



**CRESCENT VALVES**

# Ball Valve

**Forged Steel & Cast Steel  
Floating Ball Valve  
Trunnion Mounted Ball Valve**



## COMPANY OVERVIEW



The word Crescent Originates from the Latin equivalent 'Crescent', which means 'to grow'.

At Crescent Valves, growth has been the story during every moment of its 60 year existence. A growth that has been nurtured by a strong commitment to quality.

A far-sighted management professing to this creed of quality, has steered Crescent to a pinnacle position in Flow Control Industry.

The Crescent story is one of humble beginnings. Today, it possesses one manufacturing unit in Sanand and two manufacturing units in Ahmedabad, With it's head office in Mumbai. With its arsenal of sophisticated equipment and experienced personnel, Crescent has earned and successfully executed prestigious Power, Oil, Steel and Petrochemical projects in India and Abroad.

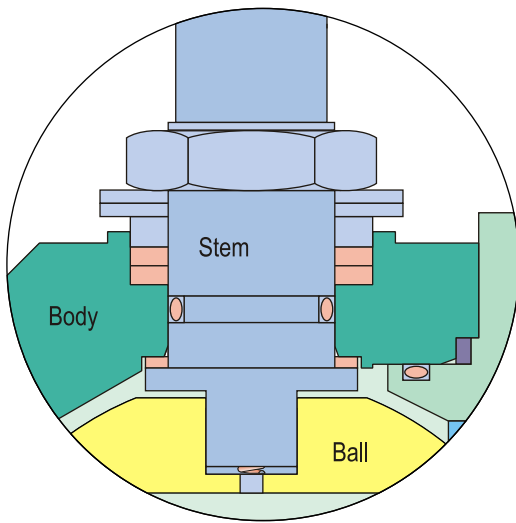
Crescent has established growing markets in the Middle East, South East Asia, Africa, the U. S. A., Europe, Russia & Kazakisthan.

## Figure

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| Floating Ball Valves Design Feature .....                         | 1  |
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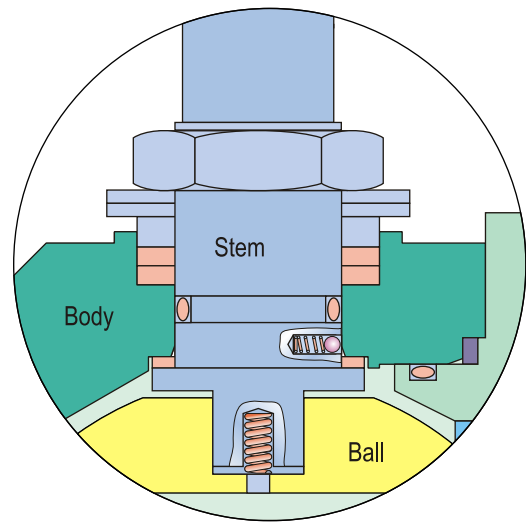


- **Blow-out Proof Stem**



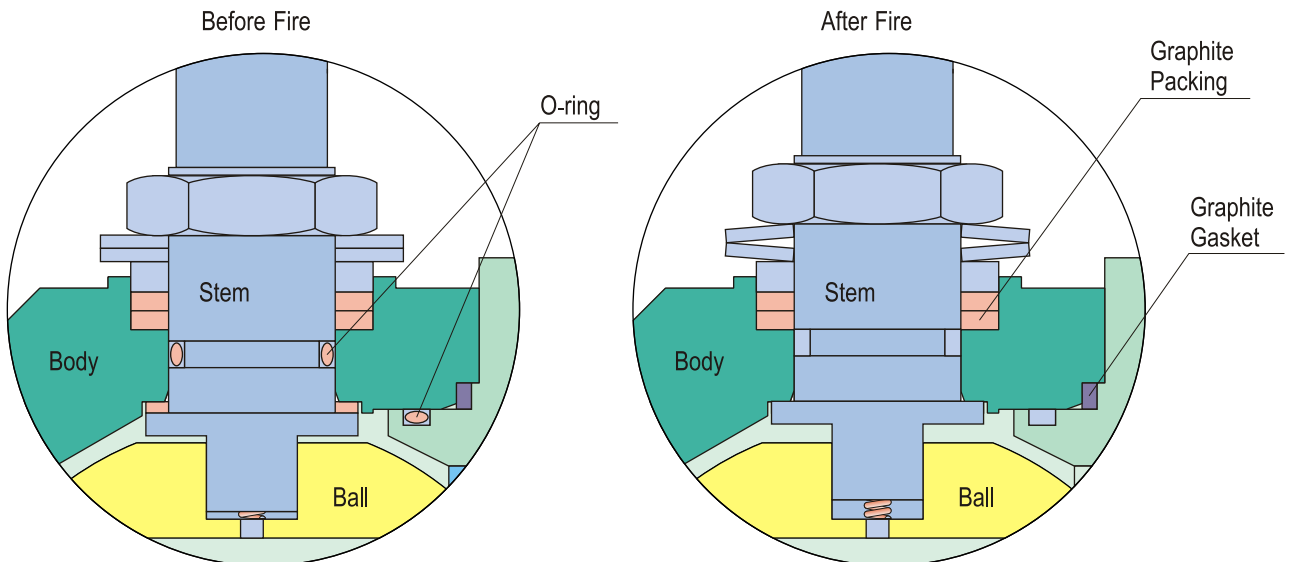
The stem is made separately from the ball with integral T-type round shoulder, installed internally from body side, retained by body to assure sealing safety at all pressure.

- **Anti-Static Device**



Spring plus graphite type anti-static device is applied between the ball, stem and body, to keep the electrical continuity between all the metallic components, and ensure the resistance lower than the most severe service requirement.

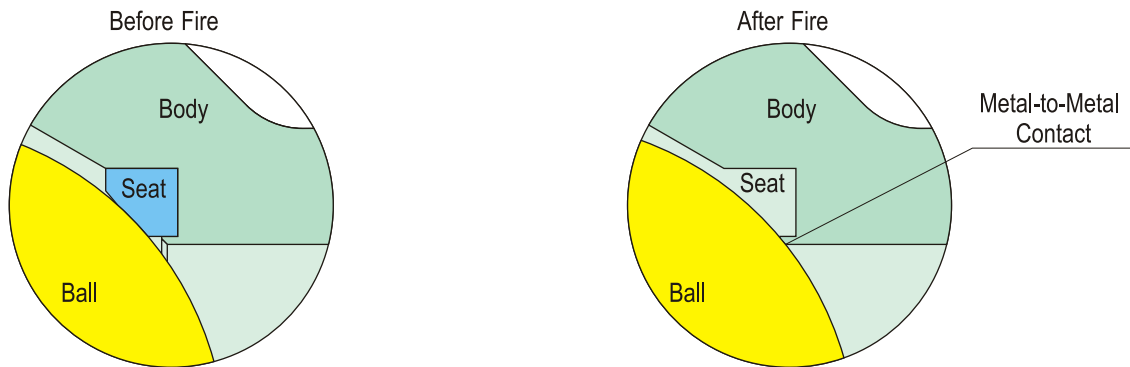
- **Fire Safe**



a) External leakage prevention

All the possible external leakage point between stem and body, body and adapter are made with primary O-ring seal and secondary graphite packing or gasket seal. When fire burned out the primary O-ring seal, the secondary graphite packing/gasket seal still can prevent the process medium without external leakage.



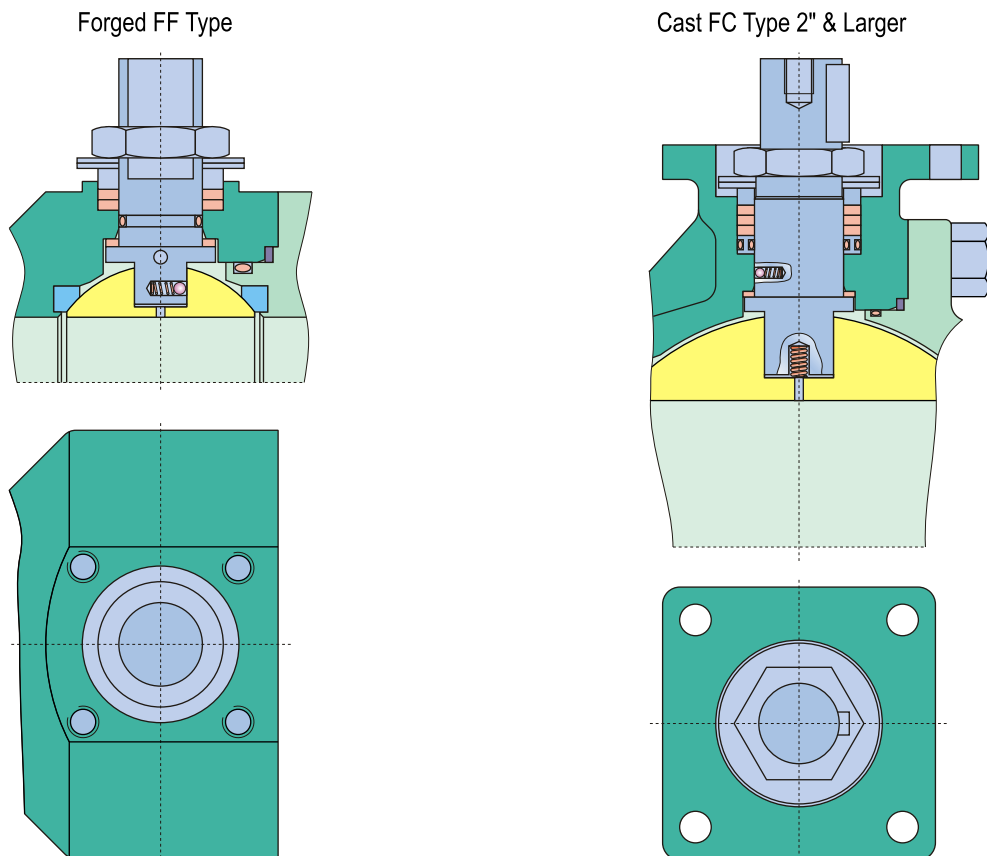


### b) Internal leakage prevention

When fire burned out the primary soft seat seal, the upstream medium pressure push the ball to downstream against the secondary metal seat lip to shut off the process medium and prevent internal leakage through the valve bore.

### • Top Mounting

All valves are designed and manufactured with ISO 5211 top mounting, for 2" & larger cast floating ball valve, actuator can be directly mounted on the valve.



### • Environment Friendly Valve

Accurate machining of stem and body sealing surfaces with double sealing (O-ring primary seal plus graphite packing seal), and dish spring live loaded ensure the low emission complying with the most severe pollution-control regulations. The test certifications are available on request.

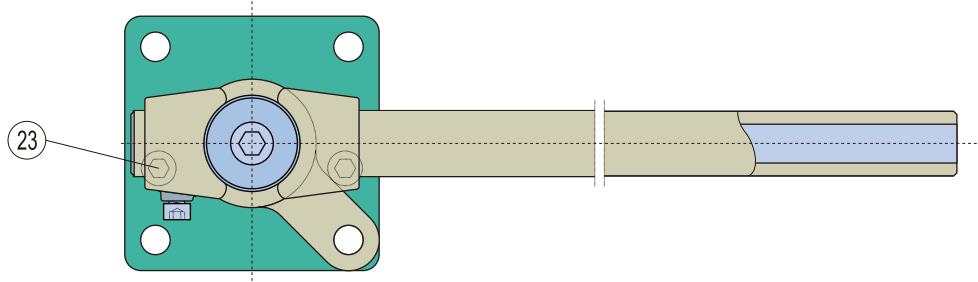
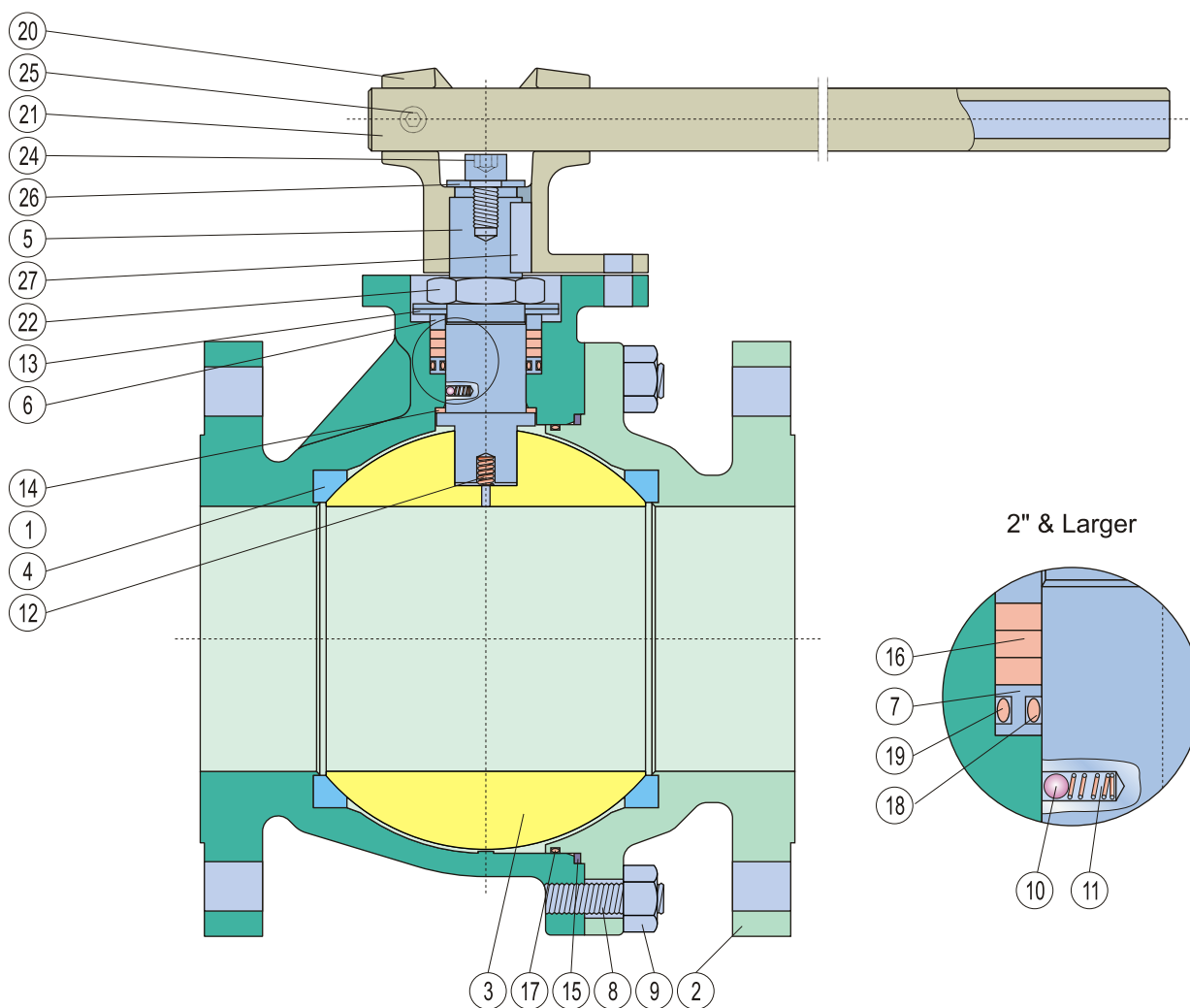


### Features

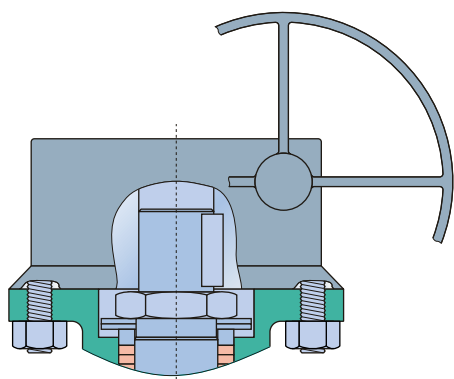
|                                    |
|------------------------------------|
| Size: 1/2"~10"                     |
| Class: 150~300                     |
| Two Pieces Cast Steel Body         |
| Floating Ball, Full & Reduced Bore |
| Anti-Static Device                 |
| Blow-out Proof Stem                |
| Fire Safe Design                   |
| Low Emission                       |

### Specifications

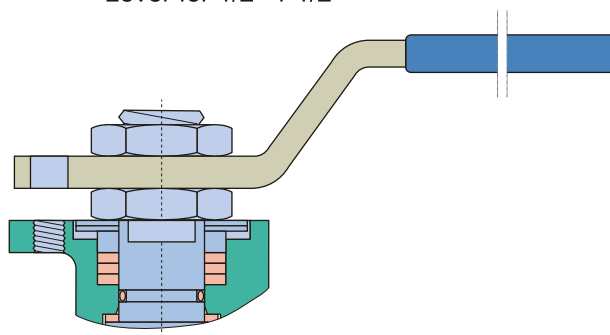
|                |                           |
|----------------|---------------------------|
| Design         | ASME B16.34/BS 5351/API6D |
| Face to Face   | ASME B16.10               |
| End to End     | ASME B16.10               |
| End Flange     | ASME B16.5                |
| BW End         | ASME B16.25               |
| Test           | API 598/ BS 6755          |
| Fire Safe Test | API 607/API 6FA           |
| Special        | NACE MR-01-75             |



Gear Standard for 6" & Larger



Lever for 1/2"-1 1/2"



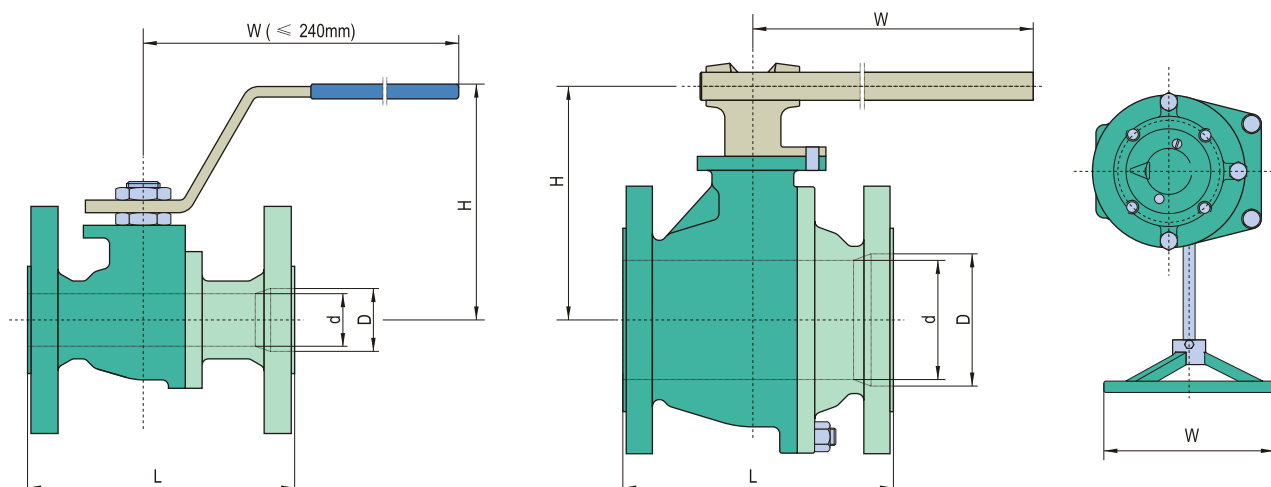
## Material Specifications

| No. | Part                  | WCB/304                  | WCB/316                  | CF8M/316                 | LCC/316 NACE             |
|-----|-----------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 1   | Body                  | ASTM A216-WCB            | ASTM A216-WCB            | ASTM A351-CF8M           | ASTM A351-LCC            |
| 2   | Adapter               | ASTM A216-WCB            | ASTM A216-WCB            | ASTM A351-CF8M           | ASTM A351-LCC            |
| 3   | Ball                  | ASTM A 351-CF8           | ASTM A 351-CF8M          | ASTM A 351-CF8M          | ASTM A 351-CF8M          |
| 4   | Seat                  | PTFE                     | PTFE                     | PTFE                     | PTFE                     |
| 5   | Stem                  | ASTM A182-F6a            | ASTM A182-F316           | ASTM A182-F316           | ASTM A182-F316           |
| 6   | Gland                 | ASTM A276-410            | ASTM A276-316            | ASTM A276-316            | ASTM A276-316            |
| 7   | O-Ring Box(2"&Larger) | ASTM A276-410            | ASTM A276-316            | ASTM A276-316            | ASTM A276-316            |
| 8   | Body Stud             | ASTM A193-B7             | ASTM A193-B7             | ASTM A193-B8             | ASTM A320-L7M            |
| 9   | Body Nut              | ASTM A194-2H             | ASTM A194-2H             | ASTM A194-8              | ASTM A194-7M             |
| 10  | Steel Ball            | Stainless Steel          | Stainless Steel          | Stainless Steel          | Stainless Steel          |
| 11  | Antistatic Spring     | INCONEL X-750            | INCONEL X-750            | INCONEL X-750            | INCONEL X-750            |
| 12  | Antistatic Spring     | INCONEL X-750            | INCONEL X-750            | INCONEL X-750            | INCONEL X-750            |
| 13  | Dish Spring           | Alloy Steel              | Alloy Steel              | Alloy Steel              | Alloy Steel              |
| 14  | Thrust Washer         | PTFE                     | PTFE                     | PTFE                     | PTFE                     |
| 15  | *Gasket               | Graphite                 | Graphite                 | Graphite                 | Graphite                 |
| 16  | *Packing              | Graphite                 | Graphite                 | Graphite                 | Graphite                 |
| 17  | *O-Ring               | Viton                    | Viton                    | Viton                    | Viton                    |
| 18  | *O-Ring               | Viton                    | Viton                    | Viton                    | Viton                    |
| 19  | *O-Ring               | Viton                    | Viton                    | Viton                    | Viton                    |
| 20  | Lever Head            | Carbon Steel Zinc Plated | Carbon Steel Zinc Plated | Carbon Steel Zinc Plated | Carbon Steel Zinc Plated |
| 21  | Lever Pipe            | Carbon Steel Zinc Plated | Carbon Steel Zinc Plated | Carbon Steel Zinc Plated | Carbon Steel Zinc Plated |
| 22  | Nut                   | Carbon Steel             | Carbon Steel             | Stainless Steel          | Carbon Steel             |
| 23  | Position Screw        | Carbon Steel             | Carbon Steel             | Stainless Steel          | Carbon Steel             |
| 24  | Screw                 | Carbon Steel             | Carbon Steel             | Stainless Steel          | Carbon Steel             |
| 25  | Screw                 | Carbon Steel             | Carbon Steel             | Stainless Steel          | Carbon Steel             |
| 26  | Washer                | Carbon Steel             | Carbon Steel             | Stainless Steel          | Carbon Steel             |
| 27  | Key                   | Carbon Steel             | Carbon Steel             | Stainless Steel          | Carbon Steel             |

\* Recommended Spare Parts



## Dimensions and Weights



Full Bore

Class 150

| Size  | d   | L   | H   | W    | Weight |
|-------|-----|-----|-----|------|--------|
| in    | mm  | mm  | mm  | mm   | Kg     |
| 1/2   | 13  | 108 | 85  | 160  | 2.2    |
| 3/4   | 19  | 117 | 93  | 160  | 2.7    |
| 1     | 25  | 127 | 112 | 180  | 4.5    |
| 1-1/2 | 38  | 165 | 132 | 240  | 7.0    |
| 2     | 51  | 178 | 138 | 350  | 9.5    |
| 2-1/2 | 64  | 191 | 155 | 400  | 15     |
| 3     | 76  | 203 | 175 | 400  | 19     |
| 4     | 102 | 229 | 200 | 450  | 30     |
| 5     | 125 | 356 | 230 | 550  | 58     |
| 6     | 152 | 394 | 230 | *300 | 75     |
| 8     | 203 | 457 | 290 | *400 | 115    |
| 10    | 254 | 533 | 320 | *400 | 180    |

Reduced Bore

Class 150

| Size    | d   | D   | L   | H   | W    | Weight |
|---------|-----|-----|-----|-----|------|--------|
| in      | mm  | mm  | mm  | mm  | mm   | Kg     |
| 3/4*1/2 | 13  | 19  | 117 | 85  | 160  | 2.5    |
| 1*3/4   | 19  | 25  | 127 | 93  | 160  | 4.0    |
| 1-1/2*1 | 25  | 38  | 165 | 112 | 180  | 6.2    |
| 2*1-1/2 | 38  | 51  | 178 | 132 | 240  | 8.6    |
| 2-1/2*2 | 51  | 64  | 191 | 138 | 350  | 13.0   |
| 3*2     | 51  | 76  | 203 | 138 | 350  | 18.9   |
| 4*3     | 76  | 102 | 229 | 175 | 400  | 23     |
| 6*4     | 102 | 152 | 267 | 200 | 450  | 55     |
| 8*6     | 152 | 203 | 292 | 230 | *300 | 83     |
| 10*8    | 203 | 254 | 330 | 290 | *400 | 122    |

\* Gear Operated

Full Bore

Class 300

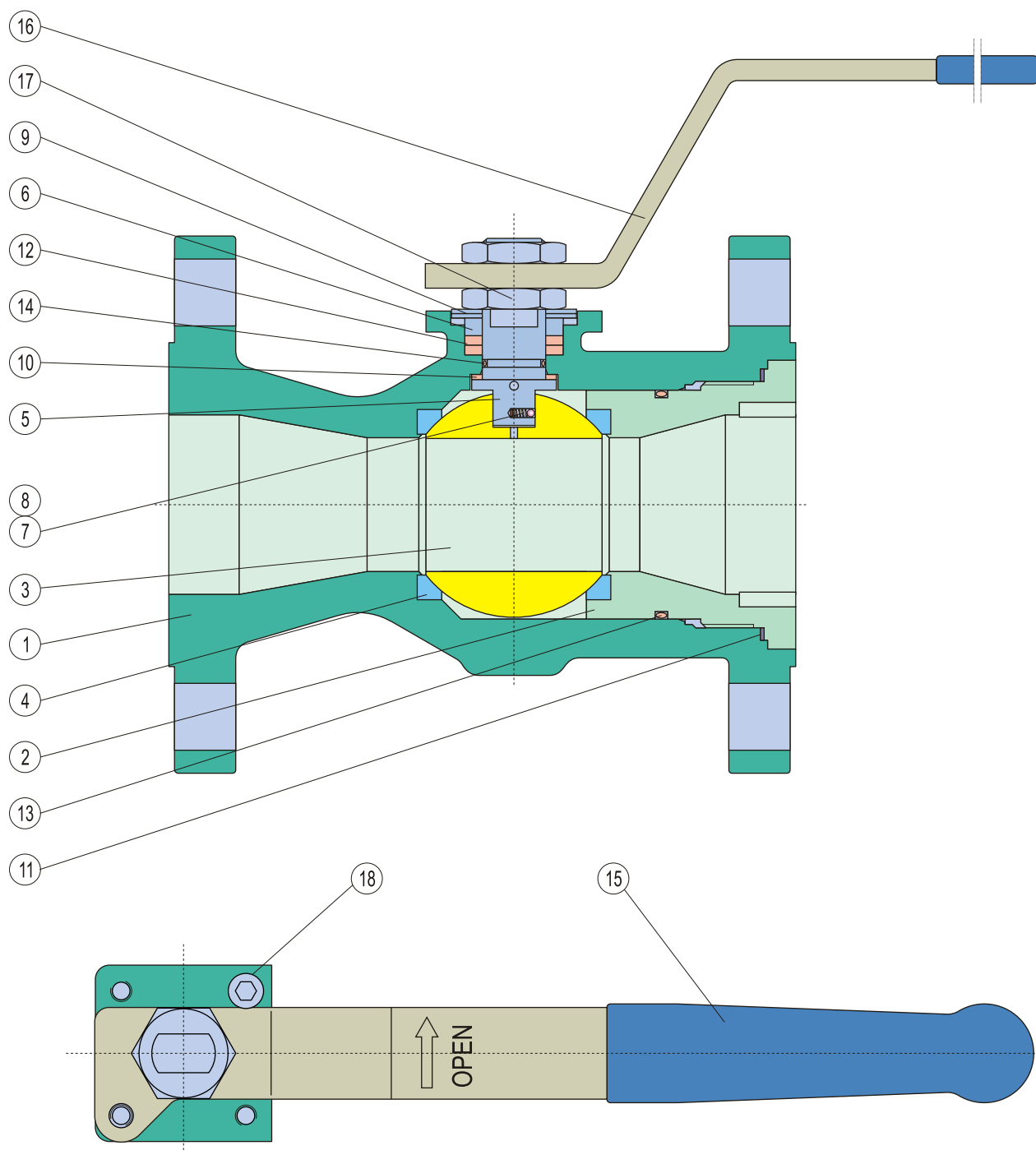
| Size  | d   | L   | H   | W    | Weight |
|-------|-----|-----|-----|------|--------|
| in    | mm  | mm  | mm  | mm   | Kg     |
| 1/2   | 13  | 140 | 85  | 160  | 2.5    |
| 3/4   | 19  | 152 | 93  | 160  | 3.5    |
| 1     | 25  | 165 | 112 | 180  | 5.5    |
| 1-1/2 | 38  | 191 | 132 | 240  | 9      |
| 2     | 51  | 216 | 138 | 400  | 13     |
| 2-1/2 | 64  | 241 | 155 | 400  | 21     |
| 3     | 76  | 283 | 175 | 450  | 27     |
| 4     | 102 | 305 | 200 | 500  | 40     |
| 5     | 125 | 381 | 230 | 550  | 65     |
| 6     | 152 | 403 | 230 | *300 | 95     |
| 8     | 203 | 502 | 290 | *400 | 150    |
| 10    | 254 | 568 | 320 | *400 | 230    |

