ANDERSON GREENWOOD

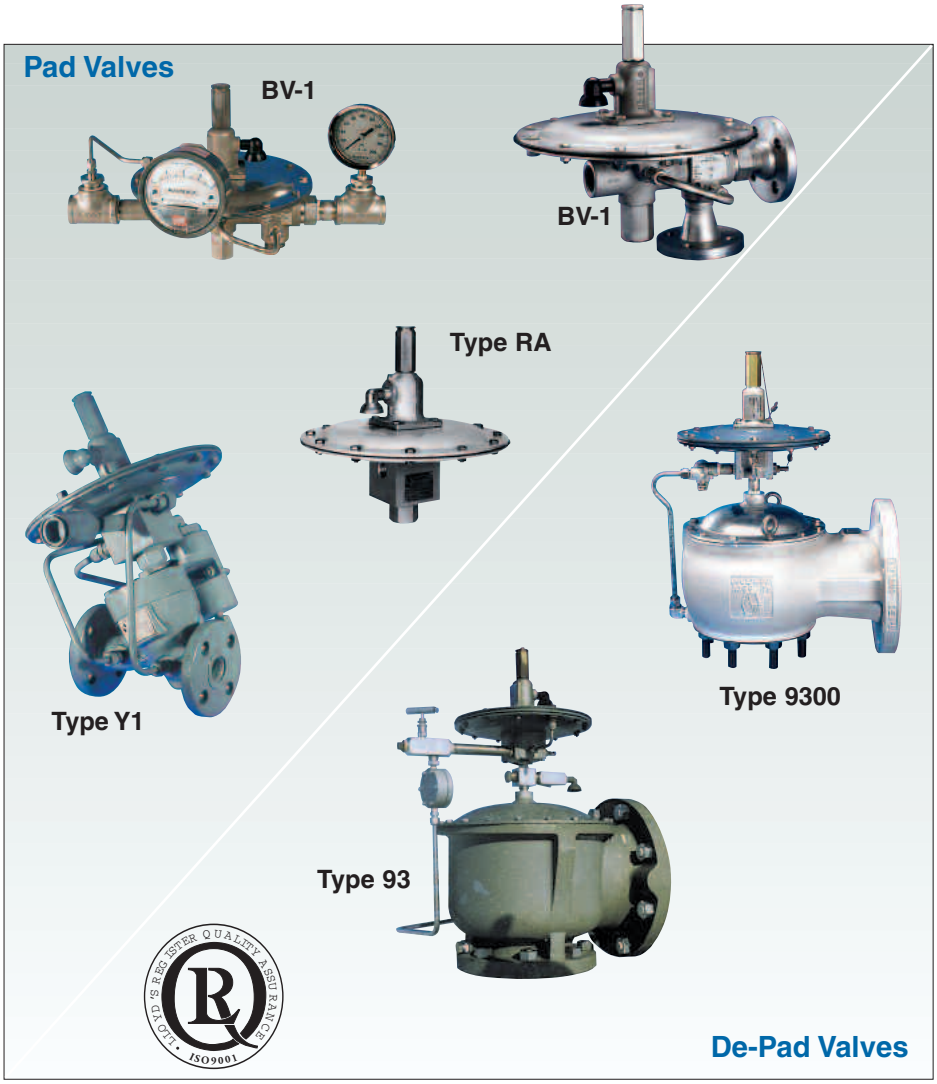
The Complete Blanketing and Safety Valve System!

Anderson Greenwood is truly the world leader in tank protection and blanketing. Anderson Greenwood has the experience and products to meet almost all blanketing and safety relief device needs. Furthermore, we can provide the Complete Blanketing and Safety Valve System including:

- **Pad and de-pad valves and regulators**
- **Pressure/vacuum vents and low pressure pilot operated valves**
- **Emergency vents and valves**
- **Flame and detonation flame arresters**

Because of the interactions between pad (blanketing) valves, de-pad (out breathing) valves, relief devices and flame arresters, each piece of equipment should be considered when specifying the blanketing system. Because of these interactions between components in the system, it makes sense to rely on one company to help specify and provide all of the products that make-up the complete pressure control system.

In fact, with many applications, it is possible to combine the functions of the de-pad valve and the pressure relief valves, thus minimizing the number of valves and tank connections. Moreover, Anderson Greenwood can provide pad, de-pad, flame arrestment and pressure/vacuum relief in a single tank penetration.



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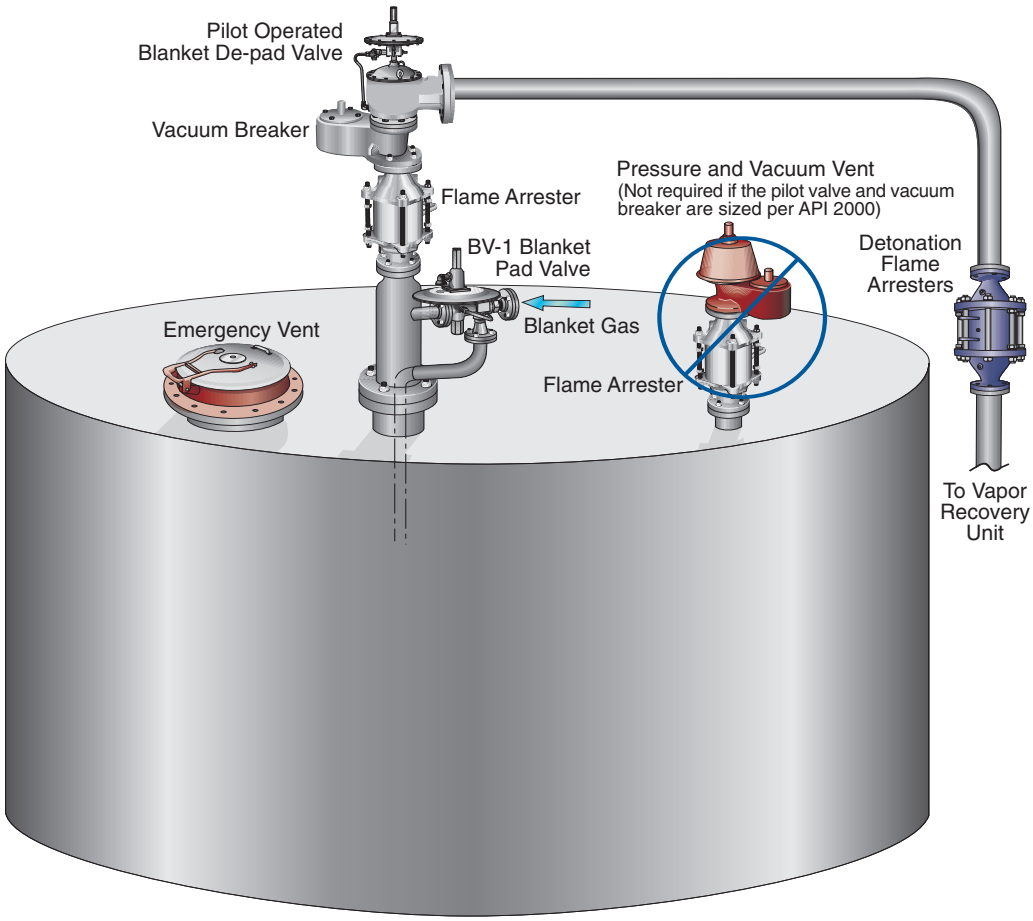


What is Blanketing or Padding?

Blanketing is a process used to maintain a gas blanket or pad in the vapor space of a pressure-tight liquid storage vessel. Gas blanketing is used to:

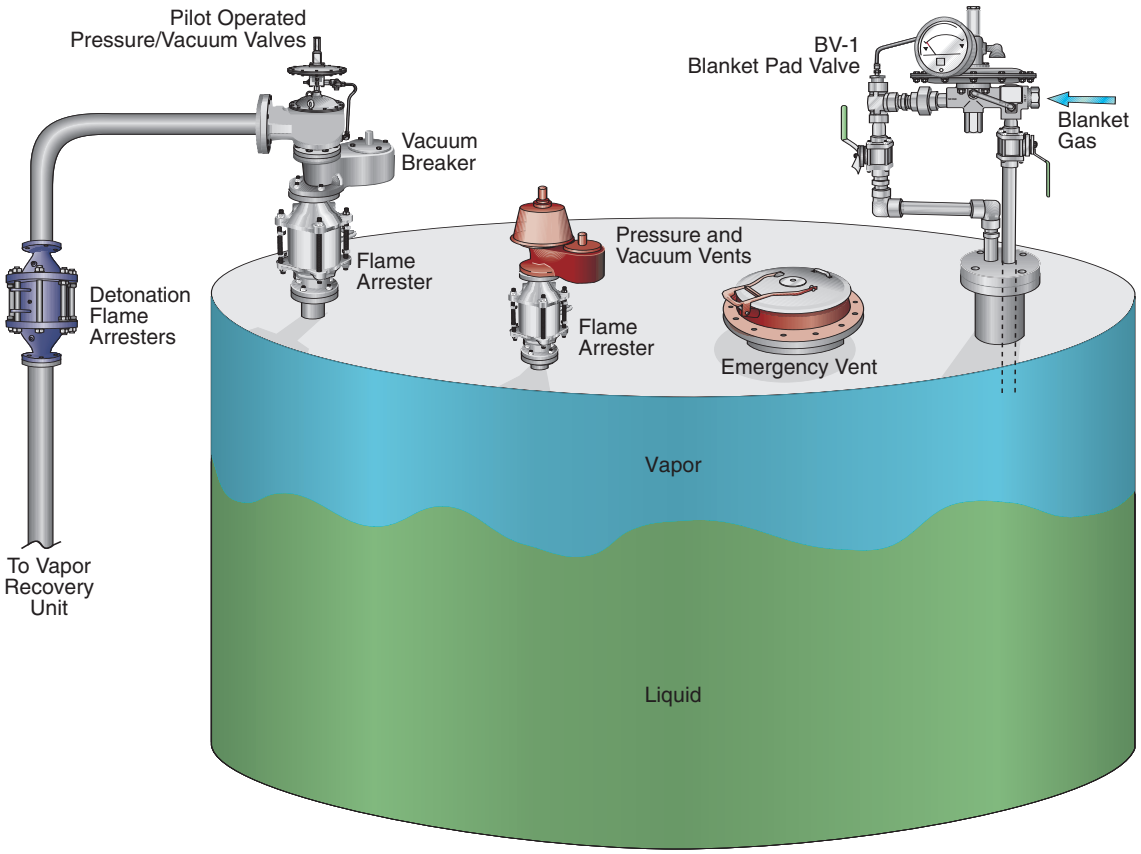
- **Prevent Evaporation**
- **Reduce Fugitive Emissions**
- **Reduce or Eliminate Combustion Potential**
- **Reduce Corrosion**
- **Prevent Contamination or Oxidation**
- **Provide make-up when the pressure drops in the tank**

Tank Blanketing normally involves the use of a valve or regulator to control the input of the pad gas, normally an inert gas such as nitrogen. When the pressure drops in the tank, the pad or blanketing valve will open and feed gas and pressure into the vessel, thus limiting the minimum pressure in the tank. This drop in pressure is normally caused by pump out or thermal cooling. In the event of pressure rise in the tank due to heat input or pump in, the de-pad or vent valve will open and vent pressure or pad gas from the tank. Traditionally, this function was performed by a conservation vent or breather valve. Today, because of the need to collect the gas coming off the top of the tank and to prevent the pressure from increasing to a point where the vent valves will leak to atmosphere, a de-pad valve is set to open at a point below the vent valves. The de-pad valve, because it normally discharges to a closed system, must be balanced against back pressure.

The Complete System

Anderson Greenwood combines the use of a pilot operated blanketing valve and a pilot operated de-pad valve to provide a simple, reliable, and accurate system. Furthermore, by utilizing a modulating de-pad or vent valve, you can eliminate the need for traditional weight loaded, unbalanced vent valves. This will reduce project costs, maintenance costs, conserve blanket gas and will further protect the environment.

Features and Benefits



Installation Flexibility

Depending on your systems needs, the Anderson Greenwood system has the flexibility to be installed so that the pad valve, de-pad valve and vacuum breaker can be installed on a single nozzle or multiple nozzles. Additionally, Anderson Greenwood can provide internal sensing in the same tank connection.

Blanketing Valve Features and Benefits

- **Lower Installation Costs.** Single unit system reduces labor and material costs.
- **Simplicity of Setting Blanket Pressure.** One unit to calibrate in lieu of conventional multi-unit systems.
- **Reduced Maintenance Costs.** Top entry provides access to all internal parts without removal from the line.
- **Optimum Performance.** Reduces supply gas pressure from 200 psig [13.8 barg] to 1/2 inch wc [1.2 mbarg] in one stage.
- **Balanced Design.** Accurately maintains setting regardless of pressure variations.
- **Premium Tightness.** O-ring seat and seals assure bubble-tight shut-off.

Blanketing Valve Specifications

- Pilot operated tank blanketing valve.
- Single unit reduces pressure from 200 psig [13.8 barg] to 1/2 inch wc [1.2 mbarg].
- Top entry design allows in-line maintenance.
- Pressure setting is not affected by varying inlet pressures.

Blanketing (Pad Valves) Operation

The conventional method (Figure 1) employs as many as four regulators to reduce high supply pressure to low blanket pressures, while the Anderson Greenwood system (Figure 2) is the first valve that requires only one unit to achieve reduction from 200 psig [13.8 barg] to low blanketing pressures.

The Type Y1 Pilot is used with the main valve to form a pressure reducing valve capable of regulating tank pressures from 1/2 inch wc [1.2 mbarg] to 6 psig [0.41 barg]. The pilot will open when the sensed pressure falls below the set pressure. As the pilot opens, the main valve dome pressure decreases, and flow through the main valve occurs. When the downstream pressure is satisfied, the sensed pressure acting on the sense plate will overcome the spring force to close the pilot, the main valve dome pressure increases, and the main valve closes.

RA Operation

For small flow requirements, the pilot can be used by itself as a direct spring tank blanketing valve. When used this way, it is designated a Type RA. The only difference in construction is the location of the sense and inlet ports. The sensed pressure acting against the spring force will determine how much, if any, the pilot is to open.

Y1 Operation

Upstream pressure enters the main body and acts upward against the main valve diaphragm. Due to a small unbalanced dome area, the effective area
above the diaphragm is slightly larger than below. Shut-off will occur when the dome pressure is equal to the inlet pressure. The sleeve/diaphragm retainer assembly is lightly spring loaded to provide initial closing force when there is no pressure differential across the diaphragm.

The Type Y1 Pilot controls dome pressure in response to tank pressure. A reduction in dome pressure allows the sleeve to move upward off the main seat, permitting flow through the valve. The amount of lift depends on the pressure reduction in the dome. The greater this reduction, the greater the flow. When the downstream pressure is satisfied, the sensed pressure acting on the pilot sense plate will overcome the spring force to close the pilot, which in turn closes the valve. No system fluid is vented to the atmosphere.

BV-1 Operation

The diaphragm and sleeve are replaced by a piston in the main valve for more rugged construction. As with the Y1 Valve, the pilot controls dome pressure. A reduction in dome pressure allows the piston to move horizontally off the seat, permitting flow through the valve. Maximum flow is controlled by the cage orifices.

Performance Characteristics

Set pressure is defined as the point at which the valve begins to flow. As the demand for flow increases, the tank pressure must drop in order for the valve to respond, since a differential pressure is required to create the necessary forces to operate the valve.

This drop in tank pressure is called 'droop.' When the valve is 100 percent open, the tank pressure must increase for the valve to respond and close. The difference between start to open and close is called deadband. For the Type Y1 blanketing valve, this deadband is 1 inch wc [2.5 mbarg] at the lowest set pressure. For the Type BV-1 blanketing valve, this 'deadband' is 3/4 inch wc [1.9 mbarg] at the lowest set pressure. Lockup, the rise above set pressure for total closure, is less than 0.1 inch wc [0.25 mbarg].

Elastomer Selection

It is important to specify an elastomer that is compatible with both the supply gas and the product being stored in the tank. Vapors will enter the valve from the discharge port and sense line. The BV-1 comes standard with Fluorosilicone and Viton® seat and seals and Teflon® diaphragm. The RA and Y1 valves come standard with BUNA-N soft goods. The BV-1 is available with an internal purge which sweeps a small flow rate of blanket gas back through the sense port and tank connection.

NACE Trim

Pilot and main valve trims are available for sour gas service in accordance with the latest edition of NACE MR-01-75.

GOX/LOX

The BV-1 model can be cleaned for GOX and LOX applications.

Conventional Method

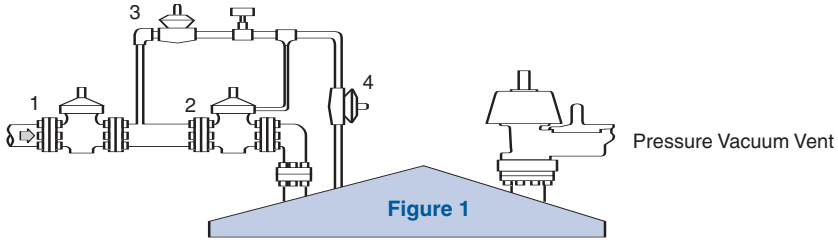


Figure 1

Anderson Greenwood Method

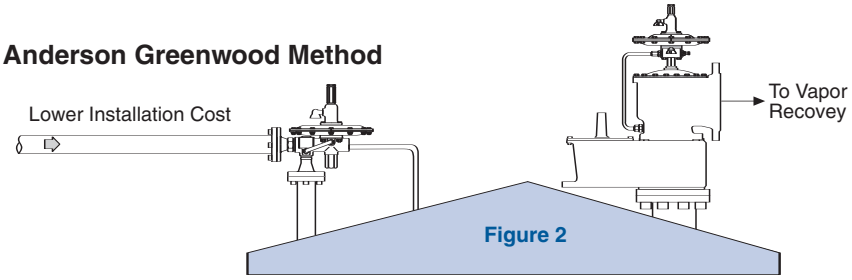
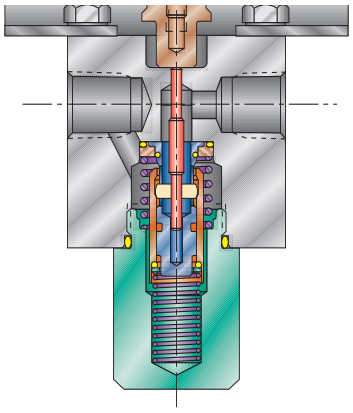


Figure 2

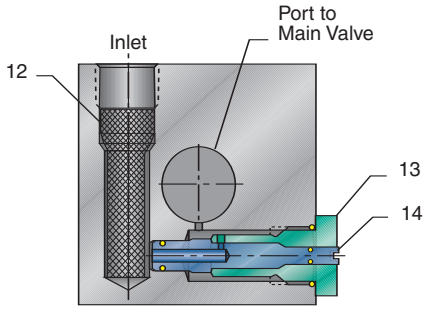
Note

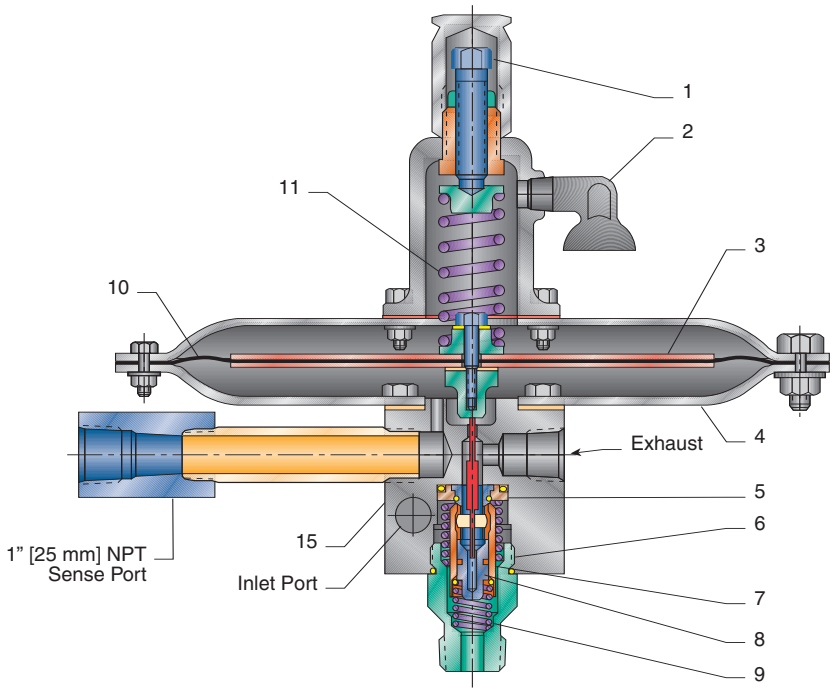
1. Teflon® and Viton® are registered trademarks of E.I. duPont de Nemours Company.

Type RA and Y1 Pilot Materials of Construction



Type RA





Type Y1 Pilot for 2 inch Valve

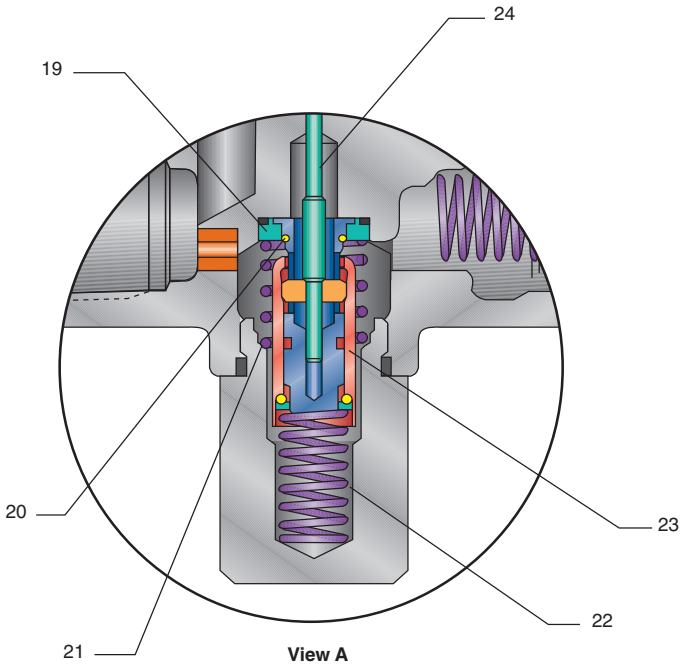
Notes

1. BUNA-N standard, Viton®, EPR, Kalrez® optional.
2. BUNA-N standard, Viton®, EPR, Teflon® optional.
3. Kalrez® is a registered trademark of E.I. duPont de Nemours Company.

Parts and Materials - Type RA and Type Y1 Pilot

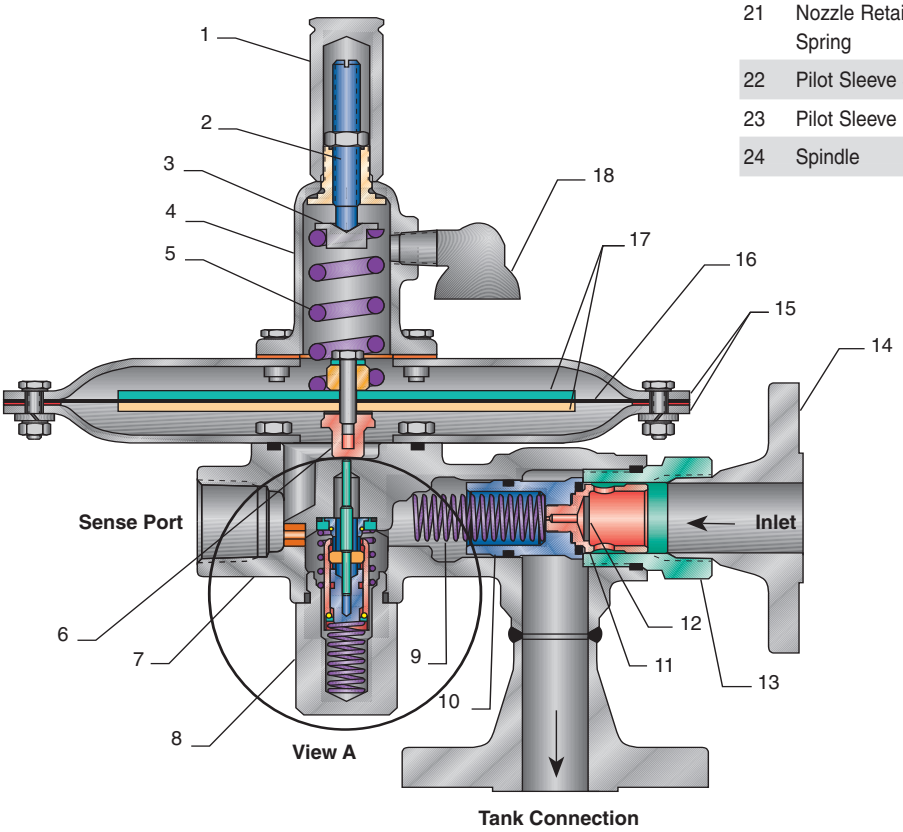
No.	Part Name	CS	SS
1	Set Pressure Adjustment Screw	SS 304/CS	SS 304/316
2	Vent	Zytel	Zytel
3	Sense Plate	CS 1010/ZNCO	SS 302/304
4	Case	CS A36	SS 304
5	Seat and Seals	BUNA-N[1]	BUNA-N[1]
6	Sleeve	SS A479-316	SS A479-316
7	Sleeve Seal	BUNA-N[1]	BUNA-N[1]
8	Nozzle - Pilot	SS A479-316	SS A479-316
9	Sleeve Spring	SS 316	SS 316
10	Diaphragm	BUNA-N[2]	BUNA-N[2]
11	Set Pressure Spring	SS 316	SS 316
12	Filter Screen	SS 302	SS 302
13	Orifice Retainer	SS A479-316	SS A479-316
14	Adjustable Orifice Core	SS A276-316	SS A276-316
15	Body	CS A108 1018	SS A479 316

