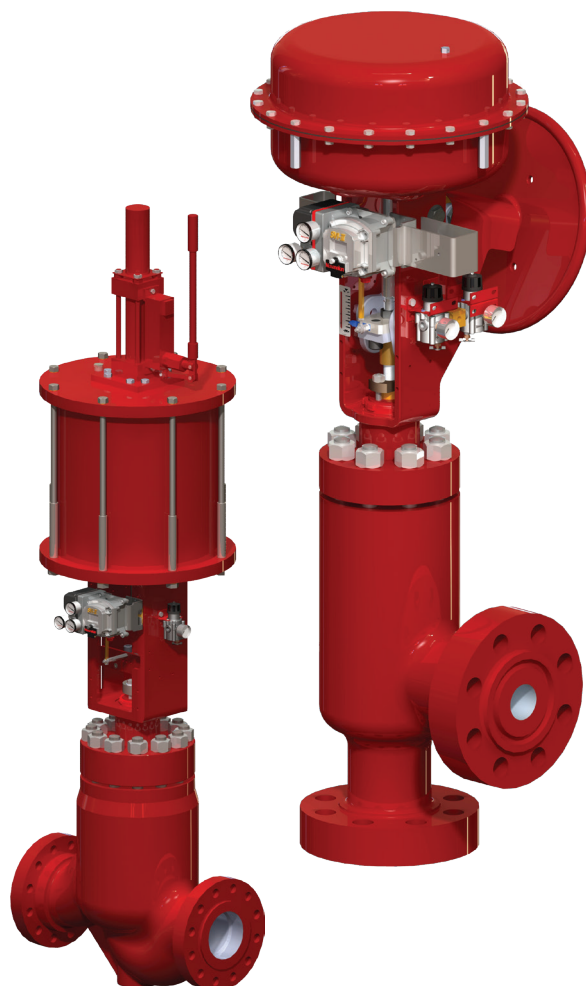


# Masoneilan™ 18000/78000 Series LincolnLog™

**High-pressure,  
anti-cavitation  
control valves**

Integrated smart  
engineered solutions  
for severe service  
applications



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# Features & Benefits

The Masoneilan LincolnLog is the premier high-pressure liquid letdown valve in the process control industry. It is a field proven severe service solution for cavitating and erosive applications in various industries. The LincolnLog is uniquely designed to operate reliably in harsh environments and dirty liquids. Hereunder key design features of the LincolnLog.

## Cavitation Elimination

The multi-step flow path created by the LincolnLog trim design reduces the pressure drop in multiple stages without allowing the local pressure to drop below the fluid vapor pressure thus preventing cavitation. These active stages throttle in unison to avoid taking the full pressure drop across any individual stage.

## Dirt Tolerant

Wide flow paths in the LincolnLog allow free passage of large particles through the unique trim and body design without causing any damage or loss of capacity. This ensures continuous and efficient operation by eliminating concerns of potential clogging due to entrained particles. The LincolnLog is a proven problem solver in dirty service applications.

## Flashing

LincolnLog flow to close trim 78500/18500 can be used in flashing service up to 25% of flashing.

## High Pressure Drop Capability

- 1000 psi (69 bar) drop per stage for continuous service is available with upgrade to trim with Kolsterising® (see High Pressure Drop Construction).
- Inconel St St type 630 H900 and St St type 630 H1150M
- XM 19
- Duplex UNS S32205 and Duplex UNS S32760
- API 6A 18400/78400 Series valves comply with API 6A standards and are capable of handling 10K psi (690 bars) and 15K psi (1034 bar) rated pressure.
- Mechanical Pressure drop is limited as follows:
  - 800 psi (55 bar) drop per stage for continuous service
  - 1000 psi (69 bar) drop per stage for intermittent service
  - 1000 psi (69 bar) drop per stage for continuous service is available with upgrade to Inconel 718 trim with
  - Kolsterising® (see High Pressure Drop Construction).
  - Application must have clean service fluid and pass a detailed cavitation risk assessment.

## Heavy Plug Guiding

Guiding is provided along the full length of the plug by a hardened liner, which minimizes any vibration effects and results in excellent dynamic stability. This helps to improve product yield through accurate and smooth process control.

## Versatile Trim Options

Standard LincolnLog trim is available in 3, 4 and 6 stages with different staging ratios to cover the vast majority of high-pressure liquid letdown services. Masoneilan can also provide engineered solutions consisting of additional stages to satisfy specific application requirements. The LincolnLog is available with both balanced and unbalanced plug designs for greater application flexibility.

## Protected Seat Design

Trim overlap is designed into the trim at low lift to keep high velocity flow away from the valve seat. This helps to avoid seat erosion and extends the operating life under high pressure drop conditions.

## Reliable Tight Shutoff

Standard seat leakage rating for the LincolnLog meets IEC 534-4 and ANSI/FCI 70.2 Class V shutoff. An optional soft seat (only Flow-to-Open - FTO) design provides Class VI bubble tight shutoff. It includes a patented sliding metal collar design, which protects the soft seat from extruding and serves as a back-up metal to metal seating surface. The LincolnLog can also be supplied with block valve tight shutoff per MSS-SP-61.

## Ease of Maintenance

LincolnLog's simple top-entry design includes quick change trim for easy access and removal. The integral liner and seat ring also reduce the number of components and simplifies assembly and disassembly.

## NACE and PED Compliance

The LincolnLog is available for Sour Service Applications using the design and construction methods defined in NACE Standard MR0103. Product configurations for applications requiring compliance to MR0175 - 2003 or ISO 15156 are also available upon request. The LincolnLog is also designed for compliance with Pressure Equipment Directive (PED) requirements.

## Leakage Class

Class IV & V leakage is standard as per IEC-60534-4.

18400/78400 API 6A should be closed only for a short period of time. There is a risk of damaging trim parts for a long period of closing.

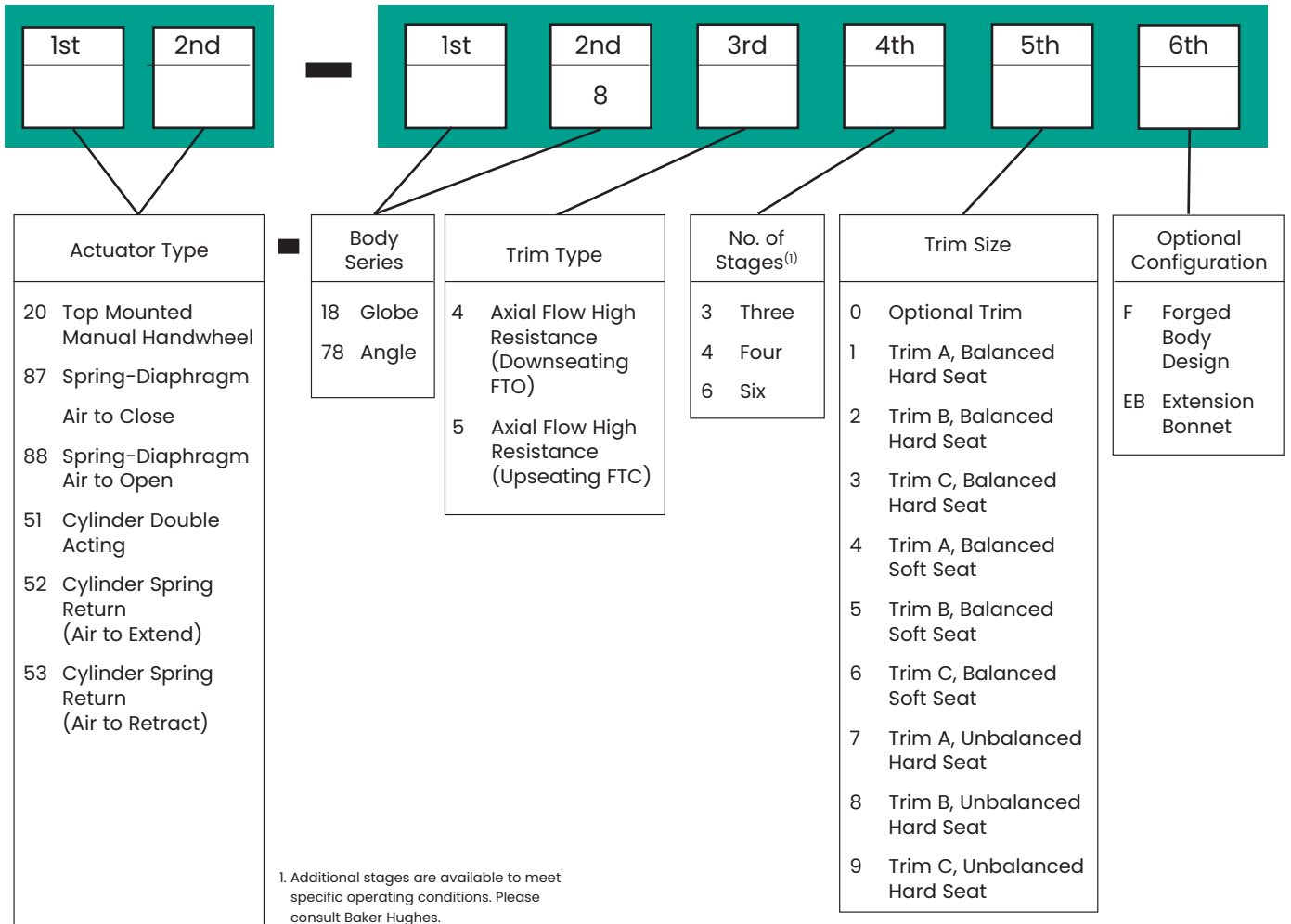
18400/78400 API 6A valves are designed as control valves, not as isolating valves.

## Additional Stages for Higher Pressure Drop

8 Stage and 10 Stage configurations are available as standard options. With upgraded trim, pressure drop of 1000 psi (69 bar) per stage can be reached.

18400/78400 API 6A valves in service above 800 psi (55 bar) per stage pressure drop are at high risk for erosion and should be serviced in regular intervals. Operation for extended periods of time is not recommended.

# Numbering System



Note: See Appendix B for API options on page 33.

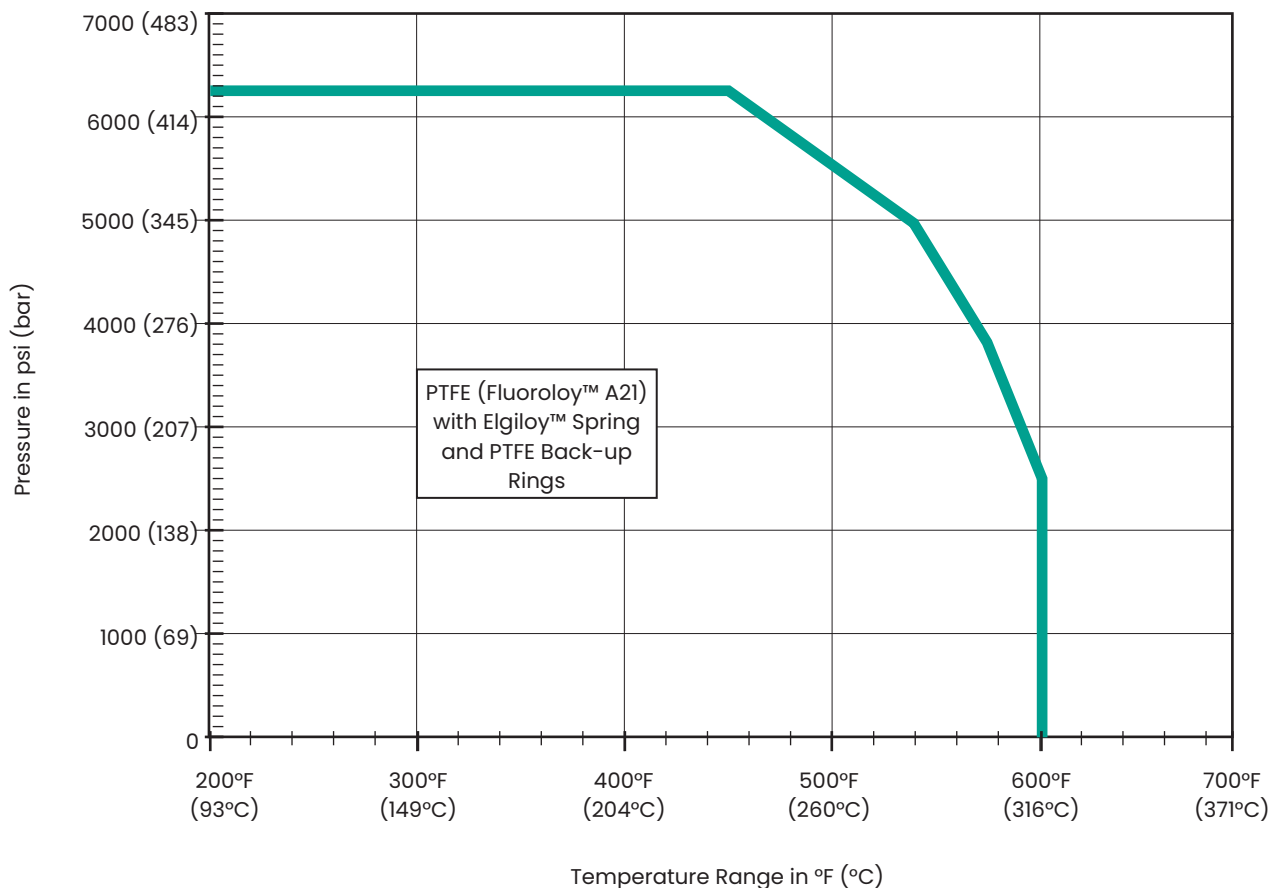
## Temperature Range/Seat Leakage

| Valve Sizes |           | Trim Type              | Seat Type  | Temperature Range <sup>1</sup> |                   | Seat Leakage Class <sup>2</sup> |
|-------------|-----------|------------------------|------------|--------------------------------|-------------------|---------------------------------|
| inches      | DN        |                        |            | min.                           | max. <sup>4</sup> |                                 |
| 1           | 25        | Unbalanced             | Metal Seat | -20°F (-29°C)                  | 600°F (316°C)     | V <sup>3</sup>                  |
| 1.5 to 8    | 40 to 200 | Balanced               | Metal Seat | -20°F (-29°C)                  | 600°F (316°C)     |                                 |
|             |           | Unbalanced             | Metal Seat | -20°F (-29°C)                  | 600°F (316°C)     |                                 |
| 2 to 8      | 50 to 200 | Balanced or Unbalanced | Soft Seat  | -20°F (-29°C)                  | 450°F (232°C)     | VI                              |

1. Designs for higher or lower temperatures are available. Please consult Baker Hughes.
2. Seat leakage class ratings per IEC 534-4 and ASME/FCI 70.2. Class V seat leakage is standard and Class VI is optional.
3. Optional block valve tight shutoff per MSS-SP-61 also available.
4. Max. temp. limit of 600°F (316°C) with unbalanced trim requires use of optional flexible graphite packing or an extension bonnet.

# Balance Seal Pressure and Temperature limits

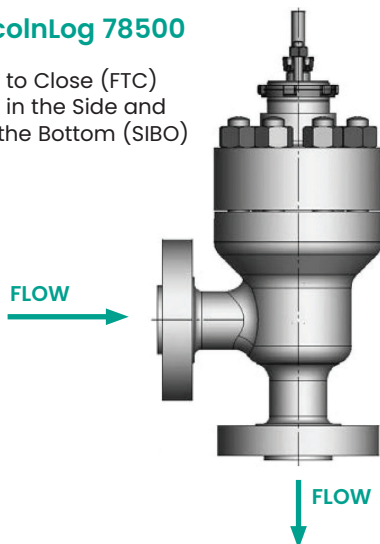
## LincolnLog 78X00/18X00 Balance Seal Pressure-Temperature Application Range



## Flow Direction

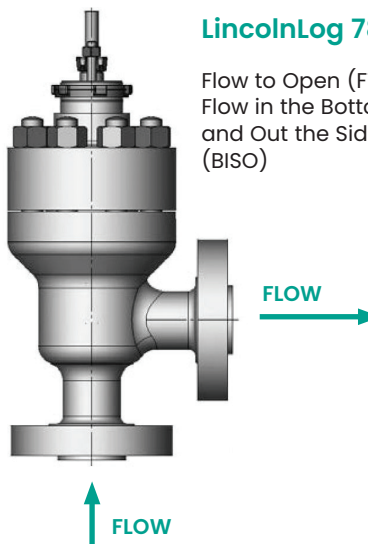
### LincolnLog 78500

Flow to Close (FTC)  
Flow in the Side and  
Out the Bottom (SIBO)



### LincolnLog 78400

Flow to Open (FTO)  
Flow in the Bottom  
and Out the Side (BISO)



# Ratings/Connections

◆ RF Flanged    ⚡ Socket Weld    ⚡ Threaded    △ RT Joint    ⇄ Butt Weld

| Valve Size <sup>1</sup> |           | Pressure Class <sup>2</sup> |      |      |      |
|-------------------------|-----------|-----------------------------|------|------|------|
| inches                  | DN        | 600                         | 900  | 1500 | 2500 |
| 1 and 1.5               | 25 and 40 | ◆⚡△⇄                        | ◆⚡△⇄ | ◆⚡△⇄ | ◆⚡△⇄ |
| 2                       | 50        | ◆⚡△⇄                        | ◆⚡△⇄ | ◆⚡△⇄ | ◆⚡△⇄ |
| 3                       | 80        | ◆△⇄                         | ◆△⇄  | ◆△⇄  | ◆△⇄  |
| 4                       | 100       | ◆△⇄                         | ◆△⇄  | ◆△⇄  | ◆△⇄  |
| 6                       | 150       | ◆△⇄                         | ◆△⇄  | ◆△⇄  | ◆△⇄  |
| 8                       | 200       | ◆△⇄                         | ◆△⇄  | ◆△⇄  | ◆△⇄  |

1. Sizes, ratings and end connections are available in both globe and angle body styles.

2. Pressure classes shown represent ASME ratings and equivalent PN ratings.

## Flow Capacity and $F_L$

### Standard Capacity – 3-Stage Design

Flow Characteristic: Modified Linear

| Valve Size |     | Orifice Diameter |      | Travel |      | Trim C |       | Min. Cont. $C_v$ |
|------------|-----|------------------|------|--------|------|--------|-------|------------------|
| inches     | DN  | inches           | mm   | inches | mm   | $C_v$  | $F_L$ |                  |
| 1          | 25  | .70              | 17.8 | .25    | 6.35 | 2.0    | .98   | .05              |
| 1.5        | 40  | 1.00             | 25.4 | .25    | 6.35 | 3.8    | .98   | .10              |
| 2          | 50  | 1.50             | 38.1 | .38    | 9.65 | 9.6    | .98   | .15              |
| 3          | 80  | 2.25             | 57.2 | .62    | 15.7 | 24.5   | .98   | .25              |
| 4          | 100 | 2.88             | 73.2 | .75    | 19.1 | 38     | .98   | .43              |
| 6          | 150 | 4.12             | 105  | 1.00   | 25.4 | 80     | .98   | .56              |
| 8          | 200 | 5.38             | 137  | 1.25   | 31.8 | 141.5  | .98   | 1.0              |

### Standard Capacity – 4-Stage Design

Flow Characteristic: Modified Linear

| Valve Size |     | Orifice Diameter |      | Travel |      | Trim A |       | Trim B |       | Trim C |       | Min. Cont. $C_v$ |
|------------|-----|------------------|------|--------|------|--------|-------|--------|-------|--------|-------|------------------|
| inches     | DN  | inches           | mm   | inches | mm   | $C_v$  | $F_L$ | $C_v$  | $F_L$ | $C_v$  | $F_L$ |                  |
| 1          | 25  | .70              | 17.8 | .25    | 6.35 | 1.0    | .996  | 1.4    | .994  | 1.7    | .991  | .04              |
| 1.5        | 40  | 1.00             | 25.4 | .25    | 6.35 | 1.9    | .996  | 2.5    | .994  | 3.2    | .991  | .08              |
| 2          | 50  | 1.50             | 38.1 | .38    | 9.65 | 4.5    | .996  | 7      | .994  | 8.4    | .991  | .12              |
| 3          | 80  | 2.25             | 57.2 | .62    | 15.7 | 10     | .996  | 13     | .994  | 21     | .991  | .20              |
| 4          | 100 | 2.88             | 73.2 | .75    | 19.1 | 16.5   | .996  | 22     | .994  | 31.5   | .991  | .35              |
| 6          | 150 | 4.12             | 105  | 1.00   | 25.4 | 34     | .996  | 45     | .994  | 66     | .991  | .46              |
| 8          | 200 | 5.38             | 137  | 1.25   | 31.8 | 60     | .996  | 97.5   | .994  | 120    | .991  | .80              |

### Standard Capacity – 6-Stage Design

Flow Characteristic: Modified Linear

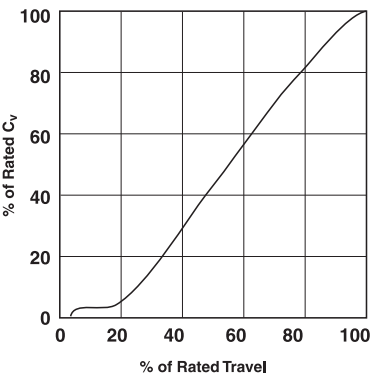
| Valve Size |     | Orifice Diameter |      | Travel |      | Trim A |       | Trim B |       | Trim C |       | Min. Cont. $C_v$ |
|------------|-----|------------------|------|--------|------|--------|-------|--------|-------|--------|-------|------------------|
| inches     | DN  | inches           | mm   | inches | mm   | $C_v$  | $F_L$ | $C_v$  | $F_L$ | $C_v$  | $F_L$ |                  |
| 1          | 25  | .70              | 17.8 | .25    | 6.35 | .80    | .998  | 1.0    | .997  | 1.4    | .994  | .03              |
| 1.5        | 40  | 1.00             | 25.4 | .25    | 6.35 | 1.4    | .998  | 1.8    | .997  | 2.5    | .994  | .05              |
| 2          | 50  | 1.50             | 38.1 | .38    | 9.65 | 3.5    | .998  | 4.5    | .997  | 6.5    | .994  | .08              |
| 3          | 80  | 2.25             | 57.2 | .62    | 15.7 | 7.5    | .998  | 9.5    | .997  | 17     | .994  | .13              |
| 4          | 100 | 2.88             | 73.2 | .75    | 19.1 | 12     | .998  | 16     | .997  | 25     | .994  | .22              |
| 6          | 150 | 4.12             | 105  | 1.00   | 25.4 | 25     | .998  | 35     | .997  | 52     | .994  | .30              |
| 8          | 200 | 5.38             | 137  | 1.25   | 31.8 | 39     | .998  | 75.5   | .997  | 93     | .994  | .65              |

# Flow Characteristics

The LincolnLog trim provides a smooth modified linear control characteristic with “clearance flow” capacity over the initial 15 percent of valve travel as shown in the generic chart and table at right.

Incorporation of the multi-stage “clearance flow” design concept prevents high pressure drops across the LincolnLog seating area while throttling at low lifts. This feature helps to extend trim life significantly, resulting in dependable and tight shutoff whenever required. It also improves the throttling control stability and performance at low lifts, while providing smooth, accurate and continuous capacity control from 15 percent to 100 percent plug travel. Controllability extends from the Maximum Rated  $C_v$  to the Minimum Controllable  $C_v$  for any valve size resulting in typical turndown ratios of 50:1.

LincolnLog  $C_v$  vs. Travel



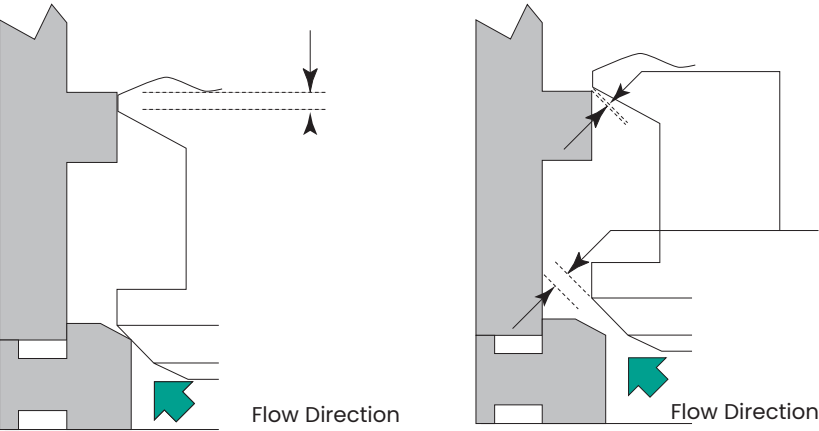
|                      |   |    |    |    |    |    |    |    |    |    |     |
|----------------------|---|----|----|----|----|----|----|----|----|----|-----|
| Percent Max. Opening | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
| Percent Max. $C_v$   | • | •  | 3  | 15 | 27 | 39 | 52 | 64 | 76 | 88 | 100 |

• Clearance Flow Only

# Trim Seat Protection

The “clearance flow” feature described in the previous section is achieved through the trim overlap design illustrated below:

LincolnLog Trim Overlap Seat Protection Feature



## 0 – 15 percent of Plug Travel

Trim overlap with the valve in the closed or low lift positions.

## 15 – 100 percent of Plug Travel

There is much greater flow area through the valve seat versus the plug notches. As a result, pressure drop and velocities across the critical seating surfaces are controlled eliminating seat damage.

# Valve Sizing Guidelines

## General

LincolnLog multi-stage control valves can be sized using either standard IEC/ISA equations or using Baker Hughes latest Masoneilan sizing and selection software program.

## Noise Predictions

Valve noise calculations can be performed using the Baker Hughes Masoneilan sizing and selection program based on the latest IEC equations. The serial stage construction of the LincolnLog design helps to significantly reduce trim noise. Calculating the noise at the last stage of the LincolnLog trim will closely approximate the overall valve noise produced. Pressure drop across the last stage can be derived from the table below and used in the noise calculations.

## Trim Selection

As indicated in the table below, the LincolnLog is available in various standard trim types and number of stages. Each trim style provides different staging ratios and different pressure drop percentages per stage. Recommended limits for  $\Delta P$  per stage are 800 psi (55 bar) for continuous duty cycle applications and up to 1000 psi (69 bar)  $\Delta P$  per stage for intermittent service. The recommended operating throttling  $\Delta P$  limits are also shown in the table below.

## Engineered Solutions

For flashing service, the expansion ratio of the fluid will determine the appropriate staging ratio to apply. Non-standard staging ratios can be supplied for compressible two-phase flow or flashing conditions not covered by the standard trim. Please consult Baker Hughes for proper sizing and design of engineered solutions for these types of applications.

## Staging ratios and pressure drop guidelines

| Trim Type | No. of Stages | Staging Ratios <sup>1 and 2</sup> | Pressure Drop per Stage <sup>3</sup> |                              | Maximum Recommended Throttling $\Delta P$ |     |                      |     |
|-----------|---------------|-----------------------------------|--------------------------------------|------------------------------|-------------------------------------------|-----|----------------------|-----|
|           |               |                                   | Stages                               | Fraction of Total $\Delta P$ | Continuous Service                        |     | Intermittent Service |     |
|           |               |                                   |                                      |                              | psi                                       | bar | psi                  | bar |
| C         | 3             | 1-1-2                             | 1 to 2                               | .44                          | 1595                                      | 110 | 2030                 | 140 |
|           |               |                                   | 3                                    | .11                          |                                           |     |                      |     |
| C         | 4             | 1-1-1-2                           | 1 to 3                               | .31                          | 2248                                      | 155 | 2900                 | 200 |
|           |               |                                   | 4                                    | .08                          |                                           |     |                      |     |
| B         | 4             | 1-1-2-3                           | 1 to 2                               | .42                          | 1885                                      | 130 | 2320                 | 160 |
|           |               |                                   | 3                                    | .11                          |                                           |     |                      |     |
|           |               |                                   | 4                                    | .05                          |                                           |     |                      |     |
|           |               |                                   | 1 to 2                               | .43                          | 1885                                      | 130 | 2320                 | 160 |
|           |               |                                   | 3                                    | .11                          |                                           |     |                      |     |
|           |               |                                   | 4                                    | .03                          |                                           |     |                      |     |
|           |               |                                   | 1 to 5                               | .19                          | 3625                                      | 250 | 3625                 | 250 |
| C         | 6             | 1-1-1-1-1-2                       | 6                                    | .05                          |                                           |     |                      |     |
|           |               |                                   | 1 to 4                               | .23                          | 3480                                      | 240 | 3625                 | 250 |
| B         | 6             | 1-1-1-1-2-3                       | 5                                    | .06                          |                                           |     |                      |     |
|           |               |                                   | 6                                    | .025                         | 3408                                      | 235 | 3625                 | 250 |
|           |               |                                   | 1 to 4                               | .23                          |                                           |     |                      |     |
|           |               |                                   | 5                                    | .06                          |                                           |     |                      |     |
| A         | 6             | 1-1-1-1-2-4                       | 6                                    | .014                         |                                           |     |                      |     |
|           |               |                                   |                                      |                              |                                           |     |                      |     |

1. Staging ratios provide approximations of the relative area ratios for each specific trim type. As an example, a staging ratio of 1-1-2 indicates that the final stage for that trim type has approximately twice the area of the first two stages.
2. Staging ratios do not have any relative correlation between the different trim types.
3. Recommended limits for  $\Delta P$  per stage are 800 psi (55 bar) for continuous duty cycle applications and up to 1000 psi (69 bar)  $\Delta P$  per stage for intermittent service.

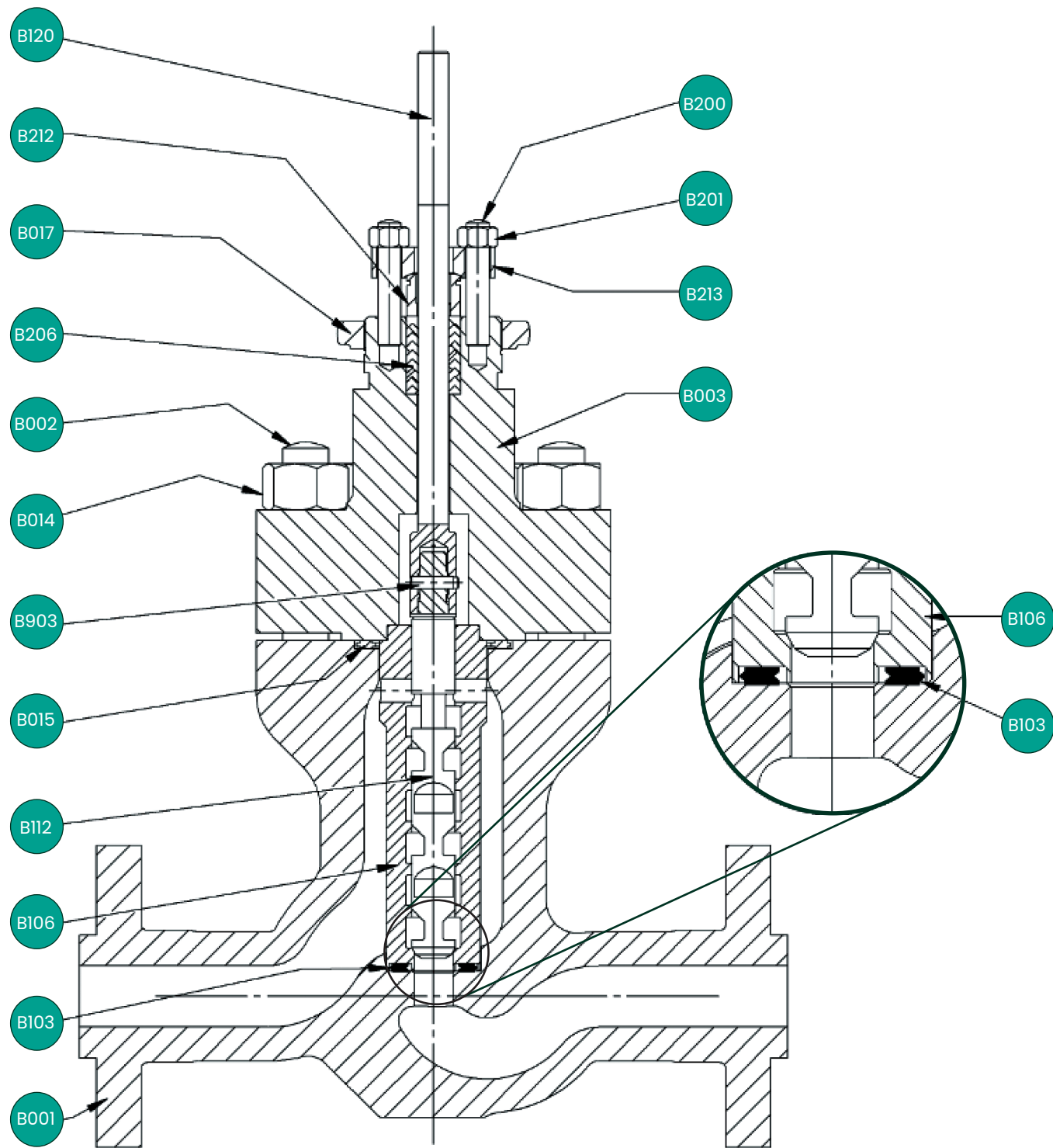
## High Pressure Drop Trim

| Trim Type | No. of Stages | Staging Ratios <sup>(1)(2)</sup> | Pressure Drop per Stage <sup>(3)(4)</sup> |                              | Maximum Recommended Throttling $\Delta P$ |     |
|-----------|---------------|----------------------------------|-------------------------------------------|------------------------------|-------------------------------------------|-----|
|           |               |                                  | Stages                                    | Fraction of Total $\Delta P$ | Continuous Service                        |     |
|           |               |                                  |                                           |                              | Psi                                       | Bar |
| C         | 6             | 1-1-1-1-1-2                      | 1 to 5                                    | .19                          | 5250                                      | 362 |
|           |               |                                  | 6                                         | .05                          |                                           |     |

1. Staging ratios provide approximations of the relative area ratios for each specific trim type. As an example, a staging ratio of 1-1-2 indicates that the final stage for that trim type has approximately twice the area of the first two stages.
2. Staging ratios do not have any relative correlation between the different trim types.
3. Recommended limits for  $\Delta P$  per stage are 1000 psi (69 bar) for continuous duty cycle applications.
4. Hardened Trim includes an Inconel 718 / St St 630 H900 / St St 630 H1150M / Duplex 2205 / Duplex S32760 / XM 19 base material with low temperature carburizing treatment for plug and liner.

