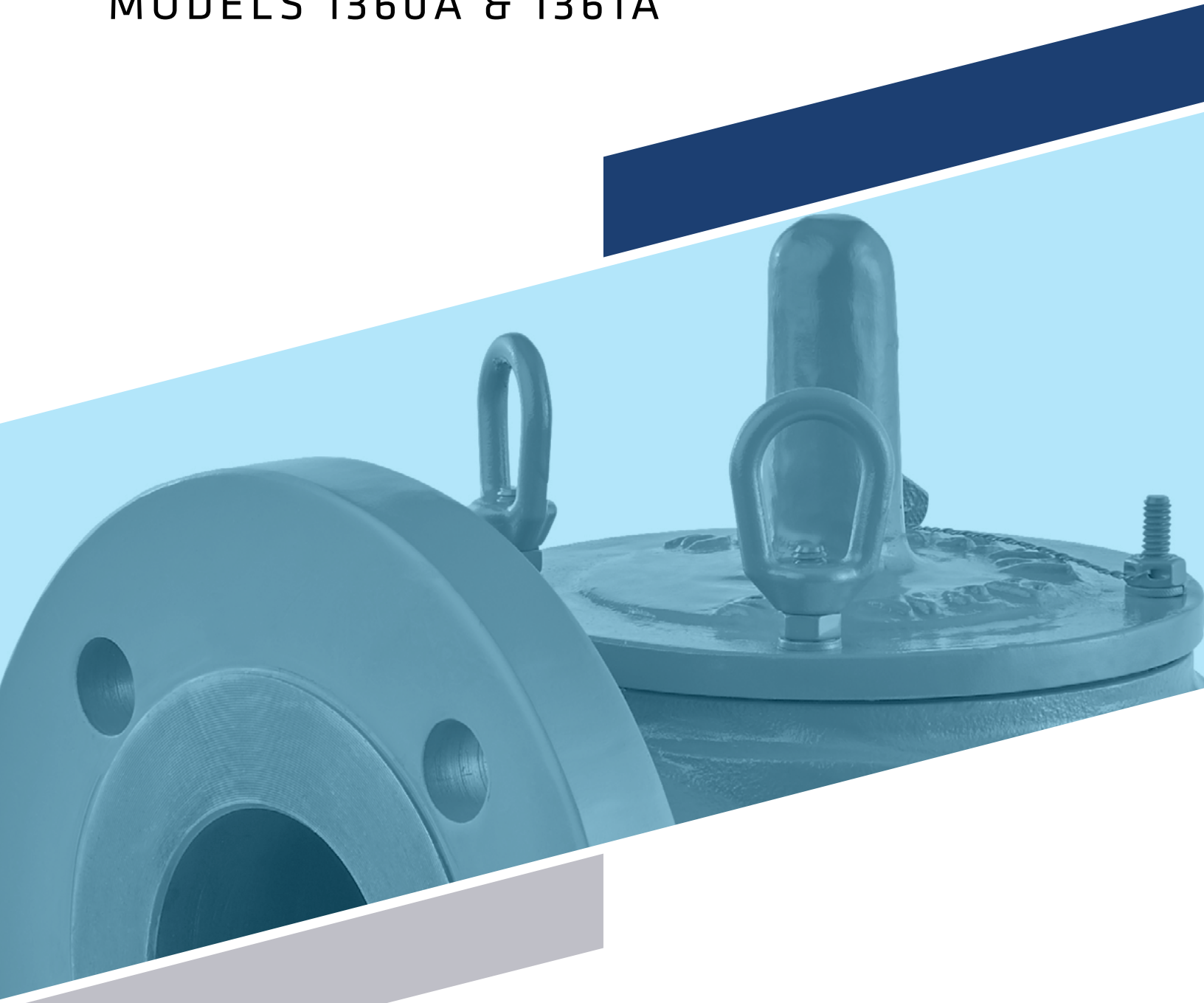




**CORPORATION**

# **VACUUM RELIEF VALVES**

MODELS 1360A & 1361A



# MODELS 1360A & 1361A

The Groth Models 1360A & 1361A are used when vacuum relief is the only requirement. Intake relief necessary under working conditions is achieved by a spring or weight loaded pallet. This feature reduces the possibility of tank damage due to an excessive vacuum condition. Valve size must be selected to perform required vacuum relief under operating and thermal conditions.

