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NASA TECH BRIEF

Marshall Space Flight Center

Interpretation of Aluminum-Alloy Weld Radiography

A comprehensive report, which attempts to improve the reliability of identifying the various aluminum-alloy weld discontinuity types, proposes the standardization of radiographic terminology. This would allow scientific interpretation of radiographic films to replace the current dependence on individual judgment and experience. Such a step would benefit industry because discontinuity evaluation errors are very costly, due to both the use of parts with undetected defects and the waste of parts rejected because of imaginary defects.

The report concludes that oxide inclusion, which can be taken as porosity, is the discontinuity most often misinterpreted. In instances of tailed porosity, the line extending from the void often goes unseen, and the defect is labelled smooth porosity. Such mistakes are serious, since the jagged edges of oxide inclusions and tailed porosities form stress concentration points that can result in rapid part failure.

On the other hand, a very difficult discontinuity to identify correctly is the enigma. Often mistaken for a serious defect, such as incomplete fusion or a crack, an enigma discontinuity produces no measurable effect on the strength of the weld.

The report includes over 50 pages of photographs, in which radiographs of aluminum welds showing various defects are compared with photomacrographs of prepared weld sections.

Notes:

1. Specific technical questions may be directed to:
   Technology Utilization Officer
   Code A&TS-TU
   Marshall Space Flight Center
   Huntsville, Alabama 35812
2. The following documentation may be obtained from:
   National Technical Information Service
   Springfield, Virginia 22151
   Single document price $3.00
   (or microfiche $0.95)

   Reference:
   NASA-TM-X-53939 (N70-28715), Radiographic Interpretation Guide for Aluminum Alloy Welds

Patent status:

No patent action is contemplated by NASA.

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