



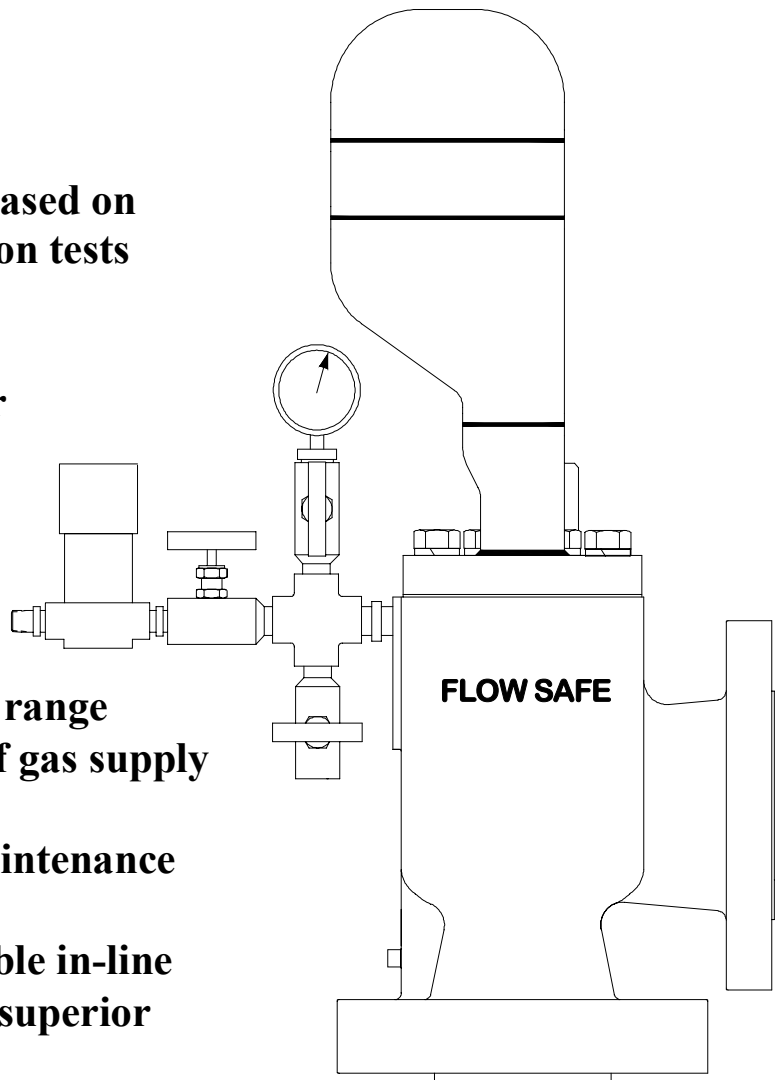
# ***FLOW SAFE, Inc.***

*"Environmental Performance for Industry"*

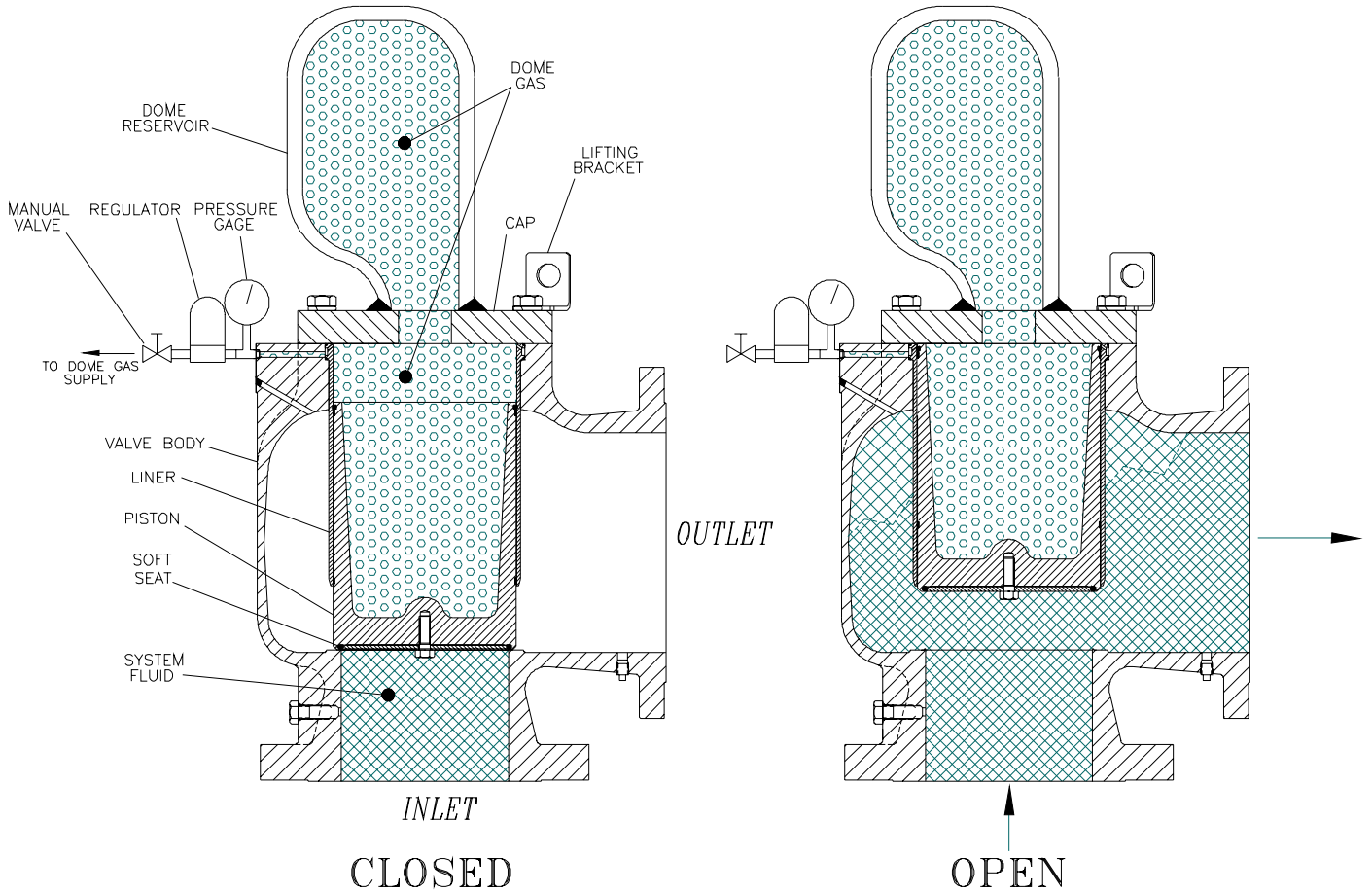
## ***F9000 SurgeFlow Series Liquid Surge Relief Valve***

### **FEATURES**

- Superior flow capacities based on National Board certification tests
- Side discharge for easy, cost-effective installation
- Piston dampening ring for chatter-free performance
- Remote or manual unloading
- Repeatably leak-tight soft seat design
- -20 to 500 °F temperature range
- Available with a variety of gas supply and control options
- Top entry for low-cost maintenance and low cost of ownership
- Self-draining and repairable in-line
- Standard 316 SS trim for superior corrosion resistance



*Flow Safe valves: Providing excellence in pressure management*



Liquid product pipelines must be protected from liquid surge, typically caused by pump failure, rapid block valve closing, non-return check valve hard-shutting, emergency shutdown of a tank or loading system, or even a pump coming on or tripping. The magnitude of surge pressures vary, some virtually undetectable to severe enough to cause major damage. These propagating waves, either increasing or decreasing rapidly, are commonly known as hydraulic transient surge or water hammer that can cause severe damage to liquid product pipelines, vessels, flanges, valving, and associated equipment.

