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RESEARCH IN VESTIGATION TO DETERMINE MECHANICAL
PROPERTIES OF NICKEL AND COBALT-BASE ALLOYS FOR
INCLUSION IN MILITARY HANDBOOK-5

VOLUME II

TECHNICAL DOCUMENTARY REPORT NO. ML-TDR-64-116

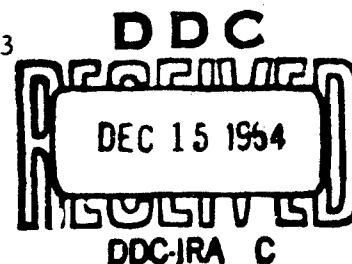
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Air Force Materials Laboratory
Air Force Systems Command
United States Air Force
Wright-Patterson Air Force Base, Ohio

Project No. 7381, Task No. 738103

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Prepared under Contract No. AF 33(657)-8924
by Republic Aviation Corporation, Farmingdale, N.Y.
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December 1, 1964

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SUBJECT: Contract AF 33(657)-8924

In accordance with the provisions of the subject contract and distribution list received from the Air Force Systems Command, forwarded herewith is copy of the following report:

Technical Documentary Report No. ML-TDR-64-116
"Research Investigation to Determine Mechanical
Properties of Nickel and Cobalt-Base Alloys For
Inclusion in Military Handbook-5"
Volume II

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J. A. Weglage, Contracts Administrator
Space Systems and Research

Encl.

FOREWORD

This report was prepared by Republic Aviation Corporation, Production Engineering Division under USAF Contract No. AF33(657)-8924. The contract was initiated under Project No. 7381, "Materials' Application", Task No. 738103, "Materials' Information Development, Collection and Processing." The work was administered under the direction of the AF Materials Laboratory, Wright-Patterson Air Force Base, Ohio, by Mr. C. L. Harmsworth, Project Engineer.

This report covers work conducted from April 1961 to June 1964.

SECTION I - RENE' 41 RAW DATA

ABSTRACT

The purpose of this program was to develop design information on nickel and cobalt base alloys for inclusion in Military Handbook-5. Alloys investigated were René 41, L-605, Inconel 702, and Incoloy 901.

The mechanical properties investigated were tensile, compression, bearing, creep, stress-rupture and fatigue. The general results are presented in Section VII of Volume I of this report. The data generated for Military Handbook-5 are presented in Section VIII of Volume I of this report.

The raw data generated in this program is presented in this

for Edward Shinn

D. A. SHINN
Chief, Materials Information Branch
Materials Application Division
Air Force Materials Laboratory

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1.1 Rene' 41 - Static Test Data

STOCK SIZE	SEAT	STOCK IDENT	TEST TEMP °F	GRAIN DIR	TENSION			COMPRESSION		HEATING				SHEAR	RE MARKS
					ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	ELONG IN (%)	0.2% OFFSET YIELD (KSI)	0.2% OFFSET YIELD (KSI)	0.2% OFFSET YIELD (KSI)	0.2% OFFSET YIELD (KSI)	0.2% OFFSET YIELD (KSI)		
1/8"	A	10	600	T	170.0	139.5		6.5							
"	"	20	"	"	175.0	144.3		10.0 (1)							
"	"	30	"	"	173.5	141.4		7.0 (2)							
"	"	40	"	"	166.8	142.0		3.5							
"	"	10	"	L											
"	"	20	"	"	175.2	139.0		7.5							
"	"	20	"	"	177.2	138.5		9.0							
"	"	30	"	"	177.8	138.5		10.5							
"	"	30	1150	T	167.4	136.9		6.0							
"	"	20	"	"	166.5	139.5		6.5							
"	"	30	"	"	165.4	143.5		5.0							
"	"	40	"	"	166.5	141.0		6.0							
"	"	50	"	"	159.0	140.9		3.5							
"	"	10	"	L	171.7	142.1		3.5 (2)							
"	"	30	"	"	170.0	142.0		4.5 (2)							
"	"	40	"	"	170.8	142.4		5.0 (2)							
"	"	50	"	"	169.4	142.2		3.5							
"	"	10	1550	T	116.7	108.5		4.5							
"	"	20	"	"	113.8	100.3		3.5							
"	"	30	"	"	111.9	108.4		3.0							
"	"	40	"	"	126.3	91.9		3.0							
"	"	50	"	"	108.0	97.8		3.0							
"	"	10	"	L	113.2	108.5		2							
"	"	20	"	"	113.1	108.7		2							
"	"	30	"	"	116.9	108.9		2							
"	"	40	"	"	110.7	100.3		15							
"	"	10	1900	T											
"	"	20	"	"	20.5	17.1		2.5							

MATERIAL: Temp 11 495 5515

NOTES: (1) Groove off center
(2) Groove out of gage length

STOCK SIZE	HEAT	STOCK IDENT	TEST TEMP	GRAIN DIR	TENSION			ELONG		TENSILE		BENDING				SHEAR	REMARKS
					ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	ELONG (%)	TEMP. (°F)	YIELD (KSI)	0.2% (KSI)	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)		
1/4"	A	20	°C	Y	161.0	150.9		2.0(2)	1100								
"	"	30	"	"	155.0	150.5		1.5	"								
"	"	30	"	"	157.2	142.1		1.0(1)	"								
"	"	50	"	"	157.5	141.3		1.0	"								
"	"	20	"	"	173.9	154.7		1.5	"								
"	"	30	"	"	164.1	153.1		1.0(2)	"								
"	"	50	"	"	161.8	152.4		0.5	"								
"	"	10	"	"	162.9	148.7		1.0	1600								
"	"	50	"	"	164.1	137.8		1.0(2)	"								
"	"	10	"	"	113.8	96.5		1.5	"								
"	"	30	"	"	125.5	101.6		1.0(1.5)	"								
"	"	50	"	"	124.7	103.5		1.0(2)	"								
"	"	10	"	"	82.8	74.8		0.0(1)	"								
"	"	30	"	"	63.0			0.5(2)	"								
"	"	40	"	"	50.7	73.3		0.0(1)	"								
"	"	10	"	"					"								
"	"	30	"	"					"								
"	"	40	"	"					"								
"	"	10	"	"					"								
"	"	30	"	"					"								
"	"	40	"	"					"								
"	"	10	"	"					"								
"	"	30	"	"					"								
"	"	40	"	"					"								
"	"	10	"	"					"								
"	"	30	"	"					"								
"	"	40	"	"					"								
"	"	10	"	"					"								
"	"	30	"	"					"								
"	"	40	"	"					"								
"	"	10	"	"					"								
"	"	30	"	"					"								
"	"	40	"	"					"								
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"	"	30	"	"					"								
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"	"	10	"	"					"								
"	"	30	"	"					"								
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"	"	30	"	"					"								
"	"	40	"	"					"								
"	"	10	"	"					"								
"	"	30	"	"					"								

STOCK SIZE	HEAT	STOCK IDENT	TEST TEMP °F	GRAIN DIR	TENSION				CHARACTERISTICS		DRAWING				REMARKS	
					ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	ELONG IN IN (%)	TENS. (%)	TDS (KSI)	0.2% OFFSET YIELD (KSI)	0.2% OFFSET YIELD (KSI)	0.2% OFFSET YIELD (KSI)	0.2% OFFSET YIELD (KSI)		
1/8"	A	20	1100	T	114.0	127.2		2.0	1000	100						
"	"	15	"	"	120.0	117.4		2.5	"	"						
"	"	20	"	"	125.9	125.9		3.5	"	500						
"	"	15	"	"	131.4	118.1		2.5	"	"						
"	"	50	"	"	110.7	125.9		2.0	"	"						
"	"	20	"	"	115.7	100.0		2.5	"	1000						
"	"	30	"	"	122.1	102.6		2.5	"	"						
"	"	50	"	"	126.2	108.0		3.0	"	"						
"	"	20	1600	"	94.5	83.5		4.0	1600	10						
"	"	30	"	"	93.2	82.3		4.5	"	"						
"	"	50	"	"	109.2	86.1		3.0	"	"						
"	"	20	"	"	86.8	86.0		2.5	"	100						
"	"	30	"	"	86.2	82.1		2.0	"	"						
"	"	50	"	"	82.9	76.3		2.5	"	"						
"	"	15	"	"	87.4	81.0		2.5	"	500						
"	"	30	"	"	92.3	78.0		1.0	"	"						
"	"	50	"	"	97.4	81.1			"	"						
"	"	10	"	"					"	1000						
"	"	30	"	"					"	"						
"	"	50	"	"					"	"						
"	"	15	1900	"	24.3	16.0		3.0	1500	10						
"	"	50	"	"	26.1	18.0		2.5	"	"						
"	"	50	"	"	22.2	15.9		2.0	"	"						
"	"	15	"	"					"	100						
"	"	30	"	"					"	"						
"	"	50	"	"					"	"						
"	"	10	"	"					"	"						
"	"	30	"	"					"	"						
"	"	50	"	"					"	"						

MATERIAL

NO. 11 405 5545

MATERIAL SPEC. 100-5515

NOTES

STOCK SIZE	HEAT	STOCK IDENT	TEST TEMP °F	GRAIN DIR.	TENSION				COMPRESSION		BEARING				REMARKS	
					ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	ELONG. IN (%)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	D-15		D-20			
											ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)		
1	1	1	1	1	132.1	132.1	31.3	5.0								
2	2	2	2	2	132.1	132.1	31.3	5.0								
3	3	3	3	3	132.1	132.1	31.3	5.0								
4	4	4	4	4	132.1	132.1	31.3	5.0								
5	5	5	5	5	132.1	132.1	31.3	5.0								
6	6	6	6	6	132.1	132.1	31.3	5.0								
7	7	7	7	7	132.1	132.1	31.3	5.0								
8	8	8	8	8	132.1	132.1	31.3	5.0								
9	9	9	9	9	132.1	132.1	31.3	5.0								
10	10	10	10	10	132.1	132.1	31.3	5.0								
11	11	11	11	11	132.1	132.1	31.3	5.0								
12	12	12	12	12	132.1	132.1	31.3	5.0								
13	13	13	13	13	132.1	132.1	31.3	5.0								
14	14	14	14	14	132.1	132.1	31.3	5.0								
15	15	15	15	15	132.1	132.1	31.3	5.0								
16	16	16	16	16	132.1	132.1	31.3	5.0								
17	17	17	17	17	132.1	132.1	31.3	5.0								
18	18	18	18	18	132.1	132.1	31.3	5.0								
19	19	19	19	19	132.1	132.1	31.3	5.0								
20	20	20	20	20	132.1	132.1	31.3	5.0								
21	21	21	21	21	132.1	132.1	31.3	5.0								
22	22	22	22	22	132.1	132.1	31.3	5.0								
23	23	23	23	23	132.1	132.1	31.3	5.0								
24	24	24	24	24	132.1	132.1	31.3	5.0								
25	25	25	25	25	132.1	132.1	31.3	5.0								
26	26	26	26	26	132.1	132.1	31.3	5.0								
27	27	27	27	27	132.1	132.1	31.3	5.0								
28	28	28	28	28	132.1	132.1	31.3	5.0								
29	29	29	29	29	132.1	132.1	31.3	5.0								
30	30	30	30	30	132.1	132.1	31.3	5.0								
31	31	31	31	31	132.1	132.1	31.3	5.0								
32	32	32	32	32	132.1	132.1	31.3	5.0								
33	33	33	33	33	132.1	132.1	31.3	5.0								
34	34	34	34	34	132.1	132.1	31.3	5.0								
35	35	35	35	35	132.1	132.1	31.3	5.0								
36	36	36	36	36	132.1	132.1	31.3	5.0								
37	37	37	37	37	132.1	132.1	31.3	5.0								
38	38	38	38	38	132.1	132.1	31.3	5.0								
39	39	39	39	39	132.1	132.1	31.3	5.0								
40	40	40	40	40	132.1	132.1	31.3	5.0								
41	41	41	41	41	132.1	132.1	31.3	5.0								
42	42	42	42	42	132.1	132.1	31.3	5.0								
43	43	43	43	43	132.1	132.1	31.3	5.0								
44	44	44	44	44	132.1	132.1	31.3	5.0								
45	45	45	45	45	132.1	132.1	31.3	5.0								
46	46	46	46	46	132.1	132.1	31.3	5.0								
47	47	47	47	47	132.1	132.1	31.3	5.0								
48	48	48	48	48	132.1	132.1	31.3	5.0								
49	49	49	49	49	132.1	132.1	31.3	5.0								
50	50	50	50	50	132.1	132.1	31.3	5.0								
51	51	51	51	51	132.1	132.1	31.3	5.0								
52	52	52	52	52	132.1	132.1	31.3	5.0								
53	53	53	53	53	132.1	132.1	31.3	5.0								
54	54	54	54	54	132.1	132.1	31.3	5.0								
55	55	55	55	55	132.1	132.1	31.3	5.0								
56	56	56	56	56	132.1	132.1	31.3	5.0								
57	57	57	57	57	132.1	132.1	31.3	5.0								
58	58	58	58	58	132.1	132.1	31.3	5.0								
59	59	59	59	59	132.1	132.1	31.3	5.0								
60	60	60	60	60	132.1	132.1	31.3	5.0								
61	61	61	61	61	132.1	132.1	31.3	5.0								
62	62	62	62	62	132.1	132.1	31.3	5.0								
63	63	63	63	63	132.1	132.1	31.3	5.0								
64	64	64	64	64	132.1	132.1	31.3	5.0								
65	65	65	65	65	132.1	132.1	31.3	5.0								
66	66	66	66	66	132.1	132.1	31.3	5.0								
67	67	67	67	67	132.1	132.1	31.3	5.0								
68	68	68	68	68	132.1	132.1	31.3	5.0								
69	69	69	69	69	132.1	132.1	31.3	5.0								
70	70	70	70	70	132.1	132.1	31.3	5.0								
71	71	71	71	71	132.1	132.1	31.3	5.0								
72	72	72	72	72	132.1	132.1	31.3	5.0								
73	73	73	73	73	132.1	132.1	31.3	5.0								
74	74	74	74	74	132.1	132.1	31.3	5.0								
75	75	75	75	75	132.1	132.1	31.3	5.0								
76	76	76	76	76	132.1	132.1	31.3	5.0								
77	77	77	77	77	132.1	132.1	31.3	5.0								
78	78	78	78	78	132.1	132.1	31.3	5.0								
79	79	79	79	79	132.1	132.1	31.3	5.0								
80	80	80	80	80	132.1	132.1	31.3	5.0								
81	81	81	81	81	132.1	132.1	31.3	5.0								
82	82	82	82	82	132.1	132.1	31.3	5.0								
83	83	83	83	83	132.1	132.1	31.3	5.0								
84	84	84	84	84	132.1	132.1	31.3	5.0								
85	85	85	85	85	132.1	132.1	31.3	5.0								
86	86	86	86	86	132.1	132.1	31.3	5.0								
87	87	87	87	87	132.1	132.1	31.3	5.0								
88	88	88	88	88	132.1	132.1	31.3	5.0								
89	89	89	89	89	132.1	132.1	31.3	5.0								
90	90	90	90	90	132.1	132.1	31.3	5.0								
91	91	91	91	91	132.1	132.1	31.3	5.0								
92	92	92	92	92	132.1	132.1	31.3	5.0								
93	93	93	93	93	132.1	132.1	31.3	5.0								
94	94	94	94	94	132.1	132.1	31.3	5.0								
95	95	95	95	95	132.1	132.1	31.3	5.0								
96	96	96	96	96	132.1	132.1	31.3	5.0								
97	97	97	97	97	132.1	132.1	31.3	5.0								
98	98	98	98	98	132.1	132.1	31.3	5.0								
99	99	99	99	99	132.1	132.1	31.3	5.0								
100	100	100	100	100	132.1	132.1	31.3	5.0								

MATERIAL: 1018

MATERIAL: 1018

NOTE: 1018

STOCK SIZE	HEAT	STOCK IDENT	TEST TEMP °F	GRAM DUR	TENSION			COMPRESSION		BENDING				REMARKS	
					ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	ELONG IN (%)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	C D 15		C D 20		
											ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ULTIMATE STRENGTH (KSI)		0.2% OFFSET YIELD (KSI)
0.005	A	00	RT	2	185.2	145.8	32.0	10.0							
"	"	"	"	"	184.5	144.5	32.0	10.0							
"	"	"	"	"	184.4	142.6	31.9	11.5							
"	"	"	"	"	187.9		31.9	9.0							
"	"	"	"	"	188.6	140.6	31.9	12.0							
"	"	"	"	"	182.1	142.1	32.0	12.5							
"	"	"	"	"	188.5	141.1	32.0	11.5							
"	"	"	"	"	188.6	140.8	32.0	12.5							
"	"	"	"	"	201.4	146.4	32.0	14.5							
"	"	00	"	"	185.1	141.1	32.0	12.0							
"	"	000	"	"	180.8	141.8	31.1	11.5							
"	"	"	"	"	186.0	150.8	32.1	11.0							
"	"	"	"	"	180.1	145.0	32.0	11.0							
"	"	"	"	"	185.2	146.7	32.0	10.5							
"	"	"	"	"	182.1	140.2	32.2	12.0							
"	"	"	"	"	181.8	144.2	32.0	14.0							
"	"	"	"	"	205.1	151.4	32.8	12.5							
"	"	"	"	"	188.1	150.0	32.0	10.5							
"	"	"	"	"	180.2	151.1	32.1	9.5							
"	"	"	"	"	186.7	151.6	32.1	11.0							
"	"	"	"	"											
"	"	"	"	"	185.5	152.8	32.1	10.0							
"	"	"	"	"	200.0	154.0	32.2	10.5							
"	"	"	"	"	188.9	151.9	32.1	10.5							
"	"	"	"	"	206.5	151.9	32.2	11.5							See Note 1
"	"	"	"	"	204.5	152.1	32.0	12.5							See Note 1
"	"	"	"	"	207.6	153.4	32.1	12.5							
0.005	C	000	RT	1	200.8	155.8	32.0	9.5							See Note 2

MATERIAL: 3003 AL 95% 55%

MATERIAL: 304 AL RT 9546

NOTES: 1) Tensile specimen from outside of middle third of 2 inch gauge section
2) Tensile specimen from outside of 2 inch gauge section

STOCK SIZE	HEAT	STOCK IDENT	TEST TEMP °F	GRAIN DIR	TENSION			COMPRESSION		BENDING				REMARKS	
					0.2% YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	ELONG IN (%)	0.2% YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	° D 15		° D 20			
										0.2% YIELD (KSI)	0.2% YIELD (KSI)	0.2% YIELD (KSI)	0.2% YIELD (KSI)		
0.100	A	C	RT	T	193.4	151.8	10.5								
"	"	"	"	"	192.6	151.1	9.0(1)								
"	"	"	"	"	191.1	150.4	10.0(1)								
"	"	"	"	"	191.7	151.7	9.5								
"	"	"	"	"	186.2	147.1	9.0								
"	"	"	"	"	191.7	146.6	8.5(1)								
"	"	"	"	"	199.0	151.2	9.5								
"	"	"	"	"	186.9	152.8	5.5(1)								
"	"	"	"	"	192.8	157.9	7.5(1)								
"	"	"	"	"	201.8	159.8	11.5								
"	"	"	"	L	175.2		4.5(1)								
"	"	"	"	"	192.6	150.9	11.0								
"	"	"	"	"	197.0	151.4	13.5								
"	"	"	"	"	186.2	150.5	11.9								
"	"	"	"	"	186.5	152.9	11.7								
"	"	"	"	"	191.7	151.7	11.8								
"	"	"	"	"	186.4	155.2	11.1								
"	"	"	"	"	193.0	151.6	12.0								
"	"	"	"	"	193.3	155.2	11.0								
"	"	"	"	"	190.9	156.0	11.0								
"	B	00	"	T	196.6	148.5	10.5								
"	"	"	"	"	196.2	152.5	11.0(2)								
"	"	"	"	"	199.1	151.4	10.0								
"	"	"	"	"	197.3	152.3	10.0								
"	"	"	"	"	188.9	151.9	10.0(1)								
"	"	"	"	"	186.1	151.1	15.5(1)								
"	"	"	"	"	186.0	150.3	12.1								
"	"	"	"	"	197.1	149.6	11.9								

MATERIAL: 800 L1 408 5545

NOTES: (1) Tension Specimen - Failed - Break off corner
(2) Tension Specimen - Failed - Break off gage length

STOCK SIZE	HEAT	STOCK IDENT	TEST TEMP °F	GRAIN DIR	TENSION				COMPRESSION		BENDING				RE MARKS
					ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	ELONG IN (in)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	D 15		D 20		
											ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	
0.010	B	09	RT	Y	186.3	119.2	32.0	17.5							
"	"	"	"	"	190.4	120.4	32.0	17.0							
"	"	"	"	"	190.1	118.9	31.9	17.5							
"	"	"	"	"	197.0	119.3	31.8	15.5 (1)							
"	"	"	"	"	199.1	116.9	31.9	19.0							
"	"	"	"	"	199.1	119.0	32.0	15.0							
"	"	"	"	"	195.5	116.4	32.1	15.0							
"	"	"	"	"	193.2	111.6	31.9	19.0							
"	"	"	"	"	191.6	111.0	32.0	14.5							
"	"	"	"	"	190.5	111.1	32.2	14.0							
"	"	"	"	"	190.7	113.9	32.0	15.0							
"	"	"	"	"	186.6	113.5	32.1	11.0 (1)							
"	C	00	"	Y	202.3	153.8	32.1	16.0							
"	"	"	"	"	200.5	151.4	32.1	15.0							
"	"	"	"	"	198.9	152.6	32.1	16.5							
"	"	"	"	"	200.9	153.1	32.2	15.5							
"	"	"	"	"	201.5	150.6	31.9	20.5							
"	"	"	"	"	205.8	153.8	31.9	21.0							
"	"	"	"	"	201.6	151.2	32.2	18.0							
"	"	"	"	"	202.3	162.0	32.2	17.5							
"	"	"	"	"	191.5	155.0	32.2	9.5							
"	"	"	"	"	203.8	156.9	31.9	16.0							
"	"	"	"	"	201.1	154.0	32.0	15.5							
"	"	"	"	"	197.6	154.6	32.1	12.0 (1)							
"	"	"	"	"	193.9	151.5	31.8	10.5							
"	"	"	"	"	197.0	153.8	32.6	11.5 (1)							
"	"	"	"	"	196.5	153.4	31.9	14.5							
"	"	"	"	"	202.3	114.9	32.0	18.0							

MATERIAL: 4140 SAE 5145

MATERIAL: 2024-T3 5054

NOTES: (1) Tension Specimen - Failed - Break off center

STOCK SIZE	HEAT	STOCK IDENT	TEST TEMP °F	GRADE DIR	TENSION			COMPRESSION		BENDING				SHEAR	REMARKS
					0.2% ELONG IN (%)	ELASTIC MODULUS (PSI x 10 ⁶)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	1.5		2.0				
									0.2% OFFSET YIELD (KSI)	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ULTIMATE STRENGTH (KSI)			
3/16	C	770	RT	L	200.0	152.7	32.1	15.5							
"	"	"	"	"	200.0	150.0	31.0	15.5							
"	"	"	"	"	200.5	150.2	31.9	10.0							
"	"	"	"	"	198.1	150.1	32.6	10.0							
"	A	0	600	T	157.0	124.3	29.9	9.5							
"	"	"	"	"	170.3	142.9	30.2	7.5 (1)							
"	"	"	"	"	172.5	143.8	30.1	9.5 (2)							
"	"	"	"	"	172.6	140.6	30.2	8.5							
"	"	"	"	"	168.3	141.3	29.8	7.0							
"	"	"	"	L	171.3	131.5	29.9	9.0 (3)							
"	"	"	"	"	173.8	141.7	30.1	11.5							
"	"	"	"	"	175.0	143.3	29.8	10.0 (3)							
"	"	"	"	"	175.9	143.4	30.1	10.5							
"	"	"	"	"	180.6	145.6	30.1	12.0 (3)							
"	"	"	1150	T	158.7	131.7	27.9	6.5 (1)							
"	"	"	"	"	158.6	128.7	28.0	9.0 (1)							
"	"	"	"	"	162.2	132.6	27.7	9.0							
"	"	"	"	"	162.9	133.0	28.1	9.0							
"	"	"	"	"	162.8	134.1	27.8	9.0 (1)							
"	"	"	"	L	162.5	128.8	26.9	7.5							
"	"	"	"	"	159.6	131.7	27.9	7.5 (3)							
"	"	"	"	"	159.3	132.4	27.8	7.5 (3)							
"	"	"	"	"	159.0	134.9	27.9	7.0 (3)							
"	"	"	"	"	159.2	135.0	29.2	6.0 (3)							
"	"	"	"	"	162.2	134.5	27.8	7.0 (3)							
"	"	"	1150	T	105.7	90.7	25.0	2.0							
"	"	"	"	"	66.4	72.0	25.0	3.5 (1)							
"	"	"	"	"	111.7	91.1	25.2	2.0							

MATERIAL: Spec 11, 402, 5545

NOTES: (1) Tension Specimen - Failed - Break off end length
(2) Tension Specimen - Failed - Break in two pieces
(3) Tension Specimen - Failed - Break off center

STOCK SIZE	HEAT	STOCK IDENT	TEST TEMP °F	GRAIN DIR	ULTIMATE STRENGTH (KSI)	TENSION			COMPRESSION		BENDING				RE MARKS	
						0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	ELONG IN YIELD (%)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	C D 1 5		C D 2 0			
											ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)		
1.00	A	00	7	T	206.6	172.4	31.1	16.0	191.2	32.3	293.3	212.5	352.0	212.5	352.0	121.9
"	"	"	"	"	210.0	172.3	32.3	16.5	191.2	32.3	271.3	212.3	372.4	212.3	372.4	121.1
"	"	"	"	"	212.5	172.0	33.5	17.5	191.5	31.6	296.4	212.6	372.3	212.6	372.3	121.4
"	"	"	"	"	206.5	172.0	32.1	16.5	195.3	32.4	279.1	212.7	372.0	212.7	372.0	121.5
"	"	"	"	"	207.0	172.5	30.2	16.2	191.3	31.5	306.4	212.5	372.3	212.5	372.3	121.1
"	"	"	"	"	207.0	172.4	30.3	16.5	197.9	32.3	272.6	212.6	368.5	212.6	368.5	121.7
"	"	"	"	"	192.4	172.2	30.0	16.0	191.9	31.1	297.0	212.7	372.3	212.7	372.3	121.4
"	"	"	"	"	206.3	172.0	31.3	17.0	193.4	30.5	270.8	212.5	372.4	212.5	372.4	121.7
"	"	"	"	"	207.0	171.0	32.1	17.5	195.9	33.4	286.4	212.1	371.4	212.1	371.4	121.1
"	"	"	"	"							298.7	212.7	371.2	212.7	371.2	
"	"	"	"	L	206.3	172.3	29.7	16.0	176.5	32.1						116.4
"	"	"	"	"	206.4	166.5	29.4	16.0	171.4	31.4						125.5
"	"	"	"	"	199.6	166.1	31.3	16.5	176.9	30.7						124.1
"	"	"	"	"	197.1	166.0	28.6	19.5	176.3	31.3						112.3
"	"	"	"	"	194.3	163.5	30.4	19.0	179.2	31.5						113.7
"	"	"	"	"	204.1	164.5	30.2	19.5	173.5	32.0						112.3
"	"	"	"	"	202.2	164.0	30.0	19.0	176.0	30.4						121.1
"	"	"	"	"	202.7	161.5	31.3	19.0	176.3	30.2						116.4
"	"	"	"	"	202.0	153.5	29.8	15.0	175.9	30.6						124.1
"	"	"	"	"					172.9	31.3						122.3
"	B	0	"	T	199.4	154.7	34.5	21.0			299.0	212.5	352.0	212.5	352.0	121.2
"	"	"	"	"	199.7	155.9	31.3	20.5	177.2	32.4	290.5	212.9	372.6	212.9	372.6	121.0
"	"	"	"	"	199.7	152.1	30.5	20.5	179.1	31.5	293.8	213.1	360.0	213.1	360.0	114.5
"	"	"	"	"	205.4	154.4	30.3	20.0	175.7	31.6	290.0	213.0	360.5	213.0	360.5	121.9
"	"	"	"	"	200.3	161.9	35.6	20.0	173.5	34.3	293.0	212.0	371.6	212.0	371.6	121.4
"	"	"	"	"	196.7	150.5	32.4	20.0	175.4	34.4	297.0	212.0	350.0	212.0	350.0	121.3
"	"	"	"	"	192.4	153.5	33.8	19.0	176.5	33.9	295.0	212.0	372.0	212.0	372.0	121.1
"	"	"	"	"	200.3	173.3	37.0	21.0	179.3	34.3	300.5	212.0	371.2	212.0	371.2	121.5

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STOCK SIZE	HEAT IDENT	STOCK TEMP OF	GRAIN DIR	TENSION				COMPRESSION			BENDING				REMARKS
				ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	ELONG IN IN (%)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	D 1.5		D 2.0			
										ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)		
0.020	4	000	600	T	190.6	-	-	18.0	-	-	-	-	-	-	See Note 1
"	"	"	"	"	192.1	149.0	-	18.0	-	-	-	-	-	-	
"	"	"	"	"	187.3	146.4	-	16.5	-	-	-	-	-	-	
"	"	"	"	"	188.7	146.1	-	18.5	-	-	-	-	-	-	
"	"	"	"	"	186.3	143.0	-	13.0	-	-	-	-	-	-	
"	"	"	"	L	186.1	148.5	-	11.5	-	-	-	-	-	-	
"	"	"	"	"	187.7	143.6	-	19.0	-	-	-	-	-	-	
"	"	"	"	"	189.7	145.5	-	17.0	-	-	-	-	-	-	
"	"	"	"	"	192.1	142.1	-	20.0	-	-	-	-	-	-	
"	"	"	"	"	189.7	144.1	-	19.0	-	-	-	-	-	-	See Note 2
"	"	"	1000	T	180.0	147.9	-	17.0	-	-	-	313.0	280.0	116.0	
"	"	"	"	"	179.7	145.5	-	16.0	-	-	-	290.0	272.0	117.0	
"	"	"	"	"	180.5	148.7	-	14.5	-	-	-	332.0	288.0	114.0	
"	"	"	"	"	180.5	149.0	-	16.0	-	-	-	-	-	-	
"	"	"	"	"	-	-	-	-	-	-	-	-	-	-	
"	"	"	"	L	181.5	148.2	-	15.0	-	-	-	-	-	-	
"	"	"	"	"	183.8	155.7	-	18.5	-	-	-	-	-	-	
"	"	"	"	"	180.2	146.9	-	16.5	-	-	-	-	-	-	See Note 3
"	"	"	"	"	180.7	147.4	-	17.0	-	-	-	-	-	-	
"	"	"	"	"	182.5	147.1	-	19.5	-	-	-	-	-	-	
"	"	"	1400	T	163.4	132.5	-	13.0	-	-	-	-	-	-	
"	"	"	"	"	152.0	132.8	-	12.0	-	-	-	284.0	230.0	107.8	See Note 4
"	"	"	"	"	156.9	130.7	-	15.5	-	-	-	322.9	255.2	96.3	
"	"	"	"	"	154.9	132.0	-	11.0	-	-	-	-	-	-	
"	"	"	"	"	160.2	139.0	-	12.5	-	-	-	-	-	-	
"	"	"	"	L	150.0	127.9	-	12.0	-	-	-	-	-	-	
"	"	"	"	"	150.0	129.6	-	15.5	-	-	-	-	-	-	See Note 4
"	"	"	"	"	143.7	125.6	-	12.5	-	-	-	-	-	-	

MATERIAL - PARTIAL SHEET

MATERIAL - 4000 AL 25%

- NOTES
1. Tensile specimens - Instron tested
 2. Tensile specimens - rolled outside edge of 2 inch gauge section
 3. Tensile specimens - rolled in two pieces
 4. Tensile specimens - rolled under half edge of Instron

STOCK SIZE	HEAT	STOCK IDENT	TEST TEMP °F	GRADE	TENSION				COMPRESSION		BENDING				REMARKS		
					ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	ELONG. IN (%)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	D 15		D 20				
											ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)			
0.00	A	1	RT	T	201.0	157.6	31.9	19.0	170.9	31.0	201.0	200.0	200.0	170.9	200.0	120.9	
"	"	"	"	"	201.5	157.2	31.5	17.0	181.4	30.0	201.5	200.0	200.0	200.0	170.9	120.9	
"	"	"	"	L	200.2	152.6	30.6	19.0	165.4	31.3	200.0	200.0	200.0	200.0	170.9	120.9	
"	"	"	"	"	201.6	153.9	31.4	19.0	169.0	31.2	200.0	200.0	200.0	200.0	170.9	120.9	
"	"	"	"	"	200.9	151.3	32.5	19.5								120.9	
"	"	L	"	T	200.0	150.0	31.6	18.5	199.4	31.0	201.5	200.0	200.0	200.0	170.9	120.9	
"	"	"	"	"	200.0	150.0	32.2	20.0	178.2	30.0	201.5	200.0	200.0	200.0	170.9	120.9	
"	"	"	"	L	200.4	150.9	31.0	20.0	190.5	35.0	201.5	200.0	200.0	200.0	170.9	120.9	
"	"	"	"	"					197.6	35.0	201.5	200.0	200.0	200.0	170.9	120.9	
"	"	H	"	T	201.0	157.0	31.9	18.0	186.3	31.4	201.5	200.0	200.0	200.0	170.9	120.9	
"	"	"	"	"	200.0	151.0	31.4				201.5	200.0	200.0	200.0	170.9	120.9	
"	"	"	"	L	200.9	150.9	31.3	20.0	191.2	35.0	201.5	200.0	200.0	200.0	170.9	120.9	
"	"	"	"	"	200.4	155.9	32.7	20.0	191.5	31.6	201.5	200.0	200.0	200.0	170.9	120.9	
"	"	H	"	T	201.0	157.8	35.4	18.0	178.2	32.6	201.5	200.0	200.0	200.0	170.9	120.9	
"	"	"	"	"	201.0	151.6	32.5	18.0	183.7	31.7	201.5	200.0	200.0	200.0	170.9	120.9	
"	"	"	"	L	200.2	151.9	31.2	20.5	190.5	35.4	201.5	200.0	200.0	200.0	170.9	120.9	
"	"	"	"	"	200.9	155.9	31.0	19.0			201.5	200.0	200.0	200.0	170.9	120.9	
"	"	P	"	T	200.0	151.1		19.0	192.9	32.4	201.5	200.0	200.0	200.0	170.9	120.9	
"	"	"	"	"	201.0	150.0	31.4	19.0	177.7	31.0	201.5	200.0	200.0	200.0	170.9	120.9	
"	"	"	"	L	200.9	157.5	32.2	19.0	197.3	35.9	201.5	200.0	200.0	200.0	170.9	120.9	
"	"	"	"	"	200.2	151.4	31.5	20.0	200.6	31.4	201.5	200.0	200.0	200.0	170.9	120.9	
"	"	H	"	T	199.2	159.4	32.9	18.5	167.9	31.8	201.5	200.0	200.0	200.0	170.9	120.9	
"	"	"	"	"	200.0	159.2	31.3	20.0			201.5	200.0	200.0	200.0	170.9	120.9	
"	"	"	"	L	201.3	157.0	31.9	19.0	199.9	31.6	201.5	200.0	200.0	200.0	170.9	120.9	
"	"	"	"	"	200.5	151.0	31.4	19.0	199.9	35.0	201.5	200.0	200.0	200.0	170.9	120.9	
"	"	O	"	T	197.5	151.4	31.4	21.5	167.7	31.3	201.5	200.0	200.0	200.0	170.9	120.9	
"	"	"	"	"	191.6	156.7	31.5	23.0	172.1	31.8	201.5	200.0	200.0	200.0	170.9	120.9	
"	"	"	"	"	199.7	157.5	31.1	23.0	166.1	31.1	201.5	200.0	200.0	200.0	170.9	120.9	

MATERIAL — Form 11, April 1954

MATERIAL - 304L SS

NOTES 1. Compression Specimen - should excessive bending after test.

STOCK SIZE	HEAT	STOCK IDENT	TEST TEMP °F	GRAIN DIR	TENSION			COMPRESSION			BENDING				REMARKS
					0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	ELONG IN (%)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	D 15		D 20			
										ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)		
3/40	B	0	RT	T	200.0	31.3	22.0	166.0	-		299.5	255.6	354.6	315.1	
"	"	"	"	"	201.5	31.7	22.5	167.3	31.4		297.3	260.2	360.0	311.5	130.9
"	"	"	"	"	197.6	31.1	22.5	164.0	31.6		279.5	257.3	354.6	312.1	
"	"	"	"	"	199.7	31.5	22.0	172.1	31.4		297.8	257.8	350.1	312.1	See Note 1
"	"	"	"	"	204.2	31.7	22.5	173.2	31.9		302.5	255.5	370.0	311.0	
"	"	"	"	"	199.5	31.6	22.0	175.3	32.4				351.0	312.5	
"	"	"	"	"	200.3	32.9	22.0	176.5	31.3				366.5	314.0	See Note 1
"	"	"	"	"				179.2	32.3						
"	"	"	"	L	201.1	32.1	19.0	171.9	34.0		289.9	257.3	379.3	289.4	120.5
"	"	"	"	"	201.6	30.8	21.5	182.4	32.6		293.0	263.1	380.5	308.9	137.0
"	"	"	"	"	200.2	32.0	22.0	175.9	32.5		287.5	259.0	388.7	312.9	126.2
"	"	"	"	"	201.5	32.7	22.0	184.2	34.5		293.0	254.5	375.3	316.0	142.9
"	"	"	"	"	199.5	34.5	21.0	175.0	31.4		288.2	251.1	360.0	318.0	135.6
"	"	"	"	"	200.0	32.3	23.5	186.7	34.7		301.7	254.0	376.6	307.3	134.1
"	"	"	"	"	199.4	31.0	22.5	193.4	33.5		296.6	251.6	395.4	313.7	135.6
"	"	"	"	"	200.4	30.9	23.0	170.9	31.7		297.0	264.0	351.2	322.0	116.7
"	"	"	"	"	200.5	31.8	22.5	170.6	34.1		296.7	262.3	375.0	321.0	142.5
"	B	"	"	"	199.3	36.1	23.0				287.5	261.0	377.3	303.2	
"	C	00	"	T	196.5	33.4	21.0	172.5	32.1		285.9	260.5	351.6	319.5	131.7
"	"	"	"	"	197.3	32.6	23.0	177.0	32.9		285.0	254.0	330.0	293.0	125.1
"	"	"	"	"	197.1	32.5	23.0	189.5	31.6		300.5	260.5	404.0	319.0	139.5
"	"	"	"	"	197.9	32.5	22.5	175.4	32.0		292.0	265.0	374.0	309.0	115.7
"	"	"	"	"	196.8	33.5	22.0	186.8	32.7		292.0	262.0	366.0	324.0	133.7
"	"	"	"	"	199.6	34.5	21.5	190.0	32.6		295.0	267.5	347.0	308.4	129.4
"	"	"	"	"	197.7	33.6	22.0	177.4	32.4		306.0	263.0	360.5	305.2	131.3
"	"	"	"	"	196.4	32.6	22.0	181.1	32.1		297.3	261.7	322.9	303.0	110.7
"	"	"	"	"	196.0	34.6	21.5	169.0	31.6		289.5	263.9	373.7	295.6	130.9
"	"	"	"	"	199.8	31.9	23.5	177.4	33.6				364.9	292.7	127.9

MATERIAL: 304L SS, 1/2" SQ

MATERIAL: 7050-T6

NOTES: 1. Compression Specimen - Bend during test - Load fell off.

STOCK SIZE	BLAT IDENT	STOCK IDENT	TEST TEMP °F	GRAIN DIR	TENSION			COMPRESSION		BENDING				REMARKS	
					ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	ELONG IN (%)	0.2% OFFSET YIELD (KSI)	ELAST. MODULUS (PSI x 10 ⁶)	D 1 1/2		D 2 0		
											ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ULTIMATE STRENGTH (KSI)		0.2% OFFSET YIELD (KSI)
1/2" x 1/2"	A	1	100°F	T	102.2			15.5	151.0		260.7	261.0	100.4	112.1	NOTE (1), (2) (3)
"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
"	"	"	"	"	106.0	151.5		16.5	157.0		276.0	263.0			NOTE (2)
"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
"	"	"	"	"	101.6	146.9		19.5	159.0		257.8	256.3	116.2	120.0	"
"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
"	"	"	"	"	106.6			21.0	159.4		267.7	266.7	142.9	113.2	NOTE (1)
"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
"	"	"	"	"	102.0	142.0		10.0	161.8		276.6	266.7	116.8	105.6	NOTE (2)
"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
"	"	"	"	"	106.0	156.0		21.5	151.8		265.6	256.0	115.7	102.8	"
"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
"	"	"	"	"	100.4	142.1		20.5	163.5		276.9	266.1	112.5	112.7	"
"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
"	"	"	"	"	102.0	146.9		10.5	166.8		277.8	267.7	117.7	107.6	NOTE (2)
"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
"	"	"	"	"	117.6	146.2		7.0			273.7	251.6		127.7	NOTE (2)
"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
"	"	"	"	"	107.0	146.1		21.5			279.5	267.8			"
"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
"	"	"	"	"	"	"	"	"	166.8				119.7	119.5	"
"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
"	"	"	"	"	"	"	"	"	154.0				121.3	111.1	"
"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
"	"	"	600°F	P	109.8	146.1		21.0	167.0		266.0	267.2	102.5	100.6	"
"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
"	"	"	"	"	107.0	146.1		6.0	161.0		266.0	266.0	120.0	126.2	NOTE (2)
"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"

MATERIAL: 7075-T6 AL 7050-S14S

- NOTES:
 (1) Tensile Specimen - Extensometer calibration
 (2) Tensile Specimen - Filled outside edge third of reduced section
 (3) Compression Specimen - Specimen

STOCK SIZE	PLAT	STOCK IDENT	TEST TEMP OF	GRAIN DIR	TENSION				COMPRESSION		BENDING				REMARKS	
					ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	ELONG. IN (4)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	C D 1.5		C D 2.0			
											ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)		
2 1/2"	A	1	100°F	T					169.1				136.0	108.0	111.2	
"	"	"	"	"												
"	"	"	"	"					167.2				108.7	266.4		
"	"	"	"	"												
"	"	"	"	"	182.4	161.5		18.5	165.4			264.5	265.1			102.9
"	"	"	"	"												
"	"	"	"	"	186.3	163.2		21.0	166.0			251.5	219.0			
"	"	"	"	"												
"	"	"	"	"	181.1	162.0		21.0	161.2			261.1	260.5	185.1	261.9	113.4
"	"	"	"	"												
"	"	"	"	"	187.3	166.9		19.5	161.0			266.1	267.6	116.9		
"	"	"	"	"												
"	"	"	"	"	181.2	161.7		20.5				257.1	266.2	126.5	261.9	115.4
"	"	"	"	"												
"	"	"	"	"	176.8	166.0		9.0				260.1	267.5	101.8	265.1	NOTE (2)
"	"	"	"	"												
"	"	"	"	"	172.5	161.8		11.5	161.0			255.1	236.0	122.2	255.9	108.2
"	"	"	"	"												
"	"	"	"	"	172.0	161.8		9.0	167.0			261.2	251.5	266.2	266.2	
"	"	"	"	"												
"	"	"	100°F	T	181.1			21.5	156.0							NOTE (1)
"	"	"	"	"												
"	"	"	"	"	175.5	161.5		11.0	176.5							NOTE (2)
"	"	"	"	"												
"	"	"	"	"	177.7	160.7		19.5	156.6			265.8	236.1	113.6	267.7	
"	"	"	"	"												
"	"	"	"	"	183.1	160.5		22.0				176.8	251.1	126.1	267.7	

MATERIAL TEST REPORT

MATERIAL - 304L SS

NOTES (1) Tensile Specimen - Standard offset calibration
(2) Tensile Specimen - Called outside - 40% third of reduced section

STOCK SIZE	HEAT	STOCK IDENT	TEST TEMP OF F	GRAIN DIR	TENSION				COMPRESSION		BENDING				REMARKS
					ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	ELONG IN (%)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	
10	A	P	1200	T	185.7	147.4		15.5					294.1	249.7	
"	"	"	"	"											
"	"	"	"	"	134.8	143.1		13.5					280.5	246.5	
"	"	"	"	"											
"	"	"	"	"					125.2	27.4			274.1	237.8	105.7
"	"	"	"	"					155.0	25.6			291.9	254.1	
"	"	"	1200	T									302.4	278.2	
"	"	"	1400	T	150.5	126.1		9.0	155.6	21.5	242.9	223.8			
"	"	"	"	"											
"	"	"	"	"	167.8	135.4		13.5			235.0	213.5	293.0	252.0	
"	"	"	"	"											
"	"	"	"	"	160.2	128.8		11.0			217.7	207.6	300.5	268.2	112.8
"	"	"	"	"											
"	"	"	"	"	155.7	128.6		13.5	141.0	20.7	235.0	220.0	303.6	266.6	Note (1)
"	"	"	"	"											
"	"	"	"	"	149.2	120.6		11.5	111.2	19.2			263.2	252.6	102.5
"	"	"	"	"											
"	"	"	"	"	151.4	126.6		13.0	149.6	20.1			292.6	255.0	Note (1)
"	"	"	"	"											
"	"	"	"	"	141.3	121.5		10.5			224.6	213.5	269.0	237.5	102.3
"	"	"	"	"											
"	"	"	"	"	144.4	123.7		12.8			236.9	219.5	293.3	262.6	
"	"	"	"	"											
"	"	"	"	"					143.7	21.1	217.6	210.1			
"	"	"	"	"					157.5	25.4	234.7	226.1			
"	"	"	"	"					143.1	21.9					
"	"	"	"	"					167.4	22.5					

MATERIAL: 304L SS 3245

NOTES: (1) Tensile Specimen - failed outside gage length of 2 inch gauge section.

STOCK SIZE	BEAT	STOCK IDENT	TEST TEMP OF	GRAIN DIR	TENSION				COMPRESSION		BENDING				REMARKS	
					ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	BLOOM IN IN (in)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	D 1.5		D 2.0			
											ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)		
3.40	A	B	1400°F	T	154.0	124.7		9.0			236.8	213.7	268.5	245.5	105.6	Note (1)
"	"	"	"	T											16.7	
"	"	"	"	L	160.1	137.6		15.0	141.6	22.0	232.4	170.8	268.1	240.0		
"	"	B	1400°F	L												
"	"	B	1600°F	T	124.1	84.5		10.6					164.0	154.1	61.5	Note (1)
"	"	"	"	T											70.0	
"	"	"	"	L	112.1	94.6		15.0					148.0	122.0		Note (1)
"	"	"	"	T					67.7	18.9					69.0	
"	"	"	"	L					62.8	17.4						
"	"	"	"	T					66.2	17.4						
"	"	"	"	L	119.0	99.6		15.0			176.3	149.5	169.7	155.6	66.3	Note (1)
"	"	"	"	T											66.8	
"	"	"	"	L	109.8	90.8		19.0	77.4	17.9	133.5	122.7	161.1	153.9	63.3	Note (2)(5)
"	"	"	"	T									155.6	138.3		
"	"	"	"	L	110.9	87.9		24.0	71.2	17.0	159.5	144.0	161.6	90.4	70.4	
"	"	"	"	T							182.5	151.0				
"	"	"	"	L	94.6	85.3		21.0	67.4	18.1	138.5	132.3	179.5	166.2		
"	"	"	"	T												
"	"	"	"	L	97.0	87.6		16.0	68.4	17.6			161.6	143.7		Note (1)
"	"	"	"	T												
"	"	"	"	L	102.4			21.0	70.9	19.0	136.2	129.7				Note (4)
"	"	"	"	T												
"	"	"	"	L	110.8	98.2		18.5	72.3	18.9	156.8	102.6	141.6			
"	"	"	"	T							152.3	144.6				
"	"	"	"	L	98.4	84.3		21.0	65.5	18.9	155.6	127.8	156.6	147.2		
3.40	A	B	1600°F	L							153.5	120.0				

MATERIAL: 7050-T6 ALUMINUM

MATERIAL: 304L, 1/2" x 1/2" x 1/2"

- NOTES:
- (1) Tensile Specimen - Failed under knife edge of extensometer
 - (2) Tensile Specimen - Failed outside gage length of 2 inch gauge section
 - (3) Compressor Specimen - Buckled
 - (4) Tensile test - Interferometer magnifying
 - (5) Clear Specimen to Penetration and Tensile Limit

STOCK SIZE	HEAT	STOCK IDENT	TEST TEMP OF	GRAIN DIR	TENSION				COMPRESSION		BENDING				SIDE AD	EXPOSED (%)
					ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	ELONG IN (%)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	0.2% OFFSET YIELD (KSI)		ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)		
											0.2% OFFSET YIELD (KSI)	ULTIMATE STRENGTH (KSI)				
0.750	A	K	RT	T	199.3	156.3	31.6	19.0								100
"	"	P	"	"	197.3	152.4	31.4	20.0								"
"	"	H	"	"	197.5	149.5	31.9	22.5								"
"	"	P	"	"	196.9	150.1	31.0	31.0								"
"	"	H	"	"	197.3	157.2	30.2	20.5								"
"	"	P	"	"	197.4	157.9	32.1	18.0								"
"	"	K	"	"	195.4	153.7	31.7	20.5								"
"	"	L	"	"	195.7	150.1	31.2	19.0								"
"	"	"	"	"	192.4	153.1	31.3	20.5								"
"	"	"	"	"	200.0	151.8	30.5	19.0								"
"	"	P	"	"	222.5	153.0	30.0	16.0								100
"	"	H	"	"	197.0	150.5	32.8	14.5								"
"	"	K	"	"												"
"	"	L	"	"												"
"	"	H	"	"												"
"	"	P	"	"	198.7	158.5		13.5								"
"	"	P	"	"	201.3	158.9		13.5								"
"	"	R	"	"	206.0	160.4		14.5								"
"	"	K	"	"	197.1	155.3	33.1	5.0								"
"	"	P	"	"	190.8	152.0	31.9	6.0								100
"	"	H	"	"	193.5	153.3	33.0	7.0								"
"	"	K	"	"												"
"	"	L	"	"												"
"	"	P	"	"												"
"	"	H	"	"	195.5	161.5	31.3	4.0								"
"	"	P	"	"	197.4	149.5	31.0	3.5								"
"	"	R	"	"	197.0	150.4	33.1	5.0								"
"	"	L	"	"	190.5	130.6	33.8	17.0								"

Notes: 1) rearing 1.5 Specimen - Fracture

STOCK SIZE	HEAT	STOCK IDENT	TEST TEMP °F	GRAIN DIR	TENSION				COMPRESSION			BENDING			REMARKS	
					ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	ELONG. IN (%)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	D 1.5		D 2.0	0.2% OFFSET YIELD (KSI)		
											ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)				ULTIMATE STRENGTH (KSI)
1/2"	A	N	RT	T	115.4	112.1	32.3	14.5							100	20
"	"	"	"	"	116.4	112.1	32.1	15.0							"	"
"	"	"	"	"	111.0	117.4	31.6	14.0							100	"
"	"	"	"	"	116.6	111.5	32.5	14.5							"	"
"	"	"	"	"					110.1						"	"
"	"	"	"	"	116.2	110.5	32.8	14.5(11)	112.3						"	"
"	"	"	"	"					116.7						"	"
"	"	"	"	"											"	"
"	"	"	"	"	111.9	111.9	30.1	14.5							"	"
"	"	"	"	"											"	"
"	"	"	"	"	151.0	109.7	34.2	5.0							"	"
"	"	"	"	"	110.4	102.0	32.1	5.0(11)	111.2						"	"
"	"	"	"	"					112.4						"	"
"	"	"	"	"					111.7						"	"
"	"	"	"	"	116.0	97.6	32.0	5.5							100	"
"	"	"	"	"											"	"
"	"	"	"	"	113.3	96.1	31.3	6.0							"	"
"	"	"	"	"					106.9						"	"
"	"	"	"	"					107.7						"	"
"	"	"	"	"	111.7	96.1	29.9	5.5	108.8						"	"
"	"	"	"	"											"	"
"	"	"	"	"	117.2	91.1	31.2	26.0							"	"
"	"	"	"	"	153.9	117.0	29.9	26.5	101.0						"	"
"	"	"	"	"	111.3	91.2	30.2	25.0	110.2						"	"
"	"	"	"	"					111.7						"	"
"	"	"	"	"											"	"
"	"	"	"	"	110.7	110.9	31.5	11.5							"	"
"	"	"	"	"	117.1	110.0	30.5	11.5(11)	115.9						"	"

MATERIAL: A3150C

NOTES: 1. Sample section - 1/2" wide x 1/4" thick x 2" long, round section.
2. Shear Specimen - Not Solenoid-type break
3. Bearing 1.5 Specimen - brittle fracture

STOCK SIZE	HEAT	STOCK IDENT	TEST TEMP °F	GRAIN DIR	TENSION			COMPRESSION		BENDING				SHARP	TEMP. (°F)	SPEC. GRAV. (lb/cu in)	
					ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	ELONG. IN (%)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	D 1.5		D 2.0				
											ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ULTIMATE STRENGTH (KSI)				0.2% OFFSET YIELD (KSI)
0.00	A	E	400	T	109.5	114.3	21.0								100	1.90	
"	"	F	"	"	197.9	114.9	19.5								"	"	
"	"	"	"	"	192.1	114.4	15.5 (8)								"	"	
"	"	E	500	"											"	"	
"	"	F	"	"	191.5	112.3	12.5 (2)								"	"	
"	"	H	"	"	145.7	111.5	17.5								"	"	
"	"	P	"	"	186.5	114.3	17.5								"	"	
"	"	E	900	"	182.3	119.3	20.5								100	"	
"	"	L	"	"	130.3	114.6	20.0								"	"	
"	"	"	"	"	180.0	115.0	19.0								"	"	
"	"	"	1000	"	179.4	152.1	12.0 (8)								1000	"	
"	"	P	"	"	185.1	155.9	17.5								"	"	
"	"	R	"	"	182.2	151.7	18.5								"	"	
"	"	E	1200	"	182.4	113.6	12.0					250.7	250.7		100	"	
"	"	L	"	"				156.3	25.3			239.0	239.0		"	"	
"	"	H	"	"				150.0	28.3			232.5	232.5		"	"	
"	"	E	"	"	193.0	111.7	12.0								"	"	
"	"	P	"	"	194.9	114.5	11.0								"	"	
"	"	R	"	"				151.7	21.7						"	"	
"	"	"	"	"											"	"	
"	"	E	1400	"	153.1	111.3	27.5								1400	1.90	
"	"	P	"	"	157.3	112.7	21.0								"	"	
"	"	R	"	"	199.7	135.5	15.5								"	"	
"	"	E	"	"				92.1							"	"	
"	"	L	"	"				93.6							"	"	
"	"	R	"	"				92.7							"	"	
"	"	H	"	"	117.5	119.0	21.0					219.3	176.4		"	"	
"	"	P	"	"	112.3	115.9	20.5					221.8	208.5		"	"	
"	"	"	"	"											"	"	
"	"	"	"	"											"	"	
"	"	"	"	"											"	"	
"	"	"	"	"											"	"	
"	"	"	"	"											"	"	
"	"	"	"	"											"	"	
"	"	"	"	"											"	"	
"	"	"	"	"											"	"	
"	"	"	"	"											"	"	
"	"	"	"	"											"	"	
"	"	"	"	"											"	"	
"	"	"	"	"											"	"	
"	"	"	"	"											"	"	
"	"	"	"	"											"	"	
"	"	"	"	"											"	"	
"	"	"	"	"											"	"	
"	"	"	"	"											"	"	
"	"	"	"	"											"	"	
"	"	"	"	"											"	"	
"	"	"	"	"											"	"	
"	"	"	"	"											"	"	
"	"	"	"	"											"	"	
"	"	"	"	"											"	"	
"	"	"	"	"											"	"	
"	"	"	"	"											"	"	
"	"	"	"	"											"	"	
"	"	"	"	"											"	"	
"	"	"	"	"											"	"	
"	"	"	"	"											"	"	
"	"	"	"	"											"	"	
"	"	"	"	"											"	"	
"	"	"	"	"											"	"	
"	"	"	"	"											"	"	
"	"	"	"	"											"	"	
"	"	"	"	"											"	"	
"	"	"	"	"											"	"	
"	"	"	"	"											"	"	
"	"	"	"	"													

MATERIAL: ANNEAL AND 5045

NOTES: 1. Tensile section - failed outside while third of 3 inch gage section.
2. Tensile section - broke under knife edge of extensometer.

STOCK SIZE	HEAT	STOCK IDENT	TEST TEMP °F	GRAIN DIR	TENSION				COMPRESSION			BENDING				SHEAR		Elongation (%)
					ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	ELONG IN (%)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	D	D	D	D	D	D		
0.000	A	A	1100	T	165.7	127.3		33.5							233.7	193.7		12.0
"	"	L	1100	"	80.6	68.2		27.0										1000
"	"	P	"	"	91.8	72.4		30.0										10
"	"	N	"	"				(2)										10
"	"	K	"	"	69.2			32.5(1)							106.5	96.0		100
"	"	L	"	"														"
"	"	H	"	"	71.2	58.9		32.0	40.4						107.3	93.1		"
"	"	P	"	"					45.4									"
"	"	P	"	"	81.6	52.3		32.5	42.3						124.9	88.6		"
"	"	N	"	"											105.1	92.4		"
"	"	L	"	"	81.9	60.3		31.0										100
"	"	H	"	"														"
"	"	H	"	"	96.5	65.0		36.5(1)	45.2						93.0	76.5		"
"	"	P	"	"	59.8	45.5		29.5	44.2									"
"	"	H	"	"					42.2						91.8	76.6		"
"	"	K	"	"	72.6	47.2		30.5(1)										"
"	"	L	"	"											182.3	134.4		1000
"	"	H	"	"	71.0	49.2		32.0										"
"	"	H	"	"					12.7									"
"	"	P	"	"					40.9									"
"	"	H	"	"	63.3	43.1		26.0(1)	39.0						92.8	77.4		"
"	"	K	1500	"											98.0	73.5		"
"	"	L	"	"	21.2	18.9		38.0	37.4	1.2								10
"	"	H	"	"	23.8	19.2		37.5							56.4	53.3		"
"	"	H	"	"	23.1	18.9		18.0(1)	37.9	3.3					55.3	56.0		"
"	"	P	"	"					39.1	2.6					56.4	49.9		"
"	"	R	"	"														"
"	"	K	"	"	70.9	15.2		40.0							57.4	47.5		100

MATERIAL: 304L STAINLESS STEEL

MATERIAL: 304L STAINLESS STEEL

- NOTES: 1. Tensile Specimen - Broken under knife edge of extensometer.
2. Tensile Specimen - Tested wrong temperature.
3. Tensile Specimen - Failed in gage mark.

STOCK SIZE	HEAT	STOCK IDENT	TEST TEMP °F	GRAIN DIR	TENSION			COMPRESSION			DRAWING				REMARKS	
					ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	ELONG. IN (IN)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	D 1.5		D 2			
											ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)		
1.250	A	1	RT	1	212.6	162.4	31.4	10.0	169.7	30.8	302.7	271.4	300.5	120.5	157.2	
"	"	"	"	"	205.4			18.5	168.7	31.2	304.5	282.2	304.0	326.0	146.2	100 (1)
"	"	"	"	"	202.4	162.3	28.8	14.0	176.8	31.7	312.0	281.2	304.4	329.4	135.6	
"	"	"	"	"	201.1	155.7	30.2	20.0	173.8	30.1			309.5	309.5	126.1	
"	"	"	"	"	201.4	159.8	32.6	15.5	177.1	31.3			304.1	304.1	124.4	
"	"	"	"	"	202.4	152.1	31.1	18.5	159.1				304.1	304.1	124.4	
"	"	"	"	"	204.1	158.6	29.8	17.0	180.0	30.7					127.1	Note (2)
"	"	"	"	"	206.8	161.8	32.5	20.0	158.6	36.7					129.6	Note (2)
"	"	"	"	"	199.5	154.9	31.3	20.0	158.6	30.0					126.1	
"	"	"	"	"	202.1	152.4	31.5	20.0							127.7	Note (2)
"	"	"	"	"	202.8	154.8	31.1	17.0	165.1	32.1	304.8	254.2			129.0	
"	"	"	"	"	201.8	159.1	28.8	18.0	168.0	30.6	301.5	270.0	302.7	302.7	131.8	
"	"	"	"	"	205.4	161.7	31.4	17.5	169.2	30.6	312.5	280.4	301.1	302.7	125.3	
"	"	"	"	"	198.8	154.4	30.7	17.5	171.8	31.1	309.4	271.1	301.8	309.5	124.3	
"	"	"	"	"	199.5	152.7	31.5	17.0	176.0	31.2	311.2	286.5	304.1	304.1	128.5	
"	"	"	"	"	207.2	171.7	32.2	17.5	167.7	29.7					126.7	
"	"	"	"	"	202.6	160.9	29.8	14.5	171.7	32.6					125.3	
"	"	"	"	"	205.1	159.3	34.5	16.0	167.0	31.1					123.3	
"	"	"	"	"	200.4	152.5	34.1	18.0	153.7	30.4					124.2	
"	"	"	"	"	201.7	157.0	31.8	18.5	165.1	29.2					125.0	
"	"	0	"	"	190.6	139.9	33.4	25.0	159.9	31.5	289.6	279.6	300.0	300.0	124.8	
"	"	"	"	"	195.4	148.2	34.0	21.0	166.7	31.1	305.2	244.0	304.3	304.3	135.6	
"	"	"	"	"	196.7	144.3	33.5	21.0	150.4	32.6	285.1	248.0	306.9	306.9	127.0	
"	"	"	"	"	196.1	141.0	32.2	23.0	157.4	30.7	292.5	285.4	304.7	304.7	134.2	
"	"	"	"	"	197.0	147.0	32.8	22.5	159.9	30.4	292.2	244.8	304.7	304.7	128.8	
"	"	"	"	"	191.6	144.3	31.5	20.5	159.7	30.7	302.2	234.2	304.1	304.1	134.4	
"	"	"	"	"	194.4	144.0	33.6	24.0	152.8	29.7	282.1	242.4	305.8	305.8	129.7	
"	"	"	"	"	194.2	147.5	32.9	23.5	146.7	29.6					110.1	

MATERIAL - 100%

MATERIAL - 304L SS

NOTES:
 (1) Tensile Specimen - Extensometer Slipped
 (2) Tensile Specimen failed outside of gage section

STOCK SIZE	HEAT	STOCK IDENT	TEST TEMP °F	GRAIN DIR	TENSION			MECHAN			BENDING			TEMP °F
					0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	ELONG IN (%)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	0.2% OFFSET YIELD (KSI)	0.2% OFFSET YIELD (KSI)	0.2% OFFSET YIELD (KSI)	0.2% OFFSET YIELD (KSI)	
1.00	A	T	RT	T										1000
"	"	"	"	"										"
"	"	M	"	"										"
"	"	"	"	"										"
"	"	T	"	"	357.3	33.2	15	212.7	(7)	256.2	256.2	256.2	256.2	1000
"	"	"	"	"										"
"	"	M	"	"	386.8	33.2	4.5	250.4	(2)					"
"	"	"	"	"	291.3	33.2	5.0							"
"	"	T	"	"	375.5	33.2	7.5	269.3	269.3	269.3	269.3	269.3	269.3	1000
"	"	"	"	"	361.8	35.2	5.5	276.3	276.3	276.3	276.3	276.3	276.3	"
"	"	M	"	"	369.2	36.3	7.5	286.0	286.0	286.0	286.0	286.0	286.0	"
"	"	"	"	"										"
"	"	T	"	"	353.9	33.4	5.5	306.0	306.0	306.0	306.0	306.0	306.0	1000
"	"	"	"	"										"
"	"	M	"	"	363.8	33.1	6.0	300.7	300.7	300.7	300.7	300.7	300.7	"
"	"	"	"	"										"
"	"	T	"	"	360.2	32.8	7.0	312.7	312.7	312.7	312.7	312.7	312.7	1000
"	"	"	"	"										"
"	"	M	"	"	362.5	35.1	7.0	294.2	294.2	294.2	294.2	294.2	294.2	"
"	"	"	"	"	339.7	34.5	3.5	250.4	250.4	250.4	250.4	250.4	250.4	"
"	"	T	"	"				273.9	273.9	273.9	273.9	273.9	273.9	1000
"	"	"	"	"										"
"	"	M	"	"				267.9	267.9	267.9	267.9	267.9	267.9	"
"	"	"	"	"				266.3	266.3	266.3	266.3	266.3	266.3	"
"	"	T	"	"	372.7	30.7	11.0	250.9	250.9	250.9	250.9	250.9	250.9	1000
"	"	"	"	"	360.6	31.6	11.0	267.4	267.4	267.4	267.4	267.4	267.4	"
"	"	M	"	"	267.1	29.5	13.0	249.9	249.9	249.9	249.9	249.9	249.9	"
"	"	"	"	"										"

MATERIAL: A516-70

NOTES: (1) Testile section runs outside middle-third of 7-inch gauge length
(2) Bearing 1.5 Section - middle fracture

STOCK SIZE	HEAT	STOCK IDENT	TEST TEMP °F	GRAIN DIR	TENSION			COMPRESSION		BENDING				REMARKS
					0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	ELONG IN IN (1/8)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	0.2% YIELD (KSI)	0.2% YIELD (KSI)	0.2% YIELD (KSI)	0.2% YIELD (KSI)	
Plate 1/2"	B	22	RT	T	184.4	29.2	23.5	119.5				201.2	186.9	
"	"	"	"	"				111.2				172.9	172.3	
"	"	"	"	"	186.5	29.0	21.5	110.0						
"	"	"	"	"	195.5	29.3	24.5	151.0						
"	"	"	"	"	195.3	29.0	22.0							
"	"	"	"	"	186.1	29.3	20.0	136.0						
"	"	"	"	"	191.7	29.2	17.0	140.5						
"	"	"	"	"	197.3	29.0	20.5	131.0						
"	"	"	"	"	195.7	29.4	20.5	152.5						
"	"	"	"	"	194.4	29.9	16.0	112.0						
"	"	"	"	"	197.2	29.4	21.0							
"	"	"	"	"	198.7	29.3	22.0							
"	"	"	"	"	196.9	29.0	21.0	118.3						
"	"	"	"	"	191.2	29.2	25.0	130.5						
"	"	"	"	"	190.3	29.5	24.5	121.5						
"	"	"	"	"	191.4	29.1	22.0	117.0						
"	"	"	"	"	190.5	29.1	20.5	109.1						
"	"	"	"	"	191.5	29.5	25.5	117.2						
"	"	"	"	"	196.9	29.0	21.0	113.2						
"	"	"	"	"	192.2	29.4	25.0	121.3						
"	"	"	"	"	191.9	29.4	26.0	117.5 (1)						
"	"	"	"	"	191.5	29.9	25.0							
"	"	"	"	"	196.2	29.5	16.0	130.1						
"	"	"	"	"	177.4	29.5	23.0	136.0						
"	"	"	"	"	195.1	29.1	19.0	115.5						
"	"	"	"	"	195.5	29.4	16.5	122.9						
"	"	"	"	"	190.9	29.1	14.5							
"	"	"	"	"	191.9	29.5	20.5	127.1						

MATERIAL: Form 13, JUNE 1955
 NOTES: (1) Compression Specimen - Thickness varies 3/64 to 5/16

SMA SIZE	HEAT	STOCK IDENT	TEST TEMP °F	GRAIN DIR	TENSION				COMPRESSION			BENDING				HEAD	REMARKS
					0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	ELONG IN (%)	0.1% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	0.2% OFFSET YIELD (KSI)	0.1% OFFSET YIELD (KSI)	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)		
10.25x1.0	1	10.25	72	1	130.5	31.8	11.0										
"	"	"	"	"	132.6	31.2	11.0										See Data 1.
"	"	"	"	"	132.1	30.5	11.5										
"	"	"	"	"	131.7	30.5	10.0										
"	"	"	1000	"			(2)										
"	"	"	"	"			(2)										
"	"	"	"	"			(3)										
"	"	"	"	"	110.1	31.7	9.0										
"	"	"	"	"	165.7	32.2	12.0										
"	"	"	"	"	152.9	32.6	7.0										
"	"	"	"	"	150.0	30.7	7.5										
"	"	"	"	"	151.6	31.2	11.0										
"	"	"	"	"	155.8	32.9	7.5										
10.25	1	10.25	1000	1	119.3	35.3	9.0										

MATERIAL

Spec. of AISI 316

NOTES

- (1) Specimen failed off center
- (2) Test specimen failed at neck not completed
- (3) Test specimen failed at neck and yield was determined

SPEC. NO.	HEAT	STOCK IDENT	TEST TEMP °F	GRAIN DIR	TENSILE				COMPRESSION				B	D	T	R	REMARKS
					ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	PLASTIC MODULUS (PSI x 10 ³)	ELONG. IN 2" (%)	0.2% OFFSET YIELD (KSI)	PLASTIC MODULUS (PSI x 10 ³)	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	
1	1		100		100	100		100									
2	1		100		100	100		100									
3	1		100		100	100		100									
4	1		100		100	100		100									
5	1		100		100	100		100									
6	1		100		100	100		100									
7	1		100		100	100		100									
8	1		100		100	100		100									
9	1		100		100	100		100									
10	1		100		100	100		100									
11	1		100		100	100		100									
12	1		100		100	100		100									
13	1		100		100	100		100									
14	1		100		100	100		100									
15	1		100		100	100		100									
16	1		100		100	100		100									
17	1		100		100	100		100									
18	1		100		100	100		100									
19	1		100		100	100		100									
20	1		100		100	100		100									
21	1		100		100	100		100									
22	1		100		100	100		100									
23	1		100		100	100		100									
24	1		100		100	100		100									
25	1		100		100	100		100									
26	1		100		100	100		100									
27	1		100		100	100		100									
28	1		100		100	100		100									
29	1		100		100	100		100									
30	1		100		100	100		100									
31	1		100		100	100		100									
32	1		100		100	100		100									
33	1		100		100	100		100									
34	1		100		100	100		100									
35	1		100		100	100		100									
36	1		100		100	100		100									
37	1		100		100	100		100									
38	1		100		100	100		100									
39	1		100		100	100		100									
40	1		100		100	100		100									
41	1		100		100	100		100									
42	1		100		100	100		100									
43	1		100		100	100		100									
44	1		100		100	100		100									
45	1		100		100	100		100									
46	1		100		100	100		100									
47	1		100		100	100		100									
48	1		100		100	100		100									
49	1		100		100	100		100									
50	1		100		100	100		100									
51	1		100		100	100		100									
52	1		100		100	100		100									
53	1		100		100	100		100									
54	1		100		100	100		100									
55	1		100		100	100		100									
56	1		100		100	100		100									
57	1		100		100	100		100									
58	1		100		100	100		100									
59	1		100		100	100		100									
60	1		100		100	100		100									
61	1		100		100	100		100									
62	1		100		100	100		100									
63	1		100		100	100		100									
64	1		100		100	100		100									
65	1		100		100	100		100									
66	1		100		100	100		100									
67	1		100		100	100		100									
68	1		100		100	100		100									
69	1		100		100	100		100									
70	1		100		100	100		100									
71	1		100		100	100		100									
72	1		100		100	100		100									
73	1		100		100	100		100									
74	1		100		100	100		100									
75	1		100		100	100		100									
76	1		100		100	100		100									
77	1		100		100	100		100									
78	1		100		100	100		100									
79	1		100		100	100		100									
80	1		100		100	100		100									
81	1		100		100	100		100									
82	1		100		100	100		100									
83	1		100		100	100		100									
84	1		100		100	100		100									
85	1		100		100	100		100									
86	1		100		100	100		100									
87	1		100		100	100		100									
88	1		100		100	100		100									
89	1		100		100	100		100									
90	1		100		100	100		100									
91	1		100		100	100		100									
92	1		100		100	100		100									
93	1		100		100	100		100									
94	1		100		100	100		100									
95	1		100		100	100		100									
96	1		100		100	100		100									
97	1		100		100	100		100									
98	1		100		100	100		100									
99	1		100		100	100		100									
100	1		100		100	100		100									

MATERIAL: 2024-T3 ALUMINUM

NOTES: 1. All tests were conducted in accordance with ASTM B 391-70. 2. The material was supplied by the Aluminum Company of America.

STOCK SIZE	HEAT	STOCK IDENT	TEST TEMP °F	GRAIN DIR	TENSION			COMPRESSION			BENDING			REMARKS
					ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁻⁶)	ELONG IN (")	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁻⁶)	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ULTIMATE STRENGTH (KSI)	
1" x 1/4"	1	0	RT	2	388.8	344.6	31.4	7.0	355.4	31.1				
"	"	"	"	"	382.2	347.9	31.2	5.0	345.4	31.5				NOTE (1)
"	"	"	"	"	387.8	342.6	32.1	7.5	340.5	32.7				
"	"	"	"	"	385.5	342.9	32.6	7.0	333.2	32.1				NOTE (1)
"	"	"	"	"	386.8	345.6	32.6	8.0	348.1	31.1				
"	"	"	"	1	387.9	345.9	29.5	10.5	357.4	31.5				
"	"	"	"	"	388.2	352.7	25.5	9.0	359.2	31.5				
"	"	"	"	"	392.2	352.7	30.0	11.0	364.3	32.0				
"	"	"	"	"	394.4	354.3	30.0	7.0	359.1	32.5				NOTE (1)
"	"	"	"	"	392.0	352.5	30.0	11.0	359.7	32.5				
"	"	"	"	2	395.4	352.2	29.6	5.0	360.1	30.0				
"	"	"	"	"	395.4	352.2	32.0	7.0	366.7	31.9				
"	"	"	"	"	395.3	350.0	27.0	5.0	350.3	32.1				
"	"	"	"	"	395.5	352.2	31.6	5.0	367.2	31.1				
"	"	"	"	"	390.3	340.0	32.6	5.0						
"	"	"	"	1	382.2	341.0	28.4	10.0	351.1	32.4				
"	"	"	"	"	375.3	340.2	30.7	15.0	356.1	31.7				
"	"	"	"	"	374.0	340.0	29.7	12.0	352.8	31.0				
"	"	"	"	"	368.2	337.2	31.5	11.0	354.0	31.2				
"	"	"	"	"	376.3	340.0	31.8	15.0	352.4	31.2				
"	5	000	"	2	384.4	346.1	28.8	13.0	348.4	32.7				
"	"	"	"	"	387.4	346.1	30.1	17.0	334.2	34.0				
"	"	"	"	"	383.4	345.0	29.4	11.0	338.9	35.0				
"	"	"	"	"	385.4	342.0	29.1	13.5	345.2	33.5				
"	"	"	"	"	385.4	341.2	30.1	16.0	344.8	32.7				
"	"	"	"	1	395.5	352.0	28.6	25.0	352.4	33.1				
"	"	"	"	"	399.5	352.0	31.1	22.0	352.2	32.6				
"	"	"	RT	"	394.4	352.0	30.1	26.0	346.0	31.4				

MATERIAL: 321 AL UNS 5712

NOTES: (1) Tensile Specimen - Break off center

STOCK SIZE	HEAT	STOCK IDENT	TEST TEMP OF	GRAIN DIR	TENSILE					COMPRESSION				BENDING				MARKS
					0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	ELONG IN (%)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	0.2% OFFSET YIELD (KSI)	0.2% OFFSET YIELD (KSI)	0.2% OFFSET YIELD (KSI)	0.2% OFFSET YIELD (KSI)	0.2% OFFSET YIELD (KSI)	0.2% OFFSET YIELD (KSI)	0.2% OFFSET YIELD (KSI)	0.2% OFFSET YIELD (KSI)	
1/2" x 3/4"	E	0	47	T	111.4	30.3	7.0	119.5	32.4								130.1	
"	"	"	"	"	7.4	31.9	7.0	117.5	30.4								131.5	
"	"	"	"	"	116.2	34.0	7.0	154.1	32.4								131.9	
"	"	"	"	"	117.0	31.2	9.0	156.9	32.4								121.2	
"	"	"	"	"	111.1	32.4	6.0	117.3	30.4								131.9	
"	"	"	"	L	150.0	31.5	5.0	161.0	31.5								116.0	See Note 1
"	"	"	"	"	151.2	30.3	11.0	159.5	31.6								117.5	
"	"	"	"	"	154.7	30.1	11.0	150.2	32.0								119.5	
"	"	"	"	"	214.4	27.1	7.5	110.7	31.9								117.1	See Note 1
"	"	"	"	"	214.5	31.2	11.0	159.7	31.4								115.5	
"	"	"	"	"	112.1	31.4	7.0	119.5	30.2								129.4	
"	"	"	"	"	111.0	31.6	9.0	145.9	30.5								129.3	
"	"	"	"	"	115.2	30.0	9.0	151.9	30.4								129.3	
"	"	"	"	"	117.2	30.5	9.0	150.2	30.1								135.9	
"	"	"	"	"	115.3	31.1	9.0	151.1	29.9								111.5	
"	"	"	"	L	118.9	29.5	19.5	150.5	35.1								130.2	
"	"	"	"	"	119.5	29.5	21.0	151.9	30.1								130.5	
"	"	"	"	"	151.0	29.1	21.0	153.4	30.1								130.5	
"	"	"	"	"	192.6	-	19.5	152.4	30.1								117.5	
"	"	"	"	"	193.0	29.5	23.0	152.7	31.5								146.5	
"	7	OC	"	T	152.0	29.6	15.0	161.0	32.4								146.0	
"	"	"	"	"	114.5	31.2	16.0	151.1	32.4								111.5	
"	"	"	"	"	110.2	31.5	12.0	159.3	31.5								110.5	
"	"	"	"	"	111.5	30.6	14.0	156.5	31.6								112.4	
"	"	"	"	"	112.5	31.2	15.0	150.2	31.4								110.2	
"	"	"	"	L	150.5	31.1	14.0	149.2	29.5								113.9	
"	"	"	"	"	152.7	31.9	19.0	142.2	29.1								110.5	
"	"	"	"	"	153.0	29.2	23.0	159.9	31.5								115.5	

WATERBURY: Form 11, A-3 (7-11)

3-55: 1.5 Tensile section failed outside of middle third of 2 inch gage section.

REME' 41 - TRANSVERSE

MECHANICAL PROPERTIES, ROOM TEMPERATURE

RAC Test Data, Except as Noted

NOTES: No. 1 - Prior "A" Test Data
No. 2 - Retest

<u>Heat No.</u>	<u>Gage In.</u>	<u>T. S. KSI</u>	<u>Y. S. KSI</u>	<u>Elong. %</u>	<u>Grain Size</u>	<u>Remarks Note No.</u>
1	.020	205.2	161.0	18	8	
		204.5	162.7	21.0		
		201.5	152.0	20.0		
		202.3	154.1	19.5		
		203.9	160.8	22.0		
		202.8	151.8	21.5		
		205.8	158.2	20.0		
		199.6	151.3	21.5		
		200.0	151.8	16.0		
		206.0	157.8	13.5		
		203.4	152.4	20.5		
		205.0	159.5	21.0		
		206.2	155.3	21.5		
		204.2	155.6	18.5		
2		213.6	172.4	17		
		207.3	159.5	21.5		
		207.1	166.1	17		
		205.3	158.8	19.5		
		206.7	159.8	18.0		
		207.1	156.2	16.5		
		207.6	160.7	19.0		
		207.7	163.9	16.5		
3		206.7	159.6	19		
		204.3	158.7	18.0		
		205.7	162.9	17.0		
		207.2	161.5	19.0		
		205.9	159.3	21.0		
		204.9	154.9	23.0		
		207.9	162.6	21.5		
		203.7	153.2	22.0		
		206.2	161.9	21.0		
		204.2	159.3	20.0		
		205.0	161.4	15.0		
		207.9	160.9	21.5		
		205.7	163.8	20.5		
		205.3	154.8	21.0		
		201.5	152.4	17.0		
		200.0	161.9	11.5		

MECHANICAL PROPERTIES, ROOM TEMPERATURE

RAC Test Data, Except as Noted

NOTES: No. 1 - Vendor "A" Test Data

No. 2 - Retest

<u>Heat No.</u>	<u>Gage In.</u>	<u>T. S. KSI</u>	<u>Y. S. KSI</u>	<u>Elong. %</u>	<u>Grain Size</u>	<u>Remarks Note No.</u>
4	.020	197.4	145.7	17.5		
		195.6	132.9	24.0		
		189.4	136.2	22.0		
		195.6	138.1	24.0		
		189.2	131.5	27.0		
		192.6	141.7	24.5		
		199.0	144.3	24.0		
		192.0	138.4	25.5		
		199.2	144.2	26.0		
		198.0	144.1	22.5		
		201.0	144.5	23.5		
		197.1	140.7	26.0		
		200.5	146.6	24.0		
		187.9	135.4	21.0		
		197.1	138.2	23.5		
		196.1	145.6	24.5		
		199.5	138.8	25.0		
		191.9	139.8	23.5		
		196.2	137.3	25.0		
		197.1	142.4	22.0		
		194.2	141.3	17.0		
		199.1	142.3	23.5		
		193.2	139.8	21.5		
		188.6	136.2	26.0		
		197.1	144.2	27.5		
		191.2	134.7	24.5		
		192.5	135.8	24.0		
		193.5	142.1	26.0		
		195.9	137.0	25.0		
		192.1	138.6	25.5		
		192.8	140.2	22.5		
		193.9	134.8	23.5		
		194.6	140.7	25.0		
		190.6	139.6	24.0		
		195.1	141.2	24.5		
		190.0	134.5	26.0		
		194.1	136.1	26.0		
		194.7	142.1	26.5		
		193.3	135.2	24.5		
		191.7	134.4	23.5		

MECHANICAL PROPERTIES, ROOM TEMPERATURE
RAC Test Data, Except as Noted

NOTES: No. 1 - Vendor "A" Test Data
 No. 2 - Retest

<u>Heat No.</u>	<u>Gage In.</u>	<u>T. S. KSI</u>	<u>Y. S. KSI</u>	<u>Elong. %</u>	<u>Grain Size</u>	<u>Remarks Note No.</u>
5	.020	207.8	151.5	20		
		197.7	142.6	23.0		
		199.0	151.4	21.0		
		201.0	146.5	20.0		
		200.0	142.9	23.0		
		199.1	143.0	21.5		
		200.0	144.7	22.0		
6		200.0	143.3	23		
		196.3	142.6	22.0		
		198.2	143.7	25.0		
		197.2	143.5	23.0		
		190.6	133.9	21.0		
		201.2	156.9	15.0		
		184.6	138.9	21.5		
		194.5	143.9	21.5		
		198.1	148.6	22.5		
		188.9	148.0	12.5		
		196.2	148.6	19.5		
		192.2	145.1	11.5		
		198.1	146.3	23.0		
		200.0	151.4	23.0		
		200.0	151.3	16.0		
		199.1	145.8	22.0		
		198.2	150.4	23.5		
		200.0	147.6	20.5		
		196.4	144.1	22.5		
		193.9	142.8	20.0		
		209.0	152.5	18.0		
		199.1	144.5	20.0		
		197.4	145.2	25.0		
		199.1	147.3	22.5		
		200.9	149.5	21.0		
7	.050	198.9	143.9	17		
		200.8	156.7	21.5		
		198.9	148.0	21.0		
		199.3	154.5	21.5		
		198.6	151.4	20.0		
		198.4	148.4	22.0		

MECHANICAL PROPERTIES, ROOM TEMPERATURE

RAC Test Data, Except as Noted

NOTES: No. 1 - Vendor "A" Test Data

No. 2 - Retest

<u>Heat No.</u>	<u>Gage In.</u>	<u>T.S. KSI</u>	<u>Y.S. KSI</u>	<u>Elong. %</u>	<u>Grain Size</u>	<u>Remarks Note No.</u>
8	.050	199.6	150	15		
		201.5	151.1	25.0		
		194.4	146.0	23.0		
		196.0	146.7	22.5		
		195.6	142.1	23.0		
		196.0	143.5	22.5		
		195.2	143.7	23.5		
		194.0	144.0	24.0		
		191.2	139.2	21.0		
		196.5	146.9	23.5		
		202.0	150.8	23.5		
		198.8	147.3	23.5		
		197.6	150.2	19.5		
		199.6	151.6	23.5		
9		193.6	144.4	16		
		195.6	148.0	21.5		
		193.6	142.9	22.5		
		198.1	146.3	23.0		
		196.5	142.5	21.0		
		192.7	139.5	24.5		
		197.6	147.4	23.0		
		193.4	145.3	22.5		
		192.0	144.5	22.5		
		198.0	156.4	23.0		
		196.0	142.6	24.5		
		196.3	151.6	21.5		
		199.2	149.6	22.0		
10		189.0	132.6	23.0		
		206.0	150.8	24.0		
		210.1	164.2	21.0		
		206.4	158.0	22.0		
		204.4	151.1	21.5		
11		198.9	143.9	17		
		200.9	158.0	17.5		
		203.4	157.3	20.5		
		200.4	149.6	20.5		
		199.2	143.3	22.0		
		201.3	143.3	22.0		
		200.0	146.6	20.5		
		204.2	147.9	21.0		
		197.2	138.3	21.0		
		198.3	150.4	20.5		

MECHANICAL PROPERTIES, ROOM TEMPERATURE
RAC Test Data, Except as Noted

NOTES: No. 1 - Vendor "A" Test Data
No. 2 - Retest

<u>Heat No.</u>	<u>Gage In.</u>	<u>T. S. KSI</u>	<u>Y. S. KSI</u>	<u>Elong. %</u>	<u>Grain Size</u>	<u>Remarks Note No.</u>
12	.050	192.6	143.9	20		
		193.1	148.0	22.0		
		198.7	144.2	22.0		
		195.5	139.1	22.0		
		200.0	150.5	21.0		
		201.9	148.3	21.5		
		195.9	157.5	19.5		
		192.8	148.3	20.5		
		196.9	148.1	21.5		
		202.2	153.9	15.0		
		239.5	176.5	22.5		
		204.1	162.8	19.0		
		197.9	142.6	23.0		
		193.2	140.0	22.5		
13		189.0	132.6	23		
		192.2	155.1	23.5		
		201.2	153.9	22.5		
		192.2	151.0	22.5		
		197.5	154.1	23.0		
14		208.8	166.7	18		
		197.8	149.1	23.0		
		199.3	150.7	22.5		
		196.9	146.4	22.0		
		198.5	148.7	23.0		
		195.5	151.1	22.0		
		207.4	168.9	18.5		
		200.0	149.6	22.5		
		203.0	157.9	22.0		
		197.0	152.1	24.0		
		200.4	153.4	23.0		
		201.5	153.4	22.5		
15		198.9	143.9	17		
		207.7	157.5	16.5		
		201.1	151.8	19.0		
		202.2	148.4	18.0		
		196.3	148.5	21.5		
		197.0	152.0	16.5		
		198.8	148.0	18.5		
		198.6	141.4	19.5		
		201.1	145.5	20.0		
		198.2	150.7	19.0		

MECHANICAL PROPERTIES, ROOM TEMPERATURE**RAC Test Data, Except as Noted****NOTES: No. 1 - Vendor "A" Test Data****No. 2 - Retest**

<u>Heat No.</u>	<u>Gage In.</u>	<u>T. S. KSI</u>	<u>Y. S. KSI</u>	<u>Elong. %</u>	<u>Grain Size</u>	<u>Remarks Note No.</u>
15	.050	203.1	152.2	20.5		
		201.5	147.8	20.5		
		207.6	158.0	21.0		
		200.7	157.1	17.5		
		203.3	159.1	20.0		
		202.8	153.2	20.0		
16		208.1	151.8	20		
		199.2	145.4	21.0		
		201.5	150.0	24.5		
		203.1	155.3	18.5		
		199.2	150.0	24.0		
		200.4	154.3	21.5		
		199.3	147.1	23.0		
		200.0	149.2	22.5		
		199.2	146.5	22.0		
		202.2	154.1	22.0		
		200.0	153.6	22.0		
		196.7	149.4	23.5		
		197.1	143.5	21.5		
		201.9	158.2	21.5		
		197.4	147.9	21.5		
		197.9	153.9	22.0		
		200.8	157.3	21.0		
17	.025	202.0	152.8	18	7	
		189.0	142.1	18.5		
18		199.6	148.8	20	7	
		194.8	137.4	18.5		
19		190.5	138.4	21	7	
		199.8	144.4	21.5		
		195.3	143.8	21.5		
		193.7	142.5	21.0		
		198.2	165.3	21.5		
		195.5	148.5	21.5		
20		191.7	134.1	24		
		199.6	153.4	20		
		196.8	146.4	19		

MECHANICAL PROPERTIES, ROOM TEMPERATURE**RAC Test Data, Except as Noted****NOTES: No. 1 - Vendor "A" Test Data
No. 2 - Retest**

<u>Heat No.</u>	<u>Gage In.</u>	<u>T. S. KSI</u>	<u>Y. S. KSI</u>	<u>Elong. %</u>	<u>Grain Size</u>	<u>Remarks Note No.</u>
21	.025	197.3 199.1 200.9	143.8 156.5 157.4	16 19.5 20.5		
22		198.2 203.8 200.0 204.7 203.7 205.6 204.2 202.5 197.6 202.9 207.5 202.6 204.1 205.9 208.2 203.7 206.2 202.7 203.2 201.2 203.8 205.0 202.5 201.6 201.2 199.2 200.5 190.4 201.7 201.6 197.2 194.3 200.0 200.4 204.2	146.5 152.4 147.7 155.1 158.4 161.2 160.2 151.5 146.7 147.5 155.8 151.3 152.9 154.2 154.9 159.6 155.0 162.2 159.6 152.3 151.7 158.0 150.0 149.2 144.8 152.0 152.9 145.0 150.4 153.2 148.4 147.0 155.2 153.0 154.2	21 22.0 21.5 19.0 21.5 21.5 20.0 21.0 22.0 22.0 20.5 19.5 21.0 23.0 20.5 14.0 22.5 18.5 21.5 20.5 21.0 21.5 16.0 21.5 23.5 21.5 19.0 21.5 23.0 15.0 22.0 22.5 21.0 21.5 21.0	7	

REF: L1 - TRANSVERSE
MECHANICAL PROPERTIES, ROOM TEMPERATURE
RAC Test Data, Except as Noted

NOTES: No. 1 - Vendor "B" Test Data
No. 2 - Retest

<u>Heat No.</u>	<u>Gage In.</u>	<u>T.S. KSI</u>	<u>Y.S. KSI</u>	<u>Elong. %</u>	<u>Grain Size</u>	<u>Remarks Note No.</u>
1	.013	184.9	155.3	9		1
		193.2	140.3	17.5		
		189.0	132.6	21.5		
		193.9	136.4	22.0		
		191.4	135.4	20.5		
		189.0	142.0	12.0		
		188.8	140.3	15.0		
2		186.7	150.8	16		1
		192.3	162.6	11.0		
		190.0	142.9	13.5		
		192.5	152.9	17.5		
		195.8	143.6	18.5		
		195.4	144.3	17.5		
		194.7	154.0	16.0		
		177.5	152.7	13.0		
		197.1	138.4	18.0		
		192.3	142.3	18.5		
		182.6	141.3	9.5		
		182.0	130.9	17.0		
3		176.1	130.5	11		1
		195.4	138.7	20.0		
		194.6	142.9	17.0		
		211.1	150.9	18.0		
		201.0	154.1	16.5		
4		189.1	134.0	18		1
		190.1	136.1	20.0		
		191.5	135.9	19.5		
		197.9	142.3	20.0		
		191.8	151.9	15.5		
5		197.3	141.7	20		1
		202.3	148.0	22.5		
		198.0	144.5	17.5		
		185.9	137.1	18.0		
		198.2	144.7	20.5		
6		178.7	131.4	17		1
		195.6	156.4	19.5		
		190.9	133.0	20.0		

MECHANICAL PROPERTIES, ROOM TEMPERATURE

BAC Test Data, Except as Noted

NOTES: No. 1 - Vendor "B" Test Data

No. 2 - Retest

<u>Heat No.</u>	<u>Gage In.</u>	<u>T. S. KSI</u>	<u>Y. S. KSI</u>	<u>Elong. %</u>	<u>Grain Size</u>	<u>Remarks Note No.</u>
7	.013	193.3	139.6	20		1
		200.0	139.1	23.5		
		197.0	142.7	22.5		
		193.2	136.9	13.5		
		193.4	142.7	14.5		
		194.2	141.2	20.5		
		194.9	144.3	16.0		
		198.9	145.4	22.5		
		199.4	139.4	23.0		
		198.2	140.0	24.0		
		198.2	140.6	22.5		
8		185.1	135.0	20		1
		182.9	127.8	21.5		
		197.0	136.2	21.0		
		195.2	135.8	23.5		
		190.9	137.3	22.5		
		207.7	148.3	24.0		
		194.2	136.3	22.0		
		194.0	134.0	25.0		
		186.8	130.7	19.0		
		185.3	132.7	22.5		
		189.0	133.9	21.0		
		184.0	130.3	14.0		
		196.6	135.1	25.0		
		196.4	137.6	21.0		
		187.5	134.4	15.0		
9		181.5	176.9	11		1
		190.7	134.0	18.5		
		195.3	137.0	20.0		
		185.5	130.5	17.0		
		191.4	130.2	19.5		
		187.7	138.1	15.0		
		190.0	135.9	14.0		
		187.4	130.3	16.5		
10		198.4	170.1	16		1
		198.5	146.5	22.5		
		188.5	147.9	17.5		
		183.4	138.4	15.5		
		185.9	133.4	13.5		
		191.1	139.8	14.0		
		189.8	151.6	19.5		
		193.1	133.8	23.5		

MECHANICAL PROPERTIES, ROOM TEMPERATURE
RAC Test Data, Except as Noted

NOTES: No. 1 - Vendor "B" Test Data
No. 2 - Retest

<u>Heat No.</u>	<u>Gage In.</u>	<u>T. S. KSI</u>	<u>Y. S. KSI</u>	<u>Elong. %</u>	<u>Grain Size</u>	<u>Remarks Note No.</u>
11	.013	201.0	161.9	19		1
		194.0	138.8	16.0		
		197.6	140.2	18.5		
		193.2	136.0	17.0		
		196.3	134.6	18.0		
		195.4	144.6	15.0		
		199.0	142.4	17.0		
		183.5	136.4	10.5		
		195.8	143.7	12.5		
		190.6	141.9	11.5		
		185.4	139.2	22.0		
		187.3	140.7	21.5		
		201.1	161.9	19		
		186.4	127.0	23.5		
		179.8	126.9	14.5		
12		191.2	143.1	20		1
		194.2	148.9	16.0		
		188.8	140.3	18.5		
		190.0	141.2	21.0		
		194.6	138.7	21.0		
		188.6	136.2	19.0		
		188.1	134.7	19.0		
		190.8	136.2	20.5		
		188.3	136.8	23.0		
		188.5	149.4	16.0		
		186.1	146.0	17.5		
		185.1	135.9	18.5		
13		204.0	146.6	20		1
		199.5	138.4	21.5		
		202.2	142.4	23.0		
		188.0	136.8	14.0		
		201.3	143.6	19.0		
		198.1	142.1	15.5		
		200.3	143.5	18.5		
		199.5	141.3	18.0		
		188.2	134.4	17.0		
14		197.5	139.5	21		1
		188.6	142.5	21.0		

MECHANICAL PROPERTIES, ROOM TEMPERATURE
RAC Test Data, Except as Noted

NOTES: No. 1 - Vendor "B" Test Data
No. 2 - Retest

<u>Heat</u> <u>No.</u>	<u>Gage</u> <u>In.</u>	<u>T. S.</u> <u>KSI</u>	<u>Y. S.</u> <u>KSI</u>	<u>Elong.</u> <u>%</u>	<u>Grain</u> <u>Size</u>	<u>Remarks</u> <u>Note No.</u>
15	.013	196.3	137.4	22		1
		191.1	136.0	22.5		
		185.2	132.7	19.5		
		127.5	66.6	32.5		
		191.7	144.9	17.0		
		190.9	139.1	19.5		
		183.8	135.0	19.0		
		190.5	133.7	21.5		
		190.9	139.3	16.5		
		184.1	139.7	17.5		
		189.9	143.9	19.0		
		187.2	134.6	21.0		
16		185.4	139.2	22.0		1
		187.3	140.7	21.5		
17		205.5	165.9	18		1
		189.8	139.0	25.5		
		192.2	145.0	21.0		
		191.8	141.8	29.0		
		197.2	149.3	22.0		
		187.7	149.3	10.5		
		194.8	148.4	20.0		
		198.4	154.5	17.5		
		197.8	143.8	25.0		
		198.4	151.8	22.0		
		200.0	148.6	21.5		
		195.9	144.9	21.5		
		202.9	150.7	21.0		
18		205.7	151.7	20		1
		202.9	154.2	20.0		
		210.0	153.4	21.5		
		197.4	143.4	21.5		
		200.0	146.1	20.0		
		201.0	155.0	18.0		
		206.6	155.6	22.5		
		206.9	165.6	19.5		
		195.2	143.0	23.0		
		208.3	158.0	20.0		
		196.9	150.0	21.5		

MECHANICAL PROPERTIES, ROOM TEMPERATURE
BAC Test Data, Except as Noted

NOTES: No. 1 - Vendor "B" Test Data
No. 2 - Retest

<u>Test</u> <u>No.</u>	<u>Gage</u> <u>In.</u>	<u>T. S.</u> <u>KSI</u>	<u>Y. S.</u> <u>KSI</u>	<u>Elong.</u> <u>%</u>	<u>Grain</u> <u>Size</u>	<u>Remarks</u> <u>Note No.</u>
19	.013	189.4	140.5	10		1
		197.7	145.4	17.0		
		200.9	148.2	22.5		
		201.2	152.5	19.5		
		195.6	144.0	20.0		
		195.6	148.3	20.5		
		191.1	138.6	18.0		
		189.0	143.8	17.5		
		179.1	138.1	11.0		
		189.4	140.5	10		
		195.3	134.2	21.5		
		194.1	135.5	20.5		
20		203.0	180.1	19		1
		198.9	139.1	23.0		
21		188.2	153.5	16		1
		191.1	132.8	22.0		
22		201.1	161.9	19		1
		185.0	129.9	24.5		
		186.4	127.0	23.5		
		179.8	126.9	14.5		
23		196.9	161.2	21		1
		187.1	142.2	12.5		
		193.3	134.6	18.5		
24		180.0	121.1	25		1
		182.6	126.4	28.0		
		177.4	126.8	19.5		
		174.3	118.2	22.0		
		187.5	133.5	22.5		
25		206.1	161.9	23		1
		195.1	150.6	21.0		
		190.0	135.1	24.5		
		197.0	145.7	28.5		
		190.4	142.8	22.0		

MECHANICAL PROPERTIES, ROOM TEMPERATURE
RAC Test Data, Except as Noted

NOTES: No. 1 - Vendor "B" Test Data
No. 2 - Retest

<u>Heat No.</u>	<u>Gage In.</u>	<u>T. S. KSI</u>	<u>Y. S. KSI</u>	<u>Elong. %</u>	<u>Grain Size</u>	<u>Remarks Note No.</u>
26	.013	199.7	146.0	23		1
		178.0	126.0	27.5		
		193.4	138.5	23.5		
		183.9	136.1	14.5		
		189.9	134.1	25.5		
27		189.6	158.7	22		1
		182.1	123.2	24.5		
		185.9	127.9	21.0		
		184.8	124.4	20.0		
		186.0	125.3	22.5		
		184.5	126.7	17.5		
28		184.2	123.3	21.5		1
		201.9	171.1	17		
		196.4	140.2	25.5		
		188.5	140.2	17.5		
29		192.3	150.8	12.0		1
		189.9	140.6	22		
		196.7	136.4	22.5		
		197.7	133.0	23.0		
		189.7	138.2	20.0		
		190.4	131.0	21.5		
		189.6	130.1	21.5		
		185.5	133.3	14.0		
		193.3	132.7	21.0		
		191.2	130.9	22.5		
		191.0	131.32	23.5		
		194.5	133.9	23.5		
		188.9	135.1	20.5		
		195.7	137.2	22.5		
		190.0	134.1	17.5		
		197.3	140.5	22.0		
		194.2	133.3	22.5		
		195.4	133.0	23.0		
		190.3	129.7	21.0		
30		189.0	129.3	22.0		1
		195.9	137.1	18.5		
		195.9	134.1	21.0		
		194.7	131.5	23.0		
		193.6	131.3	21.0		
		188.4	167.2	19		

MECHANICAL PROPERTIES, ROOM TEMPERATURE
RAC Test Data, Except as Noted

NOTES: No. 1 - Vendor "B" Test Data
No. 2 - Retest

<u>Heat No.</u>	<u>Gage In.</u>	<u>T. S. KSI</u>	<u>Y. S. KSI</u>	<u>Elong. %</u>	<u>Grain Size</u>	<u>Remarks Note No.</u>
31	.013	182.7	135.5	9		1
		191.4	133.4	19.0		
		182.7	148.4	8.5		
		190.7	141.2	13.5		
		186.4	140.7	10.5		
32		206.6	151.3	10		1
		187.3	139.6	13.5		
		196.1	148.8	20.0		
		196.1	140.2	22.5		
33		207.8	161.4	20		1
		198.6	147.1	15.5		
		200.0	149.5	17.5		
		193.3	145.2	12.5		
		187.5	147.3	10.5		
		189.3	150.3	8.5		
		187.7	151.2	10.0		
		199.0	155.6	9.5		
34		207.8	144.3	14		1
		198.4	145.1	16.5		
		196.4	139.2	20.0		
		194.4	138.6	23.8		
		197.4	141.0	21.0		
35		200.0	145.5	17		1
		193.6	147.7	22.0		
		195.9	141.4	22.5		
		204.2	150.6	20.5		
		200.0	146.3	22.0		
		196.9	144.0	17.0		
		197.4	145.3	20.0		

MECHANICAL PROPERTIES, ROOM TEMPERATURE
RAC Test Data, Except as Noted

NOTES: No. 1 - Vendor "B" Test Data
 No. 2 - Retest

<u>Heat No.</u>	<u>Gage In.</u>	<u>T. S. KSI</u>	<u>Y. S. KSI</u>	<u>Elong. %</u>	<u>Grain Size</u>	<u>Remarks Note No.</u>
36	.013	183.1	140.5	20		1
		190.6	142.9	23.5		
		190.8	140.6	15.0		
		193.1	137.6	23.5		
		192.3	133.7	24.0		
		188.4	130.3	23.5		
		186.8	129.3	23.5		
		191.2	133.7	24.0		
		192.4	135.0	21.5		
		195.6	135.8	21.0		
		193.7	136.6	16.5		
		196.6	136.6	24.0		
		194.6	134.9	22.5		
37		193.5	152.6	22		1
		194.2	147.1	19.0		
		188.7	141.4	22.0		
		187.8	142.5	18.0		
		185.9	138.1	22.0		
		191.1	150.0	18.0		
		187.8	140.0	20.0		
38		204.2	149.1	24		1
		195.5	136.9	20.0		
		191.5	130.8	21.0		
		184.6	137.0	19.0		
		190.9	142.2	21.5		
		190.2	133.4	19.0		
		191.8	141.5	18.5		
		188.9	131.8	21.0		
		184.8	131.6	14.5		
		186.2	139.2	18.5		
39		179.5	133.4	17.5		1
		206.6	151.3	10		
		186.0	147.0	17.5		
		204.7	157.6	21.0		
		188.5	142.6	14.5		

MECHANICAL PROPERTIES, ROOM TEMPERATURE**RAC Test Data, Except as Noted****NOTES: No. 1 - Vendor "B" Test Data****No. 2 - Retest**

<u>Heat No.</u>	<u>Gage In.</u>	<u>T.S. KSI</u>	<u>Y.S. KSI</u>	<u>Elong. %</u>	<u>Grain Size</u>	<u>Remarks Note No.</u>
40	.013	207.8	161.4	20		1
		186.6	157.1	11.0		
		146.0	78.64	0.5		
		147.0	77.1	43.5		
		192.6	145.3	12.0		
		144.7	68.74	2.0		
		195.6	151.8	15.0		
		199.2	154.3	16.0		
41		186.5	143.4	15		1
		197.6	162.4	10.0		
		195.9	146.9	14.0		
42	.020	204.8	138.7	20		1
		206.0	149.5	21.0		
		201.9	146.2	23.0		
		190.3	135.8	20		
		186.5	143.3	14.5		
		194.7	135.1	27.0		
		195.7	144.7	21.5		
		194.1	139.3	19		
		193.5	138.8	22.0		
		206.2	151.0	20		
		199.6	139.7	21.0		
		205.3	148.2	17.0		
		207.7	154.1	19		
		199.5	145.3	22.5		
		200.0	143.6	23.0		
		200.5	144.2	17		
		205.6	155.7	18.5		
		198.6	143.1	21.5		
		202.0	151.5	21.0		
		199.6	144.3	21		
		202.0	155.0	21.0		
		204.5	164.9	19.5		

MECHANICAL PROPERTIES, ROOM TEMPERATURE

RAC Test Data, Except as Noted

NOTES: No. 1 - Vendor "B" Test Data

No. 2 - Retest

<u>Heat No.</u>	<u>Gage In.</u>	<u>T.S. KSI</u>	<u>Y.S. KSI</u>	<u>Elong. %</u>	<u>Grain Size</u>	<u>Remarks Note No.</u>
43	.025	205.1	151.8	18		1
		205.8	158.1	17.0		
		206.9	155.0	19.5		
44		210.6	172.6	17		1
		210.9	164.3	16.0		
		208.5	162.8	18.5		
45		204.2	151.4	17		1
		208.9	162.6	21.5		
		205.6	160.7	20.0		
46		211.3	165.3	18		1
		171.1	135.4	11.0		
		195.9	145.9	20.5		
47		208.6	153.9	16		1
		199.5	153.4	19.5		
		190.0	158.2	8.0		
		202.2	151.3	21.5		
48		140.1	130.7	20		1
		202.6	160.3	20.1		
		199.2	144.0	22.0		
49		198.6	146.7	20		1
		199.6	158.9	11.0		
		202.6	148.5	17.0		
50		194.8	141.3	20		1
		192.2	138.0	23.0		
		195.3	143.0	20.0		
		195.9	140.5	22.5		
51		218.4	181.6	20		1
		192.4	144.9	23.0		
		189.3	142.7	27.0		
		202.4	162.2	13.0		
		203.3	157.0	12.5		
		212.0	171.8	17.5		

MECHANICAL PROPERTIES, ROOM TEMPERATURE**RAC Test Data, Except as Noted****NOTES: No. 1 - Vendor "B" Test Data****No. 2 - Retest**

<u>Heat No.</u>	<u>Gage In.</u>	<u>T.S. KSI</u>	<u>Y.S. KSI</u>	<u>Elong. %</u>	<u>Grain Size</u>	<u>Remarks Note No.</u>
52	.025	203.5	160.2	21		1
		201.7	163.3	20.0		
		193.4	154.7	10.5		
		200.8	158.1	18.0		
		204.8	160.8	22.5		
		203.3	162.6	14.0		
53		202.1	155.0	19		1
		203.8	151.7	21.0		
		203.5	147.9	22.0		
		204.4	149.7	20.0		
		194.2	150.4	10.5		
		210.7	172.5	15.0		
54		208.2	156.0	21		1
		199.3	153.4	15.0		
		202.4	157.3	19.0		
		201.7	157.6	19.5		
		199.7	152.8	18.5		
		202.1	156.3	20.5		
55		207.7	155.2	20		1
		196.9	150.8	18.5		
		198.6	147.2	19.5		
		194.7	148.9	12.5		
56		198.8	144.2	20		1
		200.0	152.9	17.5		
57		199.6	141.8	24		1
		194.4	146.0	22.0		
		200.7	149.7	21.5		
58		201.9	151.1	20		1
		206.9	148.7	24.0		
		207.7	167.1	20.0		
59		200.0	145.0	20		1
		198.8	145.0	20.5		
		201.7	150.0	20.0		
60		200.4	145.4	21		1
		206.0	159.9	21.0		
		214.9	162.8	20.0		

MECHANICAL PROPERTIES, ROOM TEMPERATURE
RAC Test Data, Except as Noted

NOTES: No. 1 - Vendor "B" Test Data
No. 2 - Retest

<u>Heat No.</u>	<u>Gage In.</u>	<u>T.S. KSI</u>	<u>Y.S. KSI</u>	<u>Elong. %</u>	<u>Grain Size</u>	<u>Remarks Note No.</u>
61	.025	200.9 197.7 198.0	143.9 152.6 157.0	18 20.5 17.5		1
62		199.2 192.1 194.1	142.0 142.9 139.0	22 20.5 20.0		1
63		202.3 210.9 199.2	146.2 165.2 147.3	20 19.5 21.0		1
64		203.9 205.0 199.3	153.8 158.5 146.9	18 17.5 20		1
65		215.1 192.2 194.2	195.0 147.7 148.8	15 20.0 20.0		1
66		194.8 197.0 202.4	141.5 144.0 153.6	20 24.0 17.0		1
67		207.4 208.7 209.8	161.3 159.8 165.8	16 21.0 18.0		1
68		207.3 204.8 202.1	156.0 169.6 155.6	17 13.5 18.5		1
69		192.6 192.9	143.4 135.3	22.5 25.5		1
70		209.7 201.3 194.2 197.3 201.7 199.6	180.6 150.0 150.8 153.1 156.3 155.3	18 22.5 12.0 18.0 16.5 17.5		1

MECHANICAL PROPERTIES, ROOM TEMPERATURE**RAC Test Data, Except as Noted****NOTES: No. 1 - Vendor "B" Test Data****No. 2 - Retest**

<u>Heat No.</u>	<u>Gage In.</u>	<u>T.S. KSI</u>	<u>Y.S. KSI</u>	<u>Elong. %</u>	<u>Grain Size</u>	<u>Remarks Note No.</u>
71	.025	198.6	167.3	20		1
		196.2	149.6	19.0		
		194.8	142.3	21.0		
		198.8	148.8	20.0		
		193.5	140.9	18.0		
		189.6	137.6	14.5		
72		207.9	170.0	20		1
		203.8	157.7	20.0		
		199.5	156.9	18.5		
		205.0	154.2	22.0		
		204.8	154.1	18.0		
		208.8	156.6	20.0		
73		204.8	167.7	18		1
		205.6	156.3	19.0		
		202.7	149.3	20.0		
74		202.5	146.7	22		1
		180.6	148.4	11.0		
		208.5	164.0	17.0		
75		201.3	145.0	22		1
		203.5	151.4	22.5		
		194.0	136.0	10.0		
76		206.3	160.8	17		1
		186.4	143.4	20.0		
		197.4	155.2	16.0		
77		185.3	137.2	16.5		1
		195.5	151.8	10.0		
78	.050	190.0	132.1	19		1
		200.0	144.4	23.0		
		196.7	138.1	24.5		
79		200.5	149.8	18		1
		191.6	138.3	26.5		
		192.4	140.2	25.5		
80		202.0	148.1	19		1
		196.3	140.9	24.0		
		198.5	148.1	24.5		

MECHANICAL PROPERTIES, ROOM TEMPERATURE
RAC Test Data, Except as Noted

NOTES: No. 1 - Vendor "B" Test Data
No. 2 - Retest

<u>Heat No.</u>	<u>Gage In.</u>	<u>T. S. KSI</u>	<u>Y. S. KSI</u>	<u>Elong. %</u>	<u>Grain Size</u>	<u>Remarks Note No.</u>
81	.050	192.4 194.7	142.4 140.4	20 24.0		1
82		212.9 198.1 201.3	162.7 145.3 155.7	15 24.0 21.0		1
83		199.2 204.3 208.3	141.9 148.0 166.3	23 22.0 21.5		1
84		204.8 198.0 203.0	150.4 157.6 148.7	21 21.5 21.0		1
85		197.7 191.0 196.7	145.0 146.6 157.5	18 23.5 18.5		1
86		201.5 195.4 189.6 200.8 188.1 139.7	157.3 151.3 131.3 149.0 142.8 79.7	17 16.5 21.0 20.0 17.0 38.5		1
87		190.7 190.6 192.5 186.5 188.1	137.3 144.3 138.7 135.5 137.9	28 24.0 22.0 27.0 25.0		1
88		187.5 193.2	135.1 134.6	23 24.5		1
89		207.9 204.1 206.9	162.8 161.2 163.6	18 18.0 20.0		1
90		203.6 203.1 203.1 204.0	161.7 152.9 150.0 160.5	19 23.0 18.0 17.0		1

MECHANICAL PROPERTIES, ROOM TEMPERATURE
RAC Test Data, Except as Noted

NOTES: No. 1 - Vendor "B" Test Data
No. 2 - Retest

<u>Heat</u> <u>No.</u>	<u>Gage</u> <u>In.</u>	<u>T. S.</u> <u>KSI</u>	<u>Y. S.</u> <u>KSI</u>	<u>Elong.</u> <u>%</u>	<u>Grain</u> <u>Size</u>	<u>Remarks</u> <u>Note No.</u>
91	.050	197.8	164.3	12		1
		200.0	144.4	21.0		
		195.6	143.8	16.0		
		199.3	150.6	19.0		
		204.9	160.7	21.5		
92		200.7	150.5	17		1
		200.7	146.0	20.5		
		206.6	158.1	14.5		
		209.8	156.4	19.0		
93	.071	195.5	145.5	18		1
		207.8	155.3	23.5		
		201.8	150.9	16		
		203.6	150.0	20.5		
94		196.0	139.8	19		1
		197.1	147.2	21.0		
95		207.8	153.7	17		1
		200.6	154.3	21.5		
96		204.6	149.0	17		1
		205.9	160.1	15.0		
97		195.0	159.0	23		1
		197.7	149.4	23.0		
		196.3	152.0	16.0		

REF: '41 - TRANSVERSE
MECHANICAL PROPERTIES, ROOM TEMPERATURE
RAC Test Data, Except as Noted

NOTES: No. 1 - Vendor C Test Data
No. 2 - Retest

<u>Heat No.</u>	<u>Gage In.</u>	<u>T. S. KSI</u>	<u>Y. S. KSI</u>	<u>Elong. %</u>	<u>Grain Size</u>	<u>Remarks Note No.</u>
1	.020	193.8	132.5	18	6	
		192.2	144.6	19		
		193.8	139.0	20		
		196.1	142.2	21		
		195.0	143.0	22		
		175.7	140.0	12		
		180.3	139.4	10		
		187.6	135.2	16.5		
2		194.7	135.1	25	5	
		184.0	136.5	18		
		183.2	134.7	17		
		183.7	130.0	19		
		178.6	130.1	16		
		187.5	141.7	15		
		188.6	136.2	18		
		187.3	142.2	16.5		No. 1.
3		197.1	140.9	19.6		
		170.8	141.8	8		
		187.5	136.5	15.5		No. 2.
		176.3	132.1	11		
		185.7	147.7	12.5		
4		199.0	143.7	26.5	6	
		188.6	148.0	13		
		190.8	155.5	9.5		
		185.6	149.2	10		
5		204.9	158.3	21		
		201.3	152.7	18.5		
		204.5	157.7	18.5		
		200.9	153.1	19		
		200.0	151.4	20		
		202.7	154.9	19		

MECHANICAL PROPERTIES, ROOM TEMPERATURE
RAC Test Data, Except as Noted

NOTES: No. 1 - Vendor C Test Data
No. 2 - Retest

<u>Heat No.</u>	<u>Gage In.</u>	<u>T. S. KSI</u>	<u>Y. S. KSI</u>	<u>Elong. %</u>	<u>Grain Size</u>	<u>Remarks Note No.</u>
6	.020	202.2	153.6	16		
		202.9	152.9	19		
		196.0	153.5	12		
7		192.3	148.0	20		
		198.0	149.0	18.5		
8		210.8	166.6	16		
		203.3	154.2	19.5		
		204.6	158.7	19		
9		206.2	166.0	20		
		200.0	153.4	18		
		206.8	158.3	16.5		
		200.9	158.5	16.5		
		194.4	150.0	16.5		
		203.9	157.8	18.5		
10		196.6	132.2	24		
		203.7	157.8	13.5		
		203.4	147.6	20.5		
		205.8	151.9	19		
		199.5	150.0	18		
		205.3	152.9	18		
		201.9	153.8	18.5		
		203.4	154.4	17.5		
11		197.4	151.7	24		
		200.0	149.5	20		
		204.6	149.1	21.5		
		201.8	150.0	20		
		199.1	150.0	20		
		199.1	151.4	20.5		

MECHANICAL PROPERTIES, ROOM TEMPERATURE

RAC Test Data, Except as Noted

NOTES: No. 1 - Vendor C Test Data
No. 2 - Retest

<u>Heat No.</u>	<u>Gage In.</u>	<u>T. S. KSI</u>	<u>Y. S. KSI</u>	<u>Elong. %</u>	<u>Grain Size</u>	<u>Remarks Note No.</u>
12	.020	202.4	153.7	21	6	
		201.0	158.1	19.5		
		200.0	143.4	20.5		
		204.8	151.9	20		
		202.8	147.7	18.5		
		191.6	142.5	19		
13		209.9	168.1	18		
		210.8	159.3	17.5		
		201.9	151.4	17.5		
		216.7	156.1	20.5		
14		209.9	150.5	18		
		206.6	159.0	17.5		
		206.7	161.1	17		
		207.0	162.4	16		
15		204.2	160.1	20	5	
		199.0	149.0	20		
		199.0	139.9	21.5		
		201.0	138.5	20		
16		202.5	148.3	24		
		194.3	141.9	19.5		
		195.2	144.2	21		
		197.1	143.1	20.5		
		189.2	136.3	19		
		195.1	143.2	18		
17		203.8	145.4	20		
		201.0	145.7	19.5		
		199.0	142.6	18.5		
		202.5	153.4	21.5		
		197.9	140.0	19		
18		203.1	139.4	25		
		198.1	146.3	17.5		
		198.2	140.8	22.5		
		196.6	139.9	22		

MECHANICAL PROPERTIES, ROOM TEMPERATURE

RAC Test Data, Except as Noted

NOTES: No. 1 - Vendor C Test Data
No. 2 - Retest

<u>Heat No.</u>	<u>Gage In.</u>	<u>T. S. KSI</u>	<u>Y. S. KSI</u>	<u>Elong. %</u>	<u>Grain Size</u>	<u>Remarks Note No.</u>
19		191.5	142.5	19	6	
		187.9	137.1	21.5		
		188.6	136.2	16.5		
		190.2	139.1	17		
20		199.2	142.2	22	5	
		196.7	145.7	22.5		
		195.3	146.8	22.5		
21		204.0	151.8	19		
22		192.1	134.1	22		
		196.0	149.0	22		
23		195.8	133.3	21	7	
		194.4	152.3	14		
		200.0	156.7	16		
		191.9	146.8	15		
		190.7	157.9	13		
		197.6	149.0	14		
		190.5	152.4	11		
24		187.3	141.4	19	5	
		190.8	144.9	14		
		184.8	144.4	12		
		192.5	150.0	13.5		
		185.7	144.9	11		
		192.6	145.3	18.5		
		195.0	145.0	17.5		
		190.5	137.9	18		
25		194.5	129.6	22	7	
		196.2	148.1	19		
		191.5	148.9	15.5		
		196.1	147.6	17		
		194.2	145.6	20.5		
		200.0	147.6	20		

MECHANICAL PROPERTIES, ROOM TEMPERATURE
RAC Test Data, Except as Noted

NOTES: No. 1 - Vendor C Test Data
 No. 2 - Retest

<u>Heat No.</u>	<u>Gage In.</u>	<u>T. S. KSI</u>	<u>Y. S. KSI</u>	<u>Elong. %</u>	<u>Grain Size</u>	<u>Remarks Note No.</u>
26	.020	189.8 196.2 191.3 187.9 191.2 186.2	122.6 144.2 138.5 137.4 138.2 137.6	20 21 18 19 21 19.5	7	
27		202.2 191.6 190.6 195.8	153.6 145.9 146.2 151.9	16 20.5 19.5 17.5		
28		192.3 194.1 198.2 193.0	148.0 148.0 145.6 148.9	20 18.5 23 23		
29		191.5 193.1 192.3 192.8	142.5 142.6 140.4 144.1	19 21 19.5 19.5	6	
30		183.5 194.0 191.4 194.9	148.58 143.6 143.1 139.1	21 18.5 19.5	5	
31	.025	194.0 194.6 198.7	133.0 142.5 155.2	19 19 19	7	
32		193.0 193.6 195.1	148.5 148.3 150.2	17 20.5 19		
33		198.0 198.9 197.4	157.5 158.1 150.4	19 15.5 18.5		
34		194.5 195.7 195.6	144.0 143.2 173.5	21 15.5 17		No. 1

MECHANICAL PROPERTIES, ROOM TEMPERATURE

RAC Test Data, Except as Noted

NOTES: No. 1 - Vendor C Test Data
No. 2 - Retest

<u>Heat No.</u>	<u>Gage In.</u>	<u>T. S. KSI</u>	<u>Y. S. KSI</u>	<u>Elong. %</u>	<u>Grain Size</u>	<u>Remarks Note No.</u>
52	.025	205.9	154.6	19		
		206.9	153.8	19.5		
		200.8	151.6	20.5		
53		206.8	163.1	18		
		204.0	152.9	20		
		208.2	161.1	18		
		206.0	155.6	18.5		
		201.6	154.5	14		
		207.0	161.1	14.5		
54		205.1	151.9	21		
		199.3	149.6	19		
		200.4	153.1	14.5		
		200.0	148.9	18.5		
		203.0	155.6	16.5		
		198.5	152.2	11.5		
55		205.1	150.4	20		
		200.8	148.1	17.5		
		203.8	152.0	18		
		202.3	150.8	18.5		
		203.0	150.8	18.5		
56		205.6	151.4	22		
		198.4	151.6	12		
		201.5	151.5	17		
		203.9	159.3	19		
		203.1	153.1	19		
		203.1	152.0	18.5		
57		202.9	160.5	21		
		194.3	147.0	15.5		
		195.5	148.5	21		
58		194.0	140.0	20		
		187.7	139.1	18.5		
		192.3	145.6	18		

MECHANICAL PROPERTIES, ROOM TEMPERATURE

RAC Test Data, Except as Noted

NOTES: No. 1 - Vendor C Test Data
No. 2 - Retest

<u>Heat No.</u>	<u>Gage In.</u>	<u>T. S. KSI</u>	<u>Y. S. KSI</u>	<u>Elong. %</u>	<u>Grain Size</u>	<u>Remarks Note No.</u>
59	.025	192.0 190.0	129.0 112.5	16 14	7	
60		194.0 194.2 196.9 197.6	110.0 112.1 115.3 115.2	20 20 18.5 21		
61		203.7 202.4 200.7 200.8 196.9 200.7	115.6 158.4 152.9 118.0 137.7 150.4	22 10.5 16.5 23 18.5 19.5		
62		201.7 190.6 198.8 196.2 192.5	110.2 115.7 153.7 118.1 117.4	19 19.5 18 20.5 21		
63		203.8 201.5 205.8 203.3 203.5 199.2	153.2 150.0 151.8 150.4 119.2 152.0	21 22 22 22.5 22.5 21		
64		204.9 203.5 202.7 200.0	118.8 153.1 152.7 153.0	22 18.5 21.5 23		
65		184.3 198.5 195.8	121.0 117.7 115.0	19 18.5 18.5	4	
66		192.0 195.2 195.2	113.0 114.8 113.1	16 16 17.5	7	

MECHANICAL PROPERTIES, ROOM TEMPERATURE

RAC Test Data, Except as Noted

NOTES: No. 1 - Vendor C Test Data
No. 2 - Retest

<u>Heat No.</u>	<u>Gage In.</u>	<u>T. S. KSI</u>	<u>Y. S. KSI</u>	<u>Elong. %</u>	<u>Grain Size</u>	<u>Remarks Note No.</u>
67	.032	204.2	142.7	23		
		203.3	141.9	18		
		202.5	148.4	21.5		
68		202.3	150.2	21		
		197.6	147.0	19.5		
		198.8	150.3	20		
69		201.7	147.9	23		
		194.7	148.7	21.5		
		195.6	146.6	21.5		
		195.2	142.5	22		
		199.1	147.3	22.5		
		195.8	144.9	22.5		
70		197.1	144.5	23.8		
		194.7	142.1	23.5		
		193.8	139.8	22.5		
		195.5	146.5	21		
71		205.1	155.2	22		
		196.6	143.8	22		
		193.9	142.1	20		
		197.5	148.4	21.5		
72		206.0	149.0	19		
		202.4	151.2	19.5		
		196.4	147.3	21.5		
		200.0	150.9	17.5		
73		204.1	144.0	21		
		200.0	150.0	23		
		195.4	149.1	21		
		197.6	147.0	21.5		
74		201.7	146.2	23		
		199.4	149.4	22.5		
		198.8	149.1	22		
		198.8	147.3	22.5		
		198.8	147.0	19		
		199.4	149.1	21.5		

MECHANICAL PROPERTIES, ROOM TEMPERATURE

RAC Test Data, Except as Noted

NOTES: No.1- Vendor C Test Data
No. 2 - Retest

<u>Heat No.</u>	<u>Gage In.</u>	<u>T. S. KSI</u>	<u>Y. S. KSI</u>	<u>Elong. %</u>	<u>Grain Size</u>	<u>Remarks Note No.</u>
75	.032	197.8	139.8	23	7	No. 1
		192.9	154.5	13.5		
		197.1	149.1	18		
		178.4	138.3	10		
76		200.6	153.1	22		
		197.6	150.3	19		
		201.9	152.5	18.5		
		200.5	147.6	17.5		
		200.3	148.9	17		
		200.6	147.3	16.5		
77		198.1	150.4	23		
		199.7	152.4	19		
		198.7	147.7	16		
		199.7	145.9	18		
		200.0	143.2	17		
		197.6	143.1	19.5		
78		200.0	143.7	23		
		192.6	139.9	16		
		197.5	145.1	19.5		
79		193.7	122.1	22		
		194.8	142.3	20.5		
		196.7	142.7	16		
80		196.9	137.2	23		
		186.8	140.6	10		
		197.2	138.4	20.5		
81		200.5	141.4	22		
		200.0	140.5	20		
		198.8	143.9	14		
		201.2	150.9	15		
82		202.3	150.2	21		
		197.6	147.0	15.5		
		199.4	149.1	16		

MECHANICAL PROPERTIES, ROOM TEMPERATURE

RAC Test Data, Except as Noted

NOTES: No. 1 - Vendor C Test Data

No. 2 - Retest

<u>Heat No.</u>	<u>Gage In.</u>	<u>T. S. KSI</u>	<u>Y. S. KSI</u>	<u>Elong. %</u>	<u>Grain Size</u>	<u>Remarks Note No.</u>
83	.032	192.0	151.0	17	6	
		175.1	139.0	10		
		193.0	146.1	17		
84		195.5	142.3	21	5	
		190.2	139.9	18		
		190.5	138.3	19		
85		192.5	146.0	17	6	
		191.8	149.4	18		
		192.4	144.8	19		
86		193.0	143.0	21	7	
		182.3	141.5	11		
		189.9	145.2	16		
87		198.1	143.0	23	5	
		201.5	153.6	25		
		198.0	146.5	25		
		203.1	159.1	23.5		
88		200.0	143.7	23		
		199.7	149.1	24		
		199.1	144.9	24		
89		198.1	150.4	23		
		198.8	139.3	22		
		200.0	139.4	21		
		200.0	144.5	23		
		195.1	144.5	17		
		199.4	142.0	21		
90		197.8	139.8	23	7	
		192.6	154.3	19		
		195.6	150.6	20		
		196.4	132.1	19.5		
		196.8	150.9	19.5		
		193.5	148.4	21		
91		200.0	143.7	23		
		195.8	141.9	25		
		194.7	137.7	23		

MECHANICAL PROPERTIES, ROOM TEMPERATURE

RAC Test Data, Except as Noted

NOTES: No. 1 - Vendor C Test Data

No. 2 - Retest

<u>Heat No.</u>	<u>Gage In.</u>	<u>T. S. KSI</u>	<u>Y. S. KSI</u>	<u>Elong. %</u>	<u>Grain Size</u>	<u>Remarks Note No.</u>
92	.032	200.6	138.1	22	7	
		201.2	151.2	21		
		201.2	151.8	22		
		200.0	151.2	22.5		
		200.6	146.1	20		
		201.2	154.3	20.5		
93		195.5	142.3	21	5	
		192.3	139.6	19		
		194.7	140.5	21.5		
94	.050	183.2	137.4	12	4	
		185.4	139.5	15		
		185.9	136.5	15.5		
95		195.8	148.5	22		
96	.071	195.3	139.2	25		
		191.8	142.9	18.5		
97		186.1	133.4	22		
		188.2	136.6	19		
		190.5	135.7	22.5		
98		195.3	139.2	25		
		191.0	137.0	20.5		
		189.3	137.7	16.5		
99		192.8	141.5	23		
		192.5	142.1	23		
		192.1	138.6	22		
		192.1	142.7	22.5		
100		183.9	132.7	22	6	
		185.1	139.5	16.5		
		195.1	132.5	15		
101		195.3	139.2	25		
		188.8	139.1	17		
102		185.6	122.8	17		
		185.8	137.1	15.5		
		175.2	142.9	11		

MECHANICAL PROPERTIES, ROOM TEMPERATURE

RAC Test Data, Except as Noted

NOTES: No. 1 - Vendor C Test Data

No. 2 - Retest

<u>Heat No.</u>	<u>Gage In.</u>	<u>T. S. KSI</u>	<u>Y. S. KSI</u>	<u>Elong. %</u>	<u>Grain Size</u>	<u>Remarks Note No.</u>
103	.071	191.7 191.0 189.0	144.3 143.2 141.8	21 19 23		
104		195.8 193.4	151.7 150.7	23 18.5		
105		195.6 193.5 187.6	155.4 143.8 143.0	22 22 13.5		No. 1
106		194.5 198.9	142.5 140.5	24 21.5		
107		196.0 200.6 198.3	148.0 155.9 153.2	17 15 15		
108		201.6 196.1	156.0 148.5	17 19		
109		202.4 197.3 196.1	156.4 152.0 149.0	19 18.5 17.5		

RENE' 41 - TRANSVERSE
MECHANICAL PROPERTIES, ROOM TEMPERATURE
RAC Test Data, Except as Noted

NOTES: No. 1 - Vendor D Test Data
No. 2 - Retest

<u>Heat No</u> <u>No.</u>	<u>Gage</u> <u>In.</u>	<u>T. S.</u> <u>KSI</u>	<u>Y. S.</u> <u>KSI</u>	<u>Elong.</u> <u>%</u>	<u>Grain</u> <u>Size</u>	<u>Remarks</u> <u>Note No.</u>
1	.020	200.4	140.5	24		No. 1
		199.2	143.5	22		
		203.0	143.6	24		
		199.8	144.3	22.5		
		194.7	141.8	15		
		191.3	136.3	21.5		
		203.7	145.4	21.5		
		198.7	145.3	21.5		
		202.9	148.1	23		
		197.2	142.2	21.5		
		198.1	143.4	19		
		199.1	142.5	19		
		198.6	143.4	19		
		206.9	152.5	22		
		195.9	142.7	22		
		193.5	141.2	19		
		200.0	145.8	21		
		198.5	142.5	20.5		
2	.071	191.9	133.2	25		No. 1
		200.9	162.8	20		
		194.5	141.8	25		
3		200.4	146.9	17		No. 1
		197.1	143.8	20.5		
4	.050	198.0	144.5	19		No. 1
		202.9	149.8	16.5		
		206.6	159.0	16		
		196.5	149.8	21.5		
5	.032	189.6	135.1	23		No. 1
		199.4	157.0	14		
		200.7	160.4	17.5		
		201.2	156.0	17		
		197.5	156.6	18.5		
		200.0	152.9	18.5		
		205.7	164.3	18		
		202.4	160.9	16		
6	.013	197.9	144.6	12		No. 1
		197.4	140.0	18.5		
		209.5	175.6	12		
		196.6	169.0	8		
		198.3	140.3	14.5		

MECHANICAL PROPERTIES, ROOM TEMPERATURE

RAC Test Data, Except as Noted

NOTES: No. 1 - Vendor D Test Data
No. 2 - Retest

<u>Heat No.</u>	<u>Gage In.</u>	<u>T. S. KSI</u>	<u>Y. S. KSI</u>	<u>Elong. %</u>	<u>Grain Size</u>	<u>Remarks Note No.</u>
7	.013	193.8 196.7 199.7	136.2 150.1 155.9	20 13 18		No. 1
8	.025	197.8 199.2 202.5 199.2	140.1 149.2 154.3 152.5	22 22.5 20 19.5		No. 1
9	.013	217.0	151.2	20		No. 1
10	.050	191.5 196.3 191.0 192.8 196.3	137.5 137.6 141.2 139.5 141.8	16 23 22.5 22.5 24		No. 1
11		197.5 189.9 189.6	139.6 137.5 138.4	18 24 25		No. 1
12		193.4 207.4 197.0 195.3	138.3 156.1 146.5 144.3	17 21 23.5 24		No. 1
13	.013	202.3 179.3 194.6	160.2 141.7 138.9	17 8 15		No. 1
14		192.9 206.4 198.3 202.5 199.4	173.4 150.9 144.5 150.2 150.4	10 16 14.5 16 12.5		No. 1
15		197.9 197.4 209.5 196.6 198.3	144.6 140.0 175.6 169.0 140.3	12 18.5 12 8 14.5		No. 1

MECHANICAL PROPERTIES, ROOM TEMPERATURE

RAC Test Data, Except as Noted

NOTES: No. 1 - Vendor D Test Data
No. 2 - Retest

Heat No.	Gage In.	T. S. KSI	Y. S. KSI	Elong. %	Grain Size	Remarks Note No.
16	.013	193.8 196.7 199.7	136.2 150.1 155.9	20 13 18	7	No. 1
17	.020	192.8 205.2 205.7 209.5 201.3 200.2	140.4 153.4 159.4 166.0 155.1 146.1	22 18.5 19 14.5 17.5 21	7	No. 1
18		196.1 195.2 198.9	154.9 134.1 144.3	22 21.5 20.5	8	No. 1
19		198.0 200.2	146.2 144.6	22 19.5	8	No. 1
20		187.5 176.7 190.7 183.8 181.2 179.1 189.9 197.0	136.1 125.2 132.6 125.8 130.7 124.8 129.6 131.7	15.5 13 18 19.5 16.5 22.5 20 24		No. 1 No. 2 No. 2 No. 2 No. 2 No. 2
21		187.8 182.3 180.6 181.3 183.7 176.1 180.9 184.7 180.4 181.4 188.4 181.3 183.9	139.2 114.9 117.6 119.6 123.7 116.3 120.9 124.9 117.0 124.2 127.7 118.2 124.5	18 21 25.5 24 23.5 24.5 26 21.5 25 25.5 26 24.5 28		No. 1 No. 2 No. 2 No. 2 No. 2 No. 2 No. 2 No. 2 No. 2 No. 2 No. 2 No. 2

MECHANICAL PROPERTIES, ROOM TEMPERATURE

RAC Test Data, Except as Noted

NOTES: No. 1 - Vendor D Test Data
No. 2 - Retest

<u>Heat No.</u>	<u>Gage In.</u>	<u>T. S. KSI</u>	<u>Y. S. KSI</u>	<u>Elong. %</u>	<u>Grain Size</u>	<u>Remarks Note No.</u>
22	.020	196.7	148.3	22		No. 1
		196.3	136.4	22.5		
		191.0	129.2	23		
		198.0	140.8	25.5		No. 2
		194.3	136.0	24		No. 2
		194.5	136.0	22.5		
		198.1	138.7	22		
		196.8	139.2	21		
		198.0	141.2	23		
		185.6	133.6	13		
		194.0	136.0	22.5		
		191.8	139.8	23		No. 2
		188.5	130.8	21		
		195.1	148.1	21		No. 2
		196.8	145.9	23.5		
		193.4	138.4	19		No. 2
		195.1	142.7	23.5		
		184.9	133.7	23.5		No. 2
		183.8		13.5		
		194.3	144.8	22		No. 2
		191.0	136.9	24		
		194.9	142.0	22.5		No. 2
		194.7	141.2	25		
		186.5	136.5	23		No. 2
		190.7	142.9	23.5		
		193.5	140.5	23		No. 2
		195.0	141.0	26.5		
		193.5	140.5	23		No. 2
		195.0	141.0	26.5		
		192.5	144.0	21.5		No. 2
		195.2	156.3	21.5		
		197.2	146.5	21.5		
		200.5	151.4	23		No. 2

MECHANICAL PROPERTIES, ROOM TEMPERATURE
RAC Test Data, Except as Noted

NOTES: No. 1 - Vendor D Test Data
No. 2 - Retest

<u>Heat No.</u>	<u>Gage In.</u>	<u>T. S. KSI</u>	<u>Y. S. KSI</u>	<u>Elong. %</u>	<u>Grain Size</u>	<u>Remarks Note No.</u>
24 (cont.)		175.4	115.6	25		No. 2
		192.0	139.3	24		
		189.9	137.4	26.5		
		177.6	117.6	22.5		
		189.9	140.7	23.5		No. 2
		182.0	123.7	24		
		191.9	144.1	20		No. 2
		195.5	149.8	23		
		195.1	149.6	23		
		198.0	156.1	22		
		194.9	150.8	23.5		
		193.7	145.1	23.5		
		195.7	152.5	23		
		195.2	151.0	22.5		
25	.025	197.8	140.1	22		No. 1
		199.2	149.2	22.5		
		202.5	154.3	20		
		199.2	157.5	19.5		
26		187.5	136.8	15		No. 1
		188.6	137.5	24		
		188.4	134.4	21		
		187.3	133.7	21		
		182.9	135.0	14.5		
		187.2	139.6	12.5		
		188.5	131.7	18		
27		199.2	138.0	22		No. 1
		188.4	134.4	16.5		
		188.8	136.0	23.5		
28		205.0	147.5	18		No. 1
		190.2	132.2	23		
		188.6	131.8	19.5		
		190.8	131.6	24		
		194.2	136.6	22		

MECHANICAL PROPERTIES, ROOM TEMPERATURE

RAC Test Data, Except as Noted

NOTES: No. 1 - Vendor D Test Data

No. 2 - Retest

<u>Heat No.</u>	<u>Gage In.</u>	<u>T. S. KSI</u>	<u>Y. S. KSI</u>	<u>Elong. %</u>	<u>Grain Size</u>	<u>Remarks Note No.</u>
23	.020	204.0	145.6	16		No. 1
		197.5	142.0	20		
		195.0	146.6	15		
		199.2	145.5	18.5		
		197.5	152.9	20		
		195.2	144.3	21		
		196.6	147.4	19.5		
		191.3	142.9	19.5		
24	.025	205.3	149.6	30.3		No. 1
		190.6	156.9	24.5		
		189.4	139.8	25		
		184.0	136.2	24.5		
		178.8	119.1	26		
		183.0	121.4	24		No. 2
		174.8	118.4	17.5		
		188.8	140.6	24.5		No. 2
		190.2	139.8	23		
		178.3	122.3	27		
		172.5	115.3	20.5		
		174.1	118.7	23.5		
		189.1	140.7	24		No. 2
		194.6	143.9	24		
		171.3	114.7	24		
		169.1	114.5	20		

MECHANICAL PROPERTIES, ROOM TEMPERATURE

RAC Test Data, Except as Noted

NOTES: No. 1 - Vendor D Test Data
No. 2 - Retest

<u>Heat No.</u>	<u>Gage In.</u>	<u>T. S. KSI</u>	<u>Y. S. KSI</u>	<u>Elong. %</u>	<u>Grain Size</u>	<u>Remarks Note No.</u>
29	.025	198.5	142.6	22		No. 1
		196.1	150.8	22.5		
		207.1	158.3	21		
		210.1	166.9	20		
		197.7	150.8	20		
		198.4	154.7	18		
		204.2	162.2	18.5		
		203.8	154.5	20.5		
		199.2	151.6	19.5		
		205.0	161.0	19		
		206.1	160.6	20		
		201.5	159.6	14		
		200.8	160.6	20.5		
		201.1	157.6	19.5		
		202.9	152.5	22.5		
		200.0	157.8	21.5		
		198.0	155.9	18.5		
		205.3	155.0	22		
		201.7	157.6	21.5		
		203.8	153.7	22.5		
30		191.2	135.2	21		No. 1
		200.4	154.9	23		
		199.8	157.3	19.5		
		192.9	146.9	22.5		
		196.0	149.3	19		
31		188.0	136.3	17		No. 1
		187.8	135.4	25		
		188.8	132.1	26		
		189.5	128.3	26.5		
		191.5	141.1	23		No. 2
		185.6	128.8	21.5		No. 2
		188.4	128.7	26.5		
		191.6	134.4	26		No. 2
		184.8	128.0	26.5		No. 2
		193.3	137.0	23.5		
		191.7	135.6	24		
		188.0	131.6	23		
		190.3	134.3	26		

MECHANICAL PROPERTIES, ROOM TEMPERATURE

RAC Test Data, Except as Noted

NOTES: No. 1 - Vendor D Test Data
No. 2 - Retest

<u>Heat No.</u>	<u>Gage In.</u>	<u>T. S. KSI</u>	<u>Y. S. KSI</u>	<u>Elong. %</u>	<u>Grain Size</u>	<u>Remarks Note No.</u>
32	.032	186.0	142.4	18		No. 1
		192.1	136.6	23.5		
		190.9	142.3	24		
		191.9	139.8	25.5		
		191.5	135.9	24.5		
		189.5	136.7	25.5		
		191.9	138.5	26.5		
		192.7	138.2	27		
		191.8	135.9	25.5		
		193.0	138.9	26.5		
		190.3	135.8	24.5		
		190.9	136.6	27		
		191.4	138.9	24.5		
		191.9	139.5	24.5		
33		190.7	144.4	18.5		No. 1
		194.6	146.7	22.5		
		198.4	144.5	22.5		
		199.1	142.2	23		
34		197.2	147.0	22		No. 1
		194.1	143.6	24		
35		189.6	135.1	23		No. 1
		199.4	157.0	14		
		200.7	160.4	17.5		
		201.2	156.0	17		
		197.5	156.6	18.5		
		200.0	152.9	18.5		
		205.7	164.3	18		
		202.4	160.9	16		

MECHANICAL PROPERTIES, ROOM TEMPERATURE

RAC Test Data, Except as Noted

NOTES: No. 1 - Vendor D Test Data
No. 2 - Retest

<u>Heat No.</u>	<u>Gage In.</u>	<u>T. S. KSI</u>	<u>Y. S. KSI</u>	<u>Elong. %</u>	<u>Grain Size</u>	<u>Remarks Note No.</u>
36	.032	190.7	144.4	18.5		No. 1
		197.6	143.0	23		
		195.6	142.6	18		
		193.4	139.5	27		
		197.0	143.5	24		
		196.3	143.1	22.5		
		196.0	142.7	20		
		196.8	142.1	22.5		
		198.7	143.8	23		
		194.2	135.7	25.5		
		195.6	142.5	22.5		
		196.3	143.1	22		
		181.6	140.5	10		
		193.2	135.8	21.5		
		194.0	141.4	21		
		196.5	139.7	23		
		196.9	140.3	24		
		192.9	141.7	20		
		196.3	143.1	22.5		
		198.6	149.0	22		
		196.2	145.9	25		
		195.5	140.6	26		
		192.4	136.6	26.5		
		193.4	137.5	25.5		
		193.0	136.1	26.5		
		188.9	131.8	26		
		194.1	141.2	25.5		
		187.7	132.2	24.5		
37		187.6	149.6	12		No. 1
		182.0	124.9	27		
		189.1	137.8	23.5		
		174.2	124.7	24.5		
		172.7	122.1	19.5		
		182.1	126.7	27.5		
		175.6	119.9	27.5		
		173.8	114.2	26		
		174.8	121.6	18		
		168.9	125.2	11.5		
		176.8	124.4	21.5		
		162.0	118.4	14.5		
		162.0	118.4	14.5		
		151.0	119.9	9		
						No. 2
						No. 2
						No. 2
						No. 2

MECHANICAL PROPERTIES, ROOM TEMPERATURE

RAC Test Data, Except as Noted

NOTES: No. 1 - Vendor D Test Data
No. 2 - Retest

<u>Heat No.</u>	<u>Gage In.</u>	<u>T. S. KSI</u>	<u>Y. S. KSI</u>	<u>Elong. %</u>	<u>Grain Size</u>	<u>Remarks Note No.</u>
38	.032	192.4	136.0	23		No. 1
		184.1	148.6	25.5		
		193.5	148.2	22.5		
		192.3	144.3	23.5		
		194.6	140.6	23.5		
		185.9	131.6	26.5		
		188.5	142.5	22		
		189.4	139.4	26		
		180.2	126.2	27.5		
		185.0	119.7	25		No. 2
		178.9	124.7	21		
		186.9	132.4	26		
		190.2	142.3	24		
		188.3	132.7	24.5		
		183.6	132.7	25		
		192.7	139.3	26		
		186.3	131.0	26		
39		197.2	138.4	28		No. 1
		187.3	134.9	25.5		
		187.5	131.5	25.5		
		185.7	132.3	26.5		
		187.0	128.4	25		
		188.1	127.1	24		No. 2
		184.8	132.4	17.5		
		188.6	138.9	26		
		176.6	127.8	27		
		180.0	128.5	24		
		188.2	141.2	24.5		No. 2
		191.4	145.4	25		

MECHANICAL PROPERTIES, ROOM TEMPERATURE

RAC Test Data, Except as Noted

NOTES: No. 1 - Vendor D Test Data

No. 2 - Retest

<u>Heat No.</u>	<u>Gage In.</u>	<u>T. S. KSI</u>	<u>Y. S. KSI</u>	<u>Elong. %</u>	<u>Grain Size</u>	<u>Remarks Note No.</u>
40	.032	196.2	151.0	25		No. 1
		169.9	111.4	27		
		175.8	118.2	22		No. 2
		169.5	117.5	18		No. 2
		177.0	118.0	27.5		
		175.7	117.8	26		
		165.1	117.8	15		
		173.5	115.5	25		
		166.9	116.2	16		
		169.6	119.0	17.5		
		163.7	113.1	19		
		165.6	115.6	18		No. 2
		161.7	114.6	15		No. 2
		183.4	126.0	25		
		179.0	123.7	26.5		
		183.2	129.8	22.5		
		179.6	130.6	15		
		165.4	113.4	24		
		174.5	116.1	24.5		
		172.8	115.8	26		
		166.9	105.1	23.5		
		156.2	115.4	12.5		No. 2
		167.1	114.9	18.5		No. 2
		165.8	137.3	7.5		
		163.1	113.8	21.5		

1.2 Rene' 41 - Creep Data

RENE-41-15 .005 in.
 E3TAY-43 Sheet
 30,000.psi @ 1200° F

Stress. psi	Strain-%
0	0.0
30,000	0.164

Hours	Total Plastic Strain %
0.0	0.0
0.3	0.005
1.0	0.027
2.1	0.026
3.2	0.033
4.3	0.038
5.4	0.038
6.3	0.059
7.6	0.069
9.3	0.070
27.4	0.103
50.8	0.121
79.5	0.140
101.5	0.162
122.6	0.184
146.9	0.189
171.3	0.198
194.0	0.197
218.3	0.219
242.2	0.225
266.4	0.237
290.1	0.246
314.0	0.251
338.4	0.260
363.7	0.274
386.5	0.284
409.3	0.306
432.1	0.286
453.2	0.291

Rene 41-6 .005 in.
E3TAY-23 Sheet
40,000 psi @ 1200° F

Stress, psi	Strain-%
0	0.0
40,000	0.242

Hours	Total Plastic Strain-%
0.0	0.0
0.1	0.011
0.4	0.027
1.3	0.039
2.2	0.045
3.5	0.048
3.6	Rupture

Rene 41-1 .005 in.
E3TAY-11 Sheet
75,000 psi @ 1200° F

Stress, psi	Strain-%

0	0.0
75,000	0.333

Hours	Total Plastic Strain-%

0.0	0.0
0.5	0.055
0.7	Rupture

Rene 41-348 .005 in.
E2TAY-13 Sheet
95,000 psi @ 1200° F

Stress, psi	Strain-%

0	0.0
95,000	0.269

Hours	Total Plastic Strain-%

0.0	0.0
0.2	0.035
0.5	0.039
1.0	0.046
1.6	0.053
2.5	0.063
3.2	0.064
22.4	0.104
46.8	0.222
68.9	Rupture

RENE-41-360 .005 in.
 E2TAY-31 Sheet
 20,000 psi @ 1400° F

Stress, psi	Strain-%
0	0.0
20,000	0.105

Hours	Total Plastic Strain %
0.0	0.0
0.0	0.011
1.8	0.023
2.4	0.026
10.5	0.078
40.0	0.110
60.8	0.146
93.0	0.182
115.4	0.230
138.7	0.263
165.1	0.280
197.3	0.317
211.4	0.356
235.2	0.392
261.0	0.430
284.2	0.486
307.6	0.546
333.0	0.602
356.7	0.660
384.6	0.718
406.2	0.755
429.8	0.805
452.1	0.831
475.7	0.861
500.9	0.898
524.8	0.936
546.0	0.974
571.2	1.000

RENE-41-12 .005 in.
 E3TAY-54 Sheet
 20,000 psi @ 1400° F

Stress, psi	Strain, %
0	0.0
20,000	0.103

Hours	Total Plastic Strain-%
0.0	0.0
0.4	0.010
0.9	0.036
1.4	0.046
2.3	0.054
2.9	0.065
3.7	0.072
4.7	0.082
21.4	0.183
45.6	0.305
69.5	0.426
95.1	0.562
118.3	0.748
130.0	Rupture

Rene 41-5 .005 in.
E3TAY-14 Sheet
22,500 psi @ 1400° F

Stress, psi	Strain-%

0	0.0
22,500	0.095

Hours	Total Plastic Strain-%

0.0	0.0
0.3	0.037
0.8	0.050
1.7	0.077
2.8	0.092
3.6	0.106
5.1	0.115
21.8	0.234
29.3	0.286
29.8	Rupture

Rene 41-10 .005 in.
 E3TAY-24 Sheet
 30,000 psi @ 1400° F

Stress, psi	Strain-%
0	0.0
30,000	0.157

Hours	Total Plastic Strain-%
0.0	0.0
0.2	0.005
1.1	0.018
2.0	0.025
3.2	0.029
4.4	0.043
4.8	0.045
21.4	0.078
28.7	0.086
45.4	0.122
69.4	0.175
76.6	0.200
93.0	0.265
108.6	Rupture

Sheet
121AY-12
30,000 psi @ 1400° F

Stress, psi	Strain-%
0	0.0
30,000	0.121

Hours	Total Plastic Strain-%
0.0	0.0
0.6	0.021
1.1	0.026
1.8	0.032
3.1	0.034
4.0	0.045
5.5	0.050
22.8	0.115
47.8	0.197
69.7	0.273
95.6	0.389
117.8	0.506
143.8	0.678
166.8	0.859
189.6	1.048
Discontinued	

Rene 41 .005 in.
E3TAY-13 Sheet
40,000 psi @ 1400° F

Stress, psi	Strain-%
0	0.0
40,000	0.221

Hours	Total Plastic Strain-%
0.0	0.0
0.2	0.023
0.6	0.053
1.1	0.068
1.6	0.079
2.2	0.092
2.9	0.102
3.5	0.112
4.6	0.122
22.1	0.301
27.2	0.355
47.1	0.651
52.5	0.760
68.6	1.142

Rene 41-563 .005 in.
 E2TAY-24 Sheet
 40,000 psi @ 1400° F

Stress, psi	Strain-%

0	0.0
40,000	0.183

Hours	Total Plastic Strain-%

0.0	0.0
0.2	0.012
0.5	0.021
0.8	0.030
1.2	0.046
2.2	0.073
3.2	0.075
4.4	0.078
22.7	0.140
24.9	0.150
29.8	0.165
46.6	0.220
70.7	0.312
77.5	0.350
94.3	0.427
101.3	0.458
122.1	0.573
143.1	0.692
166.5	0.867
169.6	0.892
173.4	0.918
190.5	1.065

Discontinued

RTVE-41-11 .005 in.
 E3TAY-41 Sheet
 4,000 psi @ 1600° F

Stress, psi	Strain-%
0	0.0
4,000	0.054

Hours	Total Plastic Strain-%

0.0	0.0
0.3	0.014
0.7	0.027
1.2	0.037
1.8	0.049
2.6	0.063
3.4	0.068
19.8	0.254
27.3	0.333
45.8	0.528
69.4	0.705
97.4	0.871
119.1	0.959
141.9	1.051

Rene 41-18 .005 in.
E3TAY-34 Sheet
5,000 psi @ 1600° F

Stress, psi Strain-%

0	0.0
5,000	0.161

Hours Total Plastic
 Strain-%

0.0	0.0
0.5	0.008
0.9	0.014
1.5	0.018
2.2	0.031
3.1	0.042
4.4	0.050
5.8	0.065
22.5	0.142
47.5	0.224
70.8	0.322
95.1	0.366
120.5	0.417
143.2	0.449
167.5	0.479
194.5	0.519
215.3	0.533
241.2	0.561
265.3	0.580
287.9	0.610
311.2	0.635
335.6	0.662
359.6	0.681
384.0	0.709
406.2	0.731
430.9	0.749
455.3	0.754
478.9	0.770
504.0	0.797
528.9	0.800
551.0	0.820
578.1	0.835
601.5	0.843
624.0	0.861
646.9	0.871
673.0	0.890
695.9	0.929
718.9	0.954
742.1	1.005

Rene 41-~~355~~ 359 .005 in.
E2TAY-56 Sheet
7,000 psi @ 1600° F

Stress, psi	Strain-%

0	0.0
7,000	0.097

Hours	Total Plastic Strain-%

0.0	0.0
0.2	0.006
1.3	0.007
2.2	0.016
3.2	0.034
4.3	0.043
5.4	0.054
6.0	0.059
22.0	0.155
29.7	0.249
46.1	0.369
53.7	0.448
71.1	0.617
77.9	0.694
94.3	0.900
101.8	0.996
118.2	1.235

Discontinued

Rene 41 - Foil .005 in.
E2TAY-12 Sheet
10,000 psi @ 1600° F

Stress, psi	Strain - %
0	0.0
10,000	0.074
Hours	Total Plastic Strain-%
0.0	0.0
0.1	0.008
1.4	0.047
2.5	0.077
3.5	0.101
4.1	0.114
5.0	0.137
25.2	0.534
51.3	1.064
71.2	1.867
73.5	1.942
Discontinued	

RENE-41-3 .005 in.
E3TAY-33 Sheet
12,000 psi @ 1600° F

Stress, psi	Strain-%
0	0.0
12,000	0.144

Hours	Total Plastic Strain-%
0.0	0.0
0.2	0.076
0.6	0.161
0.9	0.241
1.6	0.380
2.1	0.470
3.0	0.670
4.1	0.840
4.5	0.928
4.9	1.011

Rene 41-353 .005 in.
E2TAY-22 Sheet
350 psi @ 1800° F

Stress, psi	Strain-%
0	0.0
350	0.020

Hours	Total Plastic Strain-%
0.0	0.0
0.2	0.003
0.9	0.038
1.8	0.004
3.2	0.014
4.4	0.020
21.9	0.013
28.2	0.015
44.8	0.034
68.9	0.080
93.9	0.124
117.1	0.219
141.0	0.308
165.4	0.344
190.0	0.406
213.4	0.455
237.2	0.513
Discontinued	

Rene 41-358 .005 in.
 E2TAY-54 Sheet
 500 psi @ 1800° F

Stress, psi	Strain-%
0	0.0
5,500	0.010
Hours	Total Plastic Strain-%
0.0	0.0
0.2	0.003
1.4	0.019
2.4	0.026
3.4	0.032
4.5	0.035
21.1	0.065
48.5	0.116
70.1	0.159
93.3	0.219
117.5	0.253
141.0	0.296
164.7	0.315
189.7	0.337
213.0	0.369
237.2	0.402 -
262.3	0.420
285.2	0.455
309.1	0.487
333.1	0.517
356.8	0.548
380.4	0.600 -
405.2	0.617
429.8	0.662
452.8	0.686
477.0	0.724
501.8	0.766
525.0	0.800 -
549.0	0.856
573.4	0.923
601.2	1.187 -
Discontinued	

Rene 41-346 .005 in.
E2TAY-11 Sheet
750 psi @ 1800° F

Stress, psi	Strain-%
0	0.0
750	0.0

Hours	Total Plastic Strain-%
0.0	0.0
0.2	0.018
0.5	0.028
1.2	0.055
2.3	0.070
3.1	0.087
4.4	0.107
5.5	0.122
21.7	0.295
45.9	0.494
73.5	0.640
94.9	0.725
118.3	0.831
142.3	0.953
166.1	1.075

RENE-41-7 .005 in.
E3TAY-32 Sheet
800 psi @ 1800° F

Stress, psi

Strain-%

0
800

0.0
0.021

Hours

Total Plastic
Strain-%

0.0
0.4
0.8
1.4
2.3
3.5
24.9
47.6
67.6
91.6
117.6
143.8
164.0

0.0
0.008
0.018
0.021
0.030
0.046
0.153
0.153
0.162
0.196
0.227
0.267
0.287

RENE-41-2 Foil .005 in.
 E3TAV-22 Sheet
 900 psi @ 1800° F

Stress, psi	Strain-%
0	0.0
900	0.011

Hours	Total Plastic Strain %
0.0	0.0
0.4	0.007
0.8	0.015
2.1	0.027
23.5	0.209
46.2	0.341
66.3	0.558
90.3	0.737
116.3	1.001

RENE-41-545 .020 in.
E2TAY-6 Sheet
17,500 psi @ 1400° F

Stress, psi	Strain-%
0	0.0
17,500	0.068

Hours	Total Plastic Strain-%

0.0	0.0
0.4	0.013
1.1	0.015
2.4	0.016
21.3	0.034
44.9	0.048
72.9	0.061
94.5	0.075
118.0	0.089
140.3	0.102
163.8	0.120
189.1	0.125
212.8	0.137
235.1	0.149
259.4	0.157
284.5	0.167
306.9	0.175
331.9	0.184
355.2	0.200
378.9	0.214
406.3	0.230
430.1	0.232
450.7	0.249

Rene 41-544 .020 in.
E2TAY-5 Sheet
32,500 psi @ 1400° F

Stress, psi	Strain-%

0	0.0
32,500	0.158

Hours	Total Plastic Strain-%

0.0	0.0
0.3	0.025
1.1	0.042
2.3	0.057
3.3	0.058
4.4	0.062
21.0	0.102
48.5	0.198
70.0	0.372
93.3	0.509
117.8	0.694
141.1	0.961
145.6	1.092

Discontinued

Rene 41
E3TAY-7
50,000 psi @ 1400° F

.020 in.
Sheet

Stress, psi	Strain-%
0	0.0
50,000	0.151

Hours	Total Plastic Strain-%
0.0	0.0
0.3	0.027
0.6	0.037
1.6	0.055
2.6	0.073
3.5	0.099
4.8	0.103
21.3	0.278
29.0	0.365
45.2	0.616
69.2	1.292

REM-41507 .020 in.
 E2TAY-1R Sheet
 250 psi @ 18000 F

Stress, psi	Strain-%
0	0.0
250	0.006

Hours	Total Plastic Strain-%
0.0	0.0
0.4	0.008
0.7	0.006
1.3	0.003
2.3	0.006
18.7	0.005
42.0	0.053
66.7	0.093
91.9	0.150
115.6	0.179
138.7	0.201
164.4	0.226
187.0	0.244
216.1	0.266
260.5	0.357
283.4	0.346
312.8	0.327
332.3	0.358

RENE-41-567 .020 in.
E2TAY-28 Sheet
400 psi @ 1800° F

Stress, psi

Strain-%

0
400

0.0
0.021

Hours

Total Plastic
Strain %

0.0
0.3
1.5
2.9
4.8
22.5
45.4
68.8
93.0
118.7
141.4
166.1
189.5
213.2
240.2
264.1
285.2

0.0
0.005
0.009
0.015
0.023
0.100
0.124
0.144
0.157
0.164
0.170
0.177
0.186
0.195
0.192
0.190
0.207

E 3 TAY - 5 .020 in.
800 psi Sheet
1800°F

Stress - psi	Strain - %
0.0	0.0
800	0.016

Elapsed time - Hours	Total plastic strain - %		
0.0	0.0	765.0	0.827
0.2	0.006	788.3	0.835
0.6	0.010	812.6	0.836
1.0	0.019	836.8	0.840
1.4	0.023	860.5	0.884
2.1	0.030	880.9	0.839
2.9	0.038	908.9	0.851
19.1	0.126	933.3	0.854
43.6	0.163	958.0	0.860
67.7	0.218	980.4	0.871
94.2	0.311	1005.4	0.885
115.0	0.353	1028.6	0.903
141.5	0.385	1055.6	0.924
165.0	0.434	1078.9	0.933
188.7	0.475	1101.8	0.944
211.6	0.517	1124.4	0.953
236.5	0.550	1148.9	0.971
261.2	0.582	1172.7	0.993
284.5	0.607	1196.3	1.021
309.1	0.635	1220.0	1.041
333.0	0.647		
355.6	0.669		
380.6	0.682		
405.5	0.689		
430.0	0.691		
452.8	0.706		
476.9	0.722		
500.9	0.726		
525.0	0.730		
550.2	0.734		
572.4	0.735		
597.8	0.736		
620.4	0.744		
644.6	0.770		
668.7	0.784		
692.6	0.793		
715.7	0.803		
743.1	0.815		

Discontinued

Rene 41-23 .020 in.
E3TAY-3 Sheet
1750 psi @ 1800° F

Stress, psi	Strain-%

0	0.0
1750	0.006

Hours	Total Plastic Strain-%

0.0	0.0
0.3	0.033
1.0	0.081
1.5	0.098
3.2	0.169
4.2	0.206
20.7	0.676
44.9	1.218
73.5	1.769

Discontinued

E3 TAY 2M .020 in.
2680 psi Sheet
1800°F

Stress - psi	Strain - %
0	0.0
2626	0.023

Elapsed time - Hours	Total plastic strain - %
0.0	0.0
0.2	0.032
1.2	0.157
1.9	0.244
3.1	0.385
4.3	0.530
4.9	0.617
21.0	2.653
24.1	3.004
29.0	3.571
46.7	6.010
50.5	7.184
52.8	7.405
1197.0	Discontinued

E 3 TAY 4 .020 in.
4,500 psi Sheet
1800°F

Stress - psi	Strain - %
0	0.0
4,500	0.172

Elapsed time - Hours	Total plastic strain - %
0.0	0.0
0.2	0.111
0.6	0.276
1.0	0.425
1.5	0.577
2.1	0.830
2.5	0.984
2.9	1.147
3.2	1.279
19.2	6.515
20.9	6.991
22.8	7.484
24.3	7.938
25.5	8.319
27.1	8.797
36.3	Rupture
11.7%	Elongation

E 3 TAY 2 .020 in.
5,000 psi Sheet
1800°F

Stress - psi	Strain - %
0	0.0
5,000	0.044

Elapsed time - Hours	Total plastic strain - %
0.0	0.0
0.3	0.145
0.6	0.250
1.1	0.427
1.5	0.582
1.9	0.741
2.3	0.883
2.8	1.097
3.3	1.282
21.1	6.600
22.8	7.182
24.5	7.750
26.1	8.295
27.1	8.550
43.5	13.490
49.6	14.775
50.8	Rupture
24.3%	Elongation

Republic .040 in.
 Rene 41 Sheet
 E3TAY-1K
 70,000 psi @ 1200° F

Stress, psi	Strain-%	Hours
0	0.0	434.8
9,756	0.045	458.8
14,756	0.062	481.3
19,756	0.084	503.8
24,756	0.108	529.2
70,000	0.252	551.9
		574.7
		599.1
		624.6
		647.5
		670.3
Hours	Total Plastic Strain-%	
0.0	0.0	
0.4	0.047	
0.7	0.050	
1.6	0.050	
2.6	0.045	
3.8	0.046	
5.0	0.042	
21.5	0.044	
46.4	0.055	
67.5	0.055	
96.4	0.059	
120.9	0.061	
144.3	0.061	
167.8	0.068	
192.3	0.067	
215.6	0.071	
239.0	0.078	
264.2	0.077	
289.1	0.083	
312.2	0.085	
338.8	0.081	
360.6	0.082	
384.0	0.082	
407.1	0.088	

Rene 41-479 .040 in.
E2TAY-16M Sheet
95,000 psi @ 1200° F

Stress, psi	Strain-%

0	0.0
95,000	0.385

Hours	Total Plastic Strain-%

0.0	0.0
0.3	0.007
0.8	0.013
1.4	0.017
2.5	0.018
3.8	0.017
5.3	0.013
22.5	0.036
29.1	0.032
45.5	0.044
69.6	0.058
94.3	0.073
117.4	0.088
141.4	0.098
165.8	0.112
190.4	0.128
213.8	0.133
237.9	0.150
261.6	0.163
289.4	0.184
313.1	0.173
333.7	0.211
357.9	0.234
382.6	0.255
405.2	0.270
430.0	0.295
453.5	0.321
477.0	0.334
501.6	0.379
525.6	0.411
549.5	0.448
574.3	0.492
597.8	0.539
600.2	Discontinued

E 3 TAY 3M .040 in.
 105,000 psi Sheet
 1200°F

Stress - psi	Strain - %
0	0.0
20,000	0.077
30,000	0.127
40,000	0.174
105,000	0.493

Elapsed time - Hours	Total plastic strain - %
0.0	0.0
0.3	0.010
0.9	0.017
2.8	0.024
4.4	0.031
5.2	0.032
21.0	0.062
45.4	0.102
69.8	0.142
118.6	0.221
141.6	0.267
166.9	0.335
183.1	0.354
187.7	0.381
205.1	0.449
230.5	0.605
254.3	0.782
276.1	1.041
301.0	1.268
324.7	1.895
331.2	2.215
331.3	Rupture
2.4%	Elongation

Rene 41 .040 in.
E2TAY-3P-400 Sheet
117,500 psi @ 1200° F

Stress, psi	Strain-%
0	0.0
117,500	0.478

Hours	Total Plastic Strain-%
0.0	0.0
0.5	0.009
1.0	0.014
1.6	0.017
2.2	0.023
2.8	0.027
21.8	0.069
44.8	0.124
68.7	0.182
92.6	0.259
116.3	0.359
120.0	Discontinued

RENE-41-398 .040 in.
E2TAY-17M Sheet
130,000 psi @ 1200° F

Stress, psi	Strain-%
0	0.0
20,000	0.072
40,000	0.157
60,000	0.242
130,000	0.601

Hours	Total Plastic Strain-%
0.0	0.061
0.2	0.101
0.5	0.110
0.9	0.126
1.4	0.140
2.0	0.148
2.5	0.160
3.1	0.170
20.6	0.236
49.2	Rupture

Rene 41-41 .040 in.
E3TAY-1P Sheet
17,500 psi @ 1400° F

Stress, psi	Strain-%

0	0.0
17,500	0.078

Hours	Total Plastic Strain-%

0.0	0.0
0.3	0.005
0.7	0.003
1.1	0.007
2.1	0.004
3.3	0.008
4.2	0.007
5.1	0.011
5.8	0.014
22.5	0.023
46.8	0.029
72.2	0.051
94.9	0.061
119.1	0.063
146.2	0.073
167.0	0.078
192.9	0.076
217.1	0.079
239.6	0.088
262.9	0.100
287.0	0.097
311.3	0.112
335.6	0.115

E 2 TAY 2R .040 in.
 30,000 psi Sheet
 1400°F

Stress - psi	Strain - %
0	0.0
30,000	0.153

Elapsed time - Hours	Total plastic strain - %		
0.0	0.0	623.9	0.973
0.2	0.005	643.8	1.035
0.8	0.012	669.2	1.105
1.2	0.013	1206.4	Rupture
1.5	0.016	9.1%	Elongation
2.4	0.021		
2.7	0.023		
3.5	0.025		
20.8	0.058		
44.3	0.089		
68.1	0.111		
91.5	0.129		
117.4	0.158		
139.9	0.172		
164.0	0.199		
187.0	0.221		
212.8	0.248		
235.3	0.265		
260.6	0.295		
285.3	0.332		
311.2	0.360		
333.8	0.392		
357.9	0.428		
381.9	0.463		
406.1	0.506		
431.0	0.545		
453.3	0.583		
478.0	0.632		
501.6	0.679		
525.6	0.733		
540.6	0.784		
574.3	0.845		
596.6	0.897		

E3 TAV 3V .040 in.
40,000 psi Sheet
1400°F

Stress - psi	Strain - %
0	0.0
9.814	0.040
19.814	0.094
29.814	0.157
40.000	0.208

Elapsed time - Hours	Total plastic strain - %
0.0	0.0
0.7	0.030
2.0	0.030
2.9	0.040
21.6	0.089
45.0	0.135
69.1	0.174
92.3	0.214
116.2	0.250
147.9	0.305
164.6	0.356
188.5	0.423
212.4	0.478
238.5	0.562
261.4	0.641
284.8	0.741
309.6	0.854
333.2	0.985
358.5	1.160
382.2	1.341
405.3	1.578
429.1	1.856
453.2	2.219
477.8	2.702
500.8	3.340
Discontinued	

Rene 41-399 .040 in.
E2TAY-1N Sheet
52,000 psi @ 1400° F

Stress, psi	Strain-%
0	
52,000	0.231

Hours	Total Plastic Strain-%
0.0	0.0
0.3	0.030
0.7	0.053
1.6	0.078
2.7	0.102
3.8	0.122
22.2	0.421
24.4	0.467
29.3	0.589
45.9	1.203
Discontinued	

E3TAY2L .040 in.
57,500 psi Sheet
1400° F

Stress - psi	Strain - %
0	0.0
20,000	0.084
30,000	0.139
40,000	0.189
57,500	0.274

Elapsed time - hours	Total plastic strain - %
0.0	0.0
0.2	0.011
0.4	0.022
0.8	0.030
1.5	0.049
4.1	0.096
5.3	0.105
21.2	0.297
24.8	0.351
29.3	0.418
45.2	0.748
70.4	2.150
76.6	2.986

Discontinued

RENE-41-484 .040 in.
E2TAY-175 Sheet
3,500 psi @ 1600° F

Stress, psi	Strain-%
0	0.0
3,500	0.082

Hours	Total Plastic Strain-%
0.0	0.0
1.3	0.008
1.9	0.015
3.0	0.025
19.2	0.129
43.0	0.237
69.4	0.359
91.5	0.488
115.7	0.623
139.6	0.775
165.1	0.952
188.4	1.125

Rene 41-412 .040 in.
E2TAY-11N Sheet
5,500 psi @ 1600° F

Stress, psi	Strain-%
0	0.0
5,500	0.024

Hours	Total Plastic Strain-%
0.0	0.0
0.2	0.005
1.2	0.020
2.1	0.024
3.3	0.024
4.3	0.027
4.9	0.033
20.7	0.066
28.5	0.083
44.8	0.110
69.9	0.136
92.9	0.160
117.1	0.173
141.3	0.183
166.1	0.201
189.4	0.216
213.8	0.236
237.3	0.234
261.0	0.247
288.8	0.260
309.3	0.275
333.4	0.283
358.3	0.287
380.8	0.297
406.0	0.309
429.1	0.372
452.5	0.327
477.2	0.337
501.2	0.353
Discontinued	

Rene 41-401 .040 in.
E2TAY-11P Sheet
7,500 psi @ 1600° F

Stress, psi	Strain-%

0	0.0
7,500	0.042

Hours	Total Plastic Strain-%

0.0	0.0
0.5	0.009
1.3	0.017
1.8	0.019
2.7	0.021
20.6	0.110
28.1	0.132
44.3	0.155
69.2	0.232
92.6	0.278
116.7	0.330

Discontinued

E3TAY-3P .040 in.
10,000 psi Sheet
1600° F

Stress - psi	Strain - %
0	0.0
10,000	0.059
Elapsed time - hours	Total plastic strain - %
0.0	0.0
0.7	0.013
1.2	0.020
2.2	0.028
20.9	0.162
44.3	0.298
68.5	0.434
92.1	0.590
115.7	0.755
140.2	0.951
164.0	1.165
187.8	1.392
211.6	1.640
237.9	1.925
260.7	2.180
284.5	2.470
309.0	2.765
332.6	3.097
357.7	3.431
381.4	3.727
404.8	4.045
428.4	4.391
452.6	4.742
477.1	5.118
500.4	5.461
521.7	5.852
548.1	
572.2	6.612
595.9	6.923

E3 TAY 2N .040 in.
20,000 psi Sheet
1600°F

Stress - psi	Strain - %
0	0.0
10,810	0.054
15,810	0.088<
20,000	0.115

Elapsed time - Hours	Total plastic strain - %
0.0	0.0
0.2	0.038
0.7	0.068
1.3	0.120
1.9	0.169
2.7	0.223
3.1	0.245
19.1	1.624
24.8	2.649
26.9	3.134
47.5	Rupture
14.2%	Elongation

E3 TAY 1M .040 in.
24,000 psi Sheet
1600°F

Stress - psi	Strain - %
0	0.0
10,811	0.046
15,811	0.095
24,000	0.140

Elapsed time - Hours	Total plastic strain - %
0.0	0.0
0.1	0.032
0.3	0.051
0.5	0.076
0.8	0.094
1.1	0.118
1.7	0.161
2.3	0.195
3.0	0.242
24.4	3.360
35.5	Rupture
16.4%	Elongation

RENE-41-402 .040 in.
E2TAY-3R Sheet
200 psi @ 1800° F

Stress, psi	Strain-%
0	0.0
200	0.009

Hours	Total Plastic Strain-%
0.0	0.0
0.3	0.042
0.7	0.064
1.9	0.070
3.0	0.071
4.1	0.071
5.1	0.061
22.7	0.079
46.4	0.141
69.8	0.209
76.8	0.219
98.4	0.247
120.5	0.274
141.5	0.311
165.8	0.354
190.0	0.464
215.1	0.532
237.7	0.596
261.2	0.631

REVE-41-465 .040 in.
 F2TAY-18P Sheet
 300 psi @ 1800° F

Stress, psi	Strain-%
0	0.0
300	0.003

Hours	Total Plastic Strain-%
0.0	0.0
0.8	0.002
1.6	0.007
2.8	0.007
4.0	0.009
21.5	0.032
48.1	0.068
71.0	0.084
94.0	0.103
116.0	0.121
140.7	0.138
167.1	0.152
189.2	0.156
213.4	0.171
237.4	0.175
262.0	0.192
286.2	0.198
309.0	0.200
335.0	0.208
358.6	0.217
386.6	0.229
408.3	0.242
431.7	0.251
454.1	0.258
477.6	0.258
502.0	0.244
526.6	0.283
548.0	0.289
573.3	0.308
598.6	0.315
620.8	0.321
645.8	0.329
669.0	0.333
692.3	0.339
720.2	0.345
744.1	0.349
764.6	0.355

Rene 41 .040 in.
E3TAY-2R Sheet
800 psi @ 1800° F

Stress, psi	Strain-%

0	0.0
800	0.004

Hours	Total Plastic Strain-%

0.0	0.0
0.2	0.005
0.6	0.012
0.9	0.017
2.0	0.022
2.9	0.029
3.9	0.039
5.1	0.044
21.4	0.105
45.6	0.236
69.7	0.367
94.4	0.487
118.8	0.593
143.2	0.687
167.5	0.771
189.8	0.847
213.8	0.902
237.3	0.933
262.0	0.987
285.6	1.042

Discontinued

E 3 TAY -3R .040 in.
1400 psi Sheet
1800°F

Stress - psi	Strain - %
0	0.0
1400	0.029

Elapsed time - Hours	Total plastic strain - %
0.0	0.0
0.3	0.009
1.0	0.031
2.4	0.070
18.7	0.443
42.7	0.898
45.8	0.964
47.5	1.008
50.3	1.083
67.2	1.520
92.4	2.849

Discontinued

E 3 TAY 2P .040 in.
7000 psi Sheet
1800°F

Stress - psi	Strain - %
0	0.0
7,000	0.073

Elapsed time - Hours	Total plastic strain - %
0.0	0.0
0.3	0.228
0.5	0.374
0.7	0.522
1.3	0.928
1.9	1.402
2.3	1.741
2.7	2.052
3.0	2.265
12.5	Rupture
23.1%	Elongation

Specimen 41 .080 in.
 E2TAY-4T Sheet
 50,000 psi @ 1200° F

Stress - psi	Strain - %	Hours	Total Plastic Strain - %
0	0.0	429.2	0.033
10,000	0.036	450.9	0.045
15,000	0.054	476.6	0.044
30,000	0.111	499.6	0.050
50,000	0.189	Discontinued	

Hours	Total Plastic Strain - %
0.0	0.0
0.3	0.005
0.7	0.007
1.2	0.007
2.1	0.009
2.6	0.007
19.5	0.010
23.6	0.015
45.2	0.009
67.5	0.015
93.2	0.019
116.6	0.023
140.0	0.024
164.6	0.024
188.7	0.022
213.2	0.025
238.0	0.026
261.0	0.027
287.6	0.029
308.1	0.026
334.9	0.028
355.5	0.047
380.5	0.034
403.6	0.030

RENE-41-571 .080 in.
E2TAY-11W Sheet
8,500 psi @ 1400° F

- %

Stress, psi	Strain-%
0	0.0
8,500	0.040

Hours	Total Plastic Strain-%
0.0	0.0
0.2	0.001
0.6	0.0003
1.4	0.003
2.0	0.004
2.6	0.003
3.4	0.003
4.1	0.003
4.9	0.001
22.4	0.010
45.3	0.016
70.9	0.016
93.2	0.010
118.2	0.026
140.9	0.018
165.1	0.017
190.3	0.030
213.4	0.030
238.0	0.035
266.3	0.036
289.0	0.036
309.0	0.041
333.0	0.042
359.0	0.042
385.3	0.045
405.4	0.067
429.7	0.051
453.2	0.060
477.6	0.053
502.2	0.058
526.9	0.061
551.4	0.065
574.3	0.071
601.0	0.080
624.9	0.075
647.1	0.063

Rene 41 .080 in.
E2TAY9W Sheet
15,000 psi @ 1400° F

Stress, psi	Strain-%	Hours	Total Pl Strain
0	0.0	598.4	0.166
15,000	0.063	622.6	0.173
	Total Strain-%	650.5	0.182
	Strain-%	669.2	0.185
		694.4	0.189
0.0	0.0	717.7	0.193
0.3	0.009	744.2	0.206
0.7	0.001	764.7	0.207
1.9	0.0008	Discontinued	
2.7	0.001		
3.6	0.002		
23.0	0.013		
26.8	0.017		
45.3	0.023		
71.0	0.036		
95.4	0.035		
118.2	0.046		
141.2	0.049		
166.7	0.055		
190.7	0.063		
213.4	0.070		
234.5	0.070		
261.4	0.076		
286.5	0.082		
309.5	0.090		
334.2	0.092		
358.7	0.099		
381.4	0.101		
404.2	0.105		
430.1	0.119		
454.3	0.131		
478.9	0.134		
502.3	0.139		
526.5	0.150		
550.2	0.151		
575.8	0.161		

Rene 41-577 .080 in.
E2TAY-15W Sheet
30,000 psi @ 1400° F

Stress, psi	Strain-%
0	0.0
5,295	0.021
10,295	0.042
15,295	0.066
30,000	0.128

Hours	Total Plastic Strain-%
0.0	0.0
0.3	0.001
1.1	0.008
1.8	0.011
2.6	0.013
3.6	0.012
5.1	0.017
21.1	0.025
46.3	0.053
70.7	0.067
Discontinued	

Rene 41-576 .080 in.
E2TAY-5W Sheet
37,500 psi @ 1400° F

Stress, psi	Strain-%
0	0.0
10,000	0.045
20,000	0.085
30,000	0.131
37,500	0.165

Hours	Total Plastic Strain-%
0.0	0.0
0.3	0.007
0.7	0.013
1.4	0.022
2.4	0.023
3.8	0.034
5.1	0.043
22.4	0.091
45.1	0.156
70.9	0.216
72.2	0.228
91.7	0.278
117.4	0.360
142.3	0.437
164.9	0.520
Discontinued	

RENE-41-574 .080 in.
E2TAY-3T Sheet
45,000 psi @ 1400° F

Stress, psi	Strain-%
0	0.0
45,000	0.207

Hours	Total Plastic Strain-%
0.0	0.0
0.3	0.020
0.7	0.032
1.8	0.057
2.5	0.068
3.0	0.074
3.8	0.091
4.5	0.097
5.1	0.103
22.1	0.277
22.7	0.300
24.2	0.316
28.4	0.357
46.8	0.564
69.2	0.923
93.6	1.624

Rene 41 .080 in.
E2TAY-12W Sheet
4,000 psi @ 1600° F

Stress, psi	Strain - %	Hours	Total Plastic Strain-%
0	0.0	552.1	0.220
4,000	0.040	577.4	0.216
		600.0	0.229
Hours	Total Plastic Strain-%	622.1	0.228
		652.3	0.231
		671.1	0.244
0.0	0.0	696.3	0.247
0.3	0.006	719.8	0.242
0.6	0.007	745.8	0.252
1.5	0.010	766.4	0.253
2.3	0.011	792.3	0.248
3.5	0.015	814.4	0.259
4.5	0.016	837.5	0.258
5.2	0.018	862.3	0.252
25.5	0.043	888.3	0.266
28.5	0.046	908.7	0.265
47.5	0.066	934.7	0.276
73.0	0.080	957.5	0.285
97.3	0.092	982.2	0.290
117.8	0.100	1006.5	0.290
143.2	0.113	1011.9	0.294
168.7	0.122		
189.8	0.128		
214.4	0.136		
236.8	0.140		
263.7	0.143		
288.4	0.156		
311.5	0.159		
336.1	0.163		
360.7	0.167		
383.2	0.170		
406.0	0.169		
430.8	0.172		
452.5	0.176		
480.7	0.188		
502.4	0.190		
528.4	0.216		

Rene-41 .080 in.
E2TAY-10W Sheet
250 psi @ 1800° F

Stress, psi	Strain - %	Hours	Total Plastic Strain-%
0	0.0	597.0	0.241
250	0.001	622.5	0.251
		645.2	0.258
		669.3	0.275
		697.2	0.282
		715.8	0.283
		740.8	0.292
		764.0	0.298
		790.9	0.299
		811.4	0.305
		837.0	0.313
		860.2	0.316
		883.8	0.321
		908.9	0.332
		932.8	0.341
		953.6	0.351
		980.6	0.356
		1004.5	0.358
		1007.4	0.361
Hours	Total Plastic Strain-%		
0.0	0.0		
0.3	0.001		
0.7	0.004		
1.6	0.004		
2.6	0.010		
21.0	0.014		
26.8	0.021		
44.4	0.022		
73.9	0.043		
92.3	0.051		
118.1	0.052		
142.5	0.051		
165.2	0.055		
188.3	0.089		
213.5	0.092		
237.6	0.097		
260.3	0.105		
281.5	0.104		
308.5	0.110		
333.3	0.129		
356.4	0.130		
381.0	0.139		
405.6	0.160		
428.2	0.158		
451.1	0.166		
477.1	0.180		
501.0	0.187		
525.7	0.213		
549.1	0.214		
573.3	0.235		

RENE-41-595 .080 in.
E2TAY-8T Sheet
400 psi @ 1800° F

Stress, psi

Strain-%

0
400

0.0
-.003

Hours

Total Plastic
Strain %

0.0
3.1
5.4
22.8
30.2
47.6
71.4
94.7
123.3
145.5
166.4
190.8
214.9
240.1
262.6
286.2
310.2
336.1
358.7
383.5
406.8
430.6
457.5
481.3
502.7
527.1

0.0
0.010
0.015
0.055
0.072
0.106
0.143
0.177
0.198
0.214
0.241
0.267
0.291
0.311
0.333
0.347
0.373
0.388
0.399
0.421
0.442
0.448
0.464
0.483
0.494
0.502

Rene 41-573 .080 in.
E2TAY-13W Sheet
600 psi @ 1800° F

Stress, psi	Strain-%
0	0.0
600	0.010

Hours	Total Plastic Strain-%
0.0	0.0
0.3	0.005
0.7	0.003
1.7	0.016
3.1	0.022
18.9	0.074
44.2	0.127
68.7	0.172
93.4	0.219
116.4	0.264
135.0	0.293
166.0	0.324
188.5	0.354
211.6	0.399
Discontinued	

Rene 41 .080 in.
E3TAY-4T Sheet
1300 psi @ 1800° F

Stress, psi	Strain-%

0	0.0
1,300	0.009

Hours	Total Plastic Strain-%

0.0	0.0
0.3	0.013
0.6	0.025
1.5	0.044
2.3	0.055
3.0	0.075
20.2	0.328
27.0	0.431
43.4	0.608
50.8	0.723
67.5	0.971
74.7	1.062

Rene 41-570 .000 in.
E2TAY-1T Sheet
2500 psi @ 1800° F

Stress, psi	Strain-%
0.0	0.0
2500	0.010

Hours	Total Plastic Strain-%
0.0	0.0
0.2	0.011
1.3	0.048
2.5	0.068
3.6	0.095
20.0	0.384
43.9	0.765
69.1	1.121
Discontinued	

L-605-246 .080 in.
E2TAX-1T Sheet
4,200 psi @ 1800° F

Stress, psi	Strain-%
0	0.0
4,200	0.018

Hours	Total Plastic Strain-%
0.0	0.0
0.4	0.026
0.8	0.066
1.3	0.090
2.0	0.114
3.0	0.183
20.5	1.707
Discontinued	

E 3 TAY 3T .080 in.
5,000 psi Sheet
1800°F

Stress - psi	Strain - %
0	0.0
5,000	0.037

Elapsed time - Hours	Total plastic strain - %
0.0	0.0
0.3	0.082
0.9	0.229
1.8	0.465
2.4	0.632
3.2	0.834
3.8	0.989
4.5	1.199
5.2	1.393
21.8	7.138
23.8	8.220
24.8	8.717
28.2	10.533
29.3	11.250
47.9	Rupture
34.2	Elongation

1/2 BE3 LEX 7
105,000 psi .500 in.
1200°F Bar

Stress - psi	Strain - %
0	0.0
10,000	0.044
20,000	0.090
30,000	0.142
105,000	0.505

Elapsed time - Hours	Total plastic strain - %
0.0	0.0
0.5	0.018
1.1	0.018
2.1	0.015
18.1	0.022
26.0	0.027
43.8	0.037
69.3	0.054
76.4	0.059
95.0	0.123
145.1	0.195
166.1	0.220
192.3	0.272
215.7	0.319
239.3	0.389
262.4	0.449
287.2	0.543
311.9	0.657
335.6	0.795
360.0	0.953
384.2	1.151
406.7	1.394
431.9	1.680
456.6	2.037
481.0	2.448
503.9	2.931
508.6	Rupture
4.8%	Elongation

Rene 41-77 .500 in.
1/2BE3LEX-11 Bar
115,000 psi @ 1200° F

Stress, psi	Strain-%
0	0.0
10,000	0.059
20,000	0.109
30,000	0.163
115,000	0.636

Hours	Total Plastic Strain-%
0.0	0.0
1.3	0.015
1.5	0.013
2.1	0.022
3.2	0.032
4.2	0.030
20.2	0.052
46.6	0.152
70.1	0.241
91.3	0.349
119.3	0.606
142.6	0.931
165.3	1.432
Discontinued	

1/2BE3LEX-6 .500 in.
120,000 psi Bar
1200° F

Stress - psi	Strain - %
0	0.0
10,000	0.042
20,000	0.085
30,000	0.135
120,000	0.653

Elapsed time - hours	Total plastic strain - %
0.0	0.103
0.3	0.120
0.9	0.142
1.3	0.147
2.2	0.152
3.1	0.154
4.9	0.159
5.7	0.164
21.6	0.200
29.7	0.227
45.9	0.291
70.8	0.375
93.7	0.522
117.9	0.731
141.7	1.071
166.0	1.625
173.8	1.917
186.1	Rupture
2.5%	Elongation

1/2BE3LEX-5 .500 in.
 140,000 psi Bar
 1200° F

Stress - psi	Strain - %
0	0.0
10,000	0.059
20,000	0.109
30,000	0.151
140,000	3.317
Elapsed time - hours	Total plastic strain - %
0.0	2.657
0.2	2.761
0.5	2.761
1.0	2.807
1.9	2.889
3.0	2.963
14.3	Lupture
3.0%	Elongation

Rene 41-627 .500 in.
1/2BE24EX-4 Bar
140,000 psi @ 1200° F

Stress, psi	Strain-%
0	0.0
10,000	0.050
20,000	0.096
30,000	0.142
140,000	1.389

Hours	Total Plastic Strain-%
0.0	0.759
0.1	0.794
0.2	0.824
0.7	0.903
2.0	1.013
3.1	1.122
14.1	Rupture

1/2 BE3 LEX - 12
 45,000 psi .500 in.
 1400°F Bar

Stress - psi	Strain - %
0	0.0
10,000	0.054
20,000	0.104
30,000	0.155
45,000	0.234

Elapsed time - Hours	Total plastic strain - %
0.0	0.0
0.2	0.005
0.5	0.014
1.8	0.023
3.6	0.029
5.3	0.047
21.4	0.076
29.1	0.092
46.3	0.110
69.7	0.158
94.6	0.167
116.3	0.179
141.7	0.208
165.1	0.241
189.1	0.269
214.3	0.317
241.9	0.372
266.3	0.420
285.4	0.478
309.5	0.539
333.8	0.632
359.2	0.755
382.3	0.888
405.1	1.036
429.2	1.239
454.3	1.484
479.0	1.802
502.5	2.177
525.7	2.625
549.5	3.227
573.1	3.930
598.9	4.914
621.3	6.168
645.4	8.570
669.2	11.315
676.2	13.053
684.3	Rupture
15.5%	Elongation

Rene 41-629 .500 in.
1/2BE2LEX-6 Bar
64,000 psi @ 1400° F

Stress, psi	Strain-%

0	
10,000	0.051
20,000	0.098
30,000	0.158
64,000	0.347

Hours	Total Plastic Strain-%

0.0	0.0
0.2	0.017
1.0	0.050
2.0	0.065
3.0	0.082
21.1	0.356
47.1	2.084
Discontinued	

1/2BE 3 LEX ° .500 in.
70,000 psi Bar
1400°F

Stress - psi	Strain - %
0	0.0
10,000	0.051
20,000	0.099
30,000	0.150
70,000	0.367

Elapsed time - Hours	Total plastic strain - %
0.0	0.0
0.2	0.019
0.4	0.023
1.3	0.045
2.2	0.054
2.7	0.064
3.8	0.071
4.5	0.089
20.6	0.458
24.3	0.662
28.8	1.054
44.8	4.980
47.4	6.388
49.7	7.917
51.4	9.471
52.8	Rupture
12.7%	Elongation

1/2 BE3 LEX 10
95,000 psi .500 in.
1400°F Bar

Stress - psi	Strain - %
0	0.0
10,000	0.050
20,000	0.097
30,000	0.151
95,000	0.503

Elapsed time Hours	Total plastic strain - %
0.0	0.0
0.2	0.058
0.5	0.108
1.9	0.405
3.6	1.777
3.9	2.251
4.1	2.718
4.5	2.908
5.1	3.793
5.6	5.078
6.0	6.275
6.3	7.361
6.7	Rupture
9.6%	Elongation

Rene 41-625 .500 in.
 1/2BE24EX-2 Bar
 10,000 psi @ 1600° F

Stress, psi	Strain-%
0	0.0
10,000	0.058

Hours	Total Plastic Strain-%
0.0	0.0
0.2	0.005
0.6	0.006
1.7	0.009
2.4	0.011
3.8	0.024
4.8	0.033
21.1	0.050
45.3	0.086
72.9	0.106
94.3	0.192
117.7	0.187
141.7	0.201
165.4	0.238
189.1	0.260
213.9	0.286
237.4	0.300
261.4	0.308
Discontinued	

Rene 41-646 .500 in.
1/2BE2LEX Bar
10,000 psi @ 1000

Stress, psi	Strain-%

0	0.0
10,000	0.050

Hours	Total Plastic Strain-%

0.0	0.0
0.3	0.021
0.8	0.023
1.9	0.033
19.8	0.070
45.8	0.105
67.8	0.141
94.7	0.202
119.2	0.216
141.9	0.243

Discontinued

Rene 41-653 .500 in.
1/2BE2LEX-30 Bar
11,000 psi @ 1600° F

Stress, psi Strain-%

0.0 0.0
11,000 0.076

Hours Total Plastic
 Strain-%

0.0	0.0
0.3	0.001
1.6	0.025
3.9	0.045
22.2	0.084
29.2	0.091
45.6	0.123
69.3	0.151
90.0	0.183
117.9	0.220
141.7	0.242
165.8	0.270
189.3	0.291
213.1	0.341
237.4	0.356
262.5	0.379
285.4	0.411
309.5	0.430
334.5	0.449
357.8	0.458
381.7	0.462
406.4	0.493
411.6	0.503

Discontinued

Rene 41-82 .500 in.
 1/2BE3LEX-16 Bar
 12,500 psi @ 1600° F

Stress, psi	Strain-%	Hours	Total Plastic Strain-%
0	0.0	650.0	0.916
12,500	0.065	674.8	0.950
		694.3	0.970
		715.4	1.010
Hours	Total Plastic Strain-%	Discontinued	
0.0	0.0		
0.2	0.011		
0.6	0.019		
1.0	0.025		
1.4	0.029		
2.1	0.036		
3.1	0.029		
3.6	0.027		
21.5	0.077		
45.4	0.110		
68.1	0.139		
94.1	0.184		
117.4	0.226		
142.0	0.266		
165.0	0.301		
188.2	0.331		
213.3	0.392		
236.4	0.408		
260.7	0.443		
286.2	0.473		
308.9	0.502		
333.1	0.536		
360.1	0.560		
380.9	0.584		
406.7	0.628		
430.8	0.635		
453.5	0.668		
501.2	0.723		
525.2	0.756		
549.6	0.774		
571.3	0.812		
596.3	0.839		
620.8	0.888		

1/2 BE3 LEX 15
 15,000 psi .500 in.
 1600°F Bar

Stress - psi	Strain - %
0	0.0
15,000	0.095

Elapsed time - Hours	Total plastic strain - %		
0.0	0.0	911.2	2.696
0.3	0.015	936.3	2.847
1.7	0.025	958.5	2.988
4.0	0.024	984.2	3.161
5.0	0.026	1006.7	3.327
21.2	0.049	1030.8	3.522
24.5	0.061	1054.8	3.727
28.8	0.072	1079.4	3.910
45.2	0.102	1101.8	4.161
53.0	0.119	1129.2	4.451
69.4	0.149	1149.1	4.667
93.7	0.217	1174.4	5.012
118.2	0.269	1199.1	5.395
141.1	0.335	1222.9	5.813
165.6	0.377	1246.7	6.262
189.1	0.435	1267.0	6.764
213.3	0.494	1294.3	7.527
237.2	0.549	1319.6	8.581
265.8	0.616	1331.0	Rupture
290.3	0.666	9.4%	Elongation
309.2	0.716		
333.4	0.760		
357.7	0.829		
383.1	0.885		
406.1	0.929		
428.8	0.989		
459.0	1.049		
478.1	1.093		
502.8	1.156		
526.5	1.222		
549.4	1.274		
573.3	1.348		
596.8	1.408		
622.7	1.479		
645.1	1.549		
669.0	1.640		
693.2	1.741		
718.2	1.781		
740.6	1.879		
765.9	1.997		
790.6	2.089		
816.5	2.196		
839.0	2.307		
863.2	2.439		
887.0	2.557		

1/2BE3LEX13 .500 in.
 20,000 psi Bar
 1600° F

Stress - psi	Strain - %
0	0.0
4,010	0.016
9,010	0.045
20,000	0.119

Elapsed time - hours	Total plastic strain - %
0.0	0.0
0.2	0.008
1.7	0.028
2.6	0.037
19.4	0.104
23.9	0.110
43.4	0.196
65.7	0.319
92.2	0.523
117.2	0.793
139.4	1.122
163.7	1.577
188.6	2.244
211.1	3.071
216.1	3.296
238.6	4.681
261.9	7.780
283.2	16.563
284.7	17.455
206.6	19.137
287.8	Rupture
17.7%	Elongation

Rene 41-630 .500 in.
Bar
Code 1/2 BE2LEX-7
25,000 psi @ 1600° F

Stress, psi	Strain-%

0	
25,000	0.151

Hours	Total Plastic Strain-%

0.0	0.0
0.2	0.027
0.9	0.047
2.5	0.072
19.8	0.198
44.0	1.309
47.3	1.551

Discontinued

Rene 41-631 .500 in.
 1/2BE2LEX-8 Bar
 1,000 psi @ 1800° F

Stress, psi	Strain-%
0	0.0
1,000	0.008

Hours	Total Plastic Strain-%
0.0	0.0
0.2	0.005
0.6	0.014
1.4	0.009
2.3	0.011
3.3	0.013
21.7	0.032
43.7	0.068
70.0	0.095
94.8	0.112
117.7	0.138
140.7	0.166
164.7	0.185
189.6	0.211
212.7	0.240
237.5	0.254
259.7	0.272
285.7	0.292
308.7	0.320

Discontinued

Rene 41-624 .500 in.
1/2BE2LEX-1 Bar
3,500 psi @ 1800° F

Stress, psi	Strain-%
0	0.0
10,000	0.029
Hours	Total Plastic Strain-%
0.0	0.0
0.2	0.009
0.8	0.025
1.6	0.043
2.2	0.054
3.1	0.057
20.8	0.186
45.8	0.327
71.4	0.448
93.4	0.557
116.5	0.692
140.4	0.818
164.0	0.952
187.7	1.105
Discontinued	

Rene 41 - 74 .500 in.
1/2BE3LEX-8 Bar
4,000 psi @ 1800° F

Stress, psi	Strain-%
0	0.0
4,000	0.040

Hours	Total Plastic Strain-%
0.0	0.0
0.2	0.013
0.7	0.015
1.7	0.017
3.5	0.032
23.5	0.114
46.9	0.207
69.3	0.293
92.0	0.353
118.4	0.464
141.2	0.556
164.4	0.614
187.4	0.700
212.2	0.793
236.5	0.861
259.7	0.947
284.2	1.094

Rene 41-637 .500 in.
1/2BE2LEX-14 Bar
4,500 psi @ 1800° F

Stress, psi	Strain-%

0	0.0
4,500	0.045

Hours	Total Plastic Strain-%

0.0	0.0
0.4	0.014
0.7	0.027
1.6	0.041
2.3	0.050
19.6	0.196
43.3	0.355
69.4	0.570
91.7	0.745
115.4	0.920
119.8	0.944
140.8	1.116

Discontinued

1/2BE3LEX-19 .500 in.
9,000 psi Bar
1800° F

Stress - psi	Strain - %
0	0.0
9,000	0.072

Elapsed time - hours	Total plastic strain - %

0.0	0.0
0.2	0.021
0.4	0.039
0.9	0.056
2.2	0.103
3.6	0.150
4.4	0.176
5.7	0.218
21.7	0.752
25.1	0.945
29.2	1.178
45.6	2.710
48.4	3.097
49.3	3.271
53.5	4.116
74.2	12.536
75.2	Rupture
21.5%	Elongation

1/2 BE 3 LEX 20 .500 in.
10,000 psi Bar
1800°F

Stress - psi	Strain - %
0	0.0
10,000	0.081

Elapsed time - Hours	Total plastic strain - %
0.0	0.0
0.3	0.023
0.7	0.052
1.7	0.091
2.4	0.112
3.8	0.172
4.7	0.208
21.3	1.729
26.0	2.693
29.4	3.667
41.5	Rupture
13.9%	Elongation

1/2 BE 3 LEX 17 .500 in.
12,000 psi Bar
1800°F

Stress - psi	Strain - %
0	0.0
12,000	0.105

Elapsed time - Hours	Total plastic strain - %
0.0	0.0
0.2	0.029
1.5	0.150
2.1	0.200
2.5	0.238
3.0	0.284
22.7	1.525
31.7	Rupture
11.1%	Elongation

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Rene 41-66 1 x 3 in.
FE3TEX-6 Forgings
20,000 psi @ 1400° F

Stress, psi	Strain-%

0	0.0
5,000	0.025
10,000	0.044
15,000	0.057
20,000	0.071

Hours	Total Plastic Strain %

0.0	0.0
0.2	0.010
0.8	0.010
1.4	0.008
2.4	0.010
3.0	-
3.8	-.001
4.3	0.002
5.4	0.001
22.0	-
45.6	0.006
72.7	0.018
97.3	0.032
117.6	0.030
141.4	0.034
168.7	0.038
189.3	0.033
213.4	0.032
287.1	0.036
309.7	0.041
333.7	0.050
357.9	0.049
381.4	0.061

1 x 3 in.
 Rene 41-63 Forgings
 FE3TEX-3
 42,500 psi @ 1400° F

Stress, psi	Strain-%
0	0.0
10,000	0.200
20,000	0.265
15,000	0.242
42,500	0.393

Hours	Total Plastic Strain-%
0.0	0.0
0.3	0.012
1.0	0.018
1.7	0.026
3.1	0.032
5.0	0.041
6.4	0.048
22.6	0.086
30.5	0.100
46.7	0.126
54.4	0.140
70.5	0.151
98.5	0.188
119.8	0.202
142.8	0.236
166.7	0.276
190.6	0.301
215.6	0.329
238.4	0.362
262.9	0.406
287.2	0.439
311.4	0.482
335.6	0.528
359.2	0.579
382.8	0.622
409.9	0.697
434.5	0.742
454.8	0.816
478.6	0.887
506.0	0.976
526.5	1.067

Discontinued

FE 3 TEX 2 1 x 3 in.
 35,000 psi Forgings
 1400°F

Stress - psi	Strain - %		
0	0.0	860.6	0.478
10,000	0.046	884.8	0.499
15,000	0.078	908.7	0.514
20,000	0.102	932.9	0.541
35,000	0.180	958.0	0.560
		980.2	0.573
		1005.9	0.601
Elapsed time	Total plastic	1028.4	0.628
- Hours	strain - %	1052.4	0.648
0.0	0.0	1076.5	0.677
0.2	0.010	1100.9	0.689
0.5	0.012	1123.5	0.724
1.5	0.020	1150.9	0.749
2.5	0.023	1170.8	0.761
18.5	0.048	1196.1	0.793
26.8	0.061	1220.7	0.822
42.8	0.058	1244.7	0.846
50.4	0.069	1268.4	0.881
66.7	0.069	1288.8	0.895
74.7	0.091	1316.0	0.929
91.0	0.083	1341.2	0.971
115.0	0.099	1365.9	1.002
139.9	0.112	1388.6	1.037
162.8	0.115	1413.1	1.064
187.0	0.121	1436.6	1.103
210.9	0.139	1463.3	1.138
235.1	0.146	1486.6	1.177
258.7	0.157	1507.2	1.205
287.4	0.167	Discontinued	
311.9	0.175		
330.8	0.186		
354.9	0.188		
379.2	0.204		
404.4	0.219		
427.3	0.223		
450.5	0.231		
474.6	0.254		
499.4	0.255		
524.3	0.282		
547.9	0.295		
571.0	0.302		
595.0	0.310		
618.5	0.319		
644.3	0.342		
666.8	0.362		
690.7	0.370		
714.9	0.375		
739.9	0.388		
762.3	0.410		
787.6	0.426		
812.3	0.447		
838.1	0.464		

1 x 3 in.
 Rene 41-677 Forgings
 FE2TEX-12
 50,000 psi @ 1400° F

Stress, psi	Strain-%
0	0.0
10,000	0.040
20,000	0.088
30,000	0.141
50,000	0.262

Hours	Total Plastic Strain-%
0.0	0.0
0.2	0.012
1.0	0.020
1.7	0.040
2.7	0.041
20.0	0.113
44.0	0.196
66.8	0.297
91.8	0.425
117.2	0.600
139.6	0.796
164.5	1.065
Discontinued	

FE 3 LEX 1 1 x 3 in.
63,000 psi Forgings
1400°F

Stress - psi	Strain - %
0	0.0
10,000	0.047
20,000	0.101
30,000	0.160
63,000	0.354

Elapsed time - Hours	Total plastic strain - %
0.0	0.0
0.2	0.045
0.4	0.069
1.5	0.115
2.5	0.144
3.1	0.166
4.3	0.196
4.9	0.213
21.2	0.727
25.5	0.938
45.2	2.227
58.9	Rupture
20.1%	Elongation

FE 3 LEX 2 1 x 3 in.
90,000 psi Forgings
1400°F

Stress - psi	Strain - %
0	0.0
10,000	0.052
20,000	0.100
30,000	0.153
80,000	0.430

Elapsed time - Hours	Total plastic strain - %
0.0	0.0
0.2	0.070
0.4	0.101
0.8	0.145
2.0	0.246
2.8	0.302
3.2	0.330
3.8	0.372
4.5	0.434
5.2	0.500
17.0	Rupture
18.0%	Elongation

Rene 41-667 1 x 3 in.
FE2TEX-2 Forgings
65,000 psi @ 1400° F

Stress, psi	Strain-%
0	0.0
10,000	0.053
20,000	0.108
30,000	0.155
65,000	0.340

Hours	Total Plastic Strain-%
0.0	0.0
0.3	0.014
0.9	0.020
1.7	0.040
2.6	0.042
3.3	0.051
21.3	0.210
46.8	0.642
71.3	1.782
Discontinued	

FE3LEX-3
15,000 psi
1600° F

1 x 3 in.
Forgings

Stress - psi	Strain - %
0	0.0
15,000	0.084

Elapsed time - hours	Total plastic strain - %
0.0	0.0
0.2	0.034
0.5	0.057
0.9	0.089
2.0	0.141
2.8	0.177
3.3	0.209
4.3	0.255
5.3	0.291
16.7	1.092
21.7	1.369
24.5	1.529
40.7	2.406
48.3	2.872
64.7	4.330
67.4	4.576
72.5	5.099
89.7	7.191
93.2	7.702
96.5	8.149
113.1	11.149
138.0	18.462
161.0	Rupture
53.5%	Elongation

Rene 41-664 1 x 3 in.
FE2LEX-11 Forgings
500 psi @ 1800° F

Stress, psi	Strain-%

0	0.0
500	0.002

Hours	Total Plastic Strain-%

0.0	0.0
0.2	0.004
0.7	0.012
1.1	0.009
1.5	0.005
2.8	0.008
19.2	0.026
45.8	0.052
70.3	0.062
93.4	0.068
116.1	0.080
140.2	0.090
165.3	0.098
172.1	0.101

Discontinued

Rene 41-654 1 x 3 in.
FE2LEX-1 Forgings
1000 psi @ 1800° F

Stress, psi	Strain-%
0	0.0
1000	0.011

Hours	Total Plastic Strain-%
0.0	0.0
0.9	0.024
2.1	0.036
2.6	0.048
3.6	0.053
4.5	0.064
20.9	0.180
46.2	0.329
69.8	0.500
92.8	0.698
118.5	0.949
140.8	1.193
Discontinued	

Rene 41
FE3LEX-5

1 x 3 in.
Forgings

3,000 psi @ 1800° F

Stress, psi	Strain - %
0	0.0
3,000	0.050
Hours	Total Plastic Strain-%
0.0	0.0
0.3	0.061
0.6	0.117
1.0	0.168
1.6	0.243
2.4	0.336
3.2	0.434
3.8	0.504
5.0	0.683
5.4	0.744
23.2	Discontinued

E3LEX-6
 1 x 3 in.
 Forgings
 ,500 psi
 800° F

stress - psi	Strain - %
0	0.0
6,500	0.069

elapsed time - hours	Total plastic strain - %
0.0	0.0
0.2	0.023
0.4	0.046
0.7	0.069
1.8	0.143
2.6	0.194
4.3	0.313
5.5	0.382
21.4	1.052
47.3	4.180
70.9	5.550
76.2	6.558
95.3	11.624
117.0	Rupture
31.4%	Elongation

FE3TEX-5
12,500 psi
1800° F

1 x 3 in.
Forgings

Stress - psi

Strain - %

0
12,500

0.0
0.116

Elapsed time
- hours

Total plastic
strain - %

0.0
0.3
0.5
0.8
1.1
1.4
1.9
2.4
2.9
3.3
11.2
28.3%

0.0
0.111
0.226
0.341
0.461
0.598
0.830
1.056
1.330
1.566
Rupture
Elongation

1.3 Rene' 41 - Stress Rupture Data

Stress Rupture Properties of Rene'41 AMS 5545
0.005 Inch Sheet - Heat A

<u>Test Temp., °F</u>	<u>Grain Dir.</u>	<u>Specimen Ident.</u>	<u>Stress (ksi)</u>	<u>Life- Hours</u>	<u>Percent Elong.</u>	<u>Remarks</u>
1200	T	E3-44	100	1.3	-	
	T	23	100	8.0	0.8	
	T	14	80	5.0	0.65	
	T	E3-51	80	6.9	-	
1200	T	32	75	12.8	-	Pulled out of holder
1400	T	15	60.0	4.7	4.9	
	T	24	50	.066	1.3	
	T	51	45	76.6	2.5	
	T	33	40	0.1	0.83	
	T	E3-13	40	68.6	-	
1400	T	46	38	95.4	4.7	
1600	T	16	35	1.0	1.1	
	T	34	25	3.3	2.4	
	T	42	18	12.1	3.2	
	T	41	14	76.3	15.3	
	T	52	10	250.1	7.2	
1600	T	E3-12	10.0	73.5	-	
1800	T	44	15	0.7	19.5	
	T	21	10	2.3	14.6	
	T	43	7	10.1	22.4	
	T	53	5.9	17.2	22.6	
1800	T	36	5	90.0	10.8	

Stress Rupture Properties of Rene'41 AMS 5545
0.020 Inch Sheet - Heat A

<u>Test Temp., °F</u>	<u>Grain Dir.</u>	<u>Specimen Ident.</u>	<u>Stress (ksi)</u>	<u>Life-Hours</u>	<u>Percent Elong.</u>	<u>Remarks</u>
1200	T	9	170.0	1.0	6.0	Rupture in Gage Mark
	T	27	150.0	4.5	3.4	
	T	13	125.0	18.5	0.7	
1200	T	21	105.0	44.5	1.1	
1400	T	7	100.0	1.2	4.6	
	T	11	85.0	4.0	5.1	
	T	20	82.0	8.9	3.8	
	T	16	66.0	21.0	3.6	
	T	E3-6	65.0	18.8	2.0	
	T	3	57.0	46.2	3.4	
	T	E3-7	50.0	69.2	-	
	T	23	35.0	499.0	7.5	
1400	T	29	26.5	285.7	-	Discontinued
1600	T	2	50.0	0.7	9.5	
	T	8	38.0	2.9	12.6	
	T	22	30.0	8.2	13.1	
	T	15	24.5	27.1	13.6	
	T	26	20.0	31.2	14.0	
1600	T	30	10.0	798.6	15.2	
1800	T	4	15.0	1.1	24.7	
	T	14	12.0	4.7	7.6	
	T	10	9.0	9.1	13.0	
	T	17	5.0	40.9	25.2	
	T	E3-2	5.0	50.8	24.3	
	T	25	4.6	135.2	22.0	
	T	E3-4	4.5	36.2	11.7	
	T	19	4.0	1190.5	-	
1800	T	E3-5	0.8	1220.0	-	Discontinued

Stress Rupture Properties of Rem'hl AMS 5545
0.040 Inch Sheet - Heat A

<u>Test Temp., °F</u>	<u>Grain Dir.</u>	<u>Specimen Ident.</u>	<u>Stress (ksi)</u>	<u>Life-Hours</u>	<u>Percent Elong.</u>	<u>Remarks</u>
1200	T	2K	180.0	0.3	12.3	
	T	8K	160.0	2.5	5.9	
	T	4K	142.5	18.9	4.9	
	T	17K	129.0	23.4	2.8	
	T	E3-1K	70.0	670.3	-	
	T	1K	177.0	0.033	17.0	
	T	10K	168.0	0.95	14.7	
	T	4L	159.0	3.4	5.5	
	T	11L	150.0	6.6	4.5	
	T	2L	92.0	778.8	5.0	
	T	E3-1L	140.0	4.6	4.5	
	T	21L	125.0	34.6	1.7	Ruptured in Gage Mark
	T	5M	187.5	B.O.L.	16.6	
	T	15M	172.5	0.1	17.7	
	T	3M	140.0	27.6	2.5	
	T	11M	120.0	126.4	3.7	
	T	E3-3M	105.0	331.3	2.4	
	T	10N	180.0	0.3	16.7	
	T	16N	147.5	8.2	2.4	
	T	21N	129.0	61.8	4.4	
	T	7N	115.0	195.4	6.0	
	T	10P	172.5	B.O.L.	17.4	
	T	2P	157.5	3.4	8.7	
	T	19P	100.0	594.4	6.2	
	T	18R	170.0	1.3	11.1	
	T	5R	130.0	92.1	2.9	
	T	14R	102.0	512.1	6.9	
1200	T	21R	172.0	0.3	18.3	

Stress Rupture Properties of Rene'41 AMS 5545
0.040 Inch Sheet - Heat A

<u>Test Temp., °F</u>	<u>Grain Dir.</u>	<u>Specimen Ident.</u>	<u>Stress (ksi)</u>	<u>Life-Hours</u>	<u>Percent Elong.</u>	<u>Remarks</u>
1400	T	12K	80.0	13.5	10.3	
	T	5K	75.0	14.2	9.7	
	T	15K	65.0	47.5	12.3	
	T	E3-3K	40.0	500.8	Discont'd.	
	T	20K	40.0	542.1	19.2	
	T	16L	135.0	0.1	7.2	
	T	11L	110.0	1.0	7.8	
	T	20L	90.0	5.3	9.9	
	T	7L	70.0	21.0	7.8	
	T	E3-2L	57.5	76.6	Discont'd.	
	T	10M	140.0	0.05	10.2	
	T	4M	130.0	0.3	8.2	
	T	12M	100.0	3.1	7.2	
	T	20M	56.0	70.0	7.3	
	T	9N	85.0	6.8	8.8	
	T	18N	61.0	74.0	6.8	
	T	2N	36.0	393.2	14.2	
	T	1P	105.0	1.5	6.3	
	T	21P	92.0	3.4	12.0	
	T	13P	78.0	15.5	12.2	
	T	7P	58.0	85.2	13.6	
	T	4P	134.0	0.1	8.6	
	T	17P	127.0	0.6	8.1	
	T	20R	68.0	38.2	11.6	
	T	8R	59.0	66.1	18.2	
	T	2R	30.0	1206.4	9.1	
	L	1K	110.0	1.1	7.5	
	L	3K	77.0	14.2	11.2	
	L	4K	66.0	24.0	8.7	
	L	2K	56.0	68.0	10.9	
	L	2L	80.0	11.3	25.0	
	L	1L	64.0	41.5	19.6	
	L	4L	53.0	138.2	9.2	
	L	6L	122.0	0.4	7.6	
	L	3L	37.5	481.2	18.3	
	L	3M	100.0	2.0	2.6	
	L	1M	72.0	19.8	9.2	
	L	2M	66.0	43.4	11.5	
1400	L	4M	56.0	87.0	8.2	

Stress Rupture Properties of Rene'41 AMS 5545
0.040 Inch Sheet - Heat A

<u>Test Temp., °F</u>	<u>Grain Dir.,</u>	<u>Specimen Ident.,</u>	<u>Stress (ksi)</u>	<u>Life-Hours</u>	<u>Percent Elong.,</u>	<u>Remarks</u>
1400	L	3W	98.0	0.3	12.5	
	L	1W	95.0	7.5	9.5	
	L	7W	105.0	1.9	9.1	
	L	2W	74.0	19.5	12.0	
	L	4W	60.0	81.4	8.7	
	L	2P	100.0	2.6	1.5	Broke in Gauge Mark
	L	1P	82.0	8.8	13.0	
	L	3P	54	103.0	11.7	
	L	4P	115.0	0.6	9.1	
	L	2R	91.0	2.3	16.6	
	L	1R	65.0	30.4	16.1	
	L	4R	50.0	190.0	15.9	
	L	3R	102.5	2.1	9.0	
1400	L	9K	47.5	1.8	19.9	
1600	T	3K	35.0	6.7	21.7	
	T	13K	17.5	121.3	17.0	
	T	18K	11.45	173.4	12.5	
	T	3L	55.0	0.8	12.4	
	T	8L	40.0	1.8	9.5	
	T	12L	20.0	73.1	7.3	
	T	15L	11.5	930.5	18.5	
	T	14M	65.0	0.2	10.5	
	T	7M	52.5	0.8	16.6	
	T	13M	14.0	192.5	14.6	
	T	1M	30.0	19.7	10.6	
	T	E3-1M	24.0	35.5	16.4	
	T	19M	18.0	124.4	11.7	
	T	8M	60.0	0.4	19.5	
	T	13M	45.0	2.2	17.8	
	T	4M	34.0	7.8	16.1	
	T	19M	21.0	60.4	12.3	
	T	E3-2M	20.0	47.5	14.2	
	T	12P	75.0	0.1	24.0	
	T	20P	32.0	11.5	16.8	
	T	8P	24.0	26.0	12.2	
	T	E3-3P	10.0	947.0	17.0	
	T	6P	23.0	35.2	15.0	
	T	10R	42.5	2.7	10.8	
	T	13R	40.0	1.8	13.5	
1600	T	19R	35.0	6.8	13.4	

Stress Rupture Properties of Rene'41 AMS 5545
0.040 Inch Sheet - Heat A

<u>Test Temp., °F</u>	<u>Grain Dir.</u>	<u>Specimen Ident.</u>	<u>Stress (ksi)</u>	<u>Life-Hours</u>	<u>Percent Elong.</u>	<u>Remarks</u>
1800	T	6K	15.0	1.5	21.4	
	T	16K	8.0	22.9	21.2	
	T	11K	2.0	1818.5	Discont'd.	
	T	5L	8.7	4.6	24.8	
	T	10L	6.5	28.0	22.5	
	T	6L	3.5	210.3	23.2	
	T	17L	5.0	85.1	20.4	
	T	14L	4.8	36.7	38.2	
	T	6M	16.0	0.8	28.7	
	T	8M	10.0	5.9	26.8	
	T	18M	5.0	90.4	33.4	
	T	E3-2M	2.68	1197.5	Discont'd.	
	T	6N	25.0	0.2	34.2	
	T	14N	12.0	2.9	31.0	
	T	3N	8.0	12.0	28.2	
	T	6P	20.0	0.4	23.8	
	T	9P	11.0	5.0	21.8	
	T	E3-2P	7.0	12.5	23.1	
	T	16P	6.2	29.7	25.0	
	T	14P	4.0	86.6	27.3	
	T	4R	28.0	0.05	39.6	
	T	15R	19.55	9.0	19.6	
	T	11R	18.0	0.5	22.0	
	T	6R	4.75	64.0	27.8	
	T	E3-3R	1.4	92.4	Discont'd.	
	T	E3-2R	0.8	285.6		
	T	16R	24.0	0.1	38.4	
	L	8K	25.0	0.1	35.6	
	L	6K	20.0	0.3	21.2	
	L	5K	12.0	1.9	19.4	
	L	7K	5.4	68.6	28.2	
	L	5L	16.0	1.5	36.0	
	L	8L	12.0	2.7	25.0	
	L	7L	4.0	152.7	34.0	
	L	8M	19.0	0.3	19.6	
	L	7M	10.0	7.4	28.7	
	L	6M	4.8	62.0	34.4	
	L	5N	9.0	7.9	24.2	
	L	6N	6.4	40.2	23.8	
	L	8N	4.6	68.4	38.9	
	L	8P	23.0	0.1	34.5	
	L	6P	17.5	0.7	31.4	
	L	7P	8.5	11.9	18.5	
	L	5P	11.0	3.6	37.2	
	L	8R	8.0	8.8	25.4	
	L	5R	6.0	26.2	36.4	
	L	7R	4.9	77.5	22.9	
1800	L	6R	3.0	451.2	29.4	

Stress-Rupture Properties of Rene'41 AMS 5545
0.080 Inch Sheet-Heat A

<u>Test Temp., °F</u>	<u>Grain Dir.</u>	<u>Specimen Ident.</u>	<u>Stress (ksi)</u>	<u>Life-Hours</u>	<u>Percent Elong.</u>	<u>Remarks</u>
1200	T	9T	170.0	0.6	12.4	
	T	4T	50.0	499.6	Discont'd.	
	T	6W	135.0	30.5	1.35	
1200	T	14W	125.0	50.2	3.3	
1400	T	11T	100.0	1.7	9.6	
	T	2T	80.0	27.3	9.6	
	T	14T	72	18.6	14.3	
	T	2W	90	2.5	10.1	
	T	4W	56.0	97.2	17.8	
1400	T	9W	15.0	780.0	Discont'd.	
1400	L	1T	82.0	6.9	7.3	
	L	2T	64.0	40.5	13.6	
	L	3T	54.0	113.1	7.1	
	L	5W	137.0	0.1	12.3	
	L	4W	110.0	1.2	11.5	
1400	L	6W	90.0	4.4	18.3	
1600	T	5T	50.0	1.3	19.6	
	T	12T	40.0	10.9	16.1	
	T	15T	23.0	52.2	18.7	
	T	3W	80.0	0.1	14.8	
	T	12W	4.0	1011.9	Discont'd.	
1600	T	8W	19.0	80.5	14.2	
1800	T	6T	14.0	1.1	34.4	
	T	8T	10.0	7.1	29.6	
	T	K3-3T	5.0	47.9	34.3	
	T	13	4.6	63.0	30.0	
	T	K3-4T	1.3	74.7	-	
	T	7W	8.1	13.1	24.6	
	T	1W	4.6	63.0	30.0	
1800	T	10W	2.5	1007.4	Discont'd.	
1800	L	5T	15.0	1.5	33.6	
	L	4T	10.0	4.5	34.4	
	L	6T	6.0	34.3	41.0	
	L	2W	30.0	0.1	38.7	
	L	3W	8.2	14.2	40.0	
1800	L	1W	3.4	98.6	59.2	

Stress-Rupture Properties of Bone' 41, AMS 5713
0.500 Inch Dia. Bar - Heat E

<u>F</u>	<u>Grain</u> <u>Dir.</u>	<u>Specimen</u> <u>Ident.</u>	<u>Stress</u> <u>(ksi)</u>	<u>Life-</u> <u>Hours</u>	<u>Per Cent</u> <u>Elong.</u>	<u>Remarks</u>
	L	12	175.0	0.3	21.4	
		11	142.5	13.5	4.2	
		E3-5	140.0	14.3	3.0	
		9	130.0	33.6	2.9	
		E3-6	120.0	186.1	2.5	
		10	115.0	286.1	4.6	
		E3-7	105.0	508.6	4.8	
		17	110.0	1.4	6.1	
		18	95.0	6.3	10.4	
		E3-10	95.0	6.7	9.6	
		13	88.0	8.2	8.3	
		16	75.0	40.1	13.0	
		E3-9	70.0	52.8	12.7	
		15	63.0	65.5	11.6	
		E3-12	45.0	684.3	15.5	
		21	65.0	0.3	24.3	
		20	45.0	4.6	15.5	
		19	37.5	7.1	21.9	
		24	30.0	28.8	25.2	
		22	22.5	125.8	26.3	
		E3-13	20.0	287.8	17.7	
		E3-15	15.0	1331.0	9.4	
		E3-3	27.0	0.2	-	
		29	17.0	3.2	26.7	
		27	13.5	4.9	30.5	
		E3-17	12.0	31.7	16.9	
		28	10.0	21.7	27.0	
		E3-20	10.0	41.5	13.9	
		E3-19	9.0	75.2	21.5	
		25	8.0	81.5	25.6	
	L	26	6.0	336.9	20.0	

Stress-Rupture Properties of Rene' 41, AMS 5713
1.00 Inch Dia. Bar - Heat E

<u>Test Temp. °F</u>	<u>Grain Dir.</u>	<u>Specimen Ident.</u>	<u>Stress (ksi)</u>	<u>Life- Hours</u>	<u>Per Cent Elong.</u>	<u>Remarks</u>
1400	L	2	115.0	1.0	5.0	
		1	102.5	3.5	19.5	
		4	92.0	10.2	19.8	
		3	73.0	38.9	34.6	
		6	64.0	67.6	15.4	
		5	132.0	0.4	6.3	
1800	L	9	13.0	3.9	51.5	
		10	12.3	4.5	55.4	
		7	9.5	14.9	55.5	
		12	8.4	18.5	72.0	
		8	6.0	52.3	84.2	
		11	25.0	0.3	50.0	

Stress-Rupture Properties of Rene' 41, AMS 5713

1 x 3 Inch Forging - Heat A

Grain Dir.	Specimen Ident.	Stress (ksi)	Life- Hours	Per Cent Elong.	Remarks
T	3	130.0	0.2	9.8	
T	1	109.0	2.2	8.9	
T	4	100.0	3.9	21.8	
T	5	70.0	70.1	15.6	
T	6	56.0	282.6	18.4	
T	E3- 2	35.0	1507.2		Discontinued
L	2	100.0	3.5	13.8	
L	E3-2	80.0	19.0	18.0	
L	E3-1	63.0	58.9	20.1	
L	3	45.0	630.3	22.6	
T	E3-4	30.0	512.0	15.8	
L	E3-3	15.0	161.0	53.5	
T	8	25.0	0.5	19.4	
T	10	17.0	1.1	46.0	
T	E3-5	12.5	11.2	28.3	
T	9	10.0	15.2	33.6	
T	7	7.4	38.5	30.0	
T	11	5.0	219.0	49.4	
T	E3-6	3.0	23.2	-	
L	10	17.25	1.6	44.8	
L	8	8.0	39.4	70.0	
L	E3-6	6.5	117.0	31.4	
L	12	5.0	182.1	66.4	

1.4 Rene' 41 Fatigue Data

Fatigue Properties of Renishaw AMS 5545 - 0.040 Inch Sheet
At Room Temperature - Stress Ratio A = 0.25
Transverse Direction - 1800 CPM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
A-R	184,410	187,000	Failed in Gauge Section
R	184,410	238,000	" " " "
R	174,165	268,000	" " " "
R	184,410	228,000	" " " "
R	184,410	145,000	" " " "
P	184,410	97,000	" " " "
P	163,920	365,000	" " " "
P	199,800	129,000	" " " "
P	199,800	145,000	" " " "
P	143,430	1,145,000	" " " "
N	143,430	1,071,000	" " " "
N	202,851	115,000	" " " "
N	202,851	113,000	" " " "
N	202,851	100,000	" " " "
N	128,063	10,000,000	No Failure
M	202,851	102,000	" "
M	202,851	87,000	" "
M	143,430	10,084,000	" "
M	143,430	10,000,000	" "
M	174,165	258,000	Failed in Gauge Section
L	174,165	321,000	" " " "
L	174,165	155,000	" " " "
L	174,165	187,000	" " " "
L	163,920	354,000	" " " "
L	143,430	1,320,000	" " " "
K	153,675	1,278,000	" " " "
K	153,675	6,009,000	" " " "
K	138,308	596,000	" " " "
K	138,308	987,000	" " " "
K	133,185	509,000	" " " "

Fatigue Properties of Rene'41 AMS 5545 - 0.040 Inch Sheet
At 600°F - Stress Ratio A = 0.25
Transverse Direction - 1800 CPM

<u>Test Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
A-K	141,000	1,814,000	No Failure
H	141,000	1,000,000	" "
H	141,000	1,112,000	" "
H	141,000	1,000,000	" "
H	141,000	1,000,000	" "

At 1000°F - Stress Ratio A = 0.25
Transverse Direction - 1800 CPM

<u>Test Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
A-K	140,000	1,824,000	No Failure
H	140,000	2,522,000	" "
K	140,000	1,002,000	" "
L	140,000	1,010,000	" "
L	140,000	1,043,000	" "

Fatigue Properties of Rene'41 - AMS 5545-0.040 Inch Sheet
 At 1000°F - Stress Ratio A = 0.25
 Transverse Direction - 3600 CFM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
A-P	140,000	33,000	Failed in Gauge Section
N	140,000	10,000,000	No Failure
N	140,000	10,000,000	
K	140,000	10,000,000	
M	140,000	10,000,000	No Failure

At 1200°F - Stress Ratio A = 0.25
 Transverse Direction - 1800 CFM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
A-K	138,000	1,850,000	No Failure
K	138,000	4,640,000	
K	138,000	1,000,000	
L	138,000	1,110,000	
L	138,000	1,021,000	No Failure

Fatigue Properties of Res'n'l APB 5545 - 0.040 Inch Sheet
At 1200°F - Stress Ratio A = 0.25
Transverse Direction - 3600 CPM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
A-K	138,000	1,041,000	No Failure
K	138,000	1,001,000	
K	138,000	1,263,000	
N	138,000	1,195,000	
L	138,000	1,010,000	No Failure

At 1400°F - Stress Ratio A = 0.25
Transverse Direction - 1800 CPM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
A-L	123,000	258,000	Failed in Gauge Section
K	123,000	221,000	
K	123,000	454,000	
N	123,000	383,000	
M	95,400	783,000	Failed in Gauge Section
M	95,400	106,000	
M	95,400	421,000	
K	87,450	2,053,000	
L	87,450	1,007,000	No Failure
L	87,450	1,000,000	No Failure

Fatigue Properties of Rem'nl AMS 5545 - 0.040 Inch Sheet
 At 1400°F - Stress Ratio A = 0.25
 Transverse Direction - 3600 CPM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
A-K	123,000	281,000	Failed in Gauge Section
K	123,000	193,000	
K	123,000	230,000	
M	123,000	349,000	
K	111,300	210,000	
L	103,000	485,000	Failed in Gauge Section
M	94,400	2,050,000	
M	94,400	1,872,000	
L	94,400	1,181,000	
L	94,400	3,203,000	

At 1800°F - Stress Ratio A = 0.25
 Transverse Direction - 1800 CPM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
A-M	29,000	56,000	Failed in Gauge Section
K	29,000	106,000	
L	29,000	71,000	
M	29,000	47,000	
N	29,000	93,000	
K	20,000	1,528,000	Failed in Gauge Section
N	20,000	1,000,000	
N	20,000	1,000,000	
P	20,000	1,000,000	
P	20,000	1,000,000	

Fatigue Properties of Rene'41 AMS 5545 - 0.040 Inch Sheet
At Room Temperature - Stress Ratio A = 0.67
Transverse Direction - 1800 CFM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
A-K	163,920	114,000	Failed in Gauge Section
K	163,920	51,000	" " " "
R	184,410	32,000	" " " "
R	143,430	148,000	" " " "
R	174,165	37,000	" " " "
R	174,165	32,000	" " " "
R	184,410	26,000	" " " "
P	184,410	22,000	" " " "
P	184,410	22,000	" " " "
P	184,410	19,000	" " " "
P	163,920	64,000	" " " "
P	143,430	173,000	" " " "
N	163,920	55,000	" " " "
N	163,920	44,000	" " " "
N	143,430	117,000	" " " "
N	112,695	376,000	" " " "
N	95,000	994,000	Failed in Gauge Section
M	61,470	10,257,000	No failure
M	61,470	10,010,000	No failure
M	92,200	10,000,000	No failure
K	112,695	532,000	Failed in Gauge Section
K	92,200	10,000,000	No failure
M	112,695	705,000	Failed in Gauge Section
M	200,800	25	" " " "
L	200,800	13	" " " "
L	200,800	23	" " " "
L	194,650	1494	" " " "
L	194,650	34	" " " "
L	194,650	6	" " " "
K	194,650	1410	Failed in Gauge Section

Fatigue Properties of Rene'41 AMS 5545 - 0.040 Inch Sheet
 At 400°F - Stress Ratio A = 0.67
 Transverse Direction - 1800 CPM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
A-K	142,500	66,000	Failed in Gauge Section
N	142,500	93,000	Failed in Gauge Section
N	142,500	51,000	Failed in Gauge Section
N	142,500	20,000	Overloaded
N	142,500	16,000	Failed in Gauge Section
N	110,000	121,000	" " " "
N	110,000	1,781,000	" " " "
K	110,000	845,000	" " " "
M	110,000	400,000	" " " "
M	110,000	877,000	" " " "
M	125,000	98,000	" " " "
L	125,000	102,000	" " " "
M	125,000	59,000	" " " "
L	117,500	72,000	" " " "
L	117,500	97,000	" " " "
K	95,000	1,692,000	Failed in Gauge Section
L	90,000	7,962,000	No failure
K	90,000	10,000,000	" "
L	90,000	10,000,000	" "
L	90,000	10,000,000	No failure

Fatigue Properties of Rem'hl AMS 5545 - 0.040 Inch Sheet
 At 600°F - Stress Ratio A = 0.67
 Transverse Direction - 1800 CPM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
A-R	141,000	59,000	Failed in Gauge Section
P	141,000	20,000	" " " "
P	141,000	46,000	" " " "
R	141,000	22,000	" " " "
R	141,000	23,000	" " " "
N	125,000	336,000	" " " "
N	125,000	233,000	" " " "
N	125,000	395,000	" " " "
L	125,000	296,000	" " " "
M	125,000	69,000	" " " "
M	110,000	1,281,000	Failed in Gauge Section
K	110,000	1,000,000	No failure
K	110,000	1,004,000	" "
L	110,000	1,000,000	" "
K	110,000	1,000,000	No failure

Fatigue Properties of Rene'41 AMS 5545 - 0.01 Inch Sheet
 At 800°F - Stress Ratio A = 0.67
 Transverse Direction - 1800 CPM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
A-N	140,000	24,000	Failed in Gauge Section
K	140,000	55,000	" " " "
K	140,000	31,000	" " " "
K	140,000	198,000	" " " "
K	140,000	36,000	" " " "
K	125,000	614,000	" " " "
L	125,000	513,000	" " " "
M	125,000	94,000	" " " "
L	130,000	334,000	" " " "
N	130,000	341,000	" " " "
L	135,000	30,000	" " " "
L	135,000	38,000	" " " "
L	135,000	181,000	" " " "
M	135,000	40,000	" " " "
M	135,000	45,000	" " " "
M	105,000	1,700,000	Failed in Gauge Section
N	95,000	4,674,000	No failure
L	95,000	10,000,000	" "
K	95,000	10,000,000	" "
M	95,000	10,000,000	No failure

Fatigue Properties of Remelted AMS 5545 - 0.040 Inch Sheet
At 1000°F - Stress Ratio R = 0.67
Transverse Direction - 1800 CPM

<u>Test Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
A-R	140,000	9,000	Failed in Gauge Section
R	140,000	26,000	" " " "
P	140,000	15,000	" " " "
P	140,000	600,000	" " " "
K	140,000	21,000	" " " "
P	130,000	427,000	" " " "
K	130,000	1,946,000	" " " "
K	130,000	823,000	" " " "
L	130,000	1,733,000	No Failure
P	135,000	35,000	Failed in Gauge Section
K	120,000	1,704,000	No Failure
N	120,000	1,000,000	" "
N	120,000	1,000,000	" "
N	120,000	1,000,000	" "
E	120,000	1,000,000	" "

Fatigue Properties of Rene'41 AMS 5545 - 0.040 Inch Sheet
At 1200°F - Stress Ratio A = 0.67
Transverse Direction - 1800 CFM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
A-K	138,000	2,000	Failed in Gauge Section
K	138,000	1,000	
L	138,000	17,000	
P	138,000	15,000	
M	138,000	10,000	
M	125,000	14,000	Failed in Gauge Section
P	125,000	2,038,000	No Failure
K	125,000	2,000	
K	125,000	3,000	
L	125,000	15,000	No Failure
M	132,000	21,000	Failed in Gauge Section
L	132,000	62,000	Failed in Gauge Section
M	132,000	11,000	Failed in Gauge Section
P	120,000	2,609,000	No Failure
L	120,000	1,552,000	Failed in Gauge Section
K	110,000	2,395,000	No Failure
P	110,000	11,000	Failed in Gauge Section
L	110,000	4,725,000	No Failure
L	110,000	10,000,000	Failed in Gauge Section
M	110,000	10,000,000	Failed in Gauge Section

Fatigue Properties of Rem'41 AMS 5545 - 0.040 Inch Sheet
 At 1400°F - Stress Ratio A = 0.67
 Transverse Direction - 1800 CFM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
A-N	123,000	585,000	Failed in Gauge Section
K	123,000	58,000	
M	123,000	117,000	
R	110,000	49,000	
M	110,000	106,000	
X	110,000	7,000	
P	100,000	13,000	
P	100,000	1,000	Failed in Gauge Section
N	100,000	2,025,000	No Failure
R	95,000	74,000	Failed in Gauge Section
K	85,000	354,000	Failed in Gauge Section
K	75,000	1,657,000	No Failure
L	75,000	1,000,000	
L	75,000	1,000,000	
M	75,000	1,000,000	No Failure

Fatigue Properties of Rene'41 AMS 5545 - 0.040 Inch Sheet
 At 1600°F - Stress Ratio A = 0.67
 Transverse Direction - 1800 CPM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
A-K	88,000	6,000	Failed in Gauge Section
K	88,000	59,000	
K	88,000	10,000	
M	88,000	21,000	
N	80,000	13,000	
K	80,000	60,000	
K	80,000	24,000	
M	80,000	36,000	
M	80,000	31,000	
N	65,000	30,000	
N	60,000	280,000	
L	60,000	128,000	
N	50,000	372,000	
L	50,000	310,000	
M	40,000	576,000	Failed in Gauge Section
L	20,000	10,000,000	No Failure
M	20,000	4,753,000	
M	20,000	10,000,000	
L	20,000	10,000,000	
N	20,000	10,000,000	No Failure

Fatigue Properties of Rem'hl MS 5545 - 0.040 Inch Sheet
At 1800°F - Stress Ratio A = 0.67
Transverse Direction - 1500 CPM

<u>Test Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
A-E	29,000	11,000	Failed in Gauge Section
R	29,000	26,000	
K	29,000	50,000	
N	29,000	58,000	
M	25,000	32,000	
R	25,000	212,000	
L	25,000	62,000	
L	25,000	92,000	
M	25,000	71,000	
L	18,000	126,000	
L	17,000	152,000	Failed in Gauge Section
R	15,000	58,000	
N	10,000	1,313,000	
N	10,000	1,000,000	
N	10,000	1,000,000	No Failure
P	10,000	1,000,000	No Failure

Fatigue Properties of Rem'hl AISI 5545 - 0.040 Inch Sheet
At Room Temperature-Stress Ratio A = 0.98
Transverse Direction - 1800 CFM

<u>Test Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
A-K	80,000	10,000,000	No Failure
L	80,000	10,000,000	No Failure
M	80,000	10,000,000	No Failure
N	90,000	1,001,000	Failed in Gauge Section
P	90,000	800,000	
R	90,000	4,972,000	
L	100,000	419,000	
M	100,000	721,000	
N	100,000	496,000	
P	100,000	628,000	
R	100,000	495,000	
K	120,000	114,000	
M	120,000	250,000	
N	120,000	300,000	
P	120,000	304,000	
R	120,000	118,000	
L	140,000	69,000	
M	140,000	3,000	
N	140,000	90,000	
P	140,000	75,000	
R	140,000	55,000	Failed in Gauge Section

Fatigue Properties of Rem'hl AMS 5545 - 0.040 Inch Sheet
At 600°F - Stress Ratio A = 0.98
Transverse Direction - 1800 CPM

<u>Test Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
A-W	90,000	1,030,000	Failed in Gauge Section
P	90,000	969,000	
R	90,000	620,000	
K	90,000	123,000	Failed in Gauge Section
H	90,000	No Test	Specimen went into Compression
R	90,000	1,346,000	Failed in Gauge Section
L	120,000	94,000	
K	120,000	162,000	
H	120,000	50,000	
P	120,000	55,000	
H	120,000	202,000	
K	155,000	25,000	
H	155,000	7,000	
P	155,000	10,000	
P	155,000	20,000	
R	144,000	44,000	Failed in Gauge Section

Fatigue Properties of Rem'nl AMS 5545 - 0.040 Inch Sheet
 At 1000°F - Stress Ratio A = 0.98
 Transverse Direction - 1800 CFM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
A-L	150,000	27,000	
K	150,000	25,000	
N	150,000	25,000	
L	120,000	452,000	
M	120,000	238,000	
N	120,000	1,000	
P	120,000	1,000	
K	120,000	34,000	
L	120,000	-	Broke in Loading
R	110,000	709,000	
M	110,000	326,000	
M	100,000	11,000	
P	100,000	560,000	
R	100,000	67,000	
K	95,000	3,341,000	No Failure
K	95,000	3,000,000	No Failure
K	90,000	10,000,000	No Failure

Fatigue Properties of Rem'hl AMS 5515 - 0.040 Inch Sheet
At 1400°F - Stress Ratio A = 0.98
Transverse Direction - 1800 CFM

<u>Test Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
A-L	110,000	12,000	Failed in Gauge Section
P	110,000	125,000	
R	110,000	5,000	
L	110,000	2,000	Failed in Gauge Section
N	80,000	3,734,000	No Failure
K	100,000	561,000	Failed in Gauge Section
L	100,000	142,000	
N	100,000	9,000	
N	100,000	2,293,000	
R	90,000	1,000	
K	140,000	17,000	
L	140,000	20,000	
N	140,000	18,000	
P	140,000	12,000	Failed in Gauge Section
K	120,000		Broke on Loading
N	120,000	404,000	Failed in Gauge Section
P	120,000	2,000	Failed in Gauge Section
R	120,000		Broke on Loading

Fatigue Properties of Rene'41 AMS 5545 - 0.040 Inch Sheet
 At 1800°F - Stress Ratio A = 0.98
 Transverse Direction - 1800 CPM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
A-L	20,000	1,275,000	Failed in Gauge Section
L	22,500	1,495,000	
M	10,000	2,119,000	
M	20,000	587,000	
M	25,000	1,000	
N	15,000	1,013,000	
N	20,000	205,000	
P	15,000	1,018,000	
R	19,100	1,000	Failed in Gauge Section
R	10,000	1,844,000	

Fatigue Properties of Rem'41 AHS 5545 - 0.080 Inch Sheet
At 800°F - Stress Ratio A = 0.25
Transverse Direction - 1800 CFM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
A-W	200,000	3,000	
W	180,000	1,995,000	Broke in Hole
W	180,000	1,163,000	No Failure
W	-		Tested at 1600°F
W	188,000	54,000	Failed in Gauge Section
W	180,000	1,567,000	
W	188,000	10,000	
T	188,000	19,000	
T	192,000	2,000	
T	188,000	1,114,000	
T	192,000	1,000	
T	180,000	80,000	
T	188,000	11,000	
T	200,000	1,000	
T	180,000	628,000	Failed in Gauge Section

Fatigue Properties of Rene'41 AMS 5545 - 0.080 Inch Sheet
At Room Temperature - Stress Ratio A = 0.25
Transverse Direction - 1800 CPM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
A-T	170,000	329,000	Failed in Gauge Section
T	190,000	146,000	Failed in Gauge Section
T	220,000	2,000	Failed in Gauge Section
T			Wrong OSC Load Setting
T	190,000	130,000	Failed in Gauge Section
T	210,000	65,000	Failed in Gauge Section
T	140,000	10,060,000	No Failure
T	190,000	209,000	Failed in Gauge Section
T	170,000	221,000	Failed in Gauge Section
T	210,000	45,000	Failed in Gauge Section
T			Bent on Installation
T	150,000	936,000	Failed in Gauge Section
T	130,000	10,304,000	No Failure
T	210,000	52,000	Failed in Gauge Section
T	150,000	784,000	
W	150,000	10,378,000	
W	230,000	1,000	
W	210,000	66,000	
W	150,000	497,000	Failed in Gauge Section
W	-		Broken on Installation
W	170,000	380,000	Failed in Gauge Section
W	190,000	198,000	
W	225,000	3,000	
W	170,000	532,000	
W	170,000	431,000	
W	150,000	995,000	Failed in Gauge Section
W	140,000	10,000,000	No Failure
W	210,000	129,000	Failed in Gauge Section
W	140,000	10,037,000	No Failure
W	190,000	170,000	Failed in Gauge Section

Fatigue Properties of Rene'41 AMS 5545 - 0.080 Inch Sheet
 At 1200°F - Stress Ratio A = 0.25
 Transverse Direction - 1800 CPM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
A-W	165,000	23,000	Failed in Gauge Section
W	180,000	17,000	Failed in Gauge Section
W	180,000	17,000	Failed in Gauge Section
W	160,000	1,144,000	No Failure
W	160,000	708,000	Failed in Gauge Section
W	180,000	14,000	Failed in Gauge Section
W	140,000	2,285,000	No Failure
W	165,000	21,000	Failed in Gauge Section
T	160,000	1,466,000	
T	165,000	42,000	
T	160,000	25,000	
T	165,000	38,000	
T	180,000	16,000	Failed in Gauge Section
T	150,000	2,281,000	No Failure
T	160,000	2,169,000	Failed in Gauge Section

Fatigue Properties of Renz'li AMS 5545 - 0.080 Inch Sheet
 At 1600°F - Stress Ratio A = 0.25
 Transverse Direction - 1800 CPM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
S-W	60,000	75,000	Failed in Gauge Section
W	110,000	3,300	Continuous Creep
W	90,000	27,000	
W	70,000	144,000	
W	60,000	256,000	
W	90,000	30,000	
W	60,000	240,000	
W	90,000	29,000	
T	70,000	155,000	
T	70,000	117,000	
T	90,000	25,000	
T	110,000	4,000	Continuous Creep
T	110,000	4,000	Continuous Creep
T	75,000	56,000	Failed in Gauge Section
T	65,000	178,000	Failed in Gauge Section

Fatigue Properties of Rem'ld AMS 5545 - 0.080 Inch Sheet
At Room Temperature - Stress Ratio A = 0.67
Transverse Direction - 1800 CPM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
A-F	160,000	69,000	Failed in Gauge Section
T	145,000	214,000	Failed in Gauge Section
T	110,000	11,235,000	No Failure
T	145,000	163,000	Failed in Gauge Section
T	130,000	245,000	Failed in Gauge Section
T	175,000	38,000	Failed in Gauge Section
T	-	-	Overloaded
T	145,000	143,000	Failed in Gauge Section
T	110,000	716,000	Surface Defect
T	205,000	12,000	Failed in Gauge Section
T	115,000	110,000	
T	130,000	163,000	
T	160,000	69,000	
T	205,000	10,000	
T	175,000	50,000	
W	160,000	83,000	
W	160,000	89,000	
W	130,000	159,000	
W	145,000	136,000	Failed in Gauge Section
W	110,000	665,000	Failed Outside Gauge Section
W	130,000	234,000	Failed in Gauge Section
W	190,000	27,000	
W	160,000	93,000	
W	205,000	13,000	
W	205,000	6,000	Failed in Gauge Section
W	110,000	10,001,000	No Failure
W	130,000	446,000	Failed in Gauge Section
W	190,000	48,000	
W	190,000	22,000	
W	205,000	18,000	Failed in Gauge Section

Fatigue Properties of Rem'hl AMS 5545 - 0.080 Inch Sheet
 At 800°F - Stress Ratio A = 0.67
 Transverse Direction - 1800 CPM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
A-W	130,000	417,000	Failed in Gauge Section
W	130,000	489,000	
W	160,000	24,000	
W	175,000	28,000	
W	130,000	467,000	
W	180,000	4,000	Failed in Gauge Section
W	130,000	209,000	Broke in Hole
T	160,000	16,000	Failed in Gauge Section
T	180,000	10,000	
T	180,000	15,000	
T	175,000	20,000	
T	140,000	42,000	
T	160,000	31,000	
T	160,000	43,000	
T	160,000	16,000	

Fatigue Properties of Rene'41 AMS 5545 - 0.080 Inch Sheet
 At 1200°F - Stress Ratio A = 0.67
 Transverse Direction - 1800 CPM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
A -W	140,000	21,000	Failed in Gauge Section
W	154,000	10,000	
W	154,000	12,000	
W	140,000	351,000	
W	168,000	5,000	Failed in Gauge Section
W	140,000	418,000	Broke in Hole
W	140,000	1,858,000	Failed in Gauge Section
T	154,000	7,000	Grips Failed
T	100,000	13,927,000	Broke in Hole
T	154,000	15,000	Failed in Gauge Section
T	140,000	13,000	
T	168,000	8,000	
T	175,000	7,000	
T	168,000	6,000	
T	162,000	8,000	Failed in Gauge Section

Fatigue Properties of Rene'41 AMS 5545 - 0.080 Inch Sheet
 At 1600°F - Stress Ratio A = 0.67
 Transverse Direction - 1800 CPM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
A-W	60,000	-	Specimen Bent on Installation
W	80,000	85,000	Failed in Gauge Section
W	60,000	635,000	
W	100,000	7,000	
W	60,000	839,000	
W	80,000	122,000	Failed in Gauge Section
W	110,000	5,000	Continuous Creep
W	110,000	7,000	Failed in Gauge Section
T	60,000	687,000	
T	80,000	100,000	
T	100,000	24,000	
T	60,000	518,000	
T	100,000	17,000	
T	75,000	170,000	
T	80,000	101,000	
W	60,000	481,000	Failed in Gauge Section

Fatigue Properties of Rene'41 AMS 5713 - 1.00 Inch Bar
 At Room Temperature - Stress Ratio A = 0.67
 Longitudinal Direction - 1800 CPM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
E	145,000	339,000	Failed in Gauge Section
E	145,000	2,746,000	
E	135,000	10,054,000	
E	145,000	3,003,000	
E	165,000	83,000	
E	165,000	53,000	
E	165,000	101,000	
E	165,000	77,000	
E	156,000	157,000	
E	156,000	145,000	
E	156,000	239,000	
E	156,000	115,000	
E	150,000	280,000	
E	200,000	16,000	
E	190,000	26,000	
E	150,000	1,903,000	
E	150,000	2,200,000	
E	150,000	630,000	Failed in Gauge Section
E	150,000	812,000	Failed Outside Gauge Section
E	180,000	38,000	Failed in Gauge Section
E	180,000	42,000	
E	180,000	51,000	
E	180,000	41,000	
E	150,000	186,000	Failed in Gauge Section

Fatigue Properties of Rene'41 AMS 5713 - 1.00 Inch Bar
At 4000F - Stress Ratio A = 0.67
Longitudinal Direction-1800 CPM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
E	160,000	63,000	Failed in Gauge Section
E	160,000	42,000	
E	160,000	55,000	
E	140,000	525,000	
E	140,000	208,000	
E	140,000	473,000	
E	180,000	16,000	
E	170,000	56,000	
E	150,000	76,000	
E	134,000	297,000	
E	130,000	759,000	
E	130,000	1,097,000	
E	150,000	102,000	
E	125,000	476,000	
E	140,000	497,000	
E	150,000	356,000	
E	125,000	826,000	
F	125,000	223,000	
F	150,000	117,000	
G	150,000	58,000	
G	140,000	299,000	
E	125,000	624,000	Failed in Gauge Section

Fatigue Properties of Rem'41 - AMS 5713 - 1.00 Inch Bar
 At 800°F - Stress Ratio A = 0.67 -
 Longitudinal Direction - 1800 CPM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
E	150,000	72,000	Failed in Gauge Section
E	150,000	36,000	Failed in Gauge Section
E	150,000	55,000	Thread Failure
E	130,000	313,000	Failed in Gauge Section
E	150,000	122,000	
E	150,000	69,000	
E	120,000	481,000	
E	120,000	373,000	
E	120,000	507,000	
E	130,000	240,000	
E	120,000	340,000	
E	120,000	510,000	
E	110,000	1,037,000	
E	130,000	344,000	
E	130,000	344,000	
E	104,000	1,310,000	
E	104,000	1,024,000	
E	100,000	1,837,000	
E	130,000	202,000	
E	100,000	1,444,000	Failed in Gauge Section

Fatigue Properties of SAE 52100 - 1.00 Inch Bar
 At 18000 RPM - Stress Ratio A = 0.67
 Longitudinal Direction-1800 CPM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
E	120,000	1,037,000	Failed in Gauge Section
E	140,000	32,000	Failed Outside Gauge Section
E	130,000	1,388,000	Failed in Gauge Section
E	130,000	886,000	
E	130,000	1,037,000	
E	130,000	765,000	
E	140,000	275,000	
E	110,000	1,540,000	
E	140,000	161,000	
E	120,000	1,270,000	
E	120,000	1,048,000	
E	120,000	1,304,000	
E	130,000	467,000	
E	140,000	248,000	
E	140,000	74,000	
E	110,000	2,304,000	
E	110,000	2,925,000	
E	120,000	2,217,000	
E	110,000	2,469,000	
E	105,000	2,371,000	Failed in Gauge Section

Fatigue Properties of Rene'41 AMS 5713 - 1.00 Inch Bar
At 1600°F - Stress Ratio A = 0.67
Longitudinal Direction - 1800 CPM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
E	100,000	133,000	Failed in Gauge Section
E	110,000	13,000	
E	100,000	36,000	
E	100,000	62,000	
E	80,000	283,000	
E	80,000	525,000	
E	80,000	469,000	
E	80,000	388,000	
E	70,000	817,000	
E	70,000	826,000	
E	70,000	473,000	
E	70,000	753,000	Failed in Gauge Section
E	60,000	14,132,000	No Failure
E	64,000	560,000	Failed in Gauge Section
E	64,000	565,000	
E	70,000	369,000	
E	64,000	353,000	
E	64,000	1,082,000	
E	80,000	203,000	
F	64,000	404,000	
F	62,000	590,000	Failed in Gauge Section

Fatigue Properties of Rene'41 AMS 5713 - 1.00 Inch Bar
 At Room Temperature - Stress Ratio A = 00
 Longitudinal Direction - 1800 CPM

<u>Test Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
E	90,000	489,000	Failed in Gauge Section
E	90,000	671,000	
E	90,000	1,357,000	
E	90,000	473,000	
E	100,000	178,000	
E	100,000	222,000	
E	100,000	289,000	
E	100,000	200,000	
E	110,000	25,000	
E	110,000	20,000	
E	110,000	56,000	
E	110,000	71,000	Failed in Gauge Section

SECTION II - L-605 RAW DATA

.2.1 L-605 Static Test Data

STOCK SIZE	HEAT	STOCK IDENT.	TEST TEMP °F	GRAB OR DIEL	TENSION				COMPRESSION		BEARING			SHEAR	REMARKS
					ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	ELONG. IN. (%)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	e/D = 15		e/D = 20		
											ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)			
1/4-05	A	F	RT	T											
"	"	"	"	T	132.0	70.1	31.7	42							
"	"	"	"	L	135.5	66.0	32.1	27.5							See Note 1.
"	"	F	"	L	155.0	73.1	32.0	25.0							See Note 2.
"	"	O	"	T	141.0	74.0	32.0	31.5							
"	"	O	"	T											
"	"	O	"	L	142.4	90.0	31.9	27.5							See Note 2.
"	"	H	"	T	144.0	77.3	32.0	30.0							
"	"	H	"	T											
"	"	H	"	L	155.5	100.4	32.0	25.5							See Note 1.
"	"	E	"	T	147.7	75.3	32.0	43.0							
"	"	E	"	T	151.0	77.3	32.0	44.2							
"	"	E	"	L	157.1	107.2	32.0	20.0							
"	"	L	"	T	153.2	80.1	32.0	33.0							
"	"	L	"	T											
"	"	L	"	L	157.0	97.4	31.9	29.0							See Note 1.
"	"	A	"	T	139.0	70.0	32.0	32.0							
"	"	H	"	T											
"	"	H	"	L	142.0	66.2	32.0	26.0							See Note 1.
"	"	H	"	T	145.0	77.3	32.0	26.2							
"	"	H	"	T											
"	"	"	"	L	139.5	70.0	32.0	29.5							
"	"	P	"	T	141.2	70.0	31.9	25.3							
"	"	"	"	T	141.0	77.3	32.0	31.2							
"	"	"	"	T											
"	"	"	"	L	132.5	66.0	32.1	25.0							
"	"	"	"	L	132.5	91.2	32.1	25.5							
1/4-06	"	P	RT	L	130.9	90.0	32.1	26.5							

MATERIAL: 2025-T3 AL

NOTES: (1) Female specimen shown outside of this table. (2) Female specimen shown inside of this table. (3) GPC (Grain Outside of Center)

STOCK SIZE	HEAT	STOCK IDENT	TEST TEMP °F	GRAN DUR	TENSION				COMPRESSION		BEARING				SHEAR	REMARKS
					ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	ELONG IN (8)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	r D 15		r D 20			
											ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)		
							31.9									
						134.8	76.3	32.0	28.2							
						136.3	76.6	32.0	29.0							
								31.9								
								32.0								
						143.8	72.8	32.1	30.0							
						143.2	76.0	31.9	34.3							
						142.0	73.3	32.0	32.5							
						146.7	73.1	31.9	27.2							
						146.0	74.2	32.0	24.1							
						146.1	74.1	32.0	30.2							
						145.0	74.3	31.9	37.0							
						145.0	78.0	31.9	33.3							
						134.8	72.3	31.8	25.0							
						146.4	74.0	32.1	27.5							
						147.4	73.5	32.0	24.2							
						146.7	74.1	32.0	34.0							
						130.8	73.6	32.0	24.3							
						133.2	73.1	31.9	27.0							
						137.1	73.9	31.8	28.0							
						136.7	73.5	32.0	27.0							
						135.4	73.7	31.9	26.0							
						142.2	74.1	32.0	27.0							
						131.3	73.7	31.7	22.3							
						133.8	77.8	31.8	23.3							
						133.2	76.6	32.1	26.0							
						142.2	74.1	32.1	24.0							
						146.7	74.1	32.0	27.0							

MATERIAL: 5537A

NOTES: 1. 100% TENSILE STRENGTH REQUIRED

(3) DOC

STOCK SIZE	HEAT	STOCK IDENT	TEST TEMP °F	GRAIN DIR	TENSION			COMPRESSION		BEARING				REMARKS	
					ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	ELONG IN (%)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	D 15		D 20		
											ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ULTIMATE STRENGTH (KSI)		0.2% OFFSET YIELD (KSI)
1/4"	A		70	T	23.6	57.5		27.5 (1)							
				T											
				T											
				T											
		D		L	149.6	68.5		11.0							
		P		L	110.4	68.2		11.0							
		I		L	111.3	57.5		10.0							
		H	730	L	113.2	54.4		10.0							
		H	1150	T	96.3	57.7		20.5 (1)							
				T	87.2	53.6		28.0 (1)							
				T											
		J		L	76.3	68.1		15.0 (1)							
		K		L	76.8	69.7		13.5 (1)							
		L		L	79.1	54.9		10.0 (1)							
		H	1150	L	76.4	66.2		15.5 (1)							
			1100	T	55.1	67.5		2.5 (1)							
			1100	T	50.9	65.2		7.0 (1)							
			1550	T											
				T											
		G		L	53.2	38.0		9.5 (2)							
		J		L	58.0	41.0		10.0							
		N		L	55.4	38.3		9.5 (2)							
		H	1350	L	52.3	60.7		10.5							
			1300	T	33.0	18.2		3.5							
				T	29.6	18.5		2.5							
1/8"				T											
			1900	T											

MATERIAL: 1-805, MS 5-37A

1-805

MATERIAL: J-605, AFS 5-37A

NOTES: (1) Tension Specimen: Failed outside gauge line.
(2) Tension Specimen: Failed outside center.
(3) Tension Specimen: Failed outside of gauge marks (3-in).

STOCK SIZE	HEAT	STOCK IDENT	TEST TEMP OF	GRAIN DIR	TENSION				ELONG		TIME (MINS.)	BENDING				REMARKS
					ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	ELONG (%)	TEMP (°F)	D 1.5		D 2.0				
										ULTIMATE STRENGTH (KSI)		0.2% OFFSET YIELD (KSI)	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)		
	A	F	RT	T	111.4	21.2	32.0	6.0	12.4	500						
					104.7	21.0	32.0	5.5		500						
		J			104.7	21.1	32.1	3.5		500						
		C			117.3	25.5	32.0	3.5		1000						
					128.2	21.5	32.0	3.5		1000						
		K			121.1	20.8	32.0	4.5	1200	1000						
					120.5	21.1	31.4	15.0(1)	1100	100						
					123.0	22.8	31.9	16.5(1)		100						
					121.5	20.5	31.9	14.5(1)		100						
					128.8	25.9	31.9	3.0(1)		500						
					122.0	21.2	32.0	12.0		500						
					125.3	25.7	32.1	5.0		500						
					128.4	28.0	31.7	3.5(1)		1000						
		D			119.1	21.3	31.9	3.0(2)		1000						
					108.5	22.0	31.3	3.0(1)	1100	1000						
		E			115.5	24.5	32.6	17.0(1)	1600	10						
					128.4	20.4	32.1	10.5		10						
					113.8	22.8	31.9	21.5(1)		10						
					134.3	21.9	32.0	5.0(1)		100						
		L			131.1	20.4	30.6	5.5		100						
					114.4	25.7	31.7	3.0		100						
					102.4	27.9	32.1	0.5(2)		500						
					52.4	25.6	32.1	1.5(1)		500						
		I			122.0	24.7	31.0	1.0(2)		500						
					75.3	14.5	31.0	0.5(2)		1000						
					11.0	-	-	0.5(2)		1000						
					52.0	24.7	32.0	1.0(2)	1600	1000						
					111.4	21.2	32.6	12.0(2)	10	10						

MATERIAL: 1505, PSI 55374

MATERIAL: 3005 AL 5052A

NOTES: 1) RCP
2) RCP

STOCK SIZE	HEAT	STOCK IDENT	TEST TEMP °F	GRAIN DIR	TENSILE			E LONG IN IN (1)	RED. (%)	TIME (HRS.)	TENSILE				10 MARKS
					ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	PLASTIC MODULUS (PSI x 10 ⁶)				ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	0.2% OFFSET YIELD (KSI)	ULTIMATE STRENGTH (KSI)	
1	A	9	100	↑	91.0	67.5	37.4	15.5	100	OK					
2	A	1	↑	↑		67.5	37.4	2.0	100	OK					
3	A	5	↑	↑	67.5	67.5	37.4	15.5	100	OK					
4	A	6	↑	↑	67.5	67.5	37.4	15.5	100	OK					
5	A	7	↑	↑	67.5	67.5	37.4	15.5	100	OK					
6	A	8	↑	↑	67.5	67.5	37.4	15.5	100	OK					
7	A	10	↑	↑	67.5	67.5	37.4	15.5	100	OK					
8	A	11	↑	↑	67.5	67.5	37.4	15.5	100	OK					
9	A	12	↑	↑	67.5	67.5	37.4	15.5	100	OK					
10	A	13	↑	↑	67.5	67.5	37.4	15.5	100	OK					
11	A	14	↑	↑	67.5	67.5	37.4	15.5	100	OK					
12	A	15	↑	↑	67.5	67.5	37.4	15.5	100	OK					
13	A	16	↑	↑	67.5	67.5	37.4	15.5	100	OK					
14	A	17	↑	↑	67.5	67.5	37.4	15.5	100	OK					
15	A	18	↑	↑	67.5	67.5	37.4	15.5	100	OK					
16	A	19	↑	↑	67.5	67.5	37.4	15.5	100	OK					
17	A	20	↑	↑	67.5	67.5	37.4	15.5	100	OK					
18	A	21	↑	↑	67.5	67.5	37.4	15.5	100	OK					
19	A	22	↑	↑	67.5	67.5	37.4	15.5	100	OK					
20	A	23	↑	↑	67.5	67.5	37.4	15.5	100	OK					
21	A	24	↑	↑	67.5	67.5	37.4	15.5	100	OK					
22	A	25	↑	↑	67.5	67.5	37.4	15.5	100	OK					
23	A	26	↑	↑	67.5	67.5	37.4	15.5	100	OK					
24	A	27	↑	↑	67.5	67.5	37.4	15.5	100	OK					
25	A	28	↑	↑	67.5	67.5	37.4	15.5	100	OK					
26	A	29	↑	↑	67.5	67.5	37.4	15.5	100	OK					
27	A	30	↑	↑	67.5	67.5	37.4	15.5	100	OK					
28	A	31	↑	↑	67.5	67.5	37.4	15.5	100	OK					
29	A	32	↑	↑	67.5	67.5	37.4	15.5	100	OK					
30	A	33	↑	↑	67.5	67.5	37.4	15.5	100	OK					
31	A	34	↑	↑	67.5	67.5	37.4	15.5	100	OK					
32	A	35	↑	↑	67.5	67.5	37.4	15.5	100	OK					
33	A	36	↑	↑	67.5	67.5	37.4	15.5	100	OK					
34	A	37	↑	↑	67.5	67.5	37.4	15.5	100	OK					
35	A	38	↑	↑	67.5	67.5	37.4	15.5	100	OK					
36	A	39	↑	↑	67.5	67.5	37.4	15.5	100	OK					
37	A	40	↑	↑	67.5	67.5	37.4	15.5	100	OK					
38	A	41	↑	↑	67.5	67.5	37.4	15.5	100	OK					
39	A	42	↑	↑	67.5	67.5	37.4	15.5	100	OK					
40	A	43	↑	↑	67.5	67.5	37.4	15.5	100	OK					
41	A	44	↑	↑	67.5	67.5	37.4	15.5	100	OK					
42	A	45	↑	↑	67.5	67.5	37.4	15.5	100	OK					
43	A	46	↑	↑	67.5	67.5	37.4	15.5	100	OK					
44	A	47	↑	↑	67.5	67.5	37.4	15.5	100	OK					
45	A	48	↑	↑	67.5	67.5	37.4	15.5	100	OK					
46	A	49	↑	↑	67.5	67.5	37.4	15.5	100	OK					
47	A	50	↑	↑	67.5	67.5	37.4	15.5	100	OK					
48	A	51	↑	↑	67.5	67.5	37.4	15.5	100	OK					
49	A	52	↑	↑	67.5	67.5	37.4	15.5	100	OK					
50	A	53	↑	↑	67.5	67.5	37.4	15.5	100	OK					
51	A	54	↑	↑	67.5	67.5	37.4	15.5	100	OK					
52	A	55	↑	↑	67.5	67.5	37.4	15.5	100	OK					
53	A	56	↑	↑	67.5	67.5	37.4	15.5	100	OK					
54	A	57	↑	↑	67.5	67.5	37.4	15.5	100	OK					
55	A	58	↑	↑	67.5	67.5	37.4	15.5	100	OK					
56	A	59	↑	↑	67.5	67.5	37.4	15.5	100	OK					
57	A	60	↑	↑	67.5	67.5	37.4	15.5	100	OK					
58	A	61	↑	↑	67.5	67.5	37.4	15.5	100	OK					
59	A	62	↑	↑	67.5	67.5	37.4	15.5	100	OK					
60	A	63	↑	↑	67.5	67.5	37.4	15.5	100	OK					
61	A	64	↑	↑	67.5	67.5	37.4	15.5	100	OK					
62	A	65	↑	↑	67.5	67.5	37.4	15.5	100	OK					
63	A	66	↑	↑	67.5	67.5	37.4	15.5	100	OK					
64	A	67	↑	↑	67.5	67.5	37.4	15.5	100	OK					
65	A	68	↑	↑	67.5	67.5	37.4	15.5	100	OK					
66	A	69	↑	↑	67.5	67.5	37.4	15.5	100	OK					
67	A	70	↑	↑	67.5	67.5	37.4	15.5	100	OK					
68	A	71	↑	↑	67.5	67.5	37.4	15.5	100	OK					
69	A	72	↑	↑	67.5	67.5	37.4	15.5	100	OK					
70	A	73	↑	↑	67.5	67.5	37.4	15.5	100	OK					
71	A	74	↑	↑	67.5	67.5	37.4	15.5	100	OK					
72	A	75	↑	↑	67.5	67.5	37.4	15.5	100	OK					
73	A	76	↑	↑	67.5	67.5	37.4	15.5	100	OK					
74	A	77	↑	↑	67.5	67.5	37.4	15.5	100	OK					
75	A	78	↑	↑	67.5	67.5	37.4	15.5	100	OK					
76	A	79	↑	↑	67.5	67.5	37.4	15.5	100	OK					
77	A	80	↑	↑	67.5	67.5	37.4	15.5	100	OK					
78	A	81	↑	↑	67.5	67.5	37.4	15.5	100	OK					
79	A	82	↑	↑	67.5	67.5	37.4	15.5	100	OK					
80	A	83	↑	↑	67.5	67.5	37.4	15.5	100	OK					
81	A	84	↑	↑	67.5	67.5	37.4	15.5	100	OK					
82	A	85	↑	↑	67.5	67.5	37.4	15.5	100	OK					
83	A	86	↑	↑	67.5	67.5	37.4	15.5	100	OK					
84	A	87	↑	↑	67.5	67.5	37.4	15.5	100	OK					
85	A	88	↑	↑	67.5	67.5	37.4	15.5	100	OK					
86	A	89	↑	↑	67.5	67.5	37.4	15.5	100	OK					
87	A	90	↑	↑	67.5	67.5	37.4	15.5	100	OK					
88	A	91	↑	↑	67.5	67.5	37.4	15.5	100	OK					
89	A	92	↑	↑	67.5	67.5	37.4	15.5	100	OK					
90	A	93	↑	↑	67.5	67.5	37.4	15.5	100	OK					
91	A	94	↑	↑	67.5	67.5	37.4	15.5	100	OK					
92	A	95	↑	↑	67.5	67.5	37.4	15.5	100	OK					
93	A	96	↑	↑	67.5	67.5	37.4	15.5	100	OK					
94	A	97	↑	↑	67.5	67.5	37.4	15.5	100	OK					
95	A	98	↑	↑	67.5	67.5	37.4	15.5	100	OK					
96	A	99	↑	↑	67.5	67.5	37.4	15.5	100	OK					
97	A	100	↑	↑	67.5	67.5	37.4	15.5	100	OK					
98	A	101	↑	↑	67.5	67.5	37.4	15.5	100	OK					
99	A	102	↑	↑	67.5	67.5	37.4	15.5	100	OK					
100	A	103	↑	↑	67.5	67.5	37.4	15.5	100	OK					

MATERIAL: 1-05, 1-05, 1-05, 1-05
 NOTES: 1. 100% outside 100% marks (100%)
 2. 100% 100% marks (100%)
 3. 100% in price

STOCK SIZE	HEAT	STOCK IDENT.	TEST TEMP. °F	GRAIN DIR.	TENSION				ELONG.		REDUCTION OF AREA (%)		BENDING				REMARKS
					ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	ELONG. IN INCHES (%)	REDUCTION OF AREA (%)	TYP. (°F)	11% (RS.)	0.2% ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	0.2% ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	0.2% ULTIMATE STRENGTH (KSI)	REMARKS
1/4"	A	A-1	1800	T	27.4	21.8	8.0	3.5		1800	10						
1/4"		C			31.2	23.6	9.2	2.5			10						
1/4"		K			20.8	10.2	21.8	0.5			100						
1/4"		N			23.0	10.4	22.0	1.0			100						
1/4"		L			20.4		22.1	1.0			100						
1/4"		J			11.9	7.6	12.5	1.0			500						
1/4"					See Note 1.						500						
1/4"											500						
1/4"											1000						
1/4"											1000						
1/4"	A		1800	T						1800	1000						

MATERIAL: 2024-T3 5-17A

NOTES: 1. See Note 1.

STOCK SIZE	HEAT	STOCK IDENT	TEST TEMP °F	GRAIN DIR	TENSION			COMPRESSION		LOADING				REMARKS
					ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	ELONG IN IN (1/16)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ULTIMATE STRENGTH (KSI)	
1	1	1	1	1	122.7	5.7	31.6	34.5						
2	2	2	2	2	122.7	5.7	31.6	34.5						
3	3	3	3	3	122.7	5.7	31.6	34.5						
4	4	4	4	4	122.7	5.7	31.6	34.5						
5	5	5	5	5	122.7	5.7	31.6	34.5						
6	6	6	6	6	122.7	5.7	31.6	34.5						
7	7	7	7	7	122.7	5.7	31.6	34.5						
8	8	8	8	8	122.7	5.7	31.6	34.5						
9	9	9	9	9	122.7	5.7	31.6	34.5						
10	10	10	10	10	122.7	5.7	31.6	34.5						
11	11	11	11	11	122.7	5.7	31.6	34.5						
12	12	12	12	12	122.7	5.7	31.6	34.5						
13	13	13	13	13	122.7	5.7	31.6	34.5						
14	14	14	14	14	122.7	5.7	31.6	34.5						
15	15	15	15	15	122.7	5.7	31.6	34.5						
16	16	16	16	16	122.7	5.7	31.6	34.5						
17	17	17	17	17	122.7	5.7	31.6	34.5						
18	18	18	18	18	122.7	5.7	31.6	34.5						
19	19	19	19	19	122.7	5.7	31.6	34.5						
20	20	20	20	20	122.7	5.7	31.6	34.5						
21	21	21	21	21	122.7	5.7	31.6	34.5						
22	22	22	22	22	122.7	5.7	31.6	34.5						
23	23	23	23	23	122.7	5.7	31.6	34.5						
24	24	24	24	24	122.7	5.7	31.6	34.5						
25	25	25	25	25	122.7	5.7	31.6	34.5						
26	26	26	26	26	122.7	5.7	31.6	34.5						
27	27	27	27	27	122.7	5.7	31.6	34.5						
28	28	28	28	28	122.7	5.7	31.6	34.5						
29	29	29	29	29	122.7	5.7	31.6	34.5						
30	30	30	30	30	122.7	5.7	31.6	34.5						
31	31	31	31	31	122.7	5.7	31.6	34.5						
32	32	32	32	32	122.7	5.7	31.6	34.5						
33	33	33	33	33	122.7	5.7	31.6	34.5						
34	34	34	34	34	122.7	5.7	31.6	34.5						
35	35	35	35	35	122.7	5.7	31.6	34.5						
36	36	36	36	36	122.7	5.7	31.6	34.5						
37	37	37	37	37	122.7	5.7	31.6	34.5						
38	38	38	38	38	122.7	5.7	31.6	34.5						
39	39	39	39	39	122.7	5.7	31.6	34.5						
40	40	40	40	40	122.7	5.7	31.6	34.5						
41	41	41	41	41	122.7	5.7	31.6	34.5						
42	42	42	42	42	122.7	5.7	31.6	34.5						
43	43	43	43	43	122.7	5.7	31.6	34.5						
44	44	44	44	44	122.7	5.7	31.6	34.5						
45	45	45	45	45	122.7	5.7	31.6	34.5						
46	46	46	46	46	122.7	5.7	31.6	34.5						
47	47	47	47	47	122.7	5.7	31.6	34.5						
48	48	48	48	48	122.7	5.7	31.6	34.5						
49	49	49	49	49	122.7	5.7	31.6	34.5						
50	50	50	50	50	122.7	5.7	31.6	34.5						
51	51	51	51	51	122.7	5.7	31.6	34.5						
52	52	52	52	52	122.7	5.7	31.6	34.5						
53	53	53	53	53	122.7	5.7	31.6	34.5						
54	54	54	54	54	122.7	5.7	31.6	34.5						
55	55	55	55	55	122.7	5.7	31.6	34.5						
56	56	56	56	56	122.7	5.7	31.6	34.5						
57	57	57	57	57	122.7	5.7	31.6	34.5						
58	58	58	58	58	122.7	5.7	31.6	34.5						
59	59	59	59	59	122.7	5.7	31.6	34.5						
60	60	60	60	60	122.7	5.7	31.6	34.5						
61	61	61	61	61	122.7	5.7	31.6	34.5						
62	62	62	62	62	122.7	5.7	31.6	34.5						
63	63	63	63	63	122.7	5.7	31.6	34.5						
64	64	64	64	64	122.7	5.7	31.6	34.5						
65	65	65	65	65	122.7	5.7	31.6	34.5						
66	66	66	66	66	122.7	5.7	31.6	34.5						
67	67	67	67	67	122.7	5.7	31.6	34.5						
68	68	68	68	68	122.7	5.7	31.6	34.5						
69	69	69	69	69	122.7	5.7	31.6	34.5						
70	70	70	70	70	122.7	5.7	31.6	34.5						
71	71	71	71	71	122.7	5.7	31.6	34.5						
72	72	72	72	72	122.7	5.7	31.6	34.5						
73	73	73	73	73	122.7	5.7	31.6	34.5						
74	74	74	74	74	122.7	5.7	31.6	34.5						
75	75	75	75	75	122.7	5.7	31.6	34.5						
76	76	76	76	76	122.7	5.7	31.6	34.5						
77	77	77	77	77	122.7	5.7	31.6	34.5						
78	78	78	78	78	122.7	5.7	31.6	34.5						
79	79	79	79	79	122.7	5.7	31.6	34.5						
80	80	80	80	80	122.7	5.7	31.6	34.5						
81	81	81	81	81	122.7	5.7	31.6	34.5						
82	82	82	82	82	122.7	5.7	31.6	34.5						
83	83	83	83	83	122.7	5.7	31.6	34.5						
84	84	84	84	84	122.7	5.7	31.6	34.5						
85	85	85	85	85	122.7	5.7	31.6	34.5						
86	86	86	86	86	122.7	5.7	31.6	34.5						
87	87	87	87	87	122.7	5.7	31.6	34.5						
88	88	88	88	88	122.7	5.7	31.6	34.5						
89	89	89	89	89	122.7	5.7	31.6	34.5						
90	90	90	90	90	122.7	5.7	31.6	34.5						
91	91	91	91	91	122.7	5.7	31.6	34.5						
92	92	92	92	92	122.7	5.7	31.6	34.5						
93	93	93	93	93	122.7	5.7	31.6	34.5						
94	94	94	94	94	122.7	5.7	31.6	34.5						
95	95	95	95	95	122.7	5.7	31.6	34.5						
96	96	96	96	96	122.7	5.7	31.6	34.5						
97	97	97	97	97	122.7	5.7	31.6	34.5						
98	98	98	98	98	122.7	5.7	31.6	34.5						
99	99	99	99	99	122.7	5.7	31.6	34.5						
100	100	100	100	100	122.7	5.7	31.6	34.5						

MATERIAL: 2.03 A53.37A

NOTES: 1. SAC

STOCK SIZE	HEAT	STOCK IDENT	TEST TEMP OF	GRAIN DIR.	TENSION			COMPRESSION		BENDING				SHEAR	REMARKS
					0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	ELONG IN (%)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)		
1/2"	1	1	77	T	64.1	31.9	33.5								
1/2"	1	1	77	T	64.1	31.9	32.0								
1/2"	1	1	77	L	71.9	32.1	20.0								
1/2"	1	1	77	↑	71.9	32.6	22.0								
1/2"	1	1	77	↑	71.9	32.1	20.5 (2)								
1/2"	1	1	77	↑	71.9	31.9	16.5 (1)								
1/2"	1	1	77	↑	71.9	32.0	11.5 (2)								
1/2"	1	1	77	↑	71.9	31.9	21.0								
1/2"	1	1	77	↑	71.9	32.1	19.5 (2)								
1/2"	1	1	77	↑	71.9	31.9	26.0 (2)								
1/2"	1	1	77	↑	71.9	31.9	21.5								
1/2"	1	1	77	↑	71.9	31.9	35.5								
1/2"	1	1	77	↑	71.9	32.2	32.5								
1/2"	1	1	77	↑	71.9	32.1	37.5								
1/2"	1	1	77	↑	71.9	31.9	32.0								
1/2"	1	1	77	↑	71.9	32.1	29.5								
1/2"	1	1	77	↑	71.9	32.0	38.5 (2)								
1/2"	1	1	77	↑	71.9	31.9	32.0 (1)								
1/2"	1	1	77	↑	71.9	32.1	32.5 (2)								
1/2"	1	1	77	↑	71.9	32.1	34.0 (1)								
1/2"	1	1	77	↑	71.9	32.1	28.0 (2)								
1/2"	1	1	77	↑	71.9	31.9	33.0								
1/2"	1	1	77	↑	71.9	32.2	32.5 (1)								
1/2"	1	1	77	↑	71.9	32.2	27.0 (2)								
1/2"	1	1	77	↑	71.9	32.1	29.0								
1/2"	1	1	77	↑	71.9	31.7	22.0 (2)								
1/2"	1	1	77	↑	71.9	32.1	19.0								
1/2"	1	1	77	↑	71.9	31.9	28.0								

MATERIAL: 1 65 K3 531A

NOTES 1) HGL
2) NC

STOCK SIZE	HEAT	STOCK IDENT	TEST TEMP OF	GRAB DIR	TENSION			COMPRESSION		BENDING				REMARKS
					ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	ELONG 2 IN (%)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	0.2% OFFSET YIELD (KSI)	
0.020	B	0	R.T.	T	149.5	68.2	36.7	50.5	72.5	31.3	201.0	112.0	261.6	115.4
"	B	0	"	T	146.0	67.3	35.9	47.5	63.2	31.3	202.0	112.7	264.9	64.2
"	"	"	"	L	136.5	62.0	33.3	44.5	51.5	30.2				
"	"	"	"	"	132.2	70.6	36.3	43.5						see Note 1
"	"	"	"	"	139.5	67.5	32.3	51.5	50.0	30.9				
"	"	"	"	"	140.0	71.5	36.5	49.0	51.8	31.2				
"	"	"	"	"	140.8	68.4	30.8	50.5	56.7	30.1				
"	"	"	"	"	137.4	66.7	33.8	45.5	52.9	30.2				
"	"	"	"	"	138.8	68.0	36.0	52.0	52.2	29.9				
"	"	"	"	"	139.1	70.0	33.2	46.5	62.3	29.8				
"	"	"	"	"	139.2	70.1	33.4	49.0	68.4	31.4				
"	B	"	"	L	140.2	72.7	33.2	49.0	52.2	30.5				
"	C	00	"	T	150.0	76.0	36.2	47.0	75.7	32.1	216.4	123.1	294.6	113.8
"	"	"	"	"	150.5	71.7	36.8	47.0	74.2	31.3	213.0	121.0	294.6	111.4
"	"	"	"	"	147.5	73.0	35.0	48.0	71.5	30.4	204.7	120.8	189.9	115.2
"	"	"	"	"	149.0	69.2	35.4	50.5	71.0	31.7	219.1	123.1	276.7	120.6
"	"	"	"	"	152.6	76.5	40.5	48.0	75.0	32.3	219.8	127.4	273.0	117.0
"	"	"	"	"	152.1	75.8	37.4	48.0	73.6	32.0	214.0	120.0	268.0	126.4
"	"	"	"	"	151.6	73.2	36.6	45.0	75.2	32.0	220.1	126.6	271.0	142.4
"	"	"	"	"	152.6	76.0	36.5	48.5	75.0	31.7	211.6	125.0	263.4	132.7
"	"	"	"	"	149.5	74.7	36.3	49.5	75.2	30.3	219.7	126.4	269.7	119.9
"	"	"	"	T	146.9	75.5	37.0	46.0	76.8	32.9	215.0	126.7	256.7	110.1
"	"	"	"	L	139.6	71.8	33.7	48.5						
"	"	"	"	"	142.1	73.3	32.7	49.0	54.9	29.3				
"	"	"	"	"	141.2	76.2	32.5	44.0	51.6	31.4				
"	"	"	"	"	143.0	76.5	33.3	48.0	51.8	30.6				
"	"	"	"	"	142.8	74.4	33.5	47.5	46.9	31.7				
0.020	C	00	R.T.	L	140.0	71.0	31.8	51.0						

MATERIAL: L-605 MS 55318

NOTES: 1. Specimen broke off center of 2 in. gage section.

STOCK SIZE	HEAT	STOCK IDENT	TEST TEMP °F	GRAIN DIR	TENSION			COMPRESSION		BENDING				REMARKS	
					ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	ELONG IN (%)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	D 1.5		D 2.0		
											ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ULTIMATE STRENGTH (KSI)
0.020	A	7	600	T	109.2	35.5	-	61.5							See Note 1
"	"	"	"	"	110.2	42.9	30.5	65.0							
"	"	"	"	"	111.5	42.5	28.0	61.5							
"	"	"	"	L	110.1	44.9	30.0	60.0							
"	"	"	"	L	119.6	50.5	29.9	59.5							
"	"	"	"	L	105.4	37.1	-	63.5							See Note 1
"	"	0	"	T	110.0	42.2	28.4	57.5							
"	"	"	"	"	107.9	43.1	27.9	58.0							
"	"	"	"	"											
"	"	"	"	L	109.2	40.3	31.0	60.0							
"	"	"	"	L	113.0	40.3	28.7	58.0							
"	"	"	"	"											
"	"	7	1000	T	94.5	35.8	27.1	59.0			150.7	73.8	108.0	127.0	
"	"	"	"	"	94.6	40.3	28.3	62.0					102.5	86.3	
"	"	"	"	"											
"	"	"	"	L	98.0	41.9	26.0	59.0							
"	"	"	"	"	97.5	40.5	27.1	59.0							
"	"	"	"	"											
"	"	0	"	T	98.5	39.1	27.6	62.0			150.0	80.0			
"	"	"	"	"	98.0	41.6	26.2	51.0			147.6	79.0			
"	"	"	"	"	96.3	42.1	-	57.5					108.0	142.0	
"	"	"	"	L	99.0		-	59.0							See Note 1
"	"	"	"	"	100.0	45.5	-	62.0							
"	"	"	"	"	98.5	42.1	-	59							
"	"	"	"	"											
"	"	7	1100	T	78.0	36.0	24.5	26.0			90.0	92.4	114.6	79.0	
"	"	"	"	"	73.6	37.7	27.6	15.5			83.9	62.2			

MATERIAL: 4047 AL 5537A

- NOTES: 1. Tensile stress-strain curve not obtained due to elongation of extensometer.
2. Tensile specimen failed in grip-nut.
3. Tensile specimen failed at extensometer knife-edge.
4. Tensile specimen broke off center of 2 inch gauge section.

STOCK SIZE	HEAT	STOCK IDENT	TEST TEMP °F	GRAIN DIR	TENSION			COMPRESSION			TORSION				REMARKS
					ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	PLASTIC MODULUS (PSI x 10 ⁶)	ELONG. IN IN. (1/2)	0.2% OFFSET YIELD (KSI)	PLASTIC MODULUS (PSI x 10 ⁶)	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	PLASTIC MODULUS (PSI x 10 ⁶)	ELONG. IN IN. (1/2)	
1/2"	A	1	1100	L	71.3	37.5	26.5	16.5							See Note 2
"	"	"	1100												
"	"	"	"												
"	"	3	"	T	55.3	39.7	25.2	14.5							
"	"	"	"	"	55.0	38.3	26.0	15.2							
"	"	"	"	"	71.5	41.3	26.3	23.5							
"	"	"	"	"	55.3	40.3	21.5	11.5							
"	"	"	"	"	52.5	40.5	25.0	11.5							
"	"	"	"	"	56.6	38.1	-	15.5							
"	"	"	"												
"	"	P	1100	T	36.3	24.0	-	13.0							
"	"	"	"	"	35.9	24.3	22.3	21.5							
"	"	"	"	"	36.3	22.0	21.5	22.5							
"	"	"	"	L	33.0	24.0	-	15.0							
"	"	"	"	"	29.9	22.5	-	21.5							
"	"	"	"	"	24.9	21.7	20.3	16.0							
"	"	3	"	T	31.4	22.9	-	21.5							
"	"	"	"	"	33.0	24.3	21.0	22.5							
"	"	"	"												
"	"	"	"	L	30.9	24.1	22.3	16.0							
"	"	"	"	"	30.5	23.7	22.3	19.5							
1/2"	A	3	1100												

MATERIAL 4340 AMS 537A

- NOTES
1. Tensile stress-strain curve not obtained due to shortage of extensometer.
 2. Tensile specimen failed in grip - 100% elongation.
 3. Tensile specimen failed in grip - 100% elongation.
 4. Tensile specimen failed in grip - 100% elongation.

STOCK SIZE	HEAT	STOCK IDENT	TEST TEMP °F	GRAIN DIR	TENSION			COMPRESSION			BENDING				REMARKS		
					ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	ELONG IN (%)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	1 D 1 1/2		1 D 2 0				
											ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)			
0.750	A	L	RT	T				72.6	32.4					246.0	136.0	116.0	
"	"	"	"	"													
"	"	"	"	"													
"	"	"	"	"	L	134.7	67.2	36.7	52.0	53.5	32.4	199.5	104.5	253.3	147.7		
"	"	"	"	"	"	134.7	71.9	33.5	55.0			201.0	112.2	240.4	130.4	116.0	
"	"	"	"	"								200.5	107.5	241.4	141.4		
"	"	L	"	T	135.0	66.8	34.8	52.0	70.0	32.1				260.5	156.4	119	
"	"	"	"	"													
"	"	"	"	"													
"	"	"	"	"	L	138.0	73.5	32.9	55.0	51.8	30.0	207.8	111.7	257.3	145.1		
"	"	"	"	"	"	140.0	72.3	33.8	55.0			211.5	112.5	253.8	145.2		
"	"	"	"	"	"							211.0					
"	"	"	"	"	"							208.5	107.5				
"	"	H	"	T					69.8	30.7		206.0	106.0				
"	"	"	"	"	"							214.0	112.0				
"	"	"	"	"													
"	"	"	"	"	L	142.6	66.8	35.0	57.2	53.5	30.8						
"	"	"	"	"	"	138.3	73.1	33.9	55.5	50.2	31.8						
"	"	"	"	"	"	140.0	73.0	34.4	56.0	51.2	30.6						
"	"	"	"	"	"					51.0	29.2						
"	"	H	"	T	139.0	66.9	31.8	54.5	71.1	32.3				251.0	150.0		
"	"	"	"	"	140.0	68.2	32.6	50.5	70.4	32.0				256.0	167.5		
"	"	"	"	"										255.0	158.5		
"	"	"	"	"	L	141.5	67.8	33.4	57.0	52.5	32.0			252.0	136.2		
"	"	"	"	"	"					50.4	30.8			259.7	141.3		
"	"	"	"	"													
"	"	P	"	T	139.3	67.7	32.8	53.0	69.7	31.6		193.9	97.0	244.4	147.7	See Note 1	
"	"	"	"	"								196.0	96.5	241.0	141.5		

MATERIAL: 1-1/2" A72 537A

NOTES: 1. Compression specimen - was bent before test.

STOCK SIZE	HEAT	STOCK IDENT	TEST TEMP °F	GRAIN DIR	TENSION				COMPRESSION			BENDING				SHEAR	REMARKS
					ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	ELONG IN (IN)	0.2% OFFSET YIELD (KSI)	PLASTIC MODULUS (PSI x 10 ⁶)	D 15	D 20	D 15	D 20			
1.360	A	P	RT	T													
"	"	"	"	"													
"	"	"	"	"	134.3	67.9	37.0	54.5									
"	"	"	"	"													
"	"	"	"	"													
"	"	"	"	"													
"	"	"	"	"	139.4	64.1	31.4	55.0	64.8	31.6							
"	"	"	"	"	139.5	72.3	36.4	54.5									
"	"	"	"	"													
"	"	"	"	"													
"	"	"	"	"	133.7	68.6	32.3	52.0									
"	"	"	"	"													
"	"	"	"	"													
"	"	"	"	"													
"	"	"	"	"	136.2	64.9	31.2	53.0	72.0	30.8							
"	"	"	"	"	139.0	68.4	31.5	52.0									
"	"	"	"	"	137.0	63.5	31.9	53.5									
"	"	"	"	"	137.0	64.3	31.0	53.0									
"	"	"	"	"													
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MATERIAL 1.360S AND 55JR

NOTES: 1. Compression specimen - was bent before test.

STOCK SIZE	HEAT	STOCK IDENT	TEST TEMP °F	GRAIN DIR	TENSION				COMPRESSION		BENDING				RE MARKS
					ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	ELONG. IN (%)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	D 1.5		D 2.0		RE MARKS
											ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	
0.060	A	E	600	T	121.4	44.7		69.5	50.0	30.5	179.1	99.3	227.7	93.1	
"	"	"	"	"	120.9	45.9		62.5							
"	"	"	"	L	123.1			70.0	47.5	31.3					
"	"	"	"	"											See Note 1
"	"	L	"	T	120.5	52.8		59.5			191.8	91.3	240.8	45.7	
"	"	"	"	"	124.4	46.0		60.5							
"	"	"	"	L	125.7	52.2		69.0							
"	"	"	"	"											
"	"	H	"	T											
"	"	"	"	"							197.0	83.0	223.5	91.0	
"	"	"	"	L	124.3	61.0		70.0					244.0	96.1	
"	"	H	"	"											
"	"	"	"	T					50.8	30.5	195.9	93.7	244.0	116.0	
"	"	"	"	"											
"	"	"	"	L	126.0	50.2		73.5	45.7	31.2	188.5	77.9	226.1	96.5	
"	"	"	"	"											
"	"	P	"	T					50.6	30.3	186.7	89.3			
"	"	"	"	"											
"	"	"	"	L	123.2	49.7		66.0	47.4	31.3	183.2	79.7	244.0	96.0	
"	"	"	"	"											
"	"	R	"	T					50.8	30.7			225.3	97.9	
"	"	"	"	"											
"	"	"	"	L					46.0	31.2	182.0	80.0	227.3	93.9	
"	"	"	"	"											
"	"	S	"	T	120.5	46.6		62.0	49.9	30.5					
"	"	"	"	"											
"	"	"	"	L					45.0	31.4	150.0	95.4	229.6	91.8	
"	"	"	"	"											

MATERIAL: J-605 NB 5537A

NOTES: 1. Tensile test - extensometer clipped.
2. Tensile specimen failed under 1.5 in. edge of extensometer.

STOCK SIZE	HEAT	STOCK IDENT	TEST TEMP °F	GRAIN DIR	TENSION			COMPRESSION		TENSILE				HEAD	REMARKS	
					ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	PLASTIC MODULUS (PSI x 10 ⁶)	ELONG IN (%)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	D 1.5		D 2.0			
											ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ULTIMATE STRENGTH (KSI)			0.2% OFFSET YIELD (KSI)
0.00C	A	K	600	T				16.4	30.4	174.3	79.7					
				L				30.2	30.3	172.7	99.4	217.9	93.0			
								37.4	30.3							
		L		T				12.7	30.3	180.0	95.5					
				L						104.5	80.5	237.1	72.2			
												241.4	120.7			
		H		T	69.5	30.3		15.2	30.3			239.1	93.0			
				L								236.0	108.0			
												237.5	110.9			
				L	69.5	41.3						236.0	109.0			
		P		T		40.8		69.5		174.5	79.5	215.7	96.9	85.9		
				L		40.5		77.5	30.1	175.5	140.5					
		R		T		36.7		76.0	30.1	174.5	85.7	275.3	86.0			
				L		42.2		69.0	30.1							
		S		T		41.2		67.0	30.4			210.4	104.0			
				L		43.1		67.0		179.0	92.9					
						41.7		69.0	30.4							

MATERIAL: 1-605 AMO 5537A

NOTES: 1. Tensile test - extensometer utilized.

2. Torillo specimen failed under knife edge of extensometer.

STOCK SIZE	HEAT	STOCK IDENT	TEST TEMP °F	GRAIN DIR	TENSION				COMPRESSION			BENDING				RE MARKS
					ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	PLASTIC MODULUS (PSI x 10 ⁶)	ELONG. IN (in)	0.2% OFFSET YIELD (KSI)	PLASTIC MODULUS (PSI x 10 ⁶)	ULTIMATE STRENGTH (KSI)	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	
3.250	A	8	900	T	107.6	39.2		67.5	67.5		153.5		94.3			
"	"	"	"	"							156.4		94.2			
"	"	"	"	L	109.7	39.0		71.5	35.2			207.7		94.3		
"	"	"	"	"	110.4	39.8		71.5								
"	"	L	"	T	108.8	43.7		52.5			170.0		94.0	107.6		
"	"	"	"	"	111.7	40.0		64.0								
"	"	"	"	L	110.9	31.9		67.0				218.4		100.5		
"	"	"	"	"												
"	"	M	"	T	109.3	40.9		64.0	43.0		167.5		91.5			
"	"	"	"	"												
"	"	"	"	L	109.7	40.3		65.0	34.2							
"	"	"	"	"												
"	"	N	"	T							173.5		96.2	211.1	101.0	
"	"	"	"	"												
"	"	"	"	"							179.0		94.5			
"	"	"	"	L					37.6							
"	"	"	"	"												
"	"	P	"	T								131.9		96.9		
"	"	"	"	"												
"	"	"	"	L							175.0		94.5	216.5	98.0	
"	"	"	"	"												
"	"	R	"	T					43.3							
"	"	"	"	"												
"	"	"	"	"								206.1		90.9		
"	"	"	"	L												
"	"	"	"	"								192.2		91.0		
"	"	"	"	"												
"	"	S	"	T	107.9	33.9		61.5	44.2							
"	"	"	"	"												
"	"	"	"	"												
"	"	"	"	L	127.8	30.1		61.5	36.0		161.1		97.9	211.3	91.9	
"	"	"	"	"												

MATERIAL: 1550S, A286, 5512A

NOTES: 1. Tensile test - ardenne metal cylinder.
2. Some 10 specimen failed under 1000 psi of extreme water.

STOCK SIZE	HEAT	STOCK IDENT	TEST TEMP °F	GRAIN DIR	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	ELONG. IN (%)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ULTIMATE STRENGTH (KSI)	REMARKS
2.00	A	R	1000	T	101.5	37.8		61.5			141.6	79.9	169.5	
"	"	"	"	"	"	"	"	"	"	"	"	"	"	
"	"	"	"	"	99.5	40.1		69.0			141.9	114.6		
"	"	"	"	"	"	"		"			"	"	"	
"	"	L	"	T	102.0	36.1		61.9			140.7	79.0	151.7	See Note 1
"	"	"	"	"	"	"		"			"	"	"	
"	"	"	"	L	101.4	36.8		73.5	30.4	76.2	149.0	67.1	160.0	
"	"	"	"	"	"	"		"			"	"	"	
"	"	H	"	T	106.5	37.2		80.0	39.0	-			185.7	99.5
"	"	"	"	"	"	"		"			"	"	"	
"	"	"	"	L	"	"		"			"	"	169.0	85.7
"	"	"	"	"	"	"		"			"	"	"	
"	"	"	"	T	"	"		"	38.6	-			179.0	97.5
"	"	"	"	"	"	"		"			"	"	"	
"	"	"	"	L	101.5	39.1		72.0			"	"	168.0	86.0
"	"	"	"	"	"	"		"			"	"	"	
"	"	P	"	T	"	"		"	38.4	76.3	140.4	79.3	188.1	95.4
"	"	"	"	"	"	"		"			"	"	"	
"	"	"	"	L	101.5	37.5		67.0	44.9	75.8	130.9	81.6	132.7	94.0
"	"	"	"	"	"	"		63.5			135.6	77.2		
"	"	"	"	L	98.2	37.5		"			"	"	"	
"	"	"	"	"	"	"		"			"	"	"	
"	"	S	"	T	101.5	39.3		66.5			135.4	79.7		77.0
"	"	"	"	"	"	"		"			"	"	"	
"	"	"	"	L	100.5	34.9		65.5			131.7	75.6		
"	"	"	"	"	"	"		"			"	"	"	

MATERIAL: 305 ALUMINUM

NOTES: 1. Compression specimen barrel.
2. Tensile specimen failed under knife edge of extensometer.

STOCK SIZE	HEAT	STOCK IDENT.	TEST TEMP OF	GRAIN DIR.	TENSION			COMPRESSION		IN TENSILE			SHEAR	TEMP. (°F.)
					ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	ELONG. IN (IN)	0.2% OFFSET YIELD (KSI)	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	0.2% OFFSET YIELD (KSI)		
0.0	A	K	RT	T	135.5	64.0	31.7	58.5						1000
"	"	R	"	"	136.0	63.7	31.0	60.5						"
"	"	"	"	"	136.1	64.0	32.9	64.5						"
"	"	P	"	"	136.0	64.2	34.3	60.0						500
"	"	R	"	"	136.4	69.3	32.0	61.0						"
"	"	9	"	"	137.9	66.2	32.6	62.5						"
"	"	L	"	"	136.0	70.5	34.5	58.5						800
"	"	P	"	"	137.5	67.2	33.1	54.5						"
"	"	"	"	"	136.1	68.7	32.2	64.0						"
"	"	H	"	"	135.5	73.8	32.2	56.0						1000
"	"	P	"	"	135.1	75.8	32.2	59.0						"
"	"	R	"	"	132.6	71.8	32.4	55.5						"
"	"	R	"	"					135.2	33.5				1200
"	"	L	"	"					135.6	34.9				"
"	"	H	"	"										"
"	"	P	"	"	136.9	108.9	32.0	8.5 (2)		212.3	199.8			"
"	"	R	"	"					127.0	224.5	205.7			"
"	"	B	"	"	135.0	107.9	32.0	8.0 (2)		226.3	235.3			"
"	"	H	"	"	128.6	72.9	33.4	13.5						1400
"	"	H	"	"	128.3	73.2	31.2	18.0						"
"	"	R	"	"					84.9	32.7				1000
"	"	L	"	"					93.8	34.9				"
"	"	H	"	"						207.6	177.7			"
"	"	H	"	"	135.4	60.6	32.7	9.5	98.4	207.6	171.1			"
"	"	P	"	"						186.7	161.0		86.9	"
"	"	B	"	"	125.6	76.3	32.6	9.5						"
"	"	R	"	"	120.9	67.5	35.4	36.5						1600
"	"	L	"	"	119.4	65.7	30.4	20.0 (1)						"

MATERIAL: 4045 AL-5517A

NOTES: 1. Tension specimen - brace off center.
2. BOL

STOCK SIZE	HEAT	STOCK IDENT	TEST TEMP OF	GRAIN DIR.	TENSION				COMPRESSION		BENDING				REMARKS
					ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PBI x 10 ⁶)	ELONG. IN (%)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PBI x 10 ⁶)	r D 1 1/2		r D 2 0		
											ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	
040	A	S	RT	7	141.1	70.5	37.6	37.5(11)							1000
"	"	L	"	"	130.5	72.6	38.5	24.0(11)	74.2	31.3	194.0	100.0			"
"	"	H	"	"	111.5	73.2	41.6	12.0(11)	90.2	31.4	184.5	134.4			"
"	"	"	"	"	129.0	72.0	39.4	24.0(11)							"
"	"	H	"	"							170.3	111.0			"
"	"	S	"	"					74.5	30.7					"
"	"	L	"	"							199.0	107.0			"
"	"	H	"	"	134.1	75.6	39.5	44.5(11)							"
"	"	H	"	"					85.6	31.5					"
"	"	P	"	"	125.9	77.7	36.9	29.0	92.3	30.0					"
"	"	H	"	"					92.4	31.3	190.1	109.6			"
"	"	S	"	"							190.5	103.8			"
"	"	H	"	"											"
"	"	L	"	"	158.0	96.2	35.6	6.5							"
"	"	H	"	"	154.0	96.5	37.0	6.0			313.3	201.0			"
"	"	H	"	"	138.3	75.1	30.9	5.0							"
"	"	H	"	"							227.2	213.3			"
"	"	S	"	"							291.7	240.8			"
"	"	H	"	"	111.9	67.7	36.9	15.0(13)	70.8	24.5	131.5	139.5			1000
"	"	L	"	"							190.1	107.9			"
"	"	H	"	"	114.6	69.1	37.6	15.5	73.6	30.7					"
"	"	P	"	"							175.2	136.7			"
"	"	H	"	"					71.0	30.5					"
"	"	S	"	"	120.6	64.1	37.1	17.0(13)							"
"	"	H	"	"	115.7	65.0	35.0	7.0	76.2	24.0	189.9	103.9			"
"	"	L	"	"	134.8	69.0	34.5	10.0			220.5	189.5			"
"	"	H	"	"					77.2	31.0					"
"	"	P	"	"							230.2	176.4			"

MATERIAL: 1405, AMS 517A

NOTES: 1. Tension specimen - brace off center.
2. Tension specimen - brace at gauge mark.
3. Tension specimen - brace at 1/2 of gauge length.

STOCK SIZE	HEAT	STOCK IDENT	TEST TEMP °F	GRAIN DIR	TENSION			COMPRESSION			BENDING				TORSION
					ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	PLASTIC MODULUS (PSI x 10 ⁶)	ELONG. IN (1)	0.2% OFFSET YIELD (KSI)	PLASTIC MODULUS (PSI x 10 ⁶)	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	
3/8"	A	1	1000	✓	104.7	67.4		7.5							1000
"	"	2	"	"	117.7	66.5		7.5							"
"	"	3	"	"	105.7	67.9		7.5							"
"	"	4	"	"	121.1	60.1		79.5							"
"	"	5	"	"	117.0	61.5		90.0(1)							"
"	"	6	"	"	113.7	60.9		76.0							"
"	"	7	900	"	111.9	61.6		67.0							"
"	"	8	"	"	109.1	60.1		71.5							"
"	"	9	"	"	112.6	61.7		67.5							"
"	"	10	1000	"	120.4	62.1		69.0							1000
"	"	11	"	"	101.2	61.9		77.1							"
"	"	12	"	"	100.9	64.5		59.0(1)							"
"	"	13	1200	"	117.2	70.1		80.5(2)							1200
"	"	14	"	"											"
"	"	15	"	"	94.5	68.4		17.5(1)	86.2		151.5	123.1			"
"	"	16	"	"	179.5	71.2		95.0(1)	73.2		157.4	127.1			"
"	"	17	1100	"	99.5	48.6		31.0(1)	79.5		156.4	130.9			"
"	"	18	"	"	80.1	36.5		27.0							1100
"	"	19	"	"	90.5	39.9		21.0(1)							"
"	"	20	"	"	70.6	44.5		13.0							"
"	"	21	"	"	97.5	43.9		21.0	50.1						"
"	"	22	"	"					47.5		156.0	129.2			"
"	"	23	"	"					47.0		156.9	91.1			"
"	"	24	"	"	91.9	34.5		20.0			117.2	38.2			"
"	"	25	"	"											"
"	"	26	1000	"	57.7	29.7		21.0							1000
"	"	27	"	"	71.2	36.0		22.5(1)							"
"	"	28	"	"	71.5	34.6		22.5(1)							"
"	"	29	"	"	71.5	34.6		22.5(1)							"

MATERIAL 1205 A3 537

NOTES 1. Tension specimen is rolled under knife edge. 2. Tension specimen is rolled under knife edge. 3. Tension specimen is rolled under knife edge.

STOCK SIZE	HEAT	STOCK IDENT.	TEST TEMP. °F	GRAIN DIR.	TENSION				COMPRESSION		TENSILE				CHAR.	
					ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	ELONG. IN (%)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	TEMP. (°F)	THICK. (IN.)
360	A	L	1470	T							98.0	69.0			1470	100
"	"	"	"	"							108.5	67.5			"	"
"	"	"	"	"	61.6	40.2		37.5							"	"
"	"	"	"	"	74.5	31.6		22.5 (1)							"	"
"	"	"	"	"							92.5	64.6			"	"
"	"	"	"	"	65.9	33.9		15.5			92.5	64.0			"	"
"	"	"	"	"											"	"
"	"	"	"	"	73.4	32.7		23.5							"	"
"	"	"	"	"											"	"
"	"	"	"	"	49.0	35.0		29.0							"	"
"	"	"	"	"	55.0	31.5		25.5	32.0		95.0	64.6			"	"
"	"	"	"	"							93.0	63.5			"	"
"	"	"	"	"											"	"
"	"	"	"	"											"	"
"	"	"	"	"											"	"
"	"	"	"	"	59.1	43.1		22.5 (1)			108.5	66.2			"	"
"	"	"	"	"	37.5	28.7		37.5 (1)			96.6	62.9			"	"
"	"	"	"	"	61.9	43.7		22.5							"	"
"	"	"	1900	"							116.0	53.5			"	"
"	"	"	"	"	22.5	22.1		27.0 (1)	20.1		39.0	39.9			1470	10
"	"	"	"	"	28.1	29.6		21.5 (1)	20.6		45.5	39.0			"	"
"	"	"	"	"											"	"
"	"	"	"	"							146.0	111.0			"	"
"	"	"	"	"					21.6	24.4					"	"
"	"	"	"	"					21.3	2.6	144.5	39.1			"	100
"	"	"	"	"	32.0	28.5		(1)			140.8	37.1			"	"
"	"	"	"	"	2.1	21.2		25.5 (1)							"	"
"	"	"	"	"											"	"
"	"	"	"	"	34.0	27.5		31.5 (1)			127.0	111.0			"	"

MATERIAL: 1-505 AIR 5517

NOTES: 1. Tension specimen - failed under knife edge of extensometer.

STOCK SIZE	HEAT	STOCK IDENT	TEST TEMP °F	GRAIN DIR	TENSION				COMPRESSION				TORSION				D 1.5	D 2.0		D 2.5	D 3.0	D 3.5	D 4.0	D 4.5	D 5.0	D 5.5	D 6.0	D 6.5	D 7.0	D 7.5	D 8.0	D 8.5	D 9.0	D 9.5	D 10.0	D 10.5	D 11.0	D 11.5	D 12.0	D 12.5	D 13.0	D 13.5	D 14.0	D 14.5	D 15.0	D 15.5	D 16.0	D 16.5	D 17.0	D 17.5	D 18.0	D 18.5	D 19.0	D 19.5	D 20.0	D 20.5	D 21.0	D 21.5	D 22.0	D 22.5	D 23.0	D 23.5	D 24.0	D 24.5	D 25.0	D 25.5	D 26.0	D 26.5	D 27.0	D 27.5	D 28.0	D 28.5	D 29.0	D 29.5	D 30.0	D 30.5	D 31.0	D 31.5	D 32.0	D 32.5	D 33.0	D 33.5	D 34.0	D 34.5	D 35.0	D 35.5	D 36.0	D 36.5	D 37.0	D 37.5	D 38.0	D 38.5	D 39.0	D 39.5	D 40.0	D 40.5	D 41.0	D 41.5	D 42.0	D 42.5	D 43.0	D 43.5	D 44.0	D 44.5	D 45.0	D 45.5	D 46.0	D 46.5	D 47.0	D 47.5	D 48.0	D 48.5	D 49.0	D 49.5	D 50.0	D 50.5	D 51.0	D 51.5	D 52.0	D 52.5	D 53.0	D 53.5	D 54.0	D 54.5	D 55.0	D 55.5	D 56.0	D 56.5	D 57.0	D 57.5	D 58.0	D 58.5	D 59.0	D 59.5	D 60.0	D 60.5	D 61.0	D 61.5	D 62.0	D 62.5	D 63.0	D 63.5	D 64.0	D 64.5	D 65.0	D 65.5	D 66.0	D 66.5	D 67.0	D 67.5	D 68.0	D 68.5	D 69.0	D 69.5	D 70.0	D 70.5	D 71.0	D 71.5	D 72.0	D 72.5	D 73.0	D 73.5	D 74.0	D 74.5	D 75.0	D 75.5	D 76.0	D 76.5	D 77.0	D 77.5	D 78.0	D 78.5	D 79.0	D 79.5	D 80.0	D 80.5	D 81.0	D 81.5	D 82.0	D 82.5	D 83.0	D 83.5	D 84.0	D 84.5	D 85.0	D 85.5	D 86.0	D 86.5	D 87.0	D 87.5	D 88.0	D 88.5	D 89.0	D 89.5	D 90.0	D 90.5	D 91.0	D 91.5	D 92.0	D 92.5	D 93.0	D 93.5	D 94.0	D 94.5	D 95.0	D 95.5	D 96.0	D 96.5	D 97.0	D 97.5	D 98.0	D 98.5	D 99.0	D 99.5	D 100.0	D 100.5	D 101.0	D 101.5	D 102.0	D 102.5	D 103.0	D 103.5	D 104.0	D 104.5	D 105.0	D 105.5	D 106.0	D 106.5	D 107.0	D 107.5	D 108.0	D 108.5	D 109.0	D 109.5	D 110.0	D 110.5	D 111.0	D 111.5	D 112.0	D 112.5	D 113.0	D 113.5	D 114.0	D 114.5	D 115.0	D 115.5	D 116.0	D 116.5	D 117.0	D 117.5	D 118.0	D 118.5	D 119.0	D 119.5	D 120.0	D 120.5	D 121.0	D 121.5	D 122.0	D 122.5	D 123.0	D 123.5	D 124.0	D 124.5	D 125.0	D 125.5	D 126.0	D 126.5	D 127.0	D 127.5	D 128.0	D 128.5	D 129.0	D 129.5	D 130.0	D 130.5	D 131.0	D 131.5	D 132.0	D 132.5	D 133.0	D 133.5	D 134.0	D 134.5	D 135.0	D 135.5	D 136.0	D 136.5	D 137.0	D 137.5	D 138.0	D 138.5	D 139.0	D 139.5	D 140.0	D 140.5	D 141.0	D 141.5	D 142.0	D 142.5	D 143.0	D 143.5	D 144.0	D 144.5	D 145.0	D 145.5	D 146.0	D 146.5	D 147.0	D 147.5	D 148.0	D 148.5	D 149.0	D 149.5	D 150.0	D 150.5	D 151.0	D 151.5	D 152.0	D 152.5	D 153.0	D 153.5	D 154.0	D 154.5	D 155.0	D 155.5	D 156.0	D 156.5	D 157.0	D 157.5	D 158.0	D 158.5	D 159.0	D 159.5	D 160.0	D 160.5	D 161.0	D 161.5	D 162.0	D 162.5	D 163.0	D 163.5	D 164.0	D 164.5	D 165.0	D 165.5	D 166.0	D 166.5	D 167.0	D 167.5	D 168.0	D 168.5	D 169.0	D 169.5	D 170.0	D 170.5	D 171.0	D 171.5	D 172.0	D 172.5	D 173.0	D 173.5	D 174.0	D 174.5	D 175.0	D 175.5	D 176.0	D 176.5	D 177.0	D 177.5	D 178.0	D 178.5	D 179.0	D 179.5	D 180.0	D 180.5	D 181.0	D 181.5	D 182.0	D 182.5	D 183.0	D 183.5	D 184.0	D 184.5	D 185.0	D 185.5	D 186.0	D 186.5	D 187.0	D 187.5	D 188.0	D 188.5	D 189.0	D 189.5	D 190.0	D 190.5	D 191.0	D 191.5	D 192.0	D 192.5	D 193.0	D 193.5	D 194.0	D 194.5	D 195.0	D 195.5	D 196.0	D 196.5	D 197.0	D 197.5	D 198.0	D 198.5	D 199.0	D 199.5	D 200.0	D 200.5	D 201.0	D 201.5	D 202.0	D 202.5	D 203.0	D 203.5	D 204.0	D 204.5	D 205.0	D 205.5	D 206.0	D 206.5	D 207.0	D 207.5	D 208.0	D 208.5	D 209.0	D 209.5	D 210.0	D 210.5	D 211.0	D 211.5	D 212.0	D 212.5	D 213.0	D 213.5	D 214.0	D 214.5	D 215.0	D 215.5	D 216.0	D 216.5	D 217.0	D 217.5	D 218.0	D 218.5	D 219.0	D 219.5	D 220.0	D 220.5	D 221.0	D 221.5	D 222.0	D 222.5	D 223.0	D 223.5	D 224.0	D 224.5	D 225.0	D 225.5	D 226.0	D 226.5	D 227.0	D 227.5	D 228.0	D 228.5	D 229.0	D 229.5	D 230.0	D 230.5	D 231.0	D 231.5	D 232.0	D 232.5	D 233.0	D 233.5	D 234.0	D 234.5	D 235.0	D 235.5	D 236.0	D 236.5	D 237.0	D 237.5	D 238.0	D 238.5	D 239.0	D 239.5	D 240.0	D 240.5	D 241.0	D 241.5	D 242.0	D 242.5	D 243.0	D 243.5	D 244.0	D 244.5	D 245.0	D 245.5	D 246.0	D 246.5	D 247.0	D 247.5	D 248.0	D 248.5	D 249.0	D 249.5	D 250.0	D 250.5	D 251.0	D 251.5	D 252.0	D 252.5	D 253.0	D 253.5	D 254.0	D 254.5	D 255.0	D 255.5	D 256.0	D 256.5	D 257.0	D 257.5	D 258.0	D 258.5	D 259.0	D 259.5	D 260.0	D 260.5	D 261.0	D 261.5	D 262.0	D 262.5	D 263.0	D 263.5	D 264.0	D 264.5	D 265.0	D 265.5	D 266.0	D 266.5	D 267.0	D 267.5	D 268.0	D 268.5	D 269.0	D 269.5	D 270.0	D 270.5	D 271.0	D 271.5	D 272.0	D 272.5	D 273.0	D 273.5	D 274.0	D 274.5	D 275.0	D 275.5	D 276.0	D 276.5	D 277.0	D 277.5	D 278.0	D 278.5	D 279.0	D 279.5	D 280.0	D 280.5	D 281.0	D 281.5	D 282.0	D 282.5	D 283.0	D 283.5	D 284.0	D 284.5	D 285.0	D 285.5	D 286.0	D 286.5	D 287.0	D 287.5	D 288.0	D 288.5	D 289.0	D 289.5	D 290.0	D 290.5	D 291.0	D 291.5	D 292.0	D 292.5	D 293.0	D 293.5	D 294.0	D 294.5	D 295.0	D 295.5	D 296.0	D 296.5	D 297.0	D 297.5	D 298.0	D 298.5	D 299.0	D 299.5	D 300.0	D 300.5	D 301.0	D 301.5	D 302.0	D 302.5	D 303.0	D 303.5	D 304.0	D 304.5	D 305.0	D 305.5	D 306.0	D 306.5	D 307.0	D 307.5	D 308.0	D 308.5	D 309.0	D 309.5	D 310.0	D 310.5	D 311.0	D 311.5	D 312.0	D 312.5	D 313.0	D 313.5	D 314.0	D 314.5	D 315.0	D 315.5	D 316.0	D 316.5	D 317.0	D 317.5	D 318.0	D 318.5	D 319.0	D 319.5	D 320.0	D 320.5	D 321.0	D 321.5	D 322.0	D 322.5	D 323.0	D 323.5	D 324.0	D 324.5	D 325.0	D 325.5	D 326.0	D 326.5	D 327.0	D 327.5	D 328.0	D 328.5	D 329.0	D 329.5	D 330.0	D 330.5	D 331.0	D 331.5	D 332.0	D 332.5	D 333.0	D 333.5	D 334.0	D 334.5	D 335.0	D 335.5	D 336.0	D 336.5	D 337.0	D 337.5	D 338.0	D 338.5	D 339.0	D 339.5	D 340.0	D 340.5	D 341.0	D 341.5	D 342.0	D 342.5	D 343.0	D 343.5	D 344.0	D 344.5	D 345.0	D 345.5	D 346.0	D 346.5	D 347.0	D 347.5	D 348.0	D 348.5	D 349.0	D 349.5	D 350.0	D 350.5	D 351.0	D 351.5	D 352.0	D 352.5	D 353.0	D 353.5	D 354.0	D 354.5	D 355.0	D 355.5	D 356.0	D 356.5	D 357.0	D 357.5	D 358.0	D 358.5	D 359.0	D 359.5	D 360.0	D 360.5	D 361.0	D 361.5	D 362.0	D 362.5	D 363.0	D 363.5	D 364.0	D 364.5	D 365.0	D 365.5	D 366.0	D 366.5	D 367.0	D 367.5	D 368.0	D 368.5	D 369.0	D 369.5	D 370.0	D 370.5	D 371.0	D 371.5	D 372.0	D 372.5	D 373.0	D 373.5	D 374.0	D 374.5	D 375.0	D 375.5	D 376.0	D 376.5	D 377.0	D 377.5	D 378.0	D 378.5	D 379.0	D 379.5	D 380.0	D 380.5	D 381.0	D 381.5	D 382.0	D 382.5	D 383.0	D 383.5	D 384.0	D 384.5	D 385.0	D 385.5	D 386.0	D 386.5	D 387.0	D 387.5	D 388.0	D 388.5	D 389.0	D 389.5	D 390.0	D 390.5	D 391.0	D 391.5	D 392.0	D 392.5	D 393.0	D 393.5	D 394.0	D 394.5	D 395.0	D 395.5	D 396.0	D 396.5	D 397.0	D 397.5	D 398.0	D 398.5	D 399.0	D 399.5	D 400.0	D 400.5	D 401.0	D 401.5	D 402.0	D 402.5	D 403.0	D 403.5	D 404.0	D 404.5	D 405.0	D 405.5	D 406.0	D 406.5	D 407.0	D 407.5	D 408.0	D 408.5	D 409.0	D 409.5	D 410.0	D 410.5	D 411.0	D 411.5	D 412.0	D 412.5	D 413.0	D 413.5	D 414.0	D 414.5	D 415.0	D 415.5	D 416.0	D 416.5	D 417.0	D 417.5	D 418.0</

STOCK SIZE	HEAT	STOCK IDENT	TEST TEMP °F	GRAIN DIA	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	ELONG IN (%)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	RE MARKS
0.080	A	T	R.T.	T	135.5	65.0	32.6	57.0	71.3	31.1	209.9	126.4	281.5	166.5	
"	"	"	"	"	135.8	64.0	31.9	58.0	71.7	31.9	199.5	132.3	266.5	159.1	
"	"	"	"	"	135.9	67.0	33.0	56.0	70.9	27.6	199.0	139.0	253.3	146.5	
"	"	"	"	"	135.0	67.4	32.5	55.0	70.6	29.9	202.5	131.5	243.5	156.0	
"	"	"	"	"	135.0	66.3	33.0	50.0	70.5	31.1	195.1	133.3	260.9	157.0	
"	"	"	"	L	138.1	71.4	32.1	57.5	55.0	29.0					
"	"	"	"	"	136.2	65.6	32.7	57.0	55.2	28.4					
"	"	"	"	"	135.1	69.8	32.2	57.5	51.6	30.2					
"	"	"	"	"	135.8	67.3	32.0	56.5	53.3	31.2					
"	"	T	"	L					52.3	30.0					
"	"	"	"	T	134.9	64.0	32.1	53.0	90.6	33.3	197.5	125.9	257.0	163.0	
"	"	"	"	"	134.2	63.6	32.7	56.0	81.0	32.7	201.0	127.7	262.0	165.6	
"	"	"	"	"	134.9	61.9	30.0	55.0	90.5	34.7	202.0	132.6	246.2	164.4	
"	"	"	"	"	134.4	64.0	32.0	57.0	89.0	33.7	204.1	129.7	262.0	164.0	
"	"	"	"	T					90.0		185.5	127.6	269.5	154.5	
"	"	"	"	L	135.5	69.7	31.0	59.9	66.0	30.3					
"	"	"	"	"	134.5	66.2	32.1	56.0	76.6						
"	"	"	"	"	135.0	69.1	31.5	58.0	60.4	32.3					
"	"	"	"	"	134.5	66.3	32.0	59.0	63.0	29.7					
"	"	"	"	L	134.1	69.0	32.0	59.0	66.0	31.1					
"	"	"	"	T	136.2	64.5	33.3	54.5	75.7	32.0	203.4	133.0	257.4	161.0	
"	"	"	"	"	136.5	66.3	34.5	54.0	76.1	30.6	213.0	140.2	255.8	170.9	
"	"	"	"	"	136.0	64.0	35.3	53.0	69.9	31.1	207.6	135.0	249.9	169.9	
"	"	"	"	"	141.2	65.7	31.9	50.0	72.99	30.2	209.1	137.4	252.4	165.9	
"	"	"	"	"	140.1	66.0	32.2	49.0	73.1	30.3	213.3	137.0	266.2	168.9	See Note 1
"	"	"	"	"					71.6	31.0	202.1	135.7	249.0	166.0	
"	"	"	"	T							191.9	137.8	266.6	173.9	

MATERIAL: L-60 MS 5537a

NOTES: 1. Weigh surface on face of spec.

STOCK SIZE	HEAT	STOCK IDENT	TEST TEMP °F	GRAIN DIR	TENSION			COMPRESSION			BENDING				REMARKS
					ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	ELONG. IN (IN)	0.2% OFFSET YIELD (KSI)	PLASTIC MODULUS (PSI x 10 ⁶)	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	ULTIMATE STRENGTH (KSI)	
		C													
					140.1	72.0	31.1	50.5	52.1	31.1					
					139.6	70.1	31.5	56.5	51.6	30.7					139.6
					139.8	72.8	31.2	56.0	56.4	31.0					139.1
					140.0	71.3	32.5	56.5	56.4	31.4					139.0
					139.3	76.0	32.5	69.0	51.2	31.1					139.3
					139.4	72.5	32.3	56.0	54.0	31.1					139.2
					137.6	70.4	36.1	56.0							139.1
					137.8	67.0	32.7	56.0	76.2	32.9	217.8	137.0	251.4	169.9	139.2
					136.7	67.2	32.4	55.0	79.0	32.4	202.2	126.3	263.4	162.0	139.2
					136.6	66.8	36.9	56.0	81.4	32.7	201.7	130.9	238.5	158.5	139.2
					136.0	67.6	32.6	55.0	76.7	31.1	198.5	137.8	268.9	167.9	139.2
					141.2	66.2	33.5	55.0	80.8	31.8	212.2	136.8	236.7	167.2	139.2
									78.5	31.6	189.8	128.0	250.9	164.0	139.2
									73.8	31.3	186.2	135.6			139.2
									70.8	30.8	196.5	146.6			139.2
									72.9	30.6					139.2
															139.2
					141.3	70.5	32.5	53.5	56.6	32.1					139.2
					141.5	71.8	32.1	53.0	56.2	31.9					139.2
					141.0	69.7	36.4	54.5	57.2	30.6					139.2
					139.1	70.3	31.1	55.0	55.0	32.4					139.2
					139.5	70.4	31.4	50.5	56.4	32.2					139.2
					140.5	70.6	32.4	53.0	58.4	32.8					139.2
					139.9	69.0	31.2	69.0	55.2	32.7					139.2
									55.0	32.2					139.2
									6.9	31.2					139.2

MATERIAL

NOTES

STOCK SIZE	HEAT	STOCK IDENT	TEST TEMP OF F	GRAIN DIR	TENSION			COMPRESSION			HEADING				SHEAR	ENGINE
					ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	ELONG IN (%)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	D 1.5		D 2.0			
											ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)		
100	A	T	RT	T											12.0	100
"	"	W	"	"											"	"
"	"	"	"	"											"	"
"	"	T	"	"	111.4	89.2		10.5							12.0	100
"	"	"	"	"											"	"
"	"	W	"	"	118.5	94.9		8.0							"	"
"	"	"	"	"											"	"
"	"	T	"	"	133.3	74.0		10.5(1)							16.0	100
"	"	"	"	"											"	"
"	"	W	"	"	129.6	71.6		11.0							"	"
"	"	T	"	"	137.2	78.9		5.0							"	"
"	"	"	"	"											"	"
"	"	W	"	"	131.9	77.4		3.5(1)							"	"
"	"	"	"	"											"	"
"	"	T	"	"	138.0	78.5		5.0							"	"
"	"	"	"	"											"	"
"	"	W	"	"	134.5	75.7		3.5							"	"
"	"	"	"	"											"	"
"	"	T	"	"											"	"
"	"	W	"	"											"	"
"	"	"	"	"											"	"
"	"	T	"	"											"	"
"	"	W	"	"											"	"
"	"	"	"	"											"	"
"	"	T	"	"	131.6	68.0		8.5							"	"
"	"	"	"	"											"	"
"	"	W	"	"	131.3	68.7		9.0(1)							"	"
"	"	"	"	"											"	"
"	"	T	"	"	121.0	67.2		5.0							"	"
"	"	"	"	"											"	"
"	"	W	"	"	120.3	59.7		6.0							"	"
"	"	"	"	"											"	"
"	"	T	"	"	127.7	67.6		5.5							"	"

MATERIAL: 2456 100 5311

NOTES: 1. Tensile specimen - break off center.

STOCK SIZE	HEAT	STOCK IDENT	TEST TEMP °F	GRADE	TENSION				COMPRESSION		BENDING				REMARKS
					ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (P x 10 ⁶)	ELONG. IN (%)	0.2% OFFSET YIELD (KSI)	FLASK MODULUS (P x 10 ⁶)	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	
0.77" PLATE	A	0	RT	T	130.7	60.9	28.1	62.5	65.2	31.9	185.9	110.9			185.1
"	"	"	"	"	130.4	61.0	32.4	62.5	64.5	21.9	183.4	111.7			188.4
"	"	"	"	"	133.3	60.3	35.8	60.0	64.0	32.0	185.3	112.8			181.2
"	"	"	"	"	133.8	61.1	32.1	60.0	64.5	31.9	186.0	107.4			181.9
"	"	"	"	"	134.2	64.6	32.7	60.0	63.9	32.0	182.9	112.4			185.1
"	"	"	"	"	133.0	61.9	33.0	60.0							181.3
"	"	"	"	"	133.3	61.8	33.0	59.5							182.1
"	"	"	"	"	132.4	63.9	31.3	61.0							186.7
"	"	"	"	"	133.9	64.7	28.7	59.0							181.2
"	"	"	"	"	134.8	61.4	32.6	61.5							186.7
"	"	"	"	L	137.1	67.0	35.1	62.0	69.0	32.1					95.5
"	"	"	"	"	133.5	67.0	34.4	63.0	60.5	32.0					93.5
"	"	"	"	"	134.1	62.3	33.8	62.0	64.6	32.0					93.9
"	"	"	"	"	134.2	61.9	34.4	63.0	64.3	32.1					95.1
"	"	"	"	"	134.1	62.5	33.1	61.0	55.4	26.0					95.5
"	"	"	"	"	134.2	63.0	33.9	62.0	66.9	31.9					97.3
"	"	"	"	"	135.9	62.9	33.2	64.0							98.2
"	"	"	"	"	135.6	63.9	28.8	63.0							99.8
"	"	"	"	"	134.6	63.3	30.1	63.0							97.3
"	"	"	"	"	132.9	64.7	31.1	63.0							97.7
"	B	00	"	T	134.2	66.5	33.5	56.0	95.4	32.1	199.0	115.0	254.1	115.1	97.3
"	"	"	"	"	137.7	68.0	32.3	56.0	47.4	32.0	195.7	119.6	285.5	116.3	97.9
"	"	"	"	"	137.8	66.3	32.9	57.0	63.5	31.9	203.7	109.5	286.9	120.2	97.9
"	"	"	"	"	138.2	65.8	36.7	55.0	56.4	32.0			255.1	114.4	99.0
"	"	"	"	"	137.8	67.0	32.5	54.5	62.5	32.0			230.0	151.4	96.9
"	"	"	"	"	137.6	64.4	27.2	58.5	65.5	31.9			228.2	144.1	99.0
"	"	"	"	"	137.0	65.6	31.8	58.0	45.9	32.1			241.9	140.4	97.9
"	"	"	"	"	137.4	67.2	31.5	53.5	43.3	32.0					93.6

MATERIAL 1-403 48-337A

NOTES

STOCK SIZE	HEAT	STOCK IDENT	TEST TEMP °F	GRAIN DIR	TENSION			COMPRESSION			ELONGATION				10 MARKS		
					ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	ALONG IN (")	0.2% OFFSET YIELD (KSI)	PLASTIC MODULUS (PSI x 10 ⁶)	REDUCTION OF AREA (%)			0.2% OFFSET YIELD (KSI)		ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)
											ATTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	0.1% OFFSET YIELD (KSI)				
1/2"	1	66	65	1	137.6	67.5	34.7	58.0	66.6	32.0						137.6	
"	1	"	"	"	137.7	67.3	33.3	54.6	60.1	31.9						64.7	
"	1	"	"	1	137.9	63.5	34.9	57.5	66.6	32.0						131.1	
"	1	"	"	"	137.5	65.9	28.9	57.3	66.9	32.0						134.6	
"	1	"	"	"	138.0	64.2	33.9	57.3	65.9	32.0						106.1	
"	1	"	"	"	137.8	65.6	32.9	57.3	61.0	32.0						132.7	
"	1	"	"	"	137.9	63.7	33.6	57.3	65.6	31.7						101.7	
"	1	"	"	"	137.7	66.6	34.4	58.0	61.6	32.0						112.1	
"	1	"	"	"	138.7	64.9	35.0	59.0	61.6	32.0						106.2	
"	1	"	"	"	137.5	63.4	27.5	57.3	66.6	32.1						110.7	
"	1	"	"	"	137.6	67.4	30.7	54.5	68.6	32.1						108.1	
"	1	"	"	"	137.7	62.7	27.7	56.5	63.0	32.1						102.1	
"	1	000	"	1	137.1	67.2	33.0	54.6	67.7	32.1	205.6	115.1				99.2	
"	1	"	"	"	137.4	67.6	30.7	54.0	55.4	32.0	203.1	116.3				99.4	
"	1	"	"	"	137.2	66.3	30.9	56.0	67.6	32.0	196.9	110.2				99.0	
"	1	"	"	"	137.0	67.9	30.5	55.0	56.0	32.0	197.1	116.4				98.6	
"	1	"	"	"	136.9	64.3	30.6	57.5	66.9	32.0						101.0	
"	1	"	"	"	136.7	66.6	32.0	57.5	57.5	32.0						106.7	
"	1	"	"	"	136.7	65.7	32.6	57.0	60.9	32.0						98.2	
"	1	"	"	"	136.6	66.0	32.2	59.0	64.4	32.0						97.4	
"	1	"	"	"	136.1	66.3	33.8	59.5	51.7	32.0						96.2	
"	1	"	"	"	136.9	66.5	34.1	57.5	64.4	32.0						94.7	
"	1	"	"	1	136.7	66.5	35.3	56.5	62.5	31.8						134.2	
"	1	"	"	"	136.9	63.9	34.9	59.5	61.7	32.0						103.1	
"	1	"	"	"	144.6	64.1	35.4	66.5	65.2	32.0						104.1	
"	1	"	"	"	134.2	64.5	34.1	64.5	63.1	32.0						100	
"	1	"	"	"	134.2	64.8	34.4	63.8	67.1	32.0							
"	1	"	"	"	134.2	62.4	34.1	64.5	55.4	32.0							

MATERIAL — L-60 5053A

NOTES

STOCK SIZE	HEAT	STOCK IDENT	TEST TEMP °F	GRAIN DIR	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	ELONG IN IN (%)	0.2% OFFSET YIELD (KSI)	D 1.5		D 2.0		RE MARKS
										ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	
1/8" dia	A	C	600	T										
"	"	"	"	"										
"	"	"	"	"										
"	"	"	"	"										
"	"	"	600	"										
"	"	"	1000	"	102.3	11.1		25.0	66.6	129.3	66.6	135.9	71.2	50.9
"	"	"	"	"		11.1			62.1	129.3	62.1	141.0	79.6	8.7
"	"	"	"	"	108.1	11.1		26.0						97.5
"	"	"	"	"	105.5	11.7		27.0						110.2
"	"	"	"	T	108.1	11.2		27.5						112.9
"	"	"	"	"	86.5	25.8		20.0						67.5
"	"	"	"	"	86.7	25.4		21.0						73.4
"	"	"	"	"	85.5	24.2		22.0						71.2
"	"	"	"	"	85.7	25.4		24.0						71.1
"	"	"	"	"	86.1	26.1		21.0						75.2
"	"	"	1000	T	70.2	23.9		26.0	57.0	89.6	57.0			55.1
"	"	"	"	"	70.6	24.7		25.0	57.5	89.7	57.5			55.7
"	"	"	"	"	79.2	30.0		29.5						65.7
"	"	"	"	"	73.1	30.0		28.0						66.2
"	"	"	"	T	72.4	29.2		28.5						66.2
"	"	"	"	"	72.7	28.9		31.0						66.2
"	"	"	"	"	71.8	30.4		25.0						
"	"	"	"	"	74.4	30.2		26.5						
"	"	"	"	"	74.4	28.2		28.0						
"	"	"	1000	T	70.1	29.7		28.0						50.0
"	"	"	1000	T						91.0	47.1	78.6	55.0	22.2
"	"	"	1500	T						71.2	44.0	71.0	51.6	23.1
"	"	"	1500	T								73.7	51.7	25.9
1/8" dia	A	C	1000	T										

MATERIAL: 1.805, R23.5317 A

NOTES:

- 1) Tensile specimen failed under knife edge of extensometer
- 2) Tensile specimen failed outside of middle third of 2 inch gauge mark

STOCK SIZE	HEAT	STOCK IDENT.	TEST TEMP °F	GRAIN DIR.	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ³)	ELONG. IN YIELD (%)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ³)	0.2% OFFSET YIELD (KSI)	0.2% ULTIMATE STRENGTH (KSI)	0.2% ULTIMATE STRENGTH (KSI)	REMARKS
1.0 inch diam	A	0	RT	T	140.6	69.9	32.8	64.5						
"	"	"	"	"	141.0	71.4	35.4	60.0						
"	"	"	"	"	140.8	70.4	35.3	59.5						
"	"	"	"	"	140.9	69.0	35.4	61.0						
"	"	"	"	"	141.3	71.1	34.1	60.0						
"	"	"	"	"	141.3	70.5	36.0	60.0						
"	"	"	"	"	140.9	70.5	34.2	59.5						
"	"	"	"	"	140.6	69.8	35.4	60.5						
"	"	"	"	"	140.7	70.1	35.8	59.0						
"	"	"	"	"	141.4	69.7	34.4	59.5						
"	"	"	"	"	141.2	71.1	35.1	57.0						
"	"	"	"	"	140.7	71.6	32.3	59.0						
"	"	"	"	"	140.6	69.9	33.6	59.0						
"	"	"	"	"	140.6	70.6	32.2	59.0						
"	"	"	"	"	141.7	68.0	33.1	60.5						
"	"	"	"	"	142.4	71.2	33.7	59.0						
"	"	"	"	"	141.4	71.2	35.4	59.0						
"	"	"	"	"	141.3	69.7	33.2	58.5						
"	"	"	"	"	141.3	70.3	34.0	58.5						
"	"	"	"	"	142.3	71.2	35.3	57.5						
"	"	"	"	"	142.3	67.9	35.1	55.5						
"	"	"	"	"	140.6	68.6	33.7	54.5						
"	"	"	"	"	142.1	66.7	33.0	55.5						
"	"	"	"	"	143.1	66.9	33.9	54.0						
"	"	"	"	"	142.3	67.1	34.2	54.5						
"	"	"	"	"	142.1	66.7	34.0	55.5						
"	"	"	"	"	142.5	67.4	34.9	45.5						
1.0 inch diam	A	0	RT	T	142.1	67.6	33.6	55.5						

PATENT: 2-605 AB 5517 A

NOTES:

STOCK SIZE	HEAT	STOCK IDENT	TEST TEMP °F	GRAIN DIR	TENSION				COMPRESSION		DRAWING				SHEAR	RE MARKS
					ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	ELONG IN (%)	0.2% OFFSET YIELD (KSI)	PLASTIC MODULUS (PSI x 10 ⁶)	D 1.5		D 2.0			
											ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)		
					8.2	3.7		28.0								
					8.4	3.7		28.5								
					8.8	3.8		28.5								
					8.8	3.8		30.0								
					8.8	3.8		31.5								
					8.8	3.8		32.5								
					8.8	3.8		34.0								
					8.8	3.8		35.0								
					8.8	3.8		36.0								
					8.8	3.8		37.5								
					8.8	3.8		38.5								
									</							

MATERIAL:
NOTES:

ST. NO. SIZE	MATERIAL	STOCK IDENT.	TEST TEMP. °F	GRAIN DIR.	TENSION				COMPRESSION				BENDING				REMARKS
					ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁻⁶)	ELONG. ALONG IN. (%)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁻⁶)	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	
1	1018	0	RT	T	114.7	71.8	37.3	56.0	70.1	30.5							111.9
2	1018	0	RT	T	114.7	74.5	36.4	56.0	71.7	31.0							112.5
3	1018	0	RT	T	114.7	73.0	31.8	55.0	70.7	29.9							113.7
4	1018	0	RT	T	113.3	73.1	29.1	55.0	69.0	30.4							107.4
5	1018	0	RT	T	114.9	73.4	29.2	60.0	67.7	31.6							112.1
6	1018	0	RT	L	116.5	70.1	30.1	59.5	67.1	31.0							109.1
7	1018	0	RT	T	113.5	63.8	31.6	61.0	65.1	30.1							102.8
8	1018	0	RT	T	113.2	67.1	34.5	61.5	64.4	29.9							104.1
9	1018	0	RT	T	111.7	67.1	31.0	59.0	68.0	30.4							103.2
10	1018	0	RT	T	114.0	69.4	33.7	60.0	64.5	29.8							104.1
11	1018	00	RT	T	114.0	70.2	29.0	62.0	68.1	32.2							113.8
12	1018	0	RT	T	113.7	70.1	30.4	61.0	64.4	30.4							103.8
13	1018	0	RT	T	114.1	69.2	31.8	61.5	70.4	31.1							108.4
14	1018	0	RT	T	114.3	69.6	32.6	61.5	68.0	29.7							109.2
15	1018	0	RT	T	114.0	69.8	31.0	59.5									105.3
16	1018	0	RT	L	114.1	79.1	31.8	60.5	63.0	30.9							104.3
17	1018	0	RT	T	114.7	71.4	31.4	60.5	61.9	30.4							101.6
18	1018	0	RT	T	113.7	71.0	31.4	58.0	65.9	30.3							104.1
19	1018	0	RT	T	131.2	66.9	31.3	32.0	61.2	31.3							104.5
20	1018	0	RT	T	136.0	64.4	31.5	36.0	65.5	29.3							105.7
21	1018	000	RT	T	137.5	65.2	32.3	33.0	66.6	30.6							94.1
22	1018	0	RT	T	115.0	64.5	32.5	35.0	67.9	31.1							107.2
23	1018	0	RT	T	139.8	67.4	33.2	56.0	66.5	29.6							103.5
24	1018	0	RT	T	140.7	67.3	32.9	59.0	67.1	29.6							104.7
25	1018	0	RT	T	141.0	69.3	30.0	58.0	65.7	29.1							101.8
26	1018	0	RT	L	137.8	67.4	34.7	55.0									103.3
27	1018	0	RT	T	136.3	66.1	35.1	59.0	62.8	26.5							102.7
28	1018	0	RT	T	145.1			59.0	61.2	26.1							103.5

MATERIAL 1018 AND 575M

NOTES 1. Tensile specimen broke outside one 1/16 inch gauge section.
2. Tensile specimen broke outside of middle third of one 1/16 inch gauge section.
3. Tensile test - extensometer clipped.

**ROOM TEMPERATURE TRANSVERSE TENSILE PROPERTIES
OF HAYNES ALLOY NO. 25 SHEET AND PLATE**

<u>Heat</u>	<u>Gage</u>	<u>F_{tu}(PSI)</u>	<u>F_{ty}(PSI)</u>	<u>Elong. (% in 2")</u>
L2-1421	.020	138,000	69,000	53.0
L3-1616		146,000	71,000	57.0
-1636		137,000	63,000	53.0
L1-1438		136,000	65,000	49.0
L3-1524		137,000	64,000	46.0
-1509		145,000	71,000	54.0
L2-1463		140,000	67,000	48.0
L1-1450		137,000	70,000	42.0
-1450		137,000	68,000	43.0
-1494		142,000	75,000	42.0
-1494		140,000	70,000	45.0
-1570		142,000	70,000	52.0
-1462		139,000	72,000	48.0
-1600		140,000	70,000	44.0
L2-1709		144,000	64,000	46.0
-1709		141,000	62,000	40.0
-1693		136,000	73,000	50.0
-1658		139,000	73,000	49.0
-1709		141,000	76,000	45.0
L1-1459		132,000	69,000	45.0
L2-1787		137,000	71,000	45.0
-1782		138,000	72,000	45.0
-1754		140,000	70,000	46.0
L2-1708		144,000	78,000	46.0
-1709		141,000	73,000	47.0
-1848		137,000	66,000	45.0
L1-1848		135,000	69,000	44.0
-1447		137,000	66,000	47.0
-1447		138,000	66,000	48.0
-1466		139,000	68,000	44.0
-1450		133,000	68,000	42.0
-1466		137,000	66,000	44.0
-1450		132,000	65,000	44.0
-1466		139,000	66,000	44.0
L3-1573	.023	134,000	62,000	45.0
-1616	.022	149,000	72,000	53.0
-1616		145,000	75,000	49.0
-1616		145,000	77,000	52.0
-1576		142,000	67,000	51.0
-1582		151,000	75,000	42.0
-1582	.021	148,000	71,000	42.0
-1645		138,000	63,000	50.0

(cont'd)

<u>Heat</u>	<u>Gage</u>	<u>F_{tu}(PSI)</u>	<u>F_{ty}(PSI)</u>	<u>Elong. (% in 2")</u>
L3-1643	.022	138,000	63,000	50.0
-1643		139,000	64,000	53.0
L4-1663	.021	141,000	66,000	43.0
-1663		141,000	66,000	43.0
L2-1769	.023	139,000	71,000	47.0
-1773		137,000	67,000	45.0
-1773		139,000	68,000	46.0
-1787	.022	138,000	68,000	52.0
-1767		144,000	70,000	47.0
-1435		137,000	70,000	43.0
-1754		144,000	73,000	47.0
-1439		142,000	75,000	41.0
-1742	.021	138,000	68,000	52.0
-1742		139,000	67,000	47.0
L1-1449	.022	138,000	69,000	44.0
L2-1761	.021	138,000	70,000	40.0
-1429		135,000	66,000	41.0
-1753		141,000	71,000	43.0
-1747		139,000	67,000	45.0
-1727		137,000	66,000	48.0
-1732		133,000	64,000	43.0
-1738		142,000	67,000	54.0
-1784		137,000	66,000	44.0
-1404		131,000	65,000	43.0
-1403		134,000	67,000	44.0
-1403		131,000	67,000	43.0
-1437		134,000	68,000	42.0
-1437		134,000	68,000	45.0
-1787		141,000	73,000	47.0
-1766		138,000	69,000	45.0
L1-1514		140,000	69,000	46.0
-1551	.022	136,000	68,000	40.0
-1551		138,000	67,000	46.0
-1551		139,000	68,000	45.0
-1569	.023	137,000	71,000	51.0
-1546	.022	141,000	70,000	54.0
-1620		136,000	67,000	43.0
-1597		140,000	71,000	45.0
-1597		139,000	69,000	47.0
-1620		145,000	78,000	40.0
-1620		139,000	72,000	43.0
L2-1762	.023	136,000	68,000	45.0
-1765		135,000	66,000	46.0
-1762		137,000	73,000	46.0
-1763		136,000	70,000	45.0
-1762		135,000	71,000	42.0
-1769		139,000	68,000	49.0
-1769	.021	140,000	72,000	46.0

(cont'd)

<u>Heat</u>	<u>Gage</u>	<u>F_{tu}(PSI)</u>	<u>F_{ty}(PSI)</u>	<u>Elong. (% in</u>
L2-1769	.021	143,000	79,000	48.0
-1769		139,000	73,000	45.0
-1835	.022	138,000	64,000	46.0
-1753	.021	131,000	61,000	47.0
-1813	.022	138,000	71,000	42.0
-1813		137,000	71,000	48.0
-1753	.021	133,000	63,000	45.0
-1841	.022	139,000	72,000	42.0
-1753		134,000	65,000	43.0
L1-1451		146,000	76,000	45.0
-1473		137,000	75,000	40.0
L3-1661	.040	131,000	60,000	45.0
-1661		133,000	60,000	50.0
-1661		141,000	65,000	47.0
-1661		141,000	67,000	49.0
-1636	.039	145,000	75,000	50.0
-1623		148,000	78,000	47.0
-1636		138,000	67,000	47.0
-1624	.040	147,000	69,000	54.0
-1649		137,000	63,000	55.0
-1657		142,000	68,000	47.0
-1657		143,000	67,000	52.0
-1645		143,000	71,000	53.0
-1645		142,000	67,000	54.0
-1659		142,000	67,000	49.0
-1658		143,000	68,000	47.0
-1658		144,000	68,000	48.0
-1655		145,000	70,000	49.0
-1655		143,000	69,000	48.0
-1543	.039	145,000	66,000	55.0
L2-1456	.040	145,000	72,000	50.0
-1456		148,000	73,000	52.0
-1460		139,000	66,000	49.0
L3-1465		141,000	69,000	41.0
-1465		138,000	66,000	40.0
-1512		143,000	64,000	51.0
-1583		142,000	67,000	51.0
-1614		143,000	66,000	50.0
-1636	.039	146,000	69,000	55.0
-1623	.049	143,000	67,000	53.0
-1633	.039	139,000	61,000	53.0
L2-1684	.040	142,000	68,000	53.0
-1782		143,000	67,000	55.0
-1754		145,000	69,000	52.0
-1787		136,000	65,000	54.0
-1410	.039	145,000	69,000	56.0
-1408		145,000	72,000	49.0

(cont'd)

<u>Heat</u>	<u>Gage</u>	<u>F_{tu}(PSI)</u>	<u>F_{ty}(PSI)</u>	<u>Elong. (% in 2")</u>
L2-1410	.039	146,000	70,000	53.0
-1419	.040	150,000	77,000	52.0
-1692		145,000	69,000	54.0
-1435		141,000	67,000	52.0
-1439		141,000	70,000	47.0
-1408		142,000	68,000	47.0
-1439		142,000	69,000	48.0
-1434		144,000	70,000	52.0
-1743		139,000	68,000	50.0
L1-1574	.038	142,000	69,000	52.0
-1600		141,000	69,000	47.0
-1597	.040	139,000	67,000	50.0
-1579		140,000	69,000	50.0
-1615		145,000	69,000	53.0
-1848		140,000	71,000	49.0
-1837		144,000	72,000	46.0
-1837		141,000	78,000	51.0
-1821	.038	148,000	74,000	46.0
-1467	.040	145,000	67,000	53.0
-1812		139,000	70,000	57.0
-1816		146,000	71,000	56.0
-1836		144,000	71,000	55.0
-1941		139,000	67,000	48.0
-1837		139,000	65,000	47.0
-1837		141,000	67,000	45.0
-1844		140,000	66,000	51.0
-1847		139,000	67,000	49.0
L3-1656	.041	142,000	75,000	43.0
-1656		143,000	78,000	43.0
-1472	.042	137,000	69,000	50.0
-1323	.041	144,000	67,000	50.0
L2-1416	.042	148,000	77,000	48.0
-1415	.042	146,000	72,000	55.0
-1703	.041	141,000	65,000	53.0
-1431	.042	144,000	68,000	57.0
L1-1450	.042	144,000	68,000	52.0
-1454	.041	142,000	68,000	51.0
L3-1616	.044	143,000	73,000	55.0
-1626	.043	140,000	66,000	55.0
-1524	.044	146,000	72,000	45.0
-1545		139,000	69,000	51.0
-1628		144,000	68,000	55.0
-1583	.043	142,000	69,000	51.0
-1639	.044	139,000	65,000	52.0
-1656	.044	149,000	66,000	56.0
-1659		144,000	64,000	53.0
14-1668		140,000	61,000	52.0

(cont'd)

Heat	Gage	F_{tu} (PSI)	F_{ty} (PSI)	Elong. (% in 2")
14-1668	.044	142,000	63,000	53.0
-1668		138,000	62,000	55.0
-1668		138,000	64,000	57.0
-1668		133,000	60,000	53.0
-1664		138,000	64,000	52.0
-1668		144,000	66,000	53.0
13-1530		142,000	69,000	46.0
-1530		138,000	65,000	52.0
-1530	.043	142,000	66,000	51.0
-1573	.044	147,000	70,000	55.0
-1512		140,000	62,000	54.0
-1557		142,000	69,000	54.0
-1563		143,000	68,000	55.0
-1563		142,000	68,000	52.0
-1529	.043	133,000	66,000	41.0
-1499		135,000	65,000	47.0
-1513		143,000	69,000	57.0
-1571	.081	142,000	68,000	60.0
-1635	.078	140,000	69,000	52.0
-1623		141,000	65,000	57.0
-1635		136,000	63,000	51.0
-1624	.081	147,000	73,000	56.0
-1588	.078	137,000	64,000	50.0
-1548	.081	136,000	64,000	60.0
-1651	.078	143,000	68,000	60.0
-1651		142,000	70,000	56.0
-1651		140,000	68,000	59.0
-1648		148,000	72,000	55.0
-1654	.081	145,000	71,000	55.0
-1654		142,000	68,000	57.0
-1648	.078	142,000	68,000	57.0
-1654	.081	143,000	71,000	53.0
-1656	.078	144,000	69,000	57.0
-1532		143,000	70,000	55.0
-1635		145,000	69,000	53.0
-1665		140,000	67,000	60.0
-1608		141,000	67,000	57.0
14-1665		139,000	65,000	58.0
12-1447	.081	139,000	67,000	55.0
13-1468	.078	137,000	68,000	53.0
-1449	.081	133,000	65,000	59.0
12-1444	.078	145,000	74,000	55.0
-1452	.081	139,000	65,000	57.0
13-1340		138,000	70,000	56.0
-1340		137,000	67,000	60.0
-1341	.083	145,000	69,000	60.0
-1324		138,000	65,000	57.0

(cont'd)

<u>Heat</u>	<u>Gage</u>	<u>F_{tu} (PSI)</u>	<u>F_{ty} (PSI)</u>	<u>Elong. (% in 2")</u>
L3-1490	.078	146,000	73,000	53.0
-1499	.081	143,000	62,000	53.0
-1515		138,000	68,000	50.0
-1465		141,000	73,000	48.0
-1545		142,000	73,000	56.0
-1542	.077	139,000	65,000	56.0
-1615	.083	146,000	67,000	59.0
L2-1716	.077	141,000	75,000	52.0
-1744	.081	137,000	68,000	54.0
-1716		139,000	65,000	61.0
-1674	.078	138,000	65,000	61.0
-1744	.080	138,000	66,000	57.0
-1715	.077	135,000	62,000	54.0
-1749	.081	140,000	67,000	58.0
-1754	.080	143,000	69,000	57.0
-1787		139,000	66,000	58.0
-1782		140,000	65,000	58.0
-1710	.081	145,000	72,000	52.0
-1710		144,000	68,000	54.0
-1752		144,000	69,000	58.0
-1412	.078	141,000	68,000	54.0
-1408		143,000	68,000	55.0
-1415	.081	142,000	72,000	58.0
-1423		140,000	65,000	62.0
-1423		140,000	69,000	58.0
L1-1466	.078	139,000	68,000	53.0
-1507		139,000	68,000	56.0
-1549	.081	142,000	69,000	54.0
-1507	.078	142,000	74,000	51.0
-1541	.081	140,000	72,000	60.0
-1530	.080	137,000	66,000	57.0
-1541	.081	137,000	66,000	62.0
-1541		138,000	66,000	63.0
-1568	.076	137,000	68,000	50.0
-1586	.081	140,000	67,000	58.0
-1457	.080	143,000	68,000	58.0
-1596	.083	144,000	70,000	57.0
-1596	.078	144,000	73,000	55.0
-1637	.081	144,000	73,000	58.0
-1599	.078	141,000	68,000	60.0
L2-1674	.081	143,000	72,000	57.0
-1684		142,000	71,000	58.0
L1-1620	.078	142,000	67,000	57.0
L2-1700	.081	147,000	75,000	53.0
-1821		150,000	76,000	56.0
-1785	.077	141,000	70,000	58.0
-1797		137,000	64,000	54.0

(cont'd)

<u>Heat</u>	<u>Gage</u>	<u>F_{TU} (PSI)</u>	<u>F_{TY} (PSI)</u>	<u>Elong. (% in</u>
L2-1785	.077	143,000	74,000	54.0
-1823	.078	149,000	71,000	53.0
L1-1437	.080	138,000	68,000	49.0
-1434	.077	133,000	62,000	53.0
-1435		143,000	69,000	56.0
-1447	.078	148,000	73,000	55.0
-1448	.077	141,000	70,000	59.0
-1468	.078	145,000	73,000	58.0
-1476	.076	145,000	71,000	54.0
-1459	.078	141,000	70,000	57.0
-1492	.081	142,000	71,000	53.0
-1489		135,000	64,000	59.0
-1460		141,000	66,000	59.0
-1489		137,000	64,000	57.0
-1487		137,000	67,000	53.0
-1518		141,000	66,000	57.0
-1518		142,000	67,000	58.0
-1518		144,000	73,000	57.0
-1494	.083	146,000	79,000	49.0
-1610	.078	140,000	67,000	57.0
-1409	.081	135,000	64,000	50.0
-1401		141,000	71,000	53.0
-1817		140,000	66,000	54.0
L3-1561	.250	141,000	71,000	57.0
-1621		146,000	89,000	47.0
-1654	.375	141,000	71,000	52.0
-1626	.250	139,000	70,000	53.0
-1654	.316	141,000	71,000	60.0
-1661	.250	130,000	68,000	49.0
-1661		132,000	70,000	44.0
L4-1666		138,000	76,000	47.0
L1-1571		139,000	70,000	57.0
-1458		136,000	64,000	51.0
-1511		138,000	68,000	50.0
-1598	.375	136,000	63,000	59.0
-1602		138,000	65,000	57.0
-1611	.312	143,000	79,000	52.0
-1616	.375	141,000	72,000	54.0
L2-1643		145,000	88,000	50.0
-1654	.302	139,000	71,000	61.0
-1669	.375	141,000	79,000	51.0
-1641		139,000	66,000	58.0
-1682		144,000	73,000	55.0
-1698	.312	142,000	73,000	57.0
-1695	.375	137,000	63,000	56.0
-1695		136,000	67,000	55.0
-1713	.250	140,000	68,000	55.0

(cont'd)

<u>Heat</u>	<u>Gage</u>	<u>F_{tu}(PSI)</u>	<u>F_{ty}(PSI)</u>	<u>Elong. (% in 2")</u>
L2-1697	.250	149,000	70,000	57.0
-1697		141,000	69,000	57.0
-1720		141,000	78,000	52.0
-1720		141,000	78,000	52.0
-1763	.375	132,000	64,000	47.0
-1787		135,000	63,000	62.0
-1754		141,000	69,000	55.0
-1782		140,000	69,000	55.0
-1766	.250	136,000	66,000	54.0
-1452		143,000	77,000	51.0
L3-1468	.312	140,000	70,000	52.0
-1517	.375	141,000	68,000	58.0
L2-1438	.250	134,000	67,000	53.0
L3-1532		139,000	74,000	50.0
-1538		139,000	66,000	60.0
-1561		146,000	74,000	55.0
-1561		146,000	78,000	51.0
-1588	.375	135,000	64,000	45.0
-1561	.250	149,000	80,000	53.0
-1622	.375	143,000	66,000	55.0
-1624		149,000	72,000	55.0
-1576	.250	140,000	72,000	50.0
-1576		142,000	75,000	52.0
-1741		138,000	70,000	48.0
-1768	.365	138,000	68,000	64.0
-1770	.312	136,000	66,000	45.0
-1731	.250	142,000	72,000	55.0
-1724		142,000	73,000	48.0
-1812	.375	137,000	68,000	53.0
-1810	.250	136,000	68,000	45.0
-1808	.312	139,000	71,000	46.0
-1814	.250	137,000	71,000	49.0
-1835	.312	143,000	79,000	47.0
-1836	.280	143,000	80,000	51.0
-1836	.280	142,000	86,000	49.0
-1846	.250	139,000	73,000	67.0
-1783	.312	139,000	72,000	51.0
-1786	.312	140,000	76,000	52.0
-1783	.312	137,000	67,000	55.0
-1845	.375	139,000	69,000	48.0
L1-1409	.250	142,000	73,000	46.0
-1462		140,000	67,000	55.0
-1473		143,000	73,000	51.0
-1458		137,000	72,000	49.0
-1486	.300	137,000	68,000	48.0
-1491	.275	137,000	67,000	52.0
-1512	.250	141,000	75,000	48.0
-1428	.375	148,000	72,000	48.0

(cont'd)

<u>Heat</u>	<u>Gage</u>	<u>F_{tu}(PSI)</u>	<u>F_{ty}(PSI)</u>	<u>Elong. (% in 2")</u>
L1-1511	.250	139,000	72,000	43.0
-1518		149,000	85,000	48.0
-1510		146,000	68,000	51.0
-1473		142,000	68,000	52.0
-1518		144,000	70,000	46.0
-1566	.375	135,000	69,000	64.0
-1571	.250	137,000	68,000	58.0
L3-1497	.483	144,000	68,000	56.0
-1481	.445	146,000	66,000	58.0
-1488	.445	143,000	63,000	53.0
-1481	.435	136,000	62,000	55.0
-1520	.435	138,000	63,000	61.0
-1519		137,000	59,000	62.0
-1527		144,000	69,000	60.0
-1616	.500	144,000	69,000	58.0
-1650	.435	150,000	72,000	54.0
-1650	.445	145,000	71,000	52.0
-1639	.435	146,000	69,000	58.0
-1639		134,000	64,000	57.0
-1650		143,000	69,000	48.0
-1638	.406	135,000	60,000	46.0
-1638	.416	144,000	71,000	57.0
-1632	.435	137,000	68,000	58.0
-1632	.435	143,000	71,000	57.0
-1654	.500	145,000	69,000	62.0
-1654	.406	139,000	63,000	59.0
14-1666		140,000	67,000	65.0
L3-1466	.438	136,000	64,000	54.0

This data submitted by the Stallite Division, Union Carbide Corporation.
The heat treatment consisted of solution treating at 2250°F.

**ROOM TEMPERATURE LONGITUDINAL TENSILE
PROPERTIES OF HAYNES ALLOY NO. 25 BAR**

<u>Heat</u>	<u>Gage</u>	<u>F_{tu}(PSI)</u>	<u>F_{ty}(PSI)</u>	<u>Elong. (% in 2")</u>
L3-1564	.500	144,000	64,000	67.0
-1564		143,000	66,000	72.0
-1554		143,000	66,000	59.0
-1619		140,000	66,000	62.0
-1642	.437	139,000	66,000	61.0
-1623	.500	138,000	62,000	63.0
-1622		140,000	61,000	60.0
-1683		142,000	67,000	67.0
-1715		141,000	68,000	63.0
-1725	.437	137,000	64,000	64.0
-1660		142,000	80,000	52.0
-1737		145,000	79,000	62.0
-1794	.500	142,000	69,000	50.0
-1851		143,000	67,000	62.0
L1-1421	.437	141,000	67,000	57.0
-1421		143,000	67,000	61.0
-1479	.500	148,000	71,000	57.0
-1493	.437	144,000	65,000	59.0
-1520	.500	140,000	67,000	56.0
-1520		140,000	66,000	56.0
-1535		144,000	70,000	55.0
-1535		141,000	66,000	53.0
-1525	.437	143,000	69,000	60.0
L2-1652		146,000	58,000	59.0
L1-1634		141,000	66,000	63.0
L2-1677	.500	139,000	65,000	60.0
-1689		137,000	64,000	58.0
-1690		139,000	64,000	60.0
-1730	.437	139,000	70,000	56.0
-1737	.500	137,000	66,000	57.0
-1736		140,000	65,000	48.0
-1729		144,000	70,000	40.0
-1737		142,000	66,000	58.0
-1777		142,000	66,000	62.0
-1777		140,000	65,000	60.0
-1756		145,000	67,000	60.0
-1780		143,000	66,000	63.0
-1449	.435	143,000	67,000	57.0
-1449	.500	146,000	70,000	59.0
-1449		143,000	66,000	61.0
-1461	.437	147,000	67,000	62.0
-1494	.500	140,000	65,000	63.0
L3-1493		138,000	64,000	58.0

(cont'd)

<u>Heat</u>	<u>Gage</u>	<u>F_{CU}(PSI)</u>	<u>F_{CT}(PSI)</u>	<u>Elong. (% in 2")</u>
L3-1493	.437	138,000	64,000	62.0
-1564	.500	145,000	67,000	62.0
-1564	.562	141,000	61,000	60.0
-1564	.687	141,000	64,000	62.0
-1594	.625	145,000	68,000	61.0
-1584	.750	138,000	63,000	62.0
-1584	.687	136,000	63,000	63.0
-1584	.687	139,000	66,000	62.0
-1619	.562	140,000	67,000	57.0
-1617	.562	145,000	70,000	58.0
-1617	.687	148,000	71,000	59.0
-1630	.750	141,000	70,000	62.0
-1642	.687	141,000	66,000	62.0
-1619	.625	146,000	72,000	58.0
-1617	.562	146,000	72,000	59.0
-1507	.750	140,000	68,000	60.0
L2-1759	.625	144,000	69,000	57.0
-1789	.750	143,000	71,000	58.0
-1789	.562	139,000	65,000	46.0
-1789	.687	141,000	69,000	57.0
-1789	.625	141,000	66,000	42.0
-1780	.562	144,000	69,000	62.0
-1789	.687	143,000	69,000	58.0
-1433	.562	135,000	64,000	55.0
-1462	.750	141,000	68,000	58.0
-1449	.562	141,000	65,000	60.0
-1482	.530	140,000	66,000	60.0
-1461	.750	144,000	71,000	47.0
-1449	.687	143,000	68,000	57.0
-1462	.687	139,000	67,000	58.0
-1458	.687	136,000	64,000	55.0
L3-1495	.750	141,000	67,000	58.0
-1462	.625	140,000	63,000	44.0
L3-1495	.562	144,000	67,000	58.0
-1506	.750	141,000	69,000	64.0
-1493	.687	136,000	64,000	59.0
-1493	.562	138,000	65,000	45.0
-1506	.687	142,000	68,000	63.0
-1507	.687	142,000	69,000	60.0
-1506	.687	141,000	68,000	51.0
-1553	.750	143,000	67,000	54.0
-1553	.750	153,000	70,000	55.0
-1553	.750	149,000	66,000	52.0
-1553	.750	151,000	66,000	58.0
-1553	.750	149,000	68,000	54.0
-2535	.562	145,000	68,000	62.0

(cont'd)

<u>Heat</u>	<u>Gage</u>	<u>F_{tu}(PSI)</u>	<u>F_{ty}(PSI)</u>	<u>Elong. (% in 2")</u>
L3-1535	.625	145,000	67,000	60.0
-1554	.750	141,000	61,000	55.0
L2-1759	.687	140,000	66,000	60.0
-1759	.687	141,000	66,000	57.0
-1737	.687	138,000	67,000	57.0
-1704	.687	140,000	66,000	60.0
-1689	.687	144,000	69,000	58.0
-1689	.687	144,000	71,000	56.0
-1689	.687	140,000	67,000	61.0
-1691	.687	143,000	67,000	58.0
-1662	.562	143,000	67,000	57.0
L3-1585	.937	145,000	69,000	57.0
-1584	1.000	138,000	63,000	63.0
-1610	.812	138,000	69,000	61.0
-1584	.812	137,000	69,000	60.0
-1642	.937	138,000	66,000	62.0
-1619	1.000	142,000	71,000	60.0
-1630	.937	142,000	70,000	61.0
-1641	.875	143,000	70,000	60.0
L2-1737	.875	137,000	67,000	57.0
-1737	1.000	139,000	68,000	59.0
-1780	.937	141,000	69,000	61.0
-1756	1.000	141,000	71,000	49.0
-1448	.875	144,000	70,000	61.0
L3-1484	1.000	138,000	70,000	64.0
L2-1458	.937	135,000	67,000	52.0
L3-1494	.937	138,000	65,000	64.0
L1-1418	.812	142,000	70,000	60.0
-1477	1.000	141,000	70,000	58.0
-1501	.812	142,000	72,000	47.0
-1517	.875	141,000	68,000	54.0
-1517	.875	140,000	68,000	41.0
-1490	1.000	140,000	69,000	55.0
-1520	.937	140,000	69,000	45.0
L2-1651	1.000	139,000	72,000	65.0
-1648	1.000	139,000	70,000	56.0
-1652	1.000	142,000	73,000	60.0
-1652	1.000	142,000	74,000	61.0
-1649	.812	144,000	75,000	61.0
-1649	.812	142,000	73,000	63.0
-1649	.812	143,000	72,000	62.0
-1729	1.000	141,000	70,000	59.0
-1632	.875	141,000	66,000	65.0
-1713	.812	137,000	66,000	57.0
-1713	.875	140,000	67,000	60.0
-1725	1.000	140,000	70,000	60.0
-1660	.937	139,000	69,000	65.0
-1716	.937	142,000	71,000	49.0

(cont'd)

<u>Heat</u>	<u>Gage</u>	<u>F_{tu}(PSI)</u>	<u>F_{ty}(PSI)</u>	<u>Elong. (%)</u>
L2-1749	.937	144,000	69,000	64.
-1749	.812	141,000	68,000	63.
-1737	1.000	144,000	70,000	63.
-1754	.875	142,000	72,000	64.
-1822	.937	143,000	68,000	63.
-1822	.937	142,000	67,000	65.
-1831	.937	141,000	70,000	65.
L1-1421	.812	142,000	72,000	56.
-1421	.812	144,000	72,000	57.
-1478	1.000	142,000	70,000	58.
L2-1443	1.062	141,000	70,000	60.
L3-1485	1.250	137,000	65,000	63.
-1494	1.250	137,000	66,000	62.
L2-1400	1.250	137,000	62,000	66.
L3-1506	1.062	143,000	68,000	63.
-1552	1.062	151,000	72,000	53.
-1535	1.125	141,000	66,000	64.
-1642	1.062	141,000	68,000	63.
-1642	1.125	143,000	71,000	62.
-1641	1.250	141,000	65,000	63.
-1630	1.250	141,000	67,000	64.
L2-1691	1.062	140,000	71,000	60.
-1706	1.250	142,000	70,000	60.
-1663	1.250	139,000	70,000	62.
-1756	1.062	144,000	73,000	58.
-1779	1.250	137,000	69,000	62.
-1788	1.250	140,000	70,000	65.
-1791	1.250	141,000	69,000	67.
-1791	1.125	138,000	64,000	59.
-1756	1.250	143,000	70,000	57.
-1649	1.250	140,000	72,000	59.
-1729	1.250	137,000	67,000	58.
-1443	1.250	138,000	67,000	62.
-1443	1.250	143,000	66,000	58.
L1-1490	1.062	140,000	69,000	57.
-1535	1.250	142,000	70,000	56.
-1577	1.250	141,000	70,000	63.
-1578	1.062	138,000	66,000	62.
-1558	1.250	143,000	74,000	63.
-1558	1.125	141,000	72,000	65.
-1594	1.250	139,000	71,000	45.
-1633	1.250	146,000	75,000	60.
L2-1652	1.062	136,000	73,000	64.
-1648	1.062	141,000	72,000	56.

(cont'd)

<u>Heat</u>	<u>Gage</u>	<u>F_{tu}(PSI)</u>	<u>F_{ty}(PSI)</u>	<u>Elong. (% in 2")</u>
L2-1648	1.250	140,000	69,000	57.0
-1677	1.062	137,000	67,000	61.0
-1640	1.250	139,000	68,000	64.0
-1640	1.062	142,000	64,000	65.0
-1655	1.125	139,000	65,000	70.0
-1632	1.250	137,000	69,000	49.0
-1683	1.125	140,000	66,000	65.0
-1683	1.250	140,000	67,000	67.0
-1683	1.250	134,000	67,000	64.0
-1713	1.250	141,000	70,000	64.0
-1660	1.125	140,000	69,000	67.0
-1749	1.062	144,000	71,000	63.0
-1749	1.250	137,000	69,000	68.0
-1737	1.062	145,000	72,000	63.0
-1822	1.062	143,000	68,000	64.0
-1831	1.062	145,000	69,000	64.0
L1-1421	1.062	141,000	70,000	55.0
-1477	1.250	142,000	70,000	57.0

This data submitted by Stellite Division, Union Carbide Corporation.
The heat treatment consisted of solution treating at 2250°F.

2.2 L-605 Creep Data

L-605-229 .005 in.
E3LAX-2L Sheet
25,000 psi @ 1200° F

Stress, psi	Strain-%
0	0.0
25,000	0.137

Hours	Total Plastic Strain-%
0.0	0.0
0.3	0.007
0.7	0.017
1.1	0.023
1.9	0.030
2.5	0.042
3.5	0.046
22.0	0.107
44.0	0.139
70.2	0.172
Discontinued	

L-605-231 .005 in.
E3LAX-1D Sheet
30,000 psi @ 1200° F

Stress, psi	Strain-%

0	0.0
30,000	0.225

Hours	Total Plastic Strain-%

0.0	0.187
0.1	0.196
0.4	0.204
1.0	0.210
3.1	0.224
4.3	0.229
5.1	0.234
21.9	0.284
29.2	0.297
45.7	0.327
52.9	0.336
69.4	0.362
97.2	0.396
117.8	0.422
142.3	0.437
165.8	0.473
195.0	0.502

Discontinued

L-605-219 .005 in.
 E3LAX-1J Sheet
 32,500 psi @ 1200° F

Stress, psi	Strain-%
0	0.0
32,500	0.177

Hours	Total Plastic Strain-%
0.0	0.0
0.1	0.011
0.3	0.025
0.9	0.029
2.0	0.033
3.0	0.036
4.0	0.040
5.1	0.043
5.7	0.048
23.1	0.091
45.7	0.128
70.8	0.163
94.0	0.194
117.3	0.225
142.1	0.259
165.9	0.293
190.0	0.327
Discontinued	

L-605-215 .005 in.
E3LAX-2N Sheet
40,000 psi @ 1200° F

Stress, psi	Strain-%
0	0.0
40,000	0.146

Hours	Total Plastic Strain-%
0.0	0.0
1.3	0.011
2.3	0.022
18.2	0.098
42.5	0.171
69.0	0.235
92.5	0.311
116.0	0.341
138.2	0.397
162.3	0.460
186.3	0.509
211.4	0.574
236.7	0.628
259.8	0.685
285.5	0.744
291.1	Rupture

L-605-223 .005 in.
E3LAX-26 Sheet
45,000 psi @ 1200° F

Stress, psi	Strain-%
0	0.0
45,000	0.813

Hours	Total Plastic Strain-%
0.0	0.0
0.3	0.030
0.9	0.048
1.8	0.067
3.1	0.083
19.9	0.176
27.5	0.211
43.6	0.274
70.4	0.345
93.4	0.464
115.2	Rupture

L-605-228 .005 in.
 E3LAX-1L Sheet
 700 psi @ 1400° F

Stress, psi

Strain-%

0
 700

0.0
 0.022

Hours

Total Plastic
 Strain-%

0.0	0.0
0.3	0.003
0.6	0.003
1.0	0.007
1.7	0.006
2.3	0.010
3.1	0.013
3.9	0.015
4.5	0.012
5.4	0.015
21.8	0.023
47.8	0.035
71.3	0.016
99.4	0.019
121.1	0.024
143.9	0.019
166.9	0.019
189.6	0.016
215.7	0.020
239.2	0.009
261.6	0.040
286.1	0.043
311.4	0.035
334.5	0.040
359.0	0.033
381.6	0.038
405.6	0.037
433.0	0.030
456.8	0.033
477.8	0.036

L-605-249 .005 in.
Sheet
2TAX-3G
9,500 psi @ 1400° F

Stress, psi	Strain-%
0	0.0
9,500	0.059

Hours	Total Plastic Strain %
0.0	0.0
0.3	0.018
0.8	0.019
1.5	0.038
2.5	0.044
18.5	0.111
44.1	0.181
67.6	0.218
91.9	0.255
120.1	0.285
142.8	0.322
162.8	0.337
186.9	0.361
212.9	0.398
239.0	0.423
259.2	0.443
283.4	0.478
307.0	0.499
331.7	0.513
356.0	0.533
380.7	0.557
405.1	0.578
428.0	0.606
454.6	0.624
478.5	0.638
500.9	0.652

L-605-220 .005 in.
E3LAX-2J Sheet
11,000 psi @ 1400° F

Stress, psi	Strain-%

0	0.0
11,000	0.131

Hours	Total Plastic Strain-%

0.0	0.0
0.3	0.013
0.7	0.024
1.2	0.308
2.2	0.050
3.0	0.057
20.1	0.181
43.0	0.261
67.5	0.334
91.3	0.407

Discontinued

L-605-216 .005 in.
E3LAX-1H Sheet
14,000 psi @ 1400° F

Stress, psi	Strain-%
0	0.0
14,000	0.007

Hours	Total Plastic Strain-%
0.0	0.0
0.4	0.021
0.7	0.031
1.2	0.039
1.7	0.044
2.3	0.053
3.4	0.063
19.4	0.214
44.0	0.355
67.7	0.491
94.9	0.628
118.7	0.734
141.7	0.850
163.5	0.939
188.4	1.053
Discontinued	

L-605-232 • 005 in.
E3LAX-1K Sheet
17,500 psi @ 1400° F

Stress, psi	Strain-%
0	0.0
17,500	0.074

Hours	Total Plastic Strain-%
0.0	0.0
0.2	0.034
0.5	0.055
1.0	0.097
1.9	0.137
2.5	0.165
3.2	0.193
19.4	0.671
24.0	0.787
27.6	0.876
43.3	1.212

L-605-224 .005 in.
E3LAX-2K Sheet
32,500 psi @ 1400° F

Stress, psi	Strain-%
0	0.0
32,500	6.229

Hours	Total Plastic Strain-%
0.0	0.0
0.2	0.107
0.5	0.164
0.7	0.250
1.6	0.461
2.9	0.772
3.9	1.003
5.2	1.314

L-605-221 .005 in.
 E3LAX-1F Sheet
 4,000 psi @ 1600° F

Stress, psi	Strain-%

0	0.0
4,000	0.020

Hours	Total Plastic Strain-%

0.0	0.0
0.3	0.017
0.8	0.021
2.1	0.041
3.5	0.041
4.5	0.049
5.6	0.054
21.9	0.108
48.7	0.142
71.7	0.186
94.3	0.226
117.9	0.257
143.0	0.282
166.0	0.303

Discontinued

L-605-230 .005 in.
E3LAX-1N Sheet
4000 psi @ 1600° F

Stress, psi	Strain-%

0	0.0
4,000	0.008

Hours	Total Plastic Strain-%

0.0	0.0
0.2	0.012
0.7	0.017
1.2	0.018
1.5	0.025
2.2	0.022
3.2	0.028
19.1	0.066
45.6	0.112
70.4	0.154
93.1	0.190
115.7	0.229
140.3	0.257
165.2	0.286
187.8	0.296
213.2	0.315

Discontinued

L-605-217 .005 in.
 E3LAX-20 Sheet
 6,500 psi @ 1600° F

Stress, psi	Strain-%

0	0.0
6,500	0.083

Hours	Total Plastic Strain-%

0.0	0.0
0.3	0.026
0.8	0.014
1.7	0.006
3.1	0.052
20.3	0.221
45.2	0.369
68.3	0.518
93.2	0.514
115.4	0.672
141.3	0.786
164.4	0.903
187.2	1.002

Discontinued

L-605-225 .005 in.
E3LAX-2M Sheet
9,000 psi @ 1600° F

Stress, psi	Strain-%

0	0.0
9,000	0.065

Hours	Total Plastic Strain-%

0.0	0.0
0.2	0.053
1.1	0.154
2.1	0.221
3.0	0.276
5.5	0.351
21.1	0.986
23.9	1.069
Discontinued	

L-605- 247 .005 in.
E2LAX-10 Sheet
10,000 psi @ 1600° F

Stress, psi	Strain-%
0	0.0
10,000	0.132

Hours	Total Plastic Strain-%
0.0	0.0
0.2	0.047
0.4	0.072
1.5	0.120
2.3	0.151
3.5	0.187
4.8	0.222
20.7	0.497
46.0	0.891
48.9	0.936
52.5	1.001
Discontinued	

L-605-227 .005 in.
E3LAX-2F Sheet
1500 psi @ 1800° F

Stress, psi	Strain-%

0.0	0.0
1,500	0.011

Hours	Total Plastic Strain-%

0.0	0.0
0.2	0.006
0.8	0.007
1.4	0.006
2.3	0.015
3.4	0.016
4.5	0.016
5.7	0.021
22.5	0.028
47.3	0.044
70.7	0.057
94.3	0.073
121.2	0.114
144.1	0.159

Discontinued

L-605-222 .005 in.
E3LA~~X~~-2H Sheet
2500 psi @ 1800° F

Stress, psi	Strain-%
0	0.0
2,500	0.024

Hours	Total Plastic Strain-%
0.0	0.0
0.3	0.012
0.7	0.013
1.3	0.030
17.5	0.124
42.4	0.252
67.8	0.486
89.8	0.876
114.1	1.552
Discontinued	

L-605-218 .005 in.
E3LAX-1M Sheet
3,500 psi @ 1800° F

Stress, psi	Strain-%

0	0.0
3,500	0.030

Hours	Total Plastic Strain-%

0.0	0.0
0.7	0.040
1.2	0.047
1.6	0.064
2.2	0.062
19.3	0.273
42.9	0.598
69.9	1.306

Discontinued

L-605-226 .005 in.
E3LAX-1G Sheet
5,000 psi @ 1800° F

Stress, psi	Strain-%
0	0.0
5,000	0.039

Hours	Total Plastic Strain-%
0.0	0.0
0.2	0.054
0.4	0.076
0.7	0.105
1.6	0.162
3.2	0.255
4.2	0.297
5.3	0.350
21.7	1.015
Discontinued	

F3 TAX 3G .020 in.
 21,000 psi Sheet
 1400°F

Stress - psi	Strain - %		
0	0.0	532.8	5.614
21,000	0.066	553.0	5.715
		576.1	5.801
		597.2	5.915
Elapsed time	Total plastic	604.9	5.968
- Hours	strain - %	622.7	6.060
0.0	0.0	629.0	6.099
0.3	0.021	645.3	6.165
0.6	0.040	652.8	6.200
1.1	0.064	669.3	6.270
2.2	0.097	676.9	6.300
2.7	0.114	693.5	6.400
3.5	0.137	700.6	6.422
4.2	0.156	716.2	6.481
4.9	0.176	741.1	6.598
21.1	0.529	764.9	6.700
25.4	0.620	772.4	6.735
28.3	0.679	788.9	6.810
49.7	1.160	796.2	6.834
70.5	1.555	813.3	6.912
92.9	1.969	820.7	6.945
100.6	2.081	837.4	7.010
117.5	2.355	861.1	7.016
124.7	2.460	868.5	7.138
140.8	2.690	889.6	7.223
149.0	2.795	911.7	7.323
164.9	2.990	932.9	7.400
173.0	3.070	958.1	7.510
189.1	3.250	981.3	7.604
196.8	3.301	988.9	7.638
213.9	3.490	1005.3	7.708
243.5	3.740	1029.2	7.806
262.0	3.900	1052.2	7.892
268.8	3.940	1077.9	8.004
284.0	4.070	1101.3	8.107
309.2	4.250	1125.2	8.245
316.7	4.315	1149.3	8.327
334.3	4.444	1174.1	8.446
340.9	4.488	1202.3	8.572
357.5	4.601	1224.7	8.668
364.7	4.646	1248.2	8.764
385.3	4.776	1271.2	8.861
408.8	4.919	1295.2	8.964
428.8	5.039	1319.3	9.066
436.7	5.089	1346.7	9.189
452.9	5.185	1367.1	9.280
460.6	5.225	1390.6	9.398
477.0	5.306	1413.4	9.477
484.9	5.358	1437.1	9.642
501.1	5.448	1461.9	9.766
509.1	5.491	1485.5	9.895
524.9	5.569	over	

Code E3 TAX 3F .020 in.
 24,000 psi Sheet
 1400°F

Stress - psi	Strain - %
0.	0.0
5,260	0.011
10,500	0.032
24,000	0.091

Elapsed time - Hours	Total plastic strain - %
0.0	0.0
0.2	0.018
0.4	0.035
1.5	0.084
2.3	0.112
3.2	0.134
19.3	0.650
43.2	1.449
73.0	2.698
92.3	3.270
116.1	3.900
122.3	4.050
139.4	4.33
146.9	4.60
163.5	4.96
166.0	5.00
170.6	5.10
187.6	5.45
191.7	5.57
215.7	5.99
236.4	6.35
259.3	6.74
266.6	6.87
283.5	7.13
290.8	7.25
306.7	7.52
315.2	7.65
335.7	7.97
355.1	8.36
362.8	8.54
380.0	8.89
409.6	9.46
428.1	9.85
434.9	9.96
451.2	10.32
459.3	10.50
475.3	10.82
482.8	11.02
500.4	11.35
506.9	11.53
523.4	13.02
527.5	Rupture
17.1%	Elongation

L-605-248 .020 in.
E2LAX-2F Sheet
4,500 psi @ 1800° F

Stress, psi	Strain-%

0	0.0
4,500	0.182

Hours	Total Plastic Strain-%

0.0	0.0
0.3	0.029
1.7	0.105
2.3	0.127
3.3	0.164
19.5	0.570
22.5	0.655
27.3	0.808
43.3	1.524

Discontinued

Code E3 TAX 4G .020 in.
7,500 psi Sheet
1800°F

Stress - psi	Strain - %
0	0.0
7,500	0.065

Elapsed time - Hours	Total plastic strain - %
0.0	0.0
0.2	0.079
0.4	0.130
0.8	0.170
1.4	0.233
1.5	0.274
17.4	1.515
19.7	1.682
21.0	1.777
21.9	1.848
25.2	2.140
28.7	Rupture
4.0%	Elongation

Code E3 TAX 2F .020 in.
 9,500 psi @ 1800°F Sheet

Stress - psi	Strain - %
0	0.0
9,500	0.076

Elapsed time	Total plastic
- Hours	strain - %
0.0	0.0
0.2	0.194
0.4	0.432
0.6	0.649
0.8	0.863
1.0	1.067
1.6	1.640
1.8	1.824
2.0	1.996
2.2	2.187
2.3	2.262
2.8	2.703
3.1	2.942
3.4	3.229
3.8	3.558
4.6	4.258
5.1	4.721
5.5	5.033
5.9	5.339
6.3	5.678
6.8	6.080
11.4	Rupture
11.9%	Elongation

#3 TAY 2G .020 in.
 2,400 psi Sheet
 1800°F

Stress - psi	Strain - %	691.5	1.862
0	0.0	716.0	1.986
2,400	0.015	744.7	2.171
		767.1	2.341
Elapsed time	Total plastic	790.6	2.539
- Hours	strain - %	813.5	2.778
0.0	0.0	837.3	3.007
0.5	0.014	861.6	3.261
1.0	0.015	889.0	3.580
2.0	0.025	909.3	3.788
3.1	0.032	933.1	4.051
3.5	0.036	955.9	4.293
10.4	0.112	979.6	4.544
23.8	0.126	1004.4	4.795
27.4	0.141	1027.9	5.072
43.5	0.179	1052.4	5.352
51.6	0.189	1052.5	Rupture
67.5	0.206	6.7%	Elongation
75.2	0.202		
95.5	0.230		
118.6	0.258		
139.8	0.282		
147.4	0.295		
165.3	0.317		
171.5	0.323		
187.5	0.335		
195.2	0.340		
211.8	0.367		
219.2	0.375		
235.7	0.392		
242.9	0.410		
258.7	0.484		
285.3	0.533		
307.7	0.575		
315.1	0.578		
331.7	0.608		
356.0	0.664		
379.7	0.704		
403.5	0.764		
432.1	0.878		
454.3	0.936		
478.0	1.027		
500.5	1.101		
523.4	1.164		
547.6	1.226		
571.4	1.290		
594.5	1.395		
620.2	1.516		
643.3	1.595		
668.5	1.735		

L-605-143 .040 in.
 E2TAX-18M Sheet
 25,000 psi @ 1200° F

Stress, psi	Strain-%
0	0.0
25,000	0.087

Hours	Total Plastic Strain %
0.0	0.0
0.4	0.006
1.1	0.010
2.5	0.009
3.4	0.010
4.8	0.013
22.0	0.024
46.9	0.029
70.1	0.035
93.9	0.044
122.5	0.045
144.6	0.034
165.7	0.057
189.9	0.059

L-605-136 .040 in.
E2TAX-10S Sheet
27,500 psi @ 1200° F

Stress, psi	Strain-%

0	0.0
27,500	0.159

Hours	Total Plastic Strain-%

0.0	0.0
0.2	0.004
0.5	0.011
1.0	0.014
2.0	0.019
2.9	0.022
4.1	0.026
4.9	0.030
24.4	0.050
47.2	0.071
70.9	0.089
94.6	0.098
117.8	0.104

Discontinued

L-605-213 .040 in.
R3TAX-4N Sheet
27,500 psi @ 1200° F

Stress, psi	Strain - %
0	0.0
5,000	0.015
10,000	0.031
15,000	0.051
27,500	0.111

Hours	Total Plastic Strain-%
0.0	0.0
0.2	0.002
0.4	0.003
0.8	0.004
1.2	0.009
1.9	0.011
2.7	0.009
3.5	0.007
20.8	0.032
44.6	0.043
69.5	0.046
93.5	0.057
116.9	0.066
140.5	0.075
163.7	0.080
188.7	0.080
212.1	0.087
237.2	0.093
261.1	0.091
284.0	0.095
308.6	0.097
334.1	0.108
356.0	0.104
Discontinued	

L-605-214 .040 in.
E2LAX-6K Sheet
32,500 psi @ 1200° F

Stress, psi	Strain-%	Hours	Total Plastic Strain-%
0	0.0	643.4	0.616
32,500	0.191	667.5	0.640
		691.4	0.663
	Total Plastic Strain-%	715.0	0.682
Hours		741.9	0.716
		766.8	0.743
0.0	0.0	787.0	0.756
0.4	0.003	812.6	0.776
1.4	0.014	835.7	0.807
2.6	0.024	859.4	0.824
3.1	0.027	884.1	0.858
19.3	0.090	907.6	0.882
21.3	0.101	931.5	0.911
43.6	0.143	956.0	0.926
67.2	0.161	979.4	0.952
94.9	0.181	1004.1	0.978
119.1	0.203	1027.6	1.003
140.4	0.223	Discontinued	
163.5	0.237		
188.2	0.262		
211.5	0.284		
235.6	0.304		
260.0	0.319		
283.3	0.333		
307.1	0.353		
331.4	0.381		
355.5	0.399		
379.5	0.421		
404.4	0.443		
428.9	0.465		
453.2	0.488		
475.4	0.517		
499.4	0.539		
523.0	0.551		
547.6	0.539		
571.4	0.565		
596.6	0.556		
620.2	0.605		

E3 TAX 2S .040 in.
 36,000 psi Sheet
 1200°F

Stress - psi	Strain - %
0	0.0
15,000	0.058
25,000	0.100
36,000	0.398

Elapsed time - Hours	Total plastic strain - %		
0.0	0.253	765.1	1.096
0.2	0.258	789.5	1.129
1.5	0.266	811.4	1.234
2.3	0.271	836.6	1.294
4.3	0.274	861.1	1.345
5.3	0.279	885.7	1.404
6.0	0.277	909.5	1.458
21.3	0.277	933.8	1.518
46.2	0.308	957.3	1.595
75.7	0.332	983.4	1.658
93.0	0.356	1005.0	1.695
100.7	0.363	1029.1	1.744
117.4	0.368	1053.8	1.799
124.4	0.384	1077.4	1.848
141.5	0.390	1101.5	1.897
166.3	0.400	1114.6	Rupture
172.8	0.414	2.0%	Elongation
190.4	0.419		
196.9	0.436		
217.3	0.440		
237.9	0.454		
261.1	0.473		
284.9	0.487		
304.9	0.487		
333.2	0.521		
357.5	0.532		
381.3	0.555		
410.9	0.579		
431.3	0.599		
454.1	0.631		
479.1	0.648		
503.5	0.677		
526.9	0.701		
552.7	0.727		
576.3	0.751		
598.3	0.786		
622.5	0.816		
650.2	0.838		
671.1	0.869		
694.5	0.905		
699.3	0.932		
741.5	0.967		
	0.975		
	1.093		

L-605-142 .040 in.
 E2TAX-19-L Sheet
 42,500 psi @ 1200° F

Stress, psi	Strain-%
0	0.0
42,500	0.212

Hours	Total Plastic Strain-%
0.0	0.0
0.2	0.002
0.5	0.010
1.1	0.023
17.8	0.098
42.9	0.176
68.2	0.221
90.6	0.270
115.6	0.345
140.2	0.412
162.1	0.475
186.1	0.546
211.4	0.618
234.8	0.696
257.8	0.782
283.6	0.884
305.5	0.971
330.9	1.071
Discontinued	

L-605-122 .040 in.
E2TAX-12R Sheet
11,000 psi @ 1400° F

Stress, psi	Strain-%

0	0.0
11,000	0.048

Hours	Total Plastic Strain-%

0.0	0.0
0.2	0.0005
0.6	0.010
1.4	0.020
2.3	0.026
3.4	0.034
21.3	0.074
47.3	0.113
69.3	0.138
95.9	0.165
120.4	0.183
143.4	0.197
166.3	0.213
190.3	0.217
215.3	0.230
237.2	0.241
263.2	0.259
285.4	0.264
311.3	0.271
334.4	0.280
357.2	0.286
381.0	0.298
405.6	0.307

Discontinued

L-605-105 .040 in.
 E2TAX-11P Sheet
 12,500 psi @ 1400° F

Stress, psi	Strain-%
0	0.0
12,500	0.075
Hours	Total Plastic Strain-%
0.0	0.0
0.4	0.015
1.6	0.006
4.0	0.061
22.2	0.131
45.1	0.183
69.4	0.288
94.9	0.361
117.9	0.391 —
141.8	0.437
165.8	0.579
189.4	0.508
213.1	0.548
242.3	0.635
262.5	0.680
285.4	0.701
309.6	0.727
334.6	0.758
357.8	0.793
381.7	0.840
406.3	0.861
430.6	0.896
454.5	0.921
478.0	0.943
501.9	0.988
503.7	0.996
505.5	1.000
Discontinued	

L-605-144 .040 in.
 E2TAX-10N Sheet
 15,000 psi @ 1400° F

Stress, psi	Strain %
0	0.0
15,000	0.067

Hours	Total Plastic Strain %
0.0	0.0
0.3	0.008
0.6	0.019
1.1	0.021
1.6	0.025
2.3	0.033
3.2	0.044
19.3	0.107
44.8	0.180
67.0	0.242
92.5	0.290
120.8	0.345
143.4	0.393
163.5	0.439
187.5	0.483
213.5	0.528
239.7	0.568
259.8	0.614
284.1	0.649
307.6	0.702
332.3	0.737
356.6	0.773
381.3	0.807
405.8	0.845
428.7	0.874
455.3	0.911
479.2	0.939
501.5	0.963
524.6	0.988
547.9	1.019

L-605 .040 in.
R3TAX-4M Sheet
15,000 psi @ 1400° F

Stress, psi	Strain-%
0	0.0
15,000	0.071

Hours	Total Plastic Strain-%
0.0	0.0
0.6	0.016
1.1	0.030
2.3	0.041
3.1	0.054
4.2	0.061
21.1	0.154
47.1	0.271
69.7	0.360
92.9	0.460
116.1	0.558
143.9	0.656
168.0	0.761
190.4	0.832
212.8	0.893
238.2	0.982
259.6	1.043

L-605 .040 in.
R3TAX-4R Sheet
14,500 psi @ 1400° F

Stress, psi Strain - %

0	0.0
14,500	0.074

Hours	Total Plastic Strain-%

0.0	0.0
0.4	0.008
1.0	0.015
2.3	0.030
3.2	0.035
19.6	0.116
43.5	0.208
67.8	0.288
93.3	0.412
116.0	0.497
140.5	0.598
164.7	0.684
188.9	0.760
212.1	0.841
237.6	0.906
260.9	0.970
285.5	1.038

Discontinued

Code E3 TAX 1R
 24,000 psi .040 in.
 1400°F Sheet

Stress - psi Strain - %
 0 0.0
 24.000 0.103

Elapsed time Total plastic
 - Hours strain - %

0.0	0.0	553.7	8.93
0.4	0.038	577.3	9.21
1.1	0.052	599.3	9.45
2.0	0.077	605.3	9.50
3.0	0.092	623.4	9.70
3.8	0.104	629.3	9.75
4.8	0.122	651.3	10.0
5.5	0.135	672.3	10.21
22.4	0.461	677.5	10.27
46.9	1.222	696.1	10.49
76.4	2.200	701.2	10.56
94.6	2.730	721.4	10.79
101.2	2.900	744.5	11.08
117.7	3.28	768.0	11.45
125.3	3.44	773.6	11.57
142.7	3.80	787.0	Rupture
166.6	4.25	13.2%	Elongation
173.2	4.36		
190.8	4.65		
197.5	4.76		
218.1	5.11		
238.8	5.39		
262.9	5.69		
269.2	5.76		
287.0	5.95		
293.4	6.14		
310.6	6.35		
317.7	6.35		
334.1	6.56		
341.1	6.74		
358.6	6.88		
364.9	6.92		
382.3	7.14		
411.9	7.44		
432.4	7.73		
437.5	7.77		
455.5	8.00		
480.2	8.25		
485.3	8.31		
504.6	8.53		
509.5	8.57		
528.2	8.75		
533.5	8.79		

L-605-129 .040 in.
 E2Tax-35 Sheet
 3,300 psi @ 1600° F

Stress, psi	Strain-%
0	0.0
3,300	0.019
Hours	Total Plastic Strain %
0.0	0.0
0.3	0.001
1.6	0.002
2.6	-0.002
4.3	0.001
22.4	0.020
45.9	0.031
74.5	0.037
96.5	0.046
117.6	0.054
141.8	0.074
166.4	0.085
191.0	0.096
213.8	0.110
237.2	0.121
261.5	0.127
287.0	0.133
309.9	0.139
334.4	0.145
358.8	0.147
381.5	0.159
408.7	0.156
432.5	0.165
453.6	0.160

L-605-104 .040 in.
E2TAX-10P Sheet
6,000 psi @ 1600° F

Stress, psi	Strain-%

0	0.0
6,000	0.037

Hours	Total Plastic Strain-%

0.0	0.0
0.1	0.002
0.3	0.012
1.2	0.028
2.0	0.036
2.8	0.040
4.0	0.046
4.7	0.052
21.6	0.080
46.0	0.123
69.4	0.162
93.2	0.221
117.9	0.259
141.3	0.314
164.9	0.349
190.5	0.380
213.5	0.412
237.4	0.444
261.3	0.459
285.0	0.487
308.7	0.493
333.1	0.524

Discontinued

L-605-118 .040 in.
E2Tax-8R Sheet
7,000 psi @ 1600° F

Stress, psi	Strain-%
0	0.0
7,000	0.019
Hours	Total Plastic Strain %
0.0	0.0
0.2	0.011
0.7	0.020
2.2	0.032
3.2	0.035
20.1	0.098
27.6	0.107
43.4	0.130
68.0	0.190
75.2	0.212
91.7	0.250
115.4	0.306
139.8	0.355
163.8	0.401
188.0	0.435
212.9	0.464
236.1	0.492
259.9	0.520
288.6	0.526
310.5	0.545
331.7	0.559

L-605-145 .040 in.
E2TAX-19P Sheet
8,000 psi @ 1600° F

Stress-psi

Strain-%

0
8,000

0.0
0.034

Hours

Total Plastic
Strain-%

0.0
0.4
0.8
1.9
3.2
4.3
5.6
21.5
46.0
53.1
69.7
93.6
117.8
141.8
166.0
190.9
214.2
237.9
266.5
288.6
309.6
333.9
357.9
383.1
405.8

0.0
0.032
0.051
0.082
0.107
0.116
0.134
0.240
0.331
0.360
0.412
0.502
0.586
0.657
0.708
0.760
0.792
0.834
0.865
0.891
0.929
0.946
0.964
0.977
1.017

L-605 .040 in.
R3TAX-4P Sheet
9,000 psi @ 1600° F

Stress, psi	Strain-%

0	0.0
9,000	0.056

Hours	Total Plastic Strain-%

0.0	0.0
0.4	0.027
1.0	0.049
2.1	0.078
3.0	0.102
3.5	0.107
21.1	0.319
27.2	0.370
47.1	0.510
69.6	0.652
92.9	0.796
116.1	0.917
143.8	1.051

L-605-141 .040 in.
E2TAX-19K Sheet
9,500 psi @ 1600° F

Stress, psi	Strain-%
0	0.0
9,500	0.057

Hours	Total Plastic Strain-%
0.0	0.0
0.4	0.031
1.1	0.057
1.9	0.080
2.6	0.098
3.6	0.117
22.1	0.328
44.0	0.487
69.9	0.631
92.0	0.772
118.2	0.918
141.1	1.041
Discontinued	

Code E3 TAX 2P
17,500 psi .040 in.
1600°F Sheet

Stress - psi	Strain - %
0	0.0
17,500	0.084

Elapsed time - Hours	Total plastic - strain %
0.0	0.0
0.2	0.102
0.4	0.212
0.8	0.396
1.2	0.589
1.6	0.768
2.1	1.000
2.6	1.225
3.2	1.500
4.3	1.879
5.4	2.245
21.3	5.530
24.7	6.510
25.7	6.801
26.1	6.901
26.8	7.060
27.8	7.345
28.3	7.502
30.1	8.000
45.8	13.71
47.3	Rupture
17.4%	Elongation

L-605-127 .040 in.
E2TAX-1S Sheet
1000 psi @ 1800° F

Stress, psi	Strain-%
0	0.0
1000	0.003

Hours	Total Plastic Strain-%
0.0	0.0
0.6	0.006
1.9	0.013
2.9	0.016
3.9	0.021
20.6	0.029
28.1	0.031
45.7	0.036
69.0	0.044
92.3	0.046
117.0	0.050
Discontinued	

Code E3 TAX 2R
9,500 psi .040 in.
1800°F Sheet

Stress - psi	Strain - %
0	0.0
9,500	0.079

Elapsed time - Hours	Total plastic strain - %
0.0	0.0
0.1	0.136
0.3	0.243
0.5	0.344
0.8	0.500
1.1	0.669
1.2	0.726
1.6	0.924
2.0	1.162
2.7	1.540
10.0	Rupture
6.1%	Elongation

Code E3 TAX 1S .040 in.
7,000 psi @ 1800°F Sheet

Stress - psi	Strain - %
0	0.0
7,000	0.065

Elapsed time - Hours	Total plastic strain - %
0.0	0.0
0.2	0.039
1.0	0.116
1.4	0.146
2.0	0.186
19.5	0.954
21.6	1.033
26.2	1.190
42.7	1.687
50.1	1.916
70.7	2.689
93.8	Rupture
6.8%	Elongation

L-605-112 .040 in.
 E2TAX-2R Sheet
 3,750 psi @ 1800° F

Stress, psi	Strain-%
0	0.0
3,750	0.020

Hours	Total Plastic Strain-%
0.0	0.0
0.2	0.006
0.7	0.024
1.2	0.025
2.0	0.027
3.1	0.046
19.4	0.145
44.4	0.264
69.9	0.380
92.3	0.431
117.2	0.457
141.8	0.515
164.7	0.546
187.7	0.592
212.6	0.642
236.5	0.699
259.6	0.740
285.2	0.794
307.8	0.853
332.5	0.944
357.0	1.021
Discontinued	

L-605-55 .040 in.
 E2TAX-9L Sheet
 3500 psi @ 1800° F

Stress, psi	Strain-%

0	0.0
3500	0.024

Hours	Total Plastic Strain-%

0.0	0.0
0.4	0.020
1.2	0.035
1.8	0.044
2.5	0.051
3.3	0.060
3.9	0.059
4.9	0.070
23.4	0.188
45.2	0.267
71.2	0.332
93.4	0.372
119.5	0.413
142.4	0.457
165.2	0.503
189.2	0.547
214.0	0.608
240.6	0.672
264.3	0.728
287.5	0.799
309.9	0.878
333.2	0.967
359.6	1.073

Discontinued

L-605 .040 in.
R3TAX-4L Sheet
5,000 psi @ 1800° F

Stress, psi	Strain-%

0	0.0
5,000	0.032

Hours	Total Plastic Strain-%

0.0	0.0
0.5	0.040
1.7	0.096
2.5	0.115
3.1	0.139
20.4	0.428
26.6	0.504
46.4	0.695
68.9	1.038

L-605 .080 in.
 E2TAX13W Sheet
 40,000 psi @ 1200° F

<u>Stress - psi</u>	<u>Strain - %</u>
0	0.0
10,000	0.036
20,000	0.063
30,000	0.105
40,000	0.980

<u>Hours</u>	<u>Total Plastic Strain - %</u>
0.0	0.739
0.4	0.752
0.9	0.758
1.7	0.764
2.6	0.771
3.1	0.775
21.4	0.804
27.2	0.811
44.4	0.827
68.2	0.838
93.0	0.850
116.4	0.868
139.9	0.887
163.8	0.891
189.7	0.916
212.4	0.926
239.4	0.944
260.0	0.963
286.9	0.979
309.3	0.994
333.3	1.020
357.5	1.032
379.9	1.047
402.6	1.073
428.4	1.087
453.6	1.115
477.1	1.136
500.6	1.170
506.6	Discontinued

L-605-207 .080 in.
E2TAX-2T Sheet
10,000 psi @ 1400° F

Stress, psi	Strain-%

0	0.0
10,000	0.036

Hours	Total Plastic Strain-%

0.0	0.0
0.4	0.012
1.3	0.015
2.1	0.021
20.6	0.064
45.7	0.094
70.1	0.118
91.9	0.130
117.0	0.147
140.0	0.157
163.6	0.162

Discontinued

12,500 psi .080 in.
1400°F Sheet

Stress - psi	Strain - %		
0	0.0	860.5	0.507
12,500	0.053	885.5	0.527
		908.7	0.535
		935.8	0.550
		959.3	0.554
Elapsed time	Total plastic	981.9	0.561
- Hours	strain - %	1004.6	0.571
0.0	0.0	1029.0	0.582
0.1	0.001	1053.0	0.586
0.3	0.005	1076.5	0.600
1.2	0.006	1100.6	0.609
1.9	0.012	1124.6	0.617
2.3	0.015	1150.0	0.647
3.1	0.017	1172.0	0.655
21.4	0.054	1196.9	0.663
45.2	0.086	1221.0	0.674
68.7	0.123	Discontinued	
91.9	0.145		
116.7	0.163		
141.4	0.174		
164.8	0.183		
189.2	0.200		
213.3	0.207		
235.8	0.218		
260.9	0.229		
285.7	0.235		
310.1	0.251		
332.9	0.264		
351.9	0.275		
381.1	0.285		
404.9	0.295		
430.4	0.303		
452.7	0.318		
477.8	0.328		
500.6	0.337		
524.7	0.348		
548.9	0.360		
572.7	0.371		
595.9	0.380		
623.3	0.397		
645.2	0.402		
668.5	0.419		
692.7	0.425		
717.0	0.435		
740.7	0.451		
761.1	0.462		
789.1	0.465		
813.4	0.485		
838.1	0.498		

L-605 .080 in.
 E2TAX-10W Sheet
 20,000 psi @ 1400° F

Stress - psi	Strain - %
0	0.0
4,950	0.019
9,950	0.040
14,950	0.063
20,000	0.084

Hours	Total Plastic Strain - %
0.0	0.0
0.4	0.006
0.9	0.014
1.7	0.026
2.6	0.037
3.2	0.043
20.5	0.162
27.5	0.229
43.7	0.370
69.0	0.598
91.0	0.781
116.7	0.979
139.6	1.141
165.8	1.308
189.2	1.438
214.9	1.569
237.3	1.687
262.9	1.810
287.3	1.908
307.7	1.988
576.8	Disct.

L-605-213 .080 in.
E2TAX-8T Sheet
27,500 psi @ 1400° F

Stress, psi	Strain-%
0	0.0
5,000	0.025
10,000	0.050
15,000	0.075
27,500	0.163

Hours	Total Plastic Strain-%
0.0	0.0
0.3	0.029
0.6	0.049
1.0	0.061
1.6	0.085
2.3	0.108
3.1	0.135
4.1	0.178
5.6	0.249
21.6	1.357
28.0	1.869

E3 TAX 1W
34,000 psi .080 in.
1400°F Sheet

Stress - psi	Strain - %
0	0.0
10,000	0.055
15,000	0.083
20,000	0.116
34,000	1.408

Elapsed time - Hours	Total plastic strain - %
0.0	1.208
0.2	1.262
0.4	1.310
1.1	1.458
2.3	1.773
3.0	1.998
3.8	2.264
4.5	2.501
21.3	4.927
24.3	5.114
28.7	5.650
29.9	Rupture
9.9%	Elongation

L-605 .080 in.
 E2TAX-15W Sheet
 4000 psi @ 1600° F

Stress, psi	Strain - %	Hours	Total Plastic Strain-%
0	0.0	501.8	0.241
4,000	0.016	526.4	0.243
		551.0	0.243
Hours	Total Plastic Strain-%	573.7	0.248
		596.4	0.256
0.0	0.0	621.2	0.263
0.3	0.006	643.8	0.263
0.6	0.008	671.1	0.261
1.2	0.011	692.9	0.266
2.0	0.013	718.8	0.267
2.9	0.013	742.5	0.267
3.4	0.013	767.9	0.279
20.9	0.036	790.5	0.271
27.8	0.036	812.7	0.275
44.1	0.047	842.7	0.291
69.6	0.068	861.6	0.298
91.4	0.080	886.6	0.297
107.2	0.111	910.2	0.298
140.0	0.131	936.3	0.305
166.1	0.157	956.9	0.303
189.6	0.170	982.9	0.301
215.3	0.181	1004.9	0.314
237.8	0.193	Discontinued	
263.2	0.202		
287.6	0.201		
300.0	0.218		
333.6	0.220		
359.0	0.227		
380.0	0.231		
404.6	0.237		
427.1	0.241		
453.9	0.246		
478.7	0.243		

L-805-211 .080 in.
 E2TAX-6T Sheet
 650 psi @ 1800° F

Stress, psi	Strain-%
0	0.0
650	0.011
Hours	Total Plastic Strain-%
0.0	0.0
0.3	0.002
0.9	0.003
1.7	0.005
3.4	0.007
19.7	0.008
44.4	0.011
68.0	0.001
91.9	-0.002
117.0	0.008
140.2	0.017
164.0	0.021
187.9	0.015
211.6	0.017
235.3	0.015
259.6	0.023
284.8	0.024
307.6	0.029
331.7	0.031
358.6	0.026
381.5	0.034
405.7	0.034
429.9	0.036
454.8	0.035
478.0	0.040
502.5	0.042
524.2	0.040
547.9	0.046
575.6	0.036
596.0	0.046
601.3	0.045
Discontinued	

.080 in.
Sheet
E2TAX14W
2000 psi @ 1800° F

Stress, psi	Strain - %	Hours	Total Plastic Strain-%
0	0.0	668.7	0.144
2,000	0.008	692.9	0.145
		716.2	0.149
Hours	Total Plastic Strain-%	742.4	0.155
		765.1	0.160
		789.2	0.169
0.0	0.0	817.1	0.174
0.4	0.010	835.7	0.185
1.3	0.034	860.8	0.192
2.5	0.044	883.9	0.190
20.7	0.067	910.9	0.191
26.3	0.062	931.4	0.189
43.6	0.084	957.0	0.193
65.7	0.080	980.2	0.211
91.5	0.089	1003.9	0.203
116.7	0.097		
140.4	0.100		
163.8	0.101		
189.8	0.107		
211.8	0.105		
237.7	0.109		
262.2	0.115		
284.7	0.119		
307.8	0.113		
357.1	0.123		
380.0	0.131		
401.5	0.131		
428.1	0.132		
453.0	0.124		
476.0	0.125		
500.7	0.121		
525.2	0.129		
547.9	0.135		
570.7	0.139		
596.7	0.142		
620.6	0.144		
645.5	0.133		

L-605 .080 in.
 E3TAX-3W Sheet
 2,500 psi @ 1800° F

Stress, psi	Strain - %

0	0.0
2,500	0.013

Hours	Total Plastic Strain - %

0.0	0.0
0.2	0.003
0.5	0.005
1.5	0.016
2.1	0.019
3.2	0.022
20.3	0.063
25.8	0.077
45.7	0.110
51.0	0.122
68.4	0.129
91.3	0.142
115.6	0.150
141.1	0.159
164.1	0.166
188.4	0.172
212.7	0.180
236.8	0.185
259.6	0.186
285.5	0.192
308.9	0.195
333.5	0.198
356.4	0.206
379.7	0.211
404.8	0.212
Disct.	

E3 TAX 2W
 3.500 psi .080 in.
 1800°F Sheet

Stress - psi	Strain -%
0	0.0
3500	0.016

Elapsed time - Hours	Total plastic strain - %

0.0	0.0	910.4	0.914
0.3	0.015	934.9	0.971
0.5	0.016	958.4	1.030
1.6	0.021	982.7	1.100
3.6	0.020	Discontinued	
5.1	0.026		
21.4	0.047		
29.1	0.077		
44.2	0.107		
70.6	0.153		
94.6	0.170		
118.4	0.218		
142.7	0.234		
166.4	0.238		
190.7	0.242		
216.7	0.255		
239.7	0.271		
263.0	0.279		
285.5	0.295		
310.8	0.311		
334.7	0.315		
358.9	0.345		
381.0	0.350		
406.9	0.354		
430.3	0.369		
454.6	0.396		
478.7	0.420		
503.0	0.438		
527.9	0.451		
553.5	0.446		
578.1	0.464		
599.3	0.484		
622.4	0.502		
646.6	0.527		
672.2	0.560		
694.7	0.593		
717.4	0.638		
741.5	0.665		
767.9	0.688		
789.2	0.719		
815.1	0.762		
838.9	0.794		
862.3	0.828		
885.5	0.864		

L-605-222 .080 in.
E21AX-3W Sheet
5,000 psi @ 1800° F

Stress, psi	Strain-%
0	0.0
5,000	0.034

Hours	Total Plastic Strain %
0.0	0.0
0.3	0.022
1.0	0.059
1.9	0.086
2.6	0.105
3.5	0.127
20.8	0.332
43.8	0.523
69.5	0.644
91.7	0.761
116.7	0.844
139.4	0.931
163.5	1.201

E3 TAX 4T .080 in.
8,000 psi Sheet
1800°F

Stress - psi	Strain - %
0	0.0
3,000	0.019
5,500	0.041
8,000	0.069

Elapsed time - Hours	Total plastic strain - %
0.0	0.0
0.4	0.106
0.8	0.164
1.1	0.211
1.4	0.260
2.0	0.347
3.2	0.476
3.9	0.550
5.0	0.681
22.4	1.863
47.3	3.107
64.3	Rupture
6.2%	Elongation

E3 TAX PT .080 in.
10,000 psi Sheet
1800°F

Stress - psi	Strain - %
0	0.0
10,000	0.062

Elapsed time - Hours	Total plastic strain - %
0.0	0.0
0.2	0.177
0.4	0.292
0.6	0.393
0.8	0.540
1.0	0.606
1.8	0.901
18.5	2.031
23.2	2.504
25.9	2.910
26.6	3.025
33.0	Rupture
10.3%	Elongation

E3 TAX 4W
11,000 psi .080 in.
1800°F Sheet

Stress - psi	Strain - %
0	0.0
11,000	0.094

Elapsed time - Hours	Total plastic strain - %
0.0	0.0
0.1	0.277
0.3	0.732
0.5	1.023
0.7	1.387
1.0	1.769
1.2	2.139
1.5	2.562
1.9	3.140
2.2	3.547
2.6	4.276
2.9	4.715
3.2	5.414
3.4	5.837
3.6	6.292
3.8	6.640
4.0	6.932
4.1	7.208
4.2	7.427
4.3	7.867
4.4	8.120
4.8	8.947
5.8	Rupture
14.5%	Elongation

1/2E3LBX-7 .500 in.
46,000 psi Bar
1200° F

Stress - psi	Strain - %
0	0.0
10,000	0.032
20,000	0.001
30,000	0.414
46,000	5.237

Elapsed time - hours	Total plastic strain - %
0.0	5.037
0.2	5.046
1.1	5.070
2.1	5.090
4.4	5.105
20.6	5.190
25.6	5.199
28.1	5.217
45.7	5.247
69.8	5.296
93.9	5.324
117.1	5.379
142.3	5.423
165.7	5.457
189.1	5.492
214.0	5.509
239.5	5.562
263.2	5.604
285.1	5.641
309.9	5.686
333.9	5.715
357.0	5.754
381.1	5.783
403.3	5.821
429.8	5.854
452.5	5.900

Elapsed time
- hours

Total plastic
strain - %

477.0	5.945
501.6	5.977
525.8	6.006
548.8	6.071
576.1	6.165
599.0	6.177
621.0	6.244
644.7	6.285
669.7	6.359
693.1	6.416
717.7	6.515
740.1	6.559
766.1	6.658
774.8	Rupture
7.8%	Elongation

E3 LBX 2
 52,000 psi .500 in.
 1200°F Bar

Stress - psi	Strain - %
0	0.0
10,000	0.040
20,000	0.091
30,000 =	0.252
52,000	7.872

Elapsed time - Hours	Total plastic strain - %
0.0	7.612
0.3	7.652
0.8	7.700
1.4	7.734
2.3	7.763
3.0	7.783
18.8	8.048
23.9	8.098
26.6	8.128
43.2	8.273
50.7	8.334
67.4	8.458
91.1	8.624
119.6	8.828
141.7	8.965
163.0	9.109
188.1	9.287
211.3	9.473
235.4	9.679
241.1	Rupture
10.8%	Elongation

E3 LBX 12
57,000 psi .500 in.
1200°F Bar

Stress - psi	Strain - %
0	0.0
10,000	0.026
20,000	0.077
30,000	0.463
57,000	12.665

Elapsed time - Hours	Total plastic strain - %
0.0	12.665
0.3	12.728
1.0	12.804
1.9	12.897
2.3	12.917
3.1	12.956
3.8	12.987
4.6	13.025
20.6	13.519
25.5	13.628
27.7	13.670
44.9	13.991
52.2	14.106
68.8	14.333
76.0	14.423
76.1	Rupture
14.8%	Elongation

E3 LBX 17 .500 in.
64,000 psi Bar
1200°F

Stress - psi	Strain - %
0	0.0
10,000	0.040
15,000	0.063
20,000	0.092
64,000	19.593

Elapsed time - Hours	Total plastic strain - %
0.0	19.593
0.3	19.703
0.9	19.827
1.8	19.925
2.9	20.020
3.7	20.090
4.6	20.110
21.5	Rupture
23.6%	Elongation

L-605-314 .500 in.
 1/2E2LEX-27 Bar
 4,000 psi @ 1400° F

Stress, psi	Strain-%
0	0.0
4,000	0.021
Hours	Total Plastic Strain-%
0.0	0.0
0.5	-.003
1.2	-.001
1.9	0.001
2.8	0.0007
3.5	0.001
21.1	0.001
44.6	0.009
67.9	0.015
91.3	0.007
116.0	0.011
141.5	0.022
166.0	0.012
187.7	0.019
212.8	0.016
235.9	0.030
259.4	0.021
284.9	0.021
307.5	0.022
333.3	0.021
355.8	0.027
380.3	0.032
404.0	0.050
429.2	0.029
451.7	0.024
477.4	0.028
502.2	0.034
525.0	0.046
Discontinued	

1/2 E3 L8X 8 .500 in.
 28,000 psi Bar
 1400°F

Stress - psi	Strain - %
0	0.0
10,000	0.057
15,000	0.077
20,000	0.104
28,000	0.163

Elapsed time - HOURS	Total plastic strain - %
0.0	0.0
0.2	0.009
1.8	0.031
2.9	0.052
18.9	0.383
26.7	0.622
45.4	1.254
68.8	1.939
93.2	2.495
116.7	2.930
140.3	3.359
164.7	3.725
186.9	4.033
211.7	4.329
236.6	4.605
258.8	4.826
283.5	5.079
307.1	5.310
331.3	5.534
355.9	5.793
382.3	6.050
406.0	6.243
427.0	6.432
451.3	6.652
475.2	6.884
498.9	7.125
523.0	7.387
545.4	7.650
571.8	7.992
596.8	8.357
619.1	8.866
640.0	Rupture
10.7%	Elongation

E3 LBX 13
34,000 psi .500 in.
1400°F Bar

Stress - psi	Strain - %
0	0.0
4010	0.028
9010	0.053
14,010	0.071
34,000	1.394

Elapsed time - Hours	Total plastic strain - %
0.0	1.234
0.2	1.264
0.8	1.344
1.4	1.404
1.9	1.453
3.1	1.556
19.4	3.058
24.8	3.563
27.3	3.758
46.3	5.144
51.3	5.444
69.9	6.594
75.4	6.924
95.8	8.134
102.7	Rupture
9.1%	Elongation

E3 LBX 18
37,500psi .500 in.
1400°F Bar

Stress - psi	Strain - %
0	0.0
10,000	0.047
15,000	0.070
20,000	0.097
37,500	2.541

Elapsed time HOURS	Total plastic strain - %
0.0	2.356
0.2	2.495
1.2	2.857
2.3	3.410
3.0	3.744
3.7	4.069
4.8	4.616
11.8	7.784
20.5	13.109
24.1	14.078
26.2	14.677
27.4	14.966
28.7	15.536
31.2	Rupture
13.8%	Elongation

E3 LBX 3
41,000 psi .500 in.
1400°F Bar

Stress - psi	Strain - %
0	0.0
10,000	0.043
15,000	0.078
20,000	0.097
41,000	4.486

Elapsed time - Hours	Total plastic strain - %
0.0	4.286
0.2	4.470
0.4	4.691
0.5	4.788
0.7	4.982
1.2	5.534
1.9	6.162
2.5	6.718
3.0	7.227
3.5	7.662
4.1	8.153
4.6	8.592
5.1	8.891
13.3	Rupture
14.9%	Elongation

L-605-144 .500 in.
 1/23LBX-16 Bar
 6,000 psi @ 1600° F

Stress, psi	Strain-%
0	0.0
6,000	0.039

Hours	Total Plastic Strain-%
0.0	0.0
0.4	0.007
1.2	0.027
2.1	0.036
2.8	0.040
3.5	0.055
4.1	0.063
5.0	0.064
21.5	0.171
28.8	0.203
45.1	0.257
72.3	0.325
97.1	0.371
117.0	0.398
141.0	0.450
168.4	0.483
188.9	0.515
213.0	0.552
236.8	0.587
261.5	0.609
284.9	0.633
309.3	0.655
333.3	0.670
357.6	0.683
381.0	0.703
405.1	0.714
432.6	0.712
454.1	0.733
477.4	0.739
501.5	0.743
Discontinued	

L-605-301 .500 in.
 1/2E2LBX-13 Bar
 7,500 psi @ 1600° F

Stress, psi	Strain-%
0	0.0
7,500	0.041
Hours	Total Plastic Strain-%
0.0	0.0
0.3	0.011
0.9	0.026
1.7	0.034
2.4	0.052
20.2	0.234
45.7	0.339
67.8	0.426
90.9	0.507
114.9	0.573
138.7	0.633
163.3	0.685
188.8	0.745
211.2	0.760
236.1	0.804
260.5	0.843
283.5	0.869
307.6	0.881
331.5	0.899
355.4	0.910
378.5	0.923
404.1	0.926
427.5	0.943
451.4	0.952
475.8	0.962
500.4	0.967
523.6	0.977
547.3	0.990
573.2	1.001
Discontinued	

E3 LBX 9
12,500 psi .500 in.
1600°F Bar

Stress - psi	Strain - %
0	0.0
4,010	0.014
9,010	0.050
12,500	0.067

Elapsed time - Hours	Total plastic strain - %		
0.0	0.0	764.5	3.696
0.2	0.013	787.8	3.731
1.0	0.068	812.3	3.760
1.5	0.100	835.7	3.797
2.5	0.172	859.4	3.825
19.1	0.935	883.9	3.862
23.7	1.031	906.0	3.905
26.6	1.096	930.8	3.944
43.4	1.351	956.0	3.989
50.4	1.442	978.1	4.019
67.1	1.635	1002.9	4.063
74.4	1.708	1049.9	4.161
95.6	1.906	1075.2	4.210
117.7	2.091	1101.3	4.282
138.9	2.239	1125.4	4.323
164.1	2.390	1146.1	4.388
187.3	2.530	1171.0	4.450
211.4	2.644	1194.2	4.540
235.1	2.743	1218.1	4.618
258.1	2.825	1242.1	4.665
283.8	2.911	1264.4	4.808
307.3	2.975	1290.8	4.928
331.0	3.040	1319.9	5.044
355.3	3.095	1338.2	5.190
380.1	3.152	1362.8	5.355
408.2	3.201	1387.3	5.538
430.6	3.250	1409.9	5.753
454.2	3.281	1437.3	6.132
477.1	3.323	1460.5	6.613
501.2	3.358	1467.2	Rupture
525.3	3.390	6.0%	Elongation
552.7	3.435		
573.0	3.455		
596.5	3.493		
619.3	3.527		
643.0	3.542		
667.8	3.577		
691.4	3.606		
643.0	3.541		
667.8	3.577		
691.4	3.606		
716.2	3.627		
741.0	3.662		

E3 LBX 19 .500 in.
17,500 psi Bar
1600°F

Stress - psi	Strain - %
0	0.0
4008	0.017
9008	0.033
17,500	0.095

Elapsed time - Hours	Total plastic strain - %
0.0	0.0
0.1	0.028
0.3	0.094
0.8	0.278
1.6	0.642
2.4	0.965
18.9	3.710
22.1	4.040
26.4	4.515
44.3	6.658
50.4	7.256
70.9	9.200
73.6	9.660
74.5	9.787
107.7	Rupture
17.0%	Elongation

E3 LBX 4 .500 in.
20,000 psi Bar
1600°F

Stress - psi	Strain - %
0	0.0
4000	0.028
9000	0.056
20,000	0.125

Elapsed time - Hours	Total plastic strain - %
0.0	0.0
0.2	0.074
0.4	0.174
0.7	0.423
1.0	0.727
1.2	0.977
1.6	1.490
2.3	2.137
2.9	2.635
3.4	3.047
4.0	3.411
4.7	3.825
5.2	4.080
5.8	4.368
6.3	4.607
8.7	5.584
22.2	11.013
24.3	11.876
25.8	12.648
27.0	13.232
28.0	13.735
28.8	14.141
30.1	14.734
43.3	Rupture
28.8%	Elongation

E3 LBX 14 .500 in.
 24,000 psi Bar
 1600°F

Stress - psi	Strain - %
0	0.0
4010	0.022
9010	0.051
14,010	0.076
24,000	0.145

Elapsed time - Hours	Total plastic strain - %
0.0	0.0
0.2	0.174
0.4	0.543
0.5	0.806
0.6	1.108
0.8	1.639
1.0	2.178
1.2	2.677
1.8	3.870
2.4	4.790
2.7	5.264
3.0	5.735
3.6	6.616
12.2	Rupture
24.5%	Elongation

L-605-295 .500 in.
 1/2BE2LBX-7 Bar
 4,000 psi @ 1800° F

Stress, psi	Strain-%
0	0.0
4,000	0.033

Hours	Total Plastic Strain-%
0.0	0.0
0.4	0.030
0.8	0.049
1.4	0.065
2.0	0.076
2.9	0.095
3.7	0.114
21.0	0.280
45.0	0.381
67.7	0.435
92.7	0.467
118.2	0.501
140.7	0.516
165.5	0.528
190.1	0.546
212.9	0.561
236.0	0.589
260.9	0.601
284.8	0.613
307.9	0.628
333.5	0.651
356.2	0.670
380.8	0.686
405.2	0.704
429.9	0.713
Discontinued	

E3 LBX 15 .500 in.
6,000 psi Bar
1800°F

Stress - psi	Strain - %
0.0	0.0
6,000	0.042

Elapsed time - Hours	Total plastic strain - %
0.0	0.0
0.4	0.055
0.8	0.107
1.7	0.175
2.5	0.210
3.2	0.258
19.4	0.692
22.9	0.732
27.4	0.797
43.3	0.934
67.4	1.068
91.3	1.205
114.4	1.311
140.1	1.669
163.1	1.863
187.7	2.190
211.4	2.550
235.9	3.014
264.9	3.580
286.9	4.088
310.5	4.655
333.3	5.206
357.2	5.931
381.4	6.793
391.7	Rupture
9.3%	Elongation

E3 LBX 5
7,000 psi .500 in.
1800°F Bar

5

Stress - psi	Strain - %
0	0.0
7,000	0.050

Elapsed time - Hours	Total plastic strain - %
0.0	0.0
0.4	0.075
0.9	0.123
1.6	0.191
2.6	0.250
20.2	0.923
45.5	1.438
67.2	1.713
92.3	1.943
115.6	2.189
139.5	2.426
164.3	2.818
190.8	3.398
214.4	4.014
235.5	4.786
259.9	6.527
263.9	Rupture
6.8%	Elongation

E3 LBX 10
8,000 psi .500 in.
1800°F Bar

Stress - psi	Strain - %
0	0.0
8,000	0.043

Elapsed time - Hours	Total plastic strain - %
0.0	0.0
0.3	0.105
0.6	0.197
0.9	0.265
1.4	0.367
1.8	0.442
2.7	0.575
3.5	0.683
19.3	1.743
23.1	1.903
26.8	2.021
46.9	2.581
70.5	3.833
91.5	4.478
115.9	6.870
137.7	Rupture
13.8%	Elongation

E3 L3X 20
12,500 psi .500 in.
1800°F Bar

Stress - psi	Strain - %
0	0.0
4010	0.015
6010	0.041
8010	0.053
12,500	0.092

Elapsed time - Hours	Total plastic strain - %
0.0	0.0
0.2	0.446
0.4	0.872
0.6	1.221
1.1	2.009
1.4	2.543
1.7	2.872
2.0	3.367
2.4	4.038
2.7	4.510
10.3	Rupture
30.5%	Elongation

FE 3 TBX 2
42,000 psi
1400°F

1 x 3 in.
Forgings

Stress - psi	Strain - %
0	0.0
10,000	0.047
20,000	0.094
42,000	1.813

Elapsed time - Hours	Total plastic strain- %
0.0	1.603
0.1	1.729
0.3	1.847
0.5	2.012
0.7	2.158
1.1	2.578
1.7	3.162
2.1	3.601
2.5	4.041
2.8	4.415
3.2	4.870
10.7	Rupture
12.0%	Elongation

FT 3 LBX 2
 20,000 psi
 1400°F

1 x 3 in.
 Forgings

Stress - psi	Strain - %
0	0.0
10,000	0.055
15,000	0.103
20,000	0.136
20,000	0.286

Elapsed time - Hours	Total plastic strain - %
0.0	0.0
0.2	0.015
2.1	0.069
3.4	0.107
10.2	0.986
27.2	1.468
46.0	2.328
69.3	3.145
93.8	3.834
117.2	4.386
140.9	4.918
165.4	5.427
187.5	5.857
212.4	6.289
237.5	6.722
259.6	7.098
284.3	7.528
307.7	7.928
331.4	8.327
356.6	8.759
382.8	9.226
406.5	9.659
427.6	10.094
452.5	10.650
475.8	11.280
495.6	Rupture
12.7%	Elongation

FE 3 TBX 1
 35,000 psi
 1400°F

1 x 3 in.
 Forgings

Stress - psi	Strain - %
0	0.0
10,000	0.052
15,000	0.077
20,000	0.103
35,000	0.258

Elapsed time - Hours	Total plastic strain - %
0.0	0.082
0.2	0.102
0.8	0.142
1.9	0.227
3.1	0.342
19.3	2.527
21.3	3.177
27.3	3.404
45.9	4.492
51.1	5.252
71.8	6.532
94.5	7.832
118.2	9.332
128.8	Rupture
10.1%	Elongation

FE 3 LBX 1 1 x 3 in.
 40,000 psi Forgings
 1400°F

Stress - psi	Strain - %
0	
10,000	0.021
15,000	0.043
20,000	0.063
40,000	3.526

Elapsed time - Hours	Total plastic strain - %
0.0	3.380
0.2	3.560
0.4	3.670
1.1	4.119
2.0	4.570
2.5	4.861
3.4	5.346
4.0	5.677
4.7	6.059
20.7	10.930
24.0	11.980
24.1	Rupture
12.0%	Elongation

FE 3 TBX 4
 17,000 psi 1 x 3 in.
 1600°F Forgings

Stress - psi	Strain - %
0	0.0
4008	0.029
8008	0.047
12,008	0.070
17,000	0.109

Elapsed time - Hours	Total plastic strain - %
0.0	0.000
0.4	0.091
0.8	0.188
1.3	0.273
2.2	0.435
18.2	1.980
21.7	2.220
26.4	2.534
44.8	3.613
50.0	3.881
68.9	4.876
74.0	5.107
93.3	6.015
98.2	6.250
114.4	7.045
140.3	8.460
164.9	10.250
169.8	10.700
189.0	12.820
194.0	13.550
218.4	Rupture
19.8%	Elongation

FE 3 LBX 4
17,500 psi 1 x 3 in.
1600°F Forgings

Stress - psi	Strain - %
0	0.0
4008	0.021
9008	0.052
17,500	0.097

Elapsed time - Hours	Total plastic strain - %
0.0	0.0
0.2	0.094
0.8	0.364
1.5	0.646
2.2	0.875
3.0	1.102
19.3	3.721
22.7	4.206
27.0	4.775
44.3	7.060
50.9	7.994
70.7	11.991
74.2	13.100
75.1	13.348
84.0	Rupture
23.1%	Elongation

PE 3 15A 3 1 x 3 in.
18,000 psi Forgings
1600°F

Elapsed time - Hours	Total plastic strain - %
0.0	0.0
0.2	0.091
0.5	0.270
1.1	0.573
1.5	0.776
2.1	1.010
2.8	1.248
3.5	1.454
4.3	1.680
5.0	1.850
21.0	4.986
24.5	5.638
29.0	6.425
45.1	9.309
49.6	10.266
51.6	10.700
77.9	Rupture
23.2%	Elongation

FE 3 LBX 3 1 x 3 in.
 25,000 psi Forgings
 1600°F

Stress - psi	Strain - %
0	0.0
6,000	0.025
11,000	0.050
16,000	0.077
25,000	0.141

Elapsed time - Hours	Total plastic strain - %
0.0	0.0
0.1	0.480
0.3	1.167
0.4	1.911
0.5	2.409
0.6	2.865
0.7	3.194
0.8	3.569
0.9	3.869
1.0	4.200
1.1	4.513
1.2	4.886
1.5	5.998
1.7	6.635
1.9	7.216
2.0	7.715
2.2	8.381
2.4	8.982
3.0	11.048
3.2	11.712
7.6	Rupture
20.2%	Elongation

FE 3 LBX 6 1 x 3 in.
 5,500 psi Forgings
 1800°F

Stress - psi	Strain - %	956.9	3.306
0	0.0	982.8	3.462
5,500	0.029	1005.4	3.601
		1029.0	3.747
		1053.8	3.910
Elapsed time	Total plastic	1077.5	4.079
- Hours	strain - %	1102.8	4.276
0.0	0.0	1126.5	4.458
0.2	0.011	1149.5	4.636
1.1	0.049	1173.5	4.852
3.3	0.088	1197.3	5.079
4.4	0.102	1222.1	5.339
20.7	0.258	1245.0	5.589
26.2	0.308	1266.7	5.869
28.6	0.333	1293.1	6.209
47.4	0.451	1316.9	6.546
70.9	0.555	1340.8	7.024
96.8	0.653	1365.1	7.704
119.1	0.706	1373.7	Rupture
142.7	0.768	9.1%	Elongation
167.7	0.853		
191.0	0.885		
215.0	0.934		
239.4	0.975		
260.0	1.001		
286.5	1.075		
311.0	1.115		
335.0	1.158		
358.7	1.192		
383.2	1.243		
409.4	1.295		
431.9	1.334		
455.6	1.389		
478.1	1.444		
502.3	1.500		
525.1	1.555		
551.8	1.640		
568.0	1.687		
598.0	1.773		
621.4	1.838		
644.0	1.930		
669.2	1.999		
692.3	2.093		
716.6	2.167		
742.1	2.285		
765.9	2.365		
789.3	2.460		
813.3	2.568		
837.0	2.681		
860.5	2.800		
885.1	2.915		
908.9	3.031		
932.9	3.177		

FE 3 TBX 5 1 x 3 in.
8,000 psi Forgings
1800°F

Stress - psi	Strain - %
0	0.0
8,000	0.046

Elapsed time - Hours	Total plastic strain - %
0.0	0.0
0.2	0.050
0.5	0.084
1.1	0.138
2.0	0.193
2.7	0.238
18.9	0.934
22.4	1.057
26.8	1.194
43.0	1.630
67.0	2.161
74.7	2.313
91.0	2.588
113.9	2.977
139.6	3.577
163.1	4.075
187.1	4.880
211.0	5.940
235.8	8.510
241.6	Rupture
9.2%	Elongation

FF 3 LBX 5 1 x 3 in.
8570 psi Forgings
1800°F

Stress - psi	Strain - %
0	0.0
2,500	0.012
4,000	0.030
5,500	0.039
8,500	0.066

Elapsed time - Hours	Total plastic strain - %
0.0	0.0
0.2	0.060
0.6	0.132
1.0	0.186
1.8	0.304
2.1	0.339
2.6	0.416
3.0	0.463
19.4	2.085
21.3	2.251
22.9	2.368
25.3	2.566
27.4	2.728
43.1	3.659
51.1	4.152
69.3	5.184
74.9	5.514
91.4	6.477
95.9	6.720
98.9	6.890
116.2	8.060
141.3	11.710
163.0	Rupture
17.2%	Elongation

FE 3 TBX 6
11,000 psi
1800°F

1 x 3 in.
Forgings

Stress - psi	Strain - %
0	0.0
6,000	0.027
8,500	0.054
11,000	0.099

Elapsed time - Hours	Total plastic strain - %
0.0	0.0
0.2	0.285
0.4	0.477
0.8	0.757
1.3	1.119
2.1	1.790
2.6	2.219
3.0	3.310
4.7	4.100
5.1	4.380
22.5	Rupture
32.7%	Elongation

2.3 L-605 Stress Rupture Data

Stress-Rupture Properties of L-605, AMS 5537A
0.005 Inch Sheet - Heat A

<u>Test Temp. °F</u>	<u>Grain Dir.</u>	<u>Specimen Ident.</u>	<u>Stress (ksi)</u>	<u>Life- Hours</u>	<u>Per Cent Elong.</u>	<u>Remarks</u>
1200	L	3F	50.0	113.5	6.3	
1200	L	3M	130.0	0.016	52.0	
1200	L	2G	60.0	54.1	6.4	
1200	L	2H	90.0	6.8	31.0	
1200	L	1J	135.0			Broke on loading
1400	L	2J	35.0	3.6	2.6	
1400	L	1K	30.0	46.2	4.8	
1400	L	3L	33.0	9.9	8.7	
1400	L	3M	46.0	0.4	5.4	
1400	L	2M	27.0	95.0	6.4	
1600	L	3J	20.0	10.5	7.5	
1600	L	3H	16.0	28.7	4.3	
1600	L	3K	25.0	2.2	8.2	
1600	L	1M	35.0	0.3	7.7	
1600	L	1N	10.0	59.8	10.3	
1800	L	3D	10.0	7.2	5.8	
1800	L	1F	7.0	15.3	5.1	
1800	L	1G	20.0	0.2	11.4	
1800	L	1H	14.0	1.1	9.3	
1800	L	2L	4.0	279.1	8.9	

Stress-Rupture Properties of L-605, AMS 5537A
0.020 Inch Sheet - Heat A

<u>Test Temp. F</u>	<u>Grain Dir.</u>	<u>Specimen Ident.</u>	<u>Stress (ksi)</u>	<u>Life-Hours</u>	<u>Per Cent Elong.</u>	<u>Remarks</u>
1200	T	10F	60.0	1.0	13.0	
1200	T	1F	50.0	8.6	8.3	
1200	T	10G	72.0	0.3	23.6	
1200	T	1G	43.0	762.2	2.2	
1200	T	2G	47.0	8.1	19.1	
1200	T	6G	44.0	210.8	6.8	
1400	T	11F	52.0	0.1	13.9	
1400	T	3F	45.0	1.5	9.0	
1400	T	K3-1F	32.5	20.3	6.4	
1400	T	14F	30.0	45.9	10.9	
1400	T	K3-3F	24.0	527.5	15.1	
1400	T	2F	42.0	1.9	7.6	
1400	T	3G	50.0	0.7	9.3	
1400	T	11G	38.0	20.3	13.7	
1400	T	K3-1G	37.5	5.7	4.7	
1400	T	14G	22.5	647.0	12.2	
1400	T	K3-3G	21.0	1699.8	12.6	
1600	T	8F	32.0	0.8	21.0	
1600	T	5F	22.5	13.9	22.7	
1600	T	13F	17.0	42.0	13.7	
1600	T	5G	27.0	2.9	17.4	
1600	T	8G	14.0	133.6	8.0	
1600	T	13G	10.5	373.9	7.0	
1600	T	9G	25.0	6.0	24.2	
1600	T	15G	37.0	0.2	14.5	
1800	T	7F	15.0	1.4	18.3	
1800	T	4F	11.5	6.7	14.4	
1800	T	K3-2F	9.5	11.4	11.9	
1800	T	12F	8.8	14.7	8.7	
1800	T	K3-4F	5.75	77.0	5.0	
1800	T	15F	8.0	30.1	1.6	

(Continued)

Stress-Rupture Properties of L-605, AMS 5537A
0.020 Inch Sheet - Heat A

<u>Test Temp. °F</u>	<u>Grain Dir.</u>	<u>Specimen Ident.</u>	<u>Stress (ksi)</u>	<u>Life- Hours</u>	<u>Per Cent Elong.</u>	<u>Remarks</u>
1800	T	40	20.0	0.3	15.1	
1800	T	E3-4G	7.5	28.7	4.0	
1800	T	70	5.7	136.0	4.5	
1800	T	120	3.5	1131.5		Discontinued
1800	T	E3-20	2.5	1052.5	6.7	

(Continued)

Stress-Rupture Properties of L-605, AMS 5537A
0.040 Inch Sheet - Heat A

<u>Test Temp.^oF</u>	<u>Grain Dir.</u>	<u>Specimen Ident.</u>	<u>Stress (ksi)</u>	<u>Life-Hours</u>	<u>Per Cent Elong.</u>	<u>Remarks</u>
1400	L	2P	45.0	1.3		
1400	L	4P	37.0	5.0	15.8	
1400	L	5R	60.0	0.1	20.4	
1400	L	7R	54.0	0.2	18.2	
1400	L	3R	38.0	6.2	11.3	
1400	L	1R	30.0	63.0	13.5	
1400	L	4S	55.0	0.2	22.9	
1400	L	2S	44.0	1.7	13.0	
1400	L	6S	22.5	846.7	8.9	
1600	T	2K	31.0	1.1	20.7	
1600	T	10K	27.0	3.2	24.7	
1600	T	2K	22.5	11.3	22.8	
1600	T	K3-2K	20.0	19.9	17.2	
1600	T	4L	43.0	0.1	25.4	
1600	T	11L	37.0	0.5	23.4	
1600	T	12L	17.0	74.7	19.7	
1600	T	11M	39.0	0.3	22.5	
1600	T	7M	28.0	2.9	22.9	
1600	T	10M	19.5	23.1	24.9	
1600	T	K3-1M	15.0	143.3	13.7	
1600	T	5N	31.5	1.1	28.2	
1600	T	6N	23.0	10.7	21.4	
1600	T	12N	12.0	444.4	7.5	
1600	T	12F	42.0	0.1	19.7	
1600	T	4P	40.0	0.3	14.2	
1600	T	3P	22.0	13.2	26.4	
1600	T	20P	14.9	99.1	11.8	
1600	T	K3-2P	17.5	47.3	17.4	
1600	T	4P	9.0	143.8		
1600	T	16R	27.5	3.8	10.3	
1600	T	18R	20.0	27.5	24.3	
1600	T	11R	10.75	584.2	5.1	

(Continued)

Stress-Rupture Properties of L-605, AMS 5537A
0.040 Inch Sheet - Heat A

<u>Test Temp. °F</u>	<u>Grain Dir.</u>	<u>Specimen Ident.</u>	<u>Stress (ksi)</u>	<u>Life- Hours</u>	<u>Per Cent Elong.</u>	<u>Remarks</u>
1600	T	18S	41.0	0.2	23.1	
1600	T	11S	38.0	0.35	25.2	
1600	T	2S	15.0	75.2	11.3	
1600	T	23S	14.0	172.9	9.1	
1800	T	18K	23.0	0.2	30.8	
1800	T	16K	15.0	1.4	13.4	
1800	T	15K	11.5	8.8	20.8	
1800	T	11L	20.0	0.3	29.8	
1800	T	20L	10.0	7.6	10.2	
1800	T	3L	8.5	57.0	9.5	
1800	T	18L	7.5	89.0	9.1	
1800	T	15M	24.5	0.2	26.4	
1800	T	20M	15.0	2.0	16.0	
1800	T	E3-2M	11.0	7.2	16.2	
1800	T	16M	10.0	19.6	13.4	
1800	T	8M	4.8	329.0	7.6	
1800	T	11N	21.0	0.9	30.0	
1800	T	8N	13.0	3.5	18.2	
1800	T	7N	11.0	9.0	12.5	
1800	T	9P	24.0	0.2	23.4	
1800	T	1F	16.5	0.9	21.7	
1800	T	16P	12.5	3.3	17.9	
1800	T	E3-2R	9.5	10.0	6.1	
1800	T	17R	9.0	30.7	10.7	
1800	T	3R	8.0	66.1	11.7	
1800	T	21R	6.79	116.1	7.2	
1800	T	7R	5.0	278.5	5.7	
1800	T	20R	6.0	113.4	5.0	
1800	T	9S	25.0	0.1	19.1	
1800	T	22S	25.0	0.1	36.0	
1800	T	16S	9.0	26.8	9.0	
1800	T	19S	8.62	50.1	8.7	
1800	T	E3-1S	7.0	93.8	6.8	
1800	T	12S	13.5	2.8	18.3	
1800	T	15S	19.5	0.4	20.2	

(Continued)

Stress-Rupture Properties of L-605, AMS 5537A
0.040 Inch Sheet - Heat A

<u>Test Temp. °F</u>	<u>Grain Dir.</u>	<u>Specimen Ident.</u>	<u>Stress (ksi)</u>	<u>Life- Hours</u>	<u>Per Cent Elong.</u>	<u>Remark</u>
1800	L	4K	15.0	1.8	32.5	
1800	L	2K	11.5	4.9	18.1	
1800	L	7K	7.5	121.6	7.4	
1800	L	2L	24.5	0.1	30.9	
1800	L	6L	9.25	34.9	14.2	
1800	L	K3-43	5.0	68.9		
1800	L	4L	5.0	184.0	4.3	
1800	L	7M	20.0	0.5	28.4	
1800	L	3M	16.5	2.1	27.2	
1800	L	1M	10.0	14.3	19.3	
1800	L	5M	7.0	92.3	7.6	
1800	L	3N	24.0	0.1	29.0	
1800	L	6N	12.5	1.9	22.2	
1800	L	1N	9.4	27.1	15.5	
1800	L	3P	20.0	0.4	33.4	
1800	L	5P	13.0	3.7	18.0	
1800	L	1P	10.5	7.5	15.2	
1800	L	7P	4.75	455.3	3.4	
1800	L	6R	10.3	9.9	19.2	
1800	L	2R	7.3	93.3	11.7	
1800	L	4R	7.125	76.2	7.2	
1800	L	5S	25.0	0.1	28.0	
1800	L	1S	17.5	1.1	18.7	
1800	L	3S	9.3	34.3	12.6	
1800	L	7S	4.5	590.5	4.9	

Stress-Rupture Properties of L-605, AMS 5537A
0.040 Inch Sheet - Heat A

<u>Test Temp., °F</u>	<u>Grain Dir.</u>	<u>Specimen Ident.</u>	<u>Stress (ksi)</u>	<u>Life- Hours</u>	<u>Per Cent Elong.</u>	<u>Remarks</u>
1200	T	8K	66.0	1.2	24.8	
1200	T	5K	58.0	1.6	21.4	
1200	T	6K	50.0	11.9	10.2	
1200	T	17L	78.0	0.6	28.3	
1200	T	16L	72.0	1.2	22.8	
1200	T	15L	43.0	812.1	3.3	
1200	T	12M	90.0	0.1	49.3	
1200	T	14M	56.0	4.6	7.6	
1200	T	13M	46.0	11.6	4.3	
1200	T	16N	85.0	0.3	36.2	
1200	T	17N	60.0	6.6	13.7	
1200	T	15N	52.0	7.6	8.7	
1200	T	E3-2N	50.0	29.9	4.8	
1200	T	6P	56.0	2.7	15.5	
1200	T	E3-1P	45.0	47.4	5.7	
1200	T	7P	45.0	102.4	5.7	
1200	T	8P	44.0	247.0	8.9	
1200	T	4R	107.5		17.2	B.O.L.
1200	T	5R	47.0	20.9	6.5	
1200	T	1R	41.0	113.2	5.2	
1200	T	9R	87.0	.025	61.5	
1200	T	5S	52.0	2.9	12.3	
1200	T	6S	48.0	9.0	9.3	
1200	T	4S	42.5	203.0	2.7	
1200	T	E3-2S	36.0	1114.6	2.0	
1200	T	21S	46.5	56.4	4.6	
1400	T	17K	50.0	0.7	14.7	
1400	T	11K	47.0	1.4	13.3	
1400	T	10K	37.5	11.8	7.5	
1400	T	6L	57.0	0.45	13.5	
1400	T	8L	42.0	4.7	5.5	
1400	T	E3-1L	32.5	39.7	13.5	
1400	T	10L	27.5	242.8	16.9	

(Continued)

Stress-Rupture Properties of L-605, AMS 5537A
0.040 Inch Sheet - Heat A

<u>Test Temp., °F</u>	<u>Grain Dir.</u>	<u>Specimen Ident.</u>	<u>Stress (ksi)</u>	<u>Life- Hours</u>	<u>Per Cent Elong.</u>	<u>Remarks</u>
1100	T	5M	48.0	1.6	15.5	
1100	T	4M	40.0	9.9	11.9	
1100	T	2M	34.0	33.5	14.2	
1100	T	4M	15.0	259.6		
1100	T	2M	58.0	0.3	18.3	
1100	T	1M	48.0	1.7	24.5	
1100	T	3M	24.0	555.6	10.2	
1100	T	17P	39.0	4.1	7.2	
1100	T	18P	36.0	14.3	12.0	
1100	T	15P	29.0	132.3	11.6	
1100	T	15R	67.0	0.05	33.5	
1100	T	10R	35.0	25.5	10.2	
1100	T	1R	24.0	787.0	13.2	
1100	T	9R	22.5	647.0	12.2	
1100	T	E3-4R	14.5	285.5		
1100	T	88	43.0	1.9	15.5	
1100	T	178	30.0	102.0	21.4	
1100	T	208	66.0	0.1	31.5	
1100	L	1K	47.0	1.0	12.2	
1100	L	5K	37.0	5.6	8.4	
1100	L	3K	30.0	82.3	13.8	
1100	L	1L	52.0	1.0	15.2	
1100	L	3L	46.0	2.6	12.5	
1100	L	7L	34.0	46.1	11.5	
1100	L	5L	21.0	1759.0	12.0	
1100	L	6M	58.0	0.2	17.7	
1100	L	8M	56.0	28.2	12.1	
1100	L	2M	50.0	1.4	19.3	
1100	L	4M	25.0	621.7	17.8	
1100	L	4M	42.0	5.4	11.7	
1100	L	7M	34.0	51.7	13.1	
1100	L	2M	29.0	168.5	24.4	
1100	L	6P	55.0	0.2	21.1	

Stress-Rupture Properties of L-605, AMS 5537A
0.080 Inch Sheet - Heat A

<u>Test Temp. °F</u>	<u>Grain Dir.</u>	<u>Specimen Ident.</u>	<u>Stress (ksi)</u>	<u>Life- Hours</u>	<u>Per Cent Elong.</u>	<u>Remarks</u>
1200	T	15T	60.0	2.0	13.9	
1200	T	13T	53.5	39.2	10.1	
1200	T	9W	42.5	193.3	4.5	
1200	T	13W	40.0	506.0		Discontinued
1200	T	6W	68.0	0.4	29.4	
1200	T	8W	56.0	7.4	16.3	
1400	T	7T	40.0	4.8	8.4	
1400	T	3T	37.5	9.7	10.1	
1400	T	4T	12.0	1221.0		Discontinued
1400	T	1W	34.0	29.9	9.9	
1400	T	5W	34.0	38.2	9.9	
1400	T	1W	30.0	169.0	13.5	
1400	T	10W	20.0	576.8		Discontinued
1400	L	1T	46.5	1.9	15.6	
1400	L	3T	37.0	9.3	8.9	
1400	L	2T	34.0	19.2	5.8	
1400	L	6W	62.0	0.1	24.7	
1400	L	12W	50.0	1.1	16.8	
1600	T	10T	40.0	0.2	26.3	
1600	T	5T	30.0	1.9	21.8	
1600	T	14T	17.5	136.1	18.7	
1600	T	4W	23.5	12.9	30.0	
1600	T	11W	21.0	31.3	24.4	
1600	T	15W	4.0	1009.2		Discontinued
1800	T	9T	10.0	13.1	15.2	
1800	T	E3-2T	10.0	33.0	10.3	
1800	T	E3-4T	8.0	64.3	6.2	
1800	T	4T	7.5	29.0	6.7	
1800	T	12T	5.25	348.1	5.2	
1800	T	2W	15.0	2.5	31.8	

(Continued)

Stress-Rupture Properties of L-605, AMS 5537A
0.080 Inch Sheet - Heat A

<u>Test Temp. °F</u>	<u>Grain Dir.</u>	<u>Specimen Ident.</u>	<u>Stress (ksi)</u>	<u>Life- Hours</u>	<u>Per Cent Elong.</u>	<u>Remarks</u>
1800	T	E3-1W	11.0	5.8	14.5	
1800	T	E3-2W	3.5	982.7		Discontin
1800	T	E3-3W	2.5	404.8		
1800	T	11W	2.0	1000.3		Discontin
1800	L	4T	25.0	0.2	39.6	
1800	L	6T	20.0	0.5	24.4	
1800	L	5T	11.0	2.8	35.0	
1800	L	3W	13.8	4.8	19.3	
1800	L	1W	9.0	27.1	10.7	
1800	L	2W	6.8	114.8	5.9	

Stress-Rupture Properties of L-605, AMS 5759A
0.500 Inch Dia. Bar - Heat B

<u>Test Temp. °F</u>	<u>Grain Dir.</u>	<u>Specimen Ident.</u>	<u>Stress (ksi)</u>	<u>Life- Hours</u>	<u>Per Cent Elong.</u>	<u>Remarks</u>
1200	L	E3-17	64.0	21.5	23.6	
1200	L	2	63.0	11.6	20.2	
1200	L	30	60.0	48.0	20.3	
1200	L	E3-12	57.0	76.2	14.8	
1200	L	25	55.0	205.2	12.8	
1200	L	E3-2	52.0	241.0	10.8	
1200	L	9	46.0	427.0	8.4	
1200	L	E3-7	46.0	774.8	7.8	
1400	L	26	70.0	0.05	27.6	
1400	L	19	52.0	2.1	18.3	
1400	L	6	46.0	4.5	13.9	
1400	L	1	42.0	7.6	13.8	
1400	L	E3-3	40.0	13.3	14.9	
1400	L	E3-18	37.5	31.2	13.8	
1400	L	E3-13	34.0	102.7	9.1	
1400	L	28	34.0	104.3	10.9	
1400	L	E3-8	28.0	640.0	10.7	
1400	L	21	28.0	827.9	16.4	
1600	L	20	34.0	1.0	23.6	
1600	L	4	30.0	1.9	31.6	
1600	L	16	24.0	9.2	42.0	
1600	L	14	20.0	36.8	30.0	
1600	L	E3-4	20.0	43.3	28.8	
1600	L	E3-19	17.5	107.7	17.7	
1600	L	15	17.5	128.3	29.6	
1600	L	E3-14	16.0	9.2	42.0	
1600	L	29	13.0	1171.9	15.3	
1600	L	E3-9	12.5	1467.2	6.9	
1800	L	24	18.0	1.1	61.0	
1800	L	8	16.0	2.6	51.6	
1800	L	10	13.0	6.4	34.8	

(Continued)

Stress-Rupture Properties of L-605, AMS 5759A
0.500 Inch Dia. Bar - Heat E

<u>Test Temp. °F</u>	<u>Grain Dir.</u>	<u>Specimen Ident.</u>	<u>Stress (ksi)</u>	<u>Life- Hours</u>	<u>Per Cent Elong.</u>	<u>Remarks</u>
1800	L	12	13.0	6.9	33.0	
1800	L	E3-20	12.5	10.3	30.5	
1800	L	22	10.0	18.2	27.4	
1800	L	E3-10	8.0	137.7	13.8	
1800	L	17	7.5	185.3	16.8	
1800	L	E3-5	7.0	269.0	6.8	
1800	L	E3-15	6.0	391.7	9.3	

Stress-Rupture Properties of L-605, AMS 5759A
1.00 Inch Dia. Bar - Heat E

<u>Test Temp. °F</u>	<u>Grain Dir.</u>	<u>Specimen Ident.</u>	<u>Stress (ksi)</u>	<u>Life- Hours</u>	<u>Per Cent Elong.</u>	<u>Remarks</u>
1400	L	6	52.0	1.8	18.9	
1400	L	3	41.0	13.6	12.0	
1400	L	8	38.0	29.9	12.0	
1400	L	12	35.0	92.6	11.2	
1400	L	5	30.0	400.4	10.2	
1400	L	9	27.5	694.5	12.3	
1800	L	1	20.0	0.6	48.5	
1800	L	4	15.3	3.5	35.7	
1800	L	7	12.0	14.1	30.0	
1800	L	2	10.0	31.5	27.0	
1800	L	10	8.3	139.5	11.4	
1800	L	11	5.0	608.9	9.3	

Stress-Rupture Properties of L-605, AMS 5759A
1 x 3 Inch Forging - Heat B

<u>Test Temp. °F</u>	<u>Grain Dir.</u>	<u>Specimen Ident.</u>	<u>Stress (ksi)</u>	<u>Life- Hours</u>	<u>Per Cent Elong.</u>	<u>Remarks</u>
1100	T	2	55.0	1.9	13.7	
1100	T	3	50.0	4.5	16.3	
1100	T	4	42.5	19.5	13.6	
1100	T	K3-2	42.0	10.7	12.0	
1100	T	5	39.0	57.1	9.5	
1100	T	K3-1	35.0	128.8	10.1	
1100	T	1	35.0	156.6	15.6	
1100	T	6	29.0	860.0	10.3	
1100	L	8	55.0	0.9	16.0	
1100	L	9	42.5	16.8	12.8	
1100	L	10	40.0	20.2	14.5	
1100	L	K3-1	40.0	24.1	12.0	
1100	L	7	38.0	29.8	13.1	
1100	L	11	36.0	53.5	8.0	
1100	L	K3-2	29.0	495.6	12.7	
1100	L	12	27.5	860.7	12.8	
1600	T	K3-3	18.0	77.9	23.2	
1600	T	K3-4	17.0	218.4	19.8	
1600	L	K3-3	25.0	7.6	20.2	
1600	L	K3-4	17.5	84.0	23.1	
1800	T	11	25.0	0.1	53.0	
1800	T	9	17.0	2.1	58.0	
1800	T	8	14.0	4.5	38.8	
1800	T	7	11.5	26.9	24.0	
1800	T	K3-6	11.0	22.5	32.7	
1800	T	10	9.0	110.8	23.9	
1800	T	K3-5	8.0	241.6	9.2	
1800	T	12	6.0	131.9	7.0	
1800	L	4	17.0	1.5	59.0	
1800	L	2	14.0	5.3	50.2	
1800	L	3	12.5	9.3	44.8	

(Continued)

Stress-Rupture Properties of L-605, AMS 5759A
1 x 3 Inch Forging - Heat B

<u>Test Temp. °F</u>	<u>Grain Dir.</u>	<u>Specimen Ident.</u>	<u>Stress (ksi)</u>	<u>Life- Hours</u>	<u>Per Cent Elong.</u>	<u>Remarks</u>
1800	L	1	10.0	53.3	30.6	
1800	L	E3-5	8.5	163.0	17.2	
1800	L	6	8.0	138.0	19.1	
1800	L	E3-6	5.5	1373.7	9.1	
1800	L	5	5.0	1299.6	11.6	

2.4 L-605 Fatigue Data

Fatigue Properties of L-605 AMS 5537A

0.040 In. Sheet At Room Temperature

Stress Ratio A=0.25 - Traverse Direction - 1800 CFM

<u>Test Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
A - S	129,437	303,000	
N	132,163	240,000	Failed in gauge section
L	122,625	507,000	
S	133,525	217,000	
L	122,625	356,000	
L	115,000	864,000	
N	105,594	1,907,000	
K	98,781	1,753,000	Failed outside of gauge section
P	92,650	4,759,000	
R	81,750	10,077,000	
P	130,119	640,000	No failure
S	132,163	777,000	Failed in gauge section
P	122,625	999,000	
P		144,000	
R		897,000	
N	133,525	339,000	
M	132,163	264,000	
M		260,000	
K		128,000	
R	136,000	100	
S	134,883	297,000	
P	134,888	238,000	
N	81,750	10,000,000	No failure
N	115,000	1,264,000	Failed in gauge section
M	88,563	10,000,000	No failure
M	88,563	10,000,000	No failure
L	134,888	263,000	Failed in gauge section
L	115,000	714,000	Double fracture
K	88,563	3,564,000	Failed in gauge section

Fatigue Properties of L-605 AMS 5537A
0.040 In. Sheet Stress Ratio A=0.25
Transverse Direction - 1800 CFM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
A - L	37,000	1,671,000	No failure
L		1,000,000	
K		1,004,000	
K		1,000,000	
K		1,000,000	

Fatigue Properties of L-605 AMS 5537A
0.040 In. Sheet Stress Ratio A=0.25
Transverse Direction - 1800 CFM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
A - L	38,000	4,877,000	No failure
L		1,000,000	
L		1,000,000	
K		1,000,000	
K		1,000,000	

Fatigue Properties of L-605 AMS 5537A
 0.040 In. Sheet at 11,000°F
 Stress Ratio A=0.25 - Transverse Direction - 3600 CPM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
A - M	32,500	1,054,000	No failure
L		3,555,000	
L		1,027,000	
K		3,559,000	
K		1,042,000	

Fatigue Properties of L-605 AMS 5537A
 0.040 In. Sheet at 1800°F
 Stress Ratio A=0.25 - Transverse Direction

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
A - P	24,000	43,000	Failed in Gauge section
R	15,000	28,000	Failed in Gauge section
S	15,000	890,000	Failed in Gauge section
R	13,000	1,000,000	No failure
S	13,000	1,000,000	No failure

Fatigue Properties of L-605 AMS 5537A
0.040 In. Sheet at 1000°F
Stress Ratio A=0.25 - Transverse Direction - 3600 CPM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
A - P	37,500	1,056,000	No failure
N		3,640,000	
M		3,647,000	
R		1,044,000	
S		3,631,000	

Fatigue Properties of L-605 AMS 5537A
0.040 In. Sheet at 1200°F
Stress Ratio A=0.25 - Transverse Direction - 1800 CPM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
A - M	35,5000	1,629,000	No failure
K		1,000,000	
K			
S			

Fatigue Properties of L-605 AMS 5537A
0.040 In. Sheet at 1200°F
Stress Ratio $A=0.25$ - Transverse Direction - 3600 CFM

<u>Test Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
A - K	35,500	1,001,000	No failure
L		3,618,000	
L		1,029,000	
K		3,607,000	
L		1,000,000	

Fatigue Properties of L-605 AMS 5537A
0.040 In. Sheet at 1400°F
Stress Ratio $A=0.25$ - Transverse Direction - 1800 CFM

<u>Test Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
A - L	32,500	9,000	Failed in Gauge section
K	32,500	53,000	Failed in gauge section
S	32,500	2,103,000	No failure
S	27,000	1,667,000	
K	27,000	1,001,000	

Fatigue Properties of L-605 AMS 5537A
0.040 In. Sheet at Room Temperature
Stress Ratio A=0.67 - Transverse Direction - 1800 CFM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
A - N	135,000	99	Failed in gauge section
N		34	
M		490	
M		243	
K		120	
K	134,000	1	
L		2,840	
R		1,000	
S		248	
K		1,200	
S	122,625	89,000	
K		95,000	
L		176,000	
N		115,000	
P		122,000	
R	130,800	24,000	
P		39,000	
K		72,000	
M		77,000	
N		65,000	
S	68,125	2,011,000	
L		10,000,000	No failure
P		10,000,000	No failure
S		1,129,000	Failed in gauge section
N		10,035,000	No failure
R	95,375	257,000	Failed in gauge section
R		368,000	
P		249,000	
R		335,000	
R		365,000	

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
A - S	68,125	2,011,000	Failed in gauge section
L		10,000,000	No failure
P		10,000,000	No failure
S		1,129,000	Failed in gauge section
R	95,375	335,000	
R	95,375	365,000	
K	122,625	95,000	
L		176,000	
N		115,000	
P		122,000	
K	130,800	72,000	
		77,000	
		65,000	

Fatigue Properties of L-605 AMS 5537A
0.040 In. Sheet at 400°F
Stress Ratio A=0.67 - Transverse Direction - 1800 CFM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
A - R	46,000	2,490,000	No failure
L		10,000,000	
L		4,641,000	
L		10,000,000	
L		10,000,000	

Fatigue Properties of L-605 AMS 5537A
0.040 In. Sheet at 600°F
Stress Ratio A=0.67 - Transverse Direction - 1800 CFM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
A - L	38,000	1,440,000	No failure
K		1,000,000	
K			
L			

Fatigue Properties of L-605 AMS 5537A
 0.040 In. Sheet at 800°F
 Stress Ratio A=0.67 - Transverse Direction - 1800 CPM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
A - P	39,000	10,000,000	No failure
P		5,360,000	
R		10,000,000	
R			
R			

Fatigue Properties of L-605 AMS 5537A
 0.040 In. Sheet at 1000°F
 Stress Ratio A=0.67 - Transverse Direction - 1800 CPM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
A - R	37,000	1,447,000	No failure
R		1,000,000	
R		1,001,000	
S		1,000,000	
S		1,000,000	

Fatigue Properties of L-605 AMS 5537A
0.040 In. Sheet at Room Temperature
Stress Ratio A=0.98 - Transverse Direction - 1800 CPM

<u>Heat Number</u>	<u>Maximun Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
A - S	60,000	2,775,000	Failed in gauge section
R		4,040,000	
P		10,000,000	No failure
L		10,000,000	
K		10,000,000	
R	65,000	1,304,000	Failed in gauge section
P	72,500	360,000	
S		546,800	
K		620,000	
M		851,000	
N		843,000	
K	100,000	70,000	
L		73,000	
M		76,000	
N		68,000	
P		64,000	
K		1,000	
M		450	
N		2,200	
R		19,000	
S		27,000	
L		17,000	

Fatigue Properties of L-605 AMS 5537A
 0.040 In. Sheet at 1600°F
 Stress Ratio A=0.67 - Transverse Direction - 1800 CPM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
A - M	31,000	7000	Failed in gauge section
K	31,000	6000	
K	27,000	374,000	
K	27,000	375,000	No failure
L	21,000	727,000	Failed in gauge section
K	21,000	886,000	Failed in gauge section
L	14,000	10,000,000	No failure
L		4,143,000	
L		4,318,000	
L		6,297,000	

Fatigue Properties of L-605 AMS 5537A
 0.040 In. Sheet at 1800°F
 Stress Ratio A=0.67 - Transverse Direction - 1800 CPM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
A - R	24,000	8,000	Failed in gauge section
R	24,000	277,000	
S	13,000	34,000	
S	13,000	14,000	
S	10,000	830,000	

Fatigue Properties of L-605 AMS 5537A
 0.040 In. Sheet at 1200°F
 Stress Ratio A=0.67 - Transverse Direction - 1800 CPM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
A - M	35,000	12,000	Failed in Gauge section. Specimen elongated excessively on loading
L	35,000	890,000	Failed in Gauge section
K	35,000	4,196,000	No failure
K	30,000	10,000,000	No failure
K	30,000	10,000,000	No failure
K	30,000	10,000,000	No failure

Fatigue Properties of L-605 AMS 5537A
 0.040 In. Sheet at 1400°F
 Stress Ratio A=0.67 - Transverse Direction - 1800 CPM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
A - P	32,500	104,000	Failed in Gauge Section
P	26,000	1,677,000	No failure
N	26,000	1,000,000	No failure
N	26,000	1,000,000	No failure
M	26,000	1,000,000	No failure

Fatigue Properties of L-605 AMS 5537A
 0.040 In. Sheet at 600°F
 Stress Ratio A=0.98 - Transverse Direction - 1800 CPM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
A - L	38,500	530,000	No failure - Wring loading
K		2,225,000	No failure
M		1,000,000	
P			
N			

Fatigue Properties of L-605 AMS 5537A
 0.040 In. Sheet at 1000°F
 Stress Ratio A=0.98 - Transverse Direction - 1800 CPM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
A - L	37,000	2,413,000	No failure
K		1,000,000	
L			
M			
N			

Fatigue Properties of L-605 AMS 5537A
0.040 In. Sheet at 1400°F
Stress Ratio A=0.98 - Transverse Direction - 1800 CPM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
A - K	32,000	19,000	Failed in gauge section
P	20,000	1,565,000	No failure
R	20,000	1,000,000	No failure

Fatigue Properties of L-605 AMS 5537A
0.040 In. Sheet at 1800°F
Stress Ratio A=0.98 - Transverse Direction - 1800 CPM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
A - R	24,000	35,000	Failed in gauge section
R	24,000	38,000	
S	13,000	272,000	
R	8,000	835,000	
R	8,000	780,000	

Fatigue Properties of L-605 AMS 553/A
0.080 In. Sheet at Room Temperature
Stress Ratio A=0.25 - Transverse Direction - 1800 CPM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
A - T	130,000	257,000	Failed in gauge section
T			Overloaded
T	85,000	10,034,000	No failure
T	100,000	1,968,000	Failed in gauge section
T	130,000	177,000	
W	130,000	156,000	
W	100,000	1,142,000	
W	130,000	147,000	
W	100,000	1,762,000	
W	115,000	480,000	
B - O	160,000	5,000	
O	85,000	10,027,000	No failure
O	93,000	7,783,000	Failed in gauge section
O	100,000	4,036,000	
O	145,000	77,000	
O	145,000	71,000	
C - O	160,000	4,000	
O	145,000	62,000	
O	115,000	612,000	
O	130,000	186,000	
O	115,000	552,000	
O	160,000	4,000	
O	115,000	722,000	
A - T	93,000	8,729,000	
T	93,000	8,635,000	
W	145,000	91,000	
W	115,000	795,000	
W	100,000	1,931,000	

Fatigue Properties of L-605 AMS 5537A
0.080 In. Sheet at 800°F
Stress Ratio A=0.25 - Transverse Direction - 1800 CPM

<u>Test Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
A - T	70,000	5,057	Failed in gauge section
T	80,000	10,347,000	No failure
T	80,000	10,858,000	
W	80,000	10,080,000	
W	70,000	10,356,000	

Fatigue Properties of L-605 AMS 5537A
0.080 In. Sheet at 1200°F
Stress Ratio A=0.25 - Transverse Direction - 1800 CPM

<u>Test Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
A - W	60,000	1,758,000	Failed in gauge section
W		1,155,000	
W		1,723,000	
W		802,000	
W		518,000	

Fatigue Properties of L-605 AMS 5537A
 0.080 In. Sheet at 1600° F
 Stress Ratio A=0.25 Transverse Direction 1800 CPM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
A - T	36,000	177,000	Failed in gauge section
T		145,000	
T		145,000	
T		158,000	
T		193,000	

Fatigue Properties of L-605 AMS 5537A
 0.080 In. Sheet at 800° F
 Stress Ratio A=0.67 Transverse Direction 1800 CPM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
A - T	60,000	2,889,000	No failure
W	80,000	1,000	Continuous creep
W	60,000	887,000	Failed in gauge section
W	60,000	4,989,000	Failed in gauge section
W	60,000	10,219,000	No failure

Fatigue Properties of L-605 AMS 5537A
0.080 In. Sheet at Room Temperature
Stress Ratio A=0.67 - Transverse Direction - 1800 CPM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number Of Cycles</u>	<u>Remarks</u>
A - T	130,000	12,000	Failed in gauge section
T	130,000	14,000	
T	68,000	2,838,000	
T	115,000	55,000	
T	115,000	56,000	
W	115,000	50,000	
W	130,000	13,000	
W	115,000	50,000	
W	85,000	319,000	
W	130,000	4,000	
B - O	85,000	384,000	
O	100,000	136,000	
O	100,000	140,000	
O	70,000	3,340,000	
O	85,000	449,000	
O	70,000	2,526,000	
O	85,000	408,000	
C - O	70,000	6,789,000	
O	115,000	66,000	
O	70,000	2,449,000	
O	130,000	21,000	Oscillating load miscalculated Failed in gauge section
O	100,000	144,000	
O	100,000	147,000	
O	95,000	275,000	
A - T	85,000	360,000	
T	85,000	375,000	
W	70,000	2,110,000	

Fatigue Properties of L-605 AMS 5537A
0.080 In. Sheet at 1200°F
Stress Ratio A=0.67 Transverse Direction - 1800 CPM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
A - T	50,000	10,196,000	No failure
T	50,000	2,071,000	Failed in gauge section
T	40,000	2,177,000	Failed in gauge section
T	40,000	7,082,000	No failure
W	45,000	4,220,000	No failure

Fatigue Properties of L-605 AMS 5537A
0.080 In. Sheet at 1600°F
Stress Ratio A=0.67 Transverse Direction 1800 CPM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
A - T	30,000	1,477,000	Failed in gauge section
T		4,836,000	No failure
T		1,214,000	Failed in gauge section
W		2,269,000	Failed in gauge section
W		4,008,000	Failed in gauge section

Fatigue Properties of L-605 AMS 5759A
1.00 In. Bar at Room Temperature
Stress Ratio A=0.67 Longitudinal Direction 1800 CPM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
E	130,000	50,000	Failed in gauge section
	115,000	146,000	
	150,000	4,000	
	100,000	372,000	
	115,000	116,000	
	78,000	2,907,000	
	78,000	1,182,000	
	85,000	764,000	
	115,000	134,000	
	130,000	46,000	
	130,000	51,000	
	150,000	5,000	
	130,000	313,000	
	85,000	928,000	
	100,000	325,000	
	85,000	921,000	
	115,000	133,000	
	70,000	10,011,000	No failure Failed in gauge section
	85,000	1,077,000	
	100,000	437,000	
	78,000	1,524,000	
	150,000	6,000	
	100,000	398,000	
	120,000	64,000	
	85,000	926,000	
	130,000	52,000	
	78,000	1,448,000	
	78,000	1,983,000	
	100,000	284,000	
	115,000	147,000	

Fatigue Properties of L-605 AMS 5759A
1.00 In. Bar at 400°F
Stress Ratio A=0.67 Longitudinal Direction 1800 CPM

<u>Test Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
E	50,000	10,426,000	No failure
	70,000	10,020,000	
	70,000	10,080,000	
	100,000	1,000	Failed in gauge section
	80,000	8,278,000	
	90,000	2,986,000	
	90,000	416,000	
	90,000	3,186,000	
	85,000	6,849,000	
	80,000	9,900,000	
			No failure

Fatigue Properties of L-605 AMS 5759A
1.00' La. Bar at 800°F
Stress Ratio A=0.67 Longitudinal Direction 1800 CPM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
E	60,000	10,619,000	Failed in gauge section
	70,000	10,160,000	Failed in gauge section
	80,000	2,839,000	Failed in gauge section
	80,000		Broken installation
	80,000	10,256,000	Failed in gauge section
	70,000	9,925,000	Failed in gauge section
	80,000	2,163,000	Failed in gauge section
	80,000		Specimen improperly machined
	70,000	10,082,000	No failure
	68,000	10,019,000	No failure
	80,000	3,138,000	Failed in gauge section
	70,000	10,012,000	No failure

Fatigue Properties of L-605 AMS 3759A
 1.00 In. Bar at 1200°F
 Stress Ratio A=0.67 Longitudinal Direction 1800 CPM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
E	60,000	10,167,000	No failure
		14,844,000	No failure
		9,756,000	No failure
		3,307,000	Failed in gauge section
	45,000	10,026,000	No failure
	55,000	11,205,000	
	45,000	10,072,000	
	60,000	11,276,000	
	45,000	10,045,000	
	45,000	17,478,000	

Fatigue Properties of L-605 AMS 3759A
1.00 In. Bar at 1600°F
Stress Ratio A=0.67 Longitudinal Direction 1800 CPM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
E	40,000	400,000	Failed in gauge section
		400,000	
		480,000	
		422,000	
		430,000	
	30,000	6,116,000	
		5,876,000	
		8,222,000	
		9,145,000	
		7,272,000	

SECTION III - INCONEL 702 RAW DATA

3.1 Inconel 702 Static Test Data

STOCK SIZE	HEAT	STOCK IDENT	TEST TEMP °F	GRADE	TENSION			COMPRESSION		BENDING				REMARKS	
					ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	ELONG. IN (%)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	r D 1.5		r D 2.0		
											ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ULTIMATE STRENGTH (KSI)		0.2% OFFSET YIELD (KSI)
1/4"	A	10	RT	T	119.6	71.2	31.0	17.5							
		10		T	121.0	72.5	31.7	18.0							See Note 1.
		10		L	120.8	71.9	31.0	16.0							See Note 1.
		10		L	120.1	71.7	31.1	18.0							
		10		T	117.1	71.0	31.0	18.5							
		10		T	119.6	71.4	31.0	20.5							
		10		L	120.4	71.0	31.0	16.0							
		10		L	123.5	72.3	31.0	16.5							
		10		T	121.1	71.7	30.9	19.0							See Note 1.
		10		T	114.7	70.3	31.1	17.0							
		10		L	126.9	71.5	31.0	20.0							See Note 1.
		10		L	119.7	72.6	31.1	15.0							
		10		T	116.9	69.0	31.0	19.5							
		10		T	117.3	69.5	31.0	19.0							
		10		L	126.8	71.0	31.1	20.5							See Note 1.
		10		L	123.7	71.7	31.1	19.0							See Note 1.
		10		T	117.5	71.1	30.9	16.5							
		10		T	110.6	71.0	31.1	13.0							See Note 1.
		10		L	125.6	71.0	31.1	19.0							See Note 1.
		10		L	122.0	70.6	31.0	17.0							See Note 1.
		10		T	123.9	71.3	30.9	21.5							
		10		T	114.8	71.5	30.9	17.5							See Note 1.
		10		T	109.7	68.4	31.0	17.0							See Note 1.
		10		T	107.8	69.3	30.9	15.5							See Note 1.
		10		T	115.9	72.9	31.0	17.5							
		10		T	110.4	67.6	31.0	16.0							
		10		T	117.6	71.3	31.1	17.0							
1/4"	B	10		T	115.6	71.5	30.9	16.5							

MATERIAL: Inconel 702 AMS 5550

MATERIAL: Inconel 700 AMS 5550

NOTES: 1. Specimens broken off center.
2. Specimens broken outside gauge length.

STOCK SIZE	HEAT	STOCK IDENT	TEST TEMP OF	GRAB DIR	TENSION				COMPRESSION		DRAWING				SHEAR	REMARKS
					ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	ELONG IN (%)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	r D 15		r D 20			
											ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)		
0.005	C	0	RT	L	122.0	72.2	29.6	17.0								
					117.2	72.1	29.7	13.5								See Note 1.
					116.8	72.1	29.7	13.0								See Note 1.
					122.5	72.1	29.7	17.5								
			RT	L	122.5	70.1	29.7	18.0								See Note 2.
	A	30	700	T	107.2	70.2	30.1	17.5								See Note 2.
		20		T	100.4	62.2	29.9	18.5								See Note 2.
		30		T	95.7	62.8	29.6	15.0								
		40		T	102.8	63.7	29.9	19.0								
		50		T	96.4	62.2	30.1	15.5								
		10		L	96.7	63.2	30.1	13.0								
		20		L	93.8	59.3	30.0	13.0								See Note 2.
		30		L	93.2	57.5	30.1	17.0								See Note 1.
		40		L	91.9	60.0	30.0	12.7								See Note 2.
		50	700	L	95.0	60.4	29.8	14.5								See Note 2.
		10	800	L	99.2			15.5								
		20	1150	T	86.0	62.9	21.0	7.5								
		30		T	87.8	60.2	27.1	3.5								
		40		T	90.3	59.2	27.0	7.5								
		50		T	82.3	62.5	27.0	3.5								See Note 2.
		10		L	85.4	52.8	26.4	11.5								See Note 1.
		20		L	86.6	62.3	26.5	10.0								See Note 2.
		30		L	83.4	59.1	26.4	10.0								See Note 3.
		40	1150	L	87.3	56.8	26.4	12.0								See Note 2.
0.005	A	50	1200	L	83.8			8.0								

MATERIAL: Inconel 702, MB 5550

NOTES: 1. Specimen broke off center.
2. Break outside gauge length.
3. Specimen - double break.
4. Specimen - edge nicked.

STOCK SIZE	HEAT	STOCK IDENT.	TEST TEMP °F	GRAIN DIR.	TENSION				COMPRESSION		BEARING				SHEAR	REMARKS
					ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	ELONG IN. (%)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	e D : 1.5		e D : 2.0			
0.005"	A	10	1550	T												
		20		T	29.5	29.1	24.2	1.5								See Note 2.
		30		T	27.5	20.2	24.4	3.5								See Note 2.
		40		T	28.5		24.5	0								See Notes 1 and 2.
		50		T	49.4	44.6	24.5	3.5								
		30		L	33.5	30.9	25.0	6.0								
		20		L	24.5	10.1	24.9	0.0								
		30		L	23.0	22.2	24.9	4.0								
		40		L	32.4	29.7	25.1	1.5								See Note 1.
		50	1550	L	23.4	10.0	24.9	1.1								See Note 1.
		10	1500	T	14.0	6.7	21.1	9.0								
		20		T	12.0	0.1	20.9	0.5								
		30		T	13.6	9.1	20.9	13.0								
		40		T	10.3	7.3	21.0	12.5								
		50		T	12.2	9.4	21.0	10.0								
		10		L	12.9	0.6	21.1	10.0								
		20		L	14.7	9.3	21.0	11.0								
		30		L	12.0	7.3	21.0	17.0								
		40		L	13.9	0.7	21.0	10.5								
	0.005	A	50	1500	L	14.4	0.7	21.0	11.0							

MATERIAL: Inconel 706, AN 550

NOTES: 1. Specimen broke off center.
 2. Specimen broke outside of gauge length.
 3. Specimen - double break.
 4. Specimen - edged at head.

STOCK SIZE	HEAT	STOCK IDENT.	TEST TEMP OF	GRAB DIR.	TENSION				COMPRESSION		DRAWING				SHEAR	TYP. σ_y n UNS
					ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PBI $\times 10^{-6}$)	ELONG. IN (%)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PBI $\times 10^{-6}$)	r D 1.5		r D 2.0			
											ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)		
0.005	A	20	RT	T	105.3	73.5	31.1	10.5								100
		40			110.2	75.8	31.6	12.0								100
		50			107.5	76.5	32.0	10.0								500
		20			116.6	77.0	32.1	11.5 (1)								1000
		40			117.2	77.0	31.9	15.0 (1)								1000
		50			112.2	77.0	32.0	12.5 (1)								1000
		20			122.2	69.8	31.1	22.0								1000
		40			107.0	58.7	28.2	21.0								100
		50			115.1	69.3	31.9	16.5								100
		20			115.0	62.6	31.9	20.0								500
		40			118.0	62.8	32.0	20.5 (2)								500
		50			112.1	61.5	31.5	17.5								500
		20			111.2	55.6	31.0	21.0								1000
		40			105.5	51.7	31.4	21.0								1000
		50			104.3	49.2	31.1	21.5								1000
		20			100.4	50.0	31.0	26.0								1000
		40			96.2	48.9	31.1	27.5								10
		50			97.2	49.0	30.1	27.0								10
		20			97.0	43.5	32.5	20.6 (2)								10
		40			90.3	45.0	31.2	25.5 (2)								100
		50			86.5			20.0 (1)								100
		20			51.4	34.4	32.1	7.0								100
		40			57.0	36.9	32.1	9.0 (2)								500
		50			58.9	34.3	32.1	9.5								500
		20			49.0	31.1	32.1	14.5								500
		40			48.5	30.5	32.0	5.5								1000
0.005	A	40	RT	T	43.0	25.1	31.9	3.9								1000

MATERIAL: Inconel 703, AMS 5550

NOTES: 1. Specimen broke off center.
2. Specimen broke outside gauge length.
3. Extensometer slipped.
4. Specimen warped before test.

STOCK SIZE	HEAT	STOCK IDENT.	TEST TEMP °F	GRAIN DIR.	TENSION			COMPRESSION		BEARING				SHEAR	EXPOSURE
					ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	ELONG. IN. (%)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	0.2% OFFSET YIELD (KSI)		
0.005"	A	10	RT	↑	84.6	32.1	31.9	22.0							100
↑	↑	10	↑	↑	84.9	31.7	32.0	25.0							10
↑	↑	10	↑	↑	84.7	30.8	32.0	26.0							10
↑	↑	10	↑	↑	87.5	32.7	32.0	30.5							100
↑	↑	10	↑	↑	88.7	32.6	31.1	32.0							100
↑	↑	10	↑	↑	85.9	28.6	31.9	30.5							100
↑	↑	10	↑	↑	31.6			1.5 (1.0)							90
↑	↑	10	↑	↑	31.6			3.0 (1.0)							90
↑	↑	10	↑	↑	28.8			0 (1.0)							90
↑	↑	10	↑	↑											1000
↑	↑	10	↑	↑											1000
↑	↑	10	↑	↑	64.5	6.5	28.4	0.5							1000
↑	↑	10	↑	↑	32.5	11.9	31.8	2.0							1000
↑	↑	10	↑	↑	34.6	34.6	26.0	1.0							500
↑	↑	10	↑	↑	54.9	54.9	26.0	2.0							500
↑	↑	10	↑	↑	68.0	68.0	26.0	2.0							500
↑	↑	10	↑	↑	40.0	40.0	26.1	0.5							1000
↑	↑	10	↑	↑	58.6	54.6	26.1	1.0							1000
↑	↑	10	↑	↑	66.3	58.8	26.1	1.5							1000
↑	↑	10	↑	↑	30.0	31.5	25.1	1.0							100
↑	↑	10	↑	↑	34.5	31.5	25.0	1.5							100
↑	↑	10	↑	↑	54.8	31.5	24.9	2.5							100
↑	↑	10	↑	↑	31.0	29.3	24.1	3.0							500
↑	↑	10	↑	↑	30.4	26.7	24.0	5.5							500
↑	↑	10	↑	↑	25.9	21.9	24.1	3.5							500
↑	↑	10	↑	↑	34.8	34.8	25.0	2.0							1000
↑	↑	10	↑	↑	31.1	31.0	25.1	1.0							100
0.005"	A	50	1400	↑	27.0			5.0							1000

MATERIAL: Inconel 700, WBS 550

NOTES: 1. Specimen broke at center.
2. Specimen - double break.
3. Specimen broke in 2 places.

STOCK SIZE	HEAT	STOCK IDENT	TEST TEMP OF	GRAIN DIR.	TENSION			COMPRESSION		BEARING				SHEAR	REMARKS	
					ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁻⁶)	FLOING IN (%)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁻⁶)	c D 15		c D 20			
											ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)		ULTIMATE STRENGTH (KSI)
0.020	A	P	RT	T	147.7	89.7	32.0	31.5	96.1	30.0	227.6	141.5	281.4	154.2	108.1	
"	"	"	"	"	146.7	89.7	32.0	31.0	91.7	30.5	219.0	134.1	280.9	158.2	102.6	
"	"	"	"	"	147.2	88.1	32.0	31.0	91.5	30.4	216.5	130.0	277.1	160.0	106.7	
"	"	"	"	"	147.2	90.7	32.0	29.5	88.2	32.1	227.6	132.1	276.4	158.1	106.0	
"	"	"	"	"	147.2	89.6	32.1	30.5	95.1	29.0	212.2	129.6	278.4	159.1	107.8	
"	"	"	"	"					91.1	28.8						
"	"	"	"	"	147.2	85.7	31.7	34.5	87.4	31.2					108.1	
"	"	"	"	"	146.0	88.1	32.1	32.0	87.9	29.9					106.7	
"	"	"	"	"	146.7	86.9	32.1	32.0	88.4	30.1					106.0	
"	"	"	"	"	147.2	85.0	32.0	32.0	86.1	31.1					106.0	
"	"	"	"	"	146.1	86.0	32.0	32.0	85.9	31.0					109.1	
"	"	"	"	"	146.1	88.2	31.9	31.0	89.4	28.9	222.9	134.1	284.7	166.7	104.2	
"	"	"	"	"	139.2	89.4	31.9	31.5	90.1	30.1	211.4	131.1	269.5	164.8	110.1	
"	"	"	"	"	137.6	81.6	32.0	30.5	86.7	29.0	210.0	124.5	281.8	161.9	104.9	
"	"	"	"	"	136.2	81.4	31.9	31.0	87.0	29.6	219.0	131.4	280.0	158.1	107.4	
"	"	"	"	"					85.9	30.2	217.1	131.4	289.5	155.2	106.2	
"	"	"	"	"							220.0	129.5				
"	"	"	"	"	146.6	86.0	32.0	31.5	86.7	29.4					107.4	
"	"	"	"	"	147.1	85.8	32.0	31.5	89.5	29.1					106.2	
"	"	"	"	"	147.1	85.4	32.0	32.0	90.1	28.4					106.9	
"	"	"	"	"	147.6	84.5	32.0	31.0	87.4	29.7					107.6	
"	"	"	"	"	147.1	86.1	32.1	32.0	89.4	27.5						
"	"	"	"	"	141.1	88.2	32.0	32.0	91.5	29.7	221.9	140.8	277.8	158.0	92.9	NOTE (1)
"	"	"	"	"	141.7	85.9	32.0	31.0	87.9	29.5	221.0	139.1	281.8	167.4	91.9	NOTE (1)
"	"	"	"	"	141.1	85.0	32.0	31.5	86.9	30.5	205.7	135.2	280.0	161.8	94.0	NOTE (1)
"	"	"	"	"	142.7	84.9	31.9	32.0	90.0	30.8	224.8	141.9	306.0	177.0	89.9	NOTE (1)
"	"	"	"	"	142.4	84.8	32.0	31.0	89.4		221.8				97.1	NOTE (1)
"	"	"	"	"	155.4	99.0	34.7	29.5	89.0	30.8					130.7	

MATERIAL: 7075-T6 AL 5050

NOTES: (1) Shear Specimens - Not Heat Treated

STOCK SIZE	SEAT	STOCK IDENT	TEST TEMP °F	GRAIN DIR	TENSION			COMPRESSION			HEADING				REMARKS	
					ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ³)	ELONG IN (%)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ³)	D 15		D 20			
											ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)		
0.030	A	1	RT	1	118.1	82.5	32.7	30.0	85.6	29.0					116.1	
"	"	"	"	"	118.7	86.8	32.6	31.0	89.9	29.0					110.2	
"	"	"	"	"	118.6	81.7	32.2	31.5	86.0	31.2					116.1	
"	"	"	"	"	116.3	86.8	31.8	31.0	86.6	31.3					116.1	
"	"	"	"	"	113.6	88.8	32.0	29.0	92.1	30.2	218.0	118.2	298.0	375.0	92.2	NOTE (1)
"	"	"	"	"	113.6	86.8	32.0	28.5	87.2	30.8	212.1	118.2	272.6	367.6	85.6	NOTE (1)
"	"	"	"	"	113.1	86.8	32.0	32.0	80.8	30.5	222.6	113.0	277.1	369.6	86.8	NOTE (1)
"	"	"	"	"	112.2	86.1	32.0	32.0	87.8	30.6	218.0	110.0	255.2	367.6	85.2	NOTE (1)
"	"	"	"	"					80.1	28.8	230.0	112.0	271.6	359.2	87.8	NOTE (1)
"	"	"	"	"	112.1	100.6	36.1	32.0	93.6	30.8					116.1	
"	"	"	"	"	150.0	89.5	31.8	30.5	90.2	30.5					116.1	
"	"	"	"	"	153.0	91.1	31.8	30.0	88.8	30.3					116.0	
"	"	"	"	"	153.0	91.7	31.8	29.5	88.6	31.2					110.7	
"	"	"	"	"	118.1	91.1	32.0	30.5	88.8	30.0					107.1	
"	"	"	"	"	114.2	88.1	31.8	31.5	80.0	29.1	188.8	112.3	282.0	350.0	88.1	NOTE (1)
"	"	"	"	"	114.2	86.8	32.0	31.5	88.5	32.1	181.8	121.8	273.0	352.0	92.6	NOTE (1)
"	"	"	"	"	116.9	86.6	36.2	29.5	90.6	29.5	185.2	122.8	286.0	354.0	88.2	NOTE (1)
"	"	"	"	"	116.7	86.8	32.2	30.5	90.6	30.1	186.5	118.2	286.0	358.0	90.5	NOTE (1)
"	"	"	"	"	116.7	87.6	32.0	30.0					256.0	362.0	88.2	NOTE (1)
"	"	"	"	"	119.0	81.8	31.8	32.0	81.0	29.5					106.6	
"	"	"	"	"	118.9	81.9	31.9	31.0	83.6	31.6					107.6	
"	"	"	"	"	119.1	81.6	32.2	31.5	81.6						106.6	
"	"	"	"	"	118.1	81.2	32.2	31.0	81.6	30.0					105.1	
"	"	"	"	"	119.5	81.6	32.1	30.5							106.6	
"	"	"	"	"	116.5	86.6	32.0	31.0	88.1	28.5	203.0	121.0			86.8	NOTE (1)
"	"	"	"	"	116.7	88.2	32.0	30.5	87.8	30.6	208.0	125.0	276.0	352.0	85.8	NOTE (1)
"	"	"	"	"	116.2	81.8	31.5	30.5	89.6	30.1	209.0	130.0	288.0	355.0	88.6	NOTE (1)
"	"	"	"	"	116.0	85.8	31.8	32.0	80.1	30.3	208.0	128.0	257.0	350.0	81.0	NOTE (1)

MATERIAL: 1008103 MS 5550

NOTES: (1) Shear Specimens - Not Heat Treated

STOCK SIZE	HEAT	STOCK LENGTH	TEST TEMP °F	GRAB OR	TENSION			COMPRESSION			HEADING				REMARKS
					ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (10 ⁶ PSI)	ELONG. IN (%)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (10 ⁶ PSI)	D 15		D 20		SHEAR
											ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	
1/2"	A	8	600°	Y	124.0	71.9	21.0	36.5							100.4
"	"	"	"	Y	129.0	76.6	21.8	33.5							105.6
"	"	"	"	Y	121.0	73.2		31.5							
"	"	"	"	Y	116.5	68.1	20.5	36.0							
"	"	"	"	Y	122.6	72.9	21.7	36.5							
"	"	"	"	Y	126.1	76.1	22.0	33.5							
"	"	"	"	Y	122.2	73.1	21.6	36.0							
"	"	"	"	Y											
"	"	"	"	Y	122.1	72.8	21.6	35.5							
"	"	"	"	Y	126.1	73.2	20.8	31.5							
"	"	"	"	Y	115.2	72.5	21.6	34.5							
"	"	"	"	Y	116.1	73.8	22.5	34.5							
"	"	"	"	Y	116.7	73.1	20.1	30.0							
"	"	"	"	Y	112.5	70.1	19.8	27.0							
"	"	"	"	Y	111.8	70.5	20.0	34.0							
"	"	"	"	Y	116.0	72.1	20.8	31.5							
"	"	"	"	Y	105.1	61.2	22.5	36.0							
"	"	"	"	Y	115.7	71.1	22.2	31.5							
"	"	"	"	Y	111.8	68.6	22.6	34.0							
"	"	"	"	Y	111.2	71.1	21.2	28.5							
"	"	"	"	Y	99.2	61.6	25.8	31.0							
"	"	"	"	Y	72.1	61.2	26.2	36.5							
"	"	"	"	Y	72.1	65.9	35.7	3.0							
"	"	"	"	Y	77.9	66.8	35.2	3.5							
"	"	"	"	Y	79.7	71.9	36.1	3.5							
"	"	"	"	Y	74.5	67.4	24.5	3.5							
"	"	"	"	Y	70.1	61.2	17.6	3.5							
1/2"	A	8	1400°	Y	76.4	66.2	27.2	36.0							

MATERIAL: Tensile 102, 103, 104, 105

- NOTES
1. Tension Specimens - Rolled, surface of material third.
 2. Tension Specimens - Tensionometer aligned.
 3. Tension Specimens - Rolled in age hard.
 4. Tension Specimens - Rolled under a life of extension.

STOCK SIZE	HEAT	STOCK IDENT	TEST TEMP °F	GRAIN DIR	TENSION			COMPRESSION			DRAWING			REMARKS	
					ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	ELONG 2 IN (%)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	D 1.5		D 2.0		
											ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)			
1.00	A	1	RT	T	160.6	96.6	32.0	31.5	91.5	32.3	232.2	276.6	161.1	101.5	
"	"	"	"	T	160.6	96.6	32.0	31.5	89.5	31.8	232.5	276.1	160.2	101.5	
"	"	"	"	T	160.5	95.9	32.0	30.5	86.8	30.0	202.8	276.6	172.7	109.0	
"	"	"	"	T	159.8	95.9	32.0	32.0	87.4	30.0	221.7	290.6	155.2		
"	"	"	"	T	165.3	96.6	32.1	32.5	89.8	32.5	221.0	290.1	167.7	101.2	
"	"	"	"	T	159.6	95.6			88.6	31.0		276.5	166.8	107.2	
"	"	"	"	T	159.6	94.7	31.9	32.0	87.8	30.2	212.5	286.2	161.6	106.8	
"	"	"	"	T	159.6	95.6	31.9				165.0	286.1	165.8		
"	"	"	"	T	166.8	96.6	32.1	31.5	89.8	30.5	220.1	291.0	167.8	107.1	
"	"	"	"	T	158.8	93.5	32.0	31.5	86.1	31.1		261.7	166.2	110.0	
"	"	"	"	T	159.9	94.2	32.0	32.5	87.9	31.0	217.0	251.1	165.0	105.7	
"	"	"	"	T					87.0	31.0	221.0	286.0	167.0	101.8	
"	"	"	"	T	169.9	97.6	32.0	31.5	88.8	30.5	232.6	279.1	168.1	108.2	
"	"	"	"	T					89.7	27.8		232.0	173.5	106.6	
"	"	"	"	T	160.0	84.8	31.9	33.0	84.7	30.1	210.1	251.8	166.6	107.5	
"	"	"	"	T							236.2	276.5	170.6	108.1	
"	"	"	"	T	168.8	89.7	32.0	30.9			205.1	271.2	167.2	109.3	
"	"	"	"	T	169.3	92.1	32.0	30.5			222.2				
"	"	"	"	T	158.4	82.9	32.0	33.5	85.0	27.2	220.2	266.6	160.0	105.6	
"	"	"	"	T	161.6	85.1	31.9	32.0	84.2	22.5					
"	"	"	"	T	163.6	88.2	32.0	31.0	91.5	30.5	226.3	269.2	166.7	108.4	
"	"	"	"	T	162.4	86.3	32.0	31.0	89.5	30.2					
"	"	"	"	T	161.9	83.7	32.0	31.5	84.8	31.8	235.6	277.0	161.0	107.7	
"	"	"	"	T	161.2	84.2	32.0	30.5	83.4	30.8					
"	"	"	"	T	160.6	84.7	31.9	32.0	90.7	31.8	219.2	277.5	173.5	109.8	
"	"	"	"	T	161.2	86.2	32.1	31.0	92.4	30.1	215.2	269.6	171.0	109.0	
"	"	"	"	T	161.0	85.3	32.0	31.0	88.4	30.1	200.6	260.2	176.0	109.6	
0.661	2	1	RT	T	165.4	118.5	32.0	33.0	100.0	31.0	221.6	276.1	175.0	110.1	

MATERIAL: INCONEL 702 AMS 5502

MATERIAL: INCONEL 702, AMS 5520

NOTES:

STOCK SIZE	HEAT	STOCK IDENT.	TEST TEMP °F	GRADE	TENSION				COMPRESSION		BEARING				SHEAR	REMARKS
					ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	ELONG. 2 IN. (%)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	0.2% OFFSET YIELD (KSI)	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ULTIMATE STRENGTH (KSI)		
0.000	0	1	0	1	141.0	86.4	31.9	32.0	91.3	31.6	131.4	173.0	167.2			
0	0	0	0	0					90.7	32.0						
0	0	0	0	0												
0	0	0	0	0	142.7	86.9	31.9	33.5	102.0	31.9	135.6	179.9	164.1	160.4	111.1	
0	0	0	0	0	142.3	86.5	32.0	33.3	96.9	30.0	134.0	170.8	164.5	160.9	109.2	
0	0	0	0	0	143.7	87.3	31.9	33.9	91.3	29.0	135.0	173.0	166.2	167.3		
0	0	0	0	0	142.9	86.8	31.9	32.8	93.1	29.3	131.0	171.1	167.0	166.4		
0	0	0	0	0	142.7	86.4	31.9	32.5			131.0	171.1	167.0	166.4		
0	0	0	0	0	141.7	85.3	31.9	31.0	90.1	31.7	131.5	170.9	166.6	170.7	109.4	
0	0	0	0	0	141.4	87.4	31.9	32.0	91.0	31.0	131.5	170.9	166.6	170.7	109.2	
0	0	0	0	0	141.0	86.0	30.0	32.0	90.2	31.0	130.6	169.6	166.6	170.7	111.4	
0	0	0	0	0	141.7	87.5	31.9	32.0	90.8	31.7	131.0	170.9	166.6	170.7	111.4	
0	0	0	0	0	141.0	87.4	30.3		100.0	31.7	130.6	170.9	166.6	170.7	109.4	
0	0	0	0	0												
0	0	0	0	0	142.3	88.7	32.0	34.0	90.0	31.7	130.6	170.9	166.6	170.7	111.4	
0	0	0	0	0	142.7	88.3	31.9	33.0	89.9	29.0	131.5	170.9	166.6	170.7	111.4	
0	0	0	0	0	143.7	87.9	32.0	32.5	92.2	28.0	130.6	170.9	166.6	170.7	111.4	
0	0	0	0	0	143.0	89.0	30.0	31.5	89.4	30.4	131.5	170.9	166.6	170.7	111.4	
0	0	0	0	0					92.1	29.3						
0	0	0	0	0	142.9	85.2	31.9	31.5	88.1	30.4	131.5	170.9	166.6	170.7	109.4	
0	0	0	0	0	141.3	86.1	30.0	31.0	87.4	29.3	131.5	170.9	166.6	170.7	109.4	
0	0	0	0	0	141.5	85.4	30.0	31.0	91.0	29.9	131.5	170.9	166.6	170.7	109.4	
0	0	0	0	0	141.0	86.2	31.9	31.5	89.0	29.0	131.5	170.9	166.6	170.7	109.4	
0	0	0	0	0	141.9	85.7	31.9	32.0	89.3	29.0	131.5	170.9	166.6	170.7	109.4	
0	0	0	0	0												
0	0	0	0	0	142.3	86.1	31.0	31.5	88.6	31.2	131.5	170.9	166.6	170.7	109.4	
0	0	0	0	0	142.3	86.1	30.0	31.5	89.0	31.3	131.5	170.9	166.6	170.7	109.4	
0.000	0	1	0	1	142.8	86.5	31.0	31.0	89.1	29.4	131.5	170.9	166.6	170.7	109.4	

MATERIAL: INTEL 701 400 3114

NOTE:

STOCK SIZE	HEAT	STOCK IDENT	TEST TEMP °F	ORAB DOR	TENSION			COMPRESSION			HEATING			SHEAR	REMARKS
					ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	ELONG. IN (%)	0.2% OFFSET YIELD (KSI)	ELAS. MODULUS (PSI x 10 ⁶)	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	0.2% OFFSET YIELD (KSI)	ULTIMATE STRENGTH (KSI)	
A		n	400°F	T	131.7	78.0	28.5	37.0	79.6	30.0				283.0	156.5
B		n		T											97.0
C		n		T											283.0
D		n		T											283.0
E		n		T											283.0
F		n		T											283.0
G		n		T											283.0
H		n		T											283.0
I		n		T											283.0
J		n		T											283.0
K		n		T											283.0
L		n		T											283.0
M		n		T											283.0
N		n		T											283.0
O		n		T											283.0
P		n		T											283.0
Q		n		T											283.0
R		n		T											283.0
S		n		T											283.0
T		n		T											283.0
U		n		T											283.0
V		n		T											283.0
W		n		T											283.0
X		n		T											283.0
Y		n		T											283.0
Z		n		T											283.0
AA		n		T											283.0
AB		n		T											283.0
AC		n		T											283.0
AD		n		T											283.0
AE		n		T											283.0
AF		n		T											283.0
AG		n		T											283.0
AH		n		T											283.0
AI		n		T											283.0
AJ		n		T											283.0
AK		n		T											283.0
AL		n		T											283.0
AM		n		T											283.0
AN		n		T											283.0
AO		n		T											283.0
AP		n		T											283.0
AQ		n		T											283.0
AR		n		T											283.0
AS		n		T											283.0
AT		n		T											283.0
AU		n		T											283.0
AV		n		T											283.0
AW		n		T											283.0
AX		n		T											283.0
AY		n		T											283.0
AZ		n		T											283.0
BA		n		T											283.0
BB		n		T											283.0
BC		n		T											283.0
BD		n		T											283.0
BE		n		T											283.0
BF		n		T											283.0
BG		n		T											283.0
BH		n		T											283.0
BI		n		T											283.0
BJ		n		T											283.0
BK		n		T											283.0
BL		n		T											283.0
BM		n		T											283.0
BN		n		T											283.0
BO		n		T											283.0
BP		n		T											283.0
BQ		n		T											283.0
BR		n		T											283.0
BS		n		T											283.0
BT		n		T											283.0
BU		n		T											283.0
BV		n		T											283.0
BW		n		T											283.0
BX		n		T											283.0
BY		n		T											283.0
BZ		n		T											283.0
CA		n		T											283.0
CB		n		T											283.0
CC		n		T											283.0
CD		n		T											283.0
CE		n		T											283.0
CF		n		T											283.0
CG		n		T											283.0
CH		n		T											283.0
CI		n		T											283.0
CJ		n		T											283.0
CK		n		T											283.0
CL		n		T											283.0
CM		n		T											283.0
CN		n		T											283.0
CO		n		T											283.0
CP		n		T											283.0
CQ		n		T											283.0
CR		n		T											283.0
CS		n		T											283.0
CT		n		T											283.0
CU		n		T											283.0
CV		n		T											283.0
CW		n		T											283.0
CX		n		T											283.0
CY		n		T											283.0
CZ		n		T											283.0
DA		n		T											283.0
DB		n		T											283.0
DC		n		T											283.0
DD		n		T											283.0
DE		n		T											283.0
DF		n		T											283.0
DG		n		T											283.0
DH		n		T											283.0
DI		n		T											283.0
DJ		n		T											283.0
DK		n		T											283.0
DL		n		T											283.0
DM		n		T											283.0
DN		n		T											283.0
DO		n		T											283.0
DP		n		T											283.0
DQ		n		T											283.0
DR		n		T											283.0
DS		n		T											283.0
DT		n		T											283.0
DU		n		T											283.0
DV		n		T											283.0
DW		n		T											283.0
DX		n		T											283.0
DY		n		T											283.0
DZ		n		T											283.0
EA		n		T											283.0
EB		n		T											283.0
EC		n		T											283.0
ED		n		T											283.0
EE		n		T											283.0
EF		n		T											283.0
EG		n		T											283.0
EH		n		T											283.0
EI		n		T											283.0
EJ		n		T											283.0
EK		n		T											283.0
EL		n		T											283.0
EM		n		T											283.0
EN		n		T											283.0
EO		n		T											283.0
EP		n		T											283.0
EQ		n		T											283.0
ER		n		T											283.0
ES		n		T											283.0
ET		n		T											283.0
EU		n		T											

STOCK SIZE	HEAT	STOCK IDENT	TEST TEMP °F	GRAIN DIR	TENSION			COMPRESSION		BENDING				SHEAR	REMARKS
					0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	ELONG IN (%)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	r D 15		r D 20			
										ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)		
1/2"	A	P	1000°F	L	121.1	26.6	38.0	80.4	27.1	186.1	126.7	215.2	134.2		
"	"	F	"	T	135.9	24.1	37.5	86.0	28.9	175.6	123.4	214.9	127.1	90.7	
"	"	F	"	L	123.2	21.3	38.5	78.6				222.5	152.1		
"	"	"	"	T	121.8	24.2	38.5	88.7	28.9			214.0	152.1	92.1	
"	"	L	"	L	122.0	24.2	36.5	74.7	28.2	182.7	130.8	220.1	151.0		
"	"	H	"	T				86.2	29.0	181.0	134.0			92.4	
"	"	H	"	L						186.1	134.0				
"	"	J	"	T	123.4	28.7	36.0	89.3	29.1	185.1	129.6	264.0	159.0		
"	"	T	"	L				76.9	28.2	184.7	132.8	211.0	157.5		
"	"	A	"	T	121.5	31.2	39.5	88.7	29.2			229.2	153.2	91.1	
"	"	A	1000°F	L						186.7	134.8	215.3	155.6		
"	"	H	1000°F	T	120.2	24.4	27.0	82.4		172.8	123.0	212.0	146.7	88.2	
"	"	D	"	L	115.8	27.9	34.5	95.7		171.6	126.7	211.0	147.0		
"	"	F	"	T				88.4		171.6	126.7	211.0	147.0		
"	"	F	"	L	116.1	26.9	35.2	76.7		174.5	127.9			84.7	
"	"	G	"	T	121.8	22.8	31.5	109.1		169.8	118.0	217.0	161.0		
"	"	C	"	L	118.0	32.9	31.5	74.4		172.8	127.4	216.0	164.0		
"	"	H	"	T	109.2	23.8	34.0	103.1		169.5	125.7	224.2	159.5	90.5	
"	"	H	"	L	119.7	27.4	35.5			175.4	130.1	213.0	149.4		
"	"	J	"	T	120.0	28.3	31.5	98.0		176.2	128.3	219.3	174.8	89.9	
"	"	T	"	L				75.9				228.0	151.0		
"	"	K	"	T										84.8	
"	"	A	1000°F	L											
"	"	D	1200°F	T	99.0	28.3	9.0	81.8		169.7	125.4	211.0	151.1		
"	"	D	"	L	97.3	21.0	8.5	87.8		148.5	125.0	184.4	156.6	67.2	
"	"	L	"	T	101.5	22.7	32.6			148.3	130.0				
"	"	T	"	L						136.6	122.2	171.1	129.2	64.2	
"	"	A	1200°F	T	109.1	30.2	16.0	84.5		140.2	119.0	180.0	131.5		

MATERIAL: TITANIUM 90-10

NOTES:

STOCK SIZE	GREAT	STOCK IDENT	TEST TEMP OF	GRAM TEMP DOL	TENSION			COMPRESSION		BENDING				SHEAR	REMARKS	
					ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PBI x 10 ⁻⁶)	ELONG. IN (%)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PBI x 10 ⁻⁶)	r D 15		r D 20			
											ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ULTIMATE STRENGTH (KSI)			0.2% OFFSET YIELD (KSI)
0.060	A	0	1600	L	29.6	27.5	18.8	17.5	13.7	57.6	51.0	75.0	68.0			
		B		T	35.7	34.6	18.6	22.0		72.5	59.1	64.0	55.2	23.2		
		B		L						59.8	26.7	80.7	56.9			
		J		T	12.6	16.5	15.2	11.0 (1)								
		J		L	18.2	15.1	19.1	99.0 (2)	12.6	61.5	42.9	71.0	59.5			
		J		L	26.6	26.3	21.7	38.5 (2)								
		K		T	25.0	23.2	18.9	14.6 (2)	18.8			61.0	56.8			
		K		T												
		K		L	28.6	28.2	28.5	32.0	13.7	59.8	41.1	71.9	60.5			
		K		L					15.2							
		P	1600	T	12.6	8.7	8.2	61.0 (1)		18.7	16.8	22.4	20.7			
		P		L					8.6	20.2	18.3	21.8	17.8			
		P		T	13.2	9.7	9.8	79.0		18.5	16.7	22.1	18.7			
		P		L					8.7	21.0	18.3	22.8	17.9			
		Q		T					9.1			22.7	20.5			
		Q		L	10.6	9.1	11.8	68.5	8.4			21.8	18.3			
		R		T	11.0	9.7	8.1	71.5	8.5	19.5	18.5			10.7		
		R		T										10.8		
		S		L	8.8	7.6	10.9	58.5 (1)	8.2							
		J		T					9.1	20.3	17.5	21.2	18.3	16.0		
		J		T					8.8					7.4		
		J		L	9.4	8.3	10.4	66.5		20.4	18.8	24.0	21.2			
		J		L	10.2	8.3	17.2	57.5								
		K		T	10.4	8.0	8.7	67.5	8.6	20.3	19.5	22.0	18.3	20.0		
		B		T	12.3	8.8	7.3	60.8 (2)								
0.060	A	K	1800	L	10.1	7.9	9.2	67.5	8.7	38.5	15.9	22.9	19.3			

MATERIAL: Inconel 702, AISI 5550

NOTES: (1) Tension Specimens: Filled outside of middle third.
(2) Tension Specimens: Filled under knife edge of extensometer

* Additional 1000th specimens on last sheet.

STOCK SIZE	HEAT	STOCK IDENT	TEST TEMP °F	GRAMS DUN	TENSION			COMPRESSION		BENDING			SHEAR	TEMP. °F (MIN.)
					ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	ELONG. IN (%)	0.2% OFFSET YIELD (KSI)	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	0.2% OFFSET YIELD (KSI)		
0.00	A	P	RT	Y	139.9	86.0	32.0	31.5						1,000
		1			140.2	87.7	32.1	31.5						1,000
		J			140.0	87.0	32.0	32.0						1,000
		J			137.8	86.8	31.9	32.3						1,000
		P			140.5	87.9	32.4	31.0						1,000
		E			139.5	87.1	31.5	31.5						1,000
		J			141.7	89.4	32.0	32.0						1,000
		E			141.9	88.7	32.0	32.5						1,000
														1,000
		E			150.0	100.0	32.1	31.0						1,000
		E			150.0	99.0	32.0	30.0						1,000
														1,000
		D			149.4	90.3	31.3	29.5	100.9	32.0			115.3	1,200
		P			149.7	86.3	32.0	29.0		28.7	156.3			1,200
		J								237.0	152.7			1,200
		E								240.0	166.5		108.9	1,200
		E							101.6	31.9				1,200
		E			131.1	66.3	32.0	33.0						1,000
		J			129.8	66.5	32.0	32.0						500
		E			131.8	66.5	32.0	32.5						500
		D							86.3	32.0				500
		O			140.0	75.0	32.0							1,000
		H			139.7	75.0	32.1	29.5						1,000
		J							86.6	32.0			103.6	1,000
		E											105.7	1,000
		P			113.6	52.7	32.0	33.0						1,000
		J			114.4	53.7	32.1	30.0						1,000
0.00	A		RT	Y										1,000

MATERIAL: Inconel 700 HAS 5550

NOTES: 1. Tension

STOCK SIZE	HEAT	STOCK IDENT	TEST TEMP °F	GRAIN DIR	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ³)	ELONG IN (%)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ³)	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	TEMP. (°F)	THICKNESS (IN.)
1.000	A	D	RT	T		59.0	29.7								1600	100
		F														
		H			119.6	59.1	30.1	60.0	58.2	29.9						
		J							59.6	29.8						
		K			119.6	57.3	31.9	60.0								1.0
		D									152.0	67.5				500
		F			119.9	56.5	31.8	57.0 ⁽¹⁾	62.7	32.3						
		H			119.6	54.2	30.0	57.0 ⁽¹⁾								
		J							59.6	30.6						
		D			111.0	50.0	32.0	58.5 ⁽¹⁾			149.8	68.8				
		F							57.8	31.3	175.0	68.5				500
		H			110.6	47.6	31.5	59.5 ⁽¹⁾	67.3	32.0	190.8	90.8				1070
		J							63.4	32.0						
		D							65.6	32.0						
		F			109.2	49.8	31.9	59.0 ⁽¹⁾								
		H									166.1	93.4				
		J			110.0	48.3	32.1	61.0 ⁽¹⁾			161.0	79.5				
		D			110.9	49.8	32.0	67.0 ⁽¹⁾								1000
		F			110.3	47.6	32.0	64.0 ⁽¹⁾	65.4	30.0						
		H							68.3	29.9						
		J							69.3	29.1	168.5	111.4				
		D									168.6	117.4				10
		F			113.0	56.0	31.9	64.5 ⁽¹⁾	64.7	29.2						
		H			110.5	52.9	32.0	65.5 ⁽¹⁾			171.0	93.3				100
		J							64.6	29.0	196.3	106.5				
		D							64.0	28.2						100
		F							58.8	31.6						500
2.000	A	D	RT	T											1600	500

MATERIAL: 7050-T6 ALUMINUM

NOTES: 1. Tension specimen - Edge round
2. Tension specimen -

STOCK SIZE	HEAT	STOCK IDENT	TEST TEMP °F	GRAIN DIR	TENSION				COMPRESSION		BENDING				BENDING TEMP (°F)
					ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	ELONG IN (%)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	
2.000	A	1	70	↑					99.5	30.1					1000
		2	↑	↑											1000
		3							99.5	31.2					1000
		4			119.5	60.2	32.0	35.5	99.2	32.0				91.6	1000
		5			119.6	61.3	31.8	35.5						91.1	1000
		6			118.9	59.9	32.2	35.9	99.4	32.0					
		7		↑											
2.000	B	1	70	↑					99.7	32.0					1000
		2							99.7	32.0					1000
0.000	A	1	600	↑	139.7	80.7		33.8							1000
		2	600	↑	139.8	79.5		33.8							1000
		3	600												
		4	600		139.8	79.8		35.5							1000
		5	600		139.5	77.7		35.0							1000
		6	600												1000
		7	600		139.6	79.3		35.0							1000
		8	600		139.9	79.4		35.5							1000
		9	600												1000
		10	1000		139.1	79.9		35.5 (1)							1000
		11	1000		139.4	80.2		35.5							1000
		12	1000												1000
		13	1200		91.1	78.6		40.0 (2)			149.1	127.6			1200
		14	1200						77.8	35.3	149.2	126.6			1200
		15	1200								152.2	126.8		51.4	1200
		16	1200		89.7	79.9		35.5							1200
		17	1200		89.9	77.9		40.0 (2)							1200
		18	1400		57.8	56.6		37.5 (2)						50.8	1400
2.000	A	1	1400	↑	92.0			35.5 (1)							1400

MATERIAL: 1045 STEEL

NOTES: 1. Tension specimen - 90° end excessive elongation after
2. Tension specimen - failed outside of gage length

STOCK SIZE	HEAT	STOCK IDENT.	TEST TEMP. °F	GRAIN DIR.	TENSION			COMPRESSION			BENDING				SHEAR	TENSILE YIELD (KSI)	
					ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	ELONG IN (%)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	R D 1 1/2		R D 2 0				
											ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)			
0.000	A	1	1400	T	70.1	54.9		9.0(8)								1400	500
		2	1400	T					54.2	21.4							1400
		3	1402	T	54.2	-		1.4(1.4)									
		4	1400	T	66.4	56.9		3.0(8)	51.9	22.2					51.1		
		5	1400	T	67.3	56.1		4.5(8)									
		6	1400	T					71.9	23.7					51.7	1400	
		7	1400	T	21.1	17.1		57.9(8)									
		8	1400	T	37.6	26.1		37.5									
		9	1400	T	36.0	25.1		29.5									
		10	1400	T	37.9	24.5		27.5(8)			44.7	41.5					
		11	1400	T	23.0	17.6		53.5			43.9	41.9			23.5		
		12	1400	T	22.6	17.2		51.0							24.2		
		13	1400	T					13.9	16.1							
		14	1400	T					20.7	15.8							
		15	1400	T	25.2	18.2		40.0(11)			44.4	43.9			23.2	1400	
		16	1400	T	24.0	19.5		46.5(8)									
		17	1400	T							44.9	39.9			26.0		
		18	1400	T	21.5	14.8		33.5(8)									
		19	1400	T					18.6	14.4							
		20	1400	T					17.6	7.1							
		21	1400	T	23.6	19.6		35.5(8)	18.1	23.5					21.9	1400	
		22	1400	T					17.6	(1)							
		23	1400	T							41.1	39.0			23.5		
		24	1400	T	25.1	23.5		33.5(8)									
		25	1400	T	19.9	19.6		36.0(8)			41.4	39.5				1400	
		26	1400	T	11.7	9.1		29.0	7.6	2.1						1400	
		27	1400	T					7.4	2.7					11.9	1400	
		28	1400	T					8.4	1.7					11.4	1400	

MATERIAL: ALUMINUM 6061 T6

NOTES: 1. Tension specimen - showed excessive alligatored at extensometer
2. Tension specimen - failed under 1-1/2% edge of extensometer
3. Compression specimen - modulus underlined

**ROOM TEMPERATURE TRANSVERSE TENSILE PROPERTIES OF
COLD ROLLED INCONEL 702 SHEET**

<u>Heat</u>	<u>Gage</u>	<u>F_{cy} (PSI)</u>	<u>F_{tu} (PSI)</u>	<u>Elong. (% in 2")</u>
5805D	.020	81,000	138,000	30
3957	.025	91,000	152,000	29
4218		82,000	140,000	29
4549		84,000	144,000	34
4805		93,000	153,000	30
5651		84,000	146,000	34
5653		79,000	137,000	33
5804		82,000	141,000	34
6312		79,500	140,000	34
6313		81,000	141,000	35
5649	.031	76,000	138,000	32
5804		79,000	142,000	37
6312		100,000	169,000	34
6314		78,000	139,500	34
6312	.032	85,000	145,000	35
6316		75,500	135,000	35
4548	.034	77,000	136,000	35
3966	.045	88,000	147,000	33
4798		83,000	140,000	37
5804		81,000	138,000	37
5806		82,000	140,000	37
5805	.050	80,000	138,000	36
3047	.062	96,000	152,000	30
5807	.125	90,000	139,000	35
5807	.250	76,500	134,000	46
6943		86,000	139,000	38

This data submitted by Huntington Alloys Product Division.
The International Nickel Company Inc. The heat treatment was as follows

Mill Annealed at 2000°F
Plus Age at 1400°F for 5 hours - Air cool

3.2 Inconel 702 Creep Data

Inconel 702-248 .005 in.
E3LAZ-8 Sheet
40,000 psi @ 1200° F

Stress, psi	Strain-%

0	0.0
40,000	0.700

Hours	Total Plastic Strain-%

0.0	0.0
0.3	
0.6	0.020
1.3	0.009
2.1	0.027
3.2	0.033
4.3	0.040
5.5	0.044
22.1	0.085
41.3	Rupture

Inconel 702-239 .005 in.
E31AZ-6 Sheet
48,000 psi @ 1200° F

Stress, psi	Strain-%
0	0.0
48,000	0.197

Hours	Total Plastic Strain-%
0.0	0.0
0.3	0.015
0.5	0.027
1.0	0.031
1.6	0.034
3.2	0.046
18.9	
Rupture	

Inconel 702-236 .005 in.
E3TAZ-12 Sheet
3,500 psi @ 1400° F

Stress, psi	Strain-%

0	0.0
3,500	0.044

Hours	Total Plastic Strain-%

0.0	0.0
0.3	0.005
1.4	0.0007
2.4	0.0005
3.6	0.011
20.3	0.027
27.1	0.023
44.1	0.042
71.7	0.060
92.3	0.111
116.2	0.101
141.0	0.080
163.8	0.022
188.9	0.089
212.2	0.043
235.5	0.022
260.2	0.068
283.9	0.066

Inconel-702-249. .005 in.
 E3LAZ-9 Sheet
 9,000 psi @ 1400° F

Stress, psi	Strain-%
0	0.0
9,000	-.009

Hours	Total Plastic Strain %	Hours	Total Plastic Strain %
0.0	0.0	718.0	0.040
0.4	0.0004	741.8	0.049
0.7	-.0004	769.1	0.051
1.1	0.002	793.0	0.047
2.0	-.003	813.5	0.055
3.0	-.006		
4.0	-.005		
4.6	-.008		
5.6	-.004		
21.6	0.008		
46.2	-.014		
69.9	-.011		
97.1	-.013		
121.0	-.015		
143.8	0.020		
165.7	-.013		
190.6	-.009		
216.0	-.011		
238.1	-.007		
262.3	0.002		
286.2	0.0001		
311.3	0.008		
335.0	0.0009		
358.1	0.013		
383.8	0.015		
407.3	0.013		
435.5	0.018		
457.0	0.020		
479.9	0.018		
502.9	0.023		
525.6	0.026		
551.6	0.029		
575.2	0.035		
597.8	0.039		
622.3	0.045		
647.6	0.032		
670.7	0.031		
695.2	0.038		

Inconel 702-240 .005 in.
E3LAZ-11 Sheet
17,500 psi @ 1400° F

Stress, psi	Strain-%

0	0.0
17,500	0.128

Hours	Total Plastic Strain-%

0.0	0.0
0.2	0.003
0.5	0.012
1.3	0.018
2.2	0.026
3.0	0.031
4.2	0.039
20.7	0.078
29.2	0.091
45.3	0.118
64.5	Rupture

Inconel 702-244 .005 in.
E3LAZ-10 Sheet
30,000 psi @ 1400° F

Stress, psi	Strain-%
0	0.0
30,000	0.115

Hours	Total Plastic Strain-%
0.0	0.0
0.1	0.017
0.3	0.031
0.7	0.048
1.1	0.066
2.1	0.103
2.9	0.121
4.2	0.169
5.9	0.226
13.3	Rupture

Inconel 702-237 .005 in.
E3LAZ-13 Sheet
4,250 psi @ 1600° F

Stress, psi	Strain-%

0	0.0
4,250	0.275

Hours	Total Plastic Strain-%

0.0	0.0
0.3	0.016
0.6	0.013
2.1	0.021
3.0	0.096
19.0	0.091
43.3	0.102
69.8	0.113
99.2	0.212
116.7	0.258
138.9	0.352
163.1	0.403
187.0	0.490
212.1	0.635
218.4	0.643
237.4	0.723
260.5	0.867
286.2	0.987
288.2	1.035

Discontinued

Inconel 702-250 .005 in.
E3LAZ-16 Sheet
4,500 psi @ 1600° F

Stress, psi	Strain-%

0	0.0
4,500	0.021

Hours	Total Plastic Strain-%

0.0	0.0
0.2	0.009
0.5	0.010
1.2	0.004
1.6	0.004
2.4	0.015
3.7	0.008
4.6	0.011
6.1	0.022
23.3	0.038
30.1	0.048
48.3	0.069
54.1	0.083
70.2	0.093
96.2	0.132

Discontinued

Inconel-702-241 .005 in.
E3LAZ-14 Sheet
7,000 psi @ 1600° F

Stress, psi	Strain-%
0	0.0
7,000	0.003

Hours	Total Plastic Strain %
0.0	0.0
0.2	0.008
0.5	0.020
1.7	0.036
2.9	0.054
4.1	0.074
5.3	0.091
21.5	0.195
46.7	0.401
52.8	0.449
69.6	0.588
93.5	0.859
100.9	0.970
117.7	1.263

Inconel 702-245 .005 in.
E31AZ-15 Sheet
7,000 psi @ 1600° F

Stress, psi	Strain-%

0	0.0
7,000	0.322

Hours	Total Plastic Strain-%

0.0	0.0
0.5	0.044
0.9	0.052
1.3	0.050
1.9	0.059
2.5	0.068
19.1	0.169
44.6	0.297
64.1	Rupture

Inconel-702-253 .005 in.
E3LAZ-3 Sheet
8,000 psi @ 1600° F

Stress, psi	Strain-%
0	0.0
8,000	0.031

Hours	Total Plastic Strain %
0.0	0.0
0.3	0.021
1.0	0.054
1.9	0.088
3.0	0.111
4.7	0.154
20.9	0.531
28.2	0.755
32.9	1.003
37.4	Rupture

Inconel-702-247 .005 in.
 E3 laz-20 Sheet
 500 psi @ 1800° F

Stress, psi	Strain-%
0	0.0
500	0.009
Hours	Total Plastic Strain %
0.0	0.0
0.3	0.008
0.6	0.006
1.3	0.008
2.2	0.010
3.1	0.014
19.7	0.047
43.9	0.059
67.7	0.070
93.3	0.080
116.6	0.086
140.0	0.094
165.5	0.101
189.0	0.110
217.0	0.118
238.7	0.133
262.1	0.144
284.5	0.157
308.0	0.166
333.3	0.171
357.0	0.192
379.3	0.206

Incone!-702-238 .005 in.
 E3 laz-17 Sheet
 750 psi @ 1800° F

Stress, psi	Strain-%
0	0.0
750	0.009
Hours	Total Plastic Strain %
0.0	0.0
0.4	-.007
0.8	0.0008
1.7	-.005
2.9	-.002
19.7	0.016
46.8	0.044
70.7	0.073
93.7	0.081
115.5	0.107
140.4	0.136
165.8	0.166
187.9	0.198
212.1	0.216
235.8	0.244
261.5	0.256
284.8	0.279
307.8	0.292
333.6	0.313
357.2	0.332
385.3	0.356
406.9	0.372
429.7	0.395
452.8	0.414
475.5	0.422
501.5	0.451
525.1	0.457
547.6	0.485
571.9	0.503
597.3	0.540
620.3	0.522
644.8	0.521
667.5	0.557
691.5	0.567
718.8	0.584
742.6	0.592
763.2	0.604

Inconel-702-242 .005 in.
 E3LAZ-18 Sheet
 900 psi @ 1800° F

Stress, psi	Strain-%
0	0.0
900	0.013

Hours	Total Plastic Strain-%
0.0	0.0
0.3	0.004
0.6	0.008
1.0	0.009
1.4	0.010
20.7	0.055
45.1	0.080
68.6	0.108
90.8	0.137
115.0	0.157
138.0	0.172
163.6	0.178
185.9	0.198
210.9	0.219
233.6	0.238
257.8	0.250
283.0	0.274
306.1	0.289
330.7	0.301

Inconel-702-246
E3LAZ-19
1,000 psi • 1800° F

.005 in.
Sheet

Stress, psi Strain-%

0 0.0
1,000 0.030

Hours	Total Plastic Strain %	Hours	Total Pl Strain
0.0	0.0	834.9	0.84
0.3	0.003	862.2	0.85
0.6	0.006	886.1	0.86
1.3	0.039	906.8	0.87
2.4	0.048		
20.8	0.110		
43.0	0.142		
69.1	0.179		
92.0	0.219		
114.8	0.239		
138.8	0.246		
163.6	0.265		
190.1	0.300		
213.9	0.324		
237.0	0.356		
259.0	0.376		
282.7	0.403		
309.2	0.429		
331.3	0.464		
355.5	0.490		
379.4	0.508		
405.0	0.534		
428.2	0.554		
451.6	0.561		
477.1	0.563		
500.7	0.588		
528.7	0.606		
550.3	0.632		
573.8	0.657		
596.1	0.675		
619.6	0.697		
645.0	0.722		
668.7	0.720		
691.0	0.751		
715.4	0.753		
740.6	0.763		
762.8	0.780		
787.9	0.788		
811.1	0.834		

Inconel 702-254 .005 in.
E3LAZ-4 Sheet
2,500 psi @ 1800° F

Stress, psi	Strain-%

0	0.0
2,500	0.031

Hours	Total Plastic Strain-%

0.0	0.0
0.3	0.053
1.1	0.143
1.7	0.203
2.2	0.245
3.0	0.304
3.6	0.340
4.7	0.410
21.2	1.060

Discontinued

Inconel 702-854 .020 in.
E2TAZ-1G Sheet
9,000 psi @ 1400° F

Stress, psi	Strain-%

0	0.0
9,000	0.031

Hours	Total Plastic Strain-%

0.0	0.0
0.2	0.001
0.5	0.001
1.8	0.006
2.9	0.005
5.6	0.005
21.4	0.013
46.0	0.014
71.3	0.019
94.8	0.024
118.5	0.024
144.1	0.035
166.8	0.041
191.0	0.050
218.2	0.046
237.5	0.050

Discontinued

Inconel 702 .020 in.
E3TAZ-4F Sheet
15,000 psi @ 1400° F

Stress, psi	Strain - %
0	0.0
15,000	0.056

Hours	Total Plastic Strain-%
0.0	0.0
0.2	0.015
0.5	0.019
0.8	0.026
1.9	0.031
2.7	0.033
3.6	0.036
4.6	0.038
22.5	0.071
46.7	0.100
70.8	0.132
94.2	0.156
119.6	0.193
142.9	0.239
167.6	0.302
186.4	Rupture

Inconel 702-843 .020 in.
E2TAZ-2F Sheet
20,000 psi @ 1400° F

Stress, psi	Strain-%

0	0.0
20,000	0.095

Hours	Total Plastic Strain-%

0.0	0.0
0.4	0.010
0.8	0.016
1.7	0.027
2.9	0.031
4.1	0.034
4.7	0.044
21.2	0.097
45.8	0.191
64.4	Rupture

Inconel 702-188 .020 in.
 E3TAZ-6 Sheet
 20,000 psi @ 1400° F

Stress, psi	Strain-%.
0	0.0
20,000	0.113
Hours	Total Plastic Strain-%
0.0	0.0
0.3	0.015
1.3	0.031
2.1	0.036
3.5	0.042
4.6	0.052
5.1	0.051
21.6	0.081
29.0	0.096
45.5	0.139
58.2	Rupture

Inconel 702-186 .020 in.
E3TAZ-3G Sheet
25,000 psi @ 1400° F

Stress, psi	Strain-%
0	0.0
25,000	0.125
Hours	Total Plastic Strain-%
0.0	0.0
0.2	0.014
0.5	0.023
1.9	0.038
2.7	0.044
3.3	0.045
4.2	0.048
22.1	0.155
29.1	0.211
45.2	0.364
52.5	Rupture

Inconel 702 .020 in.
E3TAZ-3F Sheet
25,000 psi @ 1400° F

Stress, psi	Strain-%

0	0.0
25,000	0.125

Hours	Total Plastic Strain-%

0.0	0.0
0.4	0.010
0.8	0.044
1.5	0.056
2.6	0.077
3.6	0.081
5.2	0.105
6.2	0.115
22.9	0.240
23.8	Rupture

Inconel 702 .020 in.
E2TAZ-1F Sheet
650 psi @ 1800° F

Stress, psi	Strain-%
0	0.0
650	-.006

Hours	Total Plastic Strain-%

0.0	0.0
0.3	0.005
1.0	0.010
1.5	0.008
2.5	0.008
3.6	0.009
4.6	0.012
21.4	0.024
28.3	0.031
45.2	0.032
72.3	0.035
93.4	0.039
117.3	0.052
142.1	0.061
164.9	0.070
190.1	0.080
213.4	0.092
236.5	0.114
261.3	0.122
285.0	0.138
309.2	0.155
334.1	0.169
357.4	0.197
381.1	0.211
407.8	0.236
430.8	0.243
453.4	0.268
477.1	0.283
502.1	0.306

Discontinued

Inconel-702 .020 in.
 E2TAZ-2G Sheet
 650 psi @ 1300° F

Stress, psi	Strain-%
0	0.0
650	0.006

Hours	Total Plastic Strain %
0.0	0.0
0.4	0.011
1.2	0.014
2.6	0.020
3.9	0.019
4.7	0.017
21.1	0.020
23.5	0.044
45.1	0.053
70.4	0.066
93.0	0.102
116.6	0.124
140.7	0.148
166.4	0.174
190.2	0.209
213.3	0.230
237.4	0.272
250.0	0.306
286.0	0.337
311.8	0.369
333.0	0.395

Inconel 702 .020 in.
E2TAZ-4F Sheet
900 psi @ 1800° F

Stress, psi	Strain-%
0	0.0
900	0.001

Hours	Total Plastic Strain-%
0.0	0.0
0.2	0.002
1.1	0.007
2.0	0.011
2.9	0.018
21.3	0.033
43.2	0.110
69.5	0.142
94.3	0.185
117.2	0.234
139.7	0.285
164.3	0.336
Discontinued	

Inconel 702 .020 in.
 E3TAZ-3F Sheet
 1,000 psi @ 1800° F

Stress, psi	Strain-%
0	0.0
1,000	0.088
Hours	Total Plastic Strain-%
0.0	0.0
0.3	0.001
1.0	0.010
1.8	0.010
3.2	0.006
4.6	0.022
21.1	0.032
46.1	0.037
69.4	0.123
93.8	0.185
119.0	0.235
141.8	0.294
166.1	0.358
192.1	0.423
213.9	0.485
239.9	0.575
264.0	0.620
286.5	0.684
309.5	0.765
333.9	0.829
358.2	0.911
382.4	0.983
386.5	1.005
Discontinued	

Inconel-702 .020 in.
E2TAZ-3G Sheet
1,250 psi @ 1800° F

Stress, psi

0
1,250

Strain-%

0.0
0.009

Hours

0.0
0.4
0.9
1.5
2.2
18.4
42.9
66.5
91.1
115.4
140.9
164.6

Total Plastic
Strain-%

0.0
-.001
0.001
0.006
0.009
0.057
0.146
0.263
0.390
0.684
0.865
1.025

Inconel 702 .020 in.
E3TAZ-2F Sheet
1500 psi @ 1800° F

Stress, psi	Strain-%

0	0.0
1,500	0.026

Hours	Total Plastic Strain-%

0.0	0.0
0.2	0.005
1.3	0.015
2.2	0.023
3.1	0.031
4.0	0.043
4.8	0.047
24.2	0.193
48.2	0.505
75.9	0.954
93.1	1.450

Discontinued

.020 in.
Sheet

E3TAZ-1F
2,000 psi @ 1800° F

Stress, psi	Strain-%

0	0.0
2,000	0.099

Hours	Total Plastic Strain-%

0.0	0.0
0.1	0.011
0.4	0.028
1.5	0.064
2.5	0.007
3.3	0.111
4.7	0.151
21.3	0.404
29.0	0.895
45.0	1.822

E2 TAZ 6K .040 in.
Sheet

40,000 psi @ 1200° F

Stress-psi	Strain - %	Hours	Total Plastic Strain-%
0	0.0		
10,050	0.006	573.8	0.110
15,050	0.009	596.8	0.114
20,050	0.064	622.1	0.118
40,000	0.150	646.2	0.125
		668.9	0.126
		690.0	0.126
		717.0	0.127
		741.9	0.130
		765.0	0.128
		789.7	0.128
		814.2	0.132
		836.9	0.134
		859.7	0.137
		885.7	0.146
		909.6	0.147
		934.5	0.147
		957.8	0.151
		982.1	0.152
		1005.6	0.150
Hours	Total Plastic Strain-%		
0.0	0.0		
0.3	0.003		
1.1	0.008		
1.7	0.009		
2.5	0.012		
3.0	0.014		
19.9	0.031		
45.0	0.045		
67.4	0.047		
92.6	0.057		
116.7	0.057		
141.9	0.063		
164.7	0.069		
191.5	0.076		
212.1	0.074		
239.0	0.077		
261.4	0.079		
285.4	0.089		
309.7	0.088		
332.6	0.096		
354.6	0.099		
380.6	0.100		
405.8	0.101		
429.4	0.099		
452.9	0.101		
478.7	0.082		
501.1	0.106		
526.7	0.106		
551.1	0.101		

Inconel 702 .040 in.
E2TAZ-20 Sheet
45,000 psi @ 1200° F

Stress, psi	Strain-%
0	0.0
45,000	0.179

Hours	Total Plastic Strain-%
0.0	0.0
0.3	0.018
0.9	0.024
1.7	0.034
2.7	0.035
19.2	0.057
44.2	0.077
69.6	0.098
92.0	0.115
117.0	0.118
141.6	0.137
164.3	0.154
186.9	0.158
212.0	0.171
235.7	0.187
258.7	0.196
284.4	0.205
306.9	0.222
331.7	0.230
356.1	0.245
380.7	0.260
403.9	0.287
427.5	0.306
433.4	0.308

Discontinued

Inconel 702 .040 in.
 E3TAZ-1F Sheet
 50,000 psi @ 1200° F

Stress, psi	Strain - %
0	0.0
10,050	0.044
15,050	0.071
20,050	0.097
25,050	0.124
50,000	0.244

Hours	Total Plastic Strain - %
0.0	0.0
0.4	0.003
1.0	0.010
1.7	0.018
2.2	0.020
2.9	0.025
21.3	0.088
45.4	0.137
68.7	0.168
95.0	0.217
117.6	0.263
141.8	0.306
169.7	0.356
188.2	0.396
213.3	0.457
236.5	0.516
263.4	0.598
283.9	0.672
309.6	0.772
332.8	0.866
356.4	0.978
381.5	1.096

Inconel 702 .040 in.
E2TAZ-1K Sheet
60,000 psi @ 1200° F

Stress, psi	Strain-%
0	0.0
10,000	0.027
20,000	0.068
30,000	0.119
60,000	0.241

Hours	Total Plastic Strain-%
0.0	0.0
0.2	0.002
0.4	0.019
0.7	0.012
1.0	0.014
1.5	0.016
3.1	0.045
19.3	0.136
44.3	0.257
69.0	0.376
92.2	0.521
115.5	0.704
138.9	0.923
164.1	1.238
Discontinued	

Inconel 702 .040 in.
E3TAZ-1G Sheet
60,000 psi @ 1200° F

Stress, psi	Strain-%

0	0.0
15,000	0.059
25,000	0.103
35,000	0.141
60,000	0.243

Hours	Total Plastic Strain-%

0.0	0.0
0.3	-.001
0.7	0.013
1.6	0.017
2.7	0.029
19.5	0.120
44.5	0.252
68.8	0.419
91.7	0.591
116.1	0.883
142.2	1.390

Discontinued

Inconel 702 .040 in.
 E2TAZ-9D Sheet
 15,000 psi @ 1400° F

Stress - psi Strain - %

0	0.0
15,000	0.099

Hours Total plastic strain - %

0.0	0.0
0.3	0.001
0.9	0.0003
2.3	0.004
3.4	0.002
21.7	0.0009
27.3	0.006
46.5	0.031
69.5	0.067
96.1	0.081
116.6	0.091
143.3	0.099
164.0	0.111
189.9	0.122
212.1	0.132
237.6	0.146
285.0	0.172
307.9	0.195
334.1	0.207
357.6	0.233
383.3	0.251
405.8	0.274
431.2	0.297
455.6	0.309
475.9	0.343
501.4	0.367
526.9	0.389
548.1	0.431
572.2	0.485
594.1	Rupture
2.1%	Elongation

Inconel 702 .040 in.
E3TAZ-40 Sheet
20,000 psi @ 1400° F

Stress, psi	Strain-%
0	0.0
20,000	0.098

Hours	Total Plastic Strain - %
0.0	0.0
0.2	0.005
0.6	0.010
0.9	0.015
1.2	0.025
2.2	0.025
3.0	0.031
4.0	0.037
4.9	0.037
22.7	0.081
47.0	0.120
71.1	0.150
94.4	0.177
119.8	0.243
143.1	0.307
167.7	Rupture

Inconel-702 .040 in.
 E2TAZ-1 G Sheet
 22,500 psi @ 1400° F

Stress, psi	Strain-%
0	0.0
22,500	0.099

Hours	Total Plastic Strain %
0.0	0.0
0.3	0.012
0.6	0.023
1.3	0.023
1.9	0.025
3.0	0.032
21.0	0.098
49.0	0.201
70.7	0.294
94.0	0.454
114.7	rupture

Inconel-702 .040 in.
 E2TAZ-1D Sheet
 22,500 psi @ 1400° F

Stress, psi	Strain-%
0	0.0
22,500	0.086

Hours	Total Plastic Strain-%
0.0	0.0
0.2	0.009
0.9	0.026
1.8	0.037
3.3	0.046
4.4	0.046
20.8	0.082
44.7	0.135
68.9	0.194
93.0	0.266
117.2	0.362
141.9	0.510
165.4	0.945
166.5	Rupture

Inconel-702 .040 in.
E2TAZ-1 J Sheet
25,000 psi @ 1400° F

Stress, psi	Strain-%
0	0.0
25,000	0.097

Hours	Total Plastic Strain-%
0.0	0.0
0.2	0.012
0.8	0.022
1.9	0.028
3.4	0.041
5.3	0.046
23.0	0.120
45.9	0.228
69.3	0.349
93.5	0.657
114.2	rupture

Incoenl 702 .040 in.
E2TAZ-1F Sheet
4,000 psi @ 1600° F

Stress, psi	Strain-%

0	0.0
4,000	0.030

Hours	Total Plastic Strain-%

0.0	0.0
0.2	0.007
0.6	0.025
1.5	0.037
2.6	0.036
3.4	0.056
20.1	0.071
44.7	0.126
67.9	0.148
91.7	0.183

Discontinued

Inconel 702 .040 in.
 E2TAZ16K Sheet
 5,000 psi @ 1600° F

<u>Stress - psi</u>	<u>Strain - %</u>
0	0.0
5,000	0.028

<u>Hours</u>	<u>Total Plastic Strain - %</u>
0.0	0.0
0.2	0.004
0.6	0.005
1.2	0.009
2.0	0.014
2.7	0.015
19.4	0.033
44.6	0.060
66.9	0.094
92.1	0.143
116.1	0.187
141.3	0.245
164.1	0.301
191.0	0.385
211.6	0.459
238.4	0.588
260.9	0.705
284.9	0.861
309.1	1.059
332.1	1.314
354.2	1.619
380.1	2.403
405.3	3.043
428.9	4.272
452.2	5.682
576.6	Discontinued

Inconel 702 .040 in.
 E3TAZ-1K Sheet
 7000 psi @ 1600° F

Stress, psi	Strain - %
0	0.0
7,000	0.039
Hardness	Total Plastic Strain - %
0.0	0.0
0.6	0.0004
0.8	0.0002
1.7	0.0002
2.3	0.001
21.9	0.109
26.2	0.151
43.4	0.283
69.4	0.660
74.4	0.775
93.2	1.331
Discontinued	

Inconel 702 .040 in.
 E3TAX-3G Sheet
 10,000 psi @ 1600° F

<u>Stress - psi</u>	<u>Strain - %</u>
0	0.0
10,000	0.051

<u>Hours</u>	<u>Total Plastic Strain - %</u>
0.0	0.0
0.2	0.011
0.8	0.031
1.4	0.048
1.9	0.060
2.8	0.075
3.3	0.085
22.2	0.697
24.0	0.807
26.0	0.984
26.8	1.050
27.4	1.113
38.1	Rupture
4.6%	Elongation

Inconel-702 .040 in.
E2TAZ-1H Sheet
500 psi @ 1800° F

Stress, psi	Strain - %	Hours	Total Plastic Strain-%
0	0.0	690.5	0.240
500	0.001	717.7	0.251
		741.5	0.260
	Total Plastic Strain - %	764.9	0.271
Hours		788.4	0.275
		813.7	0.286
0.0	0.0	835.8	0.296
0.2	0.0	857.3	0.305
1.0	0.002	886.2	0.317
1.8	0.003	910.7	0.333
2.6	0.003	934.1	0.336
3.2	0.003	957.6	0.344
18.0	0.007	982.0	0.346
45.0	0.009	1004.9	0.362
69.9	0.008		
92.9	0.013		
117.6	0.017		
142.2	0.017		
164.8	0.027		
187.7	0.037		
213.7	0.045		
237.6	0.050		
262.4	0.063		
285.8	0.068		
309.9	0.069		
333.1	0.074		
359.3	0.080		
381.9	0.090		
406.1	0.099		
434.0	0.107		
452.6	0.120		
477.6	0.126		
500.8	0.135		
527.7	0.144		
548.2	0.156		
574.0	0.171		
597.1	0.179		
620.7	0.188		
645.7	0.210		
669.7	0.222		

Inconel 702-871 .040 in.
E2TAZ-1H Sheet
1350 psi @ 1800° F

Stress, psi	Strain-%

0	0.0
1,350	0.021

Hours	Total Plastic Strain-%

0.0	0.0
0.2	-.002
0.8	0.0007
1.7	0.004
2.4	0.009
3.4	0.011
19.6	0.045
44.5	0.125
68.3	0.220
91.5	0.330
117.1	0.444
140.4	0.580
164.1	0.710
188.7	0.872
213.3	0.997
217.7	1.015
Discontinued	

Inconel 702 .040 in.
 E2TAZ-17K Sheet
 2,000 psi @ 1800° F

<u>Stress - psi</u>	<u>Strain - %</u>
0	0.0
2,000	0.036
<u>Hours</u>	<u>Total Plastic Strain - %</u>
0.0	0.0
0.2	0.005
0.7	0.032
1.3	0.035
2.1	0.048
20.7	0.158
26.1	0.215
43.5	0.402
49.9	0.489
66.8	0.750
92.1	1.168
114.5	1.649
139.5	2.228
163.7	2.823
501.2	Discontinued

Inconel 702-874 .040 in.
E2TAZ-2G Sheet
850 psi @ 1800° F

Stress, psi	Strain-%
0	0.0
850	0.019

Hours	Total Plastic Strain-%
0.0	0.0
0.6	0.003
1.6	0.002
3.0	0.006
4.2	0.011
21.0	0.025
28.6	0.037
44.3	0.057
68.9	0.058
92.7	0.082
116.4	0.100
Discontinued	

3.3 Inconel 702 Stress Rupture Data

Stress Rupture Properties of Inconel 702 AMS5550
0.005 Inch Sheet - Heat A

<u>Test Temp., °F</u>	<u>Grain Dir.</u>	<u>Specimen Ident.</u>	<u>Stress (ksi)</u>	<u>Life-Hours</u>	<u>Percent Elong.</u>	<u>Remarks</u>
1200	L	10	80.0	0.5	4.7	
	L	3	34.0	23.0	2.1	
	L	9	60.0	1.1	3.1	
	L	11	46.0	3.9	2.5	
1200	L	12	40.0	11.5	1.8	
1400	L	13	27.0	7.0	2.5	
	L	14	35.0	0.3	2.5	
	L	16	20.0	61.0	1.2	
	L	17	24.0	22.3	1.1	
	L	4	17.8	268.0	1.8	
	L	15	30.0	2.5	1.4	
1400	L	18	40.0	1.4	2.0	
1600	L	24	8.0	161.2	3.5	
	L	1	10.0	0.4	1.2	
	L	19	10.0	25.5	3.6	
	L	20	25.0	0.1	1.8	
	L	21	20.0	0.5	2.7	
	L	22	12.0	12.1	3.5	
1600	L	23	15.0	3.0	4.6	
1800	L	30	5.0	10.4	9.3	
	L	25	2.0	346.4	7.7	
	L	26	13.0	0.025	5.1	
	L	27	3.6	17.7	5.9	
	L	28	3.6	1.8	1.5	
1800	L	29	8.0	1.7	9.8	

(cont.)

Stress-Rupture Properties of Inconel 702, AMS 5550
0.040 Inch Sheet - Heat A

<u>Test Temp. °F</u>	<u>Grain Dir.</u>	<u>Specimen Ident.</u>	<u>Stress (ksi)</u>	<u>Life- Hours</u>	<u>Per Cent Elong.</u>	<u>Remarks</u>
1800	T	17J	9.8	0.3	60.5	Discontinued
		18J	6.1	2.8	41.0	
		20J	4.92	9.6	34.4	
		19XJ	2.95	282.9	68.3	
		19K	11.0	0.2	50.0	
		18K	8.4	0.9	71.5	
		20K	4.6	21.6	40.5	
		17K	2.0	501.2		
	L	8D	10.0	0.3	78.8	
		5D	8.0	0.9	9.4	
		6D	7.0	1.9	18.8	
		7D	4.7	21.3	40.5	
		7F	13.0	0.1	74.4	
		5F	6.0	3.2	36.5	
		8F	4.0	23.9	37.9	
		6F	3.75	60.0	48.0	
		7G	7.9	0.8	59.8	
		3G	5.0	26.9	31.0	
		2G	11.0	0.2	54.8	
		6G	7.0	1.5	29.4	
		3G	3.8	33.0	42.0	
		6H	4.9	7.4	30.4	
		5H	3.8	111.1	72.0	
		11XH	3.0	241.0	39.9	
		28H	2.7	300.8	9.8	
		6J	14.0	0.1	96.5	
		8J	8.5	0.4	54.1	
		7J	7.7	1.1	39.8	
		3J	3.0	68.0	82.0	
		5J	4.4	12.3	68.7	
		6K	6.8	7.5	35.6	
		5K	6.0	4.0	37.8	
		8K	4.8	10.0	11.5	
		7K	3.0	140.2	72.1	

(cont.)

Stress-Rupture Properties of Inconel 702, AMS 5550
0.040 Inch Sheet - Heat A

<u>Test Temp. °F</u>	<u>Grain Dir.</u>	<u>Specimen Ident.</u>	<u>Stress (ksi)</u>	<u>Life- Hours</u>	<u>Per Cent Elong.</u>	<u>Remarks</u>		
1600	T	14XF	25.0	0.2	19.9			
		13F	12.1	14.0	6.8			
		16F	9.0	66.7	4.1			
		12F	8.4	106.0	8.1			
		16G	18.2	1.2	13.7			
		14G	17.0	3.9	12.6			
		13G	110.5	54.2	5.9			
		E3-30	10.5	38.1	4.6			
		13H	27.0	0.6	16.1			
		12H	8.2	96.3	16.9			
		14H	7.0	142.9	10.5			
		16XH	12.0	19.7	5.7			
		13J	29.0	0.1	24.4			
		14J	17.7	18.0	13.9			
		12J	13.0	18.7	9.9			
		16J	12.8	4.7	8.0			
		14K	23.0	0.4	19.8			
		13K	17.5	2.4	13.4			
		12K	10.0	35.0	12.0			
		1K	7.0	93.8				
		16K	5.0	576.0		Discontinued		
		1800		17D	10.0	0.4	47.8	
				19D	8.5	1.0	66.5	
				18D	7.0	37.4	44.5	
				20D	6.2	2.6	33.1	
				17F	12.0	0.1	74.0	
18F	5.0			5.9	28.6			
19F	3.0			94.8	49.0			
20G	8.45			1.0	48.0			
17G	4.4			9.8	59.3			
18G	3.5			39.9	21.0			
19G	2.5			665.0		Discontinued		
30	4.0			33.1	43.4			
17H	8.6			0.6	49.2			
18H	6.0			3.8	34.8			
1H	0.5			1004.9	-			

(cont.)

Stress-Rupture Properties of Inconel 702, AMS 5550
0.040 Inch Sheet - Heat A

<u>Test Temp. °F</u>	<u>Grain Dir.</u>	<u>Specimen Ident.</u>	<u>Stress (ksi)</u>	<u>Life- Hours</u>	<u>Per Cent Elong.</u>	<u>Remarks</u>
1400	T	9H	80.0	0.1	4.5	
		8H	37.5	12.9	3.0	
		10H	26.0	67.0	3.1	
		E3-4H	8.0	981.0	-	
		9J	79.0	0.033	9.2	
		10J	60.0	0.7	9.9	
		11J	25.0	131.3	2.2	
		10K	55.0	1.7	4.5	
		11K	50.0	2.1	6.8	
		8K	39.0	8.0	2.7	
		9K	30.0	28.6	4.4	
	L	1D	57.0	1.0	1.6	
		2D	48.0	2.6	4.1	
		4D	44.0	3.9	7.1	
		3D	38.0	17.0	6.6	
		2F	74.0	0.1	7.6	
		3F	66.0	0.5	3.8	
		1F	40.0	6.7	7.0	
		4F	29.0	57.7	2.9	
		4G	72.0	16.4	7.6	
		1G	56.0	0.9	6.0	
		12G	20.0	241.1	5.4	
		5G	30.0	40.0	3.6	
		2H	37.0	16.4	3.1	
		7H	62.0	0.5	8.6	
		4H	31.0	31.0	2.8	
		1H	27.0	173.7	1.8	
1600	T	3H	38.5	10.8	3.4	
		3J	67.0	0.3	9.5	
		2J	45.0	5.0	7.4	
		1J	39.0	12.0	6.5	
		4J	30.0	70.7	4.2	
		1K	70.0	0.3	6.3	
		2K	58.0	0.9	4.7	
		3K	23.0	272.3	2.0	
		12D	30.0	0.1	14.2	
		13D	20.0	0.5	12.4	
		16D	16.0	1.9	18.5	
		14D	11.0	20.2	7.2	

Stress-Rupture Properties of Inconel 702, AMS 5550
0.040 Inch Sheet - Heat A

<u>Test Temp. °F</u>	<u>Grain Dir.</u>	<u>Specimen Ident.</u>	<u>Stress (ksi)</u>	<u>Life-Hours</u>	<u>Per Cent Elong.</u>	<u>Remarks</u>
1200	T	4D	85.0	0.016	6.1	
		6D	80.0	7.8	4.2	
		5D	75.0	40.6	4.1	
		3D	70.0	46.4	4.2	
		5F	98.0	0.1	13.6	
		3F	90.0	1.2	5.8	
		6F	84.0	1.7	3.7	
		4F	68.0	69.0	4.4	
		E3-1F	50.0	381.5	-	
		4G	98.0	0.1	3.7	
		5G	82.0	3.6	4.6	
		6G	64.0	94.1	3.5	
		6H	94.0	0.7	9.4	
		5H	91.0	1.0	6.7	
		11H	55.0	310.8	2.5	
		3H	80.0	4.3	4.8	
		4H	79.0	26.0	4.4	
		5J	79.2	18.0	5.0	
		6J	78.4	28.1	4.8	
		4J	96.0	0.1	12.8	
		3K	92.2	0.7	13.0	
		5K	85.0	2.7	6.8	
		4K	64.0	95.9	4.2	
		6K	40.0	1005.9	-	Discontinued
1400	T	8D	60.0	0.8	9.6	
		10D	38.0	44.0	3.3	
		11D	33.0	24.0	4.2	
		E3-4D	20.0	157.7	-	
		9D	15.0	594.1	-	Discontinued
		10F	69.8	0.2	4.1	
		11F	65.0	0.3	4.7	
		9F	36.5	13.3	6.6	
		8F	27.0	93.0	2.6	
		10G	70.0	0.3	4.4	
		8G	58.0	0.7	7.7	
		11G	46.0	4.2	6.6	
		9G	31.0	26.7	3.5	
		12G	20.0	241.1	5.4	

Stress-Rupture Properties of Inconel 702, AMS 5550
0.020 Inch Sheet - Heat A

<u>Test Temp. °F</u>	<u>Grain Dir.</u>	<u>Specimen Ident.</u>	<u>Stress (ksi)</u>	<u>Life- Hours</u>	<u>Per Cent Elong.</u>	<u>Remarks</u>
1200	T	5F	90.5	0.1	8.1	
	T	11F	85.0	0.9	5.1	
	T	6F	70.0	23.6	2.8	
	T	5G	78.0	4.8	2.8	
	T	6G	61.0	89.1	2.3	
1400	T	7F	58.0	0.3	3.3	
	T	9F	40.0	5.4	2.2	
	T	E3-4F	15.0	18.64	-	
	T	7G	36.0	12.4	1.4	
	T	8G	26.5	66.3	2.5	
1600	T	12F	21.0	0.2	5.2	
	T	10F	14.0	8.1	5.6	
	T	12G	11.0	22.9	4.6	
	T	14G	13.0	4.5	15.3	
	T	10F	8.0	51.0	5.4	
1800	T	11G	15.0	0.7	13.7	
	T	13F	8.0	0.1	67.8	
	T	15F	4.0	32.6	60.0	
	T	E3-1F	2.0	45.0	-	
	T	14F	3.3	206.9	98.6	
	T	13G	5.0	7.9	33.3	
	T	4G	6.2	2.6	35.0	

3.4 Inconel 702 Fatigue Properties

Fatigue Properties of Inconel 702 AMS 5550 - 0.040 Inch Sheet
 At Room Temperature - Stress Ratio A = 0.25
 Transverse Direction - 1800 CPM

Heat Number	Maximum Stress (psi)	Number of Cycles	Remarks
A-D	115,200	1,054,000	Failed in gauge section
F		639,000	
H		641,000	
G		475,000	
K		711,000	
D	129,600	466,000	
G		489,000	
K		415,000	
J		353,000	
F		363,000	
K	103,680	1,296,000	
H		1,089,000	
J		3,274,000	
G		1,414,000	
D		1,665,000	
J	140,400	236,000	
K		167,000	
D		190,000	
F		140,000	
H		100,000	
K	90,000	10,000,000	No failure
J		3,982,000	Failed in gauge section
H		10,000,000	No failure
G		1,115,000	Failed in gauge section
F		1,726,000	
J	135,360	231,000	
F	135,360	145,000	
H	84,000	10,000,000	
D		10,000,000	
G		10,000,000	

Fatigue Properties of Inconel 702 AMS 5550 - 0.040 Inch Sheet
At 600°F - Stress Ratio A = 0.25
Transverse Direction - 1800 CPM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
A-J	74,000	1,645,000	No failure
K		1,014,000	
D		1,000,000	
F		1,005,000	
G		1,001,000	

Fatigue Properties of Inconel 702 AMS 5550 - 0.040 Inch Sheet
 At 1000°F - Stress Ratio A = 0.25
 Transverse Direction - 1800 CPM

Heat Number	Maximum Stress (psi)	Number of Cycles	Remarks
A-J	79,000	1,710,000	No failure
F		1,000,000	
H		1,000,000	
G		1,000,000	
K		1,000,000	

Fatigue Properties of Inconel 702 AMS 5550 - 0.040 Inch Sheet
 At 1000°F - Stress Ratio A = 0.25
 Transverse Direction - 3600 CPM

Heat Number	Maximum Stress (psi)	Number of Cycles	Remarks
A-F	50,500	3,679,000	No failure
G	55,000	1,002,000	
H		5,010,000	
J		4,121,000	
K		1,001,000	

Fatigue Properties of Inconel 702 AMS 5550 - 0.040 Inch Sheet
 At 1200°F - Stress Ratio A = 0.25
 Transverse Direction - 1800 CPM

Heat Number	Maximum Stress (psi)	Number of Cycles	Remarks
A-K	80,000	1,523,000	No failure
G		1,040,000	
F		1,000,000	
D		1,000,000	
J		1,000,000	

Fatigue Properties of Inconel 702 AMS 5550 - 0.040 Inch Sheet
At 1200°F - Stress Ratio A = 0.25
Transverse Direction - 3600 CPM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
A-J	55,000	3,466,000	No failure
G		1,006,000	
F		3,598,000	
D		1,013,000	
K		3,535,000	

Fatigue Properties of Inconel 702 AMS 5545 - 0.040 Inch Sheet
 At 1400°F - Stress Ratio A = 0.25
 Transverse Direction - 1800 CPM

Heat Number	Maximum Stress (psi)	Number of Cycles	Remarks
A-G	65,500	160,000	Failed in gauge section
R	65,500	98,000	Failed in gauge section
J	47,000	1,249,000	Failed in gauge section
F	47,000	1,015,000	No Failure
H	47,000	1,000,000	No Failure

Fatigue Properties of Inconel 702 AMS 5550 - 0.040 Inch Sheet
At 1400°F - Stress Ratio A = 0.25
Transverse Direction - 3600 CPM

<u>Test Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
A-K	55,000	336,000	Failed in gauge section
J	50,000	966,000	Failed in gauge section
G	50,000	340,000	Failed in gauge section
F	47,000	1,463,000	Failed in gauge section
H	47,000	1,014,000	No failure

Fatigue Properties of Inconel 702 AMS 5550 - 0.040 Inch Sheet
 At 1800°F - Stress Ratio A = 0.25
 Transverse Direction - 1800 CPM

Heat Number	Maximum Stress (psi)	Number of Cycles	Remarks
A-G	8,000	1,170,000	No failure
F		1,000,000	
D			
K			
J			

Fatigue Properties of Inconel 702 AMS 5550 - 0.040 Inch Sheet
At Room Temperature - Stress Ratio A = 0.67
Transverse Direction - 1800 CPM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
A-K	115,200	578,000	Failed in gauge section
J		83,000	
D		90,000	
G		77,000	
H		74,000	
D	129,600	62,000	
F		42,000	
K		47,000	
J		45,000	
G		30,000	
F	86,400	358,000	
D		350,000	
H		499,000	
K		306,000	
G		318,000	
F	79,200	773,000	
K		589,000	
D		617,000	
H		783,000	
G		475,000	
K	64,800	10,000,000	No failure
J			
H			
G			
F			

Fatigue Properties of Inconel 702 AMS 5550 - 0.040 Inch Sheet
 At 400°F - Stress Ratio A = 0.67
 Transverse Direction - 1800 CPM

Heat Number	Maximum Stress (psi)	Number of Cycles	Remarks
A-J	77,500	840,000	Failed in gauge section
H	77,500	417,000	
G	74,500	199,000	
D	77,500	1,278,000	
F	70,000	2,398,000	
K	65,000	10,000,000	No failure
H			
D			
G			

Fatigue Properties of Inconel 702 AMS 5550 - 0.040 Inch Sheet
At 600°F - Stress Ratio A = 0.67
Transverse Direction - 1800 CPM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of cycles</u>	<u>Remarks</u>
A-H	74,000	1,481,000	No failure
D		1,000,000	
F		1,000,000	
G		1,000,000	
J		1,000,000	

Fatigue Properties of Inconel 702 AMS 5550 - 0.040 Inch Sheet
 At 800°F - Stress Ratio A = 0.67
 Transverse Direction - 1800 CPM

Heat Number	Maximum Stress (psi)	Number of Cycles	Remarks
A-G	74,000	891,000	Failed in gauge section
K		2,351,000	
J		179,000	Failed in gauge section Specimen bent
D		232,000	Failed in gauge section Specimen pitted in gauge area.
F		2,295,000	No failure
D	67,000	10,000,000	
K		4,866,000	
F		10,000,000	
G			
H			

Fatigue Properties of Inconel 702 AMS 5550 - 0.040 Inch Sheet
At 1000°F - Stress Ratio A = 0.67
Transverse Direction - 1800 CPM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
A-F	79,000	1,441,000	No Failure
G		1,000,000	
H			
J			
K			

Fatigue Properties of Inconel 702 AMS 5550 - 0.040 Inch Sheet
 At 1200°F - Stress Ratio A = 0.67
 Transverse Direction - 1800 CPM

Heat Number	Maximum Stress (psi)	Number OF Cycles	Remarks
A-D	81,000	508,000	Failed in gauge section
G		13,000	
G		3,400,000	
F	65,000	333,000	No failure
F		10,000,000	
H		10,000,000	

Fatigue Properties of Inconel 702 AMS 5550 - 0.040 Inch Sheet
At 1400°F - Stress Ratio A = 0.67
Transverse Direction - 1800 CPM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
A-D	65,600	5,000	Failed in gauge section
J	58,000	388,000	
G	49,000	549,000	
K	44,000	326,000	
F			Overloaded
F		867,000	Failed in gauge section

Fatigue Properties of Inconel 702 AMS 5550 - 0.040 Inch Sheet
 At 1600°F - Stress Ratio A = 0.67
 Transverse Direction - 1800 CPM

Heat Number	Maximum Stress (psi)	Number of Cycles	Remarks
A-K	26,000	50,000	Failed in gauge section
K	26,000	230,000	
D	20,000	56,000	
G	20,000	610,000	
F	12,000	10,000,000	No failure
D	12,000	4,078,000	No failure

Fatigue Properties of Inconel 702 AMS 5550 - 0.040 Inch Sheet
At 1800°F - Stress Ratio A = 0.67
Transverse Direction - 1800 CPM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
A-H	8,060	1,397,000	No failure
J		1,000,000	
K			
D			
F			

Fatigue Properties of Inconel 702 AMS 5550 - 0.040 Inch Sheet
At Room Temperature - Stress Ratio A = 0.98
Transverse Direction - 1800 CPM

Heat Number	Maximum Stress (psi)	Number of Cycles	Remarks
A-K	115,200	56,000	Failed in gauge section
D		54,000	
G		51,000	
J		59,000	
H		39,000	
K	84,000	285,000	
J		256,000	Failed outside gauge section
H		85,000	
F		223,000	
D		385,000	
K	100,800	118,000	
J		158,000	
G		88,000	
F		113,000	
D		115,000	
F	129,600	28,000	
K		50,000	
H		18,000	
G		21,000	
D		25,000	
D	64,800	10,000,000	No failure
F		1,104,000	Failed in gauge section
G		10,000,000	No failure
H		10,361,000	No failure
J		909,000	Failed in gauge section
K	72,000	1,373,000	
J		1,753,000	
H		809,000	Failed outside gauge section
G		765,000	
F		165,000	

Fatigue Properties of Inconel 702 AMS 5550 - 0.040 Inch Sheet
At 600°F - Stress Ratio A = 0.98
Transverse Direction - 1800 CPM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number Of Cycles</u>	<u>Remarks</u>
A-k	74,000	656,000	Specimen bent
D		295,000	Failed in gauge section
M		403,000	
F		268,000	
G	68,000	683,000	
G	64,000	1,894,000	No failure
J		1,000,000	
K			
D			
F	74,000	700,000	

Fatigue Properties of Inconel 702 AMS 5550 - 0.040 Inch Sheet
 At 1000°F - Stress Ratio A = 0.98
 Transverse Direction - 1800 CPM

Heat Number	Maximum Stress (psi)	Number of Cycles	Remarks
A-D	79,000	1,000	Failed in gauge section
K		106,000	
J		1,000	
G		1,000	
H	70,000	1,000	No Failure
K		2,501,000	
H		1,000,000	
G		1,000,000	
J	79,000	1,177,000	Failed in gauge section
F	79,000	2,244,000	No failure

Fatigue Properties of Inconel 702 AMS 5550 - 0.040 Inch Sheet
At 1400°F - Stress Ratio A = 0.98
Transverse Direction - 1800 CPM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
A-F	65,000	6,000	Failed in gauge section
G	65,000	26,000	
G	65,000	31,000	
D	60,000	19,000	
F	40,000	1,000,000	No failure
H	40,000	1,000,000	No failure

Fatigue Properties of Inconel 702 AMS 5550 - 0.040 Inch Sheet
 At 1800°F - Stress Ratio A = 0.98
 Transverse Direction - 1800 CPM

Heat Number	Maximum Stress (psi)	Number of Cycles	Remarks
A-K	8,000	68,000	Failed in gauge section
J		170,000	
G		32,000	
G		112,000	
D		510,000	No failure
H	5,000	1,497,000	
H		1,000,000	
J			
K			
E			

SECTION IV - Incoloy 901 Raw Data

4.1 Incoley 901 Static Test Data

STOCK SIZE	HEAT	STOCK IDENT.	TEST TEMP °F	GRAB DIR.	TENSION			COMPRESSION		BEARING				SHEAR	REMARKS	
					ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁻³)	ELONG. 1 IN. (IN)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁻³)	e D = 1.5		e D = 2.0			
											ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)		
1/2" THK 2 1/2"	2	0	RT	L	174.7	124.5	30.1	19.0	114.0	29.6					119.1	
"	"	"	"	"	177.7	119.5	30.1	27.0	122.5	30.3					115.0	
"	"	"	"	"	180.7	134.5	30.1	20.0	117.6	29.0					111.7	
"	"	"	"	"	169.1	117.2	30.0	15.5	117.9	29.1					121.4	
"	"	"	"	"	174.0	124.7	30.2	17.0	115.6	28.3					117.0	
"	"	"	"	"	174.7	127.5	30.1	17.0	121.7	29.0					116.3	
"	"	"	"	"	177.1	124.0	30.2	18.0	123.5	30.5					117.0	
"	"	"	"	"	174.1	124.2	30.0	18.5	117.7	30.1					116.3	
"	"	"	"	"	169.4	121.0	30.2	17.0	120.4	27.0					119.9	
"	"	0	"	"					120.6	28.6					114.2	
"	"	00	"	"	181.4	123.2	27.4	17.0	121.1	30.8					121.4	
"	"	"	"	"	182.6	122.1	29.1	16.5	125.1	30.8					120.4	
"	"	"	"	"	182.4	122.7	29.3	17.0	122.6	30.8					121.4	
"	"	"	"	"	151.1	124.5	28.6	16.5	124.2	30.5					120.4	
"	"	"	"	"	183.0	124.0	28.0	15.5	121.7	30.2					121.9	
"	"	"	"	"	182.0	122.0	28.8	17.5	125.3	30.2					120.9	
"	"	"	"	"	181.9	122.1	27.8	17.0	131.0	29.4					120.9	
"	"	"	"	"	182.0	123.0	27.5	16.0	130.6	29.6					120.9	
"	"	"	"	"	181.2	124.5	28.4	16.0	124.0	30.4					122.4	
"	"	00	"	"	180.7	123.0	28.9	15.5	132.6	29.4					120.9	
"	"	"	"	"	180.7	124.4	28.6	21.0	146.4						121.9	
"	"	"	"	"	185.1	124.4	28.9	20.5	130.4	28.8					107.6	
"	"	"	"	"	182.1	129.4	28.9	21.0	94.7	28.0					107.6	
"	"	"	"	"	181.1	111.0	26.0	20.0	130.2	29.7					108.1	
"	"	"	"	"	180.7	124.2	28.6	21.0	140.6	29.7					108.6	
"	"	"	"	"	180.9	122.2	28.5	20.5	123.3	30.5					108.6	
"	"	"	"	"	180.0	124.9	28.2	20.0	124.9	31.0					107.1	
0.50" THK 2 1/2"	2	2.0	RT	L	177.5	126.5	28.1	20.0	140.5	28.5					109.1	

Material: Incoloy 901 4.5.5.2014

STOCK SIZE	HEAT	STOCK IDENT	TEST TEMP °F	GRAIN DIR	TENSION				COMPRESSION		BEARING				SHEAR	REMARKS
					0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	ELONG IN IN (%)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	ε D = 15		ε D = 20				
										ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)			
1/4"	1	000	42	L	107.7	26.4	20.5	104.5	31.1						107.2	
"	2	000	42	"	107.8	26.2	21.2	104.2	31.1						107.1	
"	3	000	42	"	106.8		22.0								106.0	
"	4	000	42	"	107.1	130.4	19.2								106.1	see note 1
"	5	000	42	"	106.7	128.8	13.0								106.1	
"	6	000	42	"	122.9	126.5	9.0								105.5	see note 1
"	7	000	42	"	153.0	125.0	11.0								106.5	see note 1
"	8	000	42	"	156.6	114.5	17.0								106.0	
"	9	000	42	"	104.0	119.0	16.0								100.4	
"	10	000	42	"	157.9	111.9	17.0								105.5	
"	11	000	42	"	153.6	114.3	17.0								101.7	
"	12	000	42	"	106.0	112.7	27.0								100.4	
"	13	000	42	"	154.0	104.2	17.0								100.2	
"	14	000	42	"	155.1	110.2	19.7								102.5	
"	15	000	42	"	156.3	109.4	16.0								101.4	
"	16	000	42	"	161.0	115.1	17.0								102.2	
"	17	000	42	"	157.0	111.0	17.0								97.3	
"	18	000	42	"	147.0	109.0	14.0	102.7	25.2						96.8	
"	19	000	42	"	153.0	106.0	17.0	101.3	25.2						97.1	
"	20	000	42	"	153.7	106.6	13.0	100.7	22.7						97.3	
"	21	000	42	"	156.7	111.3	13.0	102.6	26.4						97.2	see note 1
"	22	000	42	"	153.0	97.2	13.0	101.1	26.2						100.4	
"	23	000	42	"	140.0	134.0	16.0								70.2	
"	24	000	42	"	153.0	112.9	17.0								91.9	
"	25	000	42	"	143.0	110.3	16.0								70.9	
"	26	000	42	"	144.4	125.5	17.0								93.3	
"	27	000	42	"	111.1	7.7	2.0	61.3	21.4						72.6	

Material - Inconel 617 A5-100

Tested by: [illegible]

STOCK SIZE	HEAT	STOCK IDENT.	TEST TEMP °F	GRAB DUC	TENSION			COMPRESSION		BEARING				SHEAR	TYP. (in.)
					ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	ELONG. IN (%)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	0.2% OFFSET YIELD (KSI)		
0.5" dia	E	0	RT	L	172.2	136.3	30.1	22.0							1.00
					171.4	139.2	30.2	22.0							1.00
					176.7	127.1	30.1	21.0							1.00
					169.0	117.7	29.2	21.0							1.00
					172.3	121.2	30.1	21.5							1.00
					170.3	121.2	30.1	20.0							1.00
					175.4	121.4	29.2	21.5							1.00
					172.4	138.8	29.2	19.0							1.00
					186.4	140.5	29.2	21.0							1.00
					182.2	78.8	27.8	17.5							1.00
					185.2	59.4	28.0	20.5							1.00
					136.1	54.2	29.1	20.5							1.00
					141.0	56.2	29.2	16.0							1.00
					172.0	81.0	30.0	17.5							1.00
					160.6	78.4	30.2	15.0							1.00
					141.8	66.8	29.8	12.5							1.00
					136.0	56.0	30.0	16.5							1.00
					186.4	54.6	30.0	30.5							1.00
					132.8	57.2	30.0	30.0							1.00
					133.3	73.1	30.0	12.0							1.00
					109.6	45.0	30.1	18.0							1.00
0.5" dia	E	0	RT	L	91.9	30.2	29.8	12.0							1.00

MATERIAL: TITANIUM 6AL-4V

NOTES: (1) Test from Spec Sheet: RT

[illegible]

MATERIAL: 140C LOT 9C1 NPS 56604

NOTES: Revision Specimen: (1) BUGZ (2) Very Porous after test

STOCK SIZE	HEAT	STOCK IDENT	TEST TEMP °F	GRAIN DIR.	TENSION			COMPRESSION		BEARING				SHEAR	TEMP. (°F)	TIME (HRS)
					ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	ELONG. IN IN. (%)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	0.2% ULTIMATE STRENGTH (KSI)			
0.5" dia	1	0	1000	1	161.2	120.8	31.7	18.0							1000	1000
		0	1000	1	161.0	120.1	31.2	18.0							1000	1000
			1000	1	161.6	121.1	31.1	18.0							1000	1000
			1000	1	153.1	108.7	31.8	18.0							1000	1000
			1000	1	155.6	108.8	32.5	18.0							1000	1000
			1000	1	156.1	118.2	32.1	18.0							1000	1000
			1000	1	157.1	105.0	32.5	18.0							1000	1000
			1000	1	156.1	115.6	31.6	18.0							1000	1000
			1000	1	156.0	112.4	31.5	18.0							1000	1000
			1000	1	111.1	59.4	30.1	22.0							1000	1000
			1000	1	107.8	53.2	30.0	20.0							1000	1000
			1000	1	53.9	39.6	35.6	22.0							1000	500
			1000	1	66.2	35.2	32.5	36.0							1000	500
			1000	1	58.8	39.4	32.1	35.0							1000	500
			1000	1	53.1	37.5	34.7	30.0							1000	1000
			1000	1	69.7	39.5	31.6	34.0							1000	1000
			1000	1	72.5	47.2	31.0	37.0							1000	1000
			1600	1	51.7	37.9	31.2	36.0							1600	30
			1600	1	59.4			27.0							1600	30
			1600	1	44.1	32.4	31.4	74.0							1600	100
			1600	1	48.4	34.0	31.4	50.0							1600	100
0.5" dia	1	0	1600	1	40.8	29.2	39.2	40.0							1600	500

MATERIAL: INCHES 501 JR 5660A

NOTES: 1) Tension Specimen Failed under knife edge of extensometer

STOCK SIZE	HEAT	STOCK IDENT	TEST TEMP OF	GRAIN DIR	TENSION			COMPRESSION		BEARING				SHEAR		REMOVED TEMP. (° F)
					ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	ELONG IN (%)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	e D 1.5		e D 2.0		ULTIMATE STRENGTH (KSI)	REMOVED TEMP. (° F)
											ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)		
1/4"	1	0	1400	1	44.7	29.0	19.2	64.0								1500
1/4"	1	1	1400	1	36.1	30.3	12.7	38.0 (1)								1500
1/4"	1	2	1400	1	38.3	26.5	22.9	46.0								1500
1/4"	1	3	1400	1	35.0	25.7	21.8	48.0 (1)								1500
1/4"	1	4	1400	1	36.0	27.6	19.6	51.0								1500
1/4"	1	5	1400	1	21.4	13.0		(3)								1500
1/4"	1	6	1400	1	17.7			(1)								1500
1/4"	1	7	1400	1												1500
1/4"	1	8	1400	1	17.3	11.0	6.3	71.0 (1)								1500
1/4"	1	9	1400	1	16.2	11.2	8.2	65.0 (1)								1500
1/4"	1	10	1400	1												1500
1/4"	1	11	1400	1	16.1	11.6	18.3	39.0 (3)								1500
1/4"	1	12	1400	1	16.2	11.1	10.1	70.0 (3)								1500
1/4"	1	13	1400	1												1500
1/4"	1	14	1400	1	15.7	14.4	17.5	50.0								1500
1/4"	1	15	1400	1	14.8	12.4	10.4	73.0								1500
1/4"	1	16	1400	1	15.8	13.5	5.6	64.0								1500
1/4"	1	17	1400	1												1500
1/4"	1	18	1400	1												1500
1/4"	1	19	1400	1												1500
1/4"	1	20	1400	1												1500
1/4"	1	21	1400	1												1500
1/4"	1	22	1400	1												1500
1/4"	1	23	1400	1												1500
1/4"	1	24	1400	1												1500
1/4"	1	25	1400	1												1500
1/4"	1	26	1400	1												1500
1/4"	1	27	1400	1												1500
1/4"	1	28	1400	1												1500
1/4"	1	29	1400	1												1500
1/4"	1	30	1400	1												1500
1/4"	1	31	1400	1												1500
1/4"	1	32	1400	1												1500
1/4"	1	33	1400	1												1500
1/4"	1	34	1400	1												1500
1/4"	1	35	1400	1												1500
1/4"	1	36	1400	1												1500
1/4"	1	37	1400	1												1500
1/4"	1	38	1400	1												1500
1/4"	1	39	1400	1												1500
1/4"	1	40	1400	1												1500
1/4"	1	41	1400	1												1500
1/4"	1	42	1400	1												1500
1/4"	1	43	1400	1												1500
1/4"	1	44	1400	1												1500
1/4"	1	45	1400	1												1500
1/4"	1	46	1400	1												1500
1/4"	1	47	1400	1												1500
1/4"	1	48	1400	1												1500
1/4"	1	49	1400	1												1500
1/4"	1	50	1400	1												1500
1/4"	1	51	1400	1												1500
1/4"	1	52	1400	1												1500
1/4"	1	53	1400	1												1500
1/4"	1	54	1400	1												1500
1/4"	1	55	1400	1												1500
1/4"	1	56	1400	1												1500
1/4"	1	57	1400	1												1500
1/4"	1	58	1400	1												1500
1/4"	1	59	1400	1												1500
1/4"	1	60	1400	1												1500
1/4"	1	61	1400	1												1500
1/4"	1	62	1400	1												1500
1/4"	1	63	1400	1												1500
1/4"	1	64	1400	1												1500
1/4"	1	65	1400	1												1500
1/4"	1	66	1400	1												1500
1/4"	1	67	1400	1												1500
1/4"	1	68	1400	1												1500
1/4"	1	69	1400	1												1500
1/4"	1	70	1400	1												1500
1/4"	1	71	1400	1												1500
1/4"	1	72	1400	1												1500
1/4"	1	73	1400	1												1500
1/4"	1	74	1400	1												1500
1/4"	1	75	1400	1												1500
1/4"	1	76	1400	1												1500
1/4"	1	77	1400	1												1500
1/4"	1	78	1400	1												1500
1/4"	1	79	1400	1												1500
1/4"	1	80	1400	1												1500
1/4"	1	81	1400	1												1500
1/4"	1	82	1400	1												1500
1/4"	1	83	1400	1												1500
1/4"	1	84	1400	1												1500
1/4"	1	85	1400	1												1500
1/4"	1	86	1400	1												1500
1/4"	1	87	1400	1												1500
1/4"	1	88	1400	1												1500
1/4"	1	89	1400	1												1500
1/4"	1	90	1400	1												1500
1/4"	1	91	1400	1												1500
1/4"	1	92	1400	1												1500
1/4"	1	93	1400	1												1500
1/4"	1	94	1400	1												1500
1/4"	1	95	1400	1												1500
1/4"	1	96	1400	1												1500
1/4"	1	97	1400	1												1500
1/4"	1	98	1400	1												1500
1/4"	1	99	1400	1												1500
1/4"	1	100	1400	1												1500

MATERIAL: Inconel 601, AMS 5662

NOTES: (1) Tension Specimen - Failed under knife edge of extensometer
(2) Tension Specimen - Failed in gauge mark
(3) Tension Specimen - Failed outside gage length

STOCK SIZE	HEAT IDENT	STOCK TEMP OF	GRAIN DIR	TENSION				COMPRESSION		BEARING				SHEAR	REMARKS
				ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	ELONG IN (%)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	e D . 15		e D . 20			
										ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)		
2.0" Bar	B	0	RT	180.0	116.0	28.8	13.0	111.5	30.0					129.4	See Note 1
"	"	"	"	173.3	100.2	28.8	18.0	122.4	28.6					115.3	
"	"	"	"	181.1	111.8	28.9	20.0	126.5	28.6					116.8	
"	"	"	"	179.0	108.0	29.0	18.0	115.7	28.4					116.6	
"	"	"	"	180.3	110.7	30.2	18.0	117.4	29.5					116.3	
"	"	"	"	178.4	109.8	29.7	18.0	111.6	30.7					116.2	
"	"	"	"	179.1	113.7	27.7	14.0	121.6	29.9					116.1	See Note 1
"	"	"	"	181.3	110.6	28.1	17.5	122.1	29.4					115.1	
"	"	"	"	173.4	99.1	29.9	18.0	116.0	27.4					116.1	
"	"	"	"	176.7	108.0	29.0	15.0	118.5	28.3					116.1	See Note 1
"	P	00	"	187.4	119.2	27.3	24.0	120.6	32.7					128.0	
"	"	"	"	187.2	119.3	29.9	24.5	129.8	34.3					128.3	
"	"	"	"	187.0	117.8	30.1	29.5	127.1	32.8					129.0	
"	"	"	"	184.1	123.1	30.9	26.0	117.3	30.4					128.0	
"	"	"	"	184.2	122.2	32.9	25.5	117.9	30.4					128.8	
"	"	"	"	184.0	123.2	29.5	24.5	127.9	34.0					127.0	
"	"	"	"	184.3	121.6	30.2	25.0	116.4	31.3					128.3	
"	"	"	"	184.9	122.0	29.9	25.0	123.2	33.8					127.6	
"	"	"	"	184.3	120.7	29.2	24.5	125.9	32.7					122.0	
"	"	"	"	185.0	122.2	29.1	27.5	122.0	32.3					128.5	
"	3	200	"	159.0	101.8	28.9	21.5	96.4	28.5					116.2	
"	"	"	"	157.9	99.8	27.7	22.0	96.2	27.7					116.2	
"	"	"	"	157.6	100.5	28.9	23.0	103.3	28.9					116.2	
"	"	"	"	159.0	113.4	27.7	23.0	104.5	29.0					113.2	
"	"	"	"	157.5	100.0	26.5	22.5	103.2	29.5					112.7	
"	"	"	"	158.6	108.3	28.0	23.0	103.4	29.0					116.8	
"	"	"	"	156.3	98.7	27.5	23.0	107.3	29.5					107.6	
"	"	"	"	159.3	98.7	27.2	22.5	103.4	29.5					113.2	

STOCK SIZE	HEAT	STOCK IDENT	TEST TEMP OF	GRAIN DIR	TENSION			COMPRESSION		BEARING				SHEAR	REMARKS
					ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	ELONG IN (%)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁶)	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	0.2% OFFSET YIELD (KSI)		
1.0" x 1.0"	0	000	RT	1	151.6	100.1	27.1	21.5	100.0	27.8				113.2	
"	"	"	"	"	159.3	100.9	29.2	23.5	106.3	30.6				116.2	
"	8	0	1000	"					118.2	27.				109.5	
"	"	"	"	"					117.8	27.9				101.5	
"	"	"	"	"					116.1	27.9				106.5	
"	"	"	"	"					115.8	27.9				102.8	
"	"	"	"	"					116.2	27.2				109.5	
"	"	"	600	"	161.6	117.7		11.0	107.3	26.0				93.8	
"	"	"	"	"	255.6	111.6		9.0	99.1	26.2				120.4	
"	"	"	"	"	265.3	95.3		16.0	109.8	26.0				90.8	
"	"	"	"	"	161.3	106.5		13.0	100.0	26.0				99.9	
"	"	"	"	"	159.8	96.2		26.0	105.9	26.0				99.1	
"	"	"	800	"					100.7	26.6				92.2	
"	"	"	"	"					131.5	26.9				90.2	
"	"	"	"	"					102.0	26.8				93.3	
"	"	"	"	"					100.8	26.7				97.1	
"	"	"	"	"					101.7	24.7				90.1	
"	"	"	1000	"	157.6	90.2		15.0	90.7	13.7				99.	
"	"	"	"	"	159.3	112.9		17.0	92.0	23.3				93.2	
"	"	"	"	"	157.9	90.8		16.0	89.8	23.1				90.7	
"	"	"	"	"	154.9	102.0		18.0	90.3	23.9				93.1	
"	"	"	"	"	159.6	109.5		16.0	93.2	26.1				96.3	
"	"	"	1200	"					91.6	26.0				92.0	
"	"	"	"	"					100.3	23.3					
"	"	"	"	"					94.5	22.2				91.0	
"	"	"	"	"					91.0	23.8				80.2	
"	"	"	"	"					93.2	26.1				92.1	
"	"	"	1400	"	122.7	96.2		22.0	87.3	19.3				79.8	

INTERVALS: 1000 PSI AND 500 PSI
 NOTE: 1. Specimen could not be tested again.

[illegible]

STOCK SIZE	HEAT	STOCK IDENT.	TEST TEMP °F	GRAB DIL	TENSION			COMPRESSION		BEARING				SWEAR	REMARKS
					ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁻³)	ELONG. IN IN. (%)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁻³)	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	0.2% OFFSET YIELD (KSI)		
1" x 3"	E	0	RT	T	142.7	106.4	30.1	21.0	97.3					112.5	
"	"	"	"	"	142.3	106.2	30.4	17.5	99.3					112.9	
"	"	"	"	"	140.9	106.3	30.4	17.0	107.3					111.8	
"	"	"	"	"	144.6	106.1	30.3	17.5	105.5					111.9	
"	"	"	"	"	159.0	105.0	30.0	17.5	107.6					113.7	
"	"	"	"	"	159.6	105.4	30.1	18.5	113.6						
"	"	"	"	"	159.3	105.8	30.2	18.0	105.4						
"	"	"	"	"	140.3	106.2	30.1	18.0	106.4						
"	"	"	"	"	141.0	103.0	30.0	20.0	110.9						
"	"	"	"	"	149.0	109.0	30.3	17.3	113.4						
"	"	"	"	"	163.3	109.8		21.0	117.9					113.3	
"	"	"	"	"	160.2	103.6		21.0	115.9					113.8	
"	"	"	"	"	158.4	121.1		18.0	144.8					114.2	See Note 1
"	"	"	"	"	186.4	120.2		21.5	117.9					114.8	
"	"	"	"	"	163.0	97.6		21.0	112.1					113.3	
"	"	"	"	"	164.2	102.4		21.0	109.4						
"	"	"	"	"	165.4	102.0		21.0	110.3						
"	"	"	"	"	164.4	106.0		21.0	113.0						
"	"	"	"	"	163.3	107.3		22.5	113.3						
"	"	"	"	"	161.3	105.6		21.0	111.9						
"	P	00	"	T	173.3	127.8		15.5	130.4					125.3	
"	"	"	"	"	175.0	129.2		17.0	117.6					123.3	
"	"	"	"	"	173.6	127.6		16.0	126.4					126.3	
"	"	"	"	"	176.3	127.4		16.0	120.7					123.0	
"	"	"	"	"	176.0	125.4		16.0	129.7					125.0	
"	"	"	"	"	171.6	125.0		17.0	130.9					125.0	
"	"	"	"	"	176.0	123.4		16.5	123.6						
"	"	"	"	"	175.7	126.8		16.0	126.7						

MATERIAL: Inconel 718 AMS 5646

NOTE: 1. Probe outside gauge line.

STOCK SIZE	HEAT	STOCK IDENT	TEST TEMP °F	GRAIN DIR	TENSION				COMPRESSION		BEARING				SHEAR		REMARKS
					ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁻⁶)	ELONG IN (%)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PSI x 10 ⁻⁶)	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	
2" x 3/4"	7	00	RT	T	176.5	127.0		16.0	134.9								
"	"	"	"	"	175.5	124.4		16.5	136.2								
"	"	"	"	"	181.1	127.2		14.0	136.1								
"	"	"	"	"	185.0	110.1		17.0	112.9								
"	"	"	"	"	181.4	136.1		14.5	119.8								
"	"	"	"	"	180.0	116.0		17.5	122.2								
"	"	"	"	"	181.4	121.2		14.5	107.2								
"	"	"	"	"	179.9	127.1		15.0	116.9								
"	"	"	"	"	181.1	119.7		17.0	125.7								
"	"	"	"	"	181.8	121.1		15.0	125.1								
"	"	"	"	"	179.0	124.5		14.5	112.9								
"	"	"	"	"	180.6	127.6		14.5	121.0								
"	"	000	"	"	164.3	108.4		19.0	113.7								
"	"	"	"	"	166.5	112.2		19.5	115.6								
"	"	"	"	"	167.9	112.4		20.5	113.7								
"	"	"	"	"	169.8	112.5		22.5	114.8								
"	"	"	"	"	165.2	112.0		21.0	113.5								
"	"	"	"	"	167.9	112.2		22.0	114.2								
"	"	"	"	"	164.1	109.0		22.0	112.9								
"	"	"	"	"	162.7	109.2		22.5	109.9								
"	"	"	"	"	160.6	109.8		22.5	113.9								
"	"	"	"	"	161.1	108.2		22.0	110.0								
"	"	"	"	"	178.0	109.7	30.2	18.5	109.7								
"	"	"	"	"	170.7	105.4	30.1	19.5	111.7								
"	"	"	"	"	172.0	110.7	30.2	19.5	119.1								
"	"	"	"	"	171.4	106.9	30.2	17.0	108.8								
"	"	"	"	"	172.4	101.8	30.2	19.5	115.4								

STOCK SIZE	HEAT	STOCK IDENT	TEST TEMP °F	GRAB DIAL	TENSION				COMPRESSION		BEARING				SHEAR	REMARKS
					ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PES x 10 ⁻⁶)	ELONG. IN (%)	0.2% OFFSET YIELD (KSI)	ELASTIC MODULUS (PES x 10 ⁻⁶)	c. D. 15		c. D. 20			
											ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)	ULTIMATE STRENGTH (KSI)	0.2% OFFSET YIELD (KSI)		
1 1/2 x 3/8 7mm	0	000	RT	1	373.0	108.7	30.2	18.5	116.7							
"	"	"	"	"	372.7	107.1	30.3	19.0	111.5							
"	"	"	"	"	372.7	107.1	30.1	20.0	114.6							
"	"	"	"	"	372.7	106.4	30.1	18.0	119.7							
"	8	0	600	7											94.3	
"	"	"	"	"											90.4	
"	"	"	"	"											100.4	
"	"	"	"	"											77.4	
"	"	"	"	"											77.4	
"	"	"	"	"											70.7	
"	"	"	"	"	117.9	93.5		15.0	78.0	23.2					70.7	
"	"	"	"	"	110.7	94.6		17.0	84.8	21.8					87.8	
"	"	"	"	"	114.4	92.3		16.0	84.1	22.1					80.9	
"	"	"	"	"	111.9	-		15.0	85.1	23.7					86.3	See Note 1
"	"	"	"	"	110.0	97.6		12.0	84.1	20.6					70.3	See Note 2
"	"	"	"	1	111.1	94.0		20.0	98.5	20.1						
"	"	"	"	"	110.3	98.2		18.0	82.1	20.1						
"	"	"	"	"	111.1	90.3		20.0	97.8	23.0						
"	"	"	"	"	111.0	94.5		20.0	85.7	21.6						
"	"	"	"	"	110.3	93.4		18.0								
"	"	"	"	7	100.4	82.9		27.0							65.9	
"	"	"	"	"	93.4	82.0		22.0							65.9	
"	"	"	"	"	93.1	76.9		29.0							65.2	
"	"	"	"	"	101.6	82.2		21.0							71.4	
"	"	"	"	"	104.5	83.5		21.0							70.3	
"	"	"	"	1	114.9	94.7		22.0								
"	"	"	"	"	102.0	93.9		29.2								See Note 1
"	"	"	"	"	95.0	79.6		30.0								
"	"	"	"	"	113.2	98.2		22.0								See Note 1

DATE: JAN 21 1968

NOTES: 1. Fusion curve showed all-rings of artemisinin.
2. Fusion spectrum failed under half edge of artemisinin.

**ROOM TEMPERATURE LONGITUDINAL TENSILE PROPERTIES OF
FIRTH STERLING 901 ALLOY FORGINGS**

<u>Heat</u>	<u>F_{tu}(PSI)</u>	<u>F_{ty}(PSI)</u>	<u>Elong. (% in 2")</u>
1	182,000	131,000	22.0
2	175,000	127,000	17.0
3	177,000	128,000	18.0
4	173,000	126,000	23.0
5	177,000	129,000	22.0
6	172,000	124,000	22.0
7	179,000	126,000	21.0
8	177,200	124,100	24.0
9	181,500	130,200	20.0
10	179,000	133,600	18.0
11	172,800	127,000	20.0
12	171,800	126,200	20.0
13	173,000	126,500	20.0
14	180,800	127,000	25.0
15	172,600	126,000	20.0
16	171,500	124,000	16.0
17	179,600	130,000	21.0
18	177,500	126,800	20.0
19	179,200	129,800	22.0
20	181,800	136,500	21.0

This data submitted by Firth Sterling Inc.
The heat treatment was as follows:

Solution treat - 2000°F for 2 hours - Water quench
Stabilize - 1450°F for 2 hours - Air cool
Age - 1350°F for 24 hours - Air cool

**ROOM TEMPERATURE LONGITUDINAL TENSILE PROPERTIES
OF CARPENTER 901 ALLOY FORGINGS**

<u>Heat</u>	<u>Size</u>	<u>F_{ty}(PSI)</u>	<u>F_{tu}(PSI)</u>	<u>Elong. (Z)</u>
1	3/4"X 3/4"	113,500	169,400	14.7
2		117,500	169,000	13.3
3		117,000	173,900	13.6
4		121,500	173,900	12.5
5		117,500	173,400	14.5
6		115,000	167,300	13.0
7		121,500	175,500	13.6
8		120,500	178,800	15.2
9		122,000	178,000	15.7
10		124,000	175,500	12.3

This data submitted by the Carpenter Steel Company.
The heat treatment was as follows:

Solution treat - 2000°F for 2 hours - Water quench
Stabilize - 1475°F for 2 hours - Air cool
Age - 1375°F for 24 hours - Air cool

ROOM TEMPERATURE LONGITUDINAL TENSILE PROPERTIES
OF LESCOLOY 901 - SMALL BAR

<u>Heat</u>	<u>Size</u>	<u>F_{tu}(KSI)</u>	<u>F_{ty}(KSI)</u>	<u>Elong. (% i</u>
C-57010	17/32" Rd.	166.0	126.5	8.0
		176.1	127.5	12.0
		177.1	126.5	12.0
C-57007	.660" Rd.	177.9	124.5	13.0
		174.7	119.5	12.5
		174.1	119.5	13.5
C-56655	.577" Rd.	180.7	129.5	13.5
		181.8	127.5	15.0
	.531" Rd.	184.7	145.6	12.0
		184.2	141.7	12.0
	.622" Rd.	192.0	156.6	11.0
C-56751	.650"x2.0"	173.5	127.6	12.0
		172.1	122.5	12.0
C-56636	.650" Rd.	178.7	124.5	12.0
C-56751	.650" Rd.	174.9	122.4	10.0
C-56567	.472" Rd.	182.7	130.5	17.0
		190.8	145.6	18.0

This data submitted by the Latrobe Steel Company
The heat treatment was as follows:

Solution treated - 2000°F for 2 hours - Water quench
Stabilize - 1475°F for 4 hours - Water quench
Aged - 1375°F for 24 hours - Air cooled

4.2 Incoloy 901 Creep Data

Incoloy 901 .500 in.
 1/2 B2LGX-28 Bar
 90,000 psi @ 1000° F

Stress - psi	Strain - %	Hours	Total Plastic Strain - %
0	0	524.5	0.063
10,000	0.055	550.4	0.046
20,000	0.100	572.5	0.052
30,000	0.145	598.3	0.058
90,000	0.462	622.8	0.054
		645.4	0.060
Hours	Total Plastic Strain - %	668.5	0.055
		693.7	0.056
		717.9	0.062
0.0	0.042	740.6	0.060
0.4	0.046	761.7	0.061
1.5	0.053	788.7	0.061
2.1	0.055	813.6	0.053
3.0	0.059	836.6	0.047
20.5	0.059	861.3	0.053
26.9	0.046	885.9	0.058
45.5	0.054	908.5	0.049
68.3	0.057	931.4	0.060
91.7	0.053	957.4	0.063
116.8	0.060	981.3	0.063
139.1	0.065	1006.2	0.061
164.3	0.078	1029.2	0.061
188.3	0.071	1053.4	0.060
213.6	0.056	1076.8	0.058
236.4	0.059		
263.2	0.053		
283.3	0.062		
310.7	0.047		
333.1	0.053		
357.1	0.060		
381.3	0.047		
404.3	0.056		
426.5	0.053		
452.3	0.049		
477.5	0.064		
501.1	0.062		

Incoloy 901 .500 in.
 1/2BE3LGX-1 Bar
 105,000 psi @ 1000° F

Stress, psi	Strain - %	Hours	Total Plastic Strain-%
0	0.0	505.9	0.184
10,000	0.049	524.4	0.186
20,000	0.096	549.6	0.183
30,000	0.149	572.7	0.187
40,000	0.203	599.7	0.184
105,000	0.704	620.2	0.187
	0.541	645.9	0.211
	0.163	669.0	0.188
		692.6	0.185
		717.8	0.187
		741.8	0.193
		762.4	0.188
		789.6	0.180
		813.5	0.190
		836.7	0.195
		860.1	0.188
		885.4	0.186
		907.8	0.192
		929.3	0.186
		958.2	0.186
		982.6	0.190
		1006.1	0.192
Hours	Total Plastic Strain-%		
0.0	0.163		
0.2	0.178		
0.7	0.182		
1.9	0.180		
3.2	0.183		
21.9	0.195		
26.8	0.199		
46.0	0.200		
68.8	0.199		
90.4	0.197		
117.0	0.202		
141.8	0.197		
164.8	0.196		
189.4	0.191		
214.0	0.187		
236.7	0.180		
259.6	0.190		
285.5	0.195		
309.5	0.196		
334.2	0.190		
357.6	0.192		
381.6	0.188		
405.0	0.186		
431.2	0.202		
453.8	0.192		
478.1	0.191		

1/2 BF 3 LGX-2 .500 in.
 100,000 psi Bar
 1000°F

Stress - psi	Strain - %		
0	0.0	932.3	0.158
10,000	0.034	959.5	0.156
20,000	0.092	982.0	0.152
30,000	0.146	1005.6	0.150
100,000	0.598	1028.3	0.150
		1052.6	0.151
		1076.6	0.153
Elapsed time	Total plastic	1100.1	0.152
- Hours	strain - %	1124.3	0.158
0.0	0.073	1148.3	0.157
0.6	0.083	1173.7	0.146
1.2	0.078	1196.0	0.162
2.9	0.093	1220.5	0.175
18.8	0.092	1244.7	0.150
45.0	0.099	Discontinued	
68.8	0.120		
92.4	0.107		
115.5	0.124		
140.4	0.124		
165.0	0.120		
188.2	0.130		
212.8	0.129		
236.9	0.128		
259.4	0.131		
284.6	0.133		
309.3	0.132		
333.7	0.139		
356.6	0.128		
380.6	0.137		
404.8	0.136		
428.6	0.143		
454.1	0.137		
476.3	0.148		
501.7	0.145		
524.3	0.143		
548.4	0.142		
572.5	0.139		
596.4	0.145		
619.6	0.147		
647.0	0.145		
668.6	0.146		
692.2	0.146		
716.4	0.155		
740.7	0.162		
764.4	0.147		
784.7	0.159		
812.8	0.166		
837.1	0.148		
861.8	0.160		
884.2	0.143		
909.2	0.150		

Incoloy 901 .500 in.
1/2BE3LGX-3 Bar
130,000 psi @ 1,000 ° F

<u>Stress - psi</u>	<u>Strain - %</u>
0	0.0
10,000	0.041
20,000	0.088
30,000	0.140
40,000	0.192
100,000	0.564
130,000	7.682
Discontinued	

Incoloy 901 .500 in.
1/2BE2LGX-40 Bar
50,000 psi @ 1200° F

Stress, psi	Strain - %	Hours	Total Plastic Strain-%
0	0.0	575.7	0.071
4,016	0.012	596.2	0.061
9,016	0.033	623.0	0.065
14,016	0.063	643.6	0.062
50,000	0.249	668.6	0.066
		691.7	0.071
		717.2	0.076
		733.1	0.072
		764.2	0.074
		787.6	0.074
0.0	0.0	813.8	0.072
0.2	0.001	837.3	0.075
0.9	0.003	863.4	0.085
1.6	0.015	885.4	0.082
3.0	0.016	910.9	0.086
19.4	0.001	935.3	0.081
43.6	0.014	955.6	0.082
68.0	0.013	981.2	0.079
93.4	0.013	1006.7	0.085
118.3	0.018	1027.8	0.089
140.5	0.019	1052.3	0.088
165.2	0.027	1074.8	0.091
189.2	0.035	1101.6	0.097
211.5	0.027	1126.3	0.093
239.6	0.040	1149.5	0.088
283.4	0.033	1174.1	0.099
307.6	0.038	1198.7	0.092
333.4	0.041	1221.4	0.095
355.6	0.038	1244.2	0.097
381.3	0.047	1269.0	0.096
404.8	0.044	1291.6	0.100
428.1	0.044	1318.3	0.099
452.8	0.048	1340.6	0.101
476.9	0.048	1366.5	0.101
501.4	0.052	Discontinued	
526.2	0.057		
549.1	0.058		

Incoleg-901-695 .500 in.
 1/2 BE2LGX-6 Bar
 65,000 psi @ 1200° F

Stress, psi	Strain-%
0	0.0
10,000	0.051
20,000	0.116
30,000	0.157
65,000	0.335

Hours	Total Plastic Strain-%
0.0	0.0
0.3	0.007
0.8	0.009
1.4	0.014
2.1	0.014
3.0	0.011
4.0	0.012
5.1	0.013
21.6	0.030
46.2	0.037
74.5	0.051
97.3	0.077
117.2	0.075
141.2	0.085
167.2	0.098
193.5	0.110
213.6	0.123
237.9	0.136
261.5	0.150
285.8	0.147
310.4	0.163
335.1	0.182
359.6	0.196
382.5	0.217
409.2	0.233
433.1	0.246
455.3	0.249

Incoloy 901 .500 in.
 1/2BE3LCX-7 Bar
 60,000 psi @ 1200° F

Stress, psi	Strain-%	Hours	Total Plastic Strain-%
0	0.0	597.7	0.042
10,000	0.058	619.7	0.049
20,000	0.113	643.0	0.037
30,000	0.162	667.2	0.055
60,000	0.327	693.4	0.054
		714.1	0.061
		740.3	0.059
Hours	Total Plastic Strain-%	762.9	0.063
		787.5	0.067
0.0	0.0	812.0	0.069
0.3		837.1	0.065
1.2	0.002	860.0	0.068
1.7	0.005	880.8	0.074
2.6	0.009	909.7	0.077
3.4	0.009	931.7	0.083
4.7	0.008	956.8	0.096
21.2	0.002	979.9	0.102
44.1	0.001	1005.8	0.104
71.0	0.004	Discontinued	
116.6	0.0006		
141.3	0.003		
165.8	0.005		
188.5	0.015		
211.4	0.011		
236.2	0.020		
258.8	0.022		
286.0	0.020		
307.7	0.023		
333.6	0.024		
357.4	0.028		
382.8	0.020		
405.4	0.024		
427.2	0.035		
457.5	0.031		
476.5	0.025		
501.4	0.033		
525.1	0.035		
551.2	0.045		

1/2 BE 3 LOX-5 .500 in.
 1,000 psi Bar
 1000F

Press - psi	Strain - %
0	0.0
1,000	0.037
1,000	0.088
1,000	0.141
1,000	0.392

Exposed time Hours	Total plastic strain - %
0	0.017
2	0.021
3	0.034
8	0.055
5	0.059
.1	0.093
.8	0.165
.3	0.267
.1	0.345
7.8	0.452
2.8	0.613
6.2	0.792
0.6	1.005
5.4	1.242
8.3	1.473
4.7	1.554

Discontinued

Incoloy 901-156 .500 in.
1/2BE3LGX-8 Bar
83,000 psi @ 1200° F

Stress, psi	Strain-%

0	0.0
10,000	0.051
20,000	0.104
30,000	0.155
83,000	0.488

Hours	Total Plastic Strain-%

0.0	0.0
0.2	0.018
0.5	0.042
1.5	0.077
2.2	0.092
3.0	0.103
3.5	0.114
4.5	0.140
21.3	0.478
49.8	1.693
53.0	1.893

Discontinued

BE3LGX-6 .500 in.
95,000 psi Bar
1200° F

Stress-psi	Strain-%
0	0.0
10,000	0.054
20,000	0.105
30,000	0.156
95,000	0.604

Elapsed time - Hours	Total plastic strain - %
0.0	0.123
0.2	0.181
1.8	0.323
3.5	0.475
5.0	0.620
21.1	3.554
24.4	4.367
29.0	5.677
45.1	11.566
47.1	Rupture
13.1%	Elongation

Incoloy 901-692 .500 in.
1/2BE2LGX-3 Bar
100,000 psi @ 1200° F

Stress, psi	Strain-%
0	0.0
10,000	0.047
20,000	0.091
30,000	0.143
100,000	0.604

Hours	Total Plastic Strain-%
0.0	0.123
0.3	0.345
0.7	0.543
0.9	0.686
1.3	0.962
1.6	1.203
1.9	1.411

Incoloy 901 .500 in.
 1/2 BE21GX-64 Bar
 20,000 psi @ 1400° F

<u>Stress - psi</u>	<u>Strain - %</u>	<u>Hours</u>	<u>Total Plastic Strain - %</u>
0	0.0	596.4	0.321
3,992	0.018	623.3	0.344
8,992	0.052	643.8	0.366
14,992	0.083	668.7	0.396
20,000	0.112	691.9	0.436
		717.2	0.470
		739.2	0.494
		764.9	0.532
		787.7	0.574
		814.0	0.631
		837.4	0.659
		863.1	0.717
		885.5	0.770
		911.1	0.819
		935.5	0.878
		955.8	0.913
		981.3	0.975
		1006.8	1.039
		1027.8	1.085
		Discontinued	
<u>Hours</u>	<u>Total Plastic Strain - %</u>		
0.0	0.0		
0.3	0.004		
0.7	0.007		
1.3	0.006		
1.9	0.008		
3.4	0.009		
19.6	0.021		
43.7	0.026		
68.2	0.039		
93.4	0.049		
118.6	0.058		
140.8	0.069		
165.4	0.091		
189.5	0.097		
211.8	0.094		
239.9	0.115		
259.9	0.116		
283.8	0.119		
308.1	0.125		
333.4	0.132		
355.7	0.147		
381.2	0.155		
405.0	0.166		
428.3	0.178		
453.0	0.206		
477.1	0.203		
501.5	0.235		
526.3	0.258		
549.2	0.274		
576.0	0.297		

1/2 BE 3 LGX - 10
 24,000 psi .500 in.
 1400°F Bar

Stress - psi	Strain - %
0	0.0
6000	0.034
12,000	0.059
18,000	0.096
24,000	0.198

Elapsed time - Hours	Total plastic strain - %		
0.0	0.068	836.7	1.347
0.2	0.069	860.5	1.418
0.4	0.072	880.8	1.512
1.2	0.069	908.0	1.622
1.8	0.076	933.3	1.722
2.7	0.073	957.9	1.837
19.8	0.092	980.6	1.945
42.7	0.116	1005.1	2.059
66.8	0.135	1028.6	2.181
91.8	0.132	1316.7	Discontinued
116.6	0.141		
140.1	0.172		
163.3	0.196		
187.0	0.210		
210.5	0.220		
236.4	0.232		
258.8	0.248		
282.7	0.272		
306.9	0.284		
331.9	0.296		
354.3	0.316		
379.6	0.345		
404.3	0.367		
430.2	0.379		
452.8	0.412		
476.9	0.443		
500.9	0.476		
525.0	0.517		
550.1	0.560		
572.3	0.592		
598.0	0.645		
620.5	0.699		
644.5	0.752		
668.6	0.834		
693.2	0.900		
715.6	0.956		
743.0	1.043		
762.8	1.106		
788.2	1.184		
812.8	1.261		

Incoloy 901 .500 in.
 1/2BE3LGX-11 Bar
 30,000 psi @ 1400° F

Stress, psi	Strain-%
0	0.0
4,040	0.024
9,040	0.045
14,040	0.074
19,040	0.102
30,000	0.164

Hours	Total Plastic Strain-%
0.0	0.0
0.2	0.006
0.7	0.011
1.0	0.010
1.8	0.016
2.5	0.018
21.8	0.071
25.3	0.081
43.5	0.108
69.5	0.156
93.2	0.202
118.7	0.238
141.3	0.316
163.1	0.390
193.4	0.488
212.3	0.558
237.3	0.690
261.0	0.830
287.0	1.009
307.6	1.153
333.5	1.376
334.0	1.376

BE3LGX-9
 40,000 psi .500 in.
 1400° F Bar

Stress - psi	Strain - %
0	0.0
4,010	0.013
9,010	0.048
14,010	0.078
40,000	0.212

Elapsed time - hours	Total plastic strain - %
0.0	0.0
0.2	0.033
0.8	0.056
1.8	0.078
2.5	0.101
3.5	0.116
19.3	0.427
27.6	0.649
43.4	1.090
47.0	1.317
51.5	1.485
68.7	2.222
72.5	2.394
75.6	2.535
96.3	3.888
116.5	Rupture
7.8%	Elongation

Incoloy 901-165 .500 in.
1/2 BE3LGX-17 Bar
50,000 psi @ 1400° F

Stress, psi	Strain-%
0	0.0
10,000	0.049
20,000	0.106
30,000	0.156
50,000	0.274

Hours	Total Plastic Strain-%
0.0	0.0
0.3	0.022
0.5	0.044
1.1	0.074
1.9	0.107
2.7	0.145
3.3	0.174
3.9	0.197
4.8	0.242
21.0	1.813
21.9	1.976
Discontinued	

Incolay-901-696 .500 in.
1/2 BE2LGX-7 Bar
2,000 psi @ 1600° F

Stress, psi	Strain-%

0	0.0
2,000	0.009

Hours	Total Plastic Strain %

0.0	0.0
0.4	-.001
0.8	0.002
1.4	0.005
2.4	0.004
3.4	0.008
22.4	0.029
46.0	0.044
73.9	0.046
95.6	0.057
119.0	0.054
141.4	0.061
165.0	0.071
190.2	0.070
214.1	0.068
236.2	0.082
260.5	0.088
285.9	0.080
308.1	0.085
333.2	0.086
357.1	0.092
380.2	0.092
407.5	0.100
431.3	0.100
452.2	0.095

Incoloy 901-693 . 500 in.
 1/2BE21GX-4 Bar
 3,000 psi @ 1600° F

Stress, psi	Strain-%
0	0.0
3,000	0.001

Hours	Total Plastic Strain-%
0.0	0.0
0.3	-0.023
0.8	-0.012
1.3	-0.005
1.9	-0.003
2.4	-0.002
3.1	0.000
22.0	0.016
45.1	0.060
46.5	0.068
49.0	0.072
52.4	0.076
68.7	0.087
76.0	0.099
93.1	0.105
116.5	0.114
140.3	0.137
164.7	0.138
189.7	0.154

Discontinued

Incoloy 901-152 .500 in.
1/2BE3LGX-4 Bar
4,000 psi @ 1600° F

Stress, psi	Strain-%

0	0.0
4,000	0.174

Hours	Total Plastic Strain-%

0.0	0.0
0.1	0.006
0.8	0.012
1.9	0.018
3.4	0.021
4.4	0.024
21.0	0.042
28.4	0.070
44.6	0.105
52.5	0.117
68.5	0.131
76.5	0.143
92.6	0.153
100.6	0.162
116.5	0.175
144.6	0.170
165.7	0.186
188.9	0.193
212.5	0.209

Discontinued

Incoloy 901 .500 in.
 1/2BE3LGX-15 Bar
 5,000 psi @ 1600° F

Stress, psi	Strain-%	Hours	Total Plastic Strain-%
0	0.0	715.5	0.670
5,000	0.044	741.0	0.680
	Total Plastic Strain-%	763.3	0.701
Hours		785.0	0.718
		813.9	0.748
0.0	0.0	838.2	0.762
0.3	-.003	861.7	0.779
1.4	-.001	885.2	0.804
2.5	0.003	909.7	0.823
2.9	0.008	932.5	0.838
20.5	0.070	956.4	0.855
27.1	0.080	981.7	0.890
45.0	0.167	1004.4	0.907
69.6	0.167		
92.3	0.202		
115.3	0.236		
141.2	0.255		
164.9	0.261		
189.9	0.302		
213.1	0.311		
237.3	0.327		
260.5	0.347		
286.9	0.358		
309.6	0.384		
333.6	0.389		
361.6	0.409		
380.1	0.424		
405.2	0.447		
428.4	0.465		
455.3	0.486		
475.8	0.494		
501.3	0.513		
524.7	0.526		
548.4	0.538		
573.4	0.562		
597.4	0.590		
618.1	0.597		
645.3	0.617		
669.2	0.640		
692.5	0.657		

Incoloy 901-690 .500 in.
1/2BE2LGX-1 Bar
6,500 psi @ 1600° F

Stress, psi	Strain-%

0	0.0
6,500	0.042

Hours	Total Plastic Strain-%

0.0	0.0
0.2	0.006
0.8	0.001
1.3	0.010
1.8	0.014
18.7	0.132
42.4	0.267
68.6	0.368
91.0	0.426
115.8	0.474
140.3	0.526
162.9	0.568
187.3	0.609
210.8	0.659
235.0	0.707
258.2	0.765
283.8	0.812
306.8	0.862
330.7	0.903
354.8	0.950
379.9	1.006

Discontinued

1/2 BE 3 LGX -16 .500 in
 8,000 psi Bar
 1600°F

Stress - psi	Strain - %
0	0.0
8,000	0.038

Elapsed time - Hours	Total plastic strain - %
0.0	0.0
0.5	0.005
1.0	0.013
1.8	0.022
4.6	0.032
5.3	0.035
23.4	0.140
28.9	0.166
45.6	0.288
71.2	0.522
95.0	0.646
118.1	0.755
142.9	0.910
167.0	1.028
191.4	1.136
216.2	1.242
240.2	1.340
245.4	1.368

Discontinued

Incoloy 901-694 .500 in.
1/2BE2LGX-5 Bar
900 psi @ 1800° F

Stress, psi	Strain-%
0	0.0
900	-.010

Hours	Total Plastic Strain-%
0.0	0.0
0.3	0.009
0.9	0.015
1.9	0.019
3.0	0.023
3.9	0.024
22.3	0.043
46.9	0.077
71.9	0.118
76.5	0.135
93.6	0.208
119.5	0.292
142.0	0.390
164.9	0.495
191.1	0.600
212.9	0.699
239.5	0.822
264.9	0.943
287.7	1.060

Discontinued

BE3LGX-13 .500 in.
 15,000 psi Bar
 1600° F

Stress - psi	Strain - %
0	0.0
15,000	0.097
Elapsed time - hours	Total plastic strain - %
0.0	0.0
0.4	0.032
0.8	0.057
1.1	0.052
2.1	0.086
4.1	0.181
5.0	0.249
5.5	0.295
23.2	9.418
25.3	11.386
27.4	13.448
29.5	15.835
36.5	Rupture
36.37	Elongation

Incoloy 901 .500 in.
 1/2BE3LGX-20 Bar
 500 psi @ 1800° F

Stress, psi	Strain-%	Hours	Total Plastic Strain-%
0	0.0	478.0	0.302
500	0.008	501.3	0.334
		524.2	0.357
		548.8	0.386
		572.3	0.408
		599.8	0.446
		624.0	0.463
		645.3	0.494
		668.4	0.519
		693.2	0.549
		716.4	0.568
		740.6	0.604
		765.0	0.624
		788.2	0.622
		812.0	0.641
		836.5	0.670
		860.7	0.692
		884.4	0.704
		909.4	0.721
		934.0	0.742
		958.1	0.750
		980.4	0.767
		1004.2	0.785
		Discontinued	
Hours	Total Plastic Strain - %		
0.0	0.0		
0.1	0.001		
0.9	0.001		
1.7	0.002		
3.2	0.005		
9.7	0.031		
46.0	0.008		
66.7	0.012		
92.9	0.013		
115.4	0.018		
140.0	0.031		
164.5	0.024		
189.6	0.041		
212.6	0.050		
233.3	0.069		
262.2	0.090		
284.2	0.132		
309.3	0.141		
332.5	0.165		
358.3	0.185		
381.4	0.209		
404.9	0.254		
429.6	0.277		
452.7	0.304		

Incoloy 901-691 .500 in.
1/2BE2LGX-2 Bar
1300 psi @ 1800° F

Stress, psi	Strain-%
0	0.0
1300	0.026

Hours	Total Plastic Strain-%
0.0	0.0
0.2	0.015
0.8	0.047
1.5	0.044
2.3	0.046
3.3	0.065
4.6	0.086
5.9	0.106
23.5	0.251
46.4	0.487
71.3	0.645
96.7	0.916
119.1	1.135
Discontinued	

Incoloy 901 .300 in.
1/2B2LGX-112 Bar
2,000 psi - 1800° F

<u>Stress - psi</u>	<u>Strain - %</u>

0	0.0
2,000	0.034

<u>Hours</u>	<u>Total Plastic Strain - %</u>
0.0	0.0
0.2	0.011
1.1	0.052
1.8	0.071
3.1	0.089
27.1	0.590
44.2	1.073
68.9	1.801
92.3	2.502
115.8	3.250
139.7	3.960
501.8	Discontinued

1/2BE3LGX-14 .500 in.
 3250 psi Bar
 1800° F

Stress - psi	Strain - %
0	0.0
3,250	0.035
Elapsed time - hours	Total plastic strain - %
0.0	0.0
0.1	0.052
0.3	0.143
0.5	0.186
0.8	0.290
1.3	0.406
1.9	0.571
2.7	0.767
3.5	1.013
20.5	6.061
22.5	6.652
24.9	7.365
27.3	8.062
43.7	15.722
94.1	Rupture
96.6%	Elongation

1/2BE3LGX-19 .500 in.
 10,000 psi Bar
 1800° F

Stress - psi Strain - %

0	0.0
10,000	0.287

Elapsed time Total plastic
 - hours strain - %

0.0	0.0
0.067	1.971
0.135	4.632
0.200	6.822
0.250	9.058
0.300	11.390
0.350	13.831
0.400	15.947
0.450	18.398
0.480	20.725
0.520	23.075
0.550	25.237
0.580	27.602
0.700	Rupture
83.2%	Elongation

Incoloy 901-160 .500 in.
1@2 3BELGX-12 Bar
9,000 psi @ 1800° F

Stress, psi	Strain-%
0	0.0
9,000	1.% on loading

FE 3 LGX -2 1 x 3 in.
35,000 psi Forgings
1400°F

Stress - psi	Strain - %
0	0.0
6000	0.030
12,000	0.066
18,000	0.097
35,000	0.196

Elapsed time - Hours	Total plastic strain - %
0.0	0.0
0.2	0.001
0.9	0.010
1.9	0.025
3.1	0.033
4.0	0.041
5.3	0.047
21.3	0.180
24.7	0.224
29.3	0.306
45.4	0.398
53.3	0.569
73.5	1.066
93.5	1.654
117.4	2.458
124.1	2.710

Discontinued

FE3TGX-1 1 x 3 in.
 42,500 psi Forgings
 1400° F

Stress - psi	Strain - %
0	0.0
10,000	0.045
20,000	0.097
30,000	0.155
42,500	0.228

Elapsed time - hours	Total plastic strain - %
0.0	0.0
0.2	0.013
0.5	0.019
0.9	0.035
2.1	0.046
2.7	0.050
3.9	0.070
5.2	0.101
22.3	0.768
24.9	0.903
47.8	3.04
53.6	3.276
70.7	5.129
93.1	Rupture
11.7%	Elongation

Incoloy 901-179 1 x 3 in.
 FE3TGX-5 Forgings
 6,000 psi @ 1600° F

Stress, psi	Strain-%
0	0.0
6,000	0.041

Hours	Total Plastic Strain-%
0.0	0.0
0.2	0.005
0.7	0.015
1.0	0.017
2.1	0.021
20.8	0.022
43.5	0.049
69.6	0.120
92.9	0.181
117.6	0.303
140.5	0.385
163.7	0.457
188.9	0.559
212.0	0.643
236.2	0.742
261.7	0.792
284.6	0.869
308.7	0.932
335.8	0.997
356.5	1.051
Discontinued	

Incoloy 901 1 x 3 in.
FE3TGX-3 Forgings
8,000 psi @ 1600° F

Stress - psi	Strain - %
0	0.0
8,000	0.046

Hours	Total Plastic Strain - %
0.0	0.0
0.9	0.004
2.3	0.004
3.8	0.007
4.4	0.011
22.5	0.066
28.5	0.141
47.2	0.318
71.7	0.757
94.4	1.188
99.4	1.228

Incoloy 901 1 x 3 in.
FE3TGX-2 Forgings
8,000 psi @ 1600° F

Stress, psi	Strain-%
0	0.0
8,000	0.053

Hours	Total Plastic Strain-%
0.0	0.0
0.2	-.014
0.4	-.006
1.4	-.002
2.3	-.003
3.1	0.0009
4.1	-.002
22.1	0.057
46.4	0.199
70.5	0.495
93.9	0.845
119.2	1.233
142.5	1.568

Discontinued

FE3LGX-3 1 x 3 in.
 10,000 psi Forgings
 1600° F

Stress - psi	Strain - %
0	0.0
10,000	0.056

Elapsed time - hours	Total plastic strain - %
0.0	0.0
0.4	0.014
2.7	0.022
4.3	0.037
5.8	0.045
22.2	0.287
25.1	0.367
29.9	0.584
45.8	1.252
50.8	1.487
53.8	1.691
74.5	3.057
98.9	5.764
117.8	5.757
125.8	6.205
141.9	7.150
166.2	8.728
191.5	10.533
197.9	11.006
214.3	14.681
338.5	Rupture
43.7%	Elongation

FE2LGX-4 1 x 3 in.
20,000 psi Forgings
1600° F

Stress - psi	Strain - %

0	0.0
4,010	0.025
9,010	0.059
14,010	0.096
20,000	0.132

Elapsed time - hours	Total plastic strain - %

0.0	0.0
0.2	0.048
0.4	0.091
0.6	0.120
0.9	0.188
1.2	0.273
1.7	0.386
2.3	0.546
2.6	0.657
3.1	0.963
3.7	1.330
3.9	1.527
4.2	1.701
4.5	1.934
4.9	2.271
5.2	2.477
21.2	13.138
21.3	13.472
22.9	Rupture
34.6%	Elongation

Incoloy 901-169
FE3LGX-1
750 psi @ 1800° F

1 x 3 in.
Forgings

Stress, psi	Strain-%	Hours	Total Plastic Strain-%
0	0.0	623.4	0.831
750	0.013	648.1	0.867
		669.3	0.902
		697.3	0.929
		720.8	1.001
		743.2	1.006
		Discontinued	
Hours	Total Plastic Strain-%		
0.0	0.0		
0.3	0.007		
0.6	0.015		
1.3	0.021		
2.1	0.014		
3.3	0.029		
4.1	0.023		
5.2	0.019		
21.0	0.033		
47.5	0.046		
70.9	0.073		
95.5	0.088		
118.4	0.117		
141.7	0.145		
166.8	0.160		
190.0	0.197		
214.3	0.215		
239.7	0.239		
272.5	0.284		
286.7	0.299		
313.8	0.334		
334.5	0.383		
360.4	0.416		
384.5	0.440		
407.1	0.478		
429.6	0.508		
454.9	0.551		
478.9	0.584		
503.3	0.627		
525.1	0.704		
550.2	0.736		
574.5	0.779		
598.5	0.792		

FE 3 LGX-6 1 x 3 in.
1300 psi Forgings
1800°F

Stress - psi	Strain - %
0	0.0
1300	0.022

Elapsed time - Hours	Total plastic strain - %
0.0	0.0
0.1	0.011
0.9	0.024
1.6	0.039
2.3	0.050
3.2	0.051
4.4	0.055
21.7	0.200
45.5	0.437
70.3	0.725
93.9	1.033
117.2	1.358
141.2	1.700
167.1	2.051
189.7	2.378

Discontinued

FE3TGX-6 1 x 3 in.
1800° F Forgings
5,000 psi

Stress - psi	Strain - %
0	0.0
5,000	0.039

Elapsed time - hours	Total plastic strain - %
0.0	0.0
0.2	0.261
0.4	0.592
0.6	0.893
0.8	1.290
1.1	1.720
1.4	2.345
1.9	3.135
2.1	3.520
2.7	4.450
3.0	4.995
3.3	5.480
3.7	6.140
4.0	6.750
4.4	7.461
4.8	8.097
5.1	8.609
15.9	Rupture
86.6%	Elongation

4.3 Incoloy 901 Stress Rupture Properties

Stress-Rupture Properties of Incoloy 901, AMS 5660A
0.500 Inch Dia. Bar - Heat E

<u>Test Temp. °F</u>	<u>Grain Dir.</u>	<u>Specimen Ident.</u>	<u>Stress (ksi)</u>	<u>Life- Hours</u>	<u>Per Cent Elong.</u>	<u>Remarks</u>
1200	L	51	138.0	0.066	21.4	
		39	130.0	0.5	22.3	
		52	124.0	0.3	23.3	
		43	122.0	1.9	20.0	
		35	119.0	1.6	17.0	
		53	110.5	5.1	16.9	
		34	110.0	1.2	31.7	
		50	103.0	6.7	20.4	
		38	102.0	17.0	14.9	
		41	100.0	4.6	24.0	
		42	97.5	7.9	19.2	
		36	95.0	25.5	18.3	
		E3-6	95.0	47.1	13.1	
		54	94.0	47.9	16.0	
		49	93.0	42.0	14.0	
		45	92.5	11.3	25.0	
		37	92.0	34.2	12.6	
		33	92.0	48.3	16.4	
		56	87.0	84.3	13.6	
		48	86.5	91.0	16.0	
		46	86.0	114.4	17.4	
		44	80.0	234.8	16.7	
		E3-5	75.5	244.7	-	Discontinued
		E3-7	60.0	1005.8	-	Discontinued
		40	50.0	1389.9	-	Discontinued
		47	133.0	0.166	21.4	
		55	106.0	8.1	19.4	
		16	132.0	0.3	22.8	
1400		18	76.0	378.8	13.1	
		77	97.8	0.033	22.6	
		62	90.0	0.1	17.4	
		71	90.0	0.2	17.3	
		70	89.0	0.3	20.0	
		69	88.0	1.5	16.0	
		63	85.0	0.7	16.8	
		75	80.0	0.6	21.0	
		60	72.3	1.8	19.8	
		74	70.0	1.7	35.8	
		68	68.7	3.0	20.0	
		59	68.0	3.3	32.9	
		79	60.5	8.6	20.8	
		73	60.0	4.0	18.4	
		57	60.0	10.0	18.4	
		65	60.0	11.2	22.0	
		76	53.0	31.9	25.0	

(cont.)

Stress-Rupture Properties of Incoloy 901, AMS 5660A
0.500 Inch Dia. Bar - Heat E

<u>Test Temp. °F</u>	<u>Grain Dir.</u>	<u>Specimen Ident.</u>	<u>Stress (ksi)</u>	<u>Life- Hours</u>	<u>Per Cent Elong.</u>	<u>Remarks</u>
1400	L	61	52.5	29.2	14.9	
		67	52.0	35.3	25.2	
		78	50.0	33.6	26.0	
		58	43.0	105.0	17.4	
		72	43.0	108.8	15.6	
		66	42.0	109.7	32.9	
		E3-9	40.0	116.5	7.8	
		E3-11	30.0	334.1	-	
		E3-10	24.0	1316.7		Discontinued
		64	20.0	1027.8		Discontinued
		80	91.0	0.15	22.5	
		24	35.0	312.2	16.3	
1600	L	100	42.0	0.1	20.4	
		86	41.0	0.3	55.9	
		99	37.0	0.4	37.8	
		92	35.0	0.2	27.2	
		85	30.8	0.2	32.3	
		97	30.1	1.0	40.8	
		90	30.0	1.1	30.0	
		81	28.8	1.0	45.6	
		94	27.3	4.2	22.0	
		83	25.0	4.1	35.4	
		96	25.0	5.1	22.4	
		103	21.8	8.7	29.2	
		84	20.8	8.5	24.8	
		95	20.0	11.2	43.0	
		93	19.9	0.5	28.7	
		104	17.5	22.0	23.4	
		91	16.2	27.7	24.7	
		87	15.7	27.7	33.0	
		E3-13	15.0	36.5	36.3	
		89	13.0	97.7	26.0	
		82	12.5	140.8	30.4	
		98	12.0	112.5	27.4	
		E3-16	8.0	245.4		Discontinued
		88				No test
		13	8.0	440.1	34.8	
		20	27.5	3.7	23.2	
		21	10.0	343.4	40.3	

(cont.)

Stress-Rupture Properties of Incoloy 901, AMS 5660A
0.500 Inch Dia. Bar - Heat E

<u>°F</u>	<u>Grain</u> <u>Dir.</u>	<u>Specimen</u> <u>Ident.</u>	<u>Stress</u> <u>(ksi)</u>	<u>Life-</u> <u>Hours</u>	<u>Per Cent</u> <u>Elong.</u>	<u>Remarks</u>
	L	120	15.4	0.05	65.6	
		119	15.0	0.1	110.0	
		109	14.9	0.1	93.0	
		118	12.5	0.3	87.4	
		110	12.4	0.3	107.0	
		121	12.0	0.3	60.5	
		E3-19	10.0	0.7	83.2	
		125	9.2	1.0	80.0	
		113	9.1	0.9	85.0	
		105	9.0	1.1	69.0	
		123	7.7	2.1	95.0	
		117	7.3	3.1	88.0	
		106	7.2	3.7	76.5	
		116	5.7	8.0	71.5	
		126	5.6	7.4	69.8	
		107	5.5	15.2	85.0	
		124	4.26	28.1	98.0	
		115	4.25	21.7	85.0	
		111	4.2	19.6	72.6	
		114	3.3	94.0	70.5	
		122	3.28	116.2	108.0	
		E3-14	3.25	94.1	96.6	
		108	3.2	70.0	62.0	
		112	2.0	501.8		Discontinued
		E3-20	0.5	1004.2		
		15	3.0	151.7	99.0	
		127	6.0	5.5	81.5	
		11	2.8	157.1	113.8	
		12	4.8	16.5	70.0	
		14	7.8	1.9	150.0	
		23	3.8	31.2	88.0	
		102	5.0	15.4	75.4	
		128	2.5	350.0	48.0	

Stress-Rupture Properties of Incoloy 901, AMS 5660A
1.00 Inch Dia. Bar - Heat E

<u>Test Temp. °F</u>	<u>Grain Dir.</u>	<u>Specimen Ident.</u>	<u>Stress (ksi)</u>	<u>Life- Hours</u>	<u>Per Cent Elong.</u>	<u>Remarks</u>
1400	L	2	78.0	0.4	28.6	
		3	70.0	0.9	18.9	
		5	60.5	5.0	24.5	
		4	56.0	7.5	14.5	
		6	52.0	25.4	18.0	
		1	43.0	160.3	23.0	
1800		7	13.0	0.2	74.5	
		8	9.5	1.2	62.0	
		11	8.0	2.2	79.0	
		12	5.3	13.5	83.7	
		9	4.2	26.2	54.0	
		10	3.0	118.5	73.5	

Stress-Rupture Properties of Incoley 901, AMS 5660A
1 x 3 Inch Forging - Heat E

<u>Test Temp. °F</u>	<u>Grain Dir.</u>	<u>Specimen Ident.</u>	<u>Stress (ksi)</u>	<u>Life- Hours</u>	<u>Per Cent Elong.</u>	<u>Remarks</u>
1400	L	2	70.0	1.3	21.4	
		1	63.0	3.7	25.2	
		4	59.5	4.8	27.0	
		6	56.0	8.9	18.0	
		3	54.0	23.0	25.8	
		5	43.0	98.2	20.4	
		E3-2	35.0	124.1		Discontinued
	T	1	70.0	1.7	34.9	
		3	65.0	2.4	30.4	
		6	60.0	10.6	21.0	
		4	53.0	18.3	20.1	
		5	48.0	27.6	16.2	
		2	43.0	100.7	16.2	
		E3-1	42.5	93.1	11.7	
1500		E3-3	8.0	94.4		Discontinued
		E3-2	8.0	142.5	-	
	L	E3-4	20.0	22.9	34.6	
		E3-3	10.0	338.5	43.7	
1600	T	11	14.5	0.1	40.0	
		10	9.0	1.2	110.3	
		7	7.18	2.1	104.0	
		9	5.3	11.0	57.3	
		E3-6	5.0	15.9	86.6	
		12	4.1	28.4	91.0	
		8	3.27	85.4	69.5	
	L	12	12.1	0.7	98.7	
		11	10.0	0.7	62.0	
		10	7.0	4.2	84.0	
		7	5.5	8.2	72.0	
		9	4.0	38.1	122.0	
		8	3.27	134.7	73.0	
		E3-6	1.3	189.7		Discontinued

4.4 Incoloy 901 Fatigue Properties

Fatigue Properties of Incoloy 901 AMS 5660A - 1.00 Inch Bar
at 1000°F - Stress Ratio A = 0.33
Longitudinal Direction - 3600 CPM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
P	116,700	5,587,000	No Failure
E		873,000	Failed in gauge section
		506,000	
		656,000	
		873,000	
	175,000	3,000	
	175,000	2,000	
	189,600	1,000	
	160,500	11,000	
		5,000	
		28,000	
	145,900	186,000	
		161,000	
		246,000	
		163,000	

Fatigue Properties of Incoloy 901 AMS 5660A - 1.00 Inch Bar
At Room Temperature - Stress Ratio A = 0.67
Longitudinal Direction - 1800 CPM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
E	86,688	128,000	Failed in gauge section
		112,000	
		121,000	
		96,000	
		275,000	
G	79,420	275,000	
G	100,320	23,000	
E	109,500	23,000	
		12,000	
		8,000	
		12,000	
	80,300	215,000	
	80,300	242,000	
	100,375	58,000	
	100,375	23,000	
G	115,000	8,000	
E	115,000	4,000	
F	116,000	84,000	
E		46,000	
		2,000	
		3,000	
F	68,438	1,235,000	
E		1,564,000	
		1,168,000	
		2,143,000	
		376,000	
F	59,313	5,773,000	
E	54,750	10,000,000	No Failure

Fatigue Properties of Incoloy 901 AMS 5660A - 1.00 Inch Bar
 at 400°F - Stress Ratio A = 0.67
 Longitudinal Direction - 1800 CPM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
E	110,000	96,000	Failed in gauge Section
		95,000	
		89,000	
		76,000	
		85,000	
	80,000	666,000	
		577,000	
		739,000	
		707,000	
		1,081,000	
G	60,000	3,865,000	No failure
	55,000	10,000,000	
F			

Fatigue Properties of Incoloy 901 AMS 5660A - 1.00 Inch Bar
 at 600°F - Stress Ratio A = 0.67
 Longitudinal Direction - 1800 CFM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
B	104,000	160,000	Failed in gauge section
		151,000	
		165,000	
		166,000	
		154,000	
	75,000	462,000	
	75,000	594,000	
	90,000	390,000	
		451,000	
		361,000	
	68,000	1,481,000	No Failure
		1,000,000	
		1,000,000	

Fatigue Properties of Incoloy 901 AMS 5660A - 1.00 Inch Bar
 at 800°F - Stress Ratio A = 0.67
 Longitudinal Direction 1800 CFM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
E	103,000	146,000	Failed in gauge section
		125,000	
		126,000	
		119,000	
F	80,000	158,000	
E		630,000	
		564,000	
		574,000	
	90,000	337,000	
		281,000	
		153,000	
		333,000	
		261,000	
F		443,000	
G		182,000	
E	55,000	10,000,000	No Failure
F			

Fatigue Properties of Incoloy 901 AMS 5660A - 1.00 Inch Bar
at 1000°F - Stress Ratio A = 0.67
Longitudinal Direction - 1800 CPM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
E	103,000	161,000	Failed in gauge section
		131,000	
		214,000	
		137,000	
		49,000	
	90,000	623,000	No Failure
		976,000	
		477,000	
	96,000	381,000	
	96,000	206,000	
	80,000	1,427,000	
		1,000,000	
		1,000,000	

Fatigue Properties of Incoloy 901 AMS 5660A - 1.00 Inch Bar
 at 1200°F - Stress Ratio A = 0.67
 Longitudinal Direction - 1800 CPM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
F	95,000	1,898,000	Failed in gauge section
E		160,000	
		463,000	
		334,000	
	86,000	450,000	
	86,000	792,000	No failure
	80,000	2,166,000	
	80,000	1,843,000	
F	70,000	10,000,000	
E		4,849,000	
E		10,000,000	
G		10,000,000	

Fatigue Properties of Incoloy 901 AMS 5660A - 1.00 Inch Bar
 at 1200°F - Stress Ratio A = 0.67
 Longitudinal Direction - 3600 CPM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
E	91,250	567,000	Failed in gauge section
		93,000	
		431,000	
		170,000	
G		483,000	
E	104,938	65,000	
		55,000	
		116,000	
	83,950	1,021,000	
		1,024,000	
		1,369,000	
G	113,150	17,000	
E		114,000	
E		28,000	
G		41,000	

Fatigue Properties of Incoloy 901 AMS 566CA - 1.00 Inch Bar
at 1400°F - Stress Ratio A - 0.67
Longitudinal Direction - 1800 CFM

<u>Test Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
E	75,000	314,000	Failed in gauge section
		226,000	
		185,000	
		284,000	
		322,000	
	92,000	47,000	
		39,000	
		23,000	
		27,000	
		20,000	
	62,000	3,216,000	No failure
		1,000,000	
		1,000,000	
		1,000,000	
		1,000,000	

Fatigue Properties of Incoloy 901 AMS 5660A - 1.00 Inch Bar
 at 11400°F - Stress Ratio A = 0.67
 Longitudinal Direction - 3600 CPM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
E	91,250	27,000	Failed in gauge section
E		20,000	
F		336,000	
E		40,000	
		42,000	
	80,300	295,000	
		300,000	
		445,000	
		238,000	
F		1,575,000	
E	73,000	740,000	
E		1,013,000	
E		1,080,000	
F		5,957,000	
E		768,000	

Fatigue Properties of Incoloy 901 AMS 5660A - 1.00 Inch Bar
at 1600°F - Stress Ratio A = 0.67
Longitudinal Direction - 1800 CFM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
F	60,000	27,000	Failed in gauge section
E	60,000	27,000	
E	55,000	11,000	
E	55,000	23,000	
E	50,000	29,000	
E	50,000	24,000	No failure Failed in gauge section
E	40,000	1,595,000	
E	35,000	77,000	
E	35,000	163,000	
E	31,000	107,000	
E	31,000	713,000	No failure
G	31,000	16,000	
F	28,000	1,170,000	
E	28,000	493,000	
E	28,000	610,000	
E	20,000	10,000,000	No failure
E	20,000	4,820,000	
E	20,000	6,240,000	
Z	20,000	10,000,000	
F	20,000	10,000,000	

Fatigue Properties of Incoloy 901 AMS 5660A - 1.00 Inch Bar
 at 1800°F - Stress Ratio A = 0.67
 Longitudinal Direction - 1800 CPM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
E	10,000	135,000	Failed in gauge section
E	10,000	265,000	
E	10,000	206,000	
G	10,000	99,000	
E	10,000	120,000	No failure
E	5,000	1,851,000	
E	5,000	1,000,000	
E	5,000	1,000,000	
E	5,000	1,000,000	No failure
G	5,000	1,000,000	

Fatigue Properties of Incoloy 901 AMS 5660A - 1.00 Inch Bar
 at Room Temperature - Stress Ratio A = 0.98
 Longitudinal Direction - 1800 CPM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
E	110,000	14,000	Failed in gauge section
E	110,000	30,000	
E	110,000	20,000	
E	110,000	17,000	
E	100,000	45,000	
E	100,000	102,000	
E	100,000	32,000	
E	100,000	101,000	
E	100,000	60,000	
E	80,000	214,000	
E	80,000	213,000	
E	80,000	208,000	
E	80,000	245,000	
E	70,000	422,000	
E	70,000	440,000	
E	60,000	1,296,000	
E	60,000	4,216,000	
E	60,000	1,058,000	
E	60,000	1,802,000	
E	60,000	1,674,000	
E	55,000	10,000,000	No failure
E	55,000	10,195,000	
E	55,000	10,000,000	No failure
E	55,000	10,000,000	Failed in gauge section

Fatigue Properties of Incoloy 901 AMS 5660A - 1.00 Inch Bar
 at 600°F - Stress Ratio A = 0.98
 Longitudinal Direction - 1800 CPM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
E	80,000	391,000	Failed in gauge section
E	80,000	333,000	
E	80,000	245,000	
E	70,000	649,000	
E	70,000	654,000	
E	70,000	692,000	
E	70,000	880,000	
E	100,000	82,000	
E	100,000	88,000	
E	100,000	70,000	
E	100,000	67,000	Failed in gauge section
E	110,000	35,000	
E	110,000	31,000	

Fatigue Properties of Incoloy 901 AMS 5660A - 1.00 Inch Bar
 at 1000°F - Stress Ratio A = 0.98
 Longitudinal Direction - 1800 CPM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
E	110,000	57,000	Failed in gauge section
E	110,000	31,000	
E	110,000	22,000	
E	110,000	25,000	
E	90,000	172,000	
E	90,000	132,000	
E	90,000	97,000	
E	90,000	97,000	
E	70,000	836,000	
E	70,000	665,000	
E	70,000	1,100,000	
E	70,000	1,759,000	Failed in gauge section

Fatigue Properties of Incoloy 901 AMS 5660A - 1.00 Inch Bar
 at 1400°F - Stress Ratio A = 0.98
 Longitudinal Direction - 1800 CPM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
E	80,000	25,000	Failed in gauge section
E	80,000	53,000	
E	80,000	24,000	
E	80,000	46,000	
E	70,000	156,000	
E	70,000	757,000	
E	70,000	319,000	
E	70,000	483,000	
E	70,000	385,000	
E	65,000	926,000	
E	65,000	515,000	No failure
E	65,000	528,000	
E	60,000	1,851,000	
E	60,000	1,810,000	
E	60,000	1,000,000	
E	60,000	1,318,000	No failure

Fatigue Properties of Incoloy 901 AMS 5660A - 1.00 Inch Bar
 at 1800°F - Stress Ratio A = 0.98
 Longitudinal Direction - 1800 CPM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
E	10,000	41,000	Failed in gauge section
E	10,000	31,000	
E	10,000	73,000	
E	10,000	23,000	
E	8,000	162,000	
E	6,000	1,000,000	No failure
E	7,000	2,000,000	Failed in gauge section
E	7,000	3,137,000	No failure
E	7,000	1,184,000	Failed in gauge section
E	8,000	581,000	
E	8,000	295,000	
E	8,000	212,000	
E	8,000	239,000	Failed in gauge section

Fatigue Properties of Incoloy 901 AMS 5660A - 1.00 Inch Bar
at Room Temperature - Stress Ratio A = 2.0
Longitudinal Direction - 1800 CPM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
E	105,000	63,000	Failed in gauge section
E	105,000	57,000	
E	105,000	78,000	
E	105,000	40,000	
E	105,000	82,000	
E	90,000	242,000	
E	90,000	202,000	
E	90,000	128,000	
E	90,000	135,000	
E	90,000	121,000	
E	125,000	12,000	
E	125,000	13,000	
E	125,000	13,000	
E	125,000	11,000	
E	125,000	14,000	
E	80,000	263,000	
E	80,000	752,000	
E	80,000	480,000	
E	80,000	272,000	
E	80,000	489,000	
E	115,000	22,000	
E	115,000	31,000	
E	115,000	27,000	
E	115,000	28,000	
E	115,000	31,000	
E	68,000	2,090,000	
E	68,000	1,068,000	
E	68,000	1,751,000	
E	68,000	748,000	
E	68,000	538,000	Failed in gauge section

Fatigue Properties of Incoloy 901 AMS 5660A - 1.00 Inch Bar
 at 600°F - Stress Ratio A = 2.0
 Longitudinal Direction - 1800 CPM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
E	100,000	21,000	Failed in gauge section
E	100,000	17,000	
E	100,000	18,000	
E	100,000	14,000	
E	100,000	20,000	
E	85,000	60,000	
E	85,000	56,000	
E	85,000	110,000	
E	85,000	94,000	
E	85,000	73,000	
E	70,000	183,000	Failed in gauge section
E	70,000	399,000	
E	70,000	361,000	
E	70,000	409,000	
E	70,000	262,000	

Fatigue Properties of Incoloy 901 AMS 5660A - 1.00 Inch Bar
 at 1000°F - Stress Ratio A = 2.0
 Longitudinal Direction - 1800 CPM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
E	90,000	11,000	Failed in gauge section
E	90,000	34,000	
E	90,000	23,000	
E	90,000	45,000	
E	90,000	24,000	
E	70,000	251,000	
E	70,000	140,000	
E	70,000	154,000	
E	70,000	140,000	
E	70,000	380,000	
E	80,000	94,000	
E	80,000	82,000	
E	80,000	84,000	
E	80,000	59,000	
E	80,000	63,000	Failed in gauge section

Fatigue Properties of Incoloy 901 AMS 5660A - 1.00 Inch Bar
 at 1400°F - Stress Ratio A = 2.0
 Longitudinal Direction - 1800 CPM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
E	66,000	-	Bent on heating up
E	45,000	-	Bent on heating up
E	45,000	423,000	No failure
E	70,000	74,000	Failed in gauge section
E	50,000	187,000	No failure - power shut down
E	70,000	38,000	Failed in gauge section
E	70,000	13,000	
E	70,000	153,000	
E	70,000	48,000	
E	80,000	21,000	
E	60,000	856,000	
E	80,000	19,000	
E	60,000	891,000	
E	60,000	593,000	
E	60,000	736,000	Failed in gauge section

Fatigue Properties of Incoloy 901 AMS 5660A - 1.00 Inch Bar
 at 1800°F - Stress Ratio A = 2.0
 Longitudinal Direction - 1800 CPM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
E	10,000	2,126,000	No failure
E	16,000	221,000	Failed in gauge section
E	16,000	127,000	
E	16,000	149,000	
E	16,000	246,000	
E	18,000	35,000	
E	18,000	110,000	
E	18,000	117,000	
E	18,000	107,000	
E	18,000	85,000	
E	16,000	187,000	
E	20,000	41,000	
E	20,000	44,000	
E	20,000	27,000	
E	20,000	57,000	Failed in gauge section

Fatigue Properties of Incoloy 901 AMS 5660A - 1.00 Inch Bar
at Room Temperature - Stress Ratio A = ∞
Longitudinal Direction - 1800 CPM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
E	60,000	409,000	Failed in gauge section
E	60,000	351,000	
E	60,000	417,000	
E	60,000	394,000	
E	80,000	59,000	
E	50,000	2,856,000	
E	50,000	1,596,000	
E	50,000	2,135,000	
E	50,000	8,838,000	
E	50,000	1,050,000	
E	100,000	13,000	
E	100,000	10,000	
E	100,000	11,000	
E	100,000	11,000	
E	100,000	12,000	
E	80,000	83,000	
E	60,000	1,600,000	
E	80,000	55,000	
E	80,000	81,000	
E	80,000	66,000	
E	42,000	10,000,000	No failure
E	90,000	31,000	Failed in gauge section
E	90,000	26,000	
E	90,000	29,000	
E	90,000	24,000	
E	70,000	133,000	
E	70,000	96,000	
E	70,000	232,000	
E	70,000	199,000	
E	70,000	205,000	Failed in gauge section

Fatigue Properties of Incoloy 901 AMS 5660A - 1.00 Inch Bar
 at 600°F - Stress Ratio A = ∞
 Longitudinal Direction - 1800 CPM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
E	84,000	13,000	Failed in gauge section
E	84,000	21,000	
E	84,000	20,000	
E	84,000	28,000	
E	84,000	20,000	
E	74,000	42,000	
E	74,000	31,000	
E	74,000	20,000	
E	74,000	44,000	
E	74,000	44,000	
E	64,000	107,000	
E	64,000	97,000	
E	64,000	98,000	
E	64,000	162,000	
E	64,000	84,000	Failed in gauge section

Fatigue Properties of Incoloy 901 AMS 5660A - 1.00 Inch Bar
 at 1000°F - Stress Ratio A = ∞
 Longitudinal Direction - 1800 CPM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
E	90,000	6,400	Failed in gauge section
E	80,000	13,000	
E	80,000	14,000	
E	80,000	21,000	
E	80,000	23,000	
E	68,000	134,000	
E	70,000	44,000	
E	70,000	47,000	
E	70,000	43,000	
E	70,000	71,000	
E	60,000	194,000	Specimen improperly machined Failed in gauge section Failed in gauge section
E	60,000	83,000	
E	60,000	34,000	
E	60,000	168,000	
E	60,000	727,000	

Fatigue Properties of Incoloy 901 AMS 5660A - 1.00 Inch Bar
 at 1400°F - Stress Ratio A = ∞
 Longitudinal Direction - 1800 CRM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
E	70,000	4,000	Failed in gauge section
E	60,000	31,000	
E	60,000	42,000	
E	60,000	25,000	
E	60,000	20,000	
E	48,000	956,000	
E	48,000	825,000	
E	48,000	505,000	
E	48,000	699,000	
E	48,000	629,000	
E	54,000	130,000	
E	54,000	157,000	
E	54,000	119,000	
E	54,000	176,000	
E	54,000	66,000	

Fatigue Properties of Incoloy 901 AMS 5660A - 1.00 Inch Bar
 at 1800°F - Stress Ratio A = ∞
 Longitudinal Direction - 1800 CPM

<u>Heat Number</u>	<u>Maximum Stress (psi)</u>	<u>Number of Cycles</u>	<u>Remarks</u>
E	20,000	72,000	Failed in gauge section
E	20,000	43,000	
E	20,000	48,000	
E	20,000	53,000	
E	20,000	46,000	
E	18,000	115,000	
E	18,000	105,000	
E	18,000	95,000	
E	18,000	95,000	Bent during heating
E	18,000	103,000	Failed in gauge section
E	16,000	174,000	
E	16,000	136,000	
E	16,000	165,000	
E	16,000	199,000	
E	16,000	118,000	Failed in gauge section

SECTION V - EXAMPLES OF STATISTICAL METHODS

5.1 Direct Calculations

Example of Calculations for Directly Calculated Values

Material: L-605
 Form: Plate, Bar, and Forging
 Property: F_{tu} and F_{ty} (Longitudinal direction only)
 Vendor: Haynes

<u>Form</u>	<u>Number of Specimens</u>	<u>Heats per Form</u>
Bar -		
.437	14	13
.500	46	24
.530	1	1
.562	12	11
.625	6	6
.687	22	16
.750	14	10
.812	11	8
.875	8	7
.937	14	12
1 inch	30	14
1-1/16	17	17
1 1/8	7	7
1 1/4	28	26
Forging -		
1 x 3	15	3
Plate -		
3/8	30	3
1 inch	30	3

Number of Forms: 17
 Number of Specimens: 305
 Number of Heat-Form Combinations: 181
 Number of Different Heats: 92

Form	Number of Specimens per Heat							
Bar -								
.437	1	L3-1642	139.0	2.0	4.0	66.0	2.0	4.0
	1	L-1725	137.0	4.0	16.0	64.0	4.0	16.0
	1	L-1660	142.0	1.0	1.0	80.0	12.0	144.0
	1	L-1737	145.0	4.0	16.0	79.0	11.0	121.0
	2	L1-1421	142.0	1.0	1.0	67.0	1.0	1.0
	1	L1-1493	144.0	3.0	9.0	65.0	3.0	9.0
	1	L1-1525	143.0	2.0	4.0	69.0	1.0	1.0
	1	L2-1652	146.0	5.0	25.0	58.0	10.0	100.0
	1	L1-1634	141.0	0	0	66.0	2.0	4.0
	1	L2-1730	139.0	2.0	4.0	70.0	2.0	4.0
	1	L2-1449	143.0	2.0	4.0	67.0	1.0	1.0
	1	L2-1461	142.0	6.0	36.0	67.0	1.0	1.0
	1	L3-1493	138.0	3.0	9.0	64.0	4.0	16.0
.50	3	L3-1564	144.0	3.0	9.0	65.7	2.3	5.29
	1	L3-1554	143.0	2.0	4.0	66.0	2.0	4.0
	1	L3-1619	140.0	1.0	1.0	66.0	2.0	4.0
	1	L-1623	138.0	3.0	9.0	62.0	6.0	36.0
	1	L-1622	140.0	1.0	1.0	61.0	7.0	49.0
	1	L-1683	142.0	1.0	1.0	67.0	1.0	1.0
	1	L-1715	141.0	0	0	68.0	0	0
	1	L-1794	142.0	1.0	1.0	69.0	1.0	1.0
	1	L-1831	143.0	2.0	4.0	67.0	1.0	1.0
	1	L1-1479	148.0	7.0	49.0	71.0	3.0	9.0
	2	L1-1520	140.0	1.0	1.0	66.5	1.5	2.25
	2	L1-1535	142.5	1.5	2.25	68.0	0	0
	1	L2-1677	139.0	2.0	4.0	65.0	1.0	1.0
	1	L2-1689	137.0	4.0	16.0	64.0	4.0	16.0
	7	L2-1737	140.9	0.1	0.01	65.2	2.8	7.84
	1	L2-1736	140.0	1.0	1.0	65.0	3.0	9.0
	6	L2-1729	145.0	4.0	16.0	69.5	1.5	2.25
	2	L2-1777	142.0	1.0	1.0	66.0	2.0	4.0
	6	L2-1756	147.1	6.1	37.21	65.0	1.0	1.0
	1	L2-1780	143.0	2.0	4.0	66.0	2.0	4.0
	2	L2-1449	144.5	3.5	12.25	68.0	0	0
	1	L2-1494	140.0	1.0	1.0	65.0	3.0	9.0
	1	L3-1493	138.0	3.0	9.0	64.0	4.0	16.0

.530	1	L3-1482	140.0	1.0	1.0	66.0	2.0	4.0
.562	1	L3-1564	141.0	0	0	61.0	7.0	49.0
	1	L3-1619	140.0	1.0	1.0	67.0	1.0	1.0
	2	L3-1617	145.5	4.5	20.25	71.0	3.0	9.0
	1	L2-1789	139.0	2.0	4.0	65.0	3.0	9.0
	1	L2-1780	144.0	3.0	9.0	69.0	1.0	1.0
	1	L2-1433	135.0	6.0	36.0	64.0	4.0	16.0
	1	L2-1449	141.0	0	0	65.0	3.0	9.0
	1	L3-1495	144.0	3.0	9.0	67.0	1.0	1.0
	1	L3-1493	138.0	3.0	9.0	65.0	3.0	9.0
	1	L3-1535	145.0	4.0	16.0	68.0	0	0
	1	L2-1662	143.0	2.0	4.0	67.0	1.0	1.0
.625	1	L3-1594	145.0	4.0	16.0	68.0	0	0
	1	L3-1619	146.0	5.0	25.0	72.0	4.0	16.0
	1	L2-1759	144.0	3.0	9.0	69.0	1.0	1.0
	1	L2-1789	141.0	0	0	66.0	2.0	4.0
	1	L2-1462	140.0	1.0	1.0	63.0	5.0	25.0
	1	L3-1535	145.0	4.0	16.0	67.0	1.0	1.0
.687	1	L3-1564	141.0	0	0	64.0	4.0	16.0
	2	L3-1584	137.5	3.5	12.25	64.5	3.5	12.25
	1	L3-1617	148.0	7.0	49.0	71.0	3.0	9.0
	1	L3-1642	141.0	0	0	66.0	2.0	4.0
	2	L2-1789	142.0	1.0	1.0	69.0	1.0	1.0
	1	L2-1449	143.0	2.0	4.0	68.0	0	0
	1	L2-1462	139.0	2.0	4.0	67.0	1.0	1.0
	1	L3-1493	136.0	5.0	25.0	64.0	4.0	16.0
	1	L2-1458	136.0	5.0	25.0	64.0	4.0	16.0
	2	L3-1506	141.5	0.5	0.25	68.0	0	0
	1	L3-1507	142.0	1.0	1.0	69.0	1.0	1.0
	2	L2-1759	140.5	0.5	0.25	66.0	2.0	4.0
	1	L2-1737	138.0	3.0	9.0	67.0	1.0	1.0
	1	L2-1704	140.0	1.0	1.0	66.0	2.0	4.0
	3	L2-1689	142.7	1.7	2.89	69.0	1.0	1.0
	1	L2-1691	143.0	2.0	4.0	67.0	1.0	1.0
.750	1	L3-1584	138.0	3.0	9.0	63.0	5.0	25.0
	1	L3-1630	141.0	0	0	70.0	2.0	4.0
	1	L3-1507	140.0	1.0	1.0	68.0	0	0
	1	L2-1789	143.0	2.0	4.0	71.0	3.0	9.0
	1	L2-1462	141.0	0	0	68.0	0	0
	1	L2-1461	144.0	3.0	9.0	71.0	3.0	9.0
	1	L3-1495	141.0	0	0	67.0	1.0	1.0
	1	L3-1506	141.0	0	0	69.0	2.0	4.0
	5	L3-1553	149.0	8.0	64.0	67.4	0.6	.36
	1	L3-1554	141.0	0	0	61.0	7.0	49.0

.812	1	L3-1610	138.0	3.0	9.0	69.0	1.0	1.0
	1	L3-1584	137.0	4.0	16.0	69.0	1.0	1.0
	1	L1-1418	142.0	1.0	1.0	70.0	2.0	4.0
	1	L1-1501	142.0	1.0	1.0	72.0	4.0	16.0
	1	L-1713	137.0	4.0	16.0	66.0	2.0	4.0
	1	L-1749	141.0	0	0	68.0	0	0
	2	L1-1421	143.0	2.0	4.0	72.0	4.0	16.0
.875	1	L3-1641	143.0	2.0	4.0	70.0	2.0	4.0
	1	L2-1737	137.0	4.0	16.0	67.0	1.0	1.0
	1	L2-1448	144.0	3.0	9.0	70.0	2.0	4.0
	2	L1-1517	140.5	0.5	0.25	68.0	0	0
	1	L-1632	141.0	0	0	66.0	2.0	4.0
	1	L-1713	140.0	1.0	1.0	67.0	1.0	1.0
	1	L-1794	142.0	1.0	1.0	72.0	4.0	16.0
.937	1	L3-1585	145.0	4.0	16.0	68.0	1.0	1.0
	1	L3-1642	138.0	3.0	9.0	66.0	2.0	4.0
	1	L3-1630	142.0	1.0	1.0	70.0	2.0	4.0
	1	L2-1780	141.0	0	0	69.0	1.0	1.0
	1	L2-1458	135.0	6.0	36.0	67.0	1.0	1.0
	1	L3-1494	138.0	3.0	9.0	65.0	3.0	9.0
	1	L1-1520	140.0	1.0	1.0	69.0	1.0	1.0
	1	L-1660	139.0	2.0	4.0	69.0	1.0	1.0
	1	L-1716	142.0	1.0	1.0	71.0	3.0	9.0
	1	L-1749	144.0	3.0	9.0	69.0	1.0	1.0
	2	L-1822	142.5	1.5	2.25	67.5	0.5	2.25
	2	L-1831	142.0	1.0	1.0	69.5	1.5	2.25
1 inch	6	L2-1756	142.8	1.8	3.24	71.5	3.5	12.25
	6	L2-1729	140.6	0.4	0.16	70.8	2.8	7.84
	6	L2-1737	136.5	4.5	20.25	65.9	2.1	4.41
	1	L3-1584	138.0	3.0	9.0	63.0	5.0	25.0
	1	L3-1619	142.0	1.0	1.0	71.0	3.0	9.0
	1	L3-1484	138.0	3.0	9.0	70.0	2.0	4.0
	1	L1-1477	141.0	0	0	70.0	2.0	4.0
	1	L1-1490	140.0	1.0	1.0	69.0	1.0	1.0
	1	L2-1651	139.0	2.0	4.0	69.0	4.0	16.0
	1	L2-1648	139.0	2.0	4.0	70.0	2.0	4.0
	2	L2-1652	142.0	1.0	1.0	73.5	5.5	30.25
	1	L-1725	140.0	1.0	1.0	70.0	2.0	4.0
	1	L-1737	144.0	3.0	9.0	70.0	2.0	4.0
	1	L1-1478	142.0	1.0	1.0	70.0	2.0	4.0

1 1/16	1	L2-1443	141.0	0	0	70.0	2.0	4.0
	1	L3-1506	143.0	2.0	4.0	68.0	0	0
	1	L3-1552	151.0	10.0	100.0	72.0	4.0	16.0
	1	L3-1642	141.0	0	0	68.0	0	0
	1	L2-1691	140.0	1.0	1.0	71.0	3.0	9.0
	1	L2-1756	144.0	3.0	9.0	73.0	5.0	25.0
	1	L1-1490	140.0	1.0	1.0	69.0	1.0	1.0
	1	L1-1578	138.0	3.0	9.0	66.0	2.0	4.0
	1	L2-1652	136.0	5.0	25.0	73.0	5.0	25.0
	1	L2-1648	141.0	0	0	72.0	4.0	16.0
	1	L2-1677	137.0	4.0	16.0	67.0	1.0	1.0
	1	L-1640	142.0	1.0	1.0	64.0	4.0	16.0
	1	L-1749	144.0	3.0	9.0	71.0	3.0	9.0
	1	L-1737	145.0	4.0	16.0	72.0	4.0	16.0
	1	L-1822	143.0	2.0	4.0	68.0	0	0
	1	L-1831	145.0	4.0	16.0	69.0	1.0	1.0
	1	L1-1421	141.0	0	0	70.0	2.0	4.0
1 1/8	1	L3-1535	141.0	0	0	66.0	2.0	4.0
	1	L3-1642	143.0	2.0	4.0	71.0	3.0	9.0
	1	L2-1791	138.0	3.0	9.0	64.0	4.0	16.0
	1	L1-1558	141.0	0	0	72.0	4.0	16.0
	1	L-1655	139.0	2.0	4.0	65.0	3.0	9.0
	1	L-1683	140.0	1.0	1.0	66.0	2.0	4.0
	1	L-1660	140.0	1.0	1.0	69.0	1.0	1.0
1 1/4	1	L3-1485	137.0	4.0	16.0	65.0	3.0	9.0
	1	L3-1494	137.0	4.0	16.0	66.0	2.0	4.0
	1	L2-1400	137.0	4.0	16.0	62.0	6.0	36.0
	1	L3-1641	141.0	0	0	65.0	3.0	9.0
	1	L3-1630	141.0	0	0	67.0	1.0	1.0
	1	L2-1706	142.0	1.0	1.0	70.0	2.0	4.0
	1	L2-1663	139.0	2.0	4.0	70.0	2.0	4.0
	1	L2-1779	137.0	4.0	16.0	69.0	1.0	1.0
	1	L2-1791	141.0	0	0	69.0	1.0	1.0
	1	L2-1788	140.0	1.0	1.0	70.0	2.0	4.0
	1	L2-1756	143.0	2.0	4.0	70.0	2.0	4.0
	1	L2-1649	140.0	1.0	1.0	72.0	4.0	16.0
	1	L2-1729	137.0	4.0	16.0	67.0	1.0	1.0
	2	L2-1443	140.5	0.5	0.25	66.5	1.5	2.0
	1	L1-1535	142.0	1.0	1.0	70.0	2.0	4.0
	1	L1-1577	141.0	0	0	70.0	2.0	4.0
	1	L1-1558	143.0	2.0	4.0	74.0	6.0	36.0
	1	L1-1594	139.0	2.0	4.0	71.0	3.0	9.0
	1	L1-1633	146.0	5.0	25.0	75.0	7.0	49.0
	1	L2-1648	140.0	1.0	1.0	69.0	1.0	1.0
	1	L-1640	139.0	2.0	4.0	68.0	0	0

1	L-1632	137.0	4.0	16.0	69.0	1.0	1.0
1	L-1713	141.0	0	0	70.0	2.0	4.0
2	L-1683	137.0	4.0	16.0	67.0	1.0	1.0
1	L-1749	137.0	4.0	16.0	69.0	1.0	1.0
1	L-1477	142.0	1.0	1.0	70.0	2.0	4.0

Forging -

1 x 3	5	L2-1756	143.7	2.7	7.29	67.5	0.5	0.25
	5	L2-1729	139.9	1.1	1.21	70.6	2.6	6.76
	5	L2-1737	136.7	4.3	18.49	67.1	0.9	0.81

Plate -

3/8	10	L2-1787	134.8	6.2	38.44	63.7	4.3	18.49
	10	L2-1782	137.6	3.4	11.56	64.8	3.2	10.24
	10	L2-1754	139.1	1.9	3.61	64.5	3.5	12.25
1 inch	10	L2-1787	141.4	0.4	0.16	70.6	2.6	6.76
	10	L2-1782	142.2	1.2	1.44	69.3	1.3	1.39
	10	L2-1754	141.0	0	0	69.8	1.8	3.24

Calculations for F_{tu} :

$$= 25522.5$$

$$\frac{25522.5}{181} = 141.0$$

$$= \frac{1526.41}{180}$$

$$= 2.9$$

A Basis

$$K \text{ for 305 specimens} = 2.520$$

$$F_{tu} = 141.0 - 2.520 (2.9) = 133.7 \text{ ksi}$$

B Basis

$$K \text{ for 305 specimens} = 1.415$$

$$F_{tu} = 141.0 - 1.415 (2.9) = 136.9 \text{ ksi}$$

5.2 Derived Values

EXAMPLE OF CALCULATIONS FOR A DERIVED VALUE

Material: Inconel 702

Form: Sheet

Property: $F_{bra}(c/D=2.0)$ Longitudinal Direction only

Table of Ratios & Deviations (f_{bra}/f_{tu})

Heat A			Heat B			Heat C		
Ratio	$(x-\bar{x})$	$(x-\bar{x})^2$	Ratio	$(x-\bar{x})$	$(x-\bar{x})^2$	Ratio	$(x-\bar{x})$	$(x-\bar{x})^2$
$\frac{294.6}{140.5} = 2.100$	.185	.034225	$\frac{261.1}{142.7} = 1.830$	.085	.007225	$\frac{261.6}{142.3} = 1.838$	.077	.005929
$\frac{290.6}{139.8} = 2.077$	.164	.026896	$\frac{246.5}{142.3} = 1.732$	.183	.033489	$\frac{261.0}{142.3} = 1.834$	.081	.006561
$\frac{262.9}{139.6} = 1.883$	.032	.001024	$\frac{293.0}{143.7} = 2.039$	.124	.015376	$\frac{281.9}{142.0} = 1.985$	.081	.004900
$\frac{268.3}{139.6} = 1.922$	.007	.000099	$\frac{291.1}{142.7} = 2.040$	.125	.015625	$\frac{280.0}{141.9} = 1.973$	.058	.003364
$\frac{253.1}{139.9} = 1.809$	.106	.011236	$\frac{284.6}{142.7} = 1.994$	.079	.006241	$\frac{255.2}{141.6} = 1.802$	.113	.012769
$\frac{282.0}{141.6} = 1.992$	.077	.005929	$\frac{261.1}{142.3} = 1.835$	.080	.006400	$\frac{280.4}{141.2} = 1.986$	.071	.005041
$\frac{258.8}{140.0} = 1.806$	.109	.011881	$\frac{246.4}{142.7} = 1.727$	.188	.035344	$\frac{274.8}{142.0} = 1.935$	.020	.000400
$\frac{302.6}{141.9} = 2.132$	.217	.047089	$\frac{244.6}{143.7} = 1.702$	.213	.045369	$\frac{254.1}{142.6} = 1.782$	.133	.017689
$\frac{288.6}{138.4} = 2.085$	.170	.028900	$\frac{292.4}{145.0} = 2.017$	.102	.010404	$\frac{242.8}{141.9} = 1.711$	.204	.041616
$\frac{287.0}{141.9} = 2.023$	.108	.011664				$\frac{275.7}{142.7} = 1.932$	.017	.000289

Calculations:

$$\bar{r} = \frac{r}{n} = \frac{55.525}{29} = 1.915$$

$$S\bar{r} = \frac{(r-\bar{r})^2}{n(n-1)} = \frac{.452924}{29(28)} = .0236$$

$$\bar{r} - t_{.05} S\bar{r} = 1.915 - 1.96(.0236) = 1.869$$

A Basis

$$F_{bru} = 1.869 F_{tu}(A) = 1.869(125.6) = 234.7 \text{ KSI}$$

B Basis

$$F_{bru} = 1.869 F_{tu}(B) = 1.869(131.6) = 246.0 \text{ KSI}$$