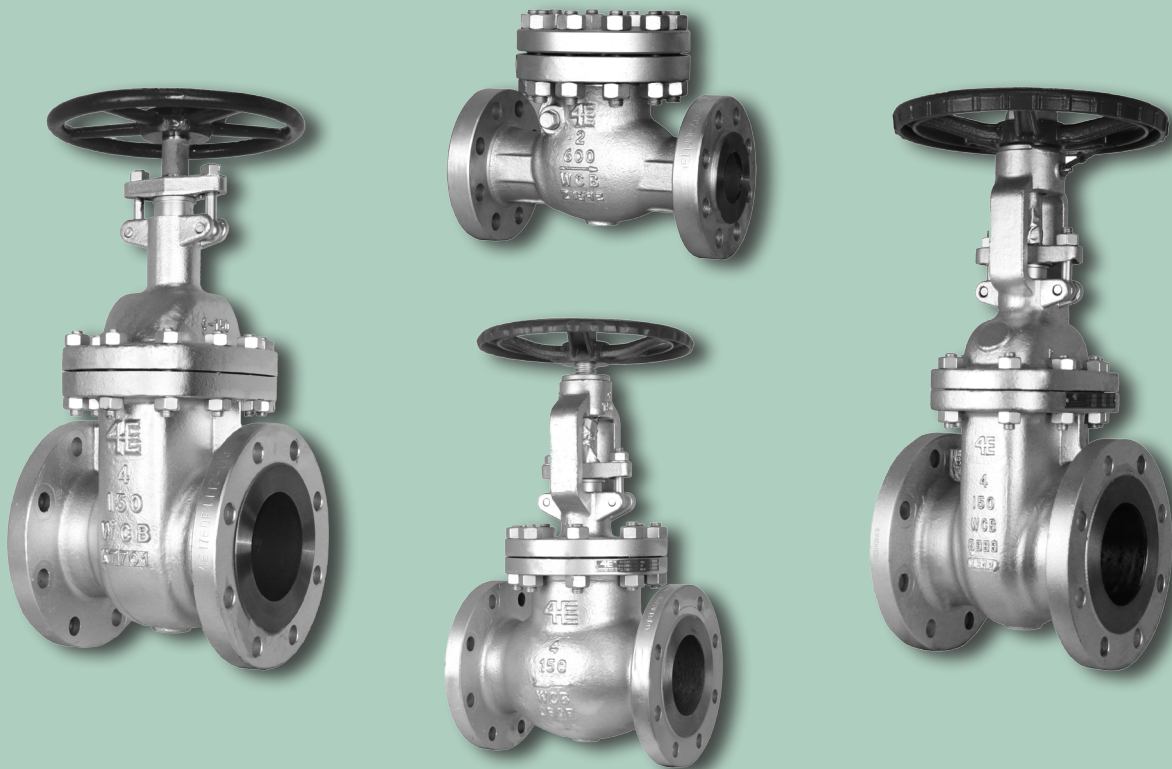




# **CAST STEEL VALVES**

**150# 300# 600# • Gate Globe Check**



**4E Valve**



**4E** Valve is a Texas Corporation Company located in Stafford, TX. Since 1993, 4Excellent Quality, 4Extraordinary Service, 4Expediant Delivery and 4Extensive Inventory is what many Industries have counted on for over decades 4E Valve. Our World-Wide Distributor Network which will be there for anyone who represent a Reliable Source of 4E Valve Products.

For Excellent Quality, 4E's API Certified manufacturing facilities are dedicated to exceeding applicable API, ANSI, ASTM and other industry standards. Our products come with a vigilant quality assurance program and Liability Insurance. 4E monitors its products from scratch to finish. And Our commitment to quality does not end at our factories where all 4E valves are tested in accordance with API 598. 4E scrutinizes material test reports and maintains an MTR Data Base System. Furthermore, 4E valves are selected periodically to undergo full non-destructive and destructive testing in accordance with ASTM A703 and API 598 at an independent laboratory to insure product integrity.

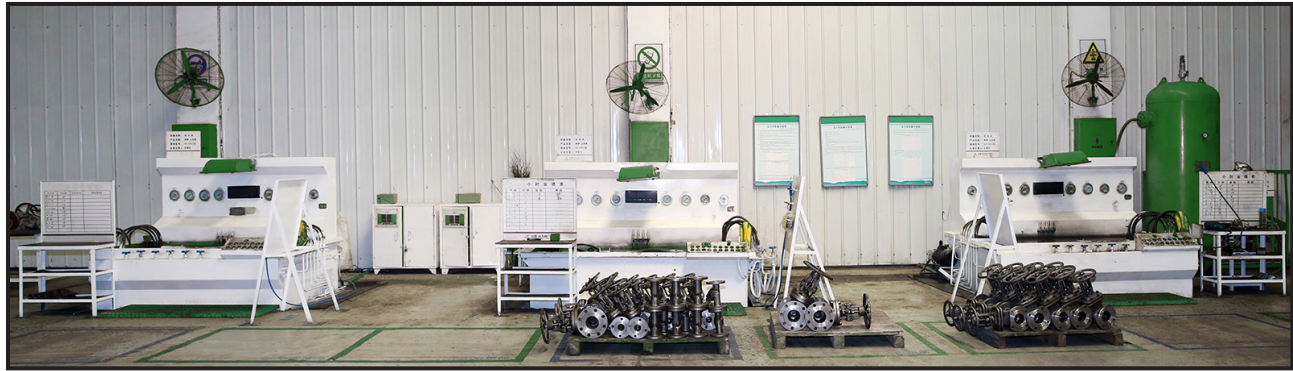
For Extraordinary Service, our trained professionals are ready to provide immediate answers to your inquiries. 4E strives to quote within the hour of receiving large inquiries via email, fax or any means of communication.

For Expediant Delivery, 4E dispatches valves from stock within 24 hours after placement of order.

For Extensive Inventory, 4E maintains a significant inventory of valves in Houston, TX and our products are available from 4E distributors and agents in the the United States, North America and overseas.

**4EXCELLENT**  
**4EXTRAORDINARY**  
**4EXPEDIANT**  
**4EXTENSIVE**

**4E Cast Steel Valve Brochure**  
**2020-10**



4E factory pressure testing

## 4E Quality Commitment

Our commitment to quality does not end at our factories where all 4E valves are tested in accordance with API 598. 4E scrutinizes material test reports and maintains an MTR Data Base System. Furthermore, 4E valves are randomly selected periodically to undergo full non-destructive and destructive testing in accordance with ASTM A703 and API 598 at an independent laboratory to insure product integrity.

**All 4E Manufactured Valves Come with General Liability Coverage.**

## Order 4E Products by Figure Number

FIG.

| TYPE                                                                                                                                                  | PRESSURE                                                                                                                                                           | BODY MATERIAL                                                                                                                                                                                                                                                                                                                                          | (Description)                                                                                                                                                                                                                                                                                                                                                                                                                                                            | TRIM                                                                                                                                                                                                                                                                                                                                                                                                                                       | ( | END CONNECTION                                                            | SUFFIX LETTERS<br>Optional                                                                                                                                                                                                         | PIECE                         |
|-------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| 1 = GATE OSY<br>2 = GLOBE OSY<br>3 = SWING CHECK<br>4 = BALL<br>5 = LIFT CHECK<br>6 = NRS GATE<br>7 = ANGLE<br>8 = THRU<br>9 = KNIFE<br>B = BUTTERFLY | 1 = 150<br>2 = 125<br>3 = 300<br>4 = 400<br>5 = 250<br>6 = 600<br>8 = 800<br>9 = 900<br>15 = 1500<br>20 = 2000<br>25 = 2500<br>30 = 3000<br>45 = 4500<br>50 = 5000 | WCB = A216 Gr WCB<br>AC5 = A217 Gr C5<br>WC6 = A217 Gr WC6<br>LCB = A352 Gr LCB<br>LC3 = A352 Gr LC3<br>CF8 = A351 Gr CF8<br>C8M = A351 Gr CF8M<br>FGO = A105<br>FG5 = A182 Gr F5<br>LF2 = A350 Gr LF2<br>F11 = A182 Gr F11<br>F04 = A182 Gr 304<br>F16 = A182 Gr 316<br>CFE = A126 Gr B<br>DF3 = A395<br>DF5 = A536<br>BRZ = B61 B62<br>ZZZ = SPECIAL | - CAST CARBON STEEL<br>- CAST ALLOY STEEL (5Cr.0.5Mo)<br>- CAST ALLOY STEEL (1.25Cr.0.5Mo)<br>- CAST LOW TEMP. CARBON STEEL<br>- CAST LOW TEMP. 3.5 Ni STEEL<br>- CAST 304 STAINLESS STEEL<br>- CAST 316<br>- FORGED CARBON STEEL<br>- FORGED ALLOY STEEL (5Cr.0.5Mo)<br>- FORGED LOW TEMP CARBON STEEL<br>- FORGED ALLOY STEEL<br>- FORGED 304 STAINLESS STEEL<br>- FORGED 316 STAINLESS STEEL<br>- CAST IRON<br>- CAST DUCTILE IRON<br>- CAST DUCTILE IRON<br>- BRONZE | 1 = 410<br>2 = 304<br>3 = F310<br>4 = HARD 410<br>5 = HARDFACED<br>5a = HARDFACED<br>6 = 410 and CuNi<br>7 = 410 and HARD 410<br>8 = 410 and HARDFACED<br>8a = 410 and HARDFACED<br>9 = MONEL<br>10 = 316<br>11 = MONEL and HARDFACED<br>12 = 310 and HARDFACED<br>13 = ALLOY 20<br>14 = ALLOY 20 and HARDFACE<br>15 = 304 and HARDFACED<br>16 = 316 and HARDFACED<br>17 = 347 and HARDFACED<br>18 = ALLOY 20 and HARDFACED<br>19 = Bronze | ( | F = FLANGED<br>J = RTJ<br>B = BUTTWELD<br>S = SOCKET WELD<br>T = THREADED | FP = FULL PORT<br>RP = REGULAR PORT<br>FB = FLOATING BALL<br>TM = TRUMON MOUNT<br>FS = FIRE SAFE<br>GO = GEAR OPERATOR<br>PS = PPRESSURE SEAL<br>WB = WELDED BONNET<br>BP = BY PASS<br>ST = SOCKET WELD X THREADED<br>ZZ = SPECIAL | 1P = 1 PIECE<br>2P = 2 PIECES |

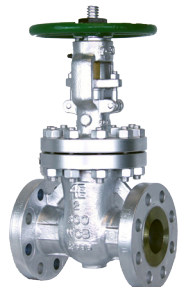


# Cast Steel - Gate Globe Check - Index

## 4E VALVE API WCB Cast Steel Gate Valves, CLASS 150 - 600



**150# GATE VALVE**  
IS 2"- 24" | BO 26"- 42"  
FIG.# 4E-11WCB8F



**300# GATE VALVE**  
IS 2"- 16" | BO 18"- 36"  
FIG.# 4E-13WCB8F



**600# GATE VALVE**  
IS 2"- 12" | BO 14"- 24"  
FIG.# 4E-16WCB8F



**150# NRS GATE VALVE**  
IS 2"- 12"  
FIG.# 4E-61WCB8F

## 4E VALVE API WCB Cast Steel Globe Valves, CLASS 150 - 600



**150# GLOBE VALVE**  
IS 2"- 12" | BO 18"- 24"  
FIG.# 4E-21WCB8F



**300# GLOBE VALVE**  
IS 2"- 12" | BO 14"- 18"  
FIG.# 4E-23WCB8F



**600# GLOBE VALVE**  
IS 2"- 8" | BO 10"- 16"  
FIG.# 4E-26WCB8F

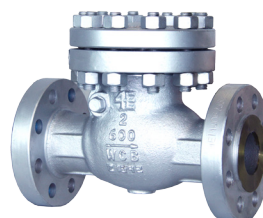
## 4E VALVE API WCB Cast Steel Check Valves, CLASS 150 - 600



**150# CHECK VALVE**  
IS 2"- 16" | BO 18"- 30"  
FIG.# 4E-31WCB8F



**300# CHECK VALVE**  
IS 2"- 12" | BO 14"- 30"  
FIG.# 4E-33WCB8F



**600# CHECK VALVE**  
IS 2"- 10" | BO 12"- 24"  
FIG.# 4E-36WCB8F

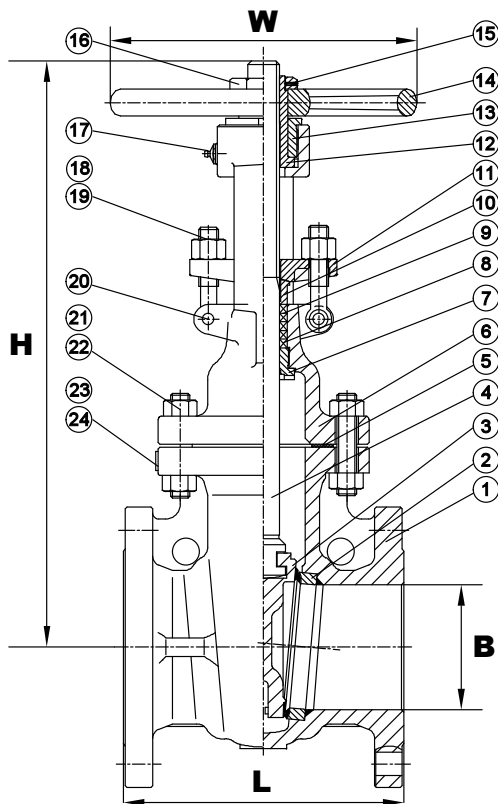
IS - IN STOCK  
BO - BACK ORDER

# Class 150 Cast Steel OS&Y Gate Valve



**FIG.# 4E-11WCB8F**

OS & Y, Rising Stem, Flexible Wedge, Bolted Bonnet  
Threaded or Welded Seat Ring, ASTM A216 WCB

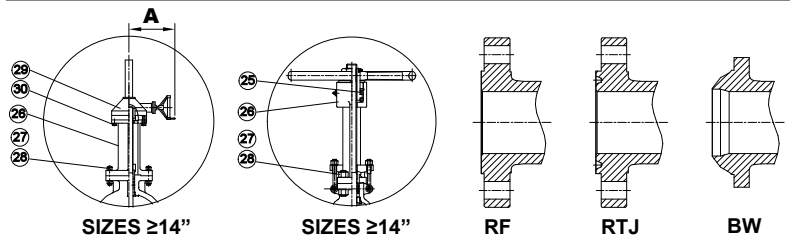


## STANDARDS COMPLIANCE:

|                         |                                                                |
|-------------------------|----------------------------------------------------------------|
| Basic Design            | API 600                                                        |
| Face to Face Dimensions | ANSI B 16.10                                                   |
| End Flange Dimensions   | 2" to 24" ASME B16.5<br>≥26" to ASME B16.47-A&B<br>ASME B16.25 |
| Test Standard           | API 598                                                        |

## MATERIAL LIST

| No. | Part Name         | ASTM Specification (Specs-Grades/Types) |                                                     |          |          |           |
|-----|-------------------|-----------------------------------------|-----------------------------------------------------|----------|----------|-----------|
|     |                   | A216 (STOCKING)                         | A352                                                | A217     |          | A351      |
|     |                   | WCB                                     | LCC                                                 | WC6      | C5       | CF8M      |
| 1.  | Body              | A216 WCB                                | A352 LCC                                            | A217 WC6 | A217 C5  | A351 CF8M |
| 2.  | Seat Ring         | A105                                    | A350 LF2, A182 F11, A182 F5, A182 F304 or A182 F316 |          |          |           |
|     | " Surface         | HF (STL.6/CoCr-A)                       | 13CR(ER410), 304, 316 or Monel                      |          |          |           |
| 3.  | Wedges            | A216 WCB                                | A352 LCC                                            | A217 WC6 | A217 C5  | A351 CF8M |
|     | " Seating Surface | 13CR(ER410)                             | HF (STL.6/CoCr-A), 304, 316 or Monel                |          |          |           |
| 4.  | Stem              | A182 F6a                                | A182 F304, A182 F316, 17-4PH or Monel               |          |          |           |
| 5.  | Gasket            | 08F+Flexible Graphite                   | F304 or F316                                        |          |          |           |
| 6.  | Bonnet            | A216 WCB                                | A352 LCC                                            | A217 WC6 | A217 C5  | A351 CF8M |
| 7.  | Back Seat         | A276 410                                | A182 F304, A182 F316 or Monel                       |          |          |           |
| 8.  | Packing           | F304+Graphite+C.I.                      |                                                     |          |          |           |
| 9.  | Packing           | Flexible Graphite+C.I.                  |                                                     |          |          |           |
| 10. | Gland             | A276 410                                | A182 F304, A182 F316 or Monel                       |          |          |           |
| 11. | Gland Flange      | A216 WCB                                | A352 LCC                                            | A217 WC6 | A217 C5  | A351 CF8M |
| 12. | Stem Nut          | A439-D2                                 |                                                     |          |          |           |
| 13. | Gland Nut         | CARBON STEEL                            | A276 Tye 316                                        |          |          |           |
| 14. | Handwheel         | DUCTILE IRON                            |                                                     |          |          |           |
| 15. | Screw             | CARBON STEEL                            | 316                                                 |          |          |           |
| 16. | Lock Nut          | CARBON STEEL                            | A276 Type 316                                       |          |          |           |
| 17. | Grease Nipple     | CARBON STEEL                            | A182 F316                                           |          |          |           |
| 18. | Eye Bolt          | A193 B7                                 | A320 L7                                             | A193 B16 | A193 B16 | A193 B8   |
| 19. | Eye Nut           | A194 2H                                 | A194 2H                                             | A194 4   | A194 4   | A194 8    |
| 20. | Pin               | CARBON STEEL                            | A276 Type 316                                       |          |          |           |
| 21. | Bolt              | A193 B7                                 | A320 L7                                             | A193 B16 | A193 B16 | A193 B8   |
| 22. | Nut               | A194 2H                                 | A194 2H                                             | A194 4   | A194 4   | A194 8    |
| 23. | Rivet             | AISI 304                                |                                                     |          |          |           |
| 24. | Name Plate        | AISI 304                                |                                                     |          |          |           |
| 25. | Axietree          | CARBON STEEL                            |                                                     |          |          |           |
| 26. | Yoke              | A216 WCB                                | A352 LCC                                            | A217 WC6 | A217 C5  | A351 CF8M |
| 27. | Yoke Bolt         | A193 B7                                 | A320 L7                                             | A193 B16 | A193 B16 | A193 B8   |
| 28. | Yoke Nut          | A194 2H                                 | A194 4                                              | A194 4   | A194 4   | A194 8    |
| 29. | Gear Box          | CARBON STEEL                            |                                                     |          |          |           |
| 30. | Hex Bolt          | CARBON STEEL                            | 316                                                 |          |          |           |



\*GEAR OPERATOR RECOMMENDED.

