

# Consolidated™ 2900-40 Series Generation II

## Pilot-Operated Safety Relief Valve

A full-nozzle pilot valve for Economizer applications.





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Baker Hughes provides a full range of Consolidated pressure safety valve styles, sizes, options and configurations for multiple industries, applications, environments, and media. From spring-actuated to pilot-operated, each pressure safety valve is configured to offer safer process flow control in harsh environments.

## Conversion Table

All the United States Customary System (USCS) values are converted to metric values using the following conversion factors:

USCS Unit	Conversion Factor	Metric Unit
in.	25.4	mm
lb.	0.4535924	kg
in <sup>2</sup>	6.4516	cm <sup>2</sup>
ft <sup>3</sup> /min	0.02831685	m <sup>3</sup> /min
gal/min	3.785412	L/min
lb/hr	0.4535924	kg/hr
psig	0.06894757	barg
ft lb	1.3558181	Nm
°F	$\frac{5}{9} (°F - 32)$	°C

Note: Multiply USCS value with conversion factor to get metric value.

# Scope of Design

The Consolidated 2900-40 Series Pilot-Operated Safety Relief Valve is supplied with the same non-flowing pilot valves used on the 3900 series Pilot-Operated safety relief valve. These pilot designs are suitable for both incompressible and compressible applications and perform per ASME B&PVC, Section I Code Case 2446 requirements for steam and liquid or two-phase flow services. The set pressure will not require adjustment if the service condition changes. A metal seat on the main valve is standard. An O-Ring option is available.

Product types covered in subsequent pages are noted below.			
Product Type	Pilot Type	Service	Description
2900-40	39PV	steam/liquid	pop action - non flowing
2900-40	39MV	steam/liquid	modulating action - non flowing

With the addition of a heat exchanger the limit of the 2900-40 Series valve can be expanded to meet high temperature requirements up to 1200°F (648.9°C). This makes the Consolidated 2900-40 Series Pilot-Operated valve the most versatile Pilot-Operated safety relief valve on the market. The scope of the 2900-40 Series valve is outlined in this section.

# Scope of Design

## 2900-40 Series Flanged Series Valve Overview

Standard Valve Connection - D Orifice <sup>(1)</sup>						
Orifice Area	API		ASME			
	in <sup>2</sup>	0.110	in <sup>2</sup>	0.128		
Valve Type	Inlet			Outlet		
	Size		ASME Std. Class	Size		ASME Std. Class
in.	mm	in.		mm		
2905-40	1.00	25.4	150	2.00	50.8	150
2906-40	1.00	25.4	300	2.00	50.8	150
2910-40	1.00	25.4	300	2.00	50.8	150
2912-40	1.00	25.4	600	2.00	50.8	150
2914-40	1.50	38.1	900	2.00	50.8	300
2916-40	1.50	38.1	1500	2.00	50.8	300
2918-40	1.50	38.1	2500	3.00	76.2	300
2920-40	1.00	25.4	300	2.00	50.8	150
2922-40	1.00	25.4	600	2.00	50.8	150
2924-40	1.50	38.1	900	2.00	50.8	300
2926-40	1.50	38.1	1500	2.00	50.8	300
2928-40	1.50	38.1	2500	3.00	76.2	300

Standard Valve Connection - E Orifice <sup>(1)</sup>						
Orifice Area	API		ASME			
	in <sup>2</sup>	0.196	in <sup>2</sup>	0.228		
Valve Type	Inlet			Outlet		
	Size		ASME Std. Class	Size		ASME Std. Class
in.	mm	in.		mm		
2905-40	1.00	25.4	150	2.00	50.8	150
2906-40	1.00	25.4	300	2.00	50.8	150
2910-40	1.00	25.4	300	2.00	50.8	150
2912-40	1.00	25.4	600	2.00	50.8	150
2914-40	1.50	38.1	900	2.00	50.8	300
2916-40	1.50	38.1	1500	2.00	50.8	300
2918-40	1.50	38.1	2500	3.00	76.2	300
2920-40	1.00	25.4	300	2.00	50.8	150
2922-40	1.00	25.4	600	2.00	50.8	150
2924-40	1.50	38.1	900	2.00	50.8	300
2926-40	1.50	38.1	1500	2.00	50.8	300
2928-40	1.50	38.1	2500	3.00	76.2	300

Standard Valve Connection - F Orifice <sup>(1)</sup>						
Orifice Area	API		ASME			
	in <sup>2</sup>	0.307	in <sup>2</sup>	0.357		
Valve Type	Inlet			Outlet		
	Size		ASME Std. Class	Size		ASME Std. Class
in.	mm	in.		mm		
2905-40	1.50	38.1	150	2.00	50.8	150
2906-40	1.50	38.1	300	2.00	50.8	150
2910-40	1.50	38.1	300	2.00	50.8	150
2912-40	1.50	38.1	600	2.00	50.8	150
2914-40	1.50	38.1	900	3.00	76.2	300
2916-40	1.50	38.1	1500	3.00	76.2	300
2918-40	1.50	38.1	2500	3.00	76.2	300
2920-40	1.50	38.1	300	2.00	50.8	150
2922-40	1.50	38.1	600	2.00	50.8	150
2924-40	1.50	38.1	900	3.00	76.2	300
2926-40	1.50	38.1	1500	3.00	76.2	300
2928-40	1.50	38.1	2500	3.00	76.2	300

Standard Valve Connection - G Orifice <sup>(1)</sup>						
Orifice Area	API		ASME			
	in <sup>2</sup>	0.503	in <sup>2</sup>	0.585		
Valve Type	Inlet			Outlet		
	Size		ASME Std. Class	Size		ASME Std. Class
in.	mm	in.		mm		
2905-40	1.50	38.1	150	3.00	76.2	150
2906-40	1.50	38.1	300	3.00	76.2	150
2910-40	1.50	38.1	300	3.00	76.2	150
2912-40	1.50	38.1	600	3.00	76.2	150
2914-40	1.50	38.1	900	3.00	76.2	300
2916-40	2.00	50.8	1500	3.00	76.2	300
2918-40	2.00	50.8	2500	3.00	76.2	300
2920-40	1.50	38.1	300	3.00	76.2	150
2922-40	1.50	38.1	600	3.00	76.2	150
2924-40	1.50	38.1	900	3.00	76.2	300
2926-40	2.00	50.8	1500	3.00	76.2	300
2928-40	2.00	50.8	2500	3.00	76.2	300

1. The center to face dimensions and the Inlet/Outlet combinations of the 2900-40 meet API Standard 526-2009 for Spring Loaded Valves.

# Scope of Design

## 2900-40 Series Flanged Series Valve Overview

Standard Valve Connection - H Orifice <sup>(1)</sup>						
Orifice Area	API		ASME			
	in <sup>2</sup>	0.785	in <sup>2</sup>	0.913		
	cm <sup>2</sup>	5.065	cm <sup>2</sup>	5.888		
Valve Type	Inlet			Outlet		
	Size		ASME Std. Class	Size		ASME Std. Class
	in.	mm		in.	mm	
2905-40	1.50	38.1	150	3.00	76.2	150
2906-40	1.50	38.1	300	3.00	76.2	150
2910-40	2.00	50.8	300	3.00	76.2	150
2912-40	2.00	50.8	600	3.00	76.2	150
2914-40	2.00	50.8	900	3.00	76.2	150
2916-40	2.00	50.8	1500	3.00	76.2	300
2920-40	2.00	50.8	300	3.00	76.2	150
2922-40	2.00	50.8	600	3.00	76.2	150
2924-40	2.00	50.8	900	3.00	76.2	150
2926-40	2.00	50.8	1500	3.00	76.2	300

Standard Valve Connection - J Orifice <sup>(1)</sup>						
Orifice Area	API		ASME			
	in <sup>2</sup>	1.287	in <sup>2</sup>	1.496		
	cm <sup>2</sup>	8.303	cm <sup>2</sup>	9.652		
Valve Type	Inlet			Outlet		
	Size		ASME Std. Class	Size		ASME Std. Class
	in.	mm		in.	mm	
2905-40	2.00	50.8	150	3.00	76.2	150
2906-40	2.00	50.8	300	3.00	76.2	150
2910-40	3.00	76.2	300	4.00	101.6	150
2912-40	3.00	76.2	600	4.00	101.6	150
2914-40	3.00	76.2	900	4.00	101.6	150
2916-40	3.00	76.2	1500	4.00	101.6	300
2918-40	3.00	76.2	2500	4.00	101.6	300
2920-40	3.00	76.2	300	4.00	101.6	150
2922-40	3.00	76.2	600	4.00	101.6	150
2924-40	3.00	76.2	900	4.00	101.6	150
2926-40	3.00	76.2	1500	4.00	101.6	300
2928-40	3.00	76.2	2500	4.00	101.6	300

Standard Valve Connection - K Orifice <sup>(1)</sup>						
Orifice Area	API		ASME			
	in <sup>2</sup>	1.838	in <sup>2</sup>	2.138		
	cm <sup>2</sup>	11.858	cm <sup>2</sup>	13.794		
Valve Type	Inlet			Outlet		
	Size		ASME Std. Class	Size		ASME Std. Class
	in.	mm		in.	mm	
2905-40	3.00	76.2	150	4.00	101.6	150
2906-40	3.00	76.2	300	4.00	101.6	150
2910-40	3.00	76.2	300	4.00	101.6	150
2912-40	3.00	76.2	600	4.00	101.6	150
2914-40	3.00	76.2	900	6.00	152.4	150
2916-40	3.00	76.2	1500	6.00	152.4	300
2918-40	3.00	76.2	2500	6.00	152.4	300
2920-40	3.00	76.2	2500	6.00	152.4	300
2922-40	3.00	76.2	600	4.00	101.6	150
2924-40	3.00	76.2	900	6.00	152.4	150
2926-40	3.00	76.2	1500	6.00	152.4	300
2928-40	3.00	76.2	2500	6.00	152.4	300

Standard Valve Connection - L Orifice <sup>(1)</sup>						
Orifice Area	API		ASME			
	in <sup>2</sup>	2.853	in <sup>2</sup>	3.317		
	cm <sup>2</sup>	18.406	cm <sup>2</sup>	21.400		
Valve Type	Inlet			Outlet		
	Size		ASME Std. Class	Size		ASME Std. Class
	in.	mm		in.	mm	
2905-40	3.00	76.2	150	4.00	101.6	150
2906-40	3.00	76.2	300	4.00	101.6	150
2910-40	4.00	101.6	300	6.00	152.4	150
2912-40	4.00	101.6	600	6.00	152.4	150
2914-40	4.00	101.6	900	6.00	152.4	150
2916-40	4.00	101.6	1500	6.00	152.4	150
2920-40	4.00	101.6	300	6.00	152.4	150
2922-40	4.00	101.6	600	6.00	152.4	150
2924-40	4.00	101.6	900	6.00	152.4	150
2926-40	4.00	101.6	1500	6.00	152.4	150

1. The center to face dimensions and the Inlet/Outlet combinations of the 2900-40 meet API Standard 526-2009 for Spring Loaded Valves.

# Scope of Design

## 2900-40 Series Flanged Series Valve Overview

Standard Valve Connection – M Orifice <sup>(1)</sup>						
Orifice Area	API			ASME		
	in <sup>2</sup>	3.600		in <sup>2</sup>	4.186	
	cm <sup>2</sup>	23.226		cm <sup>2</sup>	27.006	
Valve Type	Inlet			Outlet		
	Size		ASME Std. Class	Size		ASME Std. Class
	in.	mm		in.	mm	
2905-40	4.00	101.6	150	6.00	152.4	150
2906-40	4.00	101.6	300	6.00	152.4	150
2910-40	4.00	101.6	300	6.00	152.4	150
2912-40	4.00	101.6	600	6.00	152.4	150
2914-40	4.00	101.6	900	6.00	152.4	150
2920-40	4.00	101.6	300	6.00	152.4	150
2922-40	4.00	101.6	600	6.00	152.4	150
2924-40	4.00	101.6	900	6.00	152.4	150

Standard Valve Connection – N Orifice <sup>(1)</sup>						
Orifice Area	API			ASME		
	in <sup>2</sup>	4.340		in <sup>2</sup>	5.047	
	cm <sup>2</sup>	28.000		cm <sup>2</sup>	32.561	
Valve Type	Inlet			Outlet		
	Size		ASME Std. Class	Size		ASME Std. Class
	in.	mm		in.	mm	
2905-40	4.00	101.6	150	6.00	152.4	150
2906-40	4.00	101.6	300	6.00	152.4	150
2910-40	4.00	101.6	300	6.00	152.4	150
2912-40	4.00	101.6	600	6.00	152.4	150
2914-40	4.00	101.6	900	6.00	152.4	150
2920-40	4.00	101.6	300	6.00	152.4	150
2922-40	4.00	101.6	600	6.00	152.4	150
2924-40	4.00	101.6	900	6.00	152.4	150

Standard Valve Connection – P Orifice <sup>(1)</sup>						
Orifice Area	API			ASME		
	in <sup>2</sup>	6.380		in <sup>2</sup>	7.417	
	cm <sup>2</sup>	41.161		cm <sup>2</sup>	47.852	
Valve Type	Inlet			Outlet		
	Size		ASME Std. Class	Size		ASME Std. Class
	in.	mm		in.	mm	
2905	4.00	101.6	150	6.00	152.4	150
2906	4.00	101.6	300	6.00	152.4	150
2910	4.00	101.6	300	6.00	152.4	150
2912	4.00	101.6	600	6.00	152.4	150
2914	4.00	101.6	900	6.00	152.4	150
2920	4.00	101.6	300	6.00	152.4	150
2923	4.00	101.6	600	6.00	152.4	150
2924	4.00	101.6	900	6.00	152.4	150

Standard Valve Connection – Q Orifice <sup>(1)</sup>						
Orifice Area	API			ASME		
	in <sup>2</sup>	11.050		in <sup>2</sup>	12.850	
	cm <sup>2</sup>	71.290		cm <sup>2</sup>	82.903	
Valve Type	Inlet			Outlet		
	Size		ASME Std. Class	Size		ASME Std. Class
	in.	mm		in.	mm	
2905-40	6.00	152.4	150	8.00	203.2	150
2906-40	6.00	152.4	300	8.00	203.2	150
2910-40	6.00	152.4	300	8.00	203.2	150
2912-40	6.00	152.4	600	8.00	203.2	150
2920-40	6.00	152.4	300	8.00	203.2	150
2922-40	6.00	152.4	600	8.00	203.2	150

1. The center to face dimensions and the Inlet/Outlet combinations of the 2900-40 Series meet API Standard 526-2009 for Spring Loaded Valves.



# Scope of Design

## 2900-40 Series Flanged Series Valve Overview

Standard Valve Connection - R Orifice <sup>(1)</sup>						
Orifice Area	API			ASME		
	in <sup>2</sup>	16.000		in <sup>2</sup>	18.600	
	cm <sup>2</sup>	103.226		cm <sup>2</sup>	120.000	
Valve Type	Inlet			Outlet		
	Size		ASME Std. Class	Size		ASME Std. Class
	in.	mm		in.	mm	
2905	6.00	152.4	150	8.00	203.2	150
2906	6.00	152.4	300	8.00	203.2	150
2910	6.00	152.4	300	10.00	254.0	150
2912	6.00	152.4	600	10.00	254.0	150
2920	6.00	152.4	300	10.00	254.0	150
2922	6.00	152.4	600	10.00	254.0	150

Standard Valve Connection - T Orifice <sup>(1)</sup>						
Orifice Area	API			ASME		
	in <sup>2</sup>	26.000		in <sup>2</sup>	30.210	
	cm <sup>2</sup>	167.740		cm <sup>2</sup>	194.900	
Valve Type	Inlet			Outlet		
	Size		ASME Std. Class	Size		ASME Std. Class
	in.	mm		in.	mm	
2905	8.00	203.2	150	10.00	254.0	150
2906	8.00	203.2	300	10.00	254.0	150
2910	8.00	203.2	300	10.00	254.0	150
2912	8.00	203.2	600	10.00	254.0	150
2920	8.00	203.2	300	10.00	254.0	150
2922	8.00	203.2	600	10.00	254.0	150

Standard Valve Connection - U Orifice <sup>(1)</sup>						
Orifice Area	API			ASME		
	in <sup>2</sup>	N/A		in <sup>2</sup>	35.000	
	cm <sup>2</sup>	N/A		cm <sup>2</sup>	225.806	
Valve Type	Inlet			Outlet		
	Size		ASME Std. Class	Size		ASME Std. Class
	in.	mm		in.	mm	
2905	8.00	203.2	150	10.00	254.0	150
2906	8.00	203.2	300	10.00	254.0	150
2910	8.00	203.2	300	10.00	254.0	150
2912	8.00	203.2	600	10.00	254.0	150
2920	8.00	203.2	300	10.00	254.0	150
2922	8.00	203.2	600	10.00	254.0	150

Standard Valve Connection - V Orifice <sup>(1)</sup>						
Orifice Area	API			ASME		
	in <sup>2</sup>	N/A		in <sup>2</sup>	50.260	
	cm <sup>2</sup>	N/A		cm <sup>2</sup>	324.257	
Valve Type	Inlet			Outlet		
	Size		ASME Std. Class	Size		ASME Std. Class
	in.	mm		in.	mm	
2905	10.00	254.0	150	14.00	254.0	150
2906	10.00	254.0	300	14.00	254.0	150
2910	10.00	254.0	300	14.00	254.0	150
2912	10.00	254.0	300	14.00	254.0	150

Standard Valve Connection - W Orifice <sup>(1)</sup>						
Orifice Area	API			ASME		
	in <sup>2</sup>	N/A		in <sup>2</sup>	78.996	
	cm <sup>2</sup>	N/A		cm <sup>2</sup>	509.651	
Valve Type	Inlet			Outlet		
	Size		ASME Std. Class	Size		ASME Std. Class
	in.	mm		in.	mm	
2905	12.00	304.8	150	16.00	406.4	150
2906	12.00	304.8	300	16.00	406.4	150
2910	12.00	304.8	300	16.00	406.4	150
2920	12.00	304.8	300	16.00	406.4	150

1. The center to face dimensions and the Inlet/Outlet combinations of the 2900-40 Series meet API Standard 526-2009 for Spring Loaded Valves.

# Scope of Design

## 2900-40 Series Flanged Series Valve Overview

Pressure Limits <sup>(1),(2)&amp;(5)</sup>						
Product Type	Pilot Type	Minimum		Maximum		Service
		psig	barg	psig	barg	
2900-40	39PV	40	2.76	3750	258.55	liquid/steam
2900-40	39MV	40	2.76	5800	399.90	liquid/steam

Temperature Limits <sup>(1),(2)&amp;(5)</sup>						
Product Type	Pilot Type	Minimum		Maximum		Service
		°F	°C	°F	°C	
2900-40	39PV/MV	-40	-40.0	505	262.8	liquid
2900-40 w/ heat exchanger	39PV/MV	-450	-267.8	1200	648.9	liquid
2900-40	39PV/MV	212	100.0	505	262.8	steam
2900-40 w/ heat exchanger	39PV/MV	212	100.0	1200	648.9	steam

Soft Goods Guide <sup>(3),(4)&amp;(5)</sup>																	
Service		Pilot Valve								Main Valve							
		Temperature Range				Pressure Range				Temperature Range				Pressure Range			
		min.		max.		min.		max.		min.		max.		min.		max.	
		°F	°C	°F	°C	psig	barg	psig	barg	°F	°C	°F	°C	psig	barg	psig	barg
liquid	Ethylene Propylene	-40	-40.0	400	204.4	40	2.76	3750	258.55	-70	-56.7	500	260.0	40	2.76	3750	258.55
liquid	PTFE	212	100.0	505	262.8	40	2.76	5800	399.90	-300	-184.4	505	262.8	40	2.76	5800	399.90
steam	Ethylene Propylene	212	100.0	500	260.0	40	2.76	3750	258.55	212	100.0	500	260.0	40	2.76	3750	258.55
steam	PTFE	212	100.0	505	262.8	40	2.76	5800	399.90	212	100.0	505	262.8	40	2.76	5800	399.90

1. The above table is general in nature and is to be used as a guideline only.
2. Refer to the Pressure/Temperature Tables beginning on page 51 for actual pressure limits at a given temperature by orifice and materials of construction.
3. Refer to the Soft Goods Selection Table on page 16 for material selection for a given pressure, temperature, fluid type, durometer hardness and orifice size.
4. When the pressure temperature limits of the soft goods in the pilot valve and main valve are exceeded, the heat exchanger must be used to condition the media to within an acceptable range. A standard metal seat is used on the main base with the heat exchanger.
5. Sizing of the heat exchanger is required and may not be suitable for all applications.

# Scope of Design

## 2900-40 Series Flanged Series Valve Overview

Options		
Options	Pilot Type	
	39PV	39MV
Backflow Preventer	Yes	Yes
Bonnet (vented) <sup>(2)</sup>	Yes	Yes
Dirty Service	Yes	Yes
Dual Filters	Yes	Yes
Dual Pilots	Yes	Yes
Heat Exchanger <sup>(3)</sup>	Yes	Yes
High Capacity Line Filter (with flush valve)	Yes	Yes
Optional Sensing Line Filter (standard for steam service)	Yes	Yes
Pilot Discharge to Body Bowl	Yes	Yes
Pressure Differential Switch	Yes	Yes
Remote Actuated Blowdown	Yes	Yes
Remote Pilot Mounting	Yes	Yes
Integral Sense (Recommended)	Yes	Yes
Remote Sense <sup>(1)</sup>	Yes	Yes
Sensing Ring	Yes	Yes

1. The standard product is supplied with the remote sense connection. It must be piped to the system pressure or the sensing ring option must be used.
2. When vented bonnet option is selected for steam service, an Inconel X750 spring is supplied.
3. Use of a Heat Exchanger is subject to sizing and may not be suitable for all applications.

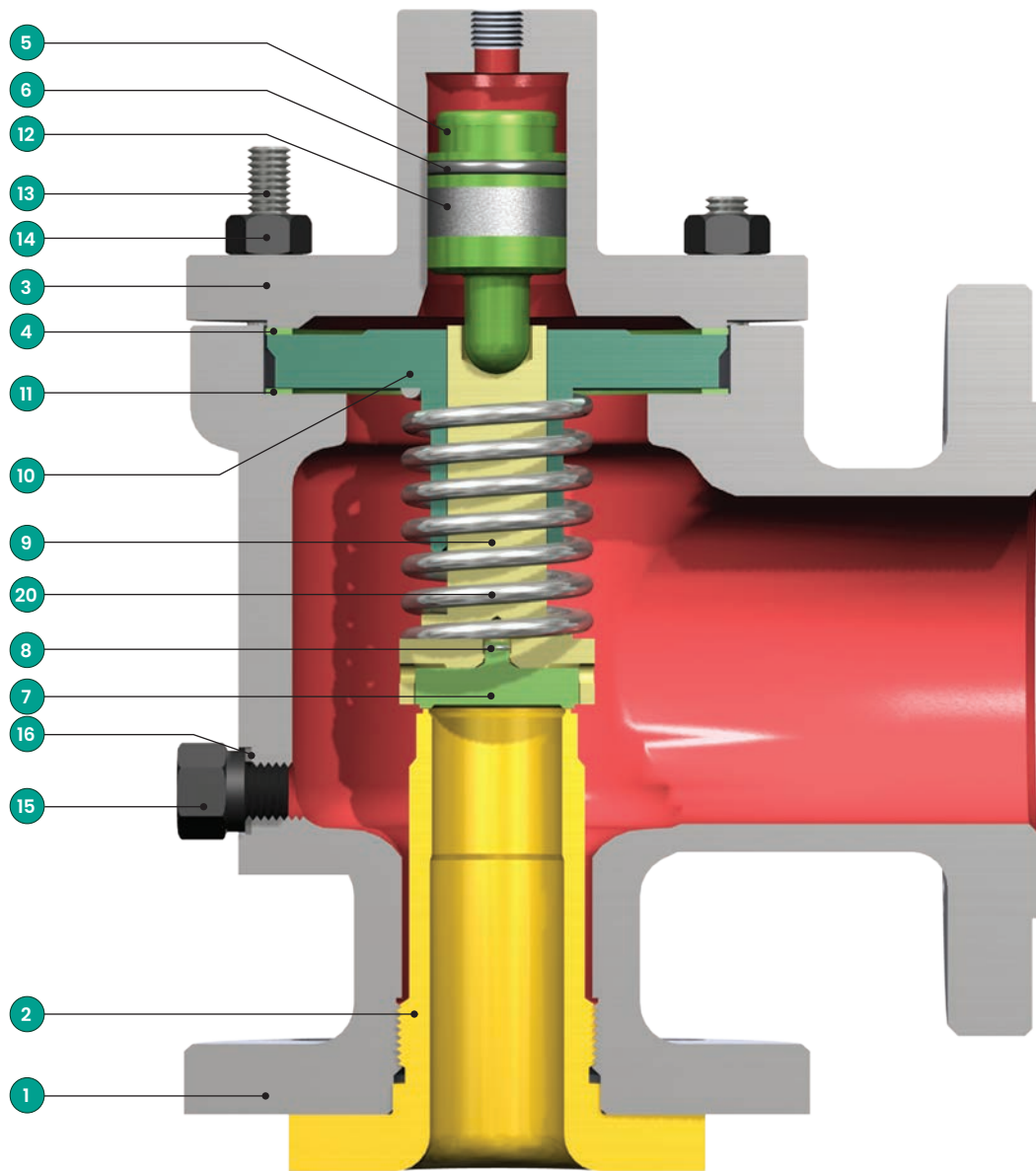
Applications		Pilot Type	
		39PV	39MV
<b>Type</b>			
Pop Action - Non Flowing		Yes	No
Modulating - Non Flowing		No	Yes
<b>Media</b>			
Vapor		No	No
Dirty Vapor (filter required)		No	No
Steam		Yes	Yes
Liquid		Yes	Yes
<b>Operational Conditions</b>			
Icing		Yes	Yes
Pulsations		Yes	Yes
Reduces Water Hammer (when valve closes)		Yes	Yes
<b>Operational Performance<sup>(1),(2)&amp;(4)</sup></b>			
Pressure Range:	40 - 3750 psig (Liquid/Steam) (2.76 - 258.88 barg)	Yes	Yes
	40 - 5800 psig (Liquid/Steam) (2.76 - 399.90 barg)	No	Yes
Blowdown:	2% to 7% adjustable	Yes	Yes
Main Valve Seat Tightness (% of set pressure):			
	Metal Seat - Per API 527	98%	98%
	Soft Seat - Bubble Tight	98%	98%
<b>Back Pressure (with pilot vented to body bowl)<sup>(5)</sup>:</b>			
	Variable - % of Set Pressure	15%	65%
	Constant - % of Set Pressure	65% <sup>3</sup>	65%
<b>Back Pressure (with pilot vented to atmosphere)<sup>(5)</sup>:</b>			
	Variable - % of Set Pressure	97%	97%
	Constant - % of Set Pressure	97%	97%
<b>Temperature:</b>			
	Without Heat Exchanger	-40°F to 505°F (-40°C to 262.8°C)	-40°F to 505°F (-40°C to 262.8°C)
	With Heat Exchanger <sup>(4)</sup>	506°F to 1200°F (263.3°C to 648.9°C)	506°F to 1200°F (263.3°C to 648.9°C)

1. Review Pressure/Temperature tables.
2. Review Outlet Flange Ratings and Capacity Correction Factor.
3. A Cold Differential Test Pressure (CDTP) must be applied for a 39PV when the constant back pressure is over 15% of set pressure.
4. Use of a Heat Exchanger is subject to sizing and may not be suitable for all applications.
5. If backflow preventer is installed, total backpressure is limited to 65%.

# Main Valve Materials

## 2900-40 Series Conventional Type Main Valve - Metal Seat

### Main Valve - Metal Seat (D-U Orifices)



# Main Valve Materials

## 2900–40 Series Conventional Type Main Valve

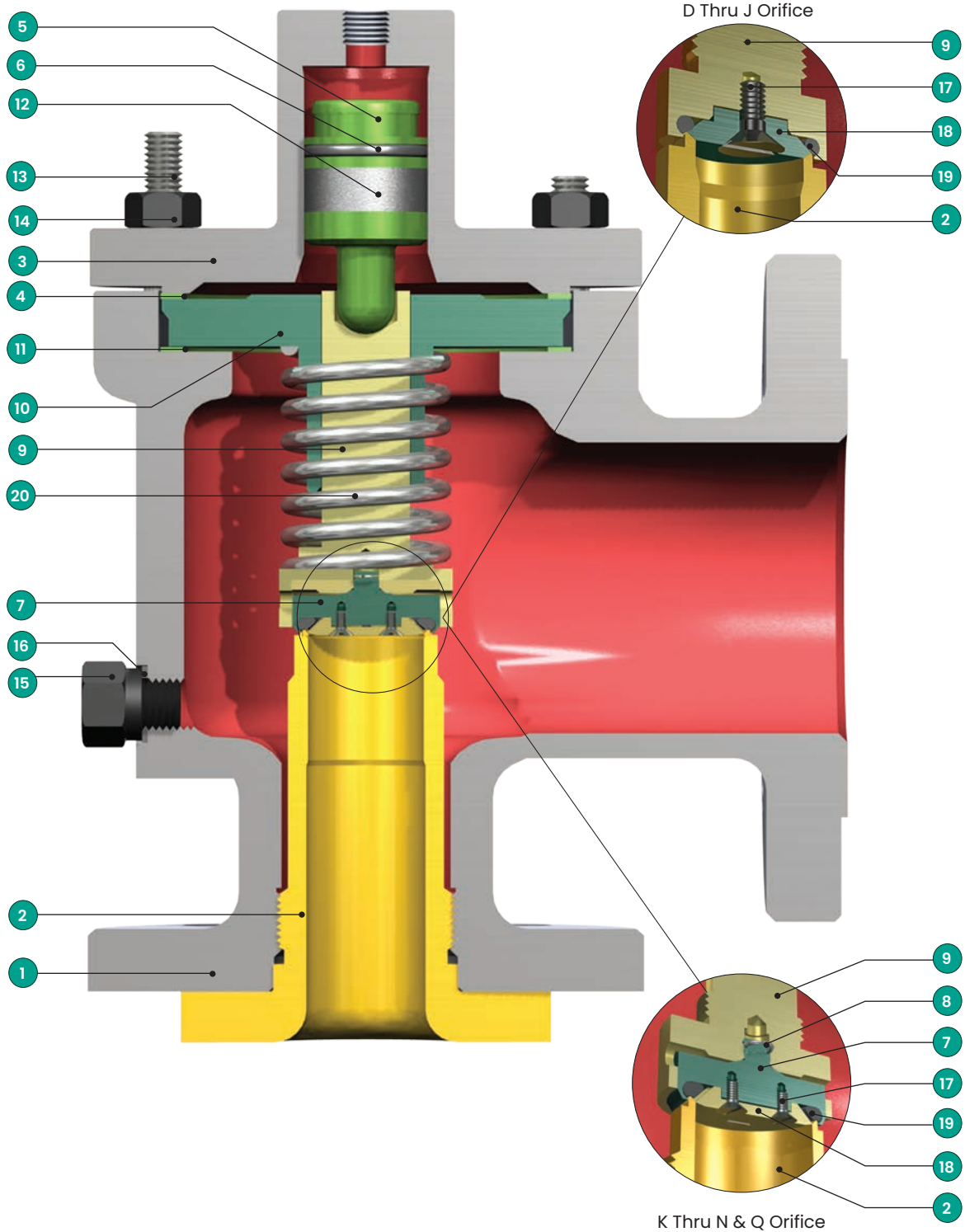
Standard Material for 2900–40 Series Metal Seat Main Valve		
Ref. No.	Nomenclature	Material
1	Base	
	2905–2918	ASME SA216 WCC Carbon Steel
	2920–2928	ASME SA217 WC6 Alloy Steel
1A	Base Plug	
	2905–2918	Carbon Steel
	2920–2928	316 Stainless Steel
2	Nozzle	316 Stainless Steel
3	Coverplate	ASME SA351 CF8M Stainless Steel
4	Coverplate Gasket	Soft Iron
5	Main Valve Piston	316 Stainless Steel
6	Main Valve Piston O-Ring	Select
7	Disc	
	Metal Seat	316 Stainless Steel
	<i>Thermodisc™</i> (Optional) <sup>(2)</sup>	616 Stainless Steel
8	Disc Retainer	Inconel X-750
9	Disc Holder	316 Stainless Steel
10	Guide	316 Stainless Steel
11	Guide Gasket	Soft Iron
12	Guide Ring	PTFE
13	Stud (Base)	ASME SA193 B7 Alloy Steel
14	Nut (Base)	ASME SA194 2H Alloy Steel
15	Plug/Adaptor	316 Stainless Steel
16	Plug/Adaptor Gasket	Soft Iron
20	Spring	Inconel X-750
	Pilot Mount Bracket	Carbon Steel
	Lifting Eye Bolt	Carbon Steel
	Sensing Ring (Optional)	316 Stainless Steel
	Sensing Tube (Optional)	316 Stainless Steel
	Integral Sensing Ring (optional)	316 Stainless Steel
	Integral Sensing Ring Gasket (Optional)	Flexitallic
	Vent Adaptor (Optional)	316 Stainless Steel
	Heat Exchanger (Optional)	316 Stainless Steel
	39PV Pilot Material	Material Option (-CC) <sup>(1)</sup>

1. Refer Page 19.

2. For steam service only.

# Main Valve Materials

## 2900-40 Series Conventional Type Main Valve - Soft Seat



# Main Valve Materials

## 2900-40 Series Conventional Type Main Valve – Soft Seat

### The Double Seal Soft Seat

The double seal design incorporates the merits of both a soft seat and a metal seat design valve. The 45° metal seat provides the load bearing surface to transmit piston pressure force, the slotted O-Ring retainer allows the O-Ring to be pressurized and accomplish the primary sealing function. For pressure/temperature ratings of the seal, refer to Soft Goods Selection beginning on page 16.

