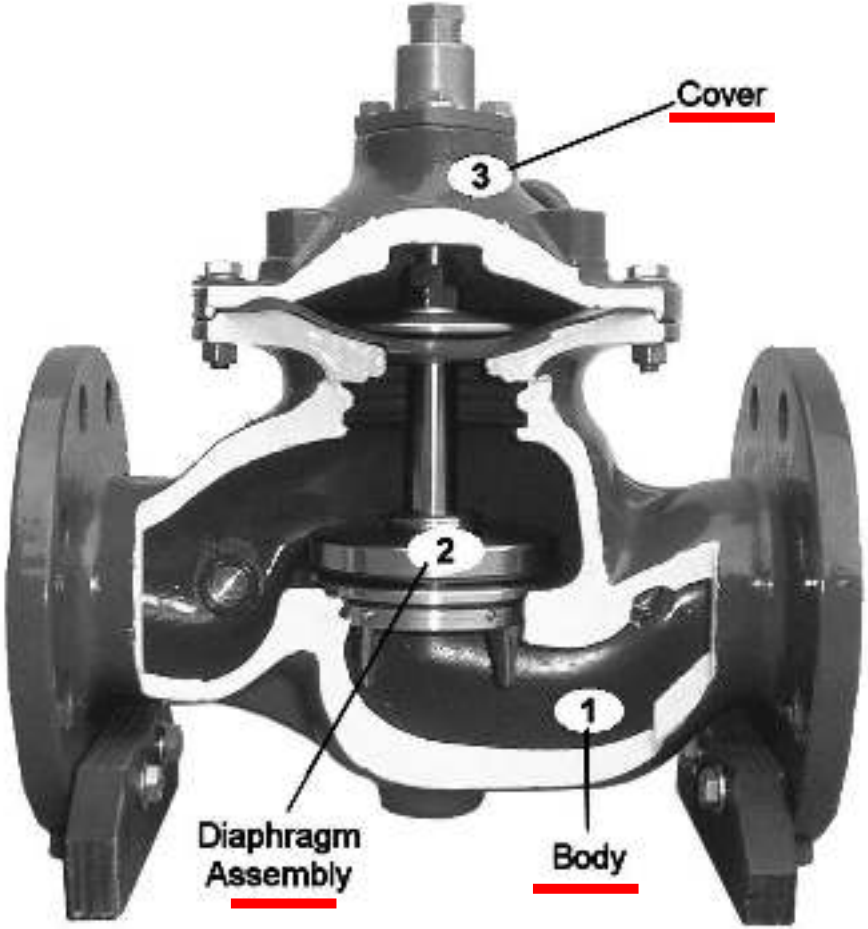

# Beeco Control Valves

## Diaphragm Actuated Disk-Type Globe Valves

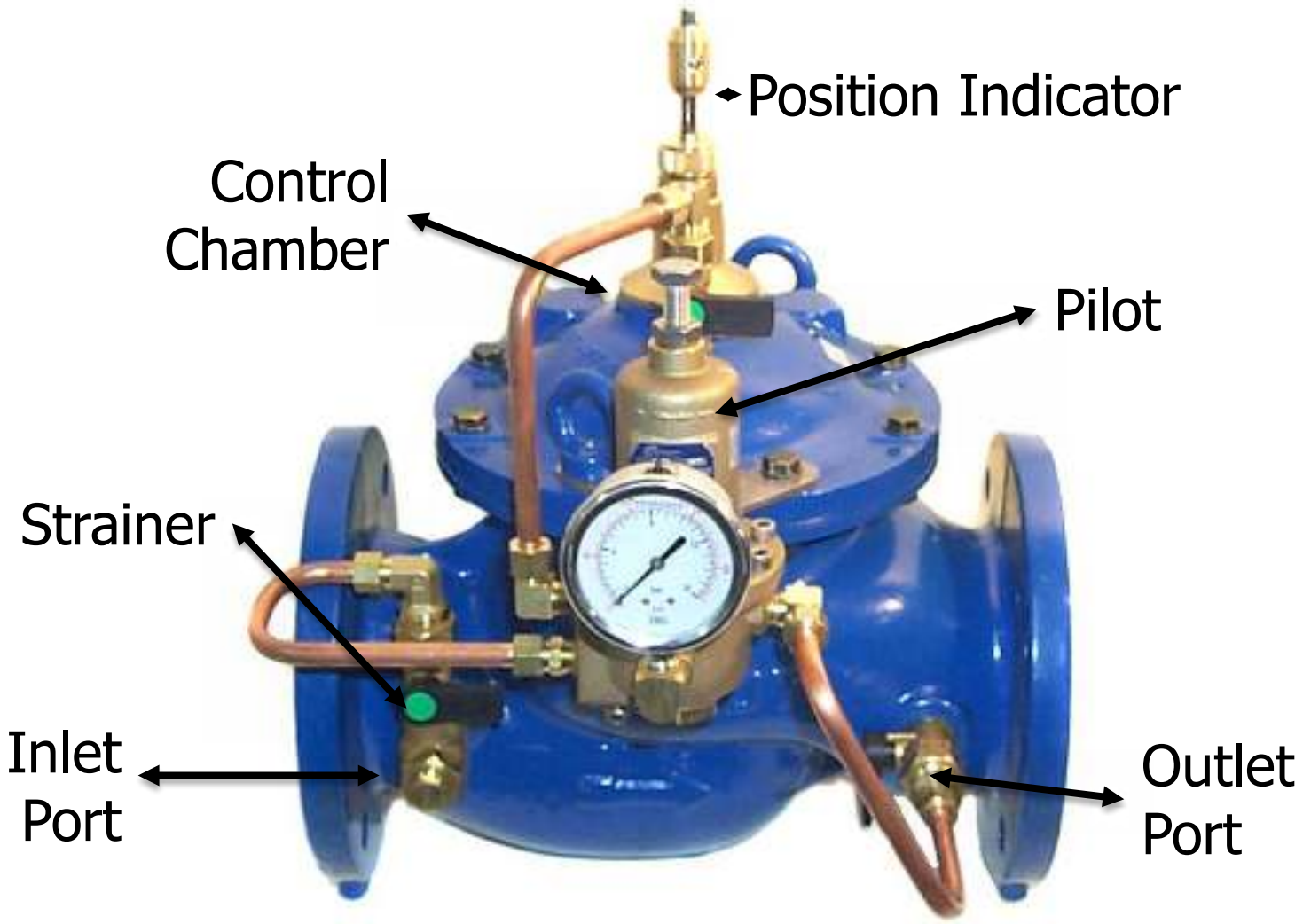
All these are “Control Valves”, but they are not Hydraulic (Automatic) Control Valves

# Beeco Control Valves




It consists of three major components:

