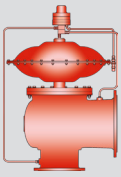
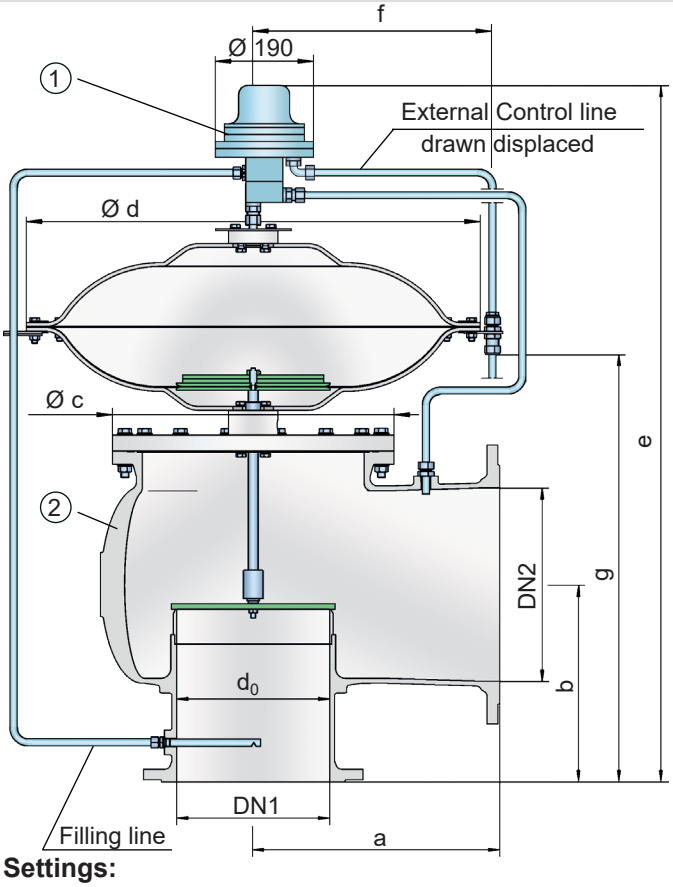


Pressure/Vacuum Relief Valve

Pilot-operated diaphragm Valve

PROTEGO® VN-A-PCPM



Settings:

Pressure*: +20 mbar up to +1034 mbar
+8 inch W.C. up to +415.1 inch W.C.

Vacuum: -2.2 mbar up to -7 mbar
-0.88 inch W.C. up to -2.8 inch W.C.

* Varies depending on the type and DN
Other settings upon request.

Function and Description

The PROTEGO® VN-A-PCPM pilot-operated diaphragm valve is a highly 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 unallowable 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. It is ideally suitable for both atmospheric conditions and for use in low temperatures.

The main valve (2) is controlled by a pilot valve (1). The pilot valve is controlled by the tank pressure. The tank substance does not continuously flow through the pilot. The set pressure is adjusted on the pilot valve by a corrosion-resistant and low-temperature- resistant permanent magnet.

As the operating pressure increases, the closing force at the main valve also increases; i.e., the valve tightness increases until the set pressure is reached to prevent leakage. After the valve responds, it immediately opens completely without any significant increase in pressure (pop-open characteristic), and the nominal volumetric flow is released through a fully open valve. If this is exceeded, the pressure increase follows the volume flow ($\Delta p/\dot{V}$ 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 state-of-the art manufacturing. This feature is ensured by valve seats made of high quality stainless steel with precisely lapped valve pallets. 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, low-temperature-resistant permanent magnet
- non-flowing pilot valve
- pop-open characteristic from the lowest pressure increase up to full lift
- max. 10% pressure increase till full lift
- extreme tightness, resulting in lowest possible product losses and reduced emissions
- set pressure close to opening pressure for optimum pressure maintenance in the system
- highest flow capacity
- suitable for use in explosive atmosphere
- designed for use at cryogenic temperatures
- automatic condensate drain

Design Types and Specifications (basic design)

