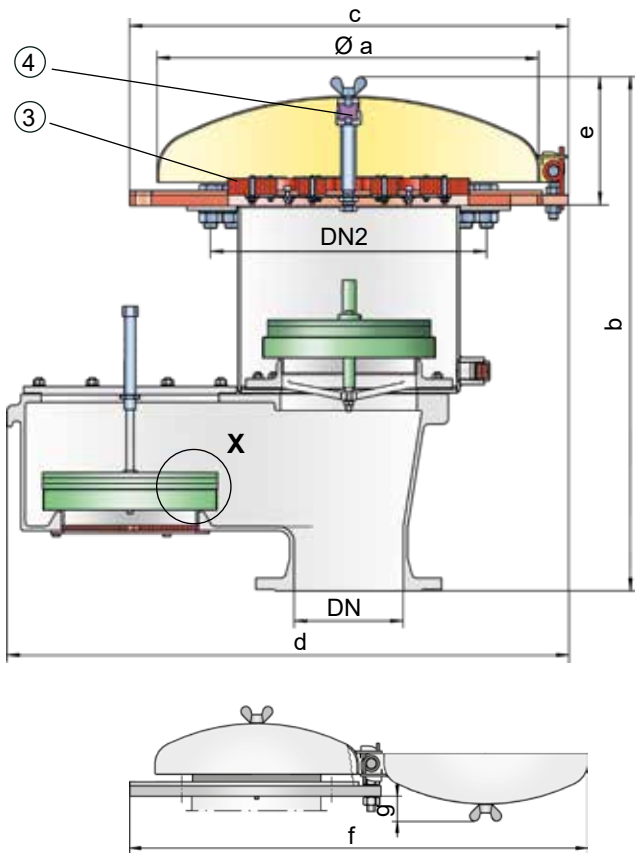


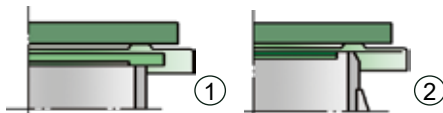
## Pressure/Vacuum Relief Valve

Deflagration-proof and Endurance Burning-proof

PROTEGO® VD-SV-EB



Detail X



### Settings:

|                  |                |       |               |
|------------------|----------------|-------|---------------|
| <b>pressure:</b> | +2.0 mbar      | up to | +60 mbar      |
|                  | +0.8 inch W.C. | up to | +24 inch W.C. |
| <b>vacuum:</b>   | -2.0 mbar      | up to | -60 mbar      |
|                  | -0.8 inch W.C. | up to | -24 inch W.C. |

Higher and lower settings upon request.

### Function and Description

The deflagration-proof and endurance burning-proof VD-SV-EB type PROTEGO® valve is a highly developed combined pressure/vacuum relief valve for high flow capacities with the integrated flame arrester PROTEGO® EB. 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 over pressure and vacuum, prevents out-breathing of product vapor and in-breathing of air almost up to the set pressure, and 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 deflagration-proof and endurance burning-proof PROTEGO® VD-SV-EB device is available for substances from explosion group IIA (NEC group D MESH > 0.9 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) 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 above the normal standards due to our state-of-the-art manufacturing technology. This feature is ensured by 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 a 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 in corrosive fluids. After the overpressure is released, 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 flame arrester PROTEGO® EB (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 of endurance burning. The valve is protected and also fulfils its function under these severe conditions. The spring-loaded weather hood opens as soon as the melting element (4) melts.

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).

Type-approved in accordance with the current ATEX Directive and EN ISO 16852, as well as other international standards

### Special Features and Advantages

- 10% technology for minimum pressure increase up to full lift for explosion group IIA (NEC group D) vapours
- 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 and endurance burning
- 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
- high flow capacity due to large FLAMEFILTER® cross section
- flameproof condensate drain
- maintenance-friendly design
- modular design enables replacement of individual FLAMEFILTER® discs and valve pallet



Vents - 10% Technology  
(Flyer pdf)



Leak Rate/10% Technology  
(Flyer pdf)



Demonstration of endurance burning  
Video

## Design and Specifications

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

The valve pallets are weight-loaded.

