FluoroSeal Inc.

PLUG VALVES

NON-LUBRICATED PLUG VALVES

FluoroSeal®, Non-Lubricated, Sleeved Plug Valves incorporate state-of-the-art PTFE fluorocarbon seat design. With little required maintenance and trouble-free operation, a high integrity bubble-tight seal is provided both in-line and to atmosphere. The engineered design features contributing to the superiority of our product are described as a function of their specific purpose to ensure a trouble-free extended life.

LEAK-FREE PERFORMANCE

PTFE fluorocarbon, utilized in the FluoroSeal® sleeve and top seal components, is universally resistant to corrosive media, being inert to all but a few rarely encountered chemicals. It is a thermoplastic that can be used at a continuous service temperature of 400°F (204°C) and much higher temperatures can be satisfactorily sustained for shorter periods. Having a very low friction coefficient it is self-lubricating, negating the need for any other form of lubrication. Since PTFE is susceptible to deformation or cold flow as it is put under load, and as it becomes more pliable at elevated temperatures, precaution is taken to control this activity for the valve's intended purpose.

The FluoroSeal® internal body configuration has been designed to totally contain all the edges of the PTFE sleeve at the top, bottom, and around the entire port opening adjacent to the waterway. Any tendency of the sleeve to grow is accommodated by relief recesses designed for this purpose and positioned at 90 degrees to the body port openings. The port-defining metal lips protect the PTFE sleeve from erosion and any possibility of sleeve rotation within the body.

The waterway in the body has been designed with a contour providing a flow path that assures minimum flow turbulence characteristics. The critical sealing areas around the top and bottom of the sleeve and around the body port openings are maintained by means of an adjustable tapered plug compressing the PTFE sleeve over raised ribs.

The PTFE top seal components are similarly contained and protected from damage. A counter bore is provided at the top of the metal body to encapsulate the outside diameter of the formed PTFE diaphragm in conjunction with the formed metal diaphragm and to protect it from rupturing by regulating the amount of compression at this point.

The inside diameter of the formed PTFE diaphragm, adjacent to the plug stem, is also contained by means of a unique lip design of the formed metal diaphragm preventing extrusion and maintaining the stem seal throughout variable service conditions. This uniquely formed metal diaphragm also provides a positive electrical ground between the plug and body, eliminating the need for an extra component to fulfill this function as is the case for other valve manufacturers' designs.

ANSI/ASME Class 600 Lbs FluoroSeal® Plug Valve

DESIGN FEATURES

EFFORTLESS EFFICIENCY

As a standard, three point external adjusting bolts in the cover assure equilibrium to the compression of the stem and in-line seals by imparting a balanced force through a metal thrust washer located under the cover above the formed metal diaphragm. This mechanism provides a multiple seal to atmosphere and a double (downstream & upstream) bi-directional in-line seal.

Independent wrench stops are cast on the cover to limit the stroke at the open and close positions without endangering the integrity of the seal adjustment as in other manufacturers' designs. Parallel flats are machined on the sides of the plug stem providing positive indication of the direction of flow at all times, independent of other position indicators.

Offered as an option on all ANSI/ASME FluoroSeal® valves, and standard on all DIN valves up to DN 150, is the EZ-SEAL® (patent pending) Top Seal and Adjustment System. Featuring a single point adjustment it eliminates the possibility of plug side loading. The EZ-SEAL® (patent pending) also introduces a new industry standard by the incorporation of a Min / Max gauge on the cover, giving a visual indication of the remaining service life of a valve and easing the process of maintenance planning.