1 inch Type BV-1 Materials of Construction



Materials of Construction

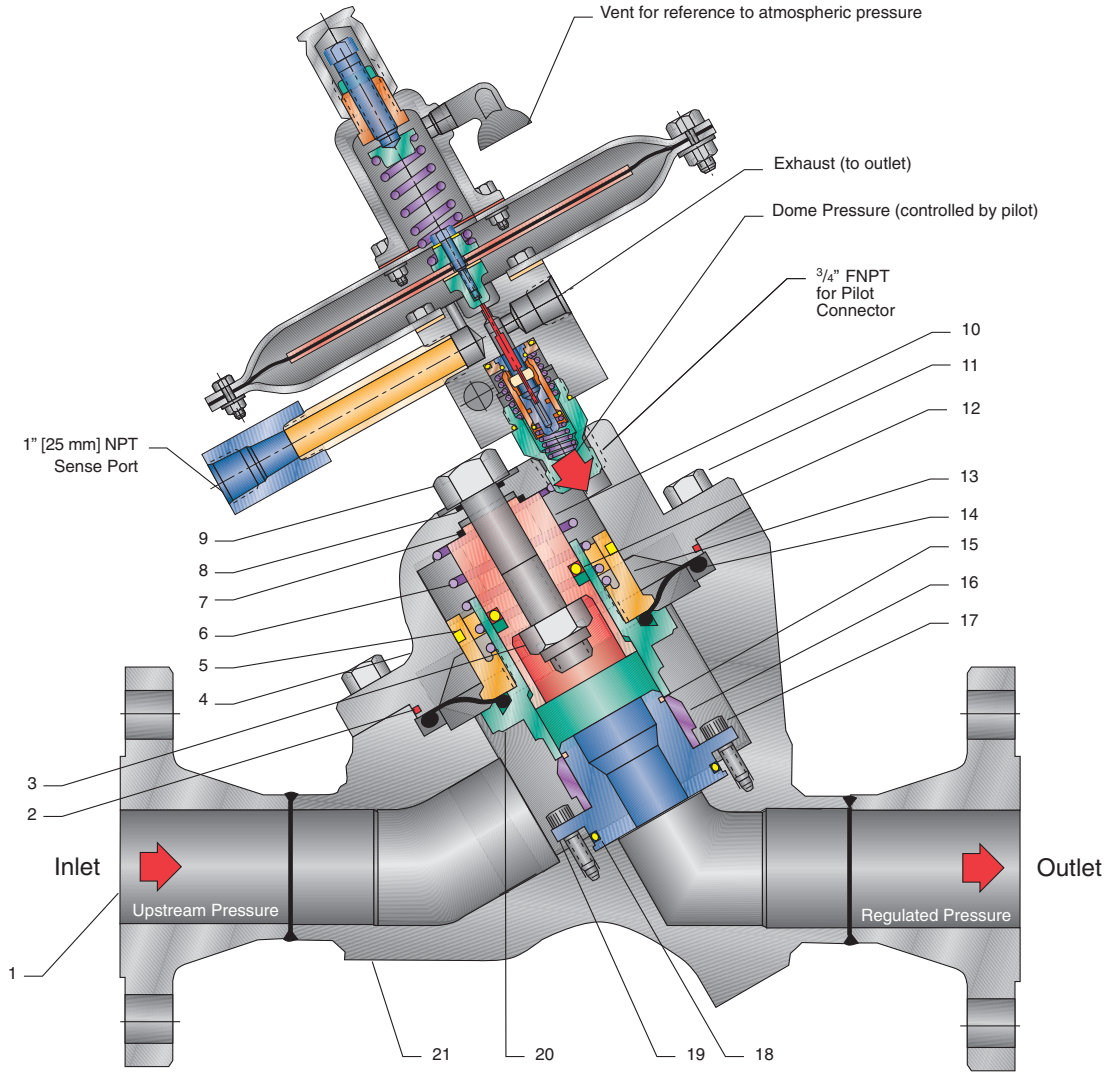
No.	Part Name	CS	SS
1	Pilot Cap	SS A582-303	SS A582-303
2	Pressure Adj. Screw	SS A276-304	SS A276-304
3	Spring Washer	STL A108-1213	SS A479-316
4	Bonnet Assembly	SS SA351-CF8M	SS SA351-CF8M
5	Spring	SS 316	SS 316
6	Actuator	STL 12L14/ZNCO	SS A479-316
7	Body	SS SA351-CF8M/SA105	SS CF8M, SA 182-316
8	Body Plug	STL SA108-1018/ZNCO	SS A479-316
9	Piston Spring	SS 316	SS 316
10	Piston	SS A479-316	SS A479-316
11	Seat Retainer/ Flow Cage	SS A479-316	SS A479-316
12	Screen Filter	SS 316	SS 316
13	Bushing Nozzle	SS A479-316	SS A479-316
14	Inlet Flange	STL SA105	SS SA182-316
15	Case	STL A36	SS A240-304
16	Diaphragm	Teflon®	Teflon®
17	Sense Plate	STL 1010	SS 302/304
18	Vent	Zytel	Zytel
19	Nozzle Retainer	SS A479-316	SS A479-316
20	Pilot Seat	Fluorosilicone[1]	Fluorosilicone[1]
21	Nozzle Retainer Spring	SS 316	SS 316
22	Pilot Sleeve Spring	SS 302	SS 302
23	Pilot Sleeve	SS A479-316	SS A479-316
24	Spindle	SS A276-316	SS A276-316



Note

1. Fluorosilicone standard, BUNA-N, EPR, Kalrez® optional.

Type Y1 Main Valve Materials of Construction



Main Valve

No.	Part Name	CS	SS
1	Flange	Steel A105	SS 182-316
2	Cap Seal	BUNA-N[1]	BUNA-N[1]
3	Lock Nut	Alloy Steel	SS 18-8
4	Cap	Steel A216-WCB	SS A351-CF8M
5	Ring	SS 316	SS 316
6	Spring	SS 316	SS 316
7	Piston Seal	BUNA-N[1]	BUNA-N[1]
8	Seal Piston Bolt	BUNA-N[1]	BUNA-N[1]
9	Piston Bolt	Alloy Steel	SS 18-8
10	Piston	SS 303	SS A479-316

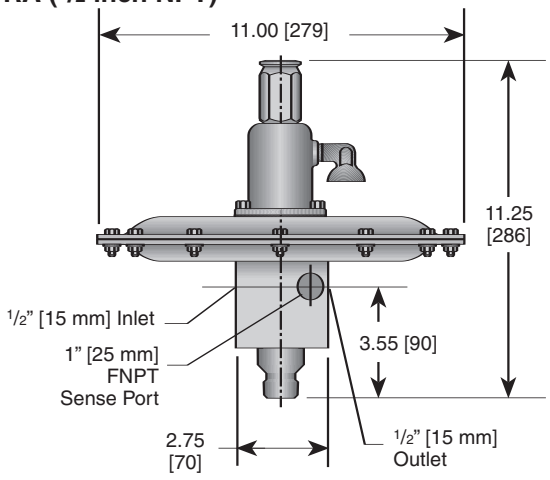
No.	Part Name	CS	SS
11	Cap Bolt	Alloy Steel	SS 18-8
12	Sleeve Seal	BUNA-N[1]	BUNA-N[1]
13	Diaphragm Retainer	Steel 1213	SS A479-316
14	Diaphragm	BUNA-N[1]	BUNA-N[1]
15	Seat	BUNA-N[1]	BUNA-N[1]
16	Seat Retainer	SS 316	SS 316
17	Nozzle Screw	SS 18-8	SS 18-8
18	Nozzle Seal	BUNA-N[1]	BUNA-N[1]
19	Nozzle	SS 316	SS 316
20	Sleeve	Steel A31-8620[2]	SS A479-316[2]
21	Body	Steel A216-WCB	SS A351-CF8M

Notes

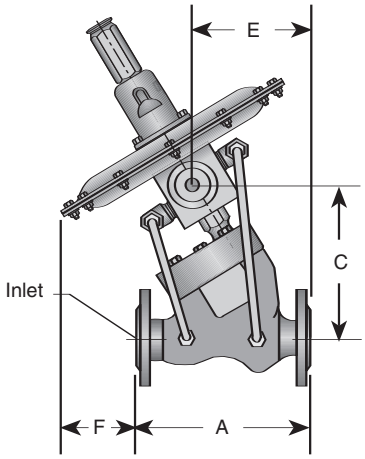
1. BUNA-N standard; Viton®, EPR, Kalrez® optional. Kalrez® not available for Item 14.
2. Chrome plated.

Dimensions and Weights

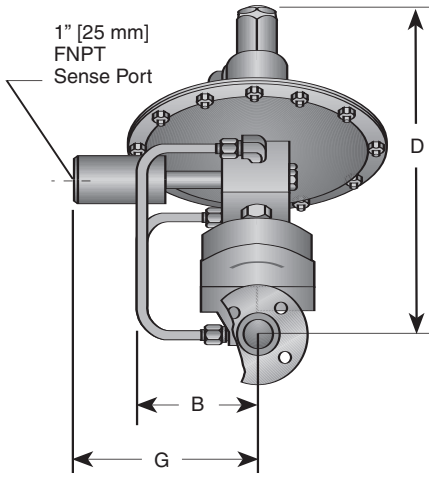
RA (1/2 inch NPT)



Y1



Y1



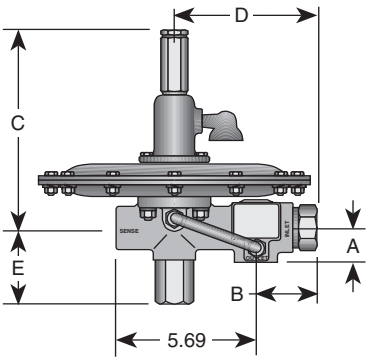
Dimensions, inches [mm] and Weights, lb (kg)

Model	Size	Dimensions A Threaded Ends	A Flanges[1] 150#	300#	600#	B	C	Maximum D	E	F	G	Weight Total	Pilot and Cap
Y1	1 inch [25 mm]	6.75 [171]	7.25 [184]	7.75 [197]	8.25 [210]	5.00 [127]	7.38 [187]	14.50 [368]	5.63 [143]	3.65 [93]	7.13 [181]	39 (17.69)	21 (9.52)
Y1	2 inch [50 mm]	9.19 [233]	14.37 [365]	14.87 [378]	15.62 [397]	5.25 [133]	10.00 [254]	17.00 [432]	9.75 [248]	2.75 [70]	7.13 [181]	75 (34.0)	27 (12.3)

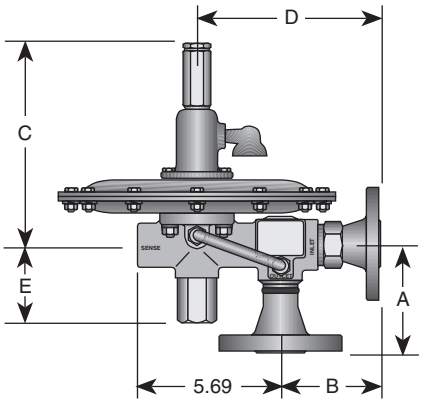
Note

1. Consult factory for other flange configurations.

BV-1 (1 inch NPT)



BV-1 (1 inch Flanged)



Dimensions, inches [mm] and Weights, lb (kg)

Connection	A	B	C	D	E	Weight
Threaded	1.91 [44]	2.53 [64]	8.25 [210]	5.84 [148]	3.25 [83]	18.5 (8.4)
150# Flange	4.06 [103]	4.06 [103]	8.25 [210]	7.37 [187]	3.25 [83]	23.5 (10.7)
300# Flange	4.31 [109]	4.31 [109]	8.25 [210]	7.62 [193]	3.25 [83]	26.5(12.0)

Dimensions are ±.06 [±1.5 mm], unless noted otherwise.
For other configurations, consult factory.

Pressure/Temperature Range

Minimum Inlet Pressure

RA: No minimum
BV-1: 15 psig [1.03 barg]
Y1: 30 psig [2.07 barg]

Maximum Pressure at Sense Port[2]

15 psig [1.03 barg]

Temperature[3]

-20°F to 300°F [-29°C to 149°C]

Set Pressure[1]	
1/2" wc to 1.4" wc	[1.2 to 3.5 mbarg]
1.2" wc to 4" wc	[3.0 to 10.0 mbarg]
3.5" wc to 10" wc	[8.7 to 25 mbarg]
8" wc to 18" wc	[20 to 45 mbarg]
15" wc to 29" wc	[37 to 72 mbarg]
0.6 to 1.4 psig	[41 to 97 mbarg]
1.3 to 3.1 psig	[90 to 215 mbarg]
2.3 to 3.5 psig	[160 to 241 mbarg]
3.0 to 6.0 psig	[207 to 414 mbarg]

Notes

1. For higher set pressures than those published, contact the factory.
2. High strength cases available to 280 psig [19.3 barg].
3. For lower temperatures than those published, contact the factory.

Sizing

When sizing for tank blanketing, it is imperative to consider both:

a. blanketing gas replacement for liquid loss during pump-out, and

b. the condensation/contraction of tank vapors during atmospheric thermal cooling.

Required amount of blanketing gas and correct size of valve must be determined on the basis that both conditions could occur simultaneously.

The maximum flow rate through the blanketing valve will determine the size of relief valve. If a flow rate less than that listed in Table C is required, restricted nozzles are available to limit the flow to 70, 50, 30 or 10 percent of the 100 percent rated capacity. Use of restricted nozzles, where applicable, will minimize the size of safety relief valve required. The BV-1 is also available with a 110 percent piston for increased capacity.

To Size a Blanketing Valve

1. Determine the gas flow rate due to pump-out (from Table A, page 11).
2. Determine the gas flow rate due to atmospheric thermal cooling (from Table B, page 12).
3. Add the requirements of 1 and 2 and select valve size based on air capacity (from Table C, pages 13 and 14).

Excerpt From API 2000[1]

For tanks with a capacity of 20,000 bbl or more, the requirements for the vacuum condition are very close to the theoretically computed value of 2 SCFH of air, per square foot of total shell and roof area.

For tanks with a capacity of less than 20,000 bbl, the requirements for the vacuum condition have been based on 1 SCFH of air, for each barrel of tank capacity. This is substantially equivalent to a mean rate of vapor space temperature change of 100°F [38°C] per hour. (See Table B, page 12)

Note

1. API 2000, Section 2.4 Table 2.

Gas Formula

English Units

$$V = 907\, C_2 C_V P_1 \sqrt{\frac{X}{GT}}$$

V = SCFH

C_2 = Correction factor for specific heat ratio

C_V = Valve sizing coefficient

P_1 = Pressure at valve inlet, (psia)

X = 0.66 for $P_1 \leq 47.7$ psia
0.69 for $P_1 > 47.7$ psia

G = Specific gravity

T = Temperature, °R (°F + 460)

Metric Units

$$V = 263\, C_2 C_V P_1 \sqrt{\frac{X}{GT}}$$

V = Nm^3/hr

C_2 = Correction factor for specific heat ratio

C_V = Valve sizing coefficient

P_1 = Pressure at valve inlet, [bara]

X = 0.66 for $P_1 \leq 3.288$ bara
0.69 for $P_1 > 3.288$ bara

G = Specific gravity

T = Temperature, °K [273 + °C]

Values C_2 and G

Gas	C_2	G
Air	1.00	1.00
Natural Gas	0.98	0.60
Nitrogen	1.00	0.97

C_V Valve Sizing Coefficients

Valve Size	Nozzle Size	C_v
RA: 1/2 inch [15 mm]	No Options	0.385
BV-1: 1 inch [25 mm]	110%	14.5
BV-1: 1 inch [25 mm]	100%	13.2
BV-1: 1 inch [25 mm]	70%	9.2
BV-1: 1 inch [25 mm]	50%	6.6
BV-1: 1 inch [25 mm]	30%	4.0
BV-1: 1 inch [25 mm]	20%	2.6
BV-1: 1 inch [25 mm]	10%	1.3
BV-1: 1 inch [25 mm]	5%	0.7
Y1: 1 inch [25 mm]	100%	10.0
Y1: 1 inch [25 mm]	70%	7.0
Y1: 1 inch [25 mm]	50%	5.0
Y1: 1 inch [25 mm]	30%	3.0
Y1: 2 inch [50 mm]	100%	43.6
Y1: 2 inch [50 mm]	70%	30.5
Y1: 2 inch [50 mm]	50%	21.8
Y1: 2 inch [50 mm]	30%	13.1
Y1: 2 inch [50 mm]	10%	4.4

Sizing Data

Table A (English) - In Breathing Rate Due to Pump-Out

Multiply Maximum Pump-Out Rate In:	By	To Obtain
U.S. GPM	8.021	SCFH air required
U.S. GPH	0.134	SCFH air required
Barrels/hr	5.615	SCFH air required
Barrels/day	0.234	SCFH air required
Liters/min	2.118	SCFH air required
m^3/hr	35.30	SCFH air required

Table A [Metric] - In Breathing Rate Due to Pump-Out

Multiply Maximum Pump-Out Rate In:	By	To Obtain
U.S. GPM	0.215	Nm^3/hr air required
IMP GPM	0.258	Nm^3/hr air required
Barrels/hr	0.151	Nm^3/hr air required
Barrels/day	0.0063	Nm^3/hr air required
Liters/min	0.057	Nm^3/hr air required

Sizing Data

Table B[1] - In Breathing Rate Due to Thermal Cooling

Required Barrels	Tank Capacity Gallons	[m^3]	In Breathing Air SCFH	[Nm^3/hr]
60	2,500	[9.5]	60	[1.6]
100	4,200	[15.9]	100	[2.7]
500	21,000	[79.5]	500	[13.4]
1,000	42,000	[159]	1,000	[26.8]
2,000	84,000	[318]	2,000	[53.6]
3,000	126,000	[477]	3,000	[80.4]
4,000	168,000	[636]	4,000	[107.2]
5,000	210,000	[795]	5,000	[134]
10,000	420,000	[1590]	10,000	[268]
15,000	630,000	[2385]	15,000	[402]
20,000	840,000	[3180]	20,000	[536]
25,000	1,050,000	[3975]	24,000	[643]
30,000	1,260,000	[4770]	28,000	[750]
35,000	1,470,000	[5560]	31,000	[830]
40,000	1,680,000	[6360]	34,000	[911]
45,000	1,890,000	[7150]	37,000	[992]
50,000	2,100,000	[7950]	40,000	[1070]
60,000	2,520,000	[9540]	44,000	[1180]
70,000	2,940,000	[11130]	48,000	[1290]
80,000	3,360,000	[12700]	52,000	[1400]
90,000	3,780,000	[14300]	56,000	[1500]
100,000	4,200,000	[15900]	60,000	[1600]
120,000	5,040,000	[19100]	68,000	[1800]
140,000	5,880,000	[22300]	75,000	[2000]
160,000	6,720,000	[25400]	82,000	[2200]
180,000	7,560,000	[28600]	90,000	[2400]

Note

1. API 2000, Section 2.4, Table 2.

Sizing Data

Table C (English) - Flow Capacities in SCFH @ 60°F[1] Gas Temperature, 100% Nozzle