Reduced Bore

Class 300

| Size    | d   | D   | L   | H   | W    | Weight |
|---------|-----|-----|-----|-----|------|--------|
| in      | mm  | mm  | mm  | mm  | mm   | Kg     |
| 3/4*1/2 | 13  | 19  | 152 | 85  | 160  | 3.2    |
| 1*3/4   | 19  | 25  | 165 | 93  | 160  | 5      |
| 1-1/2*1 | 25  | 38  | 191 | 112 | 180  | 8      |
| 2*1-1/2 | 38  | 51  | 216 | 132 | 240  | 12     |
| 2-1/2*2 | 51  | 64  | 241 | 138 | 400  | 19     |
| 3*2     | 51  | 76  | 283 | 138 | 400  | 26     |
| 4*3     | 76  | 102 | 305 | 175 | 450  | 38     |
| 6*4     | 102 | 152 | 403 | 200 | 500  | 75     |
| 8*6     | 152 | 203 | 419 | 230 | *300 | 130    |
| 10*8    | 203 | 254 | 457 | 290 | *400 | 200    |

\* Gear Operated



## Features

|                             |
|-----------------------------|
| Size: 1/2"~6"               |
| Class: 150~300              |
| One Piece Cast Steel Body   |
| Floating Ball, Reduced Bore |
| Anti-Static Device          |
| Blow-out Proof Stem         |
| Fire Safe Design            |

## Specifications

|                |                     |
|----------------|---------------------|
| Design         | ASME B16.34/API 608 |
| Face to Face   | ASME B16.10         |
| End to End     | ASME B16.10         |
| End Flange     | ASME B16.5          |
| Test           | API 598             |
| Fire Safe Test | API 607/API 6FA     |
| Special        | NACE MR-01-75       |

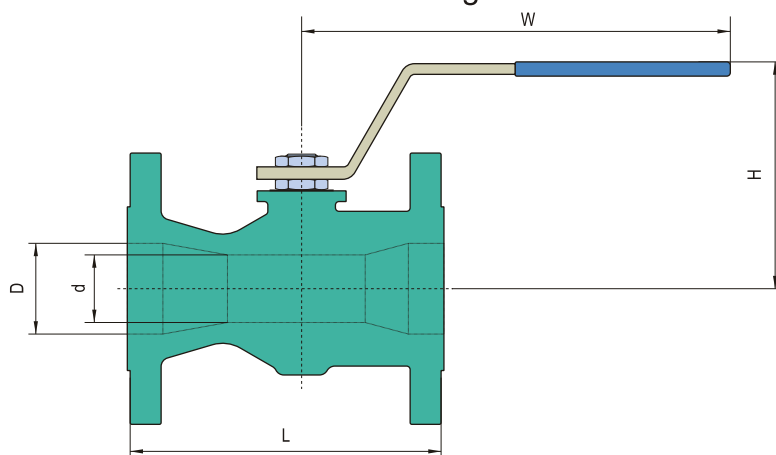


## Material Specifications

| No. | Part              | WCB/304                  | WCB/316                  | CF8M/316                 | LCC/316 NACE             |
|-----|-------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 1   | Body              | ASTM A216-WCB            | ASTM A216-WCB            | ASTM A351-CF8M           | ASTM A352-LCC            |
| 2   | Adapter           | ASTM A 216-WCB           | ASTM A 216-WCB           | ASTM A 351-CF8M          | ASTM A 352-LCC           |
| 3   | Ball              | ASTM A 351-CF8           | ASTM A 351-CF8M          | ASTM A 351-CF8M          | ASTM A 351-CF8M          |
| 4   | Seat              | PTFE                     | PTFE                     | PTFE                     | PTFE                     |
| 5   | Stem              | ASTM A182-F6a            | ASTM A182-F316           | ASTM A182-F316           | ASTM A182-F316           |
| 6   | Gland             | ASTM A276-410            | ASTM A276-316            | ASTM A276-316            | ASTM A276-316            |
| 7   | Steel Ball        | Stainless Steel          | Stainless Steel          | Stainless Steel          | Stainless Steel          |
| 8   | Antistatic Spring | INCONEL X-750            | INCONEL X-750            | INCONEL X-750            | INCONEL X-750            |
| 9   | Dish Spring       | Alloy Steel              | Alloy Steel              | Alloy Steel              | Alloy Steel              |
| 10  | Thrust Washer     | PTFE                     | PTFE                     | PTFE                     | PTFE                     |
| 11  | * Gasket          | Graphite                 | Graphite                 | Graphite                 | Graphite                 |
| 12  | * Packing         | Graphite                 | Graphite                 | Graphite                 | Graphite                 |
| 13  | * O-Ring          | Viton                    | Viton                    | Viton                    | Viton                    |
| 14  | * O-Ring          | Viton                    | Viton                    | Viton                    | Viton                    |
| 15  | Lever Cover       | Plastic                  | Plastic                  | Plastic                  | Plastic                  |
| 16  | Lever             | Carbon Steel Zinc Plated | Carbon Steel Zinc Plated | Carbon Steel Zinc Plated | Carbon Steel Zinc Plated |
| 17  | Nut               | Carbon Steel             | Carbon Steel             | Stainless Steel          | Carbon Steel             |
| 18  | Position Screw    | Carbon Steel             | Carbon Steel             | Stainless Steel          | Carbon Steel             |

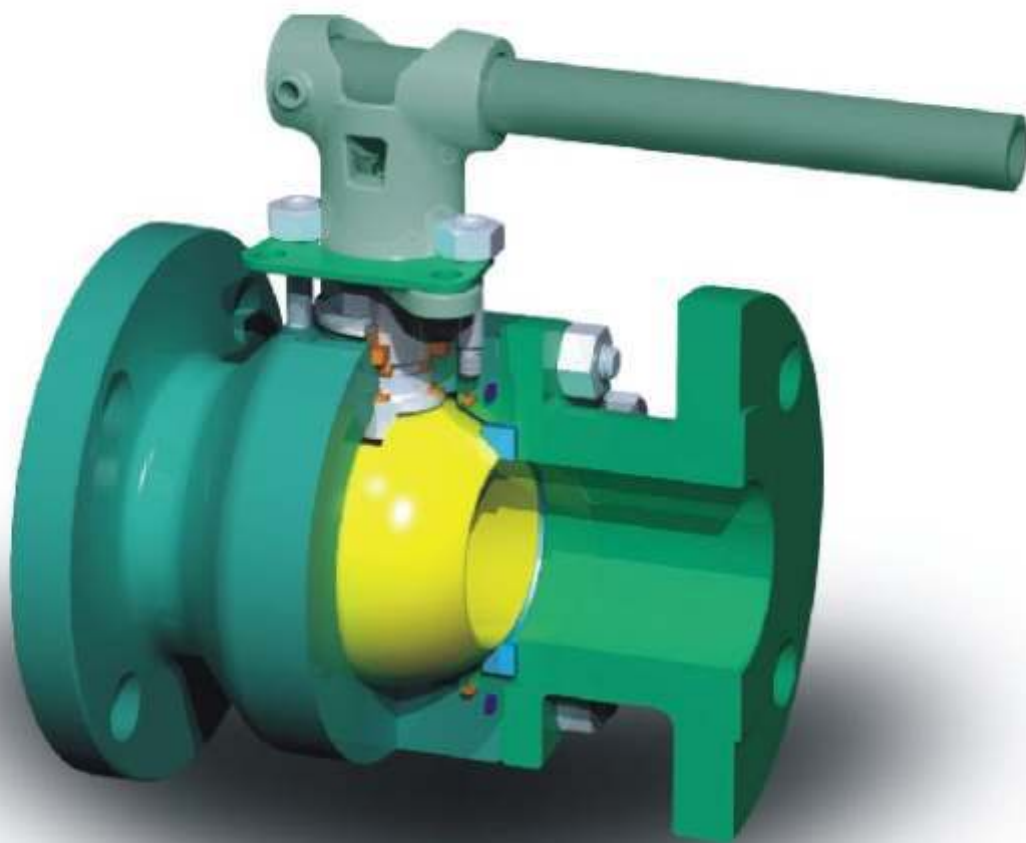
\* Recommended Spare Parts

## Dimensions and Weights



| Class 150 |     |     |     |     |     |        |
|-----------|-----|-----|-----|-----|-----|--------|
| Size      | d   | D   | L   | H   | W   | Weight |
| in        | mm  | mm  | mm  | mm  | mm  | Kg     |
| 1/2       | 10  | 13  | 108 | 89  | 129 | 5.4    |
| 3/4       | 15  | 18  | 117 | 89  | 129 | 6.0    |
| 1         | 19  | 25  | 127 | 90  | 170 | 6.6    |
| 1-1/2     | 32  | 40  | 165 | 106 | 224 | 7.8    |
| 2         | 38  | 50  | 178 | 111 | 224 | 12     |
| 3         | 59  | 80  | 203 | 146 | 356 | 23     |
| 4         | 76  | 102 | 229 | 171 | 356 | 38     |
| 6         | 102 | 150 | 267 | 246 | 546 | 80     |

| Class 300 |     |     |     |     |     |        |
|-----------|-----|-----|-----|-----|-----|--------|
| Size      | d   | D   | L   | H   | W   | Weight |
| in        | mm  | mm  | mm  | mm  | mm  | Kg     |
| 1/2       | 10  | 13  | 140 | 89  | 129 | 6.0    |
| 3/4       | 15  | 18  | 152 | 89  | 129 | 6.6    |
| 1         | 19  | 25  | 165 | 90  | 170 | 7.2    |
| 1-1/2     | 32  | 40  | 191 | 106 | 224 | 13     |
| 2         | 38  | 50  | 216 | 111 | 224 | 18     |
| 3         | 59  | 80  | 283 | 160 | 356 | 36     |
| 4         | 76  | 102 | 305 | 186 | 506 | 54     |
| 6         | 102 | 150 | 403 | 284 | 762 | 108    |

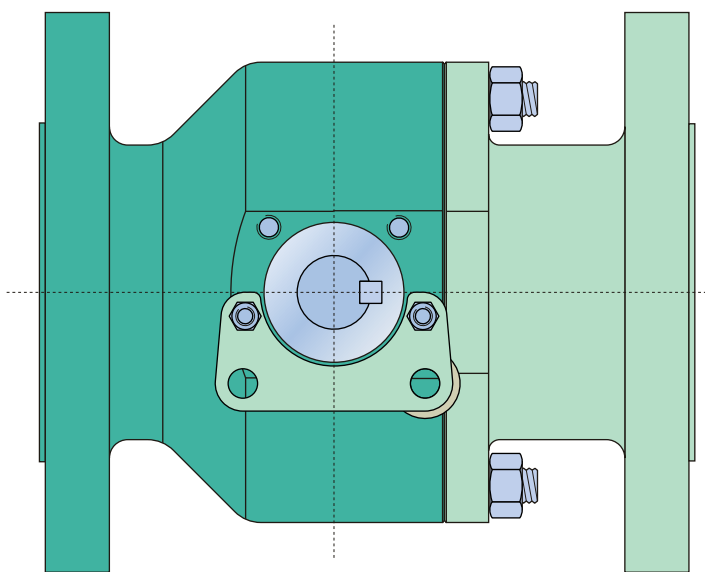
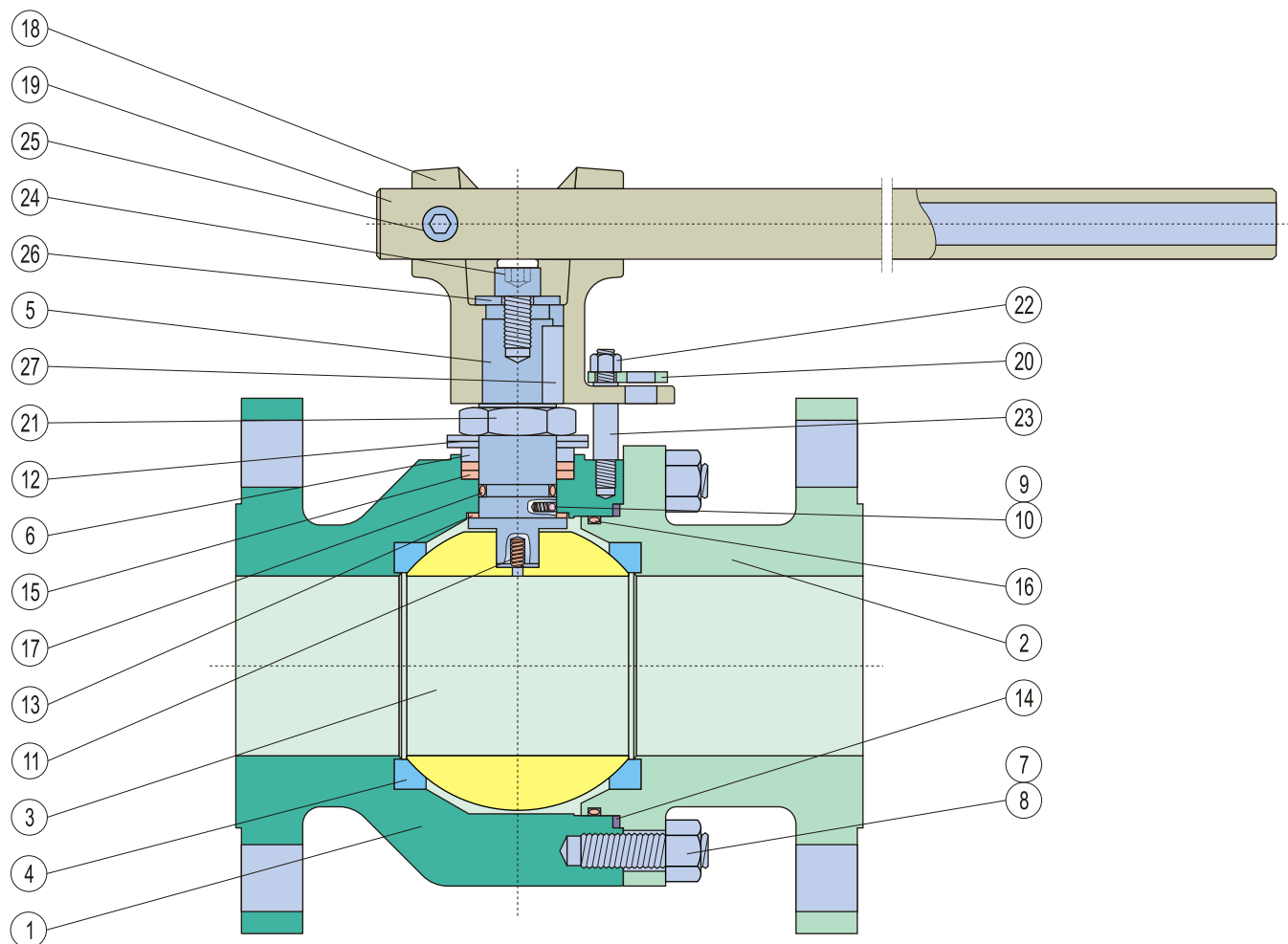


### Features

|                                    |
|------------------------------------|
| Size: 1/2"~10"                     |
| Class: 150~2500                    |
| 2PC/3PC Body Forged Steel Body     |
| Floating Ball, Full & Reduced Bore |
| Anti-Static Device                 |
| Blow-out Proof Stem                |
| Fire Safe Design                   |
| Low Emission                       |

### Specifications

|                |                           |
|----------------|---------------------------|
| Design         | ASME B16.34/BS 5351/API6D |
| Face to Face   | ASME B16.10               |
| End to End     | ASME B16.10               |
| End Flange     | ASME B16.5                |
| BW End         | ASME B16.25               |
| Test           | API 598/ BS 6755          |
| Fire Safe Test | API 607/API 6FA           |
| Special        | NACE MR-01-75             |



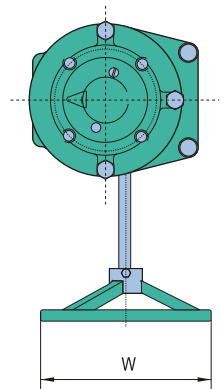
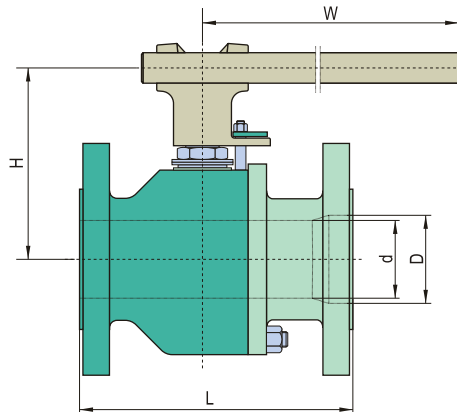
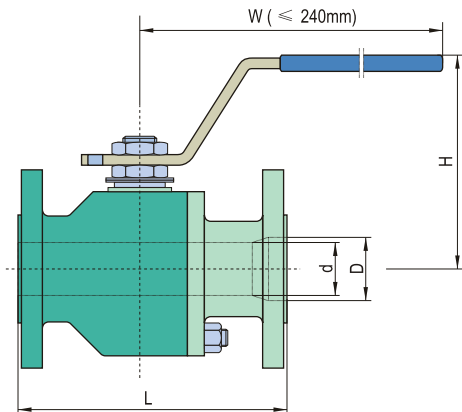
## Material Specifications

| No. | Part              | WCB/304                  | WCB/316                  | CF8M/316                 | LLC/316                  |
|-----|-------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 1   | Body              | ASTM A 216-WCB/A105      | ASTM A 216-WCB/A105      | ASTM A 351-CF8M/F316     | ASTM A 352-LLC/LCB       |
| 2   | Adapter           | ASTM A 216-WCB/A105      | ASTM A 216-WCB/A105      | ASTM A 351-CF8M/F316     | ASTM A 352-LLC/LCB       |
| 3   | Ball              | ASTM A 351-CF8/F304      | ASTM A 351-CF8M/F316     | ASTM A 351-CF8M/F316     | ASTM A 351-CF8M/F316     |
| 4   | Seat              | PTFE/Nylon/PEEK          | PTFE/Nylon/PEEK          | PTFE/Nylon/PEEK          | PTFE/Nylon/PEEK          |
| 5   | Stem              | ASTM A182-F6a            | ASTM A182-F316           | ASTM A182-F316           | ASTM A182-F316           |
| 6   | Gland             | ASTM A276-410            | ASTM A276-316            | ASTM A276-316            | ASTM A276-316            |
| 7   | Body Stud         | ASTM A193-B7             | ASTM A193-B7             | ASTM A193-B8             | ASTM A193-L7M            |
| 8   | Body Nut          | ASTM A194-2H             | ASTM A194-2H             | ASTM A194-8              | ASTM A194-7M             |
| 9   | Steel Ball        | Stainless Steel          | Stainless Steel          | Stainless Steel          | Stainless Steel          |
| 10  | Antistatic Spring | INCONEL X-750            | INCONEL X-750            | INCONEL X-750            | INCONEL X-750            |
| 11  | Antistatic Spring | INCONEL X-750            | INCONEL X-750            | INCONEL X-750            | INCONEL X-750            |
| 12  | Dish Spring       | Alloy Steel              | Alloy Steel              | Alloy Steel              | Alloy Steel              |
| 13  | Thrust Washer     | PTFE                     | PTFE                     | PTFE                     | PTFE                     |
| 14  | *Gasket           | Graphite                 | Graphite                 | Graphite                 | Graphite                 |
| 15  | *Packing          | Graphite                 | Graphite                 | Graphite                 | Graphite                 |
| 16  | *O-Ring           | Viton                    | Viton                    | Viton                    | Viton                    |
| 17  | *O-Ring           | Viton                    | Viton                    | Viton                    | Viton                    |
| 18  | Lever Head        | Carbon Steel Zinc Plated | Carbon Steel Zinc Plated | Carbon Steel Zinc Plated | Carbon Steel Zinc Plated |
| 19  | Lever Pipe        | Carbon Steel Zinc Plated | Carbon Steel Zinc Plated | Carbon Steel Zinc Plated | Carbon Steel Zinc Plated |
| 20  | Lock Plate        | Carbon Steel Zinc Plated | Carbon Steel Zinc Plated | Carbon Steel Zinc Plated | Carbon Steel Zinc Plated |
| 21  | Nut               | Carbon Steel             | Carbon Steel             | Stainless Steel          | Carbon Steel             |
| 22  | Nut               | Carbon Steel             | Carbon Steel             | Stainless Steel          | Carbon Steel             |
| 23  | Position Screw    | Carbon Steel             | Carbon Steel             | Stainless Steel          | Carbon Steel             |
| 24  | Screw             | Carbon Steel             | Carbon Steel             | Stainless Steel          | Carbon Steel             |
| 25  | Screw             | Carbon Steel             | Carbon Steel             | Stainless Steel          | Carbon Steel             |
| 26  | Washer            | Carbon Steel             | Carbon Steel             | Stainless Steel          | Carbon Steel             |
| 27  | Key               | Carbon Steel             | Carbon Steel             | Stainless Steel          | Carbon Steel             |

\* Recommended Spare Parts



## Dimensions and Weights



Gear Operation

## Full Bore

## Class 150

| Size  | d   | L   | H   | W    | Weight |
|-------|-----|-----|-----|------|--------|
| in    | mm  | mm  | mm  | mm   | Kg     |
| 1/2   | 13  | 108 | 85  | 160  | 2.8    |
| 3/4   | 19  | 117 | 93  | 160  | 3.7    |
| 1     | 25  | 127 | 112 | 180  | 5.3    |
| 1-1/2 | 38  | 165 | 125 | 240  | 8.3    |
| 2     | 51  | 178 | 126 | 350  | 11.2   |
| 2-1/2 | 64  | 191 | 139 | 400  | 18.4   |
| 3     | 76  | 203 | 164 | 400  | 23     |
| 4     | 102 | 229 | 185 | 450  | 39.3   |
| 5     | 125 | 356 | 240 | 550  | 69.3   |
| 6     | 152 | 394 | 270 | *300 | 90     |
| 8     | 203 | 457 | 360 | *400 | 140    |
| 10    | 254 | 533 | 410 | *400 | 230    |

## Reduced Bore

## Class 150

| Size    | d   | D   | L   | H   | W    | Weight |
|---------|-----|-----|-----|-----|------|--------|
| in      | mm  | mm  | mm  | mm  | mm   | Kg     |
| 3/4*1/2 | 13  | 19  | 117 | 85  | 160  | 3.5    |
| 1*3/4   | 19  | 25  | 127 | 93  | 160  | 5.0    |
| 1-1/2*1 | 25  | 38  | 165 | 112 | 180  | 7.5    |
| 2*1-1/2 | 38  | 51  | 178 | 125 | 240  | 10     |
| 2-1/2*2 | 51  | 64  | 191 | 126 | 350  | 16     |
| 3*2     | 51  | 76  | 203 | 126 | 350  | 21     |
| 4*3     | 76  | 102 | 229 | 164 | 400  | 35     |
| 6*4     | 102 | 152 | 267 | 185 | 450  | 73     |
| 8*6     | 152 | 203 | 292 | 270 | *300 | 120    |
| 10*8    | 203 | 254 | 330 | 360 | *400 | 200    |

\* Gear Operated

## Full Bore

## Class 300

| Size  | d   | L   | H   | W    | Weight |
|-------|-----|-----|-----|------|--------|
| in    | mm  | mm  | mm  | mm   | Kg     |
| 1/2   | 13  | 140 | 85  | 160  | 3.0    |
| 3/4   | 19  | 152 | 93  | 160  | 4.0    |
| 1     | 25  | 165 | 112 | 180  | 6.6    |
| 1-1/2 | 38  | 191 | 125 | 240  | 12.9   |
| 2     | 51  | 216 | 126 | 400  | 18.9   |
| 2-1/2 | 64  | 241 | 139 | 400  | 28     |
| 3     | 76  | 283 | 164 | 450  | 39     |
| 4     | 102 | 305 | 185 | 500  | 60     |
| 5     | 125 | 381 | 240 | 550  | 90     |
| 6     | 152 | 403 | 270 | *300 | 130    |
| 8     | 203 | 502 | 360 | *400 | 195    |
| 10    | 254 | 568 | 410 | *400 | 290    |

## Reduced Bore

## Class 300

| Size    | d   | D   | L   | H   | W    | Weight |
|---------|-----|-----|-----|-----|------|--------|
| in      | mm  | mm  | mm  | mm  | mm   | Kg     |
| 3/4*1/2 | 13  | 19  | 152 | 85  | 160  | 3.7    |
| 1*3/4   | 19  | 25  | 165 | 93  | 160  | 5.8    |
| 1-1/2*1 | 25  | 38  | 191 | 112 | 180  | 10.5   |
| 2*1-1/2 | 38  | 51  | 216 | 125 | 240  | 16.1   |
| 2-1/2*2 | 51  | 64  | 241 | 126 | 400  | 24.5   |
| 3*2     | 51  | 76  | 283 | 126 | 400  | 34.7   |
| 4*3     | 76  | 102 | 305 | 164 | 450  | 53     |
| 6*4     | 102 | 152 | 403 | 185 | 500  | 100    |
| 8*6     | 152 | 203 | 419 | 270 | *300 | 170    |
| 10*8    | 203 | 254 | 457 | 360 | *400 | 250    |

\* Gear Operated

## Full Bore

## Class 600

| Size  | d   | L   | H   | W   | Weight |
|-------|-----|-----|-----|-----|--------|
| in    | mm  | mm  | mm  | mm  | Kg     |
| 1/2   | 13  | 165 | 85  | 160 | 3.5    |
| 3/4   | 19  | 191 | 93  | 180 | 5.0    |
| 1     | 25  | 216 | 112 | 240 | 7.5    |
| 1-1/2 | 38  | 241 | 125 | 350 | 15     |
| 2     | 51  | 292 | 130 | 400 | 23     |
| 3     | 76  | 356 | 178 | 500 | 48     |
| 4     | 102 | 432 | 190 | 700 | 80     |

