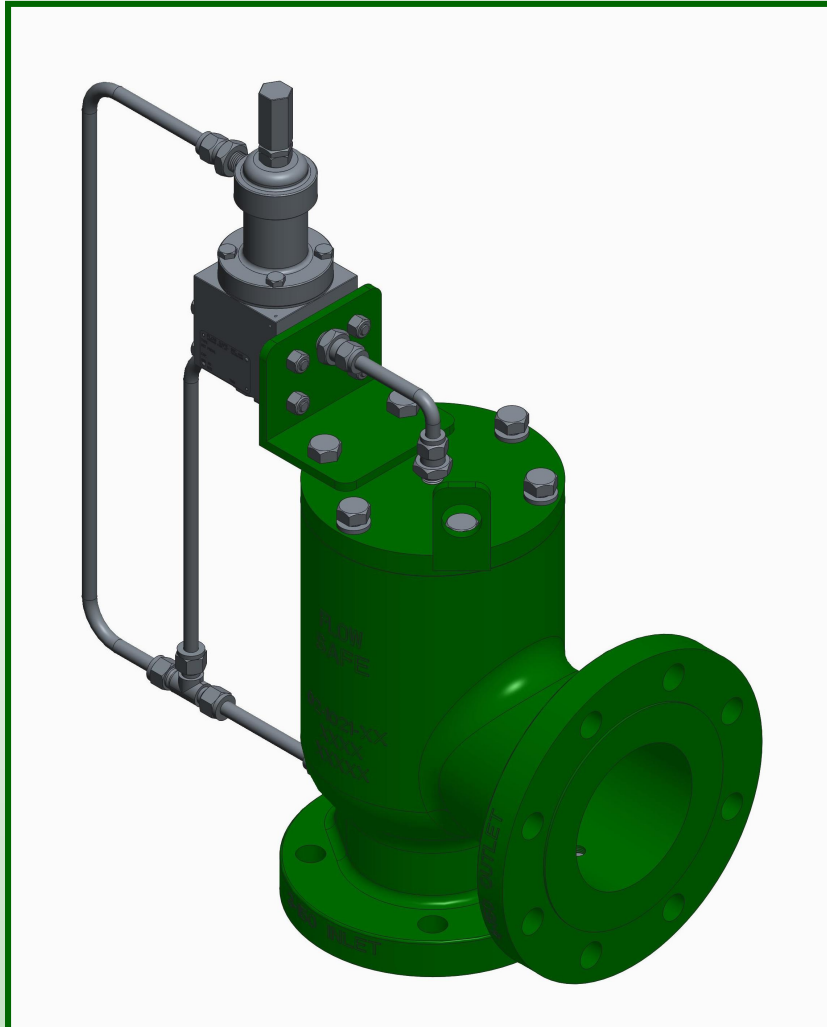


“THE NEXT GENERATION”



FLOW SAFE

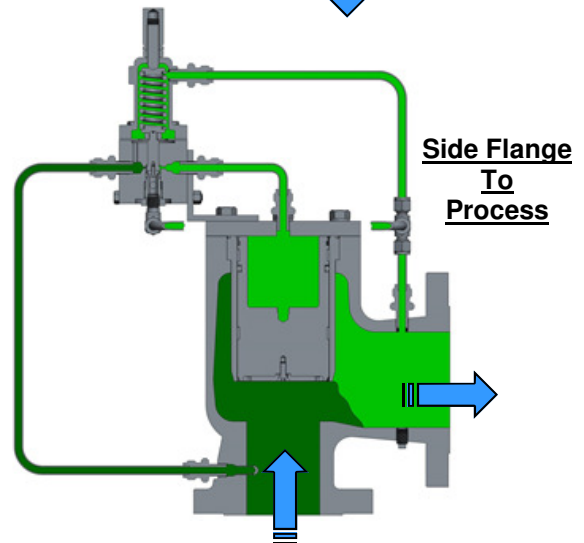
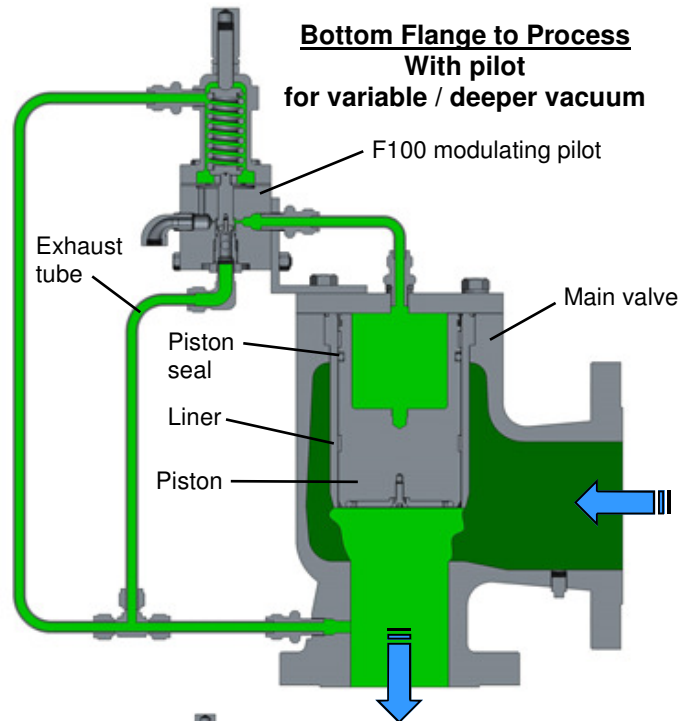
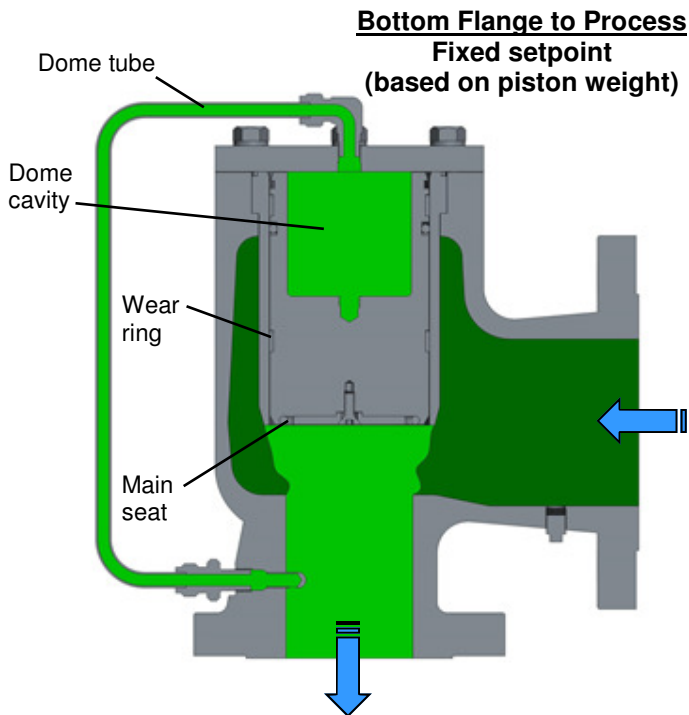
High Performance Safety Relief Valves