Inlet Pressure (psig)	Outlet Press.	Type RA, 1/2 inch			BV-1, 1 inch			Y1, 1 inch			Y1, 2 inch		
		Natural Gas	Nitrogen	Air	Natural Gas	Nitrogen	Air	Natural Gas	Nitrogen	Air	Natural Gas	Nitrogen	Air
15		468	375	369	16027	12862	12688	—	—	—	—	—	—
20		547	439	432	18725	15028	14801	—	—	—	—	—	—
25		625	502	494	21424	17193	16933	—	—	—	—	—	—
30		704	565	556	24122	19359	19066	18274	14666	14444	79675	63942	62975
40		880	706	696	30182	24222	23856	22865	18350	18072	99691	80005	78796
50		1042	835	823	35699	28650	28217	27045	21704	21376	117916	94631	93201
60		1203	966	951	41217	33078	32578	31225	25059	24680	136141	109258	107606
70		1363	1095	1078	46735	37506	36939	35405	28414	27984	154366	123884	122011
80		1525	1224	1205	52252	41934	41300	39585	31768	31288	172591	138510	136416
90	1 psig	1685	1353	1333	57770	46362	45662	43765	35123	34592	190816	153136	150822
100	or	1847	1482	1460	63288	50790	50023	47945	38478	37896	209041	167762	165227
110	less	2008	1611	1587	68805	55219	54384	52125	41832	41200	227266	182388	179632
120		2168	1740	1713	74323	59647	58745	56305	45187	44504	245491	197015	194037
130		2330	1870	1841	79840	64075	63106	60485	48541	47808	263715	211641	208442
140		2490	1999	1968	85358	68503	67467	64665	51896	51112	281940	226267	222847
150		2651	2128	2095	90876	72931	71829	68845	55251	54416	300165	240893	237252
160		2813	2257	2223	96393	77359	76190	73025	58605	57720	318390	255519	251657
170		2973	2386	2350	101911	81787	80551	77205	61960	61023	336615	270145	266062
180		3135	2515	2477	107429	86215	84912	81385	65315	64327	354840	284772	280468
190		3296	2644	2605	112946	90643	89273	85565	68669	67631	373065	299398	294873
200		3456	2773	2732	118464	95071	93635	89745	72024	70935	391290	314024	309278

Table D - Correction Factors

Actual Temperature °F	Correction Factor
-20	1.087
0	1.063
20	1.041
40	1.020
60	1.000
80	0.9813
100	0.9636
120	0.9469
150	0.9233
200	0.8876
250	0.8558

Note

1. To obtain capacities at a temperature other than 60°F, multiply capacity in Table C by appropriate temperature correction factor in Table D.

Sizing Data

Table C [Metric] - Flow Capacities in Nm^3/hr @ 0°C[1] Gas Temperature, 100% Nozzle

Inlet Pressure (barg)	Outlet Press.	Type RA, 1/2 inch [15 mm]			BV-1, 1 inch [25 mm]			Y1, 1 inch [25 mm]			Y1, 2 inch [50 mm]		
		Natural Gas	Nitrogen	Air	Natural Gas	Nitrogen	Air	Natural Gas	Nitrogen	Air	Natural Gas	Nitrogen	Air
1.0	70 mbarg or less	13	10	10	435	349	344	—	—	—	—	—	—
2.0		19	15	15	651	522	514	493	396	390	—	—	—
3.0		26	21	20	886	711	700	671	539	531	2927	2349	2313
4.0		32	26	26	1107	888	875	839	673	663	3656	2934	2890
5.0		39	31	31	1328	1066	1049	1006	807	795	4386	3520	3466
6.0		45	36	36	1549	1243	1224	1173	941	927	5115	4105	4043
7.0		52	41	41	1769	1420	1399	1340	1076	1059	5844	4690	4619
8.0		58	47	46	1990	1597	1573	1508	1210	1192	6574	5276	5196
9.0		64	52	51	2211	1774	1748	1675	1344	1324	7303	5861	5772
10.0		71	57	56	2432	1952	1922	1842	1478	1456	8032	6446	6349
11.0		77	62	61	2653	2129	2097	2010	1613	1588	8762	7032	6925
12.0		84	67	66	2873	2306	2271	2177	1747	1721	9491	7617	7502
13.0		90	72	71	3094	2483	2446	2344	1881	1853	10220	8202	8078
14.0		97	78	76	3315	2660	2620	2511	2015	1985	10950	8788	8655

Note

1. To obtain capacities at a temperature other than 0°C, multiply capacity in Table C by appropriate temperature correction factor in Table D.

Table D - Correction Factors

Actual Temperature [°C]	Correction Factor
[-30]	1.060
[-20]	1.039
[-10]	1.019
[0]	1.000
[10]	0.982
[20]	0.965
[30]	0.949
[40]	0.934
[50]	0.919
[100]	0.855
[150]	0.803

Model Numbering

Y1R	2	1	5	C	1	B	1	Y

Basic Valve Type

BV – Right angle style - pilot operated
Y1R – Y style - pilot operated
RAR – Direct spring

Valve Size

1 – 1 inch [25 mm] (BV-1 or Y1)
2 – 2 inch [50 mm] (Y1 only)
5 – 1/2 inch [15 mm] FNPT (RA only)

Connections

S – Threaded (Internal NPT)
1 – 150#
3 – 300#
L – PN 6
M – PN 10/16
N – PN 25/40

Nozzle/Piston[1]

1 – 100 percent
7 – 70 percent
5 – 50 percent
3 – 30 percent
2 – 20 percent
9 – 10 percent (BV-1 only)
x – 5 percent (BV-1 only)
0 – 110 percent (BV-1 only)

Body Material

C – CS (RA and Y1 only)
S – 316 SS
N – CS/NACE (All SS in BV-1, RA models)

Main Valve Trim Material

1 – Standard trim
2 – 316 SS trim (RA, BV-1 standard)

Seat, Seal, and Diaphragm Material

B – BUNA-N (RA, Y1 standard)
V – Viton®
E – EPR
X – Other (specify)
F – Fluorosilicone with PTFE pilot diaphragm (standard for BV-1 model only)

Set Pressure Range

1 – 1/2" wc to 1.4" wc [1.2 to 3.5 mbarg]
2 – 1.2" wc to 4" wc [3.0 to 10.0 mbarg]
3 – 3.5" wc to 10" wc [8.7 to 25 mbarg]
4 – 8" wc to 18" wc [20 to 45 mbarg]
5 – 15" wc to 29" wc [37 to 72 mbarg]
6 – 0.6 psig to 1.4 psig [41 to 97 mbarg]
7 – 1.3 psig to 3.1 psig [90 to 215 mbarg]
8 – 2.3 psig to 3.5 psig [160 to 240 mbarg]
9 – 3.0 psig to 6.0 psig [0.2 to 0.41 mbarg]

Options

Y – Pilot filter (available Y1 only)
N – No options
E – External Purge Meter
P – Internal Purge (available BV-1 only)
S – Sense Line Control Gauge
T – System Pressure Gauge
D – Both - Sense Line Gauge and Tank Pressure Gauge

For special requirements call: 281-274-4400

Note

1. RA is always 100 percent.

Stafford Facility Phone: 281-274-4400

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