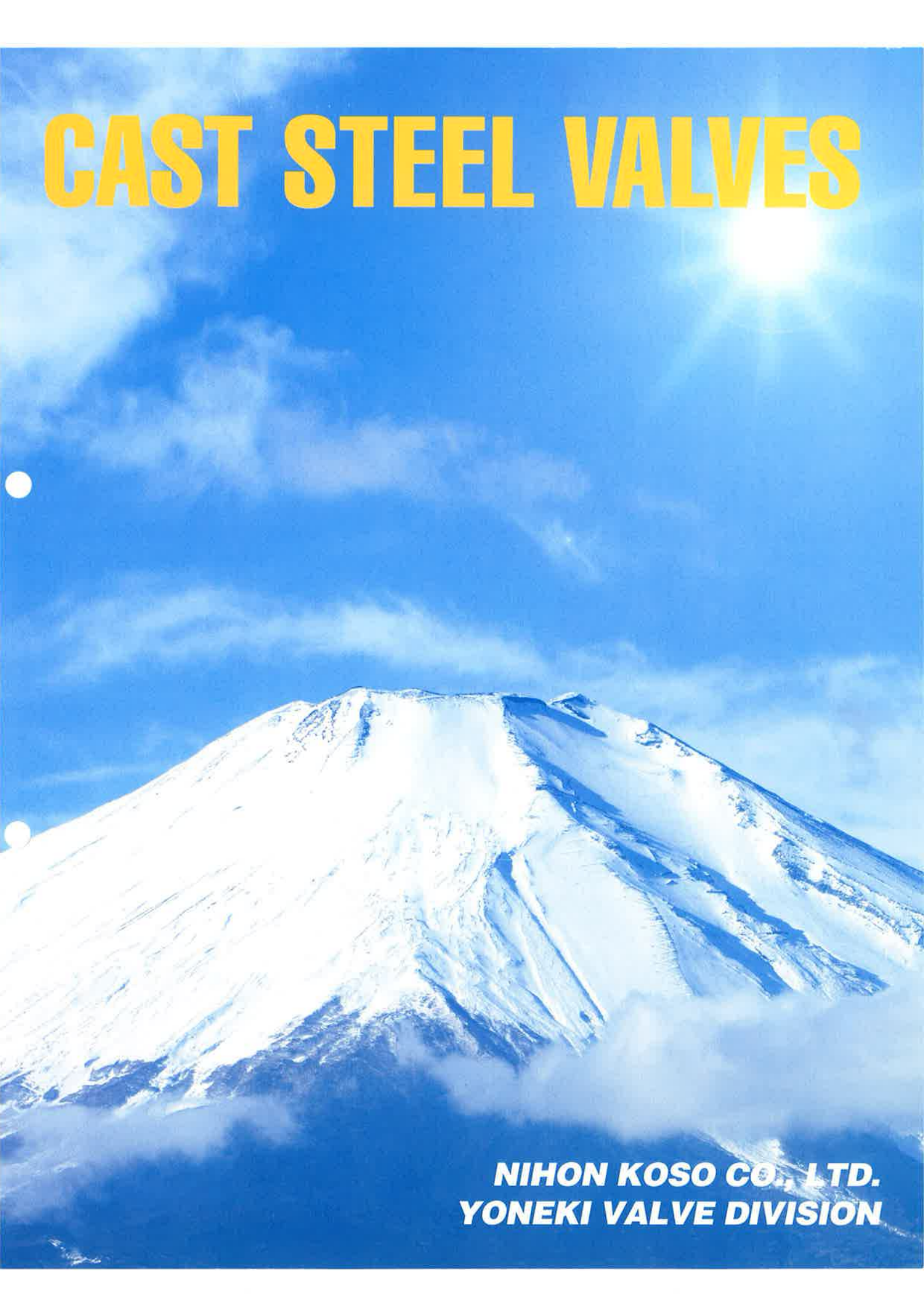


# **CAST STEEL VALVES**



**NIHON KOSO CO., LTD.  
YONEKI VALVE DIVISION**

# FIGURE NUMBER INDEX ABBREVIATIONS

| (1)<br>VALVE TYPE                              | (2)<br>RATING | (3)<br>BONNET TYPE | (4)<br>END CONNECTION | (5)<br>SEAT CONSTRUCTION | (6)<br>TRIM MATERIAL | (7)<br>OPERATOR (OPTION) |
|------------------------------------------------|---------------|--------------------|-----------------------|--------------------------|----------------------|--------------------------|
| GA: Gate                                       | 01: 150*      | 0: B.B.            | F: F.F.               | A: Renewable Seat        | See TABLE 1          | A: Air Motor             |
| FG: Full Port Gate                             | 03: 300*      | 1: B.B.Ext. type 1 | G: Grayloc            | B: Integral Seat         |                      | B: Bevel Gear            |
| VG: Venturi Gate                               | 04: 400*      | 2: B.B.Ext. type 2 | J: RTJ                | C: Welded Seat           |                      | C: Chain Wheel           |
| ND: Needle Globe                               | 06: 600*      | 3: B.B.Ext. type 3 | L: T & G              | D: Renewable W/Teflon    |                      | D: Hammer Blow           |
| AN: Angle Needle Globe                         | 09: 900*      | 4: P.Seal          | M: M & F              | E: Integral W/Teflon     |                      | E: Electric Motor        |
| YN: Y-Needle Globe                             | 15: 1500*     | 5: P.Seal Ext.     | R: R.F.               | N: Renewable Bellows     |                      | H: Hydraulic Actuator    |
| GL: Plug type Globe                            | 20: 2000**    | 6: Grayloc         | S: S.W.               | P: Integral Bellows      |                      | P: Pneumatic Actuator    |
| AG: Plug type Angle Globe                      | 25: 2500*     | 9: Other           | T: Screwed            | Q: Welded Bellows        |                      | S: Spur Gear             |
| YG: Plug type Y-Globe                          | 45: 4500*     |                    | W: B.W.               | Z: Other                 |                      | W: Worm Gear             |
| BG: Ball type Globe                            | 50: 5000**    |                    | X: BW & RF            |                          |                      | Z: Other                 |
| BA: Ball type Angle Globe                      | 00: OTHER     |                    | Y: BW & RTJ           |                          |                      |                          |
| BY: Ball type Y-Globe                          | *ANSI         |                    | Z: Other              |                          |                      |                          |
| ST: Stop Check                                 | **API         |                    |                       |                          |                      |                          |
| AS: Angle Stop Check                           |               |                    |                       |                          |                      |                          |
| YS: Y-Stop Check                               |               |                    |                       |                          |                      |                          |
| SC: Swing Check                                |               |                    |                       |                          |                      |                          |
| FS: Full Open Swing Check                      |               |                    |                       |                          |                      |                          |
| TC: Tilting Check                              |               |                    |                       |                          |                      |                          |
| TY: Yoneki type Tilting Check (One piece Body) |               |                    |                       |                          |                      |                          |
| LC: Lift Check                                 |               |                    |                       |                          |                      |                          |
| YL: Y-Lift Check                               |               |                    |                       |                          |                      |                          |
| AL: Angle Lift Check                           |               |                    |                       |                          |                      |                          |

## NOTE 1: (3) BONNET TYPE

1. B.B. Ext. type 1 means for -50°C max. (LCB & LCC)
2. B.B. Ext. type 2 means for -149°C max. (LC3 & S. Steel)
3. B.B. Ext. type 3 means for -200°C max. (Cryogenic service)

## NOTE 2: (6) TRIM MATERIAL

Trim nos. 01 thru 14 are exactly the same trim nos. as API STD. 600.

## NOTE 3: (7) OPERATOR (OPTION)

This column will be left blank if a standard handwheel operator is required.

## NOTE 4: BODY/BONNET MATERIAL

1. Must be indicated in ( ) at the tail of Fig. No.
2. Not necessary to indicate in case of WCB.
3. NACE (Other special requirement), if required, is also indicated in ( ) followed to Body/Bonnet material.

### For Example: GA154WC-05-B (WC6)

Gate Valve . . . . . GA  
1500LB Class . . . . . 15  
Pressure Seal (Std.) . . . . . 4  
Butt Weld Ends . . . . . W  
Welded Seat . . . . . C  
Stellite Seat & Disc/13Cr. Trim . . . . . 05  
Bevel Gear Operator . . . . . B  
Body/Bonnet Material . . . . . (WC6)

# FIGURE NUMBER INDEX ABBREVIATIONS

**TABLE 1**

**(6) TRIM MATERIAL**

| <u>TRIM NO.</u> | <u>SEAT RING OR SURFACE</u> | <u>WEDGE/DISC OR SURFACE</u> | <u>STEM</u>          |
|-----------------|-----------------------------|------------------------------|----------------------|
| 01              | 13% CR.                     | 13% CR.                      | 13% CR.              |
| 02              | 304 S.S.                    | 304 S.S.                     | 304 S.S.             |
| 03              | F310 (CR. 25-NI 20)         | F310 (CR. 25-NI 20)          | F310 (CR. 25-NI 20)  |
| 04              | HARD 13% CR.                | HARD 13% CR.                 | 13% CR.              |
| 05              | STELLITE                    | STELLITE                     | 13% CR.              |
| 05A             | NI-CR.                      | NI-CR.                       | 13% CR.              |
| 06              | CU-NI                       | 13% CR.                      | 13% CR.              |
| 07              | 13% CR.                     | HARD 13% CR.                 | 13% CR.              |
| 08              | STELLITE                    | 13% CR.                      | 13% CR.              |
| 08A             | NI-CR.                      | 13% CR.                      | 13% CR.              |
| 09              | MONEL                       | MONEL                        | 13% CR.              |
| 10              | 316 S.S.                    | 316 S.S.                     | 316 S.S.             |
| 11              | MONEL                       | STELLITE                     | MONEL                |
| 12              | STELLITE                    | 316 S.S.                     | 316 S.S.             |
| 13              | ALLOY 20                    | ALLOY 20                     | ALLOY 20             |
| 14              | STELLITE                    | ALLOY 20                     | ALLOY 20             |
| 15              | MONEL                       | MONEL                        | MONEL                |
| 16              | BRONZE                      | BRONZE                       | BRONZE               |
| 17              | HASTELLOY B                 | HASTELLOY B                  | HASTELLOY B          |
| 18              | HASTELLOY C                 | HASTELLOY C                  | HASTELLOY C          |
| 19              | STELLITE                    | 304 S.S.                     | 304 S.S.             |
| 20              | STELLITE                    | STELLITE                     | 304 S.S.             |
| 21              | 304L S.S.                   | 304L S.S.                    | 304L S.S.            |
| 22              | STELLITE                    | 304L S.S.                    | 304L S.S.            |
| 23              | STELLITE                    | STELLITE                     | 304L S.S.            |
| 24              | STELLITE                    | STELLITE                     | 316 S.S.             |
| 25              | 316L S.S.                   | 316L S.S.                    | 316L S.S.            |
| 26              | STELLITE                    | 316L S.S.                    | 316L S.S.            |
| 27              | STELLITE                    | STELLITE                     | 316L S.S.            |
| 28              | 321 S.S.                    | 321 S.S.                     | 321 S.S.             |
| 29              | STELLITE                    | 321 S.S.                     | 321 S.S.             |
| 30              | STELLITE                    | STELLITE                     | 321 S.S.             |
| 31              | 347 S.S.                    | 347 S.S.                     | 347 S.S.             |
| 32              | STELLITE                    | 347 S.S.                     | 347 S.S.             |
| 33              | STELLITE                    | STELLITE                     | 347 S.S.             |
| 34              | NICKEL ALLOY                | 13% CR.                      | 13% CR.              |
| 99              | DESCRIPTION REQUIRED        | DESCRIPTION REQUIRED         | DESCRIPTION REQUIRED |

# FIGURE NUMBER INDEX

| YONEKI<br>FIGURE NO. | TYPE OF VALVE |    |         |      |         | PAGE |
|----------------------|---------------|----|---------|------|---------|------|
| GA010RA              | 150           | lb | Gate    | RF   | BB OS&Y | 19   |
| GA010WA              | 150           | lb | Gate    | Weld | BB OS&Y | 19   |
| GA030RA              | 300           | lb | Gate    | RF   | BB OS&Y | 20   |
| GA030JA              | 300           | lb | Gate    | RTJ  | BB OS&Y | 20   |
| GA030WA              | 300           | lb | Gate    | Weld | BB OS&Y | 20   |
| GA060RA              | 600           | lb | Gate    | RF   | BB OS&Y | 21   |
| GA060JA              | 600           | lb | Gate    | RTJ  | BB OS&Y | 21   |
| GA060WA              | 600           | lb | Gate    | Weld | BB OS&Y | 21   |
| GA090WC              | 900           | lb | Gate    | Weld | BB OS&Y | 22   |
| GA090RC              | 900           | lb | Gate    | RF   | BB OS&Y | 22   |
| GA090JC              | 900           | lb | Gate    | RTJ  | BB OS&Y | 22   |
| GA150WC              | 1500          | lb | Gate    | Weld | BB OS&Y | 23   |
| GA150RC              | 1500          | lb | Gate    | RF   | BB OS&Y | 23   |
| GA150JC              | 1500          | lb | Gate    | RTJ  | BB OS&Y | 23   |
| GA250WC              | 2500          | lb | Gate    | Weld | BB OS&Y | 24   |
| GA250RC              | 2500          | lb | Gate    | RF   | BB OS&Y | 24   |
| GA250JC              | 2500          | lb | Gate    | RTJ  | BB OS&Y | 24   |
| GA064WC              | 600           | lb | Gate    | Weld | PS OS&Y | 27   |
| GA064RC              | 600           | lb | Gate    | RF   | PS OS&Y | 27   |
| GA064JC              | 600           | lb | Gate    | RTJ  | PS OS&Y | 27   |
| GA094WC              | 900           | lb | Gate    | Weld | PS OS&Y | 28   |
| GA094RC              | 900           | lb | Gate    | RF   | PS OS&Y | 28   |
| GA094JC              | 900           | lb | Gate    | RTJ  | PS OS&Y | 28   |
| GA154WC              | 1500          | lb | Gate    | Weld | PS OS&Y | 29   |
| GA154RC              | 1500          | lb | Gate    | RF   | PS OS&Y | 29   |
| GA154JC              | 1500          | lb | Gate    | RTJ  | PS OS&Y | 29   |
| GA254WC              | 2500          | lb | Gate    | Weld | PS OS&Y | 30   |
| GA254RC              | 2500          | lb | Gate    | RF   | PS OS&Y | 30   |
| GA254JC              | 2500          | lb | Gate    | RTJ  | PS OS&Y | 30   |
| GL010RA              | 150           | lb | Globe   | RF   | BB OS&Y | 33   |
| GL010WA              | 150           | lb | Globe   | Weld | BB OS&Y | 33   |
| GL030RA              | 300           | lb | Globe   | RF   | BB OS&Y | 34   |
| GL030JA              | 300           | lb | Globe   | RTJ  | BB OS&Y | 34   |
| GL030WA              | 300           | lb | Globe   | Weld | BB OS&Y | 34   |
| GL060RA              | 600           | lb | Globe   | RF   | BB OS&Y | 35   |
| GL060JA              | 600           | lb | Globe   | RTJ  | BB OS&Y | 35   |
| GL060WA              | 600           | lb | Globe   | Weld | BB OS&Y | 35   |
| GL090JB              | 900           | lb | Globe   | RTJ  | BB OS&Y | 36   |
| GL090RB              | 900           | lb | Globe   | RF   | BB OS&Y | 36   |
| GL090WB              | 900           | lb | Globe   | Weld | BB OS&Y | 36   |
| GL150JB              | 1500          | lb | Globe   | RTJ  | BB OS&Y | 37   |
| GL150RB              | 1500          | lb | Globe   | RF   | BB OS&Y | 37   |
| GL150WB              | 1500          | lb | Globe   | Weld | BB OS&Y | 37   |
| GL250JB              | 2500          | lb | Globe   | RTJ  | BB OS&Y | 38   |
| GL250RB              | 2500          | lb | Globe   | RF   | BB OS&Y | 38   |
| GL250WB              | 2500          | lb | Globe   | Weld | BB OS&Y | 38   |
| GL064WB              | 600           | lb | Globe   | Weld | PS OS&Y | 41   |
| GL064RB              | 600           | lb | Globe   | RF   | PS OS&Y | 41   |
| GL064JB              | 600           | lb | Globe   | RTJ  | PS OS&Y | 41   |
| GL094WB              | 900           | lb | Globe   | Weld | PS OS&Y | 42   |
| GL094RB              | 900           | lb | Globe   | RF   | PS OS&Y | 42   |
| GL094JB              | 900           | lb | Globe   | RTJ  | PS OS&Y | 42   |
| GL154WB              | 1500          | lb | Globe   | Weld | PS OS&Y | 43   |
| GL154RB              | 1500          | lb | Globe   | RF   | PS OS&Y | 43   |
| GL154JB              | 1500          | lb | Globe   | RTJ  | PS OS&Y | 43   |
| GL254WB              | 2500          | lb | Globe   | Weld | PS OS&Y | 44   |
| GL254RB              | 2500          | lb | Globe   | RF   | PS OS&Y | 44   |
| GL254JB              | 2500          | lb | Globe   | RTJ  | PS OS&Y | 44   |
| YG094WB              | 900           | lb | Y-Globe | Weld | PS OS&Y | 47   |
| YG094RB              | 900           | lb | Y-Globe | RF   | PS OS&Y | 47   |
| YG094JB              | 900           | lb | Y-Globe | RTJ  | PS OS&Y | 47   |

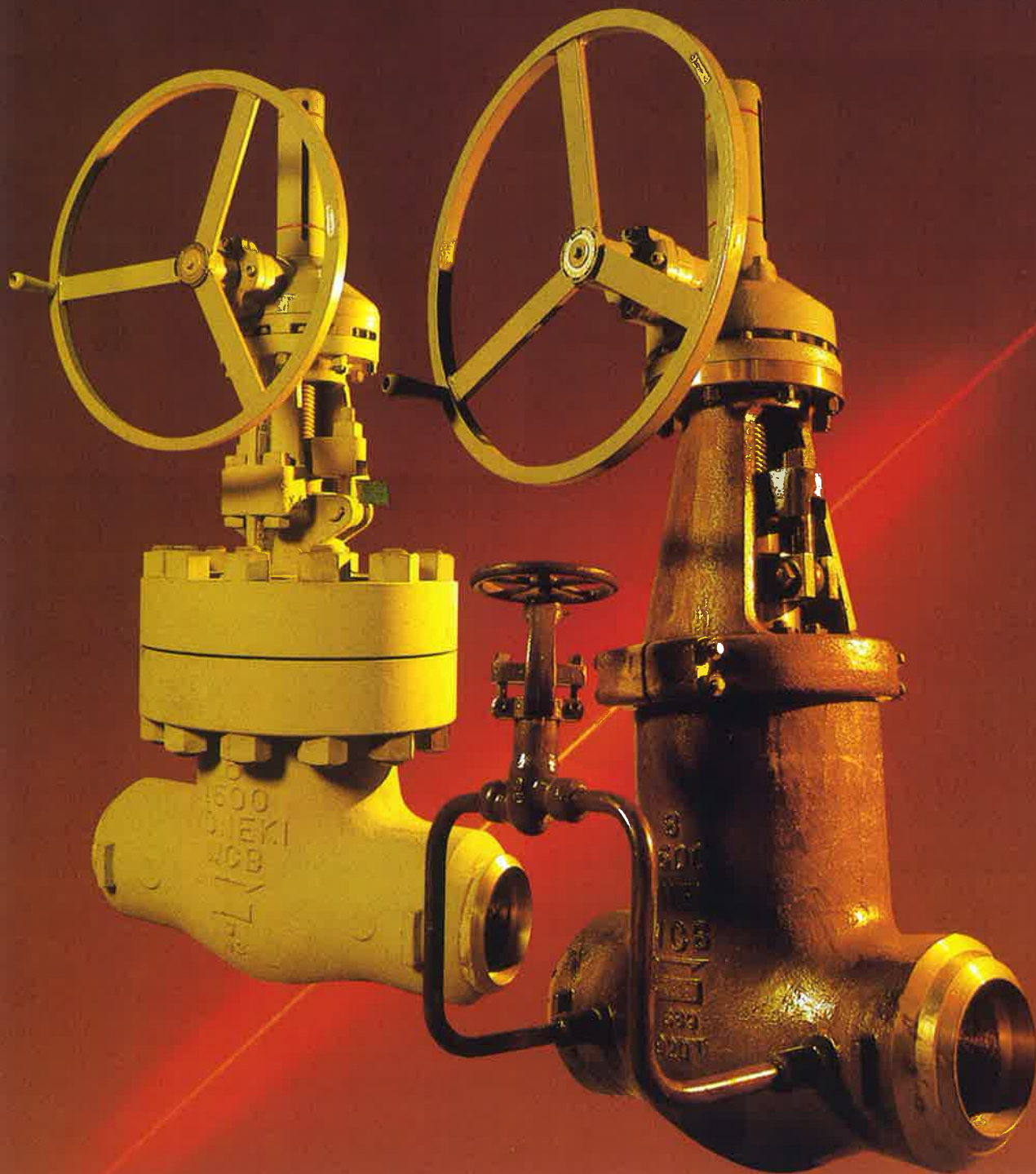
| YONEKI<br>FIGURE NO. | TYPE OF VALVE |    |         |      |                                         | PAGE |
|----------------------|---------------|----|---------|------|-----------------------------------------|------|
| YG154WB              | 1500          | lb | Y-Globe | Weld | PS OS&Y                                 | 48   |
| YG154RB              | 1500          | lb | Y-Globe | RF   | PS OS&Y                                 | 48   |
| YG154JB              | 1500          | lb | Y-Globe | RTJ  | PS OS&Y                                 | 48   |
| YG254WB              | 2500          | lb | Y-Globe | Weld | PS OS&Y                                 | 49   |
| YG254RB              | 2500          | lb | Y-Globe | RF   | PS OS&Y                                 | 49   |
| YG254JB              | 2500          | lb | Y-Globe | RTJ  | PS OS&Y                                 | 49   |
| SC010RA              | 150           | lb | Check   | RF   | BC Swing                                | 53   |
| SC010WA              | 150           | lb | Check   | Weld | BC Swing                                | 53   |
| SC030RA              | 300           | lb | Check   | RF   | BC Swing                                | 54   |
| SC030JA              | 300           | lb | Check   | RTJ  | BC Swing                                | 54   |
| SC030WA              | 300           | lb | Check   | Weld | BC Swing                                | 54   |
| SC060RA              | 600           | lb | Check   | RF   | BC Swing                                | 55   |
| SC060JA              | 600           | lb | Check   | RTJ  | BC Swing                                | 55   |
| SC060WA              | 600           | lb | Check   | Weld | BC Swing                                | 55   |
| SC090WC              | 900           | lb | Check   | Weld | BC Swing                                | 56   |
| SC090RC              | 900           | lb | Check   | RF   | BC Swing                                | 56   |
| SC090JC              | 900           | lb | Check   | RTJ  | BC Swing                                | 56   |
| SC150WC              | 1500          | lb | Check   | Weld | BC Swing                                | 57   |
| SC150RC              | 1500          | lb | Check   | RF   | BC Swing                                | 57   |
| SC150JC              | 1500          | lb | Check   | RTJ  | BC Swing                                | 57   |
| SC250WC              | 2500          | lb | Check   | Weld | BC Swing                                | 58   |
| SC250RC              | 2500          | lb | Check   | RF   | BC Swing                                | 58   |
| SC250JC              | 2500          | lb | Check   | RTJ  | BC Swing                                | 58   |
| SC064RA              | 600           | lb | Check   | RF   | PS Swing                                | 61   |
| SC064JA              | 600           | lb | Check   | RTJ  | PS Swing                                | 61   |
| SC064WA              | 600           | lb | Check   | Weld | PS Swing                                | 61   |
| SC094WC              | 900           | lb | Check   | Weld | PS Swing                                | 62   |
| SC094RC              | 900           | lb | Check   | RF   | PS Swing                                | 62   |
| SC094JC              | 900           | lb | Check   | RTJ  | PS Swing                                | 62   |
| SC154WC              | 1500          | lb | Check   | Weld | PS Swing                                | 63   |
| SC154RC              | 1500          | lb | Check   | RF   | PS Swing                                | 63   |
| SC154JC              | 1500          | lb | Check   | RTJ  | PS Swing                                | 63   |
| SC254WC              | 2500          | lb | Check   | Weld | PS Swing                                | 64   |
| SC254RC              | 2500          | lb | Check   | RF   | PS Swing                                | 64   |
| SC254JC              | 2500          | lb | Check   | RTJ  | PS Swing                                | 64   |
| TC010RA              | 150           | lb | Check   | RF   | Tilting<br>(Two Piece Body)             | 67   |
| TC030RA              | 300           | lb | Check   | RF   | Tilting<br>(Two Piece Body)             | 68   |
| TC060RA              | 600           | lb | Check   | RF   | Tilting<br>(Two Piece Body)             | 69   |
| TC060WA              | 600           | lb | Check   | Weld | Tilting<br>(Two Piece Body)             | 69   |
| TY010RC              | 150           | lb | Check   | RF   | YONEKI TYPE Tilting<br>(One Piece Body) | 73   |
| TY030RC              | 300           | lb | Check   | RF   | YONEKI TYPE Tilting<br>(One Piece Body) | 74   |
| TY060RC              | 600           | lb | Check   | RF   | YONEKI TYPE Tilting<br>(One Piece Body) | 75   |
| TY060WC              | 600           | lb | Check   | Weld | YONEKI TYPE Tilting<br>(One Piece Body) | 75   |
| TC094WC              | 900           | lb | Check   | Weld | PS Tilting                              | 79   |
| TC094RC              | 900           | lb | Check   | RF   | PS Tilting                              | 79   |
| TC094JC              | 900           | lb | Check   | RTJ  | PS Tilting                              | 79   |
| TC154WC              | 1500          | lb | Check   | Weld | PS Tilting                              | 80   |
| TC154RC              | 1500          | lb | Check   | RF   | PS Tilting                              | 80   |
| TC154JC              | 1500          | lb | Check   | RTJ  | PS Tilting                              | 80   |
| TC254WC              | 2500          | lb | Check   | Weld | PS Tilting                              | 81   |
| TC254RC              | 2500          | lb | Check   | RF   | PS Tilting                              | 81   |
| TC254JC              | 2500          | lb | Check   | RTJ  | PS Tilting                              | 81   |

# QUALITY ASSURANCE

OUR QUALITY ASSURANCE SYSTEM HAS BEEN VERY EFFECTIVE, AS WE HAVE GAINED THE REPUTATION FOR PRODUCING VERY HIGH QUALITY VALVES. OUR CUSTOMERS HAVE THE CONFIDENCE IN KNOWING THAT NO VALVE WILL BE SHIPPED FROM OUR FACTORY UNTIL IT HAS UNDERGONE THE MOST STRINGENT QUALITY CONTROL, TESTING, AND INSPECTION PROCEDURES.

WE HAVE THE CAPABILITY TO PERFORM ALL POSSIBLE NON-DESTRUCTIVE TESTS INCLUDING RADIOGRAPHIC, MAGNETIC PARTICLE, ULTRA-SONIC, AND LIQUID PENETRANT EXAMINATIONS.

OUR METALLURGISTS AND MECHANICAL ENGINEERS ARE CONSTANTLY TRYING TO DEVELOP NEW AND IMPROVED TECHNOLOGY, SO WE CAN ALWAYS OFFER THE HIGHEST QUALITY VALVES PRODUCED IN THE WORLD. OUR RESEARCH PERSONNEL HAVE AVAILABLE A WIDE RANGE OF MODERN EQUIPMENT TO CARRY OUT THEIR RESEARCH.

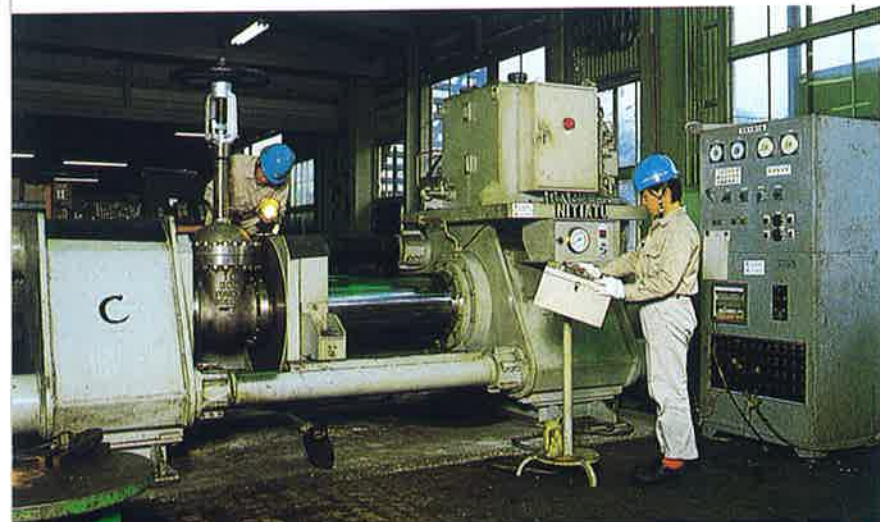


# INSPECTION AND TESTING

INSPECTION AND TESTING IS A VERY IMPORTANT PART OF OUR MANUFACTURING PROCESS. OUR INSPECTION ENGINEERS HAVE AT THEIR DISPOSAL THE NECESSARY EQUIPMENT AND TECHNIQUE TO COMPLY WITH INSPECTION AND TESTING REQUIREMENTS OF EACH CUSTOMER'S SPECIFICATION.

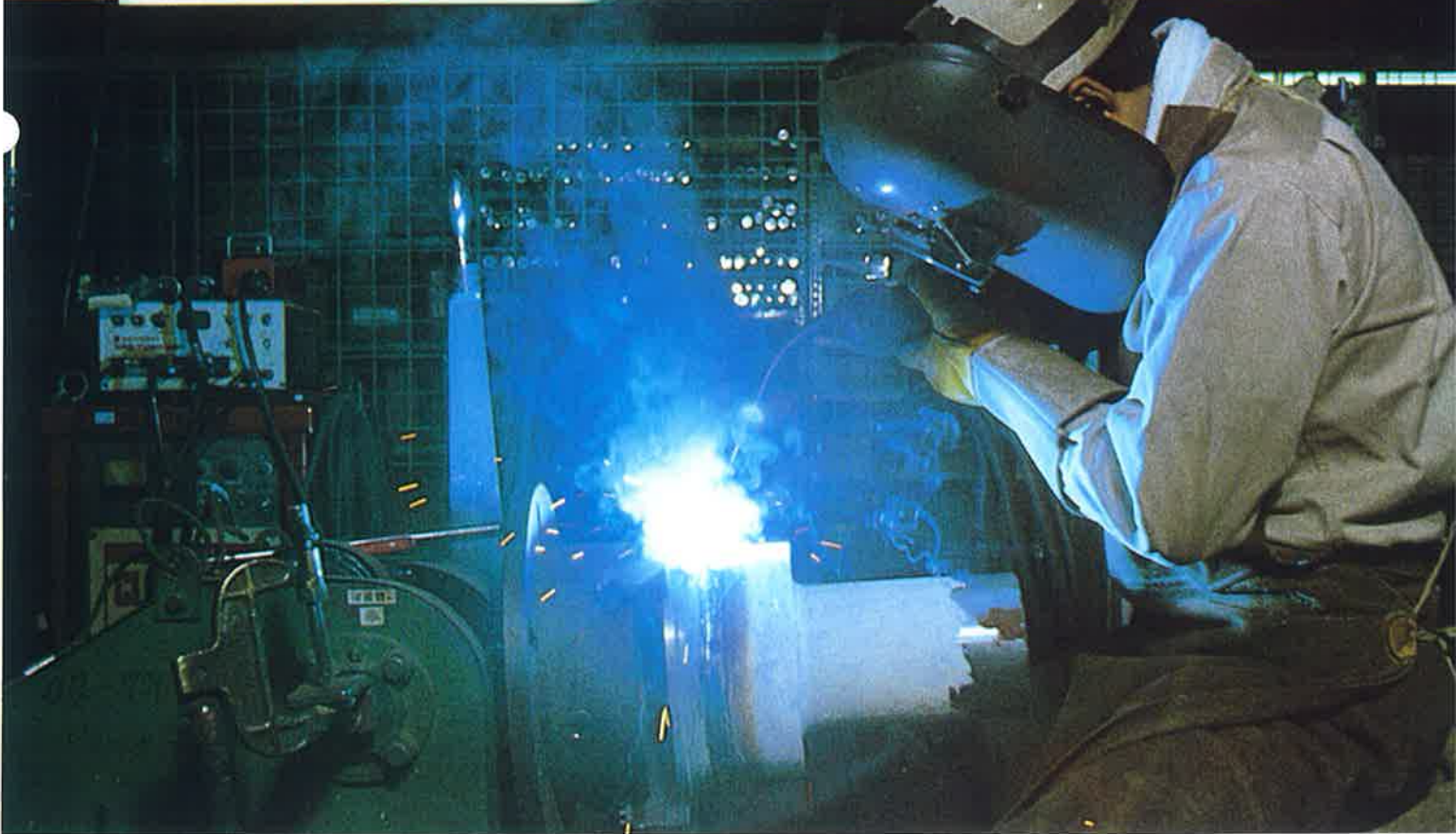
OUR TESTING EQUIPMENT INCLUDES NON-DESTRUCTIVE TESTING, BOILER TESTING, AND CRYOGENIC SERVICE TESTING EQUIPMENT. THESE TESTING EQUIPMENT GUARANTEES PRODUCT QUALITY AND DEPENDABILITY TO OUR CUSTOMERS.

OUR CAPABILITY ENCOMPASSES ALL TEMPERATURE AND PRESSURE RANGES, FROM VERY LOW TO VERY HIGH TEMPERATURE AND PRESSURE RATINGS. IT IS BECAUSE OF ALL THESE INSPECTION AND TESTING PROCEDURES THAT YOU CAN BE SURE THE VALVES WILL PERFORM EFFICIENTLY AND DEPENDABLY IN THE FIELD, WHEN YOU BUY YONEKI VALVES.

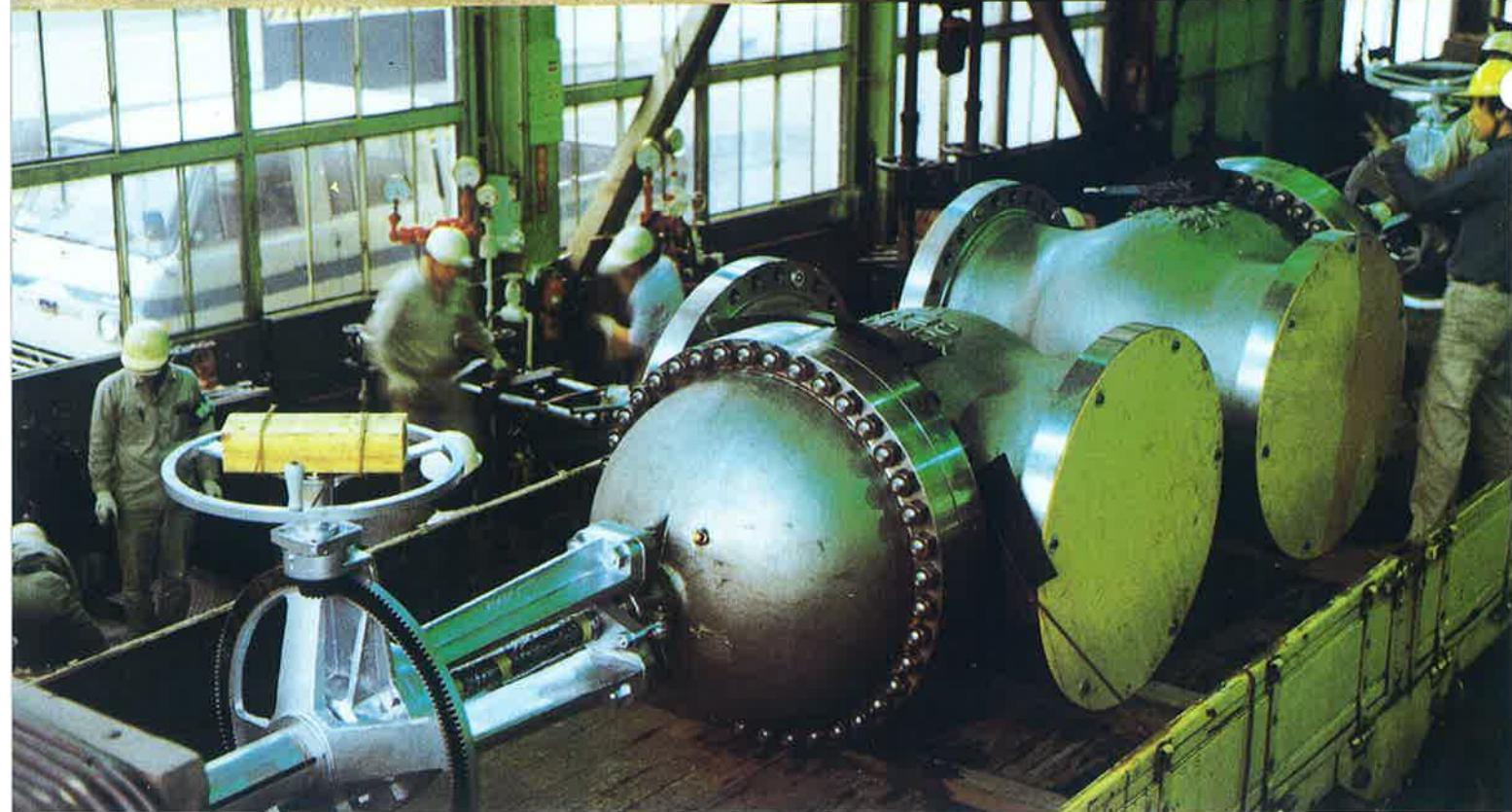


# MANUFACTURING

OUR CONSCIENTIOUS FACTORY PERSONNEL ARE HIGHLY MOTIVATED TO PRODUCE HIGH QUALITY VALVES, STRICTLY ADHERING TO DRAWINGS PERPARED BY OUR RENOWNED ENGINEERING STAFF. OUR MANUFACTURING PROCESS HAS ONLY ONE GOAL, TO PRODUCE THE BEST VALVES WITH THE BEST EQUIPMENT AND TECHNOLOGY AVAILABLE. YOU CAN BE ASSURED THAT ALL OF OUR MANUFACTURING SKILLS, REFINED OVER MANY YEARS, ARE USED IN EVERY VALVE STAMPED WITH THE NAME YONEKI. THIS IS YOUR ASSURANCE THAT YOU HAVE PURCHASED THE BEST VALVE AVAILABLE IN THE WORLD.



# DELIVERY



# APPLICATIONS



# LIST OF MATERIAL SPECIFICATIONS

## (ASME B16.34–1996 / JPI– 75–65–2000)

### TABLE 2

| Material Group No. | Nominal Designation Steel                                                                                | Applicable ASTM Specifications               |                                                              | Applicable JIS Specifications                   |                                         |
|--------------------|----------------------------------------------------------------------------------------------------------|----------------------------------------------|--------------------------------------------------------------|-------------------------------------------------|-----------------------------------------|
|                    |                                                                                                          | Forging Spec.-Grade Notes                    | Casting Spec.-Grade Notes                                    | Forging Spec.-Grade Notes                       | Casting Spec.-Grade Notes               |
| 1.1                | Carbon                                                                                                   | A105 (1)(3)<br>A350-LF2 (1)                  | A216-WCB (1)                                                 | G3203-SFVC-2A (1)(3)<br>G3205-SFL2 (1)          | G5151-SCPH2 (1)                         |
| 1.2                | Carbon<br><br>2— <sup>1</sup> / <sub>2</sub> Ni<br><br>3— <sup>1</sup> / <sub>2</sub> Ni                 |                                              | A216-WCC (1)<br>A352-LCC (8)<br>A352-LC2 (8)<br>A352-LC3 (8) |                                                 | G5152-SCPL21 (8)<br>G5152-SCPL31 (8)    |
| 1.3                | Carbon                                                                                                   |                                              | A352-LCB (8)                                                 |                                                 | G5152-SCPL1 (8)                         |
| 1.5                | C— <sup>1</sup> / <sub>2</sub> Mo                                                                        | A182-F1 (2)                                  | A217-WC1 (2)(4)<br>A352-LC1 (8)                              | G3203-SFVA F1 (2)                               | G5151-SCPH11 (2)(4)<br>G5152-SCPL11 (8) |
| 1.9                | 1Cr— <sup>1</sup> / <sub>2</sub> Mo<br>1— <sup>1</sup> / <sub>4</sub> Cr— <sup>1</sup> / <sub>2</sub> Mo | A182-F12 Cl.2 (4)(9)<br>A182-F11 Cl.2 (4)(9) | A217-WC6 (4)(10)                                             | G3203-SFVA F12 (4)(9)<br>G3203-SFVA F11A (4)(9) | G5151-SCPH21 (4)(10)                    |
| 1.10               | 2— <sup>1</sup> / <sub>4</sub> Cr— <sup>1</sup> / <sub>2</sub> Mo                                        | A182-F22 Cl.3 (9)                            | A217-WC9 (4)(10)                                             | G3203-SFVA F22B (9)                             | G5151-SCPH32 (4)(10)                    |
| 1.13               | 5Cr— <sup>1</sup> / <sub>2</sub> Mo                                                                      | A182-F5a<br>A182-F5                          | A217-C5 (4)                                                  | G3203-SFVA F5D<br>G3203-SFVA F5B                | G5151-SCPH61 (4)                        |
| 1.14               | 9Cr—1Mo                                                                                                  | A182-F9                                      | A217-C12 (4)                                                 | G3203-SFVA F9                                   |                                         |
| 2.1                | 18Cr—8Ni                                                                                                 | A182-F304 (5)<br>A182-F304H                  | A351-CF8 (5)<br>A351-CF3 (11)                                | G3214-SUSF304 (5)                               | G5121-SCS13A (5)<br>G5121-SCS19A (11)   |
| 2.2                | 16Cr—12Ni—2Mo<br>18Cr—9Ni—2Mo                                                                            | A182-F316 (5)<br>A182-F316H                  | A351-CF3M (12)<br>A351-CF8M (5)                              | G3214-SUSF316 (5)                               | G5121-SCS16A (12)<br>G5121-SCS14A (5)   |
| 2.3                | 18Cr—8Ni<br>16Cr—12Ni—2Mo                                                                                | A182-F304L (11)<br>A182-F316L (12)           |                                                              | G3214-SUSF304L (11)<br>G3214-SUSF316L (12)      |                                         |
| 2.4                | 18Cr—10Ni—Ti                                                                                             | A182-F321 (13)<br>A182-F321H (14)            |                                                              | G3214-SUSF321 (13)<br>G3214-SUSF321H (14)       |                                         |
| 2.5                | 18Cr—10Ni—Cb                                                                                             | A182-F347 (13)<br>A182-F347H (14)            | A351-CF8C (5)                                                | G3214-SUSF321 (13)<br>G3214-SUSF321H (14)       | G5121-SCS21 (5)                         |
| 3.1                | Cr—Ni—Fe—Mo<br>—Cu—Cb                                                                                    | B462 N08020 (6)                              | A351-CN7M (7)                                                |                                                 |                                         |

#### NOTES:

- (1) Upon prolonged exposure to temperatures above about 800°F (427°C), the carbide phase of steel may be converted to graphite.
- (2) Upon prolonged exposure to temperatures above about 875°F (468°C), the carbide phase of carbon-molybdenum steel may be converted to graphite.
- (3) Only killed steel shall be used above 850°F (454°C).
- (4) Use normalized and tempered material only.
- (5) At temperatures over 1,000°F (538°C), use only when the carbon content is 0.04% or higher.
- (6) Use annealed material only.
- (7) Use solution annealed material only.
- (8) Not to be used over 650°F (343°C).
- (9) Permissible, but not recommended for prolonged use above 1,100°F (593°C).
- (10) Not to be used over 1,100°F (593°C).
- (11) Not to be used over 800°F (427°C).
- (12) Not to be used over 850°F (454°C).
- (13) Not to be used over 1,000°F (538°C).
- (14) At temperature over 1,000°F (540°C), use only if the material is heat treated by heating to a minimum temperature of 2,000°F (1093°C).

# PRESSURE-TEMPERATURE RATINGS (ASME B16.34-1996)

## CLASS 150

Pressures are in pounds per square inch (psig.)

| Materials                        | Carbon Steel |                 |             | Carbon<br>—1/2Mo | 1 1/4Cr<br>—1/2Mo | 2 1/4Cr<br>—1Mo  | 5Cr<br>—1/2Mo  | 18Cr—8Ni              | 18Cr<br>—9Ni<br>—2Mo  | 18Cr<br>—10Ni<br>—Ti  | 18Cr<br>—10Ni<br>—Cb  |
|----------------------------------|--------------|-----------------|-------------|------------------|-------------------|------------------|----------------|-----------------------|-----------------------|-----------------------|-----------------------|
|                                  | A216<br>WCB  | A216<br>WCC     |             | A217<br>WC1      | A217<br>WC6       | A217<br>WC9      | A217<br>C5     | A351<br>CF8           | A351<br>CF8M          |                       | A351<br>CF8C          |
|                                  | A105         | A352<br>LCC     | A352<br>LCB | A182<br>F1       | A182<br>F11 Cl.2  | A182<br>F22 Cl.3 | A182<br>F5,F5a | A351<br>CF3           | A351<br>CF3M          | A182<br>F321<br>F321H | A182<br>F347<br>F347H |
|                                  | A350<br>LF2  | A352<br>LC2,LC3 |             | A352<br>LC1      | A182<br>F12 Cl.2  |                  |                | A182<br>F304<br>F304H | A182<br>F316<br>F316H |                       |                       |
|                                  |              | A350<br>LF3     |             |                  |                   |                  |                |                       |                       |                       |                       |
| Temperature<br>Deg.F.            |              |                 |             |                  |                   |                  |                |                       |                       |                       |                       |
| -20 to 100                       | 285          | 290             | 265         | 265              | 290               | 290              | 290            | 275                   | 275                   | 275                   | 275                   |
| 200                              | 260          | 260             | 250         | 260              | 260               | 260              | 260            | 230                   | 235                   | 245                   | 255                   |
| 300                              | 230          | 230             | 230         | 230              | 230               | 230              | 230            | 205                   | 205                   | 230                   | 230                   |
| 400                              | 200          | 200             | 200         | 200              | 200               | 200              | 200            | 190                   | 190                   | 200                   | 190                   |
| 500                              | 170          | 170             | 170         | 170              | 170               | 170              | 170            | 170                   | 170                   | 170                   | 170                   |
| 600                              | 140          | 140             | 140         | 140              | 140               | 140              | 140            | 140                   | 140                   | 140                   | 140                   |
| 650                              | 125          | 125             | 125         | 125              | 125               | 125              | 125            | 125                   | 125                   | 125                   | 125                   |
| 700                              | 110          | 110             | 110         | 110              | 110               | 110              | 110            | 110                   | 110                   | 110                   | 110                   |
| 750                              | 95           | 95              | 95          | 95               | 95                | 95               | 95             | 95                    | 95                    | 95                    | 95                    |
| 800                              | 80           | 80              | 80          | 80               | 80                | 80               | 80             | 80                    | 80                    | 80                    | 80                    |
| 850                              | 65           | 65              | 65          | 65               | 65                | 65               | 65             | 65                    | 65                    | 65                    | 65                    |
| 900                              | 50           | 50              | 50          | 50               | 50                | 50               | 50             | 50                    | 50                    | 50                    | 50                    |
| 950                              | 35           | 35              | 35          | 35               | 35                | 35               | 35             | 35                    | 35                    | 35                    | 35                    |
| 1,000                            | 20           | 20              | 20          | 20               | 20                | 20               | 20             | 20                    | 20                    | 20                    | 20                    |
| 1,050                            |              |                 |             |                  | 20(1)             | 20(1)            | 20(1)          | 20(1)                 | 20(1)                 | 20(1)                 | 20(1)                 |
| 1,100                            |              |                 |             |                  | 20(1)             | 20(1)            | 20(1)          | 20(1)                 | 20(1)                 | 20(1)                 | 20(1)                 |
| 1,150                            |              |                 |             |                  | 20(1)             | 20(1)            | 20(1)          | 20(1)                 | 20(1)                 | 20(1)                 | 20(1)                 |
| 1,200                            |              |                 |             |                  | 15(1)             | 20(1)            | 15(1)          | 20(1)                 | 20(1)                 | 20(1)                 | 20(1)                 |
| 1,250                            |              |                 |             |                  |                   |                  |                | 20(1)                 | 20(1)                 | 20(1)                 | 20(1)                 |
| 1,300                            |              |                 |             |                  |                   |                  |                | 20(1)                 | 20(1)                 | 20(1)                 | 20(1)                 |
| 1,350                            |              |                 |             |                  |                   |                  |                | 20(1)                 | 20(1)                 | 20(1)                 | 20(1)                 |
| 1,400                            |              |                 |             |                  |                   |                  |                | 20(1)                 | 20(1)                 | 20(1)                 | 20(1)                 |
| 1,450                            |              |                 |             |                  |                   |                  |                | 15(1)                 | 20(1)                 | 20(1)                 | 15(1)                 |
| 1,500                            |              |                 |             |                  |                   |                  |                | 10(1)                 | 20(1)                 | 20(1)                 | 15(1)                 |
| Hydrostatic<br>Shell Test Press. | 450          | 450             | 400         | 400              | 450               | 450              | 450            | 425                   | 425                   | 425                   | 425                   |
| Hydrostatic<br>Seat Test Press.  | 314          | 319             | 292         | 292              | 319               | 319              | 319            | 303                   | 303                   | 303                   | 303                   |
| Hydrostatic<br>Seat Test Press.  | 80           |                 |             |                  |                   |                  |                |                       |                       |                       |                       |

### NOTES:

- (1) For welding end valves only.  
Flanged end rating terminate at 1,000°F (540°C).
- (2) This pressure-temperature rating table shall be applied to STANDARD CLASS VALVES of flanged and butt welding ends type.
- (3) With regards to service temperature limit for each material and other conditions.  
Please refer to the TABLE 2 "LIST OF MATERIAL SPECIFICATIONS" in the accompanying sheet.

# PRESSURE-TEMPERATURE RATINGS

## (ASME B16.34-1996)

### CLASS 300

Pressures are in pounds per square inch (psig.)

| Materials                        | Carbon Steel |                 |             | Carbon<br>—1/2Mo | 1 1/4Cr<br>—1/2Mo | 2 1/4Cr<br>—1Mo  | 5Cr<br>—1/2Mo  | 18Cr—8Ni              | 18Cr<br>—9Ni<br>—2Mo  | 18Cr<br>—10Ni<br>—Ti  | 18Cr<br>—10Ni<br>—Cb  |
|----------------------------------|--------------|-----------------|-------------|------------------|-------------------|------------------|----------------|-----------------------|-----------------------|-----------------------|-----------------------|
|                                  | A216<br>WCB  | A216<br>WCC     |             | A217<br>WC1      | A217<br>WC6       | A217<br>WC9      | A217<br>C5     | A351<br>CF8           | A351<br>CF8M          |                       | A351<br>CF8C          |
|                                  | A105         | A352<br>LCC     | A352<br>LCB | A182<br>F1       | A182<br>F11 Cl.2  | A182<br>F22 Cl.3 | A182<br>F5,F5a | A351<br>CF3           | A351<br>CF3M          | A182<br>F321<br>F321H | A182<br>F347<br>F347H |
|                                  | A350<br>LF2  | A352<br>LC2,LC3 |             | A352<br>LC1      | A182<br>F12 Cl.2  |                  |                | A182<br>F304<br>F304H | A182<br>F316<br>F316H |                       |                       |
|                                  |              | A350<br>LF3     |             |                  |                   |                  |                |                       |                       |                       |                       |
| Temperature<br>Deg.F.            | —20 to 100   | 740             | 750         | 695              | 695               | 750              | 750            | 750                   | 720                   | 720                   | 720                   |
|                                  | 200          | 675             | 750         | 655              | 680               | 750              | 750            | 745                   | 600                   | 620                   | 645                   |
|                                  | 300          | 655             | 730         | 640              | 655               | 720              | 730            | 715                   | 540                   | 560                   | 595                   |
|                                  |              |                 |             |                  |                   |                  |                |                       |                       |                       |                       |
|                                  | 400          | 635             | 705         | 620              | 640               | 695              | 705            | 705                   | 495                   | 515                   | 550                   |
|                                  | 500          | 600             | 665         | 585              | 620               | 665              | 665            | 665                   | 465                   | 480                   | 515                   |
|                                  | 600          | 550             | 605         | 535              | 605               | 605              | 605            | 605                   | 435                   | 450                   | 485                   |
|                                  |              |                 |             |                  |                   |                  |                |                       |                       |                       |                       |
|                                  | 650          | 535             | 590         | 525              | 590               | 590              | 590            | 590                   | 430                   | 445                   | 480                   |
|                                  | 700          | 535             | 570         | 520              | 570               | 570              | 570            | 570                   | 425                   | 430                   | 465                   |
|                                  | 750          | 505             | 505         | 475              | 530               | 530              | 530            | 530                   | 415                   | 425                   | 460                   |
|                                  |              |                 |             |                  |                   |                  |                |                       |                       |                       |                       |
|                                  | 800          | 410             | 410         | 390              | 510               | 510              | 510            | 510                   | 405                   | 420                   | 450                   |
|                                  | 850          | 270             | 270         | 270              | 485               | 485              | 485            | 485                   | 395                   | 420                   | 445                   |
|                                  | 900          | 170             | 170         | 170              | 450               | 450              | 450            | 370                   | 390                   | 415                   | 440                   |
|                                  |              |                 |             |                  |                   |                  |                |                       |                       |                       |                       |
|                                  | 950          | 105             | 105         | 105              | 280               | 320              | 375            | 275                   | 380                   | 385                   | 385                   |
|                                  | 1,000        | 50              | 50          | 50               | 165               | 215              | 260            | 200                   | 320                   | 350                   | 355                   |
|                                  | 1,050        |                 |             |                  |                   | 145              | 175            | 145                   | 310                   | 345                   | 315                   |
|                                  |              |                 |             |                  |                   |                  |                |                       |                       |                       |                       |
|                                  | 1,100        |                 |             |                  |                   | 95               | 110            | 100                   | 255                   | 305                   | 270                   |
|                                  | 1,150        |                 |             |                  |                   | 60               | 70             | 60                    | 200                   | 235                   | 235                   |
|                                  | 1,200        |                 |             |                  |                   | 40               | 40             | 35                    | 155                   | 185                   | 185                   |
|                                  |              |                 |             |                  |                   |                  |                |                       |                       |                       |                       |
|                                  | 1,250        |                 |             |                  |                   |                  |                |                       | 115                   | 145                   | 140                   |
|                                  | 1,300        |                 |             |                  |                   |                  |                |                       | 85                    | 115                   | 110                   |
|                                  | 1,350        |                 |             |                  |                   |                  |                |                       | 60                    | 95                    | 85                    |
|                                  |              |                 |             |                  |                   |                  |                |                       |                       |                       |                       |
|                                  | 1,400        |                 |             |                  |                   |                  |                |                       | 50                    | 75                    | 65                    |
|                                  | 1,450        |                 |             |                  |                   |                  |                |                       | 35                    | 60                    | 50                    |
|                                  | 1,500        |                 |             |                  |                   |                  |                |                       | 25                    | 40                    | 40                    |
|                                  |              |                 |             |                  |                   |                  |                |                       |                       |                       |                       |
| Hydrostatic<br>Shell Test Press. | 1,125        | 1,125           | 1,050       | 1,050            | 1,125             | 1,125            | 1,125          | 1,100                 | 1,100                 | 1,100                 | 1,100                 |
| Hydrostatic<br>Seat Test Press.  | 814          | 825             | 765         | 765              | 825               | 825              | 825            | 792                   | 792                   | 792                   | 792                   |
| Hydrostatic<br>Seat Test Press.  | 80           |                 |             |                  |                   |                  |                |                       |                       |                       |                       |

#### NOTES:

- (1) This pressure-temperature rating table shall be applied to STANDARD CLASS VALVES of flanged and butt welding ends type.
- (2) With regards to service temperature limit for each material and other conditions.  
Please refer to the TABLE 2 "LIST OF MATERIAL SPECIFICATIONS" in the accompanying sheet.

# PRESSURE-TEMPERATURE RATINGS (ASME B16.34-1996)

## CLASS 600

Pressures are in pounds per square inch (psig.)

| Materials                        | Carbon Steel |                 |             | Carbon<br>—1/2Mo | 1 1/4Cr<br>—1/2Mo | 2 1/4Cr<br>—1Mo  | 5Cr<br>—1/2Mo  | 18Cr—8Ni              | 18Cr<br>—9Ni<br>—2Mo  | 18Cr<br>—10Ni<br>—Ti  | 18Cr<br>—10Ni<br>—Cb  |
|----------------------------------|--------------|-----------------|-------------|------------------|-------------------|------------------|----------------|-----------------------|-----------------------|-----------------------|-----------------------|
|                                  | A216<br>WCB  | A216<br>WCC     |             | A217<br>WC1      | A217<br>WC6       | A217<br>WC9      | A217<br>C5     | A351<br>CF8           | A351<br>CF8M          |                       | A351<br>CF8C          |
|                                  | A105         | A352<br>LCC     | A352<br>LCB | A182<br>F1       | A182<br>F11 Cl.2  | A182<br>F22 Cl.3 | A182<br>F5,F5a | A351<br>CF3           | A351<br>CF3M          | A182<br>F321<br>F321H | A182<br>F347<br>F347H |
|                                  | A350<br>LF2  | A352<br>LC2,LC3 |             | A352<br>LC1      | A182<br>F12 Cl.2  |                  |                | A182<br>F304<br>F304H | A182<br>F316<br>F316H |                       |                       |
|                                  |              | A350<br>LF3     |             |                  |                   |                  |                |                       |                       |                       |                       |
| Temperature<br>Deg.F.            | —20 to 100   | 1,480           | 1,500       | 1,390            | 1,390             | 1,500            | 1,500          | 1,440                 | 1,440                 | 1,440                 | 1,440                 |
|                                  | 200          | 1,350           | 1,500       | 1,315            | 1,360             | 1,500            | 1,490          | 1,200                 | 1,240                 | 1,290                 | 1,320                 |
|                                  | 300          | 1,315           | 1,455       | 1,275            | 1,305             | 1,445            | 1,430          | 1,080                 | 1,120                 | 1,190                 | 1,230                 |
|                                  | 400          | 1,270           | 1,410       | 1,235            | 1,280             | 1,385            | 1,410          | 995                   | 1,025                 | 1,105                 | 1,145                 |
|                                  | 500          | 1,200           | 1,330       | 1,165            | 1,245             | 1,330            | 1,330          | 930                   | 955                   | 1,030                 | 1,080                 |
|                                  | 600          | 1,095           | 1,210       | 1,065            | 1,210             | 1,210            | 1,210          | 875                   | 900                   | 975                   | 1,025                 |
|                                  | 650          | 1,075           | 1,175       | 1,045            | 1,175             | 1,175            | 1,175          | 860                   | 890                   | 955                   | 1,010                 |
|                                  | 700          | 1,065           | 1,135       | 1,035            | 1,135             | 1,135            | 1,135          | 850                   | 870                   | 930                   | 990                   |
|                                  | 750          | 1,010           | 1,010       | 945              | 1,065             | 1,065            | 1,055          | 830                   | 855                   | 915                   | 985                   |
|                                  | 800          | 825             | 825         | 780              | 1,015             | 1,015            | 1,015          | 805                   | 845                   | 900                   | 975                   |
|                                  | 850          | 535             | 535         | 535              | 975               | 975              | 965            | 790                   | 835                   | 895                   | 970                   |
|                                  | 900          | 345             | 345         | 345              | 900               | 900              | 740            | 780                   | 830                   | 885                   | 900                   |
|                                  | 950          | 205             | 205         | 205              | 560               | 640              | 755            | 765                   | 775                   | 775                   | 775                   |
|                                  | 1,000        | 105             | 105         | 105              | 330               | 430              | 520            | 640                   | 700                   | 715                   | 725                   |
|                                  | 1,050        |                 |             |                  |                   | 290              | 350            | 615                   | 685                   | 625                   | 720                   |
|                                  | 1,100        |                 |             |                  |                   | 190              | 220            | 515                   | 610                   | 545                   | 645                   |
|                                  | 1,150        |                 |             |                  |                   | 125              | 135            | 400                   | 475                   | 370                   | 550                   |
|                                  | 1,200        |                 |             |                  |                   | 75               | 80             | 310                   | 370                   | 365                   | 345                   |
|                                  | 1,250        |                 |             |                  |                   |                  |                | 225                   | 295                   | 280                   | 245                   |
|                                  | 1,300        |                 |             |                  |                   |                  |                | 170                   | 235                   | 220                   | 185                   |
|                                  | 1,350        |                 |             |                  |                   |                  |                | 125                   | 190                   | 170                   | 135                   |
|                                  | 1,400        |                 |             |                  |                   |                  |                | 95                    | 150                   | 130                   | 110                   |
|                                  | 1,450        |                 |             |                  |                   |                  |                | 70                    | 115                   | 105                   | 80                    |
|                                  | 1,500        |                 |             |                  |                   |                  |                | 55                    | 85                    | 75                    | 70                    |
| Hydrostatic<br>Shell Test Press. | 2,225        | 2,250           | 2,100       | 2,100            | 2,250             | 2,250            | 2,250          | 2,175                 | 2,175                 | 2,175                 | 2,175                 |
| Hydrostatic<br>Seat Test Press.  | 1,628        | 1,650           | 1,529       | 1,529            | 1,650             | 1,650            | 1,650          | 1,584                 | 1,584                 | 1,584                 | 1,584                 |
| Hydrostatic<br>Seat Test Press.  | 80           |                 |             |                  |                   |                  |                |                       |                       |                       |                       |

### NOTES:

- (1) This pressure-temperature rating table shall be applied to STANDARD CLASS VALVES of flanged and buttwelding ends type.
- (2) With regards to service temperature limit for each material and other conditions.  
Please refer to the TABLE 2 "LIST OF MATERIAL SPECIFICATIONS" in the accompanying sheet.

# PRESSURE-TEMPERATURE RATINGS (ASME B16.34-1996)

## CLASS 900

Pressures are in pounds per square inch (psig.)

| Materials                        | Carbon Steel |                 |             | Carbon<br>-1/2Mo | 1 1/4Cr<br>-1/2Mo | 2 1/4Cr<br>-1Mo  | 5Cr<br>-1/2Mo  | 18Cr-8Ni              | 18Cr<br>-9Ni<br>-2Mo  | 18Cr<br>-10Ni<br>-Ti  | 18Cr<br>-10Ni<br>-Cb  |
|----------------------------------|--------------|-----------------|-------------|------------------|-------------------|------------------|----------------|-----------------------|-----------------------|-----------------------|-----------------------|
|                                  | A216<br>WCB  | A216<br>WCC     |             | A217<br>WC1      | A217<br>WC6       | A217<br>WC9      | A217<br>C5     | A351<br>CF8           | A351<br>CF8M          |                       | A351<br>CF8C          |
|                                  | A105         | A352<br>LCC     | A352<br>LCB | A182<br>F1       | A182<br>F11 Cl.2  | A182<br>F22 Cl.3 | A182<br>F5,F5a | A351<br>CF3           | A351<br>CF3M          | A182<br>F321<br>F321H | A182<br>F347<br>F347H |
|                                  | A350<br>LF2  | A352<br>LC2,LC3 |             | A352<br>LC1      | A182<br>F12 Cl.2  |                  |                | A182<br>F304<br>F304H | A182<br>F316<br>F316H |                       |                       |
|                                  |              | A350<br>LF3     |             |                  |                   |                  |                |                       |                       |                       |                       |
| Temperature<br>Deg.F.            |              |                 |             |                  |                   |                  |                |                       |                       |                       |                       |
| -20 to 100                       | 2,220        | 2,250           | 2,085       | 2,085            | 2,250             | 2,250            | 2,250          | 2,160                 | 2,160                 | 2,160                 | 2,160                 |
| 200                              | 2,025        | 2,250           | 1,970       | 2,035            | 2,250             | 2,250            | 2,235          | 1,800                 | 1,860                 | 1,935                 | 1,980                 |
| 300                              | 1,970        | 2,185           | 1,915       | 1,955            | 2,165             | 2,185            | 2,150          | 1,620                 | 1,680                 | 1,785                 | 1,845                 |
| 400                              | 1,900        | 2,115           | 1,850       | 1,920            | 2,080             | 2,115            | 2,115          | 1,490                 | 1,540                 | 1,655                 | 1,720                 |
| 500                              | 1,795        | 1,995           | 1,745       | 1,865            | 1,995             | 1,995            | 1,995          | 1,395                 | 1,435                 | 1,545                 | 1,620                 |
| 600                              | 1,640        | 1,815           | 1,600       | 1,815            | 1,815             | 1,815            | 1,815          | 1,310                 | 1,355                 | 1,460                 | 1,540                 |
| 650                              | 1,610        | 1,765           | 1,570       | 1,765            | 1,765             | 1,765            | 1,765          | 1,290                 | 1,330                 | 1,435                 | 1,510                 |
| 700                              | 1,600        | 1,705           | 1,555       | 1,705            | 1,705             | 1,705            | 1,705          | 1,275                 | 1,305                 | 1,395                 | 1,485                 |
| 750                              | 1,510        | 1,510           | 1,420       | 1,595            | 1,595             | 1,595            | 1,585          | 1,245                 | 1,280                 | 1,375                 | 1,475                 |
| 800                              | 1,235        | 1,235           | 1,175       | 1,525            | 1,525             | 1,525            | 1,525          | 1,210                 | 1,265                 | 1,355                 | 1,460                 |
| 850                              | 805          | 805             | 805         | 1,460            | 1,460             | 1,460            | 1,450          | 1,190                 | 1,255                 | 1,340                 | 1,455                 |
| 900                              | 515          | 515             | 515         | 1,350            | 1,350             | 1,350            | 1,110          | 1,165                 | 1,245                 | 1,325                 | 1,350                 |
| 950                              | 310          | 310             | 310         | 845              | 955               | 1,130            | 825            | 1,145                 | 1,160                 | 1,160                 | 1,160                 |
| 1,000                            | 155          | 155             | 155         | 495              | 650               | 780              | 595            | 965                   | 1,050                 | 1,070                 | 1,090                 |
| 1,050                            |              |                 |             |                  | 430               | 525              | 430            | 925                   | 1,030                 | 940                   | 1,080                 |
| 1,100                            |              |                 |             |                  | 290               | 330              | 300            | 770                   | 915                   | 815                   | 965                   |
| 1,150                            |              |                 |             |                  | 185               | 205              | 185            | 595                   | 710                   | 710                   | 825                   |
| 1,200                            |              |                 |             |                  | 115               | 125              | 105            | 465                   | 555                   | 555                   | 515                   |
| 1,250                            |              |                 |             |                  |                   |                  |                | 340                   | 440                   | 420                   | 370                   |
| 1,300                            |              |                 |             |                  |                   |                  |                | 255                   | 350                   | 330                   | 280                   |
| 1,350                            |              |                 |             |                  |                   |                  |                | 185                   | 290                   | 255                   | 205                   |
| 1,400                            |              |                 |             |                  |                   |                  |                | 145                   | 225                   | 195                   | 165                   |
| 1,450                            |              |                 |             |                  |                   |                  |                | 105                   | 175                   | 155                   | 125                   |
| 1,500                            |              |                 |             |                  |                   |                  |                | 80                    | 125                   | 115                   | 105                   |
| Hydrostatic<br>Shell Test Press. | 3,350        | 3,375           | 3,150       | 3,150            | 3,375             | 3,375            | 3,375          | 3,250                 | 3,250                 | 3,250                 | 3,250                 |
| Hydrostatic<br>Seat Test Press.  | 2,442        | 2,475           | 2,294       | 2,294            | 2,475             | 2,475            | 2,475          | 2,376                 | 2,376                 | 2,376                 | 2,376                 |
| Hydrostatic<br>Seat Test Press.  | 80           |                 |             |                  |                   |                  |                |                       |                       |                       |                       |

### NOTES:

- (1) This pressure-temperature rating table shall be applied to STANDARD CLASS VALVES of flanged and buttwelding ends type.
- (2) With regards to service temperature limit for each material and other conditions.  
Please refer to the TABLE 2 "LIST OF MATERIAL SPECIFICATIONS" in the accompanying sheet.

