

Advance Control Valves Maintenance and Operation

presented by Dale Fletcher - GC Systems



CLA-VAL Course Objectives

- Basic hydraulics reminder
- Understanding...
 - Pressure reducing valves
 - Pressure relief valves
 - Altitude valves
 - Pump control valves
- Advanced troubleshooting
- New Innovations with control valves



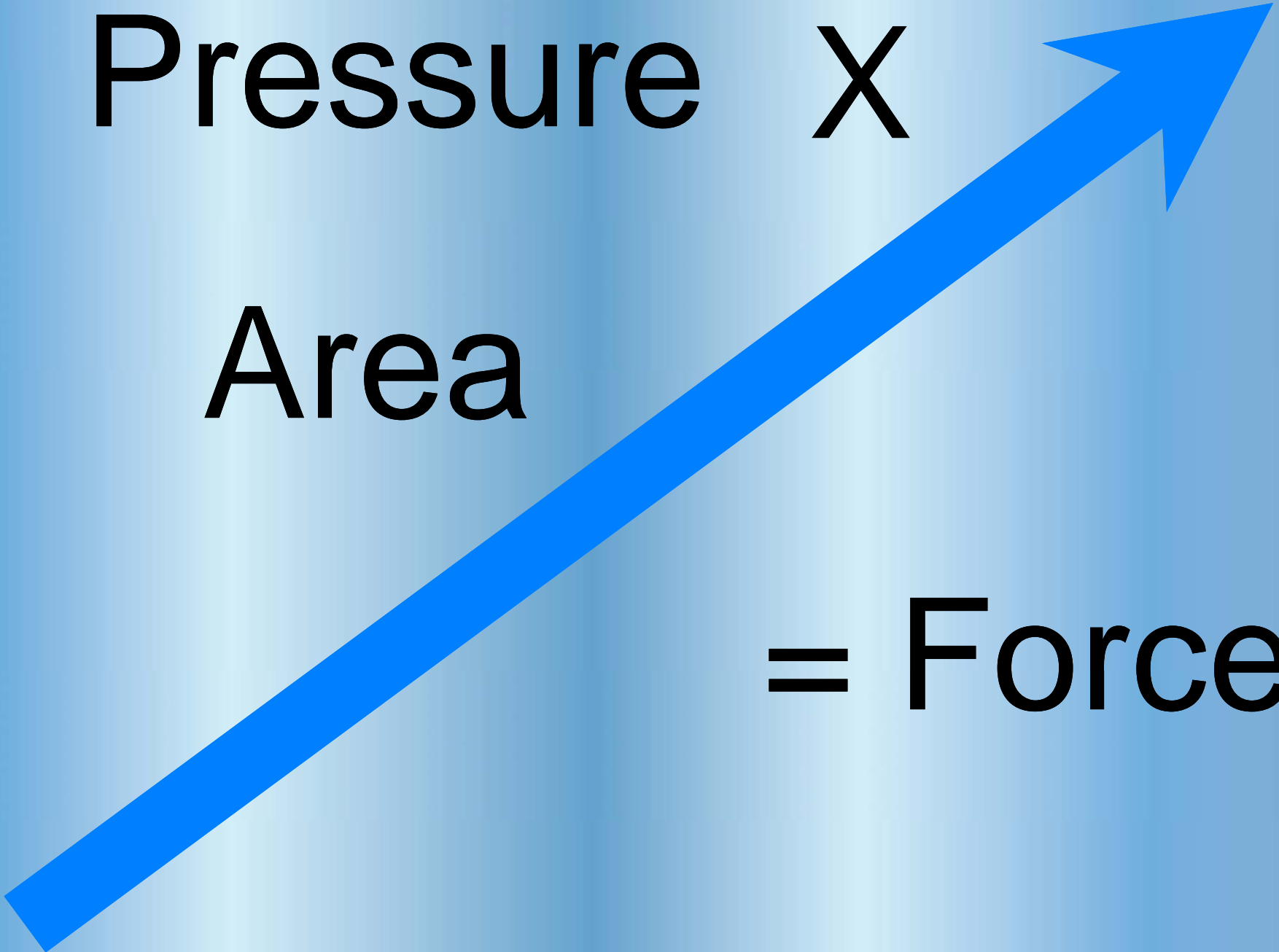
Basic Hydraulics



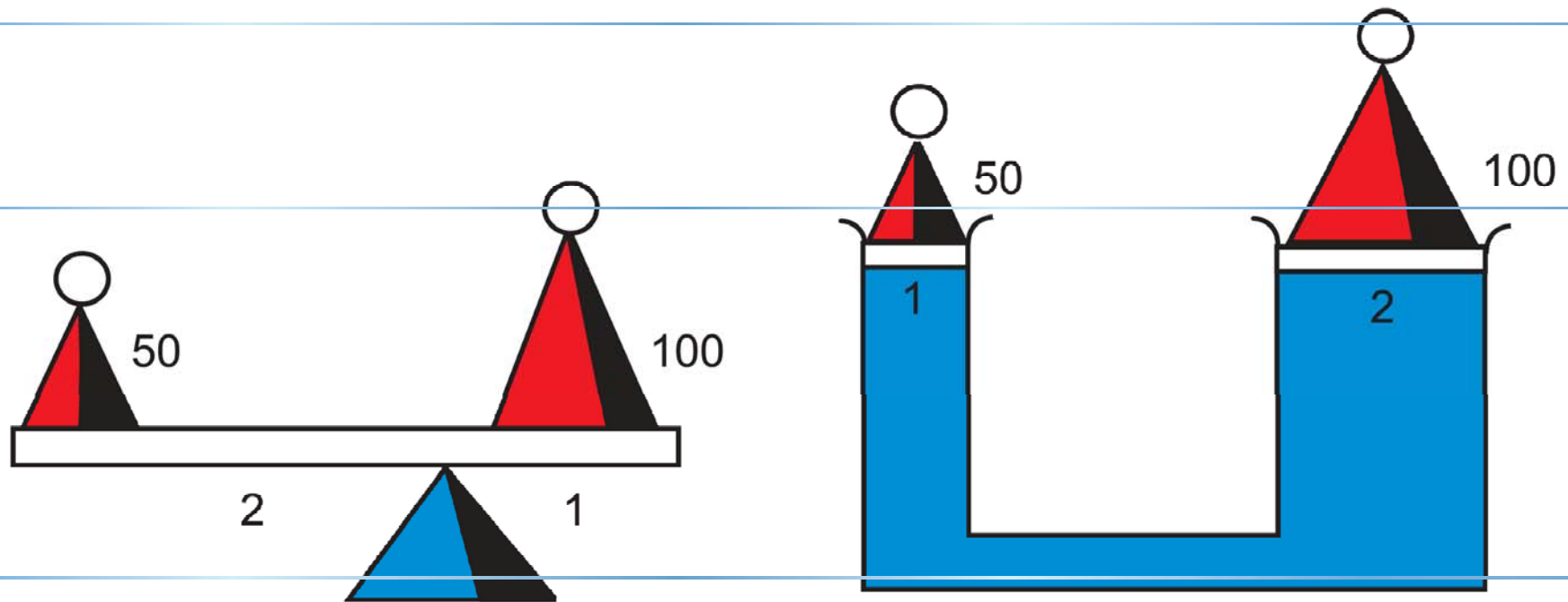
Pressure \times

Area

= Force

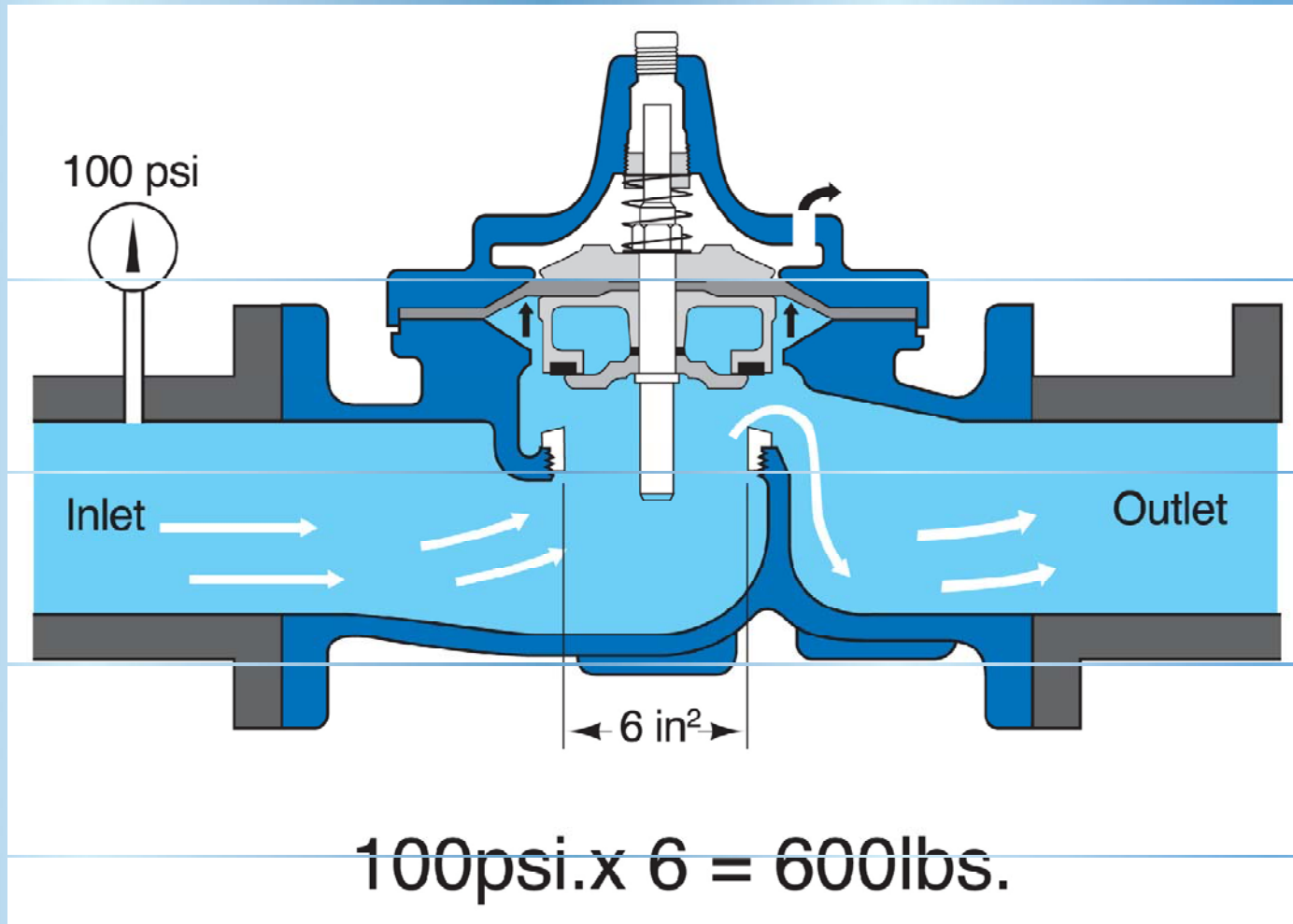


The Hydraulic Advantage

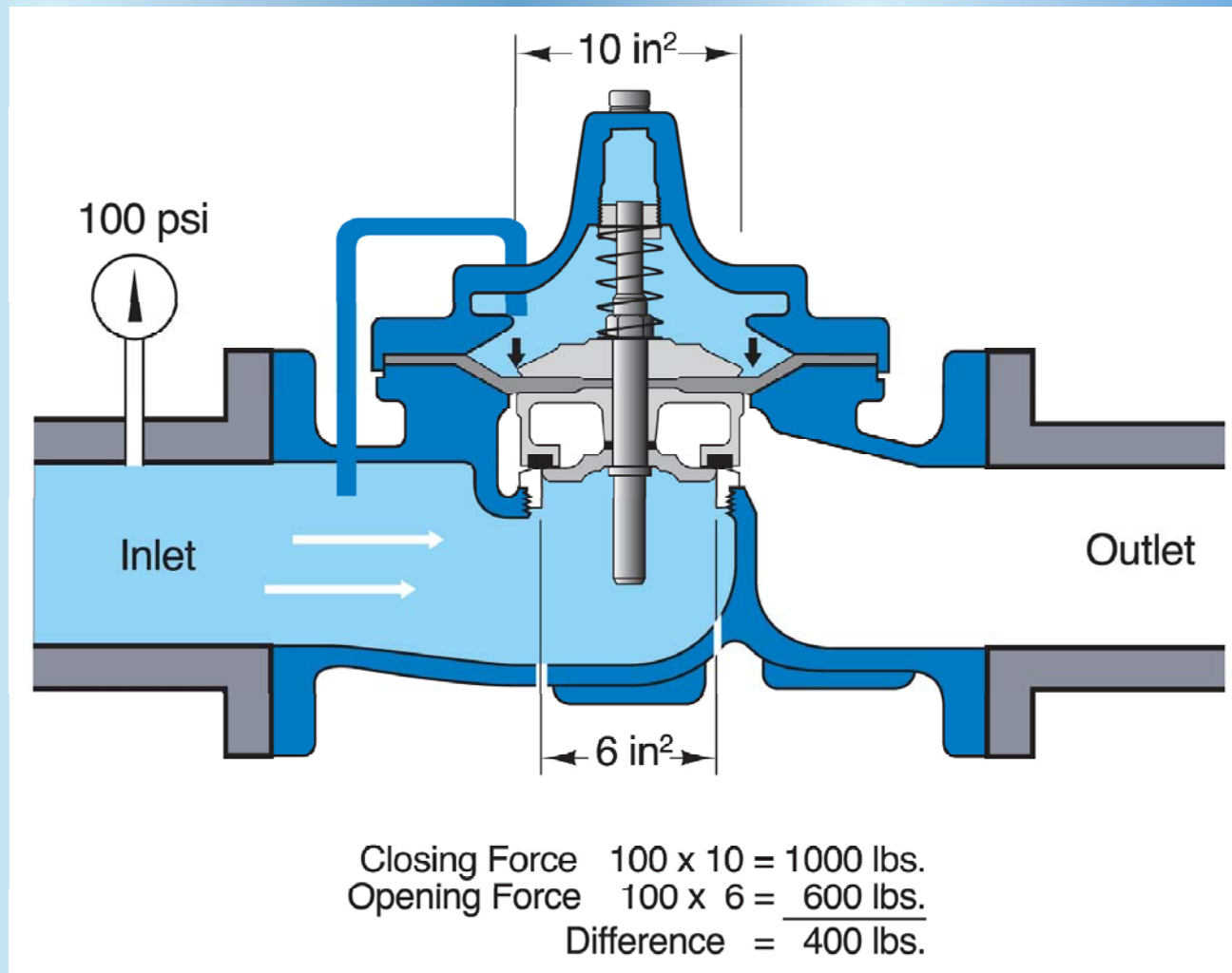


Fluid can be used like levers

Line Pressure to Open



Line Pressure to Close



Just a reminder...