Tightness: Consolidated O-Ring seat seal valves are bubble tight at 98% of set pressure.

Consolidated O-Ring seat seals provide positive closure, assuring continuous, trouble-free service, and complete valve tightness after numerous “pops”.

### Standard Material for 2900-40 Series Soft Seat Main Valve

Ref. No.	Nomenclature	Material
1	Base	
	2905-2918	ASME SA216 WCC Carbon Steel
	2920-2928	ASME SA217 WC6 Alloy Steel
1A	Base Plug	
	2905-2918	Carbon Steel
	2920-2928	316 Stainless Steel
2	Nozzle	316 Stainless Steel
3	Coverplate	ASME SA351 CF8M Stainless Steel
4	Coverplate Gasket	Soft Iron
5	Main Valve Piston	316 Stainless Steel
6	Main Valve Piston O-Ring	Select
7	Disc	
	Metal Seat/Soft Seat	316 Stainless Steel
8	Disc Retainer	Inconel X-750
9	Disc Holder	316 Stainless Steel
10	Guide	316 Stainless Steel
11	Guide Gasket	Soft Iron
12	Guide Ring	PTFE
13	Stud (Base)	ASME SA193 B7 Alloy Steel
14	Nut (Base)	ASME SA194 2H Alloy Steel
15	Plug/Adaptor	316 Stainless Steel
16	Plug/Adaptor Gasket	Soft Iron
17	O-Ring Retainer Lock Screw	316 Stainless Steel
18	O-Ring Retainer	316 Stainless Steel
19	O-Ring Seat Seal	Select
20	Spring	Inconel X-750
	Pilot Mount Bracket	Carbon Steel
	Lifting Eye Bolt	Carbon Steel
	Sensing Ring (Optional)	316 Stainless Steel
	Sensing Tube (Optional)	316 Stainless Steel
	Integral Sensing Ring (Optional)	316 Stainless Steel
	Integral Sensing Ring Gasket (Optional)	Flexitallic
	Vent Adaptor (Not Shown) (Optional)	316 Stainless Steel
	Heat Exchanger (Not Shown) (Optional)	316 Stainless Steel
	39PV Pilot Material	Material Option (-CC) <sup>(1)</sup>

Note: The Consolidated 2900-40 Series O-Ring design features a secondary metal-to-metal seat which becomes effective if O-Ring integrity is lost due to external fire or other causes. The retainer is lapped to the nozzle at assembly assuring seat tightness.

1. Refer Page 19.

# Special Materials

## 2900-40 Series Valve Special Materials Options

The 2900-40 Series valve requires various material options to satisfy customer needs and API standards. The most common options are listed in this section. For options not listed here, contact the factory. Specify the material construction classification using the construction variations, such as: S2, T1, etc.

Options included are:

- S2 - Stainless Steel - Internal Parts
- S4 - Stainless Steel - Complete Valve
- T1 - High Temperature Service - [1001°F to 1200°F (538°C to 649°C)]

Many other special options are available not necessarily of a material nature. These include, but are not limited to, special facings on connections or special connections. Contact the factory for special requirements.

### Stainless Steel

Corrosive Service, Stainless Steel Materials <sup>(1)&amp;(2)</sup>		
Component	Construction Variation	
	S2	S4
<b>Common Components</b>		
Base: Types 2905 thru 2918	ASME SA216 WCC Carbon Steel	ASME SA351 CF8M Stainless Steel
Base: Types 2920 thru 2928	ASME SA217 WC6 Alloy Steel	ASME SA351 CF8M Stainless Steel
Base Plug: Types 2905 thru 2918	Carbon Steel	316 Stainless Steel
Base Plug: Types 2920 thru 2928	316 Stainless Steel	316 Stainless Steel
Nozzle	316 Stainless Steel	316 Stainless Steel
Coverplate	ASME SA351 CF8M Stainless Steel	ASME SA351 CF8M Stainless Steel
Coverplate Gasket	Monel	Monel
Main Valve Piston	316 Stainless Steel	316 Stainless Steel
Main Valve Piston O-Ring	Select	Select
<b>Disc</b>		
Metal Seat/Soft Seat	316 Stainless Steel	316 Stainless Steel
Thermodisc (Optional) <sup>(4)</sup>	616 Stainless Steel	616 Stainless Steel
Disc Retainer	Inconel X-750	Inconel X-750
Disc Holder	316 Stainless Steel	316 Stainless Steel
Guide	316 Stainless Steel	316 Stainless Steel
Guide Gasket	Monel	Monel
Guide Ring	PTFE	PTFE
Stud (Base)	ASME SA193 B7 Alloy Steel	ASME SA193 B8M Alloy Steel
Nut (Base)	ASME SA194 2H Alloy Steel	ASME SA194 8M Alloy Steel
Plug/Adaptor	316 Stainless Steel	316 Stainless Steel
Plug/Adaptor Gasket	Monel	Monel
O-Ring Retainer Lock Screw	316 Stainless Steel	316 Stainless Steel
O-Ring Retainer	316 Stainless Steel	316 Stainless Steel
O-Ring Seat Seal	Select	Select
Spring	Inconel X-750	Inconel X-750
Pilot Mount Bracket	Carbon Steel	316 Stainless Steel
Lifting Eye Bolt	Carbon Steel	316 Stainless Steel
Sensing Ring (Optional)	316 Stainless Steel	316 Stainless Steel
Sensing Tube (Optional)	316 Stainless Steel	316 Stainless Steel
Integral Sensing Ring (Optional)	316 Stainless Steel	316 Stainless Steel
Integral Sensing Ring Gasket (Optional)	Flexitallic	Flexitallic
Vent Adaptor (Optional)	316 Stainless Steel	316 Stainless Steel
Heat Exchanger (Optional)	316 Stainless Steel	316 Stainless Steel
39PV Pilot Material	Material Option (-CC) <sup>(3)</sup>	Material Option (-CC) <sup>(3)</sup>

1. The materials in red denote variation from standard material construction.
2. To specify valves, add material designation to the valve type, 2900-40L/S2.
3. Refer Page 19.
4. For steam service only.



# Special Materials

## High Temperatures

Special Material for High Temperature Service <sup>(1),(2)&amp;(3)</sup> [1001 to 1200°F (538 to 649°C)]	
Component	Construction Variation (T1)
Common Components	
Base: Types 2905 thru 2918	ASME SA351 CF8M Stainless Steel
Base: Types 2920 thru 2928	ASME SA351 CF8M Stainless Steel
Base Plug: Types 2905 thru 2918	316 Stainless Steel
Base Plug: Types 2920 thru 2928	316 Stainless Steel
Nozzle	316 Stainless Steel
Coverplate	ASME SA351 CF8M Stainless Steel
Coverplate Gasket	Monel
Main Valve Piston	316 Stainless Steel
Main Valve Piston O-Ring	Select
Disc	
Metal Seat/Soft Seat	316 Stainless Steel
Thermodisc (Optional) <sup>(5)</sup>	Inconel X-750
Disc Retainer	Inconel X-750
Disc Holder	316 Stainless Steel/Glide Alloy Coated
Guide	316 Stainless Steel
Guide Gasket	Monel
Guide Ring	PTFE
Stud (Base)	ASME SA193 B8M Alloy Steel
Nut (Base)	ASME SA194 8M Alloy Steel
Plug/Adaptor	316 Stainless Steel
Plug/Adaptor Gasket	Monel
O-Ring Retainer Lock Screw	316 Stainless Steel
O-Ring Retainer	316 Stainless Steel
O-Ring Seat Seal	Select
Spring	Inconel X-750
Pilot Mount Bracket	Carbon Steel
Lifting Eye Bolt	Carbon Steel
Sensing Ring (Optional)	316 Stainless Steel
Sensing Tube (Optional)	316 Stainless Steel
Integral Sensing Ring (Optional)	316 Stainless Steel
Integral Sensing Ring Gasket (Optional)	
Vent Adaptor (Optional)	316 Stainless Steel
Heat Exchanger (Optional)	316 Stainless Steel
39PV Pilot Material	Material Option (-CC) <sup>(4)</sup>

1. The materials in red denote variation from standard material construction.
2. To specify valves, add material designation to the valve type, 2900-40L/T1.
3. For temperatures 505°F (263°C) and above, a heat exchanger must be specified.
4. Refer Page 19.
5. For steam service only.

# Soft Goods Selection

## Soft Goods Selection Chart

2900-40 Series Valve Soft Goods Selection Chart <sup>(3)</sup>			
Component	Description	Service	
		Steam/Liquid	
		40 to 3750 psig (2.76 to 258.55 barg)	40 to 5800 psig (2.76 to 399.90 barg)
Main Valve <sup>(1)&amp;(2)</sup>	Seat O-Ring Option	ethylene/propylene 90	PTFE
	Piston Spring Seal	N/A	PTFE
	O-Ring	ethylene/propylene 90	N/A
	Piston Guide Ring	PTFE	PTFE
Pilot Valve	Adjuster Bottom O-Ring	ethylene/propylene 90	PTFE
	Adjuster Top O-Ring	ethylene/propylene 90	PTFE
	Insert O-Ring	ethylene/propylene 90	PTFE
	Base O-Ring	ethylene/propylene 90	PTFE
	Piston Spring Seal	PTFE	PTFE
	Adjuster Top Spring Seal	PTFE	PTFE
	Insert Spring Seal	PTFE	PTFE

1. When main valve is equipped with O-Ring seat, O-Rings for seat and piston shall be of the same material and durometer.
2. When PTFE material is selected, piston shall be equipped with a PTFE Z energized seal instead of an O-Ring.
3. When a Heat Exchanger is required, use the exit temperature of the Heat Exchanger to select the soft goods. A standard metal seat is used on the main base with the heat exchanger.)

# Remote Sensing

## Remote Sensing at the Source of System Pressure

With the remote sense option, the sensing line is not connected directly at the main valve inlet. The system pressure is sensed remotely or at the pressure vessel and equipment being protected.

If the pressure drop from the equipment being protected to the relief valve inlet exceeds 3%, remote sensing can provide a solution. Remote sensing minimizes the effects of excessive inlet pressure loss and eliminates the resulting valve chatter.

The 2900-40 Series valve with remote sensing is ideal for upgrading current 1900/P Safety Relief Valves and competitors safety relief valves to the new 2900-40 Series Pilot-Operated safety relief valve, because the center to face dimensions on both the inlet and outlet are the same.

The length, size, and maximum change in height of the remote sensing line should be verified through analysis, taking into account the requirement to recharge the dome through the pilot valve. On request, Dresser will assist in the analysis to determine the appropriate length, size, and maximum change in height for the sensing line and to determine the correct capacity of the pressure relief valve. The customer needs to provide the information in the form below.

### Remote Sensing Line Sizing – Input Form

Date:	
Customer:	
For Valve Model Number:	

### Input Required

P1 = Set Pressure	_____ psig _____ barg
$\rho$ = Fluid density of the media in the condensed state	_____ lb/ft <sup>3</sup> _____ kg/m <sup>3</sup>

### Installation Input Required

Total length of the sensing line	_____ ft _____ m
The change in vertical height from the point of sensing to the pilot valve inlet (+ or -) <sup>(1)</sup>	_____ ft _____ m

#### Elbows

Quantity used:	
Type used:	
Size used:	

#### Valves

Quantity used:	
Type used:	
Size used:	

1. Plus (+) = pilot above sensing point, Minus (-) = pilot below sensing point.

# Pilot Designs

## Non-Flowing Pilot-Operated Safety Relief Valves

### 2900-40 Series Valve with 39PV Pop Action



### Description – 39PV

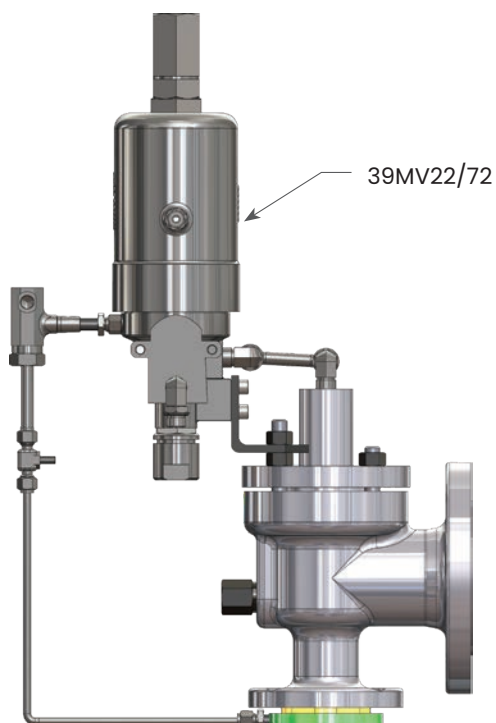
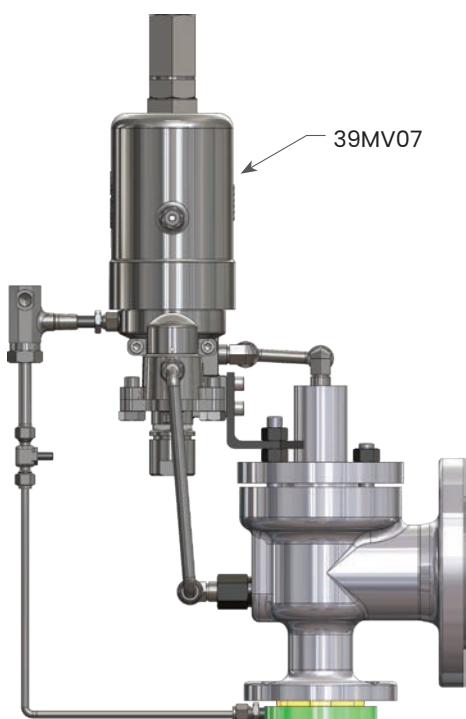
The Consolidated 39PV pop action non-flowing pilot provides excellent performance with full lift at set pressure with minimal blowdown.

The 39PV may be converted to the 39MV07 modulating pilot by simply installing the modulator assembly. The 39PV37 pop action pilot is not convertible to the 39MV22 or 39MV72 pilots.

These pilots are non-flowing at full open, improving their capabilities. 39PV/MV have the unique ability to be used on liquid or steam service without any adjustments.

Set pressures are field adjustable, and testing is easily performed using the standard field test connection. Manual blowdown, sensing line filter and backflow preventer are available as options.

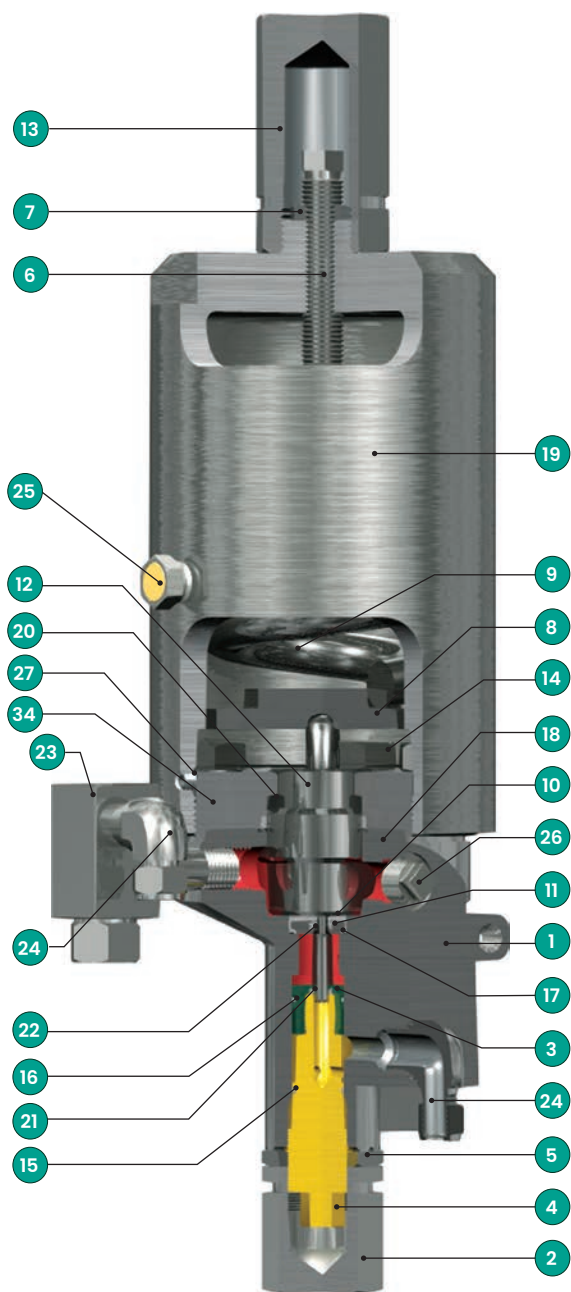
### 2900-40 Series valve with 39MV modulating action



# 39 PV Pilot Materials

## 2900-40 Series Pop Action, Non-Flowing For Set Pressure 40 - 3750 psig (2.76 - 258.55 barg)

### 39PV Pop Action Pilot Valve



### 39PV Materials

Part		Material Construction (-CC)
1	Main Base	ASME SA351 CF8M Stainless Steel
2	Adjuster Cap	316 Stainless Steel
3	Adjuster Top	316 Stainless Steel
4	Adjuster Bottom	316 Stainless Steel
5	Adjuster Lock Nut	316 Stainless Steel
6	Compression Screw	316 Stainless Steel
7	Compression Screw Lock Nut	316 Stainless Steel
8	Spring Washer	316 Stainless Steel
9	Spring	Chrome Steel (Phosphate Coated)
10	Insert Top	316 Stainless Steel
11	Insert Bottom	316 Stainless Steel
12	Main Piston	316 Stainless Steel
13	Cap (Compression Screw)	316 Stainless Steel
14	Cap Screw (Top Plate)	ASME SA193 B8M Stainless Steel
15	O-Ring (Adjuster Bottom)	Select
16	O-Ring (Adjuster Top)	Select
17	O-Ring (Insert)	Select
18	O-Ring (Top Plate)	Select
19	Bonnet	ASME SA351 CF8M Stainless Steel
20	Spring Seal (Main Piston)	PTFE
21	Spring Seal (Adjuster Top)	PTFE
22	Spring Seal (Insert)	PTFE
23	Field Test Connector	
	Ball	316 Stainless Steel
	Seat O-Ring	Select
	Plug O-Ring	Select
	Shuttle Base	316 Stainless Steel
	Shuttle Plug	316 Stainless Steel
	Tube Filter	304 Stainless Steel
24	Vent Assembly/Bug Screen (Field Test Connection)	
	Male Elbow	316 Stainless Steel
	Screen	304 Stainless Steel
25	Vent Assembly (Bonnet Vent) <sup>(1)</sup>	Nickel Steel/Bronze
	Male Elbow	-
	Screen	-
26	Pipe Plug (Pilot Valve)	304 Stainless Steel
27	Set Screw (Bonnet)	316 Stainless Steel
34	Top Plate	316 Stainless Steel

1. Standard material is a filter plug. For special materials, vent assembly is supplied.

# Pilot Materials

## Modulating Action, Non-Flowing For Set Pressures

### 2900-40 Series Valve with 39MV Modulating Action



## Quality, Reliability, Simplicity

The Consolidated 39MV Pilot-Operated Safety Relief Valve is a non-flowing modulating pilot valve that provides exceptional performance and stable operation. Since the 39MV design controls the attached main valve, relieving only enough system pressure to control the system upset, loss of media is minimal. This patented technology is the latest advancement in pilot design within the pressure range of 40 to 5800 psig (2.76 to 399.90 barg) for steam and liquid service. The 39MV design is the only non-flowing modulating valve of its kind available with adjustable blowdown. The unique modulator of the 39MV07 pilot is an addition to the 39PV pop action design whose simplicity allows for easier maintenance and for lower spare parts inventory.

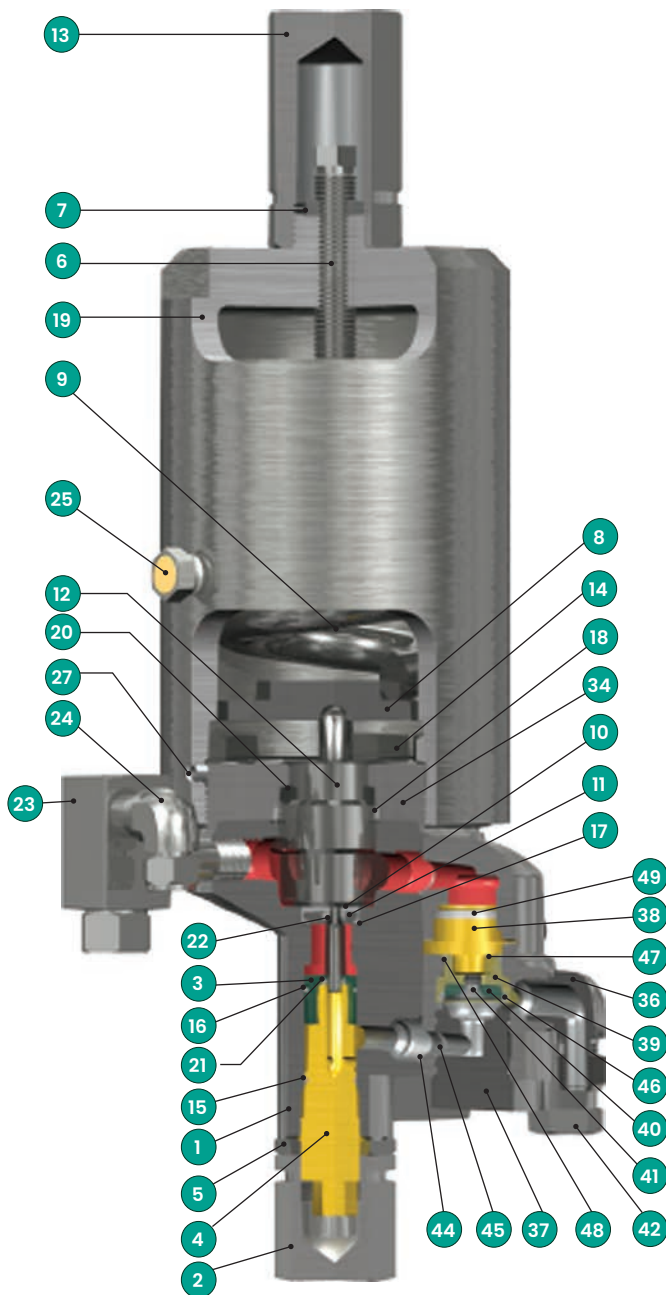
The 39MV22/72 modulating pilot features a modulator built into the pilot valve. This design reduces product cost, improves modulating performance, and increases energized seal life as well as the capable pressure range of the pilot valve to 5800 psig (399.90 barg).

# Pilot Materials (MV)

## 2900-40 Series Valve Type 39MV07 Pilot

[40 to 750 psig (2.76 to 51.71 barg)]

### 39MV07 Pilot Construction



### High Pressure



### 39MV07 Pilot Standard Material Variation

Ref. No.	Nomenclature	Material
1	Main Base	SA351 Grade CF8M St. St.
2	Adjuster Cap	316 Stainless Steel
3	Adjuster Top	316 Stainless Steel
4	Adjuster Bottom	316 Stainless Steel
5	Adjuster Lock Nut	316 Stainless Steel
6	Compression Screw	316 Stainless Steel
7	Compression Screw Lock Nut	316 Stainless Steel
8	Spring Washer	316 Stainless Steel
9	Spring	Chrome St. (Phosphate Coated)
10	Insert Top	316 Stainless Steel
11	Insert Bottom	316 Stainless Steel
12	Main Piston	316 Stainless Steel
13	Cap (Compression Screw)	316 Stainless Steel
14	Cap Screw (Top Plate)	316 Stainless Steel
15	O-ring (Adjuster Bottom)	Select
16	O-ring (Adjuster Top)	Select
17	O-ring (Insert)	Select
18	O-ring (Top Plate)	Select
19	Bonnet	SA351 Grade CF8M St. St.
20	Spring Seal (Main Piston)	PTFE
21	Spring Seal (Adjuster Top)	PTFE
22	Spring Seal (Insert)	PTFE
23	Field Test Connector	
	Ball	316 Stainless Steel
	Seat O-ring	Select
	Plug O-ring	Select
	Shuttle Base	316 Stainless Steel
	Shuttle Plug	316 Stainless Steel
	Tube Filter	304 Stainless Steel
24	Vent Assembly/Bug Screen (Field Test Connection)	
	Male Elbow	316 Stainless Steel
	Screen	304 Stainless Steel
25	Vent Assembly (Bonnet Vent) <sup>(1)</sup>	Nickel Steel/Bronze
27	Set Screw (Bonnet)	316 Stainless Steel
34	Top Plate	316 Stainless Steel
35	Plug Filter	SA351 Grade CF8M St. St.
36	Modulator Base	SA351 Grade CF8M St. St.
37	Modulator Stop	316 Stainless Steel
38	Modulator Piston Top	316 Stainless Steel
39	Modulator Piston Bottom	316 Stainless Steel
40	O-ring Retainer	316 Stainless Steel
41	Lock Screw (Retainer)	316 Stainless Steel
42	Cap Screw (Modulator)	316 Stainless Steel
43	Socket Head Cap Screw (Mod.)	Select
44	O-ring (Mod. Base)	Select
45	O-ring (Mod. Stop)	Select
46	O-ring (Mod. Seat)	Select
47	O-ring (Mod. Piston Bottom)	PTFE
48	Spring Seal (Piston Bottom)	PTFE
49	Spring Seal (Piston Top)	PTFE

1. Standard material is a filter plug. For special materials, vent assembly is supplied.

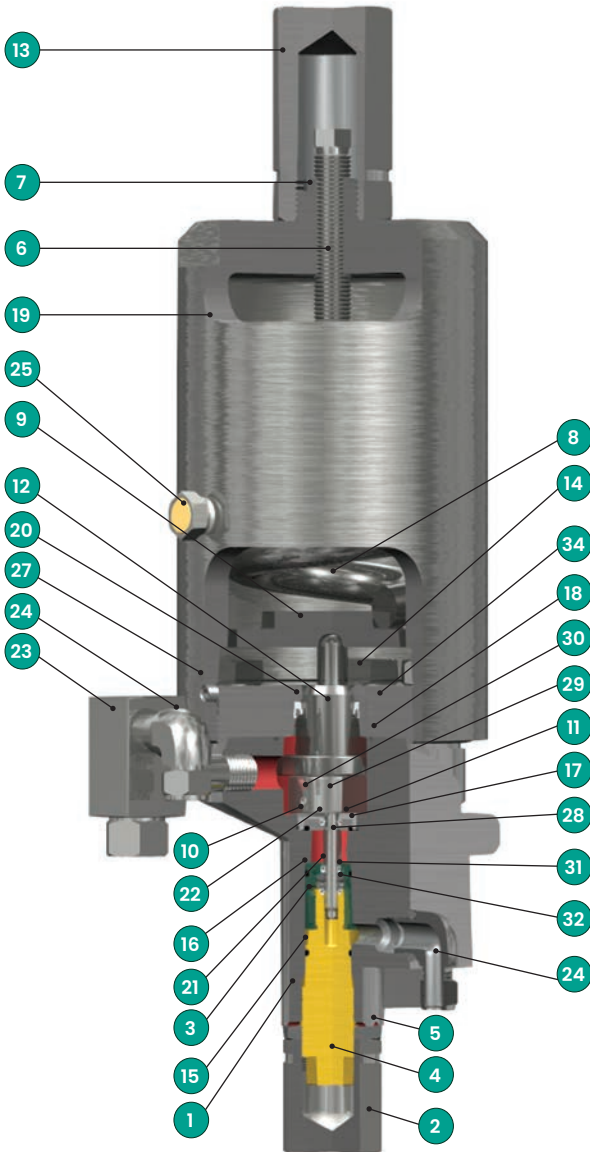
# Pilot Materials (MV)

## 2900-40 Series Valve Type 39MV22/39MV72 Pilot

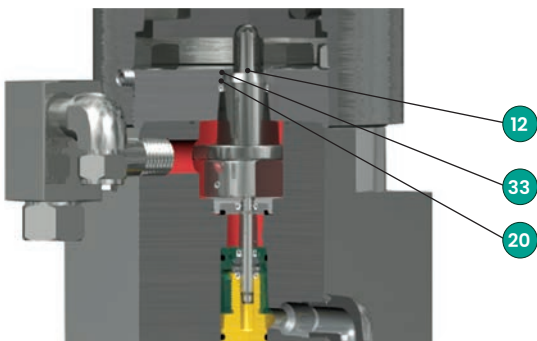
For 39MV22 : 751 to 3750 psig (51.78 to 258.55 barg)

For 39MV72 : 3751 to 5800 psig (258.62 to 399.90 barg)

### 39MV22 Pilot Construction



### 39MV72 Pilot Construction



### 39MV22/72 Pilot Standard Material Variation

Ref. No.	Nomenclature	Material (-CC)
1	Main Base	SA351 Grade CF8M St. St.
2	Adjuster Cap	316 Stainless Steel
3	Adjuster Top	316 Stainless Steel
4	Adjuster Bottom	316 Stainless Steel
5	Adjuster Lock Nut	316 Stainless Steel
6	Compression Screw	316 Stainless Steel
7	Compression Screw Lock Nut	316 Stainless Steel
8	Spring Washer	316 Stainless Steel
9	Spring	Chrome St. (Phosphate Coated)
10	Insert Top	316 Stainless Steel
11	Insert Bottom	316 Stainless Steel
12	Main Piston	316 Stainless Steel
13	Cap (Compression Screw)	316 Stainless Steel
14	Cap Screw (Top Plate)	316 Stainless Steel
15	O-ring (Adjuster Bottom)	Select
16	O-ring (Adjuster Top)	Select
17	O-ring (Insert)	Select
18	O-ring (Top Plate)	Select
19	Bonnet	SA351 Grade CF8M St. St.
20	Spring Seal (Main Piston)	PTFE
21	Spring Seal (Adjuster Top)	PTFE
22	Spring Seal (Insert)	PTFE
23	Field Test Connector	
	Ball	316 Stainless Steel
	Seat O-ring	Select
	Plug O-ring	Select
	Shuttle Base	316 Stainless Steel
	Shuttle Plug	316 Stainless Steel
	Tube Filter	304 Stainless Steel
24	Vent Assembly/Bug Screen (Field Test Connection)	
	Male Elbow	316 Stainless Steel
	Screen	304 Stainless Steel
25	Vent Assembly (Bonnet Vent) <sup>(1)</sup>	Nickel Steel/Bronze
27	Set Screw (Bonnet)	316 Stainless Steel
28	Piston Nose	316 Stainless Steel
29	Piston retainer Nut	316 Stainless Steel
30	Set Screw (Piston)	Carbon Steel
31	Vent Seal (Adaptor)	316 Stainless Steel
32	Spring Seal (Vent Seal Adaptor)	PTFE
33	Back-up Ring (39MV72 only)	Rulon 55
34	Top Plate	316 Stainless Steel

1. Standard material is a filter plug. For special materials, vent assembly is supplied.



# Pilot Design Options

## Options and Accessories

### Option

Manual Blowdown

Field Test Connection

Filters (Sensing Line, High Capacity & Dual)

Pressure Snubber (Standard)

Backflow Preventer

Dual Pilots

Pressure Differential Switch

### Manual Blowdown Valve

An optional manual blowdown valve is available for relieving the Pilot-Operated safety relief valve. Consult factory for applications requiring a pneumatic or electrical solenoid blowdown valve which may be connected to a distant location, such as an operator station, for remote actuation. The blowdown valve is ported directly to the main dome area, so that the media in the dome is vented when the blowdown valve is actuated, thus allowing the main valve to open.

ASME Section I requires each pressure relief valve to have a lifting device. The Pilot-Operated safety relief valve is able to have the standard field test connection serve as an auxiliary lifting device.

### Field Test Connection

A 1/4" FNPT field test connection is standard on all pilot valve types. This allows the stroking of the valve with an auxiliary media, e.g. air or nitrogen. An internal check valve is present in the field test connection isolating the inlet media from the test media and at the same time, allowing the valve to open normally in the event of a system overpressurization during a field test.

### Filters

Filter options are available for dirty applications. These filters are installed in the pilot inlet sensing line. For the 39PV/MV, an optional sensing line filter is available. This filter has a 316 Stainless Steel body, PTFE seals, and a 40–50 micron stainless steel filter element. This filter is standard for steam service.

Other high capacity filter options include: (1) a carbon steel cadmium coated filter body with a 35 micron stainless steel element, (2) a stainless steel filter body, and (3) an entirely stainless steel filter arrangement. The O-Ring in the filters for steam service will be PTFE. These filters may be equipped with a manually operated needle valve which allows for purging the filtered material while the valve is in operation.

### Option

Pilot Valve Tester

Remote Pilot Mounting

Sensing Ring

Heat Exchanger

A dual filter arrangement is available for applications in which the customer is unsure of the filter maintenance requirements. In these cases, a preventive maintenance program may be developed by monitoring the filters, without taking the valve off line.

### Pressure Snubber

Baker Hughes recommends the use of a pressure spike snubber for all applications which may have high frequency pressure spikes. The pressure spike snubber is designed to dampen the pressure spikes which could cause unnecessary parts wear, premature valve opening and valve chatter due to water hammer.