## Technical Details

- Certification: ATEX and PED Approval
- Materials: Aluminum, Carbon Steel, Stainless Steel, special materials upon request

### Model 1360A

- Sizes: 3"(DN80) through 14" (DN350)
- Vacuum Settings: 0.5 osi to 17.3 osi (2.15 mbarg to 1.19 barg)

### Model 1361A

- Sizes: 3"(DN80) through 14" (DN350)
- Vacuum Settings: 1 psig to 12 psig (68.9 mbarg to 827 mbarg)

## Features

- Modular Construction
- Cushioned air seating
- Fluoropolymer seating diaphragms minimize sticking caused by resinous vapors and atmospheric moisture
- Self-draining housing body and drip rings to protect seating surfaces from condensate and freezing
- Design avoids vacuum buildup due to binding or clogging of the vent

## Options

- Seating Diaphragm Options: FKM, Buna-N or other materials
- Available with flange, consult factory



Model 1360A

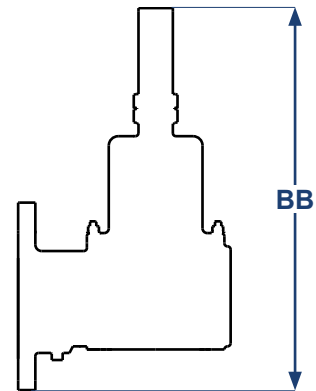
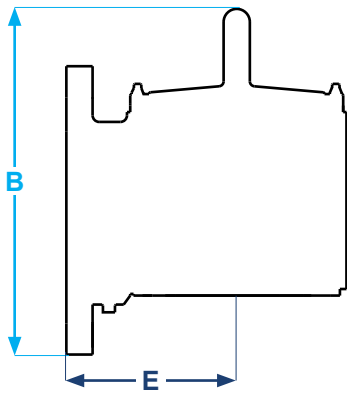
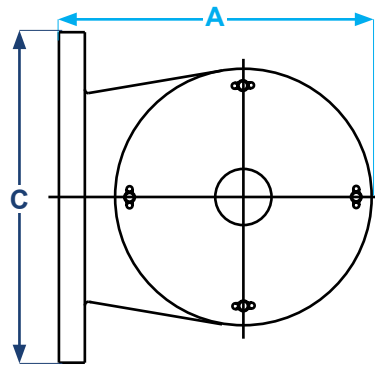


Model 1361A

# SPECIFICATIONS

Size <sup>◇</sup> Flange In (mm)	Max. Set Vacuum Weight Loaded oz/in <sup>2</sup> (gm/cm <sup>2</sup> )	Max. Set Vacuum Spring Loaded	Min. Set Vacuum Weight Loaded	Max. W.P. <sup>†</sup> for Min. Vacuum Setting	Min. Vac. Setting vs. Max. W.P. <sup>†</sup>	A Length In (mm)	B Height In (mm)	C Width In (mm)	E In (mm)	BB Height In (mm)	Approx. Ship Wt. for Al Lbs (kg)
3 (80)	11 (48.2)	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 TPD for Vacuum Settings and MAWP		8.62 (219)	9.25 (235)	7.50 (191)	5.50 (140)	16.25 (413)	12 (6)
4 (100)	13 (57.0)					10 (254)	11.50 (292)	9 (229)	6 (152)	19.75 (502)	17 (8)
6 (150)	16 (70.3)					11 (279)	14.25 (362)	11 (279)	6.50 (165)	24.62 (625)	23 (10)
8 (200)	16 (70.3)					14.50 (368)	17.75 (451)	13.50 (343)	8.50 (216)	32.75 (832)	42 (19)
10 (250)	16 (70.3)					18 (457)	21.25 (540)	16 (406)	10.75 (273)	38 (965)	71 (32)
12 (300)	16 (70.3)					20.75 (527)	25.75 (654)	19 (483)	12.50 (318)	45.37 (1152)	83 (38)
14 (350)	16 (70.3)					24.75 (629)	29.25 (743)	21 (533)	15 (381)	48.75 (1238)	118 (54)

† W.P. = Working Pressure. ‡ On spring loaded valves, change model number. ◇ 150# R.F. drilling compatibility F.F. on aluminum and R.F. on carbon steel and stainless steel alloys. Fiberglass dimensions on request. 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.



