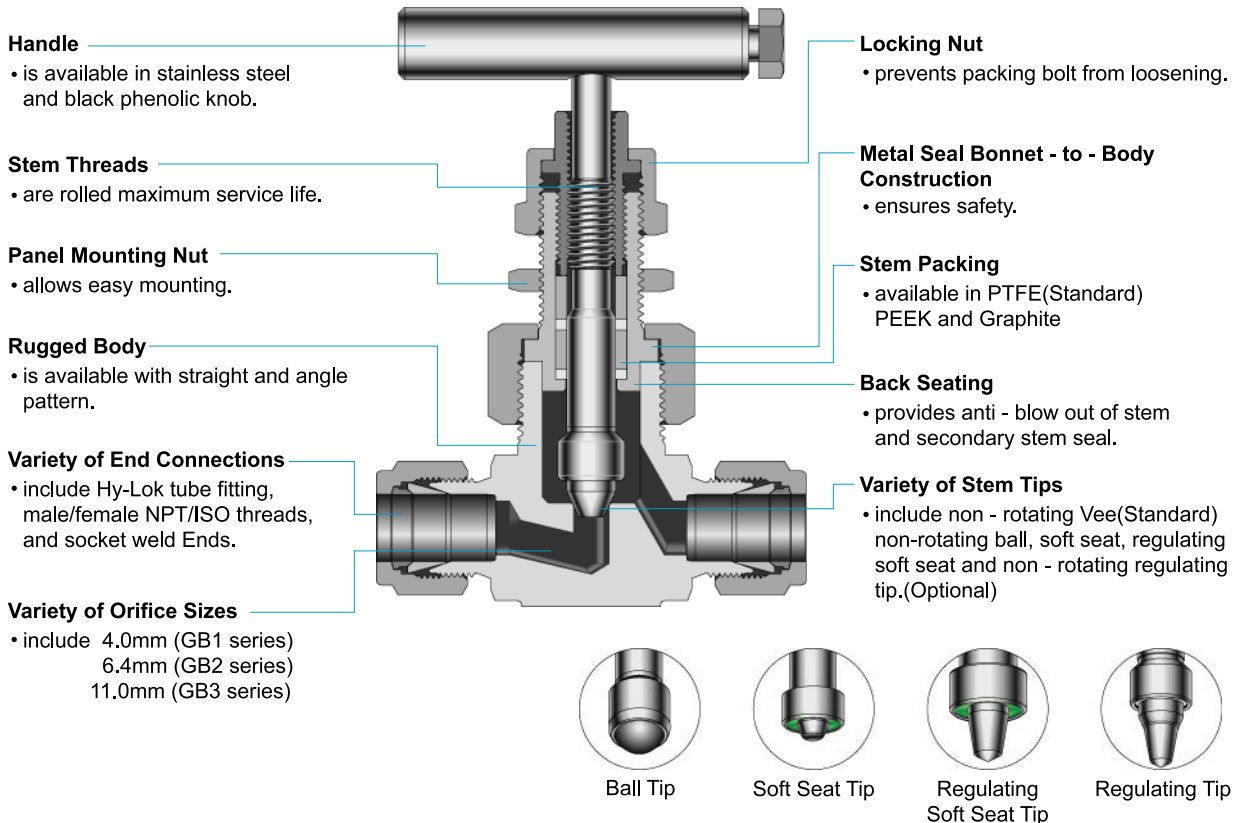


Catalog No. H-102NV  
Jun. 2019

# Union Bonnet Needle Valves

## GB Series



## Features

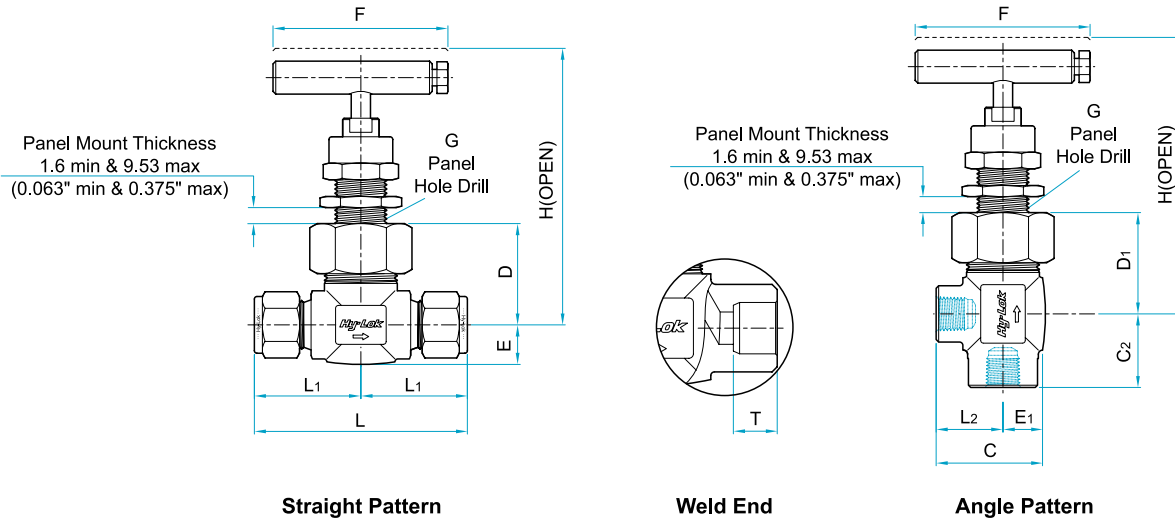
- **Pressure rating** up to 6,000 psig (413bar) @ 100°F (38°C)
- **Temperature rating** from -65°F to 450°F (-54°C to 232°C) with standard PTFE packing and up to 1,200°F (648°C) with optional Graphite packing
- **Body materials** available in 316 stainless steel, carbon steel, and alloy 400
- **100% factory tested.**

