Series 3800

Pilot Operated Pressure Relief Valves

CURTISS WRIGHT
Flow Control Company
Farris Engineering

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Piloting the Way to Precision Control

The innovative, integrally cast, flanged, semi-nozzle valves of the Series 3800 are self-contained units actuated by either the snap-acting or modulating style pilot controls. Valves in the series are certified under Section VIII of the ASME Code for Air, Gas, Vapor, Steam and Liquid Service.

Available in API Orifices D through T as well as full port models, Series 3800 valves are provided with raised face or ring joint inlet flanges from 150# through 2500# ANSI classes with 150#, 300# and selected 600# outlets. Set pressures range from 15 to 6170 psig with temperatures of -450°F to 450°F for standard options. For higher temperature and pressure requirements, please consult the Factory.

All Series 3800 valves have non-flowing pilot controls with 316 stainless steel primary components as standard. The main valve body is carbon steel with 316 stainless steel trim. The main valve is also available in a full 316 stainless steel “S4” option, a NACE standard MR0175 “N1” or “N4” option, Monel® “M4” option, Hastelloy® “H4”option, with other materials available upon request.

Viton® soft goods are standard in both pilot control and main valves. Buna-N, neoprene, ethylene propylene, silicone, Teflon® and Kalrez® soft goods are available as options; contact Factory for more information.

Warranty

All products manufactured by Farris Engineering are warranted free of defects in material and workmanship when used within the range recommended for a period of one year after installation or eighteen months from delivery. When authorized, any defective product may be returned to the factory and if found defective will be repaired or replaced free of charge, solely at the discretion of Farris Engineering, ex-works our factory. No charge for labor or other expense incurred will be allowed, as the liability of Farris Engineering is measured by the refund price of the defective product only. All warranties are based on the product being used within the range recommended and does not cover damages or defects due to normal wear and tear, misuse, alteration or neglect. The purchaser shall determine the suitability of the product for use and assumes all risks and liabilities in connection therewith.

This warranty does not cover the performance of valves tested at site on test equipment that is not to the same technical standard as that used by the manufacturer

Selection Table Matrix

3800 Series Pilot Control Application Summary

			PCF5	PCL	PCM	PCMS	HPCM
Type of Actuation	Snap-Acting		●	●			
	Modulating				●	●	●
Blow down	Adjustable		●				
	Non-adjustable			●	●	●	●
Set Pressure Ranges psig (barg)	15 to 740 (1.03 to 51.03)		●	●	●	●	
	741 to 2220 (51.1 to 153.1)		●	●			●
	2221 to 6170 (153.2 to 425.5)		●	●			
Fluid Services	Gas/Vapor		●		●	●	●
	Liquid			●	●	●	●
	Steam					●	
Temp. Range °F (°C)	-50 to 500 (-45 to 260)		●	●	●	●	●
	-423 to -51 (-253 to -46)		●			●	
Soft Goods (O-Rings) °F (°C)	Fluorocarbon (Viton)	-20 to 450 (-29 to 232)	●	●	●	●	●
	Ethylene Propylene (EPDM)	-65 to 250 (-54 to 121)	●	●	●	●	●
	Nitrile (Buna-N)	-55 to 225 (-48 to 107)	●	●	●	●	●
	Aflas	-20 to 450 (-29 to 232)	●	●		●	●
	Kalrez	0 to 500 (-17 to 260)	●	●		●	●
	Kalrez Steam	212 to 500 (100 to 260)				●	

Soft Goods Disclaimer

All PORVs use soft goods for their seats and seals. In selecting a soft good, please note the following guidelines:

- Main valve and pilot control soft good selection is based upon set pressure and relieving temperature for non-fire cases. For fire case scenarios, base soft good selection on valve set pressure and operating temperature.
- Final soft goods selection should be chemically compatible with the process fluid.
- Selection of proper soft good material is customer's responsibility.

Principles of Operation – Snap Acting

Closed Valve Position

The pilot control valves use system pressure to keep the main valve closed. System pressure is transmitted thru the pressure pickup from the inlet of the main valve, through the pilot control and into the dome of the main valve. The system pressure exerts force upon the top of the piston in the dome, holding the piston firmly against the seat on the nozzle in the main valve. The surface area of the piston in the dome of the main valve is greater than the seat area, so the greater the system pressure, the greater the force holding the piston onto the main valve seat. As a result, the pilot operated relief valve gets tighter as the system pressure approaches set pressure.

Relieving Cycle

As system pressure reaches set pressure, the force acts upon the surface area of the pilot control disc, overcoming the spring force in the pilot valve, and the pilot valve lifts. As the seat assembly in the pilot control begins to lift, it seals off the flow of pressure to both the vent and the main valve dome. At the same time, the pressure in the dome is released through the pilot vent. Once the pressure in the main valve's dome has been released, the system pressure, acting on the bottom of the piston, will lift the piston and relieve system pressure until normal process conditions are restored.

Re-Closing Cycle

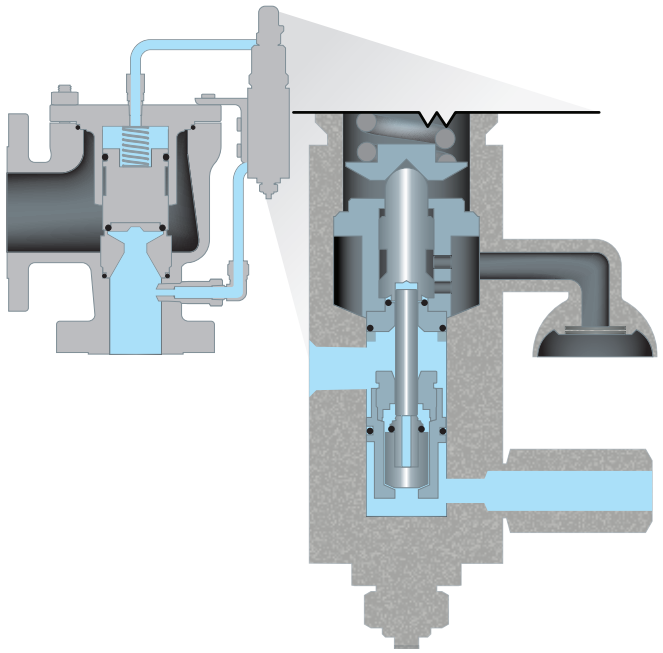
At the point where the system pressure blows down, the spring force in the pilot control overcomes the force of system pressure acting on the pilot control seat assembly, closing the upper seat and reopening the lower seat. This re-establishes flow through the pilot control, allowing system pressure to be redirected back into the main valve dome, closing the main valve. Blow down can be precisely adjusted externally by raising or lowering the blow down adjuster position in the pilot control.

Operating Advantages:

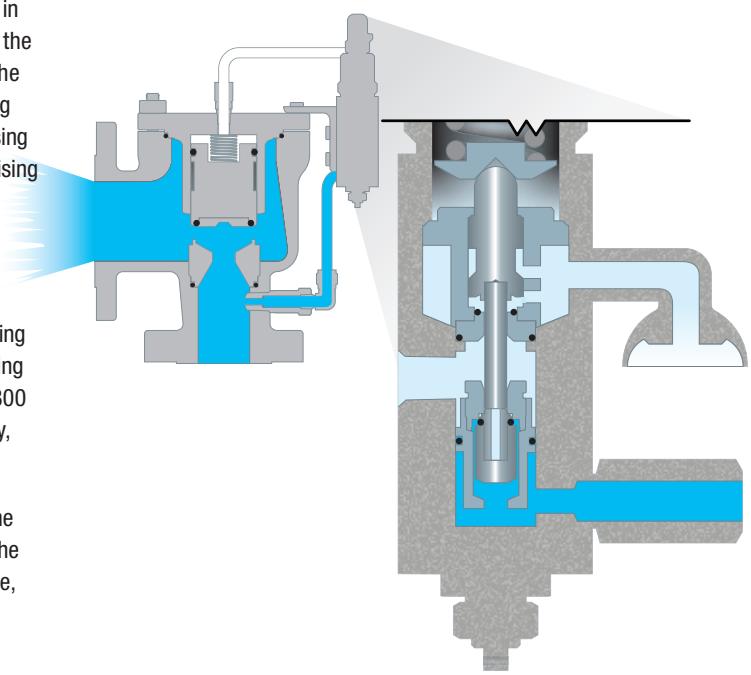
Bubble-tight closer to set pressure: Series 3800 valves operate bubble tight at higher operating pressure to set pressure ratios, allowing operators to run very close to the system's maximum allowable working pressure. While protecting the system from overpressure, Series 3800 allows maximum product throughput, increased system profitability, and reduced fugitive emissions.

Unaffected by back pressure: Unlike a direct spring loaded valve, the pilot operated valve's set pressure is not affected by back pressure. The pilot control valve, isolated from the influence of downstream pressure, controls the main valve's opening and closing.

Snap Acting Valve – Closed Position



Snap Acting Valve – Open Position



Principles of Operation – Modulating

Closed Valve Position

At normal operating system pressure, the modulating control performs the same as the snap acting control. The pressure pickup directs system pressure from the inlet of the main valve through to the pilot control inlet port and into the dome of the main valve. The pressure area of the piston in the dome of the main valve is greater than the nozzle seat area. The greater the system pressure, the greater the seating force holding the main valve piston onto the nozzle seat.

As system pressure increases and approaches the valve's set pressure, the force acting upward on the pilot control increases, overcoming the spring force of the pilot control causing the inlet seat to lift and seal against the floating spool. Pressure is maintained in the dome because the inlet and outlet seals remain closed.

Relieving Cycle

Any further incremental increase in system pressure near set pressure raises both the inlet seat and spool causing the outlet seat seal to crack open. This allows a partial venting of dome pressure in the event of an increase in system pressure. Similarly, any further decrease in system pressure near set pressure lowers both the inlet seat and spool causing the outlet seat seal to close. This allows for a re-pressurizing of the dome when the inlet seat opens at decrease in system pressure.

As the system pressure increases to set point, the modulating action of the pilot control, as described above, reduces the pressure in the main valve dome. The further decrease in dome pressure caused by increasing system pressure reduces the seating force to zero and opens the main valve seat to allow flow. The opening of the main valve responds gradually and proportionally to the rise in system pressure, either at or above the set pressure. The main valve will achieve full open and rated flow by 10% overpressure.

Re-Closing Cycle

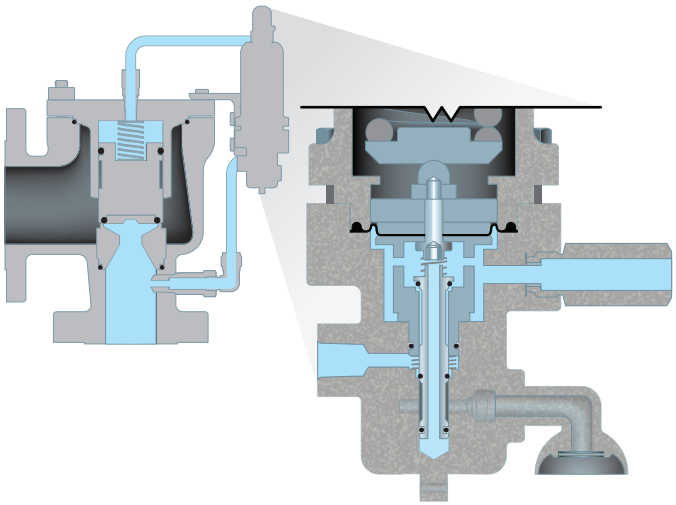
As the system pressure is decreased below set pressure, the spring force in the modulating pilot control overcomes the system pressure acting on the diaphragm/piston assembly and re-closes the outlet seat. The inlet seat then opens and allows system pressure back into the main valve dome, reseating the main valve.

Operating Advantages:

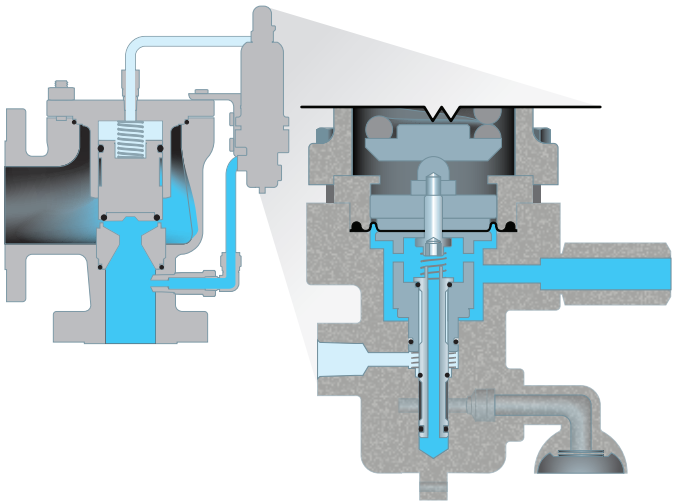
A pilot valve with a modulating control has the same operating advantages as a snap acting pilot control: operates bubble-tight close to set pressure and is unaffected by back pressure.

Minimizes product losses: In addition, the modulating control responds gradually and proportionately to the rise in over pressure, minimizing product losses and reducing reaction forces when the flow requirement is below the maximum rated flow of the valve.

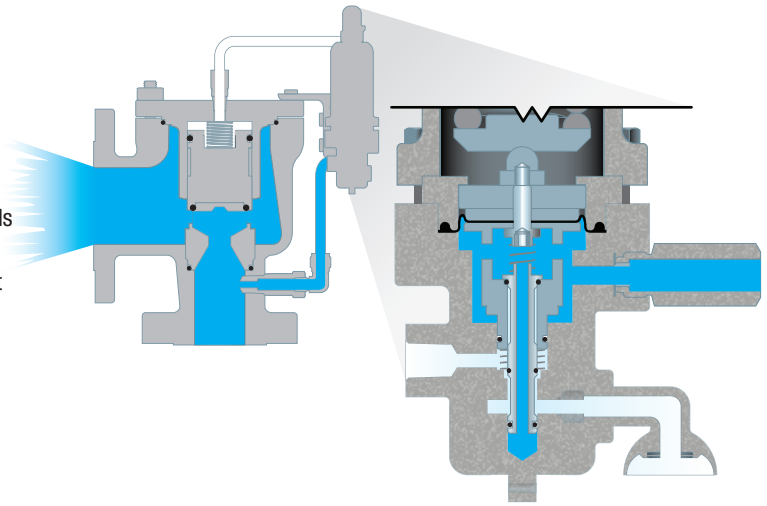
Modulating Valve – Closed Position



Modulating Valve – Partially Open Position



Modulating Valve – Fully Open Position



Numbering System

To simplify the selection and specifying of Farris pressure relief valves, use the following type numbering system. The type numbering system is ideal as the digits which comprise a specific type number have a distinct significance. The digits describe the basic valve series, orifice, seat and internal construction, inlet temperature range, body, and spring material, inlet flange class as well as Code liquid design.

38	D	C	1
Series Number	Orifice Area	Construction	Temperatures & Materials

38

Orifice Letter	Area, Sq. In.		Area, Sq. mm	
	API	Actual	API	Actual
D	0.110	0.150	71	97
E	0.196	0.225	126	145
F	0.307	0.371	198	239
G	0.503	0.559	325	361
H	0.785	0.873	506	563
J	1.287	1.430	830	923
K	1.838	2.042	1186	1317
L	2.853	3.170	1841	2045
M	3.60	4.000	2323	2581
N	4.34	4.822	2800	3111
P	6.38	7.087	4116	4572
Q	11.05	12.27	7129	7916
R	16.0	17.78	10323	11471
T	26.0	28.94	16774	18671
A	—	0.719	—	—
1	—	1.767	—	—
2	—	2.953	—	—
3	—	6.605	—	—
4	—	11.50	—	—
6	—	26.07	—	—
8	—	44.66	—	—

C Elastomer O-Ring Seat Seal

T Teflon O-Ring* Seat & Seals (Main Valve Only)

Designation	Inlet Temperature Range °F	Material	
		Body & Cover	Spring
1	-20 to 450	Carbon Steel	Stainless Steel
1	-450 to -20*	Stainless Steel	Stainless Steel

**For cryogenic applications to -450°F, add S4 to the type number. Consult the Factory.*

Ordering Information

To properly process your order and avoid delay please specify the following:

1. Quantity
2. Inlet and Outlet Size
3. Farris Type Number*
4. Inlet and Outlet Flange Class and Facing
5. Materials of Construction, if other than Standard
6. O-Ring Seal Material (Viton is Standard)
7. Set Pressure*
8. Maximum Inlet Temperature*
9. Allowable Overpressure*
10. Fluid and Fluid State*
11. Backpressure, Superimposed Constant and/or Variable and Built-up*
12. Required Capacity*
13. Physical Properties of Fluid (Molecular Weight, Specific Gravity, etc.)*
14. Accessories, if any required such as:
    a) Manual or Remote Depressurizing
    b) Field Test Connection
    c) Reverse Flow Preventer
    d) Auxiliary Filter
    e) Any other
15. Code Requirements, if any required

*As a customer service we verify your selection and sizing. If this service is desired, you must include this information.

General Notes:
If valve modification or set pressure changes are required, consideration must be given to correct the nameplate and other data.

2	X -	1	2	0	/S4
Inlet Class	**Special Construction**	**Inlet Facing**	**Pilot Control**	**Options**	**Special Material[4]**

Designation	ANSI Nominal Inlet Flange Class
0	150
2	300
3	600
4	900
5	1500
6	2500

(If applicable)

- **L** Liquid Service (Standard Connections)
- **X** Air & Vapor Service (Oversize Connections)
- **Y** Liquid Service (Oversize Connections)
- **D** Air & Vapor Service (Dual Outlet)[1]
- **E** Liquid Service (Dual Outlet)[1]
- **U** Air & Vapor Service (Non-Standard API Connections)
- **N** Air & Vapor Service (Non-Standard API Connections)

- **0** Special[2]
- **1** Raised Face, ANSI Std. (125 to 160 AARH)
- **9** Ring Joint ANSI Std. (Octagonal)
- **H** 63 AARH Smooth Finish RF

Although not applicable to the inlet facing only, the following first digit letters are also used:

- **J** 63 to 83 AARH (Outlet only)
- **K** 63 to 83 AARH (Inlet and outlet)
- **X** High Pressure Hub Connection[3]

- **2** Snap Acting Pilot Control
- **M** Modulating Pilot Control
- **S** Steam Modulating Pilot Control

- **0** No Options
- **2** Dual Pilot Controls
- **3** Auxiliary Filter
- **4** Manual Depressurizing
- **5** Field Test Connection
- **6** Reverse Flow Preventer
- **7** Pressure Spike Snubbers
- **8** Remote Depressurizing
- **F** Field Test Connection with Indicator
- **R** Remote Sensing
- **V** Pilot Control Discharge Connected to Main Valve Outlet

See table below for combinations

- **S4** Complete 316 St. St.
- **N1** NACE Carbon Body
- **N4** NACE All Stainless
- **M4** All Monel®
- **H4** All Hastelloy® C

Parts Replacement

Valves: If an exact replacement valve is required, the valve type, size and serial number must be specified to assure proper dimensions and material being supplied. If a specific valve has become obsolete, a recommendation for the current equivalent, if any, will be made.

Spare Parts: When ordering parts, use part names as listed in the bills of material in this catalog. Specify valve type, size and serial number. If serial number is not available, the original Farris factory order number will assist in our supplying the proper part and material.

