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MATERIAL PROPERTIES TEST TO DETERMINE ULTIMATE STRAIN AND TRUE STRESS-TRUE STRAIN CURVES FOR HIGH YIELD STEELS

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ABSTRACT

This testing was undertaken to develop material true stress-true strain curves for elastic-plastic material behavior for use in performing transient analysis.

Based on the conclusions of this test, the true stress-true strain curves derived herein are valid for use in elastic-plastic finite element analysis for structures fabricated from these materials.

In addition, for the materials tested herein, the ultimate strain values are greater than those values cited as the limits for the elastic-plastic strain acceptance criteria for transient analysis.

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SUMMARY

The enhanced capabilities of computer codes which perform nonlinear finite element analysis coupled with the quantum leap in computing machine capacity have enabled a greater use of strain-based structural analysis in recent years. The liability to fully utilizing these capabilities has been the lack of current, accurate true stress-true strain curves for the materials used in structural designs. In order to make efficient use of these capabilities, accurate curves which contain data points in excess of the point of strain at ultimate stress and the values for ultimate strain must be available.

Stress-strain curves for material used in current designs were judged to be either not current or not in a form easily adaptable for use in nonlinear finite element analysis. Samples of several high strength steels and weld metal were statically tested to determine both the true stress-true strain curves and the strain value at ultimate stress. The true stress-true strain curves developed by this test program were used to support nonlinear elastic-plastic analysis efforts. The curves were also used to support the testing conducted to verify elastic-plastic analysis methods.

INTRODUCTION

The objective of this test program was to obtain material properties for specific steels used in fabrication of structures. More specifically, mean ultimate strain values and true stress-true strain curves for commonly used steels were required for use in elastic-plastic analysis. Data for both the base and weld metal were obtained.

Mean ultimate strain values and true stress-true strain curves were developed for base metals and weld metals commonly used for structures. Test specimens were produced and statically tested on a tensile test machine. The specimens were fabricated from plate and weld samples as described in the following paragraphs. Weld metal specimens were produced from butt-welded plates. Base metal specifications and mark numbers, used to identify the different specimen types, are indicated in Table 1.

TABLE 1 Base Metal Type and Identification Number

MATERIAL TYPE	SPECIFICATION	MARK NUMBER
HSS	MIL-S-22698C - A1	PD20685, PD20686
HY-80	MIL-S-16216J - A1	PD20687
HY-100	MIL-S-16216K	PD20689
HY-130	MIL-S-24371A - A1	PD20684
HSLA-100	MIL-S-24645A - A1	PD20700

Where;

MATERIAL TYPE - Plate material type

MARK NO. - Specimen plate identification number, stamped on each specimen

Both engineering and true stress-strain values are used within the text of this report. Engineering values are based on the original specimen cross-sectional area and do not take into account the reduction in area of the specimen which occurs during the loading cycle. True values are based on the measured specimen cross-sectional area as it decreases under both elastic and plastic deformation.

A set of tensile specimens was tested for each base material listed in Table 1. Two specimens were cut from the plate so that the axis of the sample was parallel to the primary plate rolling direction (for base plate samples where the rolling directions could be determined). Two additional specimens were cut transverse to the primary plate rolling direction. Static tensile testing of the specimens produced tabular data of load versus strain up to the point of fracture.

Weld metal specimens were fabricated and identified per Table 2. The weld samples were produced using a preheat and interpass temperature and welding heat input at the extreme upper limit of the applicable welding procedure in an effort to obtain minimum strength properties. Four samples were cut from each weld type. A description of the method used to produce the weld specimens is included further on in this report.

The designations "L" and "T" indicate the direction of the axis of the base plate specimen with respect to the axis of the plate long axis, which was also the axis of the weld. For HY-80, the axis parallel to the long dimension of the plate is also parallel to the plate principal rolling direction. For the HY-100 and HY-130 plate, it is perpendicular. For HSS and HSLA-100, the axis of the principal rolling direction was not determined.

All curves presented in this report are from averaged values of the four specimens in each set of specimens. For each set of specimens, half were taken perpendicular to the other half, resulting in an equal number of samples transverse and longitudinal to the principal plate rolling direction.

TABLE 2 Weld Metal Specimen Type and Identification Number

MATERIAL TYPE	GMAW		SMAW	
	MARK NO.	ELECTRODE	MARK NO.	ELECTRODE
HSS	PD 20685	MIL-70S-3	PD 20686	MIL-7018
HY-80	PD 20687	MIL-100S-1	PD 20688	MIL-11018
HY-100	PD 20689	MIL-120S-1	PD 20691	MIL-12018
HY-100 (u)	PD 20690	MIL-100S-1	PD 20692	MIL-11018
HY-130	PD 20684	EB-140	N/A	N/A

Where;

MATERIAL TYPE - Plate material type

HY-100 (u) - HY-100 base plate welded with HY-80 (undermatched) weld metal

MARK NO. - Specimen plate identification number, stamped on each specimen

ELECTRODE - Welding electrode type

GMAW - Gas metal arc welding process

SMAW - Shielded metal arc welding process

In addition, each sample was individually marked using the following convention:

BMT L# - base metal specimen - axis of specimen parallel to welding direction,

BMT T# - base metal specimen - axis of specimen perpendicular to welding direction,

AWT # - weld metal specimen.

where "#" designates sample number (1, 2, 3, 4 or 5)

METHODS, ASSUMPTIONS AND PROCEDURES

Test specimens were fabricated by butt welding two 1-inch plates, as illustrated in Figure 1. The longitudinal butt weld was a type B1V.1 joint configuration and joined the two 30 inch plates together. One test plate was produced for each weld combination, per Table 2, for a total of nine plates. Welding parameters and preheat/interpass temperatures were controlled within the limits of each procedure to minimize the weld metal yield strength. Normal steel fabrication welding procedures were followed. Standard 0.505 inch diameter tensile test specimens were cut and machined from each type of base plate and welding combination. Specimen drawings are included in Appendix 1.

FIGURE 1 Test Plate Configuration

A 60K Tinius-Olsen Universal Testing Machine was used in all testing. All specimens were tested in accordance with the American Welding Society (AWS) standard B4.0, Standard Methods for Mechanical Testing of Welds. AWS B4.0 references the American Society for Testing and Materials (ASTM) standard E8, Standard Test Methods of Tension Testing of Metallic Materials, as the actual testing procedure.

The following test procedure was used for all testing. The procedure considered elastic and plastic strain, including local strain in the neck region of the specimen. The calculation of true stress versus true strain included the effect of a reduced cross section as it related to an increase in specimen gage length.

Test Procedure

1. Measure and record the overall length and the minimum diameter of the test specimen. Locate two points with punch marks along the axis of the specimen 2.0 inches apart, centered in the reduced section of the specimen. Measure the distance from each end of the specimen to the nearest punch mark.
2. Secure the ends of the test specimen in the grips of the testing machine. Attach an extensometer on the center portion of the specimen to measure and record extension. Load the test specimen at a rate of 0.025 in/in/min up to a strain (engineering) value of 2.0 %. Hold the specimen at this level of load and remove the extensometer. Measure and record the minimum diameter and length between punch marks on the specimen.
3. Continue to apply load at an increment determined by test personnel such that a sufficient number of data points is produced. Stop at each increment to measure minimum diameter and length between punch marks on the specimen until a maximum load level is reached.
4. Upon reaching maximum load, increase the increment of loading to an increment determined by test personnel such that a sufficient number of data points is produced, stopping to take the same measurements, until specimen failure.
5. At failure, record breaking load, elongation, minimum diameter, and overall length of the specimen. Measure the distance from each end of the specimen to the nearest punch mark.

For strain up to 2.0%, an extensometer was attached to the specimen that measured elongation over a 2.0 inch gage length. The extensometer was limited to measuring strains up to 2.0% . For higher values of strain, the extensometer was removed and elongation was measured directly using dividers and a calibrated scale. All diameter measurements were made by a laboratory technician using a calibrated point micrometer and hand recorded.

The Tinius-Olsen machine is equipped with a torque bar weighing system to measure all loads. While the extensometer was in use, a graphical record of load versus elongation of the test specimen was produced. For strains in excess of 2.0%, elongation was hand measured, and elongation and load were hand recorded.

The Tinius-Olsen machine was periodically calibrated and certified. Calibration was in accordance with ASTM E4. Verification of certifying devices complied with ASTM E74. Certification of other instrumentation used in the test was maintained by the testing laboratory. All certifying devices were traceable to the National Institute of Standards and Technology.

RESULTS AND DISCUSSION

This section details the individual test results and method used to determine the true stress-true strain curves. The curves are included in this report as Figures 2 to 5. A summary of mean values follows for base material (Table 3) and weld metal (Table 4). Design ultimate strain values are from Reference (b). Both the curves and tables are from averaged values of each four sample set of specimens.

TABLE 3 Base Material Average Values from Test Results

BASE PLATE MATERIAL	YIELD STRESS - KSI	ENGINEERING ULTIMATE STRESS - KSI	ENGINEERING ULTIMATE STRAIN - %	DESIGN ULTIMATE STRAIN - %
HY-130	133.0	141.0	7.5	4.0
HY-100	98.5	112.3	9.6	6.0
HY-80	83.5	102.3	12.1	8.0
HSS	55.5	75.8	23.5	16.0
HSLA-100	97.3	111.9	11.3	N/A

TABLE 4 Weld Metal Average Values from Test Results

BASE PLATE MATERIAL	WELD ELECTRODE	YIELD STRESS - KSI	ENGINEERING ULTIMATE STRESS - KSI	ENGINEERING ULTIMATE STRAIN - %	DESIGN ULTIMATE STRAIN - %
HY-130	EB-140	129.0	143.0	8.1	4.0
HY-100	MIL-120S-1	103.3	114.7	10.4	6.0
HY-100	MIL-12018	101.3	109.6	11.5	6.0
HY-100 (u)	MIL-100S-1	89.0	98.7	12.9	N/A
HY-100 (u)	MIL-11018	98.0	107.4	13.8	N/A
HY-80	MIL-100S-1	83.0	96.3	13.5	8.0
HY-80	MIL-11018	98.3	108.2	11.6	8.0
HSS	MIL-70S-3	58.3	73.9	21.5	16.0
HSS	MIL-7018	60.5	72.8	19.0	16.0

As listed in Table 3, the averaged yield stress value of the HY-100 base plate sample is below the specification minimum value (98.5 KSI test vs. 100 KSI specification). The test certificate for the material indicated that the plate, as received from the producer, met the requirements of the specification for minimum yield strength. Test samples taken by the producer to certify the plate consist of transverse specimens at both ends of the plate at the longitudinal centerline. Samples from the test reported herein were taken from a section of plate cut from the production run. The test specimens were machined to the required sample size.

The difference in yield strength values is attributed to variations in properties over the full production run of plate. Differences in yield strength of this magnitude are expected under normal plate manufacturing conditions.

Successful completion of plate testing by the producer, in accordance with the specification, indicated that the plate met the quality level required by the specification. The HSLA-100 plate also exhibited similar behavior.

With one exception, all weld metal samples exceeded minimum yield strength values for the respective base plate used in a matched welding system. The HY-130 weld metal averaged yield stress is below the minimum value required for HY-130 base plate (129 KSI test value vs. 130 KSI specification requirement). All weld samples were produced using a preheat and interpass temperature at the extreme limits of the applicable welding procedure in an effort to obtain minimum strength properties. In the attempt to produce the lowest values, the HY-130 sample produced yield values below minimum, but well within the statistical range of yield strengths expected for the welding conditions used. This difference is minimal and does not invalidate the resulting data curve. Similar to HY base plate, specifications for HY weld metal have no minimum ultimate strength requirements.

In determining the engineering and true stress - true strain values the following procedure was observed to obtain accurate results.

Up to a strain of 0.02 in/in, stresses and strains are defined as:

$$\sigma_e = L / A_0 \text{ (from tensile machine chart recording)}$$

$$\epsilon_e = \text{strain from tensile machine chart recording}$$

$$\sigma_t = \sigma_e (\epsilon_e + 1)$$

$$\epsilon_t = \ln (\epsilon_e + 1)$$

After 0.02 in/in strain, stresses and strains are defined as :

$$\sigma_e = L / A_0 \text{ (from actual load measurements)}$$

$$\epsilon_e = \text{strain calculated from gage length measurements during testing}$$

$$\sigma_t = L / A \text{ (from load measurements and micrometer measurements)}$$

$$\epsilon_t = 2.0 \ln (D_0 / D)$$

Where :

σ_e = Engineering Stress

ϵ_e = Engineering Strain

σ_t = True Stress

ϵ_t = True Strain

L = Load

A_0 = Original Area

A = Actual Area

D_0 = Original Diameter

D = Actual Diameter

ln = Natural Log

A least squares approach was utilized to determine the mean stress-strain curve. Due to the highly nonlinear nature of the stress-strain data, conventional curve fitting techniques such as single polygon fits were unsuccessful. A variable knot B-spline least squares approximation (Reference(a)) performed best for the methods evaluated. An interface program to the Reference(a) routines was developed and is listed in Appendix 2. In operation, the test data is read from an input file, sorted and the user prompted for the order of the spline (quadratic, cubic ...), the number of B-spline coefficients and an initial guess at the internal knot locations. The program then determines the best placement of the knots which will minimize the least squares error. Experience has shown that initial assumptions locating knots in areas of the curve where rapid slope changes occur results in the best fit of the test data.

In addition, the use of higher order splines and large number of coefficients causes unrealistic oscillations of the splines around the test data spread. Once a good fit of the data is obtained, the splines are evaluated and a piece-wise linear true stress - true strain curve calculated. In finite element analysis programs where only the plastic component of strain is required along with the modulus of elasticity, the elastic portion of the strain is subtracted from the total strain. A simple FORTRAN program was developed to perform this task and is presented in Appendix 2.

Appendix 3, Tables A3.1 through A3.14 present the basic material properties of the materials tested. Included are the individual specimen properties as well as average values. Appendix 3, Figures A3.1 through A3.14 show the least squares fit of the test data. The figures contain several plots, each at different scales of True Strain, in order to discern the behavior in low and high strain regions. A line using the modulus of elasticity for steel of 30,000 KSI and a line at 0.2 percent offset to that line are also plotted. Some minor variation from the least squares fit and the straight modulus line are noticeable, but such deviations are negligible for the magnitude of strains experienced in an inelastic analysis. Tabulation of all test data is included in Appendix 4.

FIGURE 2 HY-130 Base & Weld Metal True Stress-True Strain

FIGURE 3 HY-100 / HSLA-100 Base & Weld Metal True Stress-True Strain

FIGURE 4 HY-80 Base & Weld Metal True Stress-True Strain

FIGURE 5 HSS Base & Weld Metal True Stress-True Strain

CONCLUSIONS

The true stress-true strain curves derived from the mean stress versus strain data of this test are valid for use in elastic-plastic finite element analysis. They represent a set of stress-strain curves for the commonly used steels for structures. Results from this test support minimum ultimate strength values currently in use for transient elastic analysis.

The Reference (b) criteria uses material property ultimate strain values as the basis for determining allowable strain limits for HSS (16%) and HY-80 (8%). Ultimate strain values for HSS and HY-80 determined by this test program are greater than those cited in the Reference (b) criteria (23.5% for HSS and 12.1% for HY-80). Since allowable strains are based on ultimate strain values, the mean ultimate strain values determined in this test support the values cited in the Reference (b) criteria.

REFERENCES

- (a) IMSL Math/Library User's Manual, FORTRAN Subroutines for Mathematical Applications, Version 2.0, dated September, 1991
- (b) Solonick, William R.; *Elastic-Plastic Strain Acceptance Criteria for Structures Subject to Rapidly Applied Transient Dynamic Loading*, American Society of Mechanical Engineers, PVP-Vol. 343, 1996

APPENDIX 1 TEST SPECIMEN DRAWINGS

ROUND TENSILE SPECIMEN - THREADED

ROUND TENSILE SPECIMEN - SHOULDERED

FRACTIONAL TOLERANCE	THREADS
$\pm 1/64$ in	3/4 - 10 UNC - 2A

NOTES :

1. Finish reduced section 32 micro-inch minimum.
2. The reduced section may have a gradual taper from the ends toward the center with the ends not more than 1.0% larger in diameter than the center.
3. Conforms to AWS 4.0, FED STD 151b, ASTM A370, ASTM E8.

APPENDIX 2 FORTRAN PROGRAM LISTINGS

The following FORTRAN program was developed as an interface program for use with the routines in Reference(a).

```

dimension x(1000),y(1000),ip(1000),ys(1000)
dimension weight(1000),xguess(2000),xknot(2000),bscoef(1000)
character*80 infile,outfile
c
5 format(a80)
0 format(2(1x,e12.5))
print *,''
print *,'VARIABLE KNOT B-SPLINE LEAST SQUARES APPROXIMATION'
print *,' MAXIMUM NUMBER OF DATA POINTS EQUALS 1000'
print *,''
print *,'INPUT FILENAME (X,Y FREE FORMAT)'
read(*,5) infile
print *,'OUTPUT FILENAME (SPLINE FIT)'
read(*,5) outfile
print *,'ORDER OF SPLINE (3 IS QUADRATIC, 4 IS CUBIC ...)'
read *,korder
print *,'NUMBER OF B-SPLINE COEFF. (LESS THAN # OF DATA POINTS)'
read *,ncoef
c
open(unit=11,file=infile,status='old')
i=1
50 read (11,*,end=100) x(i),y(i)
i=i+1
goto 50
100 np=i-1
print *,np,' DATA POINTS READ'
close(unit=11)
c
c sort data by x value ip = permutation vector intialized at 1,2,3,4....np
c
do i=1,np
ip(i)=i
end do
call svrgp(np,x,x,ip)
do i=1,np
ys(i)=y(ip(i))
end do
c
c set weight at 1/np for each point
c
do i=1,np
weight(i)=1./np
end do
c
c original guess at knots ncoef+korder
c
do i=1,korder
xguess(i)=x(1)
end do
nv=ncoef-korder
print *, 'Estimate Internal Knot Locations # Loc. = ',nv

```

```
print *, 'Min = ',x(1), ' Max = ',x(np)
ng=0.
do i=korder+1,ncoef
  ng=ng+1
  print *, 'Estimate (',ng,')'
  read *,xguess(i)
end do
do i=ncoef+1,ncoef+korder
  xguess(i)=x(np)
end do
print *, ''
print *, 'KNOT GUESSES'
do i=1,ncoef+korder
  print *, 'xguess(',i,') = ',xguess(i)
end do
c
call bsvls(np,x,ys,weight,korder,ncoef,xguess,xknot,bscoef,ssq)
c
c print knot sequence
c
print *, ''
print *, 'OPTIMIZED KNOT SEQUENCE'
do i=1,ncoef+korder
  print *, 'xknot(',i,') = ',xknot(i)
end do
c
c print square root of the sum of the squares of the error
c
print *, ''
print *, 'RSS ERROR = ',ssq
print *, ''
c
c evaluate b-spline
c
open(unit=12, file=outfile, status='new')
print *, 'EVALUATE LEAST SQUARES B-SPLINE'
150 print *, 'XSTART, XEND, # OF STEPS'
  read *,xstart,xend,ne
  if (ne .eq. 0) goto 200
  xstep=(xend-xstart)/ne
c
  xe = xstart
  do i=1,ne+1
    ye = bsval(xe,korder,xknot,ncoef,bscoef)
    write(12,10) xe,ye
    xe=xe+xstep
  end do
  goto 150
c
200 close (unit=12)
end
```

FORTTRAN program developed to extract the plastic component of the total strain from the true stress-true strain curves developed from this test.

```
character*80 infile,outfile
  5  format (a80)
 10  format (2(1x,e14.7))
c
  print *, '    PLASTIC STRAIN CURVE PROGRAM'
  print *, ''
  print *, 'INPUT FILENAME WITH STRESS,STRAIN PAIRS (IN/IN,KSI)'
  read (5,5) infile
  print *, 'OUTPUT FILENAME'
  read(5,5) outfile
  print *, 'ELASTIC MODULUS (KSI)'
  read *, ee
c
  open (unit=11,file=infile,status='old')
  open (unit=12,file=outfile,status='new')
c
c  read true stress strain data
c  subtract elastic strain (stress/elastic modulus)
c  write out true stress in psi and true plastic strain (in/in)
c
  50 read(11,*,end=100) e,s
     ep=e-(s/ee)
     write(12,10) s*1000.,ep
     goto 50
c
  100 close(unit=11)
     close(unit=12)
     end
```

APPENDIX 3 SPECIMEN TEST DATA SUMMARIES AND CURVE FITS

Piece Identification	Yield Stress 0.2% (KSI)	Eng. Ultimate Stress (KSI)	True Ultimate Stress (KSI)	Eng. Ultimate Strain (in/in)	True Ultimate Strain (in/in)	Percent Elongation (2")	Percent Area Reduction
BMT L1	134.0	141.2	154.6	0.070	0.0906	19.0	68.0
BMT L2	133.0	141.2	157.7	0.075	0.1106	20.0	68.0
BMT T1	133.0	141.1	156.7	0.090	0.1051	22.0	68.0
BMT T2	132.0	140.5	154.2	0.065	0.0930	22.0	70.0
Average	133.0	141.0	155.8	0.075	0.0998	20.8	68.5

TABLE A3.1 HY-130 BASE PLATE MATERIAL - SAMPLE PD20684

Piece Identification	Yield Stress 0.2% (KSI)	Eng. Ultimate Stress (KSI)	True Ultimate Stress (KSI)	Eng. Ultimate Strain (in/in)	True Ultimate Strain (in/in)	Percent Elongation (2")	Percent Area Reduction
AWT 1	129.0	142.6	163.3	0.100	0.1354	21.0	66.0
AWT 2	129.0	143.2	161.2	0.080	0.1188	20.0	68.0
AWT 3	128.0	143.4	162.1	0.075	0.1227	20.0	68.0
AWT 4	130.0	143.0	159.0	0.070	0.1057	20.0	68.0
Average	129.0	143.0	161.4	0.081	0.1206	20.3	67.5

TABLE A3.2 HY-130 WELD METAL TYPE EB-140 (HY-130 BASE) - SAMPLE PD20684

Piece Identification	Yield Stress 0.2% (KSI)	Eng. Ultimate Stress (KSI)	True Ultimate Stress (KSI)	Eng. Ultimate Strain (in/in)	True Ultimate Strain (in/in)	Percent Elongation (2")	Percent Area Reduction
BMT L3	99.0	112.5	126.7	0.100	0.1188	24.0	74.0
BMT L4	98.0	111.9	125.0	0.085	0.1108	21.0	63.0
BMT T3	99.0	112.7	128.7	0.100	0.1328	24.0	77.0
BMT T4	98.0	111.9	124.6	0.100	0.1072	24.0	76.0
Average	98.5	112.3	126.3	0.096	0.1174	23.3	72.5

