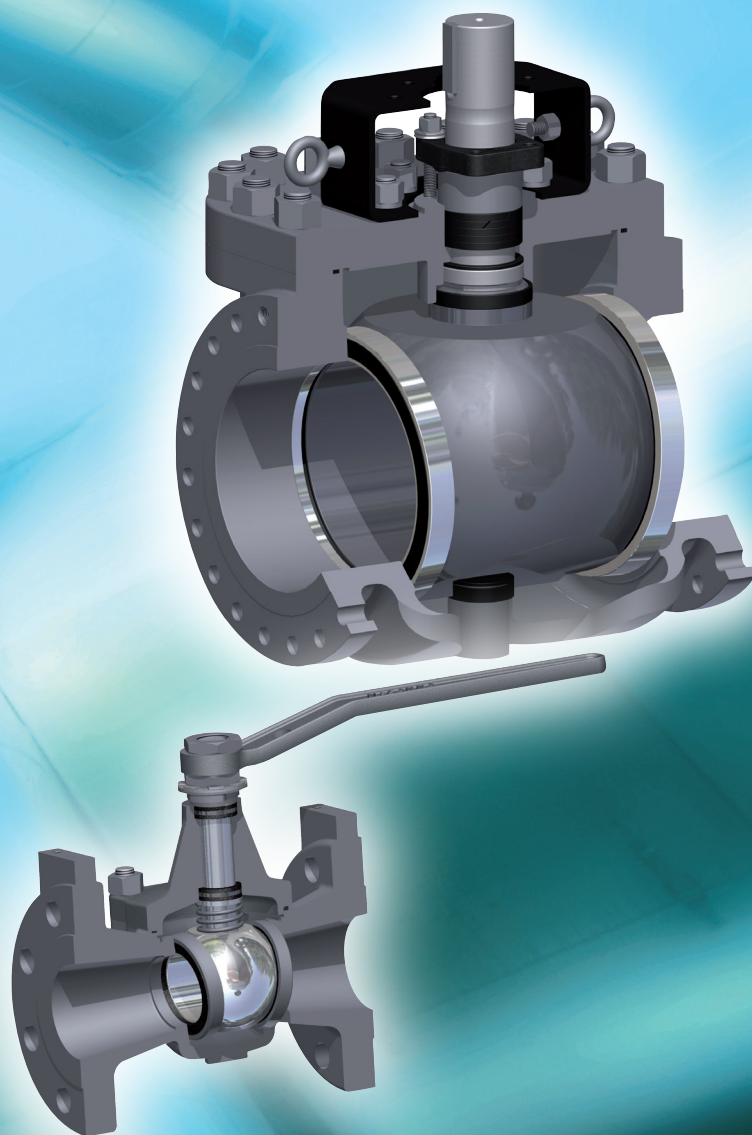




***McCANNA***  
*Ball Valves for Purified Terephthalic Acid Services*



*Experience In Motion*

## McCANNASEAL® Valves

### Meet the Challenges of Purified Terephthalic Acid (PTA) Processes

With its vast experience supplying special severe service valves to the PTA industry, Flowserve has been able to work closely with leading producers around the world to overcome the challenges of the burgeoning PTA market. These challenges include designing a valve for an aggressive environment that combines temperatures up to 10000F and corrosion with the ability to handle processes phases, with the safety of cavity relief. From the high temperature oxidation reactor to the centrifuge area leading to the drying process, McCANNA™ top entry (in-line repairable) ball valves are available in the appropriate sizes, materials, pressure and temperature specifications to meet any PTA service condition.

Due to the required purity of PTA, process designers are focused on preventing any foreign material contaminating their product. As a result only certain gaskets and seat materials are acceptable in the processing units.

Flowserve offers seats in Carbon Graphite 110 (a pure form of carbon graphite, without silicate fillers) to withstand the effects of Paraxylene and the rigorous conditions in the oxidation reactor process, including any caustic flushing applications that are introduced into the reactor to keep the PTA process clean. The versatility of the McCANNASEAL ball valve configurations also handles the increased volumes and wider piping configurations on the newer, larger PTA plants that are either already in operation or currently under construction.