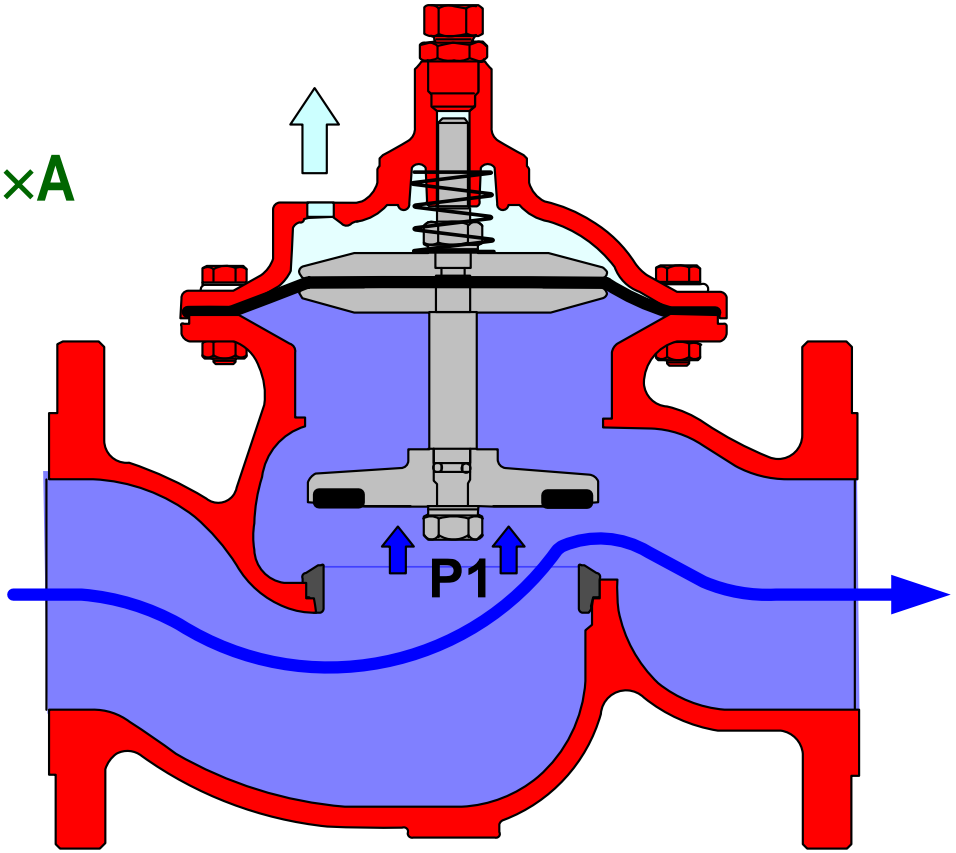
**1) Body 2) Diaphragm assembly 3) Cover**


Position Indicator
Control Chamber
Pilot
Strainer
Inlet Port
Outlet Port

# Beeco Control valves
# Operation Principle

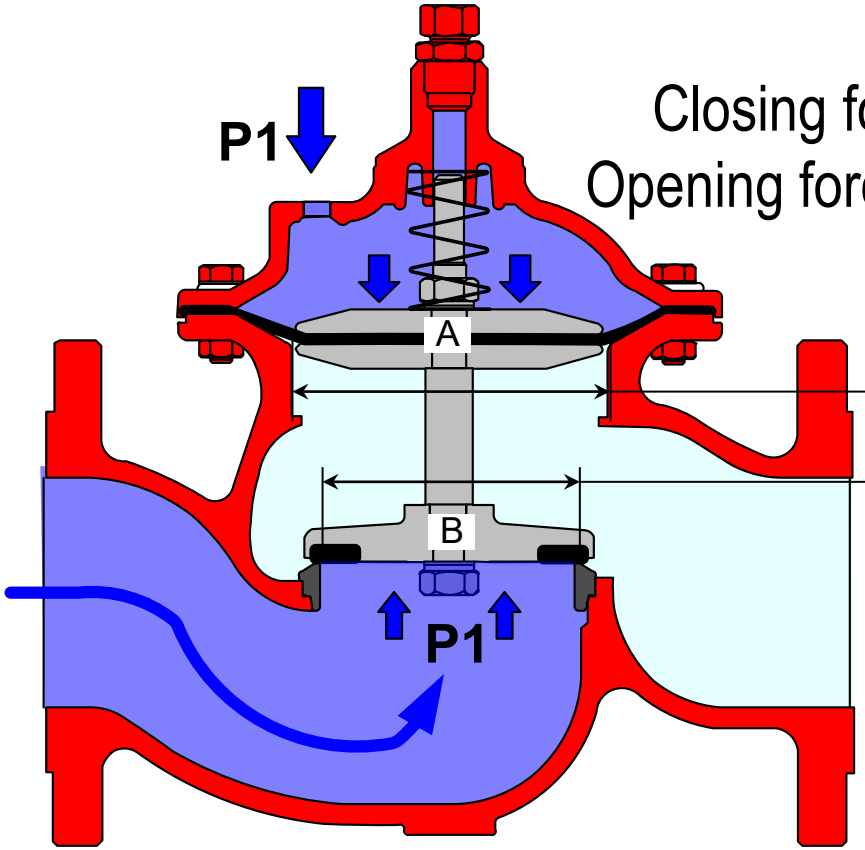
- The opening force = Line pressure × Seal disk area

F1=P1×A



# Beeco Control valves
# Operation Principle

- The closing force = F2
  F2 = Line pressure × Diaphragm area,
  which is bigger than the opening force F1.



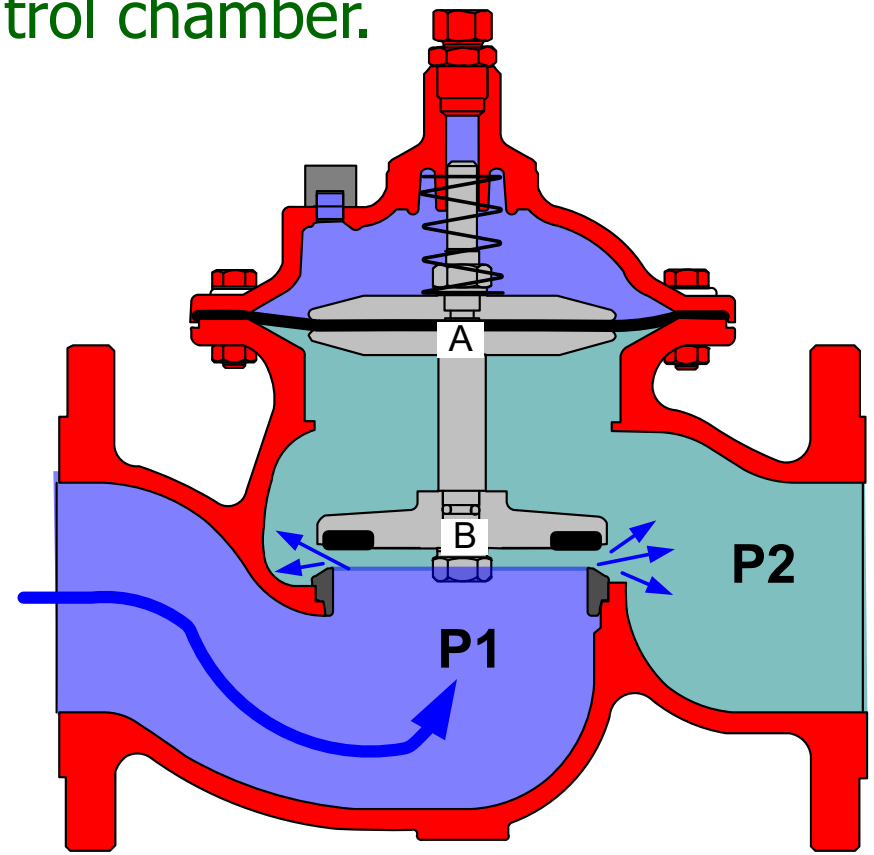

Closing force 50 x 10 = 500 lbs
Opening force 50 x 7.75 = 387 lbs
Difference = 113 lbs