Pressure/vacuum relief valve, basic design **VD-SV-EB - [ - ]**

Pressure/vacuum relief valve, with heating jacket **VD-SV-EB - [ H ]**

Additional special devices available upon request.

**Table 1: Dimensions**

Dimensions in mm / inches

| DN       | DN2       | a           | b           | c           | d            | e          | f            | g          |
|----------|-----------|-------------|-------------|-------------|--------------|------------|--------------|------------|
| 150 / 6" | 400 / 16" | 705 / 27.76 | 844 / 33.23 | 802 / 31.57 | 957 / 37.68  | 235 / 9.25 | 1500 / 59.06 | 109 / 4.29 |
| 200 / 8" | 400 / 16" | 705 / 27.76 | 939 / 36.97 | 802 / 31.57 | 1027 / 40.43 | 235 / 9.25 | 1500 / 59.06 | 109 / 4.29 |

**Table 2: Selection of explosion group**

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

**Table 3: Material selection for housing**

| Design                          | A               | B               | Special materials upon request. |
|---------------------------------|-----------------|-----------------|---------------------------------|
| Housing                         | Steel           | Stainless Steel |                                 |
| Heating jacket (VD-SV-EB-H-...) | Steel           | Stainless Steel |                                 |
| Valve seats                     | Stainless Steel | Stainless Steel |                                 |
| Gasket                          | PTFE            | PTFE            |                                 |
| Flange ring                     | Steel           | Stainless Steel |                                 |
| Weather hood                    | Steel           | Stainless Steel |                                 |
| Flame arrester unit             | A               | A, B            |                                 |

**Table 4: Material combination of flame arrester unit**

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

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

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

Special material and higher set pressure upon request.

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

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

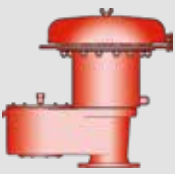
Special material and higher set vacuum upon request.

