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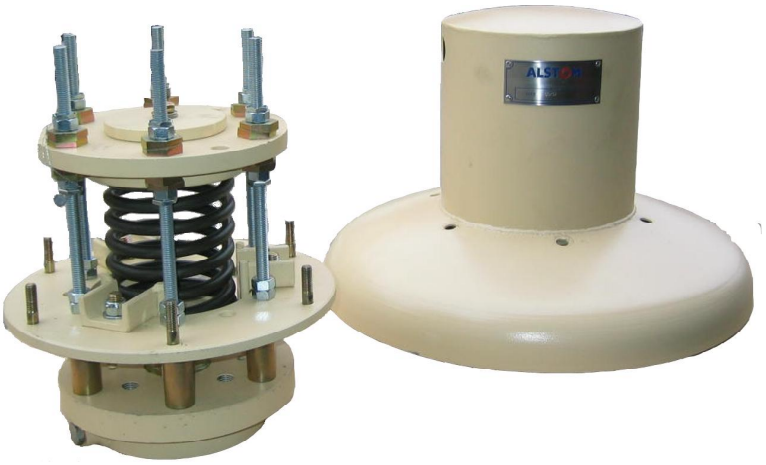
NEYRTEC® PRESSURE RELIEF VALVE

Anti-Water Hammer Relief valve



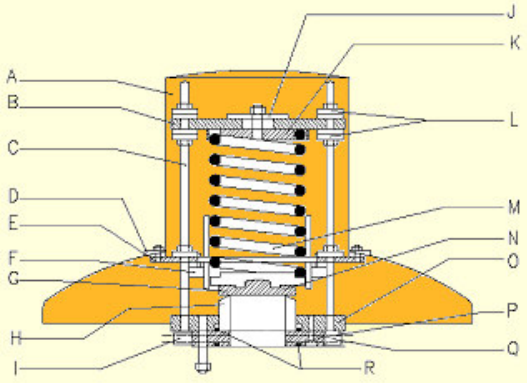
With the purpose of limiting the overpressure amount in a pipe due to water hammer, the Neyrtec® Relief Valve automatically and rapidly discharges a certain flow the moment the pressure exceeds its normal value.

Even having the same operation principle as the safety valve used for vapor boilers, the layout of Neyrtec® Relief Valve is completely different, to improve its operation and ensure operational safety.

Deriving their inspiration from their well-known Self-Centering Disc Valve®, Neyrtec® have designed a device which has the following characteristics:

- Total absence of guides;
- Negligible inertia;
- Linear metal-to-metal sealing;
- Low variation of pressure during opening;
- Compact design.

A Deflector hood
B Upper plate
C Fixed rod
D Hood washers
E Annular plate
F Stop-pieces
G Valve disc
H Nozzle
I Tapping for test-pump connection
J Locking plate
K Spring upper cup
L Washers
M Spring
N Spring lower cup
O Bearing flange
P Counter flange
Q Tapping for pressure gauge connection
R O-Ring gaskets



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The simplicity and originality of Neyrtec® Pressure Relief Valve result from long theoretical and experimental studies. The core elements on its construction are the following:

- Outlet nozzle (H) with bevelled side;
- Flat mobile valve disc (G);
- Spring (M) working in compression.

a- The absence of any mechanical guides is made possible by its very own jet that hydraulically centers the valve. On the other hand, the elastic spring characteristics are calculated with the purpose of contributing to this centering and to the stability. There is no possibility of friction or jamming due to incrustations or oxidation.

b- The simplicity of the moving parts and the reduction of the inertia to a minimum highlight the freedom of movement. The lightness of the moving parts, essential for damping out shock waves, is favorable to stable operation. Its optimum stability also stems from the fact that the device own frequency, which is much lower than that of the pipeline, in order to avoid any risk of pressure variations.

c- Sealing is obtained by very careful machining of the rigid corrosion-resistant metal contact surfaces between the nozzle and valve disc. These parts made of stainless steel eliminate the risks of an eventual adherence.

d- The use of a highly pre-compressed spring subjected to a high load assures perfect symmetry of flow, making the valve a remarkably compact device.

e- The layout applied to the nozzle, disc valve and spring contributes to the decrement reduction, that is, the difference in pressure between the opening start and the fully opening of disc valve.

Applications

The sensitivity, stability and speed of response of Neyrtec® Pressure Relief Valves, highlighted in early application testes, have been properly and practically proven by the actual safety achieved for the instalations equipped with these relief valves.

The valve is not effective in conditions of negative pressure, but is fully effective in clipping positive pressure waves at the point where it is connected into the line.

