

# VALVE & FLAME ARRESTER COMBINATION



SAFETY PRODUCTS THAT PROTECT EQUIPMENT, LIVES & THE ENVIRONMENT



# TABLE OF CONTENTS

MODEL NUMBER	MODEL DESCRIPTION	PAGE #
<b>COMBINATION RELIEF VALVES AND FLAME ARRESTERS</b>		
SERIES 8800	MODEL 8800A, 8801B, 8802B, 8803A	3-8
SERIES 8800	Features	3
SERIES 8800	Specifications & How To Order	4
MODEL 8800A	Pressure Relief Capacity	5-6
MODEL 8800A	Vacuum Relief Capacity	7-8
<b>COMBINATION RELIEF VALVES AND FLAME ARRESTERS WITH PIPE-AWAY</b>		
SERIES 8820	MODEL 8820A, 8821B, 8822B, 8823A	9-15
SERIES 8820	Features	9
SERIES 8820	Specifications	10
SERIES 8820	How To Order	11
MODEL 8820A	Pressure Relief Capacity	12-13
MODEL 8820A	Vacuum Relief Capacity	14-15

## ADDITIONAL GROTH PRODUCTS

Please see our other Groth Datasheets for additional product lines:



# SERIES 8800

- 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 carbon steel (WCB/CS), stainless steel (CF8M/316), aluminum (356/6061) and other materials
- Proven spiral-wound, crimped-ribbon flame element
- Modular construction
- ATEX Certificate available

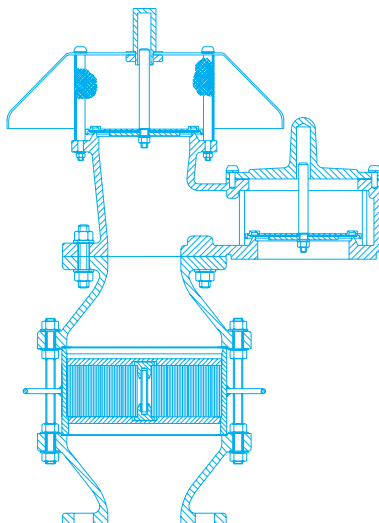


## PRESSURE / VACUUM RELIEF VALVE WITH FLAME ARRESTER

The Model 8800A Pressure/Vacuum Valve & Flame Arrester combination units are designed to protect your tank from damage created by over- pressure or excessive vacuum, at the same time that they provide protection from externally caused sources of heat and ignition. The result is increased fire protection and safety.

## SPECIAL FEATURES

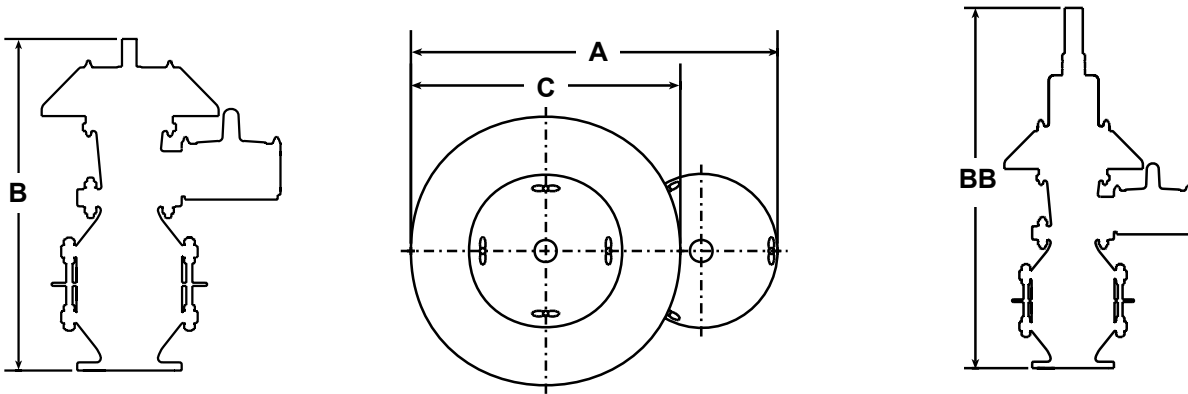
The Model 8800A Pressure/Vacuum Relief Valve offers Groth's special "cushioned air" seating. Superior performing fluoropolymer seating diaphragms are standard to minimize sticking caused by resinous vapors and atmospheric moisture. Self draining housings and drip rings protect seating surfaces from condensate and freezing.



