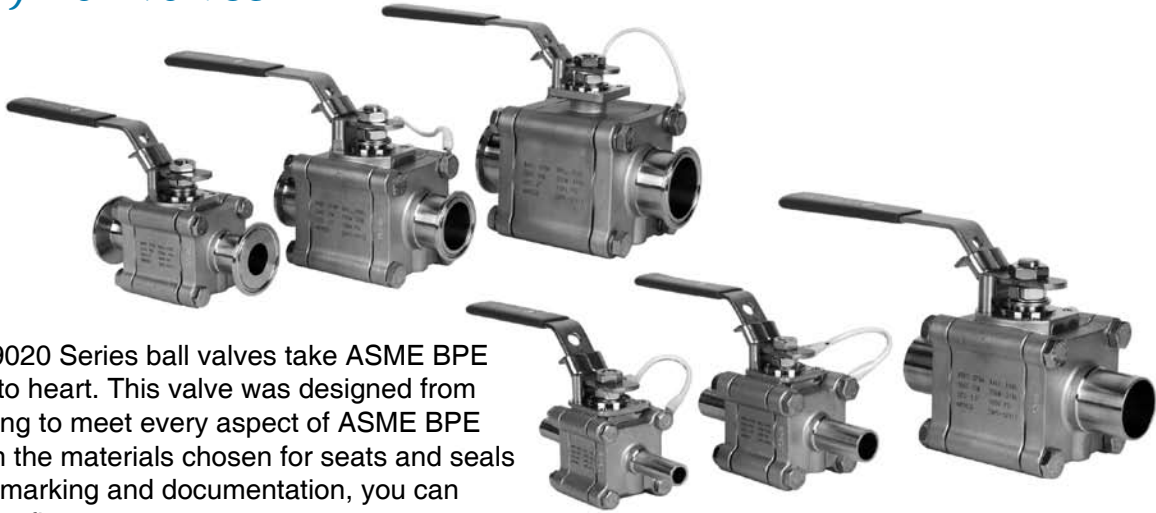


Mark 9020 Series

Sanitary Ball Valves



The Mark 9020 Series ball valves take ASME BPE guidelines to heart. This valve was designed from the beginning to meet every aspect of ASME BPE 2007. From the materials chosen for seats and seals to the final marking and documentation, you can trust the Steriflow name.

FEATURES

- Traceable Industry grade high density 316L body, ball, stem and end caps with <3% ferrite standard, 1% optional
- Certified TFM 1600 body seal, seat, thrust washer, and packing material meet:
 - FDA 21 CFR 177
 - Final form materials also certified to meet USP <88> Class VI (in-vivo), and USP <87> (in-vitro) testing requirements
- Documented surface finish on all wettable components is SF1 (20 Ra Mechanical Polish), SF4 (15Ra mechanical/electropolish optional)
- Ball porting has identical ID as inlet/outlet tubing to prevent holdup
- Pressure ratings to 1000 psig @ 100°F
- Anti-blowout stem design
- Tongue & groove body seal to insure gasket containment and precise alignment regardless of vibration
- Inline repairable
- Tri-clamp ends, extended tube weld ends, or both available on all sizes
- Available as manual or actuated (pneumatic/electric) valve
- ISO 5211 actuator mounting flange direct on body, or on stem extensions
- Optional cavity filler seats available for non-BPE applications
- Optional drain and purge ports available
- Stem grounding standard

DOCUMENTATION

The following documentation is shipped with each order:

- Steriflow Unicert
 - Certificate of Material compliance with Traceable MTR's
 - Certificate of Compliance to FDA and USP <88> Class VI and USP <87>
 - Certificate of Compliance to Surface Finish
- Final Test Reports and Certificate of Origin available upon request at time of order

APPLICATIONS

- Biopharmaceutical, Pharmaceutical Clean Steam, Condensate, or CIP
- Biopharmaceutical, Pharmaceutical Clean Air and Gas
- Food and Beverage
- Fine and Specialty chemicals
- Any viscous media or other application where inline valve cleaning or remove-for-cleaning access is desired



Steriflow by Jordan Valve

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 513.533.5600 • 800.543.7311 • 513.871.0105 (f)
 steriflow@richardsind.com • www.steriflowvalve.com

SAMPLE SPECIFICATIONS

Mark 9020 Series (1/2" – 4" / DN15 – DN100) Investment Cast two-way, three piece sanitary ball valve, shall be designed, manufactured, marked, and documented per ASME BPE-2007.

Body seal, seat, thrust washer, and packing shall be manufactured from FDA 21 CFR 177 acceptable TFM 1600, which has been tested in final form to meet the requirements of USP Chapter 88 Class VI (in-vivo) and USP Chapter 87 (in-vitro).

Body, ball, and end caps shall be manufactured from ASTM A351 Gr. CF3M 316L with ferrite controlled to <3% (<1% optional).

Internal surface finish shall be SF1, 20Ra mechanical polish, or optional to SF4, 15 Ra mechanical polish with electropolish.

Mounting flange on body and stem extensions shall be designed to ISO 5211 to facilitate actuator attachment.

Valves shall not require disassembly for welding and shall be repairable inline.