Sizes 6” and above are now trunnion mounted to reduce torque, thereby requiring a smaller actuator which brings down the cost of the automated valve package (Flowserve can also supply all the required automation ancillaries). The new trunnion design also features bi-directional sealing, cavity pressure relief and compliance to ANSI face to face dimensions.

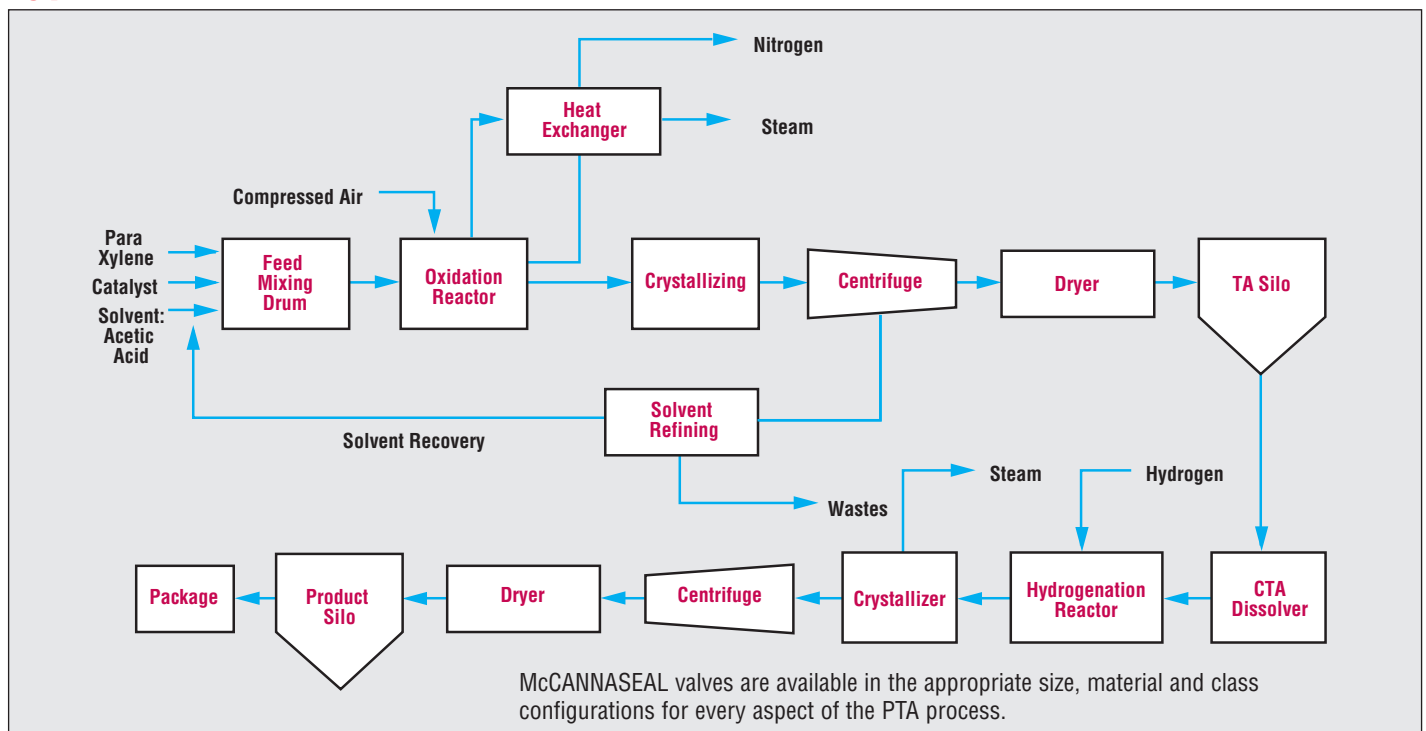
McCANNASEAL valves are available in ANSI pressure classes ranging from 150 to 1500. They meet all the key specifications including API 607 (fire test), API 608, API 6FA, ANSI B16.34, ANSI B16.10 and EN/ISO 15848 (fugitive emissions). The McCANNASEAL design has also proved to be highly reliable in IPA (Isophthalic Acid) and TMA (Trimelletic Anhydride) processes.

