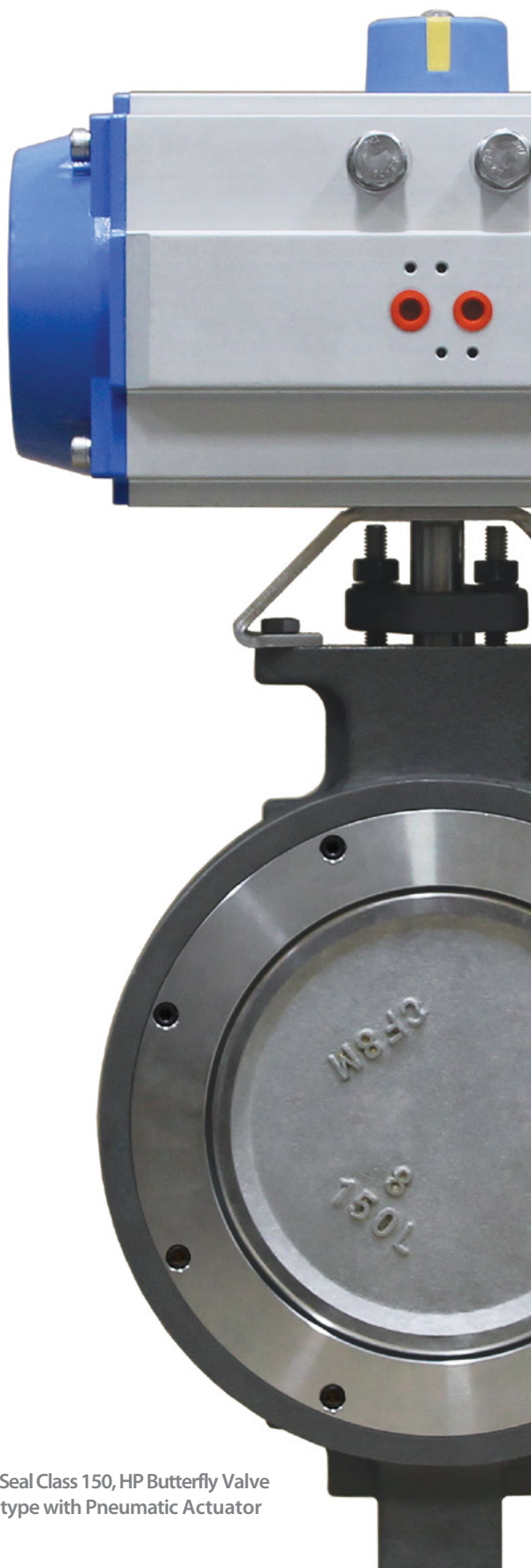




HP BUTTERFLY VALVES

ANSI/ASME/DIN
CLASS 150/300
PN10/PN16/PN25
LUG, WAFER & DOUBLE
FLANGE TYPE



FluoroSeal Class 150, HP Butterfly Valve
Wafer type with Pneumatic Actuator

LONGEVITY AND PERFORMANCE IN ONE

FluoroSeal® High Performance Butterfly Valves offer outstanding performance in a wide variety of applications in chemical processing, refining, pulp and paper, ethanol, gas separation, desalination, mining, utility, and many other industries. Because of their cost effective, yet robust design FluoroSeal High Performance Butterfly Valves often out-perform other valves by offering long term positive bi-directional shut-off in both control as well as on-off applications.

EXCELLENT CHOICE FOR CONTROL AND ON-OFF APPLICATIONS

Because of their optimized disc profile FluoroSeal High Performance Butterfly Valves (HPBV) offer precise flow control characteristics over the full range of valve rotation. Manual valve control is assured through the use of a multi-position lockable positioning plate which is standard for all lever operated valves. FluoroSeal HPBV incorporate a rugged mounting pad which allows for ease of automation utilizing pneumatic, electric, and hydraulic actuators as well as a variety of accessories including solenoid valves, limit switches, positioners, and speed control devices. Factory automation with FluoroSeal's own pneumatic rack and pinion actuator assures single source responsibility and guarantees optimum performance in demanding flow control and on-off applications.

FluoroSeal® High Performance Butterfly Valves offer increased value by incorporating advanced design features

- **DOUBLE OFFSET DESIGN**

FluoroSeal's HPBV design includes a double-offset shaft and eccentric disc. When the valve is opened the disc lifts completely off of the seat with a cam like action and eliminates seat wear and seat deformation at the top and bottom shaft areas. Due to the double-offset design FluoroSeal High Performance Butterfly Valves outperform traditional butterfly valves in terms of both sealing capabilities and service life. Because the disc doesn't contact the seat when the valve is opened operating torque is reduced resulting in lower automation cost. When the valve is closed the disc cams into the seat creating a bubble tight bi-directional seal.

• BODY CONFIGURATION

FluoroSeal High Performance Butterfly Valves are available as standard in ASME Class 150 and Class 300 wafer or lug style designs. Optional double flanged valves are available upon request. Both lug style and double flanged valves are fully rated for dead end service installations. In addition all FluoroSeal High Performance Butterfly Valves include an integrally cast internal over-travel stop to prevent disc and seat damage.

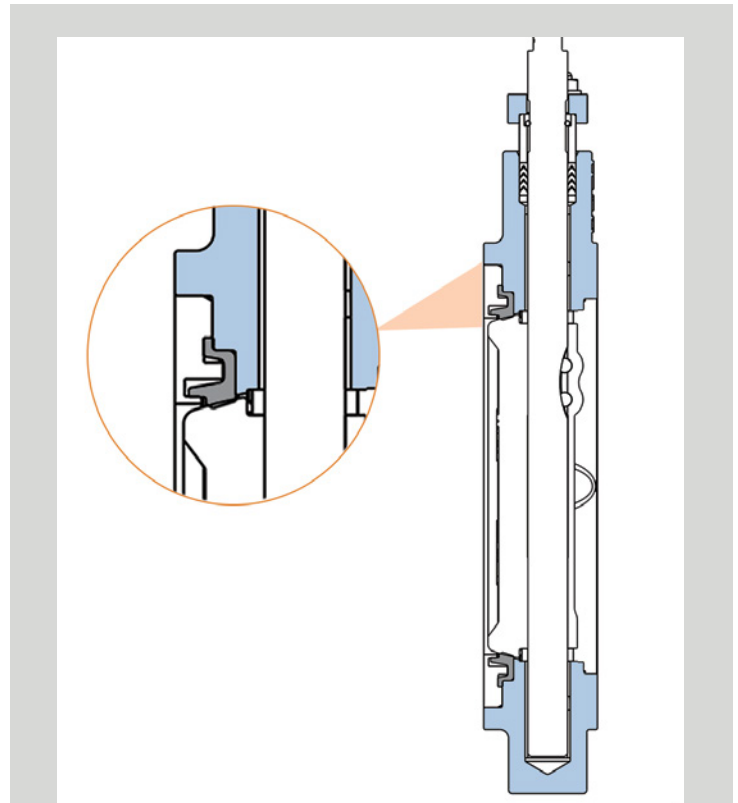
• SEAT

The flexible polymeric GF2P seat is a simple yet effective design - there are no springs, membranes, or o-rings to fail which can compromise long term bi-directional shut-off. GF2P is a chemically inert molecularly-modified ptfе with improved thermo-mechanical properties, improved cold flow resistance, and increased toughness which work together to increase temperature capability and extend the valve service life. FluoroSeal is the only High Performance Butterfly Manufacturer to offer this proprietary, upgraded seat material as a standard. FluoroSeal offers a variety of optional seat materials for difficult and demanding applications.

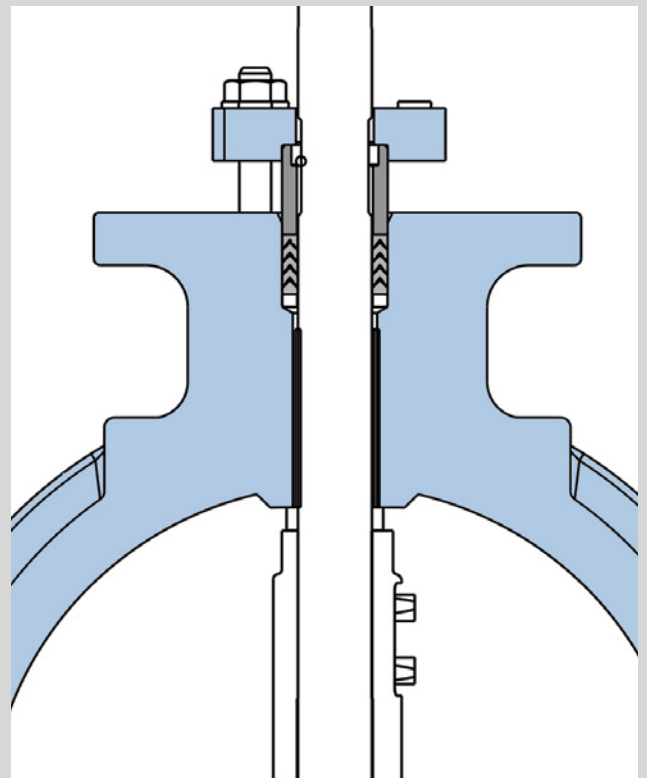
- Reinforced PTFE (RPTFE) – glass fiber reinforced PTFE for additional strength and rigidity and reduced cold flow.
- Hi-Temp – specially formulated GF2P with the addition of a proprietary carbon based filler which adds stability and allows the seat to be used in applications with continuous temperatures up to 600°F (316°C). In addition to its improved temperature capabilities the Hi-Temp seat also offers improved abrasion / erosion resistance, and excellent performance in saturated steam applications up to Class 300.
- Ultra High Molecular Weight Polyethylene (UHM-WPE) – highly resistance to abrasion / erosion as well as offering excellent radiation resistance.

