AGCV

DELATITE TM VALVES

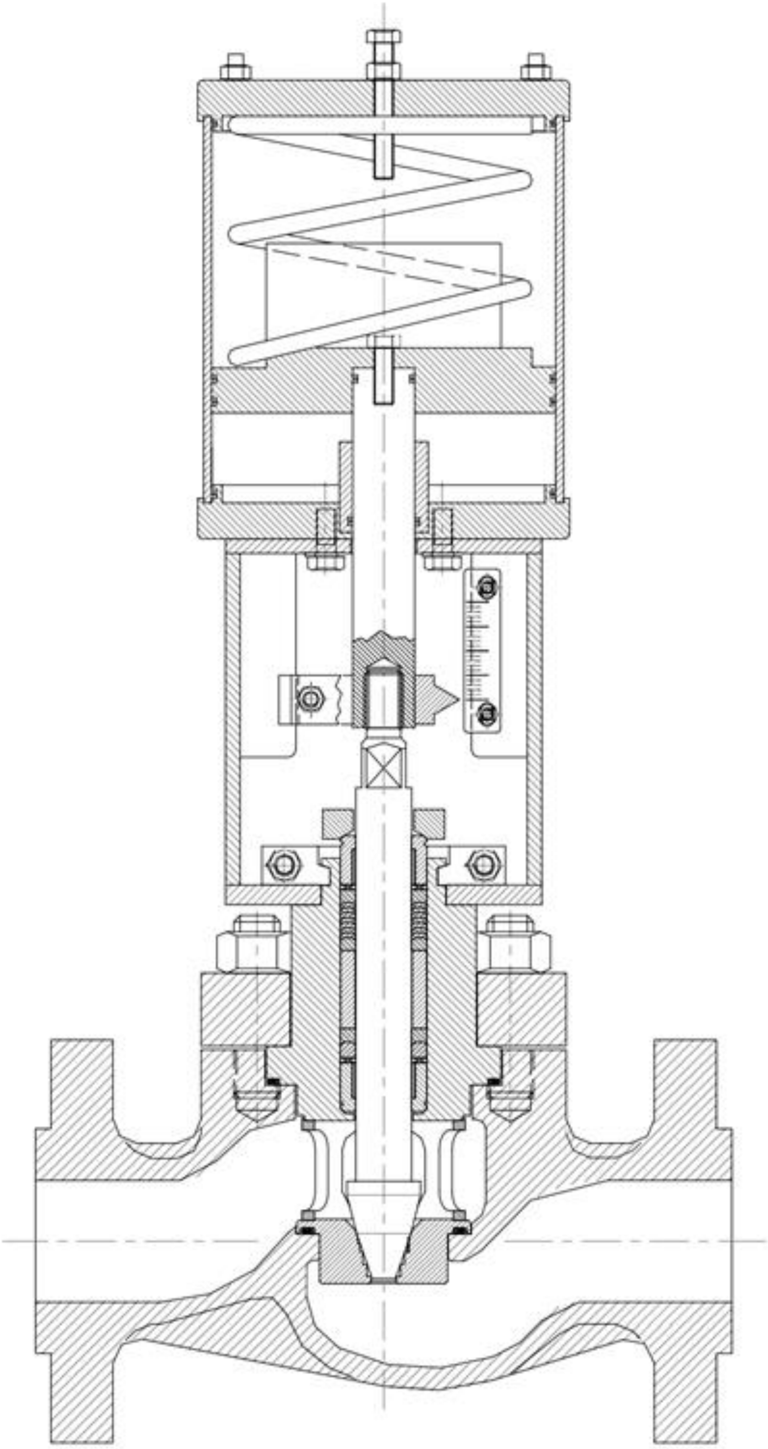
SEVERE SERVICE CONTROL VALVES

The Latest Technology in Severe Service in Control Valves

- CAVITATION CONTROL
- NOISE CONTROL
- VELOCITY CONTROL

- STEP TRIM
- LOW NOISE TRIM
- CAVITATION CONTROL TRIM
- CROC TRIM

DELATITE STEP TRIM
DEL-ST

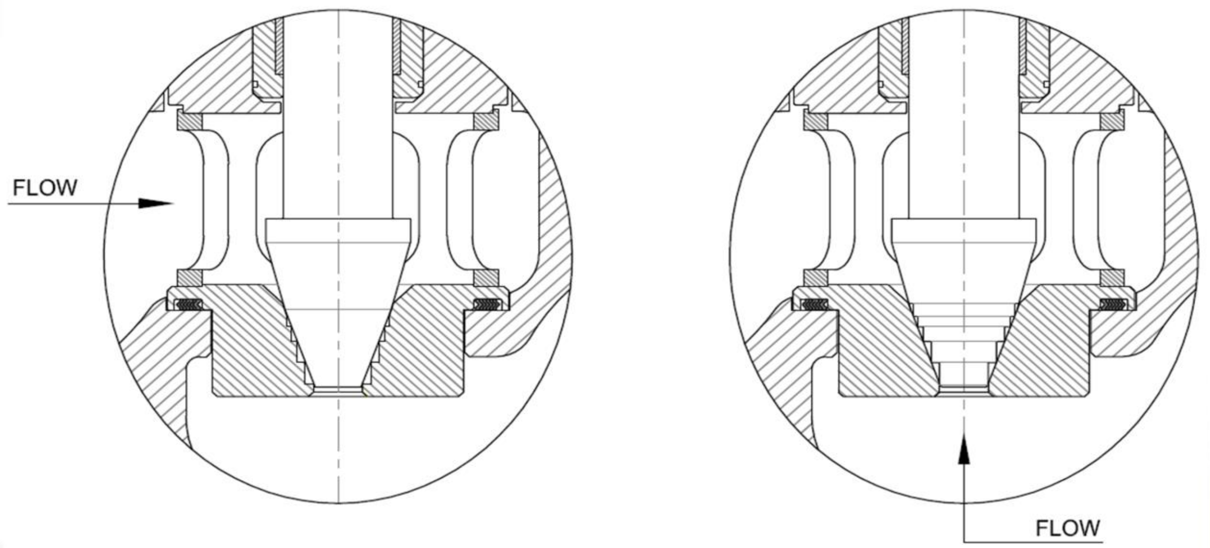


The Delatite Step Trim minimizes cavitation damage in fluids that could contain some solid particles, or low flow situations where small CV values are required.