### END-OF-LINE

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

# SPECIFICATIONS



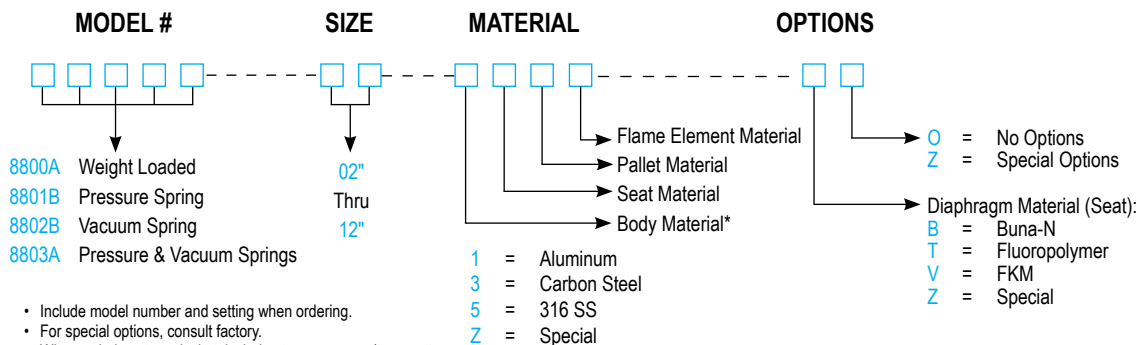
Specifications subject to change without notice. Certified dimensions available upon request.

Inlet Fig <sup>o</sup> (Metric)	Max. Set Pressure Weight Loaded	Max. Set Vacuum. Weight Loaded	Max. Setting Spring Loaded	Min. Setting Weight Loaded	Max. W.P. <sup>†</sup> for Min. Vacuum Setting	Min. Vac. Setting for Max. W.P. <sup>†</sup>	A Length (Metric)	B Height (Metric)	BB Height (Metric)	C Width (Metric)	Approx. Ship Wt. Lbs. (Aluminum)
2" (50 mm)		12 oz/in <sup>2</sup> (52.7 gm/cm <sup>2</sup> )					13.63" (346 mm)	28.5" (724 mm)	33.87" (860 mm)	9.50" (241 mm)	35 (16 kg)
3" (80 mm)		11 oz/in <sup>2</sup> (48.3 gm/cm <sup>2</sup> )					18" (457 mm)	29.63" (752 mm)	38.75" (984 mm)	11.50" (292 mm)	45 (20 kg)
4" (100 mm)		11 oz/in <sup>2</sup> (48.3 gm/cm <sup>2</sup> )					19.75" (502 mm)	34.63" (879 mm)	46.25" (1175 mm)	13" (330 mm)	70 (32 kg)
6" (150 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> )				See TPD2 for Vacuum Settings and MAWP	28.75" (730 mm)	43.25" (1099 mm)	58.75" (1492 mm)	19" (483 mm)	125 (57 kg)
8" (200 mm)		16 oz/in <sup>2</sup> (70.3 gm/cm <sup>2</sup> )					36" (914 mm)	51.38" (1305 mm)	69.50" (1765 mm)	23.63" (600 mm)	210 (95 kg)
10" (250 mm)		16 oz/in <sup>2</sup> (70.3 gm/cm <sup>2</sup> )					42" (1067 mm)	58.88" (1495 mm)	83" (2108 mm)	30.75" (781 mm)	350 (160 kg)
12" (300 mm)		16 oz/in <sup>2</sup> (70.3 gm/cm <sup>2</sup> )					48.50" (1232 mm)	65.38" (1661 mm)	88.12" (2238 mm)	35.75" (908 mm)	500 (227 kg)
			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> )							

<sup>†</sup>W.P. = Working Pressure. <sup>o</sup>On spring loaded valves, change model number. <sup>o</sup>150# ANSI 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



NOTES

- Include model number and setting when ordering.
- For special options, consult factory.
- When ordering steam jacket, include steam pressure/temperature.
- Stainless steel guides, stems are standard with aluminum and carbon steel bodies. Stainless steel seats standard with carbon steel bodies.

