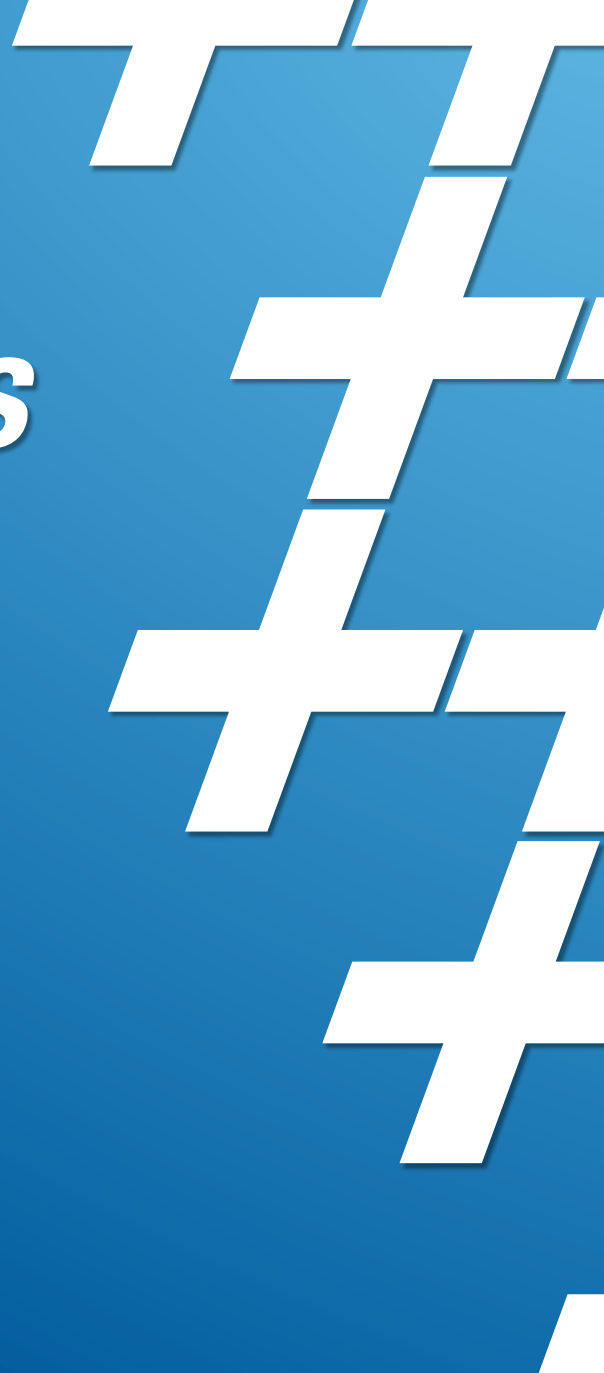
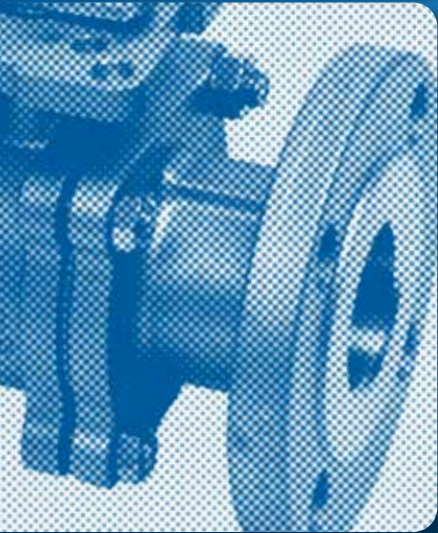


# *Ball Valves*



***FLOW+***  
Quality Valves at Low Cost

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## ABOUT US

The Flow+ product line is built around the goal of providing quality valves at competitive prices.

It's a goal that has met the needs of various oil and gas, mining, process, chemical and general industries, and the reason Flow+ remains a leader when it comes to your valve needs.

Our growing product line ranges from:

- 1, 2 and 3 piece ball valves, known as our B Series.
- Floating flanged ball valves offered in 150, 300 and 600 pressure classes, known as our Z Series.
- Trunnion ball valves, known as our T Series.
- A wide variety of butterfly valves, known as our BF Series.
- Strainers and check valves.
- Valve position monitors.

For more details, please visit [www.flowplusvalves.com](http://www.flowplusvalves.com)



## B SERIES 1, 2, 3 PC BALL VALVE PART NUMBERING SYSTEM

**1**

### 1 = Valve Size

- 02 = 1/4"
- 03 = 3/8"
- 05 = 1/2"
- 07 = 3/4"
- 10 = 1"
- 12 = 1 1/4"
- 15 = 1 1/2"
- 20 = 2"
- 25 = 2 1/2"
- 30 = 3"
- 40 = 4"

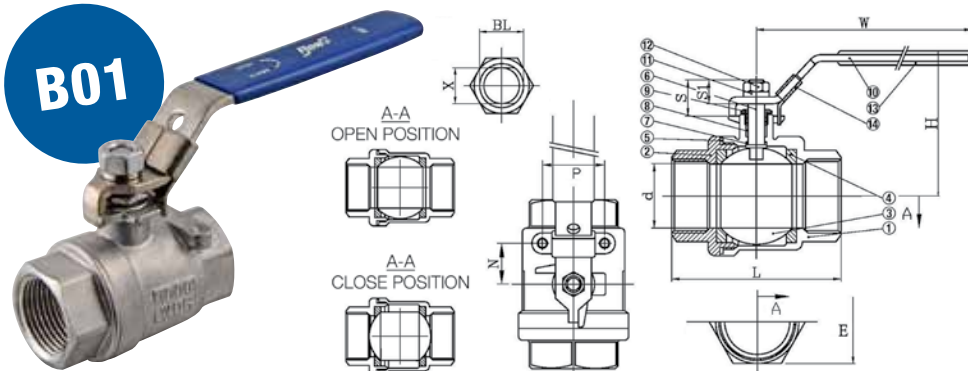
**2**

### 2 = Valve Series

- B01 = 2 PC, 1000 WOG, 316SS
- B02 = 2 PC, 2000/1500 WOG, 316SS
- B03 = 2 PC, 1000 WOG, 316SS, Direct Mount
- B04 = 3 PC, 1000 WOG, 316SS, Screwed Ends
- B04S = 3 PC, 1000 WOG, 316SS, Socket Weld Ends
- B05 = 3 PC, 1000 WOG, 316SS, Direct Mount, Screwed Ends
- B05S = 3 PC, 1000 WOG, 316SS, Direct Mount, Socket Weld Ends
- B05TC = 3 PC, 1000 WOG, 316SS, Direct Mount, Tri-Clamps Ends
- B05TO = 3 PC, 1000 WOG, 316SS, Direct Mount, Tube Ends
- B06 = 1 PC, 2000 PSI, Carbon Steel/Bar Stock
- B07L = 3 PC, 1000 WOG, 316SS, 3-way, L-Port
- B07T = 3 PC, 1000 WOG, 316SS, 3-way, T-Port
- B11 = 2 PC, 2000/1500 WOG, Carbon Steel
- BT3 = 3 PC, 3000 PSI, Carbon Steel
- BT6 = 3 PC, 6000 PSI, Carbon Steel

# 2-PC Full Port SS 1000 PSI Ball Valve

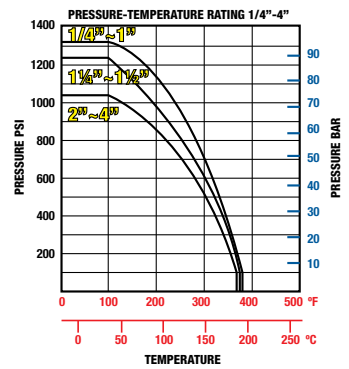
Pressure Rating: 1000 psi (69 bar) WOG for 1/4" to 2"



- Investment cast body and ends
- Blow-out proof stem
- Full port
- FNPT threaded on both ends
- Material: ASTM A351-CF8M
- NACE MR0175
- Locking handle

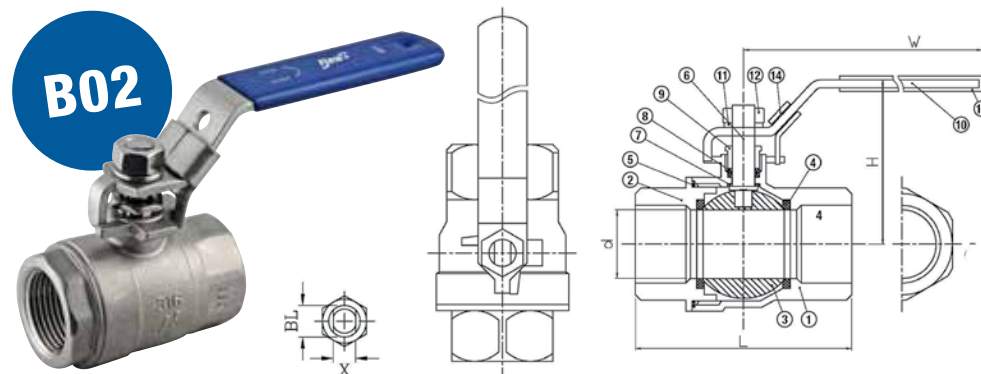
| Size   | dia (mm) | L   | H  | W   | S    | S1   | X   | N    | P    | BL    | Torque (in-lbs) | CV Factor | Kg   |
|--------|----------|-----|----|-----|------|------|-----|------|------|-------|-----------------|-----------|------|
| 1/4"   | 11.6     | 50  | 48 | 91  | 16.5 | 10.2 | 5   | 12.5 | 28.5 | 5/16" | 35              | 7         | 0.21 |
| 3/8"   | 12.5     | 50  | 48 | 91  | 16.5 | 10.2 | 5   | 12.5 | 28.5 | 5/16" | 35              | 7         | 0.22 |
| 1/2"   | 15       | 60  | 52 | 91  | 16.5 | 10.2 | 5   | 12.5 | 28.5 | 5/16" | 47              | 15        | 0.29 |
| 3/4"   | 20       | 65  | 61 | 111 | 20   | 13.5 | 6.5 | 21   | 34.8 | 3/8"  | 64              | 45        | 0.42 |
| 1"     | 25       | 80  | 65 | 111 | 23.5 | 16   | 8   | 22.5 | 34.8 | 7/16" | 90              | 65        | 0.71 |
| 1 1/4" | 32       | 92  | 79 | 154 | 23.5 | 16   | 8   | 23.5 | 38.1 | 7/16" | 117             | 125       | 1.06 |
| 1 1/2" | 38       | 105 | 83 | 154 | 25.5 | 17   | 9   | 23.5 | 38.1 | 1/2"  | 156             | 175       | 1.68 |
| 2"     | 50       | 125 | 97 | 192 | 25.5 | 17   | 9   | 23.5 | 38.1 | 1/2"  | 217             | 380       | 2.71 |

- | No. Part (Qty)        | Material       |
|-----------------------|----------------|
| 1. Body (1)           | ASTM-CF8M-A351 |
| 2. End (1)            | ASTM-CF8M-A351 |
| 3. Ball (1)           | ASTM-CF8M-A351 |
| 4. Ball Seat (2)      | 15% R-PTFE     |
| 5. Joint Gasket (1)   | PTFE           |
| 6. Stem (1)           | AISI 316       |
| 7. Thrust Washer (1)  | PTFE           |
| 8. Stem Packing (2)   | PTFE           |
| 9. Gland Nut (1)      | AISI 304       |
| 10. Handle (1)        | AISI 304       |
| 11. Spring Washer (1) | AISI 304       |
| 12. Stem Nut (1)      | AISI 304       |
| 13. Handle Sleeve (1) | Vinyl Grip     |
| 14. Lock Device (1)   | AISI 430       |



# 2-PC Full Port SS 2000 PSI Ball Valve

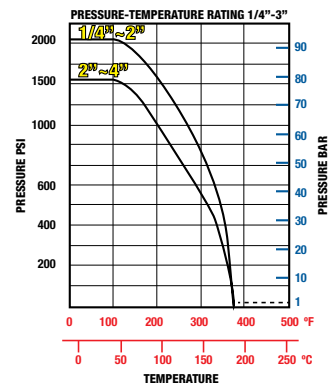
Pressure Rating: 2000 psi (138 bar) WOG for 1/4" to 2" / 1500 (103.4 bar) WOG for 3"



- Investment cast body and ends
- Blow-out proof stem
- Full port
- FNPT threaded on both ends
- Locking handle
- Material: ASTM A351-CF8M
- NACE MR0175
- Note: available in carbon steel as model B11 on Page 8.

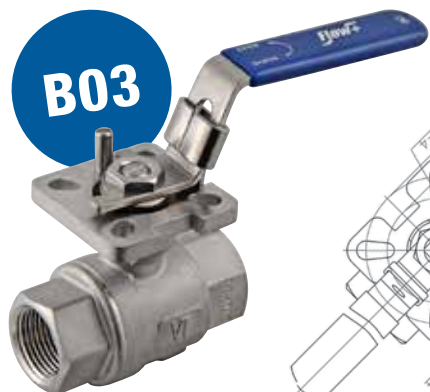
| Size   | dia (mm) | L    | H     | W   | X   | BL    | CV Factor | Torque (in-lbs) | Kg    |
|--------|----------|------|-------|-----|-----|-------|-----------|-----------------|-------|
| 1/4"   | 11.6     | 44.5 | 51    | 95  | 5   | 5/16" | 6.6       | 35              | 0.194 |
| 3/8"   | 12.7     | 44.5 | 51    | 95  | 5   | 5/16" | 7.9       | 35              | 0.205 |
| 1/2"   | 15       | 57   | 53    | 95  | 5   | 5/16" | 11.2      | 47              | 0.285 |
| 3/4"   | 20       | 65   | 59.5  | 110 | 6.5 | 3/8"  | 21        | 64              | 0.456 |
| 1"     | 25       | 76   | 73    | 135 | 8   | 7/16" | 35        | 90              | 0.764 |
| 1 1/4" | 32       | 87.5 | 79    | 135 | 8   | 7/16" | 57        | 117             | 1.163 |
| 1 1/2" | 38       | 102  | 90.5  | 165 | 9   | 1/2"  | 80        | 156             | 1.870 |
| 2"     | 50       | 123  | 98.8  | 165 | 9   | 1/2"  | 148       | 217             | 3.126 |
| 3"     | 80       | 184  | 142.5 | 215 | 12  | 3/4"  | 415       | 651             | 9.79  |

- | No. Part (Qty)        | Material       |
|-----------------------|----------------|
| 1. Body (1)           | ASTM-CF8M-A351 |
| 2. End (1)            | ASTM-CF8M-A351 |
| 3. Ball (1)           | ASTM-CF8M-A351 |
| 4. Ball Seat (2)      | 15% R-PTFE     |
| 5. Joint Gasket (1)   | PTFE           |
| 6. Stem (1)           | AISI 316       |
| 7. Thrust Washer (1)  | PTFE           |
| 8. Stem Packing (2)   | PTFE           |
| 9. Gland Nut (1)      | AISI 304       |
| 10. Handle (1)        | AISI 304       |
| 11. Spring Washer (1) | AISI 304       |
| 12. Stem Nut (1)      | AISI 304       |
| 13. Handle Sleeve (1) | Vinyl Grip     |
| 14. Lock Device (1)   | AISI 304       |

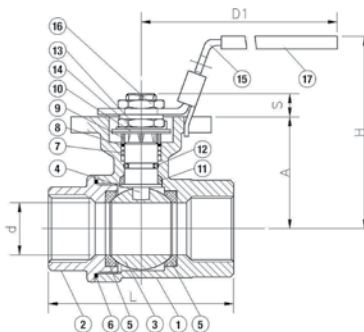
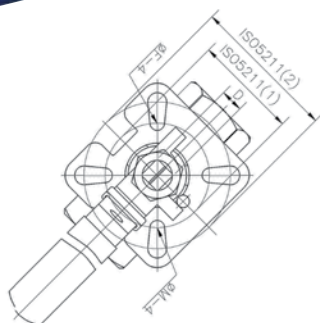


# 2-PC Full Port SS Ball Valve - Direct Mount

Pressure Rating: 1000 psi (69 bar) WOG for 1/4" to 2" / See Page 21 for Actuation



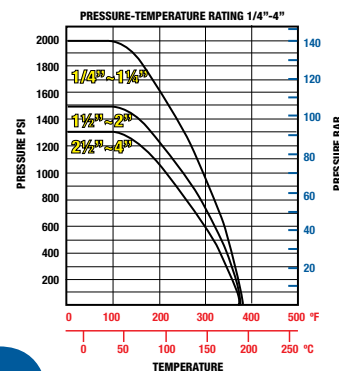
**B03**



- Investment cast body and ends
- Blow-out proof stem
- Full port
- Direct mounting pad for ISO Std 5211
- FNPT threaded on both ends
- Material: ASTM A351-CF8M (316SS)
- NACE MR0175

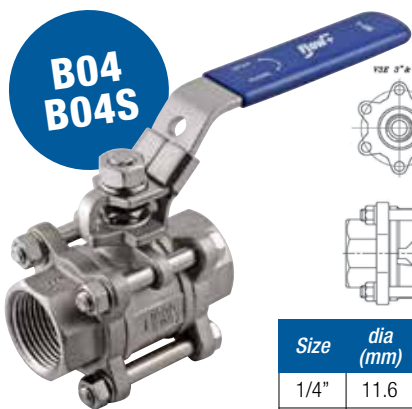
| Size   | dia (mm) | L     | F   | M   | ISO 5211        | Torque (in-lbs) | D  | H     | D1    | S    | A     | CV Factor | Kg   |
|--------|----------|-------|-----|-----|-----------------|-----------------|----|-------|-------|------|-------|-----------|------|
| 1/2"   | 15       | 65.3  | 6   | 7.5 | 42 F04; 50 F05  | 85              | 9  | 72.85 | 112   | 8.5  | 36.95 | 15        | 0.46 |
| 3/4"   | 20       | 77.3  | 7.5 | 9.5 | 50 F05; 70 F07  | 110             | 9  | 81.8  | 112   | 8.5  | 45    | 45        | 0.81 |
| 1"     | 25       | 88.7  | 7.5 | 9.5 | 50 F05; 70 F07  | 180             | 11 | 90.45 | 136   | 11.4 | 53.45 | 65        | 0.96 |
| 1 1/2" | 38       | 109   | 7.5 | 9.5 | 50 F05; 70 F07  | 315             | 14 | 114.7 | 197.9 | 14   | 74.75 | 175       | 2.3  |
| 2"     | 50       | 125.3 | 9.5 | 11  | 70 F07; 102 F10 | 450             | 14 | 124.0 | 197.9 | 13.7 | 83.5  | 380       | 2.3  |

| No. | Part              | Material           |
|-----|-------------------|--------------------|
| 1.  | Body              | ASTM-A351 Gr. CF8M |
| 2.  | Ends              | ASTM-A351 Gr. CF8M |
| 3.  | Ball              | ASTM-A351 Gr. CF8M |
| 4.  | Stem              | 316SS              |
| 5.  | Ball Seat         | 15% RTFE           |
| 6.  | Gasket            | 15% RTFE           |
| 7.  | Stem Packing      | 15% RTFE           |
| 8.  | Thrust Washer     | 15% RTFE           |
| 9.  | Stem Packing      | 304SS              |
| 10. | Belleville Washer | SUS 304-USP        |
| 11. | Thrust Washer     | PTFE +25% Carbon   |
| 12. | O-Ring            | Viton              |
| 13. | Locking Washer    | 304SS              |
| 14. | Stem Nut          | 304SS              |
| 15. | Handle            | 304SS              |
| 16. | Handle Nut        | 304SS              |
| 17. | Handle Cover      | Vinyl Grip         |