The trim has a series of steps on either the plug or the seat which force the fluid to take a torturous path between the plug and the seat.

This is most evident when the valve is opening or when the valve is operating close to the seat, at this point cavitation is generally at its most aggressive.

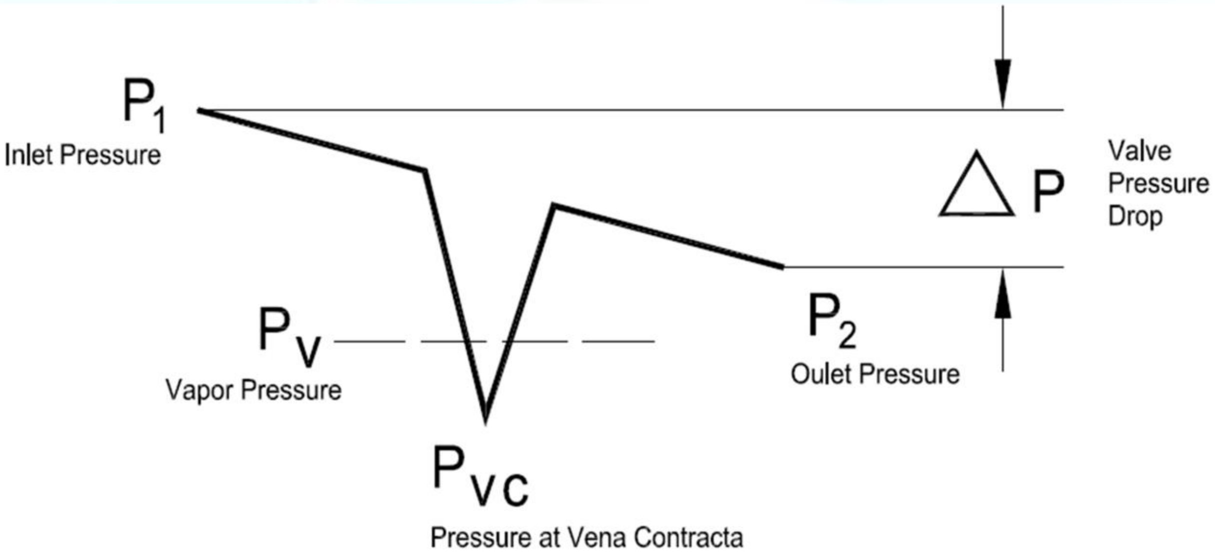
The trim has been designed to allow solids to flow through the valve without blockage of the trim.



THE CAVITATION PROBLEM

Cavitation damage is one of the major causes of control valve failure.

Cavitation occurs when the pressure of a fluid flowing through the restriction of the seat in a control valve drops below the vapor pressure of the fluid, and then the fluid pressure recovers to above the vapor pressure as the fluid leaves the valve.



The first stage of cavitation occurs when the fluid pressure drops below the vapor pressure and bubbles form in and around the vena contracta of the valve (seat area) as the fluid continues its path through the valve but after the vena contracta the pressure of the fluid begins to recover.
When the fluid pressure recovers to the point where it is just over the fluid vapor pressure the bubbles suddenly implode. The implosion forces are very high and the bubbles implode near a metal surface a small amount of metal will be removed every time a bubble implodes near the valve body or valve trim.
This is known as cavitation damage.

THE DELATITE SOLUTION

The aim of the Delatite Step Trim is to keep the fluid pressure above the fluid vapor pressure so that cavitation does not occur.

At no stage does the fluid pressure drop below the fluid vapor pressure.