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# Union Bonnet Valves



## Table of Dimensions

| Basic Part No. | Orifice Hole   | Cv             | End Connection                  |                | Dimensions      |                |                |                |                |                |                |                |                |                 |                 |                 |                |                |                |                |                |                |                |                 |                 |                 |                |                |                |                |                |                |                |   |                |                |                |                |                |                 |             |                |
|----------------|----------------|----------------|---------------------------------|----------------|-----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|-----------------|-----------------|-----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|-----------------|-----------------|-----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|---|----------------|----------------|----------------|----------------|----------------|-----------------|-------------|----------------|
|                |                |                | Inlet                           | Outlet         | L               | L1             | L2             | C              | C2             | D              | D1             | E              | E1             | F               | G               | H Straight      | H Angle        | T              |                |                |                |                |                |                 |                 |                 |                |                |                |                |                |                |                |   |                |                |                |                |                |                 |             |                |
| GB1            | 4.0<br>(0.16)  | 0.35           | 1/8" Female NPT                 |                | 50.8<br>(2.00)  | 25.4<br>(1.00) | 23.0<br>(0.91) | 32.6<br>(1.28) | 25.4<br>(1.00) | 27.8<br>(1.09) | 32.6<br>(1.28) | 11.5<br>(0.45) | 11.5<br>(0.45) | 45<br>(1.77)    | 15.1<br>(0.59)  | 77.8<br>(3.06)  | 82.6<br>(3.25) | -              |                |                |                |                |                |                 |                 |                 |                |                |                |                |                |                |                |   |                |                |                |                |                |                 |             |                |
|                |                |                | 1/4" Female NPT                 |                | 52.4<br>(2.06)  | 26.2<br>(1.03) | 25.4<br>(1.00) | 35.0<br>(1.38) |                |                |                |                |                |                 |                 |                 | 82.6<br>(3.25) |                |                |                |                |                |                |                 |                 |                 |                |                |                |                |                |                |                |   |                |                |                |                |                |                 |             |                |
|                |                |                | 1/4" Male NPT                   |                | 50.8<br>(2.00)  | 25.4<br>(1.00) | 25.4<br>(1.00) | 35.0<br>(1.38) | 25.4<br>(1.00) |                |                |                |                |                 |                 |                 | 27.8<br>(1.09) |                | 32.6<br>(1.28) | 11.5<br>(0.45) | 11.5<br>(0.45) | 45<br>(1.77)   | 15.1<br>(0.59) | 77.8<br>(3.06)  | 82.6<br>(3.25)  | -               |                |                |                |                |                |                |                |   |                |                |                |                |                |                 |             |                |
|                |                |                | 1/4" Male NPT   1/4" Female NPT |                | 52.4<br>(2.06)  | 26.2<br>(1.03) | 23.0<br>(0.91) | 32.6<br>(1.28) |                |                |                |                |                |                 |                 |                 |                |                |                |                |                |                |                |                 | 82.6<br>(3.25)  |                 |                |                |                |                |                |                |                |   |                |                |                |                |                |                 |             |                |
|                |                |                | 6mm Hy-Lok                      |                | 61.9<br>(2.44)  | 31.0<br>(1.22) | 29.4<br>(1.16) | 38.9<br>(1.53) | 33.7<br>(1.33) |                |                |                |                |                 |                 |                 |                |                |                |                |                |                |                |                 | 27.8<br>(1.09)  |                 | 32.6<br>(1.28) | 11.5<br>(0.45) | 11.5<br>(0.45) | 45<br>(1.77)   | 15.1<br>(0.59) | 77.8<br>(3.06) | 77.8<br>(3.06) | - |                |                |                |                |                |                 |             |                |
|                |                |                | 1/4" Hy-Lok                     |                | 61.9<br>(2.44)  | 31.0<br>(1.22) | 29.4<br>(1.16) | 38.9<br>(1.53) | 33.7<br>(1.33) |                |                |                |                |                 |                 |                 |                |                |                |                |                |                |                |                 |                 |                 |                |                |                |                |                |                | 77.8<br>(3.06) |   |                |                |                |                |                |                 |             |                |
