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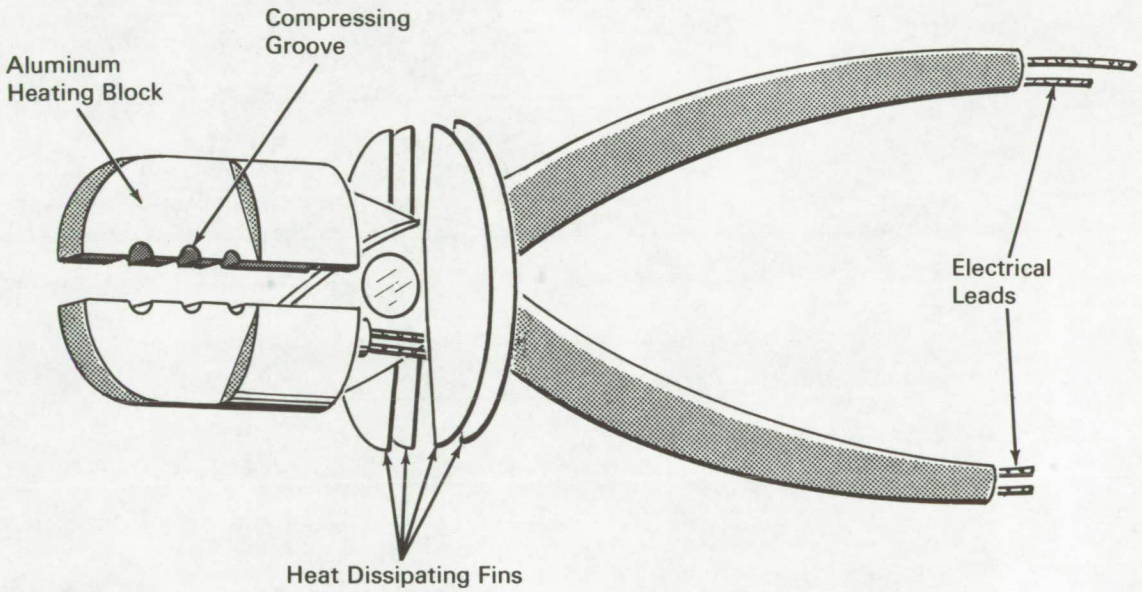
Brief 66-10209

NASA TECH BRIEF

Special Tool Seals Conductors with Combination of Plastic Sleeves



The problem:

Electrical conductors connecting instrumentation within space vehicle cryogenic fuel tanks and oxidizer tanks must be sealed to prevent contamination of the fuel and oxidizer or leakage of the liquids through the conductors. Tests have shown that slight damage to the FEP (fluorinated ethylene-propylene) insulation on 20AWG wires results in a high leakage rate at the wire ends outside the tank.

The solution:

An inner sleeve of FEP and an outer sleeve of TFE (tetrafluoroethylene) enclose a bundle of conductors and are heated with a special tool to form a tight seal of the bundle and each individual wire.

How it's done:

The special tool consists of a pair of end cutters or pliers fitted with machined aluminum blocks containing electrical-resistance heating elements and having mating faces cut out to accommodate several sizes of plastic sleeves. A powerstat is used in conjunction with a temperature indicator to hold the temperature of the aluminum blocks within close tolerances.

The FEP insulated conductors are enclosed in a close fitting sleeve of FEP and a larger sleeve of TFE is then slipped over this assembly. The entire assembly is placed in grooves in the aluminum heating blocks and is compressed. The FEP, both sleeve and con-

(continued overleaf)

ductor insulation, tends to melt and flow at the control temperature of 621°F, while the outer sleeve of TFE shrinks at this temperature to compress the two FEP components (sleeve and conductor insulation) so that excellent sealing occurs between them. The tool is used progressively, the largest opening first and the smallest opening that will accommodate the assembled sleeved conductors last, as the TFE sleeve shrinks and constricts the FEP components.

Notes:

1. Only a small longitudinal area need be sealed and this is most effective at the feed-through point in the cryogenic vessel wall.
2. Inquiries concerning this invention may be directed to:

   Technology Utilization Officer
   Marshall Space Flight Center
   Huntsville, Alabama, 35812
   Reference: B66-10209

Patent status:

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

Source: S. Young
of North American Aviation, Inc.
under contract to
Marshall Space Flight Center
(M-FS-579)