# PRESSURE-TEMPERATURE RATINGS (ASME B16.34-1996)

## CLASS 1500

Pressures are in pounds per square inch (psig.)

| Materials                        | Carbon Steel |                    |             | Carbon<br>—1/2Mo | 1 1/4Cr<br>—1/2Mo | 2 1/4Cr<br>—1Mo  | 5Cr<br>—1/2Mo  | 18Cr—8Ni              | 18Cr<br>—9Ni<br>—2Mo  | 18Cr<br>—10Ni<br>—Ti  | 18Cr<br>—10Ni<br>—Cb  |
|----------------------------------|--------------|--------------------|-------------|------------------|-------------------|------------------|----------------|-----------------------|-----------------------|-----------------------|-----------------------|
|                                  | A216<br>WCB  | A216<br>WCC        |             | A217<br>WC1      | A217<br>WC6       | A217<br>WC9      | A217<br>C5     | A351<br>CF8           | A351<br>CF8M          |                       | A351<br>CF8C          |
|                                  | A105         | A352<br>LCC        | A352<br>LCB | A182<br>F1       | A182<br>F11 Cl.2  | A182<br>F22 Cl.3 | A182<br>F5,F5a | F304H<br>CF3          | A351<br>CF3M          | A182<br>F321<br>F321H | A182<br>F347<br>F347H |
|                                  | A350<br>LF2  | A352<br>LC2<br>LC3 |             | A352<br>LC1      | A182<br>F12 Cl.2  |                  |                | A182<br>F304<br>F304H | A182<br>F316<br>F316H |                       |                       |
| Temperature<br>Deg.F.            |              | A350<br>LF3        |             |                  |                   |                  |                |                       |                       |                       |                       |
| —20 to 100                       | 3,705        | 3,750              | 3,470       | 3,470            | 3,750             | 3,750            | 3,750          | 3,600                 | 3,600                 | 3,600                 | 3,600                 |
| 200                              | 3,375        | 3,750              | 3,280       | 3,395            | 3,750             | 3,750            | 3,725          | 3,000                 | 3,095                 | 3,230                 | 3,300                 |
| 300                              | 3,280        | 3,640              | 3,190       | 3,260            | 3,610             | 3,640            | 3,580          | 3,700                 | 2,795                 | 2,975                 | 3,070                 |
| 400                              | 3,170        | 3,530              | 3,085       | 3,200            | 3,465             | 3,530            | 3,530          | 2,485                 | 2,570                 | 2,760                 | 2,870                 |
| 500                              | 2,995        | 3,325              | 2,910       | 3,105            | 3,325             | 3,325            | 3,325          | 2,330                 | 2,390                 | 2,570                 | 2,700                 |
| 600                              | 2,735        | 3,025              | 2,665       | 3,025            | 3,025             | 3,025            | 3,025          | 2,185                 | 2,255                 | 2,435                 | 2,570                 |
| 650                              | 2,685        | 2,940              | 2,615       | 2,940            | 2,940             | 2,940            | 2,940          | 2,150                 | 2,220                 | 2,390                 | 2,520                 |
| 700                              | 2,665        | 2,840              | 2,590       | 2,840            | 2,840             | 2,840            | 2,840          | 2,125                 | 2,170                 | 2,330                 | 2,470                 |
| 750                              | 2,520        | 2,520              | 2,365       | 2,660            | 2,660             | 2,660            | 2,640          | 2,075                 | 2,135                 | 2,290                 | 2,460                 |
| 800                              | 2,060        | 2,060              | 1,955       | 2,540            | 2,540             | 2,540            | 2,540          | 2,015                 | 2,110                 | 2,255                 | 2,435                 |
| 850                              | 1,340        | 1,340              | 1,340       | 2,435            | 2,435             | 2,435            | 2,415          | 1,980                 | 2,090                 | 2,230                 | 2,425                 |
| 900                              | 860          | 860                | 860         | 2,245            | 2,245             | 2,245            | 1,850          | 1,945                 | 2,075                 | 2,210                 | 2,245                 |
| 950                              | 515          | 515                | 515         | 1,405            | 1,595             | 1,885            | 1,370          | 1,910                 | 1,930                 | 1,930                 | 1,930                 |
| 1,000                            | 260          | 260                | 260         | 825              | 1,080             | 1,305            | 995            | 1,605                 | 1,750                 | 1,785                 | 1,820                 |
| 1,050                            |              |                    |             |                  | 720               | 875              | 720            | 1,545                 | 1,720                 | 1,565                 | 1,800                 |
| 1,100                            |              |                    |             |                  | 480               | 550              | 495            | 1,285                 | 1,525                 | 1,360                 | 1,610                 |
| 1,150                            |              |                    |             |                  | 310               | 345              | 310            | 995                   | 1,185                 | 1,185                 | 1,370                 |
| 1,200                            |              |                    |             |                  | 190               | 205              | 170            | 770                   | 925                   | 925                   | 855                   |
| 1,250                            |              |                    |             |                  |                   |                  |                | 565                   | 735                   | 705                   | 615                   |
| 1,300                            |              |                    |             |                  |                   |                  |                | 430                   | 585                   | 550                   | 465                   |
| 1,350                            |              |                    |             |                  |                   |                  |                | 310                   | 480                   | 430                   | 345                   |
| 1,400                            |              |                    |             |                  |                   |                  |                | 240                   | 380                   | 325                   | 275                   |
| 1,450                            |              |                    |             |                  |                   |                  |                | 170                   | 290                   | 255                   | 205                   |
| 1,500                            |              |                    |             |                  |                   |                  |                | 135                   | 205                   | 190                   | 170                   |
| Hydrostatic<br>Shell Test Press. | 5,575        | 5,625              | 5,225       | 5,225            | 5,625             | 5,625            | 5,625          | 5,400                 | 5,400                 | 5,400                 | 5,400                 |
| Hydrostatic<br>Seat Test Press.  | 4,078        | 4,125              | 3,817       | 3,817            | 4,125             | 4,125            | 4,125          | 3,960                 | 3,960                 | 3,960                 | 3,960                 |
| Hydrostatic<br>Seat Test Press.  | 80           |                    |             |                  |                   |                  |                |                       |                       |                       |                       |

### NOTES:

- (1) This pressure-temperature rating table shall be applied to STANDARD CLASS VALVES of flanged and butt welding ends type.
- (2) With regards to service temperature limit for each material and other conditions.  
Please refer to the TABLE 2 "LIST OF MATERIAL SPECIFICATIONS" in the accompanying sheet.

# PRESSURE-TEMPERATURE RATINGS (ASME B16.34-1996)

## CLASS 2500

Pressures are in pounds per square inch (psig.)

| Materials                        | Carbon Steel |                    |             | Cabon<br>—1/2Mo | 1 1/4Cr<br>—1/2Mo | 2 1/4Cr<br>—1Mo  | 5Cr<br>—1/2Mo   | 18Cr—8Ni              | 18Cr<br>—9Ni<br>—2Mo  | 18Cr<br>—10Ni<br>—Ti  | 18Cr<br>—10Ni<br>—Cb  |
|----------------------------------|--------------|--------------------|-------------|-----------------|-------------------|------------------|-----------------|-----------------------|-----------------------|-----------------------|-----------------------|
|                                  | A216<br>WCB  | A216<br>WCC        |             | A217<br>WC1     | A217<br>WC6       | A217<br>WC9      | A217<br>C5      | A351<br>CF8           | A351<br>CF8M          |                       | A351<br>CF8C          |
|                                  | A105         | A352<br>LCC        | A352<br>LCB | A182<br>F1      | A182<br>F11 Cl.2  | A182<br>F22 Cl.3 | A182<br>F5, F5a | F304H<br>CF3          | A351<br>CF3M          | A182<br>F321<br>F321H | A182<br>F347<br>F347H |
|                                  | A350<br>LF2  | A352<br>LC2<br>LC3 |             | A352<br>LC1     | A182<br>F12 Cl.2  |                  |                 | A182<br>F304<br>F304H | A182<br>F316<br>F316H |                       |                       |
|                                  |              | A350<br>LF3        |             |                 |                   |                  |                 |                       |                       |                       |                       |
| Temperature<br>Deg.F.            | —20 to 100   | 6,170              | 6,250       | 5,785           | 5,785             | 6,250            | 6,250           | 6,250                 | 6,000                 | 6,000                 | 6,000                 |
|                                  | 200          | 5,625              | 6,250       | 5,470           | 5,660             | 6,250            | 6,250           | 6,205                 | 5,000                 | 5,160                 | 5,500                 |
|                                  | 300          | 5,470              | 6,070       | 5,315           | 5,435             | 6,015            | 6,070           | 5,965                 | 4,500                 | 4,660                 | 5,120                 |
|                                  | 400          | 5,280              | 5,880       | 5,145           | 5,330             | 5,775            | 5,880           | 5,880                 | 4,140                 | 4,280                 | 4,780                 |
|                                  | 500          | 4,990              | 5,540       | 4,850           | 5,180             | 5,540            | 5,540           | 5,540                 | 3,880                 | 3,980                 | 4,500                 |
|                                  | 600          | 4,560              | 5,040       | 4,440           | 5,040             | 5,040            | 5,040           | 5,040                 | 3,640                 | 3,760                 | 4,280                 |
|                                  | 650          | 4,475              | 4,905       | 4,355           | 4,905             | 4,905            | 4,905           | 4,905                 | 3,580                 | 3,700                 | 4,200                 |
|                                  | 700          | 4,440              | 4,730       | 4,320           | 4,730             | 4,730            | 4,730           | 4,730                 | 3,540                 | 3,620                 | 4,120                 |
|                                  | 750          | 4,200              | 4,200       | 3,945           | 4,430             | 4,430            | 4,430           | 4,400                 | 3,460                 | 3,560                 | 4,100                 |
|                                  | 800          | 3,430              | 3,430       | 3,260           | 4,230             | 4,230            | 4,230           | 4,230                 | 3,360                 | 3,520                 | 4,060                 |
|                                  | 850          | 2,230              | 2,230       | 2,230           | 4,060             | 4,060            | 4,060           | 4,030                 | 3,300                 | 3,480                 | 4,040                 |
|                                  | 900          | 1,430              | 1,430       | 1,430           | 3,745             | 3,745            | 3,745           | 3,085                 | 3,240                 | 3,460                 | 3,745                 |
|                                  | 950          | 860                | 860         | 860             | 2,345             | 2,655            | 3,145           | 2,285                 | 3,180                 | 3,220                 | 3,220                 |
|                                  | 1,000        | 430                | 430         | 430             | 1,370             | 1,800            | 2,170           | 1,655                 | 2,675                 | 2,915                 | 3,030                 |
|                                  | 1,050        |                    |             |                 |                   | 1,200            | 1,455           | 1,200                 | 2,570                 | 2,865                 | 3,000                 |
|                                  | 1,100        |                    |             |                 |                   | 800              | 915             | 830                   | 2,145                 | 2,545                 | 2,685                 |
|                                  | 1,150        |                    |             |                 |                   | 515              | 570             | 515                   | 1,655                 | 1,970                 | 2,285                 |
|                                  | 1,200        |                    |             |                 |                   | 315              | 345             | 285                   | 1,285                 | 1,545                 | 1,430                 |
|                                  | 1,250        |                    |             |                 |                   |                  |                 |                       | 945                   | 1,230                 | 1,030                 |
|                                  | 1,300        |                    |             |                 |                   |                  |                 |                       | 715                   | 970                   | 770                   |
|                                  | 1,350        |                    |             |                 |                   |                  |                 |                       | 515                   | 800                   | 570                   |
|                                  | 1,400        |                    |             |                 |                   |                  |                 |                       | 400                   | 630                   | 455                   |
|                                  | 1,450        |                    |             |                 |                   |                  |                 |                       | 285                   | 485                   | 345                   |
|                                  | 1,500        |                    |             |                 |                   |                  |                 |                       | 230                   | 345                   | 285                   |
| Hydrostatic<br>Shell Test Press. | 9,275        | 9,375              | 8,700       | 8,700           | 9,375             | 9,375            | 9,375           | 9,000                 | 9,000                 | 9,000                 | 9,000                 |
| Hydrostatic<br>Seat Test Press.  | 6,787        | 6,875              | 6,364       | 6,364           | 6,875             | 6,875            | 6,875           | 6,600                 | 6,600                 | 6,600                 | 6,600                 |
| Hydrostatic<br>Seat Test Press.  | 80           |                    |             |                 |                   |                  |                 |                       |                       |                       |                       |

### NOTES:

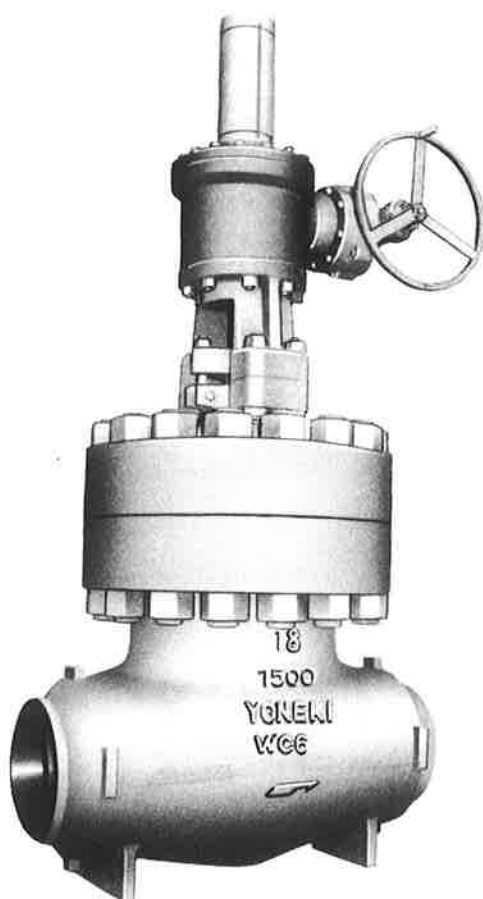
- (1) This pressure-temperature rating table shall be applied to STANDARD CLASS VALVES of flanged and butt welding ends type.
- (2) With regards to service temperature limit for each material and other conditions.  
Please refer to the TABLE 2 "LIST OF MATERIAL SPECIFICATIONS" in the accompanying sheet.

# GATE VALVES

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**CLASS 150-300-600-  
900-1500-2500**

FLANGED ENDS  
BUTT WELDING ENDS  
BOLTED BONNET O.S.&Y.





# ANSI 150 CAST STEEL GATE VALVE

## BOLTED BONNET O.S. & Y.

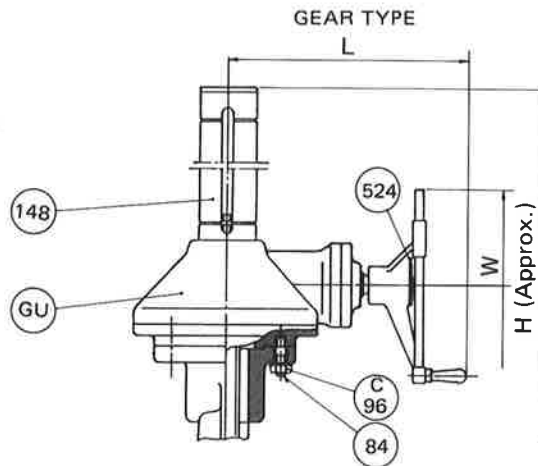
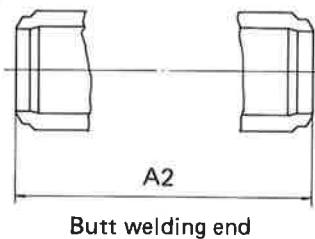
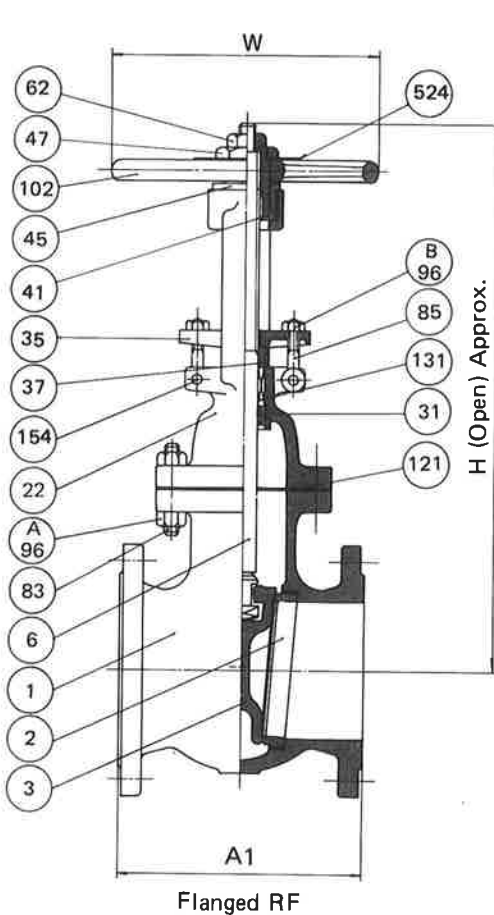


Figure No.

|         |                  |
|---------|------------------|
| GA010RA | 150 lb Gate RF   |
| GA010WA | 150 lb Gate Weld |

### ■ Features

- End to end dimensions and Wall thicknesses conform to ANSI and API specifications.
- 8 in. and smaller Valves have a one piece Bonnet and Yoke design.
- 10 in. and larger Valves have a two piece Bonnet and Yoke design.
- 4 in. and smaller Valves have a plain solid Wedge.
- 5 in. and larger Valves have a one piece flexible Wedge.
- 2 in. Valves have a square Bonnet flange.
- 2-1/2 in. and larger Valves have an oval type Bonnet flange.
- Gear operator can be furnished upon request.
- Flange dimensions;  
24 in. and smaller Valves conform to ANSI B16.5.  
26 in. and larger Valves conform to API 605.

### Material Specifications Trim No. 8

| NO. | PART NAME       | MATERIAL            |
|-----|-----------------|---------------------|
| GU  | Bevel Gear Unit | Cast Iron + etc     |
| 524 | Name Plate      | 18Cr-8Ni S. Steel   |
| 154 | Eye Bolt Pin    | 13% Cr. S. Steel    |
| 148 | Stem Cap        | Carbon Steel        |
| 131 | Packing         | *3                  |
| 121 | Gasket          | *2                  |
| 102 | Handwheel       | Nodular Iron        |
| 96C | Yoke Bolt Nut   | ASTM A194 Gr.2H     |
| 96B | Eye Bolt Nut    | ASTM A194 Gr.2H     |
| 96A | Bonnet Bolt Nut | ASTM A194 Gr.2H     |
| 85  | Eye Bolt        | ASTM A193 Gr.B7     |
| 84  | Yoke Bolt       | ASTM A193 Gr.B7     |
| 83  | Bonnet Bolt     | ASTM A193 Gr.B7     |
| 62  | Stopper         | Carbon Steel        |
| 47  | Lock Nut        | Carbon Steel        |
| 45  | Sleeve Nut      | Carbon Steel        |
| 41  | Yoke Sleeve     | Al-Bronze           |
| 37  | Gland           | ASTM A182 Gr.F6a    |
| 35  | Gland Flange    | Carbon Steel        |
| 31  | Bonnet Bush     | ASTM A182 Gr.F6a    |
| 22  | Bonnet Yoke     | ASTM A216 Gr.WCB    |
| 6   | Stem            | ASTM A182 Gr.F6a    |
| 3   | Wedge           | ASTM A182 Gr.F6a *1 |
| 2   | Body Seat Ring  | ASTM A105 + STL     |
| 1   | Body            | ASTM A216 Gr.WCB    |

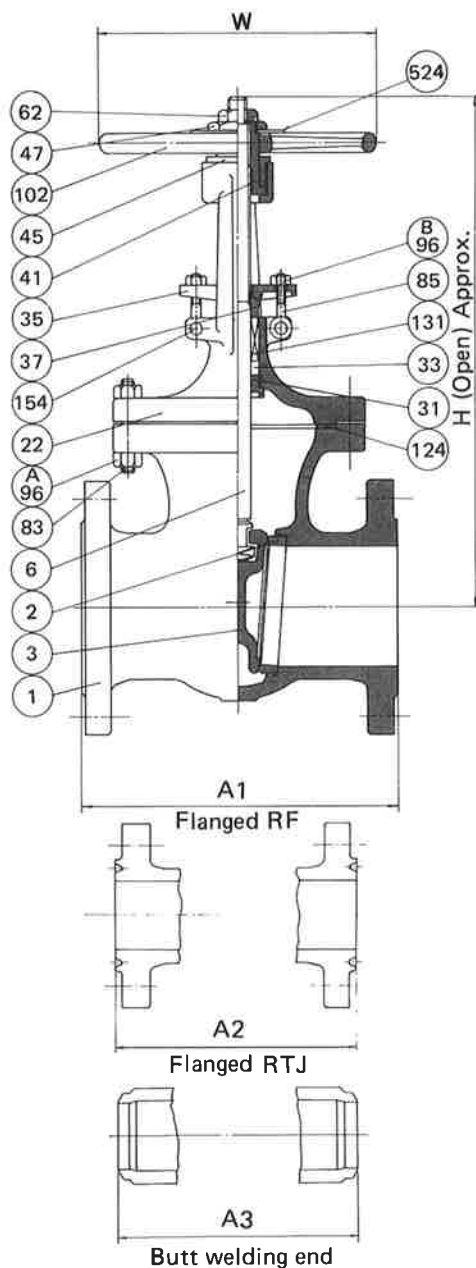
- Note \*1 6 in. & 8 in. ASTM A217 Gr. CA15  
10 in. & larger ASTM A216 Gr. WCB + 13% Cr. deposit
- \*2 Compressed asbestos or Corrugated metal
- \*3 Inconel wire reinforced asbestos braided packing

### Dimensions (in./mm)

| Norm Size        | in. | mm | 2      | 2-1/2  | 3      | 4      | 5        | 6        | 8      | 10     | 12       | 14      | 16     | 18       | 20       | 24   | 26      | 28      | 30      | 36      | 40       | 42       | 48       |
|------------------|-----|----|--------|--------|--------|--------|----------|----------|--------|--------|----------|---------|--------|----------|----------|------|---------|---------|---------|---------|----------|----------|----------|
|                  |     |    | 50     | 65     | 80     | 100    | 125      | 150      | 200    | 250    | 300      | 350     | 400    | 450      | 500      | 600  | 650     | 700     | 750     | 900     | 1000     | 1050     | 1200     |
| A1               | in. | mm | 7-1/2  | 8      | 9      | 10     | 10-1/2   | 11-1/2   | 13     | 14     | 15       | 16      | 17     | 18       | 20       | 22   | 24      | 24      | 28      | 30      | 31       | 34       |          |
|                  |     |    | 178    | 190    | 203    | 229    | 254      | 267      | 292    | 330    | 356      | 381     | 406    | 432      | 457      | 508  | 559     | 610     | 610     | 711     | 762      | 787      | 864      |
| A2               | in. | mm | 8-1/2  | 9-1/2  | 11-1/8 | 12     | 15       | 15-7/8   | 16-1/2 | 18     | 19-3/4   | 22-1/2  | 24     | 26       | 28       | 32   | 34      | 36      | 36      | 40      | 42       | 43       | 46       |
|                  |     |    | 216    | 241    | 283    | 305    | 381      | 403      | 419    | 457    | 502      | 572     | 610    | 660      | 711      | 813  | 864     | 914     | 914     | 1016    | 1067     | 1092     | 1168     |
| H                | in. | mm | 14-7/8 | 17-1/2 | 18-3/4 | 22-3/4 | 27-5/8   | 30-3/8   | 38     | 47-1/4 | 55       | 60-1/8  | 68-1/2 | 81-3/4   | 89-3/8   | 105  | 119-3/8 | 122-7/8 | 131-5/8 | 164-1/4 | 183-7/8  | 193-3/4  | 217-1/2  |
|                  |     |    | 378    | 445    | 476    | 578    | 702      | 772      | 965    | 1200   | 1397     | 1527    | 1740   | 2077     | 2270     | 2667 | 3032    | 3121    | 3343    | 4172    | 4670     | 4920     | 5525     |
| W                | in. | mm | 7-7/8  | 7-7/8  | 9-7/8  | 9-7/8  | 11-13/16 | 11-13/16 | 14     | 15-3/4 | 19-11/16 | 22-1/16 | 23-5/8 | 18-1/8   | 18-1/8   | 24   | 24      | 24      | 24      | 24      | 30       | 30       | 30       |
|                  |     |    | 200    | 200    | 250    | 250    | 300      | 300      | 355    | 400    | 500      | 560     | 600    | 460      | 460      | 610  | 610     | 610     | 610     | 610     | 760      | 760      | 760      |
| L                | in. | mm | -      | -      | -      | -      | -        | -        | -      | -      | -        | -       | -      | 16-13/16 | 16-13/16 | 17   | 20-3/16 | 20-3/16 | 20-3/16 | 20-3/16 | 21-13/16 | 21-13/16 | 21-13/16 |
|                  |     |    | -      | -      | -      | -      | -        | -        | -      | -      | -        | -       | -      | 427      | 427      | 432  | 512     | 512     | 512     | 512     | 554      | 554      | 554      |
| Weight (Approx.) | RF  | lb | 37     | 66     | 75     | 106    | 143      | 170      | 265    | 441    | 639      | 816     | 1036   | 1323     | 1654     | 2040 | 4190    | 4631    | 4410    | 8489    | 10617    | 11687    | 15678    |
|                  |     | Kg | 17     | 30     | 34     | 48     | 65       | 77       | 120    | 200    | 290      | 370     | 470    | 600      | 750      | 925  | 1900    | 2100    | 2000    | 3850    | 4815     | 5300     | 7110     |
|                  | BW  | lb | 33     | 57     | 62     | 93     | 121      | 143      | 221    | 406    | 584      | 750     | 970    | 1213     | 1566     | 1918 | 4289    | 4763    | 4476    | 8644    | 10672    | 11631    | 15545    |
|                  |     | Kg | 15     | 26     | 28     | 42     | 55       | 65       | 100    | 184    | 265      | 340     | 440    | 550      | 710      | 870  | 1945    | 2160    | 2030    | 3920    | 4840     | 5275     | 7050     |

# ANSI 300 CAST STEEL GATE VALVE

## BOLTED BONNET O.S. & Y.



GEAR TYPE

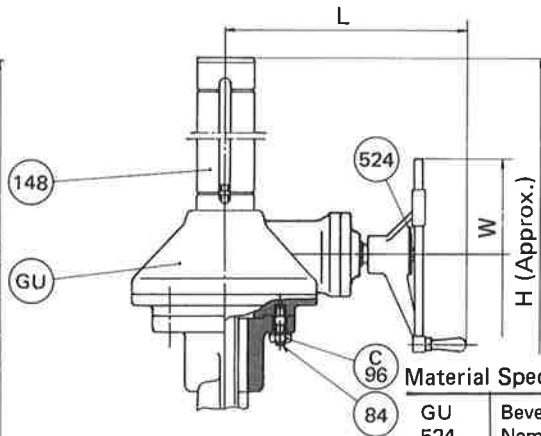


Figure No.

|         |                  |
|---------|------------------|
| GA030RA | 300 lb Gate RF   |
| GA030JA | 300 lb Gate RTJ  |
| GA030WA | 300 lb Gate Weld |

### ■ Features

- End to end dimensions and Wall thicknesses conform to ANSI and API specifications.
- 8 in. and smaller Valves have a one piece Bonnet and Yoke design.
- 10 in. and larger Valves have a two piece Bonnet and Yoke design.
- 4 in. and smaller Valves have a plain solid Wedge.
- 5 in. and larger Valves have a one piece flexible Wedge.
- Gear operator can be furnished upon request.
- Flange dimension;  
24 in. and smaller Valves conform to ANSI B16.5.  
26 in. and larger Valves conform to API 605.

### Material Specifications Trim No. 8

| NO. | PART NAME       | MATERIAL             |
|-----|-----------------|----------------------|
| GU  | Bevel Gear Unit | Cast Iron + etc.     |
| 524 | Name Plate      | 18Cr-8Ni S. Steel    |
| 154 | Eye Bolt Pin    | 13% Cr. S. Steel     |
| 148 | Stem Cap        | Carbon Steel         |
| 131 | Packing         | *3                   |
| 124 | Gasket          | *2                   |
| 102 | Handwheel       | Nodular Iron         |
| 96C | Yoke Bolt Nut   | ASTM A194 Gr. 2H     |
| 96B | Eye Bolt Nut    | ASTM A194 Gr. 2H     |
| 96A | Bonnet Bolt Nut | ASTM A194 Gr. 2H     |
| 85  | Eye Bolt        | ASTM A193 Gr. B7     |
| 84  | Yoke Bolt       | ASTM A193 Gr. B7     |
| 83  | Bonnet Bolt     | ASTM A193 Gr. B7     |
| 62  | Stopper         | Carbon Steel         |
| 47  | Lock Nut        | Carbon Steel         |
| 45  | Sleeve Nut      | Carbon Steel         |
| 41  | Yoke Sleeve     | Al-Bronze            |
| 37  | Gland           | ASTM A182 Gr. F6a    |
| 35  | Gland Flange    | Carbon Steel         |
| 33  | Packing Washer  | ASTM A182 Gr. F6a    |
| 31  | Bonnet Bush     | ASTM A182 Gr. F6a    |
| 22  | Bonnet Yoke     | ASTM A216 Gr. WCB    |
| 6   | Stem            | ASTM A182 Gr. F6a    |
| 3   | Wedge           | ASTM A182 Gr. F6a *1 |
| 2   | Body Seat Ring  | ASTM A105 + STL      |
| 1   | Body            | ASTM A216 Gr. WCB    |

Note \*1 6 in. & 8 in. ASTM A217 Gr. CA15  
10 in. & larger ASTM A216 Gr. WCB + 13% Cr. deposit

\*2 Spiral wound 304 s. steel asbestos filled

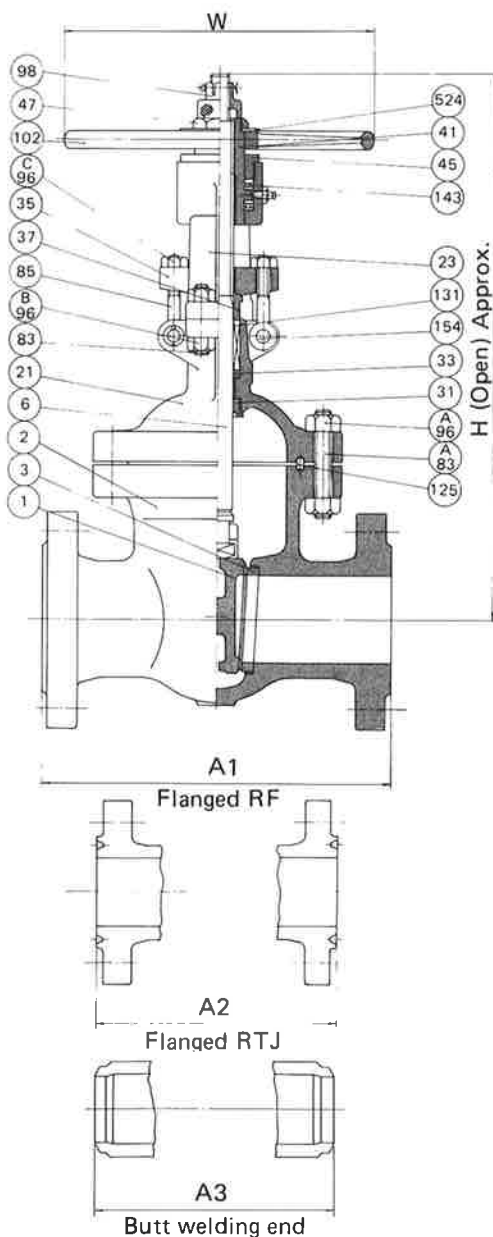
\*3 Inconel wire reinforced asbestos braided packing

### Dimensions (in./mm)

| Nom. Size        | 2      | 2-1/2  | 3      | 4      | 5        | 6      | 8      | 10       | 12      | 14       | 16     | 18     | 20     | 24      | 26      | 28       | 30       | 36       | 40      | 42      | 48      |
|------------------|--------|--------|--------|--------|----------|--------|--------|----------|---------|----------|--------|--------|--------|---------|---------|----------|----------|----------|---------|---------|---------|
| A1               | 8-1/2  | 9-1/2  | 11-1/8 | 12     | 15       | 15-7/8 | 16-1/2 | 18       | 19-3/4  | 30       | 33     | 36     | 39     | 45      | 49      | 53       | 55       | 68       | 76      | 78      | 88      |
| A2               | 9-1/8  | 10-1/8 | 11-3/4 | 12-5/8 | 15-5/8   | 16-1/2 | 17-1/8 | 18-5/8   | 20-3/8  | 30-5/8   | 33-5/8 | 36-5/8 | 39-3/4 | 45-7/8  | 50      | 54       | 56       | 69-1/8   | —       | —       | —       |
| A3               | 8-1/2  | 9-1/2  | 11-1/8 | 12     | 15       | 15-7/8 | 16-1/2 | 18       | 19-3/4  | 30       | 33     | 36     | 39     | 45      | 49      | 53       | 55       | 68       | 76      | 78      | 88      |
| H                | 16-1/4 | 18-3/4 | 19-7/8 | 23-3/4 | 30-3/4   | 31-7/8 | 40-3/8 | 49-1/4   | 57      | 66-7/8   | 80-1/8 | 89-5/8 | 96-3/4 | 112-7/8 | 126     | 130      | 148-1/2  | 169-3/4  | 188-5/8 | 198-1/8 | 217-3/8 |
| W                | 7-7/8  | 7-7/8  | 9-7/8  | 9-7/8  | 11-13/16 | 14     | 15-3/4 | 19-11/16 | 22-1/16 | 18-1/8   | 24     | 24     | 24     | 24      | 24      | 30       | 30       | 30       | 24      | 24      | 24      |
| L                | —      | —      | —      | —      | —        | —      | —      | —        | —       | 16-13/16 | 17     | 17     | 17     | 20-3/16 | 20-3/16 | 21-13/16 | 21-13/16 | 21-13/16 | 20-3/16 | 20-3/16 | 20-3/16 |
| Weight (Approx.) |        |        |        |        |          |        |        |          |         |          |        |        |        |         |         |          |          |          |         |         |         |
| RF               | 62     | 88     | 104    | 154    | 265      | 287    | 430    | 772      | 1069    | 1588     | 2536   | 3164   | 4289   | 5843    | 6946    | 8070     | 9592     | 15104    | 18654   | 20948   | 27342   |
| BW               | 28     | 40     | 47     | 70     | 120      | 130    | 195    | 350      | 485     | 720      | 1150   | 1435   | 1945   | 2650    | 3150    | 3660     | 4350     | 6850     | 8460    | 9500    | 12400   |
|                  | 51     | 77     | 70     | 132    | 221      | 234    | 324    | 562      | 838     | 1477     | 2205   | 2602   | 3638   | 4851    | 5711    | 6637     | 7629     | 11003    | 13583   | 14994   | 19845   |
|                  | 23     | 35     | 36     | 60     | 100      | 106    | 147    | 255      | 380     | 670      | 1000   | 1180   | 1650   | 2200    | 2590    | 3010     | 3460     | 4990     | 6160    | 6800    | 9000    |

# ANSI 600 CAST STEEL GATE VALVE

## BOLTED BONNET O.S. & Y.



GEAR TYPE

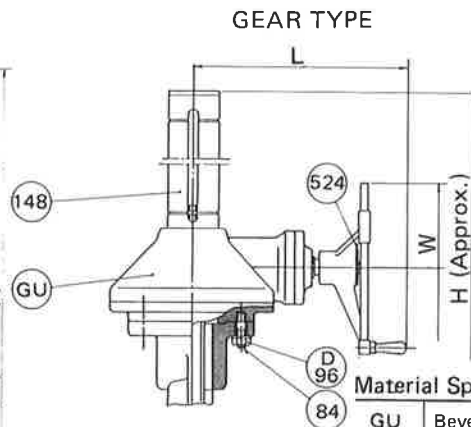


Figure No.

|         |                  |
|---------|------------------|
| GA060RA | 600 lb Gate RF   |
| GA060JA | 600 lb Gate RTJ  |
| GA060WA | 600 lb Gate Weld |

Material Specifications Trim No. 8

| NO. | PART NAME            | MATERIAL            |
|-----|----------------------|---------------------|
| GU  | Bevel Gear Unit      | Cast Iron + etc.    |
| 524 | Name Plate           | 18Cr-8Ni S. Steel   |
| 154 | Eye Bolt Pin         | 13% Cr S. Steel     |
| 148 | Stem Cap             | Carbon Steel        |
| 143 | Bearing              | Bearing Steel       |
| 131 | Packing              | *3                  |
| 125 | Gasket               | *2                  |
| 102 | Handwheel            | Nodular Iron        |
| 98  | Lift Stopper         | Carbon Steel        |
| 96D | Yoke Bolt Nut        | ASTM A194 Gr. 2H    |
| 96C | Eye Bolt Nut         | ASTM A194 Gr. 2H    |
| 96B | Bonnet Yoke Bolt Nut | ASTM A194 Gr. 2H    |
| 96A | Bonnet Bolt Nut      | ASTM A194 Gr. 2H    |
| 85  | Eye Bolt             | ASTM A193 Gr. B7    |
| 84  | Yoke Bolt            | ASTM A193 Gr. B7    |
| 83B | Bonnet Yoke Bolt     | ASTM A193 Gr. B7    |
| 83A | Bonnet Bolt          | ASTM A193 Gr. B7    |
| 47  | Lock Nut             | Carbon Steel        |
| 45  | Sleeve Nut           | Carbon Steel        |
| 41  | Yoke Sleeve          | Al-Bronze           |
| 37  | Gland                | ASTM A182 Gr. F6a   |
| 35  | Gland Flange         | Carbon Steel        |
| 33  | Packing Washer       | ASTM A182 Gr. F6a   |
| 31  | Bonnet Bush          | ASTM A182 Gr. F6a   |
| 23  | Yoke                 | ASTM A216 Gr. WCB   |
| 21  | Bonnet               | ASTM A216 Gr. WCB   |
| 6   | Stem                 | ASTM A182 Gr. F6a   |
| 3   | Wedge                | ASTM A182 Gr. F6a*1 |
| 2   | Body Seat Ring       | ASTM A105 + STL     |
| 1   | Body                 | ASTM A216 Gr. WCB   |

### ■ Features

- End to end dimensions and Wall thickness conform to ANSI and API specifications.
- 4 in. and smaller Valves have a one piece Bonnet and Yoke design.
- 5 in. and larger Valves have a two piece Bonnet and Yoke design.
- 4 in. and smaller Valves have a plain solid Wedge.
- 5 in. and larger Valves have a one piece flexible Wedge.
- Gear operator can be furnished upon request.
- Flange dimensions; 24 in. and smaller Valves conform to ANSI B16.5. 26 in. and larger Valves conform to API 605.

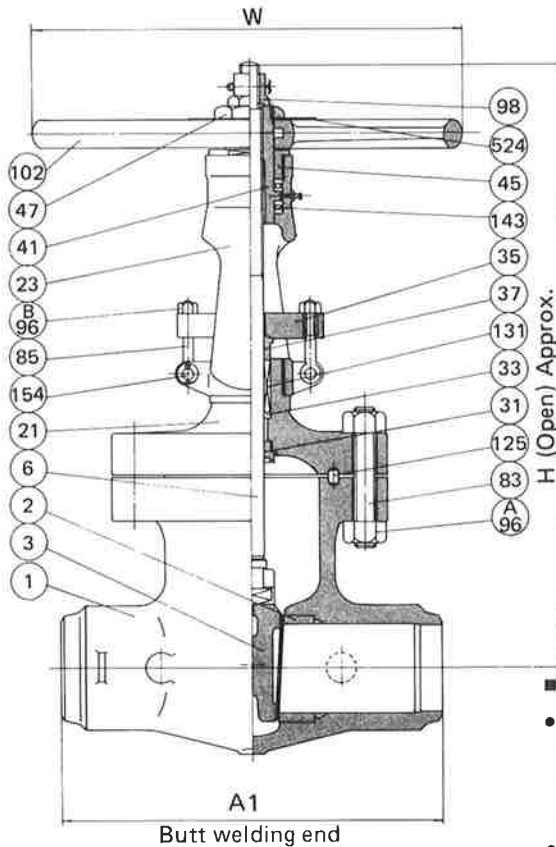
- Note \*1 5 in. & larger ASTM A216 Gr. WCB + 13% Cr. deposit  
 \*2 Soft iron ring joint gasket  
 \*3 Inconel wire reinforced asbestos braided packing

Dimensions (in./mm)

| Nom. Size        | in. | mm | 2      | 2-1/2  | 3      | 4        | 5      | 6        | 8       | 10      | 12     | 14     | 16      | 18      | 20      | 24       | 26       | 28       | 30      | 36      |
|------------------|-----|----|--------|--------|--------|----------|--------|----------|---------|---------|--------|--------|---------|---------|---------|----------|----------|----------|---------|---------|
| A1               | in. | mm | 11-1/2 | 13     | 14     | 17       | 20     | 22       | 26      | 31      | 33     | 35     | 39      | 43      | 47      | 55       | 57       | 61       | 65      | 82      |
| A2               | in. | mm | 11-5/8 | 13-1/8 | 14-1/8 | 17-1/8   | 20-1/8 | 22-1/8   | 26-1/8  | 31-1/8  | 33-1/8 | 35-1/8 | 39-1/8  | 43-1/8  | 47-1/8  | 55-3/8   | 57       | 61       | 65      | 82      |
| A3               | in. | mm | 11-1/2 | 13     | 14     | 17       | 20     | 22       | 26      | 31      | 33     | 35     | 39      | 43      | 47      | 55       | 57       | 61       | 65      | 82      |
| H                | in. | mm | 17-3/8 | 19-1/4 | 20-7/8 | 25-3/4   | 33-3/4 | 41       | 49-1/4  | 60-1/4  | 70-1/4 | 73-1/4 | 84-7/8  | 94-1/2  | 96-7/8  | 118-5/8  | 127-1/4  | 140-1/4  | 152-3/4 | 179-1/2 |
| W                | in. | mm | 7-7/8  | 9-7/8  | 9-7/8  | 11-13/16 | 15-3/4 | 19-11/16 | 22-1/16 | 27-3/16 | 24     | 24     | 24      | 24      | 24      | 30       | 30       | 30       | 24      | 24      |
| L                | in. | mm | —      | —      | —      | —        | —      | —        | —       | —       | 17     | 17     | 20-3/16 | 20-3/16 | 20-3/16 | 21-13/16 | 21-13/16 | 21-13/16 | 20-3/16 | 20-3/16 |
| Weight (Approx.) | lb  | kg | 110    | 132    | 187    | 298      | 573    | 760      | 1136    | 1863    | 2470   | 2999   | 4212    | 5149    | 5954    | 9812     | 11510    | 13340    | 15314   | 22050   |
| RF               | lb  | kg | 50     | 60     | 85     | 135      | 260    | 345      | 515     | 845     | 1120   | 1360   | 1910    | 2335    | 2700    | 4450     | 5220     | 6050     | 6945    | 10000   |
| BW               | lb  | kg | 77     | 99     | 143    | 232      | 463    | 584      | 838     | 1543    | 2040   | 2734   | 3484    | 4190    | 4741    | 8070     | 9470     | 10981    | 12591   | 18125   |
|                  | lb  | kg | 35     | 45     | 65     | 105      | 210    | 265      | 380     | 700     | 925    | 1240   | 1580    | 1900    | 2150    | 3660     | 4295     | 4980     | 5710    | 8220    |

# ANSI 900 CAST STEEL GATE VALVE

## BOLTED BONNET O.S. & Y.



GEAR TYPE

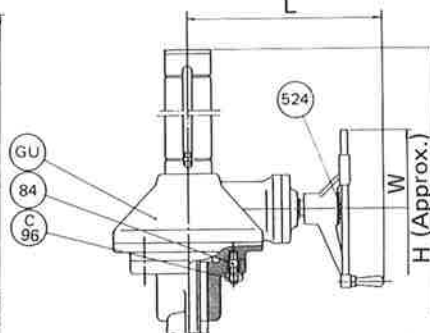


Figure No.

|         |                  |
|---------|------------------|
| GA090WC | 900 lb Gate Weld |
| GA090RC | 900 lb Gate RF   |
| GA090JC | 900 lb Gate RTJ  |

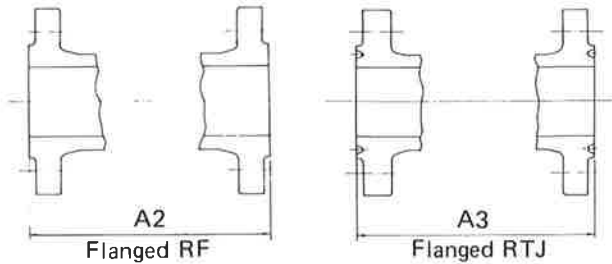
### ■ Features

- End to end dimensions and Wall thicknesses conform to ANSI and API specifications.
- Gear operator can be furnished upon request.

### Material Specifications Trim No. 5

| NO. | PART NAME       | MATERIAL           |
|-----|-----------------|--------------------|
| GU  | Bevel Gear Unit | Cast Iron + etc    |
| 524 | Name Plate      | 18Cr-8Ni S. Steel  |
| 154 | Eye Bolt Pin    | 13% Cr. S. Steel   |
| 143 | Bearing         | Bearing Steel      |
| 131 | Packing         | *3                 |
| 125 | Gasket          | *2                 |
| 102 | Handwheel       | Nodular Iron       |
| 98  | Lift Stopper    | Carbon Steel       |
| 96C | Yoke Bolt Nut   | ASTM A194 Gr.2H    |
| 96B | Eye bolt Nut    | ASTM A194 Gr.2H    |
| 96A | Bonnet Bolt Nut | ASTM A194 Gr.2H    |
| 85  | Eye Bolt        | ASTM A193 Gr.B7    |
| 84  | Yoke Bolt       | ASTM A193 Gr.B7    |
| 83  | Bonnet Bolt     | ASTM A193 gr.B7    |
| 47  | Lock Nut        | Carbon Steel       |
| 45  | Sleeve Nut      | Carbon Steel       |
| 41  | Yoke Sleeve     | Al-Bronze          |
| 37  | Gland           | ASTM A182 Gr.F6a   |
| 35  | Gland Flange    | Carbon Steel       |
| 33  | Packing Washer  | ASTM A182 Gr.F6a   |
| 31  | Bonnet Bush     | ASTM A182 Gr.F6a   |
| 23  | Yoke            | ASTM A216 Gr.WCB   |
| 21  | Bonnet          | ASTM A216 Gr.WCB   |
| 6   | Stem            | ASTM A182 Gr.F6a   |
| 3   | Wedge           | ASTM A105 + STL *1 |
| 2   | Body Seat Ring  | ASTM A105 + STL    |
| 1   | Body            | ASTM A216 Gr.WCB   |

- Note \*1 4 in. & larger ASTM A216 Gr. WCB + STL  
 \*2 Soft iron ring joint gasket  
 \*3 Inconel wire reinforced asbestos braided packing



### Dimensions (in./mm)

| Norm. Size | in. | mm | 2        | 2-1/2  | 3        | 4        | 5       | 6       | 8      | 10     | 12     | 14     | 16     | 18      | 20      | 24     |
|------------|-----|----|----------|--------|----------|----------|---------|---------|--------|--------|--------|--------|--------|---------|---------|--------|
| A1         | in. | mm | 14-1/2   | 16-1/2 | 15       | 18       | 22      | 24      | 29     | 33     | 38     | 40-1/2 | 44-1/2 | 48      | 52      | 61     |
| A2         | in. | mm | 14-1/2   | 16-1/2 | 15       | 18       | 22      | 24      | 29     | 33     | 38     | 40-1/2 | 44-1/2 | 48      | 52      | 61     |
| A3         | in. | mm | 14-5/8   | 16-3/8 | 15-1/8   | 18-1/8   | 22-1/8  | 24-1/8  | 29-1/8 | 33-1/8 | 38-1/8 | 40-7/8 | 44-7/8 | 48-1/2  | 52-1/2  | 61-3/4 |
| H          | in. | mm | 26       | 27-5/8 | 31-1/2   | 35-1/2   | 41-3/8  | 44-3/4  | 56-5/8 | 61-1/4 | 67-1/2 | 74-7/8 | 80-3/4 | 100-5/8 | 110-1/4 | 124    |
| W          | in. | mm | 11-13/16 | 15-3/4 | 17-11/16 | 17-11/16 | 27-3/16 | 27-3/16 | 18-1/8 | 24     | 24     | 24     | 24     | 30      | 30      | 24     |
| L          | in. | mm | 300      | 400    | 450      | 450      | 690     | 690     | 460    | 610    | 610    | 610    | 610    | 760     | 760     | 610    |
| RF         | lb  | Kg | 249      | 342    | 364      | 485      | 783     | 1091    | 1907   | 2315   | 3528   | 4895   | 6615   | 8533    | 10716   | 16097  |
| BW         | lb  | Kg | 198      | 287    | 286      | 397      | 624     | 882     | 1566   | 1830   | 2977   | 4167   | 5656   | 7277    | 8930    | 13495  |
|            | lb  | Kg | 90       | 130    | 130      | 180      | 285     | 400     | 710    | 830    | 1350   | 1890   | 2565   | 3300    | 4050    | 6120   |

# ANSI 1500 CAST STEEL GATE VALVE

## BOLTED BONNET O.S. & Y.

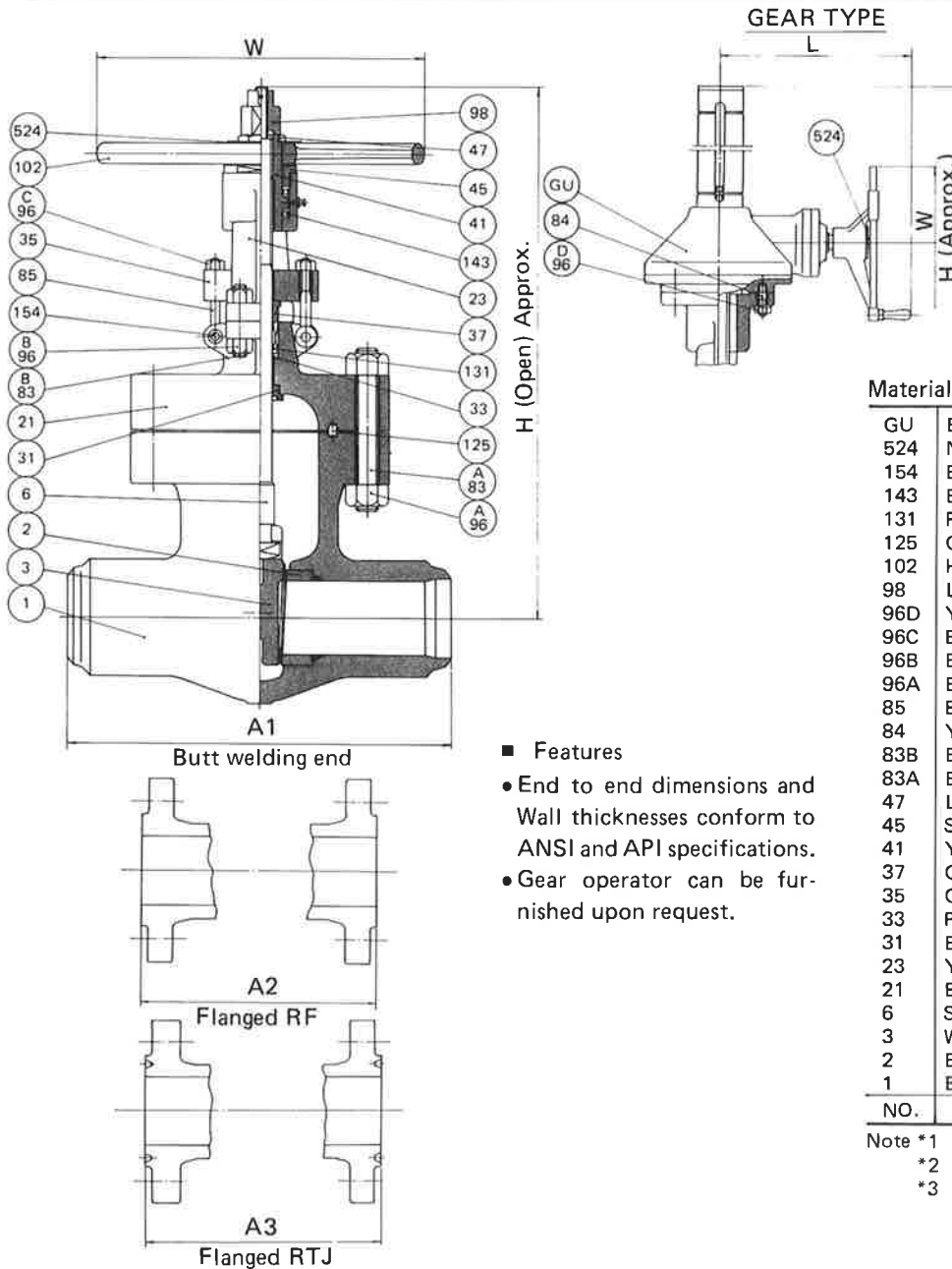


Figure No.

|         |                   |
|---------|-------------------|
| GA150WC | 1500 lb Gate Weld |
| GA150RC | 1500 lb Gate RF   |
| GA150JC | 1500 lb Gate RTJ  |

Material Specifications Trim No. 5

| NO. | PART NAME            | MATERIAL           |
|-----|----------------------|--------------------|
| GU  | Bevel Gear Unit      | Cast Iron + etc    |
| 524 | Name Plate           | 18Cr-8Ni S. Steel  |
| 154 | Eye Bolt Pin         | 13% Cr. S. Steel   |
| 143 | Bearing              | Bearing Steel      |
| 131 | Packing              | *3                 |
| 125 | Gasket               | *2                 |
| 102 | Handwheel            | Nodular Iron       |
| 98  | Lift Stopper         | Carbon Steel       |
| 96D | Yoke Bolt Nut        | ASTM A194 Gr.2H    |
| 96C | Eye Bolt Nut         | ASTM A194 Gr.2H    |
| 96B | Bonnet Yoke Bolt Nut | ASTM A194 Gr.2H    |
| 96A | Bonnet Bolt Nut      | ASTM A194 Gr.2H    |
| 85  | Eye Bolt             | ASTM A193 Gr.B7    |
| 84  | Yoke Bolt            | ASTM A193 Gr.B7    |
| 83B | Bonnet Yoke Bolt     | ASTM A193 Gr.B7    |
| 83A | Bonnet Bolt          | ASTM A193 Gr.B7    |
| 47  | Lock Nut             | Carbon Steel       |
| 45  | Sleeve Nut           | Carbon Steel       |
| 41  | Yoke Sleeve          | Al-Bronze          |
| 37  | Gland                | ASTM A182 Gr.F6a   |
| 35  | Gland Flange         | Carbon Steel       |
| 33  | Packing Washer       | ASTM A182 Gr.F6a   |
| 31  | Bonnet Bush          | ASTM A182 Gr.F6a   |
| 23  | Yoke                 | ASTM A216 Gr.WCB   |
| 21  | Bonnet               | ASTM A216 Gr.WCB   |
| 6   | Stem                 | ASTM A182 Gr.F6a   |
| 3   | Wedge                | ASTM A105 + STL *1 |
| 2   | Body Seat Ring       | ASTM A105 + STL    |
| 1   | Body                 | ASTM A216 Gr.WCB   |

Note \*1 4 in. &amp; larger ASTM A216 Gr. WCB + STL.

\*2 Soft iron ring joint gasket

\*3 Inconel wire reinforced asbestos braided packing

## ■ Features

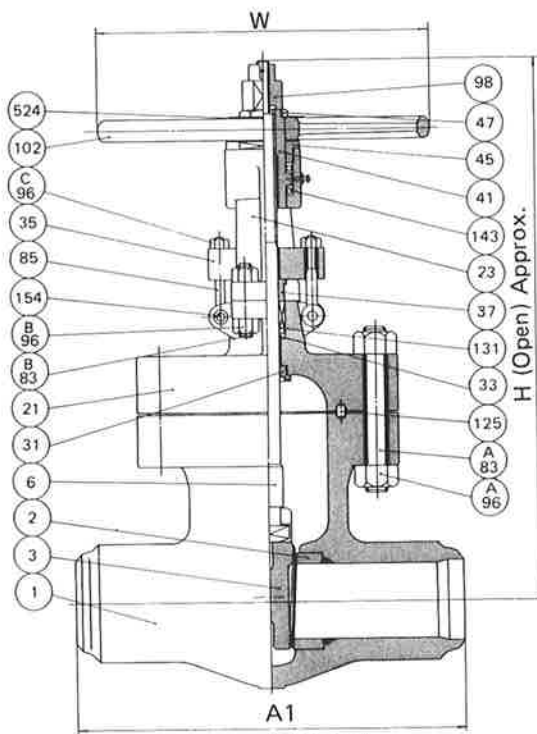
- End to end dimensions and Wall thicknesses conform to ANSI and API specifications.
- Gear operator can be furnished upon request.

Dimensions (in./mm)

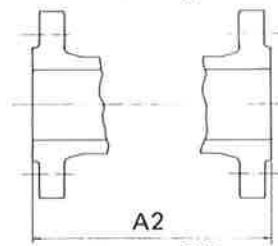
| Nom. Size        | in. | 2        | 2-1/2  | 3        | 4        | 5       | 6      | 8       | 10      | 12       | 14       | 16       | 18       | 20      | 24      |
|------------------|-----|----------|--------|----------|----------|---------|--------|---------|---------|----------|----------|----------|----------|---------|---------|
| A1               | in. | 14-1/2   | 16-1/4 | 18-1/2   | 21-1/2   | 26-1/2  | 27-3/4 | 32-3/4  | 39      | 44-1/2   | 49-1/2   | 54-1/2   | 60-1/2   | 65-1/2  | 76-1/2  |
|                  | mm  | 368      | 419    | 470      | 546      | 673     | 705    | 832     | 991     | 1130     | 1257     | 1384     | 1537     | 1664    | 1943    |
| A2               | in. | 14-1/2   | 16-1/4 | 18-1/2   | 21-1/2   | 26-1/2  | 27-3/4 | 32-3/4  | 39      | 44-1/2   | 49-1/2   | 54-1/2   | 60-1/2   | 65-1/2  | 76-1/2  |
|                  | mm  | 368      | 419    | 470      | 546      | 673     | 705    | 832     | 991     | 1130     | 1257     | 1384     | 1537     | 1664    | 1943    |
| A3               | in. | 14-5/8   | 16-5/8 | 18-5/8   | 21-5/8   | 26-5/8  | 28     | 33-1/8  | 39-3/8  | 45-1/8   | 50-1/4   | 55-3/8   | 61-3/8   | 66-3/8  | 77-5/8  |
|                  | mm  | 371      | 422    | 473      | 549      | 676     | 711    | 841     | 1000    | 1146     | 1276     | 1407     | 1559     | 1686    | 1972    |
| H                | in. | 26       | 27-5/8 | 33-7/8   | 36-7/8   | 43-3/8  | 48-1/4 | 56      | 66-3/8  | 78-5/8   | 85-1/8   | 97-7/8   | 108-3/4  | 122-1/8 | 146-1/2 |
|                  | mm  | 660      | 702    | 860      | 937      | 1102    | 1226   | 1422    | 1686    | 1997     | 2162     | 2486     | 2762     | 3102    | 3721    |
| W                | in. | 11-13/16 | 15-3/4 | 17-11/16 | 19-11/16 | 27-3/16 | 24     | 24      | 24      | 24       | 30       | 30       | 30       | 24      | 24      |
|                  | mm  | 300      | 400    | 450      | 500      | 690     | 610    | 610     | 610     | 610      | 760      | 760      | 760      | 610     | 610     |
| L                | in. | -        | -      | -        | -        | 17      | 17     | 20-3/16 | 20-3/16 | 21-13/16 | 21-13/16 | 21-13/16 | 21-13/16 | 20-3/16 | 20-3/16 |
|                  | mm  | -        | -      | -        | -        | 432     | 432    | 512     | 512     | 554      | 554      | 554      | 554      | 512     | 512     |
| Weight (Approx.) | lb  | 249      | 342    | 430      | 750      | 1224    | 1621   | 2602    | 4267    | 7199     | 9074     | 15325    | 19845    | 24542   | 35875   |
| RF               | Kg  | 113      | 155    | 195      | 340      | 555     | 735    | 1180    | 1935    | 3265     | 4115     | 6950     | 9000     | 11130   | 16270   |
| BW               | lb  | 198      | 287    | 353      | 529      | 970     | 1235   | 2073    | 3396    | 5865     | 7056     | 13230    | 17067    | 21080   | 30363   |
|                  | Kg  | 90       | 130    | 160      | 240      | 440     | 560    | 940     | 1540    | 2660     | 3200     | 6000     | 7740     | 9560    | 13770   |

## ANSI 2500 CAST STEEL GATE VALVE

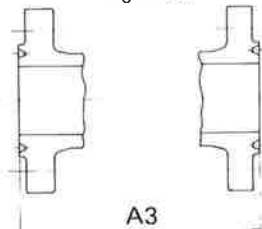
### BOLTED BONNET O.S.&Y.



Butt welding end



### Flanged RF



### Flanged RTJ

### GEAR TYPE

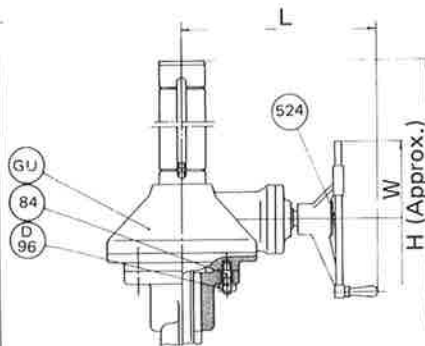


Figure No.

|         |                   |
|---------|-------------------|
| GA250WC | 2500 lb Gate Weld |
| GA250RC | 2500 lb Gate RF   |
| GA250JC | 2500 lb Gate RTJ  |

Material Specifications Trim No. 5

|     |                      |                    |
|-----|----------------------|--------------------|
| GU  | Bevel Gear Unit      | Cast Iron + etc    |
| 524 | Name Plate           | 18Cr-8Ni S. Steel  |
| 154 | Eye Bolt Pin         | 13% Cr. S. Steel   |
| 143 | Bearing              | Bearing Steel      |
| 131 | Packing              | *3                 |
| 125 | Gasket               | *2                 |
| 102 | Handwheel            | Nodular Iron       |
| 98  | Lift Stopper         | Carbon Steel       |
| 96D | Yoke Bolt Nut        | ASTM A194 Gr.2H    |
| 96C | Eye Bolt Nut         | ASTM A194 Gr.2H    |
| 96B | Bonnet Yoke Bolt Nut | ASTM A194 Gr.2H    |
| 96A | Bonnet Bolt Nut      | ASTM A194 Gr.2H    |
| 85  | Eye Bolt             | ASTM A193 Gr.B7    |
| 84  | Yoke Bolt            | ASTM A193 Gr.B7    |
| 83B | Bonnet Yoke Bolt     | ASTM A193 Gr.B7    |
| 83A | Bonnet Bolt          | ASTM A193 Gr.B7    |
| 47  | Lock Nut             | Carbon Steel       |
| 45  | Sleeve Nut           | Carbon Steel       |
| 41  | Yoke Sleeve          | Al-Bronze          |
| 37  | Gland                | ASTM A182 Gr.F6a   |
| 35  | Gland Flange         | Carbon Steel       |
| 33  | Packing Washer       | ASTM A182 Gr.F6a   |
| 31  | Bonnet Bush          | ASTM A182 Gr.F6a   |
| 23  | Yoke                 | ASTM A216 Gr.WCB   |
| 21  | Bonnet               | ASTM A216 Gr.WCB   |
| 6   | Stem                 | ASTM A182 Gr.F6a   |
| 3   | Wedge                | ASTM A105 + STL *1 |
| 2   | Body Seat Ring       | ASTM A105 + STL    |
| 1   | Body                 | ASTM A216 Gr.WCB   |
| NO. | PART NAME            | MATERIAL           |

Note \*1 4 in. & larger ASTM A216 Gr. WCB + STL.

\*2 Soft iron ring joint gasket

\*3 Inconel wire reinforced asbestos braided packing

Dimensions (in./mm)

| Nom. Size | in.<br>mm | 2      | 2-1/2  | 3        | 4      | 5       | 6      | 8       | 10      | 12       |
|-----------|-----------|--------|--------|----------|--------|---------|--------|---------|---------|----------|
|           |           | 50     | 65     | 80       | 100    | 125     | 150    | 200     | 250     | 300      |
| A1        | in.       | 17-3/4 | 20     | 22-3/4   | 26-1/2 | 31-1/4  | 36     | 40-1/4  | 50      | 56       |
|           | mm        | 451    | 508    | 578      | 673    | 794     | 914    | 1022    | 1270    | 1422     |
| A2        | in.       | 17-3/4 | 20     | 22-3/4   | 26-1/2 | 31-1/4  | 36     | 40-1/4  | 50      | 56       |
|           | mm        | 451    | 508    | 578      | 673    | 794     | 914    | 1022    | 1270    | 1422     |
| A3        | in.       | 17-7/8 | 20-1/4 | 23       | 26-7/8 | 31-3/4  | 36-1/2 | 40-7/8  | 50-7/8  | 56-7/8   |
|           | mm        | 454    | 514    | 584      | 683    | 806     | 927    | 1038    | 1292    | 1445     |
| H         | in.       | 29-5/8 | 34-1/4 | 34-1/4   | 42-1/4 | 47-1/4  | 57-1/8 | 63-3/8  | 82-1/2  | 90-1/4   |
|           | mm        | 753    | 870    | 870      | 1073   | 1201    | 1451   | 1610    | 2096    | 2292     |
| W         | in.       | 14     | 17-3/4 | 19-11/16 | 23-5/8 | 27-3/16 | 24     | 24      | 24      | 30       |
|           | mm        | 355    | 450    | 500      | 600    | 690     | 610    | 610     | 610     | 760      |
| L         | in.       | —      | —      | —        | —      | —       | 17     | 20-3/16 | 20-3/16 | 21-13/16 |
|           | mm        | —      | —      | —        | —      | —       | 432    | 512     | 512     | 554      |
| RF        | lb        | 298    | 463    | 551      | 1091   | 2293    | 3506   | 5380    | 10086   | 15832    |
|           | Kg        | 135    | 210    | 250      | 495    | 1040    | 1590   | 2440    | 4574    | 7180     |
| BW        | lb        | 221    | 353    | 397      | 838    | 1874    | 2867   | 4410    | 8370    | 13230    |
|           | Kg        | 100    | 160    | 180      | 380    | 850     | 1300   | 2000    | 3800    | 6000     |

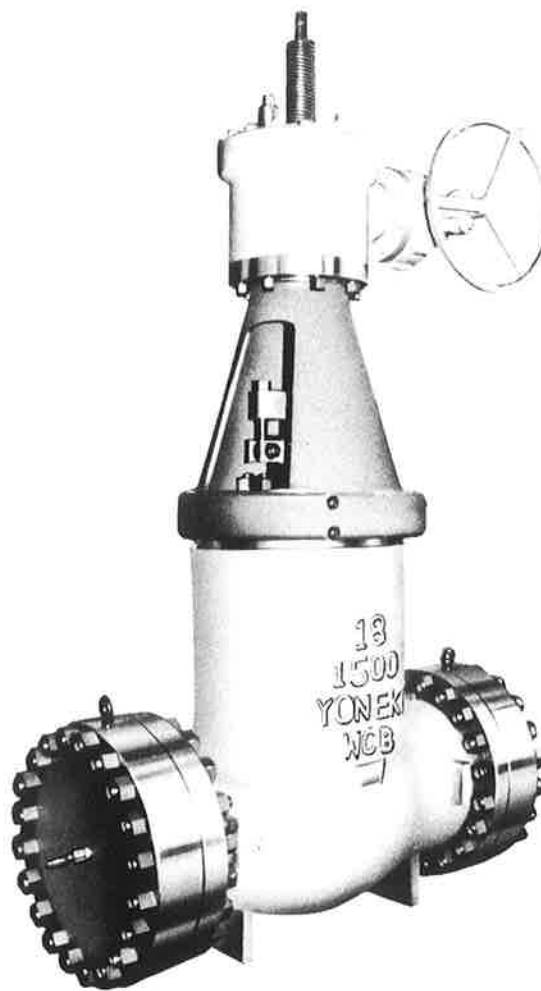
# **GATE VALVES**

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## **CLASS 600-900-1500-2500**

FLANGED ENDS  
BUTT WELDING ENDS

PRESSURE SEAL BONNET O.S.&Y.