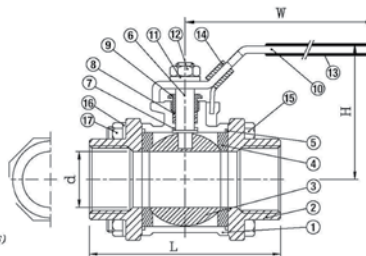
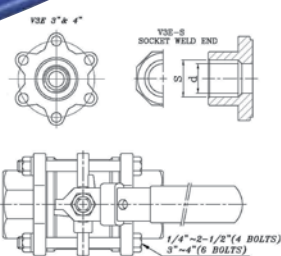


# 3-PC Full Port SS 1000 PSI Ball Valve

Pressure Rating: 1000 psi (69 bar) WOG for 1/4" to 4"



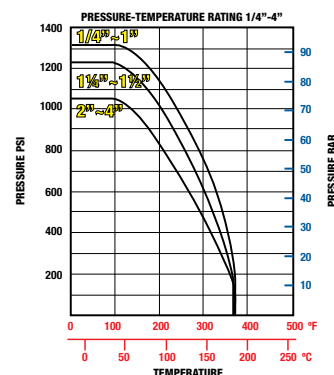
**B04  
B04S**



- Investment cast body and ends
- Blow-out proof stem
- Full port
- FNPT threaded on both ends for B04
- Socket weld on both ends for B04S
- Locking handle
- Material: ASTM A351-CF8M (316SS)

| Size   | dia (mm) | L     | H    | W   | B     | D    | S     | CV Factor | Kg   |
|--------|----------|-------|------|-----|-------|------|-------|-----------|------|
| 1/4"   | 11.6     | 54    | 51   | 84  | 12    | 18   | 14.1  | 10        | 0.34 |
| 3/8"   | 12.7     | 54    | 51   | 84  | 12.5  | 18   | 17.6  | 10        | 0.34 |
| 1/2"   | 15       | 61.5  | 55   | 84  | 15.8  | 22   | 21.7  | 26        | 0.46 |
| 3/4"   | 20       | 71    | 58.5 | 110 | 20.9  | 28   | 27.2  | 50        | 0.62 |
| 1"     | 25       | 83.5  | 73   | 135 | 26.6  | 34   | 33.9  | 68        | 1.96 |
| 1 1/4" | 32       | 97    | 78.5 | 135 | 35.05 | 44   | 42.6  | 120       | 1.49 |
| 1 1/2" | 38       | 110.5 | 90.5 | 165 | 40.9  | 50   | 48.7  | 170       | 2    |
| 2"     | 50       | 129   | 99   | 165 | 52.5  | 61.5 | 61.1  | 360       | 3.12 |
| 2 1/2" | 65       | 171.5 | 127  | 215 | 69    | 76   | 76.9  | 510       | 6.5  |
| 3"     | 80       | 200   | 136  | 215 | 82    | 90   | 89.8  | 900       | 10.4 |
| 4"     | 100      | 252   | 172  | 325 | 106   | 115  | 115.4 | 1250      | 20.2 |

| No. | Part (Qty)           | Material       |
|-----|----------------------|----------------|
| 1.  | Body (1)             | ASTM-CF8M-A351 |
| 2.  | End (1)              | ASTM-CF8M-A351 |
| 3.  | Ball (1)             | ASTM-CF8M-A351 |
| 4.  | Ball Seat (2)        | 15% RTFE       |
| 5.  | Joint Gasket (1)     | 15% RTFE       |
| 6.  | Stem (1)             | AISI 316       |
| 7.  | Thrust Washer (1)    | PTFE           |
| 8.  | Stem Packing (2)     | PTFE           |
| 9.  | Gland Nut (1)        | AISI 304       |
| 10. | Handle (1)           | AISI 304       |
| 11. | Stem Washer (1)      | AISI 304       |
| 12. | Stem Nut (1)         | AISI 304       |
| 13. | Handle Sleeve (1)    | Vinyl Grip     |
| 14. | Lock Device (1)      | AISI 304       |
| 15. | Bolt (4-6)           | AISI 304       |
| 16. | Spring Washer (4-12) | AISI 304       |
| 17. | Hex Nut (4-12)       | AISI 304       |



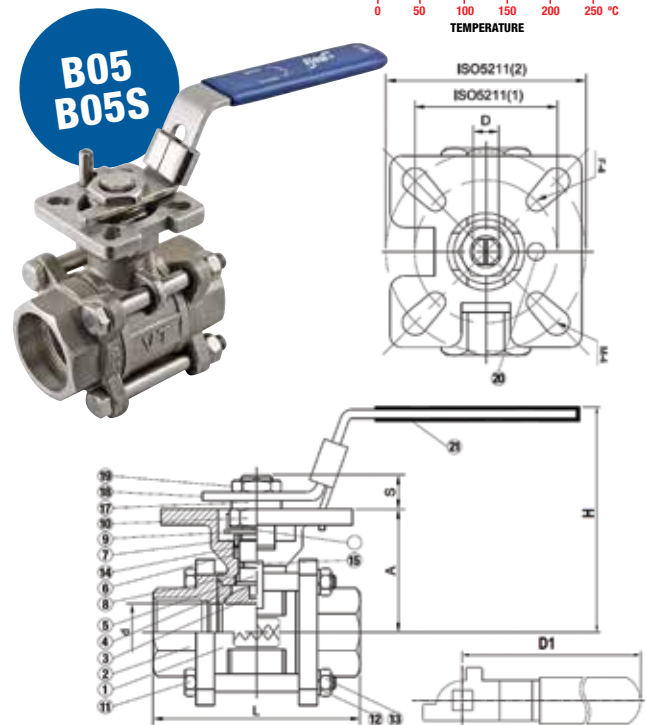
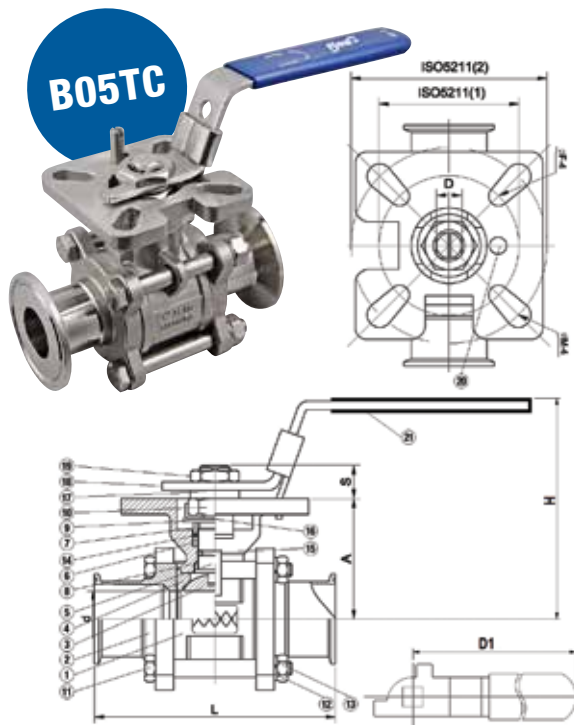
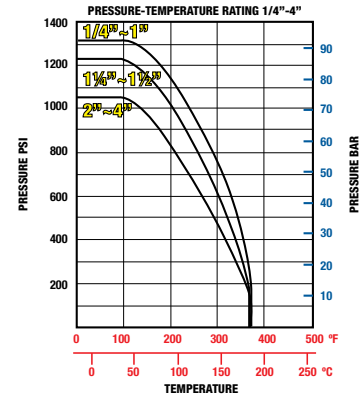
Sizes and specifications shown are subject to change without notice.

# 3-PC Full Port SS Ball Valve - Direct Mount

Pressure Rating: 1000 psi (69 bar) WOG for 1/4" to 4" / See Page 21 for Actuation

## Threaded (B05), Socket Weld (B05S) and Tri-Clamp (B05TC) Ends

- High Cycle, Live Loaded, Triple Stem Seal comprised of:
  - » Carbon filled PTFE wedge ring thrust washer and Viton O-Ring
  - » 15% RTFE Chevron packing
  - » Live loaded Belleville washers
  - » Packing nut mechanically locked to stem
- Investment cast body and ends
- Blow-out proof stem
- Full port
- Locking Handle
- Direct mounting pad for ISO Std 5211
- FNPT threaded on both ends on B05
- Socket weld ends on B05S
- Material: ASTM A351-CF8M (316SS) and 316LSS ends on socket weld



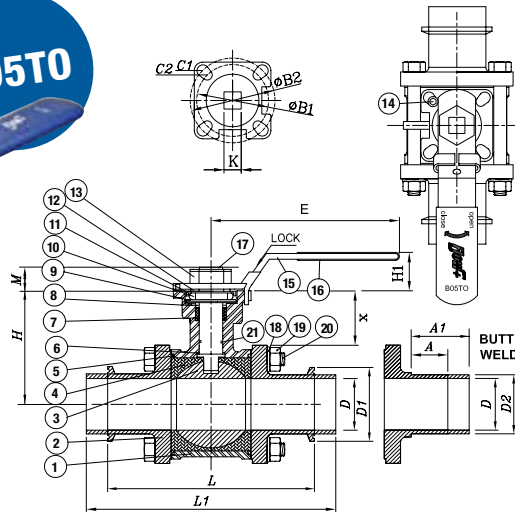
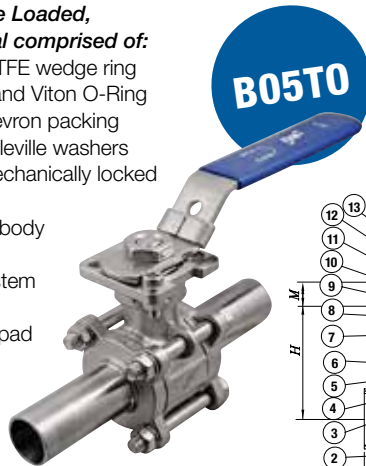
| Size            | 1/2"     | 3/4" | 1"    | 1 1/2" | 2"    | 3"     | 4"     |
|-----------------|----------|------|-------|--------|-------|--------|--------|
| <i>d</i>        | 15       | 20   | 25    | 38     | 50    | 80     | 100    |
| <i>L</i>        | 63.5     | 72.5 | 81    | 108    | 121.5 | 190    | 225    |
| <i>F</i>        | 6        | 7.5  | 7.5   | 7.5    | 9.5   | 11     | 11     |
| <i>M</i>        | 7.5      | 9.5  | 9.5   | 9.5    | 11    | 14.3   | 14.3   |
| ISO 5211        | 42       | 50   | 50    | 70     | 50    | 70     | 50     |
|                 | F04      | F05  | F05   | F07    | F05   | F07    | F05    |
| Torque (in-lbs) | 85       | 110  | 180   | 315    | 450   | 680    | 1190   |
|                 | <i>D</i> | 9    | 9     | 11     | 14    | 14     | 17     |
| <i>H</i>        | 72.95    | 80.8 | 90.45 | 115.25 | 124.0 | 208.5  | 216.7  |
| <i>D1</i>       | 112      | 112  | 136   | 197.9  | 197.9 | 264    | 325    |
| <i>S</i>        | 8.5      | 8.5  | 11.4  | 14     | 13.7  | 18     | 23     |
| <i>A</i>        | 36.95    | 45   | 53.45 | 74.75  | 83.5  | 118.25 | 153.75 |
| CV Factor       | 26       | 50   | 68    | 170    | 360   | 900    | 1250   |
| Kg              | 0.6      | 0.7  | 1.03  | 2.5    | 3.4   | 11.2   | 22     |

| No. Part (Qty)          | Material                          |
|-------------------------|-----------------------------------|
| 1. Body (1)             | ASTM-A351Gr. CF8M                 |
| 2. Ends (2)             | ASTM-A351Gr. CF8M<br>*CF3M for SW |
| 3. Ball (1)             | ASTM-A351Gr. CF8M                 |
| 4. Stem (1)             | 316SS                             |
| 5. Seat (2)             | 15% RTFE                          |
| 6. Stem Packing (1)     | 25% CTFE                          |
| 7. Washer (1)           | 304SS                             |
| 8. Thrust Washer (1)    | PTFE +25% Carbon                  |
| 9. Belleville Washer(1) | SUS 304-CSP                       |
| 10. Stem Nut (1)        | 304SS                             |
| 11. Bolts (4-6)         | 304SS                             |
| 12. Spring Washer (4-6) | 304SS                             |
| 13. Bolt Nuts (4-6)     | 304SS                             |
| 14. Stem Ring (1)       | PTFE +25% Carbon                  |
| 15. O-Ring (1)          | Viton                             |
| 16. Stopper Washer (1)  | 304SS                             |
| 17. Sqaure (1)          | 304SS                             |
| 18. Handle (1)          | 304SS                             |
| 19. Handle Nut (1)      | 304SS                             |
| 20. Stopper Pin (1)     | 304SS                             |
| 21. Handle Sleeve (1)   | Vinyl                             |

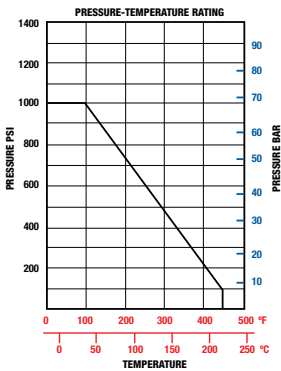
# 3-PC Full Port SS Ball Valve - Direct Mount

Pressure Rating: 1000 psi (69 bar) WOG for 1/2" to 4" / See Page 21 for Actuation

- High Cycle, Live Loaded, Triple Stem Seal comprised of:
  - » Carbon filled PTFE wedge ring thrust washer and Viton O-Ring
  - » 15% RTFE Chevron packing
  - » Live loaded Belleville washers
  - » Packing nut mechanically locked to stem
- Investment cast body and ends
- Blow-out proof stem
- Full port
- Direct mounting pad for ISO Std 5211
- Tube ends
- Material: ASTM A351-CF8M (316SS)



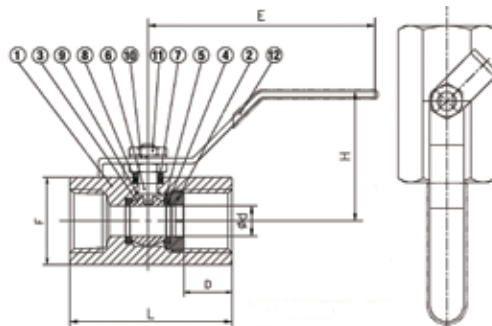
| No. | Part              | Material          |
|-----|-------------------|-------------------|
| 1.  | Body              | AISI 304/316/316L |
| 2.  | Ends              | AISI 304/316/316L |
| 3.  | Ball              | AISI 304/316/316L |
| 4.  | Seat              | PTFE/TFM 1600     |
| 5.  | Gasket            | PTFE              |
| 6.  | Thrust Packing    | PTFE              |
| 7.  | Stem Packing      | PTFE              |
| 8.  | Ring              | AISI 304          |
| 9.  | Belleville Washer | AISI 304          |
| 10. | Stem Nut          | AISI 304          |
| 11. | Lock Washer       | AISI 304          |
| 12. | Ring              | AISI 304          |
| 13. | Handle Nut        | AISI 304          |
| 14. | Stop Pin          | AISI 304          |
| 15. | Handle            | AISI 304          |
| 16. | Handle Sleeve     | Plastic           |
| 17. | Stem              | AISI 316          |
| 18. | Spring Washer     | AISI 304          |
| 19. | Bolt Nut          | AISI 304          |
| 20. | Bolt              | AISI 304          |
| 21. | O-Ring            | Viton             |



| Size   | dia mm | ISO 5211 | D    | L   | H     | M  | B1  | B2  | K  | D1    | E   | D2    | H1 | A  | C1 | C2 | Torque (in-lbs) | X    | A1   | L1  |
|--------|--------|----------|------|-----|-------|----|-----|-----|----|-------|-----|-------|----|----|----|----|-----------------|------|------|-----|
| 1/2"   | 15     | F03-F04  | 9.5  | 89  | 37.0  | 9  | 36  | 42  | 9  | 25.4  | 143 | 12.7  | 26 | 18 | 6  | 6  | 90              | 15.5 | 42   | 137 |
| 3/4"   | 20     | F03-F04  | 15.9 | 101 | 47.0  | 9  | 36  | 42  | 9  | 25.4  | 143 | 19.1  | 26 | 21 | 6  | 6  | 100             | 20.6 | 44   | 147 |
| 1"     | 25     | F04-F05  | 22.2 | 114 | 57.2  | 11 | 42  | 50  | 11 | 50.4  | 160 | 25.4  | 34 | 25 | 6  | 8  | 140             | 29.0 | 52   | 168 |
| 1 1/2" | 40     | F05-F07  | 35.0 | 140 | 78.2  | 14 | 50  | 70  | 14 | 50.4  | 187 | 38.2  | 43 | 28 | 8  | 10 | 240             | 39.0 | 51   | 186 |
| 2"     | 50     | F05-F07  | 47.6 | 156 | 86.2  | 14 | 50  | 70  | 14 | 63.8  | 187 | 50.8  | 43 | 25 | 8  | 10 | 480             | 42.0 | 58.5 | 223 |
| 2 1/2" | 65     | F07-F10  | 60.3 | 197 | 109.2 | 17 | 70  | 102 | 17 | 77.6  | 310 | 63.5  | 53 | 35 | 10 | 12 | 650             | 48.0 | /    | /   |
| 3"     | 80     | F07-F10  | 73.0 | 229 | 117.7 | 17 | 70  | 102 | 17 | 91.0  | 310 | 76.2  | 53 | 43 | 10 | 12 | 1150            | 48.7 | /    | /   |
| 4"     | 100    | F10-F12  | 97.4 | 241 | 141.2 | 22 | 102 | 125 | 22 | 119.0 | 400 | 100.6 | 56 | 37 | 12 | 14 | 1400            | 34.0 | /    | /   |

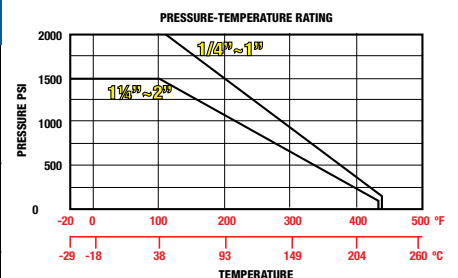
# 1-PC Reg. Port Carbon Steel 2000 PSI Ball Valve

Pressure Rating: 2000 psi (138 bar)



| No. | Part          | Material     |
|-----|---------------|--------------|
| 1.  | Body          | A108         |
| 2.  | Insert        | A108         |
| 3.  | Ball          | AISI 316     |
| 4.  | Seat          | PTFE+15% G/F |
| 5.  | Stem          | AISI316      |
| 6.  | Thrust Washer | PTFE         |
| 7.  | Stem Seal     | PTFE         |
| 8.  | Handle        | AISI 304     |
| 9.  | Handle Sleeve | Vinyl        |
| 10. | Nut           | 304SS        |
| 11. | Washer        | WCB          |
| 12. | Spring Washer | 304SS        |

| Size   | A   | B    | C     | D    | E    | F    | CV Factor | Kg   |
|--------|-----|------|-------|------|------|------|-----------|------|
| 1/4"   | 61  | 29.5 | 41.3  | 5    | 21   | 24.1 | 1.5       | 0.21 |
| 3/8"   | 79  | 34.5 | 44    | 7.2  | 23   | 26.4 | 3.5       | 0.22 |
| 1/2"   | 108 | 63   | 57.2  | 9.0  | 29   | 33.3 | 5.7       | 0.29 |
| 3/4"   | 110 | 65   | 65.1  | 12.5 | 35   | 40.3 | 10        | 0.42 |
| 1"     | 122 | 68   | 71    | 15   | 41   | 47.2 | 16        | 0.71 |
| 1 1/4" | 145 | 79.5 | 92.1  | 20   | 55   | 63.4 | 25        | 1.06 |
| 1 1/2" | 148 | 84   | 98.4  | 25   | 57   | 65.7 | 40        | 1.68 |
| 2"     | 148 | 92.5 | 114.3 | 32   | 73.5 | 84.7 | 62        | 2.71 |



Sizes and specifications shown are subject to change without notice.

