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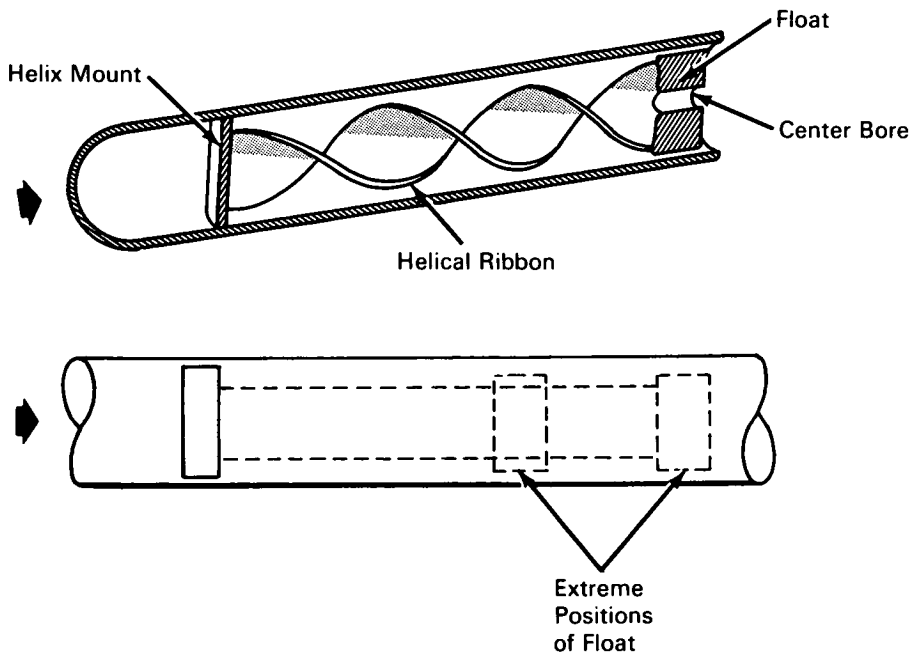
NASA TECH BRIEF

Flowmeter Measures Flow Rates of High Temperature Fluids



The problem:

To determine the flow rates of various liquid metals at elevated temperatures. Previous flowmeters have suffered because the physical dimensions of flow passage have been dictated by a rather narrow range of expected flow rates.

The solution:

A flowmeter in which flow rate is determined by measuring the position and thus the displacement of an internal float acted upon by the flowing fluid. Viscous forces cause the float to move from its mounted position, affording several means for measuring this motion and thus the flow rate.

How it's done:

The device lends itself to three types of flow rate measurement: electromechanical, pressure drop, and viscous drag. Construction consists of a tube that is rigidly mounted in a passage through which a fluid is flowing. Fastened to the inside of the tube is a helical ribbon formed from an elongated strip that has been twisted about its longitudinal axis to give it spring-like qualities. Rigidly secured to the free end of the helical ribbon is a solid cylindrical float having an outside diameter slightly smaller than the inside diameter of the tube, thus forming an annular space to allow passage of the fluid. Additionally, the

(continued overleaf)

float may include a center bore to allow passage of the fluid. As the flow rate increases, the viscous force acts to displace the float and this unwinds the helix. In addition to transverse movement of the float, a rotational movement results from the unwinding of the helix. As the float translates and rotates, several means for detecting this motion, and hence the flow rate, are available.

A properly designed solenoid coil covering the region in which the float moves will detect translatory movement of the float by change in its self-inductance.

Pressure taps may be located upstream and downstream from the float, and rate of flow determined by pressure drop as indicated by the output of a differential transducer.

The float may be equipped with a magnetic slug that is specifically oriented with the float in the "no flow" position. Flow rates may then be determined using a gaussmeter that detects the degree of float rotation.

Note:

Inquiries concerning this invention may be directed to:

Technology Utilization Officer
Lewis Research Center
21000 Brookpark Road
Cleveland, Ohio 44135
Reference: B66-10521

Patent status:

Inquiries about obtaining rights for the commercial use of this invention may be made to NASA, Code GP, Washington, D.C. 20546.

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