TABLE A3.3 HY-100 BASE PLATE MATERIAL, SAMPLE PD20689

Piece Identification	Yield Stress 0.2% (KSI)	Eng. Ultimate Stress (KSI)	True Ultimate Stress (KSI)	Eng. Ultimate Strain (in/in)	True Ultimate Strain (in/in)	Percent Elongation (2")	Percent Area Reduction
AWT 2	102.0	115.0	135.1	0.1050	0.1614	22.0	70.0
AWT 3	103.0	113.6	137.2	0.1050	0.1882	23.0	71.0
AWT 4	104.0	114.3	138.3	0.1050	0.1906	23.0	71.0
AWT 5	104.0	115.8	139.3	0.1000	0.1846	22.0	72.0
Average	103.3	114.7	137.5	0.1040	0.1812	22.5	71.0

TABLE A3.4 HY-100 WELD METAL TYPE MIL-120S-1 (HY-100 BASE) - SAMPLE PD20689

Piece Identification	Yield Stress 0.2% (KSI)	Eng. Ultimate Stress (KSI)	True Ultimate Stress (KSI)	Eng. Ultimate Strain (in/in)	True Ultimate Strain (in/in)	Percent Elongation (2")	Percent Area Reduction
AWT 1	101.0	108.2	130.3	0.100	0.1859	22.0	67.0
AWT 2	99.0	107.7	127.8	0.120	0.1711	23.0	67.0
AWT 3'	101.0	109.5	131.6	0.115	0.1842	23.0	66.0
AWT 4	104.0	113.1	126.9	0.125	0.1153	21.0	63.0
Average	101.3	109.6	129.2	0.115	0.1641	22.3	65.8

TABLE A3.5 HY-100 WELD METAL TYPE MIL-12018 (HY-100 BASE) - SAMPLE PD20691

Piece Identification	Yield Stress 0.2% (KSI)	Eng. Ultimate Stress (KSI)	True Ultimate Stress (KSI)	Eng. Ultimate Strain (in/in)	True Ultimate Strain (in/in)	Percent Elongation (2")	Percent Area Reduction
BMT L1	98.0	112.3	128.0	0.105	0.1312	26.0	75.0
BMT L2	99.0	112.6	128.4	0.115	0.1307	28.0	73.0
BMT T1	96.0	111.4	137.8	0.120	0.2120	26.0	78.0
BMT T2	96.0	111.4	129.7	0.110	0.1519	27.0	77.0
Average	97.3	111.9	131.0	0.113	0.1565	26.8	75.8

TABLE A3.6 HSLA-100 BASE PLATE MATERIAL, SAMPLE PD20700

Piece Identification	Yield Stress 0.2% (KSI)	Eng. Ultimate Stress (KSI)	True Ultimate Stress (KSI)	Eng. Ultimate Strain (in/in)	True Ultimate Strain (in/in)	Percent Elongation (2")	Percent Area Reduction
AWT 1	90.0	99.3	123.6	0.130	0.2187	26.0	75.0
AWT 3	88.0	98.5	121.0	0.130	0.2054	27.0	77.0
AWT 4	90.0	98.4	121.6	0.135	0.2112	26.0	77.0
AWT 5	88.0	98.6	118.8	0.120	0.1867	26.0	76.0
Average	89.0	98.7	121.3	0.129	0.2055	26.3	76.3

TABLE A3.7 HY-80 WELD METAL TYPE MIL-100S-1 (HY-100 BASE) - SAMPLE PD20690

Piece Identification	Yield Stress 0.2% (KSI)	Eng. Ultimate Stress (KSI)	True Ultimate Stress (KSI)	Eng. Ultimate Strain (in/in)	True Ultimate Strain (in/in)	Percent Elongation (2")	Percent Area Reduction
AWT 1	99.0	107.4	133.6	0.135	0.2182	24.0	67.0
AWT 2	98.0	107.7	127.8	0.135	0.1711	25.0	69.0
AWT 3	97.0	107.5	129.2	0.140	0.1838	26.0	69.0
AWT 4	98.0	107.1	136.9	0.140	0.2456	24.0	68.0
Average	98.0	107.4	131.9	0.138	0.2047	24.8	68.3

TABLE A3.8 HY-80 WELD METAL TYPE MIL-11018 (HY-100 BASE) - SAMPLE PD20692

Piece Identification	Yield Stress 0.2% (KSI)	Eng. Ultimate Stress (KSI)	True Ultimate Stress (KSI)	Eng. Ultimate Strain (in/in)	True Ultimate Strain (in/in)	Percent Elongation (2")	Percent Area Reduction
BMT L1	84.0	102.5	126.2	0.140	0.2077	27.0	76.0
BMT L2	83.0	103.2	119.8	0.120	0.1491	27.0	78.0
BMT T1	83.0	101.5	119.2	0.105	0.1601	25.0	74.0
BMT T2	84.0	102.0	118.9	0.120	0.1534	26.0	71.0
Average	83.5	102.3	121.0	0.121	0.1676	26.3	74.8

TABLE A3.9 HY-80 BASE PLATE MATERIAL, SAMPLE PD20687

Piece Identification	Yield Stress 0.2% (KSI)	Eng. Ultimate Stress (KSI)	True Ultimate Stress (KSI)	Eng. Ultimate Strain (in/in)	True Ultimate Strain (in/in)	Percent Elongation (2")	Percent Area Reduction
AWT 1	83.0	97.6	122.4	0.150	0.2262	29.0	75.0
AWT 2	84.0	95.7	120.5	0.145	0.2301	27.0	74.0
AWT 3	84.0	95.5	115.2	0.125	0.1878	27.0	76.0
AWT 4	81.0	96.4	111.8	0.120	0.1485	28.0	75.0
Average	83.0	96.3	117.5	0.135	0.1982	27.8	75.0

TABLE A3.10 HY-80 WELD METAL TYPE MIL-100S-1 (HY-80 BASE) - SAMPLE PD20687

Piece Identification	Yield Stress 0.2% (KSI)	Eng. Ultimate Stress (KSI)	True Ultimate Stress (KSI)	Eng. Ultimate Strain (in/in)	True Ultimate Strain (in/in)	Percent Elongation (2")	Percent Area Reduction
AWT 1	98.0	107.8	131.1	0.120	0.1954	23.0	66.0
AWT 2	97.0	106.9	124.8	0.105	0.1551	24.0	70.0
AWT 3	98.0	108.1	127.3	0.120	0.1628	24.0	68.0
AWT 4	100.0	110.0	128.1	0.120	0.1525	25.0	69.0
Average	98.3	108.2	127.8	0.116	0.1664	24.0	68.3

TABLE A3.11 HY-80 WELD METAL TYPE MIL-11018 (HY-80 BASE) - SAMPLE PD20688

Piece Identification	Yield Stress 0.2% (KSI)	Eng. Ultimate Stress (KSI)	True Ultimate Stress (KSI)	Eng. Ultimate Strain (in/in)	True Ultimate Strain (in/in)	Percent Elongation (2")	Percent Area Reduction
BMT L1	56.0	76.5	112.5	0.235	0.3849	33.0	75.0
BMT L2	56.0	75.7	101.0	0.240	0.2881	36.0	74.0
BMT T3	57.0	75.4	102.5	0.230	0.3070	32.0	66.0
BMT T4	53.0	75.7	105.7	0.235	0.3341	33.0	64.0
Average	55.5	75.8	105.4	0.235	0.3285	33.5	69.8

TABLE A3.12 HSS BASE PLATE MATERIAL, SAMPLE PD20685 & PD20686

Piece Identification	Yield Stress 0.2% (KSI)	Eng. Ultimate Stress (KSI)	True Ultimate Stress (KSI)	Eng. Ultimate Strain (in/in)	True Ultimate Strain (in/in)	Percent Elongation (2")	Percent Area Reduction
AWT 1	58.0	72.4	100.8	0.210	0.3309	33.0	74.0
AWT 2	59.0	74.1	100.5	0.215	0.3056	33.0	75.0
AWT 3	57.0	74.1	96.7	0.225	0.2653	36.0	75.0
AWT 4	59.0	75.0	102.2	0.210	0.3090	33.0	73.0
Average	58.3	73.9	100.1	0.215	0.3027	33.8	74.3

TABLE A3.13 HSS WELD METAL TYPE MIL-70S-3 (HSS BASE) - SAMPLE PD20685

Piece Identification	Yield Stress 0.2% (KSI)	Eng. Ultimate Stress (KSI)	True Ultimate Stress (KSI)	Eng. Ultimate Strain (in/in)	True Ultimate Strain (in/in)	Percent Elongation (2")	Percent Area Reduction
AWT 1	60.0	71.4	96.7	0.185	0.3030	31.0	74.0
AWT 3	60.0	72.4	92.1	0.195	0.2400	34.0	75.0
AWT 4	60.0	73.0	97.1	0.180	0.2856	30.0	74.0
AWT 5	62.0	74.4	97.1	0.200	0.2659	33.0	78.0
Average	60.5	72.8	95.8	0.190	0.2736	32.0	75.3

TABLE A3.14 HSS WELD METAL TYPE MIL-7018 (HSS BASE) - SAMPLE PD20686

FIGURE 3.1 HY-130 Base Plate Material, Sample PD20684
B-Spline Least Squares Data Fit

FIGURE 3.2 HY-130 Weld Metal Type EB-140 (HY-130 Base), Sample PD20684
B-Spline Least Squares Data Fit

FIGURE 3.3 HY-100 Base Plate Material, Sample PD20689
B-Spline Least Squares Data Fit

FIGURE 3.4 HY-100 Weld Metal Type MIL-120S-1 (HY-100 Base), Sample PD20689
B-Spline Least Squares Data Fit

FIGURE 3.5 HY-100 Weld Metal Type MIL-12018 (HY-100 Base), Sample PD20691
B-Spline Least Squares Data Fit

FIGURE 3.6 HSLA-100 Base Plate Material, Sample PD20700
B-Spline Least Squares Data Fit

FIGURE 3.7 HY-80 Weld Metal Type MIL-100S-1 (HY-100 Base), Sample PD20690
B-Spline Least Squares Data Fit

FIGURE 3.8 HY-80 Weld Metal Type MIL-11018 (HY-100 Base), Sample PD20692
B-Spline Least Squares Data Fit

FIGURE 3.9 HY-80 Base Plate Material, Sample PD20687
B-Spline Least Squares Data Fit

FIGURE 3.10 HY-80 Weld Metal Type MIL-100S-1 (HY-80 Base), Sample PD20687
B-Spline Least Squares Data Fit

FIGURE 3.11 HY-80 Weld Metal Type MIL-11018 (HY-80 Base), Sample PD20688
B-Spline Least Squares Data Fit

FIGURE 3.12 HSS Base Plate Material, Sample PD20685 & PD20686
B-Spline Least Squares Data Fit

FIGURE 3.13 HSS Weld Metal Type MIL-70S-3 (HSS Base), Sample PD20685
B-Spline Least Squares Data Fit

FIGURE 3.14 HSS Weld Metal Type MIL-7018 (HSS Base), Sample PD20686
B-Spline Least Squares Data Fit

APPENDIX 4 MATERIAL TEST TABULATION OF DATA

Nomenclature for the following tables -

load	- load on specimen (lbs)
diameter	- measured specimen diameter (in)
area	- specimen cross-sectional area (in ²)
estress	- engineering stress (lb/in ²)
tstress	- true stress (lb/in ²)
estrain	- engineering strain (in/in)
tstrain	- true strain (in/in)

Specimen : PD20684 - AWT1

Material : HY130

Type : EB-140

load	diameter	area	estress	tstress	estrain	tstrain
0	0.504	0.1995	0.0	0.0	0.0000	0.0000
3250			16.3	16.3	0.0005	0.0005
6000			30.1	30.1	0.0010	0.0010
8875			44.5	44.6	0.0015	0.0015
11850			59.4	59.5	0.0020	0.0020
14625			73.3	73.5	0.0025	0.0025
17450			87.5	87.7	0.0030	0.0030
20200			101.3	101.6	0.0035	0.0035
22650			113.5	114.0	0.0040	0.0040
23925			119.9	120.5	0.0045	0.0045
24750			124.1	124.7	0.0050	0.0050
25225			126.4	127.1	0.0055	0.0055
25550			128.1	128.8	0.0060	0.0060
26000			130.3	131.2	0.0070	0.0070
26175			131.2	132.3	0.0080	0.0080
26425			132.5	133.6	0.0090	0.0090
26525			133.0	134.3	0.0100	0.0100
26625			133.5	134.9	0.0110	0.0109
26725			134.0	135.6	0.0120	0.0119
26750			134.1	135.8	0.0130	0.0129
26750			134.1	136.0	0.0140	0.0139
26850			134.6	136.6	0.0150	0.0149
26800			134.3	136.5	0.0160	0.0159
26875			134.7	137.0	0.0170	0.0169
26950			135.1	137.5	0.0180	0.0178
26950			135.1	137.7	0.0190	0.0188
26975			135.2	137.9	0.0200	0.0198
27050	0.499	0.1956	135.6	138.3	0.0250	0.0199
27350	0.499	0.1956	137.1	139.9	0.0250	0.0199
27500	0.499	0.1956	137.8	140.6	0.0250	0.0199
27750	0.498	0.1948	139.1	142.5	0.0250	0.0240
28000	0.494	0.1917	140.3	146.1	0.0450	0.0401
28250	0.492	0.1901	141.6	148.6	0.0550	0.0482
28450	0.471	0.1742	142.6	163.3	0.1000	0.1354
27000	0.441	0.1527	135.3	176.8	0.1250	0.2671
25500	0.413	0.1340	127.8	190.3	0.1450	0.3983
24000	0.386	0.1170	120.3	205.1	0.1650	0.5335
22500	0.360	0.1018	112.8	221.0	0.1800	0.6729
21000	0.337	0.0892	105.3	235.4	0.1950	0.8050
19500	0.316	0.0784	97.7	248.6	0.2000	0.9337
18350	0.292	0.0670	92.0	274.0	0.2100	1.0916

ELECTRIC BOAT CORPORATION
REPORT NO TDA-19194

Specimen : PD20684 - AWT2

Material : HY130

Type : EB-140

load	diameter	area	estress	tstress	estrain	tstrain
0	0.503	0.1987	0.0	0.0	0.0000	0.0000
4000			20.1	20.1	0.0005	0.0005
6800			34.2	34.3	0.0010	0.0010
9750			49.1	49.1	0.0015	0.0015
12500			62.9	63.0	0.0020	0.0020
15250			76.7	76.9	0.0025	0.0025
17750			89.3	89.6	0.0030	0.0030
20100			101.2	101.5	0.0035	0.0035
21900			110.2	110.7	0.0040	0.0040
23200			116.8	117.3	0.0045	0.0045
24250			122.0	122.6	0.0050	0.0050
24950			125.6	126.2	0.0055	0.0055
25400			127.8	128.6	0.0060	0.0060
25900			130.3	131.3	0.0070	0.0070
26150			131.6	132.6	0.0080	0.0080
26450			133.1	134.3	0.0090	0.0090
26500			133.4	134.7	0.0100	0.0100
26700			134.4	135.8	0.0110	0.0109
26800			134.9	136.5	0.0120	0.0119
26900			135.4	137.1	0.0130	0.0129
26950			135.6	137.5	0.0140	0.0139
27000			135.9	137.9	0.0150	0.0149
27000			135.9	138.0	0.0160	0.0159
27000			135.9	138.2	0.0170	0.0169
27050			136.1	138.6	0.0180	0.0178
27050			136.1	138.7	0.0190	0.0188
27100			136.4	139.1	0.0200	0.0198
27400	0.496	0.1932	137.9	141.8	0.0250	0.0280
27750	0.496	0.1932	139.6	143.6	0.0250	0.0280
28000	0.491	0.1893	140.9	147.9	0.0400	0.0483
28250	0.490	0.1886	142.2	149.8	0.0450	0.0524
28450	0.474	0.1765	143.2	161.2	0.0800	0.1188
27000	0.441	0.1527	135.9	176.8	0.1100	0.2631
25500	0.411	0.1327	128.3	192.2	0.1300	0.4040
24000	0.384	0.1158	120.8	207.2	0.1500	0.5399
22500	0.360	0.1018	113.2	221.0	0.1650	0.6690
21000	0.337	0.0892	105.7	235.4	0.1750	0.8010
19500	0.316	0.0784	98.1	248.6	0.1900	0.9297
18000	0.286	0.0642	90.6	280.2	0.2000	1.1292

ELECTRIC BOAT CORPORATION
REPORT NO TDA-19194

Specimen : PD20684 - AWT3

Material : HY130

Type : EB-140

load	diameter	area	estress	tstress	estrain	tstrain
0	0.504	0.1995	0.0	0.0	0.0000	0.0000
3500			17.5	17.6	0.0005	0.0005
6350			31.8	31.9	0.0010	0.0010
9350			46.9	46.9	0.0015	0.0015
12150			60.9	61.0	0.0020	0.0020
15000			75.2	75.4	0.0025	0.0025
17500			87.7	88.0	0.0030	0.0030
20050			100.5	100.9	0.0035	0.0035
22000			110.3	110.7	0.0040	0.0040
23500			117.8	118.3	0.0045	0.0045
24350			122.1	122.7	0.0050	0.0050
25000			125.3	126.0	0.0055	0.0055
25400			127.3	128.1	0.0060	0.0060
26000			130.3	131.2	0.0070	0.0070
26150			131.1	132.1	0.0080	0.0080
26400			132.3	133.5	0.0090	0.0090
26550			133.1	134.4	0.0100	0.0100
26600			133.3	134.8	0.0110	0.0109
26750			134.1	135.7	0.0120	0.0119
26850			134.6	136.3	0.0130	0.0129
26900			134.8	136.7	0.0140	0.0139
26950			135.1	137.1	0.0150	0.0149
27000			135.3	137.5	0.0160	0.0159
27000			135.3	137.6	0.0170	0.0169
27050			135.6	138.0	0.0180	0.0178
27100			135.8	138.4	0.0190	0.0188
27150			136.1	138.8	0.0200	0.0198
28000	0.495	0.1924	140.3	145.5	0.0250	0.0360
28250	0.487	0.1863	141.6	151.7	0.0450	0.0686
28500	0.486	0.1855	142.9	153.6	0.0550	0.0727
28600	0.474	0.1765	143.4	162.1	0.0750	0.1227
27000	0.441	0.1527	135.3	176.8	0.1050	0.2671
25500	0.410	0.1320	127.8	193.1	0.1300	0.4128
24000	0.384	0.1158	120.3	207.2	0.1450	0.5439
22500	0.359	0.1012	112.8	222.3	0.1600	0.6785
21000	0.335	0.0881	105.3	238.3	0.1750	0.8169
19500	0.314	0.0774	97.7	251.8	0.1850	0.9464
18000	0.295	0.0683	90.2	263.4	0.1900	1.0712
17950	0.285	0.0638	90.0	281.4	0.2000	1.1402

ELECTRIC BOAT CORPORATION
REPORT NO TDA-19194

Specimen : PD20684 - AWT4

Material : HY130

Type : EB-140

load	diameter	area	estress	tstress	estrain	tstrain
0	0.505	0.2003	0.0	0.0	0.0000	0.0000
3450			17.2	17.2	0.0005	0.0005
6500			32.5	32.5	0.0010	0.0010
9650			48.2	48.3	0.0015	0.0015
12500			62.4	62.5	0.0020	0.0020
15350			76.6	76.8	0.0025	0.0025
18250			91.1	91.4	0.0030	0.0030
20800			103.8	104.2	0.0035	0.0035
22900			114.3	114.8	0.0040	0.0040
24050			120.1	120.6	0.0045	0.0045
24950			124.6	125.2	0.0050	0.0050
25050			125.1	125.8	0.0055	0.0055
25850			129.1	129.8	0.0060	0.0060
26250			131.1	132.0	0.0070	0.0070
26500			132.3	133.4	0.0080	0.0080
26750			133.6	134.8	0.0090	0.0090
26900			134.3	135.6	0.0100	0.0100
26950			134.6	136.0	0.0110	0.0109
27000			134.8	136.4	0.0120	0.0119
27050			135.1	136.8	0.0130	0.0129
27100			135.3	137.2	0.0140	0.0139
27150			135.5	137.6	0.0150	0.0149
27200			135.8	138.0	0.0160	0.0159
27250			136.0	138.4	0.0170	0.0169
27350			136.5	139.0	0.0180	0.0178
27350			136.5	139.1	0.0190	0.0188
27400			136.8	139.5	0.0200	0.0198
28000	0.498	0.1948	139.8	143.8	0.0250	0.0279
28250	0.492	0.1901	141.0	148.6	0.0400	0.0522
28500	0.491	0.1893	142.3	150.5	0.0400	0.0562
28650	0.479	0.1802	143.0	159.0	0.0700	0.1057
27000	0.442	0.1534	134.8	176.0	0.1100	0.2665
25500	0.412	0.1333	127.3	191.3	0.1300	0.4071
24000	0.389	0.1188	119.8	201.9	0.1450	0.5220
22500	0.362	0.1029	112.3	218.6	0.1650	0.6658
21000	0.339	0.0903	104.8	232.7	0.1700	0.7971
19500	0.317	0.0789	97.4	247.1	0.1800	0.9313
18000	0.299	0.0702	89.9	256.4	0.1950	1.0482
17900	0.286	0.0642	89.4	278.6	0.2000	1.1371

ELECTRIC BOAT CORPORATION
REPORT NO TDA-19194

Specimen : PD20684 - BMT L1

Material : HY130

Type : Base plate

load	diameter	area	estress	tstress	estrain	tstrain
0	0.497	0.1940	0.0	0.0	0.0000	0.0000
4000			20.6	20.6	0.0005	0.0005
6700			34.5	34.6	0.0010	0.0010
9550			49.2	49.3	0.0015	0.0015
12300			63.4	63.5	0.0020	0.0020
15000			77.3	77.5	0.0025	0.0025
17600			90.7	91.0	0.0030	0.0030
20300			104.6	105.0	0.0035	0.0035
22650			116.8	117.2	0.0040	0.0040
24200			124.7	125.3	0.0045	0.0045
25050			129.1	129.8	0.0050	0.0050
25500			131.4	132.2	0.0055	0.0055
25750			132.7	133.5	0.0060	0.0060
26050			134.3	135.2	0.0070	0.0070
26100			134.5	135.6	0.0080	0.0080
26100			134.5	135.7	0.0090	0.0090
26100			134.5	135.9	0.0100	0.0100
26100			134.5	136.0	0.0110	0.0109
26100			134.5	136.2	0.0120	0.0119
26100			134.5	136.3	0.0130	0.0129
26100			134.5	136.4	0.0140	0.0139
26100			134.5	136.6	0.0150	0.0149
26150			134.8	137.0	0.0160	0.0159
26150			134.8	137.1	0.0170	0.0169
26150			134.8	137.2	0.0180	0.0178
26200			135.1	137.6	0.0190	0.0188
26200			135.1	137.8	0.0200	0.0198
26450	0.490	0.1886	136.3	140.3	0.0250	0.0284
26750	0.489	0.1878	137.9	142.4	0.0250	0.0325
27000	0.485	0.1847	139.2	146.1	0.0450	0.0489
27250	0.479	0.1802	140.5	151.2	0.0550	0.0738
27400	0.475	0.1772	141.2	154.6	0.0700	0.0906
26000	0.445	0.1555	134.0	167.2	0.0950	0.2210
24500	0.418	0.1372	126.3	178.5	0.1200	0.3462
23000	0.397	0.1238	118.6	185.8	0.1350	0.4493
21500	0.368	0.1064	110.8	202.1	0.1500	0.6010
20000	0.345	0.0935	103.1	213.9	0.1650	0.7301
18500	0.323	0.0819	95.4	225.8	0.1750	0.8619
17000	0.301	0.0712	87.6	238.9	0.1800	1.0030
16200	0.282	0.0625	83.5	259.4	0.1900	1.1334