Weights are approximate and construction is subject to change without notice.

## DIMENSION & WEIGHT

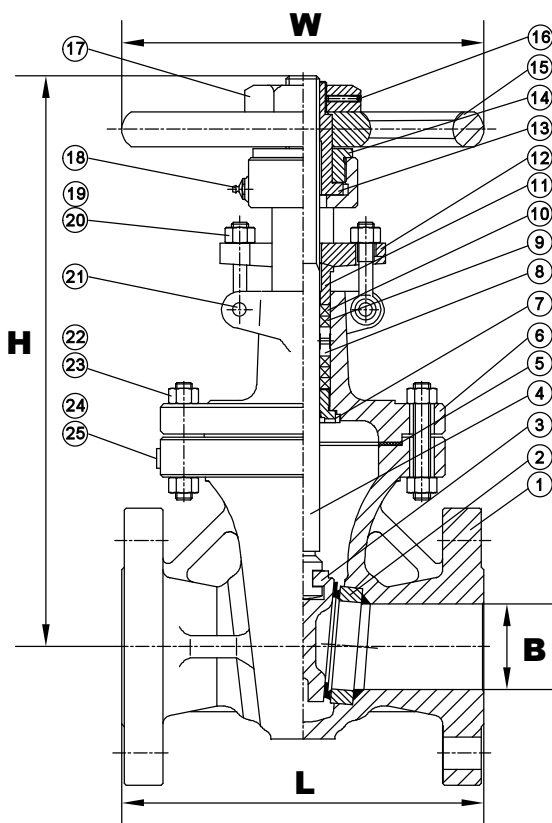
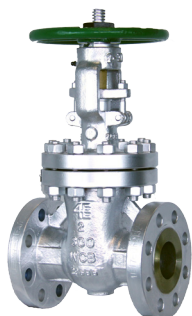
| SIZE   | unit | 2"   | 2-1/2" | 3"    | 4"   | 5"    | 6"    | 8"    | 10"   | 12"   | 14"   | 16"   | 18"   | 20"   | 24"   | 26"   | 28"   | 30"   | 32"   | 34"    | 36"    | 42"    |
|--------|------|------|--------|-------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------|--------|
| L(RF)  | inch | 7    | 7.5    | 8     | 9    | 10    | 10.5  | 11.5  | 13    | 14    | 15    | 16    | 17    | 18    | 20    | 22    | 24    | 24    | 26    | 28     | 28     | 31     |
|        | mm   | 178  | 190    | 203   | 229  | 254   | 267   | 292   | 330   | 356   | 381   | 406   | 432   | 457   | 508   | 559   | 610   | 610   | 660   | 711    | 711    | 787.4  |
| L(RTJ) | inch | 7.5  | 8      | 8.5   | 9.5  | 10.5  | 11    | 12    | 13.5  | 14.5  | 15.5  | 16.5  | 17.5  | 18.5  | 20.5  | -     | -     | -     | -     | -      | -      | -      |
|        | mm   | 191  | 203    | 216   | 241  | 267   | 279   | 305   | 343   | 368   | 394   | 419   | 445   | 470   | 521   | -     | -     | -     | -     | -      | -      | -      |
| L(BW)  | inch | 8.5  | 9.5    | 11.12 | 12   | 15    | 15.88 | 16.5  | 18    | 19.75 | 22.5  | 24    | 26    | 28    | 32    | 34    | 36    | 36    | 38    | 40     | 40     | -      |
|        | mm   | 216  | 241    | 283   | 305  | 381   | 403   | 419   | 457   | 502   | 572   | 610   | 660   | 711   | 813   | 864   | 914   | 914   | 965   | 1016   | 1016   | -      |
| A      | inch | -    | -      | -     | 12.2 | -     | 12.2  | 12.2  | 12.2  | 13.58 | 13.58 | 13.58 | 16.54 | 1654  | 19.88 | 19.88 | 19.88 | 19.88 | 19.88 | 19.88  | 24.02  | 24.02  |
|        | mm   | -    | -      | -     | 310  | -     | 310   | 310   | 310   | 345   | 345   | 345   | 420   | 420   | 420   | 505   | 505   | 505   | 505   | 505    | 610    | 610    |
| B      | inch | 2    | 2.52   | 3     | 4    | 5     | 6     | 8     | 10    | 12    | 13.25 | 15.25 | 17.24 | 19.25 | 23.25 | 25.31 | 27.25 | 29.25 | 30.75 | 32.75  | 34.49  | 40.24  |
|        | mm   | 51   | 64     | 76    | 102  | 127   | 152   | 203   | 254   | 305   | 337   | 387   | 438   | 489   | 591   | 643   | 692   | 743   | 781   | 832    | 876    | 1022   |
| H      | inch | 13   | 14.02  | 15.75 | 18.7 | 21.3  | 23.43 | 29.02 | 34.53 | 40.08 | 45.71 | 50.47 | 56.93 | 63.11 | 73.35 | 80    | 87.99 | 90.63 | 98.35 | 102.62 | 107.68 | 131.02 |
|        | mm   | 330  | 356    | 400   | 475  | 541   | 595   | 737   | 877   | 1018  | 1161  | 1282  | 1446  | 1603  | 1863  | 2032  | 2235  | 2302  | 2498  | 2594   | 2735   | 3328   |
| W      | inch | 7.87 | 9.84   | .984  | 9.84 | 11.81 | 11.81 | 13.78 | 15.75 | 17.72 | 19.69 | 22.05 | 25.2  | 25.2  | 28.35 | 27.95 | 27.95 | 27.95 | 27.95 | 27.95  | 31.5   | 31.5   |
|        | mm   | 200  | 250    | 250   | 250  | 300   | 300   | 350   | 400   | 450   | 500   | 560   | 640   | 640   | 720   | 710*  | 710*  | 710*  | 710*  | 710*   | 800*   | 800*   |
| WT.    | KG   | 18   | 27     | 34    | 50   | 64    | 78    | 122   | 180   | 260   | 383   | 503   | 600   | 748   | 1129  | 1610  | 1750  | 1958  | 2840  | 3100   | 3305   | 5400   |
|        | LB   | 40   | 60     | 75    | 110  | 141   | 171   | 269   | 397   | 573   | 844   | 1108  | 1322  | 1649  | 2489  | 3550  | 3858  | 4317  | 6261  | 6834   | 7288   | 11905  |



# Class 300 Cast Steel OS&Y Gate Valve

**FIG.# 4E-13WCB8F**

OS & Y, Rising Stem, Flexible Wedge, Bolted Bonnet  
Threaded or Welded Seat Ring, ASTM A216 WCB

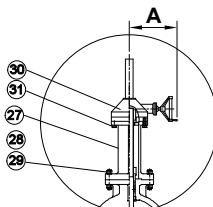


## STANDARDS COMPLIANCE:

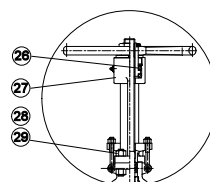
|                         |                                                                   |
|-------------------------|-------------------------------------------------------------------|
| Basic Design            | API 600                                                           |
| Face to Face Dimensions | ANSI B 16.10                                                      |
| End Flange Dimensions   | 2" to 24" to ASME B16.5<br>≥26" to ASME B16.47-A&B<br>ASME B16.25 |
| Test Standard           | API 598                                                           |

## MATERIAL LIST

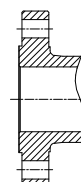
|     |                   | ASTM Specification (Specs-Grades/Types) |                                                     |          |          |           |
|-----|-------------------|-----------------------------------------|-----------------------------------------------------|----------|----------|-----------|
| No. | Part Name         | A216 (STOCKING)                         | A352                                                | A217     |          | A351      |
|     |                   | WCB                                     | LCC                                                 | WC6      | C5       | CF8M      |
| 1.  | Body              | A216 WCB                                | A352 LCC                                            | A217 WC6 | A217 C5  | A351 CF8M |
| 2.  | Seat Ring         | A105                                    | A350 LF2, A182 F11, A182 F5, A182 F304 or A182 F316 |          |          |           |
|     | " Surface         | HF (STL.6/CoCr-A)                       | 13CR(ER410), 304, 316 or Monel                      |          |          |           |
| 3.  | Wedges            | A216 WCB                                | A352 LCC                                            | A217 WC6 | A217 C5  | A351 CF8M |
|     | " Seating Surface | 13CR(ER410)                             | HF (STL.6/CoCr-A), 304, 316 or Monel                |          |          |           |
| 4.  | Stem              | A182 F6a                                | A182 F304, A182 F316, 17-4PH or Monel               |          |          |           |
| 5.  | Gasket            | 08F+Flexible Graphite                   | F304 or F316                                        |          |          |           |
| 6.  | Bonnet            | A216 WCB                                | A352 LCC                                            | A217 WC6 | A217 C5  | A351 CF8M |
| 7.  | Back Seat         | A276 410                                | A182 F304, A182 F316 or Monel                       |          |          |           |
| 8.  | Distance Ring     | A276 410                                | A182 F304, A182 F316 or Monel                       |          |          |           |
| 9.  | Packing           | F304+Graphite+C.I.                      |                                                     |          |          |           |
| 10. | Packing           | Flexible Graphite+C.I.                  |                                                     |          |          |           |
| 11. | Gland             | A276 410                                | A182 F304, A182 F316 or Monel                       |          |          |           |
| 12. | Gland Flange      | A216 WCB                                | A352 LCC                                            | A217 WC6 | A217 C5  | A351 CF8M |
| 13. | Stem Nut          | A439-D2                                 |                                                     |          |          |           |
| 14. | Gland Nut         | CARBON STEEL                            | A276 Tye 316                                        |          |          |           |
| 15. | Handwheel         | DUCTILE IRON                            |                                                     |          |          |           |
| 16. | Screw             | CARBON STEEL                            | 316                                                 |          |          |           |
| 17. | Lock Nut          | CARBON STEEL                            | A276 Type 316                                       |          |          |           |
| 18. | Grease Nipple     | CARBON STEEL                            | A182 F316                                           |          |          |           |
| 19. | Eye Bolt          | A193 B7                                 | A320 L7                                             | A193 B16 | A193 B16 | A193 B8   |
| 20. | Eye Nut           | A194 2H                                 | A194 2H                                             | A194 4   | A194 4   | A194 8    |
| 21. | Pin               | CARBON STEEL                            | A276 Type 316                                       |          |          |           |
| 22. | Bolt              | A193 B7                                 | A320 L7                                             | A193 B16 | A193 B16 | A193 B8   |
| 23. | Nut               | A194 2H                                 | A194 2H                                             | A194 4   | A194 4   | A194 8    |
| 24. | Rivet             | AISI 304                                |                                                     |          |          |           |
| 25. | Name Plate        | AISI 304                                |                                                     |          |          |           |
| 26. | Axietree          | CARBON STEEL                            |                                                     |          |          |           |
| 27. | Yoke              | A216 WCB                                | A352 LCC                                            | A217 WC6 | A217 C5  | A351 CF8M |
| 28. | Yoke Bolt         | A193 B7                                 | A320 L7                                             | A193 B16 | A193 B16 | A193 B8   |
| 29. | Yoke Nut          | A194 2H                                 | A194 4                                              | A194 4   | A194 4   | A194 8    |
| 30. | Gear Box          | CARBON STEEL                            |                                                     |          |          |           |
| 31. | Hex Bolt          | CARBON STEEL                            | 316                                                 |          |          |           |



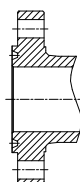
SIZE ≥ 12"



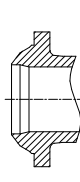
SIZE ≥ 12"



RF



RTJ



BW

\*GEAR OPERATOR RECOMMENDED.

Weights are approximate and construction is subject to change without notice.

## DIMENSION & WEIGHT

| SIZE     | unit | 2"    | 2-1/2" | 3"    | 4"    | 5"    | 6"    | 8"    | 10"   | 12"   | 14"   | 16"   | 18"   | 20"   | 24"   | 26"    | 28"    | 30"    | 36"    |
|----------|------|-------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------|--------|--------|
| L(RF-BW) | inch | 8.5   | 9.5    | 11.12 | 12    | 15    | 15.88 | 16.5  | 18    | 19.75 | 30    | 33    | 36    | 39    | 45    | 49     | 53     | 55     | 68     |
|          | mm   | 216   | 241    | 283   | 305   | 381   | 103   | 419   | 457.2 | 502   | 762   | 838   | 914   | 991   | 1143  | 1244.6 | 1346.2 | 1397   | 1727   |
| L(RTJ)   | inch | 9.12  | 10.12  | 11.74 | 12.62 | 15.62 | 16.50 | 17.12 | 18.62 | 20.37 | 30.62 | 33.62 | 36.62 | 39.75 | 45.88 | -      | -      | -      | -      |
|          | mm   | 232   | 257    | 298   | 321   | 397   | 419   | 435   | 473   | 518   | 778   | 854   | 90    | 1010  | 1165  | -      | -      | -      | -      |
| A        | inch | -     | -      | -     | 12.2  | -     | 12.2  | 12.2  | 13.58 | 13.58 | 13.58 | 16.54 | 16.54 | 1654  | 19.88 | 19.88  | 24.02  | 24.02  | 24.02  |
|          | mm   | -     | -      | -     | 310   | -     | 310   | 310   | 345   | 345   | 345   | 420   | 420   | 420   | 505   | 610    | 610    | 610    | 610    |
| B        | inch | 2     | 2.52   | 3     | 4     | 5     | 6     | 8     | 10    | 12    | 13.25 | 15.25 | 17.00 | 19.02 | 25    | 27     | 27.25  | 29     | 34.49  |
|          | mm   | 51    | 64     | 76    | 102   | 127   | 152   | 203   | 254   | 305   | 337   | 387   | 432   | 483   | 635   | 686    | 692    | 736.6  | 876    |
| H        | inch | 14.06 | 14.8   | 17.32 | 19.84 | 22.13 | 25.87 | 30.59 | 36.3  | 42.48 | 46.61 | 52.24 | 59.57 | 64.29 | 75.43 | 82.68  | 92.05  | 102.56 | 110.04 |
|          | mm   | 357   | 376    | 440   | 504   | 562   | 657   | 777   | 922   | 1079  | 1184  | 1327  | 1513  | 1633  | 1916  | 2100   | 2338   | 2605   | 2795   |
| W        | inch | 7.87  | 9.84   | 9.84  | 11.81 | 11.81 | 13.78 | 15.75 | 17.72 | 19.69 | 22.05 | 25.2  | 25.2  | 28.35 | 28.35 | 27.95  | 31.5   | 31.5   | 31.5   |
|          | mm   | 200   | 250    | 250   | 300   | 300   | 350   | 400   | 450   | 500   | 560   | 640   | 640   | 720   | 720   | 710*   | 800*   | 800*   | 800*   |
| WT.      | KG   | 26    | 36     | 50    | 70    | 97    | 144   | 208   | 296   | 466   | 762   | 909   | 1186  | 1498  | 2497  | 3200   | 3450   | 4200   | 6050   |
|          | LB   | 57    | 79     | 110   | 154   | 214   | 318   | 458   | 652   | 1028  | 1680  | 2004  | 2615  | 3298  | 5505  | 7055   | 7606   | 9260   | 13338  |

