



McCANNA/MARPAC Valves

Product Data Bulletin
FCD MMAPS0013-00
(Part PDB-6)

McCANNA Ball Valves for Steam Service

Definitions

Steam: Vapor phase of water when heated to boiling point.

Saturated Steam: Steam generated by heating water just to its boiling point. Both water and steam are at same temperature and pressure. (See Figure 1).

Wet Saturated Steam: Mixture of saturated steam with condensed water particles present.

Dry Saturated Steam: Saturated steam free of water particles.

Superheated Steam: Saturated steam passed through a superheater, increasing temperature without increasing pressure (sometimes specified as saturated steam with so many degrees superheat).

Limitations or Ball Valves

Ball valves, like all valves, are generally rated at a lower pressure for steam service than for liquid or dry gaseous service.

Wet steam is damaging to all valve parts at the moment of opening and closing, or when throttling. Resilient seat materials in ball valves may be more susceptible to damage than metal or carbon graphite seats.

Extremely high velocities are generated in the small orifice exposed as a valve begins to open or close, and the high speed droplets of water erode (wire draw) the seats and metal parts.

Steam and steam condensate is generally more corrosive than water because of the presence of dissolved gases, carbon dioxide, and oxygen. This results in stem and ball corrosion, unless the valve materials are properly selected.

If boiler water treatment chemicals and suspended solids are carried over by the steam (as evidenced by the hard white deposit seen in many valves), damage to stem, ball, and seats results if proper precautions are not taken. In the case of aluminum or bronze, alkaline “carry over” of boiler water will corrode the aluminum or bronze valve bodies. Free ammonia in the low pressure or condensate will attack bronze.

Low Pressure Steam Valves

Standard McCannaSeal® ball valves can be used in saturated steam service up to the maximum low pressure steam figures shown in Figure 2. Note that carbon steel trim is not recommended because of the aggressive action of steam on chrome plated steel.

McCannaFlo® balls must be provided with a 1/8" hole drilled in the tang slot. The purpose of the hole is to prevent excessive pressure build-up in the cavity from trapped liquid when the valve is in the open position.

High-Pressure Steam Valve

McCANNA ball valves may be used in saturated steam service up to the maximum high pressure steam figures shown in Figure 3 when specifically prepared for this service. Available body, seat, and trim materials are shown together with any limitations due to ANSI rating.

Special preparation as follows

McCannaFlo (Barstock)

1. Use “R” seats only
2. Hole drilled in tang slot of ball
3. Specify for high-pressure steam

McCannaSeal

1. Use “W”, “G”, or “M” seats only (See Figures 4 and 5 for pressure/temperature limits)
2. Use SS316 seat rings and inserts
3. Specify for high pressure or superheated steam

Superheated Steam

Clean, on-off superheated steam applications can be handled if the valve is properly selected and applied for the service. McCANNA 800® and McCannaFlo valves listed in Figures 2 and 3 may be used up to the temperature limits shown, providing the pressure is below the corresponding saturated steam pressure. Any increase in steam temperature above the valves shown in Figure 3 must be compensated for by a decrease in the maximum allowable pressure. Consult the factory to insure proper selection in these cases.

McCannaSeal ball valves with “W”, “G”, or “M”, seats may be applied to the limits shown in the graphs on pages 3 and 4, Figures

4 and 5. Orders and inquiries must specify “high pressure” or superheated steam, and the pressure/temperature conditions of the application should be specified as well. “G” seated McCannaSeal ball valves applied at temperatures of 500°F or greater MUST HAVE BALL STOPS, and only “G” quality balls and seats, lapped as matched sets, should be used as original components or replacement parts.

Hot Water

When water is heated above 212°F (100°C) but held at a higher pressure than the corresponding pressure shown for saturated steam, the standard valve temperature/pressure curves would apply. However, if the pressure on a downstream side of the valve drops to a value below the saturated steam pressure, flashing will occur and a “steam” prepared valve should be selected from Figure 3.

Figure 1: Saturated Steam Table

Pressure (psig)*	Temp (°F)	Pressure (Bar)	Temp (°C)	Pressure (psig)*	Temp (°F)	Pressure (Bar)	Temp (°C)
0	212	0	100	90	331	6.20	167
5	228	0.34	108	100	338	6.89	170
10	240	0.69	116	120	350	8.27	177
15	250	1.03	121	125	353	8.62	179
20	259	1.38	126	140	361	9.65	183
25	267	1.72	131	150	366	10.34	185
30	274	2.07	134	160	371	11.03	188
35	281	2.41	139	175	377	12.07	192
40	287	2.76	142	180	380	12.41	193
45	293	3.10	145	200	388	13.79	198
50	298	3.45	147	225	397	15.51	203
60	307	4.14	153	250	406	17.24	207
70	316	4.83	157	275	414	18.96	212
75	320	5.17	160	300	422	20.68	217
80	324	5.52	162	350	436	24.13	224

* If steam pressure is given in absolute pressure (psi), subtract 14.7 to obtain gauge pressure (psig).