PLEDGE OF QUALITY

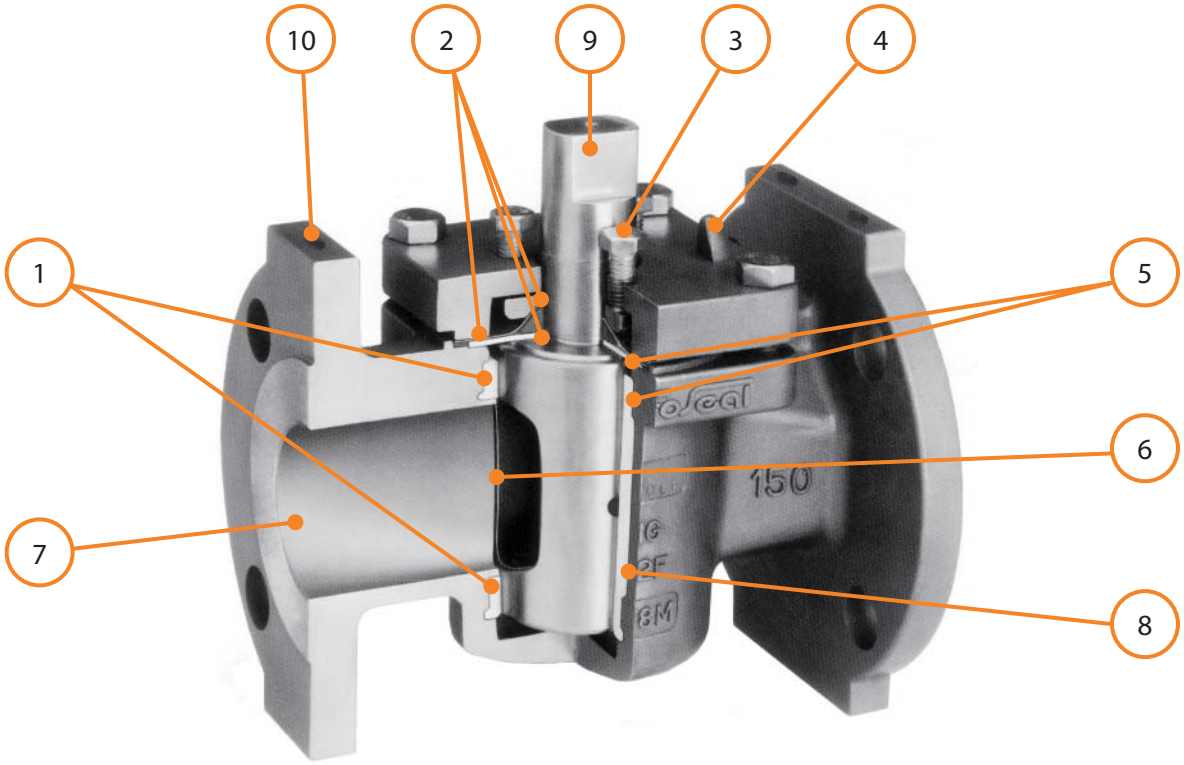
All major pressure bearing and/or boundary components (body, plug and cover) of FluoroSeal® valves are fully traceable to mill test certificates ensuring material authenticity. Quality levels are maintained through continuous inspection and manufacturing surveillance of these and all other components. A concerted effort is made to conform to all regulatory authority requirements where and when invoked, in keeping with FluoroSeal Inc.'s pledge of quality first. FluoroSeal® Plug Valves comply with the following standards:

API 598	API 599	ASME B16.5
ASME B16.10	ASME B16.25	ASME B16.34
ASME B16.42	ASTM F1545-97	DIN EN 558-1
DIN EN 1092-1	DIN EN 12266	MSS SP-55
MSS SP-61	ISO/FDI 10497	

AT A GLANCE

- Bi-directional flow
- Quarter-turn operation
- Non-lubricated
- Self-cleaning on each operation
- 2-way and multiport configurations
- Special service and jacketed designs available
- All casting components traceable to mill test certificates
- Investment cast on all materials for sizes 1/2" – 10" (ANSI/ASME Class 150 lbs)

- Investment cast on all materials for sizes 1/2" – 6" (ANSI/ASME Class 300 lbs)
- Investment cast on all materials for sizes 1/2" – 6" (ANSI/ASME Class 600 lbs)
- Investment cast on all materials for sizes DN 15 – DN 150 (PN 16 – PN 40)
- Standard heavy-duty gears available on all FluoroSeal® valves



ANSI/ASME Class 150 Lbs FluoroSeal® Plug Valve Cut-Away

DESIGN FEATURES SUMMARY

1. Bi-directional in-line bubble-tight seal independent of line pressure
2. Multiple external bubble-tight seals independent of line pressure
3. Direct mechanical three-point adjustment independent of line pressure
4. Independent travel stops
5. Full encapsulation and retention of all leading edges of PTFE sleeve and top seal components
6. Full lip at port openings protects PTFE sleeve
7. Contoured waterway ensures minimum flow turbulence characteristic
8. No body cavities to entrap flow media
9. Positive flow direction indication
10. Drilled and tapped flange mounting pads independent of cover and top seal assembly

SLEEVED PLUG VALVES — COMPONENTS

ANSI/ASME Class 150 Lbs FluoroSeal® Plug Valve with Wrench

MATERIALS OF CONSTRUCTION

Body and Plug[1]	As Specified
Cover[2]	Carbon Steel, 304 SS
Cover Bolts[2]	Carbon Steel, 304 SS
Adjusting Bolts	304 SS
Thrust Washer	304 SS
Metal Diaphragm[3]	304 SS, MONEL®
Delta Ring	PTFE Fluorocarbon
Diaphragm	PTFE Fluorocarbon
Sleeve[4]	PTFE Fluorocarbon
Wrench Operator[5]	Carbon Steel
Wrench Bolt[5]	Steel
Gear Assembly	Cast Ductile Iron Housing
Gear Adaptor[5]	Hi-Strength Steel
Gear Mounting Bracket	304 SS
Mounting Bracket Bolts[5]	Steel

1. See BODY & PLUGS MATERIAL TABLE for material selections.
2. Cover and bolt materials of standard valves will be supplied in accordance with the following table:

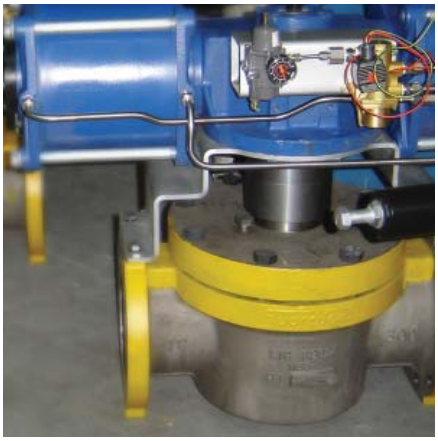
SPECIFIED BODY	COVER	ANSI/ASME COVER BOLT	DIN COVER BOLT
Ductile Iron	Carbon Steel	ASTM A193 Gr. B7	DIN EN 10269
Carbon Steel	Carbon Steel	ASTM A193 Gr. B7	DIN EN 10269
All Other Materials	CF8	ASTM A193 Gr. B8	DIN EN 10269

   Covers can be delivered in the same material as body if specified at time of order.

