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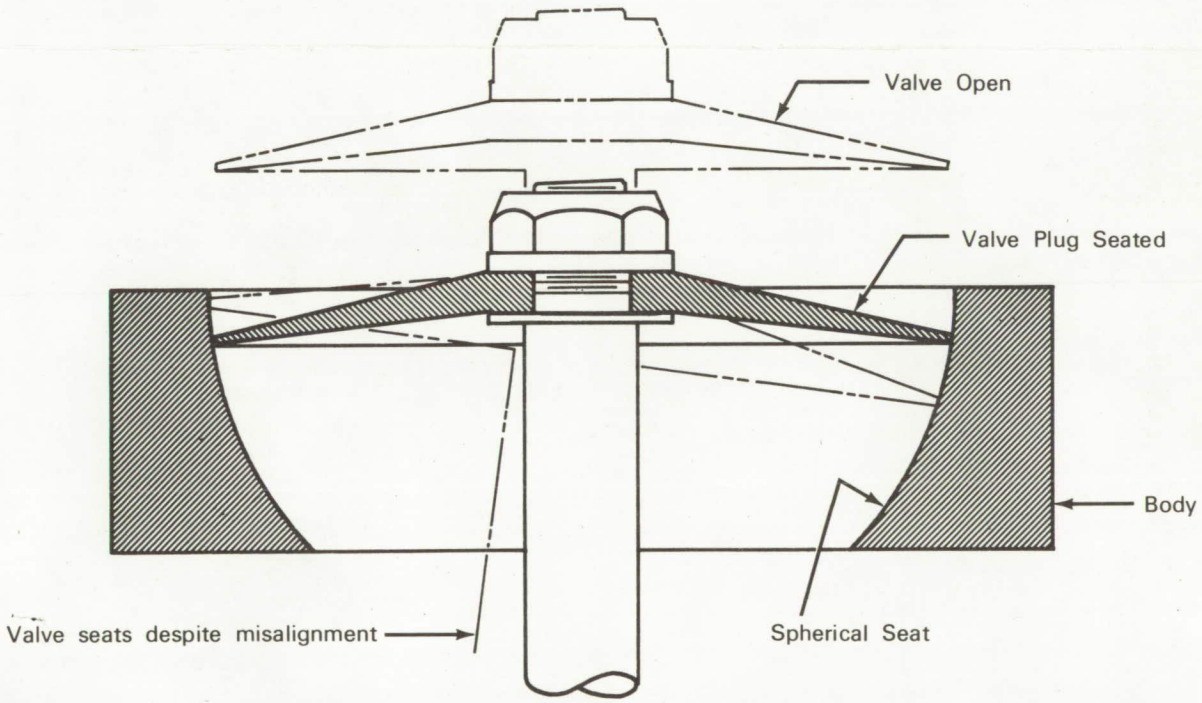
NASA TECH BRIEF

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.

Design of Valve Permits Sealing Even If The Stem Is Misaligned



The problem: To insure proper sealing of a valve during numerous seating cycles even though the valve stem may be forced out of its proper axis and may be misaligned.

The solution: A special conical-walled valve plug which seals against a recessed spherical valve seat.

How it's done: The sealing element or conical-walled valve plug is mounted on the end of a valve stem and held by a standard nut and washer. The cross section of this valve plug is in the shape of a shallow cone. In closing, the outer edge or circumference of the cone contacts the valve seat.

Because the valve seat has a recessed seating face in the form of a sphere, the valve will seal effectively even though the valve stem is out of axial alignment. Thus, the conical-walled valve plug is perpendicular to the tangent of the spherical valve seat at the point of contact, whether the stem is in its proper position or not. Uniform diminishing thickness of the conical valve plug also contributes to the sealing action.

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Many hundreds of closing and opening cycles can be obtained from this combination of conical valve plug and spherical seat. The design makes it possible to get virtually the ultimate in mechanical advantage from the forces applied to the valve. No deformation of the spherical valve seat or of the sealing face of the conical plug takes place since wearing surfaces are not stretched beyond the elastic limit due to unequal distribution of forces.

Source: Harold W. Schmidt
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