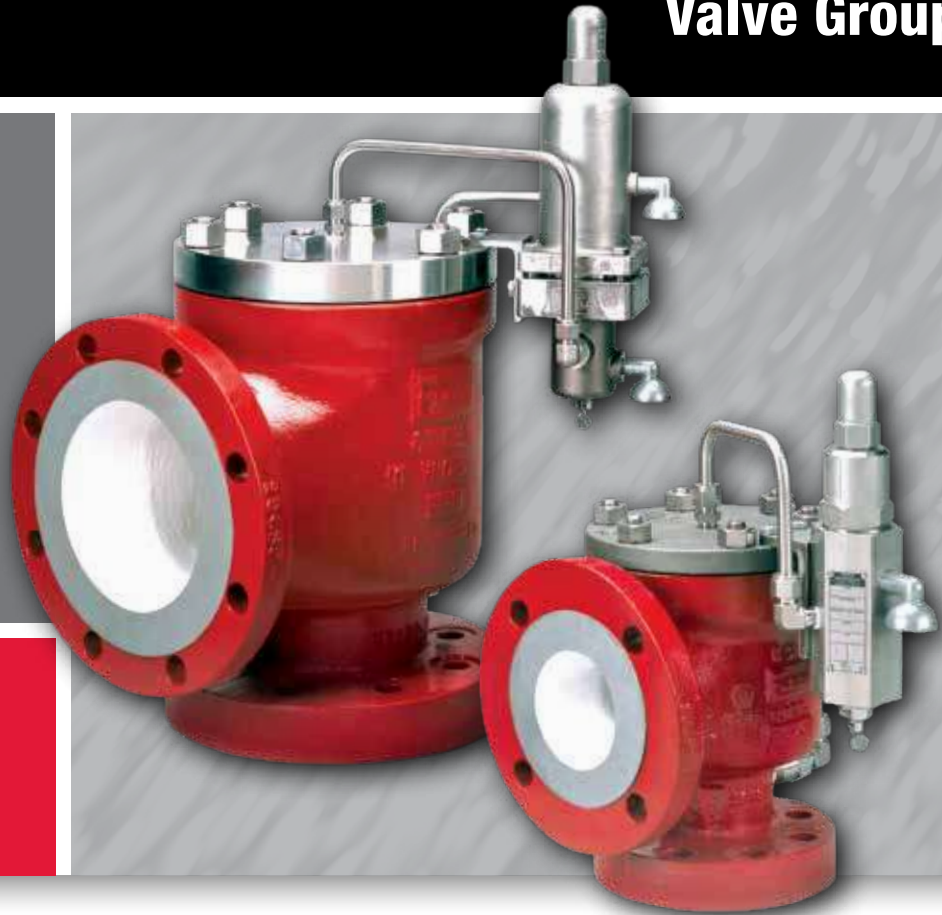


**CURTISS -
WRIGHT**

Valve Group



3800 Series

Farris Engineering
Pressure Relief Valves



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Table of Contents

Selection Table Matrix.....	1
Principles of Operation	2-3
Numbering System	4-5
Features/Bill of Materials	
Main Valve	6-7
Snap Acting Pilot Control.....	8-9
Modulating Pilot Control.....	10-11
HPCM7 Modulating Control.....	12-13
Selection Tables	
API.....	14-15
Non Standard API.....	16
Full Port.....	17
Capacity Tables – US Units	
Air Capacities: 10% Overpressure for API.....	18
Air Capacities: 10% Overpressure for Full Port.....	19
Steam Capacities: 10% Overpressure for API.....	20
Steam Capacities: 10% Overpressure for Full Port.....	20
Water Capacity: 10% Overpressure for API.....	21
Capacity Tables – Metric Units	
Air Capacities: 10% Overpressure for API.....	22
Air Capacities: 10% Overpressure for Full Port.....	23
Steam Capacities: 10% Overpressure for API.....	24
Steam Capacities: 10% Overpressure for Full Port.....	24
Water Capacity: 10% Overpressure for API.....	25
Sizing Information.....	26
Sizing Factors for Vapors and Gases.....	27
Dimensions and Weights for API Nozzle Design.....	28-29
Dimensions and Weights for Full Port Design.....	30
Optional Accessories	31-35
Conversion Factors.....	36

Piloting the Way to Precision Control

This catalog is provided to aid in the proper selection of a Farris 3800 Series.

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

3800 Series valves are available in API Orifice sizes D through T as well as full port models. Series 3800 valves offers raised face or ring joint inlet flanges from 150 through 2500 ASME classes with 150, 300 and selected 600 class outlets. Standard options support applications in pressures range from 15 to 6170 psig with temperatures of -450°F to 450°F. For higher temperature and pressure requirements, please consult the Factory.

All Series 3800 valves have non-flowing pilot controls. Standard materials of construction include a carbon steel main valve body with 316 stainless steel trim and all 316 stainless steel pilot control. The main valve is also available in optional materials in a full 316 stainless steel, NACE, Monel®, Hastelloy®, Duplex with other materials available upon request.

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

Sizing software and support is available at <http://www.cw-valvegroup.com/SizeMaster>

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.

Viton and Kalrez are registered trademarks of DuPont Performance Elastomers.
PTFE is a registered trademark of the DuPont Corporation.
Monel is a registered trademark of Inco Alloys International, Inc.
Hastelloy is a registered trademark of Haynes International, Inc.

Selection Table Matrix

3800 Series Pilot Control Application Summary			PCF5 (2)	PCL (3)	PCM (4)	PCMS (5)	HPCM (6)	HPCM (7)
Type of Actuation	Snap-Acting		✓	✓				
	Modulating				✓	✓	✓	✓
Blowdown	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	Air/Gas/Vapor		✓		✓	✓	✓	✓
	Liquid			✓	✓	✓	✓	✓
	Steam					✓		
Temp. Range °F (°C)	-50 to 500 (-45 to 260)		✓	✓	✓	✓	✓	✓
	-450 to -51 (-267 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)	-55 to 225 (-48 to 107)	✓	✓	✓	✓	✓	✓
	Aflas	-20 to 450 (-29 to 232)	✓	✓	✓	✓	✓	✓
	Kalrez	0 to 500 (-18 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:

- The main valve and pilot control soft goods selection is based on meeting the set pressure and temperature ranges shown as well as being chemically compatible with the process fluid.
- The soft goods selected should not exceed the above limits. For most applications both the operating and relieving temperatures should fall within the ranges shown. Where the sole relieving scenario is external fire, the relieving temperature may be ignored as long as the operating temperature falls within the range of the elastomer selected.
- Because of the wide variety of fluids and process conditions used in the process industry, it is the customer's responsibility to select the proper soft goods material for each specific application.

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 through 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

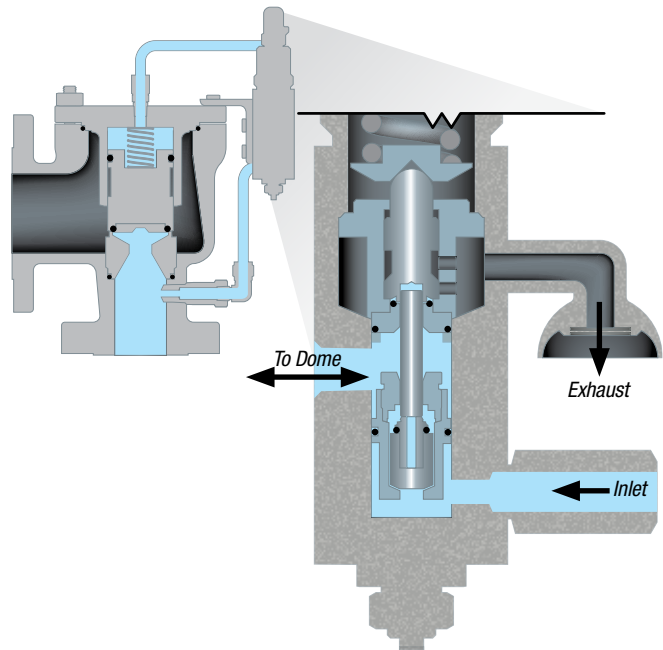
At the point where the system pressure blows down, the spring force in the pilot control overcomes the force of system pressure acting on the pilot control seat assembly, closing the upper seat and reopening the lower seat. This re-establishes flow through the pilot control, allowing system pressure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

Operating Advantages:

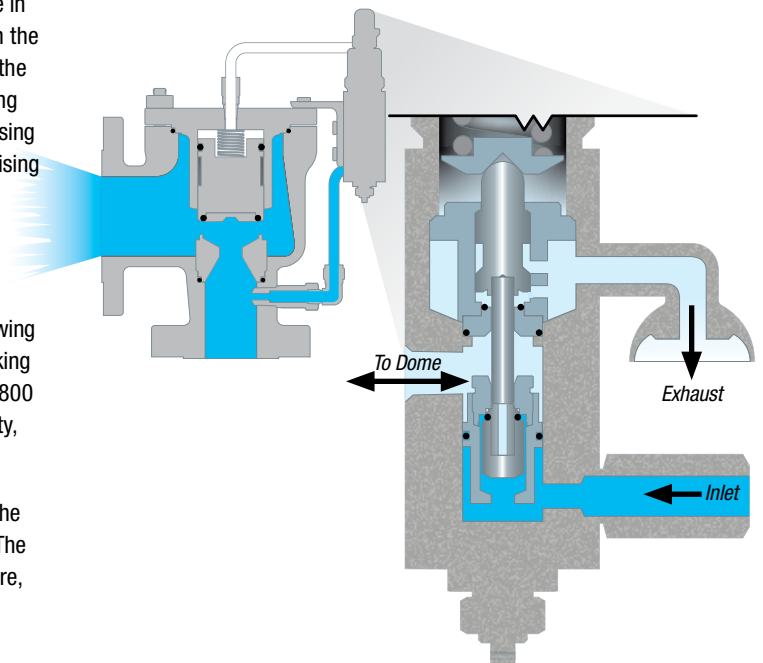
Bubble-tight closer to set pressure: Series 3800 valves operate bubble-tight at higher operating pressure to set pressure ratios, allowing operators to run very close to the system's maximum allowable working pressure. While protecting the system from overpressure, Series 3800 allows maximum product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

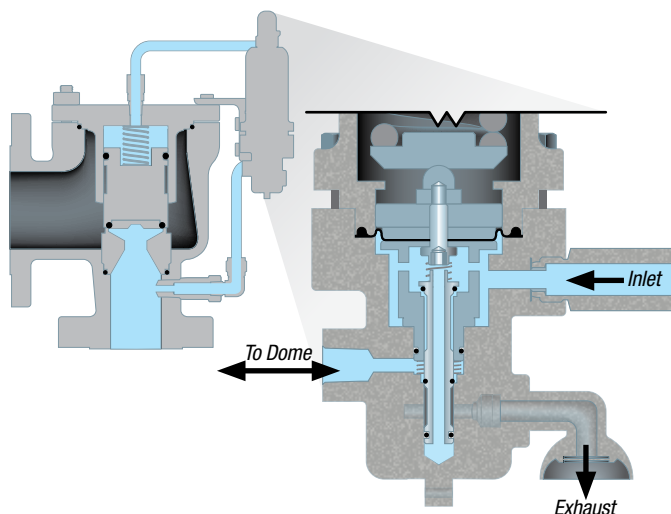
As the system pressure is decreased below set pressure, the spring force in the modulating pilot control overcomes the system pressure acting on the diaphragm/piston assembly and re-closes the outlet seat. The inlet seat then opens and allows system pressure back into the main valve dome, reseating the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

Operating Advantages:

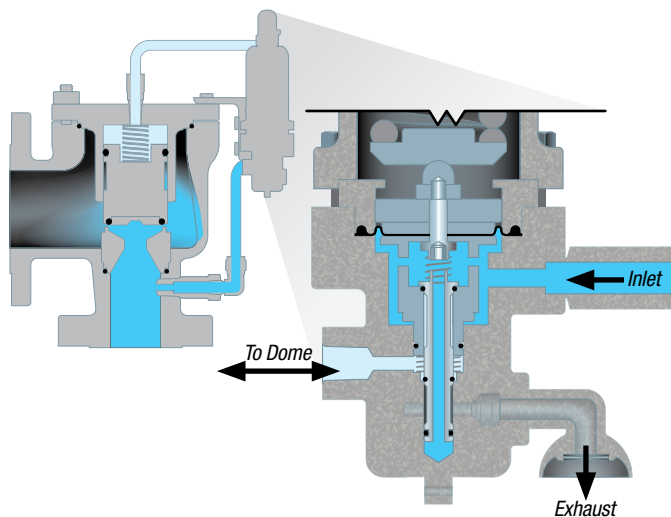
A pilot valve with a modulating control has the same operating advantages as a snap acting pilot control: operates bubble-tight close to set pressure and is unaffected by back pressure.

