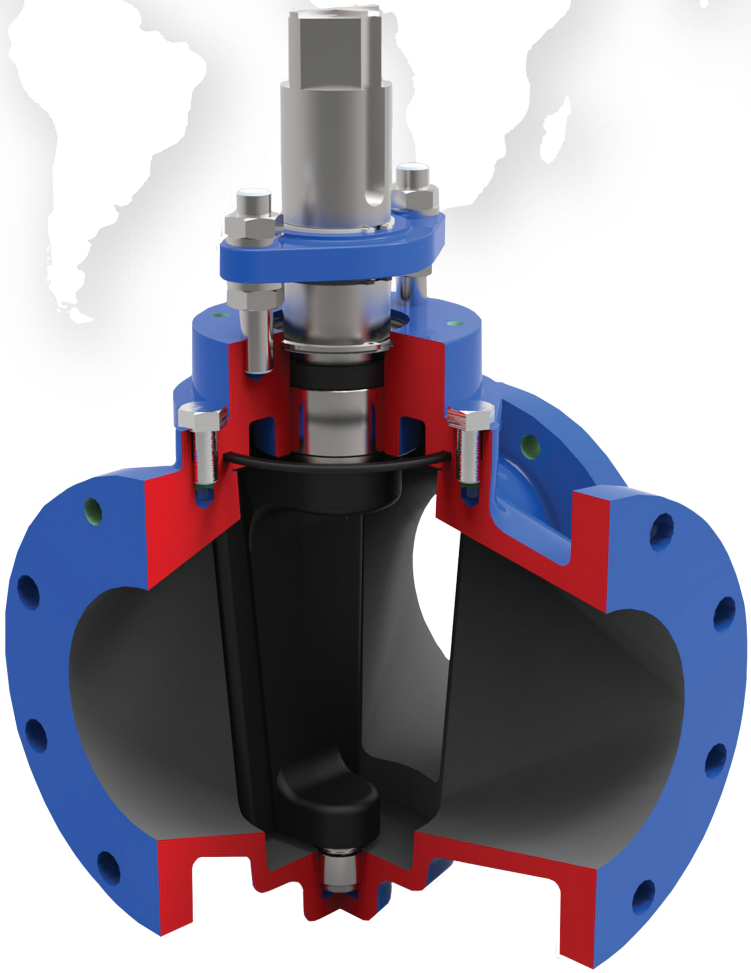
PRATT

Henry Pratt Company

# Henry Pratt Multi-Port Plug Valve



**Engineering Creative Solutions for Fluid Systems Since 1901**

## A Tradition of Excellence

With the development of the first rubber seated butterfly valve more than 70 years ago, the Henry Pratt Company became a trusted name in the flow control industry, setting the standard for product quality and customer service. Today Pratt provides the following range of superior products to the water, wastewater and power generation industries.

**Butterfly Valves:** from 3" to 162"

**Rectangular Valves:** 1' x 1' to 14' x 16'

**Ball Valves –**
**Rubber Seated:** from 4" to 60"
**Metal Seated:** from 6" to 48"

**Plug Valves:** from 1/2" to 72", 100% port available up to 48", 3 ways

**Air Valves for Water and Wastewater:** from 1/2" to 20"

**Hydraulic Control Systems**

**Valve Controls**

**Energy Dissipating Valves and Fixed Energy Dissipaters**

**Cone Valves**

**Check Valves**

**Plunger Valves**

## A Commitment to Meeting The Customers' Needs

Henry Pratt valves represent a long-term commitment to both the customer and to a tradition of product excellence. This commitment is evident in the number of innovations we have brought to the industries we serve. In fact, the Henry Pratt Company was the first to introduce many of the flow control products in use today, including the first rubber seated butterfly valve, one of the first nuclear N-Stamp valves, and the bonded seat butterfly valve.

## Innovative Products For Unique Applications

Though many of the standard valves we produce are used in water filtration and distribution applications, Pratt has built a reputation on the ability to develop specialized products that help customers to meet their individual operational challenges.

## Creative Engineering for Fluid Systems

Pratt's ability to provide practical solutions to complex issues is demonstrated by the following case histories.

## Earthquake Proof Valves

Pratt designed and manufactured hydraulically actuated valves for a water storage application so that the valves would automatically operate in the event of earthquakes. This led to the development of a valve that will withstand acceleration forces of up to 6gs.

