

# Proven Valve Performance & Reliability



## THE COMPANY



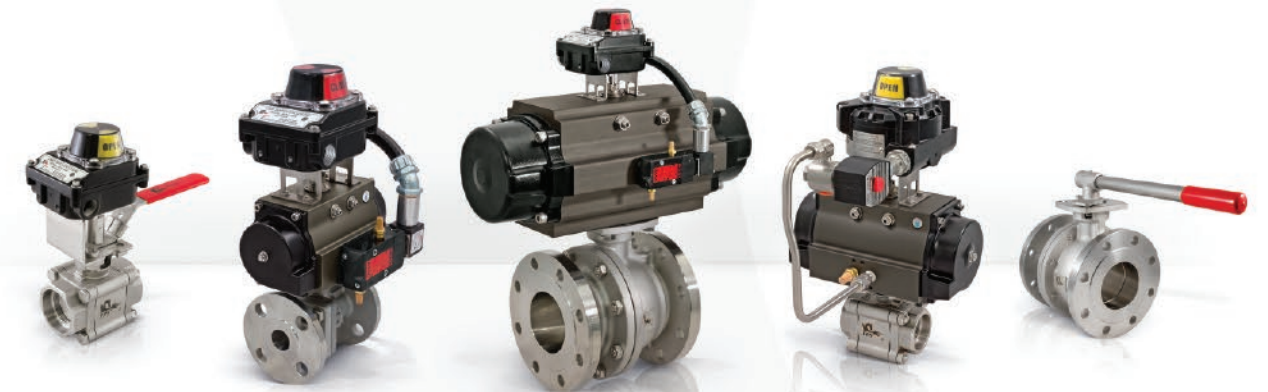
In February 2022, **Fossil Power Systems (FPS)** became part of the Babcock & Wilcox (B&W) family of steam generation and emissions control technologies. The acquisition is a natural extension of the long relationship the two companies have had for more than 35 years when B&W began serving as the exclusive supplier of FPS ignitors in the U.S.

Founded in 1981 as a designer and manufacturer of ignitors, flame scanners and drum level probes, FPS has evolved to become a worldwide leader in the design and manufacture of firing equipment and safety systems for the power generation, pulp and paper, and petrochemical industries.

FPS developed many of the technologies that are currently being used throughout the industry on flame scanning, gas/oil ignition and water level measurement equipment. Our products are specified on new construction and retrofit projects around the world. FPS products are installed in over 70 countries, all developed, manufactured and tested in our factory in Nova Scotia, Canada.

FPS is one of very few companies in the world that can provide complete boiler gas conversion expertise, with the ability to provide the optimal ignition equipment, flame scanners, natural gas piping design/fabrication, burner management system (BMS), and combustion control system (CCS), as well as manage local approvals.

FPS continues to be an industry leader in technology advancement; we continue making boilers cleaner, safer and more reliable.



## LOCATION

A 45,000 ft<sup>2</sup> facility in Dartmouth, Nova Scotia, Canada, is home for all project management and design engineering, R&D engineering, and manufacturing/testing of all high-pressure columns, fuel piping systems, ignition equipment, valves, control systems, and electronic products.

FPS also has an engineering and sales offices in Edmonton, Alberta, and Vancouver, British Columbia, with many authorized sales distributors located worldwide. We are also supported by B&W's expansive global network of Sales and Service personnel.

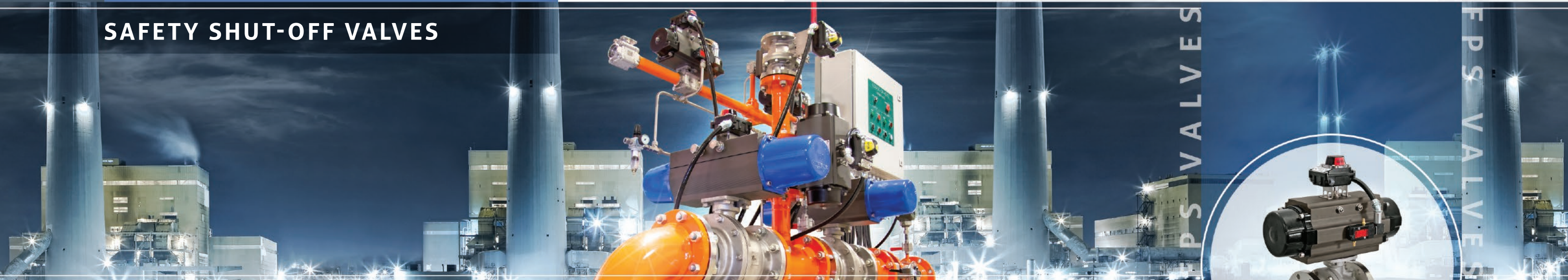


FPS

V A L V E S

# SAFETY SHUT-OFF VALVES

FPS valves are approved to the industry's top standards including: API 607 6th Edition Fire Safe, Factory Mutual (FM) Class 7400 Liquid and Gas Safety Shut-off Valves, CSA 3.16/CGA Interim Requirement No. 60 Lever Operated Gas Shut-off Valves, CGA 3.9 Automatic Safety Shut-off Gas Valves, CSA 6.5/ANSI Z21.21 Automatic Valves for Gas Appliances, Functional Safety Certified as per IEC61508 and CRN registration in all Canadian Provinces.