Springs: Order as an assembly to include spring with upper and lower spring buttons. Specify valve type, size, serial number, set pressure and back pressure, if any.

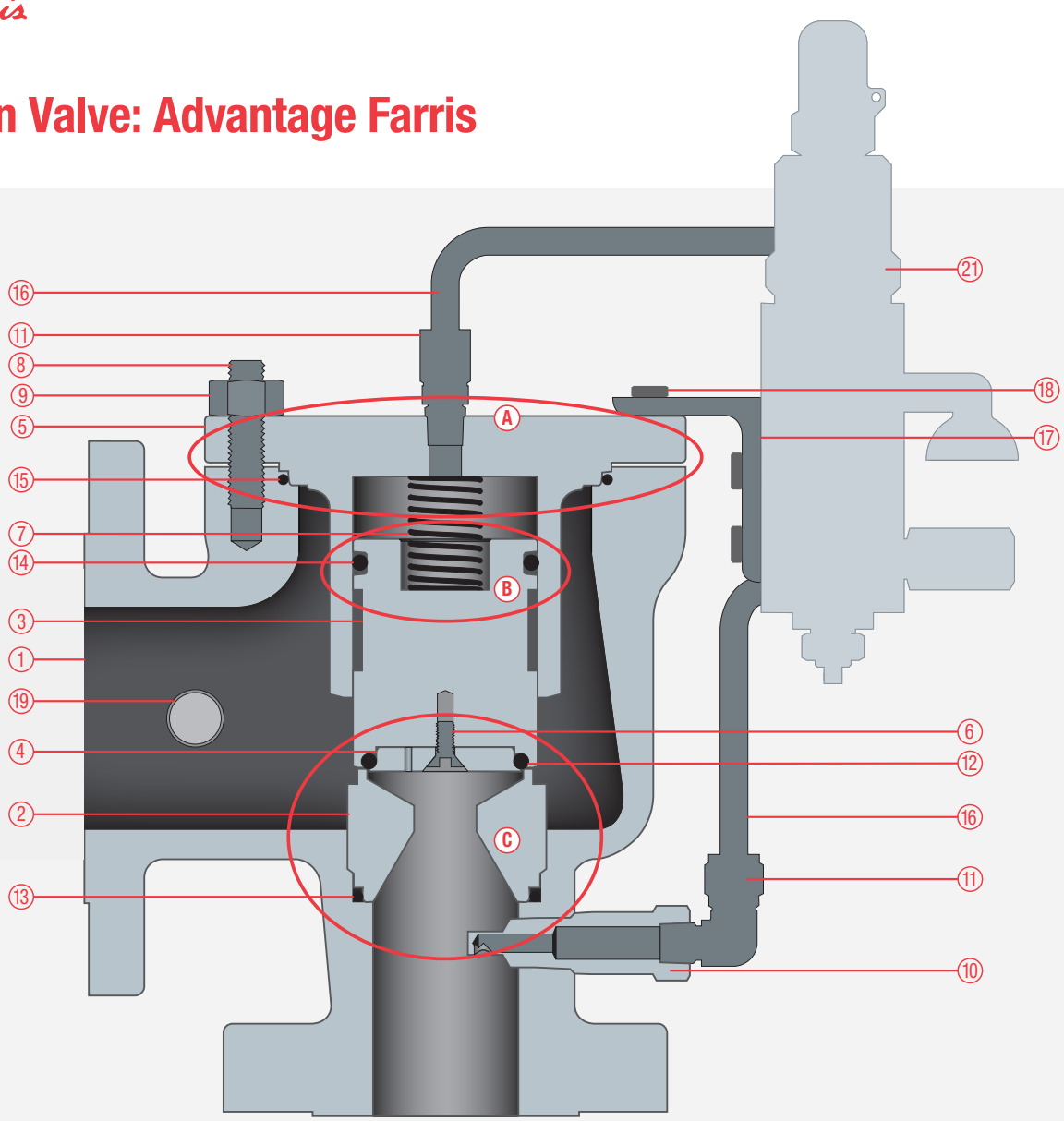
Codes for Common Accessory Combinations

9	Four Auxiliary Functions: Options 4, 5 or F*, 6 & 8
A	Combo – Auxiliary Filter (3) & Field Test Connection (5 or F)*
B	Combo – Field Test Connection (5 or F)* & Reverse Flow Preventer (6)
E	Combo – Auxiliary Filter (3), Field Test Connection (5 or F)* & Reverse Flow Preventer (6)
C	Designation for combinations of options not listed

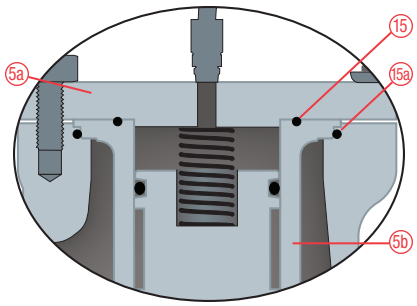
* For Modulating Controls, Field Test Connection w/ Indicator (F) is automatically supplied, unless specified otherwise.

General Notes:
1. Available on 6" and 8" inlet size valves only.
2. Historical designation for special inlet connections. This designation is obsolete.
3. Not available for all valve sizes or pressure classes. Please consult factory.
4. Duplex available upon request, contact factory.

Main Valve: Advantage Farris

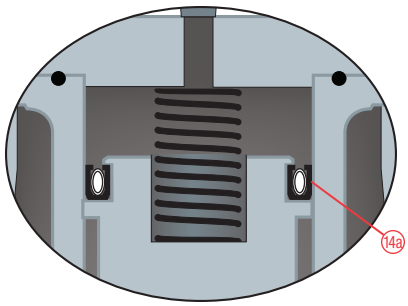


(A) Two Piece Cover and Guide



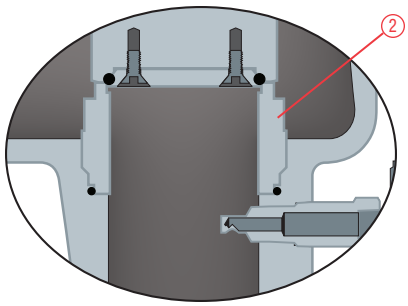
Valves with 3" inlet and larger

(B) Energized Piston Seal



Used for cyrogenic, steam and special service

(C) Full Port Nozzle



Not available for liquid service

UV Built in conformance to ASME Code Section VIII for Air, Gas, Steam, and Liquid Service.
ASME Code stamping not available on full port design in liquid service.

3800 Series Bill of Materials – Main Valve

Bill of Materials – Main Valve

Item No.	Part Name	Standard Material	S4	N1 NACE	N4 NACE	M4	H4
1	Body	SA-216 Gr. WCB Carbon St.	SA-351 Gr. CF8M St. St.	SA-216 Gr. WCB Carbon St.[2]	SA-351 Gr. CF8M St. St.[2]	SA-494 Gr. M35-1 Monel	SA-494 Gr. CW-12MW Hastelloy
2	Nozzle	316 St. St.	316 St. St.	316 St. St.[2]	316 St. St.[2]	Monel	Hastelloy C
3	Piston	316 St. St.	316 St. St.	316 St. St.[2]	316 St. St.[2]	Monel	Hastelloy C
4	O-Ring Retainer	316 St. St.	316 St. St.	316 St. St.[2]	316 St. St.[2]	Monel	Hastelloy C
5	Cover/Guide	SA-351 Gr. CF8M St. St.	SA-351 Gr. CF8M St. St.	SA-351 Gr. CF8M St. St.[2]	SA-351 Gr. CF8M St. St.[2]	SA-494 Gr. M35-1 Monel	SA-494 Gr. CW-12MW Hastelloy
5a	Cover[1]	Carbon St.	316 St. St.	Carbon St.[2]	316 St. St.[2]	Monel	Hastelloy C
5b	Guide[1]	316 St. St.	316 St. St.	316 St. St.[2]	316 St. St.[2]	Monel	Hastelloy C
6	Retainer Screw	St. St.	St. St.	St. St.	St. St.	Monel	Hastelloy C
7	Return Spring	316 St. St.	316 St. St.	Inconel™ X750	Inconel X750	Inconel X750	Inconel X750
8	Body Stud	ASME SA-193 Gr. B7 Alloy St.	ASME SA-193 Gr. B8M St. St.	ASME SA-193 Gr. B7M Alloy Steel	ASME SA-193 Gr. B8MA St. St.	ASME SB-574 UNS N10276 Hastelloy	ASME SB-574 UNS N10276 Hastelloy
9	Hex Nut (Body)	ASME SA-194 Gr. 2H Alloy St.	ASME SA-194 Gr. 8M St. St.	ASME SA-194 Gr. 2HM Alloy St.	ASME SA-194 Gr. 8MA St. St.	ASME SB-574 UNS N10276 Hastelloy	ASME SB-574 UNS N10276 Hastelloy
10	Pressure Pickup	316 St. St.	316 St. St.	316 St. St.	316 St. St.	Monel	Hastelloy C
11	Tube Fittings	316 St. St.	316 St. St.	316 St. St.	316 St. St.	Monel	Hastelloy C
12	Main Seat Seal[4]	Viton[5]	Viton[5]	EPDM[6]	EPDM[6]	Viton[5]	Viton[5]
13	Nozzle Seal	Viton[5]	Viton[5]	EPDM[6]	EPDM[6]	Viton[5]	Viton[5]
14	Piston Seal	Viton[5]	Viton[5]	EPDM[6]	EPDM[6]	Viton[5]	Viton[5]
14a	Energized Piston Seal	Teflon / SS[7]	Teflon / SS[7]	Teflon / SS[7]	Teflon / SS[7]	Teflon / SS[7]	Teflon / SS[7]
15	Cover Seal	Viton[5]	Viton[5]	EPDM[6]	EPDM[6]	Viton[5]	Viton[5]
15a	Guide Seal[1]	Viton[5]	Viton[5]	EPDM[6]	EPDM[6]	Viton[5]	Viton[5]
16	Tubing	316 St. St.	316 St. St.	316 St. St.	316 St. St.	Monel	Hastelloy C
17	Bracket	St. St.	St. St.	St. St.	St. St.	St. St.	St. St.
18	Cap Screws, Mounting Bracket	Plated Steel	St. St.	Plated Steel	St. St.	St. St.	St. St.
19	Pipe Plug, Outlet	Carbon St.	St. St.	Carbon St.	St. St.		
20	Pipe Plug, Body (not shown)	Carbon St.	St. St.	Carbon St.	St. St.	Monel	Hastelloy C
21	Pilot Control	St. St.	St. St.	St. St.	St. St.	Monel	Hastelloy C

Convertible Design: the unique convertible design minimizes the number of components and maximizes their interchangeability, reducing parts inventories and overall costs.

Convertible Nozzle: threaded convertible nozzles can be removed and replaced easily without factory service. They can be installed with common tools while the valve is in line, saving time and money.

Fewer Internal Components: the valve design requires no lift stops and the main valve opens fully at set pressure. The orifice area is controlled by the nozzle, eliminating the need for additional parts to restrict lift.

One Piece Body: integrally cast flanges assure the highest material integrity and eliminate problems that may occur with welding.

Full 316 Stainless Steel Trim: this trim is standard and includes nozzle, piston, retainer and guide for long and versatile service life.

Main Valve Soft Seat: unlike metal seated valves which require costly machining and lapping procedures, the main valve soft seat is easily maintained and repaired.

Less Weight, Lower Profile: system pressure provides the seating force in pilot operated relief valves so pilot valves are smaller in size and weight than direct spring loaded valves.

Suitable for NACE Service: for high quality materials of construction that meet NACE MR0103 or MR0175 service, refer to N1 trim for carbon steel body and N4 trim for stainless steel.

Full Port Option: the full port option provides maximum capacity per inlet size.

General Notes:
1. Part used on 3" inlet sizes and larger.
2. Materials certified in compliance with NACE specifications.
3. Teflon for seals required in main valve for temperatures below -20°F. Consult the Factory.
4. Teflon used for Main Seat Seal (item 12) for all valves with 900#, 1500#, and 2500# inlet flanges.
5. We reserve the right to substitute comparable fluorocarbon materials.
6. EPDM is standard offering for NACE; other materials can be selected. Please specify at time of order.
7. Graphite reinforced PTFE with stainless steel spring.
8. Duplex available upon request, contact factory.

Inconel is a registered trademark of Inco Alloys International, Inc.

Snap Acting Pilot Control Features

Snap-Acting, Non-Flowing: the PCF5 and PCL pilot controls are snap acting and non-flowing, minimizing the flow of process media through the pilot for reduced fugitive emissions and extended valve life.

Full 316 Stainless Steel Construction: resists corrosion and extends the life and versatility of the PCF5 and PCL controls.

Adjustable Blow Down: allows setting blow down at 3% of set pressure so that product loss is minimized and fugitive emissions reduced.

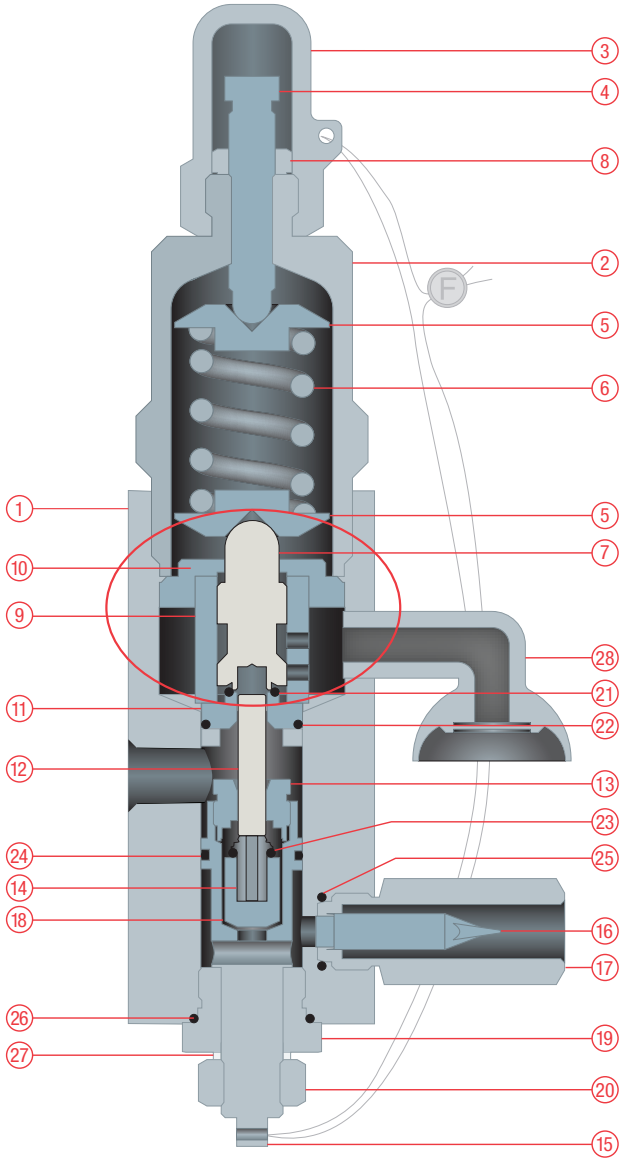
Viton Seats and Seals: these chemical-resistant seals and seats enhance a control's life. Neoprene, ethylene propylene, silicone, and Buna-N soft goods are optional and extend temperature ranges from -65°F to 450°F. Kalrez available when maximum resistance to chemical attack is required. Contact factory for more information.

Set Pressures and Blow Down Set at Pilot Control: in line service, settings and blow down adjustments are completed quickly and easily without main valve intrusion. Subsequent reduction in product loss and fugitive emissions add to system profitability.

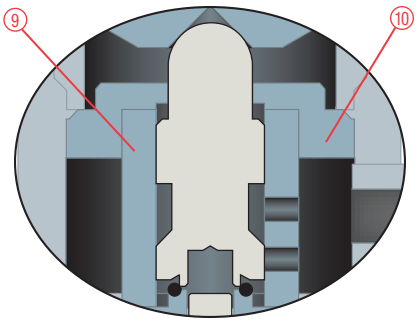
Field Test Capable: the use of a field test connection allows cycling the pilot control without interrupting system protection or removing the valve from the line. Field testing verifies system integrity in accordance with the requirements of the Code.

Remote Sensing Capable: when there is excessive inlet piping losses, or when the main valve must be installed at a different location on the protected system because of its service limitations, the pilot sensing line can be installed separate from the main valve.

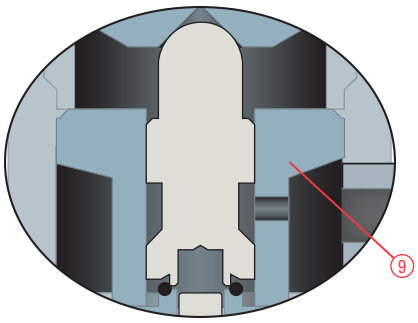
Suitable for NACE Service: for high quality materials of construction that meet NACE MR0103 or MR0175 service, refer to N1 trim for carbon steel body and N4 trim for stainless steel.



PCF5: Snap Acting Control – Air, Gas, Vapor Service



PCL: Snap Acting Control – Liquid Service



UV Built in conformance to ASME Code Section VIII for Air, Gas, and Liquid Service.
ASME Code stamping not available on full port design in liquid service.

3800 Series Bill of Materials – Snap Acting Control

Bill of Materials – PCF5 and PCL

Item No.	Part Name	Std & S4	N1 & N4 NACE	M4	H4
1	Body	316 St. St.	316 St. St.[2]	Monel	Hastelloy C
2	Bonnet	316 St. St.	316 St. St.	Monel	Hastelloy C
3	Cap	316 St. St.	316 St. St.	Monel	Hastelloy C
4	Spring Adjusting Screw	316 St. St.	316 St. St.	Monel	Hastelloy C
5	Spring Buttons	316 St. St.	316 St. St.	Monel	Hastelloy C
6	Spring	316 St. St.	Inconel X750	Inconel X750	Inconel X750
7	Disc	316 St. St.	316 St. St.	Monel	Hastelloy C
8	Jam Nut	316 St. St.	316 St. St.	Monel	Hastelloy C
9	Guide	316 St. St.	316 St. St.	Monel	Hastelloy C
10	Guide Flange[1]	316 St. St.	316 St. St.	Monel	Hastelloy C
11	Upper Seat	316 St. St.	316 St. St.	Monel	Hastelloy C
12	Blow Down Relay	316 St. St.	316 St. St.	Monel	Hastelloy C
13	Lower Seat	316 St. St.	316 St. St.	Monel	Hastelloy C
14	Retainer, Lower Seat Seal	316 St. St.	316 St. St.	Monel	Hastelloy C
15	Blow Down Adjuster	316 St. St.	316 St. St.	Monel	Hastelloy C
16	Filter	St. St.	St. St.	Monel	Monel
17	Filter Housing	316 St. St.	316 St. St.	Monel	Hastelloy C
18	Poppet	316 St. St.	316 St. St.	Monel	Hastelloy C
19	Blow Down Adjuster Cap	316 St. St.	316 St. St.	Monel	Hastelloy C
20	Blow Down Adjuster Lock Nut	316 St. St.	316 St. St.	Monel	Hastelloy C
21	Upper Seat Seal	Viton[3]	EPDM[4]	Viton[3]	Viton[3]
22	Static Seal, Body	Viton[3]	EPDM[4]	Viton[3]	Viton[3]
23	Lower Seat Seal	Viton[3]	EPDM[4]	Viton[3]	Viton[3]
24	Static Seal, Adjuster	Viton[3]	EPDM[4]	Viton[3]	Viton[3]
25	Static Seal, Filter	Viton[3]	EPDM[4]	Viton[3]	Viton[3]
26	Adjuster Cap Seal	Viton[3]	EPDM[4]	Viton[3]	Viton[3]
27	Thread Seal, O-Ring	Teflon	Teflon	Teflon	Teflon
28	Bug Vent	Aluminum	Aluminum	Aluminum	Aluminum

General Notes:
1. Part used on PCF5 only.
2. Materials certified in compliance with NACE specifications.
3. We reserve the right to substitute comparable fluorocarbon materials.
4. EPDM is standard offering for NACE; other materials can be selected. Please specify at time of order.
5. Duplex available upon request, consult factory.

