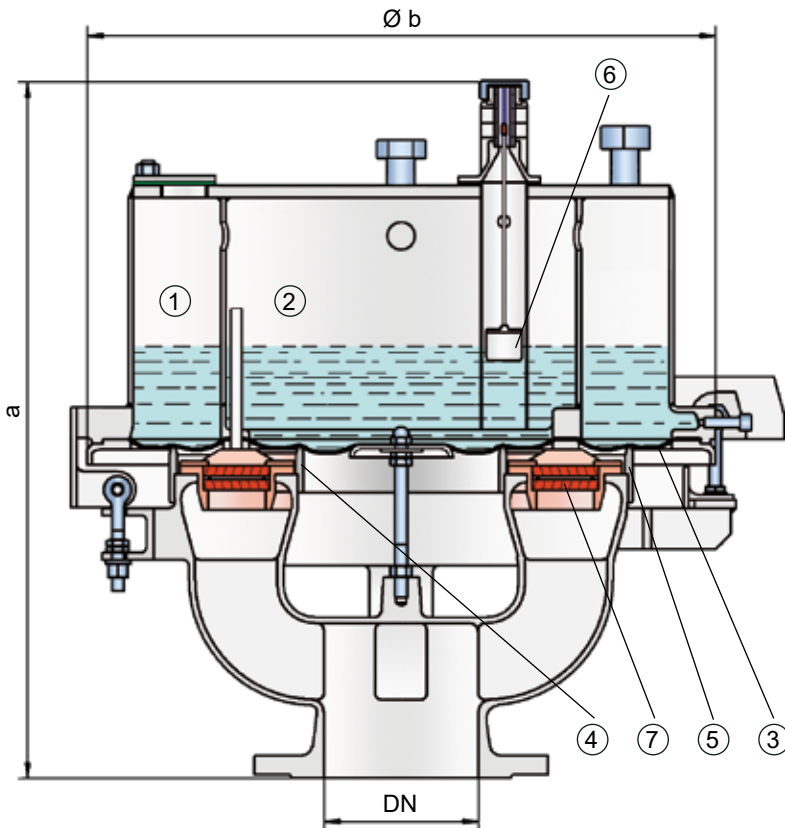


Vacuum Diaphragm Valve

Deflagration-proof

PROTEGO® UB/VF



resulting in ventilation of the tank. The vacuum setting is adjusted via the filling level of the load liquid and can be checked by a floating level indicator (6).

The tank vacuum is maintained up to the set vacuum with a tightness that is above the normal standards due to our highly developed manufacturing technology. This is achieved by the liquid loaded diaphragm pressing tightly around the special designed valve seat surface area even when the operating vacuum increases, which reduces surface pressure and unnecessary leakage. After the vacuum is balanced, the valve re-seats and provides a tight seal.

At very low vacuum settings, the explosion pressures resulting from an atmospheric deflagration may be strong enough to lift the diaphragm off the valve seat rings. The ignition into the tank can be prevented by installing the PROTEGO® flame arrester unit (7). This PROTEGO® flame arrester unit provides additional protection against atmospheric deflagration when the valve is open for maintenance and inspection.

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).

Vacuum Settings: -3.5 mbar up to -35 mbar
-1.4 inch W.C. up to -14 inch W.C.
Higher vacuum settings upon request.

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

Function and Description

The PROTEGO® UB/VF diaphragm valve is a worldwide unique vacuum relief valve combining the function of a dynamic and static flame arrester. It is primarily used as a safety device for flame transmission-proof in-breathing on tanks, containers, and process equipment. The valve offers reliable protection against vacuum build up, prevents the in-breathing of air and product losses almost up to the set vacuum, and protects against atmospheric deflagration. The PROTEGO® UB/VF diaphragm valve has proven itself over many years under a wide variety of operating conditions in the mineral oil and chemical industries. Worldwide, it is the only vent which works reliably with problem products such as styrene or acrylates. The set vacuum is adjusted with a freeze resistant water-glycol mixture which ensures safe operation under extreme cold weather conditions. The PROTEGO® UB/VF valve is available for substances from explosion group IIB3.

If a vacuum builds up in the tank, it is transmitted through pressure balancing tubes into the vacuum chambers (1), (2), which are connected to each other. This will remove the weight of the load liquid, and the atmospheric pressure will lift the diaphragm (3) off the inner and outer valve seat rings (4, 5),

Special Features and Advantages

- excellent tightness, resulting in lowest possible product losses and environmental pollution
- set pressure close to opening pressure for optimum pressure maintenance in the system
- high flow capacity
- can be used as a protective system in areas with potentially explosive atmospheres in accordance with ATEX
- protection against atmospheric deflagrations for products up to explosion group IIB3 (NEC group C MESH ≥ 0.65 mm)
- minimum pressure loss of the PROTEGO® flame arrester unit
- optimal frost protection
- automatic condensate drain
- monitoring of the load liquid by level indicator
- easy operation monitoring and maintenance by simply opening the hinged valve cap



Frost-Proof P/V Diaphragm Valve (Video)

- modular design enables replacement of individual FLAMEFILTER® discs and diaphragm
- particularly suitable for problematic products such as styrene, acrylates, etc.

Design Types and Specifications

The diaphragm is pressurized by liquid.

There are two different designs:

Vacuum diaphragm valve, basic design

UB/VF -

Vacuum diaphragm valve with heating coil

UB/VF -

(max. heating fluid temperature +85°C / 185°F)

In addition to the standard design, a series of specially developed designs (e.g., for acrylate or styrene storage tanks, etc.) can be provided 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	vacuum	80 / 3"	vacuum	100 / 4"	150 / 6"
a	up to -28 mbar / 11.2 inch W.C.	615 / 24.21	up to -22 mbar / 8.8 inch W.C.	645 / 25.39	680 / 26.77
a	< -28 mbar / 11.2 inch W.C.	765 / 31.12	< -22 mbar / 8.8 inch W.C.	795 / 31.30	830 / 32.68
b		410 / 16.14		485 / 19.09	590 / 23.23

Dimensions for vacuum diaphragm valve with heating coil upon request.

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	C	D
Housing	Steel	Stainless Steel
Valve top	Stainless Steel	Stainless Steel
Heating coil (UB/VF-H-...)	Stainless Steel	Stainless Steel
Valve seat	Stainless Steel	Stainless Steel
Gasket	FPM	PTFE
Diaphragm	A, B	A, B
Flame arrester unit	C	C

The housings are also available with an ECTFE coating. Special materials upon request.



Coated Devices (Flyer pdf)

Table 4: Material selection for diaphragm

Design	A	B
Diaphragm	FPM	FEP

Special materials upon request.

Table 5: Material combinations of flame arrester unit

Design	C
FLAMEFILTER® casing	Stainless Steel
FLAMEFILTER®	Stainless Steel
Spacer	Stainless Steel

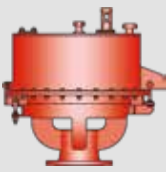
Special materials upon request.

