

## **94630 PILOT OPERATED RELIEF VALVE (MAGNETIC PILOT)**

The pilot operated relief valves model 94630 are designed to meet low pressure applications within a relief range from 1.0 psi through 15 psi. These magnavalves are ideally suited for land or marine use, specifically marine cargo tankers transporting LNG, cryogenic or low temperature liquids.

Available in 2" through 12" sizes, the 94630 provides extreme reliability by utilizing a magnetic pilot design. The magnetic pilot assures positive pressure relief at set pressure with no overpressure required and resets itself at the preset blowdown.

The main valve consists of a stainless steel bellows, which is not affected by temperature variations as are conventional diaphragm relief valves. The full area bellows provides for high lift and excellent flow characteristics. Provisions are also available for vacuum relief.

### **Expanda-seal**

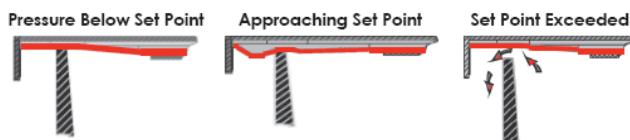
Shand & Jurs "Expanda-Seal" option is available on all pressure pallet assemblies. This feature significantly reduces leakage. The ballooning effect of the Tefl on diaphragm effectively seals the valve.

The "Expanda-Seal" feature ensures less than 0,5 SCFH of air at 95% of the set point.



### **Features**

- Magnetic pilot opens fully, instantly, at set pressure with no overpressure required.
- Heavy duty design suitable for severe environments.
- Stainless steel construction NOT affected by low temperature variations.
- Adjustable blowdown pilot design provides adjustment for extremely low blowdown.
- Full area bellows provides for high lift and excellent flow.
- Vacuum capability.



## Specifications

**Pressure setting:** 1,0 psi to 15,0 psi

**Accuracy:** 1,0 psi to 9,9 psi  $\pm$  0,1 psi  
10,0 psi to 15,0 psi  $\pm$  0,2 psi

**Reset pressure range:**

**External pilot valve supply (1 to 4 psi):**

0,2 to 0,4 psi less than nominal set pressure

**Pilot valve supply (4 to 15 psi):**

90%-95% of nominal set pressure

**Internal pilot valve supply (1 to 15 psi):**

85% to 95% of nominal set pressure

**Standard Blowdown:** 5%

**Temperature range:**

-148 °C to 232 °C -(300 °F to 450 °F )

Steel construction -28 °C (-20 °F)

**Body construction:** Aluminium, steel,  
stainless steel

**Bellows:** Stainless steel

**Type of seal:** Soft seal

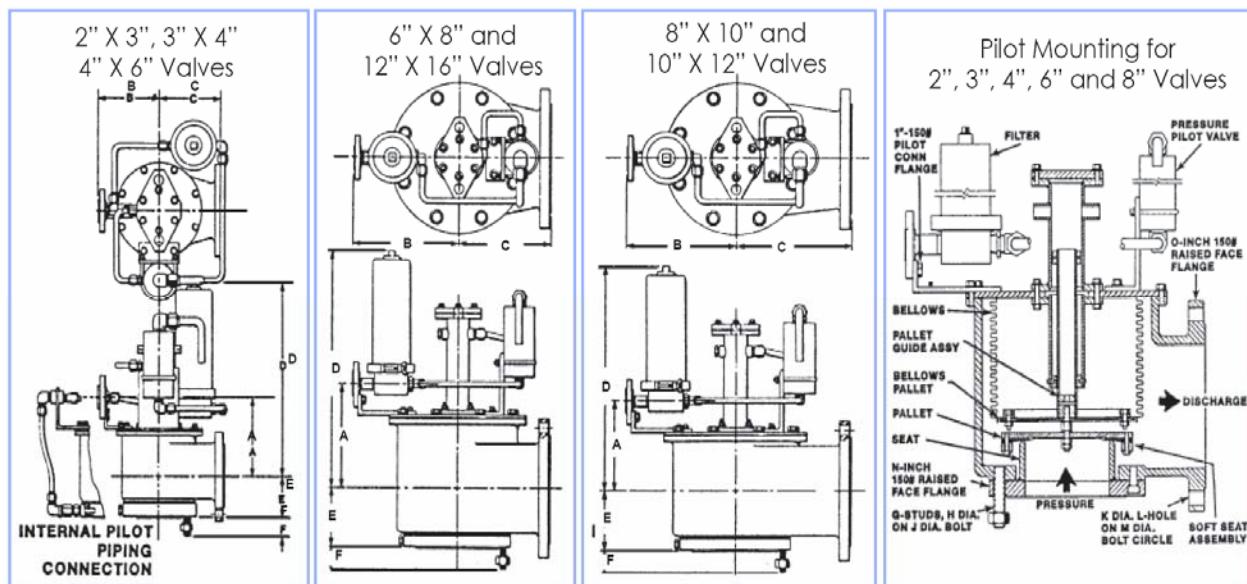
**Flange connection:** ANSI 150 Lbs or DIN  
sizes available

