MILLCENTRIC®
100% Port 3-WAY PLUG VALVE
Milliken® Millcentric® 100% Port 3-way Plug Valve

Quality, reliability, safety and value are the criteria embodied in the Millcentric 100% Port 3-Way plug valve.

High quality manufacturing processes from advanced CAD engineering to CNC machining ensure reliable operation with high flow capability.

The Millcentric 100% Port 3-Way plug valve is designed for regulation, diversion and isolation of water (clean or dirty) and sludge and slurries. The single tapered plug design can be arranged to provide a wide selection of flow configurations.

High flow and large solids passage is a key feature of the Millcentric 100% Port 3-Way valve; a 3” round solid can pass through a 4” valve without compression.

Although the regular usage of a Millcentric 3-Way valve is for flow diversion applications, the valve can provide tight shut-off, which is factory set when requested at order placement. (Not available with double-style plug or on 14” and 16” valves).

**Body & Seat**

The Millcentric 3-Way valve body is a high integrity casting in cast iron ASTM A126 Class B. The precision machined, internal tapered surface of the body is the valve seat which is provided with a corrosion and erosion resistant epoxy coating. Other materials are available.

**End Connections**

The 3-flanges are to ASME/ANSI B16.1 Class 125 flat faced.

Certain sizes of valve require some tapped bolt holes because of limited access for nuts behind the flange, details are shown on page 5.

**Plug**

The ductile iron plug is totally encapsulated (3” thru 12”) with a molded and vulcanized elastomer providing sealing and tight shut-off. For tight shut-off applications, it is advisable that the flow is against the rear of the plug. Tight shut-off not available with double-style plug or on 14” and 16” valves.

A large-diameter stem and upper and lower trunnion are integral with the plug casting. The upper end of the stem has a 2” square drive for wrench operation and also 2 keyways for maximum versatility when mounting gear operators. A cast marking on the end of the shaft indicates the plug face orientation.

The single style plug is standard in the Millcentric 3-Way valve to provide straight-through and 90º flow paths. A double-style plug is optionally available upon request (not tight shut-off).

**Bearings**

The plug rotates in permanently lubricated, corrosion resistant stainless steel bearings in the body and bonnet.

**Bonnet Seal**

The bolted bonnet is assembled in a precision location in the body and uses superior ‘O’-Ring sealing, with metal to metal contact, providing lower stress compared to traditional gaskets.

**Stem Seal**

Multiple self-adjusting U-cup seals provide positive stem sealing with trouble-free service.

**Operation**

Manual operation by lever or gear available on all sizes. Chainwheel operation is also available.

Electric or pneumatic actuation is available on request.

**Coating**

The valve interior and exterior surfaces are coated with 10-12 mils of 2-Part epoxy.
Available Flow Paths

Valve in closed position
Flow straight through valve
Flow through 90° to side port
All 3 ports connected and open
Flow through 90° to side port

*It is advisable that the flow is against the rear side of the plug for tight shut-off applications. Not available with double-style plug.

Pressure/Temperature ratings

Flange rating to ASME/ANSI B16.1 Class 125, the maximum cold working pressure for all sizes is 175psi.

The operating temperature of the valve may depend on the elastomer used for the plug and seals. Refer to the elastomer selection guide on page 4.

Installation

The Millcentric® 3-Way valve can be installed in any orientation although it is advisable to have the valve stem vertical for ease of access.

If the valve has been supplied for tight shut-off, the flow path and therefore the upstream pressure should be against the rear side of the plug.

In-Line Maintenance

In the unlikely event of gland leakage, the stem seals can be replaced without removing the bonnet. Access to the inside of the body for inspection or cleaning does not require removal of the valve from the line.