Pressure/vacuum relief valve with a pilot valve	**VN-A-PCPM**
Pressure relief valve; vacuum function prevented by check valve	**VN-A-PCPM-NV**
Pressure relief valve; vacuum function prevented by a diaphragm decoupled from the valve pallet	**VN-A-PCPM-ANV**
Pressure/vacuum relief valve with Field-Test-Connection	**VN-A-PCPM-FT**
Pressure relief valve; vacuum function prevented by check valve and with Field-Test-Connection	**VN-A-PCPM-NV-FT**
Pressure relief valve; acuum function prevented by a diaphragm decoupled from the valve pallet and with Field-Test-Connection	**VN-A-PCPM-ANV-FT**

Optional Equipment	**Soft sealing**	**EPDM***
		PTFE
	Sensor controlled	
	Vacuum pilot	
Optional Accessories	**Field-Test-Kit**	

* For variants -NV and -ANV with set pressure >+80 mbar

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
50 / 2"	50 / 2"	175 / 6.89	175 / 6.89	170 / 6.69	360 / 14.17	838 / 32.99	205 / 8.07	371 / 14.61
50 / 2"	80 / 3"	175 / 6.89	175 / 6.89	170 / 6.69	360 / 14.17	853 / 33.58	205 / 8.07	386 / 15.20
80 / 3"	80 / 3"	200 / 7.87	200 / 7.87	205 / 8.07	360 / 14.17	878 / 34.57	205 / 8.07	411 / 16.18
80 / 3"	100 / 4"	200 / 7.87	200 / 7.87	205 / 8.07	360 / 14.17	888 / 34.96	205 / 8.07	421 / 16.57
100 / 4"	100 / 4"	225 / 8.86	225 / 8.86	250 / 9.84	360 / 14.17	913 / 35.94	205 / 8.07	446 / 17.56
100 / 4"	150 / 6"	225 / 8.86	225 / 8.86	250 / 9.84	360 / 14.17	923 /36.34	205 / 8.07	456 / 17.95
150 / 6"	150 / 6"	300 / 11,81	250 / 9.84	335 / 13.19	500 / 19.69	1025 / 40.35	275 / 10.83	531 / 20.91
150 / 6"	200 / 8"	300 / 11,81	250 / 9.84	335 / 13.19	500 / 19.69	1045 / 41.14	275 / 10.83	551 / 21.69
200 / 8"	200 / 8"	375 / 14.77	300 / 11,81	410 / 16.14	630 / 24.80	1237 / 48.70	340 / 13.39	638 / 25.12
200 / 8"	250 / 10"	375 / 14.77	300 / 11,81	410 / 16.14	630 / 24.80	1188 / 46.77	340 / 13.39	668 / 26.30
250 / 10"	250 / 10"	425 / 16.73	350 / 13.78	500 / 19.69	790 / 31.10	1278 / 50.31	420 / 16.54	738 / 29.05
250 / 10"	300 / 12"	425 / 16.73	350 / 13.78	500 / 19.69	790 / 31.10	1298 / 51.10	420 / 16.54	758 / 29.84
300 / 12"	300 / 12"	500 / 19.69	400 / 15.75	570 / 22.44	920 / 36.22	1389 / 54.58	485 / 19.09	831 / 32.72
300 / 12"	350 / 14"	500 / 19.69	400 / 15.75	570 / 22.44	920 / 36.22	1409 / 55.47	485 / 19.09	851 / 33.50
300 / 12"	400 / 16"	500 / 19.69	400 / 15.75	570 / 22.44	920 / 36.22	1429 / 56.26	485 / 19.09	871 / 34.29

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	PTFE	PTFE	PTFE
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	DN2	d_0	K
50 / 2"	50 / 2"	54/2.13	0,57
50 / 2"	80 / 3"	54/2.13	0,75
80 / 3"	80 / 3"	83/3.27	0,63
80 / 3"	100 / 4"	83/3.27	0,71
100 / 4"	100 / 4"	108/4.25	0.60
100 / 4"	150 / 6"	108/4.25	0.75
150 / 6"	150 / 6"	160/6.30	0.64
150 / 6"	200 / 8"	160/6.30	0.78

