | .j_2 | 45° | 100 | 20 | 4 | 50 | Jet |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| H904A050 | .A_1 | .A_2 | 45° | 100 | 20 | 4 | 50 | Annulus |
| H904A050 | .E_1 | .E_2 | 45° | 100 | 20 | 4 | 50 | External |
| H904A075 | .J_1 | .j_2 | 45° | 100 | 20 | 4 | 75 | Jet |
| H904A075 | .A_1 | .A_2 | 45° | 100 | 20 | 4 | 75 | Annulus |
| H904A075 | .E_1 | .E_2 | 45° | 100 | 20 | 4 | 75 | External |
| H904A150 | .J_1 | .j_2 | 45° | 100 | 20 | 4 | 150 | Jet |
| H904A150 | .A_1 | .A_2 | 45° | 100 | 20 | 4 | 150 | Annulus |
| H904A150 | .E_1 | .E_2 | 45° | 100 | 20 | 4 | 150 | External |
| H904A225 | .J_1 | .j_2 | 45° | 100 | 20 | 4 | 225 | Jet |
| H904A225 | .A_1 | .A_2 | 45° | 100 | 20 | 4 | 225 | Annulus |
| H904A225 | .E_1 | .E_2 | 45° | 100 | 20 | 4 | 225 | External |
| H904AAX | .J_1 | .j_2 | 45° | 100 | 20 | 4 | 1.5-225 | Jet |
| | | | | | | | | |
| H900B001 | | .T | 0° | 25 | 4 | 1 | 1.5 | |
| H900B010 | | .T | 0° | 25 | 4 | 1 | 10 | |
| H900B025 | | .T | 0° | 25 | 4 | 1 | 25 | |
| H900B050 | | .T | 0° | 25 | 4 | 1 | 50 | |
| H900B075 | | .T | 0° | 25 | 4 | 1 | 75 | |
| H900B150 | | .T | 0° | 25 | 4 | 1 | 150 | |
| H900B225 | | .T | 0° | 25 | 4 | 1 | 225 | |
| | | | | | | | | |
| H910A001 | | .T | 0° | 100 | 20 | 4 | 1.5 | |
| H910A010 | | .T | 0° | 100 | 20 | 4 | 10 | |
| H910A025 | | .T | 0° | 100 | 20 | 4 | 25 | |
| H910A050 | | .T | 0° | 100 | 20 | 4 | 50 | |
| H910A075 | | .T | 0° | 100 | 20 | 4 | 75 | |
| H910A150 | | .T | 0° | 100 | 20 | 4 | 150 | |
| H910A225 | | .T | 0° | 100 | 20 | 4 | 225 | |
| | | | | | | | | |
| H903A001 | | .T | 30° | 100 | 20 | 4 | 1.5 | |
| H903A010 | | .T | 30° | 100 | 20 | 4 | 10 | |
| H903A025 | | .T | 30° | 100 | 20 | 4 | 25 | |
| H903A050 | | .T | 30° | 100 | 20 | 4 | 50 | |
| H903A075 | | .T | 30° | 100 | 20 | 4 | 75 | |
| H903A150 | | .T | 30° | 100 | 20 | 4 | 150 | |
| H903A225 | | .T | 30° | 100 | 20 | 4 | 225 | |
| | | | | | | | | |
| H904A001 | | .T | 45° | 100 | 20 | 4 | 1.5 | |
| H904A010 | | .T | 45° | 100 | 20 | 4 | 10 | |
| H904A025 | | .T | 45° | 100 | 20 | 4 | 25 | |
| H904A050 | | .T | 45° | 100 | 20 | 4 | 50 | |
| H904A075 | | .T | 45° | 100 | 20 | 4 | 75 | |
| H904A150 | | .T | 45° | 100 | 20 | 4 | 150 | |
| H904A225 | | .T | 45° | 100 | 20 | 4 | 225 | |

## Listings of Selected Data Files

```
C  FILENAME= H910A001.J_1
C
C  H2 FLAME; d=9.45, delta=1.2 mm; theta=0 deg.; Uj=100, Ua=20, Ue=4 m/s; x=1.5 mm
C  LDV SEED PARTICLES ADDED TO JET FLUID ONLY.
C  D090894
C  12  : No. of data points
C  y      x       U       V       W     SIG(u') SIG(v') SIG(w')   u'v'    v'w'    w'u'
  4.70   1.50  45.245   2.211   1.354  13.526  10.069   7.087  10.490    .153  -2.223
  4.49   1.50  63.038   2.455    .395  17.458  11.805   6.816  47.540  -1.563  -7.021
  4.30   1.50  80.244   2.179   -.096  17.541  12.350   6.816  47.120  -1.605  -9.640
  4.00   1.50  96.715    .840    .176  13.925   9.812   7.254  51.473  -1.320  -2.454
  3.51   1.50 106.534    .814    .197  11.118   8.132   7.339  38.856    .604  -2.605
  3.01   1.50 113.880    .744    .203   9.677   7.320   7.056  30.055   1.084    .930
  2.51   1.50 119.246    .475    .195   8.805   6.710   6.718  25.411  -1.126  -1.752
  2.00   1.50 123.636    .288    .172   8.134   6.318   6.102  21.539   -.772  -3.260
  1.51   1.50 127.633    .379    .039   7.359   5.757   5.532  13.717    .366   -.917
  1.01   1.50 130.283    .008    .051   6.719   5.313   5.073  11.360   -.199  -1.974
   .51   1.50 132.161    .143    .020   6.045   4.968   4.742   4.832    .979   -.639
   .00   1.50 132.947    .003    .004   5.843   4.906   4.395    .599    .092   -.288

C  FILENAME= H910A010.J_1
C
C  H2 FLAME; d=9.45, delta=1.2 mm; theta=0 deg.; Uj=100, Ua=20, Ue=4 m/s; x=10 mm
C  LDV SEED PARTICLES ADDED TO JET FLUID ONLY.
C  D090894
C  10  : No. of data points
C  y      x       U       V       W     SIG(u') SIG(v') SIG(w')   u'v'    v'w'    w'u'
  5.50  10.00  47.798   7.061   1.981  13.384  10.200  11.936  89.749  -2.888  -2.301
  5.00  10.00  60.681   6.716   1.777  15.929  11.585  13.037 110.695   -.502    .647
  4.51  10.00  75.968   5.069   2.037  17.337  12.785  12.997 114.151  -4.634 -11.047
  4.01  10.00  92.260   1.501   1.403  16.730  12.002  12.086  93.429  -2.484  -4.355
  3.41  10.00 106.451   -.638   1.210  13.453   9.703   9.706  57.647  -1.097  -1.549
  2.70   9.99 116.605   -.472    .488  10.257   7.556   7.464  28.801   -.119  -3.538
  2.01  10.00 123.160   -.297    .452   8.545   6.103   6.080  18.917    .311  -2.087
  1.30  10.00 128.239   -.322    .185   7.181   5.350   5.233  12.029   -.885  -1.406
   .62  10.00 130.866   -.201    .058   6.537   5.090   4.765   5.680    .235   -.158
   .01  10.00 131.208   -.302    .101   6.306   5.018   4.615   -.323    .353   -.729

C  FILENAME= H910A025.J_1
C
C  H2 FLAME; d=9.45, delta=1.2 mm; theta=0 deg.; Uj=100, Ua=20, Ue=4 m/s; x=25 mm
C  LDV SEED PARTICLES ADDED TO JET FLUID ONLY.
C  D090894
C  12  : No. of data points
C  y      x       U       V       W     SIG(u') SIG(v') SIG(w')   u'v'    v'w'    w'u'
  7.00  25.00  40.000   4.442    .548  10.343   7.167   8.780  43.624    .584   2.826
  6.01  25.00  51.245   4.184   1.351  12.630   9.113  11.048  67.799    .045   3.467
  5.51  25.00  59.076   4.699   1.655  14.016  10.557  12.120  87.083  -3.623  -1.355
  5.01  25.00  66.806   4.388   2.069  15.379  11.444  12.835 101.362    .984   -.644
  4.50  25.00  76.153   4.399   2.178  17.038  12.361  13.440 111.294  -5.517  -7.605
  4.01  25.00  86.412   3.276   1.641  17.457  12.691  13.049 111.088   1.904  -3.777
  3.41  25.00  98.616   1.749   1.300  16.298  11.842  11.973  92.842   -.232  -6.712
  2.70  25.00 111.837   1.002   1.176  14.283  10.365  10.106  70.032   1.265  -4.581
  2.01  25.00 121.454   -.143    .403  10.964   8.316   8.146  34.493    .419  -3.889
  1.29  25.00 127.682   -.291    .268   8.669   6.679   6.466  16.780    .420   -.481
   .62  25.00 130.651   -.157    .376   7.772   5.805   5.487   7.021    .140  -1.086
   .01  25.00 131.472   -.229   -.049   7.129   5.582   5.218   -.233   1.606  -1.668

C  FILENAME= H910A050.J_1
C
C  H2 FLAME; d=9.45, delta=1.2 mm; theta=0 deg.; Uj=100, Ua=20, Ue=4 m/s; x=50 mm
C  LDV SEED PARTICLES ADDED TO JET FLUID ONLY.
C  D090894
C  11  : No. of data points
C  y      x       U       V       W     SIG(u') SIG(v') SIG(w')   u'v'    v'w'    w'u'
  8.80  49.99  35.764   3.672    .642   8.774   5.877   7.484  27.519    .917  -1.676
  8.22  49.99  40.069   3.675    .644   9.489   6.538   8.318  32.578    .866   1.620
  7.01  49.99  49.646   3.749    .759  11.372   8.137  10.209  50.565  -1.965  -1.294
```

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 6.00 | 49.99 | 57.945 | 3.504 | 1.738 | 13.140 | 9.482 | 11.903 | 67.875 | -2.190 | -.967 |
| 5.01 | 49.99 | 67.518 | 3.189 | 1.531 | 15.356 | 11.025 | 12.605 | 90.926 | -1.579 | -7.205 |
| 4.00 | 49.99 | 79.731 | 2.831 | 1.696 | 16.747 | 11.750 | 12.902 | 99.144 | 1.587 | -5.555 |
| 2.72 | 49.99 | 97.285 | 1.985 | 1.235 | 16.185 | 11.578 | 11.828 | 84.821 | 2.192 | -7.972 |
| 2.00 | 49.99 | 106.157 | .929 | .935 | 15.758 | 11.535 | 11.014 | 79.219 | -.367 | -9.674 |
| 1.30 | 49.99 | 113.972 | .405 | .589 | 14.018 | 10.367 | 9.708 | 46.716 | 1.479 | -8.504 |
| .60 | 49.99 | 119.552 | .511 | .331 | 11.742 | 9.734 | 8.746 | 17.026 | 1.492 | -6.419 |
| .00 | 49.99 | 120.325 | -.367 | .511 | 11.439 | 9.462 | 8.816 | -4.297 | .136 | -4.541 |

C FILENAME= H910A075.J_1
C
C H2 FLAME; d=9.45, delta=1.2 mm; theta=0 deg.; Uj=100, Ua=20, Ue=4 m/s; x=75 mm
C LDV SEED PARTICLES ADDED TO JET FLUID ONLY.
C D090894
C 12 : No. of data points

| C y | x | U | V | W | SIG(u') | SIG(v') | SIG(w') | u'v' | v'w' | w'u' |
|---|---|---|---|---|---|---|---|---|---|---|
| 11.00 | 75.00 | 33.019 | 3.721 | .110 | 8.148 | 4.949 | 7.151 | 21.340 | 1.071 | -.669 |
| 9.49 | 75.00 | 40.316 | 3.475 | .546 | 8.839 | 6.065 | 8.634 | 25.152 | .569 | .101 |
| 8.23 | 75.00 | 47.728 | 3.742 | .499 | 10.271 | 7.447 | 9.660 | 37.627 | .411 | -.873 |
| 7.01 | 75.00 | 54.961 | 3.849 | 1.207 | 11.694 | 8.535 | 10.839 | 49.695 | 1.922 | .478 |
| 5.99 | 75.00 | 60.155 | 3.343 | 1.202 | 12.798 | 9.693 | 11.411 | 63.522 | -1.228 | -6.162 |
| 5.00 | 75.00 | 68.076 | 3.083 | 1.223 | 13.815 | 10.532 | 11.809 | 68.806 | -2.526 | -8.012 |
| 3.99 | 75.00 | 75.808 | 2.899 | 1.430 | 14.925 | 11.181 | 12.060 | 74.422 | 2.027 | -5.927 |
| 2.72 | 75.00 | 87.425 | 1.793 | 1.160 | 15.575 | 11.293 | 11.613 | 66.776 | -.755 | -7.665 |
| 2.00 | 75.00 | 93.184 | 1.393 | 1.240 | 14.995 | 11.540 | 10.996 | 55.989 | 5.786 | -8.213 |
| 1.30 | 75.00 | 97.597 | 1.059 | .970 | 14.566 | 11.448 | 10.493 | 33.976 | .838 | -3.772 |
| .61 | 75.00 | 100.550 | .399 | .991 | 13.889 | 11.213 | 10.119 | 13.381 | 1.639 | -8.131 |
| .00 | 75.00 | 100.847 | .110 | .784 | 13.714 | 11.004 | 10.073 | -4.609 | 3.454 | -9.884 |

C FILENAME= H910A150.J_1
C
C H2 FLAME; d=9.45, delta=1.2 mm; theta=0 deg.; Uj=100, Ua=20, Ue=4 m/s; x=150 mm
C LDV SEED PARTICLES ADDED TO JET FLUID ONLY.
C D090894
C 15 : No. of data points

| C y | x | U | V | W | SIG(u') | SIG(v') | SIG(w') | u'v' | v'w' | w'u' |
|---|---|---|---|---|---|---|---|---|---|---|
| 16.00 | 150.00 | 32.543 | 3.628 | .375 | 7.119 | 4.563 | 6.875 | 14.028 | -.479 | .519 |
| 13.99 | 150.00 | 36.672 | 4.016 | .237 | 7.889 | 5.235 | 7.556 | 17.348 | .395 | 1.720 |
| 11.99 | 150.00 | 40.661 | 3.640 | .259 | 8.526 | 5.836 | 7.958 | 23.405 | 1.151 | 1.320 |
| 10.00 | 150.00 | 45.669 | 3.288 | .876 | 8.844 | 6.268 | 8.111 | 23.247 | .715 | -2.045 |
| 9.00 | 150.00 | 47.279 | 3.080 | .192 | 9.249 | 6.676 | 8.427 | 27.511 | -.012 | -1.994 |
| 8.01 | 150.00 | 50.193 | 3.072 | .416 | 9.224 | 6.724 | 8.501 | 27.153 | .933 | .124 |
| 7.01 | 150.00 | 52.207 | 2.705 | .302 | 9.856 | 7.003 | 8.523 | 29.648 | 1.327 | -.744 |
| 5.99 | 150.00 | 54.615 | 2.273 | .132 | 9.749 | 7.178 | 8.550 | 25.921 | 3.413 | -2.951 |
| 5.00 | 150.00 | 56.927 | 1.819 | .503 | 10.216 | 7.325 | 8.210 | 26.735 | 3.495 | -1.077 |
| 3.99 | 150.00 | 59.859 | 1.612 | .490 | 9.411 | 7.212 | 8.227 | 19.625 | -.953 | -3.899 |
| 3.00 | 150.00 | 61.912 | 1.469 | .411 | 9.457 | 7.223 | 8.020 | 18.576 | -.170 | -6.716 |
| 2.01 | 150.00 | 63.611 | .966 | .234 | 9.647 | 7.415 | 7.639 | 10.186 | 1.037 | -4.116 |
| 1.01 | 150.00 | 64.592 | .435 | .660 | 9.573 | 7.286 | 7.784 | 5.116 | 2.119 | -5.857 |
| .51 | 150.00 | 65.262 | .157 | .301 | 9.209 | 7.265 | 7.597 | 2.818 | -.190 | -3.387 |
| .00 | 150.00 | 64.906 | -.029 | .311 | 9.579 | 7.443 | 7.717 | .603 | .391 | -5.104 |

C FILENAME= H910A225.J_1
C
C H2 FLAME; d=9.45, delta=1.2 mm; theta=0 deg.; Uj=100, Ua=20, Ue=4 m/s; x=225 mm
C LDV SEED PARTICLES ADDED TO JET FLUID ONLY.
C D090894
C 13 : No. of data points

| C y | x | U | V | W | SIG(u') | SIG(v') | SIG(w') | u'v' | v'w' | w'u' |
|---|---|---|---|---|---|---|---|---|---|---|
| 24.00 | 225.00 | 26.731 | 3.348 | .200 | 5.428 | 3.576 | 5.630 | 8.537 | .275 | .671 |
| 21.99 | 224.99 | 28.699 | 3.500 | .252 | 5.915 | 3.896 | 5.915 | 10.124 | .400 | .630 |
| 20.00 | 224.99 | 30.875 | 3.500 | .060 | 6.131 | 4.274 | 6.285 | 10.947 | .225 | -1.317 |
| 18.00 | 224.99 | 32.601 | 3.266 | .198 | 6.734 | 4.421 | 6.123 | 12.208 | .169 | .654 |
| 15.99 | 224.99 | 35.026 | 3.167 | -.034 | 6.877 | 4.606 | 6.325 | 12.465 | 1.387 | .480 |
| 13.99 | 224.99 | 37.397 | 2.925 | -.250 | 6.950 | 4.645 | 6.372 | 11.581 | .926 | -.615 |
| 11.99 | 224.99 | 40.639 | 2.459 | -.054 | 7.570 | 5.470 | 7.293 | 15.476 | -.862 | -.386 |
| 10.00 | 224.99 | 43.182 | 2.619 | -.035 | 6.908 | 4.983 | 6.149 | 11.437 | .231 | -1.101 |
| 8.00 | 224.99 | 45.480 | 2.312 | -.037 | 6.865 | 5.184 | 6.277 | 11.443 | .578 | -1.480 |
| 5.99 | 224.99 | 46.637 | 1.601 | -.228 | 7.002 | 5.207 | 6.178 | 9.452 | 1.569 | -1.753 |
| 3.98 | 224.99 | 48.849 | 1.329 | -.153 | 6.813 | 5.150 | 6.019 | 6.286 | -.072 | -1.666 |
| 2.00 | 224.99 | 49.905 | .623 | .090 | 6.725 | 5.239 | 5.827 | 3.885 | .115 | -2.420 |

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   .01 224.99  50.004   -.084   -.153   6.906   5.086   5.658     .566     .129  -1.440

C  FILENAME= H910A001.A_1
C
C  H2 FLAME; d=9.45, delta=1.2 mm; theta=0 deg.; Uj=100, Ua=20, Ue=4 m/s; x=1.5 mm
C  LDV SEED PARTICLES ADDED TO ANNULUS FLUID ONLY.
C  D090894
C  11  : No. of data points
C  y      x       U       V       W     SIG(u') SIG(v') SIG(w')   u'v'     v'w'     w'u'
 13.50   1.50  13.952   1.614    .659   3.432   2.886   2.678    4.899    .161    -.187
 13.00   1.50  17.695    .577    .520   2.961   2.109   2.268    2.660    .182    -.148
 12.49   1.50  19.672    .193    .528   2.427   1.631   1.879    1.406    .143    -.125
 12.00   1.50  21.022    .127    .577   2.146   1.372   1.639    1.048    .071    -.275
 11.19   1.50  22.600    .149    .664   1.766   1.194   1.432     .660    .038    -.107
 10.40   1.50  23.346    .088    .589   1.474   1.059   1.255     .304   -.034    -.181
  9.60   1.50  23.493    .071    .478   1.326    .997   1.186    -.084   -.056    -.137
  8.20   1.50  22.706   -.058    .295   1.586   1.097   1.319    -.587   -.057    -.135
  6.99   1.49  20.177   -.265    .099   2.184   1.338   1.663   -1.358   -.025    -.168
  6.01   1.50  15.249   -.697   -.037   3.190   1.375   1.742   -1.934    .000    -.178
  5.51   1.50   7.597  -2.581   -.082   2.005   1.066   1.417    -.617   -.004     .045

C  FILENAME= H910A010.A_1
C
C  H2 FLAME; d=9.45, delta=1.2 mm; theta=0 deg.; Uj=100, Ua=20, Ue=4 m/s; x=10 mm
C  LDV SEED PARTICLES ADDED TO ANNULUS FLUID ONLY.
C  D090894
C   9  : No. of data points
C  y      x       U       V       W     SIG(u') SIG(v') SIG(w')   u'v'     v'w'     w'u'
 14.00   9.99  13.351   1.997    .496   3.344   2.974   3.017    4.734    .667    -.238
 13.00   9.99  18.506   1.459    .631   2.862   2.300   2.521    3.031    .242    -.209
 12.01   9.99  21.561   1.098    .627   2.122   1.611   1.737    1.212    .056    -.150
 11.00   9.99  23.305   1.135    .630   1.613   1.275   1.292     .434   -.018    -.078
 10.00   9.99  23.670   1.311    .450   1.377   1.117   1.148    -.094   -.013    -.137
  9.01   9.99  23.126   1.390    .309   1.524   1.147   1.244    -.594   -.060    -.100
  8.01  10.00  21.569   1.459    .142   2.064   1.320   1.491   -1.318    .006    -.087
  7.01  10.00  19.811   1.122    .030   1.939   1.375   1.545   -1.051   -.017    -.069
  6.01  10.00  21.503  -1.064    .044   2.792   1.931   1.850    1.461    .087     .026

C  FILENAME= H910A025.A_1
C
C  H2 FLAME; d=9.45, delta=1.2 mm; theta=0 deg.; Uj=100, Ua=20, Ue=4 m/s; x=25 mm
C  LDV SEED PARTICLES ADDED TO ANNULUS FLUID ONLY.
C  D090894
C  10  : No. of data points
C  y      x       U       V       W     SIG(u') SIG(v') SIG(w')   u'v'     v'w'     w'u'
 15.99  25.00  10.061   1.296    .656   3.007   2.942   3.108    3.792    .006    -.409
 15.01  25.00  13.384   1.372    .981   3.334   3.141   3.537    5.037    .580    -.146
 13.98  25.00  18.096   1.997    .641   3.105   2.692   2.698    4.159    .219     .262
 13.01  25.00  20.982   1.823    .613   2.544   2.331   2.227    2.919    .147    -.041
 12.01  25.00  23.131   1.681    .578   1.836   1.884   1.647    1.133    .011     .000
 11.01  25.00  23.785   1.596    .419   1.598   1.610   1.227     .053   -.063     .009
 10.01  25.00  23.147   1.597    .322   1.745   1.474   1.220    -.762   -.055     .045
  9.00  25.00  22.443   1.329    .224   1.599   1.175   1.178    -.451   -.011    -.036
  8.00  25.00  22.650    .785    .139   1.463   1.059   1.177     .139   -.008     .024
  7.00  25.00  25.162   -.695    .386   3.414   2.664   2.441    2.573    .099     .357