A=10 $in^2$

B=7.75 $in^2$

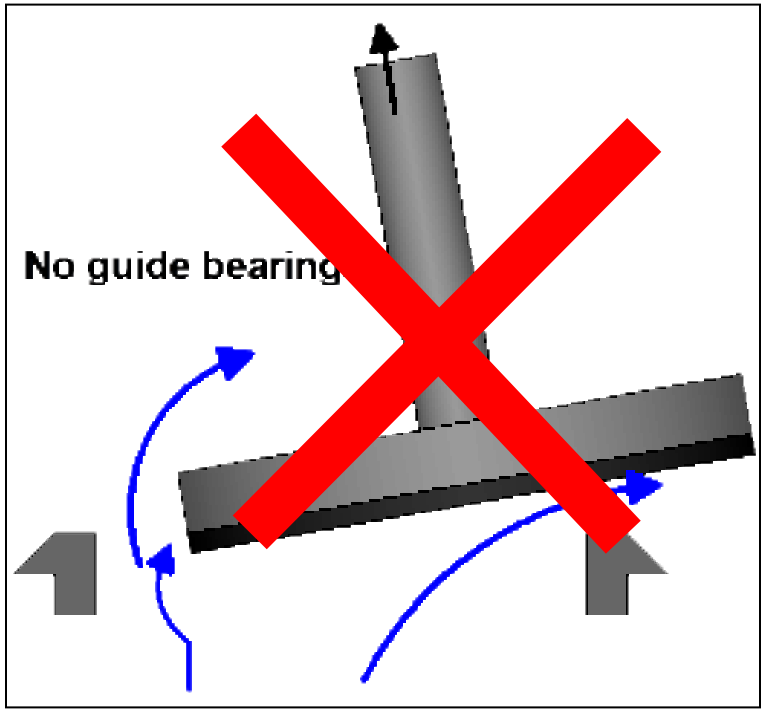
# Beeco Control valves
# Operation Principle

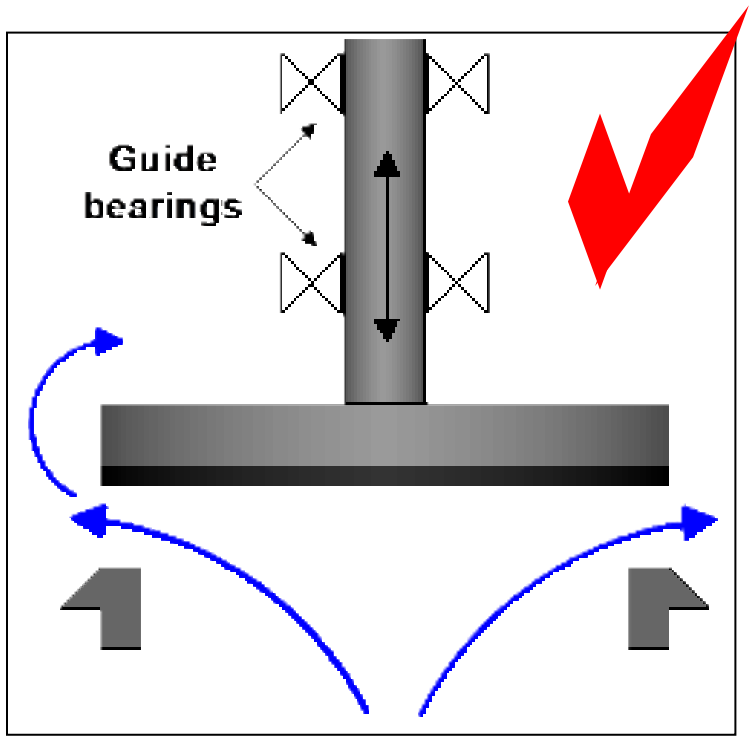
- Pressure\Flow regulation is achieved by holding the valve at an intermediate position.
  - This is done by "locking" the volume of water in the valve control chamber.



# Shaft guidance

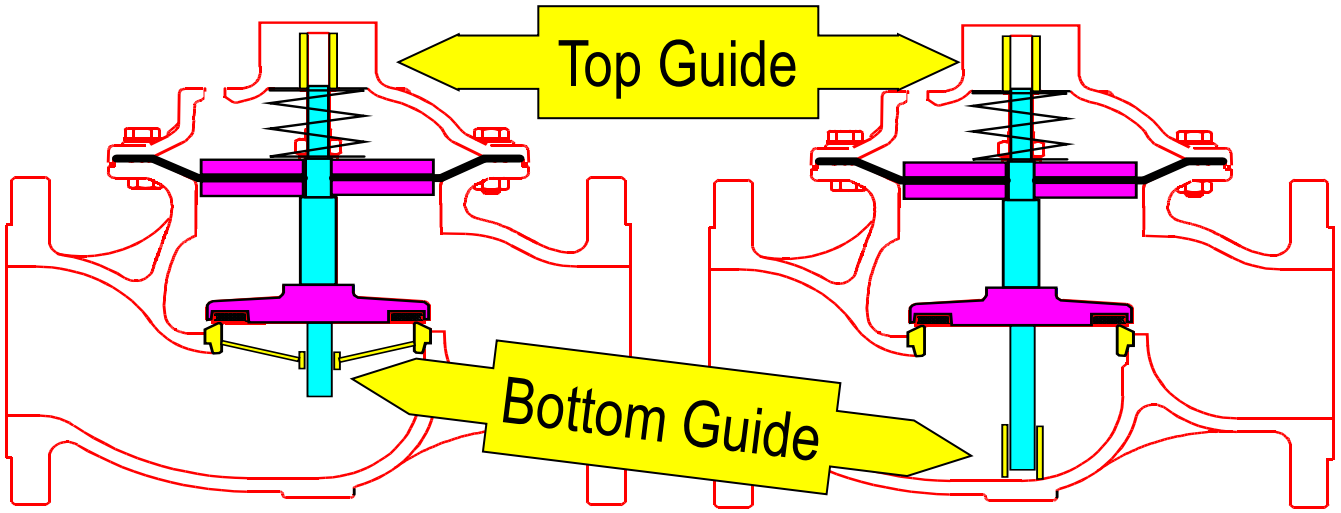
For the plug to seal tightly against the seat and to avoid vibrations during regulation, the seal trim shaft must be guided by bearings.