ELECTRIC BOAT CORPORATION
REPORT NO TDA-19194

Specimen : PD20684 - BMT L2

Material : HY130

Type : Base plate

load	diameter	area	estress	tstress	estrain	tstrain
0	0.502	0.1979	0.0	0.0	0.0000	0.0000
2500			12.6	12.6	0.0005	0.0005
5050			25.5	25.5	0.0010	0.0010
8150			41.2	41.2	0.0015	0.0015
10700			54.1	54.2	0.0020	0.0020
13500			68.2	68.4	0.0025	0.0025
16100			81.3	81.6	0.0030	0.0030
18700			94.5	94.8	0.0035	0.0035
21300			107.6	108.0	0.0040	0.0040
23500			118.7	119.3	0.0045	0.0045
24750			125.0	125.7	0.0050	0.0050
25600			129.3	130.1	0.0055	0.0055
26000			131.4	132.2	0.0060	0.0060
26400			133.4	134.3	0.0070	0.0070
26500			133.9	135.0	0.0080	0.0080
26550			134.1	135.4	0.0090	0.0090
26550			134.1	135.5	0.0100	0.0100
26550			134.1	135.6	0.0110	0.0109
26550			134.1	135.8	0.0120	0.0119
26550			134.1	135.9	0.0130	0.0129
26550			134.1	136.0	0.0140	0.0139
26600			134.4	136.4	0.0150	0.0149
26650			134.6	136.8	0.0160	0.0159
26650			134.6	136.9	0.0170	0.0169
26650			134.6	137.1	0.0180	0.0178
26700			134.9	137.5	0.0190	0.0188
26700			134.9	137.6	0.0200	0.0198
27000	0.494	0.1917	136.4	140.9	0.0250	0.0321
27250	0.493	0.1909	137.7	142.8	0.0250	0.0362
27500	0.490	0.1886	138.9	145.8	0.0350	0.0484
27750	0.489	0.1878	140.2	147.8	0.0450	0.0525
27950	0.475	0.1772	141.2	157.7	0.0750	0.1106
26500	0.446	0.1562	133.9	169.6	0.1000	0.2366
25000	0.420	0.1385	126.3	180.4	0.1200	0.3567
23500	0.394	0.1219	118.7	192.7	0.1400	0.4845
22000	0.370	0.1075	111.2	204.6	0.1500	0.6102
20500	0.348	0.0951	103.6	215.5	0.1650	0.7328
19000	0.327	0.0840	96.0	226.2	0.1750	0.8573
17500	0.305	0.0731	88.4	239.5	0.1900	0.9966
16800	0.283	0.0629	84.9	267.1	0.1950	1.1463

ELECTRIC BOAT CORPORATION
REPORT NO TDA-19194

Specimen : PD20684 - BMT T1

Material : HY130

Type : Base plate

load	diameter	area	estress	tstress	estrain	tstrain
0	0.508	0.2027	0.0	0.0	0.0000	0.0000
2700			13.3	13.3	0.0005	0.0005
5250			25.9	25.9	0.0010	0.0010
8325			41.1	41.1	0.0015	0.0015
11050			54.5	54.6	0.0020	0.0020
13875			68.5	68.6	0.0025	0.0025
16950			83.6	83.9	0.0030	0.0030
20100			99.2	99.5	0.0035	0.0035
22800			112.5	112.9	0.0040	0.0040
25200			124.3	124.9	0.0045	0.0045
26325			129.9	130.5	0.0050	0.0050
26850			132.5	133.2	0.0055	0.0055
27075			133.6	134.4	0.0060	0.0060
27225			134.3	135.3	0.0070	0.0070
27225			134.3	135.4	0.0080	0.0080
27225			134.3	135.5	0.0090	0.0090
27225			134.3	135.7	0.0100	0.0100
27225			134.3	135.8	0.0110	0.0109
27225			134.3	135.9	0.0120	0.0119
27225			134.3	136.1	0.0130	0.0129
27225			134.3	136.2	0.0140	0.0139
27225			134.3	136.3	0.0150	0.0149
27225			134.3	136.5	0.0160	0.0159
27225			134.3	136.6	0.0170	0.0169
27225			134.3	136.7	0.0180	0.0178
27225			134.3	136.9	0.0190	0.0188
27150			134.0	136.6	0.0200	0.0198
27100	0.502	0.1979	133.7	136.9	0.0300	0.0238
27250	0.501	0.1971	134.4	138.2	0.0300	0.0278
27500	0.501	0.1971	135.7	139.5	0.0300	0.0278
27750	0.501	0.1971	136.9	140.8	0.0300	0.0278
28000	0.497	0.1940	138.1	144.3	0.0450	0.0438
28250	0.495	0.1924	139.4	146.8	0.0550	0.0518
28500	0.494	0.1917	140.6	148.7	0.0600	0.0559
28600	0.482	0.1825	141.1	156.7	0.0900	0.1051
27000	0.454	0.1619	133.2	166.8	0.1200	0.2248
25500	0.425	0.1419	125.8	179.8	0.1400	0.3568
24000	0.401	0.1263	118.4	190.0	0.1550	0.4730
22500	0.376	0.1110	111.0	202.6	0.1750	0.6018
21000	0.351	0.0968	103.6	217.0	0.1850	0.7394
19500	0.327	0.0840	96.2	232.2	0.1950	0.8810
18000	0.309	0.0750	88.8	240.0	0.2100	0.9943
17350	0.287	0.0647	85.6	268.2	0.2150	1.1420

Specimen : PD20684 - BMT T2

Material : HY130

Type : Base plate

load	diameter	area	estress	tstress	estrain	tstrain
0	0.506	0.2011	0.0	0.0	0.0000	0.0000
5000			24.9	24.9	0.0005	0.0005
7950			39.5	39.6	0.0010	0.0010
10800			53.7	53.8	0.0015	0.0015
13500			67.1	67.3	0.0020	0.0020
16250			80.8	81.0	0.0025	0.0025
19000			94.5	94.8	0.0030	0.0030
21650			107.7	108.0	0.0035	0.0035
23650			117.6	118.1	0.0040	0.0040
25000			124.3	124.9	0.0045	0.0045
25800			128.3	128.9	0.0050	0.0050
26300			130.8	131.5	0.0055	0.0055
26500			131.8	132.6	0.0060	0.0060
26750			133.0	134.0	0.0070	0.0070
26900			133.8	134.8	0.0080	0.0080
26950			134.0	135.2	0.0090	0.0090
26950			134.0	135.4	0.0100	0.0100
26950			134.0	135.5	0.0110	0.0109
26950			134.0	135.6	0.0120	0.0119
26900			133.8	135.5	0.0130	0.0129
26900			133.8	135.6	0.0140	0.0139
26900			133.8	135.8	0.0150	0.0149
26950			134.0	136.2	0.0160	0.0159
26950			134.0	136.3	0.0170	0.0169
27000			134.3	136.7	0.0180	0.0178
27000			134.3	136.8	0.0190	0.0188
27000			134.3	137.0	0.0200	0.0198
27250	0.499	0.1956	135.5	139.3	0.0250	0.0279
27500	0.499	0.1956	136.8	140.6	0.0250	0.0279
27750	0.495	0.1924	138.0	144.2	0.0400	0.0440
28000	0.492	0.1901	139.2	147.3	0.0500	0.0561
28250	0.483	0.1832	140.5	154.2	0.0650	0.0930
26500	0.446	0.1562	131.8	169.6	0.1100	0.2524
25000	0.419	0.1379	124.3	181.3	0.1250	0.3773
23500	0.394	0.1219	116.9	192.7	0.1500	0.5004
22000	0.371	0.1081	109.4	203.5	0.1550	0.6207
20500	0.345	0.0935	101.9	219.3	0.1750	0.7660
19000	0.322	0.0814	94.5	233.3	0.1850	0.9040
17500	0.302	0.0716	87.0	244.3	0.1900	1.0322
16650	0.275	0.0594	82.8	280.3	0.2150	1.2195

ELECTRIC BOAT CORPORATION
REPORT NO TDA-19194

Specimen : PD20685 - AWT1

Material : HSS

Type : MIL-70S-3

load	diameter	area	estress	tstress	estrain	tstrain
0	0.505	0.2003	0.0	0.0	0.0000	0.0000
2700			13.5	13.5	0.0005	0.0005
5550			27.7	27.7	0.0010	0.0010
8375			41.8	41.9	0.0015	0.0015
11125			55.5	55.7	0.0020	0.0020
11725			58.5	58.7	0.0025	0.0025
11725			58.5	58.7	0.0030	0.0030
11725			58.5	58.7	0.0035	0.0035
11600			57.9	58.1	0.0040	0.0040
11500			57.4	57.7	0.0045	0.0045
11425			57.0	57.3	0.0050	0.0050
11375			56.8	57.1	0.0055	0.0055
11375			56.8	57.1	0.0060	0.0060
11375			56.8	57.2	0.0070	0.0070
11375			56.8	57.2	0.0080	0.0080
11375			56.8	57.3	0.0090	0.0090
11375			56.8	57.4	0.0100	0.0100
11375			56.8	57.4	0.0110	0.0109
11375			56.8	57.5	0.0120	0.0119
11375			56.8	57.5	0.0130	0.0129
11400			56.9	57.7	0.0140	0.0139
11425			57.0	57.9	0.0150	0.0149
11450			57.2	58.1	0.0160	0.0159
11475			57.3	58.3	0.0170	0.0169
11475			57.3	58.3	0.0180	0.0178
11475			57.3	58.4	0.0190	0.0188
11475			57.3	58.4	0.0200	0.0198
11750	0.497	0.1940	58.7	60.6	0.0300	0.0319
12000	0.497	0.1940	59.9	61.9	0.0350	0.0319
12250	0.496	0.1932	61.2	63.4	0.0400	0.0360
12500	0.494	0.1917	62.4	65.2	0.0450	0.0440
12750	0.493	0.1909	63.7	66.8	0.0450	0.0481
13000	0.492	0.1901	64.9	68.4	0.0500	0.0522
13250	0.490	0.1886	66.2	70.3	0.0600	0.0603
13500	0.488	0.1870	67.4	72.2	0.0650	0.0685
13750	0.485	0.1847	68.6	74.4	0.0800	0.0808
14000	0.481	0.1817	69.9	77.0	0.0900	0.0974
14250	0.476	0.1780	71.1	80.1	0.1100	0.1183
14450	0.461	0.1669	72.1	86.6	0.1600	0.1823
14500	0.428	0.1439	72.4	100.8	0.2100	0.3309
13000	0.368	0.1064	64.9	122.2	0.2650	0.6330
11500	0.323	0.0819	57.4	140.3	0.2900	0.8938
10000	0.287	0.0647	49.9	154.6	0.3150	1.1302
9000	0.255	0.0511	44.9	176.2	0.3300	1.3666

ELECTRIC BOAT CORPORATION
REPORT NO TDA-19194

Specimen : PD20685 - AWT2

Material : HSS

Type : MIL-70S-3

load	diameter	area	estress	tstress	estrain	tstrain
0	0.501	0.1971	0.0	0.0	0.0000	0.0000
3250			16.5	16.5	0.0005	0.0005
5850			29.7	29.7	0.0010	0.0010
8750			44.4	44.5	0.0015	0.0015
11400			57.8	57.9	0.0020	0.0020
11675			59.2	59.4	0.0025	0.0025
11675			59.2	59.4	0.0030	0.0030
11550			58.6	58.8	0.0035	0.0035
11550			58.6	58.8	0.0040	0.0040
11550			58.6	58.9	0.0045	0.0045
11525			58.5	58.8	0.0050	0.0050
11525			58.5	58.8	0.0055	0.0055
11525			58.5	58.8	0.0060	0.0060
11525			58.5	58.9	0.0070	0.0070
11525			58.5	58.9	0.0080	0.0080
11525			58.5	59.0	0.0090	0.0090
11525			58.5	59.0	0.0100	0.0100
11500			58.3	59.0	0.0110	0.0109
11500			58.3	59.0	0.0120	0.0119
11500			58.3	59.1	0.0130	0.0129
11425			58.0	58.8	0.0140	0.0139
11400			57.8	58.7	0.0150	0.0149
11375			57.7	58.6	0.0160	0.0159
11375			57.7	58.7	0.0170	0.0169
11375			57.7	58.7	0.0180	0.0178
11350			57.6	58.7	0.0190	0.0188
11325			57.4	58.6	0.0200	0.0198
11600	0.497	0.1940	58.8	59.8	0.0250	0.0160
11750	0.496	0.1932	59.6	60.8	0.0300	0.0201
12000	0.495	0.1924	60.9	62.4	0.0300	0.0241
12250	0.494	0.1917	62.1	63.9	0.0350	0.0281
12500	0.493	0.1909	63.4	65.5	0.0400	0.0322
12750	0.492	0.1901	64.7	67.1	0.0500	0.0363
13000	0.491	0.1893	65.9	68.7	0.0500	0.0403
13250	0.489	0.1878	67.2	70.6	0.0550	0.0485
13500	0.488	0.1870	68.5	72.2	0.0600	0.0526
13750	0.485	0.1847	69.7	74.4	0.0700	0.0649
14000	0.483	0.1832	71.0	76.4	0.0850	0.0732
14250	0.478	0.1795	72.3	79.4	0.1000	0.0940
14500	0.460	0.1662	73.6	87.2	0.1650	0.1708
14600	0.430	0.1452	74.1	100.5	0.2150	0.3056
13000	0.374	0.1099	65.9	118.3	0.2650	0.5847
11500	0.328	0.0845	58.3	136.1	0.2950	0.8472
10000	0.288	0.0651	50.7	153.5	0.3200	1.1073
9000	0.251	0.0495	45.7	181.9	0.3300	1.3823

ELECTRIC BOAT CORPORATION
REPORT NO TDA-19194

Specimen : PD20685 - AWT3

Material : HSS

Type : MIL-70S-3

load	diameter	area	estress	tstress	estrain	tstrain
0	0.499	0.1956	0.0	0.0	0.0000	0.0000
3400			17.4	17.4	0.0005	0.0005
6275			32.1	32.1	0.0010	0.0010
9250			47.3	47.4	0.0015	0.0015
11275			57.7	57.8	0.0020	0.0020
11375			58.2	58.3	0.0025	0.0025
11350			58.0	58.2	0.0030	0.0030
11225			57.4	57.6	0.0035	0.0035
11150			57.0	57.2	0.0040	0.0040
11125			56.9	57.1	0.0045	0.0045
11125			56.9	57.2	0.0050	0.0050
11125			56.9	57.2	0.0055	0.0055
11125			56.9	57.2	0.0060	0.0060
11125			56.9	57.3	0.0070	0.0070
11125			56.9	57.3	0.0080	0.0080
11125			56.9	57.4	0.0090	0.0090
11125			56.9	57.5	0.0100	0.0100
11125			56.9	57.5	0.0110	0.0109
11125			56.9	57.6	0.0120	0.0119
11125			56.9	57.6	0.0130	0.0129
11125			56.9	57.7	0.0140	0.0139
11125			56.9	57.7	0.0150	0.0149
11125			56.9	57.8	0.0160	0.0159
11125			56.9	57.9	0.0170	0.0169
11125			56.9	57.9	0.0180	0.0178
11125			56.9	58.0	0.0190	0.0188
11125			56.9	58.0	0.0200	0.0198
11400	0.494	0.1917	58.3	59.5	0.0250	0.0201
11750	0.493	0.1909	60.1	61.6	0.0250	0.0242
12000	0.492	0.1901	61.4	63.1	0.0350	0.0283
12250	0.491	0.1893	62.6	64.7	0.0350	0.0323
12500	0.490	0.1886	63.9	66.3	0.0450	0.0364
12750	0.489	0.1878	65.2	67.9	0.0500	0.0405
13000	0.487	0.1863	66.5	69.8	0.0550	0.0487
13250	0.486	0.1855	67.8	71.4	0.0600	0.0528
13500	0.483	0.1832	69.0	73.7	0.0700	0.0652
13750	0.481	0.1817	70.3	75.7	0.0800	0.0735
14000	0.477	0.1787	71.6	78.3	0.1000	0.0902
14250	0.471	0.1742	72.9	81.8	0.1250	0.1155
14500	0.437	0.1500	74.1	96.7	0.2250	0.2653
13000	0.378	0.1122	66.5	115.8	0.2850	0.5554
11500	0.330	0.0855	58.8	134.5	0.3150	0.8270
10000	0.291	0.0665	51.1	150.4	0.3400	1.0786
8800	0.249	0.0487	45.0	180.7	0.3600	1.3903

Specimen : PD20685 - AWT4

Material : HSS

Type : MIL-70S-3

load	diameter	area	estress	tstress	estrain	tstrain
0	0.496	0.1932	0.0	0.0	0.0000	0.0000
2200			11.4	11.4	0.0005	0.0005
5000			25.9	25.9	0.0010	0.0010
7850			40.6	40.7	0.0015	0.0015
10475			54.2	54.3	0.0020	0.0020
11300			58.5	58.6	0.0025	0.0025
11400			59.0	59.2	0.0030	0.0030
11400			59.0	59.2	0.0035	0.0035
11400			59.0	59.2	0.0040	0.0040
11375			58.9	59.1	0.0045	0.0045
11375			58.9	59.2	0.0050	0.0050
11375			58.9	59.2	0.0055	0.0055
11375			58.9	59.2	0.0060	0.0060
11375			58.9	59.3	0.0070	0.0070
11375			58.9	59.3	0.0080	0.0080
11375			58.9	59.4	0.0090	0.0090
11375			58.9	59.5	0.0100	0.0100
11375			58.9	59.5	0.0110	0.0109
11375			58.9	59.6	0.0120	0.0119
11350			58.7	59.5	0.0130	0.0129
11350			58.7	59.6	0.0140	0.0139
11325			58.6	59.5	0.0150	0.0149
11325			58.6	59.5	0.0160	0.0159
11325			58.6	59.6	0.0170	0.0169
11325			58.6	59.7	0.0180	0.0178
11325			58.6	59.7	0.0190	0.0188
11325			58.6	59.8	0.0200	0.0198
12000	0.490	0.1886	62.1	63.6	0.0300	0.0243
12250	0.489	0.1878	63.4	65.2	0.0350	0.0284
12500	0.488	0.1870	64.7	66.8	0.0400	0.0325
12750	0.486	0.1855	66.0	68.7	0.0450	0.0407
13000	0.485	0.1847	67.3	70.4	0.0500	0.0449
13250	0.484	0.1840	68.6	72.0	0.0600	0.0490
13500	0.482	0.1825	69.9	74.0	0.0650	0.0573
13750	0.480	0.1810	71.2	76.0	0.0700	0.0656
14000	0.476	0.1780	72.5	78.7	0.0900	0.0823
14250	0.472	0.1750	73.7	81.4	0.1050	0.0992
14500	0.425	0.1419	75.0	102.2	0.2100	0.3090
13000	0.373	0.1093	67.3	119.0	0.2600	0.5700
11500	0.326	0.0835	59.5	137.8	0.2900	0.8394
10000	0.290	0.0661	51.8	151.4	0.3150	1.0734
9400	0.259	0.0527	48.6	178.4	0.3250	1.2995

Specimen : PD20685 - BMT T3

Material : HSS

Type : Base plate

load	diameter	area	estress	tstress	estrain	tstrain
0	0.499	0.1956	0.0	0.0	0.0000	0.0000
2450			12.5	12.5	0.0005	0.0005
5525			28.3	28.3	0.0010	0.0010
8525			43.6	43.7	0.0015	0.0015
11875			60.7	60.8	0.0020	0.0020
11250			57.5	57.7	0.0025	0.0025
11200			57.3	57.4	0.0030	0.0030
11200			57.3	57.5	0.0035	0.0035
11200			57.3	57.5	0.0040	0.0040
11200			57.3	57.5	0.0045	0.0045
11175			57.1	57.4	0.0050	0.0050
11150			57.0	57.3	0.0055	0.0055
11150			57.0	57.4	0.0060	0.0060
11125			56.9	57.3	0.0070	0.0070
11075			56.6	57.1	0.0080	0.0080
11100			56.8	57.3	0.0090	0.0090
11000			56.2	56.8	0.0100	0.0100
10975			56.1	56.7	0.0110	0.0109
10975			56.1	56.8	0.0120	0.0119
10975			56.1	56.8	0.0130	0.0129
10975			56.1	56.9	0.0140	0.0139
10975			56.1	57.0	0.0150	0.0149
10975			56.1	57.0	0.0160	0.0159
10925			55.9	56.8	0.0170	0.0169
10825			55.4	56.3	0.0180	0.0178
10775			55.1	56.1	0.0190	0.0188
10750			55.0	56.1	0.0200	0.0198
10750	0.493	0.1909	55.0	56.3	0.0250	0.0242
11200	0.492	0.1901	57.3	58.9	0.0350	0.0283
11250	0.492	0.1901	57.5	59.2	0.0400	0.0283
11500	0.491	0.1893	58.8	60.7	0.0400	0.0323
11750	0.490	0.1886	60.1	62.3	0.0400	0.0364
12000	0.490	0.1886	61.4	63.6	0.0400	0.0364
12250	0.489	0.1878	62.6	65.2	0.0450	0.0405
12500	0.488	0.1870	63.9	66.8	0.0550	0.0446
12750	0.487	0.1863	65.2	68.4	0.0600	0.0487
13000	0.486	0.1855	66.5	70.1	0.0600	0.0528
13250	0.485	0.1847	67.8	71.7	0.0650	0.0569
13500	0.482	0.1825	69.0	74.0	0.0750	0.0693
13750	0.481	0.1817	70.3	75.7	0.0800	0.0735
14000	0.479	0.1802	71.6	77.7	0.0900	0.0818
14250	0.476	0.1780	72.9	80.1	0.1000	0.0944
14500	0.472	0.1750	74.1	82.9	0.1300	0.1113
14750	0.428	0.1439	75.4	102.5	0.2300	0.3070
13500	0.378	0.1122	69.0	120.3	0.2750	0.5554
12000	0.329	0.0850	61.4	141.2	0.3100	0.8331
10800	0.292	0.0670	55.2	161.3	0.3200	1.0717