- Water on the cover to close the main valve
- Water off the cover to open the main valve
- Knowing this makes troubleshooting easier...



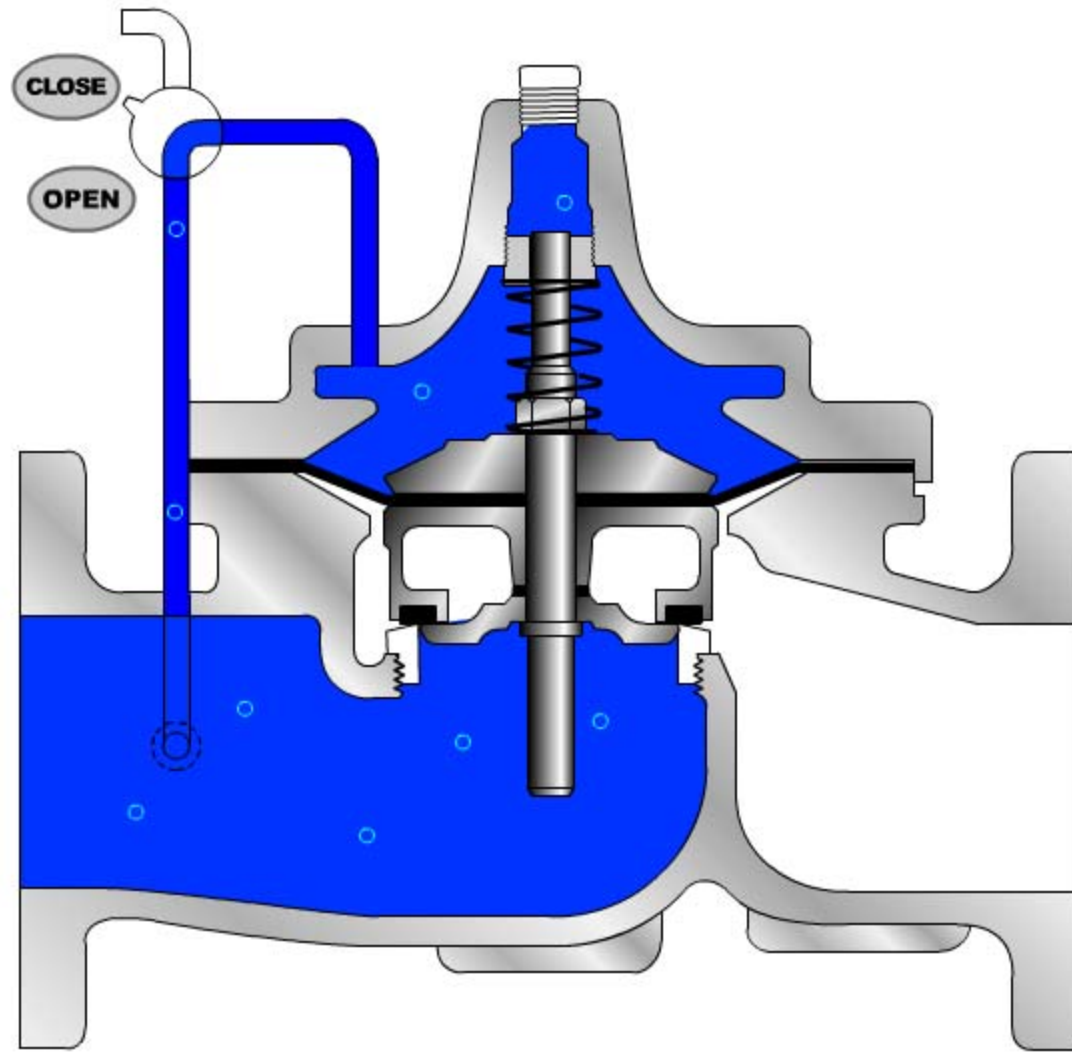
EXIT

Valve Opening/Closing Operation

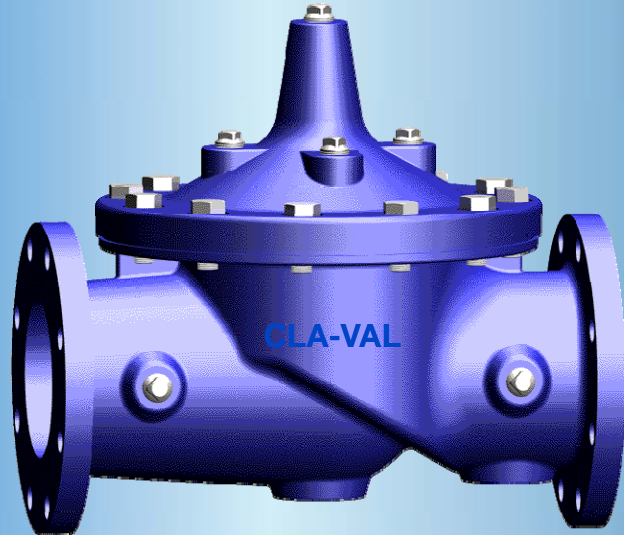
PLAY

PAUSE

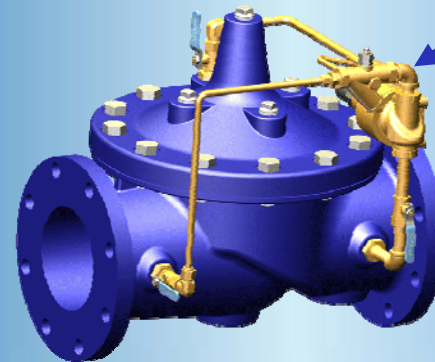
RESTART



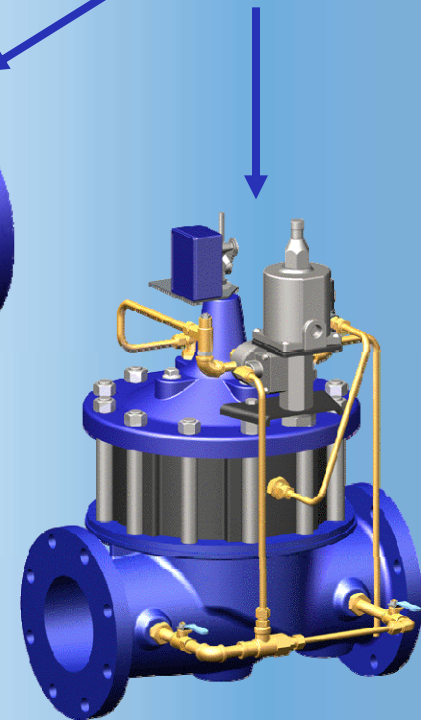
Cla-Val Automatic Control Valves Consist of...

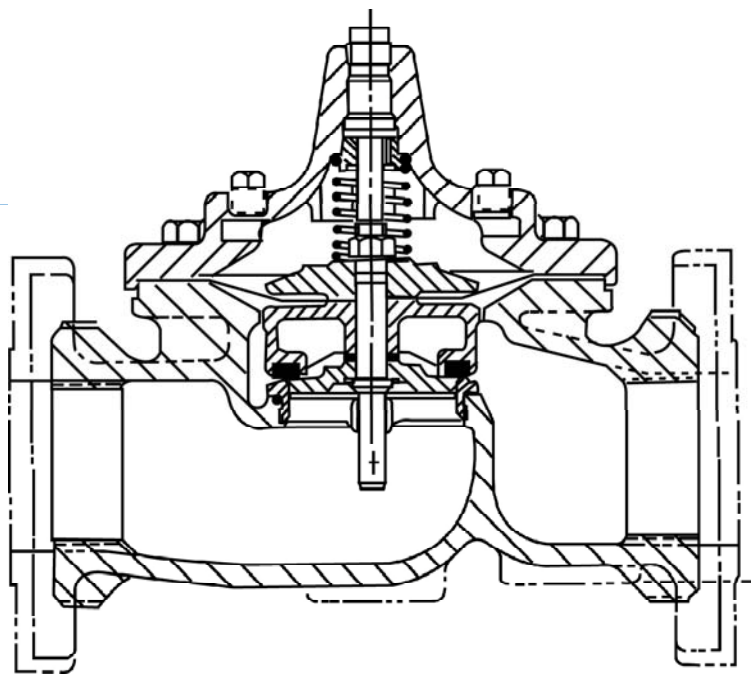


Main Valve

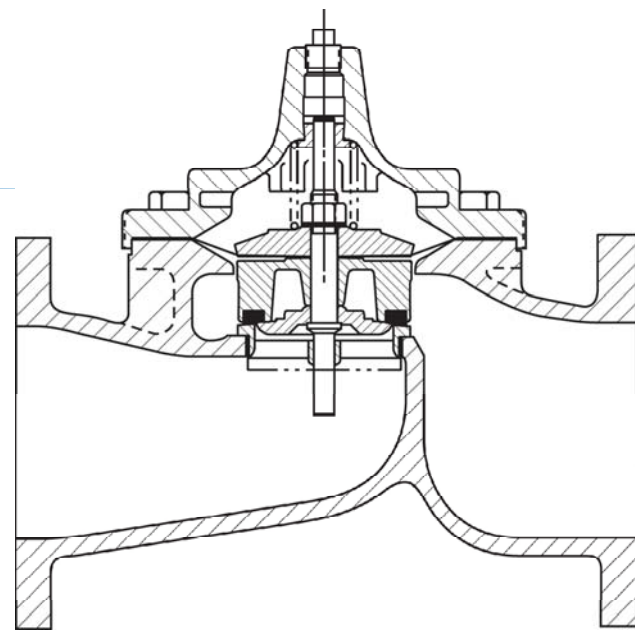


Pilot Control
System





Model 100-01



Model 100-20

From the smallest: 3/8-inch



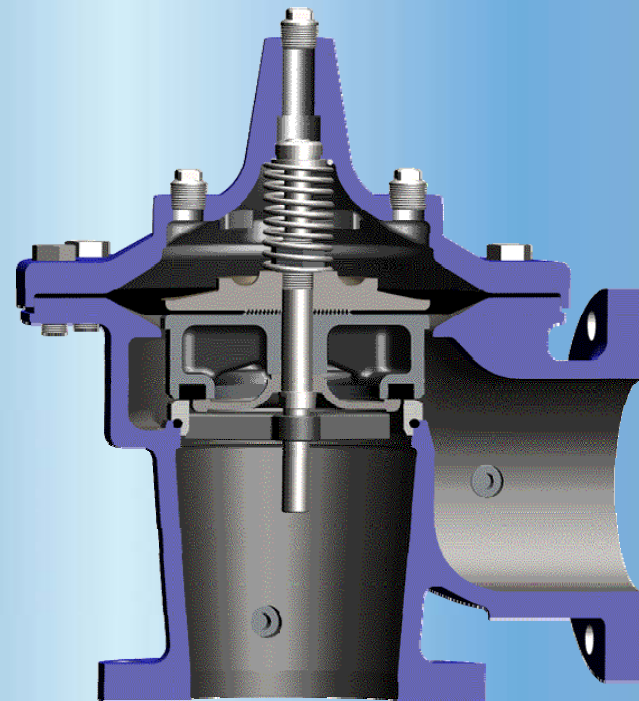
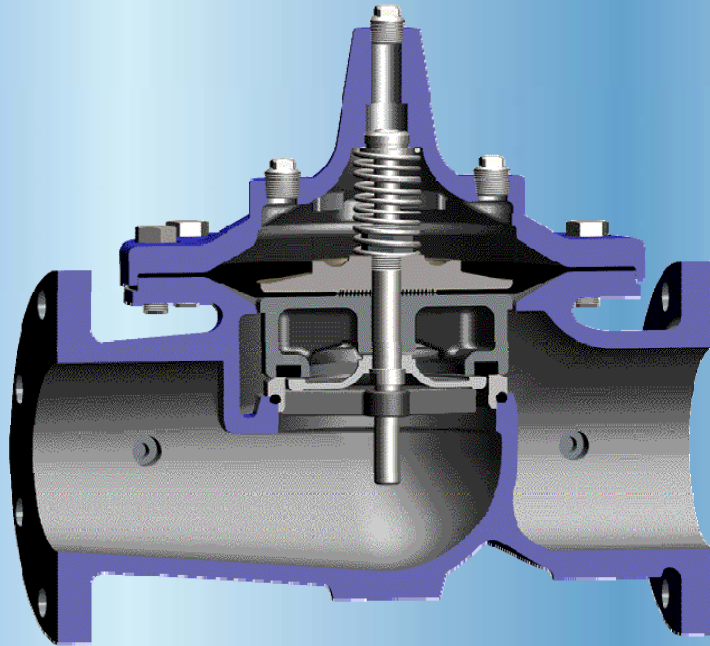
To the largest: 48 inch