These valves contribute to the high production standards of the PTA process by providing:

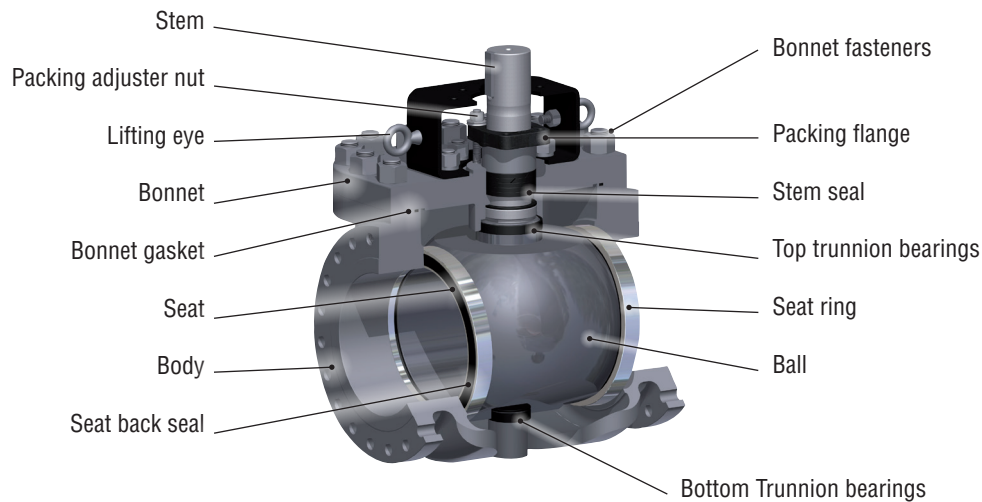
- Consistently “clean” finished product
- Reliable and consistent sealing of the carbon graphite seat with the wedge design
- A trunnion design that maximizes seal and seat life for dependable operation and productivity
- Extended service life reduces Total Cost of Ownership

Continuing their long legacy of success, McCANNASEAL valves are a proven leader in the PTA industry.