# Materials of Construction

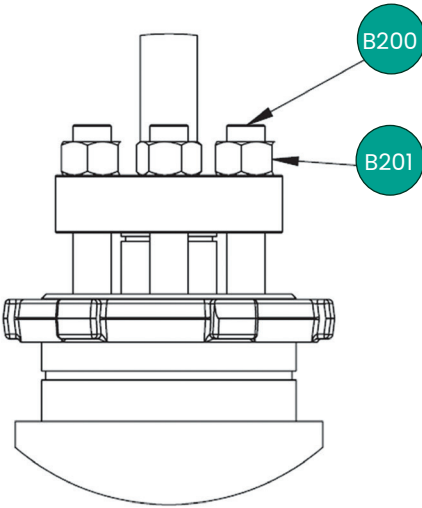
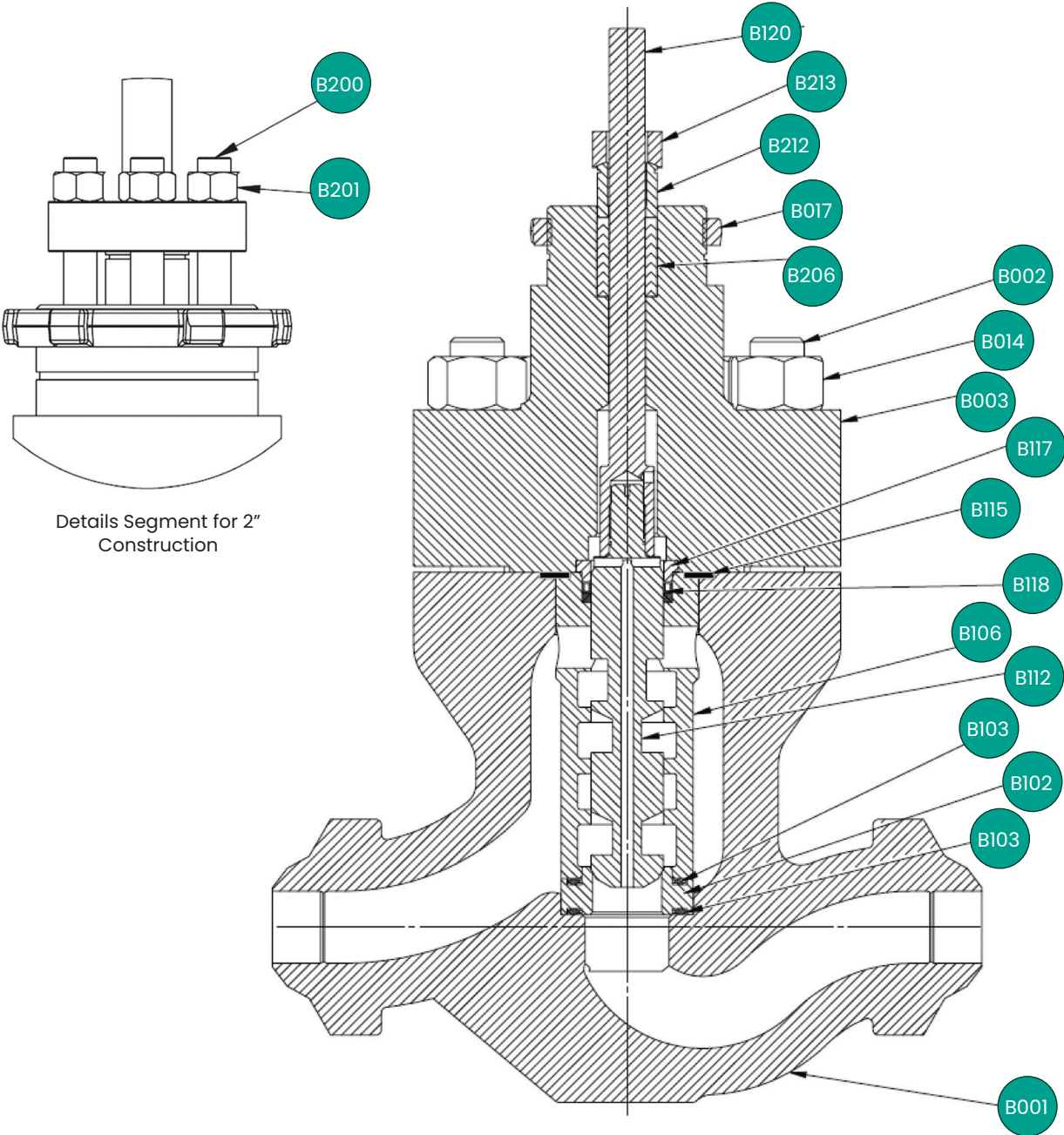
Standard Construction 1 to 1.5 inch (FTO only)



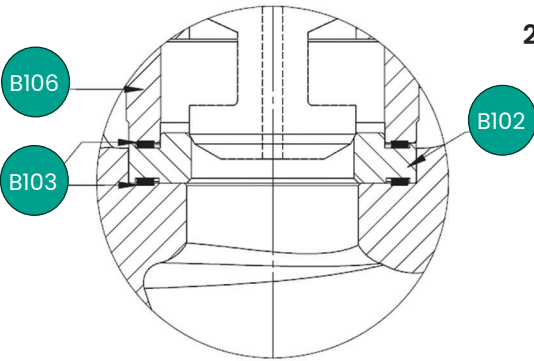
1" to 1.5" Standard Construction

# Materials of Construction

Standard Construction 2 inch (FTO only)

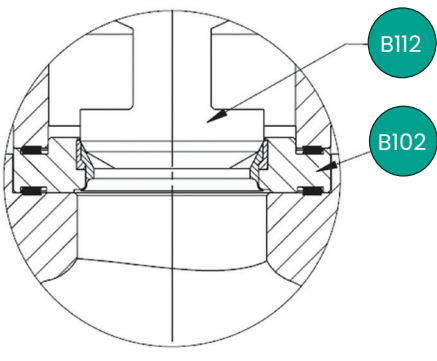


Details Segment for 2" Construction



Details Segment for 2" to 8" Construction

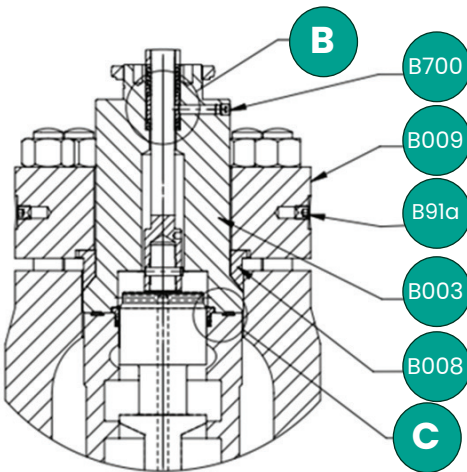
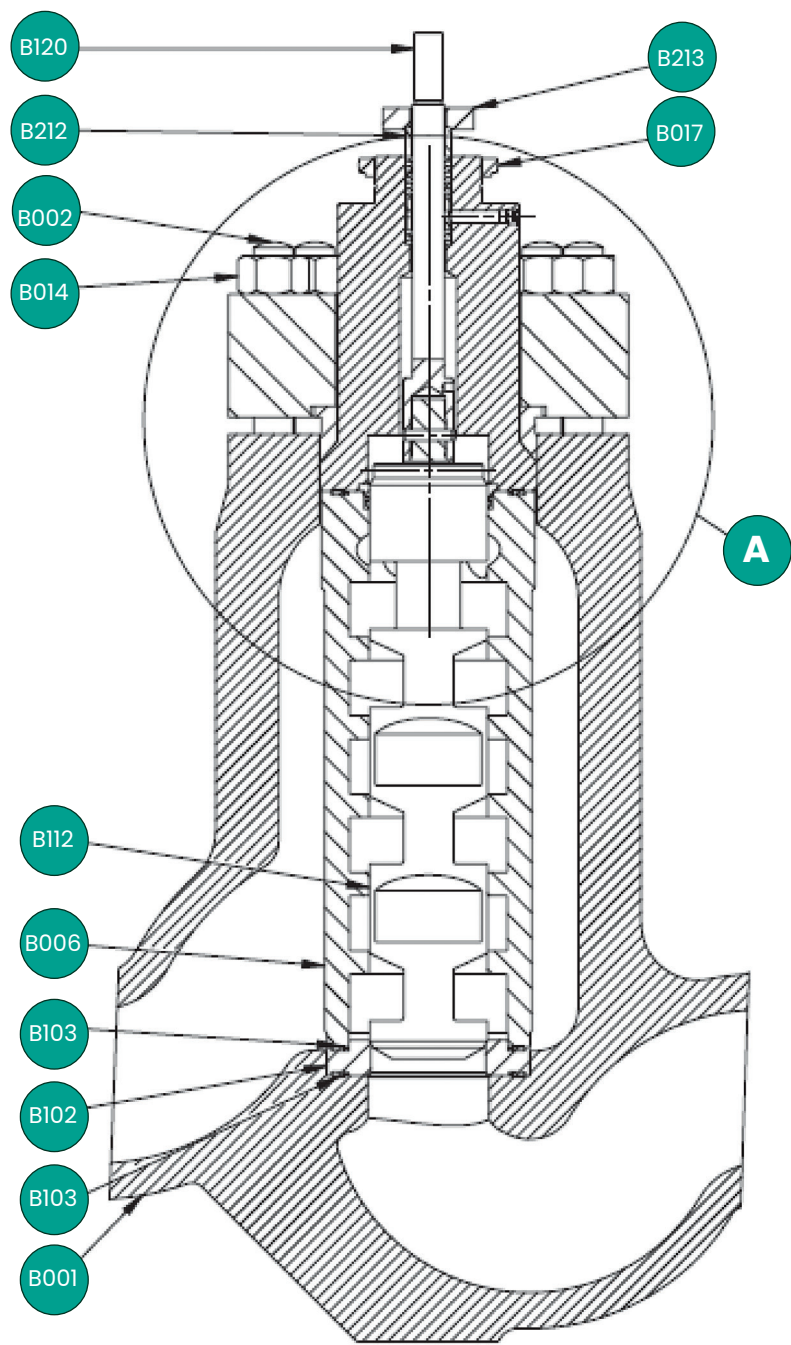
## 2" Standard Construction



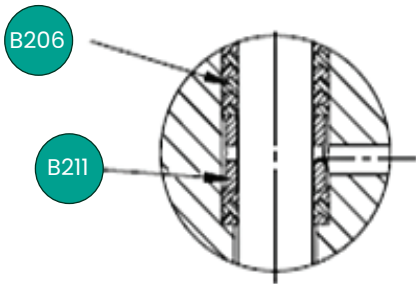
Details Segment for 2" to 8" Soft Seat Construction

# Materials of Construction

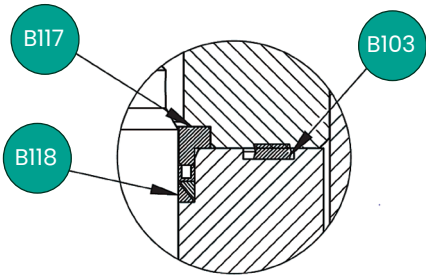
Standard Construction 3 to 8 inch (FTO only)



Detail A



Detail B

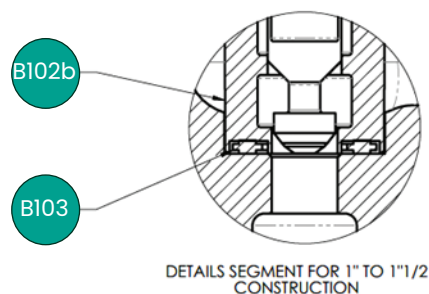
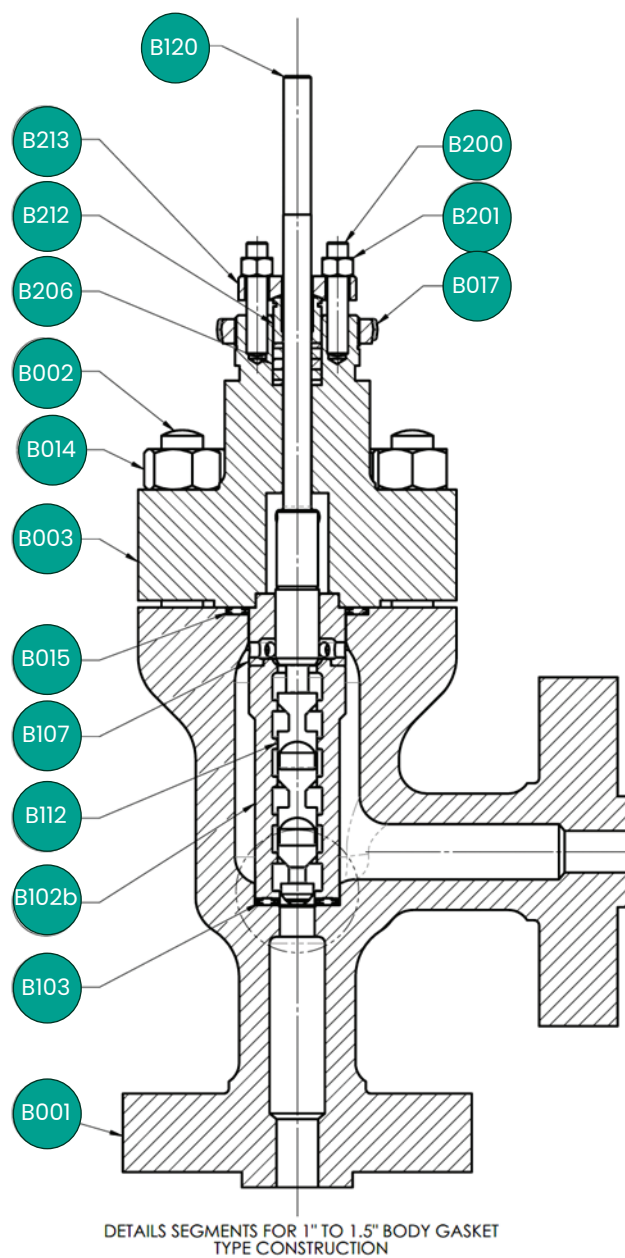


Detail C

3" to 8" Standard Construction

# Materials of Construction

Standard Construction 1 inch to 1.5 inch (FTC only)

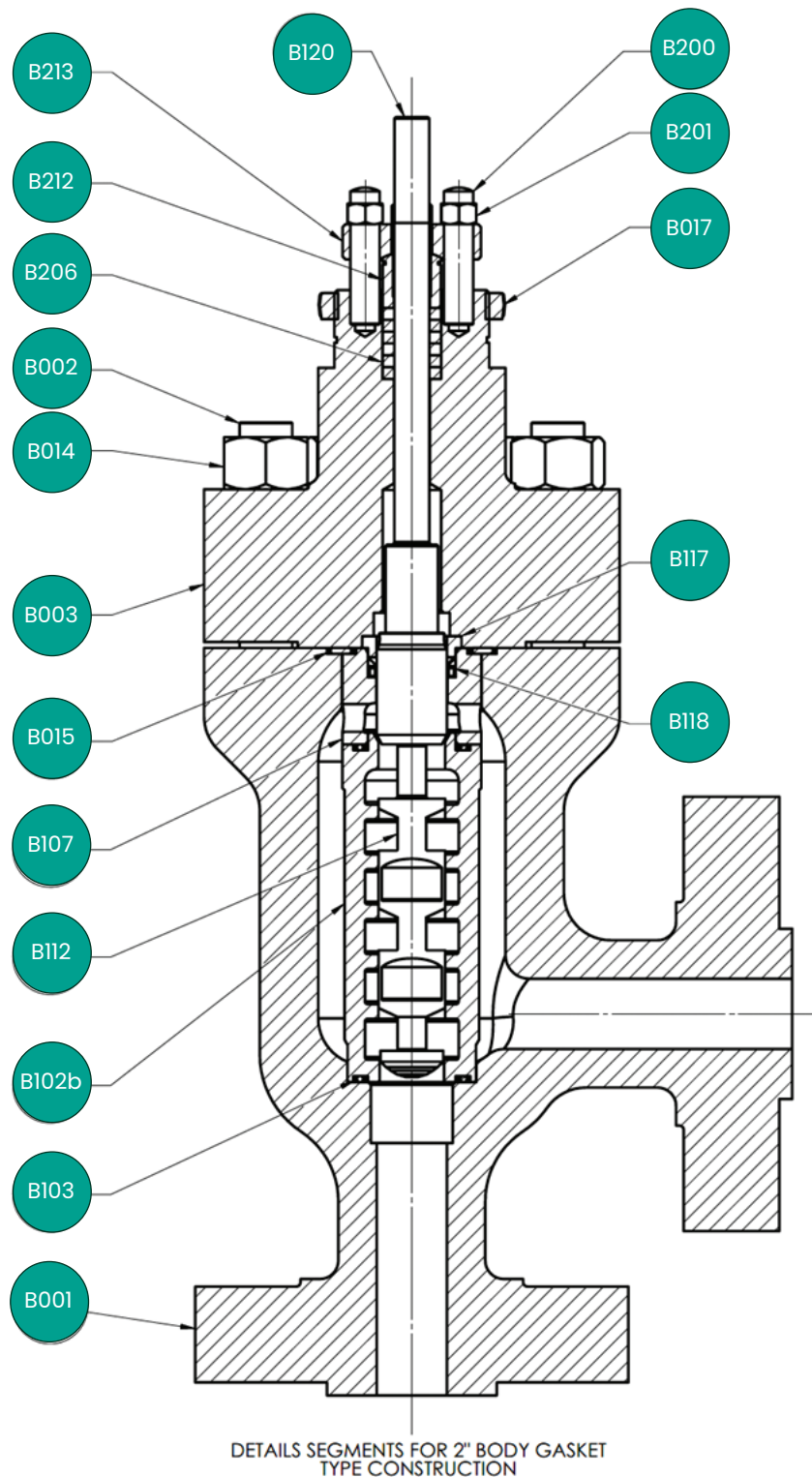


## Notes:

- 1 in. (Flow to Close) – Unbalanced configuration only
- 1.5 in. (Flow to Close) – Balanced and Unbalanced configuration

# Materials of Construction

## Standard Construction 2 inch (FTC only)

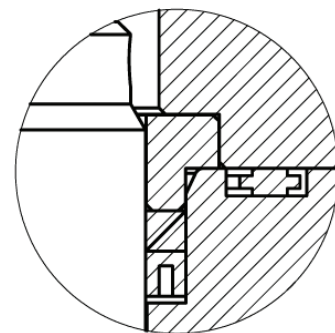
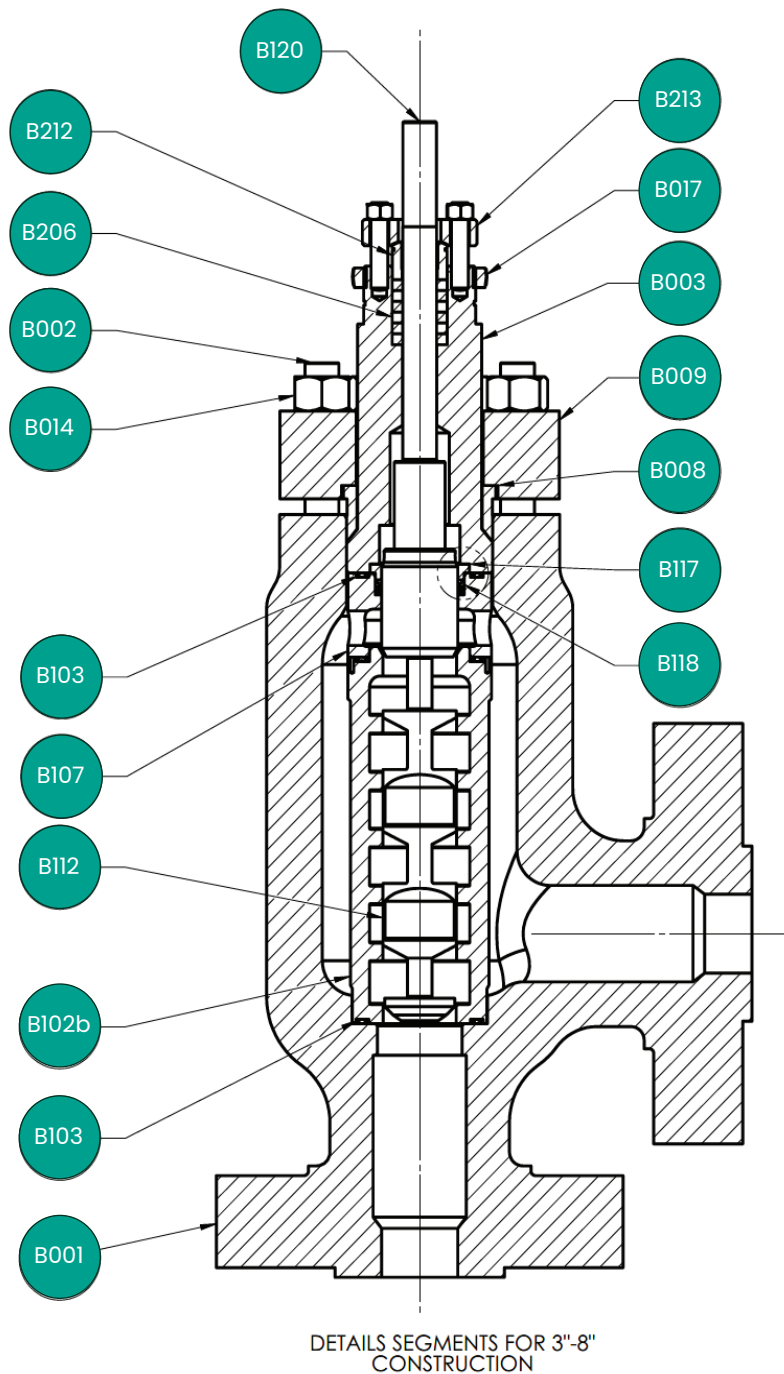


### Notes:

2 in. (Flow to Close) – Balanced and Unbalanced configuration

# Materials of Construction

Standard Construction 3 inch to 8 inch (FTC only)



DETAILS SEGMENT FOR 3" TO 8" METAL SEAL CONSTRUCTION

## Notes:

1. 3 in. and 4 in. (Flow to Close) – Balanced and Unbalanced configuration
2. 6 in. and 8 in. (Flow to Close) – Balanced configuration only

# Materials of Construction

## Standard Construction Carbon Steel

Valve Sizes 1" – 8" (DN 25–200) ASME Class 600–2500

| Ref. No. | Temperature Range                                         | -50°F<br>(-45°C)                                                         | -20°F<br>(-29°C)                                                                                                            | 450°F<br>(232°C)                                                            | 600°F<br>(316°C) |
|----------|-----------------------------------------------------------|--------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|------------------|
|          | Description                                               | Standard Materials                                                       |                                                                                                                             |                                                                             |                  |
| B001     | Body                                                      |                                                                          | A216 GRADE WCC/WCB/ EN 1.619/1.625 OR ASTM A105 / 1.0436 EN 10222-2                                                         |                                                                             |                  |
|          |                                                           | ASTM A352 GRADE LCC HRC 22 MAXIMUM OR ASTM A350 GRADE LF2 HRC 22 MAXIMUM |                                                                                                                             |                                                                             |                  |
| B002     | Body Studs                                                |                                                                          | ASTM A193 GRADE B7/EN 1.7225                                                                                                |                                                                             |                  |
|          |                                                           | ASTM A320 Grade L7 (ASTM +PED)                                           |                                                                                                                             |                                                                             |                  |
| B003     | Bonnet <sup>(6)</sup>                                     |                                                                          | A216 GRADE WCC/WCB/ EN 1.619/1.625 OR ASTM A105 / 1.0436 EN 10222-2                                                         |                                                                             |                  |
|          |                                                           | ASTM A352 GRADE LCC HRC 22 MAXIMUM OR ASTM A350 GRADE LF2 HRC 22 MAXIMUM |                                                                                                                             |                                                                             |                  |
| B008     | Metal Seal <sup>(5)</sup>                                 | STAINLESS STEEL TYPE 630 H1150M HRC 33 MAXIMUM PTFE COATED               |                                                                                                                             | STAINLESS STEEL TYPE 630 H1150M HRC 33 MAXIMUM SILVER COATED <sup>(7)</sup> |                  |
| B009     | Bonnet Flange <sup>(5)</sup> <sup>(6)</sup>               |                                                                          | A216 GRADE WCC/WCB/ EN 1.619/1.625 OR ASTM A105 / 1.0436 EN 10222-2                                                         |                                                                             |                  |
|          |                                                           | ASTM A352 GRADE LCC HRC 22 MAXIMUM OR ASTM A350 GRADE LF2 HRC 22 MAXIMUM |                                                                                                                             |                                                                             |                  |
| B014     | Body Stud Nuts                                            |                                                                          | ASTM A194 Grade 2H                                                                                                          |                                                                             |                  |
|          |                                                           | ASTM A194 Grade 7 (ASTM +PED)                                            |                                                                                                                             |                                                                             |                  |
| B015     | Bonnet Gasket                                             | 316L STAINLESS STEEL SPIRAL WOUND GASKET WITH GRAPHITE FILLER            |                                                                                                                             |                                                                             |                  |
| B017     | Yoke Clamping Nut                                         | LOW CARBON STEEL DICHROMATE ZINC PLATED                                  |                                                                                                                             |                                                                             |                  |
| B102     | Seat Ring <sup>(3)</sup>                                  | HARDFACING STELLITE NO.6 ON 316 STAINLESS STEEL                          |                                                                                                                             |                                                                             |                  |
| B102b    | Seat/Linear (FTC)                                         | HARDFACING STELLITE NO.6 ON ASTM A479 TY XM-19 ST ST                     |                                                                                                                             |                                                                             |                  |
| B103     | Seat Ring / Liner Gaskets                                 | 316L STAINLESS STEEL SPIRAL WOUND GASKET WITH GRAPHITE FILLER            |                                                                                                                             |                                                                             |                  |
| B106     | Liner                                                     | STAINLESS STEEL TYPE 630 H900                                            |                                                                                                                             |                                                                             |                  |
|          | Liner High Pressure Drop                                  | STAINLESS STEEL TYPE 630 H900 + KOLSTERIZING KDUPLEX OR S3PM             |                                                                                                                             |                                                                             |                  |
| B107     | Cage (FTC)                                                | ST ST TYPE 630 H900                                                      |                                                                                                                             |                                                                             |                  |
| B112     | Plug (Balanced)                                           | HARDFACING STELLITE NO.6 ON 316 STAINLESS STEEL                          | 410 STAINLESS STEEL QT HRC 35 MIN with CHROMEPLATE OR 410 STAINLESS STEEL QT HRC 35 MIN                                     |                                                                             |                  |
|          | Plug (Unbalanced)                                         |                                                                          | 410 STAINLESS STEEL QT HRC 35 MIN                                                                                           |                                                                             |                  |
|          |                                                           | Plug (balanced and Unbalanced) High Pressure Drop                        | ASTM A479 TYPE XM-19 – HRC 35 MAXIMUM. HARDNESS COMPLIANCE WITH NACE MR0103 SHALL BE CERTIFIED + KOLSTERISATION K33 OR S3PA | STAINLESS STEEL TYPE 630 H900 + KOLSTERIZING KDUPLEX OR S3PM                |                  |
| B117     | Seal Retainer <sup>(1)</sup>                              | SOLUTION ANNEALED 316 STAINLESS STEEL                                    |                                                                                                                             |                                                                             |                  |
| B118     | Balance Seal <sup>(1)</sup> <sup>(2)</sup> <sup>(4)</sup> | PRESSURE ENERGIZED POLYMERIC                                             |                                                                                                                             |                                                                             |                  |
| B120     | Stem                                                      | 17-4 PH STAINLESS STEEL H1075                                            |                                                                                                                             |                                                                             |                  |
| B200     | Packing Flange Studs                                      | ASTM A193 GRADE B8 CLASS 2                                               |                                                                                                                             |                                                                             |                  |
| B201     | Packing Flange Nuts                                       | ASTM A194 GRADE 8                                                        |                                                                                                                             |                                                                             |                  |
| B206     | Packing Set                                               | Carbon Core Braided PTFE                                                 |                                                                                                                             |                                                                             |                  |
| B212     | Packing Follower                                          | SOLUTION ANNEALED 316L STAINLESS STEEL                                   |                                                                                                                             |                                                                             |                  |
| B213     | Packing Flange                                            | SOLUTION ANNEALED 316L STAINLESS STEEL                                   | LOW CARBON STEEL DICHROMATE ZINC PLATED                                                                                     |                                                                             |                  |
| B903     | Plug Pin                                                  | SOLUTION ANNEALED 316 STAINLESS STEEL                                    |                                                                                                                             |                                                                             |                  |

1. The seal and retainer are not required for 1" (DN 25) size.
2. The balance seal is not required for the unbalanced construction.
3. Seat is integral with Liner on 1" – 1.5" (DN 25–40) valves.
4. See table on page 5 for pressure and temperature limits.
5. 3" – 8" (DN 80–200) valves.
6. Bonnet and bonnet flange can be manufactured from either casting or forging.
7. Material with silver plate is not applicable to nuclear application.

Review use of optional materials and configurations for temperature ranges indicated. Standard materials listed may still be applicable depending on specific service conditions. Consult Baker Hughes for appropriate material combinations.

# Materials of Construction

## Standard Construction Stainless Steel

Valve Sizes 1" – 8" (DN 25–200) ASME Class 600–2500

| Ref. No. | Temperature Range                                 | -20°F (-29°C)                                                                                                                                     | 450°F (232°C) | 600°F (316°C)                                                               |
|----------|---------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-----------------------------------------------------------------------------|
|          | Description                                       | Standard Materials                                                                                                                                |               |                                                                             |
| B001     | Body                                              | ASTM A351 GRADE CF8M / EN 1.4408 OR ASTM A182 GRADE F316 / EN 1.4401                                                                              |               |                                                                             |
|          |                                                   | ASTM A351 GRADE CF3M / EN 14408 C:0.03/14409 HRC 22 MAXIMUM OR ASTM A182 GRADE F316/F316L / 1.4401/1.4404 EN 10222-5                              |               |                                                                             |
| B002     | Body Studs                                        | ASTM A193 GRADE B7/EN 1.7225 – ZINC PLATING                                                                                                       |               |                                                                             |
| B003     | Bonnet <sup>(6)</sup>                             | ASTM A351 GRADE CF8M / EN 1.4408 OR ASTM A182 GRADE F316 / EN 1.4401                                                                              |               |                                                                             |
|          |                                                   | ASTM A351 GRADE CF3M / EN 14408 C:0.03/14409 HRC 22 MAXIMUM OR ASTM A182 GRADE F316/F316L / 1.4401/1.4404 EN 10222-5                              |               |                                                                             |
| B008     | Metal Seal <sup>(5)</sup>                         | STAINLESS STEEL TYPE 630 H1150M HRC 33 MAXIMUM PTFE COATED                                                                                        |               | STAINLESS STEEL TYPE 630 H1150M HRC 33 MAXIMUM SILVER COATED <sup>(7)</sup> |
| B009     | Bonnet Flange <sup>(5) (6)</sup>                  | ASTM A351 GRADE CF8M / EN 1.4408 OR ASTM A182 GRADE F316 / EN 1.4401                                                                              |               |                                                                             |
|          |                                                   | ASTM A351 GRADE CF3M / EN 14408 C:0.03/14409 CMS-1040 HRC 22 MAXIMUM OR ASTM A182 GRADE F316/F316L / 1.4401/1.4404 EN 10222-5                     |               |                                                                             |
| B014     | Body Stud Nuts                                    | ASTM A194 GRADE 2H – ZINC PLATING                                                                                                                 |               |                                                                             |
| B015     | Bonnet Gasket                                     | 316L STAINLESS STEEL SPIRAL WOUND GASKET WITH GRAPHITE FILLER                                                                                     |               |                                                                             |
| B017     | Yoke Clamping Nut                                 | LOW CARBON STEEL DICHROMATE ZINC PLATED                                                                                                           |               |                                                                             |
| B102     | Seat Ring <sup>(3)</sup>                          | HARDFACING STELLITE NO. 6 ON 316 STAINLESS STEEL                                                                                                  |               |                                                                             |
| B102b    | Seat/Liner (FTC)                                  | HARDFACING STELLITE NO.6 ON ASTM A479 TY XM-19 ST ST                                                                                              |               |                                                                             |
| B103     | Seat Ring / Liner Gaskets                         | 316L STAINLESS STEEL SPIRAL WOUND GASKET WITH GRAPHITE FILLER                                                                                     |               |                                                                             |
| B106     | Liner                                             | ASTM A479 TYPE XM-19                                                                                                                              |               |                                                                             |
|          | Liner High Pressure Drop                          | ASTM A479 TYPE XM-19 – HRC 35 MAXIMUM.HARDNESS COMPLIANCE WITH NACE MR0103 SHALL BE CERTIFIED + KOLSTERISATION K33 OR S3PA                        |               |                                                                             |
|          | Plug (Unbalanced)                                 | STAINLESS STEEL TYPE 630 H1150M WITH CHROMEPLATE                                                                                                  |               |                                                                             |
|          | Plug (Balanced and Unbalanced High Pressure Drop) | STAINLESS STEEL TYPE 630 H1150M HRC 33 MAXIMUM. HARDNESS COMPLIANCE WITH NACE MR0103 AND MR0175 SHALL BE CERTIFIED + KOLSTERIZING KDUPLEX OR S3PM |               |                                                                             |
| B107     | Cage (FTC)                                        | ASTM A479 TYPE XM-19                                                                                                                              |               |                                                                             |
| B112     | Plug (Balanced)                                   | STAINLESS STEEL TYPE 630 H1150M WITH CHROMEPLATE                                                                                                  |               |                                                                             |
|          | Plug (Unbalanced)                                 | STAINLESS STEEL TYPE 630 H1150M WITH CHROMEPLATE                                                                                                  |               |                                                                             |
|          | Plug (Balanced and Unbalanced High Pressure Drop) | STAINLESS STEEL TYPE 630 H1150M HRC 33 MAXIMUM. HARDNESS COMPLIANCE WITH NACE MR0103 AND MR0175 SHALL BE CERTIFIED + KOLSTERIZING KDUPLEX OR S3PM |               |                                                                             |
| B117     | Seal Retainer <sup>(1)</sup>                      | SOLUTION ANNEALED 316 STAINLESS STEEL                                                                                                             |               |                                                                             |
| B118     | Balance Seal <sup>(1) (2) (4)</sup>               | PRESSURE ENERGIZED POLYMERIC                                                                                                                      |               |                                                                             |
| B120     | Stem                                              | ASTM A479 TYPE XM-19                                                                                                                              |               |                                                                             |
| B200     | Packing Flange Studs                              | ASTM A193 GRADE B8 CLASS 2                                                                                                                        |               |                                                                             |
| B201     | Packing Flange Nuts                               | ASTM A194 GRADE 8                                                                                                                                 |               |                                                                             |
| B206     | Packing Set                                       | CARBON CORE BRAIDED PTFE                                                                                                                          |               |                                                                             |
| B212     | Packing Follower                                  | SOLUTION ANNEALED 316L STAINLESS STEEL                                                                                                            |               |                                                                             |
| B213     | Packing Flange                                    | LOW CARBON STEEL DICHROMATE ZINC PLATED                                                                                                           |               |                                                                             |
| B903     | Plug Pin                                          | SOLUTION ANNEALED 316 STAINLESS STEEL                                                                                                             |               |                                                                             |

1. The seal and retainer are not required for 1" (DN 25) size.
2. The balance seal is not required for the unbalanced construction.
3. Seat is integral with liner on 1" (DN 25) and 1 1/2" (DN 40) valves.
4. See table on page 5 for pressure and temperature limits.

5. 3" (DN 80) – 8" (DN 200) valves.
6. Bonnet and bonnet flange can be manufactured from either casting or forging.
7. Material with silver plate is not applicable to nuclear application.

# Materials of Construction

## Standard Construction 347 Stainless Steel

Valve Sizes 1" - 8" (DN 25-200) ASME Class 600-2500

| Ref. No. | Temperature Range                                         | -20°F (-29°C)                                                                                                                      | 450°F (232°C)                                                     | 600°F (316°C) |
|----------|-----------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|---------------|
|          | Description                                               | Standard Materials                                                                                                                 |                                                                   |               |
| B001     | Body                                                      | ASTM A351 GRADE CF8C HRC 22 MAXIMUM or ASTM A182 GRADE F347 HRC 22 MAXIMUM (ASTM)                                                  |                                                                   |               |
|          |                                                           | ASTM A351 GRADE CF8C HRC 22 MAXIMUM /ASTM A182 GRADE F347 HRC 22 MAXIMUM (ASTM + PED)                                              |                                                                   |               |
| B002     | Body Studs                                                | ASTM A193 GR B7/EN 1.7225 – ZINC PLATING                                                                                           |                                                                   |               |
| B003     | Bonnet <sup>(6)</sup>                                     | ASTM A351 GRADE CF8C HRC 22 MAXIMUM or ASTM A182 GRADE F347 HRC 22 MAXIMUM (ASTM)                                                  |                                                                   |               |
|          |                                                           | ASTM A351 GRADE CF8C HRC 22 MAXIMUM /ASTM A182 GRADE F347 HRC 22 MAXIMUM (ASTM + PED)                                              |                                                                   |               |
| B008     | Metal Seal <sup>(5)</sup>                                 | ST ST TYPE 630 H1150M HRC 33 MAXIMUM PTFE COATED                                                                                   | ST ST TYPE 630 H1150M HRC 33 MAXIMUM SILVER COATED <sup>(7)</sup> |               |
| B009     | Bonnet Flange <sup>(5)</sup> <sup>(6)</sup>               | ASTM A351 GRADE CF8C HRC 22 MAXIMUM or ASTM A182 GRADE F347 HRC 22 MAXIMUM (ASTM)                                                  |                                                                   |               |
|          |                                                           | ASTM A351 GRADE CF8C HRC 22 MAXIMUM /ASTM A182 GRADE F347 HRC 22 MAXIMUM (ASTM + PED)                                              |                                                                   |               |
| B014     | Body Stud Nuts                                            | ASTM A194 Grade 2H – Zinc Plating                                                                                                  |                                                                   |               |
| B015     | Bonnet Gasket                                             | 316L ST ST SPIRAL WOUND GASKET WITH GRAPHITE FILLER                                                                                |                                                                   |               |
| B017     | Yoke Clamping Nut                                         | LOW CARBON STEEL DICHROMATE ZINC PLATED                                                                                            |                                                                   |               |
| B102     | Seat Ring <sup>(3)</sup>                                  | SOLUTION ANNEALED 347 ST ST HRC 22 MAXIMUM + HARDFACING STELLITE 6                                                                 |                                                                   |               |
| B102b    | Seat/Liner (FTC)                                          | HARDFACING STELLITE 6 ON XM-19 ST ST                                                                                               |                                                                   |               |
| B103     | Seat Ring / Liner Gaskets                                 | 316L ST ST SPIRAL WOUND GASKET WITH GRAPHITE FILLER                                                                                |                                                                   |               |
| B106     | Liner <sup>(6)</sup> (FTO)                                | ASTM A479 TYPE XM-19                                                                                                               |                                                                   |               |
|          |                                                           | FERRALIUM ALLOY 255 HRC 28 MAXIMUM                                                                                                 |                                                                   |               |
|          | Liner High Pressure drop (FTO)                            | ASTM B637 GRADE NO7718 HRC 40 MAXIMUM. HARDNESS COMPLIANCE WITH NACE MR0103 SHALL BE CERTIFIED + KOLSTERISATION Double K33 or S3PM |                                                                   |               |
| B107     | Cage (FTC)                                                | ASTM A479 TYPE XM-19                                                                                                               |                                                                   |               |
| B112     | Plug (Balanced) <sup>(6)</sup>                            | SOLUTION ANNEALED 347 ST ST HRC 22 MAXIMUM + HARDFACING STELLITE NO.6                                                              |                                                                   |               |
|          |                                                           | ASTM B637 ALLOY HRC 40 MAX – NICKEL PLATED                                                                                         |                                                                   |               |
|          | Plug (Un-Balanced) <sup>(6)</sup>                         | SOLUTION ANNEALED 347 ST ST HRC 22 MAXIMUM + HARDFACING STELLITE NO.6                                                              |                                                                   |               |
|          |                                                           | ASTM B637 ALLOY HRC 40 MAX – NICKEL PLATED                                                                                         |                                                                   |               |
|          | Plug (Balanced & unbalanced High Pressure Drop)           | ASTM B637 GRADE NO7718 HRC 40 MAXIMUM. HARDNESS COMPLIANCE WITH NACE MR0103 SHALL BE CERTIFIED + KOLSTERISATION Double K33 or S3PM |                                                                   |               |
| B117     | Seal Retainer <sup>(1)</sup>                              | SOLUTION ANNEALED 347 ST ST HRC 22 MAX                                                                                             |                                                                   |               |
| B118     | Balance Seal <sup>(1)</sup> <sup>(2)</sup> <sup>(4)</sup> | ELGILOY SPRING WITH FLUOROLOY A21 JACKET & BACKUP RINGS                                                                            |                                                                   |               |
| B120     | Stem                                                      | ASTM A479 TYPE XM-19                                                                                                               |                                                                   |               |
| B200     | Packing Flange Studs                                      | ASTM A193 GRADE B8 CLASS 2                                                                                                         |                                                                   |               |
| B201     | Packing Flange Nuts                                       | ASTM A194 GRADE 8                                                                                                                  |                                                                   |               |
| B206     | Packing Set                                               | CARBON CORE BRAIDED PTFE                                                                                                           |                                                                   |               |
| B212     | Packing Follower                                          | SOLUTION ANNEALED 316L STAINLESS STEEL                                                                                             |                                                                   |               |
| B213     | Packing Flange                                            | SOLUTION ANNEALED 316L STAINLESS STEEL                                                                                             | LOW CARBON STEEL DICHROMATE ZINC PLATED                           |               |
| B903     | Plug Pin                                                  | SOLUTION ANNEALED 347 ST ST HRC 22 MAX                                                                                             |                                                                   |               |

### Notes:

1. The seal and retainer are not required for 1" [DN 25] size.
2. The balance seal is not required for the unbalanced construction.
3. Seat is integral with Liner on 1" [DN 25] and 1-1/2" [DN 40] valves
4. See graphic on page 6 for pressure and temperature limits
5. 3" [DN 80] - 8" [DN 200] valves
6. Bonnet and Bonnet Flange can be manufactured from either casting or forging.
7. Material with silver plate is not applicable to nuclear application
8. Use XM-19 Liner with 347 St. St Plug and Ferralium Alloy Liner with Inconel Plug (N07718). 347 St. St is the standard plug material. Inconel plugs to be used for erosive applications.

