



Manual Ball Valves

Ball valves are a low cost, manually operated, straight through isolation device. Their simple, robust design provides high reliability in “dirty” applications. They are commonly used on MOCVD and CVD equipment downstream from the chamber or vacuum pump to isolate traps or abatement tools. A forged 316L stainless steel body and Teflon® seat make these valves ideal for corrosive environments. Other applications include vacuum and other facilities requirements. A quarter-turn of the handle quickly switches the valve from open to close. Nor-Cal Ball Valves are available with NW-16 through 50 flanges as standards. Call for other flange configurations.

IQ Series Intellisys Throttling Butterfly Valve with On-Valve Controller

Nor-Cal Products’ IQ-Series Intellisys™ Throttling Butterfly Valve with on-valve control features the same patented closed loop motor control and proven adaptive pressure control algorithm found in Nor-Cal’s stand-alone pressure controller. The high performance controller/valve will rotate from fully open to closed in 1/8 second with over 100,000 steps of addressable control resolution. Wafer through-put increases of 5 to 15% with 2 to 10 fold reductions in wafer scrap are possible. The IQ valve’s footprint is smaller by over 90% than typical “buried box” controllers and by over 60% than competitive “integral controller” products. DeviceNET™, RS-232 serial or RS-485 MODBUS communication. For more information refer to the separate Intellisys Adaptive Pressure Control brochure located in the Valves section of this binder.





Since we have been improving our designs and expanding our product line in order to offer the vacuum industry stainless steel valves for almost every application. Our valves provide outstanding performance in the most demanding applications such as semiconductor and compound semiconductor processing.

Construction

Our poppet valves are fully opening for high conductance and to prevent bellows and poppet contamination in semiconductor applications. Bodies are die-formed from 304 stainless steel to eliminate sharp inside corners and improve conductance. The valves are electropolished for faster pump-down, lower outgassing and better corrosion resistance. The welded bellows are made from AM-350 stainless steel to provide corrosion resistance and excellent flexibility. They are designed with additional segments to provide extended life. Nor-Cal valves can be operated in any position and actuators can be removed quickly for routine inspection without disassembling the system.

Models

Nor-Cal's poppet valves are available in most port configurations from .38 to 4.0 inch ODs with CF, NW, ISO or ASA flanges. Angle, Angle-In-Line, In-Line, Tee and Straight-Through valves through 3 inch OD's are all available with manual or pneumatic actuators and Viton® or copper seal bonnets. Sizes 4.0 inches and larger are available with pneumatic actuators only.

Bakeable all-metal valves with right angle port configuration are manufactured with .75 to 2.5 inch OD ports and CF flanges.

Gate valves are available with nominal IDs of 1.5 to 12 inches with CF, NW, ISO and ASA flanges. Bonnets are either copper or Viton® sealed with manual or pneumatic actuators. (See gate valve specifications on Page 27.)

Vacuum Range

Poppet seals and welds have helium leak rates of 10⁻⁹ std. cc./sec. or less. Viton® sealed valves can be used in the 10⁻⁹ Torr range, while copper seal valves are suited for use in the 10⁻¹⁰ range. Bakeable All-Metal valves are vacuum rated to below 10⁻¹⁰ Torr.

Bakeability

Standard valves are bakeable to 204°C for intermittent periods. However, the Viton® O-rings begin to take a set at 150°C. High temperature Kalrez® O-rings are available as an option and allow these valves to be baked to 316°C for intermittent periods and 280°C for extended periods. Bakeable all-metal poppet valves are offered for 400°C bakeouts. Heater jackets are available for all valves.

Valve Actuation

Manually operated valves, available with port ODs up to 3 inches, utilize Acme threads and a self-lubricating bronze nut for fewer turns and smooth, trouble-free operation.

Pneumatic valves are normally air-to-open, spring-to-close in port ODs through 2 inches for immediate closure in case of electrical or air failure. Larger valves are air-to-open, air-to-close as are all valves as an option. Fail-Safe valves are air-to-open, spring-to-close and are available in 2.5, 3 and 4 inch sizes. Most sizes are available with air-to-open, air-to-close with spring assist as an option. Operating air pressure for all pneumatic valves is 60 to 80 psig.

Copper Seal Bonnets

Copper seal bonnet valves with CF flanges provide metal seals between the inside of the valve and the atmosphere. They are available in all standard sizes and port configurations.

Poppet Valve General Specifications

- Electropolished 304 stainless steel die-formed body
- 15 micron filter on air cylinder exhaust
- Full opening
- Viton® poppet O-ring, standard
- .38 to 4.0 inch port ODs
- Helium leak rate 10⁻⁹ std. cc./sec. or less
- Viton® Seal Bonnet: 10⁻⁹ Torr vacuum rating, Bakeable to 204°C intermittent, CF, NW, ISO and ASA flanges
- Copper Seal Bonnet: 10⁻¹⁰ Torr vacuum rating, CF flanges, bakeable to 204°C intermittent
- Pneumatically Operated: Normally closed, 60 to 80 psig operating air pressure
- Maximum differential pressure 20 psi across valve seat
- External differential pressures greater than 5 psi on the bellows may result in premature bellows failure

Options

- Micro-switch
- Actuators
- O-rings
- Fittings
- Air Solenoids
- Heater Jackets

Poppet Valve Conductance

Liters per second

The conductance values in the adjacent table have been calculated for air at room temperature using the formulas for tubes and elbows presented in the third edition of Roth's, *Vacuum Technology*:

$$C_v = 12(D^4/L')$$

$$C_m = 12(D^3/L')$$

$$L' = L_{axial} + 1.33(\theta/180)D$$

Port lengths without flanges and inner diameters for the valve sizes and configurations were used. This method is an approximation, use values accordingly.

OD	Angle or Tee		Angle-In-Line		In-Line		Straight-Through	
	Viscous	Molecular	Viscous	Molecular	Viscous	Molecular	Viscous	Molecular
0.50	4	3	-	-	3	2	-	-
0.75	9	5	8	4	7	4	6	4
1.00	26	12	19	9	18	8	-	-
1.12	-	-	-	-	-	-	29	11
1.50	128	37	88	25	84	24	80	23
2.00	311	65	230	48	207	44	-	-
2.50	820	136	499	83	506	84	-	-
3.00	1580	217	835	115	948	130	-	-
4.00	3856	396	-	-	2299	236	-	-

Dimensions in inches

Prices subject to change without notice. - International product pricing will vary.

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How to Specify Options

Several options are available on poppet valves. The options are described in detail on these two pages. One or more options can be added to a particular valve by adding the option suffix to the basic valve model number.

Please add option suffixes in the following order:

- Actuator:** "-A" = air-to-open, air-to-close
"-AS" = air-to-open, air-to-close with spring assist
"-SA" = spring-to-open, air-to-close
- Micro-switch:** "-M"
- O-ring:** "-KT" = high temp Kalrez®
"-KC" = chemical resistant Kalrez®
"-CR" = Chemraz®
"-S" = Silicone
- Angle Valve Fitting:** (see table below)
- Air Solenoid:** (see table next page)

Examples of model numbers with options:

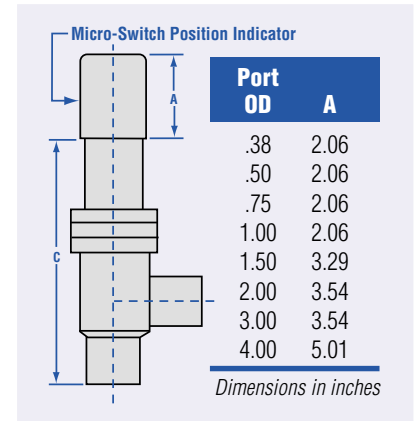
ESVP-1502-CF-AS-M-S11 or
CAIVP-3002-ISO-S-S32 or
CSV-1002-NW-CR-F2

Actuator Options

All pneumatically actuated valves with air-to-open, spring-to-close actuators (port ODs through 2 inches) can be furnished with air-to-open, air-to-close actuators at no extra charge. Air-to-open, air-to-close actuators with a spring assist can be furnished for an additional \$25.00.

Micro-Switch Options

The Micro-Switch Option is available on all pneumatically actuated Nor-Cal valves. Add \$100.00 to valve cost. A pair of 5-amp micro-switches are opened or closed by the movement of the valve stem. One switch closes when the valve is fully open and the other when it is fully closed. These can be connected to control panels with alarms or lights for positive position indication. Normally, electrical leads are approximately ten inches long, but may be cut to any length upon request.



O-ring Options

Standard Nor-Cal valves use chemical resistant Viton® O-rings for closure. Viton O-rings should not be heated to above 204°C. Even prolonged exposures of 150°C may degrade the O-rings. The following special O-rings can be provided as options:

- High temperature Kalrez® O-rings allow the valve to be baked to 316°C intermittently or 280°C for prolonged periods where the O-ring is allowed to expand.
- Silicone O-rings provide adequate sealing performance in thermal cycling from -65°C to 232°C.
- Chemical resistant Kalrez® and Chemraz® are also available.

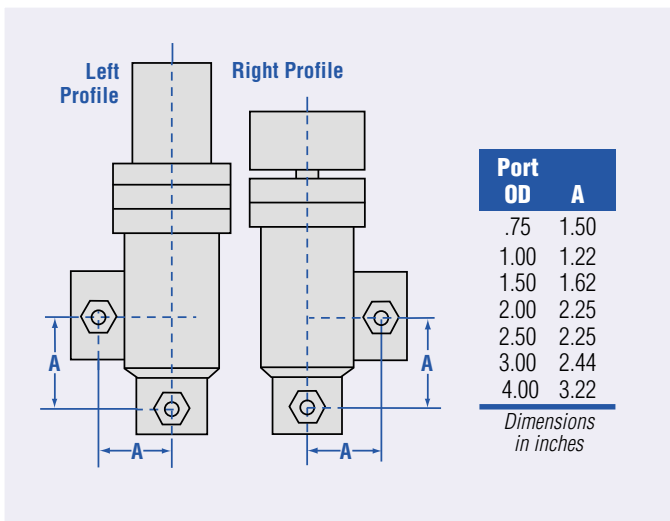
Right Angle Valve Fitting Options

All Nor-Cal right angle valves (ESV, CSV, ESVP and CSVP models) are available with the six fitting options described in the following table. These options are designed to make it easy for our customers to retrofit our valves with thermocouple gauges, leak valves, up-to-air valves or gas introduction lines. Other fittings or configurations are available upon request.

Option	Profile	Description	Ports	Add to Valve Price
F1	Left	1/4 Female VCR	Both	
F2	Left	3/8 Female VCR	Both	
F3	Left	1/8 Female NPT	Bottom	
F4	Right	1/4 Female VCR	Both	
F5	Right	3/8 Female VCR	Both	
F6	Right	1/8 Female NPT	Bottom	

Note: Available on ESV, ESVP, CSV and CSVP models only.

Dimensions in inches





Air Solenoid Options

All pneumatic poppet valves can be provided with air solenoids with several current ratings for electropneumatic actuation. (Gate valves come standard with a 120V, 50/60Hz air solenoid valve. See solenoid chart for gate valves on page 27) Valves with air-to-open, spring-to-close actuation require three-way air solenoids, while air-to-open, air-to-close actuators require four-way solenoids (see table above). Both three and four-way air solenoids are available in four current ratings. A pneumatic valve ordered with this option will arrive with an air solenoid installed. Fourteen inch long electrical leads are provided for connection to the power supply. Air solenoids can be purchased separately in a kit complete with instructions for installation by the customer. When placing your order please specify the model number of the valve that the air solenoid will be installed on, so that our sales staff can confirm whether a three-way or four-way solenoid is required.

Port OD	Option	Kit	Description	Price
.38 through 2.0 and all Fail-Safe valve sizes*	S11	S11-K	3-way 120V AC, 50/60 Hz	
	S21	S21-K	3-way 24V DC	
	S31	S31-K	3-way 240V AC, 50/60 Hz	
	S41	S41-K	3-way 24V AC, 50/60 Hz	
2.5 thru 4.0*	S12	S12-K	4-way 120V AC, 50/60 Hz	
	S22	S22-K	4-way 24V DC	
	S32	S32-K	4-way 240V AC, 50/60 Hz	
	S42	S42-K	4-way 24V AC, 50/60 Hz	

* Use 4-way solenoid option for 1.12 and 1.5 OD STVP and CSTVP models.

Dimensions in inches



Thermal Products

All Nor-Cal poppet valves and gate valves can be provided with silicone foam or fiberglass insulated heater jackets to reduce resident time of corrosives or particle buildup in semiconductor applications. These jackets are available with PID controllers or thermostats with high temperature shutoffs. Jacket and control specifications can be tailored to meet your specific needs. Call for price and model number. Refer to the Thermal Products catalog located in this binder for more information.



Manually Operated Viton Seal Angle Valves

Model Number	Port OD	Description	A	B	C	D	Price
ESV-038	.38	No Flanges	1.50	4.06	4.44	2.25	
ESV-0382-CF		Rotatable 1.33 CF on Both Ports	1.60	4.16	4.54	2.25	
ESV-0382-NWB		NW-10B on Both Ports	1.65	4.21	4.59	2.25	
ESV-050	.50	No Flanges	1.50	4.06	4.56	2.25	
ESV-0502-CF		Rotatable 1.33 CF on Both Ports	1.60	4.16	4.66	2.25	
ESV-0502-NWB		NW-10B on Both Ports	1.65	4.21	4.71	2.25	
ESV-075	.75	No Flanges	2.00	4.56	5.31	2.25	
ESV-0752-CF		Rotatable 1.33 CF on Both Ports	2.50	5.06	5.81	2.25	
ESV-0752-NWB		NW-16B on Both Ports	2.15	4.71	5.46	2.25	
ESV-100	1.00	No Flanges	1.88	4.32	5.32	2.25	
ESV-1002-CF		Rotatable 2.12 CF on Both Ports	2.05	4.49	5.49	2.25	
ESV-1002-NWB		NW-25B on Both Ports	2.03	4.47	5.47	2.25	
ESV-150	1.50	No Flanges	2.25	5.63	7.13	3.00	
ESV-1502-CF		Rotatable 2.75 CF on Both Ports	2.46	5.84	7.34	3.00	
ESV-1502-NWB		NW-40B on Both Ports	2.40	5.78	7.28	3.00	
ESV-200	2.00	No Flanges	3.25	7.85	9.85	3.50	
ESV-2002-CF		Rotatable 3.38 CF on Both Ports	3.48	8.08	10.08	3.50	
ESV-2002-NWB		NW-50B on Both Ports	3.40	8.00	10.00	3.50	
ESV-2002-ASA		Rotatable ASA-5-200R on Both Ports	3.50	8.10	10.10	3.50	
ESV-250	2.50	No Flanges	3.00	8.27	10.77	4.00	
ESV-2502-CF		Rotatable 4.50 CF on Both Ports	3.38	8.65	11.15	4.00	
ESV-2502-ISO		ISO-63-250-OF on Both Ports	3.25	8.52	11.02	4.00	
ESV-2502-ASA		Rotatable ASA-5-250R on Both Ports	3.25	8.52	11.02	4.00	
ESV-300	3.00	No Flanges	3.25	8.68	11.68	4.50	
ESV-3002-CF		Rotatable 4.62 CF on Both Ports	3.53	8.96	11.96	4.50	
ESV-3002-ISO		ISO-80-300-OF on Both Ports	3.50	8.93	11.93	4.50	
ESV-3002-ASA		Rotatable ASA-6-300R on Both Ports	3.50	8.93	11.93	4.50	

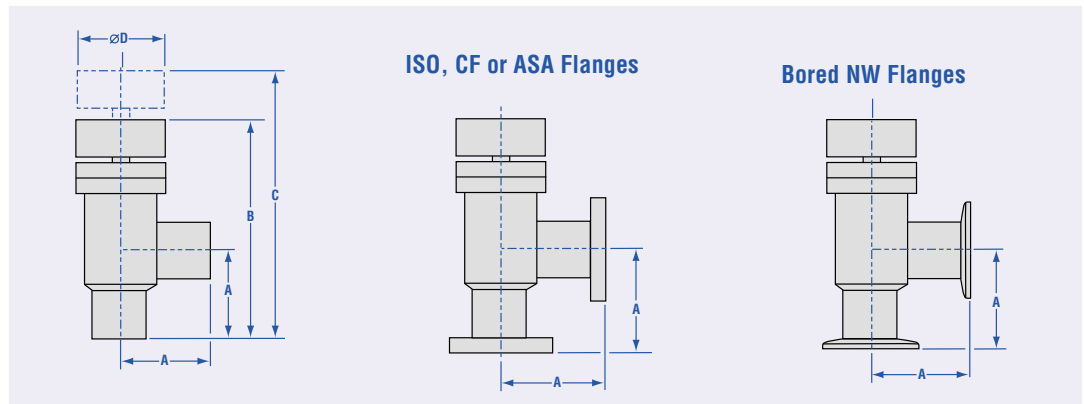
Dimensions in inches

Specifications

- Electropolished 304 stainless steel body
- .38 to 3 inch port ODs
- Self-lubricating bronze nut
- Acme threads for fewer turns
- Bakeable to 204°C intermittent
- Viton® Seal Bonnet: 10⁻⁹ Torr vacuum rating, CF, NW, ISO and ASA flanges

Options

- Fittings
- O-rings
- Heater Jackets



ESV O-Ring Kits

Port OD	Model Number	Price
.38-1.0	ESV-075-95	
1.5	ESV-150-95	
2.0	ESV-200-95	
2.5	ESV-250-95	
3.0	ESV-300-95	

Dimensions in inches

Prices subject to change without notice. - International product pricing will vary.

