AFFDL-TR-78-206
Volume II

FASTENER HOLE QUALITY

STRUCTURES DESIGN DEPARTMENT
GENERAL DYNAMICS FORT WORTH DIVISION
FORT WORTH, TEXAS 76101

DECEMBER 1978

TECHNICAL REPORT AFFDL-TR-78-206, Volume II

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AIR FORCE WRIGHT AERONAUTICAL LABORATORIES
AIR FORCE SYSTEMS COMMAND
WRIGHT-PATTERSON AIR FORCE BASE, OHIO 45433
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This technical report has been reviewed and is approved for publication.

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Project Engineer

LARRY G. KELLY, Chief
Structural Integrity Branch

FOR THE COMMANDER

RALPH L. KUSTER, JR., Col, USAF
Chief, Structures & Dynamics Division

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This document is best quality practicable. The copy furnished to DDC contained a significant number of pages which do not reproduce legibly.
This report describes the development of the EIFSA concept as a potential design tool and the generation of EIFSA data as a function of several manufacturing and design variables. Several factors or mechanisms that strongly affected the fatigue behavior of fastener holes have been identified and corrected to achieve a 100% improvement in fatigue life. Some of these improvements are being implemented in the F-16 production program and the improved drilling will be implemented in the C5A-H Mod. Program.
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I INTRODUCTION

During the performance of Air Force Flight Dynamics Laboratory Contract F33615-76-C-3113 approximately 600 coupon fatigue specimens, both no-load and low-load transfer, were manufactured, fatigue tested and fatigue cracks fractographically read. This document contains the individual fatigue test data sheets and equivalent initial flaw size values which were the result of analyses subsequently performed. Also included are listings of crack depths at one-half life intervals for most specimens.

Section I is made up of "Fatigue Test Data" sheets which contain all pertinent information e.g., time of test termination or time to failure, to facilitate fatigue testing and fractographic analysis. All data are grouped by task and individual specimen designations are deciphered in Table 1-1. Miscellaneous notes are also included in the data sheets.

Equivalent initial flaw size and crack depth values, at one-half life intervals, are found in Section II listed by task. These listings are computer generated in a manner described in Volume I. All EIFS and crack depth values are ranked in ascending order and listed with their corresponding cumulative probabilities.

It should be noted that no equivalent initial flaw size values are listed for holes filled with Taper-lok fasteners. Insufficient crack growth in these specimens precluded fractography, except for final crack depth values in some cases, thus making EIFS values unattainable.
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**V = Improved Drilling/Assembly**

KEY TO SPECIMENT DESIGNATIONS:

- W = Winslow Drilled
- Q = Quackenbush Drilled/Reamed
- P = Proper Techniques
- I = Improper Techniques
- CW = Cold-Worked Holes
- TL = Taper Loked Holes
- F = Fighter Spectra
- B = Bomber Spectra
- H = High Stress Level
- L = Low Stress Level
- ST = Ar 1410 Steel
- TY = Titanium
- *NA = Not Available
II  FRACTOGRAPHIC DATA SHEETS
### 2.1 TASK 1
### 2.1.1 WP

#### FATIGUE TEST DATA

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2 Lives / 1,417,246 L.R. ~ 14,806,428 FLT-HRS

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**FRACTOGRAPHIC DATA**

**Fatigue Test Data**

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**Cycles at Termination:**
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2 Lives/14
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#### Average Width: 1.5010

#### Average Thickness: 3.749

#### Area: 1512.7

#### Baseline Stress: 24 Kpsi

#### Max. Load: 19,131.8

#### Cycles at Termination/Failure:

- 2 Lives

---

### Fatigue Test Data

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#### Average Width: 1.501

#### Average Thickness: 3.747

#### Area: 1562.0

#### Baseline Stress: 34 Kpsi

#### Ax. Load: 19,108.0

#### Cycles at Termination/Failure:

- 2 Lives

---

**Note:**

Specimen failure was due to an electrical error which resulted in a 100% compressive load.
### Fatigue Test Data

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### Fractographic Data

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**Notes:**
- Various measurements and test conditions are recorded, including specimen number, spectrum, test date, test frame, average width, average thickness, baseline stress, and max. load.
- Cycles at termination/failure are indicated with load cycles.
- Fractographic data includes crack length and increment information for each slice.

---

**Graph:**
- A graph is present showing crack length versus load cycles.
- The graph includes data points for different load cycles and shows the progression of crack length over time.
### Fractographic Data

**Fatigue Test Data**

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**Fatigue Test Data**

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**Static Load - 30 K**

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**FRACTOGRAPHIC DATA**

**FATIGUE TEST DATA**

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**FATIGUE TEST DATA**

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**FLIGHT HRS.**

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### Fatigue Test Data

**Specimen Number:** WPF-24

**Spectrum:** Fighter

**Test Date:**

**Test Frame:** 1 2 3 4 5

**Average Width:** 1.5026

**Average Thickness:** 0.3657

**REA:** 567,6

**AS ELINE STRESS:** 34 KSI

**AX. LOAD:** 19,438 lb

**Cycles at Termination/Remainder:**

**Static Load - 302K Live**

### Fractographic Data

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*Note: The table includes data for 40 entries, with the last two entries being oversimplified.*
### Fatigue Test Data

**Fatigue Test Data**

**Specimen Number:** WPF-28

**Spectrum:** Fighter

**Test Date:**

**Test Frame:** 1 2 3 4 5

**Average Width:** 1.5015

**Average Thickness:** 3.771

**Area:** 5.675

**Baseline Stress:** 34.5k6

**Max. Load:** 19,260.8k

**Cycles at Termination/Failure:**

2 Lives

**Static Load:** 33.2k

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### Fractographic Data

**Fractographic Data**

**Specimen Number:** WPF-29

**Spectrum:** Fighter

**Test Date:**

**Test Frame:** 1 2 3 4 5

**Average Width:** 1.4995

**Average Thickness:** 3.775

**Area:** 5.675

**Baseline Stress:** 34.5k6

**Max. Load:** 19,260.8k

**Cycles at Termination/Failure:**

2 Lives

**Static Load:** 32.5k

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**Notes:**

- The data includes crack length increments for each life.
- The test was conducted under specified conditions.
- The specimens were subjected to various loads and stresses.
- The test frame and spectrum were consistent throughout.

**Diagrams:**

- Fractographic analysis showing crack growth and fatigue damage.
- Specimen dimensions and load distribution illustrated.
### Fatigue Test Data

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**Fatigue Test Data**

- **Specimen Number:** WPF-30
- **Spectrum:** Fighter
- **Test Date:** ____________
- **Test Frame:** 1 2 3 4 5
- **Average Width:** 1.5017
- **Average Thickness:** 0.3716
- **Area:** 5581
- **Gasline Stress:** 34 kpsi
- **Max. Load:** 16975.4 lb
- **Cycles at Termination/Failure:**
  - 1 Life: 2 Lives/
  - Static Load: 33.1Klb

**Fatigue Test Data**

- **Specimen Number:** WPF-31
- **Spectrum:** Fighter
- **Test Date:** ____________
- **Test Frame:** 1 2 3 4 5
- **Average Width:** 1.5017
- **Average Thickness:** 0.3716
- **Area:** 5581
- **Gasline Stress:** 34 kpsi
- **Max. Load:** 19,329 lb
- **Cycles at Termination/Failure:**
  - 1 Life: 2 Lives/
  - Static Load: 33.0 Klb
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**Spectrum:** Fighter  
**Test Date:**  
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**Average Width:** 1.5019  
**Average Thickness:** 3.729  
**Area:** 5608  
**Baseline Stress:** 34 Ks.  
**Max. Load:** 19346.6#  
**Cycles at Termination/Failure:**

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# Fractographic Data

**Fatigue Test Data**

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FATIGUE TEST DATA

SPECIMEN NUMBER: WPF-37

SPECTRUM: Fighter

TEST DATE: 1 2 3 4 5

TEST FRAME: 1 2 3 4 5

AVERAGE WIDTH: 1.5001

AVERAGE THICKNESS: 3.752

AREA: .5626

BASELINE STRESS: 34.6ksi

MAX. LOAD: 19,339.2 kips

CYCLES AT TERMINATION:

2 Lives/

FRACTOGRAPHIC DATA

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FATIGUE TEST DATA

SPECIMEN NUMBER: WPF-37

SPECTRUM: Fighter

TEST DATE: 1 2 3 4 5

TEST FRAME: 1 2 3 4 5

AVERAGE WIDTH: 1.5001

AVERAGE THICKNESS: 3.752

AREA: .5626

BASELINE STRESS: 34.6ksi

MAX. LOAD: 19,339.2 kips

CYCLES AT TERMINATION:

2 Lives/

STATIC LOAD: 33,000 kips

2 Lives/
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**FRACTOGRAPHIC DATA**

Specimen Number: WPF-38

**Fatigue Test Data**

Specimen Number: WPF-39

**Specimen Number:** WPF-38

**Fatigue Test Data**
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### Fatigue Test Data

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### Fractographic Data

**Fatigue Test Data**

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**Specimen Number:** WPF-42

**Spectrum:** Fighter

**Test Date:**

**Test Frame:**

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**Static Load:** 33.9k

**Fatigue Test Data**

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**Specimen Number:** WPF-43

**Spectrum:** Fighter

**Test Date:**

**Test Frame:**

| AVERAGE WIDTH: | 1.5017 |
| AVERAGE THICKNESS: | 3.787 |
| AREA: | 56.97 |
| BASELINE STRESS: | 34.9k |
| MAX. LOAD: | 19,284k |
| CYCLES AT TERMINATION: | 2 Lives |

**Static Load:** 33.3k
### 2.1.2 WIF

#### FATIGUE TEST DATA

**SPECIMEN NUMBER:** WIF - 1

**SPECTRUM:** Fighter

**TEST DATE:**

**TEST FRAME:** 1 2 3 4 5

**VERAGE WIDTH:** 1.506

**VERAGE THICKNESS:** 3779 3764 3765

**REA:** -5669

**ASSELINE STRESS:** 34Ksc

**AX. LOAD:** 19275.5K#

**YCES AT TERMINATION:**

**STATIC LOAD - 28.1 K#**

---

#### FATIGUE TEST DATA

**SPECIMEN NUMBER:** WIF - 2

**SPECTRUM:** Fighter

**TEST DATE:**

**TEST FRAME:** 1 2 3 4 5

**VERAGE WIDTH:** 1.501

**VERAGE THICKNESS:** 373 376 378

**REA:** -566

**ASSELINE STRESS:** 34Ksc

**AX. LOAD:** 19244K#

**YCES AT TERMINATION:**

**STATIC LOAD - 29.25 K#**

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### FRACTOGRAPHIC DATA

**RIG #** | **FLIGHT HRS.** | **CRACK LENGTH IN.** | **INCREMENT IN.** |
---|---|---|---|
40 | 0 | 3.90 | 0.0075 |
39 | 16000 | 0.127 | 0.024 |
38 | 13600 | 0.181 | 0.024 |
37 | 13600 | 0.160 | 0.010 |
36 | 13000 | 0.150 | 0.010 |
35 | 12400 | 0.165 | 0.016 |
34 | 12000 | 0.150 | 0.010 |
33 | 11600 | 0.155 | 0.005 |
32 | 11000 | 0.150 | 0.005 |
31 | 11200 | 0.170 | 0.004 |
30 | 11200 | 0.170 | 0.004 |
29 | 11600 | 0.160 | 0.004 |
28 | 11200 | 0.155 | 0.005 |
27 | 10800 | 0.150 | 0.005 |
26 | 10800 | 0.150 | 0.005 |
25 | 10600 | 0.170 | 0.004 |
24 | 10400 | 0.170 | 0.004 |
23 | 10100 | 0.255 | 0.039 |
22 | 9900 | 0.215 | 0.025 |
21 | 9600 | 0.210 | 0.025 |
20 | 9000 | 0.185 | 0.018 |
19 | 8600 | 0.170 | 0.018 |
18 | 8200 | 0.190 | 0.018 |
17 | 7600 | 0.130 | 0.013 |
16 | 7200 | 0.130 | 0.013 |
15 | 7200 | 0.130 | 0.013 |
14 | 6600 | 0.120 | 0.012 |
13 | 6600 | 0.120 | 0.012 |
12 | 6000 | 0.090 | 0.009 |
11 | 5600 | 0.085 | 0.009 |
10 | 5600 | 0.085 | 0.009 |
9 | 5200 | 0.065 | 0.006 |
8 | 5200 | 0.065 | 0.006 |
7 | 4800 | 0.035 | 0.003 |
6 | 4800 | 0.035 | 0.003 |
5 | 4400 | 0.030 | 0.003 |
4 | 4400 | 0.030 | 0.003 |
3 | 3800 | 0.007 | 0.001 |
2 | 3800 | 0.007 | 0.001 |
1 | 400 | 0.006 | 0.001 |
**FRACTOGRAPHIC DATA**

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**Fatigue Test Data**

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2 Lives/40
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### Notes
- Specimen Number: WLF-5
- Spectrum: Fighter
- Test Date: 
- Average Width: 1.501
- Average Thickness: 3.71, 3.76, 3.71
- Heat: SS8
- Ax. Load: 19,723
- Holes at Termination/Failure: Static Load - 2.33 K#
### Fatigue Test Data

**Specimen Number:** WIF-7

**Spectrum:** Fighter

**Test Date:**

**Test Frame:** 1 2 3 4 5

**Phase Width:** 1.076

**Phase Thickness:** 3.58 3.76 3.67

**Eclipsed Stress:** 3.4 Kc

**X Load:** 19.734

**2 Lives/**

**Static Load -28.1 K**

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**Specimen Number:** WIF-8

**Spectrum:** Fighter

**Test Frame:** 1 2 3 4 5

**Phase Width:** 1.500

**Phase Thickness:** 3.58 3.76 3.75

**Eclipsed Stress:** 3.4 Kc

**X Load:** 19.734

**2 Lives/**

**Static Load -22.9 K**

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27
**Fatigue Test Data**

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**Specimen Number:** WIF-9

**Spectrum:** Fighter

**Test Date:**

**Test Frame:** 1 2 3 4 5

**Average Width:** 1.501

**Average Thickness:** 373 373 375

**Rea:** 0.560

**ASLINE Stress:** 34 KSC

**Ax. Load:** 19,440#

**Cycles at Termination/Failure:** 2 Lives

**Static Load - 30.4 K#**
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| Static Load - 31.6 k# |

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| Specimen Number:  WIF-12 |  |
| Spectrum: Fighter |  |
| Test Date: |  |
| Test Frame: |  |
| Crack Width: 1,560 | 374 373 375 |
| Crack Thickness: |  |
| Area: S61 |  |
| Bending Stress: 34 KS6 |  |
| Load: 19,074# |  |
| Cycles at Termination/Failure: | 1 Life |

| Static Load - 26.9 k# | 29 |
### Fatigue Test Data

**Specimen Number:** WIF-13

**Spectrum:** Fighter

**Test Frame:** 1 2 3 4 5

**Specimen Width:** 1.499

**Specimen Thickness:** 373.378 373

**E.A.:** 561

**Seline Stress:** 34 KSi

**X. Load:** 19074

**Test Frame:** 1 2 3 4 5

**Static Load:** 25.0 Kf

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**FATIGUE TEST DATA**

**SPECIMEN NUMBER:** WPB-38 (WPB-1)

**SPECTRUM:** Bomber

**TEST DATE:**

**TEST FRAME:** 1 2 3 4 5 6

**AVERAGE WIDTH:** 1.5013

**AVERAGE THICKNESS:** 3.779

**AREA:** 5.673

**BASELINE STRESS:** 33 KSI

**MAX. LOAD:** 18,722.4

**CYCLES AT TERMINATION/FAILURE:** *3,153 cycles/933,817 L.F.S. = 364,552 FLTS*

---

**SPECIMEN NUMBER:** WPB-1 (WPB-2)

**SPECTRUM:** Bomber

**TEST DATE:**

**TEST FRAME:** 1 2 3 4 5

**AVERAGE WIDTH:** 1.5012

**AVERAGE THICKNESS:** 3.762

**AREA:** 5.648

**BASELINE STRESS:** 33 KSI

**MAX. LOAD:** 18,346.2

**CYCLES AT TERMINATION/FAILURE:** *3,153 cycles/990,171 L.F.S.*
### Fatigue Test Data

- **Specimen Number:** WPF-2 (WPB-3)
- **Spectrum:** Bomber
- **Test Date:**
- **Test Frame:** 1 2 3 4 5
- **Average Width:** 1.5007
- **Average Thickness:** .3803
- **Area:** .5707
- **Baseline Stress:** 33 KS
- **Max. Load:** 12833.6 #
- **Cycles at Termination/Failure:** 3 Lives/17197 Lb

### Fractographic Data

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- **Specimen Number:** WPF-3 (WPB-4)
- **Spectrum:** Bomber
- **Test Date:**
- **Test Frame:** 1 2 3 4 5
- **Average Width:** 1.5017
- **Average Thickness:** .3712
- **Area:** .5574
- **Baseline Stress:** 33 KS
- **Max. Load:** 12955.2 #
- **Cycles at Termination/Failure:** 3 Lives/17197 Lb

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32
### Fatigue Test Data

**Specimen Number:** WP5-4 (WPB-5)

**Spectrum:** Bomber92

**Test Date:**

**Test Frame:** 1 2 3 4 5

**Average Width:** 14960

**Average Thickness:** 3708

**Area:** 5547

**Baseline Stress:** 33 ksi

**Max. Load:** 19305.7

**Cycles at Termination/Failure:** *3 lives/99117L

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### Fractographic Data

**Specimen Number:** WP5-5 (WPB-6)

**Spectrum:** Bomber1601

**Test Date:**

**Test Frame:** 1 2 3 4 5

**Average Width:** 15048

**Average Thickness:** 3720

**Area:** 5592

**Baseline Stress:** 33 ksi

**Max. Load:** 19472.9

**Cycles at Termination/Failure:** *3 lives/99017L

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**Max. Load:** 19472.9

**Cycles at Termination/Failure:** *3 lives/99017L

**Baseline Stress:** 33 ksi

**Max. Load:** 19472.9

**Cycles at Termination/Failure:** *3 lives/99017L

**Baseline Stress:** 33 ksi

**Max. Load:** 19472.9

**Cycles at Termination/Failure:** *3 lives/99017L

**Baseline Stress:** 33 ksi

**Max. Load:** 19472.9

**Cycles at Termination/Failure:** *3 lives/99017L

**Baseline Stress:** 33 ksi

**Max. Load:** 19472.9

**Cycles at Termination/Failure:** *3 lives/99017L

**Baseline Stress:** 33 ksi

**Max. Load:** 19472.9

**Cycles at Termination/Failure:** *3 lives/99017L

**Baseline Stress:** 33 ksi

**Max. Load:** 19472.9

**Cycles at Termination/Failure:** *3 lives/99017L

**Baseline Stress:** 33 ksi

**Max. Load:** 19472.9

**Cycles at Termination/Failure:** *3 lives/99017L
**FATIGUE TEST DATA**

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**FRACOGRAPHIC DATA**

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**GENERAL DYNAMICS**  
**I-13081-1**  
**ABULATION SHEET**  
**FATIGUE TEST DATA**

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- **SPECTRUM:** Bomber  
- **TEST DATE:**  
- **TEST FRAME:** 1 2 3 4 5 6  
- **AVERAGE WIDTH:** 1.5025  
- **AVERAGE THICKNESS:** 0.3743  
- **AREA:** .5623  
- **BASELINE STRESS:** 33ksc  
- **MAX. LOAD:** 18,555ksi  
- **CYCLES AT TERMINATION/FAILURE:** 3Lives/  
  
**STATIC LOAD - 33.1K#**

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**SPECIMEN NUMBER:** WPR-10  
**SPECTRUM:** Bomber  
**TEST DATE:**  
**TEST FRAME:** 1 2 3 4 5 6  
**AVERAGE WIDTH:** 1.5015  
**AVERAGE THICKNESS:** 0.3743  
**AREA:** .5650  
**BASELINE STRESS:** 33ksc  
**MAX. LOAD:** 126,45.5 ksi  
**CYCLES AT TERMINATION/FAILURE:** 3Lives/  
  
**STATIC LOAD - 31.6 K#**

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**Fatigue Test Data**

**Specimen Number:** WPB-11

**Spectrum:** Bomber

**Test Date:**

**Test Frame:** 1 2 3 4 5 #

**Average Width:** 1.5016

**Average Thickness:** 3806

**Area:** 5715

**Baseline Stress:** 33 ksc

**Max. Load:** 18,879.94

**Cycles at Termination:** 3 Lives/

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**Specimen Number:** WPB-12

**Spectrum:** F-106 F

**Test Date:**

**Test Frame:** 1 2 3 4 5 #

**Average Width:** 1.4990

**Average Thickness:** 3843

**Area:** 5761

**Baseline Stress:** 33 ksc

**Max. Load:** 19,010.24

**Cycles at Termination:** 3 Lives/

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**Fractographic Data**

**Specimen Number:** WPB-11

**Spectrum:** Bomber

**Test Date:**

**Test Frame:** 1 2 3 4 5 #

**Average Width:** 1.5016

**Average Thickness:** 3806

**Area:** 5715

**Baseline Stress:** 33 ksc

**Max. Load:** 18,879.94

**Cycles at Termination:** 3 Lives/

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**Specimen Number:** WPB-12

**Spectrum:** F-106 F

**Test Date:**

**Test Frame:** 1 2 3 4 5 #

**Average Width:** 1.4990

**Average Thickness:** 3843

**Area:** 5761

**Baseline Stress:** 33 ksc

**Max. Load:** 19,010.24

**Cycles at Termination:** 3 Lives/
**Fatigue Test Data**

**Specimen Number:** WPB-13

**Spectrum:** Bomber

**Test Date:**

**Test Frame:** 1 2 3 4 5

**Average Width:** 1.5016

**Average Thickness:** 3762

**Area:** .5634

**Baseline Stress:** 33 ksi

**Max. Load:** 18,592.2#

**Cycles at Termination:** 31 Lives

**Static Load - 22.0 k#**

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**Fractographic Data**

**Specimen Number:** WPB-14

**Spectrum:** Bomber

**Test Date:**

**Test Frame:** 1 2 3 4 5

**Average Width:** 1.5014

**Average Thickness:** 3821

**Area:** .5737

**Baseline Stress:** 33 ksi

**Max. Load:** 18,981.6#

**Cycles at Termination:** 3 Lives

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### Summary

- **Specimen Number:** WPB-15
- **Spectrum:** Bomber
- **Test Date:**
- **Test Frame:** 1 2 3 4 5 6
- **Average Width:** 1.5001
- **Average Thickness:** 3.717
- **Area:** 6.576
- **Baseline Stress:** 33 ksi
- **Max. Load:** 18,400.7§
- **Cycles at Termination/Failure:** 3 Lives

---

- **Specimen Number:** WPB-16
- **Spectrum:** Bomber
- **Test Date:**
- **Test Frame:** 1 2 3 4 5
- **Average Width:** 1.4999
- **Average Thickness:** 3.784
- **Area:** 5.611
- **Baseline Stress:** 33 ksi
- **Max. Load:** 18,740.7§
- **Cycles at Termination/Failure:** 3 Lives

---

- **FLIGHT HOURS**
- **CRACK LENGTH INCH**
- **INCREMENT INCH**

---

*Note: The data indicates cyclic loading conditions with specific crack growth measurements for both specifications (WPB-15 and WPB-16) under various test conditions (Flight Hours and Crack Length). The data is crucial for understanding fatigue resistance and material failure under dynamic stress conditions.*

---

*Figure: Graphical representation of crack growth with load cycles for both specimens, showing the progression and critical failure points. This visualization aids in interpreting the fatigue life and structural integrity under cyclic loading.*

---

*Table: Detailed tabulation of test results, including cycle counts at termination or failure, highlighting the progression and critical points for both specimens.*
FATIGUE TEST DATA

SPECIMEN NUMBER: WPB-17

SPECTRUM: Bomber

TEST DATE: __________

TEST FRAME: 1 2 3 4 5 6

AVERAGE WIDTH: 1.5020

AVERAGE THICKNESS: 3.736

AREA: .5671

BASELINE STRESS: 33 KSI

MAX. LOAD: 18,737

CYCLES AT TERMINATION/FRAME: 3 Lives /

SPECIMEN NUMBER: WPB-18

SPECTRUM: Bomber

TEST FRAME: 1 2 3 4 5 6

AVERAGE WIDTH: 1.5013

AVERAGE THICKNESS: 3.762

AREA: .5678

BASELINE STRESS: 33 KSI

MAX. LOAD: 18,737

CYCLES AT TERMINATION/FRAME: 3 Lives /

STATIC LOAD - 2.724K#
### Fatigue Test Data

**Specimen Number:** WPB-19

**Spectrum:** Bomber

**Test Date:**

**Test Frame:** 1 2 3 4 5

**Average Width:** 1.5003

**Average Thickness:** 0.3795

**Area:** 0.634

**Baseline Stress:** 33 KS

**Max. Load:** 12.59 KS

**Cycles at Termination/Failure:** 3 lives/

\[ @ 97.526 L P / s = 3798.92 FL T S \]

\[ @ 5.624 \text{ Load} \]

---

**Specimen Number:** WPB-20

**Spectrum:** Bomber

**Test Date:**

**Test Frame:** 1 2 3 4 5

**Average Width:** 1.499

**Average Thickness:** 0.379

**Area:** 0.563

**Baseline Stress:** 33 KS

**Max. Load:** 12.65 KS

**Cycles at Termination/Failure:** 3 lives/

**Static Load:** 33.3 KS

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### Fractographic Data

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### Fatigue Test Data

**Specimen Number:** WPB-21

**Specimen:** Bomber

**Test Date:**

**Test Frame:** 1 2 3 4 5 6

| Average Width | 1.5002 |
| Average Thickness | 3770 |
| Area | 5694 |
| Baseline Stress | 33 Ks |
| Max. Load | 18.664 k |

**Cycles at Termination/Failure:** 33 Lives/

**Static Load:** 23.3 k

---

**Specimen Number:** WPB-22

**Spectrum:** Bomber

**Test Date:**

**Test Frame:** 1 2 3 4 5

| Average Width | 1.4985 |
| Average Thickness | 374 |
| Area | 5602 |
| Baseline Stress | 33 Ks |
| Max. Load | 1848.7 k |

**Cycles at Termination/Failure:** 33 Lives/

**Static Load:** 30.0 k

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<th>INCREMENT INCH</th>
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**Notes:**

- All measurements are in inches.
- The table entries are in sequence from left to right.
- The specimen numbers are WPB-21 and WPB-22.
- The test dates and other specific data are not fully visible in the image.
- The static load and material properties are provided.
- The table entries are consistent with the test data format.
### Fractographic Data

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### Fatigue Test Data

- **Specimen Number**: WPB-23
- **Spectrum**: Bomber
- **Test Date**: 08/31/72
- **Test Frame**: 1 2 3 4 5
- **Average Width**: 1.6017
- **Average Thickness**: 0.3712
- **Area**: 0.5571
- **Baseline Stress**: 33 ksi
- **Max. Load**: 18,392.8 ksi
- **Cycles at Termination/Failure**: 3 lives (failure)

- **Specimen Number**: WPB-24
- **Spectrum**: Bomber
- **Test Date**: 08/31/72
- **Test Frame**: 1 2 3 4 5
- **Average Width**: 1.5016
- **Average Thickness**: 0.3712
- **Area**: 0.5571
- **Baseline Stress**: 33 ksi
- **Max. Load**: 18,392.8 ksi
- **Cycles at Termination/Failure**: 3 lives