# Materials of Construction

## Standard Construction Chrome-Moly Steel Construction

Valve Sizes 1" - 8" (DN 25-200) ASME Class 600-2500

| Ref. No. | Temperature Range                                         | -20°F<br>(-29°C)                                                                                                     | 450°F<br>(232°C)                                  | 550°F<br>(288°C)                                                  | 600°F<br>(316°C) |
|----------|-----------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|-------------------------------------------------------------------|------------------|
|          | Description                                               | Standard Materials                                                                                                   |                                                   |                                                                   |                  |
| B001     | Body                                                      | ASTM A217 GRADE WC9 Hrc 22 MAXIMUM OR ASTM A182 GRADE F22 CLASS 3 NORMALIZED AND TEMPERED                            |                                                   |                                                                   |                  |
|          |                                                           | ASTM A217 GRADE WC6/EN 1.7357 EN10213 Hrc 22 MAXIMUM OR ASTM A182 GRADE F11 CLASS 2 NORMALIZED AND TEMPERED          |                                                   |                                                                   |                  |
| B002     | Body Studs                                                | ASTM A193 GR B7/EN 1.7225                                                                                            |                                                   |                                                                   |                  |
| B003     | Bonnet <sup>(6)</sup>                                     | ASTM A217 GRADE WC9 Hrc 22 MAXIMUM OR ASTM A182 GRADE F22 CLASS 3 NORMALIZED AND TEMPERED                            |                                                   |                                                                   |                  |
|          |                                                           | ASTM A217 GRADE WC6/EN 1.7357 EN10213 CMS-1040 Hrc 22 MAXIMUM OR ASTM A182 GRADE F11 CLASS 2 NORMALIZED AND TEMPERED |                                                   |                                                                   |                  |
| B008     | Metal Seal <sup>(5)</sup>                                 | ST ST TYPE 630 H1150M Hrc 33 MAXIMUM PTFE COATED                                                                     |                                                   | ST ST TYPE 630 H1150M Hrc 33 MAXIMUM SILVER COATED <sup>(8)</sup> |                  |
| B009     | Bonnet Flange <sup>(5)</sup> <sup>(6)</sup>               | ASTM A217 GRADE WC9 Hrc 22 MAXIMUM OR ASTM A182 GRADE F22 CLASS 3 NORMALIZED AND TEMPERED                            |                                                   |                                                                   |                  |
|          |                                                           | ASTM A217 GRADE WC6 Hrc 22 MAXIMUM OR ASTM A182 GRADE F11 CLASS 2 NORMALIZED AND TEMPERED                            |                                                   |                                                                   |                  |
| B014     | Body Stud Nuts                                            | ASTM A194 Grade 2H                                                                                                   |                                                   |                                                                   |                  |
| B015     | Bonnet Gasket                                             | 316L ST ST SPIRAL WOUND GASKET WITH GRAPHITE FILLER                                                                  |                                                   |                                                                   |                  |
| B017     | Yoke Clamping Nut                                         | LOW CARBON STEEL DICHROMATE ZINC PLATED                                                                              |                                                   |                                                                   |                  |
| B102     | Seat Ring <sup>(3)</sup>                                  | HARDFACING STELLITE NO.6 ON 316 STAINLESS STEEL                                                                      |                                                   |                                                                   |                  |
| B102b    | Seat/Liner (FTC)                                          | HARDFACING STELLITE NO.6 ON XM-19 ST ST                                                                              |                                                   |                                                                   |                  |
| B103     | Seat Ring / Liner Gaskets                                 | 316L ST ST SPIRAL WOUND GASKET WITH GRAPHITE FILLER                                                                  |                                                   |                                                                   |                  |
| B106     | Liner <sup>(FTO)</sup>                                    | ST ST TYPE 630 H900                                                                                                  |                                                   |                                                                   |                  |
|          | Liner High Pressure drop (FTO)                            | ST ST TYPE 630 H900 + KOLSTERIZING KDUPLX or S3PM                                                                    |                                                   |                                                                   |                  |
| B107     | Cage (FTC)                                                | ST ST TYPE 630 H900                                                                                                  |                                                   |                                                                   |                  |
| B112     | Plug (Balanced)                                           | 410 ST ST QT HRC 35 MIN                                                                                              |                                                   |                                                                   |                  |
|          |                                                           | 410 ST ST QT HRC 35 MIN WITH CHROMEPLATE                                                                             |                                                   |                                                                   |                  |
|          | Plug (Un-Balanced)                                        | 410 ST ST QT HRC 35 MIN                                                                                              |                                                   |                                                                   |                  |
|          |                                                           | Plug (Balanced & unbalanced High Pressure Drop)                                                                      | ST ST TYPE 630 H900 + KOLSTERIZING KDUPLX or S3PM |                                                                   |                  |
| B117     | Seal Retainer <sup>(1)</sup>                              | SOLUTION ANNEALED 316 STAINLESS STEEL                                                                                |                                                   |                                                                   |                  |
| B118     | Balance Seal <sup>(1)</sup> <sup>(2)</sup> <sup>(4)</sup> | ELGILOY SPRING WITH FLUOROLOY A21 JACKET & BACKUP RINGS                                                              |                                                   |                                                                   |                  |
| B120     | Stem                                                      | 17-4 PH STAINLESS STEEL H1075                                                                                        |                                                   |                                                                   |                  |
| B200     | Packing Flange Studs                                      | ASTM A193 GRADE B8 CLASS 2                                                                                           |                                                   |                                                                   |                  |
| B201     | Packing Flange Nuts                                       | ASTM A194 GRADE 8                                                                                                    |                                                   |                                                                   |                  |
| B206     | Packing Set                                               | CARBON CORE BRAIDED PTFE                                                                                             |                                                   |                                                                   |                  |
| B212     | Packing Follower                                          | SOLUTION ANNEALED 316L STAINLESS STEEL                                                                               |                                                   |                                                                   |                  |
| B213     | Packing Flange                                            | SOLUTION ANNEALED 316L STAINLESS STEEL                                                                               |                                                   | LOW CARBON STEEL DICHROMATE ZINC PLATED                           |                  |
| B903     | Plug Pin                                                  | SOLUTION ANNEALED 316 STAINLESS STEEL                                                                                |                                                   |                                                                   |                  |

### Notes:

- The seal and retainer are not required for 1" [DN 25] size.
- The balance seal is not required for the unbalanced construction.
- Seat is integral with Liner on 1" [DN 25] & 1 1/2" [DN 40] valves
- See graphic on page 6 for pressure and temperature limits
- 3" [DN 80] - 8" [DN 200] valves
- Bonnet and Bonnet Flange can be manufactured from either casting or forging.
- Note deleted.
- Material with Silver Plate is not applicable to nuclear application.

# Materials of Construction

## Standard Construction 22Cr Duplex Stainless Steel

Valve Sizes 1" - 8" (DN 25-200) ASME Class 600-2500

| Ref. No. | Temperature Range                                         | -20°F<br>(-29°C)                                                                                                                                | 450°F<br>(232°C)                                                     | 500°F<br>(260°C) |
|----------|-----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|------------------|
|          | Description                                               | Standard Materials                                                                                                                              |                                                                      |                  |
| B001     | Body                                                      | ASTM A995 Grade 4A or ASTM A182 GR F51 Hrc 28 MAXIMUM (ASTM)<br>ASTM A995 GR 4A + PMA 178 or ASTM A182 GR F51 PER CMS 1041 + PMA 130 (ASTM+PED) |                                                                      |                  |
| B002     | Body Studs                                                | ASTM A193 GR B7/EN 1.7225 – ZINC PLATING                                                                                                        |                                                                      |                  |
| B003     | Bonnet <sup>(6)</sup>                                     | ASTM A995 Grade 4A or ASTM A182 GR F51 Hrc 28 MAXIMUM (ASTM)                                                                                    |                                                                      |                  |
|          |                                                           | ASTM A995 GR 4A + PMA 178 or ASTM A182 GR F51 + PMA 130 (ASTM+PED)                                                                              |                                                                      |                  |
| B008     | Metal Seal <sup>(5)</sup>                                 | ST ST TYPE 630 H1150M Hrc 33 MAXIMUM PTFE COATED                                                                                                | ST ST TYPE 630 H1150M Hrc 33 MAXIMUM<br>SILVER COATED <sup>(7)</sup> |                  |
| B009     | Bonnet Flange <sup>(5)</sup> <sup>(6)</sup>               | ASTM A995 Grade 4A or ASTM A182 GR F51 Hrc 28 MAXIMUM (ASTM)<br>ASTM A995 GR 4A + PMA 178 or ASTM A182 GR F51 + PMA 130 (ASTM+PED)              |                                                                      |                  |
| B014     | Body Stud Nuts                                            | ASTM A194 Grade 2H – Zinc Plating                                                                                                               |                                                                      |                  |
| B015     | Bonnet Gasket                                             | 316L ST ST SPIRAL WOUND GASKET WITH GRAPHITE FILLER                                                                                             |                                                                      |                  |
| B017     | Yoke clamping nut                                         | LOW CARBON STEEL DICHROMATE ZINC PLATED                                                                                                         |                                                                      |                  |
| B102     | Seat Ring <sup>(3)</sup>                                  | 2205 STAINLESS STEEL (DUPLEX) Hrc 28 MAXIMUM + HARDFACING STELLITE NO.6                                                                         |                                                                      |                  |
| B102b    | Seat/Liner (FTC)                                          | HARDFACING STELLITE NO.6 ON SOLUTION ANNEALED 2205 AUSTENO–FERRITIC ST.ST.(DUPLEX) HARDNESS HRC 28<br>MAX + ENP                                 |                                                                      |                  |
| B103     | Seat Ring / Liner Gas-<br>kets                            | 316L ST ST SPIRAL WOUND GASKET WITH GRAPHITE FILLER                                                                                             |                                                                      |                  |
| B106     | Liner (FTO)                                               | SOLUTION ANNEALED 2205 STAINLESS STEEL (DUPLEX) 28 HRC MAXIMUM + ENP                                                                            |                                                                      |                  |
|          | Liner High Pressure drop<br>(FTO)                         | SOLUTION ANNEALED 2205 STAINLESS STEEL (DUPLEX) 28 HRC MAXIMUM + KOLSTERISATION K Duplex or S3PD                                                |                                                                      |                  |
| B107     | Cage (FTC)                                                | SOLUTION ANNEALED 2205 STAINLESS STEEL (DUPLEX) 28 HRC MAXIMUM + ENP                                                                            |                                                                      |                  |
| B112     | Plug (Balanced)                                           | 2205 STAINLESS STEEL (DUPLEX) Hrc 28 MAXIMUM + HARDFACING STELLITE NO.6                                                                         |                                                                      |                  |
|          | Plug (Un-Balanced)                                        | 2205 STAINLESS STEEL (DUPLEX) Hrc 28 MAXIMUM + HARDFACING STELLITE NO.6                                                                         |                                                                      |                  |
|          | Plug (Balanced & unbalanced High Pres-<br>sure Drop)      | SOLUTION ANNEALED 2205 STAINLESS STEEL (DUPLEX) 28 HRC MAXIMUM + KOLSTERISATION K Duplex or S3PD                                                |                                                                      |                  |
| B117     | Seal Retainer <sup>(1)</sup>                              | SOLUTION ANNEALED 316L Hrc 22 MAXIMUM STAINLESS STEEL                                                                                           |                                                                      |                  |
| B118     | Balance Seal <sup>(1)</sup> <sup>(2)</sup> <sup>(4)</sup> | ELGILOY SPRING WITH FLUOROLOY A21 JACKET & BACKUP RINGS                                                                                         |                                                                      |                  |
| B120     | Stem                                                      | SOLUTION ANNEALED 2205 STAINLESS STEEL (DUPLEX) Hrc 28 MAXIMUM or<br>ASTM B637 GRADE NO7718 Hrc 40 MAXIMUM                                      |                                                                      |                  |
| B200     | Packing Flange Studs                                      | ASTM A193 GRADE B8 CLASS 2                                                                                                                      |                                                                      |                  |
| B201     | Packing Flange Nuts                                       | ASTM A194 GRADE 8                                                                                                                               |                                                                      |                  |
| B206     | Packing Set                                               | CARBON CORE BRAIDED PTFE                                                                                                                        |                                                                      |                  |
| B212     | Packing Follower                                          | SOLUTION ANNEALED 316L STAINLESS STEEL                                                                                                          |                                                                      |                  |
| B213     | Packing Flange                                            | SOLUTION ANNEALED 316L STAINLESS STEEL                                                                                                          | LOW CARBON STEEL DICHROMATE ZINC PLATED                              |                  |
| B903     | Plug Pin                                                  | SOLUTION ANNEALED 2205 STAINLESS STEEL (DUPLEX) Hrc 28 MAXIMUM                                                                                  |                                                                      |                  |

### Notes:

1. The seal and retainer are not required for 1" [DN 25] size.
2. The balance seal is not required for the unbalanced construction.
3. Seat is integral with Liner on 1" [DN 25] and 1-1/2" [DN 40] valves
4. See graphic on page 5 for pressure & temperature limits.
5. 3" [DN 80] - 8" [DN 200] valves
6. Bonnet and Bonnet Flange can be manufactured from either casting or forging.
7. Material with silver plate is not applicable to nuclear application

# Materials of Construction

## Standard Construction 25r Duplex Stainless Steel

Valve Sizes 1" - 8" (DN 25-200) ASME Class 600-2500

| Ref. No. | Temperature Range                                         | -20°F<br>(-29°C)                                                                                                          | 450°F<br>(232°C)                                                  | 600°F<br>(316°C) |
|----------|-----------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|------------------|
|          | Description                                               | Standard Materials                                                                                                        |                                                                   |                  |
| B001     | Body                                                      | ASTM A995 Grade 6A or ASTM A182 GR F55 HRC 32 MAXIMUM (ASTM)                                                              |                                                                   |                  |
|          |                                                           | ASTM A 995 GR 6A + PMA 167 or ASTM A 182 GR F55 + PMA 140 (ASTM+PED)                                                      |                                                                   |                  |
| B002     | Body Studs                                                | ASTM A193 GR B7- ZINC PLATING                                                                                             |                                                                   |                  |
| B003     | Bonnet <sup>(6)</sup>                                     | ASTM A995 Grade 6A or ASTM A182 GR F55 HRC 32 MAXIMUM (ASTM)                                                              |                                                                   |                  |
|          |                                                           | ASTM A 995 GR 6A + PMA 167 or ASTM A 182 GR F55 + PMA 140 (ASTM+PED)                                                      |                                                                   |                  |
| B008     | Metal Seal <sup>(5)</sup>                                 | ST ST TYPE 630 H1150M HRC 33 MAXIMUM PTFE COATED                                                                          | ST ST TYPE 630 H1150M HRC 33 MAXIMUM SILVER COATED <sup>(7)</sup> |                  |
| B009     | Bonnet Flange <sup>(5)</sup> <sup>(6)</sup>               | ASTM A995 Grade 6A or ASTM A182 GR F55 HRC 32 MAXIMUM (ASTM)                                                              |                                                                   |                  |
|          |                                                           | ASTM A 995 GR 6A + PMA 167 or ASTM A 182 GR F55 + PMA 140 (ASTM+PED)                                                      |                                                                   |                  |
| B014     | Body Stud Nuts                                            | ASTM A194 Grade 2H - Zinc Plating                                                                                         |                                                                   |                  |
| B015     | Bonnet Gasket                                             | 316L ST ST SPIRAL WOUND GASKET WITH GRAPHITE FILLER                                                                       |                                                                   |                  |
| B017     | Yoke Clamping Nut                                         | LOW CARBON STEEL DICHROMATE ZINC PLATED                                                                                   |                                                                   |                  |
| B102     | Seat Ring <sup>(3)</sup>                                  | HARDFACING STELLITE 6 ON SOLUTION ANNEALED SUPER DUPLEX AUSTENO-FERRITIQUE STAINLESS STEEL HRC 32 MAXIMUM                 |                                                                   |                  |
| B102b    | Seat/Liner (FTC)                                          | HARDFACING STELLITE 6 ON SOLUTION ANNEALED SUPER DUPLEX AUSTENO-FERRITIQUE STAINLESS STEEL HRC 32 MAXIMUM + ENP           |                                                                   |                  |
| B103     | Seat Ring / Liner Gaskets                                 | 316L ST ST SPIRAL WOUND GASKET WITH GRAPHITE FILLER                                                                       |                                                                   |                  |
| B106     | Liner (FTO)                                               | SUPER DUPLEX AUSTENO-FERRITIQUE STAINLESS STEEL HRC 32 MAXIMUM + ENP                                                      |                                                                   |                  |
|          | Liner High Pressure drop (FTO)                            | SOLUTION ANNEALED SUPER DUPLEX AUSTENO-FERRITIQUE STAINLESS STEEL HRC 32 MAXIMUM + KOLSTERISATION K Duplex or S3PD        |                                                                   |                  |
| B107     | Cage (FTC)                                                | SUPER DUPLEX AUSTENO-FERRITIQUE STAINLESS STEEL HRC 32 MAXIMUM + ENP                                                      |                                                                   |                  |
| B112     | Plug (Balanced)                                           | HARDFACING STELLITE 6 ON SOLUTION ANNEALED SUPER DUPLEX AUSTENO-FERRITIQUE STAINLESS STEEL HRC 32 MAXIMUM                 |                                                                   |                  |
|          | Plug (Un-Balanced)                                        | HARDFACING STELLITE 6 ON SOLUTION ANNEALED SUPER DUPLEX AUSTENO-FERRITIQUE STAINLESS STEEL HRC 32 MAXIMUM                 |                                                                   |                  |
|          | Plug (Balanced & unbalanced High Pressure Drop)           | SOLUTION ANNEALED SUPER DUPLEX AUSTENO-FERRITIQUE STAINLESS STEEL HRC 32 MAXIMUM + KOLSTERISATION K Du-plex or S3PD       |                                                                   |                  |
| B117     | Seal Retainer <sup>(1)</sup>                              | SOLUTION ANNEALED 316L HRC 22 MAXIMUM STAINLESS STEEL                                                                     |                                                                   |                  |
| B118     | Balance Seal <sup>(1)</sup> <sup>(2)</sup> <sup>(4)</sup> | ELGILOY SPRING WITH FLUOROLOY A21 JACKET & BACKUP RINGS                                                                   |                                                                   |                  |
| B120     | Stem                                                      | SUPER DUPLEX AUSTENO-FERRITIQUE STAINLESS STEEL (TYPE UNS S32760) HRC 32 MAXIMUM or ASTM B637 GRADE NO7718 HRC 40 MAXIMUM |                                                                   |                  |
| B200     | Packing Flange Studs                                      | ASTM A193 GRADE B8 CLASS 2                                                                                                |                                                                   |                  |
| B201     | Packing Flange Nuts                                       | ASTM A194 GRADE 8                                                                                                         |                                                                   |                  |
| B206     | Packing Set                                               | CARBON CORE BRAIDED PTFE                                                                                                  |                                                                   |                  |
| B212     | Packing Follower                                          | SOLUTION ANNEALED 316L STAINLESS STEEL                                                                                    |                                                                   |                  |
| B213     | Packing Flange                                            | SOLUTION ANNEALED 316L STAINLESS STEEL                                                                                    | SOLUTION ANNEALED 316L STAINLESS STEEL                            |                  |
| B903     | Plug Pin                                                  | SUPER DUPLEX AUSTENO-FERRITIQUE STAINLESS STEEL HRC 32 MAXIMUM                                                            |                                                                   |                  |

### Notes:

1. The seal and retainer are not required for 1" [DN 25] size.
2. The balance seal is not required for the unbalanced construction.
3. Seat is integral with Liner on 1" [DN 25] & 1 1/2" [DN 40] valves
4. See graphic on page 6 for pressure & temperature limits.
5. 3" [DN 80] - 8" [DN 200] valves.
6. Bonnet and Bonnet Flange can be manufactured from either casting or forging.
7. Material with Silver Plate is not applicable to nuclear application.

# Materials of Construction

## Standard NACE Construction Carbon Steel

Valve Sizes 1" – 8" (DN 25–200) ASME Class 600–2500

| Ref. No. | Temperature Range                                         | -50°F<br>(-45°C)   | -20°F<br>(-29°C)                                                                                                                                | 450°F<br>(232°C) | 600°F<br>(316°C)                                           |
|----------|-----------------------------------------------------------|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|------------------|------------------------------------------------------------|
|          | Description                                               | Standard Materials |                                                                                                                                                 |                  |                                                            |
| B001     | Body                                                      |                    | CARBON STEEL OR CHROME-MOLY ARE APPLICABLE                                                                                                      |                  |                                                            |
|          |                                                           |                    | LOW TEMPERATURE CARBON STEEL                                                                                                                    |                  |                                                            |
| B002     | Body Studs                                                |                    | ASTM A193 GRADE B7/EN 1.7225 <sup>(7)</sup> (NON-EXPOSED)                                                                                       |                  |                                                            |
|          |                                                           |                    | ASTM A320 Grade L7 (ASTM + PED) <sup>(7)</sup> (NON-EXPOSED)                                                                                    |                  |                                                            |
|          |                                                           |                    | ASTM A193 GRADE B7M (ASTM + PED) <sup>(8)</sup> <sup>(10)</sup> (EXPOSED)                                                                       |                  |                                                            |
|          |                                                           |                    | ASTM A320 Grade L7M, ELECTROLESS NICKEL PLATING (ASTM + PED) <sup>(8)</sup> <sup>(9)</sup> (EXPOSED)                                            |                  |                                                            |
| B003     | Bonnet <sup>(6)</sup>                                     |                    | CARBON STEEL OR CHROME-MOLY ARE APPLICABLE                                                                                                      |                  |                                                            |
|          |                                                           |                    | LOW TEMPERATURE CARBON STEEL                                                                                                                    |                  |                                                            |
| B008     | Metal Seal <sup>(5)</sup>                                 |                    | HARDENED ASTM A638 GRADE 660 PTFE COATED                                                                                                        |                  | HARDENED ASTM A638 GRADE 660 SILVER COATED <sup>(10)</sup> |
| B009     | Bonnet Flange <sup>(5)</sup> <sup>(6)</sup>               |                    | CARBON STEEL OR CHROME-MOLY ARE APPLICABLE                                                                                                      |                  |                                                            |
|          |                                                           |                    | LOW TEMPERATURE CARBON STEEL                                                                                                                    |                  |                                                            |
| B014     | Body Stud Nuts                                            |                    | ASTM A194 GRADE 2H <sup>(9)</sup> (NON-EXPOSED)                                                                                                 |                  |                                                            |
|          |                                                           |                    | ASTM A194 GRADE 7 (ASTM +PED) <sup>(7)</sup> (NON-EXPOSED)                                                                                      |                  |                                                            |
|          |                                                           |                    | ASTM A194 GRADE 2HM NO PLATING ALLOWED (ASTM+PED) <sup>(8)</sup> <sup>(9)</sup> (EXPOSED)                                                       |                  |                                                            |
|          |                                                           |                    | ASTM A194 GRADE 7M, ELECTROLESS NICKEL PLATING (ASTM+PED) <sup>(8)</sup> <sup>(9)</sup> (EXPOSED)                                               |                  |                                                            |
| B015     | Bonnet Gasket                                             |                    | 316L STAINLESS STEEL SPIRAL WOUND GASKET WITH GRAPHITE FILLER                                                                                   |                  |                                                            |
| B017     | Yoke Camping Nut                                          |                    | LOW CARBON STEEL DICHROMATE ZINC PLATED                                                                                                         |                  |                                                            |
| B102     | Seat Ring <sup>(3)</sup>                                  |                    | HARDFACING STELLITE NO. 6 ON 316 STAINLESS STEEL                                                                                                |                  |                                                            |
| B102b    | Seat/Liner (FTC)                                          |                    | HARDFACING STELLITE NO.6 ON FERRALIUM ALLOY 255                                                                                                 |                  |                                                            |
| B103     | Seat Ring / Liner Gaskets                                 |                    | 316L STAINLESS STEEL SPIRAL WOUND GASKET WITH GRAPHITE FILLER                                                                                   |                  |                                                            |
| B106     | Liner                                                     |                    | FERRALIUM ALLOY 255                                                                                                                             |                  |                                                            |
|          | Liner High Pressure Drop                                  |                    | ASTM B637 GRADE NO7718 HRC 40 MAXIMUM. HARDNESS COMPLIANCE WITH NACE MR0103 SHALL BE CERTIFIED + KOLSTERISATION Double K33 OR S3PM              |                  |                                                            |
| B107     | Cage (FTC)                                                |                    | FERRALIUM ALLOY 255                                                                                                                             |                  |                                                            |
| B112     | Plug (Balanced)                                           |                    | STAINLESS STEEL TYPE 630 H1150M WITH CHROMEPLATE                                                                                                |                  |                                                            |
|          | Plug (Unbalanced)                                         |                    | STAINLESS STEELTYPE 630 H1150M WITH CHROMEPLATE                                                                                                 |                  |                                                            |
|          | Plug (Balanced and unbalanced High Pressure Drop)         |                    | STAINLESS STEEL TYPE 630 H1150M HRC 33 MAXIMUM. HARDNESS COMPLIANCE WITH NACE MR0103 & MR0175 SHALL BE CERTIFIED + KOLSTERIZING KDUPLEX OR S3PM |                  |                                                            |
| B117     | Seal Retainer <sup>(1)</sup>                              |                    | SOLUTION ANNEALED 316 STAINLESS STEEL                                                                                                           |                  |                                                            |
| B118     | Balance Seal <sup>(1)</sup> <sup>(2)</sup> <sup>(4)</sup> |                    | PRESSURE ENERGIZED POLYMERIC                                                                                                                    |                  |                                                            |
| B120     | Stem                                                      |                    | ASTM A479 TYPE XM-19                                                                                                                            |                  |                                                            |
| B200     | Packing Flange Studs                                      |                    | ASTM A193 GRADE B7M ELECTROLESS NICKEL PLATING                                                                                                  |                  |                                                            |
| B201     | Packing Flange Nuts                                       |                    | ASTM A194 GRADE 2HM ELECTROLESS NICKEL PLATING                                                                                                  |                  |                                                            |
| B206     | Packing Set                                               |                    | CARBON CORE BRAIDED PTFE                                                                                                                        |                  |                                                            |
| B212     | Packing Follower                                          |                    | 316L STAINLESS STEEL                                                                                                                            |                  |                                                            |
| B213     | Packing Flange                                            |                    | SOLUTION ANNEALED 316L STAINLESS STEEL                                                                                                          |                  |                                                            |
| B903     | Plug Pin                                                  |                    | SOLUTION ANNEALED 316 STAINLESS STEEL                                                                                                           |                  |                                                            |

1. The seal and retainer are not required for 1" (DN 25) size.

2. The balance seal is not required for the unbalanced construction.

3. Seat is integral with Liner on 1" (DN 25) and 1 1/2" (DN 40) valves.

4. See table on page 6 for pressure and temperature limits.

5. 3" (DN 80) – 8" (DN 200) valves.

6. Bonnet and bonnet flange can be manufactured from either casting or forging

7. NACE Non-Exposed (Class III).

8. NACE Exposed (Class I & II).

9. Bolting must be checked by the engineering department.

10. Material with silver plate is not applicable to nuclear application.

# Materials of Construction

## Standard NACE Construction Stainless Steel

Valve size 1" to 8" (DN 25 to 200) ASME Class 600-2500

| Ref. No. | Temperature Range                                         | -20°F<br>(-29°C)                                                                                                                                | 450°F<br>(232°C) | 600°F<br>(316°C)                                           |
|----------|-----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|------------------|------------------------------------------------------------|
|          | Description                                               | Standard Materials                                                                                                                              |                  |                                                            |
| B001     | Body                                                      | ASTM A351 GRADE CF8M / EN 1.4408 OR ASTM A182 GRADE F316 / EN 1.4401                                                                            |                  |                                                            |
|          |                                                           | ASTM A351 GRADE CF3M / EN 14408 C:0.03/14409 HRC 22 MAXIMUM OR<br>ASTM A182 GRADE F316/F316L / 1.4401/1.4404 EN 10222-5                         |                  |                                                            |
| B002     | Body Studs                                                | ASTM A193 GRADE B7/EN 1.7225 - ZINC PLATING <sup>(7)</sup> (NON-EXPOSED)                                                                        |                  |                                                            |
|          |                                                           | ASTM A193 GRADE B7M, ELECTROLESS NICKEL PLATING (ASTM+PED) <sup>(8)</sup> <sup>(9)</sup> (EXPOSED)                                              |                  |                                                            |
| B003     | Bonnet <sup>(6)</sup>                                     | ASTM A351 GRADE CF8M / EN 1.4408 OR ASTM A182 GRADE F316/ EN 1.4401                                                                             |                  |                                                            |
|          |                                                           | ASTM A351 GRADE CF3M / EN 14408 C:0.03/14409 HRC 22 MAXIMUM [162M] OR<br>ASTM A182 GRADE F316/F316L / 1.4401/1.4404 EN 10222-5                  |                  |                                                            |
| B008     | Metal Seal <sup>(5)</sup>                                 | HARDENED ASTM A638 GRADE 660 PTFE COATED                                                                                                        |                  | HARDENED ASTM A638 GRADE 660 SILVER COATED <sup>(10)</sup> |
| B009     | Bonnet Flange <sup>(5)</sup> <sup>(6)</sup>               | ASTM A351 GRADE CF8M / EN 1.4408 OR ASTM A182 GRADE F316/ EN 1.4401                                                                             |                  |                                                            |
|          |                                                           | ASTM A351 GRADE CF3M / EN 14408 C:0.03/14409 HRC 22 MAXIMUM OR<br>ASTM A182 GRADE F316/F316L / 1.4401/1.4404 EN 10222-5                         |                  |                                                            |
| B014     | Body Stud Nuts                                            | ASTM A194 GRADE 2H - ZINC PLATING <sup>(7)</sup> (NON-EXPOSED)                                                                                  |                  |                                                            |
|          |                                                           | ASTM A194 GRADE 2HM, ELECTROLESS NICKEL PLATING (ASTM+PED) <sup>(8)</sup> <sup>(9)</sup> (EXPOSED)                                              |                  |                                                            |
| B015     | Bonnet Gasket                                             | 316L STAINLESS STEEL SPIRAL WOUND GASKET WITH GRAPHITE FILLER                                                                                   |                  |                                                            |
| B017     | Yoke Clamping Nut                                         | LOW CARBON STEEL DICHROMATE ZINC PLATED                                                                                                         |                  |                                                            |
| B102     | Seat Ring <sup>(3)</sup>                                  | HARDFACING STELLITE NO. 6 ON 316 STAINLESS STEEL                                                                                                |                  |                                                            |
| B102b    | Seat/Liner (FTC)                                          | HARDFACING STELLITE NO.6 ON ASTM A479 TY XM-19 ST ST                                                                                            |                  |                                                            |
| B103     | Seat Ring / Liner Gaskets                                 | 316L STAINLESS STEEL SPIRAL WOUND GASKET WITH GRAPHITE FILLER                                                                                   |                  |                                                            |
| B106     | Liner                                                     | ASTM A479 TYPE XM-19                                                                                                                            |                  |                                                            |
|          | Liner High Pressure Drop                                  | ASTM A479 TYPE XM-19 - HRC 35 MAXIMUM. HARDNESS COMPLIANCE WITH NACE MR0103 SHALL BE CERTIFIED + KOLSTERISATION K33 OR S3PA                     |                  |                                                            |
| B107     | Cage (FTC)                                                | ASTM A479 TYPE XM-19                                                                                                                            |                  |                                                            |
| B112     | Plug (Balanced)                                           | STAINLESS STEEL TYPE 630 H1150M WITH CHROMEPLATE                                                                                                |                  |                                                            |
|          | Plug (Unbalanced)                                         | STAINLESS STEEL TYPE 630 H1150M WITH CHROMEPLATE                                                                                                |                  |                                                            |
|          | Plug (Balanced and unbalanced High Pressure Drop)         | STAINLESS STEEL TYPE 630 H1150M HRC 33 MAXIMUM. HARDNESS COMPLIANCE WITH NACE MR0103 & MR0175 SHALL BE CERTIFIED + KOLSTERIZING KDUPLEX OR S3PM |                  |                                                            |
| B117     | Seal Retainer <sup>(1)</sup>                              | SOLUTION ANNEALED 316 STAINLESS STEEL                                                                                                           |                  |                                                            |
| B118     | Balance Seal <sup>(1)</sup> <sup>(2)</sup> <sup>(4)</sup> | PRESSURE ENERGIZED POLYMERIC                                                                                                                    |                  |                                                            |
| B120     | Stem                                                      | ASTM A479 TYPE XM-19                                                                                                                            |                  |                                                            |
| B200     | Packing Flange Studs                                      | ASTM A193 GRADE B7M ELECTROLESS NICKEL PLATING                                                                                                  |                  |                                                            |
| B201     | Packing Flange Nuts                                       | ASTM A194 GRADE 2HM ELECTROLESS NICKEL PLATING                                                                                                  |                  |                                                            |
| B206     | Packing Set                                               | CARBON CORE BRAIDED PTFE                                                                                                                        |                  |                                                            |
| B212     | Packing Follower                                          | 316L STAINLESS STEEL                                                                                                                            |                  |                                                            |
| B213     | Packing Flange                                            | SOLUTION ANNEALED 316L STAINLESS STEEL                                                                                                          |                  |                                                            |
| B903     | Plug Pin                                                  | SOLUTION ANNEALED 316 STAINLESS STEEL                                                                                                           |                  |                                                            |

1. The seal and retainer are not required for 1" (DN 25) size.
2. The balance seal is not required for the unbalanced construction.
3. Seat is integral with liner on 1" (DN 25) and 1 1/2" (DN 40) valves.
4. See table on page 6 for pressure and temperature limits.
5. 3" (DN 80) - 8" (DN 200) valves.

6. Bonnet and Bonnet Flange can be manufactured from either casting or forging.
7. NACE Non-Exposed (Class III).
8. NACE Exposed (Class I & II).
9. Bolting must be checked by the engineering department.
10. Material with silver plate is not applicable to nuclear application.

# Materials of Construction

## Standard Construction 347 Stainless Steel NACE

Valve size 1" to 8" (DN 25 to 200) ASME Class 600-2500

| Ref. No. | Temperature Range                                         | -20°F<br>(-29°C)                                                                                                                                                            | 450°F<br>(232°C)                                           | 600°F<br>(316°C) |
|----------|-----------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|------------------|
|          | Description                                               | Standard Materials                                                                                                                                                          |                                                            |                  |
| B001     | Body                                                      | ASTM A351 GRADE CF8C HRC 22 MAXIMUM or ASTM A182 GRADE F347 HRC 22 MAXIMUM (ASTM)<br>ASTM A351 GRADE CF8C HRC 22 MAXIMUM / ASTM A182 GRADE F347 HRC 22 MAXIMUM (ASTM + PED) |                                                            |                  |
| B002     | Body Studs                                                | ASTM A193 GR B7 – ZINC PLATING <sup>(7)</sup> (non-exposed)                                                                                                                 |                                                            |                  |
|          |                                                           | ASTM A193 GR B7M, ELECTROLESS NICKEL PLATING <b>(ASTM+PED)</b> <sup>(8)</sup> <sup>(9)</sup> (exposed)                                                                      |                                                            |                  |
| B003     | Bonnet <sup>(6)</sup>                                     | ASTM A351 GRADE CF8C HRC 22 MAXIMUM or ASTM A182 GRADE F347 HRC 22 MAXIMUM (ASTM)<br>ASTM A351 GRADE CF8C HRC 22 MAXIMUM / ASTM A182 GRADE F347 HRC 22 MAXIMUM (ASTM + PED) |                                                            |                  |
| B008     | Metal Seal <sup>(5)</sup>                                 | HARDENED ASTM A638 GRADE 660 PTFE COATED                                                                                                                                    | HARDENED ASTM A638 GRADE 660 SILVER COATED <sup>(10)</sup> |                  |
| B009     | Bonnet Flange <sup>(5)</sup> <sup>(6)</sup>               | ASTM A351 GRADE CF8C HRC 22 MAXIMUM or ASTM A182 GRADE F347 HRC 22 MAXIMUM (ASTM)<br>ASTM A351 GRADE CF8C HRC 22 MAXIMUM /ASTM A182 GRADE F347 HRC 22 MAXIMUM (ASTM + PED)  |                                                            |                  |
| B014     | Body Stud Nuts                                            | ASTM A194 Grade 2H – Zinc Plating <sup>(7)</sup> (non-exposed)                                                                                                              |                                                            |                  |
|          |                                                           | ASTM A194 Grade 2HM, Electroless Nickel Plating (ASTM+PED) <sup>(8)</sup> <sup>(9)</sup> (exposed)                                                                          |                                                            |                  |
| B015     | Bonnet Gasket                                             | 316L ST ST SPIRAL WOUND GASKET WITH GRAPHITE FILLER                                                                                                                         |                                                            |                  |
| B017     | Yoke Clamping Nut                                         | LOW CARBON STEEL DICHROMATE ZINC PLATED                                                                                                                                     |                                                            |                  |
| B102     | Seat Ring <sup>(3)</sup>                                  | SOLUTION ANNEALED 347 ST ST Hrc 22 MAXIMUM + HARDFACING STELLITE NO.6                                                                                                       |                                                            |                  |
| B102b    | Seat/Liner (FTC)                                          | HARDFACING STELLITE NO.6 ON XM-19 ST ST                                                                                                                                     |                                                            |                  |
| B103     | Seat Ring / Liner Gaskets                                 | 316L ST ST SPIRAL WOUND GASKET WITH GRAPHITE FILLER                                                                                                                         |                                                            |                  |
| B106     | Liner (FTO)                                               | ASTM A479 TYPE XM-19                                                                                                                                                        |                                                            |                  |
|          | Liner High pressure drop (FTO)                            | ASTM A479 TYPE XM-19 – HRC 35 MAXIMUM.HARDNESS COMPLIANCE WITH NACE MR0103 SHALL BE CERTIFIED. + KOLSTERISATION K33 or S3PA                                                 |                                                            |                  |
| B107     | Cage (FTC)                                                | ASTM A479 TYPE XM-19                                                                                                                                                        |                                                            |                  |
| B112     | Plug (Balanced)                                           | SOLUTION ANNEALED 347 ST ST Hrc 22 MAXIMUM + HARDFACING STELLITE NO.6                                                                                                       |                                                            |                  |
|          | Plug (Un-Balanced)                                        | SOLUTION ANNEALED 347 ST ST Hrc 22 MAXIMUM + HARDFACING STELLITE NO.6                                                                                                       |                                                            |                  |
|          | Plug (Balanced & unbalanced High Pressure Drop)           | ASTM B637 GRADE NO7718 HRC 40 MAXIMUM. HARDNESS COMPLIANCE WITH NACE MR0103 SHALL BE CERTIFIED + KOLSTERISATION Double K33 or S3PM                                          |                                                            |                  |
| B117     | Seal Retainer <sup>(1)</sup>                              | SOLUTION ANNEALED 316 STAINLESS STEEL                                                                                                                                       |                                                            |                  |
| B118     | Balance Seal <sup>(1)</sup> <sup>(2)</sup> <sup>(4)</sup> | ELGILOY SPRING WITH FLUOROLOY A21 JACKET & BACKUP RINGS                                                                                                                     |                                                            |                  |
| B120     | Stem                                                      | ASTM A479 TYPE XM-19                                                                                                                                                        |                                                            |                  |
| B200     | Packing Flange Studs                                      | ASTM A193 GRADE B8 CLASS 2                                                                                                                                                  |                                                            |                  |
| B201     | Packing Flange Nuts                                       | ASTM A194 GRADE 8                                                                                                                                                           |                                                            |                  |
| B206     | Packing Set                                               | CARBON CORE BRAIDED PTFE                                                                                                                                                    |                                                            |                  |
| B212     | Packing Follower                                          | SOLUTION ANNEALED 316L STAINLESS STEEL                                                                                                                                      |                                                            |                  |
| B213     | Packing Flange                                            | SOLUTION ANNEALED 316L STAINLESS STEEL                                                                                                                                      | SOLUTION ANNEALED 316L STAINLESS STEEL                     |                  |
| B903     | Plug Pin                                                  | SOLUTION ANNEALED 347 ST ST Hrc 22 MAX                                                                                                                                      |                                                            |                  |

### Notes:

- The seal and retainer are not required for 1" [DN 25] size.
- The balance seal is not required for the unbalanced construction.
- Seat is integral with Liner on 1" [DN 25] and 1-1/2" [DN 40] valves
- See graphic on page 6 for pressure & temperature limits.
- 3" [DN 80] - 8" [DN 200] valves.
- Bonnet and Bonnet Flange can be manufactured from either casting or forging.
- NACE Non-Exposed (Class III)
- NACE Exposed (Class I & II)
- Bolting to be checked by Baker Hughes Engineering.
- Material with Silver Plate is not applicable to nuclear application.

