

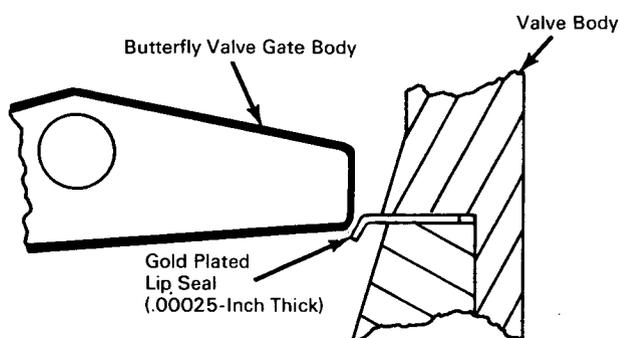


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Soft Metal Plating Enables Hard Metal Seal to Operate Successfully In Low Temperature, High Pressure Environment



The problem:

Conventional butterfly valve lip seals formed with hard metals did not operate successfully in a cryogenic fluid (hydrogen) line under high pressure (1200 psi), after varying degrees of cycling. Polymer type seals could not be used because of the high pressure and low temperature requirements.

The solution:

A thin film of soft metal to plate the hard metal lip seal.

How it's done:

The lip seal on a conventional type of butterfly valve undergoes extensive flexure during operation. To eliminate deformation of the lip a hard material such as 302 stainless steel or Inconel 718 is cold worked to form the lip seal geometry. After forming, the lip seal is plated with gold on the lip area to provide antigall and seal properties.

Notes:

1. The hard metal seal was coated with an 0.00025-inch thin film of 24 carat gold.

2. Ambient temperature friction tests of 1000 cycles showed no increase in the butterfly valve's coefficient of friction of 0.05.
3. The gold plate lip seal has been operated successfully with liquid hydrogen at 1200 psi.
4. Inquiries concerning this innovation may be directed to:

Technology Utilization Officer
AEC-NASA Space Nuclear Propulsion
Office
U.S. Atomic Energy Commission
Washington, D.C. 20545
Reference: B67-10350

Patent status:

No patent action is contemplated by AEC or NASA.

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