



FLOWSERVE
McCANNA/MARPAC Valves

MMABR1015
(Part PTA-2)

Purified Terephthalic Acid
McCannaseal® Ball Valves Services

McCannaseal Valves

Meet the Challenges of Purified Terephthalic Acid (PTA) Processes

Flowserve's vast experience in supplying special severe service valves to the PTA industry affords Flowserve the opportunity to work closely with leading PTA producers around the world meeting the challenges of this burgeoning market. From the high temperature oxidation reactor area to the centrifuge area leading to the drying process, McCannaseal Top Entry Ball Valves are readily 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 very concerned regarding any foreign material contaminating their product. As a result only certain gaskets and seat materials are acceptable in the processing units.

By being the valve leader for over 20 years, Flowserve's extensive knowledge has contributed valuable solutions to aid in the implementation of the PTA process while controlling costs. Flowserve offers Carbon Graphite 110 (a pure form of carbon graphite) seats which withstand 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.

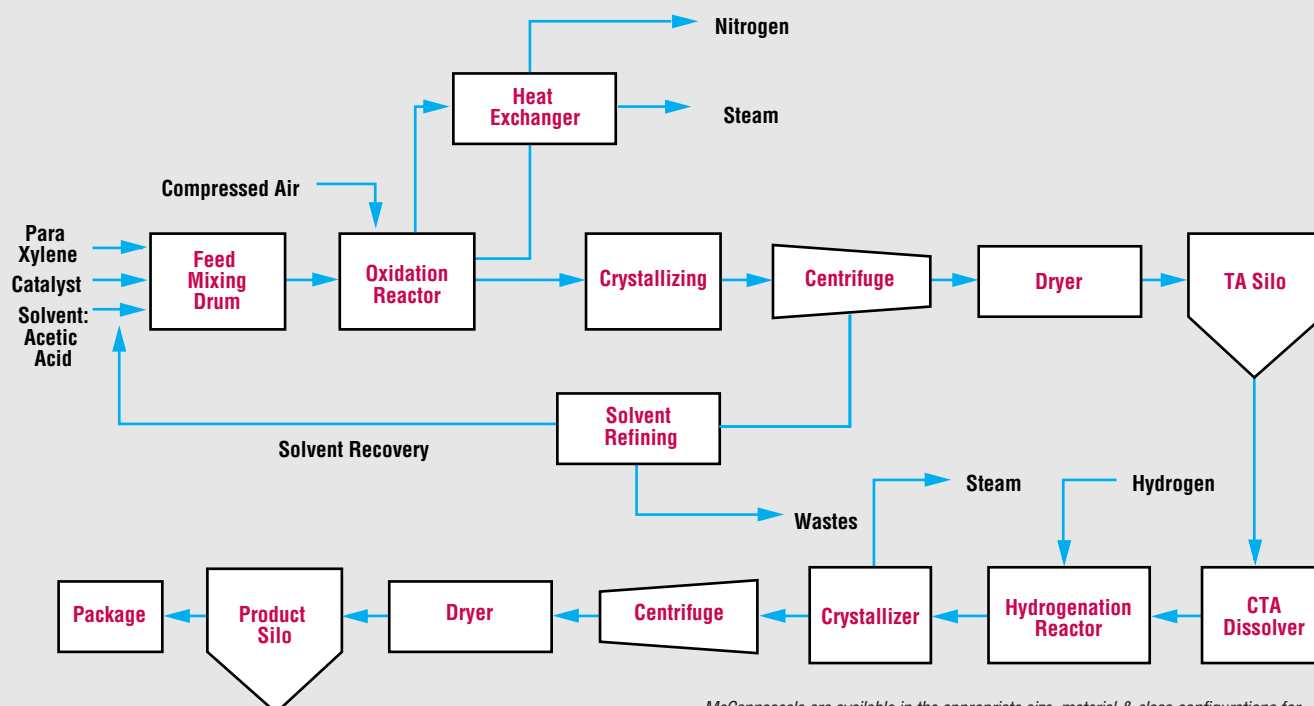
The versatility of the McCannaseal Ball Valve configurations also allows for the handling of increased volume and wider piping configurations on the newer, larger PTA plants that are either now in operation or are currently under construction. McCannaseal Ball Valves have also been proven to be highly reliable in IPA (Isophthalic Acid) and TMA (Trimellitic Anhydride) processes.

