

## Models 8820A/8821B/8822B/8823A and Flame Arrester with pipe-away feature

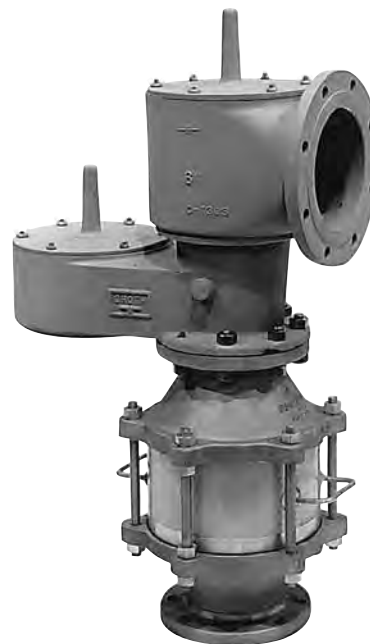
- Sizes 2" through 12"
- Pressure settings  
0.5 oz/in<sup>2</sup> to 15 psig
- Vacuum settings  
0.5 oz/in<sup>2</sup> to 12 psig
- Available in aluminum (type 356),  
carbon steel, stainless steel and other  
materials
- Proven spiral wound, crimped ribbon,  
flame element
- Modular construction

### PRESSURE / VACUUM RELIEF VALVE WITH FLAME ARRESTER (PIPE-AWAY)

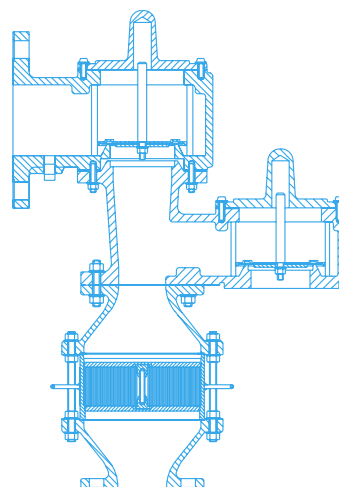
The Model 8820A combination units are used for pressure and vacuum relief where vapors must be piped away. They are designed to protect your tank from damage created by overpressure or excessive vacuum, at the same time that they provide protection from externally caused sources of heat and ignition. The result is reduced emissions level and increased fire protection and safety.

### SPECIAL FEATURES

The Model 8820A Pressure/Vacuum Relief Valve with flanged pipe-away outlet offers Groth's special "cushioned air" seating. Superior performing TEFLON® seating diaphragms are standard to minimize sticking caused by resinous vapors and atmospheric moisture. Self draining housings and drip rings protect seating surfaces from condensate and freezing. Buna-N, VITON® and other seating diaphragms can be provided when required.



MODEL 8820A



MODEL 8820A

#### END-OF-LINE

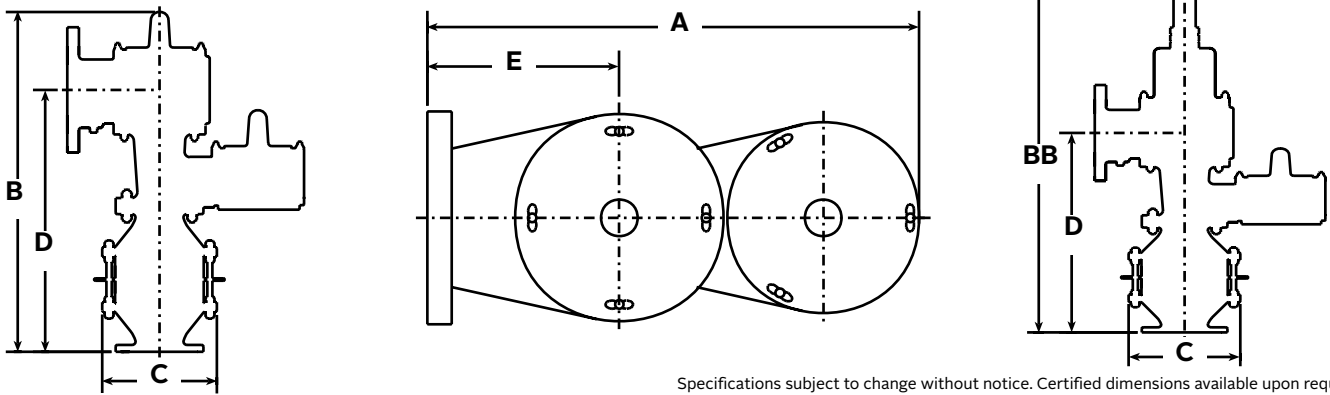
(Flanged Outlet with or without Discharge Piping)