3. MONEL® metal diaphragms will be supplied with valves having a MONEL® or nickel trim. All others will be supplied with 304 SS diaphragms.
4. Glass reinforced PTFE (RTFE), PFA Fluorocarbon, GF2P, Hi-Temp, and UHMWPE sleeves are available on special order.
5. 304 SS available on special order.

FluoroSeal Inc.

Specialty Valves



SPECIAL SERVICE

SPECIAL SERVICE FLUOROSEAL® PLUG VALVES

Whether you are looking for a valve to suit a specific application, or want to customize a standard FluoroSeal® Plug Valve, you have come to the right place. Our special service valves provide you with both an array of turn-key solutions and the ability to fully match your application needs.

CAGED CONTROL PLUG VALVES

The Caged Control Valve is ideal for abrasive applications with high solids concentrations and is commonly used in both throttling and on/off applications. Caged valves have been used successfully in many critical applications in the Mining, Pulp & Paper, and Chemical Processing industries.

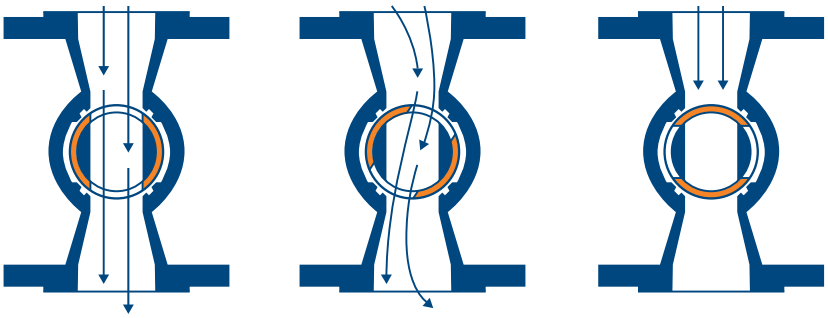
The design of the Caged Control Valve provides maximum protection to the polymer sealing surfaces in the plug valves. The key to the caged design is that the PTFE sleeve in the valve is never directly exposed to the process flow. This allows the sleeve to maintain its sealing integrity in abrasive applications.

The design of the Caged Control Valve allows the plug to rotate freely around a fixed cage within the body. The cage is stationary in the body while the plug rotates, thus allowing the sealing area of the plug to be in direct contact with the sleeve to provide bubble-tight shutoff. The cage stays in position protecting the polymer sleeve from erosion/abrasion while the plug is in any intermediate position such as when the valve is moving from the open to the closed position or when the valve is throttling.

The cage has upper and lower graphite filled RTFE bearings that prevent galling between the plug and cage. A keyway keeps the cage from rotating in the body. This allows free movement of the plug around the cage.

The Caged Control Valve still allows for in-line adjustment for through valve leakage just as a standard plug valve does since the plug and the cage are independent of each other.

The cage and plug in the Caged Control Valve are generally made from CD4MCu material, an abrasion resistant alloy with the corrosion resistance of 316 SS. Caged Control Valves are available in any material, from carbon steel and stainless steel to any of the more exotic alloys.



From Left to Right: Full Flow (Plug 0°), Control Flow (Plug Throttling), Shutoff (Plug 90°)

UREA SERVICE — A CAGED CONTROL SHOWCASE

An excellent example of the efficiency designed into a Cage Control Valve is its use in urea service. In combination with a side flush option as demonstrated in Double Block and Bleed Valves, the FluoroSeal® Cage Control Plug Valve can withstand frequent pressure drops and urea crystallization present in the fabrication of this chemical reactant.

Inherently corrosive and erosive, urea service requires a valve designed to protect its main seals from the attack of the urea flow and possible particulates. Not only does the Caged Control Valve achieve this, it also effectively prevents the valve from clogging and sticking.

SPECIAL CLEANING PLUG VALVES

FluoroSeal® Special Cleaning Plug Valves can be prepared for a variety of demanding service applications, such as hydrogen, isocyanate, oxygen, phosgene and chlorine.

In the case of chlorine, FluoroSeal® Chlorine Service Valves are provided with a vented plug to relieve pressure to the upstream side. This modification results in a uni-directional valve which is indicated on the valve whith a flow direction arrow.

FluoroSeal® Sleeved Plug Valves are manufactured in accordance with the recommendations of the Chlorine Institute Pamphlet 6 and provide superior performance on this demanding application. All FluoroSeal® Chlorine Valves are made from thoroughly cleaned and dried components under controlled conditions and this control is maintained throughout parts preparation, assembly, testing and special protective packaging.

