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Fatigue Properties of Sheet, Bar, and Cast Metallic Materials for Cryogenic Applications

The cryogenic fatigue and tensile properties of nine materials in sheet form, seven materials in wrought bar form, and two materials in cast bar form, have been determined in the operating life-time range of 10^4 to 10^7 cycles at room temperature, at -320°F and at -423°F .

Sheet materials with two surface finishes were evaluated for fatigue under full reverse bending. The bar materials were tested in axial-loading and/or rotating-beam fatigue. The results are presented as stress versus number of cycles to failure.

Materials evaluated were: 6061-T6 sheet and wrought bar; 7075-T73 sheet and wrought bar, and Tens 50-T6 cast bar aluminum alloys; Ti-5Al-2.5Sn (extra low interstitial) wrought bar; AISI 310 CRES (corrosion resistant steel) sheet and wrought bar; A-286 sheet; Inconel 718 sheet and wrought bar; iron and nickel-base age-hardenable alloys; and AISI 4340 wrought bar high-strength steel.

Results of the tests are presented in graphical and tabular form (see Note).

Note:

Requests for further information may be directed to:
Technology Utilization Officer
Code A&TS-TU
Marshall Space Flight Center
Huntsville, Alabama 35812
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Patent status:

Inquiries about obtaining rights for the commercial use of this invention may be made to NASA, Code GP, Washington, D.C. 20546.

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