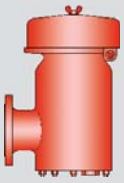
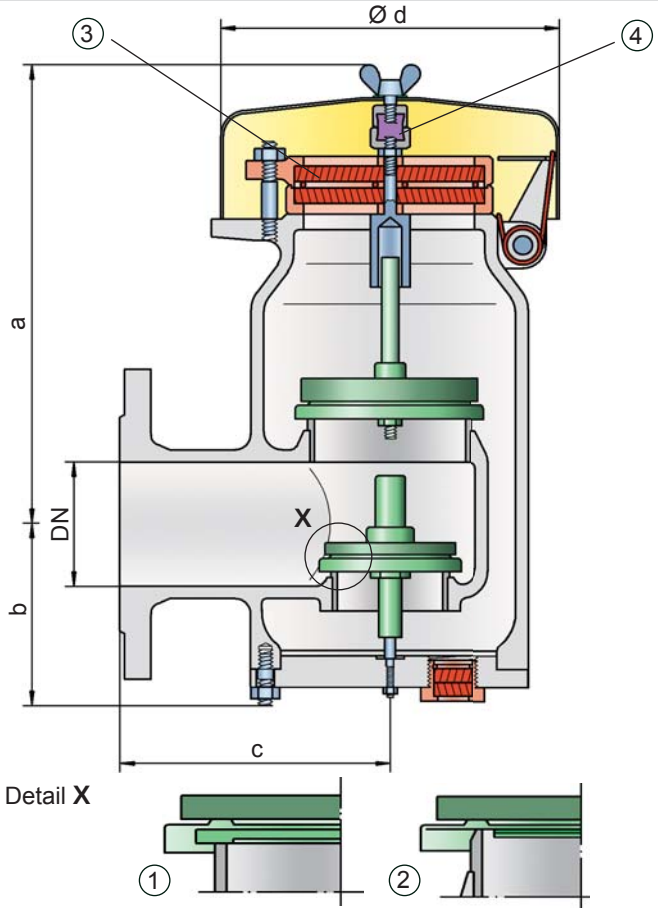


Pressure/Vacuum Relief Valve

deflagration- and endurance burning-proof

PROTEGO® PV/EB



Settings:

pressure:	+2.0 mbar	up to	+210 mbar
	+0.8 inch W.C.	up to	+84 inch W.C.
vacuum:	-14 mbar	up to	-35 mbar
	-5.6 inch W.C.	up to	-14 inch W.C.
vacuum:	-3.5 mbar	up to	-14 mbar
	-1.4 inch W.C.	up to	-5.6 inch W.C.

for presssure up to max. + 150 mbar / 60.2 inch W.C.
Higher and lower settings upon request

Function and Description

The atmospheric deflagration and endurance burning proof PV/EB type PROTEGO® valve is a highly developed combined pressure/vacuum relief valve for high flow capacities with an integrated flame arrester unit. It is primarily used as a safety device for flame transmission proof in- and outbreathing on tanks, containers and process engineering apparatus. The valve offers reliable protection against excess pressure and vacuum, prevents the inbreathing of air and product losses almost up to the set pressure and also protects against atmospheric deflagration and endurance burning if stabilized burning occurs. The PROTEGO® flame arrester unit is designed to achieve minimum pressure drop with maximum safety. The PROTEGO® PV/EB valve is available for substances of explosion group IIA (NEC group D MESG > 0.9 mm).

When the set pressure is reached, the valve starts to open and reaches full lift within 10% over pressure. This unique 10% technology enables a set pressure that is only 10% below the maximum allowable working pressure (MAWP) or maximum allowable working vacuum (MAWV) of the tank. After years of development, this typical opening characteristic of a safety relief valve is now also available for the low pressure range.

The tank pressure is maintained up to the set pressure with a tightness that is far superior to the conventional standard due to our state of the art manufacturing technology. This feature is ensured by the valve seats made of high quality stainless steel and with individually 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, the valve reseats and provides a tight seal.

If the set pressure is exceeded, explosive gas/product-vapour air mixtures are released to the atmosphere. If this mixture ignites, the integrated PROTEGO® flame arrester unit (3) prevents flame transmission into the tank. If additional mixture continues to flow and stabilized burning occurs, the integrated flame arrester unit prevents flashback as a result from endurance burning. The valve is protected and also fulfils its function under this severe service conditions. The spring loaded weather hood opens as soon as the fusible element (4) melts.