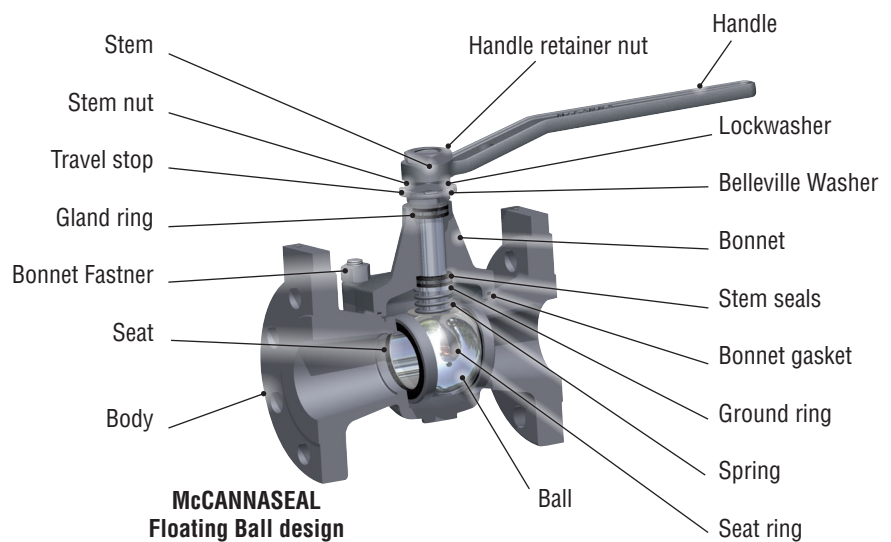
### Typical PTA Production Process



## Typical Materials of Construction



**McCANNASEAL (6" and above)  
Trunnion Mounted Ball Valve (TMBV)**



**McCANNASEAL  
Floating Ball design**

### ANSI Class 150, Class 300, Class 600, Class 900<sup>1</sup> & Class 1500<sup>1</sup>

Part Description	Hastelloy B	Hastelloy C	Stainless Steel	Titanium
Body	ASTM A494 Gr. N7M	ASTM A494 Gr. CW-12M	ASTM A351/A744 Gr. CF 8M	ASTM B367 Gr. C3
Bonnet*	ASTM A494 Gr. N7M	ASTM A494 Gr. CW-12M	ASTM A351/A744 Gr. CF 8M	ASTM B367 Gr. C3 ASTM B381 Gr. F3
Ball*	Stellite 6B	ASTM B574 UNS N10276 ASTM B494 Gr. CW-12M	ASTM A479 Type 316 ASTM A351/A744 Gr. CF 8M	ASTM B367 Gr. C3 ASTM B381 Gr. F3
Stem	ASTM B335 Gr. N10665	ASTM B574 UNS N10276	ASTM A276 Type 316 <sup>2</sup> CFB (½-3") CFA (4-10")	ASTM B367 Gr. C3 ASTM B381 Gr. F3 ASTM B348 Gr. 4
Spring	Inconel X750	Inconel X750	ASTM A313 Type 316 Inconel X750	ASTM B348 Gr. 5
Seat Ring	ASTM B335 Gr. N10665	ASTM B574 UNS N10276 (½-1") ASTM B619 UNS N10276 (1½-10")	ASTM A312 Gr. TP316	ASTM B348 Gr. 2

**Note:** To suit specific requirements, Flowserve provides McCANNASEAL Ball Valves in special materials of construction not listed in this bulletin.

\* Size of valve determines ASTM specification. Consult factory for specific information.

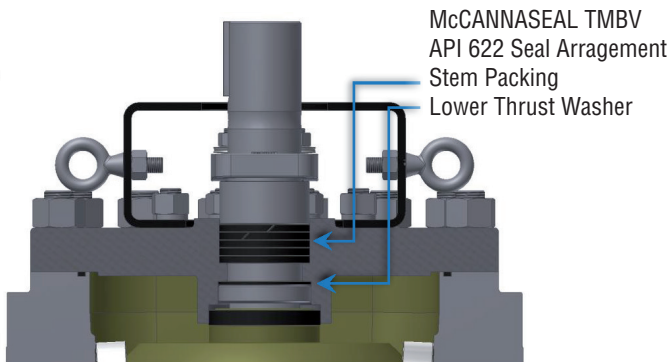
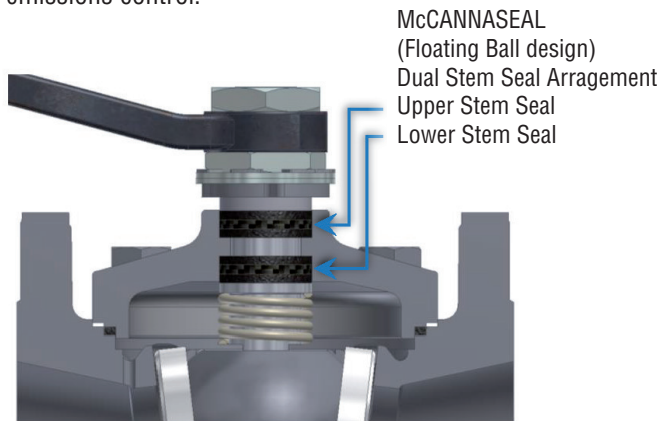
<sup>1</sup> Consult factory for class 900 & 1500 materials. <sup>2</sup> For 600, 900 & 1500 classes, stem material is 17-4 PH

## Configurations

**McCANNASEAL DAE** — Both sets of stem seals are removed from hot or cold line fluid. Recommended for clean services. Special preparation designation DAE.

**McCANNASEAL DAB** — One set of stem seals located at the lower end of the stem journal in place of the guide bushing used in type DAE. Recommended where line fluid may solidify upon cooling or where fluids contain fine solids. Special preparation designation DAB.