# Class 600 Cast Steel OS&Y Gate Valve

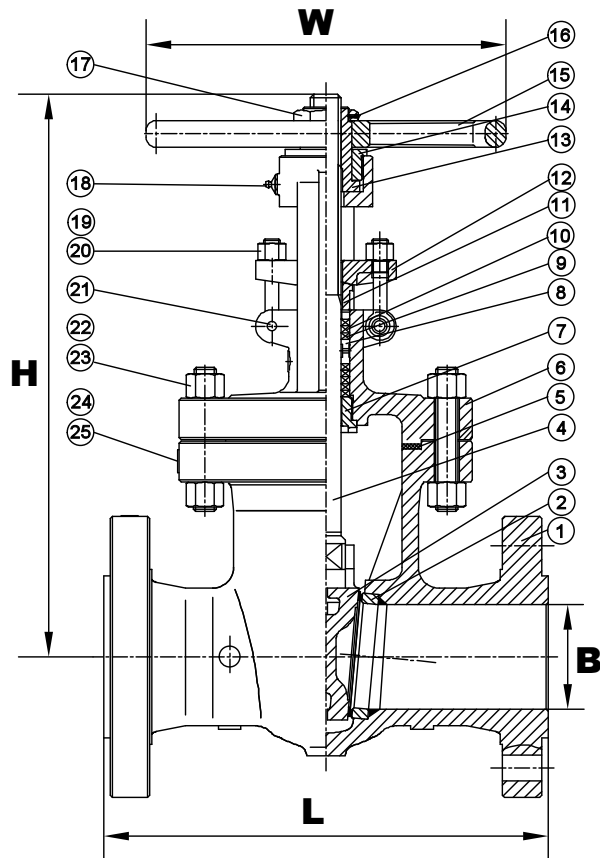


**FIG.# 4E-16WCB8F**

OS & Y, Rising Stem, Flexible Wedge, Bolted Bonnet  
Threaded or Welded Seat Ring, ASTM A216 WCB

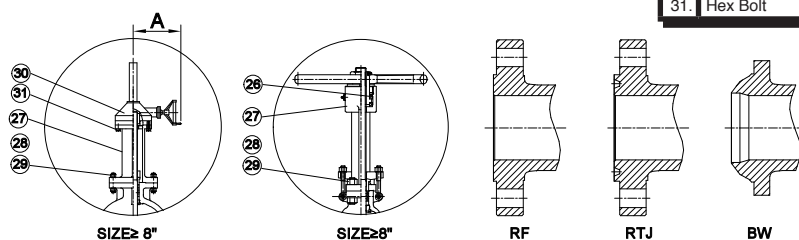
## STANDARDS COMPLIANCE:

|                         |                           |
|-------------------------|---------------------------|
| Basic Design            | API 600                   |
| Face to Face Dimensions | ANSI B 16.10              |
| End Flange Dimensions   | ASME B16.5<br>ASME B16.25 |
| Test Standard           | API 598                   |



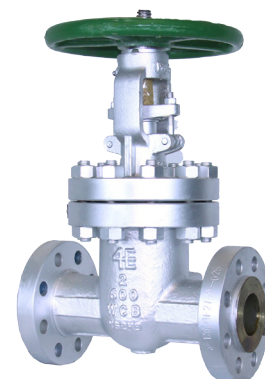
## MATERIAL LIST

| No. | Part Name         | ASTM Specification (Specs-Grades/Types) |                                                     |                                       |                   |
|-----|-------------------|-----------------------------------------|-----------------------------------------------------|---------------------------------------|-------------------|
|     |                   | A216 (STOCKING)<br>WCB                  | A352<br>LCC                                         | A217<br>WC6 C5                        | A351<br>CF8M      |
| 1.  | Body              | A216 WCB                                | A352 LCC                                            | A217 WC6                              | A217 C5 A351 CF8M |
| 2.  | Seat Ring         | A105                                    | A350 LF2, A182 F11, A182 F5, A182 F304 or A182 F316 |                                       |                   |
|     | " Surface         | HF (STL 6/CoCr-A)                       |                                                     | 13CR(ER410), 304, 316 or Monel        |                   |
| 3.  | Wedges            | A216 WCB                                | A352 LCC                                            | A217 WC6 A217 C5                      | A351 CF8M         |
|     | " Seating Surface | 13CR(ER410)                             |                                                     | HF (STL 6/CoCr-A), 304, 316 or Monel  |                   |
| 4.  | Stem              | A182 F6a                                |                                                     | A182 F304, A182 F316, 17-4PH or Monel |                   |
| 5.  | Gasket            | O8F+Flexible Graphite                   |                                                     | F304 or F316                          |                   |
| 6.  | Bonnet            | A216 WCB                                | A352 LCC                                            | A217 WC6 A217 C5                      | A351 CF8M         |
| 7.  | Back Seat         | A276 410                                |                                                     | A182 F304, A182 F316 or Monel         |                   |
| 8.  | Distance Ring     | A276 410                                |                                                     | A182 F304, A182 F316 or Monel         |                   |
| 9.  | Packing           |                                         |                                                     | F304+Graphite+C.I.                    |                   |
| 10. | Packing           |                                         |                                                     | Flexible Graphite+C.I.                |                   |
| 11. | Gland             | A276 410                                |                                                     | A182 F304, A182 F316 or Monel         |                   |
| 12. | Gland Flange      | A216 WCB                                | A352 LCC                                            | A217 WC6 A217 C5                      | A351 CF8M         |
| 13. | Stem Nut          |                                         |                                                     | A439-D2                               |                   |
| 14. | Gland Nut         | CARBON STEEL                            |                                                     | A276 Tye 316                          |                   |
| 15. | Handwheel         |                                         |                                                     | DUCTILE IRON                          |                   |
| 16. | Screw             | CARBON STEEL                            |                                                     | 316                                   |                   |
| 17. | Lock Nut          | CARBON STEEL                            |                                                     | A276 Type 316                         |                   |
| 18. | Grease Nipple     | CARBON STEEL                            |                                                     | A182 F316                             |                   |
| 19. | Eye Bolt          | A193 B7                                 | A320 L7                                             | A193 B16                              | A193 B8           |
| 20. | Eye Nut           | A194 2H                                 | A194 2H                                             | A194 4                                | A194 8            |
| 21. | Pin               | CARBON STEEL                            |                                                     | A276 Type 316                         |                   |
| 22. | Bolt              | A193 B7                                 | A320 L7                                             | A193 B16                              | A193 B8           |
| 23. | Nut               | A194 2H                                 | A194 2H                                             | A194 4                                | A194 8            |
| 24. | Rivet             |                                         |                                                     | AISI 304                              |                   |
| 25. | Name Plate        |                                         |                                                     | AISI 304                              |                   |
| 26. | Axietree          |                                         |                                                     | CARBON STEEL                          |                   |
| 27. | Yoke              | A216 WCB                                | A352 LCC                                            | A217 WC6 A217 C5                      | A351 CF8M         |
| 28. | Yoke Bolt         | A193 B7                                 | A320 L7                                             | A193 B16                              | A193 B8           |
| 29. | Yoke Nut          | A194 2H                                 | A194 4                                              | A194 4                                | A194 8            |
| 30. | Gear Box          |                                         |                                                     | CARBON STEEL                          |                   |
| 31. | Hex Bolt          | CARBON STEEL                            |                                                     | 316                                   |                   |



\*GEAR OPERATOR  
RECOMMENDED.

Weights are approximate and  
construction is subject to change  
without notice.



## DIMENSION & WEIGHT

| SIZE     | unit | 2"    | 2-1/2" | 3"    | 4"    | 5"    | 6"    | 8"    | 10"   | 12"   | 14"   | 16"   | 18"   | 20"   | 24"   |
|----------|------|-------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| L(RF-BW) | inch | 11.5  | 13     | 14    | 17    | 20    | 22    | 26    | 31    | 33    | 35    | 39    | 43    | 47    | 55    |
|          | mm   | 292   | 330    | 356   | 432   | 508   | 559   | 660   | 787.4 | 838   | 889   | 991   | 1092  | 1194  | 1397  |
| L(RTJ)   | inch | 11.62 | 13.11  | 14.12 | 17.12 | 20.12 | 22.12 | 16.14 | 31.14 | 33.11 | 35.12 | 39.13 | 43.11 | 47.25 | 55.35 |
|          | mm   | 295   | 333    | 359   | 435   | 511   | 562   | 664   | 791   | 841   | 892   | 994   | 1095  | 1200  | 1406  |
| A        | inch | -     | -      | -     | 12.2  | -     | 13.58 | 13.58 | 16.54 | 16.54 | 19.88 | 19.88 | 19.88 | 19.88 | 24.02 |
|          | mm   | -     | -      | -     | 310   | -     | 345   | 345   | 420   | 420   | 505   | 505   | 505   | 505   | 610   |
| B        | inch | 2     | 2.52   | 3     | 4     | 5     | 6     | 7.87  | 9.76  | 11.73 | 12.87 | 14.76 | 16.50 | 18.27 | 22.01 |
|          | mm   | 51    | 64     | 76    | 102   | 127   | 152   | 200   | 248   | 298   | 327   | 375   | 419   | 464   | 559   |
| H        | inch | 14.69 | 16.73  | 17.91 | 21.46 | 23.82 | 26.61 | 34.84 | 39.76 | 45.35 | 50.55 | 54.72 | 58.66 | 64.96 | 77.6  |
|          | mm   | 373   | 425    | 455   | 545   | 605   | 676   | 885   | 1010  | 1152  | 1284  | 1390  | 1490  | 1650  | 1971  |
| W        | inch | 9.84  | 9.84   | 11.81 | 13.78 | 15.75 | 17.72 | 19.69 | 25.2  | 25.2  | 27.95 | 27.95 | 27.95 | 27.95 | 31.5  |
|          | mm   | 250   | 250    | 300   | 350   | 400   | 450   | 500   | 640   | 640   | 710*  | 710*  | 710*  | 710*  | 800*  |
| WT.      | KG   | 33    | 58     | 63    | 108   | 180   | 216   | 460   | 672   | 848   | 1080  | 1303  | 1963  | 2844  | 3935  |
|          | LB   | 73    | 129    | 139   | 238   | 397   | 476   | 1014  | 1482  | 1870  | 2380  | 2872  | 4328  | 6270  | 8675  |



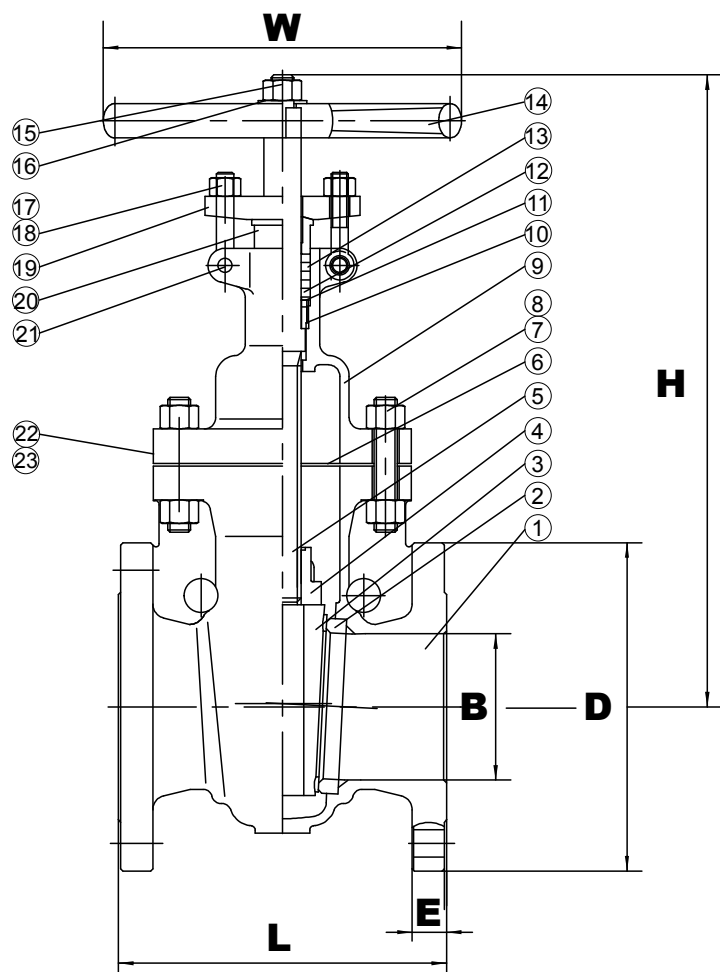
# Class 150 Cast Steel NRS Gate Valve 2"-4"

FIG.# 4E-61WCB8F

Non-Rising Stem, Flexible Wedge, Bolted Bonnet  
Threaded or Welded Seat Ring, ASTM A216 WCB

## STANDARDS COMPLIANCE:

|                         |              |
|-------------------------|--------------|
| Basic Design            | API 600      |
| Face to Face Dimensions | ANSI B 16.10 |
| End Flange Dimensions   | B16.5        |
| Test Standard           | API 598      |



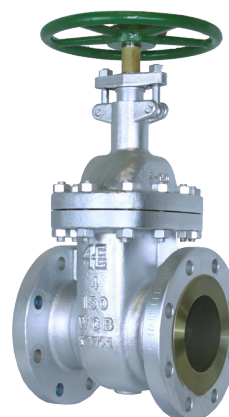
## MATERIAL LIST 2"-4"

| No. | Part Name    | Material               |
|-----|--------------|------------------------|
| 1.  | Body         | A216 WCB               |
| 2.  | Seat         | A105+STL6              |
| 3.  | Wedge        | A216 WCB+ER410         |
| 4.  | Stem Nut     | D-2                    |
| 5.  | Stem         | A182 F6a               |
| 6.  | Gasket       | F304+Flexible Graphite |
| 7.  | Bolt         | A193-B7                |
| 8.  | Nut          | A194-2H                |
| 9.  | Bonnet       | A216 WCB               |
| 10. | Nut          | A276 410               |
| 11. | Gasket       | A276 410               |
| 12. | Packing      | F304+Graphite+C.I.     |
| 13. | Packing      | Flexible Graphite+C.I. |
| 14. | Handwheel    | Ductile Iron           |
| 15. | Nut          | Carbon Steel           |
| 16. | Gasket       | Carbon Steel           |
| 17. | Eye Bolt     | A193-B7                |
| 18. | Eye Nut      | A194-2H                |
| 19. | Gland Flange | A216 WCB               |
| 20. | Gland        | A276 410               |
| 21. | Pin          | Carbon Steel           |
| 22. | Name Plate   | AISI 304               |
| 23. | Rivet        | AISI 304               |

Weights are approximate and construction is subject to change without notice.