These valves aid in the high production standards of the PTA process by providing:

- Consistently "clean" finished product
- Reliable tight shut-off
- Dependable Operation
- Extended Service Life

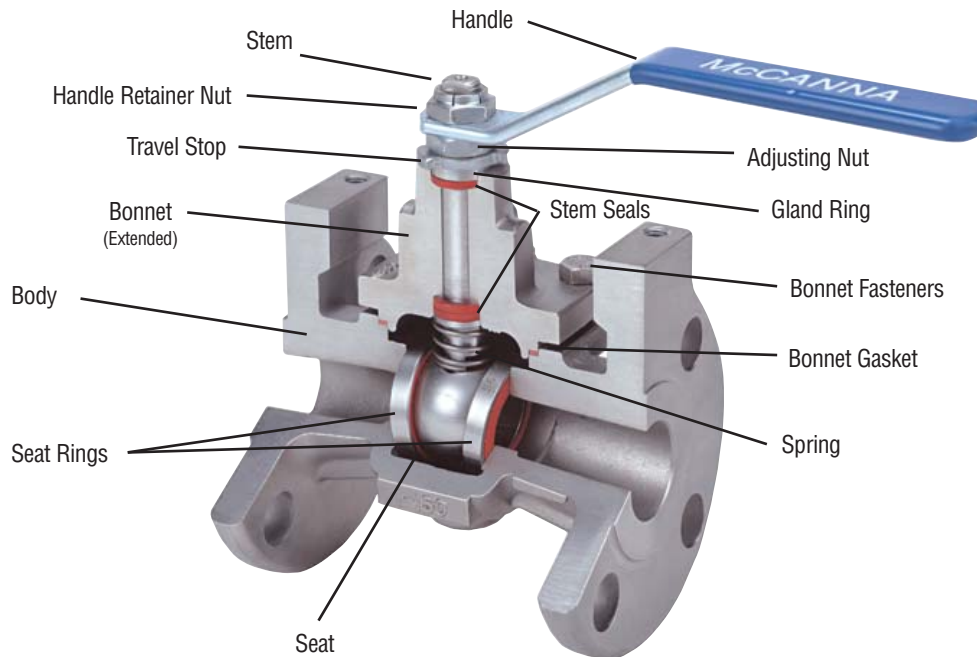
With a long history of success, McCannaseal valves are the proven leader in the PTA industry.

Typical PTA Production Process



McCannaseals are available in the appropriate size, material & class configurations for every aspect of the PTA process.

Materials of Construction



ANSI Class 150, Class 300 & Class 600 ■

Part Description	Hastelloy B	Hastelloy C	Stainless Steel	Titanium
Body – threaded or flanged ends	ASTM A494 Gr. N7M	ASTM A494 Gr. CW-12M	ASTM A351 Gr. CF 8M	ASTM B367 Gr. C3
Body – socket or butt weld ends	ASTM A494 Gr. N7M	ASTM A494 Gr. CW 12M	ASTM A351 Gr. CR 3M	ASTM B367 Gr. C3
Bonnet*	ASTM A494 Gr. N7M	ASTM A494 Gr. CW-12M	ASTM A351 Gr. CF 8M	ASTM B367 Gr. C3
Ball*	Stellite 6B	ASTM B574 UNS N10276 ASTM B494 Gr. CW-12M	ASTM A479 Type 316 ASTM A351 Gr. CF 8M	ASTM B348 Gr. 4 ASTM B367 Gr. C3
Stem	ASTM B335 Gr. N10665	ASTM B574 UNS N10276	ASTM A276 Type 316 ▲ CFB (½-3") CFA (4-10")	ASTM B348† Gr. 4
Spring – RTFE seats	Inconel X750	Inconel X750	ASTM A313 Type 316	ASTM B348 Gr. 5
Spring – all other seats	Inconel X750	Inconel X750	Inconel X750	ASTM B348 Gr. 5
Seat Ring	ASTM B335 Gr. N10665	ASTM B574 UNS N 10276 (½-1") ASTM B619 UNS N10276 (1½-10")	ASTM A312 Gr. TP316	ASTM B348 Gr. 2
Capscrew	●	●	●	●