**Fugitive Emission** McCANNASEAL (floating ball design) is provided with an extended bonnet containing two sets of packing; while McCANNASEAL TMBV is provided with an API 622 compliant stem packing arrangement for fugitive emissions control.

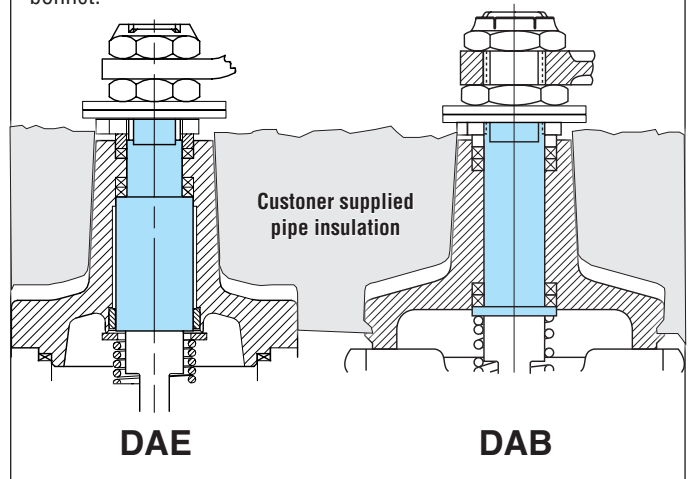


## Extended Bonnets for McCANNASEAL

The stem is firmly guided at the top and bottom, eliminating problems from “side thrust”.

The travel stop is located above the insulation, to assure non-interference of insulation between travel stop and bonnet.

Maximum safety — any stem seal leakage is readily detectable from outside of insulation. Stem seal adjustment outside of insulation.



## Options

### Steam-Jacketed Valves

Steam-jacketed valves are available for viscous or solidifying services which must be kept heated for free flow. The addition of a high-temperature bonnet and carbon graphite or metal seats enable a steam-jacketed McCANNASEAL valve to handle an ever widening range of difficult services.

### Locking Device

A locking device provides ability to lock open and lock closed.

### Gear Actuator

Gear actuators are available for manual operation tailored to the torque characteristics of the valve selected. Chainwheel option available.

### Automated

McCANNASEAL valves are ideally suited for remote actuation. A wide choice of Flowserve actuators and controls from simple open-close to actuation engineered systems to your specifications.

### Chain Handle Operation

For actuation below valve installation.

### Extension Stems

For actuation in hard to reach locations.