## Custom Actuation/Isolation Valves

Pratt has designed and manufactured nuclear quality quarter-turn valves and parts since the first nuclear-powered generating plants were built. Our custom valves are able to close in a millisecond, using specially designed Pratt electro-pneumatic actuators.

## Valves Designed for Harsh Environments

Pratt designed and manufactured a 144" diameter butterfly valve for the emergency cooling system at a jet engine test facility. The valve was designed to supply water to help dissipate the tremendous heat generated by the engines during testing.

PRATT
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**Through experience, commitment and creative engineering, Pratt is uniquely suited to provide superior products for our customers' special needs.**
**For more information, contact our corporate headquarters in Aurora, Illinois.**

# Henry Pratt Multi-Port Plug Valve

Quality, reliability, safety and value are the Henry Pratt Co. criteria embodied in the Multi-Port plug valve.

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

The Pratt Multi-Port 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 Pratt Multi-Port plug valve; a 3" round solid can pass through a 4" valve without compression.

Although the regular usage of a Pratt Multi-Port 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 Multi-Port plug 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 Pratt Multi-Port plug 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

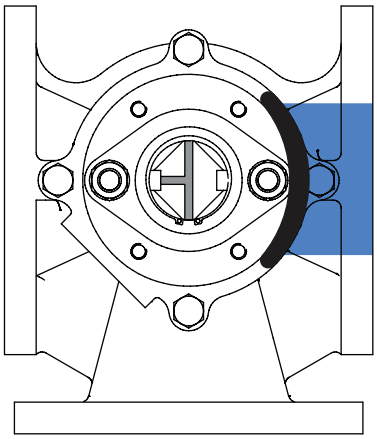
Manual operation by lever or gear available on all sizes. Chainwheel operation is also available.

Electric or pneumatic actuation is available on request.

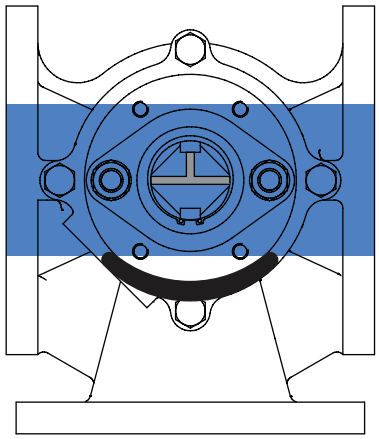
## Coating

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

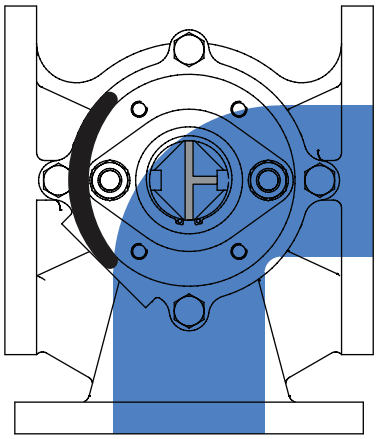
# Available Flow Paths



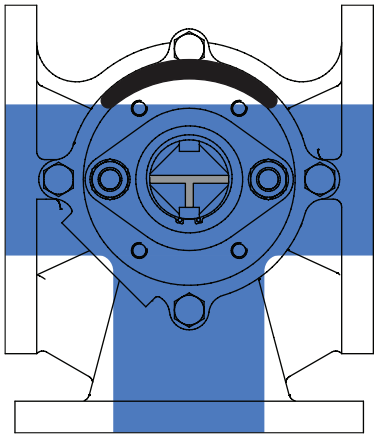
Valve in closed position*



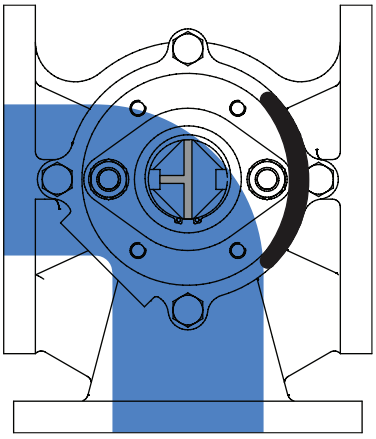
Flow straight through valve



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 Pratt Multi-Port plug valve can be installed in any orientation although it is advisable to have the valve stem vertical for ease of access.

