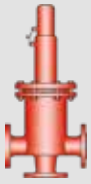
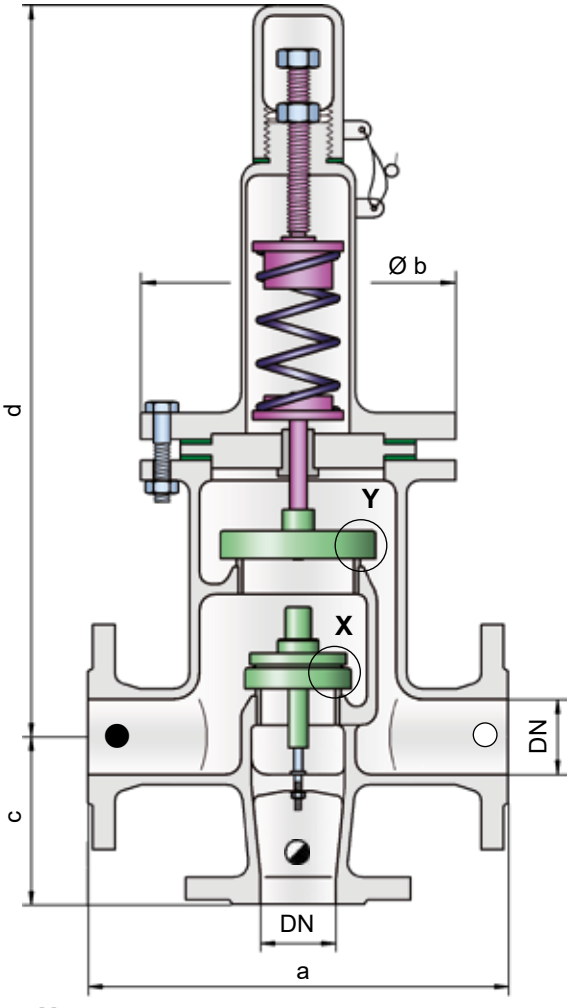
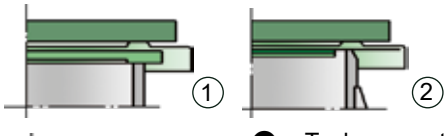


Pressure and Vacuum Relief Valve, In-Line

PROTEGO® DV/ZU-F



Detail **X**



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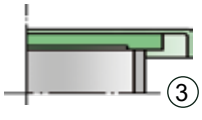


● = Tank connection
◒ = In-breathing
○ = Out-breathing

Settings:

Pressure: +60 mbar up to +500 mbar
+24 inch W.C. up to +200 inch W.C.

Vacuum: -3.5 mbar up to -50 mbar
-1.4 inch W.C. up to -20 inch W.C.

Vacuum: -3.5 mbar up to -14 mbar
-1.4 inch W.C. up to -5.6 inch W.C.
by set pressure up to +150 mbar / +60 inch W.C.

For lower set pressure, refer to type DV/ZU.
Higher set pressure and lower set vacuum upon request.

Function and Description

The PROTEGO® in-line valve DV/ZU is a state-of-the-art pressure and vacuum relief valve with separate flange connections for pressure and vacuum breathing. Typically, the valve is installed in the in-breathing and out-breathing lines of tanks, vessels, and process equipment to protect against unallowable overpressure and underpressure. The valve prevents emission losses almost up to the pressure and prevents air intake almost up to set vacuum. The valve is designed in a way that if the set pressure is exceeded, the vapors are released into an exhaust pipe (e.g., vent header). If the set vacuum is exceeded, atmospheric air is pulled into the system. For structural reasons, the vacuum valve pallet is one size smaller than the pressure valve pallet. Due to the spring-loaded design, higher set pressures can be achieved.

The device will start to open as soon as the set pressure is reached and only requires 10% overpressure to full lift. Continuous investments in and a commitment to research and development have allowed PROTEGO® to develop a low pressure valve which has the same opening characteristic as a high pressure safety relief valve. This “full lift type” technology allows the valve to be set at just 10% below the maximum allowable working pressure or vacuum (MAWP or MAWV) of the tank and still safely vent the required mass flow. The opening characteristic of the pressure and vacuum side is basically the same. However, the in-breathing will start as soon as the differential pressure between the connected in-breathing line and the tank is greater than the set pressure of the vacuum valve pallet. Due to our highly developed manufacturing technology, the tank pressure is maintained up to set pressure with a tightness that is far above the conventional standard. This feature is ensured by valve seats made of high quality stainless steel and with individually lapped valve pallets (1), (3), or with an air cushion seal (2), in conjunction with high quality FEP diaphragm and a sturdy housing design. After the overpressure is released or the vacuum is balanced, the valve re-seats and provides a tight seal.