**Leakage, Max:** 0,3 m<sup>3</sup>/h, soft seat

**\*Vacuum Operation:** This relief valve may operate under vacuum conditions, unless the vacuum preventer option is selected. The 94630 may be mounted on top of a specially configured 94110 vacuum relief valve where precise vacuum control is desired. Consult Factory for specific vacuum setting requirements.

## Dimensions

Valve size	Approximate dimensions						Pressure flange		Discharge flange			Approx. weight [kg]			
	A	B	C	D	E	F	G	H	J	N	K	L	M	O	
2" x 3"	8 3/4"	6 9/16"	6 1/8"	23 1/2"	3 1/2"	1 9/16"	4	5/8"	4 3/4"	2"	3/4"	4	6"	3"	41
3" x 4"	8 1/8"	6 9/16"	7 1/8"	23	4 1/8"	1 13/16"	4	5/8"	6"	3"	3/4"	8	7 1/2"	4"	61
4" x 6"	10 7/8"	8 1/8"	8 1/4"	25 3/4"	5 3/8"	2"	8	5/8"	7 1/2"	4"	7/8"	8	9 1/2"	6"	68
6" x 8"	10 3/16"	10 11/16"	9 3/4"	24 1/2"	6"	3 1/8"	8	3/4"	9 1/2"	6"	7/8"	8	11 1/2"	8"	88
8" x 10"	12 3/4"	11 11/16"	13"	26 3/4"	7 1/8"	2 3/16"	8	3/4"	11 3/4"	8"	1"	12	14 1/2"	10"	111
10" x 12"	10 3/16"	12 3/8"	15 3/8"	25 7/8"	8 1/8"	2 3/16"	12	7/8"	14 1/2"	10"	1"	12	17"	12"	170
12" x 16"	11 1/2"	12 1/16"	18 1/2"	25 3/4"	10 5/16"	2 1/4"	12	7/8"	17"	12"	1 1/8"	16	21 1/4"	16"	236



