Type 310A-32A Pressure Reducing Regulator

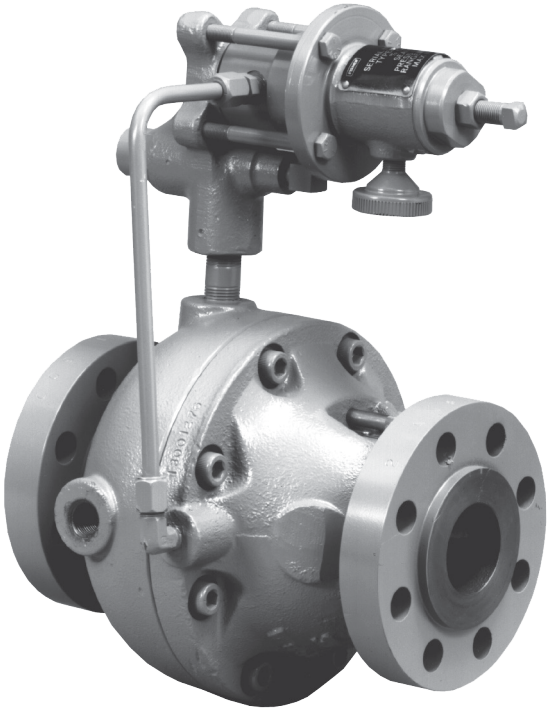

Figure 1. *Type 310A Regulator with Type 32A Pilot*

Introduction

The Type 310A pilot-operated high-pressure regulator (Figure 1) is used where high capacity and accurate control are essential. This regulator includes one Type 32A pilot assembly mounted on the main valve for pressure reducing or wide-open monitoring applications or two Type 32A pilots mounted on the main valve for working monitor applications.

Features

Accurate Control—Molded pilot diaphragms provide a narrow proportional band and registration of outlet pressure on the main diaphragm allows excellent control sensitivity.

Tight Shutoff—Throttling-sleeve design with Polytetrafluoroethylene (PTFE) seat in the body ensures positive shutoff.

High Capacity—Straight-through flow passage allows exceptionally high capacities and stable operation.

Reduced Relief Requirements—Optional restricted trim helps reduce relief valve size requirements; the regulator is easily converted to full capacity by changing the trim, if flow conditions increase.

Fast Speed of Response—Designed to meet stringent speed of response requirements for turbine startup and fuel gas applications.

Minimum Installation Space Required—Since main valve design incorporates actuator spring, less installation space is needed for the Type 310A than for other regulators of comparable capacity.

Specifications

This section lists the specifications for the Type 310A regulators. Factory specification are stamped on the nameplate fastened on the regulator at the factory.

Available Configurations

Type 310A-32A: Type 310A main valve with one Type 32A pilot for standard pressure-reducing and wide-open monitoring applications

Type 310A-32A-32A: Type 310A main valve with two Type 32A pilots for working monitor applications

Body Sizes and End Connection Styles

1 in. body with NPT ends; and 1, 2, 3, 4 or 4 x 6 in. / DN 25, 50, 80, 100 and 100 x 150 body with CL300 RF or CL600 RF flanged ends

Maximum Inlet and Pilot Supply Pressures[1]

NPT and CL600 RF: 1500 psig / 103 bar

CL300 RF: 750 psig / 51.7 bar

Maximum Pressure Drop[1]

NPT and CL600 RF: 1425 psig / 98.3 bar

CL300 RF: 720 psig / 49.6 bar

Maximum Outlet Pressure[1]

Operating: 700 psig / 48.3 bar

To Avoid Internal Part Damage: 800 psig / 55.2 bar Exceeding this pressure may result in gas venting from pilot spring case.

Emergency (Casing): 1500 psig / 103 bar or maximum inlet pressure whichever is lower.

Outlet Pressure Ranges and Proportional Bands

See Table 1

Maximum Travel

See Table 3

Minimum Differential Pressure[1]

15 psig / 1.0 bar

Flow Coefficients

See Tables 4, 5 and 6

IEC Sizing Coefficients

See Table 7

Flow Capacities

See Tables 8, 9, 10, 11 and 12

Process Temperature Capabilities[1]

Nitrile (NBR) with Wiper Ring: -20 to 150°F / -29 to 66°C

Fluorocarbon (FKM) with Wiper Ring: 0 to 150°F / -18 to 66°C

Fluorocarbon (FKM) without Wiper Ring: 0 to 300°F / -18° to 149°C

External Pilot Supply Connection

1/4 in. NPT

Pilot Vent Connection

1/4 in. NPT

Pressure Connections

See Figure 7

Options

- Main valve body without pilot for on-off service
- Travel indicator
- Pressure loaded pilot
- Type 252 pilot supply filter
- Backpressure protection system
- Relief Size-Reduction Trim (30%, 50% or 70%)
- NACE construction
- Inlet tap
- Turbine Start-up Trim for high turndown applications

Approximate Weights

1 In. / DN 25: 45 lbs / 20 kg

2 In. / DN 50: 90 lbs / 41 kg

3 In. / DN 80: 145 lbs / 66 kg

4 In. / DN 100: 190 lbs / 86 kg

4 x 6 In. / DN 100 x 150: 235 lbs / 107 kg

Construction Materials

Main Valve

Body: WCC steel

Throttling Sleeve: Stainless steel

Seat: PTFE

Diaphragm Plates: Steel

Diaphragm and O-rings: Nitrile (NBR) **(standard)** or Fluorocarbon (FKM)

Main Spring: Steel

Valve Plug: Stainless steel

Travel Indicator Rod: Stainless steel

Wiper Ring: Nitrile (NBR)

Pilot

Spring Case, Diaphragm Spacer, Pilot Body and Spring Case Cap: Cast steel

Adjusting Screw and Diaphragm Plate: Plated steel

Diaphragm: Nitrile (NBR) **(standard)** or Fluorocarbon (FKM)

Orifice Assembly and Yoke: Stainless steel

Valve Disk Assembly: Stainless steel/ Nitrile (NBR) (standard) or Stainless steel/ Fluorocarbon (FKM)

Bleed Valve and Orifice: Stainless steel

Piston and Piston Seat Assembly: Stainless steel and Nylon (PA)

Pilot Main Spring: Plated steel

1. The pressure/temperature limits in this bulletin or any applicable standard limitation should not be exceeded.

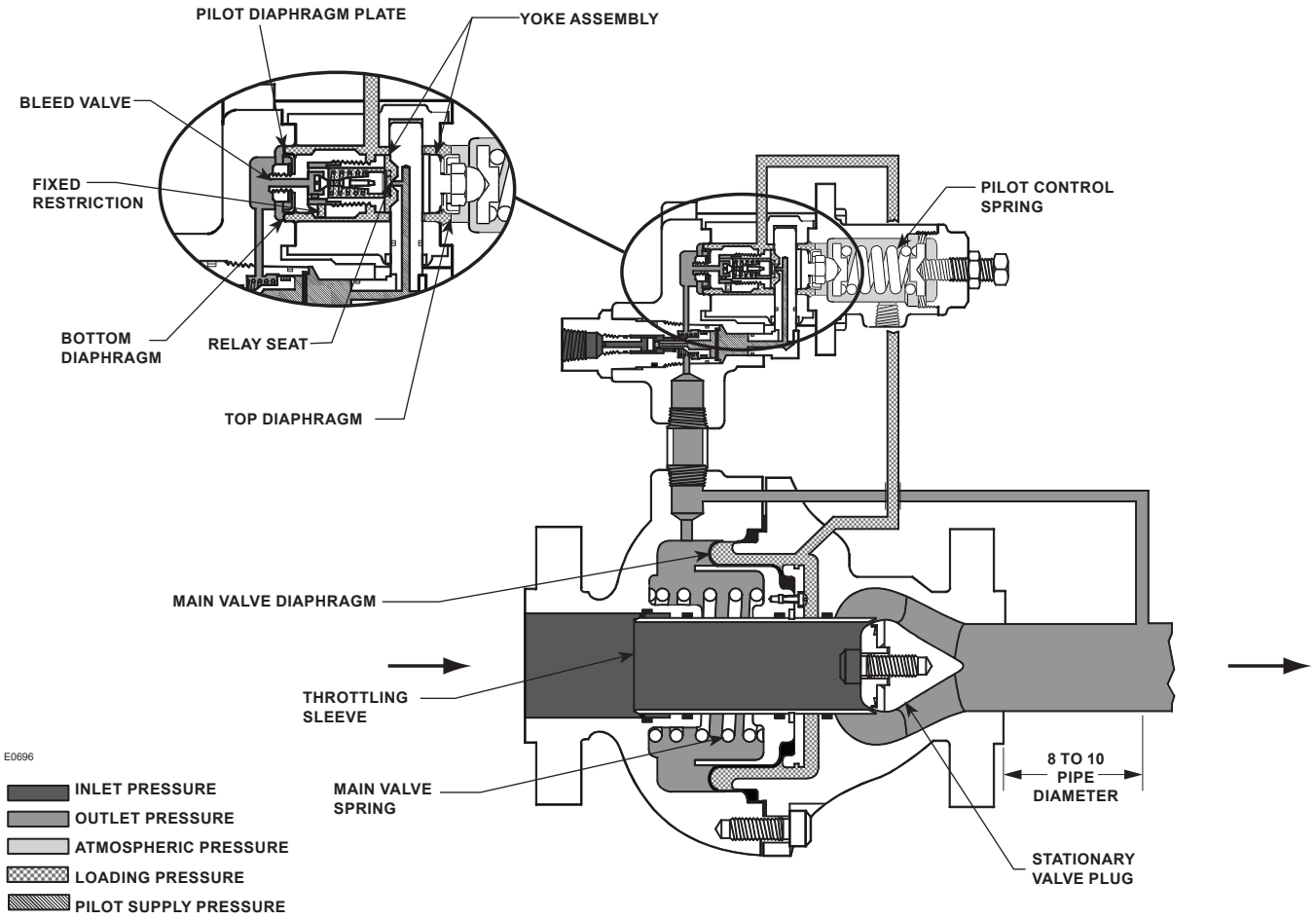

Figure 2. *Type 310A-32A Regulator Operational Schematic*

Principle of Operation

Single-Pilot Regulator (Figure 2)

The regulator inlet pressure enters the pilot through the external pilot supply line and is utilized as the supply pressure for the pilot. The setting of the pilot control spring determines the reduced outlet (downstream) pressure.