The valve can be used up to an operating temperature of +60°C / 140°F and meets the requirements of European tank design standard EN 14015 – Appendix L and ISO 28300 (API 2000).

Type-approved according to ATEX Directive 94/9/EC and EN 12874 as well as other international standards.

Special Features and Advantages

- requires only 10% overpressure to full lift
- through 10% technology higher set pressures can be used which results in product loss reduction compared to conventional 80% and 100% overpressure technology vents (compare API 2000)
- increased design flexibility through higher reseating pressures; vents reseat when conventional vent is still discharging costly product or nitrogen
- high performance seal reducing product loss below EPA's 500ppm rule preventing environmental pollution
- the valve disc is guided within the housing to protect against harsh weather conditions
- can be used as protective system according ATEX in areas subject to explosion hazards (94/9/EC)
- FLAMEFILTER® provides protection against atmospheric deflagration and endurance burning
- FLAMEFILTER® integrated into the valve saves space, weight and reduces cost
- FLAMEFILTER® protected from clogging through product vapour
- PROTEGO® flame arrester unit has a low pressure drop
- flame transmission proof condensate drain
- maintenance friendly design
- special design with lifting gear can be purchased

Design Types and Specifications

Almost any combination of vacuum and pressure levels can be set for the valve. The valve discs are weight loaded. When the difference between the pressure and vacuum exceeds 150 mbar / 60.2 inch W.C., special valve discs are used.

There are two different designs:

Pressure/vacuum relief valve, basic design **PV/EB- –**

Pressure/vacuum relief valve with heating jacket (max. heating fluid temperature +85°C / 185°F) **PV/EB- H**

Additional special devices available upon request

Table 1: Dimensions Dimensions in mm / inches

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

DN	50 / 2"	50 / 2"	80 / 3"	80 / 3"	
Set pressure	≤ +60 mbar ≤ +24.1 inch W.C.	> +60 mbar > +24.1 inch W.C.	≤ +60 mbar ≤ +24.1 inch W.C.	> +60 mbar > +24.1 inch W.C.	Dimensions for pressure/ vacuum relief valve with heating jacket upon request
a	308 / 12.13	443 / 17.44	308 / 12.13	443 / 17.44	
b	108 / 4.25	108 / 4.25	108 / 4.25	108 / 4.25	
c	165 / 6.50	165 / 6.50	167 / 6.57	167 / 6.57	
d	218 / 8.58	218 / 8.58	218 / 8.58	218 / 8.58	

Table 2: Selection of explosion group

MESG	Expl. Gr. (IEC/CEN)	Gas Group (NEC)	
> 0,90 mm	IIA	D	Special approvals upon request

Table 3: Material selection for housing

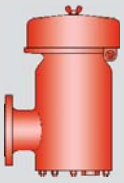
Design	B	C	
Housing Heating jacket (PV/EB-H-...)	Steel Steel	Stainless Steel Stainless Steel	Special materials upon request
Valve seats	Stainless Steel	Stainless Steel	
Weather hood	Steel	Stainless Steel	

Table 4: Material combination of flame arrester unit

Design	A	
FLAMEFILTER® cage	Stainless Steel	Special materials upon request
FLAMEFILTER®	Stainless Steel	
Spacer	Stainless Steel	

Table 5: Material selection for pressure valve pallet

Design	A	B	C	D	
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 +210 >+5.6 up to +84	>+35 up to +210 >+14 up to +84	Special material as well as higher set pressure upon request
Valve pallet	Aluminium	Stainless Steel	Stainless Steel	Stainless Steel	
Sealing	FEP	FEP	Metal to Metal	PTFE	