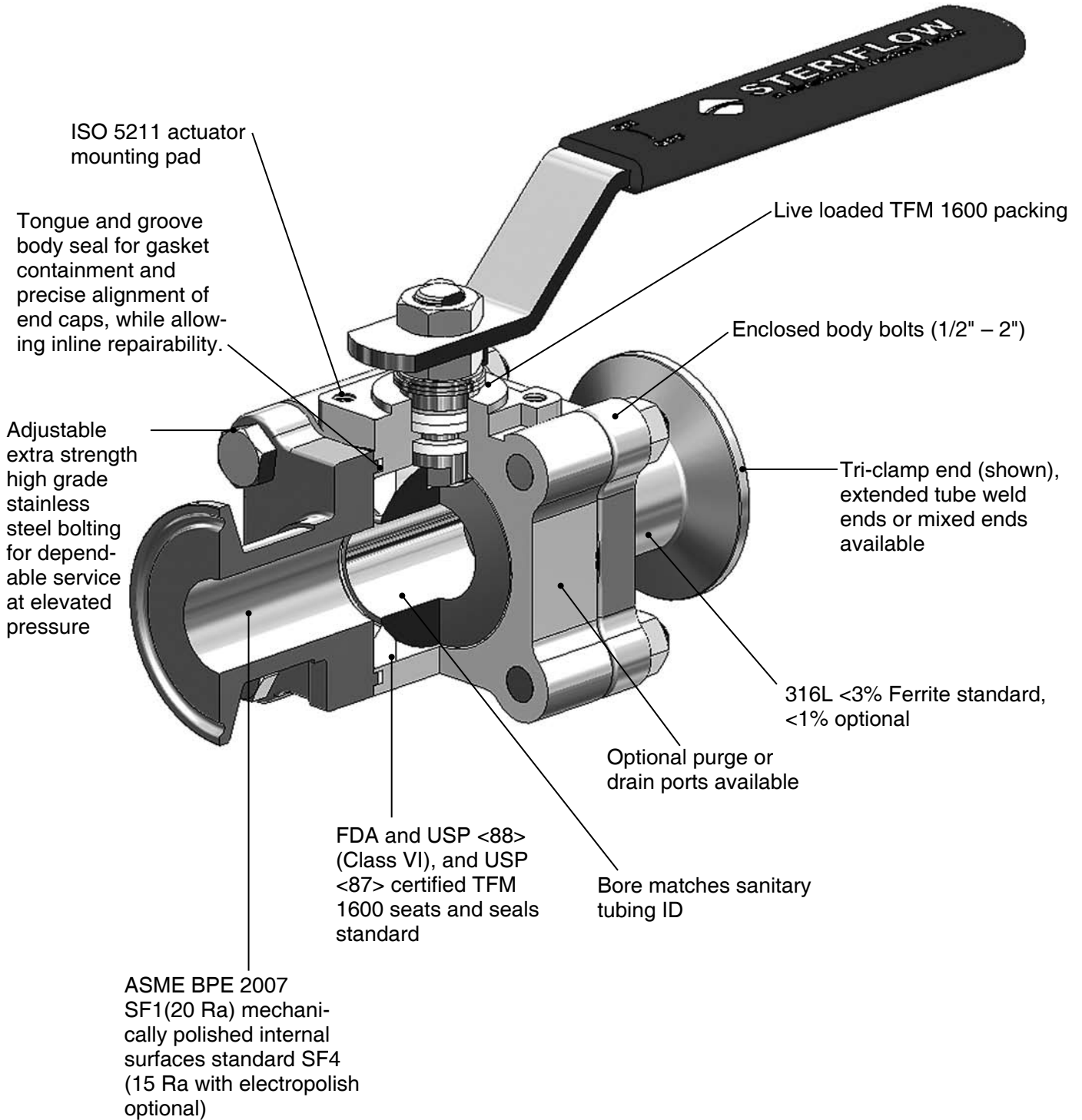
Maximum working pressure shall be 1000 psi to full vacuum at 100°F for 1/2" through 2" design, 720 psi to full vacuum for 2-1/2" through 4" sizes.

Weld end fittings or ferrules to match sanitary tubing connections. Body bolts and nuts to be 304 or better stain-hardened with minimum tensile strength of 100,000 psi.

Stem packing shall be live loaded TFM® V-rings to compensate for pressure and thermal cycles and for wear, to insure a positive seal against process leaks.

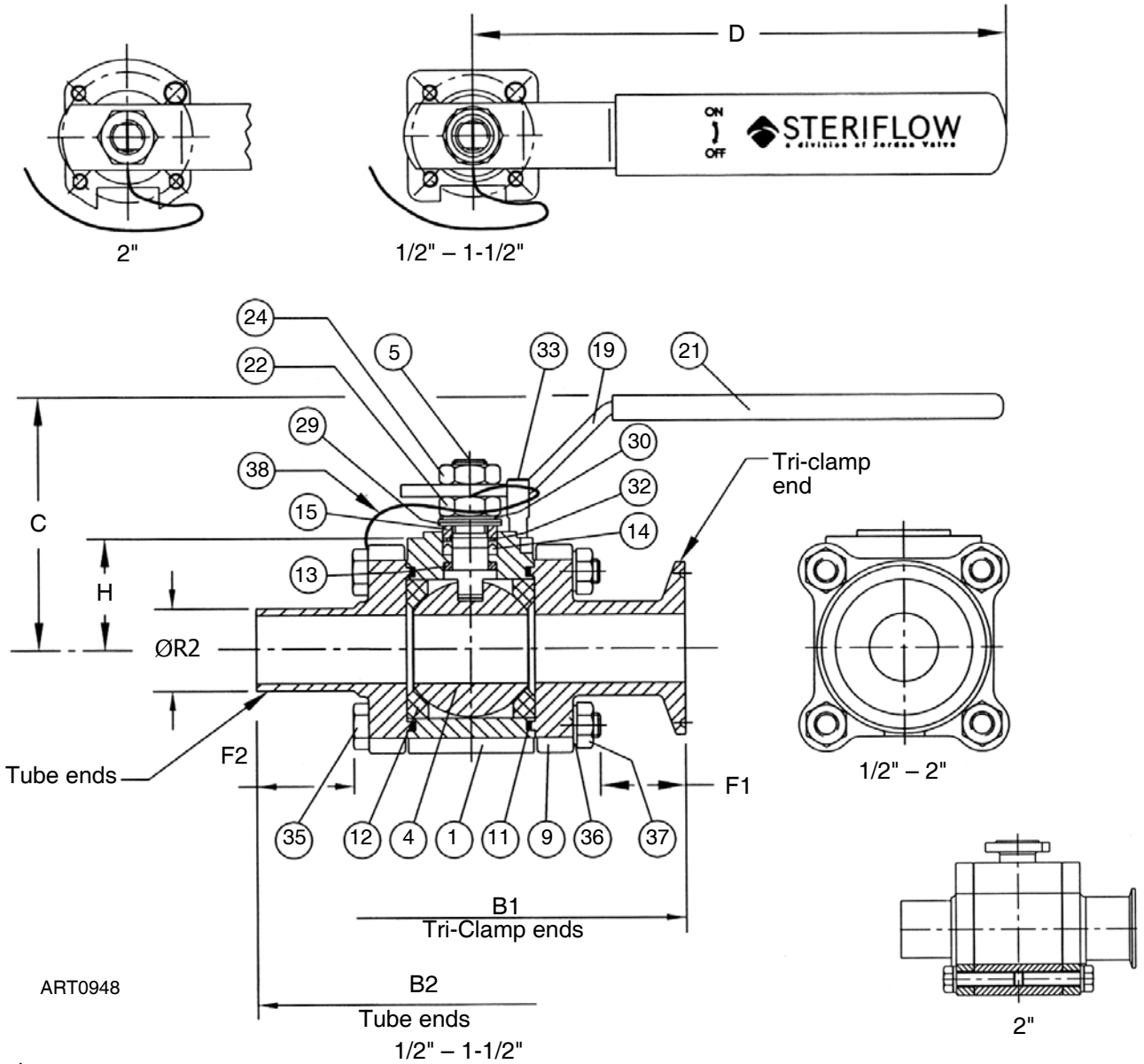
Steriflow model series Mark 9020 size, material, seat/stem extension, ends, manual/automated, actuator accessories, fail position.