• SHAFT SEAL

FluoroSeal High Performance Butterfly Valves utilize a proven ptfе v-ring packing arrangement loaded by a gland/follower as the standard shaft seal to atmosphere. Optional double packing, live loading, and monitoring port are available in applications where fugitive emission resistance is critical.



Seat



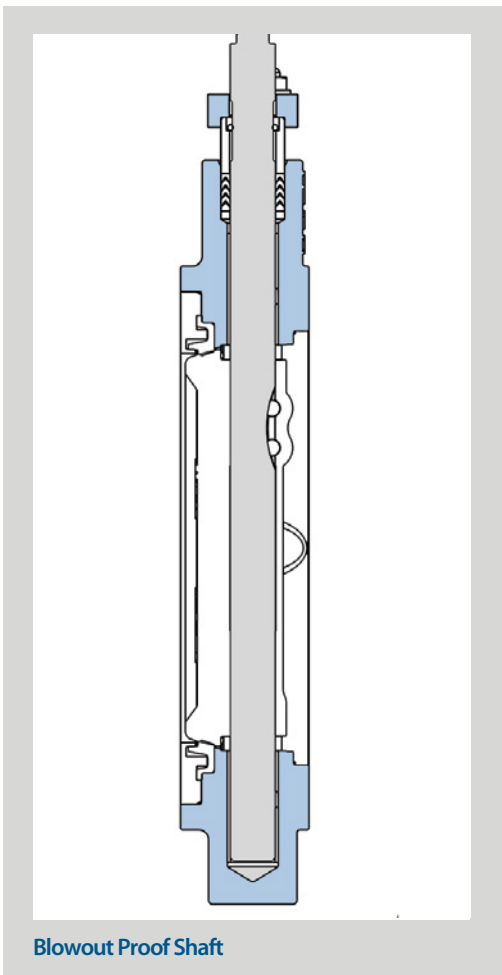
Shaft Seal

• BEARING DESIGN

Stainless steel / ptfе shaft bearings provide shaft support while resisting deformation due to line pressure to maintain shaft concentricity with stem packing to assure a positive seal to atmosphere and practically eliminate fugitive emissions. The ptfе impregnated bearings provide lubricity which ensures smooth cycling and lower operating torque.

• BLOWOUT PROOF SHAFT

A high strength, blow-out proof 17-4PH shaft is standard on all FluoroSeal High Performance Butterfly Valves. The shaft is positively contained in the case of failure by a metal retaining ring. FluoroSeal utilizes a one-piece shaft (6" and above) and a closed bottom body design to increase reliability and eliminate a potential leak path. FluoroSeal utilizes 2 piece shaft for 4" and below in order to optimize flow rates.



Blowout Proof Shaft

MAINTENANCE

FluoroSeal High Performance Butterfly Valves are virtually maintenance free and are engineered to provide a long, trouble free service life. Should seat replacement be required, it can easily be replaced by simply removing the body insert. No dis-assembly of the disc and shaft is required.

SPECIAL APPLICATIONS

FluoroSeal High Performance Butterfly Valves can be successfully used in a wide range of specialized services. Some special services applications are listed below. FluoroSeal can also provide special service High Performance Butterfly Valves built on unique end-user specifications.

- **Fugitive Emissions** – Optional double packing and live-loading offers increased emissions resistance on FluoroSeal® High-Performance Butterfly Valves. Live-loaded packing compensates for both thermal gradients as well as normal wear while double packing offer the increased sealing of two independent packing sets. A monitoring port can be supplied on those valves that incorporate double packings.
- **Vacuum** – Standard FluoroSeal® High-Performance Butterfly Valves are rated to provide positive shut-off and stem sealing in vacuum down to 2×10^{-2} torr; specially designed high-vacuum valves can perform in vacuum applications down to 1×10^{-5} torr.
- **Chlorine and Oxygen** – valves are specially cleaned and prepped to assure cleanliness and eliminate the potential of contamination with oil, grease, or other foreign material. Chlorine prepped valves meet the requirements of the Chlorine Institute Pamphlet VI.
- **NACE** - Valves are modified to meet the latest NACE specifications for materials used in sour environments: NACE MR0175 / ISO 15156 and NACE MR0103-2003. Excellent for use in sour gas, sour oil, or other applications where sulfide stress cracking or chloride stress cracking is a concern.
- **Steam** – Standard valves with RPTFE seats can be used in saturated steam applications up to 135 psig while valves with Hi-Temp seats can be used in saturated steam applications up to 150 psig.
- **Abrasive Service** - Tungsten titanium carbide (TTC) hard coated discs are available for use in abrasive applications involving slurry or solid particles in suspension. The TTC coating greatly increases the service life of the valve and its in-line sealing ability. TTC can be applied to other valve parts as required.

PLEDGE OF QUALITY

All major pressure bearing and/or boundary components 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’s pledge of “Quality First.”

QUALITY ASSURANCE

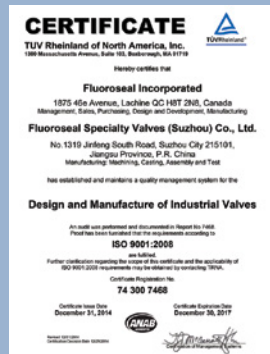
FluoroSeal Valves possess all of the best design features presently available on the market. They are inspected throughout the full manufacturing process from foundry to final assembly and packaging to assure high quality and consistency in every unit.

API Spec Q1



Design and Manufacture of Pipeline Industrial Valves

ISO 9001 : 2008



Design and Manufacture of Industrial Valves

PED 2014/68/EU



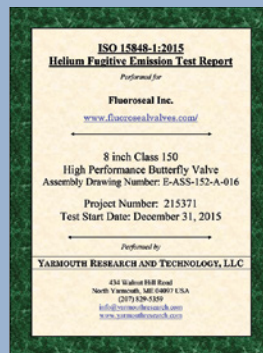
Design and Manufacture of Industrial Valves

AD 2000 -Merkblatt WO



Production of Investment Castings

ISO 15848-1:2015



Fugitive Emissions

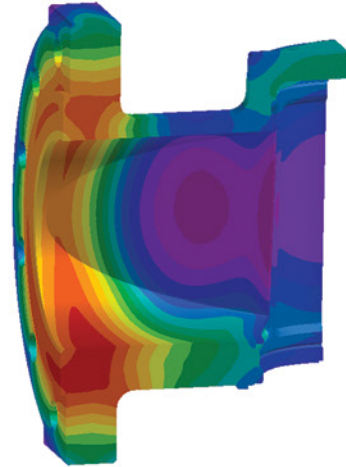
FOUNDRY



QUALITY ENGINEERED INTO EVERY CASTING

Through the use of solidification modeling, the Niyama criterion, and other proprietary engineering techniques a unique system of gating and risering is developed which provide for even casting cooling which greatly reduces or eliminates internal casting defects such as shrinkage and micro-porosity.

All newly designed FluoroSeal casting designs are subjected to a rigorous first article sampling procedure which includes radiography, liquid penetrant examination, and other non-destructive as well as destructive testing to verify the production techniques.



Solidification Model

HIGH QUALITY RAW MATERIALS ENSURE HIGH QUALITY CASTINGS

All specialty and exotic alloy High-Performance Butterfly Valve (HPBV) body and disc castings poured in FluoroSeal's in house Montreal foundry are produced using VOD ingot (vacuum oxygen decarburization). VOD ingot is a highly refined, high purity raw material that helps to minimize impurities resulting in high quality castings. FluoroSeal never alloys specialty and exotic materials to produce castings at their in house Montreal foundry. In addition, each pour in the foundry is argon blanketed to reduce oxygen contamination.



