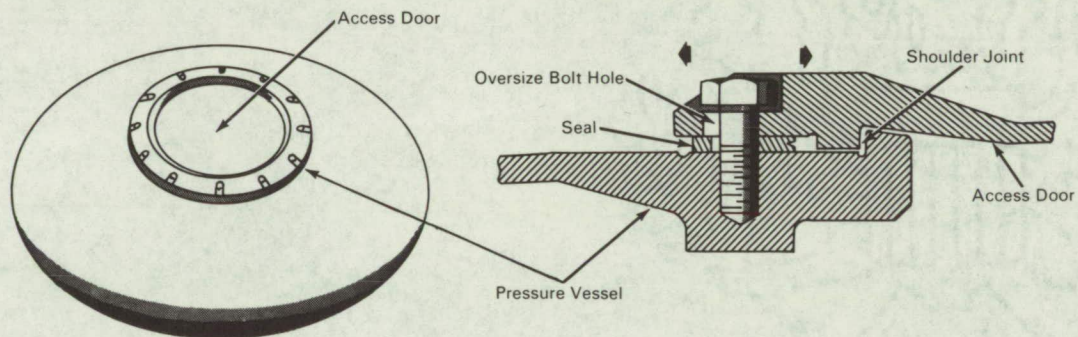


NASA TECH BRIEF



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Lightweight Door Seals Cryogenic Container Against Diaphragm Type Loading



The problem: To design a lightweight, removable, sealed joint access door for a spherical or semispherical pressure vessel containing cryogenic materials. The door must accept the same diaphragm type loading as the pressure vessel skin and the joint must be capable of handling large temperature and load deflections. Prior devices have depended on precision machined bolts and bolt holes designed to carry tension, shear, and moment loads. This places severe requirements on manufacturing and installation techniques.

The solution: An access door that incorporates a joint overlock design and oversize bolt holes so that the attaching bolts are in tension only. Shear and moment loads are taken by the joint's overlock design.

How it's done: The access door is held in place and compresses the seal by means of tension bolts in recessed sockets. The door bolt holes are oversize and the door has an internal shoulder or ridge that is slightly smaller than a mating shoulder at the periphery of the pressure vessel opening. All horizontal

loads caused by pressure are transmitted through the joint in shear and the tension bolts are relieved of this loading by the oversize holes in the door. As pressure or thermal loads decrease, the joint tends to open up but good sealing is retained by action of the tension bolts on the seal.

Notes:

1. This innovation improves reliability, appreciably reduces manufacturing costs and weight, and provides a direct seal pressure joint with flexibility and strength.
2. This concept is adaptable to all types and shapes of pressure vessels and is especially useful where large thermal and pressure deflections are involved.
3. Inquiries concerning this invention may be directed to:

Technology Utilization Officer
Marshall Space Flight Center
Huntsville, Alabama, 35812
Reference: B65-10402

(continued overleaf)

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

Source: Royal C. Englehart, Jr.
of North American Aviation, Inc.,
under contract to
Marshall Space Flight Center
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