FEATURES & BENEFITS – 1/2" – 2"



MARK 9020 SERIES SANITARY BALL VALVES

DIMENSIONS (1/2" THROUGH 2")



Inches

| Size | Port | Tri-Clamp Ends | | | Tube Ends | | | | D | C | H |
|--------|------|----------------|------|--------|-----------|------|------|--------|------|------|------|
| | | B1 | F1 | Wt, Lb | B2 | F2 | R2 | Wt. Lb | | | |
| 1/2" | 0.37 | 3.58 | 0.51 | 2.0 | 4.94 | 1.19 | 0.50 | 1.9 | 5.23 | 3.73 | 1.22 |
| 3/4" | 0.63 | 4.25 | 0.73 | 3.1 | 5.29 | 1.25 | 0.75 | 3.0 | 5.23 | 2.91 | 1.38 |
| 1" | 0.87 | 5.15 | 1.00 | 4.6 | 5.74 | 1.25 | 1.00 | 4.4 | 6.76 | 3.22 | 1.50 |
| 1-1/2" | 1.37 | 5.91 | 0.91 | 9.0 | 6.51 | 1.21 | 1.50 | 8.9 | 8.04 | 3.84 | 1.95 |
| 2" | 1.87 | 5.75 | 0.92 | 15.2 | 7.13 | 1.11 | 2.00 | 15.0 | 8.04 | 4.53 | 2.80 |

Metric

| Size | Port | Tri-Clamp Ends | | | Tube Ends | | | | D | C | H |
|------|------|----------------|------|--------|-----------|------|------|--------|-------|-------|------|
| | | B1 | F1 | Wt, Kg | B2 | F2 | R2 | Wt. Kg | | | |
| DN15 | 9,5 | 90,9 | 13,0 | 0,9 | 125,5 | 30,2 | 12,7 | 0,9 | 132,8 | 69,3 | 31,0 |
| DN20 | 15,9 | 108,0 | 18,5 | 1,4 | 134,5 | 31,8 | 19,1 | 1,4 | 132,8 | 73,8 | 35,0 |
| DN25 | 22,2 | 130,7 | 25,4 | 2,1 | 145,7 | 31,8 | 25,4 | 2,0 | 171,8 | 81,9 | 38,0 |
| DN40 | 34,9 | 150,1 | 23,1 | 4,1 | 165,3 | 30,7 | 38,1 | 4,0 | 204,2 | 97,5 | 49,5 |
| DN50 | 47,6 | 171,4 | 23,4 | 6,9 | 181,0 | 28,2 | 50,8 | 6,8 | 204,2 | 115,0 | 71,0 |