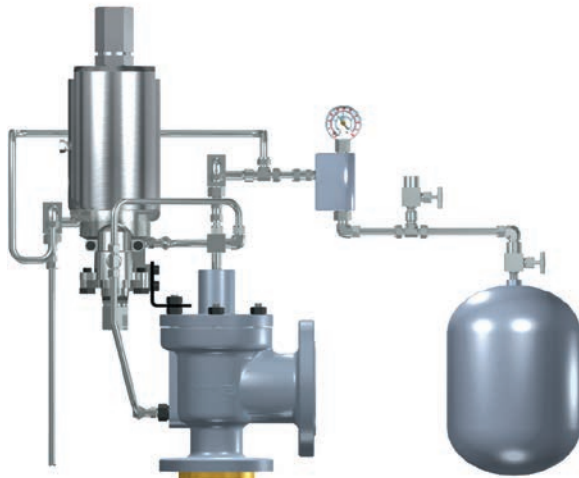
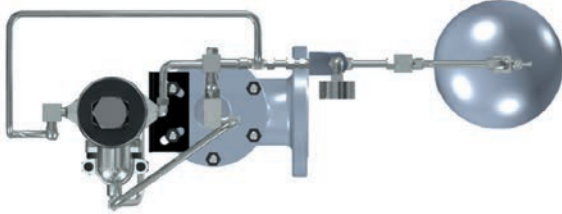
A pressure snubber is standard for the 2900–40 Series.

### Backflow Preventer

When the Pilot-Operated safety relief valve is not vented directly to atmosphere, it is possible to build up back pressure in the discharge line. This is typical in situations where several valves manifold into a common discharge header. Should the discharge line pressure exceed the valve inlet pressure, it could cause the piston to lift and allow reverse flow through the main valve. This situation can be eliminated through the use of the Backflow Preventer.

# Pilot Designs Options

## Pilot Valve Tester



Pipe to system pressure.

## Pilot Valve Tester

The pilot valve test indicator is available for the pop action pilot valve. The valve test indicator measures the set pressure of the pilot, while maintaining pressure on the main valve dome area; thereby, allowing only the pilot to actuate. The system shown below is available for remote or local testing.

## Pressure Differential Switch

**Electrical:** A pressure differential switch is available which may be wired to an operator station or some other remote location. The switch will provide a signal that indicates when the main valve is opening. The standard pressure differential switch is a single pole, double throw, rate at 5 amps and 30 volts DC with a NEMA 4 enclosure. (For other configurations, consult the factory.)

**Pneumatic:** For applications that do not permit an electrical differential switch, an option is available to provide pneumatic signal to indicate when the main valve opens.

## Remote Pilot Mounting

The 39PV pilots can be mounted separately from the main valve. Remote pilot mounting will allow heating or cooling the pilot in case ambient conditions are outside the scope of the pilot. It will also enable the user to group several pilots together for control of ambient conditions in a smaller space. In addition, this promotes easier maintenance.

## Dual Pilots

A dual pilot arrangement is available for applications in which the pilot valve O-Rings require monitoring and/or maintenance more often than the main valve. In this installation, the pilot valves may be alternated for maintenance, without bringing the system down.

### **Note:**

**For all option and accessory material variations, contact the factory.**

# Pilot Design Options

## Integral Sense

The new integral sense configuration is the default and recommended pressure sensing option when remote sense is not required due to high inlet line loss. With the new integral sense option, the pilot valve pressure can be picked up through the integral sense ring located around the base of the full through nozzle.

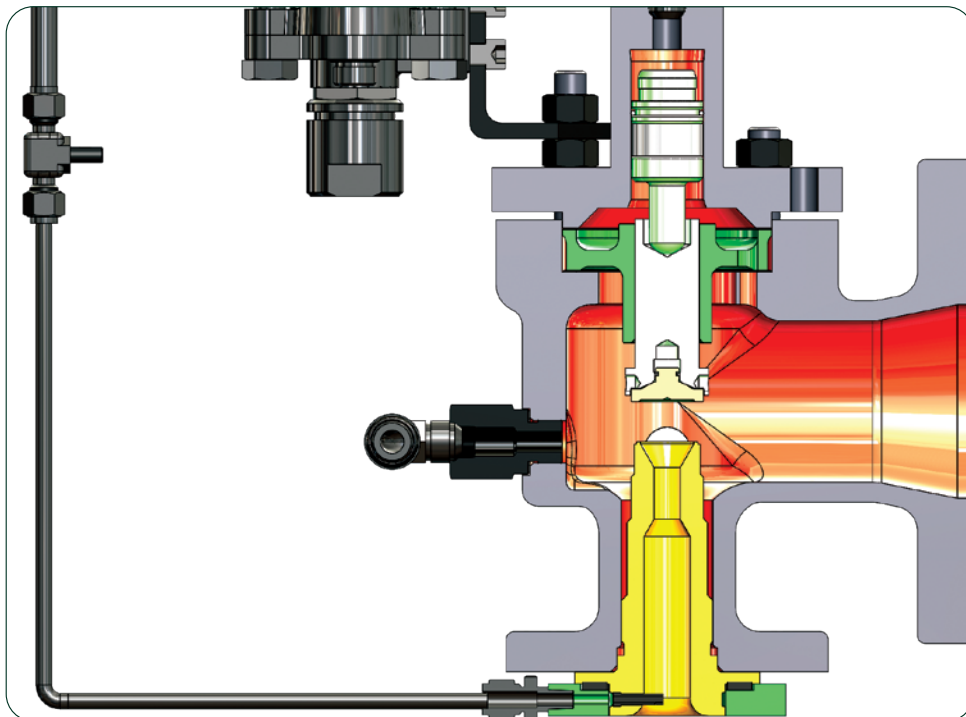
Unlike other integrally sensed full nozzle pilot valve designs, the Generation II 2900-40 Series with the integral sense option does not affect the centerline-to-face dimensions of the main valve because the integral sense ring wraps around the nozzle rather than sitting beneath. This unique design ensures that the integrally sensed Generation II 2900-40 Series will match all API 526 Direct Spring PRV centerline-to-face dimensions, including the Consolidated 1900 Series.

The parts included in the Integral Sense option are the integral sense nozzle, integral sense ring, and a gasket.

This option is recommended when there is an opportunity to upgrade or replace an existing API 526 Direct-Spring PRV with a full nozzle pilot valve to achieve the following benefits:

- Reduce maintenance costs by eliminating the need for a costly fragile Inconel bellows
- Eliminate PRV leakage and enhance operating efficiency in high operating pressures above 90% of set pressure
- Improve valve stability with modulating action

### Pilot Valve with Integral Sensing



# Pilot Design Options

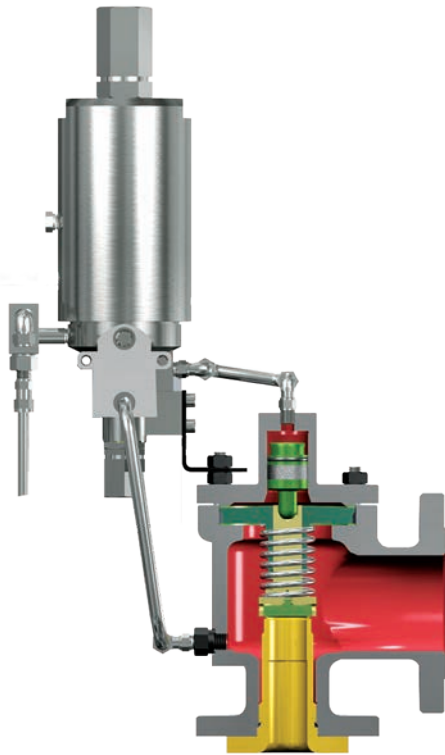
## Sensing Ring Options

Integral sense is the standard option when an integrally sensed Pilot-Operated relief valve is required. However, the sensing ring is a legacy option which remains available in case of a replacement of an existing valve with these specific center to outlet dimensions.

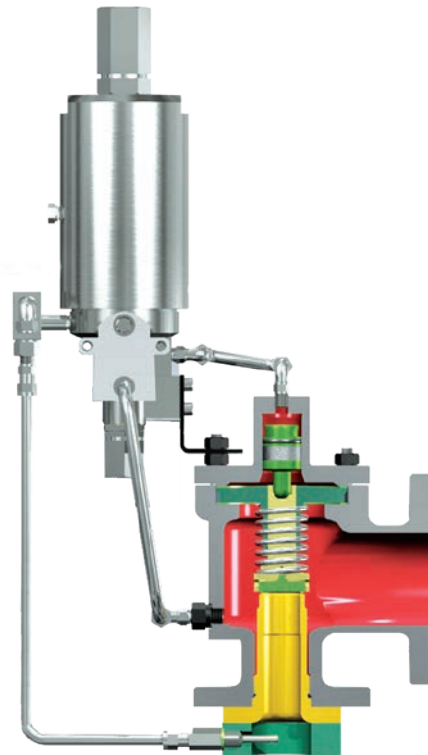
This is required for integral sense because the base, unlike the 3900 series Pilot-Operated safety relief valve, utilizes a through or full nozzle design. As a result of using the through nozzle design, all metal wetted parts in the closed position for the 2900-40 Series Pilot-Operated safety relief valve are made of 316SS material. These parts consist of the sensing ring, nozzle, disc, dome coverplate, dome piston, tubing, and pilot valve. By simply upgrading the base material to 316SS, the valve would become an all 316SS design.

The center to face dimensions for a 1900 valve being replaced or converted should be reviewed. The 2900-40 Series valve's Center to Outlet dimension remains the same as a 1900 valve. However, the Center to Outlet dimension increases by 1.5" (38.1 mm) due to the test ring requirement. In addition, the thicknesses of two inlet gaskets need to be added. The two gaskets are supplied by the customer and go in between the inlet nozzle flange and the sensing ring and also in between the sensing ring and the system flange.

**Note:**  
*For closed systems where the Takeout dimensions cannot be changed, remote sensing should be used.*



**2900-40 Series Pilot Valve with Remote Sensing (Standard)**



**2900-40 Series Pilot Valve with Inlet Sensing through the Sensing Ring**

# Pilot Design Options

## Heat Exchanger Options

Pilot valves are traditionally limited to the service ranges on its elastomers and PTFE products.

The 2900-40 Series pilot valve, metal seat design, is able to operate at a design temperature above 505°F (262°C) with the use of an air-cooled or air-warmed Heat Exchanger.

For temperatures above 1200°F (649°C), consult factory.

The Heat Exchanger is located upstream of the pilot valve in order to condition the temperature of the process fluid to within the acceptable temperature range of the pilot and

soft goods(see illustrations below). It is sized to maintain seal integrity, proper valve function and performance.

The Heat Exchanger is sized and selected to meet the service conditions for each application and valve size. The following information is needed to properly size a Heat Exchanger by a Factory Engineer.

### Heat Exchanger Sizing – Input Form

Date:

Customer:

For Valve Model Number:

#### Steam Input Required

$P_1$  = Set Pressure \_\_\_\_\_ psig \_\_\_\_\_ barg

$T_a$  max. = Maximum temperature of ambient air<sup>(1)</sup> \_\_\_\_\_ °F \_\_\_\_\_ °C

$T_a$  min. = Minimum temperature of ambient air<sup>(1)</sup> \_\_\_\_\_ °F \_\_\_\_\_ °C

$T_1$  = Media temperature before it enters the heat exchanger \_\_\_\_\_ °F \_\_\_\_\_ °C

$T_2$  = Media temperature before it enters the heat exchanger \_\_\_\_\_ °F \_\_\_\_\_ °C

#### Liquid Input Required

$P_1$  = Set Pressure \_\_\_\_\_ psig \_\_\_\_\_ barg

$\rho$  = Density of media at inlet conditions \_\_\_\_\_ lb/ft<sup>3</sup> \_\_\_\_\_ kg/m<sup>3</sup>

$C_p$  = Specific heat of media at inlet conditions \_\_\_\_\_ lb/ft<sup>3</sup> \_\_\_\_\_ kg/m<sup>3</sup>

$T_a$  max. = Maximum temperature of ambient air<sup>(1)</sup> \_\_\_\_\_ btu/lbm\*°R

$T_a$  min. = Minimum temperature of ambient air<sup>(1)</sup> \_\_\_\_\_ °F \_\_\_\_\_ °C

$T_1$  = Media temperature before it enters the heat exchanger \_\_\_\_\_ °F \_\_\_\_\_ °C

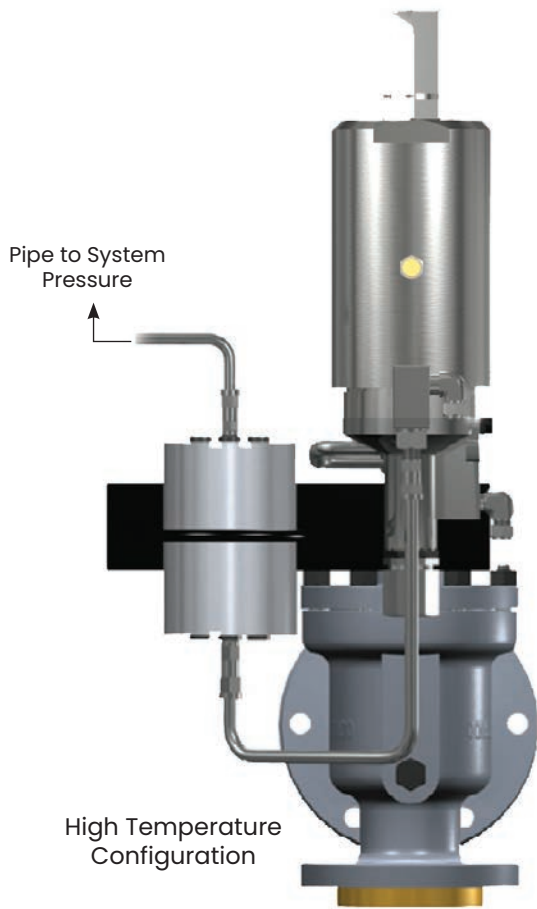
$T_2$  = Media temperature before it enters the heat exchanger \_\_\_\_\_ °F \_\_\_\_\_ °C

#### Notes:

1. Over time, the fluid temperature in a Heat Exchanger may approach the ambient temperature. Special consideration should be given to the freezing point of a condensed fluid.
2. Special consideration should be given to back pressure temperature to determine if the application can be met.

# Pilot Design Options

## Heat Exchanger Option



**Heat Exchanger with Remote Sensing (Standard)**



**Heat Exchanger and Convection with Sensing Ring**

# Piping Configurations

## Alternate Piping Arrangements

### **39 PV with Pilot Valve Vented to Atmosphere**

Standard Field Test Connection

Manual Blowdown

Pilot Supply Filter

Backflow Preventer

Manual Blowdown and Pilot Supply Filter

Backflow Preventer, Manual Blowdown, and Pilot Supply Filter

### **39 PV with Pilot Valve Vented to Body Bowl**

Standard Field Test Connection

Manual Blowdown

Pilot Supply Filter

Backflow Preventer

Manual Blowdown and Pilot Supply Filter

Backflow Preventer, Manual Blowdown, and Pilot Supply Filter

### **39MV with Pilot Valve Vented to Atmosphere**

Standard Field Test Connection

Manual Blowdown

Pilot Supply Filter

Backflow Preventer

Manual Blowdown and Pilot Supply Filter

Backflow Preventer, Manual Blowdown, and Pilot Supply Filter

### **39MV with Pilot Valve Vented to Body Bowl**

Standard Field Test Connection

Manual Blowdown

Pilot Supply Filter

Backflow Preventer

Manual Blowdown and Pilot Supply Filter

Backflow Preventer, Manual Blowdown, and Pilot Supply Filter

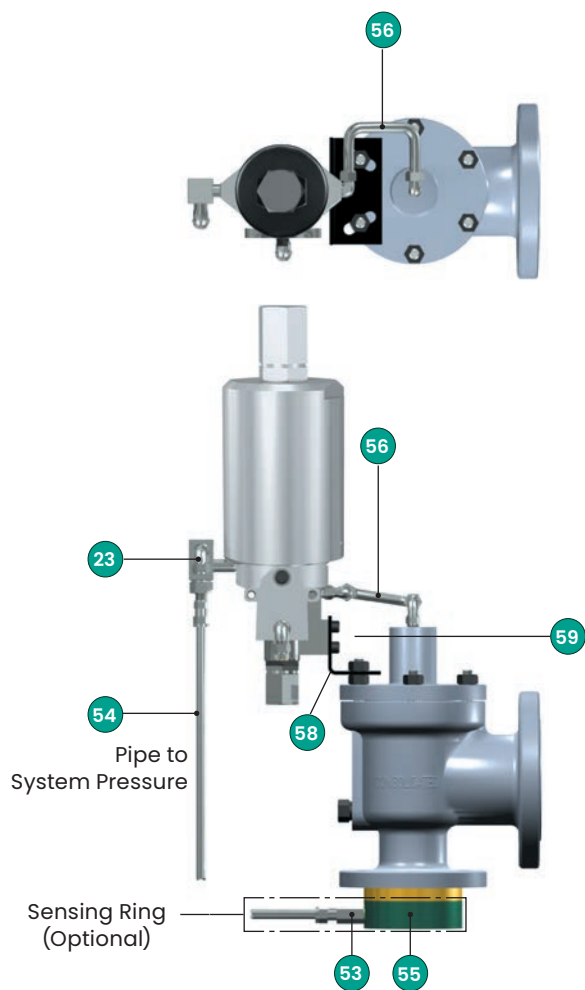
Heat Exchanger – Hot Service

# Piping Configurations

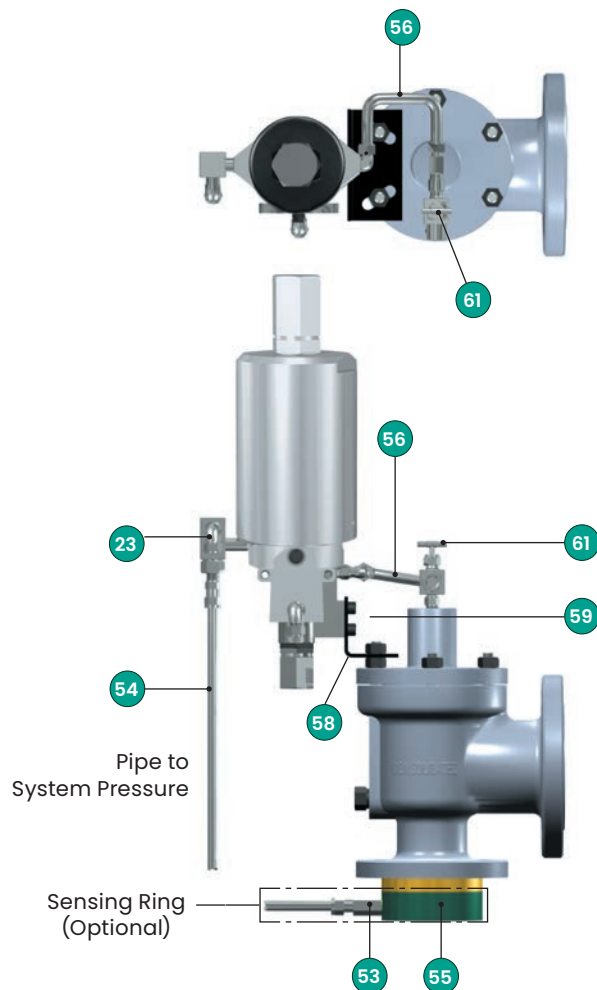
## 2900-40 Series Type 39PV Pop Pilot

(Vented to Atmosphere)

### Pilot Valve with Standard Field Test Connection (Standard for all Media Applications)



### Pilot Valve with Manual Blowdown (Optional for all Media Applications)



#### Pilot Valve with Standard Field Test Connection (Standard for all Media Applications)

No.	Part	Material
23	Field Test Connection	316 Stainless Steel
53	Sensing Tube	316 Stainless Steel
54	Sensing Line	316 Stainless Steel
55	Sensing Ring	316 Stainless Steel
56	Dome Line	316 Stainless Steel
58	Bracket	Carbon Steel
59	Bracket Cap Screw	316 Stainless Steel

#### Pilot Valve with Manual Blowdown (Optional for all Media Applications)

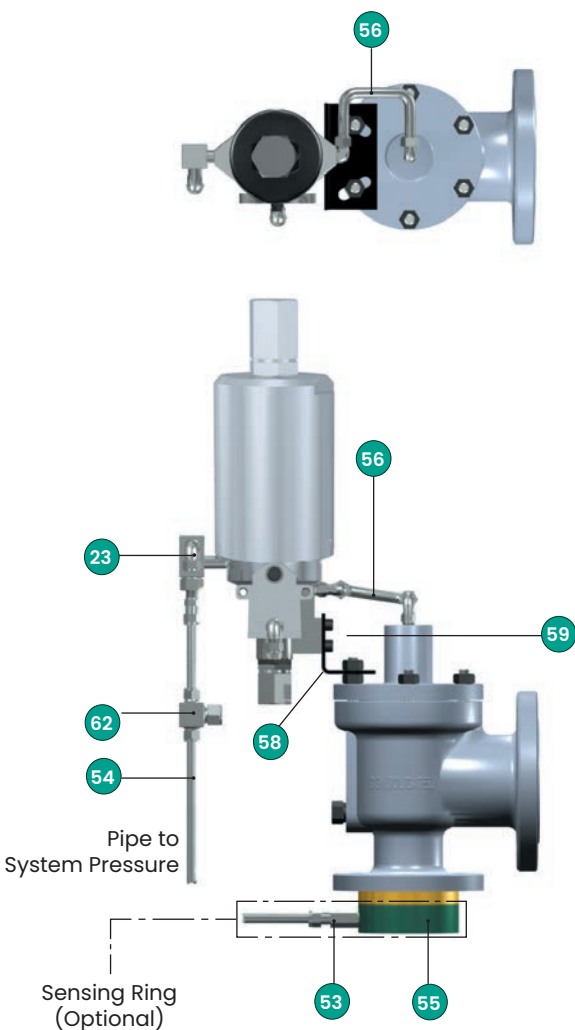
No.	Part	Material
23	Field Test Connection	316 Stainless Steel
53	Sensing Tube	316 Stainless Steel
54	Sensing Line	316 Stainless Steel
55	Sensing Ring	316 Stainless Steel
56	Dome Line	316 Stainless Steel
58	Bracket	Carbon Steel
59	Bracket Cap Screw	316 Stainless Steel
61	Needle Valve (Manual Blowdown)	316 Stainless Steel



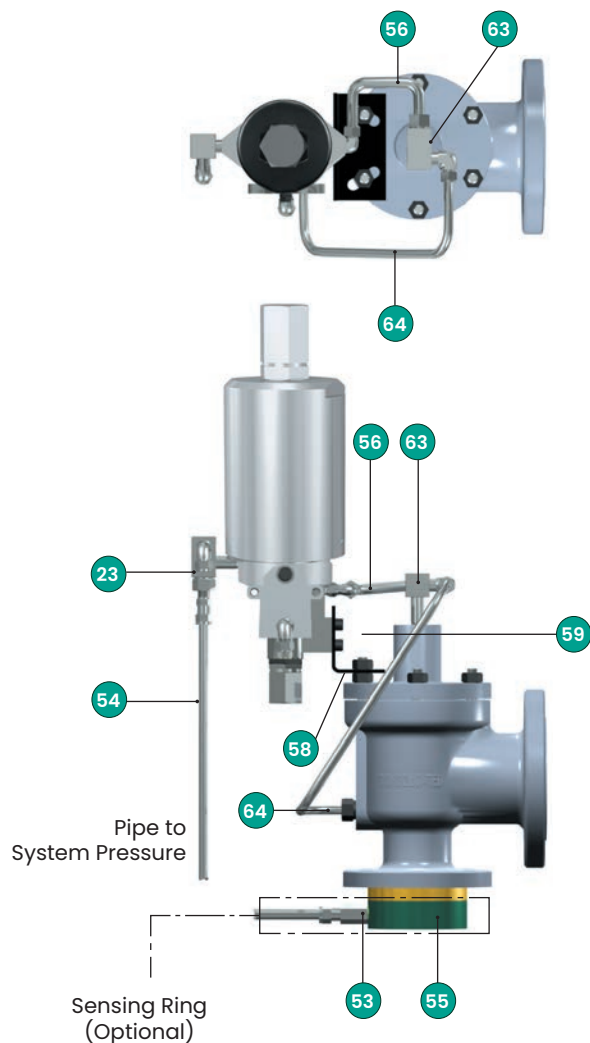
# Piping Configurations

## 2900-40 Series Type 39PV Pop Pilot (Vented to Atmosphere)

**Pilot Valve with Pilot Supply Filter  
(Optional for all Media Applications)**



**Pilot Valve with Backflow Preventer  
(Optional)**



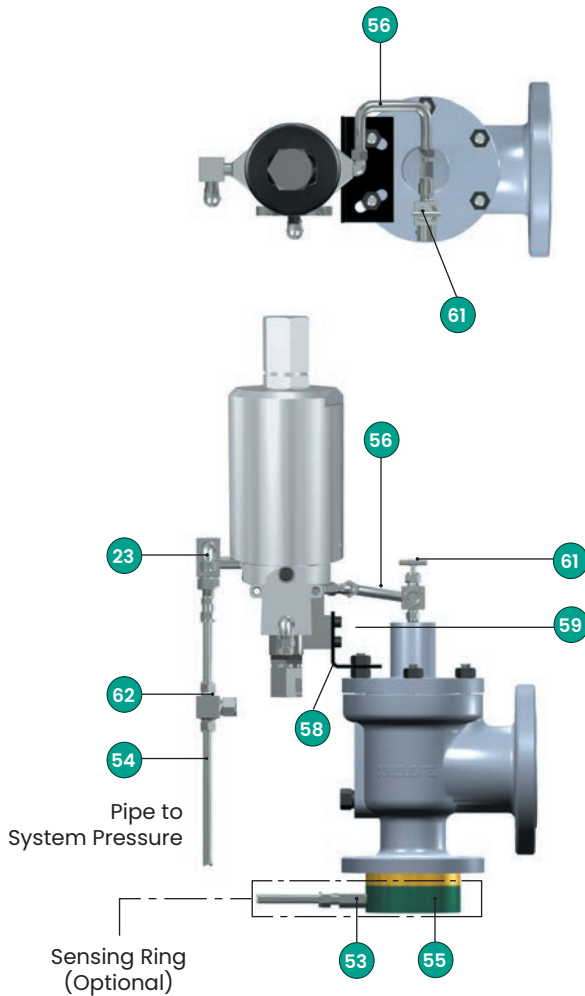
Pilot Valve with Pilot Supply Filter (Optional for all Media Applications)		
No.	Part	Material
23	Field Test Connection	316 Stainless Steel
53	Sensing Tube	316 Stainless Steel
54	Sensing Line	316 Stainless Steel
55	Sensing Ring	316 Stainless Steel
56	Dome Line	316 Stainless Steel
58	Bracket	Carbon Steel
59	Bracket Cap Screw	316 Stainless Steel
62	Pilot Supply Filter	316 Stainless Steel

Pilot Valve with Backflow Preventer (Optional)		
No.	Part	Material
23	Field Test Connection	316 Stainless Steel
53	Sensing Tube	316 Stainless Steel
54	Sensing Line	316 Stainless Steel
55	Sensing Ring	316 Stainless Steel
56	Dome Line	316 Stainless Steel
58	Bracket	Carbon Steel
59	Bracket Cap Screw	316 Stainless Steel
63	Backflow Preventer	316 Stainless Steel
64	Backflow Preventer Line	316 Stainless Steel

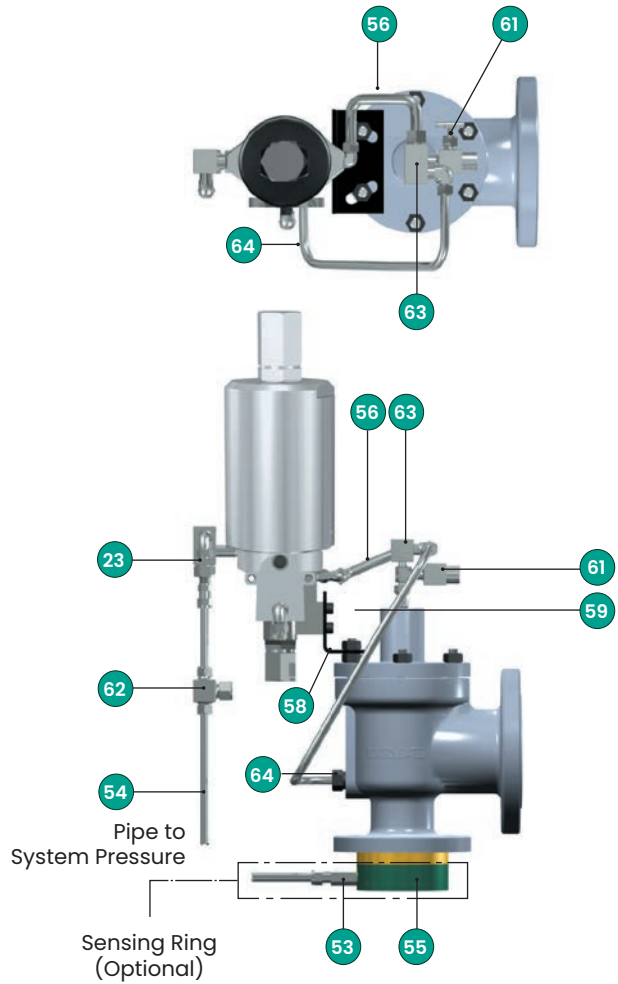
# Piping Configurations

## 2900-40 Series Type 39PV Pop Pilot (Vented to Atmosphere)

**Pilot Valve with Manual Blowdown & Pilot Supply Filter (Standard for Steam Applications, Optional for Liquid Applications)**



**Pilot Valve with Backflow Preventer, Manual Blowdown and Pilot Supply Filter (Optional for Steam Applications)**



**Pilot Valve with Manual Blowdown & Pilot Supply Filter (Standard for Steam Applications, Optional for Liquid Applications)**

No.	Part	Material
23	Field Test Connection	316 Stainless Steel
53	Sensing Tube	316 Stainless Steel
54	Sensing Line	316 Stainless Steel
55	Sensing Ring	316 Stainless Steel
56	Dome Line	316 Stainless Steel
58	Bracket	Carbon Steel
59	Bracket Cap Screw	316 Stainless Steel
61	Needle Valve (Manual Blowdown)	316 Stainless Steel
62	Pilot Supply Filter	316 Stainless Steel

**Pilot Valve with Backflow Preventer, Manual Blowdown and Pilot Supply Filter (Optional for Steam Applications)**

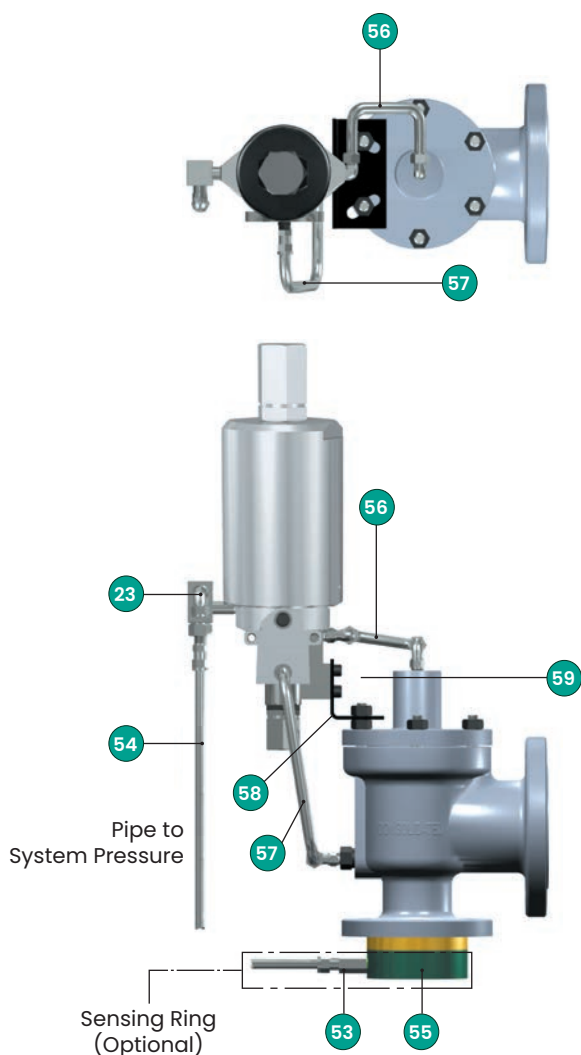
No.	Part	Material
23	Field Test Connection	316 Stainless Steel
53	Sensing Tube	316 Stainless Steel
54	Sensing Line	316 Stainless Steel
55	Sensing Ring	316 Stainless Steel
56	Dome Line	316 Stainless Steel
58	Bracket	Carbon Steel
59	Bracket Cap Screw	316 Stainless Steel
61	Needle Valve (Manual Blowdown)	316 Stainless Steel
62	Pilot Supply Filter	316 Stainless Steel
63	Backflow Preventer	316 Stainless Steel
64	Backflow Preventer Line	316 Stainless Steel