# Materials of Construction

## Standard Construction 22Cr Stainless Steel NACE

Valve size 1" to 8" (DN 25 to 200) ASME Class 600–2500

| Ref. No. | Temperature Range                                         | -20°F (-29°C)                                                                                                 | 450°F (232°C)                                             | 500°F (260°C) |
|----------|-----------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|---------------|
|          | Description                                               | Standard Materials                                                                                            |                                                           |               |
| B001     | Body                                                      | ASTM A995 Grade 4A (UNS J92205) or ASTM A182 GR F51 Hrc 28 MAXIMUM (ASTM)                                     |                                                           |               |
|          |                                                           | ASTM A995 GR 4A + PMA 178 or ASTM A182 GR F51 + PMA 130 (ASTM+PED)                                            |                                                           |               |
| B002     | Body Studs                                                | ASTM A193 GR B7/EN 1.7225 - CMS-2510 ZINC PLATING <sup>(8)</sup> (non-exposed)                                |                                                           |               |
|          |                                                           | ASTM A193 GR B7M, ELECTROLESS NICKEL PLATING (ASTM+PED) <sup>(9)</sup> <sup>(10)</sup> (exposed)              |                                                           |               |
| B003     | Bonnet <sup>(6)</sup>                                     | ASTM A995 Grade 4A or ASTM A182 GR F51 Hrc 28 MAXIMUM (ASTM)                                                  |                                                           |               |
|          |                                                           | ASTM A995 GR 4A + PMA 178 or ASTM A182 GR F51 + PMA 130 (ASTM+PED)                                            |                                                           |               |
| B008     | Metal Seal <sup>(5)</sup>                                 | HARDENED ASTM A638 GRADE 660 PTFE COATED                                                                      | HARDENED ASTM A638 GRADE 660 SILVER COATED <sup>(7)</sup> |               |
| B009     | Bonnet Flange <sup>(5)</sup> <sup>(6)</sup>               | ASTM A995 Grade 4A or ASTM A182 GR F51 Hrc 28 MAXIMUM (ASTM)                                                  |                                                           |               |
|          |                                                           | ASTM A995 GR 4A + PMA 178 or ASTM A182 GR F51 + PMA 130 (ASTM+PED)                                            |                                                           |               |
| B014     | Body Stud Nuts                                            | ASTM A194 Grade 2H - Zinc Plating <sup>(8)</sup> (non-exposed)                                                |                                                           |               |
|          |                                                           | ASTM A194 Grade 2HM, Electroless Nickel Plating (ASTM+PED) <sup>(9)</sup> <sup>(10)</sup> (exposed)           |                                                           |               |
| B015     | Bonnet Gasket                                             | 316L ST ST SPIRAL WOUND GASKET WITH GRAPHITE FILLER                                                           |                                                           |               |
| B017     | YOKE CLAMPING NUT                                         | LOW CARBON STEEL DICHROMATE ZINC PLATED                                                                       |                                                           |               |
| B102     | Seat Ring <sup>(3)</sup>                                  | 2205 STAINLESS STEEL (DUPLEX) Hrc 28 MAXIMUM + HARDFACING STELLITE NO.6                                       |                                                           |               |
| B102b    | Seat/Liner (FTC)                                          | HARDFACING STELLITE NO.6 ON SOLUTION ANNEALED 2205 AUSTENO-FERRITIC ST.ST.(DUPLEX) HARDNESS HRC 28 MAX. + ENP |                                                           |               |
| B103     | Seat Ring / Liner Gaskets                                 | 316L ST ST SPIRAL WOUND GASKET WITH GRAPHITE FILLER                                                           |                                                           |               |
| B106     | Liner (FTO)                                               | SOLUTION ANNEALED 2205 STAINLESS STEEL (DUPLEX) 28 HRC MAXIMUM + ENP                                          |                                                           |               |
|          | Liner High Pressure drop (FTO)                            | SOLUTION ANNEALED 2205 STAINLESS STEEL (DUPLEX) 28 HRC MAXIMUM + KOLSTERISATION K Duplex or S3PD              |                                                           |               |
| B107     | Cage (FTC)                                                | SOLUTION ANNEALED 2205 STAINLESS STEEL (DUPLEX) 28 HRC MAXIMUM + ENP                                          |                                                           |               |
| B112     | Plug (Balanced)                                           | 2205 STAINLESS STEEL (DUPLEX) Hrc 28 MAXIMUM + HARDFACING STELLITE NO.6                                       |                                                           |               |
|          | Plug (Un-Balanced)                                        | 2205 STAINLESS STEEL (DUPLEX) Hrc 28 MAXIMUM + HARDFACING STELLITE NO.6                                       |                                                           |               |
|          | Plug (Balanced & unbalanced High Pressure Drop)           | SOLUTION ANNEALED 2205 STAINLESS STEEL (DUPLEX) 28 HRC MAXIMUM + KOLSTERISATION K Duplex or S3PD              |                                                           |               |
| B117     | Seal Retainer <sup>(1)</sup>                              | SOLUTION ANNEALED 316L Hrc 22 MAXIMUM STAINLESS STEEL                                                         |                                                           |               |
| B118     | Balance Seal <sup>(1)</sup> <sup>(2)</sup> <sup>(4)</sup> | ELGILOY SPRING WITH FLUOROLOY A21 JACKET & BACKUP RINGS                                                       |                                                           |               |
| B120     | Stem                                                      | SOLUTION ANNEALED 2205 STAINLESS STEEL (DUPLEX) Hrc 28 MAXIMUM or ASTM B637 GRADE NO7718 Hrc 40 MAXIMUM       |                                                           |               |
| B200     | Packing Flange Studs                                      | ASTM A193 GRADE B8 CLASS 2                                                                                    |                                                           |               |
| B201     | Packing Flange Nuts                                       | ASTM A194 GRADE 8                                                                                             |                                                           |               |
| B206     | Packing Set                                               | CARBON CORE BRAIDED PTFE                                                                                      |                                                           |               |
| B212     | Packing Follower                                          | SOLUTION ANNEALED 316L STAINLESS STEEL                                                                        |                                                           |               |
| B213     | Packing Flange                                            | SOLUTION ANNEALED 316L STAINLESS STEEL                                                                        | SOLUTION ANNEALED 316L STAINLESS STEEL                    |               |
| B903     | Plug Pin                                                  | SOLUTION ANNEALED 2205 STAINLESS STEEL (DUPLEX) Hrc 28 MAXIMUM                                                |                                                           |               |

### Notes:

- The seal and retainer are not required for 1" [DN 25] size.
- The balance seal is not required for the unbalanced construction.
- Seat is integral with Liner on 1" [DN 25] and 1-1/2" [DN 40] valves
- See graphic on page 6 for pressure & temperature limits
- 3" [DN 80] - 8" [DN 200] Valves
- Bonnet and Bonnet Flange can be manufactured from either casting or forging.
- Material with silver plate is not applicable to nuclear application.
- NACE Non-Exposed (Class III)
- NACE Exposed (Class I & II)
- Bolting must be checked by Baker Hughes Engineering.

# Materials of Construction

## Cryogenic Construction

Valve size 1" to 8" (DN 25 to 200) ASME Class 600-2500

| Ref. No. | Temperature Range                | -320°F<br>(-196°C)                                                                                 | 212°F<br>(100°C) |
|----------|----------------------------------|----------------------------------------------------------------------------------------------------|------------------|
|          | Description                      | Standard Materials                                                                                 |                  |
| B001     | Body                             | ASTM A351 GRADE CF8M / EN 1.4408 <sup>(5)</sup> OR ASTM A182 GRADE F316 / EN 1.4401                |                  |
| B002     | Body Studs <sup>(5)</sup>        | ASTM A193 Grade B8 Class 2 (ASTM + PED) OR ASTM A453 Grade 660 Class A OR B (ASTM + PED)           |                  |
| B003     | Bonnet <sup>(4)</sup>            | ASTM A351 GRADE CF8M / EN 1.4408 <sup>(5)</sup> OR ASTM A182 GRADE F316 / EN 1.4401 <sup>(5)</sup> |                  |
| B008     | Metal Seal <sup>(3)</sup>        | HARDENED ASTM A638 GRADE 660 with PTFE COAT                                                        |                  |
| B009     | Bonnet Flange <sup>(3) (4)</sup> | ASTM A351 GRADE CF8M / EN 1.4408 <sup>(5)</sup> OR ASTM A182 GRADE F316 / EN 1.4401                |                  |
| B014     | Body Stud Nuts <sup>(5)</sup>    | ASTM A 194 GRADE 8 (ASTM+PED) OR ASTM A453 Grade 660 Class A OR B (ASTM + PED)                     |                  |
| B015     | Bonnet Gasket                    | 316L STAINLESS STEEL SPIRAL WOUND GASKET WITH GRAPHITE FILLER                                      |                  |
| B017     | Yoke Clamping Nut                | LOW CARBON STEEL DICHROMATE ZINC PLATED                                                            |                  |
| B102     | Seat Ring <sup>(2)</sup>         | HARDFACING STELLITE NO. 6 ON 316 STAINLESS STEEL                                                   |                  |
| B103     | Seat Ring / Liner Gaskets        | 316L STAINLESS STEEL SPIRAL WOUND GASKET WITH GRAPHITE FILLER                                      |                  |
| B106     | Liner                            | CHROMIUM PLATED SOLUTION ANNEALED 316 STAINLESS STEEL                                              |                  |
| B112     | Plug (Unbalanced)                | HARDFACING STELLITE NO. 6 ON 316 STAINLESS STEEL                                                   |                  |
|          |                                  | HARDFACING STELLITE NO. 6 ON ASTM A479 TY XM-19 STAINLESS STEEL                                    |                  |
| B117     | Seal Retainer <sup>(1)</sup>     | SOLUTION ANNEALED 316 STAINLESS STEEL                                                              |                  |
| B118     | Balance Seal                     | UNBALANCED                                                                                         |                  |
| B120     | Stem                             | SOLUTION ANNEALED 316 STAINLESS STEEL                                                              |                  |
|          |                                  | HARDENED ASTM A638 GRADE 660                                                                       |                  |
| B200     | Packing Flange Studs             | ASTM A193 GRADE B8 CLASS 2                                                                         |                  |
| B201     | Packing Flange Nuts              | ASTM A194 GRADE 8                                                                                  |                  |
| B206     | Packing Set                      | CARBON CORE BRAIDED PTFE                                                                           |                  |
| B212     | Packing Follower                 | SOLUTION ANNEALED 316L STAINLESS STEEL                                                             |                  |
| B213     | Packing Flange                   | SOLUTION ANNEALED 316L STAINLESS STEEL                                                             |                  |
| B903     | Plug Pin                         | SOLUTION ANNEALED 316 STAINLESS STEEL                                                              |                  |

### Notes:

1. The retainer is not required for 1" (DN 25) size.
2. Seat is integral with liner on 1" (DN 25) and 1 1/2" (DN 40) valves.
3. 3" (DN 80) - 8" (DN 200) valves.
4. Bonnet and bonnet flange can be manufactured from either casting or forging.
5. Bolting must be checked by the engineering department.

# Materials of Construction

## 18X00 / 78X00 Series Optional Materials

| Ref. No. | Temperature Range               | -20°F (-29°C)                                                              | 450°F (232°C) | 600°F (316°C) |
|----------|---------------------------------|----------------------------------------------------------------------------|---------------|---------------|
|          | Description                     | Standard Materials                                                         |               |               |
| B001     | Valve Body <sup>(5)</sup>       | 316 STAINLESS STEEL ASTM A351 GRADE CF8M OR ASTM A182 GRADE F316 (FORGING) |               |               |
|          |                                 | CHROME-MOLY STEEL ASTM A217 GRADE WC9 OR ASTM A182 GRADE F22 (FORGING)     |               |               |
| B003     | Valve Bonnet <sup>(5)</sup>     | 316 STAINLESS STEEL ASTM A351 GRADE CF8M                                   |               |               |
|          |                                 | CHROME-MOLY STEEL ASTM A217 GRADE WC9                                      |               |               |
| B102     | Seat Ring - Soft <sup>(6)</sup> | SEAT RING: STAINLESS STEEL TYPE 630 H1150M                                 |               |               |
|          |                                 | SEAT INSERT: FLUOROGOLD                                                    |               |               |
|          |                                 | SLIDING COLLAR: STAINLESS STEEL TYPE 630 H1150M                            |               |               |
| B112     | Plug <sup>(2)</sup>             | 440B OR 440C STAINLESS STEEL ASTM A276                                     |               |               |
| B206     | Packing Set <sup>(3)</sup>      | LOW-E PACKING <sup>(4)</sup>                                               |               |               |
|          |                                 | PTFE WITH CARBON FIBER                                                     |               |               |
|          |                                 | FLEXIBLE GRAPHITE                                                          |               |               |

### Notes:

1. Consult Baker Hughes for material combinations for temperatures below -20°F (-29°C) or above 600°F (316°C).
2. Optional plug designs using hardened 440B or 440C requires stems with male threads and plugs with female threads.
3. Teflon-based packing can also be applied up to 600°F (316°C) with an extension bonnet.
4. Low-E Packing for low emissions applications is limited to maximum operating pressure of 1500 psig (104 bar).
5. Consult factory for trim material requirements for 316 St. St. body and bonnet assemblies relative to application service conditions.
6. 2" [DN 50] - 8" [DN 200] valves, limited to 3000 psi [206 bar].

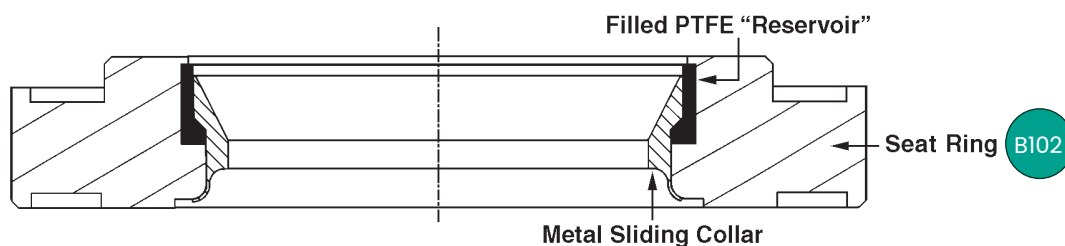
 Review use of optional materials and configurations for temperature ranges indicated. Standard materials listed may still be applicable depending on specific service conditions. Consult Baker Hughes for appropriate material combinations.

# Soft seat design

The LincolnLog 18X00/78X00 Series is available with an optional soft seat design in valve sizes 2" to 8" (DN 50 to DN 200) providing bubble tight Class VI shutoff seat leakage. This soft seat design includes a patented sliding metal collar feature as shown below.

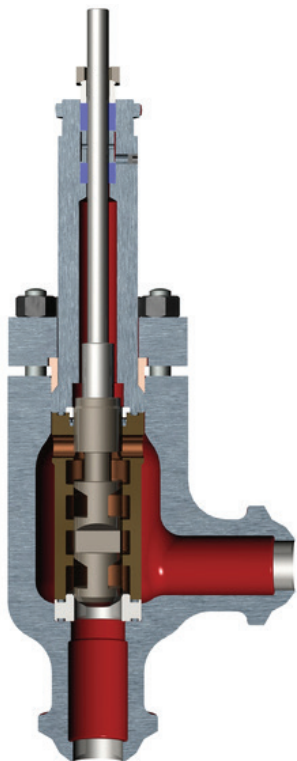
The metal collar holds the PTFE soft seat element in place and prevents it from extruding out during operation. Fluid pressure acts to push the collar up to protect the elastomer seat as the valve is throttling. As the valve plug returns to the closed position, it moves the metal collar

down to expose the filled PTFE "Reservoir" creating the soft seat interface. Combined with the LincolnLog trim overlap feature, the soft seat design will provide long-term dependable tight shutoff with minimal maintenance. The filled PTFE "Reservoir" will also compensate for any potential wear in the seating surfaces.

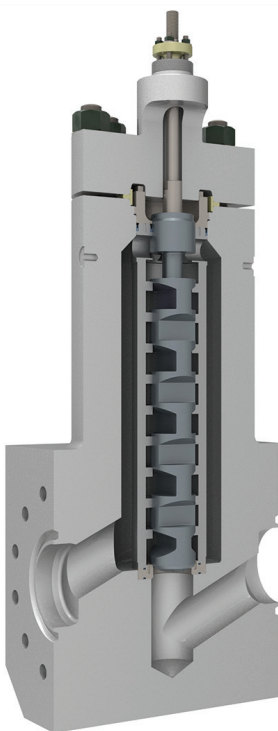


**Soft Seat Option**

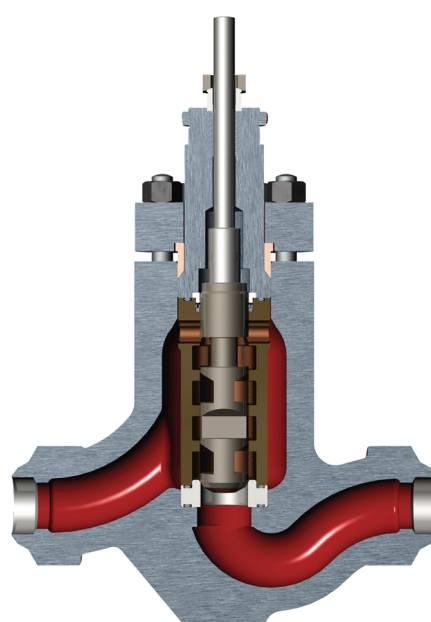
78400 Series LincolnLog  
Angle Design



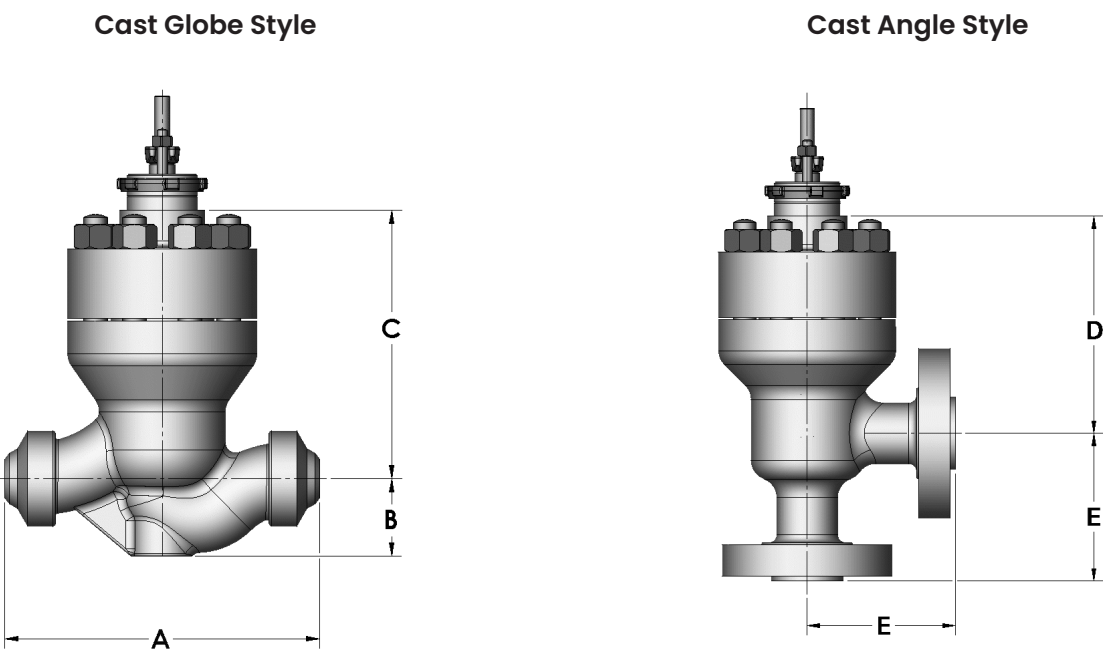
18400 API 6A Series  
LincolnLog



18400 Series LincolnLog  
Globe Design



# Dimensions (inches)



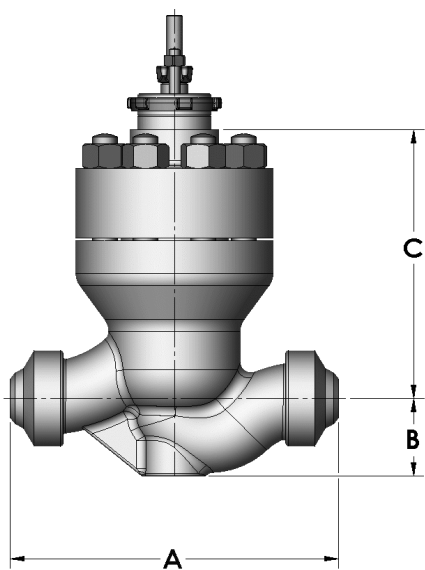
18X00/78X00 Series Cast Body Dimensions (inches)  
ASME Class 600 through 2500 and equivalent PN

| Valve Size<br>(inches) | A                  |            |                 |            |                 |            |                |       |                |       |                 |       |                 |       |
|------------------------|--------------------|------------|-----------------|------------|-----------------|------------|----------------|-------|----------------|-------|-----------------|-------|-----------------|-------|
|                        | ASME Class 600-900 |            | ASME Class 1500 |            | ASME Class 2500 |            | ASME Class 600 |       | ASME Class 900 |       | ASME Class 1500 |       | ASME Class 2500 |       |
|                        | BW                 | SW and THD | BW              | SW and THD | BW              | SW and THD | RF             | RTJ   | RF             | RTJ   | RF              | RTJ   | RF              | RTJ   |
| 1                      | 7.75               | 7.75       | 7.75            | 7.75       | 8.50            | 8.50       | 11.50          | 11.50 | 11.50          | 11.50 | 11.50           | 11.50 | 12.12           | 12.12 |
| 1.5                    | 9.25               | 9.25       | 9.25            | 9.25       | 10.25           | 10.25      | 12.25          | 12.25 | 12.25          | 12.25 | 12.25           | 12.25 | 14.12           | 14.12 |
| 2                      | 14.75              | 14.75      | 14.75           | 14.75      | 14.75           | 14.75      | 14.75          | 14.87 | 14.75          | 14.87 | 14.75           | 14.87 | 16.25           | 16.37 |
| 3                      | 17.38              | -          | 18.12           | -          | 19.62           | -          | 17.38          | 17.50 | 17.38          | 17.50 | 18.12           | 18.24 | 19.62           | 19.75 |
| 4                      | 20.12              | -          | 20.87           | -          | 22.62           | -          | 20.12          | 20.25 | 20.12          | 20.25 | 20.87           | 21.00 | 29.00           | 29.38 |
| 6                      | 30.25              | -          | 30.25           | -          | 32.25           | -          | 30.25          | 30.37 | 30.25          | 30.37 | 30.25           | 30.62 | 32.25           | 32.75 |
| 8                      | 32.75              | -          | 32.75           | -          | 40.25           | -          | 36.00          | 36.12 | 36.00          | 36.12 | 38.25           | 38.62 | 40.25           | 40.87 |

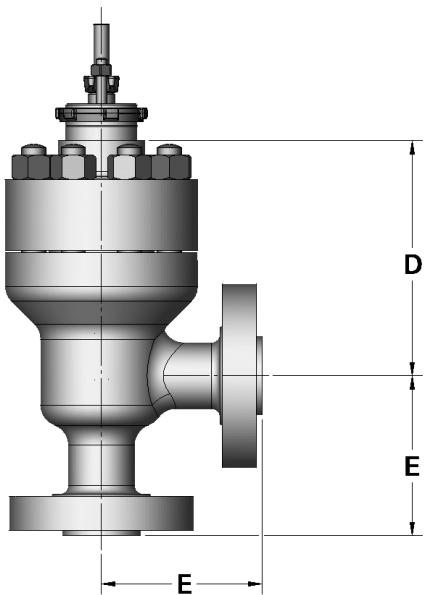
| Valve Size<br>(inches) | B                   |            |                 |            |                |                |                 |                 |
|------------------------|---------------------|------------|-----------------|------------|----------------|----------------|-----------------|-----------------|
|                        | ASME Class 600-1500 |            | ASME Class 2500 |            | ASME Class 600 | ASME Class 900 | ASME Class 1500 | ASME Class 2500 |
|                        | BW                  | SW and THD | BW              | SW and THD | RF and RTJ     | RF and RTJ     | RF and RTJ      | RF and RTJ      |
| 1                      | 1.97                | 1.97       | 1.97            | 1.97       | 2.44           | 2.94           | 2.94            | 3.13            |
| 1.5                    | 2.62                | 2.62       | 2.62            | 2.62       | 3.06           | 3.50           | 3.50            | 4.00            |
| 2                      | 3.64                | 3.64       | 3.64            | 3.64       | 3.25           | 4.25           | 4.25            | 4.63            |
| 3                      | 5.31                | -          | 5.37            | -          | 4.13           | 4.75           | 5.25            | 6.00            |
| 4                      | 6.28                | -          | 7.07            | -          | 5.37           | 5.75           | 6.12            | 7.00            |
| 6                      | 8.94                | -          | 8.94            | -          | 7.00           | 7.50           | 7.75            | 9.50            |
| 8                      | 10.63               | -          | 10.63           | -          | 8.25           | 9.25           | 9.50            | 10.87           |

# Dimensions (inches)

Cast Globe Style



Cast Angle Style



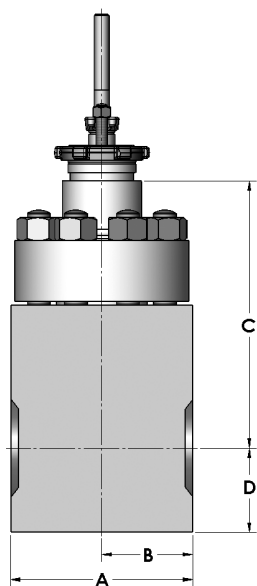
18X00/78X00Series Cast Body Dimensions (inches)  
ASME Class 600 through 2500 and equivalent PN

| Valve Size<br>(inches) | C                   |         |                     |         | D                   |         |                     |         |
|------------------------|---------------------|---------|---------------------|---------|---------------------|---------|---------------------|---------|
|                        | Standard Bonnet     |         | Extension Bonnet    |         | Standard Bonnet     |         | Extension Bonnet    |         |
|                        | ASME Class 600–2500 |         | ASME Class 600–2500 |         | ASME Class 600–2500 |         | ASME Class 600–2500 |         |
|                        | 3 and 4 Stage       | 6 Stage | 3 and 4 Stage       | 6 Stage | 3 and 4 Stage       | 6 Stage | 3 and 4 Stage       | 6 Stage |
| 1                      | 8.50                | 9.88    | 12.52               | 13.90   | 7.13                | 8.50    | 11.14               | 12.52   |
| 1.5                    | 8.44                | 9.82    | 12.46               | 13.83   | 7.13                | 8.50    | 11.14               | 12.52   |
| 2                      | 12.56               | 14.69   | 17.70               | 19.82   | 10.85               | 12.98   | 15.98               | 18.11   |
| 3                      | 16.62               | 19.86   | 22.30               | 25.55   | 14.11               | 17.36   | 19.79               | 23.05   |
| 4                      | 19.69               | 23.70   | 24.63               | 28.63   | 15.94               | 19.94   | 20.88               | 24.88   |
| 6                      | 25.48               | 30.98   | 29.48               | 34.98   | 19.91               | 25.41   | 23.91               | 29.41   |
| 8                      | 30.17               | 36.52   | 33.69               | 40.03   | 23.88               | 30.22   | 27.39               | 33.74   |

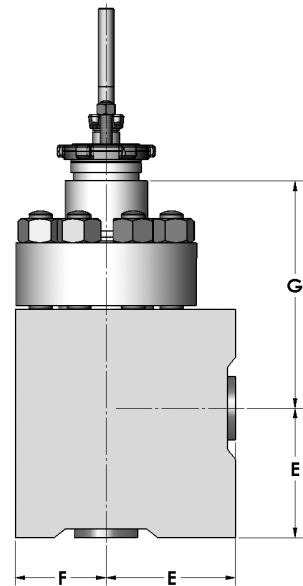
| Valve Size<br>(inches) | E                  |            |                 |            |                 |            |                |       |                |       |                 |       |                 |       |
|------------------------|--------------------|------------|-----------------|------------|-----------------|------------|----------------|-------|----------------|-------|-----------------|-------|-----------------|-------|
|                        | ASME Class 600–900 |            | ASME Class 1500 |            | ASME Class 2500 |            | ASME Class 600 |       | ASME Class 900 |       | ASME Class 1500 |       | ASME Class 2500 |       |
|                        | BW                 | SW and THD | BW              | SW and THD | BW              | SW and THD | RF             | RTJ   | RF             | RTJ   | RF              | RTJ   | RF              | RTJ   |
| 1                      | 3.87               | 3.87       | 3.87            | 3.87       | 4.25            | 4.25       | 5.75           | 5.75  | 5.75           | 5.75  | 5.75            | 5.75  | 6.06            | 6.06  |
| 1.5                    | 4.63               | 4.63       | 4.63            | 4.63       | 5.13            | 5.13       | 6.13           | 6.13  | 6.13           | 6.13  | 6.13            | 6.13  | 7.06            | 7.12  |
| 2                      | 7.38               | 7.38       | 7.38            | 7.38       | 7.38            | 7.38       | 7.38           | 7.44  | 7.38           | 7.44  | 7.38            | 7.44  | 8.13            | 8.19  |
| 3                      | 8.69               | –          | 9.06            | –          | 9.81            | –          | 8.69           | 8.75  | 8.69           | 8.75  | 9.06            | 9.12  | 9.81            | 9.87  |
| 4                      | 10.06              | –          | 10.44           | –          | 11.31           | –          | 10.06          | 10.13 | 10.06          | 10.13 | 10.44           | 10.50 | 14.50           | 14.68 |
| 6                      | 15.13              | –          | 15.13           | –          | 16.13           | –          | 15.13          | 15.19 | 15.13          | 15.19 | 15.13           | 15.31 | 16.13           | 16.37 |
| 8                      | 16.37              | –          | 16.37           | –          | 20.13           | –          | 18.00          | 18.06 | 18.00          | 18.06 | 19.13           | 19.31 | 20.13           | 20.44 |

# Dimensions (inches)

Forged Globe Style



Forged Angle Style



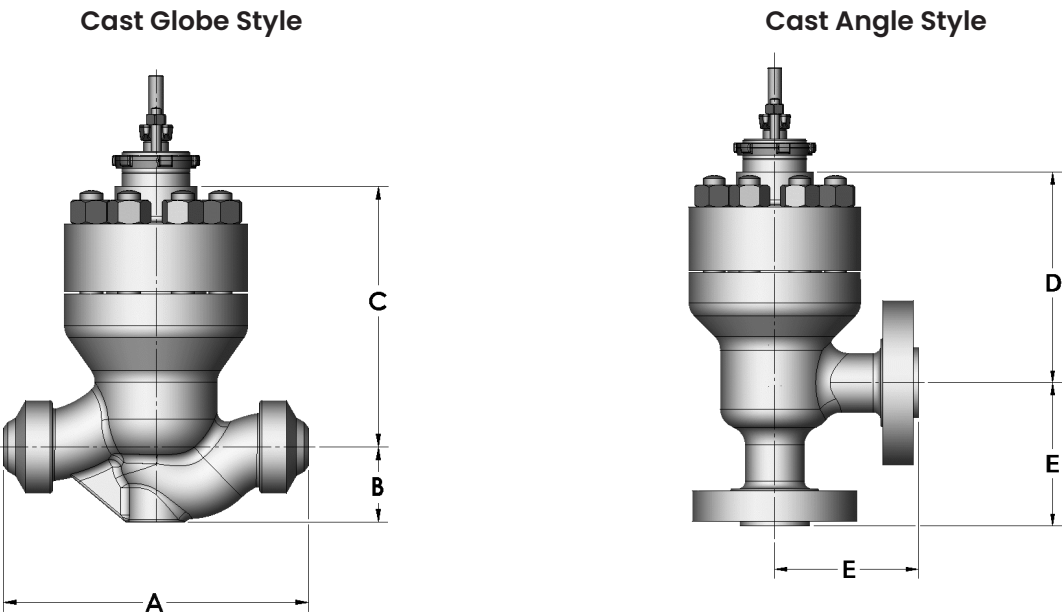
18400F Series Forged Globe Style Body Dimensions (inches)  
ASME Class 600 through 2500 and equivalent PN

| Valve Size<br>(inches) | A                      |               | B                      |               | C                   |         |                     |         | D                      |               |
|------------------------|------------------------|---------------|------------------------|---------------|---------------------|---------|---------------------|---------|------------------------|---------------|
|                        | ASME Class<br>600–2500 |               | ASME Class<br>600–2500 |               | Standard Bonnet     |         | Extension Bonnet    |         | ASME Class<br>600–2500 |               |
|                        |                        |               |                        |               | ASME Class 600–2500 |         | ASME Class 600–2500 |         |                        |               |
|                        | RF, RTJ and<br>BW      | SW and<br>THD | RF, RTJ and<br>BW      | SW and<br>THD | 3 and 4<br>STAGE    | 6 STAGE | 3 and 4<br>STAGE    | 6 STAGE | RF, RTJ and<br>BW      | SW and<br>THD |
| 1                      | 6.00                   | 6.00          | 3.00                   | 3.00          | 8.82                | 10.20   | 11.26               | 14.22   | 2.78                   | 2.78          |
| 1.5                    | 8.50                   | 8.50          | 4.25                   | 4.25          | 9.61                | 10.98   | 13.62               | 15.00   | 3.49                   | 3.49          |
| 2                      | 10.00                  | 10.00         | 5.00                   | 5.00          | 13.43               | 15.55   | 18.56               | 20.69   | 3.76                   | 3.76          |
| 3                      | 13.50                  | –             | 6.75                   | –             | 18.18               | 21.43   | 23.85               | 27.10   | 5.59                   | –             |
| 4                      | 18.00                  | –             | 9.00                   | –             | 21.70               | 25.70   | 26.63               | 30.64   | 6.25                   | –             |
| 6                      | 24.00                  | –             | 12.00                  | –             | 28.87               | 34.37   | 32.86               | 38.36   | 8.73                   | –             |
| 8                      | 36.00                  | –             | 18.00                  | –             | 33.67               | 40.02   | 37.19               | 43.53   | 10.50                  | –             |

78400F Series Forged Angle Style Body Dimensions (inches)  
ASME Class 600 through 2500 and equivalent PN

| Valve Size<br>(inches) | E                      |            | F                      |            | G                   |         |                     |         |
|------------------------|------------------------|------------|------------------------|------------|---------------------|---------|---------------------|---------|
|                        | ASME Class<br>600–2500 |            | ASME Class<br>600–2500 |            | Standard Bonnet     |         | Extension Bonnet    |         |
|                        |                        |            |                        |            | ASME Class 600–2500 |         | ASME Class 600–2500 |         |
|                        | RF, RTJ and BW         | SW and THD | RF, RTJ and BW         | SW and THD | 3 and 4 STAGE       | 6 STAGE | 3 and 4 STAGE       | 6 STAGE |
| 1                      | 4.12                   | 4.12       | 2.89                   | 2.89       | 7.24                | 8.62    | 11.26               | 12.63   |
| 1.5                    | 4.94                   | 4.94       | 3.56                   | 3.56       | 7.15                | 8.53    | 11.17               | 12.55   |
| 2                      | 5.75                   | 5.75       | 4.49                   | 4.49       | 10.61               | 12.36   | 15.57               | 17.50   |
| 3                      | 7.50                   | –          | 53.50                  | –          | 13.61               | 16.88   | 19.32               | 22.59   |
| 4                      | 9.00                   | –          | 6.50                   | –          | 15.95               | 19.95   | 20.89               | 24.89   |
| 6                      | 12.00                  | –          | 8.50                   | –          | 18.60               | 24.11   | 22.59               | 28.11   |
| 8                      | 14.00                  | –          | 10.25                  | –          | 24.70               | 31.04   | 28.22               | 34.56   |

# Dimensions (mm)



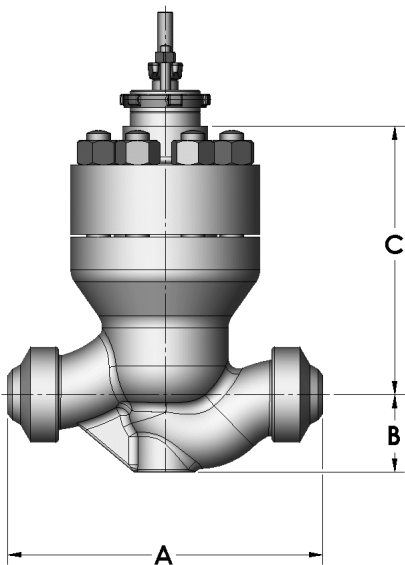
18X00/78X00 Series Cast Body Dimensions (mm)  
ASME Class 600 through 2500 and equivalent PN

| Valve Size<br>(inches) | A                  |            |     |            |                 |            |     |     |                |     |                 |     |                 |      |
|------------------------|--------------------|------------|-----|------------|-----------------|------------|-----|-----|----------------|-----|-----------------|-----|-----------------|------|
|                        | ASME Class 600-900 |            |     |            | ASME Class 2500 |            |     |     | ASME Class 900 |     | ASME Class 1500 |     | ASME Class 2500 |      |
|                        | BW                 | SW and THD | BW  | SW and THD | BW              | SW and THD | RF  | RTJ | RF             | RTJ | RF              | RTJ | RF              | RTJ  |
| 1                      | 197                | 197        | 197 | 197        | 216             | 216        | 292 | 292 | 292            | 292 | 292             | 292 | 308             | 308  |
| 1.5                    | 235                | 235        | 235 | 235        | 260             | 260        | 311 | 311 | 311            | 311 | 311             | 311 | 359             | 359  |
| 2                      | 375                | 375        | 375 | 375        | 375             | 375        | 375 | 378 | 375            | 378 | 375             | 378 | 413             | 416  |
| 3                      | 441                | –          | 460 | –          | 498             | –          | 441 | 455 | 441            | 445 | 460             | 463 | 498             | 502  |
| 4                      | 511                | –          | 530 | –          | 575             | –          | 511 | 514 | 511            | 514 | 530             | 533 | 737             | 746  |
| 6                      | 768                | –          | 769 | –          | 819             | –          | 768 | 771 | 768            | 771 | 768             | 778 | 819             | 832  |
| 8                      | 832                | –          | 832 | –          | 1022            | –          | 914 | 917 | 914            | 917 | 972             | 981 | 1022            | 1038 |