Modulating Pilot Control Features

Modulating, Non-Flowing: the PCM, PCMS and HPCM pilot controls are modulating and non-flowing, minimizing the flow of process media through the pilot for reduced fugitive emissions and extended valve life.

Full 316 Stainless Steel Construction: resists corrosion and extends the operation and versatility of the modulating control.

Blow Down: The modulating controls are a fixed blow down pilot control with no external adjustment. Depending on fluid service, a blow down of 3% to 6% is typical.

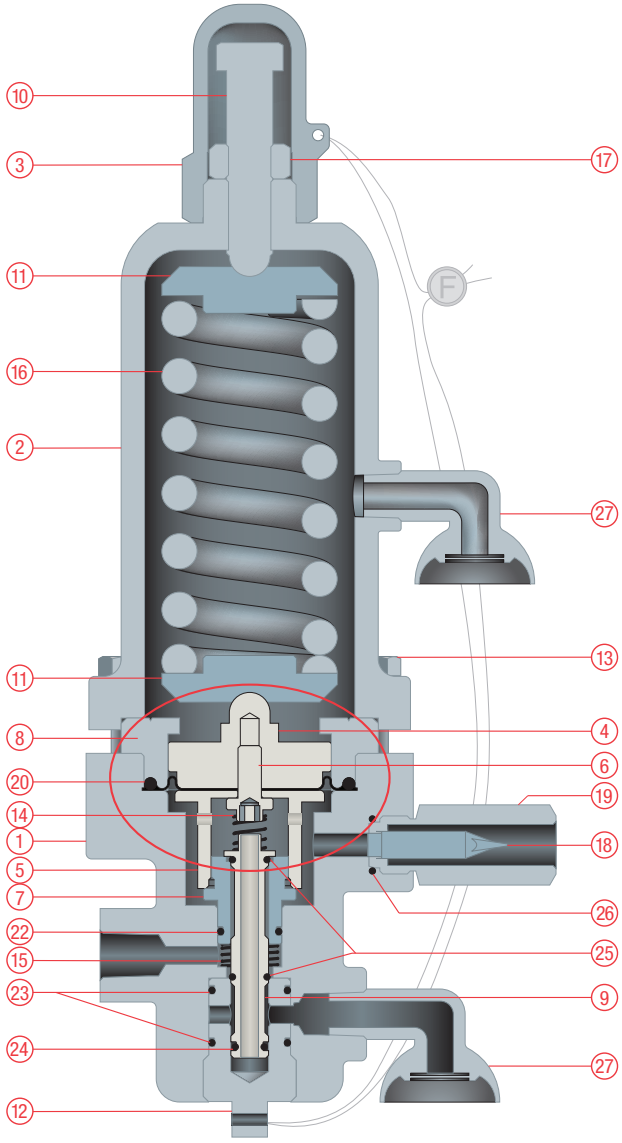
Viton Seats and Seals: have a wide spectrum of chemical compatibility and temperature range to meet most applications and enhance valve life. Buna-N and ethylene propylene soft goods are optional and extend temperature ranges from -65°F to 450°F. Contact the Farris Factory for more information on other construction materials.

Set Pressure Set at Pilot Control: in-line service and setting adjustments are done quickly and easily without main valve intrusion. Subsequent reduction in product loss and fugitive emissions adds to the system's profitability.

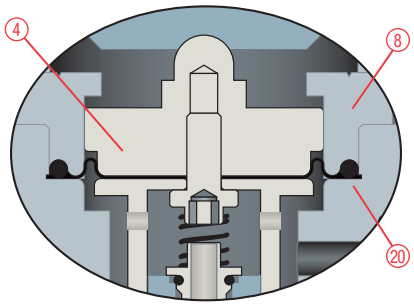
Field Test Capable: using a field test connection allows cycling the pilot control without interrupting system protection or removing the valve from the line. Field testing verifies system integrity in accordance with the ASME Code.

Remote Sensing Capable: when there is excessive inlet piping losses, or when the main valve must be installed at a different location on the protected system because of its service limitations, the pilot sensing line can be installed separate from the main valve.

Suitable for NACE Service: for high quality materials of construction that meet NACE MR0103 or MR0175 service, refer to N1 trim for carbon steel body and N4 trim for stainless steel.

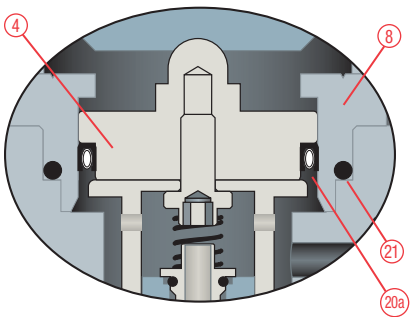


PCM: Modulating Control – 15 to 740 psig



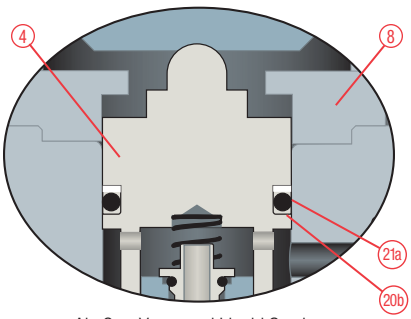
Air, Gas, Vapor and Liquid Service

PCMS: Modulating Control – 15 to 740 psig



Air, Gas, Vapor, Liquid and Steam Service

HPCM: Modulating Control – 740 to 2220 psig



Air, Gas, Vapor and Liquid Service

UV

Built in conformance to ASME Code Section VIII for Air, Gas, Steam, and Liquid Service.
ASME Code stamping not available on full port design in liquid service.

3800 Series Bill of Materials – Modulating Control

Bill of Materials – PCM, PCMS and HPCM

Item No.	Part Name	Std & S4	N1 & N4 NACE	M4	H4
1	Body	316 St. St.	316 St. St.[2]	Monel	Hastelloy C
2	Bonnet	316 St. St.	316 St. St.	Monel	Hastelloy C
3	Cap	316 St. St.	316 St. St.	Monel	Hastelloy C
4	Piston	316 St. St.	316 St. St.	Monel	Hastelloy C
5	Retainer[1]	316 St. St.	316 St. St.	Monel	Hastelloy C
6	Retainer Screw[1]	316 St. St.	316 St. St.	Monel	Hastelloy C
7	Inlet Seat	316 St. St.	316 St. St.	Monel	Hastelloy C
8	Guide	316 St. St.	316 St. St.	Monel	Hastelloy C
9	Spool	316 St. St.	316 St. St.	Monel	Hastelloy C
10	Spring Adjusting Screw	316 St. St.	316 St. St.	Monel	Hastelloy C
11	Spring Buttons	316 St. St.	316 St. St.	Monel	Hastelloy C
12	Spool Cap	316 St. St.	316 St. St.	Monel	Hastelloy C
13	Bonnet Cap Screw	316 St. St.	316 St. St.	Monel	Hastelloy C
14	Spool Return Spring	316 St. St.	Inconel X750	Inconel X750	Inconel X750
15	Lower Return Spring	316 St. St.	Inconel X750	Inconel X750	Inconel X750
16	Spring	St. St.	St. St.	St. St.	St. St.
17	Jam Nut	316 St. St.	316 St. St.	316 St. St.	316 St. St.
18	Filter	St. St.	St. St.	Monel	Monel
19	Filter Housing	316 St. St.	316 St. St.	Monel	Hastelloy C
20	Diaphragm	Viton[3]	EPDM[6]	Viton[3]	Viton[3]
20a	Spring Energized Seal[4]	Teflon/HC[7]	Teflon/HC[7]	Teflon/HC[7]	Teflon/HC[7]
20b	Piston Seal[5]	Viton[3]	EPDM[6]	Viton[3]	Viton[3]
21	Guide Seal[4]	Viton[3]	EPDM[6]	Viton[3]	Viton[3]
21a	Backup Ring[5]	Teflon	Teflon	Teflon	Teflon
22	Body Seal	Viton[3]	EPDM[6]	Viton[3]	Viton[3]
23	Spool Cap Seal	Viton[3]	EPDM[6]	Viton[3]	Viton[3]
24	Spool Seal	Viton[3]	EPDM[6]	Viton[3]	Viton[3]
25	Seat Seal	Viton[3]	EPDM[6]	Viton[3]	Viton[3]
26	Filter Seal	Viton[3]	EPDM[6]	Viton[3]	Viton[3]
27	Bug Vent	Aluminum	Aluminum	Aluminum	Aluminum

General Notes:
1. Part used on PCM and PCMS only.
2. Materials certified in compliance with NACE specifications.
3. We reserve the right to substitute comparable fluorocarbon materials.
4. Part used on PCMS only.
5. Part used on HPCM only.
6. EPDM is standard offering for NACE; other materials can be selected. Please specify at time of order.
7. Graphite reinforced PTFE with Hastelloy C spring.
8. Duplex available upon request, contact factory.

Selection Table – API

API – U.S. Customary and Metric

Orifice			Valve Size Inlet x Outlet	ANSI Flange Class		Type Number	Maximum Set Pressure				Maximum Back Pressure	
Letter	API Area Sq. In. (mm)	Actual Area Sq. In. (mm)		Inlet RF or RJ	Outlet RF		psig -20°F 100°F	psig 500°F (note 1)	barg -29°C 38°C	barg 260°C (note 1)	psig @ 100°F	barg @ 38°C
D	0.110 (71)	0.150 (97)	1 x 2	150# 300# 600#	150#	38DC10 38DC12 38DC13	285 740 1480	170 600 1200	19.6 51.0 102	11.7 41.3 82.7	285	19.6
				900# 1500# 2500#	300#	38DC14 38DC15 38DC16	2220 3705 6170	1795 2995 4990	153 255 425	124 206 344	740	51.0
			1-1/2 x 2	150# 300# 600#	150#	38DC10X 38DC12X 38DC13X	285 740 1480	170 600 1200	19.6 51.0 102	11.7 41.3 82.7	285	19.6
				900# 1500# 2500#	300#	38DC14X 38DC15X 38DC16X	2220 3705 6170	1795 2995 4990	153 255 425	124 206 344	740	51.0
E	0.196 (126)	0.225 (145)	1 x 2	150# 300# 600#	150#	38EC10 38EC12 38EC13	285 740 1480	170 600 1200	19.6 51.0 102	11.7 41.3 82.7	285	19.6
				900# 1500# 2500#	300#	38EC14 38EC15 38EC16	2220 3705 6170	1795 2995 4990	153 255 425	124 206 344	740	51.0
			1-1/2 x 2	150# 300# 600#	150#	38EC10X 38EC12X 38EC13X	285 740 1480	170 600 1200	19.6 51.0 102	11.7 41.3 82.7	285	19.6
				900# 1500# 2500#	300#	38EC14X 38EC15X 38EC16X	2220 3705 6170	1795 2995 4990	153 255 425	124 206 344	740	51.0
F	0.307 (198)	0.371 (239)	1 x 2	150# 300# 600#	150#	38FC10 38FC12 38FC13	285 740 1480	170 600 1200	19.6 51.0 102	11.7 41.3 82.7	285	19.6
				900# 1500# 2500#	300#	38FC14 38FC15 38FC16	2220 3705 6170	1795 2995 4990	153 255 425	124 206 344	740	51.0
			1-1/2 x 2	150# 300# 600#	150#	38FC10X 38FC12X 38FC13X	285 740 1480	170 600 1200	19.6 51.0 102	11.7 41.3 82.7	285	19.6
				900# 1500# 2500#	300#	38FC14X 38FC15X 38FC16X	2220 3705 6170	1795 2995 4990	153 255 425	124 206 344	740	51.0
G	0.503 (325)	0.559 (361)	1-1/2 x 3	150# 300# 600#	150#	38GC10 38GC12 38GC13	285 740 1480	170 600 1200	19.6 51.0 102	11.7 41.3 82.7	285	19.6
				900# 1500# 2500#	300#	38GC14 38GC15 38GC16	2220 3705 6170	1795 2995 4990	153 255 425	124 206 344	740	51.0
			2 x 3	150# 300# 600#	150#	38GC10X 38GC12X 38GC13X	285 740 1480	170 600 1200	19.6 51.0 102	11.7 41.3 82.7	285	19.6
				900# 1500# 2500#	300/600# (note 2)	38GC14X 38GC15X 38GC16X	2220 3705 6170	1795 2995 4990	153 255 425	124 206 344	1480	102
H	0.785 (506)	0.873 (563)	1-1/2 x 3	150# 300# 600#	150#	38HC10 38HC12 38HC13	285 740 1480	170 600 1200	19.6 51.0 102	11.7 41.3 82.7	285	19.6
				900# 1500# 2500#	300#	38HC14 38HC15 38HC16	2220 3705 6170	1795 2995 4990	153 255 425	124 206 344	740	51.0
			2 x 3	150# 300# 600#	150#	38HC10X 38HC12X 38HC13X	285 740 1480	170 600 1200	19.6 51.0 102	11.7 41.3 82.7	285	19.6
				900# 1500# 2500#	300/600# (note 2)	38HC14X 38HC15X 38HC16X	2220 3705 6170	1795 2995 4990	153 255 425	124 206 344	1480	102

General Notes:

1. Standard elastomer is Viton which is suitable to a maximum temperature of 450°F. For temperatures above 450°F the o-ring seals must be specified as Kalrez.
2. The 300# and 600# flanges have identical drilling with flange thickness equal to the 600# class.
3. For liquid service applications, add "L" to the end of the base type number for valves with standard size connections. Change the "X" to a "Y" for valves with oversize connections and change "D" to an "E" for valves with dual outlet. Examples: 38FC10L-120, 38FC10Y-120, 38TC10E-120.

Selection Table – API continued

API – U.S. Customary and Metric

Orifice			Valve Size Inlet x Outlet	ANSI Flange Class		Type Number	Maximum Set Pressure				Maximum Back Pressure	
Letter	API Area Sq. In. (mm)	Actual Area Sq. In. (mm)		Inlet RF or RJ	Outlet RF		psig -20°F 100°F	psig 500°F (note 1)	barg -29°C 38°C	barg 260°C (note 1)	psig @ 100°F	barg @ 38°C
J	1.287 (830)	1.430 (923)	2 x 3	150# 300# 600#	150#	38JC10 38JC12 38JC13	285 740 1480	170 600 1200	19.6 51.0 102	11.7 41.3 82.7	285	19.6
				900# 1500# 2500#	300/600# (note 2)	38JC14 38JC15 38JC16	2220 3705 6170	1795 2995 4990	153 255 425	124 206 344	1480	102
			3 x 4	150# 300# 600#	150#	38JC10X 38JC12X 38JC13X	285 740 1480	170 600 1200	19.6 51.0 102	11.7 41.3 82.7	285	19.6
				900# 1500#	300#	38JC14X 38JC15X	2220 3705	1795 2995	153 255	124 206	740	51.0
K	1.838 (1186)	2.042 (1317)	3 x 4	150# 300# 600#	150#	38KC10 38KC12 38KC13	285 740 1480	170 600 1200	19.6 51.0 102	11.7 41.3 82.7	285	19.6
				900# 1500#	300#	38KC14 38KC15	2220 3705	1795 2995	153 255	124 206	740	51.0
L	2.853 (1841)	3.170 (2045)	3 x 4	150# 300# 600#	150#	38LC10 38LC12 38LC13	285 740 1480	170 600 1200	19.6 51.0 102	11.7 41.3 82.7	285	19.6
				900# 1500#	300#	38LC14 38LC15	2220 3705	1795 2995	153 255	124 206	740	51.0
			4 x 6	150# 300# 600#	150#	38LC10X 38LC12X 38LC13X	285 740 1480	170 600 1200	19.6 51.0 102	11.7 41.3 82.7	285	19.6
				900# 1500#	300#	38LC14X 38LC15X	2220 3705	1795 2995	153 255	124 206	740	51.0
M	3.60 (2323)	4.000 (2581)	4 x 6	150# 300# 600#	150#	38MC10 38MC12 38MC13	285 740 1480	170 600 1200	19.6 51.0 102	11.7 41.3 82.7	285	19.6
				900# 1500#	300#	38MC14 38MC15	2220 3705	1795 2995	153 255	124 206	740	51.0
N	4.34 (2800)	4.822 (3111)	4 x 6	150# 300# 600#	150#	38NC10 38NC12 38NC13	285 740 1480	170 600 1200	19.6 51.0 102	11.7 41.3 82.7	285	19.6
				900# 1500#	300#	38NC14 38NC15	2220 3705	1795 2995	153 255	124 206	740	51.0
P	6.38 (4116)	7.087 (4572)	4 x 6	150# 300# 600#	150#	38PC10 38PC12 38PC13	285 740 1480	170 600 1200	19.6 51.0 102	11.7 41.3 82.7	285	19.6
				900# 1500#	300#	38PC14 38PC15	2220 3080	1795 2995	153 212	124 206	740	51.0
Q	11.05 (7129)	12.27 (7916)	6 x 8	150# 300# 600#	150#	38QC10 38QC12 38QC13	285 740 1480	170 600 1200	19.6 51.0 102	11.7 41.3 82.7	285	19.6
			6 x 8 x 8	150# 300# 600#	150#	38QC10D 38QC12D 38QC13D	285 740 1480	170 600 1200	19.6 51.0 102	11.7 41.3 82.7	285	19.6
R	16.0 (10323)	17.78 (11471)	6 x 8	150# 300# 600#	150#	38RC10 38RC12 38RC13	285 740 1480	170 600 1200	19.6 51.0 102	11.7 41.3 82.7	285	19.6
			6 x 8 x 8	150# 300# 600#	150#	38RC10D 38RC12D 38RC13D	285 740 1480	170 600 1200	19.6 51.0 102	11.7 41.3 82.7	285	19.6
T	26 (16774)	28.94 (18761)	8 x 10	150# 300# 600#	150#	38TC10 38TC12 38TC13	285 740 1480	170 600 1200	19.6 51.0 102	11.7 41.3 82.7	285	19.6
			8 x 10 x 10	150# 300# 600#	150#	38TC10D 38TC12D 38TC13D	285 740 1480	170 600 1200	19.6 51.0 102	11.7 41.3 82.7	285	19.6

General Notes Continued:
4. Valves with ring joint inlet connections available. Consult the Factory for final dimensions.
5. Dual outlet only available for 6" and 8" inlet valves.

