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Brief 71-10364

NASA TECH BRIEF

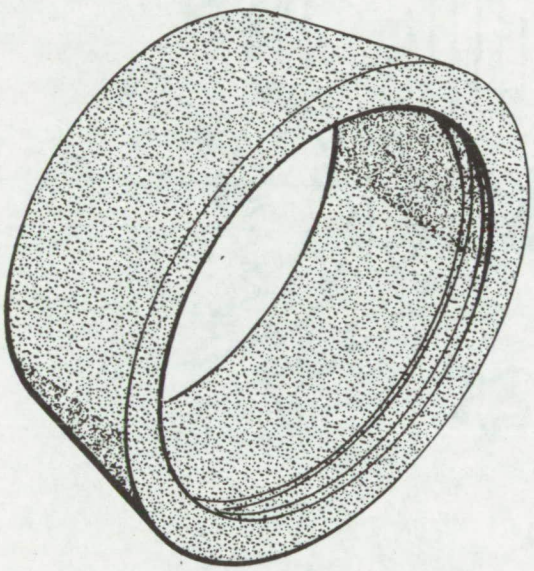
Kennedy Space Center

Insulation Assembly Uses Cryopumping to Reduce Heat Transfer in Cryogenic Liquid Line

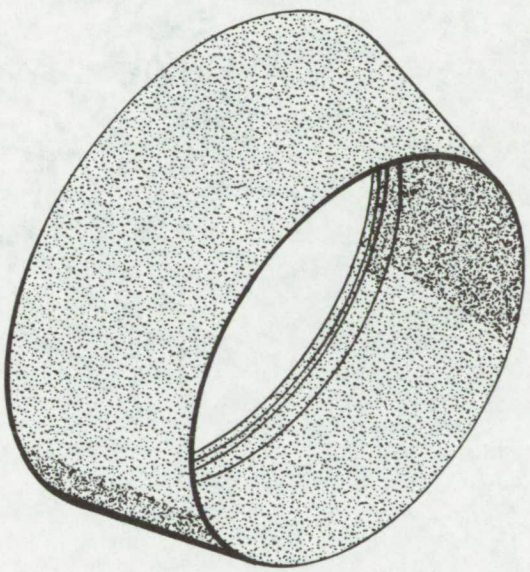
A flush joint coupling employing a foil jacketed annular cone, backfilled with CO_2, eliminates the inherent connection problems of conventional bayonet type joints used for vacuum jacketed assemblies. The open celled foam (see fig.) is contained in the stainless steel foil jacket. The foam is evacuated and then backfilled with the condensing gas, which will cryopump during passage of the liquid hydrogen through the line. This reduces the heat transfer to essentially that of the evacuated foam.

In this application, open cell foam is backfilled with CO_2, which condenses at cryogenic temperatures. During cryogenic liquid transfer, the vacuum tight shroud of stainless steel sheet seals the joint and restricts heat leak to a calculated level of 362 kJ (344 Btu/hr.) for a 20.32 cm (8 in.) joint assembly.

The bayonet member has an inward facing liquid lip seal. During assembly chilldown, the sealing surfaces tend to be pulled away from the seal. However, due to internal spring loading, the material follows and maintains the sealing contact. Four 0.076 cm (0.030 in.) diameter holes are drilled through the liquid seal to allow for pressure equalization. An ambient gas-tight hexagonal ring seal is installed in the flange assembly outside the annular cone.



Male Block



Female Block

(continued overleaf)

Note:

Requests for further information may be directed to:

Technology Utilization Officer
Code AD-PAT
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Reference: B71-10364

Patent status:

No patent action is contemplated by NASA.

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