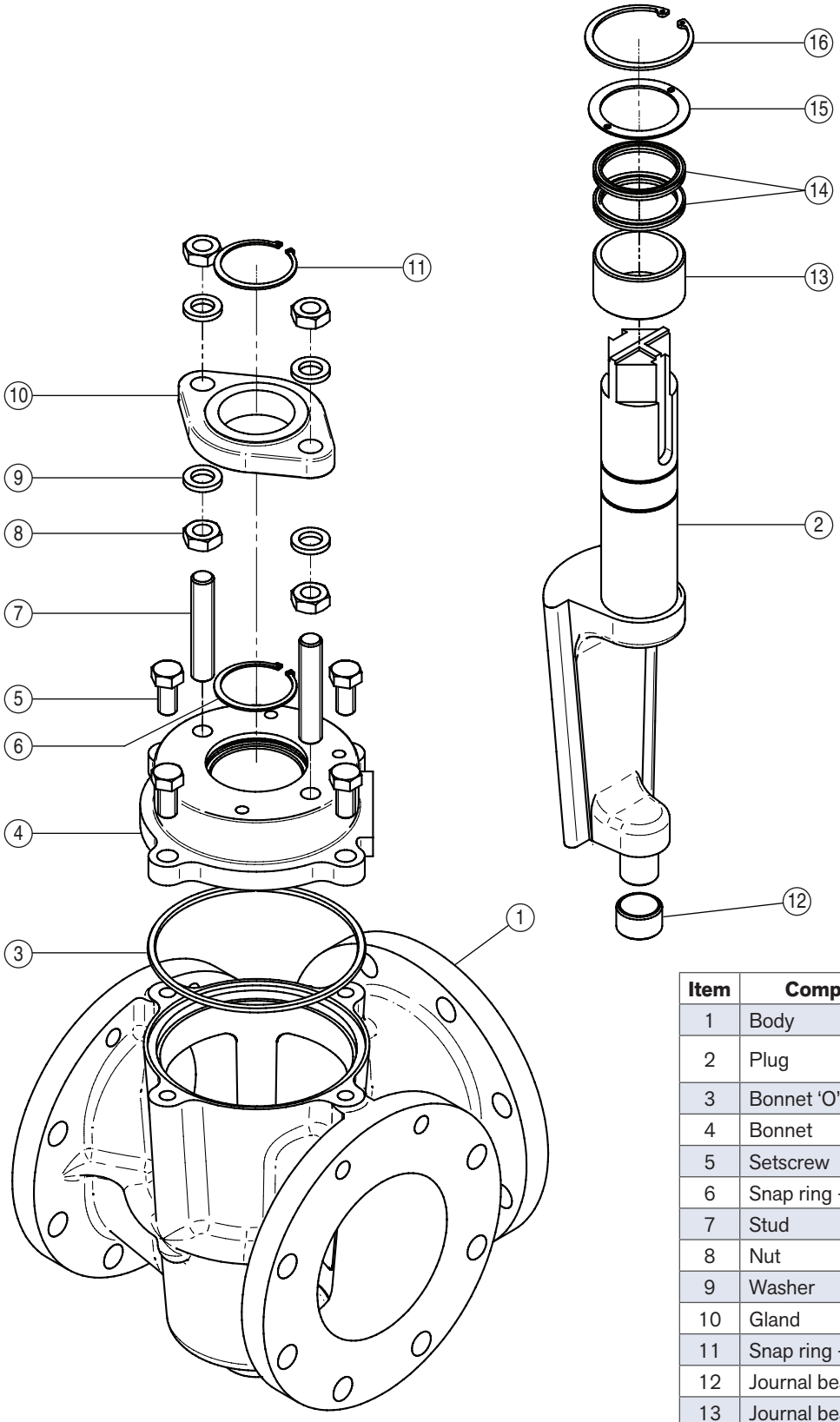
If the valve has been supplied for tight shut-off, the flow path and therefore the upstream pressure should be against the rear side of the plug.

## 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"




| Item | Component | Material |
|---|---|---|
| 1 | Body | Cast iron A126 Class B |
| 2 | Plug | Ductile iron ASTM A536 Rubber coated |
| 3 | Bonnet 'O' ring | Elastomer as specified |
| 4 | Bonnet | Cast iron A126 Class B |
| 5 | Setscrew | Steel - zinc plated |
| 6 | Snap ring - internal | Steel |
| 7 | Stud | Steel - zinc plated |
| 8 | Nut | Steel - zinc plated |
| 9 | Washer | Steel - zinc plated |
| 10 | Gland | Ductile iron ASTM A536 |
| 11 | Snap ring - internal | Steel |
| 12 | Journal bearing | Stainless Steel |
| 13 | Journal bearing | Stainless Steel |
| 14 | 'U' cup seal | Elastomer as specified |
| 15 | Seal retaining ring | Brass |
| 16 | Snap ring - external | Steel |

# Elastomers Available for Multi-Port Plug 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, alkalies, 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 alkalies. 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

| Size | Drilling | Pressure |
|---|---|---|
| 3" to 16" | Class 125 | 175 psig |

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.

