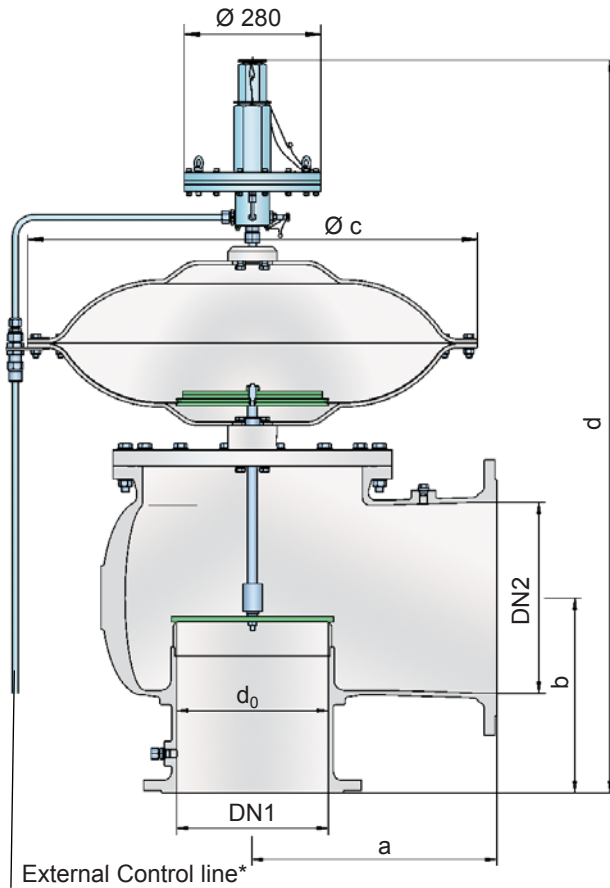




Pressure/Vacuum Relief Valve

Pilot-operated diaphragm valve

PROTEGO® VN-A-PC



The main valve is actuated by a pilot valve, which is controlled by the tank pressure. A small amount of vapor is released into the atmosphere by the pilot when the valve opens. The set pressure is adjusted by increasing or decreasing the tension on the spring on the pilot valve.

As the pressure increases, the closing force acting on the main valve pallet increases, i.e. the valve seat to valve pallet seal becomes tighter with increasing tank pressure until the set pressure is reached. Once the valve has commenced to lift opens fully within a 10% pressure rise or the opening pressure difference and the nominal volumetric flow is discharged through a fully open valve. If and when this level is exceeded the pressure increase will follow the performance curve ($\Delta p/\dot{V}$ curve). From set pressure to full capacity (fully open valve) the pressure increase is 100% in case of vacuum venting/inbreathing function. Due to the sophisticated manufacturing technology, the tank pressure is maintained up to the set pressure, with seal-tight requirements far above common standards. This feature is achieved through valve seats made of high-grade stainless steel with precisely lapped valve pallets. Once the excess pressure is relieved or pressure below atmospheric balanced out, the valve reseats and seals tight again.

Special Features and Advantages

- corrosion-resistant pilot valve
- small amount fluid stored in the tank released into the atmosphere by the pilot when the valve opens
- max. 10% Technology for minimum pressure increase until full lift
- extremely tight seal; hence, least possible product losses and reduced impact on the environment
- set pressure close to the opening pressure; hence, best possible pressure management of the system.
- control diaphragm of the main valve shielded from low temperatures - Long service life
- optimized flow capacity
- suitable for use in hazardous areas
- Field-Test-Connection on request
- Field-Test-Kit on request

Design Types and Specifications

Basic design of pressure/vacuum relief valve with a **VN-A-PC** control pilot valve

Additional special devices available upon request.

* It is recommended that an external control line is to be provided with direct connection to the tank.

Settings:

Pressure:

+20 mbar up to +1034 mbar
+8 inch W.C. up to +413.6 inch W.C.

Vacuum:

-2.2 mbar up to -7 mbar
-0.88 inch W.C. up to -2.8 inch W.C.
Higher or lower settings upon request.

Function and Description

The PROTEGO® Type VN-A-PC pilot-controlled diaphragm valve is a newly developed valve for pressure and vacuum relief. Primarily used as a safety device for outbreathing in tanks, vessels, and process engineering equipment it also offers reliable protection from overpressure and/or vacuum. It prevents intake of air and unacceptable product vapor loss up to and until the set pressure is reached. In the valve can be used as an inbreathing device. In such applications, the main valve is directly controlled when exposed to a vacuum, i.e. it functions as a weight-loaded diaphragm valve.

Table 1: Dimensions

Dimensions in mm / inches

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

DN1	300 / 12"
DN2	400 / 16"
a	500 / 19.69
b	400 / 15.75
c	920 / 36.22
d	1504 / 59.21

Table 2: Material selection for housing

Design	A	B	Special materials upon request
Housing	Aluminium	Stainless Steel	
Valve seat	Stainless Steel	Stainless Steel	
Sealing	PTFE	PTFE	
Housing diaphragm	Stainless Steel	Stainless Steel	
Pilot lines	Stainless Steel	Stainless Steel	
Pilot housing	Aluminium	Aluminium / Stainless Steel	
Pilot diaphragm	FEP	FEP	

Table 3: Flange connection type

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

Table 4: Coefficient of Discharge

DN1	300 / 12"
DN2	400 / 16"
d ₀	310 / 12.20
K	a ₀ = 1,16 a ₁ = -0,821 a ₂ = 0,3155

- DN1 = size inlet
 DN2 = size outlet
 d₀ = orifice diameter (mm / inches)
 K = coefficient of discharge

$$K = a_2 * \left(\frac{p_0}{p_i}\right)^2 + a_1 * \left(\frac{p_0}{p_i}\right) + a_0$$

p₀ = outlet pressure during flow (mbara)
 This is atmospheric pressure + total backpressure.

p_i = inlet pressure during flow (mbara)
 This is the atmospheric pressure + set pressure + overpressure - inlet pressure drop.



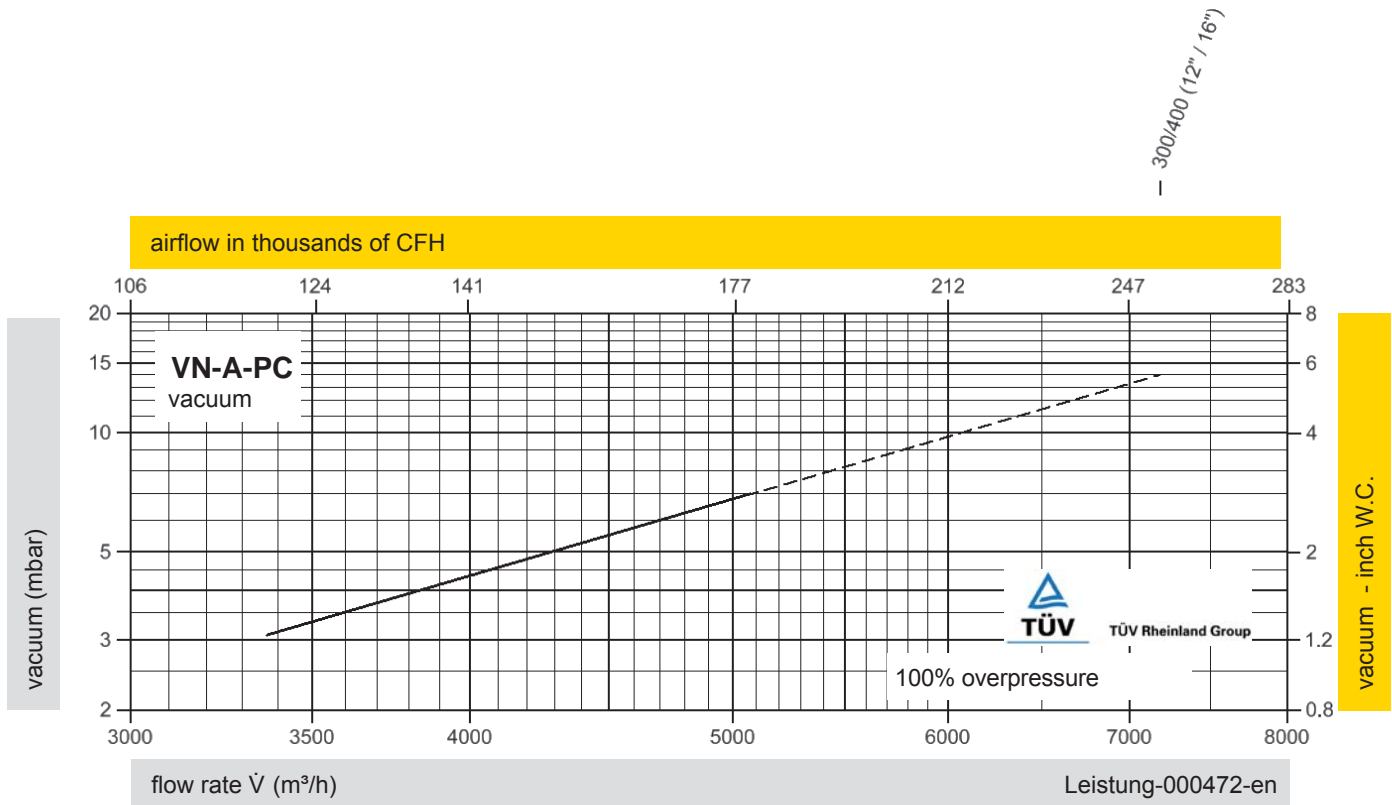
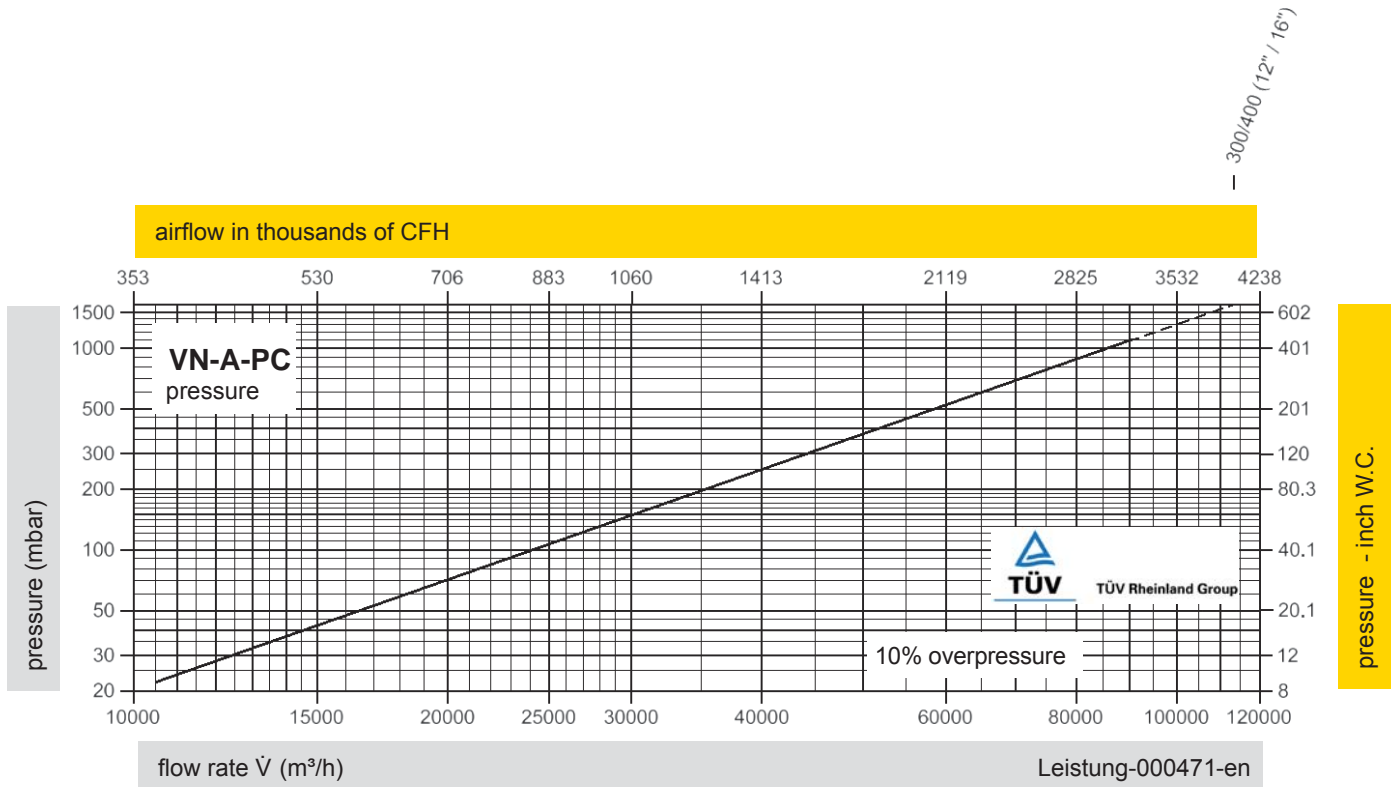
for safety and environment



Pressure/Vacuum relief valve

Flow Capacity Charts

PROTEGO® VN-A-PC



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".

Project Data Sheet

Project:

Engineering:

End-user:

relief type:	pressure only	<input type="checkbox"/>			
	pressure and vacuum	<input type="checkbox"/>			
Medium:					
T: boiling point:		°C or °F or K or R			
M: molar mass:		g/mol			
κ: Cp/Cv Ratio:		-			
total backpressure:		mbar or PSI			
dynamic backpressure:		mbar or PSI			
static (superimposed) backpressure:		mbar or PSI			
inlet pressure drop:		mbar or PSI			
set pressure:		mbar or PSI			
set vacuum:		mbar or oz/in ²			
Material of construction:					
q _p : required discharge per valve:		kg/h or lb/hr			
q _v : required vacuum capacity per valve:		m ³ /h at +20°C or SCFH			
flange connection:	ASME	<input type="checkbox"/>	EN 1092-1	<input type="checkbox"/>	JIS <input type="checkbox"/>

Fill in and tick off, if applicable, delete unit, if not applicable.

signed:	date:
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