## Model number selection

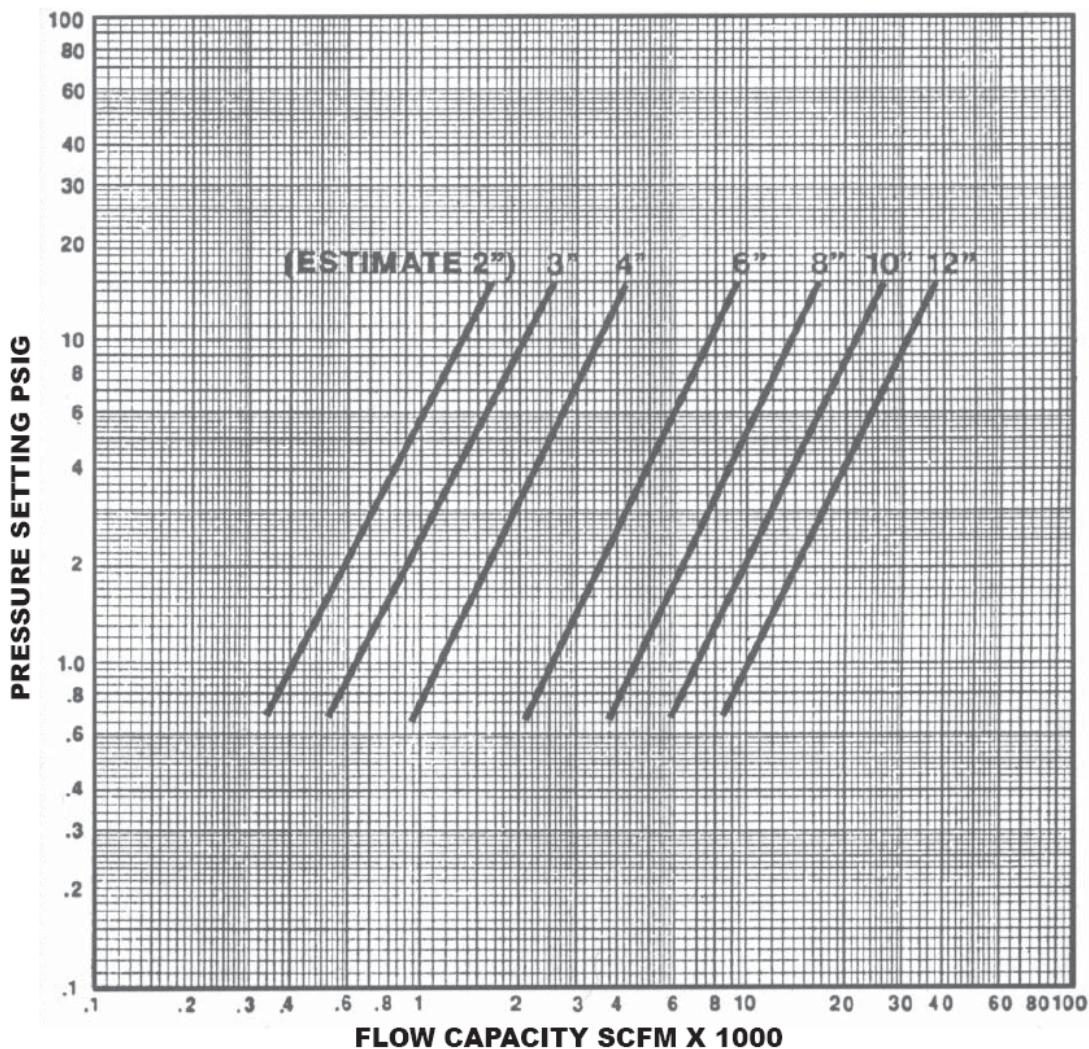
The model number will consist of a base number **94630** followed by 6 digit numbers. These digits will represent 3 option tables.

**94630 – AB – CD – EF**

Specify:

- |  |                                    |
|--|------------------------------------|
| 1. Model 94630 Pilot Operated Relief Valve | 6. Set Point                       |
| 2. Type of Product                         | 7. Internal or External Connection |
| 3. Valve and Inlet and Outlet Size         | 8. Need for a Vacuum Preventer     |
| 4. Temperature Range of Product            | 9. Need for a Test Connection      |
| 5. Body Material                           |                                    |