Selection Table – Non Standard API

Non Standard API – U.S. Customary and Metric

Orifice			Valve Size Inlet x Outlet	ANSI Flange Class		Type Number	Maximum Set Pressure				Maximum Back Pressure	
Letter	API Area Sq. In. (mm)	Actual Area Sq. In. (mm)		Inlet RF or RJ	Outlet RF		psig -20°F 100°F	psig 500°F (note 1)	barg -29°C 38°C	barg 260°C (note 1)	psig @ 100°F	barg @ 38°C
G	0.503 (325)	0.559 (361)	1 x 2	150# 300# 600#	150#	38GC10U 38GC12U 38GC13U	285 740 1480	170 600 1200	19.6 51.0 102	11.7 41.3 82.7	285	19.6
				900# 1500# 2500#	300#	38GC14U 38GC15U 38GC16U	2220 3705 6170	1795 2995 4990	153 255 425	124 206 344	740	51.0
			1-1/2 x 2	150# 300# 600#	150#	38GC10N 38GC12N 38GC13N	285 740 1480	170 600 1200	19.6 51.0 102	11.7 41.3 82.7	285	19.6
				900# 1500# 2500#	300#	38GC14N 38GC15N 38GC16N	2220 3705 6170	1795 2995 4990	153 255 425	124 206 344	740	51.0
H	0.785 (506)	0.873 (563)	1-1/2 x 2	150# 300# 600#	150#	38HC10N 38HC12N 38HC13N	285 740 1480	170 600 1200	19.6 51.0 102	11.7 41.3 82.7	285	19.6
				900# 1500# 2500#	300#	38HC14N 38HC15N 38HC16N	2220 3705 6170	1795 2995 4990	153 255 425	124 206 344	740	51.0
J	1.287 (830)	1.430 (923)	1-1/2 x 2	150# 300# 600#	150#	38JC10U 38JC12U 38JC13U	285 740 1480	170 600 1200	19.6 51.0 102	11.7 41.3 82.7	285	19.6
				900# 1500# 2500#	300#	38JC14U 38JC15U 38JC16U	2220 3705 6170	1795 2995 4990	153 255 425	124 206 344	740	51.0
			1-1/2 x 3	150# 300# 600#	150#	38JC10N 38JC12N 38JC13N	285 740 1480	170 600 1200	19.6 51.0 102	11.7 41.3 82.7	285	19.6
				900# 1500# 2500#	300#	38JC14N 38JC15N 38JC16N	2220 3705 6170	1795 2995 4990	153 255 425	124 206 344	740	51.0
K	1.838 (1186)	2.042 (1317)	2 x 3	150# 300# 600#	150#	38KC10N 38KC12N 38KC13N	285 740 1480	170 600 1200	19.6 51.0 102	11.7 41.3 82.7	285	19.6
				900# 1500# 2500#	300/600# (note 2)	38KC14N 38KC15N 38KC16N	2220 3705 6170	1795 2995 4990	153 255 425	124 206 344	1480	102
M	3.60 (2323)	4.000 (2581)	3 x 4	150# 300# 600#	150#	38MC10N 38MC12N 38MC13N	285 740 1480	170 600 1200	19.6 51.0 102	11.7 41.3 82.7	285	19.6
				900# 1500#	300#	38MC14N 38MC15N	2220 8705	1795 2995	153 255	123.7 206	740	51.0
N	4.34 (2800)	4.822 (3111)	3 x 4	150# 300# 600#	150#	38NC10N 38NC12N 38NC13N	285 740 1480	170 600 1200	19.6 51.0 102	11.7 41.3 82.7	285	19.6
				900# 1500#	300#	38NC14N 38NC15N	2220 3705	1795 2995	153 255	124 206	740	51.0

General Notes:
1. Standard elastomer is Viton which is suitable to a maximum temperature of 450°F. For temperatures above 450°F the o-ring seals must be specified as Kalrez.
2. The 300# and 600# flanges have identical drilling with flange thickness equal to the 600# class.
3. Valves only certified for air, gas, vapor and steam service.
4. Valves with ring joint inlet connections available. Consult the Factory for final dimensions.

Selection Table – Full Port

Full Port – U.S. Customary and Metric

Orifice			Valve Size Inlet x Outlet	ANSI Flange Class		Type Number	Maximum Set Pressure				Maximum Back Pressure	
Letter	API Area Sq. In. (mm)	Actual Area Sq. In. (mm)		Inlet RF or RJ	Outlet RF		psig -20°F 100°F	psig 500°F (note 5)	barg -29°C 38°C	barg 260°C (note 5)	psig @ 100°F	barg @ 38°C
A[1]	—	0.719 (464)	1 x 2	150# 300# 600#	150#	38AC10 38AC12 38AC13	285 740 1480	170 600 1200	19.6 51.0 102	11.7 41.3 82.7	285	19.6
				900# 1500# 2500#	300#	38AC14 38AC15 38AC16	2220 3705 6170	1795 2995 4990	153 255 425	124 206 344	740	51.0
1	—	1.767 (1140)	1-1/2 x 2	150# 300# 600#	150#	381C10 381C12 381C13	285 740 1480	170 600 1200	19.6 51.0 102	11.7 41.3 82.7	285	19.6
				900# 1500# 2500#	300#	381C14 381C15 381C16	2220 3705 6170	1795 2995 4990	153 255 425	124 206 344	740	51.0
			1-1/2 x 3	150# 300# 600#	150#	381C10X 381C12X 381C13X	285 740 1480	170 600 1200	19.6 51.0 102	11.7 41.3 82.7	285	19.6
				900# 1500# 2500#	300#	381C14X 381C15X 381C16X	2220 3705 6170	1795 2995 4990	153 255 425	124 206 344	740	51.0
2	—	2.953 (1905)	2 x 3	150# 300# 600#	150#	382C10 382C12 382C13	285 740 1480	170 600 1200	19.6 51.0 102	11.7 41.3 82.7	285	19.6
				900# 1500# 2500#	300/600# (note 2)	382C14 382C15 382C16	2220 3705 6170	1795 2995 4990	153 255 425	124 206 344	1480	120
3	—	6.605 (4261)	3 x 4	150# 300# 600#	150#	383C10 383C12 383C13	285 740 1480	170 600 1200	19.6 51.0 102	11.7 41.3 82.7	285	19.6
				900# 1500#	300#	383C14 383C15	2220 3705	1795 2995	153 255	124 206	740	51.0
4	—	11.50 (7419)	4 x 6	150# 300# 600#	150#	384C10 384C12 384C13	285 740 1480	170 600 1200	19.6 51.0 102	11.7 41.3 82.7	285	19.6
				900# 1500#	300#	384C14 384C15	2220 3705	1795 2995	153 255	124 206	740	51.0
6	—	26.07 (16819)	6 x 8	150# 300# 600#	150#	386C10 386C12 386C13	285 740 1480	170 600 1200	19.6 51.0 102	11.7 41.3 82.7	285	19.6
			6 x 8 x 8	150# 300# 600#	150#	386C10D 386C12D 386C13D	285 740 1480	170 600 1200	19.6 51.0 102	11.7 41.3 82.7	285	19.6
8	—	45.66 (29458)	8 x 10	150# 300# 600#	150#	388C10 388C12 388C13	285 740 1480	170 600 1200	19.6 51.0 102	11.7 41.3 82.7	285	19.6
			8 x 10 x 10	150# 300# 600#	150#	388C10D 388C12D 388C13D	285 740 1480	170 600 1200	19.6 51.0 102	11.7 41.3 82.7	285	19.6

General Notes:
1. A 1" x 2" valve with an "A" orifice is only available when configured with a remote sensing option.
2. The 300# and 600# flanges have identical drilling with flange thickness equal to the 600# class.
3. Valves with ring joint inlet connections available. Consult the Factory for final dimensions.
4. Dual outlets only available for 6" and 8" inlet valves.
5. Standard elastomer is Viton which is suitable to a maximum temperature of 450°F. For temperatures above 450°F the o-ring seals must be specified as Kalrez.

Air Capacities – 3800 Series: 10% Overpressure, API

ASME Pressure Vessel Code (UV) – Capacities in Standard Cubic Feet Per Minute at 60°F – U.S. Customary Units

Set Pressure (psig)	Orifice Letter Designation & Areas, Sq. Inches													
Areas	**D**	**E**	**F**	**G**	**H**	**J**	**K**	**L**	**M**	**N**	**P**	**Q**	**R**	**T**
API	**0.110**	**0.196**	**0.307**	**0.503**	**0.785**	**1.287**	**1.838**	**2.853**	**3.600**	**4.34**	**6.38**	**11.05**	**16.00**	**26.0**
Actual	**0.150**	**0.225**	**0.371**	**0.559**	**0.873**	**1.43**	**2.042**	**3.170**	**4.000**	**4.822**	**7.087**	**12.27**	**17.78**	**28.94**
15	77	115	191	287	449	736	1051	1632	2059	2482	3649	6317	9155	14901
20	89	133	220	331	518	848	1212	1881	2374	2862	4207	7283	10554	17179
30	112	168	278	419	655	1074	1533	2380	3004	3621	5323	9215	13354	21736
40	138	207	342	516	806	1321	1887	2930	3697	4457	6550	11341	16434	26749
50	164	246	407	613	958	1569	2241	3479	4390	5292	7778	13466	19513	31762
60	190	285	471	710	1109	1817	2594	4028	5082	6127	9005	15591	22593	36774
70	216	324	535	807	1260	2064	2948	4577	5775	6962	10233	17717	25673	41787
80	242	363	599	903	1411	2312	3302	5126	6468	7797	11460	19842	28752	46800
90	268	402	664	1000	1562	2560	3655	5675	7161	8633	12688	21967	31832	51812
100	294	441	728	1097	1714	2807	4009	6224	7854	9468	13915	24092	34912	56825
150	424	636	1049	1581	2470	4046	5778	8969	11318	13644	20053	34719	50310	81889
200	554	831	1371	2065	3226	5284	7546	11715	14782	17820	26191	45345	65708	106952
250	684	1026	1692	2549	3982	6523	9315	14460	18246	21996	32328	55972	81107	132015
300	814	1221	2013	3034	4738	7761	11083	17205	21711	26172	38466	66598	96505	157079
350	944	1416	2335	3518	5494	9000	12851	19951	25175	30348	44604	77225	111903	182142
400	1073	1610	2656	4002	6250	10238	14620	22696	28639	34524	50741	87851	127302	207206
450	1203	1805	2977	4486	7006	11477	16388	25442	32103	38700	56879	98477	142700	232269
500	1333	2000	3298	4970	7762	12715	18157	28187	35567	42876	63017	109104	158098	257333
550	1463	2195	3620	5454	8518	13953	19925	30932	39032	47053	69154	119730	173497	282396
600	1593	2390	3941	5938	9274	15192	21694	33678	42496	51229	75292	130357	188895	307459
650	1723	2585	4262	6422	10030	16430	23462	36423	45960	55405	81430	140983	204293	332523
700	1853	2780	4584	6907	10786	17669	25231	39168	49424	59581	87567	151609	219692	357586
750	1983	2974	4905	7391	11542	18907	26999	41914	52888	63757	93705	162236	235090	382650
800	2113	3169	5226	7875	12299	20146	28768	44659	56352	67933	99843	172862	250488	407713
850	2243	3364	5548	8359	13055	21384	30536	47405	59817	72109	105981	183489	265887	432777
900	2373	3559	5869	8843	13811	22623	32305	50150	63281	76285	112118	194115	281285	457840
950	2502	3754	6190	9327	14567	23861	34073	52895	66745	80461	118256	204741	296683	482903
1000	2632	3949	6511	9811	15323	25099	35842	55641	70209	84637	124394	215368	312082	507967
1050	2762	4144	6833	10295	16079	26338	37610	58386	73673	88813	130531	225994	327480	533030
1100	2892	4339	7154	10780	16835	27576	39379	61131	77138	92989	136669	236621	342878	558094
1150	3022	4533	7475	11264	17591	28815	41147	63877	80602	97166	142807	247247	358277	583157
1200	3152	4728	7797	11748	18347	30053	42915	66622	84066	101342	148944	257873	373675	608221
1250	3282	4923	8118	12232	19103	31292	44684	69368	87530	105518	155082	268500	389073	633284
1300	3412	5118	8439	12716	19859	32530	46452	72113	90994	109694	161220	279126	404472	658348
1350	3542	5313	8761	13200	20615	33769	48221	74858	94459	113870	167357	289753	419870	683411
1400	3672	5508	9082	13684	21371	35007	49989	77604	97923	118046	173495	300379	435268	708474
1450	3802	5703	9403	14168	22127	36246	51758	80349	101387	122222	179633	311006	450667	733538
1500	3931	5897	9724	14653	22883	37484	53526	83094	104851	126398	185770			
1550	4061	6092	10046	15137	23639	38722	55295	85840	108315	130574	191908			
1600	4191	6287	10367	15621	24395	39961	57063	88585	111780	134750	198046			
1650	4321	6482	10688	16105	25152	41199	58832	91331	115244	138926	204183			
1700	4451	6677	11010	16589	25908	42438	60600	94076	118708	143103	210321			
1750	4581	6872	11331	17073	26664	43676	62369	96821	122172	147279	216459			
1800	4711	7067	11652	17557	27420	44915	64137	99567	125636	151455	222597			
1850	4841	7261	11974	18041	28176	46153	65906	102312	129101	155631	228734			
1900	4971	7456	12295	18525	28932	47392	67674	105057	132565	159807	234872			
2000	5231	7846	12938	19494	30444	49868	71211	110548	139493	168159	247147			
2100	5490	8236	13580	20462	31956	52345	74748	116039	146421	176511	259423			
2200	5750	8625	14223	21430	33468	54822	78285	121530	153350	184863	271698			
2300	6010	9015	14865	22398	34980	57299	81822	127020	160278	193216	283973			
2400	6270	9405	15508	23367	36492	59776	85359	132511	167207	201568	296249			
2500	6530	9795	16151	24335	38005	62253	88896	138002	174135	209920	308524			
2600	6789	10184	16793	25303	39517	64730	92433	143493	181063	218272	320799			
2700	7049	10574	17436	26271	41029	67207	95970	148983	187992	226624	333075			
2800	7309	10964	18078	27240	42541	69684	99506	154474	194920	234976	345350			
2900	7569	11354	18721	28208	44053	72161	103043	159965	201849	243329	357626			
3000	7829	11743	19364	29176	45565	74637	106580	165456	208777	251681	369901			
3500	9128	13692	22577	34017	53126	87022	124265	192909	243419	293442	431278			
4000	10427	15640	25790	38859	60686	99406	141950	220363	278061	335202	492655			
4500	11726	17589	29003	43700	68247	111791								
5000	13025	19538	32216	48541	75808	124175								
5500	14324	21486	35429	53382	83368	136560								
6000	15623	23435	38642	58223	90929	148944								
6170	16065	24097	39734	59869	93499	153155								

General Notes:

1. Capacities at 30 PSIG and below are based on 3 PSI overpressure.
2. For sizing purposes the effective coefficient of discharge, K_d for air, gas, and steam is 0.954 when sizing using the API effective areas. When sizing using the ASME actual areas, the certified coefficient of discharge K for air, gas, and steam service is 0.859.

Air Capacities – 3800 Series: 10% Overpressure, Full Port

ASME Pressure Vessel Code (UV) – Capacities in Standard Cubic Feet Per Minute at 60°F – U.S. Customary Units

Set Pressure (psig)	Orifice Letter Designation & Areas, Sq. Inches						
Areas	A	#1	#2	#3	#4	#6	#8
Actual	0.719	1.767	2.953	6.605	11.50	26.07	45.66
15	345	848	1417	3171	5521	12517	21923
20	398	978	1634	3656	6365	14431	25275
30	503	1237	2068	4626	8054	18259	31979
40	619	1522	2545	5692	9911	22469	39354
50	735	1808	3022	6759	11769	26680	46729
60	851	2093	3499	7826	13626	30891	54103
70	968	2379	3976	8893	15484	35101	61478
80	1084	2664	4452	9960	17341	39312	68853
90	1200	2949	4929	11026	19198	43523	76228
100	1316	3235	5406	12093	21056	47733	83602
150	1897	4662	7791	17427	30343	68787	120476
200	2477	6089	10176	22761	39630	89840	157350
250	3058	7516	12561	28095	48917	110894	194224
300	3639	8943	14945	33429	58204	131947	231097
350	4219	10370	17330	38763	67491	153000	267971
400	4800	11797	19715	44097	76778	174054	304845
450	5380	13224	22100	49431	86065	195107	341719
500	5961	14651	24484	54765	95352	216161	378592
550	6542	16078	26869	60099	104640	237214	415466
600	7122	17505	29254	65433	113927	258267	452340
650	7703	18932	31639	70767	123214	279321	489214
700	8284	20359	34024	76101	132501	300374	526087
750	8864	21786	36408	81435	141788	321428	562961
800	9445	23213	38793	86769	151075	342481	599835
850	10026	24640	41178	92103	160362	363534	636709
900	10606	26067	43563	97437	169649	384588	673582
950	11187	27494	45947	102771	178936	405641	710456
1000	11768	28920	48332	108105	188223	426695	747330
1050	12348	30347	50717	113439	197510	447748	784204
1100	12929	31774	53102	118773	206797	468801	821077
1150	13510	33201	55486	124107	216085	489855	857951
1200	14090	34628	57871	129441	225372	510908	894825
1250	14671	36055	60256	134775	234659	531962	931699
1300	15251	37482	62641	140110	243946	553015	968572
1350	15832	38909	65025	145444	253233	574069	1005446
1400	16413	40336	67410	150778	262520	595122	1042320
1450	16993	41763	69795	156112	271807	616175	1079194
1500	17574	43190	72180	161446	281094		
1550	18155	44617	74564	166780	290381		
1600	18735	46044	76949	172114	299668		
1650	19316	47471	79334	177448	308955		
1700	19897	48898	81719	182782	318242		
1750	20477	50325	84104	188116	327529		
1800	21058	51752	86488	193450	336817		
1850	21639	53179	88873	198784	346104		
1900	22219	54606	91258	204118	355391		
2000	23380	57460	96027	214786	373965		
2100	24542	60314	100797	225454	392539		
2200	25703	63168	105566	236122	411113		
2300	26864	66022	110336	246790	429687		
2400	28026	68876	115105	257458	448262		
2500	29187	71730	119875	268126	466836		
2600	30348	74584	124644	278794	485410		
2700	31509	77438	129414	289462	503984		
2800	32671	80292	134183	300130	522558		
2900	33832	83146	138953	310798	541132		
3000	34993	86000	143723	321466	559707		
3500	40800	100269	167570	374806	652577		
4000	46606	114539	191418	428146	745448		
4500	52413	128809	215265				
5000	58219	143079	239113				
5500	64026	157349	262961				
6000	69832	171619	286808				
6170	71806	176470	294916				

General Notes:

1. Capacities at 30 PSIG and below are based on 3 PSI overpressure.
2. For sizing purposes the coefficient of discharge, K for air, gas, and steam is 0.801

Steam Capacities – 3800 Series: 10% Overpressure, API

ASME Pressure Vessel Code (UV) – Capacities in Pounds Per Hour at Saturation Temperature – U.S. Customary Units