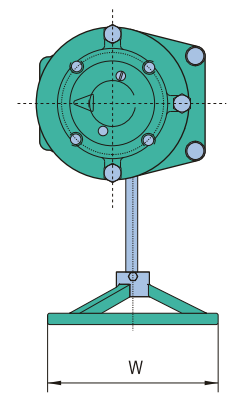
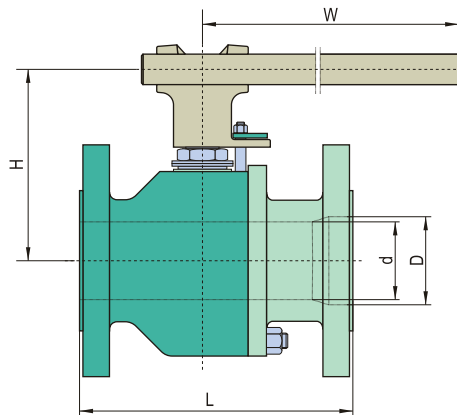
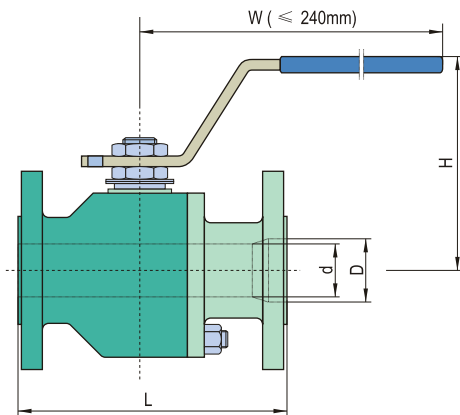
## Reduced Bore

## Class 600

| Size    | d   | D   | L   | H   | W   | Weight |
|---------|-----|-----|-----|-----|-----|--------|
| in      | mm  | mm  | mm  | mm  | mm  | Kg     |
| 3/4*1/2 | 13  | 19  | 191 | 85  | 160 | 4.0    |
| 1*3/4   | 19  | 25  | 216 | 93  | 180 | 5.5    |
| 1-1/2*1 | 25  | 38  | 241 | 112 | 240 | 10.5   |
| 2*1-1/2 | 38  | 51  | 292 | 125 | 350 | 20     |
| 3*2     | 51  | 76  | 356 | 130 | 400 | 29     |
| 4*3     | 76  | 102 | 432 | 178 | 500 | 59     |
| 6*4     | 102 | 152 | 559 | 190 | 700 | 95     |

\* Gear Operated

## Dimensions and Weights



Gear Operation

Full Bore Class 900

| Size  | D  | L   | H   | W   | Weight |
|-------|----|-----|-----|-----|--------|
| in    | mm | mm  | mm  | mm  | Kg     |
| 1/2   | 13 | 216 | 85  | 160 | 5      |
| 3/4   | 19 | 229 | 93  | 180 | 8      |
| 1     | 25 | 254 | 112 | 240 | 10     |
| 1-1/2 | 38 | 305 | 128 | 400 | 20     |
| 2     | 51 | 368 | 132 | 450 | 25     |
| 3     | 76 | 381 | 182 | 600 | 50     |

Reduced Bore Class 900

| Size    | d  | D   | L   | H   | W   | Weight |
|---------|----|-----|-----|-----|-----|--------|
| in      | mm | mm  | mm  | mm  | mm  | Kg     |
| 3/4*1/2 | 13 | 19  | 229 | 85  | 160 | 7.0    |
| 1*3/4   | 19 | 25  | 254 | 93  | 180 | 9.5    |
| 1-1/2*1 | 25 | 38  | 305 | 112 | 240 | 16.5   |
| 2*1-1/2 | 38 | 51  | 368 | 128 | 400 | 23     |
| 3*2     | 51 | 76  | 381 | 132 | 450 | 42     |
| 4*3     | 76 | 102 | 457 | 182 | 600 | 65     |

Full Bore Class 1500

| Size  | D  | L   | H   | W   | Weight |
|-------|----|-----|-----|-----|--------|
| in    | mm | mm  | mm  | mm  | Kg     |
| 1/2   | 13 | 216 | 85  | 160 | 5      |
| 3/4   | 19 | 229 | 93  | 180 | 8      |
| 1     | 25 | 254 | 112 | 240 | 10     |
| 1-1/2 | 38 | 305 | 128 | 400 | 20     |
| 2     | 51 | 368 | 132 | 450 | 30     |

Reduced Bore Class 1500

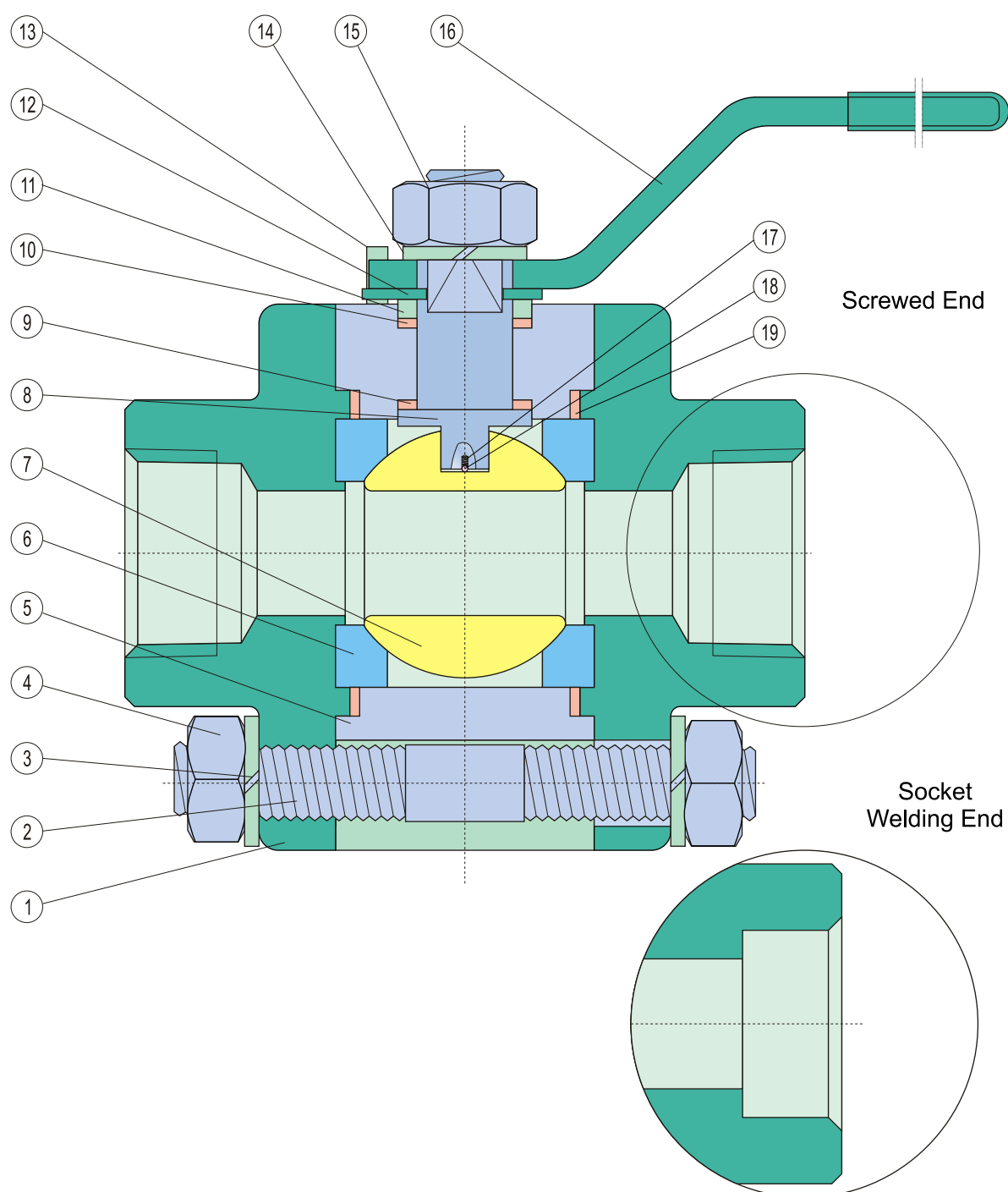
| Size    | d  | D  | L   | H   | W   | Weight |
|---------|----|----|-----|-----|-----|--------|
| in      | mm | mm | mm  | mm  | mm  | Kg     |
| 3/4*1/2 | 13 | 19 | 229 | 85  | 160 | 7.0    |
| 1*3/4   | 19 | 25 | 254 | 93  | 180 | 9.5    |
| 1-1/2*1 | 25 | 38 | 305 | 112 | 240 | 16.5   |
| 2*1-1/2 | 38 | 51 | 368 | 128 | 400 | 23     |
| 3*2     | 51 | 76 | 470 | 132 | 450 | 50     |

Full Bore Class 2500

| Size  | D  | L   | H   | W   | Weight |
|-------|----|-----|-----|-----|--------|
| in    | mm | mm  | mm  | mm  | Kg     |
| 1/2   | 13 | 264 | 93  | 180 | 7.5    |
| 3/4   | 19 | 273 | 96  | 240 | 12     |
| 1     | 25 | 308 | 117 | 350 | 15     |
| 1-1/2 | 38 | 384 | 132 | 450 | 30     |
| 2     | 51 | 451 | 138 | 550 | 37.5   |

Reduced Bore Class 2500

| Size    | d  | D  | L   | H   | W   | Weight |
|---------|----|----|-----|-----|-----|--------|
| in      | mm | mm | mm  | mm  | mm  | Kg     |
| 3/4*1/2 | 13 | 19 | 273 | 93  | 180 | 11     |
| 1*3/4   | 19 | 25 | 308 | 96  | 240 | 14     |
| 1-1/2*1 | 25 | 38 | 384 | 117 | 350 | 25     |
| 2*1-1/2 | 38 | 51 | 451 | 132 | 450 | 35     |
| 3*2     | 51 | 76 | 578 | 138 | 550 | 60     |



### Features

|                                |
|--------------------------------|
| Size: 1/2"~2"                  |
| Class: 800~1500                |
| Three Pieces Forged Steel Body |
| Floating Ball                  |
| Anti-Static Device             |
| Blow-out Proof Stem            |

### Specifications

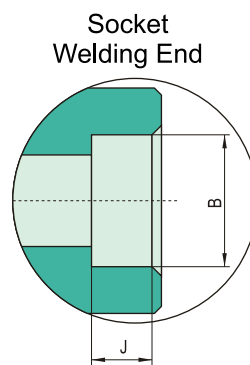
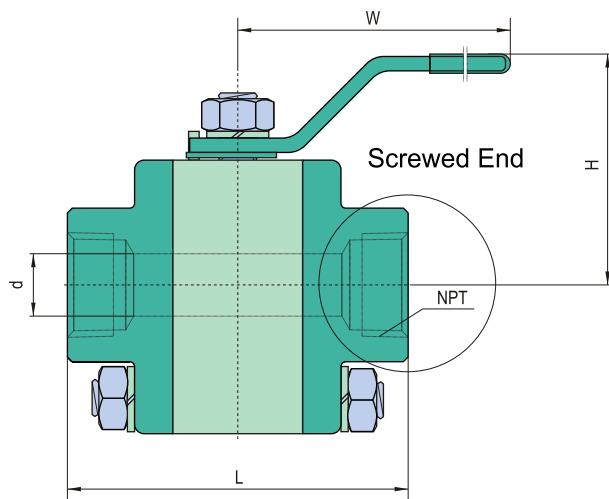
|                    |                       |
|--------------------|-----------------------|
| Design             | ASME B16.34/BS 5351   |
| End to End         | Manufacturer Standard |
| Screwed End        | ASME B1.20.1          |
| Socket Welding End | ASME B16.11           |
| Test               | API 598/ BS 6755      |
| Special            | NACE MR-01-75         |

## Material Specifications

| No. | Part              | A105/304        | A105/316        | F316/316        | LF2/316 NACE    |
|-----|-------------------|-----------------|-----------------|-----------------|-----------------|
| 1   | Adapter           | ASTM A105       | ASTM A105       | ASTM A182-F316  | ASTM A350-LF2   |
| 2   | Body Bolt         | ASTM A193-B7    | ASTM A193-B7    | ASTM A193-B8    | ASTM A320-L7M   |
| 3   | Spring Washer     | Carbon Steel    | Carbon Steel    | Stainless Steel | Stainless Steel |
| 4   | Body Nut          | ASTM A194-2H    | ASTM A194-2H    | ASTM A194-8     | ASTM A194-7M    |
| 5   | Body              | ASTM A105       | ASTM A105       | ASTM A182-F316  | ASTM A350-LF2   |
| 6   | Seat              | PTFE            | PTFE            | PTFE            | PTFE            |
| 7   | Ball              | ASTM A182-F304  | ASTM A182-F316  | ASTM A182-F316  | ASTM A182-F316  |
| 8   | Stem              | ASTM A276-304   | ASTM A276-316   | ASTM A276-316   | ASTM A276-316   |
| 9   | Thrust Washer     | PTFE            | PTFE            | PTFE            | PTFE            |
| 10  | * Stem Packing    | PTFE            | PTFE            | PTFE            | PTFE            |
| 11  | Gland             | ASTM A276-410   | ASTM A276-410   | ASTM A276-316   | ASTM A276-316   |
| 12  | Stop Plate        | Carbon Steel    | Carbon Steel    | Carbon Steel    | Carbon Steel    |
| 13  | Stop Pin          | Carbon Steel    | Carbon Steel    | Stainless Steel | Stainless Steel |
| 14  | Spring Washer     | Carbon Steel    | Carbon Steel    | Stainless Steel | Stainless Steel |
| 15  | Lever Nut         | ASTM A194-2H    | ASTM A194-2H    | ASTM A194-8     | ASTM A194-7M    |
| 16  | Lever             | Carbon Steel    | Carbon Steel    | Carbon Steel    | Carbon Steel    |
| 17  | Antistatic Spring | Stainless Steel | Stainless Steel | Stainless Steel | Stainless Steel |
| 18  | Steel ball        | Stainless Steel | Stainless Steel | Stainless Steel | Stainless Steel |
| 19  | * Body Gasket     | PTFE            | PTFE            | PTFE            | PTFE            |

\* Recommended Spare Parts

## Dimensions and Weights



Class 800/1500

| Size  | d    | L   | H   | W   | B    | J  | NPT   | Weight |
|-------|------|-----|-----|-----|------|----|-------|--------|
| in    | mm   | mm  | mm  | mm  | mm   | mm | in    | Kg     |
| 1/2   | 13   | 92  | 65  | 140 | 21.8 | 10 | 1/2   | 1.5    |
| 3/4   | 18   | 111 | 75  | 140 | 27.1 | 13 | 3/4   | 1.7    |
| 1     | 23.5 | 127 | 85  | 200 | 33.8 | 13 | 1     | 3.3    |
| 1-1/4 | 28   | 140 | 98  | 230 | 42.6 | 13 | 1-1/4 | 7.0    |
| 1-1/2 | 35   | 152 | 105 | 240 | 48.7 | 13 | 1-1/2 | 8.0    |
| 2     | 49   | 172 | 115 | 240 | 61.2 | 16 | 2     | 11.0   |

Note: Butt Welding End is on request







- **Severity Service**

Normal soft-seated valve cannot be used for abrasive service or for operation in high temperatures that prohibits the use of a resilient material. metal-to-metal seated floating ball valve (series FM, range 1/2"~4" class 150lb & 300lb, 1/2"~2" class 600lb) is designed for this type of severity service has seating action provided by the metal-to-metal contact between the ball and the seat rings.

- **General Design**

Blow-out proof stem, anti-static device are designed as standard requirements.

- **Superior Sealing**

High precision machining and seat to ball rubbing, as well as adopt seat spring structure, which push up stream seat tightly against the ball surface, result in superior ball and seat interfacing for reliable sealing conforming to ANSI/FCI 70-2 class V.

- **Stem Seal**

Belleville spring acted gland provides live-loading on stem packing. Equipped with Special low emission packing, the environmental friendly valve is available on request.

- **Reliable Operations**

Spring-loaded seat maintain close contact with the ball ensuring tight sealing even at low pressures. This also results in stable operating torques at high differential pressures over a wide range of temperatures or/and high frequency.

- **Fire Safe**

The combination of the metal seat and graphite seals results in the nature of its features/properties that is capable of passing a fire test.

- **Material Selection**

Various material components are available for a variety of service applicable up to 500°C. For service temperature above 300°C the extension bonnet is required.

- **Applications**

Hard faced ball and seats (TCC as standard, other special coatings are available on request) allow use in more severe services such as slurries, pulp stock, mining and other abrasive media in long life.



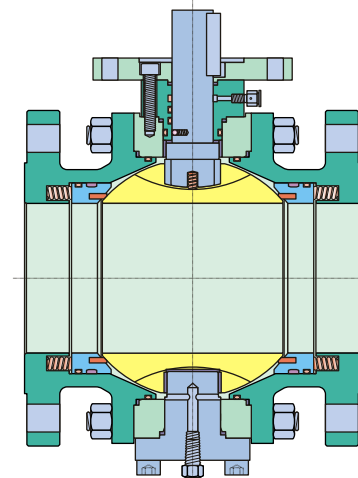
| No. | Part          | Standard Materials                                  | No. | Part              | Standard Materials              |
|-----|---------------|-----------------------------------------------------|-----|-------------------|---------------------------------|
| 1   | Body          | ASTM A 216-WCB/A105 OR ASTM A 351-CF8M/A182-F316    | 13  | Seat Packing      | Graphite                        |
| 2   | Adapter       | ASTM A 216-WCB/A105 OR ASTM A 351-CF8M/A182-F316    | 14  | Washer            | Carbon Steel or Stainless Steel |
| 3   | Ball          | ASTM A 217-CA15 OR ASTM A 351-CF8M/Nitriding or TCC | 15  | Dished Spring     | Stainless Steel                 |
| 4   | Lever         | Carbon Steel                                        | 16  | Body Stud         | ASTM A193-B7 or A193-B8         |
| 5   | Nut           | Carbon Steel or Stainless Steel                     | 17  | Body Nut          | ASTM A194-2H or A194-8          |
| 6   | Seat          | ASTM A182-F6a or F316/Stellite 6 Faced or TCC       | 18  | Locked Plate      | Carbon Steel or Stainless Steel |
| 7   | Push Ring     | Stainless Steel                                     | 19  | Screw             | Carbon Steel or Stainless Steel |
| 8   | Stem          | ASTM A182-F6a or F316                               | 20  | Stop Plate        | Carbon Steel or Stainless Steel |
| 9   | Gland         | Stainless Steel                                     | 21  | Dished Spring     | Alloy Steel or Stainless Steel  |
| 10  | Thrust Washer | Graphite                                            | 22  | Locked Washer     | Carbon Steel or Stainless Steel |
| 11  | Body Gasket   | 316+Graphite                                        | 23  | Steel Ball        | Stainless Steel                 |
| 12  | Stem Packing  | Graphite                                            | 24  | Antistatic Spring | Stainless Steel                 |

Note: 1. TCC: Tungsten Carbide Coating.  
2. Customer shall order the valve according to service condition.

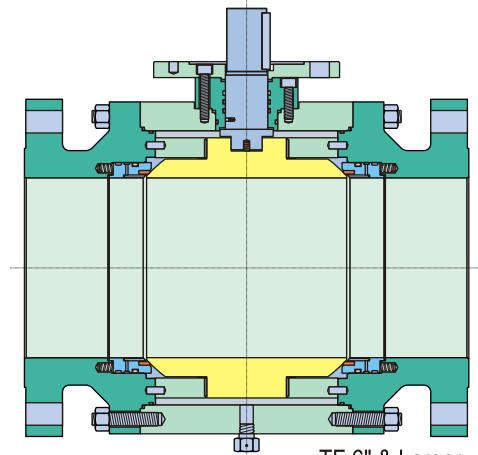
- **General Design**

The ball is fixed by trunnion (size 4" & smaller) or trunnion support (size 6" & larger), and the seat rings are floating, free to move against the ball along the valve centerline. The trunnion / trunnion support together with bearings adsorb the side load created by the pressure acting on the ball. At low pressure, the seat tight sealing is ensured by the preload of the springs acting on the seat rings. Along with the pressure increasing, the process medium pressure pushes the seat rings against the ball to provide additional load for tight sealing.

The ball and stem are independent with each other to minimize the effect of the side thrust generated by the pressure acting on the ball.



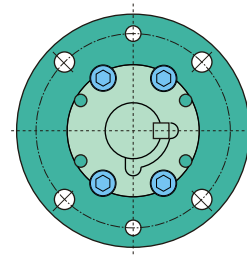
TF 4" & Smaller



TF 6" & Larger

- **Ball Seat Alignment**

Mechanical stops are equipped on all valves to ensure the ball is never to be over rotated.



- **AED O-Ring**

When valves are used under high pressure gas applications, e.g. hydrocarbon gas service under class 600lb and above, the gas may be absorbed into the molecular structure of elastomeric O-rings. If the valve is subjected to sudden decompression, the O-rings may be destroyed by the rapidly expanded gas. To avoid this possibility, special AED O-rings or Lip seals, suitable for such service conditions, are available on request.

- **Environment Friendly Valve**

Accurate machining of stem, gland and body sealing surfaces with double sealing (O-ring primary seal plus graphite gasket seal) ensure the low emission which is complying with the most severe pollution-control regulations. The test certifications are available on request.

### • Seat Design

Standard seat design is primary soft seal, and secondary metal to metal seal. Seat insert is designed as pressed-in type which is easy for maintenance. (Fig. 1) Optional design with primary metal to metal seal and secondary soft seal seat design is also available upon request. (Fig. 2)

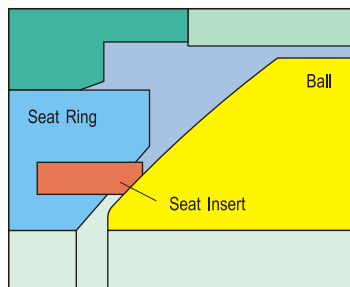


Fig.1

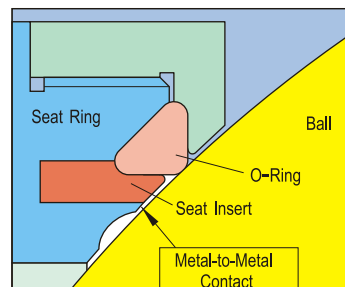


Fig.2

#### a) Standard: Single Piston Effect Seats (Self Relieving Seats)

Medium pressure, both upstream and downstream, creates a resultant thrust to the seat rings against the ball to assure tight sealing; Medium pressure acting in the body cavity creates a resultant thrust to push the seat rings away from the ball.

The single piston design permits the automatic release of any over pressure in the body cavity when the valve is in the fully open or fully closed position. (Fig. 3, 4)

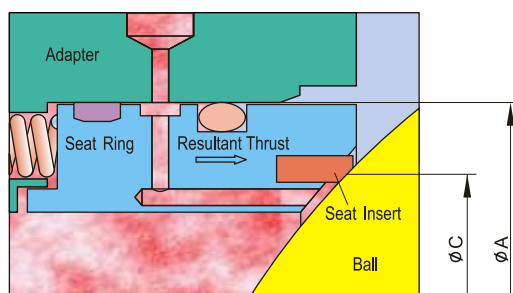


Fig.3

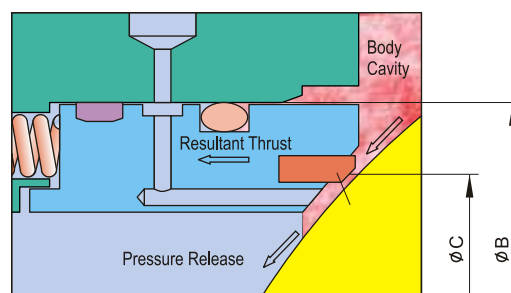


Fig.4

#### b) Option 1: Double Piston Effect Seats

Medium pressure, both upstream and downstream as well as in the body cavity, creates a resultant thrust that pushes the seat rings against the ball. Valves with double piston effect seat rings require a cavity pressure relief device to reduce the build-up of over pressure in the body cavity. (Fig. 5, 6)

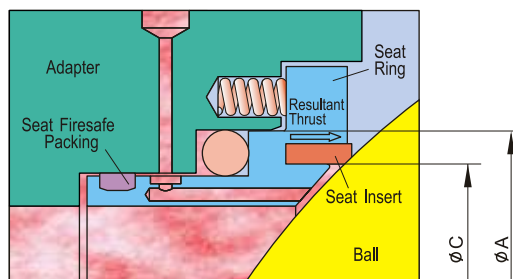


Fig.5

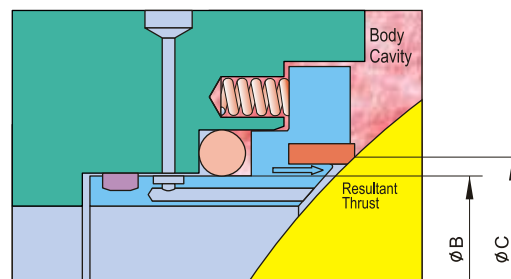


Fig.6

#### c) Option 2: Combination Seats

Combination seats design is available on request. That is a standard seat design used for upstream side and a double piston effect seats design used for downstream. The advantage is it can reach double piston effect seats design function without cavity pressure relief device to saves the cost, meanwhile only need a little care to install valve per flow direction arrow. (Fig. 3, 6)

- **Double Block and Bleed**

When the ball is in the closed position, each seat seals off the process medium independently at the same time between the up/down stream and body cavity; it allows bleeding of the trapped cavity pressure (DBB) through drain or vent valve. The double block and bleed function makes it possible to flush the valve under pressure and verify that the seats are sealing properly.(Fig. 7)

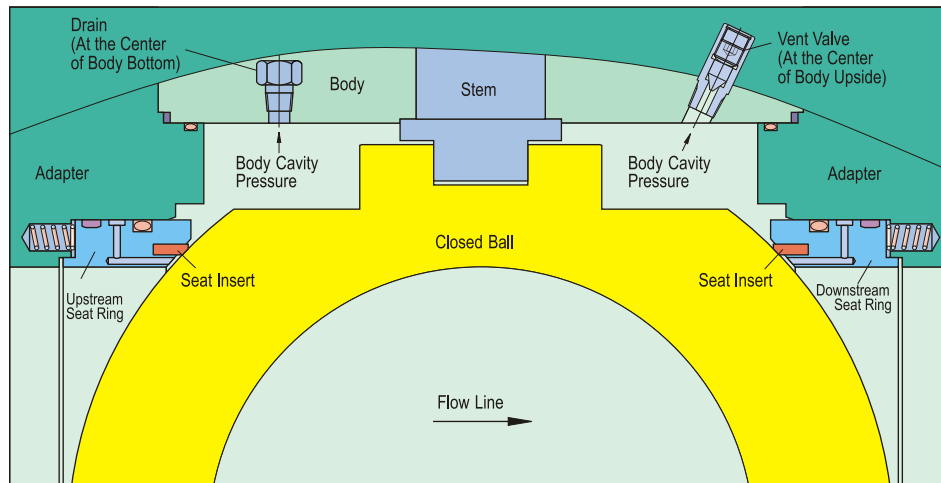


Fig.7

- **Blow-out Proof Stem**

The stem is made separately from the ball with integral T-type round shoulder, retained by gland. (other designs are available on request).(Fig. 8)

- **Anti-static Device**

Spring plus graphite type anti-static device are applied between the ball, stem, gland flange and body, to keep the electrical continuity between all the metallic components, and ensure the resistance lower than the most severe service requirement.(Fig. 8)