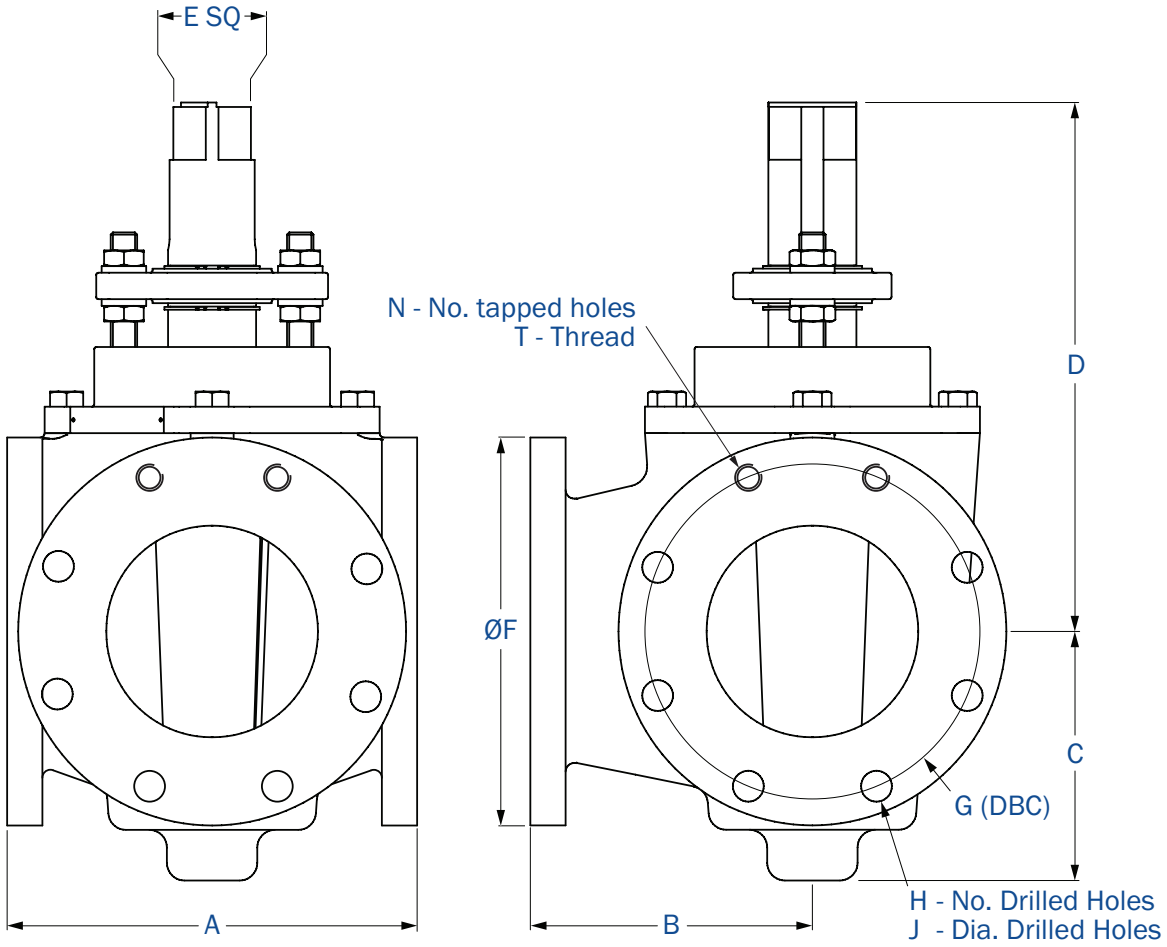
## ▪ Elastomer Selection Chart

| Service | Elastomer | Average Useful Temperature Range | Service | Elastomer | Average Useful Temperature Range | Service | Elastomer | Average Useful Temperature Range |
|---|---|---|---|---|---|---|---|---|
| Acetone | EPDM | -35˚F to 250˚F | Caustic Soda | EPDM | -35˚F to 250˚F | Oil Animal | Nitrile | -20˚F to 212˚F |
| Air | EPDM | -35˚F to 250˚F | Cement Slurry | EPDM | -35˚F to 250˚F | Oil Mobil Therm Light | Viton | 10˚F to 250˚F |
| Air w/Oil | Nitrile | 0˚F to 212˚F | Copper Sulphate | EPDM | -35˚F to 250˚F | Oil Mobil Therm 600 | Viton | 10˚F to 250˚F |
| Alcohol, Amyl | EPDM | 0˚F to 212˚F | Creosote (Coal) | Nitrile | -20˚F to 212˚F | Oil Mobil Therm 603 | Nitrile | -20˚F to 212˚F |
| Alcohol, Aromatic | Viton | 10˚F to 250˚F | Coal Slurry | Nitrile | -20˚F to 212˚F | Oil Lubricating | Nitrile | -20˚F to 212˚F |
| Alcohol, Butyl | Neoprene | -20˚F to 225˚F | Diesel Fuel No. 3 | Nitrile | -20˚F to 212˚F | Oil Vegetable | Nitrile | -20˚F to 212˚F |
| Alcohol, Denatured | Nitrile | -20˚F to 212˚F | Diethylene Glycol | EPDM | -35˚F to 250˚F | Paint Latex | Nitrile | -20˚F to 212˚F |
| Alcohol, Ethyl | EPDM | -20˚F to 250˚F | Ethylene Glycol | EPDM | -35˚F to 250˚F | Phosphate Ester | EPDM | -35˚F to 250˚F |
| Alcohol, Grain | Nitrile | -20˚F to 212˚F | Fatty Acid | Nitrile | -20˚F to 212˚F | Propane | Nitrile | -20˚F to 212˚F |
| Alcohol, Isosproply | Neoprene | -20˚F to 225˚F | Fuel Oil No. 2 | Nitrile | -20˚F to 212˚F | Rape Seed Oil | EPDM | -35˚F to 250˚F |
| Alcohol, Methyl | EPDM | -20˚F to 250˚F | Fertilizer Liquid ($H_4N_2O_2$) | EPDM | -35˚F to 250˚F | Sewage with Oil | Nitrile | -20˚F to 212˚F |
