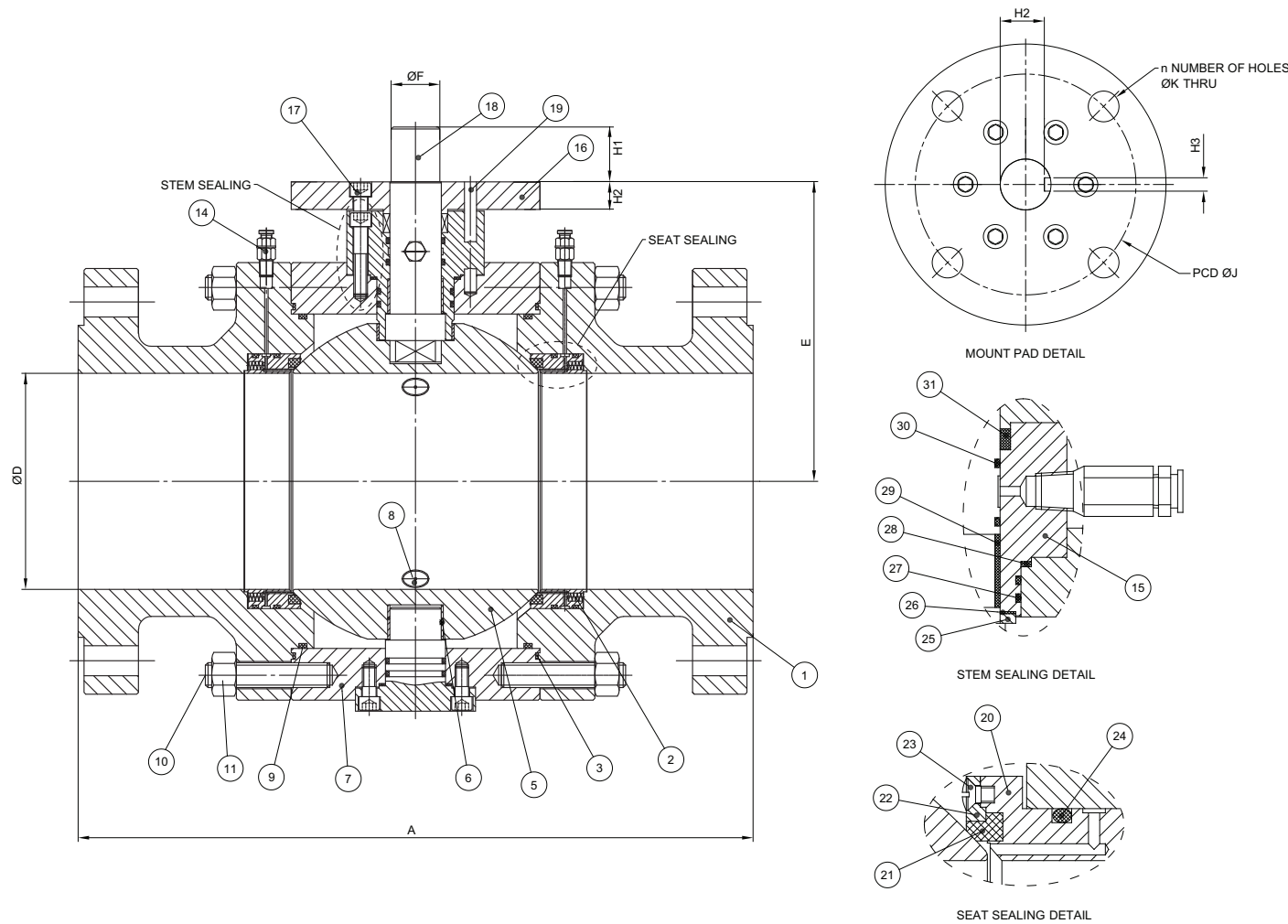


# Forged Steel Bolted Bonnet Valves



## Forged Steel Trunnion Ball Valves Product Overview



### Size

2" – 28" (Full Port)  
Fire Safe as Standard

### End Connections

150# RF Flanged  
300# RF Flanged  
600# RF Flanged  
900# RF Flanged  
1500# RF Flanged  
Butt Weld

