



A-T Controls, Inc.

M Series (FMX)

3-PC High Performance Metal Seat
Floating Ball Valve



M Series

3-PC High Performance Metal Seat Ball Valve

**Full Bore TH/SW/BW Ends
ASME Class 600**



The A-T Controls *M Series* metal seat ball valve is designed for use in severe services such as high temperature, high pressure, and abrasive fluids found in Oil & Gas, Petroleum, Petrochemical, Chemical, Power Generation, Pulp & Paper, and Mining industries.

Product Features

- Oversized stem design prevents deformation at higher pressures and temperatures.
- Larger ball design provides better sealing to prevent leakage.
- Fully conforms to ASME B16.34
- Bidirectional design for backflow application
- Inconel® spring design to maintain good contact between ball and seats during operation
- Live-loaded packing design and dual anti-static devices eliminate stem leakage while providing longer life cycle.
- Dual anti-static devices
- Blowout proof stem
- ISO 5211 mounting pad
- Fire safe design conforms to ISO 10497 3rd edition
- Optional Tungsten Carbide (TC) coating for heavy slurry & high temperatures

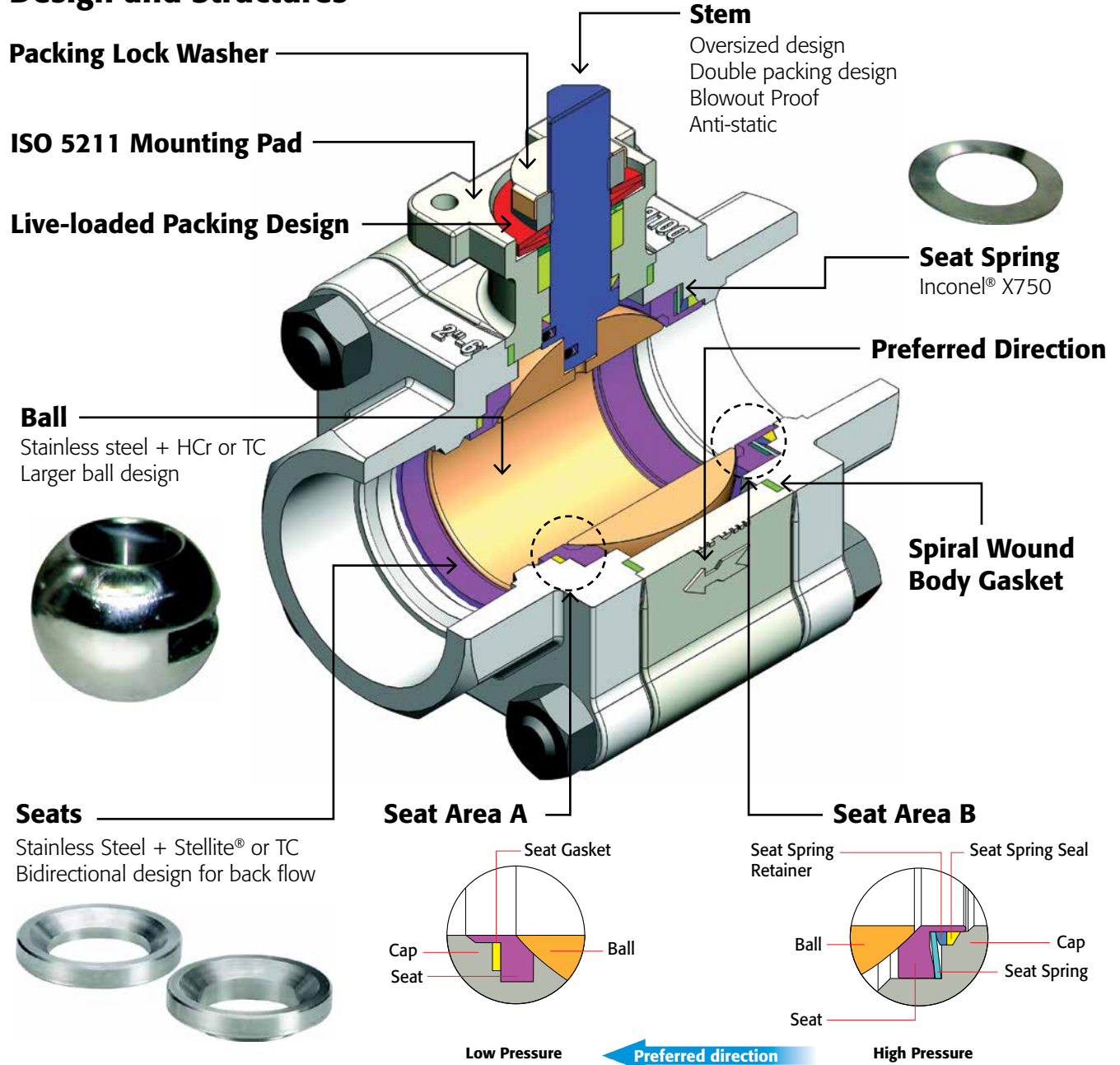


HVOF Thermal Spray

Applications

- Abrasive Fluids
- High Temperatures
- High Pressure
- Steam, gas & liquid

Design and Structures



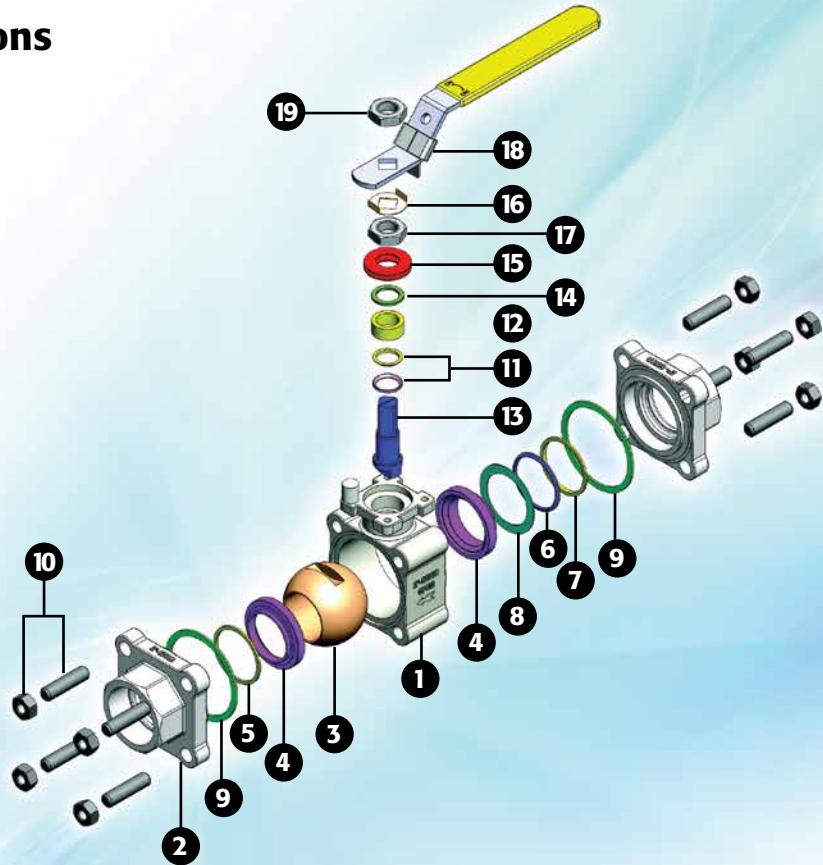
Seat Area A
 Seat-Gasket is press-fit into the body and this provides the stability for a wide range of temperatures.

Seat Area B
 Seat Spring Seal design prevents backflow leakage. Seat Spring provides flexibility for thermal expansion for stabilizing operation.