## AIR FLOW CAPACITY



**TABLE AB – Size/Housing material**

Option AB	Size	Pressure range (psi)		Housing material
		Min.	Máx.	
03	2" x 3"	1,0	6,0	Cast steel
05	2" x 3"	1,0	6,0	316 stainless steel
08	2" x 3"	6,1	15,0	Cast steel
10	2" x 3"	6,1	15,0	316 stainless steel
11	3" x 4"	1,0	6,0	Aluminium
13	3" x 4"	1,0	6,0	Cast steel
15	3" x 4"	1,0	6,0	316 stainless steel
16	3" x 4"	6,1	15,0	Aluminium
18	3" x 4"	6,1	15,0	Cast steel
20	3" x 4"	6,1	15,0	316 stainless steel
21	4" x 6"	1,0	6,0	Aluminium
23	4" x 6"	1,0	6,0	Cast steel
25	4" x 6"	1,0	6,0	316 stainless steel
26	4" x 6"	6,1	15,0	Aluminium
28	4" x 6"	6,1	15,0	Cast steel
30	4" x 6"	6,1	15,0	316 stainless steel
31	6" x 8"	1,0	6,0	Aluminium
33	6" x 8"	1,0	6,0	Cast steel
35	6" x 8"	1,0	6,0	316 stainless steel
36	6" x 8"	6,1	15,0	Aluminium
38	6" x 8"	6,1	15,0	Cast steel
40	6" x 8"	6,1	15,0	316 stainless steel
41	8" x 10"	1,0	6,0	Aluminium
43	8" x 10"	1,0	6,0	Cast steel
45	8" x 10"	1,0	6,0	316 stainless steel
46	8" x 10"	6,1	15,0	Aluminium
48	8" x 10"	6,1	15,0	Cast steel
50	8" x 10"	6,1	15,0	316 stainless steel
51	10" x 12"	1,0	6,0	Aluminium
53	10" x 12"	1,0	6,0	Cast steel
55	10" x 12"	1,0	6,0	316 stainless steel
56	10" x 12"	6,1	15,0	Aluminium
58	10" x 12"	6,1	15,0	Cast steel
60	10" x 12"	6,1	15,0	316 stainless steel
61	12" x 16"	1,0	6,0	Aluminium
63	12" x 16"	1,0	6,0	Cast steel
65	12" x 16"	1,0	6,0	316 stainless steel
66	12" x 16"	6,1	15,0	Aluminium
68	12" x 16"	6,1	15,0	Cast steel
70	12" x 16"	6,1	15,0	316 stainless steel

**TABLE CD – Pressure range**

<b>Option CD</b>	<b>Pressure range (psi)</b>
01	0,50 – 1,49
02	1,50 – 2,49
03	2,50 – 6,00
04	6,01 – 10,00
05	10,01 – 15,00

**TABLE EF – Piping configuration**

<b>Option EF</b>	<b>Size</b>	<b>Piping</b>	<b>Test connection</b>	<b>Vacuum preventer</b>
01	2" x 3" 3" x 4" 4" x 6"	Steel internal	No	No
02		Steel internal	Yes	No
04		Steel internal	Yes	Yes
05		Steel external	No	No
06		Steel external	Yes	No
08		Steel external	Yes	Yes
11		316 stainless steel internal	No	No
12		316 stainless steel internal	Yes	No
14		316 stainless steel internal	Yes	Yes
15		316 stainless steel external	No	No
16		316 stainless steel external	Yes	No
18		316 stainless steel external	Yes	Yes
21	6" x 8" 8" x 10" 10" x 12" 12" x 16"	Steel internal	No	No
22		Steel internal	Yes	No
24		Steel internal	Yes	Yes
25		Steel external	No	No
26		Steel external	Yes	No
28		Steel external	Yes	Yes
31		316 stainless steel internal	No	No
32		316 stainless steel internal	Yes	No
34		316 stainless steel internal	Yes	Yes
35		316 stainless steel external	No	No
36		316 stainless steel external	Yes	No
38		316 stainless steel external	Yes	Yes

## **94640 PILOT OPERATED RELIEF VALVE (DIAPHRAGM PILOT)**

The pilot operated relief valve model 94640 is designed to meet very specific pressure needs. The high accuracy of the valve allows the pressure to be set between 3" of water column pressure and 15 psig using sensitive springs for discrete ranges. The valve operates as follows.

