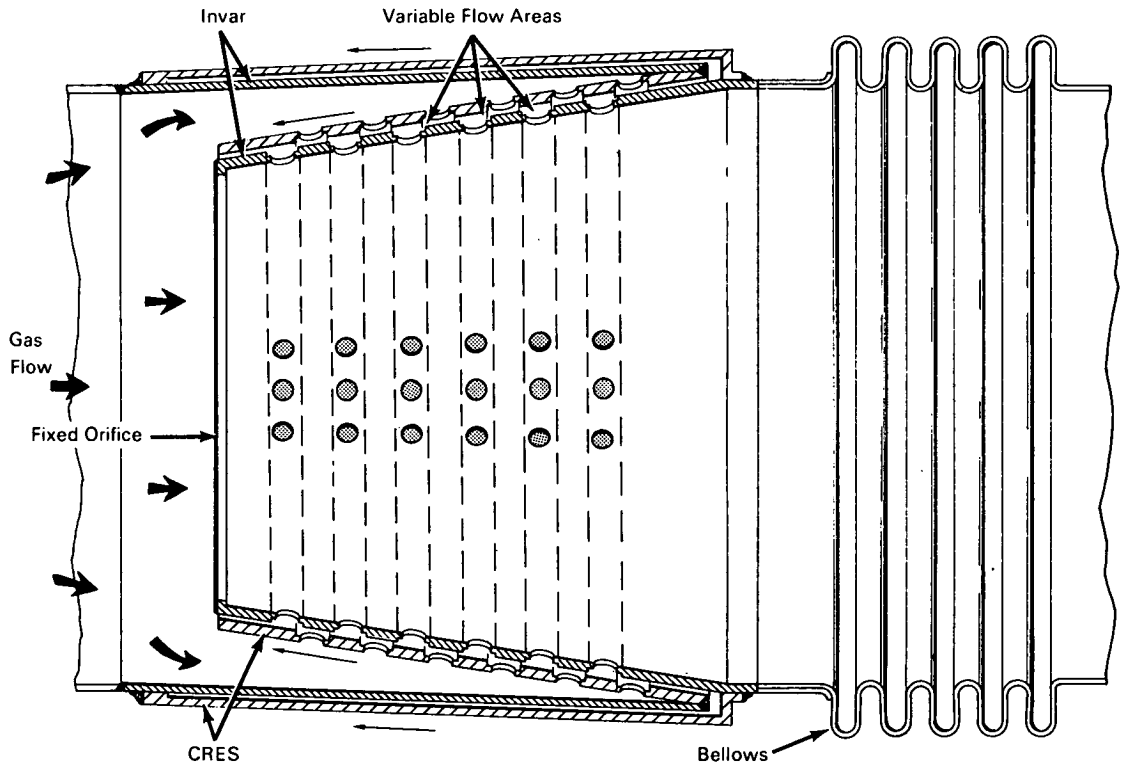
NASA TECH BRIEF

A Temperature-Controlled Fluid Flow Regulator



The problem:

In a fluid system, a component was required to control the flow by varying an orifice flow area as a function of temperature. Further, the controlling unit had to be self-contained with no external sensors or power sources necessary for operation.

The solution:

A slide-type valve, constructed of materials having different coefficients of thermal expansion, provides variable flow area as the slides move in relation to each other with temperature changes.

How it's done:

A cylinder with a slight taper, functioning as part of the ducting, is made with a bimetallic wall consisting of Invar and corrosion resistant steel (CRES) the Invar as the inside wall. The sliding valve is constructed in the form of a truncated cone with the base open and a fixed orifice as the truncating plane. The inner wall of the cone is Invar with ports appropriately spaced. Welded to the inner cylinder wall of Invar is the outer wall of the truncated cone made of CRES with ports offset below from those in the inner core and unrestrained at the top. Thus, as the tempera-

(continued overleaf)

ture increases, the CRES outer wall of the duct grows and compresses the bellows downstream, while at the same time moving the inner wall of the sliding valve to which it is welded.

Simultaneously, the CRES outer wall of the sliding valve, which is welded to the Invar inner wall of the duct, is forced to move upstream. The response of the different metals to temperature variations thus increases or decreases the flow areas in the sliding valve as the walls of the valve move in opposite directions during temperature changes.

Note:

Requests for further information may be directed to:

Technology Utilization Officer
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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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