# Piping Configurations

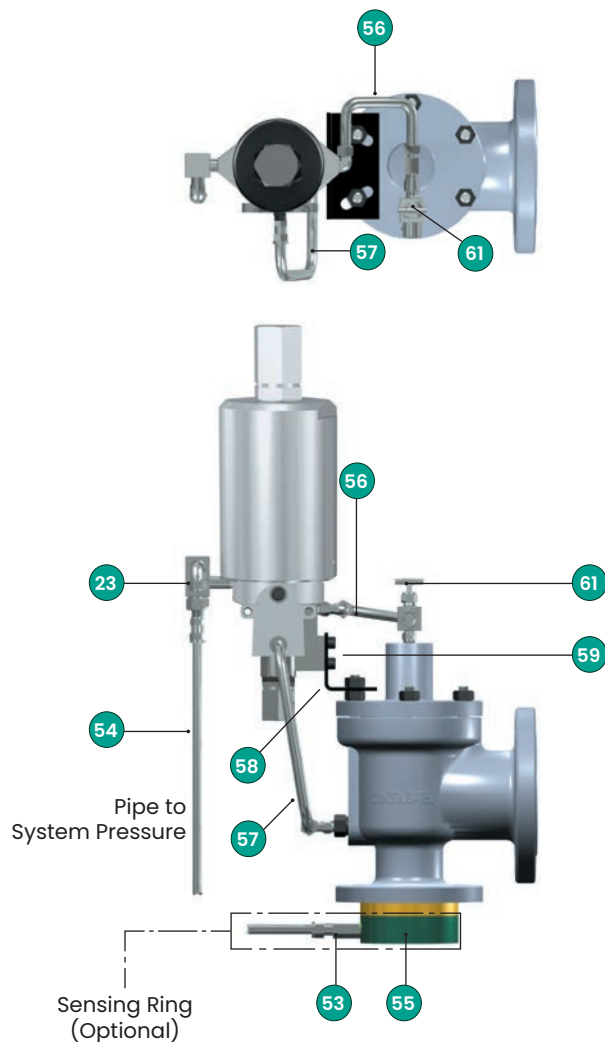
## 2900-40 Series Type 39PV Pop Pilot

(Vented to Body Bowl)

### Pilot Valve with Standard Field Test Connection (Standard for all Media Applications)



### Pilot Valve with Manual Blowdown (Optional for all Media Applications)



#### Pilot Valve with Standard Field Test Connection (Standard for all Media Applications)

No.	Part	Material
23	Field Test Connection	316 Stainless Steel
53	Sensing Tube	316 Stainless Steel
54	Sensing Line	316 Stainless Steel
55	Sensing Ring	316 Stainless Steel
56	Dome Line	316 Stainless Steel
57	Discharge Line	316 Stainless Steel
58	Bracket	Carbon Steel
59	Bracket Cap Screw	316 Stainless Steel

#### Pilot Valve with Manual Blowdown (Optional for all Media Applications)

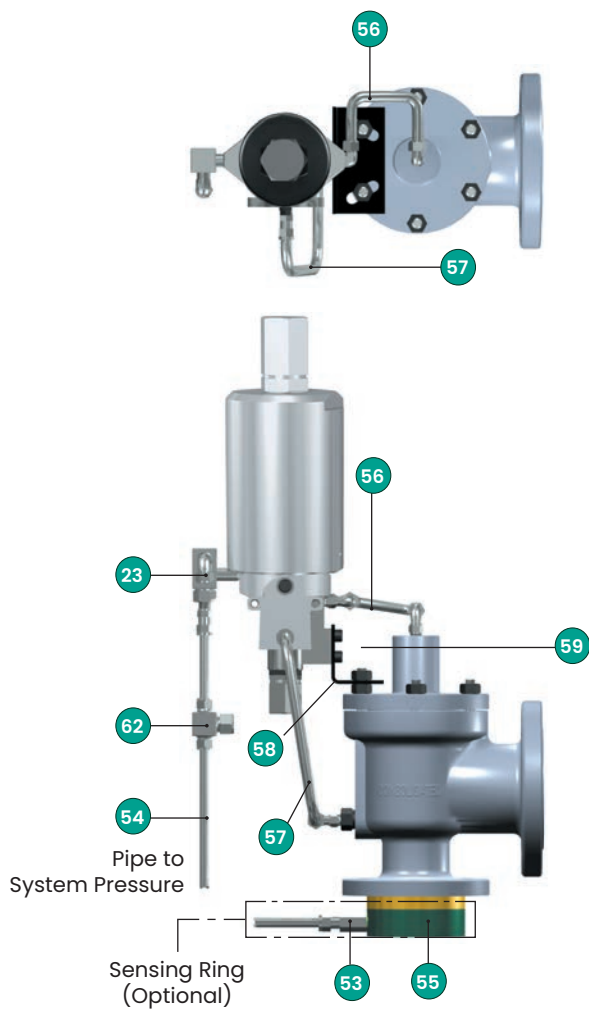
No.	Part	Material
23	Field Test Connection	316 Stainless Steel
53	Sensing Tube	316 Stainless Steel
54	Sensing Line	316 Stainless Steel
55	Sensing Ring	316 Stainless Steel
56	Dome Line	316 Stainless Steel
57	Discharge Line	316 Stainless Steel
58	Bracket	Carbon Steel
59	Bracket Cap Screw	316 Stainless Steel
61	Needle Valve (Manual Blowdown)	316 Stainless Steel

# Piping Configurations

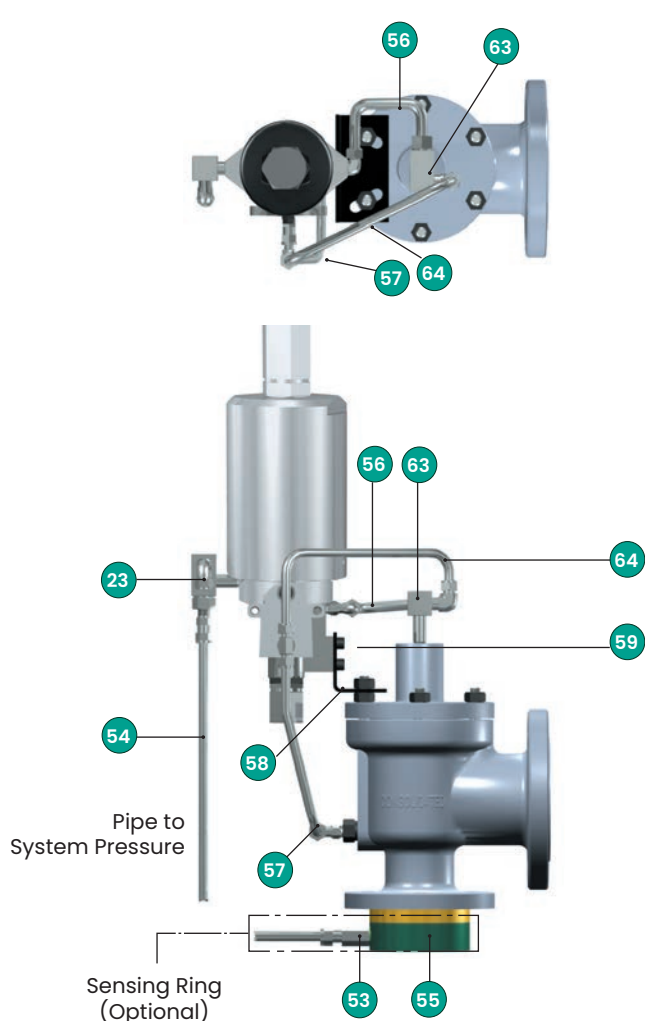
## 2900-40 Series Type 39PV Pop Pilot

(Vented to Body Bowl Atmosphere)

### Pilot Valve with Pilot Supply Filter (Optional for all Media Applications)



### Pilot Valve with Backflow Preventer (Optional for Liquid Applications)



#### Pilot Valve with Pilot Supply Filter (Optional for all Media Applications)

No.	Part	Material
23	Field Test Connection	316 Stainless Steel
53	Sensing Tube	316 Stainless Steel
54	Sensing Line	316 Stainless Steel
55	Sensing Ring	316 Stainless Steel
56	Dome Line	316 Stainless Steel
57	Discharge Line	316 Stainless Steel
58	Bracket	Carbon Steel
59	Bracket Cap Screw	316 Stainless Steel
62	Pilot Supply Filter	316 Stainless Steel

#### Pilot Valve with Backflow Preventer (Optional for Liquid Applications)

No.	Part	Material
23	Field Test Connection	316 Stainless Steel
53	Sensing Tube	316 Stainless Steel
54	Sensing Line	316 Stainless Steel
55	Sensing Ring	316 Stainless Steel
56	Dome Line	316 Stainless Steel
57	Discharge Line	316 Stainless Steel
58	Bracket	Carbon Steel
59	Bracket Cap Screw	316 Stainless Steel
63	Backflow Preventer	316 Stainless Steel
64	Backflow Preventer Line	316 Stainless Steel

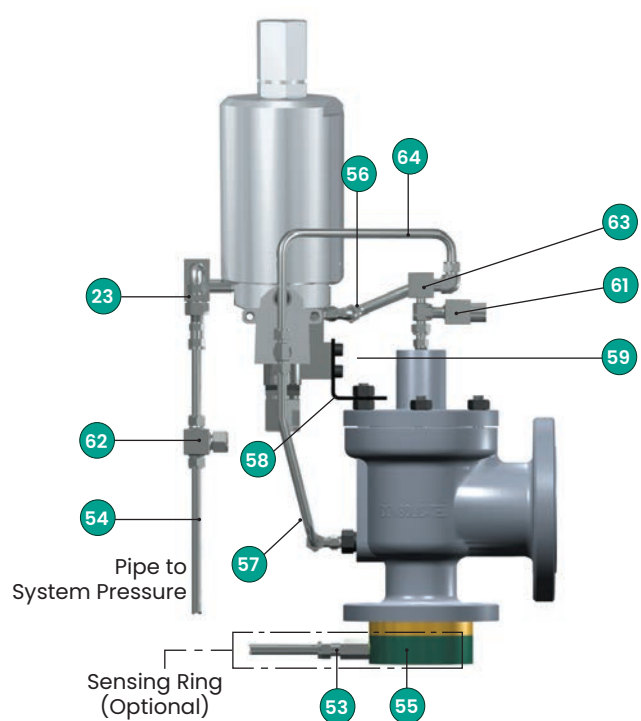
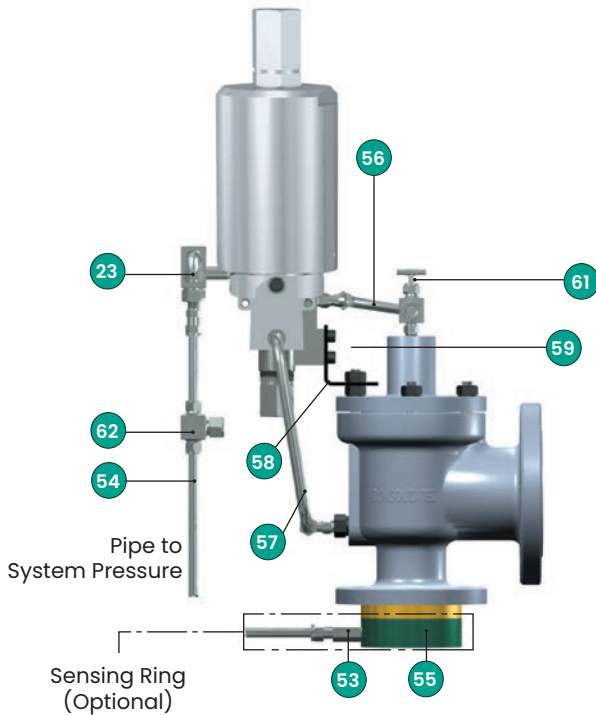
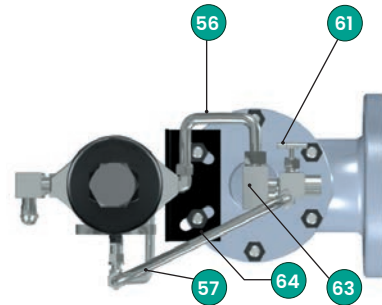
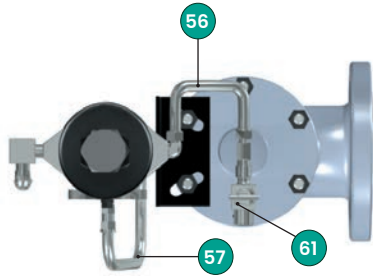
# Piping Configurations

## 2900-40 Series Type 39PV Pop Pilot

(Vented to Body Bowl)

**Pilot Valve with Manual Blowdown & Pilot Supply Filter (Standard for Steam Applications, Optional for Liquid Applications)**

**Pilot Valve with Backflow Preventer, Manual Blowdown and Pilot Supply Filter (Optional for Steam Applications)**



**Pilot Valve with Manual Blowdown & Pilot Supply Filter (Standard for Steam Applications, Optional for Liquid Applications)**

**Pilot Valve with Backflow Preventer, Manual Blowdown and Pilot Supply Filter (Optional for Steam Applications)**

No.	Part	Material
23	Field Test Connection	316 Stainless Steel
53	Sensing Tube	316 Stainless Steel
54	Sensing Line	316 Stainless Steel
55	Sensing Ring	316 Stainless Steel
56	Dome Line	316 Stainless Steel
57	Discharge Line	316 Stainless Steel
58	Bracket	Carbon Steel
59	Bracket Cap Screw	316 Stainless Steel
61	Needle Valve (Manual Blowdown)	316 Stainless Steel
62	Pilot Supply Filter	316 Stainless Steel

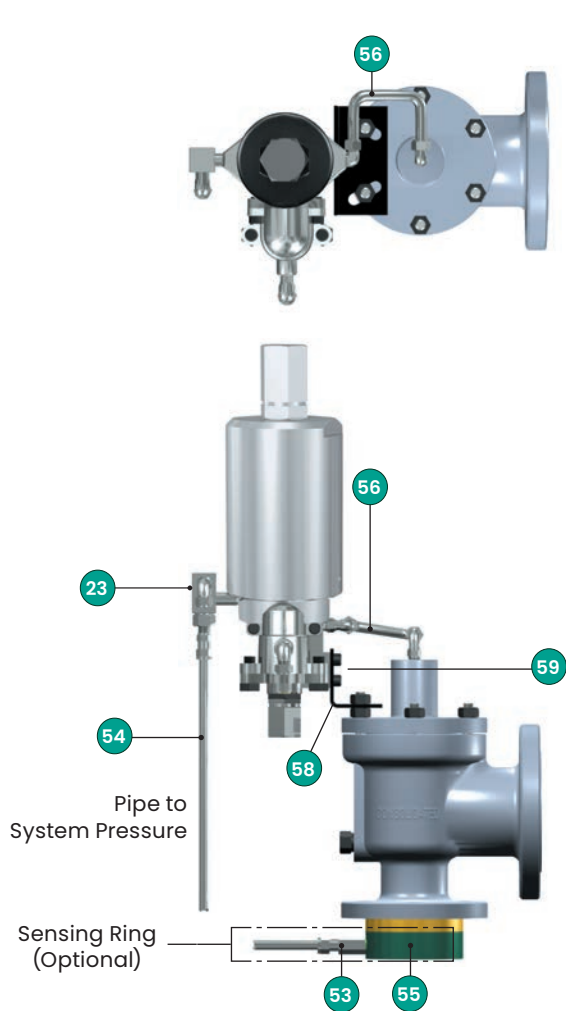
No.	Part	Material
23	Field Test Connection	316 Stainless Steel
53	Sensing Tube	316 Stainless Steel
54	Sensing Line	316 Stainless Steel
55	Sensing Ring	316 Stainless Steel
56	Dome Line	316 Stainless Steel
57	Discharge Line	316 Stainless Steel
58	Bracket	Carbon Steel
59	Bracket Cap Screw	316 Stainless Steel
61	Needle Valve (Manual Blowdown)	316 Stainless Steel
62	Pilot Supply Filter	316 Stainless Steel
63	Backflow Preventer	316 Stainless Steel
64	Backflow Preventer Line	316 Stainless Steel

# Piping Configurations

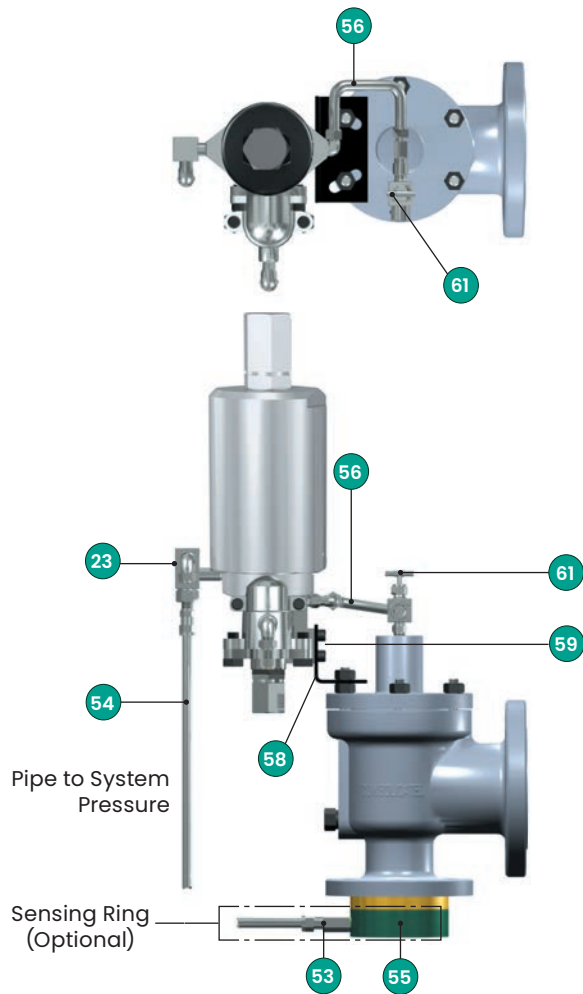
## 2900-40 Series Type 39MV Modulating Pilot

(Vented to Atmosphere)

**Pilot Valve with Standard Field Test Connection  
(Standard for all Media Applications)**



**Pilot Valve with Manual Blowdown  
(Optional for all Media Applications)**



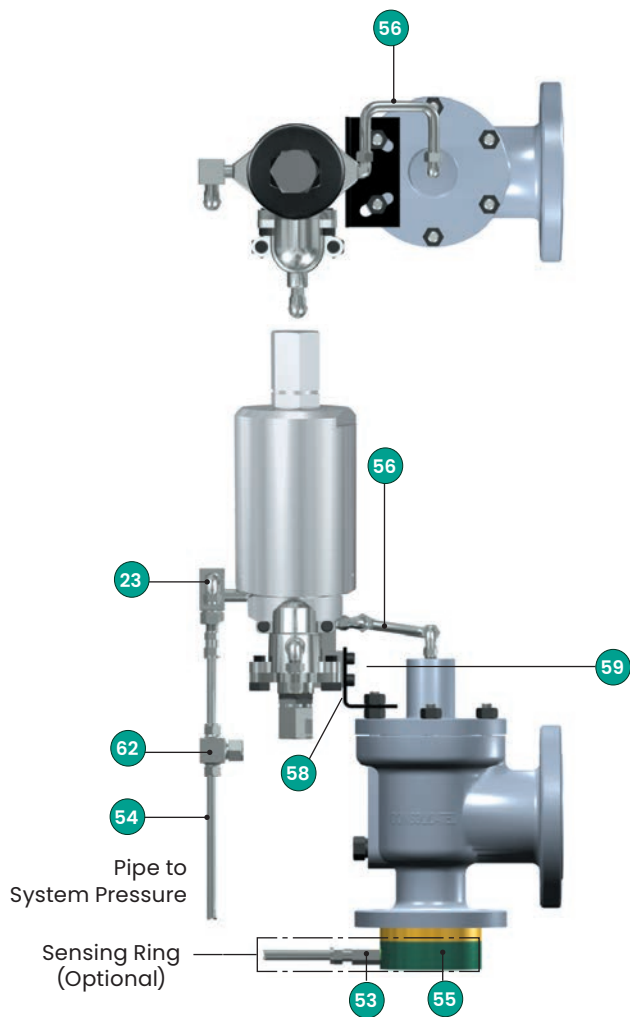
Pilot Valve with Standard Field Test Connection (Standard for all Media Applications)		
No.	Part	Material
23	Field Test Connection	316 Stainless Steel
53	Sensing Tube	316 Stainless Steel
54	Sensing Line	316 Stainless Steel
55	Sensing Ring	316 Stainless Steel
56	Dome Line	316 Stainless Steel
58	Bracket	Carbon Steel
59	Bracket Cap Screw	316 Stainless Steel

Pilot Valve with Manual Blowdown (Optional for all Media Applications)		
No.	Part	Material
23	Field Test Connection	316 Stainless Steel
53	Sensing Tube	316 Stainless Steel
54	Sensing Line	316 Stainless Steel
55	Sensing Ring	316 Stainless Steel
56	Dome Line	316 Stainless Steel
58	Bracket	Carbon Steel
59	Bracket Cap Screw	316 Stainless Steel
61	Needle Valve (Manual Blowdown)	316 Stainless Steel

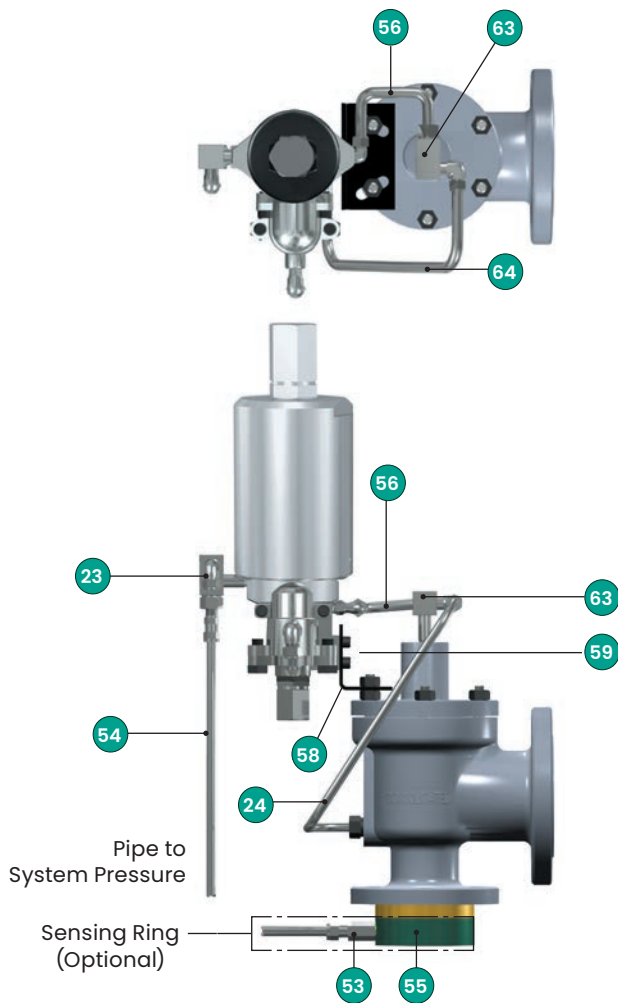
# Piping Configurations

## 2900-40 Series Type 39MV Modulating Pilot (Vented to Atmosphere)

**Pilot Valve with Pilot Supply Filter  
(Optional for all Media Applications)**



**Pilot Valve with Backflow Preventer  
(Optional for Liquid Applications)**



**Pilot Valve with Pilot Supply Filter  
(Optional for all Media Applications)**

No.	Part	Material
23	Field Test Connection	316 Stainless Steel
53	Sensing Tube	316 Stainless Steel
54	Sensing Line	316 Stainless Steel
55	Sensing Ring	316 Stainless Steel
56	Dome Line	316 Stainless Steel
58	Bracket	Carbon Steel
59	Bracket Cap Screw	316 Stainless Steel
62	Pilot Supply Filter	316 Stainless Steel

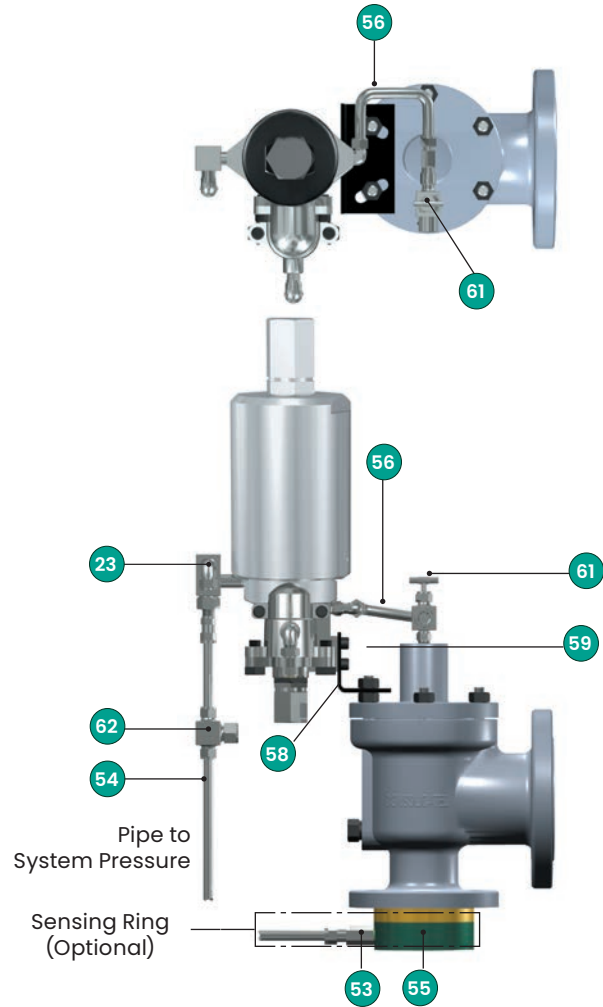
**Pilot Valve with Backflow Preventer  
(Optional for Liquid Applications)**

No.	Part	Material
23	Field Test Connection	316 Stainless Steel
53	Sensing Tube	316 Stainless Steel
54	Sensing Line	316 Stainless Steel
55	Sensing Ring	316 Stainless Steel
56	Dome Line	316 Stainless Steel
58	Bracket	Carbon Steel
59	Bracket Cap	Screw 316 Stainless Steel
63	Backflow Preventer	316 Stainless Steel
64	Backflow Preventer Line	316 Stainless Steel

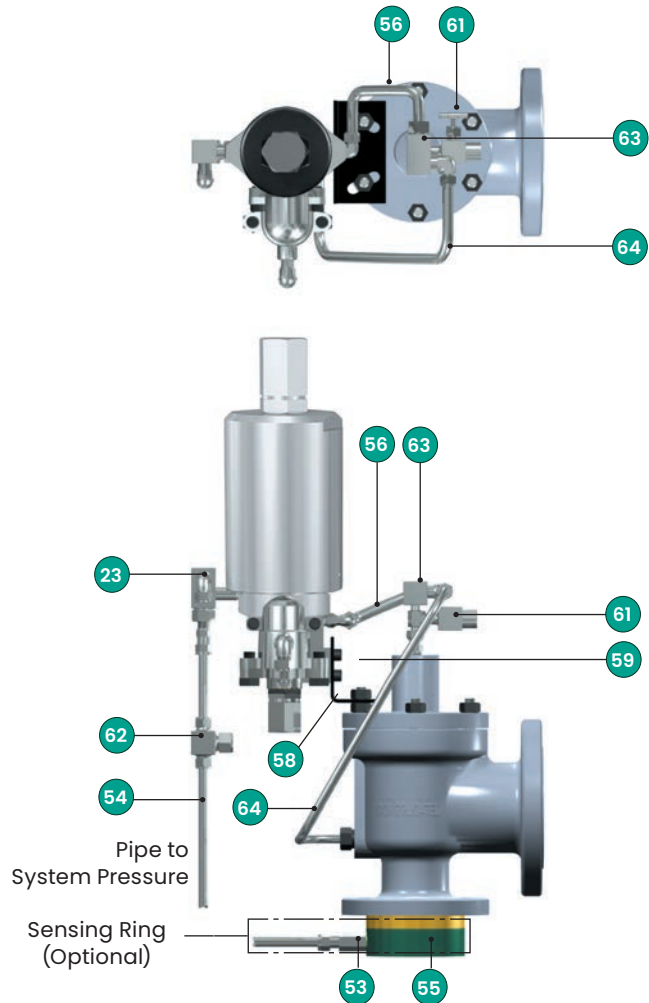
# Piping Configurations

## 2900-40 Series Type 39MV Modulating Pilot (Vented to Atmosphere)

**Pilot Valve with Manual Blowdown & Pilot Supply Filter  
(Standard for Steam Applications)  
(Optional for Liquid Applications)**



**Pilot Valve with Backflow Preventer,  
Manual Blowdown and Pilot Supply Filter  
(Optional for Steam Applications)**



**Pilot Valve with Manual Blowdown &  
Pilot Supply Filter  
(Standard for Steam Applications)  
(Optional for Liquid Applications)**

No.	Part	Material
23	Field Test Connection	316 Stainless Steel
53	Sensing Tube	316 Stainless Steel
54	Sensing Line	316 Stainless Steel
55	Sensing Ring	316 Stainless Steel
56	Dome Line	316 Stainless Steel
58	Bracket	Carbon Steel
59	Bracket Cap Screw	316 Stainless Steel
61	Needle Valve (Manual Blowdown)	316 Stainless Steel
62	Pilot Supply Filter	316 Stainless Steel

**Pilot Valve with Backflow Preventer,  
Manual Blowdown and Pilot Supply Filter  
(Optional for Steam Applications)**

No.	Part	Material
23	Field Test Connection	316 Stainless Steel
53	Sensing Tube	316 Stainless Steel
54	Sensing Line	316 Stainless Steel
55	Sensing Ring	316 Stainless Steel
56	Dome Line	316 Stainless Steel
58	Bracket	Carbon Steel
59	Bracket Cap Screw	316 Stainless Steel
61	Needle Valve (Manual Blowdown)	316 Stainless Steel
62	Pilot Supply Filter	316 Stainless Steel
63	Backflow Preventer	316 Stainless Steel
64	Backflow Preventer Line	316 Stainless Steel

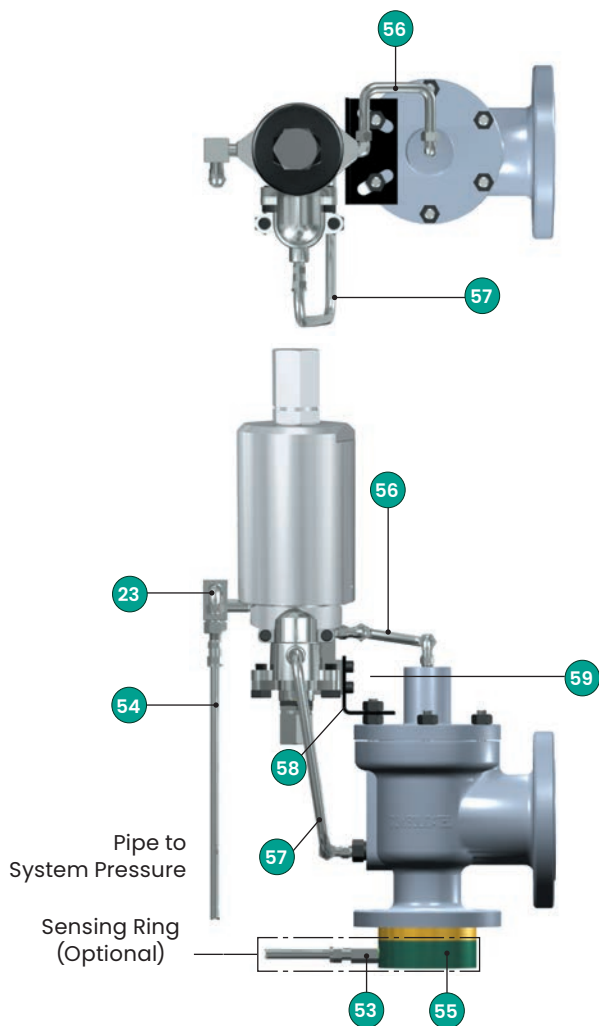


# Piping Configurations

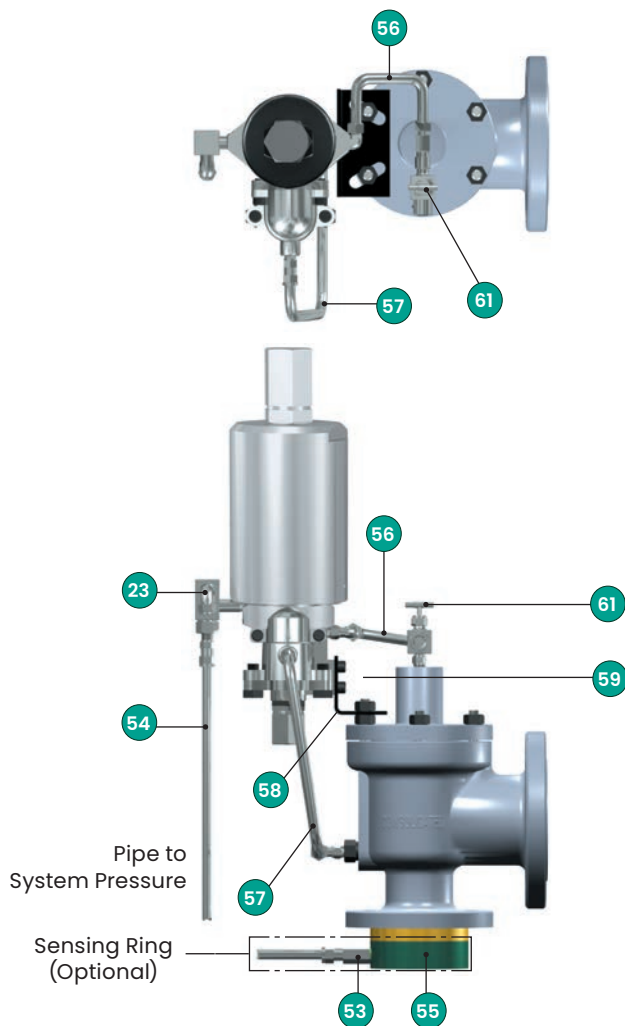
## 2900-40 Series Type 39MV Modulating Pilot

(Vented to Body Bowl)