# MODEL 1360A 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 In (mm)						
InWC	oz/in <sup>2</sup>	3 (80)	4 (100)	6 (150)	8 (200)	10 (250)	12 (300)	14 (350)
0.87	0.50	8.01	14.8	27.8	57.4	99.4	136	182
1.00	0.58	8.61	15.9	29.9	61.6	107	146	195
1.73	1.00	11.3	20.8	39.3	80.9	140	192	257
2.00	1.16	12.1	22.4	42.2	86.9	151	207	276
2.60	1.50	13.8	25.5	48.0	98.9	171	235	314
3.00	1.73	14.8	27.3	51.5	106	184	252	337
3.46	2.00	15.9	29.3	55.3	114	197	271	361
4.00	2.31	17.1	31.5	59.3	122	212	291	388
6.00	3.47	20.8	38.4	72.3	149	258	354	472
8.00	4.62	23.9	44.0	83.0	171	297	407	542
10.0	5.78	26.6	49.0	92.3	190	330	452	603
12.0	6.93	28.9	53.4	101	207	359	492	657
15.0	8.66	32.1	59.1	111	230	398	546	728
20.0	11.6	36.5	67.3	127	261	453	621	829
25.0	14.4	40.2	74.1	140	288	499	684	913
30.0	17.3	43.4	80.0	151	311	538	738	985

## 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.

Pf = Flowing pressure

Ps = 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 Flow Capacity Calculation

6" Model 1360A

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

Flow = 59,300 SCFH

2. Calculate over-vacuum

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

3. Read "C" factor from table

"C" = 0.87

4. Calculate flow capacity

$$\text{Flow} = 0.87 \times 59,300 = 51,591 \text{ SCFH}$$

## "C" Factor Table

%OV	0	1	2	3	4	5	6	7	8	9
10	0.42	0.43	0.44	0.45	0.46	0.46	0.47	0.48	0.49	0.50
20	0.51	0.52	0.52	0.53	0.54	0.55	0.56	0.56	0.57	0.58
30	0.59	0.59	0.60	0.61	0.61	0.62	0.63	0.64	0.64	0.65
40	0.66	0.66	0.67	0.68	0.68	0.69	0.70	0.70	0.71	0.72
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 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

# MODEL 1360A 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 In (mm)						
mmWC	mb	3 (80)	4 (100)	6 (150)	8 (200)	10 (250)	12 (300)	14 (350)
22	2.16	0.23	0.42	0.78	1.62	2.80	3.84	5.12
50	4.90	0.34	0.63	1.18	2.43	4.21	5.77	7.70
75	7.35	0.41	0.76	1.44	2.97	5.14	7.05	9.41
100	9.80	0.48	0.88	1.66	3.42	5.92	8.12	10.8
125	12.3	0.53	0.98	1.85	3.81	6.61	9.06	12.1
150	14.7	0.58	1.07	2.02	4.16	7.22	9.89	13.2
175	17.2	0.63	1.16	2.18	4.49	7.78	10.7	14.2
200	19.6	0.67	1.23	2.32	4.78	8.29	11.4	15.2
225	22.1	0.71	1.30	2.45	5.06	8.77	12.0	16.0
250	24.5	0.74	1.37	2.58	5.32	9.22	12.6	16.9
275	27.0	0.78	1.43	2.70	5.56	9.64	13.2	17.6
300	29.4	0.81	1.49	2.81	5.79	10.0	13.8	18.4
375	36.8	0.90	1.65	3.12	6.42	11.1	15.3	20.4
500	49.0	1.02	1.88	3.55	7.31	12.7	17.4	23.2
625	61.3	1.13	2.08	3.91	8.06	14.0	19.1	25.5
750	73.5	1.21	2.24	4.22	8.70	15.1	20.7	27.6

## 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<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 Flow Capacity Calculation

6" Model 1360A

100 mmWC Set Vacuum [P<sub>s</sub>]

175 mmWC Flowing Vacuum [P<sub>f</sub>]

1. Read flow capacity at set vacuum from table Flow = 1,660 NCMH

2. Calculate over-vacuum

$$\% \text{ OV} = [(175 - 100) / 100] \times 100 = 75\%$$

3. Read "C" factor from table

$$\text{"C"} = 0.87$$

4. Calculate flow capacity

$$\text{Flow} = 0.87 \times 1,660 = 1,444 \text{ NCMH}$$

## "C" Factor Table

%OV	0	1	2	3	4	5	6	7	8	9
10	0.42	0.43	0.44	0.45	0.46	0.46	0.47	0.48	0.49	0.50
20	0.51	0.52	0.52	0.53	0.54	0.55	0.56	0.56	0.57	0.58
30	0.59	0.59	0.60	0.61	0.61	0.62	0.63	0.64	0.64	0.65
40	0.66	0.66	0.67	0.68	0.68	0.69	0.70	0.70	0.71	0.72
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 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