C  FILENAME= H910A050.A_1
C
C  H2 FLAME; d=9.45, delta=1.2 mm; theta=0 deg.; Uj=100, Ua=20, Ue=4 m/s; x=50 mm
C  LDV SEED PARTICLES ADDED TO ANNULUS FLUID ONLY.
C  D090894
C  11  : No. of data points
C  y      x       U       V       W     SIG(u') SIG(v') SIG(w')   u'v'     v'w'     w'u'
 22.00  50.01   5.461   1.180    .539   2.244   3.034   3.125    1.584    .023    -.563
 20.00  50.01   8.297   1.858    .335   2.989   3.616   2.814    3.995    .348    -.460
 18.00  50.01  12.497   2.452    .507   3.382   3.706   3.057    5.864    .208     .072
 15.99  50.01  17.027   2.399    .633   3.335   3.424   2.813    5.571   -.026    -.372
 15.01  50.01  18.896   2.125    .630   3.048   3.300   2.732    5.046   -.146    -.267
 14.00  50.01  20.752   2.017    .450   2.711   2.946   2.254    3.460   -.107    -.112
 13.01  50.01  21.779   1.571    .513   2.367   2.631   1.888    2.228   -.364    -.065
 12.00  50.01  22.417   1.212    .401   2.064   2.305   1.541    1.151    .037     .032
```

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 11.01 | 50.01 | 22.970 | .760 | .326 | 1.865 | 1.915 | 1.342 | .866 | -.045 | .132 |
| 10.01 | 50.01 | 23.242 | .159 | .304 | 1.951 | 1.681 | 1.250 | 1.024 | .027 | .058 |
| 9.00 | 50.01 | 24.023 | -.606 | .410 | 3.002 | 2.029 | 1.901 | 1.555 | -.012 | .097 |

C FILENAME= H910A075.A_1
C
C H2 FLAME; d=9.45, delta=1.2 mm; theta=0 deg.; Uj=100, Ua=20, Ue=4 m/s; x=75 mm
C LDV SEED PARTICLES ADDED TO ANNULUS FLUID ONLY.
C D090894
C 17 : No. of data points

| C y | x | U | V | W | SIG(u') | SIG(v') | SIG(w') | u'v' | v'w' | w'u' |
|---|---|---|---|---|---|---|---|---|---|---|
| 26.00 | 75.00 | 7.384 | 3.027 | .058 | 2.979 | 4.200 | 2.627 | 4.247 | -.242 | .362 |
| 24.00 | 75.00 | 9.111 | 2.948 | .198 | 3.197 | 4.127 | 2.707 | 5.259 | .304 | .254 |
| 22.00 | 75.00 | 11.363 | 2.779 | .386 | 3.360 | 3.944 | 2.868 | 5.680 | -.296 | .135 |
| 21.00 | 75.00 | 12.849 | 2.941 | .332 | 3.487 | 3.813 | 2.844 | 5.684 | -.183 | .335 |
| 20.00 | 75.00 | 13.516 | 2.452 | .484 | 3.429 | 3.787 | 2.814 | 5.763 | -.295 | -.454 |
| 18.00 | 75.00 | 16.597 | 2.490 | .438 | 3.268 | 3.578 | 2.629 | 4.870 | -.221 | .120 |
| 16.00 | 75.00 | 18.848 | 1.920 | .536 | 3.007 | 3.138 | 2.435 | 3.793 | -.134 | .004 |
| 13.99 | 75.00 | 20.661 | 1.213 | .540 | 2.817 | 2.763 | 2.240 | 3.214 | -.060 | .057 |
| 12.00 | 75.00 | 22.061 | .323 | .337 | 3.043 | 2.370 | 2.068 | 2.914 | .005 | .323 |
| 11.01 | 75.00 | 22.855 | .240 | .378 | 4.295 | 2.775 | 2.758 | 3.863 | .265 | .507 |
| 10.01 | 75.00 | 24.483 | -.380 | .464 | 4.788 | 2.770 | 3.218 | 4.953 | .516 | .679 |
| 8.99 | 75.00 | 28.676 | -.669 | .852 | 7.402 | 4.117 | 4.754 | 13.723 | 1.988 | 2.477 |
| 7.99 | 75.00 | 36.455 | .335 | .977 | 10.813 | 6.120 | 7.304 | 35.643 | 3.393 | 2.568 |
| 5.99 | 75.00 | 53.416 | 1.034 | 2.221 | 13.499 | 8.748 | 10.353 | 61.412 | 7.484 | -1.058 |
| 5.01 | 75.00 | 60.641 | .793 | 2.470 | 14.266 | 9.395 | 11.258 | 68.798 | 5.766 | -5.666 |
| 3.99 | 75.00 | 68.597 | .163 | 2.831 | 15.261 | 9.964 | 11.271 | 76.509 | 6.879 | -5.052 |
| 3.01 | 75.00 | 77.011 | -.237 | 3.348 | 15.518 | 10.168 | 11.598 | 71.354 | 7.696 | -8.987 |

C FILENAME= H910A150.A_1
C
C H2 FLAME; d=9.45, delta=1.2 mm; theta=0 deg.; Uj=100, Ua=20, Ue=4 m/s; x=150 mm
C LDV SEED PARTICLES ADDED TO ANNULUS FLUID ONLY.
C D090894
C 14 : No. of data points

| C y | x | U | V | W | SIG(u') | SIG(v') | SIG(w') | u'v' | v'w' | w'u' |
|---|---|---|---|---|---|---|---|---|---|---|
| 26.00 | 150.00 | 13.188 | 1.355 | .369 | 2.617 | 2.541 | 2.326 | 2.842 | -.183 | .135 |
| 24.00 | 150.00 | 14.244 | 1.266 | .395 | 2.682 | 2.518 | 2.314 | 2.945 | -.057 | .013 |
| 22.00 | 150.00 | 15.443 | 1.136 | .465 | 2.760 | 2.369 | 2.285 | 3.002 | -.062 | .026 |
| 20.00 | 150.00 | 16.266 | .880 | .567 | 2.890 | 2.313 | 2.296 | 3.046 | -.093 | .269 |
| 18.00 | 150.00 | 17.265 | .644 | .405 | 3.169 | 2.240 | 2.438 | 2.923 | .001 | .243 |
| 16.00 | 150.00 | 18.813 | .442 | .476 | 3.699 | 2.258 | 2.760 | 3.345 | .321 | .204 |
| 13.99 | 150.00 | 20.606 | .077 | .637 | 4.895 | 2.598 | 3.516 | 4.734 | .460 | .469 |
| 12.00 | 150.00 | 26.384 | .453 | .972 | 8.880 | 4.303 | 5.138 | 19.307 | 1.576 | 3.483 |
| 10.01 | 150.00 | 34.935 | 1.042 | 1.413 | 10.815 | 6.055 | 7.369 | 29.543 | 4.504 | 1.267 |
| 8.00 | 150.00 | 43.767 | 1.632 | 1.281 | 11.461 | 6.989 | 8.054 | 36.205 | 4.424 | .511 |
| 6.00 | 150.00 | 50.078 | .761 | 1.876 | 11.481 | 7.318 | 8.397 | 34.272 | 3.677 | -1.099 |
| 3.99 | 150.00 | 56.517 | .456 | 1.920 | 11.402 | 7.713 | 8.120 | 30.486 | 4.130 | -4.255 |
| 2.00 | 150.00 | 62.010 | .561 | 2.126 | 10.567 | 7.794 | 7.664 | 15.784 | 3.144 | -7.148 |
| .00 | 150.00 | 64.458 | -.241 | 2.260 | 9.980 | 7.621 | 7.656 | -.326 | -.021 | -10.113 |

C FILENAME= H910A225.A_1
C
C H2 FLAME; d=9.45, delta=1.2 mm; theta=0 deg.; Uj=100, Ua=20, Ue=4 m/s; x=225 mm
C LDV SEED PARTICLES ADDED TO ANNULUS FLUID ONLY.
C D090894
C 14 : No. of data points

| C y | x | U | V | W | SIG(u') | SIG(v') | SIG(w') | u'v' | v'w' | w'u' |
|---|---|---|---|---|---|---|---|---|---|---|
| 26.00 | 224.99 | 13.859 | .643 | .306 | 2.756 | 1.929 | 2.454 | 2.235 | -.114 | .010 |
| 23.99 | 224.99 | 14.085 | .294 | .631 | 2.672 | 1.825 | 2.571 | 2.086 | -.058 | -.296 |
| 21.99 | 224.99 | 14.875 | .108 | .557 | 2.759 | 1.796 | 2.410 | 2.123 | .289 | -.041 |
| 20.00 | 224.99 | 16.546 | .039 | .493 | 3.350 | 1.929 | 2.741 | 2.240 | .384 | .439 |
| 18.00 | 224.99 | 18.138 | .010 | .573 | 4.532 | 2.252 | 3.095 | 3.777 | .516 | .648 |
| 15.99 | 224.99 | 20.981 | .220 | .775 | 7.050 | 3.288 | 3.985 | 12.176 | .830 | 1.064 |
| 13.99 | 224.99 | 27.766 | 1.428 | .617 | 8.757 | 4.748 | 5.439 | 19.554 | .793 | -1.811 |
| 11.99 | 224.99 | 33.291 | 2.023 | .801 | 8.879 | 5.418 | 6.434 | 19.446 | 3.000 | .286 |
| 9.99 | 224.99 | 36.387 | 1.545 | 1.057 | 9.131 | 5.596 | 6.431 | 20.540 | 2.606 | -1.417 |
| 7.99 | 224.99 | 40.532 | 1.437 | 1.057 | 9.160 | 5.728 | 6.362 | 18.467 | 3.471 | -1.287 |
| 5.99 | 224.99 | 43.072 | 1.100 | 1.001 | 8.722 | 5.727 | 6.376 | 13.724 | 3.019 | -2.843 |
| 3.98 | 224.99 | 46.149 | .752 | 1.044 | 8.423 | 5.810 | 6.213 | 9.809 | .323 | -2.927 |
| 2.00 | 224.99 | 47.194 | .255 | 1.354 | 8.497 | 5.876 | 5.942 | 7.068 | 1.973 | -4.286 |

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   .00 224.99  48.258   -.130   1.318   8.323   5.928   5.928    -.618   1.528  -4.175

C  FILENAME= H910A001.E_1
C
C  H2 FLAME; d=9.45, delta=1.2 mm; theta=0 deg.; Uj=100, Ua=20, Ue=4 m/s; x=1.5 mm
C  LDV SEED PARTICLES ADDED TO EXTERNAL FLUID ONLY.
C  D090894
C   8  : No. of data points
C  y      x       U       V       W     SIG(u') SIG(v') SIG(w')   u'v'    v'w'    w'u'
 26.00   1.50   4.138   -.225    .182    .267    .200    .363     .011    .002    .007
 24.00   1.50   4.164   -.273    .183    .280    .217    .386     .009    .006    .011
 22.00   1.50   4.168   -.328    .206    .275    .203    .384     .000    .003    .019
 20.00   1.50   4.109   -.420    .215    .310    .207    .377    -.008    .001    .017
 18.00   1.50   3.916   -.527    .176    .354    .228    .377    -.015    .003    .008
 16.00   1.50   3.522   -.631    .135    .518    .333    .404    -.028    .007   -.002
 15.00   1.50   3.316   -.667    .110    .755    .707    .564    -.023    .009   -.005
 14.00   1.50   5.913   -.761    .166   2.376   2.349   2.058    2.684    .195   -.110

C  FILENAME= H910A010.E_1
C
C  H2 FLAME; d=9.45, delta=1.2 mm; theta=0 deg.; Uj=100, Ua=20, Ue=4 m/s; x=10 mm
C  LDV SEED PARTICLES ADDED TO EXTERNAL FLUID ONLY.
C  D090894
C   9  : No. of data points
C  y      x       U       V       W     SIG(u') SIG(v') SIG(w')   u'v'    v'w'    w'u'
 26.00   9.99   4.057   -.191    .185    .268    .202    .365     .012    .001    .009
 24.00  10.01   4.080   -.223    .186    .276    .200    .376     .007    .003    .014
 22.00  10.00   4.070   -.245    .204    .284    .211    .361     .006    .003    .014
 20.00  10.01   3.974   -.279    .180    .306    .240    .402    -.002    .001    .019
 18.00  10.01   3.884   -.327    .183    .427    .354    .408    -.007    .006    .015
 15.99  10.01   3.881   -.400    .072    .932   1.022    .809     .079    .054   -.070
 15.00  10.01   6.767   -.058    .182   2.452   2.218   2.032    2.713    .220   -.066
 14.00  10.01  12.051    .058    .194   3.435   2.926   2.981    5.324    .514   -.284
 13.02   9.99  17.365   -.423   -.059   3.287   2.739   2.927    4.405    .381   -.759

C  FILENAME= H910A025.E_1
C
C  H2 FLAME; d=9.45, delta=1.2 mm; theta=0 deg.; Uj=100, Ua=20, Ue=4 m/s; x=25 mm
C  LDV SEED PARTICLES ADDED TO EXTERNAL FLUID ONLY.
C  D090894
C   8  : No. of data points
C  y      x       U       V       W     SIG(u') SIG(v') SIG(w')   u'v'    v'w'    w'u'
 26.00  25.00   4.005   -.140    .175    .269    .208    .351     .011    .001    .008
 24.00  25.00   4.018   -.152    .183    .293    .235    .368     .008    .004    .012
 22.00  25.00   4.037   -.189    .174    .365    .321    .414     .003   -.001    .019
 20.00  25.00   4.030   -.210    .156    .497    .474    .452     .004   -.004    .008
 18.00  25.00   4.516   -.243    .126    .920   1.050    .822     .128    .008   -.016
 16.00  25.00   9.378    .158    .265   2.989   2.417   2.409    3.424    .278   -.367
 13.99  25.00  16.563   -.014    .334   3.326   2.804   2.883    4.763    .478   -.388
 12.00  25.00  21.931   -.588    .358   2.898   2.487   2.332    3.512   -.114   -.702

C  FILENAME= H910A050.E_1
C
C  H2 FLAME; d=9.45, delta=1.2 mm; theta=0 deg.; Uj=100, Ua=20, Ue=4 m/s; x=50 mm
C  LDV SEED PARTICLES ADDED TO EXTERNAL FLUID ONLY.
C  D090894
C   8  : No. of data points
C  y      x       U       V       W     SIG(u') SIG(v') SIG(w')   u'v'    v'w'    w'u'
 26.00  50.01   4.014   -.166    .173    .495    .521    .362     .009   -.002    .008
 24.00  50.01   4.184   -.148    .159    .658    .790    .432     .040   -.021    .020
 22.00  50.01   4.563   -.210    .166    .954   1.222    .699     .076   -.037   -.016
 20.00  50.01   6.542   -.136    .148   2.102   2.057   1.634    1.450   -.019   -.340
 18.00  50.01  10.668    .035    .281   3.294   2.810   2.528    4.435    .455   -.328
 16.00  50.01  15.573   -.041    .317   3.466   3.162   2.867    6.076    .281   -.349
 13.99  50.01  19.151   -.557    .491   3.336   3.112   2.617    5.591    .280   -.767
 12.00  50.01  21.461  -1.138    .403   2.998   2.760   2.199    3.911   -.257   -.651

C  FILENAME= H910A075.E_1
C
C  H2 FLAME; d=9.45, delta=1.2 mm; theta=0 deg.; Uj=100, Ua=20, Ue=4 m/s; x=75 mm
C  LDV SEED PARTICLES ADDED TO EXTERNAL FLUID ONLY.
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C D090894
C 9 : No. of data points

| C y | x | U | V | W | SIG(u') | SIG(v') | SIG(w') | u'v' | v'w' | w'u' |
|---|---|---|---|---|---|---|---|---|---|---|
| 26.00 | 75.00 | 5.194 | -.098 | .177 | 1.307 | 1.620 | .854 | .418 | -.125 | -.024 |
| 24.00 | 75.00 | 6.701 | .086 | .109 | 2.150 | 2.184 | 1.564 | 1.742 | .040 | -.187 |
| 22.00 | 75.00 | 9.055 | .162 | .174 | 2.921 | 2.705 | 2.121 | 3.838 | -.008 | -.340 |
| 20.00 | 75.00 | 11.928 | .059 | .352 | 3.285 | 3.161 | 2.446 | 5.536 | .162 | .197 |
| 18.00 | 75.00 | 14.922 | .024 | .365 | 3.493 | 3.164 | 2.591 | 6.028 | .136 | -.068 |
| 15.99 | 75.00 | 17.368 | -.057 | .387 | 3.402 | 3.163 | 2.472 | 5.601 | -.276 | -.378 |
| 13.98 | 75.00 | 19.431 | -.658 | .434 | 3.300 | 2.825 | 2.380 | 4.550 | -.150 | -.544 |
| 11.99 | 75.00 | 20.703 | -1.043 | .356 | 3.466 | 2.511 | 2.162 | 3.736 | -.197 | -.459 |
| 10.01 | 75.00 | 22.745 | -1.801 | .450 | 4.035 | 2.347 | 2.662 | 3.753 | .345 | -.174 |

C FILENAME= H910A150.E_1
C
C H2 FLAME; d=9.45, delta=1.2 mm; theta=0 deg.; Uj=100, Ua=20, Ue=4 m/s; x=150 mm
C LDV SEED PARTICLES ADDED TO EXTERNAL FLUID ONLY.
C D090894
C 9 : No. of data points

| C y | x | U | V | W | SIG(u') | SIG(v') | SIG(w') | u'v' | v'w' | w'u' |
|---|---|---|---|---|---|---|---|---|---|---|
| 26.00 | 150.00 | 12.845 | .923 | .453 | 2.789 | 2.340 | 2.095 | 3.212 | -.155 | -.329 |
| 24.00 | 150.00 | 13.699 | .707 | .621 | 2.903 | 2.329 | 2.040 | 3.363 | .033 | -.350 |
| 21.99 | 150.00 | 15.031 | .708 | .553 | 2.821 | 2.236 | 2.069 | 3.232 | -.171 | -.310 |
| 20.00 | 150.00 | 15.774 | .482 | .600 | 3.021 | 2.265 | 2.155 | 3.214 | .197 | -.268 |
| 18.00 | 150.00 | 16.715 | .120 | .620 | 3.110 | 2.048 | 2.223 | 2.857 | .198 | -.198 |
| 15.99 | 150.00 | 17.843 | -.150 | .759 | 3.353 | 2.035 | 2.436 | 2.610 | .332 | -.249 |
| 13.99 | 150.00 | 19.280 | -.640 | .814 | 4.053 | 2.192 | 2.859 | 2.895 | .575 | -.214 |
| 11.99 | 150.00 | 22.967 | -1.142 | .958 | 6.779 | 3.018 | 4.267 | 5.932 | 2.001 | 1.061 |
| 10.00 | 150.00 | 30.751 | -1.102 | .971 | 11.799 | 4.961 | 6.557 | 22.973 | 2.529 | -1.235 |

C FILENAME= H910A225.E_1
C
C H2 FLAME; d=9.45, delta=1.2 mm; theta=0 deg.; Uj=100, Ua=20, Ue=4 m/s; x=225 mm
C LDV SEED PARTICLES ADDED TO EXTERNAL FLUID ONLY.
C D090894
C 8 : No. of data points

| C y | x | U | V | W | SIG(u') | SIG(v') | SIG(w') | u'v' | v'w' | w'u' |
|---|---|---|---|---|---|---|---|---|---|---|
| 24.00 | 224.99 | 14.751 | .363 | .701 | 2.699 | 1.762 | 2.105 | 1.993 | .193 | -.227 |
| 22.00 | 224.99 | 15.446 | .136 | .761 | 2.893 | 1.815 | 2.252 | 1.917 | .312 | -.362 |
| 20.00 | 224.99 | 16.355 | -.121 | .734 | 3.255 | 1.892 | 2.519 | 1.932 | .647 | -.298 |
| 18.00 | 224.99 | 17.343 | -.407 | .970 | 3.747 | 2.097 | 2.755 | 2.065 | .926 | .058 |
| 16.00 | 224.99 | 19.461 | -.663 | .836 | 5.412 | 2.478 | 3.426 | 3.677 | 1.383 | -.691 |
| 13.98 | 224.99 | 26.148 | -.188 | .883 | 9.087 | 4.516 | 5.373 | 17.095 | 2.148 | -1.517 |
| 11.99 | 224.99 | 28.479 | -.364 | .971 | 10.307 | 4.875 | 5.436 | 21.305 | 1.763 | -5.351 |
| 10.00 | 224.99 | 34.217 | -.232 | .944 | 10.652 | 5.866 | 6.676 | 26.045 | 4.184 | -5.463 |

C FILENAME= H910AAX.J_1
C
C H2 FLAME; d=9.45, delta=1.2 mm; theta=0 deg.; Uj=100, Ua=20, Ue=4 m/s; y=0 mm
C LDV SEED PARTICLES ADDED TO JET FLUID ONLY.
C D090894
C 15 : No. of data points

| C y | x | U | V | W | SIG(u') | SIG(v') | SIG(w') | u'v' | v'w' | w'u' |
|---|---|---|---|---|---|---|---|---|---|---|
| .00 | 1.50 | 131.512 | .000 | .001 | 5.862 | 4.915 | 4.512 | 1.286 | -.468 | -.745 |
| .00 | 9.99 | 130.673 | -.100 | -.020 | 6.099 | 5.139 | 4.679 | 1.325 | 1.608 | -.457 |
| .00 | 20.00 | 131.064 | -.149 | .163 | 7.035 | 5.487 | 4.950 | 1.540 | .985 | -2.055 |
| .00 | 30.00 | 128.996 | .004 | .108 | 7.831 | 6.396 | 5.788 | .227 | 1.258 | -2.861 |
| .00 | 40.01 | 126.374 | -.013 | .296 | 9.131 | 7.820 | 7.263 | 1.248 | .055 | -3.821 |
| .00 | 50.01 | 120.103 | .022 | .188 | 11.510 | 9.643 | 8.915 | 1.325 | 1.872 | -7.895 |
| .00 | 60.01 | 112.032 | .224 | .436 | 13.760 | 10.941 | 9.740 | -2.350 | 4.954 | -15.811 |
| .00 | 70.00 | 102.820 | .122 | .478 | 14.161 | 11.604 | 10.167 | -5.010 | 1.854 | -16.516 |
| .00 | 80.00 | 95.617 | .220 | .237 | 13.727 | 10.920 | 9.830 | -3.495 | 2.634 | -14.290 |
| .00 | 90.00 | 88.453 | .559 | .681 | 12.971 | 10.467 | 9.936 | -6.182 | 3.347 | -15.853 |
| .00 | 100.00 | 83.341 | .354 | .518 | 12.178 | 9.957 | 9.457 | -.633 | .314 | -12.619 |
| .00 | 110.00 | 78.419 | .072 | .579 | 11.143 | 9.197 | 8.797 | .886 | -.264 | -10.265 |
| .00 | 120.00 | 74.499 | .093 | .421 | 10.948 | 8.689 | 8.487 | -1.518 | .552 | -10.724 |
| .00 | 130.00 | 70.498 | .244 | .309 | 10.133 | 8.112 | 8.023 | .996 | .378 | -7.248 |
| .00 | 140.01 | 67.579 | .429 | .155 | 9.426 | 7.546 | 7.736 | -.470 | .004 | -5.501 |
| .00 | 150.00 | 64.617 | .257 | .146 | 9.153 | 7.232 | 7.426 | .571 | .052 | -4.828 |
| .00 | 160.01 | 62.182 | .075 | .155 | 8.870 | 6.803 | 6.977 | .614 | .573 | -5.556 |
| .00 | 170.00 | 59.249 | .134 | .254 | 8.125 | 6.563 | 6.738 | 1.174 | .022 | -6.182 |

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   .00 180.00  57.779    .207   -.033   7.806   6.187   6.568     .963    .401  -4.973
   .00 190.01  55.479    .093   -.254   7.857   6.103   6.401    -.007    .982  -2.481
   .00 200.00  53.964    .206   -.082   7.415   5.544   6.109     .836   -.203  -4.028
   .00 225.01  48.959    .017   -.232   6.703   5.224   5.713    1.010    .456  -4.756

C  FILENAME= H910A001.J_2
C
C  H2 FLAME; d=9.45, delta=1.2 mm; theta=0 deg.; Uj=100, Ua=20, Ue=4 m/s; x=1.5 mm
C  LDV SEED PARTICLES ADDED TO JET FLUID ONLY.
C  D090894
C  12  : No. of data points
C  y      x       u'^3      v'^3      w'^3     u'^2v'    v'^2u'    v'^2w'   w'^2v'   w'^2u'   u'^2w'
  4.70   1.50  1562.036  -382.566    50.087   245.489   833.072   -29.863   29.152   49.309  -19.634
  4.49   1.50  2437.059   381.794    71.065   265.304   333.434   -38.068   30.652    3.701  -63.160
  4.30   1.50  -642.317   -92.079    50.865  -112.384  -470.196    52.704     .412  -15.351   63.083
  4.00   1.50  -945.043  -233.448     4.738  -306.442  -476.785     3.467   13.224   25.254   -6.228
  3.51   1.50  -410.518  -135.516   -11.838  -207.688  -199.746     7.477    3.741  -36.892   38.152
  3.01   1.50  -286.334   -66.701   -25.396  -150.274  -120.081    15.252    9.293  -25.985   -5.937
  2.51   1.50  -229.818   -85.377    -2.106  -126.313  -123.771     4.527    2.108  -25.897   15.329
  2.00   1.50  -231.383   -69.088     6.301  -116.971  -106.533    12.430   -5.525  -29.304  -14.275
  1.51   1.50  -168.110   -39.530    10.965   -82.035   -91.560     3.778   -6.788  -17.136   11.108
  1.01   1.50  -140.013   -29.633     7.722   -57.436   -68.811     3.093   -1.445  -21.908    9.129
   .51   1.50   -89.287    -2.172      .450   -30.021   -52.971     3.442   -2.930  -15.439    2.688
   .00   1.50   -78.508    -1.078     5.151     4.033   -55.670     3.096    2.482  -12.272   -1.265

C  FILENAME= H910A010.J_2
C
C  H2 FLAME; d=9.45, delta=1.2 mm; theta=0 deg.; Uj=100, Ua=20, Ue=4 m/s; x=10 mm
C  LDV SEED PARTICLES ADDED TO JET FLUID ONLY.
C  D090894
C  10  : No. of data points
C  y      x       u'^3      v'^3      w'^3     u'^2v'    v'^2u'    v'^2w'   w'^2v'   w'^2u'   u'^2w'
  5.50  10.00  1628.901   622.678   134.321   927.474   782.019   -35.092  107.965  138.361  -48.609
  5.00  10.00  1884.693   543.053   138.645   717.447   636.102     5.459  151.495  156.292   50.796
  4.51  10.00   736.676   216.092    27.694    35.173   105.835   -48.765   58.425   69.308  -63.859
  4.01  10.00 -1052.929  -308.546    32.980  -613.052  -484.723    57.862     .444 -161.183   88.925
  3.41  10.00 -1153.586  -370.605   -18.407  -576.754  -453.430    -4.426  -50.519  -63.276    9.999
  2.70   9.99  -369.418  -158.914    -1.988  -179.257  -150.112    24.199  -27.839  -34.101   28.288
  2.01  10.00  -245.885   -60.805     3.913  -114.534   -83.993     4.720   -2.926  -25.920   15.248
  1.30  10.00  -155.232   -47.499     9.018   -69.181   -70.791     6.718   -8.043  -20.201    4.518
   .62  10.00  -137.494   -19.169   -11.707   -40.983   -59.452     -.666    2.284  -16.251   12.703
   .01  10.00   -92.551    -6.741    13.853     1.461   -61.079     5.134   -2.807   -8.854    6.630

C  FILENAME= H910A025.J_2
C
C  H2 FLAME; d=9.45, delta=1.2 mm; theta=0 deg.; Uj=100, Ua=20, Ue=4 m/s; x=25 mm
C  LDV SEED PARTICLES ADDED TO JET FLUID ONLY.
C  D090894
C  12  : No. of data points
C  y      x       u'^3      v'^3      w'^3     u'^2v'    v'^2u'    v'^2w'   w'^2v'   w'^2u'   u'^2w'
  7.00  25.00   829.139   268.345    68.860   413.198   363.521    26.013  117.589  229.569  -17.412
  6.01  25.00  1386.980   427.715    77.129   615.419   560.900    -5.456  118.938  181.441    9.312
  5.51  25.00  1507.366   523.400     8.018   754.207   664.117    21.976   83.152  181.815  -23.634
  5.01  25.00  1607.587   479.055  -142.991   667.429   622.570   -45.080  146.553  124.339 -151.453
  4.50  25.00  1211.457   246.965    26.761   323.925   336.570    27.604   51.902   -7.717   37.545
  4.01  25.00  -263.515     5.718  -128.188  -226.056  -163.980   -25.763  -77.398 -221.657    5.243
  3.41  25.00 -1180.836  -242.840  -135.294  -644.693  -580.470    36.908  -17.224 -142.556  -20.790
  2.70  25.00 -1812.605  -525.707    23.277  -856.518  -700.881    19.852   28.977 -137.165   17.710
  2.01  25.00  -721.307  -258.486   -14.955  -303.576  -304.230    41.419  -32.670  -77.626   34.024
  1.29  25.00  -244.235  -117.180     2.449  -131.384  -134.855   -13.735  -19.483  -23.200   -8.653
   .62  25.00  -120.980   -44.730    14.749   -44.750   -80.036     4.023   -5.282  -15.735    1.806
   .01  25.00   -81.419    -2.124     6.030     4.003   -56.919     1.700    -.154  -17.931    8.388

C  FILENAME= H910A050.J_2
C
C  H2 FLAME; d=9.45, delta=1.2 mm; theta=0 deg.; Uj=100, Ua=20, Ue=4 m/s; x=50 mm
C  LDV SEED PARTICLES ADDED TO JET FLUID ONLY.
C  D090894
C  11  : No. of data points
C  y      x       u'^3      v'^3      w'^3     u'^2v'    v'^2u'    v'^2w'   w'^2v'   w'^2u'   u'^2w'
  8.80  49.99   466.255   136.088    37.100   194.729   179.374     2.402   44.291  134.218  -20.876
```