Set Pressure (psig)	Orifice Letter Designation & Areas, Sq. Inches													
Areas	**D**	**E**	**F**	**G**	**H**	**J**	**K**	**L**	**M**	**N**	**P**	**Q**	**R**	**T**
API	**0.110**	**0.196**	**0.307**	**0.503**	**0.785**	**1.287**	**1.838**	**2.853**	**3.600**	**4.34**	**6.38**	**11.05**	**16.00**	**26.0**
Actual	**0.150**	**0.225**	**0.371**	**0.559**	**0.873**	**1.43**	**2.042**	**3.170**	**4.000**	**4.822**	**7.087**	**12.27**	**17.78**	**28.94**
15	216	325	536	808	1262	2068	2953	4585	5786	6975	10252	17749	25720	41864
20	250	375	618	932	1455	2384	3405	5286	6671	8042	11819	20463	29653	48265
30	316	474	782	1179	1842	3017	4308	6689	8440	10175	14954	25891	37518	61068
40	389	584	963	1451	2267	3713	5302	8231	10387	12521	18403	31862	46171	75151
50	462	693	1143	1723	2691	4409	6296	9774	12333	14868	21852	37833	54823	89234
60	535	803	1324	1995	3116	5105	7290	11317	14280	17214	25300	43804	63475	103317
70	608	912	1505	2267	3541	5801	8283	12859	16226	19561	28749	49775	72127	117400
80	681	1022	1685	2539	3966	6496	9277	14402	18173	21907	32198	55746	80779	131482
90	754	1131	1866	2811	4391	7192	10271	15944	20119	24254	35647	61717	89431	145565
100	827	1241	2046	3083	4815	7888	11264	17487	22066	26600	39095	67687	98084	159648
150	1192	1788	2949	4443	6940	11368	16233	25200	31798	38333	56339	97542	141344	230063
200	1557	2336	3852	5803	9064	14847	21201	32913	41531	50065	73582	127396	184605	300477
250	1922	2883	4754	7164	11188	18326	26170	40626	51263	61798	90826	157251	227866	370891
300	2287	3431	5657	8524	13312	21806	31138	48339	60996	73530	108069	187105	271127	441306
350	2652	3978	6560	9884	15436	25285	36106	56052	70728	85263	125313	216959	314388	511720
400	3017	4525	7462	11244	17560	28764	41075	63765	80460	96995	142556	246814	357649	582135
450	3382	5073	8365	12604	19684	32244	46043	71478	90193	108728	159800	276668	400909	652549
500	3747	5620	9268	13964	21808	35723	51012	79191	99925	120460	177043	306522	444170	722964
550	4112	6168	10170	15324	23932	39202	55980	86904	109658	132193	194287	336377	487431	793378
600	4477	6715	11073	16684	26057	42682	60949	94617	119390	143925	211530	366231	530692	863792
650	4842	7263	11976	18044	28181	46161	65917	102330	129123	155658	228774	396085	573953	934207
700	5207	7810	12878	19405	30305	49640	70885	110043	138855	167390	246017	425940	617214	1004621

Steam Capacities – 3800 Series: 10% Overpressure, Full Port

ASME Pressure Vessel Code (UV) – Capacities in Pounds Per Hour at Saturation Temperature – U.S. Customary Units

Set Pressure (psig)	Orifice Letter Designation & Areas, Sq. Inches						
Areas	**A**	**#1**	**#2**	**#3**	**#4**	**#6**	**#8**
Actual	**0.719**	**1.767**	**2.953**	**6.605**	**11.50**	**26.07**	**45.66**
15	969	2383	3983	8909	15512	35166	61591
20	1118	2748	4592	10271	17884	40543	71009
30	1414	3476	5810	12996	22628	51297	89845
40	1741	4278	7150	15993	27846	63127	110564
50	2067	5080	8490	18990	33065	74957	131282
60	2393	5882	9830	21988	38283	86786	152001
70	2719	6684	11170	24985	43501	98616	172720
80	3046	7485	12510	27982	48720	110446	193439
90	3372	8287	13850	30979	53938	122276	214158
100	3698	9089	15190	33976	59156	134105	234877
150	5329	13098	21890	48962	85248	193254	338472
200	6961	17107	28590	63947	111339	252402	442067
250	8592	21116	35290	78933	137431	311551	545662
300	10223	25125	41989	93919	163523	370699	649257
350	11855	29134	48689	108904	189614	429848	752852
400	13486	33143	55389	123890	215706	488996	856447
450	15117	37152	62089	138876	241797	548144	960042
500	16748	41161	68789	153861	267889	607293	1063637
550	18380	45170	75489	168847	293980	666441	1167231
600	20011	49179	82189	183832	320072	725590	1270826
650	21642	53188	88888	198818	346164	784738	1374421
700	23274	57197	95588	213804	372255	843887	1478016

General Notes:

1. Capacities at 30 PSIG and below are based on 3 PSI overpressure.
2. For sizing purposes the effective coefficient of discharge, K_d for air, gas, and steam is 0.954 when sizing using the API effective areas. When sizing using the ASME actual areas, the certified coefficient of discharge K for air, gas, and steam service is 0.859.
3. For Full Port sizing purposes the coefficient of discharge, K for air, gas, and steam is 0.801.

Water Capacities – 3800 Series: 10% Overpressure, API

ASME Pressure Vessel Code (UV) – Capacities in Gallons Per Minute at 70°F – U.S. Customary Units

Set Pressure (psig)	Orifice Letter Designation & Areas, Sq. Inches													
Areas	**D**	**E**	**F**	**G**	**H**	**J**	**K**	**L**	**M**	**N**	**P**	**Q**	**R**	**T**
API	**0.110**	**0.196**	**0.307**	**0.503**	**0.785**	**1.287**	**1.838**	**2.853**	**3.600**	**4.34**	**6.38**	**11.05**	**16.00**	**26.0**
Actual	**0.150**	**0.225**	**0.371**	**0.559**	**0.873**	**1.43**	**2.042**	**3.170**	**4.000**	**4.822**	**7.087**	**12.27**	**17.78**	**28.94**
15	18.9	28.3	46.7	70.4	110	180	257	399	504	607	893	1546	2241	3648
20	21.3	32.0	52.8	79.6	124	203	291	451	570	687	1009	1748	2533	4124
30	25.6	38.4	63.3	95.4	149	244	348	541	682	823	1209	2094	3035	4940
40	29.5	44.3	73.1	110	172	281	402	624	788	950	1396	2418	3504	5704
50	33.0	49.5	81.7	123	192	315	450	698	881	1062	1561	2703	3918	6377
60	36.2	54.3	89.5	134	210	345	492	765	965	1164	1710	2962	4292	6986
70	39.1	58.6	96.7	145	227	372	532	826	1042	1257	1847	3199	4636	7546
80	41.8	62.7	103	155	243	398	569	883	1115	1344	1975	3420	4956	8067
90	44.3	66.5	109	165	258	422	603	937	1182	1425	2095	3627	5256	8556
100	46.7	70.1	115	174	272	445	636	987	1246	1502	2208	3824	5541	9019
150	57.2	85.8	141	213	333	545	779	1209	1526	1840	2705	4683	6786	11046
200	66.1	99.1	163	246	384	630	900	1397	1762	2125	3123	5407	7836	12755
250	73.9	110	182	275	430	704	1006	1562	1971	2376	3492	6046	8761	14260
300	80.9	121	200	301	471	771	1102	1711	2159	2602	3825	6623	9597	15621
350	87.4	131	216	325	509	833	1190	1848	2332	2811	4132	7154	10366	16873
400	93.4	140	231	348	544	891	1272	1975	2493	3005	4417	7648	11082	18038
450	99.1	148	245	369	577	945	1350	2095	2644	3187	4685	8111	11754	19132
500	104	156	258	389	608	996	1423	2209	2787	3360	4938	8550	12390	20167
550	109	164	271	408	638	1045	1492	2316	2923	3524	5179	8968	12995	21152
600	114	171	283	426	666	1091	1558	2419	3053	3681	5410	9366	13573	22092
650	119	178	294	444	693	1136	1622	2518	3178	3831	5631	9749	14127	22994
700	123	185	305	460	719	1179	1683	2613	3298	3976	5843	10117	14660	23862
750	128	192	316	477	745	1220	1742	2705	3414	4115	6048	10472	15175	24700
800	132	198	327	492	769	1260	1800	2794	3525	4250	6247	10815	15672	25510
850	136	204	337	507	793	1299	1855	2880	3634	4381	6439	11148	16155	26295
900	140	210	346	522	816	1336	1909	2963	3739	4508	6626	11472	16623	27057
950	144	216	356	536	838	1373	1961	3045	3842	4631	6807	11786	17079	27799
1000	147	221	365	550	860	1409	2012	3124	3942	4752	6984	12092	17522	28521
1050	151	227	374	564	881	1444	2062	3201	4039	4869	7156	12391	17955	29225
1100	155	232	383	577	902	1478	2110	3276	4134	4984	7325	12682	18378	29913
1150	158	237	392	590	922	1511	2158	3350	4227	5096	7490	12967	18791	30585
1200	161	242	400	603	942	1543	2204	3422	4318	5205	7651	13246	19195	31243
1250	165	247	408	615	961	1575	2250	3492	4407	5313	7808	13519	19591	31887
1300	168	252	416	628	980	1606	2294	3562	4494	5418	7963	13787	19979	32519
1350	171	257	424	640	999	1637	2338	3629	4580	5521	8115	14050	20359	33138
1400	174	262	432	651	1018	1667	2381	3696	4664	5622	8264	14308	20733	33747
1450	178	267	440	663	1036	1697	2423	3761	4746	5722	8410	14561	21100	34344
1500	181	271	447	674	1053	1726	2464	3826	4828	5820	8554			
1550	184	276	455	685	1071	1754	2505	3889	4907	5916	8695			
1600	186	280	462	696	1088	1782	2545	3951	4986	6011	8834			
1650	189	284	469	707	1105	1810	2585	4013	5063	6104	8971			
1700	192	289	476	718	1121	1837	2623	4073	5139	6196	9106			
1750	195	293	483	728	1138	1864	2662	4132	5214	6286	9239			
1800	198	297	490	739	1154	1890	2700	4191	5288	6375	9370			
1850	201	301	497	749	1170	1916	2737	4249	5361	6463	9499			
1900	203	305	503	759	1185	1942	2773	4306	5433	6550	9627			
2000	209	313	517	779	1216	1993	2846	4418	5575	6720	9877			
2100	214	321	529	798	1246	2042	2916	4527	5712	6886	10121			
2200	219	328	542	817	1276	2090	2984	4633	5847	7048	10359			
2300	224	336	554	835	1304	2137	3052	4738	5978	7207	10592			
2400	229	343	566	853	1332	2183	3117	4839	6107	7362	10820			
2500	233	350	578	871	1360	2228	3181	4939	6233	7513	11043			
2600	238	357	589	888	1387	2272	3245	5037	6356	7662	11262			
2700	242	364	600	905	1413	2315	3306	5133	6477	7808	11476			
2800	247	371	611	921	1439	2358	3367	5227	6596	7952	11687			
2900	251	377	622	938	1465	2399	3427	5320	6713	8092	11894			
3000	256	384	633	954	1490	2441	3485	5411	6828	8231	12097			
3500	276	414	684	1030	1609	2636	3764	5844	7375	8890	13066			
4000	295	443	731	1101	1720	2818	4024	6248	7884	9504	13969			
4500	313	470	775	1168	1825	2989								
5000	330	495	817	1231	1923	3151								
5500	346	520	857	1292	2017	3305								
6000	362	543	895	1349	2107	3452								
6170	367	550	908	1368	2137	3500								

General Notes:

1. Capacities at 30 PSIG and below are based on 3 PSI overpressure
2. For sizing purposes the effective coefficient of discharge, K_d for liquids is 0.869 when sizing using the API effective areas. When sizing using the ASME actual areas, the certified coefficient of discharge K for water is 0.782.

Air Capacities – 3800 Series: 10% Overpressure, API

ASME Pressure Vessel Code (UV) – Capacities in Standard Cubic Meters Per Minute at 15.6°C – Metric Units

Set Pressure (barg)	Orifice Letter Designation & Areas, Sq. mm													
Areas	**D**	**E**	**F**	**G**	**H**	**J**	**K**	**L**	**M**	**N**	**P**	**Q**	**R**	**T**
API	**71**	**126**	**198**	**325**	**506**	**830**	**1186**	**1841**	**2323**	**2800**	**4116**	**7129**	**10323**	**16774**
Actual	**97**	**145**	**239**	**361**	**563**	**923**	**1317**	**2045**	**2581**	**3111**	**4572**	**7916**	**11471**	**18671**
1	2.1	3.2	5.3	8.0	12.5	20.5	29.3	45.5	57.4	69.2	101	176	255	415
2	3.1	4.6	7.7	11.6	18.1	29.7	42.5	66.0	83.3	100	147	255	370	603
3	4.1	6.2	10.3	15.6	24.3	39.9	56.9	88.4	111	134	197	342	496	807
4	5.2	7.8	12.9	19.5	30.5	50.0	71.5	111	140	168	248	429	622	1013
5	6.3	9.4	15.6	23.5	36.7	60.2	86.0	133	168	203	298	517	749	1219
6	7.3	11.0	18.2	27.5	43.0	70.4	100	156	197	237	349	604	876	1425
7	8.4	12.6	20.9	31.5	49.2	80.6	115	178	225	271	399	691	1002	1631
8	9.0	14.2	23.5	35.5	55.4	90.8	129	201	254	306	450	779	1129	1838
9	10.5	15.8	26.2	39.4	61.6	101	144	223	282	340	500	866	1255	2044
10	11.6	17.4	28.8	43.4	67.8	111	158	246	310	374	551	953	1382	2250
12	13.7	20.6	34.1	51.4	80.3	131	187	291	367	443	651	1128	1635	2662
14	15.9	23.9	39.4	59.3	92.7	151	216	336	424	512	752	1303	1888	3074
16	18.0	27.1	44.6	67.3	105	172	245	381	481	580	853	1478	2141	3486
18	20.2	30.3	49.9	75.3	117	192	275	427	538	649	954	1652	2395	3898
20	22.3	33.5	55.2	83.2	130	212	304	472	595	718	1055	1827	2648	4310
22	24.4	36.7	60.5	91.2	142	233	333	517	652	786	1156	2002	2901	4722
24	26.6	39.9	65.8	99.1	154	253	362	562	709	855	1257	2176	3154	5134
26	28.7	43.1	71.1	107	167	274	391	607	766	924	1358	2351	3407	5546
28	30.8	46.3	76.3	115	179	294	420	652	823	992	1459	2526	3660	5958
30	33.0	49.5	81.6	123	192	314	449	697	880	1061	1560	2701	3914	6370
32	35.1	52.7	86.9	131	204	335	478	742	937	1130	1661	2875	4167	6782
34	37.2	55.9	92.2	138	217	355	507	788	994	1198	1761	3050	4420	7194
36	39.4	59.1	97.5	146	229	375	536	833	1051	1267	1862	3225	4673	7607
38	41.5	62.3	102	154	241	396	565	878	1108	1336	1963	3399	4926	8019
40	43.6	65.5	108	162	254	416	594	923	1165	1404	2064	3574	5179	8431
42	45.8	68.7	113	170	266	436	623	968	1222	1473	2165	3749	5433	8843
44	47.9	71.9	118	178	279	457	653	1013	1279	1542	2266	3924	5686	9255
46	50.1	75.1	123	186	291	477	682	1058	1336	1610	2367	4098	5939	9667
48	52.2	78.3	129	194	304	498	711	1104	1393	1679	2468	4273	6192	10079
50	54.3	81.5	134	202	316	518	740	1149	1450	1748	2569	4448	6445	10491
60	65.0	97.5	160	242	378	620	885	1374	1734	2091	3073	5321	7711	12551
70	75.7	113	187	282	440	722	1031	1600	2019	2434	3578	6195	8977	14612
80	86.4	129	213	322	502	823	1176	1826	2304	2778	4082	7068	10243	16672
90	97.0	145	240	361	565	925	1321	2051	2589	3121	4587	7942	11509	18733
100	107	161	266	401	627	1027	1467	2277	2873	3464	5092	8815	12774	20793
110	118	177	292	441	689	1129	1612	2503	3158	3807	5596			
120	129	193	319	481	751	1231	1757	2729	3443	4151	6101			
130	139	209	345	521	813	1332	1903	2954	3728	4494	6605			
140	150	225	372	560	875	1434	2048	3180	4013	4837	7110			
150	161	241	398	600	938	1536	2194	3406	4297	5181	7614			
160	171	257	425	640	1000	1638	2339	3631	4582	5524	8119			
170	182	273	451	680	1062	1740	2484	3857	4867	5867	8623			
180	193	289	477	720	1124	1841	2630	4083	5152	6211	9128			
190	203	305	504	759	1186	1943	2775	4308	5436	6554	9633			
200	214	321	530	799	1248	2045	2920	4534	5721	6897	10137			
210	225	337	557	839	1310	2147	3066	4760	6006	7240	10642			
220	235	353	583	879	1373	2249	3211	4985	6291	7584	11146			
230	246	369	609	919	1435	2350	3357	5211	6576	7927	11651			
240	257	385	636	958	1497	2452	3502	5437	6860	8270	12155			
250	267	401	662	998	1559	2554	3647	5662	7145	8614	12660			
260	278	417	689	1038	1621	2656	3793	5888	7430	8957	13164			
270	289	433	715	1078	1683	2758								
280	299	449	741	1117	1745	2859								
290	310	466	768	1157	1808	2961								
300	321	482	794	1197	1870	3063								
310	332	498	821	1237	1932	3165								
320	342	514	847	1277	1994	3267								
330	353	530	874	1316	2056	3369								
340	364	546	900	1356	2118	3470								
350	374	562	926	1396	2181	3572								
370	396	594	979	1476	2305	3776								
390	417	626	1032	1555	2429	3979								
410	438	658	1085	1635	2553	4183								
425	454	682	1124	1695	2647	4336								

General Notes:

1. Capacities at 2.0 Barg set pressure and below are based on 0.2 Bar overpressure.
2. For sizing purposes the effective coefficient of discharge, K_d for air, gas, and steam is 0.954 when sizing using the API effective areas. When sizing using the ASME actual areas, the certified coefficient of discharge K for air, gas, and steam service is 0.859.

