# CAST STEEL VALVES

## GATE, GLOBE & CHECK

# REFERENCE STANDARDS AND SPECIFICATIONS

| ANSI STANDARDS - AMERICAN NATIONAL STANDARDS INSTITUTE | |
|---|---|
| B1.1 | Unified Screw Threads |
| B1.5 | Acme Screw Threads |
| B1.8 | Stub Acme Screw Threads |
| B1.12 | Class 5 Interference - Fit threads |
| B2.1 | Pipe Threads |
| B16.5 | Steel Pipe Flanges, and Flange Fittings |
| B16.10 | Face to Face and End to End Dimensions of Ferrous Valves |
| B16.11 | Forged Steel Fittings, Socket Welding and Threaded |
| B16.20 | Ring-Joint Gaskets and Grooves for Steel Pipe Flanges |
| B16.21 | Non-metallic Gaskets for Pipe Flanges |
| B16.25 | Buttwelding Ends |
| B16.34 | Steel Valves |
| B18.2.2 | Square and Hex Nuts |
| B31.1 | Power Piping |
| B31.2 | Fuel Gas Piping |
| B31.3 | Petroleum Refinery Piping |
| B31.4 | Liquid Petroleum Transportation Piping Systems |
| B31.5 | Refridgeration Piping Systems |
| B31.6 | Chemical Process Piping |
| B31.7 | Nuclear Power Piping |
| B31.8 | Gas Transmission and Distribution Piping Systems |
| B36.10 | Wrought-Steel and Wrought-Iron Pipe |

| API STANDARDS - AMERICAN PETROLEUM INSTITUTE | |
|---|---|
| 6A | Specification for Wellhead Equipment |
| 6D | Specification for Pipeline Valves |
| 597 | Steel Venturi Gate Valves |
| 598 | Valve Inspection and Testing |
| 600 | Steel Gate Valves, Flanged or Buttwelding Ends |
| 603 | 150-Lb, Light Wall, Corrosion-Resistant Gate Valve for Refinery Use |
| 605 | Large Diameter Carbon Steel Flanges |

| ASTM STANDARDS - AMERICAN SOCIETY FOR TESTING AND MATERIALS |
|---|

| MSS STANDARD PRACTICES - MANUFACTURERS STANDARDISATION SOCIETY OF THE VALVE AND FITTINGS INDUSTRY | |
|---|---|
| SP-6 | Finishes- for contact Faces of Connection End Flanges of Ferrous Valves and Fittings |
| SP-9 | MSS Spot Facing Standard |
| SP-25 | MSS Standard Marking System for Valves, Fittings, Flanges and Unions |
| SP-42 | MSS 150Lb Corrosion Resistant Cast Flanged Valves |
| SP-44 | MSS Steel Pipe Line Flanges |
| SP-45 | MSS Bypass and Drain Connection Standard |
| SP-53 | Quality Standard for Steel Castings, Dry Particle Magnetic Inspection Method |
| SP-54 | Quality Standard for Steel Castings, Radiographic Inspection Method |
| SP-55 | Quality Standard for Steel Castings, Visual Method |
| SP-61 | Hydrostatic Testing of Steel Valves |

# PERFORMANCE FOR ANY APPLICATION

In fluid process systems, it is valves which are the controlling elements. They are responsible for stopping and starting flow, throttling or regulating flow, prevention of backflow and for regulating pressure.

## GATE VALVES

Gate Valves serve as efficient stop valves with flow in both directions. They are used where a minimum pressure drop is important. Gate valves should not be used for Throttling since partially open gate valves display flow characteristics which will not help maintain accurate and consitent flow control. Partially open gate valves may also be damaged by the high velocity across the valve seats. They function best as ON/OFF valves either in the fully open or fully closed position.

## GLOBE VALVES

Globe valves are suited for service where Throttling is required. Globe valve flow characteristics allow accurate and repeatable flow control. Caution should be taken to avoid very close throttling when the pressure drop exceeds around 20%. This close throttling can lead to excessive noise or vibration and can result in damage to the valves and other piping system components.

## SWING CHECK VALVES

Swing Check Valves prevent backflow through pipelines. The valves can be installed in horizontal or vertical, upward flow, piping. They can serve to offer resistance to flow and are best suited to low velocity service condiditons.

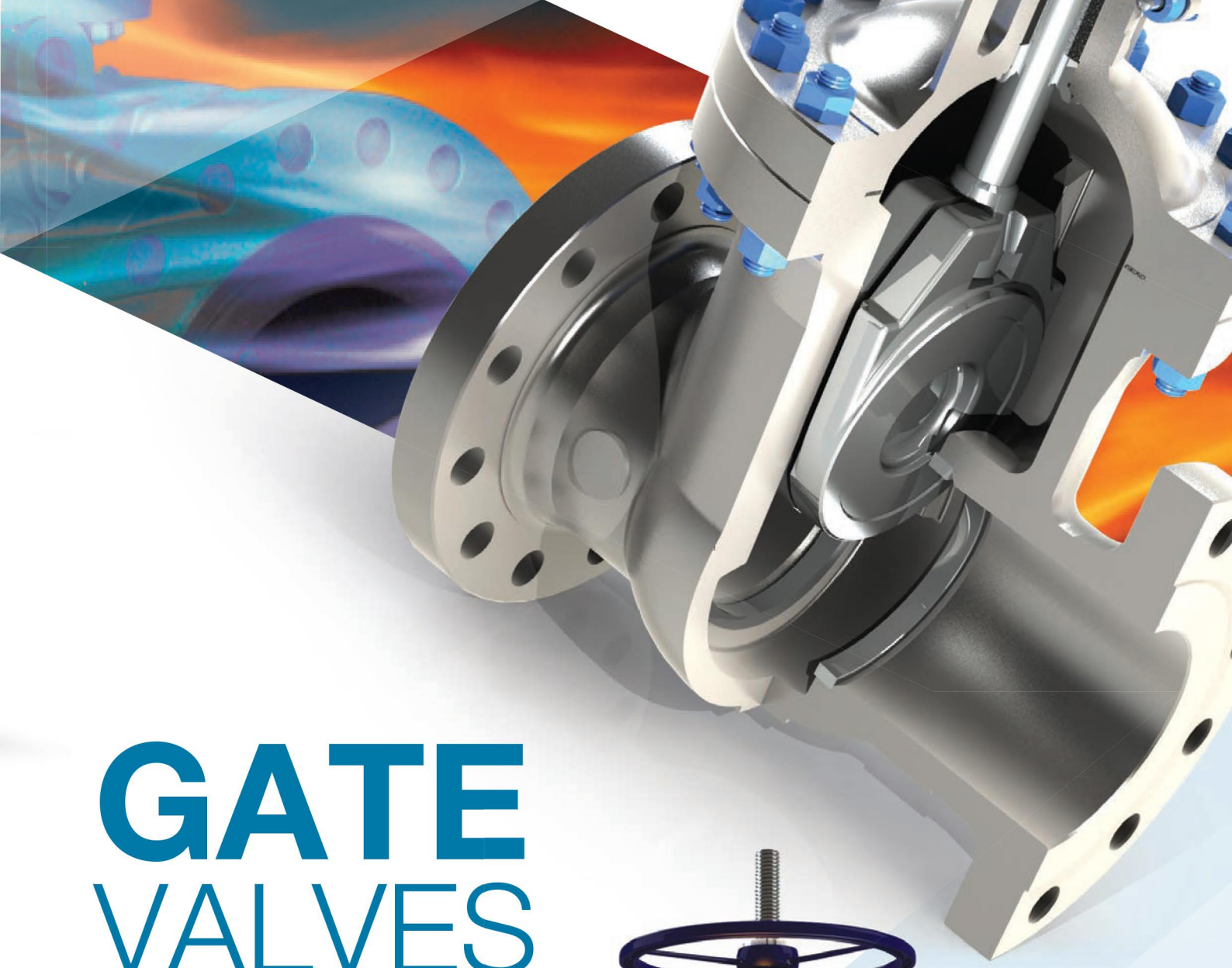
## MATERIALS OF CONSTRUCTION (SERVICE CONDITIONS)

| ASTM Classification | Service conditions |
|---|---|
| A216 WCB | For use in service up to 1000°F (537°C) assuming corrosion and oxidation are not a factor (1)(2)(3) |
| A217 C5 | For use in service up to 1200°F (649°C). Offers good corrosion and oxidation resistance. |
| A351 LCC | For service between -50°F (-46°C) and 650°F (343°C). This material must be quenched and temperered to obtain tensile and impact properties needed at low temperatures. |
| A351 LC3 | For service between -150°F (-101°C) and 650°F (343°C). Subsequent heat treatment is used to obtain tensile and impact properties needed at subzero temperatures. |
| A351 CF8M | For service up to 1000°F (537°C) , where corrosion and oxidation resistance are required. |
| A351 CF8 | For service up to 1000°F (537°C), where corrosion and oxidation resistance are desired, but lower costs than CF8M and slightly lower strength and corrosion resistance can be accepted. |

(1) Upon prolonged exposure to temperatures above 800°F (426°C) , the carbide phase of carbon steel may be converted to graphite. Permissible, but not recommended for prolonged use above 800°F (426°C)

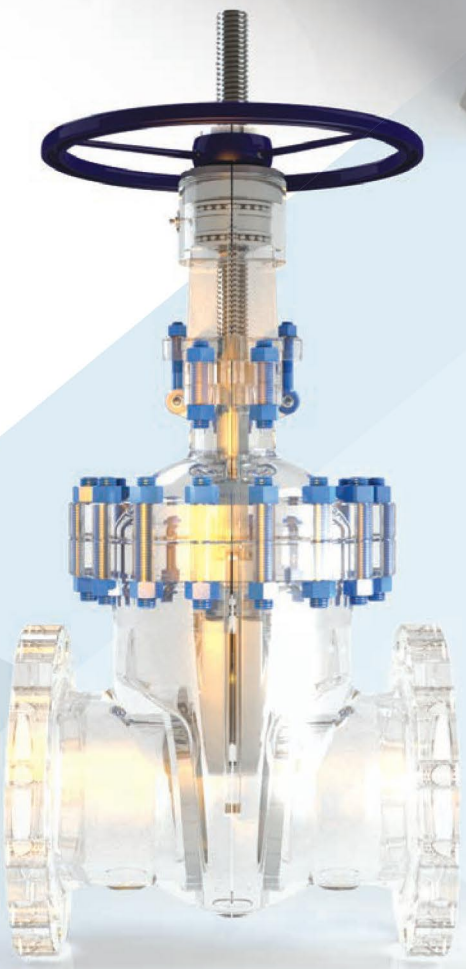
(2) Product used within the jurisdiction of Section 1 Power boilers of the ASME boiler and pressure vessel code is subject to the same temperature limitations as specificed in that document

(3) Product used within the jurisdiction of Power piping, ASME Code for Pressure piping B31.3, is subject to the same maximum temperature limitations placed upon the material in that document.



# GATE VALVES

Gate Valves are the most commonly used shut-off valve in the industry today.



# CAST STEEL GATE VALVES

## Gate Valves are manufactured to API Std 600 and tested to API Std 598.

Gate Valves are the most commonly used shut-off valve in the industry today. They are used where minimum pressure drop and bi-directional on-off service is required. Gate valves are not designed for throttling service. Prolonged use in the partially open position may lead to premature wear and damage to the seating surfaces.

Our standard offering has a rising stem with an outside screw and yoke.

### BODY AND BONNET

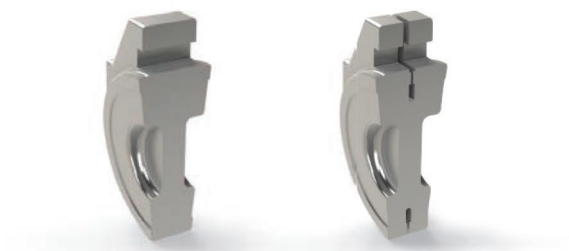
Back-Seat Bushing
Gland can be Re-packed in-situ
Wedge Clear of Flow in Full Open Position
Low Pressure Drop across valve

### BODY-BONNET JOINT / GASKET

Range of materials to suit Pressure Classes

### WEDGE

Flexible wedge as standard
(Solid Wedge available on request)
Reduces the likelihood of the wedge sticking
Fully guided wedges



NON FLEXIBLE FLEXIBLE

### WELDED-IN SEAT RING

Seat Ring is seal welded to eliminate potential leak paths.
(Renewable seat rings can be supplied on request.)

### STEM

One piece stem, forged tee-head connection
Rolled or cut ACME threads subject to valve size
Polished on the packing contact area
Ensures long life & optimal tightness
Engineered stem break-point above packing area
Ensures sealing integrity to atmosphere.

### GLAND

The Gland Flange & Packing Gland are manufactured in two separate pieces
Adjustable gland in service
Optional live loaded gland can be specified
Backseated design allowing the gland packing to be replaced in situ.

### STUFFING BOX

Packing contains corrosion inhibitor to avoid stem pitting.
Deep stuffing box design ensures long packing life.

### END CONNECTIONS

As Standard production covers valves with:
**Flanged ends** to ANSI B16.5
**RF** Raised face serrated finish or,
On request, with any other type of finish
**RTJ** Ring Type Joint

### Others

**Butt-welding ends (BW) to ANSI B16.25**
Customer must specify the type of schedule required, or class of pipe, or diameter and bore.

**Special** end connections on request.

### FACE to FACE

Face to Face dimensions to ANSI B16.10.

### HANDWHEEL

Handwheels designed for ease of operation.

### GEAR OPERATED VALVES

Valves can be supplied with bevel gear operators

### MOTOR OPERATED VALVES

On request valves can be supplied equipped with, or prepared for actuators
Electric /
Pneumatic /
Hydraulic (according to customers' requirements).

Customer is to advise all service requirements and applicable specification with enquiry.

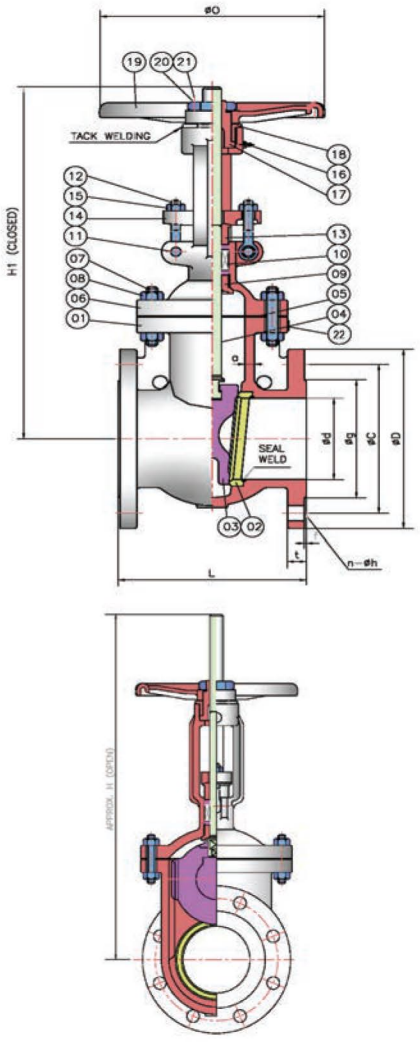
### ACCESSORIES

OnRequest:
By-passes, locking devices, chain wheels, floor stands, special extension stems and others.

### TESTING

Standard Testing is in accordance with API 598.
Customer specific testing by agreement.