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.

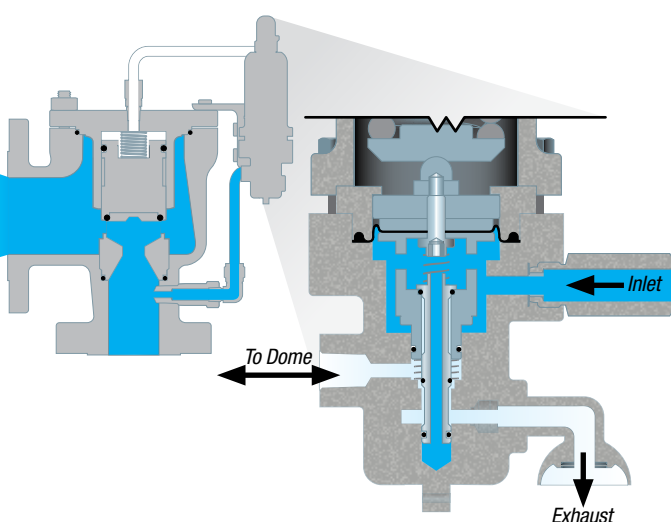
Modulating Valve – Closed Position



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		Materials & Temperatures			
38	Orifice Letter	Area, in ²		Area, mm ²		C Elastomer O-Ring Seat & Seals*	T PTFE O-Ring Seat & Seals (Main Valve Only)**	Designation	Material		Inlet Temperature Range °F
		API	Actual	API	Actual				Body & Cover	Piston	
	D	0.110	0.150	71	97			1	Carbon Steel*	Stainless Steel	-20* to 450
	E	0.196	0.225	126	145						
	F	0.307	0.371	198	239			2**	Carbon Steel	PH St. St.	-20 to 500
	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	—	464						
	1	—	1.767	—	1140						
	2	—	2.953	—	1905						
	3	—	6.605	—	4261						
	4	—	11.50	—	7419						
	6	—	26.07	—	16819						
	8	—	45.66	—	29458						
						*For set pressures above 1480 psig, main seat seal for all valves with 900#, 1500# and 2500# inlet flanges use PTFE.					*For temperature ranges down to -50F, specify LB, to -55F specify LC under special materials
						**Required for steam services					**Required for steam services
						Required for steam services					*Use for cryogenic applications, S4 special material suffix is not required.

Ordering Information

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

- Quantity
- Inlet and Outlet Size
- Farris Type Number*
- Inlet and Outlet Flange Class and Facing
- Materials of Construction, if other than Standard
- O-Ring Seal Material (Viton is Standard)
- Set Pressure*
- Maximum Inlet Temperature*
- Allowable Overpressure*
- Fluid and Fluid State*
- Backpressure, Superimposed Constant and/or Variable and Built-up*
- Required Capacity*
- Physical Properties of Fluid (Molecular Weight, Specific Gravity, etc.)*
- Accessories, if any required such as:
 - Manual or Remote Depressurizing
 - Field Test Connection
 - Reverse Flow Preventer
 - Auxiliary Filter
 - Any other
- Code Requirements, if any required

*If you would like Farris to verify your selection and sizing, this information is required.

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 (If applicable)	Inlet Facing	Pilot Control	Options	Special Material
Designation	ASME Nominal Inlet Flange Class	L Liquid Service (Standard Connections) X Air & Vapor Service (Oversize Connections) Y Liquid Service (Oversize Connections) D Air & Vapor Service (Dual Outlet)* E Liquid Service (Dual Outlet)* U Air & Vapor Service (Non-Standard API Connections) N Air & Vapor Service (Non-Standard API Connections)	1 Raised Face, ASME Std. (125 to 160 AARH) 9 Ring Joint ASME Std. (Octagonal) H 63 to 83 AARH Raised Face (Inlet only) 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*	2 PCF5 Snap Acting Control 3 PCL Liquid Snap Acting Control 4 PCM Modulating Control 5 PCMS Modulating Control 6 HPCM High Pressure Modulating Control 7 HPCM7 High Pressure Modulating Control	0 No Options 1 Test Gag 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	S3 Complete 316 St. St. PH St. St. Piston S4 Complete 316 St. St. N1 NACE Compliant Carbon St. Body N3 NACE Compliant PH St. St. Piston N4 NACE Compliant Complete 316 St. St. M4* Complete Monel H4* Complete Hastelloy C D4* Duplex St. St. DB* Super Duplex St. St. LB* Low temperature carbon steel - LCB Body LC* Low temperature carbon steel - LCC Body
0	150					
2	300					
3	600					
4	900					
5	1500					
6	2500					
		*Available on 6" and 8" inlet size valves only. Other sizes consult factory	*Limited valve sizes and pressure classes. Consult factory.		See table below for combinations	*Add "N" for NACE E.g. M4N, H4N, etc.

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.

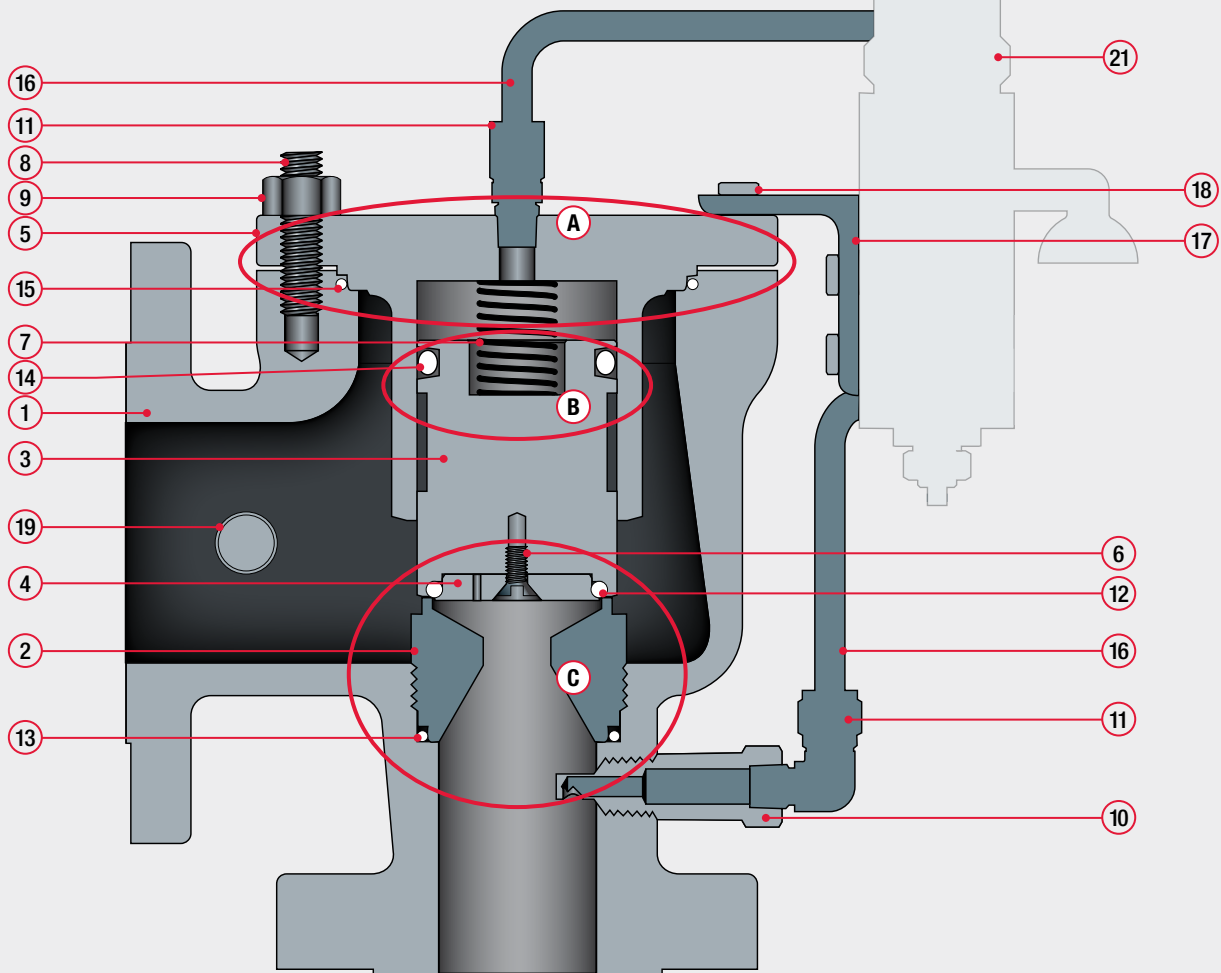
Spare Parts: When ordering parts, use part names as listed in the bills of material in this catalog. Specify valve type, size and serial number. If serial number is not available, the original Farris factory order number will assist in our supplying the proper part and material.

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.

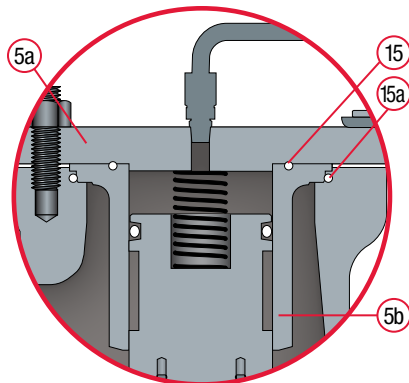
Codes for Common Accessory Combinations	
9	Four Auxiliary Functions: Options 4, 5 or F*, 6 & 8
A	Combo – Auxiliary Filter (3) & Field Test Connection (5 or F)*
B	Combo – Field Test Connection (5 or F)* & Reverse Flow Preventer (6)
E	Combo – Auxiliary Filter (3), Field Test Connection (5 or F)* & Reverse 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.