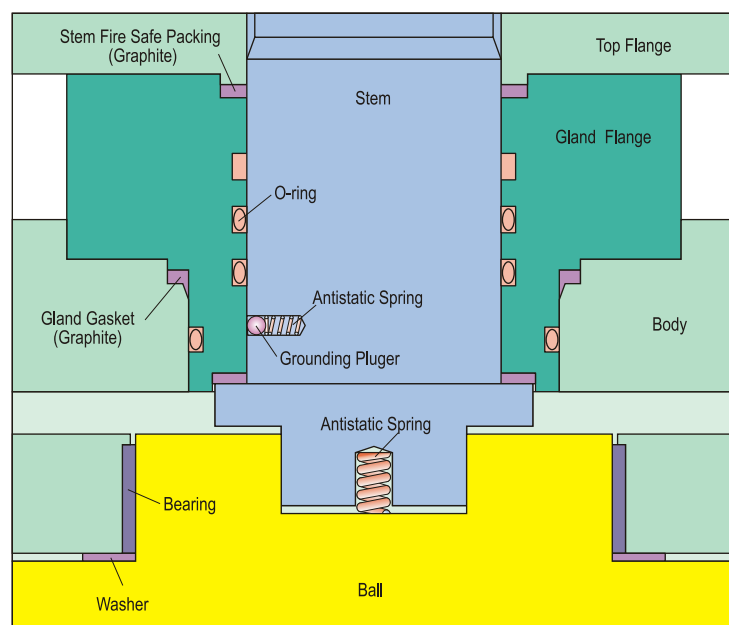


Fig.8

- Fire Safe**

- a) External leakage prevention

All the possible external leakage point between stem and gland flange, gland flange and body, body and adapter are sealed with primary O-ring then secondary graphite gasket. When fire burned out the primary O-ring seal, the secondary graphite gasket seal still can prevent the process medium from external leakage.(Fig. 9)

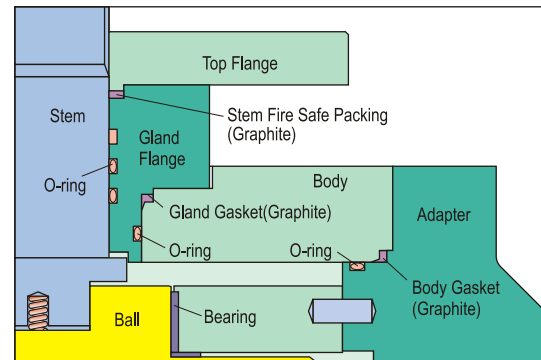


Fig.9

- b) Internal leakage prevention

When fire burned out the primary O-ring seal between the floating seat ring and adapter, also the seat insert between seat ring and ball, the secondary graphite seal between seat ring and adapter, and seat ring & ball metal to metal contact preloaded by spring will minimize the internal process medium leakage. (Fig. 10, 11)

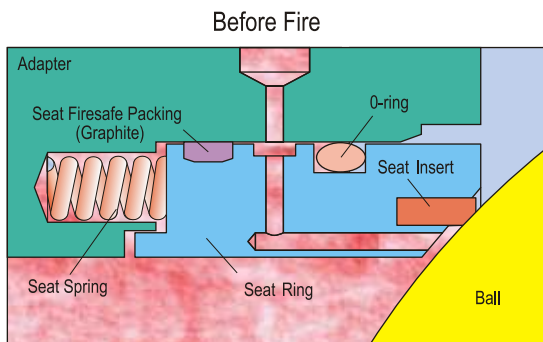


Fig.10

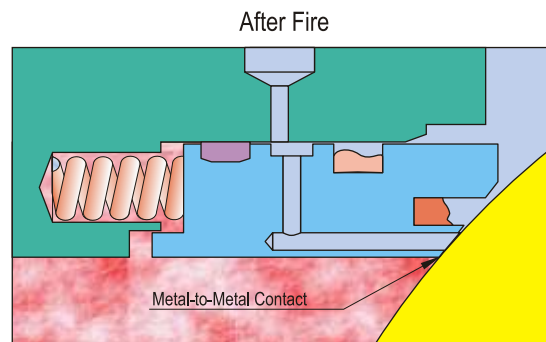


Fig.11

- Emergency Sealant Injection System**

Each valve of size 6" and larger (or smaller size on request), is equipped with sealant injection located at stem and seats area. The injection is integrated with check valve to provide backup sealing, also a check valve is equipped at front of seat sealant injection to avoid blowing out in case wrong operation. When the soft sealing materials (seat inserts and o-rings) are damaged and leakage happened by fire or other accident, the sealant can be injected through the injection fittings.(Fig. 12)

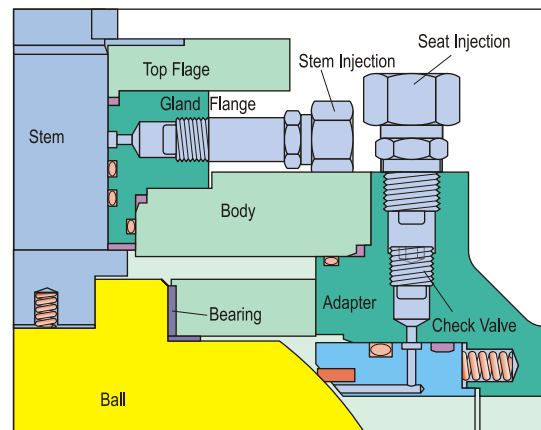


Fig.12



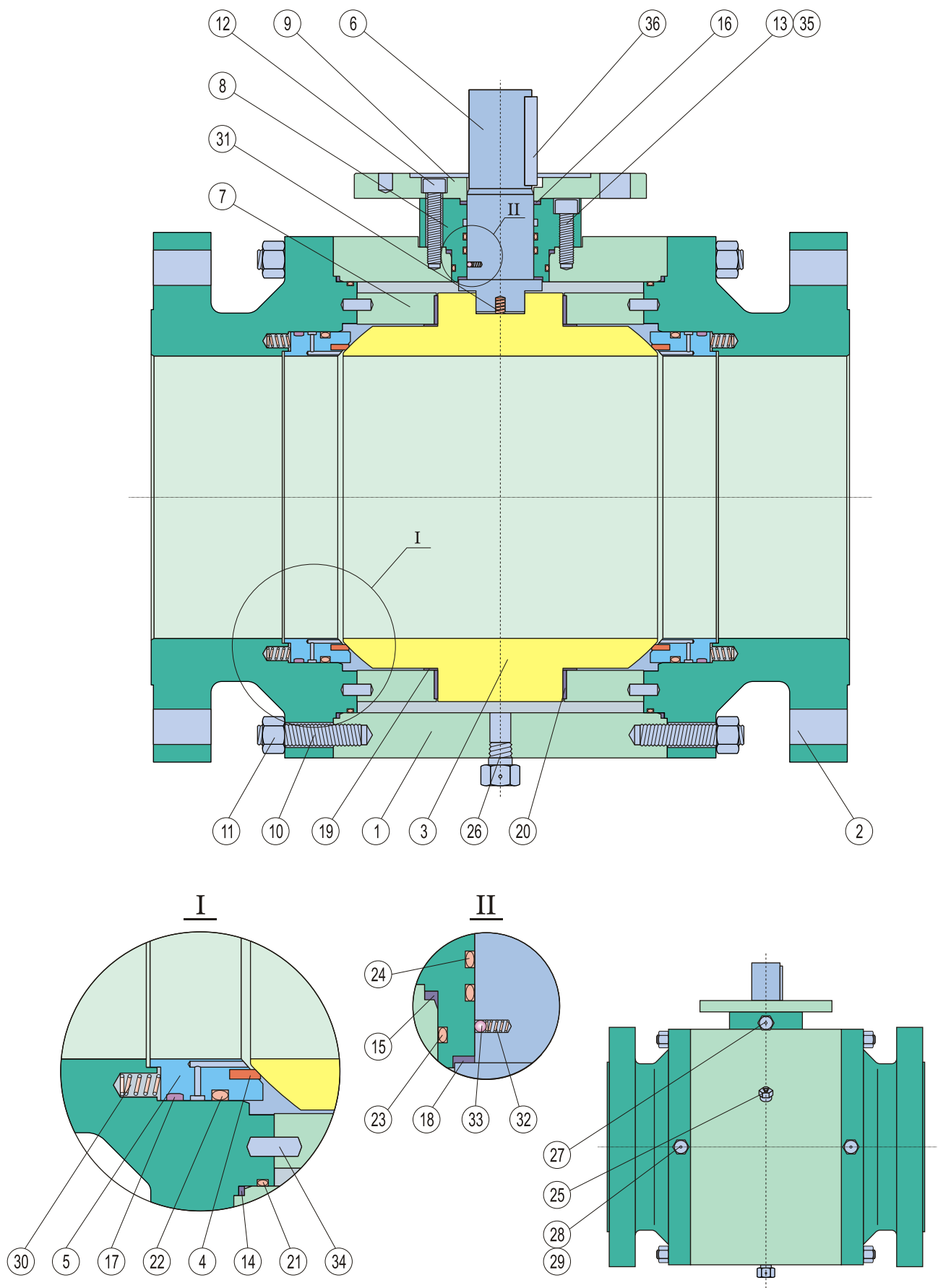
### Features

|                                               |
|-----------------------------------------------|
| Size: 2"~40"                                  |
| Class: 150~2500                               |
| Three Pieces Forged Steel Body                |
| Trunnion Mounted Ball, Full & Reduced Bore    |
| Anti-Static Device                            |
| Blow-out Proof Stem                           |
| Double Block and Bleed                        |
| Fire Safe Design                              |
| Emergency Sealant Injector ( 6" & Larger)     |
| Vent Valve ( 6" & Larger)                     |
| Lifting Lugs & Supporting Feet ( 8" & Larger) |

### Specifications

|                        |                     |
|------------------------|---------------------|
| Design                 | ASME B16.34/API 6D  |
| Face to Face           | ASME B16.10/API 6D  |
| End to End             | ASME B16.10/API 6D  |
| End Flange             | ASME B16.5/B16.47 A |
| BW End                 | ASME B16.25         |
| Test                   | API 6D              |
| Fire Safe Test         | API 607/API 6FA     |
| Special                | NACE MR-01-75       |
| Seat Pocket SS Overlay |                     |
| Seals Area ENP Coated  |                     |







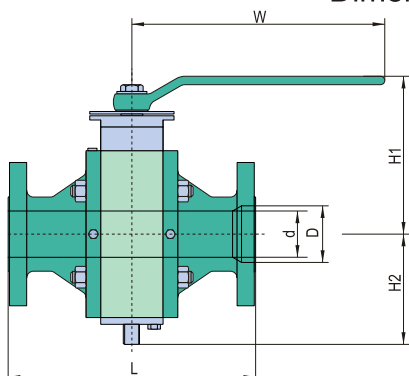
## Material Specifications

| No. | Part                    | WCB/304               | WCB/316               | CF8M/316              | LLC/316               |
|-----|-------------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 1   | Body                    | ASTM A 216-WCB/A105   | ASTM A 216-WCB/A105   | ASTM A 351-CF8M/F316  | ASTM A 352-LLC/LCB    |
| 2   | Adapter                 | ASTM A 216-WCB/A105   | ASTM A 216-WCB/A105   | ASTM A 351-CF8M/F316  | ASTM A 352-LLC/LCB    |
| 3   | Ball                    | ASTM A 351-CF8/F304   | ASTM A 351-CF8M/F316  | ASTM A 351-CF8M/F316  | ASTM A 351-CF8M/F316  |
| 4   | Seat Insert             | PTFE/Nylon/PEEK       | PTFE/Nylon/PEEK       | PTFE/Nylon/PEEK       | PTFE/Nylon/PEEK       |
| 5   | Seat Ring               | ASTM A105N/ENP        | ASTM A182-F316        | ASTM A182-F316        | ASTM A182-F316        |
| 6   | Stem                    | ASTM A105N/ENP        | ASTM A182-F316/17-4PH | ASTM A182-F316/17-4PH | ASTM A182-F316/17-4PH |
| 7   | Trunnion Support        | ASTM A105N/ENP        | ASTM A105N/ENP        | ASTM A182-F316        | ASTM A350-LF2/ENP     |
| 8   | Gland Flange            | ASTM A105N/ENP        | ASTM A105N/ENP        | ASTM A182-F316        | ASTM A350-LF2/ENP     |
| 9   | Top Flange              | ASTM A105N            | ASTM A105N            | ASTM A182-F316        | ASTM A350-LF2         |
| 10  | Body Stud               | ASTM A193-B7          | ASTM A193-B7          | ASTM A193-B8          | ASTM A320-L7M         |
| 11  | Body Nut                | ASTM A194-2H          | ASTM A194-2H          | ASTM A194-8           | ASTM A194-7M          |
| 12  | Screw                   | Carbon Steel          | Carbon Steel          | Stainless Steel       | ASTM A320-L7M         |
| 13  | Screw                   | Carbon Steel          | Carbon Steel          | Stainless Steel       | ASTM A320-L7M         |
| 14  | * Body Gasket           | Graphite              | Graphite              | Graphite              | Graphite              |
| 15  | * Gland Gasket          | Graphite              | Graphite              | Graphite              | Graphite              |
| 16  | * Stem Firesafe Packing | Graphite              | Graphite              | Graphite              | Graphite              |
| 17  | * Seat Firesafe Packing | Carbon Fibre+Graphite | Carbon Fibre+Graphite | Carbon Fibre+Graphite | Carbon Fibre+Graphite |
| 18  | Thrust Washer           | PTFE/316SS+PTFE+MoS2  | PTFE/316SS+PTFE+MoS2  | PTFE/316SS+PTFE+MoS2  | PTFE/316SS+PTFE+MoS2  |
| 19  | Washer                  | PTFE/316SS+PTFE+MoS2  | PTFE/316SS+PTFE+MoS2  | PTFE/316SS+PTFE+MoS2  | PTFE/316SS+PTFE+MoS2  |
| 20  | Bearing                 | 316SS+PTFE+MoS2       | 316SS+PTFE+MoS2       | 316SS+PTFE+MoS2       | 316SS+PTFE+MoS2       |
| 21  | * O-Ring                | Viton                 | Viton                 | Viton                 | Viton                 |
| 22  | * O-Ring                | Viton                 | Viton                 | Viton                 | Viton                 |
| 23  | * O-Ring                | Viton                 | Viton                 | Viton                 | Viton                 |
| 24  | * O-Ring                | Viton                 | Viton                 | Viton                 | Viton                 |
| 25  | Vent Valve              | Stainless Steel       | Stainless Steel       | Stainless Steel       | Stainless Steel       |
| 26  | Drain                   | Stainless Steel       | Stainless Steel       | Stainless Steel       | Stainless Steel       |
| 27  | Stem Injection          | Stainless Steel       | Stainless Steel       | Stainless Steel       | Stainless Steel       |
| 28  | Seat Injection          | Stainless Steel       | Stainless Steel       | Stainless Steel       | Stainless Steel       |
| 29  | Check Valve             | Stainless Steel       | Stainless Steel       | Stainless Steel       | Stainless Steel       |
| 30  | Seat Spring             | INCONEL X-750         | INCONEL X-750         | INCONEL X-750         | INCONEL X-750         |
| 31  | Antistatic Spring       | INCONEL X-750         | INCONEL X-750         | INCONEL X-750         | INCONEL X-750         |
| 32  | Antistatic Spring       | INCONEL X-750         | INCONEL X-750         | INCONEL X-750         | INCONEL X-750         |
| 33  | Grounding Plunger       | Stainless Steel       | Stainless Steel       | Stainless Steel       | Stainless Steel       |
| 34  | Alignment Pin           | Stainless Steel       | Stainless Steel       | Stainless Steel       | Stainless Steel       |
| 35  | Gland Pin               | Carbon Steel          | Carbon Steel          | Stainless Steel       | Carbon Steel          |
| 36  | Key                     | Carbon Steel          | Carbon Steel          | Stainless Steel       | Carbon Steel          |

\* Recommended Spare Parts



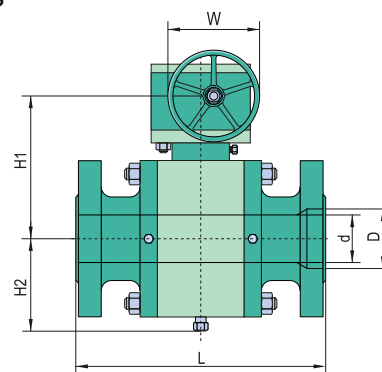
## Dimensions and Weights



Full Bore

Class 150

| Size | d   | L    | H1   | H2  | W    | Weight |
|------|-----|------|------|-----|------|--------|
| in   | mm  | mm   | mm   | mm  | mm   | Kg     |
| 2    | 51  | 178  | 155  | 85  | 350  | 30     |
| 3    | 76  | 203  | 191  | 110 | 400  | 60     |
| 4    | 102 | 229  | 211  | 130 | 450  | 92     |
| 6    | 152 | 394  | 231  | 160 | *305 | 190    |
| 8    | 203 | 457  | 282  | 235 | *406 | 345    |
| 10   | 254 | 533  | 336  | 290 | *406 | 495    |
| 12   | 305 | 610  | 373  | 315 | *406 | 705    |
| 14   | 337 | 686  | 413  | 345 | *406 | 859    |
| 16   | 387 | 762  | 457  | 383 | *600 | 1020   |
| 18   | 438 | 864  | 501  | 435 | *600 | 1440   |
| 20   | 489 | 914  | 551  | 495 | *600 | 1918   |
| 22   | 540 | 991  | 600  | 555 | *600 | 2352   |
| 24   | 591 | 1067 | 635  | 590 | *700 | 2803   |
| 26   | 635 | 1143 | 710  | 620 | *700 | 3200   |
| 28   | 686 | 1245 | 760  | 670 | *760 | 4045   |
| 30   | 737 | 1295 | 800  | 710 | *760 | 4820   |
| 32   | 781 | 1372 | 840  | 745 | *760 | 5490   |
| 34   | 832 | 1473 | 890  | 775 | *760 | 6704   |
| 36   | 876 | 1524 | 930  | 805 | *760 | 7615   |
| 40   | 978 | 1727 | 1010 | 900 | *760 | 10271  |



Reduced Bore

Class 150

| Size    | d   | D   | L    | H1  | H2  | W    | Weight |
|---------|-----|-----|------|-----|-----|------|--------|
| in      | mm  | mm  | mm   | mm  | mm  | mm   | Kg     |
| 2*1-1/2 | 38  | 51  | 178  | 152 | 80  | 350  | 26     |
| 3*2     | 51  | 76  | 203  | 155 | 85  | 350  | 34     |
| 4*3     | 76  | 102 | 229  | 191 | 110 | 400  | 62     |
| 6*4     | 102 | 152 | 394  | 211 | 130 | 450  | 102    |
| 8*6     | 152 | 203 | 457  | 231 | 160 | *305 | 225    |
| 10*8    | 203 | 254 | 533  | 282 | 235 | *406 | 373    |
| 12*10   | 254 | 305 | 610  | 336 | 290 | *406 | 533    |
| 14*10   | 254 | 337 | 686  | 336 | 290 | *406 | 626    |
| 14*12   | 305 | 337 | 686  | 373 | 315 | *406 | 730    |
| 16*12   | 305 | 387 | 762  | 373 | 315 | *406 | 790    |
| 16*14   | 337 | 387 | 762  | 413 | 345 | *406 | 844    |
| 18*14   | 337 | 438 | 864  | 413 | 345 | *406 | 1010   |
| 18*16   | 387 | 438 | 864  | 457 | 383 | *600 | 1095   |
| 20*16   | 387 | 489 | 914  | 457 | 383 | *600 | 1115   |
| 20*18   | 438 | 489 | 914  | 501 | 435 | *600 | 1152   |
| 22*18   | 438 | 540 | 991  | 501 | 435 | *600 | 2343   |
| 24*20   | 489 | 591 | 1067 | 551 | 495 | *600 | 2060   |
| 26*22   | 540 | 635 | 1143 | 600 | 555 | *600 | 2215   |
| 28*24   | 591 | 686 | 1245 | 635 | 590 | *700 | 2803   |
| 30*24   | 591 | 737 | 1295 | 635 | 590 | *700 | 2803   |
| 32*26   | 635 | 781 | 1372 | 710 | 620 | *700 | 4005   |
| 34*28   | 686 | 832 | 1473 | 760 | 670 | *760 | 4445   |
| 36*30   | 737 | 876 | 1524 | 820 | 710 | *760 | 4995   |
| 40*34   | 832 | 978 | 1727 | 935 | 775 | *760 | 8200   |

Full Bore

Class 300

| Size | d   | L    | H1   | H2  | W    | Weight |
|------|-----|------|------|-----|------|--------|
| in   | mm  | mm   | mm   | mm  | mm   | Kg     |
| 2    | 51  | 216  | 155  | 85  | 400  | 31     |
| 3    | 76  | 283  | 191  | 110 | 450  | 69     |
| 4    | 102 | 305  | 211  | 130 | 500  | 110    |
| 6    | 152 | 403  | 229  | 160 | *305 | 211    |
| 8    | 203 | 502  | 291  | 235 | *406 | 376    |
| 10   | 254 | 568  | 340  | 290 | *406 | 540    |
| 12   | 305 | 648  | 375  | 315 | *500 | 763    |
| 14   | 337 | 762  | 417  | 345 | *600 | 900    |
| 16   | 387 | 838  | 466  | 400 | *600 | 1300   |
| 18   | 438 | 914  | 506  | 440 | *600 | 1715   |
| 20   | 489 | 991  | 563  | 495 | *600 | 2090   |
| 22   | 540 | 1092 | 605  | 560 | *700 | 2220   |
| 24   | 591 | 1143 | 684  | 590 | *760 | 2890   |
| 28   | 686 | 1346 | 770  | 680 | *760 | 4575   |
| 30   | 737 | 1397 | 810  | 720 | *760 | 5590   |
| 32   | 781 | 1524 | 850  | 760 | *800 | 6240   |
| 34   | 832 | 1626 | 900  | 790 | *800 | 7370   |
| 36   | 876 | 1727 | 940  | 820 | *800 | 8435   |
| 40   | 978 | 1956 | 1025 | 915 | *800 | 11200  |

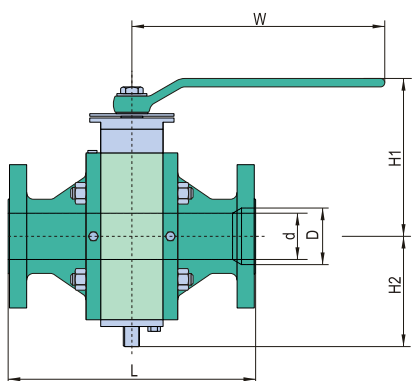
Reduced Bore

Class 300

| Size    | d   | D   | L    | H1  | H2  | W    | Weight |
|---------|-----|-----|------|-----|-----|------|--------|
| in      | mm  | mm  | mm   | mm  | mm  | mm   | Kg     |
| 2*1-1/2 | 38  | 51  | 216  | 152 | 80  | 350  | 30     |
| 3*2     | 51  | 76  | 283  | 155 | 85  | 400  | 37     |
| 4*3     | 76  | 102 | 305  | 191 | 110 | 450  | 74     |
| 6*4     | 102 | 152 | 403  | 211 | 130 | 500  | 142    |
| 8*6     | 152 | 203 | 502  | 229 | 160 | *305 | 253    |
| 10*8    | 203 | 254 | 568  | 291 | 235 | *406 | 410    |
| 12*10   | 254 | 305 | 648  | 340 | 290 | *406 | 580    |
| 14*10   | 254 | 337 | 762  | 340 | 315 | *406 | 683    |
| 14*12   | 305 | 337 | 762  | 375 | 315 | *500 | 830    |
| 16*12   | 305 | 387 | 838  | 375 | 360 | *500 | 1051   |
| 16*14   | 337 | 387 | 838  | 417 | 360 | *600 | 1125   |
| 18*14   | 337 | 438 | 914  | 417 | 400 | *600 | 1320   |
| 18*16   | 387 | 438 | 914  | 466 | 400 | *600 | 1530   |
| 20*16   | 387 | 489 | 991  | 466 | 420 | *600 | 1780   |
| 20*18   | 438 | 489 | 991  | 506 | 440 | *600 | 1830   |
| 22*18   | 438 | 540 | 1092 | 506 | 440 | *600 | 2010   |
| 24*20   | 489 | 591 | 1143 | 563 | 495 | *600 | 2220   |
| 28*24   | 591 | 686 | 1346 | 684 | 590 | *760 | 3200   |
| 30*24   | 591 | 737 | 1397 | 684 | 590 | *760 | 3200   |
| 34*28   | 686 | 832 | 1626 | 770 | 680 | *760 | 4845   |
| 36*30   | 737 | 876 | 1727 | 810 | 720 | *760 | 5590   |
| 40*34   | 832 | 978 | 1956 | 900 | 790 | *800 | 8200   |

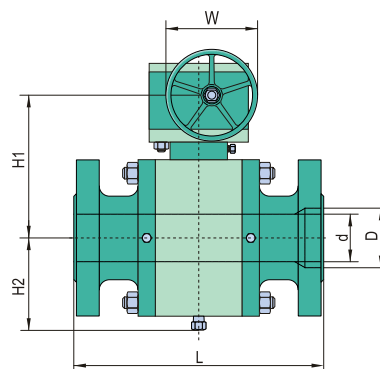
\* Gear Operated

## Dimensions and Weights



Full Bore Class 600

| Size | d   | L    | H1   | H2  | W    | Weight |
|------|-----|------|------|-----|------|--------|
| in   | mm  | mm   | mm   | mm  | mm   | Kg     |
| 2    | 51  | 292  | 155  | 85  | 400  | 45     |
| 3    | 76  | 356  | 193  | 112 | 500  | 80     |
| 4    | 102 | 432  | 239  | 140 | 700  | 150    |
| 6    | 152 | 559  | 266  | 175 | *406 | 248    |
| 8    | 203 | 660  | 310  | 250 | *406 | 438    |
| 10   | 254 | 787  | 354  | 290 | *600 | 701    |
| 12   | 305 | 838  | 411  | 345 | *600 | 855    |
| 14   | 337 | 889  | 435  | 370 | *600 | 1230   |
| 16   | 387 | 991  | 493  | 420 | *600 | 1535   |
| 18   | 438 | 1092 | 544  | 462 | *700 | 2135   |
| 20   | 489 | 1194 | 629  | 515 | *760 | 2640   |
| 22   | 540 | 1295 | 683  | 570 | *800 | 3370   |
| 24   | 591 | 1397 | 728  | 610 | *800 | 3960   |
| 28   | 686 | 1549 | 810  | 695 | *800 | 6060   |
| 30   | 737 | 1651 | 863  | 735 | *800 | 6690   |
| 32   | 781 | 1778 | 900  | 775 | *800 | 7825   |
| 34   | 832 | 1930 | 940  | 820 | *800 | 8460   |
| 36   | 876 | 2083 | 990  | 885 | *800 | 10650  |
| 40   | 978 | 2337 | 1070 | 935 | *900 | 14700  |



Reduced Bore Class 600

| Size    | d   | D   | L    | H1  | H2  | W    | Weight |
|---------|-----|-----|------|-----|-----|------|--------|
| in      | mm  | mm  | mm   | mm  | mm  | mm   | Kg     |
| 2*1-1/2 | 38  | 51  | 292  | 152 | 80  | 350  | 40     |
| 3*2     | 51  | 76  | 356  | 155 | 85  | 400  | 54     |
| 4*3     | 76  | 102 | 432  | 193 | 112 | 500  | 99     |
| 6*4     | 102 | 152 | 559  | 239 | 140 | 700  | 212    |
| 8*6     | 152 | 203 | 660  | 266 | 175 | *406 | 304    |
| 10*8    | 203 | 254 | 787  | 310 | 250 | *406 | 510    |
| 12*10   | 254 | 305 | 838  | 354 | 290 | *600 | 794    |
| 14*10   | 254 | 337 | 889  | 354 | 345 | *600 | 843    |
| 14*12   | 305 | 337 | 889  | 411 | 345 | *600 | 910    |
| 16*12   | 305 | 387 | 991  | 411 | 370 | *600 | 965    |
| 16*14   | 337 | 387 | 991  | 435 | 370 | *600 | 1310   |
| 18*14   | 337 | 438 | 1092 | 435 | 410 | *600 | 1520   |
| 18*16   | 387 | 438 | 1092 | 493 | 420 | *600 | 1640   |
| 20*16   | 387 | 489 | 1194 | 493 | 440 | *600 | 2065   |
| 20*18   | 438 | 489 | 1194 | 544 | 462 | *700 | 2270   |
| 22*18   | 438 | 540 | 1295 | 544 | 462 | *700 | 2430   |
| 24*20   | 489 | 591 | 1397 | 629 | 515 | *760 | 3440   |
| 28*24   | 591 | 686 | 1549 | 728 | 610 | *800 | 4250   |
| 30*24   | 591 | 737 | 1651 | 728 | 610 | *800 | 4730   |
| 34*28   | 686 | 832 | 1930 | 810 | 695 | *800 | 7200   |
| 36*30   | 737 | 876 | 2083 | 863 | 735 | *800 | 8600   |
| 40*34   | 832 | 978 | 2337 | 940 | 820 | *800 | 10020  |