As the internal pressure reaches the valves set point, the upward force on the sensing diaphragm overcomes the downward spring force. This causes the pilot seat to slightly lift, resulting in a small release of flow and marginal pressure relief. This enables the large diaphragm cavity to create a large, upward force which fully opens the pilot seat. This causes a large pressure reduction on the upper side of the main valve diaphragm which results in a full lift of the main valve seat. When the pressure reduces to the point its resulting upward force is less than the spring force, the pilot seat begins to close. This, in turn, builds up pressure on the upper side of the main valve diaphragm which closes the main valve seat. The pressures are again returned to their normal operating levels.

The valve's set point and blowdown can both be adjusted externally. The blowdown adjustment allows the valve to be operated in a snap action mode or a modulating mode. The snap action mode provides full opening at set point while the modulating mode provides a proportional opening with respect to over pressure.

### **Applications**

- Meeting emissions standards for process and storage tanks requiring pressure relief.
- Hot hydrocarbon vapours or liquids, corrosive liquids, gas, cryogenics.
- Tanker ships, vessels, petroleum, chemical, oil, gas, marine, environmental plants, sanitary and cryogenic industries. Tank applications operating very close to set pressure.
- Low pressure safety-relief valve for vessel applications, from general product tank storage to transportation vessels.



### **Features**

- Operating pressure between 3" W.C. to 15 psig
- Adjustment of the valve can be made externally
- Seat is Bubble tight to set pressure
- Snap action or modulating mode
- Fully open at set pressure in snap action mode
- Minimize VOC's and odour emissions

## Specifications

**Pressure setting:** 7,5 mbar (3,0 in w.c.) to 1,034 bar (15,0 psi).

**Standard Blowdown:** 5% - 20% (adjustable).

**Temperature range:** 184 °C to 204 °C (-300 ° to 400 °F).

**Body construction:** Aluminium, steel or stainless steel.

**\*Diaphragm & seat seal:** FEP Teflón

(standard) \* Other materials available (specify temperatura range & product).

**Flange connection:** ANSI 150 Lbs

**Vacuum:** See model 94645

### Options:

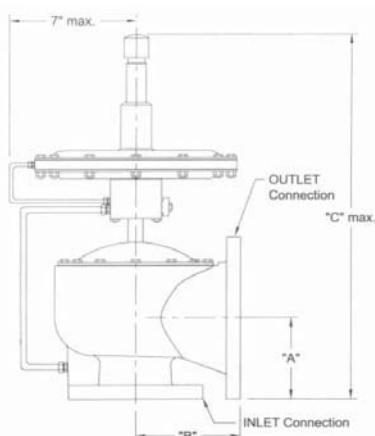
- Field test connection
- Vacuum preventer
- Backflow preventer
- Remote/manual unloader
- Sense line filter available upon request

**\*Vacuum operation:** This relief valve may operate under vacuum conditions, unless the vacuum preventer option is selected. The 94640 may be mounted on top of a specially configured 94110 vacuum relief valve where precise vacuum control is desired. Consult Factory for specific vacuum setting requirements.

## Flow capacities [Nm<sup>3</sup>/h at 15 °C and 10% over pressure)

Inlet size Set pressure	2"	3"	4"	6"	8"	10"
7,5 mbar (3 in w.c.)	146	328	557	1.247	2.316	3.245
12,5 mbar (5 in w.c.)	187	425	714	1.580	2.854	4.180
25 mbar (10 in w.c.)	255	595	1.002	2.243	4.061	5.879
37,5 mbar (15 in w.c.)	323	731	1.240	2.752	4.995	7.187
69 mbar (1 psig)	442	985	1.665	3.738	6.830	9.769
345 mbar (5 psig)	1.019	2.311	3.908	8.750	16.141	22.818
689 mbar (10 psig)	1.529	3.466	5.879	13.150	23.922	34.286
1,034 bar (15 psig)	1.988	4.485	7.612	17.024	31.873	43.953

## Valve size



Valve size	Approximate dimensions [mm]			
	A	B	C	Weight [kg]
2" x 3"	95	127	533	11
3" x 4"	114	147	572	13
4" x 6"	140	178	635	17
6" x 8"	171	236	711	29
8" x 10"	203	279	762	41
10" x 12"	241	318	838	56

## Model number selection

The model number will consist of a base number 94640 followed by 6 digit numbers. These digits will represent 5 option tables.