Main Valve: Advantage Farris

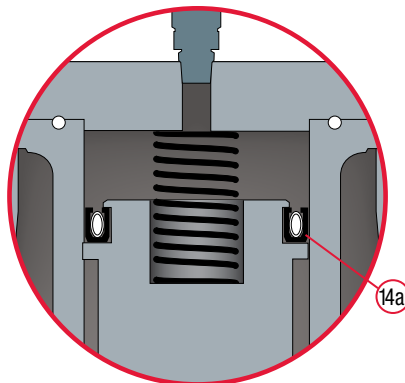


A Two Piece Cover and Guide



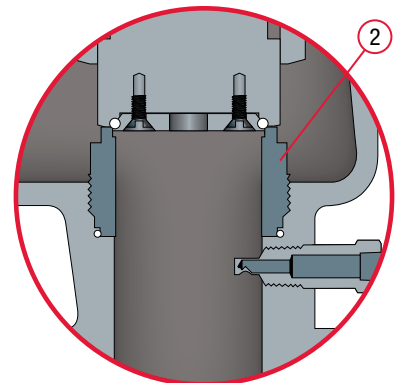
Valves with 3" inlet and larger

B Energized Piston Seal



Used for cryogenic, steam and special service

C Full Port Nozzle



Not available for liquid service

3800 Series Bill of Materials – Main Valve

Bill of Materials – Main Valve									
Item No.	Part Name	Standard Material	S3/S4	N1 NACE	N3/N4 NACE	M4	H4	D4	D8
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	SA-995 Gr. 4A Duplex	SA-995 Gr. 6A Duplex
2	Nozzle	316 St. St.	316 St. St.	316 St. St. ²	316 St. St. ²	Monel	Hastelloy C	Duplex	Duplex
3	Piston	316 St. St.	S3 = PH St. St. S4 = 316 St. St.	316 St. St. ²	N3 = PH St. St. N4 = 316 St. St.	Monel	Hastelloy C	Duplex	Duplex
4	O-Ring Retainer	316 St. St.	316 St. St.	316 St. St. ²	316 St. St. ²	Monel	Hastelloy C	Duplex	Duplex
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	SA-995 Gr. 4A Duplex	SA-995 Gr. 6A Duplex
5a	Cover ¹	Carbon St.	316 St. St.	Carbon St. ²	316 St. St. ²	Monel	Hastelloy C	Duplex	Duplex
5b	Guide ¹	316 St. St.	316 St. St.	316 St. St. ²	316 St. St. ²	Monel	Hastelloy C	Duplex	Duplex
6	Retainer Screw	St. St.	St. St.	St. St.	St. St.	Monel	Hastelloy C	Duplex	Duplex
7	Return Spring	316 St. St.	316 St. St.	Inconel™ X750	Inconel X750	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	Duplex UNS S31803	Duplex UNS S31803
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	Duplex UNS S31803	Duplex UNS S31803
10	Pressure Pickup	316 St. St.	316 St. St.	316 St. St.	316 St. St.	Monel	Hastelloy C	Duplex	Duplex
11	Tube Fittings	316 St. St.	316 St. St.	316 St. St.	316 St. St.	Monel	Hastelloy C	Duplex	Duplex
12	Main Seat Seal ⁴	Viton ⁵	Viton ⁵	EPDM ⁶	EPDM ⁶	Viton ⁵	Viton ⁵	Viton ⁵	Viton ⁵
13	Nozzle Seal	Viton ⁵	Viton ⁵	EPDM ⁶	EPDM ⁶	Viton ⁵	Viton ⁵	Viton ⁵	Viton ⁵
14	Piston Seal	Viton ⁵	Viton ⁵	EPDM ⁶	EPDM ⁶	Viton ⁵	Viton ⁵	Viton ⁵	Viton ⁵
14a	Energized Piston Seal	PTFE / SS ⁷	PTFE / SS ⁷	PTFE / SS ⁷	PTFE / SS ⁷	PTFE / SS ⁷	PTFE / SS ⁷	PTFE/SS ⁷	PTFE/SS ⁷
15	Cover Seal	Viton ⁵	Viton ⁵	EPDM ⁶	EPDM ⁶	Viton ⁵	Viton ⁵	Viton ⁵	Viton ⁵
15a	Guide Seal ¹	Viton ⁵	Viton ⁵	EPDM ⁶	EPDM ⁶	Viton ⁵	Viton ⁵	Viton ⁵	Viton ⁵
16	Tubing	316 St. St.	316 St. St.	316 St. St.	316 St. St.	Monel	Hastelloy C	Duplex	Duplex
17	Bracket	St. St.	St. St.	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.	Plated Steel	Plated Steel
19	Pipe Plug, Outlet	Carbon St.	St. St.	Carbon St.	St. St.	Monel	Hastelloy C	Duplex	Duplex
20	Pipe Plug, Body (not shown)	Carbon St.	St. St.	Carbon St.	St. St.	Monel	Hastelloy C	Duplex	Duplex
21	Pilot Control	St. St.	St. St.	St. St.	St. St.	Monel	Hastelloy C	Duplex	Duplex

Threaded 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 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. PTFE for seals required in main valve for temperatures below -20°F. Consult the Factory.
4. PTFE used for Main Seat Seal (item 12) for all valves with 900#, 1500#, and 2500# inlet flanges.

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.

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

Suitable for NACE Service: for high quality materials of construction that meet NACE MR0103 or MR0175/ISO 15156 service, refer to N1 trim for carbon steel body and N4 trim for stainless steel.

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.

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.

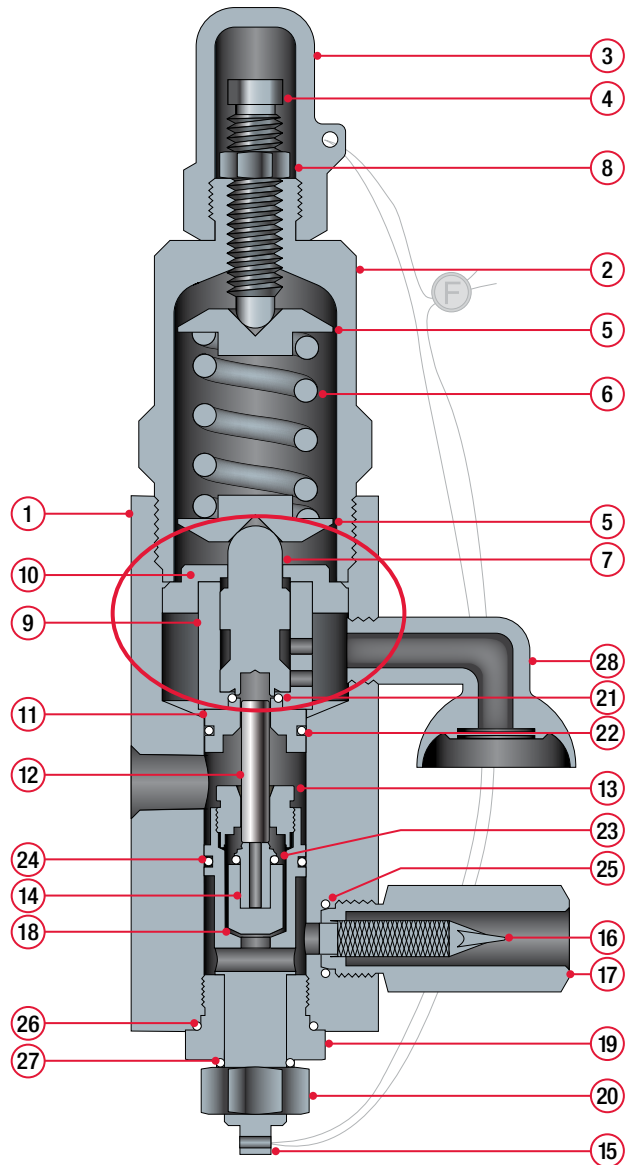
Full 316 Stainless Steel Construction: resists corrosion and extends the life and versatility of the PCF5 and PCL controls.

Adjustable Blowdown: allows setting blowdown at 3% of set pressure so that product loss is minimized and fugitive emissions reduced.

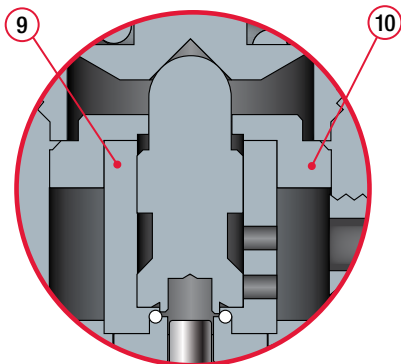
Viton Seats and Seals: these chemical-resistant seals and seats enhance a control's life. Neoprene, ethylene propylene, silicone, and Buna-N soft goods are optional and extend temperature ranges from -65°F to 450°F. Kalrez available when maximum resistance to chemical attack is required. Contact factory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

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

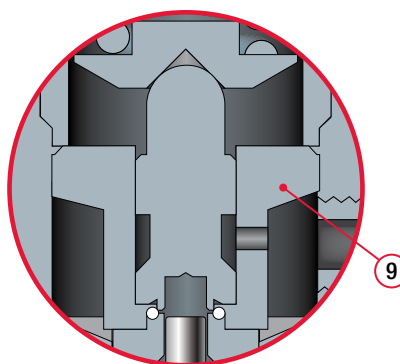
Accessory Options for Farris' snap acting controls are outlined on pages 31-35 of this brochure.



PCF5(2): Snap Acting Control – Air, Gas, Vapor Service



PCL(3): Snap Acting Control – Liquid Service



3800 Series Bill of Materials – Snap Acting Control

Bill of Materials – PCF5 and PCL						
Item No.	Part Name	Standard	NACE	Monel	Hastelloy	Duplex
1	Body	316 St. St.	316 St. St. ²	Monel	Hastelloy C	Duplex
2	Bonnet	316 St. St.	316 St. St.	Monel	Hastelloy C	Duplex
3	Cap	316 St. St.	316 St. St.	Monel	Hastelloy C	Duplex
4	Spring Adjusting Screw	316 St. St.	316 St. St.	Monel	Hastelloy C	Duplex
5	Spring Buttons	316 St. St.	316 St. St.	Monel	Hastelloy C	Duplex
6	Spring	316 St. St.	Inconel X750	Inconel X750	Inconel X750	Inconel X750
7	Disc	316 St. St.	316 St. St.	Monel	Hastelloy C	Duplex
8	Jam Nut	316 St. St.	316 St. St.	Monel	Hastelloy C	Duplex
9	Guide	316 St. St.	316 St. St.	Monel	Hastelloy C	Duplex
10	Guide Flange ¹	316 St. St.	316 St. St.	Monel	Hastelloy C	Duplex
11	Upper Seat	316 St. St.	316 St. St.	Monel	Hastelloy C	Duplex
12	Blowdown Relay	316 St. St.	316 St. St.	Monel	Hastelloy C	Duplex
13	Lower Seat	316 St. St.	316 St. St.	Monel	Hastelloy C	Duplex
14	Retainer, Lower Seat Seal	316 St. St.	316 St. St.	Monel	Hastelloy C	Duplex
15	Blowdown Adjuster	316 St. St.	316 St. St.	Monel	Hastelloy C	Duplex
16	Filter	St. St.	St. St.	Monel	Monel	Monel
17	Filter Housing	316 St. St.	316 St. St.	Monel	Hastelloy C	Duplex
18	Poppet	316 St. St.	316 St. St.	Monel	Hastelloy C	Duplex
19	Blowdown Adjuster Cap	316 St. St.	316 St. St.	Monel	Hastelloy C	Duplex
20	Blowdown Adjuster Lock Nut	316 St. St.	316 St. St.	Monel	Hastelloy C	Duplex
21	Upper Seat Seal	Viton ³	EPDM ⁴	Viton ³	Viton ³	Viton ³
22	Static Seal, Body	Viton ³	EPDM ⁴	Viton ³	Viton ³	Viton ³
23	Lower Seat Seal	Viton ³	EPDM ⁴	Viton ³	Viton ³	Viton ³
24	Static Seal, Adjuster	Viton ³	EPDM ⁴	Viton ³	Viton ³	Viton ³
25	Static Seal, Filter	Viton ³	EPDM ⁴	Viton ³	Viton ³	Viton ³
26	Adjuster Cap Seal	Viton ³	EPDM ⁴	Viton ³	Viton ³	Viton ³
27	Thread Seal, O-Ring	PTFE	PTFE	PTFE	PTFE	PTFE
28	Bug Vent	Aluminum	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.

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. Also suitable for 2-phase flow applications.