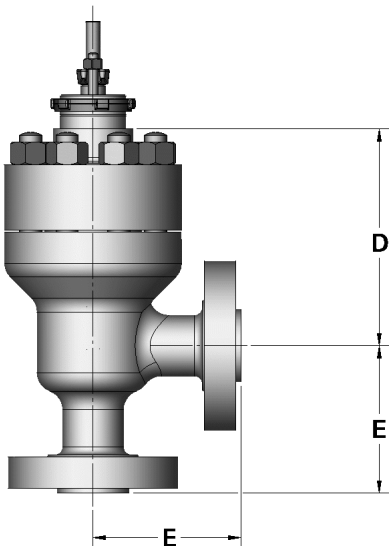
| Valve Size<br>(inches) | B                   |            |                     |            |                |                |                 |                 |
|------------------------|---------------------|------------|---------------------|------------|----------------|----------------|-----------------|-----------------|
|                        | ASME Class 600-2500 |            | ASME Class 600-2500 |            | ASME Class 600 | ASME Class 900 | ASME Class 1500 | ASME Class 2500 |
|                        | BW                  | SW and THD | BW                  | SW and THD | RF and RTJ     | RF and RTJ     | RF and RTJ      | RF and RTJ      |
| 1                      | 50                  | 50         | 50                  | 50         | 62             | 75             | 75              | 80              |
| 1.5                    | 67                  | 67         | 67                  | 67         | 78             | 89             | 89              | 102             |
| 2                      | 92                  | 92         | 92                  | 92         | 83             | 108            | 108             | 118             |
| 3                      | 135                 | –          | 136                 | –          | 105            | 121            | 133             | 152             |
| 4                      | 160                 | –          | 180                 | –          | 136            | 146            | 155             | 178             |
| 6                      | 227                 | –          | 227                 | –          | 178            | 191            | 197             | 241             |
| 8                      | 270                 | –          | 270                 | –          | 210            | 235            | 241             | 276             |

# Dimensions (mm)

Cast Globe Style



Cast Angle Style



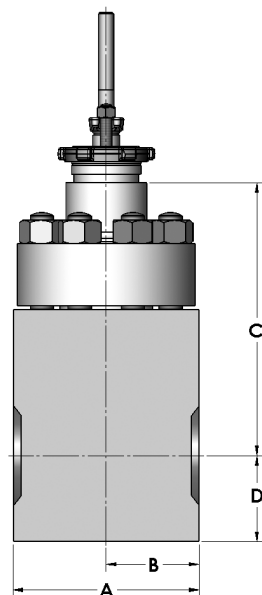
18X00/78X00 Series Cast Body Dimensions (mm)  
ASME Class 600 through 2500 and equivalent PN

| Valve Size<br>(inches) | C                   |         |                     |         | D                   |         |                     |         |
|------------------------|---------------------|---------|---------------------|---------|---------------------|---------|---------------------|---------|
|                        | Standard Bonnet     |         | Extension Bonnet    |         | Standard Bonnet     |         | Extension Bonnet    |         |
|                        | ASME Class 600-2500 |         | ASME Class 600-2500 |         | ASME Class 600-2500 |         | ASME Class 600-2500 |         |
|                        | 3 and 4 Stage       | 6 Stage | 3 and 4 Stage       | 6 Stage | 3 and 4 Stage       | 6 Stage | 3 and 4 Stage       | 6 Stage |
| 1                      | 216                 | 251     | 318                 | 353     | 181                 | 216     | 283                 | 318     |
| 1.5                    | 214                 | 249     | 316                 | 351     | 181                 | 216     | 283                 | 318     |
| 2                      | 319                 | 373     | 450                 | 503     | 276                 | 330     | 406                 | 460     |
| 3                      | 422                 | 504     | 566                 | 649     | 358                 | 441     | 503                 | 585     |
| 4                      | 500                 | 602     | 626                 | 727     | 405                 | 506     | 530                 | 632     |
| 6                      | 647                 | 787     | 749                 | 888     | 506                 | 645     | 607                 | 747     |
| 8                      | 766                 | 928     | 856                 | 1017    | 607                 | 768     | 696                 | 857     |

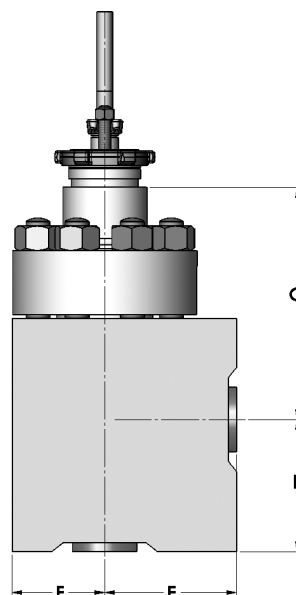
| Valve Size<br>(inches) | E                  |            |                 |            |                 |            |                |     |                |     |                 |     |                 |     |
|------------------------|--------------------|------------|-----------------|------------|-----------------|------------|----------------|-----|----------------|-----|-----------------|-----|-----------------|-----|
|                        | ASME Class 600-900 |            | ASME Class 1500 |            | ASME Class 2500 |            | ASME Class 600 |     | ASME Class 900 |     | ASME Class 1500 |     | ASME Class 2500 |     |
|                        | BW                 | SW and THD | BW              | SW and THD | BW              | SW and THD | RF             | RTJ | RF             | RTJ | RF              | RTJ | RF              | RTJ |
| 1                      | 98                 | 98         | 98              | 98         | 108             | 108        | 146            | 146 | 146            | 146 | 146             | 146 | 154             | 154 |
| 1.5                    | 118                | 118        | 118             | 118        | 130             | 130        | 156            | 156 | 156            | 156 | 156             | 156 | 179             | 181 |
| 2                      | 187                | 187        | 187             | 187        | 187             | 187        | 187            | 189 | 187            | 189 | 187             | 189 | 207             | 208 |
| 3                      | 221                | –          | 230             | –          | 249             | –          | 221            | 222 | 221            | 222 | 230             | 232 | 249             | 251 |
| 4                      | 256                | –          | 265             | –          | 287             | –          | 256            | 257 | 256            | 257 | 265             | 267 | 368             | 373 |
| 6                      | 384                | –          | 384             | –          | 410             | –          | 384            | 386 | 384            | 386 | 384             | 389 | 410             | 416 |
| 8                      | 416                | –          | 416             | –          | 511             | –          | 457            | 459 | 457            | 459 | 486             | 490 | 511             | 519 |

# Dimensions (mm)

**Forged Globe Style**



**Forged Angle Style**



**18400F Series Forged Globe Style Body Dimensions (mm)**  
**ASME Class 600 through 2500 and equivalent PN**

| Valve Size<br>(inches) | A                      |               | B                      |               | C                   |                     |                     |                     | D                      |               |
|------------------------|------------------------|---------------|------------------------|---------------|---------------------|---------------------|---------------------|---------------------|------------------------|---------------|
|                        | ASME Class<br>600-2500 |               | ASME Class<br>600-2500 |               | Standard Bonnet     |                     | Extension Bonnet    |                     | ASME Class<br>600-2500 |               |
|                        | RF, RTJ and<br>BW      | SW<br>and THD | RF, RTJ and<br>BW      | SW<br>and THD | ASME Class 600-2500 | ASME Class 600-2500 | ASME Class 600-2500 | ASME Class 600-2500 | RF, RTJ and<br>BW      | SW<br>and THD |
| 1                      | 152                    | 152           | 76                     | 76            | 224                 | 259                 | 286                 | 361                 | 71                     | 71            |
| 1.5                    | 216                    | 216           | 108                    | 108           | 244                 | 279                 | 346                 | 381                 | 89                     | 89            |
| 2                      | 254                    | 254           | 127                    | 127           | 341                 | 395                 | 471                 | 526                 | 96                     | 96            |
| 3                      | 343                    | —             | 171                    | —             | 462                 | 544                 | 606                 | 688                 | 142                    | —             |
| 4                      | 457                    | —             | 229                    | —             | 551                 | 653                 | 676                 | 778                 | 159                    | —             |
| 6                      | 610                    | —             | 305                    | —             | 733                 | 873                 | 835                 | 974                 | 222                    | —             |
| 8                      | 914                    | —             | 457                    | —             | 855                 | 1017                | 945                 | 1106                | 267                    | —             |

**78400F Series Forged Angle Style Body Dimensions (mm)**  
**ASME Class 600 through 2500 and equivalent PN**

| Valve Size<br>(inches) | E                      |            | F                      |            | G                   |         |                     |         |
|------------------------|------------------------|------------|------------------------|------------|---------------------|---------|---------------------|---------|
|                        | ASME Class<br>600-2500 |            | ASME Class<br>600-2500 |            | Standard Bonnet     |         | Extension Bonnet    |         |
|                        | RF, RTJ and BW         | SW and THD | RF, RTJ and BW         | SW and THD | ASME Class 600-2500 |         | ASME Class 600-2500 |         |
| 1                      | 105                    | 105        | 73                     | 73         | 3 and 4 STAGE       | 6 STAGE | 3 and 4 STAGE       | 6 STAGE |
| 1.5                    | 125                    | 125        | 90                     | 90         | 184                 | 219     | 286                 | 321     |
| 2                      | 146                    | 146        | 114                    | 114        | 182                 | 217     | 284                 | 319     |
| 3                      | 191                    | —          | 140                    | —          | 269                 | 314     | 395                 | 445     |
| 4                      | 229                    | —          | 165                    | —          | 346                 | 429     | 491                 | 574     |
| 6                      | 305                    | —          | 216                    | —          | 405                 | 507     | 531                 | 632     |
| 8                      | 356                    | —          | 260                    | —          | 472                 | 612     | 574                 | 714     |
|                        |                        |            |                        |            | 627                 | 788     | 717                 | 878     |

# Weights (lbs)

## 18400 Series Cast Globe Body Sub Assembly with Standard Bonnet (lbs)

| Valve Size<br>(inches) | 3 and 4 Stage Design   |            |                 |            |                   |                   |                    |                    |
|------------------------|------------------------|------------|-----------------|------------|-------------------|-------------------|--------------------|--------------------|
|                        | ASME Class<br>600-2500 |            | ASME Class 2500 |            | ASME Class<br>600 | ASME Class<br>900 | ASME Class<br>1500 | ASME Class<br>2500 |
|                        | BW                     | SW and THD | BW              | SW and THD | RF and RTJ        | RF and RTJ        | RF and RTJ         | RF and RTJ         |
| 1                      | 44                     | 45         | 46              | 46         | 52                | 61                | 61                 | 68                 |
| 1.5                    | 47                     | 48         | 51              | 52         | 62                | 73                | 73                 | 97                 |
| 2                      | 167                    | 169        | 182             | 185        | 179               | 206               | 206                | 242                |
| 3                      | 244                    | –          | 293             | –          | 264               | 284               | 311                | 420                |
| 4                      | 440                    | –          | 565             | –          | 481               | 500               | 534                | 804                |
| 6                      | 1104                   | –          | 1275            | –          | 1215              | 1262              | 1332               | 1794               |
| 8                      | 2204                   | –          | 2745            | –          | 2401              | 2501              | 2661               | 3490               |

| Valve Size<br>(inches) | 6 Stage Design         |            |                 |            |                   |                   |                    |                    |
|------------------------|------------------------|------------|-----------------|------------|-------------------|-------------------|--------------------|--------------------|
|                        | ASME Class<br>600-2500 |            | ASME Class 2500 |            | ASME Class<br>600 | ASME Class<br>900 | ASME Class<br>1500 | ASME Class<br>2500 |
|                        | BW                     | SW and THD | BW              | SW and THD | RF and RTJ        | RF and RTJ        | RF and RTJ         | RF and RTJ         |
| 1                      | 47                     | 47         | 48              | 48         | 55                | 64                | 64                 | 70                 |
| 1.5                    | 51                     | 52         | 55              | 55         | 65                | 76                | 76                 | 101                |
| 2                      | 176                    | 178        | 194             | 197        | 189               | 214               | 216                | 254                |
| 3                      | 278                    | –          | 331             | –          | 298               | 320               | 345                | 457                |
| 4                      | 499                    | –          | 631             | –          | 541               | 559               | 594                | 866                |
| 6                      | 1287                   | –          | 1518            | –          | 1398              | 1445              | 1514               | 2036               |
| 8                      | 2513                   | –          | 3206            | –          | 2714              | 2813              | 2966               | 3950               |

## 18400 Series Cast Globe Body Sub Assembly with Extension Bonnet (lbs)

| Valve Size<br>(inches) | 3 and 4 Stage Design   |            |                 |            |                   |                   |                    |                    |
|------------------------|------------------------|------------|-----------------|------------|-------------------|-------------------|--------------------|--------------------|
|                        | ASME Class<br>600-2500 |            | ASME Class 2500 |            | ASME Class<br>600 | ASME Class<br>900 | ASME Class<br>1500 | ASME Class<br>2500 |
|                        | BW                     | SW and THD | BW              | SW and THD | RF and RTJ        | RF and RTJ        | RF and RTJ         | RF and RTJ         |
| 1                      | 50                     | 51         | 52              | 52         | 59                | 67                | 67                 | 74                 |
| 1.5                    | 53                     | 54         | 57              | 57         | 68                | 78                | 78                 | 103                |
| 2                      | 185                    | 186        | 198             | 203        | 197               | 223               | 223                | 260                |
| 3                      | 258                    | –          | 307             | –          | 278               | 298               | 325                | 434                |
| 4                      | 461                    | –          | 585             | –          | 503               | 521               | 556                | 825                |
| 6                      | 1137                   | –          | 1307            | –          | 1249              | 1296              | 1365               | 1828               |
| 8                      | 2275                   | –          | 2815            | –          | 2473              | 2572              | 2732               | 3560               |

| Valve Size<br>(inches) | 6 Stage Design         |            |                 |            |                   |                   |                    |                    |
|------------------------|------------------------|------------|-----------------|------------|-------------------|-------------------|--------------------|--------------------|
|                        | ASME Class<br>600-2500 |            | ASME Class 2500 |            | ASME Class<br>600 | ASME Class<br>900 | ASME Class<br>1500 | ASME Class<br>2500 |
|                        | BW                     | SW and THD | BW              | SW and THD | RF and RTJ        | RF and RTJ        | RF and RTJ         | RF and RTJ         |
| 1                      | 52                     | 53         | 54              | 54         | 61                | 70                | 70                 | 76                 |
| 1.5                    | 57                     | 57         | 61              | 61         | 71                | 82                | 82                 | 107                |
| 2                      | 194                    | 196        | 210             | 215        | 207               | 232               | 232                | 271                |
| 3                      | 292                    | –          | 343             | –          | 312               | 334               | 359                | 472                |
| 4                      | 525                    | –          | 651             | –          | 566               | 585               | 619                | 892                |
| 6                      | 1320                   | –          | 1550            | –          | 1431              | 1478              | 1548               | 2070               |
| 8                      | 2584                   | –          | 3278            | –          | 2785              | 2884              | 3036               | 4020               |

# Weights (lbs)

## 78400 Series Cast Angle Body Sub Assembly with Standard Bonnet (lbs)

| Valve Size<br>(inches) | 3 and 4 Stage Design   |            |                 |            |                   |                   |                    |                    |
|------------------------|------------------------|------------|-----------------|------------|-------------------|-------------------|--------------------|--------------------|
|                        | ASME Class<br>600–2500 |            | ASME Class 2500 |            | ASME Class<br>600 | ASME Class<br>900 | ASME Class<br>1500 | ASME Class<br>2500 |
|                        | BW                     | SW and THD | BW              | SW and THD | RF and RTJ        | RF and RTJ        | RF and RTJ         | RF and RTJ         |
| 1                      | 42                     | 44         | 43              | 44         | 51                | 60                | 60                 | 66                 |
| 1.5                    | 46                     | 48         | 48              | 49         | 60                | 71                | 71                 | 94                 |
| 2                      | 159                    | 164        | 172             | 176        | 172               | 197               | 198                | 233                |
| 3                      | 230                    | –          | 272             | –          | 250               | 269               | 297                | 405                |
| 4                      | 421                    | –          | 457             | –          | 462               | 481               | 516                | 750                |
| 6                      | 1029                   | –          | 1114            | –          | 1140              | 1187              | 1256               | 1691               |
| 8                      | 2070                   | –          | 2423            | –          | 2271              | 2370              | 2530               | 3354               |

| Valve Size<br>(inches) | 6 Stage Design         |            |                 |            |                   |                   |                    |                    |
|------------------------|------------------------|------------|-----------------|------------|-------------------|-------------------|--------------------|--------------------|
|                        | ASME Class<br>600–2500 |            | ASME Class 2500 |            | ASME Class<br>600 | ASME Class<br>900 | ASME Class<br>1500 | ASME Class<br>2500 |
|                        | BW                     | SW and THD | BW              | SW and THD | RF and RTJ        | RF and RTJ        | RF and RTJ         | RF and RTJ         |
| 1                      | 45                     | 46         | 46              | 46         | 53                | 62                | 62                 | 69                 |
| 1.5                    | 49                     | 51         | 52              | 52         | 64                | 74                | 74                 | 98                 |
| 2                      | 169                    | 174        | 183             | 187        | 182               | 208               | 208                | 244                |
| 3                      | 264                    | –          | 310             | –          | 284               | 304               | 331                | 443                |
| 4                      | 481                    | –          | 543             | –          | 522               | 540               | 576                | 815                |
| 6                      | 1214                   | –          | 1355            | –          | 1322              | 1369              | 1442               | 1934               |
| 8                      | 2382                   | –          | 2882            | –          | 2583              | 2682              | 2843               | 3814               |

## 78400 Series Cast Angle Body Sub Assembly with Extension Bonnet (lbs)

| Valve Size<br>(inches) | 3 and 4 Stage Design   |            |                 |            |                   |                   |                    |                    |
|------------------------|------------------------|------------|-----------------|------------|-------------------|-------------------|--------------------|--------------------|
|                        | ASME Class<br>600–2500 |            | ASME Class 2500 |            | ASME Class<br>600 | ASME Class<br>900 | ASME Class<br>1500 | ASME Class<br>2500 |
|                        | BW                     | SW and THD | BW              | SW and THD | RF and RTJ        | RF and RTJ        | RF and RTJ         | RF and RTJ         |
| 1                      | 48                     | 50         | 49              | 50         | 57                | 65                | 65                 | 72                 |
| 1.5                    | 51                     | 53         | 54              | 54         | 66                | 76                | 76                 | 100                |
| 2                      | 177                    | 180        | 190             | 194        | 189               | 215               | 215                | 250                |
| 3                      | 242                    | –          | 287             | –          | 264               | 284               | 311                | 419                |
| 4                      | 443                    | –          | 495             | –          | 484               | 502               | 538                | 770                |
| 6                      | 1063                   | –          | 1145            | –          | 1173              | 1220              | 1290               | 1725               |
| 8                      | 2141                   | –          | 2493            | –          | 2342              | 2441              | 2601               | 3425               |

| Valve Size<br>(inches) | 6 Stage Design         |            |                 |            |                   |                   |                    |                    |
|------------------------|------------------------|------------|-----------------|------------|-------------------|-------------------|--------------------|--------------------|
|                        | ASME Class<br>600–2500 |            | ASME Class 2500 |            | ASME Class<br>600 | ASME Class<br>900 | ASME Class<br>1500 | ASME Class<br>2500 |
|                        | BW                     | SW and THD | BW              | SW and THD | RF and RTJ        | RF and RTJ        | RF and RTJ         | RF and RTJ         |
| 1                      | 51                     | 52         | 52              | 52         | 59                | 68                | 68                 | 74                 |
| 1.5                    | 55                     | 56         | 57              | 58         | 69                | 80                | 80                 | 104                |
| 2                      | 187                    | 189        | 201             | 205        | 199               | 225               | 225                | 262                |
| 3                      | 276                    | –          | 325             | –          | 298               | 318               | 345                | 457                |
| 4                      | 506                    | –          | 563             | –          | 547               | 565               | 600                | 841                |
| 6                      | 1247                   | –          | 1390            | –          | 1356              | 1403              | 1475               | 1967               |
| 8                      | 2453                   | –          | 2952            | –          | 2654              | 2754              | 2914               | 3884               |

# Weights (kg)

## 18400 Series Cast Globe Body Sub Assembly with Standard Bonnet (kg)

| Valve Size<br>(inches) | 3 and 4 Stage Design   |            |                 |            |                   |                   |                    |                    |
|------------------------|------------------------|------------|-----------------|------------|-------------------|-------------------|--------------------|--------------------|
|                        | ASME Class<br>600-2500 |            | ASME Class 2500 |            | ASME Class<br>600 | ASME Class<br>900 | ASME Class<br>1500 | ASME Class<br>2500 |
|                        | BW                     | SW and THD | BW              | SW and THD | RF and RTJ        | RF and RTJ        | RF and RTJ         | RF and RTJ         |
| 1                      | 20                     | 20         | 21              | 21         | 24                | 28                | 28                 | 31                 |
| 1.5                    | 21                     | 22         | 23              | 24         | 28                | 33                | 33                 | 44                 |
| 2                      | 76                     | 77         | 83              | 84         | 81                | 94                | 94                 | 110                |
| 3                      | 111                    | –          | 134             | –          | 120               | 129               | 141                | 191                |
| 4                      | 200                    | –          | 258             | –          | 218               | 227               | 242                | 364                |
| 6                      | 501                    | –          | 578             | –          | 552               | 573               | 605                | 814                |
| 8                      | 1001                   | –          | 1246            | –          | 1090              | 1135              | 1208               | 1582               |

| Valve Size<br>(inches) | 6 Stage Design         |            |                 |            |                   |                   |                    |                    |
|------------------------|------------------------|------------|-----------------|------------|-------------------|-------------------|--------------------|--------------------|
|                        | ASME Class<br>600-2500 |            | ASME Class 2500 |            | ASME Class<br>600 | ASME Class<br>900 | ASME Class<br>1500 | ASME Class<br>2500 |
|                        | BW                     | SW and THD | BW              | SW and THD | RF and RTJ        | RF and RTJ        | RF and RTJ         | RF and RTJ         |
| 1                      | 21                     | 21         | 22              | 22         | 25                | 29                | 29                 | 32                 |
| 1.5                    | 23                     | 24         | 25              | 25         | 30                | 35                | 35                 | 46                 |
| 2                      | 80                     | 81         | 88              | 89         | 86                | 97                | 98                 | 115                |
| 3                      | 126                    | –          | 151             | –          | 135               | 145               | 157                | 207                |
| 4                      | 227                    | –          | 287             | –          | 246               | 254               | 270                | 393                |
| 6                      | 584                    | –          | 688             | –          | 635               | 656               | 687                | 924                |
| 8                      | 1141                   | –          | 1455            | –          | 132               | 1277              | 1347               | 1791               |

## 18400 Series Cast Globe Body Sub Assembly with Extension Bonnet (kg)

| Valve Size<br>(inches) | 3 and 4 Stage Design   |            |                 |            |                   |                   |                    |                    |
|------------------------|------------------------|------------|-----------------|------------|-------------------|-------------------|--------------------|--------------------|
|                        | ASME Class<br>600-2500 |            | ASME Class 2500 |            | ASME Class<br>600 | ASME Class<br>900 | ASME Class<br>1500 | ASME Class<br>2500 |
|                        | BW                     | SW and THD | BW              | SW and THD | RF and RTJ        | RF and RTJ        | RF and RTJ         | RF and RTJ         |
| 1                      | 23                     | 3          | 24              | 24         | 27                | 30                | 30                 | 34                 |
| 1.5                    | 24                     | 36         | 26              | 26         | 31                | 35                | 35                 | 47                 |
| 2                      | 84                     | 84         | 90              | 92         | 89                | 101               | 101                | 118                |
| 3                      | 117                    | –          | 140             | –          | 126               | 135               | 148                | 198                |
| 4                      | 209                    | –          | 268             | –          | 228               | 237               | 252                | 373                |
| 6                      | 516                    | –          | 594             | –          | 567               | 588               | 620                | 829                |
| 8                      | 1033                   | –          | 1278            | –          | 1123              | 1168              | 1240               | 1614               |

| Valve Size<br>(inches) | 6 Stage Design         |            |                 |            |                   |                   |                    |                    |
|------------------------|------------------------|------------|-----------------|------------|-------------------|-------------------|--------------------|--------------------|
|                        | ASME Class<br>600-2500 |            | ASME Class 2500 |            | ASME Class<br>600 | ASME Class<br>900 | ASME Class<br>1500 | ASME Class<br>2500 |
|                        | BW                     | SW and THD | BW              | SW and THD | RF and RTJ        | RF and RTJ        | RF and RTJ         | RF and RTJ         |
| 1                      | 24                     | 24         | 25              | 25         | 28                | 32                | 32                 | 35                 |
| 1.5                    | 26                     | 26         | 28              | 28         | 32                | 37                | 37                 | 49                 |
| 2                      | 88                     | 89         | 95              | 98         | 94                | 105               | 105                | 123                |
| 3                      | 133                    | –          | 157             | –          | 142               | 163               | 163                | 214                |
| 4                      | 238                    | –          | 297             | –          | 257               | 281               | 281                | 405                |
| 6                      | 599                    | –          | 703             | –          | 650               | 703               | 703                | 940                |
| 8                      | 1173                   | –          | 1490            | –          | 1264              | 1378              | 1378               | 1823               |

# Weights (kg)

## 78400 Series Cast Angle Body Sub Assembly with Standard Bonnet (kg)

| Valve Size<br>(inches) | 3 and 4 Stage Design   |            |                 |            |                   |                   |                    |                    |
|------------------------|------------------------|------------|-----------------|------------|-------------------|-------------------|--------------------|--------------------|
|                        | ASME Class<br>600-2500 |            | ASME Class 2500 |            | ASME Class<br>600 | ASME Class<br>900 | ASME Class<br>1500 | ASME Class<br>2500 |
|                        | BW                     | SW and THD | BW              | SW and THD | RF and RTJ        | RF and RTJ        | RF and RTJ         | RF and RTJ         |
| 1                      | 19                     | 20         | 20              | 20         | 23                | 27                | 27                 | 30                 |
| 1.5                    | 21                     | 22         | 22              | 22         | 27                | 32                | 32                 | 43                 |
| 2                      | 72                     | 74         | 78              | 80         | 78                | 89                | 90                 | 106                |
| 3                      | 104                    | –          | 124             | –          | 114               | 122               | 135                | 184                |
| 4                      | 191                    | –          | 216             | –          | 210               | 218               | 234                | 341                |
| 6                      | 467                    | –          | 506             | –          | 518               | 539               | 570                | 767                |
| 8                      | 940                    | –          | 1098            | –          | 1031              | 1076              | 1149               | 1521               |

## 78400 Series Cast Angle Body Sub Assembly with Extension Bonnet (kg)

| Valve Size<br>(inches) | 3 and 4 Stage Design   |            |                 |            |                   |                   |                    |                    |
|------------------------|------------------------|------------|-----------------|------------|-------------------|-------------------|--------------------|--------------------|
|                        | ASME Class<br>600-2500 |            | ASME Class 2500 |            | ASME Class<br>600 | ASME Class<br>900 | ASME Class<br>1500 | ASME Class<br>2500 |
|                        | BW                     | SW and THD | BW              | SW and THD | RF and RTJ        | RF and RTJ        | RF and RTJ         | RF and RTJ         |
| 1                      | 22                     | 23         | 22              | 23         | 26                | 30                | 30                 | 33                 |
| 1.5                    | 23                     | 24         | 25              | 25         | 30                | 35                | 35                 | 45                 |
| 2                      | 80                     | 82         | 86              | 88         | 86                | 98                | 98                 | 114                |
| 3                      | 110                    | –          | 131             | –          | 120               | 129               | 141                | 191                |
| 4                      | 201                    | –          | 226             | –          | 220               | 228               | 244                | 350                |
| 6                      | 483                    | –          | 520             | –          | 533               | 554               | 586                | 773                |
| 8                      | 972                    | –          | 1130            | –          | 1063              | 1108              | 1181               | 1553               |

| Valve Size<br>(inches) | 6 Stage Design         |            |                 |            |                   |                   |                    |                    |
|------------------------|------------------------|------------|-----------------|------------|-------------------|-------------------|--------------------|--------------------|
|                        | ASME Class<br>600-2500 |            | ASME Class 2500 |            | ASME Class<br>600 | ASME Class<br>900 | ASME Class<br>1500 | ASME Class<br>2500 |
|                        | BW                     | SW and THD | BW              | SW and THD | RF and RTJ        | RF and RTJ        | RF and RTJ         | RF and RTJ         |
| 1                      | 23                     | 24         | 24              | 24         | 27                | 31                | 31                 | 34                 |
| 1.5                    | 25                     | 25         | 26              | 26         | 31                | 36                | 36                 | 47                 |
| 2                      | 85                     | 86         | 91              | 93         | 90                | 102               | 102                | 119                |
| 3                      | 125                    | –          | 147             | –          | 135               | 144               | 157                | 207                |
| 4                      | 230                    | –          | 256             | –          | 248               | 257               | 272                | 381                |
| 6                      | 566                    | –          | 631             | –          | 616               | 637               | 670                | 892                |
| 8                      | 1114                   | –          | 1340            | –          | 1205              | 1250              | 1323               | 1762               |

# Weights (lbs and kg)

## 18400F Series Forged Globe Body Sub Assembly

| Valve Size<br>(inches) | Weight (lbs)        |         |                     |         | Weight (kg)         |         |                     |         |
|------------------------|---------------------|---------|---------------------|---------|---------------------|---------|---------------------|---------|
|                        | Standard Bonnet     |         | Extension Bonnet    |         | Standard Bonnet     |         | Extension Bonnet    |         |
|                        | ASME Class 600-2500 |         | ASME Class 600-2500 |         | ASME Class 600-2500 |         | ASME Class 600-2500 |         |
|                        | 3 and 4 Stage       | 6 Stage | 3 and 4 Stage       | 6 Stage | 3 and 4 Stage       | 6 Stage | 3 and 4 Stage       | 6 Stage |
| 1                      | 86                  | 98      | 92                  | 104     | 39                  | 44      | 42                  | 47      |
| 1.5                    | 156                 | 178     | 162                 | 184     | 71                  | 81      | 74                  | 84      |
| 2                      | 344                 | 392     | 362                 | 410     | 156                 | 178     | 164                 | 186     |
| 3                      | 748                 | 874     | 762                 | 886     | 340                 | 397     | 346                 | 402     |
| 4                      | 1402                | 1636    | 1424                | 1658    | 637                 | 743     | 646                 | 753     |
| 6                      | 3212                | 3764    | 3242                | 3790    | 1458                | 1709    | 1472                | 1721    |
| 8                      | 6960                | 8086    | 7031                | 8132    | 3160                | 3671    | 3192                | 3692    |

## 78400F Series Forged Angle Body Sub Assembly

| Valve Size<br>(inches) | Weight (lbs)        |         |                     |         | Weight (kg)         |         |                     |         |
|------------------------|---------------------|---------|---------------------|---------|---------------------|---------|---------------------|---------|
|                        | Standard Bonnet     |         | Extension Bonnet    |         | Standard Bonnet     |         | Extension Bonnet    |         |
|                        | ASME Class 600-2500 |         | ASME Class 600-2500 |         | ASME Class 600-2500 |         | ASME Class 600-2500 |         |
|                        | 3 and 4 Stage       | 6 Stage | 3 and 4 Stage       | 6 Stage | 3 and 4 Stage       | 6 Stage | 3 and 4 Stage       | 6 Stage |
| 1                      | 96                  | 110     | 102                 | 116     | 44                  | 50      | 46                  | 53      |
| 1.5                    | 140                 | 162     | 150                 | 167     | 64                  | 74      | 68                  | 76      |
| 2                      | 330                 | 374     | 350                 | 390     | 150                 | 170     | 159                 | 177     |
| 3                      | 626                 | 746     | 640                 | 758     | 284                 | 339     | 291                 | 344     |
| 4                      | 1060                | 1264    | 1082                | 1286    | 481                 | 574     | 491                 | 584     |
| 6                      | 2120                | 2584    | 2154                | 2610    | 962                 | 1173    | 978                 | 1185    |
| 8                      | 4050                | 4734    | 4122                | 4802    | 1839                | 2149    | 1871                | 2180    |

# Accessories and options

- Extension Bonnets
- Environmental Capabilities (Low-E Packing)
- Lubricator and Isolation Valve
- Other Flange Facings
- Limit Stops
- Body Drain Plug
- Reducer and Nipple Connections
- U.O.P. Trim Materials
- High Temperature Materials
- Cryogenic Service Materials
- Electric Actuators

For additional accessories and options, consult Baker Hughes.

# Appendix A:

## Available Engineered to Order Trim

The trim configurations in the tables below are available upon request in addition to our standard trim configuration offering.

| 4 Stage Design |    | Flow Characteristic : Modified Linear |       |        |       |                |                |                |                       |
|----------------|----|---------------------------------------|-------|--------|-------|----------------|----------------|----------------|-----------------------|
| Valve Size     |    | Orifice Diameter                      |       | Travel |       | Trim           |                | Min Cont.      | Remarks               |
| inches         | DN | inches                                | mm    | inches | mm    | C <sub>V</sub> | F <sub>L</sub> | C <sub>V</sub> |                       |
| 1              | 25 | 0.2                                   | 5.08  | 0.125  | 3.175 | 0.1            | 0.991          | 0.04           | Flow to Close, Trim C |
| 1              | 25 | 0.375                                 | 9.525 | 0.25   | 6.35  | 0.2            | 0.996          | 0.04           | Flow to Close, Trim A |
| 1              | 25 | 0.5                                   | 12.7  | 0.25   | 6.35  | 0.4            | 0.996          | 0.04           | Trim A                |
| 1              | 25 | 0.5                                   | 12.7  | 0.25   | 6.35  | 0.6            | 0.991          | 0.04           | Trim C                |

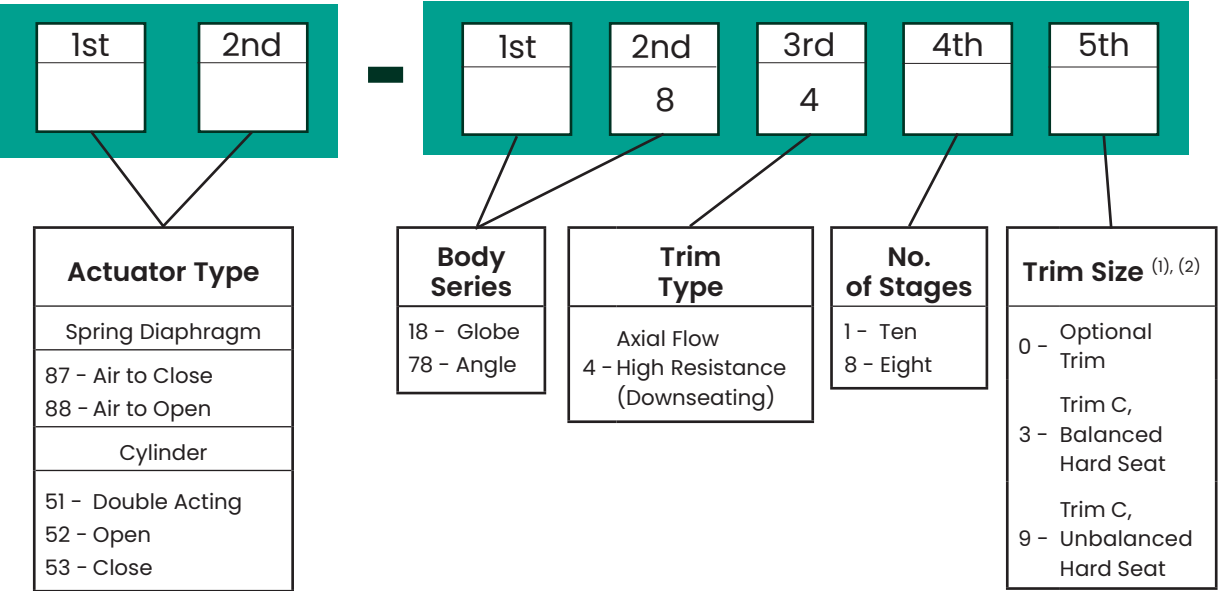
| 6 Stage Design |    | Flow Characteristic : Modified Linear |       |        |       |                |                |                |                       |
|----------------|----|---------------------------------------|-------|--------|-------|----------------|----------------|----------------|-----------------------|
| Valve Size     |    | Orifice Diameter                      |       | Travel |       | Trim           |                | Min Cont.      | Remarks               |
| inches         | DN | inches                                | mm    | inches | mm    | C <sub>V</sub> | F <sub>L</sub> | C <sub>V</sub> |                       |
| 1              | 25 | 0.12                                  | 3.048 | 0.125  | 3.175 | 0.02           | 0.998          | 0.004          | Flow to Close, Trim A |
| 1              | 25 | 0.2                                   | 5.08  | 0.125  | 3.175 | 0.04           | 0.998          | 0.008          | Flow to Close, Trim A |
| 1              | 25 | 0.2                                   | 5.08  | 0.125  | 3.175 | 0.08           | 0.994          | 0.016          | Flow to Close, Trim C |
| 1              | 25 | 0.3                                   | 7.62  | 0.25   | 6.35  | 0.2            | 0.994          | 0.03           | Flow to Close, Trim C |
| 1              | 25 | 0.5                                   | 12.7  | 0.25   | 6.35  | 0.3            | 0.998          | 0.024          | Trim A                |
| 1              | 25 | 0.5                                   | 12.7  | 0.25   | 6.35  | 0.4            | 0.998          | 0.03           | Trim A                |
| 1              | 25 | 0.5                                   | 12.7  | 0.25   | 6.35  | 0.5            | 0.994          | 0.03           | Trim C                |

# Appendix B:

## 18400/78400 API 6A Series LincolnLog

The 18400/78400 API 6A Series severe service control valves are designed to meet API 6A standard for high pressure applications.