|                |                |                | 1/4" Tube Weld                  |                | 46.0<br>(1.81)  | 23.0<br>(0.91) | 22.3<br>(0.88) | 31.8<br>(1.25) | 26.2<br>(1.03) |                |                |                |                |                 |                 |                 |                |                |                |                |                |                |                |                 |                 |                 |                |                |                |                |                |                | 27.8<br>(1.09) |   | 32.6<br>(1.28) | 11.5<br>(0.45) | 11.5<br>(0.45) | 45<br>(1.77)   | 15.1<br>(0.59) | 77.8<br>(3.06)  | 72<br>(2.8) | -              |
|                |                |                | 8mm Hy-Lok                      |                | 61.9<br>(2.44)  | 31.0<br>(1.22) | 29.4<br>(1.16) | 38.9<br>(1.53) | 33.7<br>(1.33) |                |                |                |                |                 |                 |                 |                |                |                |                |                |                |                |                 |                 |                 |                |                |                |                |                |                |                |   |                |                |                |                |                |                 | 72<br>(2.8) |                |
| GB2            | 6.4<br>(0.25)  | 0.86           | 1/4" Female NPT                 |                | 57.2<br>(2.25)  | 28.6<br>(1.13) | 25.4<br>(1.00) | 39.6<br>(1.56) | 28.6<br>(1.13) | 34.0<br>(1.34) | 34.0<br>(1.34) | 14.2<br>(0.56) | 14.2<br>(0.56) | 64<br>(2.52)    | 19.9<br>(0.78)  | 93.7<br>(3.69)  |                | 96.9<br>(3.81) |                |                |                |                |                |                 |                 |                 |                |                |                |                |                |                |                |   |                |                |                |                |                |                 | -           |                |
|                |                |                | 3/8" Female NPT                 |                | 57.2<br>(2.25)  | 28.6<br>(1.13) | 25.4<br>(1.00) | 39.6<br>(1.56) | 28.6<br>(1.13) |                |                |                |                |                 |                 |                 |                | 96.9<br>(3.81) |                |                |                |                |                |                 |                 |                 |                |                |                |                |                |                |                |   |                |                |                |                |                |                 |             |                |
|                |                |                | 10mm Hy-Lok                     |                | 73.0<br>(2.87)  | 36.5<br>(1.44) | 33.7<br>(1.33) | 47.9<br>(1.89) | 37.6<br>(1.48) |                |                |                |                |                 |                 |                 | 34.0<br>(1.34) | 34.0<br>(1.34) | 14.2<br>(0.56) | 14.2<br>(0.56) | 64<br>(2.52)   | 19.9<br>(0.78) | 93.7<br>(3.69) | 93.7<br>(3.69)  |                 | -               |                |                |                |                |                |                |                |   |                |                |                |                |                |                 |             |                |
|                |                |                | 3/8" Hy-Lok                     |                | 73.0<br>(2.87)  | 36.5<br>(1.44) | 33.5<br>(1.32) | 47.7<br>(1.88) | 37.5<br>(1.48) |                |                |                |                |                 |                 |                 |                |                |                |                |                |                |                | 93.7<br>(3.69)  |                 |                 |                |                |                |                |                |                |                |   |                |                |                |                |                |                 |             |                |
|                |                |                | 12mm Hy-Lok                     |                | 77.8<br>(3.06)  | 38.9<br>(1.53) | 36.2<br>(1.43) | 50.4<br>(1.98) | 40.2<br>(1.58) |                |                |                |                |                 |                 |                 |                |                |                |                |                |                |                | 34.0<br>(1.34)  | 34.0<br>(1.34)  |                 | 14.2<br>(0.56) | 14.2<br>(0.56) | 64<br>(2.52)   | 19.9<br>(0.78) | 93.7<br>(3.69) | 93.7<br>(3.69) |                | - |                |                |                |                |                |                 |             |                |
|                |                |                | 1/2" Hy-Lok                     |                | 77.8<br>(3.06)  | 38.9<br>(1.53) | 36.0<br>(1.42) | 50.2<br>(1.98) | 40.0<br>(1.57) |                |                |                |                |                 |                 |                 |                |                |                |                |                |                |                |                 |                 |                 |                |                |                |                |                | 93.7<br>(3.69) |                |   |                |                |                |                |                |                 |             |                |