In operation, assume the outlet pressure is less than the setting of the pilot control spring. Pilot control spring force then overcomes the force resulting from outlet pressure acting on the bottom diaphragm. The spring pushes the diaphragm plate and yoke assembly away from the relay seat, opening it and supplying additional loading pressure to the main valve diaphragm. When this additional loading pressure exceeds the force resulting from outlet pressure acting on the main valve diaphragm plus the force of the main valve spring, the diaphragm is pushed away from the stationary valve plug. The throttling sleeve opens wider and the required gas is supplied to the downstream system.

When gas demand in the downstream system has been satisfied, the outlet pressure tends to increase. The increased outlet pressure acting on the bottom diaphragm of the diaphragm plate and yoke assembly results in a force that overcomes the pilot spring setting and forces the assembly toward the relay seat, closing it. The loading pressure acting on the main valve diaphragm bleeds to the downstream system through the fixed restriction in the diaphragm plate and yoke assembly. When rapid main valve closure is required by unusual control conditions, the bleed valve opens for increased bleed rate. The force of increased outlet pressure acting on the main valve diaphragm plus the main valve spring force overcomes the force of decreased loading pressure acting on the main valve diaphragm and moves the throttling sleeve toward the stationary valve plug to decrease the gas flow to the downstream system.

The top diaphragm in the pilot acts as a sealing member for the loading chamber and as a balancing member to the bottom diaphragm. The two diaphragms are connected by a yoke. Pressure change to the center chamber has little effect on the positioning of the valve disk.

Monitor Systems

Wide-Open Monitors (Figure 3)

Monitoring regulators serve as overpressure protection devices to limit system pressure in the event of failure of working regulators feeding the system. The control line of a wide-open monitoring regulator may be connected downstream of the working regulator, so that during normal operation the wide-open monitoring regulator is standing wide open with the pressure reduction being taken across the working regulator. Only in case of working regulator failure does the wide-open monitoring regulator operate.

Working Monitors (Figure 4)

The Type 310A-32A-32A working monitor regulator differs from wide-open monitors in that it has working monitor capability. This means that it normally reduces pressure and throttles while the second-stage regulator is in operation. Should the second-stage working regulator fail open, the Type 310A-32A-32A will take over the entire pressure reduction function.

The working monitor pilots are adaptations of two Type 32A pilots with special internal parts, due to the pressure conditions in this piloting system. A spacer blocks open the differential regulator portion of the Type 32A monitoring pilot. A plug in both the working and monitoring pilots makes the internal bleed nonfunctional. A restriction placed in the external tubing between the diaphragm loading pressure and the intermediate pressure acts as a downstream bleed.

If the second-stage working regulator fails to open, the distribution pressure increases to the setting of the Type 32A monitoring pilot (slightly higher than the original distribution pressure) and is controlled at that level by the Type 310A-32A-32A.

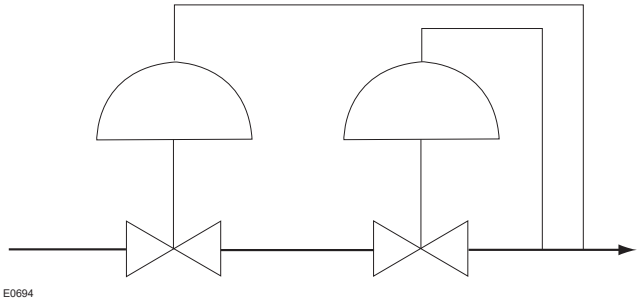

Figure 3. *Typical Wide-Open Monitor*

Thus, downstream equipment is protected against a major overpressure condition without disrupting service or venting gas to atmosphere.

In the working pilot, the inlet pressure is reduced to a pre-determined pilot supply pressure, which is further reduced to loading pressure for the Type 310A diaphragm. The loading pressure is piped through the portion of the monitoring pilot blocked open by the spacer and, as long as distribution pressure is below the setting of the monitoring pilot, passes through the relay orifice of the monitoring pilot to the diaphragm case of the Type 310A body.

Distribution pressure is piped back to the monitoring pilot. As long as the distribution pressure is less than the monitoring pilot setting, the working pilot controls the Type 310A to maintain intermediate pressure. If the distribution pressure increases to the monitoring pilot setting, the monitoring pilot relay orifice starts to throttle the loading pressure to the Type 310A diaphragm. This allows the Type 310A main spring to move the throttling sleeve closer to the seat and control distribution pressure at the monitoring pilot set point. Therefore, failure of the second-stage working regulator is controlled with only a slight increase in distribution pressure, with the Type 310A-32A-32A accomplishing the entire pressure reduction function.

Installation

The Type 310A may be installed in any position, but is normally installed in a horizontal pipeline with the pilot or pilots above the body. See Figures 5 and 6 for typical piping installation.

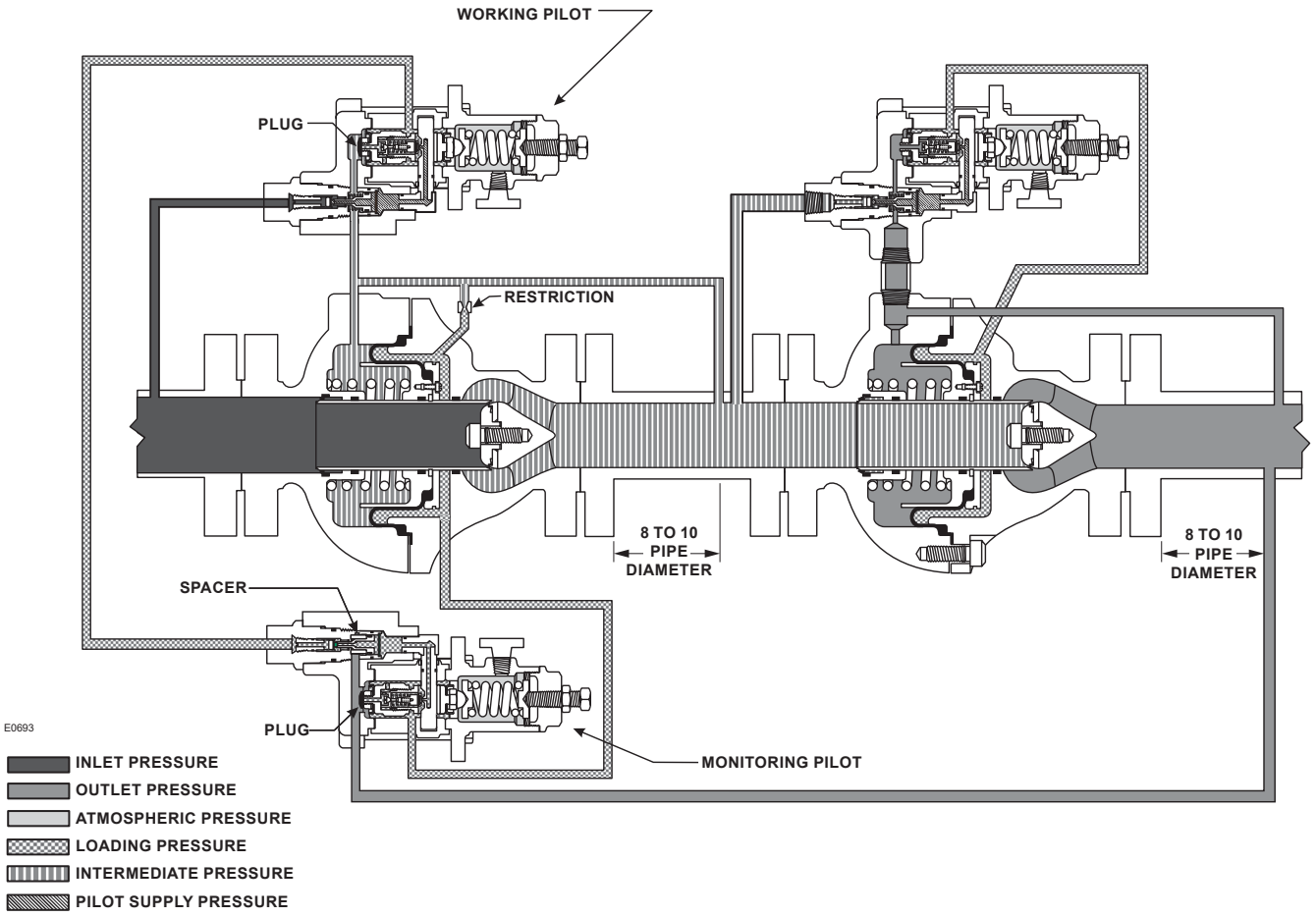

Figure 4. *Type 310A-32A-32A Working Monitor Regulator Operational Schematic*

Table 1. *Outlet Pressure Ranges*

OUTLET PRESSURE RANGE		PROPORTIONAL BAND		SPRING COLOR	SPRING PART NUMBER
psig	bar	psig	bar		
10 to 100	0.69 to 6.9	2	0.14	Yellow	1E392527022
100 to 250	6.9 to 17.2	5	0.34	Blue	1D387227022
250 to 600	17.2 to 41.4	12	0.83	Red	1D465127142
400 to 700	27.6 to 48.3(1)	20	1.4	Green	13A5543X012
1. Available with Nitrile (NBR) pilot diaphragm only.					