# Shaft guidance

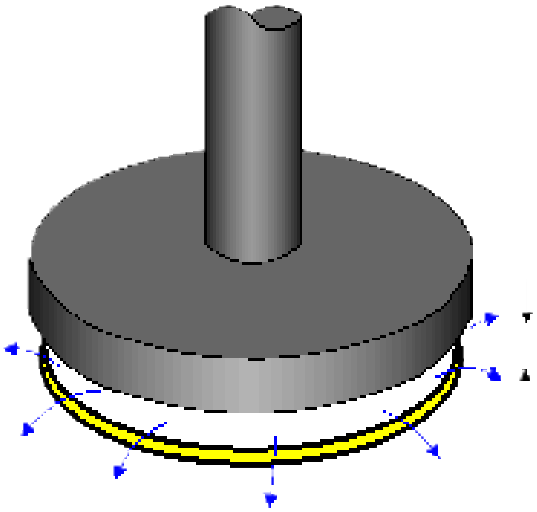
- Shaft Guidance in most of the common valves is done by using slide bearings at both shaft ends.
- Advantage - excellent shaft stability.
- Disadvantage - Complicated & expensive seat.



# Shaft guidance

- Shaft Guidance in the BEECO ACV utilizes bearings at both shaft ends (vanes for bottom guide!):
  - Stable, friction free and reliable guidance.
  - No complications in seat design and valve maintainability.

# Low flow stability

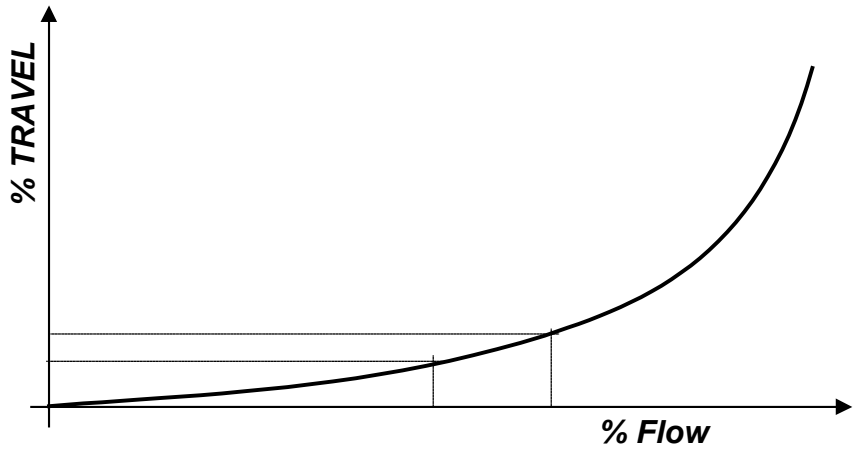


- Most of the ACV products in the marketplace utilize a flat disk-type plug. This presents poor low flow regulation abilities due to the rapid change in the cross section area of the water passage.

***THIS IS THE MAIN CAUSE OF CHATTER***

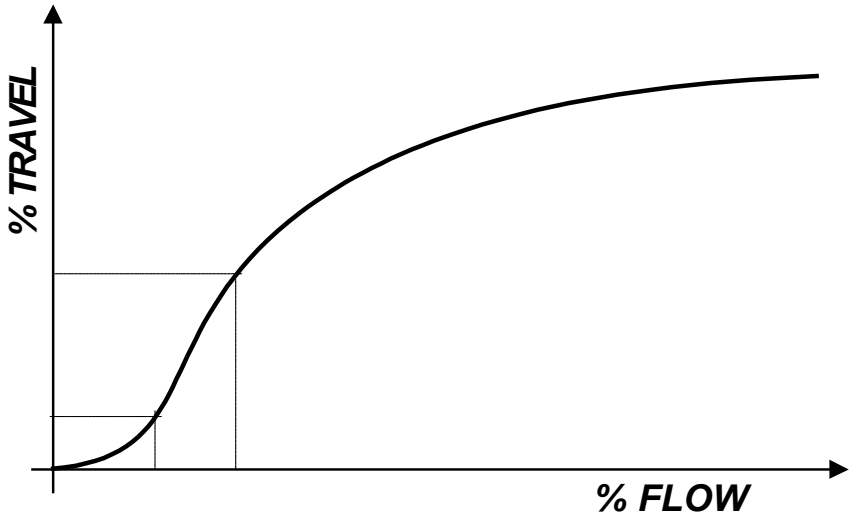
**Flow characteristics chart:**

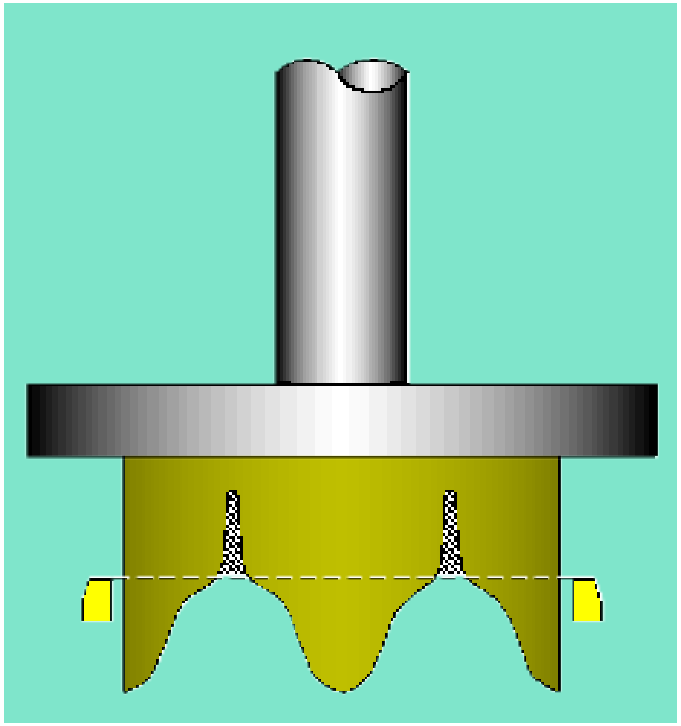
**(Small plug movements cause large flow rate changes )**



# Low flow stability

- For better regulation, some companies developed a throttling plug, featured by different flow characteristics.
- V-PORT - A throttling device with better regulation characteristics in comparison to the flat disk plug.