**Static Load**: 32.8 kPa
### Fatigue Test Data

**Specimen Number:** WPB-2S

**Spectrum:** Bomber

**Test Date:**

**Test Frame:** 1 2 3 4 5

**Average Width:** 1.5030

**Average Thickness:** 3.729

**Area:** 5605

**Baseline Stress:** 33 Kpsi

**Max. Load:** 18,495.6

**Cycles at Termination:** 3 Lives/

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### Fractographic Data

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**One Life**

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**Specimen Number:** WPB-26

**Spectrum:** Bomber

**Test Date:**

**Test Frame:** 1 2 3 4 5 6

**Average Width:** 1.5026

**Average Thickness:** 3.742

**Area:** 5624

**Baseline Stress:** 33 Kpsi

**Max. Load:** 18,560

**Cycles at Termination:** 3 Lives/
### Fatigue Test Data

**Specimen Number:** WPR-27

**Spectrum:** Bomber

**Test Date:**

**Test Frame:** 1 2 3 4 5 6

**Average Width:** 1.504

**Average Thickness:** 3.758

**Area:** 5642

**Baseline Stress:** 33 KSC

**Max. Load:** 18,619.5

**Cycles at Termination:** 3 Lives

**Static Load:** 23.11 K

---

### Fractographic Data

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**One Life:**

- 1280
- 1200
- 1100
- 1000
- 900
- 800
- 700
- 600
- 500
- 400
- 300
- 200

**Two Lives:**

- 2560
- 2480
- 2380
- 2280
- 2180
- 2080
- 1980
- 1880
- 1780
- 1680
- 1580
- 1480

---

**Specimen Number:** WPR-28

**Spectrum:** Bomber

**Test Date:**

**Test Frame:** 1 2 3 4 5 6

**Average Width:** 1.5014

**Average Thickness:** 3.754

**Area:** 5636

**Baseline Stress:** 33 KSC

**Max. Load:** 18,599.6

**Cycles at Termination:** 3 Lives

**Static Load:** 34.0 K
### Fatigue Test Data

**Specimen Number:** WPB-29

**Spectrum:** Number

**Test Date:**

**Test Frame:** 1 2 3 4 5

**Average Width:** 1.5009

**Average Thickness:** 0.3797

**Area:** 0.6499

**Baseline Stress:** 33 kpsi

**Max. Load:** 18,906.4

**Cycles at Termination/Specimen:** Three Lives/32217

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**Cycles at Termination/Specimen:** Three Lives/

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**Cycles at Termination/Specimen:** Three Lives/32217

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**SPECNEMENT NUMBER:** WPB-31  
**SPECTRUM:** Bomber  
**TEST DATE:**  
**TEST FRAME:** 1 2 3 4 5  
**AVERAGE WIDTH:** 1.5012  
**AVERAGE THICKNESS:** 3.75  
**AREA:** 6570  
**BASELINE STRESS:** 33.2 ksi  
**MAX. LOAD:** 113.871  
**CYCLES AT TERMINATION:** 3 Lives  
**STATIC LOAD:** 31.7 k  

**SPECNEMENT NUMBER:** WPB-32  
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**AVERAGE THICKNESS:** 3.757  
**AREA:** 6570  
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**MAX. LOAD:** 18514.2  
**CYCLES AT TERMINATION:** 3 Lives  
**STATIC LOAD:** 30.2 k
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**Static Load - 32.1K#**

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**Static Load - 29.9K#**

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47
### Fatigue Test Data

**Specimen Number:** WPB-35

**Spectrum:** Bomber

**Test Date:**

**Test Frame:** 1 2 3 4 5

**Average Width:** 1.5026

**Average Thickness:** .3738

**Area:** .6614

**Baseline Stress:** 33 ksi

**Max. Load:** 17.5 lbs.

**Cycles at Termination/Failure:** 3 lives

---

**Specimen Number:** WPB-36

**Spectrum:** Bomber

**Test Date:**

**Test Frame:** 1 2 3 4 5

**Average Width:** 1.5026

**Average Thickness:** .5738

**Area:** .5616

**Baseline Stress:** 33 ksi

**Max. Load:** 17.5 lbs.

**Cycles at Termination/Failure:** 3 lives

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**Flight Hours**

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**One Life**

| 1280         | .0100             |                |
| 1180         |                   |                |
| 1080         |                   |                |
| 980          |                   |                |
| 880          |                   |                |
| 780          |                   |                |
| 680          |                   |                |
| 580          |                   |                |
| 480          |                   |                |
| 380          |                   |                |
| 280          |                   |                |
| 180          |                   |                |

---

Static Load - 31.6 k#
**GENERAL**

**FATIGUE TEST DATA**

**SPECIMEN NUMBER:** WPB - 37

**SPECTRUM:** Bomber

**TEST DATE:**

**TEST FRAME:** 1 2 3 4 5

**AVERAGE WIDTH:** 1.5019

**AVERAGE THICKNESS:** 3.762

**AREA:** 5.450

**BASELINE STRESS:** 33 KSC

**MAX. LOAD:** 18,644.2#

**CYCLES AT TERMINATION/FAILURE:** 31 Lives

**STATIC LOAD - 32.4 K#**

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### Fatigue Test Data

**Specimen Number:** WIB-1

**Spectrum:** Bomber

**Test Date:**

**Test Frame:** 1 2 3 4 5

**Average Width:** 1.499"

**Average Thickness:** 3740 3753 2746 3762

**Area:** 574.2

**Baseline Stress:** 33 ks

**Max. Load:** 1261.2#

**Cycles at Failure:** 3 Lives

---

### Fractographic Data

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<tr>
<th>Flight Hours</th>
<th>Crack Length Inch</th>
<th>Increment Inch</th>
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**Specimen Number:** WIB-2

**Spectrum:** Bomber

**Test Date:**

**Test Frame:** 1 2 3 4 5

**Average Width:** 1.506#

**Average Thickness:** 375 371 376 376#

**Area:** 566#

**Baseline Stress:** 33 ks

**Max. Load:** 1269.2#

**Cycles at Failure:** 3 Lives

---

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### Fatigue Test Data

**Specimen Number:** WTB-3

**Spectrum:** Bomber

**Test Date:**

**Test Frame:** 1 2 3 4 5

**Average Width:** 1.497

**Average Thickness:** 374 375 371

**Area:** .571

**Baseline Stress:** 33 ksc

**Max. Load:** 12,843#

**Cycles at Failure:** 3,648.79 FLHRS

---

### Fractographic Data

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| One Life | 1280 | 0 |
| 1180 | 0.1 | 0.1 |
| 1080 | 0.2 | 0.2 |
| 980 | 0.3 | 0.3 |
| 880 | 0.4 | 0.4 |
| 780 | 0.5 | 0.5 |
| 680 | 0.6 | 0.6 |
| 580 | 0.7 | 0.7 |
| 480 | 0.8 | 0.8 |
| 380 | 0.9 | 0.9 |
| 280 | 1.0 | 1.0 |

---

**Specimen Number:** WTB-4

**Spectrum:** Bomber

**Test Date:**

**Test Frame:** 1 2 3 4 5

**Average Width:** 1.489

**Average Thickness:** 374 377 372

**Area:** .564

**Baseline Stress:** 33 ksc

**Max. Load:** 12,678#

**Cycles at Failure:** 3,648.79 FLHRS

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**Flight Hours**

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**One Life | 1280 | 0 |
<p>| 1180 | 0.1 | 0.1 |
| 1080 | 0.2 | 0.2 |
| 980 | 0.3 | 0.3 |
| 880 | 0.4 | 0.4 |
| 780 | 0.5 | 0.5 |
| 680 | 0.6 | 0.6 |
| 580 | 0.7 | 0.7 |
| 480 | 0.8 | 0.8 |
| 380 | 0.9 | 0.9 |
| 280 | 1.0 | 1.0 |</p>
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### Fractographic Data

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### SPECIMEN NUMBER: WIR-7

**SPECTRUM:** Bomber  
**TEST DATE:**  
**TEST FRAME:** 1 2 3 4 5  
**AVERAGE WIDTH:** 1.498  
**AVERAGE THICKNESS:**   
**AREA:** 569  
**BASELINE STRESS:** 33ksi  
**MAX. LOAD:** 18774  
**CYCLES AT TERMINATION/FAILURE:** 3 Lives/ 

---

### SPECIMEN NUMBER: WIR-8

**SPECTRUM:** Bomber  
**TEST DATE:**  
**TEST FRAME:** 1 2 3 4 5  
**AVERAGE WIDTH:** 1.499  
**AVERAGE THICKNESS:**  
**AREA:** 569  
**BASELINE STRESS:** 38ksi  
**MAX. LOAD:** 18774  
**CYCLES AT TERMINATION/FAILURE:** 2 Lives/ 

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### FATIGUE TEST DATA

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### Notes:
- Flight hours are listed in increments of 10.
- Crack length is given in inches.
- Increment is the change in crack length from one flight hour to the next.
### Fatigue Test Data

**Specimen Number:** WB-9

**Spectrum:** Bomber

**Test Date:**

**Test Frame:** 1 2 4 5

**Average Width:** 1.567

**Average Thickness:** 379 379 379

**Area:** .569

**Baseline Stress:** 33 kg/cm²

**Max. Load:** 18,777#

**Cycles at Termination:** 2 Lives/

**Static Load - 31.6 k#**

---

### Fractographic Data

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**Specimen Number:** WB-10

**Spectrum:** Bomber

**Test Date:**

**Test Frame:** 1 2 4 5

**Average Width:** 1.498

**Average Thickness:** 378 379 379

**Area:** .571

**Baseline Stress:** 33 kg/cm²

**Max. Load:** 18,343#

**Cycles at Termination:** 3 Lives/

**Static Load - 2285 k#**

---

54
### Fatigue Test Data

**Specimen Number:** WIB-11

**Spectrum:** Bomber

**Test Date:**

**Test Frame:** 02 0 4 5

**Average Width:** 1.600

**Average Thickness:** 376 377 380 375

**Area:** 567

**Baseline Stress:** 33.1 ksi

**Max. Load:** 18.694 ksi

**Cycles at Test Frame/Failure:** 3 Lives/

- @ 953,792.8Lb = 369.12 Flt-Hrs

---

**Specimen Number:** WIB-12

**Spectrum:** Bomber

**Test Date:**

**Test Frame:** 1 0 4 5

**Average Width:** 1.600

**Average Thickness:** 376 378 377

**Area:** 571

**Baseline Stress:** 38.1 ksi

**Max. Load:** 1884.8 ksi

**Cycles at Test Frame/Failure:** 3 Lives/

- @ 866,031 Lb = 3358.75 Flt-Hrs

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| 2460         | .029             | .006          |
| 2360         | .023             | .006          |
| 2260         | .020             | .006          |
| 2160         | .017             | .006          |
| 2060         | .014             | .006          |
| 1960         | .014             | .006          |
| 1860         | .010             | .006          |
| 1760         | .009             | .006          |
| 1660         | .007             | .006          |
| 1560         | .007             | .006          |
| 1460         | .005             | .006          |
| 1360         | .004             | .006          |

| One Life     |                   |                |
| 1260         | .004             | .006          |
| 1160         | .003             | .006          |
| 1060         | .003             | .006          |
| 960          | .002             | .006          |
| 860          | .002             | .006          |
| 760          | .001             | .006          |
| 660          | .001             | .006          |
| 560          | .001             | .006          |
| 460          | .000             | .006          |

**FLight Hours**

Three Lives: 3540

2100

### Fractographic Data

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| Two Lives    |                   |                |
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| 2460         | .029             | .006          |
| 2360         | .023             | .006          |
| 2260         | .020             | .006          |
| 2160         | .017             | .006          |
| 2060         | .014             | .006          |
| 1960         | .014             | .006          |
| 1860         | .010             | .006          |
| 1760         | .009             | .006          |
| 1660         | .007             | .006          |
| 1560         | .007             | .006          |
| 1460         | .005             | .006          |
| 1360         | .004             | .006          |

| One Life     |                   |                |
| 1260         | .004             | .006          |
| 1160         | .003             | .006          |
| 1060         | .003             | .006          |
| 960          | .002             | .006          |
| 860          | .002             | .006          |
| 760          | .001             | .006          |
| 660          | .001             | .006          |
| 560          | .001             | .006          |
| 460          | .000             | .006          |

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![Diagram](image_url)
### Fractographic Data

#### 2.1.5 QPF

#### Fatigue Test Data

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#### Static Load = 30,81 kN

### Fatigue Test Data

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#### Specimens at Termination:

- 2 Lives
- 1 Life

### Fractographic Data

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### Fractographic Data

**Specimen Number:** QPF-3

**Spectrum:** Fighter

**Test Frame:** 1 2 3 4 5

**Verage Width:** 1.499

**Verage Thickness:** 371 375 371

**ASA:** 0.565

**Aeelin Stress:** 35 KcL

**J. Load:** 19775

**MCLES AT TERMINATION/Failure:** 1340, 675, 175

**Test Date:**

**Test Frame:** 1 2 3

**Avg. Width:**

**Avg. Thickness:**

**J. Load:**

**MCLES AT TERMINATION/Failure:** 1340, 675, 175

**Test Date:**

**Test Frame:** 1 2 3 4 5
### Fatigue Test Data

**Specimen Number:** SPF-5

**Spectrum:** Fighter

**Test Date:**

**Test Frame:** 1 2 3 4 5

**Average Width:** 1499

**Average Thickness:** 367 370 367

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**Note:** The table continues with similar data entries for specimen number SPF-5.
FRACTOGRAPHIC DATA

FATIGUE TEST DATA

SPECIMEN NUMBER: GPF-7

SPECTRUM: Fighter

TEST DATE:____________________

TEST FRAME: 1 2 3 4 5 6

GAGE WIDTH: 1.499

GAGE THICKNESS: 3.48 3.75 3.62

EA: .562

ASLINE STRESS: 24 Ks$

AX. LOAD: 19,109

CYCLES AT TERMINATION: 2 Lives

STATIC LOAD - 33.6 Ks$

FATIGUE TEST DATA

SPECIMEN NUMBER: GPF-8

SPECTRUM: Fighter

TEST DATE:____________________

TEST FRAME: 1 2 3 4 5

GAGE WIDTH: 1.499

GAGE THICKNESS: 3.72 3.4 3.2

EA: 546

ASLINE STRESS: 34 Ks$

AX. LOAD: 19,244

CYCLES AT TERMINATION/Failure: 1560.37 Flt. Hrs

2 Lives*/

2 Lives*
## Fractographic Data

**Specimen Number:** 14PF-7

**Spectrum:** Fighter

**Test Date:**

- **Fatigue Test Data**
  
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**Spectrum:** Fighter

- **Test Data:**
  
  1 Life

**Cycles at Termination:**

- **Static Load:** 33.6 kN

- **Fatigue Test Data**

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**Spectrum:** Fighter

- **Test Data:**

  1 Life

**Cycles at Termination:**

- **Static Load:** 33.6 kN

**Fatigue Test Data**

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**Fatigue Test Data**

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### Fractographic Data

#### Fatigue Test Data

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#### Fractographic Data

- **Specimen Number:** QPF-35 (QPF-9)
- **Spectrum:** Fighter
- **Test Frame:** 1 2 3 4 5
- **Average Width:** 1.499
- **Average Thickness:** 0.560
- **Aereline Stress:** 34.1 ksi
- **Ax. Load:** 19,040 N
- **Cycles at Termination/Failure:** 2 Lives
- **Static Load - 31.9 kN**

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### Fatigue Test Data

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### Fatigue Test Data

**Specimen Number:** QPF-11

**Spectrum:** Fighter

**Test Date:**

**Test Frame:** 1 2 3 4 5

**Stage Width:** 1.504

**Stage Thickness:** 34.7 37.1 36.8

**EA:** 0.564

**Safety Stress:** 34 Ks

**J. Load:** 19,176

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**Static Load:** 32.7 k#

### Fractographic Data

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**Static Load** 31.8 KHz
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**Specimen Number:** 8 DL-17

**Spectrum:** Fighter

**Test Date:**

**Test Frame:** 1 2 3 4 5 (6)

### Static Load

**Average Width:** 1.97

**Average Thickness:** 349 371 369

**Area:** .56

**Baseline Stress:** 345.85

**Max. Load:** 19.074

**Cycles at Termination/Failure:**

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**Static Load: 32.5 K**

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## Fractographic Data

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**FRACTOGRAPHIC DATA**

**FATIGUE TEST DATA**

**SPECIMEN NUMBER:** 01-26

**SPECTRUM:** Fighter

**TEST DATE:**

**TEST FRAME:**

**AVERAGE WIDTH:** 1499

**AVERAGE THICKNESS:** .563

**AREA:** 34 kg

**BASELINE STRESS:** 34 kg

**MAX. LOAD:** 1942

**CYCLES AT TERMINATION/FAILURE:**

**STATIC LOAD - 27.1 K**

**FATIGUE TEST DATA**

**SPECIMEN NUMBER:** 01-26

**SPECTRUM:** Fighter

**TEST DATE:**

**TEST FRAME:** 1 2 3 4 5 (7)

**AVERAGE WIDTH:** 1498

**AVERAGE THICKNESS:** .563

**AREA:** .563

**BASELINE STRESS:** 34 kg

**MAX. LOAD:** 1942

**CYCLES AT TERMINATION/FAILURE:**

**STATIC LOAD - 28.4 K**
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### Cycles at Termination/Failure:

2 Lives/

Static Load - 33.1 Kf

No crack was found after 2 Lives. Since this test hole was not beams and leaving the hole under stress, the hole was drilled by the shop mechanic which resulted in putting a compression load on the test hole and cold welding the hole together. Therefore, fatigue initiation was retained.

### Fatigue Test Data

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### Cycles at Termination/Failure:

2 Lives/

Static Load - 30.8 Kf
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**STATIC LOAD - 32.5 K**

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**FATIGUE TEST DATA**

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**STATIC LOAD - 25.1 K**

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Zero at Base of Nub.
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**Static Load - 29.7 kF**

### Fatigue Test Data

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72
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#### Fatigue Test Data

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**Note:** The table represents the crack length and increment data for fatigue test specimens, with details on the specimen number, spectrum, test data, test frame, average width, average thickness, area, baseline stress, max. load, and cycles at termination/failure.
### Fatigue Test Data

**Specimen Number:** QIF-1

**Spectrum:** Fighter

**Test Frame:** 1 2 3 4 5

**Average Width:** 1.497

**Average Thickness:** 37.2 37.2 37.6

**Specimen:** 566

**Seline Stress:** 34Ks

**Load:** 1976 1772

**Cycles at Termination/Failure:** 2 Lives

**Static Load:** 29.1 kN

---

### Fatigue Test Data

**Specimen Number:** QIF-2

**Spectrum:** Fighter

**Test Frame:** 1 2 3 4 5

**Average Width:** 1.500

**Average Thickness:** 37.7 37.7 37.7

**Specimen:** 566

**Seline Stress:** 34Ks

**Load:** 19244

**Cycles at Termination/Failure:** 2 Lives

**Static Load:** 31.4 kN

---

### Fractographic Data

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**Test Date:**

**Test Frame:** 1 2 3 4 5

| Age Width | 1.50 |
| Age Thickness | 3.77 3.77 3.77 |
| Stress | 34 Ks |
| Load | 19.244 |

**Stages at Termination/Failure:**

**Static Load:** 31.4 kN

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### Fatigue Test Data 2 Lives

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| Age Width | 1.499 |
| Age Thickness | 3.76 3.79 3.79 |
| Stress | 5.66 |
| Load | 19.244 |

**Stages at Termination/Failure:**

**Static Load:** 28.0 kN

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**2 Lives at Termination/Failure:**

- Static Load: 29.8 kN

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**2 Lives at Termination/Failure:**

- Static Load: 32.8 kN

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**1 Life**

- Static Load: 29.8 kN

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**1 Life**

- Static Load: 32.8 kN
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| STATIC LOAD - 32.8 K#

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FRACTOGRAPHIC DATA

2 Lives

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39 15600 .041 .03 .045
38 15200 .031 .03 .035
37 14800 .027 .02 .027
36 14400 .021 .02 .021
35 14000 .018 .02 .018
34 13600 .024 .02 .024
33 13200 .027 .02 .027
32 12800 .024 .02 .024
31 12400 .025 .02 .025
30 12000 .026 .02 .026
29 11600 .028 .02 .028
28 11200 .030 .02 .030
27 10800 .032 .02 .032
26 10400 .034 .02 .034
25 10000 .036 .02 .036
24 9600 .038 .02 .038
23 9200 .038 .02 .038
22 8800 .038 .02 .038
21 8400 .036 .02 .036
20 8000 .034 .02 .034
19 7600 .032 .02 .032
18 7200 .030 .02 .030
17 6800 .028 .02 .028
16 6400 .026 .02 .026
15 6000 .024 .02 .024
14 5600 .022 .02 .022
13 5200 .020 .02 .020
12 4800 .018 .02 .018
11 4400 .016 .02 .016
10 4000 .014 .02 .014
9 3600 .012 .02 .012
8 3200 .010 .02 .010
7 2800 .008 .02 .008
6 2400 .006 .02 .006
5 2000 .004 .02 .004
4 1600 .002 .02 .002
3 1200 .000 .02 .000
2 800 .000 .02 .000
1 400 .000 .02 .000

FATIGUE TEST DATA

2 Lives

Rig # FLIGHT HRS. CRACK LENGTH IN. INCREMENT IN.
40 16000 .058 .08 .045
39 15600 .041 .03 .045
38 15200 .031 .03 .035
37 14800 .027 .02 .027
36 14400 .021 .02 .021
35 14000 .018 .02 .018
34 13600 .024 .02 .024
33 13200 .027 .02 .027
32 12800 .024 .02 .024
31 12400 .025 .02 .025
30 12000 .026 .02 .026
29 11600 .028 .02 .028
28 11200 .030 .02 .030
27 10800 .032 .02 .032
26 10400 .034 .02 .034
25 10000 .036 .02 .036
24 9600 .038 .02 .038
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22 8800 .038 .02 .038
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20 8000 .034 .02 .034
19 7600 .032 .02 .032
18 7200 .030 .02 .030
17 6800 .028 .02 .028
16 6400 .026 .02 .026
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13 5200 .020 .02 .020
12 4800 .018 .02 .018
11 4400 .016 .02 .016
10 4000 .014 .02 .014
9 3600 .012 .02 .012
8 3200 .010 .02 .010
7 2800 .008 .02 .008
6 2400 .006 .02 .006
5 2000 .004 .02 .004
4 1600 .002 .02 .002
3 1200 .000 .02 .000
2 800 .000 .02 .000
1 400 .000 .02 .000

FATIGUE TEST DATA

2 Lives

SPECIMEN NUMBER: OIF-13
SPECTRUM: Fighter
TEST DATE: 
TEST FRAME: 1 2 3 4 5
MAX. WIDTH: 1.501
MAX. THICKNESS: 373 375 374
EQA: 563
ASSESS STRESS: 34 KSC
AX LOAD: [100% A 70%]

1 Life

JCLES AT TERMINATION/FAILURE:

2 Lives/

STATIC LOAD - 32.6 K#
### Fractographic Data

**Fatigue Test Data**

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**Specimen Number:** QLF-15

**Spectrum:** Fighter

**Test Date:**

**Test Frame:** 1 2 3 4 5 6

**Average Width:** 1.498

**Average Thickness:** 373 378 373

**GRA:** 561

**Baseline Stress:** 34 KSi at 156°F

**Max. Load:** 19,274 at 1763

**Cycles at Termination/Failure:** 1 Life

**Static Load:** 29.6 Kf/A
### Fractographic Data

#### Fatigue Test Data

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**General Dynamics**

**Fatigue Test Data**

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### Fatigue Test Data

**SPECIMEN NUMBER:** GPE-3

**SPECTRUM:** Bomber

**TEST DATE:**

**TEST FRAME:** 1 2 3 4 5

**AVERAGE WIDTH:** 1.478

**AVERAGE THICKNESS:** 0.270 0.275 0.278

**AREA:** 0.546

**BASELINE STRESS:** 33 ksi

**MAX. LOAD:** 18,744#

**CYCLES AT TERMINATION:** 3 lives

**STATIC LOAD - 31.2 k#**

### Fractographic Data

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**STATIC LOAD - 31.2 k#**

**SPECTRUM:** Bomber

**TEST DATE:** 12/24/74

**MAX. LOAD:** 18,744#

**CYCLES AT TERMINATION:** 3 lives

**STATIC LOAD - 31.2 k#**

---

**SPECIMEN NUMBER:** GPE-4

**SPECTRUM:** Bomber

**TEST DATE:**

**TEST FRAME:** 1 2 3 4 5

**AVERAGE WIDTH:** 1.478

**AVERAGE THICKNESS:** 0.270 0.275 0.280

**AREA:** 0.546

**BASELINE STRESS:** 33 ksi

**MAX. LOAD:** 18,744#

**CYCLES AT TERMINATION:** 3 lives

**STATIC LOAD - 31.2 k#**
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**Static Load - 32.3 kN**

**Fatigue Test Data**

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**Static Load - 26.4 kN**

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**Two Lives**

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**GENERAL DYNAMICS**

**Part Mark Design**

**TABULATION SHEET**

**FATIGUE TEST DATA**

**SPECIMEN NUMBER:** 8136 - 7

**SPECTRUM:** Bomber

**TEST DATE:**

**TEST FRAME:** 1 2 3 4 5

**AVERAGE WIDTH:** 1.999

**AVERAGE THICKNESS:** 0.756 0.719

**AREA:** 5\*8

**BASELINE STRESS:** 33 ksi

**MAX. LOAD:** 18,744.0

**CYCLES AT TERMINATION/FAILURE:** 3 Lives/

---

**FRACTOGRAPHIC DATA**

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<thead>
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<th>FLIGHT HOURS</th>
<th>CRACK LENGTH INCH</th>
<th>INCREMENT INCH</th>
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**FLIGHT HOURS**

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### Fatigue Test Data

**Specimen Number:** G86-9  
**Spectrum:** Bomber  
**Test Date:**  
**Test Frame:** 12345  
**Average Width:** 1.56  
**Average Thickness:** 2783276  
**Area:** 4.57  
**Baseline Stress:** 33ksi  
**Max. Load:** 18.77k  
**Cycles at Termination:** Three Lives

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**Specimen Number:** G88-10  
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**Test Frame:** 12345  
**Average Width:** 1.56  
**Average Thickness:** 2783276  
**Area:** 4.59  
**Baseline Stress:** 33ksi  
**Max. Load:** 18.77k  
**Cycles at Termination:** Three Lives

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**Area:**  
**Baseline Stress:**  
**Max. Load:** 18.77k  
**Cycles at Termination:** Three Lives

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### Fatigue Test Data

**Specimen Number:** OPE-11  
**Spectrum:** Barber  
**Test Date:**  
**Test Frame:** 1 2 3 4 5  
**Average Width:** 1.97  
**Average Thickness:** 3.75, 3.73, 3.72  
**Area:** 5.64  
**Baseline Stress:** 35 ksf  
**Max. Load:** 12,612 ksf  
**Cycles at Termination/Failure:** 31.6 lives/  

**Static Load - 23.7 ksf**

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### Fractographic Data

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| 2160         | 0.036            | 0.044          |
| 2080         | 0.036            | 0.044          |
| 2000         | 0.036            | 0.044          |
| 1920         | 0.036            | 0.044          |
| 1840         | 0.036            | 0.044          |
| 1760         | 0.036            | 0.044          |
| 1680         | 0.036            | 0.044          |
| 1600         | 0.036            | 0.044          |
| 1520         | 0.036            | 0.044          |
| 1440         | 0.036            | 0.044          |
| 1360         | 0.036            | 0.044          |
| 1280         | 0.036            | 0.044          |
| 1200         | 0.036            | 0.044          |
| 1120         | 0.036            | 0.044          |
| 1040         | 0.036            | 0.044          |
| 960          | 0.036            | 0.044          |
| 880          | 0.036            | 0.044          |
| 800          | 0.036            | 0.044          |
| 720          | 0.036            | 0.044          |
| 640          | 0.036            | 0.044          |
| 560          | 0.036            | 0.044          |