- Gas Group: NEC D, IEC IIA
- Operating Temperature <= 140°F (60°C)
- Pre-Ignition Pressure = Atmosphere
- Discharge Piping Length <= 10 pipe diameters

#### IN-LINE

- Gas Group: IEC IIA1, Methane  
(includes most Biogas applications)
- Operating Temperature <= 140°F (60°C)
- Pre-Ignition Pressure <= 1 psig
- Run-up Length <= 50 pipe diameters (2")
- Run-up Length <= 20 pipe diameters (3")
- Run-up Length <= 10 pipe diameters (4" – 12")

## SPECIFICATIONS



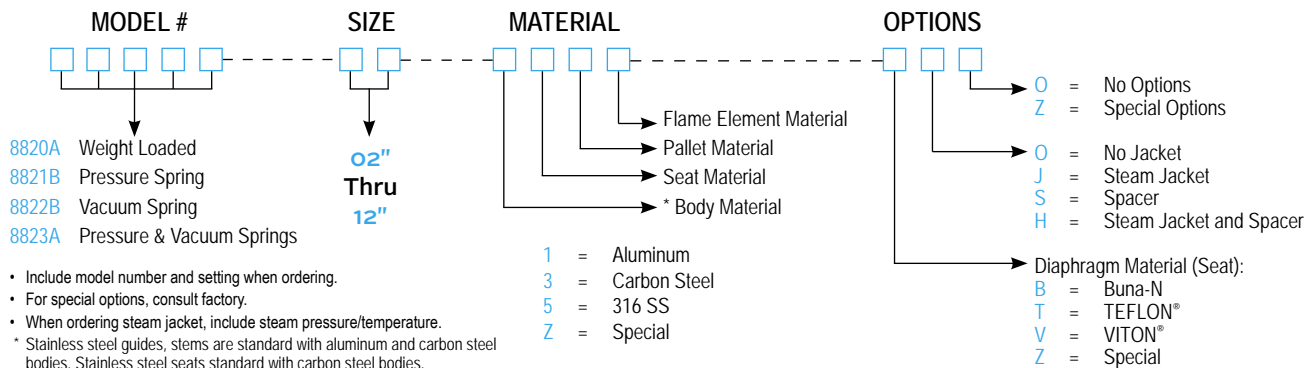
Specifications subject to change without notice. Certified dimensions available upon request.