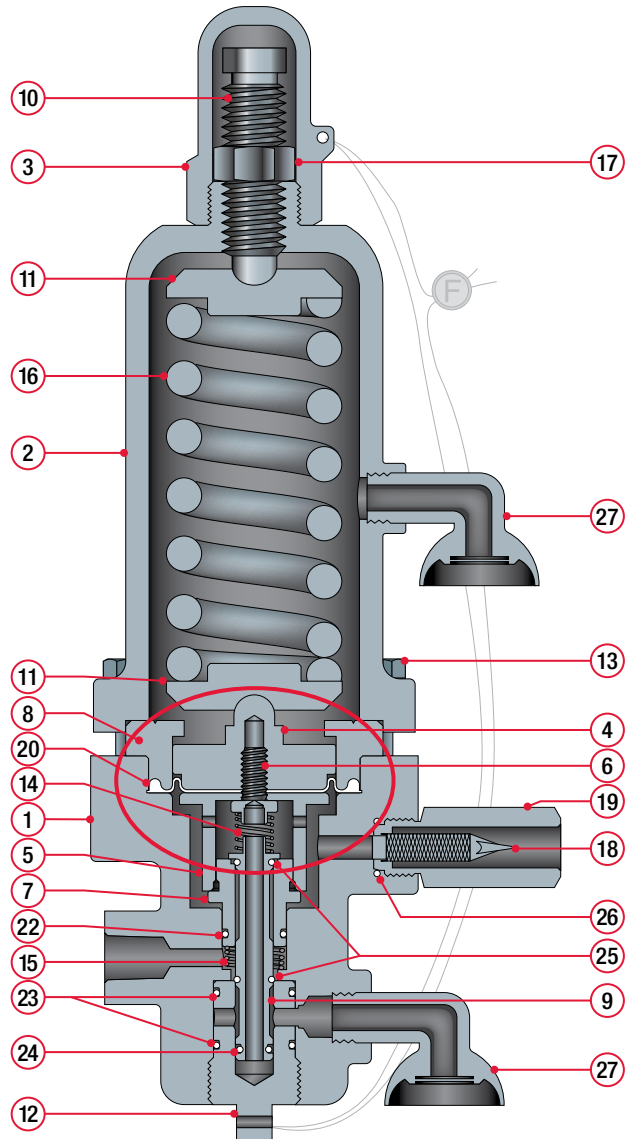
Full 316 Stainless Steel Construction: resists corrosion and extends the operation and versatility of the modulating control.

Fixed Blowdown: The modulating controls are a fixed blowdown pilot control with no external adjustment. Depending on fluid service, a blowdown of 3% to 6% is typical.

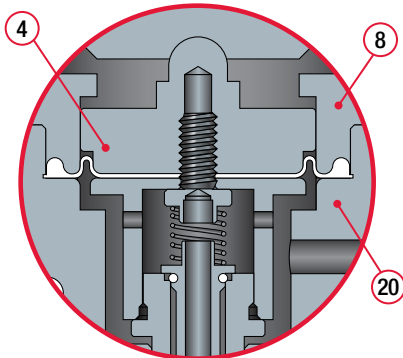
Viton Seats and Seals: have a wide spectrum of chemical compatibility and temperature range to meet most applications and enhance valve life. Buna-N and ethylene propylene soft goods are optional and extend temperature ranges from -65°F to 450°F. Contact the Farris factory for more information on other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

Accessory Options for Farris' modulating pilot controls are outlined on pages 31-35 of this brochure.

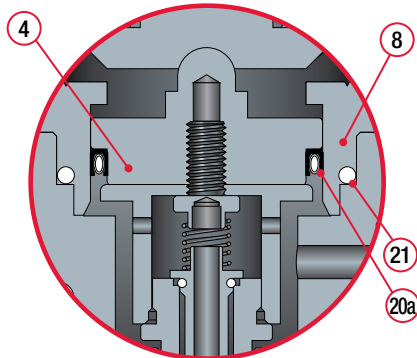


PCM(4): Modulating Control – 15 to 740 psig



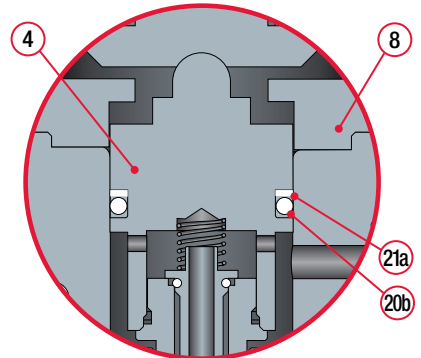
Air, Gas, Vapor and Liquid Service

PCMS(5): Modulating Control – 15 to 740 psig



Air, Gas, Vapor, Liquid and Steam Service

HPCM(6): Modulating Control – 740 to 2220 psig



Air, Gas, Vapor and Liquid Service



3800 Series Bill of Materials – Modulating Control

Bill of Materials – PCM, PCMS and HPCM						
Item No.	Part Name	Standard	NACE	Monel	Hastelloy	Duplex
1	Body	316 St. St.	316 St. St. ²	Monel	Hastelloy C	Duplex
2	Bonnet	316 St. St.	316 St. St.	Monel	Hastelloy C	Duplex
3	Cap	316 St. St.	316 St. St.	Monel	Hastelloy C	Duplex
4	Piston	316 St. St.	316 St. St.	Monel	Hastelloy C	Duplex
5	Retainer ¹	316 St. St.	316 St. St.	Monel	Hastelloy C	Duplex
6	Retainer Screw ¹	316 St. St.	316 St. St.	Monel	Hastelloy C	Duplex
7	Inlet Seat	316 St. St.	316 St. St.	Monel	Hastelloy C	Duplex
8	Guide	316 St. St.	316 St. St.	Monel	Hastelloy C	Duplex
9	Spool	316 St. St.	316 St. St.	Monel	Hastelloy C	Duplex
10	Spring Adjusting Screw	316 St. St.	316 St. St.	Monel	Hastelloy C	Duplex
11	Spring Buttons	316 St. St.	316 St. St.	Monel	Hastelloy C	Duplex
12	Spool Cap	316 St. St.	316 St. St.	Monel	Hastelloy C	Duplex
13	Bonnet Cap Screw	316 St. St.	316 St. St.	Monel	Hastelloy C	316 St. St.
14	Spool Return Spring	316 St. St.	Inconel X750	Inconel X750	Inconel X750	Inconel X750
15	Lower Return Spring	316 St. St.	Inconel X750	Inconel X750	Inconel X750	Inconel X750
16	Spring	St. St.	St. St.	St. St.	St. St.	St. St.
17	Jam Nut	316 St. St.	316 St. St.	316 St. St.	316 St. St.	316 St. St.
18	Filter	St. St.	St. St.	Monel	Monel	Monel
19	Filter Housing	316 St. St.	316 St. St.	Monel	Hastelloy C	Duplex
20	Diaphragm	Viton ³	EPDM ⁶	Viton ³	Viton ³	Viton ³
20a	Spring Energized Seal ⁴	PTFE/HC ⁷	PTFE/HC ⁷	PTFE/HC ⁷	PTFE/HC ⁷	PTFE/HC ⁷
20b	Piston Seal ⁵	Viton ³	EPDM ⁶	Viton ³	Viton ³	Viton ³
21	Guide Seal ⁴	Viton ³	EPDM ⁶	Viton ³	Viton ³	Viton ³
21a	Backup Ring ⁵	PTFE	PTFE	PTFE	PTFE	Teflon
22	Body Seal	Viton ³	EPDM ⁶	Viton ³	Viton ³	Viton ³
23	Spool Cap Seal	Viton ³	EPDM ⁶	Viton ³	Viton ³	Viton ³
24	Spool Seal	Viton ³	EPDM ⁶	Viton ³	Viton ³	Viton ³
25	Seat Seal	Viton ³	EPDM ⁶	Viton ³	Viton ³	Viton ³
26	Filter Seal	Viton ³	EPDM ⁶	Viton ³	Viton ³	Viton ³
27	Bug Vent	Aluminum	Aluminum	Aluminum	Aluminum	Aluminum

General Notes:

- Part used on PCM and PCMS only.
- Materials certified in compliance with NACE specifications.
- We reserve the right to substitute comparable fluorocarbon materials.
- Part used on PCMS only.
- Part used on HPCM only.
- EPDM is standard offering for NACE; other materials can be selected. Please specify at time of order.
- Graphite reinforced PTFE with Hastelloy C spring.

HPCM7 Modulating Control Features

Modulating, Non-Flowing: the HPCM7 pilot control is modulating and non-flowing, minimizing the flow of process media through the pilot for reduced fugitive emissions and extended valve life.

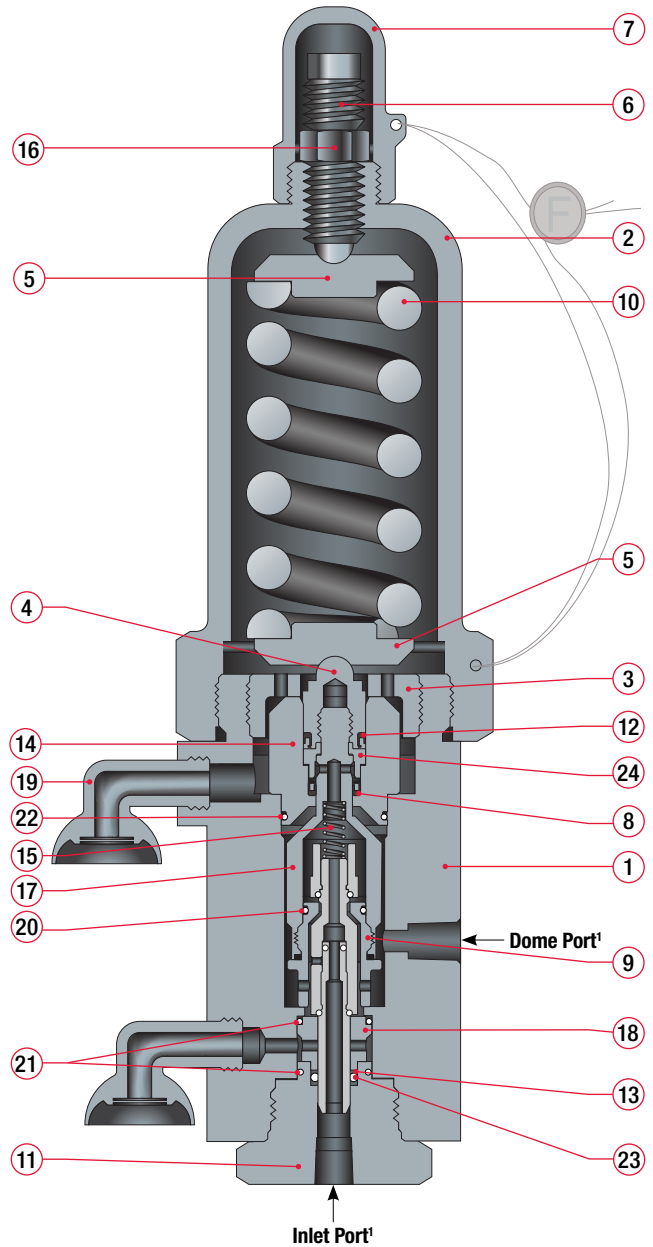
Full 316 Stainless Steel Construction: resists corrosion and extends the operation and versatility of the modulating control.

HPCM7 Modulating Pilot Control is available on valves with 1500 & 2500 class inlet flanges extending the set pressure range of modulating controls from 2220 up to 6170 psig.

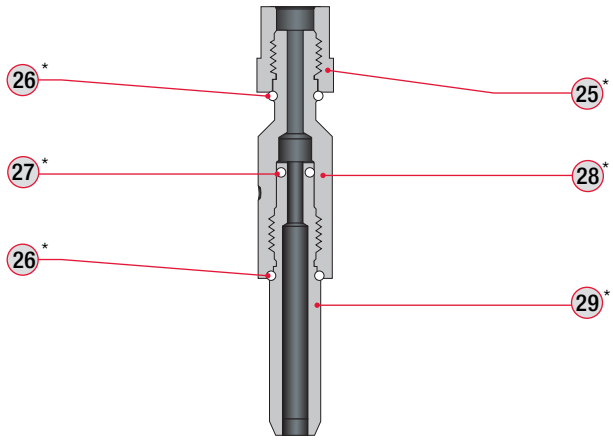
Fixed Blowdown: The modulating controls are a fixed blowdown pilot control with no external adjustment. Depending on fluid service, a blowdown of 3% to 6% is typical.

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.

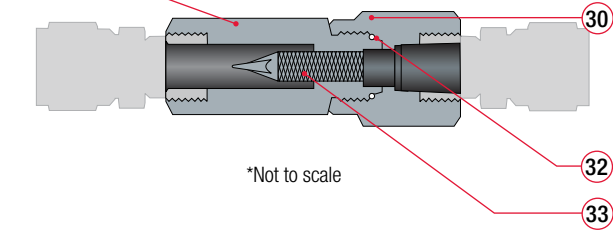
Accessory Options for Farris' modulating pilot control are outlined on pages 31-35 of this brochure.