| Ammonia, Anhydrous | Neoprene | -20˚F to 225˚F | Gasoline Keg | Nitrile | -20˚F to 212˚F | Sodium Hydroxide 20% | EPDM | -35˚F to 250˚F |
| Ammonia, Nitrate | EPDM | -20˚F to 250˚F | Gas Natural | Nitrile | -20˚F to 212˚F | Starch | EPDM | -35˚F to 250˚F |
| Ammonia, Water | EPDM | -20˚F to 250˚F | Glue Animal | Nitrile | -20˚F to 212˚F | Steam 250˚F | EPDM | -35˚F to 250˚F |
| Animal Fats | Nitrile | -20˚F to 212˚F | Green Liquor | EPDM | -20˚F to 212˚F | Stoffard Solvent | Nitrile | -20˚F to 80˚F |
| Black Liquor | EPDM | -20˚F to 250˚F | Hydraulic oil | Nitrile | -20˚F to 212˚F | Sulphuric Acid 10% 50% | Neoprene | -20˚F to 158˚F |
| Blast Furnace Gas | Neoprene | -20˚F to 225˚F | Hydrogen | Nitrile | -20˚F to 212˚F | Sulphuric Acid 100% | Viton | 10˚F to 300˚F |
| Butane | Nitrile | -20˚F to 212˚F | JP4 JP5 | Viton | -20˚F to 212˚F | Trichlorethylene Dry | Viton | 10˚F to 300˚F |
| Bunker Oil "C" | Nitrile | -20˚F to 212˚F | Kerosene | Nitrile | 0˚F to 212˚F | Triethanol Amine | EPDM | -35˚F to 250˚F |
| Calcium Chloride | EPDM | -20˚F to 250˚F | Ketone | EPDM | -35˚F to 250˚F | Varnish | Viton | 10˚F to 300˚F |
| Carbon Dioxide | EPDM | -20˚F to 250˚F | Lime Slurry | EPDM | -35˚F to 250˚F | Water, Fresh | EPDM | -35˚F to 250˚F |
| Carbon Monoxide (Cold) | Neoprene | -20˚F to 150˚F | Methane | Nitrile | -20˚F to 212˚F | Water, Salt | EPDM | -35˚F to 250˚F |
| Carbon Monoxide (Hot) | Viton | 10˚F to 300˚F | Methyl Ethyl Ketone | EPDM | -35˚F to 250˚F | Xylene | Viton | 10˚F to 300˚F |
| Carbon Tetrachloride | Viton | 10˚F to 300˚F | Naptha (Berzin) | Nitrile | -20˚F to 212˚F | | | |

NOTE: Above elastomer/temperature chart are guidelines only. See Pratt Compatibility Chart for specific applications.