If wear should occur between the plug face and the seat, the plug can be adjusted externally.
### Standard Materials of Construction - 3” to 16”

<table>
<thead>
<tr>
<th>Item</th>
<th>Component</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Body</td>
<td>Cast iron A126 Class B</td>
</tr>
<tr>
<td>2</td>
<td>Plug</td>
<td>Ductile iron ASTM A536 Rubber coated</td>
</tr>
<tr>
<td>3</td>
<td>Bonnet ‘O’ ring</td>
<td>Elastomer as specified</td>
</tr>
<tr>
<td>4</td>
<td>Bonnet</td>
<td>Cast iron A126 Class B</td>
</tr>
<tr>
<td>5</td>
<td>Setscrew</td>
<td>Steel - zinc plated</td>
</tr>
<tr>
<td>6</td>
<td>Snap ring - external</td>
<td>Steel</td>
</tr>
<tr>
<td>7</td>
<td>Stud</td>
<td>Steel - zinc plated</td>
</tr>
<tr>
<td>8</td>
<td>Nut</td>
<td>Steel - zinc plated</td>
</tr>
<tr>
<td>9</td>
<td>Washer</td>
<td>Steel - zinc plated</td>
</tr>
<tr>
<td>10</td>
<td>Gland</td>
<td>Ductile iron ASTM A536</td>
</tr>
<tr>
<td>11</td>
<td>Snap ring - external</td>
<td>Steel</td>
</tr>
<tr>
<td>12</td>
<td>Journal bearing</td>
<td>Stainless Steel</td>
</tr>
<tr>
<td>13</td>
<td>Journal bearing</td>
<td>Stainless Steel</td>
</tr>
<tr>
<td>14</td>
<td>‘U’ cup seal</td>
<td>Elastomer as specified</td>
</tr>
<tr>
<td>15</td>
<td>Seal retaining ring</td>
<td>Brass</td>
</tr>
<tr>
<td>16</td>
<td>Snap ring - internal</td>
<td>Steel</td>
</tr>
</tbody>
</table>
Elastomers Available for Millcentric® 100% Port 3-Way Valves

• NBR - Nitrile
A general purpose material sometimes referred to as BUNA N with a temperature range -20°F to 212°F. Used on sewage, water, air, hydrocarbon and mineral oils.

• EPDM
An excellent polymer for use on chilled water through to LP steam applications, having a temperature range of -20°F to 250°F. Resistance to many acids, alkalis, detergents, phosphate esters, alcohols and glycols is an added benefit. Use on hydrocarbons must be avoided.

• CR - Neoprene
This versatile material shows outstanding resistance to abrasion and ozone. Chemical resistance to a wide range of petroleum based products and dilute acids and alkalis. Temperature range -20°F to 225°F.

• FKM - Viton®
Retention of mechanical properties at high temperature is an important feature of this elastomer; temperature range is -10°F to 300°F. It also has excellent resistance to oils, fuels, lubricants and most mineral acids and aromatic hydrocarbons. NOT suitable for water or steam applications.

Pressure Rating

<table>
<thead>
<tr>
<th>Size</th>
<th>Drilling</th>
<th>Pressure</th>
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</thead>
<tbody>
<tr>
<td>3” to 16”</td>
<td>Class 125</td>
<td>175 psig</td>
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</tbody>
</table>

Body (Shell) Hydrotest = 1.5 x rated pressure
Seat hydrotest = 1.0 x rated pressure (for tight shut-off applications only)

Ordering Information

Valve Types  Designation
Class 125 Flanged Cast Iron 604
Class 125 Flanged Ductile Iron 614
Class 125 Flanged 316 Stainless Steel 604S

Seat
Epoxy (604/614)  E
Stainless Steel (604S)  S

Elastomer Trim
EPDM 0
Nitrile (Buna)  1
Viton  2
Neoprene  3

Gear Operators
Gearbox complete with handwheel AGHW
Available in 90°, 180°, 270° and 360° configurations.

Style
Available port positions as shown on page 8.
The style can be factory set and should be requested at time of order.