**One Life**  
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**Area:** 87
### Fatigue Test Data

**Specimen Number:** 096-13

**Spectrum:** Bombard  

**Test Date:**  

**Test Frame:** 1 2 3 4 5  

**Average Width:** 1.503  

**Average Thickness:** 374.375 376 378  

**Area:** 5.70  

**Baseline Stress:** 535 kpsi  

**Max. Load:** 18716 lb  

**Cycles at Termination:** 3 Lives/  

**Static Load:** 20.3 kpsi

---

### Fractographic Data

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**Specimen Number:** 096-14

**Spectrum:** Bombard  

**Test Date:**  

**Test Frame:** 1 2 3 4 5  

**Average Width:** 1.504  

**Average Thickness:** 374.375 376 378  

**Area:** 5.69  

**Baseline Stress:** 335 kpsi  

**Max. Load:** 18777 lb  

**Cycles at Termination:** 3 Lives/  

**Static Load:** 29.5 kpsi

---

88
**Fatigue Test Data**

**Specimen Number:** QPR-16

**Spectrum:** Bomber

**Test Date:**

**Test Frame:** 1 2 3 4 5

**Average Width:** 1.5062

**Average Thickness:** 3776, 3767, 3798, 3771

**Area:** 6886

**Baseline Stress:** 3338.5

**Max. Load:** 13765.34

**Cycles at Termination/Remainder:** 3 Lives/___

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**Fractographic Data**

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**Static Load:** 31.6

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### Fatigue Test Data

**Specimen Number:** 0PB-17

**Spectrum:** Bomber

**Test Date:**

**Test Frame:** 1 2 3 4 5

**Average Width:** 1.5027

**Average Thickness:** 3777 3778 3785 3773

**Area:** .5674

**Base Line Stress:** 33 KSI

**Max. Load:** 1872.36

**Cycles at Termination/Failure:** 3 Lives/

**Specimen Number:** 8PB-18

**Spectrum:** Bomber

**Test Date:**

**Test Frame:** 1 2 3 4 5

**Average Width:** 1.5029

**Average Thickness:** 3767.3764 3779.3777

**Area:** .5661

**Base Line Stress:** 33 KSI

**Max. Load:** 1867.1

**Cycles at Termination/Failure:** 3 Lives/

### Fractographic Data

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### General Dynamics

Port Huron Division

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**Fatigue Test Data**

**Specimen Number:** OPR-22

**Spectrum:** Bomber

**Test Date:**

**Test Frame:** 1 2 3 4 5

**Average Width:** 1.6047

**Average Thickness:** 3.792 3.775 3.744

**Area:** .5689

**Baseline Stress:** 33 ksi

**Max. Load:** 18,774.24

**Cycles at Termination:** 3 Lives

**Static Load:** 33.3 k#

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**Fractographic Data**

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**Specimen Number:** 914-14

**Spectrum:** Bomber

**Test Date:**

**Test Frame:** 1 2 3 4 5

**Average Width:** 1.6047

**Average Thickness:** 3.796 3.760 3.734 3.783

**Area:** .5713

**Baseline Stress:** 33 ksi

**Max. Load:** 18,762.0#

**Cycles at Termination:** 3 Lives

**Static Load:** 33.3 k#
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|              | 880               |                |
|              | 780               |                |
|              | 680               |                |
|              | 580               |                |
|              | 480               |                |
|              | 380               |                |

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|              | 3760              | 0.038          |
|              | 3660              | 0.0261         |
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| Three Lives  | 3860              | 0.0233         |
|              | 3760              | 0.038          |
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### Signature

Signature: [Signature]
### Fatigue Test Data

**Specimen Number:** QPB-27

**Spectrum:** Bomber

**Test Date:**

**Test Frame:** 1 2 3 4 5

**Average Width:** 1497

**Average Thickness:** 372.375

**Area:** 366

**Baseline Stress:** 38ks

**Max. Load:** 1867 k#

**Cycles at Termination/Frame:** 3 Lives

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### Fractographic Data

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**Specimen Number:** QPB-27

**Spectrum:** Bomber

**Test Date:**

**Test Frame:** 1 2 3 4 5

**Average Width:** 1496

**Average Thickness:** 341

**Area:** 367

**Baseline Stress:** 38ks

**Max. Load:** 1838 k#

**Cycles at Termination/Frame:** 3 Lives

---
### Fatigue Test Data

**Specimen Number:** QPB-29

**Spectrum:** Bomber

**Test Date:**

**Test Frame:** 1 2 3 4 5

**Average Width:** 1.48

**Average Thickness:** 3.66 3.66 3.66

**Area:** 557

**Baseline Stress:** 33 ksi

**Max. Load:** 17,391 lbf

**Cycles at Termination/Failure:** 3 lives/

**Static Load - 26.8 k**

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**Test Spectrum:** Bomber

**Test Date:**

**Test Frame:**

**Average Width:** 1.5065

**Average Thickness:** 3.753 3.753 3.753 3.753 3.753

**Area:** 1.5627

**Baseline Stress:** 33 ksi

**Max. Load:** 18,570 lbf

**Cycles at Termination/Failure:** 3 lives/

**Static Load - 29.2 k**
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### Flight Test Data

**Specimen Number:** QPB-34

**Spectrum:** Bomber

**Test Date:**

**Test Frame:** 1 2 3 4 5

**Average Width:** 1.501

**Average Thickness:** 26.4 26.5 26.5

**Area:** 556

**Baseline Stress:** 33.5 KSI

**Max. Load:** 12.34 KSI

**Cycles at Termination/Failure:** 3 Lives/

**Static Load - 3.14 KSI**

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### Fractographic Data

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**Total Lives:** 1280

**Cumulative Cycles:**

- 1200
- 1100
- 1000
- 900
- 800
- 700
- 600
- 500
- 400
- 300
- 200

**Average Thickness:**

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**Total Lives:** 1380

**Cumulative Cycles:**

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- 1000
- 900
- 800
- 700
- 600
- 500
- 400
- 300
- 200
GENERAL DYNAMICS
Part Weltno Division
TABULATION SHEET

FRACTOGRAPHIC DATA

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| OPR 37          |
| Spectrum: Bomber |
| Test Date:       |
| Test Frame: 1 2 3 4 5 |
| Averge Width: 1499 |
| Average Thickness: 370 273 371 |
| Area: 56x5 |
| Baseline Stress: 33K6 |
| Max. Load: 18,645K |

Cycles at termination/failure: 3 Lives

| Specimen Number: OPR 37 (QP 38) |
| Spectrum: Bomber |
| Test Date:       |
| Test Frame: 1 2 3 4 5 |
| Average Width: 1499 |
| Average Thickness: 362 371 368 |
| Area: 56x6 |
| Baseline Stress: 33K6 |
| Max. Load: 18,470K |

Cycles at termination/failure: 3 Lives

Static Load = 23.4 kN

99
### Fatigue Test Data

**Specimen Number:** QPF-9  GPF-39  
**Spectrum:** Bomber  
**Test Date:**  
**Test Frame:** 1 2 3 4 (5)  
**Average Width:** 1.499  
**Average Thickness:** 371 375 376  
**Area:** 864  
**Baseline Stress:** 33K  
**Max. Load:** 18,612#  
**Cycles at Termination:** 3 Lives/  
**Static Load:** 27.0 K#  

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100
### Fatigue Test Data

**Specimen Number:** QTB-1

**Spectrum:** Bomber

**Test Date:**

**Test Frame:** 1 2 3 4 5

**Average Width:** 1.567

**Average Thickness:** 3.76

**Area:** 362

**Baseline Stress:** 33.5 ksi

**Max. Load:** 1.544

**Cycles at Termination/Failure:** 2 Lives

**Static Load - 32.2 k#**

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### Fractographic Data

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| One Life |                    |                |
| 1250   |                    |                |
| 1200   |                    |                |
| 1150   |                    |                |
| 1100   |                    |                |
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| 350    |                    |                |
| 300    |                    |                |

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**Specimen Number:** QTB-2

**Spectrum:** Bomber

**Test Date:**

**Test Frame:** 1 2 3 4 5

**Average Width:** 1.49

**Average Thickness:** 3.75

**Area:** 367

**Baseline Stress:** 33.5 ksi

**Max. Load:** 1.544

**Cycles at Termination/Failure:** 3 Lives

**Static Load - 33.0 k#**

---

101
### Fatigue Test Data

**Specimen Number:** QTB-3

- **Spectrum:** Bomber
- **Test Date:**
- **Test Frame:** 1 2 3 4 5 6
- **Average Width:** 1.500
- **Average Thickness:** 372 377 377
- **Area:** 568
- **Baseline Stress:** 33.6 ksc
- **Max. Load:** 17.144
- **Cycles at Termination/Failure:**
  - Static Load - 29.8 kN

### Fractographic Data

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- 2680 0.630 0.19
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- 2780 0.425 0.07
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- 2880 0.281 0.04
- 2920 0.226 0.03
- 2980 0.192 0.02
- 3000 0.166 0.02
- 3020 0.146 0.02
- 3060 0.101 0.02
- 3100 0.073 0.01
- 3300 0.060 0.01
- 3500 0.047 0.01
- 3700 0.036 0.01
- 3900 0.029 0.01
- 4000 0.022 0.01
- 4060 0.022 0.01

**One Life:**
- 4100 0.036 0.01
- 4150 0.036 0.01
- 4200 0.036 0.01
- 4250 0.036 0.01
- 4300 0.036 0.01

### Additional Data

**Specimen Number:** QT8-4

- **Spectrum:** Bomber
- **Test Date:**
- **Test Frame:** 1 2 3 4 5
- **Average Width:** 1.500
- **Average Thickness:** 375 377 375
- **Area:** 564
- **Baseline Stress:** 33.6 ksc
- **Max. Load:** 17.142
- **Cycles at Termination/Failure:**
  - Static Load - 27.2 kN

**Notes:**
- Additional notes and data may be present but are not fully visible in the image provided.
### Fatigue Test Data

**Specimen Number:** QIB-5  
**Spectrum:** Bomber  
**Test Date:**  
**Test Frame:** 1 2 3 4 5 6  
**Average Width:** 1.492  
**Average Thickness:** 3.77 3.77 3.76  
**Area:** 0.565  
**Baseline Stress:** 28.3Ks  
**Max. Load:** 18.612  
**Cycles at Termination/Failure:** 2 Lives/66078  

**Static Load - 27.7 kPa**

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**General Dynamics**  
**Fatigue Test Data**  
**Specimen Number:** QIB-6  
**Spectrum:** Bomber  
**Test Date:**  
**Test Frame:** 1 2 3 4 5 6  
**Average Width:** 1.501  
**Average Thickness:** 3.77 3.77 3.76  
**Area:** 0.564  
**Baseline Stress:** 33.9Ks  
**Max. Load:** 18.612  
**Cycles at Termination/Failure:** 2 Lives/66078  

**Static Load - 33.2 kPa**
### Specimen Number: QIB-7

**Spectrum:** Bomber

**Test Frame:** 1 2 3 4 5

**Average Width:** 1497

**Average Thickness:** 373, 374, 374

**Area:** 561

**Baseline Stress:** 33KSC

**Max. Load:** 18,513

**Cycles at Termination/Failure:** 3 Lives

**Static Load:** 30.6 KFM

---

### Specimen Number: QIB-8

**Spectrum:** Bomber

**Test Frame:** 1 2 3 4 5

**Average Width:** 1997

**Average Thickness:** 377, 377, 377

**Area:** 568

**Baseline Stress:** 33KSC

**Max. Load:** 18,744

**Cycles at Termination/Failure:** 3 Lives

**Static Load:** 27.8 KFM

**Data Not Valid After 2nd Life!**

**Stress Was Higher.**
**Fatigue Test Data**

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### SPECIMEN NUMBER:

- **QTR-11**
- **QTR-12**

### SPECTRUM:

- Bomber

### TEST DATE:

- 1 2 3 4 5 6 7

### AVERAGE WIDTH:

- 1.500

### AVERAGE THICKNESS:

- 376, 377, 378

### AREA:

- 556

### BASELINE STRESS:

- 33,000

### MAX. LOAD:

- 8,579

### CYCLES AT TERMINATION/FAILURE:

- 3 Lives

- @ 89,701 K = 321.79 FLT-HRS

---

**FINAL % = 41**
2.1.9 INVF

FATIGUE TEST DATA

SPECIMEN NUMBER: ZWF-1

SPECTRUM: Fighter

TEST DATE: ____________

TEST FRAME: 1 2 3 4 5 6

RANGE WIDTH: 1.501
RANGE THICKNESS: .377
A: .564
ELINE STRESS: 34.5ksi
LOAD: 19,239.72

LES AT TERMINATION:

FATIGUE TEST DATA

SPECIMEN NUMBER: ZWF-2

SPECTRUM: Fighter

TEST DATE: ____________

TEST FRAME: 1 2 3 4 5 6

RANGE WIDTH: 1.501
RANGE THICKNESS: .377
A: .564
ELINE STRESS: 34.5ksi
LOAD: 19,239.72

LES AT TERMINATION:

PRACTOGRAPHIC DATA

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**Specimen Number:** ZWF-3

**Spectrum:** Fighter

**Test Date:**

**Test Frame:**

**Race Width:**

**Race Thickness:**

**ELIN Stress:**

**Mean Load:**

**Life at Termination:**

**Total Load:** A = 32.5 Kx
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1. **SPECIMEN NUMBER:** 2016-6
2. **SPECTRUM:** Fighter
3. **TEST DATE:**
4. **TEST FRAME:**
5. **RANGE WIDTH:** 1.500
6. **RANGE THICKNESS:** 377
7. **A:** 566
8. **ELINE STRESS:** 34,100
9. **LOAD:** 19,244.00
10. **LES AT TERMINATION:**

1. **SPECIMEN NUMBER:** 2016-6
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6. **RANGE THICKNESS:** 377
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**FRACTOGRAPHIC DATA**

**SPECIMEN NUMBER:** ZWPF-9

**SPECTRUM:** Fighter

**TEST DATE:**

**TEST FRAME:** 1 2 3 4 5 6

**RACE WIDTH:** 1.5000 1.5000 1.5000 1.5000

**RACE THICKNESS:** 0.3720 0.3720 0.3720

**A:** 0.0010

**LINE STRESS:** 34.4K psi

**LOAD:** 19150.5 lbf

**LIVES AT TERMINATION:** 2 Lives

**LOAD AT TERMINATION/A:** 22.25 K psi

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**FRACTOGRAPHIC DATA**

**SPECIMEN NUMBER:** ZWPF-10

**SPECTRUM:** Fighter

**TEST DATE:**

**TEST FRAME:** 1 2 3 4 5 6

**RACE WIDTH:** 1.5000 1.5000 1.5000 1.5000

**RACE THICKNESS:** 0.3720 0.3720 0.3720

**A:** 0.0010

**LINE STRESS:** 34.4K psi

**LOAD:** 19084.1 lbf

**LIVES AT TERMINATION:** 1 Life

**LOAD AT TERMINATION/A:** 22.25 K psi
### FRACTOGRAPHIC DATA

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FATIGUE TEST DATA

SPECIMEN NUMBER: J-12-12

SPECTRUM: Fighter

TEST DATE: 7-5-77

TEST FRAME: 1 2 3 4 5 6

RACE WIDTH: 1.65

RACE THICKNESS: 37.4

A: 65.57

EIMAX STRESS: 94.8

LOAD: 18,997.3

LE: AT TERMINATION:

1 Life

3 Lives/

1,152,621 L.P.

TAPE LOAD A-58.00 K

FATIGUE TEST DATA

SPECIMEN NUMBER: J-12-12

SPECTRUM: Fighter

TEST DATE: 7-5-77

TEST FRAME: 1 2 3 4 5 6

RACE WIDTH: 1.65

RACE THICKNESS: 37.4

A: 65.57

EIMAX STRESS: 94.8

LOAD: 11,967.7

LE: AT TERMINATION:

1 Life

3 Lives/

1,152,621 L.P.

TAPE LOAD A-58.00 K

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FRACTOGRAPHIC DATA

SPECIMEN NUMBER: ZWPF-17

SPECTRUM: Fighter

TEST DATE: 1 2 3 4 5 6

TEST WIDTH: 1.5025 1.5025 1.5025

RAGE THICKNESS: .3730 .3715 .3744

A: .5604

ELINE STRESS: 32 ksc

LOAD: 190522

LES AT TERMINATION/FRAME:

2 Lives

TOTAL LOAD: A-33.1 K4

FATIGUE TEST DATA

SPECIMEN NUMBER: ZWPF-18

SPECTRUM: Fighter

TEST DATE: 1 2 3 4 5 6

TEST FRAME: 1 2 3 4 5 6

RAGE WIDTH: 1.5023 1.5023 1.5023

RAGE THICKNESS: .3764 .3769 .3756

A: .5654

ELINE STRESS: 32 ksc

LOAD: 19223.3

LES AT TERMINATION/FRAME:

2 Lives

TOTAL LOAD: A-33.3 K4

115
### Fatigue Test Data

**Specimen Number:** ZWPF-19

**Spectrum:** Fighter

**Test Date:**

**Test Frame:** 1 2 3 4 5 6

**Rage Width:** 1.5 cm / 1.5 cm / 1.5 cm

**Rage Thickness:** 1.37 cm / 1.37 cm / 1.37 cm

**A:** 0.56 cm

**E-line Stress:** 34 kgs

**Load:** 18972

**Les at Termination/1 Life:**

@ 116,967.1 K"K

**Static Load:** A-33.4 K"K

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**Specimen Number:** ZWPF-20

**Spectrum:** Fighter

**Test Date:**

**Test Frame:** 1 2 3 4 5 6

**Rage Width:** 1.5 cm / 1.5 cm / 1.5 cm

**Rage Thickness:** 1.37 cm / 1.37 cm / 1.37 cm

**A:** 0.56 cm

**E-line Stress:** 34 kgs

**Load:** 19272

**Les at Termination/1 Life:**

@ 116,671.3 K"K

**Static Load:** A-32.7 K"K
## FATIGUE TEST DATA

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### Fatigue Test Data

**Specimen Number:** ZWP-25

**Spectrum:** Fighter

**Test Date:**

**Test Frame:** 1 2 3 4 5 6

**Rage Width:** 1.4977

**Rage Thickness:** .7243

**A:** .5605

**Eligible Stress:** 34 ksi

**Load:** 19057.5

**Les at Termination:**

- 2 Lives
- @ 1,270,000 L.R.'s
- Tail Load A-33.0 K-H

---

### Fatigue Test Data

**Specimen Number:** ZWP-26

**Spectrum:** Fighter

**Test Date:**

**Test Frame:** 1 2 3 4 5 6

**Rage Width:** 1.5015

**Rage Thickness:** .3740

**A:** .5616

**Eligible Stress:** 34 ksi

**Load:** 19003.1

**Les at Termination:**

- 2 Lives
- @ 1,272,447.85 L.R.'s
- Tail Load A-33.35 K-H

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### Fractographic Data

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\[ (1269392 L_P = 13256.96 \text{ FLt-Hrs}) \]

\[ A = 53.3 \text{ K}^4, \quad B = 2.15 \quad \text{K}^2 \]

\[ R = 0.292 \]

\[ 0.0764 \]

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\[ (1269392 L_P = 13256.96 \text{ FLt-Hrs}) \]

\[ A = 32.4 \text{ K}^4 \]

\[ 120 \]
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### Tensile Load

- 2 Lives / A - 25.6 K/N
- 2 Lives / A - 30.6 K/N
2.2 TAIL II
2.2.1 2DS

**FATIGUE TEST DATA**

2 Lives

**SPECIMEN NUMBER:** KWPF - 1A

**SPECTRUM:** Fighter

**TEST DATE:** __________

**TEST FRAME:** 1 2 3 4 5

**RACE WIDTH:** 1.5004 1.5007 1.5006 1.5005

**RACE THICKNESS:** 38.15 38.16 38.15 38.13 38.17 38.2

**A:** 5723

**ELINE STRESS:** 225

**LOAD:** 19450 lbf

**LES AT TERMINATION/Failure:**

2 Lives

**TANIE LOAD**

A - 15.14 KHz

B - 14.90 KHz

**ORIGIN LIES ON RADIUS OF BROKEN CORNER. FAILURE ORIGINATES AT THE BASE OF A SLIVER.**

---

**FATIGUE TEST DATA**

2 Lives

**SPECIMEN NUMBER:** KWPF - 2A

**SPECTRUM:** Fighter

**TEST DATE:** __________

**TEST FRAME:** 1 2 3 4 5

**RACE WIDTH:** 1.5014 1.5017 1.5018 1.5015 1.5016

**RACE THICKNESS:** 38.27 38.38 38.35 38.36 38.37 38.38

**A:** 5742

**ELINE STRESS:** 225

**LOAD:** 19521 lbf

**LES AT TERMINATION/Failure:**

2 Lives

**TANIE LOAD**

A - 13.90 KHz

B - 13.72 KHz

**ORIGIN LIES ON CHAMFERED CORNER. SURFACE NEAR BOLT HOLE/CHAMFER TRANSITION. ORIGIN STARTS FROM THE BASE OF A SLIVER.**
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<td>TAIL LOAD:</td>
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**Les at termination/failure:**

- **2 Lives**

**Tail Load:**

- A: 16.56 KHz
- B: 15.77 KHz

---

**Fatigue Test Data**

**Specimen Number:** XW PF - 4B

**Spectrum:** Fighter

**Test Frame:** 1 2 3 4 5 6

**Test Width:**

- 1.5012
- 1.5067
- 1.5067
- 1.5071
- 1.5072

**Rage Thickness:**

- 2.3863
- 2.3854
- 2.3854
- 2.3853
- 2.3850

**A:** 5.766

**Tail Load:**

- A: 12720.4
- B: 12720.4

**Original Lies on Bolt Hole Surface.**

**Les at Termination/Failure:**

- 2 Lives
**FRACTOGRAPHIC DATA**

**FATIGUE TEST DATA**

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**STATIC LOAD**

- A = 15.25 Kf
- B = 16.92 Kf

**ORIGIN LIES ON BOLT HOLE SURFACE**

Initiation Site was at the Race of a Sliver.

**BASELINE STRESS**

CALS 0.01%

**AVERAGE WIDTH**: 1.501, 1.504, 1.505, 1.502

**AVERAGE THICKNESS**: 0.353, 0.352, 0.353, 0.353

**Cycles at Termination**: 2 Lives

**FLIGHT TEST DATA**

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<td>Cycles at Termination:</td>
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**STATIC LOAD**

- A = 15.25 Kf
- B = 16.92 Kf

**ORIGIN LIES AT CORNER**

The corner had a tailed radius.
**FATIGUE TEST DATA**

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<td>ORIGIN LIES AT BOLT-HOLE MATING SURFACE CORNER, MATING SURFACES WERE Milled.</td>
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**FRACTOGRAPHIC DATA**

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**STRESS AT TERMINATION:**

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FRACTOGRAPHIC
DATA

SPECIMEN NUMBER: WMPF-9A

SPECTRUM: Fighter

TEST DATE: ____________

TEST FRAME: 1 2 3 4 5

RACE WIDTH: 1.5018

RACE THICKNESS: .3841

A: 1.5769

ELINE STRESS: 34k

LOAD: 19616

LES AT TERMINATION/FAILURE:

2 Lives/

STATIC LOAD A-10.26 K# B-14.79 K#

ORIGIN LIED ON BOLT HOLE SURFACE DUE IMPR. DEFECT.

FRACTOGRAPHIC DATA

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FRACTOGRAPHIC DATA

SPECIMEN NUMBER: WMPF-10A

SPECTRUM: Fighter

TEST DATE: ____________

TEST FRAME: 90

AVERAGE WIDTH: 1.5041

AVERAGE THICKNESS: .3801

AREA: .5706

BASELINE STRESS: 34k

MAX. LOAD: 19401.2

CYCLES AT TERMINATION:

2 Lives/

STATIC LOAD A-14.44 K# B-19.74 K#
**FATIGUE TEST DATA**

**SPECIMEN NUMBER:** XWPF-11B

**SPECTRUM:** Fighter

**TEST DATE:**

**TEST FRAME:** E

**AVERAGE WIDTH:** 1.50 in.

**AVERAGE THICKNESS:** 0.036 in.

**A. AREA:** 0.075 sq. in.

**BASELINE STRESS:** 34 ksi

**MAX. LOAD:** 19561 lbs.

**CYCLES AT TERMINATION/2 Lives:**

**STATIC LOAD A=15.42 Kft**

**B=13.31 Kft**

**ORIGIN LIES ON HOLE SURFACE NEAR CHAMFER CORNER.**

---

**FRACTOGRAPHIC DATA**

**FLIGHT HRS.**

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**2 Lives/______**

---

**FLIGHT TEST DATA**

**SPECIMEN NUMBER:** XWPF-12B

**SPECTRUM:** Fighter

**TEST DATE:**

**TEST FRAME:** 1 2 3 4 5 6 (90)

**RAGE WIDTH:** 1.4097

**RAGE THICKNESS:** 0.036

**A.:** 5488

**ELINE STRESS:** 34 ksi

**LOAD:** 1023.86

**LES AT TERMINATION/2 Lives:**

**ORIGIN LIES ON CHAMFER/BOLT HOLE CORNER.**

**HATING SURFACES WERE MILLLED.**

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### FRACTOGRAPHIC DATA

#### Fatigue Test Data

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#### Specimen Number: XWPF-13A

#### Spectrum: Fighter

#### Test Date: 1Life

#### Test Frame: 6

#### Specimen Thickness: 1.506, 1.504, 1.506, 1.506, 1.506

#### Average Thickness: 1.506, 1.506, 1.506, 1.506

#### Average Width: 1.506, 1.506, 1.506, 1.506

#### Area: 1.506, 1.506, 1.506

#### Baseline Stress: 34 ksi, 34 ksi

#### Maximum Load: 18.4 ksi

#### Cycles at Failure: 2 Lives

@ 1,225,911 L.P.S. = 12,866,435 ft-lb H.R.S.

#### Static Load: A - K4

#### B - K4

---

**Note:** Original lies on bolt hole surface. Mating surfaces were milled.

---

**Note:** Test frame and load data are also provided.
FATIGUE TEST DATA

SPECIMEN NUMBER: XWPF-15B

SPECTRUM: Fighter

TEST DATE: 15

TEST FRAME: 

AVERAGE WIDTH: 1.5007
AVERAGE THICKNESS: 0.3754
AVERAGE AREA: 5604
BASELINE STRESS: 54 ksi

MAX. LOAD: 16360.9

CYCLES AT TERMINATION:

2 Lives

STATIC LOAD: A- 1200 K# B- 11.50 K# ORIGIN LIES AT BASE OF SLIVER FROM BOLT HOLE SURFACE.

FRACTOGRAPHIC DATA

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FATIGUE TEST DATA

SPECIMEN NUMBER: XWPF-16A

SPECTRUM: Fighter

TEST FRAME: 1 2 3 4 5 6 7

RACE WIDTH: 1.3000 1.3005 1.3000 1.3005
RACE THICKNESS: 0.286 0.285 0.286 0.285
A: 5699
ELINE STRESS: 34 kvs
LOAD: 16377.8

LES AT TERMINATION:

2 Lives

ORIGIN LIES ON BOLT HOLE SURFACE HATING SURFACES WERE KILLED.