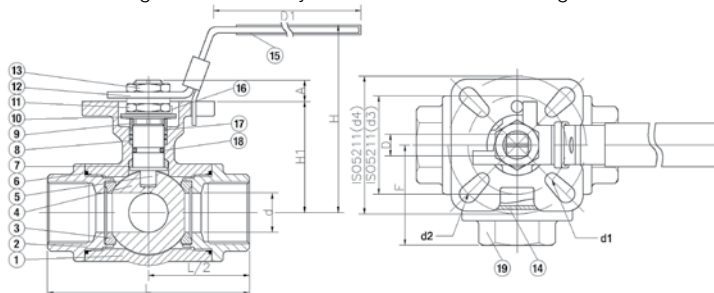
# 3-way Reg. Port SS Ball Valve - Direct Mount

Pressure Rating: 1000 psi (69 bar) WOG for 1/4" to 2" / See Page 21 for Actuation



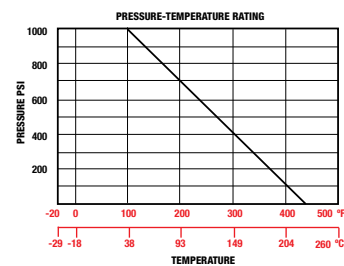
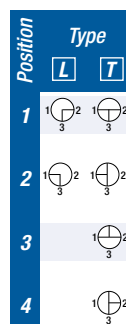
- **High Cycle, Live Loaded, Triple Stem Seal comprised of:**
  - » Carbon filled PTFE wedge ring thrust washer and Viton O-Ring
  - » 15% RTFE Chevron packing
  - » Live loaded Belleville washers
  - » Packing nut mechanically locked to stem

- Anti-static device
- L-Port and T-Port
- Blow-out proof stem
- FNPT end connections
- Material: ASTM A351-CF8M (316SS)
- Locking handle



| No. Part              | Material           |
|-----------------------|--------------------|
| 1. Body               | ASTM-A351 Gr. CF8M |
| 2. Ends               | ASTM-A351 Gr. CF8M |
| 3. Seat               | 15% RTFE           |
| 4. Ball               | ASTM-A351 Gr. CF8M |
| 5. Stem               | 316SS              |
| 6. Gasket             | 15% RTFE           |
| 7. Thrust Washer      | PTFE +25% Carbon   |
| 8. Stem Packing       | 15% RTFE           |
| 9. Gland              | 304SS              |
| 10. Belleville Washer | SUS 304-CSP        |
| 11. Stem Nut          | 304SS              |
| 12. Handle            | 304SS              |
| 13. Handle Nut        | 304SS              |
| 14. Gasket            | 15% RTFE           |
| 15. Handle Sleeve     | Vinyl              |
| 16. Locking Washer    | SUS 304-CSP        |
| 17. Thrust Washer     | PTFE +25% Carbon   |
| 18. End Cap           | ASTM-A351 Gr. CF8M |
| 19. O-Ring            | Viton              |

| Size   | dia (mm) | L     | F     | ISO 5211          | D  | H      | D1    | A    | C    | d1  | d2  | H1    | Torque (in-lbs) | Kg   | CV Factor |
|--------|----------|-------|-------|-------------------|----|--------|-------|------|------|-----|-----|-------|-----------------|------|-----------|
| 1/2"   | 12.7     | 75.7  | 37.25 | 42 F04<br>50 F05  | 9  | 77.45  | 112   | 8.5  | 12   | 6   | 7.5 | 40.65 | 85              | 0.67 | 6         |
| 3/4"   | 16.0     | 86.6  | 44.7  | 50 F05<br>70 F07  | 9  | 82     | 112   | 8.5  | 12   | 7.5 | 9.5 | 45.2  | 110             | 1.07 | 8         |
| 1"     | 20.0     | 102.4 | 51.4  | 50 F05<br>70 F07  | 11 | 93.7   | 136.5 | 11.4 | 15.8 | 7.5 | 9.5 | 56.5  | 180             | 1.68 | 11        |
| 1 1/2" | 32.0     | 125.8 | 62.7  | 50 F05<br>70 F07  | 14 | 120.25 | 197.5 | 14   | 20.8 | 7.5 | 9.5 | 73.5  | 315             | 3.6  | 65        |
| 2"     | 38.1     | 149   | 74.6  | 70 F07<br>102 F10 | 14 | 129.85 | 197.5 | 13.7 | 20.8 | 9.5 | 11  | 87.35 | 450             | 5.8  | 112       |

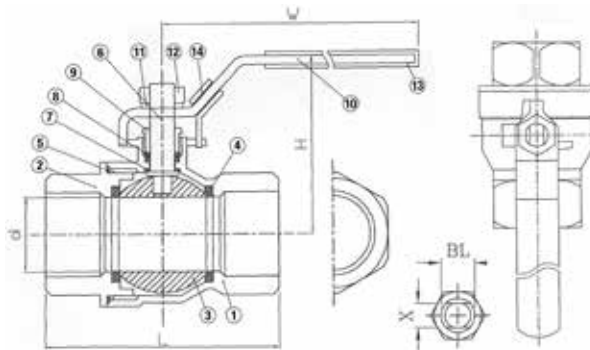


# 2-PC Full Port Carbon Steel Ball Valve

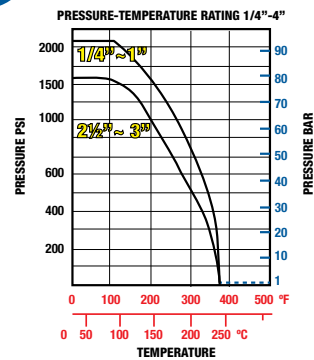
Pressure Rating: 2000 psi (138 bar) WOG for 1/4" to 2" / 1500 (103.4 bar) WOG for 3"



- Blow-out proof stem
- Full port
- FNPT threaded on both ends
- Locking handle
- Carbon steel body and ends
- Material: ASTM A216-WCB
- NACE MRO175
- Note: available in Carbon Steel as model B02 on Page 4



| Size   | dia (mm) | L    | H     | W   | X   | BL    | CV Factor | Torque (in-lbs) | Kg    |
|--------|----------|------|-------|-----|-----|-------|-----------|-----------------|-------|
| 1/4"   | 11.6     | 44.5 | 51    | 95  | 5   | 5/16" | 6.6       | 35              | 0.194 |
| 3/8"   | 12.7     | 44.5 | 51    | 95  | 5   | 5/16" | 7.9       | 35              | 0.205 |
| 1/2"   | 15       | 57   | 53    | 95  | 5   | 5/16" | 11.2      | 47              | 0.285 |
| 3/4"   | 20       | 65   | 59.5  | 100 | 6.5 | 3/8"  | 21        | 64              | 0.456 |
| 1"     | 25       | 76   | 73    | 135 | 8   | 7/16" | 35        | 90              | 0.764 |
| 1 1/4" | 32       | 87.5 | 79    | 135 | 8   | 7/16" | 57        | 117             | 1.163 |
| 1 1/2" | 38       | 102  | 90.5  | 165 | 9   | 1/2"  | 80        | 156             | 1.870 |
| 2"     | 50       | 123  | 98.8  | 165 | 9   | 1/2"  | 148       | 217             | 3.126 |
| 3"     | 80       | 184  | 142.5 | 215 | 12  | 3/4"  | 415       | 651             | 9.79  |



| No. Part (Qty)        | Material       |
|-----------------------|----------------|
| 1. Body (1)           | ASTM-A216-WCB  |
| 2. Ends (1)           | ASTM-A216-WCB  |
| 3. Ball (1)           | ASTM-CF8M-A351 |
| 4. Ball Seat (2)      | 15% R-PTFE     |
| 5. Joint Gasket (1)   | PTFE           |
| 6. Stem (1)           | AISI 316       |
| 7. Thrust Washer (1)  | PTFE           |
| 8. Stem Packing (2)   | PTFE           |
| 9. Gland Nut (1)      | AISI 304       |
| 10. Handle (1)        | AISI 304       |
| 11. Spring Washer (1) | AISI 304       |
| 12. Stem Nut (1)      | AISI 304       |
| 13. Handle Sleeve (1) | Vinyl          |
| 14. Lock Device (1)   | AISI 304       |



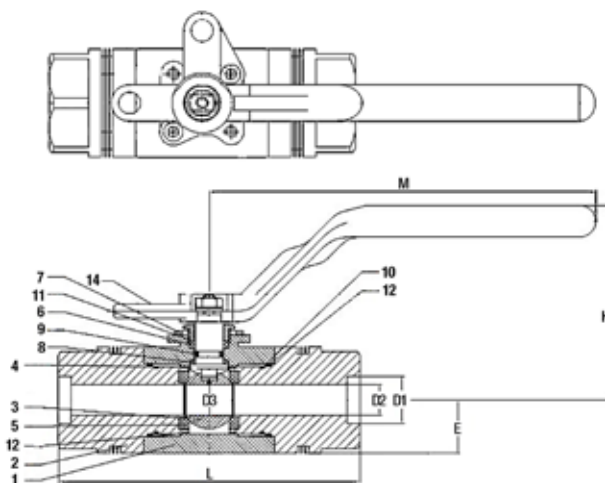
# 3-PC Threaded Body 3000/6000 PSI Ball Valve

Pressure Rating: 3000 psi for the BT3 and 6000 psi for the BT6



**BT3  
BT6**

Available in threaded, socket weld and threaded-socket weld.



## SPECIFICATIONS AND FEATURES

- Designed to ASME B16.34
- NPT and SW to ASME B16.11
- Tested to API 598
- API 607 Fire-safe
- NACE MR0175
- Available in full port and regular port
- Forged steel body
- Locking lever
- Blow-out proof stem
- Anti-static device
- Mounting device

### STANDARD SOUR

| No. | Part              | Material                     |
|-----|-------------------|------------------------------|
| 1.  | Body              | A105N                        |
| 2.  | Cap               | A105N                        |
| 3.  | Ball              | CF8M / 316SS / 17/4 PH       |
| 4.  | Stem              | 316SS / A564 Gr. 630 17/4 PH |
| 5.  | Seat*             | PEEK                         |
| 6.  | Packing Ring      | 304SS                        |
| 7.  | Gland             | Carbon Steel                 |
| 8.  | Thrust Washer     | Delrin/PEEK                  |
| 9.  | Packing           | Graphite                     |
| 10. | O-Ring            | Viton-B                      |
| 11. | O-Ring            | Viton-B                      |
| 12. | Gasket            | Graphite                     |
| 13. | Belleville Washer | 302SS                        |
| 14. | Handle            | A216 WCB                     |

\*NPT valves

### LOW TEMP / SOUR

| No. | Part              | Material                     |
|-----|-------------------|------------------------------|
| 1.  | Body              | A350 LF2                     |
| 2.  | Cap               | A350 LF2                     |
| 3.  | Ball              | CF8M / 316SS / 17/4 PH       |
| 4.  | Stem              | 316SS / A564 Gr. 630 17/4 PH |
| 5.  | Seat*             | PEEK                         |
| 6.  | Packing Ring      | 304SS                        |
| 7.  | Gland             | Carbon Steel                 |
| 8.  | Thrust Washer     | PEEK                         |
| 9.  | Packing           | Graphite                     |
| 10. | O-Ring            | Viton-B                      |
| 11. | O-Ring            | Viton-B                      |
| 12. | Gasket            | Graphite                     |
| 13. | Belleville Washer | 302SS                        |
| 14. | Handle            | A216 WCB                     |

### STAINLESS STEEL / SOUR

| No. | Part              | Material                     |
|-----|-------------------|------------------------------|
| 1.  | Body              | 316SS                        |
| 2.  | Cap               | 316SS                        |
| 3.  | Ball              | CF8M / 316SS / 17/4 PH       |
| 4.  | Stem              | 316SS / A564 Gr. 630 17/4 PH |
| 5.  | Seat*             | PEEK                         |
| 6.  | Packing Ring      | 304SS                        |
| 7.  | Gland             | Carbon Steel                 |
| 8.  | Thrust Washer     | PEEK                         |
| 9.  | Packing           | Graphite                     |
| 10. | O-Ring            | Viton-B                      |
| 11. | O-Ring            | Viton-B                      |
| 12. | Gasket            | Graphite                     |
| 13. | Belleville Washer | 302SS                        |
| 14. | Handle            | A351 CF8M                    |

| Size          | Size (mm) | L<br>NPT | L<br>SW | L<br>NPT x SW | E  | H   | D1   | D2   | D3   | M   | Torque<br>(in-lbs) |
|---------------|-----------|----------|---------|---------------|----|-----|------|------|------|-----|--------------------|
| 1/2" FP-BT3   | 12.7      | 98       | 127     | 113           | 19 | 83  | 21.8 | 12.7 | 12.7 | 160 | 156                |
| 1/2" FP-BT6   | 12.7      | 98       | 127     | 119           | 19 | 83  | 21.8 | 12.7 | 12.7 | 160 | 214                |
| 3/4" FP       | 19        | 108      | 172     | 140           | 24 | 90  | 27.8 | 19   | 19   | 160 | 358                |
| 3/4" RP       | 19        | 111      | 172     | 140           | 19 | 83  | 27.8 | 19   | 12.7 | 160 | 156                |
| 1" FP         | 25        | 108      | 172     | 152           | 27 | 94  | 48.8 | 25   | 25   | 200 | 441                |
| 1" RP-BT3     | 25        | 108      | 172     | 140           | 24 | 90  | 48.8 | 25   | 19   | 160 | 358                |
| 1" RP-BT6     | 25        | 108      | 172     | 152           | 24 | 90  | 48.8 | 25   | 19   | 160 | 560                |
| 1 1/2" FP     | 38.1      | 159      | 217     | 188           | 37 | 122 | 33.9 | 38.1 | 38.1 | 250 | 885                |
| 1 1/2" RP-BT3 | 38.1      | 159      | 217     | 188           | 27 | 94  | 33.9 | 38.1 | 25   | 200 | 441                |
| 1 1/2" RP-BT6 | 38.1      | 159      | 217     | 201           | 27 | 94  | 33.9 | 38.1 | 25   | 200 | 841                |
| 2" FP         | 50        | 159      | 324     | 241           | 43 | 150 | 61.2 | 50   | 50   | 325 | 2847               |
| 2" RP-BT3     | 50        | 159      | 217     | 188           | 37 | 122 | 61.2 | 50   | 38.1 | 250 | 885                |
| 2"RP-BT6      | 50        | 159      | 217     | 201           | 37 | 122 | 61.2 | 50   | 38.1 | 250 | 1290               |

Sizes and specifications shown are subject to change without notice.

# Z SERIES FLOATING FLANGED BALL VALVES PART NUMBERING SYSTEM

1

### 1 = Code and Class

ZR1 = Reduced port class 150  
 ZR3 = Reduced port class 300  
 ZR6 = Reduced port class 600  
 ZF1 = Full port class 150  
 ZF3 = Full port class 300  
 ZF6 = Full port class 600

2

### 2 = Size

050 = 1/2"      250 = 2 1/2"  
 075 = 3/4"      003 = 3"  
 001 = 1"        004 = 4"  
 150 = 1 1/2"    006 = 6"  
 002 = 2"        008 = 8"

3

### 3 = Type

A = Floating ball split body  
 B = Floating ball uni-body

4

### 4 = Type

1 = ASTM A216 WCB  
 2 = ASTM A325 LCC  
 3 = ASTM A351 CF8M  
 4 = A105N  
 5 = A350 LF2

5

### 5 = End Connection

F = Raised face flanged\*  
 R = Ring joint flanged ends  
 B = Butt-welded ends

6

### 6 = Trim Material

1 = Body + 3ENC  
 2 = 304SS  
 3 = 316SS\*

7

### 7 = Seat Material

P = PTFE  
 R = RTFE\*  
 N = Nylon  
 K = PEEK  
 D = Devlon

8

### 8 = Operator

H = Handle/Lever  
 G = Gear Operator  
 B = Bare Stem

9

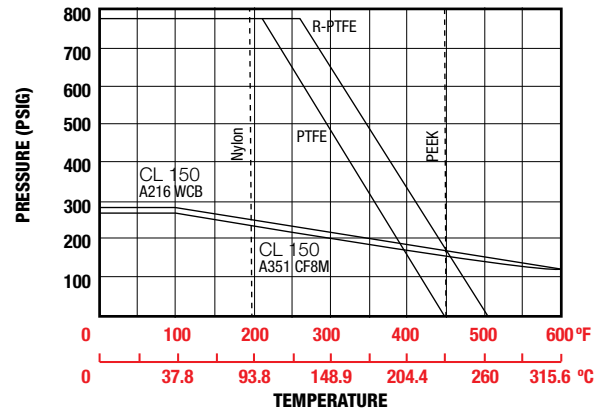
### 9 = Special Requirements

00 = Standard Requirement

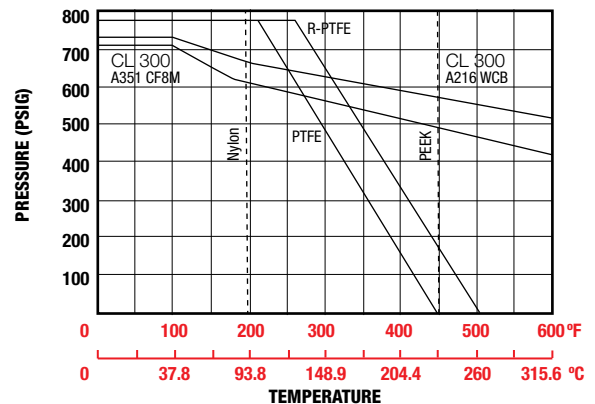
\*Denotes standard stock trim.