|                |                |                | 1/4" Pipe Weld                  |                | 57.2<br>(2.25)  | 28.6<br>(1.13) | 25.4<br>(1.00) | 39.6<br>(1.56) | 28.6<br>(1.13) |                |                |                |                |                 |                 |                 |                |                |                |                |                |                |                |                 |                 |                 |                |                |                |                |                | 34.0<br>(1.34) | 34.0<br>(1.34) |   | 14.2<br>(0.56) | 14.2<br>(0.56) | 64<br>(2.52)   | 19.9<br>(0.78) | 93.7<br>(3.69) | 93.7<br>(3.69)  |             | 10.0<br>(0.39) |
|                |                |                | 3/8" Tube Weld                  |                | 57.2<br>(2.25)  | 28.6<br>(1.13) | 25.4<br>(1.00) | 39.6<br>(1.56) | 25.4<br>(1.00) |                |                |                |                |                 |                 |                 |                |                |                |                |                |                |                |                 |                 |                 |                |                |                |                |                |                |                |   |                |                |                |                |                | 93.7<br>(3.69)  |             |                |
| 1/2" Tube Weld |                | 57.2<br>(2.25) | 28.6<br>(1.13)                  | 25.4<br>(1.00) | 39.6<br>(1.56)  | 25.4<br>(1.00) | 34.0<br>(1.34) | 34.0<br>(1.34) | 14.2<br>(0.56) | 14.2<br>(0.56) | 64<br>(2.52)   | 19.9<br>(0.78) | 93.7<br>(3.69) | 95.3<br>(3.75)  | 9.6<br>(0.38)   |                 |                |                |                |                |                |                |                |                 |                 |                 |                |                |                |                |                |                |                |   |                |                |                |                |                |                 |             |                |
|                |                | 57.2<br>(2.25) | 28.6<br>(1.13)                  | 25.4<br>(1.00) | 39.6<br>(1.56)  | 25.4<br>(1.00) |                |                |                |                |                |                |                | 95.3<br>(3.75)  |                 |                 |                |                |                |                |                |                |                |                 |                 |                 |                |                |                |                |                |                |                |   |                |                |                |                |                |                 |             |                |
| GB3            | 11.0<br>(0.43) | 2.2            | 1/2" Female NPT                 |                | 79.4<br>(3.13)  | 39.7<br>(1.56) |                |                |                |                |                |                |                | 33.3<br>(1.31)  |                 | 50.8<br>(2.00)  | 39.7<br>(1.56) | 46.1<br>(1.81) | 47.0<br>(1.85) | 15.9<br>(0.63) | 17.5<br>(0.69) | 76<br>(2.99)   | 26.2<br>(1.03) |                 |                 | 121.5<br>(4.78) |                |                |                |                |                |                |                |   |                |                |                |                |                | 122.4<br>(4.82) | -           |                |
|                |                |                | 3/4" Female NPT                 |                | 82.6<br>(3.25)  | 41.3<br>(1.63) |                |                |                |                |                |                |                | 41.3<br>(1.63)  |                 | 61.8<br>(2.43)  | 38.0<br>(1.50) | 48.4<br>(1.91) | 49.5<br>(1.95) | 19.9<br>(0.78) | 20.5<br>(0.81) |                |                |                 |                 | 123.9<br>(4.88) |                |                |                |                |                |                |                |   |                |                |                |                |                | 124.9<br>(4.92) |             |                |
|                |                |                | 1" Female NPT                   |                | 92.1<br>(3.63)  | 46.0<br>(1.81) |                |                |                |                |                |                |                | -               |                 | -               | -              | 54.0<br>(2.13) | -              | 25.4<br>(1.00) | -              |                |                | -               | 129.4<br>(5.09) | -               |                |                |                |                |                |                |                |   |                |                |                |                |                |                 |             |                |
|                |                |                | 1/2" Male NPT   1/2" Female NPT |                | 79.4<br>(3.13)  | 39.7<br>(1.56) |                |                |                |                |                |                |                | 33.3<br>(1.31)  |                 | 50.8<br>(2.00)  | 39.7<br>(1.56) | 46.0<br>(1.81) | 47.0<br>(1.85) | 15.9<br>(0.63) | 17.5<br>(0.69) |                |                | 121.5<br>(4.78) | 122.4<br>(4.82) |                 |                |                |                |                |                |                |                |   |                |                |                |                |                |                 |             |                |
|                |                |                | 3/4" Male NPT   3/4" Female NPT |                | 82.6<br>(3.25)  | 41.3<br>(1.63) |                |                |                |                |                |                |                | -               |                 | -               | -              | 48.4<br>(1.91) | -              | 19.9<br>(0.78) | -              |                |                | -               | 123.9<br>(4.88) | -               |                |                |                |                |                |                |                |   |                |                |                |                |                |                 |             |                |
