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Brief 66-10250

NASA TECH BRIEF

Diffusion Bonding Makes Strong Seal at Flanged Connector

The problem:

To seal a high pressure fluid system connector so that it is insensitive to relaxation of the bolt loads. Conventional seals are dependent upon compressive forces from the connector structural bolts and lose their effectiveness if these forces are relaxed.

The solution:

A copper strip is diffusion bonded to the surfaces of the connector flange by application of high pressure and temperature.

How it's done:

The mating surfaces of the connector flange are gold plated and a copper strip 0.008-inch thick is placed between them. The connector bolts are tightened to provide a 25,000 psi stress on the mating surfaces and the assembly is held at a temperature of 700°F for 15 minutes. The resultant bond withstood 1 1/2 times the connector's designed service internal pressure.

Notes:

1. The bond withstood an internal pressure of 6,000 psi at −321°F, showing zero leakage.
2. With the bolts retracted so the connector faces could separate freely, a force of 15,000 psi was required to destroy the bond and effect the separation.
3. Inquiries concerning this invention may be directed to:

   Technology Utilization Officer
   Marshall Space Flight Center
   Huntsville, Alabama, 35812
   Reference: B66-10250

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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