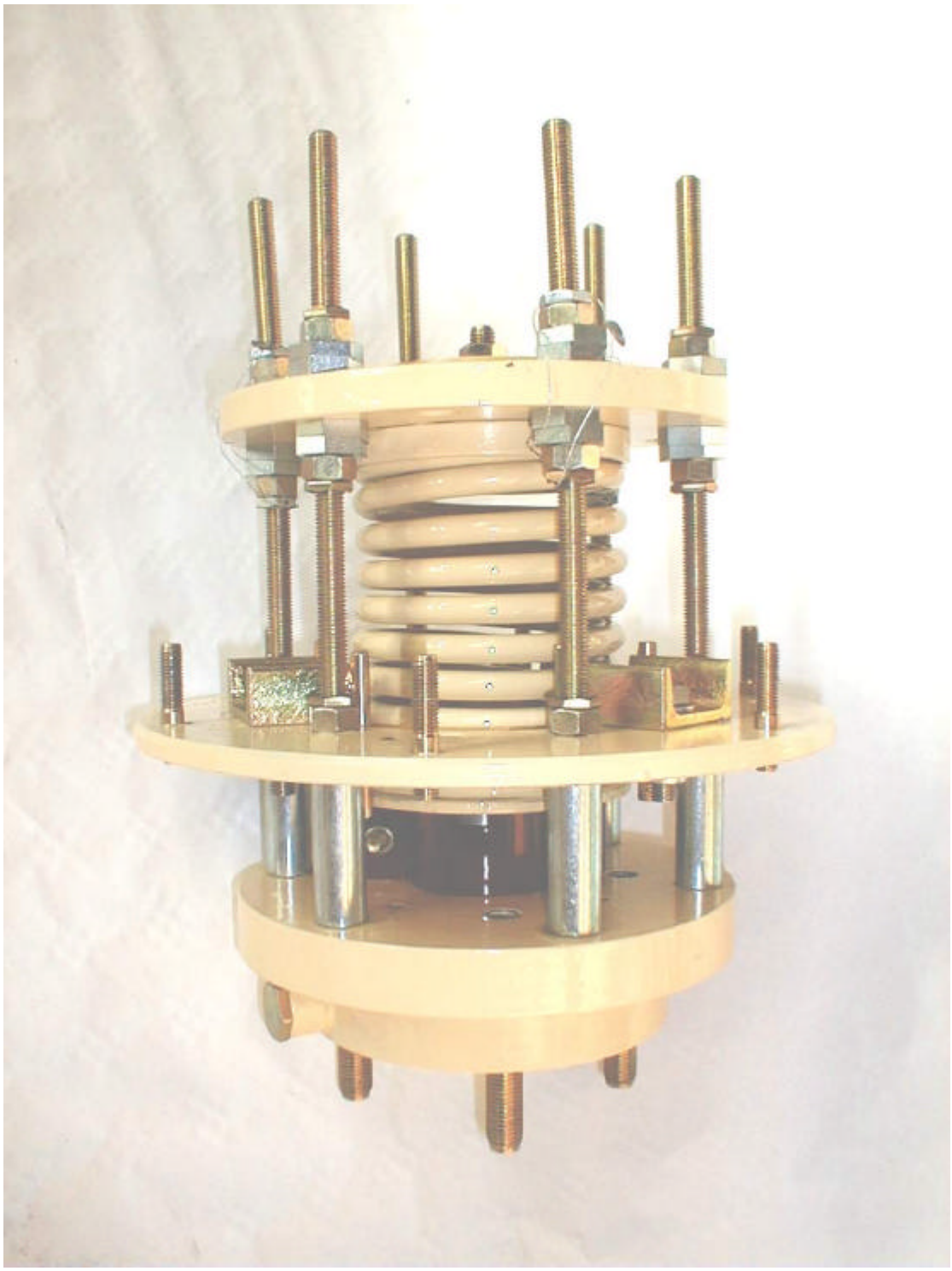
Pressure Relief Valve



SAPAG
Industrial Valves

PRINCIPLE AND MAIN FEATURES OF THE PRESSURE RELIEF VALVE

ND 50-200

Safety valves (such as those on steam boilers) are based on a principle which is attractive to the engineer who specialises in water hammer : installing a device which automatically discharges a certain flow the instant that the pressure exceeds its normal value certainly often seems to be the most effective way of protecting a pipeline against overpressures.

