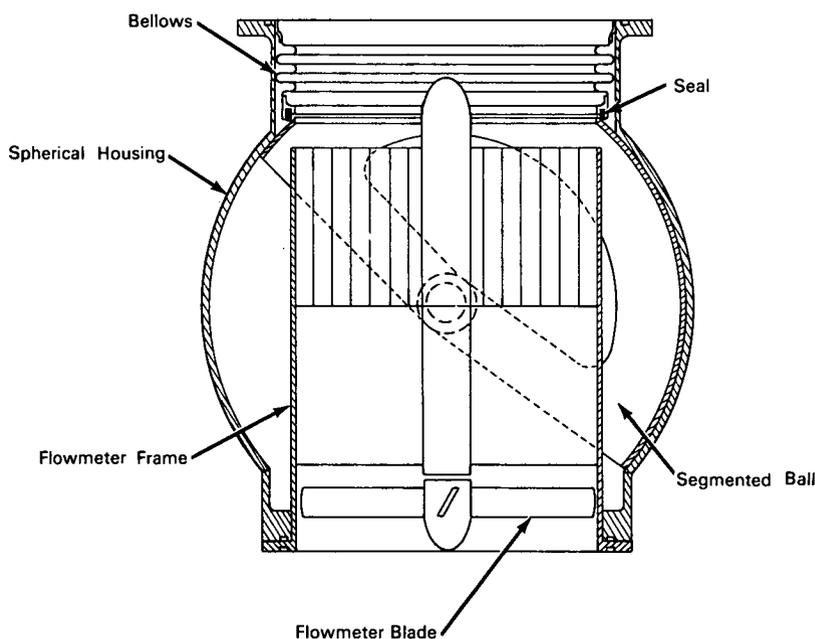


NASA TECH BRIEF



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Segmented Ball Valve Is Easy to Open and Close



The problem:

To design a valve that will handle large fluid volume without the bulkiness and weight of blade valves or conventional ball valves. It is desirable to be able to measure flow through the valve within the same device.

The solution:

A segmented ball valve and flowmeter combined within the same housing.

How it's done:

The valve consists of a segmented (partial) ball in a spherical housing. The segmented ball is 177.5 degrees

of a sphere and only 85 degrees of rotation are required to fully open or close the valve. Width of the segment is only slightly larger than the inlet and outlet tubing internal diameter, to cover fully the area required for the seal. The seal is backed up by a bellows that compensates for tolerance accumulations and body deformations. The segmented ball, rotating about one axis of the housing spherical surface, is supported on two bushings and operated by a piston and cylinder arrangement.

Located downstream from the ball segment is a flowmeter that measures fluid flow through the valve and generates a signal through a magnetic pickup.

(continued overleaf)

Notes:

1. The segmented ball valve is easily opened or closed with a minimum of force because dynamic reaction of the flow acts only on the edge of the ball segment rather than on the full diameter of the ball.
2. In this design, the flowmeter does not move when the valve is opening or closing, thus eliminating measurement errors during transient conditions.

Patent status:

Title to this invention has been waived under the provisions of the National Aeronautics and Space Act (42 U.S.C. 2457(F)), to North American Aviation, Inc., 6633 Canoga Avenue, Canoga Park, California.

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of North American Aviation, Inc.

under contract to

Western Operations Office

(WOO-248)