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### Fatigue Test Data

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FRACTOGRAPHIC DATA

SPECIMEN NUMBER: XWP-19A
SPECTRUM: Fighter
TEST DATE: ________________
TEST FRAME: E
AVERAGE WIDTH: 1.505
AVERAGE THICKNESS: .3305
AREA: .5714
BASELINE STRESS: 34 KSI
MAX. LOAD: 19,427
CYCLES AT TERMINATION: 2 Lives

STATIC LOAD A = 14.26 KSI WAS NOT MACHINED 2 SIDES
B = 14.80 KSI WAS MACHINED 2 SIDES
ORIGIN LIES ON BOLT HOLE SURFACE

FATIGUE TEST DATA

SPECIMEN NUMBER: XWP-20A
SPECTRUM: Fighter
TEST DATE: ________________
TEST FRAME: 90
AVERAGE WIDTH: 1.5015
AVERAGE THICKNESS: .3772
AREA: .5641
BASELINE STRESS: CALS 91%
MAX. LOAD: 19,427
CYCLES AT TERMINATION: 2 Lives

STATIC LOAD A = 16.35 KSI
B = 16.99 KSI
ORIGIN LIES ON BOLT HOLE SURFACE.
**Photographic Data**

**Fatigue Test Data**

**Specimen Number:** XWPF-21A

**Spectrum:** Fighter

**Test Date:**

**Test Frame:**

**Average Width:**

**Average Thickness:**

**Area:** 0.565

**Baseline Stress:** 34ksi

**Max. Load:** 192.20

**Cycles at Termination/Failure:** 2 Lives

**Static Load**

A - 15.81 KPa
B - 16.72 KPa

Origin lies at edge of sliver from bolt hole surface

---

**Fatigue Test Data**

**Specimen Number:** XWPF-22A

**Spectrum:** Fighter

**Test Date:**

**Test Frame:**

**Average Width:**

**Average Thickness:**

**Area:** 0.571

**Baseline Stress:** 34ksi

**Max. Load:** 10438

**Cycles at Termination/Failure:** 2 Lives

**Static Load**

A - KPa
B - KPa

Origin lies on bolt hole surface from crack differential tool mark (sliver)

---

**Flight Hrs.**

**Crack Length In.**

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1 @ 1.419,995 ksi = 14335/375-hrs
### Fractographic Data

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### Fatigue Test Data

**Specimen Number:** XWP-24A

**Spectrum:** Fighter

**Test Date:**

**Test Frame:**

**Average Width:**

**Average Thickness:**

**Area:**

**Baseline Stress:**

**Max. Load:**

**Cycles at Termination:**

2 Lives/

**Static Load A:** 15.27 K#

**B:** 15.90 K#

Origin lies at corner which had a radius. Origin was at the base of a sliver.
### Fatigue Test Data

**Specimen Number:** XWPF-25A

**Specimen:** Fatigue

**Test Date:**

**Test Frame:** 15

**Average Width:** 1.5058

**Average Thickness:** 0.3785

**Area:** 0.5680

**Baseline Stress:** 34 kpsi

**Max. Load:** 15213

**Cycles at Termination:** 2 Lives

**Static Load A:** 1542 KHz

**Static Load B:** 1694 KHz

---

**Fatigue Test Data**

**Specimen Number:** XWPF-26A

**Specimen:** Fatigue

**Test Date:**

**Test Frame:** 90

**Average Width:** 1.5068

**Average Thickness:** 0.3758

**Area:** 0.5648

**Baseline Stress:** 34 kpsi

**Max. Load:** 1509

**Cycles at Termination:** 2 Lives

**Static Load A:** 1400 KHz

**Static Load B:** 1587 KHz

---

**Fatographic Data**

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FRACTOGRAPHIC DATA

SPECIMEN NUMBER: XUPF-27B
SPECTRUM: Fighter
TEST DATE:
TEST FRAME:
AVERAGE WIDTH: 1.607
AVERAGE THICKNESS: 3/36
AREA: .5723
BASELINE STRESS: 34 Ksc
MAX. LOAD: 19469
CYCLES AT TERMINATION:

2 Lives

STATIC LOAD A-1769 KPA
B-15.6 KPA

FATIGUE TEST DATA

SPECIMEN NUMBER: XUPF-28A
SPECTRUM: Fighter
TEST DATE:
TEST FRAME:
AVERAGE WIDTH: 1.501
AVERAGE THICKNESS: 3/36
AREA: .5723
BASELINE STRESS: 34 Ksc
MAX. LOAD: 19469
CYCLES AT TERMINATION:

2 Lives

STATIC LOAD A-10.86 KPA
B-10.86 KPA

ORIGIN LIES ON BOLT HOLE SURFACE FROM CIRCUMFERENTIAL TOOL MARK CREATING A SLIVER.

FATIGUE TEST DATA

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FATIGUE TEST DATA

SPECIMEN NUMBER: XUPF-27B
SPECTRUM: Fighter
TEST DATE:
TEST FRAME:
AVERAGE WIDTH: 1.607
AVERAGE THICKNESS: 3/36
AREA: .5723
BASELINE STRESS: 34 Ksc
MAX. LOAD: 19469
CYCLES AT TERMINATION:

2 Lives

STATIC LOAD A-1769 KPA
B-15.6 KPA

MATING SURFACES WERE Milled. ORIGIN LIES ON BOLT HOLE SURFACE.

FATIGUE TEST DATA

SPECIMEN NUMBER: XUPF-28A
SPECTRUM: Fighter
TEST DATE:
TEST FRAME:
AVERAGE WIDTH: 1.501
AVERAGE THICKNESS: 3/36
AREA: .5723
BASELINE STRESS: 34 Ksc
MAX. LOAD: 19469
CYCLES AT TERMINATION:

2 Lives

STATIC LOAD A-10.86 KPA
B-10.86 KPA

ORIGIN LIES ON BOLT HOLE SURFACE FROM CIRCUMFERENTIAL TOOL MARK CREATING A SLIVER.
FRACTOGRAPHIC DATA

SPECIMEN NUMBER: WIPF-29B
SPECTRUM: Fighter
TEST DATE: __________
TEST FRAME: __________

AVERAGE WIDTH: 1.500
AVERAGE THICKNESS: .572
AREA: .5706
BASELINE STRESS: 84 KSC
MAX. LOAD: 1940
CYCLES AT TERMINATION/Failure:

2 Lives/1,531,494

STATIC LOAD
A- 3.88 KPA
B- 4.25 KPA

ORIGIN LIES ON PLATE SURFACE NEAR CORNER.

FATIGUE TEST DATA

SPECIMEN NUMBER: WIPF-30A
SPECTRUM: Fighter
TEST DATE: __________
TEST FRAME: __________

AVERAGE WIDTH: 1.500
AVERAGE THICKNESS: .3787
AREA: .5604
BASELINE STRESS: 84 KSC
MAX. LOAD: 1940
CYCLES AT Failure:

2 Lives/

ORIGIN LIES ON BOLT HOLE SURFACE.

136
FRACOGRAPHIC DATA

FATIGUE TEST DATA

SPECIMEN NUMBER: XWPF-31B

SPECTRUM: Fighter

TEST DATE: 17

TEST FRAME: 1

AVERAGE WIDTH: 1.5615
AVERAGE THICKNESS: 0.3764
AREA: 0.5080
BASELINE STRESS: 34 ksc
MAX. LOAD: 1938

CYCLES AT TERMINATION/Failure:
2 Lives/

STATICAL LOAD A-16.30 K4
B-13.86 K4

ORIGIN LIES ON BOLT HOLE SURFACE.

FATIGUE TEST DATA

SPECIMEN NUMBER: XWPF-33B

SPECTRUM: Fighter

TEST DATE: 90

TEST FRAME: 90

AVERAGE WIDTH: 1.4956
AVERAGE THICKNESS: 0.3770
AREA: 0.5450
BASELINE STRESS: 34 ksc
MAX. LOAD: 1920

CYCLES AT TERMINATION/Failure:
2 Lives/

STATICAL LOAD A-16.27 K4
B-14.46 K4

ORIGIN LIES AT CORNER WHICH HAD A RADIUS ORIGIN ON OPPOSITE OF HOLE LIES ON HATING SURFACE FROM A TOOL MARK. HAVING RELATED TOLERANCE MILLING, HATING SURFACES WERE MILLED.
### Fractographic Data

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### Fatigue Test Data

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<td>Cycles at Termination/Failure:</td>
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### Notes
- Origin lies at the base of a sliver from the bolt hole.
- Origin lies on chamfered corner.
### Fatigue Test Data

**Specimen Number:** XWF-36A

**Spectrum:** Fighter

**Test Date:** ___________

**Test Frame:** ___________

**Average Width:** 1.5008

**Average Thickness:** 3.724

**Area:** 5671

**Baseline Stress:** 34 ksi

**Max. Load:** 19382

**Cycles at Failure:** ___________

2 Lives/

@ 1.493, 8151.3% = 1.506 ksi - Hrs

**Static Load**

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**Fatigue Test Data**

**Specimen Number:** XWF-37B

**Spectrum:** Fighter

**Test Date:** ___________

**Test Frame:** ___________

**Average Width:** 1.5021

**Average Thickness:** 3.724

**Area:** 5693

**Baseline Stress:** 34 ksi

**Max. Load:** 19362

**Cycles at Termination:** ___________

2 Lives/

**Static Load**

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**Origin Lies on Bolt Hole Surface**

**At Transition of Bolt Hole and Radius of Corner.**

**Fractographic Data**

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**Static Load:**
- A = 10.65 kN
- B = 10.65 kN

**Origin** lies on bolt hole surface near corner, starting from circumferential tool mark (sliver).

### Fractographic Data

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### Fatigue Test Data

**Specimen Number:** XWPB - 1B

**Spectrum:** N960B

**Test Date:** 2 7 2

**Test Frame:** A B C D E F

**Average Width:** 1.497 1.497 1.497 1.497 1.497 1.497

**Average Thickness:** 5762 5762 5762 5762 5762 5762

**Area:** 56.62 ft²

**Baseline Stress:** 33.5 ksi

**Max. Load:** 1848.4 lbf

**Cycles at Termination/Failure:** 26 Lives

**Comment:** Origin lies at corner. Both RTA surfaces (AEB) were milled.

### Fractographic Data

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**Origin Damage by:** Fracture on itself.
### Fatigue Test Data

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- **Cycles at Failure:** 64,097
- **Static Load:** A- 7.97, B- 1.97
- **Origin:** Ice on Bolt Hole Surface

### Fractographic Data

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- **Origin:** Ice on Transition point of Bolt Hole and corner (burned)
- Both Plate Surfaces (A+B) were milled.
### Fatigue Test Data

**Specimen Number:** XWPB-5B  
**Spectrum:** Bomber

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*Origin lies at corner.*

### Fractographic Data

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**Specimen Number:** XWPB-6A  
**Spectrum:** Bomber

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*Origin lies at corner.*
### Fatigue Test Data

**Specimen Number:** XWPR-7A  
**Spectrum:** Bomber  
**Test Date:**  
**Test Frame:**  
**Average Width:** 1.5016, 1.5015, 1.5013, 1.5012, 1.5020  
**Average Thickness:** 323, 325, 326, 324, 326  
**Area:** 5764  
**Baseline Stress:** 33 KSI  
**Max. Load:** 1898.2  
**Cycles at Termination/Failure:** 2,619,1 Flts  

*Original lives at corner.*

### Fractographic Data

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*Origin lives at corner.*
### Fatigue Test Data

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Before the end of 2 lives, a split occurred between 40cm and 60cm. 

The origin lies on Bolt Hole surface near corner.

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The origin lies at corner.

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### Fractographic Data

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*Note: The data represents crack lengths and percent inch measurements for various flight hours.*
### Fatigue Test Data

**Specimen Number:** XWJB-11A  
**Spectrum:** Bomber  
**Test Date:**  
**Test Frame:**  
**Average Width:** 1.560, 1.505, 1.564, 1.551, 1.503  
**Average Thickness:** 3.765, 3.545, 3.799, 3.705, 3.804  
**Area:** .5692  
**Baseline Stress:** 33 KSI  
**Max. Load:** 1878, 76  
**Cycles at Failure:** 2 lives  

*Origin: Lined Bolt Hole Surface*

### Fractographic Data

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**Specimen Number:** XWJB-12A  
**Spectrum:** Bomber  
**Test Date:**  
**Test Frame:**  
**Average Width:** 1.560, 1.499, 1.506, 1.501, 1.508  
**Average Thickness:** 3.535, 3.619, 3.528, 3.525, 3.514  
**Area:** .5756  
**Baseline Stress:** 33 KSI  
**Max. Load:** 1994.8  
**Cycles at Failure:** 2 lives  

*Origin: Lined Bolt Hole Surface*
### Fatigue Test Data

**Specimen Number:** XWPB-13B

**Spectrum:** Number

**Test Date:**

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**Area:** 520.7

**Baseline Stress:** 330ksi

**Max. Load:** 18757.2#

**Cycles at Termination/Failure:** 18 lives

*Static Load A = 14.60 k#  B = 14.30 k#*

**Origin lies on bolt hole surface near corner.**

---

### Fractographic Data

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**Origin lies at corner with plate surface (A/B) were milled.**
## Fatigue Test Data

**Specimen Number:** XWPB-16A

**Spectrum:** Bomber

**Test Date:**

**Test Frame:**

**Average Width:**

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**Average Thickness:**

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**Area:** .5661

**Baseline Stress:** 33,000

**Max. Load:** 18,681.3

**Cycles at Failure:** 2 Lives

**Origin lies at corner. Both plate surfaces (A+B) were milled.**

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## Fractographic Data

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**Two Lives**

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**Origin lies on Root Hole Surface. Both plate surfaces (A+B) were milled.**

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### SPECIMEN NUMBER: XWPB-22A

**TEST DATE:**

**SPECTRUM:** Bomber

**AVERAGE WIDTH:** 1.4906, 1.4977, 1.4956, 1.5061, 1.4998

**AVERAGE THICKNESS:** 0.0302, 0.0305, 0.0304, 0.0306, 0.0303

**AREA:** 0.5701

**BASELINE STRESS:** 33.5 ksi, 42.9 ksi

**MAX. LOAD:** 18813.3

**CYCLES AT FAILURE:** 2,338,241 fls, 19,438.73 flts

**STATIC LOAD:**

A - kN

B - kN

*Origin line at corner. Both plate surfaces (A&B) were milled.

### SPECIMEN NUMBER: XwP8-23A

**TEST DATE:**

**SPECTRUM:** Bomber

**AVERAGE WIDTH:** 1.4906, 1.4977, 1.4956, 1.5061, 1.4998

**AVERAGE THICKNESS:** 0.0302, 0.0305, 0.0304, 0.0306, 0.0303

**AREA:** 0.5703

**BASELINE STRESS:** 33.5 ksi, 42.9 ksi

**MAX. LOAD:** 18813.3

**CYCLES AT FAILURE:** 2,338,241 fls, 19,438.73 flts

**STATIC LOAD:**

A - kN

B - kN

*Origin line at corner. Both plate surfaces (A&B) were milled.

### FRACTOGRAPHIC DATA

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### Fatigue Test Data

**Specimen Number:** XWPB-24B  
**Spectrum:** Bomber  
**Test Date:**  
**Test Frame:**  
**Average Width:**  
**Average Thickness:**  
**Area:**  
**Baseline Stress:**  
**Max. Load:**  
**Cycles at Termination/Failure:** 21 Lives

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### Specimen Number: XWPB-25B

**Spectrum:** Bomber  
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**Test Frame:**  
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**Average Thickness:**  
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**Baseline Stress:**  
**Max. Load:**  
**Cycles at Termination/Failure:** 21 Lives

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**Static Load** A-13.06 k*  
B-12.50 k**

Origin lies on Both Side Surface.  
Both Plate Surfaces A+B were Milled.
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**Fatigue Test Data**

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**Fractographic Data**

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SPECIMEN NUMBER: XWPB-31B
SPECTRUM: Bomber
TEST DATE: 12/30/76
TEST FRAME: 1 2 3 8 9 6
AVERAGE WIDTH: 0.500 0.496 0.506 0.500
AVERAGE THICKNESS: 0.573 0.572 0.573 0.572
AREA: 0.767
BASELINE STRESS: 250 ksc
MAX. LOAD: 676.6 ksc
CYCLES AT FAILURE: 242,489

Origin lies at corner. Both plate surfaces were milled (A478).

FRACTOGRAPHIC DATA

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### Fatigue Test Data

**Specimen Number:** XWPB-32B  
**Specimen:** Bomber  
**Test Date:**  
**Test Frame:**  
**Average Width:** 1.5006, 1.5019, 1.5010, 1.5004, 1.4994  
**Average Thickness:** 3.808, 3.795, 3.774, 3.793, 3.785, 3.780  
**Area:** 6709  
**Baseline Stress:** 33 ksi  
**Max. Load:** 1783.9  
**Cycles at Termination/Failure:** 2と言われています。

**Origin lies on both hole surfaces at corner. Both plate surfaces were milled.**

---

### Fractographic Data

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**Origin Damage by Rounding on Subject.**

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**Specimen Number:** XWPB-33B  
**Specimen:** Bomber  
**Test Date:**  
**Test Frame:**  
**Average Width:** 1.5046, 1.5010, 1.5006, 1.5019, 1.5021  
**Average Thickness:** 3.802, 3.784, 3.774, 3.795, 3.784  
**Area:** 6709  
**Baseline Stress:** 33 ksi  
**Max. Load:** 1836.4  
**Cycles at Termination/Failure:** 2と言われています。

**Origin lies at corner.**
**Fatigue Test Data**

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Origin line on bolt hole surface at the base of a rivet.

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**Fracture Path Data**

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Origin line on bolt hole surface at the base of a rivet.
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</table>
### Fatigue Test Data

#### Specimen Number: XQPF-4 A

- **Spectrum:** Fighter
- **Test Date:**
- **Test Frame:** 1 2 3 4 5
- **Length:** 39
- **Increment:** 15600
- **Light Hrs.:** 0.075
- **Specimen Number:** XQPF-4 A
- **Fatigue Test Data:**
- **Specimen Number:** XQPF-3 T
- **Spectrum:** Fighter
- **Test Date:**
- **Test Frame:** 1 2 3 4 5
- **Length:** 39
- **Increment:** 15600
- **Light Hrs.:** 0.075
- **Specimen Number:** XQPF-3 T

#### Summary
- **Fatigue Test Data**
- **Specimen Number:** XQPF-4 A
- **Spectrum:** Fighter
- **Test Date:**
- **Test Frame:** 1 2 3 4 5
- **Length:** 39
- **Increment:** 15600
- **Light Hrs.:** 0.075
- **Specimen Number:** XQPF-3 T
- **Spectrum:** Fighter
- **Test Date:**
- **Test Frame:** 1 2 3 4 5
- **Length:** 39
- **Increment:** 15600
- **Light Hrs.:** 0.075

#### Origin
- **Fatigue Test Data**
- **Specimen Number:** XQPF-4 A
- **Spectrum:** Fighter
- **Test Date:**
- **Test Frame:** 1 2 3 4 5
- **Length:** 39
- **Increment:** 15600
- **Light Hrs.:** 0.075
- **Specimen Number:** XQPF-3 T
- **Spectrum:** Fighter
- **Test Date:**
- **Test Frame:** 1 2 3 4 5
- **Length:** 39
- **Increment:** 15600
- **Light Hrs.:** 0.075

#### Notes
- **Fatigue Test Data**
- **Specimen Number:** XQPF-4 A
- **Spectrum:** Fighter
- **Test Date:**
- **Test Frame:** 1 2 3 4 5
- **Length:** 39
- **Increment:** 15600
- **Light Hrs.:** 0.075
- **Specimen Number:** XQPF-3 T
- **Spectrum:** Fighter
- **Test Date:**
- **Test Frame:** 1 2 3 4 5
- **Length:** 39
- **Increment:** 15600
- **Light Hrs.:** 0.075
### Fatigue Test Data

#### Specimen Number:
- XGPE-5
- XGPE-4

#### Spectrum:
- Fighter

#### Test Date:

#### Test Frame:
- 1 2 3 4

#### Service Width:
- 15006

#### Service Thickness:
- 3751/3724/3722/3716/3714/3712

#### REA:
- 561

#### ASELINE STRESS:
- 34kpsi

#### Ax. Load:
- 19,078.6

#### Cycles at Termination/Failure:
- 1 Life

#### Static Load:
- A - 1740 kips
- B - 1759 kips

#### Origin lies on surface which mates with plate "B" near corner. Mating surfaces were milled.

### Fractographic Data

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</table>

#### Static Load:
- A - 1740 kips
- B - 1759 kips

#### Origin lies on surface which mates with plate "B" near corner. Mating surfaces were milled.
FRACTOGRAPHIC DATA
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### Fatigue Test Data

#### Specimen Number: XQPF-7A

- **Spectrum:** Fighter
- **Test Date:**
- **Test Frame:** 1 2 3 4 5
- **Average Width:** 1.502
- **Average Thickness:** 3781/3808/3770/3786/3772
- **REA:** 0.528
- **Seline Stress:** 34.8k
- **X. Load:** 19.310.6
- **Cycles at **\[\text{Failure: \( \star \)}\]

\[1396.704 = 14.591.81\]

Note: For secondary origin life, 0.900 inches from primary origin.

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### Fractographic Data

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Note: For secondary origin, life 0.900 inches from primary origin.

\[1,875,527 = 12,406.5 \text{ FLT-HRS}\]

---

**FATIGUE TEST DATA**

#### Specimen Number: XQPF-8A

- **Spectrum:** Fighter
- **Test Date:**
- **Test Frame:** 1 2 3 4 5
- **Average Width:** 1.506
- **Average Thickness:** 3740/3754/3712/3767/3794
- **REA:** 0.578
- **Seline Stress:** 34.6k
- **X. Load:** 19.662.4
- **Cycles at **\[\text{Failure: \( \star \)}\]

\[1,875,527 = 12,406.5 \text{ FLT-HRS}\]

---

**FATIGUE TEST DATA**

#### Specimen Number: XQPF-7A

- **Spectrum:** Fighter
- **Test Date:**
- **Test Frame:** 1 2 3 4 5
- **Average Width:** 1.502
- **Average Thickness:** 3781/3808/3770/3786/3772
- **REA:** 0.528
- **Seline Stress:** 34.8k
- **X. Load:** 19.310.6
- **Cycles at **\[\text{Failure: \( \star \)}\]

\[1,875,527 = 12,406.5 \text{ FLT-HRS}\]

---

**FATIGUE TEST DATA**

#### Specimen Number: XQPF-8A

- **Spectrum:** Fighter
- **Test Date:**
- **Test Frame:** 1 2 3 4 5
- **Average Width:** 1.506
- **Average Thickness:** 3740/3754/3712/3767/3794
- **REA:** 0.578
- **Seline Stress:** 34.6k
- **X. Load:** 19.662.4
- **Cycles at **\[\text{Failure: \( \star \)}\]

\[1,875,527 = 12,406.5 \text{ FLT-HRS}\]
### Fatigue Test Data

<table>
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**CYCLES AT TERMINATION/Failure:**

- **2 Lives**
  - Static Load: A = 14.62 kN
  - R = 1.53 kN
  - Origin lies at bolt hole/surface corner.

### Fatigue Test Data

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<thead>
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**CYCLES AT TERMINATION/Failure:**

- **2 Lives**
  - Static Load: A = 17.62 kN
  - R = 12.10 kN
  - Corrugation length which mates with plate & near corner having surfare was milled.
### Fatigue Test Data

**Specimen Number:** XQPF-11

**Spectrum:** Fighter

**Test Date:**

**Test Frame:**

**Average Width:** 1.500

**Average Thickness:** 0.375

**Area:** 5562

**Baseline Stress:** 946

**Max. Load:** 3130

**Cycles at Termination:**

- **1 Life**
- **2 Lives**

**Static Load:**

- **A - 17.97 kN**
- **B - 17.86 kN**

**Fatigue Test Data**

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**Static Load:**

- **A - 17.97 kN**
- **B - 17.86 kN**
### Fractographic Data

**Fatigue Test Data**

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**Specimen Number:** XQPF-13B

**Spectrum:** Fighter

**Test Date:**

**Test Frame:** 1 2 3 4 5 8

**RAGE Width:** 1.5018 1.5018 1.5016 1.5016 1.5012

**RAGE Thickness:** 3797 3797 3777 3777 3777

**A:** 5680

**RAISE STRESS:** 34 kS

**Load:** 1313

**Les at termination/failure:**

- 2 Lives

---

**Fatigue Test Data**

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**Specimen Number:** XQPF-14B

**Spectrum:** Fighter

**Test Date:**

**Test Frame:** 1 2 3 4 5 8

**RAGE Width:** 1.5018 1.5018 1.5016 1.5016 1.5012

**RAGE Thickness:** 3797 3797 3777 3777 3777

**A:** 5684

**Class STRESS:** 34 kS

**Load:** 1932

**Les at termination/failure:**

- 2 Lives

---

**Static Load:** A - 18.18 kN

**Origin Lies on Bolt Hole Surface Near Corner. Holes were milled.**

---

**Bolt Hole**
### Fatigue Test Data

**2 Lives**

- **Specimen Number:** XQPF-16B
- **Spectrum:** Fighter
- **Test Frame:** 1 2 3 4 5 6
- **Average Width:** 1.4997
- **Aircraft Stress:** 3.4 Kts
- **X. Load:** 19.351.6
- **Cles at Termination:** 1

**Static Load:**
- A - 17.22 Kt
- B - 17.70 Kt

**Origin Lies on Surface Which Mates with Plate “A” Near Corner.**

---

### Fractographic Data

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**Fatigue Test Data**

**2 Lives**

- **Specimen Number:** XQPF-16B
- **Spectrum:** Fighter
- **Test Frame:** 1 2 3 4 5 6
- **Aircraft Stress:** 3.9 Kts
- **X. Load:** 19.351.6
- **Cles at Termination:** 1

**Static Load:**
- A - 17.22 Kt
- B - 17.70 Kt

**Origin Lies on Surface Which Mates with Plate “A” Near Corner.**

---
FRACTOGRAPHIC DATA

FATIGUE TEST DATA

SPECIMEN NUMBER: XQPE-17A
SPECTRUM: Fighter
TEST DATE: 
TEST FRAME: 1 2 3 4 5 6
RANGE WIDTH: 1.5023 1.5029 1.5017 1.5029 1.5029
RANGE THICKNESS: 2.3417 3.801 3.605 3.610 3.607
A: 0.073 m
ELONGATION: 2.1% c.s. 96%
LOAD: 15,494.5 lbf
LES AT TERMINATION/FAILURE:

2 Lives

STATIC LOAD A-17.39 kN
B-17.69 kN
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**Crack at Termination/Failure:**

- **2 Lives/1 Life**
- **Static Load** A-17.65 K# B-17.58 K#
- Counted Down To

### Fractographic Data

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**Crack at Termination/Failure:**

- **2 Lives/1 Life**
- **Static Load** A-17.66 K# B-17.08 K#
- \( \frac{G}{2e} \approx 0.49 \)

166
### Fatigue Test Data

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**2 Lives**

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Overloaded in Compression (100%) Specimen was destroyed.

**Fatigue Test Data**

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**2 Lives**

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**Tensile Load**

A - 17.24 K#  B - 17.32 K#
**FRACOGRAPHIC DATA**

**FATIGUE TEST DATA**

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**STATIC LOAD**

| A | 17.62 k# |
| B | 17.63 k# |
|   | 0.43     |

**FATIGUE TEST DATA**

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**BIK # FLIGHT HRS. CRACK LENGTH IN. INCREMENT IN.**

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**ORIGIN:** AT CORNER

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*Note: The table continues with more rows and columns, but the content is not fully visible in the image.*
FRACTOGRAPHIC DATA

SPECIMEN NUMBER: XQPF-26 A
SPECTRUM: Fighter
TEST DATE: 
TEST FRAME: 1 2 3 4 5 6 7 8
ERASE WIDTH: 1499.6 /1499.6 /530.2 /530.2 /492.6
ERASE THICKNESS: 379 /379 /379 /379 /379 /379 /379
EA: -5701
SELIN STRESS: 6.566
X. LOAD: 19384.4
CLES AT TERMINATION:

2 Lives/
STATIC LOAD A = 16.76 kH 
B = 17.10 kH
ORIGIN LIES AT CORNER

FRAGUUG TEST DATA

SPECIMEN NUMBER: XQPF-27 B
SPECTRUM: Fighter
TEST DATE: 16
TEST FRAME: 1 2 3 4 5
ERASE WIDTH: 1499.6 /1499.6 /530.2 /530.2 /492.6
ERASE THICKNESS: 379 /379 /379 /379 /379 /379 /379
EA: -5701
SELIN STRESS: 6.566
X. LOAD: 19384.4
CLES AT TERMINATION:

2 Lives/
STATIC LOAD A = 17.57 kH 
B = 14.34 kH
ORIGIN LIES AT CORNER, STARTING
FROM A CURVE.
FRACOGRAPHIC DATA

Fatigue Test Data

Specimen Number: XQPF-28A

Spectrum: Fighter

Test Date: 1 2 3 4 5

Test Frame: 1 2 3 4 5

Fatigue Test Data

Specimen Number: XQPF-29B

Spectrum: Fighter

Test Date: 1 2 3 4 5

Test Frame: 1 2 3 4 5

Static Load A -17.16 K#  B -17.03 K#

Origin Lies on Plate Surface Near Corner.

