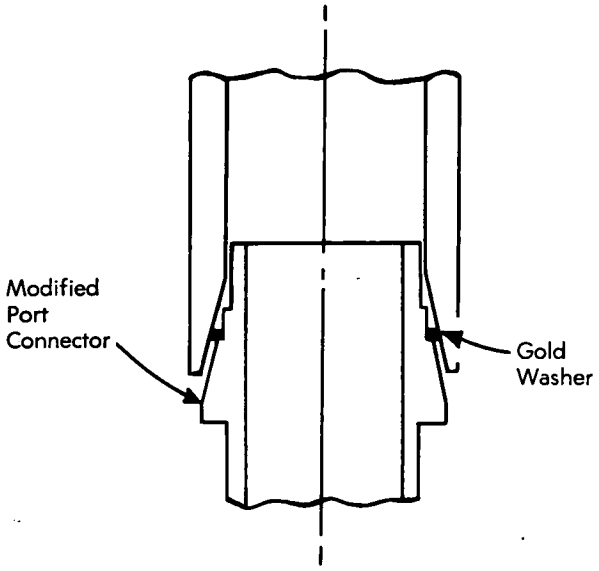
NASA TECH BRIEF

Ames Research Center

Low-Closing-Force Seal

The problem:

To attach tubes to vessels containing gas samples by a technique which effects seals with a minimum of applied force and does not contaminate the contents.



The solution:

Compress a soft, inert metal gasket between a cone and a corresponding socket.

How it's done:

A shouldered land is machined on the 4:1 tapered surface of a 0.952-cm (⅜-inch) stainless steel port connector so that a gold washer 0.025-mm (0.010-inch) thick, with ID of 1.039 cm (0.405-inch) and an OD of 1.080 cm (0.425-inch), can be fitted snugly. As shown in the diagram, the land is positioned on the tapered surface so that the washer extends about 0.13 mm (0.005-inch) when in contact with the machined shoulder.

The seal is formed when the port connector is pushed firmly into its socket; the gold washer is deformed and forced to flow into imperfections and scratches in the surfaces of the socket and the machined land. A force as low as 552 kN/m^2 (80 psi) applied to the ends of the fitting effects a seal which has a leakage rate less than 1 x 10^{-10} ml (STP)/sec of helium.

Other types of seal configurations require more force for closure than the one described above; soft metals other than gold can be used as washers.

Note:

No additional documentation is available. Specific questions, however, may be directed to:

Technology Utilization Officer
Ames Research Center
Moffett Field, California 94035
Reference: B73-10380

Patent status:

NASA has decided not to apply for a patent.

Source: Lyle E. Bergquist of
Martin Marietta Corporation
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Category 06