The optimized fluid dynamic design of the valve body and valve pallet is a result of many years of research, resulting in stable operation of the valve pallet, optimized performance, and reduced product losses

Special Features and Advantages

- 10% technology for minimum pressure increase up to full lift
- extreme tightness, resulting in lowest possible product losses and reduced environmental pollution
- based on 10% technology, set pressure is close to opening pressure for optimum pressure maintenance in the system as compared to conventional 40% or 100% technology
- high flow capacity reduces costs through the use of smaller valves
- separate connections for in-breathing and out-breathing pipes
- can be used in explosion hazardous areas
- sturdy housing design (PN 10)
- spring-loaded on overpressure side for higher set pressures
- maintenance-friendly design

Vents - 10% Technology (Flyer pdf)

Leak Rate/10% Technology (Flyer pdf)

Coated Devices (Flyer pdf)

The optimized valve pallet (Flyer pdf)

Designs and Specifications

The pressure valve pallet is spring-loaded, and the vacuum valve pallet is weight-loaded. Lower set pressures for the pressure side are achieved through weight-loaded type DV/ZU.

Two different designs are available:

In-line pressure and vacuum relief valve, standard design **DV/ZU-F** [–]

In-line pressure and vacuum relief valve with heating jacket **DV/ZU-F -** [H]

Additional special devices available upon request.

Within piping systems, the influence of backpressure has to be considered when deciding the set pressure and opening characteristics. For special design solutions (e.g., partial load operation), the valve can be supplied with standard valve pallets (with proportional opening function).

Spring-loaded PV-Valves Maintenance-friendly design (Flyer pdf)

Table 1: Dimensions Dimensions in mm / inches

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

DN	40 / 1 ½"	50 / 2"	80 / 3"	100 / 4"	150 / 6"
a	280 / 11.02	280 / 11.02	340 / 13.39	390 / 15.35	520 / 20.47
b	210 / 8.27	210 / 8.27	280 / 11.02	310 / 12.20	390 / 15.35
c	165 / 6.50	165 / 6.50	200 / 7.87	240 / 9.45	300 / 11.81
d	565 / 22.24	565 / 22.24	675 / 26.57	805 / 31.69	1070 / 42.13

Larger sizes upon request.
Dimensions for pressure and vacuum relief valve with heating jacket upon request.

Table 2: Material selection for housing

Design	A	B
Housing Heating jacket (DV/ZU-F-H-...)	Steel Steel	Stainless Steel Stainless Steel
Valve seat	Stainless Steel	Stainless Steel
Gasket	PTFE	PTFE

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

Table 3: Material of pressure valve pallet

Design	A
Pressure range (mbar) (inch W.C.)	>+60 up to +500 >+24 up to +200
Valve pallet	Stainless Steel
Sealing	Metal to Metal
Pressure spring	Stainless Steel

Special materials upon request.
For lower set pressure, use type DV/ZU.
Higher set pressure and lower set vacuum upon request.

Table 4: Material selection for vacuum valve pallet

Design	A*	B*	C	D
Pressure range (mbar) (inch W.C.)	-3.5 up to -5.0 -1.4 up to -2.0	<-5.0 up to -14 <-2.0 up to -5.6	<-14 up to -35 <-5.6 up to -14	<-35 up to -50 <-14 up to -20
Valve pallet	Aluminum	Stainless Steel	Stainless Steel	Stainless Steel
Sealing	FEP	FEP	Metal to Metal	Metal to Metal

Special materials and lower set vacuum upon request.

* by set pressure up to +150 mbar / +60 inch W.C.

Table 5: Flange connection type

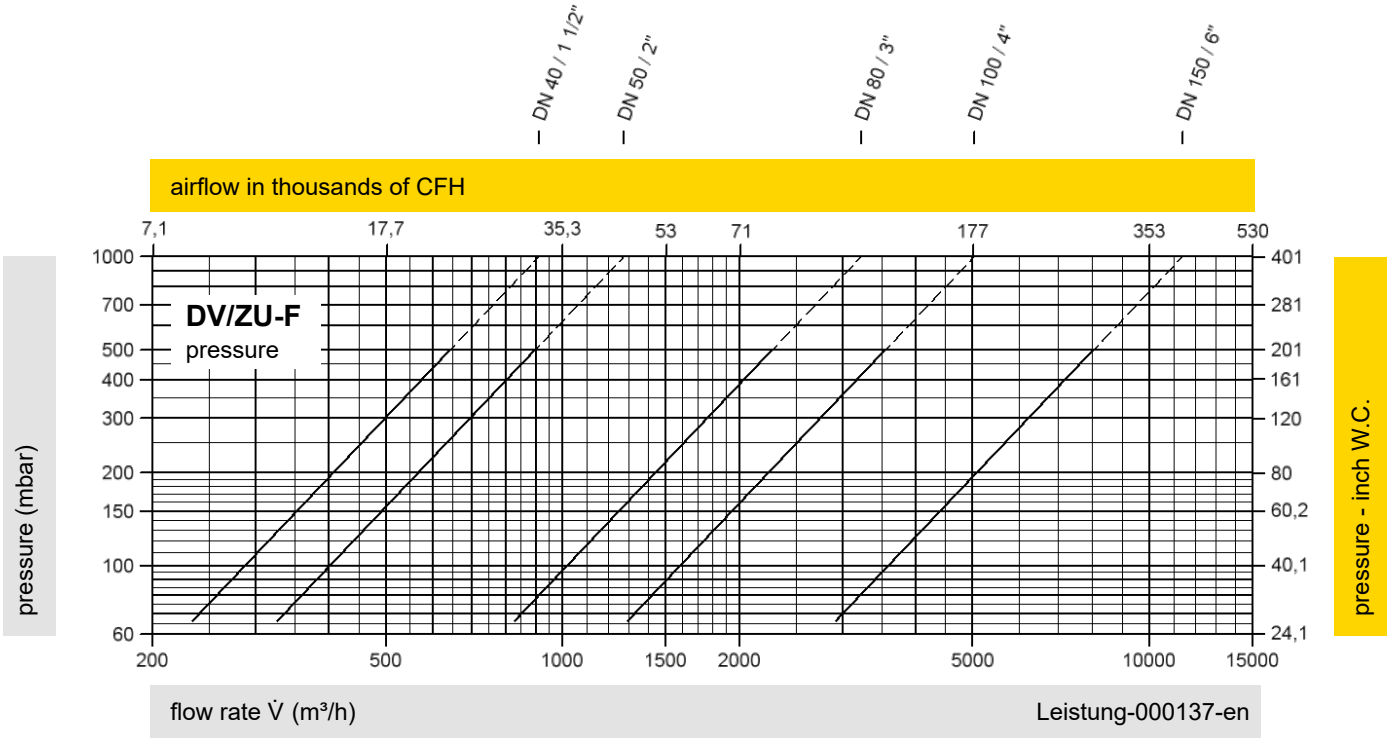
EN 1092-1; Form B1
ASME B16.5 CL 150 R.F.

