



# **F7000/8000 Dual-Outlet *Pilot-Operated Safety Relief Valves***

## Background

Dual-outlet POSRV's were introduced to the gas pipeline industry in the late 1940's, providing a solution in handling large volumes of gas at low discharge velocities and balanced thrust loads.

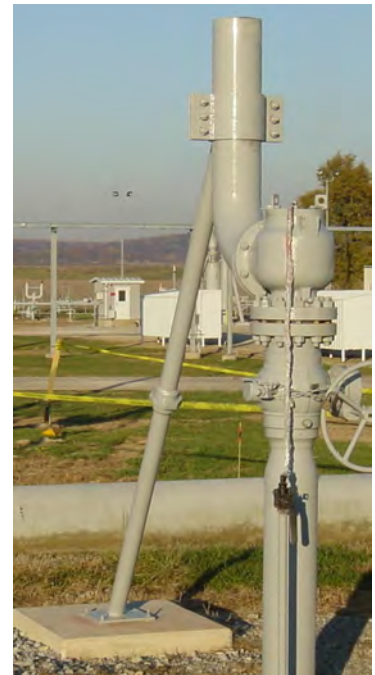
The Flow Safe dual-outlet POSRV uses a proprietary piston-to-liner dampening system to prevent rapid cycling and/or resonant chattering in providing a safe, reliable installation. No metal-to-metal contact exists between piston and liner. The high KA value offered in the Flow Safe F7000/8000 Series allows for smaller or fewer valves, saving project costs.

## Discharge Piping / Reaction Forces

When large single-outlet relief valves are installed on high-pressure systems, expensive discharge support structures may be required to protect the main inlet line and valve body from damaging bending stresses induced by discharge thrust from one side.

Reaction forces, which are substantial and may approach nine tons for discharge from a 6"x8" valve relieving at 600 psig, may be determined based on methods shown in API Standard 520, Part II.

With dual outlets, thrust reaction forces are balanced on opposite sides of the relief valve and do not impose a bending stress on the inlet piping. If vertical stacks are installed at the outlets, a simple restraint between them can reduce stresses at the flanges and allow for a more economical installation.



## Backpressure / Exit Velocity

Outlets of some large-orifice single-outlet pressure relief valves may induce undesirably high built-up backpressure at high relief pressures. These pressures can exceed the pressure rating of the outlet flange. With a long discharge stack, it is also possible to have such high backpressure at the valve outlet that flow becomes subcritical and capacity is reduced. Dual outlets can alleviate these situations.

In oxygen- and hydrogen-rich flow streams, high flow velocities can promote auto-ignition of particles striking metallic surfaces, which could result in a fire. Design criteria for oxygen and hydrogen systems may require relief valve discharge velocities to be below a certain value, and dual-outlets can help satisfy this need.

*For complete details on F7000/8000 Series, including ratings, materials, options, etc., see Catalog# F78K0914.*

# F7000/8000 Dual-Outlets

## Orifice Sizes / Flow Areas

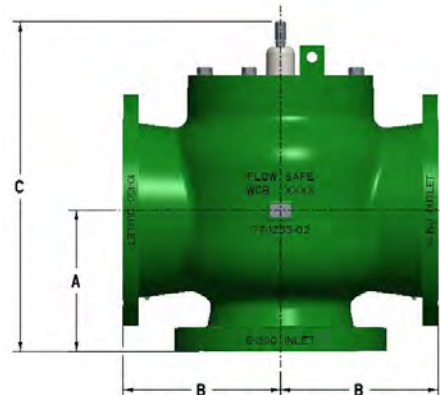
Inlet Connection	Outlet Connections	F7000 Full-Bore Orifice		F8000 Orifice (API)
		Diameter, in (mm)	Flow Area, in <sup>2</sup> (mm <sup>2</sup> )	Designation - Flow Area, in <sup>2</sup> (mm <sup>2</sup> )
2"-150# thru 600#	3"-150# x 3"-150#	1.939 (49.3)	2.953 (1905)	G - 0.588 (379) H - 0.916 (591) J - 1.503 (970)
3"-150# thru 600#	4"-150# x 4"-150#	2.900 (73.7)	6.605 (4261)	J - 1.503 (970) K - 2.147 (1385) L - 3.277 (2114)
4"-150# thru 600#	6"-150# x 6"-150#	3.816 (96.9)	11.437 (7379)	L - 3.277 (2114) M - 4.147 (2675) N - 5.014 (3235) P - 7.397 (4772)
6"-150# thru 600#	8"-150# x 8"-150#	5.760 (146.3)	26.06 (16813)	Q - 12.913 (8331) R - 18.704 (12067)
8"-150# thru 600#	8"-150# x 8"-150# or 10"-150# x 10"-150#	7.625 (193.7)	45.66 (29458)	T - 30.409 (19619)

All F7000 and F8000 orifices sizes are certified per ASME Sec. VIII on gas / vapor service only.

## Connection Dimensions

Inlet Connection	Outlet Connections	Dimensions, in (mm) <sup>1</sup>			Approx. weight, lb (kg)
		A	B	C, approx.	
2"-150#	3"-150# x 3"-150#	4.56 (116)	5.31 (135)	15.0 (381)	92 (42)
2"-300#	3"-150# x 3"-150#	4.69 (119)	5.31 (135)	15.1 (384)	100 (45)
2"-600#	3"-150# x 3"-150#	5.06 (129)	5.31 (135)	15.5 (394)	100 (45)
3"-150#	4"-150# x 4"-150#	5.56 (141)	7.00 (178)	17.7 (450)	125 (57)
3"-300#	4"-150# x 4"-150#	5.81 (148)	7.00 (178)	18.0 (457)	135 (61)
3"-600#	4"-150# x 4"-150#	6.12 (155)	7.00 (178)	18.3 (465)	138 (63)
4"-150#	6"-150# x 6"-150#	6.90 (175)	7.38 (187)	18.0 (457)	185 (84)
4"-300#	6"-150# x 6"-150#	7.43 (189)	7.38 (187)	18.5 (470)	188 (85)
4"-600#	6"-150# x 6"-150#	7.93 (201)	7.38 (187)	19.0 (483)	192 (87)
6"-150#	8"-150# x 8"-150#	8.87 (225)	8.25 (210)	22.2 (564)	285 (129)
6"-300#	8"-150# x 8"-150#	9.31 (236)	8.25 (210)	22.7 (577)	290 (132)
6"-600#	8"-150# x 8"-150#	10.00 (254)	8.25 (210)	23.4 (594)	325 (147)
8"-150#	8"-150# x 8"-150#	10.44 (265)	11.44 (291)	26.6 (676)	555 (252)
8"-300#	8"-150# x 8"-150#	10.94 (278)	11.44 (291)	27.1 (688)	565 (256)
8"-600#	8"-150# x 8"-150#	11.12 (282)	11.44 (291)	27.3 (693)	610 (276)
8"-150#	10"-150# x 10"-150#	10.25 (260)	11.06 (281)	25.9 (658)	620 (281)
8"-300#	10"-150# x 10"-150#	10.93 (278)	11.06 (281)	26.5 (673)	630 (286)
8"-600#	10"-150# x 10"-150#	11.75 (298)	11.06 (281)	27.4 (696)	690 (313)

<sup>1</sup> Contact Flow Safe for submittal drawing whenever specific dimensions are needed for construction. "C" dimension varies by pilot type.



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