

BALL VALVE POLYMERIC SEATS

Jamesbury ball valves are available with a variety of seat options to allow use in a wide range of general as well as special services. These polymeric-seated ball valves are factory tested for tight shutoff and will continue to perform so for extended periods.

One of the most important factors affecting shutoff capability is the nature of media being handled. Service life is affected by:

| | |
|--------------------------------|--------------------------|
| Pressure | Velocity of the media |
| Temperature | Speed of valve operation |
| Degree of pressure fluctuation | Cycling frequency |
| Degree of thermal fluctuation | |

All of these are interrelated in actual service. Maximum service life, therefore, can be gained by reducing the severity of any of these factors.

PTFE (T)

The basic ball valve seat material is virgin PTFE which provides the temperature capability of -100°F to 400°F (-73°C to 204°C) and chemical compatibility to fill the widest possible range of service applications. PTFE seats are rated to 1×10^4 rads maximum radiation dosage.

Filled PTFE (M)

Filled or reinforced PTFE seats retain virtually all the chemical compatibility properties of virgin PTFE but extend the temperature capability of ball valves to 500°F (260°C) for Series 5000 and 7000 valves through 6" (DN 150) size and Series 6000 and 9000 through 4" (DN 100) size. Larger Series 5000, 6000, 7000 and 9000 valves are rated to 450°F (232°C). Filled PTFE seats are rated to 1×10^4 rads maximum radiation dosage.

Metal-wrapped filled PTFE (W)

Metal-wrapped PTFE seats are a variation of the filled PTFE seat. These seats are designed specifically for service where there is heavy hydraulic shock. The primary application is in pulp mill digester blow service.

Peek® (L)

Available in Series 4000, 5000, 6000, 7000 and 9000 valves, seats of this material (polyetheretherketone) significantly increase steam-handling capabilities. They are rated for positive shutoff of saturated steam to 475 psi (33 bar). PEEK seats also extend temperature capabilities of Series 4000, 5000 and 6000 valves in other services to 550°F (288°C) and offer excellent corrosion resistance. Maximum radiation dosage is 1×10^9 rads.

Special Nylon (G)

Special nylon seats are for much higher pressures up to 4500 psi (310 bar). They are somewhat limited in media compatibility. G seats are primarily used in high pressure oil, air and other gas systems except oxygen. Maximum radiation dosage is 6×10^6 rads.

Delrin® (R)

DELIN seats are used for higher pressures in Series 3000 and 4000 valves. They are also used in Series 5600 and 6600 ANSI Class 600 valves, allowing them to be rated to their full Class 600 body rating. Maximum radiation dosage is 1×10^6 rads.

UHMW Polyethylene (U)

UHMW polyethylene is used for highly radioactive materials where PTFE is not acceptable ($>10^4$ rads) and is rated to 2×10^7 rads. These seats also meet the requirements of the tobacco industry whenever PTFE is prohibited, and are especially well-suited for handling highly abrasive media.

FEP (F)

FEP seat material, a dense, melt processable PTFE compound, is available for handling media where polymerization and expansion (described as popcorning) is present. They are especially well-suited for butadiene and styrene service. FEP seats are rated to 1×10^5 rads maximum radiation dosage.

PFA (B)

PFA seats withstand the effects of polymeric monomers such as butadiene and styrene. PFA is rated to 2×10^6 rads maximum radiation dosage.

Polyimide (V)

Polyimide seats provide tight shutoff at temperatures to 700°F (371°C) for services such as hot gases, hot oil and organic heat transfer media. **Caution:** Polyimide is not suitable for steam or any other media containing water or water vapor. Polyimide seats are rated to 2×10^8 rads maximum radiation dosage.

XTREME™ (X)

XTREME is the seat of choice for most applications. An engineered filled fluorocarbon polymer that is rated to 500°F (260°C) at significantly higher pressures than filled PTFE (M). XTREME has excellent memory for thermal and pressure cycles, and is ideal for steam, hot gases, thermal fluids and a variety of process chemicals. XTREME is available in the Eliminator™, 4000 Series, 2"-10" (DN 50-250) 9000 Series, 3"-12" (DN 80-300) 7000 Series, 1/2"-2" (DN 15-50) 5000 and 6000 Series.

Delrin is a registered trademark of E.I. Du Pont de Nemours & Co.

New Materials

New seat materials and sealing techniques continuously become available through our dedicated research and development programs. For seat application requirements please consult Metso Automation or refer to Bulletin T101-3 for chemical assistance.

Exact pressure/temperature ratings of the different seat materials described in this bulletin are shown in the applicable valve bulletins listed in the table below.