### Numbering system



- Notes:
1. Balanced Trim not available for 1" 18400/78400 API 6A Series valves.
  2. Unbalanced Trim not available for 1.5", 2", 3", 4" and 6" 18400/78400 API 6A Series valves.

# General Information

## Body:

- Type:
  - Forged Globe Body
  - Forged Angle Body
- Materials:
  - F6NM Martensitic Stainless Steel
  - F51 Duplex Stainless Steel
  - F55 Duplex Stainless Steel
  - Nickel-Alloy Inconel 718

## Trim

- Plug Type:
  - Balanced
  - Unbalanced
- Trim Type:
  - C

- Capacity:
  - Full Area
  - Reduced Area Cv 0.4 (1" Size Only)
  - Reduced Area Cv 0.2 (1" Size Only)
- Cv Ratio:
  - See "Staging Ratios and Pressure Drop Guidelines" Tables
- Flow Characteristic:
  - Modified Linear

## Actuator

- Type:
  - Spring Diaphragm (standard 87/88) or Cylinder (51/52/53)
- Handwheel
  - Optional

# API 6A Temperature Ratings and Seat Leakage

| Temp. Class | Temperature Range <sup>(1)(2)</sup> |      |      |      | Seat Leakage Class IEC 60534-4 / ANSI/FCI 70-2 |   |
|-------------|-------------------------------------|------|------|------|------------------------------------------------|---|
|             | °C                                  |      | °F   |      |                                                |   |
|             | Min.                                | Max. | Min. | Max. |                                                |   |
| K           | -60                                 | 82   | -75  | 180  | IV                                             | V |
| L           | -46                                 | 82   | -50  | 180  |                                                |   |
| N           | -46                                 | 60   | -50  | 140  |                                                |   |
| P           | -29                                 | 82   | -20  | 180  |                                                |   |
| S           | -18                                 | 60   | 0    | 140  |                                                |   |
| T           | -18                                 | 82   | 0    | 180  |                                                |   |
| U           | -18                                 | 121  | 0    | 250  |                                                |   |
| V           | 2                                   | 121  | 35   | 250  |                                                |   |
| X           | -18                                 | 180  | 0    | 350  |                                                |   |

## Notes:

- Valve end size complies with API 6A standard for 6BX flanges.
- For temperature rating selection, fluid temperature and ambient temperature should be compared and the minimum value of those two should be used to select the proper temperature rating.
  - If  $\min T^{\circ}_{\text{fluid}} > \min T^{\circ}_{\text{ambient}}$  à  $\min T^{\circ}_{\text{Class}} = \min T^{\circ}_{\text{ambient}}$
  - If  $\min T^{\circ}_{\text{fluid}} < \min T^{\circ}_{\text{ambient}}$  à  $\min T^{\circ}_{\text{Class}} = \min T^{\circ}_{\text{fluid}}$

# Ratings / Connections

Valve end connections are designed to meet the API 6A standard for API 6BX printed flange.

| Valve Body Size (in) | Valve Ends Size in (mm) | Pressure Class         |                        |
|----------------------|-------------------------|------------------------|------------------------|
| NPS                  | 6BX <sup>(1)</sup>      | API 10K <sup>(1)</sup> | API 15K <sup>(1)</sup> |
| 1                    | 1"-13/16 (1.8125)       | X                      | X                      |
| 1.5                  | 1"-13/16 (1.8125)       | X                      | X                      |
| 2                    | 2"-1/16 (2.0625)        | X                      | X                      |
| 3                    | 3"-1/16 (3.0625)        | X                      | X                      |
| 4                    | 4"-1/16 (4.0625)        | X                      | X                      |
| 6                    | 7"-1/16 (7.0625)        | X                      | X                      |

- API 6BX printed flanges are standard. Consult factory for availability of other end connection options.

# C<sub>V</sub> and F<sub>L</sub> Versus Travel

## API 6A 10K and 15K

### Sizes 1" to 6", 8-stage Modified Linear – Flow to Open

| Travel (Percent)      |       |              |       |        |       |                          | 10                              | 20                   | 30    | 40    | 50    | 60    | 70    | 80    | 90    | 100   |
|-----------------------|-------|--------------|-------|--------|-------|--------------------------|---------------------------------|----------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| F <sub>L</sub>        |       |              |       |        |       |                          | 0.994                           | 0.994                | 0.994 | 0.994 | 0.994 | 0.994 | 0.994 | 0.994 | 0.994 | 0.994 |
| Valve Body Size (NPS) |       | Orifice Dia. |       | Travel |       | Trim                     | Minimum Operable C <sub>V</sub> | Rated C <sub>V</sub> |       |       |       |       |       |       |       |       |
| Inch                  | mm    | inch         | mm    | inch   | mm    |                          |                                 |                      |       |       |       |       |       |       |       |       |
| 1                     | 25.4  | 0.7          | 17.78 | 0.25   | 6.35  | Full                     | 0.019                           | 0.071                | 0.18  | 0.32  | 0.46  | 0.67  | 0.88  | 1.11  | 1.28  | 1.34  |
|                       |       |              |       |        |       | Micro C <sub>V</sub> 0.4 | 0.014                           | 0.043                | 0.06  | 0.11  | 0.17  | 0.22  | 0.29  | 0.35  | 0.41  | 0.47  |
|                       |       |              |       |        |       | Micro C <sub>V</sub> 0.2 | 0.012                           | 0.019                | 0.03  | 0.06  | 0.09  | 0.11  | 0.14  | 0.16  | 0.19  | 0.21  |
| 1.5                   | 38.1  | 1            | 25.4  | 0.25   | 6.4   | Full                     | 0.003                           | 0.006                | 0.13  | 0.51  | 0.99  | 1.47  | 1.87  | 2.15  | 2.3   | 2.1   |
| 2                     | 50.8  | 1.5          | 38.1  | 0.38   | 9.7   | Full                     | 0.02                            | 0.02                 | 0.35  | 0.73  | 1.3   | 2.1   | 2.93  | 3.75  | 4.45  | 5.5   |
| 3                     | 76.2  | 2.25         | 57.2  | 0.62   | 15.47 | Full                     | 0.03                            | 1.1                  | 2.96  | 4.82  | 6.67  | 8.07  | 9.82  | 11.53 | 13.21 | 14    |
| 4                     | 101.6 | 2.88         | 73.2  | 0.75   | 19.1  | Full                     | 0.06                            | 0.54                 | 2.27  | 4.72  | 7.62  | 10.9  | 14.7  | 16.8  | 19.3  | 21    |
| 6                     | 152.4 | 4.12         | 104.6 | 1      | 25.4  | Full                     | 0.133                           | 1.7                  | 6.0   | 11.5  | 17.0  | 23.6  | 30.2  | 36.8  | 38.1  | 39.5  |

Note: Throttling at or below minimum operable C<sub>V</sub> levels for extended periods of time can result in trim damage.

## API 6A 10K and 15K

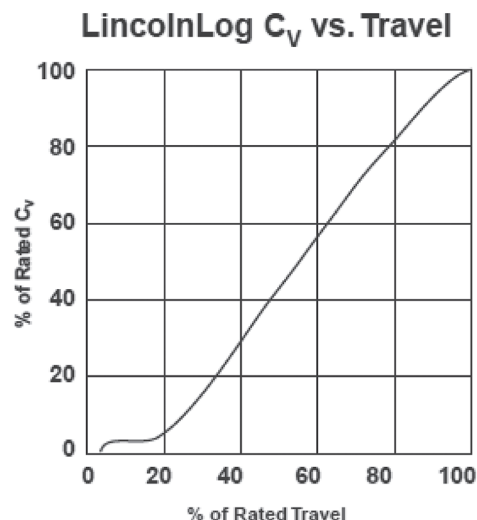
### Sizes 1" to 6", 10-stage Modified Linear – Flow to Open

| Travel (Percent)      |       |              |       |        |       |                          | 10                              | 20                   | 30    | 40    | 50    | 60    | 70    | 80    | 90    | 100   |
|-----------------------|-------|--------------|-------|--------|-------|--------------------------|---------------------------------|----------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| F <sub>L</sub>        |       |              |       |        |       |                          | 0.994                           | 0.994                | 0.994 | 0.994 | 0.994 | 0.994 | 0.994 | 0.994 | 0.994 | 0.994 |
| Valve Body Size (NPS) |       | Orifice Dia. |       | Travel |       | Trim                     | Minimum Operable C <sub>V</sub> | Rated C <sub>V</sub> |       |       |       |       |       |       |       |       |
| Inch                  | mm    | inch         | mm    | inch   | mm    |                          |                                 |                      |       |       |       |       |       |       |       |       |
| 1                     | 25.4  | 0.7          | 17.78 | 0.25   | 6.35  | Full                     | 0.016                           | 0.07                 | 0.17  | 0.31  | 0.44  | 0.63  | 0.81  | 1.00  | 1.10  | 1.19  |
|                       |       |              |       |        |       | Micro C <sub>V</sub> 0.4 | 0.011                           | 0.02                 | 0.05  | 0.09  | 0.14  | 0.19  | 0.25  | 0.30  | 0.36  | 0.41  |
|                       |       |              |       |        |       | Micro C <sub>V</sub> 0.2 | 0.009                           | 0.02                 | 0.03  | 0.05  | 0.07  | 0.09  | 0.12  | 0.14  | 0.16  | 0.19  |
| 1.5                   | 38.1  | 1            | 25.4  | 0.25   | 6.4   | Full                     | 0.002                           | 0.003                | 0.07  | 0.34  | 0.71  | 1.13  | 1.48  | 1.8   | 1.9   | 1.9   |
| 2                     | 50.8  | 1.5          | 38.1  | 0.38   | 9.7   | Full                     | 0.02                            | 0.02                 | 0.35  | 0.73  | 1.3   | 2.1   | 2.93  | 3.75  | 4.45  | 4.9   |
| 3                     | 76.2  | 2.25         | 57.2  | 0.62   | 15.47 | Full                     | 1                               | 2.34                 | 3.5   | 4.67  | 5.84  | 7.69  | 9.03  | 10.41 | 11.84 | 13    |
| 4                     | 101.6 | 2.88         | 73.2  | 0.75   | 19.1  | Full                     | 0.06                            | 0.73                 | 2.42  | 4.71  | 7.38  | 10.41 | 13.7  | 15.81 | 17.5  | 19    |
| 6                     | 152.4 | 4.12         | 104.6 | 1      | 25.4  | Full                     | 0.11                            | 1.8                  | 5.4   | 10.3  | 15.2  | 21.0  | 26.9  | 32.7  | 34.2  | 35.7  |

Note: Throttling at or below minimum operable C<sub>V</sub> levels for extended periods of time can result in trim damage. Additional sizes are available, consult factory.

# Flow Characteristics

The LincolnLog trim provides a smooth modified linear control characteristic with “clearance flow” capacity over the initial 15% of valve travel as shown in the generic chart at right. Incorporation of the multistage “clearance flow” design concept prevents high pressure drops across the LincolnLog seating area while throttling at low lifts. This feature helps to extend trim life significantly, resulting in dependable and tight shutoff whenever required. It also improves the throttling control stability and performance at low lifts, while providing smooth, accurate and continuous capacity control from 15% to 100% plug travel. Controllability extends from the Maximum Rated  $C_V$  to the Minimum Controllable  $C_V$  for any valve size resulting in typical turndown ratios of 50:1.



## Staging Ratios and Pressure Drop Guidelines

| Trim Type | Qty of Stages | Maximum Recommended Throttling $\Delta P$ <sup>(1)</sup> |     |                      |     |
|-----------|---------------|----------------------------------------------------------|-----|----------------------|-----|
|           |               | Continuous Service                                       |     | Intermittent Service |     |
|           |               | psi                                                      | bar | psi                  | bar |
| C         | 8             | 5800                                                     | 400 | 7250                 | 500 |
| C         | 10            | 7400                                                     | 510 | 9140                 | 630 |

Notes:

- Recommended limits for  $\Delta P$  per stage are 800 psi (55 bar) for continuous duty cycle applications and up to 1000 psi (69 bar)  $\Delta P$  per stage for intermittent service.

### Staging Ratios and Pressure Drop Guidelines for Upgraded Trim <sup>(1)</sup>

| Trim Type | Qty of Stages | Maximum Recommended Throttling $\Delta P$ |     |
|-----------|---------------|-------------------------------------------|-----|
|           |               | Continuous Service                        |     |
|           |               | psi                                       | bar |
| C         | 8             | 7250                                      | 500 |
| C         | 10            | 9140                                      | 630 |

Notes:

- Upgraded trim includes a Kolsterised Inconel 718 plug and liner (API 6A CRA).

# Materials and Temperatures

## Temperature Rating versus Material of Construction

| Temperature Ratings | Temperature Range <sup>(1)</sup> |        |        |        | Material of Construction Availability |        |              |             |
|---------------------|----------------------------------|--------|--------|--------|---------------------------------------|--------|--------------|-------------|
|                     | Min °C                           | Max °C | Min °F | Max °F | Martensitic                           | Duplex | Super Duplex | Inconel 718 |
| K                   | -60                              | 82     | -75    | 180    | X                                     |        |              | X           |
| L                   | -46                              | 82     | -50    | 180    | X                                     | X      | X            | X           |
| N                   | -46                              | 60     | -50    | 140    | X                                     | X      | X            | X           |
| P                   | -29                              | 82     | -20    | 180    | X                                     | X      | X            | X           |
| S                   | -18                              | 60     | 0      | 140    | X                                     | X      | X            | X           |
| T                   | -18                              | 82     | 0      | 180    | X                                     | X      | X            | X           |
| U                   | -18                              | 121    | 0      | 250    | X                                     | X      | X            | X           |
| V                   | 2                                | 121    | 35     | 250    | X                                     | X      | X            | X           |
| X                   | -18                              | 180    | 0      | 350    | X                                     | X      | X            | X           |

Note:

1. Minimum temperature of valve design is defined as the minimum between fluid temperature and ambient temperature.

- If  $\min T_{\text{fluid}}^{\circ} > \min T_{\text{ambient}}^{\circ}$  à  $\min T_{\text{Class}}^{\circ} = \min T_{\text{ambient}}^{\circ}$
- If  $\min T_{\text{fluid}}^{\circ} < \min T_{\text{ambient}}^{\circ}$  à  $\min T_{\text{Class}}^{\circ} = \min T_{\text{fluid}}^{\circ}$

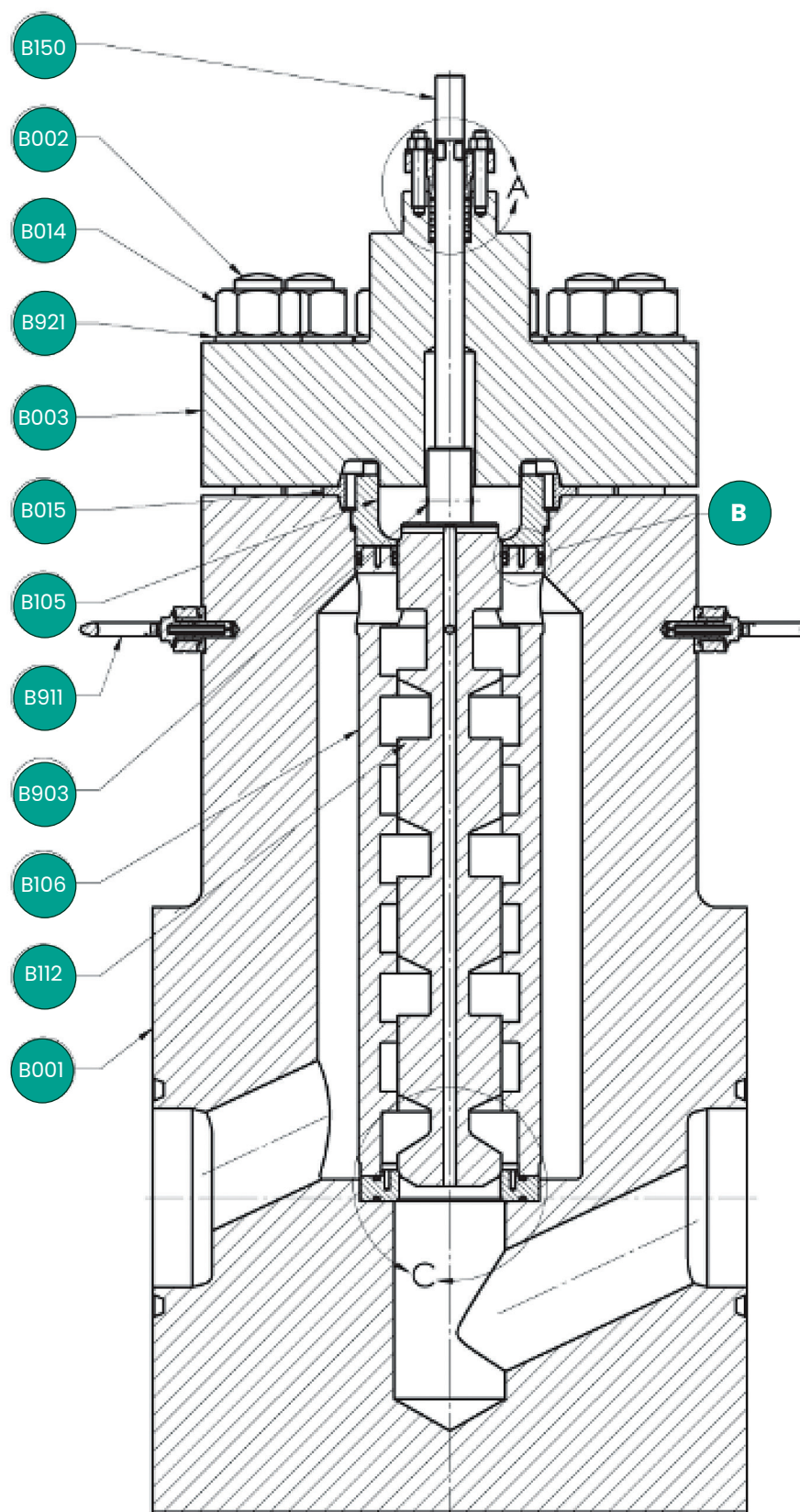
## Operating Pressure versus Material of Construction

| Max Operating Pressure | Max Inlet Pressure |      | Material of Construction Availability |        |              |             |
|------------------------|--------------------|------|---------------------------------------|--------|--------------|-------------|
|                        | bar                | kPSI | Martensitic                           | Duplex | Super Duplex | Inconel 718 |
| API 10K                | 690                | 10   | X                                     | X      | X            | X           |
| API 15K                | 1034               | 15   | X                                     |        | X            | X           |

## Material Class versus Material of Construction

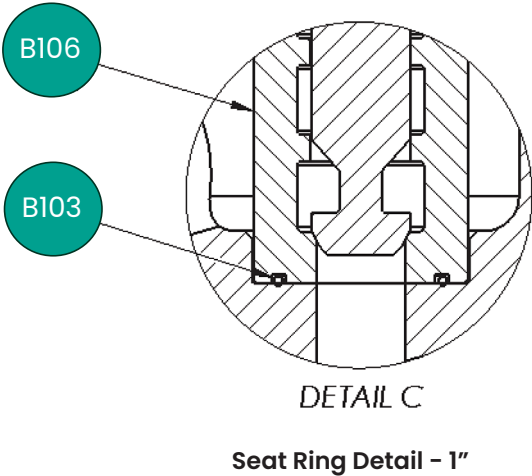
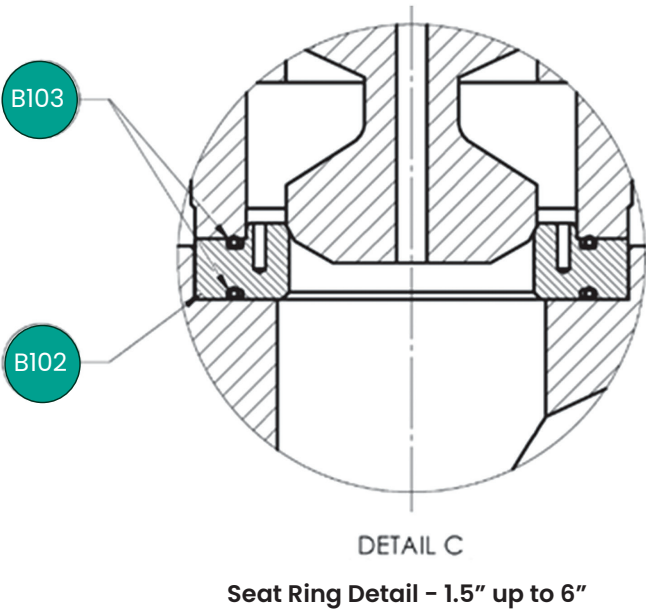
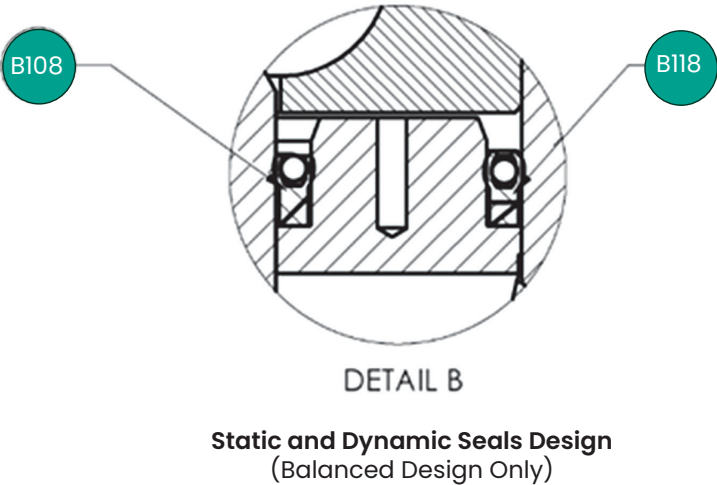
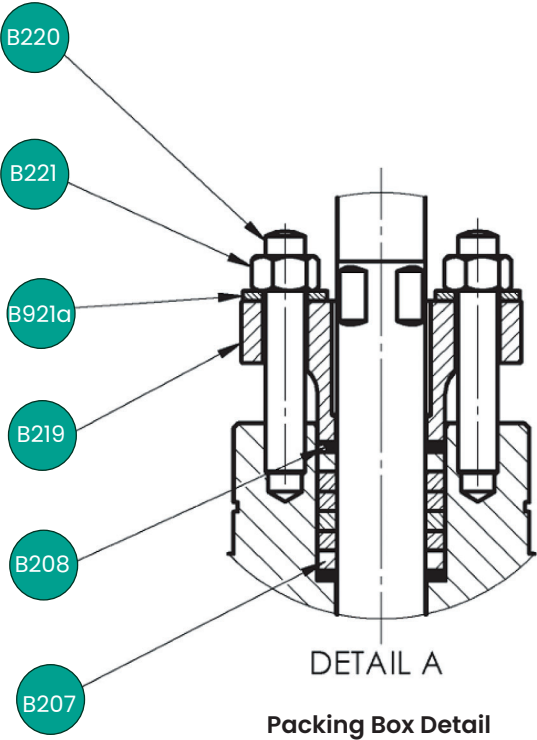
| Material Class |                 |             | NACE MR0175/ISO 15156 | Material of Construction Availability |                         |                               |                              |
|----------------|-----------------|-------------|-----------------------|---------------------------------------|-------------------------|-------------------------------|------------------------------|
|                |                 |             |                       | Martensitic NACE Non-Exposed          | Duplex NACE Non-Exposed | Super Duplex NACE Non-Exposed | Inconel 718 NACE Non-Exposed |
| AA             | General Service | Non-Exposed |                       | X                                     | X                       | X                             | X                            |
| BB             | General Service | Non-Exposed |                       | X                                     | X                       | X                             | X                            |
| CC             | General Service | Non-Exposed |                       | X                                     | X                       | X                             | X                            |
| Material Class |                 |             | NACE MR0175/ISO 15156 | Material of Construction Availability |                         |                               |                              |
|                |                 |             |                       | Martensitic NACE Exposed              | Duplex NACE Exposed     | Super Duplex NACE Exposed     | Inconel 718 NACE Exposed     |
| DD             | Sour Service    | Exposed     |                       |                                       |                         |                               | X                            |
| EE             | Sour Service    | Exposed     |                       |                                       |                         |                               | X                            |
| FF             | Sour Service    | Exposed     |                       | X                                     | X                       | X                             | X                            |
| HH             | Sour Service    | Exposed     |                       |                                       |                         |                               | X                            |

# Standard Construction Assembly



18400 Series API 6A Design

# Standard Construction Assembly



# Materials of Construction

## 18400/78400 API 6A Martensitic Stainless Steel Construction:

- Max operating pressure up to 15 kPSI [1034 bar]
- Temperature ratings: K/L/N/P/S/T/U/V/X (see page 35)
- Material classes: AA/BB/CC/FF (see page 35)

| Ref. No. | Temperature Range           | -76°F<br>[-60°C]                                                                           | 20°F<br>[29°C]                                                                      | 356°F<br>[180°C] |
|----------|-----------------------------|--------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|------------------|
|          | Description                 | Materials                                                                                  |                                                                                     |                  |
| B001     | Valve Body                  | ASTM A182 GRADE F6NM                                                                       |                                                                                     |                  |
| B002     | Body Stud                   |                                                                                            | ASTM A193 GRADE B7 ZINC PLATED + PTFE COATING <sup>(1 and 3)</sup>                  |                  |
|          |                             |                                                                                            | ASTM A193 GRADE B7M ELECTROLESS NICKEL PLATING + PTFE COATING <sup>(2 and 3)</sup>  |                  |
|          |                             |                                                                                            | ASTM A320 Gr L7 ZINC PLATED + PTFE COATING <sup>(1 and 3)</sup>                     |                  |
|          |                             |                                                                                            | ASTM A320 Gr L7M ELECTROLESS NICKEL PLATING + PTFE COATING <sup>(2 and 3)</sup>     |                  |
| B003     | Bonnet                      | ASTM A182 GRADE F6NM                                                                       |                                                                                     |                  |
| B014     | Body Nut                    |                                                                                            | ASTM A 194 GRADE 2H ZINC PLATED + PTFE COATING <sup>(1 and 3)</sup>                 |                  |
|          |                             |                                                                                            | ASTM A194 GRADE 2HM, ELECTROLESS NICKEL PLATING + PTFE COATING <sup>(2 and 3)</sup> |                  |
|          |                             |                                                                                            | ASTM A194 Gr 7 ZINC PLATED + PTFE COATING <sup>(1 and 3)</sup>                      |                  |
|          |                             |                                                                                            | ASTM A194 Gr 7M ELECTROLESS NICKEL PLATING + PTFE COATING <sup>(2 and 3)</sup>      |                  |
| B015     | Body Gasket                 | ALLOY 718 + MOS2 COATING                                                                   |                                                                                     |                  |
| B102     | Seat Ring                   | HARDFACING STELLITE NO. 6 ON 6NM                                                           |                                                                                     |                  |
| B103     | Seat Ring Gasket            | INCONEL 718 + SILVER PLATING                                                               |                                                                                     |                  |
| B105     | Retainer                    | SUPER AUSTENITIC STAINLESS STEEL UNS S20910 (NITRONIC 50) 35 HRC MAXIMUM                   |                                                                                     |                  |
| B106     | Liner                       | CA6NM CL. B STAINLESS STEEL 23 HRC MAXIMUM HARDNESS WITH “DIFFUSED KANIGEN” NICKEL COATING |                                                                                     |                  |
| B108     | Liner Gasket                | FLUOROPOLYMER JACKET/ COBALT NICKEL ALLOY SPRING                                           |                                                                                     |                  |
| B112     | Plug (Balanced)             | CA6NM CL. B STAINLESS STEEL 23 HRC MAXIMUM HARDNESS WITH “DIFFUSED KANIGEN” NICKEL COATING |                                                                                     |                  |
|          | Plug (Unbalanced)           |                                                                                            |                                                                                     |                  |
| B118     | Plug Balanced Seal          | PRESSURE ENERGIZED POLYMERIC                                                               |                                                                                     |                  |
| B150     | Plug Stem                   | ASTM A182 GRADE F6NM                                                                       |                                                                                     |                  |
| B207     | Packing Ring                | CARBON CORE PTFE <sup>(4)</sup>                                                            |                                                                                     |                  |
| B208     | Anti Extrusion Ring         | CARBON-GRAPHITE BRAIDED <sup>(4)</sup>                                                     |                                                                                     |                  |
| B219     | Packing Flange/<br>Follower | ASTM A182 GRADE F6NM                                                                       |                                                                                     |                  |
| B220     | Packing Stud                |                                                                                            | ASTM A193 GRADE B7 ZINC PLATED <sup>(1)</sup>                                       |                  |
|          |                             |                                                                                            | ASTM A193 GRADE B7M ELECTROLESS NICKEL PLATING <sup>(2)</sup>                       |                  |
|          |                             |                                                                                            | ASTM A320 Gr L7 ZINC PLATED <sup>(1)</sup>                                          |                  |
|          |                             |                                                                                            | ASTM A320 Gr L7M ELECTROLESS NICKEL PLATING <sup>(2)</sup>                          |                  |
| B221     | Packing Nut                 |                                                                                            | ASTM A 194 GRADE 2H ZINC PLATED <sup>(1)</sup>                                      |                  |
|          |                             |                                                                                            | ASTM A194 GRADE 2HM, ELECTROLESS NICKEL PLATING <sup>(2)</sup>                      |                  |
|          |                             |                                                                                            | ASTM A194 GRADE 7 ZINC PLATED <sup>(1)</sup>                                        |                  |
|          |                             |                                                                                            | ASTM A194 GRADE 7M ELECTROLESS NICKEL PLATING <sup>(2)</sup>                        |                  |
| B903     | Plug Pin                    | SOLUTION ANNEALED 316 STAINLESS STEEL HRC 22 MAXIMUM                                       |                                                                                     |                  |
| B921     | Body plain Washer           | ASTM F436 ZINC PLATED<br>410 STAINLESS STEEL HRC 35-45                                     |                                                                                     |                  |
| B921a    | Packing Plain Washer        | ASTM F436 ZINC PLATED<br>410 STAINLESS STEEL HRC 35-45                                     |                                                                                     |                  |

1. For General Service only: Nace Non-Exposed per ANSI/NACE MR0175/ISO 15156-1.
2. For Sour Service only: Nace Exposed per ANSI/NACE MR0175/ISO 15156-1.
3. Blue is the standard coating color.
4. No equivalents allowed to maintain fugitive emissions certification and performance.

# Materials of Construction

## 18400/78400 API 6A Duplex F51 Stainless Steel Construction:

- Max operating pressure up to 10 kPSI [690 bar]
- Temperature class: L/N/P/S/T/U/V/X (see page 35)
- Material class: AA/BB/CC/FF (see page 35)

| Ref. No. | Temperature Range        | -50°F<br>[-46°C]                                                                            | 20.2°F<br>[29°C]                                                                    | 356°F<br>[180°C] |
|----------|--------------------------|---------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|------------------|
|          | Description              | Materials                                                                                   |                                                                                     |                  |
| B001     | Valve Body               | ASTM A182 GRADE F51                                                                         |                                                                                     |                  |
| B002     | Body Stud                |                                                                                             | ASTM A193 GRADE B7 ZINC PLATED + PTFE COATING <sup>(3)</sup>                        |                  |
|          |                          |                                                                                             | ASTM A193 GRADE B7M ELECTROLESS NICKEL PLATING + PTFE COATING <sup>(2 and 3)</sup>  |                  |
|          |                          |                                                                                             | ASTM A320 Gr L7 ZINC PLATED + PTFE COATING <sup>(1 and 3)</sup>                     |                  |
|          |                          |                                                                                             | ASTM A320 Gr L7M ELECTROLESS NICKEL PLATING + PTFE COATING <sup>(2 and 3)</sup>     |                  |
| B003     | Bonnet                   | ASTM A182 GRADE F51                                                                         |                                                                                     |                  |
| B014     | Body Nut                 |                                                                                             | ASTM A 194 GRADE 2H ZINC PLATED + PTFE COATING <sup>(1 and 3)</sup>                 |                  |
|          |                          |                                                                                             | ASTM A194 GRADE 2HM, ELECTROLESS NICKEL PLATING + PTFE COATING <sup>(2 and 3)</sup> |                  |
|          |                          |                                                                                             | ASTM A194 Gr 7 ZINC PLATED + PTFE COATING <sup>(1 and 3)</sup>                      |                  |
|          |                          |                                                                                             | ASTM A194 Gr 7M ELECTROLESS NICKEL PLATING + PTFE COATING <sup>(2 and 3)</sup>      |                  |
| B015     | Body Gasket              | ALLOY 718 + MOS2 COATING                                                                    |                                                                                     |                  |
| B102     | Seat Ring                | 2205 ST. ST. (DUPLEX) HRC 28 MAXIMUM + HARDFACING STELLITE NO. 6                            |                                                                                     |                  |
| B103     | Seat Ring Gasket         | INCONEL 718 + SILVER PLATING                                                                |                                                                                     |                  |
| B105     | Retainer                 | SUPER AUSTENITIC STAINLESS STEEL UNS S20910 (NITRONIC 50) 35 HRC MAXIMUM                    |                                                                                     |                  |
| B106     | Liner                    | SOLUTION ANNEALED 2205 STAINLESS STEEL (DUPLEX) 28 HRC MAXIMUM + ELECTROLESS NICKEL PLATING |                                                                                     |                  |
| B108     | Liner Gasket             | FLUOROPOLYMER JACKET/ COBALT NICKEL ALLOY SPRING                                            |                                                                                     |                  |
| B112     | Plug (Balanced)          | SOLUTION ANNEALED 2205 STAINLESS STEEL (DUPLEX) 28 HRC MAXIMUM + ELECTROLESS NICKEL PLATING |                                                                                     |                  |
|          | Plug (Unbalanced)        |                                                                                             |                                                                                     |                  |
| B118     | Plug Balanced Seal       | PRESSURE ENERGIZED POLYMERIC                                                                |                                                                                     |                  |
| B150     | Plug Stem                | ASTM A182 GRADE F5                                                                          |                                                                                     |                  |
| B207     | Packing Ring             | CARBON CORE PTFE <sup>(4)</sup>                                                             |                                                                                     |                  |
| B208     | Anti Extrusion Ring      | CARBON-GRAPHITE BRAIDED <sup>(4)</sup>                                                      |                                                                                     |                  |
| B219     | Packing Flange/ Follower | ASTM A182 GRADE F51                                                                         |                                                                                     |                  |
| B220     | Packing Stud             |                                                                                             | ASTM A193 GRADE B7 ZINC PLATED <sup>(1)</sup>                                       |                  |
|          |                          |                                                                                             | ASTM A193 GRADE B7M ELECTROLESS NICKEL PLATING <sup>(2)</sup>                       |                  |
|          |                          |                                                                                             | ASTM A320 Gr L7 ZINC PLATED <sup>(1)</sup>                                          |                  |
|          |                          |                                                                                             | ASTM A320 Gr L7M ELECTROLESS NICKEL PLATING <sup>(2)</sup>                          |                  |
| B221     | Packing Nut              |                                                                                             | ASTM A 194 GRADE 2H ZINC PLATED <sup>(1)</sup>                                      |                  |
|          |                          |                                                                                             | ASTM A194 GRADE 2HM, ELECTROLESS NICKEL PLATING <sup>(2)</sup>                      |                  |
|          |                          |                                                                                             | ASTM A194 GRADE 7 ZINC PLATED <sup>(1)</sup>                                        |                  |
|          |                          |                                                                                             | ASTM A194 GRADE 7M ELECTROLESS NICKEL PLATING <sup>(2)</sup>                        |                  |
| B903     | Plug Pin                 | SOLUTION ANNEALED 2205 STAINLESS STEEL (DUPLEX) HRC 28 MAXIMUM                              |                                                                                     |                  |
| B921     | Body plain Washer        | ASTM F436 ZINC PLATED                                                                       |                                                                                     |                  |
|          |                          | 410 STAINLESS STEEL HRC 35-45                                                               |                                                                                     |                  |
| B921a    | Packing Plain Washer     | ASTM F436 ZINC PLATED                                                                       |                                                                                     |                  |
|          |                          | 410 STAINLESS STEEL HRC 35-45                                                               |                                                                                     |                  |

1. For General Service only: Nace Non-Exposed per ANSI/NACE MR0175/ISO 15156-1.
2. For Sour Service only: Nace Exposed per ANSI/NACE MR0175/ISO 15156-1.
3. Blue is the standard coating color.
4. No equivalents allowed to maintain fugitive emissions certification and performance.