**EXAMPLE** 8 8 0 0 A — 0 2 — 1 1 5 1 — T O

Indicates a 2" Model 8800A with Aluminum Body and Seat, 316 SS Pallet, Fluoropolymer Seat Diaphragm, and no other options.

# MODEL 8800A // PRESSURE RELIEF CAPACITY

Air Flow Capacity at 100% Overpressure (Double Set Pressure) 1000 Standard Cubic Feet per Hour at 60° F								
Set Pressure (P <sub>s</sub> )		Size						
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	3.01	5.98	10.7	21.5	34.8	55.2	62.3
1.00	0.58	3.29	6.68	12.0	24.2	39.2	62.1	72.0
1.73	1.00	4.56	9.70	17.6	36.3	58.4	92.0	112
2.00	1.16	4.96	10.7	19.3	39.9	64.2	101	125
2.60	1.50	5.76	12.6	22.7	47.2	75.9	120	148
3.00	1.73	6.26	13.7	24.8	51.7	82.9	131	163
3.46	2.00	6.79	15.0	27.1	56.4	90.5	143	178
4.00	2.31	7.36	16.3	29.5	61.5	99.0	155	195
6.00	3.47	9.20	20.6	37.3	78.1	125	197	249
8.00	4.62	10.9	24.3	44.0	92.2	148	233	295
10.0	5.78	12.3	27.6	50.0	105	168	264	335
12.0	6.93	13.6	30.6	55.4	116	186	293	372
15.0	8.66	15.4	34.6	62.8	132	211	332	422
20.0	11.6	18.0	40.7	73.7	155	248	390	497
25.0	14.4	20.4	46.0	83.5	175	281	442	563
30.0	17.3	22.6	50.9	92.4	194	311	489	623

## FLOW CAPACITY CALCULATION

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

Read the flow capacity at 100% overpressure directly from the table above. Use linear interpolation.

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 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	*** Consult Factory***									
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

- 6" Model 8800A
- 4 InWC set pressure [P<sub>s</sub>]
- 7 InWC 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

$$\text{Flow} = 61,500 \text{ SCFH}$$

$$\% \text{ OP} = [(7 - 4) / 4] \times 100 = 75\%$$

$$"C" = 0.87$$

$$\text{Flow} = 0.87 \times 61,500 = 53,505 \text{ SCFH}$$

# MODEL 8800A // PRESSURE RELIEF CAPACITY

Air Flow Capacity at 100% Overpressure (Double Set Pressure) 1000 Normal Cubic Meters per Hour at 0° C							
Set Pressure (P <sub>s</sub> )	Size						
mmWC	2" (50 mm)	3" (80 mm)	4" (100 mm)	6" (150 mm)	8" (200 mm)	10" (250 mm)	12" (300 mm)
22.0	0.09	0.18	0.32	0.64	1.04	1.65	1.91
50.0	0.14	0.30	0.55	1.13	1.82	2.87	3.53
75.0	0.18	0.39	0.70	1.46	2.35	3.70	4.62
100	0.21	0.46	0.83	1.74	2.80	4.40	5.53
150	0.26	0.58	1.06	2.21	3.55	5.59	7.05
200	0.31	0.69	1.25	2.61	4.19	6.59	8.35
250	0.35	0.78	1.42	2.97	4.76	7.48	9.50
300	0.39	0.87	1.57	3.29	5.27	8.30	10.5
375	0.44	0.98	1.78	3.73	5.98	9.41	12.0
500	0.51	1.15	2.09	4.39	7.02	11.0	14.1
625	0.58	1.30	2.36	4.97	7.96	12.5	15.9
750	0.64	1.44	2.62	5.50	8.80	13.8	17.6

## FLOW CAPACITY CALCULATION

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

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

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 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	*** Consult Factory***									
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

- 6" Model 8800A
- 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

Flow = 2,210 NCMH  
 $\% \text{ OP} = [(250 - 150) / 150] \times 100 = 67\%$   
 "C" = 0.82  
**Flow = 0.82 x 2,210 = 1,812 NCMH**

# MODEL 8800A // VACUUM RELIEF CAPACITY

Air Flow Capacity at 100% Over-vacuum (Double Set Vacuum) 1000 Standard Cubic Feet per Hour at 60° F								
Set Vacuum (P <sub>s</sub> )		Size						
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	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 CALCULATION

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

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

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 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.