• Elastomer Selection Chart

<table>
<thead>
<tr>
<th>Service</th>
<th>Elastomer</th>
<th>Average Useful Temperature Range</th>
<th>Service</th>
<th>Elastomer</th>
<th>Average Useful Temperature Range</th>
<th>Service</th>
<th>Elastomer</th>
<th>Average Useful Temperature Range</th>
<th>Service</th>
<th>Elastomer</th>
<th>Average Useful Temperature Range</th>
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<tbody>
<tr>
<td>Acetone</td>
<td>EPDM</td>
<td>35°F to 250°F</td>
<td>Copper Sulphate</td>
<td>Nitrile</td>
<td>35°F to 250°F</td>
<td>Oil Mobil Therm 600</td>
<td>Viton</td>
<td>10°F to 250°F</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Alcohol, Amyl</td>
<td>EPDM</td>
<td>0°F to 212°F</td>
<td>Cresote (Coal)</td>
<td>Nitrile</td>
<td>-20°F to 212°F</td>
<td>Oil Mobil Therm 603</td>
<td>Nitrile</td>
<td>-20°F to 212°F</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Alcohol, Aromatic</td>
<td>Viton</td>
<td>10°F to 250°F</td>
<td>Coal Slurry</td>
<td>Nitrile</td>
<td>-20°F to 212°F</td>
<td>Oil Lubricating</td>
<td>Nitrile</td>
<td>-20°F to 212°F</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Alcohol, Butyl</td>
<td>Neoprene</td>
<td>20°F to 225°F</td>
<td>Diesel Fuel No. 3</td>
<td>Nitrile</td>
<td>-20°F to 212°F</td>
<td>Oil Vegetable</td>
<td>Nitrile</td>
<td>-20°F to 212°F</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Alcohol, Denatured</td>
<td>Nitrile</td>
<td>20°F to 212°F</td>
<td>Diethylene Glycol</td>
<td>EPDM</td>
<td>-35°F to 250°F</td>
<td>Paint Latex</td>
<td>Nitrile</td>
<td>-20°F to 212°F</td>
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<tr>
<td>Alcohol, Ethyl</td>
<td>EPDM</td>
<td>35°F to 250°F</td>
<td>Ethylene Glycol</td>
<td>EPDM</td>
<td>-35°F to 250°F</td>
<td>Phosphate Ester</td>
<td>EPDM</td>
<td>-35°F to 250°F</td>
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<tr>
<td>Alcohol, Grain</td>
<td>Nitrile</td>
<td>20°F to 212°F</td>
<td>Fatty Acid</td>
<td>Nitrile</td>
<td>-20°F to 212°F</td>
<td>Propane</td>
<td>Nitrile</td>
<td>-20°F to 212°F</td>
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<tr>
<td>Alcohol, Isospropyl</td>
<td>Neoprene</td>
<td>20°F to 225°F</td>
<td>Fuel Oil No. 2</td>
<td>Nitrile</td>
<td>-20°F to 212°F</td>
<td>Rape Seed Oil</td>
<td>EPDM</td>
<td>-35°F to 250°F</td>
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<tr>
<td>Alcohol, Methyl</td>
<td>EPDM</td>
<td>35°F to 250°F</td>
<td>Fertilizer Liquid (H₂N₂O₃)</td>
<td>EPDM</td>
<td>-35°F to 250°F</td>
<td>Sewage with Oil</td>
<td>Nitrile</td>
<td>-20°F to 212°F</td>
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<td>Ammonia, Anhydrous</td>
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<td>20°F to 225°F</td>
<td>Gasoline Keg</td>
<td>EPDM</td>
<td>-20°F to 212°F</td>
<td>Sodium Hydroxide 20%</td>
<td>EPDM</td>
<td>-35°F to 250°F</td>
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<td>Ammonia, Nitrate</td>
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<td>35°F to 250°F</td>
<td>Gas Natural</td>
<td>EPDM</td>
<td>-20°F to 212°F</td>
<td>Starch</td>