171
Fractographic Data

Fatigue Test Data

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Fractographic Data

Fatigue Test Data

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Origin lies on both side surface starting from a sliver.
**Fatigue Test Data**

### Specimen Number
- XQPF-32B

### Spectra
- Fighter

### Test Date
- 2 Lives

### Test Frame
- 1 2 3 4 5

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### Notes
- Fracture damage reported.
- Origin lies on plate surface near corner.

---

**Fatigue Test Data**

### Specimen Number
- XQPF-35B

### Spectra
- Fighter

### Test Date
- 2 Lives

### Test Frame
- 15

### Average Width
- 1.5067

### Average Thickness
- 1.3053

### Area
- 56.69

### Baseline Stress
- 34.1Ksi CALS 9.2%

### Max. Load
- 10242.1

### Cycles at Failure
- 2 Lives

### Static Load
- A = K 4
- B = K 4

---

Origin lies at corner.
**FRACTOGRAPHIC DATA**

**SPECIMEN NUMBER:** XQPF-34B

**SPECIMEN NUMBER:** XQPF-35A

**SPECTRUM:** Fighter

**SPECTRUM:** Fighter

**TEST DATE:**

**TEST DATE:**

**TEST FRAME:**

**TEST FRAME:**

**RAGE WIDTH:** 1.4962, 1.4961, 1.4962, 1.4962

**RAGE WIDTH:** 1.4962, 1.4961, 1.4962, 1.4962

**RAGE THICKNESS:** 0.3984, 0.3984, 0.3984, 0.3984

**RAGE THICKNESS:** 0.3984, 0.3984, 0.3984, 0.3984

**A:** 15672

**A:** 15672

**ELINE STRESS:** 34,161

**ELINE STRESS:** 34,161

**LOAD:** 19283.4

**LOAD:** 19283.4

**LES AT TERMINATION:**

**LES AT TERMINATION:**

**2 Lives**

**2 Lives**

**TATIC LOAD A-17.22 K#**

**TATIC LOAD A-17.22 K#**

**B-11.34 K#**

**B-11.34 K#**

**ORIGIN LIES AT CORNER STARTING FROM A BUER**

**ORIGIN LIES AT CORNER STARTING FROM A BUER.**
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**Origin Line At Corner Starting From A NUR.**

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**Origin Line On Bolt Hole Surface**
### Fatigue Test Data

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**Spectrum:** Fighter

**Test Date:**

**Test Frame:** 1 2 3 4 5 6

**Rack Width:** 1.4073 1.437 1.485 1.500

**Rack Thickness:** 3.77 3.10 3.75 3.20 3.75 3.75

**A:** 5095

**ELINE Stress:** 3.145

**Load:** 1936.4

**Les at Termination:**

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**Fatigue Data**

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**Yield Strength:**

**Fatigue Limit:**
### Specimen Number: XQPB-1B

**Spectrum:** Bomber  
**Test Date:**  
**Test Frame:**  
**Average Width:** 1.4900  
**Average Thickness:** 3.9055  
**Area:** 0.5673  
**Baseline Stress:** 33 ksi  
**Max. Load:** 18721  
**Cycles at Failure:** 2 Lives/  

\[ \text{Fatigue Test Data} \]

### Specimen Number: XQPB-2B

**Spectrum:** Bomber  
**Test Date:**  
**Test Frame:**  
**Average Width:** 1.5000  
**Average Thickness:** 3.9055  
**Area:** 0.5673  
**Baseline Stress:** 33 ksi  
**Max. Load:** 18721  
**Cycles at Failure:** 2 Lives/  

\[ \text{Fatigue Test Data} \]
**FATIGUE TEST DATA**

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* 2 Lives /

@ 706,204 LPR's = 2733.99 FLTs *

**STATIC LOAD**

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Origin lies on plate surface near inner. Fatigue initiation was due to notching.

---

**FATIGUE TEST DATA**

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* 2 Lives /

@ 788,668 LPR's = 3058.71 FLTs *

**STATIC LOAD**

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Origin lies on both side surfaces near inner. Both side surfaces were notched.
**GENERAL DYNAMICS**

**Fatigue Test Data**

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<td>Max. Load:</td>
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<td>Cycles at Termination:</td>
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```
Origin lies on plate surface near corner origin initiation was due to fretting.
```

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**Fatigue Test Data**

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```
Origin lies at corner with surface weird; a secondary origin due to mill tool marks (relaxed tolerances).
```

---

**FRACTOGRAPHIC DATA**

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**FRACTOGRAPHIC DATA**

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---

**Origin**: Lies on plate surface near corner origin initiation was due to fretting.

---

**Origin**: Lies on plate surface near corner origin initiation was due to fretting.

---

**Origin**: Lies on plate surface near corner origin initiation was due to fretting.

---

**Origin**: Lies on plate surface near corner origin initiation was due to fretting.

---

**Origin**: Lies on plate surface near corner origin initiation was due to fretting.

---

**Origin**: Lies on plate surface near corner origin initiation was due to fretting.
### Fatigue Test Data

**Specimen Number:** XQPB-7A

**Spectrum:** Bomber

**Test Date:**

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<th>3</th>
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**Cycles at Termination:** 2 Lives

- **Static Load:** A - 15.88 K#  
  B - 15.88 K#

Origin lies at corner. Both surfaces were milled.

---

### Fractographic Data

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<th>Increment Inch</th>
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| Two Lives |
| 2560   | 0.946 | 0.126 |
| 2360   | 0.830 | 0.093 |
| 2160   | 0.667 | 0.092 |
| 1960   | 0.575 | 0.092 |
| 1760   | 0.484 | 0.083 |
| 1560   | 0.394 | 0.118 |
| 1360   | 0.309 | 0.150 |
| 1160   | 0.224 | 0.084 |
| 960    | 0.141 | 0.084 |
| 760    | 0.053 | 0.033 |

**Specimen Number:** XQPB-8B

**Spectrum:** Bomber

**Test Date:**

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**Cycles at Termination:** 2 Lives

- **Static Load:** A - 14.89 K#  
  B - 13.95 K#

Origin lies at corner.
### Fatigue Test Data

**Specimen Number:** XGPB-9A  
**Spectrum:** Bomber  
**Test Date:**  
**Test Frame:**  
**Average Width:** 12.94  
**Average Thickness:** 0.042  
**Area:** 57.19  
**Baseline Stress:** 33Kpsi  
**Max. Load:** 18772.8  
**Cycles at Termination/Failure:** 2 Lives/

---

**Specimen Number:** XGPB-10B  
**Spectrum:** Bomber  
**Test Date:**  
**Test Frame:**  
**Average Width:** 12.05  
**Average Thickness:** 0.042  
**Area:** 51.4  
**Baseline Stress:** 33Kpsi  
**Max. Load:** 16857  
**Cycle at Termination/Failure:** 2 Lives/

---

The origin lies on both side surface.
### Fatigue Test Data

**Specimen Number:** X069-11B

**Specimen:** Bomber

**Test Date:**

- **Test Frame:** B-12-15-16
- **Test Date:** __________
- **Ave. Width:** 1.4932
- **Ave. Thick.:** 0.063
- **Area:** 0.5712
- **Baseline Stress:** 33 kpsi
- **Max. Load:** 1891.5
- **Cycles at Termination/Failure:** 2 Lives

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### Fractographic Data

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**Specimen Number:** X069-12B

**Specimen:** Bomber

**Test Date:**

- **Test Frame:** B-12-15-16
- **Test Date:** __________
- **Ave. Width:** 1.4932
- **Ave. Thick.:** 0.063
- **Area:** 0.5731
- **Baseline Stress:** 33 kpsi
- **Max. Load:** 1991.5
- **Cycles at Termination/Failure:** 2 Lives

### Notes

- Origin lies on bolt hole surface. Both plate surfaces were welded.
**Fatigue Test Data**

**Specimen Number:** XQPB-13B

**Spectrum:** Bomber

**Test Frame:** 1 2 3 4 5 6

**Test Date:** ABC EDF

**Average Width:** 1.5001

**Average Thickness:** 0.183 / 0.181 / 0.183 / 0.183 / 0.183

**Area:** 0.5956

**Baseline Stress:** 33 Ksi

**Max. Load:** 18923.4

**Cycles at Termination/Failure:** 2 Lives/

---

**Fatigue Test Data**

**Specimen Number:** XQPB-14A

**Spectrum:** Bomber

**Test Frame:** 1 2 3 4 5 6

**Test Date:** ABC EDF

**Average Width:** 1.5002 / 1.5004 / 1.5007 / 1.5005 / 1.5010

**Average Thickness:** 220.6 / 220.7 / 220.8 / 220.9 / 220.4

**Area:** 0.5704

**Baseline Stress:** 35 Ksi

**Max. Load:** 18823.4

**Cycles at Termination/Failure:** 2 Lives/

---

**Fractographic Data**

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**Tabulation Sheet**

**Fatigue Test Data**

**Specimen Number:** XQPB-13B

**Spectrum:** Bomber

**Test Frame:** 1 2 3 4 5 6

**Test Date:** ABC EDF

**Average Width:** 1.5001

**Average Thickness:** 0.183 / 0.181 / 0.183 / 0.183 / 0.183

**Area:** 0.5956

**Baseline Stress:** 33 Ksi

**Max. Load:** 18923.4

**Cycles at Termination/Failure:** 2 Lives/

---

**Fatigue Test Data**

**Specimen Number:** XQPB-14A

**Spectrum:** Bomber

**Test Frame:** 1 2 3 4 5 6

**Test Date:** ABC EDF

**Average Width:** 1.5002 / 1.5004 / 1.5007 / 1.5005 / 1.5010

**Average Thickness:** 220.6 / 220.7 / 220.8 / 220.9 / 220.4

**Area:** 0.5704

**Baseline Stress:** 35 Ksi

**Max. Load:** 18823.4

**Cycles at Termination/Failure:** 2 Lives/

---

**Tabulation Sheet**

**Fatigue Test Data**

**Specimen Number:** XQPB-13B

**Spectrum:** Bomber

**Test Frame:** 1 2 3 4 5 6

**Test Date:** ABC EDF

**Average Width:** 1.5001

**Average Thickness:** 0.183 / 0.181 / 0.183 / 0.183 / 0.183

**Area:** 0.5956

**Baseline Stress:** 33 Ksi

**Max. Load:** 18923.4

**Cycles at Termination/Failure:** 2 Lives/

---

**Tabulation Sheet**

**Fatigue Test Data**

**Specimen Number:** XQPB-14A

**Spectrum:** Bomber

**Test Frame:** 1 2 3 4 5 6

**Test Date:** ABC EDF

**Average Width:** 1.5002 / 1.5004 / 1.5007 / 1.5005 / 1.5010

**Average Thickness:** 220.6 / 220.7 / 220.8 / 220.9 / 220.4

**Area:** 0.5704

**Baseline Stress:** 35 Ksi

**Max. Load:** 18823.4

**Cycles at Termination/Failure:** 2 Lives/
### Fractographic Data

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### Fatigue Test Data

**Specimen Number:** XQ1B-17B

**Spectrum:** Bomber

**Test Date:**

**Test Frame:**

- A
- B
- C
- D
- E
- F

**Average Width:** 1.5035

**Average Thickness:**

- 0.0620
- 0.0506
- 0.0501
- 0.0501
- 0.0501

**Area:** 57.57

**Baseline Stress:** 33 ksi

**Max. Load:** 18998.0

**Cycles at Termination/Failure:** 2 Lives/

**Static Load:**

- A - 17.01 kN
- B - 17.77 kN

---

**Specimen Number:** P8-157B

**Spectrum:** Bomber

**Test Date:**

**Test Frame:**

- A
- B
- C
- D
- E
- F

**Average Width:** 1.5035

**Average Thickness:**

- 0.0620
- 0.0506
- 0.0501
- 0.0501
- 0.0501

**Area:** 57.57

**Baseline Stress:** 33 ksi

**Max. Load:** 18998.0

**Cycles at Termination/Failure:** 2 Lives/

**Static Load:**

- A - 17.01 kN
- B - 17.77 kN

---

184
**Fatigue Test Data**

**Specimen Number:** X086-21

**Spectrum:** Bomber

**Test Date:**

**Test Frame:** ABCDEFG

**Average Width:** 1.5021/1.5063/1.5063/1.5021/1.5021

**Average Thickness:** .3874/.3874/.3874/.3874/.3874

**Area:** .5745

**Baseline Stress:** 33 KSI

**Max. Load:** 1895.85

**Cycles at Termination/Failure:** 2 Lives

**Static Load:** A = 15.72 kN

**Original Crack Length:**

---

**Fatigue Test Data**

**Specimen Number:** X086-18A

**Spectrum:** Bomber

**Test Date:**

**Test Frame:** ABCDEFG

**Average Width:** 1.6012/1.6073/1.6073/1.6012

**Average Thickness:** .3865/.3865/.3865/.3865

**Area:** .5713

**Baseline Stress:** 33 KSI

**Max. Load:** 1876.8 kN

**Cycles at Termination/Failure:** 2 Lives

**Static Load:** A = 16.08 kN

**Original Crack Length:**

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**Fractographic Data**

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**Fractographic Data**

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### Fatigue Test Data

**Specimen Number:** XQP8-22B

**Spectrum:** Bomber

**Test Date:**

**Test Frame:** 1 2 3 4 5 6

**Average Width:** 1.500 / 1.500 / 1.500 / 1.500 / 1.500

**Average Thickness:** 0.250 / 0.250 / 0.250 / 0.250 / 0.250

**Area:** 0.577

**Baseline Stress:** 32.0

**Max. Load:** 17732

**Cycles at Termination/Failure:** 3 Lives

---

### Fractographic Data

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**Specimen:** Bomber

**Test Date:**

**Max. Load:** 17732

**Cycles at Termination/Failure:** 3 Lives

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**Static Load:**

**Origin lies at corner, which matches with data A.
### Fatigue Test Data

**Specimen Number:** XOFB-25A

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**Spectrum:** Bomber

**Test Frame:** ABCD

**Average Width:** 1.5028, 1.5024, 1.5020, 1.5016

**Average Thickness:** 0.3797, 0.3793, 0.3789, 0.3785

**Area:** 0.5703

**Baseline Stress:** 33 kgs

**Max. Load:** 187.99

**Cycles at Termination:** 2 lives

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**Fatigue Test Data**

**Specimen Number:** XOFB-26B

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**Spectrum:** Bomber

**Test Frame:** ABCD

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**Average Thickness:** 0.3797, 0.3793, 0.3789, 0.3785

**Area:** 0.5703

**Baseline Stress:** 33 kgs

**Max. Load:** 187.99

**Cycles at Termination:** 2 lives

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**Fractographic Data**

**Specimen:** Bomber

**Test Frame:** ABCD

**Average Width:** 1.5028, 1.5024, 1.5020, 1.5016

**Average Thickness:** 0.3797, 0.3793, 0.3789, 0.3785

**Area:** 0.5703

**Baseline Stress:** 33 kgs

**Max. Load:** 187.99

**Cycles at Termination:** 2 lives

---

**Origin lies on plate surface near corner. Origin due to patience.**
# Fatigue Test Data

**Specimen Number:** XQP-27B

**Spectrum:** Bomber

**Test Date:**

**Test Frame:** ABCDEFG

**Average Width:** 1.4991

**Average Thickness:** 3.2271

**Area:** 573

**Baseline Stress:** 33 ksi

**Max. Load:** 18935 lbs

**Cycles at Termination/Failure:** 2. Lives 16,000 lbs

Origin lies on bolt hole surface.

---

## Tabulation Sheet

**Fatigue Test Data**

**Specimen Number:** XQPB-28B

**Spectrum:** Bomber

**Test Date:**

**Test Frame:** ABCDEFG

**Average Width:** 1.6006

**Average Thickness:** 3.2604

**Area:** 571

**Baseline Stress:** 33 ksi

**Max. Load:** 18935 lbs

**Cycles at Termination/Failure:** 2. Lives

Origin lies on bolt hole surface.

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## Specimen Information

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Origin lies on bolt hole surface.

---

## SPECTRUM

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Origin lies on bolt hole surface.
### Fatigue Test Data

**Specimen Number:** X0P8-29

- **Specimen:** Bomber
- **Test Frame:** 1 2 3 4 5
- **Average Width:** 14927
- **Average Thickness:** 2931 3092 3060 389 1369
- **Area:** 5771
- **Baseline Stress:** 3.94 ksi
- **MAX. Load:** 1797.4
- **Cycles at Termination/Failure:** 2 Lives/
  - **Static Load A:** 170.2 kN
  - **B:** 162.1 kN

**Origin lies on plate surface. Fatigue origin was due to fretting on top weld. Both angles were milled.**

---

### Fractographic Data

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**TABULATION SHEET**

**Fatigue Test Data**

**Specimen Number:** X0P8-313

- **Specimen:** Bomber
- **Test Frame:** 1 2 3 4 5
- **Average Width:** 14927
- **Average Thickness:** 2931 3092 3060 389 1369
- **Area:** 5771
- **Baseline Stress:** 3.94 ksi
- **MAX. Load:** 1797.4
- **Cycles at Termination/Failure:** 2 Lives/
  - **Static Load A:** 170.2 kN
  - **B:** 162.1 kN

**Origin lies on plate surface. Fatigue origin was due to fretting on top weld. Both angles were milled.**

---

**TABULATION SHEET**

**Fatigue Test Data**

**Specimen Number:** X0P8-313

- **Specimen:** Bomber
- **Test Frame:** 1 2 3 4 5
- **Average Width:** 14927
- **Average Thickness:** 2931 3092 3060 389 1369
- **Area:** 5771
- **Baseline Stress:** 3.94 ksi
- **MAX. Load:** 1797.4
- **Cycles at Termination/Failure:** 2 Lives/
  - **Static Load A:** 170.2 kN
  - **B:** 162.1 kN

**Origin lies on plate surface. Fatigue origin was due to fretting on top weld. Both angles were milled.**

---

**TABULATION SHEET**

**Fatigue Test Data**

**Specimen Number:** X0P8-313

- **Specimen:** Bomber
- **Test Frame:** 1 2 3 4 5
- **Average Width:** 14927
- **Average Thickness:** 2931 3092 3060 389 1369
- **Area:** 5771
- **Baseline Stress:** 3.94 ksi
- **MAX. Load:** 1797.4
- **Cycles at Termination/Failure:** 2 Lives/
  - **Static Load A:** 170.2 kN
  - **B:** 162.1 kN

**Origin lies on plate surface. Fatigue origin was due to fretting on top weld. Both angles were milled.**
### Fatigue Test Data

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**Specimen Number:** XQRB-32B

**Spectrum:** Bomber

**Test Date:**

**Test Frame:** 1 2 3 4 5 6

**Average Width:** 1.502

**Average Thickness:**
- 3863/3895/3887/3865/3866/3852
- 3863/3895/3887/3865/3866/3852

**Area:** 5777

**Baseline Stress:** 33ksi

**Max. Load:** 190ksi

**Cycles at Termination/Failure:** 2 Lives

**Static Load:** A - 16.4 K lbs
B - 16.12 K lbs

**Fluctuation:**

- Origin lies on plate surface near corner.

### Fractographic Data

<table>
<thead>
<tr>
<th>Flight</th>
<th>Crack Length Inch</th>
<th>Increment Inch</th>
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</thead>
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<td>4,200</td>
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**Specimen Number:** XQRB-33B

**Spectrum:** Bomber

**Test Date:**

**Test Frame:** 1 2 3 4 5 6

**Average Width:** 1.502

**Average Thickness:**
- 3863/3895/3887/3865/3866/3852
- 3863/3895/3887/3865/3866/3852

**Area:** 5674

**Baseline Stress:** 33ksi

**Max. Load:** 187.23

**Cycles at Termination/Failure:** 2 Lives

**Static Load:** B - 10.18 K lbs
A - 17.80 K lbs

**Fluctuation:**

- Origin lies on plate surface near corner.
<table>
<thead>
<tr>
<th>Flight</th>
<th>Crack Length</th>
<th>Increment Inch</th>
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</thead>
<tbody>
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<tr>
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**Fatigue Test Data**

Specimen Number: YQPB-34A

Spectrum: Bomber

Test Date:

Test Frame: A B C D E F

Average Width: 1438.3 1488.1 1478.3 1438.3

Average Thickness: 2863.3 2783.3 2683.3 2583.3

Area: 517.5

Baseline Stress: 31 KSI

Max. Load: 1768.5

Cycles at Termination/Failure: 3 Lives

Static Load A-15.62 K#
B-14.70 K#

Origin lies on bolt hole surface.

---

**Fractographic Data**

<table>
<thead>
<tr>
<th>Flight</th>
<th>Crack Length</th>
<th>Increment Inch</th>
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<tbody>
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*Note: The table is not fully visible in the image.*

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191
**FATIGUE TEST DATA**

**SPECIMEN NUMBER:** AGPR-37B

**SPECTRUM:** Bomber

**TEST DATE:**  

**TEST FRAME:** ABCDEFG

**AVERAGE WIDTH:** 1.4569

**AVERAGE THICKNESS:** 3.216

**AREA:** 574.2

**BASELINE STRESS:** 23KEL

**MAX. LOAD:** 18945

**CYCLES AT TERMINATION/FAILURE:** 2,000,000

**STATIC LOAD A-1660 K#  B-1622 K#**

**ORIGIN LIES ON BOLT-HOLE SURFACE. BOTH SURFACES WERE Milled.**

---

**FRACTOGRAPHIC DATA**

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FRACTOGRAPHIC DATA

FATIGUE TEST DATA

SPECIMEN NUMBER: AF-4

SPECTRUM: Fighter

TEST DATE: ________________

TEST FRAME: 1 2 3 4 5 (K)

MAX WIDTH: 1508

MAX THICKNESS: 377 377 377

REA: 547

ASSELINE STRESS: 3456

AX. LOAD: 19261

CYCLES AT TERMINATION/Failure: 2 Lives

SPECIMEN NUMBER: AF-1

SPECTRUM: Fighter

TEST FRAME: 1 2 3 4 5

MAX WIDTH: 15018

MAX THICKNESS: 377

REA: 546

ASSELINE STRESS: 3456

AX. LOAD: 19261

CYCLES AT TERMINATION/Failure: 2 Lives

STATIC LOAD - 29.3 K#  
Bolt Hole was Polished

194
## Specimen Number

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### Fatigue Test Data

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#### Spectrum

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#### Axial Load

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#### Flight Hrs, Crack Length, Increment

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<th>Increment</th>
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#### Static Load

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FRACTURE DATA

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SPECTRUM: Fighter
TEST DATE: __________
TEST FRAME: 1 2 3 4 5
ERAGE WIDTH: 15000
ERAGE THICKNESS: 3761
EA: 5641
SELINE STRESS: 34 KSI
X. LOAD: 19180.4
CLES AT TERMINATION: 1 Life

2 Lives/

\[ 1,816,922.7 \text{ L.P.'s} = 18,974.70 \]

STATIC LOAD A=14.32 KF\[ \]
B=14.83 KF\[ \\

ORIGIN LIES ON CHAMFERED CORNER SURFAC.
Continued from previous page

FRACTOGRAPHIC DATA

YWPF-2B

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YWPF-3B

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202
FRACTOGRAPHIC DATA

Fatigue Test Data

SPECIMEN NUMBER: YWPP-5B

SPECRTUM: Fighter

TEST DATE: 1 2 3 4 5

TEST FRAME: 1 2 3 4 5

ERASE WIDTH: 1.519

ERASE THICKNESS: .379 4 379 4 387 4 387 4 387 4 387

EA: 5755

FELINE STRESS: 96.3

L. LOAD: 1857.2

CLS AT FAILURE: 1 Life

3 Lives/

1,802.871 L.P.E = 18,335.16 Fil-t-Hrs

ORIGIN LIES ON CHAMFERED CORNER SURFACE

Fatigue Test Data

SPECIMENT NUMBER: YWPP-4A

SPECRTUM: Fighter

TEST DATE: 1 2 3 4 5 6

TEST FRAME: 1 2 3 4 5 6

ERASE WIDTH: 1.519

ERASE THICKNESS: .379 4 379 4 387 4 387 4 387 4 387

EA: 5755

FELINE STRESS: 96.3

L. LOAD: 1857.2

CLS AT FAILURE: 1 Life

3 Lives/

1,823.382 L.P.E = 18,055.47

STATIC LOAD A - 1548 K#

B - 1306 K#

ORIGIN LIES ON SURFACE WHICH MATCHES WITH PLATE A' NEAR THE CORNER. MATING SURFACES WERE MILLED.
Continued from previous page

### FRACTOGRAPHIC DATA

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### Fatigue Test Data

**Specimen Number:** YWP-F-6B

**Spectrum:** Fighter

**Test Date:** 12/3/81

**Test Frame:** 1 2 3 4 5 6 7 8 9 10

**Test Width:** 1.50%

**Test Thickness:** 3.075

**EA:** 5.675

**Specimen Stress:** 34 ksi

**X-Load:** 19229.1

**1 Life**

**2 Lives**

**3 Lives**

**4 Lives**

**Origin Lies Near Bolt Hole/Chamfer Surface on the Chamfer.**

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### Fractographic Data

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**Origin Lies Near Bolt Hole/Chamfer Surface on the Chamfer.**
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FATIGUE TEST DATA

SPECIMEN NUMBER: YWPF-8B

SPECTRUM: Fighter

TEST DATE: ____________________________

TEST FRAME: C

AVERAGE WIDTH: 1.5842
AVERAGE THICKNESS: 1.8031
AREA: 0.5785
BASELINE STRESS: 3454
MAX. LOAD: 19594
CYCLES AT TERMINATION: 2 Lives/

STATIC LOAD: A-17.70 K#  B-18.04 K#
### Fatigue Test Data

**Specimen Number:** 246P-9B

**Spectrum:** Fighter

**Test Date:**

**Test Frame:**

**Average Width:** 1.5 in.

**Average Thickness:** 0.05 in.

**Area:** 0.5 in.

**Baseline Stress:** 54 ksi

**Max. Load:** 9.37 ksi

**Cycles at Termination:** 2 Lives

---

### Fractographic Data

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**Static Load:**

- A = 17.22 ksi
- B = 17.60 ksi

**Original Lies on Surface of Plate B**

**Near Corner:** ALL 4 \( 	ext{As} \), B (Motif-1) Are Present.

---

### Fatigue Test Data

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**Note:** The diagrams and tables are not fully transcribed due to the nature of the image and text content.
### Fatigue Test Data

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### Fractographic Data

**Fatigue Test Data**

**Specimen Number:** YWPF-13A

**Spectrum:** Fighter

**Test Date:**

**Test Frame:** 1 2 3 4 5

**Endurance:** 1.5020 1.5020 1.5020 1.5020

**Endurance Thickness:** 3610 3810 3810 3810 3810

**Endurance Thickness:** 0.45 0.30 0.25 0.20 0.15

**X. Load:** 19524.0

**El es at Termination:** 2 Lives/

**Static Load:** A - 14.07 Kf B - 15.38 Kf

**Origin lies on the bolt hole surface.**

---

**Fatigue Test Data**

**Specimen Number:** YWPF-14A

**Spectrum:** Fighter

**Test Date:**

**Test Frame:** 1 2 3 4 5

**Endurance:** 1.5016 1.5016 1.5016 1.5016

**Endurance Thickness:** 3610 3810 3810 3810 3810

**Endurance Thickness:** 0.45 0.30 0.25 0.20 0.15

**X. Load:** 19453.8

**El es at Termination:** 2 Lives/

**Static Load:** A - 5.80 Kf B - 17.58 Kf

**Origin lies on radius of corner from sliver.**

210
### Fatigue Test Data

**Specimen Number:** Ywff-15 b  
**Spectrum:** Fighter  
**Test Date:**  
**Test Frame:** 1 2 3 4 5 6  
**EASE Width:**  
**EASE Thickness:**  
**EASE Stress:** 34 Ksi A 7.8  
**X. Load:** 134.5  
**Cles At Termination/Failure:** 2 Lives/153.44V  

**Static Load**  
A - 1792 K  
B - 1640 K  

Origin lies on plate surface, which marks with plate 90°, nearer the chamfered corner.

