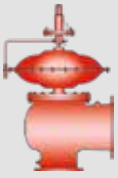
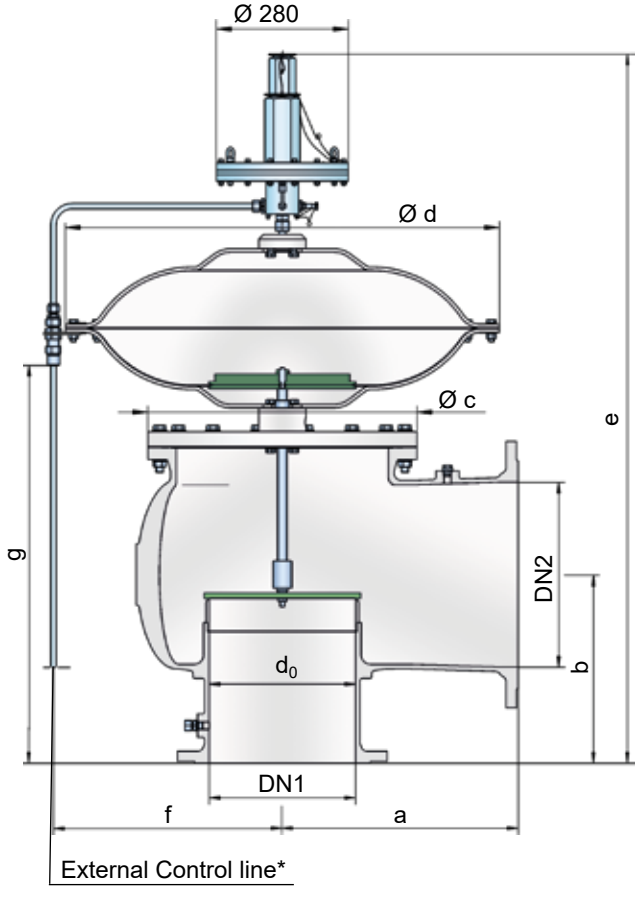


Pressure/Vacuum Relief Valve

Pilot-operated diaphragm valve

PROTEGO® VN-A-PCPF



Settings:
Pressure:
+20 mbar up to +1034 mbar
+8 inch W.C. up to +415.1 inch W.C.
Vacuum:
-2 mbar up to -7 mbar
-0.8 inch W.C. up to -2.8 inch W.C.
Higher or lower settings upon request.

Function and Description

The PROTEGO® Type VN-A-PCPF pilot-controlled diaphragm valve is a newly developed valve for pressure and vacuum relief. It is primarily used as a safety device for out-breathing in tanks, containers, and process equipment. It provides protection against vacuum and overpressure and prevents the intake of air and unallowable product vapor loss up to the set pressure.
The valve can also be used as an in-breathing valve where the main valve is directly controlled when it is exposed to a vacuum, i.e., it functions as a weight-loaded diaphragm valve.

The main valve is controlled by a pilot valve which is controlled by the tank pressure. A small amount of vapor is released into the atmosphere by the pilot valve 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 on the main valve increases, i.e., the valve becomes tighter with increasing tank pressure until the set pressure is reached. Once the valve has started to lift, it opens fully within a 10% of the pressure increase or opening pressure difference, and the nominal volume flow is released 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/in-breathing function.
The tank pressure is maintained up to the set pressure with a tightness that is above the normal standards due to our highly developed manufacturing technology. This feature is ensured by valve seats made of high quality stainless steel with precisely lapped valve discs. After the overpressure is released or the vacuum is balanced, the valve re-seats and provides a tight seal.

Special Features and Advantages

- controlled by corrosion-resistant control valve (pilot valve)
- small amounts of tank substance is released into the atmosphere when the valve is opened
- max. 10% pressure increase up to full lift
- extreme tightness, resulting in lowest possible product losses and reduced environmental pollution
- set pressure close to opening pressure for optimum pressure maintenance in the system
- protection of the main valve control diaphragm from low temperatures – high durability
- high flow capacity
- can be used in explosion hazardous areas
- field test connection possible upon request
- field test kit upon request

Design Types and Specifications

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

Additional special devices available upon request.