FPS 90D Series Valve

## FPS VALVE OVERVIEW

**FPS is a leader** in reliable, cost-effective, high performance shut-off valve technology. Our automatic and manual shut-off valves are installed around the world in pulp and paper, petrochemical and utility boiler applications. FPS valves provide low maintenance, leak proof and fail safe operation.

### Blow Out Proof Stem

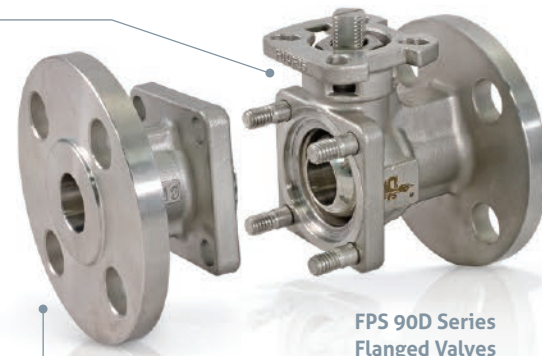
Extra high cycle life: maintenance free, live loaded, triple sealing, high cycle stem packing systems provide extra long service life.

### Leak Watch Window

Early warning of stem leak.

### 316 SS Ends

NPT, Socket Weld connections available on 88 Series. 150lb and 300lb Flanges available on 90D Series.



FPS 90D Series Flanged Valves



Series 88:  
3 Piece  
Valve Body

### Fully Encapsulated Body Seals

Bi-directional valve seals prevent leaks in both directions. 3-piece design allows for ease of maintenance.

### FPS CSA APPROVED VALVES

FPS valves are approved for use on CSA B149.3 systems. Our CSA valve assemblies are registered with CSA and have undergone operational, durability, electrical and leak testing to comply with the following standards:

#### Manual Valves:

- CGA Interim Requirement No. 60 Lever Operated Gas Shut-off Valves (This standard covers all requirements of CSA 3.16 but specifies a higher allowable process pressure).
- CSA 3.16-2015 Lever Operated Non-Lubricated Gas Shut-Off Valves.

#### Automatic Valves:

- CSA 6.5 Automatic Valves for Gas Appliances.

### UL APPROVED VALVES

FPS 9650 valve series manual valves and automatic safety shut-off valves have been tested in accordance with and conform to ULC ORD-C842 for use with No. 2 fuel oil. These valves are for use on CSA B139 systems. FPS valves can adhere to MR0175 for NACE compliance.



Highly Visible Beacon/Indicator

### Fail Safe Spring Return Actuator

On loss of air or control power, actuator will fully return the valve to its fail safe position.

### Direct Actuator To Valve Mounting

No couplings.

### Variety of Solenoid Options Available

Refer to options and configuration section of this brochure.

### FPS FACTORY MUTUAL (FM) APPROVED VALVES

FPS Valves are registered with Factory Mutual, a requirement for any shut-off valve to be installed in an FM insured commercial or industrial application. Our FM valves are tested and approved to the following standard:

#### Automatic Valves:

- FM Class 7400 Approval Standard for Liquid and Gas Safety Shutoff Valves.

#### FM/CSA Automatic Valve Dual Approval:

FPS automatic valves are also available with FM Class 7400 and CSA 6.5 as a Dual Approval Valve.

### IEC 61508 FUNCTIONAL SAFETY CERTIFIED

The FPS 9650 valve series has been assessed as per the requirements of IEC61508 and is capable of proving a safety integrity level of SIL 3. The 9650 valve series is capable of use in SIL 2 @ HFT=0 and SIL3 @ HFT=1.

The 9650 valve series serves as a final element in a Safety Instrumented System (SIS), and has been certified as an integrated assembly. This provides customers with failure data for a complete automated package which streamlines SIF calculations.





