

AD-A143 328 MECHANICAL PROPERTY DATA 7175-T736 ALUMINUM ALLOY: HAND 1/1
FORGING(U) DAYTON UNIV OH RESEARCH INST JUN 84
UDR-TN-84-20 F33615-82-C-5102

UNCLASSIFIED

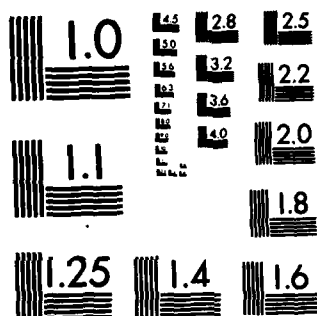
F/G 20/11 NL



END

FILED

DTIC



MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

MECHANICAL PROPERTY DATA
7175-T736 ALUMINUM ALLOY

AD-A143 328

HAND FORGING

JUNE 1984

DTIC FILE COPY

DTIC
ELECTE
S JUL 24 1984
A

Prepared By:
UNIVERSITY OF DAYTON
Research Institute
Dayton, Ohio 45469

F33615-82-C-5102

This document has been approved
for public release and sale; its
distribution is unlimited.

84 07 23 143

This data sheet was prepared by the University of Dayton Research Institute under Contract No. F33615-82-C-5102, under the direction of the Air Force Wright Aeronautical Laboratories, Materials Laboratory, Mr. Neal Ontko, MLSA, Technical Monitor.

Notices

When Government drawings, specifications, or other data are used for any purpose other than in connection with a definitely related Government procurement operation, the United States Government thereby incurs no responsibility nor any obligation whatsoever; and the fact that the Government may have formulated, furnished, or in any way supplied the said drawings, specifications, or other data, is not to be regarded by implication or otherwise as in any manner licensing the holder or any other person or corporation, or conveying any rights or permission to manufacture, use, or sell any potential invention that may be in any way related thereto.

Approved for public release; distribution unlimited.

Copies of this report should not be returned unless return is required by security considerations, contractual obligations, or notice on a specific document.



ALL

7175-T736 Aluminum Alloy Hand Forging

Material Description

→ This 7175 Aluminum Alloy, heat-treated to the T736 temper, was produced by ALCOA as a hand forging. Six plates were received in thicknesses ranging from 2 to 6.25 inches, widths ranging from 12 to 16 inches, and lengths of either 30 or 31 inches. This report contains data generated only from these six plates (heats). ←

The average chemical composition of the six heats is as follows:

<u>Chemical Composition</u>	<u>Percent Weight</u>
Silicon	0.078
Manganese	0.010
Magnesium	2.1
Iron	0.089
Copper	1.3
Zinc	5.3
Titanium	0.021
Chromium	0.190
Aluminum	Balance

Processing and Heat Treating

The 7175 aluminum alloy was processed into rectangular shapes by hand forging. The alloy plates were heat treated to the T736 temper.

Results

Only data from the six plates tested are included in this report. The average values for each property are listed in Table 1 by plate direction. The fatigue data and bands for the data are presented in Figures 1 and 2 for the longitudinal direction (notched and unnotched from multiple heats) and in Figures 3 and 4 for the long transverse direction from one heat only.

Table 1
7175-T736 Aluminum Alloy Hand Forging^(a)
R.T.

Properties	Plate Direction		
	Longitudinal	Long Transverse	Short Transverse
<u>Tension</u>			
TUS, ksi (MPa)	72.3 (498.5)	71.6 (493.4)	71.6 (493.4)
TYS, ksi (MPa)	61.7 (425.7)	60.0 (413.7)	60.1 (414.4)
RA, percent	38.6	22.1	15.6
e, percent in 2 in. (50.8 mm)	22.1	15.6	8.9
E, 10 ³ ksi (GPa)	10.23 (70.6)	10.18 (70.2)	10.04 (69.2)
<u>Compression</u>			
CYS, ksi (MPa)	64.9 (447.6)	64.3 (443.3)	63.8 (439.9)
E _c , 10 ³ ksi (GPa)	10.54 (72.7)	11.02 (76.0)	10.92 (75.3)
<u>Shear</u>			
SUS, ksi (MPa) ^(b)	42.9 (295.7)	40.0 (275.8)	40.8 (281.3)
SUS, ksi (MPa) ^(c)	44.8 (308.9)	43.5 (299.9)	43.1 (297.2)
<u>Bearing</u>			
e/D = 1.5			
BUS, ksi (MPa)	114.5 (789.5)	110.3 (760.5)	115.2 (794.3) ^(d)
BYS, ksi (MPa)	92.9 (640.5)	88.8 (612.3)	95.9 (661.2) ^(d)
e/D = 2.0			
BUS, ksi (MPa)	146.8 (1012.2)	143.2 (987.4)	143.4 (988.7) ^(d)
BYS, ksi (MPa)	111.3 (767.4)	106.9 (737.1)	109.7 (756.4) ^(d)