## DIMENSION & WEIGHT

| SIZE | unit | 2"    | 3"    | 4"     |
|------|------|-------|-------|--------|
| L    | inch | 7     | 8     | 9      |
|      | mm   | 178   | 203   | 229    |
| B    | inch | 2     | 3     | 4      |
|      | mm   | 51    | 76    | 102    |
| D    | inch | 5.98  | 7.48  | 9.02   |
|      | mm   | 152   | 190   | 229    |
| E    | inch | 0.75  | 0.94  | 0.94   |
|      | mm   | 19    | 24    | 24     |
| H    | inch | 12.36 | 15.08 | 17.05  |
|      | mm   | 314   | 383   | 433    |
| W    | inch | 7.87  | 9.84  | 9.84   |
|      | mm   | 200   | 250   | 250    |
| WT.  | KG   | 16    | 31    | 47     |
|      | LB   | 35.27 | 68.34 | 103.62 |



# Class 150 Cast Steel NRS Gate Valve 6"-12"

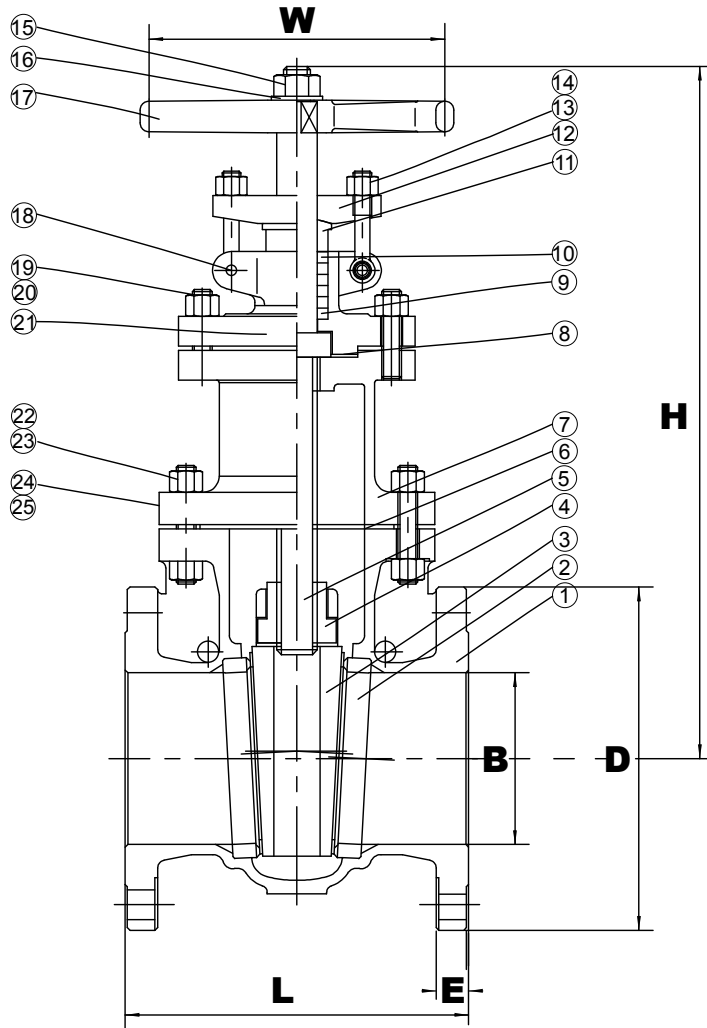


**FIG.# 4E-61WCB8F**

*Non-Rising Stem, Flexible Wedge, Bolted Bonnet  
Threaded or Welded Seat Ring, ASTM A216 WCB*

## STANDARDS COMPLIANCE:

|                         |              |
|-------------------------|--------------|
| Basic Design            | API 600      |
| Face to Face Dimensions | ANSI B 16.10 |
| End Flange Dimensions   | B16.5        |
| Test Standard           | API 598      |



## MATERIAL LIST 2"-4"

| No. | Part Name     | Material               |
|-----|---------------|------------------------|
| 1.  | Body          | A216 WCB               |
| 2.  | Seat          | A105+STL6              |
| 3.  | Wedge         | A216 WCB+ER410         |
| 4.  | Stem Nut      | D-2                    |
| 5.  | Stem          | A182 F6a               |
| 6.  | Gasket        | F304+Flexible Graphite |
| 7.  | Bonnet        | A216 WCB               |
| 8.  | Gasket        | F304+Flexible Graphite |
| 9.  | Gland Packing | F304+Graphite+C.I.     |
| 10. | Gland Packing | Flexible Graphite+C.I. |
| 11. | Gland         | A276 410               |
| 12. | Gland Flange  | A216 WCB               |
| 13. | Eye Bolt      | A193-B7                |
| 14. | Eye Nut       | A194-2H                |
| 15. | Nut           | Carbon Steel           |
| 16. | Gasket        | Carbon Steel           |
| 17. | Handwheel     | Ductile Iron           |
| 18. | Pin           | Carbon Steel           |
| 19. | Bolt          | A193-B7                |
| 20. | Nut           | A194-2H                |
| 21. | Stuff Box     | A216 WCB               |
| 22. | Bolt          | A193-B7                |
| 23. | Nut           | A194-2H                |
| 24. | Name Plate    | AISI 304               |
| 25. | Rivet         | AISI 304               |

Weights are approximate and construction is subject to change without notice.

## DIMENSION & WEIGHT

| SIZE | unit | 6"     | 8"     | 10"    | 12"    |
|------|------|--------|--------|--------|--------|
| L    | inch | 10.51  | 11.50  | 12.99  | 14.02  |
|      | mm   | 267    | 292    | 330    | 356    |
| B    | inch | 5.98   | 7.99   | 10     | 12     |
|      | mm   | 152    | 203    | 254    | 305    |
| D    | inch | 10.98  | 13.50  | 15.98  | 19.02  |
|      | mm   | 279    | 343    | 406    | 483    |
| E    | inch | 1.02   | 1.14   | 1.20   | 1.26   |
|      | mm   | 26     | 29     | 30.5   | 32     |
| H    | inch | 21.81  | 27.17  | 30.37  | 35.24  |
|      | mm   | 554    | 690    | 771.5  | 895    |
| W    | inch | 11.81  | 13.78  | 15.74  | 17.71  |
|      | mm   | 300    | 350    | 400    | 450    |
| WT.  | KG   | 73     | 116    | 170    | 250    |
|      | LB   | 160.94 | 255.74 | 374.78 | 551.16 |

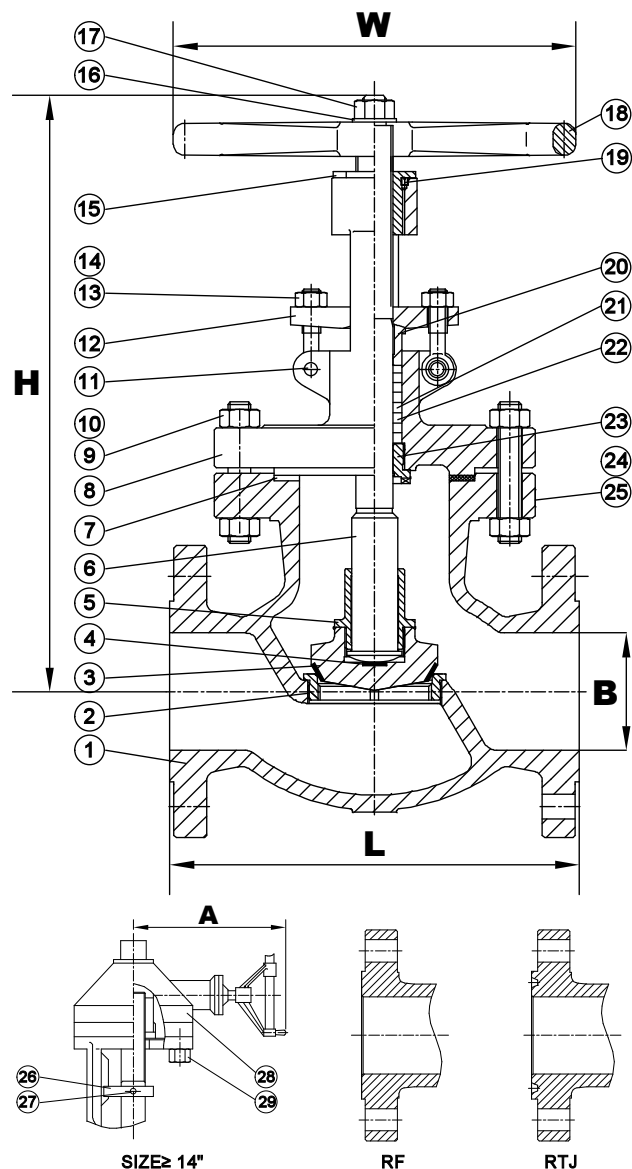


**FIG.# 4E-21WCB8F**

OS & Y, Rising Stem, Plug Disc, Bolted Bonnet  
Threaded Seat Ring, ASTM A216 WCB

## STANDARDS COMPLIANCE:

|                         |                           |
|-------------------------|---------------------------|
| Basic Design            | BS 1873 & ASME B16.34     |
| Face to Face Dimensions | ANSI B 16.10              |
| End Flange Dimensions   | ASME B16.5<br>ASME B16.25 |
| Test Standard           | API 598                   |



## MATERIAL LIST

| No. | Part Name         | ASTM Specification (Specs-Grades/Types) |                                                     |                |              |                                       |
|-----|-------------------|-----------------------------------------|-----------------------------------------------------|----------------|--------------|---------------------------------------|
|     |                   | A216 (STOCKING)<br>WCB                  | A352<br>LCC                                         | A217<br>WC6 C5 | A351<br>CF8M |                                       |
| 1.  | Body              | A216 WCB                                | A352 LCC                                            | A217 WC6       | A217 C5      | A351 CF8M                             |
| 2.  | Seat Ring         | A105                                    | A350 LF2, A182 F11, A182 F5, A182 F304 or A182 F316 |                |              |                                       |
|     | " Surface         | HF (STL.6/CoCr-A)                       |                                                     |                |              | 13CR(ER410), 304, 316 or Monel        |
| 3.  | Disc              | A105                                    | A350 LF2, A182 F11, A182 F5, A182 F304 or A182 F316 |                |              |                                       |
|     | " Seating Surface | 13CR(ER410)                             |                                                     |                |              | HF (STL.6/CoCr-A), 304, 316 or Monel  |
| 4.  | Thrust Plate      | 13CR                                    |                                                     |                |              | 304 or 316                            |
| 5.  | Disc Cover        | A276 410                                |                                                     |                |              | A182 F304, A182 F316 or Monel         |
| 6.  | Stem              | A182 F6a                                |                                                     |                |              | A182 F304, A182 F316, 17-4PH or Monel |
| 7.  | Gasket            | 08F+Flexible Graphite                   |                                                     |                |              | F304 or F316 + Flexible Graphite      |
| 8.  | Bonnet            | A216 WCB                                | A352 LCC                                            | A217 WC6       | A217 C5      | A351 CF8M                             |
| 9.  | Bolt              | A193 B7                                 | A320 L7                                             | A193 B16       | A193 B16     | A193 B8                               |
| 10. | Nut               | A194 2H                                 | A194 2H                                             | A194 4         | A194 4       | A194 8                                |
| 11. | Pin               | CARBON STEEL                            |                                                     |                |              | A276 Type 316                         |
| 12. | Gland Flange      | A216 WCB                                | A352 LCC                                            | A217 WC6       | A217 C5      | A351 CF8M                             |
| 13. | Eye Bolt          | A193 B7                                 | A320 L7                                             | A193 B16       | A193 B16     | A193 B8                               |
| 14. | Eye Nut           | A194 2H                                 | A194 2H                                             | A194 4         | A194 4       | A194 8                                |
| 15. | Stem Nut          |                                         |                                                     |                |              | A439-D2                               |
| 16. | Gasket            | CARBON STEEL                            |                                                     |                |              | A276 Type 316                         |
| 17. | Handwheel Nut     | CARBON STEEL                            |                                                     |                |              | 316                                   |
| 18. | Handwheel         |                                         |                                                     |                |              | DUCTILE IRON                          |
| 19. | Screw             | CARBON STEEL                            |                                                     |                |              | 316                                   |
| 20. | Gland             | A276 410                                |                                                     |                |              | A182 F304, A182 F316 or Monel         |
| 21. | Packing           |                                         |                                                     |                |              | F304+Graphite+C.I.                    |
| 22. | Packing           |                                         |                                                     |                |              | Flexible Graphite+C.I.                |
| 23. | Back Seat         | A276 410                                |                                                     |                |              | A182 F304, A182 F316 or Monel         |
| 24. | Rivet             |                                         |                                                     |                |              | AISI 304                              |
| 25. | Name Plate        |                                         |                                                     |                |              | AISI 304                              |
| 26. | Guide             | CARBON STEEL                            |                                                     |                |              | A276 Type 316                         |
| 27. | Pin               | CARBON STEEL                            |                                                     |                |              | A276 Type 316                         |
| 28. | Gear Box          |                                         |                                                     |                |              | CARBON STEEL                          |
| 29. | Hex Bolt          | CARBON STEEL                            |                                                     |                |              | 316                                   |

\*GEAR OPERATOR  
RECOMMENDED.

Weights are approximate  
and construction is subject  
to change without notice.



## DIMENSION & WEIGHT

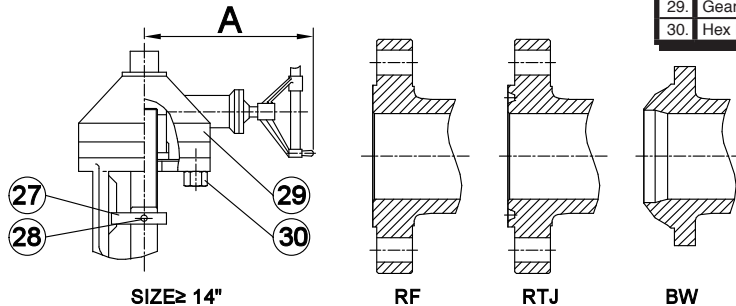
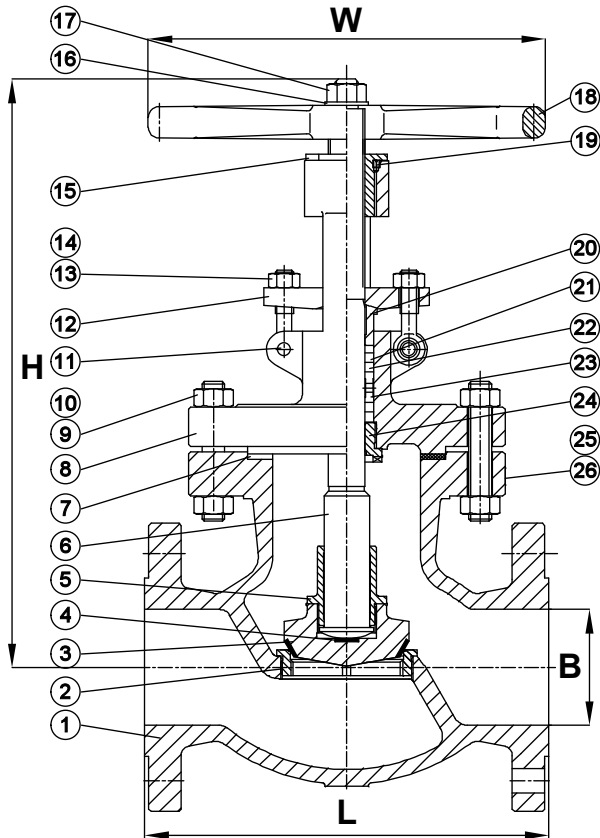
| SIZE     | unit | 2"    | 2-1/2" | 3"    | 4"    | 5"    | 6"    | 8"    | 10"   | 12"   | 14"   | 16"   | 18"   | 20"   | 24"   |
|----------|------|-------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| L(RF-BW) | inch | 8     | 8.5    | 9.5   | 11.5  | 14    | 16    | 19.5  | 24.5  | 27.5  | 31    | 36    | 38.5  | 38.5  | 51    |
|          | mm   | 203   | 216    | 241   | 292   | 356   | 406   | 495   | 622   | 699   | 787   | 914   | 978   | 978   | 1295  |
| L(RTJ)   | inch | 8.5   | 9      | 10    | 12    | 14.5  | 16.5  | 20    | 25    | 28    | 31.5  | 36.5  | 39.02 | 39.02 | 51.5  |
|          | mm   | 216   | 229    | 254   | 305   | 368   | 419   | 508   | 635   | 711   | 800   | 927   | 991   | 991   | 1308  |
| A        | inch | -     | -      | -     | 12.2  | -     | 12.2  | 13.58 | 16.54 | 16.54 | 19.88 | 19.88 | 19.88 | 19.88 | 24.02 |
|          | mm   | -     | -      | -     | 310   | -     | 310   | 345   | 420   | 420   | 505   | 505   | 505   | 505   | 610   |
| B        | inch | 2     | 2.52   | 3     | 4     | 5     | 6     | 8     | 10    | 12    | 13.25 | 15.25 | 17.25 | 19.25 | 23.25 |
|          | mm   | 51    | 64     | 76    | 102   | 127   | 152   | 203   | 254   | 305   | 337   | 387   | 438   | 489   | 591   |
| H        | inch | 12.83 | 13.78  | 13.94 | 17.02 | 17.99 | 18.86 | 21.65 | 25.43 | 32.84 | 35.63 | 39.37 | 45.67 | 43.31 | 51.97 |
|          | mm   | 326   | 350    | 354   | 450   | 457   | 479   | 550   | 646   | 834   | 905   | 1000  | 1160  | 1100  | 1320  |
| W        | inch | 7.87  | 9.84   | 9.84  | 11.81 | 11.81 | 13.78 | 15.75 | 17.72 | 22.05 | 27.95 | 27.95 | 27.95 | 27.95 | 31.50 |
|          | mm   | 200   | 250    | 250   | 300   | 300   | 350   | 400   | 450   | 560   | 710*  | 710*  | 710*  | 710*  | 800*  |
| WT.      | KG   | 22    | 31     | 40    | 59    | 75    | 96    | 161   | 278   | 506   | 519   | 810   | 1040  | 1172  | 2032  |
|          | LB   | 49    | 68     | 88    | 130   | 165   | 212   | 355   | 613   | 1116  | 1144  | 1786  | 2293  | 2584  | 4480  |