FPS

88 SERIES (NPT & SW)

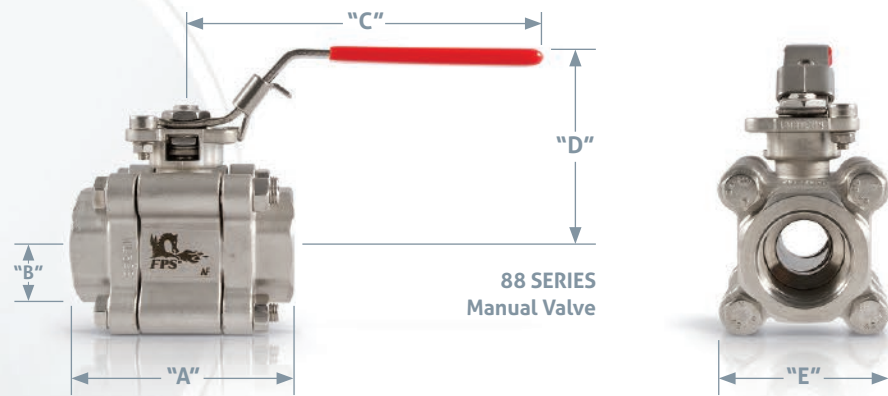
VALVE DIMENSIONS



88 SERIES AUTOMATIC VALVE DIMENSIONS



| Size   | CV  | "A" <sup>**</sup><br>mm (in) | "B"<br>Spring<br>Return<br>mm (in) | "C" <sup>***</sup><br>mm (in) | "D"<br>mm (in) | "E"<br>mm (in) | Weight<br>kg (lbs) |
|--------|-----|------------------------------|------------------------------------|-------------------------------|----------------|----------------|--------------------|
| 1/4"   | 8   | 282 (11.1)                   | 188 (7.4)                          | 159 (6.25)                    | 75 (2.95)      | 26.2 (1.03)    | 5.4 (11.9)         |
| 3/8"   | 8   | 282 (11.1)                   | 188 (7.4)                          | 159 (6.25)                    | 75 (2.95)      | 26.2 (1.03)    | 5.4 (11.9)         |
| 1/2"   | 8   | 282 (11.1)                   | 188 (7.4)                          | 159 (6.25)                    | 75 (2.95)      | 26.2 (1.03)    | 5.4 (11.9)         |
| 3/4"   | 15  | 282 (11.1)                   | 188 (7.4)                          | 159 (6.25)                    | 72.5 (2.85)    | 26.2 (1.03)    | 5.9 (13)           |
| 1"     | 34  | 292 (11.49)                  | 188 (7.4)                          | 159 (6.25)                    | 85.4 (3.36)    | 32.6 (1.28)    | 7.6 (16.7)         |
| 1-1/4" | 56  | 326 (12.83)                  | 204 (8.03)                         | 178 (7.0)                     | 105.3 (4.13)   | 34 (1.34)      | 8.3 (18.2)         |
| 1-1/2" | 85  | 358 (14.1)                   | 250.8 (9.87)                       | 197 (7.75)                    | 111 (4.37)     | 38.6 (1.52)    | 11.8 (26.0)        |
| 2"     | 125 | 378 (14.88)                  | 250.8 (9.87)                       | 197 (7.75)                    | 127.3 (5.0)    | 42.9 (1.69)    | 13.3 (29.3)        |

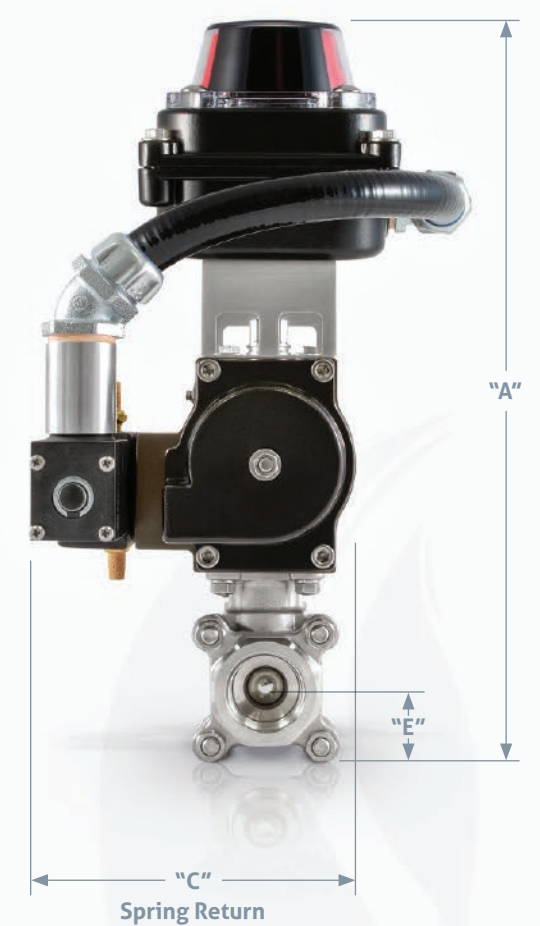


88 SERIES Manual Valve

88 SERIES MANUAL VALVE DIMENSIONS

| Size   | CV  | "A"<br>mm (in) | "B"<br>mm (in) | "C"<br>mm (in) | "D"<br>mm (in) | "E"<br>mm (in) | Weight<br>kg (lbs) |
|--------|-----|----------------|----------------|----------------|----------------|----------------|--------------------|
| 1/4"   | 8   | 75 (2.95)      | 26.2 (1.03)    | 139 (5.47)     | 77 (3.03)      | 51 (2.01)      | 0.89 (1.96)        |
| 3/8"   | 8   | 75 (2.95)      | 26.2 (1.03)    | 139 (5.47)     | 77 (3.03)      | 51 (2.01)      | 0.88 (1.94)        |
| 1/2"   | 8   | 75 (2.95)      | 26.2 (1.03)    | 139 (5.47)     | 77 (3.03)      | 51 (2.01)      | 0.83 (1.82)        |
| 3/4"   | 15  | 72.5 (2.85)    | 26.2 (1.03)    | 139 (5.47)     | 77 (3.03)      | 51 (2.01)      | 0.84 (1.85)        |
| 1"     | 34  | 85.4 (3.36)    | 32.6 (1.28)    | 139 (5.47)     | 82 (3.23)      | 61.4 (2.42)    | 1.50 (3.31)        |
| 1-1/4" | 56  | 105.3 (4.13)   | 34 (1.34)      | 165 (6.5)      | 98.5 (3.88)    | 67.8 (2.67)    | 2.17 (4.78)        |
| 1-1/2" | 85  | 111 (4.37)     | 38.6 (1.52)    | 165 (6.5)      | 102 (4.02)     | 77 (3.03)      | 4.27 (9.41)        |
| 2"     | 125 | 127.3 (5)      | 42.9 (1.69)    | 215 (8.46)     | 128 (5.04)     | 86.5 (3.4)     | 5.30 (11.68)       |