**94640 – AB – CD – EF**

Specify:

1. Model 94640 Pilot Operated Pressure Relief Valve
2. Body Material
3. Valve and Inlet Size
4. Seal Material and Set Point
5. CE for Ordinary EU Locations use Table F1
6. ATEX Certification for Group IIB, IIA EU Locations, use Table F2

**TABLE A – Material**

Option A	Material
0	Aluminium Flat Face
1	Cast steel Flat Face
2	Cast steel Raised Face
3	Stainless steel Flat Face
4	Stainless steel Raised Face

**TABLE B – Size and inlet**

Option B	Inlet x Outlet
2	2" x 3"
3	3" x 4"
4	4" x 6"
5	6" x 8"
6	8" x 10"
7	10" x 12"

**TABLE CD – Pressure settings ranges [mbar]**

Option CD	01*	02	03	04	05	06	07	08	09	10	11	12
Range from	7,6	17,2	24,1	34,47	51,7	68,9	137,9	172,4	275,8	413,7	620,5	827,4
Range to	17,2	24,1	34,5	51,7	68,95	137,9	172,4	275,8	413,7	620,5	827,4	1.034,2

**Nota:** ATEX models limited to table II options 01-09.

\* Teflon seat only.

**TABLE E – Seal material**

Option E	Material*
4	Teflon
5	Viton
6	Buna-N

\* Other materials on request.

**TABLE F – CE or ATEX**

Option F	Description
0	Standard
1	CE
2	ATEX certified

## **94645 PILOT OPERATED VACUUM RELIEF VALVE (DIAPHRAGM PILOT)**

The Shand & Jurs 94645 Pilot Operated Relief Valve is designed to meet very specific vacuum needs. The high accuracy of the valve allows the vacuum to be set between -3" of water column pressure and -5 psig using sensitive springs for discrete ranges. The valve operates as follows.

As the internal vacuum reaches the valve's set point, the upward force on the sensing diaphragm overcomes the downward spring force. This causes the pilot seat to slightly lift, resulting in a small release of flow and marginal vacuum relief. This enables the large diaphragm cavity to create a large, upward force which fully opens the pilot seat. This causes a large pressure reduction on the upper side of the main valve diaphragm which results in a full lift of the main valve seat. When the vacuum reduces to the point its resulting upward force is less than the spring force, the pilot seat begins to close. This, in turn, builds up pressure on the upper side of the main valve diaphragm which closes the main valve seat. The pressures are again returned to their normal operating levels.

The valve's set point and blowdown can both be adjusted externally. The blowdown adjustment allows the valve to be operated in a snap action mode or a modulating mode. The snap action mode provides full opening at set point while the modulating mode provides a proportional opening with respect to over pressure.

### **Applications**

- Meeting emissions standards for process and storage tanks requiring pressure relief.
- Hot hydrocarbon vapors or liquids, corrosive liquids, gas, cryogenics.
- Tanker ships, vessels, petroleum, chemical, oil, gas, marine, environmental plants, sanitary and cryogenic industries. Tank applications operating very close to set point.
- Low vacuum safety-relief valve for vessel applications, from general product tank storage to transportation vessels.



### **Features**

- Operating pressure between -3" W.C. to -5 psig
- Valve sizes 2" x 3", 3" x 4", 4" x 6", 6" x 8", 8" x 10" and 10" x 12"
- Adjustment of the valve can be made externally
- Seat is Bubble tight to set pressure
- Snap action or modulating mode
- Fully open at set point in snap action mode
- Minimize VOC's and odour emissions

## Specifications

**Vacuum setting:** -3,0 in w.c. (-7,5 mbar) to -5,0 psi (-0,345 bar).

**Standard Blowdown:** 5% - 20% (adjustable)

**Temperature range:** -300 °F to 400 °F (-184 °C to 204 °C).

**Body construction:** Aluminium, steel or stainless steel.

\* **Diaphragm & seat seal:** FEP Teflón (standard)