Pressure/Vacuum Relief Valve

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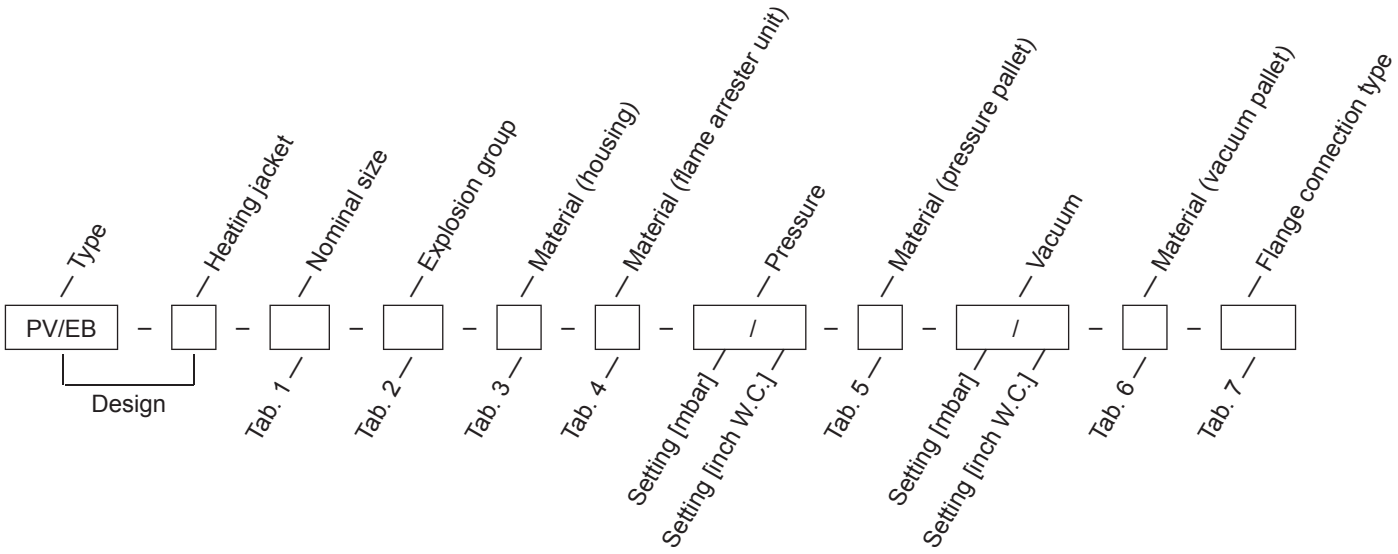
PROTEGO® PV/EB

Table 6: Material selection for vacuum pallet

Design	A	B	C	D	
Vacuum range [mbar]	-3.5 up to -5.0	<-5.0 up to -14	<-14 up to -35	<-14 up to -35	Special material as well as higher set vacuum upon request
[inch W.C.]	-1.4 up to -2.0	<-2.0 up to -5.6	<-5.6 up to -14	<-5.6 up to -14	
Valve pallet	Aluminium	Stainless Steel	Stainless Steel	Stainless Steel	
Sealing	FEP	FEP	Metal to Metal	PTFE	

Table 7: Flange connection type

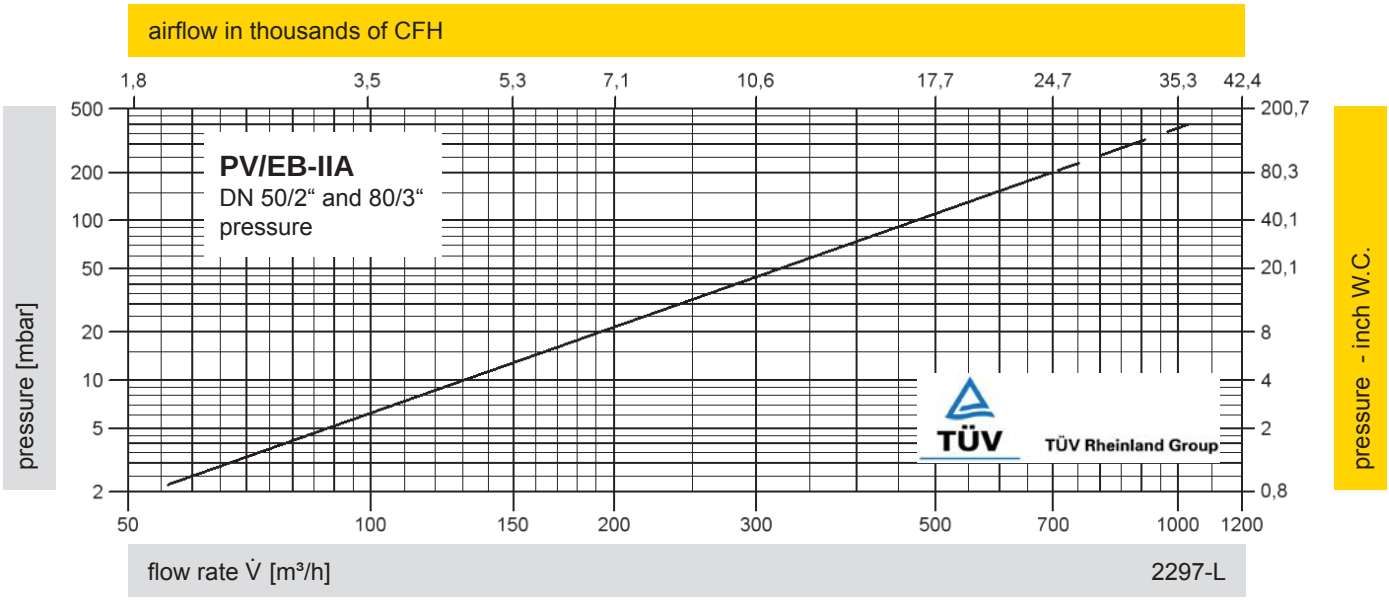
EN 1092-1, Form B1 or DIN 2501, Form C, PN 16	EN or DIN	other types upon request
ANSI 150 lbs RFSF	ANSI	