Inlet Spool Assembly



Inline Filter Assembly²



*Not to scale

3800 Series Bill of Materials – High Pressure Modulating Control

Bill of Materials – HPCM7					
Item	Name	Standard	NACE	Hastelloy	Duplex
1	Body	316 St. St.	316 St. St. ¹	Hastelloy C	Duplex
2	Bonnet	316 St. St.	316 St. St.	Hastelloy C	Duplex
3	Piston Housing Retainer	316 St. St.	316 St. St.	Hastelloy C	Duplex
4	Piston Button	316 St. St.	316 St. St.	Hastelloy C	Duplex
5	Spring Button	316 St. St.	316 St. St.	Hastelloy C	Duplex
6	Spring Adjusting Screw	316 St. St.	316 St. St.	Hastelloy C	Duplex
7	Cap	316 St. St.	316 St. St.	Hastelloy C	Duplex
8	Housing Seal	Polymer Filled PTFE/SS	Polymer Filled PTFE/SS	Polymer Filled PTFE/SS	Polymer Filled PTFE/SS
9	Inlet Seat	316 St. St.	316 St. St.	Hastelloy C	Duplex
10	Spring	St. St.	St. St.	St. St.	St. St.
11	Inlet Housing	316 St. St.	316 St. St.	Hastelloy C	Duplex
12	Piston Seal	Polymer Filled PTFE/SS	Polymer Filled PTFE/SS	Polymer Filled PTFE/SS	Polymer Filled PTFE/SS
13	Back-up Ring Spool Seal	PTFE	PTFE	PTFE	PTFE
14	Piston Housing	316 St. St.	316 St. St.	Hastelloy C	Duplex
15	Spring	Inconel X750	Inconel X750	Inconel X750	Inconel X750
16	Jam Nut	316 St. St.	316 St. St.	316 St. St.	316 St. St.
17	Inlet Plenum	316 St. St.	316 St. St.	Hastelloy C	Duplex
18	Outlet Seat	316 St. St.	316 St. St.	Hastelloy C	Duplex
19	Bug Vent	Aluminum Alloy	Aluminum Alloy	Aluminum Alloy	Aluminum Alloy
20	Plenum Seal	Viton ²	EPDM ³	Viton ²	Viton ²
21	Vent Seal	Viton ²	EPDM ³	Viton ²	Viton ²
22	Body Seal	Viton ²	EPDM ³	Viton ²	Viton ²
23	Spool Seal	Viton ²	EPDM ³	Viton ²	Viton ²
24	Piston Seal Retainer	316 St. St.	316 St. St.	Hastelloy C	Duplex
Inlet Spool Assembly		See below items 25 through 29			
25*	Inlet Seat Retainer	316 St. St.	316 St. St.	Hastelloy C	Duplex
26*	Seat Seal	Viton ²	EPDM ³	Viton ²	Viton ²
27*	Internal Spool Seal	Viton ²	EPDM ³	Viton ²	Viton ²
28*	Inlet Spool	316 St. St.	316 St. St.	Hastelloy C	Duplex
29*	Exhaust Seat Retainer	316 St. St.	316 St. St.	Hastelloy C	Duplex
Inline Filter Assembly		See below items 30 through 33			
30	Filter Head	316 St. St.	316 St. St.	Hastelloy C	Duplex
31	Filter Housing	316 St. St.	316 St. St.	Hastelloy C	Duplex
32	Seal	Viton ²	EPDM ³	Viton ²	Viton ²
33	Filter	316 St. St.	316 St. St.	Monel	Monel

General Notes:

1. Materials certified in compliance with NACE specifications.
2. We reserve the right to substitute comparable fluorocarbon materials.
3. EPDM is standard offering for NACE; other materials can be selected. Please specify at time of order.



Selection Table – API

API – U.S. Customary and Metric												
Letter	Orifice		Valve Size Inlet x Outlet	ASME Flange Class		Type Number	Maximum Set Pressure				Maximum Back Pressure	
	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#	150#	38DC10	285	170	19.6	11.7	285	19.6
				300#		38DC12	740	605	51.0	41.7		
				600#		38DC13	1480	1205	102	83		
			1-1/2 x 2	900#	300#	38DC14	2220	1810	153	125	740	51.0
				1500#		38DC15	3705	3015	255	208		
				2500#		38DC16	6170	5025	425	346		
E	0.196 (126)	0.225 (145)	1 x 2	150#	150#	38EC10	285	170	19.6	11.7	285	19.6
				300#		38EC12	740	605	51.0	41.7		
				600#		38EC13	1480	1205	102	83		
			1-1/2 x 2	900#	300#	38EC14	2220	1810	153	125	740	51.0
				1500#		38EC15	3705	3015	255	208		
				2500#		38EC16	6170	5025	425	346		
F	0.307 (198)	0.371 (239)	1 x 2	150#	150#	38FC10	285	170	19.6	11.7	285	19.6
				300#		38FC12	740	605	51.0	41.7		
				600#		38FC13	1480	1205	102	83		
			1-1/2 x 2	900#	300#	38FC14	2220	1810	153	125	740	51.0
				1500#		38FC15	3705	3015	255	208		
				2500#		38FC16	6170	5025	425	346		
G	0.503 (325)	0.559 (361)	1-1/2 x 3	150#	150#	38GC10	285	170	19.6	11.7	285	19.6
				300#		38GC12	740	605	51.0	41.7		
				600#		38GC13	1480	1205	102	83		
			2 x 3	900#	300/600# (note 2)	38GC14	2220	1810	153	125	1480	102
				1500#		38GC15	3705	3015	255	208		
				2500#		38GC16	6170	5025	425	346		
H	0.785 (506)	0.873 (563)	1-1/2 x 3	150#	150#	38HC10	285	170	19.6	11.7	285	19.6
				300#		38HC12	740	605	51.0	41.7		
				600#		38HC13	1480	1205	102	83		
			2 x 3	900#	300/600# (note 2)	38HC14	2220	1810	153	125	740	51.0
				1500#		38HC15	3705	3015	255	208		
				2500#		38HC16	6170	5025	425	346		
H	0.785 (506)	0.873 (563)	2 x 3	150#	150#	38HC10X	285	170	19.6	11.7	285	19.6
				300#		38HC12X	740	605	51.0	41.7		
				600#		38HC13X	1480	1205	102	83		
			2 x 3	900#	300/600# (note 2)	38HC14X	2220	1810	153	125	1480	102
				1500#		38HC15X	3705	3015	255	208		
				2500#		38HC16X	6170	5025	425	346		

General Notes:

- 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.
- The 300# and 600# flanges have identical drilling with flange thickness equal to the 600# class.
- 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														
Letter	Orifice		Valve Size Inlet x Outlet	ASME Flange Class		Type Number	Maximum Set Pressure				Maximum Back Pressure			
	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#	150#	38JC10	285	170	19.6	11.7	285	19.6		
				300#		38JC12	740	605	51.0	41.7				
				600#		38JC13	1480	1205	102	83				
				900#	300/600# (note 2)	38JC14	2220	1810	153	125				
			1500#	38JC15		3705	3015	255	208					
			2500#	38JC16		6170	5025	425	346					
			3 x 4	150#	150#	38JC10X	285	170	19.6	11.7	285	19.6		
				300#		38JC12X	740	605	51.0	41.7				
600#	38JC13X	1480		1205		102	83							
900#	300#	38JC14X		2220	1810	153	125							
1500#		38JC15X	3705	3015	255	208								
K	1.838 (1186)	2.042 (1317)	3 x 4	150#	150#	38KC10	285	170	19.6	11.7	285	19.6		
				300#		38KC12	740	605	51.0	41.7				
				600#		38KC13	1480	1205	102	83				
				900#	300#	38KC14	2220	1810	153	125				
				1500#		38KC15	3705	3015	255	208				
L	2.853 (1841)	3.170 (2045)	3 x 4	150#	150#	38LC10	285	170	19.6	11.7	285	19.6		
				300#		38LC12	740	605	51.0	41.7				
				600#		38LC13	1480	1205	102	83				
				900#	300#	38LC14	2220	1810	153	125				
				1500#		38LC15	3705	3015	255	208				
			4 x 6	150#	150#	38LC10X	285	170	19.6	11.7	285	19.6		
				300#		38LC12X	740	605	51.0	41.7				
				600#		38LC13X	1480	1205	102	83				
				900#	300#	38LC14X	2220	1810	153	125				
1500#	38LC15X	3705	3015	255		208								
M	3.60 (2323)	4.000 (2581)	4 x 6	150#	150#	38MC10	285	170	19.6	11.7	285	19.6		
				300#		38MC12	740	605	51.0	41.7				
				600#		38MC13	1480	1205	102	83				
				900#	300#	38MC14	2220	1810	153	125				
				1500#		38MC15	3705	3015	255	208				
N	4.34 (2800)	4.822 (3111)	4 x 6	150#	150#	38NC10	285	170	19.6	11.7	285	19.6		
				300#		38NC12	740	605	51.0	41.7				
				600#		38NC13	1480	1205	102	83				
				900#	300#	38NC14	2220	1810	153	125				
				1500#		38NC15	3705	3015	255	208				
P	6.38 (4116)	7.087 (4572)	4 x 6	150#	150#	38PC10	285	170	19.6	11.7	285	19.6		
				300#		38PC12	740	605	51.0	41.7				
				600#		38PC13	1480	1205	102	83				
				900#	300#	38PC14	2220	1810	153	125				
				1500#		38PC15	3080	3015	212	208				
Q	11.05 (7129)	12.27 (7916)	6 x 8	150#	150#	38QC10	285	170	19.6	11.7	285	19.6		
				300#		38QC12	740	605	51.0	41.7				
				600#		38QC13	1480	1205	102	83				
			6 x 8 x 8	150#	150#	38QC10D	285	170	19.6	11.7			285	19.6
				300#		38QC12D	740	605	51.0	41.7				
				600#		38QC13D	1480	1205	102	83				
R	16.0 (10323)	17.78 (11471)	6 x 8	150#	150#	38RC10	285	170	19.6	11.7	285	19.6		
				300#		38RC12	740	605	51.0	41.7				
				600#		38RC13	1480	1205	102	83				
			6 x 8 x 8	150#	150#	38RC10D	285	170	19.6	11.7			285	19.6
				300#		38RC12D	740	605	51.0	41.7				
				600#		38RC13D	1480	1205	102	83				
T	26 (16774)	28.94 (18671)	8 x 10	150#	150#	38TC10	285	170	19.6	11.7	285	19.6		
				300#		38TC12	740	605	51.0	41.7				
				600#		38TC13	1480	1205	102	83				
			8 x 10 x 10	150#	150#	38TC10D	285	170	19.6	11.7			285	19.6
				300#		38TC12D	740	605	51.0	41.7				
				600#		38TC13D	1480	1205	102	83				

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. Other sizes consult factory.



