

NASA TECH BRIEF

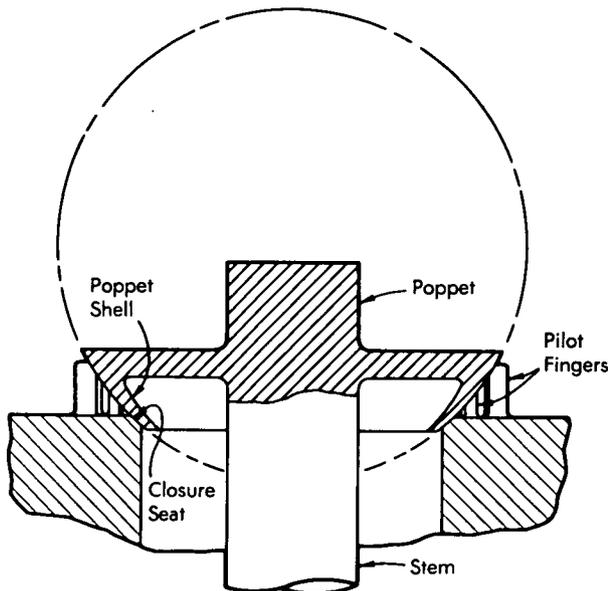
NASA Pasadena Office



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Concentric-Seating Poppet

A conventional self-centering poppet-seat arrangement must provide generous clearance between the valve stem and guide in order to prevent binding during operation of the valve. Unfortunately, the



clearance allows random contact to take place between poppet and seat until they are in firm contact; at high operational speeds, therefore, there can be extensive impact damage to mating surfaces. Moreover, as the poppet slides into final concentric seating position, scuffing can also occur between poppet and seat.

A new concept for a poppet-seat closure suggests that areas of annular configuration on the poppet and seat can provide a "zero clearance" sudden initial contact. (Zero-clearance seating is considered to be concentric seating with zero motion at the instant of

contact of mating surfaces.)

A characteristic configuration of the novel poppet-seat arrangement is shown in the diagram. The pilot-seat areas and closure-seat areas are located within a common spherical zone; the pilot seat areas are slightly larger in diameter than the closure-seat areas. Since the pilot areas are larger in diameter, closure-seat areas cannot touch at any time during the travel of the poppet until contact with the closure-seat occurs. As a result, closure is sudden, and at no time will there be localized scuffing or impact damage during poppet travel. The poppet and seat are lapped to the same spherical diameter. The pilot fingers indicated in the diagram guide the poppet into concentric contact with the closure seat; the design of the fingers and the material of construction is carefully selected so that most of the poppet seating force is applied to the closure seat.

Note:

Requests for further information may be directed to:

Technology Utilization Officer
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Patent status:

NASA has decided not to apply for a patent.

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