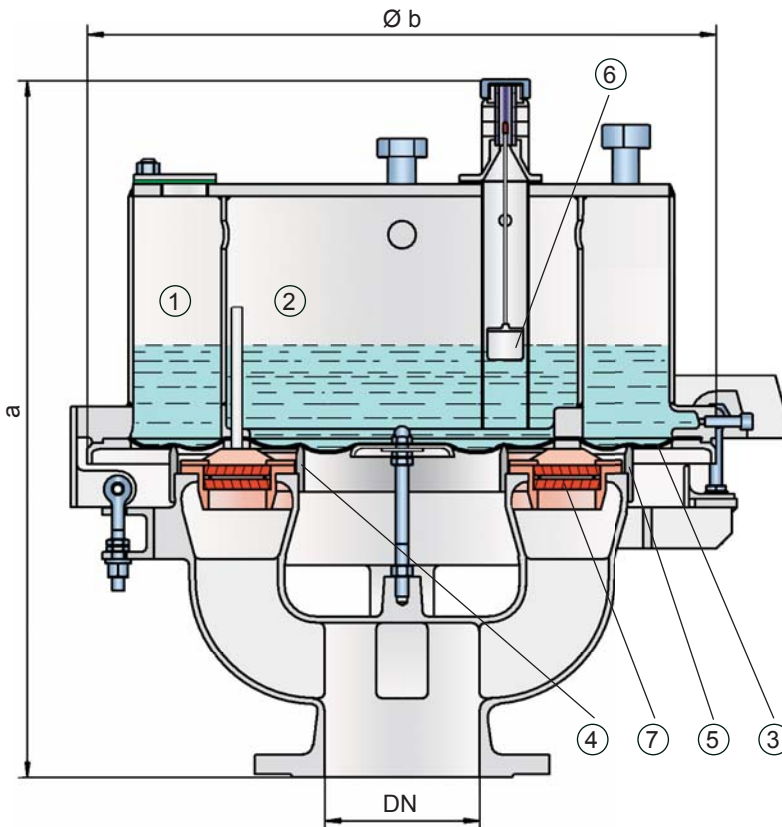


Vacuum Diaphragm Valve deflagration-proof

PROTEGO® UB/VF



vacuum chamber, is reached the atmospheric pressure lifts the diaphragm (3) up off the inner and outer valve seat rings (4,5). Ambient air can now flow into the tank. The liquid column heights, which affect the set vacuum, can be checked by a floating level indicator (6).

The tank vacuum is maintained up to the set vacuum with a tightness that is far superior to the conventional standard due to our highly developed manufacturing technology. This is achieved because the liquid loaded diaphragm presses tightly around the special designed valve seat surface area, even when the operating vacuum increases. This is extremely important to reduce leakage to an absolute minimum. After the vacuum is balanced, the valve reseats 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 so that flashback could result. The ignition into the tank can be prevented by installing the PROTEGO® flame arrester unit (7). This flame arrester unit provides additional protection against atmospheric deflagration during regular maintenance and inspection.

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

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

Function and Description

The deflagration-proof UB/VF type PROTEGO® diaphragm valve is a state-of-the-art vacuum relief valve combining the function of a dynamic and static flame arrester. Worldwide this design is unique. It is primarily used as a safety device for flame transmission proof inbreathing on tanks, containers and process engineering apparatus. The valve offers reliable protection against vacuum build up, prevents the inbreathing of air and product losses almost up to the set vacuum and protects against atmospheric deflagration. The PROTEGO® UB/VF diaphragm valve has proven its performance over many years in a great variety of severe applications in the petrochemical and chemical industry. Worldwide it is the only vent which functions in services such as styrene and acrylics. The set vacuum is adjusted with a freeze resistant water-glycol mixture, which assures safe operation under extreme cold weather conditions. The PROTEGO® UB/VF valve is available for substances from explosion group IIB3 (NEC group C MESG ≥ 0.65 mm).

If a vacuum builds up in the tank, it is transmitted through pressure balancing tubes into the vacuum chambers (1), (2). If the set vacuum, which depends on the liquid column height in the

Special Features and Advantages

- high performance seal reducing product loss below EPA's 500ppm rule preventing environmental pollution
- set vacuum close to the design vacuum enables optimum pressure maintenance in the system
- high flow capacity
- can be used as a protective system according to ATEX in areas subject to an explosion hazard
- protection against atmospheric deflagrations for products up to explosion group IIB3 (NEC group C MESG ≥ 0.65 mm)
- minimum pressure drop of the FLAMEFILTER®
- freeze protection at sub-zero conditions
- self draining function for condensate
- liquid column height is monitored by level indicators
- easy maintenance through hinged vent cap



- modular design enables individual FLAMEFILTER® discs and valve diaphragm to be replaced
- particularly suitable for problematic products such as styrene, acrylics, 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, which are particularly suitable for the operating conditions to which these products are subjected, can be provided upon request (for example, for acrylics or styrene storage tanks, etc.).

Table 1: Dimensions

Dimensions in mm / inches

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

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	Option: Housing with ECTFE-lining Special materials upon request Coated Devices (Flyer pdf)
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	

Table 4: Material selection for diaphragm

Design	A	B	Special materials upon request
Diaphragm	FPM	FEP	

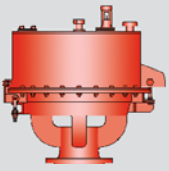
Table 5: Material combinations of flame arrester unit

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

Table 6: Flange connection type

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

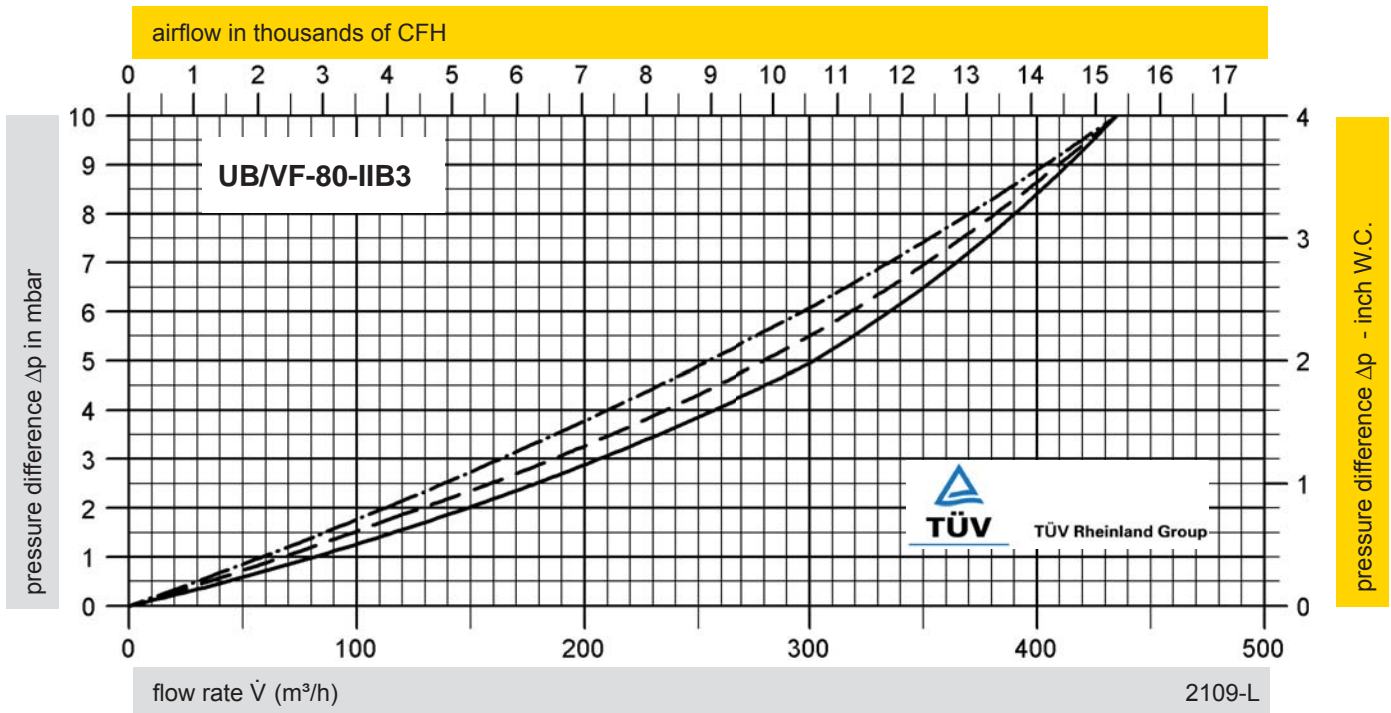




Vacuum Diaphragm Valve

Flow Capacity Charts

PROTEGO® UB/VF

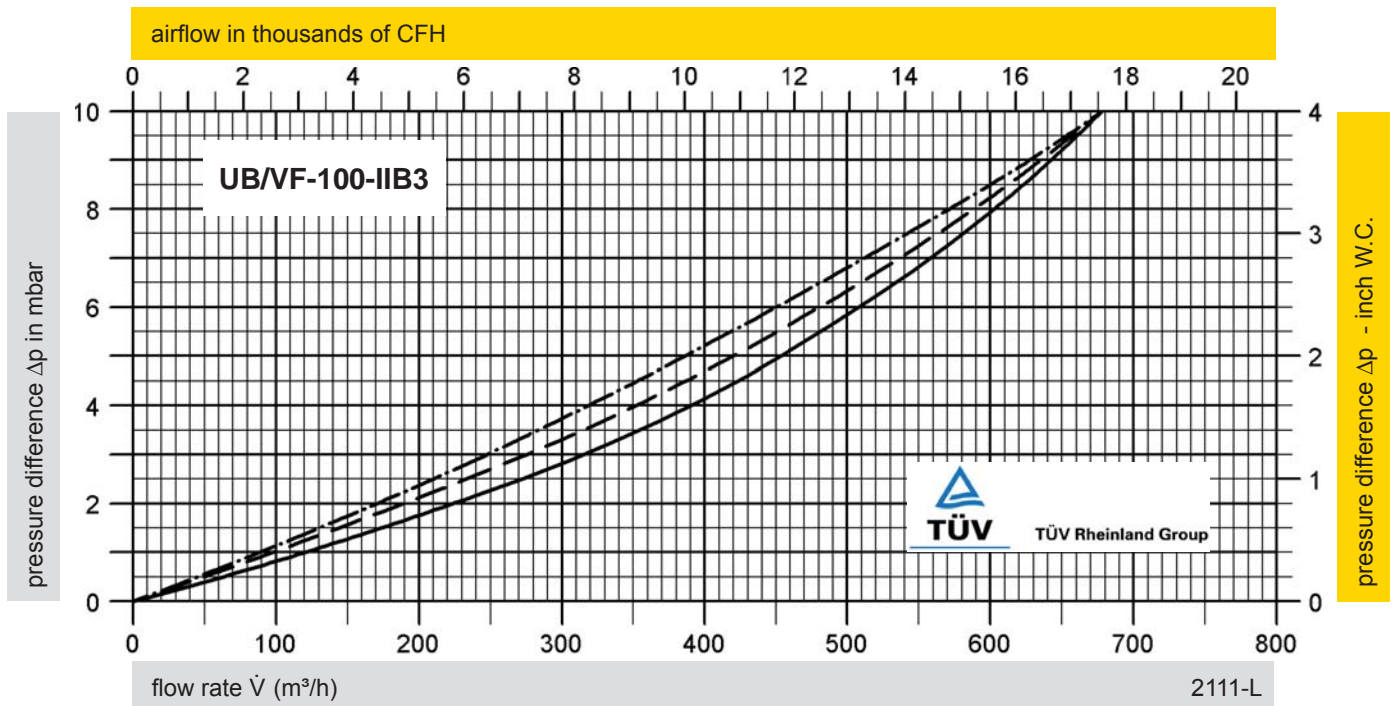


pressure difference = max. allowable tank design vacuum - valve set vacuum

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 (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".



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.