Note: To suit specific PTA requirements, Flowserve can provide McCannaseal Ball Valves in special material of construction not listed in this bulletin.

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

† PTFE coated

▲ For 600, 900 & 1500 classes, stem material is 17-4 PH

■ Consult factory for class 900 & 1500 materials.

● Materials depend on valve class, consult Flowserve

Configurations:

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

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.

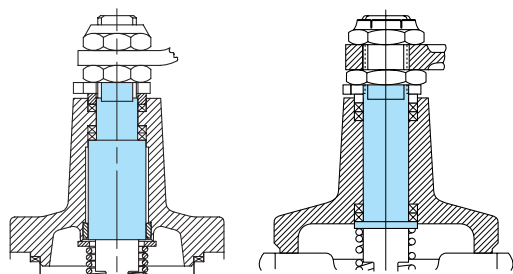
Fugitive Emission version is also available with a DAB extended bonnet design containing two sets of packing (upper and lower) with a leak detection port between the two sets of packing. Should the lower packing fail, a leak would be detected before it escapes into the atmosphere. The intermediate packing area can be pressurized to ensure one direction leakage into the process with a benign medium.

Stem is firmly guided at top and bottom, eliminating problems from "side thrust".

Travel stop located above 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.



DAE

DAB

Extended Bonnets

Options

Steam-Jacketed Valves

Steam-jacketed valves for viscous or solidifying services which must be kept heated for free flow are available. 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 service.

Locking Device

A locking device provides ability to lock open, lock closed, or both 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 Ramcon® 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.

McCannaseal Valve Size in/mm	Amount of Extension Above Standard	Max. Insulation Thickness
½, ¾, & 1 15, 30 & 25DN	1¼ 31.8	1½ 38.1
1½ 40 DN	1½ 38.1	2 50.8
2 50 DN	1¾ 44.4	2½ 63.5
3 80 DN	2 50.8	2¾ 69.8
4 100 DN	2 50.8	3½ 88.9
6 150 DN	2 50.8	4 101.6
8 200 DN	2 50.8	4¾ 120.6

Note: The DAB extended bonnet configuration is standard on all sizes of ANSI Class 600, 900 and 1500 valves.

Performance Data

McCannaseal PTA Ball Valves Capable of Temperature up to 1000°F (538°C)

