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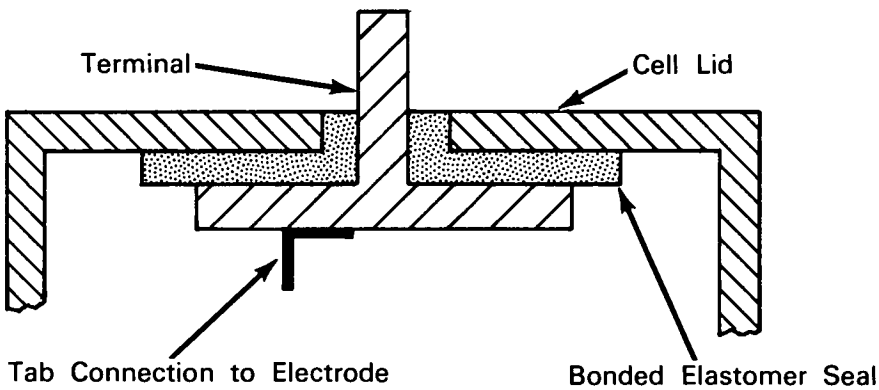
NASA TECH BRIEF

This NASA Tech Brief is issued by the Technology Utilization Division to acquaint industry with the technical content of an innovation derived from the space program.

Elastomers Bonded to Metal Surfaces Seal Electrochemical Cells



The problem: Leakproof sealing of secondary cells containing alkaline electrolytes. Seals depending on the use of ceramics or elastomers held in compression between the metal lids and terminals of the secondary cells are subject to leakage on aging. Ceramic seals may deteriorate as the result of electrolytic action; elastomeric seals tend to leak because of compressive set.

The solution: A seal formed by bonding an alkali-resistant elastomer, e.g., neoprene, to the metal lid and other metal contact surfaces.

How it's done: The metal parts are thoroughly cleaned to remove grease and other surface contaminants. All surfaces to be bonded on the clean metal and elastomer are coated with a solution of the same elastomeric material,which serves as the bonding agent. The coated parts are then placed under proper ventilation until the solvent has evaporated. After evaporation has been completed, the parts, with an excess of the bonding agent on the surfaces to be sealed, are assembled in a suitable jig. This assembly is then placed in a press that forces the parts into their correct relative positions and extrudes the excess bonding agent. The assembly is kept in the press and heated at a fixed temperature for a sufficient time to allow the bonding agent to cure. On completion of this process, the bonded assembly is taken from the press and all extruded material is removed.

Notes:

1. The results of accelerated tests with several different elastomers strongly indicate the feasibility of this sealing method.
2. If loss of oxygen or hydrogen by diffusion through the seal becomes a problem, a diffusion barrier (e.g., a perfluorinated hydrocarbon polymer) can be added.
3. A threaded terminal would make it possible to use a nut and an insulating washer to provide additional support for the seal. If bonded in place, the

(continued overleaf)

washer could also serve as a diffusion barrier. Electrical connections to threaded terminals could be made mechanically instead of by soldering, which might cause thermal deterioration of the elastomer.

4. For further information about this invention inquiries may be directed to:

   Technology Utilization Officer
   Goddard Space Flight Center
   Greenbelt, Maryland, 20771
   Reference: B64-10113

Patent status: NASA encourages the immediate commercial use of this invention. Inquiries about obtaining rights for its commercial use may be made to NASA Headquarters, Washington, D.C., 20546.

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