Specimen : PD20685 - BMT T4

Material : HSS

Type : Base plate

load	diameter	area	estress	tstress	estrain	tstrain
0	0.494	0.1917	0.0	0.0	0.0000	0.0000
3500			18.3	18.3	0.0005	0.0005
6275			32.7	32.8	0.0010	0.0010
9175			47.9	47.9	0.0015	0.0015
10150			53.0	53.1	0.0020	0.0020
10250			53.5	53.6	0.0025	0.0025
10250			53.5	53.6	0.0030	0.0030
10225			53.3	53.5	0.0035	0.0035
10225			53.3	53.6	0.0040	0.0040
10225			53.3	53.6	0.0045	0.0045
10350			54.0	54.3	0.0050	0.0050
10450			54.5	54.8	0.0055	0.0055
10450			54.5	54.8	0.0060	0.0060
10450			54.5	54.9	0.0070	0.0070
10425			54.4	54.8	0.0080	0.0080
10425			54.4	54.9	0.0090	0.0090
10400			54.3	54.8	0.0100	0.0100
10400			54.3	54.9	0.0110	0.0109
10375			54.1	54.8	0.0120	0.0119
10350			54.0	54.7	0.0130	0.0129
10350			54.0	54.8	0.0140	0.0139
10325			53.9	54.7	0.0150	0.0149
10325			53.9	54.7	0.0160	0.0159
10325			53.9	54.8	0.0170	0.0169
10300			53.7	54.7	0.0180	0.0178
10300			53.7	54.8	0.0190	0.0188
10275			53.6	54.7	0.0200	0.0198
11250	0.485	0.1847	58.7	60.9	0.0250	0.0368
11500	0.484	0.1840	60.0	62.5	0.0300	0.0409
11750	0.483	0.1832	61.3	64.1	0.0350	0.0450
12000	0.482	0.1825	62.6	65.8	0.0350	0.0492
12250	0.481	0.1817	63.9	67.4	0.0400	0.0533
12500	0.480	0.1810	65.2	69.1	0.0450	0.0575
12750	0.478	0.1795	66.5	71.1	0.0500	0.0658
13000	0.477	0.1787	67.8	72.7	0.0600	0.0700
13250	0.475	0.1772	69.1	74.8	0.0700	0.0784
13500	0.473	0.1757	70.4	76.8	0.0750	0.0869
13750	0.470	0.1735	71.7	79.3	0.0900	0.0996
14000	0.467	0.1713	73.0	81.7	0.1050	0.1124
14250	0.461	0.1669	74.3	85.4	0.1350	0.1383
14500	0.418	0.1372	75.7	105.7	0.2350	0.3341
13000	0.369	0.1069	67.8	121.6	0.2750	0.5835
11500	0.324	0.0824	60.0	139.5	0.3050	0.8436
11000	0.297	0.0693	57.4	158.8	0.3250	1.0176

Specimen : PD20686 - AWT1

Material : HSS

Type : MIL- 7018

load	diameter	area	estress	tstress	estrain	tstrain
0	0.505	0.2003	0.0	0.0	0.0000	0.0000
2875			14.4	14.4	0.0005	0.0005
5500			27.5	27.5	0.0010	0.0010
8675			43.3	43.4	0.0015	0.0015
11325			56.5	56.7	0.0020	0.0020
12000			59.9	60.1	0.0025	0.0025
12000			59.9	60.1	0.0030	0.0030
11975			59.8	60.0	0.0035	0.0035
11950			59.7	59.9	0.0040	0.0040
11875			59.3	59.6	0.0045	0.0045
11850			59.2	59.5	0.0050	0.0050
11850			59.2	59.5	0.0055	0.0055
11850			59.2	59.5	0.0060	0.0060
11850			59.2	59.6	0.0070	0.0070
11825			59.0	59.5	0.0080	0.0080
11825			59.0	59.6	0.0090	0.0090
11800			58.9	59.5	0.0100	0.0100
11800			58.9	59.6	0.0110	0.0109
11800			58.9	59.6	0.0120	0.0119
11800			58.9	59.7	0.0130	0.0129
11800			58.9	59.7	0.0140	0.0139
11825			59.0	59.9	0.0150	0.0149
11850			59.2	60.1	0.0160	0.0159
11875			59.3	60.3	0.0170	0.0169
11900			59.4	60.5	0.0180	0.0178
11900			59.4	60.5	0.0190	0.0188
11925			59.5	60.7	0.0200	0.0198
12000	0.498	0.1948	59.9	61.6	0.0250	0.0279
12250	0.497	0.1940	61.2	63.1	0.0250	0.0319
12500	0.496	0.1932	62.4	64.7	0.0300	0.0360
12750	0.495	0.1924	63.7	66.3	0.0350	0.0400
13000	0.494	0.1917	64.9	67.8	0.0450	0.0440
13250	0.492	0.1901	66.2	69.7	0.0500	0.0522
13500	0.490	0.1886	67.4	71.6	0.0550	0.0603
13750	0.486	0.1855	68.6	74.1	0.0650	0.0767
14000	0.482	0.1825	69.9	76.7	0.0900	0.0932
14250	0.471	0.1742	71.1	81.8	0.1150	0.1394
14300	0.434	0.1479	71.4	96.7	0.1850	0.3030
12800	0.382	0.1146	63.9	111.7	0.2300	0.5583
11300	0.337	0.0892	56.4	126.7	0.2700	0.8090
9800	0.300	0.0707	48.9	138.6	0.2900	1.0416
8650	0.255	0.0511	43.2	169.4	0.3050	1.3666

Specimen : PD20686 - AWT3

Material : HSS

Type : MIL- 7018

load	diameter	area	estress	tstress	estrain	tstrain
0	0.504	0.1995	0.0	0.0	0.0000	0.0000
2250			11.3	11.3	0.0005	0.0005
5000			25.1	25.1	0.0010	0.0010
8050			40.4	40.4	0.0015	0.0015
11000			55.1	55.2	0.0020	0.0020
12175			61.0	61.2	0.0025	0.0025
12175			61.0	61.2	0.0030	0.0030
12025			60.3	60.5	0.0035	0.0035
12000			60.1	60.4	0.0040	0.0040
12000			60.1	60.4	0.0045	0.0045
12000			60.1	60.5	0.0050	0.0050
12000			60.1	60.5	0.0055	0.0055
12000			60.1	60.5	0.0060	0.0060
12000			60.1	60.6	0.0070	0.0070
12000			60.1	60.6	0.0080	0.0080
11975			60.0	60.6	0.0090	0.0090
11950			59.9	60.5	0.0100	0.0100
11950			59.9	60.6	0.0110	0.0109
11950			59.9	60.6	0.0120	0.0119
11950			59.9	60.7	0.0130	0.0129
11925			59.8	60.6	0.0140	0.0139
11925			59.8	60.7	0.0150	0.0149
11925			59.8	60.7	0.0160	0.0159
11925			59.8	60.8	0.0170	0.0169
11900			59.6	60.7	0.0180	0.0178
11875			59.5	60.7	0.0190	0.0188
11875			59.5	60.7	0.0200	0.0198
12150	0.499	0.1956	60.9	62.1	0.0250	0.0199
12250	0.498	0.1948	61.4	62.9	0.0250	0.0240
12500	0.497	0.1940	62.7	64.4	0.0350	0.0280
12750	0.496	0.1932	63.9	66.0	0.0400	0.0320
13000	0.494	0.1917	65.2	67.8	0.0400	0.0401
13250	0.493	0.1909	66.4	69.4	0.0500	0.0441
13500	0.491	0.1893	67.7	71.3	0.0600	0.0523
13750	0.488	0.1870	68.9	73.5	0.0750	0.0645
14000	0.485	0.1847	70.2	75.8	0.0850	0.0769
14250	0.479	0.1802	71.4	79.1	0.1100	0.1018
14450	0.447	0.1569	72.4	92.1	0.1950	0.2400
13000	0.388	0.1182	65.2	109.9	0.2600	0.5231
11500	0.339	0.0903	57.6	127.4	0.2950	0.7932
10000	0.299	0.0702	50.1	142.4	0.3150	1.0443
8500	0.252	0.0499	42.6	170.4	0.3350	1.3863

ELECTRIC BOAT CORPORATION
REPORT NO TDA-19194

Specimen : PD20686 - AWT4

Material : HSS

Type : MIL- 7018

load	diameter	area	estress	tstress	estrain	tstrain
0	0.496	0.1932	0.0	0.0	0.0000	0.0000
2750			14.2	14.2	0.0005	0.0005
5375			27.8	27.8	0.0010	0.0010
8250			42.7	42.8	0.0015	0.0015
11000			56.9	57.0	0.0020	0.0020
12275			63.5	63.7	0.0025	0.0025
11825			61.2	61.4	0.0030	0.0030
11525			59.6	59.9	0.0035	0.0035
11525			59.6	59.9	0.0040	0.0040
11525			59.6	59.9	0.0045	0.0045
11525			59.6	59.9	0.0050	0.0050
11525			59.6	60.0	0.0055	0.0055
11600			60.0	60.4	0.0060	0.0060
11625			60.2	60.6	0.0070	0.0070
11625			60.2	60.6	0.0080	0.0080
11625			60.2	60.7	0.0090	0.0090
11625			60.2	60.8	0.0100	0.0100
11625			60.2	60.8	0.0110	0.0109
11625			60.2	60.9	0.0120	0.0119
11625			60.2	60.9	0.0130	0.0129
11625			60.2	61.0	0.0140	0.0139
11625			60.2	61.1	0.0150	0.0149
11625			60.2	61.1	0.0160	0.0159
11650			60.3	61.3	0.0170	0.0169
11700			60.6	61.6	0.0180	0.0178
11750			60.8	62.0	0.0190	0.0188
11750			60.8	62.0	0.0200	0.0198
12250	0.490	0.1886	63.4	65.0	0.0250	0.0243
12500	0.488	0.1870	64.7	66.8	0.0450	0.0325
12750	0.487	0.1863	66.0	68.4	0.0450	0.0366
13000	0.485	0.1847	67.3	70.4	0.0500	0.0449
13250	0.483	0.1832	68.6	72.3	0.0600	0.0531
13500	0.481	0.1817	69.9	74.3	0.0700	0.0614
13750	0.476	0.1780	71.2	77.3	0.0800	0.0823
14000	0.472	0.1750	72.5	80.0	0.1000	0.0992
14100	0.430	0.1452	73.0	97.1	0.1800	0.2856
12500	0.374	0.1099	64.7	113.8	0.2350	0.5646
11000	0.330	0.0855	56.9	128.6	0.2650	0.8150
9500	0.290	0.0661	49.2	143.8	0.2950	1.0734
8700	0.253	0.0503	45.0	173.1	0.3100	1.3464

ELECTRIC BOAT CORPORATION
REPORT NO TDA-19194

Specimen : PD20686 - AWT5

Material : HSS

Type : MIL- 7018

load	diameter	area	estress	tstress	estrain	tstrain
0	0.498	0.1948	0.0	0.0	0.0000	0.0000
2000			10.3	10.3	0.0005	0.0005
4900			25.2	25.2	0.0010	0.0010
7750			39.8	39.8	0.0015	0.0015
10625			54.5	54.7	0.0020	0.0020
12050			61.9	62.0	0.0025	0.0025
12075			62.0	62.2	0.0030	0.0030
12025			61.7	62.0	0.0035	0.0035
12025			61.7	62.0	0.0040	0.0040
12025			61.7	62.0	0.0045	0.0045
12025			61.7	62.0	0.0050	0.0050
12025			61.7	62.1	0.0055	0.0055
12025			61.7	62.1	0.0060	0.0060
12025			61.7	62.2	0.0070	0.0070
12050			61.9	62.4	0.0080	0.0080
12050			61.9	62.4	0.0090	0.0090
12025			61.7	62.4	0.0100	0.0100
12025			61.7	62.4	0.0110	0.0109
12025			61.7	62.5	0.0120	0.0119
12025			61.7	62.5	0.0130	0.0129
12025			61.7	62.6	0.0140	0.0139
12025			61.7	62.7	0.0150	0.0149
12025			61.7	62.7	0.0160	0.0159
12025			61.7	62.8	0.0170	0.0169
12025			61.7	62.8	0.0180	0.0178
12025			61.7	62.9	0.0190	0.0188
12025			61.7	63.0	0.0200	0.0198
12250	0.491	0.1893	62.9	64.7	0.0300	0.0283
12500	0.491	0.1893	64.2	66.0	0.0300	0.0283
12750	0.489	0.1878	65.5	67.9	0.0400	0.0365
13000	0.488	0.1870	66.7	69.5	0.0450	0.0406
13250	0.486	0.1855	68.0	71.4	0.0500	0.0488
13500	0.485	0.1847	69.3	73.1	0.0550	0.0529
13750	0.482	0.1825	70.6	75.4	0.0650	0.0653
14000	0.478	0.1795	71.9	78.0	0.0850	0.0820
14250	0.473	0.1757	73.2	81.1	0.1050	0.1030
14500	0.436	0.1493	74.4	97.1	0.2000	0.2659
13000	0.374	0.1099	66.7	118.3	0.2600	0.5727
11500	0.328	0.0845	59.0	136.1	0.2850	0.8352
10000	0.289	0.0656	51.3	152.4	0.3100	1.0883
8500	0.253	0.0503	43.6	169.1	0.3300	1.3544
7900	0.233	0.0426	40.6	185.3	0.3400	1.5191

Specimen : PD20686 - BMT L1

Material : HSS

Type : Base plate

load	diameter	area	estress	tstress	estrain	tstrain
0	0.497	0.1940	0.0	0.0	0.0000	0.0000
3000			15.5	15.5	0.0005	0.0005
5975			30.8	30.8	0.0010	0.0010
8850			45.6	45.7	0.0015	0.0015
10750			55.4	55.5	0.0020	0.0020
10800			55.7	55.8	0.0025	0.0025
10800			55.7	55.8	0.0030	0.0030
10775			55.5	55.7	0.0035	0.0035
10775			55.5	55.8	0.0040	0.0040
10775			55.5	55.8	0.0045	0.0045
10750			55.4	55.7	0.0050	0.0050
10750			55.4	55.7	0.0055	0.0055
10750			55.4	55.7	0.0060	0.0060
10750			55.4	55.8	0.0070	0.0070
10750			55.4	55.9	0.0080	0.0080
10725			55.3	55.8	0.0090	0.0090
10700			55.2	55.7	0.0100	0.0100
10700			55.2	55.8	0.0110	0.0109
10700			55.2	55.8	0.0120	0.0119
10700			55.2	55.9	0.0130	0.0129
10675			55.0	55.8	0.0140	0.0139
10675			55.0	55.9	0.0150	0.0149
10650			54.9	55.8	0.0160	0.0159
10650			54.9	55.8	0.0170	0.0169
10650			54.9	55.9	0.0180	0.0178
10600			54.6	55.7	0.0190	0.0188
10600			54.6	55.7	0.0200	0.0198
10650	0.491	0.1893	54.9	56.2	0.0250	0.0243
11000	0.490	0.1886	56.7	58.3	0.0350	0.0284
11250	0.490	0.1886	58.0	59.7	0.0350	0.0284
11500	0.489	0.1878	59.3	61.2	0.0350	0.0325
11750	0.488	0.1870	60.6	62.8	0.0350	0.0365
12000	0.487	0.1863	61.9	64.4	0.0400	0.0407
12250	0.487	0.1863	63.1	65.8	0.0500	0.0407
12500	0.486	0.1855	64.4	67.4	0.0500	0.0448
12750	0.484	0.1840	65.7	69.3	0.0500	0.0530
13000	0.483	0.1832	67.0	71.0	0.0550	0.0571
13250	0.482	0.1825	68.3	72.6	0.0600	0.0613
13500	0.480	0.1810	69.6	74.6	0.0650	0.0696
13750	0.477	0.1787	70.9	76.9	0.0750	0.0821
14000	0.475	0.1772	72.2	79.0	0.0850	0.0906
14250	0.472	0.1750	73.5	81.4	0.0950	0.1032
14500	0.468	0.1720	74.7	84.3	0.1150	0.1202
14750	0.455	0.1626	76.0	90.7	0.1650	0.1766
14850	0.410	0.1320	76.5	112.5	0.2350	0.3849
14750	0.410	0.1320	76.0	111.7	0.2350	0.3849
13250	0.369	0.1069	68.3	123.9	0.2700	0.5956
11750	0.328	0.0845	60.6	139.1	0.2950	0.8312
10250	0.291	0.0665	52.8	154.1	0.3200	1.0705
9100	0.249	0.0487	46.9	186.9	0.3300	1.3823

ELECTRIC BOAT CORPORATION
REPORT NO TDA-19194

Specimen : PD20686 - BMT L2

Material : HSS

Type : Base plate

load	diameter	area	estress	tstress	estrain	tstrain
0	0.492	0.1901	0.0	0.0	0.0000	0.0000
2250			11.8	11.8	0.0005	0.0005
5125			27.0	27.0	0.0010	0.0010
8100			42.6	42.7	0.0015	0.0015
10750			56.5	56.7	0.0020	0.0020
10775			56.7	56.8	0.0025	0.0025
10750			56.5	56.7	0.0030	0.0030
10700			56.3	56.5	0.0035	0.0035
10700			56.3	56.5	0.0040	0.0040
10700			56.3	56.5	0.0045	0.0045
10700			56.3	56.6	0.0050	0.0050
10700			56.3	56.6	0.0055	0.0055
10700			56.3	56.6	0.0060	0.0060
10700			56.3	56.7	0.0070	0.0070
10700			56.3	56.7	0.0080	0.0080
10675			56.1	56.7	0.0090	0.0090
10650			56.0	56.6	0.0100	0.0100
10625			55.9	56.5	0.0110	0.0109
10600			55.8	56.4	0.0120	0.0119
10600			55.8	56.5	0.0130	0.0129
10600			55.8	56.5	0.0140	0.0139
10600			55.8	56.6	0.0150	0.0149
10575			55.6	56.5	0.0160	0.0159
10575			55.6	56.6	0.0170	0.0169
10575			55.6	56.6	0.0180	0.0178
10550			55.5	56.5	0.0190	0.0188
10550			55.5	56.6	0.0200	0.0198
10750	0.487	0.1863	56.5	57.7	0.0300	0.0204
11000	0.487	0.1863	57.9	59.1	0.0300	0.0204
11250	0.487	0.1863	59.2	60.4	0.0350	0.0204
11500	0.486	0.1855	60.5	62.0	0.0400	0.0245
11750	0.485	0.1847	61.8	63.6	0.0400	0.0287
12000	0.484	0.1840	63.1	65.2	0.0400	0.0328
12250	0.483	0.1832	64.4	66.9	0.0450	0.0369
12500	0.482	0.1825	65.7	68.5	0.0500	0.0411
12750	0.481	0.1817	67.1	70.2	0.0550	0.0452
13000	0.480	0.1810	68.4	71.8	0.0600	0.0494
13250	0.478	0.1795	69.7	73.8	0.0700	0.0577
13500	0.476	0.1780	71.0	75.9	0.0800	0.0661
13750	0.473	0.1757	72.3	78.3	0.0900	0.0788
14000	0.469	0.1728	73.6	81.0	0.1150	0.0958
14250	0.461	0.1669	75.0	85.4	0.1500	0.1302
14400	0.426	0.1425	75.7	101.0	0.2400	0.2881
14250	0.426	0.1425	75.0	100.0	0.2400	0.2881
12750	0.371	0.1081	67.1	117.9	0.2900	0.5646
11250	0.324	0.0824	59.2	136.4	0.3200	0.8355
9750	0.289	0.0656	51.3	148.6	0.3450	1.0641
9000	0.252	0.0499	47.3	180.4	0.3550	1.3381

ELECTRIC BOAT CORPORATION
REPORT NO TDA-19194

Specimen : PD20687 - AWT 1

Material : HY80

Type : MIL-100S-1

load	diameter	area	estress	tstress	estrain	tstrain
0	0.505	0.2003	0.0	0.0	0.0000	0.0000
3000			15.0	15.0	0.0005	0.0005
6000			30.0	30.0	0.0010	0.0010
9000			44.9	45.0	0.0015	0.0015
12100			60.4	60.5	0.0020	0.0020
14550			72.6	72.8	0.0025	0.0025
15875			79.3	79.5	0.0030	0.0030
16325			81.5	81.8	0.0035	0.0035
16575			82.8	83.1	0.0040	0.0040
16700			83.4	83.8	0.0045	0.0045
16700			83.4	83.8	0.0050	0.0050
16725			83.5	84.0	0.0055	0.0055
16725			83.5	84.0	0.0060	0.0060
16725			83.5	84.1	0.0070	0.0070
16725			83.5	84.2	0.0080	0.0080
16725			83.5	84.3	0.0090	0.0090
16725			83.5	84.3	0.0100	0.0100
16725			83.5	84.4	0.0110	0.0109
16725			83.5	84.5	0.0120	0.0119
16725			83.5	84.6	0.0130	0.0129
16725			83.5	84.7	0.0140	0.0139
16725			83.5	84.8	0.0150	0.0149
16725			83.5	84.8	0.0160	0.0159
16950			84.6	86.1	0.0170	0.0169
17000			84.9	86.4	0.0180	0.0178
17000			84.9	86.5	0.0190	0.0188
17000			84.9	86.6	0.0200	0.0198
17500	0.499	0.1956	87.4	89.5	0.0250	0.0239
17750	0.498	0.1948	88.6	91.1	0.0300	0.0279
18000	0.497	0.1940	89.9	92.8	0.0300	0.0319
18250	0.495	0.1924	91.1	94.8	0.0350	0.0400
18500	0.494	0.1917	92.4	96.5	0.0350	0.0440
18750	0.493	0.1909	93.6	98.2	0.0500	0.0481
19000	0.489	0.1878	94.9	101.2	0.0600	0.0644
19250	0.485	0.1847	96.1	104.2	0.0750	0.0808
19500	0.478	0.1795	97.4	108.7	0.0950	0.1099
19550	0.451	0.1598	97.6	122.4	0.1500	0.2262
18000	0.406	0.1295	89.9	139.0	0.1950	0.4364
16500	0.367	0.1058	82.4	156.0	0.2250	0.6384
15000	0.334	0.0876	74.9	171.2	0.2500	0.8268
13500	0.301	0.0712	67.4	189.7	0.2600	1.0349
12000	0.279	0.0611	59.9	196.3	0.2700	1.1867
11600	0.253	0.0503	57.9	230.7	0.2850	1.3823