# Class 300 Cast Steel Globe Valve



**FIG.# 4E-23WCB8F**

OS & Y, Rising Stem, Plug Disc, Bolted Bonnet  
Threaded Seat Ring, ASTM A216 WCB

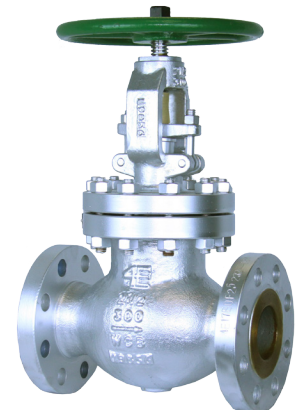


## STANDARDS COMPLIANCE:

|                         |                           |
|-------------------------|---------------------------|
| Basic Design            | BS 1873 & ASME B16.34     |
| Face to Face Dimensions | ANSI B 16.10              |
| End Flange Dimensions   | ASME B16.5<br>ASME B16.25 |
| Test Standard           | API 598                   |

## MATERIAL LIST

| No. | Part Name         | ASTM Specification (Specs-Grades/Types) |                                                     |          |          |           |
|-----|-------------------|-----------------------------------------|-----------------------------------------------------|----------|----------|-----------|
|     |                   | A216 (STOCKING)                         | A352                                                | A217     |          | A351      |
|     |                   | WCB                                     | LCC                                                 | WC6      | C5       | CF8M      |
| 1.  | Body              | A216 WCB                                | A352 LCC                                            | A217 WC6 | A217 C5  | A351 CF8M |
| 2.  | Seat Ring         | A105                                    | A350 LF2, A182 F11, A182 F5, A182 F304 or A182 F316 |          |          |           |
|     | " Surface         | HF (STL.6/CoCr-A)                       | 13CR(ER410), 304, 316 or Monel                      |          |          |           |
| 3.  | Disc              | A105                                    | A350 LF2, A182 F11, A182 F5, A182 F304 or A182 F316 |          |          |           |
|     | " Seating Surface | 13CR(ER410)                             | HF (STL.6/CoCr-A), 304, 316 or Monel                |          |          |           |
| 4.  | Thrust Plate      | 13CR                                    | 304 or 316                                          |          |          |           |
| 5.  | Disc Cover        | A276 410                                | A182 F304, A182 F316 or Monel                       |          |          |           |
| 6.  | Stem              | A182 F6a                                | A182 F304, A182 F316, 17-4PH or Monel               |          |          |           |
| 7.  | Gasket            | 08F+Flexible Graphite                   | F304 or F316 + Flexible Graphite                    |          |          |           |
| 8.  | Bonnet            | A216 WCB                                | A352 LCC                                            | A217 WC6 | A217 C5  | A351 CF8M |
| 9.  | Bolt              | A193 B7                                 | A320 L7                                             | A193 B16 | A193 B16 | A193 B8   |
| 10. | Nut               | A194 2H                                 | A194 2H                                             | A194 4   | A194 4   | A194 8    |
| 11. | Pin               | CARBON STEEL                            | A276 Type 316                                       |          |          |           |
| 12. | Gland Flange      | A216 WCB                                | A352 LCC                                            | A217 WC6 | A217 C5  | A351 CF8M |
| 13. | Eye Bolt          | A193 B7                                 | A320 L7                                             | A193 B16 | A193 B16 | A193 B8   |
| 14. | Eye Nut           | A194 2H                                 | A194 2H                                             | A194 4   | A194 4   | A194 8    |
| 15. | Stem Nut          | A439-D2                                 |                                                     |          |          |           |
| 16. | Gasket            | CARBON STEEL                            | A276 Type 316                                       |          |          |           |
| 17. | Handwheel Nut     | CARBON STEEL                            | 316                                                 |          |          |           |
| 18. | Handwheel         | DUCTILE IRON                            |                                                     |          |          |           |
| 19. | Screw             | CARBON STEEL                            | 316                                                 |          |          |           |
| 20. | Gland             | A276 410                                | A182 F304, A182 F316 or Monel                       |          |          |           |
| 21. | Packing           | F304+Graphite+C.I.                      |                                                     |          |          |           |
| 22. | Packing           | Flexible Graphite+C.I.                  |                                                     |          |          |           |
| 23. | Distance Ring     | A276 410                                | A182 F304, A182 F316 or Monel                       |          |          |           |
| 24. | Back Seat         | A276 410                                | A182 F304, A182 F316 or Monel                       |          |          |           |
| 25. | Rivet             | AISI 304                                |                                                     |          |          |           |
| 26. | Name Plate        | AISI 304                                |                                                     |          |          |           |
| 27. | Guide             | CARBON STEEL                            | A276 Type 316                                       |          |          |           |
| 28. | Pin               | CARBON STEEL                            | A276 Type 316                                       |          |          |           |
| 29. | Gear Box          | CARBON STEEL                            |                                                     |          |          |           |
| 30. | Hex Bolt          | CARBON STEEL                            | 316                                                 |          |          |           |



\*GEAR OPERATOR RECOMMENDED.

Weights are approximate and construction is subject to change without notice.

## DIMENSION & WEIGHT

| SIZE     | unit | 2"    | 2-1/2" | 3"    | 4"    | 5"    | 6"    | 8"    | 10"   | 12"   | 14"   | 16"   | 18"   |
|----------|------|-------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| L(RF-BW) | inch | 10.50 | 11.50  | 12.50 | 14.00 | 15.75 | 17.50 | 22.00 | 24.50 | 28.00 | 33.00 | 34.00 | 38.50 |
|          | mm   | 267   | 292    | 318   | 356   | 400   | 444   | 559   | 622   | 711   | 838   | 864   | 977   |
| L(RTJ)   | inch | 11.14 | 12.13  | 13.11 | 14.61 | 16.38 | 18.11 | 22.64 | 25.12 | 28.62 | 33.62 | 34.65 | 39.09 |
|          | mm   | 283   | 308    | 333   | 371   | 416   | 460   | 575   | 638   | 727   | 854   | 880   | 993   |
| A        | inch | -     | -      | -     | -     | -     | 13.58 | 16.54 | 16.54 | 19.88 | 19.88 | 19.88 | 19.88 |
|          | mm   | -     | -      | -     | -     | -     | 345   | 420   | 420   | 505   | 505   | 505   | 505   |
| B        | inch | 2.00  | 2.52   | 3.00  | 4.00  | 5.00  | 6.00  | 8.00  | 10.00 | 12.00 | 13.25 | 15.25 | 17.01 |
|          | mm   | 51    | 64     | 76    | 102   | 127   | 152   | 203   | 254   | 305   | 337   | 387   | 432   |
| H        | inch | 12.80 | 15.35  | 16.14 | 19.92 | 20.55 | 22.24 | 31.89 | 32.17 | 34.29 | 36.22 | 41.54 | 45.67 |
|          | mm   | 325   | 390    | 410   | 506   | 522   | 565   | 810   | 817   | 871   | 920   | 1055  | 1160  |
| W        | inch | 7.87  | 9.84   | 9.84  | 11.81 | 13.78 | 15.75 | 19.69 | 22.05 | 22.05 | 27.95 | 27.95 | 27.95 |
|          | mm   | 200   | 250    | 250   | 300   | 350   | 400   | 500   | 560   | 560   | 710*  | 710*  | 710*  |
| WT.      | KG   | 29    | 41     | 55    | 79    | 130   | 148   | 292   | 412   | 568   | 723   | 1072  | 1343  |
|          | LB   | 64    | 90     | 121   | 174   | 287   | 326   | 644   | 908   | 1252  | 1594  | 2363  | 2961  |

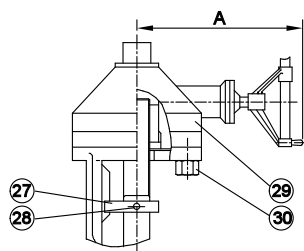
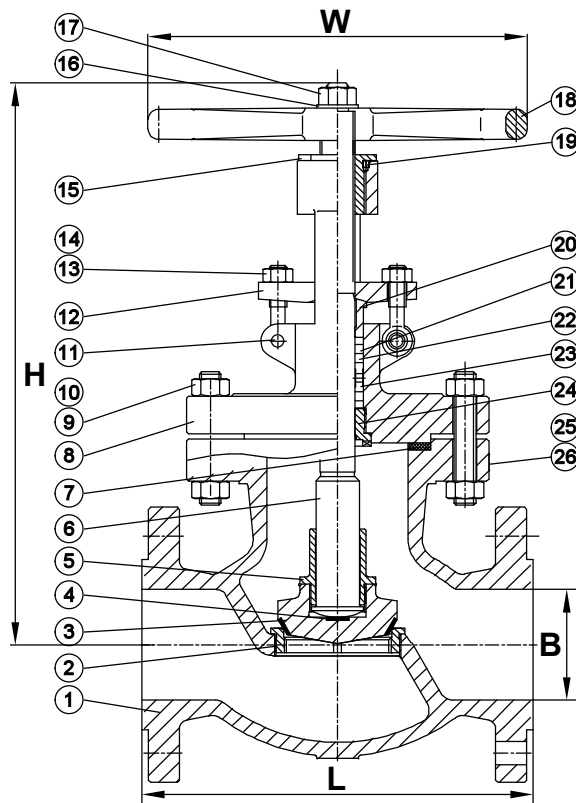
**FIG.# 4E-26WCB8F**

OS & Y, Rising Stem, Plug Disc, Bolted Bonnet  
Threaded Seat Ring, ASTM A216 WCB

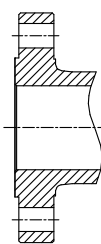
## STANDARDS COMPLIANCE:

|                         |                           |
|-------------------------|---------------------------|
| Basic Design            | BS 1873 & ASME B16.34     |
| Face to Face Dimensions | ANSI B 16.10              |
| End Flange Dimensions   | ASME B16.5<br>ASME B16.25 |
| Test Standard           | API 598                   |

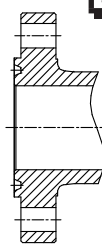
| MATERIAL LIST |                   |                                         |                                                     |                                       |           |
|---------------|-------------------|-----------------------------------------|-----------------------------------------------------|---------------------------------------|-----------|
| No.           | Part Name         | ASTM Specification (Specs-Grades/Types) |                                                     |                                       |           |
|               |                   | A216 (STOCKING)                         | A352                                                | A217                                  | A351      |
|               |                   | WCB                                     | LCC                                                 | WC6                                   | C5        |
| 1.            | Body              | A216 WCB                                | A352 LCC                                            | A217 WC6                              | A217 C5   |
| 2.            | Seat Ring         | A105                                    | A350 LF2, A182 F11, A182 F5, A182 F304 or A182 F316 |                                       | A351 CF8M |
|               | " Surface         | HF (STL.6/CoCr-A)                       |                                                     | 13CR(ER410), 304, 316 or Monel        |           |
| 3.            | Disc              | A105                                    | A350 LF2, A182 F11, A182 F5, A182 F304 or A182 F316 |                                       |           |
|               | " Seating Surface | 13CR(ER410)                             |                                                     | HF (STL.6/CoCr-A), 304, 316 or Monel  |           |
| 4.            | Thrust Plate      | 13CR                                    |                                                     | 304 or 316                            |           |
| 5.            | Disc Cover        | A276 410                                |                                                     | A182 F304, A182 F316 or Monel         |           |
| 6.            | Stem              | A182 F6a                                |                                                     | A182 F304, A182 F316, 17-4PH or Monel |           |
| 7.            | Gasket            | 08F+Flexible Graphite                   |                                                     | F304 or F316 + Flexible Graphite      |           |
| 8.            | Bonnet            | A216 WCB                                | A352 LCC                                            | A217 WC6                              | A217 C5   |
| 9.            | Bolt              | A193 B7                                 | A320 L7                                             | A193 B16                              | A193 B16  |
| 10.           | Nut               | A194 2H                                 | A194 2H                                             | A194 4                                | A194 4    |
| 11.           | Pin               | CARBON STEEL                            |                                                     | A276 Type 316                         |           |
| 12.           | Gland Flange      | A216 WCB                                | A352 LCC                                            | A217 WC6                              | A217 C5   |
| 13.           | Eye Bolt          | A193 B7                                 | A320 L7                                             | A193 B16                              | A193 B16  |
| 14.           | Eye Nut           | A194 2H                                 | A194 2H                                             | A194 4                                | A194 4    |
| 15.           | Stem Nut          |                                         |                                                     | A439-D2                               |           |
| 16.           | Gasket            | CARBON STEEL                            |                                                     | A276 Type 316                         |           |
| 17.           | Handwheel Nut     | CARBON STEEL                            |                                                     | 316                                   |           |
| 18.           | Handwheel         |                                         |                                                     | DUCTILE IRON                          |           |
| 19.           | Screw             | CARBON STEEL                            |                                                     | 316                                   |           |
| 20.           | Gland             | A276 410                                |                                                     | A182 F304, A182 F316 or Monel         |           |
| 21.           | Packing           |                                         |                                                     | F304+Graphite+C.I.                    |           |
| 22.           | Packing           |                                         |                                                     | Flexible Graphite+C.I.                |           |
| 23.           | Distance Ring     | A276 410                                |                                                     | A182 F304, A182 F316 or Monel         |           |
| 24.           | Back Seat         | A276 410                                |                                                     | A182 F304, A182 F316 or Monel         |           |
| 25.           | Rivet             |                                         |                                                     | AISI 304                              |           |
| 26.           | Name Plate        |                                         |                                                     | AISI 304                              |           |
| 27.           | Guide             | CARBON STEEL                            |                                                     | A276 Type 316                         |           |
| 28.           | Pin               | CARBON STEEL                            |                                                     | A276 Type 316                         |           |
| 29.           | Gear Box          |                                         |                                                     | CARBON STEEL                          |           |
| 30.           | Hex Bolt          | CARBON STEEL                            |                                                     | 316                                   |           |



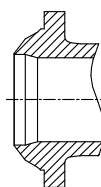
SIZE ≥ 8"



RF



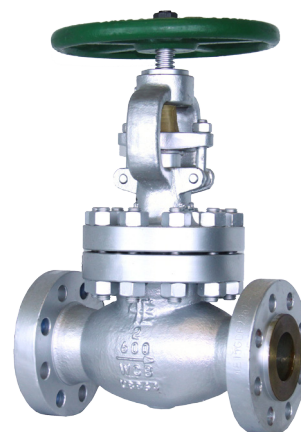
RTJ



BW

## DIMENSION & WEIGHT

| SIZE     | unit | 2"    | 2-1/2" | 3"    | 4"    | 6"    | 8"    | 10"   | 12"   | 14"   | 16"   |
|----------|------|-------|--------|-------|-------|-------|-------|-------|-------|-------|-------|
| L(RF-BW) | inch | 11.50 | 13.00  | 14.00 | 17.00 | 22.00 | 26.00 | 31.00 | 33.00 | 35.00 | 39.00 |
|          | mm   | 292   | 330    | 356   | 432   | 559   | 660   | 787.4 | 838   | 889   | 991   |
| L(RTJ)   | inch | 11.62 | 13.11  | 14.13 | 17.13 | 22.13 | 26.14 | 31.12 | 33.11 | 35.11 | 39.13 |
|          | mm   | 295   | 333    | 359   | 435   | 562   | 664   | 790.4 | 841   | 892   | 994   |
| A        | inch | -     | -      | -     | 13.56 | 16.54 | 19.88 | 19.88 | 19.88 | 24.02 | 24.02 |
|          | mm   | -     | -      | -     | 345   | 420   | 505   | 505   | 505   | 610   | 610   |
| B        | inch | 2.00  | 2.52   | 3.00  | 4.00  | 6.00  | 7.88  | 9.76  | 11.73 | 12.88 | 14.76 |
|          | mm   | 51    | 64     | 76    | 102   | 152   | 200   | 248   | 298   | 327   | 375   |
| H        | inch | 14.76 | 19.02  | 18.39 | 21.54 | 29.69 | 32.87 | 34.13 | 39.45 | 44.96 | 47.64 |
|          | mm   | 375   | 483    | 467   | 547   | 754   | 835   | 867   | 1002  | 1142  | 1210  |
| W        | inch | 9.84  | 11.81  | 13.78 | 15.75 | 19.69 | 27.95 | 27.95 | 27.95 | 31.50 | 31.50 |
|          | mm   | 250   | 300    | 350   | 400   | 500   | 710*  | 710*  | 710*  | 800*  | 800*  |
| WT.      | KG   | 35    | 58     | 65    | 117   | 275   | 424   | 700   | 900   | 1395  | 1750  |
|          | LB   | 77    | 128    | 143   | 258   | 606   | 935   | 1543  | 1984  | 3075  | 3858  |



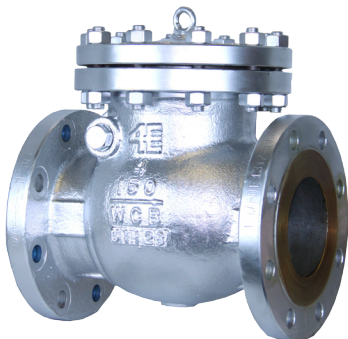
\*GEAR OPERATOR RECOMMENDED.  
Weights are approximate and construction is subject to change without notice.