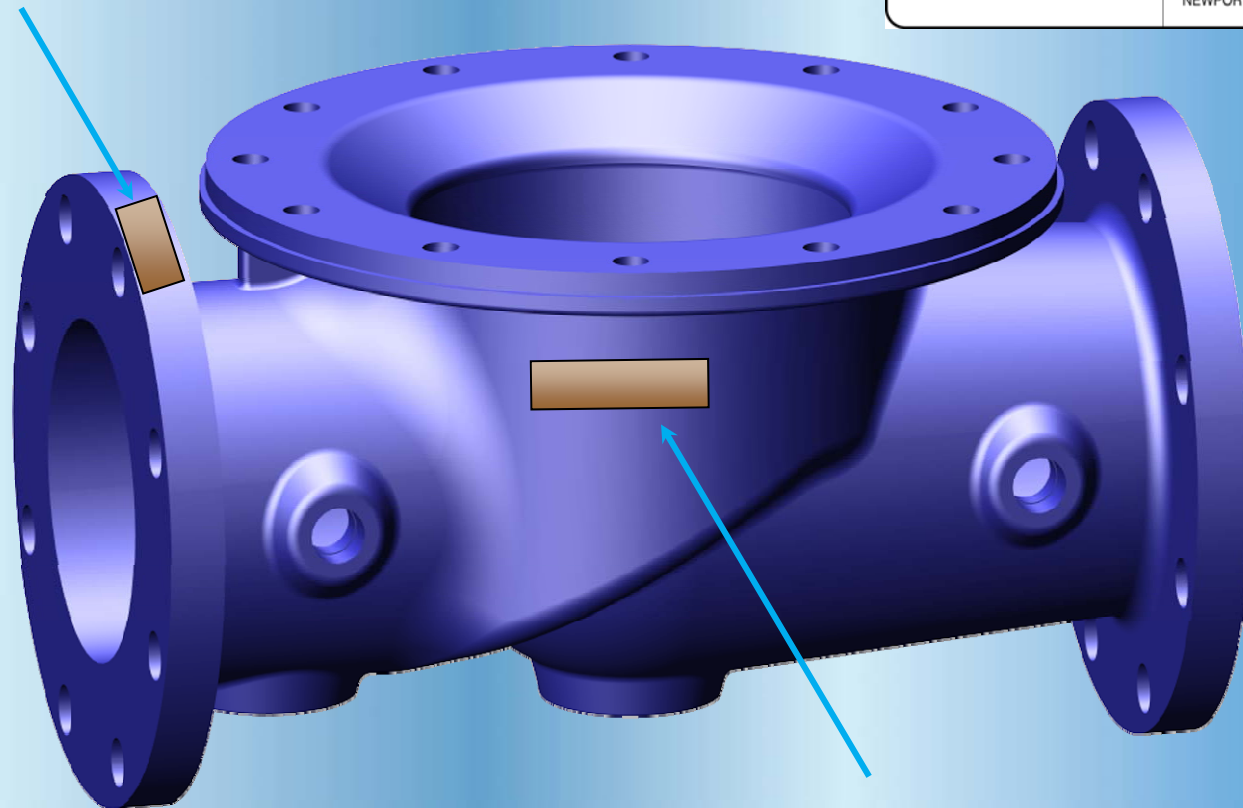
Globe and Angle Pattern



Name Plate Locations

2-1/2" and larger flanged valves

SIZE & CAT NO.	CODE
STOCK NO.	
MFD. BY CLA-VAL NEWPORT BEACH, CALIF. U.S.A.	



2" and smaller flanged valves and
all threaded and grooved valves

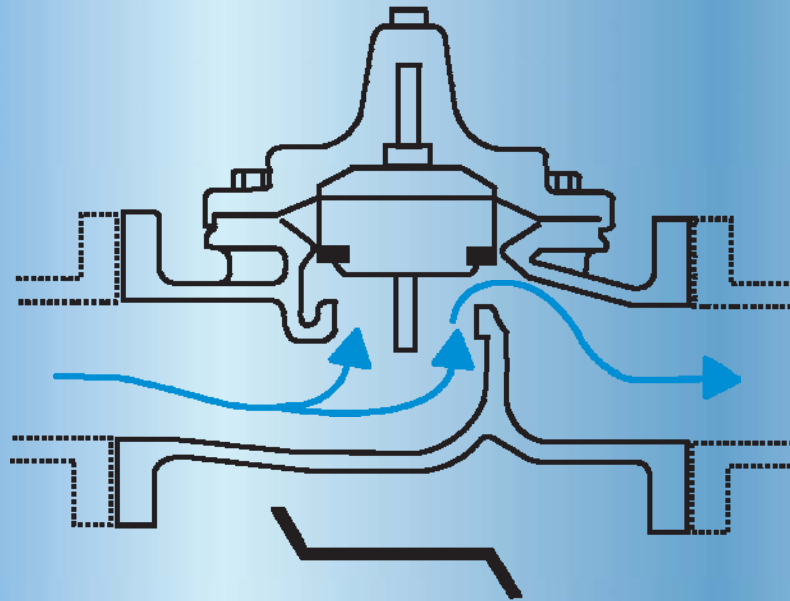


Cla-Val Nameplate



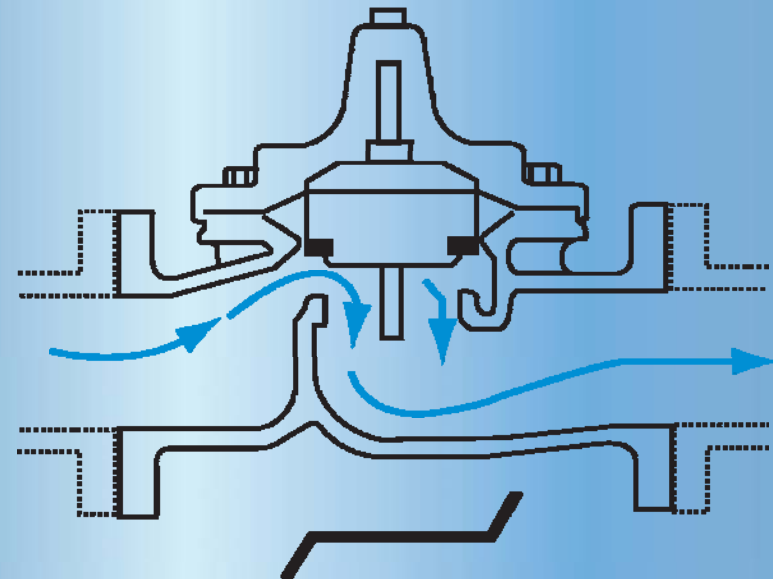
Flow Direction

Normal Flow



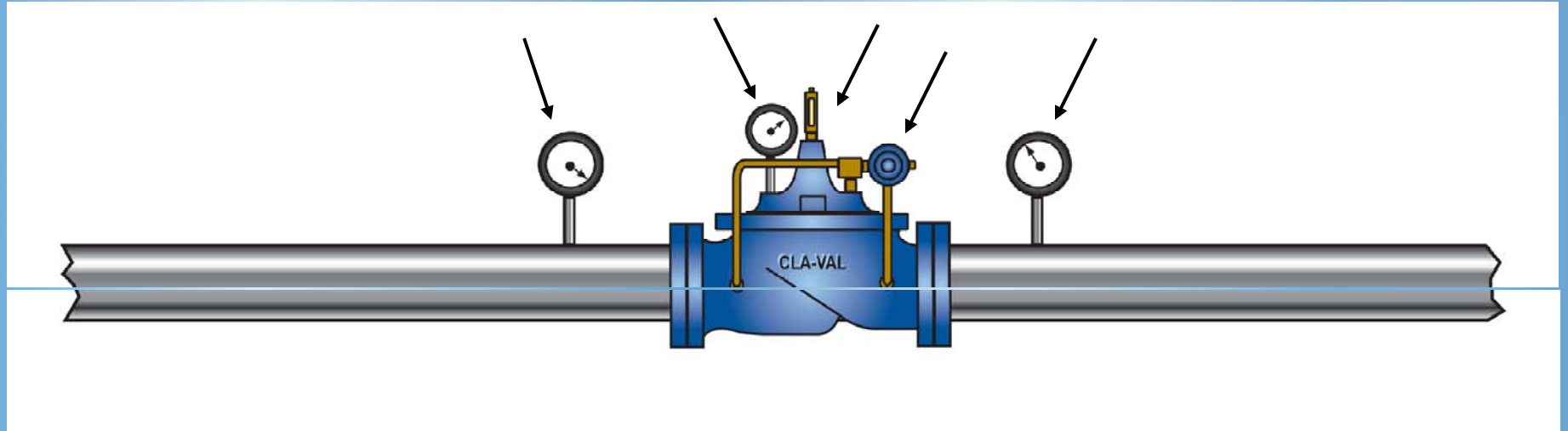
Up and Over Seat

Reverse Flow



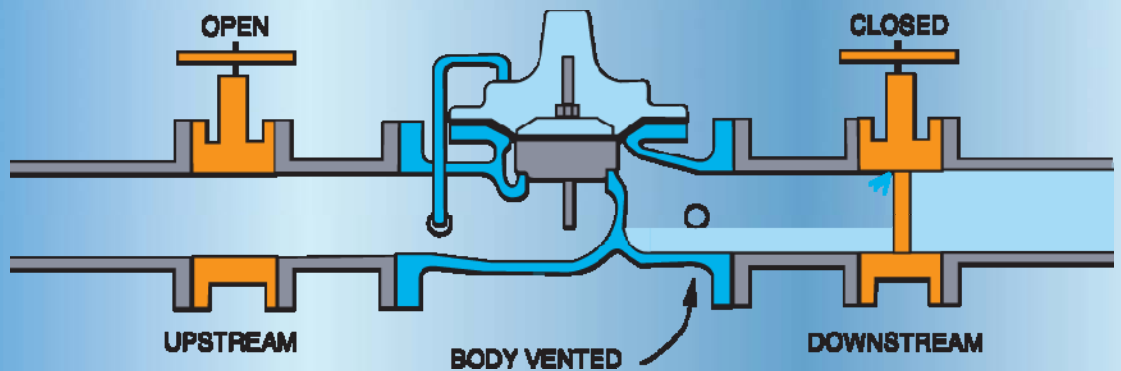
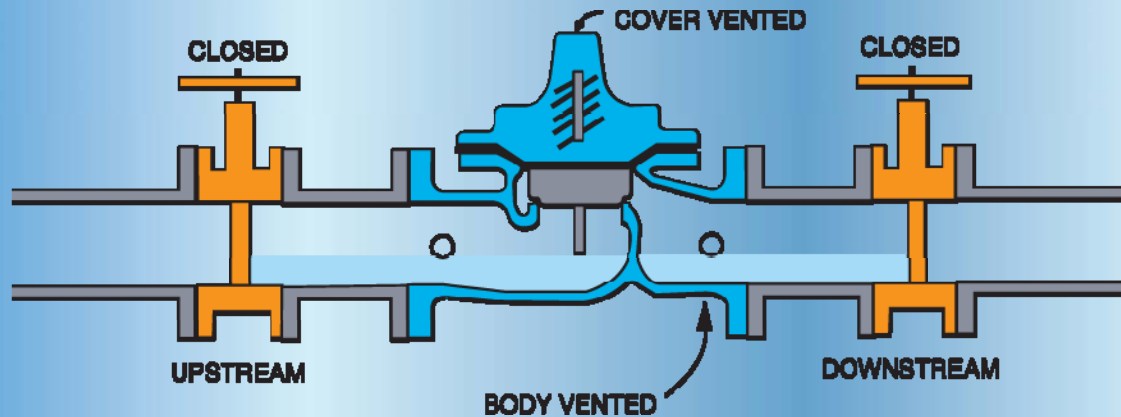
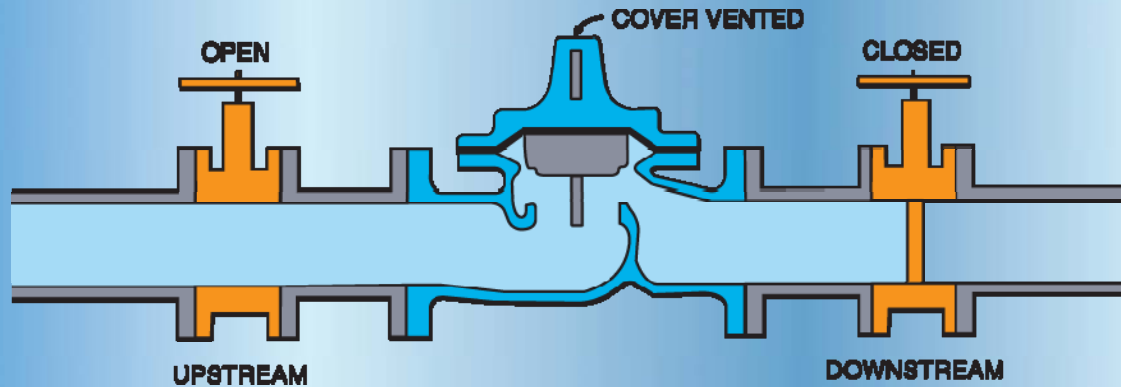
Over Seat and Down

Hytrol Troubleshooting



- Check the effect in the system before testing
- Check pilot system components
- Use three gauges
- Use X101 Valve Position Indicator
- Perform the three Hytrol checks:
 1. Diaphragm test
 2. Stem freedom of movement test
 3. Disc & seat test





Three Hytrol Checks:

