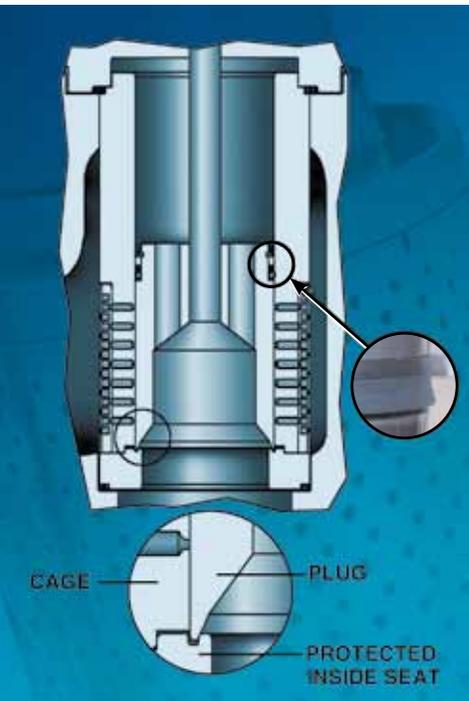


For more Severe Service solutions see us at www.fishersevereservice.com.



The improved sealing technologies for the Fisher® Cavitrol™ III trim include the protected inside seat and an improved pressure balance seal. Together, both extend the sealing life of the trim by addressing plug tip erosion and seal wear from entrained particulate.

The Protected Inside Seat Solution for Cavitrol III Trim Features:

- **Protects Shutoff Surfaces, Minimizing Leakage** - For control valves with standard Cavitrol III trim, shutoff occurs when the radius tip, located on the lower outside edge of the plug, contacts the beveled seat ring. On the protected inside seat ring design, the plug seat consists of a bevel on the inside of the plug tip that contacts a machined groove in the upper surface of the seat ring. Since seating surfaces are inside the plug tip and the radius in the groove of the seat ring, shutoff surfaces are not exposed to potential erosion.

Improved Pressure Balance Seal for Cavitrol III Trim Features:

- **Increased reliability and service life** - The pressure balance seal is made of a stronger material and offers an improved seal load profile. The seal is comprised of a jacket made of a modified PTFE with a carbon fiber matrix material, a R30003 spring and PEEK anti-

extrusion rings. This seal can be applied in any application where the current seal is utilized. It has a temperature range of -75 to 315 °C (-100 to 600 °F) and offers significantly improved seal life and reliability.

Cavitrol III Trim 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 help prevent cavitation and resulting valve failure in properly sized valves.
- **Resistance to Erosion Damage** - Standard hardened trim materials provide excellent wear resistance, resulting in longer trim life. Erosion protection is provided by separating the seat and control surfaces.
- **Easy Maintenance** - Cage-type trim allows removal/inspection of parts without taking the valve body out of the pipeline. Fine particles can not cause accumulation problems noted with labyrinth-type trim.
- **Versatility** - Available in NPS 2 to 6 globe or angle high pressure valves.
- **Characterization** - Special characterized cages are available to provide customer specified rangeability for specific system requirements.
- **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 occurred, and the vena contracta pressure remains above the liquid vapor pressure. This prevents cavitation damage in a properly-sized valve.

Operational Overview:

The Protected Inside Seat for Cavitrol III Trim - When cavitation exists in an application, there is the potential for damage to the tip of the plug as it passes in front of the cage holes. This erosion is

commonly caused by one, or both, of the following situations:

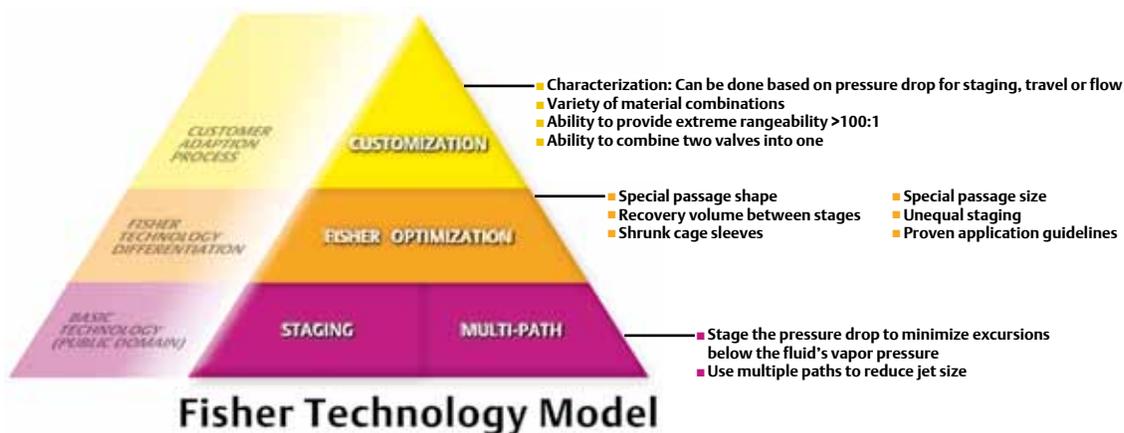
- Damage may occur when there is entrained particulate from erosion in the boiler feedwater system or from sand in a hydrocarbon system. This particulate, driven by the jets exiting the cage holes, can cause serious damage when the plug tip is located in front of the holes for extended periods of time.
- The damage may occur when controlling below recommended minimum specified C_v and the clearance flow erodes the plug tip. This damage prevents proper plug and seat contact resulting in decreased shutoff capabilities, which in turn can lead to further and accelerated trim erosion.

Cavitrol III Two and Three-Stage Trims -

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.

Typical Applications:

Power: Boiler Feedwater Startup, Boiler Feedwater Regulator, Reheat Spray, Boiler Feedwater Pump Recirculation.



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.
- **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** - Emerson's proven experience extends to common process fluids.

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