F70VP Series
Vacuum Relief Valves

APPLICATION / OPERATION

F70VP Series



Most of the time our work involves positive pressure relief applications. From time to time, we also are challenged with vacuum pressure relief applications. An example is the protection of low-pressure storage tanks that create a vacuum in the tank due to pumping liquid out of the tank. In most cases, it is not desirable to admit outside air into the storage tank because of the formation of ice or the hazard of air/hydrogen mixture. Today, most tank blanketing systems utilize regulators which provide a controlled supply of tank blanketing inert gas. Still, if a runaway situation exists and these regulator systems cannot maintain pace, a vacuum breaker device must be utilized. The F70VP vacuum relief valve is ideal and is presented in detail as follows.

The operating principle is basically the same as that for the Flow Safe F70PR pilot-operated relief valve and applications for positive pressure relief. A seating force is established by loading the large dome cavity (area above piston) of the main valve with a pressure equal to or greater than the inlet pressure under the seat. In the closed condition, atmospheric pressure is present in the dome area and vacuum is present at the inlet, causing a net downward force to close the seat. At set point, the pilot opens and discharges dome pressure. With a partial vacuum established in the dome, atmospheric pressure pushes the piston open and establishes air flow into the valve, relieving the system vacuum. When the pilot reseats, atmospheric pressure is reintroduced to the main valve dome, closing the valve.

Depending on the desired vacuum set point, the F70VP may be furnished without a pilot. In such applications, the main valve dome is connected to the inlet neck with a single length of stainless steel tubing. Operation is the same as described above, except that the set pressure is fixed and is a function of valve size and piston weight. Fixed set points vary from 0.2 psi vacuum (14.5 psia) to about 2.7 psi vacuum (12.0 psia). Contact the factory for specific fixed vacuum set pressure availability. If the valve may see positive working pressure (above atmospheric), backflow preventer check valves will be required. For maximum efficiency, the valve should be mounted with the side flange toward the vacuum process if possible (lower right figure above).

FLOW CAPACITIES

F70VP Series

SCFM @ 60 °F, Z=1.0, MW=29 (Zero overpressure)

AIR

Valve Size:	1-1/2 x 2	2 x 3	3 x 4	4 x 6	6 x 8	8 x 10	10 x 12	12 x 16
Orifice Area (in ²):	1.770	3.365	7.402	11.43	26.06	45.66	71.85	111.87
1 psiv (-1 psig)	178	339	747	1154	2632	4611	—	—
2 psiv	252	479	1054	1628	3713	6506	10237	15940
3 psiv	308	585	1288	1989	4536	7948	12508	19475
4 psiv	354	674	1484	2292	5226	9156	14408	22434
5 psiv	395	752	1655	2556	5828	10212	16070	25022
6 psiv	437	832	1831	2874	6554	11484	18071	28136
7 psiv	477	907	1996	3185	7261	12723	20021	31172
8 psiv	515	979	2154	3489	7956	13941	21938	34157
9 psiv	551	1048	2306	3791	8644	15146	23833	37109
10 psiv	586	1115	2453	4091	9327	16342	25716	40040
11 psiv	621	1180	2596	4389	10007	17534	27591	42960
12 psiv	654	1244	2736	4687	10686	18724	29464	45875
12 psiv	687	1306	2873	4985	11366	19914	31337	48792
14 psiv	720	1369	3011	5288	12058	21127	33245	51763