Air Capacities – 3800 Series: 10% Overpressure, Full Port

ASME Pressure Vessel Code (UV) – Capacities in Standard Cubic Meters Per Minute at 15.6°C – Metric Units

Set Pressure (barg)	Orifice Letter Designation & Areas, Sq. mm						
Areas	A	#1	#2	#3	#4	#6	#8
Actual	464	1140	1905	4261	7419	16819	29458
1	9.6	23.6	39.5	88.4	154	349	611
2	13.9	34.3	57.3	128	223	506	887
3	18.7	45.9	76.8	171	299	678	1188
4	23.4	57.7	96.4	215	375	851	1491
5	28.2	69.4	116	259	452	1024	1794
6	33.0	81.1	135	303	528	1197	2097
7	37.8	92.9	155	347	604	1370	2400
8	42.0	104	174	391	681	1543	2704
9	47.3	116	194	435	757	1717	3007
10	52.1	128	214	478	833	1890	3310
12	61.6	151	253	566	986	2236	3916
14	71.2	175	292	654	1139	2582	4522
16	80.7	198	331	741	1291	2928	5129
18	90.3	221	370	829	1444	3274	5735
20	99.8	245	410	917	1597	3620	6341
22	109	268	449	1005	1749	3966	6947
24	118	292	488	1092	1902	4313	7554
26	128	315	527	1180	2055	4659	8160
28	138	339	566	1268	2207	5005	8766
30	147	362	606	1355	2360	5351	9372
32	157	386	645	1443	2513	5697	9979
34	166	409	684	1531	2666	6043	10585
36	176	433	723	1618	2818	6389	11191
38	185	456	763	1706	2971	6736	11797
40	195	480	802	1794	3124	7082	12404
42	204	503	841	1882	3276	7428	13010
44	214	526	880	1969	3429	7774	13616
46	223	550	919	2057	3582	8120	14222
48	233	573	959	2145	3734	8466	14829
50	243	597	998	2232	3887	8812	15435
60	290	714	1194	2671	4651	10543	18466
70	338	831	1390	3109	5414	12274	21497
80	386	949	1586	3548	6177	14005	24529
90	433	1066	1782	3986	6941	15735	27560
100	481	1183	1978	4425	7704	17466	30591
110	529	1301	2174	4863	8468		
120	577	1418	2370	5302	9231		
130	624	1535	2566	5740	9995		
140	672	1653	2762	6179	10758		
150	720	1770	2958	6617	11522		
160	768	1887	3154	7056	12285		
170	815	2005	3350	7494	13049		
180	863	2122	3546	7933	13812		
190	911	2239	3742	8371	14575		
200	959	2356	3938	8810	15339		
210	1006	2474	4134	9248	16102		
220	1054	2591	4330	9687	16866		
230	1102	2708	4527	10125	17629		
240	1149	2826	4723	10564	18393		
250	1197	2943	4919	11002	19156		
260	1245	3060	5115	11441	19920		
270	1293	3178	5311				
280	1340	3295	5507				
290	1388	3412	5703				
300	1436	3529	5899				
310	1484	3647	6095				
320	1531	3764	6291				
330	1579	3881	6487				
340	1627	3999	6683				
350	1675	4116	6879				
370	1770	4351	7271				
390	1865	4585	7663				
410	1961	4820	8055				
425	2033	4996	8349				

General Notes:
1. Capacities at 2.0 Barg set pressure and below are based on 0.2 Bar overpressure.
2. For sizing purposes the coefficient of discharge, K_d for air, gas, and steam is 0.801.

Steam Capacities – 3800 Series: 10% Overpressure, API

ASME Pressure Vessel Code (UV) – Capacities in Kilograms Per Hour at Saturation Temperature – Metric Units

Set Pressure (barg)	Orifice Letter Designation & Areas, Sq. mm													
Areas	D	E	F	G	H	J	K	L	M	N	P	Q	R	T
API	71	126	198	325	506	830	1186	1841	2323	2800	4116	7129	10323	16774
Actual	97	145	239	361	563	923	1317	2045	2581	3111	4572	7916	11471	18671
1	96	145	239	361	564	924	1319	2049	2585	3117	4581	7931	11493	18707
2	140	210	347	524	818	1340	1914	2972	3750	4521	6645	11505	16671	27135
3	184	276	455	686	1072	1757	2509	3895	4915	5925	8709	15078	21849	35564
4	228	342	563	849	1327	2173	3104	4818	6080	7330	10773	18652	27028	43993
5	271	407	672	1012	1581	2590	3698	5742	7245	8734	12837	22225	32206	52421
6	315	473	780	1175	1835	3006	4293	6665	8410	10138	14901	25799	37384	60850
7	359	538	888	1338	2089	3423	4888	7588	9575	11543	16965	29372	42563	69278
8	402	604	996	1500	2344	3839	5483	8511	10740	12947	19029	32946	47741	77707
9	446	669	1104	1663	2598	4256	6077	9435	11905	14351	21093	36519	52919	86135
10	490	735	1212	1826	2852	4672	6672	10358	13070	15756	23157	40093	58097	94564
12	577	866	1428	2152	3361	5505	7861	12204	15400	18565	27285	47240	68454	111421
14	664	997	1644	2477	3869	6338	9051	14051	17730	21373	31413	54387	78811	128278
16	752	1128	1860	2803	4378	7171	10240	15897	20060	24182	35541	61534	89167	145135
18	839	1259	2076	3129	4886	8004	11430	17744	22390	26991	39669	68681	99524	161992
20	927	1390	2292	3454	5395	8837	12619	19590	24720	29800	43797	75828	109880	178849
22	1014	1521	2508	3780	5903	9670	13809	21437	27050	32608	47925	82975	120237	195706
24	1101	1652	2724	4105	6412	10503	14998	23283	29379	35417	52053	90123	130593	212564
26	1189	1783	2941	4431	6920	11336	16187	25130	31709	38226	56182	97270	140950	229421
28	1276	1914	3157	4757	7429	12169	17377	26976	34039	41035	60310	104417	151307	246278
30	1363	2045	3373	5082	7937	13002	18566	28823	36369	43843	64438	111564	161663	263135
32	1451	2176	3589	5408	8446	13835	19756	30669	38699	46652	68566	118711	172020	279992
36	1625	2438	4021	6059	9463	15501	22135	34362	43359	52269	76822	133005	192733	313706
40	1800	2701	4453	6710	10480	17166	24513	38055	48019	57887	85078	147299	213446	347420
44	1975	2963	4886	7361	11497	18832	26892	41748	52679	63504	93334	161593	234159	381134
48	2150	3225	5318	8013	12514	20498	29271	45441	57339	69122	101590	175888	254872	414849

Steam Capacities – 3800 Series: 10% Overpressure, Full Port

ASME Pressure Vessel Code (UV) – Capacities in Kilograms Per Hour at Saturation Temperature – Metric Units

Set Pressure (barg)	Orifice Letter Designation & Areas, Sq. mm						
Areas	A	#1	#2	#3	#4	#6	#8
Actual	464	1140	1905	4261	7419	16819	29458
1	433	1065	1779	3981	6931	15714	27522
2	628	1544	2581	5775	10055	22794	39922
3	823	2024	3383	7568	13178	29874	52323
4	1019	2504	4185	9362	16301	36954	64723
5	1214	2984	4987	11156	19424	44034	77123
6	1409	3464	5789	12950	22547	51114	89523
7	1604	3944	6591	14743	25670	58194	101924
8	1800	4424	7393	16537	28793	65274	114324
9	1995	4904	8195	18331	31917	72354	126724
10	2190	5383	8997	20125	35040	79434	139124
12	2581	6343	10601	23712	41286	93594	163925
14	2971	7303	12205	27300	47532	107754	188725
16	3362	8263	13809	30887	53778	121914	213526
18	3752	9223	15413	34475	60025	136074	238326
20	4143	10182	17017	38062	66271	150234	263126
22	4533	11142	18621	41650	72517	164394	287927
24	4924	12102	20225	45237	78764	178554	312727
26	5314	13062	21829	48825	85010	192714	337528
28	5705	14021	23433	52413	91256	206874	362328
30	6096	14981	25037	56000	97502	221034	387129
32	6486	15941	26640	59588	103749	235194	411929
36	7267	17860	29848	66763	116241	263515	461530
40	8048	19780	33056	73938	128734	291835	511131
44	8829	21699	36264	81113	141226	320155	560732
48	9610	23619	39472	88288	153719	348475	610333

General Notes:

1. Capacities at 2.0 Barg set pressure and below are based on 0.2 Bar overpressure.
2. For sizing purposes the effective coefficient of discharge, K_d for air, gas, and steam is 0.954 when sizing using the API effective areas. When sizing using the ASME actual areas, the certified coefficient of discharge K for air, gas, and steam service is 0.859.
3. For full port sizing purposes the coefficient of discharge, K for air, gas, and steam is 0.801.

Water Capacities – 3800 Series: 10% Overpressure, API

ASME Pressure Vessel Code (UV) – Capacities in Liters Per Minute at 21°C – Metric Units

Set Pressure (barg)	Orifice Letter Designation & Areas, Sq. mm													
Areas	**D**	**E**	**F**	**G**	**H**	**J**	**K**	**L**	**M**	**N**	**P**	**Q**	**R**	**T**
API	**71**	**126**	**198**	**325**	**506**	**830**	**1186**	**1841**	**2323**	**2800**	**4116**	**7129**	**10323**	**16774**
Actual	**97**	**145**	**239**	**361**	**563**	**923**	**1317**	**2045**	**2581**	**3111**	**4572**	**7916**	**11471**	**18671**
1	70.6	105	174	263	410	673	961	1492	1882	2269	3335	5775	8368	13621
2	95.4	143	236	355	555	910	1299	2017	2546	3069	4510	7809	11317	18420
3	116	175	288	435	679	1113	1589	2467	3113	3753	5516	9550	13839	22526
4	134	202	333	502	784	1285	1835	2849	3595	4333	6369	11028	15980	26011
5	150	226	372	561	877	1436	2051	3185	4019	4845	7121	12329	17866	29081
6	165	247	408	615	960	1574	2247	3489	4403	5308	7801	13506	19572	31856
7	178	267	441	664	1037	1700	2427	3769	4755	5733	8426	14588	21140	34409
8	190	285	471	710	1109	1817	2595	4029	5084	6129	9008	15596	22599	36785
9	202	303	500	753	1176	1927	2753	4273	5392	6500	9554	16542	23970	39016
10	213	319	527	794	1240	2032	2901	4504	5684	6852	10071	17437	25267	41127
12	233	350	577	870	1359	2226	3178	4934	6227	7506	11032	19101	27679	45052
14	252	378	623	939	1467	2404	3433	5330	6725	8108	11916	20631	29896	48662
16	269	404	666	1004	1569	2570	3670	5698	7190	8667	12739	22056	31961	52022
18	285	428	707	1065	1664	2726	3893	6044	7626	9193	13512	23394	33899	55177
20	301	452	745	1123	1754	2873	4103	6370	8039	9691	14243	24659	35733	58162
22	316	474	782	1178	1840	3014	4304	6681	8431	10164	14938	25863	37477	61001
24	330	495	816	1230	1921	3148	4495	6979	8806	10616	15602	27013	39144	63713
26	343	515	850	1280	2000	3276	4679	7263	9165	11049	16239	28116	40742	66315
28	356	535	882	1329	2075	3400	4855	7538	9511	11466	16852	29177	42280	68818
30	369	553	913	1375	2148	3519	5026	7802	9845	11869	17444	30201	43764	71234
32	381	571	943	1421	2219	3635	5191	8058	10168	12258	18016	31192	45199	73570
34	393	589	972	1464	2287	3747	5350	8306	10481	12635	18570	32152	46590	75834
36	404	606	1000	1507	2353	3855	5506	8547	10785	13001	19109	33084	47941	78033
38	415	623	1027	1548	2418	3961	5656	8781	11081	13358	19632	33991	49255	80171
40	426	639	1054	1588	2481	4064	5803	9009	11368	13705	20142	34874	50534	82254
42	436	655	1080	1628	2542	4164	5947	9232	11649	14043	20640	35735	51782	84285
44	447	670	1105	1666	2602	4262	6087	9449	11923	14374	21126	36576	53001	86268
46	457	685	1130	1703	2660	4358	6223	9662	12191	14697	21600	37398	54192	88207
48	467	700	1155	1740	2718	4452	6357	9869	12454	15013	22065	38202	55358	90104
50	476	714	1178	1776	2774	4544	6488	10073	12710	15322	22520	38990	56499	91963
60	522	783	1291	1945	3038	4977	7108	11034	13924	16785	24669	42711	61892	100740
70	563	845	1394	2101	3282	5376	7677	11918	15039	18130	26646	46134	66851	108812
80	602	904	1491	2246	3509	5747	8207	12741	16078	19382	28486	49319	71467	116325
90	639	959	1581	2383	3721	6096	8705	13514	17053	20557	30214	52311	75802	123381
100	674	1011	1667	2512	3923	6426	9176	14245	17975	21669	31848	55140	79902	130055
110	706	1060	1748	2634	4114	6740	9624	14941	18853	22727	33403			
120	738	1107	1826	2751	4297	7039	10052	15605	19691	23738	34888			
130	768	1152	1900	2864	4473	7327	10463	16242	20495	24707	36313			
140	797	1196	1972	2972	4642	7603	10857	16855	21269	25640	37683			
150	825	1238	2041	3076	4804	7870	11239	17447	22015	26540	39006			
160	852	1279	2108	3177	4962	8128	11607	18019	22737	27410	40285			
170	878	1318	2173	3275	5115	8378	11964	18574	23437	28254	41525			
180	904	1356	2236	3370	5263	8621	12311	19112	24117	29073	42729			
190	929	1393	2298	3462	5407	8858	12649	19636	24778	29869	43900			
200	953	1429	2357	3552	5548	9088	12977	20146	25421	30645	45040			
210	976	1465	2416	3640	5685	9312	13298	20644	26049	31402	46153			
220	999	1499	2472	3726	5819	9531	13611	21130	26662	32141	47239			
230	1022	1533	2528	3809	5949	9746	13917	21604	27261	32864	48300			
240	1044	1566	2582	3891	6077	9955	14216	22069	27848	33570	49339			
250	1065	1598	2636	3972	6203	10160	14509	22524	28422	34263	50357			
260	1086	1630	2688	4050	6326	10362	14796	22970	28985	34941	51354			
270	1107	1661	2739	4127	6446	10559								
280	1127	1691	2789	4203	6564	10753								
290	1147	1721	2839	4277	6681	10943								
300	1167	1751	2887	4351	6795	11130								
310	1186	1780	2935	4423	6907	11314								
320	1205	1808	2982	4493	7018	11495								
330	1224	1836	3028	4563	7126	11674								
340	1242	1864	3074	4632	7234	11849								
350	1261	1891	3119	4699	7339	12022								
370	1296	1944	3207	4832	7546	12361								
390	1331	1996	3292	4961	7747	12691								
410	1364	2047	3375	5086	7943	13012								
425	1389	2084	3437	5178	8087	13248								

General Notes:

1. Capacities at 2.0 Barg set pressure and below are based on 0.2 Bar overpressure.
2. For sizing purposes the effective coefficient of discharge, K_d for liquids is 0.869 when sizing using the API effective areas. When sizing using the ASME actual areas, the certified coefficient of discharge K for water is 0.782.

Optional Accessories

A full line of accessories is available to meet your service requirements.

Dual Pilot Controls

Auxiliary Filters

Manual Depressurizing

Dual Pilot Controls

The dual pilot arrangement permits switching from an active control to a back-up control, ensuring uninterrupted pressure relief protection. The original, active control can be removed from the main valve for checking or maintenance purposes.

The spare pilot can be in place during operation or be installed just prior to switch over. When the pilot controls are subjected to corrosive service that can require more frequent maintenance cycles, this option maximizes in-service time of the PORV and increases the integrity level of the valve. Select Option #2 from page 5.

Auxiliary Filters

All pilot controls are manufactured with an internal filter that reduces particles in the process stream, as these particles can impede the operation of the pilot valve. For services where particulates are present in the process media, additional filtration may be required. Auxiliary filters for the pilot valve sensing line are available to complement the internal filter. This filter is mounted upstream to the pilot's internal filter, reducing the amount of particles that can enter the pilot. As our pilot valves are non-flowing, the life cycle of the filter is dependent on the valve size, particle size and the valve usage. Select Option #3 from page 5.

Manual or Remote Depressurizing

Pilot operated relief valves potentially need an option to manually or remotely depressurize before the normal overpressure settings have been reached. In addition, this option allows for testing the main valve function without cycling the pilot control. It also allows for the pilot valve, in conjunction with other valves, to provide emergency reduction of system pressure due to potential safety situations. The main valve can be cycled to the open position by venting the pressure in the dome above the piston. A manual valve option will mount directly on the main valve, which allows for manual depressurizing of the dome. Alternately, a solenoid valve will cycle the main valve remotely. Neither the manual nor remote blow down system will interfere with the normal overpressure protection provided by the main valve and pilot. Select Options #4 or #8 from page 5.

Remote Depressurizing

Field Test Connection

Field Test Connection with Indicator

Reverse Flow Preventer

Field Test Connection or Field Test Connection with Indicator

With the addition of a field test connection, the set pressure of Farris pilot operated relief valves can be verified without interrupting system protection and does not require overpressure of the system. An auxiliary source of pressure, such as a nitrogen bottle, is connected to the pilot sensing line through a stop valve. Increasing pressure is applied thru the field test connection to the pilot control, simulating the increase in system pressure. A check valve restricts the source pressure from back flowing into the main valve inlet. When the applied pressure reaches set point, the pilot control reacts as if it were sensing overpressure via the main valve sensing line. When this occurs, the auxiliary pressure reading can be compared to the nameplate value to verify set pressure. For snap acting valves, both the pilot and main valves will cycle at set pressure. For modulating valves, the modulating controls will crack slightly depending on current system pressure, the main valve may briefly cycle. To more accurately establish the modulating pilot relief valve's set pressure, a field test connection with indicator is recommended.

The field test connection with indicator provides positive verification that set pressure has been reached. The set pressure for the current modulating relief valves is defined as the point when dome pressure is reduced to 70% of set pressure. The field test indicator is activated when the applied pressure reaches the valve's set point and at this time, can be compared to nameplate value. Select Option #5 or F from page 5.

Reverse Flow Preventer

Reverse flow in a pilot relief valve can occur in systems where back pressure exceeds system pressure or where a vacuum can form at the inlet. In both cases a reverse differential pressure exists and it is possible for the main valve to open and allow flow from the discharge system to enter the inlet side.

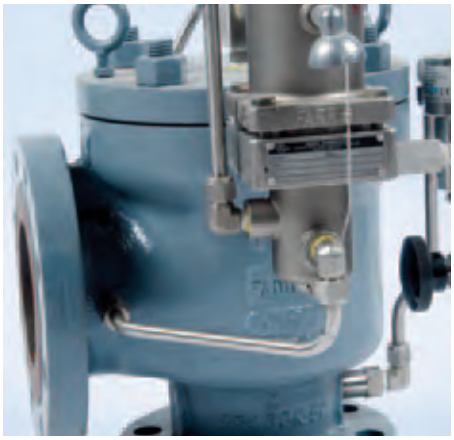
A reverse flow preventer assures that the correct pressure differential is maintained and the main valve remains closed. A reverse flow preventer introduces outlet pressure into the dome of the main valve, keeping the piston firmly seated onto the nozzle, overcoming the effect of a reverse differential. This option also prevents reverse flow thru the pilot control via the pilot sense line into the upstream side of the system. Select Option #6 from page 5.

Remote Sensing (no photo)

One of the causes of excessive chatter in a PRV is significant pressure losses on the inlet side during a relief episode. Recommended practice is to limit the non-recoverable (friction) losses to less than 3% of set pressure. When this cannot be accomplished with piping design changes, a pilot operated relief valve equipped with a remote sense line can mitigate this issue. This arrangement allows connecting the pilot sensing line at a location close to the equipment being protected, yet not affected by the inlet pipe pressure drop, thereby avoiding chatter, damage and unstable relieving flow. Select Option R from page 5.

Optional Accessories, continued

Pressure Spike Snubbers



Discharge to Outlet

Valve Lift Indicator

Pressure Spike Snubbers

Rapid pressure spikes often occur in systems with positive displacement pumps or compressors. When these pressure spikes approach or exceed the set pressure of the valve, the pilot control may actuate and cause a valve to open prematurely. A pressure spike snubber installed in the pilot valve sensing line will eliminate the negative effects of pressure pulsation. It assures that the pilot valve is sensing and reacting to mean pressure and not to instantaneous pressure spikes. Select Option #7 from page 5.

Discharge to Outlet

In order for a pilot operated relief valve to open, the system pressure retained in the main valve dome needs to be released. This small volume of process fluid in the dome is typically released to the atmosphere via the pilot control discharge port. This is true whether it is a snap-acting or a modulating pilot control.