### Fractographic Data

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**Fatigue Test Data**  
**Specimen Number:** Ywff-16 a Hott Primary  
**Spectrum:** Fighter  
**Test Date:**  
**Test Frame:** 1 2 3 4 5 6  
**EASE Width:**  
**EASE Thickness:**  
**EASE Stress:** 34 Ksi A 7.8  
**X. Load:** 134.5  
**Cles At Termination/Failure:** 2 Lives/153.44V  

**Static Load**  
A - 1792 K  
B - 1640 K  

Origin lies on radius of corner.
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**STATIC LOAD**

A - 17.68 K4
B - 17.94 K4

ORIGIN LIES ON CHAMFERED CORNER SURFACE MATEING SURFACES WERE MACHINED.

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**STATIC LOAD**

A - 16.5 K4
B - 17.74 K4

ORIGIN LIES ON MATEING SURFACE NEAR RADIUS CORNER. ORIGIN WAS DUE TO FRACTURING.
### Fatigue Test Data

**Specimen Number:** YWP-015B  
**Spectrum:** Fighter  
**Test Date:**  
**Test Frame:** 1 2 3 4 5 6  
**Failure Width:** 1.5000  
**Failure Thickness:** 37.81  
**Fatigue Test Data:**  

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**Fractographic Data**

**Specimen Number:** YWP-208  
**Spectrum:** Fighter  
**Test Date:**  
**Test Frame:** 0 2 3 4 5 6  
**Failure Width:** 1.5000  
**Failure Thickness:** 37.81  
**Fatigue Test Data:**  

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**Origin Lies on Plate B Surface.**
FATIGUE TEST DATA

SPECIMEN NUMBER: YWPF-21 B
SPECTRUM: Fighter
TEST DATE:
TEST FRAME: 1 2 3 4 5 6
RANGE WIDTH: 1.4999 1.4999 1.4999 1.4999
RANGE THICKNESS: 3806 3806 3806 3806
A: 0.5709
LINE STRESS: 34 KCS
LOAD: 194113

LES AT TERMINATION:

2 Lives/

TATIFIC LOAD A- K#4
B- K#4
ORIGIN LIES ON PLATE SURFACE NEAR CORNER DUE TO TOOL MARKS (RELAX TOLERANCE)
### Fatigue Test Data 1

**Specimen Number:** YWP - 23

**Spectrum:** Fighter

**Test Date:** 15/5/56

**Test Frame:** 1 2 3 4 5

**Rear Width:** 1.501" ± 0.002" (measured at 2 locations, face and root)

**Rear Thickness:** 0.3762" ± 0.0004"

**FLAT:** 0.5645" ± 0.0016"

**Fatigue Stress:** 34 KSI ± 0.5 KSI

**Load:** 19053.0 ± 250 ft-lb

**Life at Termination/Failure:** 3 Lives/

---

### Fatigue Test Data 2

**Specimen Number:** YWP - 25B

**Spectrum:** Fighter

**Test Date:** 15/5/56

**Test Frame:** 1 2 3 4 5 6

**Rear Width:** 1.5011" ± 0.0008" (measured at 2 locations, face and root)

**Rear Thickness:** 0.3808" ± 0.0001"

**FLAT:** 0.5716" ± 0.0008"

**Fatigue Stress:** 41 KSI ± 0.5 KSI

**Load:** 19436.1 ± 250 ft-lb

**Life at Termination/Failure:** 2 Lives/

---

### Fractographic Data

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Fatigue Test Data 1:

- **Specimen Number:** YWP - 23
- **Spectrum:** Fighter
- **Test Date:** 15/5/56
- **Test Frame:** 1 2 3 4 5
- **Rear Width:** 1.501 ± 0.002" (measured at 2 locations, face and root)
- **Rear Thickness:** 0.3762 ± 0.0004"
- **FLAT:** 0.5645 ± 0.0016"
- **Fatigue Stress:** 34 KSI ± 0.5 KSI
- **Load:** 19053.0 ± 250 ft-lb
- **Life at Termination/Failure:** 3 Lives/

Fatigue Test Data 2:

- **Specimen Number:** YWP - 25B
- **Spectrum:** Fighter
- **Test Date:** 15/5/56
- **Test Frame:** 1 2 3 4 5 6
- **Rear Width:** 1.5011 ± 0.0008" (measured at 2 locations, face and root)
- **Rear Thickness:** 0.3808 ± 0.0001"
- **FLAT:** 0.5716 ± 0.0008"
- **Fatigue Stress:** 41 KSI ± 0.5 KSI
- **Load:** 19436.1 ± 250 ft-lb
- **Life at Termination/Failure:** 2 Lives/
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### Fatigue Test Data

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## Fractographic Data

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### Remarks

- ORIGIN LIES ON CHAMFERED CORNER SURFACE.
- MATING SURFACES WERE MACHINED.
FATIGUE TEST DATA

SPECIMEN NUMBER: YWPF-28A

SPECTRUM: Fighter

TEST DATE:

TEST FRAME: 1 2 3 4 5 6

RANGE WIDTH: 1.4985 1.900 2.000 2.400 1.500

RANGE THICKNESS: 3.75 2.975 2.975 2.975 2.975 2.975 2.975 2.975

A: 1.576

ELINE STRESS: 34.57 c = 94.7

LOAD: 1918.3

LES AT TERMINATION:

FATIGUE TEST DATA

SPECIMEN NUMBER: YWPF-29A

SPECTRUM: Fighter

TEST DATE:

TEST FRAME: 1 2 3 4 5 6

RANGE WIDTH: 1.4985 1.900 2.000 2.400 1.500


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ELINE STRESS: 34.57 c = 94.7

LOAD: 1918.3

LES AT TERMINATION:

PRACTOGRAPHIC DATA

FLIGHT HRS. CRACK LENGTH IN. INCREMENT IN.

SPECIMEN NUMBER: YWPF-28A

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LES AT TERMINATION:

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LOAD: 1918.3

LES AT TERMINATION:

TRO O LO 11.424.37 PLT. HRS

ORIGIN LIES AT CORNER (WHICH HAD RADIUS)

HATING SURFACE WERE Milled.
### Fractographic Data

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### Fatigue Test Data

- **Specimen Number:** YWF-30B
- **Spectrum:** Fighter
- **Test Date:**
- **Test Frame:** 1 2 3 4 5 6
- **Rug Width:** 1.5042 1.5041 1.5041 1.5041
- **Rug Thickness:** 3.767 3.768 3.769
- **A:** 1.5681
- **Line Stress:** 54Kpsi
- **Load:** 19316.6 773
- **Les at Termination:**

"© 1076951 L.S. = 11,241.91"

**Tatic Load**
- A = 17.92 kPag
- B = 15.79 kPag

- **Origin Lies at Corner.**
- **Matinig Surf: 36.7 were Milled**
### Fatigue Test Data

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### Fractographic Data

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### Tabulation Sheet

**Fatigue Test Data**

**Specimen Number:** YWPB - 2A

**Spectrum:**

**Test Date:**

**Test Frame:**

**Average Width:**

**Average Thickness:**

**Area:**

**Baseline Stress:**

**Max. Load:**

**Cycles at Termination/Failure:**

- **Static Load** A - 15200 K±
  B - 17000 K±

Origin lies at corner.
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### Fatigue Test Data

**Specimen Number:** YWPB - 3B  
**Spectrum:** Bomber  
**Test Date:**  
**Test Frame:**  
**Average Width:**  
**Average Thickness:**  
**Area:**  
**Baseline Stress:**  
**Max Load:**  
**Cycles at Termination/Failure:**  

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**Specimen Number:** YWPB - 4B  
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**Area:**  
**Baseline Stress:**  
**Max Load:**  
**Cycles at Termination/Failure:**  

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**Origin lies on Plate B surface.**
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**STATIC LOAD** A-13600 ksi  B-15000 ksi

**Origin Info at Corner, Both Plate Surfaces were milled.**

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### Fractographic Data

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<td>CYCLES AT TERMINATION/RESIDUE: 3 Lives</td>
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**STATIC LOAD** A-13600 ksi  B-15000 ksi

**Origin Info at Corner, Both Plate Surfaces were milled.**

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### Fractographic Data

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### Tabulation Sheet

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<td>TEST FRAME:</td>
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<td>AVERAGE WIDTH: 1.502</td>
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<td>AVERAGE THICKNESS: 3.350</td>
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<td>BASELINE STRESS: 33.5 ksi</td>
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<td>MAX. LOAD: 1902</td>
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<tr>
<td>CYCLES AT TERMINATION/RESIDUE: 3 Lives</td>
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**STATIC LOAD** A-13600 ksi  B-15000 ksi

**Origin Info at Corner, Both Plate Surfaces were milled.**
**FATIGUE TEST DATA**

**SPECIMEN NUMBER:** YWPB-752

**SPECTRUM:** Bomber

**TEST DATE:**

**TEST FRAME:** ABCDEFG

**AVERAGE WIDTH:** 1.506

**AVERAGE THICKNESS:** 3633

**AREA:** .578

**BASELINE STRESS:** 33,000

**MAX. LOAD:** 1973

**Cycles at termination/possible:** 200 Lives

**Origin lies on Plate B surface due to relaxed tolerances (flat milled). Both Plate surfaces (A & B) were milled.

---

**FRACTOGRAPHIC DATA**

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**SPECIMEN NUMBER:** YWPB-9B

**SPECTRUM:** Bomber

**TEST DATE:**

**TEST FRAME:** ABCDEFG

**AVERAGE WIDTH:** 1.506

**AVERAGE THICKNESS:** 3633

**AREA:** .578

**BASELINE STRESS:** 33,000

**MAX. LOAD:** 1973

**Cycles at termination/possible:** 200 Lives

**Static load A-19,500 Kf
B-16,500 Kf**

---

**Origin lies on Plate B surface due to relaxed tolerances (flat milled). Both Plate surfaces (A & B) were milled.
FRACTOGRAPHIC DATA

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SPECTRUM: Bomber

TEST DATE: 12/31/68

TEST FRAME: 1 2 3 4 5 6

AVERAGE WIDTH: \( \frac{1.501 + 1.501 + 1.501 + 1.501 + 1.501}{5} \) = 1.501

AVERAGE THICKNESS: \( \frac{3.850 + 3.850 + 3.850 + 3.850 + 3.850}{5} \) = 3.850

AREA: 5.79

BASELINE STRESS: 33ksi

MAX. LOAD: 19,120

Cycles at termination/failure: 3 Lives

Origin lies on plate hole surface at corner.

TABULATION SHEET

SPECIMEN NUMBER: YWPA-10B

SPECTRUM: Bomber

TEST DATE: 12/31/68

TEST FRAME: 1 2 3 4 5 6

AVERAGE WIDTH: \( \frac{1.501 + 1.501 + 1.501 + 1.501 + 1.501}{5} \) = 1.501

AVERAGE THICKNESS: \( \frac{3.850 + 3.850 + 3.850 + 3.850 + 3.850}{5} \) = 3.850

AREA: 5.79

BASELINE STRESS: 33ksi

MAX. LOAD: 19,120

Cycles at termination/failure: 3 Lives

This specimen had failed before 2 lives (2,860 ft) between 2,090 + 2,100 ft. Origin lies on plate surface near corner. Both plate surfaces (AR43) were milled.
**Fatigue Test Data**

**Specimen Number:** YW PB-11 B

- **Spectrum:** Bomber
- **Test Date:** October 1977
- **Test Frame:** 1 2 3 4 5 6
- **Average Width:** 1.500 1.500 1.500 1.500 1.500
- **Average Thickness:** 0.800 0.800 0.800 0.800 0.800
- **Area:** 5.73 B
- **Baseline Stress:** 33 K S
- **Max. Load:** 18000
- **Cycles at Failure:** 8000
- **Static Load A:** 1 K
- **B:** 2 K
- **Plate B Failed in Less Than 2 Lives, Plate A Sustained Load for 2 Lives. This Specimen Failed at 3806 Flts. Origin Lies on Butt-Hole Surface, Both Plate Surfaces (A & B) Were Welded.**

**Fatigue Test Data**

**Specimen Number:** YW PB-12 B

- **Spectrum:** Bomber
- **Test Date:** October 1977
- **Test Frame:** 1 2 3 4 5 6
- **Average Width:** 1.500 1.500 1.500 1.500 1.500
- **Average Thickness:** 0.800 0.800 0.800 0.800 0.800
- **Area:** 5.73 B
- **Baseline Stress:** 33 K S
- **Max. Load:** 18000
- **Cycles at Failure:** 8000
- **Static Load A:** 1 K
- **B:** 2 K
- **Origin Lies on Surface of Plate B Which Mates Plate A. Origin was due to Fretting.**

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**Fatigue Test Data**

**Specimen Number:** YW PB-11 B

- **Spectrum:** Bomber
- **Test Date:** October 1977
- **Test Frame:** 1 2 3 4 5 6
- **Average Width:** 1.500 1.500 1.500 1.500 1.500
- **Average Thickness:** 0.800 0.800 0.800 0.800 0.800
- **Area:** 5.73 B
- **Baseline Stress:** 33 K S
- **Max. Load:** 18000
- **Cycles at Failure:** 8000
- **Static Load A:** 1 K
- **B:** 2 K
- **Plate B Failed in Less Than 2 Lives, Plate A Sustained Load for 2 Lives. This Specimen Failed at 3806 Flts. Origin Lies on Butt-Hole Surface, Both Plate Surfaces (A & B) Were Welded.**

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### Fatigue Test Data

**Specimen Number:** YWPB-13A

**Spectrum:** Bomber

**Test Date:** 1 2 3 4 5 6

**Test Frame:** ABCDEFG

**Average Width:** 1.5002 1.5001 1.5002 1.5002 1.5001 1.5002

**Average Thickness:** 0.384 0.384 0.385 0.385 0.386 0.384

**Area:** 0.5769 in²

**Baseline Stress:** 33,000 psi

**Max. Load:** 19,000 lb

**Cycles at Termination/Today:** 2,813 lives

**Origin lies at corner.**

### Fractographic Data

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**Origin lies at corner.**

**Specimen Number:** YWPB-13B

**Spectrum:** Bomber

**Test Date:** 1 2 3 4 5 6

**Test Frame:** ABCDEFG

**Average Width:** 1.5002 1.5001 1.5002 1.5002 1.5001 1.5002

**Average Thickness:** 0.384 0.384 0.385 0.385 0.386 0.384

**Area:** 0.5769 in²

**Baseline Stress:** 33,000 psi

**Max. Load:** 19,000 lb

**Cycles at Termination/Today:** 2,813 lives

**Origin lies at corner.**

---

**Tabulation Sheet**

**Fatigue Test Data**

**Specimen Number:** YWPB-13A

**Spectrum:** Bomber

**Test Date:** 1 2 3 4 5 6

**Test Frame:** ABCDEFG

**Average Width:** 1.5002 1.5001 1.5002 1.5002 1.5001 1.5002

**Average Thickness:** 0.384 0.384 0.385 0.385 0.386 0.384

**Area:** 0.5769 in²

**Baseline Stress:** 33,000 psi

**Max. Load:** 19,000 lb

**Cycles at Termination/Today:** 2,813 lives

**Origin lies at corner.**

---

**Tabulation Sheet**

**Fatigue Test Data**

**Specimen Number:** YWPB-13B

**Spectrum:** Bomber

**Test Date:** 1 2 3 4 5 6

**Test Frame:** ABCDEFG

**Average Width:** 1.5002 1.5001 1.5002 1.5002 1.5001 1.5002

**Average Thickness:** 0.384 0.384 0.385 0.385 0.386 0.384

**Area:** 0.5769 in²

**Baseline Stress:** 33,000 psi

**Max. Load:** 19,000 lb

**Cycles at Termination/Today:** 2,813 lives

**Origin lies at corner.**

---

**Tabulation Sheet**

**Fatigue Test Data**

**Specimen Number:** YWPB-13C

**Spectrum:** Bomber

**Test Date:** 1 2 3 4 5 6

**Test Frame:** ABCDEFG

**Average Width:** 1.5002 1.5001 1.5002 1.5002 1.5001 1.5002

**Average Thickness:** 0.384 0.384 0.385 0.385 0.386 0.384

**Area:** 0.5769 in²

**Baseline Stress:** 33,000 psi

**Max. Load:** 19,000 lb

**Cycles at Termination/Today:** 2,813 lives

**Origin lies at corner.**

---

**Tabulation Sheet**

**Fatigue Test Data**

**Specimen Number:** YWPB-13D

**Spectrum:** Bomber

**Test Date:** 1 2 3 4 5 6

**Test Frame:** ABCDEFG

**Average Width:** 1.5002 1.5001 1.5002 1.5002 1.5001 1.5002

**Average Thickness:** 0.384 0.384 0.385 0.385 0.386 0.384

**Area:** 0.5769 in²

**Baseline Stress:** 33,000 psi

**Max. Load:** 19,000 lb

**Cycles at Termination/Today:** 2,813 lives

**Origin lies at corner.**
### Fatigue Test Data

**Specimen Number:** YWP B-15B

**Spectrum:** Bomber

**Test Date:**

**Test Frame:** 3 3 4 3 6

**Average Width:** 1.505 * 1.502 * 1.517 * 1.516 * 1.594

**Average Thickness:** 1.505 * 1.502 * 1.502 * 1.507 * 1.507

**Area:** 158.00

**Baseline Stress:** 33 Ks

**Max. Load:** 19153

**Cycles at **

- **Fatigue Failure:** 31800 FLTS
- **Static Load A:** 19153 K
- **Static Load B:** 19153 K

### Fractographic Data

<table>
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<tr>
<th>Flight</th>
<th>Crack Length Inch</th>
<th>Increment Inch</th>
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**Origin Line:** On Bolt Hole Surface Near Corner

### Additional Data

- **Maximum Load:** 19153 K
- **Number of Load Points Above:** 31800 FLTS
- **Static Load A:** 19153 K
- **Static Load B:** 19153 K

**Note:** The specimen failed between 2150 and 24000 FLTS. Origin lies on Bolt Hole Surface Near Corner.
**FATIGUE TEST DATA**

**SPECIMEN NUMBER:** YWPB-17A

**SPECTRUM:**

**TEST DATE:**

**TEST FRAME:**

**AVERAGE WIDTH:** 1.5021, 50.11, 51.16, 51.33, 53.30

**AVERAGE THICKNESS:** 3.869, 3869, 3869, 3869, 3869

**AREA:** 0.5765, 0.0614

**BASELINE STRESS:** 33 ksi

**MAX. LOAD:** 15018

**CYCLES AT TERMINATION:** 21,600

**STATIC LOAD A - 16,420 K* 4**

**B - 16,860 K**

**origin lies on Bott Hole Surface**

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**FRACTOGRAPHIC DATA**

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**SPECIMEN NUMBER:** YWPB-18B

**SPECTRUM:**

**TEST DATE:**

**TEST FRAME:**

**AVERAGE WIDTH:** 1.5021, 50.11, 51.16, 51.33, 53.30

**AVERAGE THICKNESS:** 3.869, 3869, 3869, 3869, 3869

**AREA:** 0.5851, 0.0614

**BASELINE STRESS:** 33 ksi

**MAX. LOAD:** 19307

**CYCLES AT FAILURE:** 3 Lives/

**STATIC LOAD A - 16,420 K**

**B - 16,860 K**

**origin lies on plate surface near center. Fatigue origin was due to relaxed transverse (Test Mill) cracks. Plate surface (A+B) were**

<table>
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<th>FLIGHT</th>
<th>CRACK LENGTH INCH</th>
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**NOTE:**

- The data presented includes the results of fatigue tests conducted on the specified specimens with various test conditions and parameters. The table details the increment in crack length and the corresponding flight numbers. The data is organized to facilitate the analysis of fatigue life and crack growth under different test conditions. The notes indicate specific observations about the origin of fatigue cracks and the conditions under which they occurred. The test data is summarized in a tabulated format, providing a clear and structured representation of the experimental results.
### GENERAL DYNAMICS
#### Fatigue Test Data

**GENERAL DYNAMICS**

**Apco Aircraft Division**

**TABULATION SHEET**

**FATIGUE TEST DATA**

**SPECIMEN NUMBER:** YWP B-19A

**SPECTRUM:** Bomber

**TEST DATE:**

**TEST FRAME:**

**AVERAGE WIDTH:**

**AVERAGE THICKNESS:**

**AREA:**

**BASELINE STRESS:**

**MAX. LOAD:**

**CYCLES AT TERMINATION/REMARKS:** 2 Lives /

**STATIC LOAD:**

**Origin lies on Plate A surface.**

---

### General Dynamics

**Fatigue Test Data**

**SPECIMEN NUMBER:** YWP B-20 A

**SPECTRUM:** Bomber

**TEST DATE:**

**TEST FRAME:**

**AVERAGE WIDTH:**

**AVERAGE THICKNESS:**

**AREA:**

**BASELINE STRESS:**

**MAX. LOAD:**

**CYCLES AT TERMINATION/REMARKS:** 2 Lives /

**STATIC LOAD:**

**Origin lies on Plate A surface.**

---

### General Dynamics

**Fatigue Test Data**

**SPECIMEN NUMBER:** YWP B-19A

**SPECTRUM:** Bomber

**TEST DATE:**

**TEST FRAME:**

**AVERAGE WIDTH:**

**AVERAGE THICKNESS:**

**AREA:**

**BASELINE STRESS:**

**MAX. LOAD:**

**CYCLES AT TERMINATION/REMARKS:** 2 Lives /

**STATIC LOAD:**

**Origin lies on Plate A surface.**

---

### General Dynamics

**Fatigue Test Data**

**SPECIMEN NUMBER:** YWP B-20 A

**SPECTRUM:** Bomber

**TEST DATE:**

**TEST FRAME:**

**AVERAGE WIDTH:**

**AVERAGE THICKNESS:**

**AREA:**

**BASELINE STRESS:**

**MAX. LOAD:**

**CYCLES AT TERMINATION/REMARKS:** 2 Lives /

**STATIC LOAD:**

**Origin lies on Plate A surface.**

---

### General Dynamics

**Fatigue Test Data**

**SPECIMEN NUMBER:** YWP B-19A

**SPECTRUM:** Bomber

**TEST DATE:**

**TEST FRAME:**

**AVERAGE WIDTH:**

**AVERAGE THICKNESS:**

**AREA:**

**BASELINE STRESS:**

**MAX. LOAD:**

**CYCLES AT TERMINATION/REMARKS:** 2 Lives /

**STATIC LOAD:**

**Origin lies on Plate A surface.**

---

### General Dynamics

**Fatigue Test Data**

**SPECIMEN NUMBER:** YWP B-20 A

**SPECTRUM:** Bomber

**TEST DATE:**

**TEST FRAME:**

**AVERAGE WIDTH:**

**AVERAGE THICKNESS:**

**AREA:**

**BASELINE STRESS:**

**MAX. LOAD:**

**CYCLES AT TERMINATION/REMARKS:** 2 Lives /

**STATIC LOAD:**

**Origin lies on Plate A surface.**
**FATIGUE TEST DATA**

**SPECIMEN NUMBER:** YWPB-21B

**SPECTRUM:** Bomber

**TEST DATE:**

**TEST FRAME:**

**AVERAGE WIDTH:**

**AVERAGE THICKNESS:**

**AREA:**

**BASELINE STRESS:**

**MAX. LOAD:**

**CYCLES AT TERMINATION/FAILURE:**

---

**STATIC LOAD:**

**This specimen has failed before 2 lives (2960 fits) between 2080 and 2090 fits. Origin lies at corner. Both plate surfaces (A&B) were milled.**

---

**FRACTOGRAPHIC DATA**

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<th>FLIGHT</th>
<th>CRACK LENGTH INCH</th>
<th>INCREMENT INCH</th>
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**FLIGHT**

**CRACK LENGTH INCH**

**INCREMENT INCH**
GENERAL DYNAMICS

Fatigue Test Data

Specimen Number: YwPB-23B

Flight: 3, 4, 5, 6

Test Date: 1/23/64

Test Frame: 123456

Test Number: 1600001

Specimen: Bomber

Average Width: 1.4999

Average Thickness: 0.3689

Area: 5.714

Baseline Stress: 33 ksi

Max. Load: 18695

Cycles at Termination/ Failure: 21 Lives

Fractographic Data

Specimen Number: YwPB-24A

Flight: 3, 4, 5, 6

Test Date: 1/23/64

Test Frame: 123456

Test Number: 1600001

Specimen: Bomber

Average Width: 1.5000

Average Thickness: 0.3689

Area: 6.805

Baseline Stress: 33 ksi

Max. Load: 18885

Cycles at Termination/ Failure: 21 Lives

Origin lies on Bolt Hole surface near corner. Bolt Hole surfaces (A & B) were milled.

Specimen: Bomber

Average Width: 1.5000

Average Thickness: 0.3689

Area: 6.805

Baseline Stress: 33 ksi

Max. Load: 18885

Cycles at Termination/ Failure: 21 Lives

Origin lies on Bolt Hole surface near corner. Bolt Hole surfaces (A & B) were milled.

Specimen: Bomber

Average Width: 1.5000

Average Thickness: 0.3689

Area: 6.805

Baseline Stress: 33 ksi

Max. Load: 18885

Cycles at Termination/ Failure: 21 Lives

Origin lies on Bolt Hole surface near corner. Bolt Hole surfaces (A & B) were milled.
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<th>Increment Inch</th>
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Spectrum: Blomberg
Test Date: 3/4/76
Test Frame: A B C D E F
Average Width: 1.490 1.995 1.490 1.995 1.490
Average Thickness: 3.893 3.893 3.893 3.893 3.893
Area: .5748
Baseline Stress: 33Ksi
Max. Load: 18874

Cycles at Termination: 2 Lives

Static Load
A: 16.24 K
B: 75.14 K

Origin lies on Plate B surface. To relax tolerances both
were the cause for initiation of fatigue.
Both plates surfaces (A & B) were
milled.

Spectrum: Blomberg
Test Date: 3/4/76
Test Frame: A B C D E F
Average Width: 1.490 1.995 1.490 1.995 1.490
Average Thickness: 3.893 3.893 3.893 3.893 3.893
Area: .5748
Baseline Stress: 33Ksi
Max. Load: 18874

Cycles at Termination: 2 Lives

Static Load
A: 17.72 K
B: 94.86 K

Origin lies on Plate B surface.
Both plates surfaces (A & B) were
milled.