- Diaphragm test
- Stem movement test
- Disc & seat test

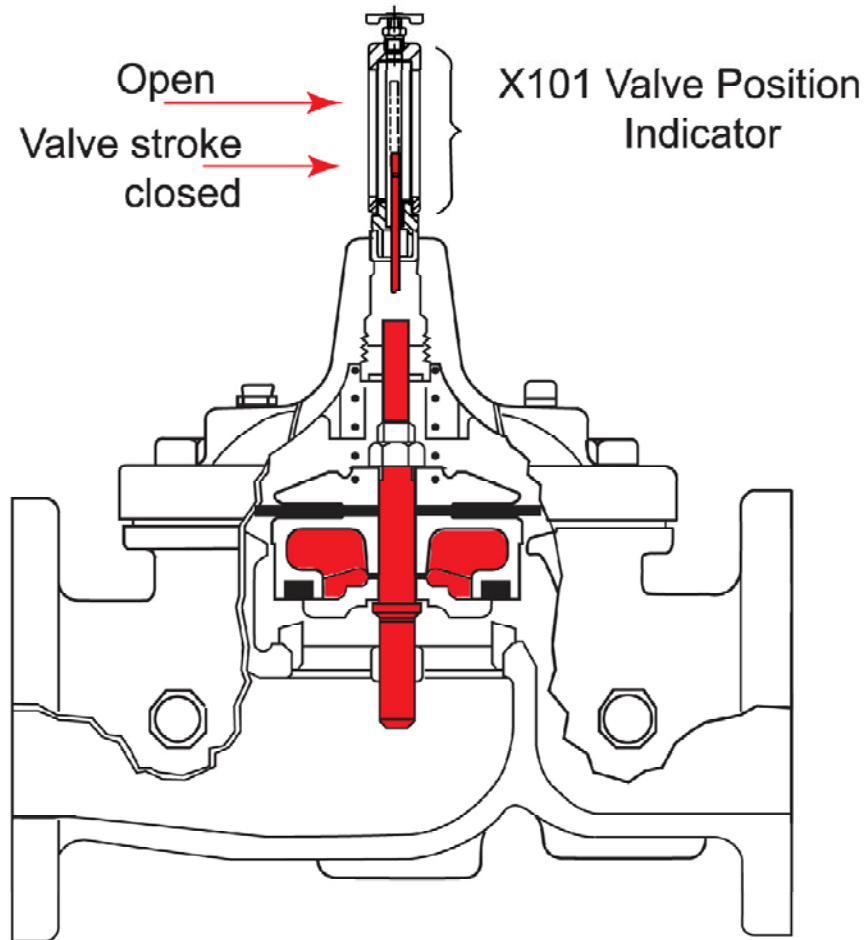
Hytrol Service Tips

1. Remove cover carefully
2. Pull STRAIGHT UP on cover and diaphragm assemblies
3. Avoid damage to seat and stem
4. Clean to a smooth surface
5. Inspect and replace as necessary
6. Reassemble in proper order
7. Perform three Hytrol checks
8. Reinstall pilot control system
9. Return to service
10. Record service activity on Preventive Maintenance form



Size	Displacement	Size	Displacement
3/8"	.012 Fl. Oz.	3"	.08 Gallons
1/2"	.34 Fl. Oz.	4"	.169 Gallons
3/4"	.34 Fl. Oz.	6"	.531 Gallons
1"	.7 Fl. Oz.	8"	1.26 Gallons
1 1/4"	.20 Gals.	10"	2.51 Gallons
1 1/2"	.20 Gals.	12"	4 Gallons
2"	.32 Gals.	14"	6.5 Gallons
2 1/2"	.43 Gals.	16"	9.57 Gallons
		24"	29 Gallons

