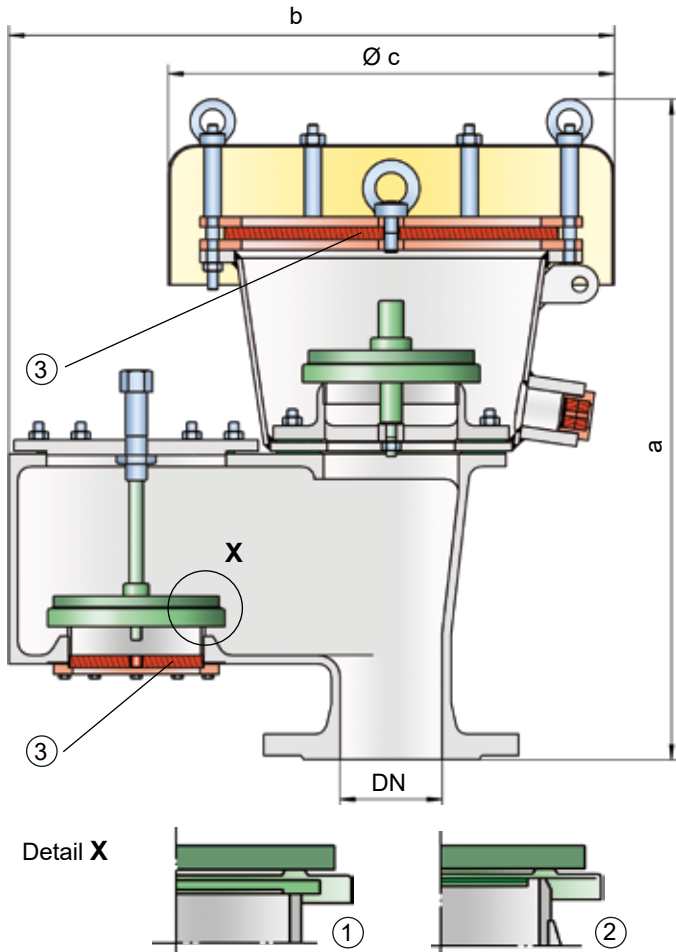


## Pressure/Vacuum Relief Valve

Atmospheric Deflagration-proof

PROTEGO® VD/SV-AD and VD/SV-ADL



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 above to the normal standards 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 them from sticking when sticky substances are used and to enable the use of corrosive fluids. After the overpressure is released or the vacuum is balanced, the valve re-seats and provides a tight seal.

If the set pressure is exceeded, explosive gas/product vapor/air mixtures are released into the atmosphere. If this mixture ignites, the integrated PROTEGO® flame arrester unit (3) prevents flame transmission resulting from atmospheric deflagration into the tank. The vacuum side is also protected against atmospheric deflagration.

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

EU conformity according to the currently valid ATEX directive. Approvals according to other national/international regulations on request.

### Special Features and Advantages

- 10% technology for minimum pressure increase up to full lift
- extreme tightness, resulting in lowest possible product losses and reduced environmental pollution
- due to 10% technology, set pressure is close to opening pressure for optimum pressure maintenance in the system as compared to conventional 40% or 100% technology
- valve opens later and closes earlier than conventional valves
- valve pallet is guided inside the housing to protect against harsh weather conditions
- can be used as a protective system in areas with potentially explosive atmospheres in accordance with ATEX
- FLAMEFILTER® provides protection against atmospheric deflagrations
- integrated PROTEGO® flame arrester unit saves space and weight and reduces costs
- PROTEGO® flame arrester unit is protected from clogging and sticky substances caused by product vapors
- minimum pressure loss of the PROTEGO® flame arrester unit
- higher flow capacity
- flameproof condensate drain
- maintenance-friendly design
- modular design enables replacement of individual FLAMEFILTER® discs and valve pallet
- best possible technology for API tanks

### Settings:

|                  |                |       |               |
|------------------|----------------|-------|---------------|
| <b>pressure:</b> | +3.5 mbar      | up to | +35 mbar      |
|                  | +1.4 inch W.C. | up to | +14 inch W.C. |
| <b>vacuum:</b>   | -2.0 mbar      | up to | -35 mbar      |
|                  | -0.8 inch W.C. | up to | -14 inch W.C. |

Higher and lower settings upon request.