# ANSI 600 CAST STEEL GATE VALVE

## PRESSURE SEAL BONNET O.S.&Y.

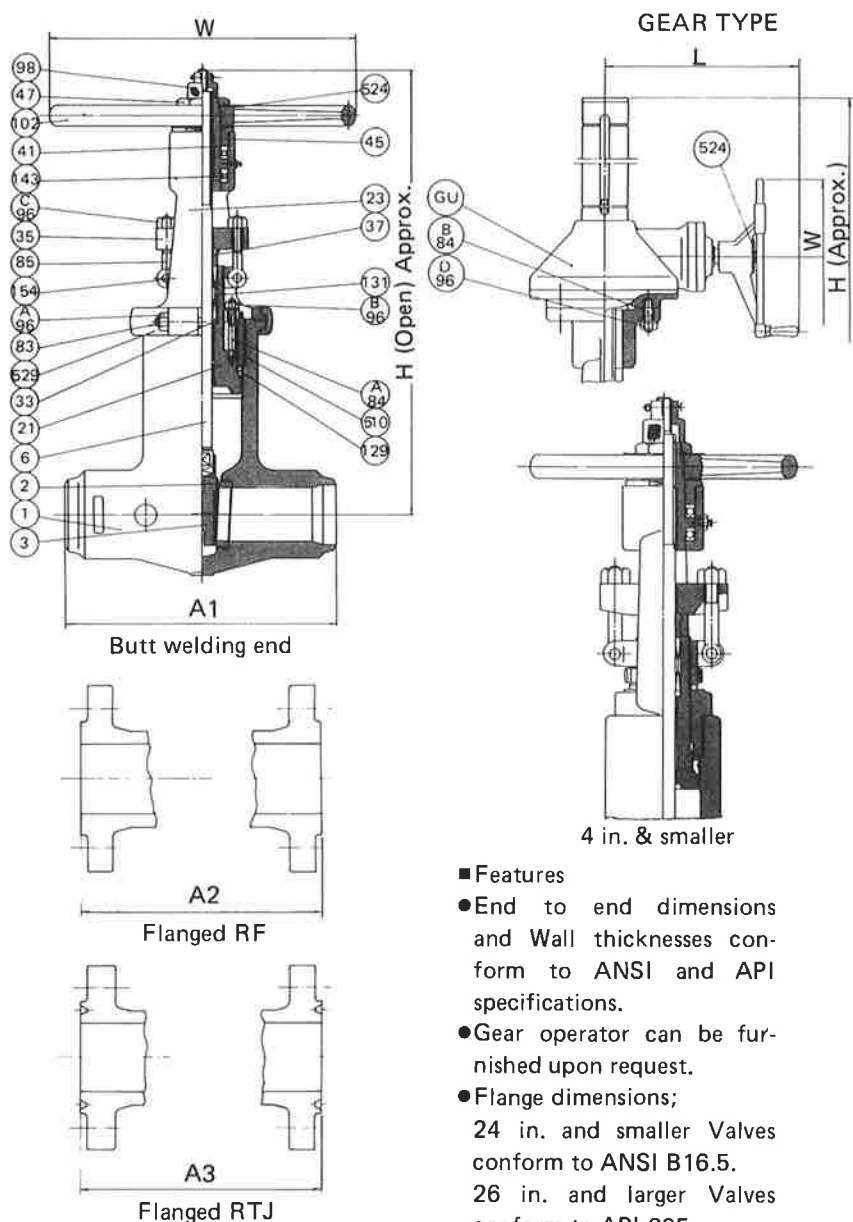


Figure No.

|           |                  |
|-----------|------------------|
| GA064WC   | 600 lb Gate Weld |
| GA064 RC  | 600 lb Gate RF   |
| GA064 J C | 600 lb Gate RTJ  |

## Material Specification Trim No. 8

|     |                     |                      |
|-----|---------------------|----------------------|
| GU  | Bevel Gear Unit     | Cast Iron + etc.     |
| 529 | Body Clamp          | ASTM A216 Gr. WCB    |
| 524 | Name Plate          | 18Cr-8Ni S. Steel    |
| 510 | Bonnet Retainer     | ASTM A105            |
| 154 | Eye Bolt Pin        | 13% Cr. S. Steel     |
| 143 | Bearing             | Bearing Steel        |
| 131 | Packing             | *4                   |
| 129 | Gasket              | *3                   |
| 102 | Handwheel           | Nodular Iron         |
| 98  | Lift Stopper        | Carbon Steel         |
| 96D | Yoke Bolt Nut       | ASTM A194 Gr.2H      |
| 96C | Eye Bolt Nut        | ASTM A194 Gr.2H      |
| 96B | Bonnet Bolt         | ASTM A194 Gr.2H      |
| 96A | Body Clamp Bolt Nut | ASTM A194 Gr.2H      |
| 85  | Eye Bolt            | ASTM A193 Gr.B7      |
| 84B | Yoke Bolt           | ASTM A193 Gr.B7      |
| 84A | Bonnet Bolt         | ASTM A193 Gr.B7      |
| 83  | Body Clamp Bolt     | ASTM A193 Gr.B7      |
| 47  | Lock Nut            | Carbon Steel         |
| 45  | Sleeve Nut          | Carbon Steel         |
| 41  | Yoke Sleeve         | Al-Bronze            |
| 37  | Gland               | ASTM A182 Gr.F6a     |
| 35  | Gland Flange        | Carbon Steel         |
| 33  | Packing Washer      | ASTM A182 Gr.F6a     |
| 23  | Yoke                | ASTM A216 Gr.WCB     |
| 21  | Bonnet              | ASTM A105 *2         |
| 6   | Stem                | ASTM A182 Gr.F6a     |
| 3   | Wedge               | ASTM A182 Gr. F6a *1 |
| 2   | Body Seat Ring      | ASTM A105 + STL      |
| 1   | Body                | ASTM A216 Gr.WCB     |

## ■ Features

- End to end dimensions and Wall thicknesses conform to ANSI and API specifications.
- Gear operator can be furnished upon request.
- Flange dimensions;  
24 in. and smaller Valves conform to ANSI B16.5.  
26 in. and larger Valves conform to API 605.

| NO.     | PART NAME                                          | MATERIAL |
|---------|----------------------------------------------------|----------|
| Note *1 | 5 in. & larger ASTM A216 Gr. WCB + 13% Cr. deposit |          |
| *2      | 6 in. & larger ASTM A216 Gr. WCB                   |          |
| *3      | Soft iron pressure seal gasket                     |          |
| *4      | Inconel wire reinforced asbestos braided packing   |          |

## Dimensions (in./mm)

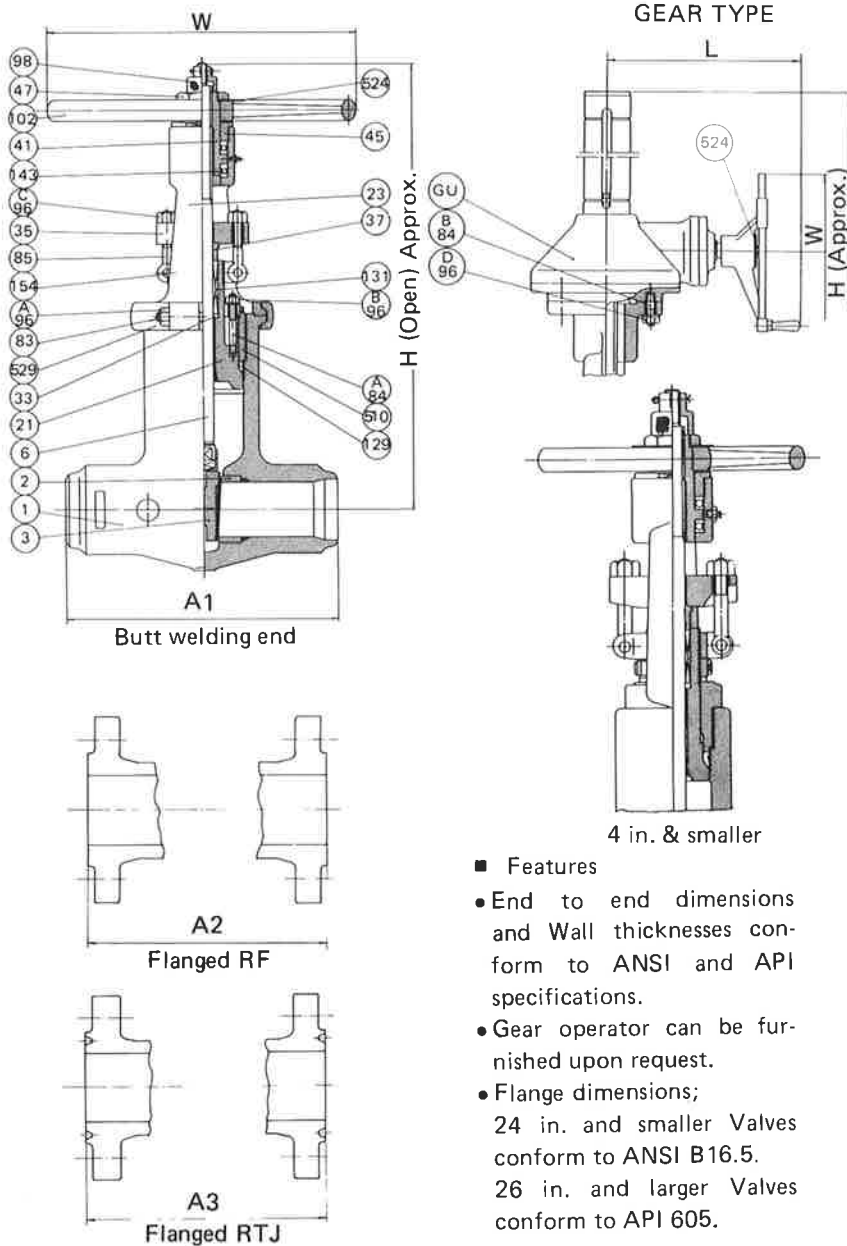
| Nom. Size | in. | mm | 2      | 2-1/2  | 3      | 4      | 5      | 6      | 8      | 10     | 12     | 14     | 16     | 18     | 20     | 24      | 26   | 28      | 30    | 36      |
|-----------|-----|----|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|------|---------|-------|---------|
| A1        | in. | mm | 11-1/2 | 13     | 14     | 17     | 20     | 22     | 26     | 31     | 33     | 35     | 39     | 43     | 47     | 55      | 57   | 61      | 65    | 82      |
| A2        | in. | mm | 292    | 330    | 356    | 432    | 508    | 559    | 660    | 787    | 838    | 889    | 991    | 1092   | 1194   | 1397    | 1448 | 1549    | 1651  | 2083    |
| A3        | in. | mm | 11-5/8 | 13-1/8 | 14-1/8 | 17-1/8 | 20-1/8 | 22-1/8 | 26-1/8 | 31-1/8 | 33-1/8 | 35-1/8 | 39-1/8 | 43-1/8 | 47-1/4 | 55-3/8  | —    | —       | —     | —       |
| H         | in. | mm | 295    | 333    | 359    | 435    | 511    | 562    | 664    | 791    | 841    | 892    | 994    | 1095   | 1200   | 1407    | —    | —       | —     | —       |
| W         | in. | mm | 23-1/4 | 24-3/4 | 26-1/4 | 36     | 39-3/8 | 42-1/2 | 49-7/8 | 59-1/2 | 70-1/2 | 73-1/8 | 85-1/8 | 88-5/8 | 97-1/4 | 118-1/8 | 128  | 137-7/8 | 149   | 179-1/2 |
| L         | in. | mm | 590    | 629    | 667    | 914    | 1000   | 1080   | 1267   | 1511   | 1791   | 1857   | 2162   | 2251   | 2470   | 3000    | 3251 | 3502    | 3785  | 4559    |
| RF        | lb  | Kg | 154    | 209    | 221    | 326    | 459    | 604    | 1014   | 1588   | 2205   | 2944   | 3936   | 4994   | 6218   | 8941    | 9845 | 11312   | 13098 | 18930   |
| BW        | lb  | Kg | 137    | 176    | 185    | 254    | 331    | 441    | 783    | 1224   | 1764   | 2426   | 3197   | 4046   | 4994   | 7188    | 7784 | 8919    | 10364 | 14994   |
|           | lb  | Kg | 60     | 80     | 84     | 115    | 150    | 200    | 355    | 555    | 800    | 1100   | 1450   | 1835   | 2265   | 3260    | 3530 | 4045    | 4700  | 6800    |

# ANSI 900 CAST STEEL GATE VALVE

## PRESSURE SEAL BONNET O.S.&Y.

Figure No.

|          |                  |
|----------|------------------|
| GA094WC  | 900 lb Gate Weld |
| GA094 RC | 900 lb Gate RF   |
| GA094 JC | 900 lb Gate RTJ  |



## Material Specifications Trim No. 5

| NO. | PART NAME           | MATERIAL          |
|-----|---------------------|-------------------|
| GU  | Bevel Gear Unit     | Cast Iron + etc   |
| 529 | Body Clamp          | ASTM A216 Gr. WCB |
| 524 | Name Plate          | 18Cr-8Ni S. Steel |
| 510 | Bonnet Retainer     | ASTM A105         |
| 154 | Eye Bolt Pin        | 13% Cr. S. Steel  |
| 143 | Bearing             | Bearing Steel     |
| 131 | Packing             | *4                |
| 129 | Gasket              | *3                |
| 102 | Handwheel           | Nodular Iron      |
| 98  | Lift Stopper        | Carbon Steel      |
| 96D | Yoke Bolt Nut       | ASTM A194 Gr.2H   |
| 96C | Eye Bolt Nut        | ASTM A194 Gr.2H   |
| 96B | Bonnet Bolt Nut     | ASTM A194 Gr.2H   |
| 96A | Body Clamp Bolt Nut | ASTM A194 Gr.2H   |
| 85  | Eye Bolt            | ASTM A193 Gr.B7   |
| 84B | Yoke Bolt           | ASTM A193 Gr.B7   |
| 84A | Bonnet Bolt         | ASTM A193 Gr.B7   |
| 83  | Body Clamp Bolt     | ASTM A193 Gr.B7   |
| 47  | Lock Nut            | Carbon Steel      |
| 45  | Sleeve Nut          | Carbon Steel      |
| 41  | Yoke Sleeve         | Al-Bronze         |
| 37  | Gland               | ASTM A182 Gr.F6a  |
| 35  | Gland Flange        | Carbon Steel      |
| 33  | Packing Washer      | ASTM A182 Gr.F6a  |
| 23  | Yoke                | ASTM A216 Gr.WCB  |
| 21  | Bonnet              | ASTM A105*2       |
| 6   | Stem                | ASTM A182 Gr.F6a  |
| 3   | Wedge               | ASTM A105 + STL*1 |
| 2   | Body Seat Ring      | ASTM A105 + STL   |
| 1   | Body                | ASTM A216 Gr. WCB |

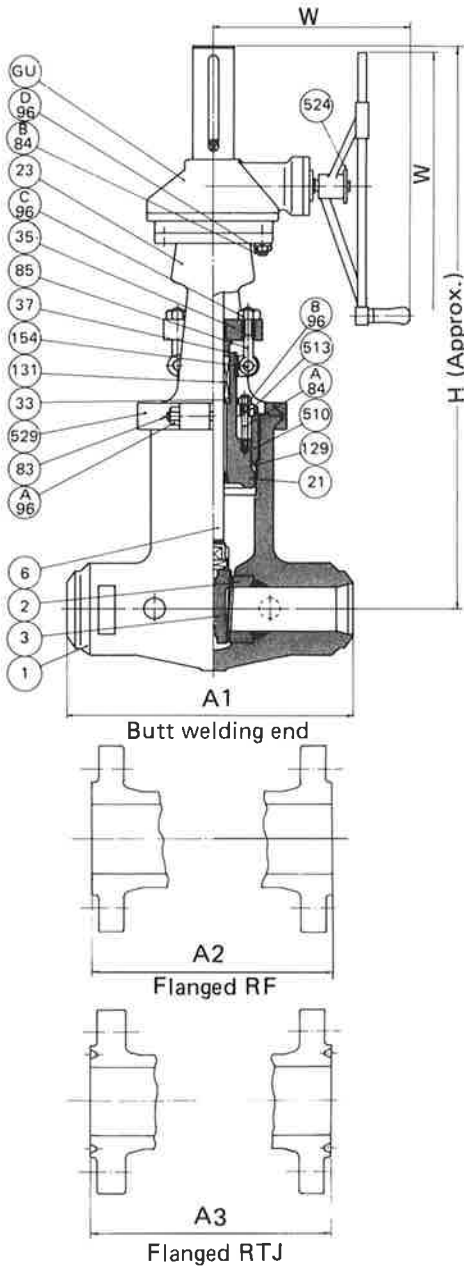
| NO.     | PART NAME                                        | MATERIAL                 |
|---------|--------------------------------------------------|--------------------------|
| Note *1 | 5 in. & larger                                   | ASTM A216 Gr. WCB + STL. |
| *2      | 6 in. & larger                                   | ASTM A216 Gr. WCB        |
| *3      | Soft iron pressure seal gasket                   |                          |
| *4      | Inconel wire reinforced asbestos braided packing |                          |

## Dimensions (in./mm)

| Nom Size | in. | mm | 2        | 2-1/2  | 3      | 4        | 5       | 6       | 8        | 10     | 12      | 14      | 16      | 18       | 20       | 24      | 26      | 28      | 30      | 36      |
|----------|-----|----|----------|--------|--------|----------|---------|---------|----------|--------|---------|---------|---------|----------|----------|---------|---------|---------|---------|---------|
| A1       | in. | mm | 8-1/2    | 10     | 12     | 14       | 17      | 20      | 26       | 31     | 36      | 39      | 43      | 48       | 52       | 61      | 64-1/2  | 68      | 71-1/2  | 83-1/2  |
| A2       | in. | mm | 14-1/2   | 16-1/2 | 15     | 18       | 22      | 24      | 29       | 33     | 38      | 40-1/2  | 44-1/2  | 48       | 52       | 61      | —       | —       | —       | —       |
| A3       | in. | mm | 14-5/8   | 16-5/8 | 15-1/8 | 18-1/8   | 22-1/8  | 24-1/8  | 29-1/8   | 33-1/8 | 38-1/8  | 40-7/8  | 44-7/8  | 48-1/2   | 52-1/2   | 61-3/4  | —       | —       | —       | —       |
| H        | in. | mm | 23-3/8   | 29-5/8 | 29-3/4 | 34       | 37-1/8  | 39-7/8  | 50-1/4   | 60-3/4 | 70-1/8  | 79-3/4  | 89      | 97-1/4   | 108-1/4  | 127-5/8 | 138-1/4 | 149     | 159-1/2 | 191-3/8 |
| W        | in. | mm | 11-13/16 | 15-3/4 | 17-3/4 | 19-11/16 | 22-1/16 | 22-1/16 | 18-1/8   | 24     | 24      | 24      | 24      | 30       | 30       | 24      | 24      | 24      | 24      | 30      |
| L        | in. | mm | —        | —      | —      | —        | —       | —       | 16-13/16 | 17     | 20-3/16 | 20-3/16 | 20-3/16 | 21-13/16 | 21-13/16 | 20-3/16 | 20-3/16 | 20-3/16 | 20-3/16 | 20-1/4  |
| RF       | lb  | Kg | 132      | 207    | 225    | 331      | 518     | 617     | 1455     | 2117   | 2976    | 3749    | 5292    | 7321     | 9702     | 14928   | —       | —       | —       | —       |
| BW       | lb  | Kg | 88       | 141    | 176    | 221      | 353     | 408     | 1091     | 1621   | 2315    | 3087    | 4300    | 6020     | 8125     | 11973   | 14046   | 16284   | 18698   | 26923   |
|          | in. | mm | 40       | 64     | 80     | 100      | 160     | 185     | 495      | 735    | 1050    | 1400    | 1950    | 2730     | 3685     | 5430    | 6370    | 7385    | 8480    | 12210   |

# ANSI 1500 CAST STEEL GATE VALVE

## PRESSURE SEAL BONNET O.S.&Y.



### ■ Features

- End to end dimensions and Wall thicknesses conform to ANSI and API specifications.

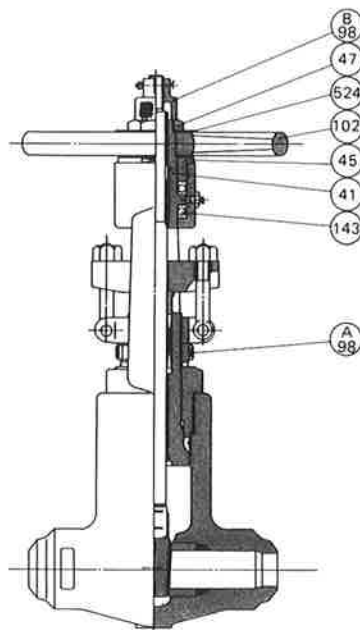
### Figure No.

|          |                   |
|----------|-------------------|
| GA154WC  | 1500 lb Gate Weld |
| GA154RC  | 1500 lb Gate RF   |
| GA154 JC | 1500 lb Gate RTJ  |

### Material Specification Trim No. 5

| NO. | PART NAME           | MATERIAL          |
|-----|---------------------|-------------------|
| GU  | Bevel Gear Unit     | Cast Iron + etc.  |
| 529 | Body Clamp          | ASTM A216 Gr. WCB |
| 524 | Name Plate          | 18Cr-8Ni S. Steel |
| 513 | Retainer Plate      | ASTM A105         |
| 510 | Bonnet Retainer     | ASTM A105         |
| 154 | Eye Bolt Pin        | 13% Cr. S. Steel  |
| 143 | Bearing             | Bearing Steel     |
| 131 | Packing             | *4                |
| 129 | Gasket              | *3                |
| 102 | Handwheel           | Nodular Iron      |
| 98B | Lift Stopper        | Carbon Steel      |
| 98A | Bonnet Nut          | 13% Cr. S. Steel  |
| 96D | Yoke Bolt Nut       | ASTM A194 Gr.2H   |
| 96C | Eye Bolt Nut        | ASTM A194 Gr.2H   |
| 96B | Bonnet Bolt Nut     | ASTM A194 Gr.2H   |
| 96A | Body Clamp Bolt Nut | ASTM A194 Gr.2H   |
| 85  | Eye Bolt            | ASTM A193 Gr.B7   |
| 84B | Yoke Bolt           | ASTM A193 Gr.B7   |
| 84A | Bonnet Bolt         | ASTM A193 Gr. B7  |
| 83  | Body Clamp Bolt     | ASTM A193 Gr. B7  |
| 47  | Lock Nut            | Carbon Steel      |
| 45  | Sleeve Nut          | Carbon Steel      |
| 41  | Yoke Sleeve         | Al-Bronze         |
| 37  | Gland               | ASTM A182 Gr.F6a  |
| 35  | Gland Flange        | Carbon Steel      |
| 33  | Packing Washer      | ASTM A182 Gr.F6a  |
| 23  | Yoke                | ASTM A216 Gr.WCB  |
| 21  | Bonnet              | ASTM A105*2       |
| 6   | Stem                | ASTM A182 Gr.F6a  |
| 3   | Wedge               | ASTM A105 + STL*1 |
| 2   | Body Seat Ring      | ASTM A105 + STL   |
| 1   | Body                | ASTM A216 Gr.WCB  |

- Note \*1 5 in. & larger ASTM A216 Gr. WCB + STL.  
 \*2 6 in. & larger ASTM A216 Gr. WCB  
 \*3 Soft iron pressure seal gasket  
 \*4 Inconel wire reinforced asbestos braided packing



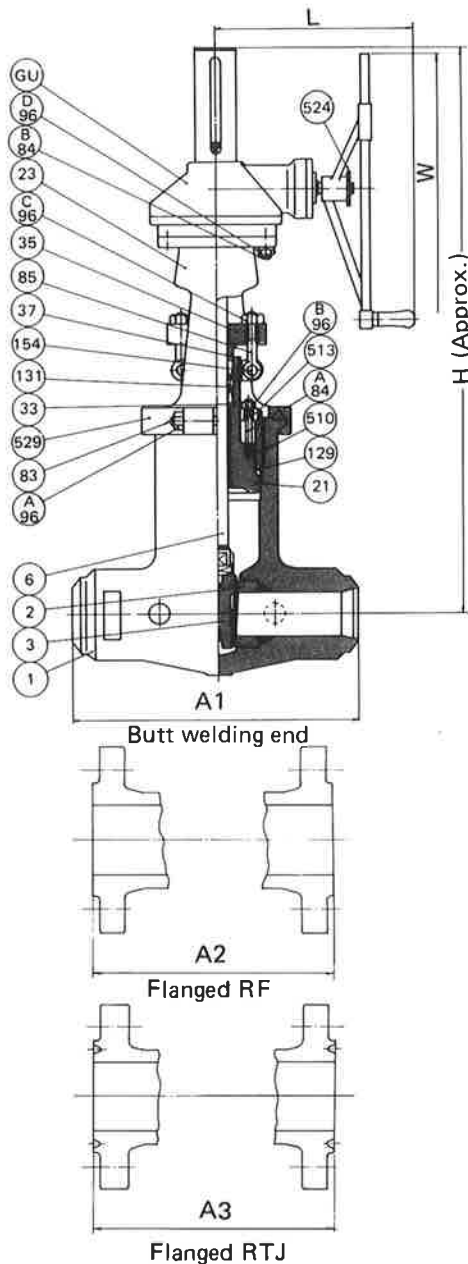
4 in. & smaller

### Dimensions (in./mm)

| Nom. Size | in. | 2        | 2-1/2  | 3      | 4        | 5       | 6      | 8      | 10     | 12     | 14     | 16     | 18      | 20      | 24      |
|-----------|-----|----------|--------|--------|----------|---------|--------|--------|--------|--------|--------|--------|---------|---------|---------|
| A1        | in. | 8-1/2    | 10     | 12     | 16       | 19      | 22     | 28     | 34     | 39     | 42     | 47     | 53      | 58      | 76-1/2  |
| A2        | in. | 14-1/2   | 16-1/2 | 18-1/2 | 21-1/2   | 26-1/2  | 27-3/4 | 32-3/4 | 39     | 44-1/2 | 49-1/2 | 54-1/2 | 60-1/2  | 65-1/2  | 76-1/2  |
| A3        | in. | 14-5/8   | 16-5/8 | 18-5/8 | 21-5/8   | 26-5/8  | 28     | 33-1/8 | 39-3/8 | 45-1/8 | 50-1/4 | 55-3/8 | 61-3/8  | 66-3/8  | 77-5/8  |
| H         | in. | 23-3/8   | 29-5/8 | 29-5/8 | 34       | 43-5/8  | 48     | 51-5/8 | 64-3/4 | 77-3/4 | 87-1/4 | 91-3/4 | 111-1/8 | 122-1/8 | 148-1/4 |
| W         | in. | 11-13/16 | 17-3/4 | 17-3/4 | 19-11/16 | 27-3/16 | 24     | 24     | 24     | 24     | 30     | 30     | 30      | 24      | 24      |
| L         | in. | 300      | 450    | 450    | 500      | 690     | 610    | 610    | 610    | 610    | 760    | 760    | 760     | 610     | 610     |
| RF        | lb  | 132      | 207    | 265    | 459      | 772     | 1058   | 2007   | 3109   | 4586   | 5755   | 7938   | 13142   | 16251   | 23395   |
| RF        | Kg  | 60       | 94     | 120    | 208      | 350     | 480    | 910    | 1410   | 2080   | 2610   | 3600   | 5960    | 7370    | 10610   |
| BW        | lb  | 88       | 141    | 176    | 326      | 518     | 750    | 1499   | 2249   | 3197   | 3969   | 6064   | 10209   | 12613   | 18169   |
| BW        | Kg  | 40       | 64     | 80     | 148      | 235     | 340    | 680    | 1020   | 1450   | 1800   | 2750   | 4630    | 5720    | 8240    |

# ANSI 2500 CAST STEEL GATE VALVE

## PRESSURE SEAL BONNET O.S.&Y.



### ■ Features

- End to end dimensions and Wall thicknesses conform to ANSI and API specifications.
- Gear operator can be furnished upon request.
- Flange dimensions conform to ANSI B16.5.

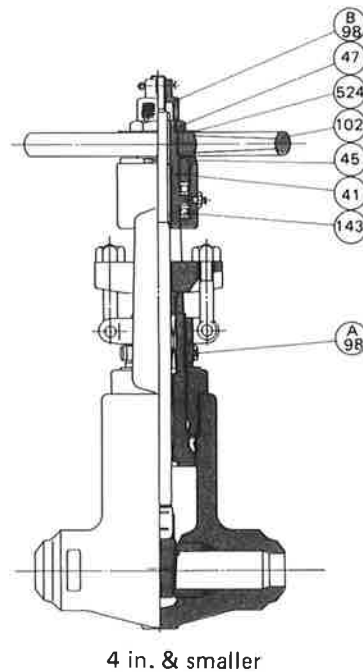
### Figure No.

|         |                   |
|---------|-------------------|
| GA254WC | 2500 lb Gate Weld |
| GA254RC | 2500 lb Gate RF   |
| GA254JC | 2500 lb Gate RTJ  |

### Material Specifications Trim No. 5

| NO. | PART NAME           | MATERIAL          |
|-----|---------------------|-------------------|
| GU  | Bevel Gear Unit     | Cast Iron + etc.  |
| 529 | Body Clamp          | ASTM A216 Gr. WCB |
| 524 | Name Plate          | 18Cr-8Ni S. Steel |
| 513 | Retainer Plate      | ASTM A105         |
| 510 | Bonnet Retainer     | ASTM A105         |
| 154 | Eye Bolt Pin        | 13% Cr. S. Steel  |
| 143 | Bearing             | Bearing Steel     |
| 131 | Packing             | *4                |
| 129 | Gasket              | *3                |
| 102 | Handwheel           | Nodular Iron      |
| 98B | Lift Stopper        | Carbon Steel      |
| 98A | Bonnet Nut          | 13% Cr. S. Steel  |
| 96D | Yoke Bolt Nut       | ASTM A194 Gr.2H   |
| 96C | Eye Bolt Nut        | ASTM A194 Gr.2H   |
| 96B | Bonnet Bolt Nut     | ASTM A194 Gr.2H   |
| 96A | Body Clamp Bolt Nut | ASTM A194 Gr.2H   |
| 85  | Eye Bolt            | ASTM A193 Gr.B7   |
| 84B | Yoke Bolt           | ASTM A193 Gr.B7   |
| 84A | Bonnet Bolt         | ASTM A193 Gr.B7   |
| 83  | Body Clamp Bolt     | ASTM A193 Gr.B7   |
| 47  | Lock Nut            | Carbon Steel      |
| 45  | Sleeve Nut          | Carbon Steel      |
| 41  | Yoke Sleeve         | Al-Bronze         |
| 37  | Gland               | ASTM A182 Gr.F6a  |
| 35  | Gland Flange        | Carbon Steel      |
| 33  | Packing Washer      | ASTM A182 Gr.F6a  |
| 23  | Yoke                | ASTM A216 Gr.WCB  |
| 21  | Bonnet              | ASTM A105*2       |
| 6   | Stem                | ASTM A182 Gr.F6a  |
| 3   | Wedge               | ASTM A105 + STL*1 |
| 2   | Body Seat Ring      | ASTM A105 + STL   |
| 1   | Body                | ASTM A216 Gr.WCB  |

- Note \*1 5 in. & larger ASTM A216 Gr. WCB + STL.  
 \*2 6 in. & larger ASTM A216 Gr. WCB  
 \*3 Soft iron pressure seal gasket  
 \*4 Inconel wire reinforced asbestos braided packing



### Dimensions (in./mm)

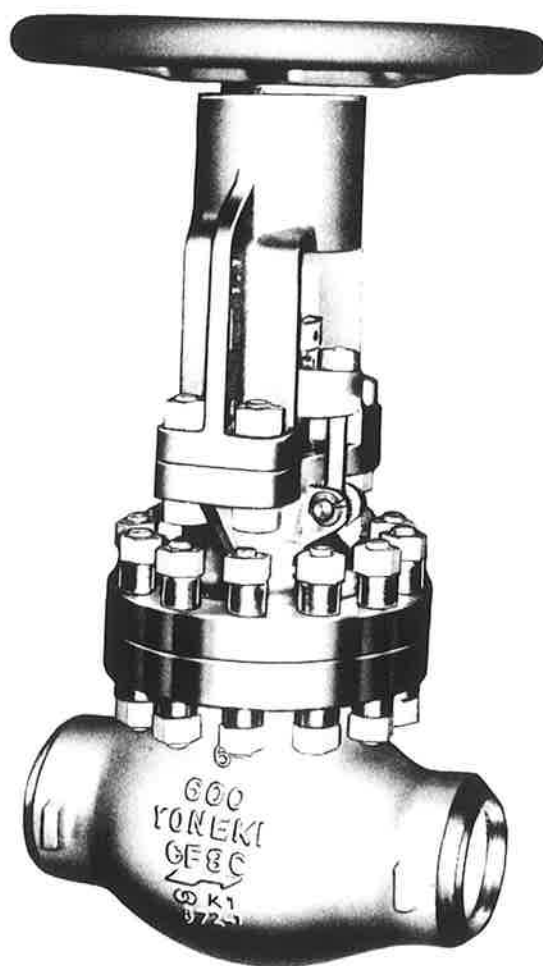
| Nom. Size | in. | mm | 2      | 2-1/2  | 3        | 4      | 5       | 6      | 8       | 10      | 12       | 14       | 16      | 18      | 20      | 24      |
|-----------|-----|----|--------|--------|----------|--------|---------|--------|---------|---------|----------|----------|---------|---------|---------|---------|
| A1        | in. | mm | 11     | 13     | 14-1/2   | 18     | 21      | 24     | 30      | 36      | 41       | 44       | 49      | 55      | 61      | 68      |
| A2        | in. | mm | 279    | 330    | 368      | 457    | 533     | 610    | 762     | 914     | 1041     | 1118     | 1245    | 1397    | 1549    | 1727    |
| A3        | in. | mm | 17-3/4 | 20     | 22-3/4   | 26-1/2 | 31-1/4  | 36     | 40-1/4  | 50      | 56       | —        | —       | —       | —       | —       |
| H         | in. | mm | 451    | 508    | 578      | 673    | 794     | 914    | 1022    | 1270    | 1422     | —        | —       | —       | —       | —       |
| W         | in. | mm | 17-7/8 | 20-1/4 | 23       | 26-7/8 | 31-3/4  | 36-1/2 | 40-7/8  | 50-7/8  | 56-7/8   | —        | —       | —       | —       | —       |
| L         | in. | mm | 454    | 514    | 584      | 683    | 806     | 927    | 1038    | 1292    | 1445     | —        | —       | —       | —       | —       |
| H         | in. | mm | 23-3/8 | 29-5/8 | 29-5/8   | 34-1/4 | 42-1/4  | 47-1/4 | 57-1/8  | 63-3/8  | 82-1/2   | 94-1/8   | 97-1/4  | 116-1/8 | 128-3/4 | 153-5/8 |
| W         | in. | mm | 594    | 753    | 753      | 870    | 1073    | 1201   | 1451    | 1610    | 2096     | 2291     | 2470    | 2950    | 3270    | 3902    |
| W         | in. | mm | 14     | 17-3/4 | 19-11/16 | 23-5/8 | 27-3/16 | 24     | 24      | 24      | 30       | 30       | 24      | 24      | 24      | 30      |
| L         | in. | mm | 355    | 450    | 500      | 600    | 690     | 610    | 610     | 610     | 760      | 760      | 610     | 610     | 610     | 760     |
| L         | in. | mm | —      | —      | —        | —      | —       | 17     | 20-3/16 | 20-3/16 | 21-13/16 | 21-13/16 | 20-3/16 | 20-3/16 | 20-3/16 | 20-1/4  |
| RF        | lb  | Kg | 187    | 298    | 364      | 765    | 1196    | 1786   | 2911    | 5235    | 7541     | —        | —       | —       | —       | —       |
| BW        | lb  | Kg | 85     | 135    | 165      | 347    | 542     | 810    | 1320    | 2374    | 3420     | —        | —       | —       | —       | —       |
| BW        | lb  | Kg | 110    | 198    | 209      | 419    | 871     | 1147   | 1632    | 3528    | 6615     | 7497     | 9261    | 11025   | 13605   | 19580   |
| BW        | in. | mm | 50     | 90     | 95       | 190    | 395     | 520    | 740     | 1600    | 3000     | 3400     | 4200    | 5000    | 6170    | 8880    |

# GLOBE VALVES

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**CLASS 150-300-600-  
900-1500-2500**

FLANGED ENDS  
BUTT WELDING ENDS  
BOLTED BONNET O.S.&Y.





# ANSI 150 CAST STEEL GLOBE VALVE

## BOLTED BONNET O.S. & Y.

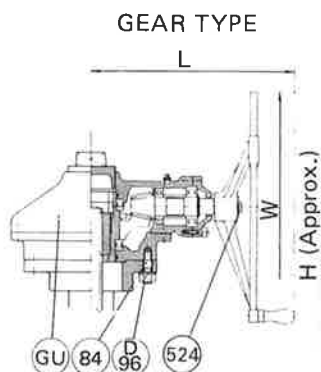
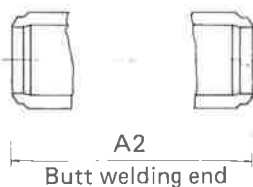
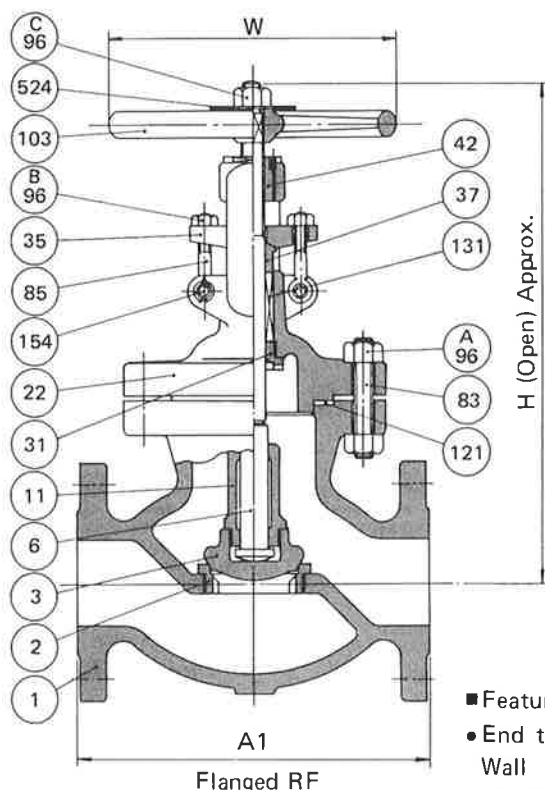


Figure No.

|         |                   |
|---------|-------------------|
| GL010RA | 150 lb Globe RF   |
| GL010WA | 150 lb Globe Weld |

### ■ Features

- End to end dimensions and Wall thicknesses conform to ANSI and API specifications.
- 10 in. and smaller Valves have a one piece Bonnet and Yoke design.
- 12 in. and larger Valves have a two piece Bonnet and Yoke design.
- Gear operator can be furnished upon request.
- 12 in. and larger Valves have hammer blow Handwheel.
- Angle and Stop check valves also available. Data supplied upon request.

### Material Specifications Trim No. 8

| NO. | PART NAME       | MATERIAL            |
|-----|-----------------|---------------------|
| GU  | Bevel Gear Unit | Cast Iron + etc.    |
| 524 | Name Plate      | 18Cr-8Ni S. Steel   |
| 154 | Eye Bolt Pin    | 13% Cr. S. Steel    |
| 131 | Packing         | *3                  |
| 121 | Gasket          | *2                  |
| 103 | Handwheel       | Nodular Iron        |
| 96D | Yoke Bolt Nut   | ASTM A 194 Gr.2H    |
| 96C | Wheel Nut       | Carbon Steel        |
| 96B | Eye Bolt Nut    | ASTM A 194 Gr.2H    |
| 96A | Bonnet Bolt Nut | ASTM A 194 Gr.2H    |
| 85  | Eye Bolt        | ASTM A 193 Gr.B7    |
| 84  | Yoke Bolt       | ASTM A 193 Gr.B7    |
| 83  | Bonnet Bolt     | ASTM A 193 Gr.B7    |
| 42  | Yoke Bush       | Al-Bronze           |
| 37  | Gland           | ASTM A 182 Gr.F6a   |
| 35  | Gland Flange    | Carbon Steel        |
| 31  | Bonnet Bush     | ASTM A 182 Gr.F6a   |
| 22  | Bonnet Yoke     | ASTM A 216 Gr.WCB   |
| 11  | Disc Stem Ring  | ASTM A 182 Gr.F6a   |
| 6   | Stem            | ASTM A 182 Gr.F6a   |
| 3   | Disc            | ASTM A 182 Gr.F6a*1 |
| 2   | Body Seat Ring  | ASTM A 105 + STL    |
| 1   | Body            | ASTM A 216 Gr. WCB  |

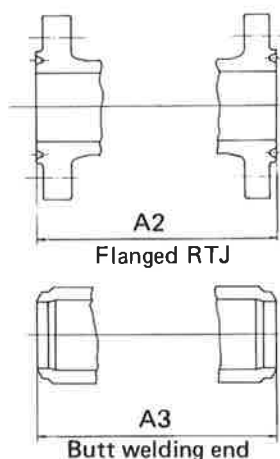
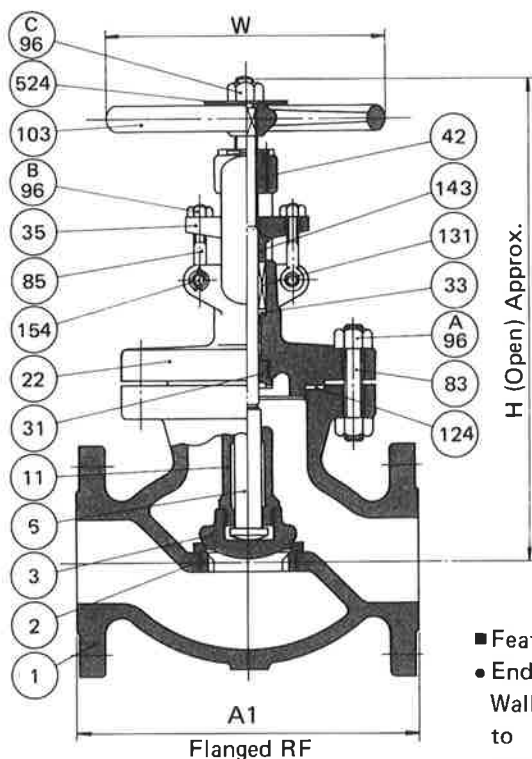
- Note \*1 12 in. & larger ASTM A216 Gr. WCB + 13% Cr. deposit  
 \*2 Compressed asbestos or Corrugated metal.  
 \*3 Inconel wire reinforced asbestos braided packing.

### Dimensions (in./mm)

| Norm Size        | in. | mm | 2      | 2-1/2  | 3      | 4        | 5        | 6      | 8        | 10       | 12      | 14   | 16     | 18     |
|------------------|-----|----|--------|--------|--------|----------|----------|--------|----------|----------|---------|------|--------|--------|
| A1               | in. | mm | 8      | 8-1/2  | 9-1/2  | 11-1/2   | 14       | 16     | 19-1/2   | 24-1/2   | 27-1/2  | 31   | 36     | 38-1/2 |
| A2               | in. | mm | 8      | 8-1/2  | 9-1/2  | 11-1/2   | 14       | 16     | 19-1/2   | 24-1/2   | 27-1/2  | 31   | 36     | 38-1/2 |
| H                | in. | mm | 13-3/8 | 15-1/4 | 15-3/4 | 17-3/4   | 19-3/8   | 21-3/8 | 25-5/8   | 28-3/4   | 35      | 51   | 63-3/4 | 78     |
| W                | in. | mm | 7-7/8  | 7-7/8  | 9-7/8  | 11-13/16 | 11-13/16 | 14     | 17-11/16 | 19-11/16 | 22-1/16 | 24   | 24     | 24     |
| L                | in. | mm | 200    | 200    | 250    | 300      | 300      | 355    | 450      | 500      | 560     | 610  | 610    | 610    |
| Weight (Approx.) |     |    |        |        |        |          |          |        |          |          |         |      |        |        |
| RF               | lb  | Kg | 53     | 77     | 82     | 139      | 221      | 267    | 401      | 650      | 1014    | 1521 | 2095   | 3969   |
| BW               | lb  | Kg | 42     | 66     | 64     | 106      | 187      | 221    | 331      | 496      | 838     | 1323 | 1874   | 3638   |
|                  |     |    | 19     | 30     | 29     | 48       | 85       | 100    | 150      | 225      | 380     | 600  | 850    | 1650   |

# ANSI 300 CAST STEEL GLOBE VALVE

## BOLTED BONNET O.S. & Y.



GEAR TYPE

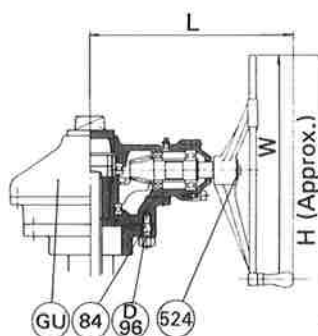


Figure No.

|         |                   |
|---------|-------------------|
| GL030RA | 300 lb Globe RF   |
| GL030JA | 300 lb Globe RTJ  |
| GL030WA | 300 lb Globe Weld |

### Features

- End to end dimensions and Wall thicknesses conform to ANSI and API specifications.
- 6 in. and smaller Valves have a one piece Bonnet and Yoke design.
- 8 in. and larger Valves have a two piece Bonnet and Yoke design.
- Gear operator can be furnished upon request.
- 8 in. and larger Valves have hammer blow Handwheel.
- Angle and Stop check valves also available. Data supplied upon request.

### Material Specifications Trim No. 8

| NO. | PART NAME       | MATERIAL            |
|-----|-----------------|---------------------|
| GU  | Bevel Gear Unit | Cast Iron + etc.    |
| 524 | Name Plate      | 18Cr-8Ni S. Steel   |
| 154 | Eye Bolt Pin    | 13% Cr. S. Steel    |
| 131 | Packing         | *3                  |
| 124 | Gasket          | *2                  |
| 103 | Handwheel       | Nodular Iron        |
| 96D | Yoke Bolt Nut   | ASTM A 194 Gr.2H    |
| 96C | Wheel Nut       | Carbon Steel        |
| 96B | Eye Bolt Nut    | ASTM A 194 Gr.2H    |
| 96A | Bonnet Bolt Nut | ASTM A 194 Gr.2H    |
| 85  | Eye Bolt        | ASTM A 193 Gr.B7    |
| 84  | Yoke Bolt       | ASTM A 193 Gr.B7    |
| 83  | Bonnet Bolt     | ASTM A 193 Gr.B7    |
| 42  | Yoke Bush       | Al-Bronze           |
| 37  | Gland           | ASTM A 182 Gr.F6a   |
| 35  | Gland Flange    | Carbon Steel        |
| 33  | Packing Washer  | ASTM A 182 Gr.F6a   |
| 31  | Bonnet Bush     | ASTM A 182 Gr.F6a   |
| 22  | Bonnet Yoke     | ASTM A 216 Gr.WCB   |
| 11  | Disc Stem Ring  | ASTM A 182 Gr.F6a   |
| 6   | Stem            | ASTM A 182 Gr.F6a   |
| 3   | Disc            | ASTM A 182 Gr.F6a*1 |
| 2   | Body Seat Ring  | ASTM A 105 + STL    |
| 1   | Body            | ASTM A 216 Gr. WCB  |

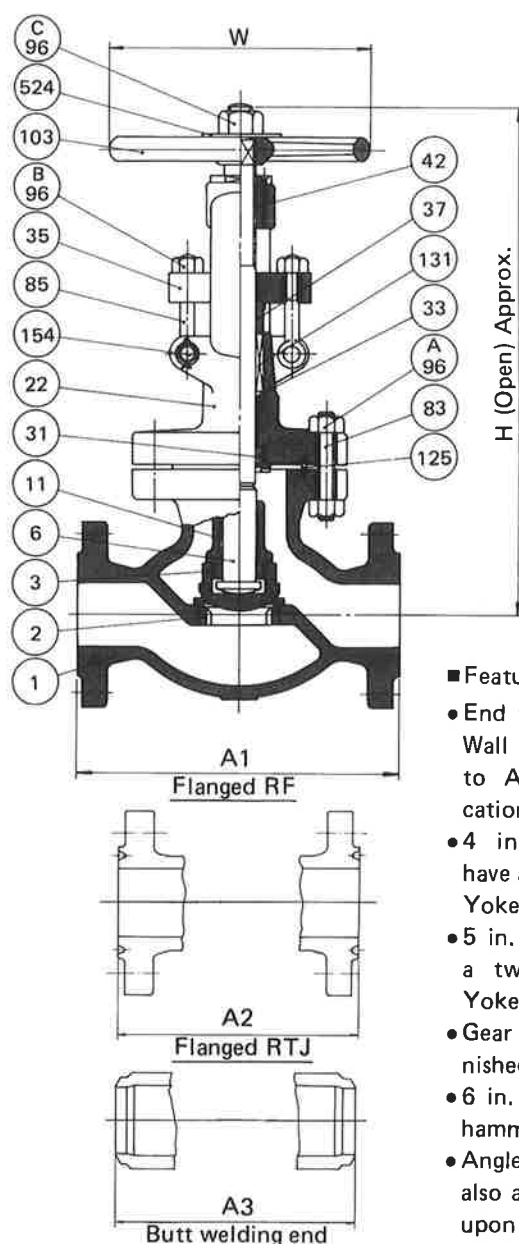
- Note
- \*1 10 in. & larger ASTM A 216 Gr. WCB + 13% Cr. deposit
  - \*2 Spiral wound 304 s. steel asbestos filled
  - \*3 Inconel wire reinforced asbestos braided packing

### Dimensions (in./mm)

| Nom. Size | in. | mm | 2      | 2-1/2   | 3        | 4      | 5      | 6        | 8       | 10     | 12     | 14     | 16     |
|-----------|-----|----|--------|---------|----------|--------|--------|----------|---------|--------|--------|--------|--------|
| A1        | in. | mm | 10-1/2 | 11-1/2  | 12-1/2   | 14     | 15-3/4 | 17-1/2   | 22      | 24-1/2 | 28     | 39     | 42     |
| A2        | in. | mm | 267    | 292     | 318      | 356    | 400    | 444      | 559     | 622    | 711    | 991    | 1067   |
| A3        | in. | mm | 11-1/8 | 12-1/8  | 13-1/8   | 14-5/8 | 16-3/8 | 18-1/8   | 22-5/8  | 25-1/8 | 28-5/8 | 39-5/8 | 42-5/8 |
| H         | in. | mm | 283    | 308     | 333      | 371    | 416    | 460      | 575     | 638    | 727    | 1006   | 1083   |
| W         | in. | mm | 10-1/2 | 11-1/2  | 12-1/2   | 14     | 15-3/4 | 17-1/2   | 22      | 24-1/2 | 28     | 39     | 42     |
| L         | in. | mm | 267    | 292     | 318      | 356    | 400    | 444      | 559     | 622    | 711    | 991    | 1067   |
| RF        | lb  | Kg | 14-5/8 | 17-1/4  | 17-1/4   | 20-5/8 | 26-5/8 | 28-1/4   | 37      | 53     | 57-1/8 | 61-1/4 | 67     |
| BW        | lb  | Kg | 372    | 438     | 438      | 524    | 676    | 717      | 940     | 1345   | 1450   | 1556   | 1700   |
| W         | in. | mm | 7-7/8  | 11-3/16 | 11-13/16 | 14     | 15-3/4 | 17-11/16 | 22-1/16 | 24     | 24     | 24     | 24     |
| L         | in. | mm | 200    | 300     | 300      | 355    | 400    | 450      | 560     | 610    | 610    | 610    | 610    |
| RF        | lb  | Kg | 75     | 115     | 132      | 205    | 353    | 450      | 719     | 1257   | 2315   | 3308   | 4851   |
| BW        | lb  | Kg | 34     | 52      | 60       | 93     | 160    | 204      | 326     | 570    | 1050   | 1500   | 2200   |
| W         | in. | mm | 60     | 88      | 97       | 150    | 287    | 353      | 595     | 1058   | 2073   | 2977   | 4410   |
| L         | in. | mm | 27     | 40      | 44       | 68     | 130    | 160      | 270     | 480    | 940    | 1350   | 2000   |

## ANSI 600 CAST STEEL GLOBE VALVE

## BOLTED BONNET O.S. &amp; Y.



## ■ Features

- End to end dimensions and Wall thicknesses conform to ANSI and API specifications.
- 4 in. and smaller Valves have a one piece Bonnet and Yoke design.
- 5 in. and larger Valves have a two piece Bonnet and Yoke design.
- Gear operator can be furnished upon request.
- 6 in. and larger Valves have hammer blow Handwheel.
- Angle and stop check valves also available. Data supplied upon request.

## GEAR TYPE

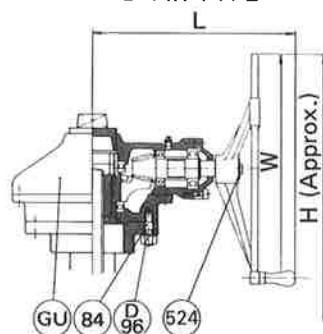


Figure No.

|         |                   |
|---------|-------------------|
| GL060RA | 600 lb Globe RF   |
| GL060JA | 600 lb Globe RTJ  |
| GL060WA | 600 lb Globe Weld |

## Material Specifications Trim No. 8

| NO. | PART NAME       | MATERIAL            |
|-----|-----------------|---------------------|
| GU  | Bevel Gear Unit | Cast Iron + etc.    |
| 524 | Name Plate      | 18Cr-8Ni S. Steel   |
| 154 | Eye Bolt Pin    | 13% Cr. S. Steel    |
| 131 | Packing         | *3                  |
| 125 | Gasket          | *2                  |
| 103 | Handwheel       | Nodular Iron        |
| 96D | Yoke Bolt Nut   | ASTM A 194 Gr.2H    |
| 96C | Wheel Nut       | Carbon Steel        |
| 96B | Eye Bolt Nut    | ASTM A 194 Gr.2H    |
| 96A | Bonnet Bolt Nut | ASTM A 194 Gr.2H    |
| 85  | Eye Bolt        | ASTM A 193 Gr.B7    |
| 84  | Yoke Bolt       | ASTM A 193 Gr.B7    |
| 83  | Bonnet Bolt     | ASTM A 193 Gr.B7    |
| 42  | Yoke Bush       | Al-Bronze           |
| 37  | Gland           | ASTM A 182 Gr.F6a   |
| 35  | Gland Flange    | Carbon Steel        |
| 33  | Packing Washer  | ASTM A 182 Gr.F6a   |
| 31  | Bonnet Bush     | ASTM A 182 Gr.F6a   |
| 22  | Bonnet Yoke     | ASTM A 216 Gr.WCB   |
| 11  | Disc Stem Ring  | ASTM A 182 Gr.F6a   |
| 6   | Stem            | ASTM A 182 Gr.F6a   |
| 3   | Disc            | ASTM A 182 Gr.F6a*1 |
| 2   | Body Seat Ring  | ASTM A 105 + STL    |
| 1   | Body            | ASTM A 216 Gr. WCB  |

- Note \*1 10 in. & larger ASTM A 216 Gr. WCB + 13% Cr. deposit
- \*2 Soft iron ring joint gasket
- \*3 Inconel wire reinforced asbestos braided packing

## Dimensions (in./mm)

| Norm. Size       | 2      | 2-1/2    | 3        | 4        | 5        | 6      | 8      | 10     | 12     | 14     | 16     |
|------------------|--------|----------|----------|----------|----------|--------|--------|--------|--------|--------|--------|
| A1               | 11-1/2 | 13       | 14       | 17       | 20       | 22     | 26     | 31     | 33     | 35     | 39     |
| A2               | 11-5/8 | 13-1/8   | 14-1/8   | 17-1/8   | 20-1/8   | 22-1/8 | 26-1/8 | 31-1/8 | 33-1/8 | 35-1/8 | 39-1/8 |
| A3               | 11-1/2 | 13       | 14       | 17       | 20       | 22     | 26     | 31     | 33     | 35     | 39     |
| H                | 18     | 20-5/8   | 23-3/4   | 27       | 31-3/4   | 36-1/4 | 55-1/8 | 62     | 67     | 70-7/8 | 76     |
| W                | 9-7/8  | 11-13/16 | 11-13/16 | 17-11/16 | 19-11/16 | 23-5/8 | 18-1/8 | 24     | 24     | 24     | 30     |
| L                | 250    | 300      | 300      | 450      | 500      | 600    | 460    | 610    | 610    | 610    | 760    |
| Weight (Approx.) |        |          |          |          |          |        |        |        |        |        |        |
| RF               | 110    | 154      | 205      | 348      | 485      | 816    | 1544   | 2756   | 4190   | 5954   | 7938   |
| BW               | 88     | 132      | 165      | 265      | 397      | 650    | 1367   | 2403   | 3793   | 5535   | 7387   |
|                  | 40     | 60       | 75       | 120      | 180      | 295    | 620    | 1090   | 1720   | 2510   | 3350   |

# ANSI 900 CAST STEEL GLOBE VALVE

## BOLTED BONNET O.S. & Y.

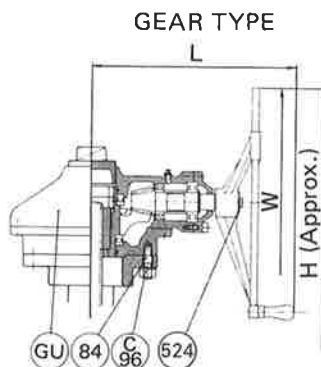
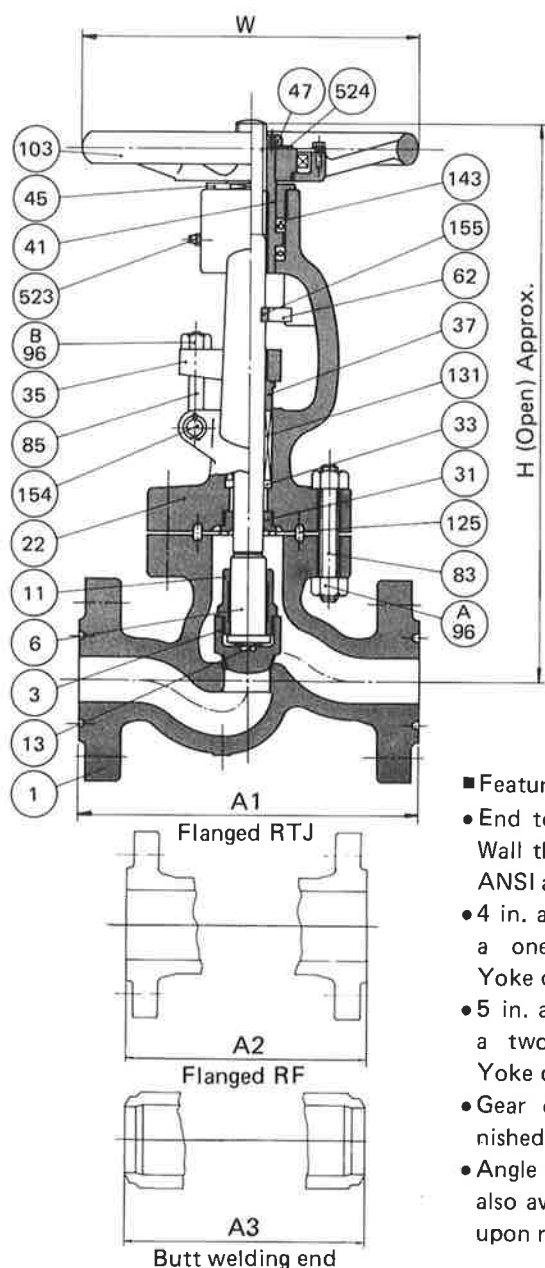


Figure No.

|         |                   |
|---------|-------------------|
| GL090JB | 900 lb Globe RTJ  |
| GL090RB | 900 lb Globe RF   |
| GL090WB | 900 lb Globe Weld |

| Material Specifications |                 | Trim No. 5             |
|-------------------------|-----------------|------------------------|
| GU                      | Bevel Gear Unit | Cast Iron + etc.       |
| 524                     | Name Plate      | 18Cr-8Ni. S. Steel     |
| 523                     | Grease Nipple   | Brass + Cr. Plating    |
| 155                     | Key             | Carbon Steel           |
| 154                     | Eye Bolt Pin    | 13% Cr. S. Steel       |
| 143                     | Bearing         | Bearing Steel          |
| 131                     | Packing         | *3                     |
| 125                     | Gasket          | *2                     |
| 103                     | Handwheel       | Carbon Steel           |
| 96C                     | Yoke Bolt Nut   | ASTM A194 Gr. 2H       |
| 96B                     | Eye Bolt Nut    | ASTM A194 Gr. 2H       |
| 96A                     | Bonnet Bolt Nut | ASTM A194 Gr. 2H       |
| 85                      | Eye Bolt        | ASTM A193 Gr. B7       |
| 84                      | Yoke Bolt       | ASTM A193 Gr. B7       |
| 83                      | Bonnet Bolt     | ASTM A193 Gr. B7       |
| 62                      | Stopper         | Carbon Steel           |
| 47                      | Lock Nut        | Carbon Steel           |
| 45                      | Sleeve Nut      | Carbon Steel           |
| 41                      | Yoke Sleeve     | Al-Bronze              |
| 37                      | Gland           | ASTM A182 Gr. F6a      |
| 35                      | Gland Flange    | Carbon Steel           |
| 33                      | Packing Washer  | ASTM A182 Gr. F6a      |
| 31                      | Bonnet Bush     | ASTM A182 Gr. F6a      |
| 22                      | Bonnet Yoke     | ASTM A216 Gr. WCB      |
| 13                      | Stem Plate      | ASTM A182 Gr. F6a      |
| 11                      | Disc Stem Ring  | ASTM A182 Gr. F6a      |
| 6                       | Stem            | ASTM A182 Gr. F6a      |
| 3                       | Disc            | ASTM A105 + STL. *1    |
| 1                       | Body            | ASTM A216 Gr. WCB+STL. |

### ■ Features

- End to end dimensions and Wall thicknesses conform to ANSI and API specifications.
- 4 in. and smaller Valves have a one piece Bonnet and Yoke design.
- 5 in. and larger Valves have a two piece Bonnet and Yoke design.
- Gear operator can be furnished upon request.
- Angle and Stop check valves also available. Data supplied upon request.

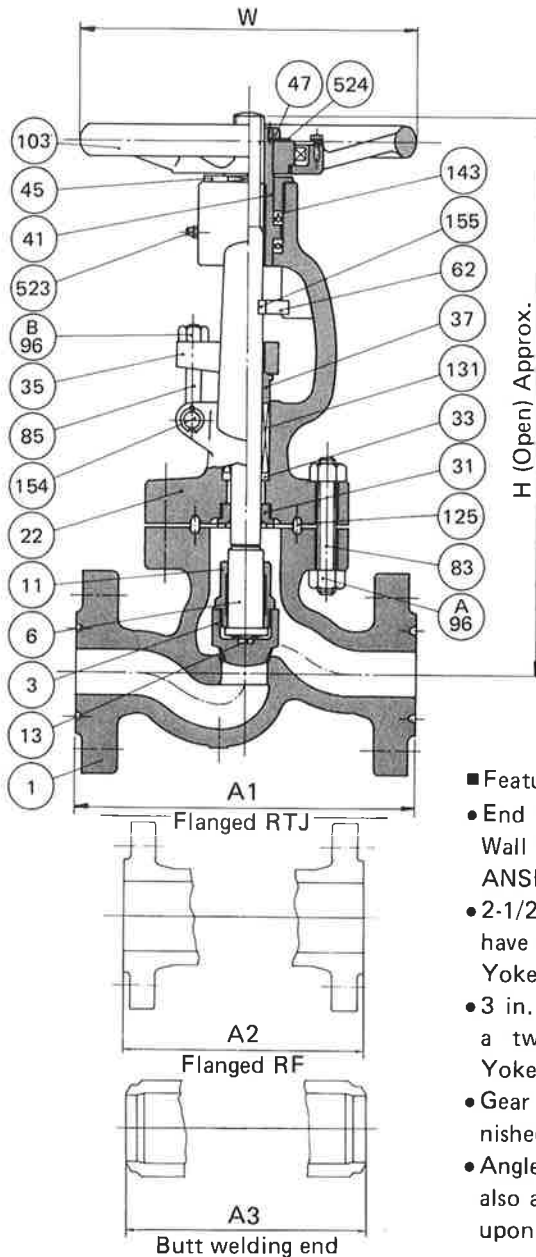
| NO.     | PART NAME                                        | MATERIAL                |
|---------|--------------------------------------------------|-------------------------|
| Note *1 | 8 in. & larger                                   | ASTM A216 Gr. WCB + STL |
| *2      | Soft iron ring joint gasket                      |                         |
| *3      | Inconel wire reinforced asbestos braided packing |                         |

### Dimensions (in./mm)

| Nom. Size        | in. | mm | 2      | 2-1/2  | 3      | 4        | 5       | 6       | 8      | 10      | 12      | 14      | 16      |
|------------------|-----|----|--------|--------|--------|----------|---------|---------|--------|---------|---------|---------|---------|
| A1               | in. | mm | 14-5/8 | 16-5/8 | 15-1/8 | 18-1/8   | 22-1/8  | 24-1/8  | 29-1/8 | 33-1/8  | 38-1/8  | 40-7/8  | 44-7/8  |
| A2               | in. | mm | 14-1/2 | 16-1/2 | 15     | 18       | 22      | 24      | 29     | 33      | 38      | 40-1/2  | 44-1/2  |
| A3               | in. | mm | 14-1/2 | 16-1/2 | 15     | 18       | 22      | 24      | 29     | 33      | 38      | 40-1/2  | 44-1/2  |
| H                | in. | mm | 23-1/4 | 26     | 27-1/2 | 30-3/4   | 53-1/8  | 55-1/8  | 59     | 63      | 67-1/8  | 87      | 103-1/8 |
| W                | in. | mm | 15-3/4 | 15-3/4 | 15-3/4 | 19-11/16 | 24      | 24      | 24     | 24      | 24      | 30      | 30      |
| L                | in. | mm | -      | -      | -      | -        | 20-3/16 | 20-3/16 | 17     | 20-3/16 | 20-3/16 | 22-5/16 | 22-5/16 |
| Weight (Approx.) | lb  | Kg | 243    | 342    | 419    | 617      | 1058    | 1389    | 2977   | 4520    | 5843    | 8048    | 9482    |
| RF               | lb  | Kg | 110    | 155    | 190    | 280      | 480     | 630     | 1350   | 2050    | 2650    | 3650    | 4300    |
| BW               | lb  | Kg | 176    | 265    | 342    | 507      | 904     | 1191    | 2646   | 4123    | 5292    | 7387    | 8600    |
|                  | lb  | Kg | 80     | 120    | 155    | 230      | 410     | 540     | 1200   | 1870    | 2400    | 3350    | 3900    |

# ANSI 1500 CAST STEEL GLOBE VALVE

## BOLTED BONNET O.S. & Y.



GEAR TYPE

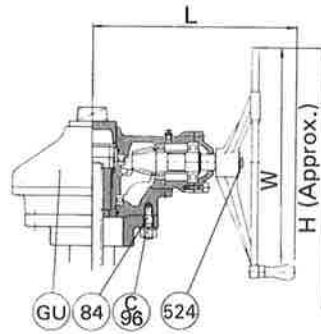


Figure No.

|         |                    |
|---------|--------------------|
| GL150JB | 1500 lb Globe RTJ  |
| GL150RB | 1500 lb Globe RF   |
| GL150WB | 1500 lb Globe Weld |

| Material Specifications |                                                  | Trim No. 5             |
|-------------------------|--------------------------------------------------|------------------------|
| GU                      | Bevel Gear Unit                                  | Cast Iron + etc        |
| 524                     | Name Plate                                       | 18Cr-8Ni S. Steel      |
| 523                     | Grease Nipple                                    | Brass + Cr. Plating    |
| 155                     | Key                                              | Carbon Steel           |
| 154                     | Eye Bolt Pin                                     | 13% Cr. S. Steel       |
| 143                     | Bearing                                          | Bearing Steel          |
| 131                     | Packing                                          | *3                     |
| 125                     | Gasket                                           | *2                     |
| 103                     | Handwheel                                        | Carbon Steel           |
| 96C                     | Yoke Bolt Nut                                    | ASTM A194 Gr. 2H       |
| 96B                     | Eye Bolt Nut                                     | ASTM A194 Gr. 2H       |
| 96A                     | Bonnet Bolt Nut                                  | ASTM A194 Gr. 2H       |
| 85                      | Eye Bolt                                         | ASTM A193 Gr. B7       |
| 84                      | Yoke Bolt                                        | ASTM A193 Gr. B7       |
| 83                      | Bonnet Bolt                                      | ASTM A193 Gr. B7       |
| 62                      | Stopper                                          | Carbon Steel           |
| 47                      | Lock Nut                                         | Carbon Steel           |
| 45                      | Sleeve Nut                                       | Carbon Steel           |
| 41                      | Yoke Sleeve                                      | Al-Bronze              |
| 37                      | Gland                                            | ASTM A182 Gr. F6a      |
| 35                      | Gland Flange                                     | Carbon Steel           |
| 33                      | Packing Washer                                   | ASTM A182 Gr. F6a      |
| 31                      | Bonnet Bush                                      | ASTM A182 Gr. F6a      |
| 22                      | Bonnet Yoke                                      | ASTM A216 Gr. WCB      |
| 13                      | Stem Plate                                       | ASTM A182 Gr. F6a      |
| 11                      | Disc Stem Ring                                   | ASTM A182 Gr. F6a      |
| 6                       | Stem                                             | ASTM A182 Gr. F6a      |
| 3                       | Disc                                             | ASTM A105 + STL. *1    |
| 1                       | Body                                             | ASTM A216 Gr. WCB+STL. |
| NO.                     | PART NAME                                        | MATERIAL               |
| Note *1                 | 10 in. & larger ASTM A216 Gr. WCB+STL            |                        |
| *2                      | Soft iron ring joint gasket                      |                        |
| *3                      | Inconel wire reinforced asbestos braided packing |                        |

### ■ Features

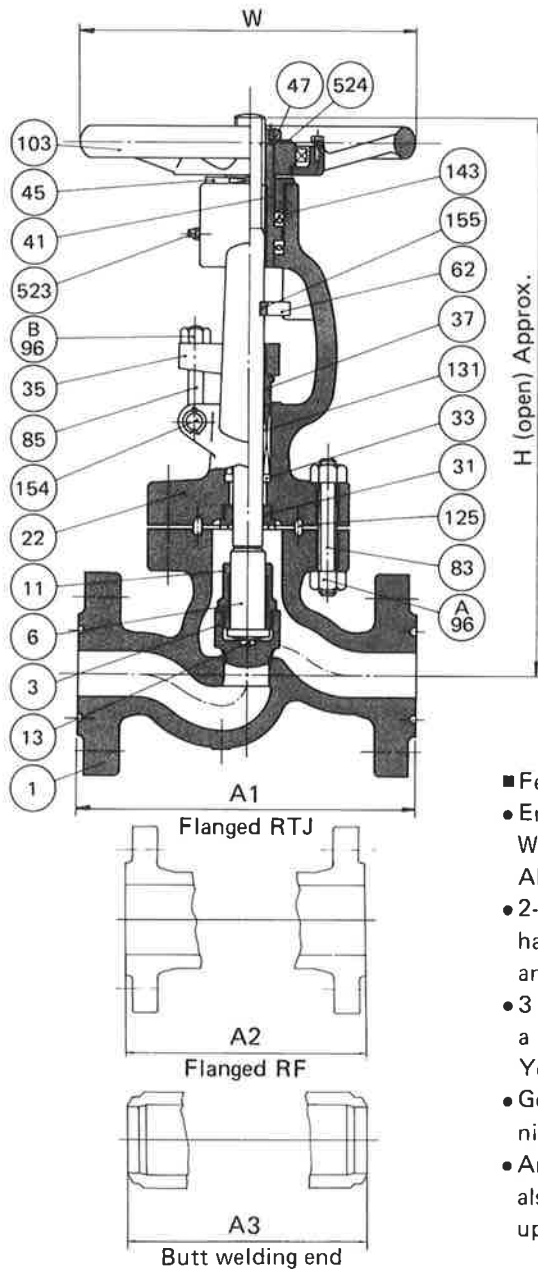
- End to end dimensions and Wall thicknesses conform to ANSI and API specifications.
- 2-1/2 in. and smaller Valves have a one piece Bonnet and Yoke design.
- 3 in. and larger Valves have a two piece Bonnet and Yoke design.
- Gear operator can be furnished upon request.
- Angle and Stop check valves also available. Data supplied upon request.