### Valve Materials

304/304L/316/316L Stainless Steel  
Carbon Steel  
LCB, LCC Carbon Steel

### Ball and Stem Materials

304/304L/316/316L Stainless Steel  
Nickel Plated Carbon Steel

### Seat Materials

Teflon  
Nylon  
PEEK  
Devlon  
Metal

### Service Applications

Chemical  
Food Processing  
Oxygen  
Steam  
Thermal Fluids  
Vacuum  
Water/Oil/Gas

### Applicable Standards

ASME B16.34  
ASME B16.10  
ASME B16.5  
API 607/API 6FA  
API 6D



# Forged Steel Bolted Bonnet Valves

## Forged Steel Trunnion Ball Valves Product Overview

| Item | Description         | Materials                          |              |                     |                     |                       |
|------|---------------------|------------------------------------|--------------|---------------------|---------------------|-----------------------|
|      |                     | Carbon Steel                       | Sulfur Proof | 304 Stainless Steel | 316 Stainless Steel | LF2                   |
| 1    | End Caps            | A105                               | A105         | A182-F304, F304L    | A182-F316, F316L    | A350-LF2              |
| 2    | Seat Spring         | 304, 316, 17-7PH, X-750            |              |                     |                     |                       |
| 3    | Body Gasket         | 304 or 316 + Graphite Spiral Wound |              |                     |                     |                       |
| 4    | Ball Retainer       | A105 + ENP                         | A105 + ENP   | A182-F304, F304L    | A182-F316, F316L    | A350-LF2 + ENP        |
| 5    | Ball                | A105 + ENP                         | A105 + ENP   | 304, 304L           | 316, 316L           | 304, 316, LF2+ ENP    |
| 6    | Ball Bearing Sleeve | 304 or 316 + PTFE                  |              |                     |                     |                       |
| 7    | Body                | A105                               | A105         | A182-F304, F304L    | A182-F316, F316L    | A350-LF2              |
| 8    | Plug                | A105                               | A105         | 304, 304L           | 316, 316L           | 304, 316              |
| 9    | Body Seal           | Viton, HNBR                        |              |                     |                     |                       |
| 10   | Body Stud           | A193-B7                            | A193-B7M     | A193-B8/B8M         | A193-B8/B8M         | A350-L7               |
| 11   | Body Nut            | A194-2H                            | A194-2HM     | A194-8/8M           | A194-8/8M           | A194-7                |
| 12   | Ball Retainer Pin   | A182-F6a                           | A182-F6a     | A182-F304, F304L    | A182-F316, F316L    | 304, 316, F6a         |
| 13   | Anti-Static Spring  | 304, 316, 17-7PH, X-750            |              |                     |                     |                       |
| 14   | Sealant Injector    | A105 + Zn                          | A105 + Zn    | 304, 304L           | 316, 316L           | 304, 316              |
| 15   | Stem Sleeve         | A105 + Zn                          | A105 + Zn    | A182-F304, F304L    | A182-F316, F316L    | A182-F304, F316, F6a  |
| 16   | Mount Pad           | A105                               | A105         | A182-F304, F304L    | A182-F316, F316L    | A350-LF2              |
| 17   | Screw               | A193-B7                            | A193-B7M     | A193-B8/B8M         | A193-B8/B8M         | A350-L7               |
| 18   | Stem                | A182-F6a                           | A182-F6a     | A182-F304, F304L    | A182-F316, F316L    | A182-F304, F316, F6a  |
| 19   | Shear Pin           | A182-F6a                           | A182-F6a     | A182-F304, F304L    | A182-F316, F316L    | 304, 316, F6a         |
| 20   | Seat Ring           | A105 + ENP                         | A105 + ENP   | A182-F304, F304L    | A182-F316, F316L    | F304, F316, LF2 + ENP |
| 21   | Seat                | RPTFE, Nylon, PEEK, Devlon, Metal  |              |                     |                     |                       |
| 22   | Seat Retainer       | A105 + ENP                         | A105 + ENP   | A182-F304, F304L    | A182-F316, F316L    | A182-F304, F316, F6a  |
| 23   | Seat Retainer Screw | A193-B7                            | A193-B7M     | A193-B8/B8M         | A193-B8/B8M         | A350-L7               |
| 24   | Seat Ring Seal      | Viton, HNBR                        |              |                     |                     |                       |
| 25   | Thrust Ring         | A105 + Zn                          | A105 + Zn    | A182-F304, F304L    | A182-F316, F316L    | A182-F304, F316, F6a  |
| 26   | Thrust Bearing      | 304 or 316 + PTFE                  |              |                     |                     |                       |
| 27   | Stem Sleeve Seal    | Viton, HNBR                        |              |                     |                     |                       |
| 28   | Stem Sleeve Gasket  | 304 or 316 + Graphite Spiral Wound |              |                     |                     |                       |
| 29   | Stem Bearing        | 304 or 316 + PTFE                  |              |                     |                     |                       |
| 30   | Stem Seal           | Viton, HNBR                        |              |                     |                     |                       |
| 31   | Stem Packing        | Graphite                           |              |                     |                     |                       |