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

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

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

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										
%OP	0	1	2	3	4	5	6	7	8	9
10	*** Consult Factory***									
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

- 6" Model 8800A
- 4 InWC Set Vacuum [P<sub>s</sub>]
- 7 InWC Flowing Vacuum [P<sub>f</sub>]

1. Read flow capacity at set vacuum from table
2. Calculate over-vacuum
3. Read "C" factor from table
4. Calculate flow capacity

$$\text{Flow} = 46,700 \text{ SCFH}$$

$$\% \text{ OV} = [(7 - 4) / 4] \times 100 = 75\%$$

$$"C" = 0.87$$

$$\text{Flow} = 0.87 \times 46,700 = 40,629 \text{ SCFH}$$

# MODEL 8800A // VACUUM RELIEF CAPACITY

Air Flow Capacity at 100% Over-vacuum (Double Set Vacuum) 1000 Normal Cubic Meters per Hour at 0° C							
Set Vacuum (P <sub>s</sub> )	Size						
mmWC	2" (50 mm)	3" (80 mm)	4" (100 mm)	6" (150 mm)	8" (200 mm)	10" (250 mm)	12" (300 mm)
22.0	0.07	0.15	0.26	0.52	0.84	1.29	1.60
50.0	0.12	0.25	0.42	0.87	1.39	2.13	2.78
75.0	0.14	0.32	0.53	1.11	1.77	2.72	3.59
100	0.17	0.38	0.63	1.32	2.09	3.21	4.27
150	0.21	0.48	0.79	1.66	2.64	4.05	5.42
200	0.25	0.56	0.93	1.95	3.11	4.76	6.40
250	0.28	0.63	1.05	2.21	3.53	5.40	7.27
300	0.31	0.70	1.17	2.45	3.90	5.97	8.06
375	0.35	0.80	1.32	2.78	4.42	6.77	9.10
500	0.41	0.93	1.55	3.26	5.19	7.94	10.7
625	0.47	1.06	1.76	3.69	5.87	8.98	12.2
750	0.52	1.17	1.94	4.08	6.50	9.90	13.5

## FLOW CAPACITY CALCULATION

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

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

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 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.

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

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

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

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 67% over-vacuum at intersection of row 60 and column 7  
"C" factor at 67% OV = 0.82

"C" Factor Table										
%OP	0	1	2	3	4	5	6	7	8	9
10	*** Consult Factory***									
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

- 6" Model 8800A
- 150 mmWC Set Vacuum [P<sub>s</sub>]
- 250 mmWC Flowing Vacuum [P<sub>f</sub>]

1. Read flow capacity at set vacuum from table
2. Calculate over-vacuum
3. Read "C" factor from table
4. Calculate flow capacity

$$\text{Flow} = 1,660 \text{ NCMH}$$

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

$$"C" = 0.82$$

$$\text{Flow} = 0.82 \times 1,660 = 1,361 \text{ NCMH}$$



# SERIES 8820

- 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 carbon steel (WCB/CS), stainless steel (CF8M/316), aluminum (356/6061) and other materials
- Proven spiral-wound, crimped-ribbon flame element
- Modular construction
- ATEX Certificate available

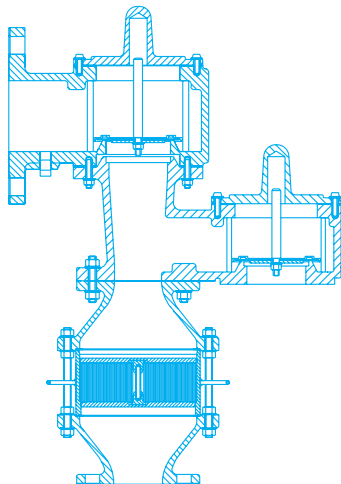


## PRESSURE / VACUUM RELIEF VALVE WITH FLAME ARRESTER (PIPE-AWAY)

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 fluoropolymer 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, FKM and other seating diaphragms can be provided when required.