Full Bore Class 900LB

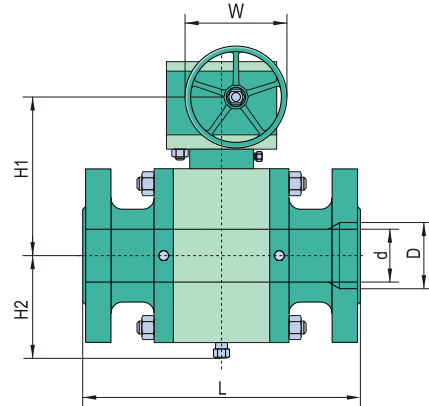
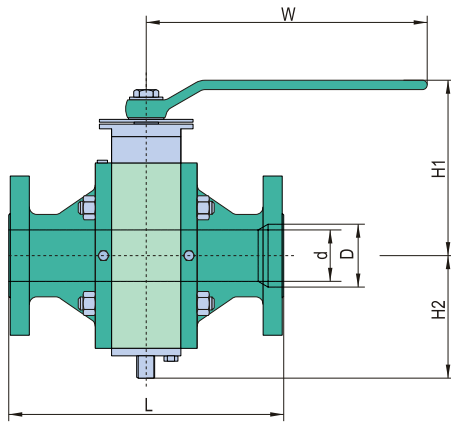
| Size | d   | L    | H1   | H2  | W    | Weight |
|------|-----|------|------|-----|------|--------|
| in   | mm  | mm   | mm   | mm  | mm   | Kg     |
| 2    | 51  | 368  | 178  | 100 | 450  | 52     |
| 3    | 76  | 381  | 221  | 125 | 600  | 87     |
| 4    | 102 | 457  | 215  | 150 | *305 | 160    |
| 6    | 152 | 610  | 268  | 215 | *406 | 385    |
| 8    | 203 | 737  | 324  | 260 | *600 | 560    |
| 10   | 254 | 838  | 371  | 305 | *600 | 820    |
| 12   | 305 | 965  | 425  | 360 | *600 | 1125   |
| 14   | 324 | 1029 | 463  | 390 | *600 | 1610   |
| 16   | 375 | 1130 | 513  | 440 | *710 | 2010   |
| 18   | 425 | 1219 | 614  | 500 | *760 | 2810   |
| 20   | 473 | 1321 | 644  | 530 | *760 | 3460   |
| 24   | 572 | 1549 | 745  | 630 | *800 | 5497   |
| 28   | 667 | 1753 | 830  | 720 | *800 | 10202  |
| 30   | 714 | 1880 | 880  | 755 | *800 | 11442  |
| 34   | 810 | 2159 | 970  | 850 | *900 | 17462  |
| 36   | 857 | 2286 | 1030 | 930 | *900 | 20154  |

Reduced Bore Class 900LB

| Size    | d   | D   | L    | H1  | H2  | W    | Weight |
|---------|-----|-----|------|-----|-----|------|--------|
| in      | mm  | mm  | mm   | mm  | mm  | mm   | Kg     |
| 2*1-1/2 | 38  | 51  | 368  | 152 | 80  | 400  | 45     |
| 3*2     | 51  | 76  | 381  | 178 | 100 | 450  | 56     |
| 4*3     | 76  | 102 | 457  | 221 | 125 | 600  | 94     |
| 6*4     | 102 | 152 | 610  | 215 | 150 | *305 | 226    |
| 8*6     | 152 | 203 | 737  | 268 | 260 | *406 | 480    |
| 10*8    | 203 | 254 | 838  | 324 | 305 | *600 | 650    |
| 12*10   | 254 | 305 | 965  | 371 | 335 | *600 | 868    |
| 14*10   | 254 | 324 | 1029 | 371 | 360 | *600 | 1050   |
| 14*12   | 305 | 324 | 1029 | 425 | 360 | *600 | 1310   |
| 16*12   | 305 | 375 | 1130 | 425 | 390 | *600 | 1385   |
| 16*14   | 324 | 375 | 1130 | 463 | 390 | *600 | 1830   |
| 18*16   | 375 | 425 | 1219 | 513 | 440 | *710 | 2205   |
| 20*16   | 375 | 473 | 1321 | 513 | 470 | *710 | 2735   |
| 20*18   | 425 | 473 | 1321 | 614 | 500 | *760 | 3140   |
| 24*20   | 473 | 572 | 1549 | 644 | 550 | *760 | 3810   |
| 28*24   | 572 | 667 | 1753 | 745 | 630 | *800 | 7580   |
| 30*24   | 572 | 714 | 1880 | 745 | 665 | *800 | 7981   |
| 34*28   | 667 | 810 | 2159 | 830 | 750 | *800 | 11202  |
| 36*30   | 714 | 857 | 2286 | 880 | 780 | *800 | 15653  |

\* Gear Operated

### Dimensions and Weights



Full Bore

Class 1500

| Size | d   | L    | H1  | H2  | W    | Weight |
|------|-----|------|-----|-----|------|--------|
| in   | mm  | mm   | mm  | mm  | mm   | Kg     |
| 2    | 51  | 368  | 178 | 100 | 450  | 60     |
| 3    | 76  | 470  | 226 | 130 | 700  | 115    |
| 4    | 102 | 546  | 241 | 162 | *406 | 194    |
| 6    | 146 | 705  | 319 | 255 | *600 | 580    |
| 8    | 194 | 832  | 345 | 280 | *600 | 752    |
| 10   | 241 | 991  | 411 | 345 | *600 | 1195   |
| 12   | 289 | 1130 | 478 | 405 | *600 | 1970   |
| 14   | 318 | 1257 | 517 | 435 | *700 | 2250   |
| 16   | 362 | 1384 | 599 | 485 | *760 | 2760   |
| 18   | 407 | 1537 | 663 | 545 | *800 | 3646   |
| 20   | 457 | 1664 | 695 | 580 | *800 | 4497   |
| 24   | 534 | 2045 | 842 | 730 | *900 | 7151   |

Reduced Bore

Class 1500

| Size    | d   | D   | L    | H1  | H2  | W    | Weight |
|---------|-----|-----|------|-----|-----|------|--------|
| in      | mm  | mm  | mm   | mm  | mm  | mm   | Kg     |
| 2*1-1/2 | 38  | 51  | 368  | 152 | 80  | 400  | 56     |
| 3*2     | 51  | 76  | 470  | 178 | 100 | 450  | 82     |
| 4*3     | 76  | 102 | 546  | 226 | 130 | 700  | 150    |
| 6*4     | 102 | 146 | 705  | 241 | 162 | *406 | 295    |
| 8*6     | 146 | 194 | 832  | 319 | 270 | *600 | 690    |
| 10*8    | 194 | 241 | 991  | 345 | 325 | *600 | 930    |
| 12*10   | 241 | 289 | 1130 | 411 | 370 | *600 | 1340   |
| 14*10   | 241 | 318 | 1257 | 411 | 405 | *600 | 1840   |
| 14*12   | 289 | 318 | 1257 | 478 | 405 | *600 | 2070   |
| 16*12   | 289 | 362 | 1384 | 478 | 435 | *600 | 2520   |
| 16*14   | 318 | 362 | 1384 | 517 | 435 | *700 | 2670   |
| 18*16   | 362 | 407 | 1537 | 599 | 485 | *760 | 2950   |
| 20*16   | 362 | 457 | 1664 | 599 | 545 | *760 | 3825   |
| 20*18   | 407 | 457 | 1664 | 663 | 545 | *800 | 4150   |
| 24*20   | 457 | 534 | 2045 | 695 | 640 | *800 | 5850   |

Full Bore

Class 2500

| Size | d   | L RTJ ) | H1  | H2  | W    | Weight |
|------|-----|---------|-----|-----|------|--------|
| in   | mm  | mm      | mm  | mm  | mm   | Kg     |
| 2    | 44  | 454     | 214 | 118 | 700  | 90     |
| 3    | 64  | 584     | 216 | 150 | *406 | 200    |
| 4    | 89  | 683     | 265 | 180 | *406 | 385    |
| 6    | 133 | 927     | 371 | 305 | *600 | 778    |
| 8    | 181 | 1038    | 426 | 360 | *600 | 1352   |
| 10   | 225 | 1292    | 463 | 390 | *710 | 2137   |
| 12   | 267 | 1445    | 550 | 465 | *760 | 3267   |

Reduced Bore

Class 2500

| Size    | d   | D   | L RTJ ) | H1  | H2  | W    | Weight |
|---------|-----|-----|---------|-----|-----|------|--------|
| in      | mm  | mm  | mm      | mm  | mm  | mm   | Kg     |
| 2*1-1/2 | 38  | 44  | 454     | 175 | 95  | 450  | 80     |
| 3*2     | 44  | 64  | 584     | 214 | 118 | 700  | 160    |
| 4*3     | 64  | 89  | 683     | 216 | 150 | *406 | 320    |
| 6*4     | 89  | 133 | 927     | 265 | 270 | *406 | 640    |
| 8*6     | 133 | 181 | 1038    | 371 | 305 | *600 | 1170   |
| 10*8    | 181 | 225 | 1292    | 426 | 370 | *600 | 1919   |
| 12*10   | 225 | 267 | 1445    | 463 | 415 | *710 | 2972   |

\* Gear Operated

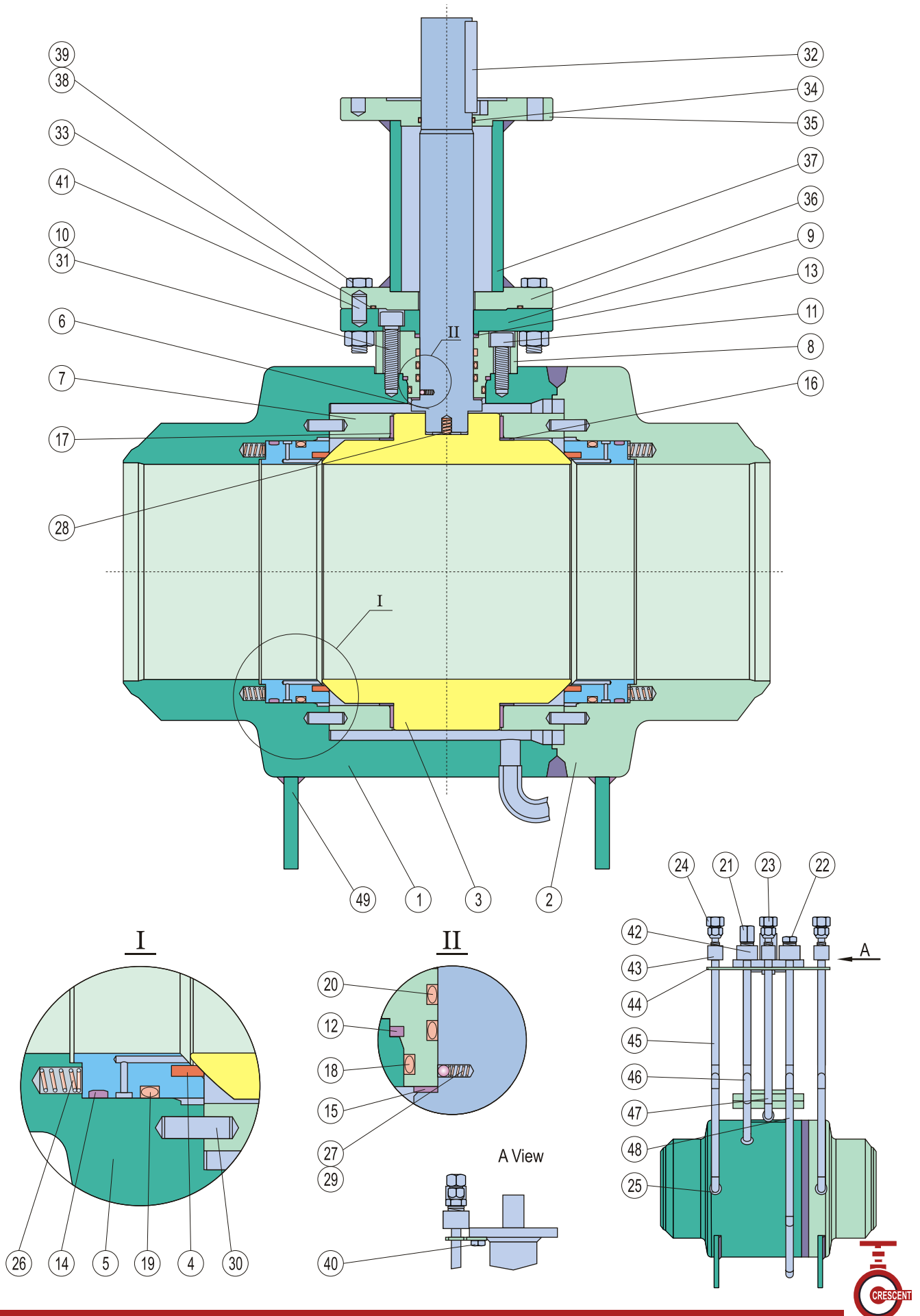


### Features

|                                 |
|---------------------------------|
| Size: 2"~40"                    |
| Class: 150~2500                 |
| Welded Forged Steel Body        |
| Trunnion Mounted Ball           |
| Anti-Static Device              |
| Blow-out Proof Stem             |
| Fire Safe Design                |
| For Undergroud Use (On Request) |

### Specifications

|                |                   |
|----------------|-------------------|
| Design         | ASMEB16.34/API6D  |
| Face to Face   | ASMEB16.34/API6D  |
| End to End     | ASMEB16.34/API6D  |
| End Flange     | ASMEB16.5/B16.47A |
| BW End         | ASME B16.25       |
| Test           | API6D             |
| Fire Safe Test | API607/6FA        |
| Special        | NACE MR-01-75     |





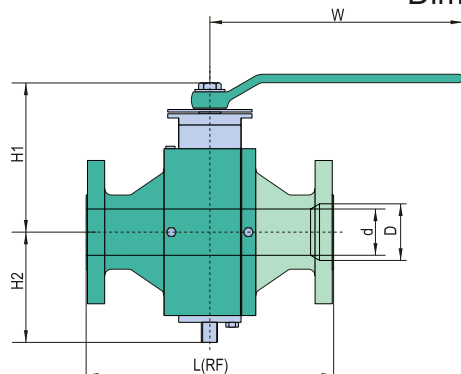
## Material Specifications

| No. | Part                    | WCB/304               | WCB/316               | CF8M/316              | LLC/316               |
|-----|-------------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 1   | Body                    | ASTM A 216-WCB/A105   | ASTM A 216-WCB/A105   | ASTM A 351-CF8M/F316  | ASTM A 352-LLC/LCB    |
| 2   | Adapter                 | ASTM A 216-WCB/A105   | ASTM A 216-WCB/A105   | ASTM A 351-CF8M/F316  | ASTM A 352-LLC/LCB    |
| 3   | Ball                    | ASTM A 351-CF8/F304   | ASTM A 351-CF8M/F316  | ASTM A 351-CF8M/F316  | ASTM A 351-CF8M/F316  |
| 4   | Seat Insert             | PTFE/Nylon/PEEK       | PTFE/Nylon/PEEK       | PTFE/Nylon/PEEK       | PTFE/Nylon/PEEK       |
| 5   | Seat Ring               | ASTM A105N/ENP        | ASTM A182-F316        | ASTM A182-F316        | ASTM A182-F316        |
| 6   | Stem                    | ASTM A105N/ENP        | ASTM A182-F316/17-4PH | ASTM A182-F316/17-4PH | ASTM A182-F316/17-4PH |
| 7   | Trunnion Support        | ASTM A105N/ENP        | ASTM A105N/ENP        | ASTM A182-F316        | ASTM A350-LF2/ENP     |
| 8   | Gland Flange            | ASTM A105N/ENP        | ASTM A105N/ENP        | ASTM A182-F316        | ASTM A350-LF2/ENP     |
| 9   | Top Flange              | ASTM A105N            | ASTM A105N            | ASTM A182-F316        | ASTM A350-LF2         |
| 10  | Screw                   | Carbon Steel          | Carbon Steel          | Stainless Steel       | ASTM A320-L7M         |
| 11  | Screw                   | Carbon Steel          | Carbon Steel          | Stainless Steel       | ASTM A320-L7M         |
| 12  | * Gland Gasket          | Graphite              | Graphite              | Graphite              | Graphite              |
| 13  | * Stem Firesafe Packing | Graphite              | Graphite              | Graphite              | Graphite              |
| 14  | * Seat Firesafe Packing | Carbon Fibre+Graphite | Carbon Fibre+Graphite | Carbon Fibre+Graphite | Carbon Fibre+Graphite |
| 15  | Thrust Washer           | PTFE/316SS+PTFE+MoS2  | PTFE/316SS+PTFE+MoS2  | PTFE/316SS+PTFE+MoS2  | PTFE/316SS+PTFE+MoS2  |
| 16  | Washer                  | PTFE/316SS+PTFE+MoS2  | PTFE/316SS+PTFE+MoS2  | PTFE/316SS+PTFE+MoS2  | PTFE/316SS+PTFE+MoS2  |
| 17  | Bearing                 | 316SS+PTFE+MoS2       | 316SS+PTFE+MoS2       | 316SS+PTFE+MoS2       | 316SS+PTFE+MoS2       |
| 18  | * O-Ring                | Viton                 | Viton                 | Viton                 | Viton                 |
| 19  | * O-Ring                | Viton                 | Viton                 | Viton                 | Viton                 |
| 20  | * O-Ring                | Viton                 | Viton                 | Viton                 | Viton                 |
| 21  | Vent Valve              | Stainless Steel       | Stainless Steel       | Stainless Steel       | Stainless Steel       |
| 22  | Drain                   | Stainless Steel       | Stainless Steel       | Stainless Steel       | Stainless Steel       |
| 23  | Stem Injection          | Stainless Steel       | Stainless Steel       | Stainless Steel       | Stainless Steel       |
| 24  | Seat Injection          | Stainless Steel       | Stainless Steel       | Stainless Steel       | Stainless Steel       |
| 25  | Check Valve             | Stainless Steel       | Stainless Steel       | Stainless Steel       | Stainless Steel       |
| 26  | Seat Spring             | INCONEL X-750         | INCONEL X-750         | INCONEL X-750         | INCONEL X-750         |
| 27  | Antistatic Spring       | INCONEL X-750         | INCONEL X-750         | INCONEL X-750         | INCONEL X-750         |
| 28  | Antistatic Spring       | INCONEL X-750         | INCONEL X-750         | INCONEL X-750         | INCONEL X-750         |
| 29  | Grounding Plunger       | Stainless Steel       | Stainless Steel       | Stainless Steel       | Stainless Steel       |
| 30  | ALignment Pin           | Stainless Steel       | Stainless Steel       | Stainless Steel       | Stainless Steel       |
| 31  | Gland Pin               | Carbon Steel          | Carbon Steel          | Stainless Steel       | Carbon Steel          |
| 32  | key                     | Carbon Steel          | Carbon Steel          | Stainless Steel       | Carbon Steel          |
| 33  | * O-Ring                | Viton                 | Viton                 | Viton                 | Viton                 |
| 34  | O-Ring                  | Viton                 | Viton                 | Viton                 | Viton                 |
| 35  | Upper Flange            | ASTM A105N            | ASTM A105N            | ASTM A182-F316        | ASTM A105N            |
| 36  | Under Flange            | ASTM A105N            | ASTM A105N            | ASTM A182-F316        | ASTM A105N            |
| 37  | Steel Tube              | Carbon Steel          | Carbon Steel          | Stainless Steel       | Carbon Steel          |
| 38  | Stud                    | Carbon Steel          | Carbon Steel          | Stainless Steel       | Carbon Steel          |
| 39  | Nut                     | Carbon Steel          | Carbon Steel          | Stainless Steel       | Carbon Steel          |
| 40  | Stud                    | Carbon Steel          | Carbon Steel          | Stainless Steel       | Carbon Steel          |
| 41  | Pin                     | Carbon Steel          | Carbon Steel          | Stainless Steel       | Carbon Steel          |
| 42  | Adapter Sleeve          | Carbon Steel          | Carbon Steel          | Stainless Steel       | Carbon Steel          |
| 43  | Adapter Sleeve          | Carbon Steel          | Carbon Steel          | Stainless Steel       | Carbon Steel          |
| 44  | fixed plate             | Carbon Steel          | Carbon Steel          | Stainless Steel       | Carbon Steel          |
| 45  | Eduction tube 1         | Carbon Steel          | Carbon Steel          | Stainless Steel       | Carbon Steel          |
| 46  | Eduction tube 2         | Carbon Steel          | Carbon Steel          | Stainless Steel       | Carbon Steel          |
| 47  | Eduction tube 3         | Carbon Steel          | Carbon Steel          | Stainless Steel       | Carbon Steel          |
| 48  | Eduction tube 4         | Carbon Steel          | Carbon Steel          | Stainless Steel       | Carbon Steel          |
| 49  | Supporting Feet         | Carbon Steel          | Carbon Steel          | Stainless Steel       | Carbon Steel          |

\* Recommended Spare Parts



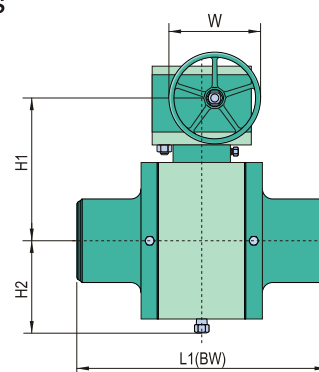
Dimensions and Weights



Full Bore

Class 150

| Size | d   | L    | L1   | H1   | H2  | W    | RF Weight | BW Weight |
|------|-----|------|------|------|-----|------|-----------|-----------|
| in   | mm  | mm   | mm   | mm   | mm  | mm   | Kg        | Kg        |
| 2    | 51  | 178  | 216  | 155  | 85  | 350  | 30        | 29        |
| 3    | 76  | 203  | 283  | 191  | 110 | 400  | 60        | 54        |
| 4    | 102 | 229  | 305  | 211  | 130 | 450  | 91        | 83        |
| 6    | 152 | 394  | 457  | 231  | 160 | *305 | 189       | 177       |
| 8    | 203 | 457  | 521  | 282  | 235 | *406 | 344       | 325       |
| 10   | 254 | 533  | 559  | 336  | 290 | *406 | 492       | 461       |
| 12   | 305 | 610  | 635  | 373  | 315 | *406 | 702       | 657       |
| 14   | 337 | 686  | 762  | 413  | 345 | *406 | 854       | 807       |
| 16   | 387 | 762  | 838  | 457  | 383 | *600 | 1014      | 948       |
| 18   | 438 | 864  | 914  | 501  | 435 | *600 | 1431      | 1338      |
| 20   | 489 | 914  | 991  | 551  | 495 | *600 | 1907      | 1783      |
| 22   | 540 | 991  | 1092 | 600  | 555 | *600 | 2338      | 2186      |
| 24   | 591 | 1067 | 1143 | 635  | 590 | *700 | 2789      | 2607      |
| 26   | 635 | 1143 | 1245 | 710  | 620 | *700 | 3181      | 2974      |
| 28   | 686 | 1245 | 1346 | 760  | 670 | *760 | 4021      | 3759      |
| 30   | 737 | 1295 | 1397 | 800  | 710 | *760 | 4791      | 4479      |
| 32   | 781 | 1372 | 1524 | 840  | 745 | *760 | 5457      | 5102      |
| 34   | 832 | 1473 | 1626 | 890  | 775 | *760 | 6664      | 6230      |
| 36   | 876 | 1524 | 1727 | 930  | 805 | *760 | 7569      | 7077      |
| 40   | 978 | 1727 | 1956 | 1010 | 900 | *760 | 10209     | 9545      |



Reduced Bore

Class 150

| Size    | d   | D   | L    | L1   | H1  | H2  | W    | RF Weight |
|---------|-----|-----|------|------|-----|-----|------|-----------|
| in      | mm  | mm  | mm   | mm   | mm  | mm  | mm   | Kg        |
| 2*1-1/2 | 38  | 51  | 178  | 216  | 152 | 80  | 350  | 26        |
| 3*2     | 51  | 76  | 203  | 283  | 155 | 85  | 350  | 34        |
| 4*3     | 76  | 102 | 229  | 305  | 191 | 110 | 400  | 62        |
| 6*4     | 102 | 152 | 394  | 457  | 211 | 130 | 450  | 101       |
| 8*6     | 152 | 203 | 457  | 521  | 231 | 160 | *305 | 224       |
| 10*8    | 203 | 254 | 533  | 559  | 282 | 235 | *406 | 372       |
| 12*10   | 254 | 305 | 610  | 635  | 336 | 290 | *406 | 530       |
| 14*10   | 254 | 337 | 686  | 762  | 336 | 290 | *406 | 623       |
| 14*12   | 305 | 337 | 686  | 762  | 373 | 315 | *406 | 727       |
| 16*12   | 305 | 387 | 762  | 838  | 373 | 315 | *406 | 787       |
| 16*14   | 337 | 387 | 762  | 838  | 413 | 345 | *406 | 839       |
| 18*14   | 337 | 438 | 864  | 914  | 413 | 345 | *406 | 1005      |
| 18*16   | 387 | 438 | 864  | 914  | 457 | 383 | *600 | 1089      |
| 20*16   | 387 | 489 | 914  | 991  | 457 | 383 | *600 | 1109      |
| 20*18   | 438 | 489 | 914  | 991  | 501 | 435 | *600 | 1143      |
| 22*18   | 438 | 540 | 991  | 1092 | 501 | 435 | *600 | 2332      |
| 24*20   | 489 | 591 | 1067 | 1143 | 551 | 495 | *600 | 2046      |
| 26*22   | 540 | 635 | 1143 | 1245 | 600 | 555 | *600 | 2201      |
| 28*24   | 591 | 686 | 1245 | 1346 | 635 | 590 | *700 | 2784      |
| 30*24   | 591 | 737 | 1295 | 1397 | 635 | 590 | *700 | 2779      |
| 32*26   | 635 | 781 | 1372 | 1524 | 710 | 620 | *700 | 3976      |
| 34*28   | 686 | 832 | 1473 | 1626 | 760 | 670 | *760 | 4412      |
| 36*30   | 737 | 876 | 1524 | 1727 | 820 | 710 | *760 | 4955      |
| 40*34   | 832 | 978 | 1727 | 1956 | 935 | 775 | *760 | 8154      |

Full Bore

Class 300

| Size | d   | L    | L1   | H1   | H2  | W    | RF Weight | BW Weight |
|------|-----|------|------|------|-----|------|-----------|-----------|
| in   | mm  | mm   | mm   | mm   | mm  | mm   | Kg        | Kg        |
| 2    | 51  | 216  | 216  | 155  | 85  | 400  | 30        | 26        |
| 3    | 76  | 283  | 283  | 191  | 110 | 450  | 68        | 62        |
| 4    | 102 | 305  | 305  | 211  | 130 | 500  | 108       | 97        |
| 6    | 152 | 403  | 457  | 229  | 160 | *305 | 208       | 193       |
| 8    | 203 | 502  | 521  | 291  | 235 | *406 | 370       | 347       |
| 10   | 254 | 568  | 559  | 340  | 290 | *406 | 531       | 498       |
| 12   | 305 | 648  | 635  | 375  | 315 | *500 | 760       | 713       |
| 14   | 337 | 762  | 762  | 417  | 345 | *600 | 895       | 830       |
| 16   | 387 | 838  | 838  | 466  | 400 | *600 | 1294      | 1214      |
| 18   | 438 | 914  | 914  | 506  | 440 | *600 | 1706      | 1618      |
| 20   | 489 | 991  | 991  | 563  | 495 | *600 | 2079      | 1966      |
| 22   | 540 | 1092 | 1092 | 605  | 560 | *700 | 2206      | 2068      |
| 24   | 591 | 1143 | 1143 | 684  | 590 | *760 | 2876      | 2717      |
| 28   | 686 | 1346 | 1346 | 770  | 680 | *760 | 4552      | 4297      |
| 30   | 737 | 1397 | 1397 | 810  | 720 | *760 | 5562      | 5251      |
| 32   | 781 | 1524 | 1524 | 850  | 760 | *800 | 6209      | 5861      |
| 34   | 832 | 1626 | 1626 | 900  | 790 | *800 | 7333      | 6922      |
| 36   | 876 | 1727 | 1727 | 940  | 820 | *800 | 8393      | 7923      |
| 40   | 978 | 1956 | 1956 | 1025 | 915 | *800 | 11144     | 10528     |