Operation Characteristics

The Neyrtec® Pressure Relief Valve is basically a discharge valve which opens at a given pressure and which is characterized by a particular pressure/discharge relationship:

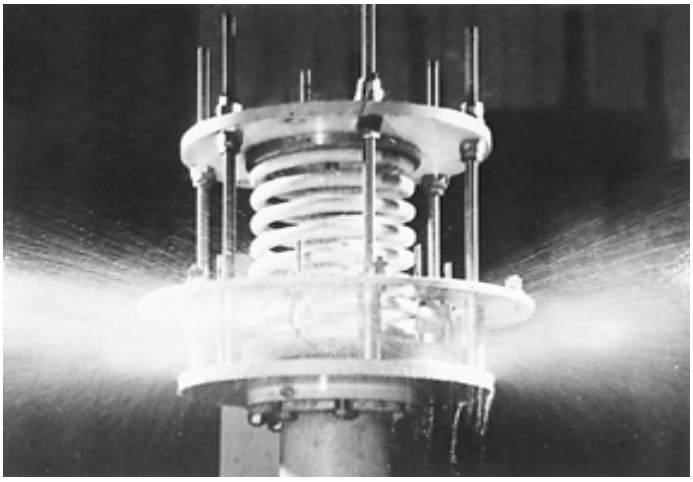
- Discharge is nil up to a pressure h_F below the disc, known as control pressure or sealing pressure;

- Discharge is Q under a pressure of $h_O = h_F + \Delta h$. below the disc

Pressure h_F should be slightly higher (about 5%) than the normal maximum pressure in the installation during a regular operation and measured at the flange on which the relief valve is fitted.

The permissible limits of h_F, h_O and Q for each type of valve are given in the table of operating characteristics.

The relief valve is defined by the nozzle diameter, spring wire diameter, both expressed in mm, and by the sealing pressure in mca. Example: 125/32 – 118 m Relief Valve.



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Operating characteristics

Any reduction of the discharge through the valve with respect to the maximum discharge indicated above brings about a proportional reduction of the corresponding rise pressure in.

The sealing pressure of a valve can be set to any value from the maximum indicated above down to that indicated for a valve of the same size with a spring one size smaller. The new opening valve pressure value corresponding to the established value will be reduced by the same number of meters as the maximum sealing pressure.

Maximum discharge varies as the square root of the pressure with the valve open.

At the same pressure, each type of valve discharges 2.5 times as much as the valve one size smaller.

Relief valve choice

To choose the suitable relief valve, the following should be known:

- The maximum pressure under normal working conditions (without opening the valve). This pressure is the static pressure or, in case of pump delivery piping, the pump pressure with flow Q=0.

- The discharge to be released;

- The allowable overpressure value during this discharge.

The discharge generally results from a surge study of the piping system. As a first guess it can be considered equal to the nominal flow rate of the pipe or at least to the maximum variation which may occur in a period of L/500 seconds, where L is the pipe length in m.

DN 50 mm					DN 80 mm					DN 125 mm					DN 200 mm				
∅ Spring wire mm	Max. sealing pressure mca	Max discharge. l/s	Pressure for valve opening mca	Corresponding overpressure mca	∅ Spring wire mm	Max. sealing pressure mca	Max discharge. l/s	Pressure for valve opening mca	Corresponding overpressure mca	∅ Spring wire mm	Max. sealing pressure mca	Max discharge. l/s	Pressure for valve opening mca	Corresponding overpressure mca	∅ Spring wire mm	Max. sealing pressure mca	Max discharge. l/s	Pressure for valve opening mca	Corresponding overpressure mca
					6	9	51	15	6	10	11	133	17	6	16	11	342	17	6
															18	14	386	21	7
					8	18	68	26	8	12	17	160	24	7	20	18	428	26	8
										14	24	187	33	9	22	23	470	32	9
6	28	32	38	10	10	31	85	41	10	16	33	214	43	10	25	31	534	41	10
										18	40	234	51	11	28	38	583	49	11
8	54	43	67	13	12	44	100	56	12	20	55	266	67	12	32	55	685	67	12
					14	67	119	80	13	22	67	294	81	14	36	71	770	85	14
10	89	53	105	16	16	89	136	105	16	25	89	334	104	15	40	89	855	105	16
					18	108	149	126	18	28	108	364	125	17	36/25				
12	124	62	143	19	20	144	170	163	19	32	151	428	171	20	40/25	104	947	129	25
14	183	75	205	22	22	176	187	198	22	36	194	480	216	22	40/25	120			
16	243	85	268	25	25	231	213	256	25	40	243	535	268	25	40/28	115	990	142	27
18	294	93	322	28	28	277	232	304	27	40/25	289	590	328	39	40/38	130	1040	156	26
20	387	107	418	31	32	387	272	418	31	40/25	331								
22	472	117	506	34	36	494	306	529	35	40/28	320	620	351	41					
25	614	133	653	39	40	580	331	618	38	40/28	355	650	397	41					
28	735	145	779	44															

X	Body A	X	Body B	X	Body C	X	Body D

Special valves for higher pressures may be manufactured upon request.
If greater flow capacity is needed, several valves may be installed in parallel.