ELECTRIC BOAT CORPORATION
REPORT NO TDA-19194

Specimen : PD20687 - AWT 2

Material : HY80

Type : MIL-100S-1

load	diameter	area	estress	tstress	estrain	tstrain
0	0.506	0.2011	0.0	0.0	0.0000	0.0000
3500			17.4	17.4	0.0005	0.0005
6625			32.9	33.0	0.0010	0.0010
9750			48.5	48.6	0.0015	0.0015
12750			63.4	63.5	0.0020	0.0020
15750			78.3	78.5	0.0025	0.0025
16800			83.5	83.8	0.0030	0.0030
16875			83.9	84.2	0.0035	0.0035
16875			83.9	84.3	0.0040	0.0040
16875			83.9	84.3	0.0045	0.0045
16875			83.9	84.3	0.0050	0.0050
16875			83.9	84.4	0.0055	0.0055
16875			83.9	84.4	0.0060	0.0060
16875			83.9	84.5	0.0070	0.0070
16875			83.9	84.6	0.0080	0.0080
16875			83.9	84.7	0.0090	0.0090
16875			83.9	84.8	0.0100	0.0100
16875			83.9	84.8	0.0110	0.0109
16875			83.9	84.9	0.0120	0.0119
16850			83.8	84.9	0.0130	0.0129
16850			83.8	85.0	0.0140	0.0139
16850			83.8	85.1	0.0150	0.0149
16850			83.8	85.1	0.0160	0.0159
16925			84.2	85.6	0.0170	0.0169
16975			84.4	85.9	0.0180	0.0178
17050			84.8	86.4	0.0190	0.0188
17125			85.2	86.9	0.0200	0.0198
17250	0.499	0.1956	85.8	88.2	0.0250	0.0279
17500	0.499	0.1956	87.0	89.5	0.0250	0.0279
17750	0.498	0.1948	88.3	91.1	0.0250	0.0319
18000	0.497	0.1940	89.5	92.8	0.0300	0.0359
18250	0.494	0.1917	90.8	95.2	0.0350	0.0480
18500	0.493	0.1909	92.0	96.9	0.0450	0.0521
18750	0.490	0.1886	93.2	99.4	0.0550	0.0643
19000	0.485	0.1847	94.5	102.8	0.0750	0.0848
19250	0.451	0.1598	95.7	120.5	0.1450	0.2301
17750	0.405	0.1288	88.3	137.8	0.1900	0.4453
16250	0.367	0.1058	80.8	153.6	0.2050	0.6423
14750	0.332	0.0866	73.4	170.4	0.2300	0.8428
13250	0.301	0.0712	65.9	186.2	0.2450	1.0389
11750	0.274	0.0590	58.4	199.3	0.2550	1.2268
11600	0.259	0.0527	57.7	220.2	0.2650	1.3394

ELECTRIC BOAT CORPORATION
REPORT NO TDA-19194

Specimen : PD20687 - AWT 3

Material : HY80

Type : MIL-100S-1

load	diameter	area	estress	tstress	estrain	tstrain
0	0.502	0.1979	0.0	0.0	0.0000	0.0000
2500			12.6	12.6	0.0005	0.0005
5400			27.3	27.3	0.0010	0.0010
8750			44.2	44.3	0.0015	0.0015
11650			58.9	59.0	0.0020	0.0020
14325			72.4	72.6	0.0025	0.0025
15875			80.2	80.4	0.0030	0.0030
16500			83.4	83.7	0.0035	0.0035
16675			84.2	84.6	0.0040	0.0040
16675			84.2	84.6	0.0045	0.0045
16625			84.0	84.4	0.0050	0.0050
16550			83.6	84.1	0.0055	0.0055
16525			83.5	84.0	0.0060	0.0060
16525			83.5	84.1	0.0070	0.0070
16525			83.5	84.2	0.0080	0.0080
16525			83.5	84.2	0.0090	0.0090
16525			83.5	84.3	0.0100	0.0100
16525			83.5	84.4	0.0110	0.0109
16500			83.4	84.4	0.0120	0.0119
16500			83.4	84.4	0.0130	0.0129
16500			83.4	84.5	0.0140	0.0139
16525			83.5	84.7	0.0150	0.0149
16550			83.6	85.0	0.0160	0.0159
16550			83.6	85.0	0.0170	0.0169
16625			84.0	85.5	0.0180	0.0178
16700			84.4	86.0	0.0190	0.0188
16725			84.5	86.2	0.0200	0.0198
16850	0.496	0.1932	85.1	87.2	0.0250	0.0240
17000	0.495	0.1924	85.9	88.3	0.0250	0.0281
17250	0.495	0.1924	87.2	89.6	0.0250	0.0281
17500	0.493	0.1909	88.4	91.7	0.0350	0.0362
17750	0.493	0.1909	89.7	93.0	0.0350	0.0362
18000	0.490	0.1886	90.9	95.5	0.0400	0.0484
18250	0.488	0.1870	92.2	97.6	0.0450	0.0566
18500	0.485	0.1847	93.5	100.1	0.0600	0.0689
18750	0.480	0.1810	94.7	103.6	0.0750	0.0896
18900	0.457	0.1640	95.5	115.2	0.1250	0.1878
17500	0.410	0.1320	88.4	132.6	0.1750	0.4049
16000	0.369	0.1069	80.8	149.6	0.2100	0.6156
14500	0.333	0.0871	73.3	166.5	0.2350	0.8209
13000	0.300	0.0707	65.7	183.9	0.2500	1.0296
11500	0.272	0.0581	58.1	197.9	0.2600	1.2256
10750	0.246	0.0475	54.3	226.2	0.2700	1.4265

ELECTRIC BOAT CORPORATION
REPORT NO TDA-19194

Specimen : PD20687 - AWT 4

Material : HY80

Type : MIL-100S-1

load	diameter	area	estress	tstress	estrain	tstrain
0	0.503	0.1987	0.0	0.0	0.0000	0.0000
4500			22.6	22.7	0.0005	0.0005
7375			37.1	37.2	0.0010	0.0010
10500			52.8	52.9	0.0015	0.0015
13300			66.9	67.1	0.0020	0.0020
15375			77.4	77.6	0.0025	0.0025
16125			81.1	81.4	0.0030	0.0030
16225			81.7	81.9	0.0035	0.0035
16225			81.7	82.0	0.0040	0.0040
16225			81.7	82.0	0.0045	0.0045
16225			81.7	82.1	0.0050	0.0050
16225			81.7	82.1	0.0055	0.0055
16225			81.7	82.1	0.0060	0.0060
16200			81.5	82.1	0.0070	0.0070
16200			81.5	82.2	0.0080	0.0080
16250			81.8	82.5	0.0090	0.0090
16250			81.8	82.6	0.0100	0.0100
16325			82.2	83.1	0.0110	0.0109
16350			82.3	83.3	0.0120	0.0119
16350			82.3	83.3	0.0130	0.0129
16350			82.3	83.4	0.0140	0.0139
16450			82.8	84.0	0.0150	0.0149
16475			82.9	84.2	0.0160	0.0159
16550			83.3	84.7	0.0170	0.0169
16650			83.8	85.3	0.0180	0.0178
16750			84.3	85.9	0.0190	0.0188
16750			84.3	86.0	0.0200	0.0198
16900	0.497	0.1940	85.0	87.1	0.0250	0.0240
17250	0.497	0.1940	86.8	88.9	0.0250	0.0240
17500	0.495	0.1924	88.1	90.9	0.0250	0.0321
17750	0.494	0.1917	89.3	92.6	0.0250	0.0361
18000	0.492	0.1901	90.6	94.7	0.0400	0.0442
18250	0.491	0.1893	91.8	96.4	0.0450	0.0483
18500	0.489	0.1878	93.1	98.5	0.0550	0.0565
18750	0.487	0.1863	94.4	100.7	0.0600	0.0647
19000	0.479	0.1802	95.6	105.4	0.0900	0.0978
19150	0.467	0.1713	96.4	111.8	0.1200	0.1485
17500	0.403	0.1276	88.1	137.2	0.1800	0.4433
16000	0.363	0.1035	80.5	154.6	0.2150	0.6524
14500	0.330	0.0855	73.0	169.5	0.2350	0.8430
13000	0.298	0.0697	65.4	186.4	0.2550	1.0470
11500	0.264	0.0547	57.9	210.1	0.2700	1.2893
11000	0.250	0.0491	55.4	224.1	0.2750	1.3983

Specimen : PD20687 - BMT L1

Material : HY80

Type : Base plate

load	diameter	area	estress	tstress	estrain	tstrain
0	0.507	0.2019	0.0	0.0	0.0000	0.0000
3500			17.3	17.3	0.0005	0.0005
6890			34.1	34.2	0.0010	0.0010
9500			47.1	47.1	0.0015	0.0015
12575			62.3	62.4	0.0020	0.0020
15500			76.8	77.0	0.0025	0.0025
16925			83.8	84.1	0.0030	0.0030
16975			84.1	84.4	0.0035	0.0035
16975			84.1	84.4	0.0040	0.0040
16975			84.1	84.5	0.0045	0.0045
16975			84.1	84.5	0.0050	0.0050
16975			84.1	84.5	0.0055	0.0055
16975			84.1	84.6	0.0060	0.0060
16975			84.1	84.7	0.0070	0.0070
16975			84.1	84.8	0.0080	0.0080
16975			84.1	84.8	0.0090	0.0090
16975			84.1	84.9	0.0100	0.0100
16975			84.1	85.0	0.0110	0.0109
17000			84.2	85.2	0.0120	0.0119
17075			84.6	85.7	0.0130	0.0129
17175			85.1	86.3	0.0140	0.0139
17225			85.3	86.6	0.0150	0.0149
17275			85.6	86.9	0.0160	0.0159
17350			85.9	87.4	0.0170	0.0169
17475			86.6	88.1	0.0180	0.0178
17525			86.8	88.5	0.0190	0.0188
17550			86.9	88.6	0.0196	0.0194
17750	0.501	0.1971	87.9	90.0	0.0300	0.0238
18000	0.501	0.1971	89.2	91.3	0.0300	0.0238
18250	0.500	0.1963	90.4	92.9	0.0300	0.0278
18500	0.499	0.1956	91.6	94.6	0.0300	0.0318
18750	0.498	0.1948	92.9	96.3	0.0350	0.0358
19000	0.497	0.1940	94.1	97.9	0.0400	0.0398
19250	0.496	0.1932	95.4	99.6	0.0450	0.0439
19500	0.495	0.1924	96.6	101.3	0.0450	0.0479
19750	0.494	0.1917	97.8	103.0	0.0500	0.0520
20000	0.492	0.1901	99.1	105.2	0.0550	0.0601
20250	0.489	0.1878	100.3	107.8	0.0650	0.0723
20500	0.483	0.1832	101.5	111.9	0.0800	0.0970
20700	0.457	0.1640	102.5	126.2	0.1400	0.2077
19200	0.424	0.1412	95.1	136.0	0.1700	0.3576
17700	0.390	0.1195	87.7	148.2	0.1950	0.5247
16200	0.353	0.0979	80.2	165.5	0.2150	0.7241
14700	0.325	0.0830	72.8	177.2	0.2350	0.8894
13200	0.297	0.0693	65.4	190.5	0.2500	1.0696
11700	0.249	0.0487	58.0	240.3	0.2650	1.4221

ELECTRIC BOAT CORPORATION
REPORT NO TDA-19194

Specimen : PD20687 - BMT L2

Material : HY80

Type : Base plate

load	diameter	area	estress	tstress	estrain	tstrain
0	0.501	0.1971	0.0	0.0	0.0000	0.0000
2500			12.7	12.7	0.0005	0.0005
5600			28.4	28.4	0.0010	0.0010
8750			44.4	44.5	0.0015	0.0015
11875			60.2	60.4	0.0020	0.0020
14700			74.6	74.8	0.0025	0.0025
16025			81.3	81.5	0.0030	0.0030
16375			83.1	83.4	0.0035	0.0035
16400			83.2	83.5	0.0040	0.0040
16425			83.3	83.7	0.0045	0.0045
16425			83.3	83.7	0.0050	0.0050
16425			83.3	83.8	0.0055	0.0055
16425			83.3	83.8	0.0060	0.0060
16425			83.3	83.9	0.0070	0.0070
16425			83.3	84.0	0.0080	0.0080
16425			83.3	84.1	0.0090	0.0090
16425			83.3	84.2	0.0100	0.0100
16500			83.7	84.6	0.0110	0.0109
16525			83.8	84.8	0.0120	0.0119
16600			84.2	85.3	0.0130	0.0129
16700			84.7	85.9	0.0140	0.0139
16750			85.0	86.2	0.0150	0.0149
16775			85.1	86.5	0.0160	0.0159
16850			85.5	86.9	0.0170	0.0169
16975			86.1	87.7	0.0180	0.0178
17025			86.4	88.0	0.0190	0.0188
17100			86.7	88.5	0.0200	0.0198
17250	0.496	0.1932	87.5	89.3	0.0250	0.0201
17500	0.496	0.1932	88.8	90.6	0.0250	0.0201
17750	0.495	0.1924	90.0	92.2	0.0250	0.0241
18000	0.494	0.1917	91.3	93.9	0.0300	0.0281
18250	0.494	0.1917	92.6	95.2	0.0300	0.0281
18500	0.493	0.1909	93.8	96.9	0.0350	0.0322
18750	0.492	0.1901	95.1	98.6	0.0350	0.0363
19000	0.491	0.1893	96.4	100.3	0.0450	0.0403
19250	0.490	0.1886	97.6	102.1	0.0450	0.0444
19500	0.488	0.1870	98.9	104.3	0.0550	0.0526
19750	0.486	0.1855	100.2	106.5	0.0600	0.0608
20000	0.484	0.1840	101.5	108.7	0.0650	0.0690
20250	0.479	0.1802	102.7	112.4	0.0800	0.0898
20350	0.465	0.1698	103.2	119.8	0.1200	0.1491
19000	0.425	0.1419	96.4	133.9	0.1600	0.3290
17500	0.386	0.1170	88.8	149.5	0.2000	0.5215
16000	0.357	0.1001	81.2	159.8	0.2150	0.6777
14500	0.324	0.0824	73.6	175.9	0.2350	0.8717
13000	0.293	0.0674	65.9	192.8	0.2500	1.0729
11500	0.258	0.0523	58.3	220.0	0.2700	1.3273
10600	0.236	0.0437	53.8	242.3	0.2700	1.5055

ELECTRIC BOAT CORPORATION
REPORT NO TDA-19194

Specimen : PD20687 - BMT T1

Material : HY80

Type : Base plate

load	diameter	area	estress	tstress	estrain	tstrain
0	0.507	0.2019	0.0	0.0	0.0000	0.0000
3500			17.3	17.3	0.0005	0.0005
7450			36.9	36.9	0.0010	0.0010
9125			45.2	45.3	0.0015	0.0015
12150			60.2	60.3	0.0020	0.0020
14875			73.7	73.9	0.0025	0.0025
16075			79.6	79.9	0.0030	0.0030
16525			81.9	82.1	0.0035	0.0035
16750			83.0	83.3	0.0040	0.0040
16775			83.1	83.5	0.0045	0.0045
16775			83.1	83.5	0.0050	0.0050
16775			83.1	83.5	0.0055	0.0055
16775			83.1	83.6	0.0060	0.0060
16775			83.1	83.7	0.0070	0.0070
16775			83.1	83.8	0.0080	0.0080
16800			83.2	84.0	0.0090	0.0090
16800			83.2	84.0	0.0100	0.0100
16800			83.2	84.1	0.0110	0.0109
16975			84.1	85.1	0.0120	0.0119
17000			84.2	85.3	0.0130	0.0129
17075			84.6	85.8	0.0140	0.0139
17175			85.1	86.3	0.0150	0.0149
17200			85.2	86.6	0.0160	0.0159
17275			85.6	87.0	0.0170	0.0169
17350			85.9	87.5	0.0180	0.0178
17450			86.4	88.1	0.0190	0.0188
17525			86.8	88.5	0.0200	0.0198
17600	0.501	0.1971	87.2	89.3	0.0250	0.0238
17750	0.501	0.1971	87.9	90.0	0.0250	0.0238
18000	0.500	0.1963	89.2	91.7	0.0250	0.0278
18250	0.500	0.1963	90.4	92.9	0.0250	0.0278
18500	0.499	0.1956	91.6	94.6	0.0300	0.0318
18750	0.498	0.1948	92.9	96.3	0.0300	0.0358
19000	0.497	0.1940	94.1	97.9	0.0400	0.0398
19250	0.495	0.1924	95.4	100.0	0.0450	0.0479
19500	0.494	0.1917	96.6	101.7	0.0450	0.0520
19750	0.493	0.1909	97.8	103.5	0.0500	0.0560
20000	0.491	0.1893	99.1	105.6	0.0600	0.0641
20250	0.487	0.1863	100.3	108.7	0.0700	0.0805
20500	0.468	0.1720	101.5	119.2	0.1050	0.1601
19000	0.418	0.1372	94.1	138.5	0.1550	0.3861
17500	0.380	0.1134	86.7	154.3	0.1850	0.5767
16000	0.347	0.0946	79.3	169.2	0.2050	0.7584
14500	0.318	0.0794	71.8	182.6	0.2250	0.9329
13000	0.292	0.0670	64.4	194.1	0.2350	1.1035
11500	0.257	0.0519	57.0	221.7	0.2510	1.3589

ELECTRIC BOAT CORPORATION
REPORT NO TDA-19194

Specimen : PD20687 - BMT T2

Material : HY80

Type : Base plate

load	diameter	area	estress	tstress	estrain	tstrain
0	0.501	0.1971	0.0	0.0	0.0000	0.0000
3750			19.0	19.0	0.0005	0.0005
6700			34.0	34.0	0.0010	0.0010
9950			50.5	50.5	0.0015	0.0015
13000			65.9	66.1	0.0020	0.0020
15575			79.0	79.2	0.0025	0.0025
16450			83.4	83.7	0.0030	0.0030
16475			83.6	83.9	0.0035	0.0035
16475			83.6	83.9	0.0040	0.0040
16475			83.6	83.9	0.0045	0.0045
16475			83.6	84.0	0.0050	0.0050
16475			83.6	84.0	0.0055	0.0055
16475			83.6	84.1	0.0060	0.0060
16475			83.6	84.2	0.0070	0.0070
16475			83.6	84.2	0.0080	0.0080
16475			83.6	84.3	0.0090	0.0090
16475			83.6	84.4	0.0100	0.0100
16475			83.6	84.5	0.0110	0.0109
16525			83.8	84.8	0.0120	0.0119
16600			84.2	85.3	0.0130	0.0129
16675			84.6	85.8	0.0140	0.0139
16725			84.8	86.1	0.0150	0.0149
16800			85.2	86.6	0.0160	0.0159
16875			85.6	87.1	0.0170	0.0169
16925			85.9	87.4	0.0180	0.0178
16975			86.1	87.7	0.0190	0.0188
17100			86.7	88.5	0.0200	0.0198
18000	0.494	0.1917	91.3	93.9	0.0300	0.0281
18250	0.493	0.1909	92.6	95.6	0.0350	0.0322
18500	0.492	0.1901	93.8	97.3	0.0400	0.0363
18750	0.491	0.1893	95.1	99.0	0.0400	0.0403
19000	0.490	0.1886	96.4	100.8	0.0450	0.0444
19250	0.488	0.1870	97.6	102.9	0.0550	0.0526
19500	0.486	0.1855	98.9	105.1	0.0600	0.0608
19750	0.484	0.1840	100.2	107.3	0.0650	0.0690
20000	0.479	0.1802	101.5	111.0	0.0850	0.0898
20100	0.464	0.1691	102.0	118.9	0.1200	0.1534
18500	0.414	0.1346	93.8	137.4	0.1650	0.3815
17000	0.379	0.1128	86.2	150.7	0.1950	0.5581
15500	0.346	0.0940	78.6	164.9	0.2100	0.7403
14000	0.319	0.0799	71.0	175.2	0.2350	0.9028
12500	0.290	0.0661	63.4	189.2	0.2450	1.0935
11300	0.269	0.0568	57.3	198.8	0.2550	1.2438

ELECTRIC BOAT CORPORATION
REPORT NO TDA-19194

Specimen : PD20688 - AWT 1

Material : HY80

Type : MIL-11018

load	diameter	area	estress	tstress	estrain	tstrain
0	0.505	0.2003	0.0	0.0	0.0000	0.0000
3300			16.5	16.5	0.0005	0.0005
6225			31.1	31.1	0.0010	0.0010
8975			44.8	44.9	0.0015	0.0015
11875			59.3	59.4	0.0020	0.0020
14750			73.6	73.8	0.0025	0.0025
17300			86.4	86.6	0.0030	0.0030
18950			94.6	94.9	0.0035	0.0035
19450			97.1	97.5	0.0040	0.0040
19500			97.4	97.8	0.0045	0.0045
19500			97.4	97.8	0.0050	0.0050
19475			97.2	97.8	0.0055	0.0055
19425			97.0	97.6	0.0060	0.0060
19425			97.0	97.7	0.0070	0.0070
19425			97.0	97.8	0.0080	0.0080
19425			97.0	97.9	0.0090	0.0090
19425			97.0	98.0	0.0100	0.0100
19425			97.0	98.0	0.0110	0.0109
19425			97.0	98.1	0.0120	0.0119
19425			97.0	98.2	0.0130	0.0129
19425			97.0	98.3	0.0140	0.0139
19425			97.0	98.4	0.0150	0.0149
19425			97.0	98.5	0.0160	0.0159
19425			97.0	98.6	0.0170	0.0169
19450			97.1	98.9	0.0180	0.0178
19500			97.4	99.2	0.0190	0.0188
19525			97.5	99.4	0.0200	0.0198
19700	0.497	0.1940	98.4	101.5	0.0250	0.0319
20000	0.496	0.1932	99.9	103.5	0.0250	0.0360
20250	0.494	0.1917	101.1	105.7	0.0300	0.0440
20500	0.494	0.1917	102.3	107.0	0.0400	0.0440
20750	0.490	0.1886	103.6	110.0	0.0550	0.0603
21000	0.484	0.1840	104.8	114.1	0.0700	0.0849
21250	0.481	0.1817	106.1	116.9	0.0800	0.0974
21500	0.458	0.1647	107.3	130.5	0.1200	0.1954
21600	0.458	0.1647	107.8	131.1	0.1200	0.1954
20000	0.413	0.1340	99.9	149.3	0.1600	0.4022
18500	0.376	0.1110	92.4	166.6	0.1900	0.5899
17000	0.345	0.0935	84.9	181.9	0.2050	0.7620
15500	0.316	0.0784	77.4	197.6	0.2200	0.9376
14750	0.295	0.0683	73.6	215.8	0.2300	1.0752

ELECTRIC BOAT CORPORATION
REPORT NO TDA-19194

Specimen : PD20688 - AWT 2

Material : HY80

Type : MIL-11018

load	diameter	area	estress	tstress	estrain	tstrain
0	0.496	0.1932	0.0	0.0	0.0000	0.0000
2925			15.1	15.1	0.0005	0.0005
5675			29.4	29.4	0.0010	0.0010
8500			44.0	44.1	0.0015	0.0015
11350			58.7	58.9	0.0020	0.0020
14125			73.1	73.3	0.0025	0.0025
16650			86.2	86.4	0.0030	0.0030
18350			95.0	95.3	0.0035	0.0035
18750			97.0	97.4	0.0040	0.0040
18750			97.0	97.5	0.0045	0.0045
18725			96.9	97.4	0.0050	0.0050
18725			96.9	97.4	0.0055	0.0055
18675			96.7	97.2	0.0060	0.0060
18625			96.4	97.1	0.0070	0.0070
18625			96.4	97.2	0.0080	0.0080
18625			96.4	97.3	0.0090	0.0090
18625			96.4	97.4	0.0100	0.0100
18600			96.3	97.3	0.0110	0.0109
18600			96.3	97.4	0.0120	0.0119
18575			96.1	97.4	0.0130	0.0129
18575			96.1	97.5	0.0140	0.0139
18575			96.1	97.6	0.0150	0.0149
18575			96.1	97.7	0.0160	0.0159
18575			96.1	97.8	0.0170	0.0169
18575			96.1	97.9	0.0180	0.0178
18575			96.1	98.0	0.0190	0.0188
18600			96.3	98.2	0.0200	0.0198
19250	0.489	0.1878	99.6	102.5	0.0250	0.0284
19500	0.486	0.1855	100.9	105.1	0.0400	0.0407
19750	0.486	0.1855	102.2	106.5	0.0400	0.0407
20000	0.482	0.1825	103.5	109.6	0.0500	0.0573
20250	0.479	0.1802	104.8	112.4	0.0650	0.0698
20500	0.473	0.1757	106.1	116.7	0.0800	0.0950
20650	0.459	0.1655	106.9	124.8	0.1050	0.1551
19000	0.410	0.1320	98.3	143.9	0.1600	0.3808
17500	0.372	0.1087	90.6	161.0	0.1950	0.5754
16000	0.339	0.0903	82.8	177.3	0.2100	0.7612
14500	0.310	0.0755	75.0	192.1	0.2250	0.9400
12700	0.273	0.0585	65.7	217.0	0.2400	1.1942

ELECTRIC BOAT CORPORATION
REPORT NO TDA-19194

Specimen : PD20688 - AWT 3

Material : HY80

Type : MIL-11018

load	diameter	area	estress	tstress	estrain	tstrain
0	0.499	0.1956	0.0	0.0	0.0000	0.0000
3125			16.0	16.0	0.0005	0.0005
6025			30.8	30.8	0.0010	0.0010
8825			45.1	45.2	0.0015	0.0015
11875			60.7	60.8	0.0020	0.0020
14600			74.7	74.8	0.0025	0.0025
17125			87.6	87.8	0.0030	0.0030
18650			95.4	95.7	0.0035	0.0035
19050			97.4	97.8	0.0040	0.0040
19100			97.7	98.1	0.0045	0.0045
19150			97.9	98.4	0.0050	0.0050
19150			97.9	98.5	0.0055	0.0055
19175			98.0	98.6	0.0060	0.0060
19175			98.0	98.7	0.0070	0.0070
19150			97.9	98.7	0.0080	0.0080
19150			97.9	98.8	0.0090	0.0090
19150			97.9	98.9	0.0100	0.0100
19125			97.8	98.9	0.0110	0.0109
19125			97.8	99.0	0.0120	0.0119
19125			97.8	99.1	0.0130	0.0129
19125			97.8	99.2	0.0140	0.0139
19125			97.8	99.3	0.0150	0.0149
19125			97.8	99.4	0.0160	0.0159
19125			97.8	99.5	0.0170	0.0169
19125			97.8	99.6	0.0180	0.0178
19125			97.8	99.7	0.0190	0.0188
19125			97.8	99.7	0.0200	0.0198
19500	0.494	0.1917	99.7	101.7	0.0250	0.0201
19750	0.492	0.1901	101.0	103.9	0.0300	0.0283
20000	0.492	0.1901	102.3	105.2	0.0350	0.0283
20250	0.489	0.1878	103.5	107.8	0.0400	0.0405
20500	0.488	0.1870	104.8	109.6	0.0450	0.0446
20750	0.484	0.1840	106.1	112.8	0.0600	0.0610
21000	0.482	0.1825	107.4	115.1	0.0700	0.0693
21150	0.460	0.1662	108.1	127.3	0.1200	0.1628
19500	0.412	0.1333	99.7	146.3	0.1700	0.3832
18000	0.372	0.1087	92.0	165.6	0.1900	0.5874
16500	0.343	0.0924	84.4	178.6	0.2100	0.7498
15000	0.311	0.0760	76.7	197.5	0.2350	0.9456
13900	0.284	0.0633	71.1	219.4	0.2400	1.1273

ELECTRIC BOAT CORPORATION
REPORT NO TDA-19194

Specimen : PD20688 - AWT 4

Material : HY80

Type : MIL-11018

load	diameter	area	estress	tstress	estrain	tstrain
0	0.504	0.1995	0.0	0.0	0.0000	0.0000
4250			21.3	21.3	0.0005	0.0005
7100			35.6	35.6	0.0010	0.0010
10025			50.2	50.3	0.0015	0.0015
13000			65.2	65.3	0.0020	0.0020
15900			79.7	79.9	0.0025	0.0025
18600			93.2	93.5	0.0030	0.0030
19975			100.1	100.5	0.0035	0.0035
20000			100.2	100.6	0.0040	0.0040
20000			100.2	100.7	0.0045	0.0045
20000			100.2	100.8	0.0050	0.0050
20000			100.2	100.8	0.0055	0.0055
20000			100.2	100.9	0.0060	0.0060
20000			100.2	101.0	0.0070	0.0070
20000			100.2	101.1	0.0080	0.0080
20000			100.2	101.2	0.0090	0.0090
20000			100.2	101.3	0.0100	0.0100
20000			100.2	101.4	0.0110	0.0109
19975			100.1	101.3	0.0120	0.0119
19975			100.1	101.4	0.0130	0.0129
19975			100.1	101.5	0.0140	0.0139
19975			100.1	101.6	0.0150	0.0149
19950			100.0	101.6	0.0160	0.0159
19950			100.0	101.7	0.0170	0.0169
19950			100.0	101.8	0.0180	0.0178
19950			100.0	101.9	0.0190	0.0188
19950			100.0	102.0	0.0200	0.0198
20050	0.498	0.1948	100.5	102.9	0.0250	0.0240
20250	0.498	0.1948	101.5	104.0	0.0250	0.0240
20500	0.497	0.1940	102.8	105.7	0.0300	0.0280
20750	0.495	0.1924	104.0	107.8	0.0350	0.0360
21000	0.494	0.1917	105.3	109.6	0.0350	0.0401
21250	0.491	0.1893	106.5	112.2	0.0500	0.0523
21500	0.490	0.1886	107.8	114.0	0.0550	0.0563
21750	0.484	0.1840	109.0	118.2	0.0750	0.0810
21950	0.467	0.1713	110.0	128.1	0.1200	0.1525
20500	0.421	0.1392	102.8	147.3	0.1650	0.3599
19000	0.387	0.1176	95.2	161.5	0.1950	0.5283
17500	0.352	0.0973	87.7	179.8	0.2200	0.7179
16000	0.322	0.0814	80.2	196.5	0.2300	0.8960
14500	0.299	0.0702	72.7	206.5	0.2450	1.0443
14400	0.281	0.0620	72.2	232.2	0.2450	1.1684

ELECTRIC BOAT CORPORATION
REPORT NO TDA-19194

Specimen : PD20689 - AWT 2

Material : HY100

Type : MIL-120S-1

load	diameter	area	estress	tstress	estrain	tstrain
0	0.503	0.1987	0.0	0.0	0.0000	0.0000
4075			20.5	20.5	0.0005	0.0005
6900			34.7	34.8	0.0010	0.0010
10000			50.3	50.4	0.0015	0.0015
13000			65.4	65.6	0.0020	0.0020
16000			80.5	80.7	0.0025	0.0025
18225			91.7	92.0	0.0030	0.0030
19550			98.4	98.7	0.0035	0.0035
20050			100.9	101.3	0.0040	0.0040
20225			101.8	102.2	0.0045	0.0045
20250			101.9	102.4	0.0050	0.0050
20275			102.0	102.6	0.0055	0.0055
20300			102.2	102.8	0.0060	0.0060
20425			102.8	103.5	0.0070	0.0070
20450			102.9	103.7	0.0080	0.0080
20500			103.2	104.1	0.0090	0.0090
20500			103.2	104.2	0.0100	0.0100
20575			103.5	104.7	0.0110	0.0109
20625			103.8	105.0	0.0120	0.0119
20725			104.3	105.7	0.0130	0.0129
20800			104.7	106.1	0.0140	0.0139
20825			104.8	106.4	0.0150	0.0149
20925			105.3	107.0	0.0160	0.0159
20975			105.6	107.3	0.0170	0.0169
21000			105.7	107.6	0.0180	0.0178
21025			105.8	107.8	0.0190	0.0188
21075			106.1	108.2	0.0200	0.0198
21250	0.497	0.1940	106.9	109.5	0.0250	0.0240
21500	0.497	0.1940	108.2	110.8	0.0250	0.0240
21750	0.496	0.1932	109.5	112.6	0.0250	0.0280
22000	0.494	0.1917	110.7	114.8	0.0350	0.0361
22250	0.493	0.1909	112.0	116.6	0.0350	0.0402
22500	0.489	0.1878	113.2	119.8	0.0450	0.0565
22750	0.484	0.1840	114.5	123.7	0.0650	0.0770
22850	0.464	0.1691	115.0	135.1	0.1050	0.1614
21350	0.423	0.1405	107.4	151.9	0.1400	0.3464
19850	0.391	0.1201	99.9	165.3	0.1650	0.5038
18350	0.357	0.1001	92.3	183.3	0.1900	0.6857
16850	0.328	0.0845	84.8	199.4	0.2000	0.8552
15350	0.302	0.0716	77.2	214.3	0.2150	1.0203
14100	0.274	0.0590	71.0	239.1	0.2200	1.2149

ELECTRIC BOAT CORPORATION
REPORT NO TDA-19194

Specimen : PD20689 - AWT 3

Material : HY100

Type : MIL-120S-1

load	diameter	area	estress	tstress	estrain	tstrain
0	0.501	0.1971	0.0	0.0	0.0000	0.0000
3750			19.0	19.0	0.0005	0.0005
6400			32.5	32.5	0.0010	0.0010
9500			48.2	48.3	0.0015	0.0015
12500			63.4	63.5	0.0020	0.0020
15500			78.6	78.8	0.0025	0.0025
18075			91.7	92.0	0.0030	0.0030
19700			99.9	100.3	0.0035	0.0035
20125			102.1	102.5	0.0040	0.0040
20200			102.5	102.9	0.0045	0.0045
20200			102.5	103.0	0.0050	0.0050
20225			102.6	103.2	0.0055	0.0055
20225			102.6	103.2	0.0060	0.0060
20225			102.6	103.3	0.0070	0.0070
20225			102.6	103.4	0.0080	0.0080
20225			102.6	103.5	0.0090	0.0090
20250			102.7	103.7	0.0100	0.0100
20300			103.0	104.1	0.0110	0.0109
20375			103.4	104.6	0.0120	0.0119
20425			103.6	105.0	0.0130	0.0129
20475			103.9	105.3	0.0140	0.0139
20500			104.0	105.5	0.0150	0.0149
20550			104.2	105.9	0.0160	0.0159
20600			104.5	106.3	0.0170	0.0169
20675			104.9	106.8	0.0180	0.0178
20725			105.1	107.1	0.0190	0.0188
20750			105.3	107.4	0.0200	0.0198
21000	0.494	0.1917	106.5	109.6	0.0250	0.0281
21250	0.494	0.1917	107.8	110.9	0.0250	0.0281
21500	0.494	0.1917	109.1	112.2	0.0250	0.0281
21750	0.490	0.1886	110.3	115.3	0.0350	0.0444
22000	0.487	0.1863	111.6	118.1	0.0450	0.0567
22250	0.486	0.1855	112.9	119.9	0.0500	0.0608
22400	0.456	0.1633	113.6	137.2	0.1050	0.1882
20900	0.419	0.1379	106.0	151.6	0.1400	0.3575
19400	0.384	0.1158	98.4	167.5	0.1750	0.5319
17900	0.352	0.0973	90.8	183.9	0.1900	0.7059
16400	0.326	0.0835	83.2	196.5	0.2000	0.8594
14900	0.298	0.0697	75.6	213.6	0.2100	1.0390
13500	0.269	0.0568	68.5	237.5	0.2300	1.2438

ELECTRIC BOAT CORPORATION
REPORT NO TDA-19194

Specimen : PD20689 - AWT 4

Material : HY100

Type : MIL-120S-1

load	diameter	area	estress	tstress	estrain	tstrain
0	0.495	0.1924	0.0	0.0	0.0000	0.0000
2625			13.6	13.6	0.0005	0.0005
5450			28.3	28.3	0.0010	0.0010
8675			45.1	45.1	0.0015	0.0015
11475			59.6	59.7	0.0020	0.0020
14300			74.3	74.5	0.0025	0.0025
17125			89.0	89.3	0.0030	0.0030
19325			100.4	100.8	0.0035	0.0035
19775			102.8	103.2	0.0040	0.0040
19900			103.4	103.9	0.0045	0.0045
19925			103.5	104.1	0.0050	0.0050
19925			103.5	104.1	0.0055	0.0055
19950			103.7	104.3	0.0060	0.0060
19950			103.7	104.4	0.0070	0.0070
19975			103.8	104.6	0.0080	0.0080
19975			103.8	104.7	0.0090	0.0090
20000			103.9	105.0	0.0100	0.0100
20000			103.9	105.1	0.0110	0.0109
20050			104.2	105.4	0.0120	0.0119
20125			104.6	105.9	0.0130	0.0129
20200			105.0	106.4	0.0140	0.0139
20250			105.2	106.8	0.0150	0.0149
20275			105.4	107.0	0.0160	0.0159
20325			105.6	107.4	0.0170	0.0169
20375			105.9	107.8	0.0180	0.0178
20450			106.3	108.3	0.0190	0.0188
20475			106.4	108.5	0.0200	0.0198
21100	0.487	0.1863	109.6	113.3	0.0250	0.0326
21350	0.484	0.1840	110.9	116.0	0.0400	0.0449
21600	0.482	0.1825	112.2	118.4	0.0450	0.0532
21850	0.480	0.1810	113.5	120.7	0.0450	0.0615
22000	0.450	0.1590	114.3	138.3	0.1050	0.1906
20500	0.415	0.1353	106.5	151.6	0.1350	0.3526
19000	0.379	0.1128	98.7	168.4	0.1650	0.5340
17500	0.348	0.0951	90.9	184.0	0.1800	0.7047
16000	0.320	0.0804	83.1	198.9	0.1950	0.8725
14500	0.293	0.0674	75.3	215.1	0.2100	1.0488
13100	0.265	0.0552	68.1	237.5	0.2300	1.2497

ELECTRIC BOAT CORPORATION
REPORT NO TDA-19194

Specimen : PD20689 - AWT 5

Material : HY100

Type : MIL-120S-1

load	diameter	area	estress	tstress	estrain	tstrain
0	0.499	0.1956	0.0	0.0	0.0000	0.0000
1250			6.4	6.4	0.0005	0.0005
4350			22.2	22.3	0.0010	0.0010
7025			35.9	36.0	0.0015	0.0015
10200			52.2	52.3	0.0020	0.0020
13200			67.5	67.7	0.0025	0.0025
16000			81.8	82.1	0.0030	0.0030
18400			94.1	94.4	0.0035	0.0035
19450			99.5	99.9	0.0040	0.0040
19850			101.5	102.0	0.0045	0.0045
20050			102.5	103.0	0.0050	0.0050
20250			103.5	104.1	0.0055	0.0055
20275			103.7	104.3	0.0060	0.0060
20350			104.1	104.8	0.0070	0.0070
20450			104.6	105.4	0.0080	0.0080
20475			104.7	105.6	0.0090	0.0090
20550			105.1	106.1	0.0100	0.0100
20575			105.2	106.4	0.0110	0.0109
20625			105.5	106.7	0.0120	0.0119
20625			105.5	106.8	0.0130	0.0129
20650			105.6	107.1	0.0140	0.0139
20725			106.0	107.6	0.0150	0.0149
20800			106.4	108.1	0.0160	0.0159
20825			106.5	108.3	0.0170	0.0169
20925			107.0	108.9	0.0180	0.0178
20975			107.3	109.3	0.0190	0.0188
21000			107.4	109.5	0.0200	0.0198
21250	0.492	0.1901	108.7	111.8	0.0300	0.0283
21500	0.492	0.1901	109.9	113.1	0.0300	0.0283
21750	0.491	0.1893	111.2	114.9	0.0300	0.0323
22000	0.487	0.1863	112.5	118.1	0.0350	0.0487
22250	0.485	0.1847	113.8	120.4	0.0450	0.0569
22500	0.478	0.1795	115.1	125.4	0.0650	0.0860
22650	0.455	0.1626	115.8	139.3	0.1000	0.1846
21150	0.419	0.1379	108.1	153.4	0.1250	0.3495
19650	0.388	0.1182	100.5	166.2	0.1550	0.5032
18150	0.354	0.0984	92.8	184.4	0.1700	0.6866
16650	0.325	0.0830	85.1	200.7	0.1900	0.8576
15150	0.298	0.0697	77.5	217.2	0.2100	1.0310
13650	0.265	0.0552	69.8	247.5	0.2150	1.2658

ELECTRIC BOAT CORPORATION
REPORT NO TDA-19194

Specimen : PD20689 - BMT L3

Material : HY100

Type : Base plate

load	diameter	area	estress	tstress	estrain	tstrain
0	0.503	0.1987	0.0	0.0	0.0000	0.0000
2600			13.1	13.1	0.0005	0.0005
5500			27.7	27.7	0.0010	0.0010
8600			43.3	43.3	0.0015	0.0015
11750			59.1	59.2	0.0020	0.0020
14750			74.2	74.4	0.0025	0.0025
17600			88.6	88.8	0.0030	0.0030
18900			95.1	95.4	0.0035	0.0035
19300			97.1	97.5	0.0040	0.0040
19550			98.4	98.8	0.0045	0.0045
19600			98.6	99.1	0.0050	0.0050
19650			98.9	99.4	0.0055	0.0055
19750			99.4	100.0	0.0060	0.0060
19800			99.6	100.3	0.0070	0.0070
19900			100.1	100.9	0.0080	0.0080
19950			100.4	101.3	0.0090	0.0090
20000			100.6	101.7	0.0100	0.0100
20050			100.9	102.0	0.0110	0.0109
20100			101.2	102.4	0.0120	0.0119
20150			101.4	102.7	0.0130	0.0129
20200			101.7	103.1	0.0140	0.0139
20250			101.9	103.4	0.0150	0.0149
20300			102.2	103.8	0.0160	0.0159
20400			102.7	104.4	0.0170	0.0169
20500			103.2	105.0	0.0180	0.0178
20550			103.4	105.4	0.0190	0.0188
20600			103.7	105.7	0.0200	0.0198
20650	0.498	0.1948	103.9	106.0	0.0300	0.0200
21000	0.497	0.1940	105.7	108.2	0.0300	0.0240
21250	0.496	0.1932	106.9	110.0	0.0350	0.0280
21500	0.496	0.1932	108.2	111.3	0.0400	0.0280
21750	0.493	0.1909	109.5	113.9	0.0450	0.0402
22000	0.492	0.1901	110.7	115.7	0.0500	0.0442
22250	0.489	0.1878	112.0	118.5	0.0550	0.0565
22350	0.474	0.1765	112.5	126.7	0.1000	0.1188
19500	0.432	0.1466	98.1	133.0	0.1450	0.3043
18000	0.399	0.1250	90.6	144.0	0.1700	0.4633
16500	0.370	0.1075	83.0	153.5	0.1900	0.6142
15000	0.340	0.0908	75.5	165.2	0.2050	0.7833
13500	0.311	0.0760	67.9	177.7	0.2200	0.9616
12300	0.287	0.0647	61.9	190.1	0.2300	1.1222
12300	0.259	0.0527	61.9	233.5	0.2400	1.3275

ELECTRIC BOAT CORPORATION
REPORT NO TDA-19194

Specimen : PD20689 - BMT L4

Material : HY100

Type : Base plate

load	diameter	area	estress	tstress	estrain	tstrain
0	0.501	0.1971	0.0	0.0	0.0000	0.0000
2600			13.2	13.2	0.0005	0.0005
5300			26.9	26.9	0.0010	0.0010
8500			43.1	43.2	0.0015	0.0015
11450			58.1	58.2	0.0020	0.0020
14450			73.3	73.5	0.0025	0.0025
17150			87.0	87.3	0.0030	0.0030
18550			94.1	94.4	0.0035	0.0035
18950			96.1	96.5	0.0040	0.0040
19200			97.4	97.8	0.0045	0.0045
19350			98.2	98.6	0.0050	0.0050
19450			98.7	99.2	0.0055	0.0055
19500			98.9	99.5	0.0060	0.0060
19550			99.2	99.8	0.0065	0.0065
19600			99.4	100.1	0.0070	0.0070
19600			99.4	100.2	0.0080	0.0080
19700			99.9	100.9	0.0100	0.0100
19850			100.7	101.9	0.0120	0.0119
20000			101.5	102.9	0.0140	0.0139
20050			101.7	103.3	0.0160	0.0159
20250			102.7	104.6	0.0180	0.0178
20450			103.7	105.8	0.0200	0.0198
20500	0.496	0.1932	104.0	106.1	0.0250	0.0201
20750	0.495	0.1924	105.3	107.8	0.0300	0.0241
21000	0.494	0.1917	106.5	109.6	0.0300	0.0281
21250	0.493	0.1909	107.8	111.3	0.0400	0.0322
21500	0.492	0.1901	109.1	113.1	0.0400	0.0363
21750	0.489	0.1878	110.3	115.8	0.0550	0.0485
22000	0.485	0.1847	111.6	119.1	0.0600	0.0649
22050	0.474	0.1765	111.9	125.0	0.0850	0.1108
20500	0.427	0.1432	104.0	143.2	0.1350	0.3196
19000	0.404	0.1282	96.4	148.2	0.1500	0.4304
17500	0.366	0.1052	88.8	166.3	0.1750	0.6279
16000	0.340	0.0908	81.2	176.2	0.1900	0.7753
14500	0.325	0.0830	73.6	174.8	0.1950	0.8656
13100	0.303	0.0721	66.5	181.7	0.2050	1.0057