# Class 150 Cast Steel Swing Check Valve



**FIG.# 4E-31WCB8F**

*Bolted Cover, Swing Type Disc, Threaded or Welded Seat Ring, ASTM A216 WCB*

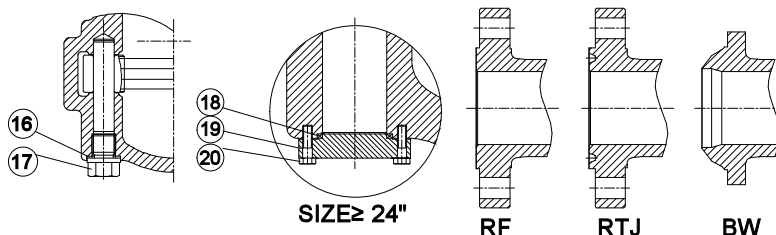
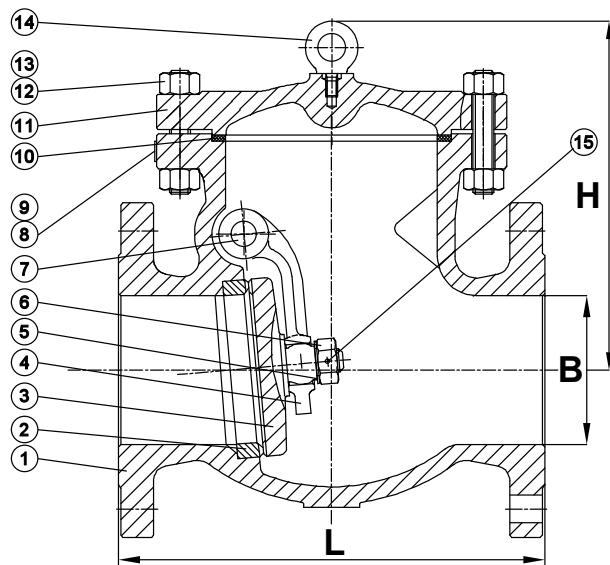


## STANDARDS COMPLIANCE:

|                         |                                                                |
|-------------------------|----------------------------------------------------------------|
| Basic Design            | BS 1868 & ASME B16.34                                          |
| Face to Face Dimensions | ANSI B 16.10                                                   |
| End Flange Dimensions   | 2" to 24" ASME B16.5<br>≥26" to ASME B16.47-A&B<br>ASME B16.25 |
| Test Standard           | API 598                                                        |

## MATERIAL LIST

|     |                   | ASTM Specification (Specs-Grades/Types) |                                                     |          |          |           |
|-----|-------------------|-----------------------------------------|-----------------------------------------------------|----------|----------|-----------|
| No. | Part Name         | A216 (STOCKING)                         | A352                                                | A217     |          | A351      |
|     |                   | WCB                                     | LCC                                                 | WC6      | C5       | CF8M      |
| 1.  | Body              | A216 WCB                                | A352 LCC                                            | A217 WC6 | A217 C5  | A351 CF8M |
| 2.  | Seat Ring         | A105                                    | A350 LF2, A182 F11, A182 F5, A182 F304 or A182 F316 |          |          |           |
|     | " Surface         | HF (STL.6/CoCr-A)                       | 13CR(ER410), 304, 316 or Monel                      |          |          |           |
| 3.  | Disc              | A105                                    | A350 LF2, A182 F11, A182 F5, A182 F304 or A182 F316 |          |          |           |
|     | " Seating Surface | 13CR(ER410)                             | HF (STL.6/CoCr-A), 304, 316 or Monel                |          |          |           |
| 4.  | Hinge             | A216 WCB                                | A352 LCC                                            | A217 WC6 | A217 C5  | A351 CF8M |
| 5.  | Washer            | A276 410                                | A182 F304 or A182 F316                              |          |          |           |
| 6.  | Nut               | A276 410                                | A182 F304 or A182 F316                              |          |          |           |
| 7.  | Pin               | A276 410                                | A182 F304 or A182 F316                              |          |          |           |
| 8.  | Rivet             | ANSI 304                                |                                                     |          |          |           |
| 9.  | Name Plate        | ANSI 304                                |                                                     |          |          |           |
| 10. | Gasket            | 08F+Flexible Graphite                   | F304 or F316 + Flexible Graphite                    |          |          |           |
| 11. | Bonnet            | A216 WCB                                | A352 LCC                                            | A217 WC6 | A217 C5  | A351 CF8M |
| 12. | Bolt              | A193 B7                                 | A320 L7                                             | A193 B16 | A193 B16 | A193 B8   |
| 13. | Nut               | A194 2H                                 | A194 2H                                             | A194 4   | A194 4   | A194 8    |
| 14. | Eye Bolt          | CARBON STEEL                            |                                                     |          |          |           |
| 15. | Pin               | ANSI 304                                |                                                     |          |          |           |
| 16. | Gasket            | SOFT IRON                               | F316                                                |          |          |           |
| 17. | Plug              | A276 410                                | A182 F316                                           |          |          |           |
| 18. | Gasket            | SOFT IRON                               | F316                                                |          |          |           |
| 19. | Gland             | A276 410                                | A182 F304, A182 F316 or Monel                       |          |          |           |
| 20. | Hex Bolt          | CARBON STEEL                            | 316                                                 |          |          |           |



Weights are approximate and construction is subject to change without notice.

## DIMENSION & WEIGHT

| SIZE     | unit | 2"   | 2-1/2" | 3"    | 4"    | 5"    | 6"    | 8"    | 10"   | 12"   | 14"   | 16"   | 18"   | 20"   | 24"   | 28"   | 30"   |
|----------|------|------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| L(RF/BW) | inch | 8.00 | 8.50   | 9.50  | 11.50 | 13.00 | 14.00 | 19.50 | 24.50 | 27.50 | 31.00 | 34.00 | 38.50 | 38.50 | 51.00 | 57.00 | 60.00 |
|          | mm   | 203  | 216    | 241   | 292   | 330   | 356   | 495.3 | 622   | 698   | 787   | 864   | 978   | 978   | 1295  | 1448  | 1524  |
| L(RTJ)   | inch | 8.50 | 9.00   | 10.00 | 12.00 | 13.50 | 14.50 | 20.00 | 25.00 | 28.00 | 31.50 | 34.50 | 39.00 | 39.00 | 51.50 | -     | -     |
|          | mm   | 216  | 229    | 254   | 305   | 343   | 368   | 508   | 635   | 711   | 800   | 876   | 991   | 991   | 1308  | -     | -     |
| B        | inch | 2.00 | 2.52   | 3.00  | 4.00  | 5.00  | 6.00  | 8.00  | 10.00 | 12.00 | 13.25 | 15.25 | 17.25 | 19.25 | 23.25 | 27.25 | 29.25 |
|          | mm   | 51   | 64     | 76    | 102   | 127   | 152   | 203   | 254   | 305   | 337   | 387   | 438   | 489   | 591   | 692   | 743   |
| H        | inch | 5.28 | 6.06   | 6.61  | 8.90  | 10.31 | 10.55 | 13.31 | 15.75 | 18.43 | 20.59 | 21.85 | 23.66 | 24.65 | 28.54 | 31.42 | 37.44 |
|          | mm   | 134  | 154    | 168   | 226   | 262   | 268   | 338   | 400   | 468   | 523   | 555   | 601   | 626   | 725   | 798   | 951   |
| WT.      | KG   | 17   | 24     | 28    | 42    | 54    | 68    | 118   | 179   | 302   | 401   | 510   | 638   | 717   | 1162  | 1532  | 2100  |
|          | LB   | 38   | 53     | 62    | 93    | 119   | 150   | 260   | 395   | 666   | 884   | 1124  | 1407  | 1580  | 2562  | 3378  | 4630  |



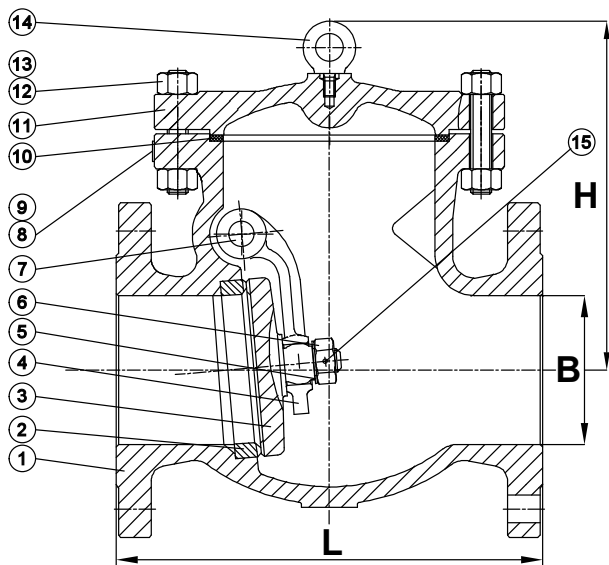
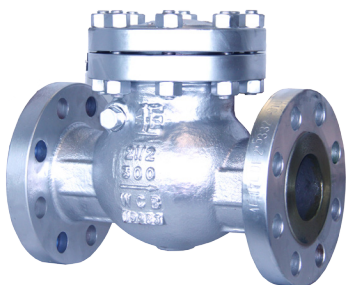
# Class 300 Cast Steel Swing Check Valve

**FIG.# 4E-33WCB8F**

*Bolted Cover, Swing Type Disc, Threaded or Welded Seat Ring, ASTM A216 WCB*

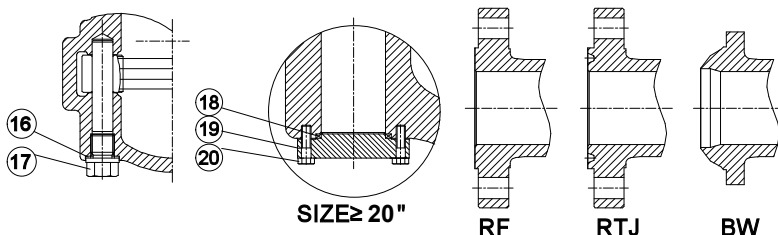
## STANDARDS COMPLIANCE:

|                         |                                                                |
|-------------------------|----------------------------------------------------------------|
| Basic Design            | BS 1868 & ASME B16.34                                          |
| Face to Face Dimensions | ANSI B 16.10                                                   |
| End Flange Dimensions   | 2" to 24" ASME B16.5<br>≥26" to ASME B16.47-A&B<br>ASME B16.25 |
| Test Standard           | API 598                                                        |



## MATERIAL LIST

|     |                   | ASTM Specification (Specs-Grades/Types) |                                                     |          |          |           |
|-----|-------------------|-----------------------------------------|-----------------------------------------------------|----------|----------|-----------|
| No. | Part Name         | A216 (STOCKING)                         | A352                                                | A217     |          | A351      |
|     |                   | WCB                                     | LCC                                                 | WC6      | C5       | CF8M      |
| 1.  | Body              | A216 WCB                                | A352 LCC                                            | A217 WC6 | A217 C5  | A351 CF8M |
| 2.  | Seat Ring         | A105                                    | A350 LF2, A182 F11, A182 F5, A182 F304 or A182 F316 |          |          |           |
|     | " Surface         | HF (STL.6/CoCr-A)                       | 13CR(ER410), 304, 316 or Monel                      |          |          |           |
| 3.  | Disc              | A105                                    | A350 LF2, A182 F11, A182 F5, A182 F304 or A182 F316 |          |          |           |
|     | " Seating Surface | 13CR(ER410)                             | HF (STL.6/CoCr-A), 304, 316 or Monel                |          |          |           |
| 4.  | Hinge             | A216 WCB                                | A352 LCC                                            | A217 WC6 | A217 C5  | A351 CF8M |
| 5.  | Washer            | A276 410                                | A182 F304 or A182 F316                              |          |          |           |
| 6.  | Nut               | A276 410                                | A182 F304 or A182 F316                              |          |          |           |
| 7.  | Pin               | A276 410                                | A182 F304 or A182 F316                              |          |          |           |
| 8.  | Rivet             | ANSI 304                                |                                                     |          |          |           |
| 9.  | Name Plate        | ANSI 304                                |                                                     |          |          |           |
| 10. | Gasket            | 08F+Flexible Graphite                   | F304 or F316 + Flexible Graphite                    |          |          |           |
| 11. | Bonnet            | A216 WCB                                | A352 LCC                                            | A217 WC6 | A217 C5  | A351 CF8M |
| 12. | Bolt              | A193 B7                                 | A320 L7                                             | A193 B16 | A193 B16 | A193 B8   |
| 13. | Nut               | A194 2H                                 | A194 2H                                             | A194 4   | A194 4   | A194 8    |
| 14. | Eye Bolt          | CARBON STEEL                            |                                                     |          |          |           |
| 15. | Pin               | ANSI 304                                |                                                     |          |          |           |
| 16. | Gasket            | SOFT IRON                               | F316                                                |          |          |           |
| 17. | Plug              | A276 410                                | A182 F316                                           |          |          |           |
| 18. | Gasket            | SOFT IRON                               | F316                                                |          |          |           |
| 19. | Gland             | A276 410                                | A182 F304, A182 F316 or Monel                       |          |          |           |
| 20. | Hex Bolt          | CARBON STEEL                            | 316                                                 |          |          |           |



Weights are approximate and construction is subject to change without notice.

## DIMENSION & WEIGHT

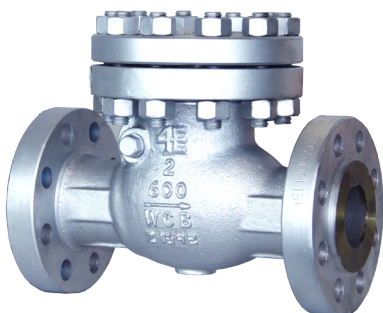
| SIZE     | unit | 2"    | 2-1/2" | 3"    | 4"    | 5"    | 6"    | 8"    | 10"   | 12"   | 14"   | 16"   | 18"   | 20"   | 24"   | 30"   |
|----------|------|-------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| L(RF/BW) | inch | 10.50 | 11.50  | 12.50 | 14.00 | 15.75 | 17.50 | 21.00 | 24.50 | 28.00 | 33.00 | 34.00 | 38.50 | 40.00 | 53.00 | 62.75 |
|          | mm   | 287   | 292    | 318   | 356   | 400   | 444   | 533   | 622   | 711   | 838   | 864   | 978   | 1016  | 1346  | 1594  |
| L(RTJ)   | inch | 11.14 | 12.13  | 13.11 | 14.61 | 16.38 | 18.11 | 21.62 | 25.12 | 28.62 | 33.62 | 34.61 | 39.13 | 40.75 | 53.86 | -     |
|          | mm   | 283   | 308    | 333   | 371   | 416   | 460   | 549   | 638   | 727   | 854   | 879   | 994   | 1035  | 1368  | -     |
| B        | inch | 2.00  | 2.52   | 3.00  | 4.00  | 5.00  | 6.00  | 8.00  | 10.00 | 12.00 | 13.25 | 15.25 | 17.01 | 19.02 | 22.99 | 28.94 |
|          | mm   | 51    | 64     | 76    | 102   | 127   | 152   | 203   | 254   | 305   | 337   | 387   | 432   | 483   | 584   | 735   |
| H        | inch | 5.95  | 6.22   | 7.09  | 9.96  | 10.98 | 11.85 | 14.13 | 17.44 | 9.65  | 22.76 | 24.10 | 26.61 | 28.31 | 30.67 | 41.65 |
|          | mm   | 151   | 158    | 180   | 253   | 279   | 301   | 359   | 443   | 499   | 578   | 612   | 676   | 719   | 779   | 1058  |
| WT.      | KG   | 21    | 28     | 40    | 60    | 84    | 108   | 184   | 298   | 425   | 680   | 840   | 1025  | 1320  | 1960  | 4013  |
|          | LB   | 46    | 62     | 88    | 132   | 185   | 238   | 406   | 657   | 937   | 1499  | 1852  | 2260  | 2910  | 4321  | 8847  |