**Pilot Valve with Standard Field Test Connection  
(Standard for all Media Applications)**



**Pilot Valve with Manual Blowdown  
(Optional for all Media Applications)**



**Pilot Valve with Standard Field Test Connection  
(Standard for all Media Applications)**

No.	Part	Material
23	Field Test Connection	316 Stainless Steel
53	Sensing Tube	316 Stainless Steel
54	Sensing Line	316 Stainless Steel
55	Sensing Ring	316 Stainless Steel
56	Dome Line	316 Stainless Steel
57	Discharge Line	316 Stainless Steel
58	Bracket	Carbon Steel
59	Bracket Cap Screw	316 Stainless Steel

**Pilot Valve with Manual Blowdown  
(Optional for all Media Applications)**

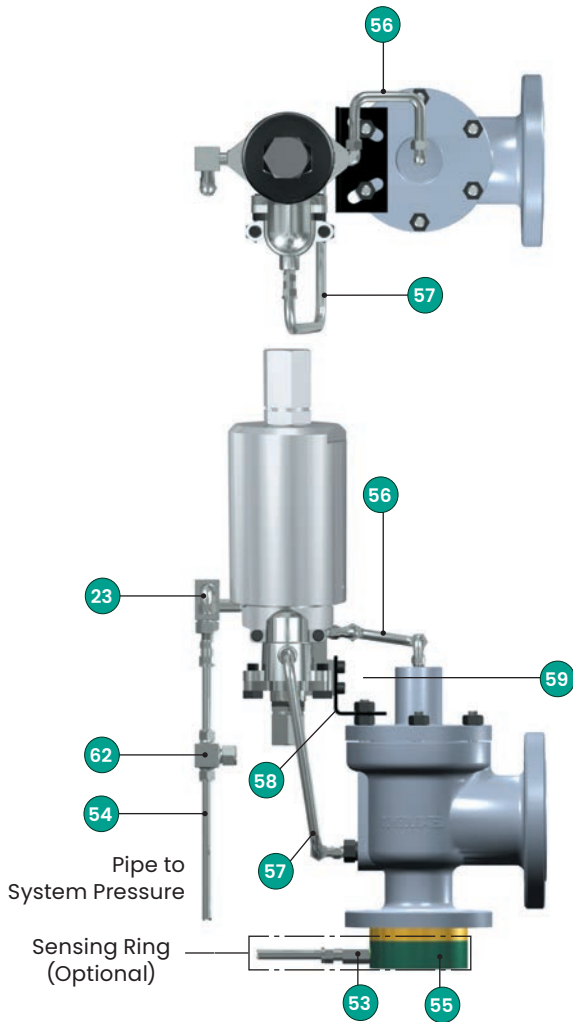
No.	Part	Material
23	Field Test Connection	316 Stainless Steel
53	Sensing Tube	316 Stainless Steel
54	Sensing Line	316 Stainless Steel
55	Sensing Ring	316 Stainless Steel
56	Dome Line	316 Stainless Steel
57	Discharge Line	316 Stainless Steel
58	Bracket	Carbon Steel
59	Bracket Cap Screw	316 Stainless Steel
61	Needle Valve (Manual Blowdown)	316 Stainless Steel

# Piping Configurations

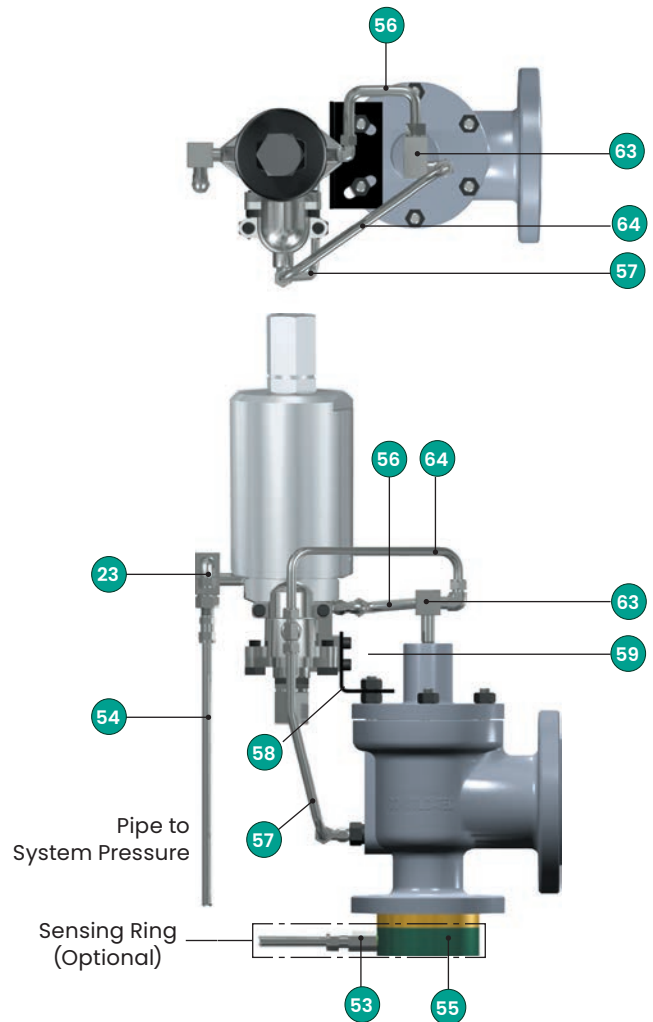
## 2900-40 Series Type 39MV Modulating Pilot

(Vented to Body Bowl)

### Pilot Valve with Pilot Supply Filter (Optional for all Media Applications)



### Pilot Valve with Backflow Preventer (Optional for Liquid Applications)



#### Pilot Valve with Pilot Supply Filter (Optional for all Media Applications)

No.	Part	Material
23	Field Test Connection	316 Stainless Steel
53	Sensing Tube	316 Stainless Steel
54	Sensing Line	316 Stainless Steel
55	Sensing Ring	316 Stainless Steel
56	Dome Line	316 Stainless Steel
57	Discharge Line	316 Stainless Steel
58	Bracket	Carbon Steel
59	Bracket Cap Screw	316 Stainless Steel
62	Pilot Supply Filter	316 Stainless Steel

#### Pilot Valve with Backflow Preventer (Optional for Liquid Applications)

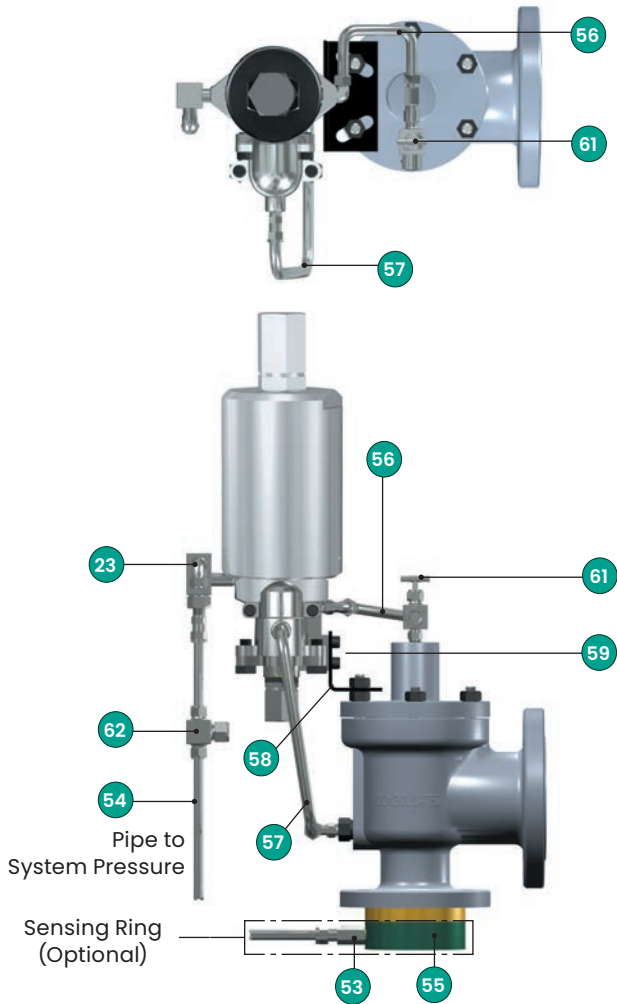
No.	Part	Material
23	Field Test Connection	316 Stainless Steel
53	Sensing Tube	316 Stainless Steel
54	Sensing Line	316 Stainless Steel
55	Sensing Ring	316 Stainless Steel
56	Dome Line	316 Stainless Steel
57	Discharge Line	316 Stainless Steel
58	Bracket	Carbon Steel
59	Bracket Cap Screw	316 Stainless Steel
63	Backflow Preventer	316 Stainless Steel
64	Backflow Preventer Line	316 Stainless Steel

# Piping Configurations

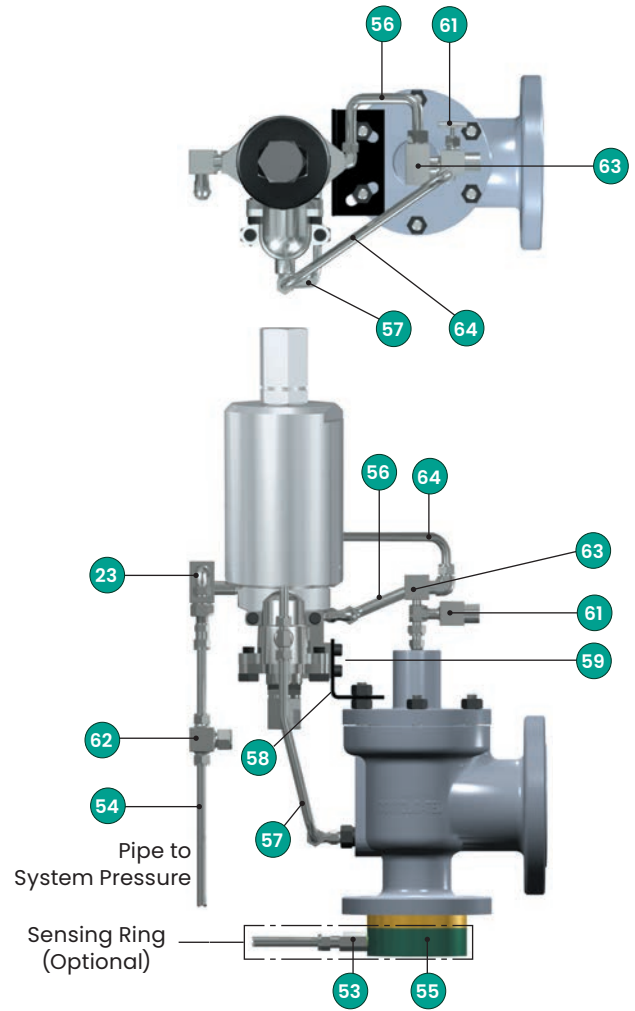
## 2900-40 Series Type 39MV Modulating Pilot

(Vented to Body Bowl)

**Pilot Valve with Manual Blowdown and Pilot Supply Filter**  
(Standard for Steam Applications)  
(Optional for Liquid Applications)



**Pilot Valve with Backflow Preventer, Manual Blowdown and Pilot Supply Filter**  
(Optional for Steam Applications)



**Pilot Valve with Manual Blowdown & Pilot Supply Filter**  
(Standard for Steam Applications)  
(Optional for Liquid Applications)

No.	Part	Material
23	Field Test Connection	316 Stainless Steel
53	Sensing Tube	316 Stainless Steel
54	Sensing Line	316 Stainless Steel
55	Sensing Ring	316 Stainless Steel
56	Dome Line	316 Stainless Steel
57	Discharge Line	316 Stainless Steel
58	Bracket	Carbon Steel
59	Bracket Cap Screw	316 Stainless Steel
61	Needle Valve (Manual Blowdown)	316 Stainless Steel
62	Pilot Supply Filter	316 Stainless Steel

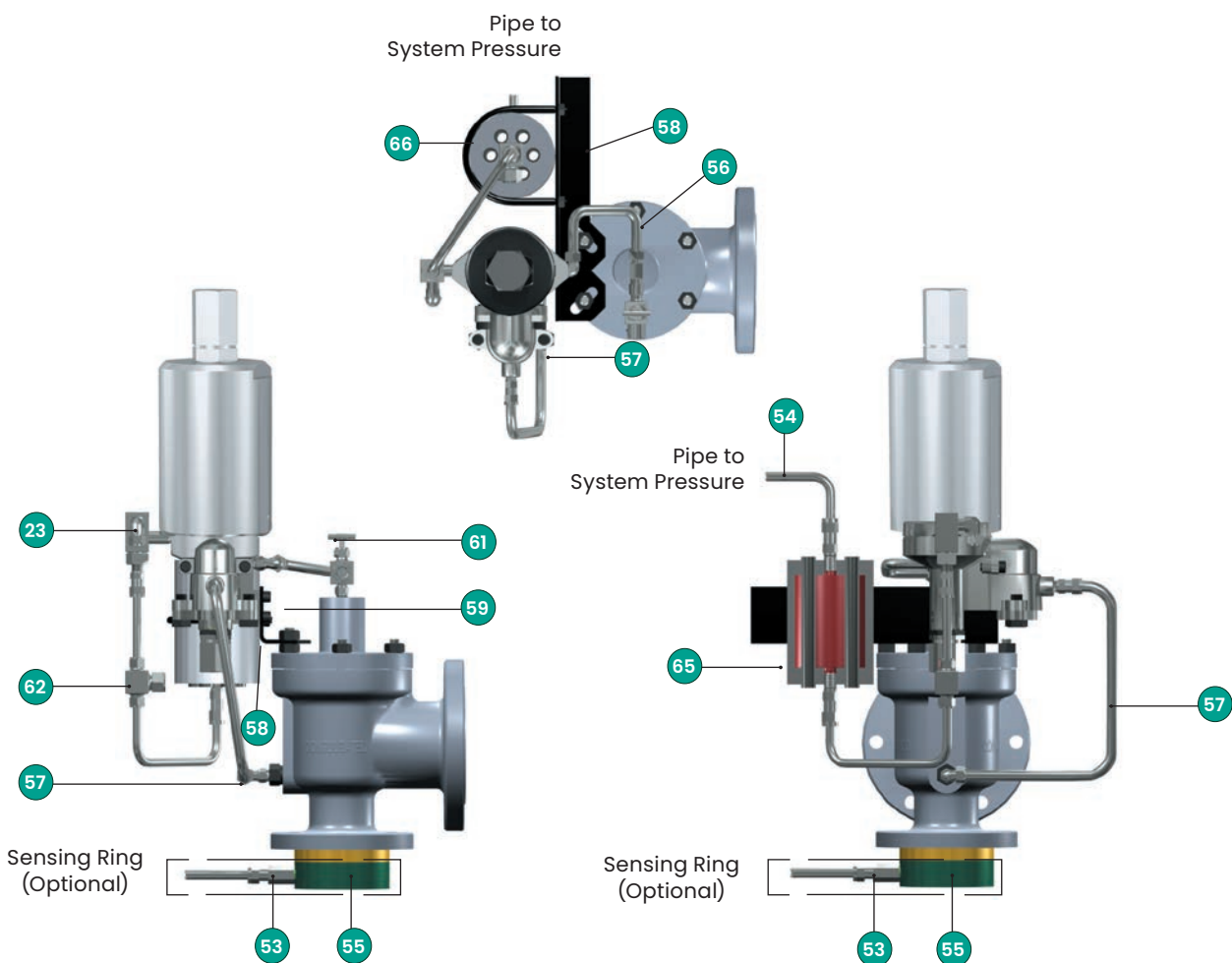
**Pilot Valve with Backflow Preventer, Manual Blowdown and Pilot Supply Filter**  
(Optional for Steam Applications)

No.	Part	Material
23	Field Test Connection	316 Stainless Steel
53	Sensing Tube	316 Stainless Steel
54	Sensing Line	316 Stainless Steel
55	Sensing Ring	316 Stainless Steel
56	Dome Line	316 Stainless Steel
57	Discharge Line	316 Stainless Steel
58	Bracket	Carbon Steel
59	Bracket Cap Screw	316 Stainless Steel
61	Needle Valve (Manual Blowdown)	316 Stainless Steel
62	Pilot Supply Filter	316 Stainless Steel
63	Backflow Preventer	316 Stainless Steel
64	Backflow Preventer Line	316 Stainless Steel

# Piping Configurations

## Alternate Piping Arrangement

2900-40 Series Type 39PV Pop Pilot with Heat Exchanger - Hot Service



### Pilot Valve with Manual Blowdown, Pilot Supply Filter and Heat Exchanger High Temp (Media above 505°F (263°C))

No.	Part	Material
23	Field Test Connection	316 Stainless Steel
53	Sensing Tube	316 Stainless Steel
54	Sensing Line	316 Stainless Steel
55	Sensing Ring	316 Stainless Steel
56	Dome Line	316 Stainless Steel
57	Discharge Line	316 Stainless Steel
58	Bracket	Carbon Steel
59	Bracket Cap Screw	316 Stainless Steel
61	Needle Valve (Manual Blowdown)	316 Stainless Steel
62	Pilot Supply Filter	316 Stainless Steel
65	Heat Exchanger	316 Stainless Steel
66	Heat Exchanger U-Bolt	316 Stainless Steel

# Valve Installation

## Valve Connections

The Consolidated 2900–40 Series flanged valves are equipped with ASME B16.5 flanges. For other standards, contact Baker Hughes for your needs.

The facing on raised flanges is a spiral finish, 125 to 250 micro inch roughness (Ra).

All flanged drilling straddle the centerlines of the valve.

## Handling and Storage

Safety relief valves should be handled carefully. The internal parts of a Pilot-Operated safety relief valve are precision machined and fitted together to maintain perfect alignment. Rough handling may damage the external tubing, pilot, and main valve seats or may cause misalignment sufficient to incur leakage or erratic operation. Safety relief valves are shipped with a protective covering over the inlet and the outlet. This is to prevent damage to the flanged surfaces and to prevent entry of foreign material into the valve. If the valves are to be stored before installation, the protective covering should be left intact until installation. A clean, dry storage area is recommended. Valves should always be protected with a suitable covering to prevent entry of foreign material.

## Inlet Piping

Pilot-Operated safety relief valves must be installed in a vertical upright position. The inlet piping to the valve should be short and direct from the vessel or equipment being protected. The connection to the vessel should be provided with a radius to permit smooth flow to the valve. Sharp corners should be avoided. Should this not be practical, then the inlet should be swaged out at least one additional pipe diameter.

In any event, the pressure drop from the vessel to the valve should not exceed 3% of set pressure when the valve is flowing full capacity. In no event should the inlet piping be smaller in diameter than the inlet connection of the valve.

## Outlet Piping

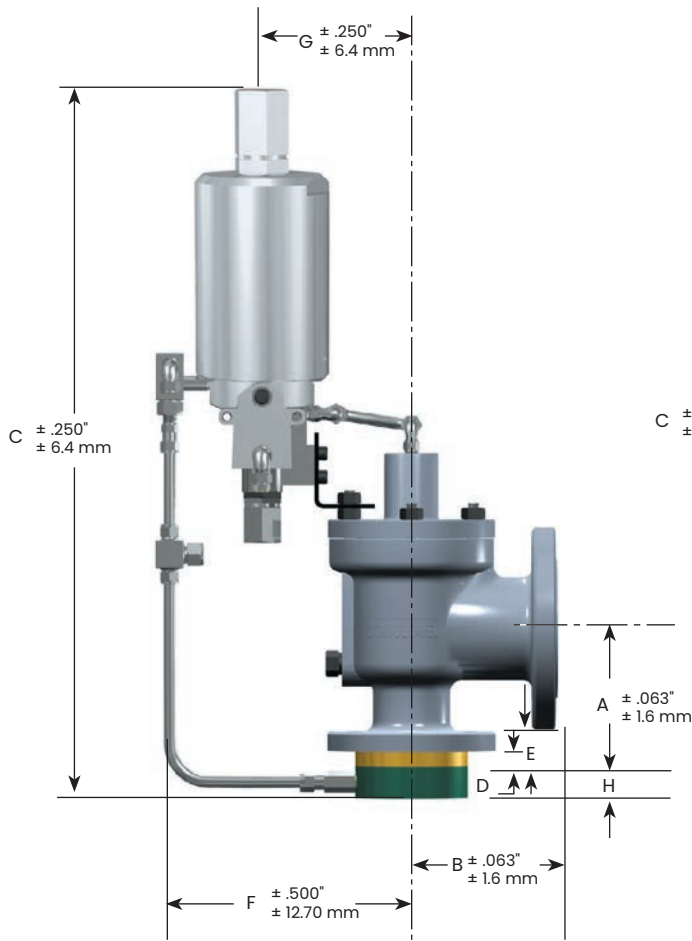
Alignment of the internal parts of a Pilot-Operated safety relief valve is important to ensure proper operation. Although the valve body will withstand a considerable mechanical load, unsupported discharge piping should not impose loads any higher than that stated in the Technical Information Section of this catalog, consisting of more than a companion flange, long radius elbow and a short vertical pipe. Care should be taken to ensure thermal expansion of piping and supports does not produce strains in a valve. Spring supports are recommended where necessary to avoid this condition. The discharge piping should be designed to allow for vessel expansion, as well as expansion of the discharge pipe itself. This is particularly important on long discharge lines. Consideration should be given to discharge pipe movement resulting from wind loads. Any oscillation of the discharge piping introduces stress distortion in the valve body, and the resultant movement of the internal parts may cause leakage.

### **Note:**

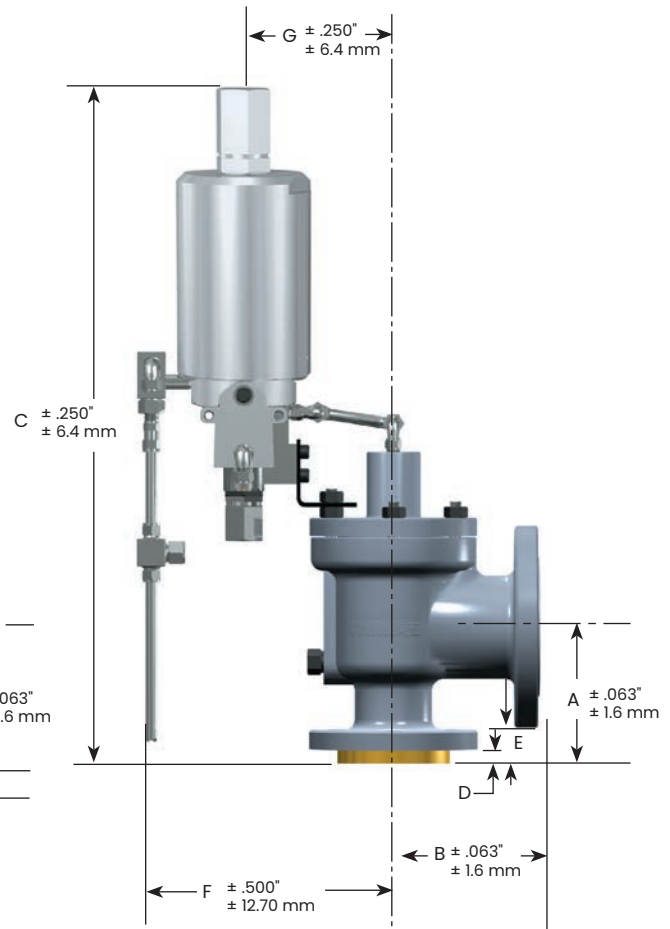
***In no event should the outlet piping be smaller in diameter than the outlet connection of the valve.***

# Dimensions & Weights

## 2900-40 Series Type 39PV Pop Pilot (Pilot Vented to Atmosphere)



With Sensing Ring Option



With Standard Remote Sensing

# Dimensions & Weights

## 2900-40 Series with Type 39PV & 39MV Pilot

Dimensions and Weights - D Orifice																				
Valve Type	A		B		C				D		E		F		G		H <sup>1</sup>		Approximate Weight	
					STD		Bellows													
	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	lb	kg
2905	4.13	104.8	4.50	114.3	22.63	574.7	23.63	600.1	.69	17.5	1.13	28.6	8.25	209.6	4.88	123.8	1.50	38.1	40	18.1
2906	4.13	104.8	4.50	114.3	22.63	574.7	23.63	600.1	.69	17.5	1.38	34.9	8.25	209.6	4.88	123.8	1.50	38.1	40	18.1
2910	4.13	104.8	4.50	114.3	22.63	574.7	23.63	600.1	.69	17.5	1.38	34.9	8.25	209.6	4.88	123.8	1.50	38.1	50	22.7
2912	4.13	104.8	4.50	114.3	22.63	574.7	23.63	600.1	.69	17.5	1.38	34.9	9.16	232.6	5.75	146.1	1.50	38.1	50	22.7
2914	4.13	104.8	5.50	139.7	23.25	590.6	24.25	616.0	.69	17.5	1.94	49.2	10.00	254.0	6.63	168.3	1.50	38.1	70	31.8
2916	4.13	104.8	5.50	139.7	23.25	590.6	24.25	616.0	.69	17.5	1.94	49.2	10.00	254.0	6.63	168.3	1.50	38.1	70	31.8
2918	5.50	139.7	7.00	177.8	24.63	625.5	25.63	650.9	.69	17.5	2.44	61.9	10.47	265.9	7.09	180.2	1.50	38.1	150	68.0
2920	4.13	104.8	4.50	114.3	22.63	574.7	23.63	600.1	.69	17.5	1.38	34.9	8.25	209.6	4.88	123.8	1.50	38.1	50	22.7
2922	4.13	104.8	4.50	114.3	22.63	574.7	23.63	600.1	.69	17.5	1.38	34.9	8.25	209.6	4.88	123.8	1.50	38.1	50	22.7
2924	4.13	104.8	5.50	139.7	23.25	590.6	24.25	616.0	.69	17.5	1.94	49.2	10.00	254.0	6.63	168.3	1.50	38.1	70	31.8
2926	4.13	104.8	5.50	139.7	23.25	590.6	24.25	616.0	.69	17.5	1.94	49.2	10.00	254.0	6.63	168.3	1.50	38.1	70	31.8
2928	5.50	139.7	7.00	177.8	24.63	625.5	25.63	650.9	.69	17.5	2.44	61.9	10.47	265.9	7.09	180.2	1.50	38.1	150	68.0

Dimensions and Weights - E Orifice																				
Valve Type	A		B		C				D		E		F		G		H <sup>1</sup>		Approximate Weight	
					STD		Bellows													
	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	lb	kg
2905	4.13	104.8	4.50	114.3	22.63	574.7	23.63	600.1	.69	17.5	1.13	28.6	8.25	209.6	4.88	123.8	1.50	38.1	40	18.1
2906	4.13	104.8	4.50	114.3	22.63	574.7	23.63	600.1	.69	17.5	1.38	34.9	8.25	209.6	4.88	123.8	1.50	38.1	40	18.1
2910	4.13	104.8	4.50	114.3	22.63	574.7	23.63	600.1	.69	17.5	1.38	34.9	8.25	209.6	4.88	123.8	1.50	38.1	50	22.7
2912	4.13	104.8	4.50	114.3	22.63	574.7	23.63	600.1	.69	17.5	1.38	34.9	9.16	232.6	5.75	146.1	1.50	38.1	50	22.7
2914	4.13	104.8	5.50	139.7	23.25	590.6	23.25	590.6	.69	17.5	1.94	49.2	10.00	254.0	6.63	168.3	1.50	38.1	70	31.8
2916	4.13	104.8	5.50	139.7	23.25	590.6	24.25	616.0	.69	17.5	1.94	49.2	10.00	254.0	6.63	168.3	1.50	38.1	70	31.8
2918	5.50	139.7	7.00	177.8	24.63	625.5	25.63	650.9	.69	17.5	2.44	61.9	10.47	265.9	7.09	180.2	1.50	38.1	150	68.0
2920	4.13	104.8	4.50	114.3	22.63	574.7	23.63	600.1	.69	17.5	1.38	34.9	8.25	209.6	4.88	123.8	1.50	38.1	50	22.7
2922	4.13	104.8	4.50	114.3	22.63	574.7	23.63	600.1	.69	17.5	1.38	34.9	8.25	209.6	4.88	123.8	1.50	38.1	50	22.7
2924	4.13	104.8	5.50	139.7	23.25	590.6	24.25	616.0	.69	17.5	1.94	49.2	10.00	254.0	6.63	168.3	1.50	38.1	70	31.8
2926	4.13	104.8	5.50	139.7	23.25	590.6	24.25	616.0	.69	17.5	1.94	49.2	10.00	254.0	6.63	168.3	1.50	38.1	70	31.8
2928	5.50	139.7	7.00	177.8	24.63	625.5	25.63	650.9	.69	17.5	2.44	61.9	10.47	265.9	7.09	180.2	1.50	38.1	150	68.0

1. Does not include thickness of two gaskets required.

# Dimensions & Weights

## 2900-40 Series with Type 39PV & 39MV Pilot

Dimensions and Weights - F Orifice																				
Valve Type	A		B		C				D		E		F		G		H <sup>1</sup>		Approximate Weight	
					STD		Bellows													
	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	lb	kg
2905	4.88	123.8	4.75	120.7	23.25	590.6	24.25	616.0	.69	17.5	1.25	31.8	8.25	209.6	4.88	123.8	1.50	38.1	45	20.4
2906	4.88	123.8	4.75	120.7	23.25	590.6	24.25	616.0	.69	17.5	1.50	38.1	8.25	209.6	4.88	123.8	1.50	38.1	45	20.4
2910	4.88	123.8	6.00	152.4	23.25	590.6	24.25	616.0	.69	17.5	1.56	39.7	8.25	209.6	4.88	123.8	1.50	38.1	50	22.7
2912	4.88	123.8	6.00	152.4	23.25	590.6	24.25	616.0	.69	17.5	1.56	39.7	9.16	232.6	5.75	146.1	1.50	38.1	60	27.2
2914	4.88	123.8	6.50	165.1	23.94	608.0	24.94	633.4	.69	17.5	1.94	49.2	10.00	254.0	6.63	168.3	1.50	38.1	100	45.4
2916	4.88	123.8	6.50	165.1	23.94	608.0	24.94	633.4	.69	17.5	1.94	49.2	10.00	254.0	6.63	168.3	1.50	38.1	100	45.4
2918	5.50	139.7	7.00	177.8	24.75	628.7	25.75	654.1	.69	17.5	2.44	61.9	10.47	265.9	7.09	180.2	1.50	38.1	150	68.0
2920	4.88	123.8	6.00	152.4	23.25	590.6	24.25	616.0	.69	17.5	1.56	39.7	8.25	209.6	4.88	123.8	1.50	38.1	50	22.7
2922	4.88	123.8	6.00	152.4	23.25	590.6	24.25	616.0	.69	17.5	1.56	39.7	8.25	209.6	4.88	123.8	1.50	38.1	50	22.7
2924	4.88	123.8	6.50	165.1	23.94	608.0	24.94	633.4	.69	17.5	1.94	49.2	10.00	254.0	6.63	168.3	1.50	38.1	100	45.4
2926	4.88	123.8	6.50	165.1	23.94	608.0	24.94	633.4	.69	17.5	1.94	49.2	10.00	254.0	6.63	168.3	1.50	38.1	100	45.4
2928	5.50	139.7	7.00	177.8	24.75	628.7	25.75	654.1	.69	17.5	2.44	61.9	10.47	265.9	7.09	180.2	1.50	38.1	150	68.0

Dimensions and Weights - G Orifice																				
Valve Type	A		B		C				D		E		F		G		H <sup>1</sup>		Approximate Weight	
					STD		Bellows													
	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	lb	kg
2905	4.88	123.8	4.75	120.7	23.25	590.6	24.25	616.0	.69	17.5	1.25	31.8	8.25	209.6	4.88	123.8	1.50	38.1	55	24.9
2906	4.88	123.8	4.75	120.7	23.25	590.6	24.25	616.0	.69	17.5	1.50	38.1	8.25	209.6	4.88	123.8	1.50	38.1	55	24.9
2910	4.88	123.8	6.00	152.4	23.25	590.6	24.25	616.0	.69	17.5	1.56	39.7	8.25	209.6	4.88	123.8	1.50	38.1	60	27.2
2912	4.88	123.8	6.00	152.4	23.25	590.6	24.25	616.0	.69	17.5	1.56	39.7	9.16	232.6	5.75	146.1	1.50	38.1	65	29.5
2914	4.88	123.8	6.50	165.1	23.94	608.1	25.19	639.8	.69	17.5	1.94	49.2	10.00	254.0	6.63	168.3	1.50	38.1	95	43.1
2916	6.13	155.6	6.75	171.5	25.19	639.8	26.44	671.6	.69	17.5	2.19	55.6	10.00	254.0	6.63	168.3	1.50	38.1	100	45.4
2918	6.13	155.6	6.75	171.5	25.19	639.8	26.44	671.6	.69	17.5	2.69	68.3	10.00	254.0	6.63	168.3	1.50	38.1	110	49.9
2920	4.88	123.8	6.00	152.4	23.25	590.6	24.25	616.0	.69	17.5	1.56	39.7	8.25	209.6	4.88	123.8	1.50	38.1	60	27.2
2922	4.88	123.8	6.00	152.4	23.25	590.6	24.25	616.0	.69	17.5	1.56	39.7	9.16	232.6	5.75	146.1	1.50	38.1	65	29.5
2924	4.88	123.8	6.50	165.1	23.94	608.1	25.19	639.8	.69	17.5	1.94	49.2	10.00	254.0	6.63	168.3	1.50	38.1	95	43.1
2926	6.13	155.6	6.75	171.5	25.19	639.8	26.44	671.6	.69	17.5	2.19	55.6	10.00	254.0	6.63	168.3	1.50	38.1	100	45.4
2928	6.13	155.6	6.75	171.5	25.19	639.8	26.44	671.6	.69	17.5	2.69	68.3	10.00	254.0	6.63	168.3	1.50	38.1	110	49.9