Measured Stroke

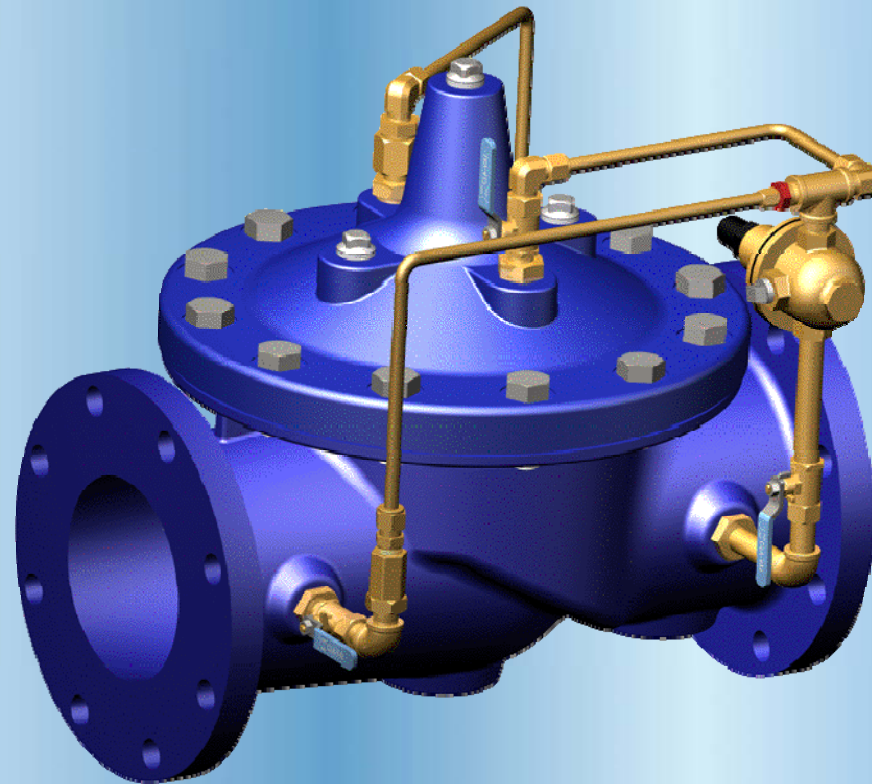


Valve stroke equals
.28 x valve size on full
ported valves

Valve stroke equals
.28 x seat size on
reduced port valves



Pressure Reducing Valves



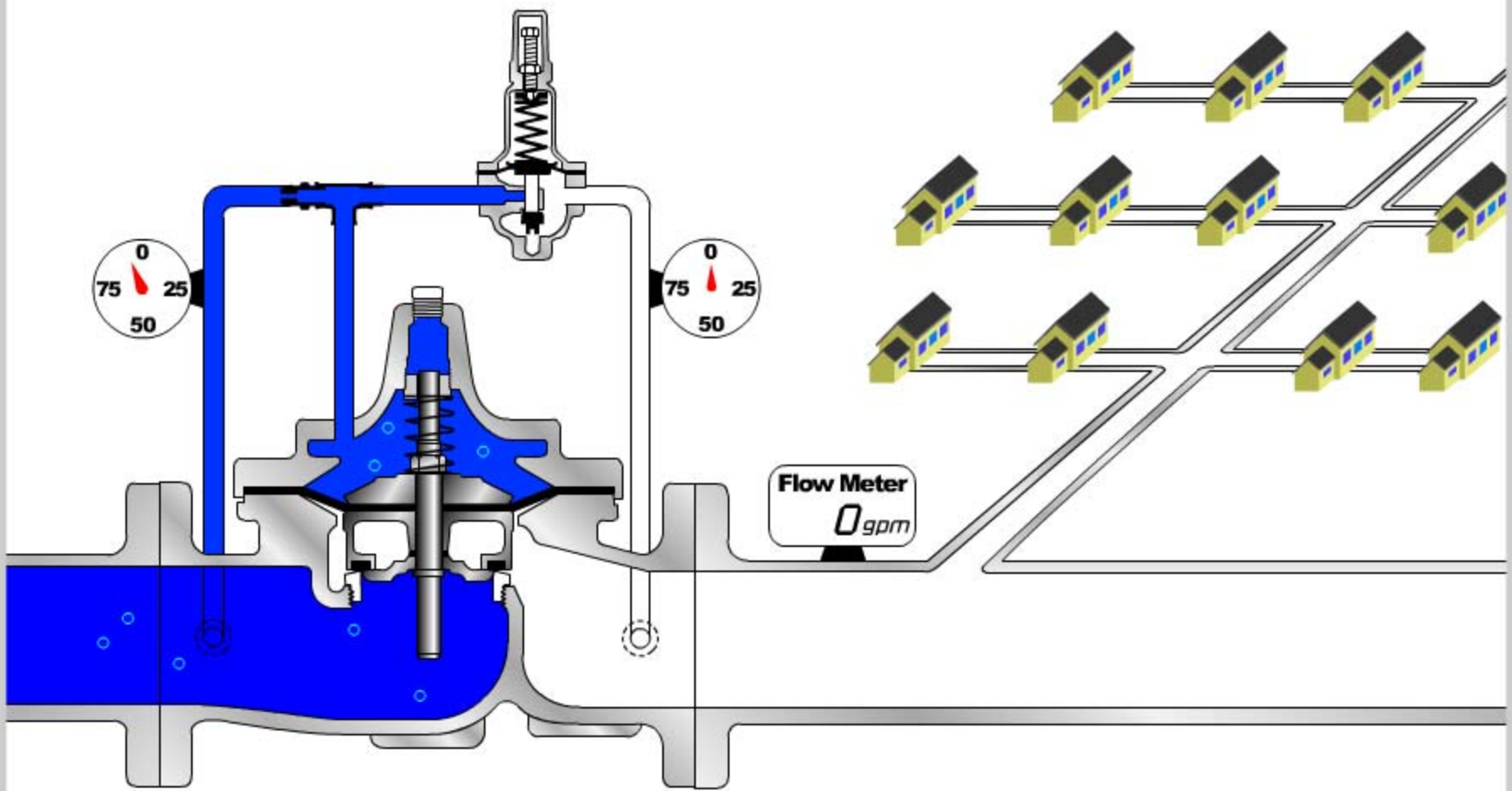
EXIT

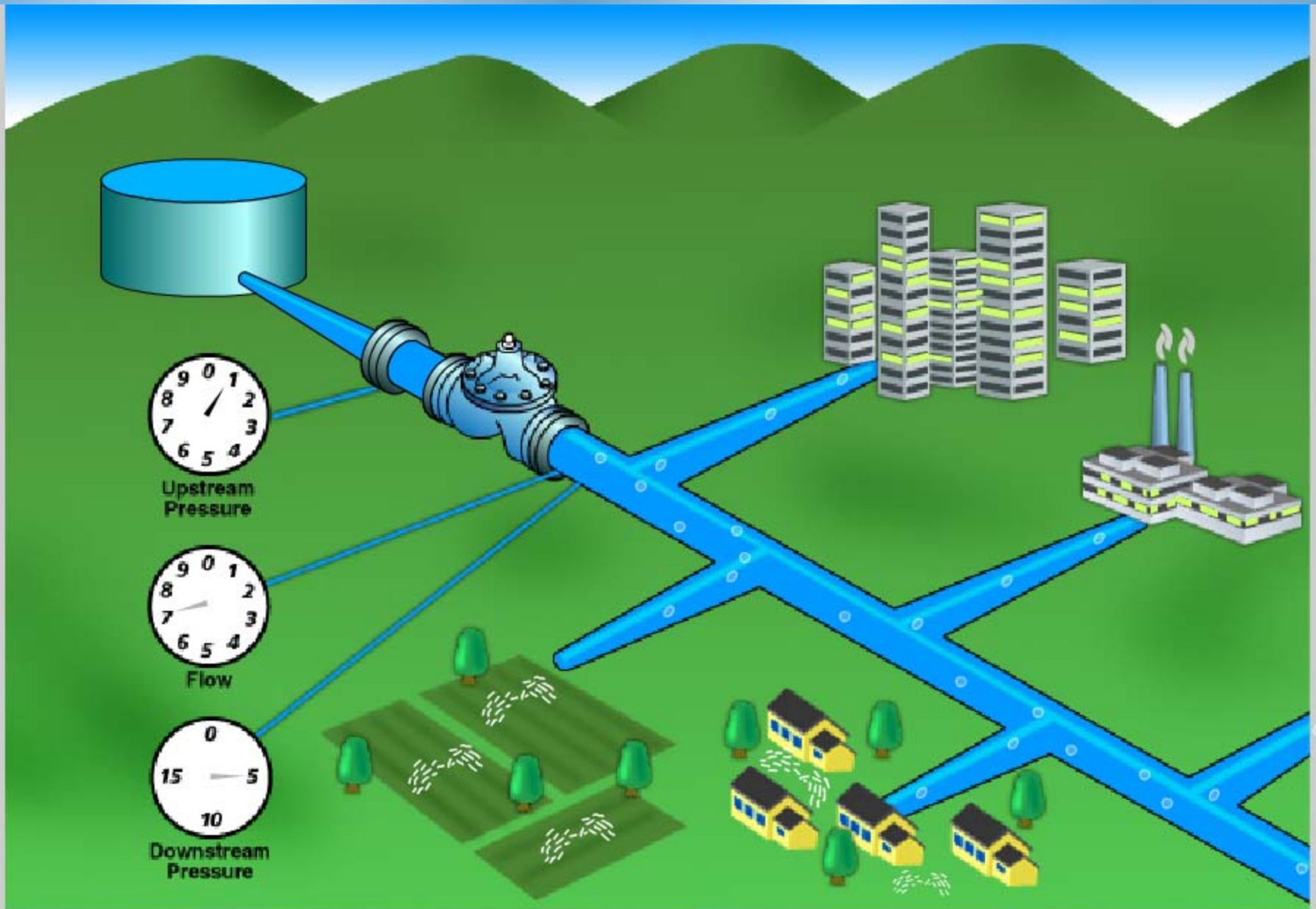
90-01 Pressure Regulation Valve

PLAY

PAUSE

RESTART

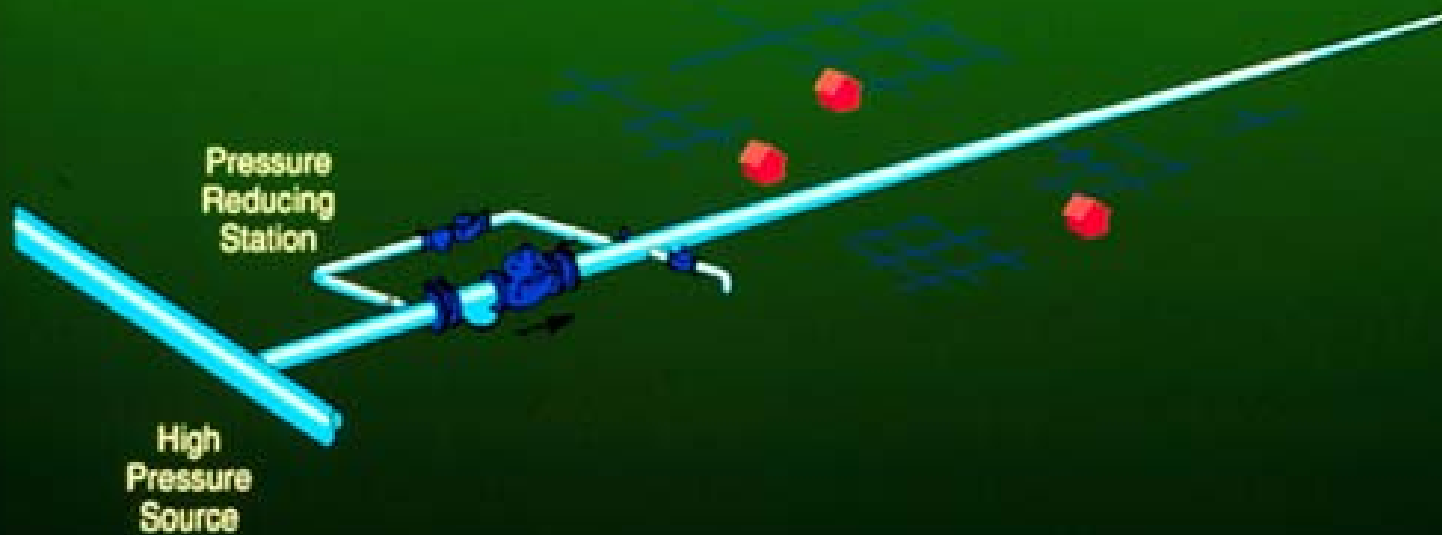




EXIT

Pressure Reducing Valve





Clayton Valley I

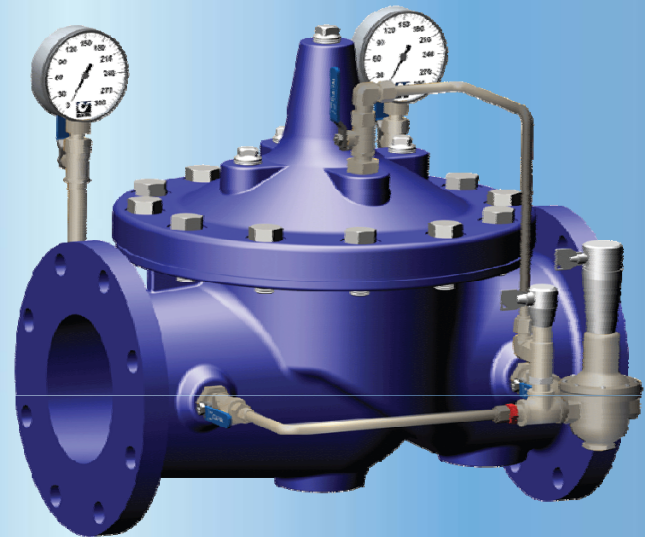
Pressure Reducing Valves

- Function
- Pressure reducing valves shall maintain a constant downstream pressure regardless of changing flow rate and/or inlet pressure
- Opens on a drop in downstream pressure
- Closes on a rise in downstream pressure
- Takes 10 psi of DP to operate
- Modulates to meet system demand

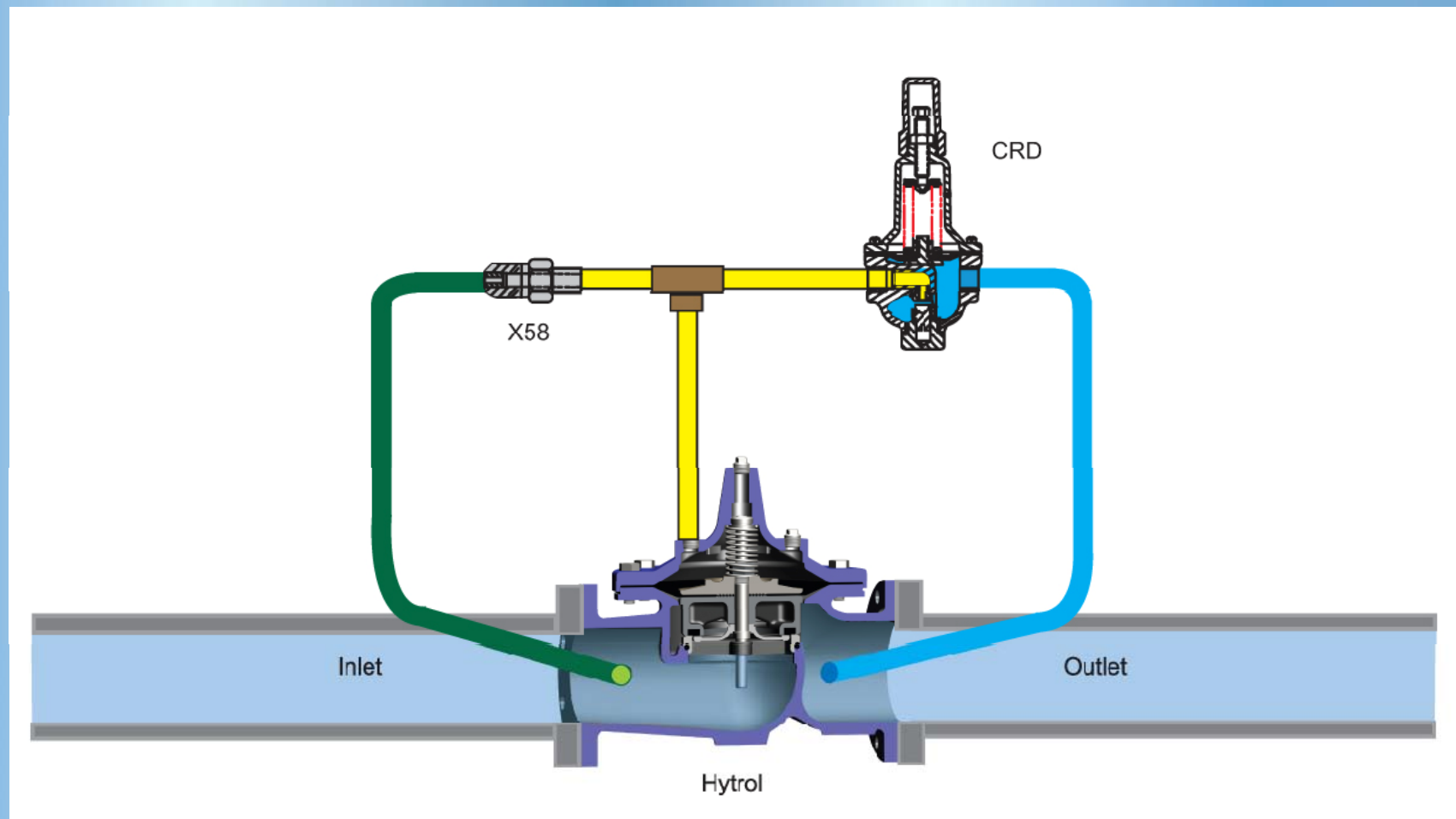


Pressure Reducing Valves

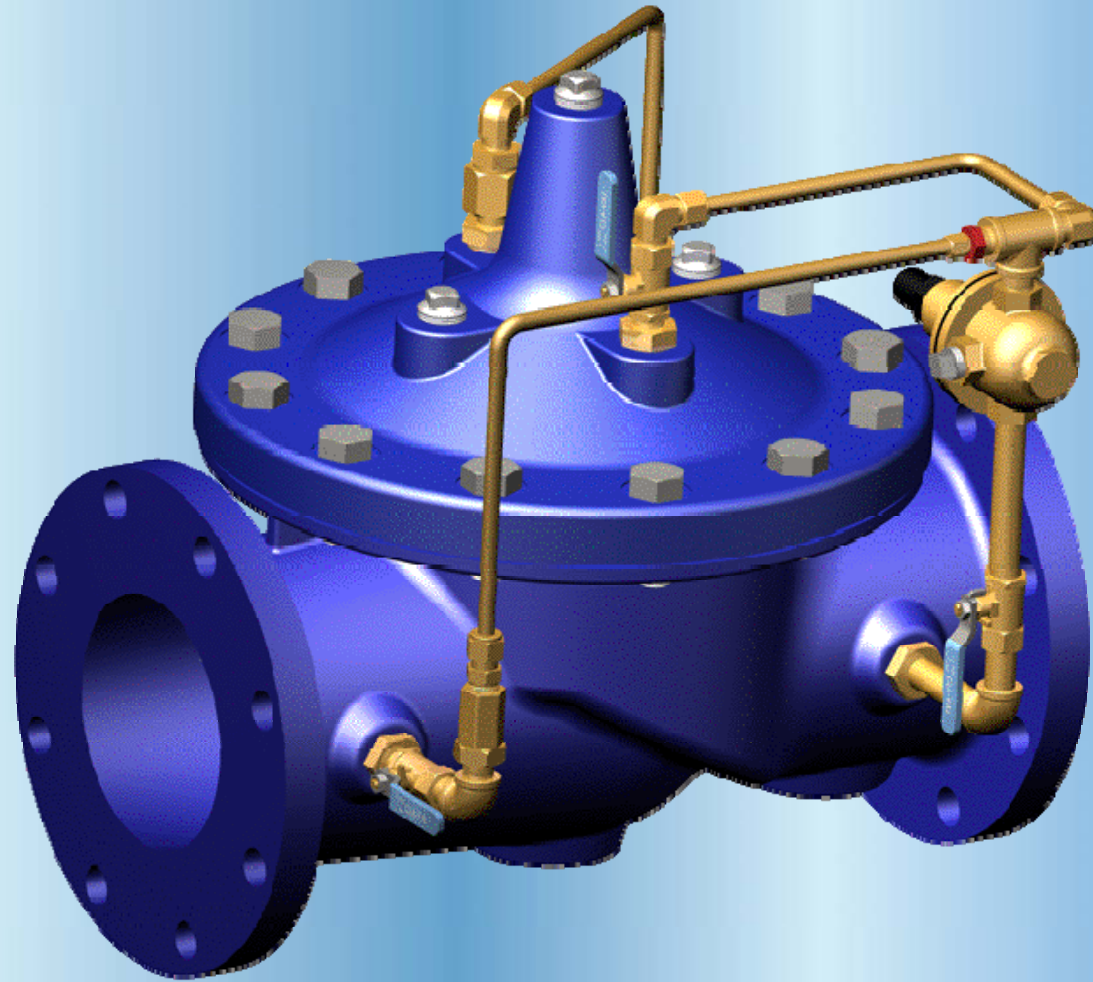
- Reduces a higher inlet pressure to a constant downstream pressure regardless of demand and supply pressure fluctuations
- Enables delivery of water at safe pressures and adequate levels for customer needs
- Installations:
 - Main line feeds
 - Distribution zones
 - Fire systems
 - Irrigation systems