## Z Series Pressure and Temperature Charts

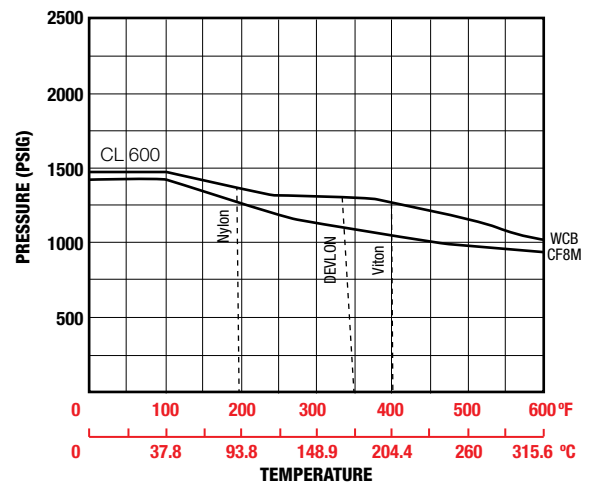
### CLASS #150



### CLASS #300



### CLASS #600



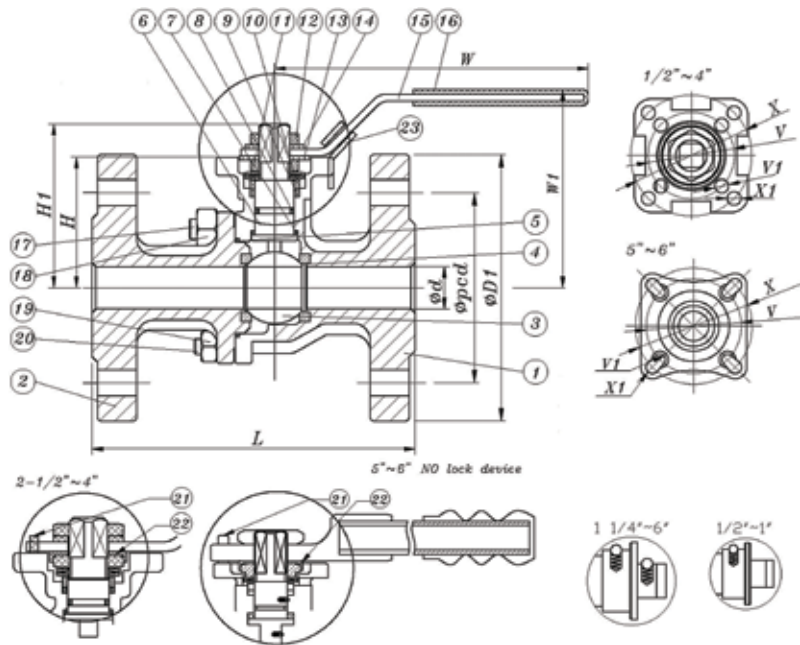
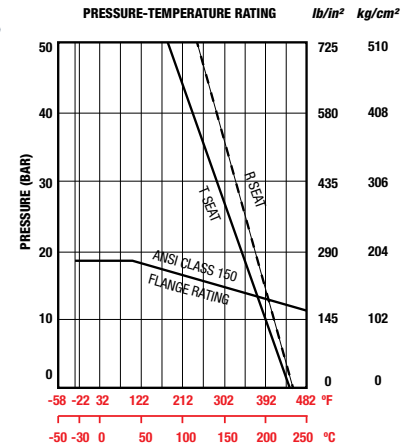
# ZF1 – 150# Full Port Direct Mount SS

## SPECIFICATIONS

- Designed according to ASME/ANSI Class 150 B16.34
- Face to Face per ASME/ANSI B16.10 Long Pattern
- Flanged designed per ASME/ANSI B16.5
- NACE MR0175
- Design Standard per API 608
- Markings per MSS-SP25
- Pressure Test per API 598

## FEATURES

- Full bore, 2 piece body floating ball
- ISO mounting pad, direct mounting
- Blow-out proof stem
- Cavity Relieved seats, anti-static device
- Lever operated



| No. Part (Qty)            | Material         |
|---------------------------|------------------|
| 1. Body (1)               | ASTM-A351 CF8M   |
| 2. Cap (1)                | ASTM-A351 CF8M   |
| 3. Ball (1)               | ASTM-A351 CF8M   |
| 4. Ball Seat (2)          | 15% R-PTFE       |
| 5. Joint Gasket (1)       | PTFE +25% Carbon |
| 6. Stem (1)               | AISI 316         |
| 7. Thrust Washer (1)      | PTFE +25% Carbon |
| 8. O-Ring (1)             | Viton            |
| 9. Stem Packing (1)       | PTFE +25% Carbon |
| 10. Stem Ring (1)         | AISI 304         |
| 11. Belleville Washer (1) | AISI 304         |
| 12. Stem Nut (2)          | AISI 304         |
| 13. Stopper (2)           | AISI 304         |
| 14. Spring Washer (1)     | AISI 304         |
| 15. Handle (1)            | AISI 304         |
| 16. Plastic Cover (1)     | Plastic          |
| 17. Nut*1 (1)             | AISI 304         |
| 18. Stud Bolt*1 (1)       | AISI 304         |
| 19. Nut*2 (3,5,7)         | AISI 304         |
| 20. Stud Bolt*2 (3,5,7)   | AISI 304         |
| 21. Stopper Pin (1)       | AISI 304         |
| 22. Lock Washer (1)       | AISI 304         |
| 23. Lock Device (1)       | AISI 304         |

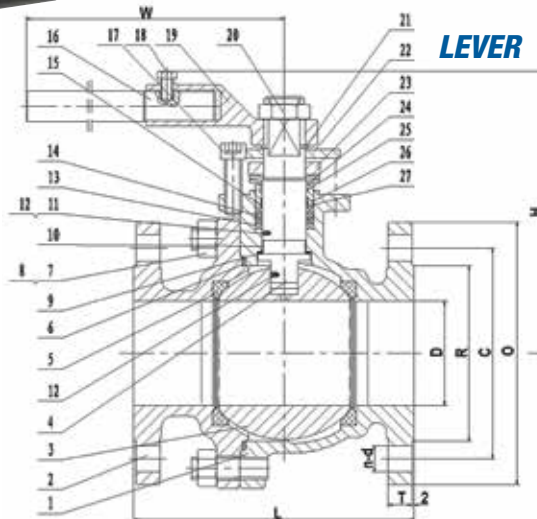
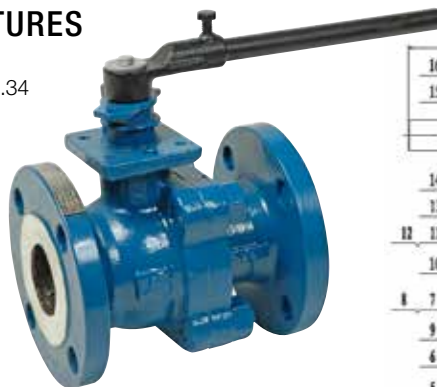
| Size   | d     | D1     | pcd    | L     | H     | H1    | W      | W1    | V     | V1    | X     | X1    | Stem Diameter | Torque     | WT      | CV   |
|--------|-------|--------|--------|-------|-------|-------|--------|-------|-------|-------|-------|-------|---------------|------------|---------|------|
| 1/4"   | 0.59" | 3.5"   | 2.38"  | 4.25" | 1.83" | 2.20" | 4.3"   | 3.50" | 1.65" | 0.24" | 1.97" | 0.28" | 0.35"         | 85 in lb   | 3.6 lb  |      |
| 12     | 15    | 89     | 60.5   | 108   | 46.5  | 56    | 110    | 89    | 42    | 6     | 50    | 7     | 9             | 9.6 Nm     | 1.6 kg  | 27   |
| 3/4"   | 0.79" | 3.875" | 2.75"  | 4.6"  | 2.03" | 2.40" | 4.3"   | 3.70" | 1.97" | 0.3"  | 2.76" | 0.38" | 0.35"         | 110 in lb  | 4.5 lb  |      |
| 20     | 20    | 98     | 70     | 117   | 51.5  | 61    | 110    | 94    | 50    | 7.6   | 70    | 9.6   | 9             | 12.4 Nm    | 2 kg    | 50   |
| 1"     | 0.98" | 4.25"  | 3.125" | 5"    | 2.26" | 2.64" | 5.35"  | 3.74" | 1.97" | 0.3"  | 2.76" | 0.38" | 0.43"         | 180 in lb  | 7 lb    |      |
| 25     | 25    | 108    | 79.5   | 127   | 57.5  | 67    | 136    | 95    | 50    | 76    | 70    | 9.6   | 11            | 20.3 Nm    | 3.2 kg  | 95   |
| 1 1/2" | 1.57" | 5"     | 3.875" | 6.5"  | 3.01" | 3.62" | 8"     | 4.36" | 2.76" | 0.38" | 4.02" | 0.44" | 0.55"         | 315 in lb  | 14 lb   |      |
| 38     | 40    | 127    | 98.5   | 165   | 76.5  | 92    | 203    | 110.7 | 70    | 9.6   | 102   | 11.2  | 14            | 35.6 Nm    | 6.4 kg  | 280  |
| 2"     | 1.97" | 6"     | 4.75"  | 7"    | 3.29" | 3.90" | 8"     | 4.63" | 2.76" | 0.38" | 4.02" | 0.44" | 0.55"         | 450 in lb  | 21 lb   |      |
| 50.8   | 50    | 152.4  | 120.5  | 178   | 83.5  | 99    | 203    | 117.7 | 70    | 9.6   | 102   | 11.2  | 14            | 50.8 Nm    | 9.5 kg  | 490  |
| 2 1/2" | 2.56" | 7.01"  | 5.49"  | 7.48" | 4.57" | 5.39" | 10.93" | 6.12" | 4.02" | 0.44" | 4.92" | 0.56" | 0.67"         | 565 in lb  | 36 lb   |      |
| 63.5   | 65    | 178    | 139.5  | 190   | 118.5 | 137   | 277.5  | 155.5 | 102   | 11.2  | 125   | 14.3  | 17            | 63.8 Nm    | 16.3 kg | 750  |
| 3"     | 3.14" | 7.5"   | 6"     | 8"    | 5.10" | 5.83" | 10.93" | 6.56" | 4.02" | 0.44" | 4.92" | 0.56" | 0.67"         | 680 in lb  | 48 lb   |      |
| 75     | 80    | 190.5  | 152.5  | 203   | 129.5 | 148   | 277.5  | 166.5 | 102   | 11.2  | 125   | 14.3  | 17            | 76.8 Nm    | 22 kg   | 1160 |
| 4"     | 3.94" | 9"     | 7.5"   | 9.06" | 5.71" | 6.44" | 14.86" | 7.17" | 4.02" | 0.44" | 4.92" | 0.56" | 0.87"         | 1190 in lb | 79 lb   |      |
| 100    | 100   | 229    | 190.5  | 230   | 145   | 163.5 | 377.5  | 182   | 102   | 11.2  | 125   | 14.3  | 22            | 134.5 Nm   | 36 kg   | 2200 |
| 6"     | 5.9"  | 15.51" | 9.5"   | 9.06" | 6.89" | 8.61" | 21.65" | 7.17" | 4.92" | 0.56" | 5.51" | 0.73" | 1.06"         | 2850 in lb | 207 lb  |      |
| 150    | 150   | 394    | 241.5  | 230   | 175   | 218.6 | 550    | 182   | 125   | 14.3  | 140   | 18.6  | 27            | 322 Nm     | 94 kg   | 5100 |

Sizes and specifications shown are subject to change without notice.

# ZF1 – 150# Full Port Carbon Steel and Low Temp

## SPECIFICATIONS AND FEATURES

- Fire-safe to API-607, latest Ed.
- Designed to ASME/ANSI Class 150-B16.34
- Face to Face to ASME/ANSI B16.10 Long Pattern
- Flanges to ASME/ANSI B16.5
- NACE MR0175
- Design Standard per API 608
- Pressure Test per API 598
- Full bore, 2 piece body floating ball
- ISO mounting pad, direct mounting
- Blow-out proof stem
- Cavity relieving seats, anti-static device
- Lever operated 2"-6", gear operated 8"



**LEVER**

### LEVER and GEAR PARTS LIST

| No. Part                    | WCB BODY                  | LCC BODY                  |
|-----------------------------|---------------------------|---------------------------|
| 1. Body                     | A216 WCB                  | A352 LCC                  |
| 2. End                      | A216 WCB                  | A352 LCC                  |
| 3. Ball                     | A182 F316                 | A182 F316                 |
| 4. Stem                     | A182 F316                 | A182 F316                 |
| 5. Seat                     | R-PTFE                    | R-PTFE                    |
| 6. Body Gasket              | 304 Graphite Spiral Wound | 304 Graphite Spiral Wound |
| 7. Nut                      | A194-2HM                  | A194-2HM                  |
| 8. Full-threaded Bolt       | A193-B7M                  | A320 L7M                  |
| 9. Stem Gasket              | PTFE                      | PTFE                      |
| 10. Stem Bearing            | PTFE                      | PTFE                      |
| 11. Steel Ball              | A276 304                  | A276 304                  |
| 12. Anti-static Spring      | A276 304                  | A276 304                  |
| 13. Stem Firesafe Gasket I  | Flexible Graphite + 316   | Flexible Graphite + 316   |
| 14. Stem Firesafe Gasket II | Flexible Graphite         | Flexible Graphite         |
| 15. Packing Gland Bearing   | PTFE                      | PTFE                      |

### LEVER PARTS ONLY

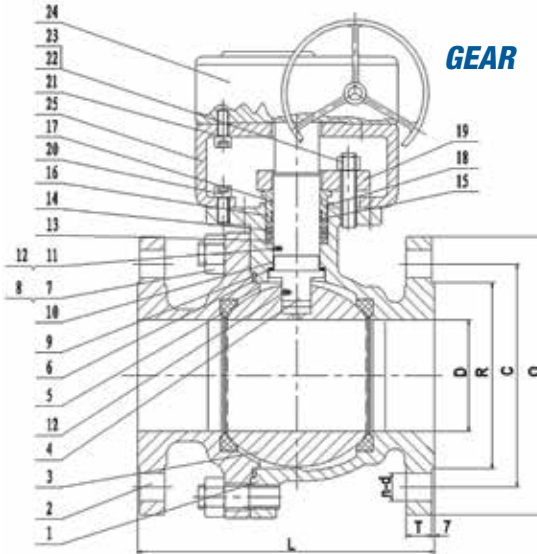
|                          |           |           |
|--------------------------|-----------|-----------|
| 16. Lever                | AISI 1020 | AISI 1020 |
| 17. Screw                | A193-B7M  | A320 L7M  |
| 18. Hex Bolt             | A193-B7M  | SS        |
| 19. Joint                | A216 WCB  | A352 LCC  |
| 20. Nut                  | AISI 1020 | AISI 1020 |
| 21. Axial Retaining Ring | AISI 1566 | AISI 1566 |
| 22. Limit Block          | A36       | A36       |
| 23. Nut                  | AISI 1020 | AISI 1020 |
| 24. Belleville Washer    | A276 304  | A276 304  |
| 25. O-Ring               | Viton     | Viton     |
| 26. O-Ring               | Viton     | Viton     |
| 27. Packing Bushing      | A276 316  | A276 316  |

### GEAR PARTS ONLY

|                     | WCB BODY  |
|---------------------|-----------|
| 16. O-Ring          | Viton     |
| 17. O-Ring          | Viton     |
| 18. Packing Bushing | A276 316  |
| 19. Packing Plate   | A216 WCB  |
| 20. Inner Hex Screw | A193-B7M  |
| 21. Inner Hex Screw | A194-B7M  |
| 22. Nut             | A194-2HM  |
| 23. Bolt            | A193-B7M  |
| 24. Actuator        | Component |
| 25. Yoke            | A36       |

|                     | LCC BODY  |
|---------------------|-----------|
| 16. O-Ring          | Viton     |
| 17. O-Ring          | Viton     |
| 18. Packing Bushing | A276 316  |
| 19. Packing Plate   | A352 LCC  |
| 20. Inner Hex Screw | A320 L7M  |
| 21. Inner Hex Screw | A320 L7M  |
| 22. Nut             | A194 7M   |
| 23. Bolt            | A320 L7M  |
| 24. Actuator        | Component |
| 25. Yoke            | A36       |



**GEAR**

| Size   | L      | D     | R       | C      | O      | n-d    | T      | W      | H      | WT       | Torque     |             | CV     |
|--------|--------|-------|---------|--------|--------|--------|--------|--------|--------|----------|------------|-------------|--------|
|        |        |       |         |        |        |        |        |        |        |          | 150 PSI    | 285 PSI     |        |
| 1/2"   | 4.25"  | 0.51" | 1.375"  | 2.375" | 3.5"   | 0.625" | 0.438" | 5.91"  | 3.19"  | 4.85 lb  | 71 in lb   | 107 in lb   | 24     |
| 12.7   | 108    | 13    | 34.93   | 60.33  | 88.9   | 4-62   | 11.11  | 150    | 81     | 2.2 kg   | 8 Nm       | 12 Nm       |        |
| 3/4"   | 4.61"  | 0.75" | 1.6875" | 2.75"  | 3.875" | 0.625" | 0.5"   | 5.91"  | 3.35"  | 5.95 lb  | 80 in lb   | 124 in lb   | 53     |
| 19.05  | 117    | 19    | 42.86   | 69.85  | 98.43  | 4-62   | 12.7   | 150    | 85     | 2.7 kg   | 9 Nm       | 14 Nm       |        |
| 1"     | 5.0"   | 0.98" | 2"      | 3.125" | 4.25"  | 0.625" | 0.56"  | 7.09"  | 3.86"  | 9.92 lb  | 142 in lb  | 239 in lb   | 92     |
| 25.4   | 127    | 25    | 50.8    | 79.38  | 107.98 | 4-62   | 14.29  | 180    | 98     | 4.5 kg   | 16 Nm      | 27 Nm       |        |
| 1 1/2" | 6.5"   | 1.50" | 2.875"  | 3.875" | 5"     | 0.625" | 0.69"  | 11.02" | 5.24"  | 15.43 lb | 292 in lb  | 487 in lb   | 211    |
| 38.1   | 165    | 38    | 73.03   | 98.43  | 127    | 4-62   | 17.46  | 280    | 133    | 7 kg     | 33 Nm      | 55 Nm       |        |
| 2"     | 7"     | 1.97" | 3.625"  | 4.75"  | 5.9"   | 0.625" | 0.562" | 9.53"  | 6.14"  | 22 lb    | 372 in lb  | 620 in lb   | 450    |
| 50.8   | 178    | 50    | 92.1    | 120.7  | 150    | 4-19   | 14.3   | 242    | 156    | 9.8 kg   | 42 Nm      | 70 Nm       |        |
| 3"     | 8"     | 2.95" | 5"      | 6"     | 7.48"  | 0.625" | 0.69"  | 13.78" | 8.07"  | 44 lb    | 797 in lb  | 1328 in lb  | 1100   |
| 76.2   | 203    | 75    | 127     | 152.4  | 190    | 4-19   | 17.5   | 350    | 205    | 20 kg    | 90 Nm      | 150 Nm      |        |
| 4"     | 9.02"  | 3.98" | 6.19"   | 7.5"   | 9.05"  | 0.625" | 0.88"  | 18.11" | 8.858" | 77 lb    | 1328 in lb | 2168 in lb  | 2200   |
| 101.6  | 229    | 101   | 157.2   | 190.5  | 230    | 8-19   | 22.3   | 460    | 225    | 35 kg    | 150 Nm     | 245 Nm      |        |
| 6"     | 15.51" | 5.94" | 8.5"    | 9.5"   | 11.02" | 0.625" | 0.94"  | 29.53" | 12.48" | 211 lb   | 3009 in lb | 4956 in lb  | 5200   |
| 152.4  | 394    | 151   | 215.9   | 241.3  | 280    | 8-22.5 | 23.9   | 750    | 317    | 96 kg    | 340 Nm     | 560 Nm      |        |
| 8"     | 18"    | 7.95" | 10.625" | 11.75" | 13.58" | 0.625" | 1.06"  | //     | //     | 364 lb   | 7213 in lb | 12001 in lb | 10,000 |
| 203.2  | 457    | 202   | 269.9   | 298.5  | 345    | 8-22.5 | 27     | //     | //     | 165 kg   | 815 Nm     | 1356 Nm     |        |