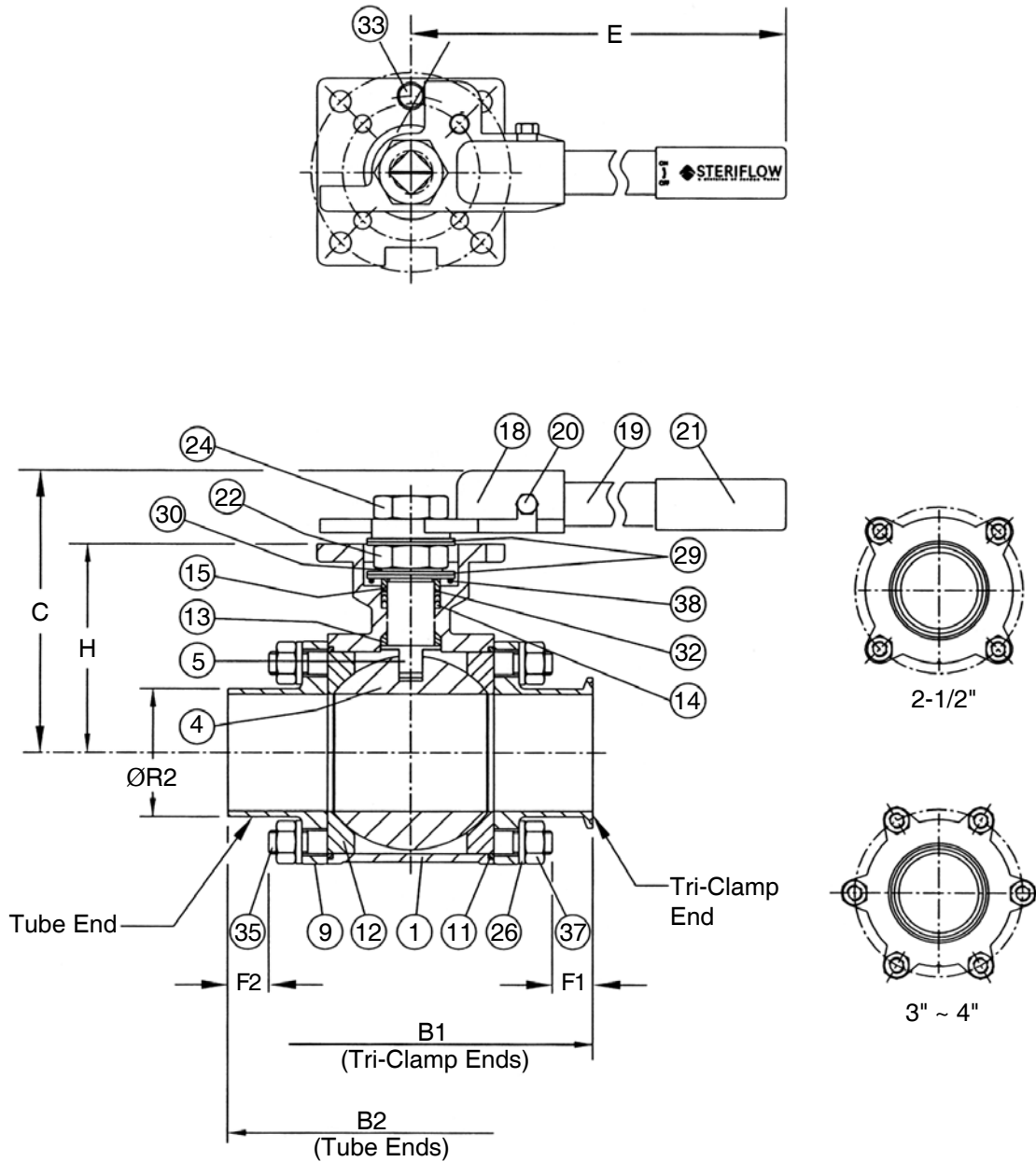
MARK 9020 SERIES SANITARY BALL VALVES

SPECIFICATIONS (1/2" THROUGH 2")

| Item | Part Name | Quantity | Material |
|------|------------------------|---------------------------|--------------------------|
| 1 | Body | 1 | ASTM A351 Gr. CF3M, 316L |
| 4 | Ball | 1 | ASTM A351 Gr. CF3M |
| 5 | Stem | 1 | 316L SS Bar |
| 9 | End Cap | 2 | ASTM A351 Gr. CF3M |
| 11 | Body Seal | 2 | TFM1600 |
| 12 | Seat | 2 | TFM1600 |
| 13 | Thrust Washer, Stem | 1 | TFM1600 |
| 14 | Packing, Stem | 1 Set | TFM1600 |
| 15 | Gland, Packing | 1 | AISI 304 SS |
| 19 | Handle | 1 | AISI 304 SS |
| 21 | Cover, Handle | 1 | Vinyl |
| 22 | Nut, Gland | 1 | AISI 304 SS |
| 24 | Nut, Handle | 1 | AISI 304 S |
| 29 | Belleville Washer | 2 | AISI 301 SS |
| 30 | Lock Tab Washer | 1 | AISI 304 SS |
| 32 | Thrust Washer, Packing | 1 | TFM1600 |
| 33 | Stop Pin, Handle | 1 | AISI 304 SS |
| 35 | Bolt, Body | 4 (1/2" - 1-1/2"); 8 (2") | AISI 304 SS |
| 36 | Lock Washer, Body Bolt | 4 (1/2" - 1-1/2"); 8 (2") | AISI 304 SS |
| 37 | Nut, Body Bolt | 4 (1/2" - 1-1/2") | AISI 304 SS |
| 38 | Grounding Cable | 1 | Braided Copper/Vinyl |

MARK 9020 SERIES SANITARY BALL VALVES

DIMENSIONS (2-1/2" THROUGH 4")



ART0949

Inches

| Size | Port | Tri-Clamp Ends | | | Tube Ends | | | | D | C | H |
|--------|------|----------------|------|--------|-----------|------|------|--------|-------|------|------|
| | | B1 | F1 | Wt, Lb | B2 | F2 | R2 | Wt. Lb | | | |
| 2-1/2" | 2.37 | 8.00 | 0.25 | 19.2 | 8.75 | 0.79 | 2.50 | 19.7 | 14.31 | 5.73 | 4.25 |
| 3" | 2.87 | 9.19 | 1.09 | 28.4 | 9.25 | 1.06 | 3.00 | 27.0 | 14.31 | 5.91 | 4.56 |
| 4" | 3.84 | 10.23 | 1.16 | 50.0 | 10.21 | 1.15 | 4.00 | 48.0 | 15.71 | 7.66 | 6.10 |