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

Table 1: Dimensions Dimensions in mm / inches

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

DN1	DN2	a	b	c	d	e	f	g
100 / 4"	100 / 4"	225 / 8.86	225 / 8.86	250 / 9.84	360 / 14.17	991 / 39.02	205 / 8.07	418 / 16.46
100 / 4"	150 / 6"	225 / 8.86	225 / 8.86	250 / 9.84	360 / 14.17	1001/39.41	205 / 8.07	428 / 16.85
150 / 6"	150 / 6"	300 / 11,81	250 / 9.84	335 / 13.19	500 / 19.69	1104 / 43.46	275 / 10.83	503 / 19.80
150 / 6"	200 / 8"	300 / 11,81	250 / 9.84	335 / 13.19	500 / 19.69	1124 / 44.25	275 / 10.83	523 / 20.59
200 / 8"	200 / 8"	375 / 14.77	300 / 11,81	410 / 16.14	630 / 24.80	1237 / 48.70	340 / 13.39	610 / 24.02
200 / 8"	250 / 10"	375 / 14.77	300 / 11,81	410 / 16.14	630 / 24.80	1267 / 49.88	340 / 13.39	640 / 25.20
250 / 10"	250 / 10"	425 / 16.73	350 / 13.78	500 / 19.69	790 / 31.10	1357 / 53.43	420 / 16.54	710 / 27.96
250 / 10"	300 / 12"	425 / 16.73	350 / 13.78	500 / 19.69	790 / 31.10	1377 / 54.41	420 / 16.54	730 / 28.74
300 / 12"	300 / 12"	500 / 19.69	400 / 15.75	570 / 22.44	920 / 36.22	1468 / 57.80	485 / 19.09	803 / 31.61
300 / 12"	350 / 14"	500 / 19.69	400 / 15.75	570 / 22.44	920 / 36.22	1488 / 58.59	485 / 19.09	823 / 32.40
300 / 12"	400 / 16"	500 / 19.69	400 / 15.75	570 / 22.44	920 / 36.22	1508 / 59.37	485 / 19.09	843 / 33.19

Table 2: Material selection for housing

Design	A	B	C
Housing	Aluminum	Stainless Steel	LTCS * (Low Temperature Carbon Steel)
Valve seat	Stainless Steel	Stainless Steel	Stainless Steel
Sealing - housing	PTFE	PTFE	PTFE
Sealing - valve disc	Metal - to - Metal	Metal - to - Metal	Metal - to - Metal
Housing diaphragm	Stainless Steel	Stainless Steel	Stainless Steel
Pilot lines	Stainless Steel	Stainless Steel	Stainless Steel
Pilot housing	Aluminum	Aluminum / Stainless Steel	Aluminum / Stainless Steel
Pilot diaphragm	FEP	FEP	FEP

* Special materials upon request.

Table 3: Flange connection type

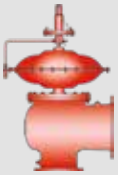
EN 1092-1; Form B1	Other types upon request.
ASME B16.5 CL 150 R.F.	

Table 4: Coefficient of Discharge

DN1	100 / 4"	100 / 4"	150 / 6"	150 / 6"	200 / 8"	200 / 8"	250 / 10"	250 / 10"	300 / 12"	300 / 12"	300 / 12"
DN2	100 / 4"	150 / 6"	150 / 6"	200 / 8"	200 / 8"	250 / 10"	250 / 10"	300 / 12"	300 / 12"	350 / 14"	400 / 16"
d_0	108/4.25	108/4.25	160/6.30	160/6.30	208/8.19	208/8.19	262/10.31	262/10.31	310/12.2	310/12.2	310/12.2
K	0.69	0.85	0.7	0.8	0.65	0.8	0.68	0.76	0.62	0.72	0.8

DN1 = size inlet
DN2 = size outlet
d_0 = orifice diameter (mm/inches)
K = coefficient of discharge

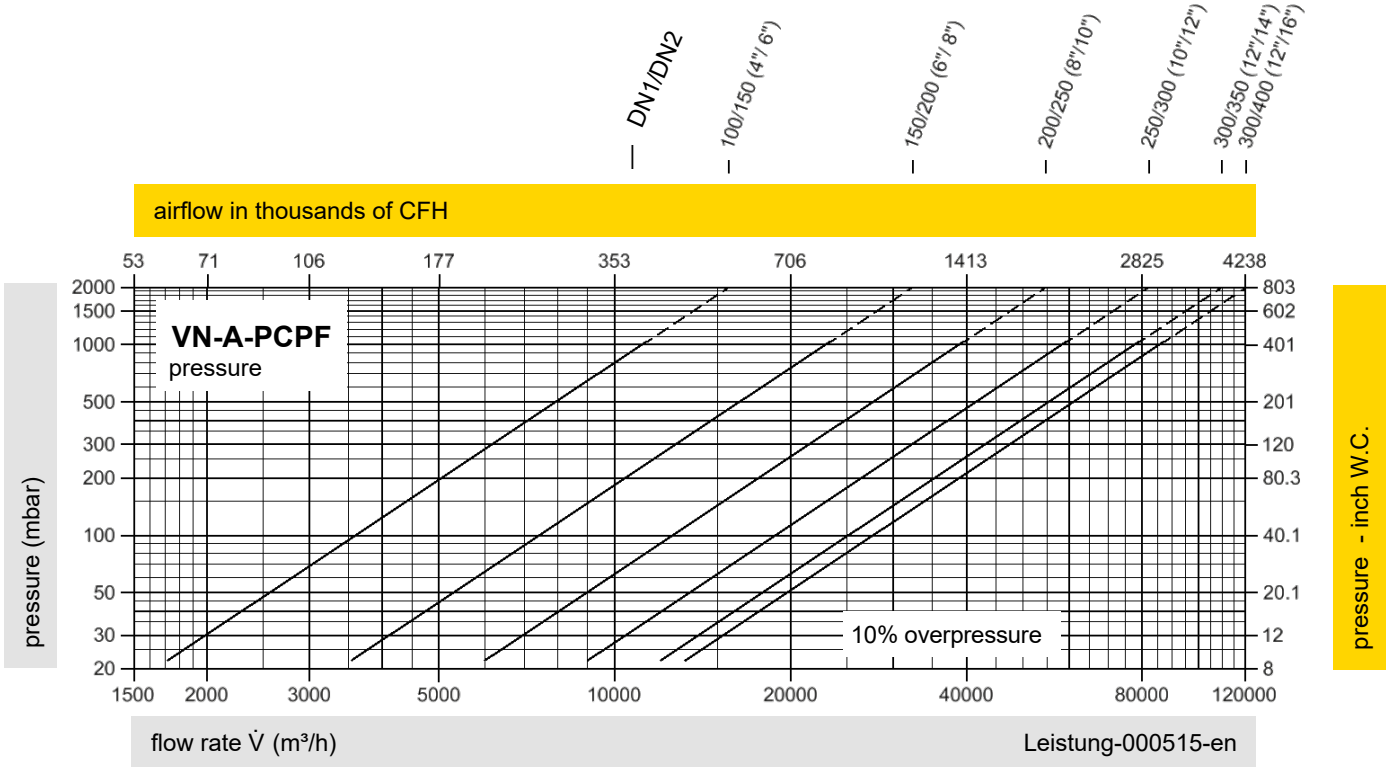
PROTEGO
for safety and environment

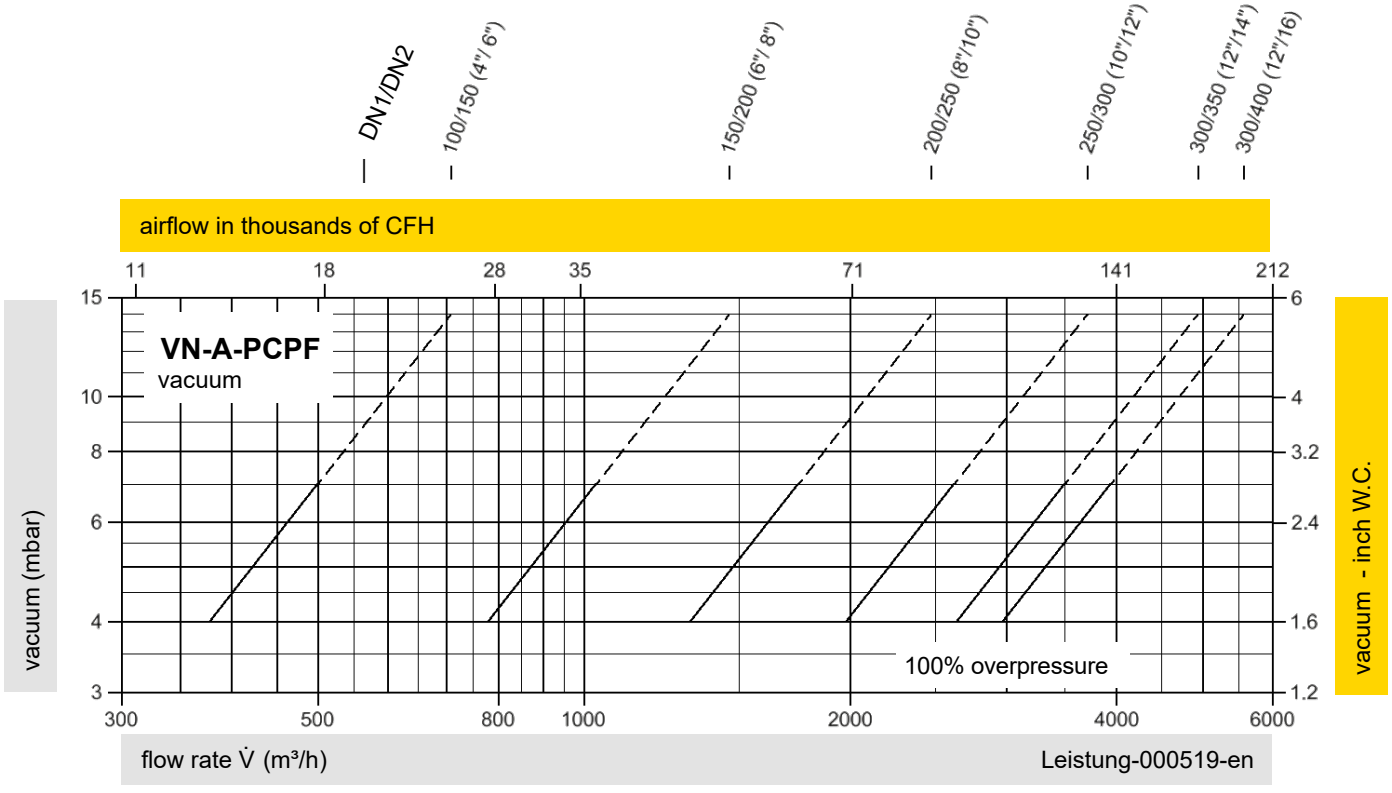


Pressure/Vacuum relief valve

Flow Capacity Charts

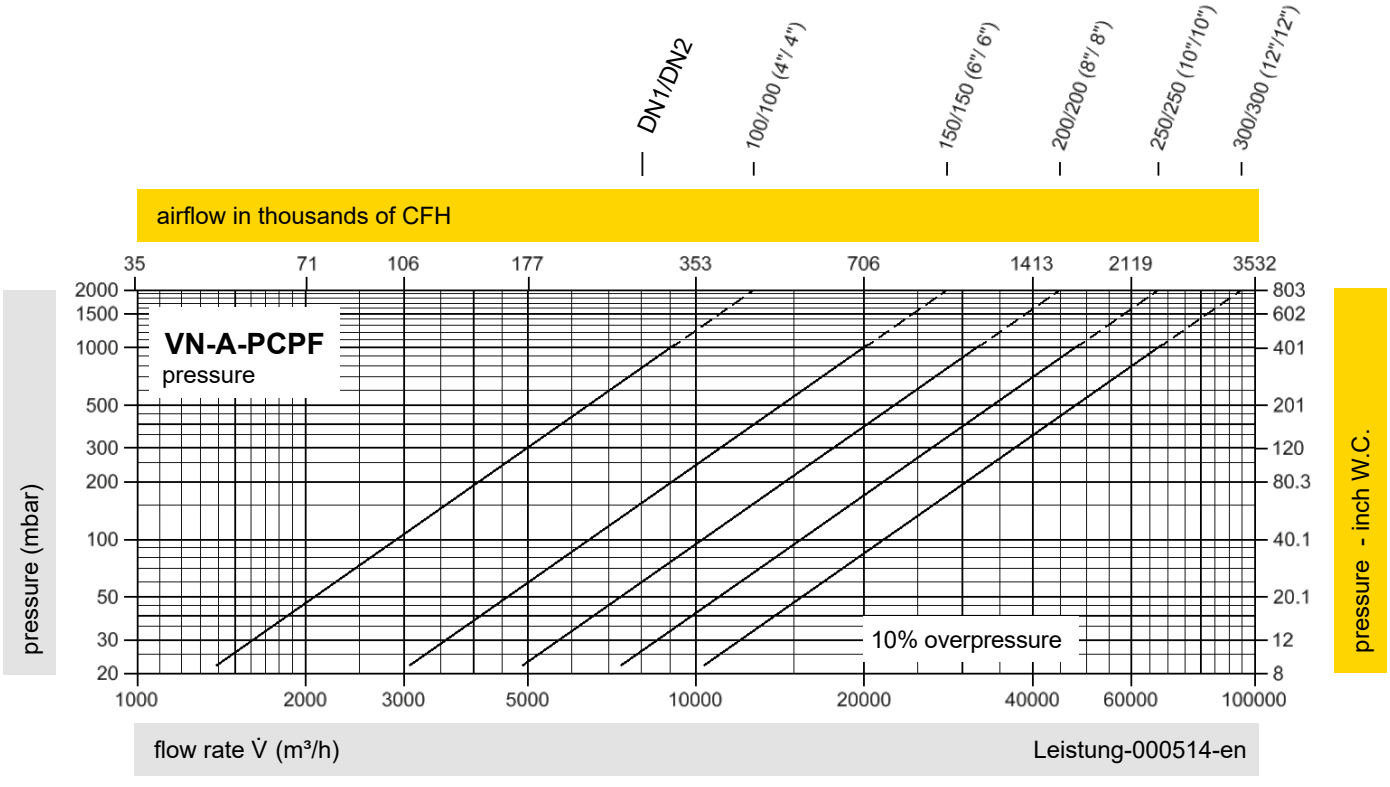
PROTEGO® VN-A-PCPF

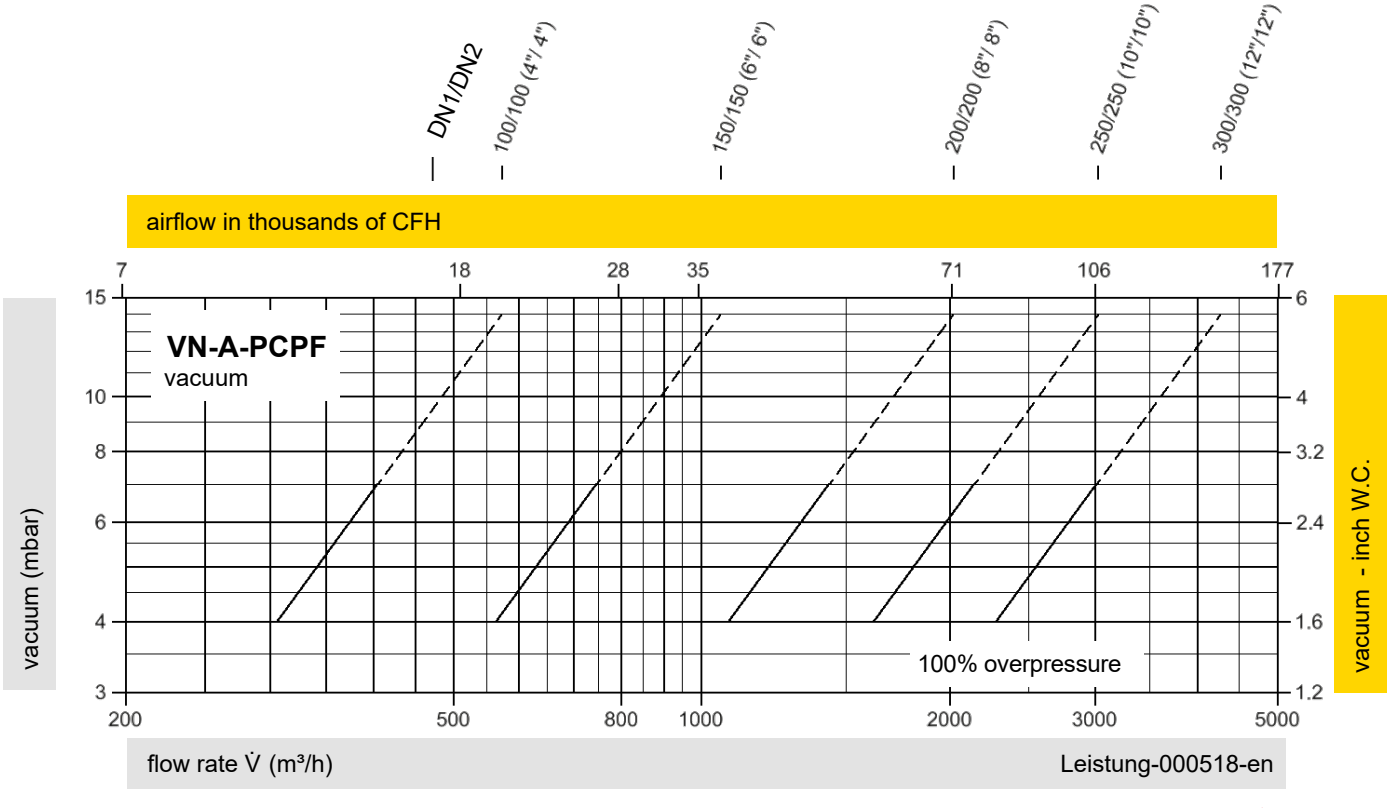




The flow capacity charts have been determined with a calibrated and TÜV certified flow capacity test rig.

Volume flow V̇ in (m³/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.”





Remark: Technical Data Sheet see on page 415.

PROTEGO® VN-A-PCPF and PROTEGO® PM/(D)S

Project Data Sheet

Project:	
Engineering:	
End-user:	

PROTEGO® VN-A-PCPF	☐					
PROTEGO® PM/(D)S	☐					
relief type:	pressure only	☐				
	pressure and vacuum	☐				
substance:						
boiling point:			°C			
molar mass:			g/mol			
total back pressure:			mbar or inch W.C.			
dynamic back pressure:			mbar or inch W.C.			
static (superimposed) back pressure:			mbar or inch W.C.			
inlet pressure drop:			mbar or inch W.C.			
set pressure:			mbar or inch W.C.			
set vacuum:			mbar or inch W.C.			
tank design code:		API 620	☐	API 650	☐	EN 14015 ☐
tank design pressure:			mbar			
tank design vacuum:			mbar			
material:						
required discharge per valve:			kg/h or lb/hr			
required vacuum capacity per valve at +20°C:			m³/h or SCFH			
flange connection:		ASME	☐	EN 1092-1	☐	JIS ☐

Fill in and ☐ check, if applicable.

signature:	date: