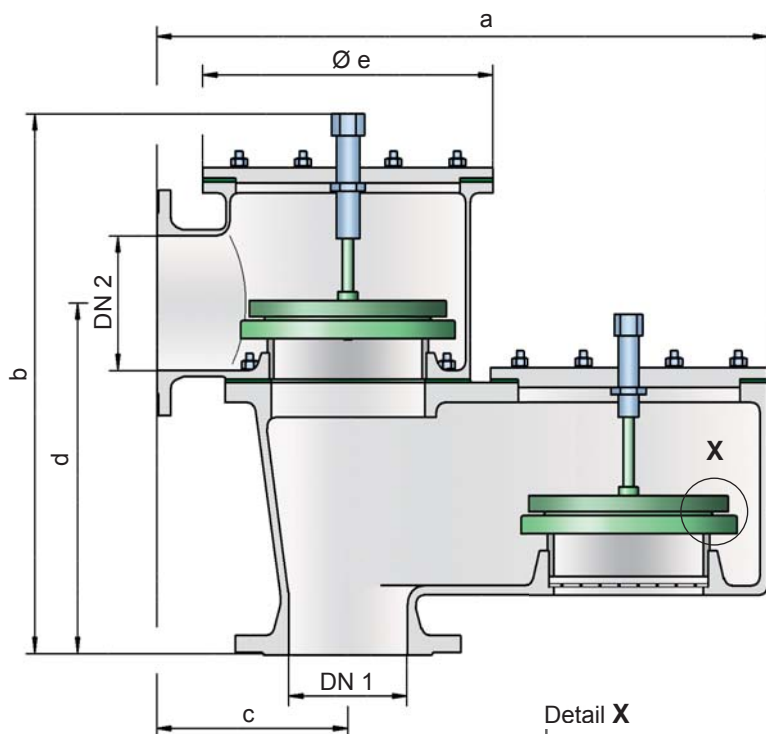


Pressure and Vacuum Relief Valve

with pipe-away connection

PROTEGO® VD/SV-PA(L)

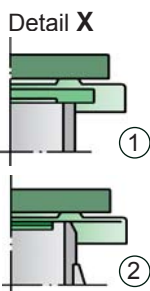


Settings:

Pressure: +2.0 mbar up to +60 mbar
+0.8 inch W.C. up to +24 inch W.C.

Vacuum: -2.0 mbar up to -60 mbar
-0.8 inch W.C. up to -24 inch W.C.

Higher or lower settings upon request.



Function and Description

The VD/SV-PA(L) type PROTEGO® valve is a highly developed pressure and vacuum relief valve with excellent flow performance. Typically the valve is installed in the in- and outbreathing lines of tanks, vessels and process apparatus to protect against unallowable high and low pressure. The valve prevents emission losses almost up to the set pressure and prevents air intake almost up to set vacuum. The product vapors can be discharged through a collective line connected to the line flange on the pressure side.

The device will start to open as soon as the set pressure is reached and only requires 10% overpressure to full lift. Continuous investments into research and development have allowed PROTEGO® to develop a low pressure valve which has the same opening characteristic as a high pressure safety relief valve. This "full lift type" technology allows the valve to be set just 10% below the maximum allowable working pressure or vacuum (MAWP or MAWV) of the tank and still safely vent the required mass flow. The opening characteristic is the same for pressure and vacuum relief.

Due to our highly developed manufacturing technology the tank pressure is maintained up to set pressure with a tightness that is far superior to the conventional standard. This feature is achieved by

valve seats made of high quality stainless steel and with precisely lapped valve pallets (1) or with an air cushion seal (2) in conjunction with high quality FEP diaphragm. The valve pallets are also available with a PTFE seal to prevent the valve pallets from sticking when sticky products are used and to enable the use of corrosive fluids. After the excess pressure is discharged or the vacuum is compensated, the valve reseats and provides a tight seal.

The optimized fluid dynamic design of the valve body and valve pallet is a result of many years of research work, which allow a stable operation of the valve pallet and optimized performance resulting in reduction of product losses.

Special Features and Advantages

- "full lift type" technology valve utilizes only 10% overpressure to reach full lift
- extreme tightness and hence least possible product losses and reduced environmental pollution
- set pressure is close to the opening pressure which results in best possible pressure management of the system
- very high flow capacity
- can be used in areas subject to explosion hazards
- self draining
- maintenance friendly design
- best technology for API-tanks

Design Types and Specifications

The valve pallets are weight-loaded. Higher pressures can be achieved upon request with a special spring-loaded design. Choose the model (L) if the discharge nozzle has a nominal diameter that is greater than the nominal diameter of the tank filler neck.

There are four different designs:

- Pressure/vacuum valve in basic design **VD/SV-PA -**
- Pressure/vacuum valve with heating jacket **VD/SV-PA - H**
- Pressure/vacuum relief valve with DN2 > DN1 **VD/SV-PAL -**
- Pressure/vacuum relief valve with DN2 > DN1 with heating jacket **VD/SV-PAL - H**

Additional special devices available upon request.

Any combination of vacuum and pressure setting can be achieved for the valve. When the difference between the pressure and vacuum exceeds 150 mbar (60.2 inch W.C.), special valve pallets are used.

Table 1: Dimensions

Dimensions in mm / inches

To select the nominal size (DN), use the flow capacity charts on the following pages

VD/SV-PA

DN 1	50 / 2"	80 / 3"	100 / 4"	150 / 6"	200 / 8"	250 / 10"	300 / 12"
DN 2	50 / 2"	80 / 3"	100 / 4"	150 / 6"	200 / 8"	250 / 10"	300 / 12"
a	405 / 15.95	480 / 18.90	600 / 23.62	805 / 31.69	925 / 36.42	1010 / 39.76	1010 / 39.76
b	390 / 15.35	485 / 19.09	550 / 21.65	660 / 25.98	780 / 30.71	875 / 34.45	875 / 34.45
c	150 / 5.91	180 / 7.09	200 / 7.87	250 / 9.84	300 / 11.81	305 / 12.01	305 / 12.01
d	240 / 9.45	300 / 11.81	330 / 12.99	390 / 15.35	480 / 18.90	555 / 21.85	582 / 22.91
e	165 / 6.50	192 / 7.56	240 / 9.45	350 / 13.78	390 / 15.35	460 / 18.11	460 / 18.11

VD/SV-PAL

DN 1	50 / 2"	80 / 3"	100 / 4"	150 / 6"	200 / 8"	250 / 10"	300 / 12"
DN 2	80 / 3"	100 / 4"	150 / 6"	200 / 8"	250 / 10"	300 / 12"	350 / 14"
a	395 / 15.55	445 / 17.52	565 / 22.24	770 / 30.31	895 / 35.24	1010 / 39.76	1010 / 39.76
b	400 / 15.74	485 / 19.09	550 / 21.65	655 / 25.79	775 / 30.51	875 / 34.45	885 / 34.45
c	140 / 5.51	143 / 5.63	165 / 6.50	216 / 8.50	267 / 10.51	305 / 12.01	305 / 12.01
d	255 / 10.04	308 / 12.13	355 / 13.98	417 / 16.42	505 / 19.88	582 / 22.91	603 / 23.74
e	165 / 6.50	192 / 7.56	240 / 9.45	350 / 13.78	390 / 15.35	460 / 18.11	460 / 18.11

Dimensions of pressure and vacuum relief valves with heating jacket upon request

Table 2: Material selection for housing

Desing	A	B	C	
Housing	Aluminium	Steel	Stainless Steel	Option: Housing with ECTFE-lining
Heating jacket (VD/SV-PA(L)-H-...)	-	Steel	Stainless Steel	
Valve seat	Stainless Steel	Stainless Steel	Stainless Steel	Special materials upon request
Sealing	PTFE	PTFE	PTFE	

Table 3: Material selection for pressure valve pallet

Design	A	B	C	D	E	F
Pressure range (mbar) (inch W.C.)	+2.0 up to +3.5 +0.8 up to +1.4	>+3.5 up to +14 >+1.4 up to +5.6	>+14 up to +35 >+5.6 up to +14	>+35 up to +60 >+14 up to +24	>+14 up to +35 >+5.6 up to +14	>+35 up to +60 >+14 up to +24
Valve pallet	Aluminium	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
Sealing	FEP	FEP	Metal to Metal	Metal to Metal	PTFE	PTFE

Special material (alu-coated, titan, hastelloy) as well as higher set pressure upon request

Table 4: Material selection for vacuum valve pallet

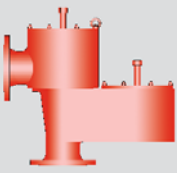
Design	A	B	C	D	E	F
Vacuum range (mbar) (inch W.C.)	-2.0 up to -3.5 -0.8 up to -1.4	<-3.5 up to -14 <-1.4 up to -5.6	<-14 up to -35 <-5.6 up to -14	<-35 up to -60 <-14 up to -24	<-14 up to +35 <-5.6 up to +14	<-35 up to -60 <-14 up to -24
Valve pallet	Aluminium	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
Sealing	FEP	FEP	Metal to Metal	Metal to Metal	PTFE	PTFE