# CAST STEEL GATE VALVES - ANSI 150




| Parts And Material List | | | FIG . 0112F |
|---|---|---|---|
| **No.** | **Part Name** | **Material** | **ASTM Specification** |
| 01 | Body | Carbon Steel | ASTM A216 WCB |
| 02 | Body Seat Ring | Carbon Steel | ASTM A105 ST'L No. 6 Face |
| 03 | Wedge | Carbon Steel | ASTM A216 WCB 13Cr Face |
| 04 | Stem | Stainless Steel | ASTM A182 F6a |
| 05 | Gasket | Stainless Steel + Graphite | ASTM A182 316 + Graphite |
| 06 | Bonnet | Carbon Steel | ASTM A216 WCB |
| 07 | Bonnet Bolt | Carbon Steel | ASTM A193 B7 |
| 08 | Bonnet Nut | Carbon Steel | ASTM A194 2H |
| 09 | Back Seat Ring | Stainless Steel | ASTM A276 410 |
| 10 | Packing ring | Graphite | Die Formed / Braided Graphite |
| 11 | Hinge Pin | Carbon Steel | - |
| 12 | Gland Bolt | Carbon Steel | ASTM A193 B7 |
| 13 | Packing Gland | Stainless Steel | ASTM A276 410 |
| 14 | Gland Flange | Carbon Steel | ASTM A216 WCB |
| 15 | Gland Nut | Carbon Steel | ASTM A194 2H |
| 16 | Grease Nipple | Stainless Steel | 2 1/2" and above |
| 17 | Yoke Sleeve | Ductile Iron | ASTM A439 D2 |
| 18 | Yoke Cap | Carbon Steel | - |
| 19 | Handwheel | Ductile Iron | - |
| 20 | Handwheel Nut | Carbon Steel | - |
| 21 | Set Screw | Steel | - |
| 22 | Nameplate | Stainless Steel | ASTM A182 F316 |

## OPERATOR OPTIONS

- Gear Operated recommended for size 16" above

## SPECIFICATION

- Bolted Bonnet
- Outside Screw and Yoke
- Flexible Wedge
- Oval Bonnet with integral Yoke
- Rising Stem - Non-rising Handwheel
- Welded-In / Threaded Seat Rings
- Raised Face Flanged Ends or Butt Weld Ends

Other End connections are available on request.

## APPLICABLE STANDARDS

Design : API 600
End Flange : ANSI B16.5
Weld Ends : ANSI B16.25
Face-to-Face : ANSI B16.10
Shell and Seat Test : API 598

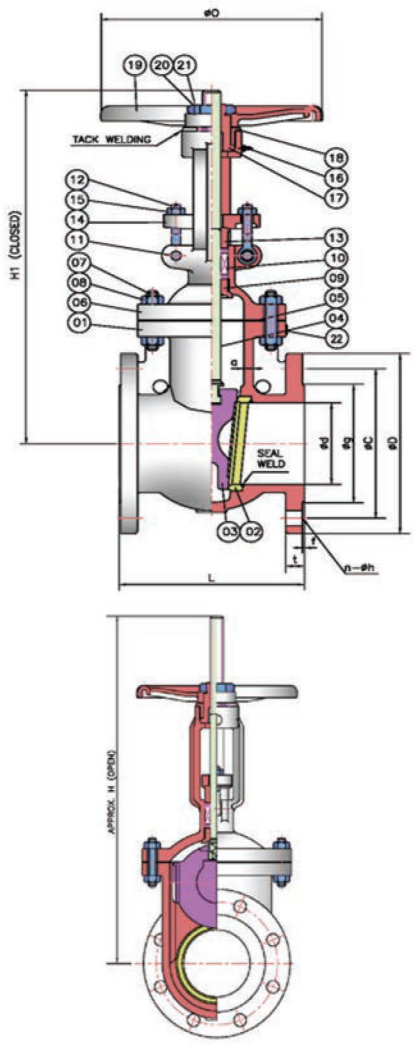
## MATERIAL

Option available for materials to meet NACE MR0175 requirement.

| Dimensional Data (mm)* | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Size | Face -to-Face L | Dia. of Bore d | O.D. of Flange D | ø of Bolt Circle C | O.D. of RF g | Thk of Flange t | Ht. of RF f | ø of Bolt Holes n-h | ø of Handwheel O | Height H/H1 | Wall Thk a min | Wt (Kg) |
| 2" | 178.0 | 50.8 | 150.0 | 120.7 | 92.1 | 16.3 | 2.0 | 4-19.1 | 200 | 397/322 | 8.6 | 18.0 |
| 2-1/2" | 190.5 | 63.5 | 177.8 | 139.7 | 104.6 | 17.9 | 2.0 | 4-19.1 | 200 | 450/351 | 9.7 | 28.0 |
| 3" | 203.0 | 76.2 | 190.0 | 152.4 | 127.0 | 19.5 | 2.0 | 4-19.1 | 250 | 506/412 | 10.4 | 34.0 |
| 4" | 229.0 | 101.6 | 230.0 | 190.5 | 157.2 | 24.3 | 2.0 | 8-19.1 | 250 | 594/475 | 11.2 | 52.0 |
| 6" | 267.0 | 152.4 | 280.0 | 241.3 | 215.9 | 25.9 | 2.0 | 8-22.4 | 350 | 778/602 | 11.9 | 88.0 |
| 8" | 292.0 | 203.2 | 345.0 | 298.5 | 269.9 | 29.0 | 2.0 | 8-22.4 | 350 | 973/745 | 12.7 | 144.0 |
| 10" | 330.0 | 254.0 | 405.0 | 362.0 | 323.8 | 30.6 | 2.0 | 12-25.4 | 400 | 1160/868 | 14.2 | 197.0 |
| 12" | 356.0 | 304.8 | 485.0 | 431.8 | 381.0 | 32.2 | 2.0 | 12-25.4 | 450 | 1384/1017 | 16.0 | 298.0 |
| 14" | 381.0 | 336.6 | 535.0 | 476.3 | 412.8 | 35.4 | 2.0 | 12-28.6 | 460 | 1560/1128 | 16.8 | 406.0 |
| 16" | 406.0 | 387.4 | 595.0 | 539.8 | 469.9 | 37.0 | 2.0 | 16-28.6 | 460 | 1775/1293 | 17.5 | 524.0 |
| 18" | 432.0 | 438.2 | 635.0 | 577.9 | 533.4 | 40.1 | 2.0 | 16-32.0 | 460 | 1959/1426 | 18.3 | 720.0 |
| 20" | 457.0 | 489.0 | 700.0 | 635.0 | 584.2 | 42.3 | 2.0 | 20-32.0 | 540 | 2155/1555 | 19.1 | 1117.0 |
| 24" | 508.0 | 590.6 | 815.0 | 749.3 | 692.2 | 48.1 | 2.0 | 20-35.0 | 540 | 2535/1835 | 20.6 | 1466.0 |

*Please note dimensions are for information only. Order specific arrangement drawing dimensions will be final.

# CAST STEEL GATE VALVES - ANSI 300




| Parts And Material List | | | FIG . 0312F |
|---|---|---|---|
| **No.** | **Part Name** | **Material** | **ASTM Specification** |
| 01 | Body | Carbon Steel | ASTM A216 WCB |
| 02 | Body Seat Ring | Carbon Steel | ASTM A105 ST'L No. 6 Face |
| 03 | Wedge | Carbon Steel | ASTM A216 WCB 13Cr Face |
| 04 | Stem | Stainless Steel | ASTM A182 F6a |
| 05 | Gasket | Stainless Steel + Graphite | ASTM A182 316 + Graphite |
| 06 | Bonnet | Carbon Steel | ASTM A216 WCB |
| 07 | Bonnet Bolt | Carbon Steel | ASTM A193 B7 |
| 08 | Bonnet Nut | Carbon Steel | ASTM A194 2H |
| 09 | Back Seat Ring | Stainless Steel | ASTM A276 410 |
| 10 | Packing ring | Graphite | Die Formed / Braided Graphite |
| 11 | Hinge Pin | Carbon Steel | - |
| 12 | Gland Bolt | Carbon Steel | ASTM A193 B7 |
| 13 | Packing Gland | Stainless Steel | ASTM A276 410 |
| 14 | Gland Flange | Carbon Steel | ASTM A216 WCB |
| 15 | Gland Nut | Carbon Steel | ASTM A194 2H |
| 16 | Grease Nipple | Stainless Steel | 2 1/2" and above |
| 17 | Yoke Sleeve | Ductile Iron | ASTM A439 D2 |
| 18 | Yoke Cap | Carbon Steel | - |
| 19 | Handwheel | Ductile Iron | - |
| 20 | Handwheel Nut | Carbon Steel | - |
| 21 | Set Screw | Steel | - |
| 22 | Nameplate | Stainless Steel | ASTM A182 F316 |

## OPERATOR OPTIONS

- Gear Operated recommended for size 14" above

## SPECIFICATION

- Bolted Bonnet
- Outside Screw and Yoke
- Flexible Wedge
- Oval Bonnet with integral Yoke
- Rising Stem - Non-rising Handwheel
- Welded-In / Threaded Seat Rings
- Raised Face Flanged Ends or Butt Weld Ends

Other End connections are available on request.

## APPLICABLE STANDARDS

Design : API 600
End Flange : ANSI B16.5
Weld Ends : ANSI B16.25
Face-to-Face : ANSI B16.10
Shell and Seat Test : API 598

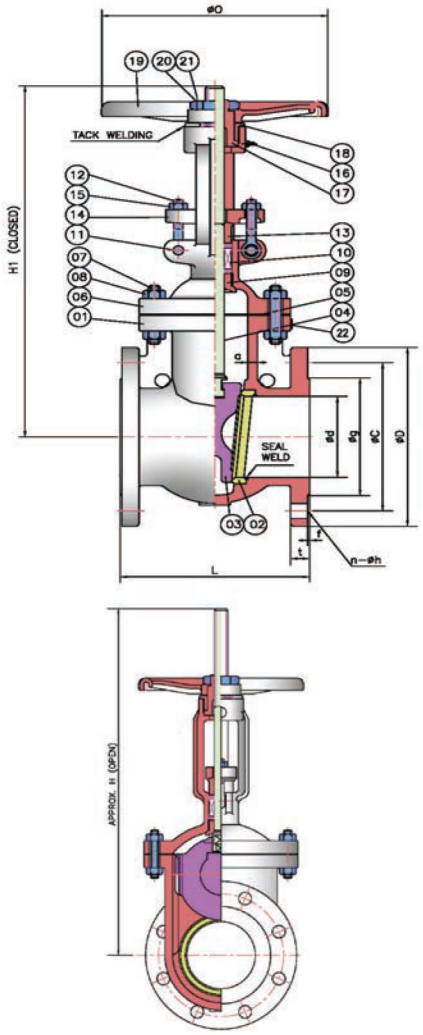
## MATERIAL

Option available for materials to meet NACE MR0175 requirement.

| Dimensional Data (mm)* | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Size | Face -to-Face L | Dia. of Bore d | O.D. of Flange D | ø of Bolt Circle C | O.D. of RF g | Thk of Flange t | Ht. of RF f | ø of Bolt Holes n-h | ø of Handwheel O | Height H/H1 | Wall Thk a min | Wt (Kg) |
| 2" | 216.0 | 50.8 | 165.0 | 127.0 | 92.1 | 22.7 | 2.0 | 8-19.1 | 200 | 422/360 | 9.7 | 24.0 |
| 2-1/2" | 241.3 | 63.5 | 190.5 | 149.4 | 104.6 | 25.8 | 2.0 | 8-22.5 | 200 | 512/419 | 11.2 | 44.0 |
| 3" | 282.0 | 76.2 | 210.0 | 168.3 | 127.0 | 29.0 | 2.0 | 8-22.4 | 250 | 522/440 | 11.9 | 52.0 |
| 4" | 305.0 | 101.6 | 255.0 | 200.0 | 157.2 | 32.2 | 2.0 | 8-22.4 | 300 | 615/512 | 12.7 | 76.0 |
| 6" | 403.0 | 152.4 | 320.0 | 269.9 | 215.9 | 37.0 | 2.0 | 12-22.4 | 350 | 804/626 | 16.0 | 146.0 |
| 8" | 419.0 | 203.2 | 380.0 | 330.2 | 269.9 | 41.7 | 2.0 | 12-25.4 | 400 | 1002/915 | 17.5 | 218.0 |
| 10" | 457.0 | 254.0 | 445.0 | 387.4 | 323.8 | 48.1 | 2.0 | 16-28.6 | 450 | 1229/949 | 19.1 | 352.0 |
| 12" | 502.0 | 304.8 | 520.0 | 450.8 | 381.0 | 51.3 | 2.0 | 16-32.0 | 460 | 1488/1112 | 20.6 | 478.0 |
| 14" | 762.0 | 336.6 | 585.0 | 514.4 | 412.8 | 54.6 | 2.0 | 20-32.0 | 460 | 1182/1614 | 22.4 | 694.0 |
| 16" | 838.0 | 387.4 | 650.0 | 571.5 | 469.9 | 57.6 | 2.0 | 20-35.0 | 460 | 1327/1809 | 23.9 | 1080.0 |
| 18" | 914.0 | 431.8 | 710.0 | 628.6 | 533.4 | 60.8 | 2.0 | 24-35.0 | 540 | 1481/2031 | 25.4 | 1235.0 |
| 20" | 991.0 | 482.6 | 775.0 | 685.8 | 584.2 | 64.0 | 2.0 | 24-35.0 | 540 | 1619/2219 | 26.9 | 1655.0 |
| 24" | 1143.0 | 584.2 | 915.0 | 812.8 | 692.2 | 70.3 | 2.0 | 24-41.0 | 610 | 2004/2668 | 30.2 | 2320.0 |

*Please note dimensions are for information only. Order specific arrangement drawing dimensions will be final.

# CAST STEEL GATE VALVES - ANSI 600




| Parts And Material List | | | FIG . 0612F |
|---|---|---|---|
| **No.** | **Part Name** | **Material** | **ASTM Specification** |
| 01 | Body | Carbon Steel | ASTM A216 WCB |
| 02 | Body Seat Ring | Carbon Steel | ASTM A105 ST'L No. 6 Face |
| 03 | Wedge | Carbon Steel | ASTM A216 WCB 13Cr Face |
| 04 | Stem | Stainless Steel | ASTM A182 F6a |
| 05 | Gasket | Stainless Steel + Graphite | ASTM A182 316 + Graphite |
| 06 | Bonnet | Carbon Steel | ASTM A216 WCB |
| 07 | Bonnet Bolt | Carbon Steel | ASTM A193 B7 |
| 08 | Bonnet Nut | Carbon Steel | ASTM A194 2H |
| 09 | Back Seat Ring | Stainless Steel | ASTM A276 410 |
| 10 | Packing ring | Graphite | Die Formed / Braided Graphite |
| 11 | Hinge Pin | Carbon Steel | - |
| 12 | Gland Bolt | Carbon Steel | ASTM A193 B7 |
| 13 | Packing Gland | Stainless Steel | ASTM A276 410 |
| 14 | Gland Flange | Carbon Steel | ASTM A216 WCB |
| 15 | Gland Nut | Carbon Steel | ASTM A194 2H |
| 16 | Grease Nipple | Stainless Steel | 2 1/2" and above |
| 17 | Yoke Sleeve | Ductile Iron | ASTM A439 D2 |
| 18 | Yoke Cap | Carbon Steel | - |
| 19 | Handwheel | Ductile Iron | - |
| 20 | Handwheel Nut | Carbon Steel | - |
| 21 | Set Screw | Steel | - |
| 22 | Nameplate | Stainless Steel | ASTM A182 F316 |

## OPERATOR OPTIONS

- Gear Operated recommended for size 8" above

## SPECIFICATION

- Bolted Bonnet
- Outside Screw and Yoke
- Flexible Wedge
- Oval Bonnet with integral Yoke
- Rising Stem - Non-rising Handwheel
- Welded-In / Threaded Seat Rings
- Raised Face Flanged Ends or Butt Weld Ends

Other End connections are available on request.