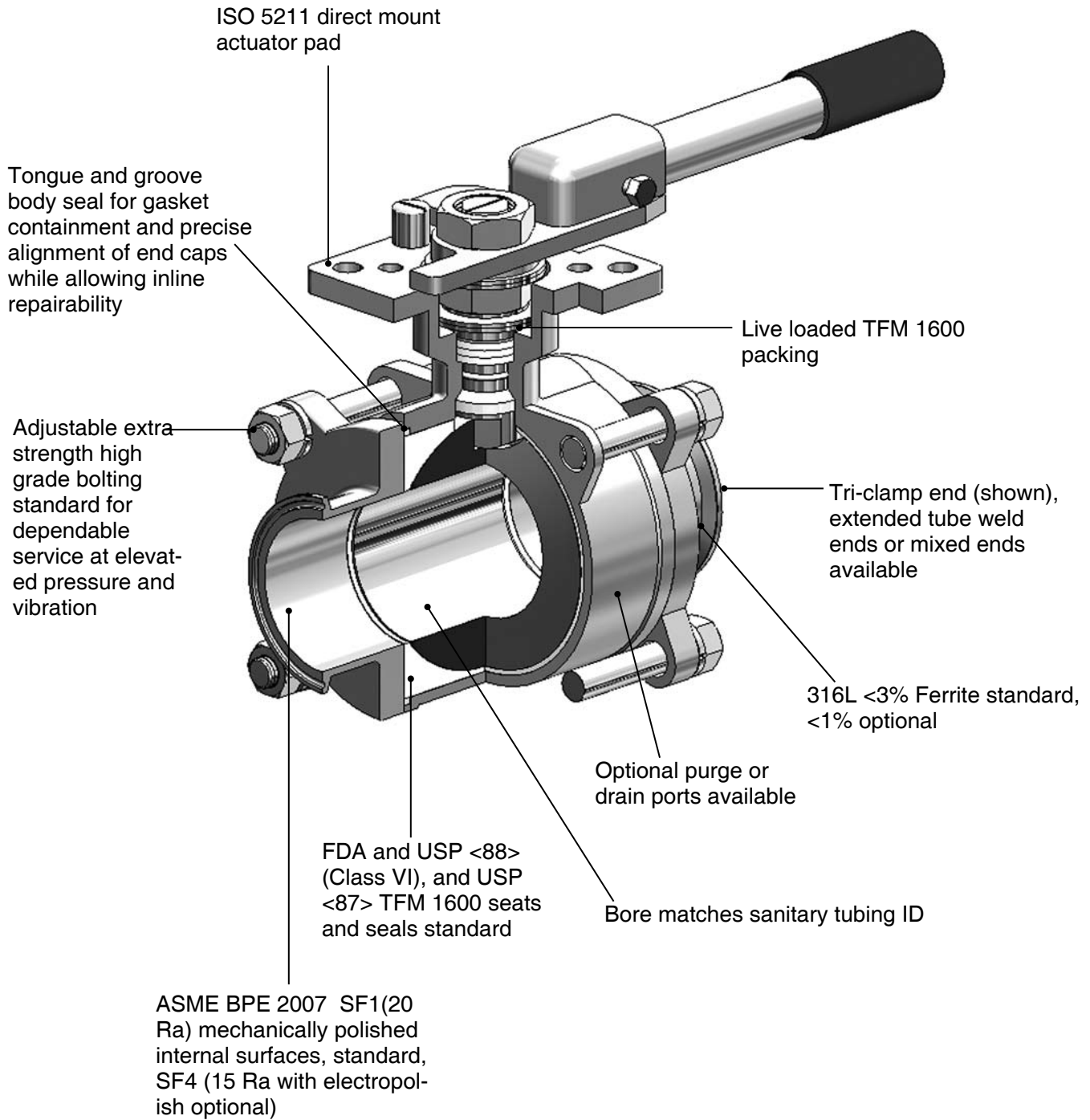
Metric

| Size | Port | Tri-Clamp Ends | | | Tube Ends | | | | D | C | H |
|-------|------|----------------|------|--------|-----------|------|-------|--------|-------|-------|-------|
| | | B1 | F1 | Wt, Kg | B2 | F2 | R2 | Wt. Kg | | | |
| DN65 | 60,2 | 203 | 6,35 | 8,8 | 222 | 20,1 | 63,5 | 8,94 | 363,5 | 145,5 | 108,0 |
| DN80 | 72,9 | 233,4 | 27,7 | 12,9 | 235 | 26,9 | 76,2 | 12,2 | 363,5 | 150,1 | 115,8 |
| DN100 | 97,5 | 259,8 | 29,5 | 22,7 | 259,3 | 29,2 | 101,6 | 21,8 | 399,0 | 194,6 | 154,9 |

SPECIFICATIONS (2-1/2" THROUGH 4")

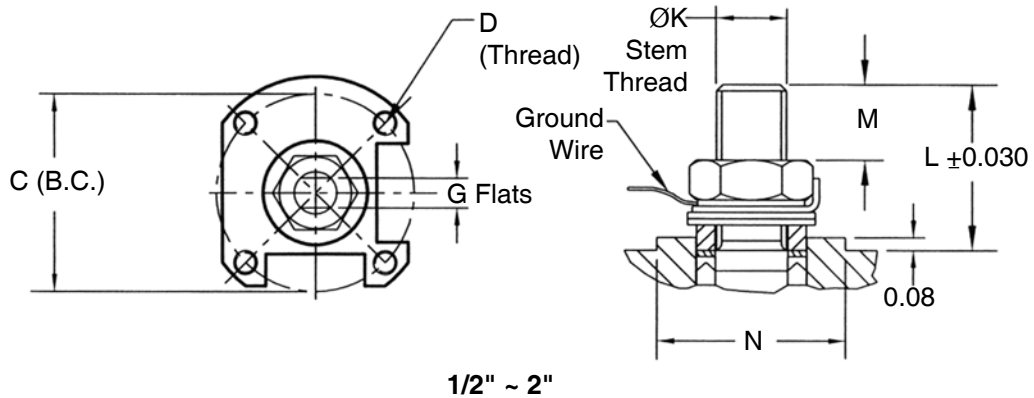
| Item | Part Name | Quantity | Material |
|------|------------------------|----------|--------------------|
| 1 | Body | 1 | ASTM A351 Gr. CF3M |
| 4 | Ball | 1 | ASTM A351 Gr. CF3M |
| 5 | Stem | 1 | 316L SS Bar |
| 9 | End Cap | 2 | ASTM A351 Gr. CF3M |
| 11 | Body Seal | 2 | TFM1600 |
| 12 | Seat | 2 | TFM1600 |
| 13 | Thrust Washer, Stem | 1 | TFM1600 |
| 14 | Packing, Stem | 1 Set | TFM1600 |
| 15 | Gland, Packing | 1 | AISI 304 SS |
| 18 | Adaptor, Handle | 1 | AISI 304 SS |
| 19 | Handle | 1 | AISI 304 SS |
| 20 | Bolt, Handle | 1 | AISI 304 SS |
| 21 | Cover, Handle | 1 | Vinyl |
| 22 | Nut, Gland | 1 | AISI 304 SS |
| 24 | Nut, Handle | 1 | AISI 304 SS |
| 29 | Belleville Washer | 2 | AISI 304 SS |
| 30 | Lock Tab Washer | 1 | AISI 301 SS |
| 32 | Thrust Washer, Packing | 1 | TFM 1600 |
| 33 | Stop Pin, Handle | 1 | AISI 304 SS |
| 35 | Stud, Body | 4 ~ 6 | AISI 304 SS |
| 36 | Lock Washer, Body Bolt | 8 ~ 12 | AISI 304 SS |
| 37 | Nut, Body Bolt | 8 ~ 12 | AISI 304 SS |
| 38 | Grounding Spring | 1 | AISI 304 SS |