Special material (alu-coated, titan, hastelloy) as well as higher set vacuum upon request

Table 5: Flange connection type

EN 1092-1; Form B1	other types upon request
ASME B16.5; 150 lbs RF5F	

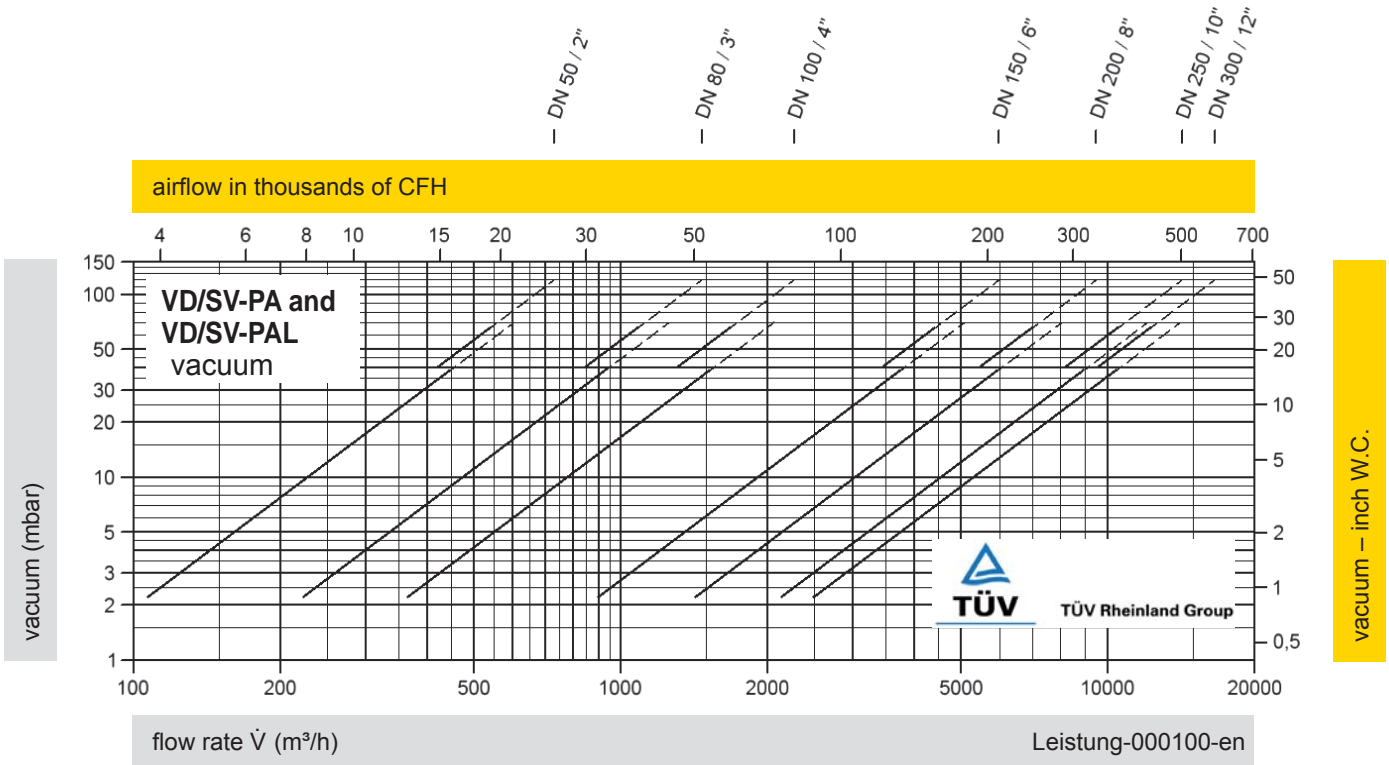




Pressure and Vacuum Relief Valve

Flow Capacity Charts

PROTEGO® VD/SV-PA(L)



The flow capacity charts have been determined with a calibrated and TÜV certified flow capacity test rig. Volume flow \dot{V} in (m^3/h) and CFH refer to the standard reference conditions of air ISO 6358 (20°C, 1bar). Conversion to other densities and temperatures refer to Vol. 1: "Technical Fundamentals".

PROTEGO® VD/SV-PA(L)