SPECIALTY ALLOY HIGH-PERFORMANCE BUTTERFLY VALVES ARE OUR SPECIALTY

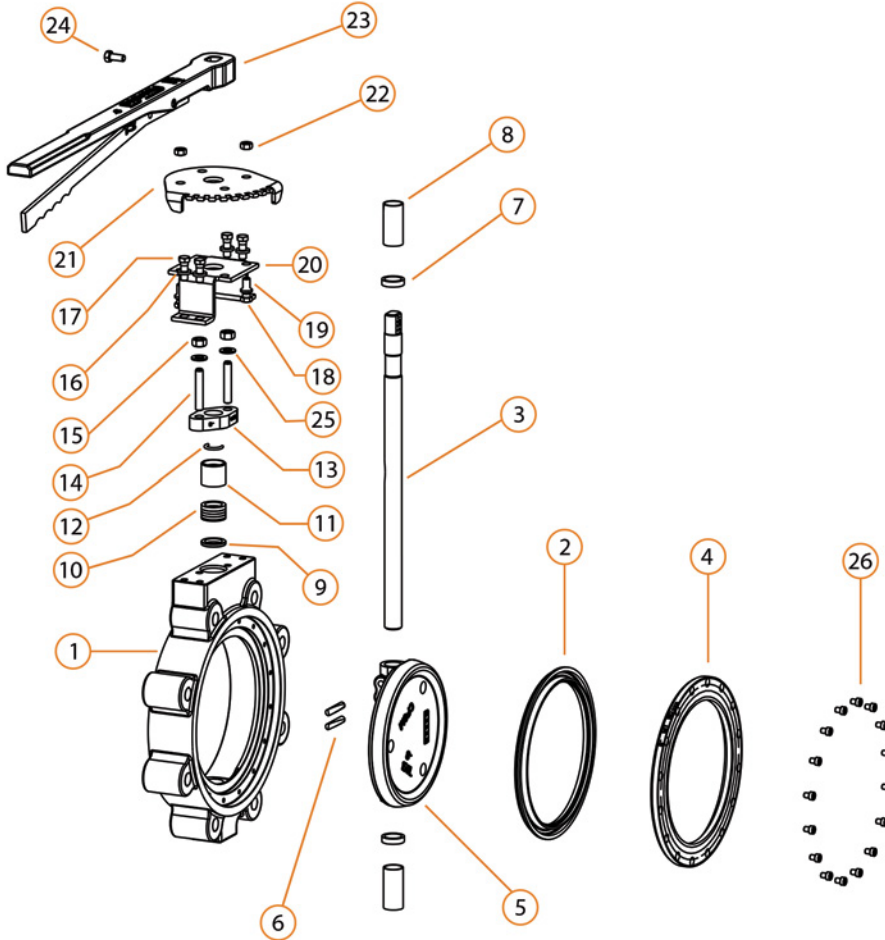
Because of their metallurgical expertise and captive in house foundry FluoroSeal controls and ensures the quality of their specialty and exotic alloy castings. Small capacity furnaces allow for low quantity casting runs greatly reducing lead times. Often times other manufacturers who utilize third party foundries are subjected to extremely long casting lead times as the foundry must wait until they have enough volume for a pour. FluoroSeal HPBV's are available in a wide variety of specialty alloys including Hastelloy B & C, Monel, Duplex Stainless Steels, Titanium, Zirconium, and many others.



Montreal Foundry

HIGH PERFORMANCE BUTTERFLY VALVE

Class 150: 2" to 12" / Class 300: 2" to 12"



LIST OF COMPONENTS

| No. | Description/Part |
|-----|------------------|
| 1 | Body |
| 2 | Seat |
| 3 | Shaft |
| 4 | Insert Lug |
| 5 | Disc |
| 6 | Pin |
| 7 | Spacer |
| 8 | Bushing |
| 9 | Packing Seat |
| 10 | Packing Group |
| 11 | Gland Follower |
| 12 | Retaining ring |
| 13 | Gland |
| 14 | Gland Stud |
| 15 | Gland Nut |
| 16 | Bracket Washer |
| 17 | Bracket Bolt |
| 18 | Plate Washer |
| 19 | Plate Bolt |
| 20 | Bracket |
| 21 | Position Plate |
| 22 | Plate Nut |
| 23 | Lever |
| 24 | Lever Nut |
| 25 | Gland Washer |
| 26 | Insert Screw |

APPLICABLE STANDARDS

API 609
Specification for Butterfly Valves, Lug Type and Wafer Type
MSS SP-61
Pressure Testing of Steel Valves
MSS SP-25
Standard Marking System for Valves, Fittings, Flanges, and Unions
ANSI B16.34/ EN 12516-1
Valves – Flanged, Threaded and Butt-welding End
NACE MR0175/ ISO 15156
Sulphide Stress Cracking Resistant Metallic Material for Oilfield Equipment
ANSI B16.5, NACE MR 0103
2½" – 14" Pipe Flanged and Flanged Fittings
EN 1092-1
Flanges and joints
ANSI B16.47
Series A, 26" – 60" Large Diameter Steel Flanges
MSS SP-68
High Pressure Offset Seat Butterfly Valves
API 598
Valve Inspection and Testing
ISO 15848
Fugitive Emissions Testing
ASTM / ANSI/ EN
Materials

STANDARD CONFIGURATION

Carbon Steel Valve

- ASTM A216, Gr. WCB body and gland, ASTM A351 Gr. CF8M disc, ASTM A564 Gr. 630 (17-4PH) Shaft, GF2P (Molecularly Enhanced PTFE) seat, PTFE packing, and ASTM A193 Gr. B7 gland studs.

Stainless Steel Valve

- ASTM A351, Gr. CF8M body, gland and disc, ASTM A564, 630 (17-4PH) Shaft, GF2P seat, PTFE packing, ASTM A193 Gr. B8 gland studs.

FLOW COEFFICIENT

| CLASS 150/PN 10/PN 16 | | |
|-----------------------|-----|-------|
| Size | | Cv |
| NPS | DN | |
| 2 1/2" | 65 | 76 |
| 3" | 80 | 166 |
| 4" | 100 | 398 |
| 5" | 125 | 647 |
| 6" | 150 | 1,052 |
| 8" | 200 | 2,198 |
| 10" | 250 | 3,003 |
| 12" | 300 | 5,097 |
| 14" | 350 | 5,797 |

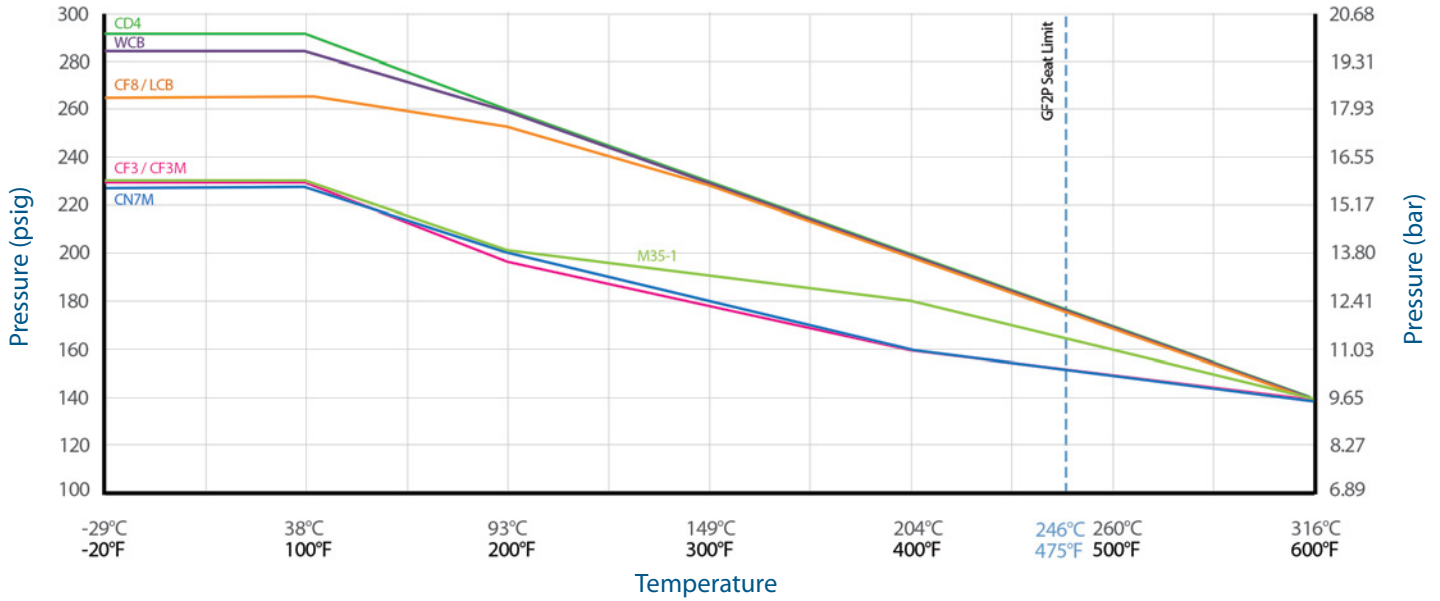
| CLASS 300/PN 25 | | |
|-----------------|-----|-------|
| Size | | Cv |
| NPS | DN | |
| 2 1/2" | 65 | 76 |
| 3" | 80 | 166 |
| 4" | 100 | 398 |
| 5" | 125 | 647 |
| 6" | 150 | 1,052 |
| 8" | 200 | 1,795 |
| 10" | 250 | 3,156 |
| 12" | 300 | 4,745 |
| 14" | 350 | 5,203 |