FEATURES & BENEFITS – 2-1/2" – 4"

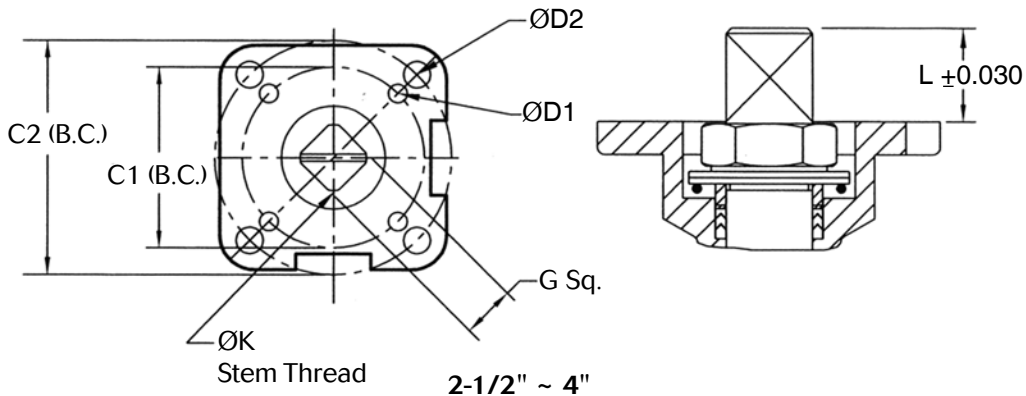


ART0958

ACTUATOR MOUNTING DIMENSIONS



1/2" ~ 2"



2-1/2" ~ 4"

ART0950

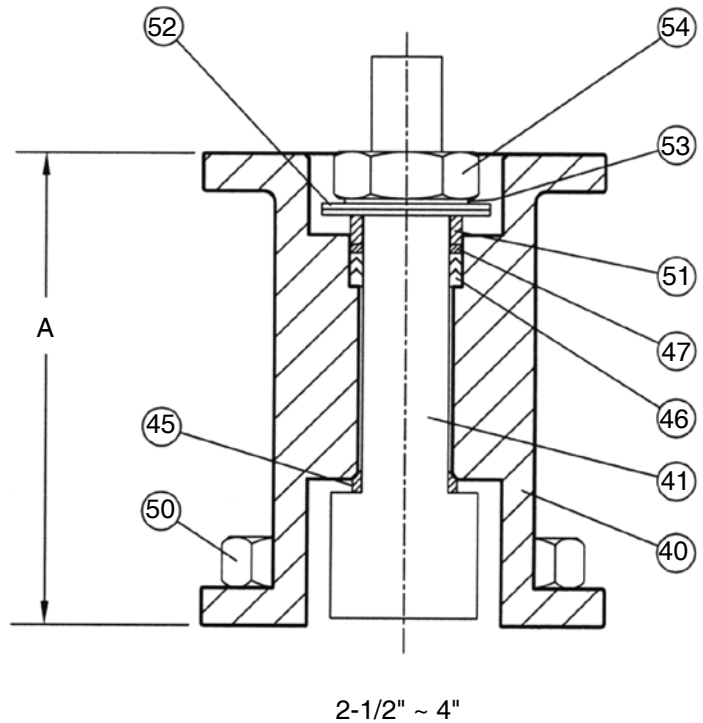
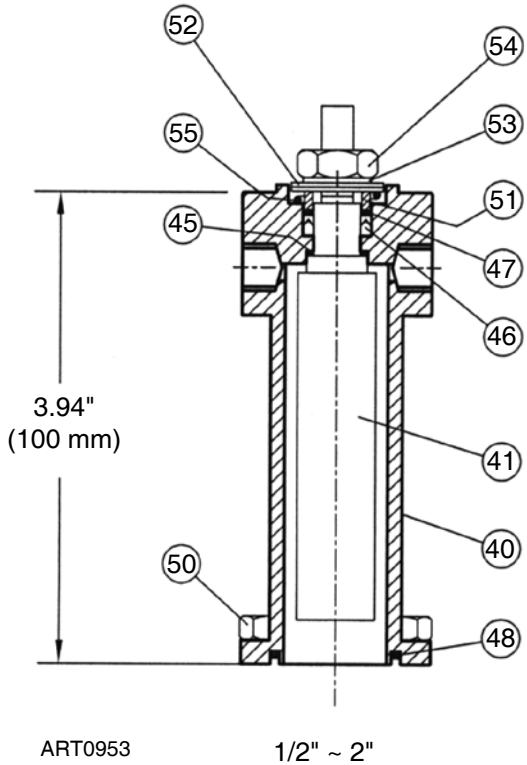
Inches