|                |                |                | 1" Male NPT   1" Female NPT     |                | 92.1<br>(3.63)  | 46.0<br>(1.81) |                |                |                |                |                |                |                | -               |                 | -               | -              | 54.0<br>(2.13) | -              | 25.4<br>(1.00) | -              |                |                | -               | 129.4<br>(5.09) | -               |                |                |                |                |                |                |                |   |                |                |                |                |                |                 |             |                |
|                |                |                | 12mm Hy-Lok                     |                | -               | -              | -              | -              | -              | -              | -              | -              | -              | -               | -               | -               |                |                |                |                |                |                |                |                 |                 |                 |                |                |                |                |                |                |                |   |                |                |                |                |                |                 |             |                |
|                |                |                | 1/2" Hy-Lok                     |                | 100.0<br>(3.94) | 50.0<br>(1.97) | 47.0<br>(1.85) | 61.1<br>(2.41) | 50.0<br>(1.97) | 46.0<br>(1.81) | 47.0<br>(1.85) | 17.5<br>(0.69) | 17.5<br>(0.69) | 121.5<br>(4.78) | 122.4<br>(4.82) |                 |                |                |                |                |                |                |                |                 |                 |                 |                |                |                |                |                |                |                |   |                |                |                |                |                |                 |             |                |
|                |                |                | 3/4" Hy-Lok                     |                | -               | -              | -              | -              | -              | -              | -              | -              | -              | -               | -               | -               |                |                |                |                |                |                |                |                 |                 |                 |                |                |                |                |                |                |                |   |                |                |                |                |                |                 |             |                |
|                |                |                | 1" Hy-Lok                       |                | -               | -              | -              | -              | -              | -              | -              | -              | -              | -               | -               | -               |                |                |                |                |                |                |                |                 |                 |                 |                |                |                |                |                |                |                |   |                |                |                |                |                |                 |             |                |
|                |                |                | 1/2" Pipe Weld                  |                | -               | -              | -              | -              | -              | 47.6<br>(1.87) | -              | 17.5<br>(0.69) | -              | -               | -               | -               |                |                |                |                |                |                |                |                 |                 |                 |                |                |                |                |                |                |                |   |                |                |                |                |                |                 |             |                |
|                |                |                | 1/2" Tube Weld                  |                | 79.4<br>(3.13)  | 39.7<br>(1.56) | 33.3<br>(1.31) | 50.8<br>(2.00) | 39.7<br>(1.56) | 42.9<br>(1.69) | 46.0<br>(1.81) | 47.6<br>(1.87) | 15.9<br>(0.63) | 19.0<br>(0.75)  | 123.1<br>(4.85) | 126.2<br>(4.97) | 10.0<br>(0.39) |                |                |                |                |                |                |                 |                 |                 |                |                |                |                |                |                |                |   |                |                |                |                |                |                 |             |                |
|                |                |                | 3/4" Tube Weld                  |                | 79.4<br>(3.13)  | 39.7<br>(1.56) | 33.3<br>(1.31) | 52.3<br>(2.06) | 39.7<br>(1.56) | 42.9<br>(1.69) | 46.0<br>(1.81) | 51.0<br>(2.00) | 15.9<br>(0.63) | 19.0<br>(0.75)  | 121.5<br>(4.78) | 126.4<br>(4.98) | 11.1<br>(0.44) |                |                |                |                |                |                |                 |                 |                 |                |                |                |                |                |                |                |   |                |                |                |                |                |                 |             |                |