Figure 2: Low Pressure Steam (specify: prepare for low pressure steam)

Valve Type	McCanna 80®	McCannafllo (Threaded)	McCannafllo (Flanged)	McCannaseal	McCannaseal
Steam Pressure	75# @ 320°F (5.2 bar@160°C)	100# @ 338°F (6.9 bar@170°C)	100#@ 338°F (6.9 bar@170°C)	100# @ 338°F (6.9 bar@170°C)	150# @ 366°F (10.3 bar@185°C)
Body Material	AL, Br, CS, S6	AL, Br, CS, S6	CS, S6 ⁽²⁾	AL, Br, CS, S6	Br, CS, S6
Seat Material	R	R	R	R	W
Trim material	AL, Br, S6	AL, Br, S6	S6	AL, Br, S6	Br, S6

Figure 3: High Pressure Steam (specify: prepare for high pressure steam)

Valve Type	McCannafllo (Threaded)	McCannafllo (Flanged)	McCannaseal	McCannaseal
Steam Pressure	(200# @ 338°F) (13.8 bar@1980°C)	(200# @ 338°F) (13.8 bar@1980°C)	(250# @ 406°F) (17.2 bar@2080°C)	(300# @422°F) (20.7 bar@217°C)
Body Material	CS, S6	CS, S6 ⁽¹⁾	CS, S6	CS, S6 ⁽¹⁾
Seat Material	R	R	W	W
Trim material	S6	S6	S6	Br, S6