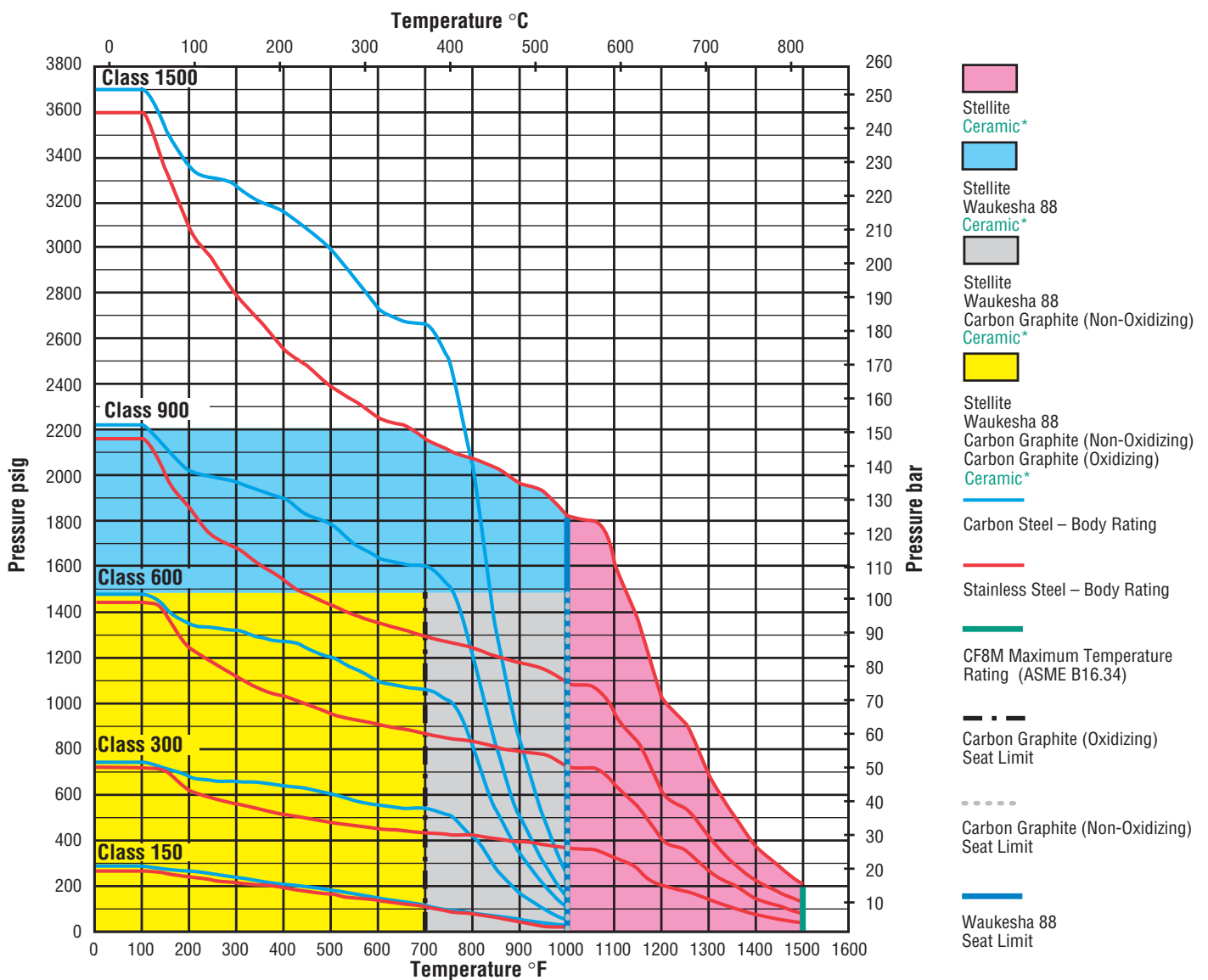
## Pressure-Temperature Ratings

### McCANNASEAL PTA Ball Valves Capable of Temperatures up to 1000 °F (538°C)

The proven wedge seat design of McCANNASEAL PTA ball valves permits the use of non-resilient seats for services beyond the temperature limits of common materials. This design does not depend on seat flexing or bending with non-resilient materials as it automatically compensates for pressure, temperature and wear. For PTA applications a specific blend of carbon and graphite powders are compressed in a confined die followed by baking in a non-oxidizing atmosphere producing the desired carbon graphite seats.

This seat material allows these valves to be used in temperatures as high as 1000°F (538°C). Metal seats are also applicable to PTA applications when it is imperative to eliminate product contamination. Waukesha 88 and Stellite have exceptional corrosion resistance and non-galling properties and are capable of services between 650°F (343°C) and 1000°F (538°C).

Extended bonnets are recommended for valves equipped with carbon graphite seats. Grafoil stem seals and spiral wound gaskets are available for PTA McCANNASEAL valves.



## Performance Data

### Flow Coefficient ( $C_v$ ) Versus Valve Size

#### Flanged Valves

Valve Size in.	Class 150	Full Port Class 150	Class 300	Full Port Class 300	Class 600	Full Port Class 600	Class 900	Class 1500
½	26	—	26	—	26	—	—	—
¾	55	—	55	—	55	—	16	16
1	55	63	51	61	46	54	27	27
1½	110	159	110	154	103	138	91	91
2	188	306	184	300	175	282	155	155
3	397	763	449	731	420	696	400	380
4	600	1430	720	1404	790	1355	740	640
6	1500	3548	1500	3522	1600	3339	1600	1550
8	2800	6148	2800	6004	2800	5779	3000	3000
10	4700	9684	4700	9684	4600	9368	—	—
12	6600	14327	6600	14327	—	13964	—	—
14	7550	—	7550	—	—	—	—	—
16	9500	—	9500	—	—	—	—	—
18	14850	—	15150	—	—	—	—	—