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Technical Specifications



MATERIALS LIST

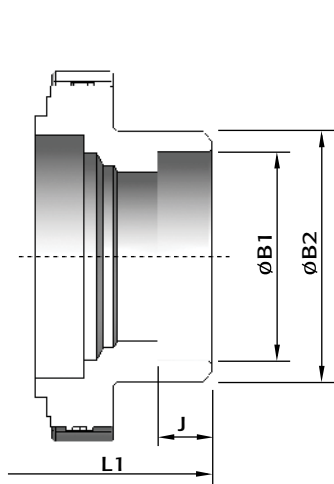
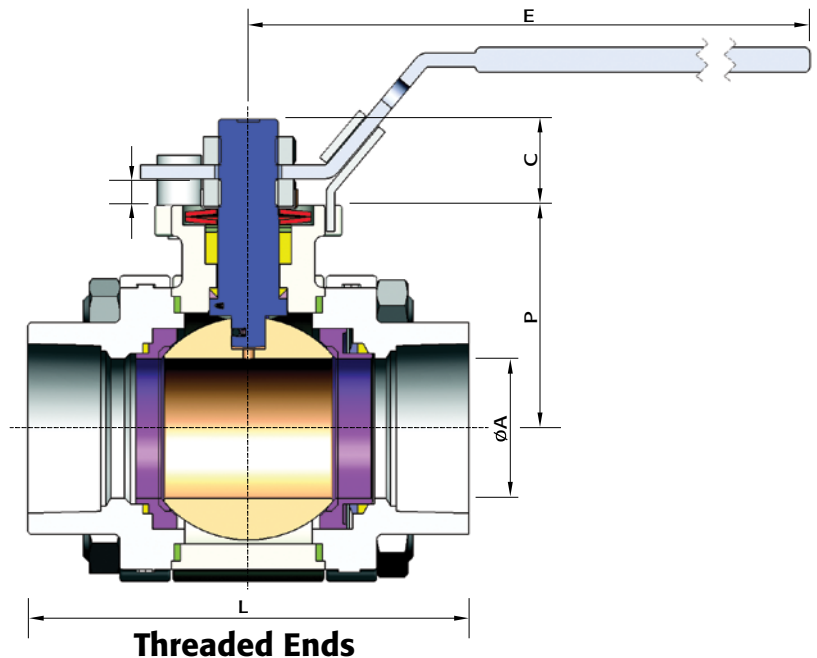
VALVE OPTIONS	CARBON STEEL			STAINLESS STEEL			
	STELLITE® SEAT	TUNGSTEN CARBIDE	CHROME CARBIDE	STELLITE® SEAT	TUNGSTEN CARBIDE	CHROME CARBIDE	
NO.	PART NAME	-20°F - 750°F	-20°F - 800°F	-20°F - 800°F	-50°F - 750°F	-50°F - 900°F	-50°F - 1000°F
1	BODY	ASTM A216 GRADE WCB			ASTM A351 GRADE CF8M		
2	CAP	ASTM A216 GRADE WCB			ASTM A351 GRADE CF8M		
3	BALL	ASTM A351 GRADE CF8M + HCr	ASTM A351 GRADE CF8M + TC	ASTM A351 GRADE CF8M + CrC	ASTM A351 GRADE CF8M + HCr	ASTM A351 GRADE CF8M + TC	ASTM A351 GRADE CF8M + CrC
4	SEAT	AISI 316 + STELLITE®	AISI 316 + TC	AISI 316 + CrC	AISI 316 + STELLITE®	AISI 316 + TC	AISI 316 + CrC
5	SEAT GASKET	GRAPHITE					
6	SEAT SPRING RETAINER	AISI 316			INCONEL® X750		
7	SEAT SPRING SEAL	GRAPHITE			GRAPHITE		
8	SEAT SPRING	INCONEL® X750			INCONEL® X750		
9	GASKET	AISI 316 + GRAPHITE			AISI 316 + GRAPHITE		
10	BOLT	ASTM A193 GRADE B7			ASTM A193 GRADE B8		
	NUT	ASTM A194 GRADE 2H			ASTM A194 GRADE 8		
11	THRUST WASHER	AISI 316 + GRAPHITE					
12	GLAND PACKING	GRAPHITE					
13	STEM	17-4 PH®			XM-19		
14	RING	AISI 316					
15	BELLEVILLE WASHER	AISI 301					
16	LOCK SADDLE	AISI 304					
17	NUT	AISI 304					
18	HANDLE	AISI 304					
19	HANDLE NUT	AISI 304					
18	HANDLE	AISI 304					
19	HANDLE NUT	AISI 304					

TRIM ABBREVIATIONS:
HCr = Hard Chrome Plated; TC = Tungsten Carbide; CrC = Chrome Carbide

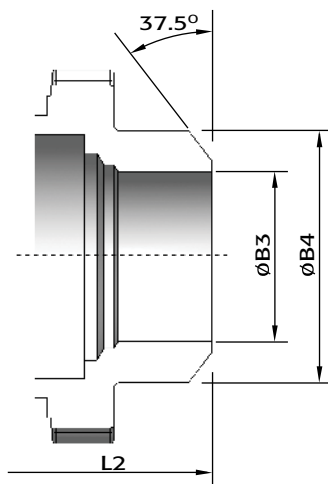
*Various usage conditions shall determine stem material
17-4 PH® SST: use below 750°F
XM-19: use up to 1100°F

Applicable Standards

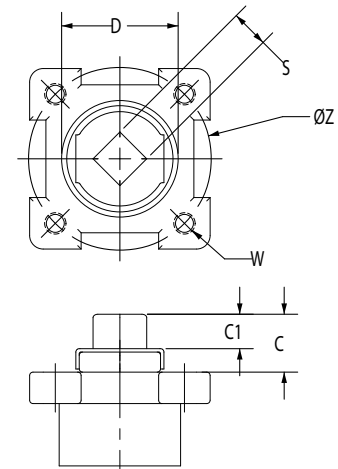
- **Standard Body material:**
WCB or CF8M (other Alloys available)
- **Nominal size:**
1/2" to 2"
- **Pressure rating:**
ASME Class 600
- **End connections:**
Threaded/Socket Weld/Butt Weld
- **Temperature Range:**
-50°F to 1000°F
- **Body Pressure Testing:**
ASME B16.34/API 598
- **Seat Leakage Testing:**
ANSI B16.104/FCI 70-2, Class V or VI
- **Fire Safety:**
Design conforms to ISO 10497 3rd Edition
- **Casting:**
MSS-SP-25 / MSS-SP-55
- **Fugitive Emissions:**
Designed to ISO 15848-1



Socket Weld Ends



Butt Weld Ends



D=minimum bracket clearance

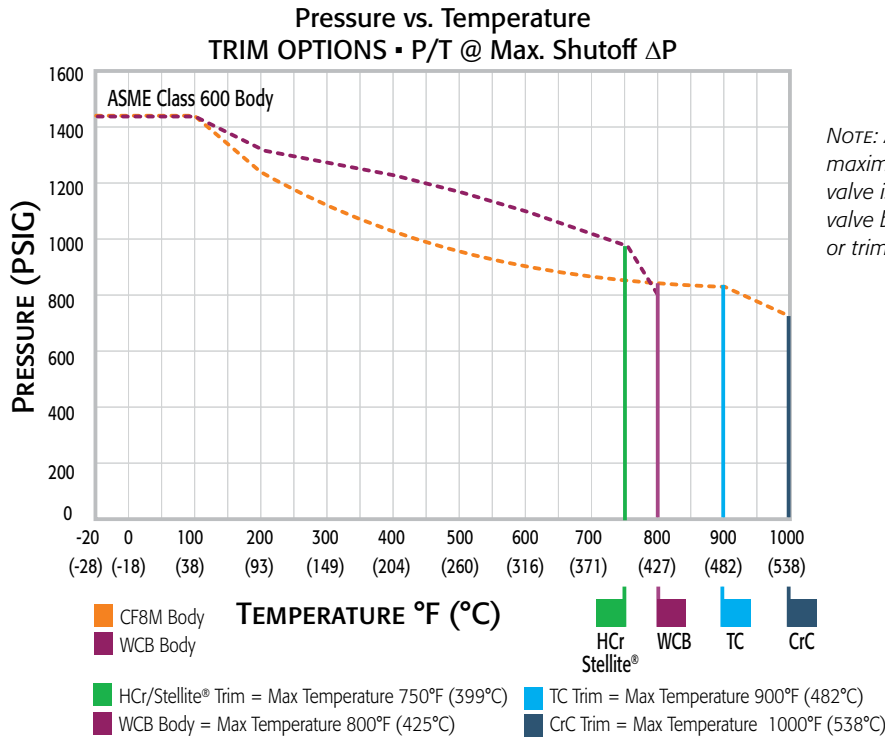
Dimensions (in.) FMX Series TH/SW/BW Ends