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Manually Operated Copper Seal Bonnet Angle Valves

Model Number	Port OD	Description	A	B	C	D	Price
CSV-038	.38	No Flanges	1.50	4.06	4.44	2.73	
CSV-0382-CF		Rotatable 1.33 CF on Both Ports	1.60	4.16	4.54	2.73	
CSV-050	.50	No Flanges	1.50	4.06	4.56	2.73	
CSV-0502-CF		Rotatable 1.33 CF on Both Ports	1.60	4.16	4.66	2.73	
CSV-075	.75	No Flanges	2.00	4.56	5.31	2.73	
CSV-0752-CF		Rotatable 1.33 CF on Both Ports	2.50	5.06	5.81	2.73	
CSV-100	1.00	No Flanges	1.88	4.32	5.32	2.73	
CSV-1002-CF		Rotatable 2.12 CF on Both Ports	2.05	4.49	5.49	2.73	
CSV-150	1.50	No Flanges	2.25	5.63	7.13	3.25	
CSV-1502-CF		Rotatable 2.75 CF on Both Ports	2.46	5.84	7.34	3.25	
CSV-200	2.00	No Flanges	3.25	7.85	9.85	4.05	
CSV-2002-CF		Rotatable 3.38 CF on Both Ports	3.48	8.08	10.08	4.05	
CSV-250	2.50	No Flanges	3.00	8.27	10.77	4.61	
CSV-2502-CF		Rotatable 4.50 CF on Both Ports	3.38	8.65	11.15	4.61	
CSV-300	3.00	No Flanges	3.25	8.68	11.68	5.62	
CSV-3002-CF		Rotatable 4.62 CF on Both Ports	3.53	8.96	11.96	5.62	

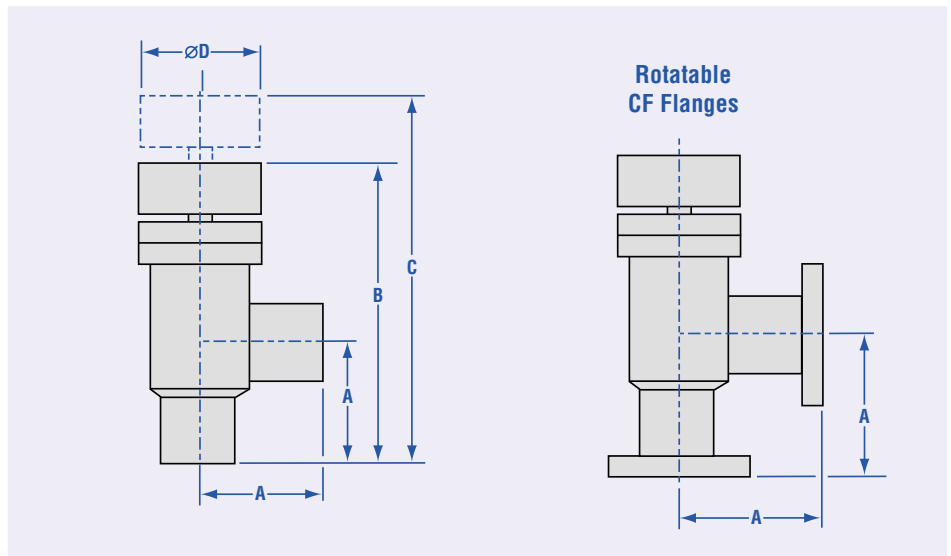
Dimensions in inches

Specifications

- Electropolished 304 stainless steel body
- .38 to 3 inch port ODs
- Self-lubricating bronze nut
- Acme threads for fewer turns
- Bakeable to 204°C intermittent
- Copper Seal Bonnet: 10⁻¹⁰ Torr vacuum rating, CF flanges

Options

- Fittings
- O-rings
- Heater Jackets



CSV O-Ring and Gasket Kits

Port OD	Model Number	Price
.38-1.0	CSV-075-95	
1.5	CSV-150-95	
2.0	CSV-200-95	
2.5	CSV-250-95	
3.0	CSV-300-95	

Dimensions in inches

Prices subject to change without notice. - International product pricing will vary.

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Pneumatically Actuated Viton Seal Angle Valves

Model Number	Port OD	Description	A	B	C	D	Price
ESVP-038	.38	No Flanges	1.50	3.62	5.77	2.25	
ESVP-0382-CF		Rotatable 1.33 CF on Both Ports	1.60	3.72	5.87	2.25	
ESVP-0382-NWB		NW-10B on Both Ports	1.65	3.77	5.92	2.25	
ESVP-050	.50	No Flanges	1.50	3.62	5.77	2.25	
ESVP-0502-CF		Rotatable 1.33 CF on Both Ports	1.60	3.72	5.87	2.25	
ESVP-0502-NWB		NW-10B on Both Ports	1.65	3.77	5.92	2.25	
ESVP-075	.75	No Flanges	2.00	4.12	6.26	2.25	
ESVP-0752-CF		Rotatable 1.33 CF on Both Ports	2.50	4.62	6.76	2.25	
ESVP-0752-NWB		NW-16B on Both Ports	2.15	4.27	6.41	2.25	
ESVP-100	1.00	No Flanges	1.88	3.88	6.02	2.25	
ESVP-1002-CF		Rotatable 2.12 CF on Both Ports	2.05	4.05	6.19	2.25	
ESVP-1002-NWB		NW-25B on Both Ports	2.03	4.03	6.17	2.25	
ESVP-150	1.50	No Flanges	2.25	4.98	7.56	3.00	
ESVP-1502-CF		Rotatable 2.75 CF on Both Ports	2.46	5.19	7.77	3.00	
ESVP-1502-NWB		NW-40B on Both Ports	2.40	5.13	7.71	3.00	
ESVP-200	2.00	No Flanges	3.25	6.74	11.23	3.50	
ESVP-2002-CF		Rotatable 3.38 CF on Both Ports	3.48	6.97	11.46	3.50	
ESVP-2002-NWB		NW-50B on Both Ports	3.40	6.89	11.38	3.50	
ESVP-2002-ASA		Rotatable ASA-5-200R on Both Ports	3.50	6.99	11.48	3.50	
ESVP-250	2.50	No Flanges	3.00	7.18	10.10	4.00	
ESVP-2502-CF		4.50 CF on Both Ports	3.38	7.56	10.48	4.00	
ESVP-2502-ISO		ISO-63-250-OF on Both Ports	3.25	7.43	10.35	4.00	
ESVP-2502-ASA		Rotatable ASA-5-250R on Both Ports	3.25	7.43	10.35	4.00	
ESVP-300	3.00	No Flanges	3.25	7.62	11.00	4.50	
ESVP-3002-CF		Rotatable 4.62 CF on Both Ports	3.53	7.90	11.28	4.50	
ESVP-3002-ISO		ISO-80-300-OF on Both Ports	3.50	7.87	11.25	4.50	
ESVP-3002-ASA		Rotatable ASA-6-300R on Both Ports	3.50	7.87	11.25	4.50	
ESVP-400	4.00	No Flanges	4.22	9.55	14.99	6.50	
ESVP-4002-CF		Rotatable 6.00 CF on Both Ports	4.66	9.99	15.43	6.50	
ESVP-4002-ISO		ISO-100-400-OF on Both Ports	4.47	9.80	15.24	6.50	
ESVP-4002-ASA		Rotatable ASA-7.5-400R on Both Ports	4.47	9.80	15.24	6.50	

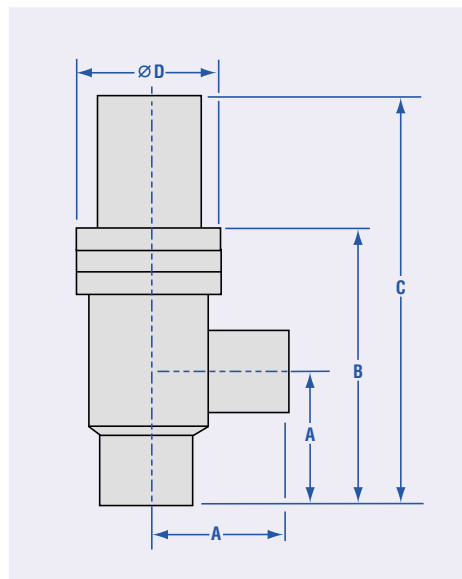
Dimensions in inches

Specifications

- Electropolished 304 stainless steel body
- 15 micron air filter on air cylinder exhaust
- .38 to 4 inch port ODs
- .38 to 2 inch OD: air-to-open, spring-to-close
- Over 2 inch OD: air-to-open, air-to-close
- 60 to 80 psig operating air pressure
- Bakeable to 204°C intermittent
- Viton® Seal Bonnet:
10⁻⁹ Torr vacuum rating,
CF, NW, ISO and ASA flanges

Options

- Fittings, O-rings and Air Solenoids
- Micro-Switch and Actuators
- Heater Jackets



ESVP O-Ring Kits

Port OD	Model Number	Price
.38-1.0	ESVP-075-95	
1.5	ESVP-150-95	
2.0	ESVP-200-95	
2.5	ESVP-250-95	
3.0	ESVP-300-95	
4.0	ESVP-400-95	

Dimensions in inches

Prices subject to change without notice. - International product pricing will vary.

VALVE-LIT 9/02



Pneumatically Actuated Copper Seal Bonnet Angle Valves

Model Number	Port OD	Description	A	B	C	D	Price
CSVP-038	.38	No Flanges	1.50	3.75	5.77	2.73	
CSVP-0382-CF		Rotatable 1.33 CF on Both Ports	1.60	3.85	5.82	2.73	
CSVP-050	.50	No Flanges	1.50	3.75	5.77	2.73	
CSVP-0502-CF		Rotatable 1.33 CF on Both Ports	1.60	3.85	5.82	2.73	
CSVP-075	.75	No Flanges	2.00	4.25	6.26	2.73	
CSVP-0752-CF		Rotatable 1.33 CF on Both Ports	2.50	4.75	6.76	2.73	
CSVP-100	1.00	No Flanges	1.88	4.00	6.02	2.73	
CSVP-1002-CF		Rotatable 2.12 CF on Both Ports	2.05	4.17	6.19	2.73	
CSVP-150	1.50	No Flanges	2.25	4.98	7.56	3.25	
CSVP-1502-CF		Rotatable 2.75 CF on Both Ports	2.46	5.19	7.77	3.25	
CSVP-200	2.00	No Flanges	3.25	6.62	11.23	4.05	
CSVP-2002-CF		Rotatable 3.38 CF on Both Ports	3.48	6.85	11.45	4.05	
CSVP-250	2.50	No Flanges	3.00	7.18	10.10	4.61	
CSVP-2502-CF		Rotatable 4.50 CF on Both Ports	3.38	7.56	10.48	4.61	
CSVP-300	3.00	No Flanges	3.25	7.62	11.00	5.62	
CSVP-3002-CF		Rotatable 4.62 CF on Both Ports	3.53	7.90	11.28	5.62	
CSVP-400	4.00	No Flanges	4.22	9.55	14.99	6.73	
CSVP-4002-CF		Rotatable 6.00 CF on Both Ports	4.66	9.99	15.43	6.73	

Dimensions in inches

Specifications

- Electropolished 304 stainless steel body
- 15 micron air filter on air cylinder exhaust
- .38 to 4 inch port ODs
- .38 to 2 inch OD: air-to-open, spring-to-close
- Over 2 inch OD: air-to-open, air-to-close
- 60 to 80 psig operating air pressure
- Bakeable to 204°C intermittent
- Copper Seal Bonnet: 10⁻¹⁰ Torr vacuum rating, CF flanges

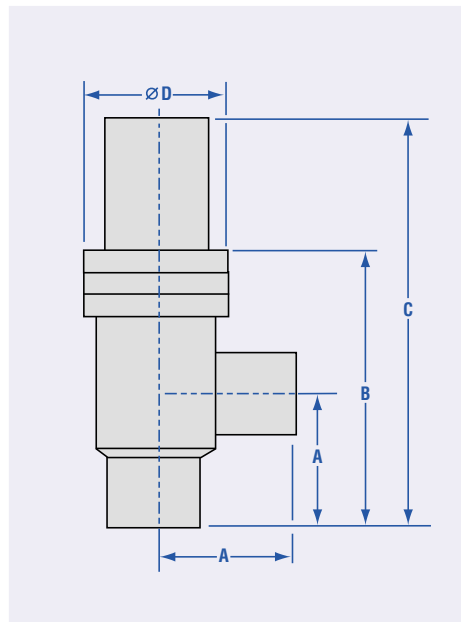
Options

- Fittings, O-rings
- Air Solenoids
- Micro-Switch
- Actuators
- Heater Jackets

CSVP O-Ring & Gasket Kits

Port OD	Model Number	Price
.38-1.0	CSVP-075-95	
1.5	CSVP-150-95	
2.0	CSVP-200-95	
2.5	CSVP-250-95	
3.0	CSVP-300-95	
4.0	CSVP-400-95	

Dimensions in inches

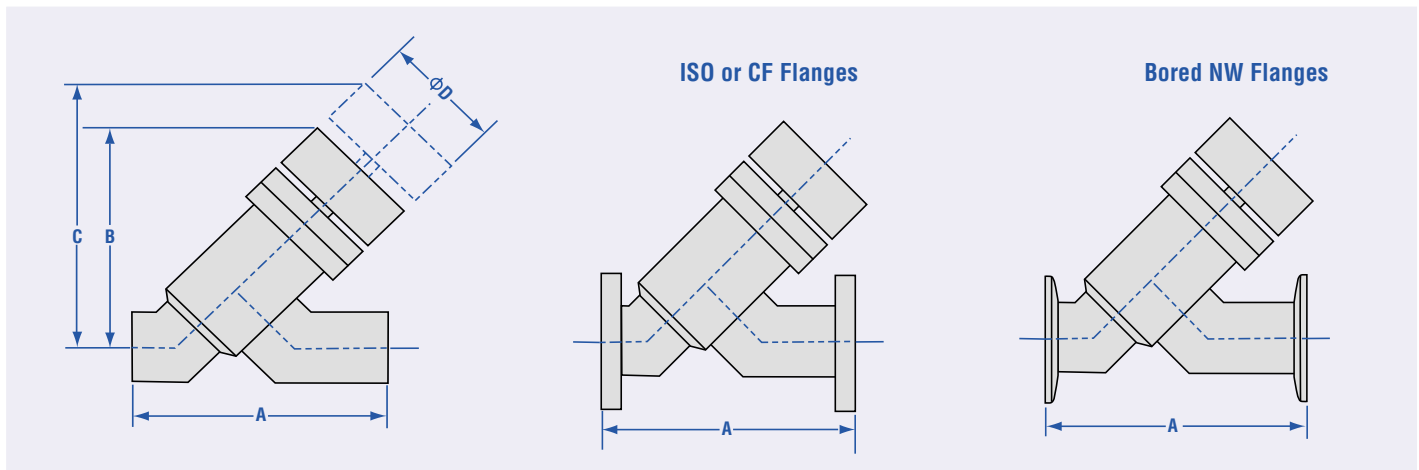




Manually Operated Viton Seal Angle-In-Line Valves

Model Number	Port OD	Description	A	B	C	D	Price
AIV-075	.75	No Flanges	3.70	3.47	4.01	2.25	
AIV-0752-CF		Rotatable 1.33 CF on Both Ports	4.70	3.47	4.01	2.25	
AIV-0752-NWB		NW-16B on Both Ports	4.00	3.47	4.01	2.25	
AIV-100	1.00	No Flanges	3.90	3.42	4.14	2.25	
AIV-1002-CF		Rotatable 2.12 CF on Both Ports	4.23	3.42	4.14	2.25	
AIV-1002-NWB		NW-25B on Both Ports	4.20	3.42	4.14	2.25	
AIV-150	1.50	No Flanges	4.82	4.55	5.61	3.00	
AIV-1502-CF		Rotatable 2.75 CF on Both Ports	5.24	4.55	5.61	3.00	
AIV-1502-NWB		NW-40B on Both Ports	5.12	4.55	5.61	3.00	
AIV-200	2.00	No Flanges	6.70	6.19	9.15	3.50	
AIV-2002-CF		Rotatable 3.38 CF on Both Ports	7.15	6.19	9.15	3.50	
AIV-2002-NWB		NW-50B on Both Ports	7.00	6.19	9.15	3.50	
AIV-250	2.50	No Flanges	7.75	6.99	10.31	4.00	
AIV-2502-CF		Rotatable 4.50 CF on Both Ports	8.50	6.99	10.31	4.00	
AIV-2502-ISO		ISO-63-250-OF on Both Ports	8.25	6.99	10.31	4.00	
AIV-300	3.00	No Flanges	10.05	7.71	11.38	4.50	
AIV-3002-CF		Rotatable 4.62 CF on Both Ports	10.61	7.71	11.38	4.50	
AIV-3002-ISO		ISO-80-300-OF on Both Ports	10.55	7.71	11.38	4.50	

Dimensions in inches



Specifications

- Electropolished 304 stainless steel bo
- .75 to 3.0 inch port OD's
- Self-lubricating bronze nut
- Acme threads for fewer turns
- Bakeable to 204°C intermittent
- Viton Seal Bonnet:
10⁻⁹ Torr vacuum rating,
CF, NW and ISO flanges

Options

- O-rings
- Heater Jackets



AIV O-Ring Kits

Port OD	Model Number	Price
.38 - 1.0	ESV-075-95	
1.5	ESV-150-95	
2.0	ESV-200-95	
2.5	ESV-250-95	
3.0	ESV-300-95	

Dimensions in inches

Prices subject to change without notice. - International product pricing will vary.

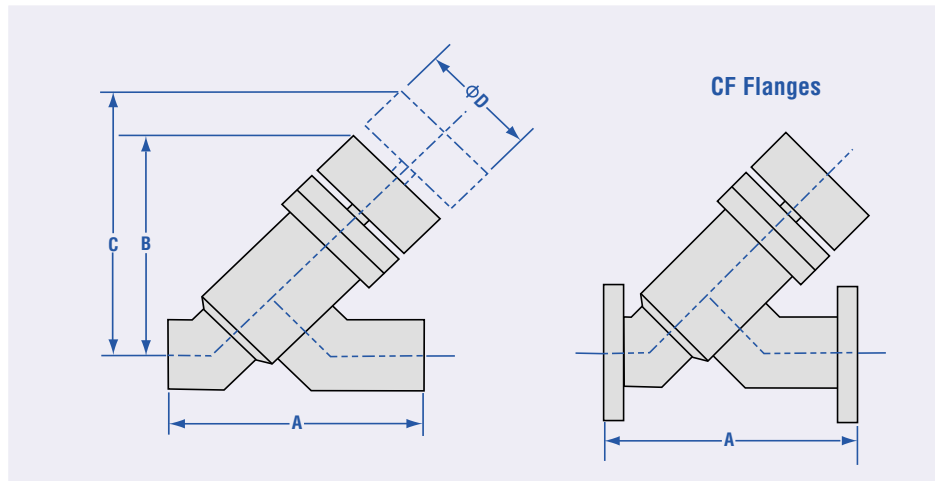
VALVE-LIT 9/02



Manually Operated Copper Seal Bonnet Angle-In-Line Valves

Model Number	Port OD	Description	A	B	C	D	Price
CAIV-075	.75	No Flanges	3.70	3.47	4.01	2.73	
CAIV-0752-CF		Rotatable 1.33 CF on Both Ports	4.70	3.47	4.01	2.73	
CAIV-100	1.00	No Flanges	3.90	3.42	4.14	2.73	
CAIV-1002-CF		Rotatable 2.12 CF on Both Ports	4.48	3.42	4.14	2.73	
CAIV-150	1.50	No Flanges	4.82	4.55	5.61	3.25	
CAIV-1502-CF		Rotatable 2.75 CF on Both Ports	5.24	4.55	5.61	3.25	
CAIV-200	2.00	No Flanges	6.70	6.19	9.15	4.05	
CAIV-2002-CF		Rotatable 3.38 CF on Both Ports	7.15	6.19	9.15	4.05	
CAIV-250	2.50	No Flanges	7.75	6.99	10.31	4.61	
CAIV-2502-CF		Rotatable 4.50 CF on Both Ports	8.50	6.99	10.31	4.61	
CAIV-300	3.00	No Flanges	10.05	7.71	11.38	5.62	
CAIV-3002-CF		Rotatable 4.62 CF on Both Ports	10.61	7.71	11.38	5.62	

Dimensions in inches



Specifications

- Electropolished 304 stainless steel body
- .75 to 3.0 inch port OD's
- Self-lubricating bronze nut
- Acme threads for fewer turns
- Bakeable to 204°C intermittent
- Copper Seal Bonnet:
10⁻¹⁰ Torr vacuum rating, CF flanges

Options

- O-rings
- Heater Jackets

CAIV O-Ring and Gasket Kits

Port OD	Model Number	Price
.38 - 1.0	CSV-075-95	
1.5	CSV-150-95	
2.0	CSV-200-95	
2.5	CSV-250-95	
3.0	CSV-300-95	

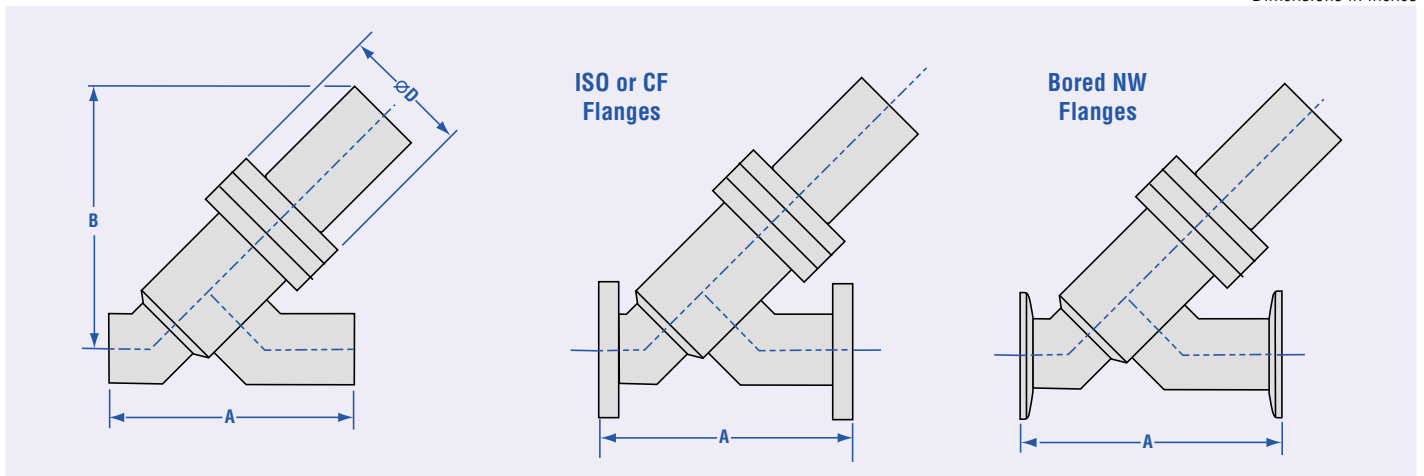
Dimensions in inches



Pneumatically Actuated Viton Seal Angle-In-Line Valves

Model Number	Port OD	Description	A	B	C	Price
AIVP-075	.75	No Flanges	3.70	4.32	2.25	
AIVP-0752-CF		Rotatable 1.33 CF on Both Ports	4.70	4.32	2.25	
AIVP-0752-NWB		NW-16B on Both Ports	4.00	4.32	2.25	
AIVP-100	1.00	No Flanges	3.90	4.27	2.25	
AIVP-1002-CF		Rotatable 2.12 CF on Both Ports	4.23	4.27	2.25	
AIVP-1002-NWB		NW-25B on Both Ports	4.20	4.27	2.25	
AIVP-150	1.50	No Flanges	4.82	5.69	3.00	
AIVP-1502-CF		Rotatable 2.75 CF on Both Ports	5.24	5.69	3.00	
AIVP-1502-NWB		NW-40B on Both Ports	5.12	5.69	3.00	
AIVP-200	2.00	No Flanges	6.70	7.94	3.50	
AIVP-2002-CF		Rotatable 3.38 CF on Both Ports	7.15	7.94	3.50	
AIVP-2002-NWB		NW-50B on Both Ports	7.00	7.94	3.50	
AIVP-250	2.50	No Flanges	7.75	7.64	4.00	
AIVP-2502-CF		Rotatable 4.50 CF on Both Ports	8.50	7.64	4.00	
AIVP-2502-ISO		ISO-63-250-OF on Both Ports	8.25	7.64	4.00	
AIVP-300	3.00	No Flanges	10.05	8.70	4.50	
AIVP-3002-CF		Rotatable 4.62 CF on Both Ports	10.61	8.70	4.50	
AIVP-3002-ISO		ISO-80-300-OF on Both Ports	10.55	8.70	4.50	

Dimensions in inches



Specifications

- Electropolished 304 stainless steel body
- 15 micron air filter on air cylinder exhaust
- .33 straight-through ID for high conductance
- .75" to 3" inch port ODs
- .75" to 2" OD: air-to-open, spring-to-close. Over 2" OD: air-to-open, air-to-close
- 60 to 80 psig operating air pressure
- Bakeable to 204°C
- Viton® Seal Bonnet: 10⁻⁹ Torr vacuum rating, CF, NW and ISO flanges

Options

- O-ring
- Actuator
- Air Solenoid
- Heater Jackets
- Micro-Switch



AIVP O-Ring Kits

Port OD	Model Number	Price
.38 - 1.0	ESVP-075-95	
1.5	ESVP-150-95	
2.0	ESVP-200-95	
2.5	ESVP-250-95	
3.0	ESVP-300-95	

Dimensions in inches

Prices subject to change without notice. - International product pricing will vary.

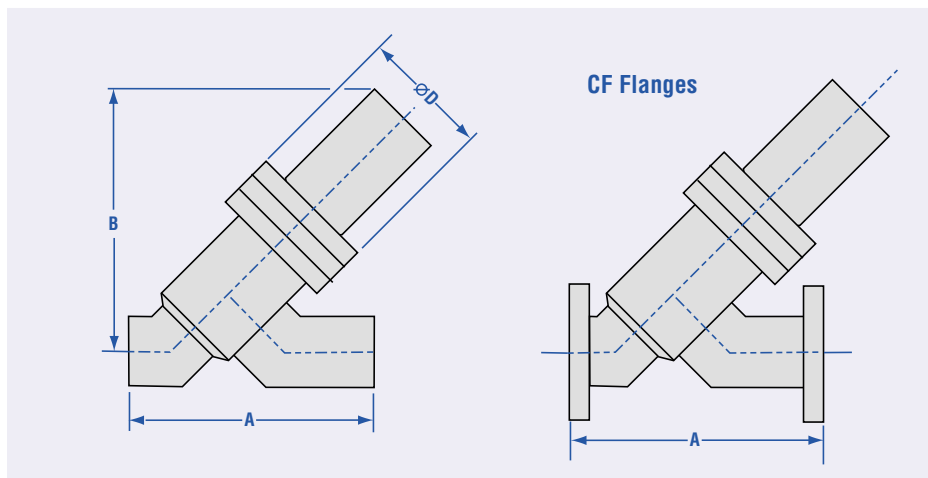
VALVE-LIT 9/02



Pneumatically Actuated Copper Seal Bonnet Angle-In-Line Valves

Model Number	Port OD	Description	A	B	C	Price
CAIVP-075	.75	No Flanges	3.70	4.32	2.73	
CAIVP-0752-CF		Rotatable 1.33 CF on Both Ports	4.70	4.32	2.73	
CAIVP-100	1.00	No Flanges	3.90	4.27	2.73	
CAIVP-1002-CF		Rotatable 2.12 CF on Both Ports	4.48	4.27	2.73	
CAIVP-150	1.50	No Flanges	4.82	5.69	3.25	
CAIVP-1502-CF		Rotatable 2.75 CF on Both Ports	5.24	5.69	3.25	
CAIVP-200	2.00	No Flanges	6.70	7.94	4.05	
CAIVP-2002-CF		Rotatable 3.38 CF on Both Ports	7.15	7.94	4.05	
CAIVP-250	2.50	No Flanges	7.75	7.64	4.61	
CAIVP-2502-CF		Rotatable 4.50 CF on Both Ports	8.50	7.64	4.61	
CAIVP-300	3.00	No Flanges	10.05	8.70	5.62	
CAIVP-3002-CF		Rotatable 4.62 CF on Both Ports	10.61	8.70	5.62	

Dimensions in inches



Specifications

- Electropolished 304 stainless steel body
- 15 micron air filter on air cylinder exhaust
- .33 straight-through ID for high conductance
- .75 to 3 inch port ODs
- .75 to 2 inch OD: air-to-open, spring-to-close
- Over 2 inch OD: air-to-open, air-to-close
- 60 to 80 psig operating air pressure
- Bakeable to 204°C
- Copper Seal Bonnet: 10⁻¹⁰ Torr vacuum rating, CF flanges

Options

- O-ring
- Air Solenoid
- Micro-Switch
- Actuator
- Heater Jackets

CAIVP O-Ring & Gasket Kits

Port OD	Model Number	Price
.38 - 1.0	CSVP-075-95	
1.5	CSVP-150-95	
2.0	CSVP-200-95	
2.5	CSVP-250-95	
3.0	CSVP-300-95	

Dimensions in inches



Prices subject to change without notice. - International product pricing will vary.

VALVE-LIT 9/02



Manually Operated Viton Seal In-Line Valves

Model Number	Port OD	Description	A	B	C	D	E	F	Price
ILV-038	.38	No Flanges	1.50	.94	1.50	4.06	2.25	4.44	
ILV-0382-CF		Rotatable 1.33 CF on Both Ports	1.60	.94	1.50	4.06	2.25	4.44	
ILV-0382-NWB		NW-10B on Both Ports	1.65	.94	1.50	4.06	2.25	4.44	
ILV-050	.50	No Flanges	1.50	1.00	1.62	4.19	2.25	4.69	
ILV-0502-CF		Rotatable 1.33 CF on Both Ports	1.60	1.00	1.62	4.19	2.25	4.69	
ILV-0502-NWB		NW-10B on Both Ports	1.65	1.00	1.62	4.19	2.25	4.69	
ILV-075	.75	No Flanges	2.00	1.12	1.87	4.44	2.25	5.19	
ILV-0752-CF		Rotatable 1.33 CF on Both Ports	2.50	1.12	1.87	4.44	2.25	5.19	
ILV-0752-NWB		NW-16B on Both Ports	2.15	1.12	1.87	4.44	2.25	5.19	
ILV-100	1.00	No Flanges	1.88	1.37	2.25	4.69	2.25	5.69	
ILV-1002-CF		Rotatable 2.12 CF on Both Ports	2.05	1.37	2.25	4.69	2.25	5.69	
ILV-1002-NWB		NW-25B on Both Ports	2.03	1.37	2.25	4.69	2.25	5.69	
ILV-150	1.50	No Flanges	2.25	1.88	3.12	6.52	3.00	8.02	
ILV-1502-CF		Rotatable 2.75 CF on Both Ports	2.46	1.88	3.12	6.52	3.00	8.02	
ILV-1502-NWB		NW-40B on Both Ports	2.40	1.88	3.12	6.52	3.00	8.02	
ILV-200	2.00	No Flanges	3.25	2.62	4.12	8.73	3.50	10.73	
ILV-2002-CF		Rotatable 3.38 CF on Both Ports	3.48	2.62	4.12	8.73	3.50	10.73	
ILV-2002-NWB		NW-50B on Both Ports	3.40	2.62	4.12	8.73	3.50	10.73	
ILV-2002-ASA		Rotatable ASA-5-200R on Both Ports	3.50	2.62	4.12	8.73	3.50	10.73	
ILV-250	2.50	No Flanges	3.00	3.12	4.93	10.20	4.00	12.70	
ILV-2502-CF		Rotatable 4.50 CF on Both Ports	3.38	3.12	4.93	10.20	4.00	12.70	
ILV-2502-ISO		ISO-63-250-OF on Both Ports	3.25	3.12	4.93	10.20	4.00	12.70	
ILV-2502-ASA		Rotatable ASA-5-250R on Both Ports	3.25	3.12	4.93	10.20	4.00	12.70	
ILV-300	3.00	No Flanges	3.25	3.68	5.62	11.04	4.50	14.04	
ILV-3002-CF		Rotatable 4.62 CF on Both Ports	3.53	3.68	5.62	11.04	4.50	14.04	
ILV-3002-ISO		ISO-80-300-OF on Both Ports	3.50	3.68	5.62	11.04	4.50	14.04	
ILV-3002-ASA		Rotatable ASA-6-300R on Both Ports	3.50	3.68	5.62	11.04	4.50	14.04	

Dimensions in inches

Specifications

- Electropolished 304 stainless steel body
- .38 to 3 inch port ODs
- Self-lubricating bronze nut
- Acme threads for fewer turns
- Bakeable to 204°C intermittent
- Viton® Seal Bonnet: 10⁻⁹ Torr vacuum rating, CF, NW, ISO and ASA flanges

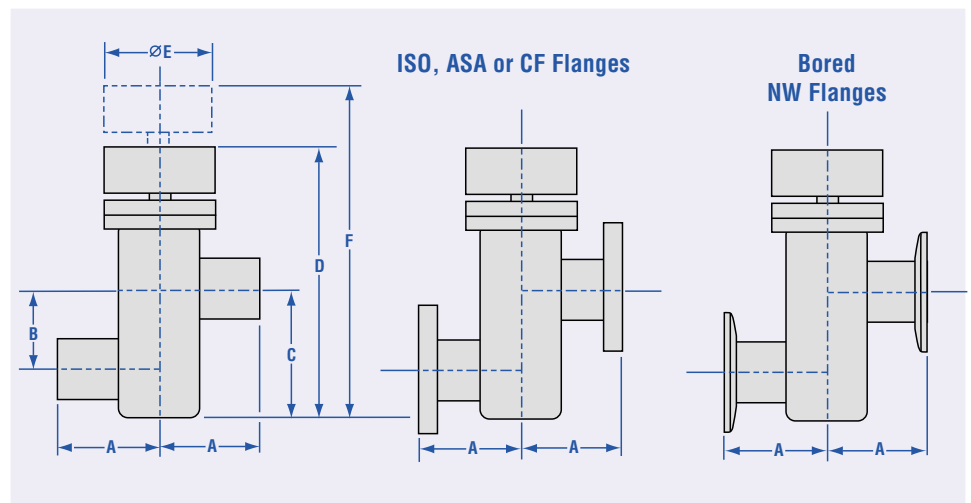
Options

- O-rings
- Heater Jackets

ILV O-Ring Kits

Port OD	Model Number	Price
.38-1.0	ESV-075-95	
1.5	ESV-150-95	
2.0	ESV-200-95	
2.5	ESV-250-95	
3.0	ESV-300-95	

Dimensions in inches



Prices subject to change without notice. - International product pricing will vary.

VALVE-LIT 9/02



Manually Operated Copper Seal Bonnet In-Line Valves

Model Number	Port OD	Description	A	B	C	D	E	F	Price
CILV-038	.38	No Flanges	1.50	.94	1.50	4.06	2.73	4.44	
CILV-0382-CF		Rotatable 1.33 CF on Both Ports	1.60	.94	1.50	4.06	2.73	4.44	
CILV-050	.50	No Flanges	1.50	1.00	1.62	4.19	2.73	4.69	
CILV-0502-CF		Rotatable 1.33 CF on Both Ports	1.60	1.00	1.62	4.19	2.73	4.69	
CILV-075	.75	No Flanges	2.00	1.12	1.87	4.44	2.73	5.19	
CILV-0752-CF		Rotatable 1.33 CF on Both Ports	2.50	1.12	1.87	4.44	2.73	5.19	
CILV-100	1.00	No Flanges	1.88	1.37	2.25	4.69	2.73	5.69	
CILV-1002-CF		Rotatable 2.12 CF on Both Ports	2.05	1.37	2.25	4.69	2.73	5.69	
CILV-150	1.50	No Flanges	2.25	1.88	3.12	6.52	3.25	8.02	
CILV-1502-CF		Rotatable 2.75 CF on Both Ports	2.46	1.88	3.12	6.52	3.25	8.02	
CILV-200	2.00	No Flanges	3.25	2.62	4.12	8.73	4.05	10.73	
CILV-2002-CF		Rotatable 3.38 CF on Both Ports	3.48	2.62	4.12	8.73	4.05	10.73	
CILV-250	2.50	No Flanges	3.00	3.12	4.93	10.20	4.61	12.70	
CILV-2502-CF		Rotatable 4.50 CF on Both Ports	3.38	3.12	4.93	10.20	4.61	12.70	
CILV-300	3.00	No Flanges	3.25	3.62	5.55	11.04	5.62	14.04	
CILV-3002-CF		Rotatable 4.62 CF on Both Ports	3.53	3.62	5.55	11.04	5.62	14.04	

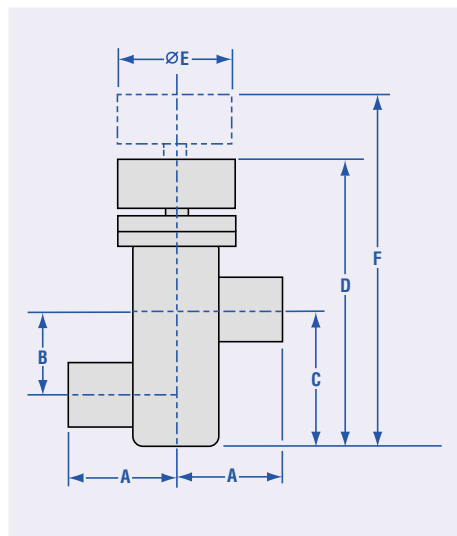
Dimensions in inches

Specifications

- Electropolished 304 stainless steel body
- .38 to 3 inch port ODs
- Self-lubricating bronze nut
- Acme threads for fewer turns
- Bakeable to 204° C intermittent
- Copper Seal Bonnet: 10⁻¹⁰ Torr vacuum rating, CF flanges

Options

- O-rings
- Heater Jackets



CILV O-Ring and Gasket Kits

Port OD	Model Number	Price
.38-1.0	CSV-075-95	
1.5	CSV-150-95	
2.0	CSV-200-95	
2.5	CSV-250-95	
3.0	CSV-300-95	

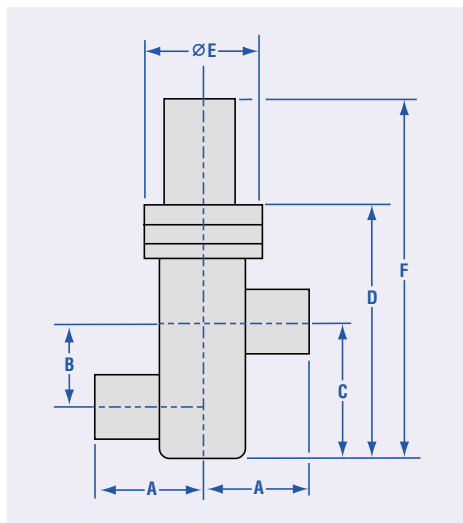
Dimensions in inches



Pneumatically Actuated Viton Seal In-Line Valves

Model Number	Port OD	Description	A	B	C	D	E	F	Price
ILVP-038	.38	No Flanges	1.50	.94	1.50	3.62	2.25	5.76	
ILVP-0382-CF		Rotatable 1.33 CF on Both Ports	1.60	.94	1.50	3.62	2.25	5.76	
ILVP-0382-NWB		NW-10B on Both Ports	1.65	.94	1.50	3.62	2.25	5.76	
ILVP-050	.50	No Flanges	1.50	1.00	1.62	3.75	2.25	5.89	
ILVP-0502-CF		Rotatable 1.33 CF on Both Ports	1.60	1.00	1.62	3.75	2.25	5.89	
ILVP-0502-NWB		NW-10B on Both Ports	1.65	1.00	1.62	3.75	2.25	5.89	
ILVP-075	.75	No Flanges	2.00	1.12	1.87	4.00	2.25	6.14	
ILVP-0752-CF		Rotatable 1.33 CF on Both Ports	2.50	1.12	1.87	4.00	2.25	6.14	
ILVP-0752-NWB		NW-16B on Both Ports	2.15	1.12	1.87	4.00	2.25	6.14	
ILVP-100	1.00	No Flanges	1.88	1.37	2.25	4.25	2.25	6.39	
ILVP-1002-CF		Rotatable 2.12 CF on Both Ports	2.05	1.37	2.25	4.25	2.25	6.39	
ILVP-1002-NWB		NW-25B on Both Ports	2.03	1.37	2.25	4.25	2.25	6.39	
ILVP-150	1.50	No Flanges	2.25	1.88	3.12	5.86	3.00	8.45	
ILVP-1502-CF		Rotatable 2.75 CF on Both Ports	2.46	1.88	3.12	5.86	3.00	8.45	
ILVP-1502-NWB		NW-40B on Both Ports	2.40	1.88	3.12	5.86	3.00	8.45	
ILVP-200	2.00	No Flanges	3.25	2.62	4.12	7.62	3.50	12.11	
ILVP-2002-CF		Rotatable 3.38 CF on Both Ports	3.48	2.62	4.12	7.62	3.50	12.11	
ILVP-2002-NWB		NW-50B on Both Ports	3.40	2.62	4.12	7.62	3.50	12.11	
ILVP-2002-ASA		Rotatable ASA-5-200R on Both Ports	3.50	2.62	4.12	7.62	3.50	12.11	
ILVP-250	2.50	No Flanges	3.00	3.12	4.93	9.11	4.00	12.03	
ILVP-2502-CF		Rotatable 4.50 CF on Both Ports	3.38	3.12	4.93	9.11	4.00	12.03	
ILVP-2502-ISO		ISO-63-250-OF on Both Ports	3.25	3.12	4.93	9.11	4.00	12.03	
ILVP-2502-ASA		Rotatable ASA-5-250R on Both Ports	3.25	3.12	4.93	9.11	4.00	12.03	
ILVP-300	3.00	No Flanges	3.25	3.68	5.62	9.98	4.50	13.38	
ILVP-3002-CF		Rotatable 4.62 CF on Both Ports	3.53	3.68	5.62	9.98	4.50	13.38	
ILVP-3002-ISO		ISO-80-300-OF on Both Ports	3.50	3.68	5.62	9.98	4.50	13.38	
ILVP-3002-ASA		Rotatable ASA-6-300R on Both Ports	3.50	3.68	5.62	9.98	4.50	13.38	
ILVP-400	4.00	No Flanges	4.22	4.88	7.38	12.83	6.50	18.27	
ILVP-4002-CF		Rotatable 6.00 CF on Both Ports	4.66	4.88	7.38	12.83	6.50	18.27	
ILVP-4002-ISO		ISO-100-400-OF on Both Ports	4.47	4.88	7.38	12.83	6.50	18.27	
ILVP-4002-ASA		Rotatable ASA-7.5-400R on Both Ports	4.47	4.88	7.38	12.83	6.50	18.27	

Dimensions in inches



Specifications

- Electropolished 304 stainless steel body
- 15 micron air filter on air cylinder exhaust
- .38" to 6.0" inch port ODs
- .38" to 2.0" OD: air-to-open, spring-to-close
- Over 2" OD: air-to-open, air-to-close
- 60 to 80 psig operating air pressure
- Bakeable to 204° C intermittent
- Viton Seal Bonnet: 10⁻⁹ Torr vacuum rating, CF, NW, ISO and ASA flanges

Options

- O-rings
- Air Solenoids
- Micro-Switch
- Actuators
- Heater Jackets

ILVP O-Ring Kits

Port OD	Model Number	Price
.38-1.0	ESVP-075-95	
1.5	ESVP-150-95	
2.0	ESVP-200-95	
2.5	ESVP-250-95	
3.0	ESVP-300-95	
4.0	ESVP-400-95	

Dimensions in inches

Prices subject to change without notice. - International product pricing will vary.

VALVE-LIT 9/02



Pneumatically Actuated Copper Seal Bonnet In-Line Valves

Model Number	Port OD	Description	A	B	C	D	E	F	Price
CILVP-038	.38	No Flanges	1.50	.94	1.50	3.74	2.73	5.76	
CILVP-0382-CF		Rotatable 1.33 CF on Both Ports	1.60	.94	1.50	3.74	2.73	5.76	
CILVP-050	.50	No Flanges	1.50	1.00	1.62	3.88	2.73	5.89	
CILVP-0502-CF		Rotatable 1.33 CF on Both Ports	1.60	1.00	1.62	3.88	2.73	5.89	
CILVP-075	.75	No Flanges	2.00	1.12	1.87	4.12	2.73	6.14	
CILVP-0752-CF		Rotatable 1.33 CF on Both Ports	2.50	1.12	1.87	4.12	2.73	6.14	
CILVP-100	1.00	No Flanges	1.88	1.37	2.25	4.38	2.73	6.39	
CILVP-1002-CF		Rotatable 2.12 CF on Both Ports	2.05	1.37	2.25	4.38	2.73	6.39	
CILVP-150	1.50	No Flanges	2.25	1.88	3.12	5.86	3.25	8.44	
CILVP-1502-CF		Rotatable 2.75 CF on Both Ports	2.46	1.88	3.12	5.86	3.25	8.44	
CILVP-200	2.00	No Flanges	3.25	2.62	4.12	7.50	4.05	12.11	
CILVP-2002-CF		Rotatable 3.38 CF on Both Ports	3.48	2.62	4.12	7.50	4.05	12.11	
CILVP-250	2.50	No Flanges	3.00	3.12	4.93	9.11	4.61	12.03	
CILVP-2502-CF		Rotatable 4.50 CF on Both Ports	3.38	3.12	4.93	9.11	4.61	12.03	
CILVP-300	3.00	No Flanges	3.25	3.62	5.55	9.98	5.62	13.38	
CILVP-3002-CF		Rotatable 4.62 CF on Both Ports	3.53	3.62	5.55	9.98	5.62	13.38	
CILVP-400	4.00	No Flanges	4.22	4.88	7.38	12.83	6.73	18.27	
CILVP-4002-CF		Rotatable 6.00 CF on Both Ports	4.66	4.88	7.38	12.83	6.73	18.27	

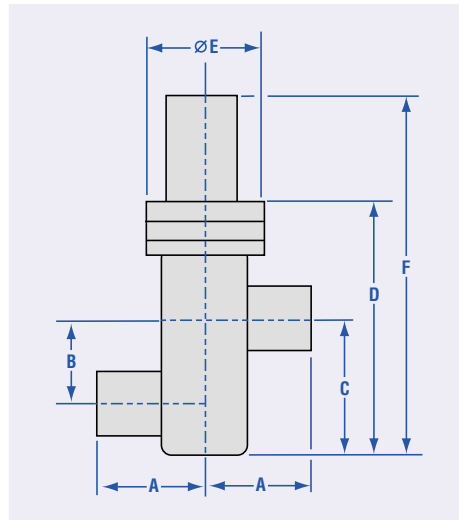
Dimensions in inches

Specifications

- Electropolished 304 stainless steel body
- 15 micron air filter on air cylinder exhaust
- .38" to 6.0" inch port ODs
- .38" to 2.0" OD: air-to-open, spring-to-close
- Over 2" OD: air-to-open, air-to-close
- 60 to 80 psig operating air pressure
- Bakeable to 204° C intermittent
- Copper Seal Bonnet: 10⁻¹⁰ Torr vacuum rating, CF flanges

Options

- O-rings
- Air Solenoids
- Micro-Switch
- Actuators
- Heater Jackets



CILVP O-Ring and Gasket Kits

Port OD	Model Number	Price
.38-1.0	CSVP-075-95	
1.5	CSVP-150-95	
2.0	CSVP-200-95	
2.5	CSVP-250-95	
3.0	CSVP-300-95	
4.0	CSVP-400-95	

Dimensions in inches

Prices subject to change without notice. - International product pricing will vary.

VALVE-LIT 9/02



Manually Operated Viton Seal Tee Valves

Model Number	Port OD	Description	A	B	C	D	Price
ESV-038T	.38	No Flanges	1.50	4.06	4.44	2.25	
ESV-0383T-CF		Rotatable 1.33 CF on All Ports	1.60	4.16	4.54	2.25	
ESV-0383T-NWB		NW-10B on All Ports	1.65	4.21	4.59	2.25	
ESV-050T	.50	No Flanges	1.50	4.06	4.56	2.25	
ESV-0503T-CF		Rotatable 1.33 CF on All Ports	1.60	4.16	4.66	2.25	
ESV-0503T-NWB		NW-10B on All Ports	1.65	4.21	4.71	2.25	
ESV-075T	.75	No Flanges	2.00	4.56	5.31	2.25	
ESV-0753T-CF		Rotatable 1.33 CF on All Ports	2.50	5.06	5.81	2.25	
ESV-0753T-NWB		NW-16B on All Ports	2.15	4.71	5.46	2.25	
ESV-100T	1.00	No Flanges	1.88	4.32	5.32	2.25	
ESV-1003T-CF		Rotatable 2.12 CF on All Ports	2.05	4.49	5.49	2.25	
ESV-1003T-NWB		NW-25B on All Ports	2.03	4.47	5.47	2.25	
ESV-150T	1.50	No Flanges	2.25	5.63	7.13	3.00	
ESV-1503T-CF		Rotatable 2.75 CF on All Ports	2.46	5.84	7.34	3.00	
ESV-1503T-NWB		NW-40B on All Ports	2.40	5.78	7.28	3.00	
ESV-200T	2.00	No Flanges	3.25	7.85	9.85	3.50	
ESV-2003T-CF		Rotatable 3.38 CF on All Ports	3.48	8.08	10.08	3.50	
ESV-2003T-NWB		NW-50B on All Ports	3.40	8.00	10.00	3.50	
ESV-2003T-ASA		Rotatable ASA-5-200R on All Ports	3.25	8.10	10.10	3.50	
ESV-250T	2.50	No Flanges	3.00	8.27	10.77	4.00	
ESV-2503T-CF		Rotatable 4.50 CF on All Ports	3.38	8.65	11.15	4.00	
ESV-2503T-ISO		ISO-63-250-OF on All Ports	3.25	8.52	11.02	4.00	
ESV-2503T-ASA		Rotatable ASA-5-250R on All Ports	3.25	8.52	11.02	4.00	
ESV-300T	3.00	No Flanges	3.25	8.68	11.68	4.50	
ESV-3003T-CF		Rotatable 4.62 CF on All Ports	3.53	8.96	11.96	4.50	
ESV-3003T-ISO		ISO-80-300-OF on All Ports	3.50	8.93	11.93	4.50	
ESV-3003T-ASA		Rotatable ASA-6-300R on All Ports	3.50	8.93	11.93	4.50	

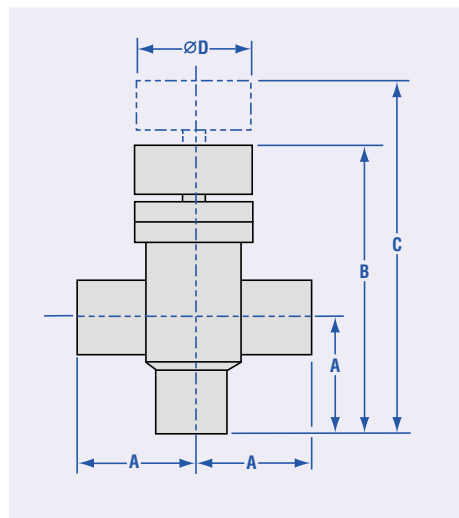
Dimensions in inches

Specifications

- Electropolished 304 stainless steel body
- Vacuum port on bottom
- .38 to 3 inch port ODs
- Self-lubricating bronze nut
- Acme threads for fewer turns
- Bakeable to 204° C intermittent
- Viton® Seal Bonnet:
10⁻⁹ Torr vacuum rating,
CF, NW, ISO and ASA flanges

Options

- O-rings
- Heater Jackets



ESV-T O-Ring Kits

Port OD	Model Number	Price
.38-1.0	ESV-075-95	
1.5	ESV-150-95	
2.0	ESV-200-95	
2.5	ESV-250-95	
3.0	ESV-300-95	

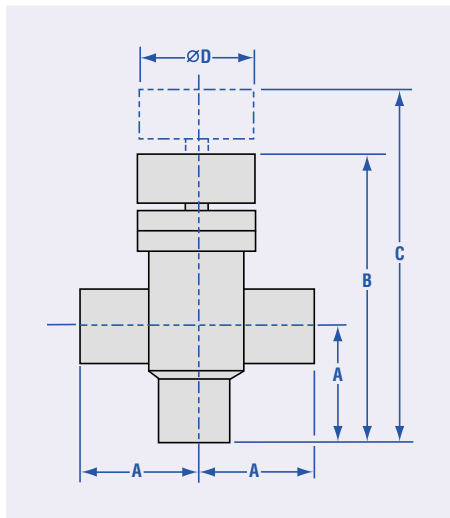
Dimensions in inches



Manually Operated Copper Seal Bonnet Tee Valves

Model Number	Port OD	Description	A	B	C	D	Price
CSV-038T	.38	No Flanges	1.50	4.06	4.44	2.73	
CSV-0383T-CF	1.33	Rotatable CF on All Ports	1.60	4.16	4.54	2.73	
CSV-050T	.50	No Flanges	1.50	4.06	4.56	2.73	
CSV-0503T-CF	1.33	Rotatable CF on All Ports	1.60	4.16	4.66	2.73	
CSV-075T	.75	No Flanges	2.00	4.56	5.31	2.73	
CSV-0753T-CF	1.33	Rotatable CF on All Ports	2.50	5.06	5.81	2.73	
CSV-100T	1.00	No Flanges	1.88	4.32	5.32	2.73	
CSV-1003T-CF	2.12	Rotatable CF on All Ports	2.05	4.49	5.49	2.73	
CSV-150T	1.50	No Flanges	2.25	5.63	7.13	3.25	
CSV-1503T-CF	2.75	Rotatable CF on All Ports	2.46	5.84	7.34	3.25	
CSV-200T	2.00	No Flanges	3.25	7.85	9.85	4.05	
CSV-2003T-CF	3.38	Rotatable CF on All Ports	3.48	8.08	10.08	4.05	
CSV-250T	2.50	No Flanges	3.00	8.27	10.77	4.61	
CSV-2503T-CF	4.50	Rotatable CF on All Ports	3.38	8.65	11.15	4.61	
CSV-300T	3.00	No Flanges	3.25	8.68	11.68	5.62	
CSV-3003T-CF	4.62	Rotatable CF on All Ports	3.53	8.96	11.96	5.62	

Dimensions in inches



Specifications

- Electropolished 304 stainless steel body
- Vacuum port on bottom
- .38 to 3 inch port ODs
- Self-lubricating bronze nut
- Acme threads for fewer turns
- Bakeable to 204° C intermittent
- Copper Seal Bonnet:
10⁻¹⁰ Torr vacuum rating,
CF flanges

Options

- O-rings
- Heater Jackets

CSV-T O-Ring & Gasket Kits

Port OD	Model Number	Price
.38-1.0	CSV-075-95	
1.5	CSV-150-95	
2.0	CSV-200-95	
2.5	CSV-250-95	
3.0	CSV-300-95	

Dimensions in inches



Pneumatically Actuated Viton Seal Tee Valves

Model Number	Port OD	Description	A	B	C	D	Price
ESVP-038T	.38	No Flanges	1.50	3.62	5.77	2.25	
ESVP-0383T-CF		Rotatable 1.33 CF on All Ports	1.60	3.67	5.87	2.25	
ESVP-0383T-NWB		NW-10B on All Ports	1.65	3.77	5.92	2.25	
ESVP-050T	.50	No Flanges	1.50	3.62	5.77	2.25	
ESVP-0503T-CF		Rotatable 1.33 CF on All Ports	1.60	3.67	5.87	2.25	
ESVP-0503T-NWB		NW-10B on All Ports	1.65	3.77	5.92	2.25	
ESVP-075T	.75	No Flanges	2.00	4.12	6.26	2.25	
ESVP-0753T-CF		Rotatable 1.33 CF on All Ports	2.50	4.62	6.76	2.25	
ESVP-0753T-NWB		NW-16B on All Ports	2.15	4.27	6.41	2.25	
ESVP-100T	1.00	No Flanges	1.88	3.88	6.02	2.25	
ESVP-1003T-CF		Rotatable 2.12 CF on All Ports	2.05	4.05	6.19	2.25	
ESVP-1003T-NWB		NW-25B on All Ports	2.03	4.03	6.17	2.25	
ESVP-150T	1.50	No Flanges	2.25	4.98	7.56	3.00	
ESVP-1503T-CF		Rotatable 2.75 CF on All Ports	2.46	5.19	7.77	3.00	
ESVP-1503T-NWB		NW-40B on All Ports	2.40	5.13	7.71	3.00	
ESVP-200T	2.00	No Flanges	3.25	6.74	11.23	3.50	
ESVP-2003T-CF		Rotatable 3.38 CF on All Ports	3.48	6.97	11.46	3.50	
ESVP-2003T-NWB		NW-50B on All Ports	3.40	6.89	11.38	3.50	
ESVP-2003T-ASA		Rotatable ASA-5-200R on All Ports	3.50	6.99	11.48	3.50	
ESVP-250T	2.50	No Flanges	3.00	7.18	10.10	4.00	
ESVP-2503T-CF		Rotatable 4.50 CF on All Ports	3.38	7.56	10.48	4.00	
ESVP-2503T-ISO		ISO-63-250-OF on All Ports	3.25	7.43	10.35	4.00	
ESVP-2503T-ASA		Rotatable ASA-5-250R on All Ports	3.25	7.43	10.35	4.00	
ESVP-300T	3.00	No Flanges	3.25	7.62	11.00	4.50	
ESVP-3003T-CF		Rotatable 4.62 CF on All Ports	3.53	7.90	11.28	4.50	
ESVP-3003T-ISO		ISO-80-300-OF on All Ports	3.50	7.87	11.25	4.50	
ESVP-3003T-ASA		Rotatable ASA-6-300R on All Ports	3.50	7.87	11.25	4.50	
ESVP-400T	4.00	No Flanges	4.22	9.55	14.99	6.50	
ESVP-4003T-CF		Rotatable 6.00 CF on All Ports	4.66	9.99	15.43	6.50	
ESVP-4003T-ISO		ISO-100-400-OF on All Ports	4.47	9.80	15.24	6.50	
ESVP-4003T-ASA		Rotatable ASA-7.5-400R on All Ports	4.47	9.80	15.24	6.50	

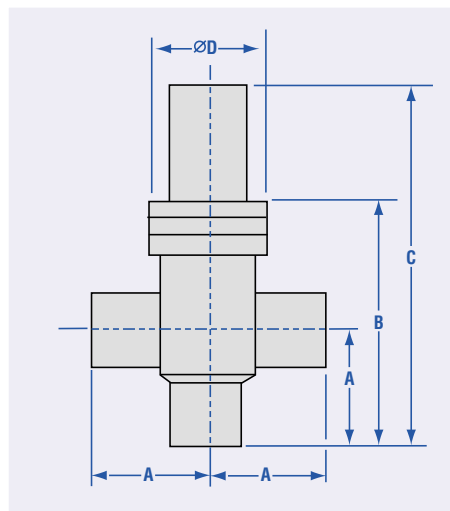
Dimensions in inches

Specifications

- Electropolished 304 stainless steel body
- 15 micron air filter on air cylinder exhaust
- Vacuum port on bottom
- .38 to 6 inch port ODs
- .38 to 2 inch ODs: air-to-open, spring-to-close
- 2 to 4 inch ODs: air-to-open, air-to-close
- 60 to 80 psig operating air pressure
- Bakeable to 204° C intermittent
- Viton Seal Bonnet: 10⁻⁹ Torr vacuum rating, CF, NW, ISO and ASA flanges

Options

- O-rings
- Air Solenoids
- Micro-Switch
- Actuators
- Heater Jackets



ESVP-T O-Ring Kits

Port OD	Model Number	Price
.38-1.0	ESVP-075-95	
1.5	ESVP-150-95	
2.0	ESVP-200-95	
2.5	ESVP-250-95	
3.0	ESVP-300-95	
4.0	ESVP-400-95	

Dimensions in inches

Prices subject to change without notice. - International product pricing will vary.

VALVE-LIT 9/02



Pneumatically Actuated Copper Seal Bonnet Tee Valves

Model Number	Port OD	Description	A	B	C	D	Price
CSVP-038T	.38	No Flanges	1.50	3.75	5.77	2.73	
CSVP-0383T-CF		Rotatable 1.33 CF on All Ports	1.60	3.85	5.82	2.73	
CSVP-050T	.50	No Flanges	1.50	3.75	5.77	2.73	
CSVP-0503T-CF		Rotatable 1.33 CF on All Ports	1.60	3.85	5.82	2.73	
CSVP-075T	.75	No Flanges	2.00	4.25	6.26	2.73	
CSVP-0753T-CF		Rotatable 1.33 CF on All Ports	2.50	4.75	6.76	2.73	
CSVP-100T	1.00	No Flanges	1.88	4.00	6.02	2.73	
CSVP-1003T-CF		Rotatable 2.12 CF on All Ports	2.05	4.17	6.19	2.73	
CSVP-150T	1.50	No Flanges	2.25	4.98	7.56	3.25	
CSVP-1503T-CF		Rotatable 2.75 CF on All Ports	2.46	5.19	7.77	3.25	
CSVP-200T	2.00	No Flanges	3.25	6.62	11.23	4.05	
CSVP-2003T-CF		Rotatable 3.38 CF on All Ports	3.48	6.85	10.58	4.05	
CSVP-250T	2.50	No Flanges	3.00	7.18	10.10	4.61	
CSVP-2503T-CF		Rotatable 4.50 CF on All Ports	3.38	7.56	10.48	4.61	
CSVP-300T	3.00	No Flanges	3.25	7.62	11.00	5.62	
CSVP-3003T-CF		Rotatable 4.62 CF on All Ports	3.53	7.90	11.28	5.62	
CSVP-400T	4.00	No Flanges	4.22	9.55	14.99	6.73	
CSVP-4003T-CF		Rotatable 6.00 CF on All Ports	4.66	9.99	15.43	6.73	

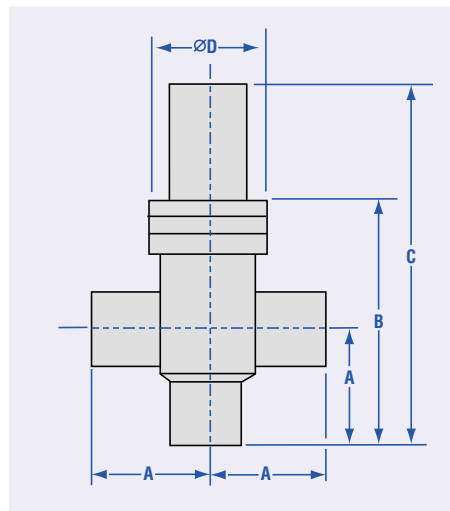
Dimensions in inches

Specifications

- Electropolished 304 stainless steel body
- 15 micron air filter on air cylinder exhaust
- Vacuum port on bottom
- .38 to 6 inch port ODs
- .38 to 2 inch ODs: air-to-open, spring-to-close
- 2 to 4 inch ODs: air-to-open, air-to-close
- 60 to 80 psig operating air pressure
- Bakeable to 204° C intermittent
- Copper Seal Bonnet: 10⁻¹⁰ Torr vacuum rating, CF flanges

Options

- O-rings
- Air Solenoids
- Micro-Switch
- Actuators
- Heater Jackets



CSVP-T O-Ring & Gasket Kits

Port OD	Model Number	Price
.38-1.0	CSVP-075-95	
1.5	CSVP-150-95	
2.0	CSVP-200-95	
2.5	CSVP-250-95	
3.0	CSVP-300-95	
4.0	CSVP-400-95	

Dimensions in inches



Manually Operated Viton Seal Straight-Through Valves

Model Number	Port ID*	Port OD	Description	A	B	C	D	Price
STV-075	.65	.75	No Flanges	5.00	3.30	4.50	2.25	
STV-0752-CF	.65	.75	Rotatable 1.33 CF on Both Ports	6.00	3.30	4.50	2.25	
STV-0752-NWB	.65	.75	NW-16B on Both Ports	5.30	3.30	4.50	2.25	
STV-112	1.00	1.12	No Flanges	5.50	3.86	5.15	3.00	
STV-1122-CF	1.00	1.12	Rotatable 2.12 CF on Both Ports	5.83	3.86	5.15	3.00	
STV-1122-NWB	1.00	1.12	NW-40B on Both Ports	5.80	3.86	5.15	3.00	
STV-150	1.38	1.50	No Flanges	7.00	5.47	7.69	3.50	
STV-1502-CF	1.38	1.50	Rotatable 2.75 CF on Both Ports	7.42	5.47	7.69	3.50	
STV-1502-NWB	1.38	1.50	NW-25B on Both Ports	7.30	5.47	7.69	3.50	

* Full opening straight-through diameter

Dimensions in inches

Manually Operated Copper Seal Bonnet Straight-Through Valves

Model Number	Port ID*	Port OD	Description	A	B	C	D	Price
CSTV-075	.65	.75	No Flanges	5.00	3.51	4.71	2.73	
CSTV-0752-CF	.65	.75	Rotatable 1.33 CF on Both Ports	6.00	3.51	4.71	2.73	
CSTV-150	1.38	1.50	No Flanges	7.00	5.47	7.69	4.05	
CSTV-1502-CF	1.38	1.50	Rotatable 2.75 CF on Both Ports	7.42	5.47	7.69	4.05	

* Full opening straight-through diameter

Dimensions in inches

Specifications

- Electropolished 304 stainless steel body
- Full-opening, straight-through ID
- .75, 1.13 and 1.5 inch port ODs
- Self-lubricating bronze nut
- Acme threads for fewer turns
- Bakeable to 204°C intermittent
- Viton Seal Bonnet: 10⁻⁹ Torr vacuum rating, CF and NW flanges
- Copper Seal Bonnet: 10⁻¹⁰ Torr vacuum rating, CF flanges

Options

- O-rings
- Heater Jackets

STV O-Ring Kits

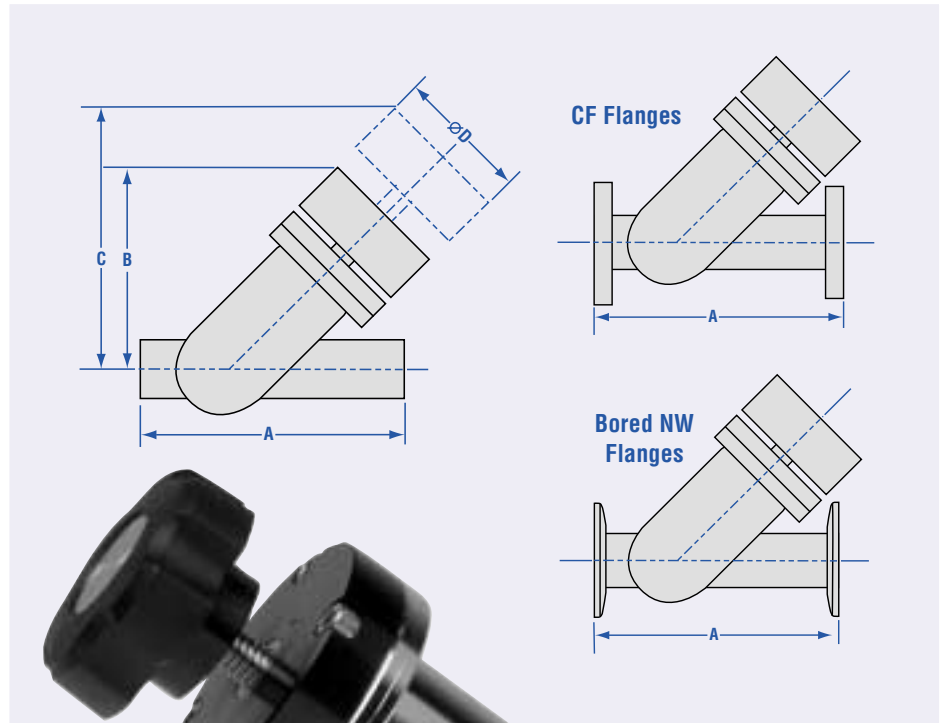
Port OD	Model Number	Price
.75	ESV-075-95	
1.12	STV-112-95	
1.50	STV-150-95	

Dimensions in inches

CSTV O-Ring & Gasket Kits

Port OD	Model Number	Price
.75	CSV-075-95	
1.50	CSTV-150-95	

Dimensions in inches



Prices subject to change without notice. - International product pricing will vary.

VALVE-LIT 9/02



Pneumatically Actuated Viton Seal Straight-Through Valves

Model Number	Port ID*	Port OD	Description	A	B	C	Price
STVP-075	.65	.75	No Flanges	5.00	3.92	2.25	
STVP-0752-CF	.65	.75	Rotatable 1.33 CF on Both Ports	6.00	3.92	2.25	
STVP-0752-NWB	.65	.75	NW-16B on Both Ports	5.30	3.92	2.25	
STVP-112	1.00	1.12	No Flanges	5.50	5.10	3.00	
STVP-1122-CF	1.00	1.12	Rotatable 2.12 CF on Both Ports	5.83	5.10	3.00	
STVP-1122-NWB	1.00	1.12	NW-40B on Both Ports	5.80	5.10	3.00	
STVP-150	1.38	1.50	No Flanges	7.00	6.11	3.50	
STVP-1502-CF	1.38	1.50	Rotatable 2.75 CF on Both Ports	7.42	6.11	3.50	
STVP-1502-NWB	1.38	1.50	NW-40B on Both Ports	7.30	6.11	3.50	

* Full opening straight-through diameter

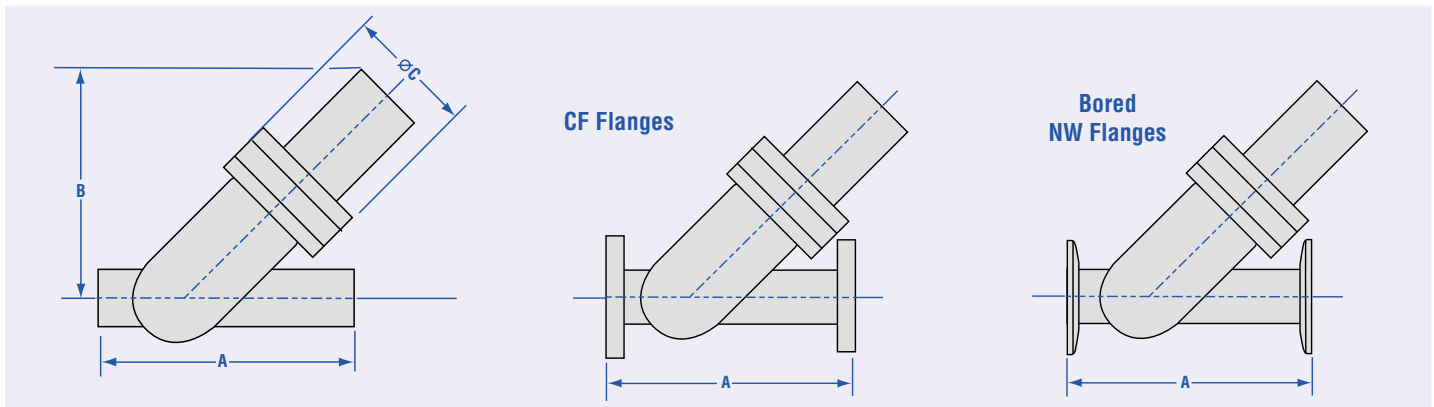
Dimensions in inches

Pneumatically Actuated Copper Seal Bonnet Straight-Through Valves

Model Number	Port ID*	Port OD	Description	A	B	C	Price
CSTVP-075	.65	.75	No Flanges	5.00	3.92	2.73	
CSTVP-0752-CF	.65	.75	Rotatable 1.33 CF on Both Ports	6.00	3.92	2.73	
CSTVP-150	1.38	1.50	No Flanges	7.00	6.11	4.05	
CSTVP-1502-CF	1.38	1.50	Rotatable 2.75 CF on Both Ports	7.42	6.11	4.05	

* Full opening straight-through diameter

Dimensions in inches



Specifications

- Electropolished 304 stainless steel body
- Full-opening, straight-through ID
- .75, 1.13 and 1.5 inch ODs
- .75 inch OD: air-to-open, spring-to-close
- 1.13 and 1.5 inch OD: air-to-open/close
- 60 to 80 psig operating air pressure
- Bakeable to 204°C intermittent
- Viton Seal Bonnet: 10⁻⁹ Torr vacuum rating, CF and NW flanges
- Copper Seal Bonnet: 10⁻¹⁰ Torr vacuum rating, CF flanges

Options

- O-rings
- Air Solenoids
- Micro-switch
- Actuators
- Heater Jackets

CSTVP O-Ring & Gasket Kits

Port OD	Model Number	Price
.75	CSVP-075-95	
1.50	CSTVP-150-95	

Dimensions in inches

STVP O-Ring Kits

Port OD	Model Number	Price
.75	ESVP-075-95	
1.12	STVP-112-95	
1.50	STVP-150-95	

Dimensions in inches

Prices subject to change without notice. - International product pricing will vary.

VALVE-LIT 9/02



Nor-Cal's new series of metal seal angle valves are intended for use in UHV or cryogenic applications where temperature extremes preclude the use of our elastomer seal valves. Approved for use in beamline facilities, these valves have a temperature operating range from 400°C to -250°C.

Maximum temperature bakeouts may require poppet seal replacement after 50 cycles, while hundreds of cycles are possible with moderate bakeouts. A dial indicator at the top of the valve indicates the proper torque for closure and also when the seal should be replaced.

The poppet seal is easily replaced with a slotted screw driver. After seal replacement the valve must be torqued to a higher value than during normal operation to make it seat. (See torque specifications table on this page) After closing the valve to its normal torque value loosen the set screw below the closure nut, rotate the indicator to the furthest counter-clockwise line on top of the valve and retighten the set screw. The valve may be closed to this mark indefinitely. Periodic checks with a torque wrench will indicate seat wear and the proper mark to use for alignment. When the indicator has reached the last mark we recommend seal replacement. Do not exceed the maximum torque specifications.

Specifications

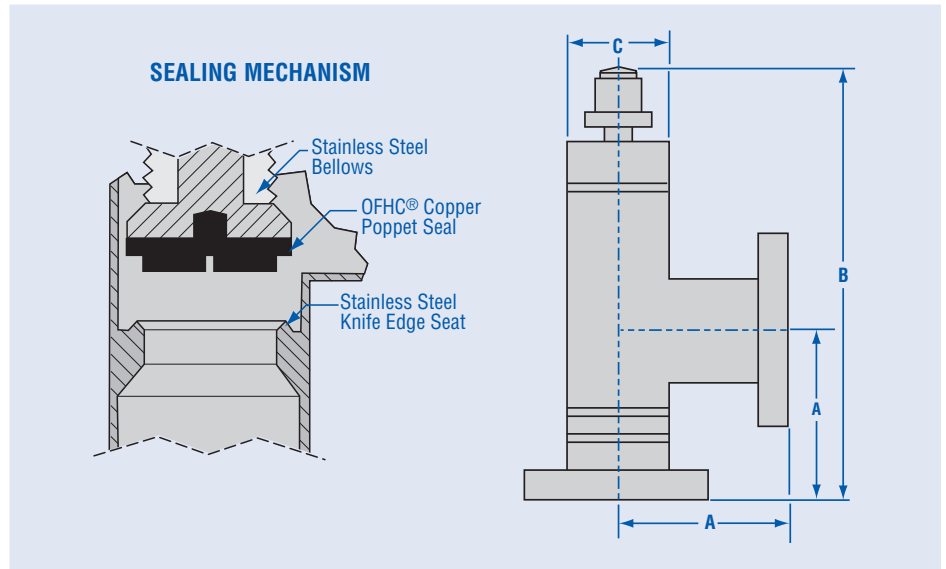
- Bakeable to 400°C open, 300°C closed
- Operable at cryogenic temperatures
- Vacuum rated to below 10⁻¹⁰ Torr
- Beamline approved
- All stainless steel construction
- Electropolished surfaces
- Extended life stainless steel bellows
- Easily replaceable copper poppet seal
- Pulled port body for higher conductance
- Clean room assembled
- Leak rate 10⁻¹⁰ std. cc./sec. or less
- Dial indicator for closure
- Heater Jackets available

Manually Operated All-Metal Angle Valves

Model Number	Port OD	Description	(Open)			Price
			A	B	C	
AMV-0752-CF	.75	Rotatable 1.33 CF on Both Ports	1.50	5.40	1.50	\$ 495.00
AMV-1502-CF	1.50	Rotatable 2.75 CF on Both Ports	2.45	6.87	1.50	\$ 520.00

Port lengths that match other manufacturers' products are available upon request.