### Dimensions (in./mm)

| Nom. Size        | in. | 2      | 2-1/2  | 3        | 4        | 5       | 6       | 8       | 10      | 12      | 14      | 16      |
|------------------|-----|--------|--------|----------|----------|---------|---------|---------|---------|---------|---------|---------|
| A1               | in. | 14-5/8 | 16-5/8 | 18-5/8   | 21-5/8   | 26-5/8  | 28      | 33-1/8  | 39-3/8  | 45-1/8  | 50-1/4  | 55-3/8  |
|                  | mm  | 371    | 422    | 473      | 549      | 676     | 711     | 841     | 1000    | 1146    | 1276    | 1407    |
| A2               | in. | 14-1/2 | 16-1/2 | 18-1/2   | 21-1/2   | 26-1/2  | 27-3/4  | 32-3/4  | 39      | 44-1/2  | 49-1/2  | 54-1/2  |
|                  | mm  | 368    | 419    | 470      | 546      | 673     | 705     | 832     | 991     | 1130    | 1257    | 1384    |
| A3               | in. | 14-1/2 | 16-1/2 | 18-1/2   | 21-1/2   | 26-1/2  | 27-3/4  | 32-3/4  | 39      | 44-1/2  | 49-1/2  | 54-1/2  |
|                  | mm  | 368    | 419    | 470      | 546      | 673     | 705     | 832     | 991     | 1130    | 1257    | 1384    |
| H                | in. | 23-1/4 | 26     | 33-1/2   | 36-1/4   | 57-1/8  | 67      | 77-1/8  | 91      | 105-1/8 | 126     | 160     |
|                  | mm  | 590    | 660    | 850      | 920      | 1450    | 1700    | 1960    | 2310    | 2670    | 3200    | 4064    |
| W                | in. | 15-3/4 | 15-3/4 | 19-11/16 | 19-11/16 | 24      | 24      | 24      | 30      | 30      | 30      | 30      |
|                  | mm  | 400    | 400    | 500      | 500      | 610     | 610     | 610     | 760     | 760     | 760     | 760     |
| L                | in. | -      | -      | -        | -        | 20-3/16 | 20-3/16 | 20-3/16 | 20-3/16 | 20-3/16 | 22-5/16 | 22-5/16 |
|                  | mm  | -      | -      | -        | -        | 512     | 512     | 512     | 512     | 512     | 567     | 567     |
| Weight (Approx.) | lb  | 243    | 342    | 507      | 882      | 1544    | 2007    | 4631    | 7056    | 9702    | 11907   | 14774   |
|                  | Kg  | 110    | 155    | 230      | 400      | 700     | 910     | 2100    | 3200    | 4400    | 5400    | 6700    |
|                  | lb  | 176    | 265    | 408      | 728      | 1323    | 1742    | 4190    | 6174    | 8379    | 10364   | 12789   |
|                  | Kg  | 80     | 120    | 185      | 330      | 600     | 790     | 1900    | 2800    | 3800    | 4700    | 5800    |

# ANSI 2500 CAST STEEL GLOBE VALVE

## BOLTED BONNET O.S. & Y.



GEAR TYPE

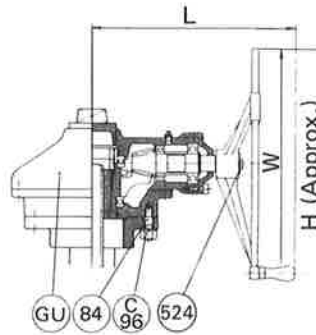


Figure No.

|         |                    |
|---------|--------------------|
| GL250JB | 2500 lb Globe RTJ  |
| GL250RB | 2500 lb Globe RF   |
| GL250WB | 2500 lb Globe Weld |

Material Specifications Trim No. 5

| GU  | Bevel Gear Unit | Cast Iron + etc        |
|-----|-----------------|------------------------|
| 524 | Name Plate      | 18Cr-8Ni S. Steel      |
| 523 | Grease Nipple   | Brass + Cr. Plating    |
| 155 | Key             | Carbon Steel           |
| 154 | Eye Bolt Pin    | 13% Cr. S. Steel       |
| 143 | Bearing         | Bearing Steel          |
| 131 | Packing         | *3                     |
| 125 | Gasket          | *2                     |
| 103 | Handwheel       | Carbon Steel           |
| 96C | Yoke Bolt Nut   | ASTM A194 Gr. 2H       |
| 96B | Eye Bolt Nut    | ASTM A194 Gr. 2H       |
| 96A | Bonnet Bolt Nut | ASTM A194 Gr. 2H       |
| 85  | Eye Bolt        | ASTM A193 Gr. B7       |
| 84  | Yoke Bolt       | ASTM A193 Gr. B7       |
| 83  | Bonnet Bolt     | ASTM A193 Gr. B7       |
| 62  | Stopper         | Carbon Steel           |
| 47  | Lock Nut        | Carbon Steel           |
| 45  | Sleeve Nut      | Carbon Steel           |
| 41  | Yoke Sleeve     | Al-Bronze              |
| 37  | Gland           | ASTM A182 Gr. F6a      |
| 35  | Gland Flange    | Carbon Steel           |
| 33  | Packing Washer  | ASTM A182 Gr. F6a      |
| 31  | Bonnet Bush     | ASTM A182 Gr. F6a      |
| 22  | Bonnet Yoke     | ASTM A216 Gr. WCB      |
| 13  | Stem Plate      | ASTM A182 Gr. F6a      |
| 11  | Disc Stem Ring  | ASTM A182 Gr. F6a      |
| 6   | Stem            | ASTM A182 Gr. F6a      |
| 3   | Disc            | ASTM A105 + STL. *1    |
| 1   | Body            | ASTM A216 Gr. WCB+STL. |
| NO. | PART NAME       | MATERIAL               |

### ■ Features

- End to end dimensions and Wall thickness conform to ANSI and API specifications.
- 2-1/2 in. and smaller Valves have a one piece Bonnet and Yoke design.
- 3 in. and larger Valves have a two piece Bonnet and Yoke design.
- Gear operator can be furnished upon request.
- Angle and Stop check valves also available. Data supplied upon request.

- Note
- \*1 10 in. & larger ASTM A216 Gr. WCB + STL
  - \*2 Soft iron ring joint gasket
  - \*3 Inconel wire reinforced asbestos braided packing

Dimensions (in./mm)

| Nom. Size        | in. | mm | 2      | 2-1/2    | 3        | 4       | 5      | 6      | 8       | 10      | 12      |
|------------------|-----|----|--------|----------|----------|---------|--------|--------|---------|---------|---------|
| A1               | in. | mm | 17-7/8 | 20-1/4   | 23       | 26-7/8  | 31-3/4 | 36-1/2 | 40-7/8  | 50-7/8  | 56-7/8  |
|                  |     |    | 454    | 514      | 584      | 683     | 806    | 927    | 1038    | 1292    | 1445    |
| A2               | in. | mm | 17-3/4 | 20       | 22-3/4   | 26-1/2  | 31-1/4 | 36     | 40-1/4  | 50      | 56      |
|                  |     |    | 451    | 508      | 578      | 673     | 794    | 914    | 1022    | 1270    | 1422    |
| A3               | in. | mm | 17-3/4 | 20       | 22-3/4   | 26-1/2  | 31-1/4 | 36     | 40-1/4  | 50      | 56      |
|                  |     |    | 451    | 508      | 578      | 673     | 794    | 914    | 1022    | 1270    | 1422    |
| H                | in. | mm | 28-3/8 | 31-1/2   | 34-7/8   | 49-5/8  | 65     | 75     | 97      | 110-1/4 | 138     |
|                  |     |    | 720    | 800      | 885      | 1260    | 1650   | 1905   | 2465    | 2800    | 3505    |
| W                | in. | mm | 15-3/4 | 19-11/16 | 19-11/16 | 24      | 24     | 24     | 30      | 30      | 30      |
|                  |     |    | 400    | 500      | 500      | 610     | 610    | 610    | 760     | 760     | 760     |
| L                | in. | mm | -      | -        | -        | 20-3/16 | 17     | 17     | 22-5/16 | 22-5/16 | 22-5/16 |
|                  |     |    | -      | -        | -        | 512     | 432    | 432    | 567     | 567     | 567     |
| Weight (Approx.) | lb  | Kg | 419    | 662      | 772      | 1852    | 3418   | 5072   | 10584   | 14994   | 18743   |
| RF               | lb  | Kg | 190    | 300      | 350      | 840     | 1550   | 2300   | 4800    | 6800    | 8500    |
| BW               | lb  | Kg | 353    | 529      | 617      | 1521    | 2867   | 4410   | 9702    | 13230   | 16538   |
|                  | lb  | Kg | 160    | 240      | 280      | 690     | 1300   | 2000   | 4400    | 6000    | 7500    |

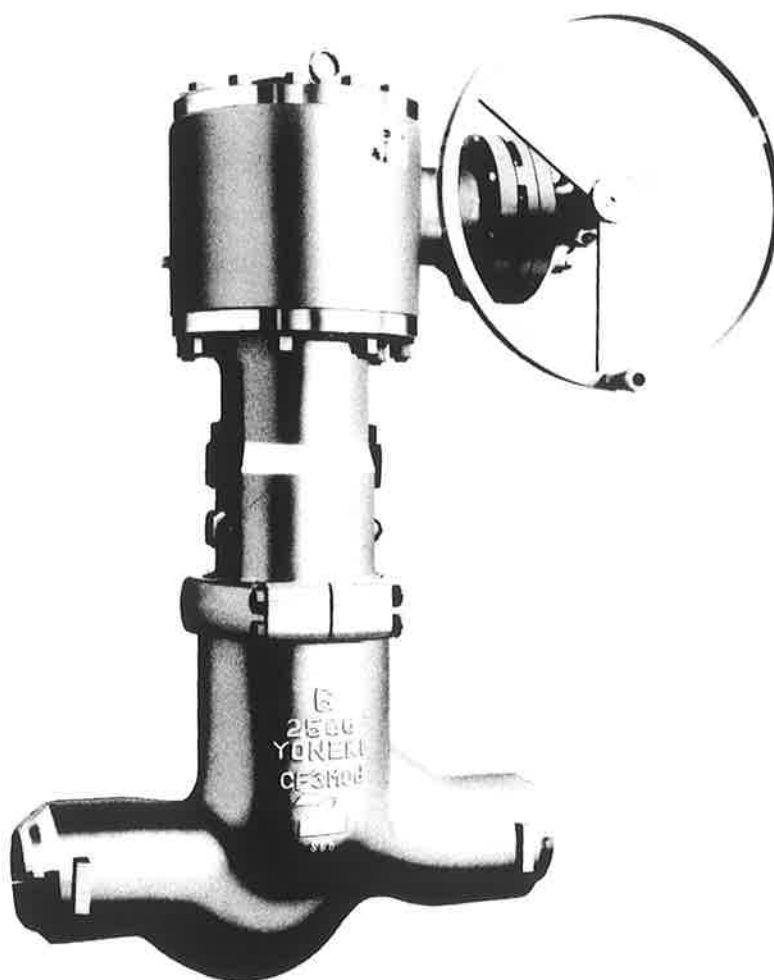
# GLOBE VALVES

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## CLASS 600-900-1500-2500

FLANGED ENDS  
BUTT WELDING ENDS

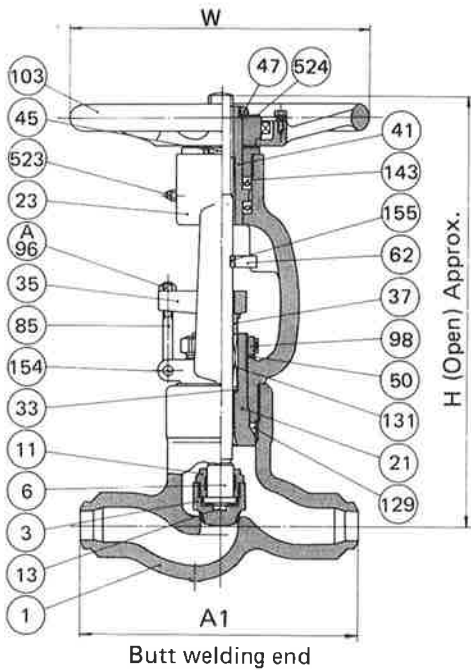
PRESSURE SEAL BONNET O.S.&Y.



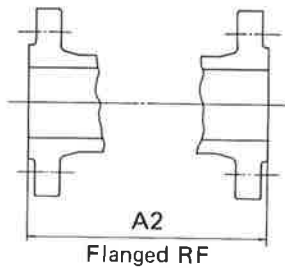


# ANSI 600 CAST STEEL GLOBE VALVE

## PRESSURE SEAL BONNET O.S.&Y.



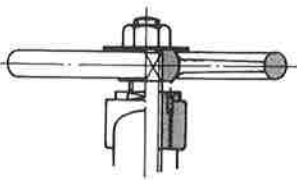
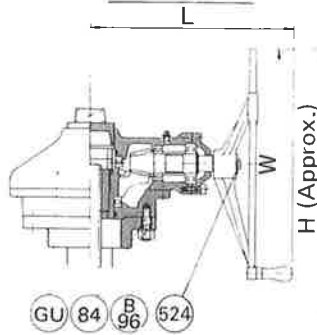
Butt welding end



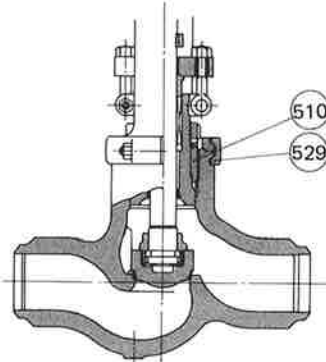
Flanged RF

Flanged RTJ

## GEAR TYPE



4 in. &amp; smaller



6 in. &amp; larger

## ■ Features

- End to end dimensions and Wall thicknesses conform to ANSI and API specifications.
- Gear operator can be furnished upon request.
- Angle and Stop check valves also available. Data supplied upon request.

## Figure No.

|          |                   |
|----------|-------------------|
| GL064WB  | 600 lb Globe Weld |
| GL064 RB | 600 lb Globe RF   |
| GL064 JB | 600 lb Globe RTJ  |

## Material Specifications Trime No. 5

| NO. | PART NAME       | MATERIAL             |
|-----|-----------------|----------------------|
| GU  | Bevel Gear Unit | Cast Iron + etc      |
| 529 | Body Clamp      | ASTM A216 Gr.WCB     |
| 524 | Name Plate      | 18Cr-8Ni S. Steel    |
| 523 | Grease Nipple   | Brass+Cr. Plating    |
| 510 | Bonnet Retainer | ASTM A105            |
| 155 | Key             | Carbon Steel         |
| 154 | Eye Bolt Pin    | 13% Cr. S. Steel     |
| 143 | Bearing         | Bearing Steel        |
| 131 | Packing         | *3                   |
| 129 | Gasket          | *2                   |
| 103 | Handwheel       | Carbon Steel         |
| 98  | Bonnet Nut      | 13% Cr. S. Steel     |
| 96B | Yoke Bolt Nut   | ASTM A194 Gr.2H      |
| 96A | Eye Bolt Nut    | ASTM A194 Gr.2H      |
| 85  | Eye Bolt        | ASTM A193 Gr.B7      |
| 84  | Yoke Bolt       | ASTM A193 Gr.B7      |
| 62  | Stopper         | Carbon Steel         |
| 50  | Washer          | 13% Cr. S. Steel     |
| 47  | Lock Nut        | Carbon Steel         |
| 45  | Sleeve Nut      | Carbon Steel         |
| 41  | Yoke Sleeve     | Al-Bronze            |
| 37  | Gland           | ASTM A182 Gr.F6a     |
| 35  | Gland Flange    | Carbon Steel         |
| 33  | Packing Washer  | ASTM A182 Gr.F6a     |
| 23  | Yoke            | ASTM A216 Gr.WCB     |
| 21  | Bonnet          | ASTM A105 + STL *1   |
| 13  | Stem Plate      | ASTM A182 Gr.F6a     |
| 11  | Disc Stem Ring  | ASTM A182 Gr.F6a     |
| 6   | Stem            | ASTM A182 Gr. F6a    |
| 3   | Disc            | ASTM A105 + STL *1   |
| 1   | Body            | ASTM A216 Gr.WCB+STL |

Note \*1 8 in. &amp; larger ASTM A216 Gr.WCB + STL

\*2 Soft iron pressure seal gasket

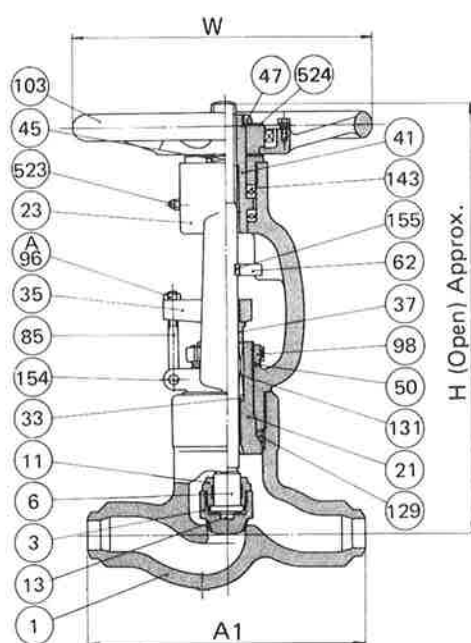
\*3 Inconel wire reinforced asbestos braided packing

## Dimensions (in./mm)

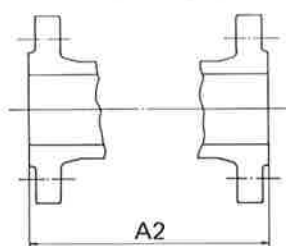
| Nom. Size | in. | mm | 2      | 2-1/2    | 3        | 4        | 5        | 6      | 8      | 10     | 12     | 14     | 16     |
|-----------|-----|----|--------|----------|----------|----------|----------|--------|--------|--------|--------|--------|--------|
| A1        | in. | mm | 11-1/2 | 13       | 14       | 17       | 20       | 22     | 26     | 31     | 33     | 35     | 39     |
| A2        | in. | mm | 11-1/2 | 13       | 14       | 17       | 20       | 22     | 26     | 31     | 33     | 35     | 39     |
| A3        | in. | mm | 11-5/8 | 13-1/8   | 14-1/8   | 17-1/8   | 20-1/8   | 22-1/8 | 26-1/8 | 31-1/8 | 33-1/8 | 35-1/8 | 39-1/8 |
| H         | in. | mm | 21-5/8 | 24-3/4   | 26-3/4   | 29-1/2   | 39-3/8   | 45-1/4 | 49-1/4 | 55-1/8 | 61     | 70-7/8 | 85     |
| W         | in. | mm | 9-7/8  | 11-13/16 | 11-13/16 | 17-11/16 | 19-11/16 | 23-5/8 | 18-1/8 | 24     | 24     | 24     | 30     |
| L         | in. | mm | 250    | 300      | 300      | 450      | 500      | 600    | 460    | 610    | 610    | 610    | 760    |
| RF        | lb  | Kg | 99     | 121      | 187      | 298      | 419      | 673    | 1367   | 2889   | 4190   | 5998   | 6946   |
| JBW       | lb  | Kg | 45     | 55       | 85       | 135      | 190      | 305    | 620    | 1310   | 1900   | 2720   | 3150   |
|           | lb  | Kg | 77     | 99       | 132      | 209      | 331      | 507    | 1191   | 2536   | 3793   | 5579   | 6395   |
|           | lb  | Kg | 35     | 45       | 60       | 95       | 150      | 230    | 540    | 1150   | 1720   | 2530   | 2900   |

# ANSI 900 CAST STEEL GLOBE VALVE

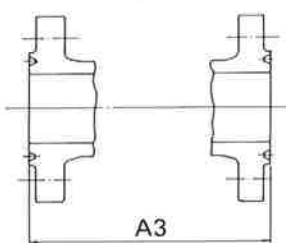
## PRESSURE SEAL BONNET O.S.&Y.



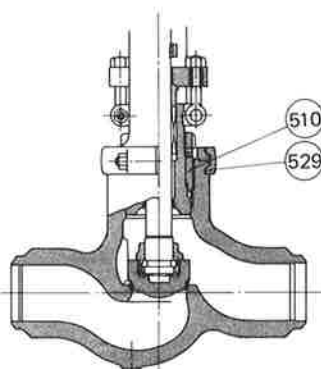
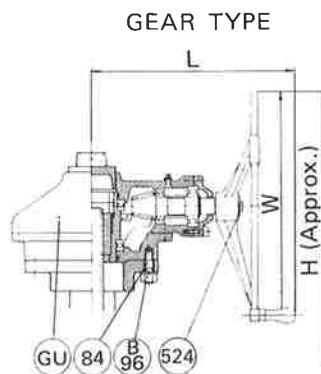
Butt welding end



Flanged RF



Flanged RTJ



6 in. &amp; larger

### ■ Features

- End to end dimensions and Wall thickness conform to ANSI and API specifications.
- Gear operator can be furnished upon request.
- Angle and Stop check valves also available. Data supplied upon request.

Figure No.

|         |                   |
|---------|-------------------|
| GL094WB | 900 lb Globe Weld |
| GL094RB | 900 lb Globe RF   |
| GL094JB | 900 lb Globe RTJ  |

### Material Specifications Trim No. 5

|     |                 |                      |
|-----|-----------------|----------------------|
| GU  | Bevel Gear Unit | Cast Iron + etc      |
| 529 | Body Clamp      | ASTM A216 Gr.WCB     |
| 524 | Name Plate      | 18Cr-8Ni S. Steel    |
| 523 | Grease Nipple   | Brass+Cr. Plating    |
| 510 | Bonnet Retainer | ASTM A105            |
| 155 | Key             | Carbon Steel         |
| 154 | Eye Bolt Pin    | 13% Cr. S. Steel     |
| 143 | Bearing         | Bearing Steel        |
| 131 | Packing         | *3                   |
| 129 | Gasket          | *2                   |
| 103 | Handwheel       | Carbon Steel         |
| 98  | Bonnet Nut      | 13% Cr. S. Steel     |
| 96B | Yoke Bolt Nut   | ASTM A194 Gr.2H      |
| 96A | Eye Bolt Nut    | ASTM A194 Gr.2H      |
| 85  | Eye Bolt        | ASTM A193 Gr.B7      |
| 84  | Yoke Bolt       | ASTM A193 Gr.B7      |
| 62  | Stopper         | Carbon Steel         |
| 50  | Washer          | 13% Cr. S. Steel     |
| 47  | Lock Nut        | Carbon Steel         |
| 45  | Sleeve Nut      | Carbon Steel         |
| 41  | Yoke Sleeve     | Al-Bronze            |
| 37  | Gland           | ASTM A182 Gr.F6a     |
| 35  | Gland Flange    | Carbon Steel         |
| 33  | Packing Washer  | ASTM A182 Gr.F6a     |
| 23  | Yoke            | ASTM A216 Gr.WCB     |
| 21  | Bonnet          | ASTM A105 + STL *1   |
| 13  | Stem Plate      | ASTM A182 Gr.F6a     |
| 11  | Disc Stem Ring  | ASTM A182 Gr.F6a     |
| 6   | Stem            | ASTM A182 Gr.F6a     |
| 3   | Disc            | ASTM A105 + STL *1   |
| 1   | Body            | ASTM A216 Gr.WCB+STL |

| NO. | PART NAME | MATERIAL |
|-----|-----------|----------|
|-----|-----------|----------|

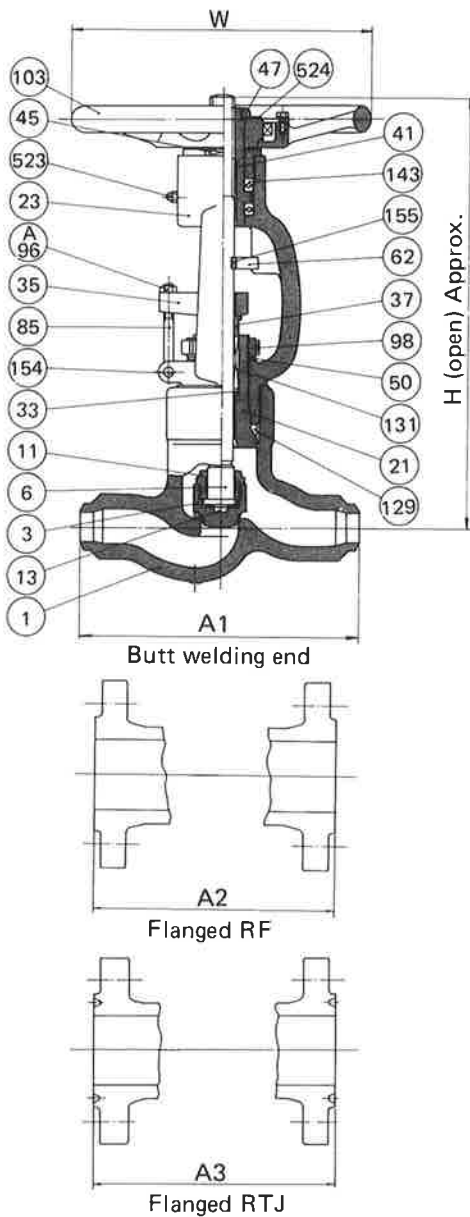
- Note \*1 8 in. & larger ASTM A216 Gr.WCB + STL  
 \*2 Soft iron pressure seal gasket  
 \*3 Inconel wire reinforced asbestos braided packing

### Dimensions (in./mm)

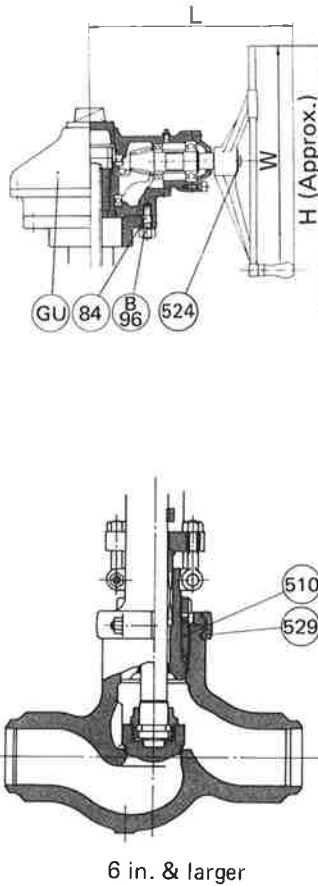
| Nom. Size | in. | mm | 2      | 2-1/2  | 3      | 4        | 5       | 6       | 8      | 10      | 12      | 14      | 16      |
|-----------|-----|----|--------|--------|--------|----------|---------|---------|--------|---------|---------|---------|---------|
| A1        | in. | mm | 14-1/2 | 16-1/2 | 15     | 18       | 22      | 24      | 29     | 33      | 38      | 40-1/2  | 44-1/2  |
| A2        | in. | mm | 14-1/2 | 16-1/2 | 15     | 18       | 22      | 24      | 29     | 33      | 38      | 40-1/2  | 44-1/2  |
| A3        | in. | mm | 14-5/8 | 16-5/8 | 15-1/8 | 18-1/8   | 22-1/8  | 24-1/8  | 29-1/8 | 33-1/8  | 38-1/8  | 40-7/8  | 44-7/8  |
| H         | in. | mm | 24-3/8 | 25-1/4 | 28-3/8 | 33-1/2   | 45-1/4  | 48-1/4  | 53-1/8 | 61      | 68-7/8  | 78-3/4  | 91      |
| W         | in. | mm | 15-3/4 | 15-3/4 | 15-3/4 | 19-11/16 | 24      | 24      | 24     | 24      | 24      | 30      | 30      |
| L         | in. | mm | -      | -      | -      | -        | 20-3/16 | 20-3/16 | 17     | 20-3/16 | 20-3/16 | 22-5/16 | 22-5/16 |
| RF        | lb  | Kg | 176    | 243    | 232    | 375      | 728     | 926     | 2205   | 3793    | 5072    | 7387    | 8820    |
| BW        | lb  | Kg | 121    | 176    | 176    | 287      | 639     | 794     | 1985   | 3352    | 4520    | 6725    | 7938    |
|           |     |    | 55     | 80     | 80     | 130      | 290     | 360     | 900    | 1520    | 2050    | 3050    | 3600    |

# ANSI 1500 CAST STEEL GLOBE VALVE

## PRESSURE SEAL BONNET O.S.&Y.



GEAR TYPE



- Features
- End to end dimensions and Wall thickness conform to ANSI and API specifications.
  - Gear operator can be furnished upon request.
  - Angle and Stop check valves also available. Data supplied upon request.

Figure No.

|         |                    |
|---------|--------------------|
| GL154WB | 1500 lb Globe Weld |
| GL154RB | 1500 lb Globe RF   |
| GL154JB | 1500 lb Globe RTJ  |

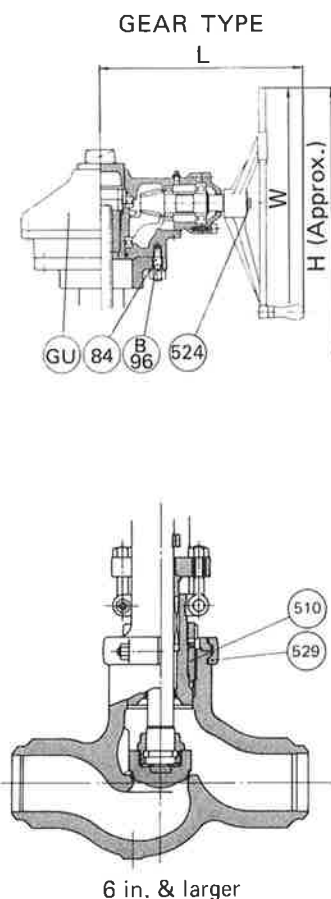
Material Specifications Trim No. 5

| NO. | PART NAME       | MATERIAL             |
|-----|-----------------|----------------------|
| GU  | Bevel Gear Unit | Cast Iron + etc      |
| 529 | Body Clamp      | ASTM A216 Gr.WCB     |
| 524 | Name Plate      | 18Cr-8Ni S. Steel    |
| 523 | Grease Nipple   | Brass+Cr. Plating    |
| 510 | Bonnet Retainer | ASTM A105            |
| 155 | Key             | Carbon Steel         |
| 154 | Eye Bolt Pin    | 13% Cr. S. Steel     |
| 143 | Bearing         | Bearing Steel        |
| 131 | Packing         | *3                   |
| 129 | Gasket          | *2                   |
| 103 | Handwheel       | Carbon Steel         |
| 98  | Bonnet Nut      | 13% Cr. S. Steel     |
| 96B | Yoke Bolt Nut   | ASTM A194 Gr.2H      |
| 96A | Eye Bolt Nut    | ASTM A194 Gr.2H      |
| 85  | Eye Bolt        | ASTM A193 Gr.B7      |
| 84  | Yoke Bolt       | ASTM A193 Gr.B7      |
| 62  | Stopper         | Carbon Steel         |
| 50  | Washer          | 13% Cr. S. Steel     |
| 47  | Lock Nut        | Carbon Steel         |
| 45  | Sleeve Nut      | Carbon Steel         |
| 41  | Yoke Sleeve     | Al-Bronze            |
| 37  | Gland           | ASTM A182 Gr.F6a     |
| 35  | Gland Flange    | Carbon Steel         |
| 33  | Packing Washer  | ASTM A182 Gr.F6a     |
| 23  | Yoke            | ASTM A216 Gr.WCB     |
| 21  | Bonnet          | ASTM A105 + STL *1   |
| 13  | Stem Plate      | ASTM A182 Gr.F6a     |
| 11  | Disc Stem Ring  | ASTM A182 Gr.F6a     |
| 6   | Stem            | ASTM A182 Gr.F6a     |
| 3   | Disc            | ASTM A105 + STL *1   |
| 1   | Body            | ASTM A216 Gr.WCB+STL |

- Note \*1 10 in. & larger ASTM A216 Gr. WCB + STL
- \*2 Soft iron pressure seal gasket
- \*3 Inconel wire reinforced asbestos braided packing

Dimensions (in./mm)

| Nom. Size        | 2      | 2-1/2  | 3        | 4        | 5       | 6       | 8       | 10      | 12      | 14      |
|------------------|--------|--------|----------|----------|---------|---------|---------|---------|---------|---------|
|                  | 50     | 65     | 80       | 100      | 125     | 150     | 200     | 250     | 300     | 350     |
| A1               | 14-1/2 | 16-1/2 | 18-1/2   | 21-1/2   | 26-1/2  | 27-3/4  | 32-3/4  | 39      | 44-1/2  | 49-1/2  |
|                  | 368    | 419    | 470      | 546      | 673     | 705     | 832     | 991     | 1130    | 1257    |
| A2               | 14-1/2 | 16-1/2 | 18-1/2   | 21-1/2   | 26-1/2  | 27-3/4  | 32-3/4  | 39      | 44-1/2  | 49-1/2  |
|                  | 368    | 419    | 470      | 546      | 673     | 705     | 832     | 991     | 1130    | 1257    |
| A3               | 14-5/8 | 16-5/8 | 18-5/8   | 21-5/8   | 26-5/8  | 28      | 33-1/8  | 39-3/8  | 45-1/8  | 50-1/4  |
|                  | 371    | 422    | 473      | 549      | 676     | 711     | 841     | 1000    | 1146    | 1276    |
| H                | 24-3/8 | 25-1/4 | 32-7/8   | 33-3/4   | 48-1/4  | 48-3/8  | 70-7/8  | 78-3/4  | 91      | 106     |
|                  | 619    | 641    | 835      | 857      | 1225    | 1230    | 1800    | 2000    | 2311    | 2692    |
| W                | 15-3/4 | 15-3/4 | 19-11/16 | 19-11/16 | 24      | 24      | 24      | 30      | 30      | 30      |
|                  | 400    | 400    | 500      | 500      | 610     | 610     | 610     | 760     | 760     | 760     |
| L                | -      | -      | -        | -        | 20-3/16 | 20-3/16 | 20-3/16 | 20-3/16 | 20-3/16 | 22-5/16 |
|                  | -      | -      | -        | -        | 512     | 512     | 512     | 512     | 512     | 567     |
| Weight (Approx.) |        |        |          |          |         |         |         |         |         |         |
| RF               | 176    | 243    | 300      | 496      | 1036    | 1433    | 3704    | 5909    | 7497    | 9482    |
|                  | 80     | 110    | 136      | 225      | 470     | 650     | 1680    | 2680    | 3400    | 4300    |
| BW               | 121    | 176    | 210      | 353      | 794     | 1147    | 3153    | 5027    | 6240    | 7938    |
|                  | 55     | 80     | 95       | 160      | 360     | 520     | 1430    | 2280    | 2830    | 3600    |



|         |                    |
|---------|--------------------|
| GL254WB | 2500 lb Globe Weld |
| GL254RB | 2500 lb Globe RF   |
| GL254JB | 2500 lb Globe RTJ  |

|     |                 |                      |
|-----|-----------------|----------------------|
| GU  | Bevel Gear Unit | Cast Iron + etc      |
| 529 | Body Clamp      | ASTM A216 Gr.WCB     |
| 524 | Name Plate      | 18Cr-8Ni S. Steel    |
| 523 | Grease Nipple   | Brass+Cr. Plating    |
| 510 | Bonnet Retainer | ASTM A105            |
| 155 | Key             | Carbon Steel         |
| 154 | Eye Bolt Pin    | 13% Cr. S. Steel     |
| 143 | Bearing         | Bearing Steel        |
| 131 | Packing         | *4                   |
| 129 | Gasket          | *3                   |
| 103 | Handwheel       | Carbon Steel         |
| 98  | Bonnet Nut      | 13% Cr. S. Steel     |
| 96B | Yoke Bolt Nut   | ASTM A194 Gr.2H      |
| 96A | Eye Bolt Nut    | ASTM A194 Gr.2H      |
| 85  | Eye Bolt        | ASTM A193 Gr.B7      |
| 84  | Yoke Bolt       | ASTM A193 Gr.87      |
| 62  | Stopper         | Carbon Steel         |
| 50  | Washer          | 13% Cr. S. Steel     |
| 47  | Lock Nut        | Carbon Steel         |
| 45  | Sleeve Nut      | Carbon Steel         |
| 41  | Yoke Sleeve     | Al-Bronze            |
| 37  | Gland           | ASTM A182 Gr.F6a     |
| 35  | Gland Flange    | Carbon Steel         |
| 33  | Packing Washer  | ASTM A182 Gr.F6a     |
| 23  | Yoke            | ASTM A216 Gr.WCB     |
| 21  | Bonnet          | ASTM A105 + STL *2   |
| 13  | Stem Plate      | ASTM A182 Gr.F6a     |
| 11  | Disc Stem Ring  | ASTM A182 Gr.F6a     |
| 6   | Stem            | ASTM A182 Gr.F6a     |
| 3   | Disc            | ASTM A105 + STL *1   |
| 1   | Body            | ASTM A216 Gr.WCB+STL |

Note \*1 10 in. & larger ASTM A216 Gr.WCB + STL  
 \*2 8 in. & larger ASTM A216 Gr.WCB + STL  
 \*3 Soft iron pressure seal gasket  
 \*4 Inconel wire reinforced asbestos braided packing

- Features
- End to end dimensions and Wall thickness conform to ANSI and API specifications.
- Gear operator can be furnished upon request.
- Angle and Stop check valves also available. Data supplied upon request.

| Nom. Size | in. | mm | 2      | 2-1/2    | 3        | 4       | 5      | 6      | 8       | 10      | 12      |
|-----------|-----|----|--------|----------|----------|---------|--------|--------|---------|---------|---------|
|           |     |    | 50     | 65       | 80       | 100     | 125    | 150    | 200     | 250     | 300     |
| A1        | in. |    | 17-3/4 | 20       | 22-3/4   | 26-1/2  | 31-1/2 | 36     | 40-1/4  | 50      | 56      |
|           | mm  |    | 451    | 508      | 578      | 673     | 794    | 914    | 1022    | 1270    | 1422    |
| A2        | in. |    | 17-3/4 | 20       | 22-3/4   | 26-1/2  | 31-1/4 | 36     | 40-1/4  | 50      | 56      |
|           | mm  |    | 451    | 508      | 578      | 673     | 794    | 914    | 1022    | 1270    | 1422    |
| A3        | in. |    | 17-7/8 | 20-1/4   | 23       | 26-7/8  | 31-3/4 | 36-1/2 | 40-7/8  | 50-7/8  | 56-7/8  |
|           | mm  |    | 454    | 514      | 584      | 683     | 806    | 927    | 1038    | 1292    | 1445    |
| H         | in. |    | 24-1/4 | 30-3/4   | 31-1/2   | 51-1/8  | 53-1/8 | 54     | 85      | 100     | 106     |
|           | mm  |    | 616    | 781      | 800      | 1300    | 1350   | 1370   | 2160    | 2540    | 2692    |
| W         | in. |    | 15-3/4 | 19-11/16 | 19-11/16 | 24      | 24     | 24     | 30      | 30      | 30      |
|           | mm  |    | 400    | 500      | 500      | 610     | 610    | 610    | 760     | 760     | 760     |
| L         | in. |    | —      | —        | —        | 20-3/16 | 17     | 17     | 22-5/16 | 22-5/16 | 22-5/16 |
|           | mm  |    | —      | —        | —        | 512     | 432    | 432    | 567     | 567     | 567     |
| RF        | lb  |    | 221    | 342      | 463      | 1103    | 2315   | 2756   | 5292    | 7277    | 9261    |
|           | Kg  |    | 100    | 155      | 210      | 500     | 1050   | 1250   | 2400    | 3300    | 4200    |
| BW        | lb  |    | 154    | 243      | 309      | 772     | 1764   | 2095   | 4410    | 5513    | 7277    |
|           | Kg  |    | 70     | 110      | 140      | 350     | 800    | 950    | 2000    | 2500    | 3300    |

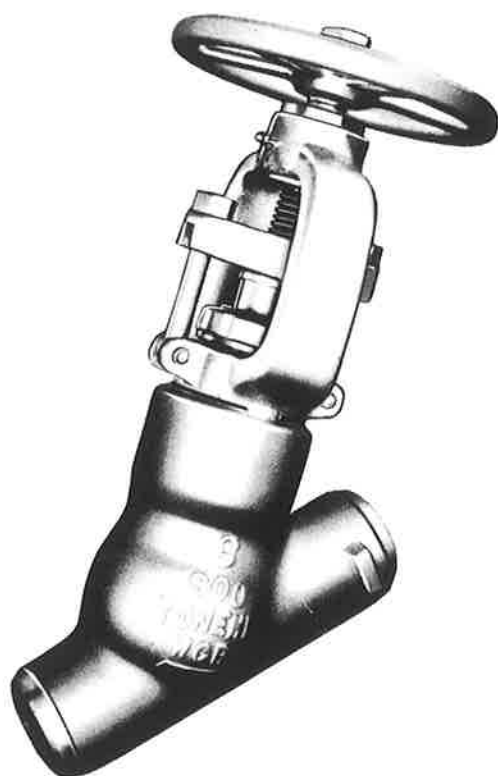
# **Y-GLOBE VALVES**

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## **CLASS 900-1500-2500**

FLANGED ENDS  
BUTT WELDING ENDS

PRESSURE SEAL BONNET O.S.&Y.

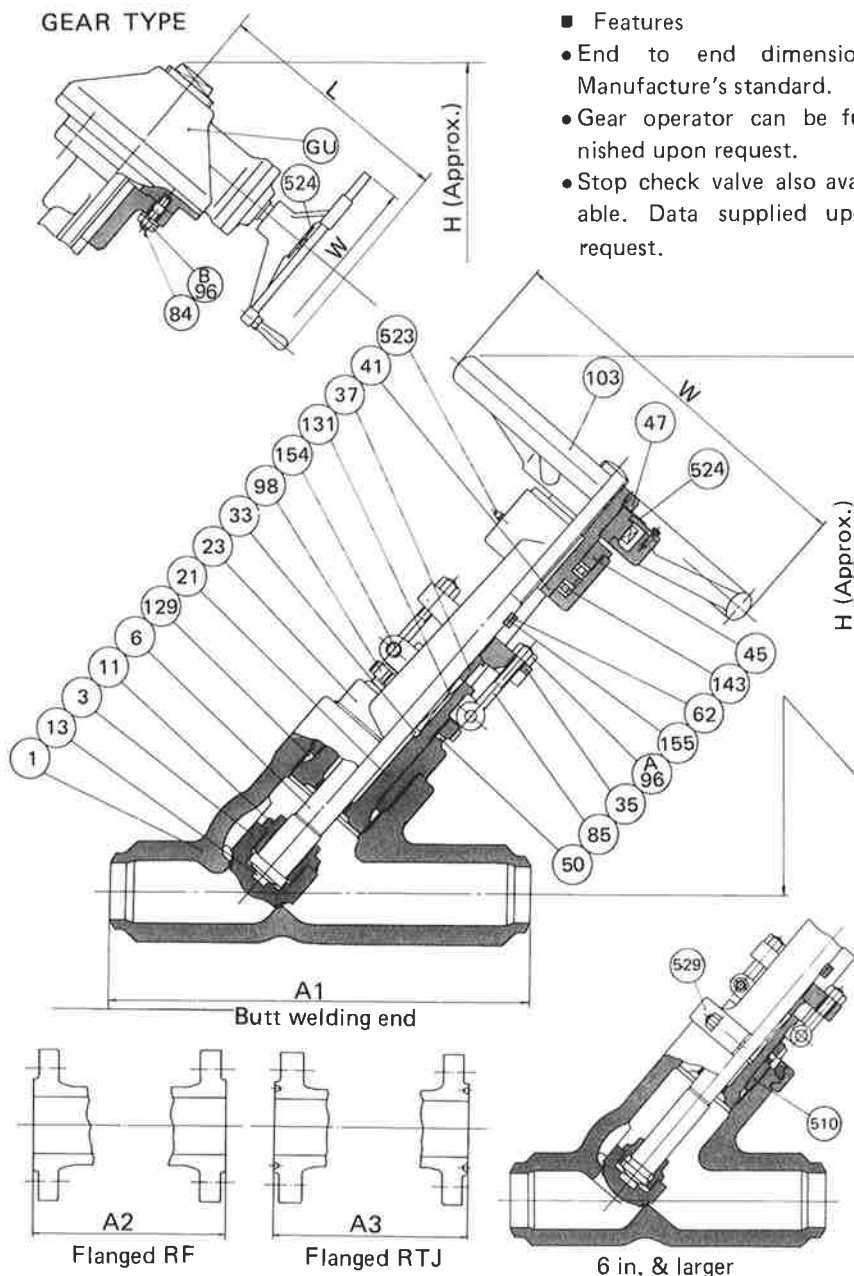




# ANSI 900 CAST STEEL Y- GLOBE VALVE

## PRESSURE SEAL BONNET O.S.&Y.

## GEAR TYPE



## ■ Features

- End to end dimensions; Manufacture's standard.
- Gear operator can be furnished upon request.
- Stop check valve also available. Data supplied upon request.

## Figure No.

|         |                     |
|---------|---------------------|
| YG094WB | 900 lb Y-Globe Weld |
| YG094RB | 900 lb Y-Globe RF   |
| YG094JB | 900 lb Y-Globe RTJ  |

## Material Specifications Trim No. 5

| NO. | PART NAME       | MATERIAL             |
|-----|-----------------|----------------------|
| GU  | Bevel Gear Unit | Cast Iron + etc      |
| 529 | Body Clamp      | ASTM A216 Gr.WCB     |
| 524 | Name Plate      | 18Cr-8Ni S. Steel    |
| 523 | Grease Nipple   | Brass+Cr. Plating    |
| 510 | Bonnet Retainer | ASTM A105            |
| 155 | Key             | Carbon Steel         |
| 154 | Eye Bolt Pin    | 13% Cr. S. Steel     |
| 143 | Bearing         | Bearing Steel        |
| 131 | Packing         | *4                   |
| 129 | Gasket          | *3                   |
| 103 | Handwheel       | Carbon Steel         |
| 98  | Bonnet Nut      | 13% Cr. S. Steel     |
| 96B | Yoke Bolt Nut   | ASTM A194 Gr.2H      |
| 96A | Eye Bolt Nut    | ASTM A194 Gr.2H      |
| 85  | Eye Bolt        | ASTM A193 Gr.B7      |
| 84  | Yoke Bolt       | ASTM A193 Gr.B7      |
| 62  | Stopper         | Carbon Steel         |
| 50  | Washer          | 13% Cr. S. Steel     |
| 47  | Lock Nut        | Carbon Steel         |
| 45  | Sleeve Nut      | Carbon Steel         |
| 41  | Yoke Sleeve     | Al-Bronze            |
| 37  | Gland           | ASTM A182 Gr.F6a     |
| 35  | Gland Flange    | Carbon Steel         |
| 33  | Packing Washer  | ASTM A182 Gr.F6a     |
| 23  | Yoke            | ASTM A216 Gr.WCB     |
| 21  | Bonnet          | ASTM A105 + STL *2   |
| 13  | Stem Plate      | ASTM A182 Gr.F6a     |
| 11  | Disc Stem Ring  | ASTM A182 Gr.F6a     |
| 6   | Stem            | ASTM A182 Gr.G6a     |
| 3   | Disc            | ASTM A105 + STL *1   |
| 1   | Body            | ASTM A216 Gr.WCB+STL |

- Note \*1 10 in. & larger ASTM A216 Gr.WCB + STL  
 \*2 8 in. & larger ASTM A216 Gr.WCB + STL  
 \*3 Soft iron pressure seal gasket  
 \*4 Inconel wire reinforced asbestos braided packing

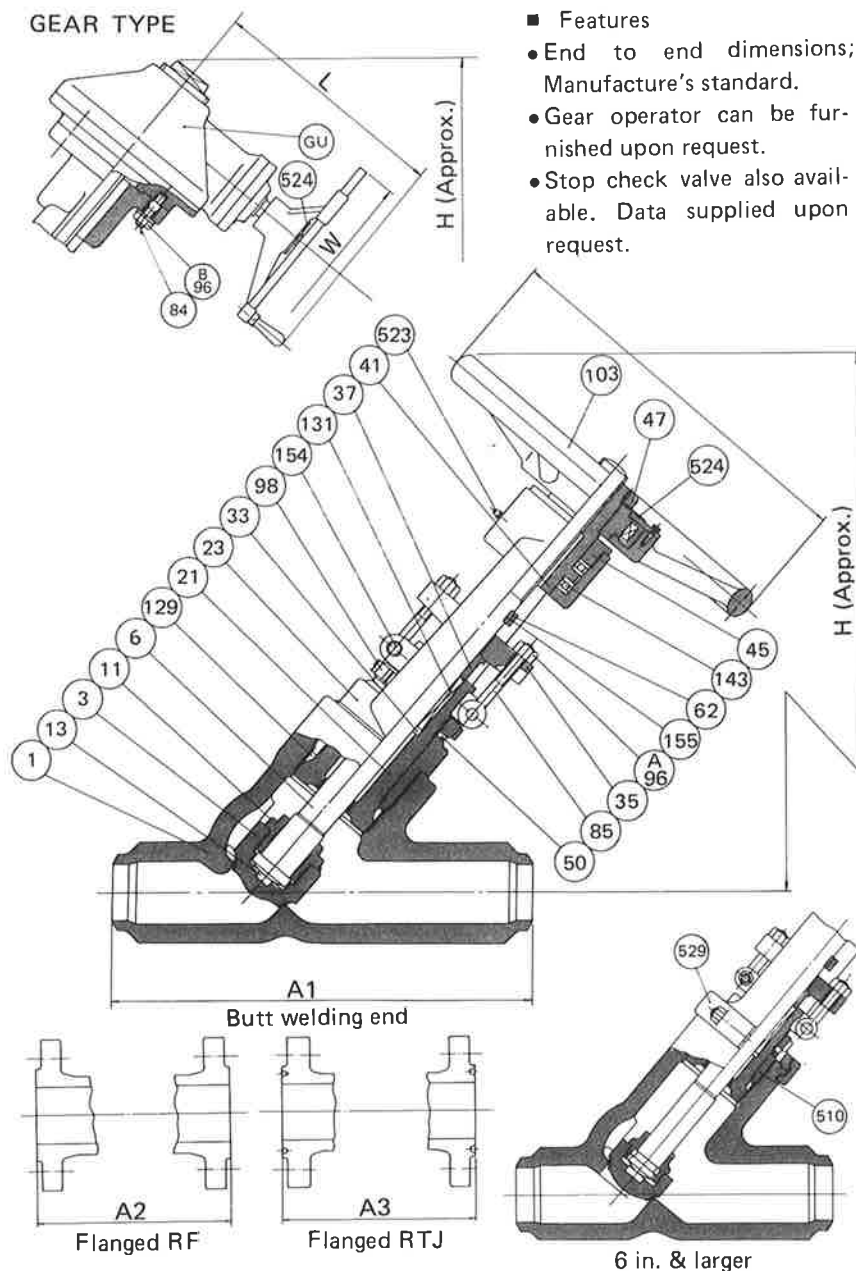
## Dimensions (in./mm)

| Nom. Size        | in. | mm | 2       | 2-1/2  | 3      | 4        | 5      | 6      | 8      | 10     | 12     | 14      | 16      |
|------------------|-----|----|---------|--------|--------|----------|--------|--------|--------|--------|--------|---------|---------|
|                  |     |    | 50      | 65     | 80     | 100      | 125    | 150    | 200    | 250    | 300    | 350     | 400     |
| A1               | in. | mm | 14-1/2  | 16-1/2 | 18     | 22       | 24     | 29     | 38     | 40-3/4 | 48-3/8 | 52-1/8  | 56-5/8  |
|                  |     |    | 368     | 419    | 457    | 559      | 610    | 737    | 965    | 1035   | 1229   | 1324    | 1438    |
| A2               | in. | mm | 16-1/2  | 16-1/2 | 18     | 22       | 24     | 29     | 38     | 40-3/4 | 48-3/8 | 52-1/8  | 56-5/8  |
|                  |     |    | 419     | 419    | 457    | 559      | 610    | 737    | 965    | 1035   | 1229   | 1324    | 1438    |
| A3               | in. | mm | 16-5/8  | 16-5/8 | 18-1/8 | 22-1/8   | 24-1/8 | 29-1/8 | 38-1/8 | 40-7/8 | 48-1/2 | 52-1/2  | 57      |
|                  |     |    | 422     | 422    | 460    | 562      | 613    | 740    | 968    | 1038   | 1232   | 1333    | 1448    |
| H                | in. | mm | 23-1/16 | 29-1/2 | 27-5/8 | 32       | 30     | 33-1/2 | 44     | 48-1/4 | 62     | 68      | 78      |
|                  |     |    | 586     | 750    | 700    | 812      | 762    | 851    | 1118   | 1226   | 1575   | 1727    | 1981    |
| W                | in. | mm | 15-3/4  | 15-3/4 | 15-3/4 | 19-11/16 | 24     | 24     | 24     | 24     | 24     | 30      | 30      |
|                  |     |    | 400     | 400    | 400    | 500      | 610    | 610    | 610    | 610    | 610    | 760     | 760     |
| L                | in. | mm | -       | -      | -      | -        | 20-1/8 | 20-1/8 | 17     | 20-1/8 | 20-1/8 | 22-5/16 | 22-5/16 |
|                  |     |    | -       | -      | -      | -        | 512    | 512    | 432    | 512    | 512    | 567     | 567     |
| Weight (Approx.) | lb  | Kg | 187     | 254    | 265    | 485      | 970    | 1058   | 2646   | 4057   | 5292   | 7497    | 10143   |
| RF               |     |    | 85      | 115    | 120    | 220      | 440    | 480    | 1200   | 1840   | 2400   | 3400    | 4600    |
| BW               | lb  | Kg | 132     | 187    | 198    | 397      | 860    | 926    | 2337   | 3616   | 4741   | 6836    | 9305    |
|                  |     |    | 60      | 85     | 90     | 180      | 390    | 420    | 1060   | 1640   | 2150   | 3100    | 4220    |

# ANSI 1500 CAST STEEL Y- GLOBE VALVE

## PRESSURE SEAL BONNET O.S.&Y.

## GEAR TYPE



## ■ Features

- End to end dimensions; Manufacture's standard.
- Gear operator can be furnished upon request.
- Stop check valve also available. Data supplied upon request.

## Figure No.

|         |                      |
|---------|----------------------|
| YG154WB | 1500 lb Y-Globe Weld |
| YG154RB | 1500 lb Y-Globe RF   |
| YG154JB | 1500 lb Y-Globe RTJ  |

## Material Specifications Trim No. 5

|     |                 |                      |
|-----|-----------------|----------------------|
| GU  | Bevel Gear Unit | Cast Iron + etc      |
| 529 | Body Clamp      | ASTM A216 Gr.WCB     |
| 524 | Name Plate      | 18Cr-8Ni S.Steel     |
| 523 | Grease Nipple   | Brass + Cr. Plating  |
| 510 | Bonnet Retainer | ASTM A105            |
| 155 | Key             | Carbon Steel         |
| 154 | Eye Bolt Pin    | 13% Cr. S. Steel     |
| 143 | Bearing         | Bearing Steel        |
| 131 | Packing         | *4                   |
| 129 | Gasket          | *3                   |
| 103 | Handwheel       | Carbon Steel         |
| 98  | Bonnet Nut      | 13% Cr. S. Steel     |
| 96B | Yoke Bolt Nut   | ASTM A194 Gr.2H      |
| 96A | Eye Bolt Nut    | ASTM A194 Gr.2H      |
| 85  | Eye Bolt        | ASTM A193 Gr.B7      |
| 84  | Yoke Bolt       | ASTM A193 Gr.B7      |
| 62  | Stopper         | Carbon Steel         |
| 50  | Washer          | 13% Cr. S. Steel     |
| 47  | Lock Nut        | Carbon Steel         |
| 45  | Sleeve Nut      | Carbon Steel         |
| 41  | Yoke Sleeve     | Al-Bronze            |
| 37  | Gland           | ASTM A 182 Gr.F6a    |
| 35  | Gland Flange    | Carbon Steel         |
| 33  | Packing Washer  | ASTM A182 Gr.F6a     |
| 23  | Yoke            | ASTM A216 Gr.WCB     |
| 21  | Bonnet          | ASTM A105 + STL *2   |
| 13  | Stem Plate      | ASTM A182 Gr.F6a     |
| 11  | Disc Stem Ring  | ASTM A182 Gr.F6a     |
| 6   | Stem            | ASTM A182 Gr.F6a     |
| 3   | Disc            | ASTM A105 + STL *1   |
| 1   | Body            | ASTM A216.Gr.WCB+STL |

| NO.     | PART NAME                                        | MATERIAL                |
|---------|--------------------------------------------------|-------------------------|
| Note *1 | 10 in. & larger                                  | ASTM A216 Gr. WCB + STL |
| *2      | 8 in. & larger                                   | ASTM A216 Gr.WCB + STL  |
| *3      | Soft iron pressure seal gasket                   |                         |
| *4      | Inconel wire reinforced asbestos braided packing |                         |

## Dimensions (in./mm)

| Nom. Size | in. | mm | 2       | 2-1/2  | 3        | 4      | 5      | 6      | 8      | 10     | 12     | 14      |
|-----------|-----|----|---------|--------|----------|--------|--------|--------|--------|--------|--------|---------|
|           |     |    | 50      | 65     | 80       | 100    | 125    | 150    | 200    | 250    | 300    | 350     |
| A1        | in. | mm | 14-1/2  | 16-1/2 | 18-1/2   | 21-1/2 | 26-1/2 | 27-3/4 | 39     | 44-1/2 | 49-1/2 | 54-1/2  |
|           |     |    | 368     | 419    | 470      | 546    | 673    | 705    | 991    | 1130   | 1257   | 1384    |
| A2        | in. | mm | 16-1/2  | 16-1/2 | 18-1/2   | 21-1/2 | 26-1/2 | 27-3/4 | 39     | 44-1/2 | 49-1/2 | 54-1/2  |
|           |     |    | 419     | 419    | 470      | 546    | 673    | 705    | 991    | 1130   | 1257   | 1384    |
| A3        | in. | mm | 16-5/8  | 16-5/8 | 18-5/8   | 21-5/8 | 26-5/8 | 28     | 39-3/8 | 44-5/8 | 49-5/8 | 54-7/8  |
|           |     |    | 422     | 422    | 473      | 549    | 676    | 711    | 1000   | 1133   | 1260   | 1393    |
| H         | in. | mm | 23-1/16 | 29-1/2 | 31       | 31     | 33-1/2 | 37     | 48-1/2 | 61     | 76-3/4 | 81-7/8  |
|           |     |    | 586     | 750    | 787      | 787    | 850    | 940    | 1232   | 1550   | 1950   | 2080    |
| W         | in. | mm | 15-3/4  | 15-3/4 | 19-11/16 | 18     | 24     | 24     | 24     | 30     | 30     | 30      |
|           |     |    | 400     | 400    | 500      | 457    | 610    | 610    | 610    | 760    | 760    | 760     |
| L         | in. | mm | -       | -      | -        | 16-1/4 | 16-1/4 | 20-1/8 | 20-1/8 | 20-1/8 | 20-1/8 | 22-5/16 |
|           |     |    | -       | -      | -        | 412    | 412    | 512    | 512    | 512    | 512    | 567     |
| RF        | lb  |    | 187     | 254    | 401      | 540    | 1300   | 1389   | 4035   | 6395   | 8974   | 10805   |
|           | Kg  |    | 85      | 115    | 182      | 245    | 590    | 630    | 1830   | 2900   | 4070   | 4900    |
| RTJ       | lb  |    | 132     | 187    | 313      | 397    | 1058   | 1103   | 3484   | 5513   | 7718   | 9261    |
|           | Kg  |    | 60      | 85     | 142      | 180    | 480    | 500    | 1580   | 2500   | 3500   | 4200    |

# ANSI 2500 CAST STEEL Y- GLOBE VALVE

## PRESSURE SEAL BONNET O.S.&Y.

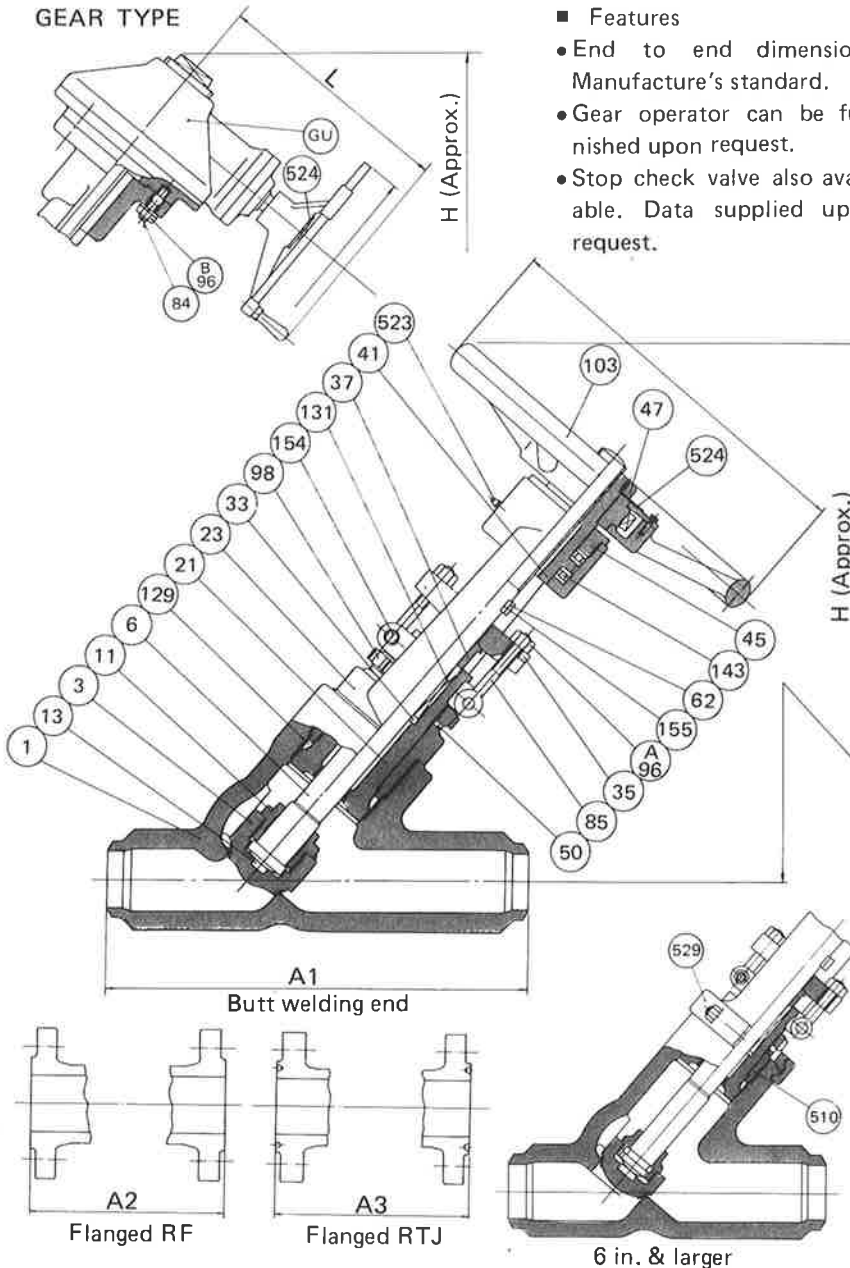
## GEAR TYPE

## ■ Features

- End to end dimensions; Manufacture's standard.
- Gear operator can be furnished upon request.
- Stop check valve also available. Data supplied upon request.