Inlet Fig. <sup>a</sup> (Metric)	Outlet Fig. <sup>a</sup> (Metric)	Max. Set Pressure Weight Loaded	Max. Set Vacuum. Weight Loaded	Max. Setting Spring Loaded	Min. Setting Weight Loaded	Max. W.P. <sup>1</sup> for Min. Vacuum Setting	Min. Vac. Setting for Max. W.P. <sup>1</sup>	A Length (Metric)	B Height (Metric)	BB Height (Metric)	C Width (Metric)	D (Metric)	E (Metric)	Approx. Ship Wt. Lbs. (Aluminum)
2" (50 mm)	3" (76 mm)	11 oz/in <sup>2</sup> (48.2 gm/cm <sup>2</sup> )	12 oz/in <sup>2</sup> (52.7 gm/cm <sup>2</sup> )	15 psig SPRING LOADED PRESSURE (1.05 kg/cm <sup>2</sup> ) 12 psig SPRING LOADED VACUUM (0.84 kg/cm <sup>2</sup> )	*0.5 oz/in <sup>2</sup> WEIGHT LOADED (2.20 gm/cm <sup>2</sup> )	See TPD2 for Vacuum Settings and MAWP		14.25" (361 mm)	26.62" (676 mm)	33.62" (854 mm)	8.75" (221 mm)	20.25" (514 mm)	5.50" (140 mm)	45 (20 kg)
3" (80 mm)	4" (102 mm)	13 oz/in <sup>2</sup> (57.0 gm/cm <sup>2</sup> )	11 oz/in <sup>2</sup> (48.3 gm/cm <sup>2</sup> )					18" (457 mm)	31.12" (790 mm)	39.37" (1000 mm)	9.50" (241 mm)	23.12" (588 mm)	6" (152 mm)	60 (27 kg)
4" (100 mm)	6" (152 mm)	16 oz/in <sup>2</sup> (70.3 gm/cm <sup>2</sup> )	11 oz/in <sup>2</sup> (48.3 gm/cm <sup>2</sup> )					19.25" (489 mm)	37" (940 mm)	47.37" (1203 mm)	11.50" (292 mm)	26.75" (679 mm)	6.50" (165 mm)	90 (41 kg)
6" (150 mm)	8" (203 mm)	16 oz/in <sup>2</sup> (70.3 gm/cm <sup>2</sup> )	16 oz/in <sup>2</sup> (70.3 gm/cm <sup>2</sup> )					26.50" (673 mm)	44.75" (1136 mm)	59.75" (1518 mm)	16.50" (419 mm)	31.50" (800 mm)	8.50" (216 mm)	160 (73 kg)
8" (200 mm)	10" (254 mm)	16 oz/in <sup>2</sup> (70.3 gm/cm <sup>2</sup> )	16 oz/in <sup>2</sup> (70.3 gm/cm <sup>2</sup> )					32.50" (826 mm)	53.50" (1358 mm)	70.25" (1784 mm)	21" (533 mm)	37.37" (949 mm)	10.75" (273 mm)	270 (123 kg)
10" (250 mm)	12" (305 mm)	16 oz/in <sup>2</sup> (70.3 gm/cm <sup>2</sup> )	16 oz/in <sup>2</sup> (70.3 gm/cm <sup>2</sup> )					37.25" (959 mm)	64.50" (1638 mm)	84.12" (2137 mm)	24.75" (629 mm)	45.25" (1149 mm)	12.50" (318 mm)	420 (190 kg)
12" (300 mm)	14" (356 mm)	16 oz/in <sup>2</sup> (70.3 gm/cm <sup>2</sup> )	16 oz/in <sup>2</sup> (70.3 gm/cm <sup>2</sup> )					42.75" (1086 mm)	71.62" (1819 mm)	91.37" (2321 mm)	28.62" (727 mm)	50.12" (1273 mm)	15" (381 mm)	600 (273 kg)

<sup>1</sup> W.P. = Working Pressure. <sup>a</sup> On spring loaded valves, change model number. <sup>o</sup> 150# R.F. drilling compatibility F.F. on aluminum and R.F. on carbon steel and stainless steel alloys. 16 oz/in<sup>2</sup> set with spacer. SS set weights-consult factory. \*Some sizes require non-ferrous components to achieve 0.5 oz/in<sup>2</sup> setting.

## HOW TO ORDER

For easy ordering, select proper model numbers



### EXAMPLE

8 8 2 0 A — 0 2 — 1 1 5 1 — T 0 0

Indicates a 2" Model 8820A with Aluminum Body and Seat, 316 SS Pallet, Aluminum Flame Element, TEFLON® Seat Diaphragm, and no other options.

# Model 8820A Pressure Relief Capacity

Set Pressure (P <sub>s</sub> )		Air Flow Capacity at 100% Overpressure (Double Set Pressure) 1000 Standard Cubic Feet per Hour at 60° F						
InWC	oz/in <sup>2</sup>	2" (50 mm)	3" (80 mm)	4" (100 mm)	6" (150 mm)	8" (200 mm)	10" (250 mm)	12" (300 mm)
0.87	0.50	2.92	5.68	10.3	20.7	32.3	51.5	59.1
1.00	0.58	3.19	6.34	11.5	23.3	36.2	57.6	67.8
1.73	1.00	4.45	9.23	16.8	34.4	53.0	84.4	105
2.00	1.16	4.84	10.1	18.5	37.8	58.2	92.6	116
2.60	1.50	5.64	11.9	21.7	44.6	68.5	109	138
3.00	1.73	6.12	13.0	23.7	48.8	74.8	119	151
3.46	2.00	6.65	14.1	25.9	53.2	81.6	130	165
4.00	2.31	7.21	15.4	28.2	58.0	88.9	141	180
6.00	3.47	9.07	19.5	35.7	73.6	113	179	230
8.00	4.62	10.7	23.0	42.1	86.8	133	211	272
10.0	5.78	12.1	26.1	47.7	98.6	151	240	309
12.0	6.93	13.3	28.9	52.9	109	167	266	343
15.0	8.66	15.1	32.7	60.0	124	189	301	389
20.0	11.6	17.7	38.4	70.4	146	222	354	457
25.0	14.4	20.0	43.5	79.7	165	252	400	518
30.0	17.3	22.2	48.1	88.2	182	278	443	574

Flow capacity is certified by Groth Corporation, based on actual tests conducted in compliance with API Std. 2000. Flow measurement accuracy has been verified by an independent testing laboratory.

Flow capacity values listed above are based on full open valves at 100% overpressure.

Consult Factory for flow capacity with fiberglass valve.

Read the flow capacity at 100% overpressure directly from the table above. Use linear interpolation if the set pressure is not listed. (Ref: TPD1)

If the allowable overpressure is less than 100%, modify the flow capacity using the appropriate "C" factor from the table. If allowable overpressure is more than 100%, consult TPD1 or your Groth Representative.

Calculate the percentage overpressure by the following formula. Note that all pressures are gauge pressure expressed in the same units of measure.

$$P_f = \text{Flowing pressure}$$

$$P_s = \text{Set pressure}$$

$$\% \text{ OP} = [(P_f - P_s) / P_s] \times 100$$

Calculate flow capacity at less than 100% overpressure according to the following example.

**Example—To find "C" factor from table:**

Read "C" factor for 75% overpressure at intersection of row 70 and column 5  
"C" factor at 75% OP = 0.87

"C" Factor Table										
%OP	0	1	2	3	4	5	6	7	8	9
10	<b>Consult Factory</b>									
20										
30										
40										
50	0.72	0.73	0.73	0.74	0.75	0.75	0.76	0.77	0.77	0.78
60	0.78	0.79	0.80	0.80	0.81	0.81	0.82	0.82	0.83	0.84
70	0.84	0.85	0.85	0.86	0.86	0.87	0.88	0.88	0.89	0.89
80	0.90	0.90	0.91	0.91	0.92	0.92	0.93	0.93	0.94	0.94
90	0.95	0.95	0.96	0.96	0.97	0.97	0.98	0.99	0.99	1.00

**Example—Flow Capacity Calculation**

- 1. Read flow capacity at set pressure from table
  - 2. Calculate overpressure
  - 3. Read "C" factor from table
  - 4. Calculate flow capacity
- 6" Model 8820A  
4 InWC set pressure [P<sub>s</sub>]  
7 InWC flowing pressure [P<sub>f</sub>]

Flow = 58,000 SCFH  
 $\% \text{ OP} = [(7 - 4) / 4] \times 100 = 75\%$   
 "C" = 0.87  
 $\text{Flow} = 0.87 \times 58,000 = 50,460 \text{ SCFH}$