Selection Table – Non Standard API

Non Standard API – U.S. Customary and Metric												
Letter	Orifice		Valve Size Inlet x Outlet	ASME Flange Class		Type Number	Maximum Set Pressure				Maximum Back Pressure	
	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 ^s	0.503 (325)	0.559 (361)	1 x 2	150#	150#	38GC10U	285	170	19.6	11.7	285	19.6
				300#		38GC12U	740	605	51.0	41.3		
				600#		38GC13U	1480	1205	102	82.7		
			1-1/2 x 2	900#	300#	38GC14U	2220	1810	153	124	740	51.0
				1500#		38GC15U	3705	3015	255	206		
				2500#		38GC16U	6170	5025	425	344		
H	0.785 (506)	0.873 (563)	1-1/2 x 2	150#	150#	38HC10N	285	170	19.6	11.7	285	19.6
				300#		38HC12N	740	605	51.0	41.3		
				600#		38HC13N	1480	1205	102	82.7		
			1-1/2 x 3	900#	300#	38HC14N	2220	1810	153	124	740	51.0
				1500#		38HC15N	3705	3015	255	206		
				2500#		38HC16N	6170	5025	425	344		
J	1.287 (830)	1.430 (923)	1-1/2 x 2	150#	150#	38JC10U	285	170	19.6	11.7	285	19.6
				300#		38JC12U	740	605	51.0	41.3		
				600#		38JC13U	1480	1205	102	82.7		
			1-1/2 x 3	900#	300#	38JC14U	2220	1810	153	124	740	51.0
				1500#		38JC15U	3705	3015	255	206		
				2500#		38JC16U	6170	5025	425	344		
K	1.838 (1186)	2.042 (1317)	2 x 3	150#	150#	38KC10N	285	170	19.6	11.7	285	19.6
				300#		38KC12N	740	605	51.0	41.3		
				600#		38KC13N	1480	1205	102	82.7		
			300/600# (note 2)	900#	300/600# (note 2)	38KC14N	2220	1810	153	124	1480	102
				1500#		38KC15N	3705	3015	255	206		
				2500#		38KC16N	6170	5025	425	344		
M	3.60 (2323)	4.000 (2581)	3 x 4	150#	150#	38MC10N	285	170	19.6	11.7	285	19.6
				300#		38MC12N	740	605	51.0	41.3		
				600#		38MC13N	1480	1205	102	82.7		
			300#	900#	300#	38MC14N	2220	1810	153	123.7	740	51.0
				1500#		38MC15N	3705	3015	255	206		
				2500#		38MC16N	6170	5025	425	344		
N	4.34 (2800)	4.822 (3111)	3 x 4	150#	150#	38NC10N	285	170	19.6	11.7	285	19.6
				300#		38NC12N	740	605	51.0	41.3		
				600#		38NC13N	1480	1205	102	82.7		
			300#	900#	300#	38NC14N	2220	1810	153	124	740	51.0
				1500#		38NC15N	3705	3015	255	206		
				2500#		38NC16N	6170	5025	425	344		

General Notes:

- 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.
- The 300# and 600# flanges have identical drilling with flange thickness equal to the 600# class.
- Valves only certified for air, gas, vapor and steam service.
- Valves with ring joint inlet connections available. Consult the Factory for final dimensions.
- A 1" x 2" valve with an "G" orifice is only available when configured with a remote sensing option.

Selection Table – Full Port

Full Port – U.S. Customary and Metric												
Letter	Orifice		Valve Size Inlet x Outlet	ASME Flange Class		Type Number	Maximum Set Pressure				Maximum Back Pressure	
	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#	150#	38AC10	285	170	19.6	11.7	285	19.6
				300#		38AC12	740	605	51.0	41.3		
600#	38AC13	1480	1205	102		82.7						
	—	1.767 (1140)	1-1/2 x 2	900#	300#	38AC14	2220	1810	153	124	740	51.0
				1500#		38AC15	3705	3015	255	206		
2500#	38AC16	6170	5025	425		344						
1	—	1.767 (1140)	1-1/2 x 2	150#	150#	381C10	285	170	19.6	11.7	285	19.6
				300#		381C12	740	605	51.0	41.3		
600#	381C13	1480	1205	102		82.7						
	—	1.767 (1140)	1-1/2 x 3	900#	300#	381C14	2220	1810	153	124	740	51.0
				1500#		381C15	3705	3015	255	206		
2500#	381C16	6170	5025	425		344						
2	—	2.953 (1905)	2 x 3	150#	150#	382C10	285	170	19.6	11.7	285	19.6
				300#		382C12	740	605	51.0	41.3		
600#	382C13	1480	1205	102		82.7						
	—	2.953 (1905)	2 x 3	900#	300/600# (note 2)	382C14	2220	1810	153	124	1480	102
				1500#		382C15	3705	3015	255	206		
2500#	382C16	6170	5025	425		344						
3	—	6.605 (4261)	3 x 4	150#	150#	383C10	285	170	19.6	11.7	285	19.6
				300#		383C12	740	605	51.0	41.3		
600#	383C13	1480	1205	102		82.7						
	—	6.605 (4261)	3 x 4	900#	300#	383C14	2220	1810	153	124	740	51.0
				1500#		383C15	3705	3015	255	206		
4	—	11.50 (7419)	4 x 6	150#		150#	384C10	285	170	19.6		
				300#	384C12		740	605	51.0	41.3		
600#	384C13	1480	1205	102	82.7							
	—	11.50 (7419)	4 x 6	900#	300#	384C14	2220	1810	153	124	740	51.0
				1500#		384C15	3705	3015	255	206		
6	—	26.07 (16819)	6 x 8	150#		150#	386C10	285	170	19.6		
				300#	386C12		740	605	51.0	41.3		
600#	386C13	1480	1205	102	82.7							
	—	26.07 (16819)	6 x 8 x 8	150#	150#	386C10D	285	170	19.6	11.7	285	19.6
				300#		386C12D	740	605	51.0	41.3		
600#	386C13D	1480	1205	102		82.7						
8	—	45.66 (29458)	8 x 10	150#	150#	388C10	285	170	19.6	11.7	285	19.6
				300#		388C12	740	605	51.0	41.3		
600#	388C13	1480	1205	102		82.7						
	—	45.66 (29458)	8 x 10 x 10	150#	150#	388C10D	285	170	19.6	11.7	285	19.6
				300#		388C12D	740	605	51.0	41.3		
600#	388C13D	1480	1205	102		82.7						

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. Other sizes consult factory.
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.
6. Full port orifices require that inlet piping have a flow area equal to or greater than the full port orifice flow area.
7. Full port valves only certified for air, gas, vapor and steam service.



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.
 3. Full port orifices require that inlet piping have a flow area equal to or greater than the full port orifice flow area.



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:

- Capacities at 30 PSIG and below are based on 3 PSI overpressure.
- 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.
- For full port sizing purposes the coefficient of discharge, K for air, gas, and steam is 0.801.
- Full port orifices require that inlet piping have a flow area equal to or greater than the full port orifice flow area.

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	886
3	18.7	45.9	76.8	171	299	678	1187
4	23.4	57.6	96.4	215	375	851	1490
5	28.2	69.4	116	259	451	1024	1793
6	33.0	81.1	135	303	528	1197	2096
7	37.7	92.8	155	347	604	1370	2399
8	42.0	104	174	390	680	1542	2702
9	47.3	116	194	434	756	1715	3005
10	52.0	128	213	478	833	1888	3308
12	61.6	151	253	566	985	2234	3914
14	71.1	174	292	653	1138	2580	4519
16	80.7	198	331	741	1290	2926	5125
18	90.2	221	370	829	1443	3272	5731
20	99.7	245	409	916	1596	3618	6337
22	109	268	449	1004	1748	3964	6943
24	118	292	488	1092	1901	4310	7549
26	128	315	527	1179	2053	4656	8155
28	137	339	566	1267	2206	5002	8760
30	147	362	605	1354	2359	5348	9366
32	157	385	644	1442	2511	5693	9972
34	166	409	684	1530	2664	6039	10578
36	176	432	723	1617	2816	6385	11184
38	185	456	762	1705	2969	6731	11790
40	195	479	801	1793	3122	7077	12395
42	204	503	840	1880	3274	7423	13001
44	214	526	880	1968	3427	7769	13607
46	223	550	919	2056	3579	8115	14213
48	233	573	958	2143	3732	8461	14819
50	242	596	997	2231	3884	8807	15425
60	290	714	1193	2669	4647	10536	18454
70	338	831	1389	3107	5410	12266	21483
80	385	948	1585	3545	6173	13995	24512
90	433	1065	1781	3984	6936	15725	27541
100	481	1183	1977	4422	7699	17454	30571
110	529	1300	2173	4860	8462		
120	576	1417	2368	5298	9225		
130	624	1534	2564	5736	9988		
140	672	1651	2760	6175	10751		
150	719	1769	2956	6613	11514		
160	767	1886	3152	7051	12277		
170	815	2003	3348	7489	13040		
180	863	2120	3544	7927	13803		
190	910	2238	3740	8366	14566		
200	958	2355	3936	8804	15329		
210	1006	2472	4132	9242	16092		
220	1053	2589	4328	9680	16854		
230	1101	2707	4523	10118	17617		
240	1149	2824	4719	10557	18380		
250	1196	2941	4915	10995	19143		
260	1244	3058	5111	11433	19906		
270	1292	3175	5307				
280	1340	3293	5503				
290	1387	3410	5699				
300	1435	3527	5895				
310	1483	3644	6091				
320	1530	3762	6287				
330	1578	3879	6483				
340	1626	3996	6678				
350	1673	4113	6874				
360	1721	4230	7070				
370	1769	4348	7266				
380	1817	4465	7462				
390	1864	4582	7658				
400	1912	4699	7854				
410	1960	4817	8050				
420	2007	4934	8246				
425	2031	4992	8344				

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.
 3. Full port orifices require that inlet piping have a flow area equal to or greater than the full port orifice flow area.



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	2048	2584	3116	4579	7929	11489	18701
2	140	210	347	523	818	1340	1913	2971	3749	4519	6642	11500	16664	27124
3	188	282	465	701	1095	1795	2563	3979	5021	6053	8897	15404	22321	36332
4	236	354	584	880	1375	2253	3217	4994	6302	7597	11166	19332	28013	45597
5	284	426	703	1059	1654	2710	3871	6009	7582	9141	13435	23260	33706	54862
6	332	498	822	1238	1934	3168	4524	7024	8863	10684	15703	27188	39398	64127
7	380	570	940	1417	2213	3626	5178	8039	10144	12228	17972	31117	45090	73392
8	428	642	1059	1596	2493	4084	5832	9054	11424	13772	20241	35045	50782	82657
9	476	714	1178	1775	2772	4542	6486	10068	12705	15316	22510	38973	56475	91923
10	524	786	1297	1954	3052	4999	7139	11083	13985	16860	24779	42901	62167	101188
12	620	930	1534	2312	3611	5915	8447	13113	16547	19947	29317	50758	73551	119718
14	716	1074	1772	2670	4170	6831	9754	15143	19108	23035	33855	58614	84936	138248
16	812	1218	2009	3028	4729	7746	11062	17173	21669	26122	38392	66471	96321	156779
18	908	1362	2247	3386	5288	8662	12369	19202	24230	29210	42930	74327	107705	175309
20	1004	1507	2484	3744	5847	9578	13677	21232	26791	32297	47468	82184	119090	193839
22	1100	1651	2722	4102	6406	10493	14984	23262	29353	35385	52006	90040	130474	212369
24	1196	1795	2960	4460	6965	11409	16292	25292	31914	38472	56544	97897	141859	230900
26	1292	1939	3197	4817	7524	12325	17599	27321	34475	41560	61082	105753	153243	249430
28	1388	2083	3435	5175	8083	13240	18907	29351	37036	44647	65619	113610	164628	267960
30	1484	2227	3672	5533	8642	14156	20214	31381	39597	47735	70157	121466	176012	286491
32	1580	2371	3910	5891	9201	15071	21522	33411	42159	50822	74695	129323	187397	305021
36	1773	2659	4385	6607	10319	16903	24137	37470	47281	56997	83771	145036	210166	342082
40	1965	2947	4860	7323	11437	18734	26752	41530	52403	63172	92846	160749	232935	379142
44	2157	3235	5335	8039	12555	20565	29367	45589	57526	69348	101922	176462	255704	416203
48	2349	3523	5810	8755	13673	22396	31982	49649	62648	75523	110997	192175	278473	453263

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	1064	1779	3980	6929	15709	27514
2	628	1544	2580	5772	10050	22784	39906
3	823	2023	3382	7565	13171	29860	52298
4	1018	2503	4183	9357	16292	36935	64689
5	1213	2982	4985	11150	19413	44010	77081
6	1408	3462	5786	12942	22534	51085	89473
7	1604	3942	6588	14735	25655	58161	101865
8	1799	4421	7389	16528	28777	65236	114257
9	1994	4901	8190	18320	31898	72311	126649
10	2189	5380	8992	20113	35019	79386	139041
12	2579	6339	10595	23698	41261	93537	163824
14	2969	7298	12198	27283	47503	107687	188608
16	3360	8258	13800	30868	53745	121838	213392
18	3750	9217	15403	34453	59987	135988	238175
20	4140	10176	17006	38038	66229	150139	262959
22	4531	11135	18609	41623	72471	164289	287743
24	4921	12094	20212	45208	78713	178440	312527
26	5311	13053	21815	48794	84955	192590	337310
28	5701	14012	23417	52379	91197	206741	362094
30	6092	14971	25020	55964	97439	220891	386878
32	6482	15930	26623	59549	103681	235042	411661
36	7262	17849	29829	66719	116165	263343	461229
40	8043	19767	33035	73889	128650	291644	510796
44	8823	21685	36240	81060	141134	319945	560364
48	9604	23603	39446	88230	153618	348246	609931

General Notes:

- Capacities at 2.0 Barg set pressure and below are based on 0.2 Bar overpressure.
- 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.
- For full port sizing purposes the coefficient of discharge, K for air, gas, and steam is 0.801.
- Full port orifices require that inlet piping have a flow area equal to or greater than the full port orifice flow area.



