Atlas of Formability

Wrought Aluminum 7050
Flow Stress Curves
The views, opinions, and/or findings contained in this report are those of the authors and should not be construed as an official Department of the Navy position, policy, or decision, unless so designated by other documentation.
In this investigation, flow behavior of Aluminum 7050 alloy was studied by conducting compression tests over a wide range of temperatures and strain rates. Stress-strain curves were recorded for each test condition. These data are essential in metalworking process design or finite element analysis of high temperature deformation.
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Wrought Aluminum 7050

Composition:

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Testing Parameters

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<th>Heat Treatment (time)</th>
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*NOTES: Specimens not marked by the asterix (*) were quenched in water after heat treatment and kept in dry ice. They were then heated to the test temperature prior to testing.

Those specimens marked by the asterisk were also quenched in water after heat treatment and kept in dry ice. Prior to testing, the specimens were reheated for 5 minutes at 475° C inside the test fixture and then cooled to the test temperature.
GRAPH NO: AL30
TEMP: 250 C
STRAIN RATE: 0.03/SEC
GRAPH NO: AL32
TEMP: 300 C
STRAIN RATE: 0.03/SEC

TRUE STRESS (MPa)

TRUE STRAIN

NCEMT
GRAPH NO: AL33
TEMP: 350 C
STRAIN RATE: 0.03/SEC

TRUE STRESS (MPA)

0.00 0.25 0.50 0.75 1.00 1.25

TRUE STRAIN

5
GRAPH NO: AL35
TEMP: 477°C
STRAIN RATE: 0.03/SEC

TRUE STRESS (MPa)

TRUE STRAIN

NCEMT
GRAPH NO: AL50
STRAIN RATE: 0.03/SEC

TRUE STRESS (MPA)

TRUE STRAIN

250 C
300 C
350 C
400 C

NCEMT
GRAPH NO: AL27

TEMP: 440°C

STRAIN RATE: 0.3/SEC

TRUE STRESS (MPA)
GRAPH NO: AL51
STRAIN RATE: 0.3/SEC

TRUE STRESS (MPA)

TRUE STRAIN

300 C

440 C

NCETM
GRAPH NO: AL37
TEMP: 250 C
STRAIN RATE: 0.6/SEC

TRUE STRESS (MPA)

TRUE STRAIN

NCEMT
GRAPH NO: AL19
TEMP: 350°C
STRAIN RATE: 0.6/SEC

TRUE STRESS (MPA)

TRUE STRAIN

NCEMT
GRAPH NO: AL22
TEMP: 400°C
STRAIN RATE: 0.6/SEC
GRAPH NO: AL24
TEMP: 440 C
STRAIN RATE: 0.6/SEC
GRAPH NO: AL26
TEMP: 477°C
STRAIN RATE: 0.6/SEC
GRAPH NO: AL52
STRAIN RATE: 0.6/SEC

TRUE STRESS (MPA)

0.00 0.25 0.50 0.75 1.00 1.25

TRUE STRAIN

350 C
250 C
400 C
440 C
477 C

NCEMT
GRAPH NO: AL16
TEMP: 300 C
STRAIN RATE: 2.0/SEC
GRAPH NO: AL17
TEMP: 400°C
STRAIN RATE: 2.0/SEC

TRUE STRESS (MPA)

TRUE STRAIN

NCEMT

19
GRAPH NO: AL53
STRAIN RATE: 2.0/SEC

TRUE STRESS (MPA)

TRUE STRAIN
GRAPH NO: AL38
TEMP: 425 C
STRAIN RATE: 5.5/SEC
GRAPH NO: AL13
TEMP: 425°C
STRAIN RATE: 5.5/SEC
GRAPH NO: AL39
TEMP: 425 C
STRAIN RATE: 5.5/SEC

TRUE STRESS (MPA)

TRUE STRAIN

NCEMT

25
GRAPH NO: AL40
TEMP: 425°C
STRAIN RATE: 5.5/SEC

TRUE STRESS (MPA)

TRUE STRAIN

NCEMT

26
GRAPH NO: AL15
TEMP: 425 C
STRAIN RATE: 5.5/SEC

TRUE STRESS (MPA)

TRUE STRAIN
GRAPH NO: AL01
TEMP: 250 C
STRAIN RATE: 17.2/SEC

TRUE STRESS (MPA)

0.00 0.25 0.50 0.75 1.00 1.25

TRUE STRAIN

0.00 50.00 100.00 150.00 200.00 250.00 300.00
GRAPH NO: AL03
TEMP: 300 C
STRAIN RATE: 17.2/SEC

TRUE STRESS (MPA)

TRUE STRAIN

NCEMT
GRAPH NO: AL06
TEMP: 400 C
STRAIN RATE: 17.2/SEC
GRAPH NO: AL07
TEMP: 440 C
STRAIN RATE: 17.2/SEC

TRUE STRESS (MPA)

TRUE STRAIN

NCEMT
GRAPH NO: AL54
STRAIN RATE: 17.2/SEC

TRUE STRESS (MPA)

TRUE STRAIN

250°C
300°C
350°C
400°C

NCEMT