## APPLICABLE STANDARDS

Design : API 600
End Flange : ANSI B16.5
Weld Ends : ANSI B16.25
Face-to-Face : ANSI B16.10
Shell and Seat Test : API 598

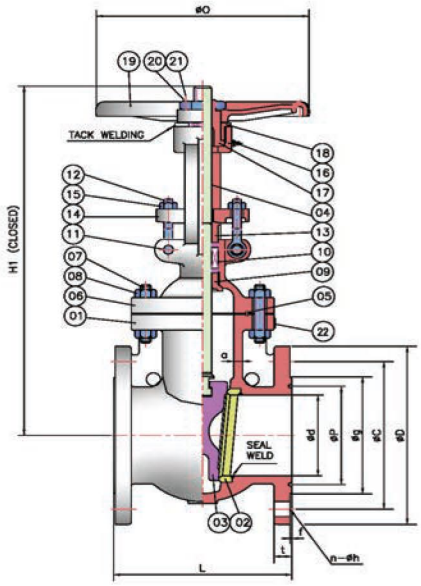
## MATERIAL

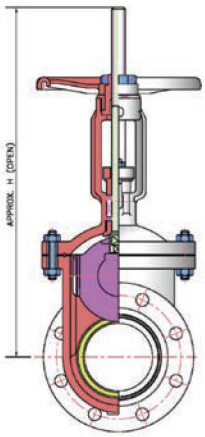
Option available for materials to meet NACE MR0175 requirement.

| Dimensional Data (mm)* | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Size | Face -to-Face L | Dia. of Bore d | O.D. of Flange D | ø of Bolt Circle C | O.D. of RF g | Thk of Flange t | Ht. of RF f | ø of Bolt Holes n-h | ø of Handwheel O | Height H/H1 | Wall Thk a min | Wt (Kg) |
| 2" | 292.0 | 50.8 | 165.0 | 127.0 | 92.1 | 25.4 | 7.0 | 8-19.1 | 250 | 458/400 | 11.2 | 46.0 |
| 2-1/2" | 330.2 | 63.5 | 190.5 | 149.4 | 104.6 | 28.5 | 7.0 | 8-22.5 | 250 | 475/403 | 11.9 | 55.0 |
| 3" | 356.0 | 76.2 | 210.0 | 168.3 | 127.0 | 31.8 | 7.0 | 8-22.4 | 250 | 546/460 | 12.7 | 72.0 |
| 4" | 432.0 | 101.6 | 275.0 | 215.9 | 157.2 | 38.1 | 7.0 | 8-25.4 | 350 | 680/570 | 16 | 128.0 |
| 6" | 559.0 | 152.4 | 355.0 | 292.1 | 215.9 | 47.7 | 7.0 | 12-28.6 | 450 | 850/675 | 19.1 | 266.0 |
| 8" | 660.0 | 199.9 | 420.0 | 349.2 | 269.9 | 55.6 | 7.0 | 12-32.0 | 310 | 1170/888 | 25.4 | 419.0 |
| 10" | 787.0 | 247.7 | 510.0 | 431.8 | 323.8 | 63.5 | 7.0 | 16-35.0 | 460 | 1327/995 | 28.7 | 754.0 |
| 12" | 838.0 | 298.5 | 560.0 | 489.0 | 381.0 | 66.7 | 7.0 | 20-35.0 | 540 | 1569/1169 | 31.8 | 981.0 |
| 14" | 889.0 | 326.9 | 605.0 | 527.0 | 412.8 | 69.9 | 7.0 | 20-38.0 | 610 | 1762/1298 | 35.1 | 1316.0 |
| 16" | 991.0 | 374.7 | 685.0 | 603.2 | 469.9 | 76.2 | 7.0 | 20-41.0 | 610 | 1905/1391 | 38.1 | 1672.0 |
| 18" | 1092.0 | 419.1 | 745.0 | 654.0 | 533.4 | 82.6 | 7.0 | 20-44.0 | 610 | 2051/1487 | 41.4 | 2070.0 |
| 20" | 1194.0 | 463.6 | 815.0 | 723.9 | 584.2 | 88.9 | 7.0 | 24-44.0 | 610 | 2320/1706 | 44.5 | 2405.0 |
| 24" | 1397.0 | 558.8 | 939.8 | 838.2 | 692.2 | 101.6 | 7.0 | 24-52.0 | 810 | 2725/1937 | 50.8 | 4550.0 |

*Please note dimensions are for information only. Order specific arrangement drawing dimensions will be final.

# CAST STEEL GATE VALVES - ANSI 900




## OPERATOR OPTIONS

- Gear Operated recommended for size 6" above

| Parts And Material List | | | FIG . 0912R |
|---|---|---|---|
| **No.** | **Part Name** | **Material** | **ASTM Specification** |
| 01 | Body | Carbon Steel | ASTM A216 WCB |
| 02 | Body Seat Ring | Carbon Steel | ASTM A105 ST'L No. 6 Face |
| 03 | Wedge | Carbon Steel | ASTM A216 WCB 13Cr Face |
| 04 | Stem | Stainless Steel | ASTM A182 F6a |
| 05 | Gasket | Stainless Steel + Graphite | ASTM A182 316 + Graphite |
| 06 | Bonnet | Carbon Steel | ASTM A216 WCB |
| 07 | Bonnet Bolt | Carbon Steel | ASTM A193 B7 |
| 08 | Bonnet Nut | Carbon Steel | ASTM A194 2H |
| 09 | Back Seat Ring | Stainless Steel | ASTM A276 410 |
| 10 | Packing ring | Graphite | Die Formed / Braided Graphite |
| 11 | Hinge Pin | Carbon Steel | - |
| 12 | Gland Bolt | Carbon Steel | ASTM A193 B7 |
| 13 | Packing Gland | Stainless Steel | ASTM A276 410 |
| 14 | Gland Flange | Carbon Steel | ASTM A216 WCB |
| 15 | Gland Nut | Carbon Steel | ASTM A194 2H |
| 16 | Grease Nipple | Stainless Steel | 2 1/2" and above |
| 17 | Yoke Sleeve | Ductile Iron | ASTM A439 D2 |
| 18 | Yoke Cap | Carbon Steel | - |
| 19 | Handwheel | Ductile Iron | - |
| 20 | Handwheel Nut | Carbon Steel | - |
| 21 | Set Screw | Steel | - |
| 22 | Nameplate | Stainless Steel | ASTM A182 F316 |

## SPECIFICATION

- Bolted Bonnet
- Outside Screw and Yoke
- Flexible Wedge
- Oval Bonnet with integral Yoke
- Rising Stem - Non-rising Handwheel
- Welded-In / Threaded Seat Rings
- Ring Type Joint or Butt Weld Ends

Other End connections are available on request.

## APPLICABLE STANDARDS

Design : API 600
End Flange : ANSI B16.5
Weld Ends : ANSI B16.25
Face-to-Face : ANSI B16.10
Shell and Seat Test : API 598

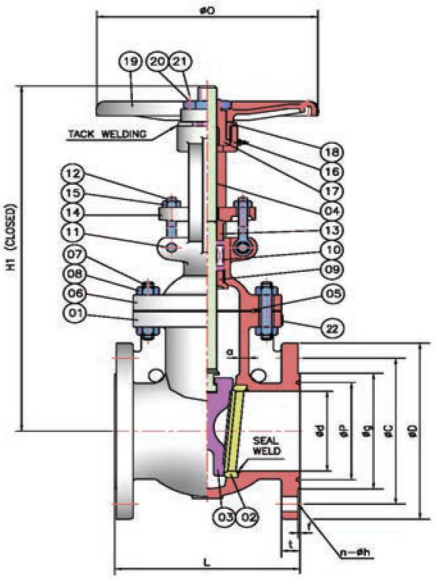
## MATERIAL

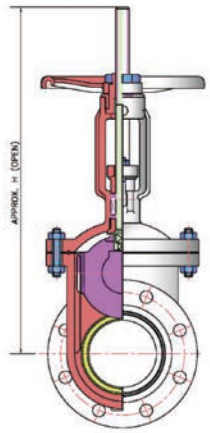
Option available for materials to meet NACE MR0175 requirement.

| Dimensional Data (mm)* | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Size | Face -to-Face L | Dia. of Bore d | O.D. of Flange D | ø of Bolt Circle C | O.D. of RF g | ø of RTJ p | Thk of Flange t | Ht. of RF f | ø of Bolt Holes n-h | ø of Handwheel O | Height H/H1 | Wall Thk a min | Wt (Kg) |
| 2" | 371.0 | 47.5 | 215.0 | 165.1 | 124.0 | 95.3 | 38.1 | 7.9 | 8-25.4 | 300 | 465/394 | 19.1 | 95.0 |
| 3" | 384.0 | 72.9 | 240.0 | 190.5 | 156.0 | 123.8 | 38.1 | 7.9 | 8-25.4 | 350 | 587/466 | 19.1 | 125.0 |
| 4" | 460.2 | 98.3 | 290.0 | 235.0 | 180.8 | 149.2 | 44.5 | 7.9 | 8-32.0 | 350 | 690/495 | 21.3 | 192.0 |
| 6" | 612.6 | 146.1 | 380.0 | 317.5 | 241.3 | 211.1 | 55.6 | 7.9 | 12-32.0 | 460 | 995/746 | 26.2 | 378.0 |
| 8" | 739.6 | 190.5 | 470.0 | 393.7 | 307.8 | 269.9 | 63.5 | 7.9 | 12-38.0 | 460 | 1186/787 | 31.8 | 635.0 |
| 10" | 841.2 | 238.0 | 545.0 | 469.9 | 362.0 | 323.9 | 69.9 | 7.9 | 16-38.0 | 540 | 1280/930 | 36.6 | 900.0 |
| 12" | 968.2 | 282.4 | 610.0 | 533.4 | 419.1 | 381.0 | 79.4 | 7.9 | 20-38.0 | 540 | 1590/1095 | 42.2 | 1550.0 |

*Please note dimensions are for information only. Order specific arrangement drawing dimensions will be final.

# CAST STEEL GATE VALVES - ANSI 1500




| Parts And Material List | | | FIG . 1512R |
|---|---|---|---|
| **No.** | **Part Name** | **Material** | **ASTM Specification** |
| 01 | Body | Carbon Steel | ASTM A216 WCB |
| 02 | Body Seat Ring | Carbon Steel | ASTM A105 ST'L No. 6 Face |
| 03 | Wedge | Carbon Steel | ASTM A216 WCB 13Cr Face |
| 04 | Stem | Stainless Steel | ASTM A182 F6a |
| 05 | Gasket | Stainless Steel + Graphite | ASTM A182 316 + Graphite |
| 06 | Bonnet | Carbon Steel | ASTM A216 WCB |
| 07 | Bonnet Bolt | Carbon Steel | ASTM A193 B7 |
| 08 | Bonnet Nut | Carbon Steel | ASTM A194 2H |
| 09 | Back Seat Ring | Stainless Steel | ASTM A276 410 |
| 10 | Packing ring | Graphite | Die Formed / Braided Graphite |
| 11 | Hinge Pin | Carbon Steel | - |
| 12 | Gland Bolt | Carbon Steel | ASTM A193 B7 |
| 13 | Packing Gland | Stainless Steel | ASTM A276 410 |
| 14 | Gland Flange | Carbon Steel | ASTM A216 WCB |
| 15 | Gland Nut | Carbon Steel | ASTM A194 2H |
| 16 | Grease Nipple | Stainless Steel | 2 1/2" and above |
| 17 | Yoke Sleeve | Ductile Iron | ASTM A439 D2 |
| 18 | Yoke Cap | Carbon Steel | - |
| 19 | Handwheel | Ductile Iron | - |
| 20 | Handwheel Nut | Carbon Steel | - |
| 21 | Set Screw | Steel | - |
| 22 | Nameplate | Stainless Steel | ASTM A182 F316 |

## OPERATOR OPTIONS

- Gear Operated recommended for size 4" above

## SPECIFICATION

- Bolted Bonnet
- Outside Screw and Yoke
- Flexible Wedge
- Oval Bonnet with integral Yoke
- Rising Stem - Non-rising Handwheel
- Welded-In / Threaded Seat Rings
- Ring Type Joint or Butt Weld Ends

Other End connections are available on request.

## APPLICABLE STANDARDS

Design : API 600
End Flange : ANSI B16.5
Weld Ends : ANSI B16.25
Face-to-Face : ANSI B16.10
Shell and Seat Test : API 598

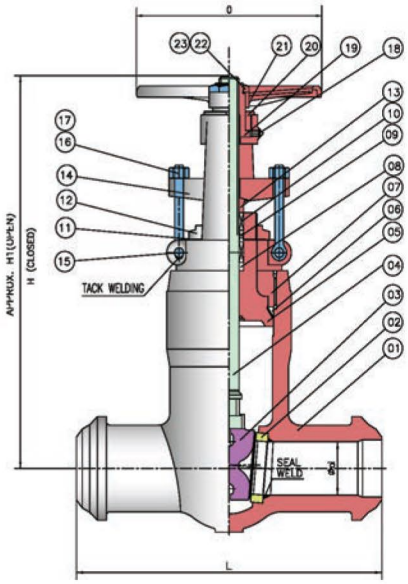
## MATERIAL

Option available for materials to meet NACE MR0175 requirement.

| Dimensional Data (mm)* | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Size | Face -to-Face L | Dia. of Bore d | O.D. of Flange D | ø of Bolt Circle C | O.D. of RF g | ø of RTJ P | Thk of Flange t | Ht. of RF f | ø of Bolt Holes n-h | ø of Handwheel O | Height H/H1 | Wall Thk a min | Wt (Kg) |
| 2" | 371.3 | 47.5 | 215.0 | 165.1 | 124.0 | 95.3 | 38.1 | 7.9 | 8-25.4 | 300 | 614/524 | 19.1 | 95.0 |
| 3" | 472.9 | 69.9 | 265.0 | 203.2 | 168.1 | 136.5 | 47.8 | 7.9 | 8-32.0 | 350 | 681/565 | 23.8 | 168.0 |
| 4" | 549.1 | 91.9 | 310.0 | 241.3 | 193.5 | 161.9 | 53.8 | 7.9 | 8-35.0 | 400 | 702/582 | 28.5 | 277.0 |
| 6" | 711.2 | 136.4 | 395.0 | 317.5 | 247.7 | 211.1 | 82.6 | 9.5 | 12-39.0 | 640 | 951/775 | 38.1 | 545.0 |
| 8" | 841.5 | 177.8 | 485.0 | 393.7 | 317.5 | 269.9 | 91.9 | 11.1 | 12-45.0 | 710 | 1137/913 | 47.8 | 1180.0 |
| 10" | 1000.3 | 222.3 | 585.0 | 482.6 | 371.3 | 323.9 | 108.0 | 11.1 | 12-51.0 | 750 | 1437/1170 | 57.1 | 2118.0 |

*Please note dimensions are for information only. Order specific arrangement drawing dimensions will be final.

# CAST STEEL GATE VALVES - ANSI 1500 PRESSURE SEAL BONNET




## OPERATOR OPTIONS

- Gear Operated recommended for size 4" above

## SPECIFICATION

- Pressure Seal Bonnet
- Outside Screw and Yoke
- Flexible Wedge
- Oval Bonnet with integral Yoke
- Rising Stem - Non-rising Handwheel
- Welded-In / Threaded Seat Rings
- Butt Weld Ends

Other End connections are available on request.

## APPLICABLE STANDARDS

Design : API 600
End Flange : ANSI B16.5
Weld Ends : ANSI B16.25
Face-to-Face : ANSI B16.10
Shell and Seat Test : API 598

## MATERIAL

Option available for materials to meet NACE MR0175 requirement.

| Parts And Material List | | | FIG . 1552B |
|---|---|---|---|
| **No.** | **Part Name** | **Material** | **ASTM Specification** |
| 01 | Body | Carbon Steel | ASTM A216 WCB |
| 02 | Body Seat Ring | Carbon Steel | ASTM A105 ST'L No. 6 Face |
| 03 | Wedge | Carbon Steel | ASTM A216 WCB ST'L No.6 Face |
| 04 | Stem | Stainless Steel | ASTM A182 F6a |
| 05 | Stuffing Box | Carbon Steel | ASTM A105 |
| 06 | Sealing Ring | Stainless Steel | ASTM A276 316L |
| 07 | Yoke | Carbon Steel | ASTM A216 WCB |
| 08 | Spacer Ring | Stainless Steel | ASTM A276 410 |
| 09 | Lantern | Stainless Steel | ASTM A276 410 |
| 10 | Packing Ring | Graphite | Die Formed / Braided Graphite |
| 11 | Nut Gasket | Stainless Steel | ASTM A276 410 |
| 12 | Stuffing Nut | Carbon Steel | ASTM A193 B7 |
| 13 | Gland | Stainless Steel | ASTM A276 410 |
| 14 | Gland Flange | Carbon Steel | ASTM A216 WCB |
| 15 | Hinge Pin | Carbon Steel | - |
| 16 | Gland Eye Bolt | Carbon Steel | ASTM A193 B7 |
| 17 | Gland Nut | Carbon Steel | ASTM A194 2H |
| 18 | Grease Nipple | Stainless Steel | - |
| 19 | Yoke Sleeve | Ductile Iron | ASTM A439 D2 |
| 20 | Yoke Cap | Carbon Steel | - |
| 21 | Handwheel | Malleable Iron | - |
| 22 | Handwheel Nut | Carbon Steel | - |
| 23 | Set Screw | Steel | - |

| Dimensional Data (mm)* | | | | | | |
|---|---|---|---|---|---|---|
| Size | Face -to-Face L | Dia. of Bore d | ø of Handwheel O | Height H/H1 | Wall Thk a min | Wt (Kg) |
| 2" | 216.0 | 47.5 | 300 | 614/524 | 19.1 | 95.0 |
| 3" | 305.0 | 69.9 | 350 | 681/565 | 23.9 | 168.0 |
| 4" | 406.0 | 91.9 | 400 | 702/582 | 28.7 | 277.0 |
| 6" | 559.0 | 136.4 | 640 | 951/775 | 38.1 | 545.0 |
| 8" | 711.0 | 177.8 | 710 | 1137/913 | 47.8 | 1180.0 |
| 10" | 864.0 | 222.3 | 750 | 1437/1170 | 57.1 | 2118.0 |
| 12" | 991.0 | 263.4 | 800 | 1834/1554 | 66.8 | 2800.0 |

* Please note dimensions are for information only. Order specific arrangement drawing dimensions will be final.

