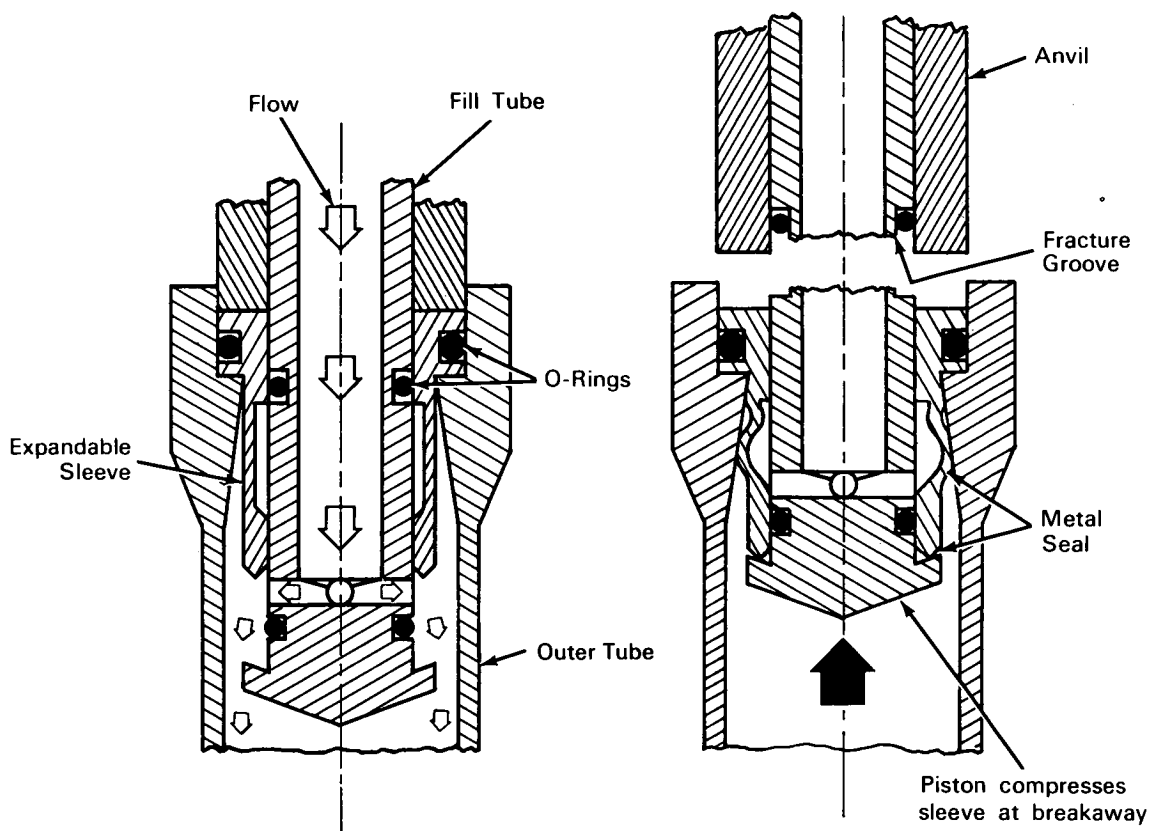


NASA TECH BRIEF



This NASA Technical Brief is issued by the Office of Technology Utilization to acquaint industry with the technical content of an innovation derived from the NASA space program.

Self Sealing Disconnect for Tubing Forms Metal Seal after Breakaway



The problem: To design disconnect fittings that will automatically form a positive metal-to-metal seal in tubing when the fitting is broken by disconnecting forces. The fitting need only be used once but must not leak during filling operations.

The solution: A novel fitting in which the fill tube, during disconnect action, pulls against a metal sleeve to form a positive metal seal.

How it's done: The fill tube is made so that the inner end has a shoulder extending beyond the outside diameter of the tube. Holes at that end permit the passage of liquids or gases. Surrounding the fill tube there is a specially designed sleeve, also with a shoulder that drops into a recess of the main body of the fitting. During filling, O-rings in the shoulder of the sleeve and near the outer end of the fill tube seal against leakage.

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When the fitting is disconnected, as would occur during the launching of a rocket or when one stage of a rocket separates from another in space, the fill tube breaks at the O-ring groove in the tube. Before it breaks, however, the disconnecting force pulls the shoulder on the inner end of the tube against the open end of the sleeve. The thin sleeve walls bulge out against the tapered inner wall of the main body of the fitting. This action makes the walls of the sleeve form the metal-to-metal seal.

An anvil, which is part of the support equipment and falls away after disconnect, positions the sleeve until breakaway is completed. Two of the O-rings now act as back-up for the metal seal.

Note:

Since this device is planned for a one-time use, it would appear to have only limited application. The unusual design, however, merits study and it is suggested for industries where gases and liquids are pumped into tanks and shipped or stored. Consideration might be given to re-design of the disconnect so that it could be used several times.

Patent status: NASA encourages commercial use of this innovation. No patent action is contemplated.

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