# Model 8820A

## Pressure Relief Capacity

Set Pressure (P <sub>s</sub> )	Air Flow Capacity at 100% Overpressure (Double Set Pressure) 1000 Normal Cubic Meters per Hour at 0° C						
	mmWC	2" (50 mm)	3" (80 mm)	4" (100 mm)	6" (150 mm)	8" (200 mm)	10" (250 mm)
22.0	0.08	0.17	0.31	0.62	0.96	1.53	1.80
50.0	0.14	0.29	0.52	1.07	1.65	2.62	3.28
75.0	0.17	0.37	0.67	1.38	2.12	3.37	4.27
100	0.20	0.44	0.80	1.64	2.52	4.01	5.11
150	0.26	0.55	1.01	2.08	3.19	5.07	6.51
200	0.30	0.65	1.19	2.46	3.76	5.98	7.70
250	0.34	0.74	1.35	2.79	4.27	6.79	8.75
300	0.38	0.82	1.50	3.10	4.73	7.52	9.70
375	0.43	0.93	1.70	3.51	5.36	8.53	11.0
500	0.50	1.09	2.00	4.12	6.29	10.0	13.0
625	0.57	1.23	2.26	4.67	7.13	11.3	14.7
750	0.63	1.36	2.50	5.17	7.89	12.5	16.3

Flow capacity is certified by Groth Corporation, based on actual tests conducted in compliance with API Std. 2000. Flow measurement accuracy has been verified by an independent testing laboratory.

Flow capacity values listed above are based on full open valves at 100% overpressure.

Consult Factory for flow capacity with fiberglass valve.

Read the flow capacity at 100% overpressure directly from the table above. Use linear interpolation if the set pressure is not listed. (Ref: TPD1)

If the allowable overpressure is less than 100%, modify the flow capacity using the appropriate "C" factor from the table. If allowable overpressure is more than 100%, consult TPD1 or your Groth Representative.

Calculate the percentage overpressure by the following formula. Note that all pressures are gauge pressure expressed in the same units of measure.

$$P_f = \text{Flowing pressure}$$

$$P_s = \text{Set pressure}$$

$$\% \text{ OP} = [(P_f - P_s) / P_s] \times 100$$

Calculate flow capacity at less than 100% overpressure according to the following example.

**Example—To find "C" factor from table:**

Read "C" factor for 67% overpressure at intersection of row 60 and column 7  
"C" factor at 67% OP = 0.82

"C" Factor Table										
%OP	0	1	2	3	4	5	6	7	8	9
10	<b>Consult Factory</b>									
20										
30										
40										
50	0.72	0.73	0.73	0.74	0.75	0.75	0.76	0.77	0.77	0.78
60	0.78	0.79	0.80	0.80	0.81	0.81	0.82	0.82	0.83	0.84
70	0.84	0.85	0.85	0.86	0.86	0.87	0.88	0.88	0.89	0.89
80	0.90	0.90	0.91	0.91	0.91	0.92	0.93	0.93	0.94	0.94
90	0.95	0.95	0.96	0.96	0.97	0.97	0.98	0.99	0.99	1.00

**Example—Flow Capacity Calculation**

- 6" Model 8820A
- 150 mmWC Set Pressure [P<sub>s</sub>]
- 250 mmWC Flowing Pressure [P<sub>f</sub>]

1. Read flow capacity at set pressure from table
2. Calculate overpressure
3. Read "C" factor from table
4. Calculate flow capacity