# ZR1 – 150# Reg. Port Carbon Steel and Low Temp

## SPECIFICATIONS

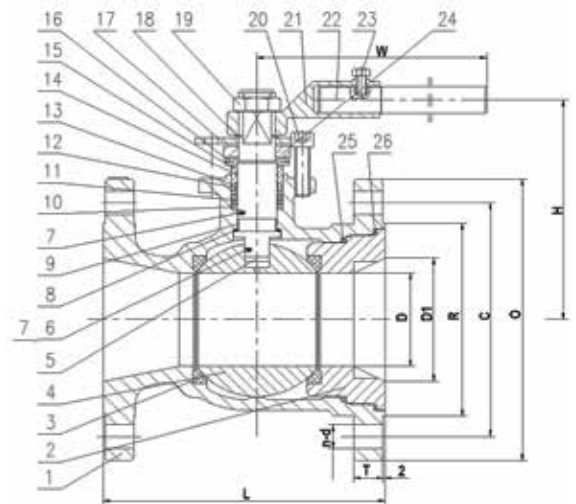
- Fire-safe to API-607, latest Ed.
- Designed to ASME/ANSI Class 150-B16.34
- Face to Face to ASME/ANSI B16.10 Short Pattern
- Markings per MSS-SP25
- NACE MR0175
- Design Standard per API 608
- Pressure Test per API 598

## FEATURES

- Reduced bore, 1 piece uni-body floating ball
- ISO mounting pad
- Blow-out proof stem
- Cavity relieving seats, anti-static device
- Lever operated



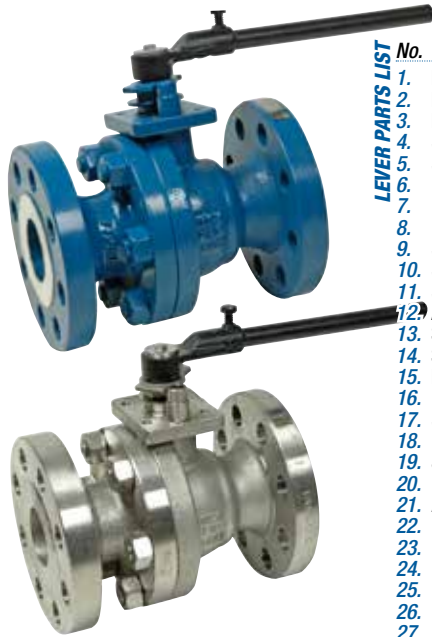
| No. Part                    | WCB BODY                  | LCC BODY                  |
|-----------------------------|---------------------------|---------------------------|
| 1. Body                     | A216 WCB                  | A352 LCC                  |
| 2. End                      | A216 WCB                  | A352 LCC                  |
| 3. Seat                     | R-PTFE                    | R-PTFE                    |
| 4. Ball                     | A182 F316                 | A182 F316                 |
| 5. Stem                     | A182 F316                 | A182 F316                 |
| 6. Stem Steel Ball          | A276 304                  | A276 304                  |
| 7. Spring                   | A276 304                  | A276 304                  |
| 8. Stem Gasket              | PTFE                      | PTFE                      |
| 9. Stem Bearing             | PTFE                      | PTFE                      |
| 10. Stem Firesafe Gasket I  | Flexible Graphite + 316   | Flexible Graphite + 316   |
| 11. Stem Firesafe Gasket II | Flexible Graphite         | Flexible Graphite         |
| 12. Packing Bushing Bearing | PTFE                      | PTFE                      |
| 13. O-Ring                  | Viton                     | Viton                     |
| 14. O-Ring                  | Viton                     | Viton                     |
| 15. Packing Bushing         | A276 316                  | A276 316                  |
| 16. Belleville Washer       | A276 304                  | A276 304                  |
| 17. Limit Block             | A36                       | A36                       |
| 18. Axial Retaining Ring    | AISI 1566                 | AISI 1566                 |
| 19. Nut                     | SS                        | SS                        |
| 20. Screw                   | A193 B7M                  | AZ320 L7M                 |
| 21. Joint                   | A216 WCB                  | A216 LCC                  |
| 22. Lever                   | AISI 1020                 | AISI 1020                 |
| 23. Hex Bolt                | CS                        | CS                        |
| 24. Nut                     | SS                        | SS                        |
| 25. Gasket                  | PTFE                      | PTFE                      |
| 26. Gasket                  | Flexible Graphite + 316SS | Flexible Graphite + 316SS |



| Size      | L     | D     | D1    | R       | C      | O      | n-d      | T      | W      | H      | WT     | Torque     |            | CV   |
|-----------|-------|-------|-------|---------|--------|--------|----------|--------|--------|--------|--------|------------|------------|------|
|           |       |       |       |         |        |        |          |        |        |        |        | 150 PSI    | 285 PSI    |      |
| 2" x 1½"  | 7"    | 1.46" | 1.97" | 3.625"  | 4.75"  | 5.9"   | 4-0.75"  | 0.562" | 9.53"  | 5.4"   | 22 lb  | 221 in lb  | 487 in lb  | 130  |
| 50 x 38   | 178   | 37    | 50    | 92.1    | 120.7  | 150    | 4-19     | 14.3   | 14.3   | 137    | 9.7 kg | 25 Nm      | 55 Nm      |      |
| 3" x 2"   | 8"    | 1.97" | 2.95" | 5"      | 6"     | 7.48"  | 4-0.75"  | 0.69"  | 9.35"  | 6.575" | 40 lb  | 372 in lb  | 620 in lb  | 350  |
| 76 x 50   | 203   | 50    | 75    | 127     | 152.4  | 190    | 4-19     | 17.5   | 242    | 167    | 18 kg  | 42 Nm      | 70 Nm      |      |
| 4" x 3"   | 9.02" | 2.95" | 3.98" | 6.19"   | 7.5"   | 9.05"  | 4-0.75"  | 0.88"  | 13.78" | 8.07"  | 77 lb  | 797 in lb  | 1328 in lb | 720  |
| 102 x 76  | 229   | 75    | 101   | 157.2   | 190.5  | 230    | 8-19     | 22.3   | 350    | 205    | 35 kg  | 90 Nm      | 150 Nm     |      |
| 6" x 4"   | 10.5" | 3.98" | 5.94" | 8.5"    | 9.5"   | 11.02" | 4-0.885" | 0.94"  | 18.11" | 8.66"  | 132 lb | 1328 in lb | 2168 in lb | 1020 |
| 152 x 102 | 267   | 101   | 151   | 215.9   | 241.3  | 280    | 8-22.5   | 23.9   | 460    | 220    | 60 kg  | 150 Nm     | 245 Nm     |      |
| 8" x 6"   | 11.5" | 5.94" | 7.95" | 10.625" | 11.75" | 13.58" | 4-0.885" | 1.06"  | 29.52" | 12.32" | 265 lb | 3009 in lb | 4956 in lb | 1800 |
| 203 x 152 | 292   | 151   | 202   | 269.9   | 298.5  | 345    | 8-22.5   | 27     | 750    | 313    | 120 kg | 340 Nm     | 560 Nm     |      |

Sizes and specifications shown are subject to change without notice.

# ZF3 – 300# Full Port Carbon Steel, Low Temp and SS



**LEVER PARTS LIST**

| No. Part                    | WCB BODY                  | LCC BODY                  | 316SS BODY                |
|-----------------------------|---------------------------|---------------------------|---------------------------|
| 1. Body                     | A216 WCB                  | A352 LCC                  | A351 CF8M                 |
| 2. End                      | A216 WCB                  | A352 LCC                  | A351 CF8M                 |
| 3. Ball                     | A182 F316                 | A182 F316                 | A182 F316                 |
| 4. Stem                     | A182 F316                 | A182 F316                 | A182 F316                 |
| 5. Seat                     | R-PTFE                    | R-PTFE                    | R-PTFE                    |
| 6. Body Gasket              | 304 Graphite Spiral Wound | 304 Graphite Spiral Wound | 304 Graphite Spiral Wound |
| 7. Nut                      | A194-2HM                  | A194-2HM                  | A194-8M                   |
| 8. Full-threaded Bolt       | A193-B7M                  | A320 L7M                  | A320 B8M                  |
| 9. Stem Gasket              | PTFE                      | PTFE                      | PTFE                      |
| 10. Stem Bearing            | PTFE                      | PTFE                      | PTFE                      |
| 11. Steel Ball              | A276 304                  | A276 304                  | A276 304                  |
| 12. Anti-static Spring      | A276 304                  | A276 304                  | A276 304                  |
| 13. Stem Firesafe Gasket I  | Flexible Graphite + 316   | Flexible Graphite + 316   | Flexible Graphite + 316   |
| 14. Stem Firesafe Gasket II | Flexible Graphite         | Flexible Graphite         | Flexible Graphite         |
| 15. Packing Gland Bearing   | PTFE                      | PTFE                      | PTFE                      |
| 16. Lever                   | AISI 1020                 | AISI 1020                 | AISI 1020 + Zn            |
| 17. Screw                   | A193-B7M                  | A320 L7M                  | A193B8M                   |
| 18. Hex Bolt                | A193-B7M                  | SS                        | SS                        |
| 19. Joint                   | A216 WCB                  | A352 LCC                  | A216 WCB + Zn             |
| 20. Nut                     | AISI 1020                 | AISI 1020                 | SS                        |
| 21. Axial Retaining Ring    | AISI 1566                 | AISI 1566                 | AISI 1566                 |
| 22. Limit Block             | A36                       | A36                       | A36                       |
| 23. Nut                     | AISI 1020                 | AISI 1020                 | SS                        |
| 24. Belleville Washer       | A276 304                  | A276 304                  | A276 304                  |
| 25. O-Ring                  | Viton                     | Viton                     | Viton                     |
| 26. O-Ring                  | Viton                     | Viton                     | Viton                     |
| 27. Packing Bushing         | A276 316                  | A276 316                  | A276 316                  |

## SPECIFICATIONS

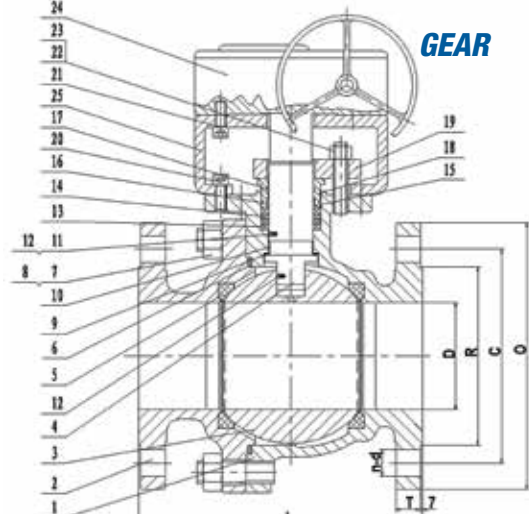
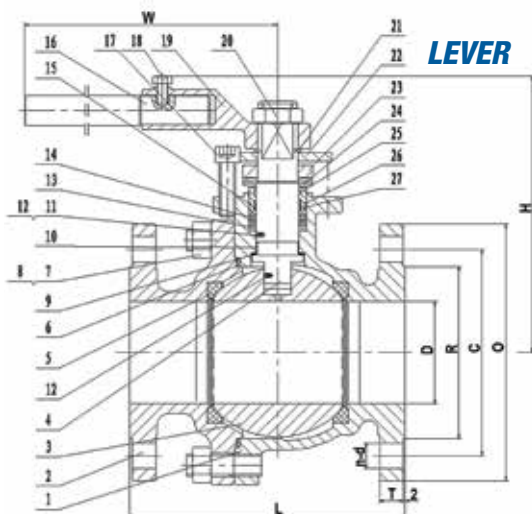
- Fire-safe to API-607, latest Ed.
- Designed to ASME/ANSI Class 300-B16.34
- Face to Face to ASME/ANSI B16.10 Long Pattern
- Flanges to ASME/ANSI B16.5
- NACE MR0175
- Design Standard per API 608
- Markings per MSS-SP25
- Pressure Test per API 598

## FEATURES

- Full bore, 2 piece body floating ball
- ISO mounting pad
- Blow-out proof stem
- Cavity relieving seats, anti-static device
- Lever operated 2"-6", gear operated 8"

**GEAR PARTS LIST**

| No. Part                    | WCB BODY                  | LCC BODY                  | 316SS BODY                |
|-----------------------------|---------------------------|---------------------------|---------------------------|
| 1. Body                     | A216 WCB                  | A352 LCC                  | A351 CF8M                 |
| 2. End                      | A216 WCB                  | A352 LCC                  | A351 CF8M                 |
| 3. Ball                     | A182 F316                 | A182 F316                 | A182 F316                 |
| 4. Stem                     | A182 F316                 | A182 F316                 | A182 F316                 |
| 5. Seat                     | R-PTFE                    | R-PTFE                    | R-PTFE                    |
| 6. Body Gasket              | 304 Graphite Spiral Wound | 304 Graphite Spiral Wound | 304 Graphite Spiral Wound |
| 7. Nut                      | A194-2HM                  | A194-2HM                  | A194-8M                   |
| 8. Full-threaded Bolt       | A193-B7M                  | A320 L7M                  | A320 B8M                  |
| 9. Stem Gasket              | PTFE                      | PTFE                      | PTFE                      |
| 10. Stem Bearing            | PTFE                      | PTFE                      | PTFE                      |
| 11. Steel Ball              | A276 304                  | A276 304                  | A276 304                  |
| 12. Anti-static Spring      | A276 304                  | A276 304                  | A276 304                  |
| 13. Stem Firesafe Gasket I  | Flexible Graphite + 316   | Flexible Graphite + 316   | Flexible Graphite + 316   |
| 14. Stem Firesafe Gasket II | Flexible Graphite         | Flexible Graphite         | Flexible Graphite         |
| 15. Packing Gland Bearing   | PTFE                      | PTFE                      | PTFE                      |
| 16. O-Ring                  | Viton                     | Viton                     | Viton                     |
| 17. O-Ring                  | Viton                     | Viton                     | Viton                     |
| 18. Packing Bushing         | A276 316                  | A276 316                  | A276 316                  |
| 19. Packing Plate           | A216 WCB                  | A352 LCC                  | A216 WCB + Zn             |
| 20. Inner Hex Screw         | A193-B7M                  | A320 L7M                  | A320 L8M                  |
| 21. Inner Hex Screw         | A193-B7M                  | A320 L7M                  | A320 L8M                  |
| 22. Nut                     | A194-2HM                  | A194-7M                   | A194-8M                   |
| 23. Bolt                    | A193-B7M                  | A320 L7M                  | A320 B8M                  |
| 24. Actuator                | Component                 | Component                 | Component                 |
| 25. Yokes                   | A36                       | A36                       | A36                       |



Cont'd from Page 14

| Size      | L             | D            | R                | C                | O             | n-d                  | T              | W             | H             | WT               | Torque                 |                        | CV     |
|-----------|---------------|--------------|------------------|------------------|---------------|----------------------|----------------|---------------|---------------|------------------|------------------------|------------------------|--------|
|           |               |              |                  |                  |               |                      |                |               |               |                  | 150 PSI                | 285 PSI                |        |
| 2"<br>50  | 8.5"<br>216   | 1.97"<br>50  | 3.625"<br>92.1   | 5"<br>127        | 6.5"<br>165   | 8-0.75"<br>8-19      | 0.814"<br>20.7 | 9.53"<br>242  | 6.34"<br>161  | 35 lb<br>16 kg   | 664 in lb<br>75 Nm     | 974 in lb<br>100 Nm    | 450    |
| 3"<br>76  | 11.1"<br>283  | 2.95"<br>75  | 5"<br>127        | 6.62"<br>168.3   | 8.26"<br>210  | 8-0.885"<br>8-22.5   | 1.06"<br>27    | 13.78"<br>350 | 8.07"<br>205  | 79 lb<br>36 kg   | 1416 in lb<br>160 Nm   | 2478 in lb<br>280 Nm   | 1100   |
| 4"<br>102 | 12"<br>305    | 3.98"<br>101 | 6.19"<br>157.2   | 7.87"<br>200     | 10.04"<br>255 | 8-0.885"<br>8-22.5   | 1.19"<br>30.2  | 18.11"<br>460 | 8.86"<br>225  | 132 lb<br>60 kg  | 2301 in lb<br>260 Nm   | 3540 in lb<br>400 Nm   | 2200   |
| 6"<br>152 | 15.87"<br>403 | 5.94"<br>151 | 8.5"<br>215.9    | 10.625"<br>269.9 | 12.6"<br>320  | 12-0.885"<br>12-22.5 | 1.38"<br>35    | 29.53"<br>750 | 12.48"<br>317 | 260 lb<br>118 kg | 4426 in lb<br>500 Nm   | 8496 in lb<br>960 Nm   | 5200   |
| 8"<br>203 | 19.76"<br>502 | 7.95"<br>202 | 10.625"<br>269.9 | 13"<br>330.2     | 14.96"<br>380 | 12-1"<br>12-25.5     | 1.56"<br>39.7  | //<br>//      | //<br>//      | 520 lb<br>236 kg | 12611 in lb<br>1425 Nm | 13718 in lb<br>1550 Nm | 10,000 |

# ZR3 – 300# Reg. Port Carbon Steel and Low Temp

## SPECIFICATIONS

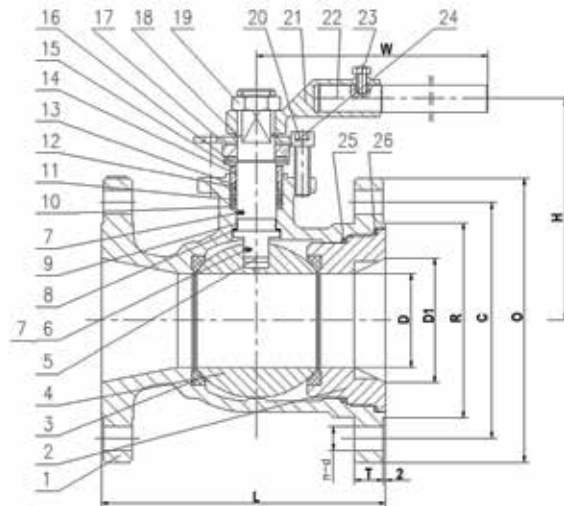
- Fire-safe to API-607, latest Ed.
- Designed to ASME/ANSI Class 300-B16.34
- Face to Face to ASME/ANSI B16.10 Short Pattern
- NACE MR0175
- Design Standard per API 608
- Markings per MSS-SP25
- Pressure Test per API 598

