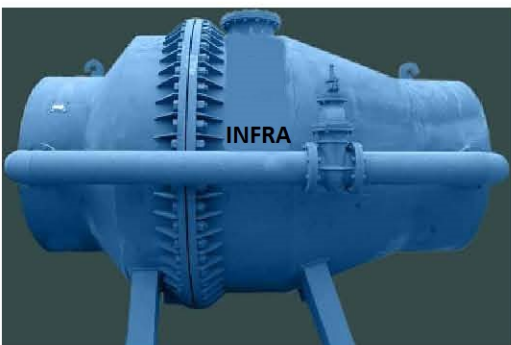


SURGE PROTECTION DEVICE



Air Cushion Valve (QRDA)



Zero Velocity Valve (PSLC)

INFRA

SHREE KRISHNA INDUSTRIES

H.O. & Works :

P-261/1 Benaras Road, Belgachia, Netajigarh,
Howrah-711108 (W.B.)

Solutions For
Water Hammer Control

Ensuring positive surge
control used for rising
mains

SHREE KRISHNA INDUSTRIES

INFRA

Zero Velocity Valve

(Proportional Spring Loaded Check Valve)

Size Range 100mm to 2000mm

Availability Barrel End

Flanged End

Extended Barrel End

Materials Cast Iron / M.S. IS 2062

INFRA Zero Velocity Valve consists of a spring loaded closing disc for stopping reverse flow in case of failure of pumps, enclosed in an outer shell. A well designed dome is located in back of disc to streamline the flow in routine operation. Disc is mounted on a central shaft and is further supported by guide rods. Valve is provided with a by pass arrangement

Valves are generally supplied with barrel ends but can also be flanged, if so desired.

The springs are designed in such a manner that the valve remains full open when 25% of designed velocity is achieved. In case of closure of pump, disc starts closing in relation to decrease of velocity and fully closes when velocity drops near to zero. Thus upstream water column is prevented from creating water hammer wave.

Bye pass arrangement keeps pressure balance on both sides of disc. It also prevents creation of vacuum in downstream side.

Featured with –

Zero velocity valve is featured self actuating

It does not require any external energy for actuation of the valve. Zero velocity valve can be installed at remote location.

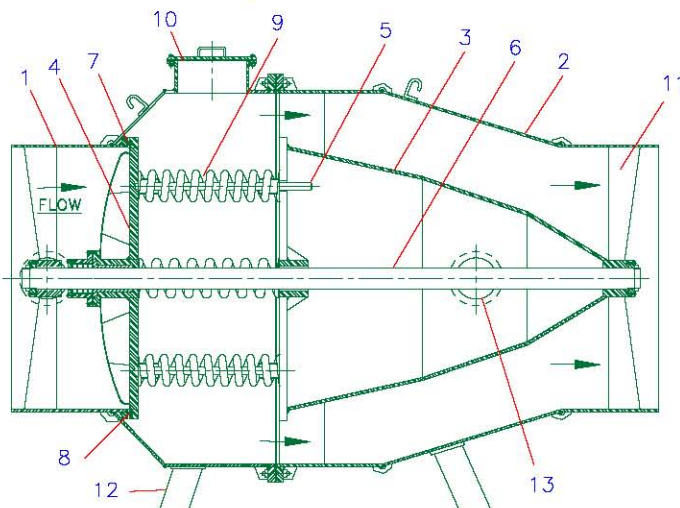
The valves are cost effective than many salutation.

Robust and versatile in usage for any kind of mains.

Resistant to corrosion since zinc rich epoxy painting

Provided with foot /saddle for safe handling during transit and for easy & fast installation.

Functional Configuration



1. INLET BARREL AND CONE
2. OUTLET BARREL AND CONE
3. CENTRAL DOME
4. CENTRAL DISC
5. ANTI ROTATION GUIDE ROD
6. CENTRAL SHAFT
7. SEAT RING
8. DISC SEAL
9. SPRINGS
10. INSP. OPENING
11. STRUTS
12. MOUNTING FEET
13. BY-PASS WITH VALVE

Zero velocity valve called as water hammer arrester

The principal behind the design of this valve is to arrest the forward moving water column at zero movement i.e. when its velocity is zero and before any return velocity is established. The valve fitted in a pipeline consists of an outer shell and an inner fixed dome leaving a streamlined annular passage for water.

A closing disc is mounted on center and a peripheral guide bar is held at the close position by compressed springs when there is no flow of water. One or multi nos. (depends upon the size of valve) bypass arrangement (not less than 10% of nominal bore area) connects the upstream and downstream side of disc. The springs are so designed that the disc remains in fully open position for velocity of water equal to 25% of the designed maximum velocity in the pipe line

The main advantages of ZERO VELOCITY VALVES are :-

I) Controlled closing characteristics II) Low head loss due to streamlined design.

