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Cavitrol® III trims are used for cavitating liquid applications in various globe and angle valve bodies. Cavitrol III trims are used extensively in the power, process, oil production, chemical refining, and other industries.

Features:

- **Controls or Eliminates Cavitation Damage-** Cavitrol III trim can lengthen valve service life and reduce maintenance downtime. The shape and spacing of holes in the cage wall circumference helps prevent cavitation and resulting valve failure in properly sized valves.
- **Characterization-** Special characterized cages are available to provide customer specified rangeability for specific system requirements.
- **Resistance to Erosion Damage-** Standard hardened trim materials provide excellent wear resistance, resulting in longer trim life. Contoured valve plug seats reduce fluid separation, help direct fluid away from trim, and protect against erosion damage.
- **Versatility-** Available in 1 to 24-inch globe or angle valves with weld-end or flanged-end connections.

- **Easy Maintenance-** Cage-type trim allows removal/inspection of parts without taking the valve body out of the pipeline. Fine particles don't cause accumulation problems noted with labyrinth-type trim.
- **Efficient Operation-** A low inlet pressure to the final stage is maintained by the flow-down configuration and the successively larger flow area of each stage. At the third stage inlet about 85% of the total pressure drop has already occurred and the vena contracta pressure remains above the liquid vapor pressure. This prevents cavitation in a properly-sized valve.
- **Trim Interchangeability-** Cavitrol III one-stage trim is interchangeable with standard trims. Quick trim changes can be made with no additional parts, such as spacers, longer bolts, and special gaskets for valve sizes greater than 1 inch.

Operational Overview:

Cavitation - the formation and subsequent collapse of vapor bubbles in liquid flow streams, is a major source of damage in control valves and adjacent piping. As liquid passes through a restriction in a control valve, the liquid velocity increases, while the liquid pressure decreases. The pressure reaches a minimum at a point called the vena contracta, and if the pressure at this point falls to or below the vapor pressure of the liquid (the pressure at which the liquid vaporizes), vapor bubbles form in the flow stream. Downstream of the vena contracta, flow area increases, velocity decreases, and pressure increases. If this recovered pressure is sufficient to raise the pressure above the liquid vapor pressure, the vapor bubbles will collapse. The collapsing bubbles generate significant noise and vibration, and can mechanically attack pipe walls and valve components which could lead to the failure of valve components, particularly the valve plug and seat ring.

Cavitrol III One-Stage Trim- The Cavitrol III one-stage trim can effectively eliminate cavitation damage. Each cage hole is shaped to create a small flow stream with a vena contracta pressure higher than that typically

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present in the flow stream of a standard cage. This higher pressure reduces the fluid's tendency to cavitate. Each hole is also designed to reduce fluid turbulence, and the holes are spaced diametrically around the cage circumference; both features dissipate fluid pressure and help to increase capacity. When selected and sized for this type of service, the radius edge on the valve plug and the diametrically opposed cage holes direct the cavitating fluid flow away from metal surfaces into the valve body cavity void. In this manner, damage from cavitating fluid flow is controlled. Application service conditions govern if cavitation damage is eliminated or controlled.

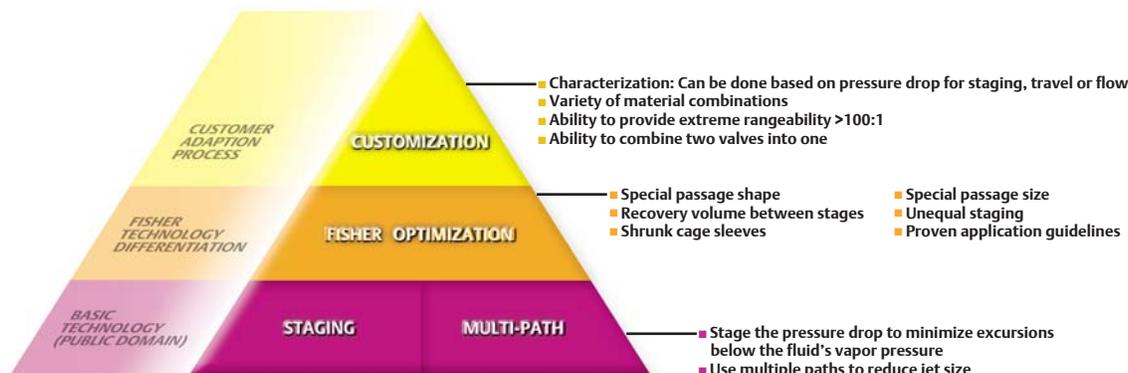
Cavitrol III Two- and Three-Stage Trims-The Cavitrol III two-and three-stage cages are concentric cylinders (or stages) with specially-shaped orifices. Inlet pressure and the required pressure drop determine cage choice. In operation, liquid passes through the orifices in each stage, undergoing a portion of the total required pressure drop. Partial pressure drop in each

stage of properly-sized valves typically prevents the liquid pressure from falling to or below its vapor pressure, eliminating the formation of vapor bubbles. For applications where the pressure drop across the valve decreases with increasing valve plug travel characterized Cavitrol III two-or-three stage can be used. These consist of two or three stages at the beginning of valve plug travel and as the valve is required to take less pressure drop, cage sections with fewer stages are used.

Typical Applications:

Hydrocarbon: Clean Hydrocarbon Liquids, Crude Feed, Seawater Discharge

Power: Boiler Feedwater Startup, Boiler Feedwater Regulator, Condensate Recirculation, Deaerator Level Control, Reheat Spray, Boiler Feedwater Pump Recirculation



Fisher Technology Model

Optimization Details:

■ **Special passage shape** - Eliminates flow separation which is key in reduction of trim area, reduction in fluid pressure and elimination of localized cavitation formation.

■ **Recovery volume between stages** - Key for pressure and flow stabilization between stages.

■ **Shrunk cage sleeve** - Eliminates potential for short circuiting of flow.

■ **Special passage size** - Provides benefits to minimize vibration.

■ **Unequal staging** - Ensures majority of drop is taken in the initial stages to ensure lowest pressure drop across last stage.

■ **Proven application guidelines** - Fisher's proven experience extends to common process fluids.

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