#### Socket Weld and Threaded Valves

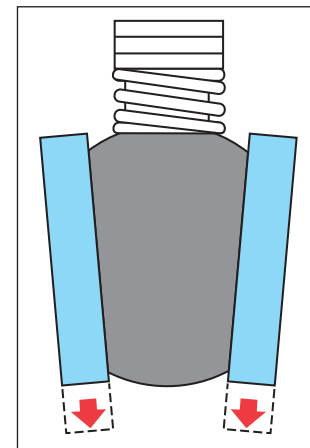
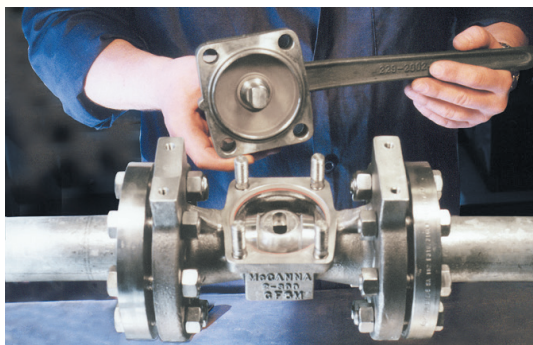
Valve Size in.	Class 300	Class 600
½	17	17
¾	26	26
1	35	35
1½	70	70
2	120	120
3	240	—

#### Butt Weld Valves

Valve Size in.	Class 300	Class 600
½	17	—
¾	26	—
1	35	—
1½	70	—
2	120	—
3	400	410
4	720	780
6	1500	1700
8	2500	3100
10	3800	—

$C_v$  values are for 100% open valve.

## Design Features & Options



1. **Top Entry** for fast, easy, in-line service that simplifies scheduled maintenance and permits emergency entry in minutes, just by removing the bonnet. All working parts can be removed for servicing, reducing downtime and maximizing safety, while the McCANNASEAL valve body stays fixed in the line. No special training or tools are needed. McCANNASEAL is the original unique top-entry ball valve.
2. **Wedge-Seat Design** permits use of hard, high temperature seat materials. For the standard design (floating ball) a 6½ degree taper seat design allows greater ball-to-seat bearing surface which provides consistent seat loading and results in longer seat life compared to other top entry ball valve designs. Positive leak-tight shut-off is assured for consistent process/operation for the full life of the seats. Seats are under compression load only and there is no flexing or bending of the seat material. For the trunnion mounted design a 3 degree taper is employed. The wedge adjusts for thermal expansion, compensates for wear, thermal cycling, erosion and corrosion with positive sealing throughout the pressure range.
3. **Available in a Wide Range of Body & Seat Materials to Meet PTA Demands** Body materials include Titanium, Hastelloy “B”, Hastelloy “C”, stainless steel and others. Seats are available in Fire-Seal, carbon graphite, metal, non-pigmented reinforced TFE and other materials.
4. **Fire-Seal Seats** protect against hazards caused by fluid flow resulting from excessive heat damage. McCANNASEAL PTA valves are qualified to meet API-607 4th Edition, BS 6755 and Exxon fire testing standards. The Fire-Seal seats consist of a metal ring enclosing an unpigmented reinforced TFE seat. Should the soft seat be destroyed by fire, a secondary metal seat provides a backup. The non-cycling, compression loaded spring provides a 10:1 mechanical advantage to ensure a tight ball-to-seat and seat-to-body seal with either resilient or metal seating elements. Grafoil stem seals and homogenous Grafoil bonnet gaskets are standard in valves with Fire-Seal seats.
5. **Ball is Wiped Clean Each Time the Valve is Operated** Ball-seat contact is constantly maintained, extending seat life.
6. **Two Way Shut-Off** assures no leakage even if flow is reversed.
7. **Quarter-Turn & Low Torque** make McCANNASEAL ball valves particularly suitable for remote operations with pneumatic or electric actuators, especially when high-cycle frequency is required.
8. **Temperatures Range from -320°F (-196°C) to 1000°F (538°C).**
9. **The Sizes ½" thru 18" and Classes 150 thru 1500** illustrated in this brochure are typical of PTA processes. Other sizes and classes are available. Contact Flowserve for details.
10. **McCANNA TMBV offers additional trunnion support.**
11. **Fugitive emissions compliant design** per API and ISO.