### Function and Description

The deflagration proof VD/SV-AD(L) 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-breathing and out-breathing in tanks, containers, and process equipment. The valve offers reliable protection against overpressure and vacuum, prevents out-breathing of product vapor and in-breathing of air almost up to the set pressure, and protects against atmospheric deflagration. The PROTEGO® flame arrester unit is designed to achieve minimum pressure drop with maximum safety. The deflagration-proof PROTEGO® VD/SV-AD(L) valve is available for substances from explosion groups IIA to IIB3 (NEC group D to C MESH  $\geq 0.65$  mm).

When the set pressure is reached, the valve starts to open and reaches full lift within 10% overpressure. 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.



Vents - 10% Technology  
(Flyer pdf)



Leak Rate/10% Technology  
(Flyer pdf)

## Design Types and Specifications

Any combination of vacuum and pressure levels can be set for the valve.

The valve pallets are weight-loaded.

There are two different designs:

Pressure/vacuum relief valve with housing, standard design

**VD/SV-AD**

Pressure/vacuum relief valve with expanded housing

**VD/SV-ADL**

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 page.

| DN | VD/SV-AD    |             | VD/SV-ADL   |             |
|----|-------------|-------------|-------------|-------------|
|    | 80 / 3"     | 100 / 4"    | 100 / 4"    | 150 / 6"    |
| a  | 540 / 21.26 | 565 / 22.24 | 650 / 25.59 | 760 / 29.92 |
| b  | 475 / 18.70 | 575 / 22.64 | 700 / 27.56 | 855 / 33.66 |
| c  | 350 / 13.78 | 350 / 13.78 | 600 / 23.62 | 600 / 23.62 |

**Table 2: Selection of explosion group**

| MESG      | Expl. Gr. (IEC/CEN) | Gas Group (NEC) | Special approvals upon request. |
|-----------|---------------------|-----------------|---------------------------------|
| ≥ 0,65 mm | IIB3                | C               |                                 |

**Table 3: Material selection for housing**

| Design              | A               | B               | The housings are also available with an ECTFE coating.<br>Special materials upon request. |
|---------------------|-----------------|-----------------|---|
| Housing             | Steel           | Stainless Steel |   |
| Valve seats         | Stainless Steel | Stainless Steel |   |
| Gasket              | PTFE            | PTFE            |   |
| Weather hood        | Stainless Steel | Stainless Steel |   |
| Flame arrester unit | A, B            | B               |   |

**Table 4: Material combinations of flame arrester units**

| Design              | A               | B               | Special materials upon request. |
|---------------------|-----------------|-----------------|---------------------------------|
| FLAMEFILTER® casing | Steel           | Stainless Steel |                                 |
| FLAMEFILTER®        | Stainless Steel | Stainless Steel |                                 |

**Table 5: Material selection for pressure valve pallet**

| Design                               | A               | B                | C               | D               | Special materials and higher set pressures upon request. |
|--------------------------------------|-----------------|------------------|-----------------|-----------------|--|
| Pressure range (mbar)<br>(inch W.C.) | +3.5 up to +5.0 | >+5.0 up to +14  | >+14 up to +35  | >+14 up to +35  |  |
|                                      | +1.4 up to +2.0 | >+2.0 up to +5.6 | >+5.6 up to +14 | >+5.6 up to +14 |  |
| Valve pallet                         | Aluminum        | Stainless Steel  | Stainless Steel | Stainless Steel |  |
| Sealing                              | FEP             | FEP              | Metal to Metal  | PTFE            |  |