The Flow Safe SurgeFlow series has been developed exclusively for liquid surge protection. These valves are extremely accurate, simple, and 100% reliable. The dome cavity volume calculated on top of the main valve piston is filled with nitrogen gas to effect proper release set pressure of the valve. This dome load forces the main valve into a closed position using a soft elastomer seat, providing 100% tight shut-off. When a surge pressure occurrence is sensed, the SurgeFlow valve opens immediately as the liquid fluid force acting under the piston overcomes the force from the dome gas acting on top. The piston continues to lift in proportion to the pressure surge. The closing cycle responds directly to pressure decay in the piping upstream of the SurgeFlow surge relief valve.

The Flow Safe SurgeFlow series valves are designed for extremely accurate performance. They are repeatable and will handle both minimal and/or maximum surge cases when called upon to relieve. Flow Safe suggests all surge relief valves be located nearest the point where increased pressures can occur in the main pipeline, for optimal safety purposes.

# SIZING

# F9000 SERIES

Valve Size	ASME Inlet Rating	Max. Cv (Full Open)	Set Pressures < 130 psig						Set Pressures ≥ 130 psig				
			Rise Over Set						Rise Over Set				
			20%	30%	40%	50%	60%	70%	20%	30%	40%	50%	60%
Cv	Cv	Cv	Cv	Cv	Cv	Cv	Cv	Cv	Cv	Cv	Cv	Cv	
1 x 2	150-900	17.3	3.5	4.3	8.7	11.8	14.7	17.3	6.6	12.1	14.0	15.7	17.3
	1500	12.5	---	---	---	---	---	---	4.8	8.8	10.1	11.4	12.5
1-1/2 x 3	150-600	42.5	8.5	10.6	21.2	28.9	36.1	42.5	16.1	29.8	34.4	38.7	42.5
	900/1500	33.7	---	---	---	---	---	---	12.8	23.6	27.3	30.7	33.7
2 x 3	150-600	71	14	18	35	48	60	71	27	50	58	65	71
	900/1500	54	---	---	---	---	---	---	21	38	44	49	54
3 x 4	150-600	159	32	40	80	108	135	159	60	111	129	145	159
	900/1500	130	---	---	---	---	---	---	50	91	105	118	130
4 x 6	150-600	275	55	69	138	187	234	275	105	193	223	250	275
	900/1500	248	---	---	---	---	---	---	94	174	201	226	248
6 x 8	150-600	628	126	157	314	427	534	628	239	440	509	571	628
8 x 10	150-600	1100	220	275	550	748	935	1100	418	770	891	1001	1100
12 x 16	150	2695	539	674	1348	1833	2291	2695	1024	1887	2183	2452	2695

$$Q = C_v [(P_1 - P_2) / SG]^{0.5} \quad \text{where: } Q = \text{flow rate (gpm)}$$

$$\text{or } C_v = Q [SG / (P_1 - P_2)]^{0.5} \quad \text{SG = specific gravity}$$

$P_1$  = inlet pressure w/accumulation (psig)  
 $P_2$  = backpressure (psig)

*Example:* 3000 bbl/hr of 40° API crude oil (SG = 0.825) required at 500 psig set pressure, zero backpressure;  
 System is ASME Class 300; Max. desired line pressure = 650 psig  
 = 30% rise over set

1. Determine required Cv:

$$Q \text{ in gpm} = (3000 \text{ bbl / hr}) ( \text{hr} / 60 \text{ min} ) ( 42 \text{ gal / bbl} ) = 2100 \text{ gpm}$$

$$C_v = (2100)(0.825 / 650)^{0.5} = 75$$

2. Select valve from right-hand section of chart, at 30% rise over set, with Cv = 75 or greater:

3 x 4, Class 300 inlet (Cv = 111).