ELECTRIC BOAT CORPORATION
REPORT NO TDA-19194

Specimen : PD20689 - BMT T3

Material : HY100

Type : Base plate

load	diameter	area	estress	tstress	estrain	tstrain
0	0.498	0.1948	0.0	0.0	0.0000	0.0000
3100			15.9	15.9	0.0005	0.0005
5850			30.0	30.1	0.0010	0.0010
9000			46.2	46.3	0.0015	0.0015
12000			61.6	61.7	0.0020	0.0020
14850			76.2	76.4	0.0025	0.0025
17450			89.6	89.9	0.0030	0.0030
18600			95.5	95.8	0.0035	0.0035
19000			97.5	97.9	0.0040	0.0040
19250			98.8	99.3	0.0045	0.0045
19300			99.1	99.6	0.0050	0.0050
19400			99.6	100.1	0.0055	0.0055
19450			99.9	100.5	0.0060	0.0060
19500			100.1	100.8	0.0070	0.0070
19550			100.4	101.2	0.0080	0.0080
19600			100.6	101.5	0.0090	0.0090
19650			100.9	101.9	0.0100	0.0100
19675			101.0	102.1	0.0110	0.0109
19750			101.4	102.6	0.0120	0.0119
19800			101.7	103.0	0.0130	0.0129
19875			102.0	103.5	0.0140	0.0139
19950			102.4	104.0	0.0150	0.0149
19975			102.6	104.2	0.0160	0.0159
20000			102.7	104.4	0.0170	0.0169
20050			102.9	104.8	0.0180	0.0178
20125			103.3	105.3	0.0190	0.0188
20250			104.0	106.0	0.0200	0.0198
20300	0.492	0.1901	104.2	106.8	0.0300	0.0242
20500	0.492	0.1901	105.2	107.8	0.0300	0.0242
20750	0.491	0.1893	106.5	109.6	0.0350	0.0283
21000	0.490	0.1886	107.8	111.4	0.0400	0.0324
21250	0.488	0.1870	109.1	113.6	0.0450	0.0406
21500	0.486	0.1855	110.4	115.9	0.0500	0.0488
21750	0.483	0.1832	111.7	118.7	0.0650	0.0612
21950	0.466	0.1706	112.7	128.7	0.1000	0.1328
20500	0.429	0.1445	105.2	141.8	0.1400	0.2983
19000	0.394	0.1219	97.5	155.8	0.1650	0.4685
17500	0.364	0.1041	89.8	168.2	0.1800	0.6269
16000	0.335	0.0881	82.1	181.5	0.1950	0.7929
14500	0.308	0.0745	74.4	194.6	0.2100	0.9610
13000	0.282	0.0625	66.7	208.1	0.2300	1.1374
10950	0.240	0.0452	56.2	242.0	0.2400	1.4599

ELECTRIC BOAT CORPORATION
REPORT NO TDA-19194

Specimen : PD20689 - BMT T4

Material : HY100

Type : Base plate

load	diameter	area	estress	tstress	estrain	tstrain
0	0.498	0.1948	0.0	0.0	0.0000	0.0000
3000			15.4	15.4	0.0005	0.0005
6000			30.8	30.8	0.0010	0.0010
9050			46.5	46.5	0.0015	0.0015
11950			61.4	61.5	0.0020	0.0020
14875			76.4	76.6	0.0025	0.0025
17200			88.3	88.6	0.0030	0.0030
18250			93.7	94.0	0.0035	0.0035
18750			96.3	96.6	0.0040	0.0040
18950			97.3	97.7	0.0045	0.0045
19050			97.8	98.3	0.0050	0.0050
19150			98.3	98.9	0.0055	0.0055
19150			98.3	98.9	0.0060	0.0060
19250			98.8	99.5	0.0070	0.0070
19350			99.3	100.1	0.0080	0.0080
19450			99.9	100.8	0.0090	0.0090
19500			100.1	101.1	0.0100	0.0100
19550			100.4	101.5	0.0110	0.0109
19550			100.4	101.6	0.0120	0.0119
19550			100.4	101.7	0.0130	0.0129
19600			100.6	102.0	0.0140	0.0139
19650			100.9	102.4	0.0150	0.0149
19700			101.1	102.8	0.0160	0.0159
19800			101.7	103.4	0.0170	0.0169
19850			101.9	103.7	0.0180	0.0178
19900			102.2	104.1	0.0190	0.0188
20000			102.7	104.7	0.0200	0.0198
20250	0.493	0.1909	104.0	106.1	0.0250	0.0202
20500	0.492	0.1901	105.2	107.8	0.0300	0.0242
20750	0.491	0.1893	106.5	109.6	0.0350	0.0283
21000	0.490	0.1886	107.8	111.4	0.0400	0.0324
21250	0.488	0.1870	109.1	113.6	0.0450	0.0406
21500	0.486	0.1855	110.4	115.9	0.0550	0.0488
21750	0.482	0.1825	111.7	119.2	0.0700	0.0653
21800	0.472	0.1750	111.9	124.6	0.1000	0.1072
20500	0.431	0.1459	105.2	140.5	0.1350	0.2890
19000	0.397	0.1238	97.5	153.5	0.1650	0.4533
17500	0.364	0.1041	89.8	168.2	0.1850	0.6269
16000	0.336	0.0887	82.1	180.4	0.2000	0.7870
14500	0.308	0.0745	74.4	194.6	0.2150	0.9610
13000	0.281	0.0620	66.7	209.6	0.2250	1.1445
11500	0.256	0.0515	59.0	223.4	0.2400	1.3308
11250	0.242	0.0460	57.8	244.6	0.2400	1.4433

ELECTRIC BOAT CORPORATION
REPORT NO TDA-19194

Specimen : PD20690 - AWT 1

Material : HY100

Type : MIL-100S-1

load	diameter	area	estress	tstress	estrain	tstrain
0	0.502	0.1979	0.0	0.0	0.0000	0.0000
3250			16.4	16.4	0.0005	0.0005
5950			30.1	30.1	0.0010	0.0010
9000			45.5	45.5	0.0015	0.0015
11775			59.5	59.6	0.0020	0.0020
14600			73.8	74.0	0.0025	0.0025
17250			87.2	87.4	0.0030	0.0030
18200			92.0	92.3	0.0035	0.0035
18200			92.0	92.3	0.0040	0.0040
18100			91.4	91.9	0.0045	0.0045
17925			90.6	91.0	0.0050	0.0050
17875			90.3	90.8	0.0055	0.0055
17850			90.2	90.7	0.0060	0.0060
17825			90.1	90.7	0.0070	0.0070
17825			90.1	90.8	0.0080	0.0080
17825			90.1	90.9	0.0090	0.0090
17825			90.1	91.0	0.0100	0.0100
17825			90.1	91.1	0.0110	0.0109
17825			90.1	91.1	0.0120	0.0119
17825			90.1	91.2	0.0130	0.0129
17825			90.1	91.3	0.0140	0.0139
17825			90.1	91.4	0.0150	0.0149
17825			90.1	91.5	0.0160	0.0159
17825			90.1	91.6	0.0170	0.0169
17825			90.1	91.7	0.0180	0.0178
17825			90.1	91.8	0.0190	0.0188
17825			90.1	91.9	0.0200	0.0198
18250	0.496	0.1932	92.2	94.5	0.0250	0.0240
18500	0.495	0.1924	93.5	96.1	0.0300	0.0281
18750	0.493	0.1909	94.7	98.2	0.0350	0.0362
19000	0.492	0.1901	96.0	99.9	0.0450	0.0402
19250	0.488	0.1870	97.3	102.9	0.0550	0.0566
19500	0.483	0.1832	98.5	106.4	0.0750	0.0772
19650	0.450	0.1590	99.3	123.6	0.1300	0.2187
18150	0.410	0.1320	91.7	137.5	0.1650	0.4049
16650	0.372	0.1087	84.1	153.2	0.1950	0.5994
15150	0.337	0.0892	76.5	169.8	0.2150	0.7970
13650	0.307	0.0740	69.0	184.4	0.2300	0.9835
12150	0.277	0.0603	61.4	201.6	0.2450	1.1892
11350	0.250	0.0491	57.3	231.2	0.2600	1.3943

ELECTRIC BOAT CORPORATION
REPORT NO TDA-19194

Specimen : PD20690 - AWT 3

Material : HY100

Type : MIL-100S-1

load	diameter	area	estress	tstress	estrain	tstrain
0	0.502	0.1979	0.0	0.0	0.0000	0.0000
2250			11.4	11.4	0.0005	0.0005
4875			24.6	24.7	0.0010	0.0010
8000			40.4	40.5	0.0015	0.0015
11125			56.2	56.3	0.0020	0.0020
14075			71.1	71.3	0.0025	0.0025
16750			84.6	84.9	0.0030	0.0030
17500			88.4	88.7	0.0035	0.0035
17500			88.4	88.8	0.0040	0.0040
17500			88.4	88.8	0.0045	0.0045
17500			88.4	88.9	0.0050	0.0050
17500			88.4	88.9	0.0055	0.0055
17500			88.4	88.9	0.0060	0.0060
17475			88.3	88.9	0.0070	0.0070
17475			88.3	89.0	0.0080	0.0080
17475			88.3	89.1	0.0090	0.0090
17475			88.3	89.2	0.0100	0.0100
17475			88.3	89.3	0.0110	0.0109
17475			88.3	89.4	0.0120	0.0119
17450			88.2	89.3	0.0130	0.0129
17450			88.2	89.4	0.0140	0.0139
17450			88.2	89.5	0.0150	0.0149
17450			88.2	89.6	0.0160	0.0159
17450			88.2	89.7	0.0170	0.0169
17450			88.2	89.8	0.0180	0.0178
17450			88.2	89.8	0.0190	0.0188
17450			88.2	89.9	0.0200	0.0198
17600	0.495	0.1924	88.9	91.5	0.0300	0.0281
17750	0.495	0.1924	89.7	92.2	0.0300	0.0281
18000	0.495	0.1924	90.9	93.5	0.0300	0.0281
18250	0.494	0.1917	92.2	95.2	0.0300	0.0321
18500	0.492	0.1901	93.5	97.3	0.0350	0.0402
18750	0.490	0.1886	94.7	99.4	0.0500	0.0484
19000	0.487	0.1863	96.0	102.0	0.0650	0.0607
19250	0.482	0.1825	97.3	105.5	0.0850	0.0813
19500	0.453	0.1612	98.5	121.0	0.1300	0.2054
18000	0.412	0.1333	90.9	135.0	0.1750	0.3952
16500	0.377	0.1116	83.4	147.8	0.2000	0.5727
15000	0.338	0.0897	75.8	167.2	0.2250	0.7911
13500	0.304	0.0726	68.2	186.0	0.2400	1.0031
12000	0.275	0.0594	60.6	202.0	0.2550	1.2037
10700	0.239	0.0449	54.1	238.5	0.2650	1.4843

ELECTRIC BOAT CORPORATION
REPORT NO TDA-19194

Specimen : PD20690 - AWT 4

Material : HY100

Type : MIL-100S-1

load	diameter	area	estress	tstress	estrain	tstrain
0	0.499	0.1956	0.0	0.0	0.0000	0.0000
2750			14.1	14.1	0.0005	0.0005
5250			26.8	26.9	0.0010	0.0010
8325			42.6	42.6	0.0015	0.0015
11375			58.2	58.3	0.0020	0.0020
14325			73.2	73.4	0.0025	0.0025
17125			87.6	87.8	0.0030	0.0030
17700			90.5	90.8	0.0035	0.0035
17700			90.5	90.9	0.0040	0.0040
17600			90.0	90.4	0.0045	0.0045
17575			89.9	90.3	0.0050	0.0050
17550			89.7	90.2	0.0055	0.0055
17550			89.7	90.3	0.0060	0.0060
17550			89.7	90.4	0.0070	0.0070
17550			89.7	90.5	0.0080	0.0080
17550			89.7	90.5	0.0090	0.0090
17550			89.7	90.6	0.0100	0.0100
17550			89.7	90.7	0.0110	0.0109
17525			89.6	90.7	0.0120	0.0119
17525			89.6	90.8	0.0130	0.0129
17525			89.6	90.9	0.0140	0.0139
17500			89.5	90.8	0.0150	0.0149
17500			89.5	90.9	0.0160	0.0159
17500			89.5	91.0	0.0170	0.0169
17500			89.5	91.1	0.0180	0.0178
17500			89.5	91.2	0.0190	0.0188
17500			89.5	91.3	0.0200	0.0198
17750	0.491	0.1893	90.8	93.7	0.0250	0.0323
18000	0.491	0.1893	92.0	95.1	0.0300	0.0323
18250	0.489	0.1878	93.3	97.2	0.0400	0.0405
18500	0.487	0.1863	94.6	99.3	0.0500	0.0487
18750	0.485	0.1847	95.9	101.5	0.0550	0.0569
19000	0.482	0.1825	97.2	104.1	0.0650	0.0693
19250	0.449	0.1583	98.4	121.6	0.1350	0.2112
17750	0.408	0.1307	90.8	135.8	0.1750	0.4027
16250	0.369	0.1069	83.1	152.0	0.2050	0.6036
14750	0.332	0.0866	75.4	170.4	0.2300	0.8149
13250	0.300	0.0707	67.8	187.4	0.2450	1.0176
11750	0.271	0.0577	60.1	203.7	0.2600	1.2210
10900	0.242	0.0460	55.7	237.0	0.2600	1.4473

ELECTRIC BOAT CORPORATION
REPORT NO TDA-19194

Specimen : PD20690 - AWT 5

Material : HY100

Type : MIL-100S-1

load	diameter	area	estress	tstress	estrain	tstrain
0	0.505	0.2003	0.0	0.0	0.0000	0.0000
3275			16.4	16.4	0.0005	0.0005
6450			32.2	32.2	0.0010	0.0010
9750			48.7	48.8	0.0015	0.0015
12600			62.9	63.0	0.0020	0.0020
15750			78.6	78.8	0.0025	0.0025
17525			87.5	87.8	0.0030	0.0030
17725			88.5	88.8	0.0035	0.0035
17725			88.5	88.8	0.0040	0.0040
17725			88.5	88.9	0.0045	0.0045
17725			88.5	88.9	0.0050	0.0050
17725			88.5	89.0	0.0055	0.0055
17725			88.5	89.0	0.0060	0.0060
17725			88.5	89.1	0.0070	0.0070
17725			88.5	89.2	0.0080	0.0080
17725			88.5	89.3	0.0090	0.0090
17750			88.6	89.5	0.0100	0.0100
17750			88.6	89.6	0.0110	0.0109
17750			88.6	89.7	0.0120	0.0119
17775			88.7	89.9	0.0130	0.0129
17800			88.9	90.1	0.0140	0.0139
17825			89.0	90.3	0.0150	0.0149
17900			89.4	90.8	0.0160	0.0159
17925			89.5	91.0	0.0170	0.0169
17925			89.5	91.1	0.0180	0.0178
17925			89.5	91.2	0.0190	0.0188
17925			89.5	91.3	0.0200	0.0198
18000	0.498	0.1948	89.9	92.4	0.0300	0.0279
18250	0.498	0.1948	91.1	93.7	0.0300	0.0279
18500	0.497	0.1940	92.4	95.4	0.0350	0.0319
18750	0.496	0.1932	93.6	97.0	0.0350	0.0360
19000	0.493	0.1909	94.9	99.5	0.0400	0.0481
19250	0.490	0.1886	96.1	102.1	0.0600	0.0603
19500	0.483	0.1832	97.4	106.4	0.0800	0.0891
19750	0.460	0.1662	98.6	118.8	0.1200	0.1867
18250	0.419	0.1379	91.1	132.4	0.1600	0.3734
16750	0.374	0.1099	83.6	152.5	0.1950	0.6006
15250	0.343	0.0924	76.1	165.0	0.2100	0.7737
13750	0.312	0.0765	68.6	179.8	0.2300	0.9631
12250	0.283	0.0629	61.2	194.7	0.2500	1.1582
11100	0.248	0.0483	55.4	229.8	0.2550	1.4223

ELECTRIC BOAT CORPORATION
REPORT NO TDA-19194

Specimen : PD20691 - AWT 1

Material : HY100

Type : MIL-12018

load	diameter	area	estress	tstress	estrain	tstrain
0	0.507	0.2019	0.0	0.0	0.0000	0.0000
4100			20.3	20.3	0.0005	0.0005
7300			36.2	36.2	0.0010	0.0010
10250			50.8	50.8	0.0015	0.0015
13000			64.4	64.5	0.0020	0.0020
15900			78.8	79.0	0.0025	0.0025
18500			91.6	91.9	0.0030	0.0030
20050			99.3	99.7	0.0035	0.0035
20400			101.0	101.5	0.0040	0.0040
20450			101.3	101.8	0.0045	0.0045
20450			101.3	101.8	0.0050	0.0050
20400			101.0	101.6	0.0055	0.0055
20400			101.0	101.7	0.0060	0.0060
20400			101.0	101.8	0.0070	0.0070
20450			101.3	102.1	0.0080	0.0080
20450			101.3	102.2	0.0090	0.0090
20450			101.3	102.3	0.0100	0.0100
20450			101.3	102.4	0.0110	0.0109
20450			101.3	102.5	0.0120	0.0119
20450			101.3	102.6	0.0130	0.0129
20500			101.5	103.0	0.0140	0.0139
20500			101.5	103.1	0.0150	0.0149
20550			101.8	103.4	0.0160	0.0159
20550			101.8	103.5	0.0170	0.0169
20600			102.0	103.9	0.0180	0.0178
20600			102.0	104.0	0.0190	0.0188
20600			102.0	104.1	0.0198	0.0196
20750	0.499	0.1956	102.8	106.1	0.0250	0.0318
21000	0.498	0.1948	104.0	107.8	0.0250	0.0358
21250	0.497	0.1940	105.3	109.5	0.0300	0.0398
21500	0.494	0.1917	106.5	112.2	0.0400	0.0520
21750	0.490	0.1886	107.7	115.3	0.0600	0.0682
21850	0.462	0.1676	108.2	130.3	0.1000	0.1859
20250	0.420	0.1385	100.3	146.2	0.1350	0.3765
18750	0.387	0.1176	92.9	159.4	0.1650	0.5402
17250	0.357	0.1001	85.4	172.3	0.1850	0.7016
15750	0.327	0.0840	78.0	187.5	0.2000	0.8771
14250	0.290	0.0661	70.6	215.7	0.2150	1.1173

Specimen : PD20691 - AWT 2

Material : HY100

Type : MIL-12018

load	diameter	area	estress	tstress	estrain	tstrain
0	0.500	0.1963	0.0	0.0	0.0000	0.0000
2500			12.7	12.7	0.0005	0.0005
5500			28.0	28.0	0.0010	0.0010
8550			43.5	43.6	0.0015	0.0015
11600			59.1	59.2	0.0020	0.0020
14525			74.0	74.2	0.0025	0.0025
17275			88.0	88.2	0.0030	0.0030
18825			95.9	96.2	0.0035	0.0035
19250			98.0	98.4	0.0040	0.0040
19450			99.1	99.5	0.0045	0.0045
19450			99.1	99.6	0.0050	0.0050
19450			99.1	99.6	0.0055	0.0055
19450			99.1	99.7	0.0060	0.0060
19450			99.1	99.8	0.0070	0.0070
19450			99.1	99.9	0.0080	0.0080
19450			99.1	99.9	0.0090	0.0090
19425			98.9	99.9	0.0100	0.0100
19425			98.9	100.0	0.0110	0.0109
19425			98.9	100.1	0.0120	0.0119
19425			98.9	100.2	0.0130	0.0129
19425			98.9	100.3	0.0140	0.0139
19425			98.9	100.4	0.0150	0.0149
19425			98.9	100.5	0.0160	0.0159
19425			98.9	100.6	0.0170	0.0169
19425			98.9	100.7	0.0180	0.0178
19425			98.9	100.8	0.0190	0.0188
19500			99.3	101.3	0.0200	0.0198
19750	0.493	0.1909	100.6	103.5	0.0300	0.0282
20000	0.493	0.1909	101.9	104.8	0.0300	0.0282
20250	0.490	0.1886	103.1	107.4	0.0350	0.0404
20500	0.488	0.1870	104.4	109.6	0.0400	0.0486
20750	0.485	0.1847	105.7	112.3	0.0550	0.0609
21000	0.478	0.1795	107.0	117.0	0.0700	0.0900
21150	0.459	0.1655	107.7	127.8	0.1200	0.1711
19500	0.417	0.1366	99.3	142.8	0.1550	0.3630
18000	0.381	0.1140	91.7	157.9	0.1800	0.5436
16500	0.349	0.0957	84.0	172.5	0.2000	0.7191
15000	0.319	0.0799	76.4	187.7	0.2200	0.8988
13500	0.286	0.0642	68.8	210.1	0.2300	1.1172

ELECTRIC BOAT CORPORATION
REPORT NO TDA-19194

Specimen : PD20691 - AWT 3

Material : HY100

Type : MIL-12018

load	diameter	area	estress	tstress	estrain	tstrain
0	0.500	0.1963	0.0	0.0	0.0000	0.0000
2825			14.4	14.4	0.0005	0.0005
5500			28.0	28.0	0.0010	0.0010
8250			42.0	42.1	0.0015	0.0015
11050			56.3	56.4	0.0020	0.0020
13750			70.0	70.2	0.0025	0.0025
16375			83.4	83.6	0.0030	0.0030
18850			96.0	96.3	0.0035	0.0035
19725			100.5	100.9	0.0040	0.0040
19825			101.0	101.4	0.0045	0.0045
19825			101.0	101.5	0.0050	0.0050
19825			101.0	101.5	0.0055	0.0055
19825			101.0	101.6	0.0060	0.0060
19825			101.0	101.7	0.0070	0.0070
19825			101.0	101.8	0.0080	0.0080
19825			101.0	101.9	0.0090	0.0090
19825			101.0	102.0	0.0100	0.0100
19825			101.0	102.1	0.0110	0.0109
19825			101.0	102.2	0.0120	0.0119
19825			101.0	102.3	0.0130	0.0129
19825			101.0	102.4	0.0140	0.0139
19850			101.1	102.6	0.0150	0.0149
19850			101.1	102.7	0.0160	0.0159
19950			101.6	103.3	0.0170	0.0169
20000			101.9	103.7	0.0180	0.0178
20100			102.4	104.3	0.0190	0.0188
20150			102.6	104.7	0.0200	0.0198
20250	0.494	0.1917	103.1	105.7	0.0250	0.0241
20500	0.494	0.1917	104.4	107.0	0.0250	0.0241
20750	0.493	0.1909	105.7	108.7	0.0350	0.0282
21000	0.489	0.1878	107.0	111.8	0.0500	0.0445
21250	0.486	0.1855	108.2	114.6	0.0550	0.0568
21500	0.456	0.1633	109.5	131.6	0.1150	0.1842
20000	0.425	0.1419	101.9	141.0	0.1500	0.3250
18500	0.385	0.1164	94.2	158.9	0.1750	0.5227
17000	0.353	0.0979	86.6	173.7	0.1950	0.6963
15500	0.323	0.0819	78.9	189.2	0.2100	0.8739
14200	0.293	0.0674	72.3	210.6	0.2250	1.0689