Reduced Bore

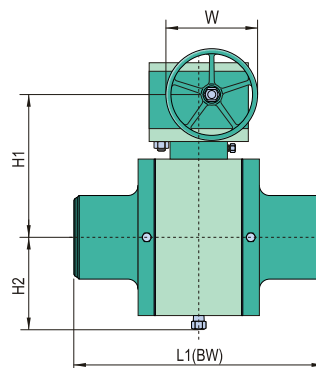
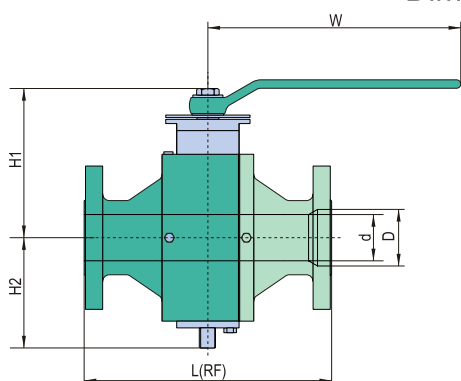
Class 300

| Size    | d   | D   | L    | L1   | H1  | H2  | W    | RF Weight |
|---------|-----|-----|------|------|-----|-----|------|-----------|
| in      | mm  | mm  | mm   | mm   | mm  | mm  | mm   | Kg        |
| 2*1-1/2 | 38  | 51  | 216  | 216  | 152 | 80  | 350  | 30        |
| 3*2     | 51  | 76  | 283  | 283  | 155 | 85  | 400  | 36        |
| 4*3     | 76  | 102 | 305  | 305  | 191 | 110 | 450  | 72        |
| 6*4     | 102 | 152 | 403  | 457  | 211 | 130 | 500  | 139       |
| 8*6     | 152 | 203 | 502  | 521  | 229 | 160 | *305 | 247       |
| 10*8    | 203 | 254 | 568  | 559  | 291 | 235 | *406 | 401       |
| 12*10   | 254 | 305 | 648  | 635  | 340 | 290 | *406 | 577       |
| 14*10   | 254 | 337 | 762  | 762  | 340 | 315 | *406 | 678       |
| 14*12   | 305 | 337 | 762  | 762  | 375 | 315 | *500 | 825       |
| 16*12   | 305 | 387 | 838  | 838  | 375 | 360 | *500 | 1045      |
| 16*14   | 337 | 387 | 838  | 838  | 417 | 360 | *600 | 1116      |
| 18*14   | 337 | 438 | 914  | 914  | 417 | 400 | *600 | 1309      |
| 18*16   | 387 | 438 | 914  | 914  | 466 | 400 | *600 | 1516      |
| 20*16   | 387 | 489 | 991  | 991  | 466 | 420 | *600 | 1766      |
| 20*18   | 438 | 489 | 991  | 991  | 506 | 440 | *600 | 1807      |
| 22*18   | 438 | 540 | 1092 | 1092 | 506 | 440 | *600 | 1982      |
| 24*20   | 489 | 591 | 1143 | 1143 | 563 | 495 | *600 | 2189      |
| 28*24   | 591 | 686 | 1346 | 1346 | 684 | 590 | *760 | 3163      |
| 30*24   | 591 | 737 | 1397 | 1397 | 684 | 590 | *760 | 3158      |
| 34*28   | 686 | 832 | 1626 | 1626 | 770 | 680 | *760 | 4789      |
| 36*30   | 737 | 876 | 1727 | 1727 | 810 | 720 | *760 | 5525      |
| 40*34   | 832 | 978 | 1956 | 1956 | 900 | 790 | *800 | 8112      |

\* Gear Operated



## Dimensions and Weights



Full Bore

Class 600

| Size | d   | L    | L1   | H1   | H2  | W    | RF Weight | BW Weight |
|------|-----|------|------|------|-----|------|-----------|-----------|
| in   | mm  | mm   | mm   | mm   | mm  | mm   | Kg        | Kg        |
| 2    | 51  | 292  | 292  | 155  | 85  | 400  | 44        | 41        |
| 3    | 76  | 356  | 356  | 193  | 112 | 500  | 79        | 73        |
| 4    | 102 | 432  | 432  | 239  | 140 | 700  | 148       | 138       |
| 6    | 152 | 559  | 559  | 266  | 175 | *406 | 243       | 227       |
| 8    | 203 | 660  | 660  | 310  | 250 | *406 | 432       | 408       |
| 10   | 254 | 787  | 787  | 354  | 290 | *600 | 690       | 655       |
| 12   | 305 | 838  | 838  | 411  | 345 | *600 | 841       | 790       |
| 14   | 337 | 889  | 889  | 435  | 370 | *600 | 1211      | 1141      |
| 16   | 387 | 991  | 991  | 493  | 420 | *600 | 1511      | 1424      |
| 18   | 438 | 1092 | 1092 | 544  | 462 | *700 | 2106      | 1997      |
| 20   | 489 | 1194 | 1194 | 629  | 515 | *760 | 2605      | 2473      |
| 22   | 540 | 1295 | 1295 | 683  | 570 | *800 | 3318      | 3162      |
| 24   | 591 | 1397 | 1397 | 728  | 610 | *800 | 3901      | 3703      |
| 28   | 686 | 1549 | 1549 | 810  | 695 | *800 | 5969      | 5671      |
| 30   | 737 | 1651 | 1651 | 863  | 735 | *800 | 6590      | 6261      |
| 32   | 781 | 1778 | 1778 | 900  | 775 | *800 | 7708      | 7323      |
| 34   | 832 | 1930 | 1930 | 940  | 820 | *800 | 8333      | 7916      |
| 36   | 876 | 2083 | 2083 | 990  | 885 | *800 | 10490     | 9966      |
| 40   | 978 | 2337 | 2337 | 1070 | 935 | *900 | 14480     | 13756     |

Reduced Bore

Class 600

| Size    | d   | D   | L    | L1   | H1  | H2  | W    | RF Weight |
|---------|-----|-----|------|------|-----|-----|------|-----------|
| in      | mm  | mm  | mm   | mm   | mm  | mm  | mm   | Kg        |
| 2*1-1/2 | 38  | 51  | 292  | 292  | 152 | 80  | 350  | 40        |
| 3*2     | 51  | 76  | 356  | 356  | 155 | 85  | 400  | 53        |
| 4*3     | 76  | 102 | 432  | 432  | 193 | 112 | 500  | 98        |
| 6*4     | 102 | 152 | 559  | 559  | 239 | 140 | 700  | 210       |
| 8*6     | 152 | 203 | 660  | 660  | 266 | 175 | *406 | 299       |
| 10*8    | 203 | 254 | 787  | 787  | 310 | 250 | *406 | 504       |
| 12*10   | 254 | 305 | 838  | 838  | 354 | 290 | *600 | 783       |
| 14*10   | 254 | 337 | 889  | 889  | 354 | 345 | *600 | 832       |
| 14*12   | 305 | 337 | 889  | 889  | 411 | 345 | *600 | 896       |
| 16*12   | 305 | 387 | 991  | 991  | 411 | 370 | *600 | 951       |
| 16*14   | 337 | 387 | 991  | 991  | 435 | 370 | *600 | 1291      |
| 18*14   | 337 | 438 | 1092 | 1092 | 435 | 410 | *600 | 1501      |
| 18*16   | 387 | 438 | 1092 | 1092 | 493 | 420 | *600 | 1616      |
| 20*16   | 387 | 489 | 1194 | 1194 | 493 | 440 | *600 | 2041      |
| 20*18   | 438 | 489 | 1194 | 1194 | 544 | 462 | *700 | 2241      |
| 22*18   | 438 | 540 | 1295 | 1295 | 544 | 462 | *700 | 2401      |
| 24*20   | 489 | 591 | 1397 | 1397 | 629 | 515 | *760 | 3405      |
| 28*24   | 591 | 686 | 1549 | 1549 | 728 | 610 | *800 | 4191      |
| 30*24   | 591 | 737 | 1651 | 1651 | 728 | 610 | *800 | 4671      |
| 34*28   | 686 | 832 | 1930 | 1930 | 810 | 695 | *800 | 7109      |
| 36*30   | 737 | 876 | 2083 | 2083 | 863 | 735 | *800 | 8500      |
| 40*34   | 832 | 978 | 2337 | 2337 | 940 | 820 | *800 | 9903      |

Full Bore

Class 900LB

| Size | d   | L    | L1   | H1   | H2  | W    | RF Weight | BW Weight |
|------|-----|------|------|------|-----|------|-----------|-----------|
| in   | mm  | mm   | mm   | mm   | mm  | mm   | Kg        | Kg        |
| 2    | 51  | 368  | 368  | 178  | 100 | 450  | 50        | 47        |
| 3    | 76  | 381  | 381  | 221  | 125 | 600  | 85        | 78        |
| 4    | 102 | 457  | 457  | 215  | 150 | *305 | 156       | 142       |
| 6    | 152 | 610  | 610  | 268  | 215 | *406 | 379       | 351       |
| 8    | 203 | 737  | 737  | 324  | 260 | *600 | 554       | 512       |
| 10   | 254 | 838  | 838  | 371  | 305 | *600 | 809       | 738       |
| 12   | 305 | 965  | 965  | 425  | 360 | *600 | 1110      | 1027      |
| 14   | 324 | 1029 | 1029 | 463  | 390 | *600 | 1591      | 1491      |
| 16   | 375 | 1130 | 1130 | 513  | 440 | *710 | 1986      | 1844      |
| 18   | 425 | 1219 | 1219 | 614  | 500 | *760 | 2781      | 2605      |
| 20   | 473 | 1321 | 1321 | 644  | 530 | *760 | 3416      | 3193      |
| 24   | 572 | 1549 | 1549 | 745  | 630 | *800 | 5443      | 5113      |
| 28   | 667 | 1753 | 1753 | 830  | 720 | *800 | 10132     | 9473      |
| 30   | 714 | 1880 | 1880 | 880  | 755 | *800 | 11385     | 10645     |
| 34   | 810 | 2159 | 2159 | 970  | 850 | *900 | 17375     | 16246     |
| 36   | 857 | 2286 | 2286 | 1030 | 930 | *900 | 20053     | 18750     |

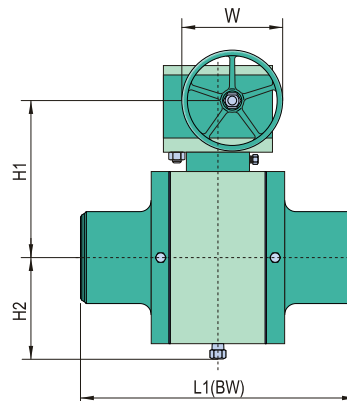
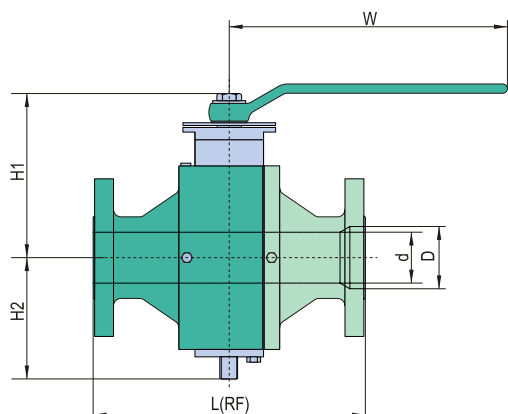
Reduced Bore

Class 900LB

| Size    | d   | D   | L    | L1   | H1  | H2  | W    | RF Weight |
|---------|-----|-----|------|------|-----|-----|------|-----------|
| in      | mm  | mm  | mm   | mm   | mm  | mm  | mm   | Kg        |
| 2*1-1/2 | 38  | 51  | 368  | 368  | 152 | 80  | 400  | 44        |
| 3*2     | 51  | 76  | 381  | 381  | 178 | 100 | 450  | 54        |
| 4*3     | 76  | 102 | 457  | 457  | 221 | 125 | 600  | 92        |
| 6*4     | 102 | 152 | 610  | 610  | 215 | 150 | *305 | 222       |
| 8*6     | 152 | 203 | 737  | 737  | 268 | 260 | *406 | 474       |
| 10*8    | 203 | 254 | 838  | 838  | 324 | 305 | *600 | 644       |
| 12*10   | 254 | 305 | 965  | 965  | 371 | 335 | *600 | 857       |
| 14*10   | 254 | 324 | 1029 | 1029 | 371 | 360 | *600 | 1039      |
| 14*12   | 305 | 324 | 1029 | 1029 | 425 | 360 | *600 | 1295      |
| 16*12   | 305 | 375 | 1130 | 1130 | 425 | 390 | *600 | 1370      |
| 16*14   | 324 | 375 | 1130 | 1130 | 463 | 390 | *600 | 1811      |
| 18*16   | 375 | 425 | 1219 | 1219 | 513 | 440 | *710 | 2181      |
| 20*16   | 375 | 473 | 1321 | 1321 | 513 | 470 | *710 | 2711      |
| 20*18   | 425 | 473 | 1321 | 1321 | 614 | 500 | *760 | 3111      |
| 24*20   | 473 | 572 | 1549 | 1549 | 644 | 550 | *760 | 3766      |
| 28*24   | 572 | 667 | 1753 | 1753 | 745 | 630 | *800 | 7526      |
| 30*24   | 572 | 714 | 1880 | 1880 | 745 | 665 | *800 | 7927      |
| 34*28   | 667 | 810 | 2159 | 2159 | 830 | 750 | *800 | 11132     |
| 36*30   | 714 | 857 | 2286 | 2286 | 880 | 780 | *800 | 15596     |

\* Gear Operated

## Dimensions and Weights



Full Bore

Class 1500

| Size | d   | L    | L1   | H1  | H2  | W    | RF Weight | BW Weight |
|------|-----|------|------|-----|-----|------|-----------|-----------|
| in   | mm  | mm   | mm   | mm  | mm  | mm   | Kg        | Kg        |
| 2    | 51  | 368  | 368  | 178 | 100 | 450  | 50        | 47        |
| 3    | 76  | 470  | 470  | 226 | 130 | 700  | 112       | 100       |
| 4    | 102 | 546  | 546  | 241 | 162 | *406 | 190       | 170       |
| 6    | 146 | 705  | 705  | 319 | 255 | *600 | 574       | 534       |
| 8    | 194 | 832  | 832  | 345 | 280 | *600 | 742       | 674       |
| 10   | 241 | 991  | 991  | 411 | 345 | *600 | 1184      | 1086      |
| 12   | 289 | 1130 | 1130 | 478 | 405 | *600 | 1952      | 1818      |
| 14   | 318 | 1257 | 1257 | 517 | 435 | *700 | 2224      | 2070      |
| 16   | 362 | 1384 | 1384 | 599 | 485 | *760 | 2717      | 2528      |
| 18   | 407 | 1537 | 1537 | 663 | 545 | *800 | 3584      | 3317      |
| 20   | 457 | 1664 | 1664 | 695 | 580 | *800 | 4421      | 4088      |
| 24   | 534 | 2045 | 2045 | 842 | 730 | *900 | 7029      | 6383      |

Reduced Bore

Class 1500

| Size    | d   | D   | L    | L1   | H1  | H2  | W    | Weight |
|---------|-----|-----|------|------|-----|-----|------|--------|
| in      | mm  | mm  | mm   | mm   | mm  | mm  | mm   | Kg     |
| 2*1-1/2 | 38  | 51  | 368  | 368  | 152 | 80  | 400  | 55     |
| 3*2     | 51  | 76  | 470  | 470  | 178 | 100 | 450  | 80     |
| 4*3     | 76  | 102 | 546  | 546  | 226 | 130 | 700  | 147    |
| 6*4     | 102 | 146 | 705  | 705  | 241 | 162 | *406 | 291    |
| 8*6     | 146 | 194 | 832  | 832  | 319 | 270 | *600 | 684    |
| 10*8    | 194 | 241 | 991  | 991  | 345 | 325 | *600 | 920    |
| 12*10   | 241 | 289 | 1130 | 1130 | 411 | 370 | *600 | 1329   |
| 14*10   | 241 | 318 | 1257 | 1257 | 411 | 405 | *600 | 1829   |
| 14*12   | 289 | 318 | 1257 | 1257 | 478 | 405 | *600 | 2052   |
| 16*12   | 289 | 362 | 1384 | 1384 | 478 | 435 | *600 | 2502   |
| 16*14   | 318 | 362 | 1384 | 1384 | 517 | 435 | *700 | 2644   |
| 18*16   | 362 | 407 | 1537 | 1537 | 599 | 485 | *760 | 2907   |
| 20*16   | 362 | 457 | 1664 | 1664 | 599 | 545 | *760 | 3782   |
| 20*18   | 407 | 457 | 1664 | 1664 | 663 | 545 | *800 | 4088   |
| 24*20   | 457 | 534 | 2045 | 2045 | 695 | 640 | *800 | 5774   |

Full Bore

Class 2500

| Size | d   | L(RTJ) | L1   | H1  | H2  | W    | RF Weight | BW Weight |
|------|-----|--------|------|-----|-----|------|-----------|-----------|
| in   | mm  | mm     | mm   | mm  | mm  | mm   | Kg        | Kg        |
| 2    | 44  | 454    | 451  | 214 | 118 | 700  | 87        | 71        |
| 3    | 64  | 584    | 578  | 216 | 150 | *406 | 194       | 159       |
| 4    | 89  | 683    | 673  | 265 | 180 | *406 | 375       | 320       |
| 6    | 133 | 927    | 914  | 371 | 305 | *600 | 756       | 614       |
| 8    | 181 | 1038   | 1022 | 426 | 360 | *600 | 1319      | 1108      |
| 10   | 225 | 1292   | 1270 | 463 | 390 | *710 | 2096      | 1688      |
| 12   | 267 | 1445   | 1422 | 550 | 465 | *760 | 3216      | 2639      |

Reduced Bore

Class 2500

| Size    | d   | D   | L(RTJ) | L1   | H1  | H2  | W    | Weight |
|---------|-----|-----|--------|------|-----|-----|------|--------|
| in      | mm  | mm  | mm     | mm   | mm  | mm  | mm   | Kg     |
| 2*1-1/2 | 38  | 44  | 454    | 451  | 175 | 95  | 450  | 78     |
| 3*2     | 44  | 64  | 584    | 578  | 214 | 118 | 700  | 157    |
| 4*3     | 64  | 89  | 683    | 673  | 216 | 150 | *406 | 314    |
| 6*4     | 89  | 133 | 927    | 914  | 265 | 270 | *406 | 630    |
| 8*6     | 133 | 181 | 1038   | 1022 | 371 | 305 | *600 | 1148   |
| 10*8    | 181 | 225 | 1292   | 1270 | 426 | 370 | *600 | 1886   |
| 12*10   | 225 | 267 | 1445   | 1422 | 463 | 415 | *710 | 2921   |

\* Gear Operated



### Features

|                                            |
|--------------------------------------------|
| Size: 2"~24"                               |
| Class: 150~1500                            |
| Top Entry Forged Steel Body                |
| Trunnion Mounted Ball, Full & Reduced Bore |
| Anti-Static Device                         |
| Blow-out Proof Stem                        |
| Fire Safe Design                           |
| Emergency Sealant Injector ( 6" & Larger)  |

### Specifications

|                |                    |
|----------------|--------------------|
| Design         | ASME B16.34/API 6D |
| Face to Face   | ASME B16.10/API 6D |
| End to End     | ASME B16.10/API 6D |
| End Flange     | ASME B16.5         |
| BW End         | ASME B16.25        |
| Test           | API 6D             |
| Fire Safe Test | API 607/API 6FA    |
| Special        | NACE MR-01-75      |



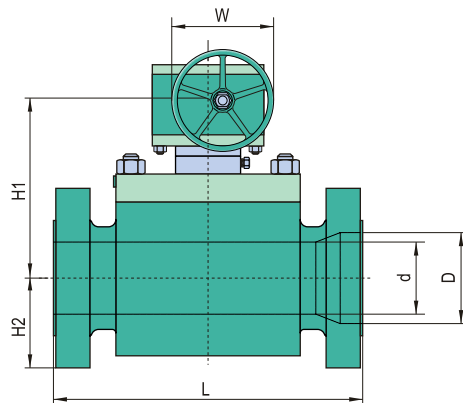
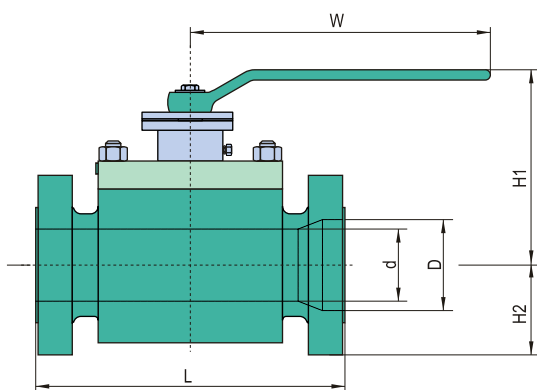
## Material Specifications

| No. | Part                   | WCB/304               | WCB/316               | CF8M/316              | LLC/316               |
|-----|------------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 1   | Body                   | ASTM A 216-WCB/A105   | ASTM A 216-WCB/A105   | ASTM A 351-CF8M/F316  | ASTM A 352-LLC/LCB    |
| 2   | Cover                  | ASTM A 216-WCB/A105   | ASTM A 216-WCB/A105   | ASTM A 351-CF8M/F316  | ASTM A 352-LLC/LCB    |
| 3   | Ball                   | ASTM A 351-CF8/F304   | ASTM A 351-CF8M/F316  | ASTM A 351-CF8M/F316  | ASTM A 351-CF8M/F316  |
| 4   | Seat Insert            | PTFE/Nylon/PEEK       | PTFE/Nylon/PEEK       | PTFE/Nylon/PEEK       | PTFE/Nylon/PEEK       |
| 5   | Seat Ring              | ASTM A105N/ENP        | ASTM A182-F316        | ASTM A182-F316        | ASTM A182-F316        |
| 6   | Stem                   | ASTM A105N/ENP        | ASTM A182-F316/17-4PH | ASTM A182-F316/17-4PH | ASTM A182-F316/17-4PH |
| 7   | Top Flange             | ASTM A105N            | ASTM A105N            | ASTM A182-F316        | ASTM A350-LF2         |
| 8   | Body Stud              | ASTM A193-B7          | ASTM A193-B7          | ASTM A193-B8          | ASTM A320-L7M         |
| 9   | Body Nut               | ASTM A194-2H          | ASTM A194-2H          | ASTM A194-8           | ASTM A194-7M          |
| 10  | Screw                  | Carbon Steel          | Carbon Steel          | Stainless Steel       | ASTM A320-L7M         |
| 11  | *Body Gasket           | Graphite              | Graphite              | Graphite              | Graphite              |
| 12  | *Stem Firesafe packing | Graphite              | Graphite              | Graphite              | Graphite              |
| 13  | *Seat Firesafe Packing | Carbon Fibre+Graphite | Carbon Fibre+Graphite | Carbon Fibre+Graphite | Carbon Fibre+Graphite |
| 14  | Thrust Washer          | PTFE/316SS+PTFE+MoS2  | PTFE/316SS+PTFE+MoS2  | PTFE/316SS+PTFE+MoS2  | PTFE/316SS+PTFE+MoS2  |
| 15  | Washer                 | PTFE/316SS+PTFE+MoS2  | PTFE/316SS+PTFE+MoS2  | PTFE/316SS+PTFE+MoS2  | PTFE/316SS+PTFE+MoS2  |
| 16  | Bearing                | 316SS+PTFE+MoS2       | 316SS+PTFE+MoS2       | 316SS+PTFE+MoS2       | 316SS+PTFE+MoS2       |
| 17  | Bearing                | 316SS+PTFE+MoS2       | 316SS+PTFE+MoS2       | 316SS+PTFE+MoS2       | 316SS+PTFE+MoS2       |
| 18  | *O-Ring                | Viton                 | Viton                 | Viton                 | Viton                 |
| 19  | *O-Ring                | Viton                 | Viton                 | Viton                 | Viton                 |
| 20  | *O-Ring                | Viton                 | Viton                 | Viton                 | Viton                 |
| 21  | Vent Valve             | Stainless Steel       | Stainless Steel       | Stainless Steel       | Stainless Steel       |
| 22  | Drain                  | Stainless Steel       | Stainless Steel       | Stainless Steel       | Stainless Steel       |
| 23  | Stem Injection         | Stainless Steel       | Stainless Steel       | Stainless Steel       | Stainless Steel       |
| 24  | Seat Injection         | Stainless Steel       | Stainless Steel       | Stainless Steel       | Stainless Steel       |
| 25  | Seat Spring            | INCONEL X-750         | INCONEL X-750         | INCONEL X-750         | INCONEL X-750         |
| 26  | Antistatic Spring      | INCONEL X-750         | INCONEL X-750         | INCONEL X-750         | INCONEL X-750         |
| 27  | Antistatic Spring      | INCONEL X-750         | INCONEL X-750         | INCONEL X-750         | INCONEL X-750         |
| 28  | Grounding Plunger      | Stainless Steel       | Stainless Steel       | Stainless Steel       | Stainless Steel       |
| 29  | Gland Pin              | Carbon Steel          | Carbon Steel          | Stainless Steel       | Stainless Steel       |
| 30  | Key                    | Carbon Steel          | Carbon Steel          | Stainless Steel       | Carbon Steel          |

\* Recommended Spare Parts



## Dimensions and Weights



Full Bore Class 150

| Size | d   | L    | H1  | H2  | W    | Weight |
|------|-----|------|-----|-----|------|--------|
| in   | mm  | mm   | mm  | mm  | mm   | Kg     |
| 2    | 51  | 292  | 210 | 83  | 350  | 46     |
| 3    | 76  | 356  | 225 | 110 | 400  | 83     |
| 4    | 102 | 432  | 260 | 143 | 450  | 156    |
| 6    | 152 | 559  | 295 | 217 | *305 | 256    |
| 8    | 203 | 660  | 322 | 264 | *406 | 453    |
| 10   | 254 | 787  | 357 | 313 | *406 | 622    |
| 12   | 305 | 838  | 405 | 372 | *406 | 747    |
| 14   | 337 | 889  | 455 | 430 | *406 | 959    |
| 16   | 387 | 991  | 470 | 452 | *600 | 1220   |
| 18   | 438 | 1092 | 500 | 470 | *600 | 1640   |
| 20   | 489 | 1194 | 555 | 583 | *600 | 2118   |
| 24   | 591 | 1397 | 600 | 594 | *700 | 2950   |