Viton® is a registered trademark of Du Pont

# Dimensional Data for Multi-Port Plug Valve

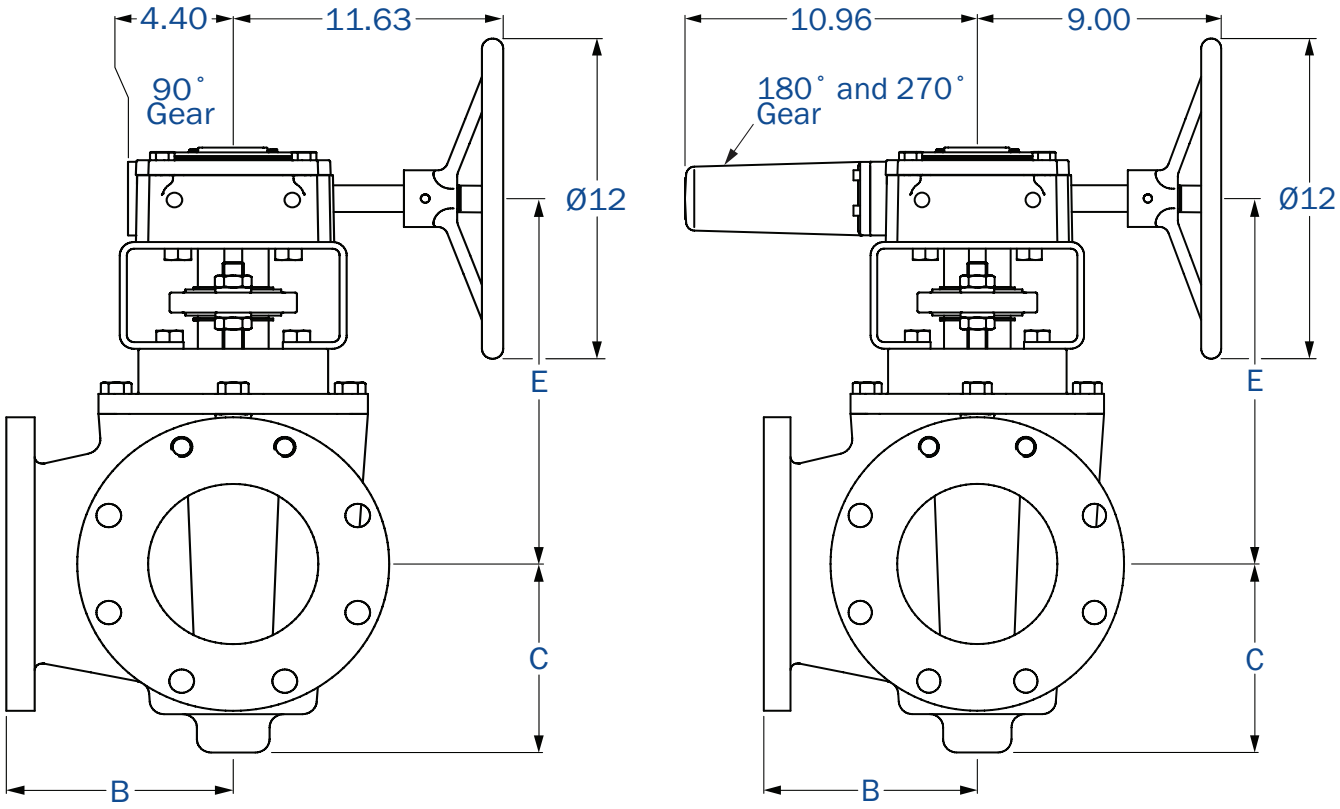



| Flanged End - Fig. 604 - Class 125 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Dimensions | Nominal Valve Size | | | | | | | |
| in | 3" | 4" | 6" | 8" | 10" | 12" | 14" | 16" |
| A | 8 | 9.88 | 11.63 | 13.88 | 16.75 | 19 | 21 | 23.75 |
| B | 5.5 | 6.5 | 8 | 9 | 11 | 11.56 | 12.5 | 15.13 |
| C | 4.81 | 5.94 | 7.06 | 10.94 | 10.94 | 12.88 | 14.19 | 14.75 |
| D | 9.04 | 13.36 | 15.04 | 18.69 | 18.69 | 21.20 | 21.10 | 22.00 |
| E | 1* | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| F | 7.50 | 9.00 | 11.00 | 13.50 | 16.00 | 19.00 | 21.00 | 23.50 |
| G | 6.00 | 7.50 | 9.50 | 11.75 | 14.25 | 17.00 | 18.75 | 21.25 |
| H | 4 | 6 | 6 | 4 | 12 | 12 | 10 | 16 |
| J | 0.75 | 0.75 | 0.88 | 0.88 | 1 | 1 | 1.13 | 1.13 |
| N | - | 2 | 2 | 4 | - | - | 2 | - |
| T | - | ⅝" - 11 UNC | ¾" - 10 UNC | ¾" - 10 UNC | - | - | 1" - 8 UNC | - |
| Weight - lb | 65 | 120 | 170 | 325 | 380 | 475 | 850 | 970 |

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

* Adaptor available to convert to 2" Nut.

# Dimensional Data for Multi-Port Plug Valve with Handwheel




| Flanged End - Fig. 604AGHW - Class 125 | | | | | | | |
|---|---|---|---|---|---|---|---|
| Dimensions | Nominal Valve Size | | | | | | |
| in | 4” | 6” | 8” | 10” | 12” | 14” | 16” |
| A* | 9.88 | 11.63 | 13.88 | 16.75 | 19 | 21 | 23.75 |
| B | 6.50 | 8 | 9 | 11 | 11.56 | 12.50 | 15.13 |
| C | 5.94 | 7.06 | 10.94 | 10.94 | 12.88 | 14.19 | 14.75 |
| E | 12.94 | 14.06 | 17.75 | 17.75 | 19.50 | 20.38 | 21.06 |
| Weight - lb | 200 | 250 | 405 | 460 | 555 | 937 | 1053 |

**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 pre-set 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 90º flow paths only, a double-style plug is available which operates through 90º travel and isolates either straight-through port (Style A90 only).