VALVE OPERATING TORQUES

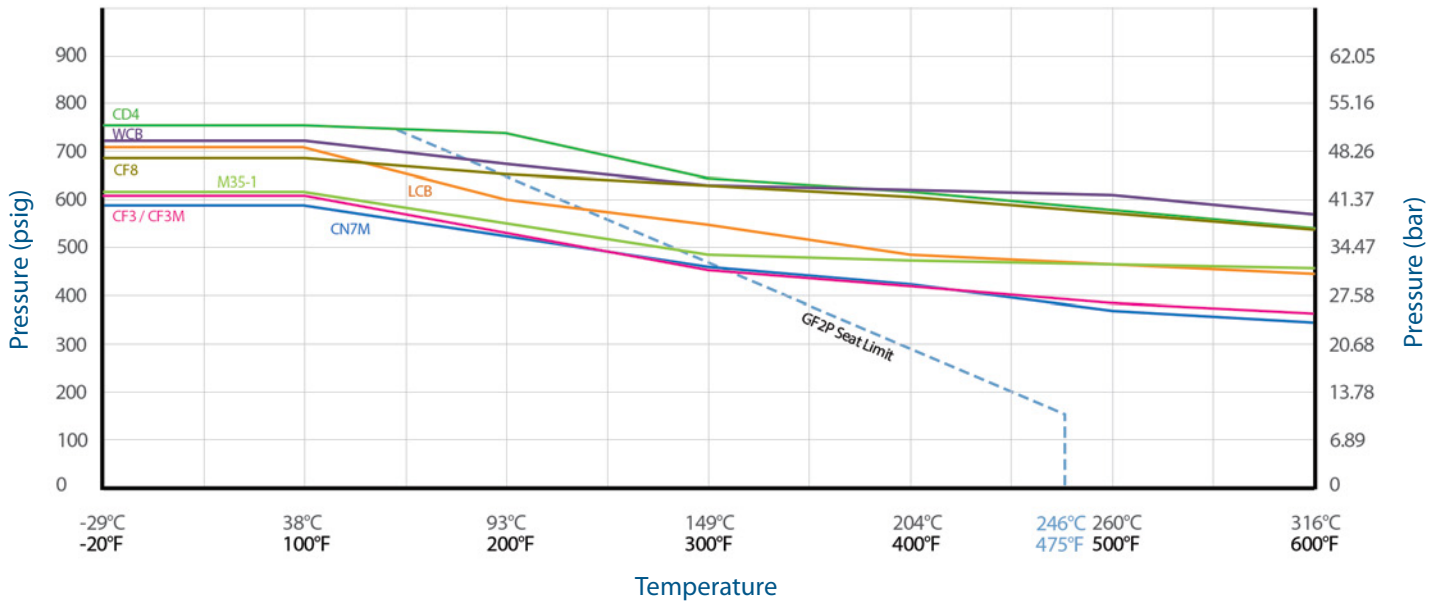
| CLASS 150/PN 10/PN 16 | | | | | | | |
|-----------------------|-----|-------------------|-----|--------------------|-----|--------------------|-----|
| Size | | 100 psi / 6.9 bar | | 200 psi / 13.8 bar | | 285 psi / 19.7 bar | |
| in | DN | in-lbs | Nm | in-lbs | Nm | in-lbs | Nm |
| 2 1/2" | 65 | 265 | 30 | 221 | 25 | 310 | 35 |
| 3" | 80 | 309 | 35 | 345 | 39 | 363 | 41 |
| 4" | 100 | 442 | 50 | 451 | 51 | 497 | 56 |
| 5" | 125 | 549 | 62 | 655 | 74 | 770 | 87 |
| 6" | 150 | 832 | 94 | 1,018 | 115 | 1,141 | 129 |
| 8" | 200 | 1,433 | 162 | 1,726 | 195 | 1,947 | 220 |
| 10" | 250 | 1,938 | 219 | 2,407 | 272 | 2,841 | 321 |
| 12" | 300 | 2,593 | 293 | 3,487 | 394 | 4,186 | 473 |
| 14" | 350 | 4,310 | 487 | 6,018 | 680 | 7,594 | 858 |

| CLASS 300/ PN 25 | | | | | | | | | | | | | |
|------------------|-----|--------------------|-------|--------------------|-------|--------------------|-------|--------------------|-------|--------------------|-------|------------------|-------|
| Size | | 300 psi / 20.7 bar | | 400 psi / 27.6 bar | | 500 psi / 34.5 bar | | 600 psi / 41.4 bar | | 700 psi / 48.3 bar | | 740 psi / 51 bar | |
| in | DN | in-lbs | Nm | in-lbs | Nm | in-lbs | Nm | in-lbs | Nm | in-lbs | Nm | in-lbs | Nm |
| 2 1/2" | 65 | 309 | 35 | 336 | 38 | 336 | 38 | 424 | 48 | 389 | 44 | 389 | 44 |
| 3" | 80 | 354 | 40 | 389 | 44 | 424 | 48 | 495 | 56 | 575 | 65 | 531 | 60 |
| 4" | 100 | 646 | 73 | 725 | 82 | 752 | 85 | 823 | 93 | 911 | 103 | 991 | 112 |
| 5" | 125 | 1,008 | 114 | 1,150 | 130 | 1,327 | 150 | 1,460 | 165 | 1,628 | 184 | 1,734 | 196 |
| 6" | 150 | 1,389 | 157 | 1,637 | 185 | 1,911 | 216 | 2,106 | 238 | 2,336 | 264 | 3,310 | 274 |
| 8" | 200 | 2,787 | 315 | 3,239 | 366 | 3,779 | 427 | 4,212 | 476 | 4,690 | 530 | 4,885 | 552 |
| 10" | 250 | 4,274 | 483 | 5,036 | 569 | 5,859 | 662 | 6,673 | 754 | 7,478 | 845 | 7,868 | 889 |
| 12" | 300 | 5,921 | 669 | 7,018 | 793 | 8,098 | 915 | 9,142 | 1,033 | 10,204 | 1,153 | 10,656 | 1,204 |
| 14" | 350 | 9,912 | 1,120 | 12,169 | 1,375 | 14,435 | 1,631 | 16,621 | 1,878 | 18,834 | 2,128 | 19,781 | 2,235 |

OPERATING PRESSURE-TEMPERATURE CHART HIGH-PERFORMANCE BUTTERFLY VALVES - CLASS 150/ PN 10/ PN 16



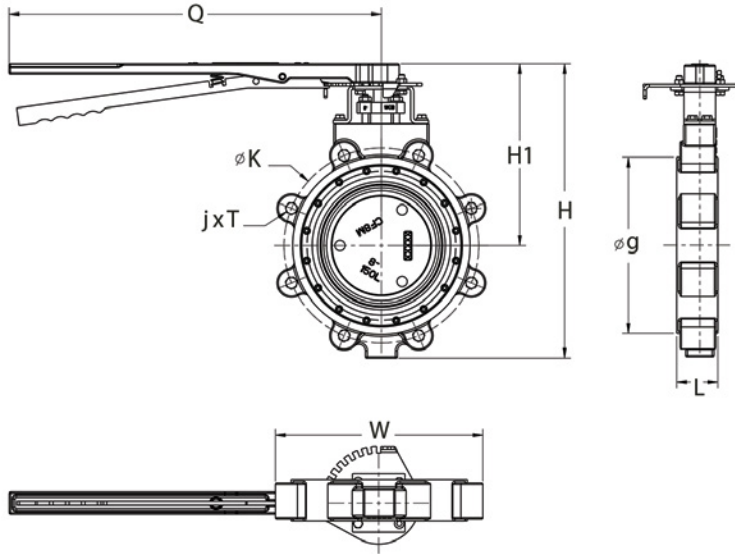
OPERATING PRESSURE-TEMPERATURE CHART HIGH-PERFORMANCE BUTTERFLY VALVES - CLASS 300/PN 25



NOTES:

1. The information in this catalog is provided for general informational purposes only.
2. For all technical parameters of the product please contact your local FluoroSeal sales office or authorized representative.