# Materials of Construction

## 18400/78400 API 6A Super Duplex F55 Stainless-Steel Construction:

- Max operating pressure up to 15 kPSI [1034 bar]
- Temperature class: L/N/P/S/T/U/V/X (see page 35)
- Material class: AA/BB/CC/FF (see page 35)

| Ref. No. | Temperature Range        | -50°F<br>[-46°C]                                                                                                             | 20.2°F<br>[29°C]                                                                    | 356°F<br>[180°C] |
|----------|--------------------------|------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|------------------|
|          | Description              | Materials                                                                                                                    |                                                                                     |                  |
| B001     | Valve Body               | ASTM A182 GRADE F55                                                                                                          |                                                                                     |                  |
| B002     | Body Stud                |                                                                                                                              | ASTM A193 GRADE B7 ZINC PLATED + PTFE COATING API 6A <sup>(1 and 3)</sup>           |                  |
|          |                          |                                                                                                                              | ASTM A193 GRADE B7M ELECTROLESS NICKEL PLATING + PTFE COATING <sup>(2 and 3)</sup>  |                  |
|          |                          |                                                                                                                              | ASTM A320 Gr L7 ZINC PLATED + PTFE COATING <sup>(1 and 3)</sup>                     |                  |
|          |                          |                                                                                                                              | ASTM A320 GRADE L7M ELECTROLESS NICKEL PLATING + PTFE COATING <sup>(2 and 3)</sup>  |                  |
| B003     | Bonnet                   | ASTM A182 GRADE F55                                                                                                          |                                                                                     |                  |
| B014     | Body Nut                 |                                                                                                                              | ASTM A 194 GRADE 2H ZINC PLATED + PTFE COATING <sup>(1 and 3)</sup>                 |                  |
|          |                          |                                                                                                                              | ASTM A194 GRADE 2HM, ELECTROLESS NICKEL PLATING + PTFE COATING <sup>(2 and 3)</sup> |                  |
|          |                          |                                                                                                                              | ASTM A194 GRADE 7 ZINC PLATED + PTFE COATING <sup>(1 and 3)</sup>                   |                  |
|          |                          |                                                                                                                              | ASTM A194 GRADE 7M ELECTROLESS NICKEL PLATING + PTFE COATING <sup>(2 and 3)</sup>   |                  |
| B015     | Body Gasket              | ALLOY 718 + MOS2 COATING                                                                                                     |                                                                                     |                  |
| B102     | Seat Ring                | HARDFACING STELL NO. 6 ON SOLUTION ANNEALED SUPER DUPLEX AUSTENO-FERRITIQUE STAINLESS STEEL (TYPE UNS S32760) HRC 32 MAXIMUM |                                                                                     |                  |
| B103     | Seat Ring Gasket         | INCONEL 718 + SILVER PLATING                                                                                                 |                                                                                     |                  |
| B105     | Retainer                 | SUPER AUSTENITIC STAINLESS STEEL UNS S20910 (NITRONIC 50) 35 HRC MAXIMUM                                                     |                                                                                     |                  |
| B106     | Liner                    | SUPER DUPLEX AUSTENO-FERRITIQUE STAINLESS STEEL (TYPE UNS S32760) HRC 32 MAXIMUM + HARD ELECTROLESS NICKEL PLATING           |                                                                                     |                  |
| B108     | Liner Gasket             | FLUOROPOLYMER JACKET/ COBALT NICKEL ALLOY SPRING                                                                             |                                                                                     |                  |
| B112     | Plug (Balanced)          | SUPER DUPLEX AUSTENO-FERRITIQUE STAINLESS STEEL (TYPE UNS S32760) HRC 32 MAXIMUM + HARD ELECTROLESS NICKEL PLATING           |                                                                                     |                  |
|          | Plug (Unbalanced)        |                                                                                                                              |                                                                                     |                  |
| B118     | Plug Balanced Seal       | PRESSURE ENERGIZED POLYMERIC                                                                                                 |                                                                                     |                  |
| B150     | Plug Stem                | ASTM A182 GRADE F55                                                                                                          |                                                                                     |                  |
| B207     | Packing Ring             | CARBON CORE PTFE <sup>(4)</sup>                                                                                              |                                                                                     |                  |
| B208     | Anti Extrusion Ring      | CARBON-GRAPHITE BRAIDED <sup>(4)</sup>                                                                                       |                                                                                     |                  |
| B219     | Packing Flange/ Follower | ASTM A182 GRADE F55                                                                                                          |                                                                                     |                  |
| B220     | Packing Stud             |                                                                                                                              | ASTM A193 GRADE B7 ZINC PLATED <sup>(1)</sup>                                       |                  |
|          |                          |                                                                                                                              | ASTM A193 GRADE B7M ELECTROLESS NICKEL PLATING <sup>(2)</sup>                       |                  |
|          |                          |                                                                                                                              | ASTM A320 GRADE L7 ZINC PLATED <sup>(1)</sup>                                       |                  |
|          |                          |                                                                                                                              | ASTM A320 Gr L7M ELECTROLESS NICKEL PLATING <sup>(2)</sup>                          |                  |
| B221     | Packing Nut              |                                                                                                                              | ASTM A 194 GRADE 2H ZINC PLATED <sup>(1)</sup>                                      |                  |
|          |                          |                                                                                                                              | ASTM A194 GRADE 2HM, ELECTROLESS NICKEL PLATING <sup>(2)</sup>                      |                  |
|          |                          |                                                                                                                              | ASTM A194 GRADE 7 ZINC PLATED <sup>(1)</sup>                                        |                  |
|          |                          |                                                                                                                              | ASTM A194 GRADE 7M ELECTROLESS NICKEL <sup>(2)</sup>                                |                  |
| B903     | Plug Pin                 | SUPER DUPLEX AUSTENO-FERRITIQUE STAINLESS STEEL (TYPE UNS S32760) HRC 32 MAXIMUM                                             |                                                                                     |                  |
| B921     | Body plain Wa-<br>sher   | ASTM F436 ZINC PLATED                                                                                                        |                                                                                     |                  |
|          |                          | 410 STAINLESS STEEL HRC 35-45                                                                                                |                                                                                     |                  |
| B921a    | Packing Plain Washer     | ASTM F436 ZINC PLATED                                                                                                        |                                                                                     |                  |
|          |                          | 410 STAINLESS STEEL HRC 35-45                                                                                                |                                                                                     |                  |

1. For General Service only: Nace Non-Exposed per ANSI/NACE MR0175/ISO 15156-1.
2. For Sour Service only: Nace Exposed per ANSI/NACE MR0175/ISO 15156-1.
3. Blue is the standard coating color.
4. No equivalents allowed to maintain fugitive emissions certification and performance.

# Materials of Construction

## 18400/78400 API 6A CRA Inconel 718 Construction:

- Max operating pressure Is up to 15 kPSI [1034 bar]
- Temperature class: K/L/N/P/S/T/U/V/X (see page 35)
- Material class: AA/BB/CC/DD/EE/FF/HH (see page 35)

| Ref. No. | Temperature Range           | -76°F<br>[-60°C] | 20.2°F<br>[29°C]                                                                                             | 356°F<br>[180°C] |
|----------|-----------------------------|------------------|--------------------------------------------------------------------------------------------------------------|------------------|
|          | Description                 | Materials        |                                                                                                              |                  |
| B001     | Valve Body                  |                  | UNS N07718                                                                                                   |                  |
| B002     | Body Stud                   |                  | ASTM A193 GRADE B7 ZINC PLATED + PTFE COATING API6A <sup>(1 and 3)</sup>                                     |                  |
|          |                             |                  | ASTM A193 GRADE B7M ELECTROLESS NICKEL PLATING + PTFE COATING <sup>(2 and 3)</sup>                           |                  |
|          |                             |                  | ASTM A320 GRADE L7 ZINC PLATED + PTFE COATING <sup>(1 and 3)</sup>                                           |                  |
|          |                             |                  | ASTM A320 GRADE L7M ELECTROLESS NICKEL PLATING + PTFE COATING <sup>(2 and 3)</sup>                           |                  |
| B003     | Bonnet                      |                  | UNS N07718                                                                                                   |                  |
| B014     | Body Nut                    |                  | ASTM A 194 GRADE 2H ZINC PLATED + PTFE COATING <sup>(1 and 3)</sup>                                          |                  |
|          |                             |                  | ASTM A194 GRADE 2HM, ELECTROLESS NICKEL PLATING + PTFE COATING <sup>(2 and 3)</sup>                          |                  |
|          |                             |                  | ASTM A194 GRADE 7 ZINC PLATED + PTFE COATING <sup>(1 and 3)</sup>                                            |                  |
|          |                             |                  | ASTM A194 GRADE 7M ELECTROLESS NICKEL PLATING + PTFE COATING <sup>(2 and 3)</sup>                            |                  |
| B015     | Body Gasket                 |                  | ALLOY 718 + MOS2 COATING                                                                                     |                  |
| B102     | Seat Ring                   |                  | UNS N07718                                                                                                   |                  |
| B103     | Seat Ring Gasket            |                  | INCONEL 718 + SILVER PLATING                                                                                 |                  |
| B105     | Retainer                    |                  | SUPER AUSTENITIC STAINLESS STEEL UNS S20910 (NITRONIC 50) 35 HRC MAXIMUM                                     |                  |
| B106     | Liner                       |                  | UNS N07718                                                                                                   |                  |
| B108     | Liner Gasket                |                  | FLUOROPOLYMER JACKET/ COBALT NICKEL ALLOY SPRING                                                             |                  |
| B112     | Plug (Balanced, Unbalanced) |                  | UNS N07718                                                                                                   |                  |
| B118     | Plug Balanced Seal          |                  | PRESSURE ENERGIZED POLYMERIC                                                                                 |                  |
| B150     | Plug Stem                   |                  | UNS N07718                                                                                                   |                  |
| B207     | Packing Ring                |                  | CARBON CORE PTFE <sup>(4)</sup>                                                                              |                  |
| B208     | Anti Extrusion Ring         |                  | CARBON-GRAPHITE BRAIDED <sup>(4)</sup>                                                                       |                  |
| B219     | Packing Flange/ Follower    |                  | UNS N07718 + ELECTROLESS NICKEL PLATING                                                                      |                  |
| B220     | Packing Stud                |                  | ASTM A193 GRADE B7 ZINC PLATED <sup>(1)</sup>                                                                |                  |
|          |                             |                  | ASTM A193 GRADE B7M ELECTROLESS NICKEL PLATING <sup>(2)</sup>                                                |                  |
|          |                             |                  | ASTM A320 GRADE L7 ZINC PLATED <sup>(1)</sup>                                                                |                  |
|          |                             |                  | ASTM A320 GRADE L7M ELECTROLESS NICKEL PLATING <sup>(2)</sup>                                                |                  |
| B221     | Packing Nut                 |                  | ASTM A 194 GRADE 2H ZINC PLATED <sup>(1)</sup>                                                               |                  |
|          |                             |                  | ASTM A194 GRADE 2HM, ELECTROLESS NICKEL PLATING <sup>(2)</sup>                                               |                  |
|          |                             |                  | ASTM A194 GRADE 7 ZINC PLATED <sup>(1)</sup>                                                                 |                  |
|          |                             |                  | ASTM A194 GRADE 7M ELECTROLESS NICKEL PLATING <sup>(2)</sup>                                                 |                  |
| B903     | Plug Pin                    |                  | ASTM B637 GRADE N07718 (UNS 07718) HRC 40 MAXIMUM<br>HARDNESS COMPLIANCE WITH NACE MR0103 SHALL BE CERTIFIED |                  |
| B921     | Body plain Washer           |                  | ASTM F436 ZINC PLATED                                                                                        |                  |
|          |                             |                  | 410 STAINLESS STEEL HRC 35-45                                                                                |                  |
| B921a    | Packing Plain Washer        |                  | ASTM F436 ZINC PLATED                                                                                        |                  |
|          |                             |                  | 410 STAINLESS STEEL HRC 35-45                                                                                |                  |

1. For General Service only: NACE Non-Exposed per ANSI/NACE MR0175/ISO 15156-1.
2. For Sour Service only: NACE Exposed per ANSI/NACE MR0175/ISO 15156-1.
3. Blue is the standard coating color.
4. No equivalents allowed to maintain fugitive emissions certification and performance.

# Materials of Construction

## High Pressure (>800 psi/Stage) API 6A CRA Inconel 718 Construction:

- Max operating pressure is up to 15 kPSI [1034 bar]
- Temperature class: K/L/N/P/S/T/U/V/X (see page 35)
- Material class: AA/BB/CC/DD/EE/FF/HH (see page 35)

| Ref. No. | Temperature Range                       | -76°F<br>[-60°C] | 20.2°F<br>[29°C]                                                                  | 356°F<br>[180°C] |
|----------|-----------------------------------------|------------------|-----------------------------------------------------------------------------------|------------------|
|          | Description                             | Materials        |                                                                                   |                  |
| B001     | Valve Body                              |                  | UNS N07718                                                                        |                  |
| B002     | Body Stud <sup>(4)</sup>                |                  | ASTM A193 GRADE B7 ZINC PLATED PTFE COATING API 6A <sup>(1 and 3)</sup>           |                  |
|          |                                         |                  | ASTM A193 GRADE B7M ELECTROLESS NICKEL PLATING PTFE COATING <sup>(2 and 3)</sup>  |                  |
|          |                                         |                  | ASTM A320 GRADE L7 ZINC PLATED PTFE COATING <sup>(1 and 3)</sup>                  |                  |
|          |                                         |                  | ASTM A320 GRADE L7M ELECTROLESS NICKEL PLATING PTFE COATING <sup>(2 and 3)</sup>  |                  |
| B003     | Bonnet                                  |                  | UNS N07718                                                                        |                  |
| B014     | Body Nut <sup>(4)</sup>                 |                  | ASTM A 194 GRADE 2H ZINC PLATED + PTFE COATING <sup>(1 and 3)</sup>               |                  |
|          |                                         |                  | ASTM A194 GRADE 2HM, ELECTROLESS NICKEL PLATING PTFE COATING <sup>(2 and 3)</sup> |                  |
|          |                                         |                  | ASTM A194 GRADE 7 ZINC PLATED + PTFE COATING <sup>(1 and 3)</sup>                 |                  |
|          |                                         |                  | ASTM A194 GRADE 7M ELECTROLESS NICKEL PLATING + PTFE COATING <sup>(2 and 3)</sup> |                  |
| B015     | Body Gasket                             |                  | ALLOY 718 + MOS2 COATING                                                          |                  |
| B102     | Seat Ring                               |                  | UNS N07718 + KOLSTERISATION                                                       |                  |
| B103     | Seat Ring Gasket                        |                  | INCONEL 718 + SILVER PLATING                                                      |                  |
| B105     | Retainer                                |                  | SUPER AUSTENITIC STAINLESS STEEL UNS S20910 (NITRONIC 50) 35 HRC MAXIMUM          |                  |
| B106     | Liner                                   |                  | UNS N07718 + KOLSTERISATION                                                       |                  |
| B108     | Liner Gasket                            |                  | FLUOROPOLYMER JACKET / COBALT NICKEL ALLOY SPRING                                 |                  |
| B112     | Plug (Balanced, Unbalanced)             |                  | UNS N07718 + OLSTERISATION                                                        |                  |
| B118     | Plug Balanced Seal                      |                  | PRESSURE ENERGIZED POLYMERIC                                                      |                  |
| B150     | Plug Stem <sup>(3)</sup>                |                  | UNS N07718                                                                        |                  |
| B207     | Packing Ring                            |                  | CARBON CORE PTFE <sup>(4)</sup>                                                   |                  |
| B208     | Anti Extrusion Ring                     |                  | CARBON-GRAPHITE BRAIDED <sup>(4)</sup>                                            |                  |
| B219     | Packing Flange/ Follower <sup>(3)</sup> |                  | UNS N07718                                                                        |                  |
| B220     | Packing Stud <sup>(4)</sup>             |                  | ASTM A193 GRADE B7 ZINC PLATED <sup>(1)</sup>                                     |                  |
|          |                                         |                  | ASTM A193 GRADE B7M ELECTROLESS NICKEL PLATING <sup>(2)</sup>                     |                  |
|          |                                         |                  | ASTM A320 GRADE L7 ZINC PLATED <sup>(1)</sup>                                     |                  |
|          |                                         |                  | ASTM A320 GRADE L7M ELECTROLESS NICKEL PLATING <sup>(2)</sup>                     |                  |
| B221     | Packing Nut <sup>(4)</sup>              |                  | ASTM A 194 GRADE 2H ZINC PLATED <sup>(1)</sup>                                    |                  |
|          |                                         |                  | ASTM A194 GRADE 2HM, ELECTROLESS NICKEL PLATING <sup>(2)</sup>                    |                  |
|          |                                         |                  | ASTM A194 GRADE 7 ZINC PLATED <sup>(1)</sup>                                      |                  |
|          |                                         |                  | ASTM A194 GRADE 7M ELECTROLESS NICKEL PLATING <sup>(2)</sup>                      |                  |
| B903     | Plug Pin                                |                  | ASTM B637 GRADE N07718 (UNS 07718) HRC 40 MAXIMUM                                 |                  |
| B921     | Body plain Washer <sup>(4)</sup>        |                  | ASTM F436 ZINC PLATED                                                             |                  |
|          |                                         |                  | 410 STAINLESS STEEL HRC 35-45                                                     |                  |
| B921a    | Packing Plain Washer <sup>(4)</sup>     |                  | ASTM F436 ZINC PLATED                                                             |                  |
|          |                                         |                  | 410 STAINLESS STEEL HRC 35-45                                                     |                  |

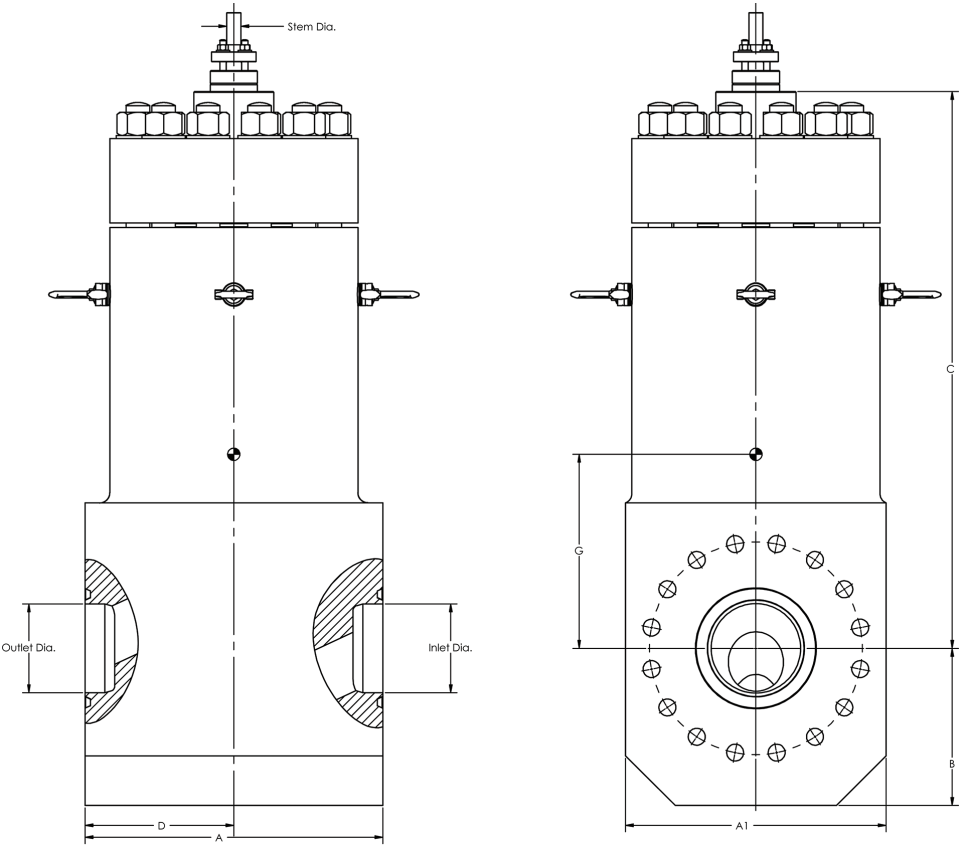
1. For General Service only: Nace Non-Exposed per ANSI/NACE MR0175/ISO 15156-1.
2. For Sour Service only: Nace Exposed per ANSI/NACE MR0175/ISO 15156-1.
3. Blue is the standard coating color.
4. No equivalents allowed to maintain fugitive emissions certification and performance.

# Materials of Construction

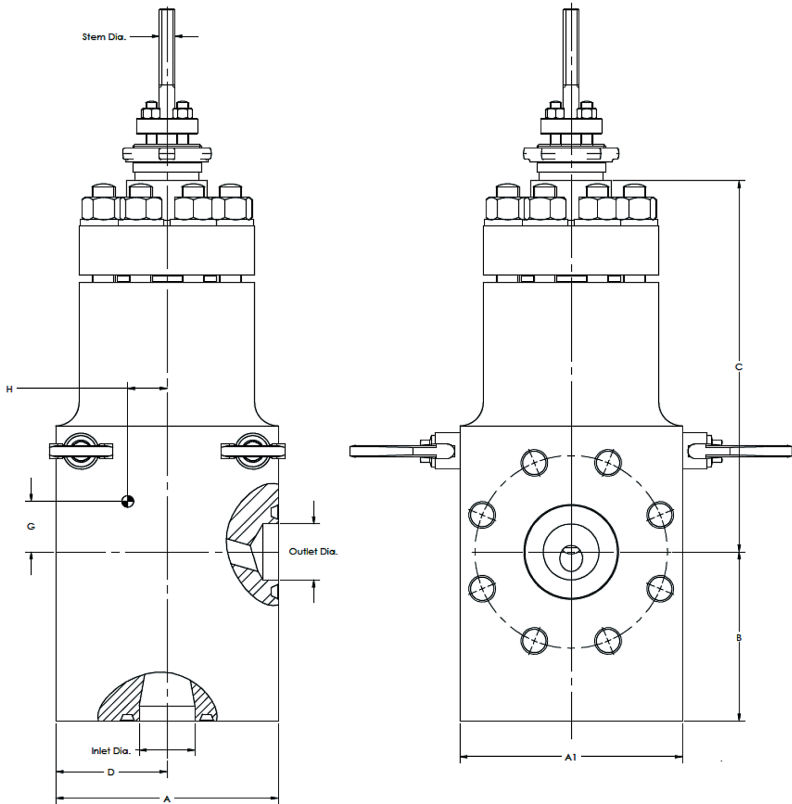
## Common Parts

| Ref.<br>No. | Description       | -76°F<br>[-60°C] | Materials                                                    | 356°F<br>[180°C] |
|-------------|-------------------|------------------|--------------------------------------------------------------|------------------|
| B017        | Drive Nut         |                  | SOLUTION ANNEALED 316 STAINLESS STEEL HRC 22 MAXIMUM         |                  |
| B703        | Serial Plate      |                  | GENERAL SERVICE ANNEALED 316L STAINLESS STEEL HRC 22 MAXIMUM |                  |
| B704        | Flow Arrow        |                  | AUSTENITIC STAINLESS STEEL                                   |                  |
| B902        | Drive Screw       |                  | AUSTENITIC STAINLESS STEEL                                   |                  |
| B911        | Lifting Lugs      |                  | STAINLESS STEEL                                              |                  |
| B913        | Yoke/Bonnet Screw |                  | A4-80 (ISO 3506) 316L                                        |                  |

# Dimensions



18400 Series API 6A Dimensions



78400 Series API 6A Dimensions

# Dimensions

## API 10K and 15K Body Sub Assembly dimensions (inch)

| Valve<br>body<br>Size<br>NPS | Valve<br>Ends Size<br>NPS (mm) | Body<br>Type   | Pressure<br>Class   | Number<br>of Stages | Stem<br>Dia.        | Inlet<br>Dia.  | Outlet<br>Dia. | Spud<br>Dia.  | A    | A1                   | B              | C                | D     |      |      |      |                |               |      |      |      |       |      |
|------------------------------|--------------------------------|----------------|---------------------|---------------------|---------------------|----------------|----------------|---------------|------|----------------------|----------------|------------------|-------|------|------|------|----------------|---------------|------|------|------|-------|------|
| 1                            | 1"-13/16<br>(1.8125)           | 78400<br>Angle | API 10K             | 8                   | 0.5                 | 1.83           | 1.83           | 2.25-16<br>UN | 7.28 | 6.73                 | 4.93           | 10.8             | 3.64  |      |      |      |                |               |      |      |      |       |      |
|                              |                                |                |                     | 10                  |                     |                |                |               |      |                      |                | 12.2             |       |      |      |      |                |               |      |      |      |       |      |
|                              |                                |                | API 15K             | 8                   |                     |                |                |               |      |                      |                | 10.8             |       |      |      |      |                |               |      |      |      |       |      |
|                              |                                |                |                     | 10                  |                     |                |                |               |      |                      |                | 12.2             |       |      |      |      |                |               |      |      |      |       |      |
|                              |                                | 18400<br>Globe | API 10K             | 8                   |                     |                |                |               |      | 10.8                 |                |                  |       |      |      |      |                |               |      |      |      |       |      |
|                              |                                |                |                     | 10                  |                     |                |                |               |      | 12.2                 |                |                  |       |      |      |      |                |               |      |      |      |       |      |
|                              |                                |                | API 15K             | 8                   |                     |                |                |               |      | 10.8                 |                |                  |       |      |      |      |                |               |      |      |      |       |      |
|                              |                                |                |                     | 10                  |                     |                |                |               |      | 12.2                 |                |                  |       |      |      |      |                |               |      |      |      |       |      |
|                              |                                |                |                     | 1.5                 |                     |                |                |               |      | 1"-13/16<br>(1.8125) | 78400<br>Angle | API 10K          |       | 8    | 0.5  | 1.82 | 1.82           | 2.25-16<br>UN | 7.36 | 7.36 | 5.3  | 12.38 | 3.68 |
|                              |                                |                |                     |                     |                     |                |                |               |      |                      |                |                  |       | 10   |      |      |                |               | 7.36 | 7.36 | 5.71 | 13.56 | 3.68 |
| API 15K                      | 8                              | 8.19           | 8.19                |                     | 5.9                 | 12.38          | 4.09           |               |      |                      |                |                  |       |      |      |      |                |               |      |      |      |       |      |
|                              | 10                             | 8.19           | 8.19                |                     | 6.01                | 13.56          | 4.09           |               |      |                      |                |                  |       |      |      |      |                |               |      |      |      |       |      |
| 18400<br>Globe               | API 10K                        | 8              | 7.36                |                     | 7.36                | 4.53           | 12.38          | 3.68          |      |                      |                |                  |       |      |      |      |                |               |      |      |      |       |      |
|                              |                                | 10             | 7.36                |                     | 7.36                | 4.53           | 13.56          | 3.68          |      |                      |                |                  |       |      |      |      |                |               |      |      |      |       |      |
|                              | API 15K                        | 8              | 8.19                |                     | 8.19                | 4.53           | 12.38          | 4.09          |      |                      |                |                  |       |      |      |      |                |               |      |      |      |       |      |
|                              |                                | 10             | 8.19                |                     | 8.19                | 4.33           | 13.56          | 4.09          |      |                      |                |                  |       |      |      |      |                |               |      |      |      |       |      |
|                              |                                | 2              | 2"-1/16<br>(2.0625) |                     | 78400<br>Angle      | API 10K        | 8              | 0.75          | 2.08 |                      | 2.08           | 3-5/16-<br>16 UN | 11.02 | 9.05 |      |      |                |               | 5.04 | 15.7 | 5.51 |       |      |
|                              |                                |                |                     |                     |                     |                | 10             |               |      |                      |                |                  |       | 9.05 |      |      |                |               | 5.3  | 17.8 |      |       |      |
| API 15K                      | 8                              |                |                     | 10                  |                     | 6.22           | 15.7           |               |      |                      |                |                  |       |      |      |      |                |               |      |      |      |       |      |
|                              | 10                             |                |                     | 10                  |                     | 5.98           | 17.77          |               |      |                      |                |                  |       |      |      |      |                |               |      |      |      |       |      |
| 18400<br>Globe               | API 10K                        |                |                     | 8                   | 9.05                | 4.41           | 19             |               |      |                      |                |                  |       |      |      |      |                |               |      |      |      |       |      |
|                              |                                |                |                     | 10                  | 9.05                | 4.25           | 21.11          |               |      |                      |                |                  |       |      |      |      |                |               |      |      |      |       |      |
|                              | API 15K                        |                |                     | 8                   | 10                  | 4.37           | 18.87          |               |      |                      |                |                  |       |      |      |      |                |               |      |      |      |       |      |
|                              |                                |                |                     | 10                  | 10                  | 4.41           | 21.11          |               |      |                      |                |                  |       |      |      |      |                |               |      |      |      |       |      |
|                              |                                |                |                     | 3                   | 3"-1/16<br>(3.0625) | 78400<br>Angle | API 10K        |               |      | 8                    |                |                  |       | 1    | 2.25 | 2.25 | 3"3/4-12<br>UN | 14.2          | 10.6 | 7.48 |      | 20.7  | 7.1  |
|                              |                                |                |                     |                     |                     |                |                |               |      | 10                   |                |                  |       |      |      |      |                | 14.2          | 10.6 | 7.48 |      | 24    | 7.1  |
| API 15K                      | 8                              | 14.2           | 11.8                |                     |                     |                | 7.48           | 20.7          | 7.1  |                      |                |                  |       |      |      |      |                |               |      |      |      |       |      |
|                              | 10                             | 14.2           | 11.8                |                     |                     |                | 7.48           | 24            | 7.1  |                      |                |                  |       |      |      |      |                |               |      |      |      |       |      |
| 18400<br>Globe               | API 10K                        | 8              | 14.2                |                     |                     | 10.6           | 5.51           | 25.5          | 7.1  |                      |                |                  |       |      |      |      |                |               |      |      |      |       |      |
|                              |                                | 10             | 14.2                |                     |                     | 10.6           | 5.51           | 28.7          | 7.1  |                      |                |                  |       |      |      |      |                |               |      |      |      |       |      |
|                              | API 15K                        | 8              | 14.2                |                     |                     | 11.8           | 5.51           | 25.5          | 7.1  |                      |                |                  |       |      |      |      |                |               |      |      |      |       |      |
|                              |                                | 10             | 14.2                |                     |                     | 11.8           | 5.51           | 28.7          | 7.1  |                      |                |                  |       |      |      |      |                |               |      |      |      |       |      |

## API 10K and 15K Body Sub Assembly dimensions (inch)

| Valve body Size NPS | Valve Ends Size NPS (mm) | Body Type   | Pressure Class | Number of Stages | Stem Dia. | Inlet Dia. | Outlet Dia. | Spud Dia.    | A     | A1    | B     | C     | D    |
|---------------------|--------------------------|-------------|----------------|------------------|-----------|------------|-------------|--------------|-------|-------|-------|-------|------|
| 1                   | 1"-13/16 (1.8125)        | 78400 Angle | API 10K        | 8                | 0.5       | 1.83       | 1.83        | 2.25-16 UN   | 7.28  | 6.73  | 4.93  | 10.8  | 3.64 |
|                     |                          |             |                | 10               |           |            |             |              |       |       |       | 12.2  |      |
|                     |                          |             | API 15K        | 8                |           |            |             |              |       |       |       | 10.8  |      |
|                     |                          |             |                | 10               |           |            |             |              |       |       |       | 12.2  |      |
|                     |                          | 18400 Globe | API 10K        | 8                |           |            |             |              |       | 6.73  | 3.91  | 10.8  |      |
|                     |                          |             |                | 10               |           |            |             |              |       |       |       | 12.2  |      |
|                     |                          |             | API 15K        | 8                |           |            |             |              |       | 7.28  | 4.65  | 10.8  |      |
|                     |                          |             |                | 10               |           |            |             |              |       |       |       | 12.2  |      |
|                     |                          |             |                | 8                |           |            |             |              |       |       |       | 10.8  |      |
|                     |                          |             |                | 10               |           |            |             |              |       |       |       | 12.2  |      |
| 1.5                 | 1"-13/16 (1.8125)        | 78400 Angle | API 10K        | 8                | 0.5       | 1.82       | 1.82        | 2.25-16 UN   | 7.36  | 7.36  | 5.3   | 12.38 | 3.68 |
|                     |                          |             |                | 10               |           |            |             |              | 7.36  | 7.36  | 5.71  | 13.56 | 3.68 |
|                     |                          |             | API 15K        | 8                |           |            |             |              | 8.19  | 8.19  | 5.9   | 12.38 | 4.09 |
|                     |                          |             |                | 10               |           |            |             |              | 8.19  | 8.19  | 6.01  | 13.56 | 4.09 |
|                     |                          | 18400 Globe | API 10K        | 8                |           |            |             |              | 7.36  | 7.36  | 4.53  | 12.38 | 3.68 |
|                     |                          |             |                | 10               |           |            |             |              | 7.36  | 7.36  | 4.53  | 13.56 | 3.68 |
|                     |                          |             | API 15K        | 8                |           |            |             |              | 8.19  | 8.19  | 4.53  | 12.38 | 4.09 |
|                     |                          |             |                | 10               |           |            |             |              | 8.19  | 8.19  | 4.33  | 13.56 | 4.09 |
|                     |                          |             |                | 8                |           |            |             |              | 8.19  | 8.19  | 4.33  | 13.56 | 4.09 |
|                     |                          |             |                | 10               |           |            |             |              | 8.19  | 8.19  | 4.33  | 13.56 | 4.09 |
| 2                   | 2"-1/16 (2.0625)         | 78400 Angle | API 10K        | 8                | 0.75      | 2.08       | 2.08        | 3-5/16-16 UN | 11.02 | 9.05  | 5.04  | 15.7  | 5.51 |
|                     |                          |             |                | 10               |           |            |             |              |       | 9.05  | 5.3   | 17.8  |      |
|                     |                          |             | API 15K        | 8                |           |            |             |              |       | 10    | 6.22  | 15.7  |      |
|                     |                          |             |                | 10               |           |            |             |              |       | 10    | 5.98  | 17.77 |      |
|                     |                          | 18400 Globe | API 10K        | 8                |           |            |             |              |       | 9.05  | 4.41  | 19    |      |
|                     |                          |             |                | 10               |           |            |             |              |       | 9.05  | 4.25  | 21.11 |      |
|                     |                          |             | API 15K        | 8                |           |            |             |              |       | 10    | 4.37  | 18.87 |      |
|                     |                          |             |                | 10               |           |            |             |              |       | 10    | 4.41  | 21.11 |      |
|                     |                          |             |                | 8                |           |            |             |              |       | 10    | 4.41  | 21.11 |      |
|                     |                          |             |                | 10               |           |            |             |              |       | 10    | 4.41  | 21.11 |      |
| 3                   | 3"-1/16 (3.0625)         | 78400 Angle | API 10K        | 8                | 1         | 2.25       | 2.25        | 3-3/4-12 UN  | 14.2  | 10.6  | 7.48  | 20.7  | 7.1  |
|                     |                          |             |                | 10               |           |            |             |              | 14.2  | 10.6  | 7.48  | 24    | 7.1  |
|                     |                          |             | API 15K        | 8                |           |            |             |              | 14.2  | 11.8  | 7.48  | 20.7  | 7.1  |
|                     |                          |             |                | 10               |           |            |             |              | 14.2  | 11.8  | 7.48  | 24    | 7.1  |
|                     |                          | 18400 Globe | API 10K        | 8                |           |            |             |              | 14.2  | 10.6  | 5.51  | 25.5  | 7.1  |
|                     |                          |             |                | 10               |           |            |             |              | 14.2  | 10.6  | 5.51  | 28.7  | 7.1  |
|                     |                          |             | API 15K        | 8                |           |            |             |              | 14.2  | 11.8  | 5.51  | 25.5  | 7.1  |
|                     |                          |             |                | 10               |           |            |             |              | 14.2  | 11.8  | 5.51  | 25.5  | 7.1  |
|                     |                          |             |                | 8                |           |            |             |              | 14.2  | 11.8  | 5.51  | 25.5  | 7.1  |
|                     |                          |             |                | 10               |           |            |             |              | 14.2  | 11.8  | 5.51  | 28.7  | 7.1  |
| 4                   | 4"-1/16 (4.0625)         | 78400 Angle | API 10K        | 8                | 1         | 4.05       | 4.05        | 3-3/4-12 UN  | 17.72 | 9.05  | 5.04  | 15.7  | 8.86 |
|                     |                          |             |                | 10               |           |            |             |              |       | 14.96 | 9.44  | 28.88 |      |
|                     |                          |             | API 15K        | 8                |           |            |             |              |       | 14.96 | 8.65  | 32.82 |      |
|                     |                          |             |                | 10               |           |            |             |              |       | 15.75 | 9.83  | 28.88 |      |
|                     |                          | 18400 Globe | API 10K        | 8                |           |            |             |              |       | 15.75 | 9.04  | 32.82 |      |
|                     |                          |             |                | 10               |           |            |             |              |       | 14.96 | 9.45  | 28.88 |      |
|                     |                          |             | API 15K        | 8                |           |            |             |              |       | 14.96 | 9.45  | 32.82 |      |
|                     |                          |             |                | 10               |           |            |             |              |       | 14.96 | 9.45  | 32.82 |      |
|                     |                          |             |                | 8                |           |            |             |              |       | 15.75 | 9.45  | 28.88 |      |
|                     |                          |             |                | 10               |           |            |             |              |       | 15.75 | 9.45  | 28.88 |      |
| 6                   | 7"-1/16 (7.0625)         | 78400 Angle | API 10K        | 8                | 1.125     | 7.09       | 7.09        | 3.75-12 UN   | 23.6  | 19.6  | 11.81 | 38.7  | 12   |
|                     |                          |             |                | 10               |           |            |             |              |       |       |       | 44.2  |      |
|                     |                          |             | API 15K        | 8                |           |            |             |              |       |       |       | 38.7  |      |
|                     |                          |             |                | 10               |           |            |             |              |       |       |       | 44.2  |      |
|                     |                          | 18400 Globe | API 10K        | 8                |           |            |             |              |       | 19.6  | 12.48 | 38.7  |      |
|                     |                          |             |                | 10               |           |            |             |              |       |       |       | 44.2  |      |
|                     |                          |             | API 15K        | 8                |           |            |             |              |       | 20.7  | 12.51 | 38.7  |      |
|                     |                          |             |                | 10               |           |            |             |              |       |       |       | 44.2  |      |
|                     |                          |             |                | 8                |           |            |             |              |       |       |       | 38.7  |      |
|                     |                          |             |                | 10               |           |            |             |              |       |       |       | 44.2  |      |