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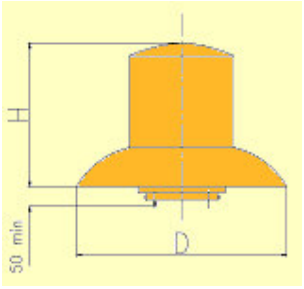
Basic dimensions and weights:



Hold flange drilling (smooth flange)
(1) ∅ 50 – 4 holes ∅ 18 diam 125
(2) ∅ 80 – 8 holes ∅ 18 diam 160
(3) ∅ 125 – 8 holes ∅ 18 diam = 210
(4) ∅ 125 – 8 holes ∅ 27 diam = 220
(5) ∅ 125 – 8 holes ∅ 22 diam = 295

Valves are fixed with studs. Flange sealing is by an O-ring supplied with the valve.
A clearance above the valve of at least the same as the height H should be left to allow the hood to be dismantled.

Body	A	B	C	D
∅ spring mm / ∅ nozzle mm	6 to 12	14 to 18	20 to 28	32 to 40
50	PN 10 (1)	PN 16 (1) or 25 (1)		
80	PN 10 (2)	PN 10 (2)	PN 16 (2) or 25 (2)	
125		PN 10 (3)	PN 10 (3)	PN 16 (3) or 25 (4)
200			PN 10 (5)	PN 10 (5)
H height mm	400	520	730	940
D diameter mm	550	800	1000	1500
Mass (hood) Kg	44 to49 (12)	94 to 109 (30)	186 to 241 (58)	476 to 549 (136)

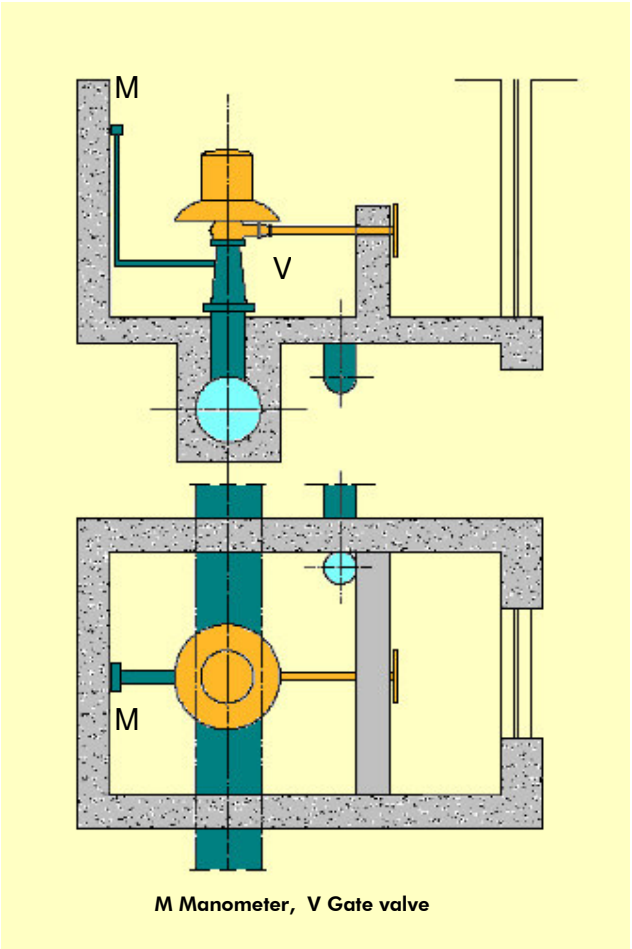
Nominal pressures in bar

Installation

Our relief valves are delivered works-adjusted to pressure h_F , which should be specified when ordering.

For satisfactory opertaion and easy maintenance, the valve layout should be arranged as follows:

- Take off from the mains as short as possible and securely fixed, ending with a convergent section, equipped with pressure tapping and gauge;
- A well levelled hold flange;
- Shut off valve (suitable for operation under any circumstances);
- Drain for water discharged by the valve;
- Good access all round the valve for easy erection and maintenance.



M Manometer, V Gate valve

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