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 8.22 | 49.99 | 456.533 | 169.355 | 58.912 | 241.002 | 222.303 | 22.540 | 56.344 | 135.537 | 8.450 |
| 7.01 | 49.99 | 833.647 | 249.858 | 8.604 | 375.224 | 327.119 | -24.243 | 127.320 | 182.563 | -27.584 |
| 6.00 | 49.99 | 1235.980 | 405.349 | -101.261 | 562.325 | 519.095 | 8.078 | 110.716 | 210.989 | -53.178 |
| 5.01 | 49.99 | 1659.615 | 496.288 | -84.271 | 632.151 | 616.590 | 43.380 | 116.778 | 48.729 | -113.415 |
| 4.00 | 49.99 | 778.382 | 209.363 | -237.581 | 222.756 | 194.256 | -14.063 | 85.042 | -95.282 | -96.964 |
| 2.72 | 49.99 | -1202.364 | -278.238 | 5.084 | -552.570 | -481.321 | -34.290 | -12.726 | -263.861 | 79.312 |
| 2.00 | 49.99 | -1707.252 | -418.185 | -10.981 | -757.963 | -729.538 | 41.395 | -47.972 | -393.221 | 42.242 |
| 1.30 | 49.99 | -1960.485 | -255.059 | 30.201 | -683.661 | -775.475 | 66.513 | -40.300 | -294.940 | 82.635 |
| .60 | 49.99 | -1223.460 | -151.798 | 36.132 | -258.810 | -618.087 | 61.448 | -10.199 | -146.456 | 55.876 |
| .00 | 49.99 | -1087.148 | 28.435 | 9.674 | 110.823 | -580.952 | 11.205 | -22.326 | -218.811 | 35.876 |

C FILENAME= H910A075.J_2
C
C H2 FLAME; d=9.45, delta=1.2 mm; theta=0 deg.; Uj=100, Ua=20, Ue=4 m/s; x=75 mm
C LDV SEED PARTICLES ADDED TO JET FLUID ONLY.
C D090894
C 12 : No. of data points

| C y | x | u'^3 | v'^3 | w'^3 | u'^2v' | v'^2u' | v'^2w' | w'^2v' | w'^2u' | u'^2w' |
|---|---|---|---|---|---|---|---|---|---|---|
| 11.00 | 75.00 | 351.077 | 81.373 | -3.386 | 127.082 | 117.636 | -5.829 | 47.466 | 129.293 | -9.410 |
| 9.49 | 75.00 | 357.516 | 119.672 | 17.079 | 169.400 | 171.885 | 12.979 | 47.279 | 115.396 | -34.371 |
| 8.23 | 75.00 | 444.495 | 199.563 | -14.902 | 239.037 | 242.680 | -.035 | 92.002 | 136.433 | -2.801 |
| 7.01 | 75.00 | 849.833 | 278.370 | 10.607 | 377.976 | 345.766 | 21.623 | 68.222 | 62.182 | -34.363 |
| 5.99 | 75.00 | 1068.688 | 364.761 | -89.555 | 441.560 | 453.568 | 4.984 | 120.430 | 86.940 | -107.747 |
| 5.00 | 75.00 | 857.188 | 337.500 | 21.326 | 320.210 | 378.324 | -27.151 | 91.160 | -8.857 | -126.833 |
| 3.99 | 75.00 | 656.792 | 236.892 | -240.132 | 162.667 | 194.019 | -17.016 | 110.329 | 35.735 | -103.193 |
| 2.72 | 75.00 | -96.111 | 118.330 | -169.995 | -140.028 | -96.066 | -5.739 | 12.898 | -185.387 | 48.807 |
| 2.00 | 75.00 | -417.963 | -150.258 | -127.887 | -300.325 | -421.355 | 13.946 | 16.266 | -178.949 | -55.781 |
| 1.30 | 75.00 | -793.852 | -98.504 | -29.836 | -275.895 | -498.250 | -75.794 | -2.111 | -186.231 | 50.128 |
| .61 | 75.00 | -738.124 | -17.550 | -46.159 | -142.388 | -488.847 | 33.365 | -16.025 | -117.758 | 108.125 |
| .00 | 75.00 | -736.543 | -6.256 | -5.594 | 102.609 | -532.337 | 43.564 | 5.272 | -185.678 | 66.883 |

C FILENAME= H910A150.J_2
C
C H2 FLAME; d=9.45, delta=1.2 mm; theta=0 deg.; Uj=100, Ua=20, Ue=4 m/s; x=150 mm
C LDV SEED PARTICLES ADDED TO JET FLUID ONLY.
C D090894
C 15 : No. of data points

| C y | x | u'^3 | v'^3 | w'^3 | u'^2v' | v'^2u' | v'^2w' | w'^2v' | w'^2u' | u'^2w' |
|---|---|---|---|---|---|---|---|---|---|---|
| 16.00 | 150.00 | 176.555 | 40.168 | 16.919 | 47.265 | 72.829 | 1.841 | 19.679 | 68.415 | -4.401 |
| 13.99 | 150.00 | 147.179 | 55.646 | -15.253 | 45.558 | 70.859 | .689 | 38.283 | 71.176 | 9.025 |
| 11.99 | 150.00 | 156.735 | 57.844 | 75.617 | 88.451 | 86.198 | 10.507 | 54.390 | 61.585 | -7.867 |
| 10.00 | 150.00 | 128.487 | 69.212 | -14.046 | 84.020 | 100.775 | -10.504 | 32.138 | 23.611 | -8.276 |
| 9.00 | 150.00 | 185.200 | 78.924 | -13.905 | 91.190 | 96.403 | -6.614 | 42.950 | 31.114 | -10.953 |
| 8.01 | 150.00 | 160.377 | 75.197 | 1.314 | 65.224 | 82.230 | -4.469 | 40.777 | -4.670 | -31.476 |
| 7.01 | 150.00 | 166.506 | 80.946 | -16.080 | 70.561 | 96.569 | -10.024 | 19.465 | -25.967 | -14.230 |
| 5.99 | 150.00 | 72.178 | 45.256 | 15.107 | 9.241 | 44.767 | -3.088 | 12.081 | -35.209 | 9.289 |
| 5.00 | 150.00 | -11.005 | 24.761 | -30.844 | -38.578 | 21.582 | -2.356 | -.076 | -71.407 | -3.732 |
| 3.99 | 150.00 | 37.112 | 5.632 | -.834 | -23.388 | 19.143 | -7.976 | -12.553 | -40.368 | 15.244 |
| 3.00 | 150.00 | -29.489 | 13.553 | 12.117 | -46.315 | -6.719 | -8.348 | -16.073 | -54.427 | 2.712 |
| 2.01 | 150.00 | -25.123 | -12.986 | 13.298 | -43.363 | -10.249 | -15.657 | -3.760 | -67.558 | 19.394 |
| 1.01 | 150.00 | -23.057 | 1.690 | -17.297 | -34.052 | -45.706 | 8.879 | 8.063 | -65.288 | -6.989 |
| .51 | 150.00 | -31.389 | -2.781 | 4.108 | -18.373 | -54.384 | -5.547 | -12.615 | -58.013 | 18.273 |
| .00 | 150.00 | -170.792 | -17.533 | 9.560 | -12.355 | -35.326 | 9.382 | -8.847 | -69.756 | 8.618 |

C FILENAME= H910A225.J_2
C
C H2 FLAME; d=9.45, delta=1.2 mm; theta=0 deg.; Uj=100, Ua=20, Ue=4 m/s; x=225 mm
C LDV SEED PARTICLES ADDED TO JET FLUID ONLY.
C D090894
C 13 : No. of data points

| C y | x | u'^3 | v'^3 | w'^3 | u'^2v' | v'^2u' | v'^2w' | w'^2v' | w'^2u' | u'^2w' |
|---|---|---|---|---|---|---|---|---|---|---|
| 24.00 | 225.00 | 68.766 | 15.188 | 19.442 | 19.195 | 27.957 | -1.001 | -1.691 | 25.546 | -3.330 |
| 21.99 | 224.99 | 84.776 | 18.335 | -5.061 | 27.797 | 35.605 | 5.759 | 7.527 | 29.779 | -4.377 |
| 20.00 | 224.99 | 80.578 | 23.507 | -9.003 | 22.509 | 40.002 | 5.552 | 11.449 | 29.565 | -17.184 |
| 18.00 | 224.99 | 129.026 | 25.468 | 3.306 | 38.535 | 42.537 | -1.481 | 9.702 | 23.145 | 6.427 |
| 15.99 | 224.99 | 99.259 | 29.280 | -11.734 | 22.955 | 34.178 | -1.376 | 11.350 | 27.096 | -4.537 |
| 13.99 | 224.99 | 28.924 | 25.387 | -.011 | 20.756 | 33.624 | -2.393 | 13.665 | 10.780 | -4.073 |
| 11.99 | 224.99 | 110.227 | 41.725 | -35.198 | 46.378 | 54.909 | -6.874 | 14.451 | 12.731 | 15.161 |
| 10.00 | 224.99 | -1.512 | 15.017 | .033 | -1.737 | 15.423 | 1.935 | 5.208 | -10.260 | -2.752 |
| 8.00 | 224.99 | -3.664 | 15.361 | -12.087 | -3.881 | 6.015 | -4.940 | 2.586 | -14.696 | -4.459 |
| 5.99 | 224.99 | -21.806 | 15.942 | -4.566 | -16.928 | .859 | .872 | 2.871 | -18.660 | 6.156 |

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  3.98 224.99   -44.285    -2.668    12.905   -10.967     2.028    -2.616    -6.873   -24.804     5.811
  2.00 224.99   -30.515    -2.023    -7.264     -.283    -3.836     2.410    -4.164   -17.802    15.406
   .01 224.99    -1.164     6.772     9.005      .283    -7.339    -2.724     2.750   -18.681     6.797

C  FILENAME= H910A001.A_2
C
C  H2 FLAME; d=9.45, delta=1.2 mm; theta=0 deg.; Uj=100, Ua=20, Ue=4 m/s; x=1.5 mm
C  LDV SEED PARTICLES ADDED TO ANNULUS FLUID ONLY.
C  D090894
C  11  : No. of data points
C  y      x       u'^3      v'^3      w'^3     u'^2v'    v'^2u'    v'^2w'    w'^2v'    w'^2u'    u'^2w'
 13.50   1.50   -10.120    -9.827     1.477    -9.625    -8.605     1.131    -1.446    -1.339     -.888
 13.00   1.50    -9.595    -4.839     -.856    -5.433    -4.586      .077    -1.623    -1.002     -.970
 12.49   1.50    -4.456    -1.178      .013    -1.854    -1.404     -.146     -.735     -.462     -.535
 12.00   1.50    -2.474     -.730      .390    -1.283     -.952     -.091     -.334     -.367     -.137
 11.19   1.50    -1.390     -.333      .233     -.871     -.559      .011     -.079     -.125     -.153
 10.40   1.50     -.496     -.219      .096     -.450     -.265      .019     -.046      .028     -.006
  9.60   1.50     -.230      .065     -.054      .012     -.245     -.058      .011      .044     -.079
  8.20   1.50     -.873      .424      .032      .578     -.452      .019      .232     -.192     -.146
  6.99   1.49    -4.175     1.129     -.052     2.044    -1.213      .091      .320     -.681      .025
  6.01   1.50    -4.833     -.215      .255      .947     -.147      .175      .043      .296     -.197
  5.51   1.50     3.104     -.017      .267     -.951      .192     -.017     -.040      .304      .103

C  FILENAME= H910A010.A_2
C
C  H2 FLAME; d=9.45, delta=1.2 mm; theta=0 deg.; Uj=100, Ua=20, Ue=4 m/s; x=10 mm
C  LDV SEED PARTICLES ADDED TO ANNULUS FLUID ONLY.
C  D090894
C   9  : No. of data points
C  y      x       u'^3      v'^3      w'^3     u'^2v'    v'^2u'    v'^2w'    w'^2v'    w'^2u'    u'^2w'
 14.00   9.99     1.389    -7.563    -1.638    -2.738    -3.528     -.440    -1.588     1.114    -1.042
 13.00   9.99    -8.091    -6.965    -1.018    -6.090    -5.153      .201    -3.376    -2.023    -1.101
 12.01   9.99    -2.832    -2.010      .005    -1.853    -1.475     -.126    -1.223     -.587     -.268
 11.00   9.99     -.810     -.473      .118     -.630     -.571     -.059     -.254     -.155      .037
 10.00   9.99     -.125      .168     -.002     -.018     -.394     -.051      .019     -.015     -.078
  9.01   9.99    -1.419      .602      .056      .794     -.601      .039      .280     -.339     -.081
  8.01  10.00    -3.595      .856     -.051     1.747    -1.115     -.077      .500     -.758     -.279
  7.01  10.00     1.177      .720      .392     -.470      .098      .090      .192      .008     -.021
  6.01  10.00     1.591     1.054      .921     2.706     -.116      .356     1.002     -.361      .125

C  FILENAME= H910A025.A_2
C
C  H2 FLAME; d=9.45, delta=1.2 mm; theta=0 deg.; Uj=100, Ua=20, Ue=4 m/s; x=25 mm
C  LDV SEED PARTICLES ADDED TO ANNULUS FLUID ONLY.
C  D090894
C  10  : No. of data points
C  y      x       u'^3      v'^3      w'^3     u'^2v'    v'^2u'    v'^2w'    w'^2v'    w'^2u'    u'^2w'
 15.99  25.00     5.763     4.470    15.198     4.294     4.118      .096     1.539     -.118      .904
 15.01  25.00     2.487    -1.315    31.928      .691      .379     -.080    -1.623     -.586    -2.309
 13.98  25.00    -9.824    -6.627      .864    -6.833    -5.385     -.763    -3.474    -2.165     -.759
 13.01  25.00    -9.883    -6.685      .076    -7.019    -5.834     -.482    -3.190    -2.581     -.353
 12.01  25.00    -2.223    -1.530      .490    -1.960    -1.983      .411    -1.132     -.712     -.124
 11.01  25.00    -1.289     -.198      .092      .173    -1.306     -.063     -.305     -.253     -.136
 10.01  25.00    -1.489      .676      .039      .782     -.870      .018      .124     -.161     -.122
  9.00  25.00      .164      .202     -.042     -.200      .015     -.010      .071      .005      .068
  8.00  25.00     -.680      .130     -.054     -.103     -.120      .007      .107     -.147     -.130
  7.00  25.00    18.837     4.564     5.151     9.741     8.655      .528      .244     3.068     1.397