### Notes Regarding Dimensional Tables

- All dimensions in the above tables are for guidance only and can be subject to change dependant upon actual operating conditions and design parameters specified at point of sale. Accurate drawings are available for each valve size and can be supplied once an order is placed.
- The torque values are based upon opening torque for soft seated valves at maximum differential pressure and clean gas or liquid conditions. No safety factor has been applied.
- Metal seated versions have a torque approximately three times higher than that shown in the tables.
- All mount pads conform to ISO 5211.

### Bi-directional Upstream Sealing

This valve is equipped with two spring energized seats which provide pre-loading and thereby effective sealing at low pressures. Sealing is enhanced at higher pressures as the upstream pressure creates a piston effect on the seat. Both seats are identical thus ensuring true bi-directional operation.

### Anti-Static Design

A number of metal components are isolated by packing and bearing materials which can cause electrical conductance continuity to be lost. To overcome this, spring energized balls are installed to maintain continuity and prevent the possibility of sparking resulting from static.

### Emergency Sealant System

Valve sizes 6" and above (smaller sizes upon request where design allows) are fitted with an injection system. This system enables the user to inject special sealing grease around the stem seals and seats to create an emergency temporary seal in the event of a fire or seal/seat failure.

### Blow-Out Prevention Stem

The stem has an integral shoulder as part of the design to prevent blow-out if excess pressure is encountered during operation.

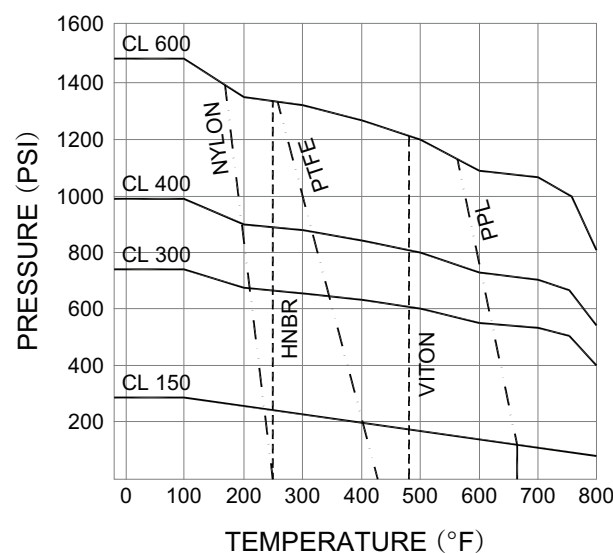
### Fire-Safe Design

In the event of a fire, several safety features are in place to prevent leakage. The seats have a metal lip that is pushed against the ball after the main seat melts away to effect temporary sealing. The main external joints have spiral wound gaskets to withstand the high temperatures encountered during a fire.

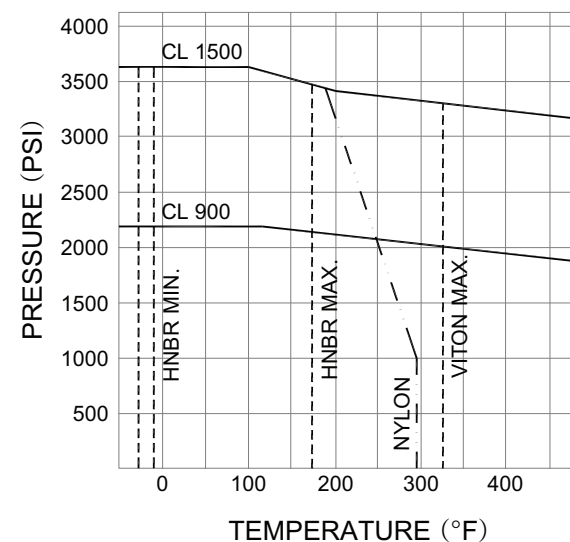
### Seat Design Variations

These valves are supplied with self relieving (single piston) seat designs as standard. These seats also act as double block and bleed when the ball is in the closed position via the vent or drain port. Double piston effect seat design is available upon request and is suggested to be used in conjunction with a body cavity relief valve.