Chlorine Service Packaging Caution Tags

DOUBLE BLOCK & BLEED AND SAMPLING PLUG VALVES

Because of the double port seals in both directions and the sealed isolation of the chamber below the plug and the areas around the plug, 90° to the port openings, a drainage connection into the plug cavity may be drilled and tapped through the body from either side or the bottom.

A 1/2" (12.7 mm) drain connection is standard, but other sizes can also be provided. Specify connection size; length as indicated on the drawing and whether the bleed valve is required. A FluoroSeal® Fig. R152/302SE is ideally suited as the bleed valve.

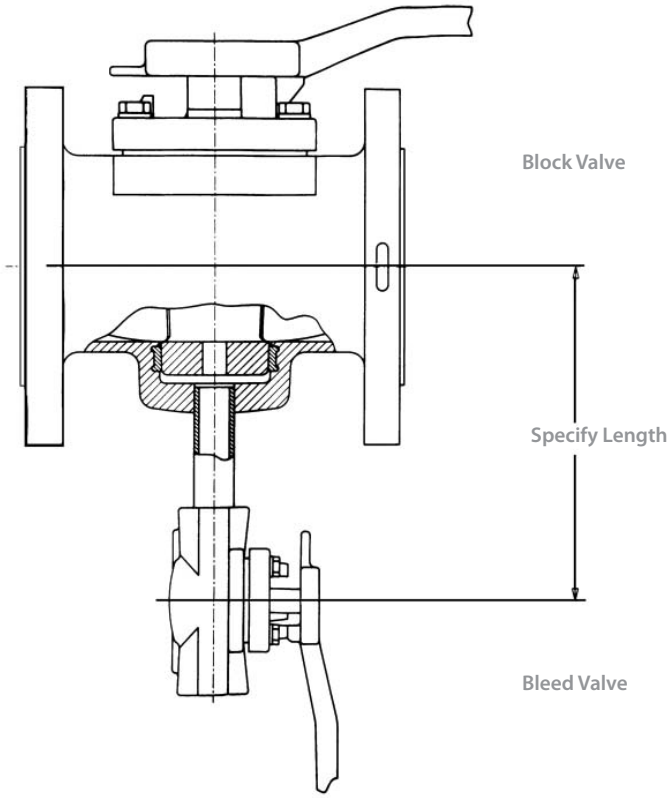
ANSI/ASME FluoroSeal® Double Block and Bleed Plug Valve with Gear

ANSI/ASME

Bleed valve diameter 1/2" available in block valve size 2", 2 1/2", 3", 4"
Bleed valve diameter 3/4" available in block valve size 6", 8"
Bleed valve diameter 1" available in block valve size 10", 12", 14", 16", 18", 24"

DIN

Bleed valve diameter DN 15 available in block valve size DN 50, DN 65, DN 80, DN 100
Bleed valve diameter DN 20 available in block valve size DN 150



FIRE SAFE SLEEVED PLUG VALVES

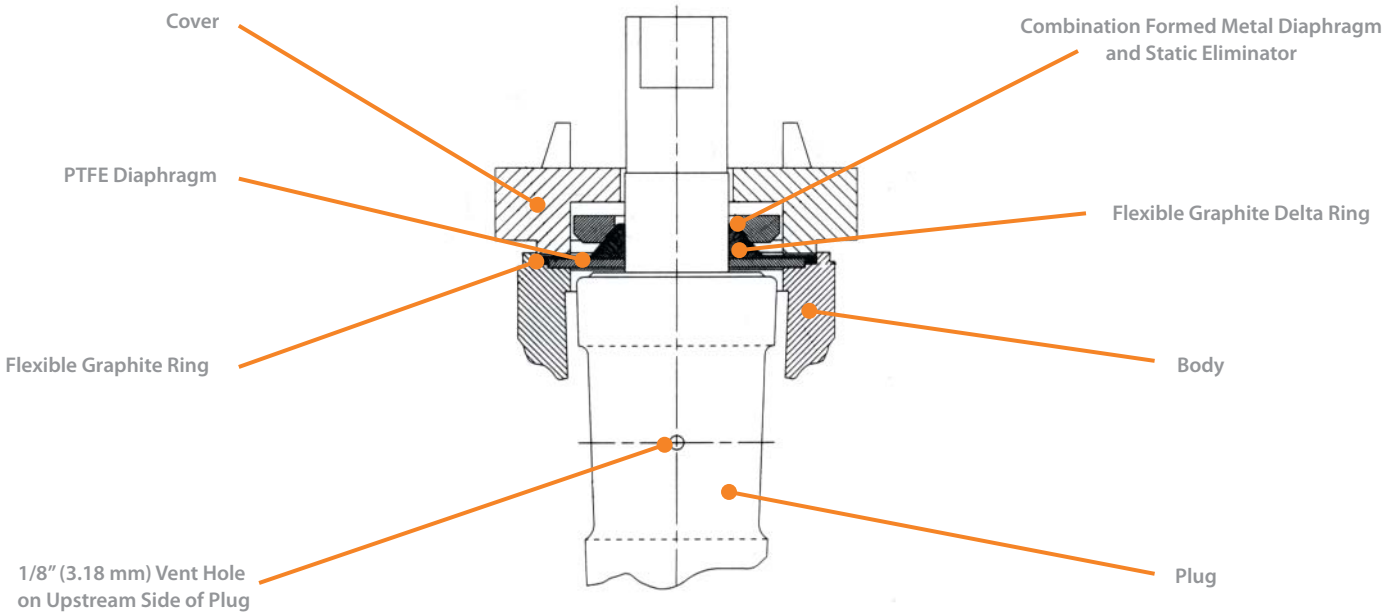
FluoroSeal® Sleeved Plug Valves with the Fire Safe top seal have been tested and certified by an independent laboratory to the requirements of API 607, Fifth Edition (ISO 10497-5) for external leakage.