<td>EPDM</td>
<td>-35°F to 250°F</td>
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<td>Ammonia, Water</td>
<td>EPDM</td>
<td>35°F to 250°F</td>
<td>Glue Animal</td>
<td>Nitrile</td>
<td>-20°F to 212°F</td>
<td>Steam 250°F</td>
<td>EPDM</td>
<td>-35°F to 250°F</td>
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<tr>
<td>Animal Fats</td>
<td>Nitrile</td>
<td>20°F to 212°F</td>
<td>Green Liquor</td>
<td>EPDM</td>
<td>-20°F to 212°F</td>
<td>Stoffard Solvent</td>
<td>Nitrile</td>
<td>-20°F to 80°F</td>
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<td>Black Liquor</td>
<td>EPDM</td>
<td>35°F to 250°F</td>
<td>Hydraulic oil</td>
<td>EPDM</td>
<td>-20°F to 212°F</td>
<td>Sulphuric Acid 10% 50%</td>
<td>Neoprene</td>
<td>-20°F to 158°F</td>
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<tr>
<td>Blast Furnace Gas</td>
<td>Neoprene</td>
<td>20°F to 225°F</td>
<td>Hydrogen</td>
<td>Nitrile</td>
<td>-20°F to 212°F</td>
<td>Sulphuric Acid 100%</td>
<td>Viton</td>
<td>10°F to 300°F</td>
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<td>Butane</td>
<td>Nitrile</td>
<td>20°F to 212°F</td>
<td>JP4 JPS</td>
<td>Viton</td>
<td>-20°F to 212°F</td>
<td>Trichlorethylene Dry</td>
<td>Viton</td>
<td>10°F to 300°F</td>
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<td>Bunker Oil “C”</td>
<td>Nitrile</td>
<td>20°F to 212°F</td>
<td>Kerosene</td>
<td>Nitrile</td>
<td>0°F to 212°F</td>
<td>Triethanol Amine</td>
<td>EPDM</td>
<td>-35°F to 250°F</td>
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<td>Calcium Chloride</td>
<td>EPDM</td>
<td>35°F to 250°F</td>
<td>Ketone</td>
<td>EPDM</td>
<td>-35°F to 250°F</td>
<td>Varnish</td>
<td>Viton</td>
<td>10°F to 300°F</td>
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<td>Carbon Dioxide</td>
<td>EPDM</td>
<td>35°F to 250°F</td>
<td>Lime Slurry</td>
<td>EPDM</td>
<td>-35°F to 250°F</td>
<td>Water, Fresh</td>
<td>EPDM</td>
<td>-35°F to 250°F</td>
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<tr>
<td>Carbon Monoxide (Cold)</td>
<td>Neoprene</td>
<td>20°F to 150°F</td>
<td>Methane</td>
<td>Nitrile</td>
<td>-20°F to 212°F</td>
<td>Water, Salt</td>
<td>EPDM</td>
<td>-35°F to 250°F</td>
<td></td>
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<tr>
<td>Carbon Monoxide (Hot)</td>
<td>Viton</td>
<td>10°F to 300°F</td>
<td>Methyl Ethyl Ketone</td>
<td>EPDM</td>
<td>-35°F to 250°F</td>
<td>Xylene</td>
<td>Viton</td>
<td>10°F to 300°F</td>
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<td>Carbon Tetrachloride</td>
<td>Viton</td>
<td>10°F to 300°F</td>
<td>Naphtha (Benzin)</td>
<td>Nitrile</td>
<td>-20°F to 212°F</td>
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<td>Caustic Soda</td>
<td>EPDM</td>
<td>35°F to 250°F</td>
<td>Oil Animal</td>
<td>Nitrile</td>
<td>-20°F to 212°F</td>
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<tr>
<td>Cement Slurry</td>
<td>EPDM</td>
<td>35°F to 250°F</td>
<td>Oil Mobil Therm Light</td>
<td>Viton</td>
<td>10°F to 250°F</td>
<td></td>
<td></td>
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</tbody>
</table>