**Table 6: Material selection for vacuum valve pallet**

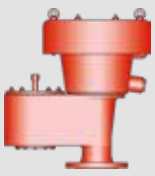
| Design                             | A               | B                | C               | D               | Special material and higher set vacuum upon request. |
|------------------------------------|-----------------|------------------|-----------------|-----------------|--|
| Vacuum range (mbar)<br>(inch W.C.) | -2.0 up to -3.5 | <-3.5 up to -14  | <-14 up to -35  | <-14 up to -35  |  |
|                                    | -0.8 up to -1.4 | <-1.4 up to -5.6 | <-5.6 up to -14 | <-5.6 up to -14 |  |
| Valve pallet                       | Aluminum        | Stainless Steel  | Stainless Steel | Stainless Steel |  |
| Sealing                            | FEP             | FEP              | Metal to Metal  | PTFE            |  |

**Table 7: Flange connection type**

|                        |                           |
|------------------------|---------------------------|
| EN 1092-1; Form B1     | Other types upon request. |
| ASME B16.5 CL 150 R.F. |                           |



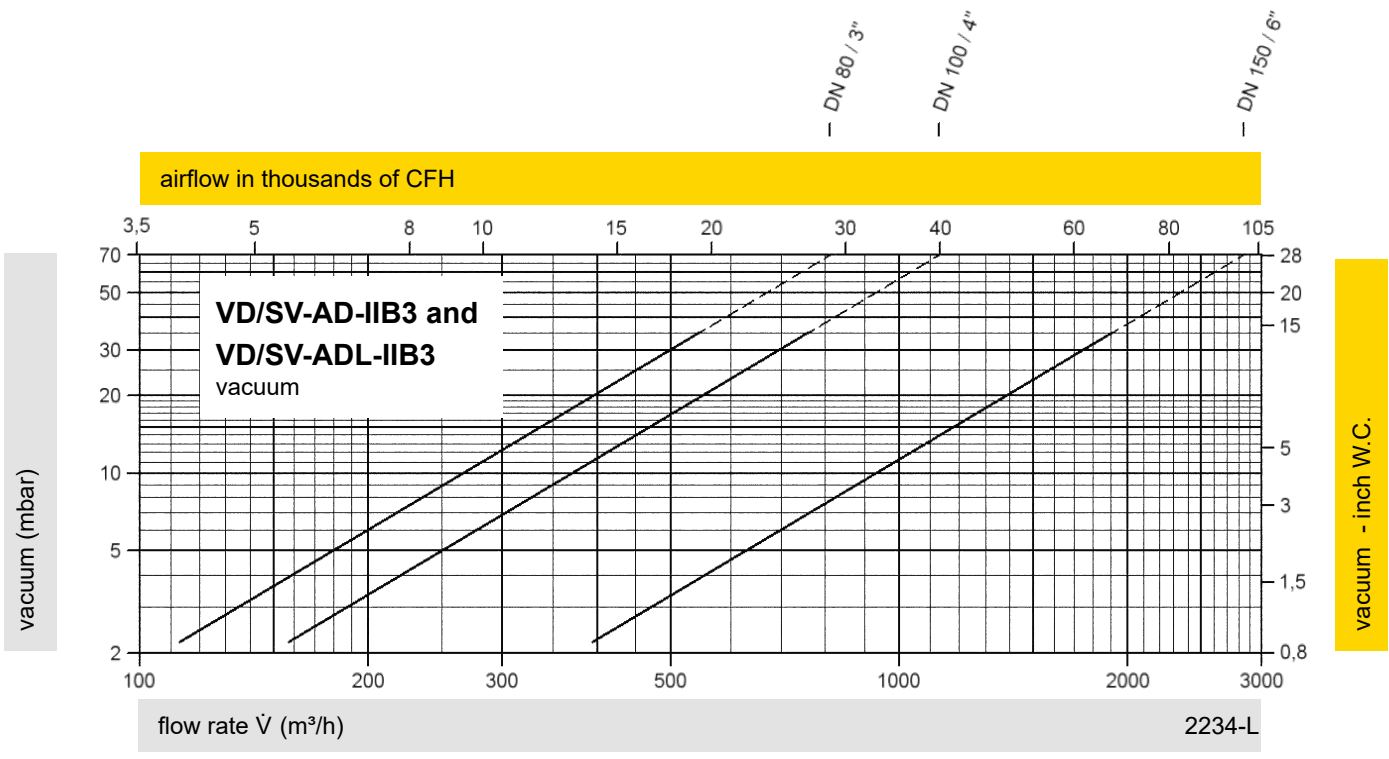
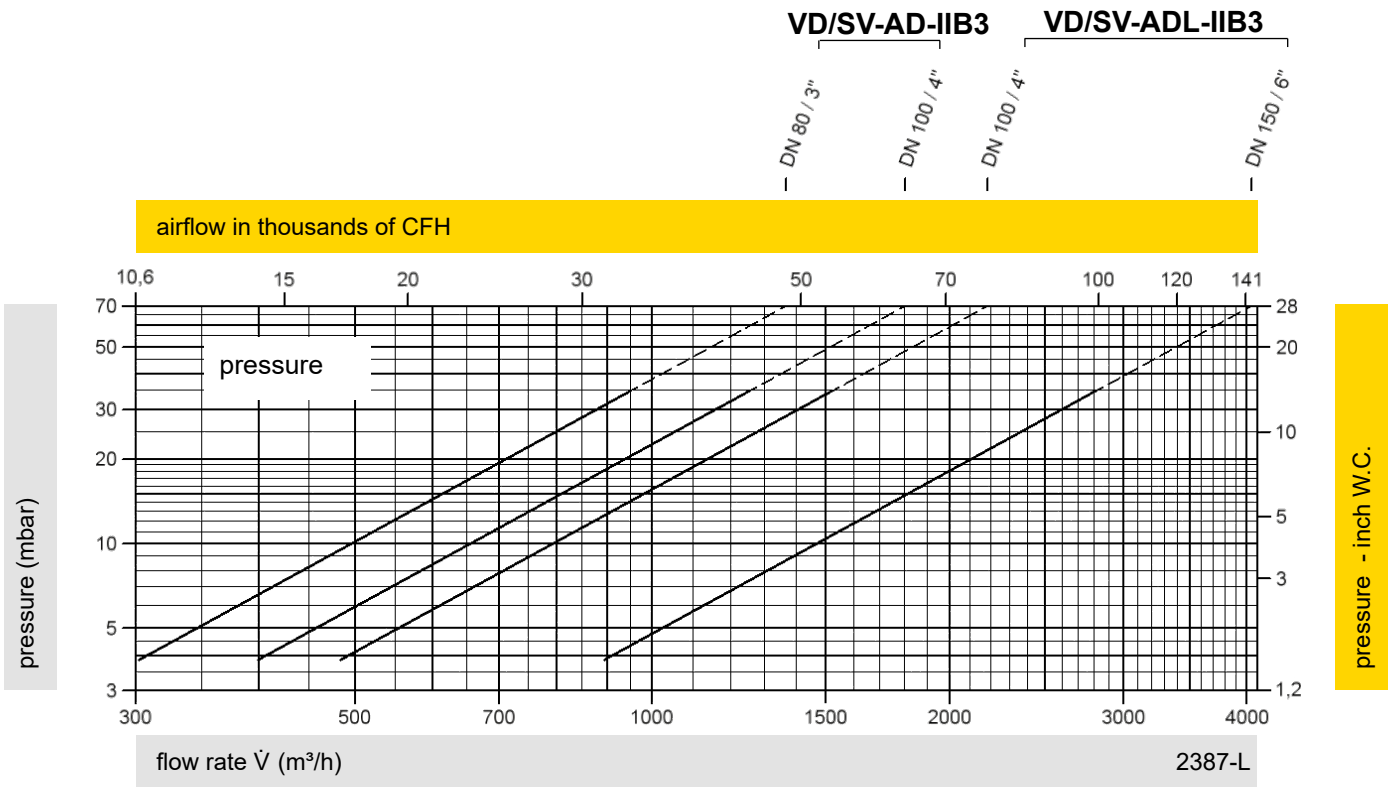
for safety and environment



# Pressure/Vacuum Relief Valve

## Flow Capacity Charts

### PROTEGO® VD/SV-AD and VD/SV-ADL



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