The FluoroSeal® Fire Seal design utilizes a PTFE sleeve and PTFE diaphragm as the external sealing components under normal conditions. Should these components be destroyed by fire, external leakage is prevented by:

1. A secondary flexible graphite seal ring encapsulated and compressed between the metal diaphragm and the machined counterbore in the valve body

2. A flexible graphite delta ring encapsulated and compressed between the unique shaped metal diaphragm and the machined plug stem

FluoroSeal® Fire Safe Valves also utilize a vented plug designed to relieve pressure buildup resulting from expansion of the service media within the plug, due to elevated temperatures caused by fire. The pressure is relieved to the upstream side, providing a preferred flow direction indicated by an arrow on the valve cover.



Fire Safe Assembly

FluoroSeal Inc.

Specialty Valves

OPTIONS

EZ-SEAL® TOP SEAL & ADJUSTMENT SYSTEM

This product is available on FluoroSeal® Sleeved and Lined Plug Valves in ANSI/ ASME and DIN standards. In fact all DIN valves up to DN 150 come fitted with the EZ-SEAL® (patent pending) as standard.

FluoroSeal®, non-lubricated, EZ-SEAL® (patent pending) Sleeved and Lined Plug Valves possess the state–of–the–art in PTFE fluorocarbon seat designs. With low maintenance and trouble-free operation, a high integrity bubble-tight seal is provided both in-line and to atmosphere. The specific design features contributing to the superiority of this product are described as a function of their individual purpose and engineering precautions taken to assure maximum service life.

This innovation places FluoroSeal® Plug Valves at the leading edge of technology in the industrial valve market .

The EZ-SEAL® offers 360° simultaneous and even compression adjustment of the packing and plug, eliminating side loading. Visual indication takes the guess work out of valve adjustment and remaining service life diagnostic.

Valve with EZ-SEAL® (Patent Pending) Assembly

THE EZ-SEAL® CONCEPT

An easily accessible, single point frontal adjustment system that introduces the ease and precision of maintenance planning and cost savings on both manual and automated valve applications. Achievement is two-fold:

1. Maintenance technicians now have a trouble-free way of resealing both manual and automated valves with a single, quick and easy adjustment point (in comparison to time-consuming, cumbersome multiple adjustment bolt designs)
2. Visual gauging offers upfront knowledge of valve status, useful in scheduling valve change-out on shutdowns

EZ-SEAL® (Patent Pending) Cover with Cast On Min / Max Gauge

EZ-SEAL® (Patent Pending)
Bracket and Lock

ADVANTAGES

- No special tooling needed
- Signifcantly reduces recordable leakages
- Visual diagnostic
- Extended service life
- Allows for easy maintenance planning
- EZ-SEAL® Bracket and EZ-SEAL® Lock with a wide range of ISO mount patterns and five locking positions are offered in 304 SS as standard
- Allows direct mounting of actuation without inhibiting visual verification of stem status

DESIGN FEATURES SUMMARY

1. Single point frontal adjustment system
2. 360° simultaneous and even compression of top seal and plug
3. Plug adjustment is linear, impossible to side load
4. Tapered stem for increased sealing capabilities
5. Visual Min / Max cam adjustment indicator
6. Combination formed metal diaphragm and static eliminator
7. ISO mount stem
8. All-in-one ISO bracket and locking device, as standard
9. All components are high precision investment cast
10. Explosion-proof stem design
11. Positive shutoff

ANSI/ASME Class 300 Lbs FluoroSeal® Sleeved Plug Valve with EZ-SEAL®
(Patent Pending) Cover

JACKETED PLUG VALVES

The bolt-on Fully Jacketed Plug Valve with standard flanges eliminates the need to oversize piping flanges, translating in tremendous savings to the user.

Among other features, the ease of installation allows any FluoroSeal® Plug Valve to be retrofitted in-line in process.

FluoroSeal® Plug Valves are also available with Partial Steam Jackets. Choose accordingly to the application requirements.

There's no limits to the possibilities: all FluoroSeal® valves in all trim materials are available in either a two-way or multiport versions, with partial or full jackets.

DIN Fully Jacketed Plug Valves are available upon request.