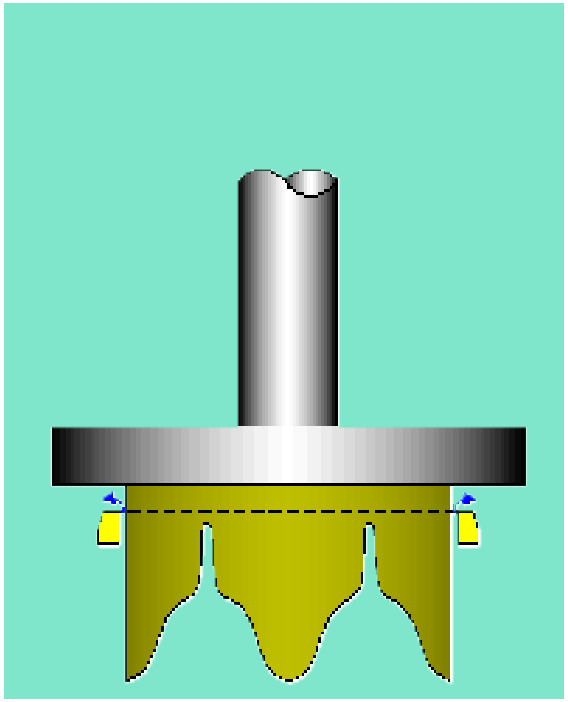
# Low flow stability

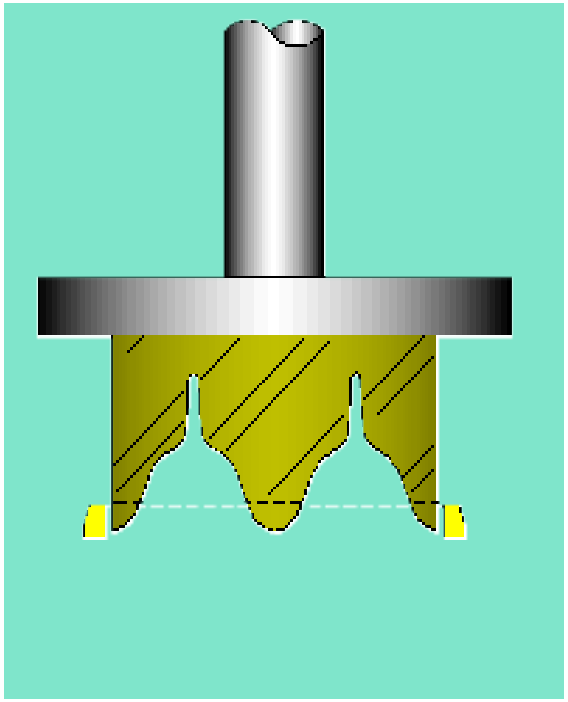
## V-PORT

# Low flow stability

## Limitations:

- The near zero flow regulation is still unstable.
  A small diameter by-pass regulator is used for low flow regulation, in addition to installation of a V-PORT in the main valve.
- Creates high head losses at high flow rates!

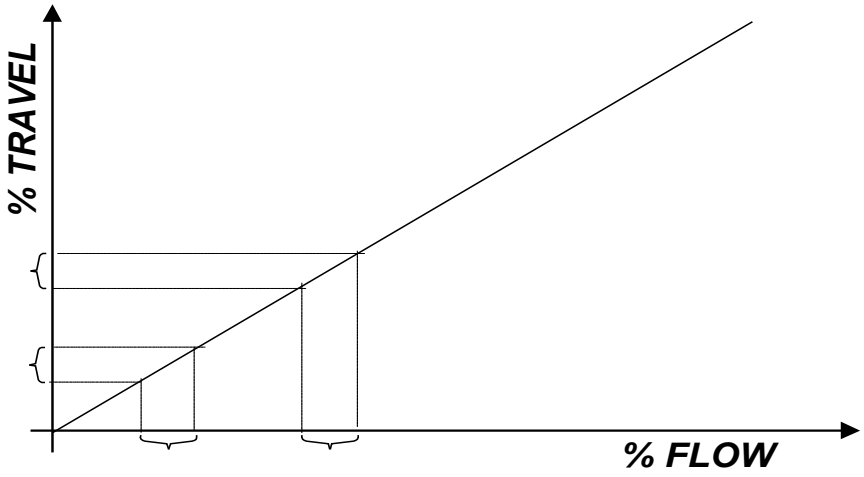


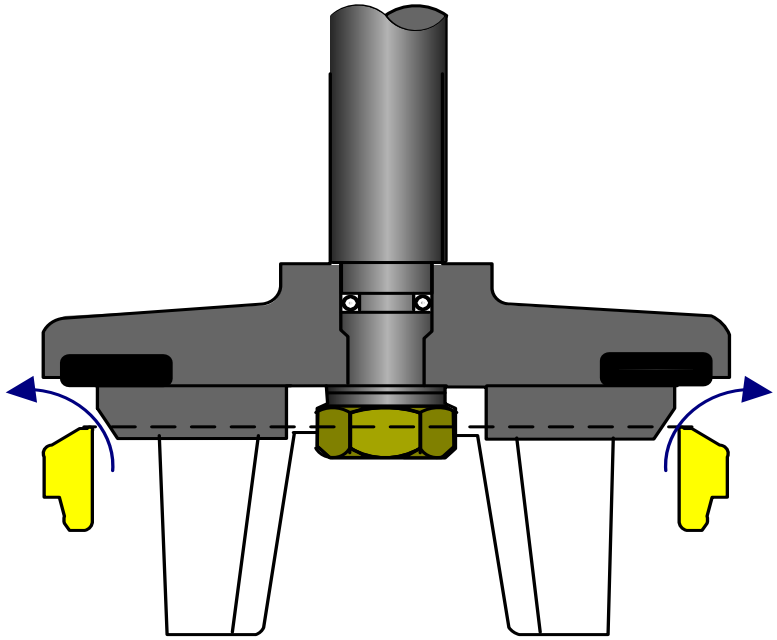


# Low flow stability

- The **Beeco Control standard** plug is assembled with a linear flow characteristic throttling device (LTP®):