DIMENSIONS & WEIGHTS



HIGH PERFORMANCE BUTTERFLY VALVE
LUG - CLASS150 & 300/PN 10/
PN 16/PN 25
 SIZE 2 ½" to 8"
 (DN65-DN200)
 Wrench Operated
 Actuators Optional on All Sizes
 Face-to-Face Dimensions to API 609,
 ANSI B16.10, and EN 558-1
 Flanged End Dimensions to ANSI B16.5 and
 EN 1092-1

ANSI CLASS 150

| Size | | L | | W | | H | | H1 | | K | | g | | T | j | Q | |
|------|-----|-----|----|------|-----|------|-----|------|-----|------|-------|------|-----|------------|--------------|------|-----|
| in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | | No. of holes | in | mm |
| 2 ½" | 65 | 1.9 | 49 | 5.7 | 146 | 11.6 | 295 | 7.8 | 197 | 5.5 | 139.7 | 4.7 | 119 | 5/8-11 UNC | 4 | 11.0 | 280 |
| 3" | 80 | 1.9 | 49 | 5.7 | 146 | 12.7 | 323 | 8.2 | 208 | 6.0 | 152.4 | 5.2 | 132 | 5/8-11 UNC | 4 | 11.0 | 280 |
| 4" | 100 | 2.0 | 52 | 8.4 | 214 | 14.1 | 357 | 8.6 | 219 | 7.5 | 190.5 | 6.2 | 157 | 5/8-11 UNC | 8 | 11.0 | 280 |
| 5" | 125 | 2.5 | 64 | 9.7 | 247 | 13.5 | 344 | 8.7 | 220 | 8.5 | 215.9 | 7.4 | 188 | 3/4-10 UNC | 8 | 11.0 | 280 |
| 6" | 150 | 2.2 | 57 | 10.3 | 261 | 14.6 | 371 | 9.4 | 238 | 8.4 | 214.3 | 8.5 | 216 | 3/4-10 UNC | 8 | 11.0 | 280 |
| 8" | 200 | 2.5 | 64 | 12.6 | 320 | 17.8 | 451 | 11.0 | 279 | 11.8 | 298.5 | 10.7 | 272 | 3/4-10 UNC | 8 | 22.4 | 570 |

ANSI CLASS 300

| Size | | L | | W | | H | | H1 | | K | | g | | T | j | Q | |
|------|-----|-----|----|------|-----|------|-----|------|-----|------|-------|-----|-----|-------------|--------------|------|-----|
| in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | | No. of holes | in | mm |
| 2 ½" | 65 | 1.9 | 49 | 7.2 | 182 | 11.6 | 295 | 7.8 | 197 | 5.9 | 149.2 | 4.6 | 118 | 3/4"-10 UNC | 8 | 11.0 | 280 |
| 3" | 80 | 1.9 | 49 | 7.9 | 200 | 12.7 | 323 | 8.2 | 208 | 6.6 | 168.3 | 5.2 | 132 | 3/4"-10 UNC | 8 | 11.0 | 280 |
| 4" | 100 | 2.1 | 54 | 9.0 | 229 | 14.1 | 357 | 8.6 | 219 | 7.9 | 200.0 | 6.8 | 172 | 3/4"-10 UNC | 8 | 11.0 | 280 |
| 6" | 150 | 2.3 | 59 | 12.0 | 305 | 14.6 | 371 | 9.4 | 238 | 10.6 | 269.9 | 7.6 | 194 | 3/4"-10 UNC | 8 | 11.0 | 280 |
| 8" | 200 | 2.9 | 73 | 14.3 | 363 | 17.8 | 451 | 11.0 | 279 | 13.0 | 330.2 | 9.8 | 248 | 7/8"-9 UNC | 12 | 22.4 | 570 |

PN 10

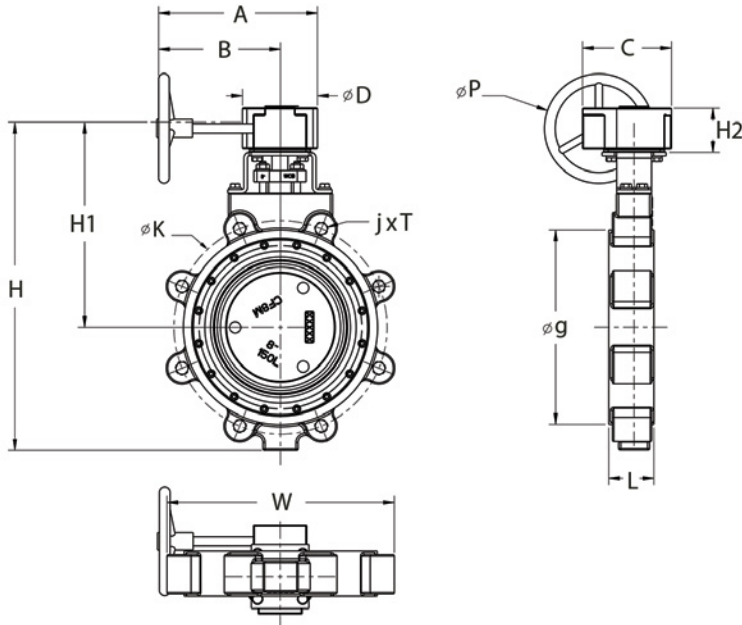
| Size | | L | | W | | H | | H1 | | K | | g | | T | j | Q | |
|------|-----|-----|----|------|-----|------|-----|------|-----|------|-----|------|-----|---------|--------------|------|-----|
| in | DN | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | | No. of holes | in | mm |
| 2 ½" | 65 | 1.9 | 49 | 5.7 | 146 | 11.6 | 295 | 7.8 | 197 | 5.7 | 145 | 4.7 | 119 | M16X2 | 8 | 11.0 | 280 |
| 3" | 80 | 1.9 | 49 | 5.7 | 146 | 12.7 | 323 | 8.2 | 208 | 6.3 | 160 | 5.2 | 132 | M16X2 | 8 | 11.0 | 280 |
| 4" | 100 | 2.0 | 52 | 8.4 | 214 | 14.1 | 357 | 8.6 | 219 | 7.1 | 180 | 6.2 | 157 | M16X2 | 8 | 11.0 | 280 |
| 5" | 125 | 2.5 | 64 | 9.7 | 247 | 13.5 | 344 | 8.7 | 220 | 8.3 | 210 | 7.4 | 188 | M16X2 | 8 | 11.0 | 280 |
| 6" | 150 | 2.2 | 57 | 10.3 | 261 | 14.6 | 371 | 9.4 | 238 | 9.4 | 240 | 8.5 | 216 | M20X2.5 | 8 | 11.0 | 280 |
| 8" | 200 | 2.5 | 64 | 12.6 | 320 | 17.8 | 451 | 11.0 | 279 | 11.6 | 295 | 10.7 | 272 | M20X2.5 | 8 | 22.4 | 570 |

PN 16

| Size | | L | | W | | H | | H1 | | K | | g | | T | j | Q | |
|------|-----|-----|----|------|-----|------|-----|------|-----|------|-----|------|-----|---------|--------------|------|-----|
| in | DN | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | | No. of holes | in | mm |
| 2 ½" | 65 | 1.9 | 49 | 5.7 | 146 | 11.6 | 295 | 7.8 | 197 | 5.7 | 145 | 4.7 | 119 | M16X2 | 8 | 11.0 | 280 |
| 3" | 80 | 1.9 | 49 | 5.7 | 146 | 12.7 | 323 | 8.2 | 208 | 6.3 | 160 | 5.2 | 132 | M16X2 | 8 | 11.0 | 280 |
| 4" | 100 | 2.0 | 52 | 8.4 | 214 | 14.1 | 357 | 8.6 | 219 | 7.1 | 180 | 6.2 | 157 | M16X2 | 8 | 11.0 | 280 |
| 5" | 125 | 2.5 | 64 | 9.7 | 247 | 13.5 | 344 | 8.7 | 220 | 8.3 | 210 | 7.4 | 188 | M16X2 | 8 | 11.0 | 280 |
| 6" | 150 | 2.2 | 57 | 10.3 | 261 | 14.6 | 371 | 9.4 | 238 | 9.4 | 240 | 8.5 | 216 | M20X2.5 | 8 | 11.0 | 280 |
| 8" | 200 | 2.5 | 64 | 12.6 | 320 | 17.8 | 451 | 11.0 | 279 | 11.6 | 295 | 10.7 | 272 | M20X2.5 | 12 | 22.4 | 570 |

PN 25

| Size | | L | | W | | H | | H1 | | K | | g | | T | j | Q | |
|------|-----|-----|----|------|-----|------|-----|------|-----|------|-----|-----|-----|---------|--------------|------|-----|
| in | DN | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | | No. of holes | in | mm |
| 2 ½" | 65 | 1.9 | 49 | 7.2 | 182 | 11.6 | 295 | 7.8 | 197 | 5.7 | 145 | 4.6 | 118 | M16X2 | 8 | 11.0 | 280 |
| 3" | 80 | 1.9 | 49 | 7.9 | 200 | 12.7 | 323 | 8.2 | 208 | 6.3 | 160 | 5.2 | 132 | M16X2 | 8 | 11.0 | 280 |
| 4" | 100 | 2.1 | 54 | 9.0 | 229 | 14.1 | 357 | 8.6 | 219 | 7.5 | 190 | 6.8 | 172 | M20X2.5 | 8 | 11.0 | 280 |
| 6" | 150 | 2.3 | 59 | 12.0 | 305 | 14.6 | 371 | 9.4 | 238 | 9.8 | 250 | 7.6 | 194 | M24X3 | 8 | 11.0 | 280 |
| 8" | 200 | 2.9 | 73 | 14.3 | 363 | 17.8 | 451 | 11.0 | 279 | 12.2 | 310 | 9.8 | 248 | M24X3 | 12 | 22.4 | 570 |