# GLOBE VALVES

Globe Valves are used where throttling and shut off are required. Close throttling can lead to altered velocities, this leads to excessive noise and vibration which can damage the valve or piping system.

# CAST STEEL GLOBE VALVES

## Globe valves are manufactured to BS 1873, B16.34 and tested to API Std 598

Globe Valves are used where throttling and shut off are required. They can also be used for on-off service, but due to high pressure drop, this is generally confined to applications where the valve is normally closed and pressure drop is not important when the valve is open. Close throttling can lead to altered velocities, this leads to excessive noise and vibration which can damage the valve or piping system.

### BODY AND BONNET

Back-Seat Bushing
Gland can be Re-packed in-situ
Spherical body with large radius, allows stress and turbulence to be minimised

### BODY-BONNET JOINT / GASKET

Range of materials to suit Pressure Classes

### DISC

Valves are supplied with plug type disc as shown

### WELDED-IN SEAT RING

Seat ring is seal welded to eliminate potential leak paths.

### STEM

One piece stem, forged tee-head connection
Rolled or cut ACME threads subject to valve size
Polished on the packing contact area
Ensures long life & optimal tightness
Engineered stem break-point above packing area
Ensures sealing integrity to atmosphere.

### GLAND

The Gland Flange & Packing Gland are manufactured in two separate pieces
Adjustable gland in service
Optional live loaded gland can be specified
Backseated design allowing the gland packing to be replaced in situ.

### STUFFING BOX

Packing contains corrosion inhibitor to avoid stem pitting.
Deep stuffing box design ensures long packing life.

### END CONNECTIONS

As Standard production covers valves with:
**Flanged ends** to ANSI B16.5
**RF** Raised face serrated finish or,
On request, with any other type of finish
**RTJ** Ring Type Joint

### Others

**Butt-welding ends (BW) to ANSI B16.25**
Customer must specify the type of schedule required, or class of pipe, or diameter and bore.

**Special** end connections on request.

### FACE to FACE

Face to Face dimensions to ANSI B16.10.

### HANDWHEEL

Handwheels designed for ease of operation.

### GEAR OPERATED VALVES

Valves can be supplied with bevel gear operators

### MOTOR OPERATED VALVES

On request valves can be supplied equipped with, or prepared for actuators
Electric /
Pneumatic /
Hydraulic (according to customers' requirements).

Customer is to advise all service requirements and applicable specification with enquiry.

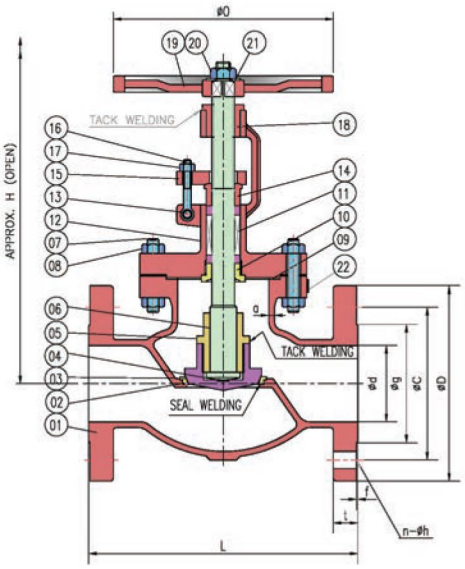
### ACCESSORIES

OnRequest:
By-passes, locking devices, chain wheels, floor stands, special extension stems and others.

### TESTING

Standard Testing is in accordance with API 598.
Customer specific testing by agreement.

# CAST STEEL GLOBE VALVE - ANSI 150




| Parts And Material List | | | FIG . 0122F |
|---|---|---|---|
| **No.** | **Part Name** | **Material** | **ASTM Specification** |
| 01 | Body | Carbon Steel | ASTM A216 Gr. WCB |
| 02 | Body Seat Ring | Carbon Steel | ASTM A105 ST'L No.6 Face |
| 03 | Disc | Carbon Steel | ASTM A105 13Cr Face |
| 04 | Disc Thrust Plate | Stainless Steel | A276 410 |
| 05 | Disc Nut | Stainless Steel | A276 410 |
| 06 | Stem | Stainless Steel | ASTM A182 F6a |
| 07 | Bonnet Bolt | Carbon Steel | ASTM A193 B7 |
| 08 | Bonnet Nut | Carbon Steel | ASTM A194 2H |
| 09 | Gasket | Stainless Steel | Spiral Wound 316 + Graphite |
| 10 | Back Seat Ring | Stainless Steel | A276 410 |
| 11 | Packing Ring | Graphite | Die Formed/Braided Graphite |
| 12 | Bonnet | Carbon Steel | ASTM A216 Gr. WCB |
| 13 | Hinge Pin | Carbon Steel | Carbon Steel |
| 14 | Packing Gland | Stainless Steel | ASTM A276 410 |
| 15 | Gland Flange | Carbon Steel | ASTM A216 WCB |
| 16 | Gland Bolt | Carbon Steel | ASTM A193 B7 |
| 17 | Gland Nut | Carbon Steel | ASTM A194 2H |
| 18 | Yoke Bush | Ductile Iron | ASTM A439 D2 |
| 19 | Handwheel | Malleable Iron | Malleable Iron |
| 20 | Handwheel Nut | Carbon Steel | Carbon Steel |
| 21 | Washer | Carbon Steel | Carbon Steel |
| 22 | Nameplate | Stainless Steel | ASTM A182 F316 |

## OPERATOR OPTIONS

- Gear Operated recommended for size 12" above

## SPECIFICATION

- Bolted Bonnet
- Outside Screw and Yoke
- Yoke integral with bonnet
- Rising Stem - Handwheel
- Welded or Threaded Seat Ring - Stellited
- Raised Face Flanged Ends or Butt Weld Ends

Other End connections are available on request.

## APPLICABLE STANDARDS

Design : ANSI B16.34
End Flange : ANSI B16.5
Weld Ends : ANSI B16.25
Face-to-Face : ANSI B16.10
Shell and Seat Test : API 598

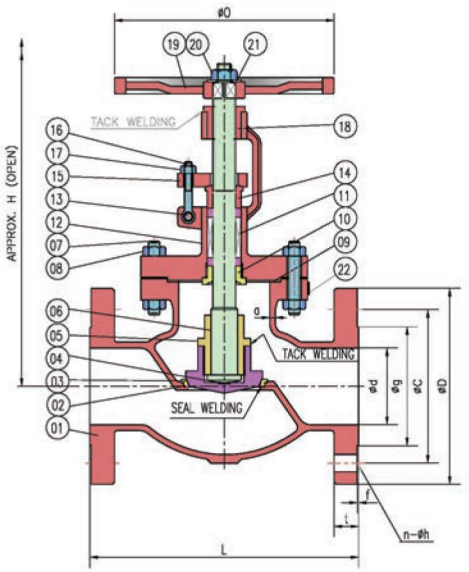
## MATERIAL

Option available for materials to meet NACE MR0175 requirement.

| Dimensional Data (mm)* | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Size | Face -to-Face L | Dia. of Bore d | O.D. of Flange D | ø of Bolt Circle C | O.D. of RF g | Thk of Flange t | Ht. of RF f | ø of Bolt Holes n-h | ø of Handwheel O | Height H | Wall Thk a min | Wt (Kg) |
| 2" | 203.0 | 50.8 | 150.0 | 120.7 | 92.1 | 16.3 | 2.0 | 4-19.1 | 200 | 350 | 8.6 | 22.0 |
| 2-1/2" | 216.0 | 64.0 | 178.0 | 139.5 | 105.0 | 19.5 | 2.0 | 4-19.1 | 250 | 403 | 9.7 | 30.0 |
| 3" | 241.0 | 76.2 | 190.0 | 152.4 | 127.0 | 19.5 | 2.0 | 4-19.1 | 250 | 405 | 10.4 | 42.0 |
| 4" | 292.0 | 101.6 | 230.0 | 190.5 | 157.2 | 24.3 | 2.0 | 8-19.1 | 300 | 478 | 11.2 | 60.0 |
| 6" | 406.0 | 152.4 | 280.0 | 241.3 | 215.9 | 25.9 | 2.0 | 8-22.4 | 350 | 513 | 11.9 | 101.0 |
| 8" | 495.0 | 203.2 | 345.0 | 298.5 | 269.7 | 29.0 | 2.0 | 8-22.4 | 450 | 610 | 12.7 | 161.0 |
| 10" | 622.0 | 254.0 | 405.0 | 362.0 | 323.8 | 30.6 | 2.0 | 12-25.4 | 450 | 730 | 14.2 | 308.0 |
| 12" | 698.0 | 304.8 | 485.0 | 431.8 | 381.0 | 32.0 | 2.0 | 12-25.4 | 610 | 923 | 16.0 | 410.0 |

* Please note dimensions are for information only. Order specific arrangement drawing dimensions will be final.

# CAST STEEL GLOBE VALVE - ANSI 300




| Parts And Material List | | | FIG . 0322F |
|---|---|---|---|
| **No.** | **Part Name** | **Material** | **ASTM Specification** |
| 01 | Body | Carbon Steel | ASTM A216 Gr. WCB |
| 02 | Body Seat Ring | Carbon Steel | ASTM A105 ST'L No.6 Face |
| 03 | Disc | Carbon Steel | ASTM A105 13Cr Face |
| 04 | Disc Thrust Plate | Stainless Steel | A276 410 |
| 05 | Disc Nut | Stainless Steel | A276 410 |
| 06 | Stem | Stainless Steel | ASTM A182 F6a |
| 07 | Bonnet Bolt | Carbon Steel | ASTM A193 B7 |
| 08 | Bonnet Nut | Carbon Steel | ASTM A194 2H |
| 09 | Gasket | Stainless Steel | Spiral Wound 316 + Graphite |
| 10 | Back Seat Ring | Stainless Steel | A276 410 |
| 11 | Packing Ring | Graphite | Die Formed/Braided Graphite |
| 12 | Bonnet | Carbon Steel | ASTM A216 Gr. WCB |
| 13 | Hinge Pin | Carbon Steel | Carbon Steel |
| 14 | Packing Gland | Stainless Steel | ASTM A276 410 |
| 15 | Gland Flange | Carbon Steel | ASTM A216 WCB |
| 16 | Gland Bolt | Carbon Steel | ASTM A193 B7 |
| 17 | Gland Nut | Carbon Steel | ASTM A194 2H |
| 18 | Yoke Bush | Ductile Iron | ASTM A439 D2 |
| 19 | Handwheel | Malleable Iron | Malleable Iron |
| 20 | Handwheel Nut | Carbon Steel | Carbon Steel |
| 21 | Washer | Carbon Steel | Carbon Steel |
| 22 | Nameplate | Stainless Steel | ASTM A182 F316 |

## OPERATOR OPTIONS

- Gear Operated recommended for size 10" above

## SPECIFICATION

- Bolted Bonnet
- Outside Screw and Yoke
- Yoke integral with bonnet
- Rising Stem - Handwheel
- Welded or Threaded Seat Ring - Stellited
- Raised Face Flanged Ends or Butt Weld Ends

Other End connections are available on request.

## APPLICABLE STANDARDS

Design : ANSI B16.34
End Flange : ANSI B16.5
Weld Ends : ANSI B16.25
Face-to-Face : ANSI B16.10
Shell and Seat Test : API 598

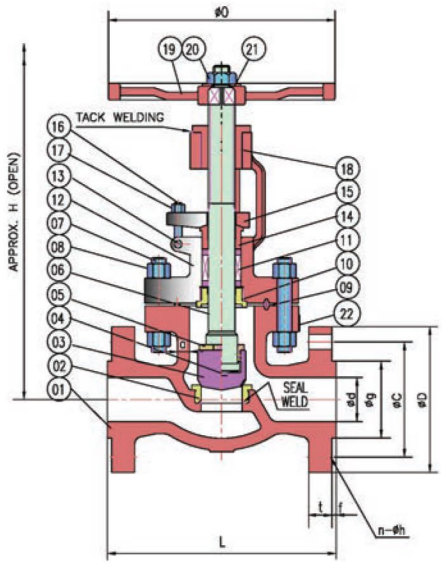
## MATERIAL

Option available for materials to meet NACE MR0175 requirement.

| Dimensional Data (mm)* | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Size | Face -to-Face L | Dia. of Bore d | O.D. of Flange D | ø of Bolt Circle C | O.D. of RF g | Thk of Flange t | Ht. of RF f | ø of Bolt Holes n-h | ø of Handwheel O | Height H | Wall Thk a min | Wt (Kg) |
| 2" | 267.0 | 50.8 | 165.0 | 127.0 | 92.1 | 22.7 | 2.0 | 8-19.1 | 200 | 384 | 9.7 | 31.0 |
| 2-1/2" | 292.0 | 63.5 | 190.5 | 149.4 | 104.6 | 25.9 | 2.0 | 8-22.5 | 250 | 412 | 11.2 | 40.0 |
| 3" | 318.0 | 76.2 | 210.0 | 168.3 | 127.0 | 29.0 | 2.0 | 8-22.4 | 300 | 438 | 11.9 | 58.0 |
| 4" | 356.0 | 101.6 | 255.0 | 200.0 | 157.2 | 32.2 | 2.0 | 8-22.4 | 350 | 556 | 12.7 | 86.0 |
| 6" | 444.0 | 152.4 | 320.0 | 269.9 | 215.9 | 37.0 | 2.0 | 12-22.4 | 450 | 632 | 16 | 150.0 |
| 8" | 559.0 | 203.2 | 380.0 | 330.2 | 269.9 | 41.7 | 2.0 | 12-25.4 | 450 | 1002 | 17.5 | 397.0 |
| 10" | 622.0 | 254.0 | 445.0 | 387.4 | 323.8 | 48.1 | 2.0 | 16-28.6 | 560 | 1078 | 19.1 | 527.0 |
| 12" | 711.0 | 304.8 | 520.0 | 450.8 | 381.0 | 51.3 | 2.0 | 16-32.0 | 650 | 1100 | 20.7 | 608.0 |

* Please note dimensions are for information only. Order specific arrangement drawing dimensions will be final.