Purpose of Zero velocity valve

Zero velocity valves are developed to eliminate water hammer problems. In common practices swing check valves are installed on the pump discharged end. Theoretically, swing check valve close quickly when the pump is shut of but actually not quick enough to prevent reversal velocity of flow. The flap of the swing check valves will slam against its body seat and will cause noise Vibration pipe stressing and seat damaging.

Application & Location of Zero velocity valve

Zero velocity valves has function to problem or limiting water surge after power failure.

Locations of the valves have therefore to be based on the results of the analysis of water column separation.

Zero velocity valves are so placed that the entire length of water column is suitably divided in spite of different gradients and undulations. More than one valve may be required in such cases

Zero velocity can be mounted in any position i.e. horizontal, vertical or inclined pumping main as well as gravity main, due to the center guided spring assisted design. This eliminates the problems arising from installing a valve WRONG orientation or necessity of changing existing lines to accommodate the valves design. Inventory requirement are reduced because one valve design can be used in a wide variety of application, regardless of the valve's in the line (when the valve is used vertical download flow position, a heavier spring is simply substituted to compensate for the weight of the disc and shaft.

Size, material construction and pressure rating :

Size 100 to 300mm NB	Material Of Construction			
	Cast Iron (IS:210)	Carbon Steel (IS:2062)		
Shell Test Pressure	10/16 Kg/Sq.Cm.	16 Kg/Sq.Cm.	20 Kg/Sq.Cm.	25 Kg/Sq.Cm.
Size 350 to 2000mm NB	Material Of Construction			
	Carbon Steel (IS:2062)			
Shell Test Pressure	10 Kg/Sq.Cm.	16 Kg/Sq.Cm.	20 Kg/Sq.Cm.	25 Kg/Sq.Cm.

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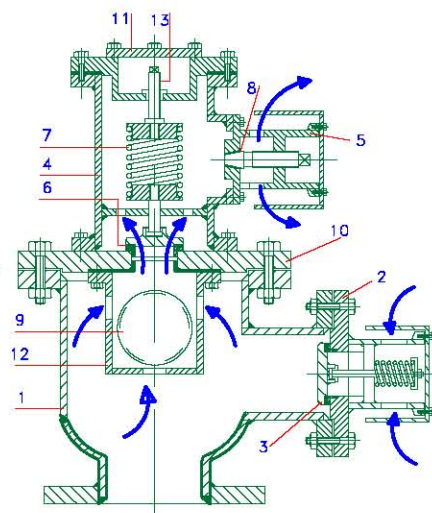
Air Cushion Valve

(Quick Release Damped Air Valve)

Size Range 50mm to 300mm
 Availability Flanged End
 Materials Cast Iron / M.S. IS 2062

INFRA Air Cushion Valve is the device to prevent collapse of pipe as well as bursting during sudden stoppage of pump or valve etc. It nullifies the effect of "Water Hammer"

Air Cushion Valve is provided with separate Inlet and Outlet for air. When a pumping machine suddenly stop due to any reason the water column travels forward due to its momentum. When the momentum is lost, it returns backward and exerts a pressure on non return valve/sluice valve. Then it again travels forward and backwards till the total energy is lost. During this process water column separates at various places creating vacuum. Air is required to fill the vacuum to prevent the pipe from collapsing in case of excess vacuum. When



1. MAIN BODY
2. INLET HOUSING
3. INLET VALVE
4. OUTLET BODY
5. OUTLET HOUSING
6. OUTLET VALVE
7. SPRING
8. AIR EXHAUST VALVE
9. BALL FLOAT
10. DIAPHRAGM
11. TOP COVER
12. CAGE
13. OUTLET ADJUSTABLE

the water column returns back, it creates excessive pressure, which is the cause of water hammer

With the installation of INFRA Air Cushion Valve at places, where water column separation is likely to take place, sufficient air is inhaled at the time of water column separation. Once the air is taken in and the water column starts returning, the air inlet is closed. Air is then compressed in between separated water columns. When air compression creates sufficient pressure, Outlet valve opens allowing air to escape under pressure. The outlet is further controlled by orifice controlled Needle valve to limit the quantity of outgoing air. Thus the energy of water column is lost in expelling the air and an air cushion is formed in between the separated water columns. Due to this process the rejoining of water columns is very slow and increase in pressure at this moment is moderate.

Working Principle of Air Cushion Valve

When The Pump Trips –

As the separation occurs, air is taken in through air inlet port at low differential head. The air can be taken in, even in presence of water at low pressure to prevent development of negative pressure.

When water column returns –

Air escapes port allows exit of air supply when pre-determined pressure is reached. The compressed air offers a 'CUSHION' to the returning water column. Controlled release of air ensures that the velocity of the returning column is reduced. Once all the air has escaped, the ball close the passage and prevents water from leakage.

Size, material construction and pressure rating :

Size 50 to 300mm NB	Material Of Construction			
	Cast Iron (IS:210)	Carbon Steel (IS:2062)		
Body Test Pressure	10/16 Kg/Sq.Cm.	16 Kg/Sq.Cm.	20 Kg/Sq.Cm.	25 Kg/Sq.Cm.