## Figure No.

|         |                      |
|---------|----------------------|
| YG254WB | 2500 lb Y-Globe Weld |
| YG254RB | 2500 lb Y-Globe RF   |
| YG254JB | 2500 lb Y-Globe RTJ  |



## Material Specifications

## Trim No. 5

|     |                 |                      |
|-----|-----------------|----------------------|
| GU  | Bevel Gear Unit | Cast Iron + etc      |
| 529 | Body Clamp      | ASTM A216 Gr.WCB     |
| 524 | Name Plate      | 18Cr-8Ni S.Steel     |
| 523 | Grease Nipple   | Brass + Cr. Plating  |
| 510 | Bonnet Retainer | ASTM A105            |
| 155 | Key             | Carbon Steel         |
| 154 | Eye Bolt Pin    | 13% Cr. S. Steel     |
| 143 | Bearing         | Bearing Steel        |
| 131 | Packing         | *4                   |
| 129 | Gasket          | *3                   |
| 103 | Handwheel       | Carbon Steel         |
| 98  | Bonnet Nut      | 13% Cr. S. Steel     |
| 96B | Yoke Bolt Nut   | ASTM A194 Gr.2H      |
| 96A | Eye Bolt Nut    | ASTM A194 Gr.2H      |
| 85  | Eye Bolt        | ASTM A193 Gr.B7      |
| 84  | Yoke Bolt       | ASTM A193 Gr.B7      |
| 62  | Stopper         | Carbon Steel         |
| 50  | Washer          | 13% Cr. S. Steel     |
| 47  | Lock Nut        | Carbon Steel         |
| 45  | Sleeve Nut      | Carbon Steel         |
| 41  | Yoke Sleeve     | Al-Bronze            |
| 37  | Gland           | ASTM A 182 Gr.F6a    |
| 35  | Gland Flange    | Carbon Steel         |
| 33  | Packing Washer  | ASTM A182 Gr.F6a     |
| 23  | Yoke            | ASTM A216 Gr.WCB     |
| 21  | Bonnet          | ASTM A105 + STL *2   |
| 13  | Stem Plate      | ASTM A182 Gr.F6a     |
| 11  | Disc Stem Ring  | ASTM A182 Gr.F6a     |
| 6   | Stem            | ASTM A182 Gr.F6a     |
| 3   | Disc            | ASTM A105 + STL *1   |
| 1   | Body            | ASTM A216 Gr.WCB+STL |

| NO.     | PART NAME                                        | MATERIAL               |
|---------|--------------------------------------------------|------------------------|
| Note *1 | 10 in. & larger                                  | ASTM A216 Gr.WCB + STL |
| *2      | 8 in. & larger                                   | ASTM A216 Gr.WCB + STL |
| *3      | Soft iron pressure seal gasket                   |                        |
| *4      | Inconel wire reinforced asbestos braided packing |                        |

## Dimensions (in./mm)

| Nom. Size        | in. | 2      | 2-1/2    | 3        | 4      | 5      | 6      | 8       | 10      | 12      |       |
|------------------|-----|--------|----------|----------|--------|--------|--------|---------|---------|---------|-------|
|                  | mm  | 50     | 65       | 80       | 100    | 125    | 150    | 200     | 250     | 300     |       |
| A1               | in. | 17-3/4 | 20       | 22-3/4   | 26-1/2 | 31-1/4 | 36     | 50      | 56      | 60-1/2  |       |
|                  | mm  | 451    | 508      | 578      | 673    | 794    | 914    | 1270    | 1422    | 1537    |       |
| A2               | in. | 17-3/4 | 20       | 22-3/4   | 26-1/2 | 31-1/4 | 36     | 50      | 56      | 60-1/2  |       |
|                  | mm  | 451    | 508      | 578      | 673    | 794    | 914    | 1270    | 1422    | 1537    |       |
| A3               | in. | 17-7/8 | 20-1/4   | 23       | 26-7/8 | 31-3/4 | 36-1/2 | 50-5/8  | 56-7/8  | 61-3/8  |       |
|                  | mm  | 454    | 514      | 584      | 683    | 806    | 927    | 1286    | 1445    | 1559    |       |
| H                | in. | 27     | 30-1/4   | 32-3/8   | 28     | 35-1/2 | 42-1/8 | 68      | 80      | 85      |       |
|                  | mm  | 686    | 768      | 822      | 711    | 902    | 1070   | 1727    | 2032    | 2160    |       |
| W                | in. | 15-3/4 | 19-11/16 | 19-11/16 | 24     | 24     | 24     | 30      | 30      | 30      |       |
|                  | mm  | 400    | 500      | 500      | 610    | 610    | 610    | 760     | 760     | 760     |       |
| L                | in. | -      | -        | -        | 20-1/8 | 17     | 17     | 22-5/16 | 22-5/16 | 22-5/16 |       |
|                  | mm  | -      | -        | -        | 512    | 432    | 432    | 567     | 567     | 567     |       |
| Weight (Approx.) | RF  | lb     | 221      | 408      | 507    | 1213   | 2646   | 3087    | 5954    | 8379    | 11466 |
|                  |     | Kg     | 100      | 185      | 230    | 550    | 1200   | 1400    | 2700    | 3800    | 5200  |
|                  | BW  | lb     | 154      | 309      | 353    | 882    | 2095   | 2426    | 5072    | 6615    | 9482  |
|                  |     | Kg     | 70       | 140      | 160    | 400    | 950    | 1100    | 2300    | 3000    | 4300  |

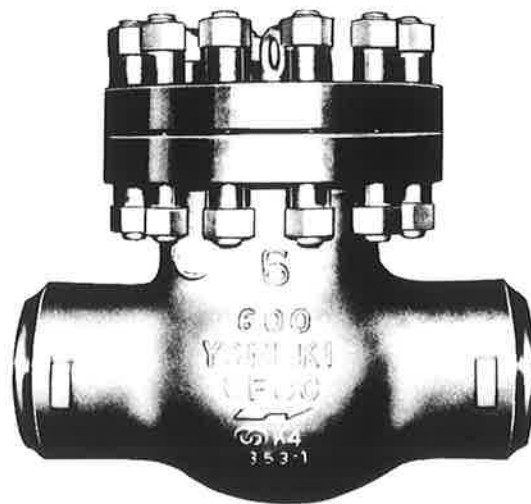


# **SWING CHECK VALVES**

**CLASS 150-300-600-  
900-1500-2500**

FLANGED ENDS  
BUTT WELDING ENDS

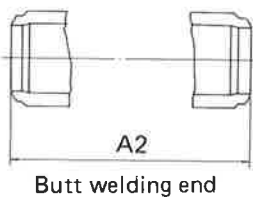
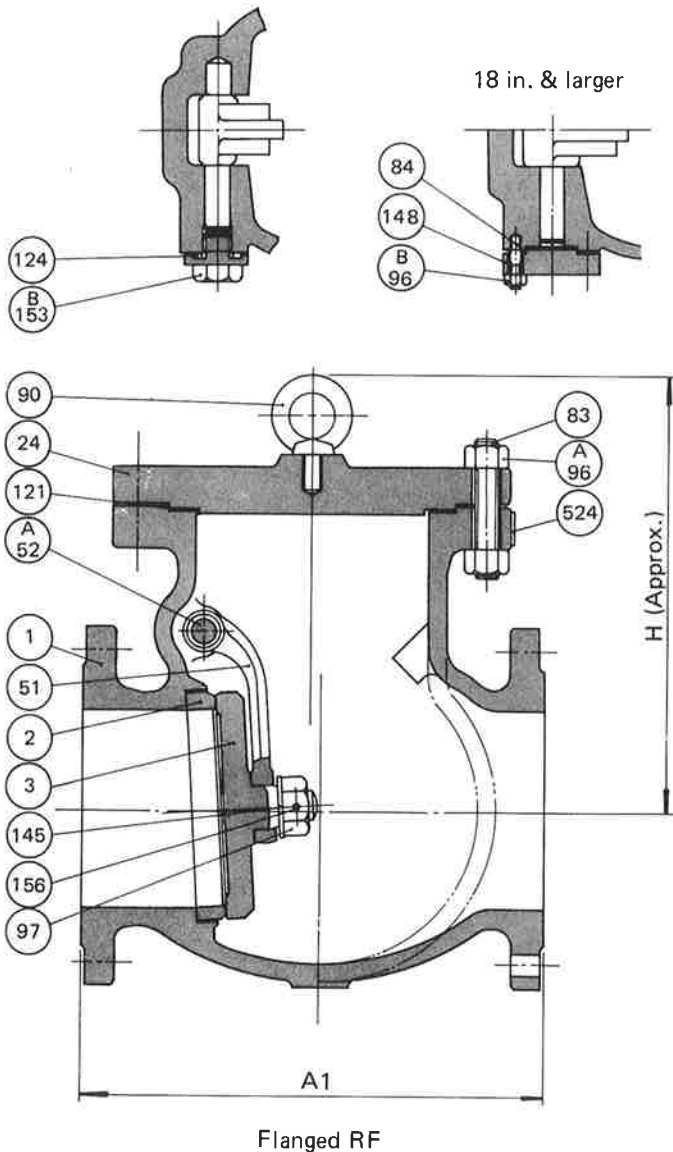
BOLTED COVER





# ANSI 150 CAST STEEL SWING CHECK VALVE

## BOLTED COVER



Dimensions (in./mm)

| Nom Size | in  | 2     | 2-1/2 | 3     | 4      | 5     | 6      | 8      | 10     | 12     | 14   | 16     | 18     | 20     | 24     | 26     | 28   | 30     | 36     |
|----------|-----|-------|-------|-------|--------|-------|--------|--------|--------|--------|------|--------|--------|--------|--------|--------|------|--------|--------|
|          | mm  | 50    | 65    | 80    | 100    | 125   | 150    | 200    | 250    | 300    | 350  | 400    | 450    | 500    | 600    | 650    | 700  | 750    | 900    |
| A1       | in. | 8     | 8-1/2 | 9-1/2 | 11-1/2 | 13    | 14     | 19-1/2 | 24-1/2 | 27-1/2 | 31   | 34     | 38-1/2 | 38-1/2 | 51     | 51     | 57   | 60     | 77     |
|          | mm  | 203   | 216   | 241   | 292    | 330   | 356    | 495    | 622    | 698    | 787  | 864    | 978    | 978    | 1295   | 1295   | 1448 | 1524   | 1956   |
| A2       | in. | 8     | 8-1/2 | 9-1/2 | 11-1/2 | 13    | 14     | 19-1/2 | 24-1/2 | 27-1/2 | 31   | 34     | 38-1/2 | 38-1/2 | 51     | 51     | 57   | 60     | 77     |
|          | mm  | 203   | 216   | 241   | 292    | 330   | 356    | 495    | 622    | 698    | 787  | 864    | 978    | 978    | 1295   | 1295   | 1448 | 1524   | 1956   |
| H        | in. | 6-7/8 | 7     | 7-1/2 | 8-5/8  | 9-1/4 | 12-3/4 | 15-1/8 | 17-5/8 | 21-1/4 | 22   | 24-5/8 | 25-5/8 | 26-5/8 | 34-5/8 | 37-3/8 | 41   | 45-1/4 | 53-1/8 |
|          | mm  | 175   | 178   | 191   | 219    | 235   | 324    | 384    | 448    | 540    | 559  | 626    | 651    | 676    | 880    | 949    | 1041 | 1149   | 1349   |
| RF       | lb  | 44    | 53    | 77    | 121    | 185   | 211    | 353    | 540    | 761    | 1125 | 1455   | 1874   | 2315   | 3197   | 3859   | 4520 | 5182   | 7387   |
|          | Kg  | 20    | 24    | 35    | 55     | 84    | 96     | 160    | 245    | 345    | 510  | 660    | 850    | 1050   | 1450   | 1750   | 2050 | 2350   | 3350   |
| BW       | lb  | 31    | 37    | 57    | 82     | 115   | 176    | 293    | 470    | 648    | 970  | 1252   | 1654   | 2029   | 2800   | 3638   | 4300 | 4961   | 6946   |
|          | Kg  | 14    | 17    | 26    | 37     | 52    | 80     | 133    | 213    | 294    | 440  | 568    | 750    | 920    | 1270   | 1650   | 1950 | 2250   | 3150   |

Figure No.

|         |                         |
|---------|-------------------------|
| SC010RA | 150 lb Swing Check RF   |
| SC010WA | 150 lb Swing Check Weld |

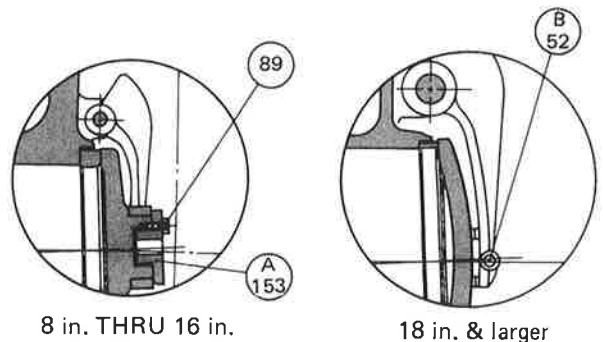
## ■ Features

- End to end dimensions and Wall thicknesses conform to ANSI and API specifications.
- Flange dimensions; 24 in. and smaller Valves conform to ANSI B16.5.
- 26 in. and larger Valves conform to API 605.
- Internal Hinge pin design is available.
- Lift check valve also available. Data supplied upon request.

## Material Specifications Trim No. 8

| No.  | PART NAME        | MATERIAL            |
|------|------------------|---------------------|
| 524  | Name Plate       | 18Cr-8Ni S. Steel   |
| 156  | Knock Pin        | 18Cr-8Ni S. Steel   |
| 153B | Hinge Pin Plug   | ASTM A105           |
| 153A | Disc Plug        | ASTM A182 Gr.F6a    |
| 148  | Hinge Pin Cover  | ASTM A105           |
| 145  | Disc Washer      | 18Cr-8Ni S. Steel   |
| 124  | Hinge Pin Gasket | *6                  |
| 121  | Cover Gasket     | *5                  |
| 97   | Disc Nut         | 18Cr-8Ni S. Steel   |
| 96B  | Cover Bolt Nut   | ASTM A194 Gr.2H     |
| 96A  | Cover Bolt Nut   | ASTM A194 Gr.2H     |
| 90   | Eye Bolt         | Carbon Steel *4     |
| 89   | Set Bolt         | 18Cr-8Ni S. Steel   |
| 84   | Cover Bolt       | ASTM A193 Gr.B7     |
| 83   | Cover Bolt       | ASTM A193 Gr.B7     |
| 52B  | Hinge Pin        | ASTM A182 Gr.F6a    |
| 52A  | Hinge Pin        | ASTM A182 Gr.F6a    |
| 51   | Swing Lever      | ASTM A105 *3        |
| 24   | Cover            | ASTM A105 *2        |
| 3    | Disc             | ASTM A182 Gr.F6a *1 |
| 2    | Body Seat Ring   | ASTM A105 + STL     |
| 1    | Body             | ASTM A216 Gr.WCB    |

- Note \*1 14 in. & larger ASTM A216 Gr.WCB + 13% Cr. deposit  
 \*2 12 in. & larger ASTM A216 Gr.WCB  
 \*3 8 in. & larger ASTM A216 Gr.WCB  
 \*4 6 in. & larger  
 \*5 Compressed asbestos or Corrugated metal  
 \*6 Spiral wound 304 s. steel asbestos filled

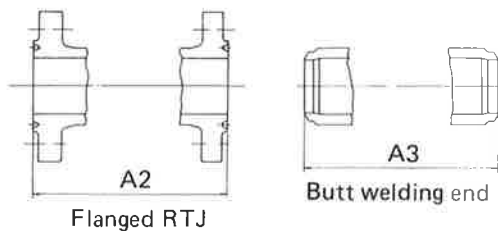
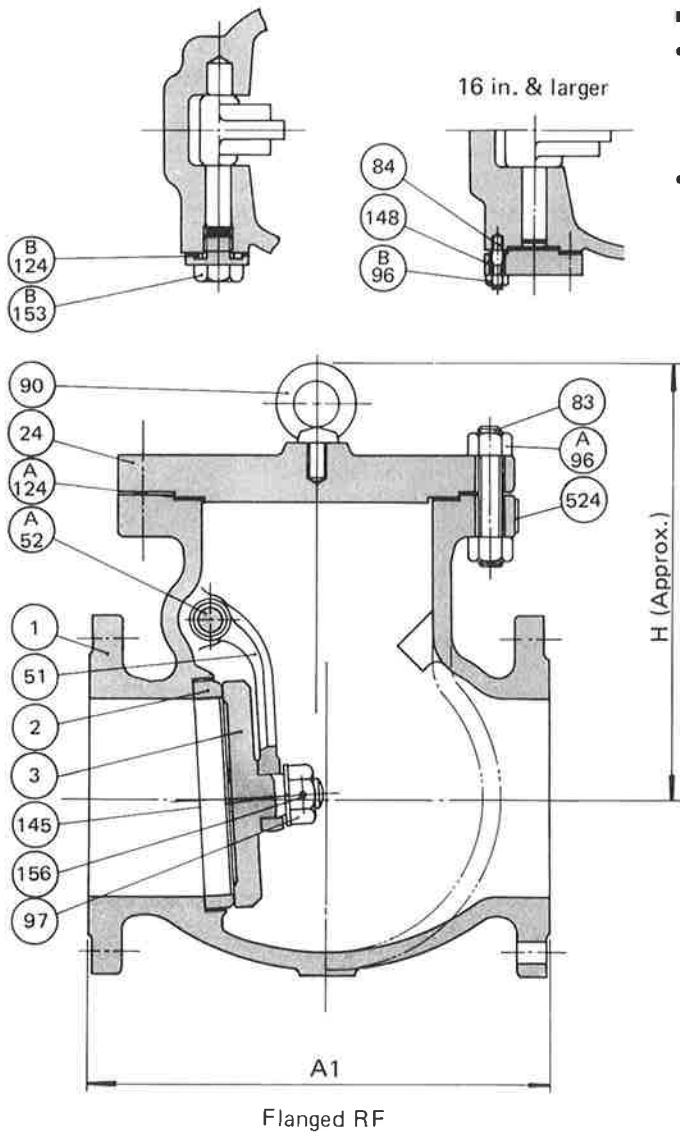


8 in. THRU 16 in.

18 in. &amp; larger

# ANSI 300 CAST STEEL SWING CHECK VALVE

## BOLTED COVER



Dimensions (in./mm)

| Nom. Size | in. | mm | 2      | 2-1/2  | 3      | 4      | 5      | 6      | 8      | 10     | 12     | 14     | 16     | 18     | 20     | 24     | 26     | 28     | 30     | 36     |
|-----------|-----|----|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| A1        | in. | mm | 10-1/2 | 11-1/2 | 12-1/2 | 14     | 15-3/4 | 17-1/2 | 21     | 24-1/2 | 28     | 33     | 34     | 38-1/2 | 40     | 53     | 53     | 59     | 62-3/4 | 82     |
| A2        | in. | mm | 11-1/8 | 12-1/8 | 13-1/8 | 14-5/8 | 16-3/8 | 18-1/8 | 21-5/8 | 25-1/8 | 28-5/8 | 33-5/8 | 34-5/8 | 39-1/8 | 40-3/4 | 53-7/8 | 54     | 60     | 63-3/4 | 83     |
| A3        | in. | mm | 10-1/2 | 11-1/2 | 12-1/2 | 14     | 15-3/4 | 17-1/2 | 21     | 24-1/2 | 28     | 33     | 34     | 38-1/2 | 40     | 53     | 53     | 59     | 62-3/4 | 82     |
| H         | in. | mm | 7-3/4  | 8      | 8-3/4  | 10-7/8 | 11-5/8 | 13-1/4 | 16-1/4 | 18-1/4 | 22-1/8 | 23-1/2 | 25-3/8 | 29-7/8 | 33-5/8 | 37     | 41-3/8 | 45-1/4 | 50     | 60-5/8 |
| RF        | lb  | Kg | 77     | 82     | 132    | 181    | 243    | 342    | 591    | 838    | 1091   | 1566   | 2095   | 2646   | 2977   | 4851   | 5513   | 6174   | 7497   | 11025  |
| BW        | lb  | Kg | 35     | 37     | 60     | 82     | 110    | 155    | 268    | 380    | 495    | 710    | 950    | 1200   | 1350   | 2200   | 2500   | 2800   | 3400   | 5000   |
|           | lb  | Kg | 71     | 77     | 110    | 143    | 154    | 282    | 507    | 595    | 1014   | 1224   | 1764   | 2139   | 2359   | 3925   | 4675   | 5292   | 6505   | 9482   |
|           | lb  | Kg | 32     | 35     | 50     | 65     | 70     | 128    | 230    | 270    | 460    | 555    | 800    | 970    | 1070   | 1780   | 2120   | 2400   | 2950   | 4300   |

### Features

- End to end dimensions and Wall thickness conform to ANSI and API specifications.
- Flange dimensions: 24 in. and smaller Valves conform to ANSI B16.5. 26 in. and larger Valves conform to API 605.

### Figure No.

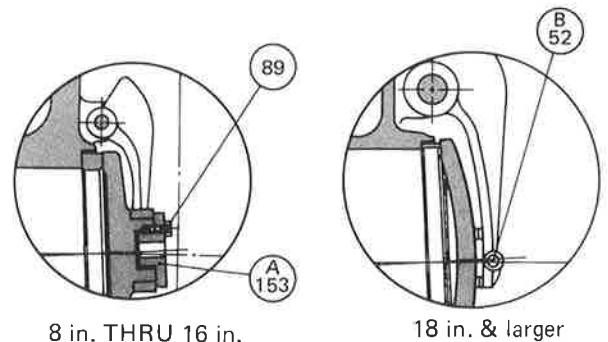
|         |                         |
|---------|-------------------------|
| SC030RA | 300 lb Swing Check RF   |
| SC030JA | 300 lb Swing Check RTJ  |
| SC030WA | 300 lb Swing Check Weld |

- Internal Hinge pin design is available.
- Lift check valve also available. Data supplied upon request.

### Material Specifications Trim No. 8

| NO   | PART NAME        | MATERIAL            |
|------|------------------|---------------------|
| 524  | Name Plate       | 18Cr-8Ni S. Steel   |
| 156  | Knock Pin        | 18Cr-8Ni S. Steel   |
| 153B | Hinge Pin Plug   | ASTM A105           |
| 153A | Disc Plug        | ASTM A182 Gr. F6a   |
| 148  | Hinge Pin Cover  | ASTM A105           |
| 145  | Disc Washer      | 18Cr-8Ni S. Steel   |
| 124B | Hinge Pin Gasket | *5                  |
| 124A | Cover Gasket     | *5                  |
| 97   | Disc Nut         | 18Cr-8Ni S. Steel   |
| 96B  | Cover Bolt Nut   | ASTM A194 Gr.2H     |
| 96A  | Cover Bolt Nut   | ASTM A194 Gr.2H     |
| 90   | Eye Bolt         | Carbon Steel *4     |
| 89   | Set Bolt         | 18Cr-8Ni S. Steel   |
| 84   | Cover Bolt       | ASTM A193 Gr. B7    |
| 83   | Cover Bolt       | ASTM A193 Gr. B7    |
| 52B  | Hinge Pin        | ASTM A182 Gr. F6a   |
| 52A  | Hinge Pin        | ASTM A182 Gr. F6a   |
| 51   | Swing Lever      | ASTM A105 *3        |
| 24   | Cover            | ASTM A105 *2        |
| 3    | Disc             | ASTM A182 Gr. F6a*1 |
| 2    | Body Seat Ring   | ASTM A105 + STL     |
| 1    | Body             | ASTM A216 Gr. WCB   |

- Note \*1 14 in. & larger ASTM A216 Gr. WCB + 13% Cr. deposit
- \*2 12 in. & larger ASTM A216 Gr. WCB
- \*3 8 in. & larger ASTM A216 Gr. WCB
- \*4 4 in. & larger
- \*5 Spiral wound 304 s. steel asbestos filled

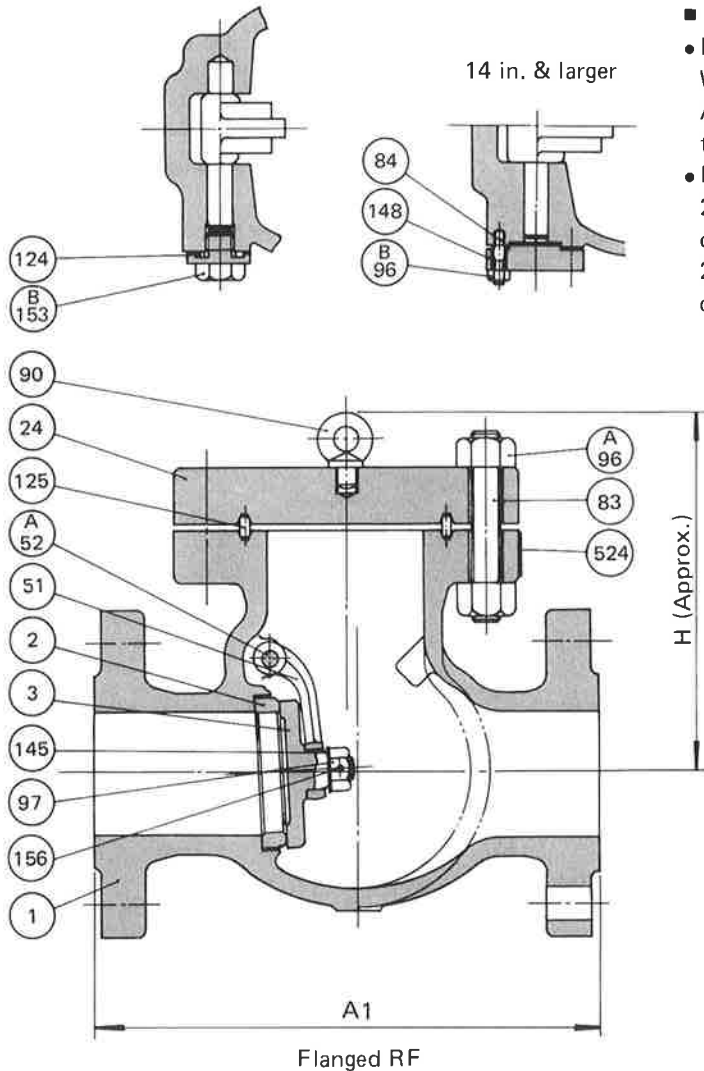


8 in. THRU 16 in.

18 in. &amp; larger

# ANSI 600 CAST STEEL SWING CHECK VALVE

## BOLTED COVER



### Features

- End to end dimensions and Wall thicknesses conform to ANSI and API specifications.
- Flange dimensions; 24 in. and smaller Valves conform to ANSI B16.5. 26 in. and larger Valves conform to API 605.

### Figure No.

|           |                         |
|-----------|-------------------------|
| SC060 RA  | 600 lb Swing Check RF   |
| SC060 J A | 600 lb Swing Check RTJ  |
| SC060WA   | 600 lb Swing Check Weld |

- Internal Hinge pin design is available.
- Lift check valve also available. Data supplied upon request.

### Material Specifications Trim No. 8

| 524  | Name Plate       | 18Cr-8Ni S. Steel   |
|------|------------------|---------------------|
| 156  | Knock Pin        | 18Cr-8Ni S. Steel   |
| 153B | Hinge Pin Plug   | ASTM A105           |
| 153A | Disc Plug        | ASTM A182 Gr. F6a   |
| 148  | Hinge Pin Cover  | ASTM A105           |
| 145  | Disc Washer      | 18 Cr-8Ni S. Steel  |
| 125  | Cover Gasket     | *6                  |
| 124  | Hinge Pin Gasket | *5                  |
| 97   | Disc Nut         | 18Cr-8Ni S. Steel   |
| 96B  | Cover Bolt Nut   | ASTM A194 Gr. 2H    |
| 96A  | Cover Bolt Nut   | ASTM A194 Gr. 2H    |
| 90   | Eye Bolt         | Carbon Steel *4     |
| 89   | Set Bolt         | 18Cr-8Ni S. Steel   |
| 84   | Cover Bolt       | ASTM A193 Gr. B7    |
| 83   | Cover Bolt       | ASTM A193 Gr. B7    |
| 52B  | Hinge Pin        | ASTM A182 Gr. F6a   |
| 52A  | Hinge Pin        | ASTM A182 Gr. F6a   |
| 51   | Swing Lever      | ASTM A105 *3        |
| 24   | Cover            | ASTM A105 *2        |
| 3    | Disc             | ASTM A182 Gr. F6a*1 |
| 2    | Body Seat Ring   | ASTM A105 + STL     |
| 1    | Body             | ASTM A216 Gr. WCB   |
| NO.  | PART NAME        | MATERIAL            |

Note \*1 14 in. & larger ASTM A216 Gr.WCB + 13% Cr. deposit

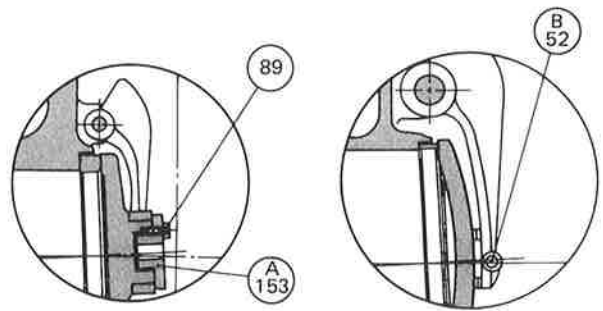
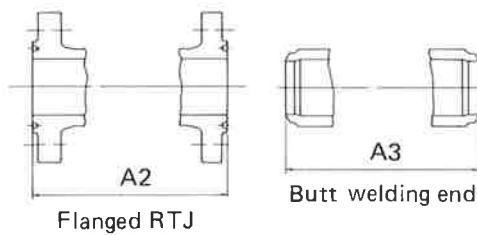
\*2 12 in. & larger ASTM A216 Gr. WCB

\*3 8 in. & larger ASTM A216 Gr. WCB

\*4 3 in. & larger

\*5 Spiral wound 304 s. steel asbestos filled

\*6 Soft iron ring joint gasket



8 in. THRU 16 in.

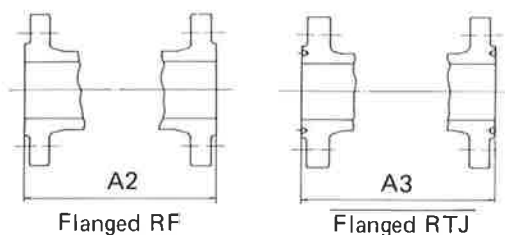
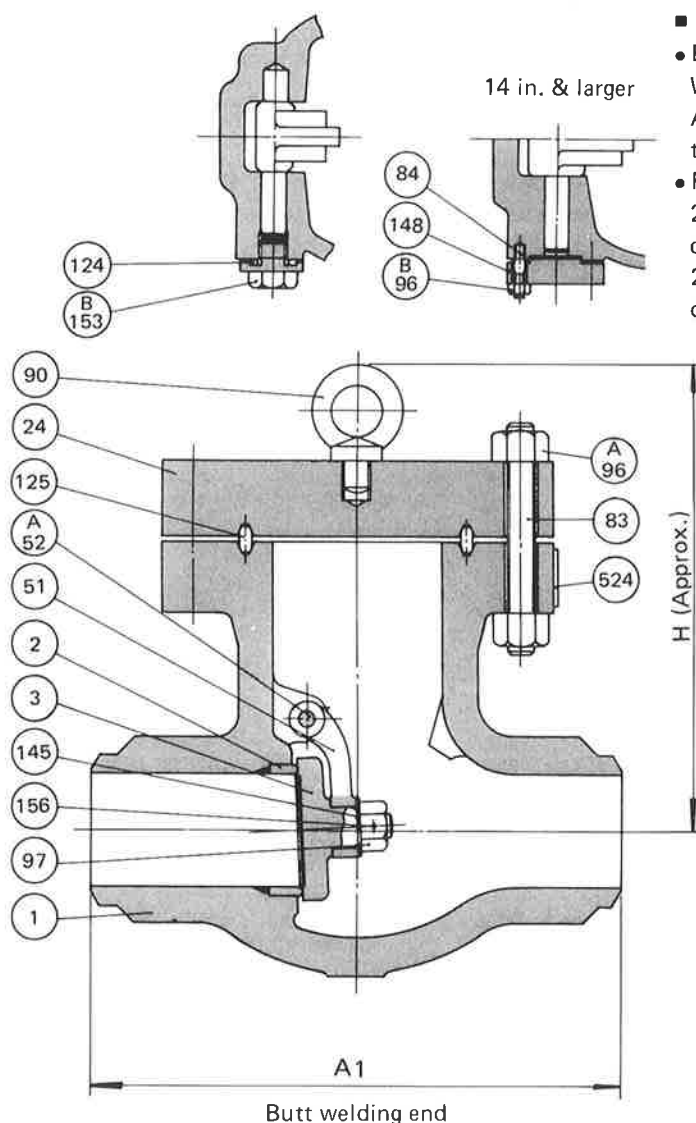
18 in. & larger

### Dimensions (in./mm)

| Nom. Size        | in. | 2      | 2-1/2  | 3      | 4      | 5      | 6      | 8      | 10     | 12     | 14     | 16     | 18     | 20     | 24     | 26     | 28     | 30     |
|------------------|-----|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| in.              | mm  | 50     | 65     | 80     | 100    | 125    | 150    | 200    | 250    | 300    | 350    | 400    | 450    | 500    | 600    | 650    | 700    | 750    |
| A1               | in. | 11-1/2 | 13     | 14     | 17     | 20     | 22     | 26     | 31     | 33     | 35     | 39     | 43     | 47     | 55     | 57     | 63     | 65     |
|                  | mm  | 292    | 330    | 356    | 432    | 508    | 559    | 660    | 787    | 838    | 889    | 991    | 1092   | 1194   | 1397   | 1448   | 1600   | 1651   |
| A2               | in. | 11-5/8 | 13-1/8 | 14-1/8 | 17-1/8 | 20-1/8 | 22-1/8 | 26-1/8 | 31-1/8 | 33-1/8 | 35-1/8 | 39-1/8 | 43-1/8 | 47-1/4 | 55-3/8 | 57-1/2 | 63-1/2 | 65-1/2 |
|                  | mm  | 295    | 333    | 359    | 435    | 511    | 562    | 664    | 791    | 841    | 892    | 994    | 1095   | 1200   | 1407   | 1461   | 1613   | 1664   |
| A3               | in. | 11-1/2 | 13     | 14     | 17     | 20     | 22     | 26     | 31     | 33     | 35     | 39     | 43     | 47     | 55     | 57     | 63     | 65     |
|                  | mm  | 292    | 330    | 356    | 432    | 508    | 559    | 660    | 787    | 838    | 889    | 991    | 1092   | 1194   | 1397   | 1448   | 1600   | 1651   |
| H                | in. | 8-1/4  | 8-5/8  | 10-1/2 | 11-3/4 | 13-1/4 | 15     | 18-3/4 | 21-5/8 | 22-5/8 | 26-3/8 | 30-1/8 | 35-1/4 | 38-3/8 | 43-3/4 | 48     | 53-1/8 | 56-1/4 |
|                  | mm  | 210    | 219    | 267    | 299    | 337    | 381    | 476    | 549    | 575    | 670    | 765    | 895    | 975    | 1111   | 1219   | 1349   | 1429   |
| Weight (Approx.) | lb  | 88     | 121    | 159    | 265    | 386    | 595    | 926    | 1367   | 1786   | 2426   | 3197   | 3969   | 4631   | 6615   | 7718   | 9041   | 11025  |
|                  | Kg  | 40     | 55     | 72     | 120    | 175    | 270    | 420    | 620    | 810    | 1100   | 1450   | 1800   | 2100   | 3000   | 3500   | 4100   | 5000   |
|                  | lb  | 68     | 99     | 132    | 187    | 276    | 496    | 805    | 1103   | 1577   | 1940   | 2514   | 3197   | 3638   | 5072   | 6615   | 7718   | 9482   |
|                  | Kg  | 31     | 45     | 60     | 85     | 125    | 225    | 365    | 500    | 715    | 880    | 1140   | 1450   | 1650   | 2300   | 3000   | 3500   | 4300   |

# ANSI 900 CAST STEEL SWING CHECK VALVE

## BOLTED COVER



### Features

- End to end dimensions and Wall thicknesses conform to ANSI and API specifications.
- Flange dimensions; 24 in. and smaller Valves conform to ANSI B16.5. 26 in. and larger Valves conform to API 605.

### Figure No.

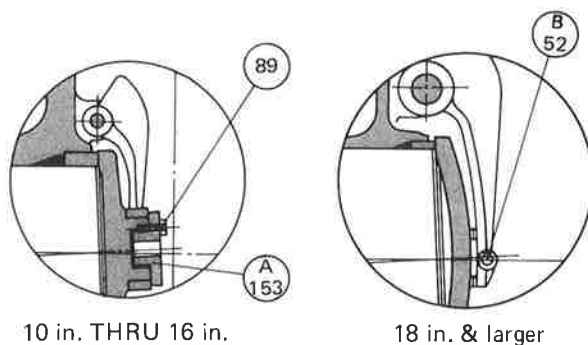
|          |                         |
|----------|-------------------------|
| SC090WC  | 900 lb Swing Check Weld |
| SC090 RC | 900 lb Swing Check RF   |
| SC090 JC | 900 lb Swing Check RTJ  |

- Internal Hinge pin design is available.
- Lift check valve also available. Data supplied upon request.

### Material Specifications Trim No. 5

| NO.  | PART NAME        | MATERIAL           |
|------|------------------|--------------------|
| 524  | Name Plate       | 18Cr-8Ni S. Steel  |
| 156  | Knock Pin        | 18Cr-8Ni S. Steel  |
| 153B | Hinge Pin Plug   | ASTM A105          |
| 153A | Disc Plug        | ASTM A182 Gr. F6a  |
| 148  | Hinge Pin Cover  | ASTM A105          |
| 145  | Disc Washer      | 18Cr-8Ni S. Steel  |
| 125  | Cover Gasket     | *5                 |
| 124  | Hinge Pin Gasket | *4                 |
| 97   | Disc Nut         | 18Cr-8Ni S. Steel  |
| 96B  | Cover Bolt Nut   | ASTM A194 Gr. 2H   |
| 96A  | Cover Bolt Nut   | ASTM A194 Gr. 2H   |
| 90   | Eye Bolt         | Carbon Steel       |
| 89   | Set Bolt         | 18Cr-8Ni S. Steel  |
| 84   | Cover Bolt       | ASTM A193 Gr. B7   |
| 83   | Cover Bolt       | ASTM A193 Gr. B7   |
| 52B  | Hinge Pin        | ASTM A182 Gr. F6a  |
| 52A  | Hinge Pin        | ASTM A182 Gr. F6a  |
| 51   | Swing Lever      | ASTM A105 *3       |
| 24   | Cover            | ASTM A105 *2       |
| 3    | Disc             | ASTM A105 + STL *1 |
| 2    | Body Seat Ring   | ASTM A105 + STL    |
| 1    | Body             | ASTM A216 Gr. WCB  |

- Note
- \*1 14 in. & larger ASTM A216 Gr. WCB + STL
  - \*2 14 in. & larger ASTM A216 Gr. WCB
  - \*3 3 in. & larger ASTM A216 Gr. WCB
  - \*4 Spiral wound 304 s. steel asbestos filled
  - \*5 Soft iron ring joint gasket



### Dimensions (in./mm)

| Nom. Size | in. | 2      | 2-1/2  | 3      | 4      | 5      | 6      | 8      | 10     | 12     | 14     | 16     | 18     | 20     | 24     | 26     | 28     | 30     |
|-----------|-----|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
|           | mm  | 50     | 65     | 80     | 100    | 125    | 150    | 200    | 250    | 300    | 350    | 400    | 450    | 500    | 600    | 650    | 700    | 750    |
| A1        | in. | 14-1/2 | 16-1/2 | 15     | 18     | 22     | 24     | 29     | 33     | 38     | 40-1/2 | 44-1/2 | 48     | 52     | 61     | 65     | 69     | 73     |
|           | mm  | 368    | 419    | 381    | 457    | 559    | 610    | 737    | 838    | 965    | 1029   | 1130   | 1219   | 1321   | 1549   | 1651   | 1753   | 1854   |
| A2        | in. | 14-1/2 | 16-1/2 | 15     | 18     | 22     | 24     | 29     | 33     | 38     | 40-1/2 | 44-1/2 | 48     | 52     | 61     | 65     | 69     | 73     |
|           | mm  | 368    | 419    | 381    | 457    | 559    | 610    | 737    | 838    | 965    | 1029   | 1130   | 1219   | 1321   | 1549   | 1651   | 1753   | 1854   |
| A3        | in. | 14-5/8 | 16-5/8 | 15-1/8 | 18-1/8 | 22-1/8 | 24-1/8 | 29-1/8 | 33-1/8 | 38-1/8 | 40-7/8 | 44-7/8 | 48-1/2 | 52-1/2 | 61-3/4 | 65-7/8 | 69-7/8 | 73-7/8 |
|           | mm  | 371    | 422    | 384    | 460    | 562    | 613    | 740    | 841    | 968    | 1038   | 1140   | 1232   | 1333   | 1568   | 1673   | 1775   | 1876   |
| H         | in. | 12-5/8 | 13-3/4 | 12-5/8 | 16     | 17-3/8 | 18-7/8 | 22-1/4 | 26-1/8 | 30-1/2 | 28-7/8 | 33     | 36-1/4 | 41-3/8 | 47-1/4 | 50-3/4 | 55-1/8 | 61-3/4 |
|           | mm  | 321    | 349    | 321    | 406    | 441    | 479    | 565    | 664    | 775    | 733    | 838    | 921    | 1051   | 1200   | 1289   | 1400   | 1569   |
| RF        | lb  | 154    | 243    | 243    | 441    | 662    | 838    | 1433   | 2536   | 3197   | 3859   | 5336   | 7166   | 8820   | 12789  | 14994  | 17309  | 19955  |
|           | Kg  | 70     | 110    | 110    | 200    | 300    | 380    | 650    | 1150   | 1450   | 1750   | 2420   | 3250   | 4000   | 5800   | 6800   | 7850   | 9050   |
| BW        | lb  | 110    | 192    | 187    | 353    | 529    | 662    | 1147   | 2095   | 2602   | 3197   | 4520   | 5953   | 7277   | 9923   | 12789  | 14663  | 16868  |
|           | Kg  | 50     | 87     | 85     | 160    | 240    | 300    | 520    | 950    | 1180   | 1450   | 2050   | 2700   | 3300   | 4500   | 5800   | 6650   | 7650   |

# ANSI 1500 CAST STEEL SWING CHECK VALVE

## BOLTED COVER

Figure No.

|          |                          |
|----------|--------------------------|
| SC150WC  | 1500 lb Swing Check Weld |
| SC150RC  | 1500 lb Swing Check RF   |
| SC150 JC | 1500 lb Swing Check RTJ  |

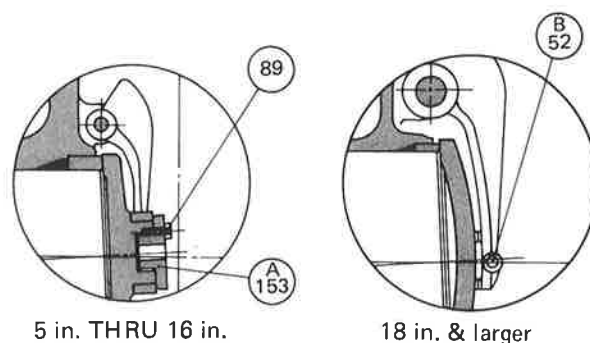
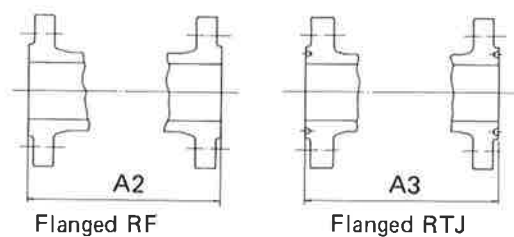
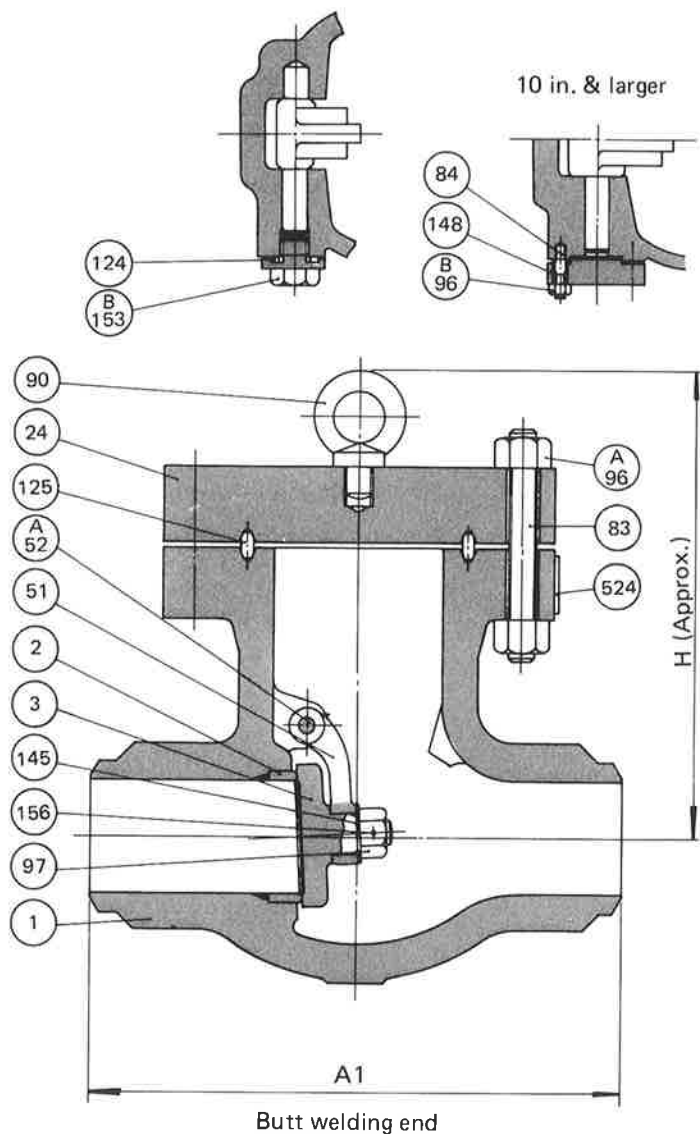
### ■ Features

- End to end dimensions and Wall thicknesses conform to ANSI and API specifications.
- Internal Hinge pin design is available.
- Lift check valve also available. Data supplied upon request.

### Material Specifications Trim No. 5

| NO.  | PART NAME        | MATERIAL           |
|------|------------------|--------------------|
| 524  | Name Plate       | 18Cr-8Ni S. Steel  |
| 156  | Knock Pin        | 18Cr-8Ni S. Steel  |
| 153B | Hinge Pin Plug   | ASTM A105          |
| 153A | Disc Plug        | ASTM A182 Gr. F6a  |
| 148  | Hinge Pin Cover  | ASTM A105          |
| 145  | Disc Washer      | 18Cr-8Ni S. Steel  |
| 125  | Cover Gasket     | *5                 |
| 124  | Hinge Pin Gasket | *4                 |
| 97   | Disc Nut         | 18Cr-8Ni S. Steel  |
| 96B  | Cover Bolt Nut   | ASTM A194 Gr. 2H   |
| 96A  | Cover Bolt Nut   | ASTM A194 Gr. 2H   |
| 90   | Eye Bolt         | Carbon Steel       |
| 89   | Set Bolt         | 18Cr-8Ni S. Steel  |
| 84   | Cover Bolt       | ASTM A193 Gr. B7   |
| 83   | Cover Bolt       | ASTM A193 Gr. B7   |
| 52B  | Hinge Pin        | ASTM A182 Gr. F6a  |
| 52A  | Hinge Pin        | ASTM A182 Gr. F6a  |
| 51   | Swing Lever      | ASTM A105 *2       |
| 24   | Cover            | ASTM A105 *3       |
| 3    | Disc             | ASTM A105 + STL *1 |
| 2    | Body Seat Ring   | ASTM A105 + STL    |
| 1    | Body             | ASTM A216 Gr. WCB  |

Note \*1 14 in. & larger ASTM A216 Gr. WCB + STL  
 \*2 14 in. & larger ASTM A216 Gr. WCB  
 \*3 5 in. & larger ASTM A216 Gr. WCB  
 \*4 Spiral wound 304 s. steel asbestos filled  
 \*5 Soft iron ring joint gasket



### Dimensions (in./mm)

| Nom. Size | in. | mm | 2      | 2-1/2  | 3      | 4      | 5      | 6      | 8      | 10     | 12     | 14     | 16     | 18     | 20     | 24     |
|-----------|-----|----|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| A1        | in. | mm | 14-1/2 | 16-1/2 | 18-1/2 | 21-1/2 | 26-1/2 | 27-3/4 | 32-3/4 | 39     | 44-1/2 | 49-1/2 | 54-1/2 | 60-1/2 | 65-1/2 | 76-1/2 |
| A2        | in. | mm | 14-1/2 | 16-1/2 | 18-1/2 | 21-1/2 | 26-1/2 | 27-3/4 | 32-3/4 | 39     | 44-1/2 | 49-1/2 | 54-1/2 | 60-1/2 | 65-1/2 | 76-1/2 |
| A3        | in. | mm | 14-5/8 | 16-5/8 | 18-5/8 | 21-5/8 | 26-5/8 | 28     | 33-1/8 | 39-3/8 | 45-1/8 | 50-1/4 | 55-3/8 | 61-3/8 | 66-3/8 | 77-5/8 |
| H         | in. | mm | 12-5/8 | 13-3/4 | 14-3/8 | 16-1/2 | 18-7/8 | 20-1/8 | 26-3/4 | 29-3/4 | 33-3/4 | 38     | 42     | 47-1/8 | 51-1/8 | 57-1/8 |
| RF        | lb  | Kg | 154    | 243    | 375    | 662    | 992    | 1532   | 2624   | 4079   | 6064   | 7938   | 10805  | 14553  | 17971  | 25909  |
| BW        | lb  | Kg | 110    | 192    | 298    | 540    | 750    | 1235   | 2128   | 3263   | 4807   | 6240   | 8600   | 11576  | 14222  | 19845  |
|           |     |    | 50     | 87     | 135    | 245    | 340    | 560    | 965    | 1480   | 2180   | 2830   | 3900   | 5250   | 6450   | 9000   |

# ANSI 2500 CAST STEEL SWING CHECK VALVE

## BOLTED COVER

Figure No.

|          |                          |
|----------|--------------------------|
| SC250WC  | 2500 lb Swing Check Weld |
| SC250 RC | 2500 lb Swing Check RF   |
| SC250 JC | 2500 lb Swing Check RTJ  |

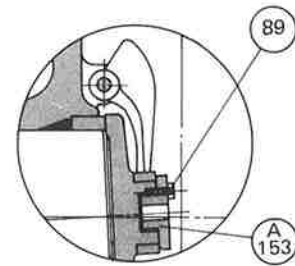
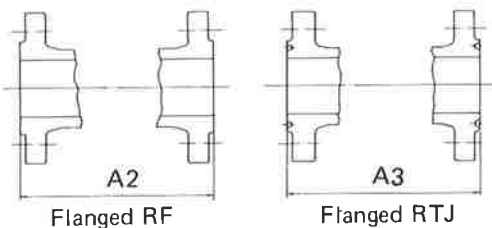
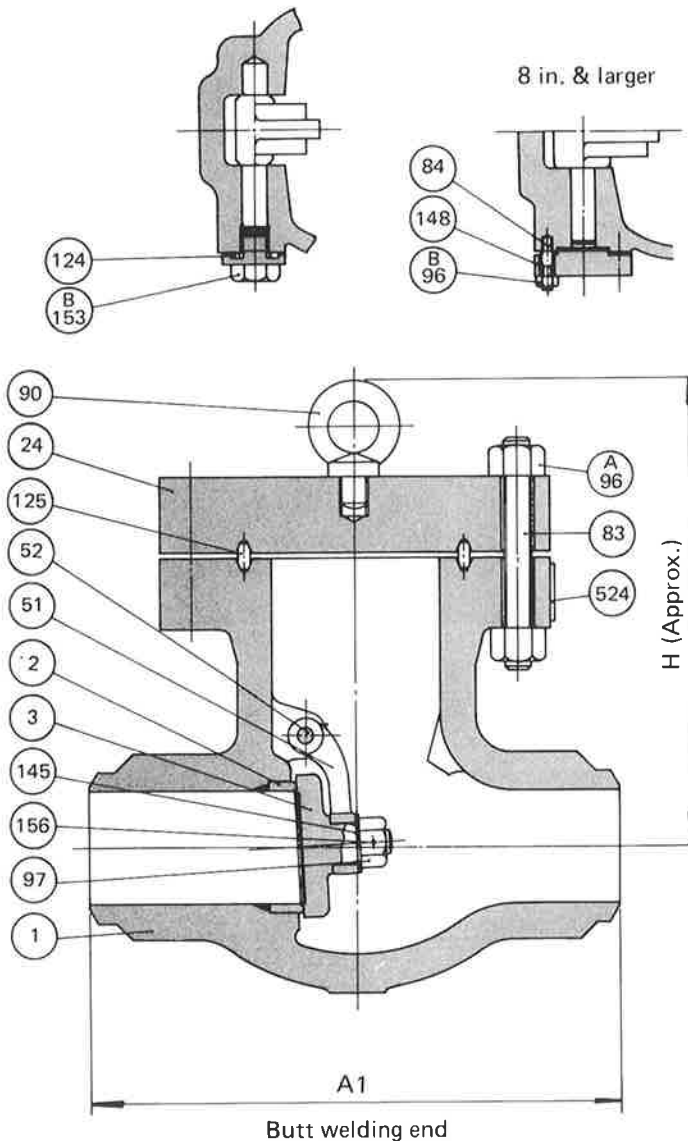
## ■ Features

- End to end dimensions and Wall thicknesses conform to ANSI and API specifications.
- Internal Hinge pin design is available.
- Lift check valve also available. Data supplied upon request.

Material Specifications Trim No. 5

|      |                  |                   |
|------|------------------|-------------------|
| 524  | Name Plate       | 18Cr-8Ni S. Steel |
| 156  | Knock Pin        | 18Cr-8Ni S. Steel |
| 153B | Hinge Pin Plug   | ASTM A105         |
| 153A | Disc Plug        | ASTM A182 Gr. F6a |
| 148  | Hinge Pin Cover  | ASTM A105         |
| 145  | Disc Washer      | 18Cr-8Ni S. Steel |
| 125  | Cover Gasket     | *5                |
| 124  | Hinge Pin Gasket | *4                |
| 97   | Disc Nut         | 18Cr-8Ni S. Steel |
| 96B  | Cover Bolt Nut   | ASTM A194 Gr. 2H  |
| 96A  | Cover Bolt Nut   | ASTM A194 Gr. 2H  |
| 90   | Eye Bolt         | Carbon Steel      |
| 89   | Set Bolt         | 18Cr-8Ni S. Steel |
| 84   | Cover Bolt       | ASTM A193 Gr. B7  |
| 83   | Cover Bolt       | ASTM A193 Gr. B7  |
| 52   | Hinge Pin        | ASTM A182 Gr. F6a |
| 51   | Swing Lever      | ASTM A105*3       |
| 24   | Cover            | ASTM A105*2       |
| 3    | Disc             | ASTM A105 + STL*1 |
| 2    | Body Seat Ring   | ASTM A105 + STL   |
| 1    | Body             | ASTM A216 Gr. WCB |

| NO.     | PART NAME                                 | MATERIAL                |
|---------|-------------------------------------------|-------------------------|
| Note *1 | 14 in. & larger                           | ASTM A216 Gr. WCB + STL |
| *2      | 14 in. & larger                           | ASTM A216 Gr. WCB       |
| *3      | 5 in. & larger                            | ASTM A216 Gr. WCB       |
| *4      | Spiral wound 304 s. steel asbestos filled |                         |
| *5      | Soft iron ring joint gasket               |                         |



5 in. &amp; larger

## Dimensions (in./mm)

| Nom. Size | in. | mm | 2      | 2-1/2  | 3      | 4      | 5      | 6      | 8      | 10     | 12     | 14     | 16     |
|-----------|-----|----|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| A1        | in. | mm | 17-3/4 | 20     | 22-3/4 | 26-1/2 | 31-1/4 | 36     | 40-1/4 | 50     | 56     | 62     | 68     |
| A2        | in. | mm | 17-3/4 | 20     | 22-3/4 | 26-1/2 | 31-1/4 | 36     | 40-1/4 | 50     | 56     | -      | -      |
| A3        | in. | mm | 17-7/8 | 20-1/4 | 23     | 26-7/8 | 31-3/4 | 36-1/2 | 40-7/8 | 50-7/8 | 56-7/8 | -      | -      |
| H         | in. | mm | 16-3/8 | 16-1/2 | 17-3/8 | 18-7/8 | 19-1/4 | 20-1/8 | 28     | 33-1/2 | 39-3/8 | 47-1/4 | 51-1/8 |
| RF        | lb  | Kg | 331    | 529    | 772    | 1433   | 2095   | 3197   | 5623   | 8710   | 12569  | -      | -      |
| BW        | lb  | Kg | 265    | 430    | 617    | 1191   | 1698   | 2646   | 4851   | 6946   | 10033  | 13671  | 17861  |
|           |     |    | 120    | 195    | 280    | 540    | 770    | 1200   | 2200   | 3150   | 4550   | 6200   | 8100   |

# **SWING CHECK VALVES**

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## **CLASS 600-900-1500-2500**

FLANGED ENDS  
BUTT WELDING ENDS

PRESSURE SEAL COVER



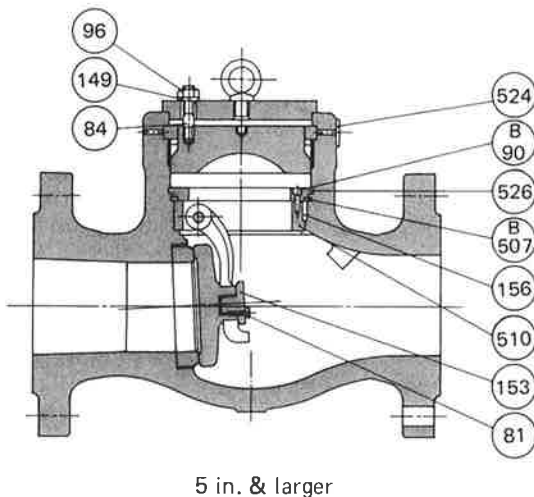
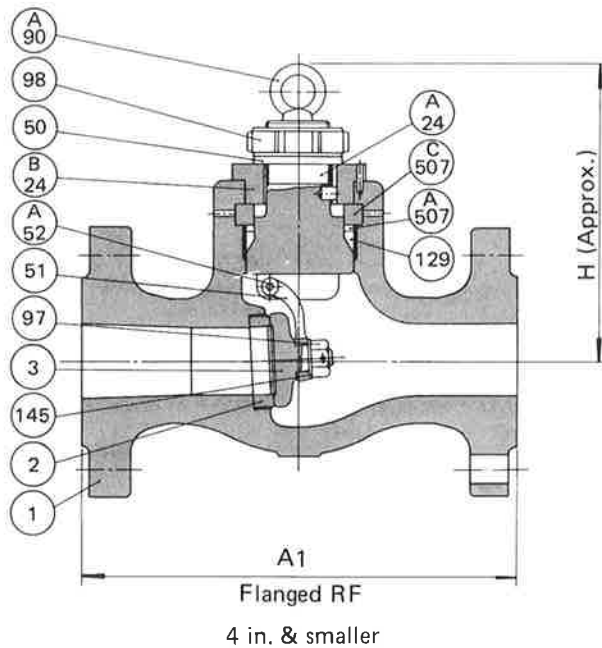


# ANSI 600 CAST STEEL SWING CHECK VALVE

## PRESSURE SEAL COVER

### ■ Features

- End to end dimensions and Wall thicknesses conform to ANSI B16.5. 26 in. and larger Valves conform to API 605.
- Lift check valve also available. Data supplied upon request.
- Flange dimensions; 24 in. and smaller Valves



Flanged RTJ

Butt welding end

18 in. &amp; larger

### Dimensions (in./mm)

| Nom. Size | in. | mm | 2      | 2-1/2  | 3      | 4      | 5      | 6      | 8      | 10     | 12     | 14     | 16     | 18     | 20     | 24     | 26     | 28     | 30     |
|-----------|-----|----|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| A1        | in. | mm | 11-1/2 | 13     | 14     | 17     | 20     | 22     | 26     | 31     | 33     | 35     | 39     | 43     | 47     | 55     | 63     | 65     | 65     |
| A2        | in. | mm | 11-5/8 | 13-1/8 | 14-1/8 | 17-1/8 | 20-1/8 | 22-1/8 | 26-1/8 | 31-1/8 | 33-1/8 | 35-1/8 | 39-1/8 | 43-1/8 | 47-1/4 | 55-3/8 | 63-1/2 | 65-1/2 | 65-1/2 |
| A3        | in. | mm | 11-1/2 | 13     | 14     | 17     | 20     | 22     | 26     | 31     | 33     | 35     | 39     | 43     | 47     | 55     | 63     | 65     | 65     |
| H         | in. | mm | 9-1/2  | 10-3/8 | 10-5/8 | 12-1/2 | 15-3/4 | 15-3/4 | 23-1/8 | 23-7/8 | 27-3/8 | 29-1/2 | 28-3/4 | 28-3/4 | 32-1/4 | 37-3/8 | 39-3/8 | 43-1/4 | 47-1/4 |
| RF        | lb  | Kg | 60     | 77     | 99     | 187    | 298    | 419    | 772    | 1103   | 1477   | 1940   | 2536   | 3263   | 4145   | 5733   | 6836   | 7718   | 8820   |
| BW        | lb  | Kg | 27     | 35     | 45     | 85     | 135    | 190    | 350    | 500    | 670    | 880    | 1150   | 1480   | 1880   | 2600   | 3100   | 3500   | 4000   |
|           | lb  | Kg | 40     | 53     | 71     | 121    | 187    | 287    | 573    | 816    | 1080   | 1455   | 1874   | 2426   | 3285   | 4498   | 5513   | 6174   | 6946   |
|           | lb  | Kg | 18     | 25     | 32     | 55     | 85     | 130    | 260    | 370    | 490    | 660    | 850    | 1100   | 1490   | 2040   | 2500   | 2800   | 3150   |

### Figure No.

|           |                         |
|-----------|-------------------------|
| SC064 RA  | 600 lb Swing Check RF   |
| SC064 J A | 600 lb Swing Check RTJ  |
| SC064WA   | 600 lb Swing Check Weld |

### Material Specifications

### Trim No. 8

|      |                |                     |
|------|----------------|---------------------|
| 526  | Plate          | ASTM A105           |
| 524  | Name Plate     | 18Cr-8Ni S. Steel   |
| 510  | Lever Set Ring | ASTM A216 Gr. WCB   |
| 507C | Retainer Ring  | ASTM A182 Gr. F6a   |
| 507B | Spacer Ring    | ASTM A182 Gr. F6a   |
| 507A | Spacer Ring    | ASTM A182 Gr. F6a   |
| 156  | Knock Pin      | 13% Cr. S. Steel    |
| 153  | Disc Plug      | ASTM A182 Gr. F6a   |
| 149  | Spring Washer  | Carbon Steel        |
| 145  | Disc Washer    | 18Cr-8Ni S. Steel   |
| 129  | Gasket         | *4                  |
| 98   | Bonnet Nut     | 13% Cr. S. Steel    |
| 97   | Disc Nut       | 18Cr-8Ni S. Steel   |
| 96   | Stud Bolt Nut  | ASTM A194 Gr. 2H    |
| 90B  | Cap Bolt       | 18Cr-8Ni S. Steel   |
| 90A  | Eye Bolt       | Carbon Steel        |
| 84   | Stud Bolt      | ASTM A193 Gr. B7    |
| 81   | Set Bolt       | 18Cr-8Ni S. Steel   |
| 52B  | Hinge Pin      | ASTM A182 Gr. F6a   |
| 52A  | Hinge Pin      | ASTM A182 Gr. F6a   |
| 51   | Swing Lever    | ASTM A105*3         |
| 50   | Washer         | 13% Cr. S. Steel    |
| 24B  | Cover Retainer | ASTM A105           |
| 24A  | Cover          | ASTM A105*2         |
| 3    | Disc           | ASTM A182 Gr. F6a*1 |
| 2    | Body Seat Ring | ASTM A105 + STL     |
| 1    | Body           | ASTM A216 Gr. WCB   |

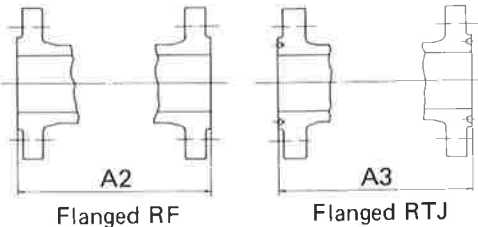
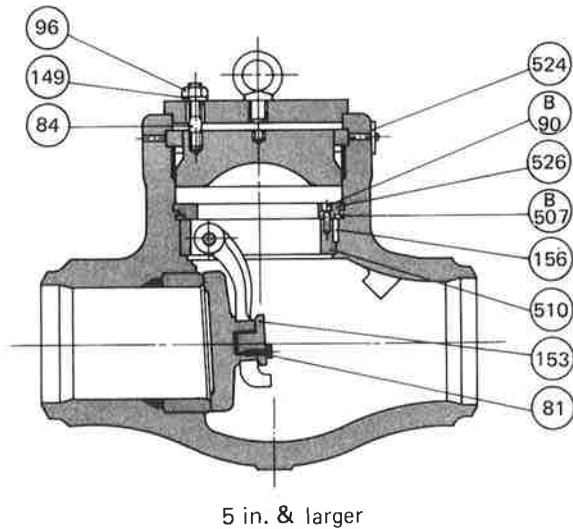
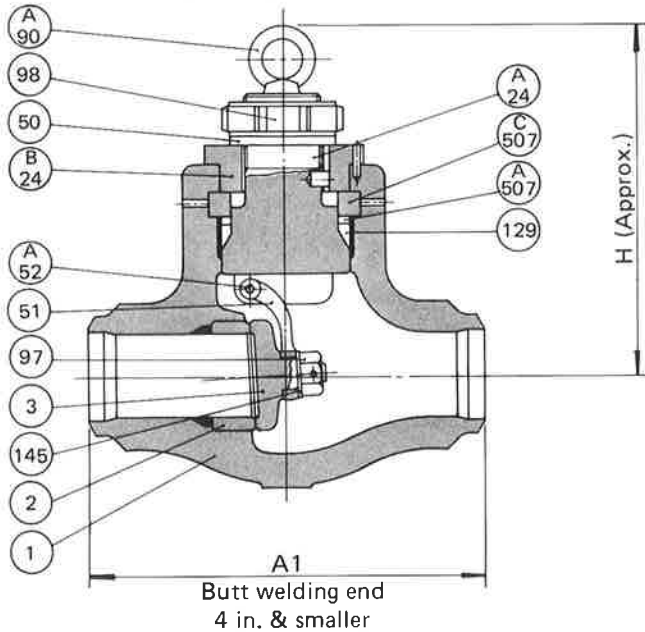
- Note \*1 14 in. & larger ASTM A216 Gr. WCB + 13 Cr. deposit  
 \*2 8 in. & larger ASTM A216 Gr. WCB  
 \*3 5 in. & larger ASTM A216 Gr. WCB  
 \*4 Soft iron pressure seal gasket

# ANSI 900 CAST STEEL SWING CHECK VALVE

## PRESSURE SEAL COVER

### ■ Features

- End to end dimensions and Wall thicknesses conform to ANSI and API specifications.
- Flange dimensions; 24 in. and smaller Valves conform to ANSI B16.5.
- 26 in. and larger Valves conform to API 605.
- Lift check valve also available. Data supplied upon request.



### Figure No.

|          |                         |
|----------|-------------------------|
| SC094WC  | 900 lb Swing Check Weld |
| SC094 RC | 900 lb Swing Check RF   |
| SC094 JC | 900 lb Swing Check RTJ  |

### Material Specifications

### Trim No. 5

| 526  | Plate          | ASTM A105          |
|------|----------------|--------------------|
| 524  | Name Plate     | 18Cr-8Ni S. Steel  |
| 510  | Lever Set Ring | ASTM A216 Gr. WCB  |
| 507C | Retainer Ring  | ASTM A182 Gr. F6a  |
| 507B | Spacer Ring    | ASTM A182 Gr. F6a  |
| 507A | Spacer Ring    | ASTM A182 Gr. F6a  |
| 156  | Knock Pin      | 13% Cr. S. Steel   |
| 153  | Disc Plug      | ASTM A182 Gr. F6a  |
| 149  | Spring Washer  | Carbon Steel       |
| 145  | Disc Washer    | 18Cr-8Ni S. Steel  |
| 129  | Gasket         | *4                 |
| 98   | Bonnet Nut     | 13% Cr. S. Steel   |
| 97   | Disc Nut       | 18Cr-8Ni S. Steel  |
| 96   | Stud Bolt Nut  | ASTM A194 Gr. 2H   |
| 90B  | Cap Bolt       | 18Cr-8Ni S. Steel  |
| 90A  | Eye Bolt       | Carbon Steel       |
| 84   | Stud Bolt      | ASTM A193 Gr. B7   |
| 81   | Set Bolt       | 18Cr-8Ni S. Steel  |
| 52B  | Hinge Pin      | ASTM A182 Gr. F6a  |
| 52A  | Hinge Pin      | ASTM A182 Gr. F6a  |
| 51   | Swing Lever    | ASTM A105 *3       |
| 50   | Washer         | 13% Cr. S. Steel   |
| 24B  | Cover Retainer | ASTM A105          |
| 24A  | Cover          | ASTM A105 *2       |
| 3    | Disc           | ASTM A105 + STL *1 |
| 2    | Body Seat Ring | ASTM A105 + STL    |
| 1    | Body           | ASTM A216 Gr. WCB  |
| NO.  | PART NAME      | MATERIAL           |

- Note \*1 14 in. & larger ASTM A216 Gr. WCB+STL  
 \*2 8 in. & larger ASTM A216 Gr. WCB  
 \*3 5 in. & larger ASTM A216 Gr. WCB  
 \*4 Soft iron pressure seal gasket

### Dimensions (in./mm)

| Nom. Size        | in. | mm | 2      | 2-1/2  | 3      | 4      | 5      | 6      | 8      | 10     | 12     | 14     | 16     | 18     | 20     | 24     | 26     | 28     | 30     |
|------------------|-----|----|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| A1               | in. | mm | 8-1/2  | 10     | 12     | 14     | 17     | 20     | 26     | 31     | 36     | 39     | 43     | 48     | 52     | 61     | 63     | 67     | 71     |
| A2               | in. | mm | 216    | 254    | 305    | 356    | 432    | 508    | 660    | 787    | 914    | 991    | 1092   | 1219   | 1321   | 1549   | 1600   | 1702   | 1803   |
| A3               | in. | mm | 14-1/2 | 16-1/2 | 18     | 22     | 24     | 29     | 33     | 38     | 40-1/2 | 44-1/2 | 48     | 52     | 61     | 65     | 69     | 73     | 77     |
| H                | in. | mm | 368    | 419    | 381    | 457    | 559    | 610    | 737    | 838    | 965    | 1029   | 1130   | 1219   | 1321   | 1549   | 1651   | 1753   | 1854   |
| RF               | in. | mm | 14-5/8 | 16-5/8 | 18-1/8 | 22-1/8 | 24-1/8 | 29-1/8 | 33-1/8 | 38-1/8 | 40-7/8 | 44-7/8 | 48-1/2 | 52-1/2 | 61-3/4 | 65-7/8 | 69-7/8 | 73-7/8 | 77-7/8 |
| BW               | in. | mm | 371    | 422    | 384    | 460    | 562    | 613    | 740    | 841    | 968    | 1038   | 1140   | 1232   | 1333   | 1568   | 1673   | 1775   | 1876   |
| Weight (Approx.) | lb  | Kg | 88     | 121    | 115    | 232    | 364    | 507    | 1257   | 1874   | 2867   | 3418   | 3638   | 5072   | 6615   | 9041   | 10143  | 11466  | 13230  |
|                  | lb  | Kg | 40     | 55     | 52     | 105    | 165    | 230    | 570    | 850    | 1300   | 1550   | 1650   | 2300   | 3000   | 4100   | 4600   | 5200   | 6000   |
|                  | lb  | Kg | 44     | 71     | 66     | 143    | 221    | 353    | 970    | 1521   | 2249   | 2690   | 2977   | 4079   | 5292   | 6365   | 7938   | 8820   | 10143  |
|                  | lb  | Kg | 20     | 32     | 30     | 65     | 100    | 160    | 440    | 690    | 1020   | 1220   | 1350   | 1850   | 2400   | 2900   | 3600   | 4000   | 4600   |

# ANSI 1500 CAST STEEL SWING CHECK VALVE

## PRESSURE SEAL COVER

### ■ Features

- End to end dimensions and Wall thicknesses conform to ANSI and API specifications.
- Flanged dimensions; 24 in. and smaller Valves conform to ANSI B16.5.
- 26 in. and larger Valves conform to API 605.
- Lift check valve also available. Data supplied upon request.