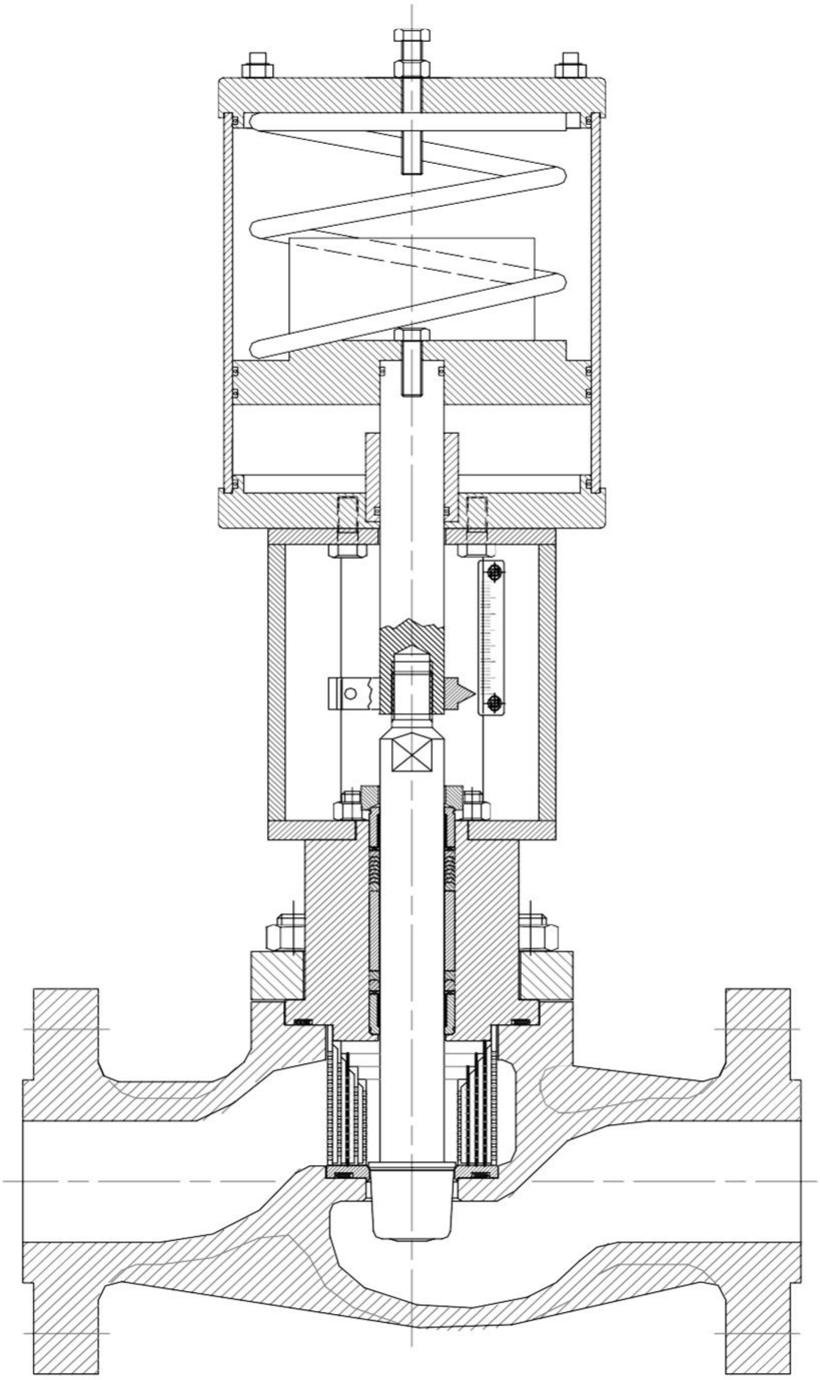
The DEL-ST fits into all Delatite standard control valve bodies.

The trim is available in:

Flow Under Fail Open
Flow Over Fail Closed

DELATITE NOISE REDUCTION TRIM

DEL-LNT

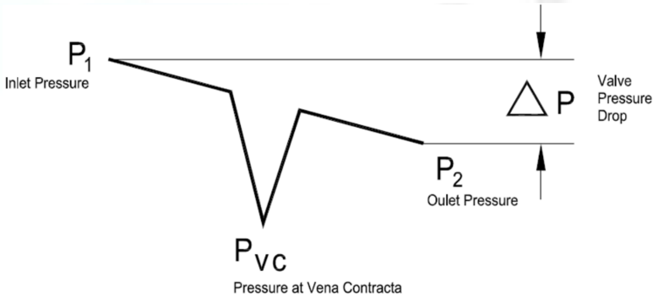


The Delatite Noise Reduction Trim has been designed to reduce Noise, Velocity and Vibration in control valves by using a number of drilled hole cylinders and pressure reducing flow chambers.

High pressure drops in gaseous flow applications can cause premature valve failure due to uncontrolled vibration which can over time cause trim and valve failure.
It is not uncommon for continuous vibration to cause stem failure and or breakage.

High pressure drop in gaseous flow application can lead to high flow velocity which is the main cause of excessive noise.

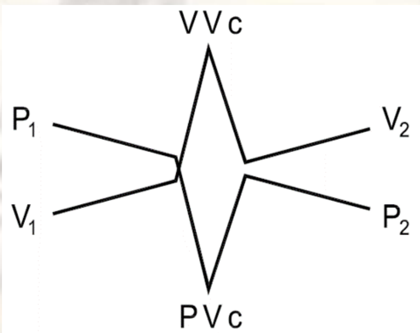
By controlling flow velocity and turbulence you can control valve noise levels and valve vibration.
The DEL-LNT can effectively reduce noise levels by up to 30dBA.



In a single seated control valve the flow travels from P1 (upstream Pressure) to P2 (downstream pressure)

The gas takes a very large pressure drop just after the seat of the valve which is also the point of most constriction in the valve body. This point is known as the vena contracta.

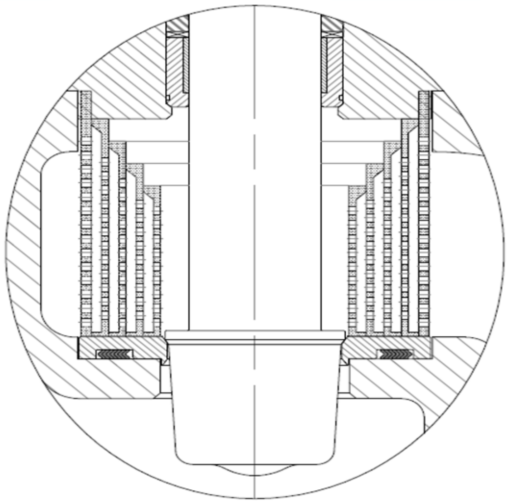
As this point is the most constrictive in the valve this area also experiences the highest velocity as shown in figure.



The problem becomes quit clear when you overlay the velocity profile with the pressure profile.

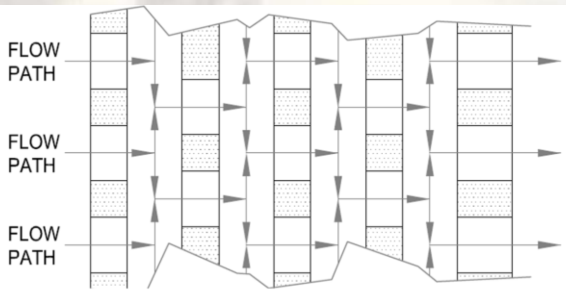
In gaseous applications where there is a large pressure drop across the valve the flow velocity is increased greatly at the valve vena contrata which can generate velocities in the valve which can reach sonic velocity. These sonic velocities can generate high noise and vibration levels within the valve even though inlet and outlet velocities are relatively lower.