Fig. 1 Standard Welded Full Jacket with Oversized Flanges

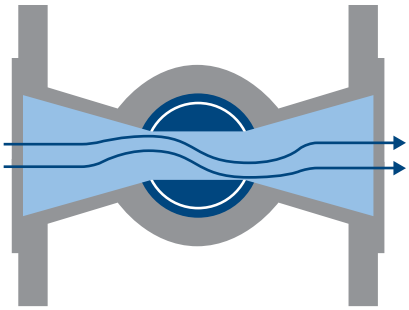
Fig. 3 Full Bottom Jacket Using Valve Body Standard Flanges (Jacket Pressure Rating Available in 150 & 300 lbs)

Fig. 2 Partial Welded Jacket

Fig. 4 Multiport with Full Welded Jacket

V-PORT & CHARACTERIZED PLUGS

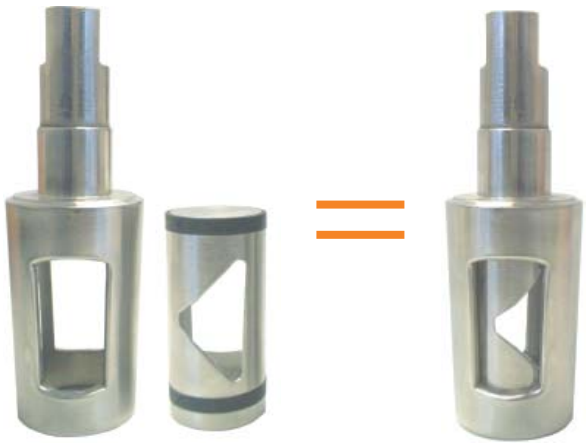
FluoroSeal® Plug Valves are also available with Characterized Plugs for fine control applications. Standard V-Ports in 60° and other custom configurations are available in all trim materials.



Flow Diagram

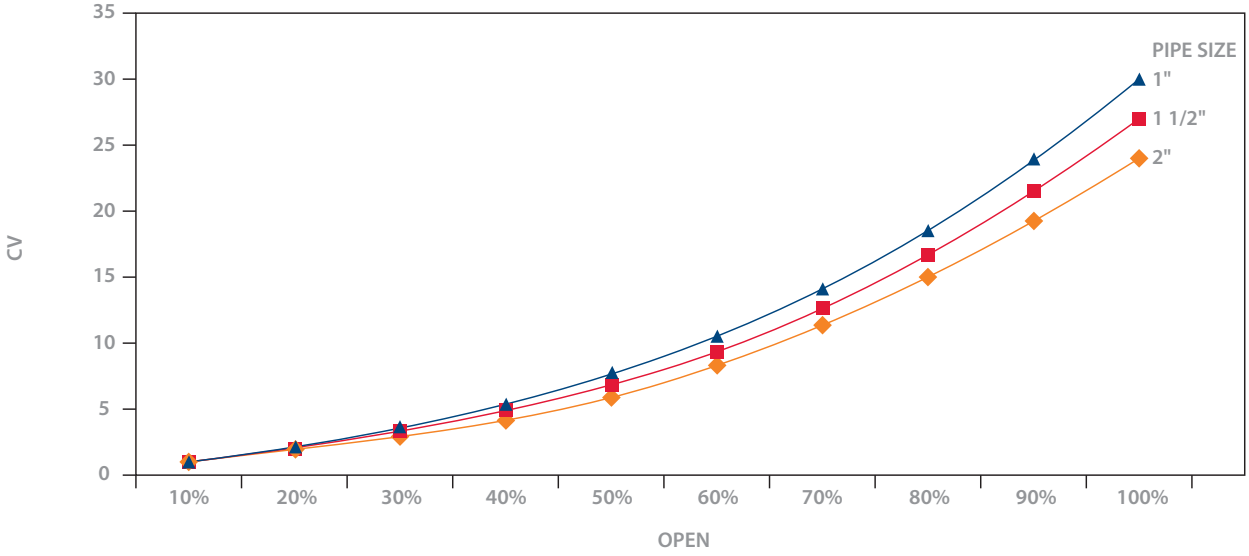
The design and features of the FluoroSeal® Plug Valve makes it an excellent choice for fine throttling in slurry and chemical applications. The no cavity design allows the plug valve to throttle without exposing the stem seal to line pressure, a definite advantage over most ball valves specifically in high cycling applications.

The Cage Control V-Port Plug Valve is mostly used in highly abrasive applications offering the benefits of a metal seated control valve, with the added advantage of a bubble-tight shutoff at a fraction of the cost. This product is available in all materials from 1" to 14" (DN 25 to DN 150).