HIGH PERFORMANCE BUTTERFLY VALVE
LUG - CLASS150 & 300/PN 10/
PN 16/PN 25
 SIZE 8" to 14"
 (DN200-DN350)
 Enclosed Gear Operated
 Actuators Optional on All Sizes
 Face-to-Face Dimensions to API 609,
 ANSI B16.10, and EN 558-1
 Flanged End Dimensions to ANSI B16.5 and
 EN 1092-1

| ANSI CLASS 150 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|----------------|-----|-----|----|------|-----|------|-----|------|-----|------|-------|------|-----|------------|----|------|-----|-----|-----|-----|-----|-----|-----|-----|----|------|-----|----|
| Size | | L | | W | | H | | H1 | | K | | g | | T | j | A | | B | | C | | D | | H2 | | P | | |
| in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | Holes | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm |
| 8" | 200 | 2.5 | 64 | 12.6 | 320 | 17.9 | 454 | 11.1 | 282 | 11.8 | 298.5 | 10.7 | 272 | 3/4-10 UNC | 8 | 8.4 | 213 | 6.7 | 170 | 4.9 | 125 | 4.1 | 105 | 2.4 | 62 | 5.9 | 150 | |
| 10" | 250 | 2.8 | 71 | 15.5 | 394 | 21.7 | 552 | 13.5 | 342 | 14.3 | 362.0 | 12.8 | 324 | 7/8-9 UNC | 12 | 12.2 | 310 | 9.3 | 235 | 6.9 | 174 | 6.0 | 152 | 3.1 | 78 | 11.8 | 300 | |
| 12" | 300 | 3.2 | 81 | 18.4 | 468 | 24.4 | 620 | 14.6 | 371 | 17.0 | 431.8 | 15.0 | 381 | 7/8-9 UNC | 12 | 12.2 | 310 | 9.3 | 235 | 6.9 | 174 | 6.0 | 152 | 3.1 | 78 | 11.8 | 300 | |
| 14" | 350 | 3.6 | 92 | 20.5 | 520 | 28.3 | 718 | 16.5 | 420 | 18.8 | 476.3 | 20.4 | 518 | 3/8-16 UNC | 16 | 12.2 | 310 | 8.9 | 226 | 7.7 | 195 | 6.7 | 170 | 3.1 | 80 | 11.8 | 300 | |

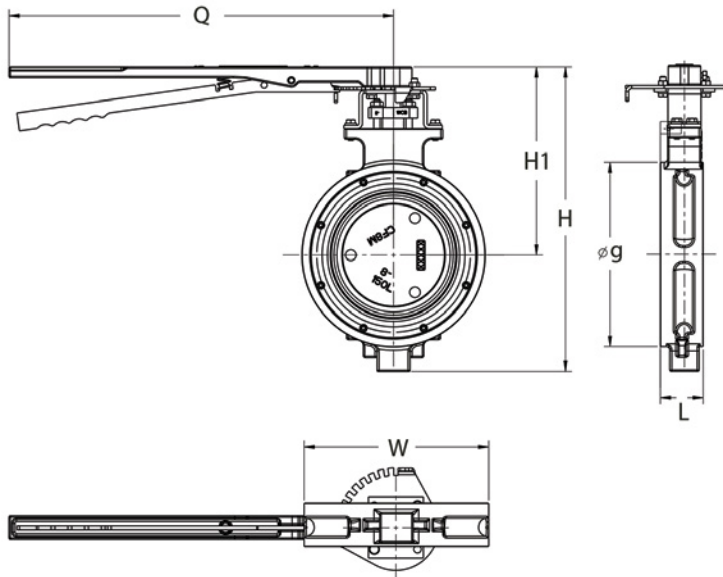
| ANSI CLASS 300 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|----------------|-----|-----|-----|------|-----|------|-----|------|-----|------|-------|------|-----|-------------|----|------|-----|-----|-----|-----|-----|-----|-----|-----|----|------|-----|----|
| Size | | L | | W | | H | | H1 | | K | | g | | T | j | A | | B | | C | | D | | H2 | | P | | |
| in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | Holes | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm |
| 8" | 200 | 2.9 | 73 | 14.3 | 363 | 17.9 | 454 | 11.1 | 282 | 13.0 | 330.2 | 9.8 | 248 | 7/8"-9 UNC | 12 | 8.4 | 213 | 6.7 | 170 | 4.9 | 125 | 4.1 | 105 | 2.4 | 62 | 5.9 | 150 | |
| 10" | 250 | 3.3 | 83 | 16.7 | 424 | 21.7 | 552 | 13.5 | 342 | 15.3 | 387.4 | 11.7 | 298 | 1"-8 UNC | 16 | 12.2 | 310 | 9.3 | 235 | 6.9 | 174 | 6.0 | 152 | 3.1 | 78 | 11.8 | 300 | |
| 12" | 300 | 3.6 | 92 | 19.8 | 502 | 24.4 | 620 | 14.6 | 371 | 17.7 | 450.8 | 14.0 | 356 | 1 1/8"-8 UN | 16 | 12.2 | 310 | 9.3 | 235 | 6.9 | 174 | 6.0 | 152 | 3.1 | 78 | 11.8 | 300 | |
| 14" | 350 | 4.6 | 117 | 22.8 | 578 | 28.3 | 718 | 16.5 | 420 | 20.3 | 514.4 | 15.2 | 387 | 1 1/8"-8 UN | 20 | 12.2 | 311 | 8.9 | 226 | 7.7 | 195 | 6.7 | 170 | 3.1 | 80 | 11.8 | 300 | |

| PN 10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|-----|-----|-----|------|-----|------|-----|------|-----|------|-----|------|-----|---------|----|------|-----|-----|-----|-----|-----|-----|-----|-----|----|------|-----|----|
| Size | | L | | W | | H | | H1 | | K | | g | | T | j | A | | B | | C | | D | | H2 | | P | | |
| in | DN | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | Holes | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm |
| 8" | 200 | 2.9 | 73 | 14.3 | 363 | 17.9 | 454 | 11.1 | 282 | 11.6 | 295 | 9.8 | 248 | M20X2.5 | 8 | 8.4 | 213 | 6.7 | 170 | 4.9 | 125 | 4.1 | 105 | 2.4 | 62 | 5.9 | 150 | |
| 10" | 250 | 3.3 | 83 | 16.7 | 424 | 21.7 | 552 | 13.5 | 342 | 13.8 | 350 | 11.7 | 298 | M20X2.5 | 12 | 12.2 | 310 | 9.3 | 235 | 6.9 | 174 | 6.0 | 152 | 3.1 | 78 | 11.8 | 300 | |
| 12" | 300 | 3.6 | 92 | 19.8 | 502 | 24.4 | 620 | 14.6 | 371 | 15.7 | 400 | 14.0 | 356 | M20X2.5 | 12 | 12.2 | 310 | 9.3 | 235 | 6.9 | 174 | 6.0 | 152 | 3.1 | 78 | 11.8 | 300 | |
| 14" | 350 | 4.6 | 117 | 22.8 | 578 | 28.3 | 718 | 16.5 | 420 | 18.1 | 460 | 15.2 | 387 | M20X2.5 | 16 | 12.2 | 311 | 8.9 | 226 | 7.7 | 195 | 6.7 | 170 | 3.1 | 80 | 11.8 | 300 | |

| PN 16 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|-----|-----|-----|------|-----|------|-----|------|-----|------|-----|------|-----|---------|----|------|-----|-----|-----|-----|-----|-----|-----|-----|----|------|-----|----|
| Size | | L | | W | | H | | H1 | | K | | g | | T | j | A | | B | | C | | D | | H2 | | P | | |
| in | DN | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | Holes | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm |
| 8" | 200 | 2.9 | 73 | 14.3 | 363 | 17.9 | 454 | 11.1 | 282 | 12.6 | 295 | 9.8 | 248 | M20X2.5 | 12 | 8.4 | 213 | 6.7 | 170 | 4.9 | 125 | 4.1 | 105 | 2.4 | 62 | 5.9 | 150 | |
| 10" | 250 | 3.3 | 83 | 16.7 | 424 | 21.7 | 552 | 13.5 | 342 | 14.0 | 355 | 11.7 | 298 | M24X3 | 12 | 12.2 | 310 | 9.3 | 235 | 6.9 | 174 | 6.0 | 152 | 3.1 | 78 | 11.8 | 300 | |
| 12" | 300 | 3.6 | 92 | 19.8 | 502 | 24.4 | 620 | 14.6 | 371 | 16.1 | 410 | 14.0 | 356 | M24X3 | 12 | 12.2 | 310 | 9.3 | 235 | 6.9 | 174 | 6.0 | 152 | 3.1 | 78 | 11.8 | 300 | |
| 14" | 350 | 4.6 | 117 | 22.8 | 578 | 28.3 | 718 | 16.5 | 420 | 18.5 | 470 | 15.2 | 387 | M24X3 | 16 | 12.2 | 311 | 8.9 | 226 | 7.7 | 195 | 6.7 | 170 | 3.1 | 80 | 11.8 | 300 | |

| PN 25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------|-----|-----|-----|------|-----|------|-----|------|-----|------|-----|------|-----|-------|----|------|-----|-----|-----|-----|-----|-----|-----|-----|----|------|-----|----|
| Size | | L | | W | | H | | H1 | | K | | g | | T | j | A | | B | | C | | D | | H2 | | P | | |
| in | DN | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | Holes | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm |
| 8" | 200 | 2.9 | 73 | 14.3 | 363 | 17.9 | 454 | 11.1 | 282 | 12.2 | 310 | 9.8 | 248 | M24X3 | 12 | 8.4 | 213 | 6.7 | 170 | 4.9 | 125 | 4.1 | 105 | 2.4 | 62 | 5.9 | 150 | |
| 10" | 250 | 3.3 | 83 | 16.7 | 424 | 21.7 | 552 | 13.5 | 342 | 14.6 | 370 | 11.7 | 298 | M27X3 | 12 | 12.2 | 310 | 9.3 | 235 | 6.9 | 174 | 6.0 | 152 | 3.1 | 78 | 11.8 | 300 | |
| 12" | 300 | 3.6 | 92 | 19.8 | 502 | 24.4 | 620 | 14.6 | 371 | 16.9 | 430 | 14.0 | 356 | M27X3 | 16 | 12.2 | 310 | 9.3 | 235 | 6.9 | 174 | 6.0 | 152 | 3.1 | 78 | 11.8 | 300 | |
| 14" | 350 | 4.6 | 117 | 22.8 | 578 | 28.3 | 718 | 16.5 | 420 | 19.3 | 490 | 15.2 | 387 | M30X3 | 16 | 12.2 | 311 | 8.9 | 226 | 7.7 | 195 | 6.7 | 170 | 3.1 | 80 | 11.8 | 300 | |

DIMENSIONS & WEIGHTS



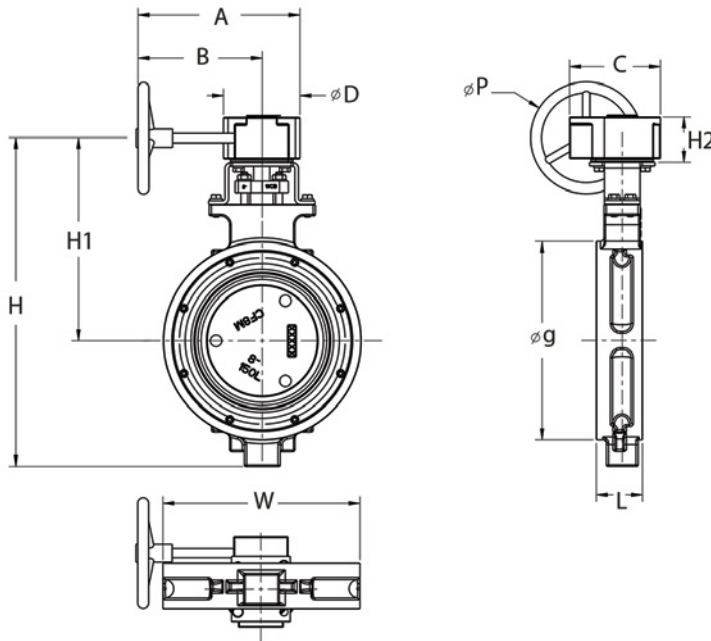
HIGH PERFORMANCE BUTTERFLY VALVE
WAFER - CLASS150 & 300/PN 10/
PN 16/PN 25
SIZE 2 ½" to 8"
(DN65-DN200)
 Wrench Operated
 Actuators Optional on All Sizes
 Face-to-Face Dimensions to API 609,
 ANSI B16.10, and EN 558-1
 Flanged End Dimensions to ANSI B16.5 and
 EN 1092-1

ANSI CLASS 150/PN 10/ PN 16/ PN 25

| Size | | L | | W | | H | | H1 | | g | | Q | |
|------|-----|-----|----|------|-----|------|-----|------|-----|------|-----|------|-----|
| in | DN | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm |
| 2 ½" | 65 | 1.9 | 49 | 5.7 | 146 | 11.6 | 295 | 7.8 | 197 | 4.7 | 119 | 11.0 | 280 |
| 3" | 80 | 1.9 | 49 | 5.7 | 146 | 12.7 | 323 | 8.2 | 208 | 5.2 | 132 | 11.0 | 280 |
| 4" | 100 | 2.1 | 54 | 6.2 | 157 | 13.8 | 350 | 8.6 | 219 | 6.2 | 157 | 11.0 | 280 |
| 5" | 125 | 2.5 | 64 | 7.4 | 188 | 13.7 | 348 | 8.7 | 220 | 7.4 | 188 | 11.0 | 280 |
| 6" | 150 | 2.2 | 57 | 8.5 | 216 | 14.6 | 371 | 9.4 | 238 | 8.5 | 216 | 11.0 | 280 |
| 8" | 200 | 2.5 | 64 | 10.7 | 272 | 17.8 | 451 | 11.0 | 279 | 10.7 | 272 | 22.4 | 570 |

ANSI CLASS 300/PN 10/ PN 16/ PN 25

| Size | | L | | W | | H | | H1 | | g | | Q | |
|------|-----|-----|----|------|-----|------|-----|------|-----|------|-----|------|-----|
| in | DN | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm |
| 2 ½" | 65 | 1.9 | 49 | 5.7 | 146 | 11.6 | 295 | 7.8 | 197 | 4.7 | 119 | 11.0 | 280 |
| 3" | 80 | 1.9 | 49 | 5.7 | 146 | 12.7 | 323 | 8.2 | 208 | 5.2 | 132 | 11.0 | 280 |
| 4" | 100 | 2.1 | 54 | 6.2 | 157 | 14.1 | 357 | 8.6 | 219 | 6.2 | 157 | 11.0 | 280 |
| 6" | 150 | 2.3 | 59 | 8.5 | 216 | 14.6 | 371 | 9.4 | 238 | 8.5 | 216 | 11.0 | 280 |
| 8" | 200 | 2.9 | 73 | 10.6 | 270 | 17.8 | 451 | 11.0 | 279 | 10.7 | 272 | 22.4 | 570 |



HIGH PERFORMANCE BUTTERFLY VALVE
WAFER - CLASS150 & 300/PN 10/
PN 16/PN 25
 SIZE 8" to 14"
 (DN200-DN350)
 Enclosed Gear Operated
 Actuators Optional on All Sizes
 Face-to-Face Dimensions to API 609,
 ANSI B16.10, and EN 558-1
 Flanged End Dimensions to ANSI B16.5 and
 EN 1092-1

ANSI CLASS 150/PN 10/ PN 16/ PN 25

| Size | | L | | W | | H | | H1 | | g | | A | | B | | C | | D | | H2 | | P | |
|------|-----|-----|----|------|-----|------|-----|------|-----|------|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|----|------|-----|
| in | DN | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm |
| 8" | 200 | 2.5 | 64 | 10.7 | 272 | 17.9 | 454 | 11.1 | 282 | 10.7 | 272 | 8.4 | 213 | 6.7 | 170 | 4.9 | 125 | 4.1 | 105 | 2.4 | 62 | 5.9 | 150 |
| 10" | 250 | 2.8 | 71 | 12.9 | 327 | 21.7 | 552 | 13.5 | 342 | 12.8 | 324 | 12.2 | 310 | 9.3 | 235 | 6.9 | 174 | 6.0 | 152 | 3.1 | 78 | 11.8 | 300 |
| 12" | 300 | 3.2 | 81 | 15.0 | 381 | 24.4 | 620 | 14.6 | 371 | 15.0 | 381 | 12.2 | 310 | 9.3 | 235 | 6.9 | 174 | 6.0 | 152 | 3.1 | 78 | 11.8 | 300 |
| 14" | 350 | 3.6 | 92 | 18.7 | 475 | 28.4 | 721 | 16.5 | 420 | 16.3 | 413 | 12.2 | 311 | 8.9 | 226 | 7.7 | 195 | 6.7 | 170 | 3.1 | 80 | 11.8 | 300 |