# Class 600 Cast Steel Swing Check Valve



**FIG.# 4E-36WCB8F**

*Bolted Cover, Swing Type Disc, Threaded or Welded Seat Ring, ASTM A216 WCB*

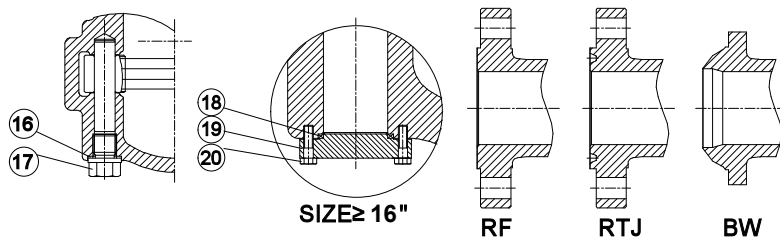
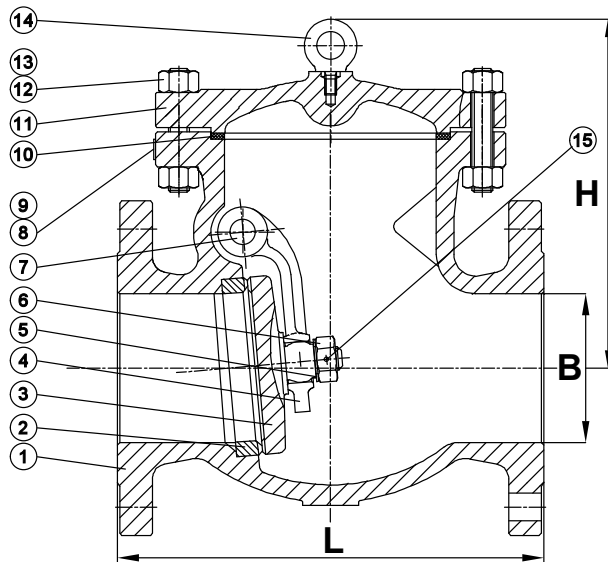


## STANDARDS COMPLIANCE:

|                         |                                                                |
|-------------------------|----------------------------------------------------------------|
| Basic Design            | BS 1868 & ASME B16.34                                          |
| Face to Face Dimensions | ANSI B 16.10                                                   |
| End Flange Dimensions   | 2" to 24" ASME B16.5<br>≥26" to ASME B16.47-A&B<br>ASME B16.25 |
| Test Standard           | API 598                                                        |

## MATERIAL LIST

|     |                   | ASTM Specification (Specs-Grades/Types) |                                                     |          |          |           |
|-----|-------------------|-----------------------------------------|-----------------------------------------------------|----------|----------|-----------|
| No. | Part Name         | A216 (STOCKING)                         | A352                                                | A217     |          | A351      |
|     |                   | WCB                                     | LCC                                                 | WC6      | C5       | CF8M      |
| 1.  | Body              | A216 WCB                                | A352 LCC                                            | A217 WC6 | A217 C5  | A351 CF8M |
| 2.  | Seat Ring         | A105                                    | A350 LF2, A182 F11, A182 F5, A182 F304 or A182 F316 |          |          |           |
|     | " Surface         | HF (STL.6/CoCr-A)                       | 13CR(ER410), 304, 316 or Monel                      |          |          |           |
| 3.  | Disc              | A105                                    | A350 LF2, A182 F11, A182 F5, A182 F304 or A182 F316 |          |          |           |
|     | " Seating Surface | 13CR(ER410)                             | HF (STL.6/CoCr-A), 304, 316 or Monel                |          |          |           |
| 4.  | Hinge             | A216 WCB                                | A352 LCC                                            | A217 WC6 | A217 C5  | A351 CF8M |
| 5.  | Washer            | A276 410                                | A182 F304 or A182 F316                              |          |          |           |
| 6.  | Nut               | A276 410                                | A182 F304 or A182 F316                              |          |          |           |
| 7.  | Pin               | A276 410                                | A182 F304 or A182 F316                              |          |          |           |
| 8.  | Rivet             | ANSI 304                                |                                                     |          |          |           |
| 9.  | Name Plate        | ANSI 304                                |                                                     |          |          |           |
| 10. | Gasket            | 08F+Flexible Graphite                   | F304 or F316 + Flexible Graphite                    |          |          |           |
| 11. | Bonnet            | A216 WCB                                | A352 LCC                                            | A217 WC6 | A217 C5  | A351 CF8M |
| 12. | Bolt              | A193 B7                                 | A320 L7                                             | A193 B16 | A193 B16 | A193 B8   |
| 13. | Nut               | A194 2H                                 | A194 2H                                             | A194 4   | A194 4   | A194 8    |
| 14. | Eye Bolt          | CARBON STEEL                            |                                                     |          |          |           |
| 15. | Pin               | ANSI 304                                |                                                     |          |          |           |
| 16. | Gasket            | SOFT IRON                               | F316                                                |          |          |           |
| 17. | Plug              | A276 410                                | A182 F316                                           |          |          |           |
| 18. | Gasket            | SOFT IRON                               | F316                                                |          |          |           |
| 19. | Gland             | A276 410                                | A182 F304, A182 F316 or Monel                       |          |          |           |
| 20. | Hex Bolt          | CARBON STEEL                            | 316                                                 |          |          |           |



Weights are approximate and construction is subject to change without notice.

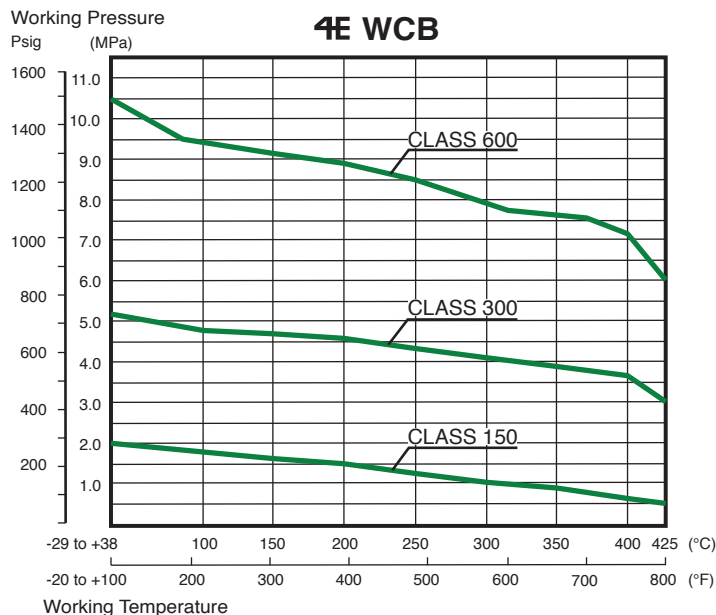
## DIMENSION & WEIGHT

| SIZE     | unit | 2"    | 2-1/2" | 3"    | 4"    | 5"    | 6"    | 8"    | 10"   | 12"   | 14"   | 16"   | 18"    | 20"    | 24"   |
|----------|------|-------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------|-------|
| L(RF/BW) | inch | 11.50 | 13.00  | 14.00 | 17.00 | 20.00 | 22.00 | 26.00 | 31.00 | 33.00 | 35.00 | 39.00 | 43.00  | 47.00  | 55.00 |
|          | mm   | 292   | 330    | 356   | 432   | 508   | 559   | 660   | 787.4 | 838   | 889   | 990.6 | 1092.2 | 1193.8 | 1397  |
| L(RTJ)   | inch | 11.62 | 13.11  | 14.13 | 17.13 | 20.12 | 22.13 | 26.14 | 31.14 | 33.11 | 35.11 | 39.13 | 43.11  | 47.25  | 55.39 |
|          | mm   | 295   | 333    | 359   | 435   | 511   | 562   | 664   | 791   | 841   | 892   | 994   | 1095   | 1200   | 1407  |
| B        | inch | 2.00  | 2.52   | 3.00  | 4.00  | 5.00  | 6.00  | 7.88  | 9.76  | 11.73 | 12.87 | 14.76 | 16.50  | 18.27  | 22.01 |
|          | mm   | 51    | 64     | 76    | 102   | 127   | 152   | 200   | 248   | 298   | 327   | 375   | 419    | 464    | 559   |
| H        | inch | 6.02  | 7.56   | 7.40  | 10.43 | 13.58 | 14.17 | 18.58 | 21.58 | 23.82 | 24.33 | 27.87 | 31.42  | 30.51  | 32.99 |
|          | mm   | 153   | 192    | 188   | 265   | 345   | 360   | 472   | 555   | 605   | 618   | 708   | 798    | 775    | 838   |
| WT.      | KG   | 36    | 42     | 45    | 84    | 164   | 200   | 360   | 589   | 777   | 944   | 1220  | 1620   | 2119   | 3100  |
|          | LB   | 80    | 93     | 100   | 185   | 362   | 441   | 794   | 1299  | 1713  | 2081  | 2690  | 3572   | 4672   | 6834  |



# Pressure Temperature Ratings

In Accordance with ASME B16.34 for Press Temperature Ratings and API 598 for the Testing Pressures, charts and datas are provided as follows:



Pressure in psig.

| Class 150                    |          |          |          |           |            |
|------------------------------|----------|----------|----------|-----------|------------|
| Maximum Service Temp. Deg. F | A216 WCB | A217 WC6 | A351 CF8 | A351 CF8M | A182 F304L |
|                              | A105     |          | A351 CF3 | A351 CF3M | A182 F316L |
|                              |          |          | A182 F34 | A182 F316 |            |
| -20 to 100                   | 285      | 290      | 275      | 275       | 230        |
| 200                          | 260      | 260      | 235      | 240       | 195        |
| 300                          | 230      | 230      | 205      | 215       | 175        |
| 400                          | 200      | 200      | 180      | 195       | 160        |
| 500                          | 170      | 170      | 170      | 170       | 145        |
| 600                          | 140      | 140      | 140      | 140       | 140        |
| 650                          | 125      | 125      | 125      | 125       | 125        |
| 700                          | 110      | 110      | 110      | 110       | 110        |
| 750                          | 95       | 95       | 95       | 95        | 95         |
| 800                          | 80       | 80       | 80       | 80        | 80         |
| 850                          |          | 65       | 65       | 65        | 65         |
| 900                          |          | 50       | 50       | 50        |            |
| 950                          |          | 35       | 35       | 35        |            |
| 1000                         |          | 20       | 20       | 20        |            |
| 1050                         |          | 20*      | 20*      | 20*       |            |
| 1100                         |          | 20*      | 20*      | 20*       |            |
| 1150                         |          |          | 20*      | 20*       |            |
| 1200                         |          |          | 20*      | 20*       |            |
| Hydrostatic Shell Test psig. | 450      |          | 425      |           | 350        |
| Hydrostatic Seat Test psig.  | 320      |          | 320      |           | 260        |

Note: \* For welding end valve only. Flanged end ratings terminate at 1000 °F.

Pressure in psig.

| Class 300                    |          |          |          |           |            |
|------------------------------|----------|----------|----------|-----------|------------|
| Maximum Service Temp. Deg. F | A216 WCB | A217 WC6 | A351 CF8 | A351 CF8M | A182 F304L |
|                              | A105     |          | A351 CF3 | A351 CF3M | A182 F316L |
|                              |          |          | A182 F34 | A182 F316 |            |
| -20 to 100                   | 740      | 750      | 720      | 720       | 600        |
| 200                          | 675      | 710      | 600      | 620       | 505        |
| 300                          | 655      | 675      | 530      | 560       | 455        |
| 400                          | 635      | 660      | 470      | 515       | 415        |
| 500                          | 600      | 640      | 435      | 480       | 380        |
| 600                          | 550      | 605      | 415      | 450       | 360        |
| 650                          | 535      | 590      | 410      | 445       | 350        |
| 700                          | 535      | 570      | 405      | 430       | 345        |
| 750                          | 505      | 530      | 400      | 425       | 335        |
| 800                          | 410      | 510      | 395      | 415       | 330        |
| 850                          |          | 485      | 390      | 405       | 320        |
| 900                          |          | 450      | 385      | 395       |            |
| 950                          |          | 380      | 375      | 385       |            |
| 1000                         |          | 225      | 325      | 365       |            |
| 1050                         |          | 140      | 310      | 360       |            |
| 1100                         |          | 95       | 260      | 325       |            |
| 1150                         |          |          | 195      | 275       |            |
| 1200                         |          |          | 155      | 205       |            |
| Hydrostatic Shell Test psig. | 1125     |          | 1100     |           | 900        |
| Hydrostatic Seat Test psig.  | 825      |          | 800      |           | 660        |

Pressure in psig.

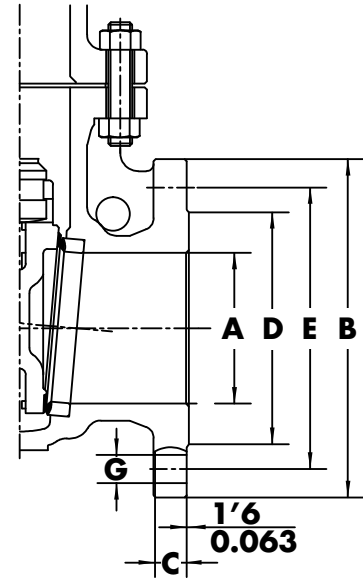
| Class 600                    |          |          |          |           |            |
|------------------------------|----------|----------|----------|-----------|------------|
| Maximum Service Temp. Deg. F | A216 WCB | A217 WC6 | A351 CF8 | A351 CF8M | A182 F304L |
|                              | A105     |          | A351 CF3 | A351 CF3M | A182 F316L |
|                              |          |          | A182 F34 | A182 F316 |            |
| -20 to 100                   | 1480     | 1500     | 1440     | 1440      | 1200       |
| 200                          | 1350     | 1425     | 1200     | 1240      | 1015       |
| 300                          | 1315     | 1345     | 1055     | 1120      | 910        |
| 400                          | 1270     | 1315     | 940      | 1030      | 825        |
| 500                          | 1200     | 1285     | 875      | 955       | 765        |
| 600                          | 1095     | 1210     | 830      | 905       | 720        |
| 650                          | 1075     | 1175     | 815      | 890       | 700        |
| 700                          | 1065     | 1135     | 805      | 865       | 685        |
| 750                          | 1010     | 1065     | 795      | 845       | 670        |
| 800                          | 825      | 1015     | 790      | 830       | 660        |
| 850                          |          | 975      | 780      | 810       | 645        |
| 900                          |          | 900      | 770      | 790       |            |
| 950                          |          | 755      | 750      | 775       |            |
| 1000                         |          | 445      | 645      | 725       |            |
| 1050                         |          | 275      | 620      | 720       |            |
| 1100                         |          | 190      | 515      | 645       |            |
| 1150                         |          |          | 390      | 350       |            |
| 1200                         |          |          | 310      | 310       |            |
| Hydrostatic Shell Test psig. | 2250     |          | 2175     |           | 1800       |
| Hydrostatic Seat Test psig.  | 1650     |          | 1600     |           | 1320       |

# Flange Dimensions



**Class 150 Flange Dimensions Fig. 1**

| Normal Size | Unit | Bore A | Outside Dia. B | Thickness of Flange C | Raised Face Dia. D | Dia. of Bolted Circle E | Number of Bolted Holes | Dia. of Bolt G |
|-------------|------|--------|----------------|-----------------------|--------------------|-------------------------|------------------------|----------------|
| 2"          | mm   | 51     | 152            | 19.1                  | 92                 | 120.5                   | 4                      | 19             |
|             | inch | 2.00   | 6.00           | 0.75                  | 3.62               | 4.75                    |                        | 3/4            |
| 2-1/2"      | mm   | 64     | 178            | 22.5                  | 105                | 139.5                   | 4                      | 19             |
|             | inch | 2.50   | 7.00           | 0.88                  | 4.12               | 5.50                    |                        | 3/4            |
| 3"          | mm   | 76     | 190            | 24                    | 127                | 152.5                   | 4                      | 19             |
|             | inch | 3.00   | 7.50           | 0.94                  | 5.00               | 6.00                    |                        | 3/4            |
| 4"          | mm   | 102    | 229            | 24                    | 157                | 190.5                   | 8                      | 19             |
|             | inch | 4.00   | 9.00           | 0.94                  | 6.19               | 7.50                    |                        | 3/4            |
| 5"          | mm   | 127    | 254            | 24                    | 186                | 216                     | 8                      | 22             |
|             | inch | 5.00   | 10.00          | 0.94                  | 7.31               | 8.50                    |                        | 7/8            |
| 6"          | mm   | 152    | 279            | 26                    | 216                | 241.5                   | 8                      | 22             |
|             | inch | 6.00   | 11.00          | 1.00                  | 8.50               | 9.50                    |                        | 7/8            |
| 8"          | mm   | 203    | 343            | 29                    | 270                | 298.5                   | 8                      | 22             |
|             | inch | 8.00   | 13.50          | 1.12                  | 10.62              | 11.75                   |                        | 7/8            |
| 10"         | mm   | 254    | 406            | 30.3                  | 324                | 362                     | 12                     | 25             |
|             | inch | 10.00  | 16.00          | 1.19                  | 12.75              | 14.25                   |                        | 1              |
| 12"         | mm   | 305    | 483            | 32                    | 381                | 432                     | 12                     | 25             |
|             | inch | 12.00  | 19.00          | 1.25                  | 15.00              | 17.00                   |                        | 1              |
| 14"         | mm   | 337    | 535            | 35                    | 413                | 476                     | 12                     | 29             |
|             | inch | 13.25  | 19.00          | 1.38                  | 16.25              | 18.75                   |                        | 1-1/8          |
| 16"         | mm   | 387    | 597            | 37                    | 470                | 540                     | 16                     | 29             |
|             | inch | 15.25  | 23.50          | 1.44                  | 18.25              | 21.25                   |                        | 1-1/8          |
| 18"         | mm   | 438    | 635            | 40                    | 533                | 578                     | 16                     | 32             |
|             | inch | 17.25  | 25.00          | 1.56                  | 21.00              | 22.75                   |                        | 1-1/4          |
| 20"         | mm   | 489    | 699            | 43                    | 584                | 635                     | 20                     | 32             |
|             | inch | 19.25  | 27.50          | 1.69                  | 23.00              | 25.00                   |                        | 1-1/4          |
| 24"         | mm   | 591    | 813            | 48                    | 692                | 749.5                   | 20                     | 35             |
|             | inch | 23.25  | 32.00          | 1.88                  | 27.25              | 29.50                   |                        | 1-3/8          |
| 26"         | mm   | 642.9  | 870            | 68.5                  | 749.3              | 806.5                   | 24                     | 35             |
|             | inch | 25.25  | 34.25          | 2.69                  | 29.5               | 31.75                   |                        | 1-3/8          |
| 28"         | mm   | 692    | 927            | 71.5                  | 800.1              | 863.6                   | 28                     | 35             |
|             | inch | 27.25  | 36.50          | 2.81                  | 31.50              | 34.00                   |                        | 1-3/8          |
| 30"         | mm   | 743    | 984            | 74.7                  | 857                | 914.4                   | 28                     | 35             |
|             | inch | 29.25  | 38.75          | 2.94                  | 33.75              | 36.00                   |                        | 1-3/8          |