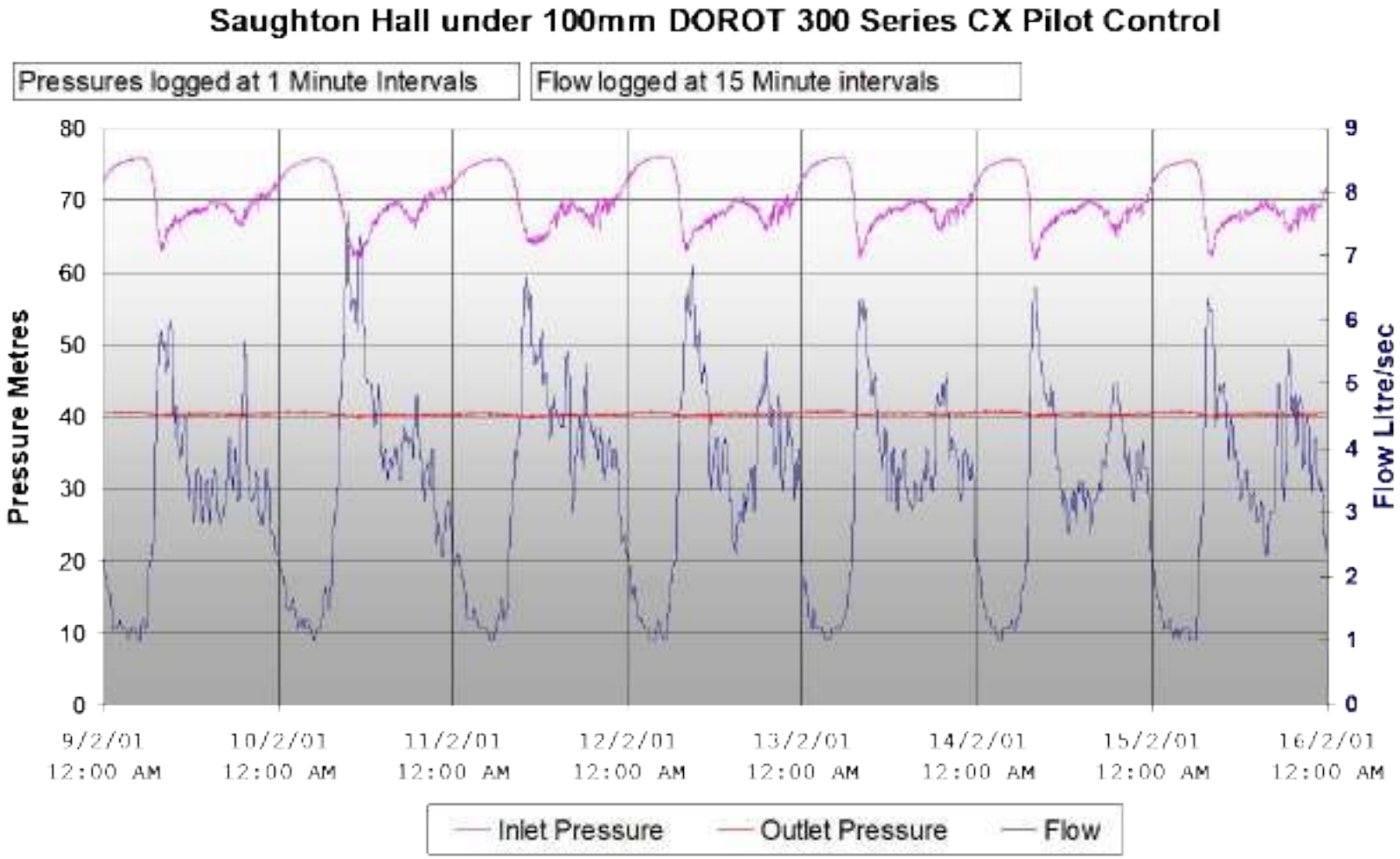
  Enables uniform regulation throughout the entire stroke and corresponds with low head losses in the fully open position.



# Low flow stability

Pressure logging results of a 4” (100mm) PRV:

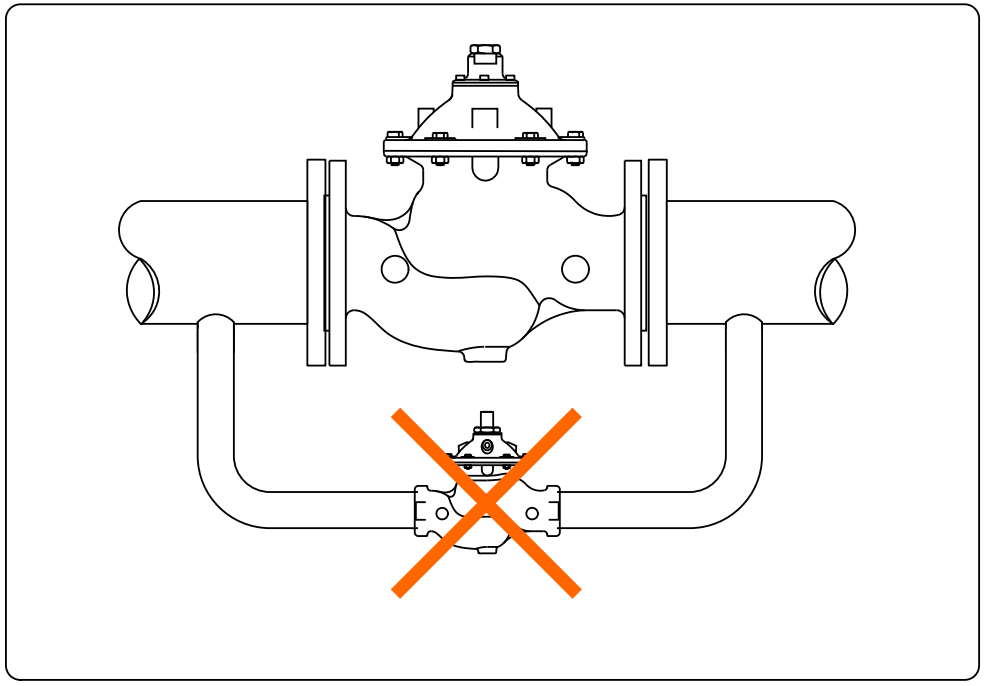


# Low flow stability

For low-flow regulation with the Beeco valve:

There is no need for a V-Port

There is no need for a by-pass valve




# FULL OR REDUCED PORT

## Size Selection Table

| Valve Size | | 40 (1½") | 50 (2") | 65 (2½") | 80 (3") | 100 (4") | 150 (6") | 200 (8") | 250 (10") | 300 (12") | 350 (14") | 400 (16") | 450 (18") | 500 (20") | 600 (24") | 700 (28") | 800 (32") |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Max. recommended flow rate for continuous operation ($m^3/h$ - V = 5.5m/s) | | 25 | 40 | 40 | 90 | 160 | 350 | 620 | 970 | 1400 | 1900 | 2500 | 3100 | 3900 | 5600 | 7600 | 9900 |
| Max. recommended flow rate for continuous operation (Gpm - V = 18f/s) | | 110 | 180 | 180 | 400 | 700 | 1600 | 2800 | 4300 | 6200 | 8400 | 11000 | 17000 | 17000 | 24700 | 33500 | 43600 |
| Min. recommended flow rate | | <1$m^3/h$ (<5 gpm) | | | | | | | | | | | | | | | |
| Globe Type | | | | | | | | | | | | | | | | | |
| Flow Rate Factor: | Kv (Metric) | 43 | 43 | 43 | 103 | 167 | 407 | 676 | 1160 | 1600 | 1600 | 3000 | 3150 | 3300 | 7000 | 7000 | 7000 |
| | Cv (US) | 50 | 50 | 50 | 120 | 195 | 475 | 790 | 1360 | 1900 | 1900 | 3500 | 3700 | 3860 | 8200 | 8200 | 8200 |
| Head Loss Factor K (dimensionless) | | 2.2 | 5.4 | 15.4 | 6.7 | 5.6 | 4.8 | 5.5 | 4.5 | 5 | 9 | 3.8 | 6 | 5.9 | 4.2 | 7.8 | 13.4 |
| Angle Type | | | | | | | | | | | | | | | | | |
| Flow Rate Factor: | Kv (Metric) | 60 | 60 | | 140 | 190 | 460 | 770 | 1310 | | | | | | | | |
| | Cv (US) | 70 | 70 | | 164 | 222 | 537 | 900 | 1533 | | | | | | | | |
| Head Loss Factor K (dimensionless) | | 1.3 | 2.8 | | 3.3 | 4.3 | 4.3 | 4.2 | 3.6 | | | | | | | | |

For head Loss of fully open valves use the following equations:

$$H\,(Bar) = \left(\frac{Q\,[m^3/h]}{Kv}\right)^2 \quad | \quad H\,(Psi) = \left(\frac{Q\,[gpm]}{Cv}\right)^2 \quad | \quad H = K\,\frac{V^2}{2g}$$

# ACV PART NUMBERS

ACV4.00-HF-PR list $8,201

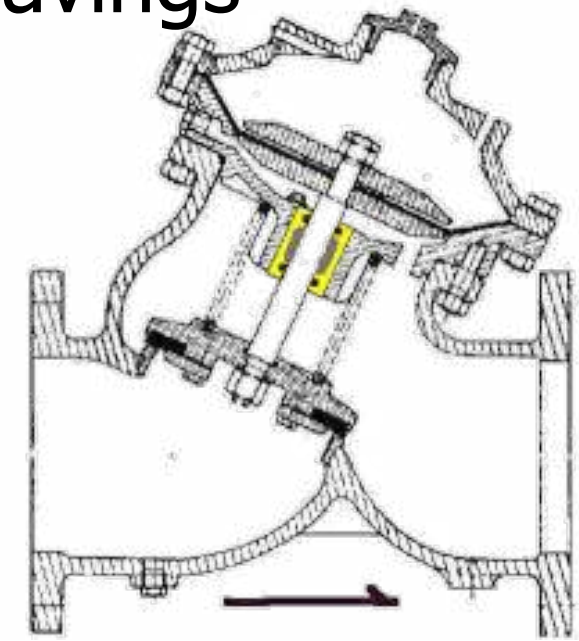
HF IS HIGH FLOW OR FULL PORT .

ACV4.00-PR list $6,045 26% savings

REDUCED PORT

ACV4.00-HF5PR $5,005

LOW COST ANGLE VALVE PAGE 9



# Beeco ACV Valves: Features & Benefits

- Replaceable SST seat ensuring durability in the toughest conditions.
- Ductile Iron body, resistant to high mechanical stress.
- Closing pace is slowed at the end, preventing pressure surge.
- The control loop is equipped with a self flushing SST filter, ensuring jam free pilot operation and eliminating the need for frequent periodic filter cleaning.

# Beeco ACV Valves: Features & Benefits

- All Stainless-Steel internals thru 6” Diameter  are furnished as standard to prevent corrosion!
- Stainless Steel diaphragm washers can be furnished as an option above 6” diameter.
- All Control Porting is furnished with a Stainless-Steel Liner to prevent corrosion in the most critical part of the valve.  The control circuit!
- All Stainless-Steel Bolting up to 6”

# Main Applications

Level Control

Pressure Control

Pump Control

Flow Control

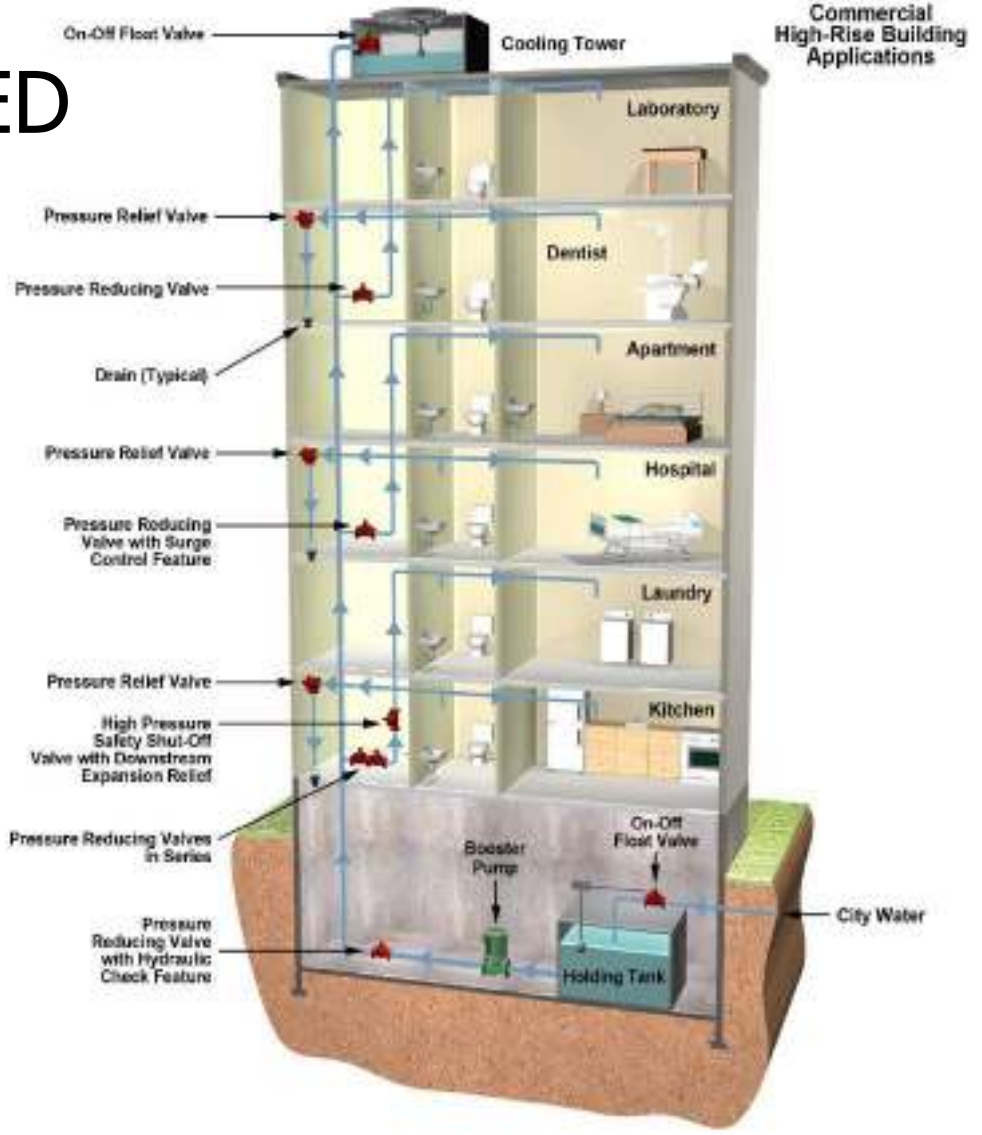
Electronic Control

Safety Valves

# WHERE ARE ACV'S USED

**Commercial Plumbing**
High Rise Buildings
Schools & Universities
Hotels & Condominiums
Hospitals and Prisons
Institutional and Plants
**Sizes typically range from 1.50" through 8.00"**

**Fire Protection**
Overhead Sprinkler
OEM & Specialty Systems
**Sizes typically range from 2.00" through 6.00"**



# FLOAT CONTROL

Controlled by vertical On-Off Float Pilot

*Hydraulically Controlled On-Off Float Valve
*Opens Fully when commanded by Float Pilot
*Closes when commanded by Float Pilot / Solenoid
*Allows water in tank to “cycle” Adjustable from 1’ – 4’

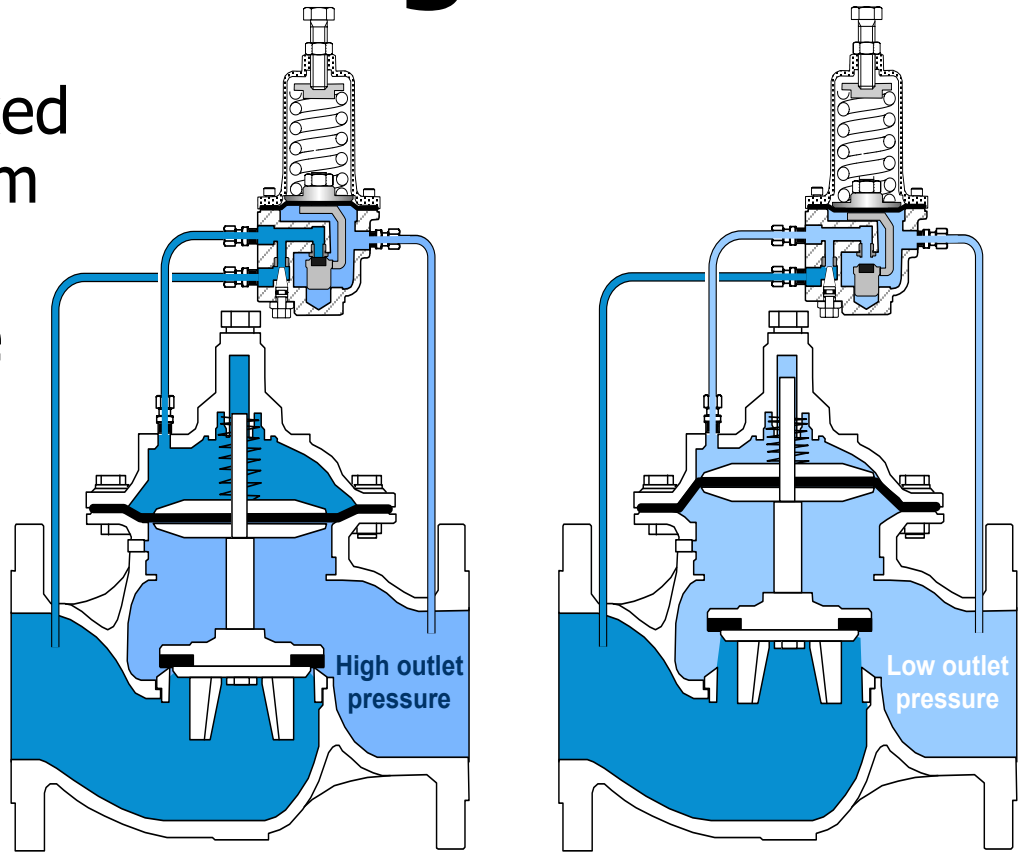
# Pressure Reducing Valve

*The valve maintains a fixed predetermined downstream pressure

*Regardless of flow rate fluctuations.

*Regardless of upstream pressure changes.

*Controlled by Pressure Reducing Pilot



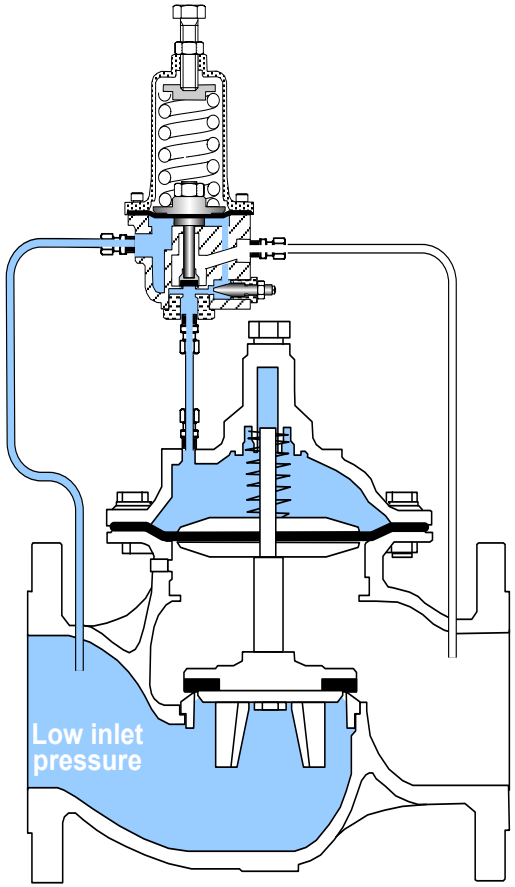
# Pressure Sustaining Valve

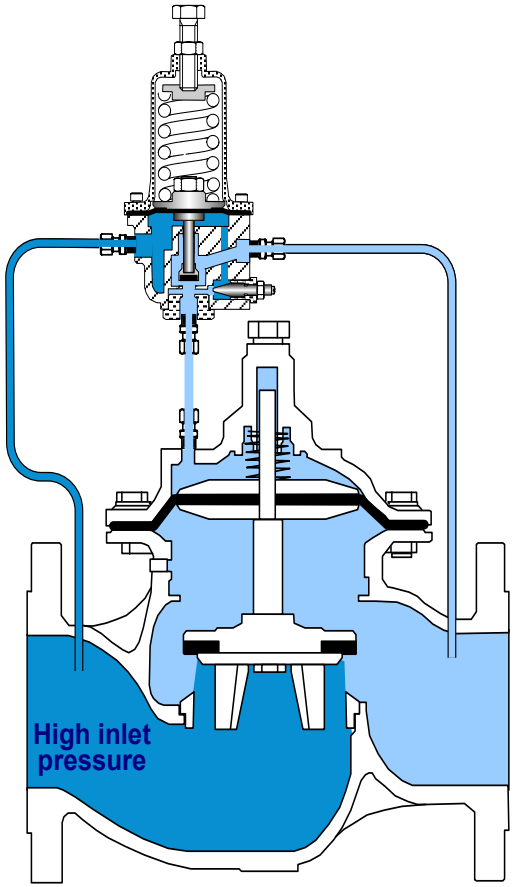
*The valve maintains a minimal, predetermined pressure, upstream of its location

*Regardless of demand flow rate fluctuations.

*Controlled by Pressure Sustaining Pilot

*In case the inlet pressure is lower than the set-value, the valve will fully close.



# ALTITUDE CONTROL VALVE

*The Beeco altitude control valves  is ideal for maintaining a preset maximum water level.

*The Valve allows normal forward flow to fill the storage tank to the maximum level, then closes drip-tight at the set-point.

*It opens to refill the tank once the level drops an adjustable


# Control Solutions:

*A full range of hydraulic control solutions using a wide variety of control devices
*Pressure Control applications
*Flow control application
*Water level control solutions
*Safety and protection devices for water-supply systems, pumping systems etc.
*Water hammer\Surge prevention
*Automated & Remote control of the hydraulic parameters

# *Thank you for your attention!*

Back to start