$$\text{Flow} = 2,080 \text{ NCMH}$$

$$\% \text{ OP} = [(250 - 150) / 150] \times 100 = 67\%$$

$$"C" = 0.82$$

$$\text{Flow} = 0.82 \times 2,080 = 1,706 \text{ NCMH}$$

# Model 8820A Vacuum Relief Capacity

Set Vacuum (P <sub>s</sub> )		Air Flow Capacity at 100% Over-vacuum (Double Set Vacuum) 1000 Standard Cubic Feet per Hour at 60° F						
InWC	oz/in <sup>2</sup>	2" (50 mm)	3" (80 mm)	4" (100 mm)	6" (150 mm)	8" (200 mm)	10" (250 mm)	12" (300 mm)
0.87	0.50	2.55	5.19	8.80	17.9	28.6	44.3	53.6
1.00	0.58	2.77	5.73	9.70	19.8	31.6	48.9	60.4
1.73	1.00	3.78	8.15	13.6	28.3	45.1	69.4	89.8
2.00	1.16	4.10	8.90	14.9	31.0	49.3	75.8	99.0
2.60	1.50	4.74	10.4	17.4	36.2	57.7	88.6	117
3.00	1.73	5.14	11.3	18.9	39.5	62.9	96.0	128
3.46	2.00	5.56	12.3	20.5	42.9	68.4	105	139
4.00	2.31	6.03	13.4	22.3	46.7	74.4	114	152
6.00	3.47	7.54	16.9	28.1	58.9	93.8	144	193
8.00	4.62	8.84	19.9	33.0	69.4	110	169	227
10.0	5.78	10.0	22.5	37.4	78.6	125	192	258
12.0	6.93	11.1	24.9	41.5	87.1	139	212	286
15.0	8.66	12.5	28.2	46.9	98.6	157	240	324
20.0	11.6	14.7	33.1	55.1	116	184	282	381
25.0	14.4	16.6	37.5	62.3	131	209	319	432
30.0	17.3	18.3	41.5	68.9	145	231	353	478

Flow capacity is certified by Groth Corporation, based on actual tests conducted in compliance with API Std. 2000. Flow measurement accuracy has been verified by an independent testing laboratory.

Flow capacity values listed above are based on full open valves at 100% over-vacuum.

Consult Factory for flow capacity with fiberglass valve.

Read the flow capacity at 100% over-vacuum directly from the table above. Use linear interpolation if the set vacuum is not listed. (Ref: TPD1)

If the allowable over-vacuum is less than 100%, modify the flow capacity using the appropriate "C" factor from the table. If allowable over-vacuum is more than 100%, consult TPD1 or your Groth Representative.

Calculate the percentage over-vacuum by the following formula. Note that all pressures are gauge pressure expressed in the same units of measure.

P<sub>f</sub> = Flowing pressure  
 P<sub>s</sub> = Set pressure  
 $\% \text{ OV} = [(P_f - P_s) / P_s] \times 100$

Calculate flow capacity at less than 100% over-vacuum according to the following example.

**Example—To find "C" factor from table:**

Read "C" factor for 75% Over-vacuum at intersection of row 70 and column 5  
 "C" factor at 75% OV = 0.87

"C" Factor Table										
%OV	0	1	2	3	4	5	6	7	8	9
10	<b>Consult Factory</b>									
20										
30										
40										
50	0.72	0.73	0.73	0.74	0.75	0.75	0.76	0.77	0.77	0.78
60	0.78	0.79	0.80	0.80	0.81	0.81	0.82	0.82	0.83	0.84
70	0.84	0.85	0.85	0.86	0.86	0.87	0.88	0.88	0.89	0.89
80	0.90	0.90	0.91	0.91	0.91	0.92	0.93	0.93	0.94	0.94
90	0.95	0.95	0.96	0.96	0.97	0.97	0.98	0.99	0.99	1.00

**Example—Flow Capacity Calculation**

1. Read flow capacity at set vacuum from table
  2. Calculate over-vacuum
  3. Read "C" factor from table
  4. Calculate flow capacity
- 6" Model 8820A  
 4 InWC set vacuum [P<sub>s</sub>]  
 7 InWC flowing vacuum [P<sub>f</sub>]

Flow = 46,700 SCFH  
 $\% \text{ OV} = [(7 - 4) / 4] \times 100 = 75\%$   
 "C" = 0.87  
 $\text{Flow} = 0.87 \times 46,700 = 40,629 \text{ SCFH}$