1. Does not include thickness of two gaskets required.



# Dimensions & Weights

## 2900-40 Series with Type 39PV & 39MV Pilot

Dimensions and Weights – H Orifice																				
Valve Type	A		B		C				D		E		F		G		H <sup>1</sup>		Approximate Weight	
					STD		Bellows													
	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	lb	kg
2905	5.13	130.2	4.88	123.8	24.56	623.9	24.56	623.9	.69	17.5	1.25	31.8	8.25	209.6	4.88	123.8	1.50	38.1	60	27.2
2906	5.13	130.2	4.88	123.8	24.56	623.9	24.56	623.9	.69	17.5	1.56	39.7	8.25	209.6	4.88	123.8	1.50	38.1	60	27.2
2910	5.13	130.2	4.88	123.8	24.56	623.9	24.56	623.9	.69	17.5	1.69	42.9	9.19	233.4	5.81	147.7	1.50	38.1	65	29.5
2912	6.06	154.0	6.38	161.9	25.63	650.9	25.63	650.9	.69	17.5	1.69	42.9	9.25	235.0	5.88	149.2	1.50	38.1	85	38.6
2914	6.06	154.0	6.38	161.9	26.13	663.6	26.13	663.6	.69	17.5	2.19	55.6	10.31	262.0	6.94	176.2	1.50	38.1	130	59.0
2916	6.06	154.0	6.38	161.9	26.13	663.6	26.13	663.6	.69	17.5	2.19	55.6	10.31	262.0	6.94	176.2	1.50	38.1	140	63.5
2920	5.13	130.2	4.88	123.8	24.56	623.9	24.56	623.9	.69	17.5	1.69	42.9	9.19	233.4	5.81	147.7	1.50	38.1	65	29.5
2922	5.13	130.2	4.88	123.8	24.56	623.9	24.56	623.9	.69	17.5	1.69	42.9	9.19	233.4	5.81	147.7	1.50	38.1	65	29.5
2924	6.06	154.0	6.38	161.9	25.69	652.5	25.69	652.5	.69	17.5	2.19	55.6	9.25	235.0	5.88	149.2	1.50	38.1	90	40.8
2926	6.06	154.0	6.38	161.9	26.13	663.6	26.13	663.6	.69	17.5	2.19	55.6	10.31	262.0	6.94	176.2	1.50	38.1	140	63.5

Dimensions and Weights – J Orifice																				
Valve Type	A		B		C				D		E		F		G		H <sup>1</sup>		Approximate Weight	
					STD		Bellows													
	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	lb	kg
2905	5.38	136.5	4.88	123.8	25.34	643.7	25.34	643.7	.69	17.5	1.31	33.4	9.25	235.0	5.88	149.2	1.50	38.1	75	34.0
2906	5.38	136.5	4.88	123.8	25.34	643.7	25.34	643.7	.69	17.5	1.56	39.7	9.25	235.0	5.88	149.2	1.50	38.1	75	34.0
2910	7.25	184.2	7.13	181.0	25.09	637.4	25.09	637.4	.69	17.5	1.81	46.1	9.38	238.1	6.00	152.4	1.50	38.1	100	45.4
2912	7.25	184.2	7.13	181.0	27.81	706.5	27.81	706.5	.69	17.5	1.81	46.1	10.50	266.7	7.13	181.0	1.50	38.1	170	77.1
2914	7.25	184.2	7.13	181.0	27.81	706.5	27.81	706.5	.69	17.5	2.19	55.6	10.50	266.7	7.13	181.0	1.50	38.1	195	88.5
2916	7.25	184.2	7.13	181.0	27.81	706.5	27.81	706.5	.69	17.5	2.56	65.1	10.50	266.7	7.13	181.0	1.50	38.1	220	99.8
2918	7.94	201.6	8.63	219.1	28.5	723.9	28.5	723.9	.69	17.5	3.31	84.1	10.50	266.7	7.13	181.0	1.50	38.1	245	111.1
2920	7.25	184.2	7.13	181.0	25.09	637.4	25.09	637.4	.69	17.5	1.81	46.1	9.38	238.1	6.00	152.4	1.50	38.1	100	45.4
2922	7.25	184.2	7.13	181.0	27.69	703.3	27.69	703.3	.69	17.5	1.81	46.1	10.50	266.7	7.13	181.0	1.50	38.1	100	45.4
2924	7.25	184.2	7.13	181.0	27.81	706.5	27.81	706.5	.69	17.5	2.19	55.6	10.50	266.7	7.13	181.0	1.50	38.1	180	81.6
2926	6.13	155.6	6.75	171.5	25.19	639.8	26.44	671.6	.69	17.5	2.19	55.6	10.00	254.0	6.63	168.3	1.50	38.1	100	45.4
2928	7.94	201.6	8.63	219.1	28.5	723.9	28.5	723.9	.69	17.5	3.31	84.1	10.50	266.7	7.13	181.0	1.50	38.1	245	111.1

1. Does not include thickness of two gaskets required.

# Dimensions & Weights

## 2900-40 Series with Type 39PV & 39MV Pilot

Dimensions and Weights - K Orifice																				
Valve Type	A		B		C				D		E		F		G		H <sup>1</sup>		Approximate Weight	
					STD		Bellows													
	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	lb	kg
2905	6.13	155.6	6.38	161.9	25.88	657.2	25.88	657.2	.69	17.5	1.44	36.5	9.38	238.1	6.00	152.4	1.50	38.1	110	49.9
2906	6.13	155.6	6.38	161.9	25.88	657.2	25.88	657.2	.69	17.5	1.81	46.1	9.38	238.1	6.00	152.4	1.50	38.1	115	52.2
2910	6.13	155.6	6.38	161.9	26.06	662.0	26.06	662.0	.69	17.5	1.94	49.2	10.00	254.0	6.63	168.3	1.50	38.1	140	63.5
2912	7.25	184.2	7.13	181.0	27.19	690.6	27.19	690.6	.69	17.5	1.94	49.2	10.00	254.0	6.63	168.3	1.50	38.1	150	68.0
2914	7.81	198.5	8.50	215.9	28.56	725.5	28.56	725.5	.69	17.5	2.19	55.6	10.88	276.2	7.50	190.5	1.50	38.1	300	136.1
2916	7.75	196.9	8.50	215.9	28.50	723.9	28.25	717.6	.69	17.5	2.56	65.1	10.88	276.2	7.50	190.5	1.50	38.1	320	145.2
2918	9.19	233.4	9.00	228.6	32.5	825.5	32.5	825.5	.69	17.5	3.31	84.1	10.88	276.2	7.50	190.5	1.50	38.1	340	154.2
2920	6.13	155.6	6.38	161.9	26.19	665.2	26.19	665.2	.69	17.5	1.94	49.2	10.00	254.0	6.63	168.3	1.50	38.1	140	63.5
2922	6.13	155.6	6.38	161.9	26.19	665.2	26.19	665.2	.69	17.5	1.94	49.2	10.00	254.0	6.63	168.3	1.50	38.1	140	63.5
2924	7.25	184.2	7.13	181.0	27.31	693.8	28.56	725.5	.69	17.5	2.19	55.6	10.00	254.0	6.63	168.3	1.50	38.1	165	74.8
2926	7.75	196.9	8.50	215.9	28.50	723.9	26.13	663.6	.69	17.5	2.56	65.1	10.88	276.2	7.50	190.5	1.50	38.1	320	145.2
2928	9.19	233.4	9.00	228.6	32.5	825.5	32.5	825.5	.69	17.5	3.31	84.1	10.88	276.2	7.50	190.5	1.50	38.1	340	154.2

Dimensions and Weights - L Orifice																				
Valve Type	A		B		C				D		E		F		G		H <sup>1</sup>		Approximate Weight	
					STD		Bellows													
	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	lb	kg
2905	6.13	155.6	6.50	165.1	26.88	682.6	26.88	682.6	.69	17.5	1.44	36.5	10.25	260.4	6.88	174.6	1.50	38.1	140	63.5
2906	6.13	155.6	6.50	165.1	26.88	682.6	26.88	682.6	.69	17.5	1.81	46.1	10.25	260.4	6.88	174.6	1.50	38.1	145	65.8
2910	7.06	179.4	7.13	181.0	28.19	716.0	28.19	716.0	.69	17.5	1.94	49.2	10.63	269.9	7.25	184.2	1.50	38.1	220	99.8
2912	7.06	179.4	8.00	203.2	28.19	716.0	28.19	716.0	.69	17.5	2.19	55.6	10.63	269.9	7.25	184.2	1.50	38.1	230	104.3
2914	7.75	196.9	8.75	222.3	29.50	749.3	29.25	743.0	.69	17.5	2.44	61.9	12.19	309.6	8.81	223.9	1.50	38.1	360	163.3
2916	7.75	196.9	8.75	222.3	29.50	749.3	29.25	743.0	.69	17.5	2.81	71.5	12.19	309.6	8.81	223.9	1.50	38.1	370	167.8
2920	7.06	179.4	7.13	181.0	28.19	716.0	28.19	716.0	.69	17.5	1.94	49.2	10.63	269.9	7.25	184.2	1.50	38.1	220	99.8
2922	7.06	179.4	8.00	203.2	28.19	716.0	28.19	716.0	.69	17.5	2.19	55.6	10.63	269.9	7.25	184.2	1.50	38.1	230	104.3
2924	7.75	196.9	8.75	222.3	29.50	749.3	29.25	743.0	.69	17.5	2.44	61.9	12.19	309.6	8.81	223.9	1.50	38.1	360	163.3
2926	7.75	196.9	8.75	222.3	29.50	749.3	29.25	743.0	.69	17.5	2.81	71.5	12.19	309.6	8.81	223.9	1.50	38.1	370	167.8

# Dimensions & Weights

## 2900-40 Series with Type 39PV & 39MV Pilot

Dimensions and Weights – M Orifice																				
Valve Type	A		B		C				D		E		F		G		H <sup>1</sup>		Approximate Weight	
					STD		Bellows													
	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	lb	kg
2905	7.00	177.8	7.25	184.2	27.88	708.0	27.88	708.0	.69	17.5	1.63	41.3	10.44	265.1	7.06	179.4	1.50	38.1	185	83.9
2906	7.00	177.8	7.25	184.2	27.88	708.0	27.88	708.0	.69	17.5	1.94	49.2	10.44	265.1	7.06	179.4	1.50	38.1	190	86.2
2910	7.00	177.8	7.25	184.2	28.13	714.4	28.13	714.4	.69	17.5	1.94	49.2	10.44	265.1	7.06	179.4	1.50	38.1	230	104.3
2912	7.00	177.8	8.00	203.2	28.69	728.7	28.69	728.7	.69	17.5	2.19	55.6	11.75	298.5	8.38	212.7	1.50	38.1	300	136.1
2914	7.75	196.9	8.75	222.3	29.44	747.7	29.44	747.7	.69	17.5	2.44	61.9	11.75	298.5	8.38	212.7	1.50	38.1	340	154.2
2920	7.00	177.8	7.25	184.2	28.13	714.4	28.13	714.4	.69	17.5	1.94	49.2	10.44	265.1	7.06	179.4	1.50	38.1	230	104.3
2922	7.00	177.8	8.00	203.2	28.69	728.7	28.69	728.7	.69	17.5	2.19	55.6	10.44	265.1	7.06	179.4	1.50	38.1	300	136.1
2924	7.75	196.9	8.75	222.3	29.44	747.7	29.44	747.7	.69	17.5	2.44	61.9	11.75	298.5	8.38	212.7	1.50	38.1	340	154.2

Dimensions and Weights – N Orifice																				
Valve Type	A		B		C				D		E		F		G		H <sup>1</sup>		Approximate Weight	
					STD		Bellows													
	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	lb	kg
2905	7.75	196.9	8.25	209.6	29.06	738.2	29.06	738.2	.69	17.5	1.63	41.3	10.63	269.9	7.25	184.2	1.50	38.1	220	99.8
2906	7.75	196.9	8.25	209.6	29.06	738.2	29.06	738.2	.69	17.5	1.94	49.2	10.63	269.9	7.25	184.2	1.50	38.1	225	102.1
2910	7.75	196.9	8.25	209.6	29.44	747.7	29.44	747.7	.69	17.5	1.94	49.2	10.94	277.8	7.56	192.1	1.50	38.1	260	117.9
2912	7.75	196.9	8.75	222.3	29.94	760.4	29.94	760.4	.69	17.5	2.19	55.6	12.13	308.0	8.75	222.3	1.50	38.1	360	163.3
2914	7.75	196.9	8.75	222.3	29.94	760.4	29.94	760.4	.69	17.5	2.44	61.9	12.13	308.0	8.75	222.3	1.50	38.1	380	172.4
2920	7.75	196.9	8.25	209.6	29.44	747.7	29.44	747.7	.69	17.5	1.94	49.2	10.94	277.8	7.56	192.1	1.50	38.1	260	117.9
2922	7.75	196.9	8.75	222.3	29.94	760.4	29.94	760.4	.69	17.5	2.19	55.6	12.13	308.0	8.75	222.3	1.50	38.1	360	163.3
2924	7.75	196.9	8.75	222.3	29.94	760.4	29.94	760.4	.69	17.5	2.44	61.9	12.13	308.0	8.75	222.3	1.50	38.1	380	172.4

Dimensions and Weights – P Orifice																				
Valve Type	A		B		C				D		E		F		G		H <sup>1</sup>		Approximate Weight	
					STD		Bellows													
	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	lb	kg
2905	7.13	181.0	9.00	228.6	30.25	768.4	30.25	768.4	.69	17.5	1.63	41.3	10.88	276.2	7.50	190.5	1.50	38.1	260	117.9
2906	7.13	181.0	9.00	228.6	30.25	768.4	30.25	768.4	.69	17.5	1.94	49.2	10.88	276.2	7.50	190.5	1.50	38.1	270	122.5
2910	8.88	225.4	10.00	254.0	32.44	823.9	32.44	823.9	.69	17.5	1.94	49.2	11.19	284.2	7.81	198.5	1.50	38.1	350	158.8
2912	8.88	225.4	10.00	254.0	32.94	836.6	32.94	836.6	.69	17.5	2.19	55.6	12.75	323.9	9.38	238.1	1.50	38.1	530	240.4
2914	8.88	225.4	10.00	254.0	32.94	836.6	32.94	836.6	.69	17.5	2.44	61.9	12.75	323.9	9.38	238.1	1.50	38.1	545	247.2
2920	8.88	225.4	10.00	254.0	32.44	823.9	32.44	823.9	.69	17.5	1.94	49.2	11.19	284.2	7.81	198.5	1.50	38.1	350	158.8
2923	8.88	225.4	10.00	254.0	32.94	836.6	32.94	836.6	.69	17.5	2.19	55.6	12.75	323.9	9.38	238.1	1.50	38.1	530	240.4
2924	8.88	225.4	10.00	254.0	32.94	836.6	32.94	836.6	.69	17.5	2.44	61.9	12.75	323.9	9.38	238.1	1.50	38.1	545	247.2

1. Does not include thickness of two gaskets required.

# Dimensions & Weights

## 2900-40 Series with Type 39PV & 39MV Pilot

Dimensions and Weights - Q Orifice																				
Valve Type	A		B		C				D		E		F		G		H <sup>1</sup>		Approximate Weight	
					STD		Bellows													
	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	lb	kg
2905	9.44	239.7	9.50	241.3	32.50	825.5	32.50	825.5	.81	20.7	1.81	46.1	12.63	320.7	9.25	235.0	1.50	38.1	430	195.0
2906	9.44	239.7	9.50	241.3	32.50	825.5	32.50	825.5	.81	20.7	2.25	57.2	12.63	320.7	9.25	235.0	1.50	38.1	445	201.8
2910	9.44	239.7	9.50	241.3	33.13	841.4	33.13	841.4	.81	20.7	2.25	57.2	12.88	327.0	9.50	241.3	1.50	38.1	530	240.4
2912	9.44	239.7	9.50	241.3	33.75	857.3	33.75	857.3	.81	20.7	2.69	68.3	12.94	328.6	9.56	242.9	1.50	38.1	645	292.6
2920	9.44	239.7	9.50	241.3	32.25	819.2	32.25	819.2	.81	20.7	2.25	57.2	12.63	320.7	9.25	235.0	1.50	38.1	445	201.8
2922	9.44	239.7	9.50	241.3	33.75	857.3	33.75	857.3	.81	20.7	2.69	68.3	12.94	328.6	9.56	242.9	1.50	38.1	645	292.6

Dimensions and Weights - R Orifice																				
Valve Type	A		B		C				D		E		F		G		H <sup>1</sup>		Approximate Weight	
					STD		Bellows													
	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	lb	kg
2905	9.44	239.7	9.50	241.3	34.63	879.5	34.63	879.5	.81	20.7	1.81	46.1	12.94	328.6	9.56	242.9	1.50	38.1	495	224.5
2906	9.44	239.7	9.50	241.3	34.63	879.5	34.63	879.5	.81	20.7	2.25	57.2	12.94	328.6	9.56	242.9	1.50	38.1	510	231.3
2910	9.44	239.7	10.50	266.7	34.63	879.5	34.63	879.5	.81	20.7	2.25	57.2	12.94	328.6	9.56	242.9	1.50	38.1	550	249.5
2912	9.44	239.7	10.50	266.7	34.88	885.8	34.88	885.8	.81	20.7	2.69	68.3	13.25	336.6	9.88	250.8	1.50	38.1	675	306.2
2920	9.44	239.7	9.50	241.3	34.63	879.5	34.63	879.5	.81	20.7	2.25	57.2	12.94	328.6	9.56	242.9	1.50	38.1	510	231.3
2922	9.44	239.7	10.50	266.7	34.88	885.8	34.88	885.8	.81	20.7	2.69	68.3	13.25	336.6	9.88	250.8	1.50	38.1	675	306.2

Dimensions and Weights - T Orifice																				
Valve Type	A		B		C				D		E		F		G		H <sup>1</sup>		Approximate Weight	
					STD		Bellows													
	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	lb	kg
2905	10.88	276.2	11.00	279.4	35.00	889.0	35.00	889.0	.81	20.7	1.94	49.2	13.75	349.3	10.38	263.5	1.50	38.1	620	281.2
2906	10.88	276.2	11.00	279.4	35.00	889.0	35.00	889.0	.81	20.7	2.44	61.9	13.75	349.3	10.38	263.5	1.50	38.1	640	290.3
2910	10.88	276.2	11.00	279.4	35.25	895.4	35.25	895.4	.81	20.7	2.44	61.9	13.75	349.3	10.38	263.5	1.50	38.1	840	381.0
2912	10.88	276.2	11.00	279.4	35.25	895.4	35.25	895.4	.81	20.7	3.00	76.2	13.75	349.3	10.38	263.5	1.50	38.1	925	419.6
2920	10.88	276.2	11.00	279.4	35.25	895.4	35.25	895.4	.81	20.7	2.44	61.9	13.75	349.3	10.38	263.5	1.50	38.1	840	381.0
2922	10.88	276.2	11.00	279.4	35.25	895.4	35.25	895.4	.81	20.7	3.00	76.2	13.75	349.3	10.38	263.5	1.50	38.1	925	419.6

1. Does not include thickness of two gaskets required.

# Dimensions & Weights

## 2900-40 Series with Type 39PV & 39MV Pilot

Dimensions and Weights - U Orifice																				
Valve Type	A		B		C				D		E		F		G		H <sup>1</sup>		Approximate Weight	
					STD		Bellows													
	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	lb	kg
2905	10.88	276.2	11.00	279.4	35.00	889.0	35.00	889.0	.81	20.7	1.94	49.2	13.75	349.3	10.38	263.5	1.50	38.1	620	281.2
2906	10.88	276.2	11.00	279.4	35.00	889.0	35.00	889.0	.81	20.7	2.44	61.9	13.75	349.3	10.38	263.5	1.50	38.1	640	290.3
2910	10.88	276.2	11.00	279.4	35.25	895.4	35.25	895.4	.81	20.7	2.44	61.9	13.75	349.3	10.38	263.5	1.50	38.1	840	381.0
2912	10.88	276.2	11.00	279.4	35.25	895.4	35.25	895.4	.81	20.6	3.00	76.2	13.75	349.3	10.38	263.5	1.50	38.1	925	419.6
2920	10.88	276.2	11.00	279.4	35.25	895.4	35.25	895.4	.81	20.7	2.44	61.9	13.75	349.3	10.38	263.5	1.50	38.1	840	381.0
2922	10.88	276.2	11.00	279.4	35.25	895.4	35.25	895.4	.81	20.6	3.00	76.2	13.75	349.3	10.38	263.5	1.50	38.1	925	419.6

Dimensions and Weights - V Orifice																				
Valve Type	A		B		C				D		E		F		G		H <sup>1</sup>		Approximate Weight	
					STD		Bellows													
	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	lb	kg
2905	12.00	304.8	16.00	406.4	43.50	1104.9	43.50	1104.9	.81	20.7	2.00	50.8	16.94	430.2	13.25	336.6	1.50	38.1	1600	725.7
2906	12.00	304.8	16.00	406.4	43.50	1104.9	43.50	1104.9	.81	20.7	2.69	68.3	16.94	430.2	13.25	336.6	1.50	38.1	1700	771.1
2910	12.00	304.8	16.00	406.4	46.38	1177.9	46.38	1177.9	.81	20.7	2.69	68.3	17.94	455.6	14.25	362.0	1.50	38.1	2000	907.2
2920	12.00	304.8	16.00	406.4	46.38	1177.9	46.38	1177.9	.81	20.7	2.69	68.3	17.94	455.6	14.25	362.0	1.50	38.1	2000	907.2

Dimensions and Weights - W Orifice																				
Valve Type	A		B		C				D		E		F		G		H <sup>1</sup>		Approximate Weight	
					STD		Bellows													
	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	lb	kg
2905	14.00	355.6	16.00	406.4	49.25	1251.0	49.25	1251.0	.81	20.7	2.81	71.5	17.94	455.6	14.25	362.0	1.50	38.1	2800	1270.1
2906	14.00	355.6	16.00	406.4	49.25	1251.0	49.25	1251.0	.81	20.7	2.94	74.6	17.94	455.6	14.25	362.0	1.50	38.1	2860	1297.3
2910	14.00	355.6	16.00	406.4	49.25	1251.0	49.25	1251.0	.81	20.7	2.94	74.6	17.94	455.6	14.25	362.0	1.50	38.1	2860	1297.3
2920	14.00	355.6	16.00	406.4	49.25	1251.0	49.25	1251.0	.81	20.7	2.94	74.6	17.94	455.6	14.25	362.0	1.50	38.1	2860	1297.3

1. Does not include thickness of two gaskets required.

# Pressure / Temperature

## Pressure / Temperature Tables

### How to Use Rating Tables

The Pressure/Temperature limitations of the 2900-40 series valves are based on the ASME B16.5, 2013 Edition and by the base coverplate bolting material. The following tables give the ratings for standard valves. For valves made from special materials, the maximum pressure may exceed the pressure stated in the following tables, but may be limited to the pressure ratings given in ASME B16.5.

The included tables specify important data about the valve sizes, flange ratings, pressure and temperature limits, back pressure ratings, and materials with allowable temperature ranges.

After determining valve size from the Valve Sizing section, or capacity tables in this section, select the proper set of tables (in the following pages) for the size valve. Enter the pressure/temperature tables and determine valve type. Review the table of data for that size valve to get other pertinent information.

#### **Notes:**

*When soft seats are used, they may govern the valve pressure/temperature rating.*

*Not every application is suitable for using a heat exchanger. The heat exchanger must be sized to meet the service conditions for each application.*

*For service above temperatures of 1000°F (538°C), consult factory for pressure/temperature limits.*

# Pressure / Temperature

## Selection Table for Steam and Water

2900-40 Series Valves, D Orifice - ASME Area: 0.128 in<sup>2</sup> (0.825 cm<sup>2</sup>)

Pressure Temperature Ratings for "D" Orifice										
Valve Type	ASME Ratings, D Orifice - (0.128 in <sup>2</sup> (0.825 cm <sup>2</sup> ) Actual)								Backpressure Limits @ 100°F (37.8°C)	
	Standard Material of Construction								Conventional	
	-20 to 100 °F (-28.9 to 37.8°C)		450°F (232.2°C)		800°F (426.7°C)		1000°F (537.8°C)			
	psig	barg	psig	barg	psig	barg	psig	barg	psig	barg
2905-40	290	19.99	185	12.75	80	5.51	-	-	280	19.30
2906-40	750	51.71	685	47.22	410	28.26	-	-	290	19.99
2910-40	750	51.71	685	47.22	410	28.26	-	-	290	19.99
2912-40	1500	103.42	1367	94.25	825	56.88	-	-	290	19.99
2914-40	2250	155.13	2052	141.48	1235	85.15	-	-	750	51.71
2916-40	3750	258.55	3422	235.94	2055	141.68	-	-	750	51.71
2918-40	5800	399.90	5702	393.14	3430	236.49	-	-	750	51.71
2920-40	-	-	-	-	510	35.16	215	14.82	290	19.99
2922-40	-	-	-	-	1015	69.98	430	29.64	290	19.99
2924-40	-	-	-	-	1525	105.14	650	44.81	750	51.71
2926-40	-	-	-	-	2540	175.12	1080	74.46	750	51.71
2928-40	-	-	-	-	4230	291.64	1800	124.10	750	51.71

## Selection Table for Steam and Water

2900-40 Series Valve, E Orifice - ASME Area: 0.228 in<sup>2</sup> (1.470 cm<sup>2</sup>)

Pressure Temperature Ratings for "E" Orifice										
Valve Type	ASME Ratings, E Orifice - (0.228 in <sup>2</sup> (1.470 cm <sup>2</sup> ) Actual)								Backpressure Limits @ 100°F (37.8°C)	
	Standard Material of Construction								Conventional	
	-20 to 100 °F (-28.9 to 37.8°C)		450°F (232.2°C)		800°F (426.7°C)		1000°F (537.8°C)			
	psig	barg	psig	barg	psig	barg	psig	barg	psig	barg
2905-40	290	19.99	185	12.75	80	5.51	-	-	280	19.30
2906-40	750	51.71	685	47.22	410	28.26	-	-	290	19.99
2910-40	750	51.71	685	47.22	410	28.26	-	-	290	19.99
2912-40	1500	103.42	1367	94.25	825	56.88	-	-	290	19.99
2914-40	2250	155.13	2052	141.48	1235	85.15	-	-	750	51.71
2916-40	3750	258.55	3422	235.94	2055	141.68	-	-	750	51.71
2918-40	5800	399.90	5702	393.14	3430	236.49	-	-	750	51.71
2920-40	-	-	-	-	510	35.16	215	14.82	290	19.99
2922-40	-	-	-	-	1015	69.98	430	29.64	290	19.99
2924-40	-	-	-	-	1525	105.14	650	44.81	750	51.71
2926-40	-	-	-	-	2540	175.12	1080	74.46	750	51.71
2928-40	-	-	-	-	4230	291.64	1800	124.10	750	51.71

# Pressure / Temperature

## Selection Table for Steam and Water

2900-40 Series Valve, F Orifice - ASME Area: 0.357 in<sup>2</sup> (2.302 cm<sup>2</sup>)

Pressure Temperature Ratings for "F" Orifice										
Valve Type	ASME Ratings, F Orifice - (0.357 in <sup>2</sup> (2.302 cm <sup>2</sup> ) Actual )								Backpressure Limits @ 100°F (37.8°C)	
	Standard Material of Construction								Conventional	
	-20 to 100 °F (-28.9 to 37.8°C)		450°F (232.2°C)		800°F (426.7°C)		1000°F (537.8°C)			
	psig	barg	psig	barg	psig	barg	psig	barg	psig	barg
2905-40	290	19.99	185	12.75	80	5.51	-	-	280	19.30
2906-40	750	51.71	685	47.22	410	28.26	-	-	290	19.99
2910-40	750	51.71	685	47.22	410	28.26	-	-	290	19.99
2912-40	1500	103.42	1367	94.25	825	56.88	-	-	290	19.99
2914-40	2250	155.13	2052	141.48	1235	85.15	-	-	750	51.71
2916-40	3750	258.55	3422	235.94	2060	142.03	-	-	750	51.71
2918-40	5800	399.90	5702	393.14	3430	236.49	-	-	750	51.71
2920-40	-	-	-	-	510	35.16	215	14.82	290	19.99
2922-40	-	-	-	-	1015	69.98	430	29.64	290	19.99
2924-40	-	-	-	-	1525	105.14	650	44.81	750	51.71
2926-40	-	-	-	-	2540	175.12	1080	74.46	750	51.71
2928-40	-	-	-	-	4230	291.64	1800	124.10	750	51.71

## Selection Table for Steam and Water

2900-40 Series Valve, G Orifice - ASME Area: 0.585 in<sup>2</sup> (3.774 cm<sup>2</sup>)

Pressure Temperature Ratings for "G" Orifice										
Valve Type	ASME Ratings, G Orifice - (0.585 in <sup>2</sup> (3.774 cm <sup>2</sup> ) Actual )								Backpressure Limits @ 100°F (37.8°C)	
	Standard Material of Construction								Conventional	
	-20 to 100 °F (-28.9 to 37.8°C)		450°F (232.2°C)		800°F (426.7°C)		1000°F (537.8°C)			
	psig	barg	psig	barg	psig	barg	psig	barg	psig	barg
2905-40	290	19.99	185	12.75	80	5.51	-	-	280	19.30
2906-40	750	51.71	685	47.22	410	28.26	-	-	290	19.99
2910-40	750	51.71	685	47.22	410	28.26	-	-	290	19.99
2912-40	1500	103.42	1367	94.25	825	56.88	-	-	290	19.99
2914-40	2250	155.13	2052	141.48	1235	85.15	-	-	750	51.71
2916-40	3750	258.55	3422	235.94	2055	141.68	-	-	750	51.71
2918-40	5800	399.90	5702	393.14	3430	236.49	-	-	750	51.71
2920-40	-	-	-	-	510	35.16	215	14.82	290	19.99
2922-40	-	-	-	-	1015	69.98	430	29.64	290	19.99
2924-40	-	-	-	-	1525	105.14	650	44.81	750	51.71
2926-40	-	-	-	-	2540	175.12	1080	74.46	750	51.71
2928-40	-	-	-	-	4230	291.64	1800	124.10	750	51.71



# Pressure / Temperature

## Selection Table for Steam and Water

2900-40 Series Valve, H Orifice - ASME Area: 0.913 in<sup>2</sup> (5.888 cm<sup>2</sup>)

Pressure Temperature Ratings for "H" Orifice										
Valve Type	ASME Ratings, H Orifice - (0.913 in <sup>2</sup> (5.888 cm <sup>2</sup> ) Actual )								Backpressure Limits @ 100°F (37.8°C)	
	Standard Material of Construction								Conventional	
	-20 to 100 °F (-28.9 to 37.8°C)		450°F (232.2°C)		800°F (426.7°C)		1000°F (537.8°C)			
	psig	barg	psig	barg	psig	barg	psig	barg	psig	barg
2905-40	290	19.99	185	12.75	80	5.51	-	-	280	19.30
2906-40	750	51.71	685	47.22	410	28.26	-	-	290	19.99
2910-40	750	51.71	685	47.22	410	28.26	-	-	290	19.99
2912-40	1500	103.42	1367	94.25	825	56.88	-	-	290	19.99
2914-40	2250	155.13	2052	141.48	1235	85.15	-	-	290	19.99
2916-40	3750	258.55	3422	235.94	2055	141.68	-	-	750	51.71
2920-40	-	-	-	-	510	35.16	215	14.82	290	19.99
2922-40	-	-	-	-	1015	69.98	430	29.64	290	19.99
2924-40	-	-	-	-	1525	105.14	650	44.81	290	19.99
2926-40	-	-	-	-	2540	175.12	1080	74.46	750	51.71

## Selection Table for Steam and Water

2900-40 Series Valve, J Orifice - ASME Area: 1.496 in<sup>2</sup> (9.652 cm<sup>2</sup>)

Pressure Temperature Ratings for "J" Orifice										
Valve Type	ASME Ratings, J Orifice - (1.496 in <sup>2</sup> (9.652 cm <sup>2</sup> ) Actual )								Backpressure Limits @ 100°F (37.8°C)	
	Standard Material of Construction								Conventional	
	-20 to 100 °F (-28.9 to 37.8°C)		450°F (232.2°C)		800°F (426.7°C)		1000°F (537.8°C)			
	psig	barg	psig	barg	psig	barg	psig	barg	psig	barg
2905-40	290	19.99	185	12.75	80	5.51	-	-	280	19.30
2906-40	750	51.71	685	47.22	410	28.26	-	-	290	19.99
2910-40	750	51.71	685	47.22	410	28.26	-	-	290	19.99
2912-40	1500	103.42	1367	94.25	825	56.88	-	-	290	19.99
2914-40	2250	155.13	2052	141.48	1235	85.15	-	-	290	19.99
2916-40	3750	258.55	3422	235.94	2055	141.68	-	-	750	51.71
2918-40	5800	399.90	5702	393.14	3430	236.49	-	-	750	51.71
2920-40	-	-	-	-	510	35.16	215	14.82	290	19.99
2922-40	-	-	-	-	1015	69.98	430	29.64	290	19.99
2924-40	-	-	-	-	1525	105.14	650	44.81	290	19.99
2926-40	-	-	-	-	2540	175.12	1080	74.46	750	51.71

# Pressure / Temperature

## Selection Table for Steam and Water

2900-40 Series Valve, K Orifice - ASME Area: 2.138 in<sup>2</sup> (13.794 cm<sup>2</sup>)

Pressure Temperature Ratings for "K" Orifice										
Valve Type	ASME Ratings, K Orifice - (2.138 in <sup>2</sup> (13.794 cm <sup>2</sup> ) Actual )								Backpressure Limits @ 100°F (37.8°C)	
	Standard Material of Construction								Conventional	
	-20 to 100 °F (-28.9 to 37.8°C)		450°F (232.2°C)		800°F (426.7°C)		1000°F (537.8°C)			
	psig	barg	psig	barg	psig	barg	psig	barg	psig	barg
2905-40	290	19.99	185	12.75	80	5.51	-	-	280	19.30
2906-40	750	51.71	685	47.22	410	28.26	-	-	290	19.99
2910-40	750	51.71	685	47.22	410	28.26	-	-	290	19.99
2912-40	1500	103.42	1367	94.25	825	56.88	-	-	290	19.99
2914-40	2250	155.13	2052	141.48	1235	85.15	-	-	290	19.99
2916-40	3750	258.55	3422	235.94	2055	141.68	-	-	750	51.71
2918-40	5800	399.90	5702	393.14	3430	236.49	-	-	750	51.71
2920-40	-	-	-	-	510	35.16	215	14.82	290	19.99
2922-40	-	-	-	-	1015	69.98	430	29.64	290	19.99
2924-40	-	-	-	-	1525	105.14	650	44.81	290	19.99
2926-40	-	-	-	-	2540	175.12	1080	74.46	750	51.71

## Selection Table for Steam and Water

2900-40 Series Valve, L Orifice - ASME Area: 3.317 in<sup>2</sup> (21.400 cm<sup>2</sup>)

Pressure Temperature Ratings for "L" Orifice										
Valve Type	ASME Ratings, L Orifice - (3.317 in <sup>2</sup> (21.400 cm <sup>2</sup> ) Actual )								Backpressure Limits @ 100°F (37.8°C)	
	Standard Material of Construction								Conventional	
	-20 to 100 °F (-28.9 to 37.8°C)		450°F (232.2°C)		800°F (426.7°C)		1000°F (537.8°C)			
	psig	barg	psig	barg	psig	barg	psig	barg	psig	barg
2905-40	290	19.99	185	12.75	80	5.51	-	-	280	19.30
2906-40	290	19.99	685	47.22	410	28.26	-	-	290	19.99
2910-40	750	51.71	685	47.22	410	28.26	-	-	290	19.99
2912-40	1500	103.42	1367	94.25	825	56.88	-	-	290	19.99
2914-40	2250	155.13	2052	141.48	1235	85.15	-	-	290	19.99
2916-40	3750	258.55	3422	235.94	2055	141.68	-	-	290	19.99
2920-40	-	-	-	-	510	35.16	215	14.82	290	19.99
2922-40	-	-	-	-	1015	69.98	430	29.64	290	19.99
2924-40	-	-	-	-	1525	105.14	650	44.81	290	19.99
2926-40	-	-	-	-	2540	175.12	1080	74.46	290	19.99

# Pressure / Temperature

## Selection Table for Steam and Water

2900-40 Series Valve, M Orifice - ASME Area: 4.186 in<sup>2</sup> (27.006 cm<sup>2</sup>)

Pressure Temperature Ratings for "M" Orifice										
Valve Type	ASME Ratings, M Orifice - (4.186 in <sup>2</sup> (27.006 cm <sup>2</sup> ) Actual)								Backpressure Limits @ 100°F (37.8°C)	
	Standard Material of Construction								Conventional	
	-20 to 100 °F (-28.9 to 37.8°C)		450°F (232.2°C)		800°F (426.7°C)		1000°F (537.8°C)			
	psig	barg	psig	barg	psig	barg	psig	barg	psig	barg
2905-40	290	19.99	185	12.75	80	5.51	-	-	280	19.30
2906-40	750	51.71	685	47.22	410	28.26	-	-	290	19.99
2910-40	750	51.71	685	47.22	410	28.26	-	-	290	19.99
2912-40	1500	103.42	1367	94.25	825	56.88	-	-	290	19.99
2914-40	2250	155.13	2052	141.48	1235	85.15	-	-	290	19.99
2920-40	-	-	-	-	510	35.16	215	14.82	290	19.99
2922-40	-	-	-	-	1015	69.98	430	29.64	290	19.99
2924-40	-	-	-	-	1525	105.14	650	44.81	290	19.99

## Selection Table for Steam and Water

2900-40 Series Valve, N Orifice - ASME Area: 5.047 in<sup>2</sup> (32.561 cm<sup>2</sup>)

Pressure Temperature Ratings for "N" Orifice										
Valve Type	ASME Ratings, N Orifice - (5.047 in <sup>2</sup> (32.561 cm <sup>2</sup> ) Actual)								Backpressure Limits @ 100°F (37.8°C)	
	Standard Material of Construction								Conventional	
	-20 to 100 °F (-28.9 to 37.8°C)		450°F (232.2°C)		800°F (426.7°C)		1000°F (537.8°C)			
	psig	barg	psig	barg	psig	barg	psig	barg	psig	barg
2905-40	290	19.99	185	12.75	80	5.51	-	-	280	19.30
2906-40	750	51.71	685	47.22	410	28.26	-	-	290	19.99
2910-40	750	51.71	685	47.22	410	28.26	-	-	290	19.99
2912-40	1500	103.42	1367	94.25	825	56.88	-	-	290	19.99
2914-40	2250	155.13	2052	141.48	1235	85.15	-	-	290	19.99
2920-40	-	-	-	-	510	35.16	215	14.82	290	19.99
2922-40	-	-	-	-	1015	69.98	430	29.64	290	19.99
2924-40	-	-	-	-	1525	105.14	650	44.81	290	19.99

# Pressure / Temperature

## Selection Table for Steam and Water

2900-40 Series Valve, P Orifice - ASME Area: 7.417 in<sup>2</sup> (47.852 cm<sup>2</sup>)

Pressure Temperature Ratings for "P" Orifice										
Valve Type	ASME Ratings, P Orifice - (7.417 in <sup>2</sup> (47.852 cm <sup>2</sup> ) Actual)								Backpressure Limits @ 100°F (37.8°C)	
	Standard Material of Construction								Conventional & Bellows	
	-20 to 100 °F (-28.9 to 37.8°C)		450°F (232.2°C)		800°F (426.7°C)		1000°F (537.8°C)			
	psig	barg	psig	barg	psig	barg	psig	barg	psig	barg
2905	290	19.99	185	12.75	80	5.51	-	-	280	19.30
2906	750	51.71	685	47.22	410	28.26	-	-	290	19.99
2910	750	51.71	685	47.22	410	28.26	-	-	290	19.99
2912	1500	103.42	1367	94.25	825	56.88	-	-	290	19.99
2914	2250	155.13	2052	141.48	1235	85.15	-	-	290	19.99
2920	-	-	-	-	510	35.16	215	14.82	290	19.99
2922	-	-	-	-	1015	69.98	430	29.64	290	19.99
2924	-	-	-	-	1525	105.14	650	44.81	290	19.99

## Selection Table for Steam and Water

2900-40 Series Valve, Q Orifice - ASME Area: 12.850 in<sup>2</sup> (82.903 cm<sup>2</sup>)

Pressure Temperature Ratings for "Q" Orifice										
Valve Type	ASME Ratings, Q Orifice - (12.850 in <sup>2</sup> (82.903 cm <sup>2</sup> ) Actual)								Backpressure Limits @ 100°F (37.8°C)	
	Standard Material of Construction								Conventional	
	-20 to 100 °F (-28.9 to 37.8°C)		450°F (232.2°C)		800°F (426.7°C)		1000°F (537.8°C)			
	psig	barg	psig	barg	psig	barg	psig	barg	psig	barg
2905-40	290	19.99	185	12.75	80	5.51	-	-	280	19.30
2906-40	750	51.71	685	47.22	410	28.26	-	-	290	19.99
2910-40	750	51.71	685	47.22	410	28.26	-	-	290	19.99
2912-40	1500	103.42	1367	94.25	825	56.88	-	-	290	19.99
2920-40	-	-	-	-	510	35.16	215	14.82	290	19.99
2922-40	-	-	-	-	1015	69.98	430	29.64	290	19.99

# Pressure / Temperature

## Selection Table for Steam and Water

2900-40 Series Valves, R Orifice - ASME Area: 18.600 in<sup>2</sup> (120.000 cm<sup>2</sup>)

Pressure Temperature Ratings for "R" Orifice										
Valve Type	ASME Ratings, R Orifice - (18.600 in <sup>2</sup> (120.000 cm <sup>2</sup> ) Actual)								Backpressure Limits @ 100°F (37.8°C)	
	Standard Material of Construction									
	-20 to 100 °F (-28.9 to 37.8°C)		450°F (232.2°C)		800°F (426.7°C)		1000°F (537.8°C)		Conventional & Bellows	
	psig	barg	psig	barg	psig	barg	psig	barg		
2905	290	19.99	185	12.75	80	5.51	-	-	280	19.30
2906	750	51.71	685	47.22	410	28.26	-	-	290	19.99
2910	750	51.71	685	47.22	410	28.26	-	-	290	19.99
2912	1500	103.42	1367	94.25	825	56.88	-	-	290	19.99
2920	-	-	-	-	510	35.16	215	14.82	290	19.99
2922	-	-	-	-	1015	69.98	430	29.64	290	19.99

## Selection Table for Steam and Water

2900-40 Series Valve, T Orifice - ASME Area: 30.210 in<sup>2</sup> (194.903 cm<sup>2</sup>)

Pressure Temperature Ratings for "T" Orifice										
Valve Type	ASME Ratings, T Orifice - (30.210 in <sup>2</sup> (194.903 cm <sup>2</sup> ) Actual)								Backpressure Limits @ 100°F (37.8°C)	
	Standard Material of Construction									
	-20 to 100 °F (-28.9 to 37.8°C)		450°F (232.2°C)		800°F (426.7°C)		1000°F (537.8°C)		Conventional & Bellows	
	psig	barg	psig	barg	psig	barg	psig	barg		
2905	290	19.99	185	12.75	80	5.51	-	-	280	19.30
2906	750	51.71	685	47.22	410	28.26	-	-	290	19.99
2910	750	51.71	685	47.22	410	28.26	-	-	290	19.99
2912 <sup>(1)</sup>	905	62.39	905	62.39	825	56.88	-	-	290	19.99
2920	-	-	-	-	510	35.16	215	14.82	290	19.99
2922 <sup>(1)</sup>	-	-	-	-	905	62.39	430	29.64	290	19.99

1. Pressure/Temperature rating is limited by the base to coverplate bolting (B7 material).

# Pressure / Temperature

## Selection Table for Steam and Water

2900-40 Series Valve, U Orifice - ASME Area: 35.000 in<sup>2</sup> (225.806 cm<sup>2</sup>)

Pressure Temperature Ratings for "U" Orifice										
Valve Type	ASME Ratings, U Orifice - (35.000 in <sup>2</sup> (225.806 cm <sup>2</sup> ) Actual)								Backpressure Limits @ 100°F (37.8°C)	
	Standard Material of Construction									
	-20 to 100 °F (-28.9 to 37.8°C)		450°F (232.2°C)		800°F (426.7°C)		1000°F (537.8°C)		Conventional & Bellows	
	psig	barg	psig	barg	psig	barg	psig	barg		
2905	290	19.99	185	12.75	80	5.51	-	-	280	19.30
2906	750	51.71	685	47.22	410	28.26	-	-	290	19.99
2910	750	51.71	685	47.22	410	28.26	-	-	290	19.99
2912 <sup>(1)</sup>	905	62.39	905	62.39	825	56.88	-	-	290	19.99
2920	-	-	-	-	510	35.16	215	14.82	290	19.99
2922 <sup>(1)</sup>	-	-	-	-	905	62.39	430	29.64	290	19.99

1. Pressure/Temperature rating is limited by the base to coverplate bolting (B7 material).

## Selection Table for Steam and Water

2900-40 Series Valve, V Orifice - ASME Area: 50.260 in<sup>2</sup> (324.257 cm<sup>2</sup>)

Pressure Temperature Ratings for "V" Orifice										
Valve Type	ASME Ratings, V Orifice - (50.260 in <sup>2</sup> (324.257 cm <sup>2</sup> ) Actual)								Backpressure Limits @ 100°F (37.8°C)	
	Standard Material of Construction									
	-20 to 100 °F (-28.9 to 37.8°C)		450°F (232.2°C)		800°F (426.7°C)		1000°F (537.8°C)		Conventional & Bellows	
	psig	barg	psig	barg	psig	barg	psig	barg		
2905	290	19.99	185	12.75	80	5.51	-	-	280	19.30
2906 <sup>(1)</sup>	675	46.53	675	46.53	410	28.26	-	-	290	19.99
2910 <sup>(1)</sup>	675	46.53	675	46.53	410	28.26	-	-	290	19.99
2920	-	-	-	-	510	35.16	215	14.82	290	19.99

1. Pressure/Temperature rating is limited by the base to coverplate bolting (B7 material).

# Pressure / Temperature

## Selection Table for Steam and Water

2900-40 Series Valve, W Orifice - ASME Area: 78.996 in<sup>2</sup> (509.651 cm<sup>2</sup>)

Pressure Temperature Ratings for "W" Orifice										
Valve Type	ASME Ratings, W Orifice - (78.996 in <sup>2</sup> (509.651 cm <sup>2</sup> ) Actual)								Backpressure Limits @ 100°F (37.8°C)	
	Standard Material of Construction								Conventional & Bellows	
	-20 to 100 °F (-28.9 to 37.8°C)		450°F (232.2°C)		800°F (426.7°C)		1000°F (537.8°C)			
	psig	barg	psig	barg	psig	barg	psig	barg	psig	barg
2905	290	19.99	185	12.76	80	5.52	-	-	280	19.31
2906 <sup>(1)</sup>	535	36.89	535	36.89	410	28.27	-	-	290	19.99
2910 <sup>(1)</sup>	535	36.89	535	36.89	410	28.27	-	-	290	19.99
2920	-	-	-	-	510	35.16	215	14.82	290	19.99

1. Pressure/Temperature rating is limited by the base to coverplate bolting (B7 material).

# Capacities

## Valve Capacity for ASME B&PV Code Section I, for Saturated Steam<sup>(2)</sup> ASME Section I Capacity for Saturated Steam, With 2 Psig (0.14 barg) or 3% Overpressure

Orifice Designation		D		E		F		G		H		J	
Orifice Area		in <sup>2</sup>	cm <sup>2</sup>	in <sup>2</sup>	cm <sup>2</sup>	in <sup>2</sup>	cm <sup>2</sup>	in <sup>2</sup>	cm <sup>2</sup>	in <sup>2</sup>	cm <sup>2</sup>	in <sup>2</sup>	cm <sup>2</sup>
Set Pressure		0.128	0.825	0.228	1.470	0.357	2.302	0.585	3.774	0.913	5.888	1.496	9.652
Orifice Capacity													
psig	barg	lb/hr	kg/hr	lb/hr	kg/hr	lb/hr	kg/hr	lb/hr	kg/hr	lb/hr	kg/hr	lb/hr	kg/hr
40	2.75	317	143.78	566	256.73	886	401.88	1453	659.06	2268	1028.74	3717	1686.00
50	3.44	373	169.18	666	302.09	1043	473.09	1709	775.18	2668	1210.18	4373	1983.55
60	4.13	429	194.59	766	347.45	1199	543.85	1966	891.76	3068	1391.62	5028	2280.66
70	4.82	486	220.44	866	392.81	1357	615.52	2225	1009.24	3472	1574.87	5690	2580.94
80	5.51	544	246.75	969	439.53	1518	688.55	2489	1128.99	3884	1761.75	6366	2887.56
90	6.20	602	273.06	1072	486.25	1679	761.58	2753	1248.73	4296	1948.63	7041	3193.74
100	6.89	659	298.91	1175	532.97	1840	834.61	3017	1368.48	4708	2135.51	7716	3499.91
120	8.27	775	351.53	1381	626.41	2162	980.66	3545	1607.98	5532	2509.27	9067	4112.72
140	9.65	890	403.69	1587	719.85	2484	1126.72	4073	1847.48	6356	2883.03	10418	4725.52
160	11.03	1006	456.31	1792	812.83	2806	1272.78	4601	2086.97	7180	3256.79	11768	5337.87
180	12.41	1121	508.47	1998	906.27	3129	1419.29	5129	2326.47	8004	3630.55	13119	5950.67
200	13.78	1237	561.09	2204	999.71	3451	1565.34	5657	2565.97	8828	4004.31	14470	6563.48
220	15.16	1352	613.25	2410	1093.15	3773	1711.40	6185	2805.46	9652	4378.07	15820	7175.83
240	16.54	1468	665.87	2615	1186.14	4095	1857.46	6713	3044.96	10476	4751.83	17171	7788.63
260	17.92	1583	718.03	2821	1279.58	4417	2003.51	7241	3284.46	11300	5125.59	18521	8400.98
280	19.30	1698	770.19	3027	1373.02	4739	2149.57	7769	3523.95	12124	5499.35	19872	9013.78
300	20.68	1814	822.81	3233	1466.46	5061	2295.63	8297	3763.45	12948	5873.11	21223	9626.59
320	22.06	1929	874.97	3438	1559.45	5383	2441.68	8825	4002.95	13772	6246.87	22573	10238.94
340	23.44	2045	927.59	3644	1652.89	5706	2588.19	9353	4242.44	14596	6620.63	23924	10851.74
360	24.82	2160	979.75	3850	1746.33	6028	2734.25	9881	4481.94	15420	6994.39	25275	11464.54
380	26.20	2276	1032.37	4056	1839.77	6350	2880.31	10410	4721.89	16244	7368.15	26625	12076.89
400	27.57	2391	1084.53	4261	1932.75	6672	3026.36	10938	4961.39	17068	7741.91	27976	12689.70
420	28.95	2507	1137.15	4467	2026.19	6994	3172.42	11466	5200.89	17892	8115.67	29326	13302.05
440	30.33	2622	1189.31	4673	2119.63	7316	3318.48	11994	5440.38	18716	8489.43	30677	13914.85
460	31.71	2738	1241.93	4879	2213.07	7638	3464.53	12522	5679.88	19540	8863.19	32028	14527.65
480	33.09	2853	1294.09	5084	2306.06	7960	3610.59	13050	5919.38	20364	9236.95	33378	15140.00
500	34.47	2969	1346.71	5290	2399.50	8283	3757.10	13578	6158.87	21188	9610.71	34729	15752.81
600	41.36	3546	1608.43	6319	2866.25	9893	4487.38	16218	7356.36	25308	11479.51	41482	18815.91
700	48.26	4123	1870.16	7348	3332.99	11504	5218.12	18859	8554.29	29428	13348.31	48235	21879.02
800	55.15	4701	2132.33	8376	3799.28	13114	5948.41	21499	9751.78	33548	15217.11	54988	24942.13
900	62.05	5278	2394.06	9405	4266.03	14725	6679.14	24139	10949.26	37668	17085.91	61742	28005.70
1000	68.94	5855	2655.78	10434	4732.78	16336	7409.88	26779	12146.75	41788	18954.71	68495	31068.81
1100	75.84	6433	2917.95	11463	5199.52	17946	8140.16	29420	13344.68	45908	20823.51	75248	34131.92
1200	82.73	7010	3179.68	12492	5666.27	19557	8870.90	32060	14542.17	50028	22692.32	82001	37195.03
1300	89.63	7588	3441.85	13520	6132.56	21168	9601.64	34700	15739.65	54148	24561.12	88754	40258.13
1400	96.52	8165	3703.58	14549	6599.31	22778	10331.92	37341	16937.59	58268	26429.92	95507	43321.24
1500	103.42	8742	3965.30	15578	7066.06	24389	11062.66	39981	18135.07	62388	28298.72	102260	46384.35
1520 <sup>1</sup>	104.80	8858	4017.92	15784	7159.50	24711	11208.72	40509	18374.57	63212	28672.48	103611	46997.16
2000	137.89	12008	5446.73	21397	9705.51	33500	15195.34	54916	24909.48	85693	38869.69	140460	63711.58
2250	155.13	13793	6256.39	24578	11148.39	38479	17453.78	63079	28612.15	98431	44647.55	161339	73182.14
2500	172.36	15726	7133.19	28022	12710.56	43871	19899.55	71918	32621.45	112223	50903.49	183944	83435.60
3000	206.84	20333	9222.89	36232	16434.55	56725	25730.02	92989	42179.10	145103	65817.61	237838	107881.50
3100 <sup>2</sup>	213.73	21447	9728.19	38216	17334.48	59831	27138.88	98080	44488.34	153049	69421.86	250861	113788.64

1. The following Napier factor is applied to the capacity of pressures greater than 1520 psig (104.80 barg) and less than and including 3100 psig (213.73 barg):

$$\frac{.1906 \times P_{psig} - 1000}{.2292 \times P_{psig} - 1061}$$

2. Capacity correction factors for superheated steam and supercritical steam are listed in pages 65, 66 and 67.



# Capacities

Valve Capacity for ASME B&PV Code Section I, for Saturated Steam <sup>(2)</sup> ASME Section I Capacity for Saturated Steam, With 2 Psig (0.14 barg) or 3% Overpressure											
Orifice Designation		K		L		M		N		Q	
Orifice Area		in <sup>2</sup>	cm <sup>2</sup>	in <sup>2</sup>	cm <sup>2</sup>	in <sup>2</sup>	cm <sup>2</sup>	in <sup>2</sup>	cm <sup>2</sup>	in <sup>2</sup>	cm <sup>2</sup>
		2.138	13.794	3.317	1.470	4.186	2.302	5.047	3.774	12.850	5.888
Set Pressure		Orifice Capacity									
psig	barg	lb/hr	kg/hr	lb/hr	kg/hr	lb/hr	kg/hr	lb/hr	kg/hr	lb/hr	kg/hr
40	2.75	5312	2409.48	8242	3738.50	10402	4718.26	12541	5688.50	31931	14483.65
50	3.44	6249	2834.49	9696	4398.03	12236	5550.15	14753	6691.84	37563	17038.29
60	4.13	7186	3259.51	11150	5057.55	14071	6382.49	16965	7695.19	43195	19592.92
70	4.82	8133	3689.06	12618	5723.42	15924	7223.00	19199	8708.52	48883	22172.95
80	5.51	9098	4126.78	14115	6402.45	17813	8079.84	21477	9741.80	54683	24803.79
90	6.20	10063	4564.50	15613	7081.93	19703	8937.13	23756	10775.54	60484	27435.08
100	6.89	11028	5002.21	17110	7760.96	21592	9793.96	26034	11808.82	66285	30066.37
120	8.27	12958	5877.65	20105	9119.47	25372	11508.54	30590	13875.39	77886	35328.49
140	9.65	14889	6753.53	23099	10477.53	29151	13222.67	35147	15942.41	89487	40590.62
160	11.03	16819	7628.97	26094	11836.04	32930	14936.79	39704	18009.43	101089	45853.20
180	12.41	18749	8504.40	29089	13194.54	36709	16650.92	44260	20075.99	112690	51115.32
200	13.78	20679	9379.83	32083	14552.60	40489	18365.50	48817	22143.02	124291	56377.45
220	15.16	22610	10255.72	35078	15911.11	44268	20079.62	53373	24209.58	135893	61640.03
240	16.54	24540	11131.15	38073	17269.62	48047	21793.75	57930	26276.60	147494	66902.15
260	17.92	26470	12006.59	41067	18627.67	51826	23507.87	62486	28343.17	159095	72164.28
280	19.30	28400	12882.02	44062	19986.18	55606	25222.45	67043	30410.19	170696	77426.40
300	20.68	30331	13757.91	47057	21344.69	59385	26936.58	71599	32476.76	182298	82688.98
320	22.06	32261	14633.34	50051	22702.75	63164	28650.71	76156	34543.78	193899	87951.11
340	23.44	34191	15508.77	53046	24061.26	66943	30364.83	80713	36610.80	205500	93213.23
360	24.82	36121	16384.21	56041	25419.77	70722	32078.96	85269	38677.37	217102	98475.81
380	26.20	38051	17259.64	59035	26777.82	74502	33793.54	89826	40744.39	228703	103737.94
400	27.57	39982	18135.53	62030	28136.33	78281	35507.66	94382	42810.95	240304	109000.06
420	28.95	41912	19010.96	65025	29494.84	82060	37221.79	98939	44877.97	251906	114262.64
440	30.33	43842	19886.39	68019	30852.90	85839	38935.91	103495	46944.54	263507	119524.77
460	31.71	45772	20761.83	71014	32211.41	89619	40650.49	108052	49011.56	275108	124786.89
480	33.09	47703	21637.71	74009	33569.91	93398	42364.62	112609	51078.58	286710	130049.47
500	34.47	49633	22513.15	77003	34927.97	97177	44078.74	117165	53145.15	298311	135311.60
600	41.36	59284	26890.77	91977	41720.06	116073	52649.83	139948	63479.34	356317	161622.68
700	48.26	68935	31268.39	106950	48511.70	134969	61220.91	162731	73813.54	414324	187934.21
800	55.15	78587	35646.46	121923	55303.34	153865	69791.99	185514	84147.74	472331	214245.75
900	62.05	88238	40024.08	136897	62095.43	172762	78363.53	208296	94481.48	530337	240556.83
1000	68.94	97889	44401.70	151870	68887.07	191658	86934.61	231079	104815.67	588344	266868.36
1100	75.84	107540	48779.32	166844	75679.17	210554	95505.69	253862	115149.87	646350	293179.44
1200	82.73	117191	53156.94	181817	82470.80	229450	104076.77	276645	125484.06	704357	319490.98
1300	89.63	126843	57535.02	196790	89262.44	248346	112647.85	299428	135818.26	762363	345802.06
1400	96.52	136494	61912.64	211764	96054.54	267242	121218.94	322210	146152.00	820370	372113.59
1500	103.42	146145	66290.26	226737	102846.17	286139	129790.47	344993	156486.20	877383	397974.26
1520 <sup>1</sup>	104.80	148075	67165.69	229732	104204.68	289918	131504.60	349550	158553.22	—	—
2000	137.89	200738	91053.23	311434	141264.09	393025	178273.15	473865	214941.56	—	—
2250	155.13	230576	104587.52	357728	162262.70	451447	204772.92	544303	246891.70	—	—
2500	172.36	262883	119241.73	407851	184998.11	—	—	—	—	—	—
3000	206.84	339905	154178.32	527345	239199.68	—	—	—	—	—	—
3100 <sup>2</sup>	213.73	358517	162620.58	556221	252297.61	—	—	—	—	—	—

1. The following Napier factor is applied to the capacity of pressures greater than 1520 psig (104.80 barg) and less than and including 3100 psig (213.74 barg):

$$\frac{.1906 \times P_{psig} - 1000}{.2292 \times P_{psia} - 1061}$$

2. Capacity correction factors for superheated steam and supercritical steam are listed in pages 65, 66 and 67.



# Capacities

## Valve Capacity for ASME B&PV Code Section I, for Water

ASME Section I Capacity For Water, With 2 Psig (0.14 barg) Or 3% Overpressure

Orifice Designation		K		L		M		N		Q	
Orifice Area		in <sup>2</sup>	cm <sup>2</sup>	in <sup>2</sup>	cm <sup>2</sup>	in <sup>2</sup>	cm <sup>2</sup>	in <sup>2</sup>	cm <sup>2</sup>	in <sup>2</sup>	cm <sup>2</sup>
Set Pressure		Orifice Capacity									
psig	barg	gpm	L/min	gpm	L/min	gpm	L/min	gpm	L/min	gpm	L/min
40	2.75	363	1374	564	2134	712	2695	858	3247	2186	8274
50	3.44	404	1529	628	2377	792	2998	955	3615	2433	9209
60	4.13	442	1673	685	2593	865	3274	1043	3948	2656	10054
70	4.82	476	1801	739	2797	933	3531	1125	4258	2864	10841
80	5.51	509	1926	790	2990	997	3774	1202	4550	3062	11590
90	6.20	540	2044	838	3172	1058	4004	1275	4826	3248	12295
100	6.89	569	2153	883	3342	1115	4220	1344	5087	3424	12961
120	8.27	624	2362	968	3664	1221	4621	1473	5575	3751	14199
140	9.65	674	2551	1045	3955	1319	4992	1591	6022	4051	15334
160	11.03	720	2725	1118	4232	1410	5337	1701	6438	4331	16394
180	12.41	764	2892	1185	4485	1496	5662	1804	6828	4594	17390
200	13.78	805	3047	1250	4731	1577	5969	1902	7199	4842	18328
220	15.16	845	3198	1311	4962	1654	6261	1994	7548	5079	19226
240	16.54	882	3338	1369	5182	1728	6541	2083	7885	5304	20077
260	17.92	918	3475	1425	5394	1798	6806	2168	8206	5521	20899
280	19.30	953	3607	1479	5598	1866	7063	2250	8517	5729	21686
300	20.68	986	3732	1530	5791	1932	7313	2329	8816	5931	22451
320	22.06	1019	3857	1581	5984	1995	7551	2405	9103	6125	23185
340	23.44	1050	3974	1629	6166	2056	7782	2479	9384	6314	23901
360	24.82	1081	4092	1677	6348	2116	8009	2551	9656	6497	24593
380	26.20	1110	4201	1723	6522	2174	8229	2621	9921	6675	25267
400	27.57	1139	4311	1767	6688	2230	8441	2689	10178	6848	25922
420	28.95	1167	4417	1811	6855	2286	8653	2756	10432	7017	26562
440	30.33	1195	4523	1854	7018	2339	8854	2821	10678	7182	27186
460	31.71	1221	4621	1895	7173	2392	9054	2884	10917	7344	27800
480	33.09	1248	4724	1936	7328	2443	9247	2946	11151	7502	28398
500	34.47	1273	4818	1976	7479	2494	9440	3007	11382	7656	28981
600	41.36	1395	5280	2165	8195	2732	10341	3294	12469	8387	31748
700	48.26	1507	5704	2338	8850	2951	11170	3558	13468	9059	34292
800	55.15	1611	6098	2500	9463	3155	11942	3804	14399	9685	36661
900	62.05	1709	6469	2651	10035	3346	12665	4034	15270	10272	38883
1000	68.94	1801	6817	2795	10580	3527	13351	4253	16099	10828	40988
1100	75.84	1889	7150	2931	11095	3699	14002	4460	16882	11357	42990
1200	82.73	1973	7468	3061	11587	3864	14626	4658	17632	11862	44902
1300	89.63	2054	7775	3187	12064	4021	15221	4849	18355	12346	46734
1400	96.52	2131	8066	3307	12518	4173	15796	5032	19048	12812	48498
1500	103.42	2206	8350	3423	12957	4320	16352	5208	19714	13262	50202
1520	104.80	2221	8407	3446	13044	4348	16458	5243	19846	—	—
2000	137.89	2547	9641	3953	14963	4988	18881	6014	22765	—	—
2250	155.13	2702	10228	4192	15868	5291	20028	6379	24147	—	—
2500	172.36	2848	10780	4419	16727	—	—	—	—	—	—
3000	206.84	3120	11810	4841	18325	—	—	—	—	—	—
3100	213.73	3172	12007	4921	18628	—	—	—	—	—	—
3200	220.63	3222	12196	5000	18927	—	—	—	—	—	—
3300	227.52	3272	12385	5077	19218	—	—	—	—	—	—
3400	234.42	3322	12575	5154	19510	—	—	—	—	—	—
3500	241.31	3370	12756	5229	19793	—	—	—	—	—	—
3600	248.21	3418	12938	5303	20074	—	—	—	—	—	—
3700	255.10	3465	13116	5376	20350	—	—	—	—	—	—
3750	258.55	3488	13203	5412	20486	—	—	—	—	—	—
3800	262	3509	13299	—	—	—	—	—	—	—	—
3900	268.89	3555	13473	—	—	—	—	—	—	—	—
4000	275.79	3600	13644	—	—	—	—	—	—	—	—
4100	282.68	3645	13814	—	—	—	—	—	—	—	—
4200	289.57	3689	13981	—	—	—	—	—	—	—	—
4300	296.47	3733	14147	—	—	—	—	—	—	—	—
4400	303.36	3776	14310	—	—	—	—	—	—	—	—
4500	310.26	3818	14472	—	—	—	—	—	—	—	—
4600	317.15	3861	14632	—	—	—	—	—	—	—	—
4700	324.05	3902	14790	—	—	—	—	—	—	—	—
4800	330.94	3944	14947	—	—	—	—	—	—	—	—
4900	337.84	3985	15101	—	—	—	—	—	—	—	—
5000	344.73	4025	15255	—	—	—	—	—	—	—	—
5100	351.63	4065	15407	—	—	—	—	—	—	—	—
5200	358.52	4105	15557	—	—	—	—	—	—	—	—
5300	365.42	4144	15706	—	—	—	—	—	—	—	—
5400	372.31	4183	15853	—	—	—	—	—	—	—	—
5500	379.21	4221	15999	—	—	—	—	—	—	—	—
5600	386.1	4260	16144	—	—	—	—	—	—	—	—
5700	393	4298	16288	—	—	—	—	—	—	—	—
5800	399.89	4335	16430	—	—	—	—	—	—	—	—

# Capacities

## Superheat Correction Factor (Ksh)

Superheat Correction Factor <sup>(1)&amp;(2)</sup>																	
Total Temp. (°F)	400	450	500	550	600	650	700	750	800	850	900	950	1000	1050	1100	1150	1200
Flowing Pressure (psia) <sup>(3)</sup>																	
50	0.987	0.957	0.930	0.905	0.882	0.861	0.841	0.823	0.805	0.789	0.774	0.759	0.745	0.732	0.719	0.708	0.696
100	0.998	0.963	0.935	0.909	0.885	0.864	0.843	0.825	0.807	0.790	0.775	0.760	0.746	0.733	0.720	0.708	0.697
150	0.984	0.970	0.940	0.913	0.888	0.866	0.846	0.826	0.808	0.792	0.776	0.761	0.747	0.733	0.721	0.709	0.697
200	0.979	0.977	0.945	0.917	0.892	0.869	0.848	0.828	0.810	0.793	0.777	0.762	0.748	0.734	0.721	0.709	0.698
250	-	0.972	0.951	0.921	0.895	0.871	0.850	0.830	0.812	0.794	0.778	0.763	0.749	0.735	0.722	0.710	0.698
300	-	0.968	0.957	0.926	0.898	0.874	0.852	0.832	0.813	0.796	0.780	0.764	0.750	0.736	0.723	0.710	0.699
350	-	0.968	0.963	0.930	0.902	0.877	0.854	0.834	0.815	0.797	0.781	0.765	0.750	0.736	0.723	0.711	0.699
400	-	-	0.963	0.935	0.906	0.880	0.857	0.836	0.816	0.798	0.782	0.766	0.751	0.737	0.724	0.712	0.700
450	-	-	0.961	0.940	0.909	0.883	0.859	0.838	0.818	0.800	0.783	0.767	0.752	0.738	0.725	0.712	0.700
500	-	-	0.961	0.946	0.914	0.886	0.862	0.840	0.820	0.801	0.784	0.768	0.753	0.739	0.725	0.713	0.701
550	-	-	0.962	0.952	0.918	0.889	0.864	0.842	0.822	0.803	0.785	0.769	0.754	0.740	0.726	0.713	0.701
600	-	-	0.964	0.958	0.922	0.892	0.867	0.844	0.823	0.804	0.787	0.770	0.755	0.740	0.727	0.714	0.702
650	-	-	0.968	0.958	0.927	0.896	0.869	0.846	0.825	0.806	0.788	0.771	0.756	0.741	0.728	0.715	0.702
700	-	-	-	0.958	0.931	0.899	0.872	0.848	0.827	0.807	0.789	0.772	0.757	0.742	0.728	0.715	0.703
750	-	-	-	0.958	0.936	0.903	0.875	0.850	0.828	0.809	0.790	0.774	0.758	0.743	0.729	0.716	0.703
800	-	-	-	0.960	0.942	0.906	0.878	0.852	0.830	0.810	0.792	0.774	0.759	0.744	0.730	0.716	0.704
850	-	-	-	0.962	0.947	0.910	0.880	0.855	0.832	0.812	0.793	0.776	0.760	0.744	0.730	0.717	0.704
900	-	-	-	0.965	0.953	0.914	0.883	0.857	0.834	0.813	0.794	0.777	0.760	0.745	0.731	0.718	0.705
950	-	-	-	0.969	0.958	0.918	0.886	0.860	0.836	0.815	0.796	0.778	0.761	0.746	0.732	0.718	0.705
1000	-	-	-	0.974	0.959	0.923	0.890	0.862	0.838	0.816	0.797	0.779	0.762	0.747	0.732	0.719	0.706
1050	-	-	-	-	0.960	0.927	0.893	0.864	0.840	0.818	0.798	0.780	0.763	0.748	0.733	0.719	0.707
1100	-	-	-	-	0.962	0.931	0.896	0.867	0.842	0.820	0.800	0.781	0.764	0.749	0.734	0.720	0.707
1150	-	-	-	-	0.964	0.936	0.899	0.870	0.844	0.821	0.801	0.782	0.765	0.749	0.735	0.721	0.708
1200	-	-	-	-	0.966	0.941	0.903	0.872	0.846	0.823	0.802	0.784	0.766	0.750	0.735	0.721	0.708
1250	-	-	-	-	0.969	0.946	0.906	0.875	0.848	0.825	0.804	0.785	0.767	0.751	0.736	0.722	0.709
1300	-	-	-	-	0.973	0.952	0.910	0.878	0.850	0.826	0.805	0.786	0.768	0.752	0.737	0.723	0.709
1350	-	-	-	-	0.977	0.958	0.914	0.880	0.852	0.828	0.807	0.787	0.769	0.753	0.737	0.723	0.710
1400	-	-	-	-	0.982	0.963	0.918	0.883	0.854	0.830	0.808	0.788	0.770	0.754	0.738	0.724	0.710
1450	-	-	-	-	0.987	0.968	0.922	0.886	0.857	0.832	0.809	0.790	0.771	0.754	0.739	0.724	0.711
1500	-	-	-	-	0.993	0.970	0.926	0.889	0.859	0.833	0.811	0.791	0.772	0.755	0.740	0.725	0.711

1. For capacity on superheated steam, multiply saturated steam capacity by correction factor.
2. Convert set pressure from (psig) to (psia) flowing pressure.
3. psia flowing = [set pressure psig x overpressure] + 14.7.