# CAST STEEL GLOBE VALVE - ANSI 600




| Parts And Material List | | | FIG . 0622F |
|---|---|---|---|
| **No.** | **Part Name** | **Material** | **ASTM Specification** |
| 01 | Body | Carbon Steel | ASTM A216 Gr. WCB |
| 02 | Body Seat Ring | Carbon Steel | ASTM A105 ST'L No.6 Face |
| 03 | Disc | Carbon Steel | ASTM A105 13Cr Face |
| 04 | Disc Thrust Plate | Stainless Steel | A276 410 |
| 05 | Disc Nut | Stainless Steel | A276 410 |
| 06 | Stem | Stainless Steel | ASTM A182 F6a |
| 07 | Bonnet Bolt | Carbon Steel | ASTM A193 B7 |
| 08 | Bonnet Nut | Carbon Steel | ASTM A194 2H |
| 09 | Gasket | Stainless Steel | Spiral Wound 316 + Graphite |
| 10 | Back Seat Ring | Stainless Steel | A276 410 |
| 11 | Packing Ring | Graphite | Die Formed/Braided Graphite |
| 12 | Bonnet | Carbon Steel | ASTM A216 Gr. WCB |
| 13 | Hinge Pin | Carbon Steel | Carbon Steel |
| 14 | Packing Gland | Stainless Steel | ASTM A276 410 |
| 15 | Gland Flange | Carbon Steel | ASTM A216 WCB |
| 16 | Gland Bolt | Carbon Steel | ASTM A193 B7 |
| 17 | Gland Nut | Carbon Steel | ASTM A194 2H |
| 18 | Yoke Bush | Ductile Iron | ASTM A439 D2 |
| 19 | Handwheel | Malleable Iron | Malleable Iron |
| 20 | Handwheel Nut | Carbon Steel | Carbon Steel |
| 21 | Washer | Carbon Steel | Carbon Steel |
| 22 | Nameplate | Stainless Steel | ASTM A182 F316 |

## OPERATOR OPTIONS

- Gear Operated recommended for size 6" above

## SPECIFICATION

- Bolted Bonnet
- Outside Screw and Yoke
- Yoke integral with bonnet
- Rising Stem - Handwheel
- Welded or Threaded Seat Ring - Stellited
- Raised Face Flanged Ends or Butt Weld Ends

Other End connections are available on request.

## APPLICABLE STANDARDS

Design : ANSI B16.34
End Flange : ANSI B16.5
Weld Ends : ANSI B16.25
Face-to-Face : ANSI B16.10
Shell and Seat Test : API 598

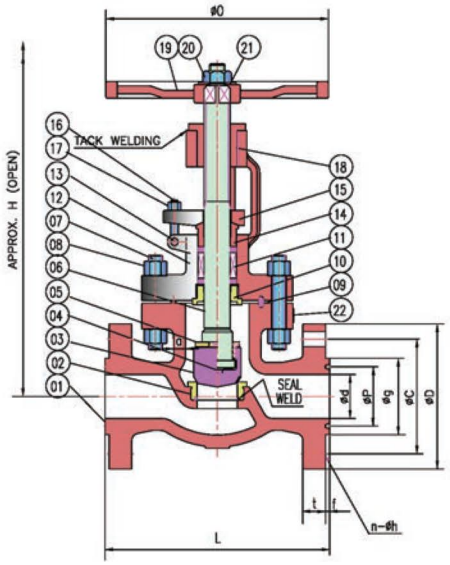
## MATERIAL

Option available for materials to meet NACE MR0175 requirement.

| Dimensional Data (mm)* | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Size | Face -to-Face L | Dia. of Bore d | O.D. of Flange D | ø of Bolt Circle C | O.D. of RF g | Thk of Flange t | Ht. of RF f | ø of Bolt Holes n-h | ø of Handwheel O | Height H | Wall Thk a min | Wt (Kg) |
| 2" | 292.0 | 50.8 | 165.0 | 127.0 | 92.1 | 25.4 | 7.0 | 8-19.1 | 250 | 430 | 11.2 | 57.0 |
| 3" | 356.0 | 76.2 | 210.0 | 168.3 | 127.0 | 31.8 | 7.0 | 8-22.5 | 350 | 530 | 12.7 | 89.0 |
| 4" | 432.0 | 101.6 | 275.0 | 215.9 | 157.2 | 38.1 | 7.0 | 8-25.4 | 450 | 620 | 16 | 149.0 |
| 6" | 559.0 | 152.4 | 355.0 | 292.1 | 215.9 | 47.7 | 7.0 | 12-28.6 | 500 | 886 | 19.1 | 417.0 |
| 8" | 660.0 | 199.9 | 420.0 | 349.3 | 269.9 | 55.6 | 7.0 | 12-32.0 | 560 | 932 | 25.4 | 542.0 |
| 10" | 787.0 | 247.7 | 510.0 | 431.8 | 323.8 | 63.5 | 7.0 | 16-35.0 | 720 | 1040 | 28.7 | 700.0 |
| 12" | 838.0 | 298.5 | 560.0 | 489.0 | 381.0 | 66.7 | 7.0 | 20-35.0 | 720 | 1060 | 31.8 | 1105.0 |

* Please note dimensions are for information only. Order specific arrangement drawing dimensions will be final.

# CAST STEEL GLOBE VALVE - ANSI 900




| Parts And Material List | | | FIG . 0922R |
|---|---|---|---|
| **No.** | **Part Name** | **Material** | **ASTM Specification** |
| 01 | Body | Carbon Steel | ASTM A216 Gr. WCB |
| 02 | Body Seat Ring | Carbon Steel | ASTM A105 ST'L No.6 Face |
| 03 | Disc | Carbon Steel | ASTM A105 13Cr Face |
| 04 | Disc Thrust Plate | Stainless Steel | A276 410 |
| 05 | Disc Nut | Stainless Steel | A276 410 |
| 06 | Stem | Stainless Steel | ASTM A182 F6a |
| 07 | Bonnet Bolt | Carbon Steel | ASTM A193 B7 |
| 08 | Bonnet Nut | Carbon Steel | ASTM A194 2H |
| 09 | Gasket | Stainless Steel | Spiral Wound 316 + Graphite |
| 10 | Back Seat Ring | Stainless Steel | A276 410 |
| 11 | Packing Ring | Graphite | Die Formed/Braided Graphite |
| 12 | Bonnet | Carbon Steel | ASTM A216 Gr. WCB |
| 13 | Hinge Pin | Carbon Steel | Carbon Steel |
| 14 | Packing Gland | Stainless Steel | ASTM A276 410 |
| 15 | Gland Flange | Carbon Steel | ASTM A216 WCB |
| 16 | Gland Bolt | Carbon Steel | ASTM A193 B7 |
| 17 | Gland Nut | Carbon Steel | ASTM A194 2H |
| 18 | Yoke Bush | Ductile Iron | ASTM A439 D2 |
| 19 | Handwheel | Malleable Iron | Malleable Iron |
| 20 | Handwheel Nut | Carbon Steel | Carbon Steel |
| 21 | Washer | Carbon Steel | Carbon Steel |
| 22 | Nameplate | Stainless Steel | ASTM A182 F316 |

## OPERATOR OPTIONS

- Gear Operated recommended for size 6" above

## SPECIFICATION

- Bolted Bonnet
- Outside Screw and Yoke
- Yoke integral with bonnet
- Rising Stem - Handwheel
- Welded or Threaded Seat Ring - Stellited
- Ring Type Joint or Butt Weld Ends

Other End connections are available on request.

## APPLICABLE STANDARDS

Design : ANSI B16.34
End Flange : ANSI B16.5
Weld Ends : ANSI B16.25
Face-to-Face : ANSI B16.10
Shell and Seat Test : API 598

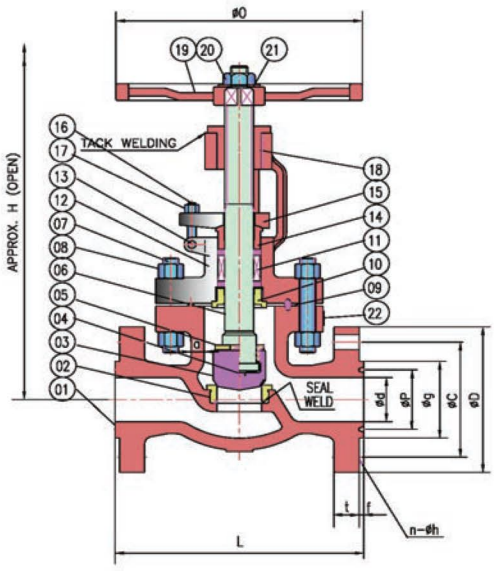
## MATERIAL

Option available for materials to meet NACE MR0175 requirement.

| Dimensional Data (mm)* | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Size | Face -to-Face L | Dia. of Bore d | O.D. of Flange D | ø of Bolt Circle C | O.D. of RF g | ø of RTJ P | Thk of Flange t | Ht. of RF f | ø of Bolt Holes n-h | ø of Handwheel O | Height H | Wall Thk a min | Wt (Kg) |
| 2" | 368.0 | 47.5 | 215.0 | 165.1 | 124.0 | 95.3 | 38.1 | 7.0 | 8-25.4 | 350 | 485 | 19.1 | 87.0 |
| 3" | 381.0 | 72.9 | 240.0 | 190.5 | 156.0 | 123.8 | 38.1 | 7.0 | 8-25.4 | 450 | 595 | 19.1 | 122.0 |
| 4" | 457.0 | 98.3 | 290.0 | 235.0 | 181.0 | 149.2 | 44.5 | 7.0 | 8-32.0 | 450 | 760 | 21.3 | 182.0 |
| 6" | 610.0 | 146.1 | 380.0 | 317.5 | 241.0 | 211.1 | 55.6 | 7.0 | 12-32.0 | 560 | 890 | 26.2 | 434.0 |
| 8" | 737.0 | 190.5 | 470.0 | 393.7 | 308.0 | 269.9 | 63.5 | 7.0 | 12-38.0 | 720 | 910 | 31.8 | 730.0 |
| 10" | 838.0 | 238.0 | 545.0 | 469.9 | 362.0 | 323.9 | 69.9 | 7.0 | 16-38.0 | 810 | 1278 | 36.6 | 1231.0 |

* Please note dimensions are for information only. Order specific arrangement drawing dimensions will be final.

# CAST STEEL GLOBE VALVE - ANSI 1500




| Parts And Material List | | | FIG . 1522R |
|---|---|---|---|
| **No.** | **Part Name** | **Material** | **ASTM Specification** |
| 01 | Body | Carbon Steel | ASTM A216 Gr. WCB |
| 02 | Body Seat Ring | Carbon Steel | ASTM A105 ST'L No.6 Face |
| 03 | Disc | Carbon Steel | ASTM A105 13Cr Face |
| 04 | Disc Thrust Plate | Stainless Steel | A276 410 |
| 05 | Disc Nut | Stainless Steel | A276 410 |
| 06 | Stem | Stainless Steel | ASTM A182 F6a |
| 07 | Bonnet Bolt | Carbon Steel | ASTM A193 B7 |
| 08 | Bonnet Nut | Carbon Steel | ASTM A194 2H |
| 09 | Gasket | Stainless Steel | Spiral Wound 316 + Graphite |
| 10 | Back Seat Ring | Stainless Steel | A276 410 |
| 11 | Packing Ring | Stainless Steel | 316 SS Ring Joint |
| 12 | Bonnet | Carbon Steel | ASTM A216 Gr. WCB |
| 13 | Hinge Pin | Carbon Steel | Carbon Steel |
| 14 | Packing Gland | Stainless Steel | ASTM A276 410 |
| 15 | Gland Flange | Carbon Steel | ASTM A216 WCB |
| 16 | Gland Bolt | Carbon Steel | ASTM A193 B7 |
| 17 | Gland Nut | Carbon Steel | ASTM A194 2H |
| 18 | Yoke Bush | Ductile Iron | ASTM A439 D2 |
| 19 | Handwheel | Malleable Iron | Malleable Iron |
| 20 | Handwheel Nut | Carbon Steel | Carbon Steel |
| 21 | Washer | Carbon Steel | Carbon Steel |
| 22 | Nameplate | Stainless Steel | ASTM A182 F316 |

## OPERATOR OPTIONS

- Gear Operated recommended for size 4" above

## SPECIFICATION

- Bolted Bonnet
- Outside Screw and Yoke
- Yoke integral with bonnet
- Rising Stem - Handwheel
- Welded or Threaded Seat Ring - Stellited
- Ring Type Joint or Butt Weld Ends

Other End connections are available on request.

## APPLICABLE STANDARDS

Design : ANSI B16.34
End Flange : ANSI B16.5
Weld Ends : ANSI B16.25
Face-to-Face : ANSI B16.10
Shell and Seat Test : API 598

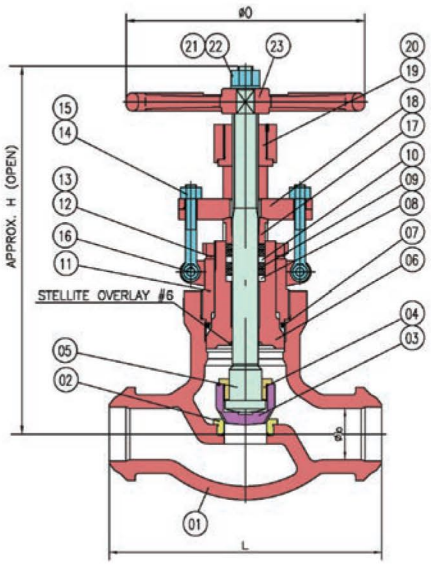
## MATERIAL

Option available for materials to meet NACE MR0175 requirement.

| Dimensional Data (mm)* | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Size | Face -to-Face L | Dia. of Bore d | O.D. of Flange D | ø of Bolt Circle C | O.D. of RF g | ø of RTJ P | Thk of Flange t | Ht. of RF f | ø of Bolt Holes n-h | ø of Handwheel O | Height H | Wall Thk a min | Wt (Kg) |
| 2" | 371.3 | 49.5 | 215.0 | 165.1 | 124.0 | 95.3 | 38.1 | 7.9 | 8-25.4 | 350 | 650 | 19.1 | 87.0 |
| 3" | 472.9 | 69.9 | 265.0 | 203.2 | 168.1 | 136.5 | 47.7 | 7.9 | 8-32.0 | 450 | 711 | 23.9 | 250.0 |
| 4" | 549.1 | 91.9 | 310.0 | 241.3 | 193.5 | 161.9 | 54.0 | 7.9 | 8-35.0 | 560 | 782 | 28.7 | 435.0 |
| 6" | 711.2 | 136.4 | 395.0 | 31.5 | 247.7 | 211.1 | 82.6 | 9.5 | 12-38.0 | 640 | 927 | 38.1 | 540.0 |

* Please note dimensions are for information only. Order specific arrangement drawing dimensions will be final.

# CAST STEEL GLOBE VALVE - ANSI 1500 PRESSURE SEAL BONNET




## OPERATOR OPTIONS

- Gear Operated recommended for size 4" above

## SPECIFICATION

- Pressure Seal Bonnet
- Outside Screw and Yoke
- Yoke integral with bonnet
- Rising Stem - Handwheel
- Welded or Threaded Seat Ring - Stellited
- Butt Weld Ends

Other End connections are available on request.

## APPLICABLE STANDARDS

Design : ANSI B16.34
End Flange : ANSI B16.5
Weld Ends : ANSI B16.25
Face-to-Face : ANSI B16.10
Shell and Seat Test : API 598

## MATERIAL

Option available for materials to meet NACE MR0175 requirement.