ELECTRIC BOAT CORPORATION
REPORT NO TDA-19194

Specimen : PD20691 - AWT 4

Material : HY100

Type : MIL-12018

load	diameter	area	estress	tstress	estrain	tstrain
0	0.500	0.1963	0.0	0.0	0.0000	0.0000
3450			17.6	17.6	0.0005	0.0005
6175			31.4	31.5	0.0010	0.0010
9275			47.2	47.3	0.0015	0.0015
12100			61.6	61.7	0.0020	0.0020
14850			75.6	75.8	0.0025	0.0025
17500			89.1	89.4	0.0030	0.0030
19500			99.3	99.7	0.0035	0.0035
20250			103.1	103.5	0.0040	0.0040
20275			103.3	103.7	0.0045	0.0045
20300			103.4	103.9	0.0050	0.0050
20300			103.4	104.0	0.0055	0.0055
20325			103.5	104.1	0.0060	0.0060
20350			103.6	104.4	0.0070	0.0070
20375			103.8	104.6	0.0080	0.0080
20425			104.0	105.0	0.0090	0.0090
20450			104.2	105.2	0.0100	0.0100
20475			104.3	105.4	0.0110	0.0109
20475			104.3	105.5	0.0120	0.0119
20475			104.3	105.6	0.0130	0.0129
20475			104.3	105.7	0.0140	0.0139
20500			104.4	106.0	0.0150	0.0149
20500			104.4	106.1	0.0160	0.0159
20500			104.4	106.2	0.0170	0.0169
20500			104.4	106.3	0.0180	0.0178
20525			104.5	106.5	0.0190	0.0188
20550			104.7	106.8	0.0200	0.0198
20650	0.494	0.1917	105.2	107.7	0.0250	0.0241
21000	0.494	0.1917	107.0	109.6	0.0250	0.0241
21250	0.491	0.1893	108.2	112.2	0.0400	0.0363
21500	0.490	0.1886	109.5	114.0	0.0450	0.0404
21750	0.487	0.1863	110.8	116.8	0.0500	0.0527
22000	0.482	0.1825	112.0	120.6	0.0700	0.0733
22200	0.472	0.1750	113.1	126.9	0.1250	0.1153
22000	0.472	0.1750	112.0	125.7	0.1250	0.1153
20500	0.418	0.1372	104.4	149.4	0.1450	0.3583
19000	0.382	0.1146	96.8	165.8	0.1700	0.5384
17500	0.352	0.0973	89.1	179.8	0.1900	0.7020
16000	0.326	0.0835	81.5	191.7	0.2050	0.8554
15100	0.302	0.0716	76.9	210.8	0.2050	1.0084

ELECTRIC BOAT CORPORATION
REPORT NO TDA-19194

Specimen : PD20692 - AWT 1

Material : HY100

Type : MIL-11018

load	diameter	area	estress	tstress	estrain	tstrain
0	0.503	0.1987	0.0	0.0	0.0000	0.0000
2950			14.8	14.9	0.0005	0.0005
5825			29.3	29.3	0.0010	0.0010
8525			42.9	43.0	0.0015	0.0015
11500			57.9	58.0	0.0020	0.0020
14250			71.7	71.9	0.0025	0.0025
16875			84.9	85.2	0.0030	0.0030
19075			96.0	96.3	0.0035	0.0035
19725			99.3	99.7	0.0040	0.0040
19725			99.3	99.7	0.0045	0.0045
19700			99.1	99.6	0.0050	0.0050
19650			98.9	99.4	0.0055	0.0055
19650			98.9	99.5	0.0060	0.0060
19625			98.8	99.5	0.0070	0.0070
19625			98.8	99.6	0.0080	0.0080
19625			98.8	99.6	0.0090	0.0090
19625			98.8	99.7	0.0100	0.0100
19625			98.8	99.8	0.0110	0.0109
19600			98.6	99.8	0.0120	0.0119
19600			98.6	99.9	0.0130	0.0129
19600			98.6	100.0	0.0140	0.0139
19600			98.6	100.1	0.0150	0.0149
19575			98.5	100.1	0.0160	0.0159
19575			98.5	100.2	0.0170	0.0169
19600			98.6	100.4	0.0180	0.0178
19625			98.8	100.6	0.0190	0.0188
19625			98.8	100.7	0.0200	0.0198
20500	0.491	0.1893	103.2	108.3	0.0450	0.0483
20750	0.490	0.1886	104.4	110.0	0.0450	0.0524
21000	0.486	0.1855	105.7	113.2	0.0650	0.0688
21250	0.477	0.1787	106.9	118.9	0.0900	0.1061
21350	0.451	0.1598	107.4	133.6	0.1350	0.2182
19850	0.412	0.1333	99.9	148.9	0.1700	0.3991
18350	0.374	0.1099	92.3	167.0	0.1950	0.5927
16850	0.347	0.0946	84.8	178.2	0.2100	0.7425
15350	0.315	0.0779	77.2	197.0	0.2300	0.9360
14350	0.289	0.0656	72.2	218.8	0.2400	1.1083

ELECTRIC BOAT CORPORATION
REPORT NO TDA-19194

Specimen : PD20692 - AWT 2

Material : HY100

Type : MIL-11018

load	diameter	area	estress	tstress	estrain	tstrain
0	0.500	0.1963	0.0	0.0	0.0000	0.0000
2825			14.4	14.4	0.0005	0.0005
5550			28.3	28.3	0.0010	0.0010
8750			44.6	44.6	0.0015	0.0015
11800			60.1	60.2	0.0020	0.0020
14875			75.8	75.9	0.0025	0.0025
17700			90.1	90.4	0.0030	0.0030
19050			97.0	97.4	0.0035	0.0035
19200			97.8	98.2	0.0040	0.0040
19225			97.9	98.4	0.0045	0.0045
19225			97.9	98.4	0.0050	0.0050
19225			97.9	98.5	0.0055	0.0055
19225			97.9	98.5	0.0060	0.0060
19225			97.9	98.6	0.0070	0.0070
19225			97.9	98.7	0.0080	0.0080
19225			97.9	98.8	0.0090	0.0090
19225			97.9	98.9	0.0100	0.0100
19225			97.9	99.0	0.0110	0.0109
19225			97.9	99.1	0.0120	0.0119
19225			97.9	99.2	0.0130	0.0129
19250			98.0	99.4	0.0140	0.0139
19250			98.0	99.5	0.0150	0.0149
19250			98.0	99.6	0.0160	0.0159
19250			98.0	99.7	0.0170	0.0169
19250			98.0	99.8	0.0180	0.0178
19250			98.0	99.9	0.0190	0.0188
19250			98.0	100.0	0.0200	0.0198
19350	0.494	0.1917	98.5	101.0	0.0250	0.0241
19750	0.492	0.1901	100.6	103.9	0.0300	0.0323
20000	0.492	0.1901	101.9	105.2	0.0300	0.0323
20250	0.490	0.1886	103.1	107.4	0.0400	0.0404
20500	0.487	0.1863	104.4	110.1	0.0550	0.0527
20750	0.487	0.1863	105.7	111.4	0.0550	0.0527
21000	0.479	0.1802	107.0	116.5	0.0800	0.0858
21150	0.459	0.1655	107.7	127.8	0.1350	0.1711
19500	0.412	0.1333	99.3	146.3	0.1750	0.3872
18000	0.372	0.1087	91.7	165.6	0.1950	0.5914
16500	0.340	0.0908	84.0	181.7	0.2150	0.7713
15000	0.311	0.0760	76.4	197.5	0.2350	0.9496
13500	0.284	0.0633	68.8	213.1	0.2450	1.1313
13450	0.277	0.0603	68.5	223.2	0.2450	1.1812

Specimen : PD20692 - AWT 3

Material : HY100

Type : MIL-11018

load	diameter	area	estress	tstress	estrain	tstrain
0	0.501	0.1971	0.0	0.0	0.0000	0.0000
2275			11.5	11.5	0.0005	0.0005
4900			24.9	24.9	0.0010	0.0010
7750			39.3	39.4	0.0015	0.0015
10625			53.9	54.0	0.0020	0.0020
13500			68.5	68.7	0.0025	0.0025
16375			83.1	83.3	0.0030	0.0030
18700			94.9	95.2	0.0035	0.0035
19300			97.9	98.3	0.0040	0.0040
19325			98.0	98.5	0.0045	0.0045
19275			97.8	98.3	0.0050	0.0050
19225			97.5	98.1	0.0055	0.0055
19200			97.4	98.0	0.0060	0.0060
19175			97.3	97.9	0.0070	0.0070
19175			97.3	98.0	0.0080	0.0080
19175			97.3	98.1	0.0090	0.0090
19175			97.3	98.2	0.0100	0.0100
19175			97.3	98.3	0.0110	0.0109
19175			97.3	98.4	0.0120	0.0119
19175			97.3	98.5	0.0130	0.0129
19175			97.3	98.6	0.0140	0.0139
19175			97.3	98.7	0.0150	0.0149
19175			97.3	98.8	0.0160	0.0159
19175			97.3	98.9	0.0170	0.0169
19175			97.3	99.0	0.0180	0.0178
19175			97.3	99.1	0.0190	0.0188
19200			97.4	99.3	0.0200	0.0198
19750	0.494	0.1917	100.2	103.0	0.0250	0.0281
20000	0.493	0.1909	101.5	104.8	0.0300	0.0322
20250	0.490	0.1886	102.7	107.4	0.0450	0.0444
20500	0.488	0.1870	104.0	109.6	0.0500	0.0526
20750	0.486	0.1855	105.3	111.9	0.0550	0.0608
21000	0.478	0.1795	106.5	117.0	0.0850	0.0940
21200	0.457	0.1640	107.5	129.2	0.1400	0.1838
21000	0.457	0.1640	106.5	128.0	0.1400	0.1838
19500	0.405	0.1288	98.9	151.4	0.1850	0.4254
18000	0.374	0.1099	91.3	163.8	0.2050	0.5847
16500	0.342	0.0919	83.7	179.6	0.2250	0.7636
15000	0.312	0.0765	76.1	196.2	0.2500	0.9472
13500	0.280	0.0616	68.5	219.2	0.2600	1.1636

ELECTRIC BOAT CORPORATION
REPORT NO TDA-19194

Specimen : PD20692 - AWT 4

Material : HY100

Type : MIL-11018

load	diameter	area	estress	tstress	estrain	tstrain
0	0.502	0.1979	0.0	0.0	0.0000	0.0000
2175			11.0	11.0	0.0005	0.0005
4975			25.1	25.2	0.0010	0.0010
8250			41.7	41.7	0.0015	0.0015
11350			57.3	57.5	0.0020	0.0020
14600			73.8	74.0	0.0025	0.0025
17525			88.5	88.8	0.0030	0.0030
19300			97.5	97.9	0.0035	0.0035
19450			98.3	98.7	0.0040	0.0040
19475			98.4	98.8	0.0045	0.0045
19475			98.4	98.9	0.0050	0.0050
19475			98.4	98.9	0.0055	0.0055
19475			98.4	99.0	0.0060	0.0060
19475			98.4	99.1	0.0070	0.0070
19475			98.4	99.2	0.0080	0.0080
19475			98.4	99.3	0.0090	0.0090
19475			98.4	99.4	0.0100	0.0100
19475			98.4	99.5	0.0110	0.0109
19475			98.4	99.6	0.0120	0.0119
19475			98.4	99.7	0.0130	0.0129
19475			98.4	99.8	0.0140	0.0139
19475			98.4	99.9	0.0150	0.0149
19475			98.4	100.0	0.0160	0.0159
19475			98.4	100.1	0.0170	0.0169
19475			98.4	100.2	0.0180	0.0178
19475			98.4	100.3	0.0190	0.0188
19450			98.3	100.2	0.0200	0.0198
19500	0.496	0.1932	98.5	100.9	0.0250	0.0240
19750	0.494	0.1917	99.8	103.0	0.0300	0.0321
20000	0.493	0.1909	101.0	104.8	0.0350	0.0362
20250	0.492	0.1901	102.3	106.5	0.0400	0.0402
20500	0.488	0.1870	103.6	109.6	0.0550	0.0566
20750	0.487	0.1863	104.8	111.4	0.0600	0.0607
21000	0.481	0.1817	106.1	115.6	0.0800	0.0855
21200	0.444	0.1548	107.1	136.9	0.1400	0.2456
21000	0.444	0.1548	106.1	135.6	0.1400	0.2456
19500	0.405	0.1288	98.5	151.4	0.1850	0.4294
18000	0.372	0.1087	90.9	165.6	0.2000	0.5994
16500	0.341	0.0913	83.4	180.7	0.2200	0.7734
15000	0.313	0.0769	75.8	194.9	0.2300	0.9448
14100	0.284	0.0633	71.2	222.6	0.2350	1.1393

Specimen : PD20700 - BMT L1

Material : HSLA100

Type : Base plate

load	diameter	area	estress	tstress	estrain	tstrain
0	0.504	0.1995	0.0	0.0	0.0000	0.0000
2850			14.3	14.3	0.0005	0.0005
5400			27.1	27.1	0.0010	0.0010
8500			42.6	42.7	0.0015	0.0015
11350			56.9	57.0	0.0020	0.0020
14300			71.7	71.9	0.0025	0.0025
16800			84.2	84.5	0.0030	0.0030
18550			93.0	93.3	0.0035	0.0035
19200			96.2	96.6	0.0040	0.0040
19425			97.4	97.8	0.0045	0.0045
19525			97.9	98.4	0.0050	0.0050
19575			98.1	98.7	0.0055	0.0055
19600			98.2	98.8	0.0060	0.0060
19700			98.7	99.4	0.0070	0.0070
19775			99.1	99.9	0.0080	0.0080
19825			99.4	100.3	0.0090	0.0090
19875			99.6	100.6	0.0100	0.0100
19950			100.0	101.1	0.0110	0.0109
20000			100.2	101.5	0.0120	0.0119
20025			100.4	101.7	0.0130	0.0129
20075			100.6	102.0	0.0140	0.0139
20125			100.9	102.4	0.0150	0.0149
20200			101.3	102.9	0.0160	0.0159
20250			101.5	103.2	0.0170	0.0169
20300			101.8	103.6	0.0180	0.0178
20325			101.9	103.8	0.0190	0.0188
20350			102.0	104.0	0.0200	0.0198
20500	0.498	0.1948	102.8	105.2	0.0250	0.0240
20750	0.498	0.1948	104.0	106.5	0.0250	0.0240
21000	0.497	0.1940	105.3	108.2	0.0300	0.0280
21250	0.495	0.1924	106.5	110.4	0.0400	0.0360
21500	0.494	0.1917	107.8	112.2	0.0400	0.0401
21750	0.492	0.1901	109.0	114.4	0.0500	0.0482
22000	0.490	0.1886	110.3	116.7	0.0550	0.0563
22250	0.487	0.1863	111.5	119.4	0.0650	0.0686
22400	0.472	0.1750	112.3	128.0	0.1050	0.1312
21000	0.427	0.1432	105.3	146.6	0.1500	0.3316
19500	0.394	0.1219	97.7	159.9	0.1800	0.4925
18000	0.365	0.1046	90.2	172.0	0.1950	0.6454
16500	0.336	0.0887	82.7	186.1	0.2050	0.8109
15000	0.308	0.0745	75.2	201.3	0.2250	0.9850
13500	0.284	0.0633	67.7	213.1	0.2350	1.1472
12450	0.253	0.0503	62.4	247.7	0.2550	1.3784

Specimen : PD20700 - BMT L2

Material : HSLA100

Type : Base plate

load	diameter	area	estress	tstress	estrain	tstrain
0	0.506	0.2011	0.0	0.0	0.0000	0.0000
2500			12.4	12.4	0.0005	0.0005
5250			26.1	26.1	0.0010	0.0010
8700			43.3	43.3	0.0015	0.0015
11350			56.4	56.6	0.0020	0.0020
14500			72.1	72.3	0.0025	0.0025
17000			84.5	84.8	0.0030	0.0030
18675			92.9	93.2	0.0035	0.0035
19450			96.7	97.1	0.0040	0.0040
19675			97.8	98.3	0.0045	0.0045
19800			98.5	99.0	0.0050	0.0050
19875			98.8	99.4	0.0055	0.0055
19925			99.1	99.7	0.0060	0.0060
19975			99.3	100.0	0.0070	0.0070
20000			99.5	100.3	0.0080	0.0080
20075			99.8	100.7	0.0090	0.0090
20100			100.0	101.0	0.0100	0.0100
20200			100.5	101.6	0.0110	0.0109
20225			100.6	101.8	0.0120	0.0119
20275			100.8	102.1	0.0130	0.0129
20325			101.1	102.5	0.0140	0.0139
20375			101.3	102.8	0.0150	0.0149
20425			101.6	103.2	0.0160	0.0159
20500			101.9	103.7	0.0170	0.0169
20525			102.1	103.9	0.0180	0.0178
20575			102.3	104.3	0.0190	0.0188
20625			102.6	104.6	0.0200	0.0198
21500	0.498	0.1948	106.9	110.4	0.0300	0.0319
21750	0.497	0.1940	108.2	112.1	0.0350	0.0359
22000	0.495	0.1924	109.4	114.3	0.0450	0.0440
22250	0.493	0.1909	110.6	116.6	0.0500	0.0521
22500	0.488	0.1870	111.9	120.3	0.0650	0.0724
22650	0.474	0.1765	112.6	128.4	0.1150	0.1307
21000	0.421	0.1392	104.4	150.9	0.1850	0.3678
19500	0.398	0.1244	97.0	156.7	0.2100	0.4802
18000	0.366	0.1052	89.5	171.1	0.2300	0.6478
16500	0.337	0.0892	82.1	185.0	0.2500	0.8129
15000	0.309	0.0750	74.6	200.0	0.2550	0.9864
13500	0.284	0.0633	67.1	213.1	0.2750	1.1551
12900	0.263	0.0543	64.2	237.5	0.2800	1.3088

ELECTRIC BOAT CORPORATION
REPORT NO TDA-19194

Specimen : PD20700 - BMT T1

Material : HSLA100

Type : Base plate

load	diameter	area	estress	tstress	estrain	tstrain
0	0.507	0.2019	0.0	0.0	0.0000	0.0000
3000			14.9	14.9	0.0005	0.0005
5750			28.5	28.5	0.0010	0.0010
8625			42.7	42.8	0.0015	0.0015
11500			57.0	57.1	0.0020	0.0020
14250			70.6	70.8	0.0025	0.0025
16500			81.7	82.0	0.0030	0.0030
18050			89.4	89.7	0.0035	0.0035
18800			93.1	93.5	0.0040	0.0040
19175			95.0	95.4	0.0045	0.0045
19425			96.2	96.7	0.0050	0.0050
19525			96.7	97.2	0.0055	0.0055
19600			97.1	97.7	0.0060	0.0060
19700			97.6	98.3	0.0070	0.0070
19750			97.8	98.6	0.0080	0.0080
19850			98.3	99.2	0.0090	0.0090
19850			98.3	99.3	0.0100	0.0100
19925			98.7	99.8	0.0110	0.0109
19975			98.9	100.1	0.0120	0.0119
20000			99.1	100.4	0.0130	0.0129
20100			99.6	101.0	0.0140	0.0139
20150			99.8	101.3	0.0150	0.0149
20200			100.1	101.7	0.0160	0.0159
20250			100.3	102.0	0.0170	0.0169
20300			100.6	102.4	0.0180	0.0178
20325			100.7	102.6	0.0190	0.0188
20425			101.2	103.2	0.0200	0.0198
20500	0.500	0.1963	101.5	104.4	0.0250	0.0278
20750	0.500	0.1963	102.8	105.7	0.0250	0.0278
21000	0.499	0.1956	104.0	107.4	0.0300	0.0318
21250	0.498	0.1948	105.3	109.1	0.0300	0.0358
21500	0.497	0.1940	106.5	110.8	0.0300	0.0398
21750	0.495	0.1924	107.7	113.0	0.0400	0.0479
22000	0.492	0.1901	109.0	115.7	0.0550	0.0601
22250	0.489	0.1878	110.2	118.5	0.0600	0.0723
22500	0.456	0.1633	111.4	137.8	0.1200	0.2120
21000	0.425	0.1419	104.0	148.0	0.1450	0.3528
19500	0.393	0.1213	96.6	160.8	0.1700	0.5094
18000	0.362	0.1029	89.2	174.9	0.1900	0.6737
16500	0.333	0.0871	81.7	189.5	0.2050	0.8407
15000	0.305	0.0731	74.3	205.3	0.2200	1.0164
13500	0.280	0.0616	66.9	219.2	0.2300	1.1874
12000	0.256	0.0515	59.4	233.1	0.2450	1.3667
9950	0.238	0.0445	49.3	223.7	0.2600	1.5125

ELECTRIC BOAT CORPORATION
REPORT NO TDA-19194

Specimen : PD20700 - BMT T2

Material : HSLA100

Type : Base plate

load	diameter	area	estress	tstress	estrain	tstrain
0	0.506	0.2011	0.0	0.0	0.0000	0.0000
3175			15.8	15.8	0.0005	0.0005
6275			31.2	31.2	0.0010	0.0010
9275			46.1	46.2	0.0015	0.0015
12350			61.4	61.5	0.0020	0.0020
15250			75.8	76.0	0.0025	0.0025
17300			86.0	86.3	0.0030	0.0030
18375			91.4	91.7	0.0035	0.0035
18950			94.2	94.6	0.0040	0.0040
19150			95.2	95.7	0.0045	0.0045
19325			96.1	96.6	0.0050	0.0050
19450			96.7	97.3	0.0055	0.0055
19500			97.0	97.6	0.0060	0.0060
19550			97.2	97.9	0.0070	0.0070
19625			97.6	98.4	0.0080	0.0080
19700			98.0	98.8	0.0090	0.0090
19750			98.2	99.2	0.0100	0.0100
19800			98.5	99.5	0.0110	0.0109
19900			99.0	100.1	0.0120	0.0119
19950			99.2	100.5	0.0130	0.0129
20000			99.5	100.9	0.0140	0.0139
20025			99.6	101.1	0.0150	0.0149
20100			100.0	101.6	0.0160	0.0159
20175			100.3	102.0	0.0170	0.0169
20200			100.5	102.3	0.0180	0.0178
20250			100.7	102.6	0.0190	0.0188
20275			100.8	102.8	0.0200	0.0198
20400	0.500	0.1963	101.4	103.9	0.0250	0.0239
20750	0.500	0.1963	103.2	105.7	0.0250	0.0239
21000	0.499	0.1956	104.4	107.4	0.0250	0.0279
21250	0.497	0.1940	105.7	109.5	0.0350	0.0359
21500	0.495	0.1924	106.9	111.7	0.0350	0.0440
21750	0.494	0.1917	108.2	113.5	0.0450	0.0480
22000	0.491	0.1893	109.4	116.2	0.0550	0.0602
22250	0.488	0.1870	110.6	119.0	0.0650	0.0724
22400	0.469	0.1728	111.4	129.7	0.1100	0.1519
21000	0.431	0.1459	104.4	143.9	0.1500	0.3209
19500	0.397	0.1238	97.0	157.5	0.1850	0.4852
18000	0.364	0.1041	89.5	173.0	0.2000	0.6588
16500	0.335	0.0881	82.1	187.2	0.2150	0.8248
15000	0.307	0.0740	74.6	202.6	0.2350	0.9994
13500	0.282	0.0625	67.1	216.1	0.2400	1.1693
12000	0.255	0.0511	59.7	235.0	0.2550	1.3705
11600	0.241	0.0456	57.7	254.3	0.2650	1.4835