# MODEL 1361A 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> ) psig	Size In (mm)						
	3 (80)	4 (100)	6 (150)	8 (200)	10 (250)	12 (300)	14 (350)
1.00	22.6	49.8	86.4	196	322	494	689
1.10	23.6	52.0	90.2	204	336	516	720
1.20	24.5	54.0	93.8	213	349	536	748
1.30	25.4	56.0	97.2	220	362	556	775
1.40	26.2	57.8	100	227	374	574	801
1.50	27.0	59.6	103	234	385	591	825
1.75	28.8	63.5	110	250	411	631	880
2.00	30.4	67.0	116	264	433	665	928
2.25	31.8	70.1	122	276	453	696	971
2.50	33.1	72.8	126	287	471	723	1009
2.75	34.1	75.2	131	296	486	747	1042
3.00	35.1	77.3	134	304	500	767	1070
3.25	35.9	79.0	137	311	511	785	1095
3.50	36.5	80.5	140	317	520	799	1115
>3.50	CONSULT FACTORY FOR VACUUM SETTINGS GREATER THAN 3.5 PSIG						

## 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 pressure 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<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 Flow Capacity Calculation

6" Model 1361A

2 psig Set Vacuum [P<sub>s</sub>]

3.5 psig 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

Flow = 166,000 SCFH

$$\% \text{ OV} = [(3.50 - 2.0) / 2.0] \times 100 = 75\%$$

"C" = 0.83

$$\text{Flow} = 0.83 \times 116,000 = 96,280 \text{ SCFH}$$

"C" Factor Table										
%OV	0	1	2	3	4	5	6	7	8	9
10	... Consult Factory ...									
20	0.27	0.29	0.30	0.32	0.33	0.35	0.36	0.38	0.39	0.40
30	0.42	0.43	0.44	0.45	0.47	0.48	0.49	0.50	0.51	0.52
40	0.53	0.54	0.55	0.56	0.57	0.58	0.59	0.60	0.61	0.62
50	0.63	0.64	0.65	0.66	0.67	0.67	0.68	0.69	0.70	0.71
60	0.72	0.72	0.73	0.74	0.75	0.76	0.76	0.77	0.78	0.79
70	0.80	0.80	0.81	0.82	0.82	0.83	0.84	0.85	0.85	0.86
80	0.87	0.87	0.88	0.89	0.90	0.90	0.91	0.92	0.92	0.93
90	0.94	0.94	0.95	0.96	0.96	0.97	0.97	0.98	0.99	1.00

### 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 = 0.83

# MODEL 1361A 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 In (mm)						
	3 (80)	4 (100)	6 (150)	8 (200)	10 (250)	12 (300)	14 (350)
barg							
0.07	0.66	1.46	2.53	5.74	9.39	14.4	20.2
0.10	0.77	1.71	2.96	6.72	11.0	16.9	23.7
0.11	0.81	1.78	3.09	7.00	11.5	17.6	24.7
0.12	0.84	1.85	3.20	7.26	11.9	18.3	25.6
0.13	0.86	1.91	3.31	7.50	12.3	18.9	26.4
0.14	0.89	1.96	3.41	7.72	12.6	19.4	27.2
0.15	0.91	2.02	3.50	7.93	13.0	19.9	27.9
0.16	0.94	2.07	3.58	8.12	13.3	20.4	28.6
0.17	0.96	2.11	3.66	8.30	13.6	20.9	29.3
0.18	0.98	2.15	3.73	8.47	13.9	21.3	29.8
0.19	0.99	2.19	3.80	8.62	14.1	21.7	30.4
0.20	1.01	2.23	3.86	8.76	14.3	22.0	30.9
0.22	1.04	2.29	3.97	9.01	14.7	22.7	31.7
0.24	1.06	2.34	4.06	9.21	15.1	23.2	32.4
>0.24	CONSULT FACTORY FOR VACUUM SETTINGS GREATER THAN 0.24 BARG						

## 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 pressure 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<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 Flow Capacity Calculation

6" Model 1361A

0.12 barg Set Vacuum [P<sub>s</sub>]