\* Gear Operated

Reduced Bore Class 150

| Size    | d   | D   | L    | H1  | H2  | W    | Weight |
|---------|-----|-----|------|-----|-----|------|--------|
| in      | mm  | mm  | mm   | mm  | mm  | mm   | Kg     |
| 2*1-1/2 | 38  | 51  | 292  | 180 | 78  | 250  | 41     |
| 3*2     | 51  | 76  | 356  | 210 | 83  | 350  | 58     |
| 4*3     | 76  | 102 | 432  | 225 | 110 | 400  | 104    |
| 6*4     | 102 | 152 | 559  | 260 | 143 | 450  | 228    |
| 8*6     | 152 | 203 | 660  | 295 | 217 | *305 | 320    |
| 10*8    | 203 | 254 | 787  | 322 | 264 | *406 | 536    |
| 12*10   | 254 | 305 | 838  | 357 | 313 | *406 | 685    |
| 14*10   | 254 | 337 | 889  | 357 | 313 | *406 | 740    |
| 14*12   | 305 | 337 | 889  | 405 | 372 | *406 | 840    |
| 16*12   | 305 | 387 | 991  | 405 | 372 | *406 | 924    |
| 16*14   | 337 | 387 | 991  | 455 | 430 | *406 | 1070   |
| 18*14   | 337 | 438 | 1092 | 455 | 430 | *406 | 1177   |
| 18*16   | 387 | 438 | 1092 | 463 | 452 | *600 | 1430   |
| 20*16   | 387 | 489 | 1194 | 463 | 452 | *600 | 1681   |
| 20*18   | 438 | 489 | 1194 | 500 | 470 | *600 | 1850   |
| 24*20   | 489 | 591 | 1397 | 555 | 583 | *600 | 2450   |

Full Bore Class 300

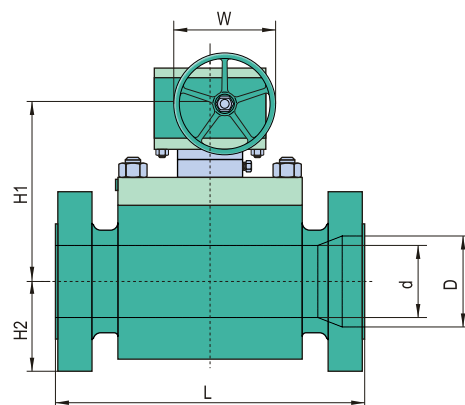
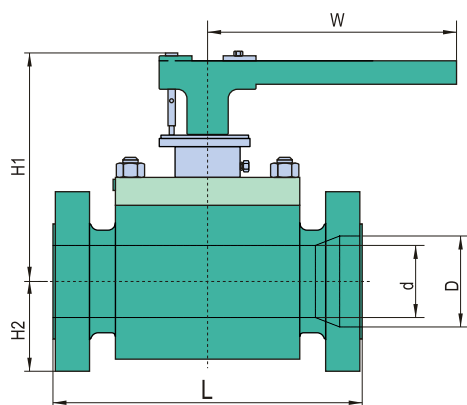
| Size | d   | L    | H1  | H2  | W    | Weight |
|------|-----|------|-----|-----|------|--------|
| in   | mm  | mm   | mm  | mm  | mm   | Kg     |
| 2    | 51  | 292  | 210 | 83  | 400  | 49     |
| 3    | 76  | 356  | 225 | 110 | 450  | 87     |
| 4    | 102 | 432  | 260 | 143 | 500  | 164    |
| 6    | 152 | 559  | 295 | 217 | *305 | 272    |
| 8    | 203 | 660  | 330 | 264 | *406 | 479    |
| 10   | 254 | 787  | 365 | 313 | *406 | 657    |
| 12   | 305 | 838  | 415 | 400 | *500 | 783    |
| 14   | 337 | 889  | 460 | 430 | *600 | 1007   |
| 16   | 387 | 991  | 480 | 452 | *600 | 1281   |
| 18   | 438 | 1092 | 523 | 470 | *600 | 1722   |
| 20   | 489 | 1194 | 585 | 583 | *600 | 2224   |
| 24   | 591 | 1397 | 635 | 594 | *760 | 3100   |

\* Gear Operated

Reduced Bore Class 300

| Size    | d   | D   | L    | H1  | H2  | W    | Weight |
|---------|-----|-----|------|-----|-----|------|--------|
| in      | mm  | mm  | mm   | mm  | mm  | mm   | Kg     |
| 2*1-1/2 | 38  | 51  | 292  | 180 | 78  | 250  | 44     |
| 3*2     | 51  | 76  | 356  | 210 | 83  | 400  | 62     |
| 4*3     | 76  | 102 | 432  | 225 | 110 | 450  | 110    |
| 6*4     | 102 | 152 | 559  | 260 | 143 | 500  | 243    |
| 8*6     | 152 | 203 | 660  | 295 | 217 | *305 | 343    |
| 10*8    | 203 | 254 | 787  | 330 | 264 | *406 | 559    |
| 12*10   | 254 | 305 | 838  | 365 | 313 | *406 | 725    |
| 14*10   | 254 | 337 | 889  | 365 | 313 | *406 | 798    |
| 14*12   | 305 | 337 | 889  | 415 | 400 | *500 | 890    |
| 16*12   | 305 | 387 | 991  | 415 | 400 | *500 | 1052   |
| 16*14   | 337 | 387 | 991  | 460 | 430 | *600 | 1120   |
| 18*14   | 337 | 438 | 1092 | 460 | 430 | *600 | 1288   |
| 18*16   | 387 | 438 | 1092 | 480 | 452 | *600 | 1480   |
| 20*16   | 387 | 489 | 1194 | 480 | 452 | *600 | 1728   |
| 20*18   | 438 | 489 | 1194 | 523 | 470 | *600 | 1960   |
| 24*20   | 489 | 591 | 1397 | 585 | 583 | *600 | 2650   |

## Dimensions and Weights



Full Bore Class 600

| Size | d   | L   | H1  | H2  | W    | Weight |
|------|-----|-----|-----|-----|------|--------|
| in   | mm  | mm  | mm  | mm  | mm   | Kg     |
| 2    | 51  | 292 | 210 | 83  | 400  | 52     |
| 3    | 76  | 356 | 225 | 110 | 500  | 92     |
| 4    | 102 | 432 | 260 | 143 | 700  | 173    |
| 6    | 152 | 559 | 295 | 217 | *406 | 285    |
| 8    | 203 | 660 | 330 | 264 | *406 | 504    |
| 10   | 254 | 787 | 370 | 313 | *600 | 680    |
| 12   | 305 | 838 | 425 | 400 | *600 | 819    |

Reduced Bore Class 600

| Size    | d   | D   | L   | H1  | H2  | W    | Weight |
|---------|-----|-----|-----|-----|-----|------|--------|
| in      | mm  | mm  | mm  | mm  | mm  | mm   | Kg     |
| 2*1-1/2 | 38  | 51  | 292 | 180 | 78  | 350  | 46     |
| 3*2     | 51  | 76  | 356 | 210 | 83  | 400  | 74     |
| 4*3     | 76  | 102 | 432 | 225 | 110 | 500  | 120    |
| 6*4     | 102 | 152 | 559 | 260 | 143 | 700  | 249    |
| 8*6     | 152 | 203 | 660 | 295 | 217 | *406 | 380    |
| 10*8    | 203 | 254 | 787 | 330 | 264 | *406 | 587    |
| 12*10   | 254 | 305 | 838 | 370 | 313 | *600 | 752    |

\* Gear Operated

Full Bore Class 900

| Size | d   | L   | H1  | H2  | W    | Weight |
|------|-----|-----|-----|-----|------|--------|
| in   | mm  | mm  | mm  | mm  | mm   | Kg     |
| 2    | 51  | 368 | 210 | 83  | 450  | 60     |
| 3    | 76  | 381 | 225 | 110 | 600  | 100    |
| 4    | 102 | 457 | 260 | 143 | *305 | 204    |
| 6    | 152 | 610 | 295 | 225 | *406 | 420    |
| 8    | 203 | 737 | 335 | 270 | *600 | 644    |
| 10   | 254 | 838 | 377 | 320 | *600 | 943    |
| 12   | 305 | 965 | 510 | 415 | *600 | 1295   |

Reduced Bore Class 900

| Size    | d   | D   | L   | H1  | H2  | W    | Weight |
|---------|-----|-----|-----|-----|-----|------|--------|
| in      | mm  | mm  | mm  | mm  | mm  | mm   | Kg     |
| 2*1-1/2 | 38  | 51  | 368 | 180 | 78  | 400  | 54     |
| 3*2     | 51  | 76  | 381 | 210 | 83  | 450  | 80     |
| 4*3     | 76  | 102 | 457 | 225 | 110 | 600  | 148    |
| 6*4     | 102 | 152 | 610 | 260 | 143 | *305 | 305    |
| 8*6     | 152 | 203 | 737 | 295 | 225 | *406 | 552    |
| 10*8    | 203 | 254 | 838 | 335 | 270 | *600 | 748    |
| 12*10   | 254 | 305 | 965 | 377 | 320 | *600 | 1048   |

\* Gear Operated

Full Bore Class 1500

| Size | d   | L    | H1  | H2  | W    | Weight |
|------|-----|------|-----|-----|------|--------|
| in   | mm  | mm   | mm  | mm  | mm   | Kg     |
| 2    | 51  | 368  | 210 | 83  | 450  | 69     |
| 3    | 76  | 470  | 235 | 120 | 700  | 133    |
| 4    | 102 | 546  | 290 | 153 | *406 | 256    |
| 6    | 146 | 705  | 300 | 235 | *600 | 667    |
| 8    | 194 | 832  | 350 | 282 | *600 | 865    |
| 10   | 241 | 991  | 400 | 335 | *600 | 1375   |
| 12   | 289 | 1130 | 525 | 425 | *600 | 2175   |

Reduced Bore Class 1500

| Size    | d   | D   | L    | H1  | H2  | W    | Weight |
|---------|-----|-----|------|-----|-----|------|--------|
| in      | mm  | mm  | mm   | mm  | mm  | mm   | Kg     |
| 2*1-1/2 | 38  | 51  | 368  | 180 | 78  | 400  | 63     |
| 3*2     | 51  | 76  | 470  | 235 | 120 | 450  | 95     |
| 4*3     | 76  | 102 | 546  | 290 | 153 | 700  | 183    |
| 6*4     | 102 | 146 | 705  | 300 | 235 | *406 | 359    |
| 8*6     | 146 | 194 | 832  | 350 | 282 | *600 | 794    |
| 10*8    | 194 | 241 | 991  | 400 | 335 | *600 | 1070   |
| 12*10   | 241 | 289 | 1130 | 525 | 425 | *600 | 1541   |

\* Gear Operated





- **Severity Service**

Normal soft-seated valve cannot be used for abrasive service or/and for operation in high temperatures that prohibits the use of a resilient material. metal-to-metal seated trunnion mounted ball valve (series TM, range 2"~24" class 150lb~2500lb) is designed for this type of severity service has seating action provided by the metal-to-metal contact between the ball and the seat rings.

- **General Design**

Blow-out proof stem, anti-static device, double block & bleed, self relieving seats, Mechanical stops for ball seat alignment are designed as standard requirements; while for fire safe and sealant injection system will be supplied when service request.

- **Superior Sealing**

High precision machining and seat to ball rubbing result in superior ball and seat interfacing for reliable sealing conforming to ANSI/FCI 70-2 class V.

- **Reliable Operations**

Spring-loaded seats maintain close contact with the ball ensuring tight sealing even at low pressures. This also results in stable operating torques at high differential pressures over a wide range of temperatures or/and high frequency.

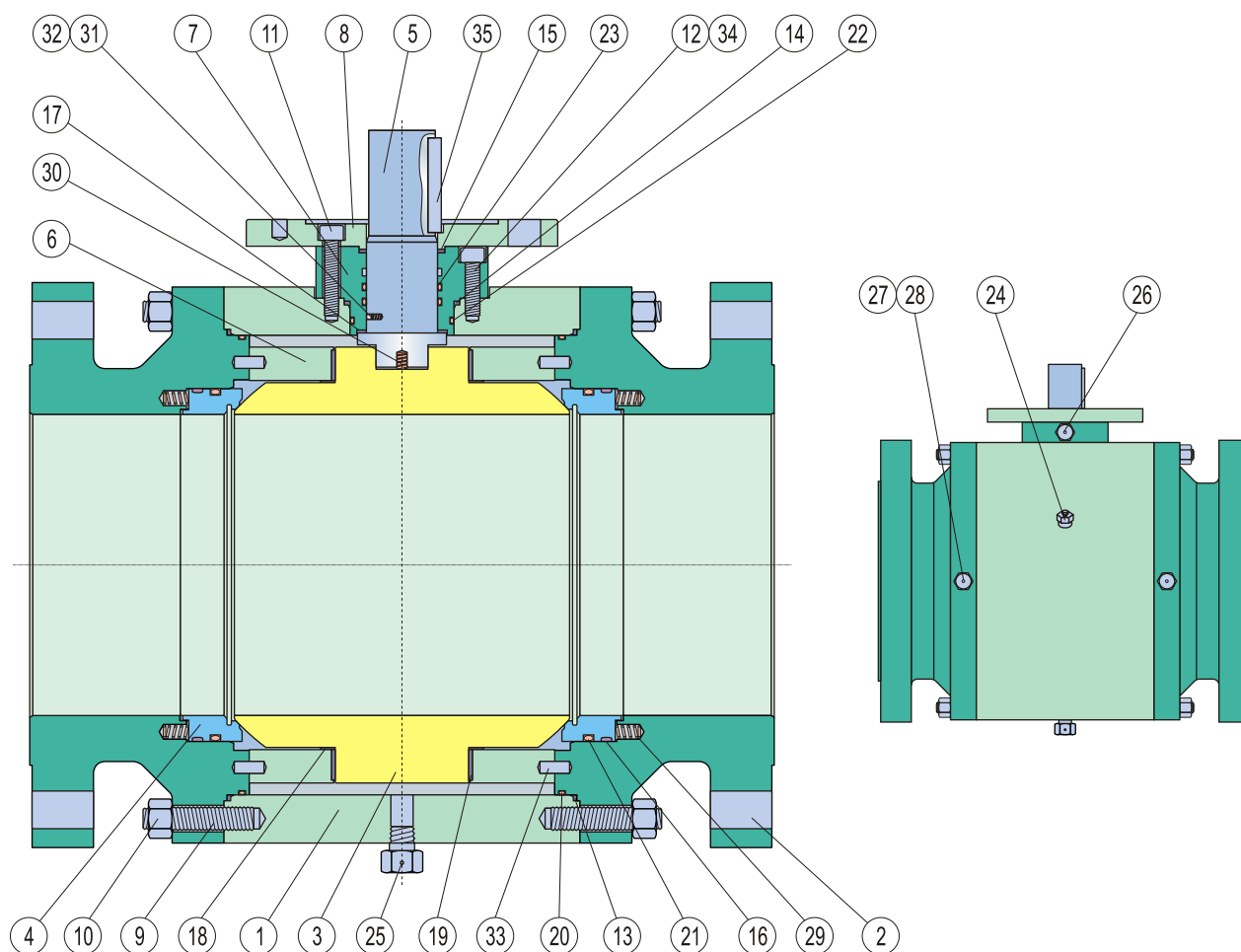
- **Material Selection**

Various material components are available for a variety of service applicable up to 500°C. For service temperature above 300°C, the extension bonnet is required.

- **Applications**

Hard faced ball and seats (TCC as standard, other special coatings are available on request) allow use in more severe services such as slurries, pulp stock, mining and other abrasive media in long life.





### Material Specifications

| No. | Part                    | Standard Materials                                | No. | Part              | Standard Materials              |
|-----|-------------------------|---------------------------------------------------|-----|-------------------|---------------------------------|
| 1   | Body                    | ASTM A 216-WCB/ASTM A 351-CF8M OR ASTM A 105/F316 | 19  | Bearing           | 316SS+PTFE+MoS2                 |
| 2   | Adapter                 | ASTM A 216-WCB/ASTM A 351-CF8M OR ASTM A 105/F316 | 20  | * O-Ring          | Viton                           |
| 3   | Ball                    | ASTM A 351-CF8 OR ASTM A 351-CF8M                 | 21  | * O-Ring          | Viton                           |
| 4   | Seat                    | ASTM A105N+TCC or A182-F316+TCC                   | 22  | * O-Ring          | Viton                           |
| 5   | Stem                    | ASTM A105N/ENP or A182-F316/17-4PH                | 23  | * O-Ring          | Viton                           |
| 6   | Trunnion Supprot        | ASTM A105N/ENP or A182-F316                       | 24  | Vent Valve        | Stainless Steel                 |
| 7   | Gland Flange            | ASTM A105N/ENP or A182-F316                       | 25  | Drain             | Stainless Steel                 |
| 8   | Top Flange              | ASTM A105N or A182-F316                           | 26  | Stem Injection    | Stainless Steel                 |
| 9   | Body Stud               | ASTM A193-B7 or A193-B8                           | 27  | Seat Injection    | Stainless Steel                 |
| 10  | Body Nut                | ASTM A194-2H or A194-8                            | 28  | Check Valve       | Stainless Steel                 |
| 11  | Screw                   | Carbon Steel or Stainless Steel                   | 29  | Seat Spring       | Inconel X-750                   |
| 12  | Screw                   | Carbon Steel or Stainless Steel                   | 30  | Antistatic Spring | Inconel X-750                   |
| 13  | * Body Gasket           | Graphite                                          | 31  | Antistatic Spring | Inconel X-750                   |
| 14  | * Gland Gasket          | Graphite                                          | 32  | Grounding Plunger | Stainless Steel                 |
| 15  | * Stem Firesafe Packing | Graphite                                          | 33  | Alignment Pin     | Stainless Steel                 |
| 16  | * Seat Firesafe Packing | Carbon Fibre+Graphite                             | 34  | Gland Pin         | Carbon Steel or Stainless Steel |
| 17  | Thrust Washer           | PTFE/316SS+PTFE+MoS2                              | 35  | Key               | Carbon Steel or Stainless Steel |
| 18  | Washer                  | PTFE/316SS+PTFE+MoS2                              |     |                   |                                 |

Note: 1. \* Recommended Spare Parts

2. TCC: Tungsten Carbide Coating.

3. Customer shall order the valve according to service condition.



- **Cryogenic Service**

Valves are demanded widely in cryogenic applications ( $-196 \sim -50^{\circ}\text{C}$ ), including LNG that is fast becoming a better alternative source of clean energy.

- **Standards**

ASME B16.34, ASME B16.5  
API 6D, BS 5351, BS 6364, Shell MESC 77/200  
BS 6755, Shell MESC 77/306

- **Applications**

|                              |                        |
|------------------------------|------------------------|
| Ethane:                      | $-89^{\circ}\text{C}$  |
| Ethylene:                    | $-104^{\circ}\text{C}$ |
| Methane:                     | $-162^{\circ}\text{C}$ |
| Liquefied Natural Gas (LNG): | $-162^{\circ}\text{C}$ |
| Oxygen:                      | $-183^{\circ}\text{C}$ |
| Nitrogen:                    | $-196^{\circ}\text{C}$ |

- **Cryogenic Test**

Valves can be tested by in house cryogenic test facility and issue the report on request.

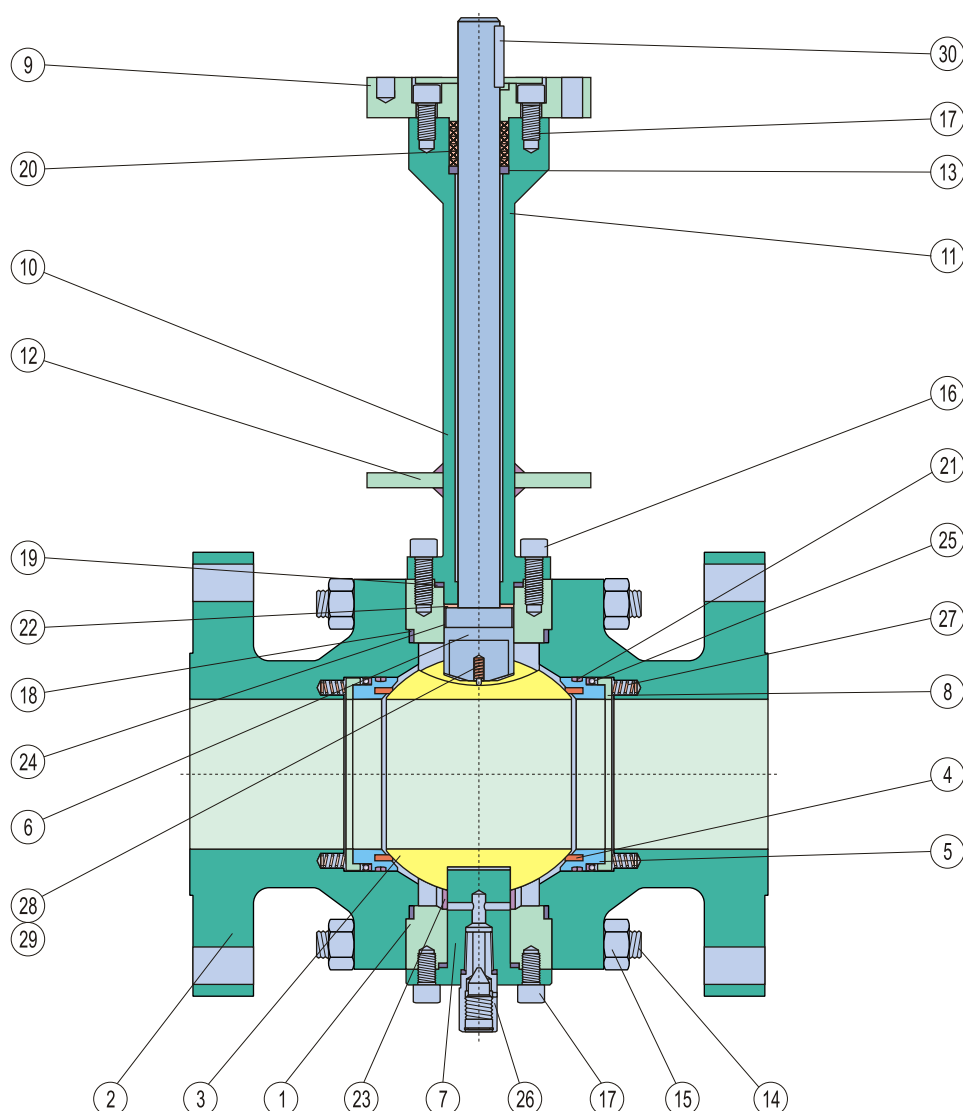
- **General Features**

Extension bonnet gives enough vapour space to maintain the stem packing at a temperature high enough to protect the stem packing against malfunctioning due to freezing;  
Cavity pressure relief;  
Low operating torque for smoother operations;  
Blow-out proof stem, anti-static device and fire safe design;  
Double block & Bleed (Series TY);  
Low fugitive emission compliance.

- **Technical Data**

|                |                                                             |
|----------------|-------------------------------------------------------------|
| Design type:   | Floating, Trunnion                                          |
| Sizes:         | $1/2'' \sim 24''$                                           |
| Pressure:      | class 150lb~600lb                                           |
| Temperature:   | $-196^{\circ}\text{C}$ to ambient temperature               |
| Body material: | A351 Gr CF8/CF8M, A182 F304/F316 ( $-196^{\circ}\text{C}$ ) |





## Material Specifications

| No. | Part            | Standard Materials    | No. | Part              | Standard Materials    |
|-----|-----------------|-----------------------|-----|-------------------|-----------------------|
| 1   | Body            | ASTM A182-F316        | 16  | Screw             | ASTM A320-B8          |
| 2   | Adapter         | ASTM A182-F316        | 17  | Screw             | ASTM A320-B8          |
| 3   | Ball            | ASTM A182-F316        | 18  | *Body Gasket      | 316SS+Graphite        |
| 4   | Seat Insert     | PCTFE                 | 19  | *Gasket           | 316SS+Graphite        |
| 5   | Seat ring       | ASTM A182-F316        | 20  | *Stem Packing     | Graphite              |
| 6   | Stem            | ASTM A182-F316/17-4PH | 21  | *Seat Packing     | Carbon Fibre+Graphite |
| 7   | Trunnion        | ASTM A182-F316        | 22  | Thrust Washer     | PTFE/316SS+PTFE+MoS2  |
| 8   | Seat Follower   | ASTM A182-F316        | 23  | Bearing           | 316SS+PTFE+MoS2       |
| 9   | Top Flange      | ASTM A182-F316        | 24  | Stem Bearing      | 316SS+PTFE+MoS2       |
| 10  | Extension       | Assembled by 14&15    | 25  | Lip-Seal          | PTFE+Spring           |
| 11  | Extended Bonnet | ASTM A182-F316        | 26  | Vent Valve        | Stainless Steel       |
| 12  | Adiabatic Plate | ASTM A182-F316        | 27  | Seat Spring       | INCONEL X-750         |
| 13  | Packing Washer  | ASTM A276-316         | 28  | Antistatic Spring | INCONEL X-750         |
| 14  | Body Stud       | ASTM A320-B8          | 29  | Grounding Plunger | Stainless Steel       |
| 15  | Body Nut        | ASTM A194-8           | 30  | Key               | Stainless Steel       |

\* Recommended Spare Parts

## Floating Ball Valve Design Torque

| Size<br>(inch) | Design Torque (N.m) |           |           |           |            |
|----------------|---------------------|-----------|-----------|-----------|------------|
|                | Class 150           | Class 300 | Class 600 | Class 900 | Class 1500 |
| 1/2            | 12                  | 17        | 30        | 38        | 51         |
| 3/4            | 14                  | 23        | 38        | 56        | 71         |
| 1              | 27                  | 48        | 66        | 98        | 130        |
| 1-1/2          | 55                  | 89        | 120       | 189       | 238        |
| 2              | 75                  | 100       | 160       | 240       | 350        |
| 2-1/2          | 125                 | 141       | 233       | 390       | 550        |
| 3              | 162                 | 216       | 308       | 610       | 980        |
| 4              | 234                 | 476       | 635       | --        | --         |
| 5              | 546                 | 910       | --        | --        | --         |
| 6              | 804                 | 1338      | 1944      | --        | --         |
| 8              | 1410                | 3100      | --        | --        | --         |
| 10             | 2600                | 5400      | --        | --        | --         |

## Notes:

1. For FC, FR & FF series valves, torque is the same.
2. All valves are in normal temperature, with PTFE seat for Class 150~300 and Nylon seat for Class 600~1500.
3. For cryogenic ball valve, torque will be 2~2.5 times the above torque.
4. Torque shown in this table is to be used as a guide for actuator selection. A safety factor of 1.5 is recommended for actuator sizing.
5. Torque may be changed according to different medium and trim material.