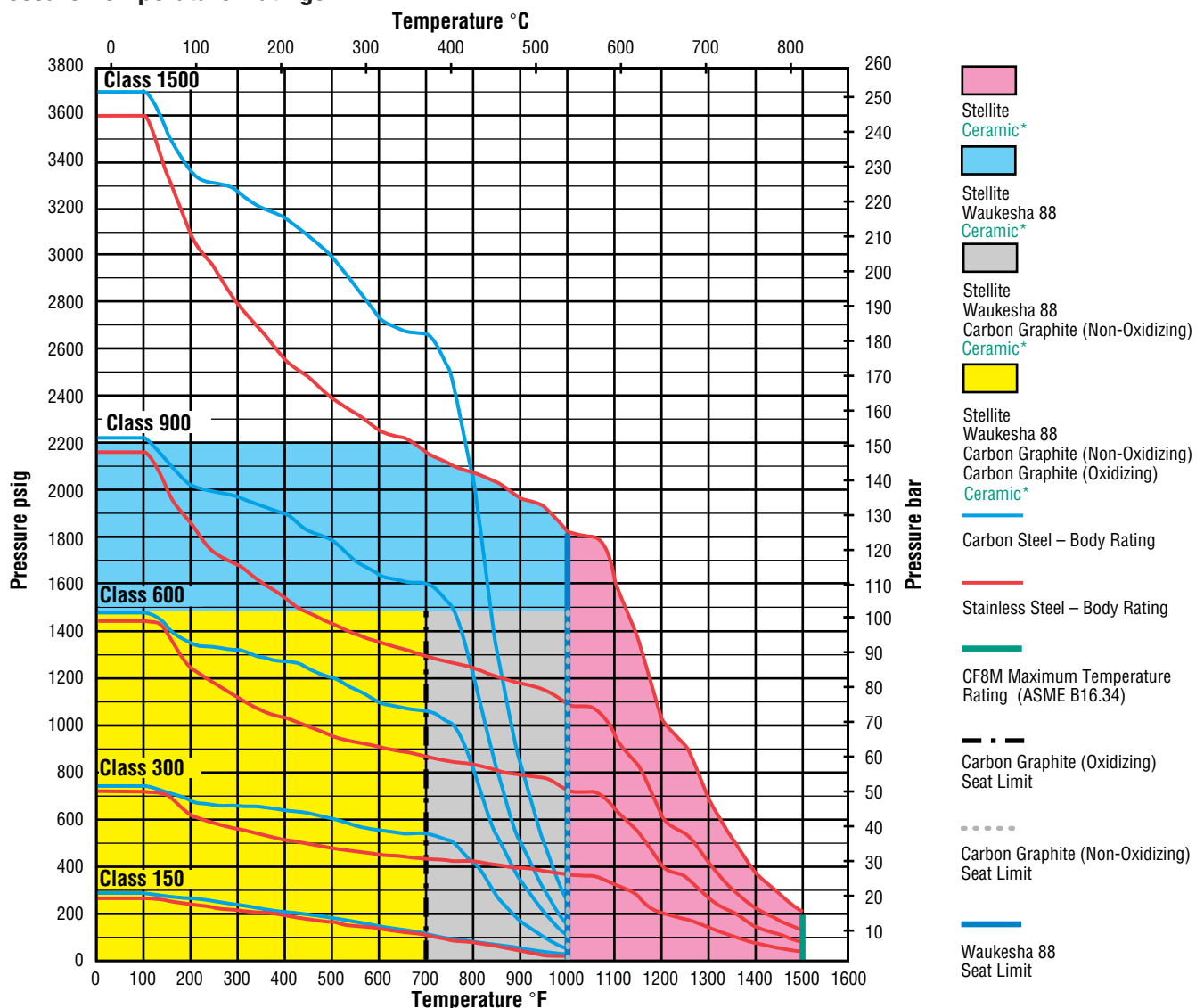
The proven wedge seat design of McCannaseal PTA ball valves permits the use of non-resilient seats for services beyond the temperature limits of common materials. This design does not depend on seat flexing or bending with non-resilient materials as it automatically compensates for pressure, temperature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

Pressure-Temperature Ratings



Ceramic* seats limited to Class 300 pressure ratings.

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	—	4100
12	6600	14327	6600	14327	—	13964	—	—
14	7550	—	7550	—	—	—	—	—
16	9500	—	9500	—	—	—	—	—
18	14850	—	15150	—	—	—	—	—