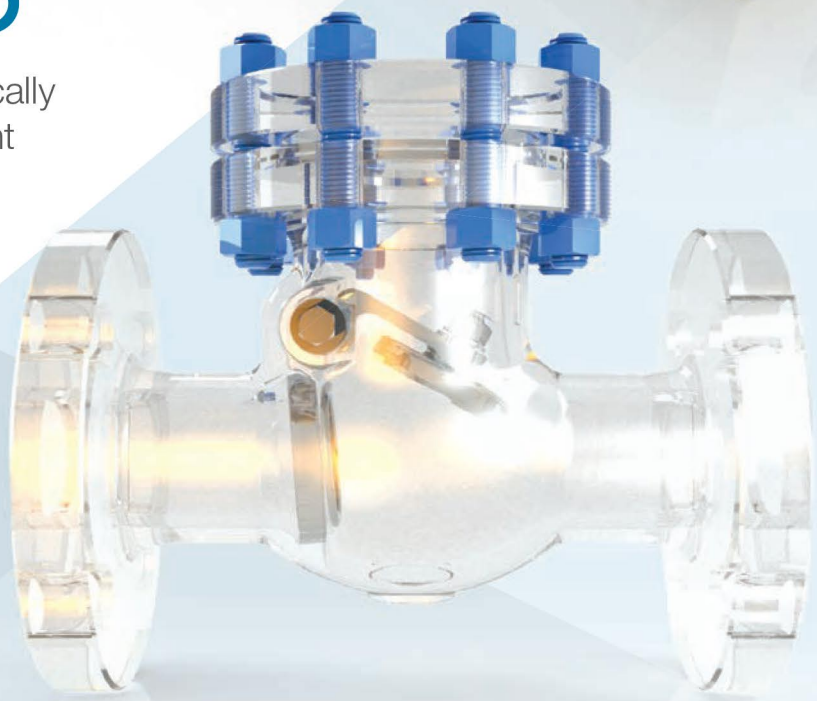
| Parts And Material List | | | FIG . 1562B |
|---|---|---|---|
| **No.** | **Part Name** | **Material** | **ASTM Specification** |
| 01 | Body | Carbon Steel | ASTM A216 Gr. WCB |
| 02 | Body Seat Ring | Carbon Steel | ASTM A105 ST'L No.6 Face |
| 03 | Disc | Carbon Steel | ASTM A105 ST'L No.6 Face |
| 04 | Disc Nut | Stainless Steel | ASTM A276 410 |
| 05 | Stem | Stainless Steel | ASTM A182 F6a |
| 06 | Stuffing Box | Carbon Steel | ASTM A105 |
| 07 | Sealing Ring | Stainless Steel | ASTM A276 316L |
| 08 | Spacer Ring | Stainless Steel | ASTM A276 410 |
| 09 | Packing Ring | Graphite | Die Formed/Braided Graphite |
| 10 | Lantern | Stainless Steel | ASTM A276 410 |
| 11 | Yoke | Carbon Steel | ASTM A216 WCB |
| 12 | Gland Seat | Carbon Steel | - |
| 13 | Gland Seat Washer | Stainless Steel | ASTM A276 410 |
| 14 | Gland | Stainless Steel | ASTM A276 410 |
| 15 | Gland Flange | Carbon Steel | ASTM A216 Gr. WCB |
| 16 | Hinge Pin | Carbon Steel | - |
| 17 | Gland Bolt | Carbon Steel | ASTM A193 B7 |
| 18 | Gland Nut | Carbon Steel | ASTM A194 2H |
| 19 | Yoke Bush | Ductile Iron | ASTM A439 D2 |
| 20 | Set Screw | Steel | - |
| 21 | Handwheel | Malleable Iron | Malleable Iron |
| 22 | Handwheel Nut | Carbon Steel | - |
| 23 | Washer | Carbon Steel | - |

| Dimensional Data (mm)* | | | | | | |
|---|---|---|---|---|---|---|
| Size | Face -to-Face L | Dia. of Bore d | ø of Handwheel O | Height H | Wall Thk a min | Wt (Kg) |
| 2" | 216.0 | 47.5 | 350 | 650 | 19.1 | 87.0 |
| 3" | 305.0 | 69.9 | 450 | 711 | 23.9 | 250.0 |
| 4" | 406.0 | 91.9 | 560 | 782 | 28.7 | 435.0 |
| 6" | 559.0 | 136.4 | 640 | 927 | 38.1 | 540.0 |
| 8" | 711.0 | 177.8 | 720 | 1127 | 47.8 | 760.0 |
| 10" | 864.0 | 222.3 | 900 | 1308 | 57.2 | 940.0 |

* Please note dimensions are for information only. Order specific arrangement drawing dimensions will be final.

# SWING CHECK VALVES

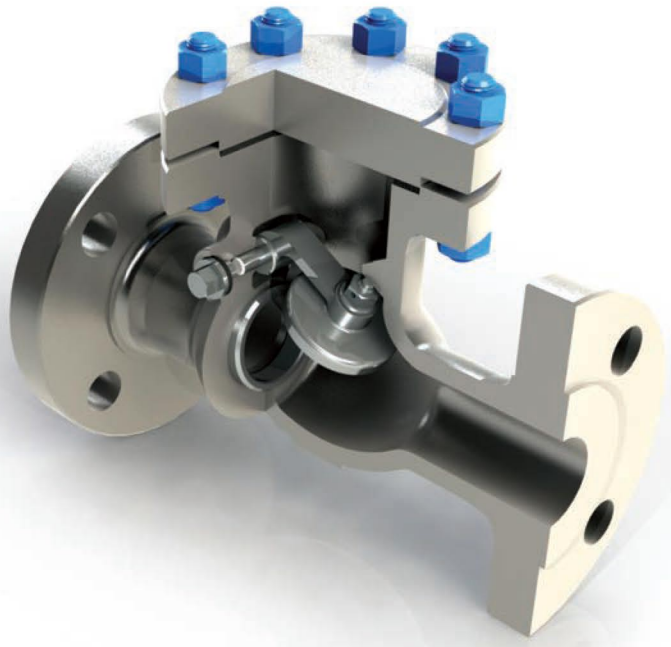
Swing Check valves are automatically actuated. They are used to prevent flow reversal in piping systems.



# CAST STEEL SWING CHECK VALVES

## Swing Check Valves are manufactured to BS 1868, B16.34 and tested to API Std. 598

Swing Check valves are automatically actuated. They are used to prevent flow reversal in piping systems. They are suitable for service in the horizontal and the vertical orientation (flow up through valve). Swing check valves have low pressure drop characteristics and are best suited for moderate velocity applications. There is no tendency for the seating surfaces of swing check valves to gall or score, this is due to the fact that the disc meets the flat seat squarely and there is no rubbing upon contact.



**BODY**

Spherical body with large radius, allows stress and turbulence to be minimized

Strong construction assures safety, even above pressure and temperature limits.

**BODY-BONNET JOINT / GASKET**

Range of materials to suit Pressure Classes

**DISC**

Designed to close on its own weight to stop backflow.

**WELDED-INSEAT RING**

Seat ring is seal welded to eliminate potential leak paths.

**END CONNECTIONS**

As Standard production covers valves with:

**Flanged ends** to ANSI B16.5

**RF** Raised face serrated finish or,

On request, with any other type of finish

**RTJ** Ring Type Joint

**Others**

**Butt-welding ends (BW) to ANSI B16.25**

Customer must specify the type of schedule required, or class of pipe, or diameter and bore.

**Special** end connections on request.

**FACE to FACE**

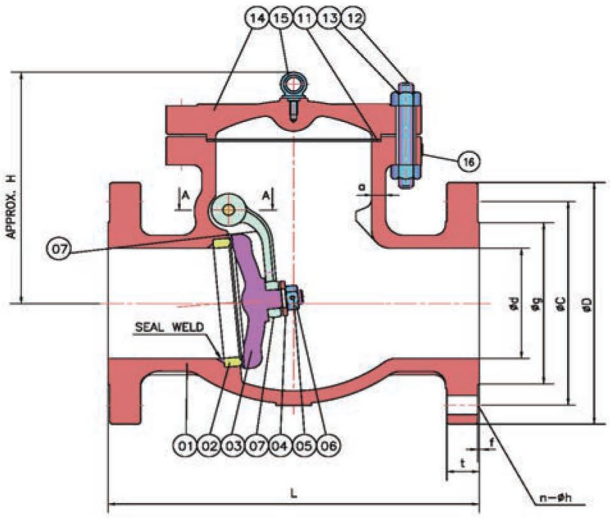
Face to Face dimensions to ANSI B16.10.

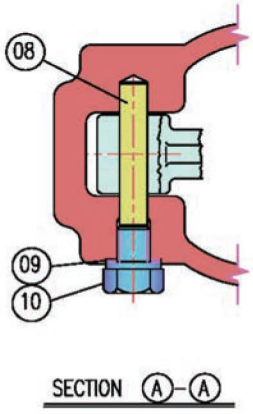
**TESTING**

Standard Testing is in accordance with API 598.

Customer specific testing by agreement.

# CAST STEEL SWING CHECK VALVE - ANSI 150




| Parts And Material List | | | FIG . 0132F |
|---|---|---|---|
| **No.** | **Part Name** | **Material** | **ASTM Specification** |
| 01 | Body | Carbon Steel | ASTM A216 Gr. WCB |
| 02 | Body Seat Ring | Carbon Steel | ASTM A105 ST'L No.6 Face |
| 03 | Disc | Carbon Steel | ASTM A216 13Cr Face |
| 04 | Washer | Carbon Steel | ASTM A276 316 |
| 05 | Disc Nut Pin | Stainless Steel | ASTM A276 410 |
| 06 | Disc Nut | Carbon Steel | ASTM A194 8 |
| 07 | Arm | Carbon Steel | ASTM A216 WCB |
| 08 | Arm Pin | Stainless Steel | ASTM A276 410 |
| 09 | Spring Washer | Stainless Steel | ASTM A276 316 |
| 10 | Plug | Stainless Steel | ASTM A276 410 |
| 11 | Gasket | Stainless Steel | Spiral Wound 316+Graphite |
| 12 | Cover Bolt | Carbon Steel | ASTM A193 B7 |
| 13 | Cover Bolt Nut | Carbon Steel | ASTM A194 2H |
| 14 | Cover | Carbon Steel | ASTM A216 WCB |
| 15 | Eye Bolt | Carbon Steel | Carbon Steel |
| 16 | Nameplate | Stainless Steel | ASTM A182 F316 |

## SPECIFICATION

- Bolted Cover
- For Horizontal or Vertical Lines (Up Flow Only)
- Welded or Threaded Seat Ring
- Raised Face Flanged Ends or Butt Weld Ends

Other End connections are available on request.

## APPLICABLE STANDARDS

Design : ANSI B16.34
End Flange : ANSI B16.5
Weld Ends : ANSI B16.25
Face-to-Face : ANSI B16.10
Shell and Seat Test : API 598

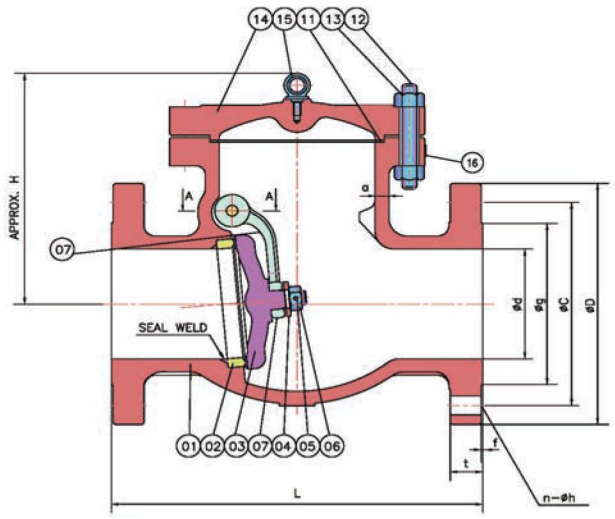
## MATERIAL

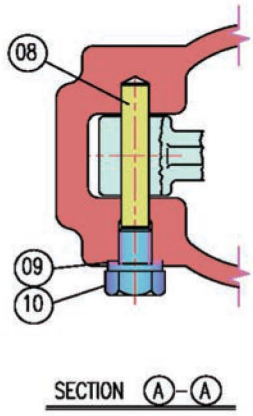
Option available for materials to meet NACE MR0175 requirement.

| Dimensional Data (mm)* | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Size | Face -to-Face L | Dia. of Bore d | O.D. of Flange D | ø of Bolt Circle C | O.D. of RF g | Thk of Flange t | Ht. of RF f | ø of Bolt Holes h | Height H | Wall Thk a min | Wt (Kg) |
| 2" | 203.0 | 50.8 | 150.0 | 120.7 | 92.1 | 16.3 | 2.0 | 4-19.1 | 165 | 8.6 | 18.0 |
| 3" | 241.0 | 76.2 | 190.0 | 152.4 | 127.0 | 19.5 | 2.0 | 4-19.1 | 186 | 10.4 | 29.0 |
| 4" | 292.0 | 101.6 | 230.0 | 190.5 | 157.2 | 24.3 | 2.0 | 8-19.1 | 217 | 11.2 | 48.0 |
| 6" | 356.0 | 152.4 | 280.0 | 241.3 | 215.9 | 25.9 | 2.0 | 8-22.4 | 266 | 11.9 | 77.0 |
| 8" | 495.0 | 203.2 | 345.0 | 298.5 | 269.9 | 29.0 | 2.0 | 8-22.4 | 318 | 12.7 | 133.0 |
| 10" | 622.0 | 254.0 | 405.0 | 362.0 | 323.8 | 30.6 | 2.0 | 12-25.4 | 368 | 14.2 | 266.0 |
| 12" | 698.0 | 304.8 | 485.0 | 431.8 | 381.0 | 32.2 | 2.0 | 12-25.4 | 406 | 16.0 | 347.0 |
| 14" | 787.0 | 336.6 | 535.0 | 476.3 | 412.8 | 35.4 | 2.0 | 12-28.6 | 432 | 16.8 | 451.0 |
| 16" | 864.0 | 387.4 | 595.0 | 539.8 | 469.9 | 37.0 | 2.0 | 16-28.6 | 483 | 17.5 | 556.0 |
| 18" | 978.0 | 438.2 | 635.0 | 577.9 | 533.4 | 40.1 | 2.0 | 16-32.0 | 600 | 18.3 | 784.0 |
| 20" | 978.0 | 489.0 | 700.0 | 635.0 | 584.2 | 43.3 | 2.0 | 20-32.0 | 660 | 19.1 | 835.0 |
| 24" | 1295.0 | 590.6 | 815.0 | 749.3 | 692.2 | 48.1 | 2.0 | 20-35.0 | 740 | 20.6 | 1150.0 |

* Please note dimensions are for information only. Order specific arrangement drawing dimensions will be final.

# CAST STEEL SWING CHECK VALVE - ANSI 300




| Parts And Material List | | | FIG . 0332F |
|---|---|---|---|
| **No.** | **Part Name** | **Material** | **ASTM Specification** |
| 01 | Body | Carbon Steel | ASTM A216 Gr. WCB |
| 02 | Body Seat Ring | Carbon Steel | ASTM A105 ST'L No.6 Face |
| 03 | Disc | Carbon Steel | ASTM A216 13Cr Face |
| 04 | Washer | Carbon Steel | ASTM A276 316 |
| 05 | Disc Nut Pin | Stainless Steel | ASTM A276 410 |
| 06 | Disc Nut | Carbon Steel | ASTM A194 8 |
| 07 | Arm | Carbon Steel | ASTM A216 WCB |
| 08 | Arm Pin | Stainless Steel | ASTM A276 410 |
| 09 | Spring Washer | Stainless Steel | ASTM A276 316 |
| 10 | Plug | Stainless Steel | ASTM A276 410 |
| 11 | Gasket | Stainless Steel | Spiral Wound 316+Graphite |
| 12 | Cover Bolt | Carbon Steel | ASTM A193 B7 |
| 13 | Cover Bolt Nut | Carbon Steel | ASTM A194 2H |
| 14 | Cover | Carbon Steel | ASTM A216 WCB |
| 15 | Eye Bolt | Carbon Steel | Carbon Steel |
| 16 | Nameplate | Stainless Steel | ASTM A182 F316 |

## SPECIFICATION

- Bolted Cover
- For Horizontal or Vertical Lines (Up Flow Only)
- Welded or Threaded Seat Ring
- Raised Face Flanged Ends or Butt Weld Ends

Other End connections are available on request.