THE DELATITE SOLUTION

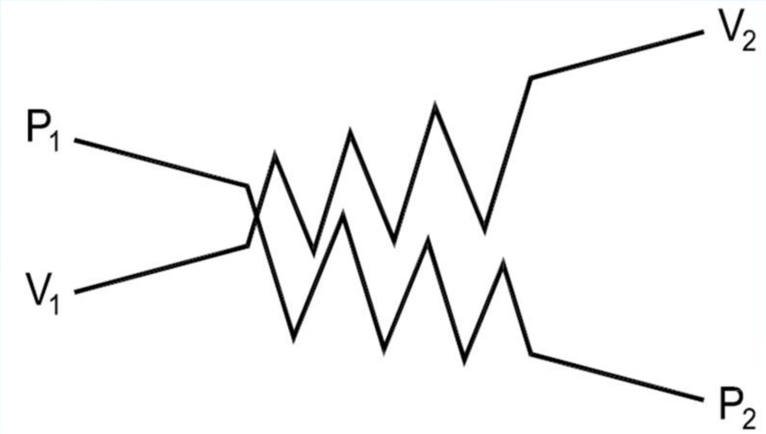


The solution to high flow velocity is to gradually reduce the pressure within the valve without any large pressure drops.
By doing this flow velocities are reduced which in turn reduce noise levels and vibration.

The drilled hole stages within the trim break up the flow into small stream and also create back pressure, the pressure chambers between the stages allows for a controlled expansion of the gas and help reduce turbulence.
This all helps to reduce velocity, vibration and control valve noise.



Flow Profile through Trim



The Delatite DEL-LNT has been designed to use a standard plug and seat with the noise reduction trim taking the place of the seat retainer.

By using this design the flow control is still performed by the characterized plug in the valve seat.

Noise reduction is performed by the DEL-LNT trim, with this design the pressure drop is shared between the plug/seat as per the standard Delatite control valves and the velocity/noise is dealt with by the DEL-LNT trim.

FLOW VELOCITIES

One of the major factors to consider with noise reduction trims is the flow velocity through the valve.

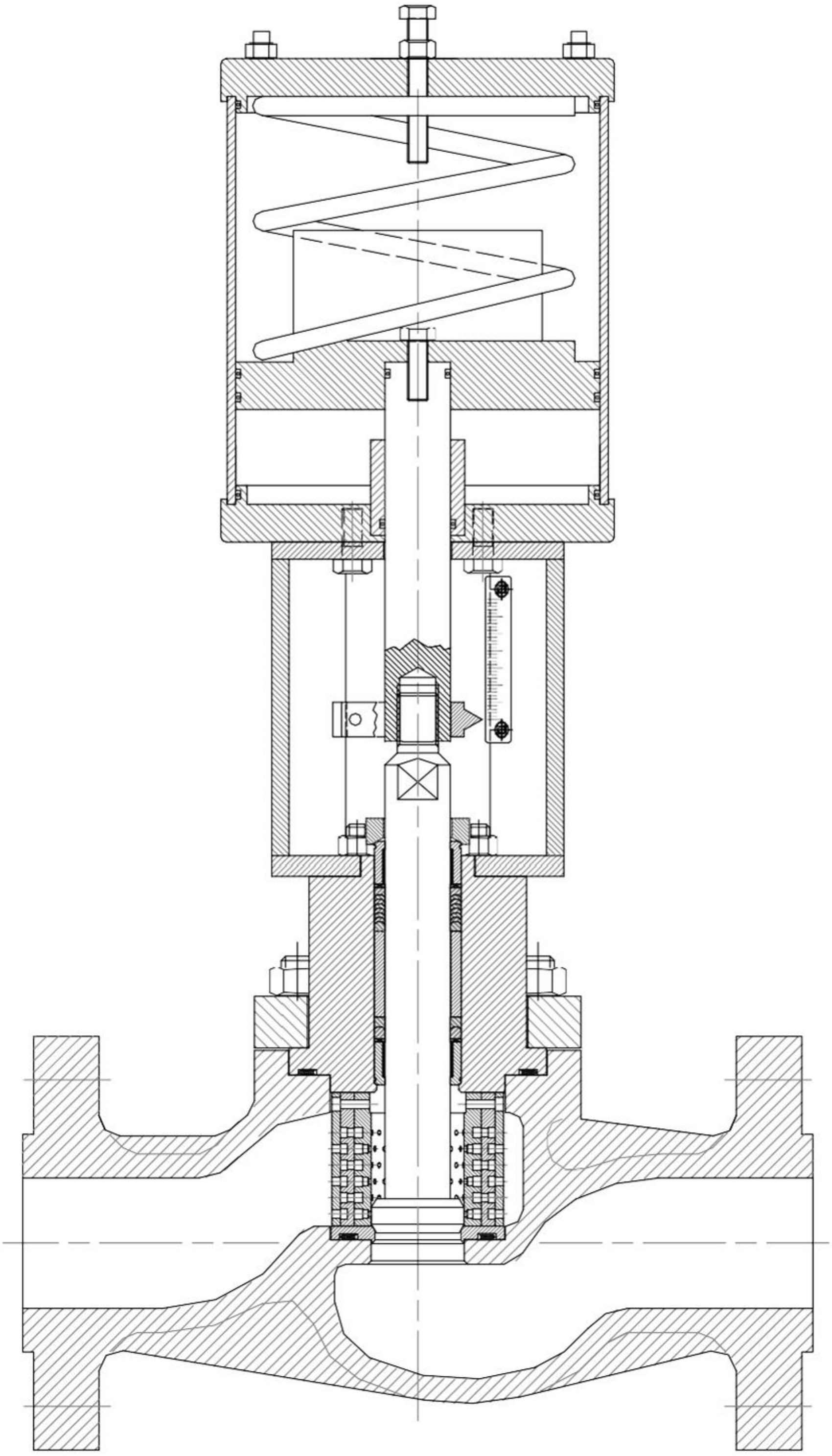
Attention must be given to velocity at the vena contracta but as the pressure drops in a gaseous application the gas can expand, for this reason Delatite have designed expansion chambers into the trim allowing the gas to expand as it leaves the drilled hole section of the trim. The gas is then forced to contract as it goes through the next set of holes, this action helps control velocity and dissipate energy.