Table 2. *Recommended Minimum Differential Between Monitoring Pilot Setting and Distribution Pressure*

OUTLET PRESSURE RANGE		SPRING COLOR	SPRING PART NUMBER	MINIMUM PRESSURE AT WHICH MONITORING PILOT CAN BE SET, psig / bar
psig	bar			
10 to 100	0.69 to 6.9	Yellow	1E392527022	5.0 / 0.34 over normal distribution pressure
100 to 250	6.9 to 17.2	Blue	1D387227022	10 / 0.69 over normal distribution pressure
250 to 600	17.2 to 41.4	Red	1D465127142	15 / 1.0 over normal distribution pressure
400 to 700	27.6 to 48.3(1)	Green	13A5543X012	20 / 1.4 over normal distribution pressure

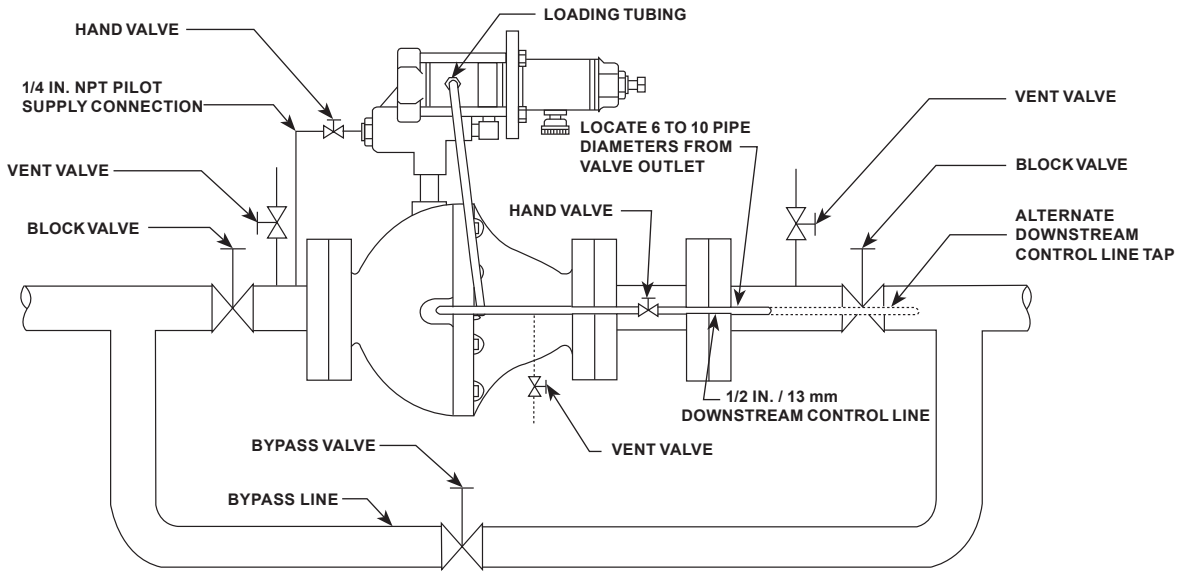

Figure 5. *Typical Pressure Reducing Installation*

Capacity Information

Note

Type 310A regulator flow capacities are laboratory verified; therefore, they may be sized for 100% flow using capacities as shown in Tables 8, 9, 10, 11 and 12. It is not necessary to reduce published capacities.

Tables 8, 9, 10, 11 and 12 show the natural gas regulating capacities of the Type 310A regulator at selected inlet pressures and outlet pressure settings. Flows are in thousands of SCFH at 60°F and 14.7 psia (and in thousands of Nm^3/h at 0°C and 1.01325 bar) of 0.6 specific gravity natural gas.

To determine equivalent capacities for air, propane, butane or nitrogen, multiply the capacity by the following appropriate conversion factor: 0.775 for air, 0.628 for propane, 0.548 for butane or 0.789 for nitrogen. For gases of other specific gravities, multiply the given capacity by 0.775 and divide by the square root of the appropriate specific gravity. Then, if capacity is desired in normal cubic meters per hour at 0°C and 1.01325 bar, multiply SCFH by 0.0268.

To find approximate regulating capacities at pressure settings not given in Tables 8, 9, 10, 11 and 12 or to find wide-open flow capacities for relief sizing at any inlet pressure, perform one of the following procedures. Then, if necessary, convert using the factors provided above.

For critical pressure drops (absolute outlet pressure equal to or less than one-half of absolute inlet pressure), use the following formula:

$$Q = (P_1)(C_g)(1.29)$$

For pressure drops lower than critical (absolute outlet pressure greater than one-half of absolute inlet pressure).

$$Q = \sqrt{\frac{520}{GT}}\, C_g P_1 \mathrm{SIN}\left(\frac{3417}{C_1}\sqrt{\frac{\Delta P}{P_1}}\right) \mathrm{DEG}$$

where,

Q = gas flow rate, SCFH
P_1 = absolute inlet pressure, psia (P_1 gauge + 14.7)
C_g = regulating or wide-open gas sizing coefficient from Table 4, 5 or 6
G = gas specific gravity of the gas
T = absolute temperature of gas at inlet, °Rankine
C_1 = flow coefficient
ΔP = pressure drop across the regulator, psi

When sizing a working monitor setup, size each regulator separately using either the capacity tables or the equation method. When sizing a wide-open monitor setup, first use the equation method, solving for the pressure drop across the monitor at the maximum flow condition. Next size the worker using either the capacity tables or equation method while taking into account the monitor's maximum pressure drop.

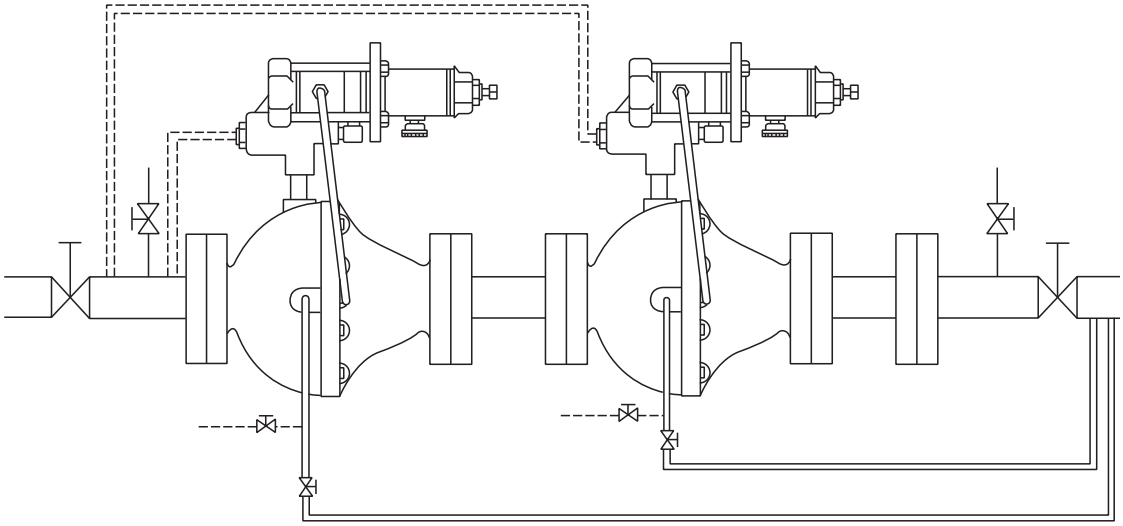

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Figure 6. *Typical Wide-Open Monitor Installation*

Table 3. *Maximum Travel*

BODY SIZE		MAXIMUM TRAVEL	
In.	**DN**	**In.**	**mm**
1	25	0.5	13
2	50	0.875	22
3	80	1	25
4	100	1.125	28
4 x 6	100 x 150	1.5	38

Table 4. *Wide-Open Flow Coefficients for Relief Valve Sizing with Body Size Piping for Relief Valve Sizing*

TRIM SIZE		BODY SIZE, IN. / DN				
		1 / 25	**2 / 50**	**3 / 80**	**4 / 100**	**4 x 6 / 100 x 150**
30%	C_g	238	835	1810	3080	4400
	C_v	8.6	30.6	64.6	114.9	181.8
	C_1	27.7	27.3	28	26.8	24.2
50%	C_g	313	1240	2810	4620	6600
	C_v	10.3	46.3	99.3	172.4	280.9
	C_1	30.4	26.8	28.3	26.8	23.5
70%	C_g	401	1800	3780	6660	9000
	C_v	14.3	69	129	213	360
	C_1	28.1	26.2	29.3	31.3	25
100%	C_g	612	2610	5510	8830	16,200
	C_v	22	95	200	322	661
	C_1	28.1	27.5	27.5	27.4	24.5