| Size NPS | ISO Pattern | C1 (B.C.) | D1 | ISO Pattern | C2 (B.C.) | D2 | G Flats or Sq. | K Stem Thd. | L | M | N |
|----------|-------------|-----------|-------|-------------|-----------|-------|----------------|-------------|------|------|------|
| 1/2" | F03 | 1.42 | M5 | — | — | — | 0.258 / 0.254 | 0.38-24 | 0.67 | 0.30 | 0.98 |
| 3/4" | F03 | 1.42 | M5 | — | — | — | 0.258 / 0.254 | 0.38-24 | 0.73 | 0.34 | 0.98 |
| 1" | F04 | 1.65 | M5 | — | — | — | 0.317 / 0.313 | 0.44-20 | 1.00 | 0.40 | 1.18 |
| 1-1/2" | F05 | 1.97 | M6 | — | — | — | 0.384 / 0.380 | M14x1.4 | 1.26 | 0.58 | 1.38 |
| 2" | F05 | 1.97 | M6 | — | — | — | 0.384 / 0.380 | M14x1.4 | 1.04 | 0.51 | 1.38 |
| 2-1/2" | F07 | 2.76 | 0.354 | F10 | 4.02 | 0.433 | 0.671 / 0.677 | 0.88-14 | 1.01 | — | — |
| 3" | F07 | 2.76 | 0.354 | F10 | 4.02 | 0.433 | 0.671 / 0.677 | 0.88-14 | 1.01 | — | — |
| 4" | — | — | — | F12 | 4.92 | 0.512 | 0.868 / 0.864 | 1.12-12 | 1.84 | — | — |

Metric

| Size DN | ISO Pattern | C1 (B.C.) | D1 | ISO Pattern | C2 (B.C.) | D2 | G Flats or Sq. | K Stem Thd. | L | M | N |
|---------|-------------|-----------|-----|-------------|-----------|------|----------------|-------------|------|------|------|
| DN15 | F03 | 36,1 | M5 | — | — | — | 6,5 | 0.38-24 | 17,0 | 7,6 | 24,9 |
| DN20 | F03 | 36,1 | M5 | — | — | — | 6,5 | 0.38-24 | 18,5 | 8,6 | 24,9 |
| DN25 | F04 | 41,9 | M5 | — | — | — | 8,0 | 0.44-20 | 25,4 | 10,2 | 30,0 |
| DN40 | F05 | 50,0 | M6 | — | — | — | 9,7 | M14x1.4 | 32,0 | 14,7 | 35,1 |
| DN50 | F05 | 50,0 | M6 | — | — | — | 9,7 | M14x1.4 | 26,4 | 13,0 | 35,1 |
| DN65 | F07 | 70,1 | 9,0 | F10 | 102,1 | 11,0 | 17,0 | 0.88-14 | 25,7 | — | — |
| DN80 | F07 | 70,1 | 9,0 | F10 | 102,1 | 11,0 | 17,0 | 0.88-14 | 25,7 | — | — |
| DN100 | — | — | — | F12 | 125,0 | 13,0 | 22,0 | 1.12-12 | 46,7 | — | — |

STEM EXTENSION DIMENSIONS



| Size | A |
|--------|--------------|
| 2-1/2" | 3.94 (100mm) |
| 3" | 3.94 (100mm) |
| 4" | 5.25 (134mm) |

Notes:

1. Handle parts from valve.
2. Handle length and actuator mounting dimensions same as top of valve.
3. Add stem extension height "D" above to valve heights for heights of valve with stem extension.

| Item | Part Name | Quantity | Material |
|------|----------------------------------|----------|--------------------|
| 40 | Bonnet | 1 | ASTM A351 Gr. CF3M |
| 41 | Stem, Extension | 1 | AISI 316L SS |
| 45 | Thrust Washer, Ext. Stem | 1 | AISI 316L SS |
| 46 | Packing, Ext. Stem | 1 Set | TFM 1600 |
| 47 | Thrust Washer, Ext. Stem Packing | 1 | TFM 1600 |
| 48 | Seal, Bonnet (1/2" ~ 2") | 1 | PTFE |
| 50 | Bolt, Bonnet | 4 | AISI 304 SS |
| 51 | Gland, Ext. Stem Packing | 1 | TFM 1600 |
| 52 | Belleville Washer, Ext. Stem | 2 | TFM 1600 |
| 53 | Tab Lock Washer, Ext. Stem | 1 | AISI 304 SS |
| 54 | Nut, Ext. Stem Packing | 1 | AISI 304 SS |

TRI CLAMP PRESSURE - TEMPERATURE RATINGS

| Temp °F | Pressure Rating, psi 13MHP Tri-Clamp (2 bolt) | | | Pressure Rating, psi A13MHM Tri-Clamp (2-Segment Hinged, Wing Nut) | | | | |
|---------|--|-------|-----|---|-----|--------|-----|-----|
| | 1/2"~1-1/2" | 2"~3" | 4" | 1/2"~1-1/2" | 2" | 2-1/2" | 3" | 4" |
| -20 | 1500 | 1000 | 800 | 500 | 450 | 400 | 350 | 300 |
| 0 | 1500 | 1000 | 800 | 500 | 450 | 400 | 350 | 300 |
| 75 | 1500 | 1000 | 800 | 500 | 450 | 400 | 350 | 300 |
| 250 | 1200 | 800 | 600 | 300 | 250 | 200 | 175 | 150 |

Tri-Clamp gasket material maximum temperatures: Buna-N, PTFE – 200°F; EPDM – 300°F; Viton — 400°F; Silicon — 450°F

TUBE PRESSURE - TEMPERATURE RATINGS

| Temp °F | Pressure Rating, 2" ~ 4" Tube End, psi | | | | | | | |
|-------------|--|-------|------|--------|-----|--------|-----|-----|
| | 1/2" | 3/4" | 1" | 1-1/2" | 2" | 2-1/2" | 3" | 4" |
| -20 to +300 | >2000 | >2000 | 1635 | 1070 | 795 | 695 | 525 | 505 |
| 350 | >2000 | >2000 | 1575 | 1035 | 770 | 610 | 510 | 485 |
| 400 | >2000 | >2000 | 1575 | 995 | 740 | 590 | 480 | 470 |
| 450 | >2000 | >2000 | 1465 | 960 | 715 | 570 | 470 | 450 |