## API 10K and 15K Body Sub Assembly dimensions (millimeter)

| Valve<br>body<br>Size<br>NPS | Valve<br>Ends Size<br>NPS (mm) | Body<br>Type   | Pressure<br>Class   | Number<br>of Stages | Stem<br>Dia.        | Inlet<br>Dia.  | Outlet<br>Dia. | Spud<br>Dia.  | A     | A1                   | B              | C                | D    |      |       |       |                |               |       |        |     |       |      |
|------------------------------|--------------------------------|----------------|---------------------|---------------------|---------------------|----------------|----------------|---------------|-------|----------------------|----------------|------------------|------|------|-------|-------|----------------|---------------|-------|--------|-----|-------|------|
| 1                            | 1"-13/16<br>(1.8125)           | 78400<br>Angle | API 10K             | 8                   | 12.7                | 46.5           | 46.5           | 2.25-16<br>UN | 185   | 171                  | 125            | 274              | 92.5 |      |       |       |                |               |       |        |     |       |      |
|                              |                                |                |                     | 10                  |                     |                |                |               |       |                      |                | 309              |      |      |       |       |                |               |       |        |     |       |      |
|                              |                                |                | API 15K             | 8                   |                     |                |                |               |       |                      |                | 274              |      |      |       |       |                |               |       |        |     |       |      |
|                              |                                |                |                     | 10                  |                     |                |                |               |       |                      |                | 309              |      |      |       |       |                |               |       |        |     |       |      |
|                              |                                | 18400<br>Globe | API 10K             | 8                   |                     |                |                |               |       | 274                  |                |                  |      |      |       |       |                |               |       |        |     |       |      |
|                              |                                |                |                     | 10                  |                     |                |                |               |       | 309                  |                |                  |      |      |       |       |                |               |       |        |     |       |      |
|                              |                                |                | API 15K             | 8                   |                     |                |                |               |       | 274                  |                |                  |      |      |       |       |                |               |       |        |     |       |      |
|                              |                                |                |                     | 10                  |                     |                |                |               |       | 309                  |                |                  |      |      |       |       |                |               |       |        |     |       |      |
|                              |                                |                |                     | 1.5                 |                     |                |                |               |       | 1"-13/16<br>(1.8125) | 78400<br>Angle | API 10K          |      | 8    | 12.7  | 46.5  | 46.5           | 2.25-16<br>UN | 187   | 187    | 135 | 314.4 | 93.5 |
|                              |                                |                |                     |                     |                     |                |                |               |       |                      |                |                  |      | 10   |       |       |                |               | 187   | 187    | 145 | 344.4 | 93.5 |
| API 15K                      | 8                              | 208            | 208                 |                     | 150                 | 314.4          | 104            |               |       |                      |                |                  |      |      |       |       |                |               |       |        |     |       |      |
|                              | 10                             | 208            | 208                 |                     | 155                 | 344.4          | 104            |               |       |                      |                |                  |      |      |       |       |                |               |       |        |     |       |      |
| 18400<br>Globe               | API 10K                        | 8              | 187                 |                     | 187                 | 115            | 314.3          | 93.5          |       |                      |                |                  |      |      |       |       |                |               |       |        |     |       |      |
|                              |                                | 10             | 187                 |                     | 187                 | 115            | 344.4          | 93.5          |       |                      |                |                  |      |      |       |       |                |               |       |        |     |       |      |
|                              | API 15K                        | 8              | 208                 |                     | 208                 | 115            | 314.3          | 104           |       |                      |                |                  |      |      |       |       |                |               |       |        |     |       |      |
|                              |                                | 10             | 208                 |                     | 208                 | 110            | 344.4          | 104           |       |                      |                |                  |      |      |       |       |                |               |       |        |     |       |      |
|                              |                                | 2              | 2"-1/16<br>(2.0625) |                     | 78400<br>Angle      | API 10K        | 8              | 19.05         | 52.75 |                      | 52.75          | 3"5/16-<br>16 UN | 280  | 230  |       |       |                |               | 128   | 398.4  | 140 |       |      |
|                              |                                |                |                     |                     |                     |                | 10             |               |       |                      |                |                  |      | 230  |       |       |                |               | 134   | 452.4  |     |       |      |
| API 15K                      | 8                              |                |                     | 254                 |                     | 158            | 398.4          |               |       |                      |                |                  |      |      |       |       |                |               |       |        |     |       |      |
|                              | 10                             |                |                     | 254                 |                     | 152            | 451.4          |               |       |                      |                |                  |      |      |       |       |                |               |       |        |     |       |      |
| 18400<br>Globe               | API 10K                        |                |                     | 8                   | 230                 | 112            | 482.4          |               |       |                      |                |                  |      |      |       |       |                |               |       |        |     |       |      |
|                              |                                |                |                     | 10                  | 230                 | 108            | 536.4          |               |       |                      |                |                  |      |      |       |       |                |               |       |        |     |       |      |
|                              | API 15K                        |                |                     | 8                   | 254                 | 111            | 479.4          |               |       |                      |                |                  |      |      |       |       |                |               |       |        |     |       |      |
|                              |                                |                |                     | 10                  | 254                 | 112            | 536.4          |               |       |                      |                |                  |      |      |       |       |                |               |       |        |     |       |      |
|                              |                                |                |                     | 3                   | 3"-1/16<br>(3.0625) | 78400<br>Angle | API 10K        |               |       | 8                    |                |                  |      | 25.4 | 57.2  | 57.2  | 3"3/4-12<br>UN | 360           | 270   | 190    |     | 527   | 180  |
|                              |                                |                |                     |                     |                     |                |                |               |       | 10                   |                |                  |      |      |       |       |                | 360           | 270   | 190    |     | 609   | 180  |
|                              | API 15K                        |                |                     |                     |                     |                | 8              |               |       | 360                  |                |                  |      |      |       |       |                | 300           | 190   | 527    |     | 180   |      |
|                              |                                |                |                     |                     |                     |                | 10             |               |       | 360                  |                |                  |      |      |       |       |                | 300           | 190   | 609    |     | 609   |      |
| 18400<br>Globe               | API 10K                        |                |                     |                     |                     | 8              | 360            |               |       | 270                  |                |                  |      |      |       |       |                | 140           | 647   | 180    |     |       |      |
|                              |                                |                |                     |                     |                     | 10             | 360            |               |       | 270                  |                |                  |      |      |       |       |                | 140           | 729   | 180    |     |       |      |
|                              | API 15K                        |                |                     |                     |                     | 8              | 360            |               |       | 300                  |                |                  |      |      |       |       |                | 140           | 647   | 180    |     |       |      |
|                              |                                |                |                     |                     |                     | 10             | 360            |               |       | 300                  |                |                  |      |      |       |       |                | 140           | 729   | 180    |     |       |      |
|                              |                                | 4              | 4"-1/16<br>(4.0625) |                     |                     | 78400<br>Angle | API 10K        | 8             | 25.4  | 103.1                | 103.1          | 3"3/4-12<br>UN   | 450  |      |       |       |                | 380           | 239.7 | 733.53 | 225 |       |      |
|                              |                                |                |                     |                     |                     |                |                | 10            |       |                      |                |                  |      |      |       |       |                | 380           | 219.7 | 833.53 |     |       |      |
|                              |                                |                |                     |                     |                     |                | API 15K        | 8             |       |                      |                |                  |      |      |       |       |                | 400           | 249.7 | 733.53 |     |       |      |
|                              |                                |                |                     |                     |                     |                |                | 10            |       |                      |                |                  |      |      |       |       |                | 400           | 229.7 | 833.53 |     |       |      |
| 18400<br>Globe               | API 10K                        |                |                     |                     |                     | 8              | 380            | 240           |       |                      |                |                  |      |      |       |       |                | 733.53        |       |        |     |       |      |
|                              |                                |                |                     |                     |                     | 10             | 380            | 240           |       |                      |                |                  |      |      |       |       |                | 33.53         |       |        |     |       |      |
|                              | API 15K                        |                |                     |                     |                     | 8              | 400            | 240           |       |                      |                |                  |      |      |       |       |                | 733.53        |       |        |     |       |      |
|                              |                                |                |                     |                     |                     | 10             | 400            | 240           |       |                      |                |                  |      |      |       |       |                | 833.53        |       |        |     |       |      |
|                              |                                |                |                     | 6                   | 7"-1/16<br>(7.0625) | 78400<br>Angle | API 10K        | 8             |       |                      |                |                  |      | 28.6 | 180.1 | 180.1 | 3.75-12<br>UN  | 600           | 497   | 300    |     | 983   | 300  |
|                              |                                |                |                     |                     |                     |                |                | 10            |       |                      |                |                  |      |      |       |       |                |               |       |        |     | 1123  |      |
|                              | API 15K                        |                |                     |                     |                     |                | 8              | 983           |       |                      |                |                  |      |      |       |       |                |               |       |        |     |       |      |
|                              |                                |                |                     |                     |                     |                | 10             | 1123          |       |                      |                |                  |      |      |       |       |                |               |       |        |     |       |      |
| 18400<br>Globe               | API 10K                        |                |                     |                     |                     | 8              | 497            | 317           |       |                      |                |                  |      |      |       |       |                |               | 983   |        |     |       |      |
|                              |                                |                |                     |                     |                     | 10             | 1123           |               |       |                      |                |                  |      |      |       |       |                |               |       |        |     |       |      |
|                              | API 15K                        |                |                     |                     |                     | 8              | 525            | 318           |       |                      |                |                  |      |      |       |       |                |               | 983   |        |     |       |      |
|                              |                                |                |                     |                     |                     | 10             | 1123           |               |       |                      |                |                  |      |      |       |       |                |               |       |        |     |       |      |

# Weights and Center of Gravity

## Body Sub Assembly (lbs) / Center of Gravity (inches)

| Valve Body Size NPS | Valve Ends Size NPS (mm) | Body Type   | Number of Stages | API 10K            |      |         | API 15K            |      |         |
|---------------------|--------------------------|-------------|------------------|--------------------|------|---------|--------------------|------|---------|
|                     |                          |             |                  | 6BX Printed Flange |      |         | 6BX Printed Flange |      |         |
|                     |                          |             |                  | G                  | H    | Mass    | G                  | H    | Mass    |
| 1                   | 1"-13/16 (1.8125)        | 78400 Angle | 8                | 1.81               | 0.04 | 143     | 1.18               | 0.04 | 181     |
|                     |                          |             | 10               | 1.73               | 0.03 | 178     | 1.65               | 0.04 | 190     |
|                     |                          | 18400 Globe | 8                | 2.27               | -    | 141     | 1.79               | -    | 161     |
|                     |                          |             | 10               | 2.81               | -    | 150     | 2.32               | -    | 170     |
| 1.5                 | 1"-13/16 (1.8125)        | 78400 Angle | 8                | 2.11               | 0    | 200.1   | 1.73               | 0    | 256.2   |
|                     |                          |             | 10               | 2.40               | 0    | 216.5   | 2.10               | 0    | 271.4   |
|                     |                          | 18400 Globe | 8                | 2.85               | -    | 179.5   | 2.74               | -    | 220     |
|                     |                          |             | 10               | 3.33               | -    | 188.8   | 3.35               | -    | 228     |
| 2                   | 2"-1/16 (2.0625)         | 78400 Angle | 8                | 3.148              | 0    | 377.5   | 2.7                | 0    | 471.4   |
|                     |                          |             | 10               | 3.85               | 0    | 411.8   | 3.7                | 0    | 497.3   |
|                     |                          | 18400 Globe | 8                | 5.37               | -    | 423.3   | 5.72               | -    | 476.6   |
|                     |                          |             | 10               | 6.29               | -    | 446.6   | 168.3              | -    | 515.4   |
| 3                   | 3"-1/16 (3.0625)         | 78400 Angle | 8                | 3.82               | 0    | 812     | 3.78               | 0    | 899     |
|                     |                          |             | 10               | 5.35               | 0    | 936     | 5.28               | 0    | 1038    |
|                     |                          | 18400 Globe | 8                | 5.77               | -    | 860     | 5.48               | -    | 971     |
|                     |                          |             | 10               | 7.36               | -    | 983     | 7.07               | -    | 1109    |
| 4                   | 4"-1/16 (4.0625)         | 78400 Angle | 8                | 5.85               | 0.64 | 1884.9  | 8.67               | 0.7  | 2101    |
|                     |                          |             | 10               | 8.08               | 0.55 | 2085.35 | 8.47               | 0.73 | 2318.6  |
|                     |                          | 18400 Globe | 8                | 6.84               | -    | 1746.05 | 7.55               | -    | 1913.38 |
|                     |                          |             | 10               | 8.5                | -    | 2020.53 | 9.06               | -    | 2225.12 |
| 6                   | 7"-1/16 (7.0625)         | 78400 Angle | 8                | 7.91               | 0.14 | 4111    | 9.16               | 0.13 | 4661    |
|                     |                          |             | 10               | 10.06              | 0.13 | 4440    | 11.57              | 0.12 | 5107    |
|                     |                          | 18400 Globe | 8                | 5.28               | -    | 3666    | 9.13               | -    | 4636    |
|                     |                          |             | 10               | 7.6                | -    | 4032    | 11.69              | -    | 5079    |

Note: Values in this table are estimates. Consult factory for detailed data.

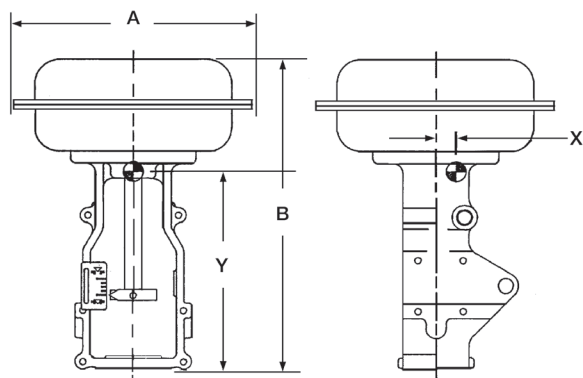
## Body Sub Assembly (kg) / Center of Gravity (mm)

| Valve Body Size NPS | Valve Ends Size NPS (mm) | Body Type   | Number of Stages | API 10K            |      |       | API 15K            |      |        |
|---------------------|--------------------------|-------------|------------------|--------------------|------|-------|--------------------|------|--------|
|                     |                          |             |                  | 6BX Printed Flange |      |       | 6BX Printed Flange |      |        |
|                     |                          |             |                  | G                  | H    | Mass  | G                  | H    | Mass   |
| 1                   | 1"-13/16<br>(1.8125)     | 78400 Angle | 8                | 46                 | 1.0  | 65    | 30                 | 1.1  | 82     |
|                     |                          |             | 10               | 44                 | 0.9  | 81    | 42                 | 1.1  | 86     |
|                     |                          | 18400 Globe | 8                | 58                 | -    | 64    | 46                 | -    | 73     |
|                     |                          |             | 10               | 161                | -    | 68    | 59                 | -    | 77     |
| 1.5                 | 1"-13/16<br>(1.8125)     | 78400 Angle | 8                | 53.7               | 0    | 90.8  | 43.9               | 0    | 116.2  |
|                     |                          |             | 10               | 60.7               | 0    | 98.2  | 53.27              | 0    | 123.1  |
|                     |                          | 18400 Globe | 8                | 72.5               | -    | 81.4  | 69.6               | -    | 99.8   |
|                     |                          |             | 10               | 84.62              | -    | 85.7  | 85.2               | -    | 103.4  |
| 2                   | 2"-1/16<br>(2.0625)      | 78400 Angle | 8                | 80                 | 0    | 171.2 | 69.7               | 0    | 213.8  |
|                     |                          |             | 10               | 97.84              | 0    | 186.8 | 94.8               | 0    | 225.6  |
|                     |                          | 18400 Globe | 8                | 136.5              | -    | 192   | 145.4              | -    | 216.2  |
|                     |                          |             | 10               | 159.8              | -    | 202.6 | 168.3              | -    | 233.8  |
| 3                   | 3"-1/16<br>(3.0625)      | 78400 Angle | 8                | 97                 | 0    | 368   | 3.78               | 0    | 408    |
|                     |                          |             | 10               | 135.6              | 0    | 424   | 134.2              | 0    | 471    |
|                     |                          | 18400 Globe | 8                | 146.5              | -    | 390   | 139.2              | -    | 440    |
|                     |                          |             | 10               | 187                | -    | 446   | 179.6              | -    | 503    |
| 4                   | 4"-1/16<br>(4.0625)      | 78400 Angle | 8                | 148.41             | 1.62 | 855   | 220                | 1.77 | 953    |
|                     |                          |             | 10               | 205.34             | 1.40 | 945.9 | 215.1              | 1.85 | 1051.7 |
|                     |                          | 18400 Globe | 8                | 173.65             | -    | 792.1 | 191.77             | -    | 867.9  |
|                     |                          |             | 10               | 215.67             | -    | 916.5 | 230.21             | -    | 1009.3 |
| 6                   | 7"-1/16<br>(7.0625)      | 78400 Angle | 8                | 201                | 3.5  | 1865  | 233                | 3.3  | 2114   |
|                     |                          |             | 10               | 256                | 3.3  | 2014  | 294                | 3    | 2316   |
|                     |                          | 18400 Globe | 8                | 134                | -    | 1663  | 232                | -    | 2103   |
|                     |                          |             | 10               | 193                | -    | 1829  | 297                | -    | 2304   |

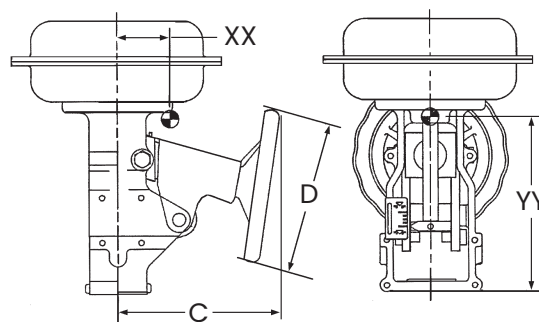
Note: Values in this table are estimates. Consult factory for detailed data.

# Model 87/88 Actuator

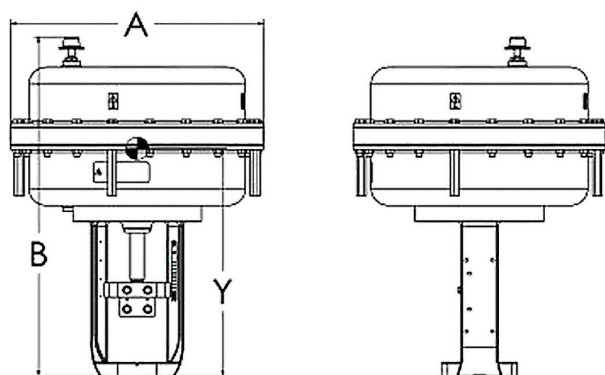
## Dimensions and Weights (inches/lbs)



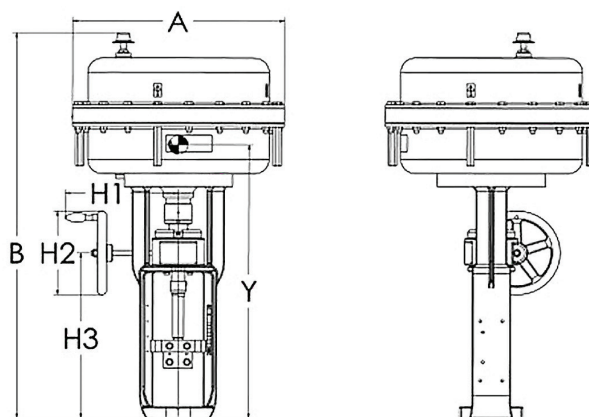
Shown without optional Handwheel



Shown with optional Handwheel



23L Shown without optional Handwheel



23L Shown with optional Handwheel

## Dimensions and Weights

| Actuator Size | Spring Range | Actuator Dimensions (inches) |               |      |    | H1   | H2  | Weights (lbs.) |             |
|---------------|--------------|------------------------------|---------------|------|----|------|-----|----------------|-------------|
|               |              | A                            | B (Model 88)  | C    | D  |      |     | Standard       | w/Handwheel |
| 6             | All          | 11.5                         | 15.54 (17.52) | 10   | 9  | -    | -   | 45             | 60          |
| 10            | All          | 14.5                         | 19.58 (21.54) | 10.9 | 12 | -    | -   | 85             | 105         |
| 16            | All          | 18.75                        | 28.22 (30.79) | 14   | 18 | -    | -   | 210            | 245         |
| 23            | All          | 21.63                        | 30.71 (33.27) | 16   | 18 | -    | -   | 265            | 320         |
| 23L           | 3-15, 6-30   | 21.63                        | 27.8 (30.00)  | -    | -  | 11.5 | 8.9 | 375            | 417         |
| 23L           | 11-23, 21-45 | 21.63                        | 38.55 (40.75) | -    | -  | 11.5 | 8.9 | 507            | 549         |

Actuator Removal Clearance = 6 inches

## Center of Gravity (inches)

### Without Handwheel

| Size             | X   | Y    |
|------------------|-----|------|
| 6                | 0.2 | 9.8  |
| 10               | 0.0 | 12.9 |
| 16               | 0.1 | 18.5 |
| 23               | 0.1 | 21.1 |
| 23L <sup>1</sup> | 0.0 | 20.1 |
| 23L <sup>2</sup> | 0.0 | 21.9 |

- Nominal spring ranges 3-15 and 6-30
- Nominal spring ranges 11-23 and 21-45

### With Handwheel

| Size             | XX  | YY   |
|------------------|-----|------|
| 6                | 1.3 | 9.1  |
| 10               | 0.9 | 12.0 |
| 16               | 1.4 | 16.7 |
| 23               | 1.4 | 19.0 |
| 23L <sup>1</sup> | 0.0 | 28.9 |
| 23L <sup>2</sup> | 0.0 | 30.7 |

# Model 87/88 Actuator

## Dimensions and Weights (inches/lbs)

### Limit Stops (inches)

#### Up Stop

| Size             | Spring Range | Model | Overall Height B |
|------------------|--------------|-------|------------------|
| 6                | All          | 87    | 19.5             |
| 10               | All          |       | 25.4             |
| 16               | All          |       | 36.4             |
| 23               | All          |       | 38.8             |
| 23L <sup>1</sup> | 3-15, 6-30   |       | 38.4             |
| 23L <sup>1</sup> | 11-23, 21-45 |       | 41.3             |
| 23L <sup>2</sup> | 3-15, 6-30   |       | 49.1             |
| 23L <sup>2</sup> | 11-23, 21-45 |       | 52.1             |
| 6                | All          | 88    | 19.2             |
| 10               | All          |       | 25.1             |
| 16               | All          |       | 35.5             |
| 23               | All          |       | 35.5             |
| 23L <sup>1</sup> | 3-15, 6-30   |       | 38.4             |
| 23L <sup>1</sup> | 11-23, 21-45 |       | 41.3             |
| 23L <sup>2</sup> | 3-15, 6-30   |       | 49.1             |
| 23L <sup>2</sup> | 11-23, 21-45 |       | 52.1             |

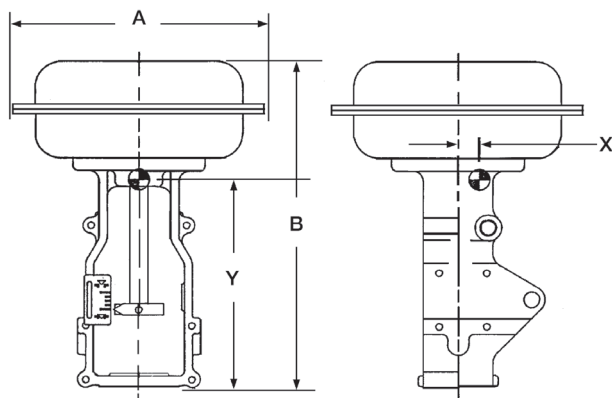
#### Down Stop

| Size             | Spring Range | Model | Overall Height B |
|------------------|--------------|-------|------------------|
| 6                | All          | 87    | 19.8             |
| 10               | All          |       | 26.0             |
| 16               | All          |       | 37.2             |
| 23               | All          |       | 39.9             |
| 23L <sup>1</sup> | 3-15, 6-30   |       | 39.9             |
| 23L <sup>1</sup> | 11-23, 21-45 |       | 42.8             |
| 23L <sup>2</sup> | 3-15, 6-30   |       | 50.6             |
| 23L <sup>2</sup> | 11-23, 21-45 |       | 53.6             |
| 6                | All          | 88    | 19.7             |
| 10               | All          |       | 25.9             |
| 16               | All          |       | 37.5             |
| 23               | All          |       | 40.3             |
| 23L <sup>1</sup> | 3-15, 6-30   |       | 39.9             |
| 23L <sup>1</sup> | 11-23, 21-45 |       | 42.8             |
| 23L <sup>2</sup> | 3-15, 6-30   |       | 50.6             |
| 23L <sup>2</sup> | 11-23, 21-45 |       | 53.6             |

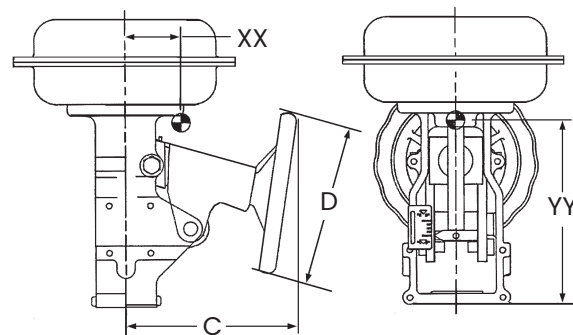
1. Without Handwheel  
2. With Handwheel

# Model 87/88 Actuator

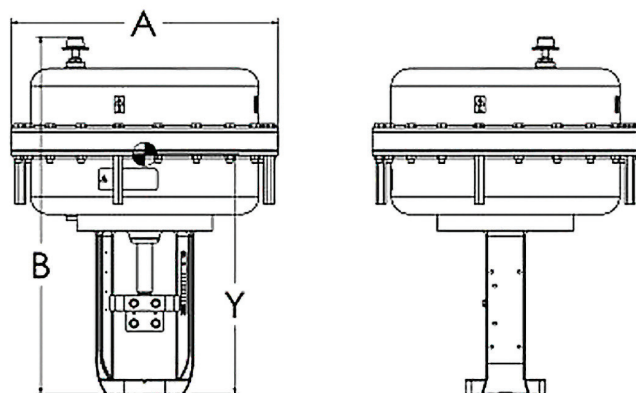
## Dimensions and Weights (mm/kg)



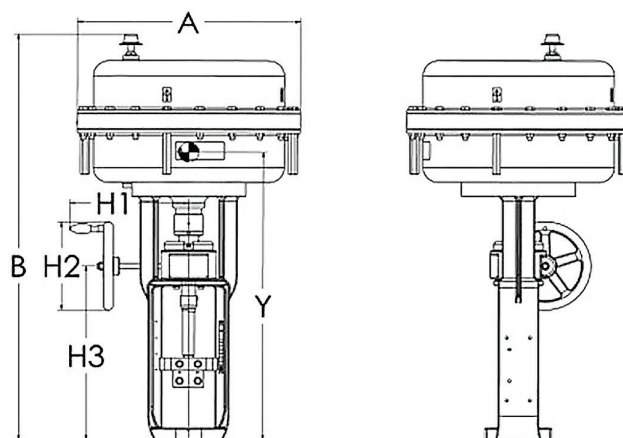
Shown without optional Handwheel



Shown with optional Handwheel



23L Shown without optional Handwheel



23L Shown with optional Handwheel

## Dimensions and Weights

| Actuator Size | Spring Range | Actuator Dimensions (mm) |              |     |     | H1  | H2  | Weights (kg) |             |
|---------------|--------------|--------------------------|--------------|-----|-----|-----|-----|--------------|-------------|
|               |              | A                        | B (Model 88) | C   | D   |     |     | Standard     | w/Handwheel |
| 6             | All          | 302                      | 395 (445)    | 254 | 229 | -   | -   | 20           | 27          |
| 10            | All          | 373                      | 497 (547)    | 277 | 305 | -   | -   | 39           | 48          |
| 16            | All          | 476                      | 717 (782)    | 356 | 457 | -   | -   | 95           | 111         |
| 23            | All          | 549                      | 780 (845)    | 406 | 457 | -   | -   | 120          | 145         |
| 23L           | 3-15, 6-30   | 549                      | 706 (762)    | -   | -   | 292 | 225 | 170          | 189         |
| 23L           | 11-23, 21-45 | 549                      | 781 (837)    | -   | -   | 292 | 225 | 230          | 249         |

Actuator Removal Clearance = 150 mm

## Center of Gravity (mm)

### Without Handwheel

| Size             | X | Y   |
|------------------|---|-----|
| 6                | 5 | 248 |
| 10               | 0 | 327 |
| 16               | 3 | 470 |
| 23               | 2 | 537 |
| 23L <sup>1</sup> | 0 | 511 |
| 23L <sup>2</sup> | 0 | 557 |

1. Nominal spring ranges 3-15 and 6-30
2. Nominal spring ranges 11-23 and 21-45

### With Handwheel

| Size             | XX | YY  |
|------------------|----|-----|
| 6                | 32 | 232 |
| 10               | 22 | 305 |
| 16               | 35 | 425 |
| 23               | 35 | 483 |
| 23L <sup>1</sup> | 0  | 734 |
| 23L <sup>2</sup> | 0  | 780 |

# Model 87/88 Actuator

## Dimensions and Weights (mm/kg)

### Limit Stops (mm)

#### Up Stop

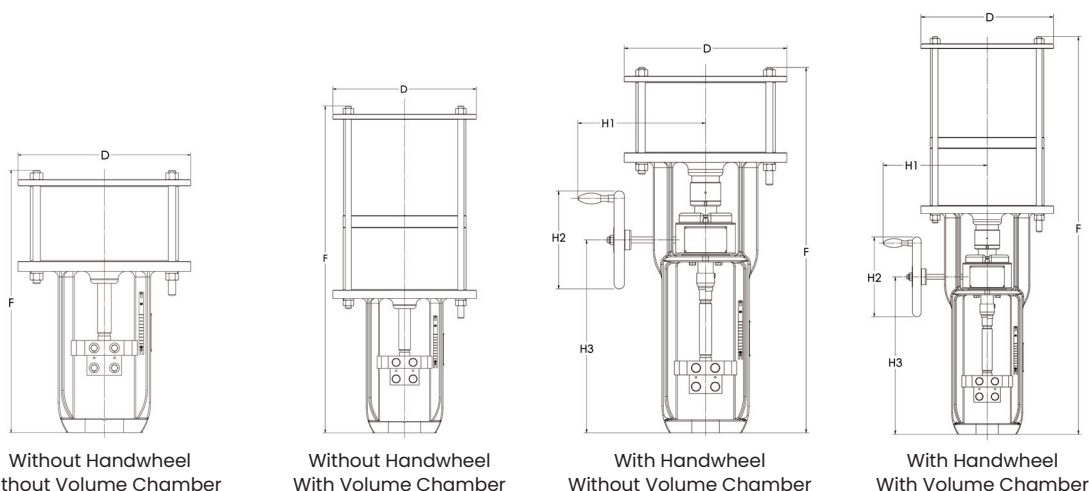
| Size             | Spring Range | Model | Overall Height B |
|------------------|--------------|-------|------------------|
| 6                | All          | 87    | 494              |
| 10               | All          |       | 646              |
| 16               | All          |       | 925              |
| 23               | All          |       | 987              |
| 23L <sup>1</sup> | 3-15, 6-30   |       | 975              |
| 23L <sup>1</sup> | 11-23, 21-45 |       | 1050             |
| 23L <sup>2</sup> | 3-15, 6-30   |       | 1248             |
| 23L <sup>2</sup> | 11-23, 21-45 |       | 1323             |
| 6                | All          | 88    | 487              |
| 10               | All          |       | 636              |
| 16               | All          |       | 901              |
| 23               | All          |       | 982              |
| 23L <sup>1</sup> | 3-15, 6-30   |       | 975              |
| 23L <sup>1</sup> | 11-23, 21-45 |       | 1050             |
| 23L <sup>2</sup> | 3-15, 6-30   |       | 1248             |
| 23L <sup>2</sup> | 11-23, 21-45 |       | 1323             |

1. Without Handwheel  
2. With Handwheel

#### Down Stop

| Size             | Spring Range | Model | Overall Height B |
|------------------|--------------|-------|------------------|
| 6                | All          | 87    | 503              |
| 10               | All          |       | 660              |
| 16               | All          |       | 945              |
| 23               | All          |       | 1014             |
| 23L <sup>1</sup> | 3-15, 6-30   |       | 1013             |
| 23L <sup>1</sup> | 11-23, 21-45 |       | 1088             |
| 23L <sup>2</sup> | 3-15, 6-30   |       | 1286             |
| 23L <sup>2</sup> | 11-23, 21-45 |       | 1361             |
| 6                | All          | 88    | 501              |
| 10               | All          |       | 657              |
| 16               | All          |       | 952              |
| 23               | All          |       | 1024             |
| 23L <sup>1</sup> | 3-15, 6-30   |       | 1013             |
| 23L <sup>1</sup> | 11-23, 21-45 |       | 1088             |
| 23L <sup>2</sup> | 3-15, 6-30   |       | 1286             |
| 23L <sup>2</sup> | 11-23, 21-45 |       | 1361             |

# Model 51/52/53 Dimensions and Weights



## Model 51 Dimensional Data

Inches (mm)

| Size | D          | H1         | H2        | H3         |
|------|------------|------------|-----------|------------|
| 12   | 14.7 (373) | 11.5 (292) | 8.9 (225) | 17.4 (443) |
| 16   | 18.1 (461) | 13.4 (340) | 11 (280)  | 21.7 (553) |
| 20   | 22.6 (573) | 13.4 (340) | 11 (280)  | 22.1 (563) |
| 24   | 18.1 (461) | 13.4 (340) | 11 (280)  | 22.1 (563) |
| 28   | 22.6 (573) | 13.4 (340) | 11 (280)  | 22.1 (563) |
| 32   | 26.4 (670) | 13.4 (340) | 11 (280)  | 22.2 (564) |

| Actuator Type                                    | Actuator Size | Dimension F inches (mm)             |             |             |             |             |             |
|--------------------------------------------------|---------------|-------------------------------------|-------------|-------------|-------------|-------------|-------------|
|                                                  |               | Nominal Actuator Travel inches (mm) |             |             |             |             |             |
|                                                  |               | 2.5 (63.5)                          | 4 (101.6)   | 6 (152.4)   | 8 (203.2)   | 10 (254)    | 12 (304.8)  |
| Standard                                         | 12            | -                                   | 23.0 (584)  | -           | -           | -           | -           |
|                                                  | 16            | 24.7 (628)                          | 26.2 (666)  | 28.2 (717)  | 36.2 (920)  | 38.2 (971)  | 42.2 (1073) |
|                                                  | 20            | 25.4 (645)                          | 26.9 (683)  | 28.9 (734)  | 36.7 (931)  | 38.7 (982)  | 45.0 (1142) |
|                                                  | 24            | 33.1 (842)                          | 36.1 (918)  | 40.1 (1020) | 48.1 (123)  | 52.1 (1324) | 60.2 (1528) |
|                                                  | 28            | 34.3 (870)                          | 37.3 (946)  | 52.2 (1326) | 49.3 (1251) | 53.3 (1353) | 61.3 (1556) |
|                                                  | 32            | 42.7 (1085)                         | 45.7 (1161) | 49.7 (1262) | 57.8 (1467) | 61.8 (1569) | 69.8 (1773) |
| Standard with Integral Volume Tank               | 12            | -                                   | 34.0 (864)  | -           | -           | -           | -           |
|                                                  | 16            | 35.8 (908)                          | 37.3 (946)  | 39.3 (997)  | -           | -           | -           |
|                                                  | 20            | 36.0 (915)                          | 37.5 (953)  | 39.5 (1004) | -           | -           | -           |
| Standard with Handwheel                          | 12            | -                                   | 33.7 (857)  | -           | -           | -           | -           |
|                                                  | 16            | 40.6 (1031)                         | 42.1 (1069) | 44.1 (1119) | 59.3 (1506) | 61.3 (1557) | 69.3 (1760) |
|                                                  | 20            | 41.2 (1048)                         | 42.7 (1086) | 44.7 (1136) | 59.6 (1513) | 61.6 (1564) | 69.6 (1767) |
|                                                  | 24            | 48.2 (1224)                         | 51.2 (1301) | 55.2 (1402) | 71.2 (1808) | 75.2 (1910) | 85.2 (2164) |
|                                                  | 28            | 49.2 (1249)                         | 52.2 (1326) | 53.2 (1427) | 72.1 (1831) | 76.1 (1933) | 86.1 (2187) |
|                                                  | 32            | 56.6 (1440)                         | 59.7 (1516) | 63.7 (1617) | 79.7 (2025) | 83.7 (2126) | 93.7 (2381) |
| Standard with Integral Volume Tank and Handwheel | 12            | -                                   | 44.8 (1137) | -           | -           | -           | -           |
|                                                  | 16            | 51.6 (1311)                         | 53.1 (1349) | 55.1 (1399) | -           | -           | -           |
|                                                  | 20            | 51.9 (1318)                         | 53.4 (1356) | 55.4 (1406) | -           | -           | -           |

# Model 51/52/53 Dimensions and Weights

## Model 52 and 53 Dimensional Data

Inches (mm)

| Size | D           | H1          | H2          | H3          |
|------|-------------|-------------|-------------|-------------|
| 12   | 14.69 (373) | 11.50 (292) | 8.86 (225)  | 17.44 (443) |
| 16   | 18.15 (461) | 13.39 (340) | 11.02 (280) | 21.77 (553) |
| 20   | 22.56 (573) | 13.39 (340) | 11.02 (280) | 22.17 (563) |

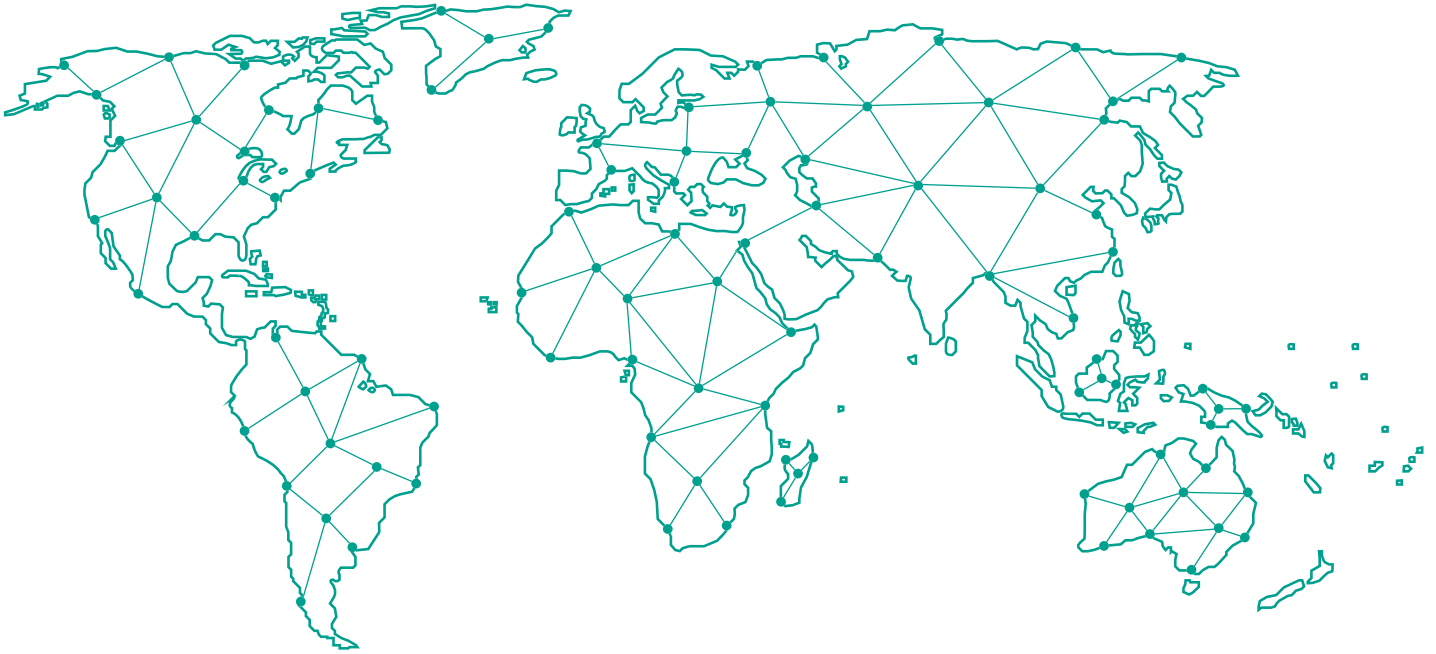
| Actuator Type           | Actuator Size | Dimension F in (mm)              |              |              |
|-------------------------|---------------|----------------------------------|--------------|--------------|
|                         |               | Nominal Actuator Travel In. (mm) |              |              |
|                         |               | 2.5 (63.5)                       | 4 (101.6)    | 6 (152.4)    |
| Standard                | 12            | -                                | 39.1 (993.8) | -            |
|                         | 16            | 39.5 (1003)                      | 44 (1117)    | 50 (1269)    |
|                         | 20            | 41.1 (1045)                      | 45.6 (1159)  | 51.6 (1311)  |
| Standard with Handwheel | 12            | -                                | 49.9 (1267)  | -            |
|                         | 16            | 55.3 (1406)                      | 59.8 (1520)  | 65.8 (1671)  |
|                         | 20            | 64.6 (1642)                      | 69.1 (1756)  | 75.11 (1908) |





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