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NASA TECH BRIEF

Lewis Research Center



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Variable-Area Nozzle Automatically Controls Fluid Flow

The problem:

In fluid injection systems with fixed-area orifices or nozzles, the pressure drop varies as the square of the flow rate. When large variations in flow

rate are required, it is often necessary to provide excessive pressure at the pump or other pressurized fluid supply.

The solution:

A simple passive nozzle requires no active control system to vary the injection area. The injection area changes with changing pressure, thereby allowing greater flow as the pressure increases.

How it's done:

A slotted nozzle with expandable segments or leaves is used as the injection flow-control orifice of the system. As the pressure difference across the nozzle is increased, the segments of the nozzle expand outward, increasing the slotted injection or flow area. Flow is thereby increased more rapidly than with an orifice of fixed area, and the pressure requirements for a given flow range are reduced. As the pressure drop across the nozzle is decreased, the spring action of the segments causes them to move inward, decreasing the flow area.

Note:

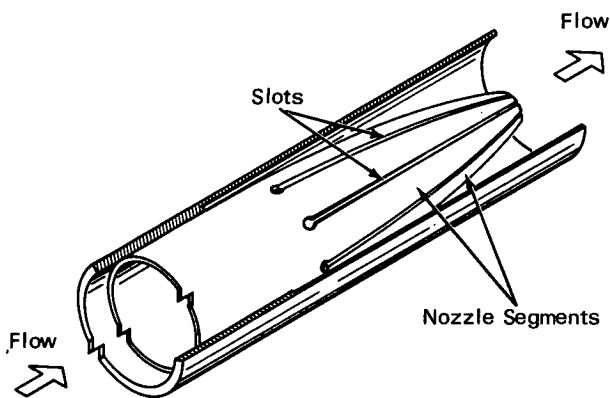
No additional documentation is available. Specific questions, however, may be directed to:

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Patent status:

No patent action is contemplated by NASA.

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