\* Note: Height Dimension "A" Shown for Watertight Limit Switch. For Assemblies with Explosion Proof Limit Switch add 25.4 mm (1") to Dimension "A".  
 \*\* Note: Dimension "C" Approximate. Dimension varies depending on solenoid used.





FPS

90D SERIES (150# & 300#)

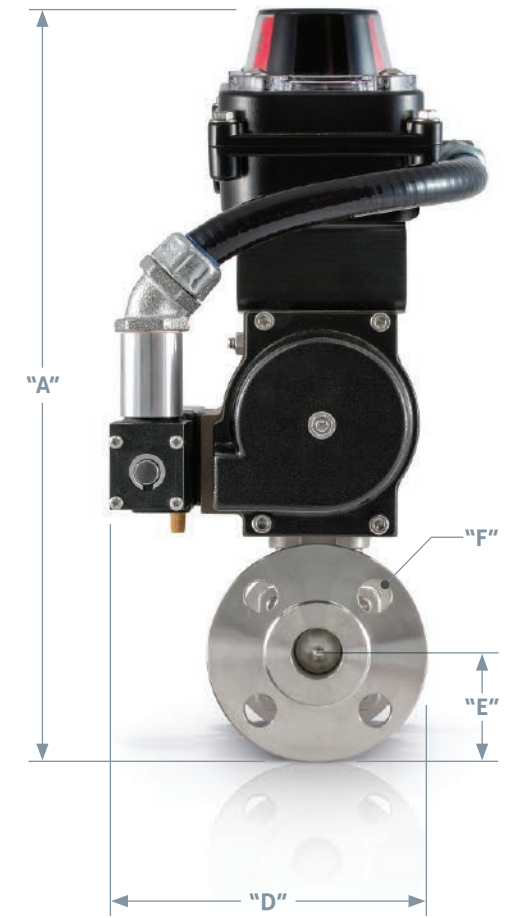
AUTOMATIC VALVE DIMENSIONS



90D SERIES AUTOMATIC VALVE DIMENSIONS

| Size   | CV   | "A" <sup>**</sup><br>mm (in) | "B"<br>mm (in) | "C"<br>mm (in) | "D" <sup>**</sup><br>mm (in) | "E"<br>mm (in) | "F" Bolts |                      |                        | Weight<br>kg (lbs) |
|--------|------|------------------------------|----------------|----------------|------------------------------|----------------|-----------|----------------------|------------------------|--------------------|
|        |      |                              |                |                |                              |                | No.       | F 1 Dia.<br>of Holes | F 2 Dia.<br>of Pattern |                    |
| 1/2"   | 12   | 326<br>(12.84)               | 195<br>(7.8)   | 108<br>(4.3)   | 127<br>(5)                   | 44.5<br>(1.75) | 4         | 16<br>(0.62)         | 60<br>(2.38)           | 5.2<br>(11.5)      |
| 3/4"   | 32   | 335<br>(13.2)                | 195<br>(7.8)   | 117<br>(4.6)   | 133<br>(5.25)                | 49.3<br>(1.94) | 4         | 16<br>(0.62)         | 70<br>(2.75)           | 5.6<br>(12.3)      |
| 1"     | 70   | 348<br>(13.7)                | 204<br>(8)     | 127<br>(5.0)   | 137<br>(5.38)                | 54<br>(2.12)   | 4         | 16<br>(0.62)         | 79<br>(3.12)           | 7.2<br>(15.9)      |
| 1-1/2" | 240  | 408<br>(16.06)               | 251<br>(9.87)  | 165<br>(6.5)   | 152<br>(6)                   | 63.5<br>(2.5)  | 4         | 16<br>(0.62)         | 99<br>(3.88)           | 13<br>(28.7)       |
| 2"     | 410  | 454<br>(17.74)               | 350<br>(13.8)  | 178<br>(7.0)   | 178<br>(7)                   | 76.2<br>(3)    | 4         | 19<br>(0.75)         | 121<br>(4.76)          | 20.6<br>(45.5)     |
| 2-1/2" | 680  | 485<br>(19.09)               | 350<br>(13.8)  | 190<br>(7.5)   | 229<br>(9)                   | 89<br>(3.5)    | 4         | 19<br>(0.75)         | 140<br>(5.5)           | 25.7<br>(56.7)     |
| 3"     | 940  | 540<br>(21.26)               | 404<br>(15.9)  | 204<br>(8)     | 229<br>(9)                   | 95<br>(3.75)   | 4         | 19<br>(0.75)         | 152<br>(6)             | 38<br>(86)         |
| 4"     | 1740 | 605<br>(23.82)               | 488<br>(19.2)  | 229<br>(9)     | 251<br>(9.88)                | 114.5<br>(4.5) | 8         | 19<br>(0.75)         | 191<br>(7.5)           | 59.4<br>(130.9)    |
| 6"     | 5000 | 729<br>(28.7)                | 640<br>(25.2)  | 394<br>(15.5)  | 305<br>(12)                  | 140<br>(5.5)   | 8         | 22.2<br>(0.88)       | 241<br>(9.5)           | 127.3<br>(280.6)   |