Pressure/Temperature Rating for Class 150, 300, 400 & 600



Pressure/Temperature Rating for Class 900 & 1500



### Notes Regarding Pressure/Temperature Graphs

- The above graphs represent just some of the seat/seal combinations available covering typical applications.

### ANSI Class 150 Dimensions

| SIZE   | A (mm)     |           | D (mm) | E (mm) | F (mm) | H1 (mm) | H2 (mm) | H3 (mm) | J (mm) | K (mm) | n | ISO 5211 | Weight (kg) | TORQUE (N.m) | CV     |
|--------|------------|-----------|--------|--------|--------|---------|---------|---------|--------|--------|---|----------|-------------|--------------|--------|
|        | RF Flanged | Butt Weld |        |        |        |         |         |         |        |        |   |          |             |              |        |
| 2"     | 178        | 216       | 49     | 110    | 20     | 35      | 16.5    | 6       | 102    | 11     | 4 | F10      | 15          | 42           | 500    |
| 2 1/2" | 191        | 241       | 62     | 115    | 24     | 40      | 20      | 8       | 102    | 11     | 4 | F10      | 18          | 65           | 1050   |
| 3"     | 203        | 283       | 74     | 125    | 24     | 40      | 20      | 8       | 125    | 14     | 4 | F12      | 28          | 100          | 1300   |
| 4"     | 229        | 305       | 100    | 155    | 32     | 45      | 24      | 10      | 125    | 14     | 4 | F12      | 44          | 165          | 2300   |
| 6"     | 394        | 457       | 150    | 235    | 42     | 60      | 37      | 12      | 165    | 23     | 4 | F16      | 160         | 380          | 5400   |
| 8"     | 457        | 521       | 201    | 275    | 48     | 65      | 42.5    | 14      | 165    | 23     | 4 | F16      | 346         | 640          | 10000  |
| 10"    | 533        | 559       | 252    | 315    | 48     | 65      | 42.5    | 14      | 165    | 23     | 4 | F16      | 340         | 1150         | 17800  |
| 12"    | 610        | 635       | 303    | 350    | 55     | 70      | 49      | 16      | 165    | 23     | 4 | F16      | 529         | 1650         | 26000  |
| 14"    | 686        | 762       | 335    | 380    | 60     | 75      | 53      | 18      | 254    | 19     | 8 | F25      | 595         | 2650         | 32000  |
| 16"    | 762        | 838       | 385    | 430    | 75     | 95      | 67.5    | 20      | 254    | 19     | 8 | F25      | 890         | 3350         | 44000  |
| 18"    | 864        | 914       | 436    | 465    | 75     | 95      | 67.5    | 20      | 254    | 19     | 8 | F25      | 1350        | 5100         | 58000  |
| 20"    | 914        | 991       | 487    | 510    | 80     | 100     | 71      | 22      | 254    | 19     | 8 | F25      | 1680        | 6400         | 75000  |
| 24"    | 1067       | 1143      | 589    | 600    | 95     | 130     | 86      | 25      | 298    | 23     | 8 | F30      | 3650        | 11500        | 111200 |
| 28"    | 1245       | 1346      | 684    | 695    | 115    | 140     | 104     | 32      | 356    | 33     | 8 | F35      | 5100        | 17000        | 143000 |