## SPECIFICATIONS

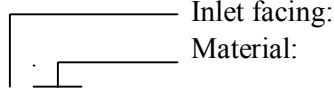
<b>Pressure range</b>	30 to 3705 psig
<b>Temperature range</b>	-20 to 500 °F
<b>Valve body material</b>	SA-216 WCB / SA-352 LCB *
<b>Dome reservoir material</b>	SA-106 B / SA-53 E/B, SA-234 WPB *
<b>Trim (wetted part) material</b>	316 or 304 SS *
<b>Seat &amp; piston seal material</b>	Buna-N, Viton, EPR, or as requested
<b>Piston wear/dampening ring material</b>	Graphite-filled PTFE

\* Other materials available upon request

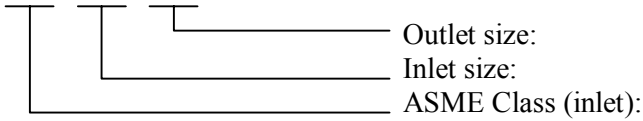
# PART NUMBERS

# F9000 SERIES

Valve Assembly  
Part Number:



9 0 5 0



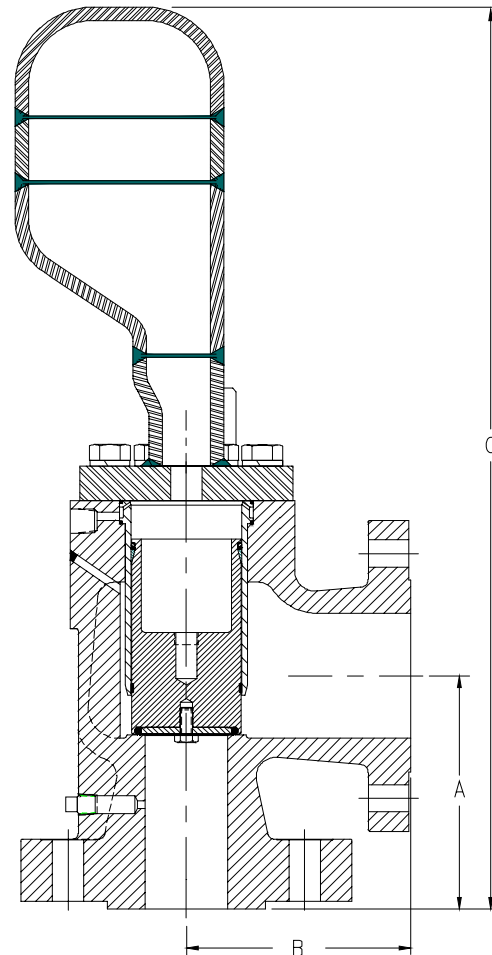
F = Raised face; R = RTJ  
S1 = CS w/ SS trim (standard)  
SS = All stainless steel

02, 03, 04, 06, 08, 10, or 16  
01, 15, 02, 03, 04, 06, 08, or 12  
05 = 150#      10 = 300#      12 = 600#  
14 = 900#      16 = 1500#

Standard assembly includes **regulator**, **pressure gage**, and **block valve** for dome gas supply from customer-furnished gas source. Specific components and supply configuration to be selected for each application; contact factory for details.

## DIMENSIONS / WEIGHTS

SIZE	Inlet Flange Rating (ASME B16.5)	Approx. Dimensions (in)			Approx. Wt. (lbs)
		A	B	C	
1 x 2	150 – 600	4.38	4.50	19	50
	900 – 1500	4.94	4.75	20	60
1-1/2 x 3	150 – 600	5.12	4.87	22	65
	900 – 1500	6.38	6.75	23	95
2 x 3	150 – 600	5.37	4.87	24	80
	900 – 1500	6.56	6.75	25	100
3 x 4	150	6.13	6.38	27	120
	300 – 600	6.38	6.38	27	125
	900 – 1500	7.50	7.12	29	160
4 x 6	150 – 600	7.75	8.25	30	220
	900 – 1500	9.74	9.19	32	300
6 x 8	150 – 300	9.44	9.50	38	320
	600	9.70	9.50	38	370
8 x 10	150 – 300	10.88	11.00	41	550
	600	11.62	11.00	42	620
12 x 16	150	11.92	15.56	48	1320



**FLOW SAFE, Inc.** - "Environmental Performance for Industry"

S-3865 Taylor Road  
Orchard Park, New York 14127  
716-662-2585-Sales  
716-662-2580-Fax  
www.flowsafe.com  
e-mail: info@flowsafe.com

Your Authorized Representative