

NASA TECH BRIEF



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Valve Designed with Elastic Seat

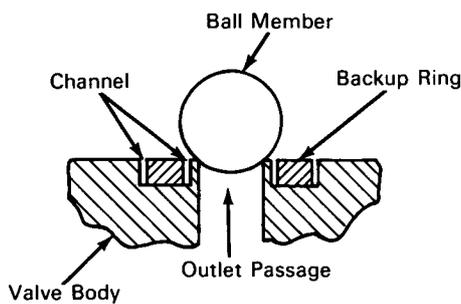


FIGURE 1

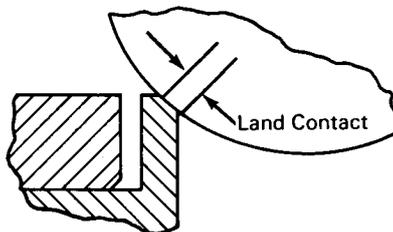


FIGURE 2

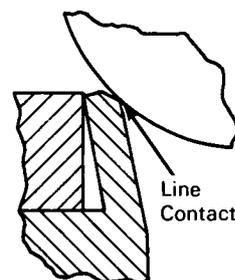


FIGURE 3

The problem: Ball and pintle valves are normally manufactured with either the seat or the closure device made of rubber or plastic in order to obtain the degree of deformation during closing necessary to prevent leakage. These rubber or plastic components are subject to deterioration under repeated use.

The solution: A valve made entirely of metal having its seat relieved sufficiently to provide elasticity during closure. This elasticity not only provides tight conformity of seat to ball irregularity, but also provides the scrubbing or wiping action required to eliminate minute particles.

How it's done: The valve body is machined with an axially annular channel surrounding the outlet passage. This annular channel effectively changes the outlet passage into a thin tubular seat member. Around the seat member there is an annular backup ring having an inside diameter slightly greater than the external diameter of the tubular seat and an outside diameter slightly less than the outside diameter of the channel. This ring serves as a retainer around the tubular seat so that the seat will not be expanded beyond its elastic limit during valve closure. The

tubular seat member is spherically lapped so that upon contact, the ball closure member elastically conforms to the ball surface and makes a radial land contact as shown in figure 2. As the ball member is driven further down the tubular seat is forced radially outward to the point shown in figure 3. At this position, the ball member makes only a radial line contact but sufficient for absolute closure. Between these two points, the scrubbing or wiping action takes place to remove any minute particles that might otherwise cause leakage.

Note:

Inquiries concerning this invention may be directed to:

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Reference: B65-10040

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.

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(JPL-442)

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