Figure No.

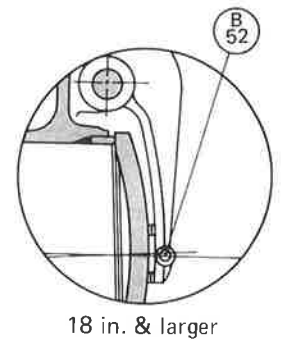
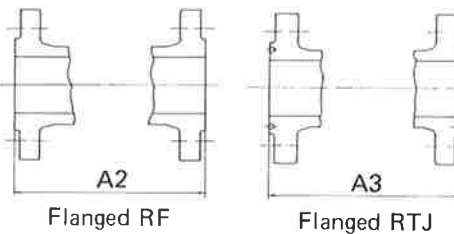
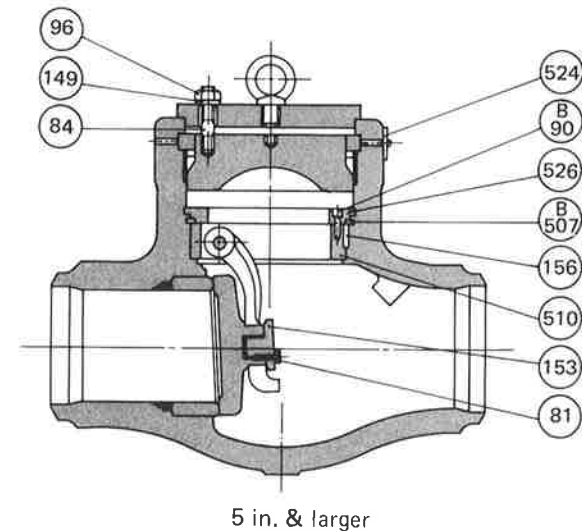
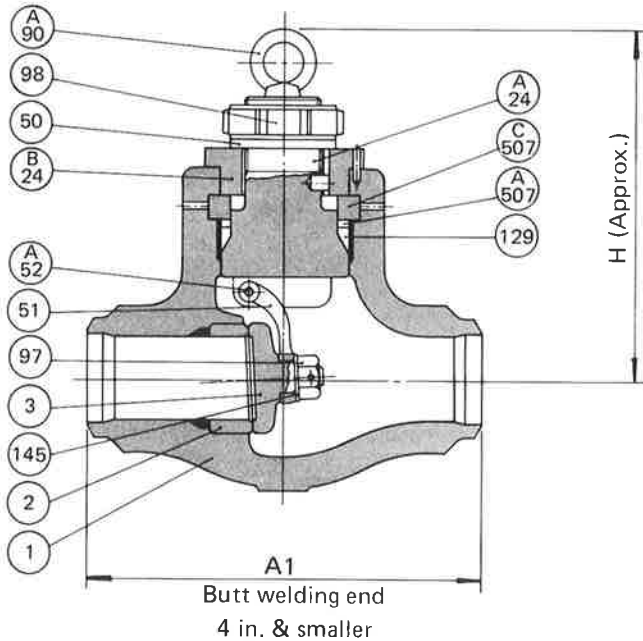
|          |                          |
|----------|--------------------------|
| SC154WC  | 1500 lb Swing Check Weld |
| SC154RC  | 1500 lb Swing Check RF   |
| SC154 JC | 1500 lb Swing Check RTJ  |

## Material Specifications

## Trim No. 5

|      |                |                    |
|------|----------------|--------------------|
| 526  | Plate          | ASTM A105          |
| 524  | Name Plate     | 18Cr-8Ni S. Steel  |
| 510  | Lever Set Ring | ASTM A216 Gr. WCB  |
| 507C | Retainer Ring  | ASTM A182 Gr. F6a  |
| 507B | Spacer Ring    | ASTM A182 Gr. F6a  |
| 507A | Spacer Ring    | ASTM A182 Gr. F6a  |
| 156  | Knock Pin      | 13% Cr. S. Steel   |
| 153  | Disc Plug      | ASTM A182 Gr. F6a  |
| 149  | Spring Washer  | Carbon Steel       |
| 145  | Disc Washer    | 18Cr-8Ni S. Steel  |
| 129  | Gasket         | *4                 |
| 98   | Bonnet Nut     | 13% Cr. S. Steel   |
| 97   | Disc Nut       | 18Cr-8Ni S. Steel  |
| 96   | Stud Bolt Nut  | ASTM A194 Gr. 2H   |
| 90B  | Cap Bolt       | 18Cr-8Ni S. Steel  |
| 90A  | Eye Bolt       | Carbon Steel       |
| 84   | Stud Bolt      | ASTM A193 Gr. B7   |
| 81   | Set Bolt       | 18Cr-8Ni S. Steel  |
| 52B  | Hinge Pin      | ASTM A182 Gr. F6a  |
| 52A  | Hinge Pin      | ASTM A182 Gr. F6a  |
| 51   | Swing Lever    | ASTM A105 *3       |
| 50   | Washer         | 13% Cr. S. Steel   |
| 24B  | Cover Retainer | ASTM A105          |
| 24A  | Cover          | ASTM A105 *2       |
| 3    | Disc           | ASTM A105 + STL *1 |
| 2    | Body Seat Ring | ASTM A105 + STL    |
| 1    | Body           | ASTM A216 Gr. WCB  |

| NO.     | PART NAME       | MATERIAL                       |
|---------|-----------------|--------------------------------|
| Note *1 | 14 in. & larger | ASTM A216 Gr.WCB + STL         |
| *2      | 8 in. & larger  | ASTM A216 Gr.WCB               |
| *3      | 5 in. & larger  | ASTM A216 Gr.WCB               |
| *4      |                 | Soft iron pressure seal gasket |



### Dimensions (in./mm)

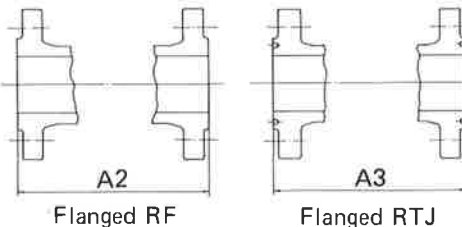
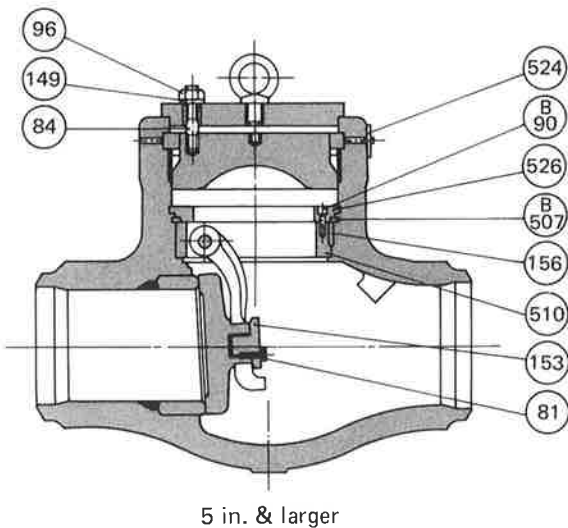
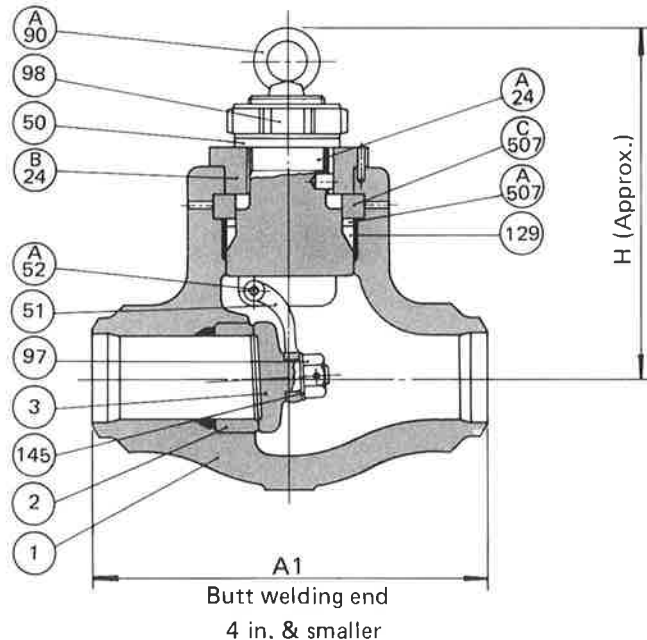
| Norm. Size | 2      | 2-1/2  | 3      | 4      | 5      | 6      | 8      | 10     | 12     | 14     | 16     | 18     | 20     | 24     | 26     | 28     | 30    |
|------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|
| A1         | 8-1/2  | 10     | 12     | 16     | 19     | 22     | 28     | 34     | 39     | 42     | 47     | 60-1/2 | 65-1/2 | 76-1/2 | 76-1/2 | 78     | 750   |
| A2         | 14-1/2 | 16-1/2 | 18-1/2 | 21-1/2 | 26-1/2 | 27-3/4 | 32-3/4 | 39     | 44-1/2 | 49-1/2 | 54-1/2 | 60-1/2 | 65-1/2 | 76-1/2 | 76-1/2 | 78     | 2083  |
| A3         | 14-5/8 | 16-5/8 | 18-5/8 | 21-5/8 | 26-5/8 | 28     | 33-1/8 | 39-3/8 | 45-1/8 | 50-1/4 | 55-3/8 | 61-3/8 | 66-3/8 | 77-5/8 | 77-5/8 | 78     | 2083  |
| H          | 9-1/2  | 10-3/8 | 10-5/8 | 12-1/2 | 15-3/4 | 15-3/4 | 18-7/8 | 23-1/4 | 25-3/8 | 28     | 29-1/2 | 34-5/8 | 37-3/8 | 43-1/4 | 47-1/4 | 55-1/8 | 63    |
| RF         | 88     | 121    | 221    | 309    | 551    | 882    | 1345   | 2315   | 3418   | 4631   | 5733   | 7277   | 9261   | 13230  | 1200   | 1400   | 1600  |
| BW         | 44     | 71     | 88     | 154    | 298    | 617    | 1058   | 1632   | 2426   | 3109   | 3528   | 4631   | 5733   | 7718   | 9261   | 11025  | 13230 |
|            | 20     | 32     | 40     | 70     | 135    | 280    | 480    | 740    | 1100   | 1410   | 1600   | 2100   | 2600   | 3500   | 4200   | 5000   | 6000  |

# ANSI 2500 CAST STEEL SWING CHECK VALVE

## PRESSURE SEAL COVER

### ■ Features

- End to end dimensions and Wall thicknesses conform to ANSI and API specifications.
- Lift check valve also available. Data supplied upon request.



### Figure No.

|         |                          |
|---------|--------------------------|
| SC254WC | 2500 lb Swing Check Weld |
| SC254RC | 2500 lb Swing Check RF   |
| SC254JC | 2500 lb Swing Check RTJ  |

### Material Specifications

### Trim No. 5

|      |                |                    |
|------|----------------|--------------------|
| 526  | Plate          | ASTM A105          |
| 524  | Name Plate     | 18Cr-8Ni S. Steel  |
| 510  | Lever Set Ring | ASTM A216 Gr. WCB  |
| 507C | Retainer Ring  | ASTM A182 Gr. F6a  |
| 507B | Spacer Ring    | ASTM A182 Gr. F6a  |
| 507A | Spacer Ring    | ASTM A182 Gr. F6a  |
| 156  | Knock Pin      | 13% Cr. S. Steel   |
| 153  | Disc Plug      | ASTM A182 Gr. F6a  |
| 149  | Spring Washer  | Carbon Steel       |
| 145  | Disc Washer    | 18Cr-8Ni S. Steel  |
| 129  | Gasket         | *4                 |
| 98   | Bonnet Nut     | 13%Cr. S. Steel    |
| 97   | Disc Nut       | 18Cr-8Ni S. Steel  |
| 96   | Stud Bolt Nut  | ASTM A194 Gr. 2H   |
| 90B  | Cap Bolt       | 18Cr-8Ni S. Steel  |
| 90A  | Eye Bolt       | Carbon Steel       |
| 84   | Stud Bolt      | ASTM A193 Gr. B7   |
| 81   | Set Bolt       | 18Cr-8Ni S. Steel  |
| 52B  | Hinge Pin      | ASTM A182 Gr. F6a  |
| 52A  | Hinge Pin      | ASTM A182 Gr. F6a  |
| 51   | Swing Lever    | ASTM A105 *3       |
| 50   | Washer         | 13%Cr. S. Steel    |
| 24B  | Cover Retainer | ASTM A105          |
| 24A  | Cover          | ASTM A105 *2       |
| 3    | Disc           | ASTM A105 + STL *1 |
| 2    | Body Seat Ring | ASTM A105 + STL    |
| 1    | Body           | ASTM A216 Gr. WCB  |

Note \*1 14 in. & larger ASTM A216 Gr. WCB + STL

\*2 8 in. & larger ASTM A216 Gr. WCB

\*3 5 in. & larger ASTM A216 Gr. WCB

\*4 Soft iron pressure seal gasket

### Dimensions (in./mm)

| Nom. Size | 2      | 2-1/2  | 3      | 4      | 5      | 6      | 8      | 10     | 12     | 14     | 16     | 18     | 20     | 24     |
|-----------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| A1        | 11     | 13     | 14-1/2 | 18     | 21     | 24     | 30     | 36     | 41     | 44     | 49     | 55     | 61     | 68     |
| A2        | 17-3/4 | 20     | 22-3/4 | 26-1/2 | 31-1/4 | 36     | 40-1/4 | 50     | 56     | 61     | 66     | 71     | 76     | 81     |
| A3        | 17-7/8 | 20-1/4 | 23     | 26-7/8 | 31-3/4 | 36-1/2 | 40-7/8 | 50-7/8 | 56-7/8 | 61     | 66     | 71     | 76     | 81     |
| H         | 9-5/8  | 10-3/8 | 10-5/8 | 12-1/2 | 15-3/4 | 15-3/4 | 22     | 24-3/4 | 27-1/2 | 33-7/8 | 35-3/8 | 39-3/8 | 45-1/4 | 55-1/8 |
| RF        | 187    | 260    | 342    | 628    | 1091   | 1654   | 2977   | 4741   | 6615   | 8600   | 10000  | 11000  | 11490  | 14000  |
| BW        | 85     | 118    | 155    | 285    | 495    | 750    | 1350   | 2150   | 3000   | 4020   | 5050   | 6050   | 7000   | 8700   |
|           | 110    | 154    | 187    | 364    | 673    | 1014   | 1985   | 2867   | 3969   | 5402   | 7056   | 8930   | 11025  | 15876  |
|           | 50     | 70     | 85     | 165    | 305    | 460    | 900    | 1300   | 1800   | 2450   | 3200   | 4050   | 5000   | 7200   |

# **TILTING DISC CHECK VALVES**

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## **CLASS 150-300-600**

FLANGED ENDS  
BUTT WELDING ENDS  
TWO PIECE BODY







# ANSI 300 CAST STEEL TILTING CHECK VALVE

## TWO PIECE BODY

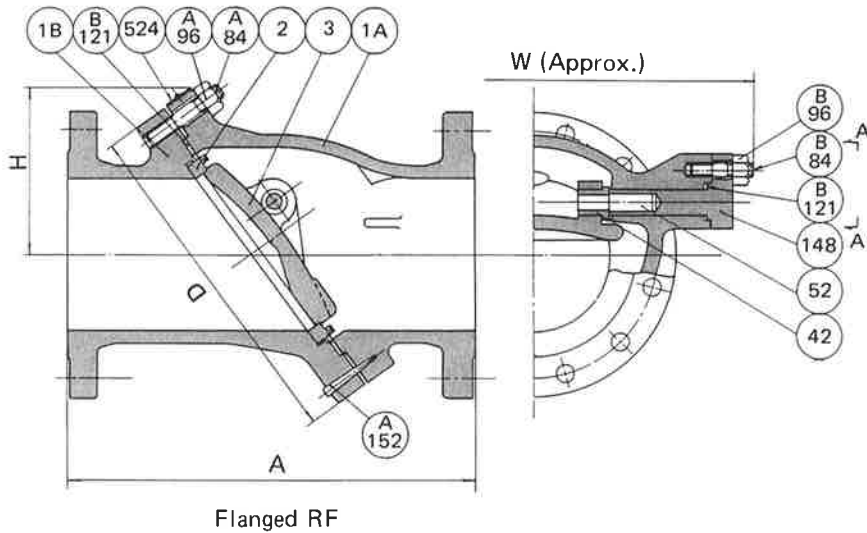
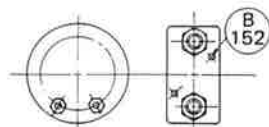


Figure No.

TC030RA 300 lb Tilting RF



12 in. &amp; larger 10 in. &amp; smaller

View A-A'

### ■ Features

- End to end dimensions conform to YONEKI's standard.
- Wall thickness conform to ANSI and API specifications.
- Flange dimensions;  
24 in. and smaller Valves conform to ANSI B16.5.  
26 in. and larger Valves conform to API 605.

| Material Specifications |                | Trim No. 8          |
|-------------------------|----------------|---------------------|
| 524                     | Name Plate     | 18Cr-8Ni S.Steel    |
| 152B                    | Knock Pin      | 13% Cr. S. Steel    |
| 152A                    | Knock Pin      | 13% Cr. S. Steel    |
| 148                     | Cover          | ASTM A105           |
| 142                     | Bush           | ASTM A182 Gr.F6a+HF |
| 121B                    | Cover Gasket   | *2                  |
| 121A                    | Body Gasket    | *2                  |
| 96B                     | Cover Bolt Nut | ASTM A194 Gr. 2H    |
| 96A                     | Body Bolt Nut  | ASTM A194 Gr. 2H    |
| 84B                     | Cover Bolt     | ASTM A193 Gr. B7    |
| 84A                     | Body Bolt      | ASTM A193 Gr. B7    |
| 52                      | Hinge Pin      | ASTM A182 Gr. F6a   |
| 3                       | Disc           | *1                  |
| 2                       | Body Seat Ring | ASTM A105 + STL.    |
| 1B                      | Body           | ASTM A216 Gr. WCB   |
| 1A                      | Body           | ASTM A216 Gr. WCB   |
| NO.                     | PART NAME      | MATERIAL            |

Note \*1 ASTM A216 Gr. WCB + 13% Cr. deposit

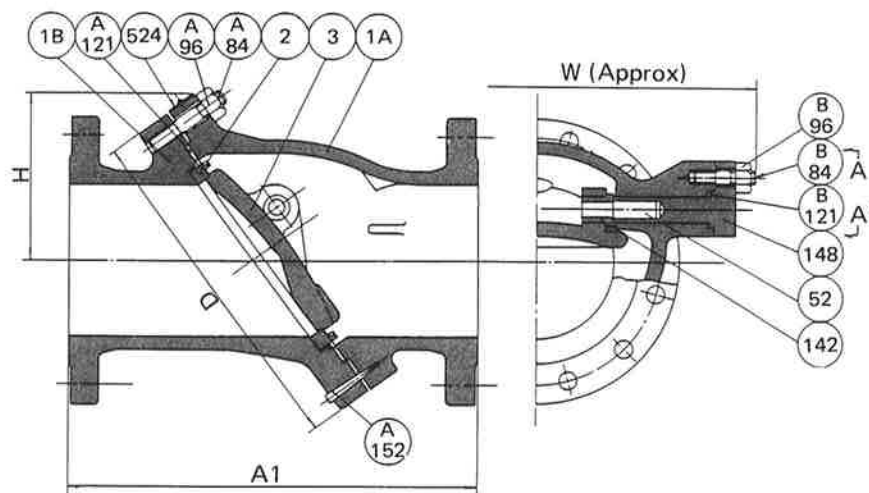
\*2 Spiral wound 304 s. steel asbestos filled

### Dimensions (in./mm)

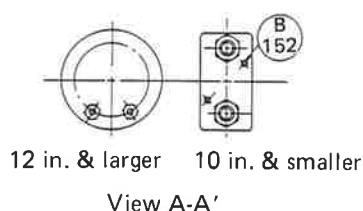
| Nom. Size        | 2      | 2-1/2  | 3      | 4      | 6      | 8      | 10     | 12     | 14     | 16     | 18     | 20     | 24     | 26     | 28     | 30     | 32     | 36    |
|------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|
| A                | 10-7/8 | 11-1/2 | 12-1/2 | 14     | 17-1/2 | 21     | 24-1/2 | 28     | 30     | 33     | 36     | 39     | 45     | 48     | 51     | 54     | 57     | 60    |
| D                | 12-5/8 | 12-5/8 | 12-5/8 | 14-5/8 | 18-1/2 | 22-1/2 | 25     | 27-1/4 | 31-1/2 | 32-5/8 | 35-1/4 | 38-5/8 | 43-1/2 | 46-7/8 | 49-1/2 | 52-3/8 | 55-1/8 | 61    |
| H                | 7-7/8  | 7-7/8  | 7-7/8  | 10-1/4 | 14     | 17-1/2 | 20-7/8 | 23-1/2 | 25-3/4 | 29     | 31-1/4 | 34-7/8 | 39-1/2 | 44-1/2 | 49-1/4 | 53-3/4 | 58-1/4 | 68    |
| Weight (Approx.) | 77     | 99     | 121    | 176    | 243    | 441    | 728    | 992    | 1213   | 1764   | 2426   | 3087   | 3749   | 4520   | 5292   | 6218   | 7938   | 11830 |
|                  | 35     | 45     | 55     | 80     | 110    | 200    | 330    | 450    | 550    | 800    | 1100   | 1400   | 1700   | 2050   | 2400   | 2820   | 3600   | 5365  |

# ANSI 600 CAST STEEL TILTING CHECK VALVE

## TWO PIECE BODY

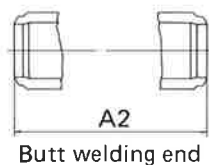


Flanged RF



12 in. &amp; larger 10 in. &amp; smaller

View A-A'



Butt welding end

### ■ Features

- End to end dimensions conform to YONEKI's standard.
- Wall thicknesses conform to ANSI and API specifications.
- Flange dimensions;  
24 in. and smaller Valves conform to ANSI B16.5.  
26 in. and larger Valves conform to API 605.

Figure No.

|         |                     |
|---------|---------------------|
| TC060RA | 600 lb Tilting RF   |
| TC060WA | 600 lb Tilting Weld |

### Material Specifications

### Trim No. 8

| 524  | Name Plate     | 18Cr-8Ni S.Steel     |
|------|----------------|----------------------|
| 152B | Knock Pin      | 13% Cr. S. Steel     |
| 152A | Knock Pin      | 13% Cr. S. Steel     |
| 148  | Cover          | ASTM A105            |
| 142  | Bush           | ASTM A182 Gr. F6a+HF |
| 121B | Cover Gasket   | *2                   |
| 121A | Body Gasket    | *2                   |
| 96B  | Cover Bolt Nut | ASTM A194 Gr. 2H     |
| 96A  | Body Bolt Nut  | ASTM A194 Gr. 2H     |
| 84B  | Cover Bolt     | ASTM A193 Gr. B7     |
| 84A  | Body Bolt      | ASTM A193 Gr. B7     |
| 52   | Hinge Pin      | ASTM A182 Gr. F6a    |
| 3    | Disc           | *1                   |
| 2    | Body Seat Ring | ASTM A105 + STL      |
| 1B   | Body           | ASTM A216 Gr. WCB    |
| 1A   | Body           | ASTM A216 Gr. WCB    |
| NO.  | PART NAME      | MATERIAL             |

Note \*1 ASTM A216 Gr. WCB + 13% Cr. deposit  
\*2 Spiral wound 304 s. steel asbestos filled

### Dimensions (in./mm)

| Nom. Size | in. | mm | 2      | 2-1/2  | 3      | 4      | 6      | 8      | 10     | 12     | 14     | 16     | 18     | 20     | 24     | 26     | 28     | 30     |
|-----------|-----|----|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| A1        | in. | mm | 11-1/2 | 13     | 14     | 17     | 22     | 26     | 31     | 33     | 35     | 39     | 43     | 47     | 55     | 55     | 59     | 59     |
| A2        | in. | mm | 11-1/2 | 13     | 14     | 17     | 22     | 26     | 31     | 33     | 35     | 39     | 43     | 47     | 55     | 55     | 59     | 59     |
| W         | in. | mm | 10-1/4 | 10-1/4 | 12-5/8 | 16-1/8 | 20-5/8 | 23-5/8 | 25-5/8 | 27-5/8 | 31-1/2 | 35-5/8 | 37     | 41-3/8 | 48     | 52-3/8 | 59     | 65     |
| D         | in. | mm | 8-5/8  | 10-1/4 | 10-1/4 | 12-5/8 | 15-3/4 | 19-1/4 | 20-1/2 | 23-5/8 | 27-5/8 | 31-3/8 | 33-1/8 | 37     | 44-5/8 | 46-1/2 | 53-1/8 | 60-1/4 |
| H         | in. | mm | 4-3/8  | 5-1/8  | 5-1/8  | 6-1/2  | 8-1/8  | 9-5/8  | 11-1/4 | 13     | 14-1/4 | 14-3/4 | 17-3/8 | 18-1/2 | 22     | 22-7/8 | 24-3/8 | 26     |
| RF        | lb  | Kg | 88     | 110    | 154    | 232    | 441    | 739    | 1069   | 1555   | 1995   | 2767   | 3638   | 4520   | 5623   | 6725   | 8048   | 9404   |
| BW        | lb  | Kg | 40     | 50     | 70     | 105    | 200    | 335    | 485    | 705    | 905    | 1255   | 1650   | 2050   | 2550   | 3050   | 3650   | 4265   |
|           | lb  | Kg | 66     | 88     | 110    | 154    | 287    | 507    | 617    | 1036   | 1422   | 1940   | 2536   | 3308   | 3969   | 5513   | 6615   | 7607   |
|           | lb  | Kg | 30     | 40     | 50     | 70     | 130    | 230    | 280    | 470    | 645    | 880    | 1150   | 1500   | 1800   | 2500   | 3000   | 3450   |



# TILTING DISC CHECK VALVES

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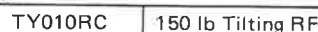
## CLASS 150-300-600

FLANGED ENDS  
BUTT WELDING ENDS

YONEKI TYPE ONE PIECE BODY







Note \*1 ASTM A216 Gr. WCB + 13% Cr. deposit  
\*2 Spiral wound 304 s. steel asbestos filled  
\*3 TFE impregnated asbestos braid-over-braid  
packing & TFE sheet

- End to end dimensions conform to YONEKI's standard.
- Wall thicknesses conform to ANSI and API specifications.
- Flange dimensions;  
24 in. and smaller Valves conform to ANSI B16.5.  
26 in. and larger Valves conform to API 605.

| Nom. Size           | in.<br>mm | 12<br>300     | 14<br>350     | 16<br>400     | 18<br>450     | 20<br>500     | 24<br>600     | 26<br>650     | 28<br>700      | 30<br>750      | 32<br>800     | 36<br>900     | 40<br>1000     | 42<br>1050     | 48<br>1200     | 52<br>1300    | 54<br>1350     |
|---------------------|-----------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|----------------|----------------|---------------|---------------|----------------|----------------|----------------|---------------|----------------|
| A                   | in.<br>mm | 14<br>356     | 15<br>381     | 16<br>406     | 17<br>432     | 18<br>457     | 20<br>508     | 22<br>559     | 24<br>610      | 28<br>711      | 32<br>811     | 36<br>911     | 40<br>1011     | 42<br>1111     | 48<br>1211     | 52<br>1311    | 54<br>1411     |
| B1                  | in.<br>mm | 30<br>760     | 30<br>760     | 31-1/8<br>790 | 32-1/2<br>825 | 35-1/2<br>900 | 37<br>940     | 40<br>1015    | 41-3/4<br>1060 | 43-1/2<br>1105 | 45<br>1140    | 46<br>1170    | 49-1/4<br>1250 | 51-1/4<br>1300 | 55-3/8<br>1405 | 57<br>1450    | 61-3/4<br>1570 |
| B2                  | in.<br>mm | 10-5/8<br>270 | 11-5/8<br>295 | 12-3/4<br>325 | 14<br>355     | 15-1/8<br>385 | 17-1/2<br>445 | 18-3/4<br>475 | 19-7/8<br>505  | 21<br>535      | 22-5/8<br>575 | 23-7/8<br>605 | 24-7/8<br>630  | 27<br>685      | 30-3/4<br>780  | 32-3/4<br>830 | 33-1/2<br>850  |
| L                   | in.<br>mm | 11-7/8<br>300 | 11-7/8<br>300 | 13-7/8<br>350 | 13-7/8<br>350 | 17-3/4<br>450 | 19-3/4<br>500 | 19-3/4<br>500 | 19-3/4<br>500  | 21-3/4<br>550  | 23-5/8<br>600 | 27-5/8<br>700 | 27-5/8<br>700  | 27-5/8<br>700  | 27-5/8<br>700  | 31-1/2<br>800 | 31-1/2<br>800  |
| H                   | in.<br>mm | 12<br>305     | 13<br>330     | 13-7/8<br>350 | 15<br>380     | 16-1/8<br>410 | 19-3/4<br>500 | 20-1/2<br>520 | 23-1/4<br>590  | 24-1/4<br>615  | 25<br>635     | 27<br>685     | 29-1/8<br>740  | 29-3/4<br>755  | 34-7/8<br>885  | 38-3/8<br>975 | 41-3/8<br>1050 |
| Weight<br>(Approx.) | lb<br>Kg  | 441<br>200    | 573<br>260    | 794<br>360    | 937<br>425    | 1157<br>525   | 1411<br>640   | 1654<br>750   | 1874<br>850    | 2095<br>950    | 2426<br>1100  | 3087<br>1400  | 3749<br>1700   | 4190<br>1900   | 5733<br>2600   | 7056<br>3200  | 7938<br>3600   |

# ANSI 300 CAST STEEL TILTING CHECK VALVE

## YONEKI TYPE (ONE PIECE BODY)

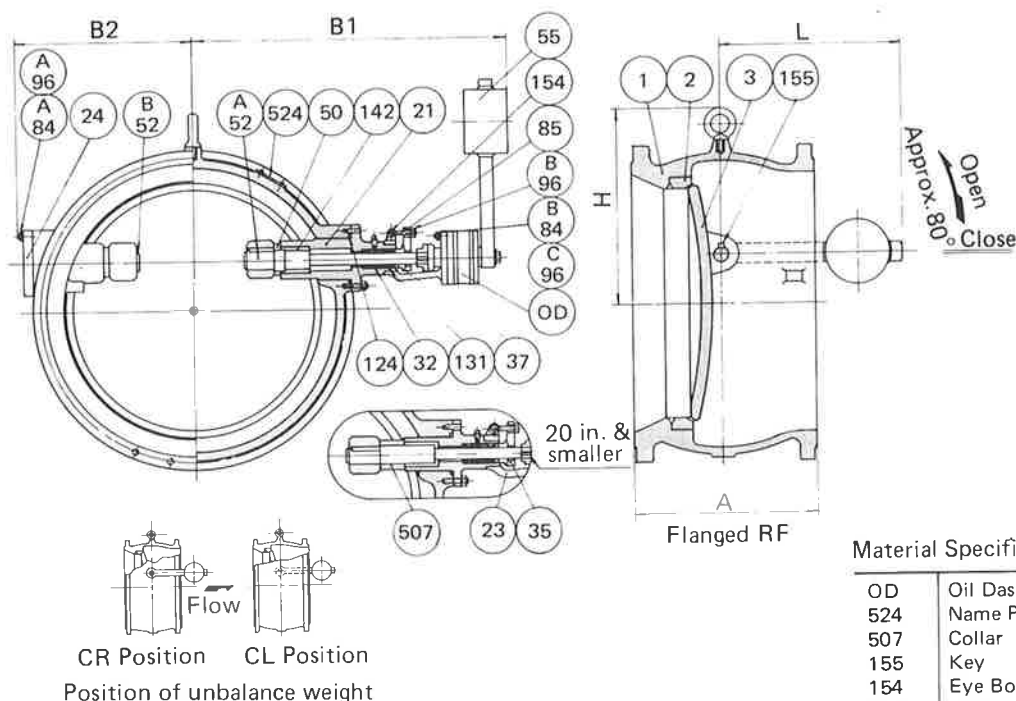


Figure No.

|         |                   |
|---------|-------------------|
| TY030RC | 300 lb Tilting RF |
|---------|-------------------|

## Material Specifications

## Trim No. 8

| OD  | Oil Dashpot     | Carbon Steel         |
|-----|-----------------|----------------------|
| 524 | Name Plate      | 18Cr-8Ni S. Steel    |
| 507 | Collar          | ASTM A182 Gr. F6a    |
| 155 | Key             | Carbon Steel         |
| 154 | Eye Bolt Pin    | 13% Cr. S. Steel     |
| 142 | Bush            | ASTM A182 Gr. F6a+HF |
| 131 | Packing         | *3                   |
| 124 | Gasket          | *2                   |
| 96C | Yoke Bolt Nut   | ASTM A194 Gr. 2H     |
| 96B | Eye Bolt Nut    | ASTM A194 Gr. 2H     |
| 96A | Bonnet Bolt Nut | ASTM A194 Gr. 2H     |
| 85  | Eye Bolt        | ASTM A193 Gr. B7     |
| 84B | Yoke Bolt       | ASTM A193 Gr. B7     |
| 84A | Bonnet Bolt     | ASTM A193 Gr. B7     |
| 55  | Weight          | Carbon Steel         |
| 52B | Hinge Pin       | ASTM A182 Gr. F6a    |
| 52A | Hinge Pin       | ASTM A182 Gr. F6a+HF |
| 50  | Washer          | ASTM A182 Gr. F6a    |
| 37  | Gland           | ASTM A182 Gr. F6a    |
| 35  | Gland Flange    | Carbon Steel         |
| 32  | Lantern Ring    | ASTM A182 Gr. F6a    |
| 24  | Cover           | ASTM A216 Gr. WCB    |
| 23  | Yoke            | ASTM A216 Gr. WCB    |
| 21  | Bonnet          | ASTM A216 Gr. WCB    |
| 3   | Disc            | *1                   |
| 2   | Body Seat Ring  | ASTM A105 + STL      |
| 1   | Body            | ASTM A216 Gr. WCB    |
| NO. | PART NAME       | MATERIAL             |

- Note \*1 ASTM A216 Gr. WCB + 13% Cr. deposit  
 \*2 Spiral wound 304 s. steel asbestos filled  
 \*3 TFE impregnated asbestos braid-over-braid packing & TFE sheet

## ■ Features

- End to end dimensions conform to YONEKI's standard.
- Wall thicknesses conform to ANSI and API specifications.
- Flange dimensions;  
 24 in. and smaller Valves conform to ANSI B16.5.  
 26 in. and larger Valves conform to API 605.

## Dimensions (in./mm)

| Nom Size         | in. | mm | 12     | 14     | 16     | 18     | 20     | 24     | 26     | 28     | 30     | 32     | 36     | 40     | 42     | 48     | 52     | 54     |
|------------------|-----|----|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| A                | in. | mm | 14     | 15     | 16     | 17     | 18     | 20     | 22     | 24     | 24     | 28     | 28     | 28     | 28     | 29-1/2 | 33-1/2 | 37-3/8 |
| B1               | in. | mm | 356    | 381    | 406    | 432    | 457    | 508    | 559    | 610    | 610    | 711    | 711    | 711    | 711    | 750    | 850    | 950    |
| B2               | in. | mm | 29-1/2 | 31     | 31-1/8 | 32-1/2 | 36-7/8 | 37-1/4 | 40     | 41-3/4 | 43-3/8 | 46-1/2 | 52     | 56     | 59-7/8 | 67     | 72     | 74-3/4 |
| L                | in. | mm | 750    | 785    | 790    | 825    | 935    | 945    | 1015   | 1060   | 1100   | 1180   | 1320   | 1420   | 1520   | 1700   | 1830   | 1900   |
| H                | in. | mm | 10-5/8 | 11-5/8 | 12-3/4 | 14     | 15-1/8 | 17-1/2 | 18-3/4 | 19-7/8 | 21     | 22-1/4 | 24-3/8 | 28-3/8 | 29-1/2 | 33-1/8 | 36-1/4 | 37-1/2 |
| Weight (Approx.) | lb  | Kg | 66.2   | 79.4   | 101.4  | 119.1  | 149.9  | 183.0  | 220.5  | 253.6  | 286.7  | 319.7  | 385.9  | 474.1  | 529.2  | 705.6  | 826.9  | 904.1  |
|                  |     |    | 300    | 360    | 460    | 540    | 680    | 830    | 1000   | 1150   | 1300   | 1450   | 1750   | 2150   | 2400   | 3200   | 3750   | 4100   |

# ANSI 600 CAST STEEL TILTING CHECK VALVE

## YONEKI TYPE (ONE PIECE BODY)

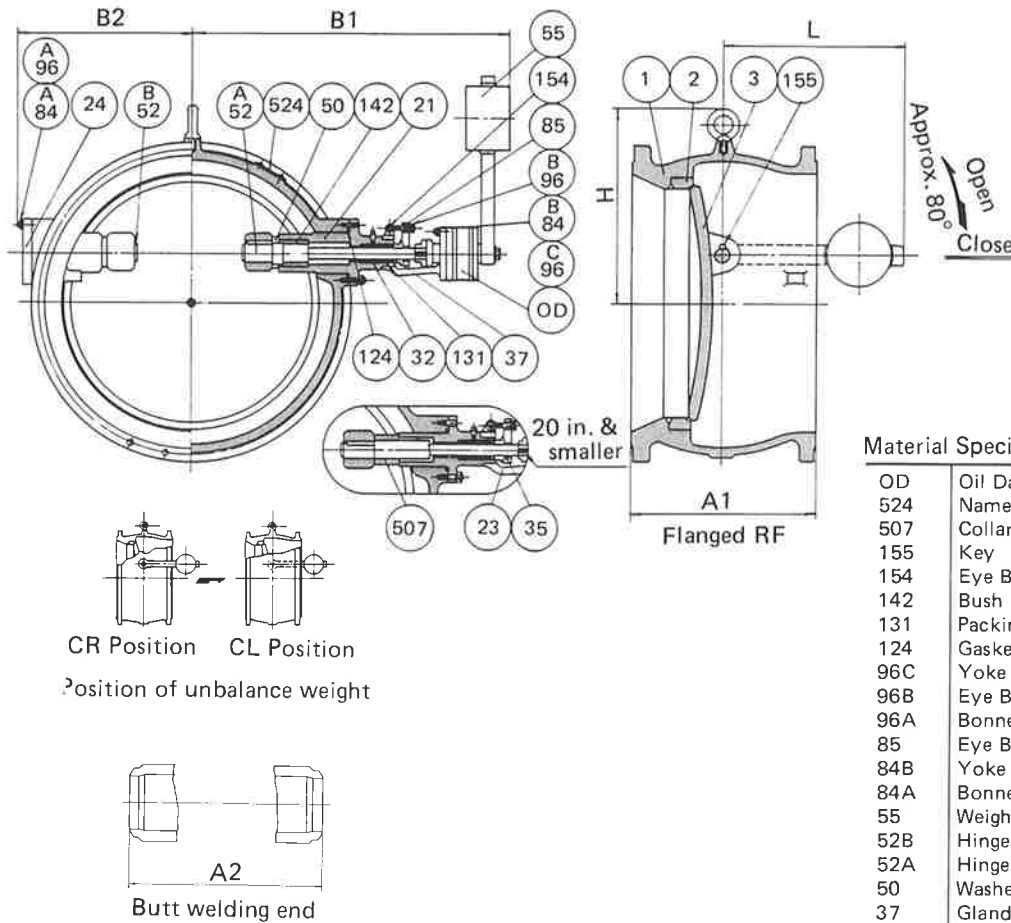


Figure No.

|         |                     |
|---------|---------------------|
| TY060RC | 600 lb Tilting RF   |
| TY060WC | 600 lb Tilting Weld |

## Material Specifications Trim No. 8

|     |                 |                      |
|-----|-----------------|----------------------|
| OD  | Oil Dashpot     | Carbon Steel         |
| 524 | Name Plate      | 18Cr-8Ni S. Steel    |
| 507 | Collar          | ASTM A182 Gr. F6a    |
| 155 | Key             | Carbon Steel         |
| 154 | Eye Bolt Pin    | 13% Cr. S. Steel     |
| 142 | Bush            | ASTM A182 Gr. F6a+HF |
| 131 | Packing         | *3                   |
| 124 | Gasket          | *2                   |
| 96C | Yoke Bolt Nut   | ASTM A194 Gr. 2H     |
| 96B | Eye Bolt Nut    | ASTM A194 Gr. 2H     |
| 96A | Bonnet Bolt Nut | ASTM A194 Gr. 2H     |
| 85  | Eye Bolt        | ASTM A193 Gr. B7     |
| 84B | Yoke Bolt       | ASTM A193 Gr. B7     |
| 84A | Bonnet Bolt     | ASTM A193 Gr. B7     |
| 55  | Weight          | Carbon Steel         |
| 52B | Hinge Pin       | ASTM A182 Gr. F6a    |
| 52A | Hinge Pin       | ASTM A182 Gr. F6a+HF |
| 50  | Washer          | ASTM A182 Gr. F6a    |
| 37  | Gland           | ASTM A182 Gr. F6a    |
| 35  | Gland Flange    | Carbon Steel         |
| 32  | Lantern Ring    | ASTM A182 Gr. F6a    |
| 24  | Cover           | ASTM A216 Gr. WCB    |
| 23  | Yoke            | ASTM A216 Gr. WCB    |
| 21  | Bonnet          | ASTM A216 Gr. WCB    |
| 3   | Disc            | *1                   |
| 2   | Body Seat Ring  | ASTM A105 + STL      |
| 1   | Body            | ASTM A216 Gr. WCB    |

Note \*1 ASTM A216 Gr. WCB + 13% Cr. deposit  
 \*2 Spiral wound 304 s. steel asbestos filled  
 \*3 TFE impregnated asbestos braid-over-braid packing & TFE sheet

## ■ Features

- End to end dimensions conform to YONEKI's standard.
- Wall thicknesses conform to ANSI and API specifications.
- Flange dimensions;  
 24 in. and smaller Valves conform to ANSI B16.5.  
 26 in. and larger Valves conform to API 605.

## Dimensions (in./mm)

| Nom. Size | in. | mm | 12     | 14     | 16     | 18     | 20     | 24     | 26     | 28     | 30     | 32     | 36     | 40     |
|-----------|-----|----|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| A1        | in. | mm | 300    | 350    | 400    | 450    | 500    | 600    | 650    | 700    | 750    | 800    | 900    | 1000   |
| A2        | in. | mm | 14     | 15     | 16     | 17     | 18     | 20     | 22     | 24     | 26     | 28     | 30     | 32     |
| B1        | in. | mm | 356    | 381    | 406    | 432    | 457    | 508    | 559    | 610    | 661    | 711    | 761    | 811    |
| B2        | in. | mm | 14     | 15     | 16     | 17     | 18     | 20     | 22     | 24     | 26     | 28     | 30     | 32     |
| L         | in. | mm | 356    | 381    | 406    | 432    | 457    | 508    | 559    | 610    | 661    | 711    | 761    | 811    |
| H         | in. | mm | 32-3/4 | 34-5/8 | 35-7/8 | 37     | 42-1/8 | 43-3/8 | 45-1/4 | 45-1/4 | 45-1/4 | 52-5/8 | 52-5/8 | 52-5/8 |
| RF        | in. | mm | 830    | 880    | 910    | 940    | 1070   | 1100   | 1150   | 1150   | 1150   | 1335   | 1335   | 1335   |
| BW        | in. | mm | 11-7/8 | 12-5/8 | 13-7/8 | 15     | 16-1/2 | 19-3/8 | 23-5/8 | 23-5/8 | 23-5/8 | 27-5/8 | 27-5/8 | 30     |
|           | in. | mm | 300    | 320    | 350    | 380    | 420    | 490    | 600    | 600    | 600    | 700    | 700    | 760    |
|           | in. | mm | 13-7/8 | 17-3/4 | 21-5/8 | 23-5/8 | 25-5/8 | 27-5/8 | 27-5/8 | 27-5/8 | 27-5/8 | 27-5/8 | 27-5/8 | 27-5/8 |
|           | in. | mm | 350    | 450    | 550    | 600    | 650    | 700    | 700    | 700    | 700    | 700    | 700    | 700    |
|           | in. | mm | 13-3/8 | 14-3/8 | 14-3/4 | 16     | 19     | 21-1/4 | 23     | 24     | 24-7/8 | 28-1/8 | 32-1/4 | 35-1/2 |
|           | in. | mm | 340    | 365    | 375    | 405    | 480    | 540    | 585    | 610    | 630    | 715    | 820    | 900    |
|           | lb  | Kg | 794    | 1047   | 1367   | 1720   | 2249   | 3197   | 4079   | 5027   | 5910   | 6880   | 8930   | 10870  |
|           | lb  | Kg | 360    | 475    | 620    | 780    | 1020   | 1450   | 1850   | 2280   | 2680   | 3120   | 4050   | 4930   |
|           | lb  | Kg | 353    | 507    | 640    | 794    | 1058   | 1588   | 2056   | 2538   | 3020   | 3500   | 4470   | 5490   |
|           | lb  | Kg | 160    | 230    | 290    | 360    | 480    | 720    | 1250   | 1650   | 1900   | 2400   | 2800   | 3400   |

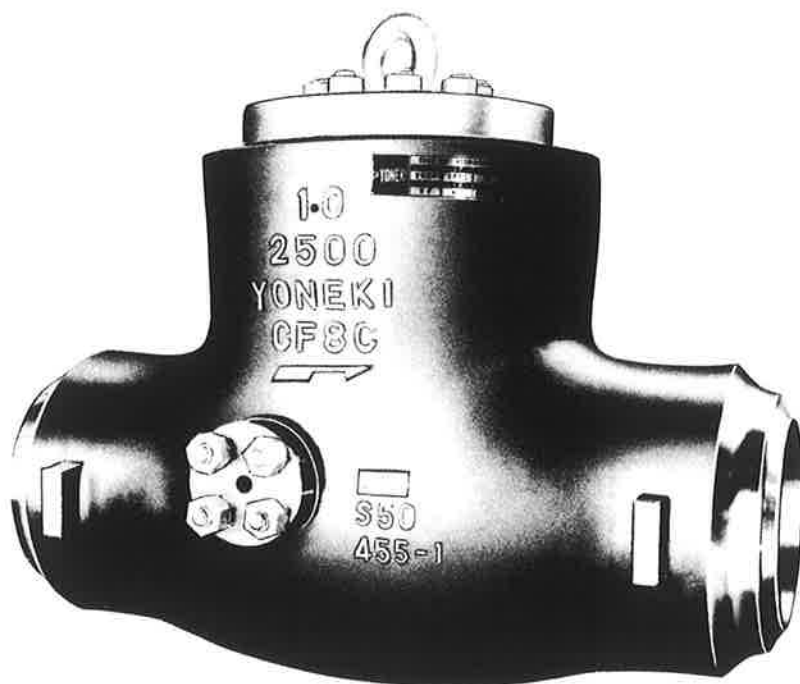


# TILTING DISC CHECK VALVES

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## CLASS 900-1500-2500

FLANGED ENDS  
BUTT WELDING ENDS  
PRESSURE SEAL COVER





# ANSI 900 CAST STEEL TILTING CHECK VALVE

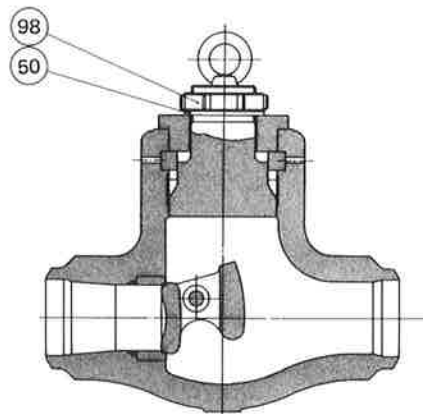
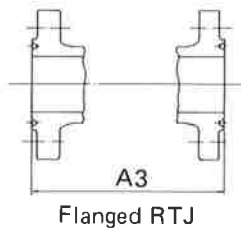
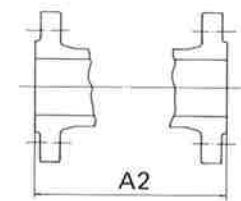
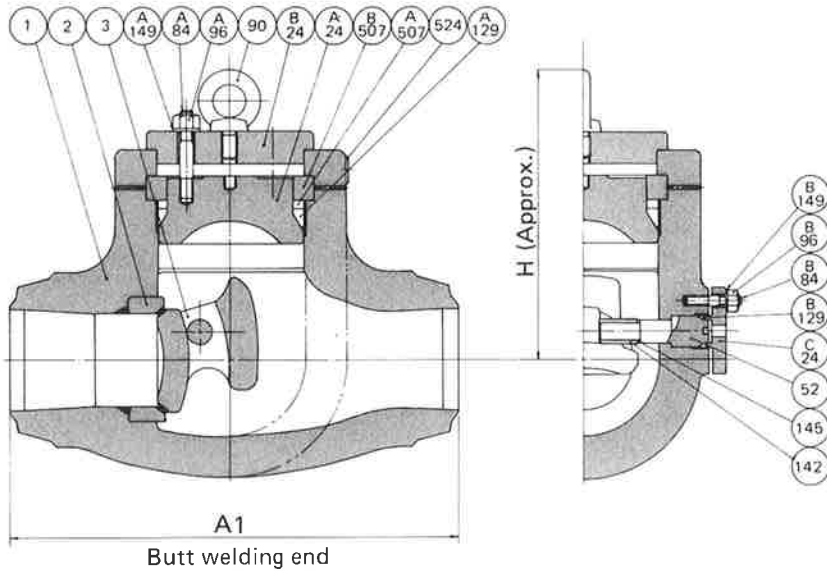
## PRESSURE SEAL COVER

Figure No.

|          |                   |
|----------|-------------------|
| TC094WC  | 900 lb Check Weld |
| TC094 RC | 900 lb Check RF   |
| TC094 JC | 900 lb Check RTJ  |

## ■ Features

- End to end dimensions and Wall thicknesses conform to ANSI and API specifications.



## Material Specification

## Trim No. 5

| 524  | Name Plate            | 18Cr-8Ni S. Steel   |
|------|-----------------------|---------------------|
| 507B | Retainer Ring         | ASTM A182 Gr. F6a   |
| 507A | Spacer Ring           | ASTM A182 Gr. F6a   |
| 149B | Spring Washer         | Carbon Steel        |
| 149A | Spring Washer         | Carbon Steel        |
| 145  | Washer                | 13% Cr. S. Steel    |
| 142  | Bush                  | 13% Cr. S. Steel    |
| 129B | Hinge Pin Gasket      | *2                  |
| 129A | Cover Gasket          | *2                  |
| 98   | Bonnet Nut            | 13% Cr. S. Steel    |
| 96B  | Stud Bolt Nut         | ASTM A194 Gr. 2H    |
| 96A  | Stud Bolt Nut         | ASTM A194 Gr. 2H    |
| 90   | Eye Bolt              | Carbon Steel        |
| 84B  | Stud Bolt (Hinge Pin) | ASTM A193 Gr. B7    |
| 84A  | Stud Bolt (Cover)     | ASTM A193 Gr. B7    |
| 52   | Hinge Pin             | ASTM A182 Gr. F6a   |
| 50   | Washer                | 13% Cr. S. Steel    |
| 24C  | Cover (Hinge Pin)     | ASTM A105           |
| 24B  | Cover Retainer        | ASTM A105           |
| 24A  | Cover                 | ASTM A105 * 1       |
| 3    | Disc                  | ASTM A216 WCB + STL |
| 2    | Body Seat Ring        | ASTM A105 + STL     |
| 1    | Body                  | ASTM A216 Gr. WCB   |
| NO.  | PART NAME             | MATERIAL            |

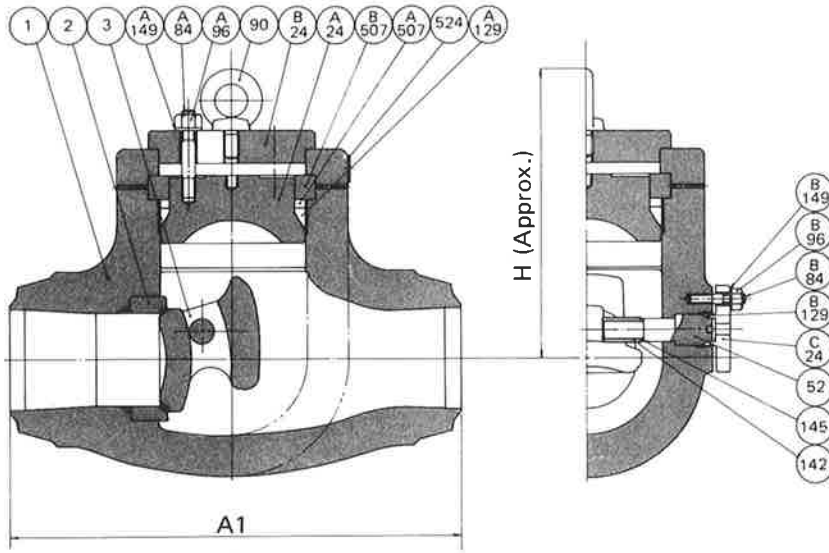
Note \*1 8 in. & larger ASTM A216 Gr. WCB  
\*2 Soft iron pressure seal gasket

## Dimensions (in./mm)

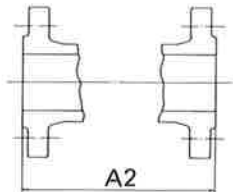
| Nom. Size        | in. | 2      | 2-1/2  | 3      | 4      | 5      | 6      | 8      | 10     | 12     | 14     | 16     | 18     | 20     | 24     | 26     | 28     | 30    |
|------------------|-----|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|
| A1               | in. | 8-1/2  | 10     | 12     | 14     | 17     | 20     | 26     | 31     | 36     | 39     | 43     | 48     | 52     | 61     | 65     | 70     | 800   |
|                  | mm  | 216    | 254    | 305    | 356    | 432    | 508    | 660    | 787    | 914    | 991    | 1092   | 1219   | 1321   | 1549   | 1600   | 1702   | 1803  |
| A2               | in. | 14-1/2 | 16-1/2 | 15     | 18     | 22     | 24     | 29     | 33     | 38     | 40-1/2 | 44-1/2 | 48     | 52     | 61     | -      | -      | -     |
|                  | mm  | 368    | 419    | 381    | 457    | 559    | 610    | 737    | 838    | 965    | 1029   | 1130   | 1219   | 1321   | 1549   | -      | -      | -     |
| A3               | in. | 14-5/8 | 16-5/8 | 15-1/8 | 18-1/8 | 22-1/8 | 24-1/8 | 29-1/8 | 33-1/8 | 38-1/8 | 40-7/8 | 44-7/8 | 48-1/2 | 52-1/2 | 61-3/4 | -      | -      | -     |
|                  | mm  | 371    | 422    | 384    | 460    | 562    | 613    | 740    | 841    | 968    | 1038   | 1140   | 1232   | 1333   | 1568   | -      | -      | -     |
| H                | in. | 9      | 10-1/4 | 8-1/8  | 11     | 13-1/4 | 13-1/4 | 17-3/8 | 19-1/4 | 21-1/4 | 23     | 26     | 29-5/8 | 33     | 39-3/8 | 41-3/8 | 43-3/4 | 46    |
|                  | mm  | 229    | 260    | 206    | 280    | 337    | 337    | 441    | 489    | 540    | 584    | 660    | 753    | 838    | 1000   | 1050   | 1111   | 1168  |
| Weight (Approx.) | RF  | lb     | 119    | 154    | 194    | 260    | 441    | 507    | 1213   | 1874   | 2690   | 3726   | 5976   | 6681   | 8335   | 11907  | -      | -     |
|                  |     | Kg     | 54     | 70     | 88     | 118    | 200    | 230    | 550    | 850    | 1220   | 1690   | 2710   | 3030   | 3780   | 5400   | -      | -     |
| BW               | lb  | 66     | 102    | 108    | 205    | 331    | 353    | 860    | 1323   | 1985   | 2646   | 3528   | 4410   | 5513   | 7938   | 9195   | 10695  | 13230 |
|                  | Kg  | 30     | 46     | 49     | 93     | 150    | 160    | 390    | 600    | 900    | 1200   | 1600   | 2000   | 2500   | 3600   | 4170   | 4850   | 6000  |

# ANSI 1500 CAST STEEL TILTING CHECK VALVE

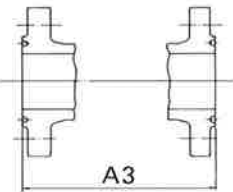
## PRESSURE SEAL COVER



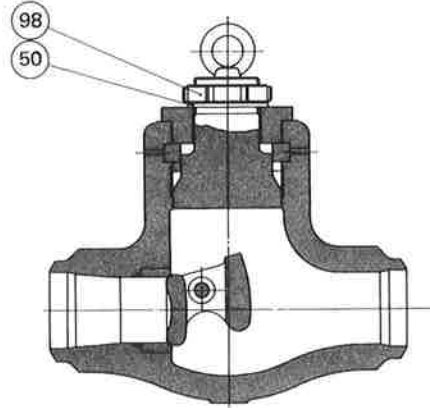
Butt welding end



Flanged RF



Flanged RTJ



2 in. &amp; 2-1/2 in.

Figure No.

|         |                    |
|---------|--------------------|
| TC154WC | 1500 lb Check Weld |
| TC154RC | 1500 lb Check RF   |
| TC154JC | 1500 lb Check RTJ  |

## ■ Features

- End to end dimensions and Wall thicknesses conform to ANSI and API specifications.

## Material Specification Trim No. 5

| 524  | Name Plate           | 18Cr-8Ni S. Steel    |
|------|----------------------|----------------------|
| 507B | Retainer Ring        | ASTM A182 Gr.F6a     |
| 507A | Spacer Ring          | ASTM A182 Gr.F6a     |
| 149B | Spring Washer        | Carbon Steel         |
| 149A | Spring Washer        | Carbon Steel         |
| 145  | Washer               | 13% Cr. S. Steel     |
| 142  | Bush                 | 13% Cr. S. Steel     |
| 129B | Hinge Pin Gasket     | *2                   |
| 129A | Cover Gasket         | *2                   |
| 98   | Bonnet Nut           | 13% Cr. S.Steel      |
| 96B  | Stud Bolt Nut        | ASTM A194 Gr.2H      |
| 96A  | Stud Bolt Nut        | ASTM A194 Gr.2H      |
| 90   | Eye Bolt             | Carbon Steel         |
| 84B  | Stud Bolt(Hinge Pin) | ASTM A193 Gr.B7      |
| 84A  | Stud Bolt (Cover)    | ASTM A193 Gr.B7      |
| 52   | Hinge Pin            | ASTM A182 Gr.F6a     |
| 50   | Washer               | 13% Cr. S.Steel      |
| 24C  | Cover(Hinge Pin)     | ASTM A105            |
| 24B  | Cover Retainer       | ASTM A105            |
| 24A  | Cover                | ASTM A105 *1         |
| 3    | Disc                 | ASTM A216 Gr.WCB+STL |
| 2    | Body Seat Ring       | ASTM A105+STL        |
| 1    | Body                 | ASTM A216 Gr.WCB     |
| NO.  | PART NAME            | MATERIAL             |

Note \*1 8 in. &amp; larger ASTM A216 Gr. WCB

\*2 Soft iron pressure seal gasket

## Dimensions (in./mm)

| Nom. Size | in. | 2      | 2-1/2  | 3      | 4      | 5      | 6      | 8      | 10     | 12     | 14     | 16     | 18     | 20     | 24     |
|-----------|-----|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| A1        | in. | 8-1/2  | 10     | 12     | 16     | 19     | 22     | 28     | 34     | 39     | 42     | 47     | 53     | 58     | 64     |
|           | mm  | 216    | 254    | 305    | 406    | 483    | 559    | 711    | 864    | 991    | 1067   | 1194   | 1346   | 1473   | 1626   |
| A2        | in. | 14-1/2 | 16-1/2 | 18-1/2 | 21-1/2 | 26-1/2 | 27-3/4 | 32-3/4 | 39     | 44-1/2 | 49-1/2 | 54-1/2 | 60-1/2 | 65-1/2 | 76-1/2 |
|           | mm  | 368    | 419    | 470    | 546    | 673    | 705    | 832    | 991    | 1130   | 1257   | 1384   | 1537   | 1664   | 1943   |
| A3        | in. | 14-5/8 | 16-5/8 | 18-5/8 | 21-5/8 | 26-5/8 | 28     | 33-1/8 | 39-3/8 | 45-1/8 | 50-1/4 | 55-3/8 | 61-3/8 | 66-3/8 | 77-5/8 |
|           | mm  | 371    | 422    | 473    | 549    | 676    | 711    | 841    | 1000   | 1146   | 1276   | 1407   | 1559   | 1686   | 1972   |
| H         | in. | 9      | 10-1/4 | 8-1/8  | 13-1/8 | 13-7/8 | 14-1/4 | 18-3/8 | 21-1/2 | 25-1/4 | 30-1/8 | 33     | 37-3/8 | 39-3/8 | 46-1/2 |
|           | mm  | 229    | 260    | 206    | 333    | 353    | 362    | 467    | 546    | 641    | 765    | 838    | 950    | 1000   | 1181   |
| RF        | lb  | 119    | 154    | 232    | 393    | 794    | 864    | 1323   | 2161   | 3418   | 4631   | 5733   | 7276   | 9261   | 13340  |
|           | Kg  | 54     | 70     | 105    | 178    | 360    | 392    | 600    | 980    | 1550   | 2100   | 2600   | 3300   | 4200   | 6050   |
| BW        | lb  | 66     | 102    | 143    | 298    | 551    | 618    | 1058   | 1720   | 2426   | 3307   | 4410   | 5513   | 6747   | 10584  |
|           | Kg  | 30     | 46     | 65     | 135    | 250    | 280    | 480    | 780    | 1100   | 1500   | 2000   | 2500   | 3060   | 4800   |

# ANSI 2500 CAST STEEL TILTING CHECK VALVE

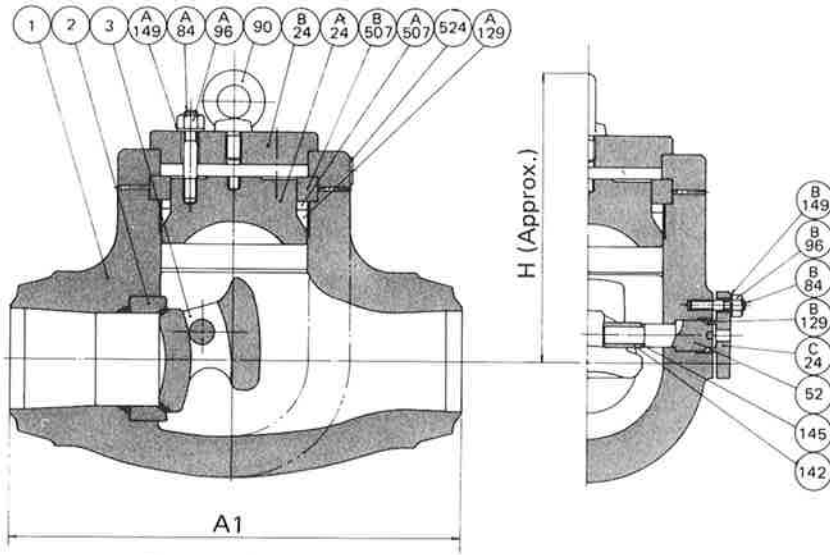
## PRESSURE SEAL COVER

Figure No.

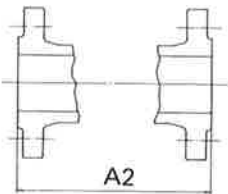
|          |                    |
|----------|--------------------|
| TC254WC  | 2500 lb Check Weld |
| TC254 RC | 2500 lb Check RF   |
| TC254 JC | 2500 lb Check RTJ  |

## ■ Features

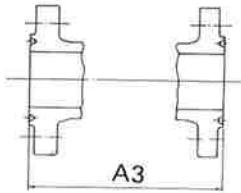
- End to end dimensions and Wall thicknesses conform to ANSI and API specifications.



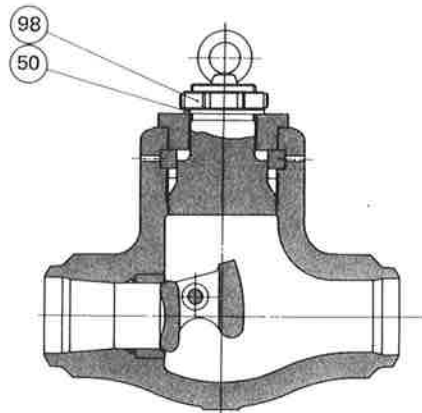
Butt welding end



Flanged RF



Flanged RTJ



2 in. &amp; 2-1/2 in.