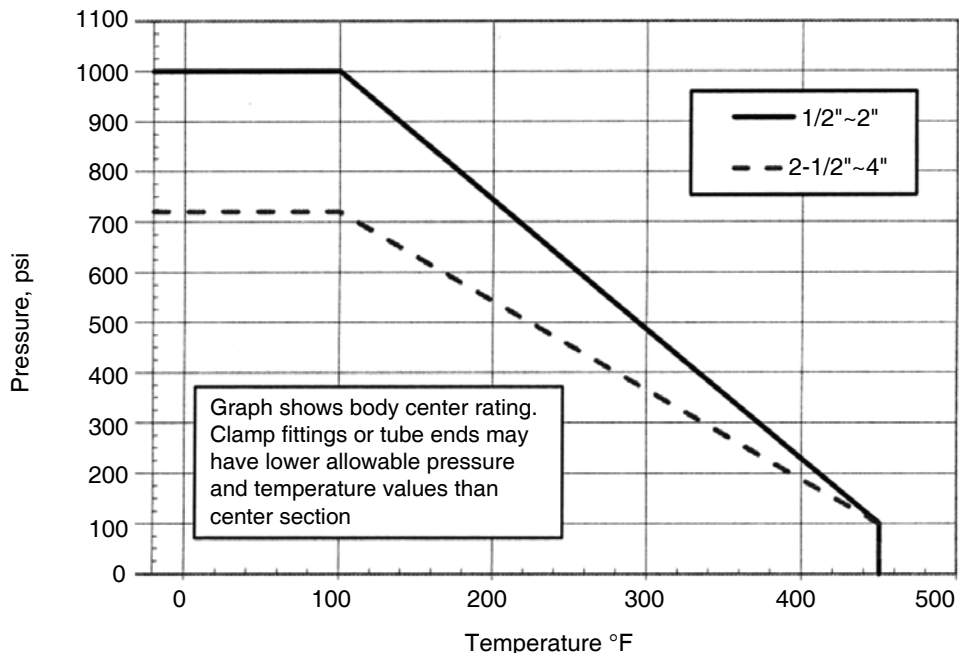
Tube ratings based on ASME B31.3 – 2002 for 316L tubing

TECHNICAL INFORMATION

| Size | | Operating Torque* | | Flow Coefficient | |
|--------|-------|-------------------|------|------------------|------|
| NPS | DN | in-lb | N.m | Cv | Kv |
| 1/2" | DN15 | 39 | 4,4 | 8 | 6,9 |
| 3/4" | DN20 | 95 | 10,7 | 30 | 26 |
| 1" | DN25 | 148 | 16,7 | 65 | 56 |
| 1-1/2" | DN40 | 338 | 38 | 190 | 163 |
| 2" | DN50 | 651 | 74 | 435 | 374 |
| 2-1/2" | DN65 | 797 | 90 | 720 | 619 |
| 3" | DN80 | 974 | 110 | 1120 | 963 |
| 4" | DN100 | 1328 | 150 | 2100 | 1806 |

* TFM 1600 seats, maximum differential pressure

PRESSURE - TEMPERATURE CHART



ORDERING SCHEMATIC

| Model | — | Size | — | Body Mat'l | / | 1 | 2 | 3 | 4 | 5 | 6 |
|-------|---|------|---|------------|---|---|---|---|---|---|---|
| | | | | | | | | | | | |

| Model Number | |
|--------------|--|
| 9020 | 3-Pc BPE Sanitary Ball Valve |
| EB9020 | 3-Pc BPE Sanitary Ball Valve w/Enc. Stem Ext |

| Size | |
|------|--------|
| 050 | 1/2" |
| 075 | 3/4" |
| 100 | 1" |
| 150 | 1-1/2" |
| 200 | 2" |
| 250 | 2-1/2" |
| 300 | 3" |
| 400 | 4" |

| Body Material | |
|---------------|------------------------|
| 6L | CF3M 3% Ferrite (Std.) |
| LF | CF3M 1% Ferrite |

| 1 Seat/Stem Extension | |
|-----------------------|---|
| T | TFM1600 Enhanced Teflon (Std.) |
| C | TFM1600 Cavity Filler Enhanced Teflon |
| E | TFM1600 with Enclosed Stem Extension |
| S | TFM1600 Cavity Filler with Stem Extension |

| 2 Ends | |
|--------|---|
| A | Tri-Clamp / SF1 Int. Fin. (Std.) |
| B | Extended Tube End / SF1 Int. Fin. (Std.) |
| C | Tri-Clamp x Extended Tube End / SF1 Int. Fin. |
| D | Tri-Clamp / SF4 Int. Fin. |
| E | Extended Tube End / SF4 Int. Fin. |
| F | Tri-Clamp x Extended Tube End / SF4 Int. Fin. |

| 3 & 4 Operation | |
|-----------------|----------------------------------|
| HL | Lever (Std.) |
| NN | None |
| *DA | Double Acting Pneumatic Actuator |
| *SR | Spring Return Pneumatic Actuator |
| *EA | Electric Actuator |
| *GO | Gear Operator |
| ZZ | Non-Standard |

| 5 Actuator Accessories | |
|------------------------|---|
| 0 | None |
| 1 | Limit Switch - 2 SPDT NEMA 4 |
| 2 | Positioner, Electro Pneumatic 3-15 psi |
| 3 | Positioner, Electric 4-20 mA |
| 4 | Solenoid, 3-Way (for SR Pneumatic Act.) |
| 5 | Solenoid, 4-Way (for DA Pneumatic Act.) |

| 6 Fail Position for SR Pneumatic Actuator | |
|---|---|
| 0 | Not Applicable (for Lever, Elect., DA Pneum.) |
| 1 | Fail Open (for SR Pneum.) |
| 2 | Fail Close (for SR Pneum.) |

* These automation codes are general only, and require additional information. Specify type and size of actuator. Provide appropriate operating parameters, such as air supply pressure, electrical power supply characteristics. NEMA 4 weatherproof or NEMA 7 explosion proof electrical enclosures, etc. A unique code for the automation specified appears on the order, not these general codes.



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