The Delatite DEL-LNT is designed for optimum performance at a velocity of .3 mach at the valve discharge.

Consideration needs to be given to all flow areas of the valve to ensure .3 mach is not exceeded. Areas like the valve inlet, the valve gallery area, and the valve outlet must all be considered.

The DEL-LNT fit into all standard Delatite control valves taking the place of the standard seat retainer.

DELATITE CAVITATION CONTROL TRIM
DEL-CCT



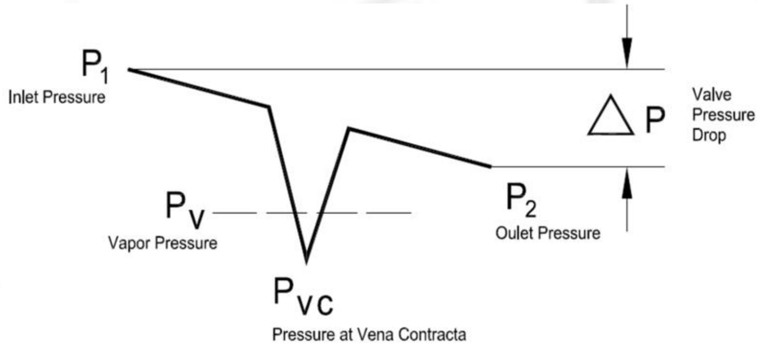
The Delatite Cavitation Control Trim has been designed to eliminate cavitation damage by using a number of drilled hole cylinders and pressure reducing flow passages.

The trim reduces velocity by means of tortuous flow path technologies which eliminate cavitation by forcing the liquid to take numerous pressure reductions as it travels through the valve trim.

THE CAVITATION PROBLEM

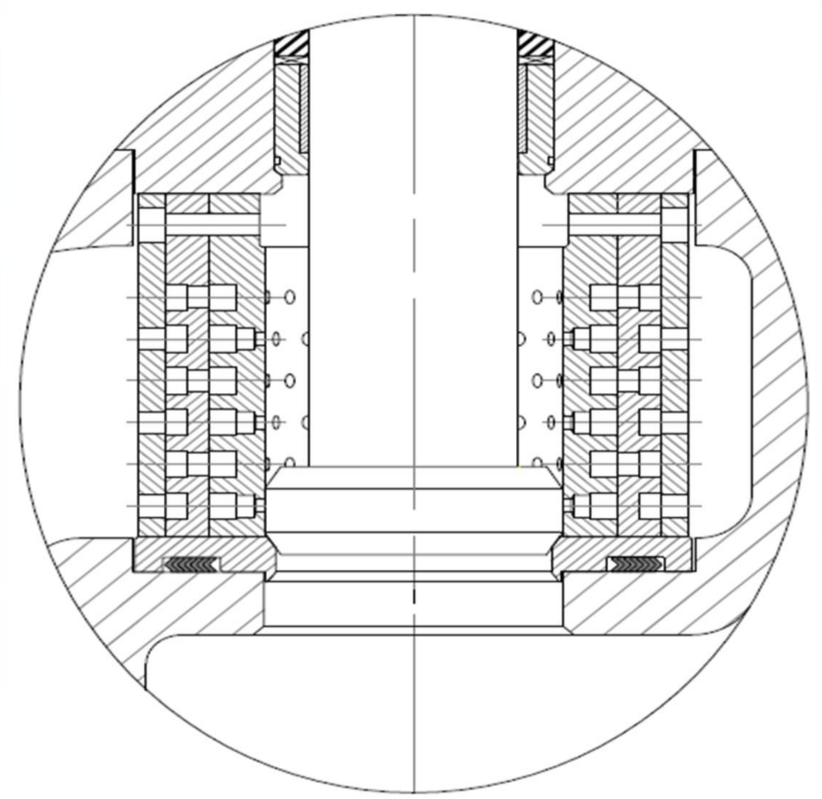
Cavitation damage is one of the major causes of control valve failure.

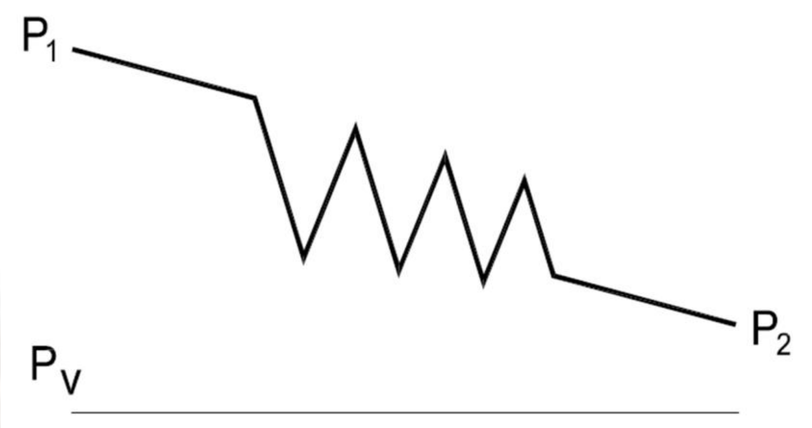
Cavitation occurs when the pressure of the fluid flowing through a restriction of the seat in a control valve drops below the vapor pressure of the fluid, and then the pressure recovers to above the vapor pressure of the fluid as the fluid leaves the valve.