NOTE: Above elastomer/temperature chart are guidelines only. Contact factory for specific applications.

Series 604 Millcentric® 100% Port 3-Way Plug Valve

Note: Drawings are for information purposes only; please request certified drawings before preparing piping drawings.

* Adaptor available to convert to 2" Nut.
Note: 3” gear operated valve details upon request.
Drawings are for information purposes only; please request certified drawings before preparing piping drawings.
* Face to face dimension and flange drilling see page 5.
Accessories

Wrench

Wrench operators are available for all sizes (for tight shut-off, we recommend the use of a gear operator).

Power operation

Pneumatic, electric and hydraulic operation is available, complete with limit switches and solenoid valves when required.

Styling Ring (for wrench operated valves)

The valve may be ordered with the plug positions preset at the factory to suit the port flow requirements. This is achieved by fitting a styling ring to the valve stem.

Gear operators

Gear operators are available for all sizes.
They can be provided with 90°, 180° or 270° travel and are fitted with travel stops. 360° travel is also available.

Locking device

Factory fitted locking devices are available for wrench operated and gear operated valves.

Double-style plug

To provide 90° flow paths only, a double-style plug is available which operates through 90° travel and isolates either straight-through port (Style A90 only).
3-Way Valve Port Positions

Port Positions Viewed from Above

- **Position 1**
- **Position 2**

3-way, 3 port, 180° turn

**Style A180**

- **Position 1**
- **Position 2**

3-way, 3 port, 90° turn

**Style D**

- **Position 1**
- **Position 2**

3-way, 3 port, 90° turn

**Style G**

- **Position 1**
- **Position 2**

3-way, 3 port, 180° turn

**Style I**

- **Position 1**
- **Position 2**

3-way, 3 port, 90° turn

**Style J**

- **Position 1**
- **Position 2**

3-way, 2 port, 90° turn

**Style A90**

- **Position 1**
- **Position 2**

3-way, 3 port, 90° turn

**Style C**

- **Position 1**
- **Position 2**

3-way, 3 port, 90° turn

**Style E**

- **Position 1**
- **Position 2**

3-way, 3 port, 180° turn

**Style H**

- **Position 1**
- **Position 2**

3-way, 3 port, 180° turn

**Style I**

- **Position 1**
- **Position 2**

3-way, 2 port, 90° turn

**Style A90**

- **Position 1**
- **Position 2**

3-way, 3 port, 90° turn

**Style C**

- **Position 1**
- **Position 2**

3-way, 3 port, 90° turn

**Style F**

- **Position 1**
- **Position 2**

3-way, 3 port, 180° turn

**Style F**

- **Position 1**
- **Position 2**

3-way, 3 port, 180° turn

**Style M**

- **Position 1**
- **Position 2**

3-way, 3 port, 270° turn

**Style K**

- **Position 1**
- **Position 2**

3-way, 3 port, 270° turn

**Style L**

- **Position 1**
- **Position 2**

3-way, 3 port, 270° turn

**Style N**

- **Position 1**
- **Position 2**

3-way, 3 port, 270° turn

**Style N**

- **Position 3**
- **Position 4**

3-way, 3 port, 270° turn

**Style M**

- **Position 3**
- **Position 4**

3-way, 3 port, 270° turn

**Style N**

*Requires Double-Style Plug. Not tight shut-off. Consult factory for special pricing and availability.

**HOW TO ORDER**

When ordering 3-Way Valves, specify style letter of the port position required.
Technical Specification

Millcentric® 100% Port 3-Way Plug Valves

Valves shall be of the 100% Port 3-Way non-lubricated concentric type with a totally encapsulated plug. The elastomer shall be suitable for the service intended.

Valve flanges shall comply with ASME/ANSI B16.1 Class 125, including facing, drilling and thickness. Valves shall be designed for a maximum working pressure of 175 CWP.

The valve body and bonnet shall be in cast iron to ASTM A126 Class B and the plug shall be ductile iron to ASTM A536 Grade 65-45-12. The axial position of the plug shall be held by the adjustable gland, and the valve shall operate without the need to lift the plug prior to turning.

Replaceable sleeve-type bearings, manufactured in oil-impregnated stainless steel shall be fitted in the body and bonnet. Stem seals shall be self-adjusting U-cup type and be replaceable without removing the bonnet from the valve.

The valve stem shall be provided with a 2” square nut for use with removable levers or extended T-handles. Wrench operated valves shall be capable of being converted to gear or automated operation without removing the bonnet from the valve.

Where required, gear operators shall be of heavy duty construction with a ductile iron quadrant supported by upper and lower oil-impregnated bronze bearings. The worm gear and shaft shall be manufactured in hardened steel and run in high efficiency roller bearings. Gear operators shall require single handwheel operation only.

100% Port 3-Way plug valves shall be Millcentric Series 604.
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