**Table 7: Flange connection type**

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



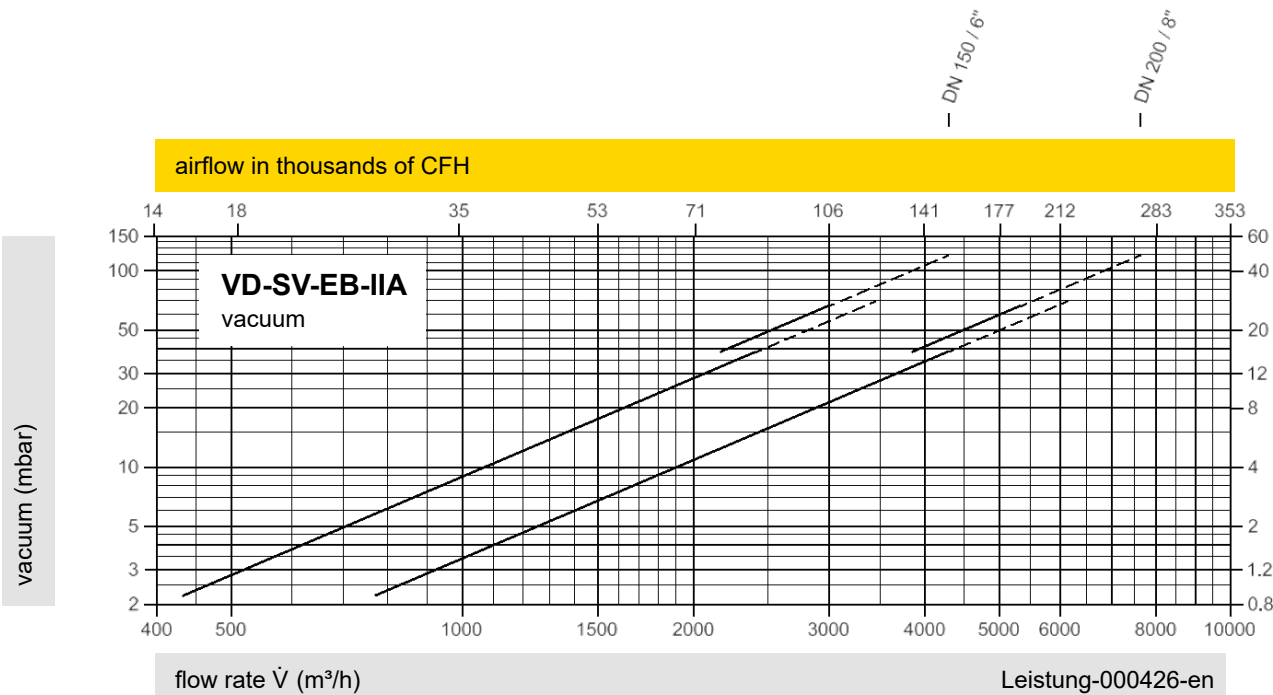
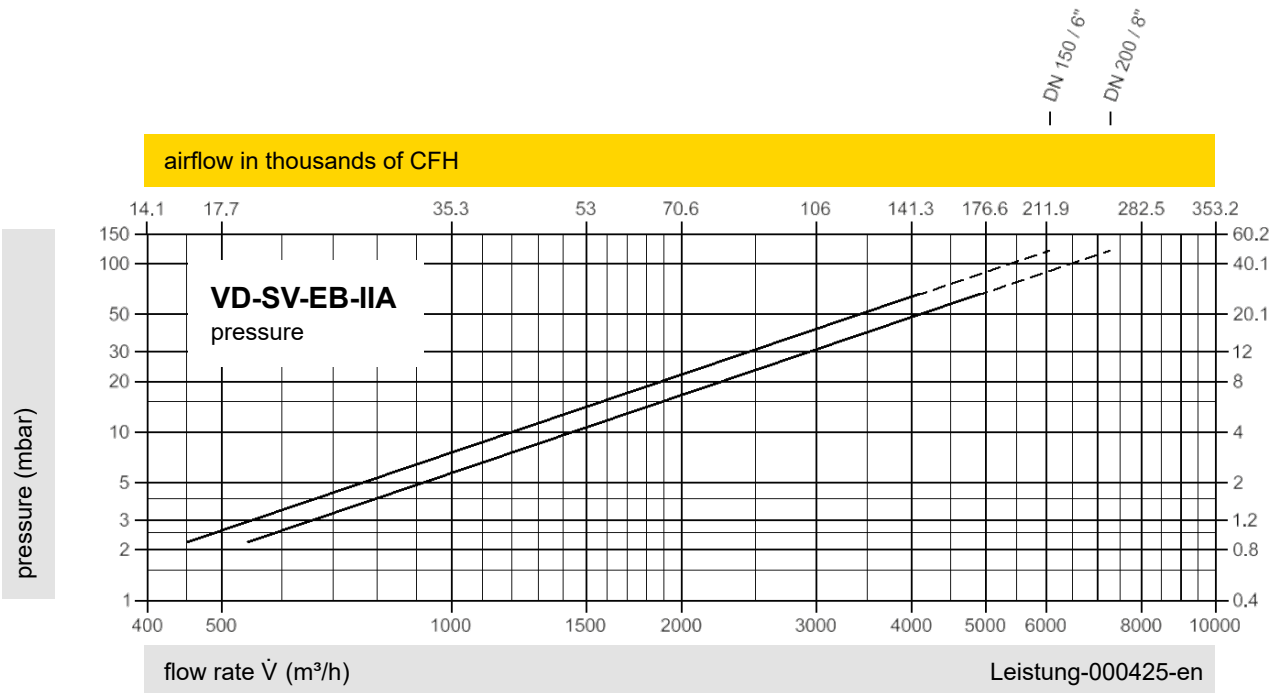
for safety and environment



# Pressure/Vacuum Relief Valve

## Flow Capacity Charts

### PROTEGO® VD-SV-EB-IIA



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."