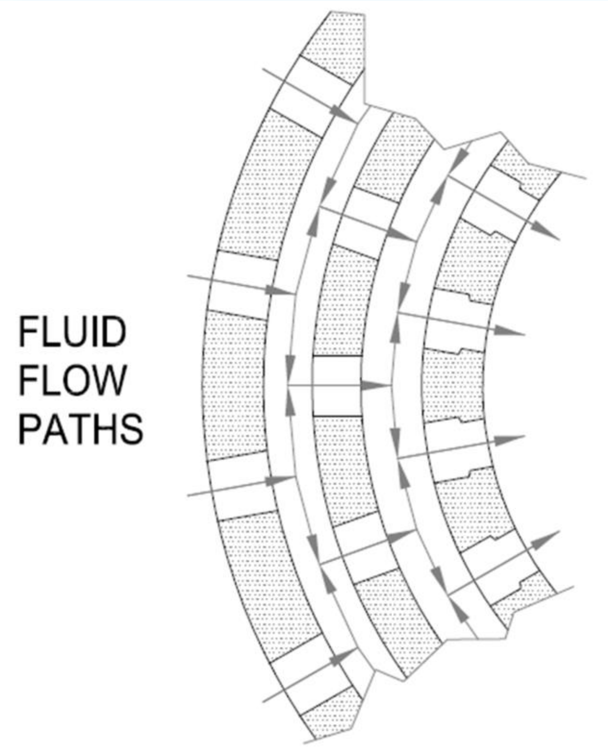
The first stage of cavitation occurs when the fluid pressure drops below the fluid vapor pressure and bubbles form in and around the vena contracta of the valve (seat area). As the fluid continues its path through the valve but after the vena contracta the pressure of the fluid begins to recover. When the fluid pressure recovers to the point where it is just above the fluid vapor pressure the bubbles suddenly implode. The implosion forces are very high and if bubbles implode near a metal surface small amounts of metal will be removed every time a bubble implodes near the body or valve trim.
This is known as cavitation damage.

THE DELATITE SOLUTION





Delatite utilize a number of techniques to provide a gradual pressure reduction as the fluid travels through the valve trim keeping the fluid pressure above the fluid vapor pressure.



Each stage in the trim have a number of drilled holes which the fluid is forced to travel through.

When the fluid leaves the first stage of holes it is forced to turn 90 degree either left or right. The fluid collides with fluid coming from the opposite direction before being forced again to turn and enter the next stage of holes. This process is then repeated up to 6 time depending on the process flow requirements.

Every time you have streams of liquid collide you cause a small pressure drop. When fluid is forced to change direction you cause a small pressure drop.

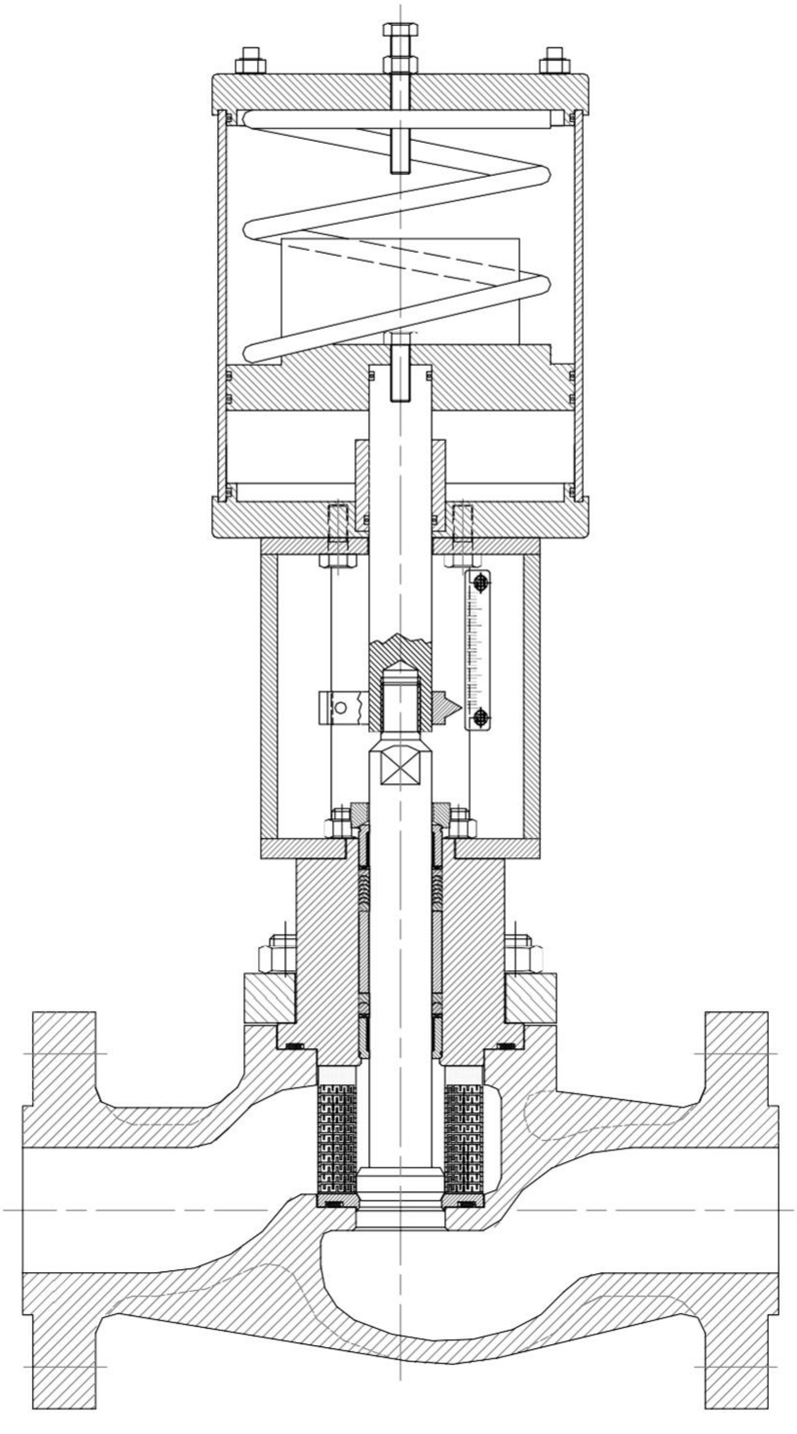
When flow streams are increased in size you control velocity.