Flanged 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	—

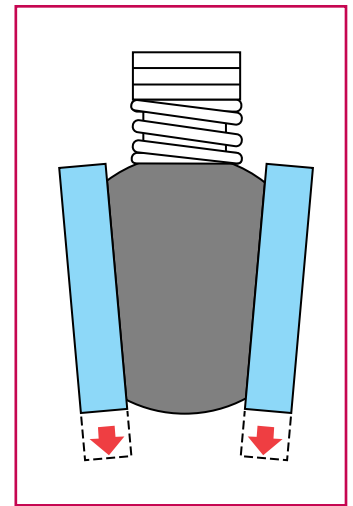
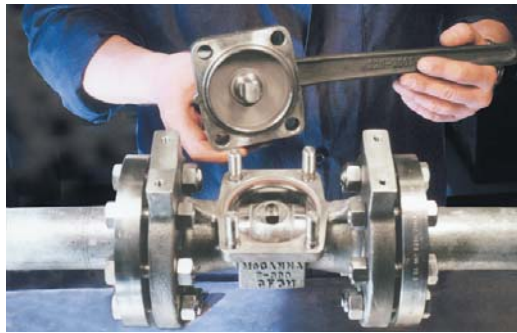
Butt Weld Valves

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. For additional information, including C_v values for incremental valve positions, refer to Flowserve's

"Flow Manual for Quarter-Turn Valves"

Design Features and 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 while the McCannaseal valve body stays fixed in the line. No special training or tools are needed. McCannaseal is the original patented top-entry ball valve.

2. Wedge-Seat Design permits use of hard, high temperature seat materials. A 6/7 degree taper seat design allows greater ball-to-seat bearing surface resulting in longer seat life compared to other top entry ball valve designs. Positive leak-tight shutoff is assured for the full life of the seats. Seats are under compression load only. There is no flexing or bending of the seat material.

3. Unique Spring Loaded Ball and Seat Construction is exclusive to the McCannaseal Ball Valve. This self adjusting, spring loaded design assures leak-tight closure under all operating conditions and valve orientations, including TA slurry applications. Seats remain in tight contact with the ball as the spring provides an even, nonbinding, elastic pre-load on the seats at all pressures, temperatures and at all stages of seat wear. The corrosion-resistant spring is non-flexing, non-torsional and has a low compression design stress. Also available is an optional ball stop to help further prevent differences in the thermal expansion rates of the ball, seats and body from jamming the ball and seats into the body wedge.

4. Available in a Wide Range of Body and 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.

5. 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.

6. Ball is Wiped Clean Each Time the Valve is Operated Ball-seat contact is constantly maintained, extending seat life.

7. Backseated Stem-Conical Stem Seats The stem shoulder design eliminates any possibility of stem blowout and increased line pressure increases stem sealing.

8. Two-Way ShutOff assures no leakage even if flow is reversed.

9. Quarter-Turn and Low Torque make McCannaseal ball valves particularly suitable for remote operations with pneumatic or electric actuators, especially when high-cycle frequency is required.

10. Temperatures Range from -320°F (-196°C) to 1000°F (538°C).

11. The Sizes ½" thru 12" and Classes 150 thru 1500 illustrated in this brochure are typical to PTA processes. Other sizes and classes are available. Contact Flowserve for details.

Extended Bonnets

Extended bonnets for McCannaseal ball valves provide a longer stem for higher temperature or semi-cryogenic applications. The extended bonnet improves stem seal performance by raising the seal arrangement out of the proximity of the fluid flow, thus maintaining seals at a more normal temperature.

The extended bonnet supports side loads thereby reducing the possibility of stem galling and leakage under severe services.

The McCannaseal extended bonnet assembly is interchangeable with standard McCannaseal bonnet assemblies. This flexibility is accomplished without disturbing existing piping due to the top-entry feature.

How to Specify and Order

Order by valve size and figure number.