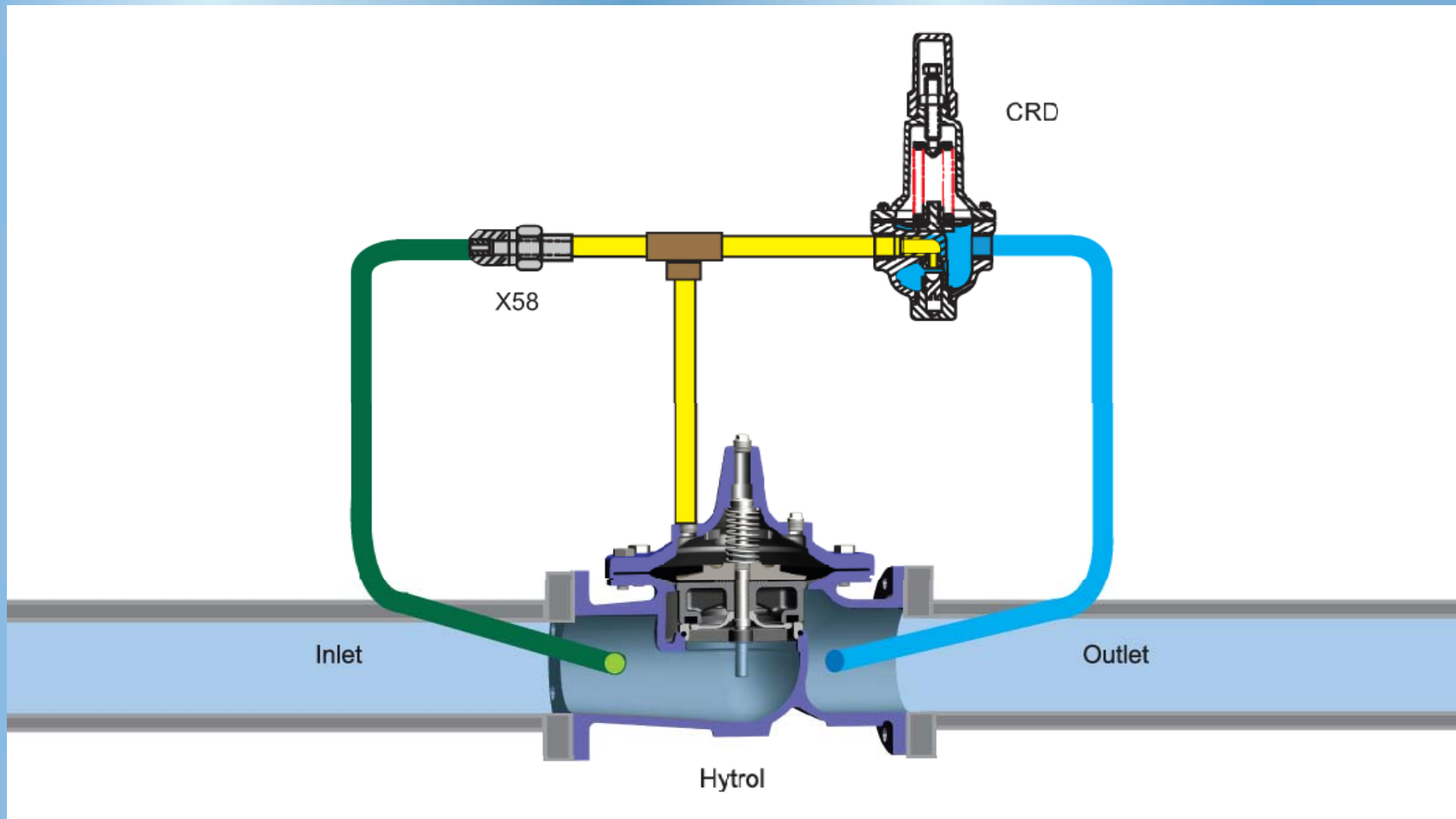
90 Series Pressure Reducing Valve



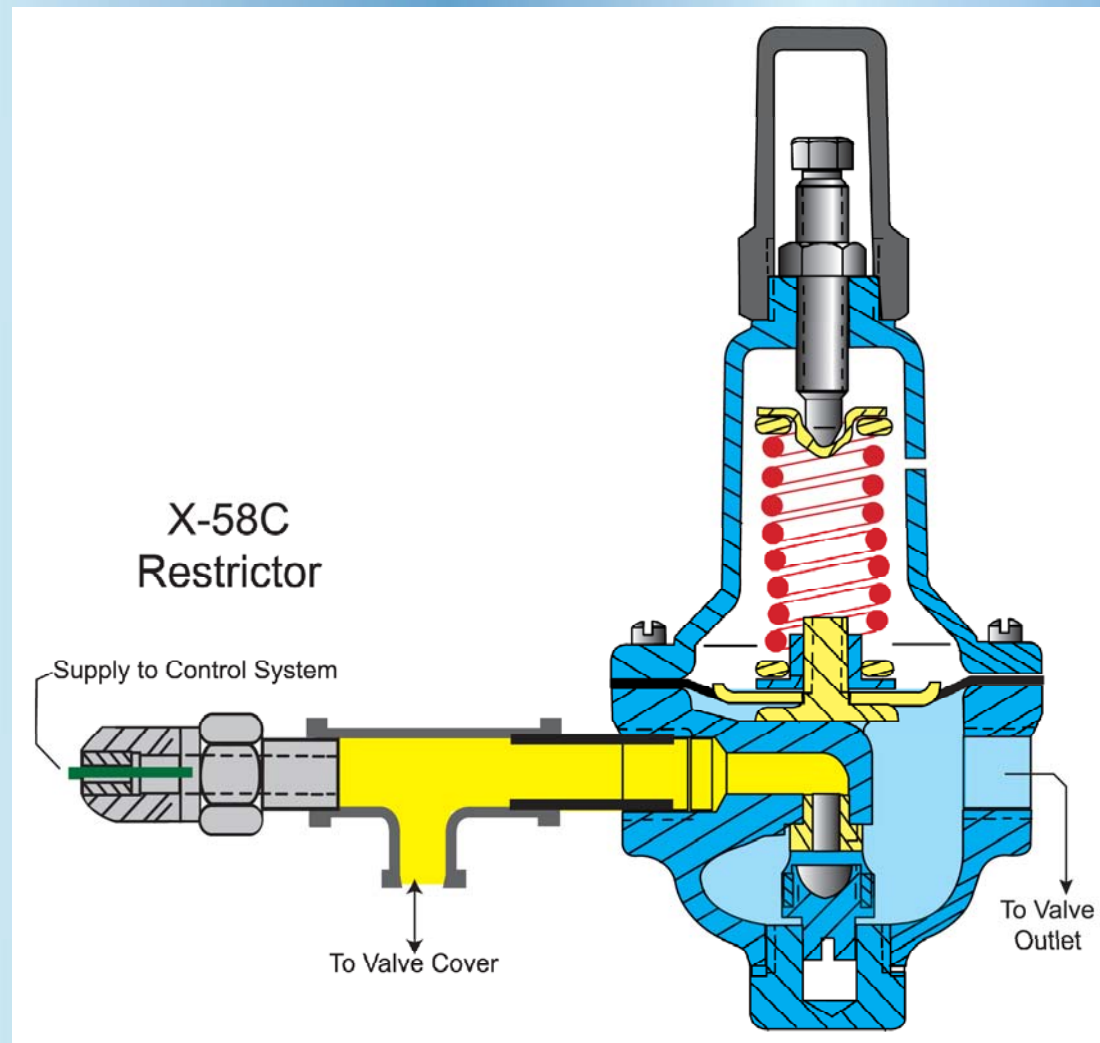
90 Series Valve: Exterior View



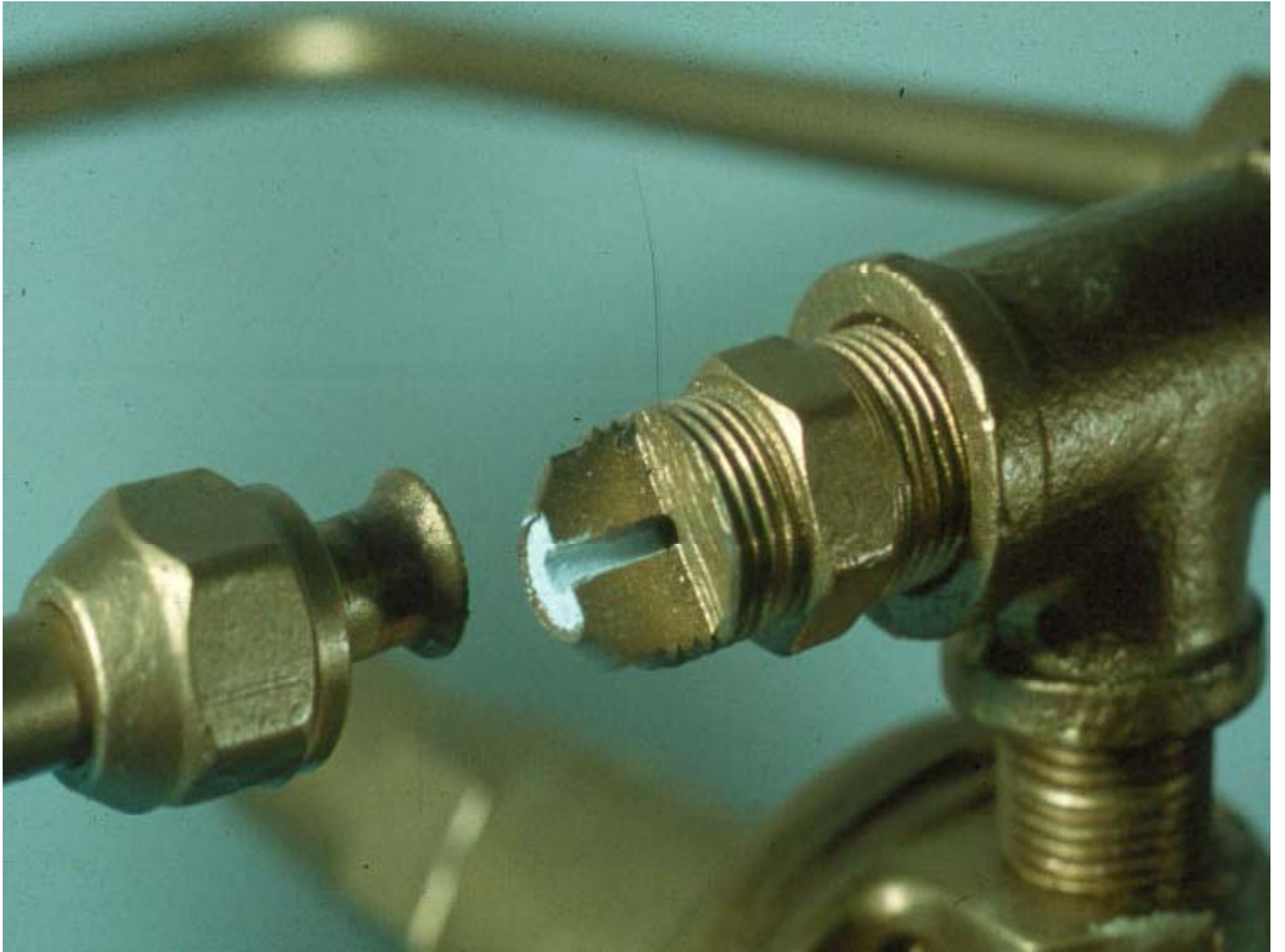
Basic Operation of 90 Series PVS



Operation of 90 Series PVS







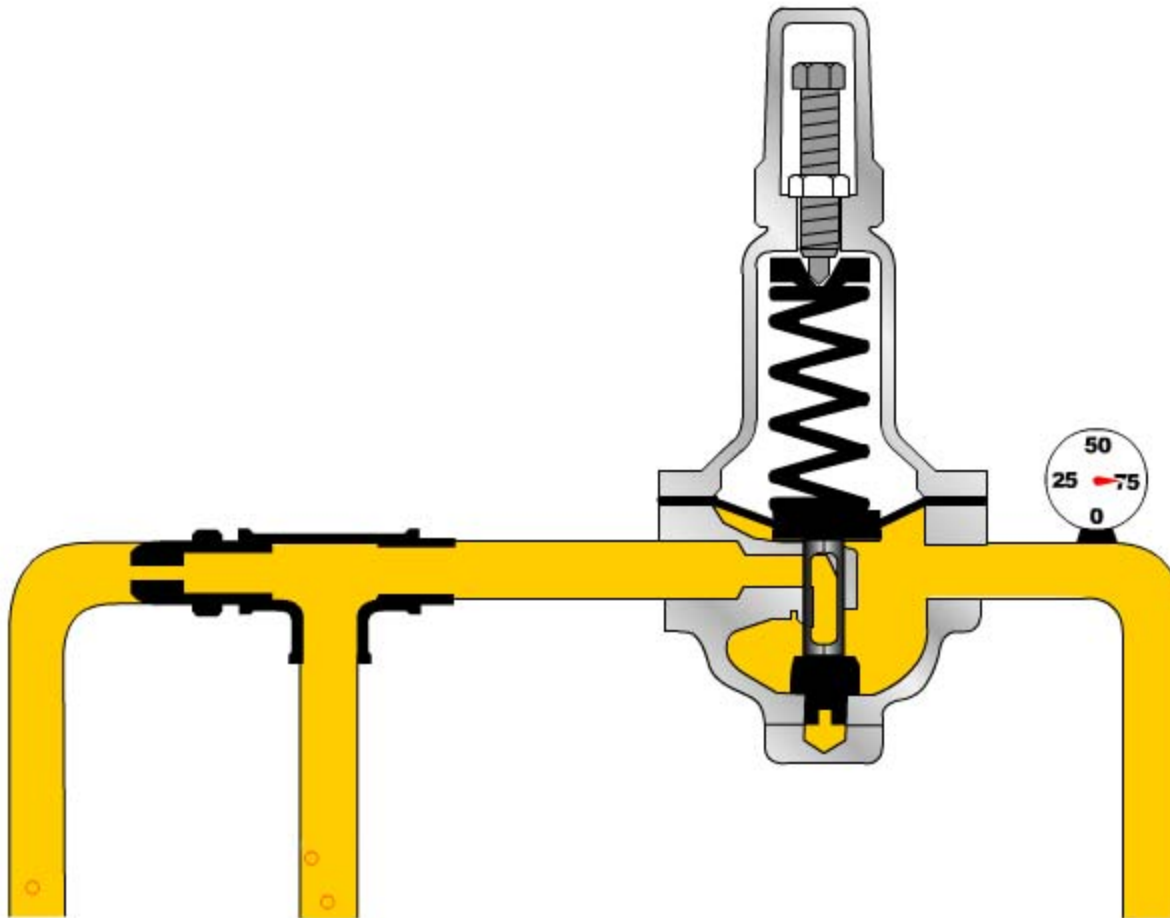
EXIT

CRD

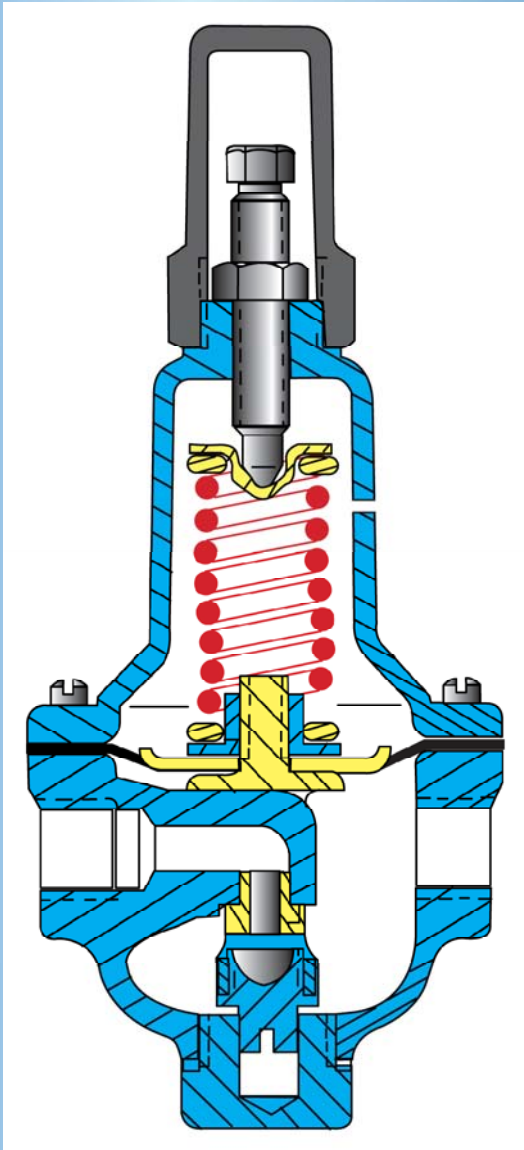
PLAY

PAUSE

RESTART

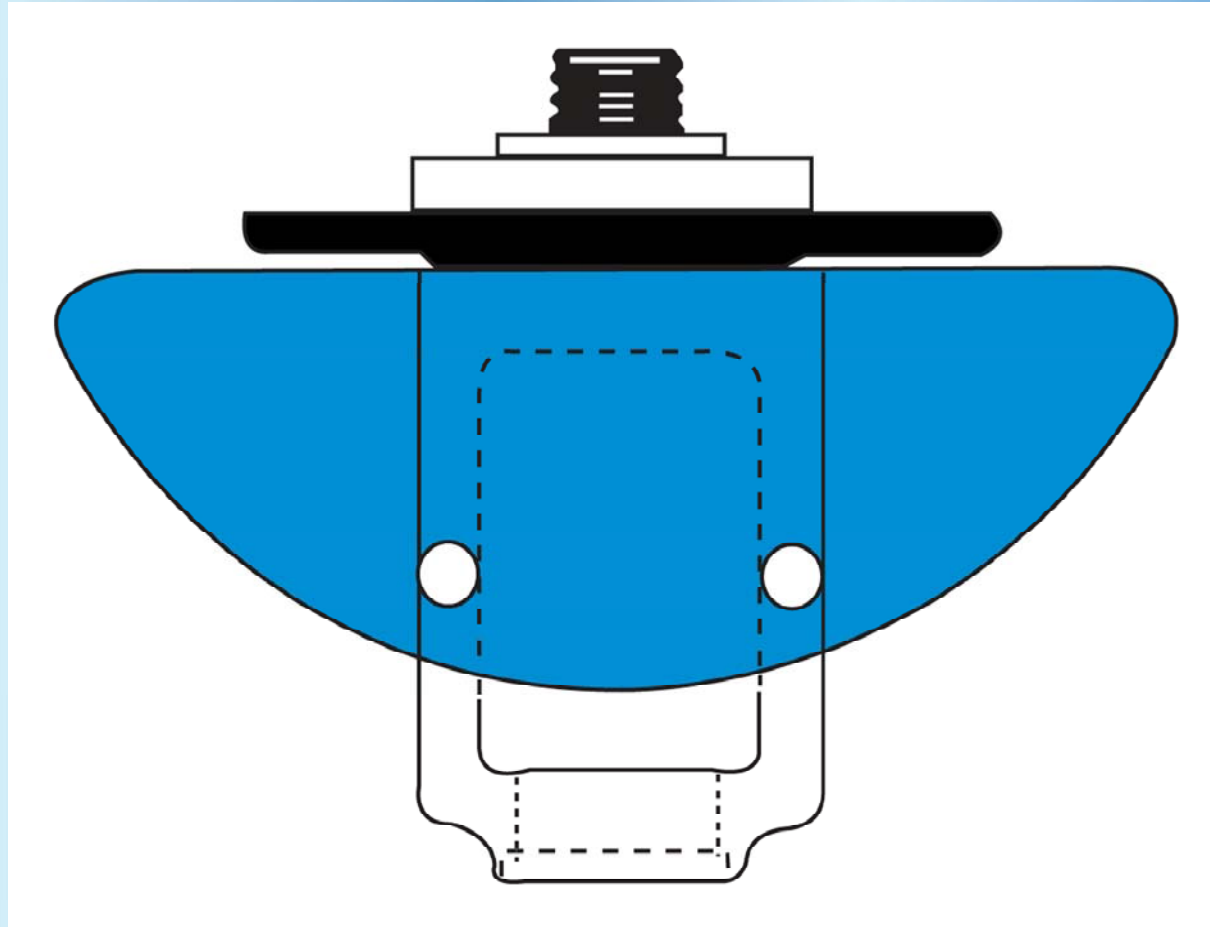


CRD Reducing Pilot Control