C  FILENAME= H910A050.A_2
C
C  H2 FLAME; d=9.45, delta=1.2 mm; theta=0 deg.; Uj=100, Ua=20, Ue=4 m/s; x=50 mm
C  LDV SEED PARTICLES ADDED TO ANNULUS FLUID ONLY.
C  D090894
C  11  : No. of data points
C  y      x       u'^3      v'^3      w'^3     u'^2v'    v'^2u'    v'^2w'    w'^2v'    w'^2u'    u'^2w'
 22.00  50.01     5.214    16.415    35.236     5.314     4.822      .012     2.974      .421     -.163
 20.00  50.01    11.089    18.201     6.274     8.093     9.962      .834     4.356     1.350      .883
 18.00  50.01      .775     8.450     4.978      .810     2.015     -.953      .548     1.812    -1.094
 15.99  50.01   -16.610    -5.901     3.604   -11.235    -9.904      .792    -6.485    -3.684      .985
 15.01  50.01   -15.110    -7.847     5.811   -12.135   -12.109      .907    -5.975    -4.652     -.481
 14.00  50.01   -16.038    -8.647      .860   -11.668   -11.942      .534    -5.544    -4.321      .495
```

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 13.01 | 50.01 | -9.561 | -5.671 | .943 | -7.829 | -7.921 | 1.047 | -3.185 | -2.424 | .138 |
| 12.00 | 50.01 | -4.737 | -4.902 | .518 | -3.980 | -5.251 | -.039 | -1.958 | -1.273 | .169 |
| 11.01 | 50.01 | -3.691 | -2.105 | .365 | -2.395 | -2.354 | -.169 | -.919 | -.377 | -.334 |
| 10.01 | 50.01 | -5.175 | -1.806 | .159 | -1.655 | -2.106 | -.051 | -.489 | -.536 | -.208 |
| 9.00 | 50.01 | -6.929 | .413 | 2.297 | 1.273 | -.870 | .014 | .094 | -1.063 | .898 |

C FILENAME= H910A075.A_2
C
C H2 FLAME; d=9.45, delta=1.2 mm; theta=0 deg.; Uj=100, Ua=20, Ue=4 m/s; x=75 mm
C LDV SEED PARTICLES ADDED TO ANNULUS FLUID ONLY.
C D090894
C 17 : No. of data points

| C y | x | u'^3 | v'^3 | w'^3 | u'^2v' | v'^2u' | v'^2w' | w'^2v' | w'^2u' | u'^2w' |
|---|---|---|---|---|---|---|---|---|---|---|
| 26.00 | 75.00 | 14.451 | 19.985 | .042 | 12.070 | 7.392 | 3.751 | 5.547 | 2.493 | .082 |
| 24.00 | 75.00 | 9.198 | 21.233 | 1.646 | 7.749 | 4.803 | 1.578 | 3.141 | 2.304 | -.290 |
| 22.00 | 75.00 | 5.050 | 15.911 | 2.364 | 6.226 | 1.913 | -.341 | .643 | .712 | .102 |
| 21.00 | 75.00 | .364 | 6.333 | 1.306 | 1.187 | -3.936 | -.885 | -.723 | 1.274 | -.754 |
| 20.00 | 75.00 | 1.121 | 11.579 | 3.565 | 1.381 | -2.665 | .887 | .032 | .265 | -.915 |
| 18.00 | 75.00 | -12.087 | -4.766 | 1.042 | -7.247 | -11.518 | -.564 | -5.115 | -2.610 | 1.411 |
| 16.00 | 75.00 | -13.229 | -3.612 | 2.522 | -8.666 | -10.366 | .882 | -4.938 | -2.338 | .793 |
| 13.99 | 75.00 | -11.436 | -3.672 | 1.811 | -6.670 | -6.336 | -.052 | -3.109 | -1.970 | .488 |
| 12.00 | 75.00 | -16.344 | -3.485 | .912 | -4.481 | -3.617 | -.432 | -1.464 | -1.721 | -.564 |
| 11.01 | 75.00 | -.623 | 7.353 | .292 | 14.590 | 1.655 | -.405 | 5.950 | -1.575 | -.077 |
| 10.01 | 75.00 | 64.995 | 11.894 | -.073 | 21.796 | 12.023 | 1.036 | 7.913 | 8.418 | -.392 |
| 8.99 | 75.00 | 365.086 | 57.559 | 34.343 | 124.875 | 89.449 | 11.661 | 28.527 | 65.343 | 4.770 |
| 7.99 | 75.00 | 824.162 | 213.161 | 29.915 | 335.669 | 262.621 | 26.813 | 119.019 | 183.825 | 15.997 |
| 5.99 | 75.00 | 947.620 | 304.129 | -64.660 | 365.143 | 314.226 | 21.521 | 184.222 | 156.662 | 24.459 |
| 5.01 | 75.00 | 875.199 | 317.222 | -119.410 | 315.672 | 223.678 | 4.335 | 145.247 | -18.400 | -35.543 |
| 3.99 | 75.00 | 806.435 | 332.287 | -94.775 | 262.985 | 255.678 | -36.053 | 85.109 | -22.027 | -9.691 |
| 3.01 | 75.00 | 544.053 | 310.744 | -240.650 | 112.648 | 83.569 | 59.941 | 91.491 | -161.282 | -33.843 |

C FILENAME= H910A150.A_2
C
C H2 FLAME; d=9.45, delta=1.2 mm; theta=0 deg.; Uj=100, Ua=20, Ue=4 m/s; x=150 mm
C LDV SEED PARTICLES ADDED TO ANNULUS FLUID ONLY.
C D090894
C 14 : No. of data points

| C y | x | u'^3 | v'^3 | w'^3 | u'^2v' | v'^2u' | v'^2w' | w'^2v' | w'^2u' | u'^2w' |
|---|---|---|---|---|---|---|---|---|---|---|
| 26.00 | 150.00 | 1.081 | 4.230 | .936 | 1.434 | .795 | -.135 | .437 | .000 | -.180 |
| 24.00 | 150.00 | .291 | 2.572 | .854 | .769 | -.047 | .197 | .958 | -.182 | -.140 |
| 22.00 | 150.00 | .671 | 2.440 | .725 | .119 | .597 | -.338 | .293 | -.264 | .230 |
| 20.00 | 150.00 | 3.837 | 2.769 | .583 | 1.531 | 1.948 | -.387 | 1.183 | 1.062 | -.386 |
| 18.00 | 150.00 | 12.235 | 2.538 | 1.807 | 3.576 | 2.259 | .254 | 3.077 | 3.390 | -.106 |
| 16.00 | 150.00 | 29.935 | 4.926 | -.430 | 8.757 | 5.398 | .196 | 3.851 | 8.196 | -.619 |
| 13.99 | 150.00 | 136.151 | 10.020 | 5.877 | 26.343 | 20.878 | 2.925 | 9.147 | 35.038 | 1.149 |
| 12.00 | 150.00 | 641.860 | 75.019 | 20.726 | 186.612 | 133.900 | 12.230 | 41.069 | 130.059 | 14.519 |
| 10.01 | 150.00 | 463.331 | 117.523 | -16.708 | 186.317 | 170.730 | 6.736 | 82.872 | 145.401 | -39.628 |
| 8.00 | 150.00 | 112.704 | 115.886 | -26.546 | 78.417 | 112.892 | 8.740 | 70.762 | 87.079 | -22.541 |
| 6.00 | 150.00 | -98.463 | 67.399 | -69.327 | -6.619 | 46.711 | 32.500 | 35.301 | -16.051 | 8.832 |
| 3.99 | 150.00 | -232.690 | 55.858 | -47.857 | -70.630 | -67.032 | 23.761 | -.886 | -65.234 | 12.723 |
| 2.00 | 150.00 | -274.785 | 34.266 | -58.709 | -97.961 | -135.850 | -.890 | -5.114 | -94.865 | 47.819 |
| .00 | 150.00 | -312.290 | 34.718 | -24.355 | 5.838 | -131.566 | 10.724 | -10.352 | -58.159 | 87.618 |

C FILENAME= H910A225.A_2
C
C H2 FLAME; d=9.45, delta=1.2 mm; theta=0 deg.; Uj=100, Ua=20, Ue=4 m/s; x=225 mm
C LDV SEED PARTICLES ADDED TO ANNULUS FLUID ONLY.
C D090894
C 14 : No. of data points

| C y | x | u'^3 | v'^3 | w'^3 | u'^2v' | v'^2u' | v'^2w' | w'^2v' | w'^2u' | u'^2w' |
|---|---|---|---|---|---|---|---|---|---|---|
| 26.00 | 224.99 | 10.404 | 2.712 | 1.544 | 2.542 | 2.251 | -.249 | 1.878 | 2.861 | -1.892 |
| 23.99 | 224.99 | 11.900 | 2.153 | 4.267 | 3.260 | 2.773 | -.376 | 2.104 | 1.904 | -.962 |
| 21.99 | 224.99 | 10.578 | 1.820 | 3.059 | 2.573 | 1.847 | -.078 | 1.366 | 2.042 | -.481 |
| 20.00 | 224.99 | 32.165 | 2.004 | 3.229 | 6.552 | 5.232 | -.185 | 2.839 | 7.571 | -.011 |
| 18.00 | 224.99 | 125.142 | 6.206 | 4.020 | 22.748 | 15.613 | -.332 | 9.955 | 26.862 | 3.579 |
| 15.99 | 224.99 | 443.888 | 39.644 | 8.411 | 113.133 | 69.927 | 3.981 | 23.470 | 70.004 | 16.748 |
| 13.99 | 224.99 | 308.127 | 72.701 | 8.657 | 95.962 | 94.187 | -1.532 | 37.167 | 86.052 | -8.029 |
| 11.99 | 224.99 | 48.722 | 58.825 | 5.066 | 11.894 | 49.567 | 5.108 | 30.872 | 43.050 | -7.941 |
| 9.99 | 224.99 | 32.189 | 42.570 | -15.959 | 11.495 | 38.183 | -1.880 | 24.624 | 19.109 | -25.938 |
| 7.99 | 224.99 | -105.125 | 26.743 | -6.793 | -37.053 | 11.684 | 9.622 | 23.747 | -8.546 | 15.040 |
| 5.99 | 224.99 | -24.205 | 12.309 | 14.128 | -27.152 | -12.824 | 1.056 | 3.591 | -27.057 | 29.185 |

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  3.98 224.99  -119.602    -1.126   -18.155   -24.606   -34.397    -4.028   11.649  -21.843   22.491
  2.00 224.99  -179.148     8.407    -5.832   -39.740   -42.751     3.486   -1.081  -41.546   18.667
   .00 224.99  -145.987    -6.803   -17.867    -7.455   -46.711     1.674  -10.709  -36.749   29.430

C  FILENAME= H910A001.E_2
C
C  H2 FLAME; d=9.45, delta=1.2 mm; theta=0 deg.; Uj=100, Ua=20, Ue=4 m/s; x=1.5 mm
C  LDV SEED PARTICLES ADDED TO EXTERNAL FLUID ONLY.
C  D090894
C   8  : No. of data points
C  y      x       u'^3      v'^3      w'^3      u'^2v'    v'^2u'    v'^2w'    w'^2v'    w'^2u'    u'^2w'
 26.00   1.50      .005      .002      .003      .001      .001      .002      .001      .002      .001
 24.00   1.50      .003      .002      .002      .001      .000      .002      .001      .000      .001
 22.00   1.50      .003      .000      .003      .000      .001      .001      .000     -.001      .001
 20.00   1.50      .000      .000      .005      .003     -.001      .001      .002      .000      .003
 18.00   1.50     -.017      .001      .005      .007     -.003      .002      .002     -.002      .003
 16.00   1.50     -.054     -.001      .009      .008     -.006     -.001      .001      .002      .001
 15.00   1.50     -.100      .048     -.017      .036     -.057      .007      .018     -.036      .003
 14.00   1.50    14.580     9.204      .525     9.330     8.692      .705     1.502     2.628      .193

C  FILENAME= H910A010.E_2
C
C  H2 FLAME; d=9.45, delta=1.2 mm; theta=0 deg.; Uj=100, Ua=20, Ue=4 m/s; x=10 mm
C  LDV SEED PARTICLES ADDED TO EXTERNAL FLUID ONLY.
C  D090894
C   9  : No. of data points
C  y      x       u'^3      v'^3      w'^3      u'^2v'    v'^2u'    v'^2w'    w'^2v'    w'^2u'    u'^2w'
 26.00   9.99      .005      .002      .000      .001      .001      .000      .000      .001      .001
 24.00  10.01      .005      .001      .003      .001      .001      .001      .001      .004      .001
 22.00  10.00      .004      .001      .005      .001      .000      .002      .002      .002      .002
 20.00  10.01      .002      .002      .005      .001     -.001      .001      .000     -.001      .002
 18.00  10.01     -.014      .005      .006      .004     -.005      .001      .001     -.003     -.002
 15.99  10.01     -.040      .177      .051      .143      .166      .088      .145     -.017      .056
 15.00  10.01    13.741     8.513      .352     8.069     7.588      .594     2.744     3.558      .505
 14.00  10.01     7.910     6.912     -.830     4.974     5.625     1.418     2.577     3.797     1.658
 13.02   9.99    -3.732    -1.014    -2.164    -1.853     -.848      .376     -.661    -1.900     1.238

C  FILENAME= H910A025.E_2
C
C  H2 FLAME; d=9.45, delta=1.2 mm; theta=0 deg.; Uj=100, Ua=20, Ue=4 m/s; x=25 mm
C  LDV SEED PARTICLES ADDED TO EXTERNAL FLUID ONLY.
C  D090894
C   8  : No. of data points
C  y      x       u'^3      v'^3      w'^3      u'^2v'    v'^2u'    v'^2w'    w'^2v'    w'^2u'    u'^2w'
 26.00  25.00      .005      .001      .005      .001      .001      .001      .001      .001      .001
 24.00  25.00      .004      .002      .001      .000      .000      .000     -.001      .000      .000
 22.00  25.00      .001      .006      .002      .003     -.001      .000      .002     -.001      .001
 20.00  25.00     -.026      .017      .005      .004     -.012      .002      .007     -.001      .000
 18.00  25.00      .206      .372     -.147      .196      .192     -.010      .126      .036     -.042
 16.00  25.00    16.468     7.959     -.137     7.940     6.863      .693     2.031     3.462      .291
 13.99  25.00    -1.714     -.375     -.754     -.832     -.776     -.419      .661    -1.264     -.467
 12.00  25.00   -10.744    -3.179     -.400    -5.182    -3.815     -.421    -2.173    -3.010      .514

C  FILENAME= H910A050.E_2
C
C  H2 FLAME; d=9.45, delta=1.2 mm; theta=0 deg.; Uj=100, Ua=20, Ue=4 m/s; x=50 mm
C  LDV SEED PARTICLES ADDED TO EXTERNAL FLUID ONLY.
C  D090894
C   8  : No. of data points
C  y      x       u'^3      v'^3      w'^3      u'^2v'    v'^2u'    v'^2w'    w'^2v'    w'^2u'    u'^2w'
 26.00  50.01     -.038      .035      .004      .006     -.019     -.003      .003     -.001      .001
 24.00  50.01     -.055      .172     -.010      .034     -.032     -.016      .022     -.019     -.006
 22.00  50.01      .072      .599      .003      .122      .207      .001      .185      .004     -.015
 20.00  50.01     8.746     5.805     -.526     4.071     4.751     -.303     1.840     2.168     -.700
 18.00  50.01    17.568    16.351     -.048    10.518    11.843      .554     3.860     4.303     -.198
 16.00  50.01     4.037    12.139    -1.447     3.544     7.002     -.628    -1.246      .779     -.129
 13.99  50.01    -8.605     2.515      .187    -5.100    -1.718     -.929    -2.811    -3.228     -.273
 12.00  50.01   -12.562    -1.492      .264    -5.902    -3.816     -.499    -1.700    -1.680      .547

C  FILENAME= H910A075.E_2
C
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C H2 FLAME; d=9.45, delta=1.2 mm; theta=0 deg.; Uj=100, Ua=20, Ue=4 m/s; x=75 mm
C LDV SEED PARTICLES ADDED TO EXTERNAL FLUID ONLY.
C D090894
C 9 : No. of data points

| C y | x | u'^3 | v'^3 | w'^3 | u'^2v' | v'^2u' | v'^2w' | w'^2v' | w'^2u' | u'^2w' |
|---|---|---|---|---|---|---|---|---|---|---|
| 26.00 | 75.00 | .766 | 1.588 | .006 | .486 | .869 | -.001 | .346 | .133 | -.018 |
| 24.00 | 75.00 | 8.891 | 9.001 | -.606 | 4.665 | 6.125 | -.343 | 2.576 | 2.570 | -.646 |
| 22.00 | 75.00 | 15.231 | 17.363 | -1.395 | 10.832 | 12.361 | -.073 | 4.178 | 4.453 | -.547 |
| 20.00 | 75.00 | 12.969 | 22.315 | .346 | 9.432 | 13.428 | .089 | 2.714 | 4.363 | -.201 |
| 18.00 | 75.00 | 4.128 | 13.266 | .366 | 2.681 | 5.284 | -1.236 | .571 | 1.727 | -1.210 |
| 15.99 | 75.00 | -6.099 | 7.288 | -.541 | -4.063 | -.391 | -1.360 | -2.816 | -1.535 | .119 |
| 13.98 | 75.00 | -9.314 | 2.488 | .334 | -3.569 | -.948 | -1.103 | -1.356 | .189 | -.637 |
| 11.99 | 75.00 | -12.138 | .520 | -.797 | -1.478 | -.639 | -.687 | .134 | .118 | -.740 |
| 10.01 | 75.00 | 4.981 | 1.422 | .175 | 3.207 | 3.138 | .708 | 2.003 | 3.620 | 2.266 |

C FILENAME= H910A150.E_2
C
C H2 FLAME; d=9.45, delta=1.2 mm; theta=0 deg.; Uj=100, Ua=20, Ue=4 m/s; x=150 mm
C LDV SEED PARTICLES ADDED TO EXTERNAL FLUID ONLY.
C D090894
C 9 : No. of data points

| C y | x | u'^3 | v'^3 | w'^3 | u'^2v' | v'^2u' | v'^2w' | w'^2v' | w'^2u' | u'^2w' |
|---|---|---|---|---|---|---|---|---|---|---|
| 26.00 | 150.00 | -.458 | 4.253 | -.726 | 1.107 | 1.776 | -.442 | .822 | 1.650 | .253 |
| 24.00 | 150.00 | -1.108 | 3.596 | .172 | .832 | 2.012 | -.551 | .396 | 1.431 | .485 |
| 21.99 | 150.00 | 2.204 | 2.622 | -1.614 | .854 | 1.769 | -.098 | 1.019 | 1.604 | .087 |
| 20.00 | 150.00 | .129 | 3.091 | -1.586 | .640 | 1.490 | -.049 | .777 | 1.228 | .127 |
| 18.00 | 150.00 | 7.790 | 2.480 | .281 | 2.444 | 2.951 | -.473 | 1.252 | 2.047 | -1.329 |
| 15.99 | 150.00 | 14.632 | 2.150 | .908 | 2.542 | 3.647 | .672 | 1.893 | 4.241 | -.667 |
| 13.99 | 150.00 | 54.371 | 3.342 | 4.012 | 6.618 | 7.155 | 1.226 | 2.839 | 7.973 | -1.497 |
| 11.99 | 150.00 | 433.947 | 10.692 | 12.204 | 58.756 | 45.915 | 3.403 | 19.211 | 80.675 | -3.562 |
| 10.00 | 150.00 | 1520.931 | 98.716 | -28.174 | 370.951 | 242.491 | .252 | 87.363 | 313.234 | -94.495 |

C FILENAME= H910A225.E_2
C
C H2 FLAME; d=9.45, delta=1.2 mm; theta=0 deg.; Uj=100, Ua=20, Ue=4 m/s; x=225 mm
C LDV SEED PARTICLES ADDED TO EXTERNAL FLUID ONLY.
C D090894
C 8 : No. of data points

| C y | x | u'^3 | v'^3 | w'^3 | u'^2v' | v'^2u' | v'^2w' | w'^2v' | w'^2u' | u'^2w' |
|---|---|---|---|---|---|---|---|---|---|---|
| 24.00 | 224.99 | 8.529 | 1.837 | -.212 | 2.502 | 1.966 | .350 | 1.775 | 2.828 | .326 |
| 22.00 | 224.99 | 13.352 | 2.091 | -.238 | 2.181 | 2.831 | .383 | 1.891 | 3.417 | -1.306 |
| 20.00 | 224.99 | 19.218 | 2.573 | .740 | 1.051 | 3.681 | .949 | 2.874 | 6.201 | -.751 |
| 18.00 | 224.99 | 47.113 | 2.082 | -.925 | 3.636 | 8.712 | 1.129 | 1.895 | 10.460 | -1.952 |
| 16.00 | 224.99 | 226.099 | 7.689 | -9.319 | 28.078 | 26.281 | 1.021 | 6.478 | 37.702 | -9.970 |
| 13.98 | 224.99 | 610.585 | 58.387 | -13.838 | 171.353 | 128.819 | 2.835 | 37.748 | 131.841 | -16.770 |
| 11.99 | 224.99 | 886.338 | 92.028 | -23.204 | 249.748 | 180.213 | -3.171 | 37.467 | 145.100 | -72.778 |
| 10.00 | 224.99 | 395.767 | 113.335 | -27.368 | 155.002 | 150.415 | .681 | 47.844 | 134.532 | -62.446 |

C FILENEME= H910AAX.J_2
C
C H2 FLAME; d=9.45, delta=1.2 mm; theta=0 deg.; Uj=100, Ua=20, Ue=4 m/s; y=0 mm
C LDV SEED PARTICLES ADDED TO JET FLUID ONLY.
C D090894
C 22 : No. of data points

| C y | x | u'^3 | v'^3 | w'^3 | u'^2v' | v'^2u' | v'^2w' | w'^2v' | w'^2u' | u'^2w' |
|---|---|---|---|---|---|---|---|---|---|---|
| .00 | 1.50 | -87.970 | -5.887 | -3.569 | -7.544 | -55.685 | -1.071 | .065 | -4.527 | .112 |
| .00 | 9.99 | -89.744 | 1.101 | 5.366 | -2.582 | -61.014 | 4.336 | -3.549 | -12.483 | -.591 |
| .00 | 20.00 | -91.203 | -5.843 | 13.955 | -2.911 | -69.367 | 3.147 | 2.806 | -15.479 | 8.344 |
| .00 | 30.00 | -160.425 | -9.364 | 2.053 | 14.437 | -120.660 | 8.024 | -4.632 | -20.315 | 15.304 |
| .00 | 40.01 | -450.552 | -24.895 | 23.117 | -17.819 | -268.002 | 2.159 | -5.184 | -35.735 | 31.361 |
| .00 | 50.01 | -1029.567 | -48.922 | 82.893 | 10.017 | -591.720 | 29.863 | 22.887 | -123.032 | 47.646 |
| .00 | 60.01 | -1502.238 | 75.065 | 50.352 | 23.718 | -737.912 | 90.181 | -11.550 | -236.167 | 243.795 |
| .00 | 70.00 | -1081.373 | 66.723 | -46.689 | 51.971 | -650.900 | 38.663 | -11.523 | -137.459 | 136.247 |
| .00 | 80.00 | -721.883 | -64.057 | 5.633 | 85.661 | -377.494 | 9.926 | -24.513 | -136.079 | 135.917 |
| .00 | 90.00 | -354.860 | 24.212 | -28.932 | 4.310 | -283.321 | 6.094 | -14.421 | -142.766 | 126.007 |
| .00 | 100.00 | -156.685 | -29.255 | 38.505 | -37.933 | -183.546 | 9.104 | -9.518 | -149.521 | 6.850 |
| .00 | 110.00 | -80.893 | 10.745 | -41.396 | -11.854 | -171.965 | 6.568 | -40.658 | -100.645 | 45.520 |
| .00 | 120.00 | -113.858 | 8.896 | -1.134 | -24.621 | -97.892 | 7.825 | -25.003 | -82.638 | 16.397 |
| .00 | 130.00 | -68.767 | 15.706 | -9.503 | -17.950 | -91.901 | 29.162 | -32.711 | -84.635 | 16.813 |
| .00 | 140.01 | -26.552 | -7.046 | 27.341 | -27.531 | -49.845 | -3.789 | 9.714 | -81.442 | 32.559 |
| .00 | 150.00 | -54.684 | .654 | -6.674 | -21.696 | -40.904 | -9.455 | -6.697 | -68.489 | 8.071 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| .00 | 160.01 | -35.158 | 8.735 | 10.201 | -8.571 | -18.388 | -9.474 | -13.093 | -55.635 | 30.547 |
| .00 | 170.00 | -46.869 | -8.660 | -1.157 | 2.255 | -5.947 | 5.243 | 2.629 | -32.249 | 7.874 |
| .00 | 180.00 | -11.563 | 6.847 | 5.065 | -16.861 | -28.017 | -9.884 | -4.793 | -43.937 | 19.545 |
| .00 | 190.01 | -33.267 | 7.424 | -14.184 | 13.673 | -20.364 | 1.566 | 4.696 | -44.147 | 21.872 |
| .00 | 200.00 | -12.499 | -.346 | 4.332 | 3.657 | -9.893 | -8.210 | 4.344 | -37.920 | 12.712 |
| .00 | 225.01 | -25.958 | -5.128 | 25.229 | -1.711 | .133 | -3.685 | -9.656 | -25.486 | 14.612 |

C FILENAME= H904A001.J_1
C
C H2 FLAME; d=9.45, delta=0.2 mm; theta=45 deg.; Uj=100, Ua=20, Ue=4 m/s; x=1.5 mm
C LDV SEED PARTICLES ADDED TO JET FLUID ONLY.
C D090894
C 12 : No. of data points

| C y | x | U | V | W | SIG(u') | SIG(v') | SIG(w') | u'v' | v'w' | w'u' |
|---|---|---|---|---|---|---|---|---|---|---|
| 4.70 | 1.50 | 40.383 | 4.218 | 2.012 | 11.492 | 5.335 | 7.141 | 19.370 | -.559 | -1.173 |
| 4.51 | 1.50 | 53.430 | 2.067 | 1.990 | 16.069 | 8.412 | 6.758 | 37.920 | -.543 | -6.864 |
| 4.30 | 1.50 | 72.362 | 2.113 | 1.109 | 18.736 | 10.552 | 6.806 | 44.752 | -1.080 | -7.813 |
| 4.00 | 1.50 | 91.288 | 1.494 | .537 | 16.024 | 8.913 | 6.972 | 46.124 | -1.664 | -4.921 |
| 3.49 | 1.50 | 103.895 | .678 | .374 | 11.732 | 7.627 | 7.162 | 39.229 | -.819 | -3.870 |
| 3.01 | 1.50 | 110.943 | .695 | .696 | 10.207 | 6.897 | 7.133 | 31.270 | .134 | -3.573 |
| 2.49 | 1.50 | 116.721 | .426 | .445 | 9.052 | 6.596 | 6.500 | 25.089 | .541 | -4.699 |
| 2.00 | 1.50 | 120.962 | .232 | .247 | 8.395 | 5.944 | 6.103 | 19.743 | 1.393 | -1.646 |
| 1.50 | 1.50 | 124.389 | .432 | .137 | 7.477 | 5.733 | 5.625 | 14.381 | .146 | -1.937 |
| .99 | 1.50 | 127.509 | .164 | .097 | 6.910 | 5.362 | 5.194 | 11.236 | -.143 | -1.624 |
| .51 | 1.50 | 129.352 | .032 | .012 | 6.353 | 4.978 | 4.863 | 6.173 | .717 | -2.212 |
| .01 | 1.50 | 130.160 | .001 | -.001 | 6.243 | 4.936 | 4.570 | 1.985 | .418 | -1.805 |

C FILENAME= H904A010.J_1
C
C H2 FLAME; d=9.45, delta=0.2 mm; theta=45 deg.; Uj=100, Ua=20, Ue=4 m/s; x=10 mm
C LDV SEED PARTICLES ADDED TO JET FLUID ONLY.
C D090894
C 10 : No. of data points

| C y | x | U | V | W | SIG(u') | SIG(v') | SIG(w') | u'v' | v'w' | w'u' |
|---|---|---|---|---|---|---|---|---|---|---|
| 5.50 | 10.01 | 51.940 | 11.972 | 5.242 | 15.243 | 12.375 | 16.260 | 119.284 | -3.818 | -6.450 |
| 4.99 | 10.01 | 60.036 | 12.064 | 4.903 | 16.862 | 12.665 | 16.359 | 126.302 | -1.777 | -8.456 |
| 4.51 | 10.01 | 68.664 | 9.709 | 4.033 | 18.411 | 13.372 | 15.965 | 123.777 | -2.310 | -21.042 |
| 3.99 | 10.01 | 82.532 | 6.545 | 3.314 | 19.378 | 13.254 | 14.994 | 105.242 | 5.736 | -22.463 |
| 3.42 | 10.01 | 96.032 | 1.742 | 2.301 | 17.259 | 12.292 | 12.861 | 76.342 | -3.266 | -20.280 |
| 2.71 | 10.01 | 107.880 | -.619 | 1.274 | 14.328 | 10.257 | 10.134 | 59.417 | -2.495 | -8.435 |
| 2.01 | 9.99 | 116.029 | -.811 | .758 | 10.804 | 8.013 | 7.461 | 28.489 | -1.107 | -4.697 |
| 1.29 | 9.99 | 121.748 | -.609 | .380 | 8.723 | 6.520 | 6.111 | 16.943 | -.050 | -2.943 |
| .61 | 9.99 | 125.466 | -.901 | .206 | 7.664 | 5.625 | 5.228 | 8.962 | .138 | -2.709 |
| .00 | 9.99 | 127.080 | -1.035 | .325 | 6.929 | 5.354 | 4.952 | 3.798 | -.528 | -2.026 |

C FILENAME= H904A025.J_1
C
C H2 FLAME; d=9.45, delta=0.2 mm; theta=45 deg.; Uj=100, Ua=20, Ue=4 m/s; x=25 mm
C LDV SEED PARTICLES ADDED TO JET FLUID ONLY.
C D090894
C 13 : No. of data points

| C y | x | U | V | W | SIG(u') | SIG(v') | SIG(w') | u'v' | v'w' | w'u' |
|---|---|---|---|---|---|---|---|---|---|---|
| 7.99 | 25.00 | 43.437 | 4.394 | 6.989 | 12.674 | 11.048 | 12.435 | 16.416 | .126 | -2.087 |
| 7.00 | 25.00 | 46.055 | 7.038 | 6.532 | 12.729 | 11.098 | 14.022 | 53.677 | -.861 | -2.186 |
| 6.01 | 25.00 | 50.729 | 8.306 | 6.178 | 14.435 | 11.632 | 15.556 | 90.290 | -8.833 | -14.738 |
| 5.49 | 25.00 | 54.794 | 8.912 | 5.362 | 15.802 | 11.887 | 16.413 | 104.354 | 1.050 | -9.924 |
| 5.00 | 25.00 | 57.864 | 8.586 | 5.203 | 16.523 | 12.662 | 16.803 | 113.009 | 2.419 | -5.296 |
| 4.50 | 25.00 | 62.663 | 8.003 | 4.757 | 17.202 | 12.749 | 17.162 | 114.261 | -.207 | -9.127 |
| 4.01 | 25.00 | 67.947 | 7.432 | 4.325 | 18.020 | 13.320 | 16.639 | 113.540 | -7.323 | -19.253 |
| 3.41 | 25.00 | 77.940 | 6.410 | 3.788 | 19.408 | 13.562 | 16.134 | 102.907 | -2.649 | -21.557 |
| 2.70 | 25.00 | 89.439 | 4.492 | 3.062 | 19.451 | 13.196 | 15.276 | 92.649 | 3.944 | -24.651 |
| 2.01 | 25.00 | 100.476 | 2.076 | 2.123 | 18.260 | 12.089 | 13.661 | 77.892 | 3.489 | -26.090 |
| 1.29 | 25.00 | 109.338 | .221 | 1.109 | 15.989 | 11.399 | 11.336 | 59.757 | 1.557 | -11.454 |
| .60 | 25.00 | 116.105 | -.523 | .897 | 12.941 | 10.176 | 9.634 | 42.626 | 2.184 | -10.756 |
| .00 | 25.00 | 119.865 | -1.172 | .467 | 11.173 | 8.947 | 8.543 | 18.756 | 2.927 | -11.596 |

C FILENAME= H904A050.J_1
C
C H2 FLAME; d=9.45, delta=0.2 mm; theta=45 deg.; Uj=100, Ua=20, Ue=4 m/s; x=50 mm
C LDV SEED PARTICLES ADDED TO JET FLUID ONLY.

C D090894
C 11 : No. of data points

| C y | x | U | V | W | SIG(u') | SIG(v') | SIG(w') | u'v' | v'w' | w'u' |
|---|---|---|---|---|---|---|---|---|---|---|
| 8.81 | 49.99 | 40.846 | 4.630 | 5.918 | 12.419 | 10.005 | 11.640 | 12.621 | 1.727 | -3.374 |
| 8.20 | 49.99 | 42.216 | 4.432 | 5.236 | 12.440 | 10.879 | 12.217 | 14.501 | 2.674 | -4.591 |
| 7.01 | 49.99 | 45.940 | 6.814 | 4.914 | 12.943 | 9.767 | 13.069 | 61.247 | -1.226 | -2.091 |
| 5.99 | 49.99 | 49.358 | 6.320 | 3.173 | 13.872 | 10.668 | 13.909 | 65.856 | .392 | -1.821 |
| 5.00 | 49.99 | 54.590 | 6.836 | 3.287 | 14.459 | 11.236 | 15.013 | 85.015 | 5.206 | 4.824 |
| 3.99 | 49.99 | 61.018 | 6.875 | 2.396 | 16.574 | 12.229 | 15.192 | 90.822 | 1.749 | -1.807 |
| 2.73 | 49.99 | 69.151 | 5.840 | 1.606 | 17.784 | 12.849 | 15.459 | 87.294 | 1.816 | -5.681 |
| 2.01 | 49.99 | 73.364 | 4.661 | 1.026 | 18.667 | 13.634 | 15.450 | 88.929 | 5.917 | -9.422 |
| 1.29 | 49.99 | 80.808 | 3.731 | .884 | 19.050 | 13.570 | 14.996 | 75.479 | 2.706 | -16.564 |
| .60 | 49.99 | 83.540 | 2.351 | .430 | 18.934 | 14.036 | 14.325 | 53.765 | 6.846 | -19.777 |
| .00 | 49.99 | 86.729 | 1.424 | .301 | 19.127 | 13.992 | 14.236 | 46.533 | 2.496 | -24.027 |

C FILENAME= H904A075.J_1
C
C H2 FLAME; d=9.45, delta=0.2 mm; theta=45 deg.; Uj=100, Ua=20, Ue=4 m/s; x=75 mm
C LDV SEED PARTICLES ADDED TO JET FLUID ONLY.
C D090894
C 11 : No. of data points

| C y | x | U | V | W | SIG(u') | SIG(v') | SIG(w') | u'v' | v'w' | w'u' |
|---|---|---|---|---|---|---|---|---|---|---|
| 9.50 | 75.00 | 36.965 | 4.423 | 4.961 | 10.112 | 7.464 | 9.049 | 23.819 | -.412 | -.363 |
| 8.20 | 75.00 | 40.955 | 4.893 | 3.955 | 10.371 | 7.553 | 9.990 | 34.462 | -.774 | .178 |
| 7.00 | 75.00 | 42.799 | 3.861 | 2.875 | 10.275 | 8.053 | 10.435 | 26.292 | -2.208 | -.875 |
| 6.01 | 75.00 | 46.762 | 4.759 | 2.454 | 11.278 | 8.431 | 10.751 | 39.688 | 1.883 | 3.204 |
| 4.99 | 75.00 | 49.659 | 4.881 | 1.624 | 11.439 | 8.648 | 11.179 | 40.661 | -.894 | 2.392 |
| 4.01 | 75.00 | 52.499 | 4.602 | 1.204 | 12.183 | 9.150 | 11.603 | 44.169 | -2.928 | 2.732 |
| 2.72 | 75.00 | 54.486 | 3.303 | .459 | 12.405 | 9.399 | 11.737 | 40.341 | -1.227 | -.840 |
| 2.01 | 75.00 | 57.766 | 3.418 | .582 | 12.483 | 9.676 | 11.865 | 34.556 | 2.092 | -2.221 |
| 1.29 | 75.00 | 59.273 | 2.550 | .241 | 12.692 | 9.808 | 11.821 | 27.399 | .093 | -.316 |
| .61 | 75.00 | 61.049 | 2.161 | .233 | 13.169 | 10.073 | 11.433 | 23.326 | -1.222 | -5.202 |
| .00 | 75.00 | 62.194 | 1.626 | -.112 | 12.640 | 10.316 | 11.666 | 18.046 | 3.303 | -1.802 |

C FILENAME= H904A150.J_1
C
C H2 FLAME; d=9.45, delta=0.2 mm; theta=45 deg.; Uj=100, Ua=20, Ue=4 m/s; x=150 mm
C LDV SEED PARTICLES ADDED TO JET FLUID ONLY.
C D090894
C 9 : No. of data points

| C y | x | U | V | W | SIG(u') | SIG(v') | SIG(w') | u'v' | v'w' | w'u' |
|---|---|---|---|---|---|---|---|---|---|---|
| 13.99 | 150.00 | 29.324 | 3.167 | 3.126 | 5.863 | 4.028 | 5.296 | 9.852 | .043 | -.628 |
| 12.00 | 150.00 | 30.726 | 3.039 | 2.525 | 5.914 | 4.066 | 5.115 | 9.253 | .898 | .083 |
| 10.01 | 150.00 | 31.997 | 2.817 | 1.723 | 5.998 | 4.165 | 5.323 | 8.313 | -.178 | .703 |
| 7.99 | 150.00 | 33.687 | 2.473 | 1.264 | 5.847 | 4.338 | 5.342 | 7.287 | .006 | .979 |
| 5.99 | 150.00 | 34.913 | 2.160 | .800 | 5.902 | 4.252 | 5.191 | 5.046 | .619 | 2.336 |
| 3.98 | 150.00 | 37.109 | 2.124 | .467 | 5.968 | 4.408 | 5.431 | 4.635 | .270 | 2.718 |
| 2.01 | 150.00 | 37.181 | 1.363 | .182 | 5.939 | 4.510 | 5.257 | 2.884 | .694 | 2.206 |
| 1.00 | 150.00 | 37.597 | 1.138 | -.077 | 6.016 | 4.510 | 5.215 | 2.852 | .174 | 2.062 |
| .01 | 150.00 | 37.905 | .799 | -.076 | 5.992 | 4.543 | 5.389 | .912 | .527 | 1.548 |

C FILENAME= H904A225.J_1
C
C H2 FLAME; d=9.45, delta=0.2 mm; theta=45 deg.; Uj=100, Ua=20, Ue=4 m/s; x=225 mm
C LDV SEED PARTICLES ADDED TO JET FLUID ONLY.
C D090894
C 10 : No. of data points

| C y | x | U | V | W | SIG(u') | SIG(v') | SIG(w') | u'v' | v'w' | w'u' |
|---|---|---|---|---|---|---|---|---|---|---|
| 18.00 | 224.99 | 25.810 | 2.400 | 1.964 | 4.048 | 2.853 | 3.703 | 3.770 | .436 | .428 |
| 16.00 | 224.99 | 26.839 | 2.339 | 1.970 | 4.079 | 2.876 | 4.090 | 3.933 | .144 | .443 |
| 13.99 | 224.99 | 27.683 | 2.261 | 1.381 | 4.145 | 3.037 | 3.784 | 3.647 | .318 | .543 |
| 12.00 | 224.99 | 27.963 | 1.988 | 1.140 | 3.996 | 2.979 | 3.681 | 3.158 | .421 | .440 |
| 10.01 | 224.99 | 28.748 | 1.825 | .913 | 4.081 | 3.001 | 3.746 | 2.734 | .246 | .848 |
| 7.99 | 224.99 | 29.152 | 1.626 | .548 | 4.085 | 3.119 | 3.591 | 2.175 | -.323 | 1.169 |
| 5.99 | 224.99 | 29.857 | 1.259 | .589 | 4.197 | 3.056 | 3.527 | 1.520 | -.079 | .846 |
| 3.98 | 224.99 | 29.796 | 1.141 | .351 | 4.105 | 3.085 | 3.515 | 1.394 | .098 | .946 |
| 2.00 | 224.99 | 29.800 | .888 | .052 | 3.998 | 3.070 | 3.618 | .202 | -.168 | .551 |
| .00 | 224.99 | 29.747 | .501 | .053 | 4.016 | 3.040 | 3.590 | -.095 | -.005 | 1.157 |

C FILENAME= H904A001.A_1
C

C  H2 FLAME; d=9.45, delta=0.2 mm; theta=45 deg.; Uj=100, Ua=20, Ue=4 m/s; x=1.5 mm
C  LDV SEED PARTICLES ADDED TO ANNULUS FLUID ONLY.
C  D090894
C  10  : No. of data points

| C y | x | U | V | W | SIG(u') | SIG(v') | SIG(w') | u'v' | v'w' | w'u' |
|---|---|---|---|---|---|---|---|---|---|---|
| 13.49 | 1.50 | 23.082 | 4.314 | 16.709 | 2.921 | 3.343 | 4.271 | 2.597 | 3.432 | .093 |
| 13.01 | 1.50 | 23.360 | 4.397 | 18.023 | 2.315 | 2.789 | 2.714 | .778 | 1.769 | -.314 |
| 12.51 | 1.50 | 23.590 | 4.465 | 18.403 | 2.093 | 2.641 | 2.062 | .167 | 1.068 | -.135 |
| 12.01 | 1.50 | 23.866 | 4.534 | 18.584 | 2.082 | 2.561 | 1.871 | -.177 | .721 | -.255 |
| 11.19 | 1.50 | 23.969 | 4.684 | 18.259 | 2.126 | 2.471 | 1.882 | -.203 | -.120 | -.504 |
| 10.40 | 1.50 | 24.486 | 5.006 | 17.012 | 2.257 | 2.359 | 2.193 | -.146 | -1.272 | -.606 |
| 9.60 | 1.50 | 24.450 | 5.621 | 15.212 | 2.305 | 2.161 | 2.206 | -.605 | -1.233 | .236 |
| 8.20 | 1.50 | 20.948 | 4.686 | 12.362 | 3.733 | 2.259 | 2.370 | -1.259 | .490 | 2.533 |
| 6.99 | 1.50 | 14.143 | 2.309 | 9.054 | 4.206 | 2.623 | 3.262 | -2.198 | .186 | 1.840 |
| 6.01 | 1.50 | 8.236 | -.018 | 6.459 | 3.848 | 2.353 | 3.437 | .000 | -.006 | -.986 |

C  FILENAME= H904A010.A_1
C
C  H2 FLAME; d=9.45, delta=0.2 mm; theta=45 deg.; Uj=100, Ua=20, Ue=4 m/s; x=10 mm
C  LDV SEED PARTICLES ADDED TO ANNULUS FLUID ONLY.
C  D090894
C  9  : No. of data points

| C y | x | U | V | W | SIG(u') | SIG(v') | SIG(w') | u'v' | v'w' | w'u' |
|---|---|---|---|---|---|---|---|---|---|---|
| 18.00 | 9.99 | 11.869 | 6.507 | 6.742 | 4.818 | 5.519 | 5.357 | 10.157 | 7.012 | .491 |
| 16.00 | 9.99 | 20.607 | 7.249 | 11.457 | 4.651 | 4.771 | 4.714 | 10.107 | 4.748 | 2.156 |
| 13.99 | 9.99 | 24.260 | 6.700 | 14.925 | 2.490 | 2.885 | 2.583 | .655 | .467 | .615 |
| 13.02 | 10.00 | 23.825 | 6.623 | 14.300 | 2.537 | 2.377 | 2.689 | -.810 | -.874 | 1.749 |
| 11.98 | 10.00 | 21.971 | 6.521 | 11.812 | 2.935 | 2.160 | 2.923 | -.532 | -1.038 | 2.698 |
| 11.01 | 10.00 | 20.069 | 5.922 | 9.122 | 3.318 | 2.087 | 2.554 | .266 | -.276 | 2.311 |
| 10.00 | 10.00 | 17.664 | 4.729 | 7.363 | 3.549 | 2.281 | 2.364 | 1.207 | -.015 | 1.768 |
| 9.01 | 10.00 | 14.719 | 2.832 | 5.776 | 3.750 | 2.525 | 2.511 | 2.823 | -.235 | .955 |
| 8.01 | 10.00 | 11.488 | .219 | 4.845 | 4.600 | 3.580 | 2.711 | 5.995 | -.287 | -.229 |

C  FILENAME= H904A025.A_1
C
C  H2 FLAME; d=9.45, delta=0.2 mm; theta=45 deg.; Uj=100, Ua=20, Ue=4 m/s; x=25 mm
C  LDV SEED PARTICLES ADDED TO ANNULUS FLUID ONLY.
C  D090894
C  15  : No. of data points

| C y | x | U | V | W | SIG(u') | SIG(v') | SIG(w') | u'v' | v'w' | w'u' |
|---|---|---|---|---|---|---|---|---|---|---|
| 24.00 | 25.00 | 10.174 | 5.371 | 3.635 | 4.529 | 5.512 | 4.682 | 8.266 | 4.909 | .760 |
| 23.00 | 25.00 | 12.264 | 5.648 | 4.555 | 4.925 | 5.647 | 4.758 | 12.086 | 5.151 | 1.589 |
| 22.00 | 25.00 | 14.730 | 6.184 | 5.621 | 5.284 | 5.499 | 4.805 | 12.644 | 5.110 | 3.006 |
| 21.00 | 25.00 | 17.235 | 6.310 | 6.540 | 5.049 | 5.377 | 4.856 | 12.373 | 5.775 | 2.605 |
| 20.00 | 25.00 | 18.966 | 5.782 | 7.264 | 5.136 | 5.327 | 4.647 | 12.743 | 5.875 | 3.163 |
| 19.00 | 25.00 | 21.654 | 5.871 | 8.309 | 4.575 | 4.991 | 4.172 | 10.243 | 4.368 | 2.650 |
| 18.01 | 25.00 | 22.903 | 5.398 | 8.775 | 3.951 | 4.733 | 3.864 | 7.160 | 3.590 | 2.558 |
| 16.98 | 25.00 | 23.783 | 4.820 | 9.190 | 3.478 | 4.305 | 3.338 | 3.950 | 2.338 | 1.897 |
| 16.01 | 25.00 | 23.529 | 4.032 | 9.194 | 3.232 | 3.786 | 2.999 | 1.097 | 1.204 | 1.981 |
| 14.99 | 25.00 | 22.860 | 2.826 | 8.957 | 3.385 | 3.390 | 2.885 | .417 | .462 | 2.437 |
| 14.01 | 25.00 | 20.294 | 1.676 | 8.273 | 3.884 | 3.077 | 2.870 | .030 | .410 | 3.646 |
| 13.01 | 25.00 | 18.544 | .058 | 7.933 | 3.920 | 2.870 | 2.867 | -.011 | -.333 | 3.098 |
| 12.00 | 25.00 | 14.892 | -1.834 | 7.418 | 4.515 | 3.112 | 3.039 | 1.290 | -.537 | 2.723 |
| 11.01 | 25.00 | 10.664 | -3.246 | 7.182 | 4.964 | 4.683 | 3.635 | -.410 | -.493 | 1.481 |
| 10.99 | 25.00 | 10.356 | -3.619 | 6.979 | 5.020 | 4.034 | 3.449 | 2.058 | -.503 | .473 |

C  FILENAME= H904A050.A_1
C
C  H2 FLAME; d=9.45, delta=0.2 mm; theta=45 deg.; Uj=100, Ua=20, Ue=4 m/s; x=50 mm
C  LDV SEED PARTICLES ADDED TO ANNULUS FLUID ONLY.
C  D090894
C  14  : No. of data points

| C y | x | U | V | W | SIG(u') | SIG(v') | SIG(w') | u'v' | v'w' | w'u' |
|---|---|---|---|---|---|---|---|---|---|---|
| 26.00 | 50.01 | 15.219 | 4.137 | 4.406 | 4.004 | 4.189 | 3.955 | 5.925 | 3.532 | 1.433 |
| 24.00 | 50.01 | 17.010 | 3.408 | 5.028 | 3.941 | 4.096 | 3.555 | 4.716 | 2.599 | 1.713 |
| 22.00 | 50.01 | 17.238 | 2.477 | 5.092 | 3.833 | 4.059 | 3.405 | 3.758 | 2.871 | 1.528 |
| 20.00 | 50.01 | 18.078 | 1.514 | 5.565 | 3.431 | 3.717 | 3.215 | 2.334 | 2.513 | 1.219 |
| 18.00 | 50.01 | 17.421 | .313 | 5.946 | 3.369 | 3.507 | 3.170 | 1.294 | 2.604 | .754 |
| 15.99 | 50.01 | 16.176 | -.975 | 6.054 | 3.230 | 3.104 | 3.058 | .658 | 2.031 | .468 |
| 15.01 | 50.01 | 15.368 | -1.446 | 6.139 | 3.263 | 3.030 | 2.928 | -.394 | 1.965 | .380 |
| 14.01 | 50.01 | 14.479 | -1.859 | 5.912 | 3.238 | 2.928 | 2.996 | -.570 | 2.433 | .331 |

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 13.00  50.01  13.916  -2.282   5.914   3.209   2.858   3.075    -.551   2.452    .653
 12.00  50.01  13.259  -2.571   5.828   3.311   2.865   3.115    -.812   2.453    .336
 11.01  50.01  13.101  -2.861   5.711   3.222   2.925   3.296    -.274   2.681    .606
  9.99  50.01  12.806  -3.023   5.507   3.454   3.063   3.784    -.033   2.901    .793
  9.00  50.01  13.839  -3.050   5.712   4.390   4.386   5.245    3.731   3.462   2.636
  8.00  50.01  19.203  -1.673   6.459  10.056   8.184   8.947   40.248  12.358   7.157

C  FILENAME= H904A075.A_1
C
C  H2 FLAME; d=9.45, delta=0.2 mm; theta=45 deg.; Uj=100, Ua=20, Ue=4 m/s; x=75 mm
C  LDV SEED PARTICLES ADDED TO ANNULUS FLUID ONLY.
C  D090894
C  18  : No. of data points
C  y      x       U       V       W     SIG(u') SIG(v') SIG(w')   u'v'    v'w'    w'u'
 26.00  75.00  15.188   2.058   3.542   3.012   3.078   2.694   1.706   1.760    .696
 24.00  75.00  15.540   1.576   3.886   2.824   2.957   2.630   1.041   1.414    .582
 22.00  75.00  15.453   1.129   4.230   2.729   2.889   2.544    .865   1.438    .356
 21.00  75.00  15.426    .968   4.454   2.657   2.920   2.428    .825   1.531    .563
 20.00  75.00  14.709   1.163   4.415   2.692   2.825   2.433    .040   1.387    .457
 19.00  75.00  15.248    .598   4.600   2.590   2.749   2.420    .348   1.556    .342
 18.01  75.00  14.981    .442   4.696   2.549   2.678   2.320    .191   1.382    .394
 15.99  75.00  14.847    .100   4.910   2.448   2.617   2.362    .341   1.494    .642
 13.99  75.00  14.754   -.149   5.099   2.606   2.673   2.596    .720   1.773    .700
 11.99  75.00  15.110   -.740   5.219   2.684   2.679   2.819    .794   2.192    .946
 11.01  75.00  15.588  -1.046   5.193   3.134   2.846   3.231   1.567   2.392   1.422
  9.99  75.00  16.704  -1.226   5.203   4.442   3.531   4.411   3.587   3.566   2.417
  9.00  75.00  19.680  -1.141   5.300   7.261   4.891   5.731  13.437   5.938   3.989
  8.00  75.00  23.987   -.638   4.722  10.180   6.695   7.171  31.027   5.278   2.257
  5.99  75.00  33.640   -.506   4.008  13.283   9.062   9.837  53.963   7.771  -1.539
  5.01  75.00  38.962   -.199   3.552  14.282  10.099  10.819  64.465  12.332   2.082
  4.00  75.00  42.967   -.603   3.062  14.997  10.452  11.345  61.910  12.893  -2.989
  3.02  75.00  46.444  -1.122   3.046  15.090  10.936  11.528  57.528  10.960  -8.503

C  FILENAME= H904A150.A_1
C
C  H2 FLAME; d=9.45, delta=0.2 mm; theta=45 deg.; Uj=100, Ua=20, Ue=4 m/s; x=150 mm
C  LDV SEED PARTICLES ADDED TO ANNULUS FLUID ONLY.
C  D090894
C  14  : No. of data points
C  y      x       U       V       W     SIG(u') SIG(v') SIG(w')   u'v'    v'w'    w'u'
 26.00 149.99  13.408    .667   2.366   1.843   1.706   1.646    .991    .573    .179
 24.00 149.99  13.800    .464   2.547   1.876   1.700   1.700    .803    .602    .222
 22.00 149.99  14.092    .304   2.567   1.905   1.621   1.684    .779    .669    .242
 20.00 149.99  14.540    .122   2.668   2.056   1.694   1.773    .802    .862    .203
 18.00 149.99  14.984   -.070   2.750   2.248   1.739   1.863    .817    .766    .272
 16.00 149.99  15.787   -.250   2.898   2.855   1.895   2.254   1.271   1.053    .804
 13.99 149.99  17.387   -.305   2.953   4.072   2.500   2.807   3.080    .870    .698
 12.00 149.99  20.031   -.103   3.005   5.655   3.492   3.698   8.605   1.612   1.361
 10.01 149.99  22.739    .021   2.605   6.404   4.085   4.341  10.916   2.016   1.349
  7.99 149.99  25.972    .291   1.911   7.078   4.554   4.850  12.699    .963  -1.042
  5.99 149.99  28.282    .162   1.276   7.130   4.834   5.276  12.761    .979    .233
  3.98 149.99  30.074   -.005   1.083   6.923   5.090   5.351   9.854    .571   1.121
  2.01 149.99  31.963   -.331    .764   6.952   5.187   5.429   6.967    .557    .986
   .00 149.99  32.691   -.437    .549   6.828   5.221   5.510   4.119    .532   -.820

C  FILENAME= H904A225.A_1
C
C  H2 FLAME; d=9.45, delta=0.2 mm; theta=45 deg.; Uj=100, Ua=20, Ue=4 m/s; x=225 mm
C  LDV SEED PARTICLES ADDED TO ANNULUS FLUID ONLY.
C  D090894
C  14  : No. of data points
C  y      x       U       V       W     SIG(u') SIG(v') SIG(w')   u'v'    v'w'    w'u'
 26.00 224.99  13.327   -.001   1.542   2.076   1.437   1.736   1.007    .605    .465
 24.00 224.99  13.708   -.081   1.606   2.213   1.438   1.797   1.053    .614    .472
 22.00 224.99  14.261   -.181   1.730   2.430   1.492   1.929   1.139    .661    .692
 20.00 224.99  14.934   -.290   1.761   2.926   1.637   2.172   1.776    .714    .880
 18.00 224.99  15.984   -.332   1.739   3.497   1.848   2.334   2.568    .836   1.208
 15.99 224.99  17.101   -.366   1.702   4.063   2.103   2.504   3.646    .931   1.538
 13.99 224.99  19.012   -.096   1.779   4.644   2.607   2.898   5.454   1.064   1.708
 11.99 224.99  20.059   -.196   1.484   4.883   2.744   3.092   5.822    .785   1.421
  9.99 224.99  21.887    .041   1.328   4.979   3.082   3.262   6.337    .670   1.721
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  7.99 224.99  23.482   .222   .862  4.920  3.228  3.447   5.740   .203  1.641
  5.99 224.99  24.273  -.080   .816  4.746  3.304  3.554   4.804  -.251  1.140
  3.98 224.99  25.257  -.020   .509  4.666  3.320  3.518   3.357   .130  1.786
  2.01 224.99  25.998   .063   .282  4.656  3.463  3.575   2.323  -.042  1.905
   .00 224.99  26.145  -.099   .119  4.573  3.400  3.556    .953   .114  1.819

C  FILENAME= H904A001.E_1
C
C  H2 FLAME; d=9.45, delta=0.2 mm; theta=45 deg.; Uj=100, Ua=20, Ue=4 m/s; x=1.5 mm
C  LDV SEED PARTICLES ADDED TO EXTERNAL FLUID ONLY.
C  D090894
C   8  : No. of data points
C  y      x       U       V       W     SIG(u') SIG(v') SIG(w')   u'v'    v'w'    w'u'
 26.00   1.50   4.059   -.205    .074    .269    .213    .360   -.010    .013    .010
 24.00   1.50   3.970   -.249    .051    .297    .234    .392   -.019    .008    .005
 22.00   1.50   3.908   -.308    .071    .340    .245    .406   -.021    .015    .007
 20.00   1.50   3.758   -.413    .095    .399    .293    .417   -.036    .017    .009
 18.00   1.50   3.490   -.541    .149    .532    .436    .524   -.053    .030    .015
 16.00   1.50   3.676   -.714   1.059   1.240   1.685   1.943   -.200    .266   -.069
 15.01   1.50   8.295    .319   6.321   4.059   4.649   5.642   8.761   3.859   3.092
 14.01   1.50  19.333    .471  11.898   5.350   5.227   6.102  14.089   4.667   2.714

C  FILENAME= H904A010.E_1
C
C  H2 FLAME; d=9.45, delta=0.2 mm; theta=45 deg.; Uj=100, Ua=20, Ue=4 m/s; x=10 mm
C  LDV SEED PARTICLES ADDED TO EXTERNAL FLUID ONLY.
C  D090894
C   8  : No. of data points
C  y      x       U       V       W     SIG(u') SIG(v') SIG(w')   u'v'    v'w'    w'u'
 26.00  10.00   4.040   -.208    .050    .348    .336    .398   -.011    .017    .026
 24.00  10.00   4.021   -.216    .046    .437    .448    .441   -.034    .026    .040
 22.00  10.00   3.990   -.213    .055    .667    .775    .605   -.088    .073    .080
 20.00  10.00   4.478   -.210    .589   1.268   1.788   1.426   -.123    .219   -.026
 18.00  10.00   9.951   1.952   5.681   4.565   4.915   5.029  10.335   7.185   4.276
 16.00  10.00  19.425   3.364  10.529   5.489   5.585   4.945  14.384   7.623   2.964
 15.01  10.00  22.876   3.015  12.375   4.847   4.942   4.588   9.674   5.174   1.268
 14.00  10.00  24.350   2.092  14.117   4.002   4.213   3.869   5.877   3.285    .453

C  FILENAME= H904A025.E_1
C
C  H2 FLAME; d=9.45, delta=0.2 mm; theta=45 deg.; Uj=100, Ua=20, Ue=4 m/s; x=25 mm
C  LDV SEED PARTICLES ADDED TO EXTERNAL FLUID ONLY.
C  D090894
C   7  : No. of data points
C  y      x       U       V       W     SIG(u') SIG(v') SIG(w')   u'v'    v'w'    w'u'
 26.00  25.00   4.732   -.420    .506   1.588   2.027   1.633    .227    .373   -.007
 24.00  25.00   7.272    .282   2.000   3.257   3.748   3.375   5.231   3.248   2.110
 22.00  25.00  11.677   1.349   4.525   4.903   5.069   4.467  12.122   6.021   4.365
 20.00  25.00  16.875   2.115   6.431   5.421   5.543   4.672  15.795   6.550   4.024
 18.00  25.00  20.700   1.351   7.661   4.846   5.387   4.255  11.875   4.705   1.548
 15.99  25.00  22.147    .118   8.531   4.250   4.956   3.660   8.395   3.773   1.487
 13.99  25.00  20.203  -2.522   8.221   4.226   4.075   3.409   3.292   2.476   2.256

C  FILENAME= H904A050.E_1
C
C  H2 FLAME; d=9.45, delta=0.2 mm; theta=45 deg.; Uj=100, Ua=20, Ue=4 m/s; x=50 mm
C  LDV SEED PARTICLES ADDED TO EXTERNAL FLUID ONLY.
C  D090894
C  11  : No. of data points
C  y      x       U       V       W     SIG(u') SIG(v') SIG(w')   u'v'    v'w'    w'u'
 26.00  50.00  13.409   1.453   3.611   4.182   4.225   3.648   8.303   3.409   1.870
 24.00  50.00  15.377   1.125   4.069   4.064   4.230   3.570   7.338   3.693   1.940
 22.00  50.00  16.056    .535   4.297   4.142   4.140   3.416   6.520   3.638   2.230
 20.00  50.00  16.525   -.325   4.916   3.861   3.873   3.259   4.543   3.220   1.055
 18.00  50.00  15.904  -1.162   5.335   3.745   3.691   3.147   2.174   3.616    .704
 17.00  50.00  15.217  -1.674   5.560   3.656   3.495   3.132   1.757   3.291    .164
 16.01  50.00  14.411  -1.853   5.763   3.703   3.271   3.043    .426   2.877    .365
 14.99  50.00  13.427  -2.269   5.807   3.814   3.172   3.040   -.651   3.038    .274
 14.01  50.00  12.583  -2.186   6.028   3.717   3.179   2.967  -1.480   2.664    .098
 13.00  50.00  11.996  -2.639   5.989   3.654   3.044   2.936  -1.883   3.034    .274
 12.00  50.00  11.250  -2.506   5.960   3.681   3.027   3.117  -2.336   3.046    .413
```

C FILENAME= H904A075.E_1
C
C H2 FLAME; d=9.45, delta=0.2 mm; theta=45 deg.; Uj=100, Ua=20, Ue=4 m/s; x=75 mm
C LDV SEED PARTICLES ADDED TO EXTERNAL FLUID ONLY.
C D090894
C 15 : No. of data points

| C y | x | U | V | W | SIG(u') | SIG(v') | SIG(w') | u'v' | v'w' | w'u' |
|---|---|---|---|---|---|---|---|---|---|---|
| 26.00 | 75.00 | 14.578 | .992 | 3.249 | 2.988 | 3.101 | 2.646 | 2.550 | 1.893 | .686 |
| 24.00 | 75.00 | 14.496 | 1.206 | 3.508 | 3.062 | 3.121 | 2.497 | .587 | 1.686 | .368 |
| 22.00 | 75.00 | 14.743 | .630 | 3.959 | 2.776 | 2.987 | 2.489 | .748 | 2.031 | -.027 |
| 20.00 | 75.00 | 14.731 | .444 | 4.205 | 2.704 | 2.816 | 2.329 | .774 | 1.637 | -.069 |
| 19.00 | 75.00 | 14.327 | -.058 | 4.362 | 2.757 | 2.807 | 2.400 | .169 | 1.792 | .099 |
| 18.01 | 75.00 | 13.978 | .368 | 4.545 | 2.660 | 2.775 | 2.327 | -.245 | 1.368 | .079 |
| 17.00 | 75.00 | 13.872 | -.159 | 4.571 | 2.653 | 2.699 | 2.298 | .325 | 1.678 | .195 |
| 16.00 | 75.00 | 13.727 | -.225 | 4.787 | 2.589 | 2.649 | 2.302 | .080 | 1.901 | .252 |
| 15.01 | 75.00 | 13.609 | -.402 | 4.889 | 2.667 | 2.614 | 2.338 | .432 | 2.158 | .413 |
| 14.01 | 75.00 | 13.585 | -.393 | 4.972 | 2.681 | 2.574 | 2.388 | .301 | 1.786 | .776 |
| 13.01 | 75.00 | 13.805 | -.533 | 5.044 | 2.854 | 2.648 | 2.708 | .898 | 2.101 | .617 |
| 12.00 | 75.00 | 13.998 | -.620 | 5.185 | 2.969 | 2.755 | 2.824 | .693 | 2.583 | 1.052 |
| 11.01 | 75.00 | 14.621 | -.912 | 5.046 | 3.327 | 2.924 | 3.249 | 1.908 | 3.399 | 1.397 |
| 9.99 | 75.00 | 15.698 | -1.263 | 4.972 | 4.275 | 3.300 | 3.956 | 2.714 | 3.710 | 1.299 |
| 9.01 | 75.00 | 17.812 | -1.279 | 4.517 | 6.010 | 4.159 | 5.104 | 6.613 | 5.095 | .284 |

C FILENAME= H904A150.E_1
C
C H2 FLAME; d=9.45, delta=0.2 mm; theta=45 deg.; Uj=100, Ua=20, Ue=4 m/s; x=150 mm
C LDV SEED PARTICLES ADDED TO EXTERNAL FLUID ONLY.
C D090894
C 6 : No. of data points

| C y | x | U | V | W | SIG(u') | SIG(v') | SIG(w') | u'v' | v'w' | w'u' |
|---|---|---|---|---|---|---|---|---|---|---|
| 26.00 | 150.00 | 13.238 | .609 | 2.382 | 2.077 | 1.771 | 1.693 | 1.118 | .832 | -.047 |
| 24.00 | 150.00 | 13.756 | .483 | 2.433 | 2.041 | 1.752 | 1.602 | 1.073 | .669 | -.194 |
| 22.00 | 150.00 | 14.175 | .369 | 2.487 | 2.075 | 1.755 | 1.733 | .971 | .933 | -.026 |
| 18.00 | 150.00 | 15.538 | .146 | 2.760 | 2.951 | 1.967 | 2.248 | .984 | 1.159 | -.308 |
| 16.00 | 150.00 | 16.465 | .085 | 2.837 | 3.395 | 2.167 | 2.397 | 2.387 | 1.145 | .078 |
| 13.99 | 150.00 | 19.371 | .367 | 2.666 | 5.121 | 3.070 | 3.262 | 6.697 | 1.356 | -1.062 |

C FILENAME= H904A225.E_1
C
C H2 FLAME; d=9.45, delta=0.2 mm; theta=45 deg.; Uj=100, Ua=20, Ue=4 m/s; x=225 mm
C LDV SEED PARTICLES ADDED TO EXTERNAL FLUID ONLY.
C D090894
C 10 : No. of data points

| C y | x | U | V | W | SIG(u') | SIG(v') | SIG(w') | u'v' | v'w' | w'u' |
|---|---|---|---|---|---|---|---|---|---|---|
| 26.00 | 224.99 | 13.387 | -.087 | 1.383 | 2.180 | 1.456 | 1.682 | .840 | .591 | -.016 |
| 24.00 | 224.99 | 14.520 | .066 | 1.585 | 2.946 | 1.699 | 2.116 | 1.916 | 1.033 | .508 |
| 22.00 | 224.99 | 14.599 | -.284 | 1.403 | 3.007 | 1.732 | 1.984 | 1.693 | .933 | -.023 |
| 20.00 | 224.99 | 16.277 | -.033 | 1.525 | 3.714 | 2.083 | 2.247 | 2.582 | .956 | -.452 |
| 18.00 | 224.99 | 18.222 | .121 | 1.356 | 4.238 | 2.497 | 2.575 | 3.895 | 1.157 | -.373 |
| 15.99 | 224.99 | 19.497 | .268 | 1.300 | 4.312 | 2.750 | 2.816 | 4.691 | .602 | -1.202 |
| 13.99 | 224.99 | 21.110 | .512 | 1.084 | 4.545 | 2.868 | 2.896 | 4.902 | .688 | -1.482 |
| 11.99 | 224.99 | 20.812 | .165 | 1.120 | 4.659 | 2.791 | 2.891 | 4.945 | .826 | -1.365 |
| 10.00 | 224.99 | 22.260 | .085 | .809 | 4.558 | 2.850 | 3.160 | 3.909 | .409 | -1.558 |
| 8.00 | 224.99 | 23.356 | .271 | .935 | 4.489 | 2.983 | 3.055 | 3.414 | .263 | -1.725 |

C FILENAME= H904AAX.J_1
C
C H2 FLAME; d=9.45, delta=0.2 mm; theta=45 deg.; Uj=100, Ua=20, Ue=4 m/s; y=0 mm
C LDV SEED PARTICLES ADDED TO JET FLUID ONLY.
C D090894
C 22 : No. of data points

| C y | x | U | V | W | SIG(u') | SIG(v') | SIG(w') | u'v' | v'w' | w'u' |
|---|---|---|---|---|---|---|---|---|---|---|
| .00 | 1.50 | 129.999 | .001 | -.010 | 6.044 | 4.963 | 4.655 | 1.798 | 1.092 | -1.129 |
| .00 | 10.00 | 127.485 | -.770 | .297 | 6.657 | 5.202 | 4.844 | 3.154 | .166 | -.795 |
| .00 | 20.00 | 124.431 | -1.481 | .603 | 9.221 | 7.220 | 6.678 | 9.466 | .617 | -3.795 |
| .00 | 30.00 | 115.284 | -1.012 | 1.002 | 13.761 | 11.219 | 10.029 | 22.822 | 6.621 | -15.054 |
| .00 | 40.01 | 102.083 | .407 | 1.189 | 17.802 | 13.859 | 12.962 | 31.422 | 4.919 | -25.531 |
| .00 | 50.00 | 86.809 | 1.463 | 1.513 | 18.629 | 14.467 | 13.805 | 35.162 | -1.744 | -31.176 |
| .00 | 60.01 | 74.397 | .898 | .903 | 16.595 | 12.783 | 13.536 | 28.557 | 2.592 | -10.466 |
| .00 | 70.00 | 63.127 | .461 | 1.156 | 13.970 | 10.985 | 12.166 | 17.959 | 4.042 | -10.422 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| .00 | 80.00 | 58.433 | 1.044 | .186 | 11.312 | 9.300 | 10.674 | 13.817 | -.200 | -6.432 |
| .00 | 90.00 | 53.218 | .778 | .313 | 9.788 | 7.888 | 9.562 | 8.006 | 1.062 | -4.962 |
| .00 | 100.00 | 49.522 | .874 | -.121 | 8.853 | 7.154 | 8.349 | 8.658 | 1.062 | -.079 |
| .00 | 110.00 | 46.415 | .891 | -.047 | 7.930 | 6.128 | 7.317 | 4.963 | .175 | -.896 |
| .00 | 120.00 | 43.641 | .989 | -.094 | 7.222 | 5.658 | 6.657 | 2.693 | -.662 | .920 |
| .00 | 130.00 | 41.185 | .594 | .112 | 6.859 | 5.204 | 6.227 | 3.006 | -.073 | .604 |
| .00 | 140.00 | 39.887 | .542 | -.172 | 6.461 | 4.726 | 5.578 | 1.642 | .067 | .265 |
| .00 | 150.01 | 37.942 | .599 | -.080 | 5.926 | 4.545 | 5.292 | .310 | .113 | .688 |
| .00 | 160.00 | 36.374 | .808 | -.101 | 5.582 | 4.303 | 4.991 | .467 | -.095 | .768 |
| .00 | 170.01 | 35.142 | .388 | .181 | 5.032 | 3.957 | 4.964 | .795 | .622 | .717 |
| .00 | 180.00 | 33.909 | .604 | .130 | 4.853 | 3.867 | 4.444 | -.514 | .198 | .112 |
| .00 | 190.01 | 32.864 | .454 | -.015 | 4.814 | 3.571 | 4.022 | -.789 | .157 | .408 |
| .00 | 200.01 | 31.782 | .433 | -.054 | 4.419 | 3.468 | 4.086 | -.007 | .282 | .066 |
| .00 | 224.99 | 29.833 | .438 | .150 | 3.860 | 2.998 | 3.764 | -.387 | .015 | -.439 |

C FILENAME= H904A001.J_2
C
C H2 FLAME; d=9.45, delta=1.2 mm; theta=45 deg.; Uj=100, Ua=20, Ue=4 m/s; x=1.5 mm
C LDV SEED PARTICLES ADDED TO JET FLUID ONLY.
C D090894
C 12 : No. of data points

| C y | x | u'^3 | v'^3 | w'^3 | u'^2v' | v'^2u' | v'^2w' | w'^2v' | w'^2u' | u'^2w' |
|---|---|---|---|---|---|---|---|---|---|---|
| 4.70 | 1.50 | 918.544 | -18.093 | 22.748 | 198.393 | 121.994 | 11.002 | 14.756 | 47.920 | 10.085 |
| 4.51 | 1.50 | 2494.387 | 168.211 | 47.573 | 522.527 | 368.078 | -38.829 | -5.261 | 49.791 | -158.758 |
| 4.30 | 1.50 | 999.423 | 286.346 | 37.389 | 33.622 | -94.407 | 19.061 | -8.305 | -.111 | 8.169 |
| 4.00 | 1.50 | -1564.181 | 40.258 | 22.161 | -367.690 | -377.038 | 26.229 | 1.103 | 24.301 | 37.480 |
| 3.49 | 1.50 | -639.083 | -89.448 | 33.188 | -277.814 | -187.966 | 12.954 | 1.230 | -34.362 | 62.294 |
| 3.01 | 1.50 | -314.813 | -84.408 | -6.143 | -179.434 | -139.151 | .452 | -10.435 | -26.193 | -28.813 |
| 2.49 | 1.50 | -268.484 | -56.934 | -.985 | -138.488 | -104.819 | .329 | -2.191 | -27.639 | 4.730 |
| 2.00 | 1.50 | -186.684 | -43.904 | 5.534 | -96.896 | -76.692 | -.979 | -15.576 | -42.641 | -2.171 |
| 1.50 | 1.50 | -161.111 | -42.592 | 8.114 | -67.795 | -84.332 | 9.888 | -3.852 | -20.890 | 14.014 |
| .99 | 1.50 | -147.620 | -32.839 | 4.400 | -63.300 | -71.503 | 7.818 | -1.505 | -20.031 | 19.861 |
| .51 | 1.50 | -108.408 | -19.924 | 9.535 | -36.163 | -53.774 | 1.410 | -.949 | -10.834 | 18.052 |
| .01 | 1.50 | -110.191 | -1.584 | 16.817 | -13.298 | -59.830 | 2.177 | .958 | -9.395 | 9.992 |