SIZE	A	B1	B2	B3	B4	C	C1	D	E	J	L	L1	L2	P	S	W	Z	ISO 5211	LBS
1/2"	0.59	0.87	1.18	0.59	1.18	0.55	0.35	1.08	5.12	0.37	3.17	2.95	2.95	1.75	0.354	M5	1.654	F04	3
3/4"	0.79	1.09	1.50	0.79	1.50	0.55	0.35	1.08	5.12	0.49	3.80	3.54	3.54	1.85	0.354	M5	1.654	F04	3.5
1"	0.98	1.35	1.81	0.98	1.81	0.79	0.59	1.23	6.69	0.49	4.25	3.94	3.94	2.36	0.433	M6	1.969	F05	6
1-1/4"	1.26	1.70	2.20	1.26	2.20	0.79	0.59	1.23	6.69	0.49	5.00	4.33	4.33	2.52	0.433	M6	1.969	F05	9
1-1/2"	1.57	1.94	2.44	1.57	2.44	1.22	0.83	1.88	8.82	0.49	5.59	4.92	4.92	2.87	0.669	M8	2.756	F07	13
2"	1.97	2.43	2.91	1.97	2.91	1.22	0.83	1.88	8.82	0.63	6.22	5.91	5.91	3.15	0.669	M8	2.756	F07	18

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Temperature & Pressure Curves



Full Bore Cv

Size	Cv
1/2"	25
3/4"	50
1"	90
1-1/4"	160
1-1/2"	245
2"	460

FMX Series Metal Seat Torque Tables

316 HCr/Stellite® Trim (316/TC Trim or CrC Trim add 20% to below torques)

Torques (in*lbs) @ PSIG														
PSI	150	200	285	350	400	500	600	650	740	870	1000	1160	1300	1480
1/2"	90	92	95	98	100	104	108	110	114	119	124	130	136	142
3/4"	130	132	137	140	142	147	152	155	159	165	172	180	187	194
1"	150	165	190	209	224	254	283	298	325	CF	CF	CF	CF	CF
1-1/4"	269	298	347	384	413	471	529	558	610	CF	CF	CF	CF	CF
1-1/2"	415	463	543	605	653	748	843	890	976	CF	CF	CF	CF	CF
2"	490	563	688	784	857	1,004	1,150	1,224	1,356	CF	CF	CF	CF	CF

Torques can be interpolated for intermediate pressures.

Temperature °F	Recommended Safety Factor Multiplier
Less than 200	1
400	1.1
550	1.3
750	1.6
850	CF
950	CF
1000	CF

Note: Safety factors can be interpolated for intermediate temperatures.

Notes:

- 1) Safety factors should be added for high temperature, viscous fluid, powders, steam and slurries.
- 2) Torques are based on valve being installed in suggested direction. Consult The Application Sizing Guide for assistance with sizing actuators.

Manual Ball Valve Part Number Matrix

<p>1 Fire Safe Designation F Fire Safe design</p> <p>2 Valve Series MX Metal Seat 3-pc Bidirectional, Floating Ball</p> <p>3 Body Material Blank No Designation = Stainless Steel Body and Trim CF8M-316 SST C Carbon Steel Body, A216 Gr WCB L Low Carbon 316 SST, CF3M-316L D CD3MN Duplex SST G CE3MN Super Duplex SST 4 F316H Forged 5 LCB, A352 8 LCC, A352 6 WC6, A217 9 WC9, A217</p> <p>4 End Connection TH Threaded (NPT) SW Socket Weld BW Butt Weld</p> <p>5 Valve Size 0050 1/2" 0075 3/4" 0100 1" 0125 1-1/4" 0150 1-1/2" 0200 2"</p>	<p>6 Seat, Lining & Trim Materials 2 Tungsten Carbide Coated 316SST Seats & Ball 3 HCr Coated Ball with Stellite® Inlay Seats 4 Chrome Carbide Coated 316SST Seats & Ball 8 Chrome Carbide Coated Inconel® 718 Seats & Ball</p> <p>7 Special Designations X No Specials G Gear Operator</p> <p>8 Additional Specials X No Specials O Oxygen Cleaned Z Special End Configuration V Vented Ball</p> <p>9 Special Designation A 17-4PH® Stem B XM-19 (Nitronic® 50) Stem C Duplex 2205 Stem D Inconel® 718 Stem</p>
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How To Order

1 - 2 - 3 - 4 - 5 - 678 - 9
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F - MX - C - TH - 0150 - 4XX - A



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