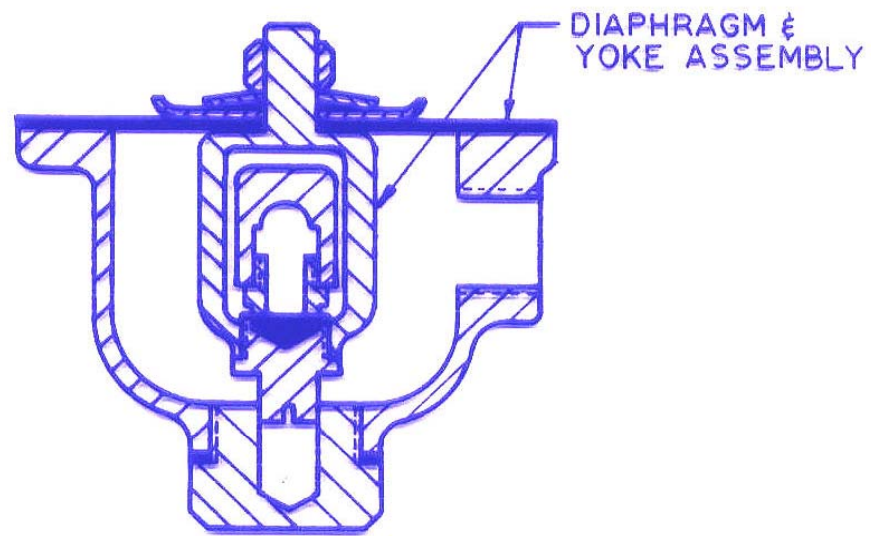
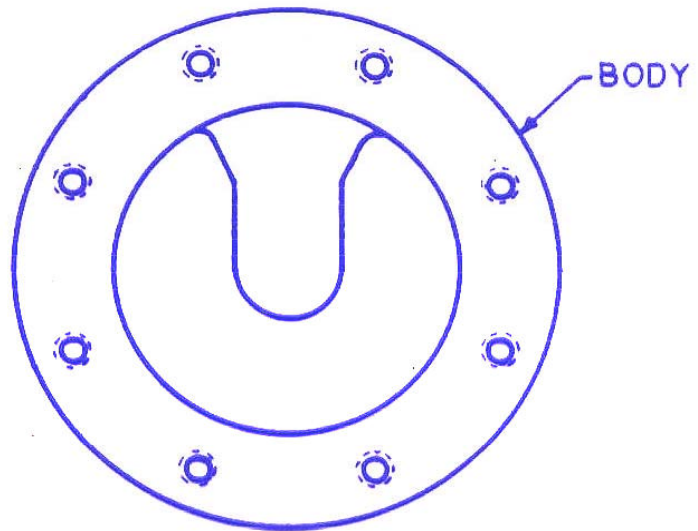


- Normally open
- Closes on pressure rise
- Senses outlet pressure

Diaphragm & Yoke Alignment



Yoke Assembly

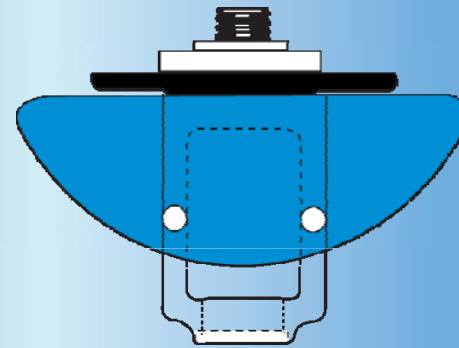




CRD Troubleshooting



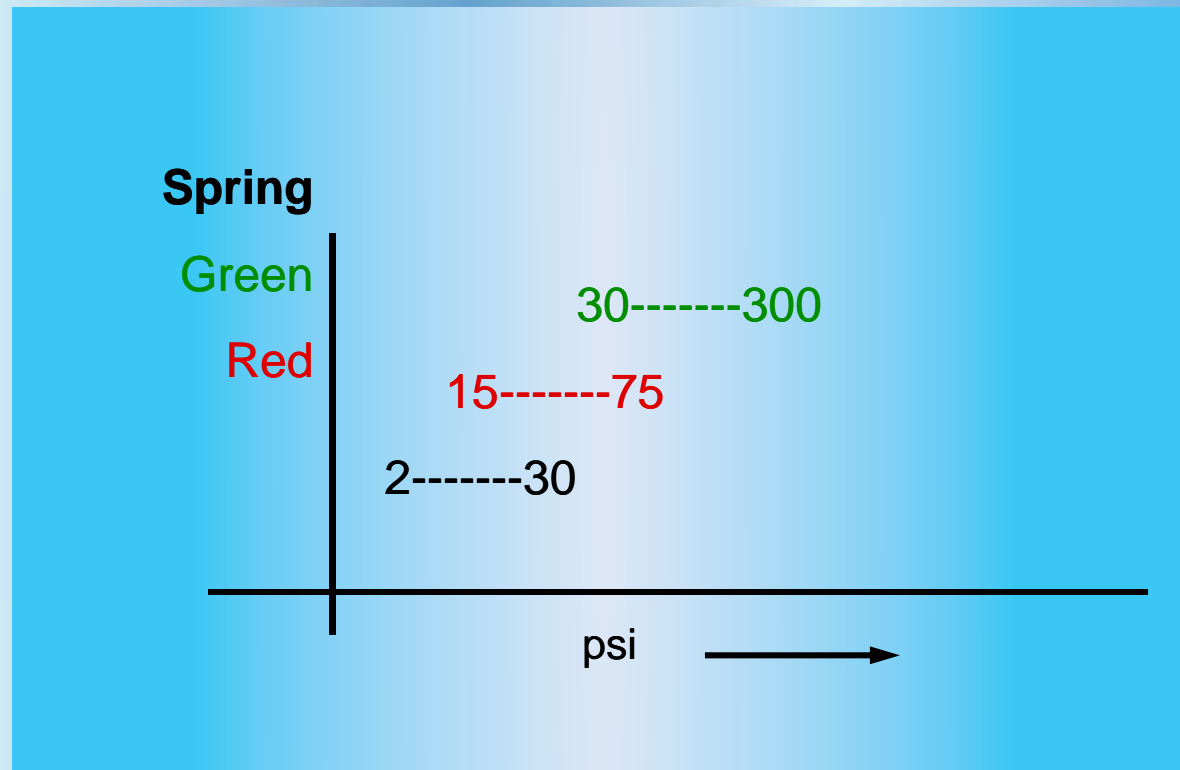
- Make a visual check
 - ✓ Cover vent hole
 - ✓ Pressure gauge
- Vary control adjustment
- Check disc
- Check yoke alignment



