

NASA TECH BRIEF

Lyndon B. Johnson Space Center



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Cryogenic Line Insulation Made From Prefabricated Polyurethane Shells

The problem:

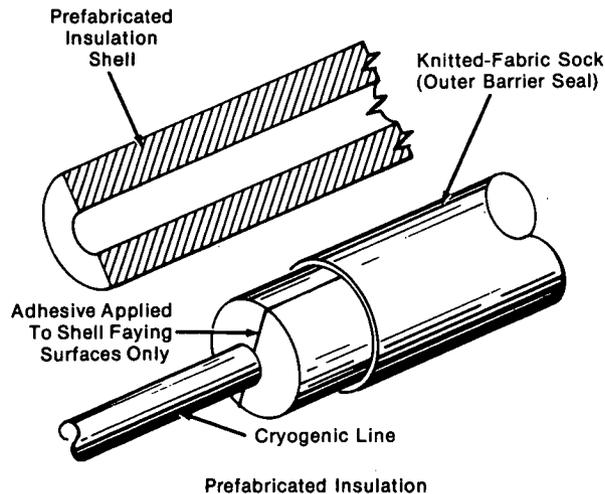
Cryogenic lines are usually insulated with either steel vacuum jackets or synthetic foams. The vacuum jackets are expensive and add extra weight to cryogenic systems. The synthetic foams, on the other hand, are difficult to work with because they have to be poured and machined to shape at the installation, often in cramped quarters.

The solution:

Prefabricated polyurethane foam insulation is inexpensive and is easily installed on cryogenic lines.

How it's done:

The insulation is formed by pouring polyurethane foam into epoxy/fiberglass molds. The molds are semicircular cylinder sections covered inside with light-gauge aluminum sheet. After a mold is filled, a tube section of the same diameter as the cryogenic line is placed into the foam to form the inner diameter. The excess foam is removed to the mold line by a sharp spatula. The foam is then left to cure.



The finished insulation sections are semicircular half shells (see figure). A pair of these half shells is placed to surround the cryogenic line. An adhesive bonding material is applied to the polyurethane faying surfaces to attach the half shells together. No adhesives are used on the shell surfaces in contact with the cryogenic lines. A cylindrically-shaped, knit Kevlar* 29, or equivalent, sock is pulled over the insulation. The sock then is tapered at the ends and is covered with polyurethane resin to seal the system.

*Trademark of E.I. du Pont de Nemours and Company, Wilmington, Delaware 19898

Note:

Requests for further information may be directed to:

Technology Utilization Officer
Johnson Space Center
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Houston, Texas 77058
Reference: TSP75-10110

Patent status:

Inquiries concerning rights for the commercial use of this invention should be addressed to:

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Categories: 06 (Mechanics)
08 (Fabrication Technology)
04 (Materials)