Delatite include all these technologies when designing the DEL-CCT severe service trim.

All DEL-CCT trims fit into all standard Delatite control valve bodies.

DELATITE CROC TRIM
DEL-CROC

TAKE A LARGE BITE OUT OF CAVITATION, NOISE AND HIGH VELOCITY



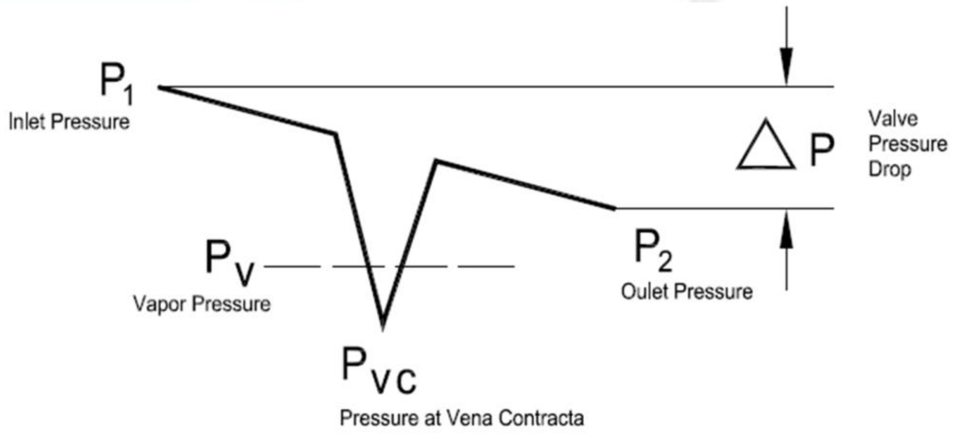
The Delatite Croc Trim has been designed to eliminate cavitation damage in liquid service and noise/velocity in gaseous service where control valves are working in high pressure drop applications.

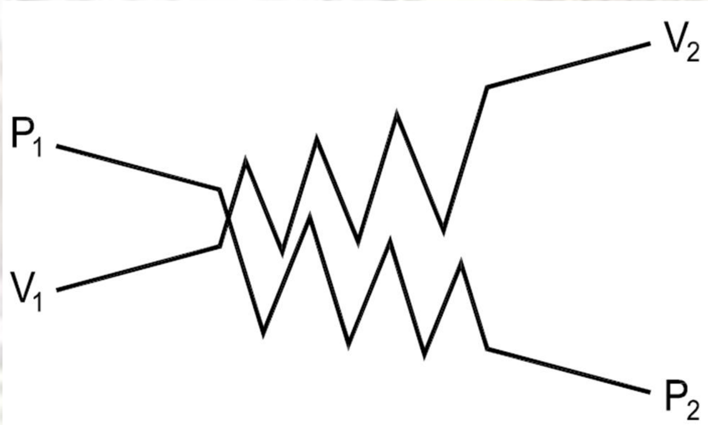
The trim is made up of a series of discs which have proves machined into both sides of the disc and when these discs are stacked together they form a torturous path. This is also known as a disc stack.

The size and number of grooves are engineered to meet the required flow conditions.

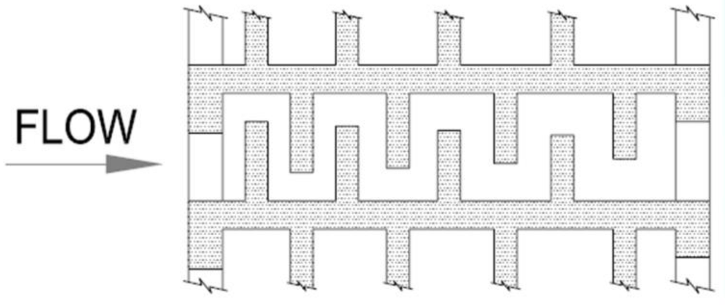
As the grooves are radial and the flow is from center out the volume of the groove is increased as the flow passes through the trim.

This is of great advantage in controlling velocity in gaseous service.