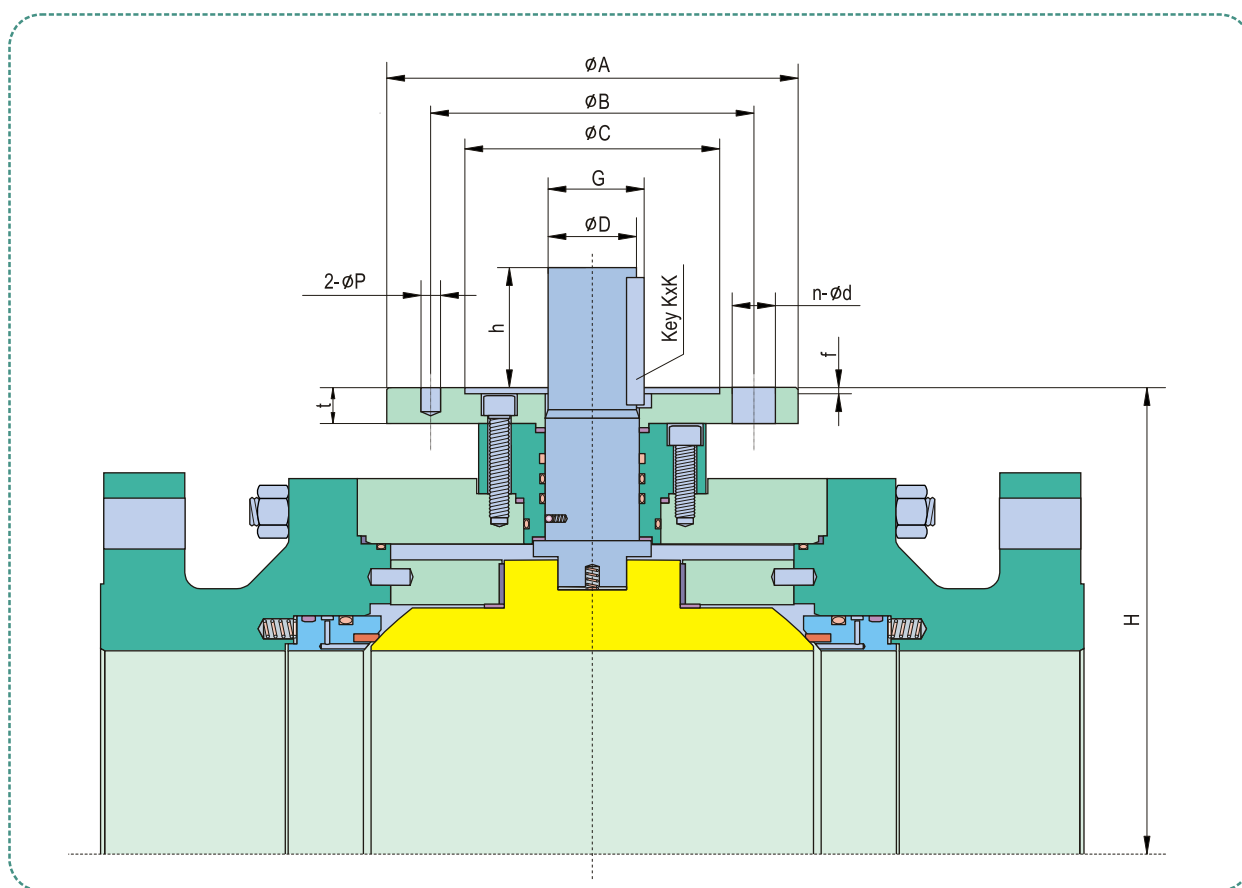
## Ball Valve Flow Coefficient (Cv)

| Size<br>(inch) | Cv        |           |           |           |            |            |
|----------------|-----------|-----------|-----------|-----------|------------|------------|
|                | Class 150 | Class 300 | Class 600 | Class 900 | Class 1500 | Class 2500 |
| 1/2            | 24        | 24        | 24        | 24        | 24         | 24         |
| 3/4            | 53        | 53        | 53        | 53        | 53         | 53         |
| 1              | 92        | 92        | 92        | 92        | 92         | 92         |
| 1-1/2          | 211       | 211       | 211       | 211       | 211        | 211        |
| 2              | 381       | 381       | 381       | 381       | 381        | 283        |
| 3              | 845       | 845       | 845       | 845       | 845        | 600        |
| 4              | 1523      | 1523      | 1523      | 1523      | 1523       | 1160       |
| 6              | 3381      | 3381      | 3381      | 3381      | 3120       | 2590       |
| 8              | 6031      | 6031      | 6031      | 6031      | 5508       | 4795       |
| 10             | 9442      | 9442      | 9442      | 9442      | 8500       | 7410       |
| 12             | 13614     | 13614     | 13614     | 13614     | 12223      | 10433      |
| 14             | 16621     | 16621     | 16621     | 15363     | 14800      | --         |
| 16             | 21920     | 21920     | 21920     | 20581     | 19178      | --         |
| 18             | 28076     | 28076     | 28076     | 26435     | 24243      | --         |
| 20             | 34995     | 34995     | 34995     | 32743     | 30565      | --         |
| 22             | 42676     | 42676     | 42676     | 40184     | 35860      | --         |
| 24             | 51117     | 51117     | 51117     | 47884     | 41733      | --         |
| 26             | 59012     | 59012     | 59012     | 56076     | --         | --         |
| 28             | 68872     | 68872     | 68872     | 65110     | --         | --         |
| 30             | 79493     | 79493     | 79493     | 74610     | --         | --         |
| 32             | 89268     | 89268     | 89268     | 84977     | --         | --         |
| 34             | 101307    | 101307    | 101307    | 96020     | --         | --         |
| 36             | 112306    | 112306    | 112306    | 107487    | --         | --         |
| 40             | 139982    | 139982    | 139982    | --        | --         | --         |

## Note:

1. The flow coefficient "Cv" of a valve is the flow rate in Gallons /minute of 60°F water through a fully opened valve, at a pressure drop of 1 psi across the valve.
2. All the ball valves are in full bore.





| Size<br>inch | Class | Torque<br>N.m | Flange Dimensions<br>mm |     |     |   |    |      |    | ISO5211<br>Flange<br>No. | Key Size<br>KxK<br>mm | G<br>mm | D<br>mm | h<br>mm | H<br>mm |
|--------------|-------|---------------|-------------------------|-----|-----|---|----|------|----|--------------------------|-----------------------|---------|---------|---------|---------|
|              |       |               | A                       | B   | C   | f | t  | n-d  | P  |                          |                       |         |         |         |         |
| 2*1-1/2      | 150   | 42            | 90                      | 70  | 55  | 3 | 12 | 4-9  | 6  | F07                      | 6x6                   | 25      | 22      | 25      | 95      |
|              | 300   | 66            | 90                      | 70  | 55  | 3 | 12 | 4-9  | 6  | F07                      | 6x6                   | 25      | 22      | 25      | 95      |
|              | 600   | 102           | 90                      | 70  | 55  | 3 | 12 | 4-9  | 6  | F07                      | 6x6                   | 25      | 22      | 25      | 95      |
|              | 900   | 142           | 90                      | 70  | 55  | 3 | 12 | 4-9  | 6  | F07                      | 6x6                   | 25      | 22      | 25      | 100     |
|              | 1500  | 241           | 90                      | 70  | 55  | 3 | 15 | 4-9  | 6  | F07                      | 6x6                   | 25      | 22      | 25      | 100     |
|              | 2500  | 423           | 125                     | 102 | 70  | 3 | 15 | 4-11 | 8  | F10                      | 8x8                   | 32      | 28      | 30      | 115     |
| 2            | 150   | 76            | 90                      | 70  | 55  | 3 | 12 | 4-9  | 6  | F07                      | 6x6                   | 25      | 22      | 25      | 103     |
|              | 300   | 91            | 90                      | 70  | 55  | 3 | 12 | 4-9  | 6  | F07                      | 6x6                   | 25      | 22      | 25      | 103     |
|              | 600   | 143           | 90                      | 70  | 55  | 3 | 12 | 4-9  | 6  | F07                      | 6x6                   | 25      | 22      | 25      | 102     |
|              | 900   | 231           | 125                     | 102 | 70  | 3 | 17 | 4-11 | 8  | F10                      | 8x8                   | 32      | 28      | 30      | 117     |
|              | 1500  | 349           | 125                     | 102 | 70  | 3 | 17 | 4-11 | 8  | F10                      | 8x8                   | 32      | 28      | 30      | 117     |
|              | 2500  | 798           | 150                     | 125 | 85  | 3 | 20 | 4-13 | 10 | F12                      | 10x10                 | 41      | 36      | 55      | 141     |
| 3            | 150   | 121           | 125                     | 102 | 70  | 3 | 15 | 4-11 | 8  | F10                      | 8x8                   | 32      | 28      | 30      | 129     |
|              | 300   | 159           | 125                     | 102 | 70  | 3 | 15 | 4-11 | 8  | F10                      | 8x8                   | 32      | 28      | 30      | 129     |
|              | 600   | 269           | 125                     | 102 | 70  | 3 | 15 | 4-11 | 8  | F10                      | 8x8                   | 32      | 28      | 30      | 132     |
|              | 900   | 524           | 150                     | 125 | 85  | 3 | 18 | 4-13 | 10 | F12                      | 10x10                 | 41      | 36      | 55      | 140     |
|              | 1500  | 887           | 150                     | 125 | 85  | 3 | 18 | 4-13 | 10 | F12                      | 10x10                 | 41      | 36      | 55      | 153     |
|              | 2500  | 1583          | 175                     | 140 | 100 | 4 | 24 | 4-18 | 10 | F14                      | 12x12                 | 51      | 45      | 65      | 169     |
| 4            | 150   | 179           | 125                     | 102 | 70  | 3 | 15 | 4-11 | 8  | F10                      | 8x8                   | 32      | 28      | 30      | 150     |
|              | 300   | 355           | 125                     | 102 | 70  | 3 | 15 | 4-11 | 8  | F10                      | 8x8                   | 32      | 28      | 30      | 150     |
|              | 600   | 670           | 150                     | 125 | 85  | 3 | 18 | 4-13 | 10 | F12                      | 10x10                 | 41      | 36      | 55      | 160     |
|              | 900   | 875           | 175                     | 140 | 100 | 4 | 20 | 4-18 | 10 | F14                      | 12x12                 | 51      | 45      | 65      | 172     |
|              | 1500  | 1351          | 210                     | 165 | 130 | 5 | 24 | 4-22 | 12 | F16                      | 14x14                 | 57      | 50      | 75      | 193     |
|              | 2500  | 2111          | 210                     | 165 | 130 | 5 | 26 | 4-22 | 12 | F16                      | 14x14                 | 62      | 55      | 80      | 205     |



| Size<br>inch | Class | Torque<br>N.m | Flange Dimensions<br>mm |     |     |   |    |      |    | ISO5211<br>Flange<br>No. | Key Size<br>KxK<br>mm | G<br>mm | D<br>mm | h<br>mm | H<br>mm |
|--------------|-------|---------------|-------------------------|-----|-----|---|----|------|----|--------------------------|-----------------------|---------|---------|---------|---------|
|              |       |               | A                       | B   | C   | f | t  | n-d  | P  |                          |                       |         |         |         |         |
| 6            | 150   | 631           | 150                     | 125 | 85  | 3 | 18 | 4-13 | 10 | F12                      | 10x10                 | 41      | 36      | 55      | 188     |
|              | 300   | 854           | 150                     | 125 | 85  | 3 | 18 | 4-13 | 10 | F12                      | 10x10                 | 41      | 36      | 55      | 188     |
|              | 600   | 1609          | 175                     | 140 | 100 | 4 | 20 | 4-18 | 10 | F14                      | 12x12                 | 51      | 45      | 65      | 208     |
|              | 900   | 1927          | 210                     | 165 | 130 | 5 | 22 | 4-22 | 12 | F16                      | 14x14                 | 62      | 55      | 80      | 215     |
|              | 1500  | 3512          | 210                     | 165 | 130 | 5 | 24 | 4-22 | 14 | F16                      | 16x16                 | 68      | 60      | 90      | 235     |
|              | 2500  | 5454          | 300                     | 254 | 200 | 5 | 28 | 8-18 | 16 | F25                      | 16x16                 | 73      | 65      | 95      | 270     |
| 8            | 150   | 987           | 210                     | 165 | 130 | 5 | 20 | 4-22 | 10 | F16                      | 12x12                 | 51      | 45      | 60      | 233     |
|              | 300   | 1562          | 210                     | 165 | 130 | 5 | 20 | 4-22 | 10 | F16                      | 12x12                 | 51      | 45      | 60      | 233     |
|              | 600   | 2501          | 210                     | 165 | 130 | 5 | 22 | 4-22 | 12 | F16                      | 14x14                 | 62      | 55      | 80      | 249     |
|              | 900   | 4012          | 210                     | 165 | 130 | 5 | 22 | 4-22 | 14 | F16                      | 16x16                 | 68      | 60      | 90      | 266     |
|              | 1500  | 6513          | 300                     | 254 | 200 | 5 | 28 | 8-18 | 16 | F25                      | 18x18                 | 79      | 70      | 105     | 285     |
|              | 2500  | 8495          | 300                     | 254 | 200 | 5 | 32 | 8-18 | 16 | F25                      | 18x18                 | 84      | 75      | 110     | 355     |
| 10           | 150   | 1321          | 210                     | 165 | 130 | 5 | 20 | 4-22 | 12 | F16                      | 14x14                 | 62      | 55      | 80      | 278     |
|              | 300   | 2304          | 210                     | 165 | 130 | 5 | 20 | 4-22 | 12 | F16                      | 14x14                 | 62      | 55      | 80      | 278     |
|              | 600   | 3450          | 210                     | 165 | 130 | 5 | 24 | 4-22 | 14 | F16                      | 16x16                 | 68      | 60      | 90      | 300     |
|              | 900   | 5017          | 300                     | 254 | 200 | 5 | 25 | 8-18 | 16 | F25                      | 18x18                 | 79      | 70      | 105     | 315     |
|              | 1500  | 7996          | 300                     | 254 | 200 | 5 | 28 | 8-18 | 16 | F25                      | 18x18                 | 84      | 75      | 110     | 345     |
|              | 2500  | 13148         | 300                     | 254 | 200 | 5 | 32 | 8-18 | 16 | F25                      | 20x20                 | 95      | 85      | 125     | 412     |
| 12           | 150   | 1650          | 210                     | 165 | 130 | 5 | 24 | 4-22 | 14 | F16                      | 16x16                 | 68      | 60      | 90      | 318     |
|              | 300   | 3041          | 210                     | 165 | 130 | 5 | 24 | 4-22 | 14 | F16                      | 16x16                 | 68      | 60      | 90      | 320     |
|              | 600   | 4507          | 300                     | 254 | 200 | 5 | 25 | 8-18 | 16 | F25                      | 18x18                 | 79      | 70      | 105     | 345     |
|              | 900   | 6512          | 300                     | 254 | 200 | 5 | 28 | 8-18 | 16 | F25                      | 18x18                 | 84      | 75      | 110     | 360     |
|              | 1500  | 10078         | 300                     | 254 | 200 | 5 | 30 | 8-18 | 16 | F25                      | 20x20                 | 95      | 85      | 125     | 408     |
|              | 2500  | 18007         | 350                     | 298 | 260 | 5 | 38 | 8-22 | 20 | F30                      | 24x24                 | 107     | 95      | 140     | 478     |
| 14           | 150   | 2415          | 300                     | 254 | 200 | 5 | 26 | 8-18 | 16 | F25                      | 16x16                 | 73      | 65      | 95      | 353     |
|              | 300   | 4019          | 300                     | 254 | 200 | 5 | 26 | 8-18 | 16 | F25                      | 16x16                 | 73      | 65      | 95      | 360     |
|              | 600   | 6578          | 300                     | 254 | 200 | 5 | 28 | 8-18 | 16 | F25                      | 18x18                 | 84      | 75      | 110     | 376     |
|              | 900   | 9489          | 300                     | 254 | 200 | 5 | 28 | 8-18 | 16 | F25                      | 20x20                 | 95      | 85      | 125     | 388     |
|              | 1500  | 14860         | 300                     | 254 | 200 | 5 | 35 | 8-18 | 16 | F25                      | 24x24                 | 107     | 95      | 140     | 448     |
|              | 2500  | 21857         | 350                     | 298 | 230 | 5 | 35 | 8-22 | 20 | F30                      | 28x28                 | 119     | 105     | 155     | 490     |
| 16           | 150   | 3314          | 300                     | 254 | 200 | 5 | 28 | 8-18 | 16 | F25                      | 18x18                 | 84      | 75      | 110     | 393     |
|              | 300   | 5350          | 300                     | 254 | 200 | 5 | 28 | 8-18 | 16 | F25                      | 18x18                 | 84      | 75      | 110     | 406     |
|              | 600   | 9025          | 300                     | 254 | 200 | 5 | 28 | 8-18 | 16 | F25                      | 20x20                 | 95      | 85      | 125     | 414     |
|              | 900   | 12877         | 300                     | 254 | 200 | 5 | 30 | 8-18 | 16 | F25                      | 24x24                 | 107     | 95      | 140     | 442     |
|              | 1500  | 21857         | 350                     | 298 | 230 | 5 | 35 | 8-22 | 20 | F30                      | 28x28                 | 119     | 105     | 155     | 490     |
|              | 2500  | 3512          | 300                     | 254 | 200 | 5 | 28 | 8-18 | 16 | F25                      | 18x18                 | 84      | 75      | 110     | 435     |
| 18           | 150   | 5148          | 300                     | 254 | 200 | 5 | 28 | 8-18 | 16 | F25                      | 18x18                 | 84      | 75      | 110     | 435     |
|              | 300   | 8375          | 300                     | 254 | 200 | 5 | 28 | 8-18 | 16 | F25                      | 20x20                 | 95      | 85      | 125     | 448     |
|              | 600   | 13493         | 300                     | 254 | 200 | 5 | 30 | 8-18 | 16 | F25                      | 24x24                 | 107     | 95      | 140     | 458     |
|              | 900   | 18975         | 350                     | 298 | 230 | 5 | 32 | 8-22 | 20 | F30                      | 28x28                 | 119     | 105     | 165     | 487     |
|              | 1500  | 29032         | 350                     | 298 | 230 | 5 | 38 | 8-22 | 20 | F30                      | 32x32                 | 136     | 120     | 180     | 545     |
|              | 2500  | 40907         | 415                     | 356 | 260 | 5 | 42 | 8-33 | 28 | F35                      | 36x36                 | 158     | 140     | 210     | 580     |
| 20           | 150   | 6425          | 300                     | 254 | 200 | 5 | 30 | 8-18 | 16 | F25                      | 20x20                 | 90      | 80      | 120     | 477     |
|              | 300   | 10987         | 300                     | 254 | 200 | 5 | 30 | 8-18 | 16 | F25                      | 24x24                 | 107     | 95      | 140     | 485     |
|              | 600   | 18502         | 350                     | 298 | 230 | 5 | 32 | 8-22 | 20 | F30                      | 28x28                 | 119     | 105     | 165     | 510     |
|              | 900   | 26048         | 350                     | 298 | 230 | 5 | 38 | 8-22 | 20 | F30                      | 32x32                 | 136     | 120     | 180     | 530     |
|              | 1500  | 40907         | 415                     | 356 | 260 | 5 | 42 | 8-33 | 28 | F35                      | 36x36                 | 158     | 140     | 210     | 580     |
|              | 2500  | 65223         | 475                     | 406 | 300 | 8 | 48 | 8-39 | 28 | F40                      | 40x40                 | 180     | 160     | 240     | 730     |
| 24           | 150   | 12379         | 300                     | 254 | 200 | 5 | 32 | 8-18 | 16 | F25                      | 24x24                 | 102     | 90      | 135     | 562     |
|              | 300   | 19384         | 350                     | 298 | 230 | 5 | 32 | 8-22 | 20 | F30                      | 28x28                 | 124     | 110     | 165     | 565     |
|              | 600   | 29546         | 350                     | 298 | 230 | 5 | 38 | 8-22 | 20 | F30                      | 32x32                 | 136     | 120     | 180     | 602     |
|              | 900   | 42379         | 415                     | 356 | 260 | 5 | 42 | 8-33 | 28 | F35                      | 36x36                 | 158     | 140     | 210     | 630     |
|              | 1500  | 65223         | 475                     | 406 | 300 | 8 | 48 | 8-39 | 28 | F40                      | 40x40                 | 180     | 160     | 240     | 730     |
|              | 2500  | 10987         | 300                     | 254 | 200 | 5 | 30 | 8-18 | 16 | F25                      | 24x24                 | 107     | 95      | 140     | 485     |

## Notes:

- The above table is for TF, TW&TT series valves, which are with ISO 5211 mounting flange and adaptability for all types actuators mounting.
- The torque is for valves with PTFE seat or Nylon seat as per different size/class selection.
- The torque value showed in above table is the valve torque at normal temperature. For customer's sizing actuator:
  - If medium temperature is -10°C~40°C, the output torque of actuator should be 1.5 times the valve torque;
  - If medium temperature is less than -10°C, the output torque of actuator should be 2 or 2.5 times the valve torque.





## Specifications for Seat Materials

|                                       | PTFE                            | RPTFE                           | Molon(Nylon+MoS <sub>2</sub> )  | PEEK                             |
|---------------------------------------|---------------------------------|---------------------------------|---------------------------------|----------------------------------|
| Tensile Strength (MPa)                | 24.8                            | 25.4                            | 75~100                          | 91                               |
| Compressive Strength (MPa)            | 35                              | 52                              | 100~140                         | 137                              |
| Elongation (%)                        | 250                             | 120                             | 10~30                           | 50                               |
| Hardness(SH.A)                        | 56                              | 60                              | 78                              | 82                               |
| Water Absorption (%)                  | <0.01                           | <0.01                           | 0.7                             | 0.12                             |
| Specific Gravity (G/cm <sup>3</sup> ) | 2.2                             | 2.2                             | 1.2                             | 1.35                             |
| Temperature Range (°F)                | -300~400                        | -150~425                        | -40~300                         | -150~500                         |
| Pressure Rating (Class)               | 150~600                         | 150~600                         | 150~1500                        | 150~2500                         |
| Service Application                   | Chemical & Cryogenic            | Chemical & Cryogenic            | High Pressure & Low Temperature | High Pressure & High Temperature |
|                                       | Nylon 1010                      | Nylon 12                        | Devlon V                        | Delrin                           |
| Tensile Strength (MPa)                | 55                              | 60                              | 80                              | 68                               |
| Compressive Strength (MPa)            | 70                              | 79                              | 140                             | 110                              |
| Elongation (%)                        | 150                             | 200                             | 5.37                            | 220                              |
| Hardness(SH.A)                        | 70                              | 75                              | 78                              | 78                               |
| Water Absorption (%)                  | 0.3                             | 0.2                             | 0.1                             | 0.2                              |
| Specific Gravity (G/cm <sup>3</sup> ) | 1.04                            | 1.01                            | 1.14                            | 1.41                             |
| Temperature Range (°F)                | -40~200                         | -58~250                         | -150~300                        | -58~230                          |
| Pressure Rating (Class)               | 600~1500                        | 600~1500                        | 150~1500                        | 150~1500                         |
| Service Application                   | High Pressure & Low Temperature | High Pressure & Low Temperature | High Pressure & Low Temperature | High Pressure & Low Temperature  |

## Specifications for Seal Materials

|                                       | Viton A                                      | NBR                                   | Viton B                   | HNBR (HSN)                                                                      | Viton AED                                                                       |
|---------------------------------------|----------------------------------------------|---------------------------------------|---------------------------|---------------------------------------------------------------------------------|---------------------------------------------------------------------------------|
| Temperature range (°F)                | -20~400                                      | -50~250                               | -20~400                   | -40~320                                                                         | -20~480                                                                         |
| Hardness (SH.A)                       | 70                                           | 70                                    | 70                        | 80                                                                              | 90                                                                              |
| Specific Gravity (G/cm <sup>3</sup> ) | 1.85                                         | 1.2                                   | 1.85                      | 1.33                                                                            | 1.9                                                                             |
| Service Application                   | Petroleum Oils, Gasoline, Transmission Fluid | Petroleum Oils, Water, Hydraulic Oils | Mineral Acid, Steam, MTBE | Petroleum Oils, H <sub>2</sub> S & CO <sub>2</sub> Anti-Explosive Decompression | Petroleum Oils, H <sub>2</sub> S & CO <sub>2</sub> Anti-Explosive Decompression |

## Specifications for Gasket Materials

|                      | Flexible Graphite | Spiral Wound 316+Graphite | PTFE                      | Spiral Wound Monel + PTFE |
|----------------------|-------------------|---------------------------|---------------------------|---------------------------|
| Temperature Range °F | -300~900          | -300~900                  | -300~400                  | -300~400                  |
| PH                   | 0~14              | 0~14                      | 0~14                      | 0~14                      |
| Service Application  | Fire-safe         | Fire-safe                 | Cryogenic, High Corrosive | High Corrosive            |

## Our Other Product Catalogues

 CRESCENT VALVES

### Ball Valve

Forged Steel & Cast Steel  
Floating Ball Valve  
Trunnion Mounted Ball Valve



 CRESCENT VALVES

### Gate, Globe, Check Valve's



Gate Valve  
Globe Valve  
Swing Check Valve  
Y Strainer  
Forged Instrumentation  
Valve  
Steam Trap

 CRESCENT VALVES

### Butterfly Valve

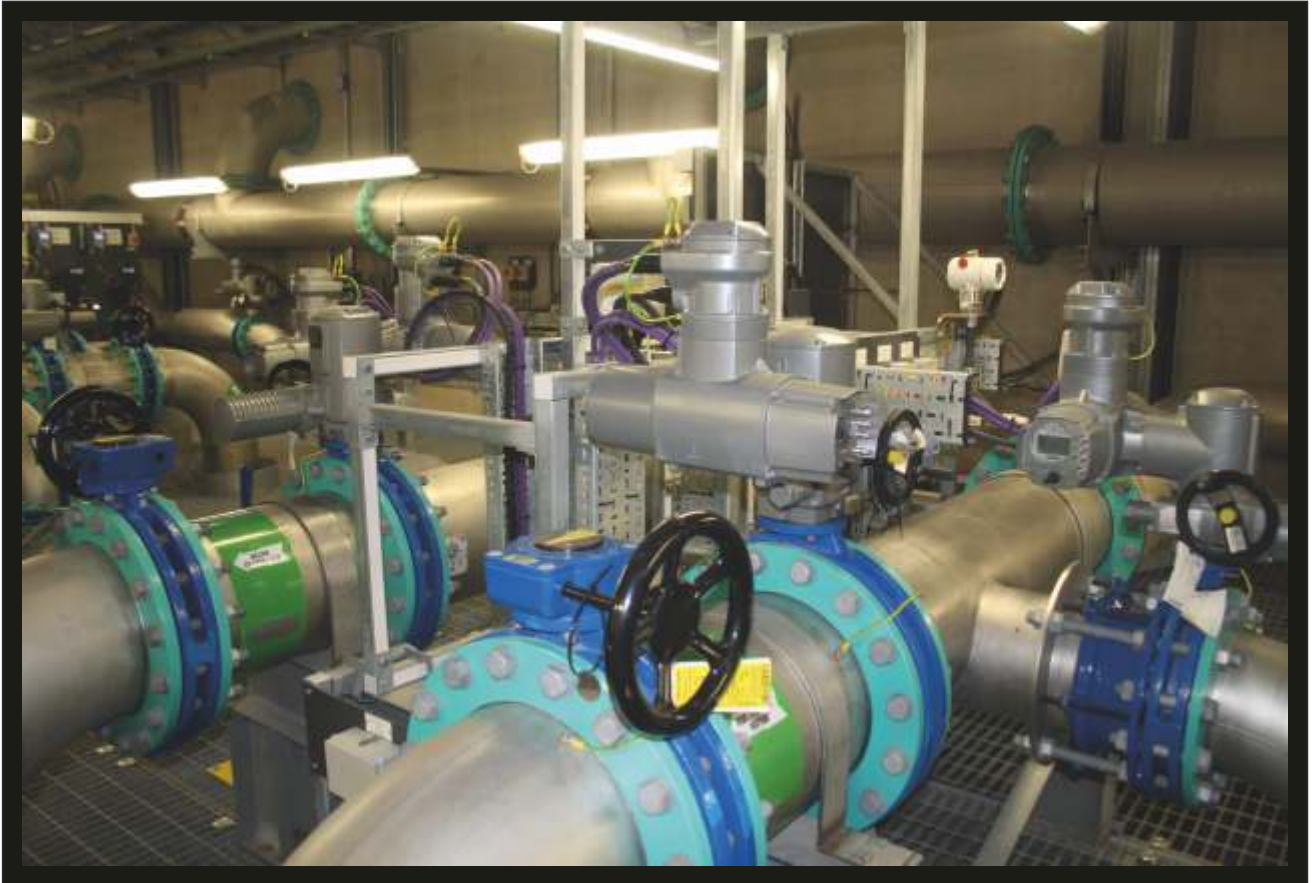
Resilient Seat Valve  
PTFE Seat Valve  
Wafer Check Valve  
High Performance Valve



 CRESCENT VALVES

### Safety Relief Valve





**Crescent Has Entered Into A Technical Collaboration With Thevignot Of France, now under the valve Italia Group.**

**The Import Of High-Precision Technology From A World Leader In Valve Manufacturing Has Added New Dimensions Of Quality To Process Control In India.**

**Crescent Continues To Pledge Its Assistance To The Dynamic Growth Of India Industry.**



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