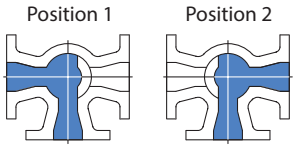
## Styling Ring

## Gear Operator

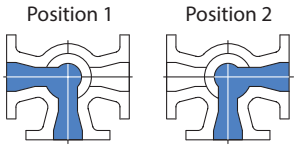
**Shown with 180˚/270˚ Gear**

# Multi-Port Plug Valve Port Positions

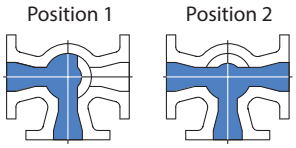
## Port Positions Viewed from Above



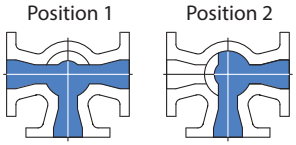

3 way, 3 port, 180˚ turn
**Style A180**



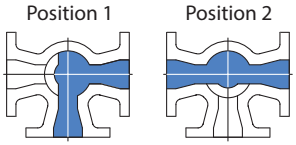

3 way, 2 port, 90˚ turn
**Style A90***



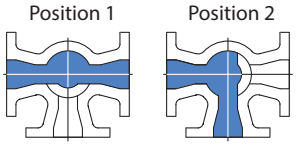

3 way, 3 port, 90˚ turn
**Style C**



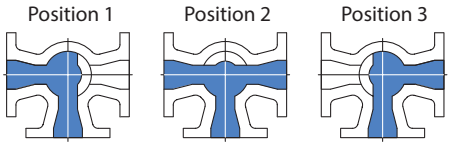

3 way, 3 port, 90˚ turn
**Style D**



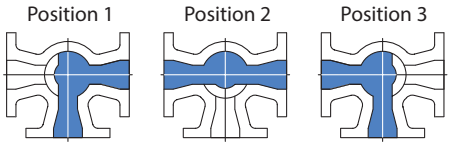

3 way, 3 port, 90˚ turn
**Style E**



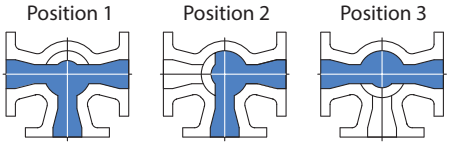

3 way, 3 port, 90˚ turn
**Style F**



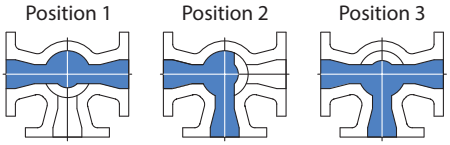

3 way, 3 port, 180˚ turn
**Style G**



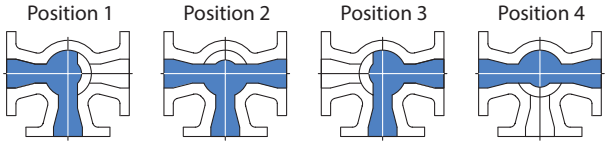

3 way, 3 port, 180˚ turn
**Style H**



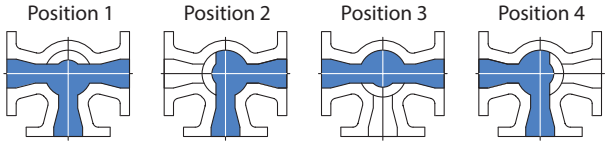

3 way, 3 port, 180˚ turn
**Style I**



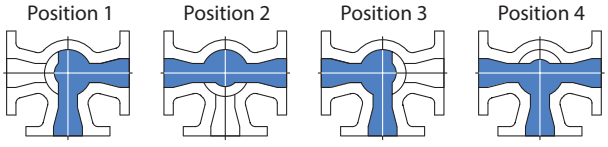

3 way, 3 port, 180˚ turn
**Style J**



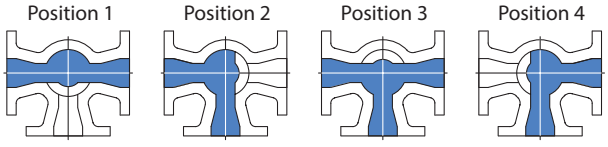

3 way, 3 port, 270˚ turn
**Style K**




3 way, 3 port, 270˚ turn
**Style L**




3 way, 3 port, 270˚ turn
**Style M**




3 way, 3 port, 270˚ turn
**Style N**

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

## HOW TO ORDER

When ordering Multi-Port plug valves, specify style letter of the port position required.

# Technical Specification
## Multi-Port Plug Valves

Valves shall be of the Multi-Port 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.