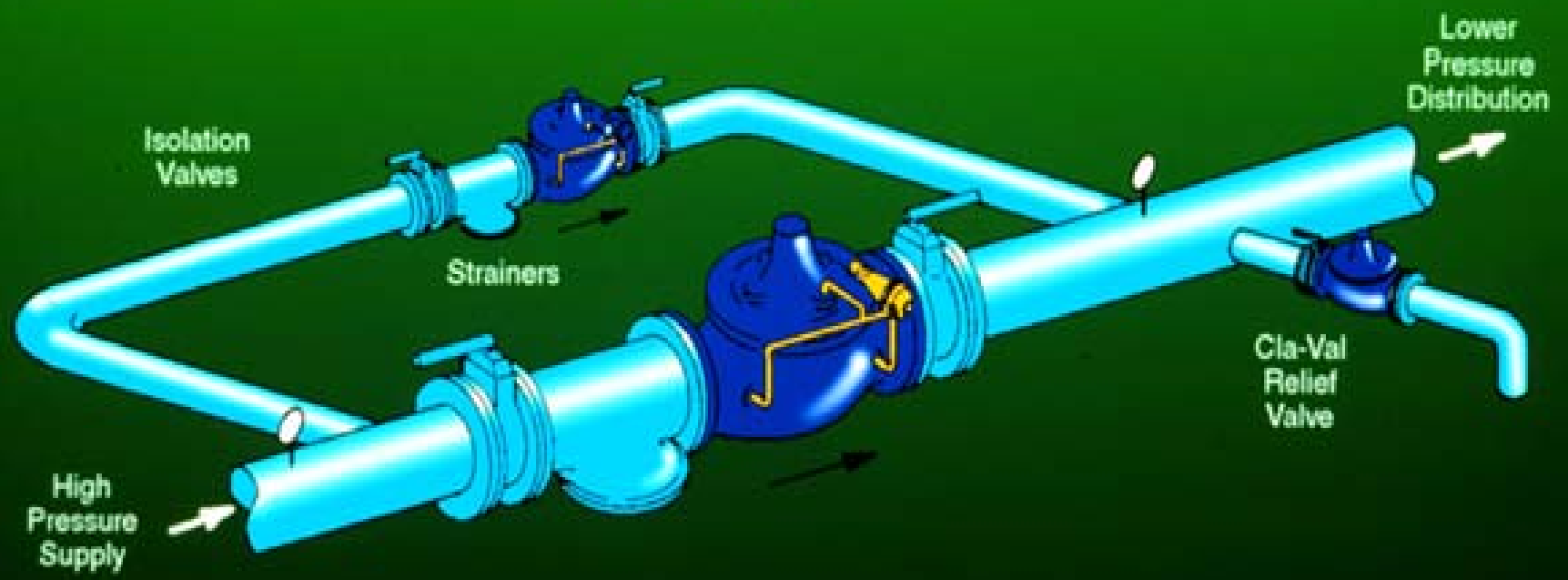


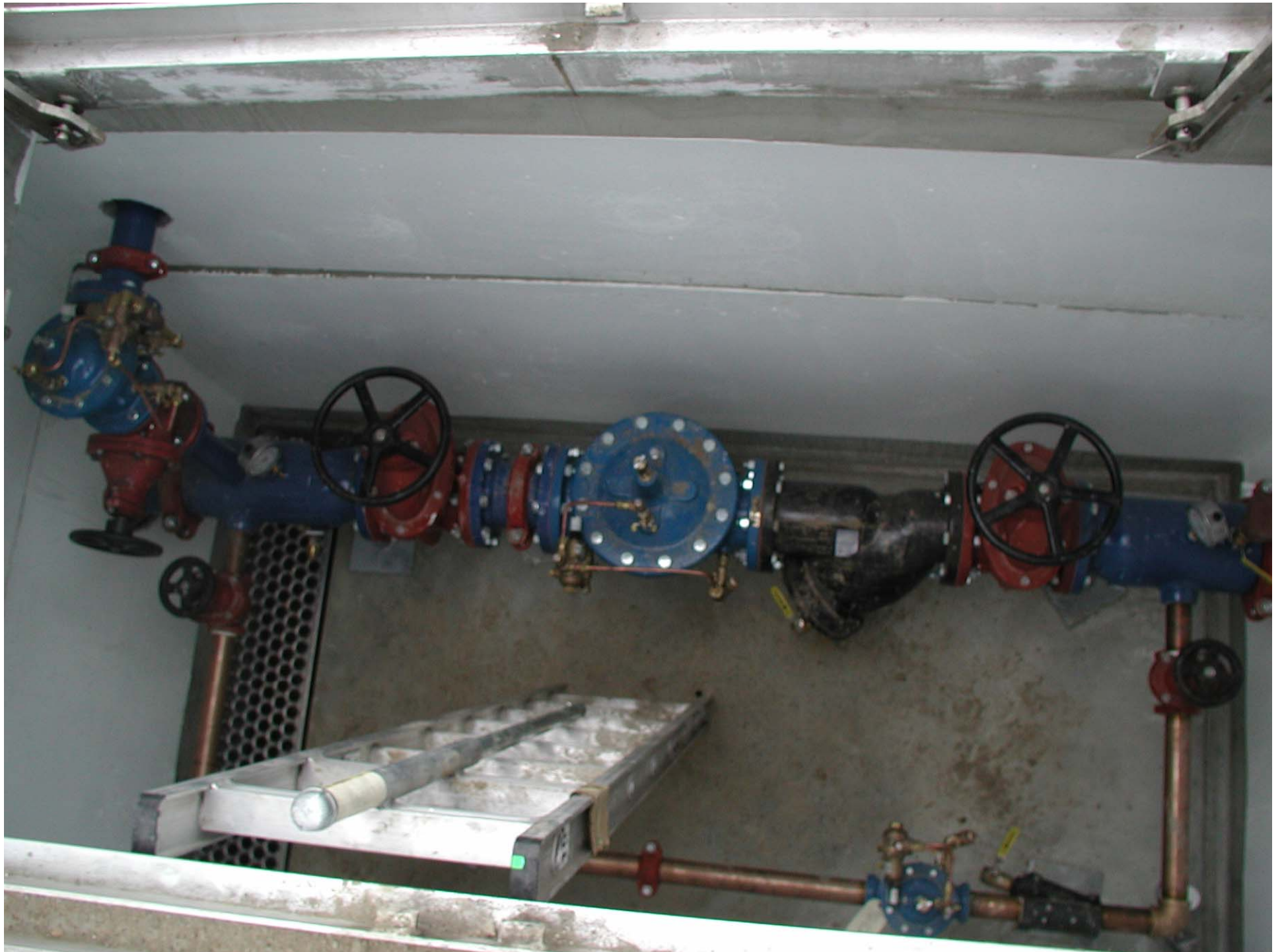


CRD Adjustment Ranges

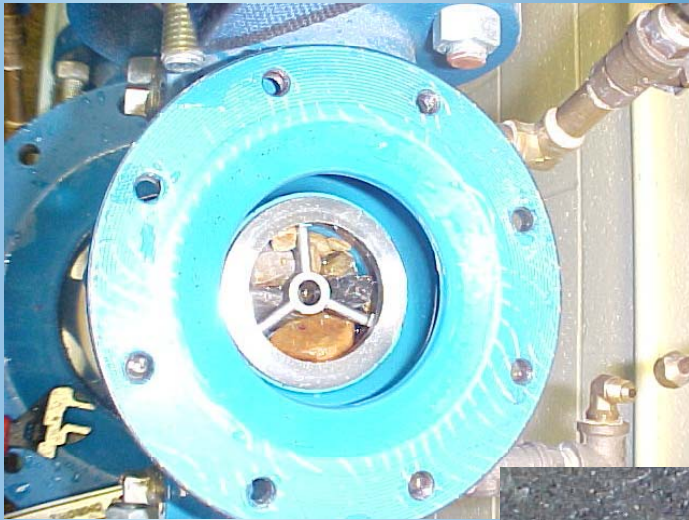


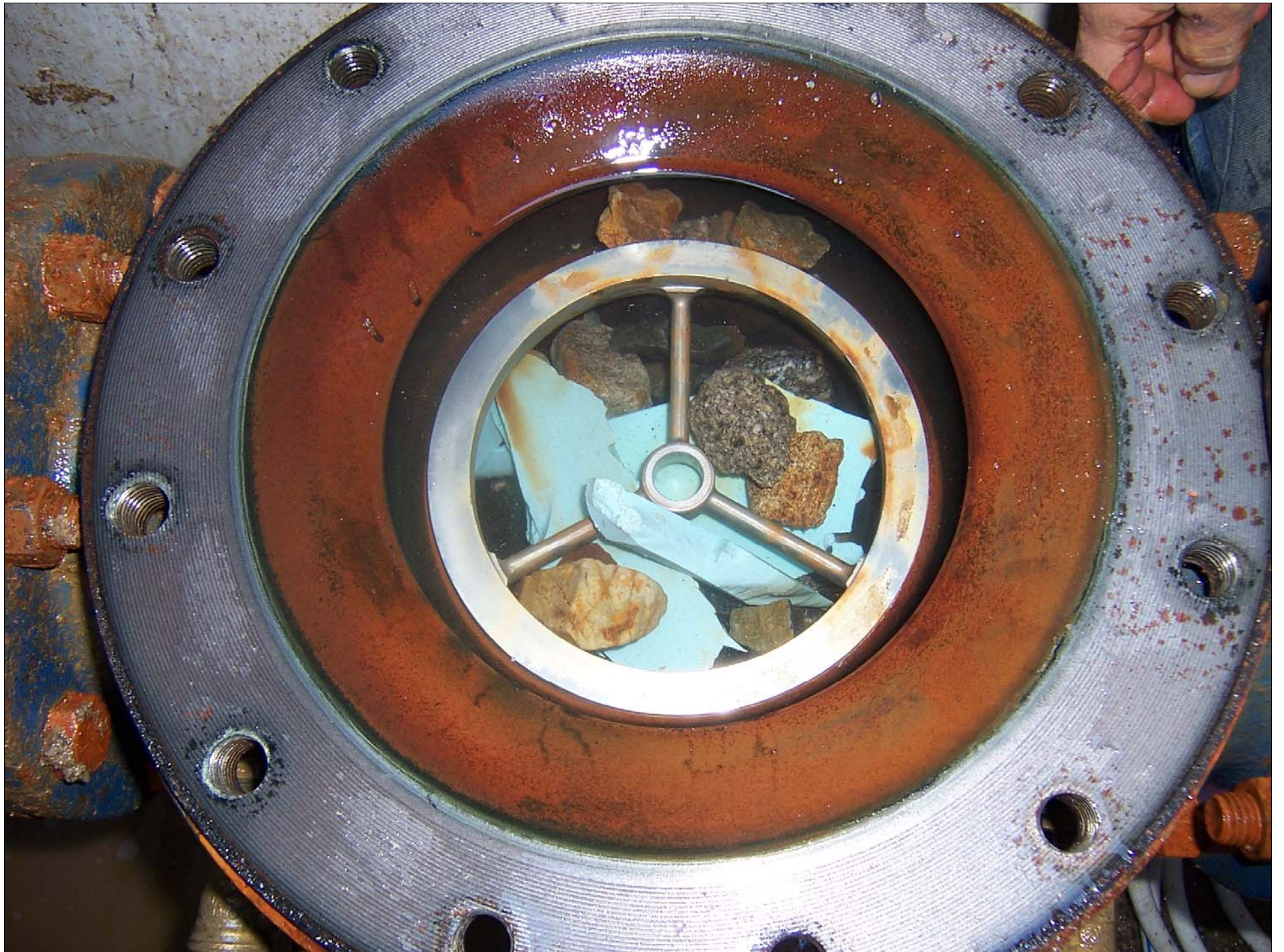
Cla-Val Pressure Reducing Valves





With the Model X43 H Strainer
you can avoid...





The Challenge: Pipeline Debris

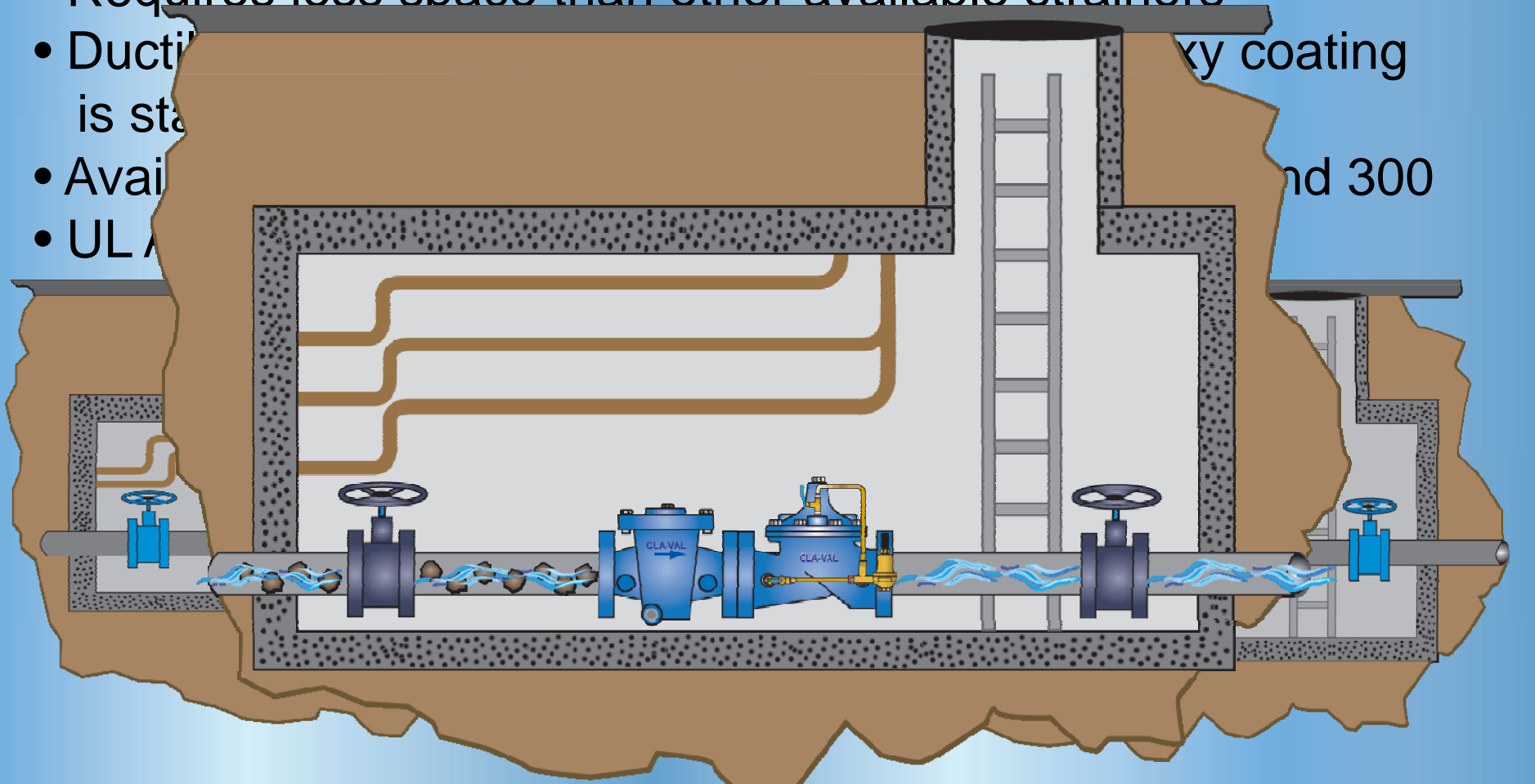
The Solution: X43 H-Strainers

- Protects valves and equipment from pipeline debris
- Requires less space than other available strainers

- Ductile
- is sta

- Avail

- UL A



Pipeline Strainers

- X43 H-Strainers protect valves & equipment from debris
- Requires less space than other available strainers
- Standard ductile iron body & fusion bonded epoxy coating
- Available in sizes 1-1/2" - 24 " - Flanged ANSI 150 and 300



An ideal companion for any automatic control valve

Troubleshooting Pressure Reducing Valves

Section 5.5 of Service Training Manual

If valve fails to open, check for...

- No inlet pressure
- CRD not opening
- Rusted CRD spring
- Dragging yoke
- Plugged speed control
- Shut-off cock closed
- Missing restriction



Troubleshooting Pressure Reducing Valves

Section 5.5 of Service Training Manual

If valve fails to close, check for...

- Rocks or other debris in main valve
- CRD adjusted too tightly
- Worn CRD disc
- Dragging yoke
- Plugged strainer
- Whether diaphragm needs to be replaced
- Plugged speed control

