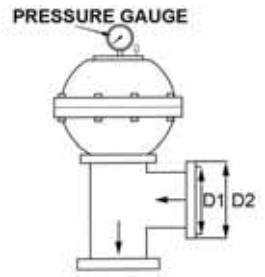
SKEAT

FIG: SW33 WATER HAMMER ARRESTOR

Operating Condition	
Nom.Size ∅ mm	50mm ~ 150mm
Working Pressure	16Bar
Tests Pressure	24Bar
Max.Temperature	80℃
Applications	Water



Materials	
Body	Cast Steel
Cover	Cast Steel
Into Perforated Pipe	Cast
The Elastic Tube	**NBR**
Flange	Cast steel

Dimensions (mm)							
SIZE	**IN.**	**2**	**21/2**	**3**	**4**	**6**	**8**
	MM	**50**	**65**	**80**	**100**	**150**	**200**
D1		125	145	160	180	240	295
D2		160	180	195	215	280	340
Ari Pressure		5 Bar	5 Bar	5 Bar	5 Bar	5 Bar	5 Bar

When the fluid flows in the pipe, if the valve close suddenly and stop the flow, the kinetic energy will be changed into elastic resilience and create a serial positive and negative pressure wave vibrating back and forth in the pipe until the energy lost by friction. Especially when the pump stop, the fluid still flows by inertia and gravity also cause the fluid to flow back, and these two forces will cause the positive and negative pressure waves. The friction caused by the two waves will make the pipe vibrating and create noise. Hence, the life of the pump and the piping accessories will be affected and, at the same time, cause the uncomfortable noise. under such situation, to set up one or more sets of water hammer arrester will improve the situation.

The Features of Water Hammer Arresters :

- The airbag adopts the ball-pressing-type design, which is no friction, less function progresses, prompt and sensitive response and has obvious result. In addition, the life of the arrester will be increased several times.
- The arrester will absorb water hammer directly and has the functions of water hammer prevention andabsorption.
- Special design of the air diaphragm rubber will not release pressure and its life won't be affected by the bad water quality.
- To prevent the air leakage, the pressed air chamber is covered by speeding prevention rubber.
- The design of structure is excellent and easy to maintain.

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How big of the fluid pressure of the water hammer will be?

The water hammer effect caused by closing the valve should be added at the largest water head in the pipe to calculate the height of the pressure water head and fluidpressure.

Vensano's formula：

$$Zo=\frac{2LVo}{gT}$$

Ho = the pressure water head before closing the valve
Vo = the flow speed before closing the valve
T = the time needed to close the valve
L = the pipe length between the inlet and outlet of free water surface
Zo = the largest pressure water head increased by water hammer effect
H =full pressure water head after adding water hammer at the end of the pipe
Remark: the transferring speed of in-pipe pressure and acceleration
(about 1000 m / second)

Example：Assume Vo = 5 m/ sec, Ho = 72 m, L = 210 m, if the it takes 3 seconds to close the valve, then, what is the pressure of water hammer?

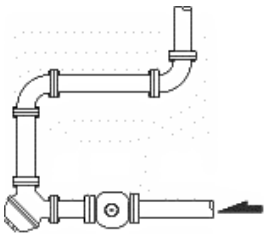
$$Zo=\frac{2LVo}{gT}=\frac{2\times210\times5}{9.81\times3}=\frac{2100}{29.43}=71.35\,m$$

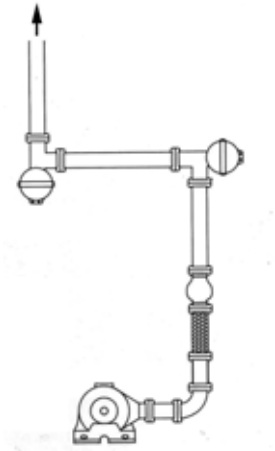
The full pressure water head including water hammer is： H=Zo+H0=71.35+72=143.35 m
Assume the pressure water head 10 m = 1 kgf/cm^2
Then, The fluid pressure including water hammer is ： 143.35 / 10=14.335 kg / fcm^2

・The flow-directing mechanism, in the valve, has the functions of flow-guiding and pressure-stabilizing.
・In the corner of pipe, the water hammer is the most obvious. The design is for meeting the requirement and set the arrestor at the corner directly.
This design not only saves the space and is easy to set up, and also can replace the traditional crooked head to reduce the cost of setting up.
・L style has the double way water-hammer-absorbing and has excellent results.

When and where should the L style water hammer arrestor be set up?

When the pump shut off, the pressure decrease instantly and cause the unstable positive and negative pressure gap which cause water hammer effect and create noise and pipe vibration. To set up water hammer arrestor at the pipe corner upside of the pump (shown as the figure) can prevent the water hammer effect and protect the machine.





Remark:
When lift is longer than 50m and pressure is 5 kgf/cm^2, we suggest to set up arrestors each at the downside of the long pipe and the corner upside of the check valve.

When the fluid flow through the serial corner, the change of flow speed and direction and friction effect will cause unstable pressure wave, which will lead to vibration and noise. To set up arrestor and silent check valve can eliminate the pressure wave.

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Remark:

- The pressure meter on the valve will show the air chamber pressure before piping and show the pipe pressure after piping.
- To leave a 10 cm opening between valve and wall for easy to maintain.
- Considering the high-pressure situation, cast iron or stainless steel valve body is suggested for the valve whose diameter is larger than 2".
- When lift is longer than 50 m and pressure is 5 kgf/cm^2, we suggest to set up arrester each at the downside of the long pipe and the corner upside of the check Valve.
- Before setting up, make sure the pressure of water hammer arrester air chamber cannot be higher than pipe pressure.
- When the pressure of the air chamber of the water hammer arrester is maintained at the 60% ~ 90% of pipe pressure, the arrester will have the best water-hammer-preventing result.
- If the water pressure in the pipe is too low or the air pressure of the arrester air chamber is too low. Both can be corrected by pumped into air or release air from the air-pumping hole at the top of the arrester.
- When the Outlet is under open pressure like float valve, bathroom equipment and faucet, input pressure 1 ~ 1.3 kgf/cm^2 is preferred.