Table 6: Flange connection type

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



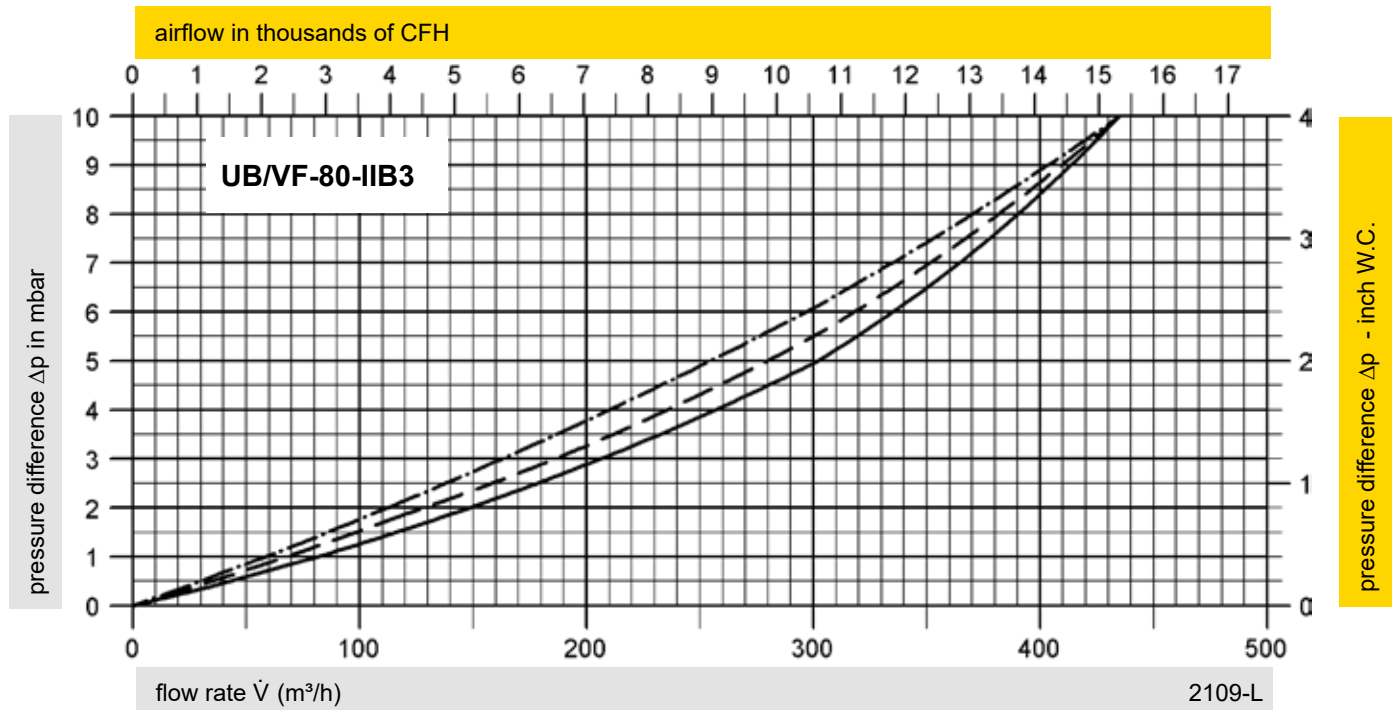
for safety and environment



Vacuum Diaphragm Valve

Flow Capacity Charts

PROTEGO® UB/VF

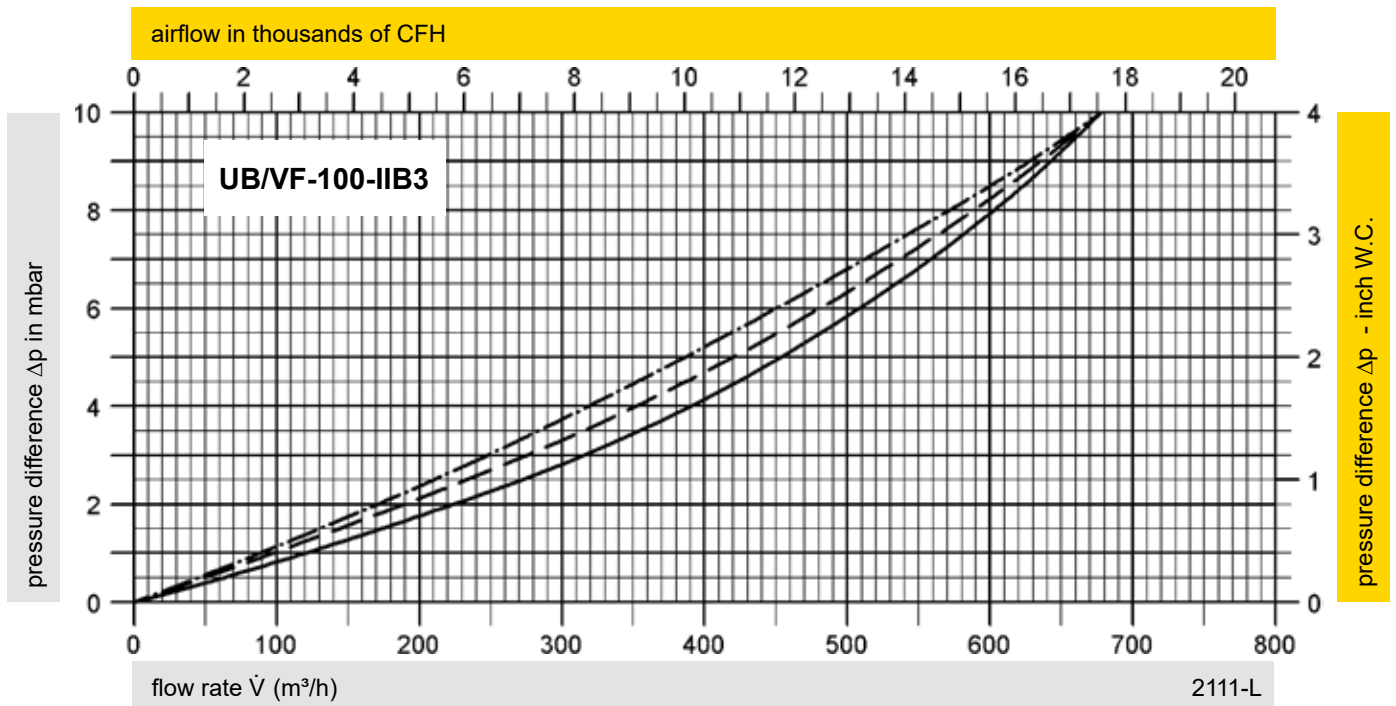


pressure difference = max. allowable tank design vacuum - valve set vacuum

adjusted set vacuum:

- ≤ -5 mbar / ≤ -2 inch W.C.
- - - > -5 mbar up to ≤ -7 mbar / > -2 inch W.C. up to ≤ -2.8 inch W.C.
- . - . > -7 mbar up to ≤ -35 mbar / > -2.8 inch W.C. up to ≤ -14 inch W.C.

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 in ISO 6358 (20°C, 1bar). For conversion to other densities and temperatures, refer to Sec. 1: "Technical Fundamentals."



pressure difference = max. allowable tank design vacuum - valve set vacuum

adjusted set vacuum:

- ≤ -5 mbar / ≤ -2 inch W.C.
- - - > -5 mbar up to ≤ -7 mbar / > -2 inch W.C. up to ≤ -2.8 inch W.C.
- · - · > -7 mbar up to ≤ -35 mbar / > -2.8 inch W.C. up to ≤ -14 inch W.C.