## How to Specify and Order

Order by valve size and figure number.

### McCANNA Ball Valve Figure No. Code System<sup>(1)</sup>

Valve Size (inches)	I	II	III	IV	V	VI	VII
	Type	Pressure <sup>(2)</sup>	Body Connection	Standard Material <sup>(1)</sup>	Standard Seats	Trim <sup>(1)(3)</sup>	Special Preparation
½	S- McCANNASEAL <sup>(6)</sup>	15- ANSI Class 150	1- Flanged	HB- Hastelloy "B"	G- Carbon Graphite	HB- Hastelloy "B"	Specify service or variation
¾	Z- Fire-Seal <sup>(5)</sup>	30- ANSI Class 300	RF or FF <sup>(4)</sup>	HC- Hastelloy "C"	U- Reinforced TFE (non-pigmented)	HC- Hastelloy "C"	
1	T- McCANNA	60- ANSI Class 600	2- Threaded	S6- SS316		S6- SS316	
1½	TMBV <sup>(5) (6)</sup>	90- ANSI Class 900	3- Socket Weld	T1- Titanium		SO- SS410	
2	Y- Fire Seal 6" and larger.	A5- ANSI Class 1500	H- BWE SCH 10	6L- SS316L		T1- Titanium	
3	Unidirectional unless otherwise indicated.	1F- ANSI Class 150	J- BWE SCH 40			6L- SS316L	
4		3F- ANSI Class 300	K- BWE SCH 60				
6		6F- ANSI Class 600	L- BWE SCH 80				
8		9F- ANSI Class 900					
10		AF- ANSI Class 1500					
12							
14							
16							

**Notes:** <sup>(1)</sup> This is basic Figure Number Code System only. Not all combinations available. Not all materials shown. McCANNA can provide McCANNASEAL Valves for PTA applications in special material of construction not listed in this bulletin. Please contact McCANNA for assistance and recommendations.

<sup>(2)</sup> Nominal pressure rating only. Actual CWP ratings vary with construction and valve configurations.

<sup>(3)</sup> Trim consists of ball and stem. Seat ring, spring, gland ring and other components may change due to this code.

<sup>(4)</sup> Standard flange finish 125 - 250 Micro-Inches Ra.

<sup>(5)</sup> Valves qualified to API-607 and ISO 10497.

<sup>(6)</sup> TMBV Valves qualified to ISO 15848-1. McCANNASEAL valves with teflon seals and packing qualified to ISO 15848-1

#### Ordering Example:

Size <sup>(7)</sup>	I,II,III <sup>(8)</sup>	IV <sup>(9)</sup>	V <sup>(10)</sup>	VI <sup>(11)</sup>	VII <sup>(12)</sup>
10"	S901	Ti	G	Ti	

<sup>(7)</sup> Valve size

<sup>(8)</sup> Type, pressure class or group, and end connection from Column I, II, & III

<sup>(9)</sup> Body material from Column IV

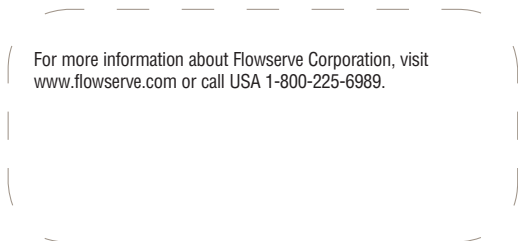
<sup>(10)</sup> Seat from Column V

<sup>(11)</sup> Trim from Column VI

<sup>(12)</sup> Special preparation description

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Contact:



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