## APPLICABLE STANDARDS

Design : ANSI B16.34
End Flange : ANSI B16.5
Weld Ends : ANSI B16.25
Face-to-Face : ANSI B16.10
Shell and Seat Test : API 598

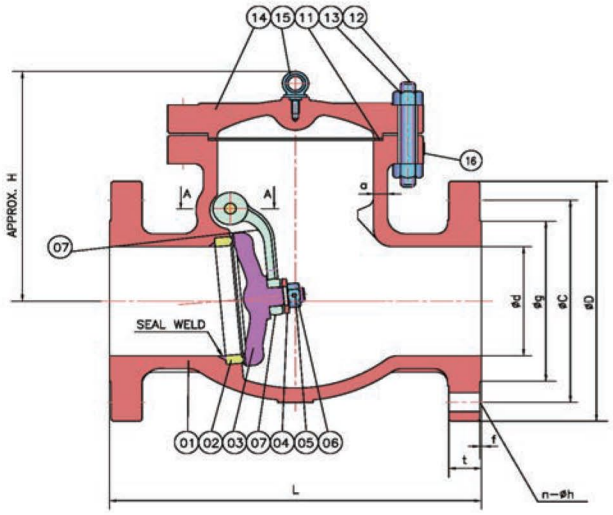
## MATERIAL

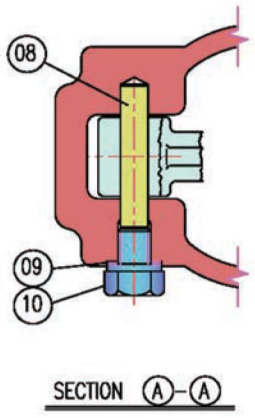
Option available for materials to meet NACE MR0175 requirement.

| Dimensional Data (mm)* | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Size | Face -to-Face L | Dia. of Bore d | O.D. of Flange D | ø of Bolt Circle C | O.D. of RF g | Thk of Flange t | Ht. of RF f | ø of Bolt Holes n-h | Height H | Wall Thk a min | Wt (Kg) |
| 2" | 267.0 | 50.8 | 165.0 | 127.0 | 92.1 | 22.7 | 2.0 | 8-19.1 | 178 | 9.7 | 19.0 |
| 3" | 318.0 | 76.2 | 210.0 | 168.3 | 127.0 | 29.0 | 2.0 | 8-22.4 | 211 | 11.9 | 29.0 |
| 4" | 356.0 | 101.6 | 255.0 | 200.0 | 157.2 | 32.2 | 2.0 | 8-22.4 | 246 | 12.7 | 48.0 |
| 6" | 444.0 | 152.4 | 320.0 | 269.9 | 215.9 | 37.0 | 2.0 | 12-22.4 | 318 | 16.0 | 77.0 |
| 8" | 533.0 | 203.2 | 380.0 | 330.2 | 269.9 | 41.7 | 2.0 | 12-25.4 | 356 | 17.5 | 133.0 |
| 10" | 622.0 | 254.0 | 445.0 | 387.4 | 323.8 | 48.1 | 2.0 | 16-28.6 | 394 | 19.1 | 266.0 |
| 12" | 711.0 | 304.8 | 520.0 | 450.8 | 381.0 | 51.3 | 2.0 | 16-32.0 | 482 | 20.6 | 347.0 |
| 16" | 864.0 | 387.4 | 650.0 | 571.5 | 469.9 | 57.6 | 2.0 | 20-35 | 584 | 23.9 | 840.0 |
| 18" | 978.0 | 431.8 | 710.0 | 628.6 | 533.4 | 60.8 | 2.0 | 24-35 | 590 | 25.4 | 1025.0 |
| 20" | 1016.0 | 482.6 | 775.0 | 685.8 | 584.2 | 64.0 | 2.0 | 24-35 | 614 | 26.9 | 1320.0 |
| 24" | 1346.0 | 584.2 | 915.0 | 812.8 | 692.2 | 70.3 | 2.0 | 24-41 | 655 | 30.2 | 1960.0 |

* Please note dimensions are for information only. Order specific arrangement drawing dimensions will be final.

# CAST STEEL SWING CHECK VALVE - ANSI 600




| Parts And Material List | | | FIG . 0632F |
|---|---|---|---|
| **No.** | **Part Name** | **Material** | **ASTM Specification** |
| 01 | Body | Carbon Steel | ASTM A216 Gr. WCB |
| 02 | Body Seat Ring | Carbon Steel | ASTM A105 ST'L No.6 Face |
| 03 | Disc | Carbon Steel | ASTM A216 13Cr Face |
| 04 | Washer | Carbon Steel | ASTM A276 316 |
| 05 | Disc Nut Pin | Stainless Steel | ASTM A276 410 |
| 06 | Disc Nut | Carbon Steel | ASTM A194 8 |
| 07 | Arm | Carbon Steel | ASTM A216 WCB |
| 08 | Arm Pin | Stainless Steel | ASTM A276 410 |
| 09 | Spring Washer | Stainless Steel | ASTM A276 316 |
| 10 | Plug | Stainless Steel | ASTM A276 410 |
| 11 | Gasket | Stainless Steel | Spiral Wound 316+Graphite |
| 12 | Cover Bolt | Carbon Steel | ASTM A193 B7 |
| 13 | Cover Bolt Nut | Carbon Steel | ASTM A194 2H |
| 14 | Cover | Carbon Steel | ASTM A216 WCB |
| 15 | Eye Bolt | Carbon Steel | Carbon Steel |
| 16 | Nameplate | Stainless Steel | ASTM A182 F316 |

## SPECIFICATION

- Bolted Cover
- For Horizontal or Vertical Lines (Up Flow Only)
- Welded or Threaded Seat Ring
- Raised Face Flanged Ends or Butt Weld Ends

Other End connections are available on request.

## APPLICABLE STANDARDS

Design : ANSI B16.34
End Flange : ANSI B16.5
Weld Ends : ANSI B16.25
Face-to-Face : ANSI B16.10
Shell and Seat Test : API 598

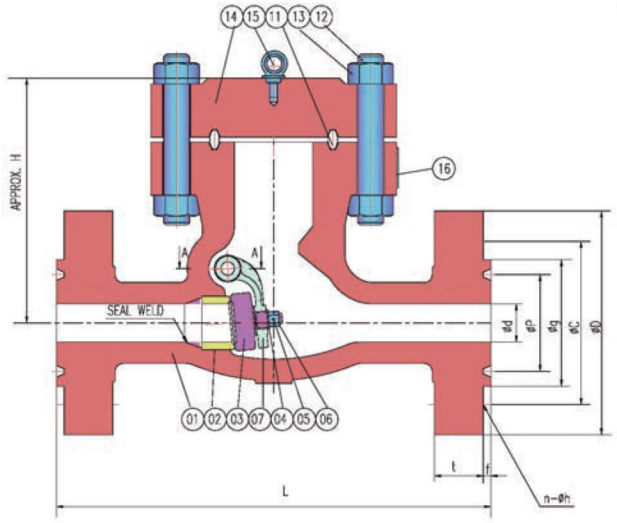
## MATERIAL

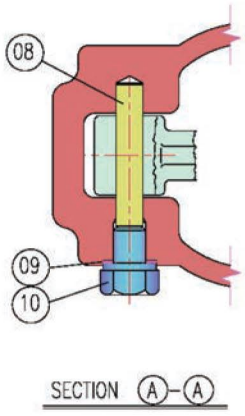
Option available for materials to meet NACE MR0175 requirement.

| Dimensional Data (mm)* | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Size | Face -to-Face L | Dia. of Bore d | O.D. of Flange D | ø of Bolt Circle C | O.D. of RF g | Thk of Flange t | Ht. of RF f | ø of Bolt Holes n-h | Height H | Wall Thk a min | Wt (Kg) |
| 2" | 292.0 | 50.8 | 165.0 | 127.0 | 92.1 | 25.4 | 7.0 | 8-19.1 | 187 | 11.2 | 52.0 |
| 3" | 356.0 | 76.2 | 210.0 | 168.3 | 127.0 | 31.8 | 7.0 | 8-22.4 | 278 | 12.7 | 75.0 |
| 4" | 432.0 | 101.6 | 275.0 | 215.9 | 157.2 | 38.1 | 7.0 | 8-25.4 | 316 | 16 | 122.0 |
| 6" | 559.0 | 152.4 | 355.0 | 292.1 | 215.9 | 47.7 | 7.0 | 12-28.6 | 400 | 19.1 | 227.0 |
| 8" | 660.0 | 199.9 | 420.0 | 349.2 | 269.9 | 55.6 | 7.0 | 12-32.0 | 432 | 25.4 | 346.0 |
| 10" | 787.0 | 247.7 | 510.0 | 431.8 | 323.8 | 63.5 | 7.0 | 16-35.0 | 483 | 28.7 | 628.0 |
| 12" | 838.0 | 298.5 | 560.0 | 489.0 | 381.0 | 66.7 | 7.0 | 20-35.0 | 508 | 31.8 | 796.0 |
| 14" | 889.0 | 326.9 | 605.0 | 527.0 | 412.8 | 69.9 | 7.0 | 20-38.0 | 572 | 35.1 | 892.0 |
| 16" | 991.0 | 374.7 | 685.0 | 603.2 | 469.9 | 76.2 | 7.0 | 20-41.0 | 660 | 38.1 | 1200.0 |
| 18" | 1092.0 | 419.1 | 745.0 | 654.0 | 533.4 | 82.6 | 7.0 | 20-44.0 | 730 | 41.4 | 1600.0 |
| 20" | 1094.0 | 463.6 | 815.0 | 723.9 | 584.2 | 88.9 | 7.0 | 24-44.0 | 800 | 44.5 | 2420.0 |
| 24" | 1397.0 | 558.8 | 940.0 | 838.2 | 692.2 | 101.6 | 7.0 | 24-52.0 | 900 | 50.8 | 3150.0 |

* Please note dimensions are for information only. Order specific arrangement drawing dimensions will be final.

# CAST STEEL SWING CHECK VALVE - ANSI 900




| Parts And Material List | | | FIG . 0932R |
|---|---|---|---|
| **No.** | **Part Name** | **Material** | **ASTM Specification** |
| 01 | Body | Carbon Steel | ASTM A216 Gr. WCB |
| 02 | Body Seat Ring | Carbon Steel | ASTM A105 ST'L No.6 Face |
| 03 | Disc | Carbon Steel | ASTM A216 13Cr Face |
| 04 | Washer | Carbon Steel | ASTM A276 316 |
| 05 | Disc Nut Pin | Stainless Steel | ASTM A276 410 |
| 06 | Disc Nut | Carbon Steel | ASTM A194 8 |
| 07 | Arm | Carbon Steel | ASTM A216 WCB |
| 08 | Arm Pin | Stainless Steel | ASTM A276 410 |
| 09 | Spring Washer | Stainless Steel | ASTM A276 316 |
| 10 | Plug | Stainless Steel | ASTM A276 410 |
| 11 | Gasket | Stainless Steel | 316 SS Ring Joint |
| 12 | Cover Bolt | Carbon Steel | ASTM A193 B7 |
| 13 | Cover Bolt Nut | Carbon Steel | ASTM A194 2H |
| 14 | Cover | Carbon Steel | ASTM A216 WCB |
| 15 | Eye Bolt | Carbon Steel | Carbon Steel |
| 16 | Nameplate | Stainless Steel | ASTM A182 F316 |

## SPECIFICATION

- Bolted Cover
- For Horizontal or Vertical Lines (Up Flow Only)
- Welded or Threaded Seat Ring
- Ring Type Joint or Butt Weld Ends

Other End connections are available on request.

## APPLICABLE STANDARDS

Design : ANSI B16.34
End Flange : ANSI B16.5
Weld Ends : ANSI B16.25
Face-to-Face : ANSI B16.10
Shell and Seat Test : API 598

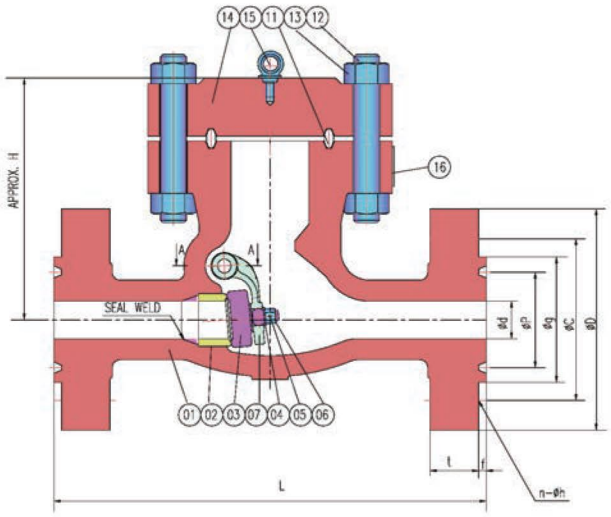
## MATERIAL

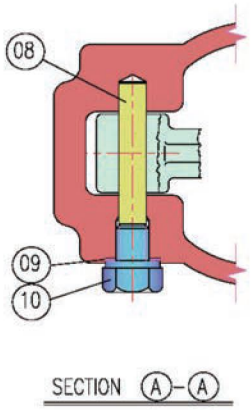
Option available for materials to meet NACE MR0175 requirement.

| Dimensional Data (mm)* | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Size | Face -to-Face L | Dia. of Bore d | O.D. of Flange D | ø of Bolt Circle C | O.D. of RF g | ø of RTJ P | Thk of Flange t | Ht. of RF f | ø of Bolt Holes n-h | Height H | Wall Thk a min | Wt (Kg) |
| 2" | 371.3 | 47.5 | 215.0 | 165.1 | 124.0 | 95.25 | 38.1 | 7.9 | 8-25.4 | 225 | 19.1 | 69.0 |
| 3" | 384.0 | 72.9 | 240.0 | 190.5 | 155.4 | 123.83 | 38.1 | 7.9 | 8-25.4 | 250 | 19.1 | 85.0 |
| 4" | 460.2 | 98.3 | 290.0 | 235.0 | 180.8 | 149.23 | 44.5 | 7.9 | 8-32.0 | 320 | 21.3 | 145.0 |
| 6" | 612.6 | 146.1 | 380.0 | 317.5 | 241.3 | 211.12 | 55.6 | 7.9 | 12-32.0 | 345 | 26.2 | 310.0 |
| 8" | 739.6 | 190.5 | 470.0 | 393.7 | 307.8 | 269.88 | 63.5 | 7.9 | 12-38.0 | 415 | 31.8 | 500.0 |
| 10" | 841.2 | 238.0 | 545.0 | 469.9 | 362.0 | 323.85 | 69.9 | 7.9 | 16-38.0 | 515 | 36.6 | 772.0 |
| 12" | 968.2 | 282.4 | 610.0 | 533.4 | 419.1 | 381.00 | 79.4 | 7.9 | 20-38.0 | 560 | 42.2 | 1080.0 |

* Please note dimensions are for information only. Order specific arrangement drawing dimensions will be final.

# CAST STEEL SWING CHECK VALVE - ANSI 1500




| Parts And Material List | | | FIG . 1532R |
|---|---|---|---|
| **No.** | **Part Name** | **Material** | **ASTM Specification** |
| 01 | Body | Carbon Steel | ASTM A216 Gr. WCB |
| 02 | Body Seat Ring | Carbon Steel | ASTM A105 ST'L No.6 Face |
| 03 | Disc | Carbon Steel | ASTM A216 13Cr Face |
| 04 | Washer | Carbon Steel | ASTM A276 316 |
| 05 | Disc Nut Pin | Stainless Steel | ASTM A276 410 |
| 06 | Disc Nut | Carbon Steel | ASTM A194 8 |
| 07 | Arm | Carbon Steel | ASTM A216 WCB |
| 08 | Arm Pin | Stainless Steel | ASTM A276 410 |
| 09 | Spring Washer | Stainless Steel | ASTM A276 316 |
| 10 | Plug | Stainless Steel | ASTM A276 410 |
| 11 | Gasket | Stainless Steel | 316 SS Ring Joint |
| 12 | Cover Bolt | Carbon Steel | ASTM A193 B7 |
| 13 | Cover Bolt Nut | Carbon Steel | ASTM A194 2H |
| 14 | Cover | Carbon Steel | ASTM A216 WCB |
| 15 | Eye Bolt | Carbon Steel | Carbon Steel |
| 16 | Nameplate | Stainless Steel | ASTM A182 F316 |

## SPECIFICATION

- Bolted Cover
- For Horizontal or Vertical Lines (Up Flow Only)
- Welded or Threaded Seat Ring
- Ring Type Joint or Butt Weld Ends

Other End connections are available on request.