### ANSI Class 300 Dimensions

| SIZE   | A (mm)     |           | D (mm) | E (mm) | F (mm) | H1 (mm) | H2 (mm) | H3 (mm) | J (mm) | K (mm) | n | ISO 5211 | Weight (kg) | TORQUE (N.m) | CV     |
|--------|------------|-----------|--------|--------|--------|---------|---------|---------|--------|--------|---|----------|-------------|--------------|--------|
|        | RF Flanged | Butt Weld |        |        |        |         |         |         |        |        |   |          |             |              |        |
| 2"     | 216        | 216       | 49     | 110    | 20     | 35      | 16.5    | 6       | 102    | 11     | 4 | F10      | 17          | 80           | 470    |
| 2 1/2" | 241        | 241       | 62     | 115    | 24     | 40      | 20      | 8       | 102    | 11     | 4 | F10      | 26          | 120          | 850    |
| 3"     | 283        | 283       | 74     | 125    | 24     | 40      | 20      | 8       | 125    | 14     | 4 | F12      | 33          | 210          | 1100   |
| 4"     | 305        | 305       | 100    | 170    | 32     | 45      | 24      | 10      | 125    | 14     | 4 | F12      | 60          | 260          | 2200   |
| 6"     | 403        | 457       | 150    | 220    | 42     | 60      | 37      | 12      | 165    | 23     | 4 | F16      | 160         | 620          | 5400   |
| 8"     | 502        | 521       | 201    | 275    | 48     | 65      | 42.5    | 14      | 165    | 23     | 4 | F16      | 265         | 1050         | 10000  |
| 10"    | 568        | 559       | 252    | 305    | 48     | 65      | 42.5    | 14      | 165    | 23     | 4 | F16      | 390         | 1850         | 17100  |
| 12"    | 648        | 635       | 303    | 360    | 55     | 70      | 49      | 16      | 254    | 19     | 8 | F25      | 560         | 2350         | 25000  |
| 14"    | 762        | 762       | 335    | 400    | 60     | 75      | 53      | 18      | 254    | 19     | 8 | F25      | 670         | 3300         | 31000  |
| 16"    | 838        | 838       | 385    | 440    | 75     | 95      | 67.5    | 20      | 254    | 19     | 8 | F25      | 1080        | 4800         | 42000  |
| 18"    | 914        | 914       | 436    | 485    | 75     | 95      | 67.5    | 20      | 254    | 19     | 8 | F25      | 1610        | 6800         | 56000  |
| 20"    | 991        | 991       | 487    | 530    | 80     | 100     | 71      | 22      | 254    | 19     | 8 | F25      | 2210        | 8350         | 72000  |
| 24"    | 1143       | 1143      | 589    | 625    | 95     | 130     | 86      | 25      | 298    | 23     | 8 | F30      | 4435        | 15500        | 102000 |
| 28"    | 1346       | 1346      | 684    | 695    | 115    | 140     | 104     | 32      | 356    | 33     | 8 | F35      | 5600        | 23000        | 123000 |

# Forged Steel Bolted Bonnet Valves



## Forged Steel Trunnion Ball Valves • ANSI Class 600~900

### ANSI Class 600 Dimensions

| SIZE   | A (mm)                |             | D (mm) | E (mm) | F (mm) | H1 (mm) | H2 (mm) | H3 (mm) | J (mm) | K (mm) | n | ISO 5211 | Weight (kg) | TORQUE (N.m) | CV     |
|--------|-----------------------|-------------|--------|--------|--------|---------|---------|---------|--------|--------|---|----------|-------------|--------------|--------|
|        | RF Flanged/ Butt Weld | RTJ Flanged |        |        |        |         |         |         |        |        |   |          |             |              |        |
| 2"     | 292                   | 295         | 49     | 110    | 28     | 40      | 24      | 8       | 102    | 11     | 4 | F10      | 40          | 165          | 400    |
| 2 1/2" | 330                   | 333         | 62     | 135    | 32     | 45      | 24      | 10      | 125    | 14     | 4 | F12      | 47          | 300          | 875    |
| 3"     | 356                   | 359         | 74     | 155    | 32     | 45      | 24      | 10      | 125    | 14     | 4 | F12      | 70          | 430          | 1000   |
| 4"     | 432                   | 435         | 100    | 185    | 38     | 55      | 33      | 10      | 165    | 23     | 4 | F16      | 110         | 600          | 1800   |
| 6"     | 559                   | 562         | 150    | 258    | 48     | 65      | 42.5    | 14      | 165    | 23     | 4 | F16      | 245         | 1550         | 4500   |
| 8"     | 660                   | 664         | 201    | 306    | 55     | 75      | 49      | 16      | 254    | 19     | 8 | F25      | 480         | 2470         | 8900   |
| 10"    | 787                   | 791         | 252    | 365    | 65     | 75      | 58      | 18      | 254    | 19     | 8 | F25      | 760         | 3850         | 14500  |
| 12"    | 838                   | 841         | 303    | 390    | 70     | 90      | 67.5    | 20      | 254    | 19     | 8 | F25      | 1010        | 5800         | 22000  |
| 14"    | 889                   | 892         | 335    | 406    | 75     | 95      | 67.5    | 20      | 254    | 19     | 8 | F25      | 1850        | 8550         | 28000  |
| 16"    | 991                   | 994         | 385    | 485    | 85     | 110     | 71      | 22      | 254    | 19     | 8 | F25      | 2100        | 9400         | 39000  |
| 20"    | 1194                  | 1200        | 487    | 560    | 95     | 130     | 86      | 25      | 356    | 33     | 8 | F35      | 3360        | 18500        | 66000  |
| 24"    | 1397                  | 1407        | 589    | 660    | 115    | 140     | 104     | 32      | 356    | 33     | 8 | F35      | 5650        | 30500        | 92000  |
| 28"    | 1549                  | 1562        | 684    | 710    | 135    | 170     | 123     | 36      | 406    | 39     | 8 | F40      | 7000        | 45000        | 122000 |