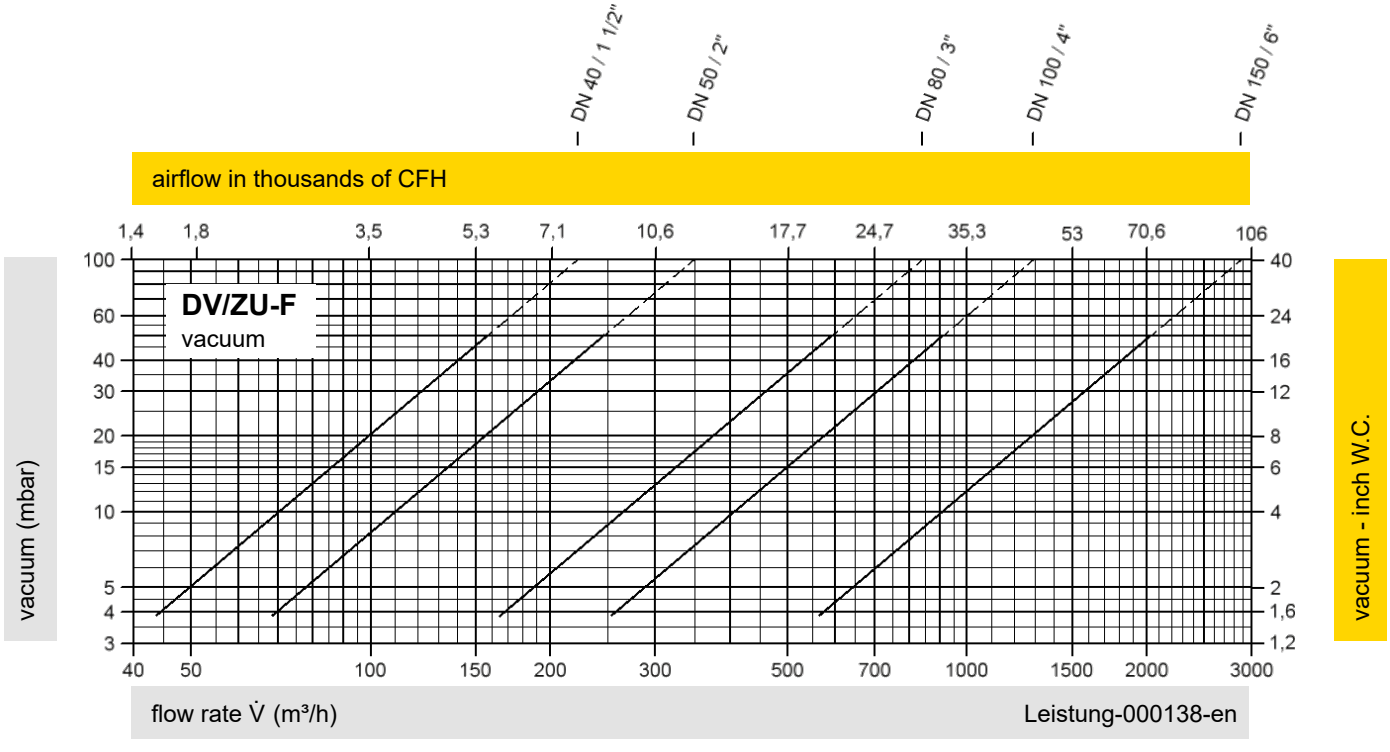
Other types upon request.

Pressure and Vacuum Relief Valve, In-Line

Flow Capacity Charts

PROTEGO® DV/ZU-F





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.”