Sizing Information

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

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.

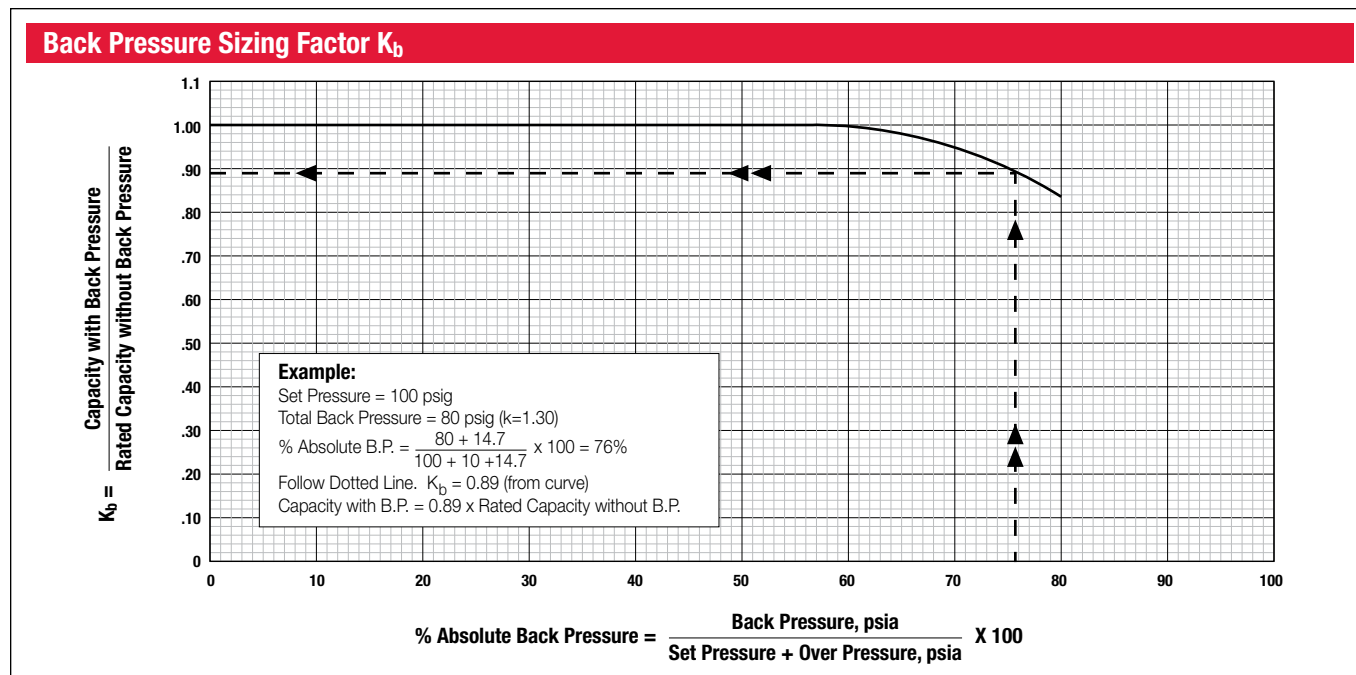
Orifice Area Calculations	Constant Back Pressure
VAPORS or GASES – Lbs./hr.: $A = \frac{W \sqrt{T} \sqrt{Z}}{C K_d P \sqrt{M} K_b}$	$K_b = 1$ when back pressure is below 55% of abs. relieving pressure.
VAPORS or GASES – S.C.F.M.: $A = \frac{V \sqrt{G} \sqrt{T} \sqrt{Z}}{1.175 C K_d P K_b}$	$K_b = 1$ 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 ASME/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.
- P₁ = Set pressure at inlet, psig.
- P₂ = Back pressure at outlet, psig.
- ΔP = Set pressure + overpressure, psig – back pressure, psig. At 10% overpressure ΔP = 1.1P₁-P₂. Below 30 psig set, ΔP = P₁+3-P₂.
- 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

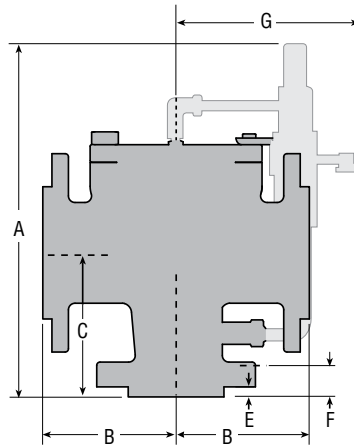
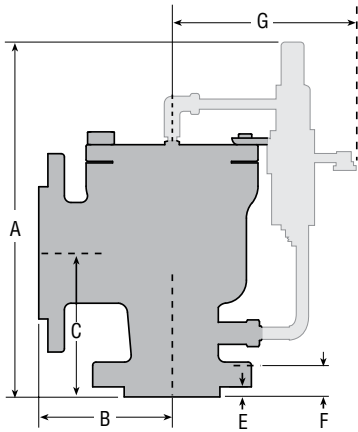
Sizing Factors for Vapors and Gases



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	
140	361							1.00	1.00	.99	.98	.96	.95	.94	
160	371								1.00	.99	.98	.97	.95	.94	
180	380									1.00	.99	.98	.96	.95	
200	388										1.00	.99	.98	.95	
220	395											1.00	.99	.94	
240	403												1.00	.94	
260	409													1.00	
280	416														
300	422														
350	436														
400	448														
450	460														
500	470														
550	480														
600	489														
650	497														
700	506														

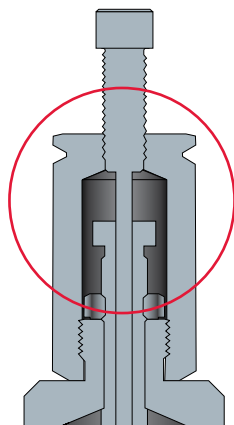
Dimensions & Weights: API Nozzle Design



API Nozzle Design																	
Valve Size Inlet x Outlet	Type Number	ASME Flange Class		Dimensions, Inches						Approx. Wt. Lbs. ⁶	Dimensions, mm						Approx. Wt. Kg. ⁶
		Inlet RF	Outlet RF	A ³	B	C	E	F ⁴	G		A ³	B	C	E	F ⁴	G	
1 x 2	38 (D, E, F) C10	150#	150#	12-5/8	4-1/2	4-1/8	1/16	11/16	8 3/4	35	321	115	105	2	18	223	16
	38 (D, E, F) C12	300#		12-7/8	4-1/2	4-3/8	1/4	15/16	8 3/4	36	328	115	112	7	24	223	17
	38 (D, E, F) C13	600#		12-7/8	4-1/2	4-3/8	1/4	15/16	8 3/4	36	328	115	112	7	24	223	17
	38 (D, E, F) C14	900#	300#	13 3/8	4-3/4	4-15/16	1/4	1-7/16	9	49	340	121	126	7	37	229	23
	38 (D, E, F) C15	1500#		13 3/8	4-3/4	4-15/16	1/4	1-7/16	9	49	340	121	126	7	37	229	23
	38 (D, E, F) C16	2500#		13-1/2	4-3/4	4-15/16	1/4	1-11/16	9	55	343	121	126	7	43	229	25
1 x 2 ⁵	38GC10U	150#	150#	12-5/8	4-1/2	4-1/8	1/16	11/16	8 3/4	35	321	115	105	2	18	223	16
	38GC12U	300#		12-7/8	4-1/2	4-3/8	1/4	15/16	8 3/4	36	328	115	112	7	24	223	17
	38GC13U	600#		12-7/8	4-1/2	4-3/8	1/4	15/16	8 3/4	36	328	115	112	7	24	223	17
	38GC14U	900#	300#	13-3/8	4-3/4	4-15/16	1/4	1-7/16	9	49	340	121	126	7	37	229	23
	38GC15U	1500#		13-3/8	4-3/4	4-15/16	1/4	1-7/16	9	49	340	121	126	7	37	229	23
	38GC16U	2500#		13-1/2	4-3/4	4-15/16	1/4	1-11/16	9	55	343	121	126	7	43	229	25
1-1/2 x 2	38 (D, E, F) C10X	150#	150#	14	4-3/4	4-7/8	1/16	1-1/8	9 1/4	48	356	121	124	2	29	235	22
	38 (D, E, F) C12X	300#		14	4-3/4	4-7/8	1/4	1-1/8	9 1/4	50	356	121	124	7	29	235	23
	38 (D, E, F) C13X	600#		14	4-3/4	4-7/8	1/4	1-1/8	9 1/4	50	356	121	124	7	29	235	23
	38 (D, E, F) C14X	900#	300#	15	5-1/2	5 7/8	1/4	1-9/16	9 1/2	71	381	140	150	7	40	242	33
	38 (D, E, F) C15X	1500#		15	5-1/2	5 7/8	1/4	1-9/16	9 1/2	71	381	140	150	7	40	242	33
	38 (D, E, F) C16X	2500#		15-1/8	5-1/2	5 7/8	1/4	2-1/8	9 1/2	85	385	140	150	7	54	242	39
1-1/2 x 2	38 (G, H) C10N	150#	150#	14	4-3/4	4-7/8	1/16	1-1/8	9 1/4	48	356	121	124	2	29	235	22
	38 (G, H) C12N	300#		14	4-3/4	4-7/8	1/4	1-1/8	9 1/4	50	356	121	124	7	29	235	23
	38 (G, H) C13N	600#		14	4-3/4	4-7/8	1/4	1-1/8	9 1/4	50	356	121	124	7	29	235	23
	38 (G, H) C14N	900#	300#	15	5-1/2	5 7/8	1/4	1-9/16	9 1/2	71	381	140	150	7	40	242	33
	38 (G, H) C15N	1500#		15	5-1/2	5 7/8	1/4	1-9/16	9 1/2	71	381	140	150	7	40	242	33
	38 (G, H) C16N	2500#		15-1/8	5-1/2	5 7/8	1/4	2-1/8	9 1/2	85	385	140	150	7	54	242	39
1-1/2 x 2	38JC10U	150#	150#	14	4-3/4	4-7/8	1/16	1-1/8	9 1/4	48	356	121	124	2	29	235	22
	38JC12U	300#		14	4-3/4	4-7/8	1/4	1-1/8	9 1/4	50	356	121	124	7	29	235	23
	38JC13U	600#		14	4-3/4	4-7/8	1/4	1-1/8	9 1/4	50	356	121	124	7	29	235	23
	38JC14U	900#	300#	15	5-1/2	5 7/8	1/4	1-9/16	9 1/2	71	381	140	150	7	40	242	33
	38JC15U	1500#		15	5-1/2	5 7/8	1/4	1-9/16	9 1/2	71	381	140	150	7	40	242	33
	38JC16U	2500#		15-1/8	5-1/2	5 7/8	1/4	2-1/8	9 1/2	85	385	140	150	7	54	242	39
1-1/2 x 3	38 (G, H) C10	150#	150#	14	4-7/8	5-1/8	1/16	1-3/16	9 1/4	50	356	124	131	2	31	235	23
	38 (G, H) C12	300#		14	4-7/8	5-1/8	1/4	1 3/16	9 1/4	52	356	124	131	7	31	235	24
	38 (G, H) C13	600#		14	4-7/8	5-1/8	1/4	1 3/16	9 1/4	52	356	124	131	7	31	235	24
	38 (G, H) C14	900#	300#	15-1/4	6-3/4	6-3/8	1/4	1-9/16	9 1/2	75	388	172	162	7	40	242	35
	38 (G, H) C15	1500#		15-1/4	6-3/4	6-3/8	1/4	1-9/16	9 1/2	75	388	172	162	7	40	242	35
	38 (G, H) C16	2500#		15-3/8	6-3/4	6-3/8	1/4	2-1/8	9 1/2	96	391	172	162	7	54	242	44
1-1/2 x 3	38JC10N	150#	150#	14	4-7/8	5-1/8	1/16	1-3/16	9 1/4	50	356	124	131	2	31	235	23
	38JC12N	300#		14	4-7/8	5-1/8	1/4	1-3/16	9 1/4	52	356	124	131	7	31	235	24
	38JC13N	600#		14	4-7/8	5-1/8	1/4	1-3/16	9 1/4	52	356	124	131	7	31	235	24
	38JC14N	900#	300#	15-1/4	6-3/4	6-3/8	1/4	1-9/16	9 1/2	75	388	172	162	7	40	242	35
	38JC15N	1500#		15-1/4	6-3/4	6-3/8	1/4	1-9/16	9 1/2	75	388	172	162	7	40	242	35
	38JC16N	2500#		15-3/8	6-3/4	6-3/8	1/4	2-1/8	9 1/2	96	391	172	162	7	54	242	44

Optional Accessories

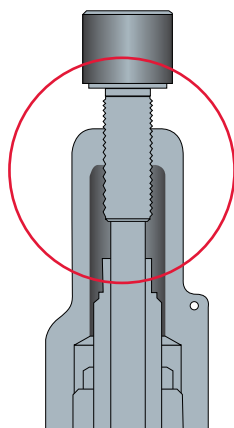
A full line of accessories is available to meet your service requirements.