These ratings are based on differential pressure with the ball in the fully closed position. IT IS IMPORTANT TO RECOGNIZE THAT THESE PRESSURE/TEMPERATURE CHARTS REFER TO SEATS ONLY, AND MAY BE SUBJECT TO LOWER LIMITS DICTATED BY LOWER WORKING PRESSURE RATINGS OF THE VALVE BODY. The valve body pressure limitations, also listed in each valve bulletin, must be reviewed in conjunction with seat pressure/temperature ratings.

| Valve Series | Type | Ball Valves Seat Materials | | | | | | | | | | | | | Reference Bulletin(s) | | |
|--------------|--------------------------------|----------------------------------|------------------------------|---------------|-----|---|----|---|---|---|----|----|-----|----|-----------------------|--|----------------|
| | | Size | | Seat Material | | | | | | | | | | | | | |
| | | Inches | DN | T | X | M | W | G | R | L | U | F | V | B | | | |
| 2000 | Screwed End | 1/4 – 2" | 6-50 | • | • | | | | | | | | | | | | B102-1 |
| 3A/3C | Screwed/Socket End | 1/4 – 2" | 6-50 | • | • | | | | | | | | | | | | B105-4 |
| 300 | Screwed/Socket End | 1/4 – 2" | 6-50 | • | • | | | | | | | | | | | | B103-1 |
| 3000 | Screwed End | 1/4 – 2" | 6-50 | • | • | | | | • | | | | | | | | B104-1 |
| 4000 | Screwed, Socket, Butt Weld End | 1/2 – 2" Std. Port | 13-50 Std. Port | • | • | • | | | • | • | • | | OA | • | | | B105-1 |
| 4000 | Screwed, Socket, Butt Weld End | 1/2 – 1-1/2" Full Port | 13-40 Full Port | • | • | • | | | • | • | • | | OA | • | | | B105-1 |
| 4000 | Screwed, Socket, Butt Weld End | 2" Full Port 2-1/2" Std. Port | 50 Full Port 65 Std. Port | • | • | • | | | | • | • | OA | OA | OA | | | B105-1 |
| 6F | Screwed End | 1/4 – 2" | 6-50 | • | • | | | | | | | | | | | | B101-3 |
| A | Screwed End | 1/4 – 2" | 6-50 | • | • | | | • | | | • | | | | | | B100-1 |
| Eliminator | Screwed End | 1/4 – 2" | 6-50 | • | • | • | | | • | • | • | OA | OA | OA | | | B101-2 |
| 5000 | Flanged | 1/2 – 2" | 13-50 | • | • | • | | | | • | • | OA | • | • | | | B107-1 |
| 5000 | Flanged | 12" Trunnion | 300 Trunnion | • | • | • | OA | | | | OA | OA | OA | | | | B107-1, B130-1 |
| 5000 | Flanged | 14 – 20" Trunnion | 350-500 Trunnion | • | • | • | OA | | | | | OA | OA* | | † | | B107-1 |
| 6000 | Flanged | 3/4 – 1-1/2" | 19-40 | • | • | • | | | | • | • | | | • | • | | B107-1 |
| 6000 | Flanged | 14-20" Trunnion | 350-500 Trunnion | • | • | • | OA | | | | | OA | OA | | | | B107-1 |
| 5600 | Flanged | 2" | 50 | | | | | | • | | | | | | | | B107-1 |
| 6600 | Flanged | 1/2 – 1-1/2" | 3-40 | | | | | | • | | | | | | | | B107-1 |
| 7000 | Flanged | 3 – 6" | 80-150 | • | • | • | OA | | | • | • | OA | | • | | | B107-1 |
| 7000 | Flanged | 8 – 10" | 200-250 | • | • | • | OA | | | | OA | • | OA | | • | | B107-1 |
| 9000 | Flanged | 2 – 4" | 50-100 | • | • | • | OA | | | • | • | OA | | • | | | B107-1 |
| 9000 | Flanged | 6 – 12" | 150-300 | • | 10" | • | OA | | | | | OA | OA | | • | | B107-1 |

† Available in 8" (DN 200) only.
* Available in 10" (DN 250) only.

OA - On application, consult factory.

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|-----------------------------|-----------------------------|
| T-PTFE | L-PEEK |
| X-XTREME | U-UHMW polyethylene |
| M-Filled PTFE | F-FEP |
| W-Metal-wrapped filled PTFE | V-Graphite filled polyimide |
| G-Special Nylon | B-PFA |
| R-DELRIN | |

Installation Instructions, Maintenance and Operation

IMO's (Installation, Maintenance, and Operating instructions) or AMI's (Assembly, Mounting, and Installation instructions) are shipped with the products. Additional copies of these instructions are available. Call your local Metso Automation Distributor, or visit our web site.

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