But, the use, of classical safety valves cannot be considered :
-Either because of the inertia of such systems
-Or because of the possible risks of jamming which would make safety a mere illusion.

Because the moving parts have to be guided, there is a possibility that the valve will size up if the principal elements jam or become incrusted with deposits. Water hammer occuring in a pipeline after several months of normal operation might, in these conditions, be propagated without forcing the safety valve to open. Thus what would have been a mere incident becomes an accident. Deriving their inspiration from their wellknown self centring valve, SAPAG has designed a device which has the following characteristics :

-TOTALLY FREE OF GUIDES-
-NEGLIGIBLE INERTIA-
-LINEAR METAL/METAL SEALING-
-LOW VARIATION OF PRESSURE DURING OPENING-
-COMPACT DESIGN-

The SAPAG valves owes these qualities to its original simplicity, which is the result of long theoretical and experimental researches. This valve is made up of :
-A fixed bevelled nozzle
-A flat mobile valve disc
-A spring working in compression

The absence of mechanical guides is due to the fact that the disc centres itself hydraucally on the jet. The mechanical characteristics of the spring are calculated with purpose of contributing to its centring and to the stability.

There is no possibility of friction nor jamming because of incrustations or deposits. Further, the movements of the self centring disc are perpendicular to the contact plane between the disc and the nozzle. Thus the disc can move under the least impulse and close again smoothly without itself causing water hammer; it closes as soon as the pressure reaches a value less than the one which has caused it to open.

The reduction of inertia to a minimum accentuates the freedom of movement. The lightness of moving parts is favourable to stable operation and is besides essential for damping out shock waves. For stability it is necessary for the period of the device to be much less than the one of the pipeline, in order to avoid any risk of pressure pulsations.

Sealing is obtained by very careful machining of the rigid corrosion resistant metal contact surfaces. To prevent chattering and avoid any cavitation in the valve, the seal contact must be linear and there must be provision for adequate aeration of discharge as soon as it leaves the nozzle. For the valve to be sensitive, sealing must be achieved as soon as the parts are in contact without requiring additionnal compression to form the seal by deformation. The use of corrosion resistant materials eliminates any risk of jamming, ensuring that the valve will always operate correctly.

Parts are heat treated for high strengh. In spite of the high degree of hardness obtained, the metal contact surfaces may, in some cases, suffer from particularly intense service conditions and require touching up to restore water tightness. However, even if the valve is temporarily not leaktight, the safety of the installation is in no way jeopardised.

Acces to wear parts is quick and easy, and their replacement does not require any disassembling or disadjustment.

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The nozzle is held against its upper bearing by a cushion of water at pipeline pressure, an arrangement which breaks the continuity in the transmission of any possible shock due to the valve disc falling back onto its seating after the valve has opened.