(1) CS - Class 150, Limit 200# @ 388°F; S6 - Class 150, Limit 195# @ 386°F

Figure 4

McCANNASEAL Ball Valve - W Seats
Steam Service, Clean, On-Off Service Only

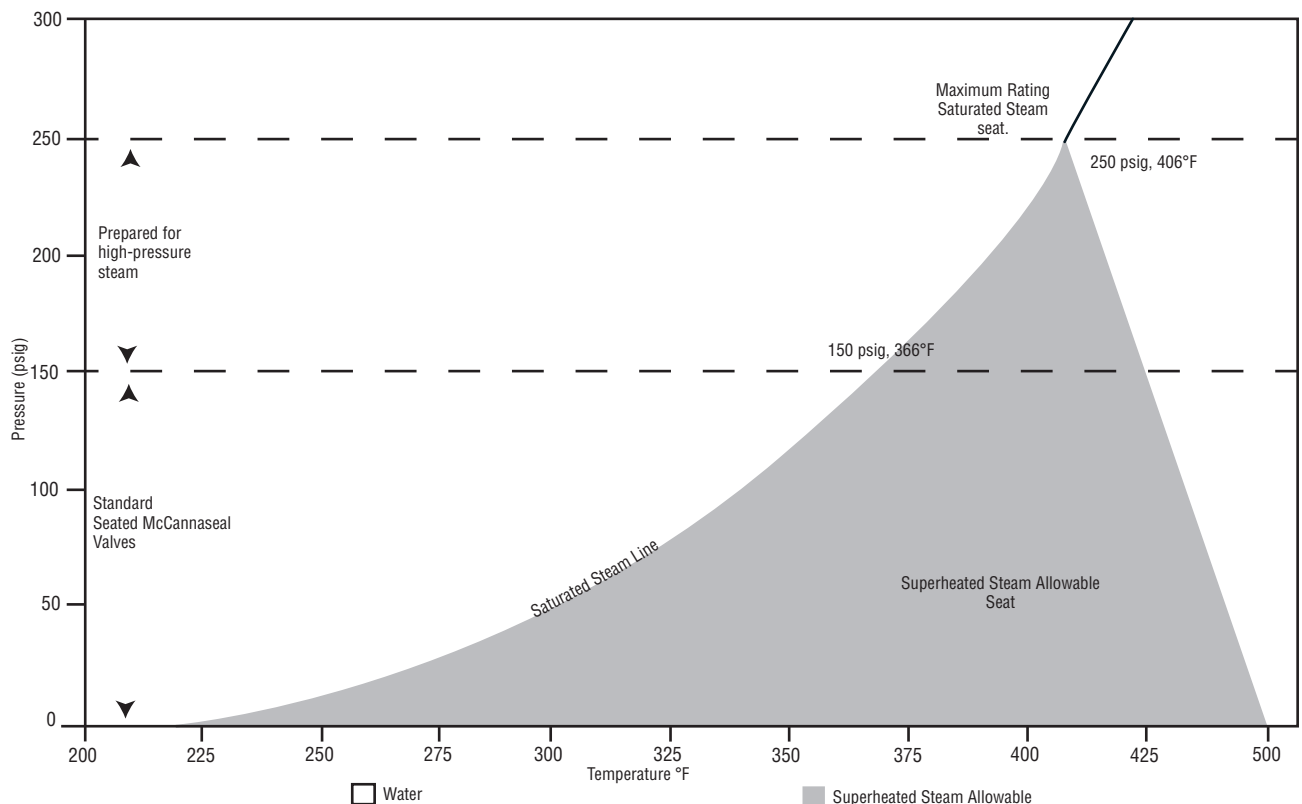
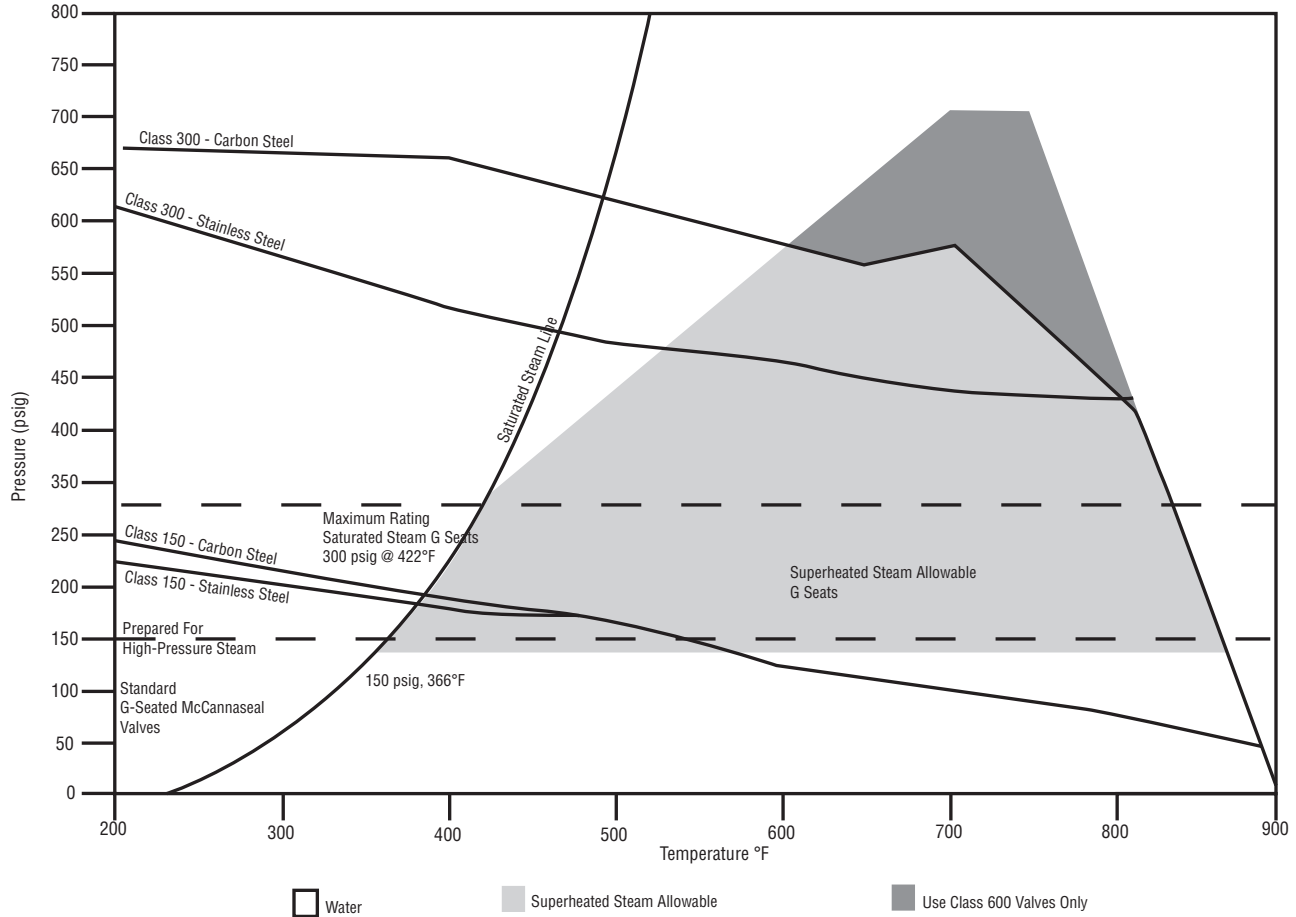


Figure 5

McCANNASEAL Ball Valve - G Seats
Steam Service, Clean, On-Off Service Only



McCannaFlo® is a registered trademark of Flowserve Corporation.
McCannaseal® is a registered trademark of Flowserve Corporation.
Marpac® is a registered trademark of Flowserve Corporation.
McCANNA 800® is a registered trademark of Flowserve Corporation

For more information about Flowserve Corporation, visit www.flowserve.com or call USA 1-800-225-6989.

FLOWERVE CORPORATION
FLOW CONTROL DIVISION
1978 Foreman Drive
Cookeville, Tennessee 38501 USA
Phone: 931 432 4021
Facsimile: 931 432 3105
www.flowserve.com