Normally, the end user can accept this small amount of product loss and fugitive emissions when the process fluid is gaseous. However, if the process fluid is a liquid, flammable, or possibly hazardous, then the release to atmosphere may need to be minimized and/or eliminated.

The conventional solution is to pipe the discharge of the pilot control to a safe location or atmospheric collection system. This is not always possible or practical. In these cases, piping the modulating pilot control discharge directly to the main valve outlet is the solution. The design of the modulating pilot control features a balanced relief chamber that neutralizes the effects of back pressure to set pressure similar to that of a bellows-style spring loaded valve. Therefore the discharge for a modulating pilot control can be piped directly to the main valve outlet and is recommended for liquid applications.

This option is only available with the modulating pilot control and must be specified at the time of order. Select Option V from page 5.

Valve Lift Indicator

A valve lift indicator allows the operator to know when the pilot operated relief valve has opened. This auxiliary option consists of a differential pressure switch as the indicator. The switch is mounted to the dome of the main valve. When the dome pressure is reduced sufficiently so that the main valve opens, the switch is actuated, allowing a signal to be sent to a remote location. In order to supply this option, please be prepared to supply information regarding the electrical source, switch contact style, and switch rating, enclosure and hazard rating. This option will be designated under SP – special construction.

Optional Accessory Availability Table

	Snap Acting Control All Services	Modulating Control	
		Air, Gas, Vapor and Liquid	Steam
Dual Pilots	●	●	
Auxillary Filter	●	●	●
Manual Depressurizing	●	●	●
Remote Depressurizing[2]	●	●	●
Field Test Connection[3]	●	●	●
Field Test Connection w/Indicator		●	●
Reverse Flow Preventor	●	●	●
Pressure Spike Snubber	●	●	
Remote Sensing	●	●	●
Valve Lift Indicator[4]	●	●	●
Discharge to Outlet[5]		●	●

General Notes:
1. Materials of construction for the accessories will remain consistent with the main valve and pilot control constructions. Please consult factory for details.
2. Customer will need to provide supplemental information to specify this option.
3. Field test connection with indicator is the recommended option for modulating pilot control applications.
4. Complete details regarding electrical source, switch contact style, switch rating, enclosure and hazard rating must be provided by customer.
5. This option is recommended for modulating controls when process fluid is a liquid, flammable, or possibly hazardous.

Sizing Information

The following equations are presented in U.S. customary units.
For metric equivalents please consult our sizing software, SizeMaster at **www.sizemaster.com**

General Equations

Before beginning any calculations, it is necessary to establish the general category of the pressure relief valve to be used. This section covers pilot operated relief valves.

Given the rate of fluid flow to be relieved, the usual procedure is to first calculate the minimum area required in the valve orifice for the conditions contained in one of the following equations. In the case of steam, air or water, the selection of an orifice may be made directly from the capacity tables.

The second step is to select the specific type of valve that meets the pressure and temperature requirements.

General equations are given first, to identify the basic terms that correlate with ASME Pressure Vessel Code, Section VIII.

Since these equations are conservative, it is recommended that computations of relieving loads avoid cascading of safety factors or multiple contingencies beyond the reasonable flow needed to protect the pressure vessel.

Orifice Area Calculations	Constant Back Pressure
VAPORS or GASES – Lbs./hr.: $A = \frac{W\sqrt{T}\sqrt{Z}}{C K_d P \sqrt{M} K_b}$	K_b = 1 when back pressure is below 55% of abs. relieving pressure.
VAPORS or GASES – S.C.F.M.: $A = \frac{V\sqrt{G}\sqrt{T}\sqrt{Z}}{1.175\, C K_d P K_b}$	K_b = 1 when back pressure is below 55% of abs. relieving pressure.
STEAM – Lbs./hr.: $A = \frac{W_s}{51.5 K_d P K_b K_{sh} K_n}$	K_b = 1 when back pressure is below 55% of abs. relieving pressure. K_{sh} = 1 for Sat. Steam
AIR – S.C.F.M.: $A = \frac{V_a\sqrt{T}}{418 K_d P K_b}$	K_b = 1 when back pressure is below 55% of abs. relieving pressure.
LIQUIDS – 3800L Series, G.P.M., ASME Code: $A = \frac{V_L\sqrt{G}}{38.0 K_d\sqrt{\Delta P} K_u}$	K_u = 1 at normal viscosities

Nomenclature

A = Required orifice area in square inches. This value may be compared with the API effective areas included in this catalog and defined in ANSI/API Standard 526 or the ASME actual area.

W = Required vapor capacity in pounds per hour.

W_s = Required steam capacity in pounds per hour.

V = Required gas capacity in SCFM.

V_L = Required liquid capacity in U.S. gallons per minute.

G = Specific gravity of gas (air = 1) or specific gravity of liquid (water = 1) at actual discharge temperature.

M = Average molecular weight of vapor.

P = Relieving pressure in psia = set pressure + over pressure + 14.7 Minimum overpressure is 10% or 3 psi, whichever is greater.

P_1 = Set pressure at inlet, psig.

P_2 = Back pressure at outlet, psig.

ΔP = Set pressure + overpressure, psig – back pressure, psig. At 10% overpressure $\Delta P = 1.1P_1 - P_2$. Below 30 psig set, $\Delta P = P_1 + 3 - P_2$.

T = Inlet temperature absolute (°F+460).

Z = Compressibility factor corresponding to T and P (if this factor is not available, compressibility correction can be safely ignored by using a value of Z = 1.0).

C = Gas or vapor flow constant.

k = Ratio of specific heats, C_p/C_v. This value is constant for an ideal gas. If this ratio is unknown, the value k = 1.001, C = 315 will result in a safe valve size. Isentropic coefficient n maybe used instead of k.

K_b = Vapor or gas flow correction factor for back pressures above critical pressure. See curve.

K_u = Liquid viscosity correction factor.

K_{sh} = Steam superheat correction factor. $K_{sh} = 1$ for saturated steam.

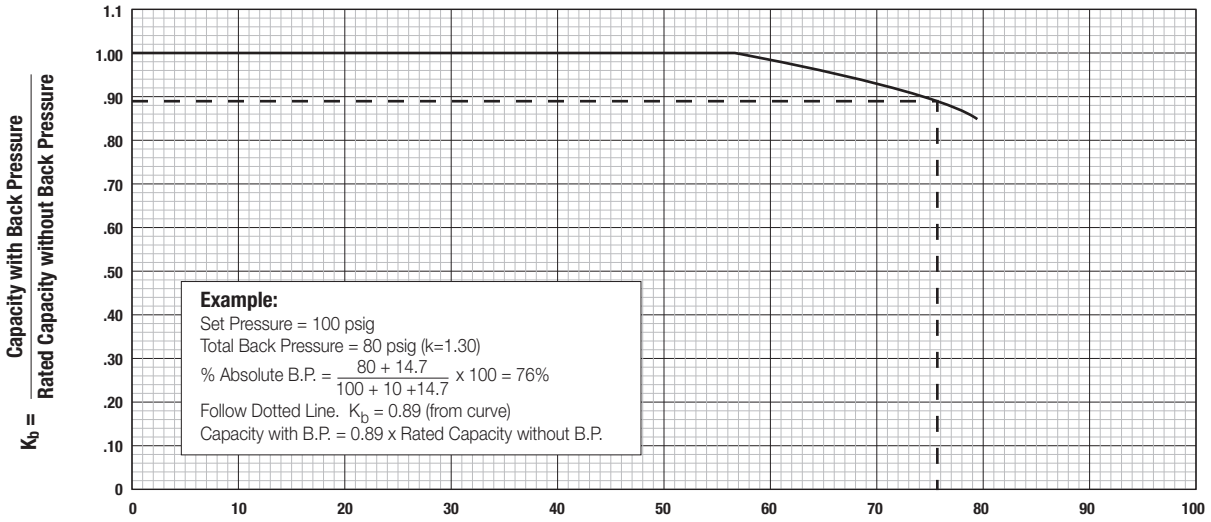
K_n = Napier steam correction factor for set pressures between 1500 and 2900 psig.

K_d = Coefficient of Discharge, where:

Service Fluid	K_d when sizing using	
	API Effective Areas	ASME Actual Areas
Air, Steam, Vapor & Gas (API nozzles)	0.954	0.859
Liquid (API nozzles)	0.869	0.782
Air, Steam, Vapor & Gas (Full Port nozzles)	n/a	0.801

Sizing Factors for Vapors and Gases

Back Pressure Sizing Factor K_b

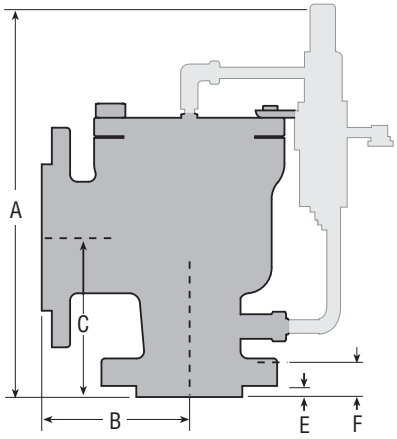


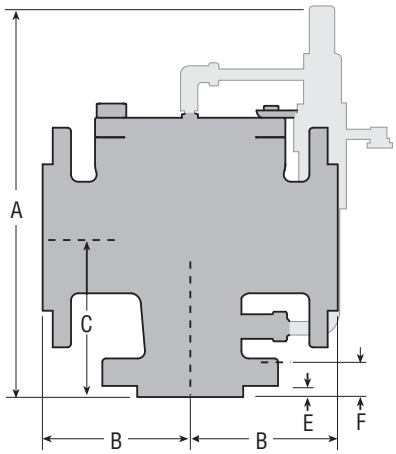
$$\% \text{ Absolute Back Pressure} = \frac{\text{Back Pressure, psia}}{\text{Set Pressure + Over Pressure, psia}} \text{ X } 100$$

Superheat Steam Correction Factor

Set Pressure psig	Saturated Steam Temp. °F	Total Temperature in Degrees Fahrenheit												
		280	300	320	340	360	380	400	420	440	460	480	500	520
15	250	1.00	1.00	1.00	.99	.99	.98	.98	.97	.96	.95	.94	.93	.92
20	259	1.00	1.00	1.00	.99	.99	.98	.98	.97	.96	.95	.94	.93	.92
40	287		1.00	1.00	1.00	.99	.99	.98	.97	.96	.95	.94	.93	.92
60	308			1.00	1.00	.99	.99	.98	.97	.96	.95	.94	.93	.92
80	324				1.00	1.00	.99	.99	.98	.97	.96	.94	.93	.92
100	338					1.00	1.00	.99	.98	.97	.96	.95	.94	.93
120	350					1.00	1.00	.99	.98	.97	.96	.95	.94	.93
140	361						1.00	1.00	.99	.98	.96	.95	.94	.93
160	371						1.00	1.00	.99	.98	.97	.95	.94	.93
180	380							1.00	.99	.98	.97	.96	.95	.93
200	388							1.00	.99	.99	.97	.96	.95	.93
220	395							1.00	1.00	.99	.98	.96	.95	.94
240	403								1.00	.99	.98	.97	.95	.94
260	409								1.00	.99	.98	.97	.96	.94
280	416								1.00	1.00	.99	.97	.96	.95
300	422									1.00	.99	.98	.96	.95
350	436									1.00	1.00	.99	.97	.96
400	448										1.00	.99	.98	.96
450	460											1.00	.99	.97
500	470											1.00	.99	.98
550	480												1.00	.99
600	489												1.00	.99
650	497													1.00
700	506													1.00

Dimensions & Weights: API Nozzle Design





API Nozzle Design

Valve Size Inlet x Outlet	Type Number	ANSI Flange Class		Dimensions, Inches					Approx. Wt. Lbs.	Dimensions, mm					Approx. Wt. Kg.
		Inlet RF	Outlet RF	A	B	C	E	F[4]		A	B	C	E	F[4]	
1 x 2	38 (D, E, F) C10	150#		12-5/8	4-1/2	4-1/8	1/16	11/16	35	321	115	105	2	18	16
	38 (D, E ,F) C12	300#	150#	12-7/8	4-1/2	4-3/8	1/4	15/16	36	328	115	112	7	24	17
	38 (D, E, F) C13	600#		12-7/8	4-1/2	4-3/8	1/4	15/16	36	328	115	112	7	24	17
	38 (D, E, F) C14	900#		13 3/8	4-3/4	4-15/16	1/4	1-7/16	49	340	121	126	7	37	23
	38 (D, E, F) C15	1500#	300#	13 3/8	4-3/4	4-15/16	1/4	1-7/16	49	340	121	126	7	37	23
	38 (D, E, F) C16	2500#		13-1/2	4-3/4	4-15/16	1/4	1-11/16	55	343	121	126	7	43	25
1 x 2	38GC10U	150#		12-5/8	4-1/2	4-1/8	1/16	11/16	35	321	115	105	2	18	16
	38GC12U	300#	150#	12-7/8	4-1/2	4-3/8	1/4	15/16	36	328	115	112	7	24	17
	38GC13U	600#		12-7/8	4-1/2	4-3/8	1/4	15/16	36	328	115	112	7	24	17
	38GC14U	900#		13-3/8	4-3/4	4-15/16	1/4	1-7/16	49	340	121	126	7	37	23
	38GC15U	1500#	300#	13-3/8	4-3/4	4-15/16	1/4	1-7/16	49	340	121	126	7	37	23
	38GC16U	2500#		13-1/2	4-3/4	4-15/16	1/4	1-11/16	55	343	121	126	7	43	25
1-1/2 x 2	38 (D, E, F) C10X	150#		14	4-3/4	4-7/8	1/16	1-1/8	48	356	121	124	2	29	22
	38 (D, E, F) C12X	300#	150#	14	4-3/4	4-7/8	1/4	1-1/8	50	356	121	124	7	29	23
	38 (D, E, F) C13X	600#		14	4-3/4	4-7/8	1/4	1-1/8	50	356	121	124	7	29	23
	38 (D, E, F) C14X	900#		15	5-1/2	5 7/8	1/4	1-9/16	71	381	140	150	7	40	33
	38 (D, E, F) C15X	1500#	300#	15	5-1/2	5 7/8	1/4	1-9/16	71	381	140	150	7	40	33
	38 (D, E, F) C16X	2500#		15-1/8	5-1/2	5 7/8	1/4	2-1/8	85	385	140	150	7	54	39
1-1/2 x 2	38 (G, H) C10N	150#		14	4-3/4	4-7/8	1/16	1-1/8	48	356	121	124	2	29	22
	38 (G, H) C12N	300#	150#	14	4-3/4	4-7/8	1/4	1-1/8	50	356	121	124	7	29	23
	38 (G, H) C13N	600#		14	4-3/4	4-7/8	1/4	1-1/8	50	356	121	124	7	29	23
	38 (G, H) C14N	900#		15	5-1/2	5 7/8	1/4	1-9/16	71	381	140	150	7	40	33
	38 (G, H) C15N	1500#	300#	15	5-1/2	5 7/8	1/4	1-9/16	71	381	140	150	7	40	33
	38 (G, H) C16N	2500#		15-1/8	5-1/2	5 7/8	1/4	2-1/8	85	385	140	150	7	54	39
1-1/2 x 2	38JC10U	150#		14	4-3/4	4-7/8	1/16	1-1/8	48	356	121	124	2	29	22
	38JC12U	300#	150#	14	4-3/4	4-7/8	1/4	1-1/8	50	356	121	124	7	29	23
	38JC13U	600#		14	4-3/4	4-7/8	1/4	1-1/8	50	356	121	124	7	29	23
	38JC14U	900#		15	5-1/2	5 7/8	1/4	1-9/16	71	381	140	150	7	40	33
	38JC15U	1500#	300#	15	5-1/2	5 7/8	1/4	1-9/16	71	381	140	150	7	40	33
	38JC16U	2500#		15-1/8	5-1/2	5 7/8	1/4	2-1/8	85	385	140	150	7	54	39
1-1/2 x 3	38 (G, H) C10	150#		14	4-7/8	5-1/8	1/16	1 3/16	50	356	124	131	2	31	23
	38 (G, H) C12	300#	150#	14	4-7/8	5-1/8	1/4	1 3/16	52	356	124	131	7	31	24
	38 (G, H) C13	600#		14	4-7/8	5-1/8	1/4	1 3/16	52	356	124	131	7	31	24
	38 (G, H) C14	900#		15-1/4	6-3/4	6-3/8	1/4	1-9/16	75	388	172	162	7	40	35
	38 (G, H) C15	1500#	300#	15-1/4	6-3/4	6-3/8	1/4	1-9/16	75	388	172	162	7	40	35
	38 (G, H) C16	2500#		15-3/8	6-3/4	6-3/8	1/4	2-1/8	96	391	172	162	7	54	44
1-1/2 x 3	38JC10N	150#		14	4-7/8	5-1/8	1/16	1-3/16	50	356	124	131	2	31	23
	38JC12N	300#	150#	14	4-7/8	5-1/8	1/4	1-3/16	52	356	124	131	7	31	24
	38JC13N	600#		14	4-7/8	5-1/8	1/4	1-3/16	52	356	124	131	7	31	24
	38JC14N	900#		15-1/4	6-3/4	6-3/8	1/4	1-9/16	75	388	172	162	7	40	35
	38JC15N	1500#	300#	15-1/4	6-3/4	6-3/8	1/4	1-9/16	75	388	172	162	7	40	35
	38JC16N	2500#		15-3/8	6-3/4	6-3/8	1/4	2-1/8	96	391	172	162	7	54	44