**Snap Acting PCF5 Pilot Control
with Test Gag**



Dual Pilot Controls



**Modulating PCM Pilot
Control with Test Gag**

Test Gags

There are certain circumstances where it may be necessary to prevent a relief valve from opening; this can be done with the use of a test gag. The test gag is screwed into the cap of the pilot control, preventing the disc (or piston in the modulating style) from lifting; this keeps the main valve closed. When using a test gag on a relief valve, it is important to limit the hydrostatic test pressure to 10% above the nameplate set pressure to avoid valve damage. Prior test gags must be completely removed prior to placing valve into service. Select Option #1 from page 5.

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.

Optional Accessories, continued



Auxiliary Filters

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.

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.



Manual Depressurizing

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 blowdown system will interfere with the normal overpressure protection provided by the main valve and pilot. Select Option #4 or #8 from page 5.



Remote Depressurizing

Optional Accessories, continued



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 through 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 through the pilot control via the pilot sense line into the upstream side of the system. Select Option #6 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 Accessories, continued

Accessories Reference Table ¹						
	Snap Acting Control		Modulating Control			
	PCF5 (2)	PCL (3)	PCM (4)	PCMS (5)	HPCM (6)	HPCM7 (7)
Test Gag (1)	✓	✓	✓	✓	✓	
Dual Pilots (2)	✓	✓	✓	✓	✓	
Auxillary Filter (3)	✓	✓	✓	✓	✓	✓
Manual Depressurizing ⁴ (4)	✓	✓	✓	✓	✓	✓
Remote Depressurizing ³ (8)	✓	✓	✓	✓	✓	✓
Field Test Connection (5)	✓	✓	✓ ²	✓ ²	✓ ²	✓ ²
Field Test Connection w/ Indicator (F)			✓ ²	✓ ²	✓ ²	✓ ²
Reverse Flow Preventer (6)	✓	✓	✓	✓	✓	✓
Pressure Spike Snubber (7)	✓	✓	✓		✓	
Remote Sensing (R)	✓	✓	✓	✓	✓	✓
Discharge to Outlet (V)			✓ ⁵	✓ ⁵	✓ ⁵	✓ ⁵
Valve Lift Indicator ⁶	✓	✓	✓	✓	✓	

General Notes:

1. Materials of construction for optional accessories will remain consistent with main and pilot valve constructions. Not all optional accessories may be available for valves specified with special trim material, based on commercial availability.
2. Option with indicator is recommended for modulating pilot control applications.
3. Customer will need to provide supplemental information to specify this option.
4. The effective CV of the manual depressurizing unit should be at least 0.4 (KV = 0.35) including any associated tubing or piping.
5. When liquid service is specified, this option is recommended.
6. Furnish complete details on type of signal output desired and power supply available.

Conversion Factors

Area		
To Convert From	To	Multiply By
Square Inches	Square Centimeters	6.452
	Square Millimeters	645.2
	Square Feet	0.006944

Density		
To Convert From	To	Multiply By
Pounds Per Cubic Feet	Pounds/US Gallon	0.1337
	Pounds/Cubic Inch	0.0005787
	Grams/Cubic Centimeter	0.01602
	Kilograms/Cubic Meter	16.018

Flow Rate (Mass)		
To Convert From	To	Multiply By
Pounds Per Hour	Kilograms Per Hour	0.4536
	Tons Per Hour (Short)	0.0005

Flow Rate (Volume)		
To Convert From	To	Multiply By
Gallons Per Minute	Cubic Feet Per Second	0.02228
	Liters Per Minute	3.785
	Liters Per Second	0.06308
	Meters Cubed Per Hour	0.2271

Length		
To Convert From	To	Multiply By
Feet	Centimeters	30.48
	Inches	12
	Millimeters	304.8
	Meters	0.3048
	Miles	0.000189
Meters	Yards	0.3333
	Centimeters	100.0
	Feet	3.281
	Inches	39.37
	Millimeters	1000.0
	Yards	1.094

Mass (Weight)		
To Convert From	To	Multiply By
Pounds	Cubic Feet of Water	0.01603
	Gallons of Water	0.11995
	Grams	453.6
	Kilograms	0.4536
	Ounces	16
	Tons (Short)	0.0005
	Tons (Long)	0.0004464
	Tons (Metric)	0.0004536

Pressure		
To Convert From	To	Multiply By
Atmospheres	Bars	1.013
	Feet of Water	33.96
	Inches of Mercury	29.92
	Inches of Water	407.50
	Kilograms per cm ²	1.033
	Millimeters of Mercury	760.00
Pounds Per Sq. In.	Pounds per square inch	14.70
	Bars	0.06895
	Feet of Water	2.31
	Inches of Mercury	2.036
	Inches of Water	27.73
	Millimeters of Mercury	51.71
	Kilograms per square cm	0.07031
	Kilopascals	6.895

Temperature Conversion Equations	
Celsius (C) =	5/9 x (Fahrenheit - 32)
Fahrenheit (F) =	(9/5 x Celsius) + 32
Kelvin (K) =	Celsius + 273.15
Rankin (R) =	Fahrenheit + 459.67

Viscosity – Absolute or Dynamic		
To Convert From	To	Multiply By
Centipoise	lbf-sec/ft. ²	0.000208854
Centipoise	kg-sec/meter ²	0.000102
Lbf-sec/sq. ft.	Pascal-sec	47.8803
Pascal sec.	Centipoise	1000
Poise (gm/cm-sec)	Centipoise	100

Viscosity – Kinematic		
To Convert From	To	Multiply By
Centistokes	Stokes	0.01
Centistokes	sq. meters/sec	0.000001
Square Feet/Sec.	Centistokes	92903.04
Square Feet/Sec.	Square meters/sec	0.092903

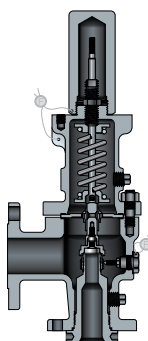
Viscosity – Absolute to Kinematic		
To Convert From	To	Multiply By
Centipoise	Centistokes	1/density (g/cm ³)

Volume		
To Convert From	To	Multiply By
Gallons (US)	Barrels	0.02381
	Cubic Inches	231.0
	Cubic Feet	0.1337
	Cubic Centimeters (or ml)	3785
	Imperial Gallons	0.8327
	Liters	3.785

Miscellaneous		
To Convert From	To	Multiply By
Specific Gravity-Gas, Water (Cubic Feet @ 60°F)	Molecular Weight-Gas	28.970
	Pounds per Cubic Feet @ 60°F	62.37
	Imperial Gallons	0.8327
	Liters	3.785

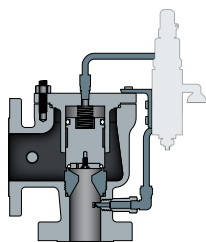
Farris Engineering Products

Process Pressure Relief Valves



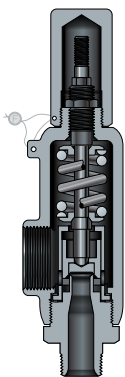
SERIES 2600/2600L

- 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

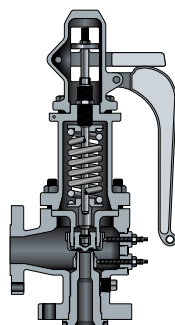
- ASME NB Certified: Air, Steam & Water
- Sizes: 1" x 2" to 12" x 16"
- Pressure Range: 15 psig to 6170 psig
- Temperature Range: -450°F to +500°F
- Materials: Carbon Steel, Stainless Steel, Monel & Hastelloy C
- Actuation: Snap and Modulating Controls
- Options: Field Test Connections, Reverse Flow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



SERIES 2700

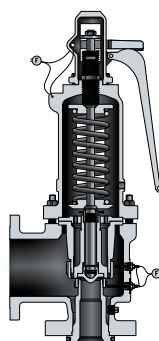
- ASME NB Certified: Air, Steam & Water
- Sizes: ½" x 1" to 1½" x 2½"
- Pressure Range: 15 psig to 6500 psig
- Temperature Range: -450°F to +750°F
- Materials: Carbon Steel, Stainless Steel, Monel & Hastelloy C
- Options: Balanced Design, O-Ring Seats, Flanged, Socket Weld, Welding Nipple, & Sanitary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

Steam Safety Valves



SERIES 4200

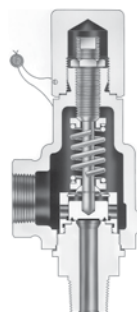
- ASME NB Section I & VIII Certified: Steam & Air
- Sizes 1¼" x 1½" to 6" x 8"
- Pressure Range: 15 psig to 1000 psig
- Temperature Range: -20°F to +1000°F
- Materials: Carbon Steel, Stainless Steel, Chrome-Moly
- Options: Test Gag
- CE Approved



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)

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

Farris Engineering Products and Services

Process Pressure Relief Valves – ASME Code Section VIII

Series 2600	ASME NB Certified for Air and Steam
Series 2600S	ASME NB Certified for Air and Steam
Series 2600L	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

Steam Safety Valves – ASME Code Section I & VIII

Series 4200	ASME NB Certified for Steam
Series 6400/6600	ASME NB Certified for Steam

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

Changeover Valves

Series 320B & 370B

Certifications and Approvals:

- ASME V, UV, NV and NPT
- National Board Approval, NB
- ISO 9001-2008
- PED 2014/68/EU (European Pressure Equipment Directive)
- ATEX 94/9/EC (European Potentially Explosive Atmospheres)
- CSA B51 (Canadian Registration)
- CSQL (China Safety Quality License)
- Customs Union TR CU 010-2011 and Customs Union TR CU 032-2013
- US Coast Guard
- Nuclear - 10 CFR 50 Appendix B, NCA-4000, NQA-1, N285.0
- First Point Assessment Limited



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- Worldwide Network of Service Centers with Factory Trained Technicians
- Local Inventory and Support, 24 Hours a Day, 7 Days a Week
- Access to Worldwide Farris Inventory through the Web
- ASME/National Board Approved Assembly, Repair & Test Facilities
- Application, Sizing & Selection Support

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Pressure Relief Valve Engineering Software for Sizing and Selection

PSM Engineering Services

- Pressure Relief System Design Services
- Pressure Relief System Audit Services
- iPRSM Pressure Relief System Management Software



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Offices Worldwide: For a listing of our global sales network, visit our website at www.cw-valvegroup.com/farrisdistributors.

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