### ANSI Class 900 Dimensions

| SIZE   | A (mm)                |             | D (mm) | E (mm) | F (mm) | H1 (mm) | H2 (mm) | H3 (mm) | J (mm) | K (mm) | n | ISO 5211 | Weight (kg) | TORQUE (N.m) | CV    |
|--------|-----------------------|-------------|--------|--------|--------|---------|---------|---------|--------|--------|---|----------|-------------|--------------|-------|
|        | RF Flanged/ Butt Weld | RTJ Flanged |        |        |        |         |         |         |        |        |   |          |             |              |       |
| 2"     | 368                   | 371         | 49     | 125    | 28     | 45      | 24      | 8       | 125    | 14     | 4 | F12      | 55          | 195          | 360   |
| 2 1/2" | 419                   | 422         | 62     | 150    | 32     | 50      | 24      | 10      | 125    | 14     | 4 | F12      | 65          | 380          | 750   |
| 3"     | 381                   | 384         | 74     | 165    | 32     | 50      | 24      | 10      | 125    | 14     | 4 | F12      | 90          | 550          | 1000  |
| 4"     | 457                   | 460         | 100    | 190    | 42     | 60      | 37      | 12      | 165    | 23     | 4 | F16      | 180         | 950          | 1800  |
| 6"     | 610                   | 613         | 150    | 258    | 48     | 65      | 42.5    | 14      | 165    | 23     | 4 | F16      | 290         | 2150         | 4300  |
| 8"     | 737                   | 740         | 201    | 315    | 60     | 75      | 53      | 18      | 254    | 19     | 8 | F25      | 600         | 3500         | 8400  |
| 10"    | 838                   | 841         | 252    | 375    | 70     | 90      | 67.5    | 20      | 254    | 19     | 8 | F25      | 990         | 7100         | 14000 |
| 12"    | 965                   | 968         | 303    | 405    | 80     | 100     | 71      | 22      | 298    | 23     | 8 | F30      | 1065        | 9620         | 21000 |
| 14"    | 1029                  | 1038        | 322    | 440    | 95     | 130     | 86      | 25      | 298    | 23     | 8 | F30      | 1406        | 16000        | 26000 |
| 16"    | 1130                  | 1140        | 373    | 498    | 100    | 130     | 90      | 28      | 356    | 33     | 8 | F35      | 1723        | 20000        | 36000 |
| 18"    | 1219                  | 1232        | 424    | 546    | 115    | 140     | 104     | 32      | 356    | 33     | 8 | F35      | 2562        | 25000        | 47500 |
| 20"    | 1321                  | 1334        | 471    | 588    | 115    | 140     | 104     | 32      | 356    | 33     | 8 | F35      | 3651        | 36200        | 60000 |
| 24"    | 1549                  | 1569        | 570    | 680    | 135    | 170     | 123     | 36      | 406    | 39     | 8 | F40      | 4876        | 48500        | 86000 |