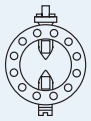
Replaceable sleeve-type bearings, manufactured in oil-impregnated stainless steel shall be fitted in the body and bonnet. Stem seals shall be self-adjusting U-cup type and be replaceable without removing the bonnet from the valve.

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.

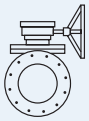
Multi-Port plug valves shall be as manufactured by the Henry Pratt Valve Company.

# PRATT PRODUCT GUIDE

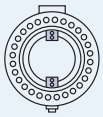


Model
2FII

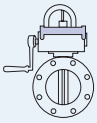
Monoflange
MKII



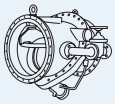
Plug
Valve



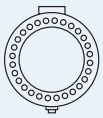
Triton®
XR70



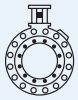
Indicating Butterfly Valve
UL & FM approved



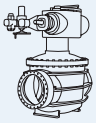
Tilting Disc
Check Valve



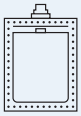
Triton®
XL



N-Stamp Nuclear
Butterfly Valve

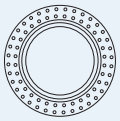


Cone
Valve

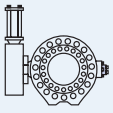


Rectangular

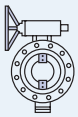
PIVA Post Indicating Valve Assembly
UL & FM approved



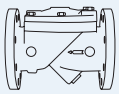
Sleeve
Valve



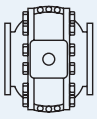
Rubber Seated
Ball Valve



Triton®
HP250

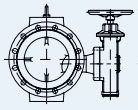


Check
Valve



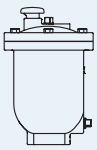
Metal Seated
Ball Valve


Control
Systems



Plunger Valve

PRATT



Air Valve

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