## Material Specification Trim No. 5

| NO.  | PART NAME             | MATERIAL              |
|------|-----------------------|-----------------------|
| 524  | Name Plate            | 18Cr-8Ni S. Steel     |
| 507B | Retainer Ring         | ASTM A182 Gr. F6a     |
| 507A | Spacer Ring           | ASTM A182 Gr. F6a     |
| 149B | Spring Washer         | Carbon Steel          |
| 149A | Spring Washer         | Carbon Steel          |
| 145  | Washer                | 13% Cr. S. Steel      |
| 142  | Bush                  | 13% Cr. S. Steel      |
| 129B | Hinge Pin Gasket      | *2                    |
| 129A | Cover Gasket          | *2                    |
| 98   | Bonnet Nut            | 13% Cr. S. Steel      |
| 96B  | Stud Bolt Nut         | ASTM A194 Gr. 2H      |
| 96A  | Stud Bolt Nut         | ASTM A194 Gr. 2H      |
| 90   | Eye Bolt              | Carbon Steel          |
| 84B  | Stud Bolt (Hinge Pin) | ASTM A193 Gr. B7      |
| 84A  | Stud Bolt (Cover)     | ASTM A193 Gr. B7      |
| 52   | Hinge Pin             | ASTM A182 Gr. F6a     |
| 50   | Washer                | 13% Cr. S. Steel      |
| 24C  | Cover (Hinge Pin)     | ASTM A105             |
| 24B  | Cover Retainer        | ASTM A105             |
| 24A  | Cover                 | ASTM A105 *1          |
| 3    | Disc                  | ASTM A216 Gr. WCB+STL |
| 2    | Body Seat Ring        | ASTM A105 + STL       |
| 1    | Body                  | ASTM A216 Gr. WCB     |

Note \*1 10 in. &amp; larger ASTM A216 Gr. WCB

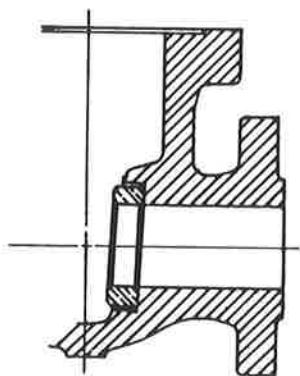
\*2 Soft iron pressure seal gasket

## Dimensions (in./mm)

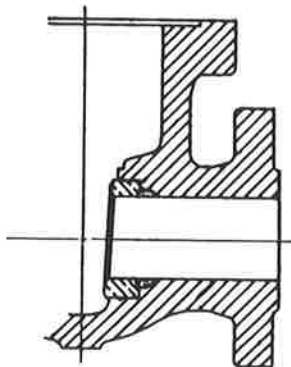
| Nom. Size | in. | mm | 2      | 2-1/2  | 3      | 4      | 5      | 6      | 8      | 10     | 12     | 14   | 16   | 18     | 20    | 24    |
|-----------|-----|----|--------|--------|--------|--------|--------|--------|--------|--------|--------|------|------|--------|-------|-------|
| A1        | in. | mm | 11     | 13     | 14-1/2 | 18     | 21     | 24     | 30     | 36     | 41     | 44   | 49   | 55     | 61    | 68    |
| A2        | in. | mm | 17-3/4 | 20     | 22-3/4 | 26-1/2 | 31-1/4 | 36     | 40-1/4 | 50     | 56     | 61   | 68   | 75     | 82    | 90    |
| A3        | in. | mm | 17-7/8 | 20-1/4 | 23     | 26-7/8 | 31-3/4 | 36-1/2 | 40-7/8 | 50-7/8 | 56-7/8 | 61   | 68   | 75     | 82    | 90    |
| H         | in. | mm | 9      | 10-1/4 | 10-5/8 | 11     | 13-1/2 | 13-1/2 | 19     | 22     | 26     | 31   | 34   | 38-5/8 | 41    | 48    |
| RF        | lb  | Kg | 185    | 265    | 368    | 529    | 1058   | 1290   | 2172   | 3528   | 5050   | 660  | 787  | 864    | 981   | 1041  |
| BW        | lb  | Kg | 115    | 141    | 194    | 320    | 662    | 728    | 1720   | 2690   | 3969   | 5292 | 6946 | 8705   | 10760 | 15479 |
|           | lb  | Kg | 52     | 64     | 88     | 145    | 300    | 330    | 780    | 1220   | 1800   | 2400 | 3150 | 3948   | 4880  | 7020  |



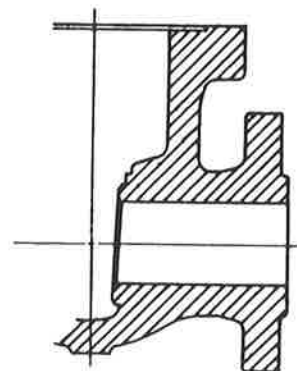
# VALVE BODY SEAT CONSTRUCTION



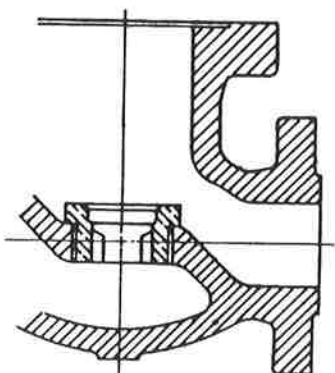
Threaded-In Seat Ring  
in Gate Valve



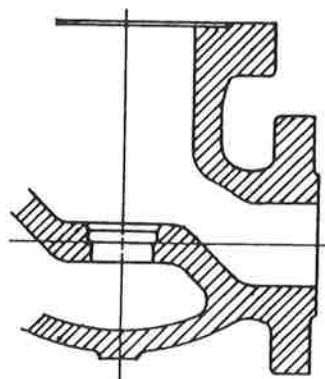
Welded-In Seat Ring  
in Gate Valve



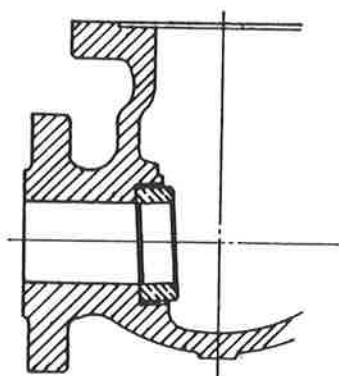
Integral Seat  
in Gate Valve



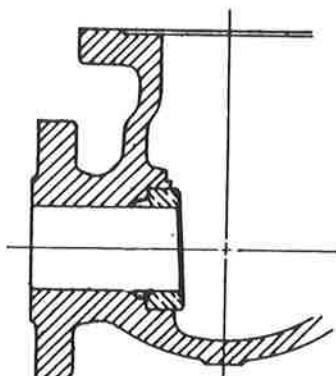
Threaded-In Seat Ring  
in Globe Valve



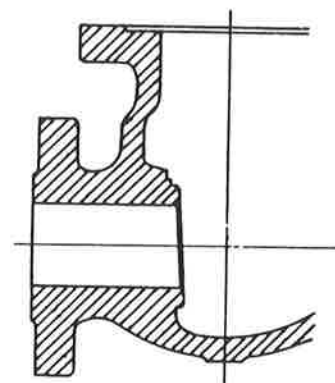
Integral Seat  
in Globe Valve



Threaded-In Seat Ring  
in Swing Check Valve



Welded-In Seat Ring  
in Swing Check Valve

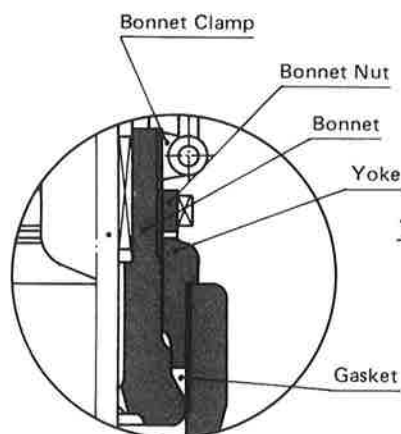


Integral Seat  
in Swing Check Valve

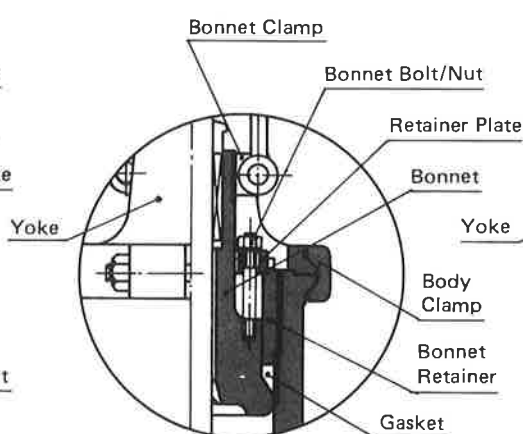
# STANDARD BONNET CONSTRUCTION

## PRESSURE SEAL TYPE

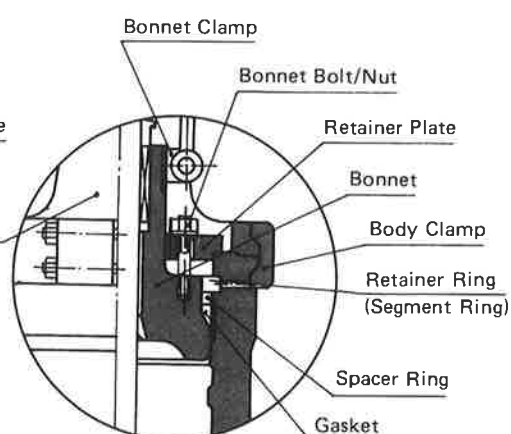
### STANDARD BONNET CONSTRUCTION OF PRESSURE SEAL TYPE



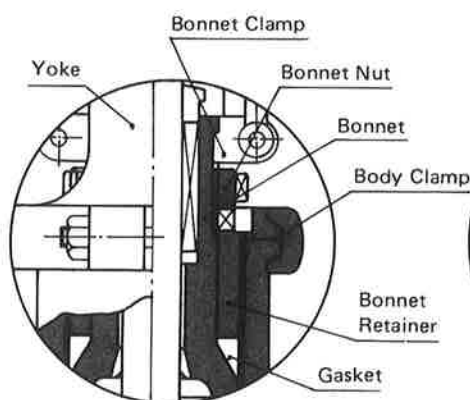
TYPE "A"  
(Gate & Globe V.)



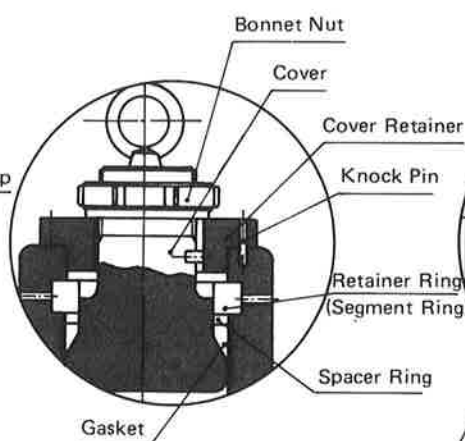
TYPE "B"  
(Gate & Globe V.)



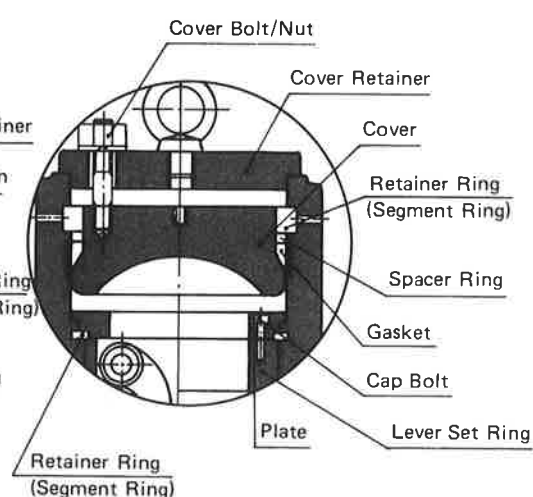
TYPE "C"  
(Gate V.)



TYPE "D"  
(Globe V.)



TYPE "E"  
(Check V.)



TYPE "F"  
(Check V.)

Classified Table of Standard Pressure Seal Bonnet/Cover

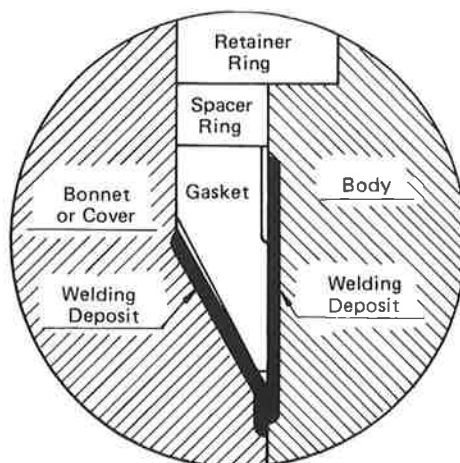
| Size         | Type<br>Class | GATE  |        |        | GLOBE |        |        | CHECK |        |        |
|--------------|---------------|-------|--------|--------|-------|--------|--------|-------|--------|--------|
|              |               | 900CL | 1500CL | 2500CL | 900CL | 1500CL | 2500CL | 900CL | 1500CL | 2500CL |
| 2"           |               | A     | A      | A      | A     | A      | A      | E     | E      | E      |
| 3"           |               | A     | A      | A      | A     | A      | A      | E     | E      | E      |
| 4"           |               | A     | A      | A      | A     | A      | A      | E     | E      | E      |
| 6"           |               | B     | B      | B      | D     | D      | D      | F     | F      | F      |
| 8"           |               | B     | B      | B      | B     | B      | B      | F     | F      | F      |
| 10"          |               | C     | C      | C      | B     | B      | B      | F     | F      | F      |
| 12"          |               | C     | C      | C      | B     | —      | —      | F     | F      | F      |
| 14" & Larger |               | C     | C      | C      | —     | —      | —      | F     | F      | F      |

Note: Special ordered valves are not included.

# OVERLAY IN GASKET CONTACT AREA

## PRESSURE SEAL VALVE

(STANDARD DESIGN)



| BODY MATERIAL | WELDING DEPOSIT<br>(SEE NOTE 1) |                                          |         | GASKET SPECIFICATION |         |            |
|---------------|---------------------------------|------------------------------------------|---------|----------------------|---------|------------|
| CASTING       | BODY                            | BONNET<br>(CASTING ONLY)<br>(SEE NOTE 2) | MAX. HB | MATERIAL             | MAX. HB | MAX. TEMP. |
| A216 WCB      | 304                             | 304                                      | 180     | SOFT IRON            | 90      | 540°C      |
| A217 WC1      | 304                             | 304                                      | 180     | SOFT IRON            | 90      | 540°C      |
| A217 WC6      | 304                             | 304                                      | 180     | F5                   | 130     | 650°C      |
| A217 WC9      | 304                             | 304                                      | 180     | F5                   | 130     | 650°C      |
| A217 C5       | 309                             | 309                                      | 180     | F5                   | 130     | 650°C      |
| A351 CF8      | 304                             | 304                                      | 180     | 304L                 | 150     | 800°C      |
| A351 CF3      | 304L                            | 304L                                     | 180     | 304L                 | 150     | 800°C      |
| A351 CF8M     | 316                             | 316                                      | 180     | 316L                 | 150     | 800°C      |
| A351 CF3M     | 316L                            | 316L                                     | 180     | 316L                 | 150     | 800°C      |
| A351 CF8C     | 347                             | 347                                      | 180     | 347                  | 150     | 870°C      |
| A352 LCC      | 304                             | 304                                      | 180     | 304L                 | 150     | 800°C      |

Note. 1: Other materials are available upon request.

Note. 2: Range of casting Bonnet and Cover is as follows.

|        | Gate Valve      | Globe Valve     | Check Valve     |
|--------|-----------------|-----------------|-----------------|
| 600CL  | 6in. and Larger | 8in. and Larger | 5in. and Larger |
| 900CL  | 6in. and Larger | 8in. and Larger | 8in. and Larger |
| 1500CL | 6in. and Larger | 8in. and Larger | 8in. and Larger |
| 2500CL | 6in. and Larger | 8in. and Larger | 8in. and Larger |

# GEAR OPERATOR

## ■ SELECTION CHART FOR MANUAL OPERATORS

| Unit Size                                   |               | BA-0                                  | BA-1                                   | BA-2                                   | BA-3                                   |
|---------------------------------------------|---------------|---------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|
| Gear Ratio                                  |               | 3 : 1                                 | 4.11 : 1                               | 6 : 1                                  | 9 : 1                                  |
| Allowable Torque                            | kg m (ft-lb)  | 75 (540)                              | 150 (1,085)                            | 300 (2,170)                            | 600 (4,340)                            |
| Allowable Thrust                            | kg (lb)       | 10,000 (22,000)                       | 20,000 (44,000)                        | 35,000 (77,000)                        | 63,000 (139,000)                       |
| Max. Stem Dia<br>mm<br>(inch)               | Max. Stem Dia | 55 (2.165)                            | 62 (2.441)                             | 85 (3.346)                             | 115 (4.528)                            |
|                                             | Max. Bore Dia | 45 key 12 x 8<br>(1.772)(0.472x0.315) | 52 key 15 x 10<br>(2.047)(0.591x0.394) | 70 key 18 x 12<br>(2.756)(0.709x0.472) | 95 key 24 x 16<br>(3.740)(0.945x0.630) |
| Weight                                      | kg<br>(lb)    | 24<br>(52.9)                          | 42<br>(92.6)                           | 87<br>(191.8)                          | 162<br>(357.2)                         |
| Motorized Units is Combined<br>with BA Unit |               | SMB-000<br>SMB-00 HMB-00              | SMB-00 HMB-00<br>SMB-0 HMB-0           | SMB-0 HMB-0<br>SMB-1 HMB-1             | S(H)MB-0, 1, 2                         |

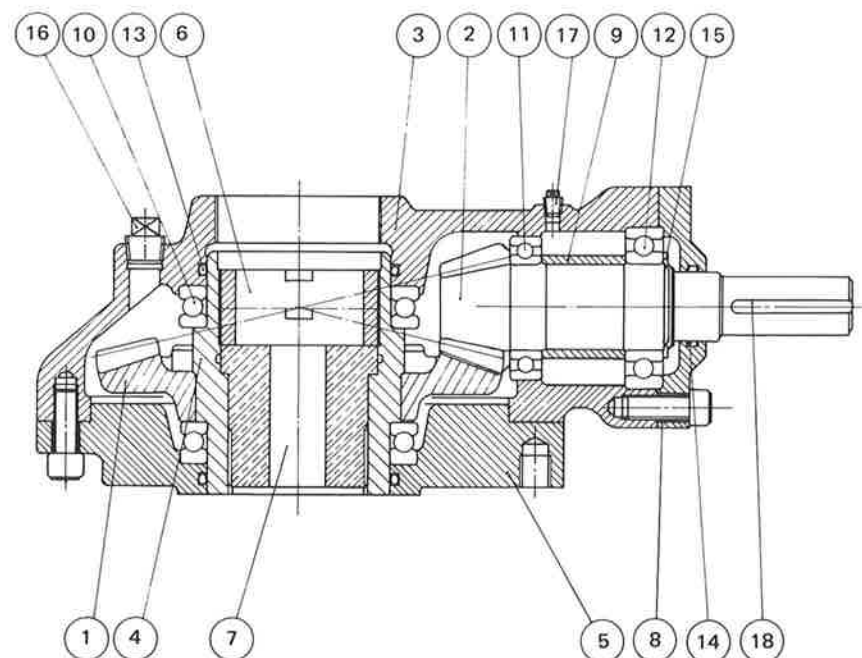
1. Stem nut is provided with pilot bore.
2. Unit is designed to handle a one time thrust overload 1.5 x its rating.

## ■ UNIT & SIZE

BA series has basic type, with MDPI type, with MDPI and limitswitch type and dual input shaft type. BA type have four sizes of 0, 1, 2 and 3.

- BA - □ : Basic Type
- BA - □ P: With MDPI Type
- BA - □ S: With MDPI and Limitswitch Type
- BAW - □ : Dual Inputshaft Type

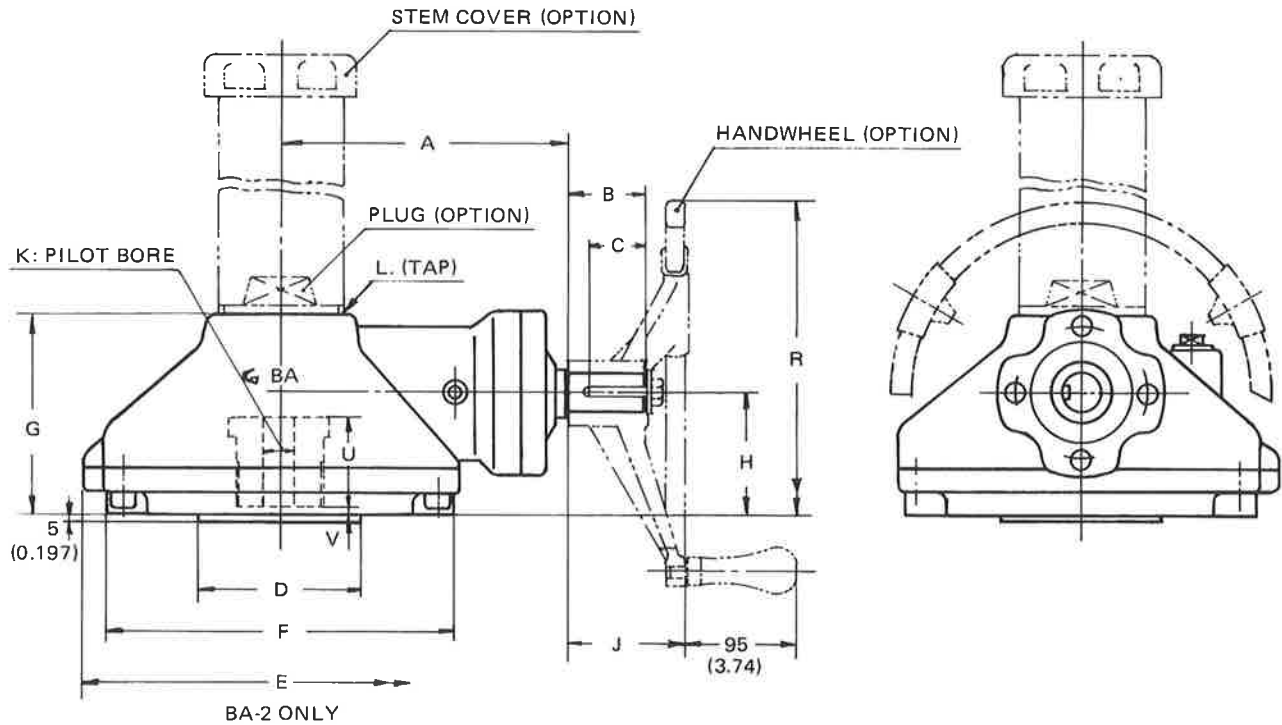
- MDPI is option.
- MDPI can be attached with all BA units.



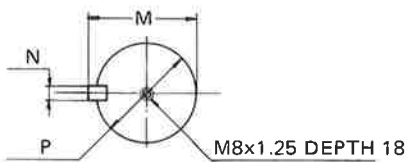
| NO. | PART NAME      | NO. REQ. | MATERIAL       |
|-----|----------------|----------|----------------|
| 1   | Bevel Gear     | 1        | Cr-Mo Steel    |
| 2   | Bevel Pinion   | 1        | Cr-Mo Steel    |
| 3   | Housing        | 1        | Cast Iron      |
| 4   | Drive Sleeve   | 1        | Nodular Iron   |
| 5   | Base           | 1        | Cast Iron      |
| 6   | Locking Nut    | 2        | Carbon Steel   |
| 7   | Stem Nut       | 1        | Al-Bronze      |
| 8   | End Cap        | 1        | Cast Iron      |
| 9   | Spacer         | 1        | Carbon Steel   |
| 10  | Thrust Bearing | 2        | Bearing Steel  |
| 11  | Ball Bearing   | 1        | Bearing Steel  |
| 12  | Ball Bearing   | 1        | Bearing Steel  |
| 13  | "O" Ring       | 2        | NBR            |
| 14  | "O" Ring       | 1        | NBR            |
| 15  | Retaining Ring | 1        | Carbon Steel   |
| 16  | Plug           | 1        | Malleable Iron |
| 17  | Plug           | 1        | Malleable Iron |
| 18  | Key            | 1        | Carbon Steel   |

# GEAR OPERATOR

## DIMENSIONS



### KEY DETAIL OF INPUT SHAFT



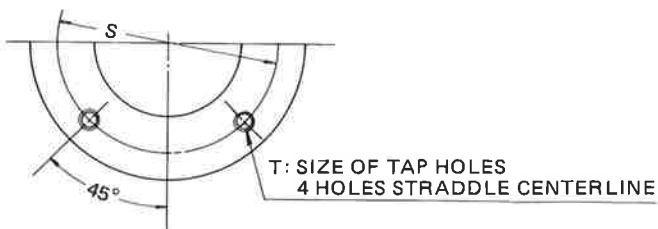
### HANDWHEEL DIMENSIONS

|   | 12 type      | 18 type       | 24 type       | 30 type       |
|---|--------------|---------------|---------------|---------------|
| R | 310<br>(12)  | 460<br>(18)   | 610<br>(24)   | 760<br>(30)   |
| J | 92<br>(3.62) | 107<br>(4.21) | 112<br>(4.41) | 115<br>(4.53) |

mm (inch)

|   | BA-0                                                                             | BA-1                                                                             | BA-2                                                                              | BA-3                                                                              |
|---|----------------------------------------------------------------------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| A | 170 (6.69)                                                                       | 225 (8.86)                                                                       | 305 (12)                                                                          | 344 (13.54)                                                                       |
| B | 60 (2.36)                                                                        | 60 (2.36)                                                                        | 60 (2.36)                                                                         | 70 (2.76)                                                                         |
| C | 45 (1.77)                                                                        | 45 (1.77)                                                                        | 55 (2.17)                                                                         | 60 (2.36)                                                                         |
| D | 127 <sup>+0</sup> <sub>-0.076</sub> (5 <sup>+0</sup> <sub>-0.003</sub> )         | 152.4 <sup>+0</sup> <sub>-0.076</sub> (6 <sup>+0</sup> <sub>-0.003</sub> )       | 177.8 <sup>+0</sup> <sub>-0.076</sub> (7 <sup>+0</sup> <sub>-0.003</sub> )        | 215.9 <sup>+0</sup> <sub>-0.076</sub> (8.5 <sup>+0</sup> <sub>-0.003</sub> )      |
| E | —                                                                                | —                                                                                | 386 (15.2)                                                                        | 470 (18.5)                                                                        |
| F | 210 (8.27)                                                                       | 289 (11.38)                                                                      | 343 (13.5)                                                                        | 406 (15.98)                                                                       |
| G | 135 (5.32)                                                                       | 155 (6.1)                                                                        | 225 (8.86)                                                                        | 264 (10.39)                                                                       |
| H | 85 (3.346)                                                                       | 95 (3.740)                                                                       | 140 (5.512)                                                                       | 170 (6.693)                                                                       |
| K | 15 (0.59)                                                                        | 25 (0.98)                                                                        | 35 (1.38)                                                                         | 35 (1.38)                                                                         |
| L | PF 2 1/2"                                                                        | PF 3"                                                                            | PF 4"                                                                             | PF 6"                                                                             |
| M | 31.66 <sup>+0</sup> <sub>-0.158</sub> (1.2464 <sup>+0</sup> <sub>-0.0061</sub> ) | 31.66 <sup>+0</sup> <sub>-0.158</sub> (1.2464 <sup>+0</sup> <sub>-0.0061</sub> ) | 35.5 <sup>+0</sup> <sub>-0.158</sub> (1.3976 <sup>+0</sup> <sub>-0.0061</sub> )   | 41.5 <sup>+0</sup> <sub>-0.158</sub> (1.6338 <sup>+0</sup> <sub>-0.0061</sub> )   |
| N | 7 <sup>+0.030</sup> <sub>-0.016</sub> (0.276 <sup>+0</sup> <sub>-0.0005</sub> )  | 7 <sup>+0.030</sup> <sub>-0.016</sub> (0.276 <sup>+0</sup> <sub>-0.0005</sub> )  | 10 <sup>+0.030</sup> <sub>-0.015</sub> (0.3948 <sup>+0</sup> <sub>-0.0005</sub> ) | 10 <sup>+0.030</sup> <sub>-0.015</sub> (0.3948 <sup>+0</sup> <sub>-0.0005</sub> ) |
| P | 28.56 <sup>+0</sup> <sub>-0.04</sub> (1.1244 <sup>+0</sup> <sub>-0.0015</sub> )  | 28.56 <sup>+0</sup> <sub>-0.04</sub> (1.1244 <sup>+0</sup> <sub>-0.0015</sub> )  | 32 <sup>+0.009</sup> <sub>-0.034</sub> (1.2594 <sup>+0</sup> <sub>-0.0009</sub> ) | 38 <sup>+0.009</sup> <sub>-0.034</sub> (1.4957 <sup>+0</sup> <sub>-0.0009</sub> ) |
| S | 165.1 (6.5)                                                                      | 254 (10)                                                                         | 298.5 (11.75)                                                                     | 355.6 (14)                                                                        |
| T | M20 x 2.5 DP, 25 (0.98)                                                          | M16 x 2 DP, 34 (1.34)                                                            | M20 x 2.5 DP, 31 (1.22)                                                           | M24 x 3 DP, 45 (1.77)                                                             |
| U | 70 (2.76)                                                                        | 75 (2.95)                                                                        | 110 (4.33)                                                                        | 150 (5.91)                                                                        |
| V | 0                                                                                | 0                                                                                | 9 (0.35)                                                                          | 13 (0.51)                                                                         |

### BA-0 FLANGE DIMENSION



### BA-1, 2, 3 FLANGE DIMENSION



# OPERATORS

All YONEKI Cast Steel Gate Globe, Angle and Non-Return Valves can be Furnished with an Electric or Air actuated operator.

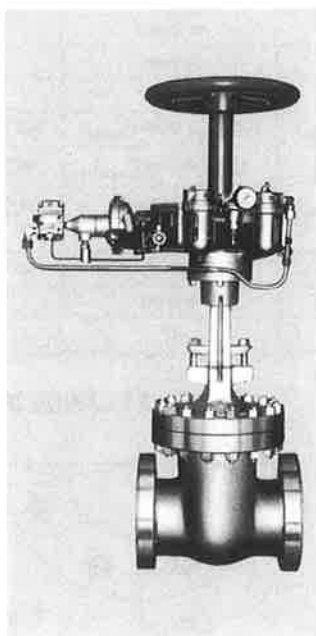
The following information must accompany an Inquiry.

( ○ Marks Required )

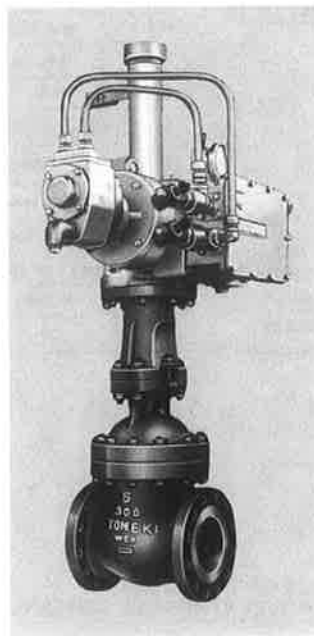
|    |                                                                                                                                      | Electric Motor Actuator | Air Motor Actuator | Cylinder Actuator |
|----|--------------------------------------------------------------------------------------------------------------------------------------|-------------------------|--------------------|-------------------|
| 1  | SIZE and TYPE OF VALVE — Gate, Globe, — Angle, Non-Return                                                                            | ○                       | ○                  | ○                 |
| 2  | SERVICE — Steam, Air, Water, Oil, Gas, etc.                                                                                          | ○                       | ○                  | ○                 |
| 3  | ELECTRIC CHARACTERISTICS-AC or DC, voltage, phases, cycles                                                                           | ○                       | —                  | ○                 |
| 4  | CONTROLS — integral or remote                                                                                                        | ○                       | —                  | —                 |
| 5  | AMBIENT TEMPERATURE                                                                                                                  | ○                       | ○                  | ○                 |
| 6  | DIFFERENTIAL PRESSURE — Maximum differential pressure across valve in closed position.                                               | ○                       | ○                  | ○                 |
| 7  | CLOSING TIME — in seconds                                                                                                            | ○                       | ○                  | ○                 |
| 8  | TYPE OF ENCLOSURES — weatherproof or explosion-proof for electrical equipment                                                        | ○                       | —                  | ○                 |
| 9  | Line Pressure and Temperature                                                                                                        | ○                       | ○                  | ○                 |
| 10 | Pressure available to actuator supply                                                                                                | —                       | ○                  | ○                 |
| 11 | Method of control and control accessories required                                                                                   | ○                       | ○                  | ○                 |
| 12 | If fail safe operation is required specify if valve is required to "open" or "close" on failure of power source pressure             | —                       | ○                  | ○                 |
| 13 | Specify all accessories required such as solenoids, limit switches, positioners, speed controls, quick exhaust valves, filters, etc. | —                       | ○                  | ○                 |



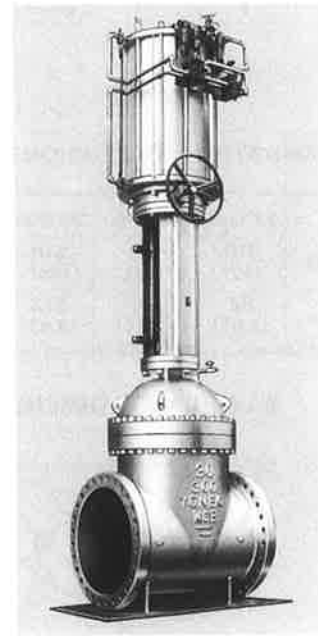
With Electric Motor



With Air Motor



With Air Motor

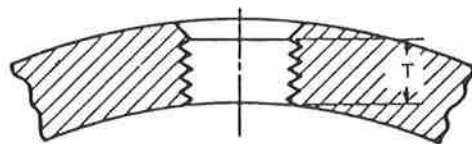
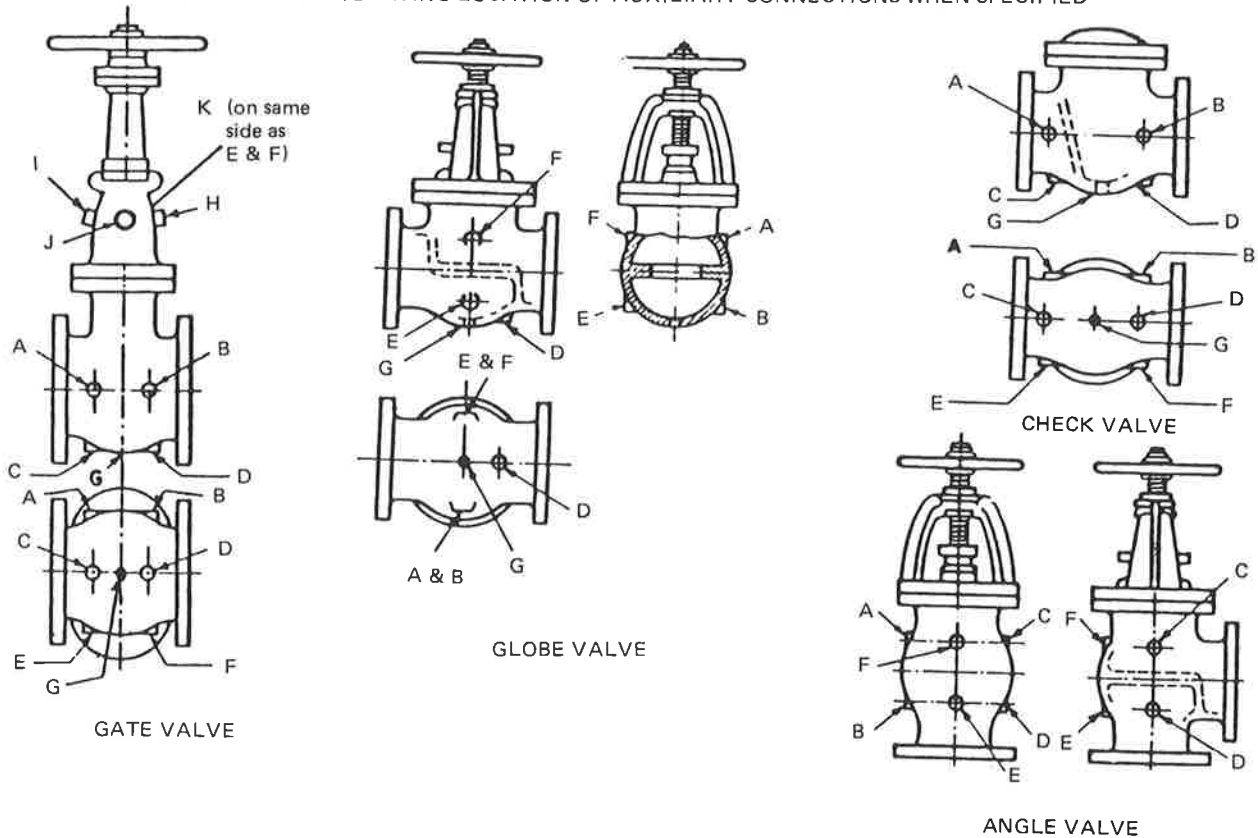


With Air Cylinder

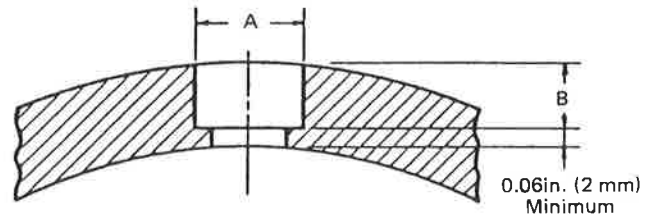
# TAPS AND DRAINS

(ASME B16.34 – 1996)

## METHOD OF DESIGNATING LOCATION OF AUXILIARY CONNECTIONS WHEN SPECIFIED



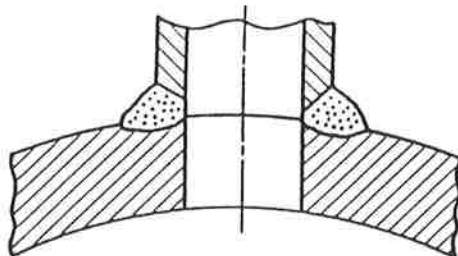
THREAD LENGTH FOR AUXILIARY CONNECTION



SOCKET WELDING FOR AUXILIARY CONNECTIONS

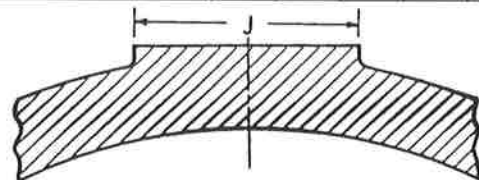
| Connection Size, NPS  | 3/8  | 1/2  | 3/4  | 1    | 1-1/4 | 1-1/2 | 2    |
|-----------------------|------|------|------|------|-------|-------|------|
| Thread Length, T, in. | 0.41 | 0.53 | 0.55 | 0.68 | 0.71  | 0.72  | 0.76 |
| mm                    | 14   | 14   | 14   | 18   | 18    | 19    | 20   |

In no case shall the effective length of thread, T, be less than that shown in table above. These lengths are equal to the effective thread length of American National Standard External Pipe Threads (ANSI B2.1).



BUTT WELDING FOR AUXILIARY CONNECTIONS

| Connection Size, NPS          | 3/8   | 1/2   | 3/4   | 1     | 1-1/4 | 1-1/2 | 2     |
|-------------------------------|-------|-------|-------|-------|-------|-------|-------|
| Minimum Dia of Socket, A, in. | 0.690 | 0.855 | 1.065 | 1.330 | 1.675 | 1.915 | 2.406 |
| mm                            | 17.5  | 22    | 27    | 34    | 43    | 49    | 61    |
| Minimum Depth, B, in.         | 0.19  | 0.19  | 0.25  | 0.25  | 0.25  | 0.25  | 0.31  |
| mm                            | 5     | 5     | 6     | 6     | 6     | 6     | 8     |



BOSSES FOR AUXILIARY CONNECTIONS

| Connection Size, NPS  | 3/8  | 1/2  | 3/4  | 1    | 1-1/4 | 1-1/2 | 2    |
|-----------------------|------|------|------|------|-------|-------|------|
| Min. Boss Dia, J, in. | 1.25 | 1.50 | 1.75 | 2.12 | 2.50  | 2.75  | 3.38 |
| mm                    | 32   | 38   | 44   | 54   | 64    | 70    | 86   |

# BUTT-WELDING ENDS

(ASME B16.25 – 1997)

(See ASME B16.25 for Gas Tungsten Arc Root Pass Welding End)

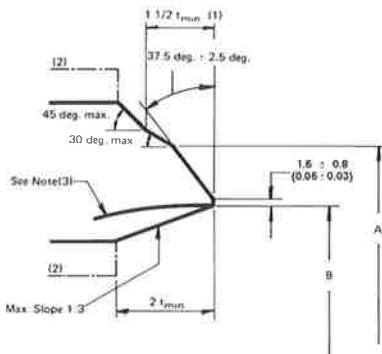


Figure 2a Welding End Detail for Joint Without Backing Ring.

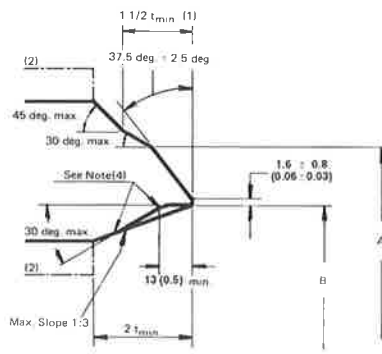


Figure 2b Welding End Detail for Joint Using Split Rectangular Backing Ring.

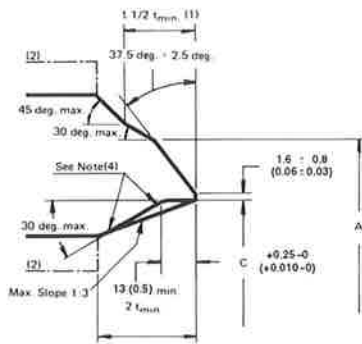


Figure 2c Welding End Detail for Joint Using Continuous Rectangular Backing Ring.

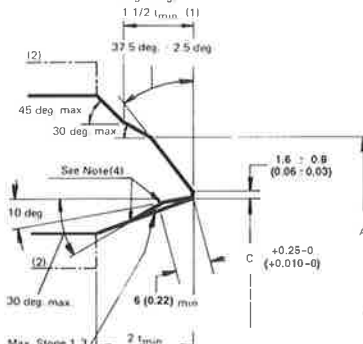


Figure 2d Welding End Detail for Joint Using Continuous Tapered Backing Ring.

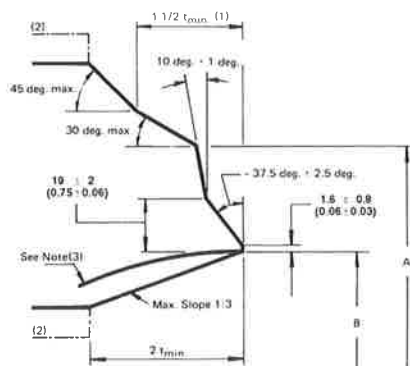


Figure 3a Welding End Detail for Joint Without Backing Ring.

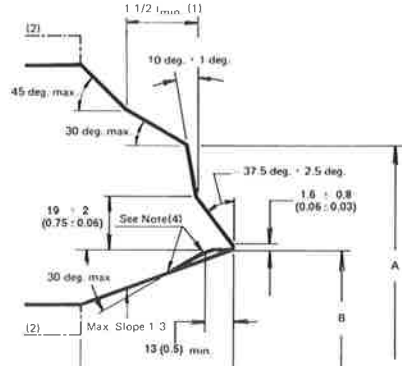


Figure 3b Welding End Detail for Joint Using Split Rectangular Backing Ring.

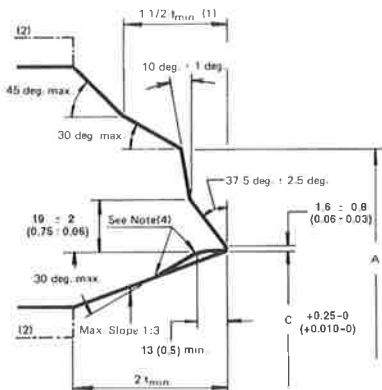


Figure 3c Welding End Detail for Joint Using Continuous Rectangular Backing Ring.

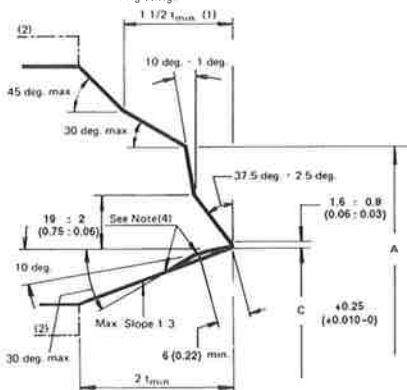


Figure 3d Welding End Detail for Joint Using Continuous Tapered Backing Ring.

A = Nominal O.D. of pipe.

B = Values for the I.D. at the welding end.

C = A - 0.79 - 1.75t - 0.25 (millimeters)

C = A - 0.031 - 1.75t - 0.010 (inches)

t = Nominal wall thickness of pipe.

0.79 = Minus tolerance on O.D. of pipe to (0.031) ASTM Specification A106, etc.

1.75 = Minimum wall of 87 1/2% of nominal wall (Permitted by ASTM Specification A106, etc.) multiplied by two convert into terms of diameter.

0.25 = Plus tolerance on diameter C. (0.010)

(1) The value of t min. is whichever of the following is applicable.

- a) the minimum ordered wall thickness of the pipe
- b) 0.875 times the nominal wall thickness of pipe ordered to a pipe schedule wall thickness which has an under tolerance of 12.5%.
- c) the minimum ordered wall thickness of the cylindrical welding end of a component or fitting (or the thinner of the two) when the joint is between two components.

(2) Where transitions using maximum slope do not intersect inside or outside surface, as shown by phantom outlines, maximum slopes shown or alternate radii shall be used.

(3) Internal surface may be as-formed or machined for dimension B at root face. Contour within the envelope is manufacturer's option unless otherwise specifically ordered.

(4) Intersections should be slightly rounded.

# BUTT-WELDING ENDS

(ASME B16.25 — 1997)

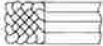
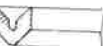
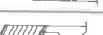
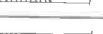
| Nominal<br>Pipe<br>Size | Schedule<br>Number<br>or<br>Wall | Outside Diameter |       | Nominal<br>Inside Diameter |        | Machined<br>Inside Diameter |        | Nominal<br>Wall Thickness |       |
|-------------------------|----------------------------------|------------------|-------|----------------------------|--------|-----------------------------|--------|---------------------------|-------|
|                         |                                  | A                |       | B                          |        | C                           |        | t                         |       |
|                         |                                  | mm               | inch  | mm                         | inch   | mm                          | inch   | mm                        | inch  |
| 65<br>(2½)              | 40                               | 73.0             | 2.88  | 62.5                       | 2.469  | 62.93                       | 2.479  | 5.16                      | 0.203 |
|                         | 80                               |                  |       | 59.0                       | 2.323  | 59.69                       | 2.351  | 7.01                      | 0.276 |
|                         | 160                              |                  |       | 54.0                       | 2.125  | 55.28                       | 2.178  | 9.53                      | 0.375 |
|                         | XXS                              |                  |       | 45.0                       | 1.771  | 47.43                       | 1.868  | 14.02                     | 0.552 |
| 80<br>(3)               | 40                               | 88.9             | 3.50  | 78.0                       | 3.068  | 78.25                       | 3.081  | 5.49                      | 0.216 |
|                         | 80                               |                  |       | 73.5                       | 2.900  | 74.53                       | 2.934  | 7.62                      | 0.300 |
|                         | 160                              |                  |       | 66.5                       | 2.624  | 68.38                       | 2.692  | 11.13                     | 0.438 |
|                         | XXS                              |                  |       | 58.5                       | 2.300  | 61.19                       | 2.409  | 15.24                     | 0.600 |
| 90<br>(3½)              | 40                               | 101.6            | 4.00  | 90.0                       | 3.548  | 90.52                       | 3.564  | 5.74                      | 0.226 |
|                         | 80                               |                  |       | 85.5                       | 3.364  | 86.42                       | 3.402  | 8.08                      | 0.318 |
| 100<br>(4)              | 40                               | 114.3            | 4.50  | 102.0                      | 4.026  | 102.73                      | 4.044  | 6.02                      | 0.237 |
|                         | 80                               |                  |       | 97.0                       | 3.826  | 98.28                       | 3.869  | 8.56                      | 0.337 |
|                         | 120                              |                  |       | 92.0                       | 3.624  | 93.78                       | 3.692  | 11.13                     | 0.438 |
|                         | 160                              |                  |       | 87.5                       | 3.438  | 89.65                       | 3.530  | 13.49                     | 0.531 |
|                         | XXS                              |                  |       | 80.0                       | 3.152  | 83.30                       | 3.279  | 17.12                     | 0.674 |
| 125<br>(5)              | 40                               | 141.3            | 5.56  | 128.0                      | 5.047  | 128.80                      | 5.070  | 6.55                      | 0.258 |
|                         | 80                               |                  |       | 122.0                      | 4.813  | 123.58                      | 4.866  | 9.53                      | 0.375 |
|                         | 120                              |                  |       | 116.0                      | 4.563  | 118.04                      | 4.647  | 12.70                     | 0.500 |
|                         | 160                              |                  |       | 109.5                      | 4.313  | 112.47                      | 4.428  | 15.88                     | 0.625 |
|                         | XXS                              |                  |       | 103.0                      | 4.063  | 106.92                      | 4.209  | 19.05                     | 0.750 |
| 150<br>(6)              | 40                               | 168.3            | 6.62  | 154.0                      | 6.065  | 154.82                      | 6.094  | 7.11                      | 0.280 |
|                         | 80                               |                  |       | 146.5                      | 5.761  | 148.06                      | 5.828  | 10.97                     | 0.432 |
|                         | 120                              |                  |       | 140.0                      | 5.501  | 142.29                      | 5.600  | 14.27                     | 0.562 |
|                         | 160                              |                  |       | 132.0                      | 5.187  | 135.31                      | 5.326  | 18.26                     | 0.719 |
|                         | XXS                              |                  |       | 124.5                      | 4.897  | 128.85                      | 5.072  | 21.95                     | 0.864 |
| 200<br>(8)              | 40                               | 219.1            | 8.62  | 203.0                      | 7.981  | 203.75                      | 8.020  | 8.18                      | 0.322 |
|                         | 60                               |                  |       | 198.5                      | 7.813  | 200.02                      | 7.873  | 10.31                     | 0.406 |
|                         | 80                               |                  |       | 193.5                      | 7.625  | 195.84                      | 7.709  | 12.70                     | 0.500 |
|                         | 100                              |                  |       | 189.0                      | 7.437  | 191.65                      | 7.544  | 15.09                     | 0.594 |
|                         | 120                              |                  |       | 182.5                      | 7.187  | 186.11                      | 7.326  | 18.26                     | 0.719 |
|                         | 140                              |                  |       | 178.0                      | 7.001  | 181.98                      | 7.163  | 20.62                     | 0.812 |
|                         | XXS                              |                  |       | 174.5                      | 6.875  | 179.16                      | 7.053  | 22.23                     | 0.875 |
|                         | 160                              |                  |       | 173.0                      | 6.813  | 177.79                      | 6.998  | 23.01                     | 0.906 |
| 250<br>(10)             | 40                               | 273.0            | 10.75 | 254.5                      | 10.020 | 255.74                      | 10.070 | 9.27                      | 0.365 |
|                         | 60                               |                  |       | 247.5                      | 9.750  | 249.74                      | 9.834  | 12.70                     | 0.500 |
|                         | 80                               |                  |       | 243.0                      | 9.562  | 245.55                      | 9.670  | 15.09                     | 0.594 |
|                         | 100                              |                  |       | 236.5                      | 9.312  | 240.01                      | 9.451  | 18.26                     | 0.719 |
|                         | 120                              |                  |       | 230.0                      | 9.062  | 234.44                      | 9.232  | 21.44                     | 0.844 |
|                         | 140                              |                  |       | 222.0                      | 8.750  | 227.51                      | 8.959  | 25.40                     | 1.000 |
|                         | 160                              |                  |       | 216.0                      | 8.500  | 221.95                      | 8.740  | 28.58                     | 1.125 |
| 300<br>(12)             | STD                              | 323.8            | 12.75 | 305.0                      | 12.000 | 306.08                      | 12.053 | 9.53                      | 0.375 |
|                         | 40                               |                  |       | 303.0                      | 11.938 | 304.72                      | 11.999 | 10.31                     | 0.406 |
|                         | XS                               |                  |       | 298.5                      | 11.750 | 300.54                      | 11.834 | 12.70                     | 0.500 |
|                         | 60                               |                  |       | 295.0                      | 11.626 | 297.79                      | 11.725 | 14.27                     | 0.562 |
|                         | 80                               |                  |       | 289.0                      | 11.374 | 292.17                      | 11.505 | 17.48                     | 0.688 |
|                         | 100                              |                  |       | 281.0                      | 11.062 | 285.24                      | 11.232 | 21.44                     | 0.844 |
|                         | 120                              |                  |       | 273.0                      | 10.750 | 278.31                      | 10.959 | 25.40                     | 1.000 |
|                         | 140                              |                  |       | 266.5                      | 10.500 | 272.75                      | 10.740 | 28.58                     | 1.125 |
|                         | 160                              |                  |       | 257.0                      | 10.126 | 264.45                      | 10.413 | 33.32                     | 1.312 |

# BUTT-WELDING ENDS

(ASME B16.25 – 1997)

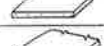
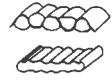
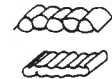
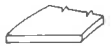
| Nominal<br>Pipe<br>Size | Schedule<br>Number<br>or<br>Wall | Outside Diameter |       | Nominal<br>Inside Diameter |        | Machined<br>Inside Diameter |        | Nominal<br>Wall Thickness |       |
|-------------------------|----------------------------------|------------------|-------|----------------------------|--------|-----------------------------|--------|---------------------------|-------|
|                         |                                  | A                |       | B                          |        | C                           |        | t                         |       |
|                         |                                  | mm               | inch  | mm                         | inch   | mm                          | inch   | mm                        | inch  |
| 350<br>(14)             | STD                              | 355.6            | 14.00 | 336.5                      | 13.250 | 337.88                      | 13.303 | 9.53                      | 0.375 |
|                         | 40                               |                  |       | 333.5                      | 13.124 | 335.08                      | 13.192 | 11.13                     | 04.38 |
|                         | XS                               |                  |       | 330.0                      | 13.000 | 332.34                      | 13.084 | 12.70                     | 0.500 |
|                         | 60                               |                  |       | 325.5                      | 12.812 | 328.15                      | 12.920 | 15.09                     | 0.594 |
|                         | 80                               |                  |       | 317.5                      | 12.500 | 321.22                      | 12.646 | 19.05                     | 0.750 |
|                         | 100                              |                  |       | 308.0                      | 12.124 | 312.86                      | 12.318 | 23.83                     | 0.938 |
|                         | 120                              |                  |       | 300.0                      | 11.812 | 305.93                      | 12.044 | 27.79                     | 1.094 |
|                         | 140                              |                  |       | 292.0                      | 11.500 | 299.00                      | 11.771 | 31.75                     | 1.250 |
|                         | 160                              |                  |       | 284.0                      | 11.188 | 292.07                      | 11.498 | 35.71                     | 1.406 |
| 400<br>(16)             | STD                              | 406.4            | 16.00 | 387.5                      | 15.250 | 388.68                      | 15.303 | 9.53                      | 0.375 |
|                         | 40                               |                  |       | 381.0                      | 15.000 | 383.14                      | 15.084 | 12.70                     | 0.500 |
|                         | 60                               |                  |       | 373.0                      | 14.688 | 376.21                      | 14.811 | 16.66                     | 0.656 |
|                         | 80                               |                  |       | 363.5                      | 14.312 | 367.84                      | 14.482 | 21.44                     | 0.844 |
|                         | 100                              |                  |       | 354.0                      | 13.938 | 359.53                      | 14.155 | 26.19                     | 1.031 |
|                         | 120                              |                  |       | 344.5                      | 13.562 | 351.18                      | 13.826 | 30.96                     | 1.219 |
|                         | 140                              |                  |       | 333.5                      | 13.124 | 341.43                      | 13.442 | 36.53                     | 1.438 |
|                         | 160                              |                  |       | 325.5                      | 12.812 | 334.50                      | 13.170 | 40.49                     | 1.594 |
| 450<br>(18)             | STD                              | 457.2            | 18.00 | 438.0                      | 17.250 | 439.48                      | 17.303 | 9.53                      | 0.375 |
|                         | XS                               |                  |       | 432.0                      | 17.000 | 433.94                      | 17.084 | 12.70                     | 0.500 |
|                         | 40                               |                  |       | 428.5                      | 16.876 | 431.19                      | 16.975 | 14.27                     | 0.562 |
|                         | 60                               |                  |       | 419.0                      | 16.500 | 422.82                      | 16.646 | 19.05                     | 0.750 |
|                         | 80                               |                  |       | 409.5                      | 16.124 | 414.46                      | 16.318 | 23.83                     | 0.938 |
|                         | 100                              |                  |       | 398.5                      | 15.688 | 404.78                      | 15.936 | 29.36                     | 1.156 |
|                         | 120                              |                  |       | 387.5                      | 15.250 | 395.03                      | 15.553 | 34.93                     | 1.375 |
|                         | 140                              |                  |       | 378.0                      | 14.876 | 386.77                      | 15.225 | 39.67                     | 1.562 |
|                         | 160                              |                  |       | 366.5                      | 14.438 | 376.99                      | 14.842 | 45.24                     | 1.781 |
| 500<br>(20)             | STD                              | 508.0            | 20.00 | 489.0                      | 19.250 | 490.28                      | 19.303 | 9.53                      | 0.375 |
|                         | XS                               |                  |       | 482.5                      | 19.000 | 484.74                      | 19.084 | 12.70                     | 0.500 |
|                         | 40                               |                  |       | 478.0                      | 18.812 | 480.55                      | 18.920 | 15.09                     | 0.594 |
|                         | 60                               |                  |       | 467.0                      | 18.376 | 470.88                      | 18.538 | 20.62                     | 0.812 |
|                         | 80                               |                  |       | 455.5                      | 17.938 | 461.13                      | 18.155 | 26.19                     | 1.031 |
|                         | 100                              |                  |       | 443.0                      | 17.438 | 450.02                      | 17.717 | 32.54                     | 1.281 |
|                         | 120                              |                  |       | 432.0                      | 17.000 | 440.29                      | 17.334 | 38.10                     | 1.500 |
|                         | 140                              |                  |       | 419.0                      | 16.500 | 429.17                      | 16.896 | 44.45                     | 1.750 |
|                         | 160                              |                  |       | 408.0                      | 16.062 | 419.44                      | 16.513 | 50.01                     | 1.969 |
| 550<br>(22)             | STD                              | 558.8            | 22.00 | 539.0                      | 21.250 | 541.08                      | 21.303 | 9.53                      | 0.375 |
|                         | XS                               |                  |       | 533.0                      | 21.000 | 535.54                      | 21.084 | 12.70                     | 0.500 |
|                         | 60                               |                  |       | 514.0                      | 20.250 | 518.86                      | 20.428 | 22.23                     | 0.875 |
|                         | 80                               |                  |       | 501.0                      | 19.750 | 507.75                      | 19.990 | 28.58                     | 1.125 |
|                         | 100                              |                  |       | 488.5                      | 19.250 | 496.63                      | 19.553 | 34.93                     | 1.375 |
|                         | 120                              |                  |       | 476.0                      | 18.750 | 485.52                      | 19.115 | 41.28                     | 1.625 |
|                         | 140                              |                  |       | 463.0                      | 18.250 | 474.41                      | 18.678 | 47.63                     | 1.875 |
|                         | 160                              |                  |       | 450.5                      | 17.750 | 463.30                      | 18.240 | 53.98                     | 2.125 |
| 600<br>(24)             | STD                              | 609.6            | 24.00 | 590.5                      | 23.250 | 591.88                      | 23.303 | 9.53                      | 0.375 |
|                         | XS                               |                  |       | 584.0                      | 23.000 | 586.34                      | 23.084 | 12.70                     | 0.500 |
|                         | 30                               |                  |       | 581.0                      | 22.876 | 583.59                      | 22.975 | 14.27                     | 0.562 |
|                         | 40                               |                  |       | 574.5                      | 22.624 | 577.97                      | 22.755 | 17.48                     | 0.688 |
|                         | 60                               |                  |       | 560.5                      | 22.062 | 565.49                      | 22.263 | 24.61                     | 0.969 |
|                         | 80                               |                  |       | 547.5                      | 21.562 | 554.38                      | 21.826 | 30.96                     | 1.219 |
|                         | 100                              |                  |       | 532.0                      | 20.938 | 540.49                      | 21.280 | 38.89                     | 1.531 |
|                         | 120                              |                  |       | 517.5                      | 20.376 | 528.03                      | 20.788 | 46.02                     | 1.812 |
|                         | 140                              |                  |       | 505.0                      | 19.876 | 516.91                      | 20.350 | 52.37                     | 2.062 |
|                         | 160                              |                  |       | 490.5                      | 19.312 | 504.37                      | 19.857 | 59.54                     | 2.344 |

# PACKING AND GASKET COMPARISON

|         | Manufacturer                                                                        |                                                      | Tombo<br>(Nichias)<br>Style No. | Nippon<br>Pillar<br>Style No. | Nippon<br>Valqua<br>Style No. | John Crane<br>Style No. | Garlock<br>Style No.      | Chesterton<br>Style No. |
|---------|-------------------------------------------------------------------------------------|------------------------------------------------------|---------------------------------|-------------------------------|-------------------------------|-------------------------|---------------------------|-------------------------|
|         | Sketches                                                                            | Specifications                                       |                                 |                               |                               |                         |                           |                         |
| PACKING |    | Graphited asbestos mole-braid packing                | 2350                            | —                             | 135                           | 816                     | 257                       | 5010                    |
|         |                                                                                     | Oil-resistant asbestos mole-braid packing            | 3700                            | —                             | 137                           | 804                     | 237                       | (5010)<br>340           |
|         |                                                                                     | Hot-oil-proof asbestos mole-braid packing            | 3900                            | 114 C                         | 139                           | 804-D                   | (734)                     | (5010)                  |
|         |                                                                                     | Copper wire reinforced asbestos mole-braid packing   | 3305                            | 312                           | 1260                          | —                       | 256                       | —                       |
|         |    | Asbestos spiral packing                              | —                               | —                             | 240                           | 801<br>803              | 144                       | 64                      |
|         |    | Asbestos-cored Aluminum foil spiral packing          | 2788                            | —                             | 1120                          | 100-AL<br>(101-AL)      | 633                       | 666                     |
|         |                                                                                     | Asbestos-cored Lead foil spiral packing              | 2882                            | —                             | 1140                          | 110-M<br>(111-M)        | 631                       | 555                     |
|         |    | Covered soft jam packing                             | 2990                            | —                             | 1240                          | (SS-3J)                 | 930                       | —                       |
|         |  | Stainless wire reinforced asbestos braid packing     | 2913                            | —                             | 1271                          | —                       | 5250<br>5270              | —                       |
|         |                                                                                     | Monel wire reinforced asbestos braid packing         | 2921                            | 315                           | 1272                          | 187                     | —                         | —                       |
|         |                                                                                     | Inconel wire reinforced asbestos braid packing       | 2920                            | 316                           | 1273                          | 187-I                   | 127                       | (1000)<br>1500          |
|         |  | Teflon impregnated asbestos braid-over-braid packing | 9075-V                          | 4513                          | 7133                          | C-04<br>C-06            | 5861<br>555               | 322                     |
|         |                                                                                     | Teflon libre braid-over-braid packing                | 9034                            | 4505                          | 7233                          | C-1045                  | 5888                      | 324                     |
|         |  | Rubber V-packing                                     | 2661                            | —                             | 2631                          | —                       | —                         | —                       |
|         |                                                                                     | Teflon V-packing                                     | 9027                            | 4260                          | 7631                          | C-VH<br>C-VU            | 8764                      | —                       |
|         |  | Pure graphite moulded ring packing                   | 2200                            | 6610                          | VF 10                         | 237                     | GRAPH-LOCK                | —                       |
|         |  | Pure 100% graphite yarn, packing                     | (9077)                          | 6527                          | 6266                          | 1625GF                  | —                         | —                       |
| GASKET  |  | Corrugated metal gasket                              | 1880                            | 1200                          | 500                           | —                       | —                         | —                       |
|         |  | Flat metal jacketed asbestos filled gasket           | 1840                            | 1000                          | 520                           | —                       | —                         | —                       |
|         |  | Oval ring-joint gasket                               | 1850-V                          | 1501                          | 550-O                         | —                       | —                         | —                       |
|         |  | Octagonal ring-joint gasket                          | 1850-C                          | 1500                          | 550-S                         | —                       | —                         | —                       |
|         |  | Gasket for pressure seal                             | 1850                            | 1502                          | 550-P                         | —                       | —                         | —                       |
|         |  | Plain metal gasket                                   | 1850-P                          | 1400                          | 560                           | —                       | —                         | —                       |
|         |  | Serranted metal gasket                               | 1890                            | 1300                          | 540                           | —                       | —                         | —                       |
|         |  | Spiral wound gasket                                  | 1804                            | 2200                          | 590                           | —                       | 555-RM                    | —                       |
|         |  | Spiral wound gasket with outer ring                  | 1834                            | 2202                          | 591                           | —                       | 555-CR                    | —                       |
|         |  | Spiral wound gasket with inner ring                  | 1804-R                          | 2201                          | 592                           | —                       | —                         | —                       |
|         |  | Spiral wound gasket with inner and outer ring        | 1834-R                          | 2203                          | 596                           | —                       | 555-CRI                   | —                       |
|         |  | Compressed asbestos sheet                            | 1000<br>1100                    | 5000                          | 1500                          | 888<br>333              | 8748<br>7021              | 270<br>235              |
|         |  | Compressed asbestos sheet for aircraft               | 1700                            | 5000AC                        | 1500AC                        | 891                     | 7228                      | —                       |
|         |  | Teflon sheet gasket                                  | 9007                            | 4400                          | 7010                          | 15                      | 8764                      | 2000                    |
|         |  | Teflon sheet gasket with inorganic filler            | 9007-G20<br>9007-SC<br>9007-LC  | 4400-G2                       | 7020                          | —                       | GYLON BLACK<br>GYLON FAWN | —                       |
|         |  | Teflon spiral wound gasket                           | 9090                            | 2300                          | 7590                          | —                       | —                         | —                       |
|         |  | Pure graphite spiral wound gasket                    | 1808-GR                         | 2600                          | 6590                          | —                       | —                         | —                       |

# GASKET MATERIALS AND CONSTRUCTION

(Based upon the ASME Unfired Pressure Vessels Code, Section VIII, Division 1.)

| GASKET GROUP NUMBER | GASKET MATERIAL                                                                                                              |                                                    | GASKET FACTOR<br>m | Minimum Design Seating Stress, $\gamma$<br>psi      MPa |              | SKETCHES                                                                              |
|---------------------|------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|--------------------|---------------------------------------------------------|--------------|---------------------------------------------------------------------------------------|
| Ia                  | Self-Energizing Types<br>O-Rings, Metallic, Elastomer, other Gasket Types<br>Considered as Self-sealing                      |                                                    | 0                  | 0                                                       | 0            | —                                                                                     |
|                     | Elastomer without Fabric or a High Percentage of Asbestos Fiber:<br>Below 75 Shore Durometer<br>75 or Higher Shore Durometer |                                                    | 0.50<br>1.00       | 0<br>200                                                | 0<br>1.4     |    |
|                     | Asbestos with a Suitable Binder for the Operating Conditions                                                                 | 0.12 in. (3.2 mm) thick<br>0.06 in. (1.6 mm) thick | 2.00<br>2.75       | 1600<br>3700                                            | 11.0<br>25.5 |    |
|                     | Elastomer with Cotton Fabric Insertion                                                                                       |                                                    | 1.25               | 400                                                     | 2.8          |    |
|                     | Elastomer with Asbestos Fabric Insertion, with or without Wire Reinforcement                                                 | 3-ply                                              | 2.25               | 2200                                                    | 15.2         |    |
|                     |                                                                                                                              | 2-ply                                              | 2.50               | 2900                                                    | 20.0         |    |
|                     |                                                                                                                              | 1-ply                                              | 2.75               | 3700                                                    | 25.5         |    |
|                     | Vegetable Fiber                                                                                                              |                                                    | 1.75               | 1100                                                    | 7.6          |   |
| Ib                  | Spiral-Wound Metal, with Asbestos or other Nonmetallic Filler                                                                | Carbon Steel<br>Stainless Steel or Monel           | 3.00               | 10000                                                   | 68.9         |   |
|                     | Corrugated Metal, Asbestos Inserted or<br>Corrugated Metal Double Jacketed Asbestos Filled                                   | Soft Aluminum                                      | 2.50               | 2900                                                    | 20.0         |  |
|                     |                                                                                                                              | Soft Copper or Brass                               | 2.75<br>3.00       | 3700<br>4500                                            | 25.5<br>31.0 |                                                                                       |
|                     |                                                                                                                              | Iron or Soft Steel                                 | 3.00               | 4500                                                    | 31.0         |                                                                                       |
|                     | Corrugated Metal                                                                                                             | Soft Aluminum<br>Soft Copper or Brass              | 2.75<br>3.00       | 3700<br>4500                                            | 25.5<br>31.0 |  |
| IIa & IIb           | Asbestos with a Suitable Binder for the Operating Conditions                                                                 | 0.03 in. (0.8 mm) thick                            | 3.50               | 6500                                                    | 44.8         |  |
|                     | Corrugated Metal, Asbestos Inserted or<br>Corrugated Metal Double Jacketed Asbestos Filled                                   | Monel or 4–6% Chrome                               | 3.25               | 5500                                                    | 37.9         |  |
|                     |                                                                                                                              | Stainless Steels                                   | 3.50               | 6500                                                    | 44.8         |                                                                                       |
|                     | Corrugated Metal                                                                                                             | Iron or Soft Steel                                 | 3.25               | 5500                                                    | 37.9         |  |
|                     |                                                                                                                              | Monel or 4–6% Chrome                               | 3.50               | 6500                                                    | 44.8         |                                                                                       |
|                     |                                                                                                                              | Stainless Steels                                   | 3.75               | 7600                                                    | 52.4         |                                                                                       |
|                     | Flat Metal Jacketed Asbestos Filled                                                                                          | Soft Aluminum                                      | 3.25               | 5500                                                    | 37.9         |  |
|                     |                                                                                                                              | Soft Copper or Brass                               | 3.50               | 6500                                                    | 44.8         |                                                                                       |
|                     |                                                                                                                              | Iron or Soft Steel                                 | 3.75               | 7600                                                    | 52.4         |                                                                                       |
|                     |                                                                                                                              | Monel                                              | 3.50               | 8000                                                    | 55.2         |                                                                                       |
|                     |                                                                                                                              | 4–6% Chrome                                        | 3.75               | 9000                                                    | 62.0         |                                                                                       |
|                     | Grooved Metal                                                                                                                | Stainless Steels                                   | 3.75               | 9000                                                    | 62.0         |  |
|                     |                                                                                                                              | Soft Aluminum                                      | 3.25               | 5500                                                    | 37.9         |                                                                                       |
|                     |                                                                                                                              | Soft Copper or Brass                               | 3.50               | 6500                                                    | 44.8         |                                                                                       |
| IIIa & IIIb         | Solid Flat Metal                                                                                                             | Iron or Soft Steel                                 | 3.75               | 7600                                                    | 52.4         |  |
|                     |                                                                                                                              | Monel or 4–6% Chrome                               | 4.25               | 10100                                                   | 69.6         |                                                                                       |
|                     |                                                                                                                              | Stainless Steels                                   | 4.00               | 8800                                                    | 60.7         |                                                                                       |
|                     |                                                                                                                              | Soft Aluminum                                      | 3.25               | 5500                                                    | 37.9         |                                                                                       |
|                     |                                                                                                                              | Soft Copper or Brass                               | 3.50               | 6500                                                    | 44.8         |                                                                                       |
| —                   | Ring Joint                                                                                                                   | Iron or Soft Steel                                 | 5.50               | 18000                                                   | 124.1        |  |
|                     |                                                                                                                              | Monel or 4–6% Chrome                               | 6.00               | 21800                                                   | 150.3        |                                                                                       |
|                     |                                                                                                                              | Stainless Steels                                   | 6.50               | 26000                                                   | 179.3        |                                                                                       |
|                     |                                                                                                                              | Soft Aluminum                                      | 4.00               | 8800                                                    | 60.7         |                                                                                       |

# HARDNESS CONVERSION

| Brinell Indentation Diameter, mm | Brinell Hardness Number |                       | Rockwell Hardness Number |         | Tensile Strength (Approximate) |                                          | Brinell Indentation Diameter, mm | Brinell Hardness Number |                       | Rockwell Hardness Number |         | Tensile Strength (Approximate) |                                          |
|----------------------------------|-------------------------|-----------------------|--------------------------|---------|--------------------------------|------------------------------------------|----------------------------------|-------------------------|-----------------------|--------------------------|---------|--------------------------------|------------------------------------------|
|                                  | Standard Ball           | Tungsten-Carbide Ball | B Scale                  | C Scale | x1000 psi                      | kgf/mm <sup>2</sup> (N/mm <sup>2</sup> ) |                                  | Standard Ball           | Tungsten-Carbide Ball | B Scale                  | C Scale | x1000 psi                      | kgf/mm <sup>2</sup> (N/mm <sup>2</sup> ) |
|                                  | 10mm Ball 3000kg        | 1/16" Ball 100kg Load | Brale 150kg Load         |         |                                |                                          |                                  | 10mm Ball 3000kg        | 1/16" Ball 100kg Load | Brale 150kg Load         |         |                                |                                          |
| —                                | —                       | —                     | —                        | 68.0    | —                              | —                                        | 2.95                             | 429                     | 429                   | —                        | 45.7    | 219                            | 154(1510)                                |
| —                                | —                       | —                     | —                        | 67.5    | —                              | —                                        | 3.00                             | 415                     | 415                   | —                        | 44.5    | 212                            | 149(1461)                                |
| —                                | —                       | —                     | —                        | 67.0    | —                              | —                                        | 3.05                             | 401                     | 401                   | —                        | 43.1    | 202                            | 142(1392)                                |
| —                                | —                       | (767)                 | —                        | 66.4    | —                              | —                                        | 3.10                             | 388                     | 388                   | —                        | 41.8    | 193                            | 136(1334)                                |
| —                                | —                       | (757)                 | —                        | 65.9    | —                              | —                                        | 3.15                             | 375                     | 375                   | —                        | 40.4    | 184                            | 129(1265)                                |
| 2.25                             | —                       | (745)                 | —                        | 65.3    | —                              | —                                        | 3.20                             | 363                     | 363                   | —                        | 39.1    | 177                            | 124(1216)                                |
| —                                | —                       | (733)                 | —                        | 64.7    | —                              | —                                        | 3.25                             | 352                     | 352                   | (110.0)                  | 37.9    | 171                            | 120(1177)                                |
| —                                | —                       | (722)                 | —                        | 64.0    | —                              | —                                        | 3.30                             | 341                     | 341                   | (109.0)                  | 36.6    | 164                            | 115(1128)                                |
| 2.30                             | —                       | (712)                 | —                        | —       | —                              | —                                        | 3.35                             | 331                     | 331                   | (108.5)                  | 35.5    | 159                            | 112(1098)                                |
| —                                | —                       | (710)                 | —                        | 63.3    | —                              | —                                        | 3.40                             | 321                     | 321                   | (108.0)                  | 34.3    | 154                            | 108(1059)                                |
| —                                | —                       | (698)                 | —                        | 62.5    | —                              | —                                        | —                                | —                       | —                     | —                        | —       | —                              | —                                        |
| —                                | —                       | (684)                 | —                        | 61.8    | —                              | —                                        | 3.45                             | 311                     | 311                   | (107.5)                  | 33.1    | 149                            | 105(1030)                                |
| 2.35                             | —                       | (682)                 | —                        | 61.7    | —                              | —                                        | 3.50                             | 302                     | 302                   | (107.0)                  | 32.1    | 146                            | 103(1010)                                |
| —                                | —                       | (670)                 | —                        | 61.0    | —                              | —                                        | 3.55                             | 293                     | 293                   | (106.0)                  | 30.9    | 141                            | 99( 971)                                 |
| —                                | —                       | (656)                 | —                        | 60.1    | —                              | —                                        | 3.60                             | 285                     | 285                   | (105.5)                  | 29.9    | 138                            | 97( 951)                                 |
| 2.40                             | —                       | (653)                 | —                        | 60.0    | —                              | —                                        | 3.65                             | 277                     | 277                   | (104.5)                  | 28.8    | 134                            | 94( 922)                                 |
| —                                | —                       | (647)                 | —                        | 59.7    | —                              | —                                        | 3.70                             | 269                     | 269                   | (104.0)                  | 27.6    | 130                            | 91( 892)                                 |
| —                                | —                       | (638)                 | —                        | 59.2    | —                              | —                                        | 3.75                             | 262                     | 262                   | (103.0)                  | 26.6    | 127                            | 89( 873)                                 |
| —                                | —                       | 630                   | —                        | 58.8    | —                              | —                                        | 3.80                             | 255                     | 255                   | (102.0)                  | 25.4    | 123                            | 86( 843)                                 |
| 2.45                             | —                       | 627                   | —                        | 58.7    | —                              | —                                        | 3.85                             | 248                     | 248                   | (101.0)                  | 24.2    | 120                            | 84( 824)                                 |
| —                                | —                       | —                     | —                        | 58.7    | —                              | —                                        | 3.90                             | 241                     | 241                   | 100.0                    | 22.8    | 116                            | 82( 804)                                 |
| 2.50                             | {                       | —                     | —                        | 59.1    | —                              | —                                        | 3.95                             | 235                     | 235                   | 99.0                     | 21.7    | 114                            | 80( 785)                                 |
| —                                | —                       | 601                   | —                        | 57.3    | —                              | —                                        | 4.00                             | 229                     | 229                   | 98.2                     | 20.5    | 111                            | 78( 765)                                 |
| 2.55                             | {                       | —                     | —                        | 57.3    | —                              | —                                        | 4.05                             | 223                     | 223                   | 97.3                     | (18.8)  | —                              | —                                        |
| —                                | —                       | 578                   | —                        | 56.0    | —                              | —                                        | 4.10                             | 217                     | 217                   | 96.4                     | (17.5)  | 105                            | 74( 726)                                 |
| —                                | —                       | —                     | —                        | 56.0    | —                              | —                                        | 4.15                             | 212                     | 212                   | 95.5                     | (16.0)  | 102                            | 72( 706)                                 |
| 2.60                             | {                       | —                     | —                        | 55.6    | —                              | —                                        | 4.20                             | 207                     | 207                   | 94.6                     | (15.2)  | 100                            | 70( 686)                                 |
| —                                | —                       | 555                   | —                        | 54.7    | 298                            | 210(2095)                                | 4.25                             | 201                     | 201                   | 93.8                     | (13.8)  | 98                             | 69( 677)                                 |
| 2.65                             | {                       | —                     | —                        | 54.0    | 292                            | 205(2010)                                | 4.30                             | 197                     | 197                   | 92.8                     | (12.7)  | 95                             | 67( 657)                                 |
| —                                | —                       | 534                   | —                        | 53.5    | 288                            | 202(1981)                                | 4.35                             | 192                     | 192                   | 91.9                     | (11.5)  | 93                             | 65( 637)                                 |
| —                                | —                       | —                     | —                        | 53.5    | 288                            | 202(1981)                                | 4.40                             | 187                     | 187                   | 90.7                     | (10.0)  | 90                             | 63( 618)                                 |
| 2.70                             | {                       | —                     | —                        | 52.5    | 278                            | 195(1912)                                | 4.45                             | 183                     | 183                   | 90.0                     | ( 9.0)  | 89                             | 63( 618)                                 |
| —                                | —                       | 514                   | —                        | 52.1    | 274                            | 193(1893)                                | 4.50                             | 179                     | 179                   | 89.0                     | ( 8.0)  | 87                             | 61( 598)                                 |
| 2.75                             | {                       | 495                   | —                        | 51.6    | 269                            | 189(1854)                                | 4.55                             | 174                     | 174                   | 87.8                     | ( 6.4)  | 85                             | 60( 588)                                 |
| —                                | —                       | —                     | —                        | 51.1    | 264                            | 186(1824)                                | 4.60                             | 170                     | 170                   | 86.8                     | ( 5.4)  | 83                             | 58( 569)                                 |
| —                                | —                       | 495                   | —                        | 51.0    | 264                            | 186(1824)                                | 4.65                             | 167                     | 167                   | 86.0                     | ( 4.4)  | 81                             | 57( 559)                                 |
| 2.80                             | {                       | 477                   | —                        | 50.3    | 258                            | 181(1775)                                | 4.70                             | 163                     | 163                   | 85.0                     | ( 3.3)  | 79                             | 56( 549)                                 |
| —                                | —                       | —                     | —                        | 49.6    | 252                            | 177(1736)                                | 4.80                             | 156                     | 156                   | 82.9                     | ( 0.9)  | 76                             | 53( 520)                                 |
| —                                | —                       | 477                   | —                        | 49.6    | 252                            | 177(1736)                                | 4.90                             | 149                     | 149                   | 80.8                     | —       | 73                             | 51( 500)                                 |
| 2.85                             | {                       | 461                   | —                        | 48.8    | 244                            | 172(1687)                                | 5.00                             | 143                     | 143                   | 78.7                     | —       | 71                             | 50( 490)                                 |
| —                                | —                       | —                     | —                        | 48.5    | 242                            | 170(1667)                                | 5.10                             | 137                     | 137                   | 76.4                     | —       | 67                             | 47( 461)                                 |
| —                                | —                       | 461                   | —                        | 48.5    | 242                            | 170(1667)                                | 5.20                             | 131                     | 131                   | 74.0                     | —       | 65                             | 46( 451)                                 |
| 2.90                             | {                       | 444                   | —                        | 47.2    | 230                            | 162(1589)                                | 5.30                             | 126                     | 126                   | 72.0                     | —       | 63                             | 44( 431)                                 |
| —                                | —                       | —                     | —                        | 47.1    | 230                            | 162(1589)                                | 5.40                             | 121                     | 121                   | 69.8                     | —       | 60                             | 42( 412)                                 |
| —                                | —                       | —                     | —                        | 47.1    | 230                            | 162(1589)                                | 5.50                             | 116                     | 116                   | 67.6                     | —       | 58                             | 41( 402)                                 |
| —                                | —                       | 444                   | —                        | 47.1    | 230                            | 162(1589)                                | 5.60                             | 111                     | 111                   | 65.7                     | —       | 56                             | 39( 382)                                 |

1. The above HARDNESS CONVERSION TABLE (hereinafter referred as THE TABLE) is made according to SAE 417b and quoted as information only.