FPS VALVES  
150#



| Size   | CV   | "A" <sup>**</sup><br>mm (in) | "B"<br>mm (in) | "C"<br>mm (in) | "D" <sup>**</sup><br>mm (in) | "E"<br>mm (in)  | "F" Bolts |                      |                        | Weight<br>kg (lbs) |
|--------|------|------------------------------|----------------|----------------|------------------------------|-----------------|-----------|----------------------|------------------------|--------------------|
|        |      |                              |                |                |                              |                 | No.       | F 1 Dia.<br>of Holes | F 2 Dia.<br>of Pattern |                    |
| 1/2"   | 12   | 329<br>(12.95)               | 195<br>(7.8)   | 140<br>(5.5)   | 191<br>(7.5)                 | 47.75<br>(1.88) | 4         | 16<br>(0.62)         | 66.5<br>(2.62)         | 5.7<br>(12.6)      |
| 3/4"   | 32   | 355<br>(14)                  | 195<br>(7.8)   | 152<br>(6)     | 196<br>(7.7)                 | 58.75<br>(2.31) | 4         | 19<br>(0.75)         | 82.6<br>(3.25)         | 7.3<br>(16.1)      |
| 1"     | 70   | 360<br>(14.2)                | 204<br>(8)     | 165<br>(6.5)   | 203<br>(8)                   | 62<br>(2.44)    | 4         | 19<br>(0.75)         | 88.9<br>(3.5)          | 9.3<br>(20.5)      |
| 1-1/2" | 240  | 423<br>(16.65)               | 251<br>(9.87)  | 190<br>(7.5)   | 226<br>(8.9)                 | 78<br>(3.06)    | 4         | 22.2<br>(0.87)       | 114.3<br>(4.5)         | 16.6<br>(36.6)     |
| 2"     | 410  | 460<br>(18.1)                | 350<br>(13.8)  | 216<br>(8.5)   | 252<br>(9.9)                 | 83<br>(3.27)    | 8         | 19<br>(0.75)         | 127<br>(5)             | 24<br>(52.9)       |
| 2-1/2" | 680  | 501<br>(19.72)               | 350<br>(13.8)  | 241<br>(9.5)   | 264<br>(10.4)                | 95<br>(3.75)    | 8         | 22.2<br>(0.87)       | 149.4<br>(5.88)        | 31.1<br>(68.6)     |
| 3"     | 940  | 550<br>(21.65)               | 404<br>(15.9)  | 282<br>(11.1)  | 300<br>(11.8)                | 105<br>(4.13)   | 8         | 22.2<br>(0.87)       | 168.2<br>(6.62)        | 46<br>(101.4)      |
| 4"     | 1740 | 618<br>(24.33)               | 488<br>(19.2)  | 305<br>(12)    | 320<br>(12.6)                | 127<br>(5.0)    | 8         | 22.2<br>(0.87)       | 200.2<br>(7.88)        | 76.6<br>(160)      |
| 6"     | 5000 | 748<br>(29.45)               | 640<br>(25.2)  | 403<br>(15.8)  | 363<br>(14.3)                | 158<br>(6.25)   | 12        | 22.2<br>(0.87)       | 269.7<br>(10.62)       | 151.7<br>(334.4)   |

FPS VALVES  
300#

\* Note: Height Dimension "A" Shown for Watertight Limit Switch. For Assemblies with Explosion Proof Limit Switch add 25.4 mm (1") to Dimension "A".  
 \*\* Note: Dimension "D" Approximate. Dimension varies depending on solenoid used.



FPS

90D SERIES (150# & 300#)

MANUAL VALVE DIMENSIONS



T-Pipe Handle - 3" to 6"

Stainless Steel Handle with Vinyl Sleeve - 1/2" to 2-1/2"



FPS 88 & 90D SERIES VALVES  
AMBIENT PRESSURE & TEMPERATURE RATINGS

| Valve Approval                   | Maximum Operating Pressure* | Maximum Ambient Operating Temperature* | Minimum Ambient Operating Temperature* |
|----------------------------------|-----------------------------|--|--|
| CSA Automatic Gas Valves         | 1380kPa (200psig)           | 50°C (122°F)                           | -45°C (-49°F)                          |
| CSA Manual Gas Valves            | 1380kPa (200psig)           | 65°C (149°F)                           | -40°C (-40°F)                          |
| FM Automatic Liquid & Gas Valves | 1380kPa (200psig)           | 60°C (140°F)                           | -10°C (14°F)                           |
| All Other Valves                 | Consult Factory             | Consult Factory                        | -45°C (-49°F)                          |

\* Note: CSA and FM pressure and temperature ratings are lower than actual maximum operating conditions. Please consult factory for more information.