McCanna Ball Valve Figure No. Code System ⁽¹⁾							
Valve Size (inches)	I Type	II Pressure ⁽²⁾	III End Connection	IV Body Material ⁽¹⁾	V Standard Seats	VI Trim ⁽¹⁾⁽³⁾	VII Special Preparation
1/2 3/4 1 1 1/2 2 3 4 6 8 10 12	S – McCannaseal Z – Fire-Seal ⁽⁵⁾	15 – ANSI Class 150 30 – ANSI Class 300 60 – ANSI Class 600 90 – ANSI Class 900 A5 – ANSI Class 1500	1 – Flanged RF or FF ⁽⁴⁾ 2 – Threaded 3 – Socket Weld 4 – Butt Weld	HB – Hastelloy “B” HC – Hastelloy “C” S6 – SS316 Ti – Titanium 6L – SS316L	G – Carbon Graphite U – Reinforced TFE (non-pigmented)	HB – Hastelloy “B” HC – Hastelloy “C” S6 – SS316 SO – SS410 Ti – Titanium 6L – SS316L	Specify service or variation

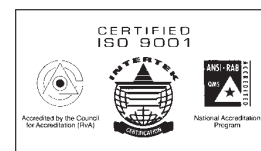
Notes: (1) This is basic Figure Number Code System only. Not all combinations available. Not all materials shown. Flowserve can provide McCannaseal Valves for PTA applications in special material of construction not listed in this bulletin. Please contact Flowserve for assistance and recommendations.

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

(3) Trim consists of ball and stem.

(4) Standard flange finish 125–250 Micro-Inches Ra.

(5) Valves qualified to API-607 and BS6755.



Ordering Example:

(1)	(2)	(3)	(4)	(5)	(6)
10"	S901	Ti	G	Ti	
SIZE	I, II, III	IV	V	VI	VII

(1) Valve size

(2) Type, pressure class or group, and end connection from Column I, II, & III

(3) Body material from Column IV

(4) Seat from Column V

(5) Trim from Column VI

(6) Special preparation description

Flowserve...
Your Single
Source for a
Wide Variety of
Reliable Valves
and Actuators



McCannaseal® Ball Valves Top-of-the-line, top-entry ball valves with wedge-seat design are available in sizes 1/2 to 12 for pressures to 3750 psi. Available in a wide range of materials.

McCannaflo® Ball Valves Economical, end-entry ball valves with patented prestressed, Fire-Seal® seats in sizes 1/4 to 12 for pressures to 1200 psi.

McCanna 800® Ball Valves Standard ball valves that combine high-pressure reliability, low cost and Fire-Seal seats in sizes 1/4" through 2" for pressures to 2,000 psi.

McCanna General Purpose Ball Valves Sturdy, compact general purpose design available in brass or steel in sizes 1/4 to 2 for pressures to 2000 psi.

Diaphragm Valves Versatile, weir-type soft-seated valves provide leak-tight shutoff on sizes from 1/2 through 12 for pressures to 200 psi.

NOTICE: Flowserve Ball Valves are designed and manufactured using good workmanship and materials, and they meet all applicable industry standards. Flowserve, Corp. is anxious to avoid injuries and property damage which could result from misapplication of the product. Proper valve selection is imperative. Examples of the misapplications or misuse of a valve include but are not limited to use in a service in which the pressure/temperature rating is exceeded or in a chemical service incompatible with the valve materials; use of undersized valve actuators; use of extremely fast valve actuation and/or continuous valve cycling on standard valves; making modifications of the product of any kind; failure to use caution in operating valves in high temperature, high pressure, or highly hazardous services; and the failure to maintain valves as recommended. The right is reserved to change or modify product design or construction without prior notice and without incurring any obligation to make such changes and modification on products previously or subsequently sold.

Flowserve Corporation has established industry leadership in the design and manufacture of its products. When properly selected, this Flowserve product is designed to perform its intended function safely during its useful life. However, the purchaser or user of Flowserve products should be aware that Flowserve products might be used in numerous applications under a wide variety of industrial service conditions. Although Flowserve can (and often does) provide general guidelines, it cannot provide specific data and warnings for all possible applications. The purchaser/user must therefore assume the ultimate responsibility for the proper sizing and selection, installation, operation, and maintenance of Flowserve products. The purchaser/user should read and understand the Installation Operation Maintenance (IOM) instructions included with the product, and train its employees and contractors in the safe use of Flowserve products in connection with the specific application.

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