Table 5. *Regulating Flow Coefficients for Body Size Piping*

COEFFICIENT AT PERCENT OF MAXIMUM TRAVEL		TRIM SIZE (PERCENT OF FLOW CAPACITY) BY BODY SIZE, IN. / DN																			
		1 / 25			2 / 50				3 / 80				4 / 100				4 x 6 / 100 x 150			
		100%	50%	30%	100%	70%	50%	30%	100%	70%	50%	30%	100%	70%	50%	30%	100%	70%	50%	30%
10%	C_g	65	60	56	210	200	190	185	346	340	325	305	805	725	615	510	895	800	780	760
	C_v	2.2	2.0	2.0	7.6	7.5	6.9	7.0	12.5	11.6	11.3	10.8	29.6	24.0	22.6	19.2	36.5	32.0	33.2	31.4
20%	C_g	115	93	83	460	396	311	260	810	735	615	460	1800	1310	1040	705	2235	1680	1420	1160
	C_v	4.0	3.2	3.0	16.6	14.9	11.3	9.8	29.3	25.2	21.4	16.3	66.2	43.4	38.2	26.6	91.2	67.2	60.4	47.9
30%	C_g	210	124	107	810	583	430	325	1520	1120	85	606	3100	1990	1480	917	3800	2550	2050	1550
	C_v	7.3	4.2	3.8	29.2	21.9	15.6	12.3	55.1	38.4	3.0	21.4	114.0	65.9	54.4	34.6	155.1	102.0	87.2	64.0
40%	C_g	343	151	126	1120	758	540	385	2380	1480	1130	755	4350	2650	1900	1130	5510	3300	2650	1940
	C_v	11.9	5.1	4.5	40.4	28.5	19.6	14.6	86.2	50.7	39.4	26.7	159.9	87.7	69.9	42.6	224.9	132.0	112.8	80.2
50%	C_g	427	178	140	1440	925	646	444	3270	1840	1380	902	5480	3280	2300	1340	7300	4150	3250	2330
	C_v	14.8	6.0	5.0	52.0	34.8	23.4	16.8	118.5	63.0	48.1	31.9	201.5	108.6	84.6	50.6	298.0	166.0	138.3	96.3
60%	C_g	485	204	150	1750	1090	744	502	3890	2190	1630	1060	6310	3950	2730	1540	9010	5010	3840	2720
	C_v	16.8	6.9	5.4	63.2	41.0	27.0	19.0	140.9	75.0	56.8	37.5	232.0	130.8	110.4	58.1	367.8	200.4	163.4	112.4
70%	C_g	523	226	159	2040	1240	841	561	4410	2540	1880	1210	7040	4550	3140	1740	10580	5870	4430	3110
	C_v	18.2	7.7	5.7	73.6	46.6	30.5	21.3	159.8	87.0	65.5	42.8	258.8	150.7	115.4	65.7	431.8	234.8	188.5	128.5
80%	C_g	549	250	168	2260	1400	946	624	4820	2900	2130	1360	7640	5110	3540	1950	12100	6720	5030	3500
	C_v	19	8	6	82	53	34	24	175	99	74	48	281	169	130	74	493.9	269	214	145
90%	C_g	573	272	177	2430	1550	1040	690	5080	3210	2380	1510	8140	5700	3950	2200	13600	7570	5650	3870
	C_v	20	9	6	88	58	38	26	184	110	83	53	299	189	145	83	555.1	303	240	160
100%	C_g	597	289	184	2520	1700	1130	761	5330	3530	2640	1670	8670	6390	4390	2680	14900	8450	6320	4120
	C_v	21	10	7	91	64	41	29	193	121	92	59	319	212	161	101	608.2	338	269	174
C_1		28.8	29.5	28	27.7	26.6	27.6	26.4	27.6	29.2	28.7	28.3	27.2	30.2	27.2	26.5	24.5	25	23.5	24.2

Table 6. *Regulating Flow Coefficients for 2:1 Swaged Piping and 100% Trim*

COEFFICIENT AT PERCENT OF MAXIMUM TRAVEL		TRIM SIZE (PERCENT OF FLOW CAPACITY) BY BODY SIZE, IN. / DN				
		1 / 25	2 / 50	3 / 80	4 / 100	4 x 6 / 100 x 150
10%	C_g	60	210	340	810	850
	C_v	2.0	7.1	11.6	28.1	29.8
20%	C_g	115	450	825	1700	2050
	C_v	3.8	15.2	28.3	59.0	71.9
30%	C_g	205	795	1540	3050	3300
	C_v	6.7	26.8	52.7	105.9	115.8
40%	C_g	330	1110	2350	4300	4650
	C_v	10.8	37.4	80.5	149.3	163.2
50%	C_g	395	1380	3025	5400	6050
	C_v	13.0	46.5	103.6	187.5	212.3
60%	C_g	450	1610	3550	6200	7430
	C_v	14.8	54.2	121.6	215.3	260.7
70%	C_g	490	1800	3900	3900	8700
	C_v	16.1	60.6	133.6	135.4	305.3
80%	C_g	515	1960	4200	7400	9860
	C_v	17	66	144	257	346
90%	C_g	533	2055	4440	7800	10800
	C_v	17	69	152	271	379
100%	C_g	548	2140	4610	8150	11600
	C_v	18	72	158	283	407
C_1		30.5	29.7	29.2	28.8	28.5

Table 7. *IEC Sizing Coefficients*

BODY SIZE, IN. / DN	1 / 25	2 / 50	3 / 80	4 / 100	4 x 6 / 100 x 150
X_T	0.53	0.49	0.48	0.47	0.38
F_D	0.66	0.59	0.56	0.48	0.58
F_L	0.74	0.74	0.74	0.74	0.74

Table 8. *1 In. / DN 25 Body Capacities with 100% Trim and Body Size Piping (Thousands of SCFH / Nm³/h) of 0.6 Specific Gravity Gas)*

INLET PRESSURE		OUTLET PRESSURE, psig / bar																					
		25 / 1.7		50 / 3.5		75 / 5.2		100 / 6.9		125 / 8.6		150 / 10.3		175 / 12.1		200 / 13.8		225 / 15.5		250 / 17.2		300 / 20.7	
psig	bar	psig	bar	psig	bar	psig	bar	psig	bar	psig	bar	psig	bar	psig	bar	psig	bar	psig	bar	psig	bar	psig	bar
50	3.5	48	1.3																				
75	5.2	69	1.8	61	1.6																		
100	6.9	88	2.4	87	2.3	73	1.9																
150	10.3	127	3.4	127	3.4	125	3.4	115	3.1	92	2.5												
200	13.8	165	4.4	165	4.4	165	4.4	163	4.4	156	4.2	139	3.7	107	2.9								
250	17.2	204	5.5	204	5.5	204	5.5	204	5.5	202	5.4	195	5.2	182	4.9	160	4.3	121	3.2				
300	20.7	243	6.5	243	6.5	243	6.5	243	6.5	242	6.5	240	6.4	234	6.3	223	6.0	206	5.5	178	4.8		
350	24.1	281	7.5	281	7.5	281	7.5	281	7.5	281	7.5	281	7.5	278	7.5	273	7.3	263	7.1	248	6.6	195	5.2
400	27.6	320	8.6	320	8.6	320	8.6	320	8.6	320	8.6	320	8.6	319	8.5	317	8.5	312	8.4	303	8.1	272	7.3
450	31.0	358	9.6	358	9.6	358	9.6	358	9.6	358	9.6	358	9.6	358	9.6	358	9.6	355	9.5	350	9.4	331	8.9
500	34.5	397	10.6	397	10.6	397	10.6	397	10.6	397	10.6	397	10.6	397	10.6	397	10.6	396	10.6	393	10.5	381	10.2
550	38.0	435	11.7	435	11.7	435	11.7	435	11.7	435	11.7	435	11.7	435	11.7	435	11.7	435	11.7	434	11.6	427	11.4
600	41.4	474	12.7	474	12.7	474	12.7	474	12.7	474	12.7	474	12.7	474	12.7	474	12.7	474	12.7	474	12.7	470	12.6
650	44.8	512	13.7	512	13.7	512	13.7	512	13.7	512	13.7	512	13.7	512	13.7	512	13.7	512	13.7	512	13.7	511	13.7
700	48.3	551	14.8	551	14.8	551	14.8	551	14.8	551	14.8	551	14.8	551	14.8	551	14.8	551	14.8	551	14.8	551	14.8
750	51.7	589	15.8	589	15.8	589	15.8	589	15.8	589	15.8	589	15.8	589	15.8	589	15.8	589	15.8	589	15.8	589	15.8
800	55.2	628	16.8	628	16.8	628	16.8	628	16.8	628	16.8	628	16.8	628	16.8	628	16.8	628	16.8	628	16.8	628	16.8
850	58.6	666	17.8	666	17.8	666	17.8	666	17.8	666	17.8	666	17.8	666	17.8	666	17.8	666	17.8	666	17.8	666	17.8
900	62.1	705	18.9	705	18.9	705	18.9	705	18.9	705	18.9	705	18.9	705	18.9	705	18.9	705	18.9	705	18.9	705	18.9
950	65.5	744	19.9	744	19.9	744	19.9	744	19.9	744	19.9	744	19.9	744	19.9	744	19.9	744	19.9	744	19.9	744	19.9
1000	68.9	782	21.0	782	21.0	782	21.0	782	21.0	782	21.0	782	21.0	782	21.0	782	21.0	782	21.0	782	21.0	782	21.0
1100	75.8	859	23.0	859	23.0	859	23.0	859	23.0	859	23.0	859	23.0	859	23.0	859	23.0	859	23.0	859	23.0	859	23.0
1200	82.7	936	25.1	936	25.1	936	25.1	936	25.1	936	25.1	936	25.1	936	25.1	936	25.1	936	25.1	936	25.1	936	25.1
1300	89.6	1013	27.1	1013	27.1	1013	27.1	1013	27.1	1013	27.1	1013	27.1	1013	27.1	1013	27.1	1013	27.1	1013	27.1	1013	27.1
1400	96.5	1090	29.2	1090	29.2	1090	29.2	1090	29.2	1090	29.2	1090	29.2	1090	29.2	1090	29.2	1090	29.2	1090	29.2	1090	29.2

Table 8. *1 In. / DN 25 Body Capacities with 100% Trim and Body Size Piping (continued)*