(a) Values are average of triplicate room temperature tests conducted on six plates (heats) at the University of Dayton Research Institute under the subject contract.

(b) Double "rivet" pin shear tests conducted on all six heats for all three directions using 3/8 inch diameter x 1.5 inch long double "rivet" shear specimens.

(c) "Amsler" double pin shear tests conducted on all six heats for L and LT directions and on four heats (with thicknesses above 3.0 inches), using 3/8 inch diameter x 3.0 inch long specimens.

(d) Bearing tests in the short transverse direction were only conducted on 4 heats which had thicknesses of 3.75 inches and greater.

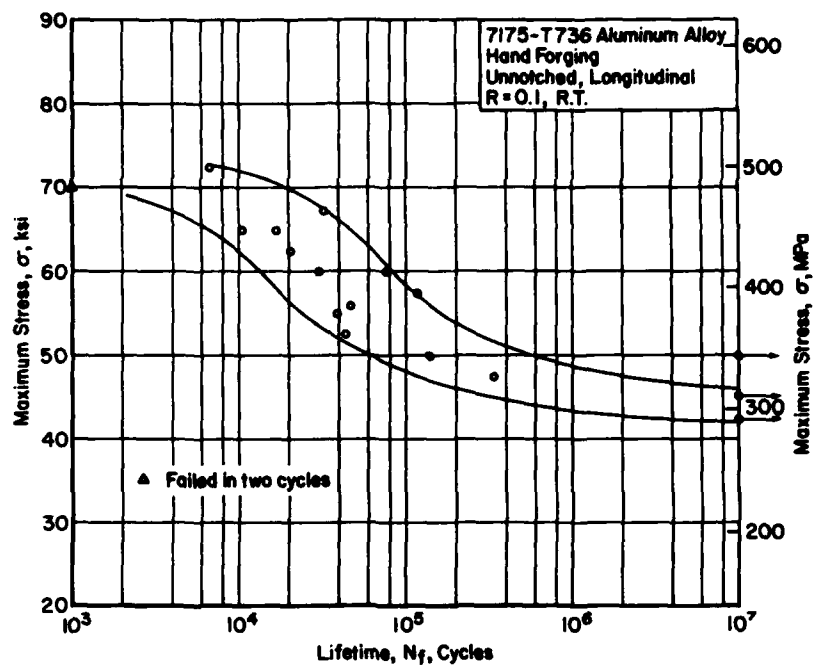


Figure 1. Axial load fatigue data (multiple heats).

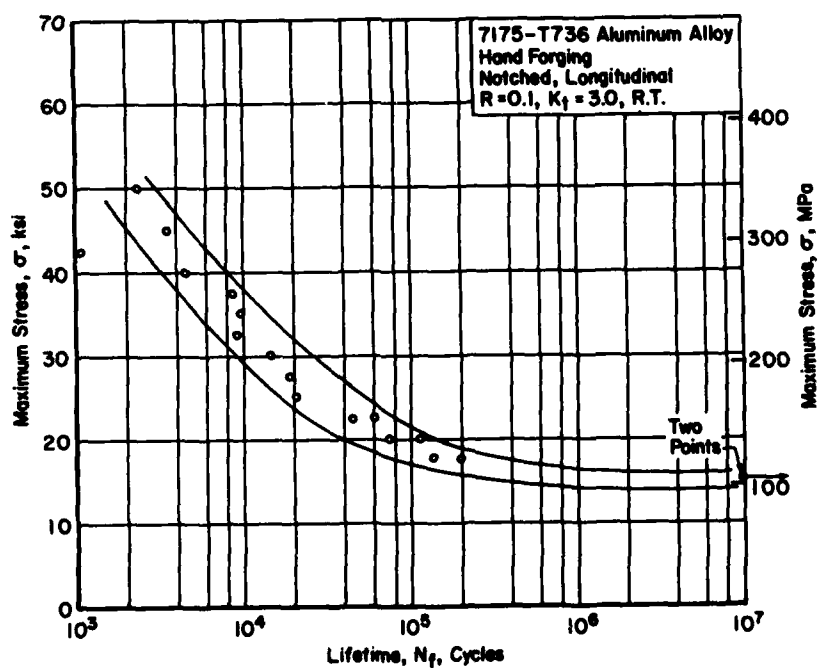


Figure 2. Axial load fatigue data (multiple heats).

