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Brief 71-10257

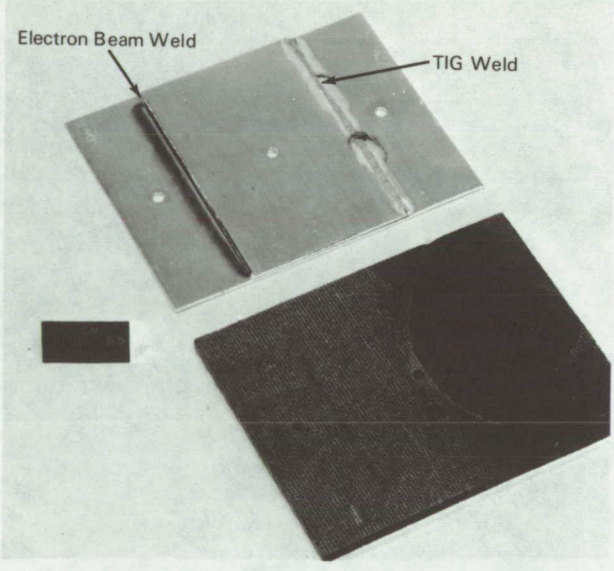
NASA TECH BRIEF

Lewis Research Center

Technique for In-Place Welding of Aluminum Backed Up by a Combustible Material

The problem:

Weld an external aluminum jacket tightly wrapped around an inner layer of wood composition fiberboard without damaging the underlying fiberboard.



The solution:

Weld the complete assembly in an oxygen-free environment. Combustion is prevented by the absence of oxygen, and the fiberboard will not be severely damaged or destroyed by the heat alone. (Some superficial deterioration, however, might be encountered.)

How it's done:

Since fiberboard burns in air or an oxygen environment at temperatures of about 589 K, which is well below the welding temperature of aluminum, two methods of welding were chosen which could be carried out in an oxygen-free environment: electron beam welding in a vacuum, and tungsten-inert gas (TIG) welding in a nitrogen environment. Test specimens prepared from 0.16 cm thick aluminum plates bolted to fiberboard panels were successfully welded by both methods. As shown in the photograph, the electron beam welding resulted in only a faint trace line of discoloration on the fiberboard and no apparent deterioration. The TIG welding resulted in a discoloration of an area on the surface of the fiberboard under the weld line, but again the fiberboard was apparently undamaged.

Notes:

1. This technique can be applied to in-place welding or cutting of metals in similar assemblies without disassembly to remove the combustible materials from the proximity of the welding heat.
2. No further documentation is available. Specific questions, however, may be directed to:

   Technology Utilization Officer
   Lewis Research Center
   21000 Brookpark Road
   Cleveland, Ohio 44135
   Reference: B71-10257

Patent status:

No patent action is contemplated by NASA.

Source: A. C. Spagnuolo
Lewis Research Center
(LEW-11328)

Category 08