INLET PRESSURE		OUTLET PRESSURE, psig / bar																			
		325 / 22.4		350 / 24.1		400 / 27.6		425 / 29.3		450 / 31.0		500 / 34.5		550 / 38.0		600 / 41.4		650 / 44.8		700 / 48.3	
psig	bar	psig	bar	psig	bar	psig	bar	psig	bar	psig	bar	psig	bar	psig	bar	psig	bar	psig	bar	psig	bar
350	24.1	145	3.9																		
400	27.6	246	6.6	211	5.7																
450	31.0	315	8.4	294	7.9	225	6.0	165	4.4												
500	34.5	371	9.9	357	9.6	314	8.4	282	7.6	239	6.4										
550	38.0	420	11.3	411	11.0	381	10.2	360	9.6	333	8.9	252	6.7								
600	41.4	466	12.5	459	12.3	438	11.7	423	11.3	404	10.8	351	9.4	264	7.1						
650	44.8	508	13.6	504	13.5	489	13.1	478	12.8	465	12.5	427	11.4	369	9.9	276	7.4				
700	48.3	549	14.7	547	14.7	536	14.4	528	14.2	518	13.9	490	13.1	448	12.0	385	10.3	287	7.7		
750	51.7	589	15.8	588	15.8	581	15.6	575	15.4	567	15.2	546	14.6	514	13.8	468	12.5	401	10.7	297	8.0
800	55.2	628	16.8	628	16.8	623	16.7	619	16.6	614	16.5	597	16.0	572	15.3	537	14.4	487	13.1	416	11.1
850	58.6	666	17.8	666	17.8	664	17.8	662	17.7	658	17.6	645	17.3	626	16.8	598	16.0	559	15.0	506	13.6
900	62.1	705	18.9	705	18.9	704	18.9	703	18.8	700	18.8	691	18.5	676	18.1	653	17.5	622	16.7	580	15.5
950	65.5	744	19.9	744	19.9	743	19.9	743	19.9	741	19.9	734	19.7	723	19.4	705	18.9	680	18.2	646	17.3
1000	68.9	782	21.0	782	21.0	782	21.0	782	21.0	781	20.9	777	20.8	768	20.6	754	20.2	733	19.6	705	18.9
1100	75.8	859	23.0	859	23.0	859	23.0	859	23.0	859	23.0	858	23.0	853	22.9	845	22.6	831	22.3	812	21.8
1200	82.7	936	25.1	936	25.1	936	25.1	936	25.1	936	25.1	936	25.1	935	25.1	930	24.9	921	24.7	908	24.3
1300	89.6	1013	27.1	1013	27.1	1013	27.1	1013	27.1	1013	27.1	1013	27.1	1013	27.1	1011	27.1	1006	27.0	998	26.7
1400	96.5	1090	29.2	1090	29.2	1090	29.2	1090	29.2	1090	29.2	1090	29.2	1090	29.2	1090	29.2	1090	29.2	1082	29.0

Table 9. *2 In. / DN 50 Body Capacities with 100% Trim and Body Size Piping (Thousands of SCFH / Nm³/h) of 0.6 Specific Gravity Gas)*

INLET PRESSURE		OUTLET PRESSURE, psig / bar																					
		25 / 1.7		50 / 3.5		75 / 5.2		100 / 6.9		125 / 8.6		150 / 10.3		175 / 12.1		200 / 13.8		225 / 15.5		250 / 17.2		300 / 20.7	
psig	bar	psig	bar	psig	bar	psig	bar	psig	bar	psig	bar	psig	bar	psig	bar	psig	bar	psig	bar	psig	bar	psig	bar
50	3.5	205	5.5																				
75	5.2	292	7.8	265	7.1																		
100	6.9	373	10.0	369	9.9	315	8.4																
150	10.3	536	14.4	536	14.4	532	14.3	497	13.3	399	10.7												
200	13.8	698	18.7	698	18.7	698	18.7	695	18.6	668	17.9	602	16.1	468	12.5								
250	17.2	861	23.1	861	23.1	861	23.1	861	23.1	858	23.0	835	22.4	785	21.0	693	18.6	529	14.2				
300	20.7	1024	27.4	1024	27.4	1024	27.4	1024	27.4	1024	27.4	1020	27.3	1000	26.8	959	25.7	889	23.8	775	20.8		
350	24.1	1186	31.8	1186	31.8	1186	31.8	1186	31.8	1186	31.8	1186	31.8	1183	31.7	1165	31.2	1130	30.3	1072	28.7	849	22.8
400	27.6	1349	36.2	1349	36.2	1349	36.2	1349	36.2	1349	36.2	1349	36.2	1349	36.2	1345	36.0	1329	35.6	1298	34.8	1175	31.5
450	31.0	1512	40.5	1512	40.5	1512	40.5	1512	40.5	1512	40.5	1512	40.5	1512	40.5	1512	40.5	1508	40.4	1493	40.0	1421	38.1
500	34.5	1674	44.9	1674	44.9	1674	44.9	1674	44.9	1674	44.9	1674	44.9	1674	44.9	1674	44.9	1674	44.9	1670	44.8	1631	43.7
550	38.0	1837	49.2	1837	49.2	1837	49.2	1837	49.2	1837	49.2	1837	49.2	1837	49.2	1837	49.2	1837	49.2	1837	49.2	1820	48.8
600	41.4	2000	53.6	2000	53.6	2000	53.6	2000	53.6	2000	53.6	2000	53.6	2000	53.6	2000	53.6	2000	53.6	2000	53.6	1995	53.5
650	44.8	2162	57.9	2162	57.9	2162	57.9	2162	57.9	2162	57.9	2162	57.9	2162	57.9	2162	57.9	2162	57.9	2162	57.9	2162	57.9
700	48.3	2325	62.3	2325	62.3	2325	62.3	2325	62.3	2325	62.3	2325	62.3	2325	62.3	2325	62.3	2325	62.3	2325	62.3	2325	62.3
750	51.7	2488	66.7	2488	66.7	2488	66.7	2488	66.7	2488	66.7	2488	66.7	2488	66.7	2488	66.7	2488	66.7	2488	66.7	2488	66.7
800	55.2	2650	71.0	2650	71.0	2650	71.0	2650	71.0	2650	71.0	2650	71.0	2650	71.0	2650	71.0	2650	71.0	2650	71.0	2650	71.0
850	58.6	2813	75.4	2813	75.4	2813	75.4	2813	75.4	2813	75.4	2813	75.4	2813	75.4	2813	75.4	2813	75.4	2813	75.4	2813	75.4
900	62.1	2976	79.8	2976	79.8	2976	79.8	2976	79.8	2976	79.8	2976	79.8	2976	79.8	2976	79.8	2976	79.8	2976	79.8	2976	79.8
950	65.5	3138	84.1	3138	84.1	3138	84.1	3138	84.1	3138	84.1	3138	84.1	3138	84.1	3138	84.1	3138	84.1	3138	84.1	3138	84.1
1000	68.9	3301	88.5	3301	88.5	3301	88.5	3301	88.5	3301	88.5	3301	88.5	3301	88.5	3301	88.5	3301	88.5	3301	88.5	3301	88.5
1100	75.8	3626	97.2	3626	97.2	3626	97.2	3626	97.2	3626	97.2	3626	97.2	3626	97.2	3626	97.2	3626	97.2	3626	97.2	3626	97.2
1200	82.7	3952	106	3952	106	3952	106	3952	106	3952	106	3952	106	3952	106	3952	106	3952	106	3952	106	3952	106
1300	89.6	4277	115	4277	115	4277	115	4277	115	4277	115	4277	115	4277	115	4277	115	4277	115	4277	115	4277	115
1400	96.5	4602	123	4602	123	4602	123	4602	123	4602	123	4602	123	4602	123	4602	123	4602	123	4602	123	4602	123

Table 9. *2 In. / DN 50 Body Capacities with 100% Trim and Body Size Piping (continued)*

INLET PRESSURE		OUTLET PRESSURE, psig / bar																			
		325 / 22.4		350 / 24.1		400 / 27.6		425 / 29.3		450 / 31.0		500 / 34.5		550 / 38.0		600 / 41.4		650 / 44.8		700 / 48.3	
psig	bar	psig	bar	psig	bar	psig	bar	psig	bar	psig	bar	psig	bar	psig	bar	psig	bar	psig	bar	psig	bar
350	24.1	634	17.0																		
400	27.6	1070	28.7	917	24.6																
450	31.0	1359	36.4	1271	34.1	981	26.3	724	19.4												
500	34.5	1592	42.7	1537	41.2	1361	36.5	1226	32.9	1041	27.9										
550	38.0	1796	48.1	1761	47.2	1645	44.1	1559	41.8	1446	38.8	1098	29.4								
600	41.4	1983	53.1	1961	52.6	1884	50.5	1824	48.9	1748	46.8	1526	40.9	1152	30.9						
650	44.8	2158	57.8	2146	57.5	2095	56.1	2054	55.0	2000	53.6	1846	49.5	1603	43.0	1204	32.3				
700	48.3	2325	62.3	2320	62.2	2289	61.3	2261	60.6	2223	59.6	2112	56.6	1939	52.0	1677	44.9	1253	33.6		
750	51.7	2488	66.7	2488	66.7	2472	66.3	2453	65.7	2427	65.0	2346	62.9	2218	59.4	2029	54.4	1746	46.8	1301	34.9
800	55.2	2650	71.0	2650	71.0	2645	70.9	2634	70.6	2617	70.1	2558	68.6	2463	66.0	2321	62.2	2113	56.6	1814	48.6
850	58.6	2813	75.4	2813	75.4	2813	75.4	2808	75.3	2797	75.0	2756	73.9	2685	72.0	2576	69.0	2418	64.8	2196	58.9
900	62.1	2976	79.8	2976	79.8	2976	79.8	2975	79.7	2970	79.6	2944	78.9	2891	77.5	2808	75.3	2684	71.9	2513	67.3
950	65.5	3138	84.1	3138	84.1	3138	84.1	3138	84.1	3138	84.1	3123	83.7	3085	82.7	3021	81.0	2924	78.4	2789	74.7
1000	68.9	3301	88.5	3301	88.5	3301	88.5	3301	88.5	3301	88.5	3295	88.3	3270	87.6	3222	86.4	3145	84.3	3038	81.4
1100	75.8	3626	97.2	3626	97.2	3626	97.2	3626	97.2	3626	97.2	3626	97.2	3620	97.0	3596	96.4	3549	95.1	3482	93.3
1200	82.7	3952	106	3952	106	3952	106	3952	106	3952	106	3952	106	3952	106	3945	106	3919	105	3878	104
1300	89.6	4277	115	4277	115	4277	115	4277	115	4277	115	4277	115	4277	115	4277	115	4277	115	4245	114
1400	96.5	4602	123	4602	123	4602	123	4602	123	4602	123	4602	123	4602	123	4602	123	4602	123	4602	123

Table 10. *3 In. / DN 80 Body Capacities with 100% Trim and Body Size Piping (Thousands of SCFH / Nm³/h) of 0.6 Specific Gravity Gas)*

INLET PRESSURE		OUTLET PRESSURE, psig / bar																					
		25 / 1.7		50 / 3.5		75 / 5.2		100 / 6.9		125 / 8.6		150 / 10.3		175 / 12.1		200 / 13.8		225 / 15.5		250 / 17.2		300 / 20.7	
psig	bar	psig	bar	psig	bar	psig	bar	psig	bar	psig	bar	psig	bar	psig	bar	psig	bar	psig	bar	psig	bar	psig	bar
50	3.5	434	11.6																				
75	5.2	617	16.5	561	15.0																		
100	6.9	739	19.8	781	20.9	668	17.9																
150	10.3	1133	30.4	1133	30.4	1126	30.2	1052	28.2	845	22.6												
200	13.8	1477	39.6	1477	39.6	1477	39.6	1471	39.4	1414	37.9	1276	34.2	993	26.6								
250	17.2	1821	48.8	1821	48.8	1821	48.8	1821	48.8	1815	48.6	1768	47.4	1663	44.6	1470	39.4	1123	30.1				
300	20.7	2165	58.0	2165	58.0	2165	58.0	2165	58.0	2165	58.0	2159	57.9	2118	56.8	2032	54.5	1884	50.5	1643	44.0		
350	24.1	2510	67.3	2510	67.3	2510	67.3	2510	67.3	2510	67.3	2510	67.3	2503	67.1	2467	66.1	2393	64.1	2271	60.9	1800	48.2
400	27.6	2854	76.5	2854	76.5	2854	76.5	2854	76.5	2854	76.5	2854	76.5	2854	76.5	2847	76.3	2814	75.4	2749	73.7	2491	66.8
450	31.0	3198	85.7	3198	85.7	3198	85.7	3198	85.7	3198	85.7	3198	85.7	3198	85.7	3198	85.7	3190	85.5	3160	84.7	3011	80.7
500	34.5	3542	94.9	3542	94.9	3542	94.9	3542	94.9	3542	94.9	3542	94.9	3542	94.9	3542	94.9	3542	94.9	3534	94.7	3453	92.5
550	38.0	3886	104	3886	104	3886	104	3886	104	3886	104	3886	104	3886	104	3886	104	3886	104	3886	104	3851	103
600	41.4	4230	113	4230	113	4230	113	4230	113	4230	113	4230	113	4230	113	4230	113	4230	113	4230	113	4222	113
650	44.8	4574	123	4574	123	4574	123	4574	123	4574	123	4574	123	4574	123	4574	123	4574	123	4574	123	4574	123
700	48.3	4918	132	4918	132	4918	132	4918	132	4918	132	4918	132	4918	132	4918	132	4918	132	4918	132	4918	132
750	51.7	5262	141	5262	141	5262	141	5262	141	5262	141	5262	141	5262	141	5262	141	5262	141	5262	141	5262	141
800	55.2	5606	150	5606	150	5606	150	5606	150	5606	150	5606	150	5606	150	5606	150	5606	150	5606	150	5606	150
850	58.6	5950	159	5950	159	5950	159	5950	159	5950	159	5950	159	5950	159	5950	159	5950	159	5950	159	5950	159
900	62.1	6294	169	6294	169	6294	169	6294	169	6294	169	6294	169	6294	169	6294	169	6294	169	6294	169	6294	169
950	65.5	6638	178	6638	178	6638	178	6638	178	6638	178	6638	178	6638	178	6638	178	6638	178	6638	178	6638	178
1000	68.9	6982	187	6982	187	6982	187	6982	187	6982	187	6982	187	6982	187	6982	187	6982	187	6982	187	6982	187
1100	75.8	7670	206	7670	206	7670	206	7670	206	7670	206	7670	206	7670	206	7670	206	7670	206	7670	206	7670	206
1200	82.7	8358	224	8358	224	8358	224	8358	224	8358	224	8358	224	8358	224	8358	224	8358	224	8358	224	8358	224
1300	89.6	9046	242	9046	242	9046	242	9046	242	9046	242	9046	242	9046	242	9046	242	9046	242	9046	242	9046	242
1400	96.5	9735	261	9735	261	9735	261	9735	261	9735	261	9735	261	9735	261	9735	261	9735	261	9735	261	9735	261

Table 10. *3 In. / DN 80 Body Capacities with 100% Trim and Body Size Piping (continued)*

INLET PRESSURE		OUTLET PRESSURE, psig / bar																			
		325 / 22.4		350 / 24.1		400 / 27.6		425 / 29.3		450 / 31.0		500 / 34.5		550 / 38.0		600 / 41.4		650 / 44.8		700 / 48.3	
psig	bar	psig	bar	psig	bar	psig	bar	psig	bar	psig	bar	psig	bar	psig	bar	psig	bar	psig	bar	psig	bar
350	24.1	1345	36.0																		
400	27.6	2268	60.8	1946	52.2																
450	31.0	2879	77.2	2695	72.2	2081	55.8	1536	41.2												
500	34.5	3372	90.4	3256	87.3	2886	77.3	2601	69.7	2209	59.2										
550	38.0	3803	102	3729	100	3487	93.5	3304	88.5	3066	82.2	2330	62.4								
600	41.4	4196	112	4151	111	3990	107	3866	104	3705	99.3	3237	86.8	2445	65.5						
650	44.8	4566	122	4541	122	4437	119	4351	117	4238	114	3913	105	3400	91.1	2555	68.5				
700	48.3	4918	132	4909	132	4846	130	4788	128	4709	126	4475	120	4111	110	3556	95.3	2658	71.2		
750	51.7	5262	141	5262	141	5231	140	5193	139	5138	138	4969	133	4701	126	4301	115	3703	99.2	2760	74.0
800	55.2	5606	150	5606	150	5597	150	5575	149	5539	148	5418	145	5219	140	4919	132	4481	120	3847	103
850	58.6	5950	159	5950	159	5950	159	5941	159	5920	159	5836	156	5688	152	5459	146	5125	137	4657	125
900	62.1	6294	169	6294	169	6294	169	6293	169	6284	168	6231	167	6122	164	5948	159	5687	152	5327	143
950	65.5	6638	178	6638	178	6638	178	6638	178	6637	178	6608	177	6532	175	6399	171	6194	166	5911	158
1000	68.9	6982	187	6982	187	6982	187	6982	187	6982	187	6972	187	6922	186	6823	183	6662	179	6437	173
1100	75.8	7670	206	7670	206	7670	206	7670	206	7670	206	7670	206	7659	205	7612	204	7515	201	7374	198
1200	82.7	8358	224	8358	224	8358	224	8358	224	8358	224	8358	224	8358	224	8347	224	8295	222	8210	220
1300	89.6	9046	242	9046	242	9046	242	9046	242	9046	242	9046	242	9046	242	9046	242	9046	242	8984	241
1400	96.5	9735	261	9735	261	9735	261	9735	261	9735	261	9735	261	9735	261	9735	261	9375	251	9375	251

Table 11. *4 In. / DN 100 Body Capacities with 100% Trim and Body Size Piping (Thousands of SCFH / Nm³/h) of 0.6 Specific Gravity Gas)*

INLET PRESSURE		OUTLET PRESSURE, psig / bar																					
		25 / 1.7		50 / 3.5		75 / 5.2		100 / 6.9		125 / 8.6		150 / 10.3		175 / 12.1		200 / 13.8		225 / 15.5		250 / 17.2		300 / 20.7	
psig	bar	psig	bar	psig	bar	psig	bar	psig	bar	psig	bar	psig	bar	psig	bar	psig	bar	psig	bar	psig	bar	psig	bar
50	3.5	709	19.0																				
75	5.2	1004	26.9	919	24.6																		
100	6.9	1284	34.4	1274	34.1	1096	29.4																
150	10.3	1843	49.4	1843	49.4	1836	49.2	1724	46.2	1390	37.3												
200	13.8	2403	64.4	2403	64.4	2403	64.4	2396	64.2	2313	62.0	2094	56.1	1635	43.8								
250	17.2	2963	79.4	2963	79.4	2963	79.4	2963	79.4	2957	79.2	2889	77.4	2725	73.0	2415	64.7	1849	49.6				
300	20.7	3522	94.4	3522	94.4	3522	94.4	3522	94.4	3522	94.4	3517	94.3	3460	92.7	3327	89.2	3090	82.8	2701	72.4		
350	24.1	4082	109	4082	109	4082	109	4082	109	4082	109	4082	109	4077	109	4027	108	3915	105	3723	99.8	2962	79.4
400	27.6	4642	124	4642	124	4642	124	4642	124	4642	124	4642	124	4642	124	4636	124	4592	123	4495	120	4087	110
450	31.0	5201	139	5201	139	5201	139	5201	139	5201	139	5201	139	5201	139	5201	139	5196	139	5156	138	4929	132
500	34.5	5761	154	5761	154	5761	154	5761	154	5761	154	5761	154	5761	154	5761	154	5761	154	5756	154	5641	151
550	38.0	6321	169	6321	169	6321	169	6321	169	6321	169	6321	169	6321	169	6321	169	6321	169	6321	169	6281	168
600	41.4	6880	184	6880	184	6880	184	6880	184	6880	184	6880	184	6880	184	6880	184	6880	184	6880	184	6875	184
650	44.8	7440	199	7440	199	7440	199	7440	199	7440	199	7440	199	7440	199	7440	199	7440	199	7440	199	7440	199
700	48.3	8000	214	8000	214	8000	214	8000	214	8000	214	8000	214	8000	214	8000	214	8000	214	8000	214	8000	214
750	51.7	8559	229	8559	229	8559	229	8559	229	8559	229	8559	229	8559	229	8559	229	8559	229	8559	229	8559	229
800	55.2	9119	244	9119	244	9119	244	9119	244	9119	244	9119	244	9119	244	9119	244	9119	244	9119	244	9119	244
850	58.6	9679	259	9679	259	9679	259	9679	259	9679	259	9679	259	9679	259	9679	259	9679	259	9679	259	9679	259
900	62.1	10,238	274	10,238	274	10,238	274	10,238	274	10,238	274	10,238	274	10,238	274	10,238	274	10,238	274	10,238	274	10,238	274
950	65.5	10,798	289	10,798	289	10,798	289	10,798	289	10,798	289	10,798	289	10,798	289	10,798	289	10,798	289	10,798	289	10,798	289
1000	68.9	11,357	304	11,357	304	11,357	304	11,357	304	11,357	304	11,357	304	11,357	304	11,357	304	11,357	304	11,357	304	11,357	304
1100	75.8	12,477	334	12,477	334	12,477	334	12,477	334	12,477	334	12,477	334	12,477	334	12,477	334	12,477	334	12,477	334	12,477	334
1200	82.7	13,596	364	13,596	364	13,596	364	13,596	364	13,596	364	13,596	364	13,596	364	13,596	364	13,596	364	13,596	364	13,596	364
1300	89.6	14,715	394	14,715	394	14,715	394	14,715	394	14,715	394	14,715	394	14,715	394	14,715	394	14,715	394	14,715	394	14,715	394
1400	96.5	15,835	424	15,835	424	15,835	424	15,835	424	15,835	424	15,835	424	15,835	424	15,835	424	15,835	424	15,835	424	15,835	424

Table 11. *4 In. / DN 100 Body Capacities with 100% Trim and Body Size Piping (continued)*

INLET PRESSURE		OUTLET PRESSURE, psig / bar																			
		325 / 22.4		350 / 24.1		400 / 27.6		425 / 29.3		450 / 31.0		500 / 34.5		550 / 38.0		600 / 41.4		650 / 44.8		700 / 48.3	
psig	bar	psig	bar	psig	bar	psig	bar	psig	bar	psig	bar	psig	bar	psig	bar	psig	bar	psig	bar	psig	bar
300	20.7																				
350	24.1	2217	59.4																		
400	27.6	3728	99.9	3202	85.8																
450	31.0	4720	126	4424	119	3427	91.8	2533	67.9												
500	34.5	5517	148	5335	143	4741	127	4278	115	3638	97.5										
550	38.0	6211	166	6098	163	5717	153	5424	145	5039	135	3837	103								
600	41.4	6843	183	6778	182	6531	175	6335	170	6078	163	5322	143	4027	108						
650	44.8	7435	199	7404	198	7251	194	7118	191	6942	186	6422	172	5592	150	4209	113				
700	48.3	8000	214	7994	214	7909	212	7823	210	7701	206	7334	197	6751	181	5850	157	4380	117		
750	51.7	8559	229	8559	229	8527	229	8474	227	8393	225	8132	218	7709	207	7066	189	6093	163	4548	122
800	55.2	9119	244	9119	244	9113	244	9087	244	9038	242	8857	237	8546	229	8070	216	7363	197	6331	170
850	58.6	9679	259	9679	259	9679	259	9673	259	9648	259	9529	255	9303	249	8945	240	8411	225	7654	205
900	62.1	10,238	274	10,238	274	10,238	274	10,238	274	10,233	274	10,163	272	10,003	268	9734	261	9322	250	8745	234
950	65.5	10,798	289	10,798	289	10,798	289	10,798	289	10,798	289	10,769	289	10,662	286	10,462	280	10,143	272	9694	260
1000	68.9	11,357	304	11,357	304	11,357	304	11,357	304	11,357	304	11,352	304	11,288	303	11,144	299	10,897	292	10,545	283
1100	75.8	12,477	334	12,477	334	12,477	334	12,477	334	12,477	334	12,477	334	12,471	334	12,411	333	12,271	329	12,057	323
1200	82.7	13,596	364	13,596	364	13,596	364	13,596	364	13,596	364	13,596	364	13,596	364	13,590	364	13,524	362	13,403	359
1300	89.6	14,715	394	14,715	394	14,715	394	14,715	394	14,715	394	14,715	394	14,715	394	14,715	394	14,715	394	14,645	392
1400	96.5	15,835	424	15,835	424	15,835	424	15,835	424	15,835	424	15,835	424	15,835	424	15,835	424	15,835	424	15,835	424

Table 12. *4 x 6 In. / DN 100 x 150 Body Capacities with 100% Trim and 2:1 Swaged Piping (Thousands of SCFH / Nm³/h) of 0.6 Specific Gravity Gas)*

INLET PRESSURE		OUTLET PRESSURE, psig / bar																					
		25 / 1.7		50 / 3.5		75 / 5.2		100 / 6.9		125 / 8.6		150 / 10.3		175 / 12.1		200 / 13.8		225 / 15.5		250 / 17.2		300 / 20.7	
psig	bar	psig	bar	psig	bar	psig	bar	psig	bar	psig	bar	psig	bar	psig	bar	psig	bar	psig	bar	psig	bar	psig	bar
50	3.5	933	25.0																				
75	5.2	1342	36.0	1199	32.1																		
100	6.9	1716	46.0	1686	45.2	1423	38.1																
150	10.3	2465	66.1	2465	66.1	2434	65.2	2253	60.4	1794	48.1												
200	13.8	3213	86.1	3213	86.1	3213	86.1	3180	85.2	3035	81.3	2720	72.9	2104	56.4								
250	17.2	3961	106	3961	106	3961	106	3961	106	3926	105	3802	102	3555	95.3	3126	83.8	2375	63.7				
300	20.7	4709	126	4709	126	4709	126	4709	126	4709	126	4672	125	4561	122	4353	117	4017	108	3488	93.5		
350	24.1	5457	146	5457	146	5457	146	5457	146	5457	146	5456	146	5417	145	5315	142	5135	138	4835	130	3818	102
400	27.6	6206	166	6206	166	6206	166	6206	166	6206	166	6206	166	6203	166	6163	165	6067	163	5906	158	5312	142
450	31.0	6954	186	6954	186	6954	186	6954	186	6954	186	6954	186	6954	186	6949	186	6908	185	6818	183	6453	173
500	34.5	7702	206	7702	206	7702	206	7702	206	7702	206	7702	206	7702	206	7702	206	7695	206	7653	205	7430	199
550	38.0	8450	226	8450	226	8450	226	8450	226	8450	226	8450	226	8450	226	8450	226	8450	226	8441	226	8316	223
600	41.4	9198	247	9198	247	9198	247	9198	247	9198	247	9198	247	9198	247	9198	247	9198	247	9198	247	9144	245
650	44.8	9947	267	9947	267	9947	267	9947	267	9947	267	9947	267	9947	267	9947	267	9947	267	9947	267	9933	266
700	48.3	10,695	287	10,695	287	10,695	287	10,695	287	10,695	287	10,695	287	10,695	287	10,695	287	10,695	287	10,695	287	10,695	287
750	51.7	11,443	307	11,443	307	11,443	307	11,443	307	11,443	307	11,443	307	11,443	307	11,443	307	11,443	307	11,443	307	11,443	307
800	55.2	12,191	327	12,191	327	12,191	327	12,191	327	12,191	327	12,191	327	12,191	327	12,191	327	12,191	327	12,191	327	12,191	327
850	58.6	12,939	347	12,939	347	12,939	347	12,939	347	12,939	347	12,939	347	12,939	347	12,939	347	12,939	347	12,939	347	12,939	347
900	62.1	13,688	367	13,688	367	13,688	367	13,688	367	13,688	367	13,688	367	13,688	367	13,688	367	13,688	367	13,688	367	13,688	367
950	65.5	14,436	387	14,436	387	14,436	387	14,436	387	14,436	387	14,436	387	14,436	387	14,436	387	14,436	387	14,436	387	14,436	387
1000	68.9	15,184	407	15,184	407	15,184	407	15,184	407	15,184	407	15,184	407	15,184	407	15,184	407	15,184	407	15,184	407	15,184	407
1100	75.8	16,680	447	16,680	447	16,680	447	16,680	447	16,680	447	16,680	447	16,680	447	16,680	447	16,680	447	16,680	447	16,680	447
1200	82.7	18,177	487	18,177	487	18,177	487	18,177	487	18,177	487	18,177	487	18,177	487	18,177	487	18,177	487	18,177	487	18,177	487
1300	89.6	19,673	527	19,673	527	19,673	527	19,673	527	19,673	527	19,673	527	19,673	527	19,673	527	19,673	527	19,673	527	19,673	527
1400	96.5	21,170	567	21,170	567	21,170	567	21,170	567	21,170	567	21,170	567	21,170	567	21,170	567	21,170	567	21,170	567	21,170	567

Table 12. *4 x 6 In. / DN 100 x 150 Body Capacities with 100% Trim and 2:1 Swaged Piping (continued)*

INLET PRESSURE		OUTLET PRESSURE, psig / bar																			
		325 / 22.4		350 / 24.1		400 / 27.6		425 / 29.3		450 / 31.0		500 / 34.5		550 / 38.0		600 / 41.4		650 / 44.8		700 / 48.3	
psig	bar	psig	bar	psig	bar	psig	bar	psig	bar	psig	bar	psig	bar	psig	bar	psig	bar	psig	bar	psig	bar
300	20.7																				
350	24.1	2843	76.2																		
400	27.6	4822	129	4123	110																
450	31.0	6150	165	5739	154	4407	118	3244	87.0												
500	34.5	7233	194	6965	187	6139	165	5519	148	4675	125										
550	38.0	8188	219	8007	215	7447	200	7039	189	6516	175	4928	132								
600	41.4	9064	243	8943	240	8552	229	8266	222	7903	212	6874	184	5170	139						
650	44.8	9889	265	9812	263	9539	256	9332	250	9070	243	8338	223	7216	193	5400	145				
700	48.3	10,679	286	10,634	285	10,449	280	10,299	276	10,107	271	9565	256	8753	235	7542	202	5622	151		
750	51.7	11,442	307	11,424	306	11,306	303	11,200	300	11,058	296	10,651	285	10,039	269	9151	245	7856	211	5835	156
800	55.2	12,191	327	12,190	327	12,125	325	12,052	323	11,950	320	11,643	312	11,173	299	10,494	281	9534	256	8159	219
850	58.6	12,939	347	12,939	347	12,915	346	12,870	345	12,799	343	12,570	337	12,206	327	11,676	313	10,933	293	9903	265
900	62.1	13,688	367	13,688	367	13,684	367	13,661	366	13,615	365	13,449	360	13,168	353	12,750	342	12,161	326	11,356	304
950	65.5	14,436	387	14,436	387	14,436	387	14,430	387	14,430	387	14,291	383	14,077	377	13,746	368	13,275	356	12,630	338
1000	68.9	15,184	407	15,184	407	15,184	407	15,184	407	15,177	407	15,105	405	14,946	401	14,686	394	14,306	383	13,783	369
1100	75.8	16,680	447	16,680	447	16,680	447	16,680	447	16,680	447	16,670	447	16,596	445	16,442	441	16,198	434	15,848	425
1200	82.7	18,177	487	18,177	487	18,177	487	18,177	487	18,177	487	18,177	487	18,162	487	18,086	485	17,937	481	17,706	475
1300	89.6	19,673	527	19,673	527	19,673	527	19,673	527	19,673	527	19,673	527	19,673	527	19,654	527	19,576	525	19,431	521
1400	96.5	21,170	567	21,170	567	21,170	567	21,170	567	21,170	567	21,170	567	21,170	567	21,170	567	21,146	567	21,066	565

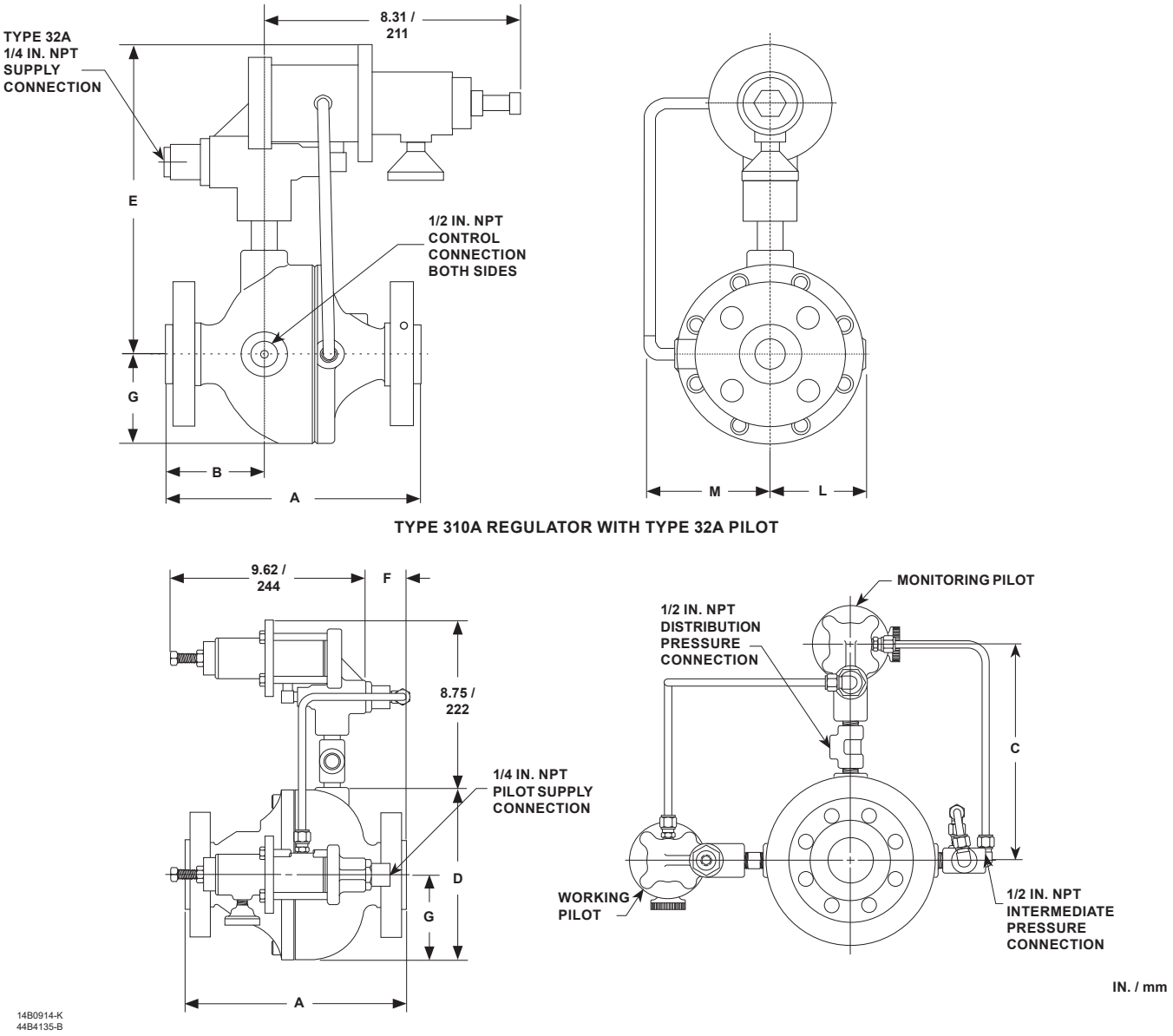

Figure 7. *Dimensions*

Table 13. *Dimensions*

BODY SIZE, IN. / DN	DIMENSIONS, IN. / mm												
	A			B			C	D	E	F	G	L	M
	CL150 RF	CL300 RF	CL600 RF	CL150 RF	CL300 RF	CL600 RF							
1 / 25	- - - -	7.78 / 198	8.28 / 210	- - - -	2.94 / 75	3.19 / 81	9.62 / 244	8.25 / 210	10.56 / 268	2.25 / 57	3.06 / 78	3.56 / 90	4.00 / 102
2 / 50	10.06 / 256	10.53 / 267	11.28 / 287	3.19 / 81	3.44 / 87	3.81 / 97	10.68 / 271	11.25 / 286	11.56 / 294	3.12 / 79	4.44 / 113	4.56 / 116	5.44 / 138
3 / 80	- - - -	12.53 / 318	13.28 / 337	- - - -	3.81 / 97	4.19 / 106	11.50 / 292	13.25 / 337	12.38 / 314	3.12 / 79	5.25 / 133	5.38 / 137	6.25 / 159
4 / 100	- - - -	14.53 / 369	15.53 / 394	- - - -	4.88 / 124	5.38 / 137	13.38 / 340	15.50 / 394	14.25 / 362	3.88 / 99	7.12 / 181	7.25 / 184	8.12 / 206
4 x 6 / 100 x 150	- - - -	16.19 / 411	17.38 / 441	- - - -	4.88 / 124	5.38 / 137	13.38 / 340	15.50 / 394	14.25 / 362	3.88 / 99	7.12 / 181	7.25 / 184	8.00 / 203

Ordering Guide

Type (Select One)

- ☐ 310A-32A (one pilot for standard pressure reducing and wide-open monitor applications)***
- ☐ 310A-32A-32A (two pilots for working monitor applications)***

Body Size and End Connection Style (Select One)

1 In. / DN 25 Body
- ☐ NPT***
- ☐ CL300 RF***
- ☐ CL600 RF***

2 In. / DN 50 Body
- ☐ CL300 RF***
- ☐ CL600 RF***

3 In. / DN 80 Body
- ☐ CL300 RF***
- ☐ CL600 RF***

4 In. / DN 100 Body
- ☐ CL300 RF***
- ☐ CL600 RF***

4 x 6 In. / DN 100 x 150 Body
- ☐ CL300 RF***
- ☐ CL600 RF***

Outlet Pressure Range (Select One)

- ☐ 10 to 100 psig / 0.69 to 6.9 bar***
- ☐ 100 to 250 psig / 6.9 to 17.2 bar***
- ☐ 250 to 600 psig / 17.2 to 41.4 bar***
- ☐ 400 to 700 psig / 27.6 to 48.3 bar(1)***

1. Only available in Nitrile (NBR).
2. Maximum Operating Pressure of 600 psig / 41.4 bar.

Regulators Quick Order Guide	
* * *	Standard - Readily Available for Shipment
* *	Non-Standard - Allow Additional Time for Shipment
*	Special Order, Constructed from Non-Stocked Parts. Consult your local Sales Office for Availability.
Availability of the product being ordered is determined by the component with the longest shipping time for the requested construction.	

Main Valve Trim Size (Select One)

- ☐ 100% **(standard)*****
- ☐ 70%
- ☐ 50%
- ☐ 30%

Main Valve Diaphragm and O-rings (Select One)

- ☐ Nitrile (NBR) **(standard)*****
- ☐ Fluorocarbon (FKM)**

Pilot Diaphragm (Select One)

- ☐ Stainless Steel/Nitrile (NBR) **(standard)*****
- ☐ Stainless Steel/Fluorocarbon (FKM)**

Pilot Valve Disk Assembly (Select One)

- ☐ Nitrile (NBR) **(standard)*****
- ☐ Fluorocarbon (FKM)(2)**

Main Valve Replacement Parts Kit (Optional)

- ☐ Yes, send one replacement parts kit to match this order.

Pilot Replacement Parts Kit (Optional)

- ☐ Yes, send one replacement parts kit to match this order.

Specification Worksheet

Application (Please designate units):

Specific Use _____
Line Size _____
Gas Type and Specific Gravity _____
Gas Temperature _____
Does the Application Require Overpressure Protection?
☐ No ☐ Yes, if so, which is preferred:
☐ Relief Valve ☐ Monitor Regulator ☐ Shutoff Device
Is overpressure protection equipment selection assistance desired? _____

Pressure (Please designate units):

Maximum Inlet Pressure (P_{1max}) _____
Minimum Inlet Pressure (P_{1min}) _____
Downstream Pressure Setting(s) (P_2) _____
Maximum Flow (Q_{max}) _____

Performance Required:

Accuracy Requirements? _____
Need for Extremely Fast Response? _____

Other Requirements: _____

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