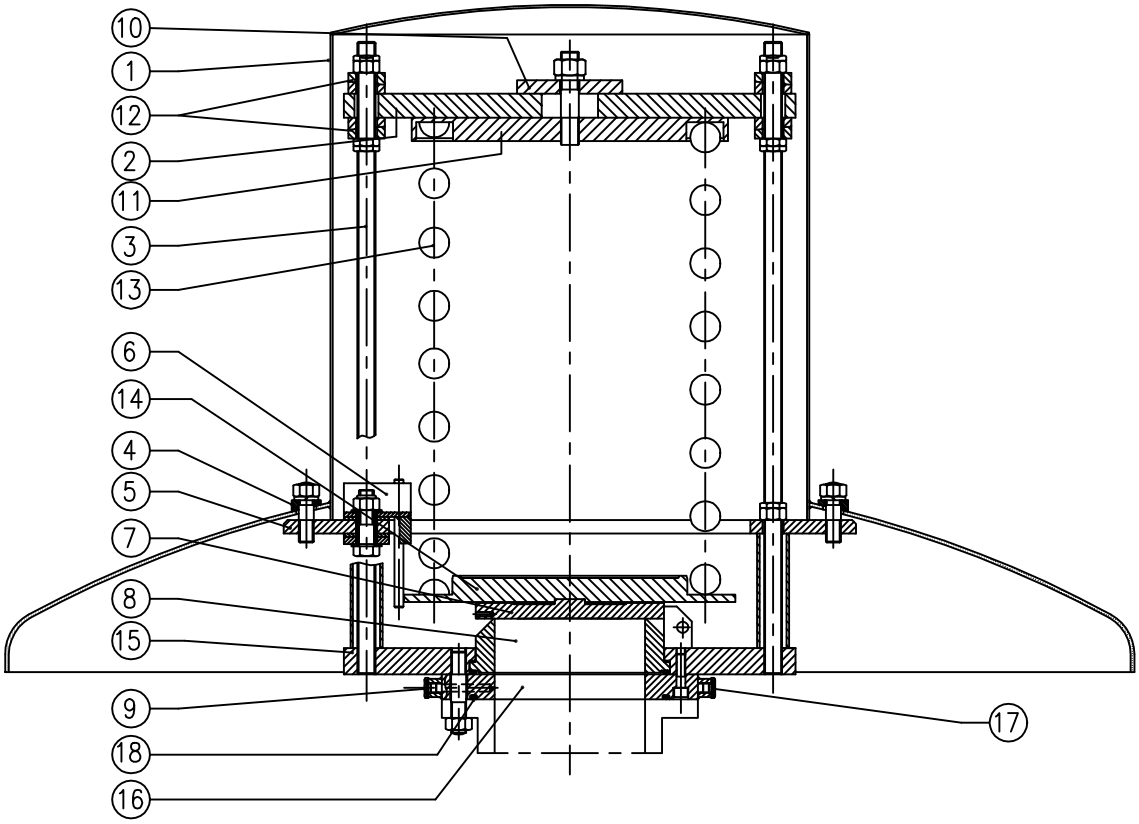
The adopted design for nozzle, disc and spring leads to highly satisfactory operating conditions. Showing pressure variation versus discharge.

The pressure at which the valve starts to open is practically the same as the one which allows the valve to close.

The pressure/discharge curve (H,Q see the hydraulic characteristics) is rectilinear from zero discharge, with a low but positive gradient, and pressure variations are reduced to a minimum.

The use of a highly precompressed spring subjected to a high load, and the perfect symmetry of flow, make the valve a remarkably compact device, considering flow capacity.

Finally, two pressure taps in the bottom of counter flange may be used, if necessary, to check the sealing pressure and to reset the valve when it has been duly isolated from the pipeline by its shut off valve and connected to a testing pump.



Rep.	DESIGNATION
1	DEFLECTOR HOOD
2	UPPER PLATE
3	FIXED ROD
4	HOOD WASHER
5	ANNULAR PLATE
6	STOP–PIECES
7	VALVE DISC
8	NOZZLE
9	TEST–PUMP CONNECTION

Rep.	DESIGNATION
10	LOCKING PLATE
11	SPRING UPPER CUP
12	BEVEL WASHERS
13	SPRING
14	SPRING LOWER CUP
15	BEARING FLANGE
16	COUNTER FLANGE
17	PRESSURE GAUGE CONNECTION
18	"O" RING GASKETS

REV.	DATE		
A	01/95		

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Robinetterie Industrielle

PRESSURE RELIEF VALVE

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