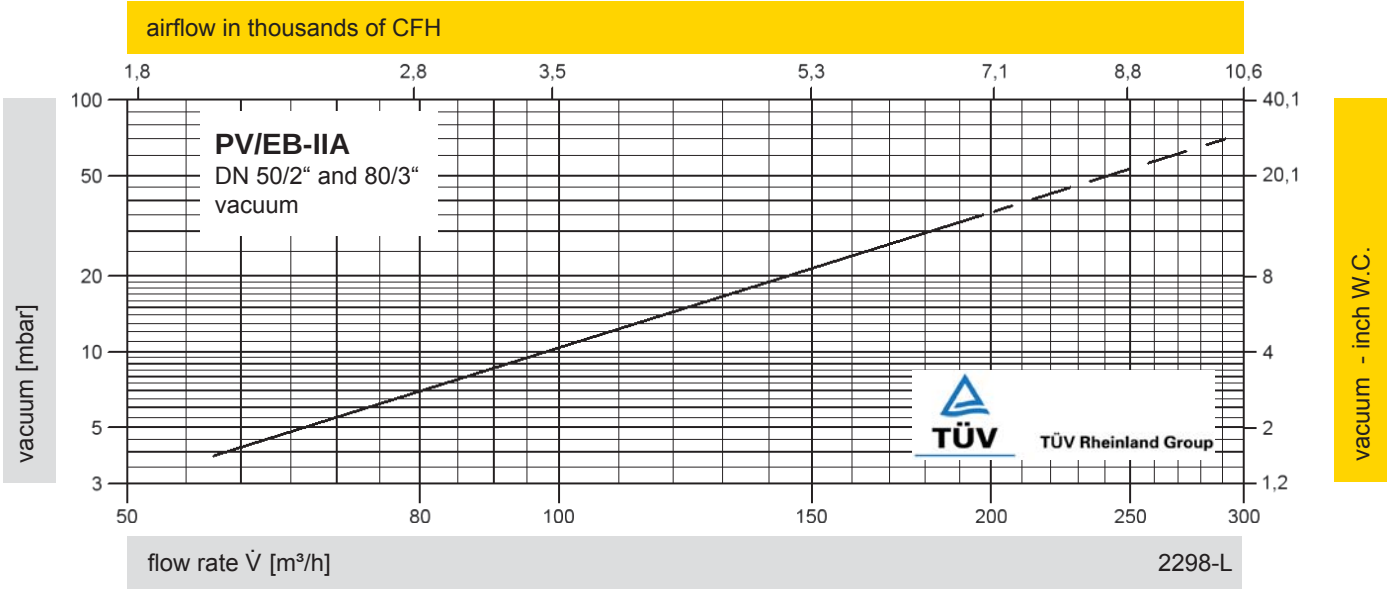


Order example

PV/EB	–	H	–	50	–	IIA	–	B	–	A	–	50 / –	–	D	–	-10 / –	–	B	–	DIN

Materials and chemical resistance: See Vol. 1 “Technical Fundamentals”





The flow capacity chart has been determined with a calibrated and TÜV certified flow capacity test rig.
Volume flow V̇ in [m³/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
for safety and environment