C FILENAME= H904A010.J_2
C
C H2 FLAME; d=9.45, delta=1.2 mm; theta=45 deg.; Uj=100, Ua=20, Ue=4 m/s; x=10 mm
C LDV SEED PARTICLES ADDED TO JET FLUID ONLY.
C D090894
C 10 : No. of data points

| C y | x | u'^3 | v'^3 | w'^3 | u'^2v' | v'^2u' | v'^2w' | w'^2v' | w'^2u' | u'^2w' |
|---|---|---|---|---|---|---|---|---|---|---|
| 5.50 | 10.01 | 1500.343 | 519.230 | -751.789 | 973.551 | 991.074 | 11.632 | 38.239 | 66.183 | -146.811 |
| 4.99 | 10.01 | 1219.310 | 144.546 | -486.059 | 497.570 | 564.509 | 10.533 | 58.023 | -137.637 | -51.916 |
| 4.51 | 10.01 | 1676.237 | 101.148 | -233.420 | 266.977 | 368.915 | 50.763 | 77.499 | -38.577 | -9.652 |
| 3.99 | 10.01 | -539.329 | -93.486 | 108.955 | -454.504 | -384.402 | -87.574 | -47.072 | -515.095 | 80.721 |
| 3.42 | 10.01 | -2229.229 | -297.130 | 381.252 | -724.947 | -628.557 | -70.820 | -99.085 | -374.746 | 179.451 |
| 2.71 | 10.01 | -1649.723 | -529.960 | 182.244 | -815.823 | -667.387 | 66.059 | -140.001 | -187.364 | 239.204 |
| 2.01 | 9.99 | -423.350 | -182.783 | 45.287 | -243.969 | -223.964 | 23.750 | -59.153 | -81.761 | 10.545 |
| 1.29 | 9.99 | -205.297 | -65.346 | 6.829 | -75.935 | -105.923 | 21.259 | -17.382 | -36.268 | 34.529 |
| .61 | 9.99 | -183.449 | -34.609 | 14.655 | -54.972 | -72.341 | 6.013 | -3.279 | -18.246 | 10.107 |
| .00 | 9.99 | -100.498 | -15.559 | 11.564 | -18.480 | -56.015 | 8.030 | -5.441 | -16.867 | 17.205 |

C FILENAME= H904A025.J_2
C
C H2 FLAME; d=9.45, delta=1.2 mm; theta=45 deg.; Uj=100, Ua=20, Ue=4 m/s; x=25 mm
C LDV SEED PARTICLES ADDED TO JET FLUID ONLY.
C D090894
C 13 : No. of data points

| C y | x | u'^3 | v'^3 | w'^3 | u'^2v' | v'^2u' | v'^2w' | w'^2v' | w'^2u' | u'^2w' |
|---|---|---|---|---|---|---|---|---|---|---|
| 7.99 | 25.00 | 977.075 | -158.160 | -298.843 | 133.423 | 1055.650 | -14.721 | 156.822 | 64.694 | -118.765 |
| 7.00 | 25.00 | 871.202 | 250.997 | -659.128 | 485.428 | 1059.981 | -18.280 | 245.840 | 201.293 | 19.132 |
| 6.01 | 25.00 | 1504.632 | 483.101 | -679.601 | 978.518 | 1047.663 | -80.971 | 187.501 | 175.747 | -181.917 |
| 5.49 | 25.00 | 1647.525 | 547.012 | -739.568 | 963.412 | 977.152 | 8.983 | 69.464 | 182.307 | -93.925 |
| 5.00 | 25.00 | 2055.079 | 629.430 | -764.984 | 1170.115 | 1163.896 | 1.973 | 10.353 | -47.545 | -271.702 |
| 4.50 | 25.00 | 2216.855 | 493.959 | -949.510 | 878.142 | 908.115 | -4.232 | -198.974 | -285.979 | -206.187 |
| 4.01 | 25.00 | 1980.300 | 335.041 | -687.138 | 584.853 | 715.398 | -18.207 | 74.973 | -198.564 | -200.243 |
| 3.41 | 25.00 | 300.842 | -111.593 | -308.037 | -187.923 | 122.601 | 51.605 | -85.896 | -656.513 | -101.360 |
| 2.70 | 25.00 | -1803.820 | -388.219 | -120.195 | -525.472 | -502.404 | 150.973 | -73.928 | -651.395 | 63.310 |
| 2.01 | 25.00 | -3528.372 | -543.008 | 193.288 | -810.600 | -975.761 | 211.578 | -192.569 | -768.059 | 188.437 |
| 1.29 | 25.00 | -3221.464 | -512.194 | 166.833 | -843.166 | -1009.862 | 46.397 | -69.392 | -453.587 | 152.024 |

```
   .60  25.00 -1400.272  -343.754   171.918  -699.435  -780.903    64.735  -10.271 -294.230   68.929
   .00  25.00  -788.473   -79.021   165.906  -233.221  -466.609    20.953  -74.558 -248.264  140.958

C  FILENAME= H904A050.J_2
C
C  H2 FLAME; d=9.45, delta=1.2 mm; theta=45 deg.; Uj=100, Ua=20, Ue=4 m/s; x=50 mm
C  LDV SEED PARTICLES ADDED TO JET FLUID ONLY.
C  D090894
C  11  : No. of data points
C  y      x       u'^3      v'^3      w'^3     u'^2v'    v'^2u'    v'^2w'   w'^2v'   w'^2u'   u'^2w'
  8.81  49.99  1213.615  -338.572  -234.784  -111.733   956.595   -57.188   85.105  144.566  -59.658
  8.20  49.99  1001.521  -583.750  -173.891   -86.589  1079.129  -103.691   89.046  228.786  -25.833
  7.01  49.99   964.263   338.162  -266.494   593.638   676.398   -16.702   64.042  206.536  -66.743
  5.99  49.99  1507.126   305.707  -281.496   696.993   911.175    18.155  158.789  200.221  -62.064
  5.00  49.99  1570.448   587.548  -198.574   890.884   960.158    79.690  124.887   66.273 -111.979
  3.99  49.99  2069.978   537.756  -358.374   663.415   914.544   106.157  144.145 -207.342 -188.758
  2.73  49.99  1707.440   308.915  -356.869   297.901   547.135   -18.711   66.779 -473.488  -21.753
  2.01  49.99  1337.915   422.656  -277.936   300.943   624.791    38.799   88.267 -264.224  -63.041
  1.29  49.99   276.218   138.511  -285.339  -131.024    59.949   -18.513  -12.054 -742.161   16.112
   .60  49.99    25.660    88.117  -474.264  -221.925  -159.780   111.772   72.104 -603.351 -162.384
   .00  49.99  -794.691    29.938  -189.332  -239.487  -395.643   -53.545 -108.610 -688.034   16.818

C  FILENAME= H904A075.J_2
C
C  H2 FLAME; d=9.45, delta=1.2 mm; theta=45 deg.; Uj=100, Ua=20, Ue=4 m/s; x=75 mm
C  LDV SEED PARTICLES ADDED TO JET FLUID ONLY.
C  D090894
C  11  : No. of data points
C  y      x       u'^3      v'^3      w'^3     u'^2v'    v'^2u'    v'^2w'   w'^2v'   w'^2u'   u'^2w'
  9.50  75.00   531.809   -23.465   -65.924    41.638   432.288   -21.873   61.130  123.121  -27.709
  8.20  75.00   395.974   125.791   -78.019   201.979   301.400     5.568   81.932  127.139   10.865
  7.00  75.00   602.141    51.170  -222.130   136.022   433.580     3.241   62.268   90.861  -12.094
  6.01  75.00   409.018   176.632   -75.785   217.709   336.319    -2.051   44.233   64.913  -10.514
  4.99  75.00   504.520   160.756   -68.438   224.582   271.771    20.640   65.310   52.185  -21.008
  4.01  75.00   600.869   205.406   -24.367   164.102   274.595   -42.681   79.662  -11.682  -74.232
  2.72  75.00   737.954   134.393  -184.252   185.213   278.497     6.588   44.000  -47.358  -34.056
  2.01  75.00   615.494    95.018   -58.835   120.374   241.365      .396   41.363  -99.401  -41.977
  1.29  75.00   549.224    51.938    96.693    85.572   247.444     2.810   11.069 -190.141 -101.023
   .61  75.00   599.583    90.837   -98.389    57.442   209.339    -4.916  -13.656 -211.639    7.398
   .00  75.00   538.433     3.630  -127.781     6.357   188.076     9.584   50.017 -142.312  -63.312

C  FILENAME= H904A150.J_2
C
C  H2 FLAME; d=9.45, delta=1.2 mm; theta=45 deg.; Uj=100, Ua=20, Ue=4 m/s; x=150 mm
C  LDV SEED PARTICLES ADDED TO JET FLUID ONLY.
C  D090894
C   9  : No. of data points
C  y      x       u'^3      v'^3      w'^3     u'^2v'    v'^2u'    v'^2w'   w'^2v'   w'^2u'   u'^2w'
 13.99 150.00   88.409    17.314     6.336    21.769    38.022    -1.616    5.307   21.516   -3.870
 12.00 150.00   51.915    16.482     3.257     5.637    22.672     -.898    7.856   10.103   -4.040
 10.01 150.00   49.379    12.475    15.470      .652    20.044     1.975    5.522    5.090   -7.812
  7.99 150.00   31.907    13.025     7.489     1.051    24.658     -.829    1.599    2.508   -2.920
  5.99 150.00   14.655     7.239     7.154    -6.056     8.974     2.752     .520   -8.287   -5.646
  3.98 150.00    1.962     4.027    10.470    -7.079     1.725    -1.657   -1.535   -6.961   -6.110
  2.01 150.00    9.025     2.670     4.973     1.069     5.065    -2.484   -2.633  -10.198  -10.916
  1.00 150.00   -4.618     2.686    -2.305     2.226     -.036      .415     .456  -11.408  -10.865
   .01 150.00    3.273     3.398     7.307     5.199     -.162      .442   -1.480  -16.259   -9.154

C  FILENAME= H904A225.J_2
C
C  H2 FLAME; d=9.45, delta=1.2 mm; theta=45 deg.; Uj=100, Ua=20, Ue=4 m/s; x=225 mm
C  LDV SEED PARTICLES ADDED TO JET FLUID ONLY.
C  D090894
C  10  : No. of data points
C  y      x       u'^3      v'^3      w'^3     u'^2v'    v'^2u'    v'^2w'   w'^2v'   w'^2u'   u'^2w'
 18.00 224.99    8.629     3.213     5.468      .059     5.452      .055   -1.305   -2.937    1.445
 16.00 224.99   14.566     6.529    18.224     4.117     8.021     -.004    1.794    2.929    -.337
 13.99 224.99    9.662     3.564     7.045    -1.925     3.092      .988     .739    -.074   -4.843
 12.00 224.99    7.053     1.613     5.031      .527     4.634    -1.551    -.399   -1.531   -1.780
 10.01 224.99    7.805     1.842    14.391      .148     5.085      .477   -1.147   -6.187   -3.632
  7.99 224.99    2.671      .992     5.677    -2.171     4.382     1.255   -1.259   -1.173   -1.593
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  5.99 224.99    11.018    -1.627     3.686     -.484     2.333     1.219    -2.278    -4.618     -.650
  3.98 224.99     7.750     -.989     2.024    -1.332     1.720      .451      .549    -4.284    -1.710
  2.00 224.99     4.142     -.623     7.522    -1.375     2.366     1.381    -1.493    -2.895    -2.201
   .00 224.99     3.945    -1.530     9.554     1.106     2.582     2.153    -2.147    -3.146      .458

C  FILENAME= H904A001.A_2
C
C  H2 FLAME; d=9.45, delta=1.2 mm; theta=45 deg.; Uj=100, Ua=20, Ue=4 m/s; x=1.5 mm
C  LDV SEED PARTICLES ADDED TO ANNULUS FLUID ONLY.
C  D090493
C  10  : No. of data points
C  y      x       u'^3      v'^3      w'^3     u'^2v'    v'^2u'    v'^2w'    w'^2v'    w'^2u'    u'^2w'
 13.49   1.50    -5.925   -23.285   -83.472   -13.710   -10.402    -8.620   -12.826     1.858    -6.755
 13.01   1.50    -1.850    -9.462   -15.717    -4.878    -2.859    -2.921    -6.728     -.375    -1.563
 12.51   1.50     -.105    -8.164    -3.061    -1.330    -1.533    -2.616    -2.903      .381     -.482
 12.01   1.50      .171    -5.943    -1.956     -.475    -1.297    -2.257    -1.285      .225     -.327
 11.19   1.50     -.182    -2.405     -.682      .173     -.074    -1.348      .053      .212     -.653
 10.40   1.50     -.769     -.651    -1.647     1.119     -.420    -1.547     2.229    -1.165     -.984
  9.60   1.50    -4.144     1.820      .926     2.140    -2.423     -.783      .149    -2.538    -1.856
  8.20   1.50   -35.480     3.120    -5.566     7.283    -6.896     -.404      .066    -5.885    -6.239
  6.99   1.50    -9.735     5.240    -7.746     3.307    -6.035      .876     1.198    -2.116     3.235
  6.01   1.50     4.307     -.256     6.627    -1.304    -3.151      .797      .841    -2.373     6.300

C  FILENAME= H904A010.A_2
C
C  H2 FLAME; d=9.45, delta=1.2 mm; theta=45 deg.; Uj=100, Ua=20, Ue=4 m/s; x=10 mm
C  LDV SEED PARTICLES ADDED TO ANNULUS FLUID ONLY.
C  D090894
C   9  : No. of data points
C  y      x       u'^3      v'^3      w'^3     u'^2v'    v'^2u'    v'^2w'    w'^2v'    w'^2u'    u'^2w'
 18.00   9.99    15.149   -21.878    22.540     6.080    -1.053     1.370    15.604     3.048     1.249
 16.00   9.99   -52.885   -63.400   -46.111   -46.909   -44.958   -19.694   -12.152   -10.675   -19.312
 13.99   9.99    -1.385   -14.211    -8.908    -4.748    -4.110    -4.103    -3.065     -.375    -1.387
 13.02  10.00    -3.993    -4.179    -7.836      .001     -.097     -.463     1.453    -3.514    -4.069
 11.98  10.00    -8.503     -.222     -.475    -1.211     -.488     -.310    -1.282     -.913    -3.439
 11.01  10.00   -17.079     -.340     3.332    -2.994    -2.440     -.042    -1.753    -2.701    -3.724
 10.00  10.00   -15.989    -1.134    -2.488    -5.148    -5.293     -.310     -.287    -3.701    -1.942
  9.01  10.00   -27.138    -5.786    -1.832   -13.130   -11.144     -.888      .422    -1.793      .500
  8.01  10.00   -40.316   -15.348      .585   -18.341   -34.702     -.254     -.781    -8.716     6.007

C  FILENAME= H904A025.A_2
C
C  H2 FLAME; d=9.45, delta=1.2 mm; theta=45 deg.; Uj=100, Ua=20, Ue=4 m/s; x=25 mm
C  LDV SEED PARTICLES ADDED TO ANNULUS FLUID ONLY.
C  D090894
C  15  : No. of data points
C  y      x       u'^3      v'^3      w'^3     u'^2v'    v'^2u'    v'^2w'    w'^2v'    w'^2u'    u'^2w'
 24.00  25.00    28.143    15.751    19.350    15.485     9.112     7.334    19.208     1.407     1.896
 23.00  25.00    19.765     9.824     6.484     9.058     6.452     4.694     6.174     3.471     2.082
 22.00  25.00     7.106    -8.662    -3.983     -.639   -10.410    -1.454    -1.337    -1.539     5.145
 21.00  25.00   -29.516   -40.500   -22.988   -19.761   -25.314   -11.912    -3.984    -8.884    -9.016
 20.00  25.00   -43.304   -30.721   -25.837   -30.203   -34.511    -9.651   -14.395   -18.837   -10.514
 19.00  25.00   -58.178   -59.012   -29.484   -42.743   -47.637   -18.753   -14.263   -18.803   -13.220
 18.01  25.00   -39.031   -46.437   -30.429   -36.616   -43.162   -17.986   -11.454   -12.044    -9.618
 16.98  25.00   -24.926   -41.502   -14.870   -21.814   -28.081   -10.134   -10.576    -7.704    -8.116
 16.01  25.00   -14.434   -34.318    -6.744    -7.959   -15.139    -5.939    -3.383    -3.899    -5.548
 14.99  25.00   -15.050   -22.616    -3.679    -3.402    -5.010    -1.129    -1.147    -4.037    -6.121
 14.01  25.00   -20.698   -16.280    -3.421    -5.376      .100    -1.124     -.747    -2.609    -4.757
 13.01  25.00   -21.905   -13.500    -1.857    -4.922     1.046    -1.586      .710    -1.293    -1.036
 12.00  25.00   -37.943   -15.203    -4.499   -10.749    -8.111    -2.982    -2.277    -5.547     3.035
 11.01  25.00   -15.850    78.862    -2.335     5.851   -50.609     1.134    10.146   -13.087     8.127
 10.99  25.00   -13.486    13.453     3.657    -2.183   -22.945    -4.717     5.868   -12.300    11.965

C  FILENAME= H904A050.A_2
C
C  H2 FLAME; d=9.45, delta=1.2 mm; theta=45 deg.; Uj=100, Ua=20, Ue=4 m/s; x=50 mm
C  LDV SEED PARTICLES ADDED TO ANNULUS FLUID ONLY.
C  D090894
C  14  : No. of data points
C  y      x       u'^3      v'^3      w'^3     u'^2v'    v'^2u'    v'^2w'    w'^2v'    w'^2u'    u'^2w'
 26.00  50.01    -2.568    -2.218    -8.777    -4.633    -8.459    -3.432    -4.625    -2.815    -1.879
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| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 24.00 | 50.01 | -11.799 | -5.122 | -9.852 | -7.777 | -9.499 | -3.256 | -6.714 | -5.293 | -5.003 |
| 22.00 | 50.01 | -10.761 | -1.084 | -7.424 | -6.959 | -11.043 | -3.590 | -5.923 | -5.022 | -3.975 |
| 20.00 | 50.01 | -9.185 | -9.749 | -8.541 | -5.138 | -11.228 | -4.891 | -4.496 | -4.877 | -3.908 |
| 18.00 | 50.01 | -11.830 | -9.245 | -10.233 | -3.064 | -8.083 | -4.810 | -4.508 | -2.785 | -.884 |
| 15.99 | 50.01 | -5.843 | -6.655 | -8.959 | -2.698 | -4.773 | -2.769 | -2.617 | -3.202 | -1.199 |
| 15.01 | 50.01 | -9.020 | -3.571 | -6.577 | .867 | -5.602 | -1.670 | -1.479 | -3.375 | -3.376 |
| 14.01 | 50.01 | -10.020 | -1.545 | -8.092 | 1.257 | -3.334 | -1.742 | -1.865 | -3.540 | -1.935 |
| 13.00 | 50.01 | -7.186 | -.185 | -7.561 | 2.141 | -4.152 | -1.193 | -1.391 | -3.447 | -2.811 |
| 12.00 | 50.01 | -12.936 | 3.241 | -6.242 | 3.776 | -3.340 | .994 | 1.382 | -2.123 | -1.842 |
| 11.01 | 50.01 | -3.329 | 7.539 | -3.254 | 4.579 | .777 | 2.383 | 2.798 | -.946 | .125 |
| 9.99 | 50.01 | 6.082 | 9.681 | -.559 | 3.114 | 2.330 | 5.152 | 5.756 | 1.600 | -1.403 |
| 9.00 | 50.01 | 66.759 | 63.112 | 40.614 | 30.534 | 39.933 | 24.495 | 37.713 | 39.893 | 11.878 |
| 8.00 | 50.01 | 1482.532 | 554.266 | 108.120 | 626.203 | 494.268 | 85.488 | 288.449 | 401.674 | 17.732 |

C FILENAME= H904A075.A_2
C
C H2 FLAME; d=9.45, delta=1.2 mm; theta=45 deg.; Uj=100, Ua=20, Ue=4 m/s; x=75 mm
C LDV SEED PARTICLES ADDED TO ANNULUS FLUID ONLY.
C D090894
C 18 : No. of data points

| C y | x | u'^3 | v'^3 | w'^3 | u'^2v' | v'^2u' | v'^2w' | w'^2v' | w'^2u' | u'^2w' |
|---|---|---|---|---|---|---|---|---|---|---|
| 26.00 | 75.00 | .590 | -3.416 | -1.976 | -2.414 | -4.236 | -2.267 | -2.139 | -2.196 | -.632 |
| 24.00 | 75.00 | -1.013 | -1.456 | -4.800 | -1.586 | -2.741 | -.902 | -3.070 | -.721 | -.381 |
| 22.00 | 75.00 | -.408 | -2.902 | -3.131 | -2.390 | -3.300 | -2.032 | -2.456 | -.768 | -.317 |
| 21.00 | 75.00 | .237 | -3.340 | -2.403 | -1.896 | -2.666 | -1.502 | -1.787 | -.556 | -.655 |
| 20.00 | 75.00 | -.948 | -1.819 | -2.080 | -.909 | -1.776 | -1.622 | -1.057 | -.935 | -1.398 |
| 19.00 | 75.00 | .585 | -2.369 | -2.375 | -1.359 | -1.704 | -2.018 | -2.947 | -.113 | -1.065 |
| 18.01 | 75.00 | -2.955 | -2.027 | -2.135 | -.663 | -1.487 | -1.526 | -1.455 | -.147 | -.946 |
| 15.99 | 75.00 | -1.191 | -2.001 | -3.036 | -.381 | -.243 | -1.061 | -.642 | -.938 | -1.338 |
| 13.99 | 75.00 | 3.261 | 3.248 | -4.368 | 2.775 | 1.783 | -1.264 | .117 | 1.164 | -1.385 |
| 11.99 | 75.00 | 5.033 | 3.590 | -4.230 | 1.486 | 3.448 | 1.457 | .491 | 2.645 | -1.961 |
| 11.01 | 75.00 | 23.011 | 5.292 | -3.766 | 5.996 | 6.248 | 3.694 | 3.568 | 7.754 | 2.213 |
| 9.99 | 75.00 | 105.041 | 23.111 | 7.264 | 24.183 | 33.946 | 15.162 | 24.259 | 50.218 | 4.970 |
| 9.00 | 75.00 | 587.502 | 102.217 | 42.093 | 168.146 | 152.955 | 30.742 | 79.041 | 146.718 | 7.658 |
| 8.00 | 75.00 | 1262.213 | 298.215 | -15.012 | 435.133 | 359.142 | 17.150 | 151.681 | 278.394 | -2.199 |
| 5.99 | 75.00 | 1524.565 | 511.607 | -83.222 | 539.558 | 517.528 | 24.770 | 203.558 | 308.123 | -67.599 |
| 5.01 | 75.00 | 1358.027 | 568.282 | -237.542 | 384.595 | 420.032 | 48.337 | 222.952 | 251.700 | -13.294 |
| 4.00 | 75.00 | 1475.883 | 413.008 | -267.594 | 295.475 | 259.708 | 22.557 | 162.566 | 124.919 | -109.576 |
| 3.02 | 75.00 | 1280.919 | 466.983 | -212.306 | 142.659 | 135.473 | -.824 | 150.240 | 19.238 | -106.106 |

C FILENAME= H904A150.A_2
C
C H2 FLAME; d=9.45, delta=1.2 mm; theta=45 deg.; Uj=100, Ua=20, Ue=4 m/s; x=150 mm
C LDV SEED PARTICLES ADDED TO ANNULUS FLUID ONLY.
C D090894
C 14 : No. of data points

| C y | x | u'^3 | v'^3 | w'^3 | u'^2v' | v'^2u' | v'^2w' | w'^2v' | w'^2u' | u'^2w' |
|---|---|---|---|---|---|---|---|---|---|---|
| 26.00 | 149.99 | -.048 | -.717 | -.820 | -.628 | -.565 | -.092 | -.611 | -.396 | .195 |
| 24.00 | 149.99 | .101 | -.691 | -.894 | -.390 | -.368 | -.320 | -.428 | .079 | -.130 |
| 22.00 | 149.99 | .704 | -.327 | -.636 | -.477 | -.357 | -.202 | -.335 | .241 | .247 |
| 20.00 | 149.99 | 2.528 | -.300 | -.604 | .145 | .217 | .047 | -.140 | .749 | .753 |
| 18.00 | 149.99 | 6.034 | .535 | .133 | .881 | .968 | .605 | .274 | 2.207 | .762 |
| 16.00 | 149.99 | 25.246 | 2.491 | 2.485 | 4.920 | 4.245 | 1.794 | 1.747 | 7.544 | 4.873 |
| 13.99 | 149.99 | 89.544 | 9.160 | 4.978 | 22.390 | 20.418 | -.181 | 7.196 | 19.436 | .464 |
| 12.00 | 149.99 | 186.414 | 41.903 | 3.688 | 62.390 | 52.418 | 6.030 | 18.022 | 40.489 | 2.177 |
| 10.01 | 149.99 | 182.300 | 46.459 | 2.556 | 61.187 | 56.076 | 3.951 | 25.547 | 45.144 | 10.518 |
| 7.99 | 149.99 | 136.887 | 47.434 | -10.718 | 33.851 | 44.106 | .318 | 23.042 | 29.638 | -7.971 |
| 5.99 | 149.99 | 97.374 | 46.881 | -2.409 | 21.511 | 31.553 | 1.650 | 22.658 | 15.455 | 2.219 |
| 3.98 | 149.99 | 67.483 | 28.292 | -2.303 | 5.764 | 14.848 | -2.320 | 12.256 | -.869 | 9.312 |
| 2.01 | 149.99 | 44.979 | 18.055 | -4.916 | -10.874 | -3.203 | -1.115 | 5.904 | -3.168 | 6.192 |
| .00 | 149.99 | 26.562 | 16.224 | -11.621 | -8.923 | -13.506 | -.689 | 5.930 | -19.366 | 3.623 |

C FILENAME= H904A225.A_2
C
C H2 FLAME; d=9.45, delta=1.2 mm; theta=45 deg.; Uj=100, Ua=20, Ue=4 m/s; x=225 mm
C LDV SEED PARTICLES ADDED TO ANNULUS FLUID ONLY.
C D090894
C 14 : No. of data points

| C y | x | u'^3 | v'^3 | w'^3 | u'^2v' | v'^2u' | v'^2w' | w'^2v' | w'^2u' | u'^2w' |
|---|---|---|---|---|---|---|---|---|---|---|
| 26.00 | 224.99 | 2.036 | .624 | .580 | .307 | .675 | .431 | .709 | 1.060 | .654 |
| 24.00 | 224.99 | 6.419 | .669 | 1.455 | 1.621 | 1.059 | .367 | 1.049 | 2.209 | 1.353 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 22.00 | 224.99 | 10.805 | .950 | 1.760 | 2.267 | 1.726 | .925 | .868 | 2.990 | 2.687 |
| 20.00 | 224.99 | 26.326 | 2.649 | 3.384 | 6.311 | 4.665 | 1.347 | 2.158 | 5.814 | 3.248 |
| 18.00 | 224.99 | 44.906 | 3.981 | 3.716 | 11.236 | 7.868 | 2.219 | 3.708 | 9.071 | 4.559 |
| 15.99 | 224.99 | 71.961 | 7.448 | 3.598 | 19.708 | 13.475 | 2.624 | 4.242 | 12.121 | 7.385 |
| 13.99 | 224.99 | 63.103 | 13.968 | 6.541 | 19.062 | 17.207 | 1.073 | 6.915 | 16.098 | 6.046 |
| 11.99 | 224.99 | 61.213 | 14.681 | 4.177 | 18.286 | 18.125 | .526 | 6.971 | 12.562 | 6.871 |
| 9.99 | 224.99 | 30.598 | 14.387 | 5.400 | 7.348 | 13.563 | 1.764 | 6.695 | 9.724 | 2.896 |
| 7.99 | 224.99 | 19.353 | 13.860 | 1.856 | .755 | 9.210 | .296 | 4.509 | 7.989 | 5.047 |
| 5.99 | 224.99 | 24.377 | 8.534 | 5.934 | 6.089 | 3.871 | .908 | 2.152 | 2.067 | -1.692 |
| 3.98 | 224.99 | 10.643 | 5.631 | 5.181 | -3.297 | 1.010 | -.373 | 3.278 | -.562 | .021 |
| 2.01 | 224.99 | 6.313 | 6.161 | 4.476 | -5.260 | -2.772 | .371 | .778 | -1.735 | .921 |
| .00 | 224.99 | 3.772 | 2.779 | 3.847 | -.170 | -.672 | 1.060 | 2.862 | -2.406 | -3.484 |

C FILENAME= H904A001.E_2
C
C H2 FLAME; d=9.45, delta=1.2 mm; theta=45 deg.; Uj=100, Ua=20, Ue=4 m/s; x=1.5 mm
C LDV SEED PARTICLES ADDED TO EXTERNAL FLUID ONLY.
C D090894
C 8 : No. of data points

| C y | x | u'^3 | v'^3 | w'^3 | u'^2v' | v'^2u' | v'^2w' | w'^2v' | w'^2u' | u'^2w' |
|---|---|---|---|---|---|---|---|---|---|---|
| 26.00 | 1.50 | .002 | .004 | .010 | .002 | .000 | .003 | .005 | .001 | .003 |
| 24.00 | 1.50 | -.003 | .001 | .008 | .002 | -.001 | .002 | .002 | -.002 | .001 |
| 22.00 | 1.50 | -.004 | .002 | .006 | .004 | -.003 | .002 | .001 | -.003 | .006 |
| 20.00 | 1.50 | -.005 | .004 | .010 | .002 | -.004 | .002 | .005 | -.003 | .005 |
| 18.00 | 1.50 | -.052 | -.008 | .003 | .011 | -.011 | .001 | .014 | -.010 | .000 |
| 16.00 | 1.50 | -.187 | 1.777 | 7.318 | .177 | -.346 | 1.135 | .194 | .073 | .164 |
| 15.01 | 1.50 | 47.760 | 87.021 | 122.296 | 37.476 | 44.052 | 30.608 | 17.284 | 11.561 | 22.721 |
| 14.01 | 1.50 | -22.662 | 19.084 | -56.151 | -10.885 | -1.843 | .629 | 1.372 | -.495 | -4.107 |

C FILENAME= H904A010.E_2
C
C H2 FLAME; d=9.45, delta=1.2 mm; theta=45 deg.; Uj=100, Ua=20, Ue=4 m/s; x=10 mm
C LDV SEED PARTICLES ADDED TO EXTERNAL FLUID ONLY.
C D090894
C 8 : No. of data points

| C y | x | u'^3 | v'^3 | w'^3 | u'^2v' | v'^2u' | v'^2w' | w'^2v' | w'^2u' | u'^2w' |
|---|---|---|---|---|---|---|---|---|---|---|
| 26.00 | 10.00 | -.009 | .004 | .006 | .002 | -.006 | .002 | .005 | -.003 | .000 |
| 24.00 | 10.00 | -.034 | -.011 | .013 | .006 | -.017 | -.006 | .007 | -.006 | -.004 |
| 22.00 | 10.00 | -.191 | .070 | -.038 | .028 | -.136 | -.034 | .029 | -.084 | -.040 |
| 20.00 | 10.00 | .293 | 1.687 | 1.530 | .295 | .346 | .814 | .336 | -.312 | .476 |
| 18.00 | 10.00 | 56.456 | 86.368 | 62.111 | 39.947 | 45.382 | 41.109 | 24.155 | 14.490 | 17.706 |
| 16.00 | 10.00 | -33.263 | 9.733 | -37.281 | -25.004 | -16.959 | 2.167 | -8.660 | -5.029 | -5.941 |
| 15.01 | 10.00 | -38.814 | -13.660 | -45.635 | -23.058 | -18.064 | -8.832 | -16.744 | -11.494 | -3.107 |
| 14.00 | 10.00 | -28.933 | -18.602 | -31.308 | -20.766 | -19.040 | -4.176 | -8.800 | -4.879 | -3.905 |

C FILENAME= H904A025.E_2
C
C H2 FLAME; d=9.45, delta=1.2 mm; theta=45 deg.; Uj=100, Ua=20, Ue=4 m/s; x=25 mm
C LDV SEED PARTICLES ADDED TO EXTERNAL FLUID ONLY.
C D090894
C 7 : No. of data points

| C y | x | u'^3 | v'^3 | w'^3 | u'^2v' | v'^2u' | v'^2w' | w'^2v' | w'^2u' | u'^2w' |
|---|---|---|---|---|---|---|---|---|---|---|
| 26.00 | 25.00 | 1.337 | 4.848 | 1.869 | 1.580 | .792 | 1.790 | 2.314 | .081 | .256 |
| 24.00 | 25.00 | 37.077 | 56.721 | 30.772 | 26.391 | 32.207 | 21.552 | 21.005 | 16.950 | 11.670 |
| 22.00 | 25.00 | 67.380 | 94.810 | 41.047 | 42.701 | 48.308 | 21.473 | 19.177 | 18.620 | 15.777 |
| 20.00 | 25.00 | 15.244 | 53.678 | -2.579 | 13.348 | 17.143 | 9.521 | 1.356 | -4.018 | 4.575 |
| 18.00 | 25.00 | -23.373 | 17.598 | -13.758 | -11.960 | -11.977 | -4.780 | -5.423 | -6.073 | -4.374 |
| 15.99 | 25.00 | -25.913 | -6.765 | -16.906 | -18.931 | -22.473 | -5.167 | -9.582 | -6.800 | -4.369 |
| 13.99 | 25.00 | -25.144 | -4.769 | -10.801 | 4.431 | -7.538 | -1.614 | -1.629 | -7.692 | -6.558 |

C FILENAME= H904A050.E_2
C
C H2 FLAME; d=9.45, delta=1.2 mm; theta=45 deg.; Uj=100, Ua=20, Ue=4 m/s; x=50 mm
C LDV SEED PARTICLES ADDED TO EXTERNAL FLUID ONLY.
C D090894
C 11 : No. of data points

| C y | x | u'^3 | v'^3 | w'^3 | u'^2v' | v'^2u' | v'^2w' | w'^2v' | w'^2u' | u'^2w' |
|---|---|---|---|---|---|---|---|---|---|---|
| 26.00 | 50.00 | 21.025 | 37.468 | 3.658 | 10.320 | 12.806 | 6.739 | 5.253 | 4.758 | 2.182 |
| 24.00 | 50.00 | 9.394 | 25.371 | -.027 | 1.702 | -.090 | 2.730 | 2.298 | .482 | -1.257 |
| 22.00 | 50.00 | 5.222 | 12.221 | -4.962 | -2.538 | -4.737 | 1.233 | .306 | -2.261 | -2.764 |
| 20.00 | 50.00 | -5.037 | 2.970 | -4.188 | -2.904 | -7.280 | -4.468 | -2.054 | -1.767 | -1.628 |