Dimensions & Weights: API Nozzle Design continued

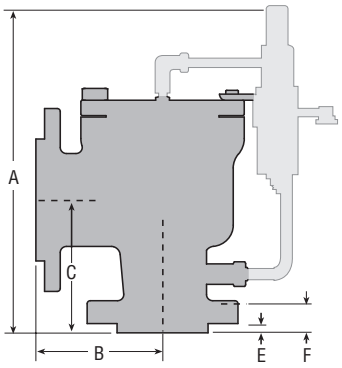
API Nozzle Design

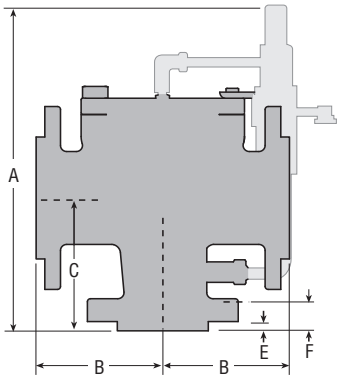
Valve Size Inlet x Outlet	Type Number	ANSI Flange Class		Dimensions, Inches					Approx. Wt. Lbs.	Dimensions, mm					Approx. Wt. Kg.
		Inlet RF	Outlet RF	A	B	C	E	F[4]		A	B	C	E	F[4]	
2 x 3	38 (G, H) C10X	150#	150#	15	4-7/8	5-3/8	1/16	1-1/4	65	381	124	137	2	32	30
	38 (G, H) C12X	300#		15	4-7/8	5-3/8	1/4	1-1/4	65	381	124	137	7	32	30
	38 (G, H) C13X	600#		15	4-7/8	5-3/8	1/4	1-1/4	65	381	124	137	7	32	30
	38 (G, H) C14X	900#	300#	16-1/8	6-3/4	6-9/16	1/4	1-7/8	102	410	172	167	7	48	47
	38 (G, H) C15X	1500#		16-1/8	6-3/4	6-9/16	1/4	1-7/8	102	410	172	167	7	48	47
	38 (G, H) C16X	2500#		16-3/4	6-3/4	7	1/4	2-3/8	130	426	172	178	7	61	59
2 x 3	38JC10	150#	150#	15	4-7/8	5-3/8	1/16	1-1/4	65	381	124	137	2	32	30
	38JC12	300#		15	4-7/8	5-3/8	1/4	1-1/4	65	381	124	137	7	32	30
	38JC13	600#		15	4-7/8	5-3/8	1/4	1-1/4	65	381	124	137	7	32	30
	38JC14	900#	300#	16-1/8	6-3/4	6-9/16	1/4	1-7/8	102	410	172	167	7	48	47
	38JC15	1500#		16-1/8	6-3/4	6-9/16	1/4	1-7/8	102	410	172	167	7	48	47
	38JC16	2500#		16-3/4	6-3/4	7	1/4	2-3/8	130	426	172	178	7	61	59
2 x 3	38KC10N	150#	150#	15	4-7/8	5-3/8	1/16	1-1/4	65	381	124	137	2	32	30
	38KC12N	300#		15	4-7/8	5-3/8	1/4	1-1/4	65	381	124	137	7	32	30
	38KC13N	600#		15	4-7/8	5-3/8	1/4	1-1/4	65	381	124	137	7	32	30
	38KC14N	900#	300#	16-1/8	6-3/4	6-9/16	1/4	1-7/8	102	410	172	167	7	48	47
	38KC15N	1500#		16-1/8	6-3/4	6-9/16	1/4	1-7/8	102	410	172	167	7	48	47
	38KC16N	2500#		16-3/4	6-3/4	7	1/4	2-3/8	130	426	172	178	7	61	59
3 x 4	38JC10X	150#	150#	17-5/8	6-3/8	6-1/8	1/16	1-1/4	135	448	162	156	2	32	62
	38JC12X	300#		17-5/8	6-3/8	6-1/8	1/16	1-1/4	140	448	162	156	2	32	64
	38JC13X	600#		17-7/8	6-3/8	6-3/8	1/4	1-1/2	140	455	162	162	7	39	64
	38JC14X	900#	300#	19-1/8	7-1/8	7-1/2	1/4	2-1/4	195	486	181	191	7	58	89
	38JC15X	1500#		19-1/8	7-1/8	7-1/2	1/4	2-1/4	204	486	181	191	7	58	93
3 x 4	38 (K, L) C10	150#	150#	17-5/8	6-3/8	6-1/8	1/16	1-1/4	135	448	162	156	2	32	62
	38 (K, L) C12	300#		17-5/8	6-3/8	6-1/8	1/16	1-1/4	140	448	162	156	2	32	64
	38 (K, L) C13	600#		17-7/8	6-3/8	6-3/8	1/4	1-1/2	140	455	162	162	7	39	64
	38 (K, L) C14	900#	300#	19-1/8	7-1/8	7-1/2	1/4	2-1/4	195	486	181	191	7	58	89
	38 (K, L) C15	1500#		19-1/8	7-1/8	7-1/2	1/4	2-1/4	204	486	181	191	7	58	93
3 x 4	38 (M, N) C10N	150#	150#	17-5/8	6-3/8	6-1/8	1/16	1-1/4	135	448	162	156	2	32	62
	38 (M, N) C12N	300#		17-5/8	6-3/8	6-1/8	1/16	1-1/4	140	448	162	156	2	32	64
	38 (M, N) C13N	600#		17-7/8	6-3/8	6-3/8	1/4	1-1/2	140	455	162	162	7	39	64
	38 (M, N) C14N	900#	300#	19-1/8	7-1/8	7-1/2	1/4	2-1/4	195	486	181	191	7	58	89
	38 (M, N) C15N	1500#		19-1/8	7-1/8	7-1/2	1/4	2-1/4	204	486	181	191	7	58	93
4 x 6	38LC10X	150#	150#	20-1/4	8-1/4	7-3/4	1/16	1-3/4	212	515	210	197	2	45	97
	38LC12X	300#		20-1/4	8-1/4	7-3/4	1/16	1-3/4	218	515	210	197	2	45	99
	38LC13X	600#		20-1/4	8-1/4	7-3/4	1/4	1-3/4	220	515	210	197	7	45	100
	38LC14X	900#	300#	22	9-3/16	9-13/16	1/4	2-1/2	320	559	234	250	7	64	146
	38LC15X	1500#		22	9-3/16	9-13/16	1/4	2-1/2	325	559	234	250	7	64	148
4 x 6	38 (M, N, P) C10	150#	150#	20-1/4	8-1/4	7-3/4	1/16	1-3/4	212	515	210	197	2	45	97
	38 (M, N, P) C12	300#		20-1/4	8-1/4	7-3/4	1/16	1-3/4	218	515	210	197	2	45	99
	38 (M, N, P) C13	600#		20-1/4	8-1/4	7-3/4	1/4	1-3/4	220	515	210	197	7	45	100
	38 (M, N, P) C14	900#	300#	22	9-3/16	9-13/16	1/4	2-1/2	320	559	234	250	7	64	146
	38 (M, N, P) C15	1500#		22	9-3/16	9-13/16	1/4	2-1/2	325	559	234	250	7	64	148
6 x 8	38 (Q, R) C10	150#	150#	24-5/8	9-1/2	9-7/16	1/16	1-7/8	465	626	242	240	2	48	211
	38 (Q, R) C12	300#		24-5/8	9-1/2	9-7/16	1/16	1-7/8	480	626	242	240	2	48	218
	38 (Q, R) C13	600#		24-7/8	9-1/2	9-11/16	1/4	2-1/8	500	632	242	247	7	54	227
6 x 8 x 8	38 (Q, R) C10D	150#	150#	24-5/8	9-1/2	9-7/16	1/16	1-7/8	504	626	242	240	2	48	229
	38 (Q, R) C12D	300#		24-5/8	9-1/2	9-7/16	1/16	1-7/8	519	626	242	240	2	48	236
	38 (Q, R) C13D	600#		24-7/8	9-1/2	9-11/16	1/4	2-1/8	539	632	242	247	7	54	245
8 x 10	38TC10	150#	150#	29	11	10-7/8	1/16	1-5/8	830	737	280	277	2	42	377
	38TC12	300#		29	11	10-7/8	1/16	1-5/8	835	737	280	277	2	42	379
	38TC13	600#		29-7/8	11	11-11/16	1/4	2-7/16	925	759	280	297	7	62	420
8 x 10 x 10	38TC10D	150#	150#	29	11	10-7/8	1/16	1-5/8	885	737	280	277	2	42	402
	38TC12D	300#		29	11	10-7/8	1/16	1-5/8	890	737	280	277	2	42	404
	38TC13D	600#		29-7/8	11	11-11/16	1/4	2-7/16	980	759	280	297	7	62	445

General Notes:

1. For liquid service valves with standard size connections (L in the type number), use the standard type number dimensions, i.e. 38HC10-120. For liquid service valves with oversize connections (Y in the type number), use the oversize type number dimensions, i.e. 38DC10X-120.
2. Valves with ring joint inlet connections available. Consult the Factory for final dimensions.
3. For modulating valves, add 2-1/2" to the A dimension.
4. F dimension meets or exceeds ANSI thickness requirement.

Dimensions & Weights: Full Port Design





Full Port Design

Valve Size Inlet x Outlet	Type Number	ANSI Flange Class		Dimensions, Inches					Approx. Wt. Lbs.	Dimensions, mm					Approx. Wt. Kg.
		Inlet RF	Outlet RF	A	B	C	E	F[4]		A	B	C	E	F[4]	
1 x 2[1]	38AC10-120	150#	150#	12-5/8	4-1/2	4-1/8	1/16	11/16	35	321	115	105	2	18	16
	38AC12-120	300#		12-7/8	4-1/2	4-3/8	1/4	15/16	36	328	115	112	7	24	17
	38AC13-120	600#		12-7/8	4-1/2	4-3/8	1/4	15/16	36	328	115	112	7	24	17
	38AC14-120	900#	300#	13-3/8	4-3/4	4-15/16	1/4	1-7/16	49	340	121	126	7	37	23
	38AC15-120	1500#		13-3/8	4-3/4	4-15/16	1/4	1-7/16	49	340	121	126	7	37	23
	38AC16-120	2500#		13-1/2	4-3/4	4-15/16	1/4	1-11/16	55	343	121	126	7	43	25
1-1/2 x 2	381C10-120	150#	150#	14	4-3/4	4-7/8	1/16	1-1/8	48	356	121	124	2	29	22
	381C12-120	300#		14	4-3/4	4-7/8	1/4	1-1/8	50	356	121	124	7	29	23
	381C13-120	600#		14	4-3/4	4-7/8	1/4	1-1/8	50	356	121	124	7	29	23
	381C14-120	900#	300#	15	5-1/2	5-7/8	1/4	1-9/16	71	381	140	150	7	40	33
	381C15-120	1500#		15	5-1/2	5-7/8	1/4	1-9/16	71	381	140	150	7	40	33
	381C16-120	2500#		15-1/8	5-1/2	5-7/8	1/4	2-1/8	85	385	140	150	7	54	39
1-1/2 x 3	381C10X-120	150#	150#	14	4-7/8	5-1/8	1/16	1-3/16	50	356	124	131	2	31	23
	381C12X-120	300#		14	4-7/8	5-1/8	1/4	1-3/16	52	356	124	131	7	31	24
	381C13X-120	600#		14	4-7/8	5-1/8	1/4	1-3/16	52	356	124	131	7	31	24
	381C14X-120	900#	300#	15-1/4	6-3/4	6-3/8	1/4	1-9/16	75	388	172	162	7	40	35
	381C15X-120	1500#		15-1/4	6-3/4	6-3/8	1/4	1-9/16	75	388	172	162	7	40	35
	381C16X-120	2500#		15-3/8	6-3/4	6-3/8	1/4	2-1/8	96	391	172	162	7	54	44
2 x 3	382C10-120	150#	150#	15	4-7/8	5-3/8	1/16	1-1/4	65	381	124	137	2	32	30
	382C12-120	300#		15	4-7/8	5-3/8	1/4	1-1/4	65	381	124	137	7	32	30
	382C13-120	600#		15	4-7/8	5-3/8	1/4	1-1/4	65	381	124	137	7	32	30
	382C14-120	900#	300#	16-1/8	6-3/4	6-9/16	1/4	1 7/8	102	410	172	167	7	48	47
	382C15-120	1500#		16-1/8	6-3/4	6-9/16	1/4	1 7/8	102	410	172	167	7	48	47
	382C16-120	2500#		16-3/4	6-3/4	7	1/4	2 3/8	130	426	172	178	7	61	59
3 x 4	383C10-120	150#	150#	17-5/8	6-3/8	6-1/8	1/16	1-1/4	135	448	162	156	2	32	62
	383C12-120	300#		17-5/8	6-3/8	6-1/8	1/16	1-1/4	140	448	162	156	2	32	64
	383C13-120	600#		17-7/8	6-3/8	6-3/8	1/4	1-1/2	140	455	162	162	7	39	64
	383C14-120	900#	300#	19-1/8	7-1/8	7-1/2	1/4	2-1/4	195	486	181	191	7	58	89
	383C15-120	1500#		19-1/8	7-1/8	7-1/2	1/4	2-1/4	204	486	181	191	7	58	93
4 x 6	384C10-120	150#	150#	20-1/4	8-1/4	7-3/4	1/16	1-3/4	212	515	210	197	2	45	97
	384C12-120	300#		20-1/4	8-1/4	7-3/4	1/16	1-3/4	218	515	210	197	2	45	99
	384C13-120	600#		20-1/4	8-1/4	7-3/4	1/4	1-3/4	220	515	210	197	7	45	100
	384C14-120	900#	300#	22	9-3/16	9-13/16	1/4	2-1/2	320	559	234	250	7	64	146
	384C15-120	1500#		22	9-3/16	9-13/16	1/4	2-1/2	325	559	234	250	7	64	148
6 x 8	386C10-120	150#	150#	24-5/8	9-1/2	9-7/16	1/16	1-7/8	465	626	242	240	2	48	211
	386C12-120	300#		24-5/8	9-1/2	9-7/16	1/16	1-7/8	480	626	242	240	2	48	218
	386C13-120	600#		24-7/8	9-1/2	9-11/16	1/4	2-1/8	500	632	242	247	7	54	227
6 x 8 x 8	386C10D-120	150#	150#	24-5/8	9-1/2	9-7/16	1/16	1-7/8	504	626	242	240	2	48	229
	386C12D-120	300#		24-5/8	9-1/2	9-7/16	1/16	1-7/8	519	626	242	240	2	48	236
	386C13D-120	600#		24 7/8	9-1/2	9-11/16	1/4	2-1/8	539	632	242	247	7	54	245
8 x 10	388C10-120	150#	150#	29	11	10-7/8	1/16	1-5/8	830	737	280	277	2	42	377
	388C12-120	300#		29	11	10-7/8	1/16	1-5/8	835	737	280	277	2	42	379
	388C13-120	600#		29-7/8	11	11-11/16	1/4	2-7/16	925	759	280	297	7	62	420
8 x 10 x 10	388C10D-120	150#	150#	29	11	10-7/8	1/16	1 5/8	885	737	280	277	2	42	402
	388C12D-120	300#		29	11	10-7/8	1/16	1 5/8	890	737	280	277	2	42	404
	388C13D-120	600#		29-7/8	11	11-11/16	1/4	2 7/16	980	759	280	297	7	62	445

General Notes:
1. A 1" x 2" valve with an "A" orifice is only available when configured with a remote sensing option.
2. Valves with ring joint inlet connections available. Consult the Factory for final dimensions.
3. For modulating valves, add 2-1/2" to the A dimension.
4. F dimension meets or exceeds ANSI thickness requirement.

Farris Engineering Products

Process Pressure Relief Valves

SERIES 2600/2600L

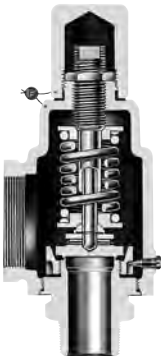
- ASME NB Certified: Air, Steam & Water
- Sizes: 1" x 2" to 20" x 24"
- Pressure Range: 15 psig to 6000 psig
- Temperature Range: -450°F to +1500°F
- Materials*: Carbon Steel, Stainless Steel, Monel & Hastelloy C
- Options: Balanced Bellows, O-Ring Seat, Open Bonnet
- CE Approved

SERIES 3800 Pilot Operated

- ASME NB Certified: Air, Steam & Water
- Sizes: 1" x 2" to 12" x 16"
- Pressure Range: 15 psig to 6170 psig
- Temperature Range: -450°F to +500°F
- Materials*: Carbon Steel, Stainless Steel, Monel & Hastelloy C
- Actuation: Snap and Modulating Controls
- Options: Field Test Connections, Reverse Flow Preventer, Remote Depressurizing & Auxiliary Filters
- CE Approved

SERIES 2700

- ASME NB Certified: Air, Steam & Water
- Sizes: ½" x 1" to 1½" x 2½"
- Pressure Range: 15 psig to 6500 psig
- Temperature Range: -450°F to +750°F
- Materials*: Carbon Steel, Stainless Steel, Monel & Hastelloy C
- Options: Balanced Design, O-Ring Seats, Flanged, Socket Weld, Welding Nipple, & Sanitary Connections
- CE Approved



SERIES 2850/2856

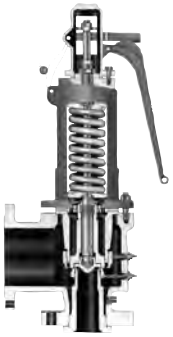
- ASME NB Certified: Air & Steam
- Sizes: ¾" x 1" to 1½" x 2" (2850) ¾" x 1¼" to 2" x 3" (2856)
- Pressure Range: 15 psig to 300 psig
- Temperature Range: -20° F to +750°F (2850) -450° F to +400°F (2856)
- Materials: Stainless Steel Body & Trim Steel Bonnet (2850) Brass Body & Trim, Bronze Bonnet (2856)

*Other materials available upon request. Please consult the factory.

Steam Safety Valves

SERIES 4200

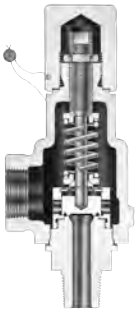
- ASME NB Section I & VIII Certified: Steam & Air
- Sizes 1¼" x 1½" to 6" x 8"
- Pressure Range: 15 psig to 1000 psig
- Temperature Range: -20°F to +1000°F
- Materials: Carbon Steel, Stainless Steel, Chrome-Moly
- Options: Test Gag
- CE Approved



SERIES 6400/6600

- ASME NB Section I & VIII Certified: Steam & Air
- Sizes: 1" x 2" to 4" x 6"
- Pressure Range: 15 psig to 1500 psig
- Temperature Range: -20°F to +1000°F
- Materials: Carbon Steel, Stainless Steel, Chrome-Moly
- Options: Closed Bonnet (6600) & Test Gag

Special Purpose Pressure Relief Valves



SERIES 1890/1896M

- ASME NB Certified: Air, Steam & Water
- Sizes: ½" x 1" & ¾" x 1" (1890) ½" x ¾" & ¾" x ¾" (1896M)
- Pressure Range: 15 psig to 800 psig (1890) 15 psig to 300 psig (1896M)
- Temperature Range: -20°F to +750°F (1890) -450°F to +400°F (1896M)
- Materials: Stainless Steel Body & Trim (1890) Brass Body & Trim, Bronze Bonnet (1896M)

Farris Engineering Products and Services

The following is a list of Farris approvals currently on record:

- ASME “V”, “UV” and “NV”
- National Board “NB” approval
- ISO 9001-2008
- US Coast Guard
- PED 97/23/EC (European Pressure Equipment Directive)
- ATEX 94/9/EC (European Potentially Explosive Atmospheres)
- B51 CRN
- China Safety Quality License
- Russian GOST-R and RTN (Russian Certification and Permits)
- First Point Assesment Limited
- Nuclear – 10 CFR 50 Appendix B, NCA-4000, NQA-1, N285.0

Process Pressure Relief Valves

Series 2600	ASME NB Certified for Air, Steam and Water
Series 3800	ASME NB Certified for Air, Steam and Water
Series 2700	ASME NB Certified for Air, Steam and Water
Series 1890/1896M	ASME NB Certified for Air, Steam and Water
Series 2850/2856	ASME NB Certified for Air and Steam
Series 88/89	ASME NB Certified for Air and Steam
Series 570	ASME NB Certified for Air and Steam
Series 69	Liquid Service
Series 140	Air Service

Steam Safety Valves

Series 4200	ASME NB Certified for Steam – Section I & VIII
Series 6400/6600	ASME NB Certified for Steam – Section I & VIII
Series 560	ASME NB Certified for Steam – Section I & VIII

Nuclear Pressure Relief Valves

Series 4700/4700L	ASME NB Section III, Division 1 Class I, II & III
Series 2700/3700	ASME NB Section III, Division 1 Class I, II & III
Series 2600/2600L	ASME NB Section III, Division 1 Class I, II & III
Series 3800	ASME NB Section III, Division 1 Class I, II & III

SizeMaster™ Mark IV

Pressure Relief Valve Engineering Software for Sizing and Selection

FAST Centers (Farris Authorized Service Team)

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- Application, Sizing & Selection Support

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