0.17 barg 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

Flow = 3,200 NCMH

$$\% \text{ OV} = [(0.17 - 0.12) / 0.12] \times 100 = 42\%$$

"C" = 0.55

$$\text{Flow} = 0.55 \times 3,200 = 1,760 \text{ NCMH}$$

## "C" Factor Table

%OV	0	1	2	3	4	5	6	7	8	9
10	*** Consult Factory ***									
20	0.27	0.29	0.30	0.32	0.33	0.35	0.36	0.38	0.39	0.40
30	0.42	0.43	0.44	0.45	0.47	0.48	0.49	0.50	0.51	0.52
40	0.53	0.54	0.55	0.56	0.57	0.58	0.59	0.60	0.61	0.62
50	0.63	0.64	0.65	0.66	0.67	0.67	0.68	0.69	0.70	0.71
60	0.72	0.72	0.73	0.74	0.75	0.76	0.76	0.77	0.78	0.79
70	0.80	0.80	0.81	0.82	0.82	0.83	0.84	0.85	0.85	0.86
80	0.87	0.87	0.88	0.89	0.90	0.90	0.91	0.92	0.92	0.93
90	0.94	0.94	0.95	0.96	0.96	0.97	0.97	0.98	0.99	1.00

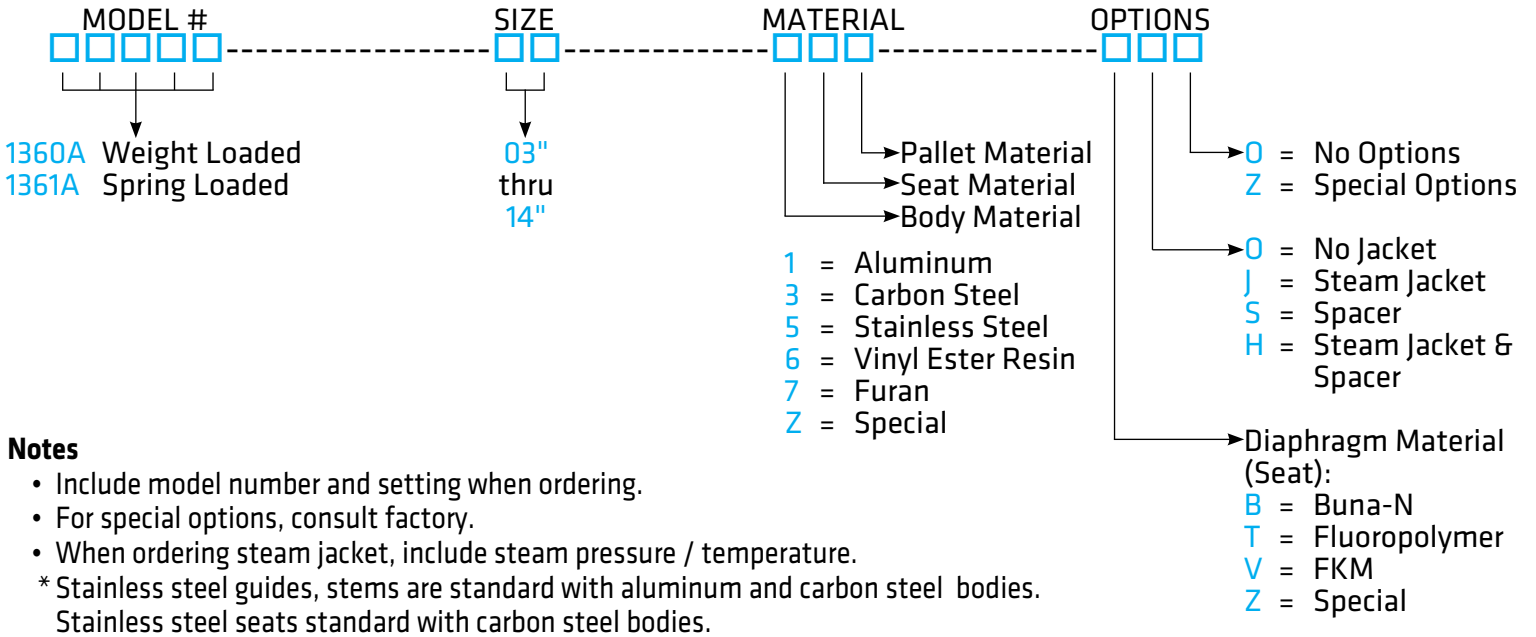
### Example to find "C" factor from table:

Read "C" factor for 72% over-vacuum at intersection of row 40 and column 2

"C" factor at 42% OV = 0.55

# 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

1 3 6 0 A - 0 3 - 1 1 5 - T 0 0

Indicates a 3" Model 1360A with Aluminum Body and Seat, Stainless Steel Pallet, Fluoropolymer Seat Diaphragm, and no other options.



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