#### END-OF-LINE

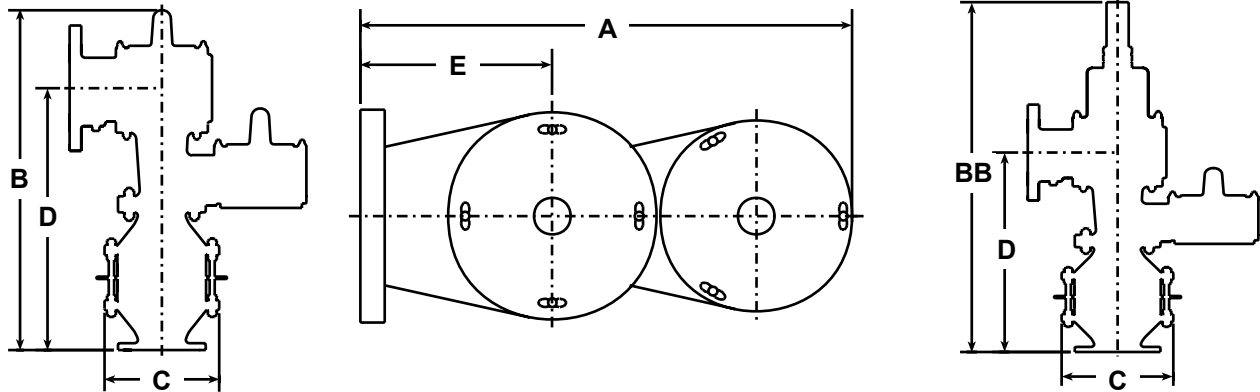
Flanged Outlet with or without Discharge Piping

- Gas Group: NEC D, IEC IIA
- Operating Temperature  $\leq 140^{\circ}\text{F}$  ( $60^{\circ}\text{C}$ )
- Pre-Ignition Pressure = Atmosphere
- Discharge Piping Length  $\leq 10$  pipe diameters

#### IN-LINE

- Gas Group: IEC IIA1, Methane  
(includes most Biogas applications)
- Operating Temperature  $\leq 140^{\circ}\text{F}$  ( $60^{\circ}\text{C}$ )
- Pre-Ignition Pressure  $\leq 1$  psig
- Run-up Length  $\leq 50$  pipe diameters (2")
- Run-up Length  $\leq 20$  pipe diameters (3")
- Run-up Length  $\leq 10$  pipe diameters (4"–12")

# SPECIFICATIONS



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

Inlet Flg <sup>o</sup> (Metric)	Outlet Flg <sup>o</sup> (Metric)	Max. Set Pressure Weight Loaded	Max. Set Vacuum Weight Loaded	Max. Setting Spring Loaded	Min. Setting Weight Loaded	Max. W.P. <sup>†</sup> for Min. Vacuum Setting	Min. Vac. Setting for Max. W.P. <sup>†</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> )					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>†</sup> W.P. = Working Pressure. <sup>o</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

MODEL #	SIZE	MATERIAL	OPTIONS
<div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; width: 20px; height: 20px;"></div> <div style="border: 1px solid black; width: 20px; height: 20px;"></div> <div style="border: 1px solid black; width: 20px; height: 20px;"></div> <div style="border: 1px solid black; width: 20px; height: 20px;"></div> </div> 8820A Weight Loaded 8821B Pressure Spring 8822B Vacuum Spring 8823A Pressure & Vacuum Springs	<div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; width: 20px; height: 20px;"></div> <div style="border: 1px solid black; width: 20px; height: 20px;"></div> </div> 02" Thru 12"	<div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; width: 20px; height: 20px;"></div> <div style="border: 1px solid black; width: 20px; height: 20px;"></div> <div style="border: 1px solid black; width: 20px; height: 20px;"></div> <div style="border: 1px solid black; width: 20px; height: 20px;"></div> </div> 1 = Aluminum 3 = Carbon Steel 5 = 316 SS Z = Special	<div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; width: 20px; height: 20px;"></div> <div style="border: 1px solid black; width: 20px; height: 20px;"></div> </div> O = No Options Z = Special Options Diaphragm Material (Seat): B = Buna-N T = Fluoropolymer V = FKM Z = Special

**NOTES**

- Include model number and setting when ordering.
- For special options, consult factory.
- When ordering steam jacket, include steam pressure/temperature.
- \* Stainless steel guides, stems are standard with aluminum and carbon steel bodies. Stainless steel seats standard with carbon steel bodies.