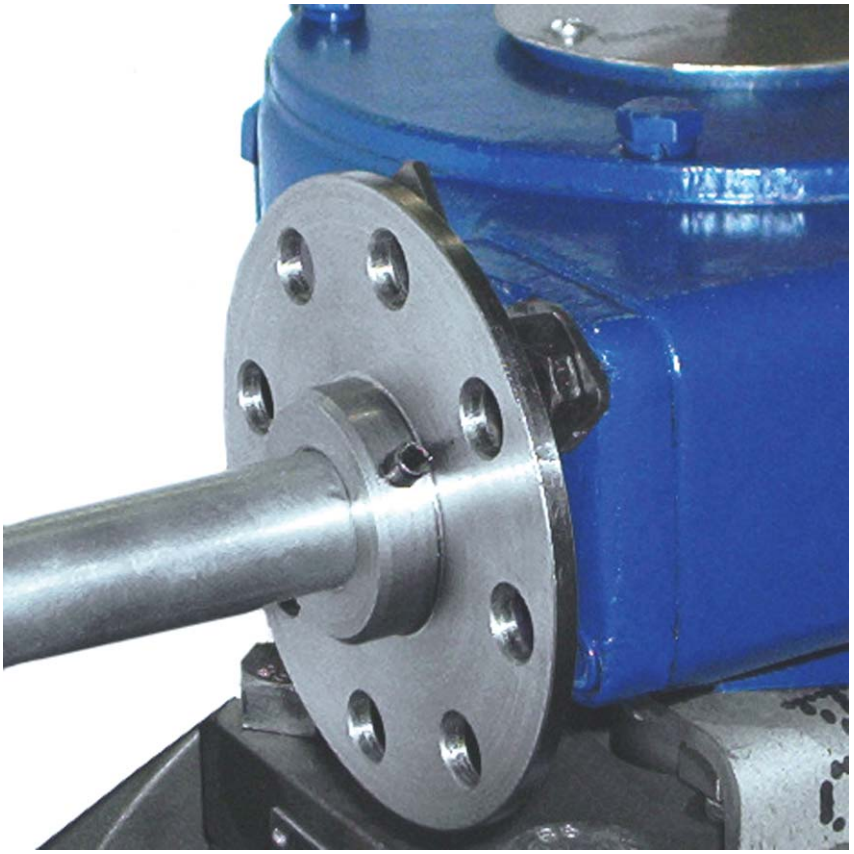
Characterized Plug

TYPICAL FLOW CHART FOR A 1" 60° V-PORT PLUG VALVE



FluoroSeal Inc.

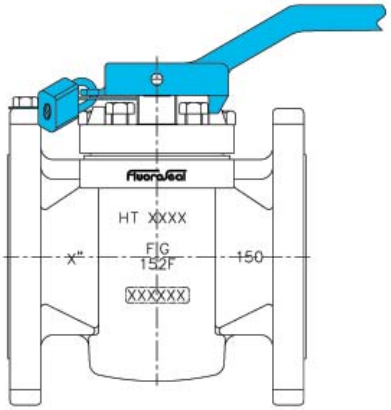
Specialty Valves

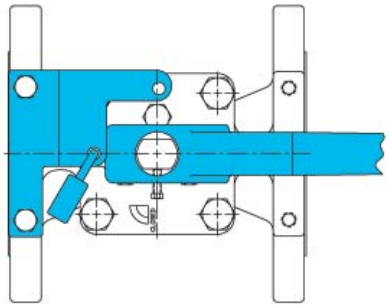


ACCESSORIES

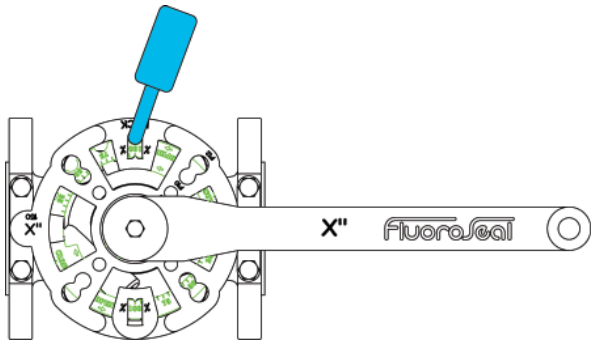
WRENCH OPERATOR LOCKING DEVICE

Pad lock is not supplied.





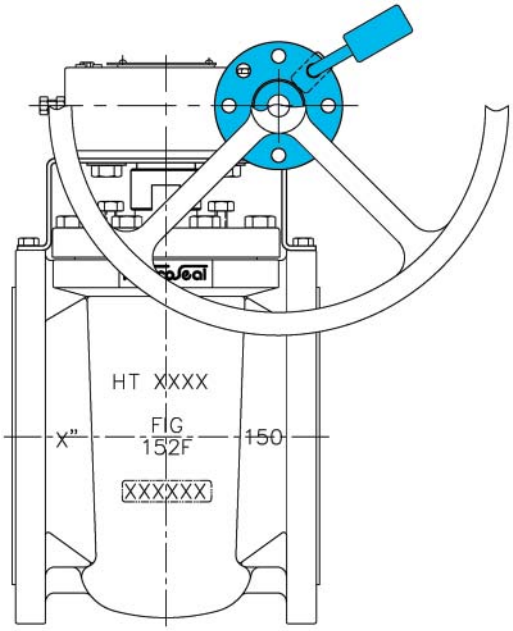
Locking Device on Regular Cover

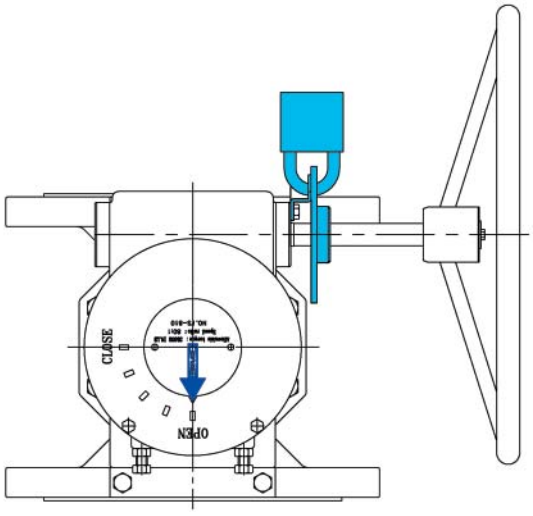


Locking Device on EZ-SEAL®

GEAR OPERATOR LOCKING DEVICE

Pad lock is not supplied.