90D SERIES MANUAL VALVE DIMENSIONS

| Size   | CV   | "A"<br>mm (in) | "B"<br>mm (in) | "C"<br>mm (in) | "D"<br>mm (in)  | "E" Bolts |                     |                       | Weight<br>kg (lbs) |
|--------|------|----------------|----------------|----------------|-----------------|-----------|---------------------|-----------------------|--------------------|
|        |      |                |                |                |                 | No.       | E1 Dia.<br>of Holes | E2 Dia.<br>of Pattern |                    |
| 1/2"   | 12   | 108<br>(4.3)   | 44.5<br>(1.75) | 165<br>(6.5)   | 82.7<br>(3.3)   | 4         | 16<br>(0.62)        | 60<br>(2.38)          | 1.81<br>(4)        |
| 3/4"   | 32   | 117<br>(4.6)   | 49.3<br>(1.94) | 165<br>(6.5)   | 87.2<br>(3.4)   | 4         | 16<br>(0.62)        | 70<br>(2.75)          | 2.19<br>(4.8)      |
| 1"     | 70   | 127<br>(5)     | 54<br>(2.12)   | 165<br>(6.5)   | 94.8<br>(3.7)   | 4         | 16<br>(0.62)        | 79<br>(3.12)          | 2.91<br>(6.4)      |
| 1-1/2" | 240  | 165<br>(6.5)   | 63.5<br>(2.5)  | 262<br>(10.3)  | 147.1<br>(5.8)  | 4         | 16<br>(0.62)        | 99<br>(3.88)          | 6.4<br>(14.1)      |
| 2"     | 410  | 178<br>(7)     | 76.2<br>(3)    | 262<br>(10.3)  | 154.6<br>(6.1)  | 4         | 19<br>(0.75)        | 121<br>(4.76)         | 9.19<br>(20.3)     |
| 2-1/2" | 680  | 190<br>(7.5)   | 89<br>(3.5)    | 262<br>(10.3)  | 174<br>(6.9)    | 4         | 19<br>(0.75)        | 140<br>(5.5)          | 14.3<br>(31.5)     |
| 3"     | 940  | 204<br>(8)     | 95<br>(3.75)   | 365<br>(14.4)  | 178.7<br>(7)    | 4         | 19<br>(0.75)        | 152<br>(6)            | 19.5<br>(43)       |
| 4"     | 1740 | 229<br>(9)     | 114.5<br>(4.5) | 365<br>(14.4)  | 203.2<br>(8)    | 8         | 19<br>(0.75)        | 191<br>(7.5)          | 31.0<br>(68.3)     |
| 6"     | 5000 | 394<br>(15.5)  | 140<br>(5.5)   | 705<br>(27.7)  | 276.7<br>(10.9) | 8         | 22.2<br>(0.88)      | 241<br>(9.5)          | 75.0<br>(165.3)    |

150#

| Size   | CV   | "A"<br>mm (in) | "B"<br>mm (in) | "C"<br>mm (in) | "D"<br>mm (in)  | "E" Bolts |                     |                       | Weight<br>kg (lbs) |
|--------|------|----------------|----------------|----------------|-----------------|-----------|---------------------|-----------------------|--------------------|
|        |      |                |                |                |                 | No.       | E1 Dia.<br>of Holes | E2 Dia.<br>of Pattern |                    |
| 1/2"   | 12   | 140<br>(5.5)   | 48<br>(1.88)   | 165<br>(6.5)   | 84.7<br>(3.3)   | 4         | 16<br>(0.62)        | 66.5<br>(2.62)        | 2.3<br>(5.07)      |
| 3/4"   | 3    | 152<br>(6)     | 59<br>(2.31)   | 165<br>(6.5)   | 99.5<br>(3.9)   | 4         | 19<br>(0.75)        | 82.6<br>(3.25)        | 3.9<br>(8.60)      |
| 1"     | 70   | 165<br>(6.5)   | 62<br>(2.44)   | 165<br>(6.5)   | 99.5<br>(3.9)   | 4         | 19<br>(0.75)        | 88.9<br>(3.5)         | 5.0<br>(11.02)     |
| 1-1/2" | 240  | 190<br>(7.5)   | 78<br>(3.06)   | 262<br>(10.3)  | 147.1<br>(5.8)  | 4         | 22.2<br>(0.87)      | 114.3<br>(4.5)        | 10.05<br>(22.16)   |
| 2"     | 410  | 216<br>(8.5)   | 83<br>(3.27)   | 262<br>(10.3)  | 154.6<br>(6.1)  | 8         | 19<br>(0.75)        | 127<br>(5)            | 12.56<br>(27.69)   |
| 2-1/2" | 680  | 241<br>(9.5)   | 95<br>(3.75)   | 262<br>(10.3)  | 174<br>(6.9)    | 8         | 22.2<br>(0.87)      | 149.4<br>(5.88)       | 19.72<br>(43.48)   |
| 3"     | 940  | 282<br>(11.1)  | 105<br>(4.13)  | 365<br>(14.4)  | 179<br>(7)      | 8         | 22.2<br>(0.87)      | 168.2<br>(6.62)       | 27.50<br>(60.63)   |
| 4"     | 1740 | 305<br>(12)    | 127<br>(5.0)   | 365<br>(14.4)  | 203.2<br>(8)    | 8         | 22.2<br>(0.87)      | 202.2<br>(7.88)       | 44.20<br>(97.44)   |
| 6"     | 5000 | 403<br>(15.8)  | 159<br>(6.25)  | 705<br>(27.7)  | 276.7<br>(10.9) | 12        | 22.2<br>(0.87)      | 269.7<br>(10.62)      | 99.40<br>(219.14)  |

300#

FPS VALVES



FPS

88 & 90D SERIES

BILL OF MATERIALS

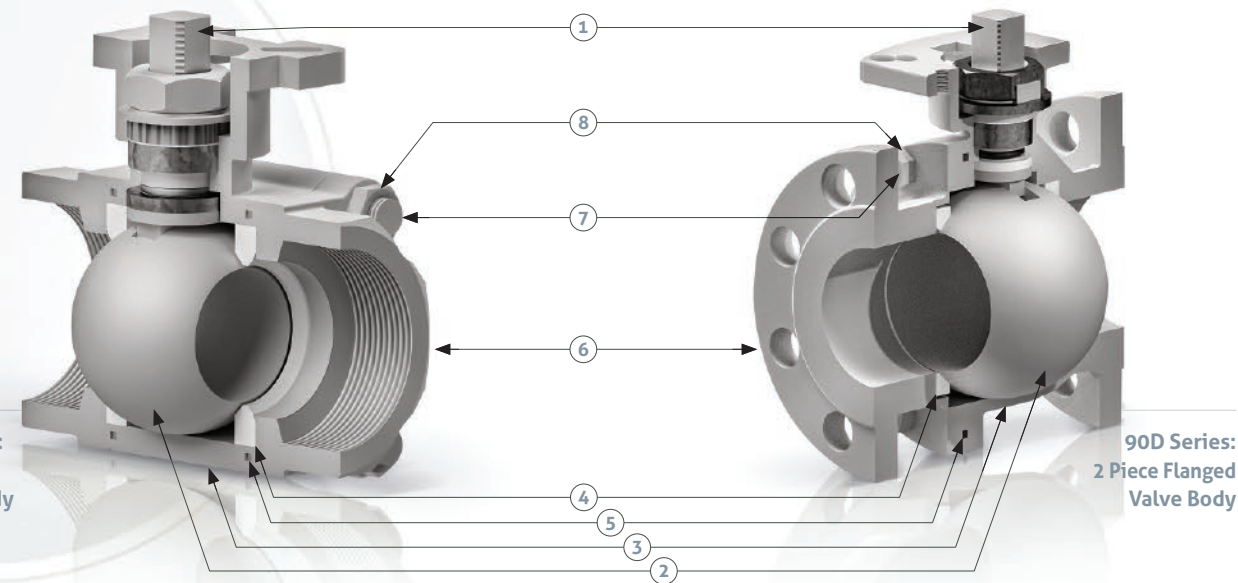


88 & 90D SERIES BILL OF MATERIALS

| Item | Qty. | Description                  | Material                    |
|------|------|------------------------------|-----------------------------|
| 1    | 1    | Anti-Blowout Stem            | SS316                       |
| 2    | 1    | Ball                         | SS316                       |
| 3    | 1    | Body                         | CF8M                        |
| 4    | 2    | Seal                         | PTFE, RTFE*                 |
| 5    | 2    | Joint Gasket                 | Graphite                    |
| 6    | 2    | End Cap                      | CF8M                        |
| 7    | 4    | Bolt                         | SS304                       |
| 8    | 4    | Nut                          | SS304                       |
| 9    | 1    | Pyramidal Stem Seal          | RTFE                        |
| 10   | 1    | O-Ring                       | VITON                       |
| 11   | 1    | Chevron™ V-Ring Stem Packing | Graphite                    |
| 12   | 1    | Gland                        | 15% Glass Fiber Filled PTFE |
| 13   | 1    | Anti-Static Gland            | SS304                       |
| 14   | 1    | Belleville™ Washer           | SS304                       |
| 15   | 1    | Lock Saddle                  | SS304                       |
| 16   | 1    | Stem Nut                     | SS304                       |
| 17   | 1    | Anti Static Device           | SS304                       |

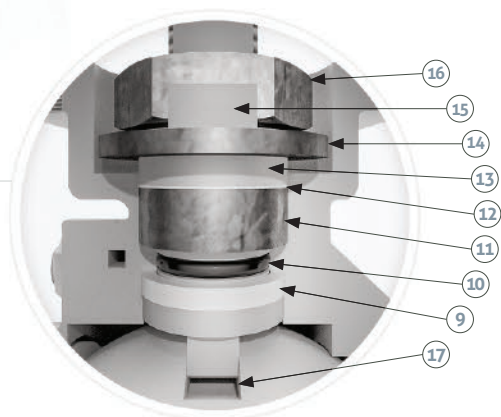
Body

Stem



88 Series:  
3 Piece  
Valve Body

90D Series:  
2 Piece Flanged  
Valve Body



Valve Stem Sealing Detail

\* Standard seats listed. Consult factory for additional seat options.

LEAK PROOF STEM

**9. Pyramidal Stem with Stem Seal**

First stage of defense against leakage. 45 degree stem slope accompanied by the stem seal effectively blocks all leak paths during rotation.

**10. O-Ring Stem Packing**

Second stage of defense against leakage. Enhances stem seal and maintains stem alignment, ensuring extra long service life.

**11. V-Ring Stem Packing**

Third Stage of defense against leakage. Multi-layered V-Ring Chevron™ Packing expands sideways when compressed, blocking all air pockets to prevent a leak path.

**12. Gland Bushing**

RTFE bushing reduces stem seal friction.

**13. Gland**

Made of stainless steel, equally distributes compressive force on the packing and seal.

**14. Belleville™ Washer**

Automatic adjustment of stem sealing system compression for normal wear, pressure, and temperature fluctuations.

**15. Lock Saddle**

Stabilizes stem nut to prevent loosening during operation.

**16. Stem Nut**

Compresses entire stem system to block leakage.

**17. Anti-Static Device**

Ball-to-stem anti-static device.



FPS

V A L V E S

# OPTIONS & CONFIGURATIONS

## 88 SERIES END CONNECTIONS

NPT End Connection



Socketweld End Connection



\* End connection material available: WCB or CP8M.

## 90D SERIES END CONNECTIONS

150# Flange Connection



300# Flange Connection



## FPS SPRING RETURN ("FAIL-SAFE") ACTUATORS



Low Pressure Actuator



Standard Pressure Actuator

**FPS Actuators** will fully return the valve to its fail safe position on loss of air or control power. Actuator can be configured to fail open or fail close.

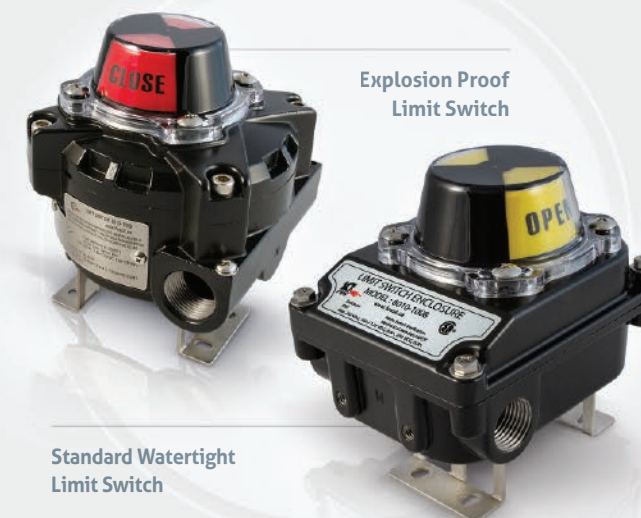
### FPS ACTUATOR FEATURES:

- Bi-Directional Pinion Travel Stops
- Low Air Pressure 50 psig - 70 psig
- Standard Air Pressure 70 psig - 120 psig
- Direct Actuator to Valve Mounting, No Brackets or Couplings
- Suitable for Low Temperature Operation -45°C/-49°F
- Stem Extensions Available for High Temperature Applications

Alternate options available. Please consult factory for more information.

### LIMIT SWITCH OPTIONS & FEATURES

- Water-tight (IP67)
- Mechanical Switches: 2-SPDT
- Contact Rating: 250VAC-15A, 125VDC-0.6A, 250VDC-0.3A
- Explosion Proof, Dust-Ignition Proof and Flame Proof
- **FM/US:**
  - Class I, Division 1, Groups A, B, C, D; IP67
  - Class II, Division 1, Groups E, F, G, Class III, Division 1; IP67
  - Class I, Zone 1, AEx db IIC T5 Gb; IP67
- **FM/C:**
  - Class I, Division 1, Groups B, C and D; IP67
  - Class II/III Division 1, Groups E, F, G; IP67
  - Class I, Zone 1, AEx db IIC T5 Gb; IP67



Standard Watertight Limit Switch

Explosion Proof Limit Switch



ASCO™ Solenoid Inline Spool Style

### SOLENOID OPTIONS & FEATURES:

|                                  |   |
|----------------------------------|---|
| <b>Body Material</b>             | 316 Stainless Steel, Aluminum   |
| <b>Voltage</b>                   | 12VDC, 24VDC, 120VAC, 240 VAC   |
| <b>Enclosure Type</b>            | Explosion Proof, Watertight   |
| <b>Additional Styles/Options</b> | NAMUR, Direct Mount<br>Poppet Style<br>Low Power Options<br>Low Temperature Options<br>Intrinsically Safe |

\* Typical options shown. Consult factory for additional options.



ASCO™ Solenoid Poppet Style





## Steam Power Industries Hardware/Software Systems



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