**EXAMPLE**    8 8 2 0 A — 0 2 — 1 1 5 1 — T O

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

# MODEL 8820A // PRESSURE RELIEF CAPACITY

Air Flow Capacity at 100% Overpressure (Double Set Pressure) 1000 Standard Cubic Feet per Hour at 60° F								
Set Pressure (P <sub>s</sub> )		Size						
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 CALCULATION

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

Read the flow capacity at 100% overpressure directly from the table above. Use linear interpolation.

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 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	*** Consult Factory***									
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

- 6" Model 8820A
- 4 InWC set pressure [P<sub>s</sub>]
- 7 InWC 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

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

# MODEL 8820A // PRESSURE RELIEF CAPACITY

Air Flow Capacity at 100% Overpressure (Double Set Pressure) 1000 Normal Cubic Meters per Hour at 0° C							
Set Pressure (P <sub>s</sub> )	Size						
mmWC	2" (50 mm)	3" (80 mm)	4" (100 mm)	6" (150 mm)	8" (200 mm)	10" (250 mm)	12" (300 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 CALCULATION

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

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

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 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	*** Consult Factory***									
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

- 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

Air Flow Capacity at 100% Over-vacuum (Double Set Vacuum) 1000 Standard Cubic Feet per Hour at 60° F								
Set Vacuum (P <sub>s</sub> )		Size						
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	53.9
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	90.7
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 CALCULATION

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

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

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 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.

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

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

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

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	*** Consult Factory***									
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

- 6" Model 8820A
- 4 InWC Set Vacuum [P<sub>s</sub>]
- 7 InWC Flowing Vacuum [P<sub>f</sub>]

1. Read flow capacity at set vacuum from table
2. Calculate over-vacuum
3. Read "C" factor from table
4. Calculate flow capacity

$$\text{Flow} = 46,700 \text{ SCFH}$$

$$\% \text{ OV} = [(7 - 4) / 4] \times 100 = 75\%$$

$$"C" = 0.87$$

$$\text{Flow} = 0.87 \times 46,700 = 40,629 \text{ SCFH}$$

# MODEL 8820A // VACUUM RELIEF CAPACITY

Air Flow Capacity at 100% Over-vacuum (Double Set Vacuum) 1000 Normal Cubic Meters per Hour at 0° C							
Set Vacuum (P <sub>s</sub> )	Size						
mmWC	2" (50 mm)	3" (80 mm)	4" (100 mm)	6" (150 mm)	8" (200 mm)	10" (250 mm)	12" (300 mm)
22.0	0.07	0.15	0.26	0.52	0.84	1.29	1.60
28.0	0.08	0.17	0.28	0.58	0.92	1.43	2.00
50.0	0.12	0.25	0.42	0.87	1.39	2.13	2.78
75.0	0.14	0.32	0.53	1.11	1.77	2.72	3.59
100	0.17	0.38	0.63	1.32	2.09	3.21	4.27
150	0.21	0.48	0.79	1.66	2.64	4.05	5.42
200	0.25	0.56	0.93	1.95	3.11	4.76	6.40
250	0.28	0.63	1.05	2.21	3.53	5.40	7.27
300	0.31	0.70	1.17	2.45	3.90	5.97	8.06
375	0.35	0.80	1.32	2.78	4.42	6.77	9.10
500	0.41	0.93	1.55	3.26	5.19	7.94	10.7
625	0.47	1.06	1.76	3.69	5.87	8.98	12.2
750	0.52	1.17	1.94	4.08	6.50	9.90	13.5

## FLOW CAPACITY CALCULATION

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

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

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

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

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

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

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 67% over-vacuum at intersection of row 60 and column 7  
"C" factor at 67% OV = 0.82

"C" Factor Table										
%OV	0	1	2	3	4	5	6	7	8	9
10	*** Consult Factory***									
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

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

1. Read flow capacity at set vacuum from table
2. Calculate over-vacuum
3. Read "C" factor from table
4. Calculate flow capacity

$$\text{Flow} = 1,660 \text{ NCMH}$$

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

$$"C" = 0.82$$

$$\text{Flow} = 0.82 \times 1,660 = 1,361 \text{ NCMH}$$



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