## FEATURES

- Reduce bore, 1 piece uni-body floating ball
- ISO mounting pad
- Blow-out proof stem
- Cavity relieving seats, anti-static device
- Lever operated



| No. Part                    | WCB BODY                  | LCC BODY                  |
|-----------------------------|---------------------------|---------------------------|
| 1. Body                     | A216 WCB                  | A352 LCC                  |
| 2. End                      | A216 WCB                  | A352 LCC                  |
| 3. Seat                     | R-PTFE                    | R-PTFE                    |
| 4. Ball                     | A182 F316                 | A182 F316                 |
| 5. Stem                     | A182 F316                 | A182 F316                 |
| 6. Stem Steel Ball          | A276 304                  | A276 304                  |
| 7. Spring                   | A276 304                  | A276 304                  |
| 8. Stem Gasket              | PTFE                      | PTFE                      |
| 9. Stem Bearing             | PTFE                      | PTFE                      |
| 10. Stem Firesafe Gasket I  | Flexible Graphite + 316   | Flexible Graphite + 316   |
| 11. Stem Firesafe Gasket II | Flexible Graphite         | Flexible Graphite         |
| 12. Packing Bushing Bearing | PTFE                      | PTFE                      |
| 13. O-Ring                  | Viton                     | Viton                     |
| 14. O-Ring                  | Viton                     | Viton                     |
| 15. Packing Bushing         | A276 316                  | A276 316                  |
| 16. Belleville Washer       | A276 304                  | A276 304                  |
| 17. Limit Block             | A36                       | A36                       |
| 18. Axial Retaining Ring    | AISI 1566                 | AISI 1566                 |
| 19. Nut                     | SS                        | SS                        |
| 20. Screw                   | A193 B7M                  | AZ320 L7M                 |
| 21. Joint                   | A216 WCB                  | A216 LCC                  |
| 22. Lever                   | AISI 1020                 | AISI 1020                 |
| 23. Hex Bolt                | CS                        | CS                        |
| 24. Nut                     | SS                        | SS                        |
| 25. Gasket                  | PTFE                      | PTFE                      |
| 26. Gasket                  | Flexible Graphite + 316SS | Flexible Graphite + 316SS |



| Size                   | L             | D            | D1           | R              | C                | O             | n-d                  | T              | W             | H             | WT               | Torque               |                      | CV   |
|------------------------|---------------|--------------|--------------|----------------|------------------|---------------|----------------------|----------------|---------------|---------------|------------------|----------------------|----------------------|------|
|                        |               |              |              |                |                  |               |                      |                |               |               |                  | 300 PSI              | 740 PSI              |      |
| 2" x 1 1/2"<br>50 x 38 | 8.5"<br>216   | 1.46"<br>37  | 1.97"<br>50  | 3.625"<br>92.1 | 5"<br>127        | 6.5"<br>165   | 8-0.75"<br>8-19      | 0.814"<br>20.7 | 9.53"<br>242  | 5.4"<br>137   | 33 lb<br>15 kg   | 575 in lb<br>65 Nm   | 841 in lb<br>95 Nm   | 130  |
| 3" x 2"<br>76 x 50     | 11.1"<br>283  | 1.97"<br>50  | 2.95"<br>75  | 5"<br>127      | 6.62"<br>168.3   | 8.26"<br>210  | 8-0.885"<br>8-22.5   | 1.06"<br>27    | 9.53"<br>242  | 6.575"<br>167 | 69 lb<br>31.2 kg | 664 in lb<br>75 Nm   | 974 in lb<br>110 Nm  | 350  |
| 4" x 3"<br>102 x 76    | 12"<br>305    | 2.95"<br>75  | 3.98"<br>101 | 6.19"<br>157.2 | 7.87"<br>200     | 10.04"<br>255 | 8-0.885"<br>8-22.5   | 1.19"<br>30.2  | 13.78"<br>350 | 8.07"<br>205  | 126 lb<br>57 kg  | 1415 in lb<br>160 Nm | 2478 in lb<br>280 Nm | 720  |
| 6" x 4"<br>152 x 102   | 15.87"<br>403 | 3.98"<br>101 | 5.94"<br>151 | 8.5"<br>215.9  | 10.625"<br>269.9 | 12.6"<br>320  | 12-0.885"<br>12-22.5 | 1.38"<br>35    | 18.11"<br>460 | 8.66"<br>220  | 183 lb<br>83 kg  | 2301 in lb<br>260 Nm | 3540 in lb<br>400 Nm | 1020 |

Sizes and specifications shown are subject to change without notice.

# ZF6 – 600# Full Port Carbon Steel and Low Temp

## SPECIFICATIONS

- Fire-safe to API-607, latest Ed.
- Designed to ASME/ANSI Class 600-B16.34
- Face to Face to ASME/ANSI B16.10 Long Pattern
- Flanges to ASME/ANSI B16.5
- NACE MR0175
- Design Standard per API 608
- Markings per MSS-SP25
- Pressure Test per API 598

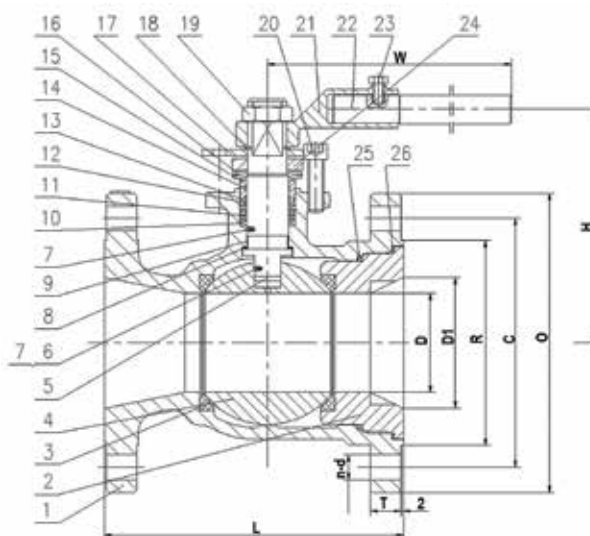
## FEATURES

- Full bore, 2 piece split body floating ball
- ISO mounting pad
- Blow-out proof stem
- Anti-static device
- Lever operated



LEVER PARTS LIST

| No. | Part                    | WCB BODY                  | LCC BODY                  |
|-----|-------------------------|---------------------------|---------------------------|
| 1.  | Body                    | A216 WCB                  | A352 LCC                  |
| 2.  | End                     | A216 WCB                  | A352 LCC                  |
| 3.  | Ball                    | A182 F316                 | A182 F316                 |
| 4.  | Stem                    | A182 F316                 | A182 F316                 |
| 5.  | Seat                    | Nylon                     | Nylon                     |
| 6.  | Body Gasket             | 304 Graphite Spiral Wound | 304 Graphite Spiral Wound |
| 7.  | Nut                     | A194-2HM                  | A194-2HM                  |
| 8.  | Full-threaded Bolt      | A193-B7M                  | A320 L7M                  |
| 9.  | Stem Gasket             | PTFE                      | PTFE                      |
| 10. | Stem Bearing            | PTFE                      | PTFE                      |
| 11. | Steel Ball              | A276 304                  | A276 304                  |
| 12. | Anti-static Spring      | A276 304                  | A276 304                  |
| 13. | Stem Firesafe Gasket I  | Flexible Graphite + 316   | Flexible Graphite + 316   |
| 14. | Stem Firesafe Gasket II | Flexible Graphite         | Flexible Graphite         |
| 15. | Packing Gland Bearing   | PTFE                      | PTFE                      |
| 16. | Lever                   | AISI 1020                 | AISI 1020                 |
| 17. | Screw                   | A193-B7M                  | A320 L7M                  |
| 18. | Hex Bolt                | A193-B7M                  | SS                        |
| 19. | Joint                   | A216 WCB                  | A352 LCC                  |
| 20. | Nut                     | AISI 1020                 | AISI 1020                 |
| 21. | Axial Retaining Ring    | AISI 1566                 | AISI 1566                 |
| 22. | Limit Block             | A36                       | A36                       |
| 23. | Nut                     | AISI 1020                 | AISI 1020                 |
| 24. | Belleville Washer       | A276 304                  | A276 304                  |
| 25. | O-Ring                  | Viton                     | Viton                     |
| 26. | O-Ring                  | Viton                     | Viton                     |
| 27. | Packing Bushing         | A276 316                  | A276 316                  |



| Size      | L            | D            | R              | C              | O             | n-d                | T             | W             | H             | WT              | Torque               |                      | CV   |
|-----------|--------------|--------------|----------------|----------------|---------------|--------------------|---------------|---------------|---------------|-----------------|----------------------|----------------------|------|
|           |              |              |                |                |               |                    |               |               |               |                 | 600 PSI              | 1440 PSI             |      |
| 2"<br>50  | 11.5"<br>292 | 1.97"<br>50  | 3.625"<br>92.1 | 5"<br>127      | 6.5"<br>165   | 8-0.75"<br>8-19    | 1"<br>25.4    | 17"<br>432    | 6.14"<br>156  | 42 lb<br>19 kg  | 841 in lb<br>95 Nm   | 1682 in lb<br>190 Nm | 450  |
| 3"<br>76  | 14"<br>356   | 2.95"<br>75  | 5"<br>127      | 6.62"<br>168.3 | 8.26"<br>210  | 8-0.885"<br>8-22.5 | 1.25"<br>31.8 | 21.65"<br>550 | 8.22"<br>309  | 99 lb<br>45 kg  | 2080 in lb<br>235 Nm | 4071 in lb<br>460 Nm | 1100 |
| 4"<br>102 | 17"<br>432   | 3.98"<br>101 | 6.19"<br>157.2 | 8.5"<br>215.9  | 10.82"<br>275 | 8-1"<br>8-22.5     | 1.5"<br>38.1  | 33.46"<br>850 | 11.02"<br>280 | 167 lb<br>76 kg | 2567 in lb<br>290 Nm | 5089 in lb<br>575 Nm | 2200 |



# ZR6 – 600# Reg. Port Carbon Steel and Low Temp

## SPECIFICATIONS

- Fire-safe to API-607, latest Ed.
- Designed to ASME/ANSI Class 600-B16.34
- Face to Face to ASME/ANSI B16.10 Long Pattern
- NACE MR0175
- Design Standard per API 608
- Markings per MSS-SP25
- Pressure Test per API 598

## FEATURES

- Reduce bore, 2 piece split body floating ball
- ISO mounting pad
- Blow-out proof stem
- Anti-static device
- Lever operated 2"-4", gear operated 6"

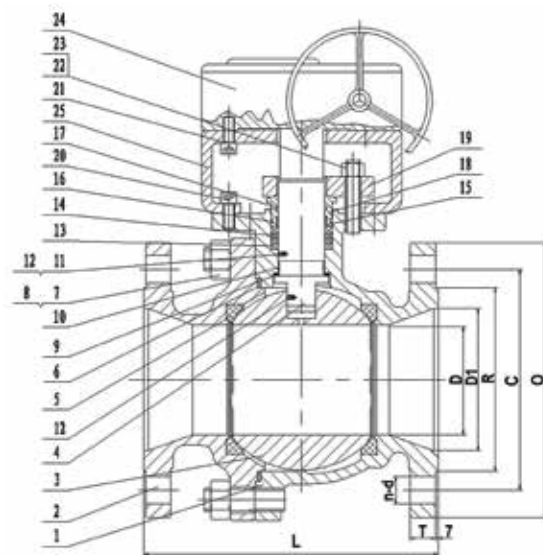
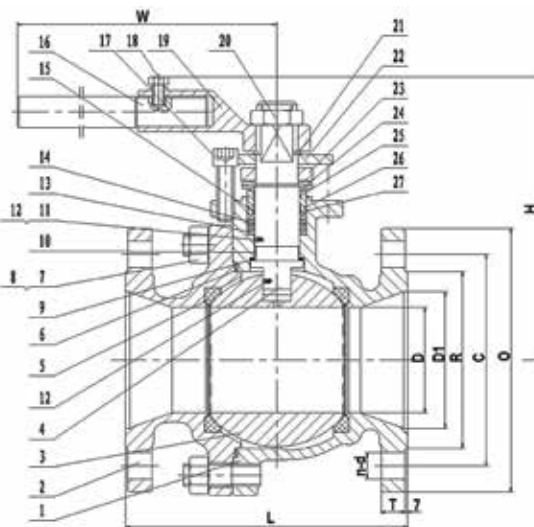


LEVER PARTS LIST

| No. | Part                    | WCB BODY                  | LCC BODY                  |
|-----|-------------------------|---------------------------|---------------------------|
| 1.  | Body                    | A216 WCB                  | A352 LCC                  |
| 2.  | End                     | A216 WCB                  | A352 LCC                  |
| 3.  | Ball                    | A182 F316                 | A182 F316                 |
| 4.  | Stem                    | A182 F316                 | A182 F316                 |
| 5.  | Seat                    | Nylon                     | Nylon                     |
| 6.  | Body Gasket             | 304 Graphite Spiral Wound | 304 Graphite Spiral Wound |
| 7.  | Nut                     | A194-2HM                  | A194-2HM                  |
| 8.  | Full-threaded Bolt      | A193-B7M                  | A320 L7M                  |
| 9.  | Stem Gasket             | PTFE                      | PTFE                      |
| 10. | Stem Bearing            | PTFE                      | PTFE                      |
| 11. | Steel Ball              | A276 304                  | A276 304                  |
| 12. | Anti-static Spring      | A276 304                  | A276 304                  |
| 13. | Stem Firesafe Gasket I  | Flexible Graphite + 316   | Flexible Graphite + 316   |
| 14. | Stem Firesafe Gasket II | Flexible Graphite         | Flexible Graphite         |
| 15. | Packing Gland Bearing   | PTFE                      | PTFE                      |
| 16. | Lever                   | AISI 1020                 | AISI 1020                 |
| 17. | Screw                   | A193-B7M                  | A320 L7M                  |
| 18. | Hex Bolt                | A193-B7M                  | SS                        |
| 19. | Joint                   | A216 WCB                  | A352 LCC                  |
| 20. | Nut                     | AISI 1020                 | AISI 1020                 |
| 21. | Axial Retaining Ring    | AISI 1566                 | AISI 1566                 |
| 22. | Limit Block             | A36                       | A36                       |
| 23. | Nut                     | AISI 1020                 | AISI 1020                 |
| 24. | Belleville Washer       | A276 304                  | A276 304                  |
| 25. | O-Ring                  | Viton                     | Viton                     |
| 26. | O-Ring                  | Viton                     | Viton                     |
| 27. | Packing Bushing         | A276 316                  | A276 316                  |

GEAR PARTS LIST

| No. | Part                    | WCB BODY                  | LCC BODY                  |
|-----|-------------------------|---------------------------|---------------------------|
| 1.  | Body                    | A216 WCB                  | A352 LCC                  |
| 2.  | End                     | A216 WCB                  | A352 LCC                  |
| 3.  | Ball                    | A182 F316                 | A182 F316                 |
| 4.  | Stem                    | A182 F316                 | A182 F316                 |
| 5.  | Seat                    | Nylon                     | Nylon                     |
| 6.  | Body Gasket             | 304 Graphite Spiral Wound | 304 Graphite Spiral Wound |
| 7.  | Nut                     | A194-2HM                  | A194-2HM                  |
| 8.  | Full-threaded Bolt      | A193-B7M                  | A320 L7M                  |
| 9.  | Stem Gasket             | PTFE                      | PTFE                      |
| 10. | Stem Bearing            | PTFE                      | PTFE                      |
| 11. | Steel Ball              | A276 304                  | A276 304                  |
| 12. | Anti-static Spring      | A276 304                  | A276 304                  |
| 13. | Stem Firesafe Gasket I  | Flexible Graphite + 316   | Flexible Graphite + 316   |
| 14. | Stem Firesafe Gasket II | Flexible Graphite         | Flexible Graphite         |
| 15. | Packing Gland Bearing   | PTFE                      | PTFE                      |
| 16. | O-Ring                  | Viton                     | Viton                     |
| 17. | O-Ring                  | Viton                     | Viton                     |
| 18. | Packing Bushing         | A276 316                  | A276 316                  |
| 19. | Packing Plate           | A216 WCB                  | A352 LCC                  |
| 20. | Inner Hex Screw         | A193-B7M                  | A320-L7M                  |
| 21. | Inner Hex Screw         | A193-B7M                  | A320-L7M                  |
| 22. | Nut                     | A194-B7M                  | A194-B7                   |
| 23. | Bolt                    | A193-B7M                  | A320-L7M                  |
| 24. | Actuator                | Component                 | Component                 |
| 25. | Yokes                   | A36                       | A36                       |



| Size        | L     | D     | D1    | R      | C     | O      | n-d      | T     | W      | H     | WT      | Torque     |            | CV   |
|-------------|-------|-------|-------|--------|-------|--------|----------|-------|--------|-------|---------|------------|------------|------|
|             |       |       |       |        |       |        |          |       |        |       |         | 300 PSI    | 740 PSI    |      |
| 2" x 1 1/2" | 11.5" | 1.46" | 1.97" | 3.625" | 5"    | 6.5"   | 8-0.75"  | 1"    | 9.53"  | 5.4"  | 40 lb   | 664 in lb  | 1328 in lb | 130  |
| 50 x 38     | 292   | 37    | 50    | 92.1   | 127   | 165    | 8-19     | 25.4  | 242    | 137   | 18.2 kg | 75 Nm      | 150 Nm     |      |
| 3" x 2"     | 14"   | 1.97" | 2.95" | 5"     | 6.62" | 8.26"  | 8-0.885" | 1.25" | 13.78" | 7.56" | 77 lb   | 841 in lb  | 1682 in lb | 350  |
| 76 x 50     | 356   | 50    | 75    | 127    | 168.3 | 210    | 8-22.5   | 31.8  | 350    | 192   | 35 kg   | 95 Nm      | 190 Nm     |      |
| 4" x 3"     | 17"   | 2.95" | 3.98" | 6.19"  | 8.5"  | 10.82" | 8-1"     | 1.5"  | 21.65" | 8.2"  | 165 lb  | 2080 in lb | 4071 in lb | 720  |
| 102 x 76    | 432   | 75    | 101   | 157.2  | 215.9 | 275    | 8-25.5   | 38.1  | 550    | 205   | 75 kg   | 235 Nm     | 460 Nm     |      |
| 6" x 4"     | 22"   | 3.98" | 5.94" | 8.5"   | 11.5" | 13.98" | 12-1.12" | 1.88" | /      | /     | 342 lb  | 2567 in lb | 5089 in lb | 1020 |
| 152 x 102   | 559   | 101   | 151   | 215.9  | 292.1 | 355    | 12-28.5  | 47.7  | /      | /     | 155 kg  | 290 Nm     | 575 Nm     |      |

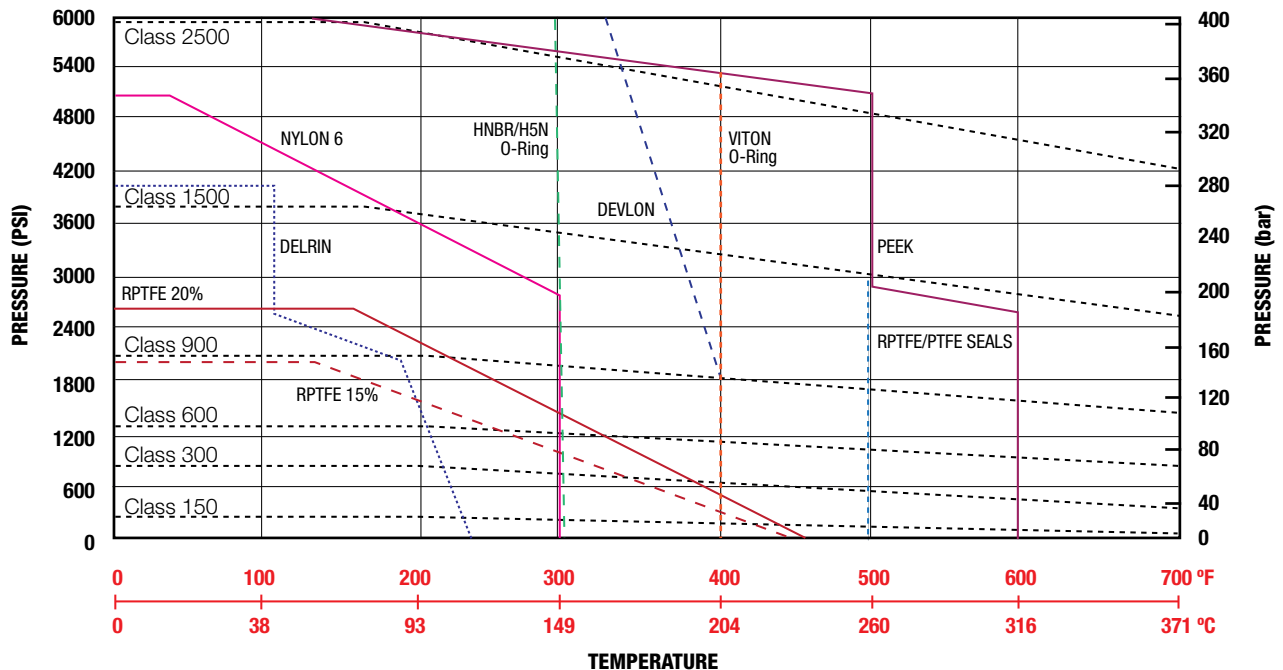
Sizes and specifications shown are subject to change without notice.