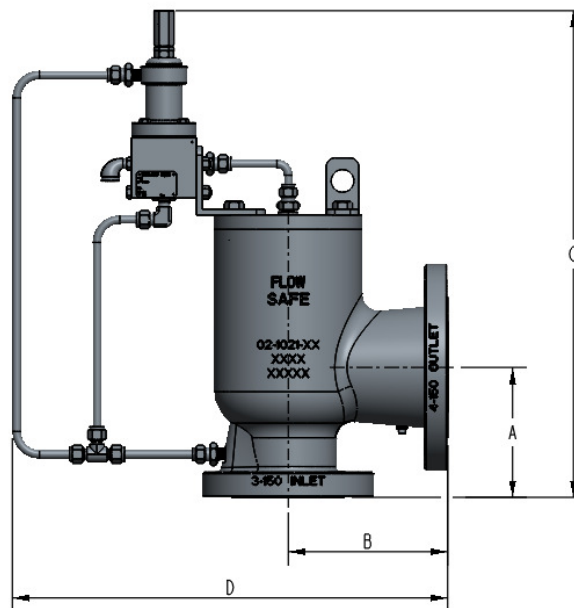
NOTE: Inches Hg (mercury) x 13.57 = in. w.c.
Psi x 27.71 = in. w.c.

lb/hr = 4.59 x SCFM

DIMENSIONS

Inlet Connection	Outlet Connection	Orifice area, in ² (mm ²)	Dimensions, in (mm) ¹				Approx. weight, lb (kg)
			A	B	C, approx.	D, approx.	
1-1/2" FNPT	2" FNPT	1.770 (1142)	2.75 (70)	3.00 (76)	12.6 (320)	12.0 (305)	15 (7)
2"-150#	3"-150#	3.365 (2171)	4.56 (116)	5.30 (135)	18.5 (470)	17.5 (445)	60 (27)
3"-150#	4"-150#	7.402 (4775)	5.70 (145)	7.00 (178)	21.5 (546)	18.5 (470)	85 (39)
4"-150#	6"-150#	11.43 (7374)	7.75 (197)	8.25 (210)	22.5 (572)	19.0 (483)	170 (77)
6"-150#	8"-150#	26.06 (16813)	9.44 (240)	9.50 (241)	25.6 (650)	22.0 (559)	270 (122)
8"-150#	10"-150#	45.66 (29458)	10.88 (276)	11.00 (279)	30.0 (762)	26.5 (673)	460 (209)
10"-150#	12"-150#	71.85 (46354)	11.63 (295)	13.00 (330)	32.0 (813)	31.0 (787)	775 (351)
12"-150#	16"-150#	111.87 (72174)	11.92 (303)	15.56 (395)	37.0 (940)	32.0 (813)	1100 (500)

¹ Contact Flow Safe for submittal drawing whenever specific dimensions are needed for construction.



SPECIFICATIONS

Vacuum pressure range	1-1/2x2 thru 8x10: 0.36 to 14.7 psiv (-0.025 to -1.01 barg) ^{1,2}
	10x12 and 12x16: 2 to 14.7 psiv (-0.14 to -1.01 barg) ¹
Temperature range	-20 °F (-29 °C) to 275 °F (135 °C) / 400 °F (204 °C) with Viton
Main valve body material	Carbon steel (WCB) / Aluminum for 1-1/2" x 2"
Main valve piston material	Aluminum
Main valve liner material	Carbon steel (plated)
Seat and seal material	Nitrile (Buna-N), Viton, or as requested
Wear ring material	Graphite-filled PTFE
Tubing / fitting material	316 SS
Bolting material	CS main cap bolts; 304 or 316 SS retainer & pilot bolts

¹ with aluminum internals

Other materials available upon request

² minimum vacuum varies by valve size; contact factory

PART NUMBERING

P 7 0 V P - 0 2 R F 1 - 0 3 R F 1 - C S - A L - B B J

Inlet size:

- 15 = 1-1/2"
- 02 = 2"
- 03 = 3"
- 04 = 4"
- 06 = 6"
- 08 = 8"
- 10 = 10"
- 12 = 12"

Inlet connection type:

- FN = Female NPT
- RF = RF flange (ASME B16.5)

Inlet rating:

- 0 = Threaded
- 1 = ASME 150#

Options:

- J = Pilot added for variable vacuum settings

Seals (includes pilot seat / seals):

- B = Buna-N Y = HNBR
- V = Viton ('A')
- E = EPDM / EPDM

MV Seat: O-ring material from 'Seals' above

Trim material:

- AL = Aluminum
- SS = 316 SS

Body material:

- CS = Carbon steel
- AL = Aluminum

Outlet size / connection type / rating: See "Inlet size", plus
16 = 16"



YOUR AUTHORIZED REPRESENTATIVE

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