DN1	DN2	d_0	K
200 / 8"	200 / 8"	208/8.19	0.063
200 / 8"	250 / 10"	208/8.19	0.76
250 / 10"	250 / 10"	262/10.31	0.62
250 / 10"	300 / 12"	262/10.31	0.73
300 / 12"	300 / 12"	310/12.2	0.63
300 / 12"	350 / 14"	310/12.2	0.68
300 / 12"	400 / 16"	310/12.2	0.74

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

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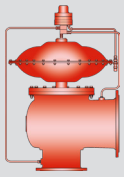
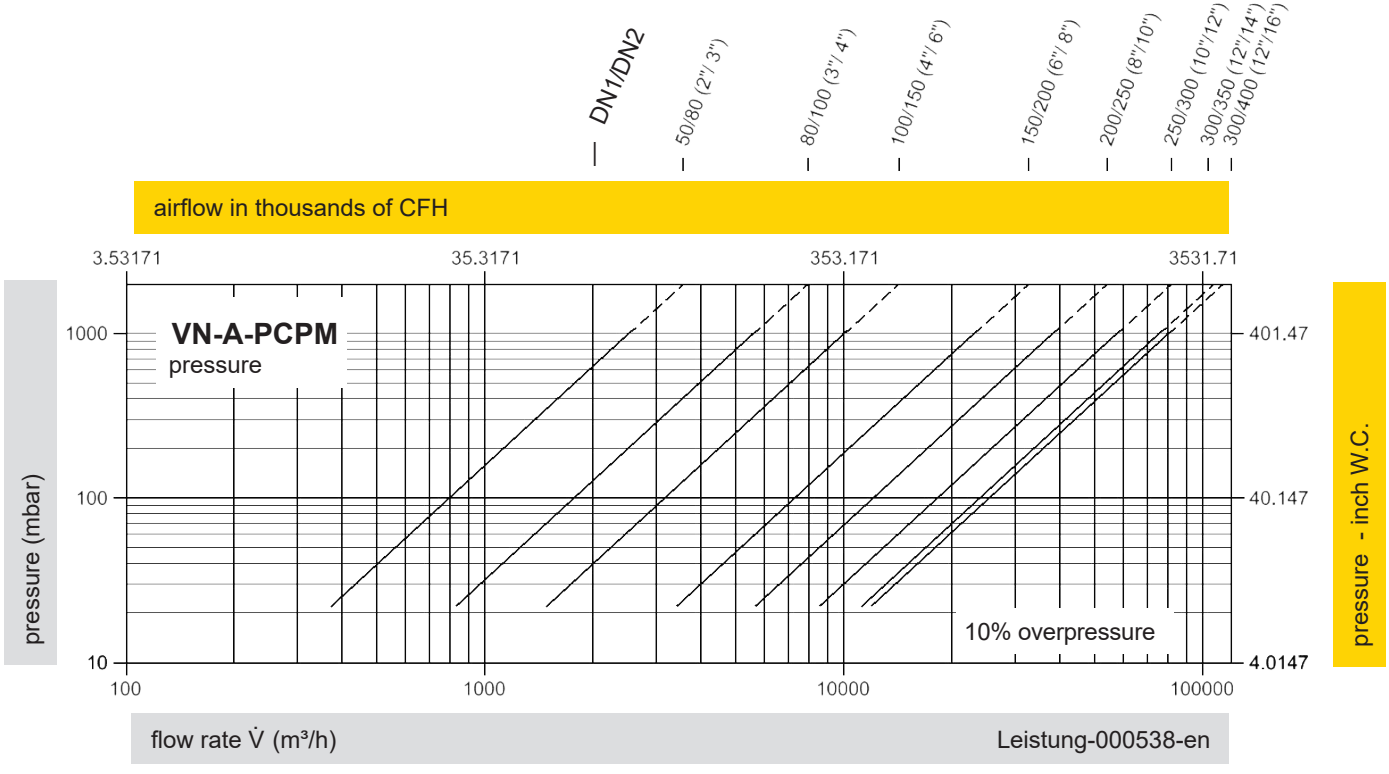
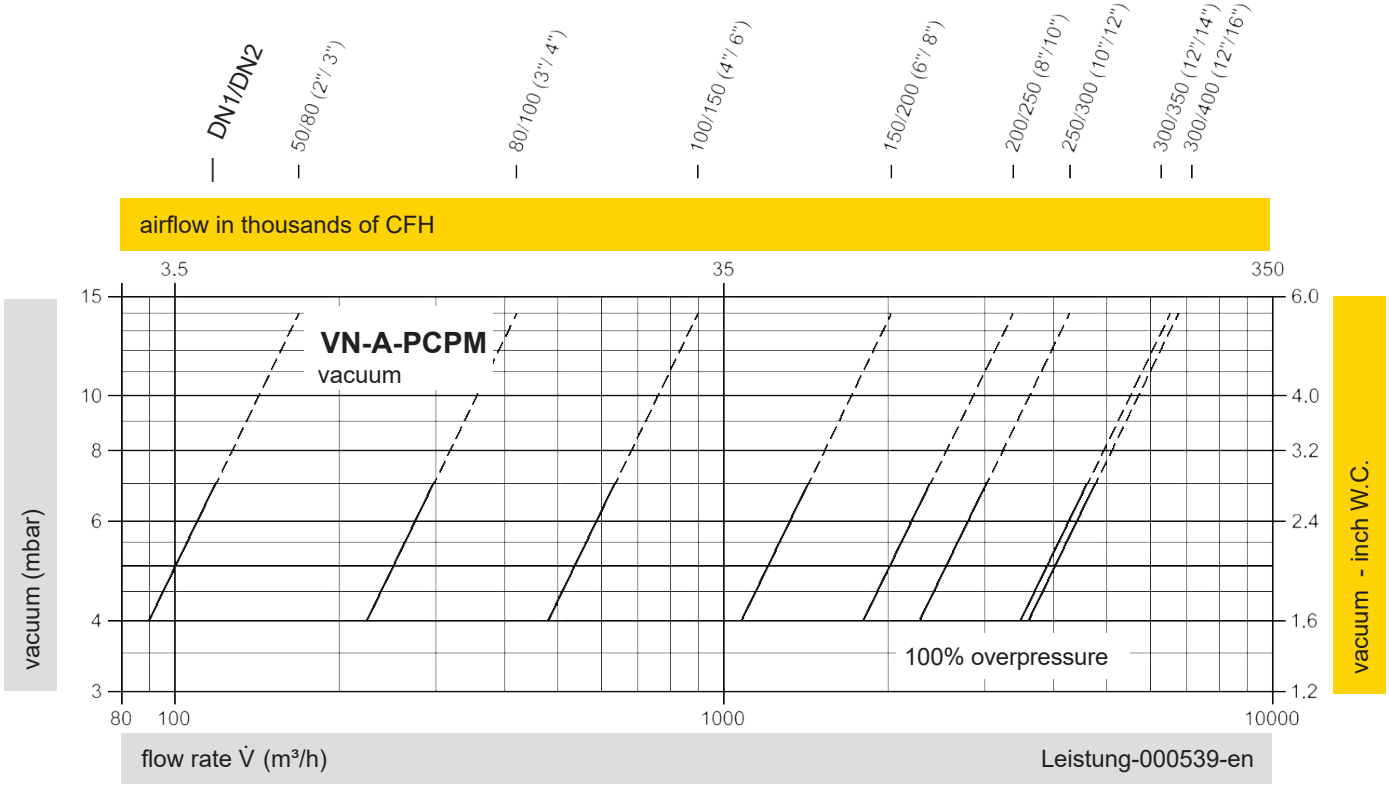