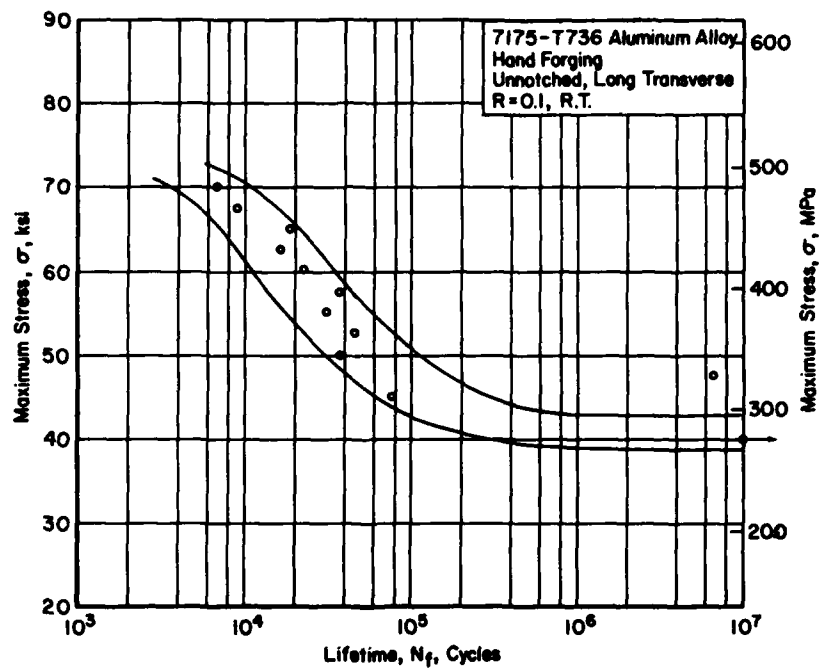


Figure 3. Axial load fatigue data (one heat only).

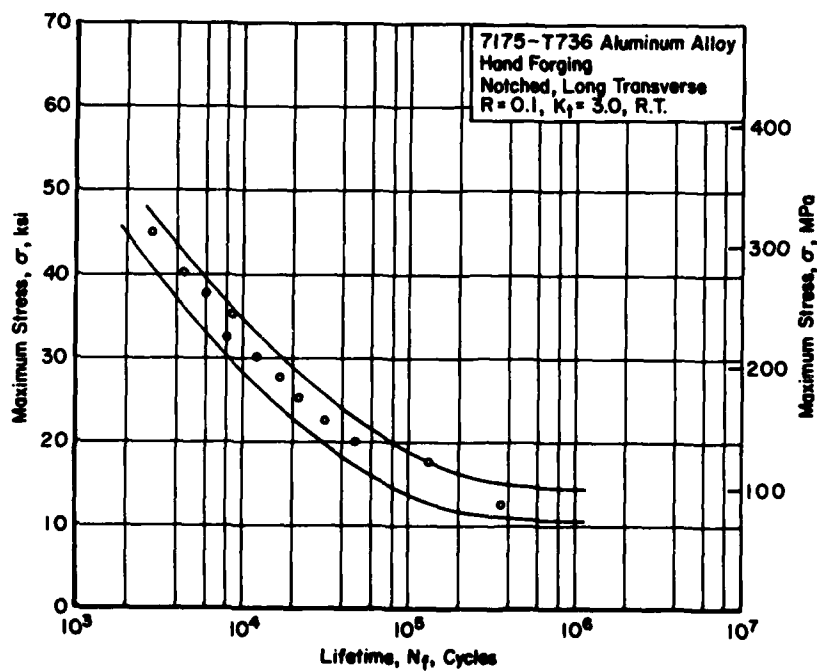


Figure 4. Axial load fatigue data (one heat only).

END

FILMED

8-84

DTIC