## APPLICABLE STANDARDS

Design : ANSI B16.34
End Flange : ANSI B16.5
Weld Ends : ANSI B16.25
Face-to-Face : ANSI B16.10
Shell and Seat Test : API 598

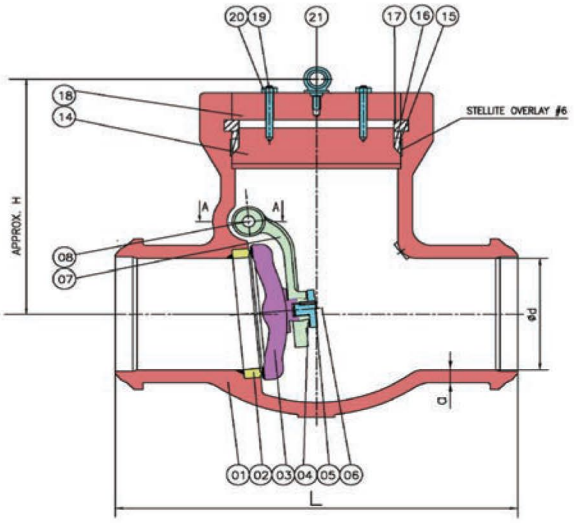
## MATERIAL

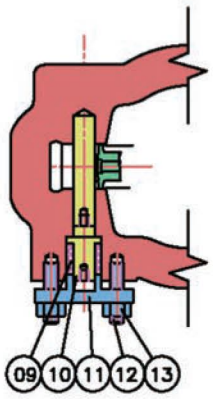
Option available for materials to meet NACE MR0175 requirement.

| Dimensional Data (mm)* | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Size | Face -to-Face L | Dia. of Bore d | O.D. of Flange D | ø of Bolt Circle C | O.D. of RF g | ø of RTJ P | Thk of Flange t | Ht. of RF f | ø of Bolt Holes n-h | Height H | Wall Thk a min | Wt (Kg) |
| 2" | 371.3 | 47.5 | 215.0 | 165.1 | 124.0 | 95.25 | 38.1 | 7.9 | 8-25.4 | 225 | 19.1 | 60.0 |
| 3" | 472.9 | 69.9 | 265.0 | 203.2 | 168.1 | 136.53 | 47.7 | 7.9 | 8-32.0 | 330 | 23.9 | 78.0 |
| 4" | 549.1 | 91.9 | 310.0 | 241.3 | 193.5 | 161.93 | 54.0 | 7.9 | 8-35.0 | 355 | 28.7 | 130.0 |
| 6" | 711.2 | 136.4 | 395.0 | 317.5 | 247.7 | 211.12 | 82.6 | 9.5 | 12-38.0 | 450 | 38.1 | 334.0 |
| 8" | 841.5 | 177.8 | 485.0 | 393.7 | 317.5 | 269.88 | 92.1 | 11.1 | 12-44.0 | 460 | 47.8 | 590.0 |
| 10" | 1000.3 | 222.3 | 585.0 | 482.6 | 371.3 | 323.85 | 108.0 | 11.1 | 12-52.0 | 519 | 57.2 | 1025.0 |

* Please note dimensions are for information only. Order specific arrangement drawing dimensions will be final.

# CAST STEEL SWING CHECK VALVE - ANSI 1500 PRESSURE SEAL BONNET




| Parts And Material List | | | FIG . 1572B |
|---|---|---|---|
| **No.** | **Part Name** | **Material** | **ASTM Specification** |
| 01 | Body | Carbon Steel | ASTM A216 Gr. WCB |
| 02 | Body Seat Ring | Carbon Steel | ASTM A105 ST'L No.6 Face |
| 03 | Disc | Carbon Steel | ASTM A105 ST'L No.6 Face |
| 04 | Washer | Stainless Steel | ASTM A276 316 |
| 05 | Disc Nut Screw | Stainless Steel | ASTM A276 410 |
| 06 | Disc Nut | Carbon Steel | ASTM A194 8 |
| 07 | Hinge | Carbon Steel | ASTM A216 WCB |
| 08 | Pin | Stainless Steel | ASTM A276 410 |
| 09 | Packing | Graphite | Graphite |
| 10 | Hinge pin | Stainless Steel | ASTM A276 410 |
| 11 | Plug | Stainless Steel | ASTM A276 410 |
| 12 | Plug Bolt | Carbon Steel | ASTM A193 B7 |
| 13 | Plug bolt Nut | Carbon Steel | ASTM A194 2H |
| 14 | Cover | Carbon Steel | ASTM A105 |
| 15 | Sealing Ring | Stainless Steel | ASTM A276 316L |
| 16 | Pressure Ring | Stainless Steel | ASTM A276 410 |
| 17 | Segment Ring | Stainless Steel | ASTM A276 410 |
| 18 | Cover Clamp | Carbon Steel | ASTM A105 |
| 19 | Cover Bolt | Carbon Steel | ASTM A193 B7 |
| 20 | Cover Bolt Nut | Carbon Steel | ASTM A194 2H |
| 21 | Eye Bolt | Carbon Steel | Carbon Steel |

| Dimensional Data (mm)* | | | | | |
|---|---|---|---|---|---|
| Size | Face -to-Face L | Dia. of Bore d | Height H | Wall Thk a min | Wt (Kg) |
| 3" | 305.0 | 69.9 | 330.0 | 23.9 | 78.0 |
| 4" | 406.0 | 91.9 | 355.0 | 28.7 | 130.0 |
| 6" | 559.0 | 136.4 | 400.0 | 38.1 | 334.0 |
| 8" | 711.0 | 177.8 | 460.0 | 47.8 | 590.0 |
| 10" | 864.0 | 222.3 | 630.0 | 57.2 | 1025.0 |

## SPECIFICATION

- Bolted Cover
- For Horizontal or Vertical Lines (Up Flow Only)
- Welded or Threaded Seat Ring
- Butt Weld Ends

Other End connections are available on request.

## APPLICABLE STANDARDS

Design : ANSI B16.34
End Flange : ANSI B16.5
Weld Ends : ANSI B16.25
Face-to-Face : ANSI B16.10
Shell and Seat Test : API 598

## MATERIAL

Option available for materials to meet NACE MR0175 requirement.

* Please note dimensions are for information only. Order specific arrangement drawing dimensions will be final.

# FIGURE NUMBERING SYSTEM

**Example : -**

| Fig. | 01 | 1 | 2 | F | - | 8 |
|---|---|---|---|---|---|---|
| | ANSI Rating | Valve Type | Body / Bonnet Materia | End Connection | | Seating Trim |

| ANSI Rating | Valve Type | Body / Bonnet Material | End Connection |
|---|---|---|---|
| 01= ANSI 150 | 1 = Gate | 1 = Low Carbon Steel - ASTM A352 LCB / LC3 / LCC | B = Bevel Weld |
| 03 = ANSI 300 | 2 = Globe | 2 = Carbon Steel - ASTM A216 Gr.WCB | F = Raised Face Flange |
| 06 = ANSI 600 | 3 = Swing Check | 3 = Stainless Steel - ASTM A351 CF8M / CF3M | R = Ring Type Joint |
| 09 = ANSI 900 | 5 = PS Gate | 4 = Stainless Steel - ASTM A351 CF8 / CF3 / CF10 | |
| 15 = ANSI 1500 | 6 = PS Globe | 5 = Stainless Steel - ASTM A351 CF8C (Type 347) | |
| 25 = ANSI 2500* | 7 = PS Check | 6 = Stainess Steel - ASTM A351 CG8M / CG3M | |
| | 0 = Others | 7 = Alloy Steel - ASTM A217 WC1 / WC6 / WC9 / C5 / C12 | |
| | | 8 = Alloy 20 - ASTM A351CN7M | |
| * Available on request<br>PS denotes Pressure Seal | | 9 = Duplex Stainless Steel | |
| | | 0 = Hastelloy, Monel or Others | |

** With Reference from API 600

| Seating Trim | | | | | | |
|---|---|---|---|---|---|---|
| **Trim No** | **Trim** | **Seat Surface Hardness (Hb[a] Min.)** | **Body Seating Surface(Facing)** | **Gate / Disc Seating Surface(Facing)** | **Backseat*** | **Stem*** |
| 1 | F6 | [b] | 13Cr | 13Cr | 13Cr(410) | 13Cr(410) |
| 2 | 304 | [c] | 18 Cr-8Ni(304) | SS304 | SS304 | SS304 |
| 5 | Hardfaced | 350[d] | Stellite 6 | Stellite 6 | 13Cr | 13Cr(410) |
| 8 | F6 and HF | 250[f] & 350[f] | Stellite 6 | 13Cr | 13Cr(410) | 13Cr(410) |
| 9 | Monel | [c] | Ni-Cu alloy | Ni-Cu alloy | Ni-Cu alloy | Ni-Cu alloy |
| 10 | 316 | [c] | 18Cr-8Ni | SS316 | SS316 | SS316 |
| 11 | Monel & HF | [c] & 350[f] | Stellite 6 | Ni-Cu alloy | Ni-Cu alloy | Ni-Cu alloy |
| 12 | 316 & HF | [c] & 350[f] | Stellite 6 | SS316 | SS316 | SS316 |
| 13 | Alloy 20 | [c] | 19Cr-29Ni | 19Cr-29Ni | 19Cr-29Ni | 19Cr-29Ni |
| 14 | Alloy 20 & HF | [c] & 350[f] | Stellite 6 | 19Cr-29Ni | 19Cr-29Ni | 19Cr-29Ni |
| 15 | Hardfaced | 350[d] | Stellite 6 | Stellite 6 | SS304 | SS304 |
| 16 | Hardfaced | 350[d] | Stellite 6 | Stellite 6 | SS316 | SS316 |
| ST | Special Trim | NA | Others | Others | Others | Others |

**Note:**

* Backseat and Stem only applies to Gate and Globe Valves.
For Swing Check Valve, Trim material includes Hinge Pin material which will take reference from stem material.

[a] HB (formerly HBN) is the symbol for Brinell Hardness per ASTM E10.

[b] Body and gate seat 250HB minimum, with 50 HB minimum differential between body and gate seat surfaces.

[c] Manufacturer's standard hardness.

[d] Differential hardness between the body and gate seat surfaces is not required.

[f] Hardness differential between body and gate seat surfaces shall be manufacturer's standard.

Wafer Retainerless

Flanged Retainerless

Solid Lug Retainerless

Hub Ended

# WAFER CHECK
## VALVES

Wafer check valves are automatically actuated designed to prevent flow reversal in piping systems. Their compact dual plate design clamps between flanges with bolting around the outside of the valve.

# STEEL DUAL PLATE WAFER CHECK VALVES

## Wafer Check Valves are manufactured to API594 and tested to API Std. 598.

Dual Plate Wafer Check Valves are automatically actuated to prevent flow reversal in piping systems. Their design is generally more economical than conventional swing check valves, and easier to install and maintain due to their lighter weight / smaller dimensions. Their operation is governed with spring assistance.

## Body

Compact body in wafer, flanged or solid lug design it is also available in retainerless versions ensuring there is no potential media leakage to atmosphere via plate pin stem bolting.

## Dual Plates

Dual Plates offer a quick respsonsiveness which can alleviate water hammer in some situations further protecting associated equipment

## Connections

Based on the 3 body options they are available from Class 150 to Class 1500.

## Seat

Predominantly metal to metal seated with stellite option they are also available with soft seat  such as Viton

## Spring

The springs have been designed to endure stresses and also ensure longlivety.

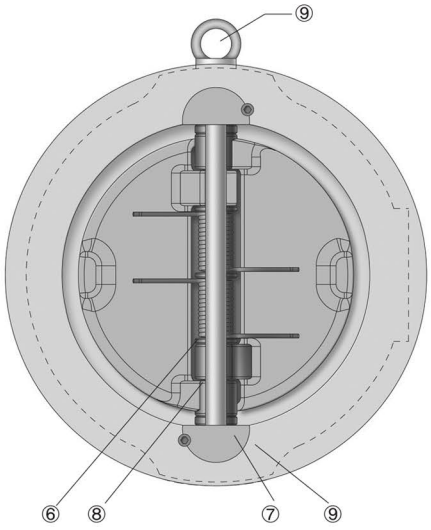
## Testing

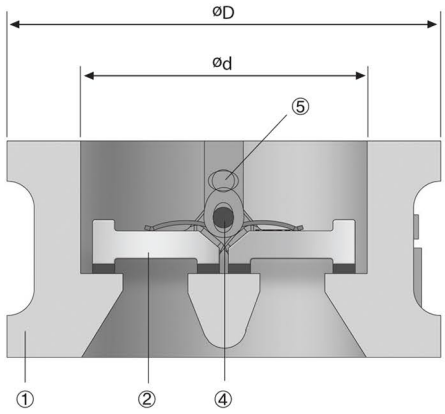
Standard testing is in accordance with API 598. Other customer specific test requirements such as API 6D and firesafe testing is by agreement.

## Face to Face

Wafer flange dimensions to API 605 and face to face API 594
Flanged dimensions to ANSI B16.5 and Face to Face API6D.

# STEEL DUAL PLATE WAFER CHECK VALVE
# ANSI 150 - ANSI 1500




| NO. | PART NAME | MATERIAL | | |
|---|---|---|---|---|
| 1 | BODY | A216 - WCB | A351 CF8M | A351 CF3M |
| 2 | DISC | A351 CF8M | A351 CF3M | A217 CA15 |
| 3 | SEAT | SS 316 | 13 CR | STELLITE $6 |
| 4 | HINGE PIN | A276 316 | A276 410 | A276 304 |
| 5 | STOP PIN | A276 316 | A276 410 | A276 304 |
| 6 | SPRING | INCONEL X-750 | SS 316 | |
| 7 | GUIDE | A276 316 | A276 410 | A276 304 |
| 8 | WASHER | A276 316 | A276 304 | |
| 9 | SET SCREW | A193 B7 | A193 B8 | A193 B8m |
| 10 | EYE BOLT | SS400 or SS304 | SS304 | SS304 |

## CLASS 150

UNIT : mm

| SIZE | 2 | 3 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ØD | 102 | 133 | 171 | 219 | 276 | 337 | 406 | 448 | 511 | 546 | 603 | 714 |
| Ød | 60 | 87 | 113 | 166 | 207 | 260 | 300 | 339 | 387 | 438 | 487 | 580 |
| L | 60 | 73 | 73 | 98 | 127 | 146 | 181 | 184 | 191 | 203 | 219 | 222 |

## CLASS 300

UNIT : mm

| SIZE | 2 | 3 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ØD | 108 | 146 | 178 | 248 | 305 | 359 | 419 | 483 | 537 | 594 | 651 | 772 |
| Ød | 60 | 87 | 113 | 166 | 207 | 260 | 300 | 339 | 387 | 438 | 487 | 580 |
| L | 60 | 73 | 73 | 98 | 127 | 146 | 181 | 222 | 232 | 264 | 292 | 318 |

## CLASS 600

UNIT : mm

| SIZE | 2 | 3 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ØD | 108 | 146 | 191 | 264 | 317 | 397 | 454 | 489 | 562 | 610 | 679 | 787 |
| Ød | 60 | 87 | 113 | 166 | 207 | 260 | 300 | 339 | 387 | 438 | 487 | 580 |
| L | 60 | 73 | 79 | 137 | 165 | 213 | 229 | 273 | 305 | 362 | 368 | 438 |

## CLASS 900

UNIT : mm

| SIZE | 2 | 3 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ØD | 140 | 165 | 203 | 286 | 356 | 432 | 495 | 518 | 571 | 635 | 695 | 835 |
| Ød | 60 | 87 | 113 | 166 | 207 | 260 | 300 | 339 | 387 | 438 | 487 | 580 |
| L | 70 | 83 | 102 | 159 | 206 | 241 | 292 | 356 | 384 | 451 | 451 | 495 |

## CLASS 1500

UNIT : mm

| SIZE | 2 | 3 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 24 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ØD | 140 | 171 | 206 | 279 | 349 | 432 | 518 | 575 | 638 | 702 | 752 | 899 |
| Ød | 60 | 87 | 113 | 166 | 207 | 260 | 300 | 339 | 387 | 438 | 487 | 580 |
| L | 70 | 83 | 102 | 159 | 206 | 248 | 305 | 356 | 384 | 468 | 533 | 559 |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