# T SERIES FLANGED TRUNNION BALL VALVES

## PART NUMBERING SYSTEM

|   |  |  |  |          |           |          |           |          |           |          |           |           |           |           |           |           |           |           |           |           |           |  |  |  |
|---|--|--|--|----------|-----------|----------|-----------|----------|-----------|----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|--|--|--|
| <div style="background-color: #0056b3; color: white; border-radius: 50%; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center; margin-bottom: 10px;">1</div> <p><b>1 = Port and Class</b></p> <p>TR1 = Reduced port class 150<br/>         TR3 = Reduced port class 300<br/>         TR6 = Reduced port class 600<br/>         TR9 = Reduced port class 900<br/>         TR15 = Reduced port class 1500<br/>         TR25 = Reduced port class 2500<br/>         TF1 = Full port class 150<br/>         TF3 = Full port class 300<br/>         TF6 = Full port class 600<br/>         TF9 = Full port class 900<br/>         TF15 = Full port class 1500<br/>         TF25 = Full port class 2500</p> | <div style="background-color: #0056b3; color: white; border-radius: 50%; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center; margin-bottom: 10px;">2</div> <p><b>2 = Size</b></p> <table border="0"> <tr><td>002 = 2"</td><td>020 = 20"</td></tr> <tr><td>003 = 3"</td><td>024 = 24"</td></tr> <tr><td>004 = 4"</td><td>026 = 26"</td></tr> <tr><td>006 = 6"</td><td>028 = 28"</td></tr> <tr><td>008 = 8"</td><td>030 = 30"</td></tr> <tr><td>010 = 10"</td><td>032 = 32"</td></tr> <tr><td>012 = 12"</td><td>034 = 34"</td></tr> <tr><td>014 = 14"</td><td>036 = 36"</td></tr> <tr><td>016 = 16"</td><td>040 = 40"</td></tr> <tr><td>018 = 18"</td><td>042 = 42"</td></tr> </table> | 002 = 2"   | 020 = 20"  | 003 = 3" | 024 = 24" | 004 = 4" | 026 = 26" | 006 = 6" | 028 = 28" | 008 = 8" | 030 = 30" | 010 = 10" | 032 = 32" | 012 = 12" | 034 = 34" | 014 = 14" | 036 = 36" | 016 = 16" | 040 = 40" | 018 = 18" | 042 = 42" | <div style="background-color: #0056b3; color: white; border-radius: 50%; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center; margin-bottom: 10px;">3</div> <p><b>3 = Type</b></p> <p>T = 3 Piece Split Body<br/>         S = 2 Piece Split Body<br/>         W = Welded Body</p> | <div style="background-color: #0056b3; color: white; border-radius: 50%; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center; margin-bottom: 10px;">4</div> <p><b>4 = Body Material</b></p> <p>1 = ASTM A216 WCB (-29C)<br/>         2 = ASTM A325 LCC (-46C)<br/>         3 = ASTM A351CF8M (-196C)<br/>         4 = ASTM A105N (-29C)<br/>         5 = ASTM A350 LF2 (-46C)<br/>         6 = ASTM 182 F316 (-196C)<br/>         7 = DUPLEX 22CR</p> | <div style="background-color: #0056b3; color: white; border-radius: 50%; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center; margin-bottom: 10px;">5</div> <p><b>5 = End Connections</b></p> <p>F = Flanged Raised Face<br/>         J = Flanged RTJ<br/>         B = Butt Weld End<br/>         G = Weld X RF<br/>         H = Weld X RTJ<br/>         P = Weld W/PUPS<br/>         X = GRAYLOC</p> |
| 002 = 2"  | 020 = 20"  |  |  |          |           |          |           |          |           |          |           |           |           |           |           |           |           |           |           |           |           |  |  |  |
| 003 = 3"  | 024 = 24"  |  |  |          |           |          |           |          |           |          |           |           |           |           |           |           |           |           |           |           |           |  |  |  |
| 004 = 4"  | 026 = 26"  |  |  |          |           |          |           |          |           |          |           |           |           |           |           |           |           |           |           |           |           |  |  |  |
| 006 = 6"  | 028 = 28"  |  |  |          |           |          |           |          |           |          |           |           |           |           |           |           |           |           |           |           |           |  |  |  |
| 008 = 8"  | 030 = 30"  |  |  |          |           |          |           |          |           |          |           |           |           |           |           |           |           |           |           |           |           |  |  |  |
| 010 = 10"   | 032 = 32"  |  |  |          |           |          |           |          |           |          |           |           |           |           |           |           |           |           |           |           |           |  |  |  |
| 012 = 12"   | 034 = 34"  |  |  |          |           |          |           |          |           |          |           |           |           |           |           |           |           |           |           |           |           |  |  |  |
| 014 = 14"   | 036 = 36"  |  |  |          |           |          |           |          |           |          |           |           |           |           |           |           |           |           |           |           |           |  |  |  |
| 016 = 16"   | 040 = 40"  |  |  |          |           |          |           |          |           |          |           |           |           |           |           |           |           |           |           |           |           |  |  |  |
| 018 = 18"   | 042 = 42"  |  |  |          |           |          |           |          |           |          |           |           |           |           |           |           |           |           |           |           |           |  |  |  |
| <div style="background-color: #0056b3; color: white; border-radius: 50%; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center; margin-bottom: 10px;">6</div> <p><b>6 = Trim Material</b></p> <p>1 = Body + 3ENC<br/>         2 = 304SS<br/>         3 = 316SS<br/>         4 = 410SS<br/>         5 = DUPLEX 22CR</p>   | <div style="background-color: #0056b3; color: white; border-radius: 50%; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center; margin-bottom: 10px;">7</div> <p><b>7 = Seat Material</b></p> <p>P = PTFE<br/>         R = RTFE<br/>         N = Nylon<br/>         K = PEEK<br/>         D = Devlon<br/>         M = Metal x Metal</p>   | <div style="background-color: #0056b3; color: white; border-radius: 50%; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center; margin-bottom: 10px;">8</div> <p><b>8 = Operator</b></p> <p>L = Handle/Lever<br/>         G = Gear Operator<br/>         B = Bare Stem<br/>         C = Chain Wheel</p> | <div style="background-color: #0056b3; color: white; border-radius: 50%; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center; margin-bottom: 10px;">9</div> <p><b>9 = Special Requirements</b></p> <p>00 = Standard Requirement</p> |          |           |          |           |          |           |          |           |           |           |           |           |           |           |           |           |           |           |  |  |  |

## T Series Pressure and Temperature Charts



Consult ASME 16.34 for Specific Material Pressure/Temperature Ratings.  
 For reference purposes only.

# T Series Trunnion Ball Valves

## COMPLIANCE / SPECIFICATIONS

- ISO 14313:2007 / API 6D
- ISO 9001-2008 Registered Quality System
- API 608 / API 598 Fire-safe to API 607
- ASME B16.34, B16.5, B16.10
- CSA Z245.15 Steel Valves
- NACE MR0175 / ISO 15156 Compliance

### Designs Available

Two piece cast or three piece forged designs available.

### Double Block and Bleed

Independent spring loaded upstream and downstream seats and body bleed ensure suitability for use in double and bleed services.

### Anti-Static Design

Anti-static design to ensure electrical continuity between stem, ball and body.

### Emergency Seat and Stem Seal Injection Fittings

In the event of leakage, sealant injection fittings are provided for the stem and seat areas to temporarily allow sealing the valve before a more permanent repair can be made.

### Automatic Body Cavity Relief

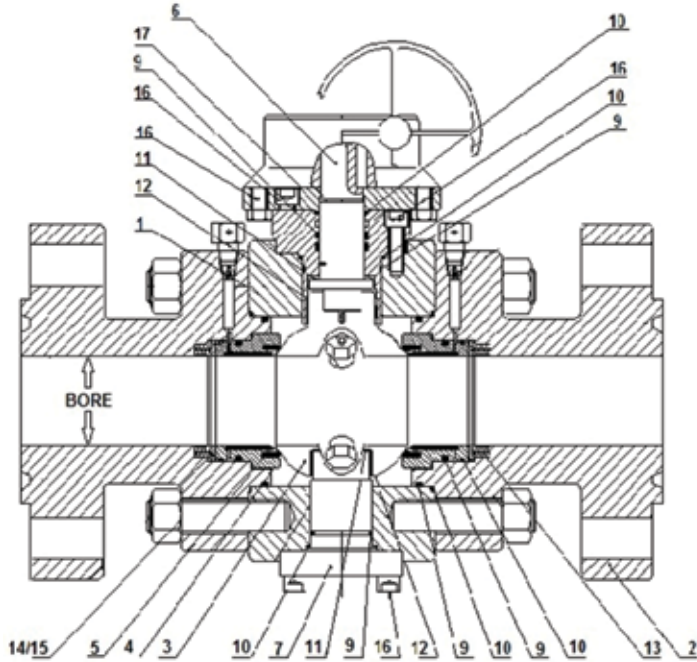
Trunnion mounted ball valves are protected from thermal expansion and over pressurizations due to spring loaded seats which automatically relieve pressure to the down stream side of the body cavity. In addition, all valves come with a manual safe relieving bleed valve.

### Seat Design

Independent free floating spring loaded seats provide a tight seal even in a low differential pressure situation.

#### Additional Notes

- Other materials available upon request.
- Materials shown are general materials of construction for 2 piece or 3 piece Trunnion Ball Valves.
- We reserve the right to substitute materials listed above with alternate approved material for specific service conditions.



| No. | Part Name      | Standard NACE  | Low Temperature NACE*  | Stainless Steel NACE                             | Duplex   |
|-----|----------------|--|--|--|--|
| 1.  | Body           | A105N<br>A216 WCB  | A350 LF2*<br>A352 LCC  | A182 F316<br>A351 CF8M                           | DUPLEX<br>22CR                                   |
| 2.  | Cap/Adapter    | A105N<br>A216 WCB  | A350 LF2*<br>A352 LCC  | A182 F316<br>A351 CF8M                           | DUPLEX<br>22CR                                   |
| 3.  | Ball           | A105N / ENP<br>A182 CF8M / 316SS                         | A350 LF2 / ENP*<br>A182 CF8M / 316SS                         | A182 F316<br>A351 CF8M                           | DUPLEX<br>22CR                                   |
| 4.  | Seat Holder    | A105N / ENP<br>A182 F316SS                               | A350 LF2/ ENP*<br>A182 F316SS                                | A182 F316SS                                      | A182 F51   |
| 5.  | Seat Insert    | RTFE<br>Nylon<br>Devlon<br>PEEK                          | RTFE<br>Nylon<br>Devlon<br>PEEK                              | RTFE<br>Nylon<br>Devlon<br>PEEK                  | RTFE<br>Nylon<br>Devlon<br>PEEK                  |
| 6.  | Stem           | A105N / ENP<br>4130 / 4140 / ENP<br>A182 F316SS / 17-4PH | A350 LF2 / ENP*<br>4130 / 4140 / ENP<br>A182 F316SS / 17-4PH | A182 F316SS<br>A479 Type 316SS<br>17-4PH         | A182 F316SS<br>A479 Type 316SS<br>17-4PH         |
| 7.  | Trunnion       | A105N / ENP<br>4130 / 4140 ENP<br>A182 F316SS            | A350 LF2 / ENP*<br>4130 / 4140 / ENP<br>A182 F316SS          | A182 F316SS<br>A479 Type 316SS<br>-              | A182 F316SS<br>A479 Type 316SS<br>-              |
| 8.  | Bonnet         | A105N<br>A216 WCB  | A350 LF2*<br>A352 LCC  | A182 CF8M<br>A182 F316                           | A182 CF8M<br>A182 F316                           |
| 9.  | O-Ring         | Viton-B<br>Viton-AED<br>Viton-GLT<br>HSN<br>EPDM         | Viton-B<br>Viton-AED<br>Viton-GLT<br>HSN (HNBR)*<br>EPDM     | Viton-B<br>Viton-AED<br>Viton-GLT<br>HSN<br>EPDM | Viton-B<br>Viton-AED<br>Viton-GLT<br>HSN<br>EPDM |
| 10. | Gasket         | Graphite   | Graphite*  | Graphite   | Graphite   |
| 11. | Thrust Washer  | RTFE<br>PEEK   | RTFE<br>PEEK   | Graphite<br>PEEK                                 | Graphite<br>PEEK                                 |
| 12. | Bearings       | Carbon Steel-DU  | Carbon Steel-DU  | Carbon Steel-DU                                  | Carbon Steel-DU                                  |
| 13. | Springs        | Inconel X750   | Inconel X750   | Inconel X750                                     | Inconel X750                                     |
| 14. | Studs          | A193 B7M   | A320 L2M   | A193 B8M   | A193 B8M   |
| 15. | Nuts           | A194 2HM   | A194 7M  | A194 Gr. 8                                       | A194 Gr. 8                                       |
| 16. | Bolting        | A193 B7M   | A320 L7M   | 193 B8M  | 193 B8M  |
| 17. | Mounting Plate | Carbon Steel   | Carbon Steel   | Stainless Steel                                  | Stainless Steel                                  |

Sizes and specifications shown are subject to change without notice.

# T Series Trunnion General Dimensions Data

## ANSI 150

| Size | Full Port Bore |     | Regular Bore |     | Raised Face Length |      | Weld End Length |      | RTJ Length |      |
|------|----------------|-----|--------------|-----|--------------------|------|-----------------|------|------------|------|
|      | Inch           | mm  | Inch         | mm  | Inch               | mm   | Inch            | mm   | Inch       | mm   |
| 2    | 2              | 49  | 2            | 49  | 7                  | 178  | 8.5             | 216  | 7.5        | 191  |
| 3    | 3              | 74  | 3            | 74  | 8                  | 203  | 11.12           | 283  | 8.5        | 219  |
| 4    | 4              | 100 | 4            | 100 | 9                  | 229  | 12              | 305  | 9.5        | 241  |
| 6    | 6              | 150 | 6            | 150 | 15.5               | 394  | 18              | 457  | 16         | 406  |
| 8    | 8              | 201 | 8            | 201 | 18                 | 467  | 20.5            | 521  | 18.5       | 470  |
| 10   | 10             | 252 | 10           | 252 | 21                 | 533  | 22              | 559  | 21.5       | 546  |
| 12   | 12             | 303 | 12           | 303 | 24                 | 610  | 25              | 635  | 24.5       | 622  |
| 14   | 14             | 334 | 12           | 303 | 27                 | 686  | 30              | 762  | 27.5       | 699  |
| 16   | 16             | 385 | 16           | 385 | 30                 | 762  | 33              | 838  | 30.5       | 775  |
| 18   | 18             | 436 | 16           | 385 | 34                 | 864  | 36.37           | 914  | 34.5       | 876  |
| 20   | 20             | 487 | 20           | 487 | 36                 | 914  | 39              | 991  | 35.6       | 927  |
| 24   | 24             | 589 | 20           | 487 | 42                 | 1067 | 45              | 1143 | 42.5       | 1080 |
| 26   | 26             | 633 | 24           | 589 | 45                 | 1143 | 49              | 1245 | -          | -    |
| 28   | 28             | 684 | 26           | 633 | 49                 | 1245 | 53              | 1346 | -          | -    |
| 30   | 30             | 735 | -            | -   | 51                 | 1295 | 55              | 1397 | -          | -    |

## ANSI 300

| Size | Full Port Bore |     | Regular Bore |     | Raised Face Length |      | Weld End Length |      | RTJ Length |      |
|------|----------------|-----|--------------|-----|--------------------|------|-----------------|------|------------|------|
|      | Inch           | mm  | Inch         | mm  | Inch               | mm   | Inch            | mm   | Inch       | mm   |
| 2    | 2              | 49  | -            | -   | 8.5                | 216  | 8.5             | 216  | 9.12       | 232  |
| 3    | 3              | 74  | 2            | 49  | 11.12              | 283  | 11.12           | 283  | 11.75      | 298  |
| 4    | 4              | 100 | 3            | 74  | 12                 | 305  | 12              | 305  | 12.62      | 321  |
| 6    | 6              | 150 | 4            | 100 | 15.87              | 403  | 18              | 457  | 16.5       | 419  |
| 8    | 8              | 201 | 6            | 150 | 19.75              | 502  | 20.5            | 521  | 20.37      | 518  |
| 10   | 10             | 252 | 8            | 201 | 22.37              | 568  | 22              | 559  | 23         | 584  |
| 12   | 12             | 303 | 10           | 252 | 25.5               | 648  | 25              | 635  | 26.12      | 664  |
| 14   | 14             | 334 | 12           | 303 | 30                 | 762  | 30              | 762  | 30.62      | 778  |
| 16   | 16             | 385 | 12           | 303 | 33                 | 838  | 33              | 838  | 33.62      | 854  |
| 18   | 18             | 436 | 16           | 385 | 36                 | 914  | 36.37           | 914  | 36.62      | 930  |
| 20   | 20             | 487 | 16           | 385 | 39                 | 991  | 39              | 991  | 39.75      | 1010 |
| 24   | 24             | 589 | 20           | 487 | 45                 | 1143 | 45              | 1143 | 45.87      | 1165 |
| 26   | 26             | 633 | 20           | 487 | 49                 | 1245 | 49              | 1245 | 50         | 1270 |
| 28   | 28             | 684 | 24           | 589 | 53                 | 1346 | 53              | 1346 | 54         | 1372 |
| 30   | 30             | 735 | 26           | 633 | 55                 | 1397 | 55              | 1397 | 56         | 1422 |

## ANSI 600

| Size | Full Port Bore |     | Regular Bore |     | Raised Face Length |      | Weld End Length |      | RTJ Length |      |
|------|----------------|-----|--------------|-----|--------------------|------|-----------------|------|------------|------|
|      | Inch           | mm  | Inch         | mm  | Inch               | mm   | Inch            | mm   | Inch       | mm   |
| 2    | 2              | 49  | -            | -   | 11.5               | 292  | 11.5            | 292  | 11.62      | 295  |
| 3    | 3              | 74  | 2            | 49  | 14                 | 356  | 14              | 356  | 14.12      | 359  |
| 4    | 4              | 100 | 3            | 74  | 17                 | 432  | 17              | 432  | 17.12      | 435  |
| 6    | 6              | 150 | 4            | 100 | 22                 | 559  | 22              | 559  | 22.12      | 562  |
| 8    | 8              | 201 | 6            | 150 | 26                 | 660  | 26              | 660  | 26.12      | 664  |
| 10   | 10             | 252 | 8            | 201 | 31                 | 787  | 31              | 787  | 31.12      | 791  |
| 12   | 12             | 303 | 10           | 252 | 33                 | 838  | 33              | 838  | 33.12      | 841  |
| 14   | 14             | 334 | 12           | 303 | 35                 | 889  | 35              | 889  | 35.12      | 892  |
| 16   | 16             | 385 | 12           | 303 | 39                 | 991  | 39              | 991  | 39.12      | 994  |
| 18   | 18             | 436 | 16           | 385 | 43                 | 1092 | 43              | 1092 | 43.12      | 1095 |
| 20   | 20             | 487 | 16           | 385 | 47                 | 1194 | 47              | 1194 | 47.25      | 1200 |
| 24   | 24             | 589 | 20           | 487 | 51                 | 1295 | 51              | 1295 | 51.37      | 1305 |
| 26   | 26             | 633 | 20           | 487 | 55                 | 1397 | 55              | 1397 | 55.37      | 1407 |
| 28   | 28             | 684 | 24           | 589 | 57                 | 1448 | 57              | 1448 | 57.5       | 1461 |
| 30   | 30             | 735 | 26           | 633 | 61                 | 1549 | 61              | 1549 | 61.5       | 1562 |

## ANSI 900

| Size | Full Port Bore |     | Regular Bore |     | Raised Face Length |      | Weld End Length |      | RTJ Length |      |
|------|----------------|-----|--------------|-----|--------------------|------|-----------------|------|------------|------|
|      | Inch           | mm  | Inch         | mm  | Inch               | mm   | Inch            | mm   | Inch       | mm   |
| 2    | 2              | 49  | -            | -   | 14.5               | 368  | 14.5            | 368  | 14.62      | 371  |
| 3    | 3              | 74  | 2            | 49  | 15                 | 381  | 15              | 381  | 15.12      | 384  |
| 4    | 4              | 100 | 3            | 74  | 18                 | 457  | 18              | 457  | 18.12      | 460  |
| 6    | 6              | 150 | 4            | 100 | 24                 | 610  | 24              | 610  | 24.12      | 613  |
| 8    | 8              | 201 | 6            | 150 | 29                 | 737  | 29              | 737  | 29.12      | 740  |
| 10   | 10             | 252 | 8            | 201 | 33                 | 838  | 33              | 838  | 33.12      | 841  |
| 12   | 12             | 303 | 10           | 252 | 38                 | 965  | 38              | 965  | 38.12      | 968  |
| 16   | 14.67          | 373 | 12           | 303 | 44.5               | 1130 | 44.5            | 1130 | 44.87      | 1140 |
| 18   | 16.67          | 423 | -            | -   | 48                 | 1219 | 48              | 1219 | 48.5       | 1232 |
| 20   | 18.5           | 471 | -            | -   | 52                 | 1321 | 52              | 1321 | 52.5       | 1334 |
| 24   | 22.5           | 570 | -            | -   | 61                 | 1549 | 61              | 1549 | 61.75      | 1568 |

For information on ANSI 2500, please contact your Flow+ supplier.