**Fig. 1: Class 150 - 300**

**Class 300 Flange Dimensions Fig. 1**

| Normal Size | Unit | Bore A | Outside Dia. B | Thickness of Flange C | Raised Face Dia. D | Dia. of Bolted Circle E | Number of Bolted Holes | Dia. of Bolt G |
|-------------|------|--------|----------------|-----------------------|--------------------|-------------------------|------------------------|----------------|
| 2"          | mm   | 51     | 165            | 23                    | 92                 | 127                     | 8                      | 19             |
|             | inch | 2.00   | 6.50           | 0.88                  | 3.62               | 5.00                    |                        | 3/4            |
| 2-1/2"      | mm   | 64     | 190            | 26                    | 105                | 149                     | 8                      | 22             |
|             | inch | 2.50   | 7.50           | 1.00                  | 4.12               | 5.88                    |                        | 7/8            |
| 3"          | mm   | 76     | 210            | 29                    | 127                | 168.3                   | 8                      | 22             |
|             | inch | 3.00   | 8.25           | 1.12                  | 5.00               | 6.62                    |                        | 7/8            |
| 4"          | mm   | 102    | 254            | 32                    | 157                | 200                     | 8                      | 22             |
|             | inch | 4.00   | 10.00          | 1.25                  | 6.19               | 7.88                    |                        | 7/8            |
| 5"          | mm   | 127    | 279            | 35                    | 186                | 235                     | 8                      | 22             |
|             | inch | 5.00   | 11.00          | 1.38                  | 7.31               | 9.25                    |                        | 7/8            |
| 6"          | mm   | 152    | 318            | 37                    | 216                | 270                     | 12                     | 22             |
|             | inch | 6.00   | 12.50          | 1.44                  | 8.50               | 10.62                   |                        | 7/8            |
| 8"          | mm   | 203    | 381            | 42                    | 270                | 330                     | 12                     | 25             |
|             | inch | 8.00   | 15.00          | 1.62                  | 10.62              | 13.00                   |                        | 1              |
| 10"         | mm   | 254    | 445            | 48                    | 324                | 387.5                   | 16                     | 29             |
|             | inch | 10.00  | 17.50          | 1.88                  | 12.75              | 15.25                   |                        | 1-1/8          |
| 12"         | mm   | 305    | 521            | 51                    | 381                | 451                     | 16                     | 32             |
|             | inch | 12.00  | 20.50          | 2.00                  | 15.00              | 17.75                   |                        | 1-1/4          |
| 14"         | mm   | 337    | 584            | 54                    | 413                | 514.5                   | 20                     | 32             |
|             | inch | 13.25  | 23.00          | 2.12                  | 16.25              | 20.25                   |                        | 1-1/4          |
| 16"         | mm   | 387    | 648            | 58                    | 470                | 571                     | 20                     | 35             |
|             | inch | 15.25  | 25.50          | 2.25                  | 18.25              | 22.50                   |                        | 1-3/8          |
| 18"         | mm   | 438    | 711            | 61                    | 533                | 629                     | 24                     | 35             |
|             | inch | 17.25  | 28.00          | 2.38                  | 21.00              | 24.75                   |                        | 1-3/8          |
| 20"         | mm   | 483    | 775            | 64                    | 584                | 686                     | 24                     | 35             |
|             | inch | 19.00  | 30.50          | 2.50                  | 23.00              | 27.00                   |                        | 1-3/8          |
| 24"         | mm   | 584    | 914            | 70                    | 692                | 813                     | 24                     | 41             |
|             | inch | 23.00  | 36.00          | 2.75                  | 27.25              | 32.00                   |                        | 1-5/8          |
| 30"         | mm   | 736.6  | 1092           | 952                   | 857                | 997                     | 28                     | 48             |
|             | inch | 29.00  | 43.00          | 3.63                  | 33.75              | 39.25                   |                        | 1-7/8          |

## Class 600 Flange Dimensions Fig. 2

| Normal Size | Unit | Bore A | Outside Dia. B | Thickness of Flange C | Raised Face Dia. D | Dia. of Bolt Circle E | Number of Bolted Holes | Dia. of Bolt G |
|-------------|------|--------|----------------|-----------------------|--------------------|-----------------------|------------------------|----------------|
| 2"          | mm   | 51     | 165            | 26                    | 92                 | 127                   | 8                      | 19             |
|             | inch | 2.00   | 6.50           | 1.00                  | 3.62               | 5.00                  | 8                      | 3/4            |
| 2-1/2"      | mm   | 64     | 190            | 29                    | 105                | 149                   | 8                      | 22             |
|             | inch | 2.50   | 7.50           | 1.12                  | 4.12               | 5.88                  | 8                      | 7/8            |
| 3"          | mm   | 76     | 210            | 32                    | 127                | 168                   | 8                      | 22             |
|             | inch | 3.00   | 8.25           | 1.25                  | 5.00               | 6.62                  | 8                      | 7/8            |
| 4"          | mm   | 102    | 273            | 38                    | 157                | 216                   | 8                      | 25             |
|             | inch | 4.00   | 10.75          | 1.50                  | 6.19               | 8.50                  | 8                      | 1              |
| 5"          | mm   | 127    | 330            | 44.5                  | 186                | 266.5                 | 8                      | 29             |
|             | inch | 5.00   | 13.00          | 1.75                  | 7.31               | 10.50                 | 8                      | 1-1/8          |
| 6"          | mm   | 152    | 356            | 48                    | 216                | 292                   | 12                     | 29             |
|             | inch | 6.00   | 14.00          | 1.88                  | 8.50               | 11.50                 | 12                     | 1-1/8          |
| 8"          | mm   | 200    | 419            | 56                    | 270                | 349                   | 12                     | 32             |
|             | inch | 7.87   | 16.50          | 2.19                  | 10.62              | 13.75                 | 12                     | 1-1/4          |
| 10"         | mm   | 248    | 508            | 64                    | 324                | 432                   | 16                     | 35             |
|             | inch | 9.75   | 20.00          | 2.50                  | 12.75              | 17.00                 | 16                     | 1-3/8          |
| 12"         | mm   | 298    | 559            | 67                    | 381                | 489                   | 20                     | 35             |
|             | inch | 11.75  | 22.00          | 2.62                  | 15.00              | 19.25                 | 20                     | 1-3/8          |
| 14"         | mm   | 327    | 603            | 70                    | 413                | 527                   | 20                     | 38             |
|             | inch | 12.87  | 23.75          | 2.75                  | 16.25              | 20.75                 | 20                     | 1-1/2          |
| 16"         | mm   | 375    | 686            | 77                    | 470                | 603                   | 20                     | 41             |
|             | inch | 14.75  | 27.00          | 3.00                  | 18.5               | 23.75                 | 20                     | 1-1/2          |
| 18"         | mm   | 419    | 743            | 83                    | 533                | 654                   | 20                     | 44             |
|             | inch | 16.50  | 29.25          | 3.25                  | 21.00              | 25.75                 | 20                     | 1-3/4          |
| 20"         | mm   | 464    | 813            | 89                    | 584                | 724                   | 24                     | 44             |
|             | inch | 18.25  | 32.00          | 3.50                  | 23.00              | 28.50                 | 24                     | 1-3/4          |
| 24"         | mm   | 559    | 940            | 102                   | 692                | 838                   | 24                     | 52             |
|             | inch | 22.00  | 37.00          | 4.00                  | 27.25              | 33.00                 | 24                     | 2              |

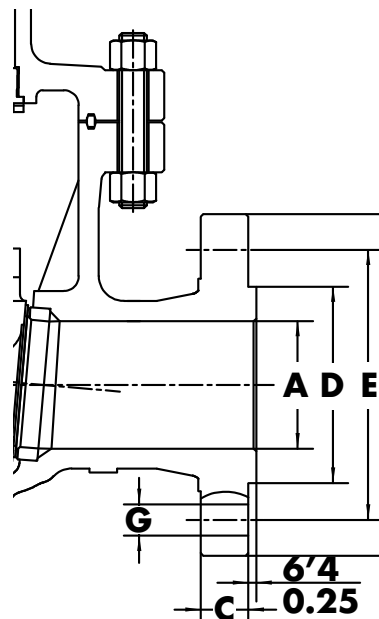
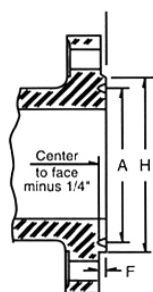


Fig. 2: Class 600



Valve Classes 400, 600

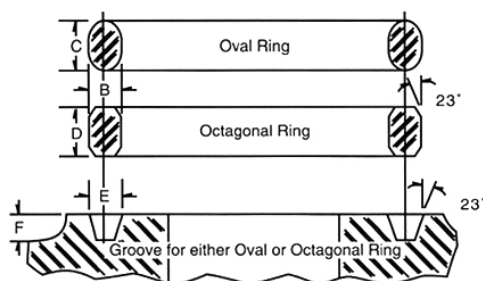
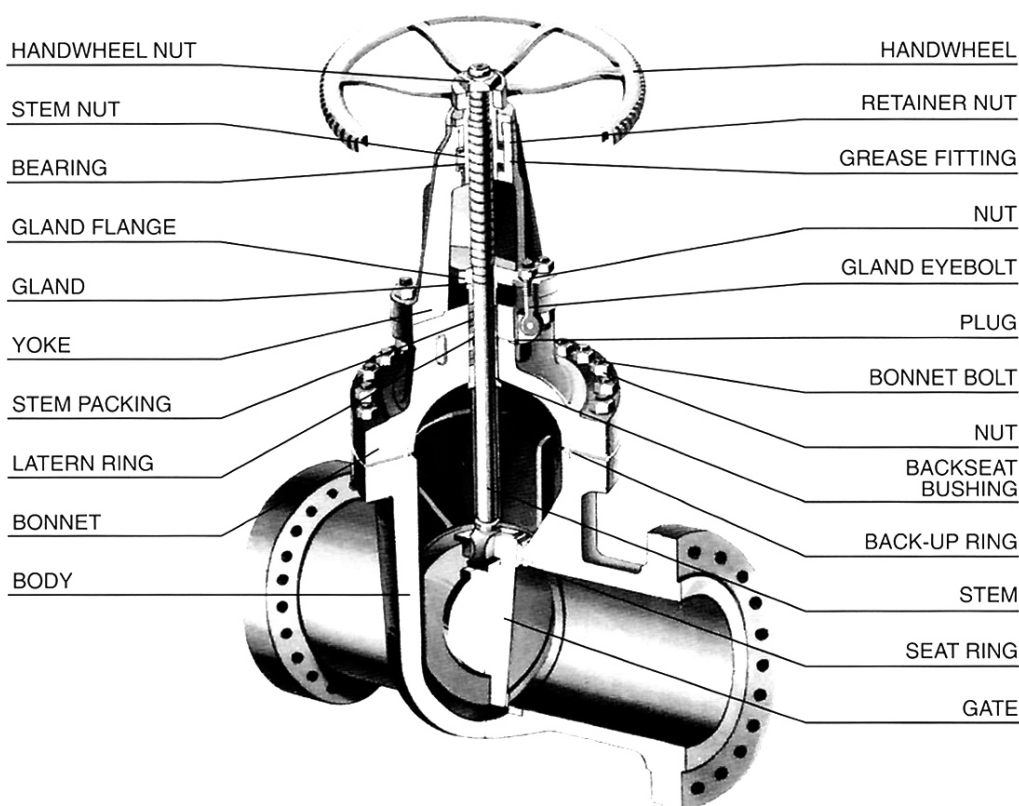


fig. 3: Oval rings fit grooves having either a flat or round bottom; octagonal rings only fit grooves having a flat bottom.

## Flange Dimensions Fig. 3

| Class            | Size  | Ring No. | A      | B     | C     | D     | E     | F     | H     |
|------------------|-------|----------|--------|-------|-------|-------|-------|-------|-------|
| Class 300<br>600 | 1/2   | R11      | 1.344  | 0.250 | 0.438 | 0.375 | 0.281 | 0.219 | 2.00  |
|                  | 3/4   | R13      | 1.688  | 0.312 | 0.562 | 0.500 | 0.344 | 0.250 | 2.50  |
|                  | 1     | R16      | 2.000  | 0.312 | 0.562 | 0.500 | 0.344 | 0.250 | 2.75  |
|                  | 1-1/4 | R18      | 2.375  | 0.312 | 0.562 | 0.500 | 0.344 | 0.250 | 3.12  |
|                  | 1-1/2 | R20      | 2.688  | 0.312 | 0.562 | 0.500 | 0.344 | 0.250 | 3.56  |
|                  | 2     | R23      | 3.250  | 0.438 | 0.688 | 0.625 | 0.469 | 0.312 | 4.25  |
|                  | 2-1/2 | R26      | 4.000  | 0.438 | 0.688 | 0.625 | 0.469 | 0.312 | 5.00  |
|                  | 3     | R31      | 4.875  | 0.438 | 0.688 | 0.625 | 0.469 | 0.312 | 5.75  |
|                  | 3-1/2 | R34      | 5.188  | 0.438 | 0.688 | 0.625 | 0.469 | 0.312 | 6.25  |
|                  | 4     | R37      | 5.875  | 0.438 | 0.688 | 0.625 | 0.469 | 0.312 | 6.88  |
|                  | 5     | R41      | 7.125  | 0.438 | 0.688 | 0.625 | 0.469 | 0.312 | 8.25  |
|                  | 6     | R45      | 8.312  | 0.438 | 0.688 | 0.625 | 0.469 | 0.312 | 9.50  |
|                  | 8     | R49      | 10.625 | 0.438 | 0.688 | 0.625 | 0.469 | 0.312 | 11.88 |
|                  | 10    | R53      | 12.750 | 0.438 | 0.688 | 0.625 | 0.469 | 0.312 | 14.00 |
|                  | 12    | R57      | 15.000 | 0.438 | 0.688 | 0.625 | 0.469 | 0.312 | 16.25 |
|                  | 14    | R61      | 16.500 | 0.438 | 0.688 | 0.625 | 0.469 | 0.312 | 18.00 |
|                  | 16    | R65      | 18.500 | 0.438 | 0.688 | 0.625 | 0.469 | 0.312 | 20.00 |
|                  | 18    | R69      | 21.000 | 0.438 | 0.688 | 0.625 | 0.469 | 0.312 | 22.62 |
|                  | 20    | R73      | 23.000 | 0.500 | 0.750 | 0.688 | 0.531 | 0.375 | 25.00 |
|                  | 24    | R77      | 27.250 | 0.625 | 0.875 | 0.812 | 0.656 | 0.438 | 29.50 |



## WARRANTY

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2. In the event 4E shall determine that the product is defective based upon such examination of the product which 4E may deem appropriate, 4E shall thereupon, at its sole option, cause the defective product to be (a) repaired, (b) replaced with a substantially identical product, or (c) accept the return of a defective product and refund the purchasing price to the original purchaser, but shall in no event bear any installation, reinstallation, engineering or other costs incurred in connection with repair or replacement.

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