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**SPECIMEN NUMBER:** YK-D8-26A

- **CUTTING:** 3/8" H8 T
- **SPECTRUM:** Bomber
- **BASELINE STRESS:** 2
- **MAX. LOAD:** 1999

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**SPECIMEN NUMBER:** 8-1/8" H8 T

- **CUTTING:** 3/8" H8 T
- **SPECTRUM:** Bomber
- **BASELINE STRESS:** 2
- **MAX. LOAD:** 1999

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**SPECTRUM:** Bomber

- **BASELINE STRESS:** 2
- **MAX. LOAD:** 1999

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**Fatigue Test Data**

**Specimen Number:** YWPB-23A

**Spectrum:** Bomber

**Test Date:** 10/5/65

**Test Frame:** 3/4/65

**Average Width:** 1.452

**Average Thickness:** 0.307

**Area:** 0.576

**Baseline Stress:** 33 ksi

**Max. Load:** 218 ksi

**Cycles at Termination/Failure:** 2,113,000

This specimen had failed before 2,113,000 cycles between 2450 and 2460 psi. Origin lies on bolt hole surface. Both plate surfaces (A & B) were milled.

---

**Fatigue Test Data**

**Specimen Number:** YWPB-30A

**Spectrum:** Bomber

**Test Date:** 10/5/65

**Test Frame:** 3/4/65

**Average Width:** 1.452

**Average Thickness:** 0.307

**Area:** 0.576

**Baseline Stress:** 33 ksi

**Max. Load:** 218 ksi

**Cycles at Termination/Failure:** 2,113,000

Origin lies at corner.
### Fatigue Test Data

**2.3.3 HYFP**

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**Fatigue Test Data**

**SPECIMEN NUMBER:** HYFP-1B

**Spectrum:** Fighter

**Test Date:**

**Test Frame:** 12345668

**ERAGE WIDTH:** 1.5010 1.5023 1.5024 1.5004 1.4975

**ERAGE THICKNESS:** 3758 3773 3793 3799 3804 3901

**STEIN:** 5641

**SILENE STRESS:** 40.8 KS

**X. LOAD:** 23016.7

**CIES AT **FAILURE:** *

**SPECIMEN NUMBER:** HYFP-2A

**Spectrum:** Fighter

**Test Date:**

**Test Frame:** 12345668

**ERAGE WIDTH:** 1.5010 1.5023 1.5024 1.5004 1.4975

**ERAGE THICKNESS:** 3758 3773 3793 3799 3804 3901

**STEIN:** 5641

**SILENE STRESS:** 40.8 KS

**X. LOAD:** 23016.7

**CIES AT **FAILURE:** *

**STATIC LOAD:**

A- 0453
B- 9133

**ORIGIN LIES ON BOLT HOLE SURFACE**

**MATING SURFACES WERE MILLedd.**

---

**ERAGE THICKNESS:**

A - 37
B - 39
C - 29
D - 29

**SILENE STRESS:**

A - 57.1
B - 26
C - 9

**X. LOAD:**

A - 221
B - 8400
C - 8800
D - 9200

**SELINE STRESS:**

A - 7200
B - 7200
C - 7200
D - 7200

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**ERAGE THICKNESS:**

A - 37
B - 39
C - 29
D - 29

**SILENE STRESS:**

A - 57.1
B - 26
C - 9

**X. LOAD:**

A - 221
B - 8400
C - 8800
D - 9200

**SELINE STRESS:**

A - 7200
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### Fatigue Test Data

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**Notes:**

- **Spectrum:** Fighter
- **Specimen Number:** HY WPF-3A
- **Specimen Number:** HY WPF-4B
- **Test Date:**
- **Test Frame:**
- **Mean Width:**
- **Mean Thickness:**
- **E-A:**
- **Averaged Width:**
- **Averaged Thichness:**
- **Specimen Number:**
- **Spectrum:**
- **Test Date:**
- **Test Frame:**
- **Mean Width:**
- **Mean Thickness:**
- **E-A:**
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- **Test Frame:**
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- **Spectrum:**
- **Test Date:**
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- **Spectrum:**
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- **Spectrum:**
- **Test Date:**
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### Fractographic Data

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### Static Load

| A-1315 K# |
| 1 | 15000 |
| 2 | 16000 |
| 3 | 17000 |
| 4 | 18000 |
| 5 | 19000 |
| 6 | 20000 |
| 7 | 21000 |
| 8 | 22000 |
| 9 | 23000 |
| 10| 24000 |
| 11| 25000 |
| 12| 26000 |
| 13| 27000 |
| 14| 28000 |
| 15| 29000 |
| 16| 30000 |
| 17| 31000 |
| 18| 32000 |
| 19| 33000 |
| 20| 34000 |
| 21| 35000 |
| 22| 36000 |
| 23| 37000 |
| 24| 38000 |
| 25| 39000 |
| 26| 40000 |

### Notes

1. A-1315 K#
2. B-1569 K#
3. Origin lies at plate surface/radius corner. Mating surfaces were milled.
### Fatigue Test Data

**Specimen Number:** HYWPF - 717

**Spectrum:** Fighter

**Test Date:**

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</table>

**Crack at Terminations:**

1 Life

2 Lives

3) $459447.8 \text{ lbs} = 4800 \text{ Flt-Hrs}

**Static Load**

- A: 1450 KPa
- B: 1332 KPa

**Origin Lies on Bolt Hole Surface Near Corner of Mating Surfaces. Mating Surfaces Were Milled.**
### Fractographic Data

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### Fatigue Test Data

**Bill #** 41

- **Bill Description:** 2 Lives
- **Flight Hrs.:** 16000
- **Crack Length In.:**
  - Increment:
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    - 2
    - 3
    - 4
    - 5
    - 6
    - 7
    - 8
    - 9
    - 10
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    - 14
    - 15
    - 16
    - 17
    - 18
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    - 30
    - 31
    - 32
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    - 40

### Notes

- **Specimen Number:** HMWPF-9
- **Spectrum:** Fighter
- **Test Date:**
- **Test Frame:**
- **Failure Mode:**
- **Origin Lies on Bolt Hole Surface:**
- **Mating Surfaces Were Milled.

### Bill # 42

- **Bill Description:** 2 Lives
- **Flight Hrs.:** 16000
- **Crack Length In.:**
  - Increment:
    - 1
    - 2
    - 3
    - 4
    - 5
    - 6
    - 7
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    - 38
    - 39
    - 40

### Notes

- **Specimen Number:** HMWPF-10
- **Spectrum:** Fighter
- **Test Date:**
- **Test Frame:**
- **Failure Mode:**
- **Origin Lies on Bolt Hole Surface:**
- **Mating Surfaces Were Milled.

---

238
### Specimen Data

**Specimen Number:** HYW08-1A

**Spectrum:** Room

**Test Date:** [Not legible]

**Test Frame:** [Not legible]

**Average Width:** 1.4964

**Average Thickness:** 0.3872

**Area:** 0.575

**Baseline Stress:** 68 ksi

**Max. Load:** 23,868

**Cycles at Failure:** [Not legible]

**Origin lies on Bolt-Hole Surface**

---

### Fatigue Test Data

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**Specimen Number:** HYW08-2B

**Spectrum:** Room

**Test Date:** [Not legible]

**Test Frame:** [Not legible]

**Average Width:** 1.4961

**Average Thickness:** 0.3872

**Area:** 0.575

**Baseline Stress:** 68 ksi

**Max. Load:** 23,868

**Cycles at Termination:** [Not legible]

**Origin lies on Bolt-Hole Surface**

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**Fatigue Test Data**

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FA TIGUE TEST DATA

SPECIMEN NUMBER: HWPB-3B

SPECTRUM: Number

TEST DATE: 1 2 3 4

TEST FRAME: 1 2 3 4

AVERAGE WIDTH: 1400 / 1500 / 1500 / 1500 (1500)

AVERAGE THICKNESS: 320 / 320 / 320 / 320

AREA: 57.32 sq. ft

BASELINE STRESS: 36,000 psi

MAX. LOAD: 23,458

CYCLES AT FAILURE: 1,178,833

Origin lies on Bolt Hole surface corner.

240
### Fatigue Test Data

**Specimen Number:** HYPB-5B

**Spectrum:** Bomber

**Test Date:**

**Test Frame:** A B C

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<th>AVERAGE THICKNESS</th>
<th>AREA</th>
<th>BASELINE STRESS</th>
<th>MAX. LOAD</th>
<th>CYCLES AT TERMINATION</th>
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<td>0.028 in</td>
<td>15.805 sq in</td>
<td>38.5 ksi</td>
<td>22587 cycles</td>
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**Origin lies on Bolt Hole Surface.**

---

**Specimen Number:** HYPB-6A

**Spectrum:** Bomber

**Test Date:**

**Test Frame:** A B C

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<td>15.805 sq in</td>
<td>38.5 ksi</td>
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**Origin lies on Bolt Hole Surface near corner.**

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**Flap Length**

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**Flap Thickness**

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**Crack Thickness**

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**Flap Failure**

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**Crack Failure**

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**Crack Failure**

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### Fatigue Test Data

#### Specimen Number: H-1WBB-9

**Spectrum:** Bomber

**Test Date:**

**Test Frame:** 1, 2, 3, 4

**Average Width:** 1.197

**Average Thickness:**

- 3825
- 3820
- 3812
- 3810
- 3850

**Area:** 5539

**Baseline Stress:** 35.6

**Max. Load:** 22760

**Cycles at Termination/Failure:** 25,860 PLL

#### Specimen Number: H-1WBB-10

**Spectrum:** Bomber

**Test Date:**

**Test Frame:** 1, 2, 3, 4

**Average Width:** 1.197

**Average Thickness:**

- 3825
- 3820
- 3812
- 3810
- 3850

**Area:** 5539

**Baseline Stress:** 35.6

**Max. Load:** 22770

**Cycles at Termination/Failure:** 25,860 PLL

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### Fractographic Data

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[Figure of crack growth and analysis]
FRACTOGRAPHIC DATA

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SPECIMEN NUMBER: LYNPF-1B

SPECTRUM: Fighter

TEST DATE: 1969

TEST FRAME: 1 2 3 4 5 6

EAL: 0.076

SIGNAL STRESS: 30.6 KSF

X. LOAD: 17361.9

LIVES AT TERMINATION/FAILURE:
3 Lives/

STATIC LOAD A - 18.83 KLF
B - 16.92 KLF

ORIGIN LIES ON SURFACE WHICH MATURES WITH PLATE A. MATTING SURFACES WERE MILLLED.

FATIGUE TEST DATA

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SPECIMEN NUMBER: LYNPF-2B

SPECTRUM: Fighter

TEST DATE: 1969

TEST FRAME: 1 2 3 4 5 6

EAL: 0.076

SIGNAL STRESS: 30.6 KSF

X. LOAD: 17361.9

LIVES AT TERMINATION/FAILURE:
3 Lives/

STATIC LOAD A - 16.92 KLF
B - 15.44 KLF

ORIGIN LIES ON SURFACE WHICH MATURES WITH PLATE A. MATTING SURFACES WERE MILLLED.
## FRACTOGRAPHIC DATA

### LYWPF-1B

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### LYWPF-2B

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### Fractographic Data

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**Note:** The table continues with similar data entries. The images show a diagram of a test setup with notations and measurements.
### FRACTOGRAPHIC DATA

**Fractograph Data from Previous Page**

**Fractograph Data for LYWPF-3B**

<table>
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*This Origin Lies on Bolt Hole Surface*

**Fatigue Test Data**

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2 Lives

3/4 80.287/1.5%= 18335.16 FLH-HRS.

Static Load A- 17.63 K
B- 17.58 K

*This Origin Lies on Plate Surface Which Mates With Plate "B." Initiation Was Due to Fretting.
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**Fatigue Test Data**

1. **Specimen Number:** LWYPF-9A
2. **Spectrum:** Fighter
3. **Test Date:** __________
4. **Test Frame:** 1 2 3 4 5 6
5. **Crack Length:** 1,493.0
6. **Increment:** 1.4935
7. **Specimen Number:** LWYPF-10B
8. **Spectrum:** Fighter
9. **Test Date:** __________
10. **Test Frame:** 1 2 3 4 5 6
11. **Crack Length:** 1,493.0
12. **Increment:** 1.4935
13. **Origin occurred at the edge of a sliver.**
14. **The sliver was generated during the breaking (detaching) of the corner.**
15. **Origin lies on both hole surface.**
16. **Mating surfaces were milled.**
Continued from previous page

**FRACTOGRAPHIC DATA**

**LYWPF-9A**

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**Fatigue Test Data**

**Specimen Number:** LYWPB-1A

**Spectrum:** Bomber

**Test Date:**

**Test Frame: A B C D E F**

**Average Width:** 1.5065

**Average Thickness:**

**Area:** 5734

**Baseline Stress:** 29.7 ksi

**Max. Load:** 17.036

**Cycles at Failure:** 31 Lives

---

**Specimen Number:** LYWPB-2B

**Spectrum:** Bomber

**Test Date:**

**Test Frame:**

**Average Width:** 1.5035

**Average Thickness:** 287

**Baseline Stress:** 86 ksi

**Max. Load:** 17110

**Cycles at Failure:** 31 Lives

---

**Fatigue Test Data**

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**Note:**

Corrected failure data at

3648 Flts.

Origin lies on plate A surface near corner on extension formed during drilling. Plate surfaces (A+B) were milled. This specimen failed between 3340-3350 Flts.
### Specimen Number: Lxwby-3A

- **Spectrum**: Random
- **Test Date**: T-7 1966
- **Average Width**: 5.61 
- **Average Thickness**: 3.11 
- **Area**: 5780 
- **Baseline Stress**: 262 ksi 
- **Max. Load**: 1760 lbf 
- **Cycles at Termination/Failure**: 3,600 cycles

**Original Note:** Line 15.16 (2) 15.46 (2)

---

### Specimen Number: Lxwby-4B

- **Spectrum**: Random
- **Test Date**: T-7 1966
- **Average Width**: 5.61 
- **Average Thickness**: 3.11 
- **Area**: 5780 
- **Baseline Stress**: 262 ksi 
- **Max. Load**: 1760 lbf 
- **Cycles at Termination/Failure**: 3,600 cycles

**Original Note:** Line 15.16 (2) 15.46 (2)
**STATIC DYNAMIC**

**SPECIMEN NUMBER:** Lywpe-3B

**SPECTRUM:** Bomber

**TEST DATA:**

- **TEST FRAME:** CDE
- **AVERAGE WIDTH:** 1.4500 / 1.4950 / 1.4900 / 1.4900
- **AVERAGE THICKNESS:** 3.340 / 3.380 / 3.360 / 3.390 / 3.360
- **AREA:** 15.28
- **BASELINE STRESS:** 12 ksi
- **MAX. LOAD:** 16200
- **CYCLES AT TERMINATION/FAILURE:** 1,727

*Origin lies on bolt hole surface. Both surfaces (A & B) were milled.*

---

**FATIGUE TEST DATA**

**SPECIMEN NUMBER:** Lywpe-1B

**SPECTRUM:** Bomber

**TEST DATA:**

- **TEST FRAME:** ADE
- **AVERAGE WIDTH:** 1.5000 / 1.5000 / 1.5000 / 1.5000
- **AVERAGE THICKNESS:** 3.200 / 3.200 / 3.200 / 3.200
- **AREA:** 15.752
- **BASELINE STRESS:** 12 ksi
- **MAX. LOAD:** 17000
- **CYCLES AT TERMINATION/FAILURE:** 1,706

*Origin lies on bolt hole surface. Both plate surfaces (A & B) were milled.*
2.3.7 HVIF

**FATIGUE TEST DATA**

**SPECIMEN NUMBER:** HVIF-1A

**SPECTRUM:** Flight

**TEST DATE:**

**TEST FRAME:** A

**AVERAGE WIDTH:** 1.50 (1.50, 1.50)

**AVERAGE THICKNESS:** 3.76, 3.01, 3.67, 3.75, 3.50

**META:** 3.670

**BASELINE STRESS:** 34.4 kgs

**MAX. LOAD:** 193.73

**CYCLES AT TERMINATION:** 2 Lives

**STATE LOAD:** A-1644kN

**ORIGIN Lies on PLATE Surface.**

---

**FATIGUE TEST DATA**

**SPECIMEN NUMBER:** HVIF-2A

**SPECTRUM:** Flight

**TEST DATE:**

**TEST FRAME:** B

**AVERAGE WIDTH:** 1.50

**AVERAGE THICKNESS:** 3.65, 3.01, 3.65, 3.85, 3.65

**META:** 34.4 kgs

**BASELINE STRESS:** 34.4 kgs

**MAX. LOAD:** 197.2

**CYCLES AT TERMINATION:** 2 Lives

**STATE LOAD:** A-1277kN

**ORIGIN Lies on PLATE Surface.**

Both PLATE surfaces (A & B) were milled.

**FRACOGRAPHIC DATA**

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Note: The table above shows the progression of crack length increment over time in a fatiguing test. Each increment is recorded at specific flight hours, showing a consistent increase in crack length.
### Fatigue Test Data

**Specimen Number:** XWIF-3B

**Spectrum:** Fighter

**Test Date:**

**Test Frame:** "C"

**Average Width:** 1.493

**Average Thickness:** 3.773

**Baseline Stress:** 34 kpsi

**Max. Load:** 1023.3

**Cycles at Failure:** *2 Lives*

Origin lies on plate surface B" near corner upset flank. Both plate surfaces (A & B) were milled.

---

### Fatigue Test Data

**Specimen Number:** XWIF-4A

**Spectrum:** Fighter

**Test Date:**

**Test Frame:** "A"

**Average Width:** 1.493

**Average Thickness:** 3.861

**Baseline Stress:** 34 kpsi

**Max. Load:** 1947.5

**Cycles at Failure:** *2 Lives* @ 1,465,532 P.S.I. = 15,206 Fl. Hrs.

Origin lies at corner. Both plate surfaces (A & B) were milled.

---

### Fractographic Data

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FRACTOGRAPHIC DATA

FATIGUE TEST DATA

SPECIMEN NUMBER: 1211F-5A
SPECTRUM: Fighter
TEST DATE: __________
TEST FRAME: A
AVERAGE WIDTH: 14088 1492 11989 1192 11989
AVERAGE THICKNESS: 3744 3744 3744 3744 3744
AIFA: -5.6659 CALS 1870 1807
BASELINE STRESS: CALS 97%
MAX. LOAD: 19240 A.W.T. 770
CYCLES AT TERMINATION/FAILURE: 2,416,496 3675.20 FLT-HRS

SPECIMEN NUMBER: 1211F-6A
SPECTRUM: Fighter
TEST DATE: __________
TEST FRAME: B
AVERAGE WIDTH: 15004 15004 15004 15004 15004
AVERAGE THICKNESS: 364 364 364 364 364
AIFA: -5.7727 CALS 95%
BASELINE STRESS: CALS 95%
MAX. LOAD: 19455 A.W.T. 778
CYCLES AT TERMINATION/FAILURE: 2,416,496 3675.20 FLT-HRS

FATIGUE TEST DATA

SPECIMEN NUMBER: 1211F-7A
SPECTRUM: Fighter
TEST DATE: __________
TEST FRAME: B
AVERAGE WIDTH: 15004 15004 15004 15004 15004
AVERAGE THICKNESS: 364 364 364 364 364
AIFA: -5.7727 CALS 95%
BASELINE STRESS: CALS 95%
MAX. LOAD: 19455 A.W.T. 778
CYCLES AT TERMINATION/FAILURE: 2,416,496 3675.20 FLT-HRS

FATIGUE TEST DATA

SPECIMEN NUMBER: 1211F-8A
SPECTRUM: Fighter
TEST DATE: __________
TEST FRAME: B
AVERAGE WIDTH: 15004 15004 15004 15004 15004
AVERAGE THICKNESS: 364 364 364 364 364
AIFA: -5.7727 CALS 95%
BASELINE STRESS: CALS 95%
MAX. LOAD: 19455 A.W.T. 778
CYCLES AT TERMINATION/FAILURE: 2,416,496 3675.20 FLT-HRS

FATIGUE TEST DATA

SPECIMEN NUMBER: 1211F-9A
SPECTRUM: Fighter
TEST DATE: __________
TEST FRAME: B
AVERAGE WIDTH: 15004 15004 15004 15004 15004
AVERAGE THICKNESS: 364 364 364 364 364
AIFA: -5.7727 CALS 95%
BASELINE STRESS: CALS 95%
MAX. LOAD: 19455 A.W.T. 778
CYCLES AT TERMINATION/FAILURE: 2,416,496 3675.20 FLT-HRS

FATIGUE TEST DATA

SPECIMEN NUMBER: 1211F-10A
SPECTRUM: Fighter
TEST DATE: __________
TEST FRAME: B
AVERAGE WIDTH: 15004 15004 15004 15004 15004
AVERAGE THICKNESS: 364 364 364 364 364
AIFA: -5.7727 CALS 95%
BASELINE STRESS: CALS 95%
MAX. LOAD: 19455 A.W.T. 778
CYCLES AT TERMINATION/FAILURE: 2,416,496 3675.20 FLT-HRS
### Fatigue Test Data

| Specimen Number: | XWIF-9B  
|------------------|------------------  
| Spectrum:        | Fighter  
| Test Date:       |  
| Test Frame:      | B  
| Average Width:   | 1.5011  
| Average Thickness: | 0.0375  
| A F A:           | 5.738  
| Baseline Stress: | 34 Ksc  
| Max. Load:       | 1950  
| Cycles at Failure: | *  

@ 1225.816 Lbs = 12806.49 Flt-Hrs *

### Fatigue Test Data

| Specimen Number: | XWIF-10A  
|------------------|------------------  
| Spectrum:        | Fighter  
| Test Date:       |  
| Test Frame:      | C  
| Average Width:   | 1.502  
| Average Thickness: | 0.0363  
| A F A:           | 5.758  
| Baseline Stress: | 34 Ksc  
| Max. Load:       | 1957  
| Cycles at Failure: | *  

@ 1.455278 Lbs = 15235.09 Flt-Hrs

### Fractographic Data

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FATIGUE TEST DATA

SPECIMEN NUMBER: XWIF - 12 A

SPECIFICATIONS: Flighter

TEST DATE:

TEST FRAME: A

AVERAGE WIDTH: 11.500
AVERAGE THICKNESS: 0.002
A NPS: 3.0
BASELINE STRESS: CAL 0.36
MAX. LOAD: 19.500

CYCLES AT TERMINATION/FAILURE:

2 Lives/

STATEMENT: A- 12.40K 4
B - 12.40K 4

Origin lies on both plate surface near corner. Both plate surface were milled.

FATIGUE TEST DATA

SPECIMEN NUMBER: XWIF - 12 A

SPECIFICATIONS: Flighter

TEST DATE:

TEST FRAME: B

AVERAGE WIDTH: 1.501
AVERAGE THICKNESS: 0.002
A NPS: 3.056
BASELINE STRESS: CAL 0.37
MAX. LOAD: 19.250

CYCLES AT TERMINATION/FAILURE:

2 Lives/

STATEMENT: A- 12.40K 4
B - 12.40K 4

Origin lies at corner.
**Fatigue Test Data**

**Specimen Number:** XW1F - 13B

**Specimen:** Fighter

**Test Date:**

**Test Fringe:**

- AVERAGE WIDTH: 1.500, 1.500, 1.500, 1.500, 1.500
- AVERAGE THICKNESS: 1.387, 1.385, 1.385, 1.385, 1.385
- AREA: 5.711
- BASELINE STRESS: 94.5 kpsi
- MAX. LOAD: 1541 kips

**Cycles at Failure:** 2 lives

**Fatigue Life:**

- 125,812 kips / 12,804 ft-lb hrs

**Static Load:**

- 14 kips

**Origin Lies at Corner**
### Task IV

#### 2.4 (AF-Fatigue Test Data)

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### Fractographic Data

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**STT3**

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- Fatigue Test Data
  - Specimen Number: STF-3
  - Spectrum: Flighter
  - Test Date: 6/27/78
  - Test Frame: A
  - Average Width: 1.0038
  - Average Thickness: 0.2244
  - Area: 0.2244
  - Baseline Stress: 125 KSI
  - Max. Load: 28,050 #
  - Cycles at Failure: 1 Life

- Fatigue Test Data
  - Specimen Number: STT3
  - Spectrum: Flighter
  - Test Date: 6/27/78
  - Test Frame: B
  - Average Width: 1.0200
  - Average Thickness: 0.249
  - Area: 0.2089
  - Baseline Stress: 125 KSI
  - Max. Load: 26,122.5 #
  - Cycles at Failure: 1 Life

### Fractographic Data

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**Note:**
- Static Load A-K4
- Static Load B-K4
- Baseline Stress: 125 KSI
- Baseline Swing: 71.5
- Max. Load: 26,122.5 #
- Cycles at Failure: 1 Life

- Fatigue Test Data
  - Specimen Number: STF-3
  - Spectrum: Flighter
  - Test Date: 6/27/78
  - Test Frame: A
  - Average Width: 1.0038
  - Average Thickness: 0.2244
  - Area: 0.2244
  - Baseline Stress: 125 KSI
  - Max. Load: 28,050 #
  - Cycles at Failure: 1 Life

- Fatigue Test Data
  - Specimen Number: STT3
  - Spectrum: Flighter
  - Test Date: 6/27/78
  - Test Frame: B
  - Average Width: 1.0200
  - Average Thickness: 0.249
  - Area: 0.2089
  - Baseline Stress: 125 KSI
  - Max. Load: 26,122.5 #
  - Cycles at Failure: 1 Life
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### Fatigue Test Data

**Specimen Number:** ST-7

**Spectrum:** Fighter

**Test Date:**

**Test Frame:** B

**Average Width:** 1.0451

**Average Thickness:** 2.1853

**Area:** 2.194

**Baseline Stress:** 125 ksi

**Max. Load:** 27425.04 (A Pot 9.14)

**Cycles at Termination:**

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**Static Load:**

- A = 4.25 ksi
- B = 1.0 ksi

*Original corner burr.*

**Fatigue Test Data**

**Specimen Number:** ST-8

**Spectrum:** Fighter

**Test Date:** 6/27/77

**Test Frame:** C

**Average Width:** 1.005

**Average Thickness:** 2.005, 2.006

**Area:** 2.006

**Baseline Stress:** 125 ksi

**Max. Load:** 25075.84 (A Pot 8.36)

**Cycles at Failure:**

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**Fatigue Test Data**

**Specimen Number:** ST-7

**Spectrum:** Fighter

**Test Date:**

**Test Frame:** B

**Average Width:** 1.0451

**Average Thickness:** 2.1853

**Area:** 2.194

**Baseline Stress:** 125 ksi

**Max. Load:** 27425.04 (A Pot 9.14)

**Cycles at Termination:**

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**Fatigue Test Data**

**Specimen Number:** ST-8

**Spectrum:** Fighter

**Test Date:** 6/27/77

**Test Frame:** C

**Average Width:** 1.005

**Average Thickness:** 2.005, 2.006

**Area:** 2.006

**Baseline Stress:** 125 ksi

**Max. Load:** 25075.84 (A Pot 8.36)

**Cycles at Failure:**

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### Specimen Number:

- **ST-9**
  - **Spectrum:** Fighter
  - **Test Date:**
  - **Test Frame:**
  - **Average Width:** 1.0446
  - **Average Thickness:** 2.170
  - **Area:** 2.26
  - **Baseline Stress:** 125 ksi
  - **Max. Load:** 28,326
  - **Cycles at Failure:**

- **2 Lives**

### Fatigue Test Data

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### Specimen Number:

- **ST-10**
  - **Spectrum:** Fighter
  - **Test Date:**
  - **Test Frame:**
  - **Average Width:** 1.0474
  - **Average Thickness:** 2.20
  - **Area:** 2.308
  - **Baseline Stress:** 125 ksi
  - **Max. Load:** 28,812.5
  - **Cycles at Failure:**

- **2 Lives**

### Fatigue Test Data

<table>
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<tr>
<th>Bkil</th>
<th>Flight Hrs</th>
<th>Crack Length In</th>
<th>Increment In</th>
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### Notes:

- Static load: A - K1, B - K2
- Fatigue test results for specimens ST-9 and ST-10.
### Fatigue Test Data

**Specimen Number:** ST-13   
**Spectrum:** Fighter  
**Test Date:**  
**Test Frame:** A  
**Average Width:** 1.0453  
**Average Thickness:** 2203.498  
**Area:** 2302  
**Baseline Stress:** 125 kpsi  
**Max. Load:** 28.775 k#  
**Cycles at Termination/Failure:**  

**Static Load A:** 2425 k#  
**Static Load B:** A  

---

### Fatigue Test Data

**Specimen Number:** ST-14  
**Spectrum:** Fighter  
**Test Date:**  
**Test Frame:** C  
**Average Width:** 1.0272  
**Average Thickness:** 2.241  
**Area:** 2.241  
**Baseline Stress:** 125 kpsi  
**Max. Load:** 28012.5 k#  
**Cycles at Termination/Failure:**  

**Static Load A:** 2425 k#  
**Static Load B:** A  

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**Static Load A:** 2425 k#  
**Static Load B:** A  

---

**Area:** The area...
### Fatigue Test Data

**Spectrum Number:** ST-15

**Spectrum:** Fighter

**Test Date:**

**Test Frame:** A

**Average Width:** 1.049

**Average Thickness:**

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**Area:** 2.279

**Baseline Stress:** 125 KSI

**Max. Load:** 28487.5

**Cycles At Failure:**

- 2 Lives

**Static Load:**

- A = 14 KSI

- B = 112 KSI

---

### Fatigue Test Data

**Spectrum Number:** ST-17

**Spectrum:** Fighter

**Test Date:**

**Test Frame:** C

**Average Width:** 1.663

**Average Thickness:**

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**Area:** 2.250

**Baseline Stress:** 125 KSI

**Max. Load:** 28487.5

**Cycles At Failure:**

- 2 Lives

**Static Load:**

- A = 14 KSI

- B = 112 KSI

---

### Fractographic Data

**Test Date:**

- 6/16/80

**Incident In:**

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### FATIGUE TEST DATA

**SPECIMEN NUMBER:** 57-19

**SPECTRUM:** Fighter

**TEST DATE:**

**TEST FRAME:**

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**STATIC LOAD**

- Origin a, b as in

**BASELINE LOAD**

- Origin a, b as in

### FATIGUE TEST DATA

**SPECIMEN NUMBER:** 57-20

**SPECTRUM:** Fighter

**TEST DATE:**

**TEST FRAME:**

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**STATIC LOAD**

- Origin a, b as in

**BASELINE LOAD**

- Origin a, b as in
### FATIGUE TEST DATA

**Test Number:** ST-21
**Test Date:**
**Test Frame:** A
**Width:** 0.626
**Thickness:** 2.135
**Area:** 2.223
**Baseline Stress:** 125 ksi
**Max Load:** 2778.5

**Cycles at Failure:** *2 Lives/

---

### Specimen Number: ST-22

**Test Number:** ST-22
**Test Date:**
**Test Frame:** C
**Width:** 0.626
**Thickness:** 2.122
**Area:** 2.06
**Baseline Stress:** 125 ksi
**Max Load:** 27575.0

**Cycles at Failure:** *2 Lives/

---

### Table: Fatigue Test Data

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*Note: All values are hypothetical and for demonstration purposes.*
### Fatigue Test Data

**Specimen Number:** ST-23

**Spectrum:** Fighter

**Test Date:**

**Test Frame:**

**Average Width:** 0.625

**Average Thickness:** 2.272

**Area:** 2.366

**Baseline Stress:** 125 ksi

**Max. Load:** 295 ksi

**Cycles at Failure:**

---

**Fatigue Test Data**

**Specimen Number:** ST-24

**Spectrum:** Fighter

**Test Date:**

**Test Frame:**

**Average Width:** 0.557

**Average Thickness:** 2.172

**Area:** 2.192

**Baseline Stress:** 125 ksi

**Max. Load:** 274 ksi

**Cycles at Failure:**

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**Fatigue Test Data**

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**Static Load:**

- A - 12000
- B - 12000

**Origin Line on Specimen:**

- Edge across from life (arrow)

---

**Fatigue Test Data**

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**Static Load:**

- A - 12000
- B - 12000

**Origin Line on Specimen:**

- Edge across from life (arrow)
### Fatigue Test Data

**Specimen Number:** ST-25

**Spectrum:** Fighter

**Test Date:**

**Test Frame:**

- **Average Width:** 1.048
- **Average Thickness:** 2.097
- **Area:** 2.141
- **Baseline Stress:** 125 ksi
- **Max. Load:** 271 ksi
- **Cycles at Failure:** 1 Life

Failure occurred at the grip end on the radius/test section tangent point.

### Crack Length Data

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### Fatigue Test Data

**Specimen Number:** ST-26

**Spectrum:** Fighter

**Test Date:**

**Test Frame:**

- **Average Width:** 6.312
- **Average Thickness:** 22607
- **Area:** 2.721
- **Baseline Stress:** 125 ksi
- **Max. Load:** 29450
- **Cycles at Failure:** 1 Life

Failure occurred at 922,258 ft-lbs on the test hole surface.
**Fatigue Test Data**

**Specimen Number:** ST-27

**Spectrum:** Fighter

**Test Date:**

**Test Frame:**

**Average Width:** 0.034

**Average Thickness:** 0.0255

**Area:** 0.0221

**Baseline Stress:** 125ksi - cal swing 67.3

**Max. Load:** 27762.5

**Cycles at Failure:** 1

**Fatigue Test Data**

**Specimen Number:** ST-28

**Spectrum:** Fighter

**Test Date:**

**Test Frame:**

**Average Width:** 0.036

**Average Thickness:** 0.0255

**Area:** 0.0234

**Baseline Stress:** 125ksi - cal swing 64.5

**Max. Load:** 28950

**Cycles at Failure:** 1

@ 842.939 L/Hrs = 8806.45 Fat-Hrs

**Static Load:**

- A - K=1
- B - K=1

**Origin A, lies on Bolt Hole Surface

Origin A, lies at Corner.
**Fatigue Test Data**

**Specimen Number:** S7-29

**Spectrum:** Fighter

**Test Date:**

**Test Frame:**

**Average Width:** 1.033 in.

**Average Thickness:** 0.223 in.

**Area:** 0.231 sq in.

**Baseline Stress:** 12.5 ksi, CAL SWING 6.7

**Max. Load:** 283 ksi, # A POT 9.63

**Cycles at **/Failure:**

© 1.0223092 L.P.'s = 10,677.698 ft-lb/hr *

Static Load: A - K±, B - K±

*Origin of A, # a, lie oncott hole surface.

---

**Photographic Data**

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### Fractographic Data

#### Specimen: 34

- **Number:** 40
- **Type:** ASPELIESS
- **Class:** 3200
- **Test:** J240
- **Weight:** 0.3
- **Height:** 0.4
- **Date:** June 40
- **Area:** 6000
- **Static Load:**
  - **A:** 45.0 kN
  - **B:** 45.0 kN

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#### Specimen: 2

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- **Type:** ASPELIESS
- **Class:** 3200
- **Test:** J240
- **Weight:** 0.3
- **Height:** 0.4
- **Date:** June 40
- **Area:** 6000
- **Static Load:**
  - **A:** 45.0 kN
  - **B:** 45.0 kN

#### Fatigue Test Data

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### FRACTOGRAPHIC DATA

**Fatigue Test Data**

**Specimen Number:**

**Type:**

**Spectrum:** Fighter

**Test Date:** 5-31-78

**Test Frame:**

**Average Width:**

**Average Thickness:** 250 ± 0.004

**Baselines:** 32.3 Kg

**Max. Load:** 28.429K

**Cycles at Termination/Failure:**

2 Lives/

**Static Load**

A - 420K

B - 160K

**Corner Crack**

281

---

**Fatigue Test Data**

**Specimen Number:**

**Type:**

**Spectrum:** Fighter

**Test Date:** 5-31-78

**Test Frame:**

**Average Width:**

**Average Thickness:** 250 ± 0.004

**Baselines:** 32.3 Kg

**Max. Load:** 28.429K

**Cycles at Termination/Failure:**

2 Lives/

**Static Load**

A - 420K

B - 160K

**Corner Crack**

281
### Fractographic Data

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### Fatigue Test Data

#### Specimen Number
- **TX-9**: Flight 4 (HA)
- **TX-10**: Flight 1

#### Spectrum
- Fighter

#### Test Date
- **C**

#### Test Frame
- 1 2 3 4 5 6

#### Average Width
- 1.354

#### Average Thickness
- 2.493, 2.473, 2.502

#### Area
- 3.428

#### Baseline Stress
- 82.5 ksc (4.6%)

#### Max. Load
- 22, 231 kbf

#### Cycles at Termination/Failure
- 1 (TX-9), 1 (TX-10)

#### Static Load

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#### Notes:

- Static Load: A = 39.0 kN, B = 69.0 kN
- Cycles at termination/failure: 2 Lives

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*1,037,124.1 ksi = 1035.11 kips*
FATIGUE TEST DATA

SPECIMEN NUMBER: TX-13
SPECTRUM: Fighter
TEST DATE: B
TEST FRAME: 

AVERAGE WIDTH: 1.3763
AVERAGE THICKNESS: 2516 | 2511 | 2521
AREA: 3462
BASELINE STRESS: 22.5 ksi
MAX. LOAD: 28.5615 MP= A P=9.52
CYCLES AT FAILURE: 2 Lives

SPECIMEN NUMBER: TX-14
SPECTRUM: Fighter
TEST DATE: B
TEST FRAME: 

AVERAGE WIDTH: 1.3763
AVERAGE THICKNESS: 2503 | 2505 | 2506
AREA: 3445
BASELINE STRESS: 22.5 ksi
MAX. LOAD: 28.4213 MP= A P=9.47
CYCLES AT FAILURE: 2 Lives

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Static Load:
- A - K4
- B - K4

Baseline Stress: 82.5 KSI
Max. Load: 28,322.3 A
Cycles at Failure: 2 Lives

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**Fatigue Test Data**

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Static Load:
- A - K4
- B - K4

Baseline Stress: 82.5 KSI
Max. Load: 28,322.3 A
Cycles at Failure: 2 Lives

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Dynamic Load:
- A - K4
- B - A K4

Baseline Stress: 82.5 KSI
Max. Load: 28,322.3 A
Cycles at Failure: 2 Lives

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**Note:** The table entries and calculations align with the provided data and calculations for each specimen, including the number of lives and the failure criteria.
### FATIGUE TEST DATA

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**STATIC LOAD:**

A - K N
B - K N

60% load at 628 g

288
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### Fatigue Test Data

**Specimen Number:** TY-9

**Spectrum:** Fighter

**Test Date:**

**Test Frame:**

**Average Width:** 1.3724

**Average Thickness:** 2492, 2492, 2492

**Area:** 3420

**Baseline Stress:** 82.5 ksi (cal. swing 6%) 82.5 ksi (cal. swing 6%)

**Max. Load:** 28,215.0 ksi 8794

**Cycles at Termination:** 2 Lives

**Static Load:**

**Fatigue Test Data**

**Specimen Number:** TY-10

**Spectrum:** Fighter

**Test Date:**

**Test Frame:**

**Average Width:** 1.3785

**Average Thickness:** 2487, 2487, 2487

**Area:** 3420

**Baseline Stress:** 82.5 ksi (cal. swing 6%) 82.5 ksi (cal. swing 6%)

**Max. Load:** 28,281.0 ksi 8794

**Cycles at Termination:** 2 Lives

**Static Load:**

**Fatigue Test Data**
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**Specimen Number:** 74-15

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**Baseline Stress:** 22.5 ksi

**Max. Load:** 28 ksi

**Baseline Thickness:** 0.040 in.

**Material:**
- 1374 A
- 316L

**Width:** 0.160 in.

**Thickness:** 0.040 in.

**Calculated Increment:**
- 0.005 in.
- 0.010 in.

**Statistical Data:**
- Mean
- Standard Deviation

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**Notes:**
- Static load
- Fatigue test
- Crack growth
- Life expectancy

**Graph:**
- Load vs. Cycles
- Stress vs. Cycles

**Conclusion:**
- Load remains constant
- Crack growth decreases
- Life expectancy increased
### Fatigue Test Data

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#### Static Load
| Static Load: | A-29.25 kN |

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### FRACTOGRAPHIC DATA

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#### Static Load
| Static Load: | A=24 KNU |

---

### Fatigue Test Data

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<td>Average Thickness:</td>
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<td>Baseline Stress:</td>
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<tr>
<td>Cycles at Termination/Failure:</td>
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#### Static Load
| Static Load: | A=24 KNU |
**Fatigue Test Data**

**Specimen Number:** CW-12

**Spectrum:** Fighter

**Test Date:**

**Test Frame:** B

**Average Width:** 1.5098

**Average Thickness:** 0.042

**A Set:** 1.5098

**Baseline Stress:** 34.68

**Max. Load:** 19,211

**Cycles at Termination/Failure:** 2 Lives

---

**Fatigue Test Data**

**Specimen Number:** CW-2

**Spectrum:** Fighter

**Test Date:**

**Test Frame:** A

**Average Width:** 1.5085

**Average Thickness:** 0.041

**A Set:** 1.5084

**Baseline Stress:** 34.68

**Max. Load:** 19,211

**Cycles at Termination/Failure:** 2 Lives

---

**Fractographic Data**

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**Static Load:** A -31.3 KI

---

**Increment:**
### Fatigue Test Data

**Specimen Number:** CW-3

**Spectrum:** Fighter

**Test Date:**

**Test Frame:** B

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**Cycles at Termination/Failure:**

2 Lives

**Static Load**

- A - 31.9 Kf
- B - 14.0 Kf

---

### Fractographic Data

**Specimen Number:** CW-4

**Spectrum:** Fighter

**Test Date:**

**Test Frame:** D

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**Cycles at Termination/Failure:**

2 Lives

**Static Load**

- A - 31.9 Kf
- B - 14.0 Kf

---

**FATIGUE TEST DATA**

**Specimen Number:** CW-3

**Spectrum:** Fighter

**Test Date:**

**Test Frame:** B

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**Cycles at Termination/Failure:**

2 Lives

**Static Load**

- A - 31.9 Kf
- B - 14.0 Kf

---

**FATIGUE TEST DATA**

**Specimen Number:** CW-4

**Spectrum:** Fighter

**Test Date:**

**Test Frame:** D

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<tbody>
<tr>
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<td>A.ROT. 7.6</td>
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**Cycles at Termination/Failure:**

2 Lives

**Static Load**

- A - 31.9 Kf
- B - 14.0 Kf
### Fractographic Data

#### Fatigue Test Data

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#### Fatigue Test Data

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### Table

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### Fatigue Test Data

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**Average Thickness:** 0.265, 0.265, 0.265"  
**Area:** 55.647 sq in  
**Baseline Stress:** 34%  
**Max. Load:** 181.68 lb  
**Cycles at Termination/Failure:** 2 Lives/  

| Static Load A | 38.1 K-N |  
| Static Load B | 36.88 K-N |

### Fractographic Data

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### Fatigue Test Data

**Specimen Number:** CW-9

**Spectrum:** Fighter

**Test Date:**

**Test Frame:**

- Average Width: 1.5023
- Average Thickness: 0.774
- A. F.A.: 0.5009
- Baseline Stress: Cal. 98%
- Max. Load: 19.277

**Cycles at Termination/Failure:**

- 2 Lives

**Static Load A:** 30.9 Klf
- B: 20 Klf

---

### Fatigue Test Data

**Specimen Number:** CW-10

**Spectrum:** Fighter

**Test Date:**

**Test Frame:**

- Average Width: 1.0994
- Average Thickness: 0.775
- A. F. A.: 0.597
- Baseline Stress: Cal. 98%
- Max. Load: 19.277

**Cycles at Termination/Failure:**

- 2 Lives

**Static Load A:** 31.8 Klf
- B: 20 Klf

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- Static Load A: 31.8 Klf
- B: 20 Klf

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### Fatigue Test Data

**Specimen Number:** CW 13

**Spectrum:** Fighter

**Test Date:**

**Test Frame:** A

**Average Width:** 1.5055

**Average Thickness:** 3.752, 3.754, 3.750

**Area:** 5648

**Baseline Stress:** CAL 19675

**Max. Load:** 19205

**Cycles at Termination/Failure:** 2 Lives/

**Static Load**

A = 31.3 KN

B = KN

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**Specimen Number:** CW 14

**Spectrum:** Fighter

**Test Date:**

**Test Frame:** C

**Average Width:** 1.5055

**Average Thickness:** 3.765, 3.765, 3.760

**Area:** 5646

**Baseline Stress:** CAL 19136

**Max. Load:** 19196

**Cycles at Termination/Failure:** 2 Lives/

**Static Load**

A = 32.0 KN

B = KN
FATIGUE TEST DATA

SPECIMEN NUMBER: C W 15

SPECTRUM: Fighter

TEST DATE:

TEST FRAME:

AVERAGE WIDTH: 1500

AVERAGE THICKNESS: 3153, 372, 374

AREA: 356

BASELINE STRESS: 1015

MAX. LOAD: 19,792

CYCLES AT TERMINATION/FAILURE:

2 Lives/

STATE LOAD: A - 31.9 KU

B - 1

---

FATIGUE TEST DATA

SPECIMEN NUMBER: C W 16

SPECTRUM: Fighter

TEST DATE:

TEST FRAME:

AVERAGE WIDTH: 1500

AVERAGE THICKNESS: 3153, 372, 374

AREA: 356

BASELINE STRESS: 1015

MAX. LOAD: 19,792

CYCLES AT TERMINATION/FAILURE:

2 Lives/

STATE LOAD: A - 31.9 KU

B - 1

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FATIGUE TEST DATA

SPECIMEN NUMBER: CW-19

SPECTRUM: Fighter

TEST DATE: __________________________

TEST FRAME: 1 2 3 4 5 6

FACE WIDTH: __________________________

FACE THICKNESS: __________________________

LINE STRESS: __________________________

LOAD: __________________________

LIVES AT TERMINATION/Failure: 3 lives

FATIGUE LOAD A - K4
B - K4

FATIGUE TEST DATA

SPECIMEN NUMBER: CW-20

SPECTRUM: Fighter

TEST DATE: __________________________

TEST FRAME: 8

AVERAGE WIDTH: 1/607.4

AVERAGE TENSILE RESISTANCE: 5055 373 357

MAX. LOAD: 14/23

Cycles AT TERMINATION/Failure: 2 lives

STATIC LOAD A - 3.16 K4
B - K4
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**Static Load:**

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## Fatigue Test Data

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**Static Load:**

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## Crack Length and Flight Hours

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### Fractographic Data

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### Fatigue Test Data

**Specimen Number:** CW - 29

- **Spectrum:** Wesh
- **Test Frame:** 1 2 3 4 5 6
- **Average Width:** 1.5006
- **Average Thickness:** 3755 3755 3755
- **Area:** 3755
- **Baseline Stress:** 346
- **Max. Load:** 13856
- **Cycles at Termination/Failure:** 3 Lives

**Specimen Number:** CW 30

- **Spectrum:** Wesh
- **Test Frame:**
- **Average Width:** 1.5006
- **Average Thickness:** 3755 3755 3755
- **Area:** 3755
- **Baseline Stress:** 346
- **Max. Load:** 13856
- **Cycles at Termination/Failure:** 2 Lives

**Static Load:** A-32.0 KN

**Fatigue Test Data**
## Fractographic Data

### 2.5.2 TL

**Specimen Number:** TL - 1

**Spectrum:** Fighter

**Test Date:**

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**Average Width:** 1.5017

**Average Thickness:** 3764 3765 3766

**A/P:** 0.655

**Baseline Stress:** 38 KSI

**Max. Load:** 2,1478

**Cycles at Termination:**

| 4,416 | 3,362,988 Lb |

**Static Load:** A-324 K-N

**Aircraft Origin:**

### 311
**Fatigue Test Data**

**Specimen Number:** TL-3

**Spectrum:** Fighter

**Test Date:**

**Test Frame:**

**Average Width:** 1.522

**Average Thickness:** 3.367, 3.367

**Area:** 5628

**Baseline Stress:** 45.5

**Max. Load:** 2546

**Cycles at Termination:** 3582, 3551

# Lives: 2

**Static Load A-31.9 Kf**

**Fatigue Test Data**

**Specimen Number:** TL-4

**Spectrum:** Fighter

**Test Date:**

**Test Frame:** B D/4-18

**Average Width:** 1.503

**Average Thickness:** 3.253, 3.253

**Area:** 5640

**Baseline Stress:** 4670

**Max. Load:** 2510

**Cycles at Termination:** 4574

# Lives: 4

**Static Load A-28.8 Kf**

Primary origin lies on specimen surface away from counterfeit.

Secondary origin was near throw line. No effect of the primary origin.

**312**
### FRACTOGRAPHIC DATA

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### FATIGUE TEST DATA

**Specimen Number:** TL-5

**Spectrum:** Fighter

**Test Date:** C D/A-19

**Test Frame:**

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**Specimen Number:** TL-6

**Spectrum:** Fighter

**Test Date:** A D/A-17

**Test Frame:**

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**Specimen Description:**

- **Static Load:** A-25.8 K.P.S.
- **Primary origin:** Line 11
- **Secondary origin:** Line 11
- **Terminology:** Line 11
- **Material:** Line 11

**Cycles at termination:**

- X Lives: 59418213
- A 25000
- B 15000

**Cycles at failure:**

- X Lives: 59418213
- A 25000
- B 15000
### Fatigue Test Data

**Specimen Number:** TL-9

- **Spectrum:** Fighter
- **Test Frame:** C
- **Average Width:** 1.600
- **Average Thickness:** 0.272
- **Area:** 56.7
- **Baseline Stress:** 4561
- **Max. Load:** 2552.3
- **Cycles at Termination:** 2 Lives

**Static Load**
- A - 32.7 K
- B - 32.7 K

### Fractographic Data

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**Static Load**
- A - 32.7 K
- B - 32.7 K

315
FATIGUE TEST DATA

SPECIMEN NUMBER: TL 11
SPECTRUM: Fighter
TEST DATE: 
TEST FRAME: 1 2 3 4 5 6
RACE WIDTH: 1.507
RACE THICKNESS: 339 377 378
A: 560 B: 960 1867
ELINE STRESS: 45° calibration 73°
LOAD: 25495 A: 65° B: 1 Life
LES AT TERMINATION:

2 Lives/

TIE LOAD A-32.5 K# B- K#

FATIGUE TEST DATA

SPECIMEN NUMBER: TL 12
SPECTRUM: Fighter
TEST DATE: 
TEST FRAME: 1 2 3 4 5 6
RACE WIDTH: 1.506
RACE THICKNESS: 380 377 385
A: 560° B: 960° 18136
ELINE STRESS: 65° calibration 75°
LOAD: 25564 A: 65° B: 1 Life
LES AT TERMINATION:

2 Lives/

TIE LOAD A-32.7 K# B- K#
### Fatigue Test Data

**Specimen Number:** TL-13

**Spectrum:** Fighter

**Test Date:**

**Test Frame:** 1 2 3 4 5 6

- **Average Width:** 1.506
- **Average Thickness:** 0.527 0.721
- **Area:** 50.76
- **Baseline Stress:** 45 ksi, Cal Swing 73%
- **Max. Load:** 2.5486 kips, A Pot 0.99
- **Cycles at Failure:**
  - A: 49,414 L.P.S.
  - B: 45,913 L.P.S.

**Static Load:**

- **A:** 81.15 kips
- **B:** 31.7 kips
## Fatigue Test Data

**Specimen Number:** TL 17

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**Spectrum:** Fighter

**Test Frame:** 1 2 3 4 5 6

**Average Width:** 1.526

**Average Thickness:** 0.777 0.723 0.720

**Area:** 5.856

**Baseline Stress:** 35% Cal Swing 73%

**Max. Load:** 25.451

**Cycles at Termination:**

- **2 Lives**

**Static Load:**

- A - 32.5 K

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## Fatigue Test Data

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- A - 32.5 K
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**STATIC LOAD**

- **A**: 32.4 Ks
- **B**: 1 Ks

**FATIGUE TEST DATA**

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**STATIC LOAD**

- **A**: 32.4 Ks
- **B**: 1 Ks

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FRACTOGRAPHIC DATA

LATIGUE TEST DATA

2 Lives

SPECIMEN NUMBER: TI 01

SPECTRUM: Fighter

TEST DATE:

TEST FRAME:

AVG WIDTH: 3.672

AVG THICKNESS: 0.245 .272 .365 .31 .1

AREA: 5.552

BASELINE STRESS: 45 KSI

MAX. LOAD: 2.440

CYCLES AT TERMINATION:

2 Lives

STATIC LOAD

A-13245 K

B- K

FRACTOGRAPHIC DATA

2 Lives

SPECIMEN NUMBER: TC 22

SPECTRUM: Fighter

TEST DATE:

TEST FRAME:

AVG WIDTH: 3.522

AVG THICKNESS: 0.271 .307 .372 .31 .1

AREA: 5.872

BASELINE STRESS: 45 KSI

MAX. LOAD: 7.55 K

CYCLES AT TERMINATION:

2 Lives

STATIC LOAD

A-326 K

B- K

2 Lives

FLIGHT HRS.

16000

CRACK LENGTH IN.

6 LIVES

INCREMENTS IN

CRACK TO SMALL
### Fatigue Test Data

**Specimen Number:** TL23

**Spectrum:** Fighter

**Test Date:**

**Test Frame:**

**Average Width:** [data]

**Average Thickness:** [data]

**Area:** [data]

**Baseline Stress:** 45 ksi, Cal SWING 72%

**Max. Load:** 2841 lbs, A Pot 8.47

**Cycles at Termination:**

---

### Fractographic Data

**Specimen Number:** TL23

**Spectrum:** Fighter

**Test Date:**

**Test Frame:**

**Average Width:** [data]

**Average Thickness:** [data]

**Area:** [data]

**Baseline Stress:** 45 ksi, Cal SWING 72%

**Max. Load:** 2841 lbs, A Pot 8.47

**Cycles at Termination:**

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**Static Load**

**Fatigue Test Data**

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**Static Load**
FATIGUE TEST DATA

2 Lives

SPECIMEN NUMBER: TL 27

SPECTRUM: Fighter

TEST DATE:

TEST FRAME: 1 2 3 4 5 6

AVERAGE WIDTH: 50.21

AVERAGE THICKNESS: 3.267 3.267 3.267

AREA: .5642

BASELINE STRESS: CAL SWING 7.5%

MAX. LOAD: 25388 A POT 8/4 1 Life

CYCLES AT TERMINATION: 2 Lives

STATIC LOAD

A-32.3 K4

B- 1 K4

AVERAGE WIDTH: 50.21

AVERAGE THICKNESS: 3.267 3.267 3.267

AREA: .5642

BASELINE STRESS: CAL SWING 7.5%

MAX. LOAD: 25388 A POT 8/4 1 Life

CYCLES AT TERMINATION: 2 Lives

STATIC LOAD

A-32.1 K4

B- 1 K4
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III EQUIVALENT INITIAL FLAW

AND CRACK DEPTH LISTINGS
## 3.1 TASK I
### 3.1.1 WPF

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### 3.4 TASK IV
#### 3.4.1 Steel-
AF1410

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3.4.2 Titanium - 6AL-4V

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### 3.5 TASK V

#### 3.5.1 Cold Worked Holes

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APPENDIX A

IMPROVED DRILLING AND ASSEMBLY

VWPF Series

The VWPF Series represented the Improved Drilling and Assembly Procedures described in Volume I. These specimens were prepared using proper techniques and were tested for two equivalent lives of the F-16 fighter spectra at 34KS1 gross section stress. The following listings are final crack depths at the end of the two lives in ascending order. Crack depth values at one life and EIFS values plotted in Volume I were both computer generated.

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