2. The table gives the approximate relationship of hardness of BRINELL and ROCKWELL. It is impossible to give the exact relationship, because of the inevitable influence of size, mass, composition and method of heat treatment. Where more precise conversion is required, it should be developed specially to chemical composition, heat treatment and part for each steel.

3. The table is based on extensive tests on carbon and alloy steels, mostly in the heat treated condition, but have been found to be reliable on practically all constructional alloy steel and tool steels in the as-forged, annealed, normalized and quenched and tempered conditions, provided they are homogenous. Such special cases as high manganese steel, 18% chromium 8% nickel steel and other austenitic steels, and nickel base alloys, as well as constructional alloy steels and tool steels in the cold worked condition, may not conform to the relationships given with the degree of accuracy as the steels for which the table are intended.

# SYMBOLS CONVERSION

## Length

| cm                | m                      | in                     | ft                     |
|-------------------|------------------------|------------------------|------------------------|
| 1                 | 1X10 <sup>-3</sup>     | 3.937X10 <sup>-1</sup> | 3.281X10 <sup>-2</sup> |
| 1X10 <sup>2</sup> | 1                      | 3.937X10               | 3.281                  |
| 2.540             | 2.540X10 <sup>-2</sup> | 1                      | 8.333X10 <sup>-2</sup> |
| 3.048X10          | 3.048X10 <sup>-1</sup> | 12                     | 1                      |

## Area

| cm <sup>2</sup>       | m <sup>2</sup>         | in <sup>2</sup>        | ft <sup>2</sup>        |
|-----------------------|------------------------|------------------------|------------------------|
| 1                     | 1X10 <sup>-6</sup>     | 1.550X10 <sup>-1</sup> | 1.076X10 <sup>-3</sup> |
| 1X10 <sup>4</sup>     | 1                      | 1.550X10 <sup>3</sup>  | 1.076X10               |
| 6.452                 | 6.452X10 <sup>-4</sup> | 1                      | 6.944X10 <sup>-3</sup> |
| 9.290X10 <sup>2</sup> | 9.290X10 <sup>-2</sup> | 1.44X10 <sup>2</sup>   | 1                      |

## Volume-1

| cm <sup>3</sup>       | m <sup>3</sup>         | in <sup>3</sup>        | ft <sup>3</sup>        |
|-----------------------|------------------------|------------------------|------------------------|
| 1                     | 1X10 <sup>-6</sup>     | 6.102X10 <sup>-2</sup> | 3.531X10 <sup>-3</sup> |
| 1X10 <sup>6</sup>     | 1                      | 6.102X10 <sup>4</sup>  | 3.531X10               |
| 1.639X10              | 1.639X10 <sup>-5</sup> | 1                      | 5.787X10 <sup>-4</sup> |
| 2.832X10 <sup>4</sup> | 2.832X10 <sup>-2</sup> | 1.728X10 <sup>3</sup>  | 1                      |

## Volume-2

1 U.S. gal. = 231 cu. in.  
1 cu. ft. = 7.4805 U.S. gal

| litre             | m <sup>3</sup>         | British gal.           | U.S. gal.              |
|-------------------|------------------------|------------------------|------------------------|
| 1                 | 1X10 <sup>-3</sup>     | 2.20X10 <sup>-1</sup>  | 2.642X10 <sup>-1</sup> |
| 1X10 <sup>3</sup> | 1                      | 2.20X10 <sup>2</sup>   | 2.642X10 <sup>2</sup>  |
| 4.546             | 4.546X10 <sup>-3</sup> | 1                      | 1.201                  |
| 3.785             | 3.785X10 <sup>-3</sup> | 8.327X10 <sup>-1</sup> | 1                      |

## Weight

t; ton, ton; British ton, Shtn; U.S. ton

| kg                     | t                      | lb                    | ton                    | Sh tn                  |
|------------------------|------------------------|-----------------------|------------------------|------------------------|
| 1                      | 1X10 <sup>-3</sup>     | 2.205                 | 9.842X10 <sup>-4</sup> | 1.102X10 <sup>-3</sup> |
| 1X10 <sup>3</sup>      | 1                      | 2.205X10 <sup>3</sup> | 9.842X10 <sup>-1</sup> | 1.102                  |
| 4.536X10 <sup>-1</sup> | 4.536X10 <sup>-4</sup> | 1                     | 4.464X10 <sup>-4</sup> | 5.1X10 <sup>-4</sup>   |
| 1.016X10 <sup>3</sup>  | 1.016                  | 2.240X10 <sup>3</sup> | 1                      | 1.12                   |
| 9.072X10 <sup>2</sup>  | 9.072X10 <sup>-1</sup> | 2.000X10 <sup>3</sup> | 8.929X10 <sup>-1</sup> | 1                      |

## Density

1 g/cm<sup>3</sup> = 1 t/m<sup>3</sup>

| g/cm <sup>3</sup>      | Kg/m <sup>3</sup>     | lb/in <sup>3</sup>     | lb/ft <sup>3</sup>     | lb/U.S. gal.           |
|------------------------|-----------------------|------------------------|------------------------|------------------------|
| 1                      | 1X10 <sup>3</sup>     | 3.613X10 <sup>-2</sup> | 6.243X10               | 8.345                  |
| 1X10 <sup>-3</sup>     | 1                     | 3.613X10 <sup>-5</sup> | 6.243X10 <sup>-2</sup> | 8.345X10 <sup>-3</sup> |
| 2.768X10               | 2.768X10 <sup>4</sup> | 1                      | 1.728X10 <sup>3</sup>  | 231                    |
| 1.602X10 <sup>-2</sup> | 1.602X10              | 5.787X10 <sup>-4</sup> | 1                      | 1.337X10 <sup>-1</sup> |
| 1.198X10 <sup>-1</sup> | 1.198X10 <sup>3</sup> | 4.329X10 <sup>-3</sup> | 7.481                  | 1                      |

## Force

1 dyn = 10<sup>-5</sup> N

| kgf                      | lbf                    | N                  | dyn                     |
|--------------------------|------------------------|--------------------|-------------------------|
| 1                        | 2.205                  | 9.80665            | 9.80665X10 <sup>5</sup> |
| 4.536X10 <sup>-1</sup>   | 1                      | 4.44822            | 4.44822X10 <sup>5</sup> |
| 1.01972X10 <sup>-1</sup> | 2.248X10 <sup>-1</sup> | 1                  | 1X10 <sup>5</sup>       |
| 1.01972X10 <sup>-6</sup> | 2.248X10 <sup>-6</sup> | 1X10 <sup>-5</sup> | 1                       |

## Power

1W = 1 J/s, 1 kgf·m/s = 9.80665W, 1 PS = 0.7355kW

| kW                      | kgf·m/s                | PS                      | HP                     |
|-------------------------|------------------------|-------------------------|------------------------|
| 1                       | 1.0197X10 <sup>2</sup> | 1.3596                  | 1.3405                 |
| 9.8067X10 <sup>-3</sup> | 1                      | 1.3333X10 <sup>-2</sup> | 1.315X10 <sup>-2</sup> |
| 7.355X10 <sup>-1</sup>  | 7.5X10                 | 1                       | 9.859X10 <sup>-1</sup> |
| 7.46X10 <sup>-1</sup>   | 7.607X10               | 1.0143                  | 1                      |

## Pressure

1 Pa = 1 N/m<sup>2</sup>

| kg/cm <sup>2</sup>       | psi                      | bar                      | Pa                      | kPa                     | MPa                      |
|--------------------------|--------------------------|--------------------------|-------------------------|-------------------------|--------------------------|
| 1                        | 14.22313                 | 9.80665X10 <sup>-1</sup> | 9.80665X10 <sup>4</sup> | 9.80665X10 <sup>1</sup> | 9.80665X10 <sup>-2</sup> |
| 0.070308                 | 1                        | 6.89486X10 <sup>-2</sup> | 6.89486X10 <sup>3</sup> | 6.89486                 | 6.89486X10 <sup>-3</sup> |
| 1.01972                  | 14.50356                 | 1                        | X10 <sup>5</sup>        | X10 <sup>2</sup>        | X0.1                     |
| 1.01972X10 <sup>-5</sup> | 1.45036X10 <sup>-4</sup> | 1X10 <sup>-5</sup>       | 1                       | X10 <sup>-3</sup>       | X10 <sup>-6</sup>        |
| 1.01972X10 <sup>-2</sup> | 1.45036X10 <sup>-1</sup> | 1X10 <sup>-2</sup>       | X10 <sup>3</sup>        | 1                       | X10 <sup>-3</sup>        |
| 1.01972X10 <sup>1</sup>  | 1.45036X10 <sup>2</sup>  | X10 <sup>1</sup>         | X10 <sup>6</sup>        | X10 <sup>3</sup>        | 1                        |

## Stress

1 N/mm<sup>2</sup> = 1 MPa

| kgf/mm <sup>2</sup>      | kgf/cm <sup>2</sup>      | lbf/ft <sup>2</sup>    | Pa                      | MPa (=N/mm <sup>2</sup> ) |
|--------------------------|--------------------------|------------------------|-------------------------|---------------------------|
| 1                        | 1X10 <sup>2</sup>        | 2.048X10 <sup>5</sup>  | 9.80665X10 <sup>6</sup> | 9.80665                   |
| 1X10 <sup>-2</sup>       | 1                        | 2.048X10 <sup>3</sup>  | 9.80665X10 <sup>4</sup> | 9.80665X10 <sup>-2</sup>  |
| 4.882X10 <sup>-6</sup>   | 4.882X10 <sup>-4</sup>   | 1                      | 4.786X10                | 4.786X10 <sup>-5</sup>    |
| 1.01972X10 <sup>-7</sup> | 1.01972X10 <sup>-5</sup> | 2.089X10 <sup>-2</sup> | 1                       | 1X10 <sup>-6</sup>        |
| 1.01972X10 <sup>-1</sup> | 1.01972X10               | 2.089X10 <sup>4</sup>  | 1X10 <sup>6</sup>       | 1                         |

## Velocity

1 kn (Knot) = 1852 m/h

| m/s    | km/h  | kn     | ft/s   | mile/h |
|--------|-------|--------|--------|--------|
| 1      | 3.6   | 1.944  | 3.281  | 2.237  |
| 0.2778 | 1     | 0.5400 | 0.9113 | 0.6214 |
| 0.5144 | 1.852 | 1      | 1.688  | 1.151  |
| 0.3048 | 1.097 | 0.5925 | 1      | 0.6818 |
| 0.4470 | 1.609 | 0.8690 | 1.467  | 1      |

## Viscosity

1 lbf·s/in<sup>2</sup> = 6.9X10<sup>6</sup> cP, 1 Pa·s = 1N·s/m<sup>2</sup>, 1 cP = 1mPa·s  
1 P = 1 dyn·s/cm<sup>2</sup> = 1 g/cm·s

| kgf·s/m <sup>2</sup>     | lbf·s/in <sup>2</sup>  | Pa·s                | cP                      | P                   |
|--------------------------|------------------------|---------------------|-------------------------|---------------------|
| 1                        | 1.422X10 <sup>-3</sup> | 9.80665             | 9.80665X10 <sup>3</sup> | 9.80665X10          |
| 7.03X10 <sup>2</sup>     | 1                      | 6.9X10 <sup>3</sup> | 6.9X10 <sup>6</sup>     | 6.9X10 <sup>4</sup> |
| 1.01973X10 <sup>-1</sup> | 1.449X10 <sup>-4</sup> | 1                   | 1X10 <sup>3</sup>       | 1X10                |
| 1.01973X10 <sup>-4</sup> | 1.449X10 <sup>-7</sup> | 1X10 <sup>-3</sup>  | 1                       | 1X10 <sup>2</sup>   |
| 1.01973X10 <sup>-2</sup> | 1.449X10 <sup>-5</sup> | 1X10 <sup>-1</sup>  | 1X10 <sup>2</sup>       | 1                   |

## Kinematic viscosity

1 St = 1 cm<sup>2</sup>/s

| m <sup>2</sup> /s      | ft <sup>2</sup> /s     | cSt                   | St                    |
|------------------------|------------------------|-----------------------|-----------------------|
| 1                      | 1.076X10               | 1X10 <sup>6</sup>     | 1X10 <sup>4</sup>     |
| 9.290X10 <sup>-2</sup> | 1                      | 9.290X10 <sup>4</sup> | 9.290X10 <sup>2</sup> |
| 1X10 <sup>-6</sup>     | 1.076X10 <sup>-5</sup> | 1                     | 1X10 <sup>-2</sup>    |
| 1X10 <sup>-4</sup>     | 1.076X10 <sup>-3</sup> | 1X10 <sup>-2</sup>    | 1                     |

## Flow

| m <sup>3</sup> /s      | m <sup>3</sup> /h      | ft <sup>3</sup> /h    | ft <sup>3</sup> /s     |
|------------------------|------------------------|-----------------------|------------------------|
| 1                      | 3.600X10 <sup>3</sup>  | 1.272X10 <sup>5</sup> | 3.531X10               |
| 2.778X10 <sup>-4</sup> | 1                      | 3.531X10              | 9.807X10 <sup>-3</sup> |
| 7.865X10 <sup>-6</sup> | 2.832X10 <sup>-2</sup> | 1                     | 2.778X10 <sup>-4</sup> |
| 2.832X10 <sup>-2</sup> | 1.020X10 <sup>2</sup>  | 3.600X10 <sup>3</sup> | 1                      |

## Energy

1 J = 1 W·s, 1 W·h = 3600W·s  
1 cal = 4.18605J

| kgf·m                   | lbf·ft                 | J                     | kW·h                   | kcal                   |
|-------------------------|------------------------|-----------------------|------------------------|------------------------|
| 1                       | 7.231                  | 9.807                 | 2.724X10 <sup>-6</sup> | 2.343X10 <sup>-3</sup> |
| 1.383X10 <sup>-1</sup>  | 1                      | 1.356                 | 3.766X10 <sup>-7</sup> | 3.239X10 <sup>-4</sup> |
| 1.0197X10 <sup>-1</sup> | 7.376X10 <sup>-1</sup> | 1                     | 2.778X10 <sup>-7</sup> | 2.389X10 <sup>-4</sup> |
| 3.671X10 <sup>5</sup>   | 2.655X10 <sup>6</sup>  | 3.600X10 <sup>6</sup> | 1                      | 8.600X10 <sup>2</sup>  |
| 4.269X10 <sup>2</sup>   | 3.087X10 <sup>3</sup>  | 4.186X10 <sup>3</sup> | 1.163X10 <sup>-3</sup> | 1                      |

# TEMPERATURE CONVERSION °C—°F

(Centigrade To Fahrenheit—Fahrenheit To Centigrade)

| -459.4° to 0° |                     |        | 1° to 60° |                     |       | 61° to 290° |                     |       | 300° to 890° |                     |      | 900° to 3000° |                     |      |
|---------------|---------------------|--------|-----------|---------------------|-------|-------------|---------------------|-------|--------------|---------------------|------|---------------|---------------------|------|
| C             | CENT.<br>OR<br>FAH. | F      | C         | CENT.<br>OR<br>FAH. | F     | C           | CENT.<br>OR<br>FAH. | F     | C            | CENT.<br>OR<br>FAH. | F    | C             | CENT.<br>OR<br>FAH. | F    |
| -273          | -459.4              |        | -17.2     | 1                   | 33.8  | 16.1        | 61                  | 141.8 | 149          | 300                 | 572  | 482           | 900                 | 1652 |
| -268          | -450                |        | -16.7     | 2                   | 35.6  | 16.7        | 62                  | 143.6 | 154          | 310                 | 590  | 488           | 910                 | 1670 |
| -262          | -440                |        | -16.1     | 3                   | 37.4  | 17.2        | 63                  | 145.4 | 160          | 320                 | 608  | 493           | 920                 | 1688 |
| -257          | -430                |        | -15.6     | 4                   | 39.2  | 17.8        | 64                  | 147.2 | 166          | 330                 | 626  | 499           | 930                 | 1706 |
| -251          | -420                |        | -15.0     | 5                   | 41.0  | 18.3        | 65                  | 149.0 | 171          | 340                 | 644  | 504           | 940                 | 1724 |
| -246          | -410                |        | -14.4     | 6                   | 42.8  | 18.9        | 66                  | 150.8 | 177          | 350                 | 662  | 510           | 950                 | 1742 |
| -240          | -400                |        | -13.9     | 7                   | 44.6  | 19.4        | 67                  | 152.6 | 182          | 360                 | 680  | 516           | 960                 | 1760 |
| -234          | -390                |        | -13.3     | 8                   | 46.4  | 20.0        | 68                  | 154.4 | 188          | 370                 | 698  | 521           | 970                 | 1778 |
| -229          | -380                |        | -12.8     | 9                   | 48.2  | 20.6        | 69                  | 156.2 | 193          | 380                 | 716  | 527           | 980                 | 1796 |
| -223          | -370                |        | -12.2     | 10                  | 50.0  | 21.1        | 70                  | 158.0 | 199          | 390                 | 734  | 532           | 990                 | 1814 |
| -218          | -360                |        | -11.7     | 11                  | 51.8  | 21.7        | 71                  | 159.8 | 204          | 400                 | 752  | 538           | 1000                | 1832 |
| -212          | -350                |        | -11.1     | 12                  | 53.6  | 22.2        | 72                  | 161.6 | 210          | 410                 | 770  | 549           | 1020                | 1868 |
| -207          | -340                |        | -10.6     | 13                  | 55.4  | 22.8        | 73                  | 163.4 | 215          | 420                 | 788  | 560           | 1040                | 1904 |
| -201          | -330                |        | -10.0     | 14                  | 57.2  | 23.3        | 74                  | 165.2 | 221          | 430                 | 806  | 571           | 1060                | 1940 |
| -196          | -320                |        | -9.4      | 15                  | 59.0  | 23.9        | 75                  | 167.0 | 227          | 440                 | 824  | 582           | 1080                | 1976 |
| -190          | -310                |        | -8.9      | 16                  | 60.8  | 24.4        | 76                  | 168.8 | 232          | 450                 | 842  | 593           | 1100                | 2012 |
| -184          | -300                |        | -8.3      | 17                  | 62.6  | 25.0        | 77                  | 170.6 | 238          | 460                 | 860  | 604           | 1120                | 2048 |
| -179          | -290                |        | -7.8      | 18                  | 64.4  | 25.6        | 78                  | 172.4 | 243          | 470                 | 878  | 616           | 1140                | 2084 |
| -173          | -280                |        | -7.2      | 19                  | 66.2  | 26.1        | 79                  | 174.2 | 249          | 480                 | 896  | 627           | 1160                | 2120 |
| -169          | -273                | -459.4 | -6.7      | 20                  | 68.0  | 26.7        | 80                  | 176.0 | 254          | 490                 | 914  | 638           | 1180                | 2156 |
| -168          | -270                | -454   | -6.1      | 21                  | 69.8  | 27.2        | 81                  | 177.8 | 260          | 500                 | 932  | 649           | 1200                | 2192 |
| -162          | -260                | -436   | -5.6      | 22                  | 71.6  | 27.8        | 82                  | 179.6 | 266          | 510                 | 950  | 660           | 1220                | 2228 |
| -157          | -250                | -418   | -5.0      | 23                  | 73.4  | 28.3        | 83                  | 181.4 | 271          | 520                 | 968  | 671           | 1240                | 2264 |
| -151          | -240                | -400   | -4.4      | 24                  | 75.2  | 28.9        | 84                  | 183.2 | 277          | 530                 | 986  | 682           | 1260                | 2300 |
| -146          | -230                | -382   | -3.9      | 25                  | 77.0  | 29.4        | 85                  | 185.0 | 282          | 540                 | 1004 | 693           | 1280                | 2336 |
| -140          | -220                | -364   | -3.3      | 26                  | 78.8  | 30.0        | 86                  | 186.8 | 288          | 550                 | 1022 | 704           | 1300                | 2372 |
| -134          | -210                | -346   | -2.8      | 27                  | 80.6  | 30.6        | 87                  | 188.6 | 293          | 560                 | 1040 | 732           | 1350                | 2462 |
| -129          | -200                | -328   | -2.2      | 28                  | 82.4  | 31.1        | 88                  | 190.4 | 299          | 570                 | 1058 | 760           | 1400                | 2552 |
| -123          | -190                | -310   | -1.7      | 29                  | 84.2  | 31.7        | 89                  | 192.2 | 304          | 580                 | 1076 | 788           | 1450                | 2642 |
| -118          | -180                | -292   | -1.1      | 30                  | 86.0  | 32.2        | 90                  | 194.0 | 310          | 590                 | 1094 | 816           | 1500                | 2732 |
| -112          | -170                | -274   | -0.6      | 31                  | 87.8  | 32.8        | 91                  | 195.8 | 316          | 600                 | 1112 | 843           | 1550                | 2822 |
| -107          | -160                | -256   | 0.0       | 32                  | 89.6  | 33.3        | 92                  | 197.6 | 321          | 610                 | 1130 | 871           | 1600                | 2912 |
| -101          | -150                | -238   | 0.6       | 33                  | 91.4  | 33.9        | 93                  | 199.4 | 327          | 620                 | 1148 | 899           | 1650                | 3002 |
| -96           | -140                | -220   | 1.1       | 34                  | 93.2  | 34.4        | 94                  | 201.2 | 332          | 630                 | 1166 | 927           | 1700                | 3092 |
| -90           | -130                | -202   | 1.7       | 35                  | 95.0  | 35.0        | 95                  | 203.0 | 338          | 640                 | 1184 | 954           | 1750                | 3182 |
| -84           | -120                | -184   | 2.2       | 36                  | 96.8  | 35.6        | 96                  | 204.8 | 343          | 650                 | 1202 | 982           | 1800                | 3272 |
| -79           | -110                | -166   | 2.8       | 37                  | 98.6  | 36.1        | 97                  | 206.6 | 349          | 660                 | 1220 | 1010          | 1850                | 3362 |
| -73           | -100                | -148   | 3.3       | 38                  | 100.4 | 36.7        | 98                  | 208.4 | 354          | 670                 | 1238 | 1038          | 1900                | 3452 |
| -68           | -90                 | -130   | 3.9       | 39                  | 102.2 | 37.2        | 99                  | 210.2 | 360          | 680                 | 1256 | 1066          | 1950                | 3542 |
| -62           | -80                 | -112   | 4.4       | 40                  | 104.0 | 37.8        | 100                 | 212.0 | 366          | 690                 | 1274 | 1093          | 2000                | 3632 |
| -57           | -70                 | -94    | 5.0       | 41                  | 105.8 | 43          | 110                 | 230   | 371          | 700                 | 1292 | 1121          | 2050                | 3722 |
| -51           | -60                 | -76    | 5.6       | 42                  | 107.6 | 49          | 120                 | 248   | 377          | 710                 | 1310 | 1149          | 2100                | 3812 |
| -46           | -50                 | -58    | 6.1       | 43                  | 109.4 | 54          | 130                 | 266   | 382          | 720                 | 1328 | 1177          | 2150                | 3902 |
| -40           | -40                 | -40    | 6.7       | 44                  | 111.2 | 60          | 140                 | 284   | 388          | 730                 | 1346 | 1204          | 2200                | 3992 |
| -34           | -30                 | -22    | 7.2       | 45                  | 113.0 | 66          | 150                 | 302   | 393          | 740                 | 1364 | 1232          | 2250                | 4082 |
| -29           | -20                 | -4     | 7.8       | 46                  | 114.8 | 71          | 160                 | 320   | 399          | 750                 | 1382 | 1260          | 2300                | 4172 |
| -23           | -10                 | 14     | 8.3       | 47                  | 116.6 | 77          | 170                 | 338   | 404          | 760                 | 1400 | 1288          | 2350                | 4262 |
| -17.8         | 0                   | 32     | 8.9       | 48                  | 118.4 | 82          | 180                 | 356   | 410          | 770                 | 1418 | 1316          | 2400                | 4352 |
|               |                     |        | 9.4       | 49                  | 120.2 | 88          | 190                 | 374   | 416          | 780                 | 1436 | 1343          | 2450                | 4442 |
|               |                     |        | 10.0      | 50                  | 122.0 | 93          | 200                 | 392   | 421          | 790                 | 1454 | 1371          | 2500                | 4532 |
|               |                     |        | 10.6      | 51                  | 123.8 | 99          | 210                 | 410   | 427          | 800                 | 1472 | 1399          | 2550                | 4622 |
|               |                     |        | 11.1      | 52                  | 125.6 | 100         | 212                 | 413.6 | 432          | 810                 | 1490 | 1427          | 2600                | 4712 |
|               |                     |        | 11.7      | 53                  | 127.4 | 104         | 220                 | 428   | 438          | 820                 | 1508 | 1454          | 2650                | 4802 |
|               |                     |        | 12.2      | 54                  | 129.2 | 110         | 230                 | 446   | 443          | 830                 | 1526 | 1482          | 2700                | 4892 |
|               |                     |        | 12.8      | 55                  | 131.0 | 116         | 240                 | 464   | 449          | 840                 | 1544 | 1510          | 2750                | 4982 |
|               |                     |        | 13.3      | 56                  | 132.8 | 121         | 250                 | 482   | 454          | 850                 | 1562 | 1538          | 2800                | 5072 |
|               |                     |        | 13.9      | 57                  | 134.6 | 127         | 260                 | 500   | 460          | 860                 | 1580 | 1566          | 2850                | 5162 |
|               |                     |        | 14.4      | 58                  | 136.4 | 132         | 270                 | 518   | 466          | 870                 | 1598 | 1593          | 2900                | 5252 |
|               |                     |        | 15.0      | 59                  | 138.2 | 138         | 280                 | 536   | 471          | 880                 | 1616 | 1621          | 2950                | 5342 |
|               |                     |        | 15.6      | 60                  | 140.0 | 143         | 290                 | 554   | 477          | 890                 | 1634 | 1649          | 3000                | 5432 |

Locate temperature in middle column. If in degrees Centigrade, read Fahrenheit equivalent in right hand column: If in degrees Fahrenheit, read Centigrade equivalent in left hand column.

Degrees—Fahrenheit to Centigrade

$$-^{\circ}\text{C} = 5/9 (^{\circ}\text{F} + 32)$$

$$+^{\circ}\text{C} = 5/9 (^{\circ}\text{F} - 32)$$

Degrees—Centigrade to Fahrenheit

$$-^{\circ}\text{F} = (9/5 \times ^{\circ}\text{C}) - 32$$

$$+^{\circ}\text{F} = (9/5 \times ^{\circ}\text{C}) + 32$$

# PRESSURE CONVERSION

$$1 \text{ kgs./cm}^2 = 14.223 \text{ Lbs./In.}^2 \quad 1 \text{ Lbs./In.}^2 = 0.0703 \text{ kgs./cm}^2$$

| 1 to 60              |                       |                       | 61 to 200            |                       |                       | 205 to 700           |                       |                       | 710 to 1,600         |                       |                       | 1,620 to 2,800       |                       |                       |
|----------------------|-----------------------|-----------------------|----------------------|-----------------------|-----------------------|----------------------|-----------------------|-----------------------|----------------------|-----------------------|-----------------------|----------------------|-----------------------|-----------------------|
|                      | kgs./cm <sup>2</sup>  | lbs./in. <sup>2</sup> |                      | kgs./cm <sup>2</sup>  | lbs./in. <sup>2</sup> |                      | kgs./cm <sup>2</sup>  | lbs./in. <sup>2</sup> |                      | kgs./cm <sup>2</sup>  | lbs./in. <sup>2</sup> |                      | kgs./cm <sup>2</sup>  | lbs./in. <sup>2</sup> |
| kgs./cm <sup>2</sup> | lbs./in. <sup>2</sup> |                       | kgs./cm <sup>2</sup> | lbs./in. <sup>2</sup> |                       | kgs./cm <sup>2</sup> | lbs./in. <sup>2</sup> |                       | kgs./cm <sup>2</sup> | lbs./in. <sup>2</sup> |                       | kgs./cm <sup>2</sup> | lbs./in. <sup>2</sup> |                       |
| 0.07                 | 1                     | 14.22                 | 4.29                 | 61                    | 868                   | 14.41                | 205                   | 2,916                 | 49.92                | 710                   | 10,098                | 113.90               | 1,620                 | 23,041                |
| 0.14                 | 2                     | 28.45                 | 4.36                 | 62                    | 882                   | 14.76                | 210                   | 2,987                 | 50.62                | 720                   | 10,241                | 115.30               | 1,640                 | 23,326                |
| 0.21                 | 3                     | 42.67                 | 4.43                 | 63                    | 896                   | 15.12                | 215                   | 3,058                 | 51.32                | 730                   | 10,383                | 116.71               | 1,660                 | 23,610                |
| 0.28                 | 4                     | 56.89                 | 4.50                 | 64                    | 910                   | 15.47                | 220                   | 3,129                 | 52.03                | 740                   | 10,525                | 118.12               | 1,680                 | 23,895                |
| 0.35                 | 5                     | 71.12                 | 4.57                 | 65                    | 925                   | 15.82                | 225                   | 3,200                 | 52.73                | 750                   | 10,667                | 119.52               | 1,700                 | 24,179                |
| 0.42                 | 6                     | 85.34                 | 4.64                 | 66                    | 939                   | 16.17                | 230                   | 3,271                 | 53.43                | 760                   | 10,809                | 120.93               | 1,720                 | 24,464                |
| 0.49                 | 7                     | 99.56                 | 4.71                 | 67                    | 953                   | 16.52                | 235                   | 3,342                 | 54.14                | 770                   | 10,952                | 122.33               | 1,740                 | 24,748                |
| 0.56                 | 8                     | 113.78                | 4.78                 | 68                    | 967                   | 16.87                | 240                   | 3,414                 | 54.84                | 780                   | 11,094                | 123.74               | 1,760                 | 25,032                |
| 0.63                 | 9                     | 128.01                | 4.85                 | 69                    | 981                   | 17.23                | 245                   | 3,485                 | 55.54                | 790                   | 11,236                | 125.15               | 1,780                 | 25,317                |
| 0.70                 | 10                    | 142.23                | 4.92                 | 70                    | 996                   | 17.58                | 250                   | 3,556                 | 56.25                | 800                   | 11,378                | 126.56               | 1,800                 | 25,601                |
| 0.77                 | 11                    | 156.45                | 4.99                 | 71                    | 1,010                 | 17.93                | 255                   | 3,627                 | 56.95                | 810                   | 11,521                | 127.96               | 1,820                 | 25,886                |
| 0.84                 | 12                    | 170.68                | 5.06                 | 72                    | 1,024                 | 18.28                | 260                   | 3,698                 | 57.65                | 820                   | 11,663                | 129.36               | 1,840                 | 26,170                |
| 0.91                 | 13                    | 184.90                | 5.13                 | 73                    | 1,038                 | 18.63                | 265                   | 3,769                 | 58.35                | 830                   | 11,805                | 130.76               | 1,860                 | 26,455                |
| 0.98                 | 14                    | 199.12                | 5.20                 | 74                    | 1,053                 | 18.98                | 270                   | 3,840                 | 59.06                | 840                   | 11,947                | 132.18               | 1,880                 | 26,739                |
| 1.05                 | 15                    | 213.35                | 5.27                 | 75                    | 1,067                 | 19.33                | 275                   | 3,911                 | 59.76                | 850                   | 12,090                | 133.58               | 1,900                 | 27,024                |
| 1.12                 | 16                    | 227.57                | 5.34                 | 76                    | 1,081                 | 19.69                | 280                   | 3,982                 | 60.46                | 860                   | 12,232                | 134.99               | 1,920                 | 27,308                |
| 1.20                 | 17                    | 241.79                | 5.41                 | 77                    | 1,095                 | 20.04                | 285                   | 4,054                 | 61.17                | 870                   | 12,374                | 136.39               | 1,940                 | 27,593                |
| 1.27                 | 18                    | 256.01                | 5.48                 | 78                    | 1,109                 | 20.39                | 290                   | 4,125                 | 61.87                | 880                   | 12,516                | 137.80               | 1,960                 | 27,877                |
| 1.34                 | 19                    | 270.24                | 5.55                 | 79                    | 1,124                 | 20.74                | 295                   | 4,196                 | 62.57                | 890                   | 12,658                | 139.21               | 1,980                 | 28,162                |
| 1.41                 | 20                    | 284.46                | 5.62                 | 80                    | 1,138                 | 21.09                | 300                   | 4,267                 | 63.28                | 900                   | 12,801                | 140.61               | 2,000                 | 28,446                |
| 1.48                 | 21                    | 298.68                | 5.69                 | 81                    | 1,152                 | 21.80                | 310                   | 4,409                 | 63.98                | 910                   | 12,943                | 142.02               | 2,020                 | 28,730                |
| 1.55                 | 22                    | 312.91                | 5.77                 | 82                    | 1,166                 | 22.50                | 320                   | 4,551                 | 64.68                | 920                   | 13,085                | 143.43               | 2,040                 | 29,015                |
| 1.62                 | 23                    | 327.13                | 5.84                 | 83                    | 1,181                 | 23.20                | 330                   | 4,694                 | 65.39                | 930                   | 13,227                | 144.83               | 2,060                 | 29,299                |
| 1.69                 | 24                    | 341.35                | 5.91                 | 84                    | 1,195                 | 23.90                | 340                   | 4,836                 | 66.09                | 940                   | 13,370                | 146.24               | 2,080                 | 29,584                |
| 1.76                 | 25                    | 355.58                | 5.98                 | 85                    | 1,209                 | 24.61                | 350                   | 4,978                 | 66.79                | 950                   | 13,512                | 147.64               | 2,100                 | 29,868                |
| 1.83                 | 26                    | 369.80                | 6.05                 | 86                    | 1,223                 | 25.31                | 360                   | 5,120                 | 67.49                | 960                   | 13,654                | 149.05               | 2,120                 | 30,153                |
| 1.90                 | 27                    | 384.02                | 6.12                 | 87                    | 1,237                 | 26.01                | 370                   | 5,263                 | 68.20                | 970                   | 13,796                | 150.46               | 2,140                 | 30,437                |
| 1.97                 | 28                    | 398.24                | 6.19                 | 88                    | 1,252                 | 26.72                | 380                   | 5,405                 | 68.90                | 980                   | 13,939                | 151.86               | 2,160                 | 30,722                |
| 2.04                 | 29                    | 412.47                | 6.26                 | 89                    | 1,266                 | 27.42                | 390                   | 5,547                 | 69.60                | 990                   | 14,081                | 153.27               | 2,180                 | 31,006                |
| 2.11                 | 30                    | 426.69                | 6.33                 | 90                    | 1,280                 | 28.12                | 400                   | 5,689                 | 70.31                | 1,000                 | 14,223                | 154.67               | 2,200                 | 31,291                |
| 2.18                 | 31                    | 440.91                | 6.40                 | 91                    | 1,294                 | 28.83                | 410                   | 5,831                 | 71.71                | 1,020                 | 14,507                | 156.08               | 2,220                 | 31,575                |
| 2.25                 | 32                    | 455.14                | 6.47                 | 92                    | 1,309                 | 29.53                | 420                   | 5,974                 | 73.12                | 1,040                 | 14,792                | 157.49               | 2,240                 | 31,860                |
| 2.32                 | 33                    | 469.36                | 6.54                 | 93                    | 1,323                 | 30.23                | 430                   | 6,116                 | 74.52                | 1,060                 | 15,076                | 158.89               | 2,260                 | 32,144                |
| 2.39                 | 34                    | 483.58                | 6.61                 | 94                    | 1,337                 | 30.93                | 440                   | 6,258                 | 75.93                | 1,080                 | 15,361                | 160.30               | 2,280                 | 32,428                |
| 2.46                 | 35                    | 497.81                | 6.68                 | 95                    | 1,351                 | 31.64                | 450                   | 6,400                 | 77.34                | 1,100                 | 15,645                | 161.71               | 2,300                 | 32,713                |
| 2.53                 | 36                    | 512.03                | 6.75                 | 96                    | 1,365                 | 32.34                | 460                   | 6,543                 | 78.74                | 1,120                 | 15,930                | 163.11               | 2,320                 | 32,997                |
| 2.60                 | 37                    | 526.25                | 6.82                 | 97                    | 1,380                 | 33.04                | 470                   | 6,685                 | 80.15                | 1,140                 | 16,214                | 164.52               | 2,340                 | 33,282                |
| 2.67                 | 38                    | 540.47                | 6.89                 | 98                    | 1,394                 | 33.75                | 480                   | 6,827                 | 81.56                | 1,160                 | 16,499                | 165.92               | 2,360                 | 33,566                |
| 2.74                 | 39                    | 554.70                | 6.96                 | 99                    | 1,408                 | 34.45                | 490                   | 6,969                 | 82.96                | 1,180                 | 16,783                | 167.33               | 2,380                 | 33,851                |
| 2.81                 | 40                    | 568.92                | 7.03                 | 100                   | 1,422                 | 35.15                | 500                   | 7,112                 | 84.37                | 1,200                 | 17,068                | 168.74               | 2,400                 | 34,135                |
| 2.88                 | 41                    | 583.14                | 7.38                 | 105                   | 1,493                 | 35.86                | 510                   | 7,254                 | 85.77                | 1,220                 | 17,352                | 170.14               | 2,420                 | 34,420                |
| 2.95                 | 42                    | 597.40                | 7.73                 | 110                   | 1,565                 | 36.56                | 520                   | 7,396                 | 87.18                | 1,240                 | 17,637                | 171.55               | 2,440                 | 34,704                |
| 3.02                 | 43                    | 611.59                | 8.09                 | 115                   | 1,636                 | 37.26                | 530                   | 7,538                 | 88.59                | 1,260                 | 17,921                | 172.95               | 2,460                 | 34,989                |
| 3.09                 | 44                    | 625.81                | 8.44                 | 120                   | 1,707                 | 37.97                | 540                   | 7,680                 | 89.99                | 1,280                 | 18,205                | 174.36               | 2,480                 | 35,273                |
| 3.16                 | 45                    | 640.04                | 8.79                 | 125                   | 1,778                 | 38.67                | 550                   | 7,823                 | 91.40                | 1,300                 | 18,490                | 175.77               | 2,500                 | 35,558                |
| 3.23                 | 46                    | 654.26                | 9.14                 | 130                   | 1,849                 | 39.37                | 560                   | 7,965                 | 92.80                | 1,320                 | 18,774                | 177.16               | 2,520                 | 35,842                |
| 3.30                 | 47                    | 668.48                | 9.49                 | 135                   | 1,920                 | 40.07                | 570                   | 8,107                 | 94.21                | 1,340                 | 19,059                | 178.56               | 2,540                 | 36,126                |
| 3.37                 | 48                    | 682.70                | 9.84                 | 140                   | 1,991                 | 40.78                | 580                   | 8,249                 | 95.62                | 1,360                 | 19,343                | 180.00               | 2,560                 | 36,411                |
| 3.45                 | 49                    | 696.93                | 10.19                | 145                   | 2,062                 | 41.48                | 590                   | 8,392                 | 97.02                | 1,380                 | 19,628                | 181.37               | 2,580                 | 36,695                |
| 3.52                 | 50                    | 711.15                | 10.55                | 150                   | 2,133                 | 42.18                | 600                   | 8,534                 | 98.43                | 1,400                 | 19,912                | 182.78               | 2,600                 | 36,980                |
| 3.59                 | 51                    | 725.37                | 10.90                | 155                   | 2,205                 | 42.89                | 610                   | 8,676                 | 99.84                | 1,420                 | 20,197                | 184.19               | 2,620                 | 37,264                |
| 3.66                 | 52                    | 739.60                | 11.25                | 160                   | 2,276                 | 43.59                | 620                   | 8,818                 | 101.24               | 1,440                 | 20,481                | 185.59               | 2,640                 | 37,549                |
| 3.73                 | 53                    | 753.82                | 11.60                | 165                   | 2,347                 | 44.29                | 630                   | 8,960                 | 102.65               | 1,460                 | 20,766                | 187.00               | 2,660                 | 37,833                |
| 3.80                 | 54                    | 768.04                | 11.95                | 170                   | 2,418                 | 45.00                | 640                   | 9,103                 | 104.05               | 1,480                 | 21,050                | 188.40               | 2,680                 | 38,118                |
| 3.87                 | 55                    | 782.27                | 12.30                | 175                   | 2,489                 | 45.70                | 650                   | 9,245                 | 105.46               | 1,500                 | 21,335                | 189.81               | 2,700                 | 38,402                |
| 3.94                 | 56                    | 796.49                | 12.66                | 180                   | 2,560                 | 46.40                | 660                   | 9,387                 | 106.87               | 1,520                 | 21,619                | 191.22               | 2,720                 | 38,687                |
| 4.01                 | 57                    | 810.71                | 13.01                | 185                   | 2,631                 | 47.11                | 670                   | 9,529                 | 108.27               | 1,540                 | 21,903                | 192.62               | 2,740                 | 38,971                |
| 4.08                 | 58                    | 824.93                | 13.36                | 190                   | 2,702                 | 47.81                | 680                   | 9,672                 | 109.68               | 1,560                 | 22,188                | 194.03               | 2,760                 | 39,255                |
| 4.15                 | 59                    | 839.16                | 13.71                | 195                   | 2,773                 | 48.51                | 690                   | 9,814                 | 111.08               | 1,580                 | 22,472                | 195.43               | 2,780                 | 39,540                |
| 4.22                 | 60                    | 853.38                | 14.06                | 200                   | 2,845                 | 49.21                | 700                   | 9,956                 | 112.49               | 1,600                 | 22,757                | 196.84               | 2,800                 | 39,824                |

# INCH TO MILLIMETER

## Fractions of an Inch to Millimeters

1 Inch = 25.4 Millimeters

| Inch | 0       | 1/16    | 1/8     | 3/16    | 1/4     | 5/16    | 3/8     | 7/16    | 1/2     | 9/16    | 5/8     | 11/16   | 3/4     | 13/16   | 7/8     | 15/16   | Inch |
|------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|------|
| 0    | 0.0     | 1.6     | 3.2     | 4.8     | 6.4     | 7.9     | 9.5     | 11.1    | 12.7    | 14.3    | 15.9    | 17.5    | 19.1    | 20.6    | 22.2    | 23.8    | 0    |
| 1    | 25.4    | 27.0    | 28.6    | 30.2    | 31.8    | 33.3    | 34.9    | 36.5    | 38.1    | 39.7    | 41.3    | 42.9    | 44.5    | 46.0    | 47.6    | 49.2    | 1    |
| 2    | 50.8    | 52.4    | 54.0    | 55.6    | 57.2    | 58.7    | 60.3    | 61.9    | 63.5    | 65.1    | 66.7    | 68.3    | 69.9    | 71.4    | 73.0    | 74.6    | 2    |
| 3    | 76.2    | 77.8    | 79.4    | 81.0    | 82.6    | 84.1    | 85.7    | 87.3    | 88.9    | 90.5    | 92.1    | 93.7    | 95.3    | 96.8    | 98.4    | 100.0   | 3    |
| 4    | 101.6   | 103.2   | 104.8   | 106.4   | 108.0   | 109.5   | 111.1   | 112.7   | 114.3   | 115.9   | 117.5   | 119.1   | 120.7   | 122.2   | 123.8   | 125.4   | 4    |
| 5    | 127.0   | 128.6   | 130.2   | 131.8   | 133.4   | 134.9   | 136.5   | 138.1   | 139.7   | 141.3   | 142.9   | 144.5   | 146.1   | 147.6   | 149.2   | 150.8   | 5    |
| 6    | 152.4   | 154.0   | 155.6   | 157.2   | 158.8   | 160.3   | 161.9   | 163.5   | 165.1   | 166.7   | 168.3   | 169.9   | 171.5   | 173.0   | 174.6   | 176.2   | 6    |
| 7    | 177.8   | 179.4   | 181.0   | 182.6   | 184.2   | 185.7   | 187.3   | 188.9   | 190.5   | 192.1   | 193.7   | 195.3   | 196.9   | 198.4   | 200.0   | 201.6   | 7    |
| 8    | 203.2   | 204.8   | 206.4   | 208.0   | 209.6   | 211.1   | 212.7   | 214.3   | 215.9   | 217.5   | 219.1   | 220.7   | 222.3   | 223.8   | 225.4   | 227.0   | 8    |
| 9    | 228.6   | 230.2   | 231.8   | 233.4   | 235.0   | 236.5   | 238.1   | 239.7   | 241.3   | 242.9   | 244.5   | 246.1   | 247.7   | 249.2   | 250.8   | 252.4   | 9    |
| 10   | 254.0   | 255.6   | 257.2   | 258.8   | 260.4   | 261.9   | 263.5   | 265.1   | 266.7   | 268.3   | 269.9   | 271.5   | 273.1   | 274.6   | 276.2   | 277.8   | 10   |
| 11   | 279.4   | 281.0   | 282.6   | 284.2   | 285.8   | 287.3   | 288.9   | 290.5   | 292.1   | 293.7   | 295.3   | 296.9   | 298.5   | 300.0   | 301.6   | 303.2   | 11   |
| 12   | 304.8   | 306.4   | 308.0   | 309.6   | 311.2   | 312.7   | 314.3   | 315.9   | 317.5   | 319.1   | 320.7   | 322.3   | 323.9   | 325.4   | 327.0   | 328.6   | 12   |
| 13   | 330.2   | 331.8   | 333.4   | 335.0   | 336.6   | 338.1   | 339.7   | 341.3   | 342.9   | 344.5   | 346.1   | 347.7   | 349.3   | 350.8   | 352.4   | 354.0   | 13   |
| 14   | 355.6   | 357.2   | 358.8   | 360.4   | 362.0   | 363.5   | 365.1   | 366.7   | 368.3   | 369.9   | 371.5   | 373.1   | 374.7   | 376.2   | 377.8   | 379.4   | 14   |
| 15   | 381.0   | 382.6   | 384.2   | 385.8   | 387.4   | 388.9   | 390.5   | 392.1   | 393.7   | 395.3   | 396.9   | 398.5   | 400.1   | 401.6   | 403.2   | 404.8   | 15   |
| 16   | 406.4   | 408.0   | 409.6   | 411.2   | 412.8   | 414.3   | 415.9   | 417.5   | 419.1   | 420.7   | 422.3   | 423.9   | 425.5   | 427.0   | 428.6   | 430.2   | 16   |
| 17   | 431.8   | 433.4   | 435.0   | 436.6   | 438.2   | 439.7   | 441.3   | 442.9   | 444.5   | 446.1   | 447.7   | 449.3   | 450.9   | 452.4   | 454.0   | 455.6   | 17   |
| 18   | 457.2   | 458.8   | 460.4   | 462.0   | 463.6   | 465.1   | 466.7   | 468.3   | 469.9   | 471.5   | 473.1   | 474.7   | 476.3   | 477.8   | 479.4   | 481.0   | 18   |
| 19   | 482.6   | 484.2   | 485.8   | 487.4   | 489.0   | 490.5   | 492.1   | 493.7   | 495.3   | 496.9   | 498.5   | 500.1   | 501.7   | 503.2   | 504.8   | 506.4   | 19   |
| 20   | 508.0   | 509.6   | 511.2   | 512.8   | 514.4   | 515.9   | 517.5   | 519.1   | 520.7   | 522.3   | 523.9   | 525.5   | 527.1   | 528.6   | 530.2   | 531.8   | 20   |
| 21   | 533.4   | 535.0   | 536.6   | 538.2   | 539.8   | 541.3   | 542.9   | 544.5   | 546.1   | 547.7   | 549.3   | 550.9   | 552.5   | 554.0   | 555.6   | 557.2   | 21   |
| 22   | 558.8   | 560.4   | 562.0   | 563.6   | 565.2   | 566.7   | 568.3   | 569.9   | 571.5   | 573.1   | 574.7   | 576.3   | 577.9   | 579.4   | 581.0   | 582.6   | 22   |
| 23   | 584.2   | 585.8   | 587.4   | 589.0   | 590.6   | 592.1   | 593.7   | 595.3   | 596.9   | 598.5   | 600.1   | 601.7   | 603.3   | 604.8   | 606.4   | 608.0   | 23   |
| 24   | 609.5   | 611.2   | 612.8   | 614.4   | 616.0   | 617.5   | 619.1   | 620.7   | 622.3   | 623.9   | 625.5   | 627.1   | 628.7   | 630.2   | 631.8   | 633.4   | 24   |
| 25   | 635.0   | 636.6   | 638.2   | 639.8   | 641.4   | 642.9   | 644.5   | 646.1   | 647.7   | 649.3   | 650.9   | 652.5   | 654.1   | 655.6   | 657.2   | 658.8   | 25   |
| 26   | 660.4   | 662.0   | 663.6   | 665.2   | 666.8   | 668.3   | 669.9   | 671.5   | 673.1   | 674.7   | 676.3   | 677.9   | 679.5   | 681.0   | 682.6   | 684.2   | 26   |
| 27   | 685.8   | 687.4   | 689.0   | 690.6   | 692.2   | 693.7   | 695.3   | 696.9   | 698.5   | 700.1   | 701.7   | 703.3   | 704.9   | 706.4   | 708.0   | 709.6   | 27   |
| 28   | 711.2   | 712.8   | 714.4   | 716.0   | 717.6   | 719.1   | 720.7   | 722.3   | 723.9   | 725.5   | 727.1   | 728.7   | 730.3   | 731.8   | 733.4   | 735.0   | 28   |
| 29   | 736.6   | 738.2   | 739.8   | 741.4   | 743.0   | 744.5   | 746.1   | 747.7   | 749.3   | 750.9   | 752.5   | 754.1   | 755.7   | 757.2   | 758.8   | 760.4   | 29   |
| 30   | 762.0   | 763.6   | 765.2   | 766.8   | 768.4   | 769.9   | 771.5   | 773.1   | 774.7   | 776.3   | 777.9   | 779.5   | 781.1   | 782.6   | 784.2   | 785.8   | 30   |
| 31   | 787.4   | 789.0   | 790.6   | 792.2   | 793.8   | 795.3   | 796.9   | 798.5   | 800.1   | 801.7   | 803.3   | 804.9   | 806.5   | 808.0   | 809.6   | 811.2   | 31   |
| 32   | 812.8   | 814.4   | 816.0   | 817.6   | 819.2   | 820.7   | 822.3   | 823.9   | 825.5   | 827.1   | 828.7   | 830.3   | 831.9   | 833.4   | 835.0   | 836.6   | 32   |
| 33   | 838.2   | 839.8   | 841.4   | 843.0   | 844.6   | 846.1   | 847.7   | 849.3   | 850.9   | 852.5   | 854.1   | 855.7   | 857.3   | 858.8   | 860.4   | 862.0   | 33   |
| 34   | 863.6   | 865.2   | 866.8   | 868.4   | 870.0   | 871.5   | 873.1   | 874.7   | 876.3   | 877.9   | 879.5   | 881.1   | 882.7   | 884.2   | 885.8   | 887.4   | 34   |
| 35   | 889.0   | 890.6   | 892.2   | 893.8   | 895.4   | 896.9   | 898.5   | 900.1   | 901.7   | 903.3   | 904.9   | 906.5   | 908.1   | 909.6   | 911.2   | 912.8   | 35   |
| 36   | 914.4   | 916.0   | 917.6   | 919.2   | 920.8   | 922.3   | 923.9   | 925.5   | 927.1   | 928.7   | 930.3   | 931.9   | 933.5   | 935.0   | 936.6   | 938.2   | 36   |
| 37   | 939.8   | 941.4   | 943.0   | 944.6   | 946.2   | 947.7   | 949.3   | 950.9   | 952.5   | 954.1   | 955.7   | 957.3   | 958.9   | 960.4   | 962.0   | 963.6   | 37   |
| 38   | 965.2   | 966.8   | 968.4   | 970.0   | 971.6   | 973.1   | 974.7   | 976.3   | 977.9   | 979.5   | 981.1   | 982.7   | 984.3   | 985.8   | 987.4   | 989.0   | 38   |
| 39   | 990.6   | 992.2   | 993.8   | 995.4   | 997.0   | 998.5   | 1,000.1 | 1,001.7 | 1,003.3 | 1,004.9 | 1,006.5 | 1,008.1 | 1,009.7 | 1,011.2 | 1,012.8 | 1,014.4 | 39   |
| 40   | 1,016.0 | 1,017.6 | 1,019.2 | 1,020.8 | 1,022.4 | 1,023.9 | 1,025.5 | 1,027.1 | 1,028.7 | 1,030.3 | 1,031.9 | 1,033.5 | 1,035.1 | 1,036.6 | 1,038.2 | 1,039.8 | 40   |
| 41   | 1,041.4 | 1,043.0 | 1,044.6 | 1,046.2 | 1,047.8 | 1,049.3 | 1,050.9 | 1,052.5 | 1,054.1 | 1,055.7 | 1,057.3 | 1,058.9 | 1,060.5 | 1,062.0 | 1,063.6 | 1,065.2 | 41   |
| 42   | 1,066.8 | 1,068.4 | 1,070.0 | 1,071.6 | 1,073.2 | 1,074.7 | 1,076.3 | 1,077.9 | 1,079.5 | 1,081.1 | 1,082.7 | 1,084.3 | 1,085.9 | 1,087.4 | 1,089.0 | 1,090.6 | 42   |
| 43   | 1,092.2 | 1,093.8 | 1,095.4 | 1,097.0 | 1,098.6 | 1,100.1 | 1,101.7 | 1,103.3 | 1,104.9 | 1,106.5 | 1,108.1 | 1,109.7 | 1,111.3 | 1,112.8 | 1,114.4 | 1,116.0 | 43   |
| 44   | 1,117.6 | 1,119.2 | 1,120.8 | 1,122.4 | 1,124.0 | 1,125.5 | 1,127.1 | 1,128.7 | 1,130.3 | 1,131.9 | 1,133.5 | 1,135.1 | 1,136.7 | 1,138.2 | 1,139.8 | 1,141.4 | 44   |
| 45   | 1,143.0 | 1,144.6 | 1,146.2 | 1,147.8 | 1,149.4 | 1,150.9 | 1,152.5 | 1,154.1 | 1,155.7 | 1,157.3 | 1,158.9 | 1,160.5 | 1,162.1 | 1,163.6 | 1,165.2 | 1,166.8 | 45   |
| 46   | 1,168.4 | 1,170.0 | 1,171.6 | 1,173.2 | 1,174.8 | 1,176.3 | 1,177.9 | 1,179.5 | 1,181.1 | 1,182.7 | 1,184.3 | 1,185.9 | 1,187.5 | 1,189.0 | 1,190.6 | 1,192.2 | 46   |
| 47   | 1,193.8 | 1,195.4 | 1,197.0 | 1,198.6 | 1,200.2 | 1,201.7 | 1,203.3 | 1,204.9 | 1,206.5 | 1,208.1 | 1,209.7 | 1,211.3 | 1,212.9 | 1,214.4 | 1,216.0 | 1,217.6 | 47   |
| 48   | 1,219.2 | 1,220.8 | 1,222.4 | 1,224.0 | 1,225.6 | 1,227.1 | 1,228.7 | 1,230.3 | 1,231.9 | 1,233.5 | 1,235.1 | 1,236.7 | 1,238.3 | 1,239.8 | 1,241.4 | 1,243.0 | 48   |
| 49   | 1,244.6 | 1,246.2 | 1,247.8 | 1,249.4 | 1,251.0 | 1,252.5 | 1,254.1 | 1,255.7 | 1,257.3 | 1,258.9 | 1,260.5 | 1,262.1 | 1,263.7 | 1,265.2 | 1,266.8 | 1,268.4 | 49   |
| 50   | 1,270.0 | 1,271.6 | 1,273.2 | 1,274.8 | 1,276.4 | 1,277.9 | 1,279.5 | 1,281.1 | 1,282.7 | 1,284.3 | 1,285.9 | 1,287.5 | 1,289.1 | 1,290.6 | 1,292.2 | 1,293.8 | 50   |
| 51   | 1,295.4 | 1,297.0 | 1,298.6 | 1,300.2 | 1,301.8 | 1,303.3 | 1,304.9 | 1,306.5 | 1,308.1 | 1,309.7 | 1,311.3 | 1,312.9 | 1,314.5 | 1,316.0 | 1,317.6 | 1,319.2 | 51   |
| 52   | 1,320.8 | 1,322.4 | 1,324.0 | 1,325.6 | 1,327.2 | 1,328.7 | 1,330.3 | 1,331.9 | 1,333.5 | 1,335.1 | 1,336.7 | 1,338.3 | 1,339.9 | 1,341.4 | 1,343.0 | 1,344.6 | 52   |
| 53   | 1,346.2 | 1,347.8 | 1,349.4 | 1,351.0 | 1,352.6 | 1,354.1 | 1,355.7 | 1,357.3 | 1,358.9 | 1,360.5 | 1,362.1 | 1,363.7 | 1,365.3 | 1,366.8 | 1,368.4 | 1,370.0 | 53   |
| 54   | 1,371.6 | 1,373.2 | 1,374.8 | 1,376.4 | 1,378.0 | 1,379.5 | 1,381.1 | 1,382.7 | 1,384.3 | 1,385.9 | 1,387.5 | 1,389.1 | 1,390.7 | 1,392.2 | 1,393.8 | 1,395.4 | 54   |
| 55   | 1,397.0 | 1,398.6 | 1,400.2 | 1,401.8 | 1,403.4 | 1,404.9 | 1,406.5 | 1,408.1 | 1,409.7 | 1,411.3 | 1,412.9 | 1,414.5 | 1,416.1 | 1,417.6 | 1,419.2 | 1,420.8 | 55   |
| 56   | 1,422.4 | 1,424.0 | 1,425.6 | 1,427.2 | 1,428.8 | 1,430.3 | 1,431.9 | 1,433.5 | 1,435.1 | 1,436.7 | 1,438.3 | 1,439.9 | 1,441.5 | 1,443.0 | 1,444.6 | 1,446.2 | 56   |
| 57   | 1,447.8 | 1,449.4 | 1,451.0 | 1,452.6 | 1,454.2 | 1,455.7 | 1,457.3 | 1,458.9 | 1,460.5 | 1,462.1 | 1,463.7 | 1,465.3 | 1,466.9 | 1,468.4 | 1,470.0 | 1,471.6 | 57   |
| 58   | 1,473.2 | 1,474.8 | 1,476.4 | 1,478.0 | 1,479.6 | 1,481.1 | 1,482.7 | 1,484.3 | 1,485.9 | 1,487.5 | 1,489.1 | 1,490.7 | 1,492.3 | 1,493.8 | 1,495.4 | 1,497.0 | 58   |
| 59   | 1,498.6 | 1,500.2 | 1,501.8 | 1,503.4 | 1,505.0 | 1,506.5 | 1,508.1 | 1,509.7 | 1,511.3 | 1,512.9 | 1,514.5 | 1,516.1 | 1,517.7 | 1,519.2 | 1,520.8 | 1,522.4 | 59   |
| 60   | 1,524.0 | 1,525.6 | 1,527.2 | 1,528.8 | 1,530.4 | 1,531.9 | 1,533.5 | 1,535.1 | 1,536.7 | 1,538.3 | 1,539.9 | 1,541.5 | 1,543.1 | 1,544.6 | 1,546.2 | 1,547.8 | 60   |





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|                       |                                                   |
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