

# NASA TECH BRIEF



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## Inexpensive Insulation Is Effective for Cryogenic Transfer Lines

### The problem:

To provide a low cost thermal insulation for cryogenic-liquid transfer pipelines.

### The solution:

Cover the transfer pipeline with a matting consisting of layers of commercially available fiberglass tape in which the fibers are randomly oriented in parallel planes.

### How it's done:

The surface of the pipe is coated with a suitable adhesive, and the fiberglass tapes are laid up longitudinally or wrapped spirally on the coated pipe. Because of the construction of the tape, all of the fibers will lie in concentric cylindrical shells parallel to the surface of the pipe, and thus offer greater thermal resistance than randomly oriented fibers (which include radial orientation) as in wrapped conventional fiberglass insulation. The insulation is compressed to a density of approximately 10 pounds per cubic foot when the outer metal pipe jacket is pulled over it.

For optimum operation of the system, the insulation is purged of all gases and then backfilled with carbon dioxide at a pressure of 3 psig. Cryopumping (condensation of the carbon dioxide) at the interface between the outer surface of the transfer pipe and the inner surface of the fiberglass reduces the carbon dioxide pressure to approximately 1 micron of mercury, thus minimizing convective and radiative heat transfer.

### Note:

Inquiries concerning this innovation may be directed to:

Technology Utilization Officer  
Manned Spacecraft Center  
Houston, Texas 77058  
Reference: B66-10348

### Patent status:

No patent action is contemplated by NASA.

Source: Arnie R. Lindgren  
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