# Forged Steel Bolted Bonnet Valves

## Forged Steel Trunnion Ball Valves • ANSI Class 1500

### ANSI Class 1500 Dimensions

| SIZE   | A (mm)                 |             | D (mm) | E (mm) | F (mm) | H1 (mm) | H2 (mm) | H3 (mm) | J (mm) | K (mm) | n | ISO 5211 | Weight (kg) | TORQUE (N.m) | CV    |
|--------|------------------------|-------------|--------|--------|--------|---------|---------|---------|--------|--------|---|----------|-------------|--------------|-------|
|        | RF Flanged / Butt Weld | RTJ Flanged |        |        |        |         |         |         |        |        |   |          |             |              |       |
| 2"     | 368                    | 371         | 49     | 155    | 30     | 45      | 26      | 8       | 125    | 14     | 4 | F12      | 76          | 350          | 360   |
| 2 1/2" | 419                    | 422         | 62     | 175    | 32     | 50      | 24      | 10      | 140    | 19     | 4 | F14      | 90          | 640          | 690   |
| 3"     | 470                    | 473         | 74     | 195    | 38     | 55      | 33      | 10      | 165    | 23     | 4 | F16      | 135         | 950          | 900   |
| 4"     | 546                    | 549         | 100    | 225    | 48     | 65      | 42.5    | 14      | 165    | 23     | 4 | F16      | 248         | 1700         | 1600  |
| 6"     | 705                    | 711         | 144    | 275    | 60     | 75      | 53      | 18      | 254    | 19     | 8 | F25      | 409         | 3650         | 4000  |
| 8"     | 832                    | 841         | 192    | 325    | 75     | 95      | 67.5    | 20      | 254    | 19     | 8 | F25      | 870         | 7450         | 7900  |
| 10"    | 991                    | 1000        | 239    | 370    | 85     | 110     | 71      | 22      | 298    | 23     | 8 | F30      | 1088        | 11500        | 13000 |
| 12"    | 1130                   | 1146        | 287    | 420    | 95     | 130     | 86      | 25      | 298    | 23     | 8 | F30      | 1682        | 16500        | 19000 |
| 14"    | 1257                   | 1276        | 316    | 445    | 100    | 130     | 90      | 28      | 356    | 33     | 8 | F35      | 1959        | 24000        | 24000 |
| 16"    | 1384                   | 1407        | 360    | 510    | 120    | 160     | 109     | 32      | 356    | 33     | 8 | F35      | 3485        | 34500        | 33000 |

### HOW TO ORDER

| 2"     | Flanged Ball Valve      | 304 SS              | 304SS                | PTFE          | Graphoil      | 150                | Air-operated  |
|--------|-------------------------|---------------------|----------------------|---------------|---------------|--------------------|---------------|
| Size   | Series                  | Body & End Material | Ball & Stem Material | Seat Material | Seal Material | End Style          | Options       |
| 2"     | Flanged Ball Valve      | ASTM A105           | 304 SS               | PTFE          | Graphoil      | 150 - Class150Lb   | Gear Operated |
| 2 1/2" | Butt Welding Ball Valve | 304 SS              | 316 SS               | Nylon         | PTFE          | 300 - Class300Lb   | Lever Handle  |
| 3"     |                         | 316 SS              |                      | PEEK          |               | 600 - Class600Lb   | Air-operated  |
| 4"     |                         | ASTM A350 LF2       |                      | Devlon        |               | 900 - Class900Lb   |               |
| 6"     |                         |                     |                      | Metal         |               | 1500 - Class1500Lb |               |
| 8"     |                         |                     |                      |               |               |                    |               |
| 10"    |                         |                     |                      |               |               |                    |               |
| 12"    |                         |                     |                      |               |               |                    |               |
| 14"    |                         |                     |                      |               |               |                    |               |
| 16"    |                         |                     |                      |               |               |                    |               |
| 18"    |                         |                     |                      |               |               |                    |               |
| 20"    |                         |                     |                      |               |               |                    |               |
| 24"    |                         |                     |                      |               |               |                    |               |
| 28"    |                         |                     |                      |               |               |                    |               |

\* This brochure is general in nature and we reserve the right to alter dimensions, materials or make design improvements.