FluoroSeal Inc.

Specialty Valves

TECHNICAL DATA

ENGINEERED SOLUTIONS DIVISION (ESD)

Our Engineered Solutions Division (ESD) is staffed with highly skilled engineers, technicians and draftsmen specialized in modifying existing designs to meet your specific needs.


Chemical


Mining

OUR ENGINEERING COMMITMENT

We will assist you in making the most appropriate selection of alloys and polymers to suit your application. We will provide you with CV factors and other necessary flow calculations, therefore making your decision process as easy as possible. We will work together with you to develop the best valve possible, no matter what your industry sector:


Oil & Gas


Power Generation


Pulp & Paper

QUALITY ASSURANCE

FluoroSeal® Plug Valves possess all of the best design features presently available in a non-lubricated valve. They are inspected throughout the full manufacturing process from foundry to final assembly and packaging to assure high quality and consistency in every unit.

All valves are pressure tested prior to shipment and fully compliant to ANSI B16.34 (DIN EN 12266-1) shell tests and MSS SP-61 seat test requirements. All high nickel alloy valves are helium shell tested on a standard basis.

TESTING

- All FluoroSeal® valves are tested with dry air to 1.5 times the full rated pressure of ANSI/ASME Class 150 as per ANSI B16.34 paragraph 7.1 (DIN EN 12266-1)
- All FluoroSeal® valves in ANSI/ASME Classes 150, 300 and 600 lbs and DIN PN 16 to PN 40 are tested in full compliance with ANSI B16.34 paragraph 7.2 (DIN EN 12266-2)
- FluoroSeal® Fire Safe Valves are tested to API 607 Fifth Edition (ISO 104397-5)

CERTIFICATE OF APPROVAL

This is to certify that the Quality Management System of:

FluoroSeal, Inc.
Montreal, Quebec
Canada

has been approved by Lloyd's Register Quality Assurance to the following Quality Management System Standards:

ISO 9001:2000

The Quality Management System is applicable to:

Design and Manufacture of Industrial Valves for Oil and Gas, Petrochemical, Chemical, Pharmaceutical, Power Generation, Mining, Water Treatment, Pulp and Paper, Food and Beverage Applications.

Approval Certificate No: UQA 0113191

Original Approval: December 20, 2002
Current Certificate: July 27, 2007
Certificate Expiry: December 31, 2008

Issued by: LRQA, Inc. Houston

ISO 9001:2000 Certificate

Lloyd's Register

EC CERTIFICATE OF CONFORMITY

In accordance with the requirements of the Pressure Equipment Directive 97/23/EC and the Pressure Equipment Regulations 1999, UK Statutory Instrument 1999 No. 2001 and SI 2002 No. 1267

This is to certify that the Quality Management System of:

FluoroSeal, Inc.
1875 46° Avenue
Montreal, Quebec, H8T 2N8
Canada

has been assessed against the requirements of Annex III, Module H of the Pressure Equipment Directive 97/23/EC, and Schedule 4, Module H of the Pressure Equipment Regulations 1999 and conforms to the requirements for the products shown below:

Design, manufacture and testing of Plug valves

Approval is subject to the continued maintenance of the quality system in accordance with the requirements of the above Directive and Regulations.

Authorisation is hereby given to use the LRV Notified Body Identification Number in accordance with the requirements of the specified Directive and Regulations in relation to the products as identified above.

Certificate No: 0038/PED/20020103/A
Original Approval: 17 May 2003
Current Certificate: 17 August 2007
Certificate Expiry: 31 May 2009
LRV Notified Body Number 0038

S C Emeny on behalf of Lloyd's Register Verification

Lloyd's Register

EC CERTIFICATE OF CONFORMITY
CERTIFICATE 0038/PED/20020103/A SCHEDULE

In accordance with the requirements of the Pressure Equipment Directive 97/23/EC and the Pressure Equipment Regulations 1999, UK Statutory Instrument 1999 No. 2001 and 2002 No. 1267

FluoroSeal, Inc.
1875 46° Avenue
Montreal, Quebec, H8T 2N8
Canada

Products
Sleeved Plug Valves
1½" through 18" ASME 150, 300, 600 class
20" and 24" ASME 150, 300 class

Lined Plug Valves
1½" through 8" ASME 150 class

Schedule Issue: 04
Date of Schedule Issue: 17 August 2007
LRV Notified Body Number 0038

S C Emeny on behalf of Lloyd's Register Verification

EC Certificate of Conformity

FLUOROSEAL INC. PRODUCTION & ASSEMBLY FACILITIES

Our experienced shop personnel work with the latest technology in machining and testing equipment.

Exclusive Distributor:

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FluoroSeal Inc.