## ANSI 1500

| Size | Full Port Bore |     | Regular Bore |     | Raised Face Length |      | Weld End Length |      | RTJ Length |      |
|------|----------------|-----|--------------|-----|--------------------|------|-----------------|------|------------|------|
|      | Inch           | mm  | Inch         | mm  | Inch               | mm   | Inch            | mm   | Inch       | mm   |
| 2    | 2              | 49  | -            | -   | 14.5               | 368  | 14.5            | 368  | 14.61      | 371  |
| 3    | 3              | 74  | 2            | 49  | 18.5               | 470  | 18.5            | 470  | 18.62      | 473  |
| 4    | 4              | 100 | 3            | 74  | 21.5               | 546  | 21.5            | 546  | 21.62      | 549  |
| 6    | 5.67           | 144 | 4            | 100 | 27.75              | 705  | 27.75           | 705  | 28         | 711  |
| 8    | 7.56           | 192 | 6            | 150 | 32.75              | 832  | 32.75           | 832  | 33.12      | 841  |
| 10   | 9.41           | 239 | 8            | 201 | 39                 | 991  | 39              | 991  | 39.37      | 1000 |
| 12   | 11.3           | 287 | 10           | 252 | 44.5               | 1130 | 44.5            | 1130 | 45.12      | 1146 |
| 16   | 14.17          | 360 | 12           | 303 | 54.5               | 1384 | 54.5            | 1384 | 55.39      | 1407 |

# Cv Flow Coefficients

| Size | 150#   | 300#   | 600#   | 900#   | 1500# | 2500# |
|------|--------|--------|--------|--------|-------|-------|
| Inch | Cv     | Cv     | Cv     | Cv     | Cv    | Cv    |
| 1/2  | 46     | 46     | 46     | 42     | 41    | -     |
| 3/4  | 97     | 97     | 97     | 90     | 88    | -     |
| 1    | 168    | 168    | 168    | 156    | 152   | -     |
| 1.5  | 389    | 389    | 389    | 360    | 350   | -     |
| 2    | 647    | 647    | 647    | 599    | 582   | 412   |
| 3    | 2086   | 2086   | 2086   | 1932   | 1879  | 1268  |
| 4    | 2694   | 2694   | 2694   | 2494   | 2426  | 1766  |
| 6    | 6062   | 6062   | 6062   | 5612   | 5030  | 4004  |
| 8    | 10885  | 10885  | 10885  | 10077  | 8943  | 7476  |
| 10   | 17109  | 17109  | 17109  | 15840  | 13857 | 11603 |
| 12   | 24734  | 24734  | 24734  | 22990  | 19982 | 16385 |
| 14   | 30055  | 30055  | 30055  | 25862  | 24071 | 19894 |
| 16   | 39934  | 39934  | 39934  | 34703  | 31440 | 25872 |
| 18   | 51214  | 51214  | 51214  | 44630  | 39988 | 32636 |
| 20   | 63896  | 63896  | 63896  | 53333  | 50002 | 40982 |
| 24   | 96465  | 96465  | 96465  | 81039  | 7231  | 58329 |
| 26   | 109956 | 109956 | 109956 | 98501  | -     | -     |
| 28   | 121833 | 121833 | 121833 | 113248 | -     | -     |
| 30   | 145588 | 145588 | 145588 | 129948 | -     | -     |
| 32   | 170872 | 170872 | 170872 | 151468 | -     | -     |
| 36   | 211092 | 211092 | 211092 | 198273 | -     | -     |
| 40   | 267398 | 267398 | 267398 | -      | -     | -     |
| 42   | 280946 | 280946 | 280946 | -      | -     | -     |
| 48   | 383846 | 383846 | 383846 | -      | -     | -     |
| 46   | 520791 | 520791 | 520791 | -      | -     | -     |

## METHOD OF CALCULATING FLOW

The Flow Coefficient “Cv” of a valve is the flow rate of water (gallons/minute) through a fully opened valve, with a pressure drop of 1 PSI across the valve. To find the flow of liquid through the valve from the Cv, use the following formulae.

### Liquid Flow

$$Q_L = C_v (\Delta P/G)^{1/2}$$

WHERE

Q<sub>L</sub> = flow rate of liquid (gal./min.)

ΔP = differential pressure across the valve (psi)

G = specific gravity of liquid (for water, G=1)

### Gas Flow

$$Q_g = 61C_v (P_2 \Delta P/g)^{1/2}$$

WHERE {(ΔP/P < 1.0)}

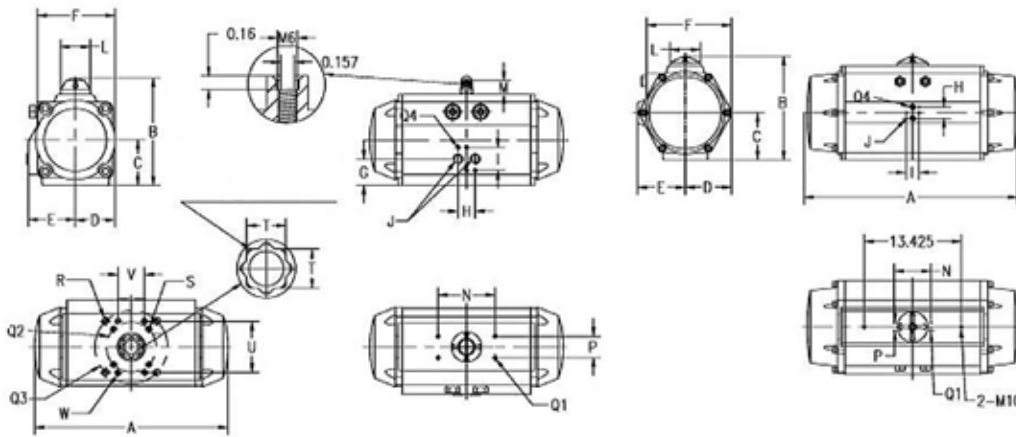
Q<sub>g</sub> = flow rate of gas (CFH at STP)

P<sub>2</sub> = outlet pressure (psi)

g = specific gravity of gas (for air, G=1.0)

# SPNII Actuator Information

For ISO Direct Mount Ball Valves Only (B03, B05/5S/5TC/5T0, B07L/T and ZF1 SS)\*



| Model | Unit | A     | B     | C    | D    | E    | F     | G    | H    | H1   | H2   | I    | J    | L    |
|-------|------|-------|-------|------|------|------|-------|------|------|------|------|------|------|------|
| 032   | in   | 4.61  | 1.77  | 0.88 | 0.88 | 0.88 | 1.77  | .88  | 0.94 | 0.39 | -    | 1.25 | 1/8" | 1.4  |
|       | mm   | 117   | 45    | 22   | 22   | 22   | 45    | 22   | 24   | 10   |      | 32   |      | 36   |
| 050   | in   | 5.8   | 3.62  | 1.35 | 1.12 | 1.61 | 2.28  | 1.02 | 0.94 | 0.47 | 1.26 | 1.26 | 1/4" | 1.65 |
|       | mm   | 147   | 92    | 34   | 28   | 41   | 58    | 26   | 24   | 12   | 32   | 32   |      | 42   |
| 063   | in   | 6.26  | 4.25  | 1.67 | 1.42 | 1.14 | 2.83  | 1.18 | 0.94 | 0.63 | 1.34 | 1.26 | 1/4" | 1.65 |
|       | mm   | 159   | 108   | 42   | 36   | 29   | 72    | 30   | 24   | 16   | 34   | 32   |      | 42   |
| 075   | in   | 8.39  | 4.92  | 2.01 | 1.71 | 2.07 | 3.39  | 1.03 | 0.94 | 0.75 | 1.34 | 1.26 | 1/4" | 1.65 |
|       | mm   | 213   | 125   | 51   | 43   | 53   | 86    | 26   | 24   | 19   | 34   | 32   |      | 42   |
| 085   | in   | 9.8   | 5.43  | 2.27 | 1.91 | 2.22 | 3.8   | 1.26 | 0.94 | 0.75 | 1.34 | 1.26 | 1/4" | 1.65 |
|       | mm   | 249   | 138   | 58   | 49   | 56   | 97    | 32   | 24   | 19   | 34   | 32   |      | 42   |
| 100   | in   | 10.67 | 5.94  | 2.5  | 2.2  | 2.6  | 4.17  | 1.46 | 0.94 | 0.91 | 1.89 | 1.26 | 1/4" | 1.65 |
|       | mm   | 271   | 151   | 64   | 56   | 66   | 106   | 37   | 24   | 23   | 48   | 32   |      | 42   |
| 115   | in   | 12.40 | 6.89  | 2.85 | 2.52 | 3.03 | 5.00  | 1.67 | 0.94 | 0.91 | 1.89 | 1.26 | 1/4" | 2.6  |
|       | mm   | 315   | 175   | 72   | 64   | 77   | 127   | 42   | 24   | 23   | 48   | 32   |      | 66   |
| 125   | in   | 13.62 | 7.48  | 3.09 | 2.72 | 3.23 | 5.12  | 1.8  | 0.94 | 1.14 | 2.56 | 1.26 | 1/4" | 2.6  |
|       | mm   | 346   | 190   | 78   | 69   | 82   | 130   | 46   | 24   | 29   | 65   | 32   |      | 66   |
| 145   | in   | 16.22 | 8.25  | 3.46 | 3.15 | 3.54 | 5.85  | 2.17 | 0.94 | 1.14 | 2.56 | 1.26 | 1/4" | 2.6  |
|       | mm   | 412   | 210   | 88   | 80   | 90   | 149   | 55   | 24   | 29   | 65   | 32   |      | 66   |
| 160   | in   | 17.44 | 9.06  | 3.88 | 3.46 | 3.87 | 6.28  | 2.04 | 0.94 | 1.14 | 2.56 | 1.26 | 1/4" | 2.6  |
|       | mm   | 443   | 230   | 99   | 88   | 98   | 160   | 52   | 24   | 29   | 65   | 32   |      | 66   |
| 180   | in   | 19.37 | 9.96  | 4.29 | 3.88 | 4.15 | 7.07  | 2.37 | 0.94 | 1.65 | 3.62 | 1.26 | 1/4" | 3.15 |
|       | mm   | 492   | 253   | 109  | 99   | 105  | 180   | 60   | 24   | 42   | 92   | 32   |      | 80   |
| 200   | in   | 21.54 | 10.91 | 4.8  | 4.29 | 4.41 | 7.64  | 2.6  | 0.94 | 1.65 | 3.62 | 1.26 | 1/4" | 3.15 |
|       | mm   | 547   | 277   | 122  | 109  | 112  | 194   | 66   | 24   | 42   | 92   | 32   |      | 80   |
| 240   | in   | 24.17 | 13.7  | 5.75 | 5.14 | 5.16 | 9.09  | 2.76 | 1.57 | 1.97 | 3.27 | 1.77 | 3/8" | 3.15 |
|       | mm   | 614   | 348   | 146  | 131  | 131  | 231   | 70   | 40   | 50   | 92   | 45   |      | 80   |
| 265   | in   | 28.7  | 15.31 | 6.57 | 5.79 | 5.78 | 9.99  | 3.54 | 1.57 | 1.97 | 3.27 | 1.77 | 3/8" | 3.15 |
|       | mm   | 729   | 389   | 167  | 147  | 147  | 254   | 90   | 40   | 50   | 92   | 45   |      | 80   |
| 300   | in   | 33.03 | 16.14 | 6.99 | 6.38 | 6.81 | 11.42 | 3.35 | 1.57 | 1.97 | 3.27 | 1.77 | 1/2" | 3.15 |
|       | mm   | 839   | 410   | 178  | 162  | 173  | 290   | 85   | 40   | 50   | 92   | 45   |      | 80   |

| Model | Unit | M    | N    | P    | Q1 | Q2  | Q3  | Q4 | R   | S   | T    | U    | V    | W   |
|-------|------|------|------|------|----|-----|-----|----|-----|-----|------|------|------|-----|
| 032   | in   | 0.79 | 1.97 | 1.18 | M5 | F03 | -   | M5 | -   | -   | 0.35 | -    | -    | -   |
|       | mm   | 20   | 50   | 30   |    |     |     |    |     |     | 9    |      |      |     |
| 050   | in   | 0.79 | 3.15 | 1.18 | M5 | F04 | -   | M5 | -   | M5  | 0.67 | -    | -    | -   |
|       | mm   | 20   | 80   | 30   |    |     |     |    |     |     | 17   |      |      |     |
| 063   | in   | 0.79 | 3.15 | 1.18 | M5 | F05 | -   | M5 | -   | M6  | 0.67 | -    | -    | -   |
|       | mm   | 20   | 80   | 30   |    |     |     |    |     |     | 17   |      |      |     |
| 075   | in   | 0.79 | 3.15 | 1.18 | M5 | F05 | F07 | M5 | M8  | M6  | 0.87 | -    | -    | -   |
|       | mm   | 20   | 80   | 30   |    |     |     |    |     |     | 22   |      |      |     |
| 085   | in   | 0.79 | 3.15 | 1.18 | M5 | F05 | F07 | M5 | M8  | M6  | 0.87 | -    | -    | -   |
|       | mm   | 20   | 80   | 30   |    |     |     |    |     |     | 22   |      |      |     |
| 100   | in   | 0.79 | 3.15 | 1.18 | M5 | F07 | F10 | M5 | M10 | M8  | 0.87 | 2.83 | 1.46 | M8  |
|       | mm   | 20   | 80   | 30   |    |     |     |    |     |     | 22   | 72   | 37   |     |
| 115   | in   | 1.18 | 3.15 | 1.18 | M5 | F07 | F10 | M5 | -   | M10 | 0.87 | -    | -    | M8  |
|       | mm   | 30   | 80   | 30   |    |     |     |    |     |     | 22   |      |      |     |
| 125   | in   | 1.18 | 3.15 | 1.18 | M5 | F10 | -   | M5 | -   | M10 | 1.42 | 2.83 | 1.46 | M8  |
|       | mm   | 30   | 80   | 30   |    |     |     |    |     |     | 36   | 72   | 37   |     |
| 145   | in   | 1.18 | 3.15 | 1.18 | M5 | F10 | F12 | M5 | M12 | M10 | 1.42 | 2.83 | 1.46 | M8  |
|       | mm   | 30   | 80   | 30   |    |     |     |    |     |     | 36   | 72   | 37   |     |
| 160   | in   | 1.18 | 3.15 | 1.18 | M5 | F10 | F12 | M5 | M12 | M10 | 1.42 | 2.83 | 1.46 | M8  |
|       | mm   | 30   | 80   | 30   |    |     |     |    |     |     | 36   | 72   | 37   |     |
| 180   | in   | 1.18 | 5.12 | 1.18 | M5 | F10 | F14 | M5 | M16 | M10 | 1.42 | 3.9  | 2.09 | M10 |
|       | mm   | 30   | 130  | 30   |    |     |     |    |     |     | 36   | 99   | 53   |     |
| 200   | in   | 1.18 | 5.12 | 1.18 | M5 | F10 | F14 | M5 | M16 | M10 | 1.42 | 3.9  | 2.09 | M10 |
|       | mm   | 30   | 130  | 30   |    |     |     |    |     |     | 36   | 99   | 53   |     |
| 240   | in   | 1.97 | 5.12 | 1.18 | M5 | F12 | F16 | M6 | M20 | M12 | 1.81 | -    | -    | -   |
|       | mm   | 50   | 130  | 30   |    |     |     |    |     |     | 46   |      |      |     |
| 265   | in   | 1.97 | 5.12 | 1.18 | M5 | -   | F16 | M6 | M20 | -   | 1.81 | -    | -    | -   |
|       | mm   | 50   | 130  | 30   |    |     |     |    |     |     | 46   |      |      |     |
| 300   | in   | 1.97 | 5.12 | 1.18 | M5 | -   | F16 | M6 | M20 | -   | 1.81 | -    | -    | -   |
|       | mm   | 50   | 130  | 30   |    |     |     |    |     |     | 46   |      |      |     |

## Actuation Selection Chart

| Actuator Sizing Info | Double Acting | Spring Return | Valve Torque |
|----------------------|---------------|---------------|--------------|
| 1/2"                 | SPNII50DA     | SPNII63SR     | 85           |
| 3/4"                 | SPNII63DA     | SPNII63SR     | 110          |
| 1"                   | SPNII63DA     | SPNII75SR     | 180          |
| 1 1/2"               | SPNII75DA     | SPNII85SR     | 315          |
| 2"                   | SPNII75DA     | SPNII100SR    | 450          |
| 3"                   | SPNII100DA    | SPNII115SR    | 680          |
| 4"                   | SPNII115DA    | SPNII125SR    | 1190         |
| 6"                   | SPNII145DA    | SPNII180SR    | 2850         |

### ADDITIONAL NOTES

\*Actuator sized for liquid service up to 500 psig differential line pressure using 80 psig instrument air.

\*\* Actuator sizing torques up to 500 psig DP: Water – 1.0, Oil – 0.8, Gas Wet (Steam) – 1.0, Gas Dry – 1.3.

\*\*\* Add 20% on torque valves for 3-way B07 series valve.

\*\*\*\* For high or low temperature applications consult supplier for special seal kits.



Example of the ZF1 SS mounted to a SPNII actuator.



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