```
 18.00  50.00    -5.709     2.050    -7.401    -2.767    -8.440    -2.735    -2.317    -4.538    -2.480
 17.00  50.00    -3.331     2.765    -5.623     -.430    -6.552    -3.665    -1.115    -2.353    -1.092
 16.01  50.00    -8.717      .593   -10.185     1.844    -9.456    -2.203    -1.279    -3.145    -2.675
 14.99  50.00   -16.327     -.389    -8.967     5.318    -3.767    -1.138    -1.331    -2.668    -4.981
 14.01  50.00    -9.746     1.204    -5.939     4.580    -5.277    -3.366      .192    -1.204    -5.179
 13.00  50.00    -6.597     2.290    -8.426     6.442    -3.097    -1.171     1.019    -2.374    -4.111
 12.00  50.00     -.259     3.458   -11.245     5.269    -1.640    -4.263      .398    -3.027    -5.386

C  FILENAME= H904A075.E_2
C
C  H2 FLAME; d=9.45, delta=1.2 mm; theta=45 deg.; Uj=100, Ua=20, Ue=4 m/s; x=75 mm
C  LDV SEED PARTICLES ADDED TO EXTERNAL FLUID ONLY.
C  D090894
C  15  : No. of data points
C  y      x       u'^3      v'^3      w'^3     u'^2v'    v'^2u'    v'^2w'    w'^2v'    w'^2u'    u'^2w'
 26.00  75.00      .373     6.618    -1.314     -.103    -2.065     -.597    -1.936     -.466    -1.314
 24.00  75.00    -2.670     -.998    -4.176      .471    -5.885    -3.170    -3.087    -1.330    -1.587
 22.00  75.00     -.549      .545    -3.491     -.307    -3.042    -1.723    -2.585     -.417      .470
 20.00  75.00    -6.023    -3.945    -2.064      .132      .708    -4.920    -1.883    -2.363     -.092
 19.00  75.00    -2.250     1.254    -3.341      .777    -2.057    -1.068    -2.043      .642     -.797
 18.01  75.00    -3.151     -.808    -2.671      .792     -.961    -1.930    -1.436    -1.364    -1.842
 17.00  75.00    -2.196      .848    -3.514     1.069     -.970     -.587     -.988      .051    -1.536
 16.00  75.00     -.932      .250    -4.067      .013      .479    -1.095    -2.097     -.714    -1.185
 15.01  75.00     -.151     1.867    -3.466     1.006     1.343    -1.415    -1.349      .462     -.689
 14.01  75.00    -1.981     1.302    -4.178     1.808     1.652    -1.410     -.358      .083    -2.204
 13.01  75.00     3.799     4.388    -5.162     2.942     4.580      .739     1.847     1.255     -.264
 12.00  75.00    12.068     5.260    -2.774     2.850     4.409     1.940     2.920     3.409    -1.330
 11.01  75.00    22.515     9.612    -6.491     6.829    11.762     3.529     6.108     7.994    -1.430
  9.99  75.00    88.565    15.632    -7.920    17.310    18.623     4.399    12.292    39.071      .853
  9.01  75.00   312.236    42.803   -41.544    63.525    72.571     2.144    41.222    87.004   -18.839

C  FILENAME= H904A150.E_2
C
C  H2 FLAME; d=9.45, delta=1.2 mm; theta=45 deg.; Uj=100, Ua=20, Ue=4 m/s; x=150 mm
C  LDV SEED PARTICLES ADDED TO EXTERNAL FLUID ONLY.
C  D090894
C   6  : No. of data points
C  y      x       u'^3      v'^3      w'^3     u'^2v'    v'^2u'    v'^2w'    w'^2v'    w'^2u'    u'^2w'
 26.00 150.00     1.466     -.017     -.369      .454      .176     -.220     -.155      .798     -.077
 24.00 150.00      .801      .112     -.306     -.063     -.154      .147     -.029      .372     -.385
 22.00 150.00     1.077      .250      .324      .435      .336      .078      .220      .463      .338
 18.00 150.00    19.978     2.796     1.446     3.584     4.292      .631     1.455     4.615      .208
 16.00 150.00    50.593     5.520    -1.398    13.541    10.015     1.132     4.317    11.558     1.191
 13.99 150.00   131.633    24.685    -3.438    39.477    30.591      .773     9.948    22.168    -7.519

C  FILENAME= H904A225.E_2
C
C  H2 FLAME; d=9.45, delta=1.2 mm; theta=45 deg.; Uj=100, Ua=20, Ue=4 m/s; x=225 mm
C  LDV SEED PARTICLES ADDED TO EXTERNAL FLUID ONLY.
C  D090894
C  10  : No. of data points
C  y      x       u'^3      v'^3      w'^3     u'^2v'    v'^2u'    v'^2w'    w'^2v'    w'^2u'    u'^2w'
 26.00 224.99     4.670      .982     -.095     -.215      .666      .690      .775     1.909      .045
 24.00 224.99    23.052     2.560     -.008     5.083     3.948      .793     1.936     5.454     1.599
 22.00 224.99    20.261     2.947      .872     4.561     3.967     1.325     1.690     3.801      .402
 20.00 224.99    43.355     6.714     -.067    12.228     9.785     1.021     2.428     7.914     -.319
 18.00 224.99    41.803    11.957    -1.384    11.728    12.351     1.346     3.423     6.735     -.839
 15.99 224.99    26.213    13.479    -2.712     7.300    11.342      .405     4.840     8.233    -1.768
 13.99 224.99    15.892    11.733     -.465     5.236     8.511      .096     2.861     5.615     3.540
 11.99 224.99    34.894    10.173    -1.327     9.680    10.438      .060     3.571     5.945     1.188
 10.00 224.99    11.088     8.105     -.766     3.773     5.817    -1.385     3.067     1.866     3.008
  8.00 224.99    10.024     4.208    -4.123     1.280      .678      .099     2.553     1.777     4.672

C  FILENEME= H904AAX.J_2
C
C  H2 FLAME; d=9.45, delta=1.2 mm; theta=45 deg.; Uj=100, Ua=20, Ue=4 m/s; y=0 mm
C  LDV SEED PARTICLES ADDED TO JET FLUID ONLY.
C  D090894
C  22  : No. of data points
C  y      x       u'^3      v'^3      w'^3     u'^2v'    v'^2u'    v'^2w'    w'^2v'    w'^2u'    u'^2w'
    .00   1.50   -96.780   -15.799     5.647   -14.518   -59.957     3.293      .294    -9.571     3.772
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    .00  10.00  -126.950   -22.548     2.528   -18.440   -66.413     1.838   -5.289  -17.162   -6.330
    .00  20.00  -263.847   -75.136    22.372   -59.740  -184.356    35.293  -21.457  -40.347   31.191
    .00  30.00 -2372.275  -255.725   271.859  -435.568 -1080.690   111.003  -17.317 -302.969  225.222
    .00  40.01 -3424.759  -255.961    82.782  -372.150 -1077.115    84.062   42.975 -505.530  362.229
    .00  50.00  -584.645   -34.839   -72.670  -240.753  -441.104    57.280  -43.838 -567.125   80.701
    .00  60.01   735.500    34.866  -257.312    33.931   179.685    39.390    9.474 -321.682  -27.680
    .00  70.00   926.892   156.672  -298.232    83.900   300.507    22.463  -15.137 -279.047  -98.514
    .00  80.00   405.467    43.339   -64.024     -.060   138.876    32.352   -2.082  -34.209   14.190
    .00  90.00   219.090    51.235   -32.551    -3.266    98.791   -19.290  -22.307  -38.885   15.245
    .00 100.00   122.708     9.264   -10.592    16.593    66.380   -23.160   -1.171  -52.330   -3.251
    .00 110.00    39.755     1.838   -14.223    30.987    22.578    -9.707    4.413  -39.521  -31.580
    .00 120.00    10.716     3.987   -27.493    -2.284    11.334    -7.567   -2.461  -39.861  -18.141
    .00 130.00    35.163    14.961   -13.017    18.005     4.127     2.351    1.216  -17.454  -17.089
    .00 140.00   -13.689     7.401    -5.756     -.666     2.515     1.662    -.001  -10.957     .899
    .00 150.01   -14.053      .077     3.621    1.364     3.852      .990   -1.904  -13.581   -2.605
    .00 160.00    11.102     1.254    11.550    2.003     1.245     1.384    5.418   -5.086   -9.912
    .00 170.01    30.958     7.538    25.172    5.765     5.367     6.549    2.424   -2.985   -5.068
    .00 180.00     3.659      .445    10.637   -2.078     1.862    -1.034   -1.283  -10.169   -7.494
    .00 190.01     6.798     -.692     8.668     .151     2.808     1.762     .044   -6.661   -1.660
    .00 200.01     4.588      .934    15.714    2.265    -1.008    -1.709    -.296   -7.326     .542
    .00 224.99     6.114      .331    19.360     .644     2.296      .939     .638   -2.803   -1.357

C  H2 FLAME; d=9.45, delta=0.2 mm; theta=45 deg.; Uj=100, Ua=20, Ue=4 m/s; x=1.5 mm
C  D062394
C  10  : No. of data points
C
C  y     x    T SIGt'
  4.5   1.5 1456  91
  5.0   1.5 1645 193
  5.5   1.5 1603 483
  5.75  1.5 1389 624
  6.0   1.5 1123 654
  6.25  1.5  937 633
  6.5   1.5  691 525
  7.0   1.5  450 313
  7.6   1.5  329  74
  8.8   1.5  315  41

C  FILENAME= H904A010.T
C
C  H2 FLAME; d=9.45, delta=0.2 mm; theta=45 deg.; Uj=100, Ua=20, Ue=4 m/s; x=10 mm
C  D062394
C   8  : No. of data points
C
C  y     x    T SIGt'
  6.0   10  1615 146
  6.5   10  1716 171
  7.0   10  1827 253
  8.2   10  1776 403
  8.8   10  1525 617
  9.6   10   959 650
 10.4   10   623 471
 11.2   10   400 221

C  FILENAME= H904A025.T
C
C  H2 FLAME; d=9.45, delta=0.2 mm; theta=45 deg.; Uj=100, Ua=20, Ue=4 m/s; x=25 mm
C  D062394
C  13  : No. of data points
C
C  y     x    T SIGt'
  8.2   25  1580 116
  8.8   25  1595 114
  9.6   25  1633 141
 10.4   25  1677 150
 11.2   25  1761 209
 12.0   25  1776 364
 12.8   25  1654 558
 13.4   25  1460 641
 14.0   25  1618 480
 14.7   25   814 618
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 15.5   25   598 473
 16.5   25   407 235
 17.7   25   340  88

C  FILENAME= H904A050.T
C
C  H2 FLAME; d=9.45, delta=0.2 mm; theta=45 deg.; Uj=100, Ua=20, Ue=4 m/s; x=50 mm
C  D062394
C  16  : No. of data points
C
C  y     x    T SIGt'
  9.6   50  1528 349
 10.4   50  1664 223
 11.2   50  1546 425
 12.0   50  1485 480
 12.8   50  1670 305
 13.4   50  1615 340
 14.0   50  1365 595
 14.7   50  1631 369
 15.5   50  1446 578
 16.5   50  1083 641
 17.7   50   902 625
 19.0   50   778 560
 20.5   50   587 440
 22.0   50   532 378
 23.5   50   443 282
 25.0   50   388 180

C  FILENAME= H904A075.T
C
C  H2 FLAME; d=9.45, delta=0.2 mm; theta=45 deg.; Uj=100, Ua=20, Ue=4 m/s; x=75 mm
C  D062394
C  19  : No. of data points
C
C  y     x    T SIGt'
  8.8   75  1573 279
  9.6   75  1604 295
 10.4   75  1605 294
 11.2   75  1578 334
 12.0   75  1583 407
 12.8   75  1534 420
 13.4   75  1482 469
 14.0   75  1418 521
 14.7   75  1376 530
 15.5   75  1309 536
 16.5   75  1277 567
 17.7   75  1191 566
 19.0   75  1421 390
 20.5   75  1012 559
 22.0   75   884 543
 23.5   75   762 495
 25.0   75   669 439
 26.5   75   553 350
 28.0   75   535 331

C  FILENAME= H904A150.T
C
C  H2 FLAME; d=9.45, delta=0.2 mm; theta=45 deg.; Uj=100, Ua=20, Ue=4 m/s; x=150 mm
C  D062394
C  15  : No. of data points
C
C  y     x    T SIGt'
  0.0  150 1604  98
  1.3  150 1619 104
  2.7  150 1635 117
  4.5  150 1637 119
  6.0  150 1637 137
  7.6  150 1646 152
  9.6  150 1630 218
 11.2  150 1650 185
 13.4  150 1659 214
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 14.7   150 1606 373
 16.5   150 1719 269
 19.0   150 1661 309
 22.0   150 1420 557
 25.0   150 1166 594
 28.0   150 1005 555

C  FILENAME= H904A225.T
C
C  H2 FLAME; d=9.45, delta=0.2 mm; theta=45 deg.; Uj=100, Ua=20, Ue=4 m/s; x=225 mm
C  D062394
C  15  : No. of data points
C
C  y     x    T SIGt'
   0.0   225 1629 121
   1.3   225 1636 177
   2.7   225 1669 116
   4.5   225 1680 130
   6.0   225 1664 127
   7.6   225 1666 122
   9.6   225 1669 166
  12.0   225 1694 210
  13.4   225 1692 181
  14.7   225 1676 316
  16.5   225 1690 270
  19.0   225 1681 376
  22.0   225 1559 468
  25.0   225 1420 548
  28.0   225 1257 539
```