# Capacities

## Superheat Correction Factor (Ksh)

Superheat Correction Factor <sup>(1)&amp;(2)</sup>																	
Total Temp. (°F)	400	450	500	550	600	650	700	750	800	850	900	950	1000	1050	1100	1150	1200
Flowing Pressure (psia) <sup>(3)</sup>																	
1550	-	-	-	-	-	0.972	0.930	0.892	0.861	0.835	0.812	0.792	0.773	0.756	0.740	0.726	0.712
1600	-	-	-	-	-	0.973	0.934	0.894	0.863	0.836	0.813	0.792	0.774	0.756	0.740	0.726	0.712
1650	-	-	-	-	-	0.973	0.936	0.895	0.863	0.836	0.812	0.791	0.772	0.755	0.739	0.724	0.710
1700	-	-	-	-	-	0.973	0.938	0.895	0.863	0.835	0.811	0.790	0.771	0.754	0.738	0.723	0.709
1750	-	-	-	-	-	0.974	0.940	0.896	0.862	0.835	0.810	0.789	0.770	0.752	0.736	0.721	0.707
1800	-	-	-	-	-	0.975	0.942	0.897	0.862	0.834	0.810	0.788	0.768	0.751	0.735	0.720	0.705
1850	-	-	-	-	-	0.976	0.944	0.897	0.862	0.833	0.809	0.787	0.767	0.749	0.733	0.718	0.704
1900	-	-	-	-	-	0.977	0.946	0.898	0.862	0.832	0.807	0.785	0.766	0.748	0.731	0.716	0.702
1950	-	-	-	-	-	0.979	0.949	0.898	0.861	0.832	0.806	0.784	0.764	0.746	0.729	0.714	0.700
2000	-	-	-	-	-	0.982	0.952	0.899	0.861	0.831	0.805	0.782	0.762	0.744	0.728	0.712	0.698
2050	-	-	-	-	-	0.985	0.954	0.899	0.860	0.830	0.804	0.781	0.761	0.742	0.726	0.710	0.696
2100	-	-	-	-	-	0.988	0.956	0.900	0.860	0.828	0.802	0.779	0.759	0.740	0.724	0.708	0.694
2150	-	-	-	-	-	-	0.956	0.900	0.859	0.827	0.801	0.778	0.757	0.738	0.722	0.706	0.692
2200	-	-	-	-	-	-	0.955	0.901	0.859	0.826	0.799	0.776	0.755	0.736	0.720	0.704	0.690
2250	-	-	-	-	-	-	0.954	0.901	0.858	0.825	0.797	0.774	0.753	0.734	0.717	0.702	0.687
2300	-	-	-	-	-	-	0.953	0.901	0.857	0.823	0.795	0.772	0.751	0.732	0.715	0.699	0.685
2350	-	-	-	-	-	-	0.952	0.902	0.856	0.822	0.794	0.769	0.748	0.729	0.712	0.697	0.682
2400	-	-	-	-	-	-	0.952	0.902	0.855	0.820	0.791	0.767	0.746	0.727	0.710	0.694	0.679
2450	-	-	-	-	-	-	0.951	0.902	0.854	0.818	0.789	0.765	0.743	0.724	0.707	0.691	0.677
2500	-	-	-	-	-	-	0.951	0.902	0.852	0.816	0.787	0.762	0.740	0.721	0.704	0.688	0.674
2550	-	-	-	-	-	-	0.951	0.902	0.851	0.814	0.784	0.759	0.738	0.718	0.701	0.685	0.671
2600	-	-	-	-	-	-	0.951	0.903	0.849	0.812	0.782	0.756	0.735	0.715	0.698	0.682	0.664
2650	-	-	-	-	-	-	0.952	0.903	0.848	0.809	0.779	0.754	0.731	0.712	0.695	0.679	0.664
2700	-	-	-	-	-	-	0.952	0.903	0.846	0.807	0.776	0.750	0.728	0.708	0.691	0.675	0.661
2750	-	-	-	-	-	-	0.953	0.903	0.844	0.804	0.773	0.747	0.724	0.705	0.687	0.671	0.657
2800	-	-	-	-	-	-	0.956	0.903	0.842	0.801	0.769	0.743	0.721	0.701	0.684	0.668	0.653
2850	-	-	-	-	-	-	0.959	0.902	0.839	0.798	0.766	0.739	0.717	0.697	0.679	0.663	0.649
2900	-	-	-	-	-	-	0.963	0.902	0.836	0.794	0.762	0.735	0.713	0.693	0.675	0.659	0.645
2950	-	-	-	-	-	-	-	0.902	0.834	0.790	0.758	0.731	0.708	0.688	0.671	0.655	0.640
3000	-	-	-	-	-	-	-	0.901	0.831	0.786	0.753	0.726	0.704	0.684	0.666	0.650	0.635
3050	-	-	-	-	-	-	-	0.899	0.827	0.782	0.749	0.722	0.699	0.679	0.661	0.645	0.630
3100	-	-	-	-	-	-	-	0.896	0.823	0.777	0.744	0.716	0.693	0.673	0.656	0.640	0.625
3150	-	-	-	-	-	-	-	0.894	0.819	0.772	0.738	0.711	0.688	0.668	0.650	0.634	0.620
3200	-	-	-	-	-	-	-	0.889	0.815	0.767	0.733	0.705	0.682	0.662	0.644	0.628	0.614

1. For capacity on superheated steam, multiply saturated steam capacity by correction factor.
2. Convert set pressure from (psig) to (psia) flowing pressure.
3. psia flowing = [set pressure psig x overpressure] + 14.7.

# Capacities

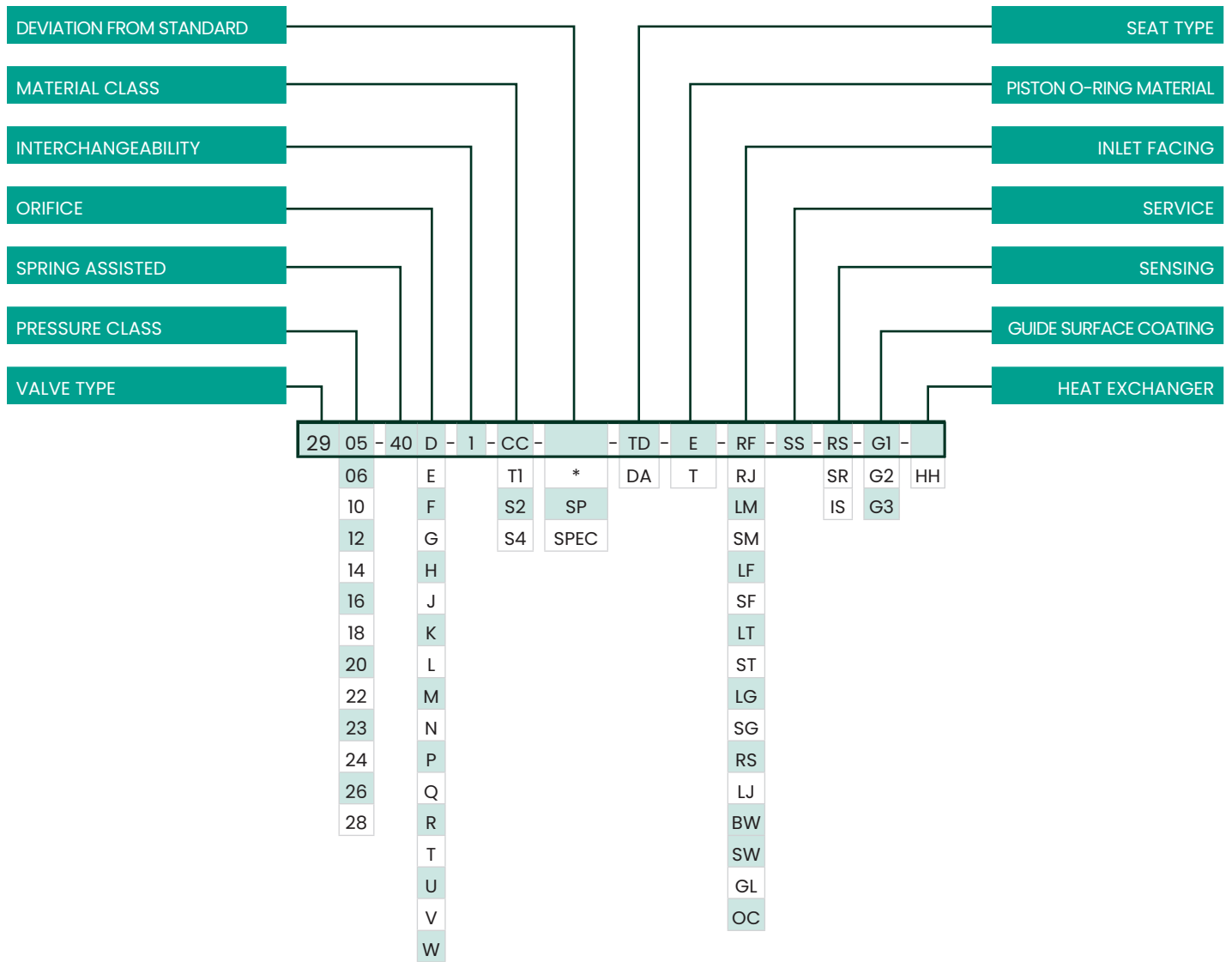
## Supercritical Correction Factor (Ksc)

Supercritical Correction Factor <sup>(1)&amp;(2)</sup>										
Total Temp. (°F)	750	800	850	900	950	1000	1050	1100	1150	1200
Flowing Pressure (psia) <sup>(3)</sup>	Supercritical Correction Factor or K <sub>sc</sub> Total Temperature, °F, of Superheated Steam									
3208.2	1.059	0.971	0.913	0.872	0.839	0.811	0.788	0.767	0.748	0.731
3250	1.064	0.975	0.916	0.874	0.841	0.813	0.788	0.767	0.748	0.731
3300	1.070	0.980	0.919	0.876	0.842	0.814	0.790	0.768	0.749	0.732
3350	1.077	0.985	0.922	0.878	0.844	0.815	0.791	0.769	0.750	0.732
3400	1.084	0.990	0.925	0.881	0.846	0.817	0.792	0.770	0.750	0.733
3450	1.091	0.996	0.929	0.883	0.848	0.818	0.793	0.771	0.751	0.734
3500	1.100	1.002	0.932	0.885	0.849	0.819	0.794	0.772	0.752	0.734
3550	1.109	1.008	0.935	0.888	0.851	0.821	0.795	0.773	0.753	0.735
3600	1.118	1.014	0.939	0.890	0.853	0.822	0.796	0.774	0.754	0.735
3650	1.129	1.020	0.943	0.893	0.855	0.824	0.797	0.775	0.754	0.736
3700	1.141	1.027	0.946	0.895	0.857	0.825	0.799	0.775	0.755	0.737
3750	1.153	1.034	0.950	0.898	0.859	0.827	0.800	0.776	0.756	0.737
3800	1.168	1.041	0.954	0.9	0.861	0.828	0.801	0.777	0.757	0.738
3850	1.186	1.048	0.958	0.903	0.862	0.83	0.802	0.778	0.757	0.739
3900	1.205	1.056	0.962	0.906	0.864	0.831	0.803	0.779	0.758	0.739
3950	1.227	1.064	0.966	0.908	0.866	0.833	0.804	0.78	0.759	0.74
4000	1.251	1.072	0.97	0.911	0.868	0.834	0.806	0.781	0.76	0.741
4050	1.279	1.08	0.974	0.914	0.87	0.836	0.807	0.782	0.76	0.741
4100	1.31	1.089	0.978	0.916	0.872	0.837	0.808	0.783	0.761	0.742
4150	1.343	1.098	0.983	0.919	0.874	0.839	0.809	0.784	0.762	0.743
4200	1.395	1.107	0.987	0.922	0.876	0.84	0.81	0.785	0.763	0.743
4250	1.444	1.116	0.992	0.925	0.878	0.842	0.812	0.786	0.764	0.744
4300	1.491	1.125	0.997	0.928	0.881	0.844	0.813	0.787	0.765	0.745
4350	1.538	1.135	1.002	0.931	0.883	0.845	0.814	0.788	0.765	0.745
4400	-	1.146	1.007	0.934	0.885	0.847	0.815	0.789	0.766	0.746
4450	-	1.157	1.012	0.937	0.887	0.848	0.817	0.79	0.767	0.746
4500	-	1.169	1.017	0.94	0.889	0.85	0.818	0.791	0.768	0.747
4550	-	1.181	1.022	0.943	0.892	0.852	0.819	0.792	0.768	0.748
4600	-	1.194	1.027	0.947	0.894	0.853	0.82	0.793	0.769	0.749
4650	-	1.207	1.033	0.95	0.896	0.855	0.822	0.794	0.77	0.749
4700	-	1.22	1.038	0.953	0.898	0.857	0.823	0.795	0.771	0.75
4750	-	1.234	1.044	0.957	0.9	0.858	0.824	0.796	0.772	0.751
4800	-	1.248	1.05	0.96	0.903	0.86	0.826	0.797	0.773	0.751
4850	-	1.263	1.056	0.963	0.905	0.862	0.827	0.798	0.774	0.752
4900	-	1.278	1.062	0.967	0.908	0.863	0.828	0.799	0.774	0.753
4950	-	1.294	1.069	0.97	0.91	0.865	0.83	0.8	0.775	0.753
5000	-	1.31	1.075	0.974	0.912	0.867	0.831	0.801	0.776	0.754
5050	-	1.326	1.082	0.978	0.915	0.869	0.832	0.803	0.777	0.755
5100	-	1.343	1.088	0.981	0.917	0.871	0.834	0.804	0.778	0.755
5150	-	1.36	1.095	0.985	0.92	0.872	0.835	0.805	0.779	0.756
5200	-	1.377	1.102	0.989	0.922	0.874	0.837	0.806	0.78	0.757
5250	-	1.393	1.109	0.993	0.925	0.876	0.838	0.807	0.78	0.758
5300	-	1.411	1.116	0.997	0.927	0.878	0.839	0.808	0.781	0.758
5350	-	1.427	1.123	1.001	0.93	0.88	0.841	0.809	0.782	0.759
5400	-	1.443	1.131	1.004	0.933	0.882	0.842	0.81	0.783	0.76
5450	-	1.46	1.139	1.009	0.935	0.884	0.844	0.811	0.784	0.76
5500	-	1.476	1.146	1.013	0.938	0.886	0.845	0.812	0.785	0.761
5550	-	1.491	1.154	1.017	0.941	0.887	0.846	0.813	0.786	0.762
5600	-	1.507	1.162	1.021	0.943	0.889	0.848	0.815	0.787	0.763
5650	-	1.522	1.171	1.025	0.946	0.891	0.849	0.816	0.788	0.763
5700	-	1.536	1.179	1.03	0.949	0.893	0.851	0.817	0.788	0.764
5750	-	1.551	1.187	1.034	0.952	0.895	0.852	0.818	0.789	0.765
5800	-	1.565	1.195	1.038	0.955	0.897	0.854	0.819	0.79	0.765
5850	-	1.578	1.204	1.043	0.957	0.899	0.855	0.82	0.791	0.766
5900	-	1.591	1.212	1.047	0.96	0.901	0.857	0.821	0.792	0.767
5950	-	1.603	1.221	1.052	0.963	0.903	0.858	0.823	0.793	0.768
6000	-	1.615	1.229	1.057	0.966	0.906	0.86	0.824	0.794	0.768

1. For capacity on supercritical steam, multiply saturated steam capacity by correction factor.
2. Convert set pressure from (psig) to (psia) flowing pressure.
3. psia flowing = [set pressure psig x overpressure] + 14.7

# Valve Configuration Code

## 2900-40 Series Main Valve



# Valve Configuration Code

## 2900-40 Series Main Valve

Pressure Class	
Designation	Class
05	150#
06	300#
10	300#
12	600#
14	900#
16	1500#
18	2500#
20	300#
22	600#
24	900#
26	1500#
28	2500#

Remote Sensing	
Designation	Type
RS	Remote Sensing
SR	Sensing Ring
IS	Integral Sense

Piston O-Ring Material	
Designation	Valve Type
E	Ethylene/Propylene
T	PTFE

Heat Exchanger	
Designation	Type
HH	Media is 506°F (263°C) or Above

Seat Design	
Designation	Type
TD	Thermodisc
DA	O-Ring

Service	
Designation	Description
SS	Steam

Standard Orifice Area				
Designation	Area (API)		Area (ASME)	
	in <sup>2</sup>	cm <sup>2</sup>	in <sup>2</sup>	cm <sup>2</sup>
D	0.110	2.794	0.128	0.825
E	0.196	4.978	0.228	1.470
F	0.307	7.798	0.357	2.302
G	0.503	12.776	0.585	3.774
H	0.785	19.939	0.913	5.888
J	1.287	32.690	1.496	9.652
K	1.838	46.685	2.138	13.794
L	2.853	72.466	3.317	21.400
M	3.600	91.440	4.186	27.006
N	4.340	110.236	5.047	32.561
P	6.380	162.052	7.417	47.852
Q	11.050	280.670	12.850	82.903
R	16.000	406.400	18.600	120.000
T	26.000	660.400	30.210	194.903
U	N/A	N/A	35.000	225.806
V	N/A	N/A	50.260	324.257
W	N/A	N/A	78.996	509.651

Inlet Flange Facing	
Designation	Facing
RF	Raised Face Serrated
RJ	Ring Joint
LM	Large Male
SM	Small Male
LF	Large Female
SF	Small Female
LT	Large Tongue
ST	Small Tongue
LG	Large Groove
SG	Small Groove
RS	Raised Face, Smooth
LJ	Lens Joint
BW	Butt Weld
SW	Socket Weld
GL	Grayloc
OC	Oteco

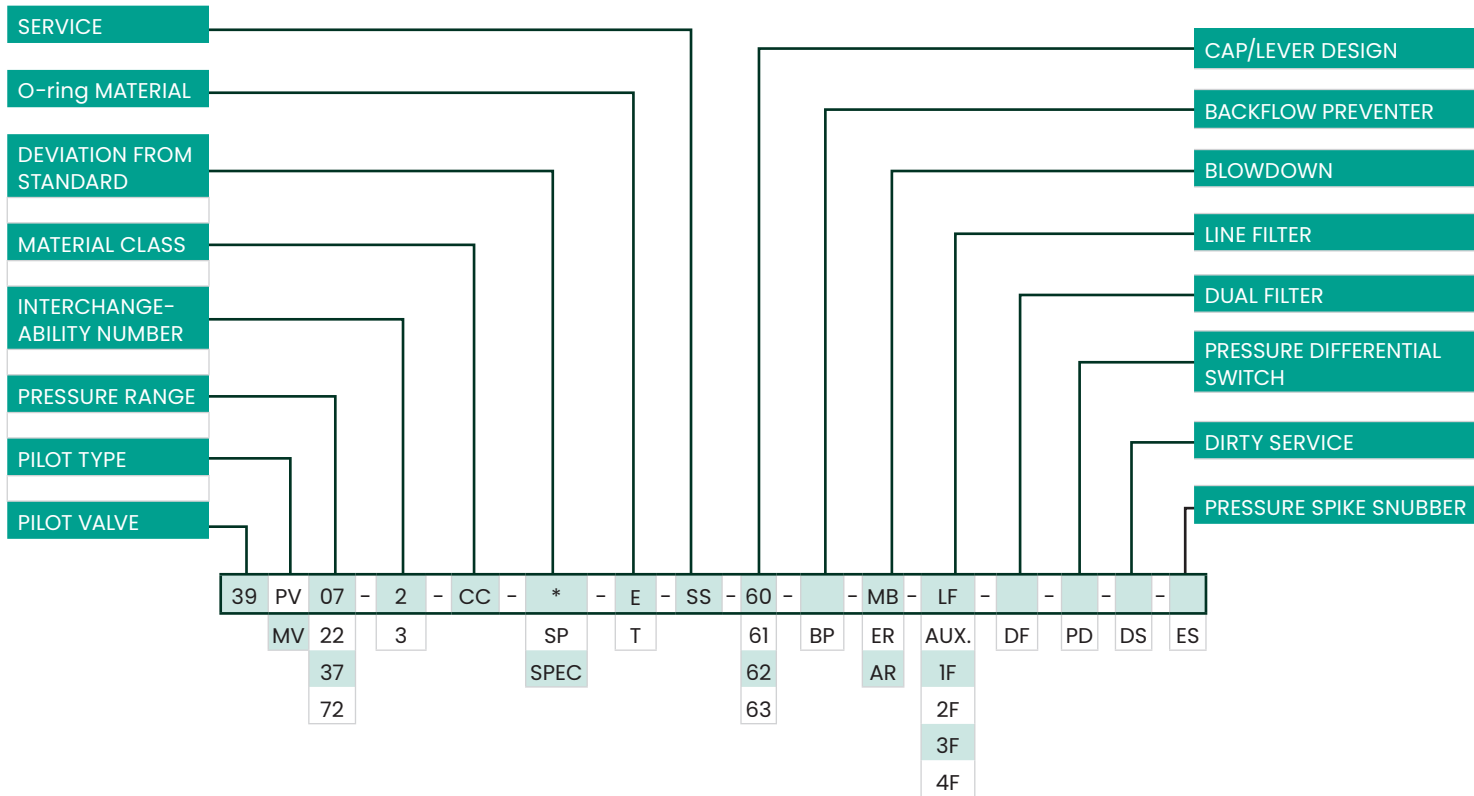
Material Class Variations	
Designation	Variation
CC	Standard Material
T1	High Temperature Service [1001 - 1200°F (538 - 649°C)]
S2	Stainless Steel (Internals)
S4	Stainless Steel (Complete Valve)

Guide Surface Coating	
Designation	Part Coated
G1	Glide-Aloy™ Disc Holder and Piston
G2	Glide-Aloy™ Guide and Coverplate
G3	Glide-Aloy™ Disc Holder, Piston, Guide and Coverplate



# Valve Configuration Code

## 2900-40 Series Pilot Valve



Pilot Type	
Designation	Description
PV	Pop Pilot
MV	Modulating Pilot

Pressure Range	
Designation	Description
07	40 to 750 psig (2.76 - 51.71 barg)
22	751 to 3750 psig (51.78 - 258.55 barg) MV only
37	751 to 3750 psig (51.78 - 258.55 barg) PV only
72	3751 to 5800 psig (258.62 - 399.90 barg) MV only

Interchangeability Number	
Designation	Description
2	Screwed Cap
3	Lifting Lever and/or Gag

Blowdown	
Designation	Description
MB	Manual Blowdown
ER	Electronic Remote
AR	Air Remote

O-ring Material	
Designation	Description
E	Ethylene Propylene
T	PTFE

Cap / Lever Design	
Designation	Description
60	Screwed Cap (No Gag or Lifting Lever)
61	Gag Only
62	Lifting Lever
63	Gag and Lifting Lever

Material Class Variations	
Designation	Description
CC	Standard Material

Sensing Line Filter	
Designation	Description
LF	Line Filter (Standard)
AUX.	High Capacity Filter
1F	Carbon Steel
2F	Stainless Steel
3F	Carbon Steel With Flush Valve
4F	Stainless Steel With Flush Valve

Service	
Designation	Description
SS	Steam

Pressure Spike Snubber	
Designation	Description
ES	Pressure Spike Snubber for Economizer Service (Also Standard for RH or Drum Applications)

# Ordering Consolidated 2900-40 Series Safety Relief Valve

## Specification Sheet

Page \_\_\_\_\_ of \_\_\_\_\_

Requisition No. \_\_\_\_\_  
 Job No. \_\_\_\_\_  
 Date \_\_\_\_\_  
 Revised By \_\_\_\_\_

### General

1. Item Number: \_\_\_\_\_
2. Tag Number: \_\_\_\_\_
3. Service, Line or Equipment No: \_\_\_\_\_
4. Number Required: \_\_\_\_\_

### Basis of Selection

5. ASME Section I  
 YES  NO  OTHER Specify: \_\_\_\_\_

### Valve Design, Pilot

6. Design Type: Pilot
7. No. of Pilots: \_\_\_\_\_
8. Pilot Action:  Pop  Modulating
9. Pilot Sense:  Internal  Remote<sup>(1)</sup>
10. Seat Type:  Resilient
11. Seat Tightness:  API 527  
 OTHER Specify: \_\_\_\_\_
12. Pilot Vent:  Atmosphere  Outlet  
 OTHER Specify: \_\_\_\_\_

### Valve Design, Main Base

13.  Metal Seat  Resilient Seat

### Connections

- |                  |         |         |
|------------------|---------|---------|
| 14. Inlet Size:  | Rating: | Facing: |
| 15. Outlet Size: | Rating: | Facing: |
16.  OTHER Specify: \_\_\_\_\_

### Materials, Main Valve

17. Body: \_\_\_\_\_
18. Nozzle: \_\_\_\_\_
19. Seat O-Ring: \_\_\_\_\_
20. Disc: \_\_\_\_\_
21. Piston Seal: \_\_\_\_\_
22. Other O-Rings: \_\_\_\_\_
23. Guide: \_\_\_\_\_
24. Cover Plate: \_\_\_\_\_

### Materials, Pilot

25. Body/Bonnet: \_\_\_\_\_
26. Internals: \_\_\_\_\_
27. Seals: \_\_\_\_\_
28. Tubing/Fittings: \_\_\_\_\_
29. Spring: \_\_\_\_\_
30. Comply with NACE MR0175:  YES  NO
31.  OTHER Specify: \_\_\_\_\_

Note: To assure proper valve operation when pilot is remotely sensed use .375" (9.53 mm) diameter tubing for lengths up to ten feet (3.05 m). Contact factory for proper size of tubing when sensing line exceeds ten feet (3.05 m).

## Accessories

32. External Filter:  YES  NO
33. Lifting Lever: N/A
34. Field Test Connection:  YES  NO
35. Backflow Preventer:  YES  NO
36. Manual Blowdown Valve:  YES  NO
37. Heat Exchange (For High Temperature Applications):  YES  NO
38.  OTHER Specify: \_\_\_\_\_

## Service Conditions

39. Fluid and State: \_\_\_\_\_
40. Required Capacity per Valve & Units: \_\_\_\_\_
41. Molecular Weight or Specific Gravity: \_\_\_\_\_
42. Viscosity at Flowing Temperature & Units: \_\_\_\_\_
43. Operating Pressure & Units: \_\_\_\_\_
44. Blowdown:  Standard  Other
45. Latent Heat of Vaporization & Units: \_\_\_\_\_
46. Operating Temperature & Units: \_\_\_\_\_
47. Relieving Temperature & Units: \_\_\_\_\_
48. Built-up Back Pressure & Units: \_\_\_\_\_
49. Superimposed Back Pressure & Units: \_\_\_\_\_
50. Cold differential Test Pressure & Units: \_\_\_\_\_
51. Allowable Overpressure in Percent or Units: \_\_\_\_\_
52. Compressibility Factor, Z: \_\_\_\_\_
53. Ratio of Specific Heats: \_\_\_\_\_

## Sizing and Selection

54. Calculated Orifice Area: \_\_\_\_\_ in<sup>2</sup> \_\_\_\_\_ cm<sup>2</sup>
55. Selected Orifice Area: \_\_\_\_\_ in<sup>2</sup> \_\_\_\_\_ cm<sup>2</sup>
56. Orifice Designation (letter): \_\_\_\_\_
57. Manufacturer: \_\_\_\_\_
58. Model Number: \_\_\_\_\_
59. Vendor Calculations Required:  YES  NO

## Heat Exchanger

60. Sizing Required: \_\_\_\_\_
61. Back Pressure Restrictions on Temperature: \_\_\_\_\_
62. Set Pressure: \_\_\_\_\_ psig \_\_\_\_\_ barg
63. Specific Volume of Media at Inlet Conditions:  
 \_\_\_\_\_ lbm/ft<sup>3</sup> \_\_\_\_\_ kgm/m<sup>3</sup>
64. Entropy of Media at Inlet Conditions  
 (btu/lbm\*°R): \_\_\_\_\_
65. Temperature of Ambient Air (°F/°C) (min./max.): \_\_\_\_\_
66. Media Temperature before it enters the Heat Exchanger:  
 \_\_\_\_\_ °F \_\_\_\_\_ °C

## Remote Sensing

67. Sizing Required: \_\_\_\_\_
68. Set Pressure: \_\_\_\_\_ psig \_\_\_\_\_ barg
69. Orifice Selection: \_\_\_\_\_
70. Fluid Density of Media in condensed state:  
 \_\_\_\_\_ lbm/ft<sup>3</sup> \_\_\_\_\_ kgm/m<sup>3</sup>
71. Length of Sensing Line<sup>1</sup>: \_\_\_\_\_ ft \_\_\_\_\_ m
72. Equivalent Length of Sensing Line for Valves, Elbows, Tees etc.: \_\_\_\_\_
73. Total change in Height: \_\_\_\_\_ ft \_\_\_\_\_ m







# Direct Sales Office Locations

## Australia

Brisbane  
Phone: +61-7-3001-4319

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## United Kingdom

Phone: +44-7919-382-156

## United States

Houston, Texas  
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[valves.bakerhughes.com/contact-us](http://valves.bakerhughes.com/contact-us)

## Tech Field Support & Warranty:

Phone: +1-866-827-5378

[valvesupport@bakerhughes.com](mailto:valvesupport@bakerhughes.com)

[valves.bakerhughes.com](http://valves.bakerhughes.com)

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