\* Other materials available (specify temperature range and product)

**Flange connection:** ANSI 150 Lbs

**Pressure:** See model 94640

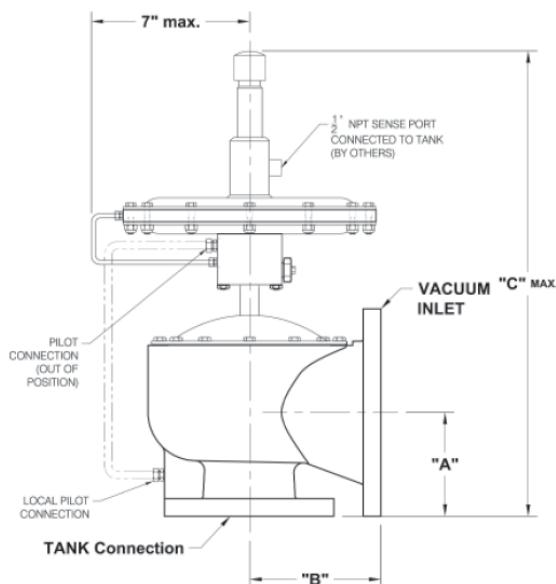
**Options (upon request):**

- Field test connection
- Pressure preventer
- Sense line filter

## Flow capacities [Nm<sup>3</sup>/h at 15°C and 10% over vacuum)

Inlet size Set vacuum	2"	3"	4"	6"	8"	10"
7,5 mbar (3 in w.c.)	146	328	557	1.247	2.316	3.245
12,5 mbar (5 in w.c.)	187	425	714	1.580	2.854	4.180
25 mbar (10 in w.c.)	255	595	1.002	2.243	4.061	5.879
37,5 mbar (15 in w.c.)	323	731	1.240	2.752	4.995	7.187
0,069 bar (1 psig)	442	985	1.665	3.738	6.830	9.769
0,345 bar (5 psig)	1.019	2.311	3.908	8.750	16.141	22.818

## Valve size



Valve size	Approximate dimensions [mm]			
	A	B	C	Weight [kg]
2" x 3"	95	127	533	11
3" x 4"	114	147	572	13
4" x 6"	140	178	635	17
6" x 8"	171	236	711	29
8" x 10"	203	279	762	41
10" x 12"	241	318	838	56

## Model number selection

The model number will consist of a base number **94645** followed by 6 digit numbers. These digits will represent 5 option tables.

**94645 – AB – CD – EF**

Specify:

1. Model 94645 Pilot Operated Vacuum Relief Valve
2. Body Material
3. Valve and Inlet Size
4. Seal Material and Set Point
5. CE for Ordinary EU Locations use Table F1
6. ATEX Certification for Group IIB, IIA EU Locations, use Table F2

**TABLE A – Material**

Option A	Material
0	Aluminium Flat Face
1	Cast steel Flat Face
2	Cast steel Raised Face
3	Stainless steel Flat Face
4	Stainless steel Raised Face

**TABLE B – Size & Inlet**

Option B	Inlet x Outlet
2	2" x 3"
3	3" x 4"
4	4" x 6"
5	6" x 8"
6	8" x 10"
7	10" x 12"

**TABLE CD – Vacuum setting ranges [mbar]**

Option CD	01*	02	03	04	05	06	07	08	09
Range from	7,58	17,24	24,13	34,47	51,71	68,95	137,9	172,4	275,8
Range to	17,24	24,13	34,47	51,71	68,95	137,9	172,4	275,8	344,75

**Note:** ATEX models limited to max. Positive pressure of 0,52 bar.

\* Teflon seat only.

**TABLE E – Seal material**

Option E	Material*
4	Teflon
5	Viton
6	Buna-N

\* Other material on request.

**TABLA F – CE or ATEX**

Option F	Description
0	Standard
1	CE
2	ATEX certification