Pressure/Vacuum Relief Valve

Flow Capacity Charts

PROTEGO® VN-A-PCPM

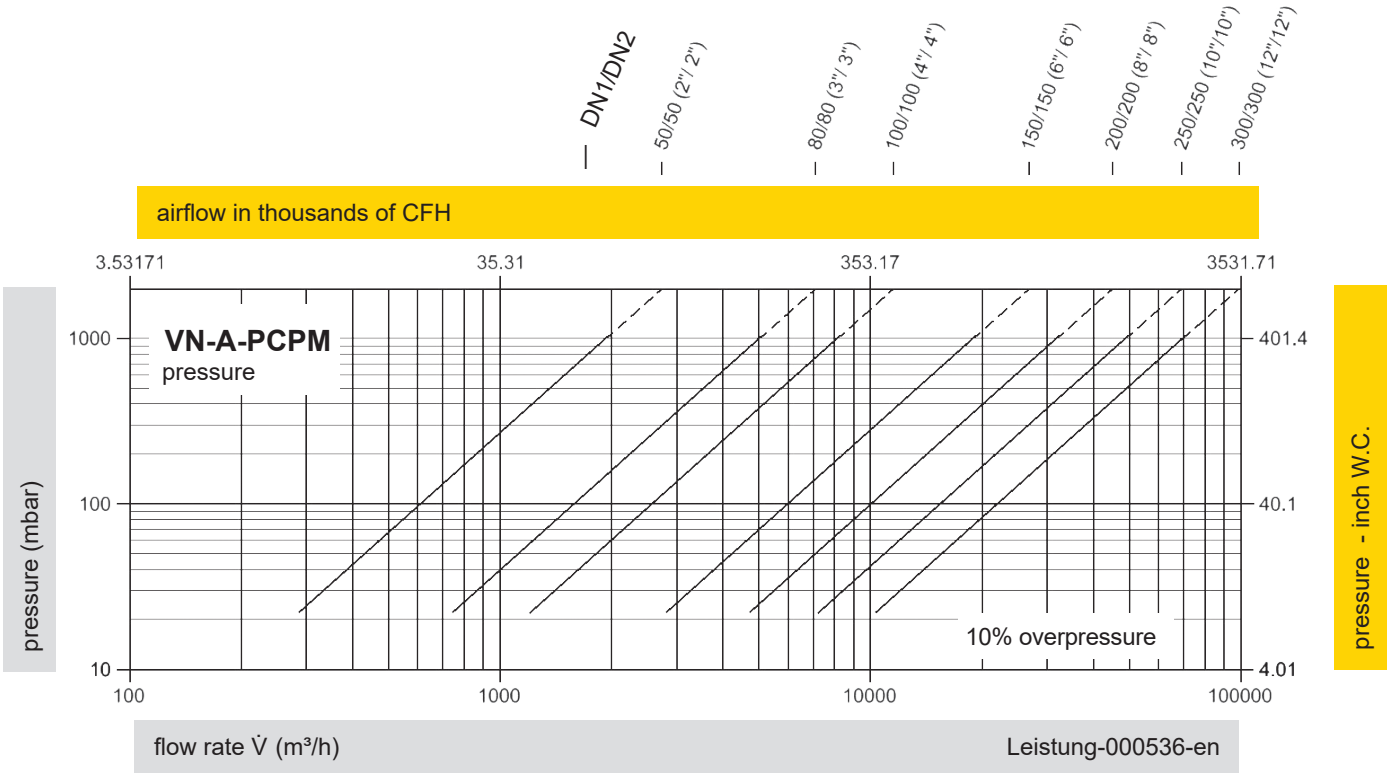


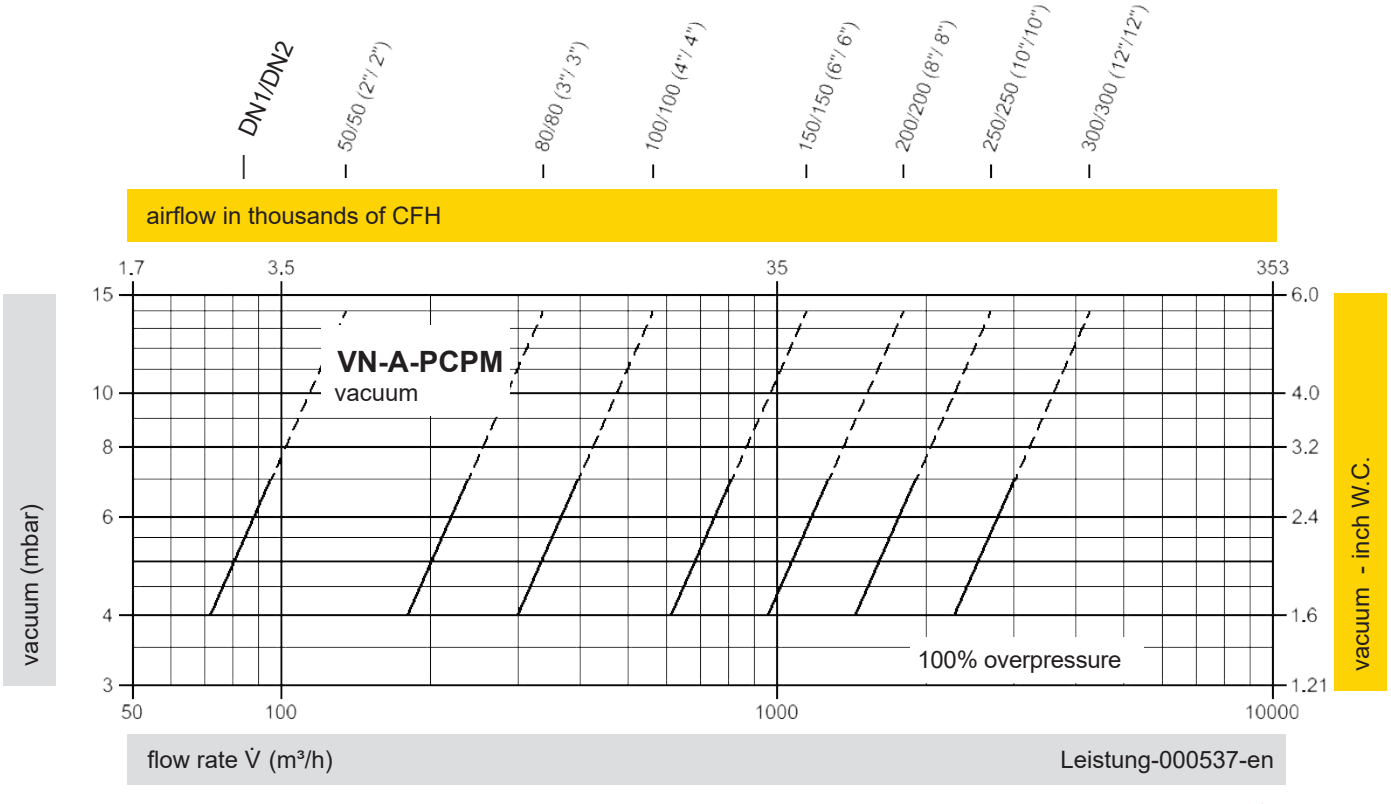


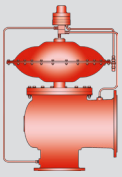
The flow capacity charts have been determined with a calibrated and TÜV certified flow capacity test rig.

Volume flow V̇ in (m³/h) and CFH refer to the standard reference conditions of air ISO 6358 (20°C, 1bar).
For conversion to other densities and temperatures, refer to Sec. 1: “Technical Fundamentals”.

PROTEGO® VN-A-PCPM







Pressure/Vacuum Relief Valve

Flow Capacity Charts

PROTEGO® VN-A-PCPF and PROTEGO® VN-A-PCPM

Project Data Sheet

Project:	
Engineering:	
End-user:	

PROTEGO® VN-A-PCPF	☐						
PROTEGO® VN-A-PCPM	☐						
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: