



Stainless and Aluminum Gate Valves



Aluminum valves with (left to right): Electro Pneumatic, Manual, and Motor Actuators. Stainless Steel valves also available.

ANSI, ISO, JIS, or Special Flanges

These Vacuum Research 5 minute rebuild valves are available with virtually any flange or combination of flanges at no extra charge. Combinations of ISO on one flange and ANSI on the other are easily accommodated. Even different sizes such as 4 inch on one flange and 6 inch on the other.

Insertable "Flangeless" Valves

It is sometimes helpful to keep the flange to flange dimension ("A" dimension on the dimensions pages) as short as possible. In such cases your valves can be provided with no port flanges at all and with either O-Ring grooves machined into the valve body or with a precision machined surface on the body to seal against the O-rings on your pump or chamber. Contact the factory for prices.

Aluminum or Stainless Steel

Vacuum Research Bonnet Style valves are available in stainless steel or 6061 aluminum. Smooth surface finish gives low outgassing and fast pump down.

High Conductance

In addition to the oversize ports used in the LPWA Series for the last 40 years, we now offer the X-LPWA Series where a 4 inch valve has a 6 inch port, an 8 inch valve has a 10 inch port, etc. Conductance values are shown on page 39.

Fail Safe

All Vacuum Research Valves can be installed for fast close on power failure and air operated valves can be manually positioned without air or electricity.

Long Life

More than 250,000 cycles for aluminum valves. That's one cycle every 2 minutes, 24 hours/day for a year. An optional million cycle design is available.

Less Outgassing Than Stainless Steel

Dozens of papers show the 6000 Series aluminum used in VRC valves outgasses up to 2 orders of magnitude less than 300 Series stainless steel and of course no hydrogen. A bibliography of 70 peer reviewed papers about outgassing compiled by Dr. M. Wong at Fermi Labs can be found at http://home.fnal.gov/~mlwong/outgas_rev.htm. See page 39 for more information

Vacuum & Pressure

Vacuum Research valves stay sealed with vacuum or atmosphere on either side.

Satisfaction Guaranteed

Vacuum Research has been building high vacuum valves for almost 50 years and has earned a reputation for world class product quality and customer service. If you are not satisfied with our valve just send it back.

No Leaks

All Vacuum Research valves have total leak rates of less than 5×10^{-10} std cc/sec. By total leak we mean that each completed valve is tested in a He filled bag.

RoHS Compliant

All Valves are (RoHS) 2002/95/EC Compliant.

Electric Motor, Air or Manual Actuators

All Vacuum Research gate valves are available with 3 types of actuators. Manual actuators are the least expensive. Electro-pneumatic actuators use 70 psi (4.9 kg/cm) compressed air and include the solenoid (specify the solenoid voltage that is most convenient for you). Electric motor actuators use high torque servo motors and operate from 115V or 230V, 1Ø 50 or 60 Hz. CE Mark included.

Roughing and Gauge Ports

There are six locations for optional gauge and roughing ports described on page 42.

Position Indicators, Limit Switches

Visual position indication of valve position is included on all valves. Limit switches for remote indication are described on the Optional Features pages in the Accessories & Parts section.

Complete Rebuild



in 5 Minutes!

With no special tools or training you can replace every moving part in your Vacuum Research Bonnet Style Valve in 5 minutes. (Our best guys can do it in less time, but they practice.)



Stainless steel & aluminum valves with Conflat® flanges. Aluminum has less outgassing than stainless steel. Up to 2 orders of magnitude less, see references on page 39.

Less Outgassing Than Stainless Steel Dozens of papers show the 6000 Series aluminum used in VRC valves outgasses up to 2 orders of magnitude less than 300 Series stainless steel and of course no hydrogen. A bibliography of 70 peer reviewed papers about outgassing compiled by Dr. M. Wong at Fermi Labs can be found at http://home.fnal.gov/~mlwong/outgas_rev.htm. Refer to page 39 for more information.

ORDERING INFORMATION

Model Number: Refer to page 2 for instructions to specify the features you need.

Electric Motor Actuators: Any Vacuum Research valve can be supplied with a high torque electric motor actuator. Refer to the "Electric Motor Actuator" page in the Accessories and Parts section of this catalog for pricing.

Special Features: Refer to pgs 40-43 for specifications of roughing & gauge ports, position indicators & other special features.

Viton® or Kalrez® or Silicone O-Rings: Our standard Valves use a Viton® O-Ring for the gate seal and Buna-N O-Rings for all other locations. You may specify Viton® (or other materials) throughout the valve with a "V", "S", or "K" in the model number. For Viton® add the following to the price. (For Silicone or Kalrez® contact the factory for prices.)

| | | | | | | | | | | | |
|-------------------|---------|--------------|------------|--------------|-------------|--------------|-------------|---------------|------------|---------------|------------|
| 2 or 3 in. valves | ..\$57. | 4 in. valves |\$86. | 6 in. valves |\$107. | 8 in. valves |\$171. | 10 in. valves |\$223. | 12 in. valves |\$286. |
|-------------------|---------|--------------|------------|--------------|-------------|--------------|-------------|---------------|------------|---------------|------------|

Metal Bonnet Seal: To specify a metal (rather than elastomer) bonnet seal add "MBS" to the model number & add the cost below:

| Aluminum Valve | | | Stainless Steel | | | Aluminum Valve | | | Stainless Steel | | |
|-----------------|-------------|-------------|-----------------|-------------|-------------|----------------|-------------|-------------|-----------------|--|--|
| 2.75 in. valves |\$229. |\$280. | 6 inch valves |\$266. |\$318. | 12 inch valves |\$445. |\$638. | | | |
| 3.38 in. valves |\$220. |\$269. | 8 inch valves |\$280. |\$510. | | | | | | |
| 4.50 in. valves |\$220. |\$269. | 10 inch valves |\$445. |\$638. | | | | | | |

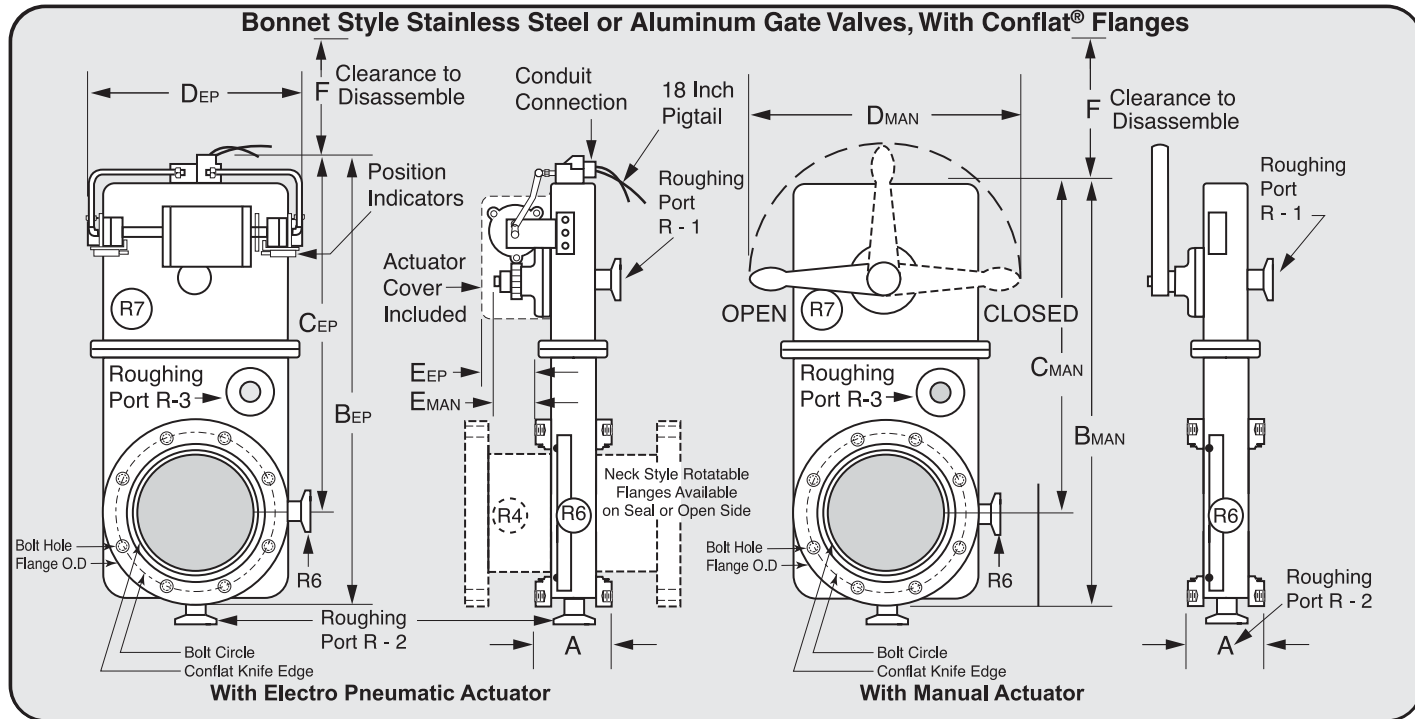
CF® Flanges with Metric Threads: No extra charge for Conflat® flanges with metric threads. Bolt circle, gasket size, and other dimensions remain unchanged. Specify "CF-MET" in the model number.

| Valve Port Diam. | Flange O. D. | Bolts | Valve Port Diam. | Flange O. D. | Bolts | Valve Port Diam. | Flange O. D. | Bolts |
|------------------|--------------|--------|------------------|--------------|---------|------------------|--------------|---------|
| 38 mm | 70 mm | 6, M-6 | 100 mm | 152 mm | 16, M-8 | 200 mm | 254 mm | 24, M-8 |
| 63 mm | 114 mm | 8, M-8 | 150 mm | 203 mm | 20, M-8 | 250 mm | 304 mm | 32, M-8 |

Aluminum Conflat Gaskets®: Prices shown below are for packs of 10, or each, depending on Gasket size.

| Flange O.D. | Gasket O.D. | Part No. | Price | Flange O.D. | Gasket O.D. | Part No. | Price | Flange O.D. | Gasket O.D. | Part No. | Price |
|-------------|-------------|--------------|----------|-------------|-------------|-------------|-----------|-------------|-------------|-------------|-----------------|
| 1.33 in. | 0.838 in. | X701G01.33A | \$42./10 | 4.50 in. | 3.25 in. | X701G04.50A | \$107./10 | 10.00 in. | 8.73 in. | X701G10.00 | \$239./10 |
| 2.75 in. | 1.895 in. | X701G02.75A | \$64./10 | 6.00 in. | 4.75 in. | X701G06.00A | \$150./10 | 12.00 in. | 10.73 in. | X701G12.00 | \$34./ea. |
| 3.375 in. | 2.425 in. | X701G03.375A | \$88./10 | 8.00 in. | 6.73 in. | X701G08.00A | \$214./10 | 13.25 in. | 11.55 in. | X701G13.25A | \$42./ea. |
| | | | | | | | | 14.00 in. | 12.31 in. | X701G14.00A | contact factory |

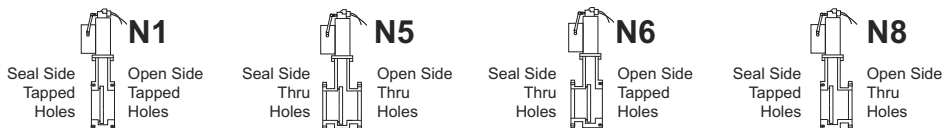
| Conflat® Outside Diameter | Conflat® Valves with Electro-Pneumatic Operator | | | | Conflat® Valves with Manual Operator | | | |
|---|---|---------|---------------------------------------|-----------|--------------------------------------|---------|---------------------------------------|-----------|
| | Aluminum Model & Neck Style | Price | Stainless Steel Model & Neck Style | Price | Aluminum Model & Neck Style | Price | Stainless Steel Model & Neck Style | Price |
| 2.75 in. Outside Diameter Conflat® Flange (1.63" Port) | OPWA-2.75-CF-N1-EP | \$1220. | OPSS-2.75-CF-N1-EP | \$4420. | OPWA-2.75-CF-N1-M | \$1086. | OPSS-2.75-CF-N1-M | \$4155. |
| | OPWA-2.75-CF-N5-EP | \$1358. | OPSS-2.75-CF-N5-EP | \$4628. | OPWA-2.75-CF-N5-M | \$1225. | OPSS-2.75-CF-N5-M | \$4363. |
| | OPWA-2.75-CF-N6-EP | \$1292. | OPSS-2.75-CF-N6-EP | \$4524. | OPWA-2.75-CF-N6-M | \$1159. | OPSS-2.75-CF-N6-M | \$4259. |
| | OPWA-2.75-CF-N8-EP | \$1292. | OPSS-2.75-CF-N8-EP | \$4524. | OPWA-2.75-CF-N8-M | \$1159. | OPSS-2.75-CF-N8-M | \$4259. |
| 3.375 in. Outside Diameter Conflat® Flange (2.01" Port) | LPWA-3.375-CF-N1-EP | \$1568. | LPSS-3.375-CF-N1-EP | \$5086. | LPWA-3.375-CF-N1-M | \$1436. | LPSS-3.375-CF-N1-M | \$5132. |
| | LPWA-3.375-CF-N5-EP | \$1790. | LPSS-3.375-CF-N5-EP | \$5346. | LPWA-3.375-CF-N5-M | \$1658. | LPSS-3.375-CF-N5-M | \$5020. |
| | LPWA-3.375-CF-N6-EP | \$1774. | LPSS-3.375-CF-N6-EP | \$5216. | LPWA-3.375-CF-N6-M | \$1640. | LPSS-3.375-CF-N6-M | \$4950. |
| | LPWA-3.375-CF-N8-EP | \$1774. | LPSS-3.375-CF-N8-EP | \$5216. | LPWA-3.375-CF-N8-M | \$1577. | LPSS-3.375-CF-N8-M | \$4950. |
| 4.50 in. Outside Diameter Conflat® Flange (2.51" Port) | LPWA-4.50-CF-N1-EP | \$1679. | LPSS-4.50-CF-N1-EP | \$5148. | LPWA-4.50-CF-N1-M | \$1537. | LPSS-4.50-CF-N1-M | \$4883. |
| | LPWA-4.50-CF-N5-EP | \$2124. | LPSS-4.50-CF-N5-EP | \$5325. | LPWA-4.50-CF-N5-M | \$1988. | LPSS-4.50-CF-N5-M | \$5060. |
| | LPWA-4.50-CF-N6-EP | \$2071. | LPSS-4.50-CF-N6-EP | \$5288. | LPWA-4.50-CF-N6-M | \$1928. | LPSS-4.50-CF-N6-M | \$5897. |
| | LPWA-4.50-CF-N8-EP | \$2071. | LPSS-4.50-CF-N8-EP | \$5288. | LPWA-4.50-CF-N8-M | \$1928. | LPSS-4.50-CF-N8-M | \$5897. |
| 6 in. Outside Diameter Conflat® Flange (4.01" Port) | LPWA-6-CF-N1-EP | \$1988. | LPSS-6-CF-N1-EP | \$5928. | LPWA-6-CF-N1-M | \$1845. | LPSS-6-CF-N1-M | \$5611. |
| | LPWA-6-CF-N5-EP | \$2172. | LPSS-6-CF-N5-EP | \$6500. | LPWA-6-CF-N5-M | \$2029. | LPSS-6-CF-N5-M | \$6500. |
| | LPWA-6-CF-N6-EP | \$1999. | LPSS-6-CF-N6-EP | \$6214. | LPWA-6-CF-N6-M | \$1928. | LPSS-6-CF-N6-M | \$5897. |
| | LPWA-6-CF-N8-EP | \$1999. | LPSS-6-CF-N8-EP | \$6214. | LPWA-6-CF-N8-M | \$1928. | LPSS-6-CF-N8-M | \$5897. |
| 8 in. Outside Diameter Conflat® Flange (6.02" Port) | LPWA-8-CF-N1-EP | \$2273. | LPSS-8-CF-N1-EP | \$7072. | LPWA-8-CF-N1-M | \$2071. | LPSS-8-CF-N1-M | \$6755. |
| | LPWA-8-CF-N5-EP | \$2556. | LPSS-8-CF-N5-EP | \$7850. | LPWA-8-CF-N5-M | \$2362. | LPSS-8-CF-N5-M | \$7535. |
| | LPWA-8-CF-N6-EP | \$2632. | LPSS-8-CF-N6-EP | \$7462. | LPWA-8-CF-N6-M | \$2213. | LPSS-8-CF-N6-M | \$7145. |
| | LPWA-8-CF-N8-EP | \$2632. | LPSS-8-CF-N8-EP | \$7462. | LPWA-8-CF-N8-M | \$2213. | LPSS-8-CF-N8-M | \$7145. |
| 10 in. Outside Diameter Conflat® Flange (8.02" Port) | LPWA-10-CF-N1-EP | \$3749. | LPSS-10-CF-N1-EP | \$7436. | LPWA-10-CF-N1-M | \$3357. | LPSS-10-CF-N1-M | \$7119. |
| | LPWA-10-CF-N5-EP | \$4039. | LPSS-10-CF-N5-EP | \$8268. | LPWA-10-CF-N5-M | \$3642. | LPSS-10-CF-N5-M | \$7951. |
| | LPWA-10-CF-N6-EP | \$3932. | LPSS-10-CF-N6-EP | \$7852. | LPWA-10-CF-N6-M | \$3501. | LPSS-10-CF-N6-M | \$7535. |
| | LPWA-10-CF-N8-EP | \$3932. | LPSS-10-CF-N8-EP | \$7852. | LPWA-10-CF-N8-M | \$3501. | LPSS-10-CF-N8-M | \$7535. |
| 12 in. Outside Diameter Conflat® Flange (10.02" Port) | LPWA-12-CF-N1-EP | \$5043. | LPSS-12-CF-N1-EP | \$11,960. | LPWA-12-CF-N1-M | \$4716. | LPSS-12-CF-N1-M | \$11,320. |
| | LPWA-12-CF-N5-EP | \$5362. | LPSS-12-CF-N5-EP | \$13,104. | LPWA-12-CF-N5-M | \$5072. | LPSS-12-CF-N5-M | \$12,464. |
| | LPWA-12-CF-N6-EP | \$5143. | LPSS-12-CF-N6-EP | \$12,532. | LPWA-12-CF-N6-M | \$4929. | LPSS-12-CF-N6-M | \$11,892. |
| | LPWA-12-CF-N8-EP | \$5143. | LPSS-12-CF-N8-EP | \$12,532. | LPWA-12-CF-N8-M | \$4929. | LPSS-12-CF-N8-M | \$11,892. |



Open Side - Seal Side

On stainless steel valves the gate seal is on the side opposite the actuator for 2, 10, and 12 inch valves.

On aluminum valves the gate seal O-ring is on the actuator side (to left) in sizes through 8 inch and the gate seal is on the side opposite the actuator on 10, 12, & 16 inch valves.



| Nominal CF Flange Outside Diameter | Model No. ANSI Flange All dimensions in inches | Port Diameter | Flange O.D. | Flange Thickness | Bolt Circle | (no. of bolts) x bolt size | A | A | BMAN | BEP | DEP | F | Weight lbs. Aluminum | |
|------------------------------------|---|---------------|-------------|------------------|-------------|----------------------------|--------------------------|----------------------------|-----------------------|-------------------|------------------|--------------------|----------------------|------|
| | | | | | | | Alumin. Flange to Flange | St. Steel Flange to Flange | Manual Overall Height | EP Overall Height | EP Overall Width | Disassy. Clearance | Net | Ship |
| 2.75 inch | OPWA 2.75 N1 | 1.50 | 2.75 | 0.500 | 2.312 | (6) 1/4 - 28 | 3.88 | 2.38 | 10.41 | 11.13 | 6.75 | 2.63 | 8 | 13 |
| 2.75 inch | OPWA 2.75 N5 | 1.50 | 2.75 | 0.500 | 2.312 | .265 thru hole on neck | 6.63 | 5.12 | 10.41 | 11.13 | 6.75 | 2.63 | 8 | 13 |
| 2.75 inch | OPWA 2.75 N6 & 8 | 1.50 | 2.75 | 0.500 | 2.312 | | 5.25 | 3.75 | 10.41 | 11.13 | 6.75 | 2.63 | 8 | 13 |
| 3.375 inch | LPWA 3.375 N1 | 2.01 | 3.38 | 0.625 | 2.85 | (8) 5/16 - 24 | 3.88 | 2.630 | 10.41 | 11.13 | 6.75 | 2.63 | 8 | 13 |
| 3.375 inch | LPWA 3.375 N5 | 2.01 | 3.38 | 0.625 | 2.85 | .332 thru hole on neck | 7.13 | 5.88 | 10.41 | 11.13 | 6.75 | 2.63 | 8 | 13 |
| 3.375 inch | LPWA 3.375 N6 & 8 | 2.01 | 3.38 | 0.625 | 2.85 | | 5.51 | 4.26 | 10.41 | 11.13 | 6.75 | 2.63 | 8 | 13 |
| 4.50 inch | LPWA 4.50 N1 | 2.51 | 4.50 | 0.680 | 3.628 | (8) 5/16 - 24 | 3.88 | 2.74 | 10.75 | 11.5 | 6.75 | 2.63 | 8 | 13 |
| 4.50 inch | LPWA 4.50 N5 | 2.51 | 4.50 | 0.680 | 3.628 | .332 thru hole on neck | 7.35 | 6.21 | 10.75 | 11.5 | 6.75 | 2.63 | 8 | 13 |
| 4.50 inch | LPWA 4.50 N6 & 8 | 2.51 | 4.50 | 0.680 | 3.628 | | 5.62 | 4.48 | 10.75 | 11.5 | 6.75 | 2.63 | 8 | 13 |
| 6 inch | LPWA 6 N1 | 4.01 | 6.00 | 0.780 | 5.128 | (16) 5/16 - 24 | 4.43 | 2.94 | 14.18 | 14.93 | 7.80 | 4.00 | 10 | 15 |
| 6 inch | LPWA 6 N5 | 4.01 | 6.00 | 0.780 | 5.128 | .332 thru hole on neck | 8.30 | 6.81 | 14.18 | 14.93 | 7.80 | 4.00 | 10 | 15 |
| 6 inch | LPWA 6 N6 & 8 | 4.01 | 6.00 | 0.780 | 5.128 | | 6.37 | 4.88 | 14.18 | 14.93 | 7.80 | 4.00 | 10 | 15 |
| 8 inch | LPWA 8 N1 | 6.02 | 8.00 | 0.880 | 7.128 | (20) 5/16 - 24 | 4.63 | 3.14 | 19.75 | 20.5 | 10.50 | 4.48 | 14 | 21 |
| 8 inch | LPWA 8 N5 | 6.02 | 8.00 | 0.880 | 7.128 | .332 thru hole on neck | 8.90 | 7.41 | 19.75 | 20.5 | 10.50 | 4.48 | 14 | 21 |
| 8 inch | LPWA 8 N6 & 8 | 6.02 | 8.00 | 0.880 | 7.128 | | 6.77 | 5.28 | 19.75 | 20.5 | 10.50 | 4.48 | 14 | 21 |
| 10 inch | LPWA 10 N1 | 8.02 | 10.00 | 0.970 | 9.128 | (24) 5/16 - 24 | 4.81 | 4.05 | 25.81 | 26.6 | 12.0 | 5.51 | 25 | 30 |
| 10 inch | LPWA 10 N5 | 8.02 | 10.00 | 0.970 | 9.128 | .332 thru hole on neck | 9.44 | 8.68 | 25.81 | 26.6 | 12.0 | 5.51 | 25 | 30 |
| 10 inch | LPWA 10 N6 & 8 | 8.02 | 10.00 | 0.970 | 9.128 | | 7.12 | 6.36 | 25.81 | 26.6 | 12.0 | 5.51 | 25 | 30 |
| 12 inch | LPWA 12 N1 | 10.02 | 12.00 | 1.020 | 11.18 | (32) 5/16 - 24 | 4.91 | 4.15 | 25.75 | 26.5 | 16.50 | 5.51 | 50 | 59 |
| 12 inch | LPWA 12 N5 | 10.02 | 12.00 | 1.020 | 11.18 | .332 thru hole on neck | 9.74 | 8.98 | 25.75 | 26.5 | 16.50 | 5.51 | 50 | 59 |
| 12 inch | LPWA 12 N6 & 8 | 10.02 | 12.00 | 1.020 | 11.18 | | 7.32 | 6.56 | 25.75 | 26.5 | 16.50 | 5.51 | 50 | 59 |



Vacuum Research valves are available with dozens of options to allow you to select exactly the features you need for your vacuum system. The model number system illustrated below will accurately describe most valves, but if you have any questions about the best way to specify what you need, just call or fax our customer service department and we will be happy to help you. All Valves are (RoHS) 2002/95/EC Compliant.

Basic Valve Style

| | |
|----------------|--|
| LPWA | Bonnet Style, Large Port Aluminum |
| TBWA | Thick Body Valves for Dirty Environments |
| X-LPWA | Bonnet Style, Extra Large Port Aluminum |
| LPSS | Bonnet Style, Large Port Stainless Steel |
| X-LPSS | Bonnet Style, Extra Large Port Stainless Steel |
| BEL | Bellows Seal, Welded Aluminum |
| END STD | Standard Port Aluminum Gate Valves |
| END LP | Oversize Large Port Aluminum Gate Valves |
| AVAL | Aluminum Poppet Style Valves |
| AVMS | Mild Steel Poppet Valves |
| REB | Rectangular Port, Bellows Seal |
| REQ | Rectangular Port, Quad Ring Seal |

Roughing & Gauge Ports

Specify location (R-1, R-2, etc.) and size of port (NW-16, NW-25, etc.) Refer to page 42 in this catalog: Roughing and Gauge Ports, for the range of port sizes available in each location for your basic valve style.

Limit Switches (Position Indicators)

Visual Position Indicators are included on All Bonnet Gate Valves. Limit switches are described in the "Optional Features and Accessories" section on page 41. (Sold by the pair, 1 for open, 1 for closed)

| | |
|--------------|-------------------------------------|
| LSS | Enclosed Limit Switch (SPDT) |
| LSD | Enclosed Limit Switch (DPDT) |
| LSO | Open Type Limit Switch (SPDT) |
| LSE | Electronic Type Limit Switch (SPDT) |
| LSX-C | Explosion Proof, Grps. C, D (SPDT) |
| LSX-B | Explosion Proof, Grp. B (SPDT) |

Flange Bolt Pattern

| | |
|---------------|-------------------------|
| ASA | ANSI Bolt Pattern |
| CF | Conflat® Flanges |
| CF-MET | Metric Conflat® |
| JIS | Japan Industrial Std. |
| DEP | Dependex Flanges |
| ISO | ISO Bolt Pattern |
| SPEC | Customer Special Flange |
| BLANK | No Holes or O-Ring |

Flange O-Rings

| | |
|-----------|----------------------|
| 2O | O-Rings both flanges |
| NO | No flange O-Rings |
| 1O | O-Ring Open Side |
| 1S | O-Ring Seal Side |

LPWA - 12 - ASA - N8 - 2O - B - R2 - NW-16 - EP - 115 - LSS

Port Flange Neck Style

| | |
|------------|------------------------------|
| N1 | Tapped Holes Both Sides |
| N5 | Neck Flange on Both Sides |
| N6 | Neck Flange on Seal Side |
| N8 | Neck Flange on Open Side |
| TAP | Tapped Holes on Neck Flanges |

Our standard neck style valves (N5, N6, N8) have slots rather than holes for bolts. For tapped holes instead of slots add "TAP" to Model number. No extra charge.

Type of Operator

| | |
|--------------|------------------------------|
| EP | Electro-Pneumatic |
| A | Air Pilot |
| 3 POS | 3 Position Electro-Pneumatic |
| P | Pneumatic only (no solenoid) |
| M | Manual Lever |
| T | Manual Throttle |
| MO | Motor Actuator |

Nominal Valve Port Size

| | |
|------------------|---------------------------------------|
| Inches: | 2, 3, 4, 6, 8, 10, 12, 16, 20, 24, 32 |
| ISO: | 63 mm to 630 mm |
| JIS: | 63 mm to 630 mm |
| Conflat®: | 2.75, 4.5, 6, 8, 10, 12 Inch OD |

O-Ring Material

| | |
|----------|----------|
| B | Buna-N |
| V | Viton® |
| S | Silicone |
| K | Kalrez® |
| C | Chemraz® |

Solenoid Voltage Only Used With EP Operator

| | |
|---------------|----------------------------|
| 115 | 115V, 50/60 Hz |
| 220 | 220-240 V, 50 Hz |
| 24D | 24 VDC |
| 115 EX | Expl. Proof 115V, 50/60 Hz |
| 220 EX | Expl. Proof 220V, 50 Hz |
| 24 EX | Expl. Proof 24 VDC |

Ordering Information



Call our toll free number (800) 426-9340, or (412) 261-7630 to place orders, or for customer service. Our FAX number is (412) 261-7220. Address orders by mail to Vacuum Research Corporation, 100 Chapel Harbor Drive, #4, Pittsburgh, PA 15238 USA. Prices in this catalog are FOB factory. CIF or C&F prices available. Contact factory for pro forma invoice or price quotation. Terms are Net 30 Days.



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