Dimensions in inches



Torque Specifications (Inch Pounds)

Model Number	Seating	Normal	Maximum
AMV-075-CF	60	50	120
AMV-150-CF	120	100	200

Replacement Poppet Seals

Port OD	Model Number
.75	AMV-075-95
1.50	AMV-150-95

Dimensions in inches

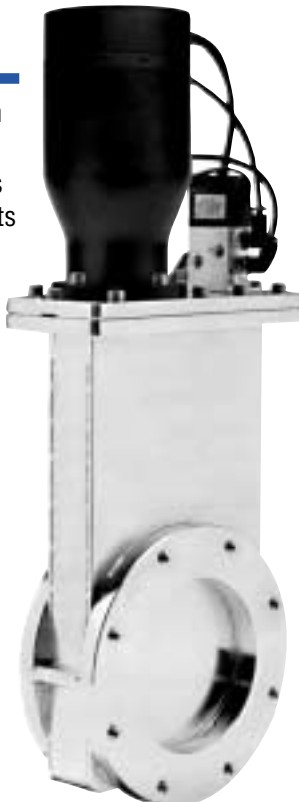


Specifications

- 304 SS vacuum furnace brazed body
- Electropolished inside and out
- Welded AM-350 bellows
- Viton gate O-ring, standard
- 1.5 to 12 inch nominal IDs
- Helium leak rate 2×10^{-9} std. cc./sec.
- Maximum Pressure Differential:
At Opening:
4 inch ID or smaller:
760 Torr on gate side,
20 torr on carriage side
Greater than 4 inch ID:
20 Torr either direction
Closed: 760 Torr in either direction
- Viton Seal Bonnet: 10^{-9} Torr vacuum rating, Bakeable to 150°C
- Copper Seal Bonnet: 10^{-10} Torr vacuum rating, Bakeable to 200°C with CF flanges and gate in open position
- Pneumatically Actuated: Normally closed 120V, 50/60Hz air solenoid, standard, Maximum 80 psig operating air pressure, standard. (*Higher operating pressures available upon request*) Reed-switch position indicator, standard
- Manually operated:
Acme threads for fewer turns

Options

- Micro-switch
- O-rings
- Air Solenoids
- Heater Jackets



General Information

Nor-Cal stainless steel gate valves share with our poppet valves the innovative design, highest grade materials and superior workmanship that has made us a major supplier of valves to the vacuum industry. The estimated service interval on these valves is 100,000 cycles, depending on the application.

Our gate valves have an ultra-slim profile which makes them perfect for applications where space is limited, and their smaller volume results in lower outgassing and faster pumpdown. Larger sizes have a unique feature in the actuator which dampens the vibration which can arise when the gate is opened. This makes these valves ideal for semiconductor and other vibration sensitive processes. The carriage assembly and actuator can be removed without disassembling the body from the system for easy maintenance. The 304 stainless steel bodies are vacuum furnace brazed to 1100°C at 10^{-6} Torr before being electropolished inside and out. The welded AM-350 bellows have a short stroke for a longer cycle life.

Nor-Cal gate valves are available with NW (ISO-KF), ISO (clamp and bolt type), CF and ASA flanges in port sizes from 1.5 to 12 inches. Larger sizes are available upon request. Choose from manual or pneumatic actuation and Viton® or copper seal bonnet.

Air Solenoid Options

All pneumatic gate valves come standard with a 4-Way, 120V, 50/60Hz air solenoid. Solenoids are mounted on all Viton seal bonnet gate valves with four inch ID and larger. Solenoids for Viton seal bonnet gate valves with under four inch ID and all sizes of copper seal gate valves are shipped unmounted with the valve. Solenoids for these valves can be provided mounted with an optional mounting bracket for an additional \$55.00. Specify when ordering. Specify other Air solenoid options by adding the correct suffix to model number. See chart below. Example: GVMP-1502-CF-S22. Air Solenoids can be ordered separately. Call for price and part number.

Option	Description	Price
(standard)	4-way, 120V AC, 60 Hz	
S22	4-way, 24V DC	
S32	4-way, 240V AC, 50/60 Hz	
S42	4-way, 24V AC, 50/60 Hz	

Dimensions in inches

Bakeability

Nor-Cal gate valves with Viton® seal bonnet and gate and standard Reed-switch position indicators are bakeable to 150°C, as long as the actuator is not baked above 60°C. A gate valve with copper seal bonnet, Viton® gate and micro-switch option can be baked to 200°C, except for the actuator. With the air solenoid and position indicators removed, a copper seal bonnet valve with high temperature Kalrez® gate O-ring can be baked to 250°C with the gate in the open position. Silicone heater jackets for bakeouts up to 200°C can be provided. Please ask your Nor-Cal representative for pricing.

How to Specify Options

One or more options can be ordered by adding the option suffix to the basic valve model number. Please add the option suffixes in the following order:

1. **Micro-switch:** "-M" (Add \$300 to price)
2. **O-ring:** "-KT" = high temp Kalrez
"-KC" = chemical resistant Kalrez
"-CR" = Chemraz
"-S" = Silicone
3. **Air Solenoid:** (*See table below*)

Examples of model numbers with options:

GVP-4002-ISO-M-S32
GVMP-4002-CF-KT-S22



Manually Operated Viton Seal Gate Valves

Nom ID	Model Number	Flange Type	Conductance (molecular-l/sec.)	A	B	C	D	E	F	G	Price
1.5	GV-1502-NW	NW-40	130	4.69	3.40	1.99	2.00	3.61	3.31	2.45	
	GV-1502-CF	2.75 CF	130	4.69	3.40	2.03	2.00	3.61	3.31	2.45	
2.0	GV-2002-NW	NW-50	220	5.60	4.12	1.99	2.00	3.61	3.81	2.96	
	GV-2002-CF	3.38 CF	300	5.60	4.12	2.28	2.00	3.61	3.81	2.96	
2.5	GV-2502-CF	4.50 CF	520	6.50	4.81	2.40	2.00	3.61	4.37	3.52	
	GV-2502-ASA	ASA-6*	610	6.50	4.81	2.03	2.00	3.61	4.37	3.52	
	GV-2502-ISO	ISO-63	610	6.50	4.81	2.03	2.00	3.61	4.37	3.52	
	GV-2502-ISO-OF	ISO-63-OF	320	6.50	4.81	3.46	2.00	3.61	4.37	3.52	
3.0	GV-3002-CF	4.62 CF	840	7.70	5.77	2.53	2.00	3.61	4.94	4.28	
	GV-3002-ASA	ASA-7.5*	1070	7.70	5.77	2.03	2.00	3.61	4.94	4.28	
	GV-3002-ISO	ISO-80	1070	7.70	5.77	1.97	2.00	3.61	4.94	4.28	
	GV-3002-ISO-OF	ISO-80-OF	550	7.70	5.77	3.84	2.00	3.61	4.94	4.28	
4.0	GV-4002-CF	6.00 CF	1700	10.76	8.13	2.97	3.11	7.90	7.00	5.65	
	GV-4002-ASA	ASA-9*	2100	10.76	8.13	2.41	3.11	7.90	7.00	5.65	
	GV-4002-ISO	ISO-100	2100	10.76	8.13	2.41	3.11	7.90	7.00	5.65	
	GV-4002-ISO-OF	ISO-100-OF	1900	10.76	8.13	4.25	3.11	7.90	7.00	5.65	
6.0	GV-6002-CF	8.00 CF	5400	14.07	10.64	3.17	3.11	7.90	8.75	7.55	
	GV-6002-ASA	ASA-11*	7100	14.07	10.64	2.41	3.11	7.90	8.75	7.55	
	GV-6002-ISO	ISO-160	7100	14.07	10.64	2.36	3.11	7.90	8.75	7.55	
	GV-6002-ISO-OF	ISO-160-OF	4000	14.07	10.64	4.25	3.11	7.90	8.75	7.55	
8.0	GV-8002-CF	10.00 CF	12200	18.42	13.93	3.35	3.11	7.90	11.25	10.02	
	GV-8002-ASA	ASA-11*	14500	18.42	13.93	2.76	3.11	7.90	11.25	10.02	
	GV-8002-ISO	ISO-200	15200	18.42	13.93	2.66	3.11	7.90	11.25	10.02	
	GV-8002-ISO-OF	ISO-200-OF	9500	18.42	13.93	4.25	3.11	7.90	11.25	10.02	
10.0	GV-10002-CF	12.00 CF	24900	24.04	18.30	3.65	8.98	12.00	13.44	11.99	
	GV-10002-ASA	ASA-16*	24800	24.04	18.30	3.15	8.98	12.00	13.44	11.99	
	GV-10002-ISO	ISO-250	26900	24.04	18.30	3.15	8.98	12.00	13.44	11.99	
	GV-10002-ISO-OF	ISO-250-OF	15400	24.04	18.30	5.51	8.98	12.00	13.44	11.99	
12.0	GV-12002-CF	14.00 CF	34600	28.89	22.03	3.89	8.98	12.00	15.90	14.28	
	GV-12002-ASA	ASA-16*	42800	28.89	22.03	3.15	8.98	12.00	15.90	14.28	
	GV-12002-ISO	ISO-320	42800	28.89	22.03	3.15	8.98	12.00	15.90	14.28	
	GV-12002-ISO-OF	ISO-320-OF	24500	28.89	22.03	4.67	8.98	12.00	15.90	14.28	

*Without O-ring grooves. Grooves can be provided on request.

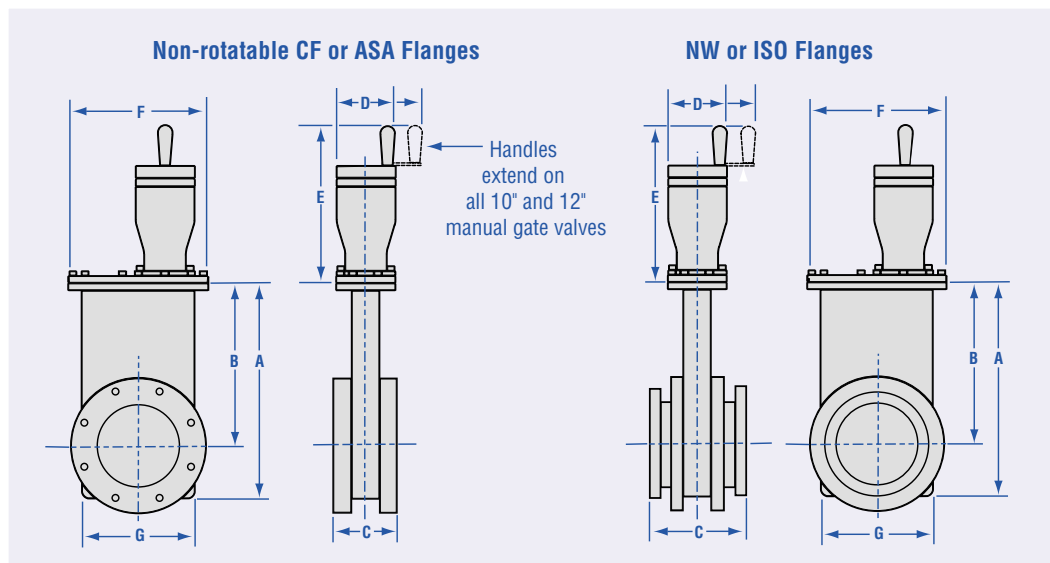
Dimensions in inches.

Specifications

- 1.5 to 12 inch nom. IDs
- Acme threads for fewer turns
- Viton Seal Bonnet: 10⁻⁹ Torr vacuum rating, Bakeable to 150°C, CF, NW, ISO and ASA flanges

Options

- O-rings
- Heater Jackets



Prices subject to change without notice. - International product pricing will vary.

VALVE-LIT 9/02



Manually Operated Copper Seal Bonnet Gate Valves

Nom ID	Model Number	Flange Type	Conductance (molecular-l/sec.)	A	B	C	D	E	F	G	Price
1.5	GVM-1502-CF	2.75 CF	130	4.69	3.40	2.03	2.00	3.57	3.31	2.45	
2.0	GVM-2002-CF	3.38 CF	300	5.60	4.12	2.28	2.00	3.61	3.81	2.96	
2.5	GVM-2502-CF	4.50 CF	520	6.50	4.81	2.40	2.00	3.61	4.37	3.52	
3.0	GVM-3002-CF	4.62 CF	840	7.70	5.77	2.53	2.00	3.61	5.24	4.28	
4.0	GVM-4002-CF	6.00 CF	1700	10.76	8.13	2.97	3.11	7.90	7.00	5.65	
6.0	GVM-6002-CF	8.00 CF	5400	14.07	10.64	3.17	3.11	7.90	8.75	7.55	
8.0	GVM-8002-CF	10.00 CF	12200	18.42	13.93	3.35	3.11	7.90	11.25	10.02	
10.0	GVM-10002-CF	12.00 CF	24900	24.04	18.30	3.65	8.98	12.12	13.44	11.99	
12.0	GVM-12002-CF	14.00 CF	34600	28.89	22.03	3.89	8.98	12.12	15.90	14.28	

Larger sizes are available upon request

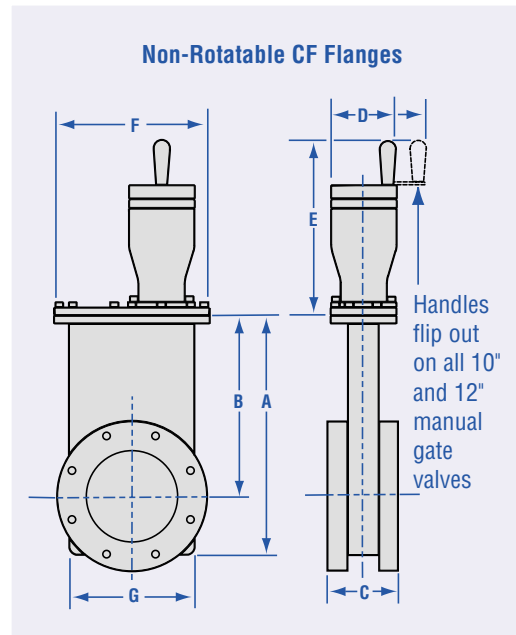
Dimensions in inches

Specifications

- 1.5 to 12 inch nominal IDs
- Acme threads for fewer turns
- Copper Seal Bonnet:
10⁻¹⁰ Torr Vacuum rating,
Bakeable to 200°C with CF flanges

Options

- O-rings
- Heater Jackets



GV O-Ring Kits

Nom. ID	Model Number	Price
1.5	GV-150-95	
2.0	GV-200-95	
2.5	GV-250-95	
3.0	GV-300-95	
4.0	GV-400-95	
6.0	GV-600-95	
8.0	GV-800-95	
10.0	GV-1000-95	
12.0	GV-1200-95	

Dimensions in inches

GVM O-Ring and Gasket Kits

Nom. ID	Model Number	Price
1.5	GVM-150-95	
2.0	GVM-200-95	
2.5	GVM-250-95	
3.0	GVM-300-95	
4.0	GVM-400-95	
6.0	GVM-600-95	
8.0	GVM-800-95	
10.0	GVM-1000-95	
12.0	GVM-1200-95	

Dimensions in inches

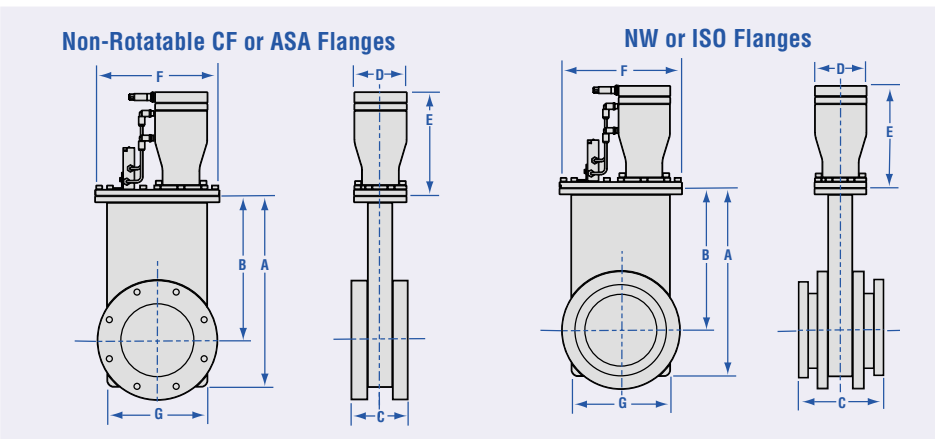


Pneumatically Actuated Viton Seal Gate Valves

Nom ID	Model Number	Flange Type	Conductance (molecular-l/sec.)	A	B	C	D	E	F	G	Price
1.5	GVP-1502-NW	NW-40	130	4.69	3.40	1.99	2.00	5.29	3.31	2.45	
	GVP-1502-CF	2.75 CF	130	4.69	3.40	2.03	2.00	5.29	3.31	2.45	
2.0	GVP-2002-NW	NW-50	220	5.60	4.12	1.99	2.00	5.29	3.81	2.96	
	GVP-2002-CF	3.38 CF	300	5.60	4.12	2.28	2.00	5.29	3.81	2.96	
2.5	GVP-2502-CF	4.50 CF	520	6.50	4.81	2.40	2.00	5.29	4.37	3.52	
	GVP-2502-ASA	ASA-6*	610	6.50	4.81	2.03	2.00	5.29	4.37	3.52	
	GVP-2502-ISO	ISO-63	610	6.50	4.81	2.03	2.00	5.29	4.37	3.52	
	GVP-2502-ISO-OF	ISO-63-OF	320	6.50	4.81	3.46	2.00	5.29	4.37	3.52	
3.0	GVP-3002-CF	4.62 CF	840	7.70	5.77	2.53	2.00	5.29	4.94	4.28	
	GVP-3002-ASA	ASA-7.5*	1070	7.70	5.77	2.03	2.00	5.29	4.94	4.28	
	GVP-3002-ISO	ISO-80	1070	7.70	5.77	1.97	2.00	5.29	4.94	4.28	
	GVP-3002-ISO-OF	ISO-80-OF	550	7.70	5.77	3.84	2.00	5.29	4.94	4.28	
4.0	GVP-4002-CF	6.00 CF	1700	10.76	8.13	2.97	2.97	6.95	7.00	5.65	
	GVP-4002-ASA	ASA-9*	2100	10.76	8.13	2.41	2.97	6.95	7.00	5.65	
	GVP-4002-ISO	ISO-100	2100	10.76	8.13	2.41	2.97	6.95	7.00	5.65	
	GVP-4002-ISO-OF	ISO-100-OF	1900	10.76	8.13	4.25	2.97	6.95	7.00	5.65	
6.0	GVP-6002-CF	8.00 CF	5400	14.07	10.64	3.17	2.97	6.95	8.75	7.55	
	GVP-6002-ASA	ASA-11*	7100	14.07	10.64	2.41	2.97	6.95	8.75	7.55	
	GVP-6002-ISO	ISO-160	7100	14.07	10.64	2.36	2.97	6.95	8.75	7.55	
	GVP-6002-ISO-OF	ISO-160-OF	4000	14.07	10.64	4.25	2.97	6.95	8.75	7.55	
8.0	GVP-8002-CF	10.00 CF	12200	18.42	13.93	3.35	2.97	6.95	11.25	10.02	
	GVP-8002-ASA	ASA-11*	14500	18.42	13.93	2.76	2.97	6.95	11.25	10.02	
	GVP-8002-ISO	ISO-200	15200	18.42	13.93	2.66	2.97	6.95	11.25	10.02	
	GVP-8002-ISO-OF	ISO-200-OF	9500	18.42	13.93	4.25	2.97	6.95	11.25	10.02	
10.0	GVP-10002-CF	12.00 CF	24900	24.04	18.30	3.65	4.75	9.47	13.44	11.99	
	GVP-10002-ASA	ASA-16*	24800	24.04	18.30	3.15	4.75	9.47	13.44	11.99	
	GVP-10002-ISO	ISO-250	26900	24.04	18.30	3.15	4.75	9.47	13.44	11.99	
	GVP-10002-ISO-OF	ISO-250-OF	15400	24.04	18.30	5.51	4.75	9.47	13.44	11.99	
12.0	GVP-12002-CF	14.00 CF	34600	28.89	22.03	3.89	4.75	9.47	15.90	14.28	
	GVP-12002-ASA	ASA-16*	42800	28.89	22.03	3.15	4.75	9.47	15.90	14.28	
	GVP-12002-ISO	ISO-320	42800	28.89	22.03	3.15	4.75	9.47	15.90	14.28	
	GVP-12002-ISO-OF	ISO-320-OF	24500	28.89	22.03	4.67	4.75	9.47	15.90	14.28	

*Without O-ring grooves. Grooves can be provided on request.

Dimensions in inches.



Specifications

- 1.5 to 12 inch nominal IDs
- Normally closed
- 4 way, 120V, 60Hz air solenoid, standard
- Reed-switch position indicator, standard
- 60 to 80 psig operating air pressure
- Viton Seal Bonnet: 10⁻⁹ Torr vacuum rating, Bakeable to 150°C, CF, NW, ISO and ASA flanges

Options

- O-rings
- Micro-Switch
- Air Solenoids
- Heater Jackets

NOTE: Solenoids for Viton seal bonnet gate valves with under four inch ID and all sizes of copper seal gate valves are shipped unmounted with the valve. Solenoids for these valves can be provided mounted with an optional mounting bracket for an additional \$55.00. Specify when ordering.

Prices subject to change without notice. - International product pricing will vary.

VALVE-LIT 9/02



Pneumatically Actuated Copper Seal Bonnet Gate Valves

Nom. ID	Model Number	Flange Type	Conductance (molecular-l/sec.)	A	B	C	D	E	F	G	Price
1.5	GVMP-1502-CF	2.75 CF	130	4.69	3.40	2.03	2.00	5.29	3.31	2.45	
2.0	GVMP-2002-CF	3.38 CF	300	5.60	4.12	2.28	2.00	5.29	3.81	2.96	
2.5	GVMP-2502-CF	4.50 CF	520	6.50	4.81	2.40	2.00	5.29	4.37	3.52	
3.0	GVMP-3002-CF	4.62 CF	840	7.70	5.77	2.53	2.00	5.29	5.24	4.28	
4.0	GVMP-4002-CF	6.00 CF	1700	10.76	8.13	2.97	2.97	6.95	7.00	5.65	
6.0	GVMP-6002-CF	8.00 CF	5400	14.07	10.64	3.17	2.97	6.95	8.75	7.55	
8.0	GVMP-8002-CF	10.00 CF	12200	18.42	13.93	3.35	2.97	6.95	11.25	10.02	
10.0	GVMP-10002-CF	12.00 CF	24900	24.04	18.30	3.65	4.75	9.47	13.44	11.99	
12.0	GVMP-12002-CF	14.00 CF	34600	28.89	22.03	3.89	4.75	9.47	15.90	14.28	

Larger sizes are available upon request.

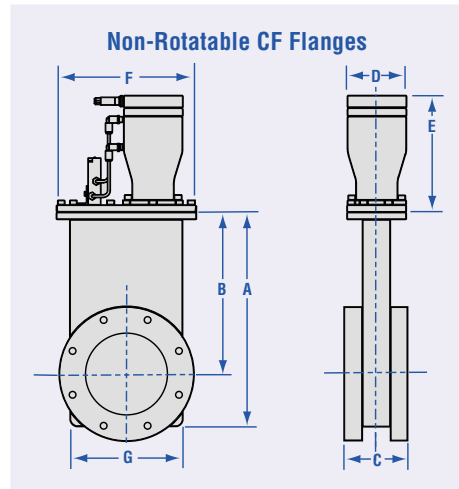
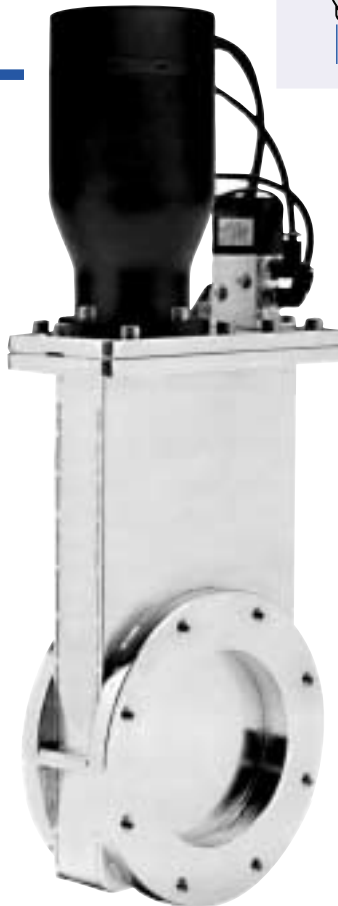
Dimensions in inches

Specifications

- 1.5 to 12 inch nominal IDs
- Normally closed
- 4-way, 120V, 60Hz air solenoid, standard Solenoid is bagged and shipped unmounted with valve
- Reed-switch position indicator, standard
- 60 to 80 psig operating air pressure
- Copper Seal Bonnet: 10⁻¹⁰ Torr Vacuum rating, Bakeable to 200°C with CF flanges

Options

- O-rings
- Micro-Switch
- Air Solenoids
- Heater Jackets



NOTE: Solenoids for Viton seal bonnet gate valves with under four inch ID and all sizes of copper seal gate valves are shipped unmounted with the valve. Solenoids for these valves can be provided mounted with an optional mounting bracket for an additional \$55.00. Specify when ordering.

GVP O-Ring Kits

Nom. ID	Model Number	Price
1.5	GVP-150-95	
2.0	GVP-200-95	
2.5	GVP-250-95	
3.0	GVP-300-95	
4.0	GVP-400-95	
6.0	GVP-600-95	
8.0	GVP-800-95	
10.0	GVP-1000-95	
12.0	GVP-1200-95	

Dimensions in inches

GVMP O-Ring & Gasket Kits

Nom. ID	Model Number	Price
1.5	GVMP-150-95	
2.0	GVMP-200-95	
2.5	GVMP-250-95	
3.0	GVMP-300-95	
4.0	GVMP-400-95	
6.0	GVMP-600-95	
8.0	GVMP-800-95	
10.0	GVMP-1000-95	
12.0	GVMP-1200-95	

Dimensions in inches

Prices subject to change without notice. - International product pricing will vary.

VALVE-LIT 9/02



Manual Ball Valves

Ball valves are a low cost, manually operated, straight through isolation device. Their simple, robust design provides high reliability in “dirty” applications. They are commonly used on MOCVD and CVD equipment downstream from the chamber or vacuum pump to isolate traps or abatement tools. A forged 316L stainless steel body and Teflon seat make these valves ideal for corrosive environments. Other applications include vacuum and other facilities requirements. A quarter-turn of the handle quickly switches the valve from open to close. They are available with NW-16 through 50 flanges as standards. Call for other flange configurations.



Port ID	Model Number	Valve ID	A	B	C	D	Flange E	Type	Price
.75	BV-0752-NWB	.75	3.82	3.12	.98	2.88	4.75	NW-16	
1.00	BV-1002-NWB	1.00	4.80	3.85	1.20	3.75	5.41	NW-25	
1.50	BV-1502-NWB	1.50	5.87	5.20	1.67	4.42	7.00	NW-40	
2.00	BV-2002-NWB	1.50	5.69	5.03	1.53	4.42	7.00	NW-50	

Dimensions in inches



Specifications

- Viton stem seal
- Teflon ball seal
- 316L forged stainless steel body
- Leak tested to 1×10^{-9} std. cc/sec. (helium)
- Typical pressure range: 45 psi to 1×10^{-9} Torr
- Bakeable to 150°C
- Heater jackets are available on request



Flange Dimensions

This table provides general specifications on standard flanges for specific valve sizes. For specific information on a particular flange refer to the appropriate catalog. Again, these are standard flanges only. Other sizes or types of flanges for Nor-Cal valves are available upon request. Call your Nor-Cal Products representative for more information.

Nom ID	Flange Type	No. Holes/Clamps	Thread Size	Bolt Circle	OD
1.5	NW-40	-	-	-	2.16
	2.75 CF	6	1/4 - 28	2.312	2.75
2.0	NW-50	-	-	-	2.95
	3.38 CF	8	5/16 - 24	2.850	3.37
2.5	4.50 CF	8	5/16 - 24	3.628	4.47
	ASA-6*	4	3/8 - 16	4.750	6.00
	ISO-63	4	M8 - 1.25	4.330	5.12
	ISO-63-OF	3-4	-	-	3.74
3.0	4.62 CF	10	5/16 - 24	4.030	4.62
	ASA-7.5*	4	3/8 - 16	6.000	6.00
	ISO-80	8	M8 - 1.25	4.920	5.71
	ISO-80-OF	4-8	-	-	4.33
4.0	6.00 CF	16	5/16 - 24	5.128	6.00
	ASA-9*	8	3/8 - 16	7.500	9.00
	ISO-100	8	M8 - 1.25	5.710	6.50
	ISO-100-OF	4-8	-	-	5.12
6.0	8.00 CF	20	5/16 - 24	7.128	8.00
	ASA-11*	8	3/4 - 10	9.500	11.00
	ISO-160	8	M10 - 1.50	7.870	9.00
	ISO-160-OF	4-8	-	-	7.09
8.0	10.00 CF	24	5/16 - 24	9.128	10.00
	ASA-11*	8	3/4 - 10	9.500	11.00
	ISO-200	12	M10 - 1.50	10.240	11.25
	ISO-200-OF	6-12	-	-	9.45
10.0	12.00 CF	32	5/16 - 24	11.181	12.00
	ASA-16*	12	3/4 - 10	14.250	16.00
	ISO-250	12	M10 - 1.50	12.200	14.00
	ISO-250-OF	6-12	-	-	11.42
12.0	14.00 CF	30	3/8 - 24	12.810	14.00
	ASA-16*	12	3/4 - 10	14.250	16.00
	ISO-320	12	M12 - 1.75	15.550	16.73
	ISO-320-OF	8-12	-	-	14.57

*Without O-ring groove. Grooves can be provided on request.

Dimensions in inches

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