How the Croc Trim Works:

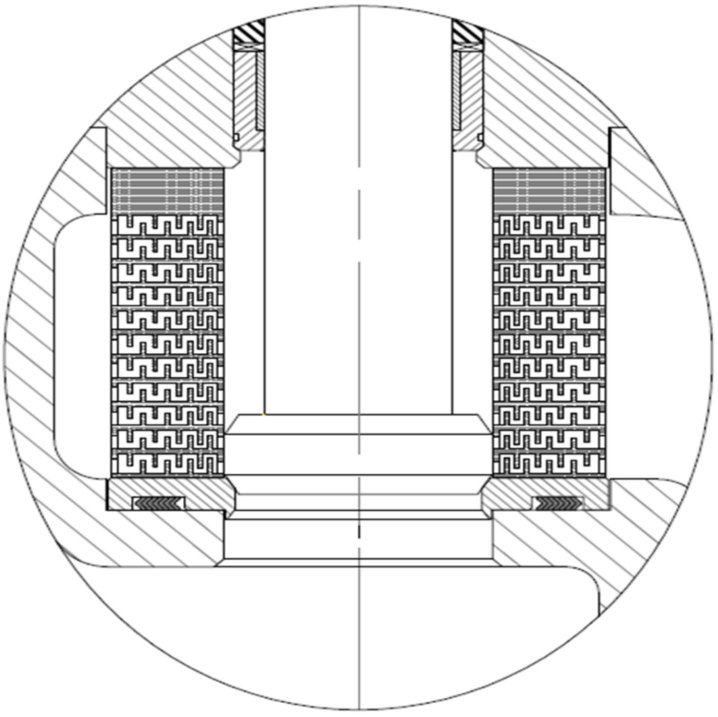


The flow direction is from inside to outside

When the valve is opened the fluid or gas enters the first section of the trim, it is then forced to change direction by 90 degrees 4 times before it gets to the second groove/stage.

There can be up to 7 stages in this design of trim.

This gives Delatite a clear advantage when designing valves that operate in high pressure drop applications.



NOISE AND VELOCITY CONTROL

For noise or velocity control service.

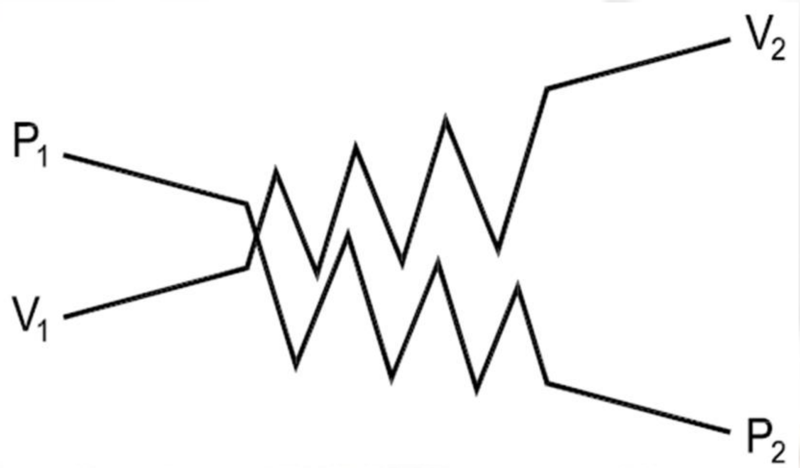
The gases travel from inside to outside there are a number of advantages in the Croc Trim design.

As the flow is radial in this style of trim the flow area gradually becomes larger as the gas travels through the trim.

This feature is a valuable advantage when trying to control velocity and in turn noise as gas generally expands when the pressure drops.

The tortuous path also has a major impact on velocity as the flow is continually forced to change direction as it travels through the trim.

Every time the flow changes direction a small pressure drop is achieved.



Noise reductions of up to 40dBA can be achieved with this trim.

CAVITATION CONTROL

The flow direction for cavitating service is from inside to outside.

The fluid travels radially from the inside of the trim, while travelling through the trim it is forced to change direction a number of time before it leaves the trim (4 times per stage)

Every time the fluid is forced to change direction it takes a small pressure drop. The number of these direction changes is calculated to make sure the fluid pressure inside the Croc trim does not drop below the fluid vapor pressure and therefore cavitation is eliminated.

With the area of the flow passages increasing as the fluid passes through the trim fluid velocity is easier to control and in turn trim erosion is reduced.

PRESSURE REDUCTION

The aim of the Croc trim is to provide a gradual pressure reduction in small stages as the fluid passes through the valve trim.

With this technology Delatite Croc Trims are able to reduce noise levels by up to 40 DBA.

The DEL-CROC trim fits into all standard Delatite control valves.

The disc stack takes the place of the seat retainer.

Valve Construction	
Item	Material
Body	Carbon Steel, Stainless Steel, Alloy Steels
Plug / Seat	316 S/S, LLk 1906 Coated 316 S/S, Alloy Steels, Inconel, Alloys
Trim Del CT	316 S/S, LLK 1906 Coated 316 S/S, 400 Series S/S, Inconel, Other Material upon request.
Trim Del CCT	316 S/S, 400 Series S/S, Inconel, Other Material upon request.
Trim Del ST	316 S/S, LLK 1906 Coated 316 S/S, 416 S/S, Other Material upon request.
Trim Del LNT	316 S/S, Inconel
Body Styles	Globe, Angle
Size Range	25 NS through to 350 NS, Other Sizes upon request.
Pressure Ratings	ANSI 150# Through To ANSI 2500#
End Connections	RF Flange, Butt Weld, Socket Weld, Threaded, RTJ, Special Ends available upon request.
Flow Direction	Descrption
Del CT	Under
Del ST	Under or Over
Del CCT	Over
Del LNT	Under

Valve Availability			
Model	Size	Stages	Pressure Rating
Del ST	25 to 50	2 to 4	150# to 600#
Del CCT	50 to 300	1 to 6	150# to 2500#
Del LNT	25 to 300	1 to 7	150 to 600#
Del CT	50 to 300	2 to 8	150# to 2500#

For further information or verification please contact your Delatite Valve Representative.

Manufactured in Australia by:

Delatite Valves Pty Ltd
Victoria
Australia
sales@delatitevalves.com
www.delatitevalves.com

Authorised Distributor

QAS INTERNATIONAL
ISO 9001:2015
REGISTERED COMPANY
Certificate No. AU1807

Updated 05/10/2020