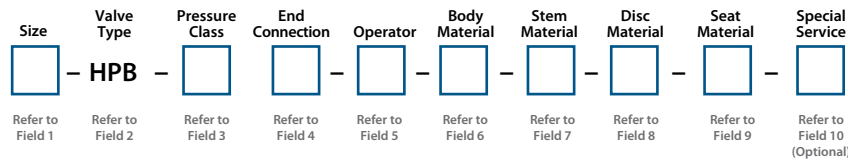
ANSI CLASS 300/PN 10/ PN 16/ PN 25

| Size | | L | | W | | H | | H1 | | g | | A | | B | | C | | D | | H2 | | P | |
|------|-----|-----|-----|------|-----|------|-----|------|-----|------|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|----|------|-----|
| in | DN | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm |
| 8" | 200 | 2.9 | 73 | 10.6 | 270 | 17.9 | 454 | 11.1 | 282 | 10.7 | 272 | 8.4 | 213 | 6.7 | 170 | 4.9 | 125 | 4.1 | 105 | 2.4 | 62 | 5.9 | 150 |
| 10" | 250 | 3.3 | 83 | 12.8 | 324 | 21.7 | 552 | 13.5 | 342 | 12.8 | 324 | 12.2 | 310 | 9.3 | 235 | 6.9 | 174 | 6.0 | 152 | 3.1 | 78 | 11.8 | 300 |
| 12" | 300 | 3.6 | 92 | 15.0 | 381 | 24.4 | 620 | 14.6 | 371 | 15.0 | 381 | 12.2 | 310 | 9.3 | 235 | 6.9 | 174 | 6.0 | 152 | 3.1 | 78 | 11.8 | 300 |
| 14" | 350 | 4.6 | 117 | 19.3 | 490 | 28.3 | 718 | 16.5 | 420 | 16.4 | 416 | 12.2 | 311 | 8.9 | 226 | 7.7 | 195 | 6.7 | 170 | 3.1 | 80 | 11.8 | 300 |

NOTES:

- The information on this catalog is provided for general informational purposes only.
- Customization for specific applications is available upon request.
- For all technical parameters of the product please contact your local FluoroSeal sales office or authorized representative.
- We reserve the right to make changes without prior notice.

ORDERING INSTRUCTIONS



| Field 1 - Size | |
|-------------------|-----------|
| Size Range | 2" to 14" |

| Field 2 - Valve Type | |
|----------------------|----------------------------------|
| Code | Type |
| HPB | High Performance Butterfly Valve |

| Field 3 - Pressure Class | | | | | |
|--------------------------|-----|-----|------|------|------|
| Code | 15 | 30 | D10 | D16 | D25 |
| Type | 150 | 300 | PN10 | PN16 | PN25 |

| Field 4 - End Connection | | | |
|--------------------------|---------------------|---------------|-------|
| Code | LF | DF | WF |
| Type | Lug (Single Flange) | Double Flange | Wafer |

| Field 5 - Operator | | | | |
|--------------------|--------------------------------|-----------------------------------|---|-----------|
| Code | A | WL | WX | B |
| Type | Actuated | Wrench+ Locking Device (Standard) | Wrench + Locking Device + Stem Extension | Bare Stem |
| Code | EG | | EX | |
| Type | Enclosed Gear + Locking Device | | Enclosed Gear + Locking Device + Stem Extension | |

| Field 6 - Body Material | |
|--|--|
| Refer to Table 1 - Available Materials | |

| Field 7 - Shaft Material | |
|--------------------------|----------------------------|
| Code | 00 (Standard) |
| Type | ASTM A564 Gr. 630 (17-4PH) |

or refer to Table 1 - Available Materials

| Field 8 - Disc Material | |
|--|--|
| Refer to Table 1 - Available Materials | |

| Field 9 - Seat Material | | | | | |
|-------------------------|------|------|--------------|--------|---------|
| Code | G | R | H | U | X |
| Type | GF2P | RTFE | Hi-Temp GF2P | UHMWPE | Special |

| Field 10 - Special Service (a combination of Special Service can be used) - Optional | | | | | | |
|--|------------------|----------|--------|-----------------------|---------------|-----------------------------|
| Code | V | CL | OX | NA | S | FE |
| Type | Vacuum Service | Chlorine | Oxygen | NACE MR-01-75 Service | Steam Service | Fugitive Emission Stem Seal |
| Code | TC | X | | | | |
| Type | Abrasive Service | Special | | | | |

| Table 1 - Available Materials | | | | | | | |
|-------------------------------|----------------------|---------------------|--------|------|-----------------------|----------------------------|--------|
| Code | Description | ASTM Designation | DIN | Code | Description | ASTM Designation | DIN |
| C1 | Carbon Steel | ASTM A216 Gr. WCB | 1.0619 | H3 | HASTELLOY C | ASTM A494 Gr. CW6M | 2.4883 |
| C2 | Carbon St. Low Temp. | ASTM A352 Gr. LCB | 1.6220 | H4 | HASTELLOY C 276 | ASTM A494 Gr. CW12MW | 2.4686 |
| C3 | Carbon St. Low Temp. | ASTM A352 Gr. LCC | 1.7219 | I6 | INCONEL | ASTM A494 Gr. CY40 | 2.4816 |
| S1 | 304 Stainless Steel | ASTM A351 Gr. CF8 | 1.4308 | N1 | Nickel | ASTM A494 Gr. CZ-100 | 2.4816 |
| S2 | 304L Stainless Steel | ASTM A351 Gr. CF3 | 1.4309 | M1 | MONEL | ASTM A494 Gr. M35-1 | 2.4365 |
| S3 | 316 Stainless Steel | ASTM A351 Gr. CF8M | 1.4408 | T2 | Titanium (Comm. Pure) | ASTM B367 Gr. C2 | 3.7035 |
| S4 | 316L Stainless Steel | ASTM A351 Gr. CF3M | 1.4409 | T3 | Titanium | ASTM B367 Gr. C3 | 3.7031 |
| S5 | 317 Stainless Steel | ASTM A351 Gr. CG8M | | T5 | Titanium | ASTM B367 Gr. C5 | |
| S6 | 317L Stainless Steel | ASTM A351 Gr. CG3M | | Z2 | Zirconium | ASTM B752 Gr. 702C | |
| S7 | 904L Stainless Steel | Cast grade | 1.4584 | Z5 | Zirconium | ASTM B752 Gr. 705C | |
| A2 | Alloy 20 | ASTM A351 Gr. CN7M | 1.4500 | 00 | Alloy 17-4 | ASTM A564 Gr. 630 (17-4PH) | 1.4542 |
| CD | CD4MCuN | ASTM A995 Gr. 1B | 1.4463 | | | | |
| H1 | HASTELLOY B | ASTM A494 Gr. N7M | 2.4882 | | | | |
| H2 | HASTELLOY B 2 | ASTM A494 Gr. N12MV | 2.4685 | | | | |

MODEL SELECTION EXAMPLE

Example: 2"HPB-15WF/WL-C1-S1-C2-G-V

Description: FluoroSeal 2" API 609 High Performance Butterfly Valve, Class 150, Wafer Type, Wrench Operated, body in ASTM A216 Gr. WCB, seat in GF2P, disc in ASTM A352 Gr. LCB, shaft in ASTM A351 Gr. CF8, and Vacuum Service.

NOTES:

1. For all technical parameters of the product please refer to this catalog, additional information can be obtained from your local FluoroSeal sales office or authorized representative.
2. Customization for specific applications is available upon request.
3. For different materials, not listed in the above tables, please specify.
4. Special material configurations upon request with (X) shown in the model number.

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SHIPMENTS

All products sent out will be carefully examined, counted and packed. The cost of any special packing or special handling caused by Buyer's requirements or requests shall be added to the amount of the order. No claim for shortages will be allowed unless made in writing within ten (10) days of receipt of a shipment. Claims for products damaged or lost in transit should be made to the carrier, as FluoroSeal Inc.'s responsibility ceases, and title passes, on delivery to the carrier.

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Orders covering special or non-standard products are not subject to cancellation except on such terms as FluoroSeal Inc. may specify on application.

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Prices and designs are subject to change without notice. All prices are F.O.B. Point of Shipment, unless otherwise stated.

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The amount of any sales, excise or other taxes, if any, applicable to the products, shall be added to the purchase price and shall be paid by Buyer unless Buyer provides FluoroSeal Inc. with an exemption certificate acceptable to the taxing authorities.

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Where the products, engineering design or fabrication is for nuclear plant applications, Buyer agrees (a) to take all necessary steps to add FluoroSeal Inc. as an insured supplier under the American Nuclear Insurers (ANI) pool and under the Mutual Atomic Energy Reinsurance Pool (MAERP) for property damage and liability insurance and if necessary steps could have been taken, but are not taken, Buyer shall hold FluoroSeal Inc. harmless against all such losses which could have been thus covered; (b) Buyer agrees to hold FluoroSeal Inc. harmless with respect to any personal injury or death, property damage or any other loss in a nuclear incident which is caused directly or indirectly by defective design, material, or workmanship, furnished by FluoroSeal Inc. and which is covered by insurance maintained by Buyer (or which could be so covered but with respect to which Buyer has elected to self-insure), and further agrees to waive subrogation by its carriers of such insurance against FluoroSeal Inc.; (c) as to nuclear hazards for which Buyer cannot obtain insurance coverage, the liability of FluoroSeal Inc. for any personal injury or death, property damage or any other loss directly caused by defective design, material, or workmanship furnished by FluoroSeal Inc. shall not exceed the value of the material furnished by FluoroSeal Inc. at the time of the loss occurrence.



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