All dimensions in millimeters (inch.) Dimensions shown with Hy-Lok nuts in finger-tight position, where applicable.

## Technical Data

### Materials of Construction

| Description       | Grade / ASTM Specification |                           |                      |
|-------------------|----------------------------|---------------------------|----------------------|
|                   | Valve Body Materials       |                           |                      |
|                   | SS316                      | Carbon Steel              | Alloy 400            |
| Handle            | Stainless Steel            | Aluminum                  | Stainless Steel      |
| Lock Nut          | SS316 / A479 or A276       | 1020 / A108 JIS 4051 S20C | SS316 / A479 or A276 |
| Packing Bolt      | SS630 / A564               |                           |                      |
| Packing Gland     | SS316 / A479 or A276       |                           | SS316 / A479 or A276 |
| Packing Support * | Reinforced PTFE            |                           |                      |
| Stem Packing *    | PTFE                       |                           |                      |
| Bonnet *          | SS316 / A479               | 1020 / A108 JIS 4051 S20C | Alloy 400 / B164     |
| Stem *            | SS316 / A479 or A276       |                           | Alloy 400 / B164     |
| Stem Tip *        | Vee Tip                    | SS630 / A564              | Alloy 400 / B164     |
|                   | Ball Tip                   |                           |                      |
|                   | Regulating                 |                           |                      |
|                   | Soft Tip                   |                           |                      |
| Body *            | SS316 / A479 or A182       | 1020 / A108 JIS 4051 S20C | Alloy 400 / B164     |

Note : "\*" marked are wetted parts.

Nickel anti-seize lubricant for PTFE packed valves and fluorinated grease for PEEK and Graphite packed valves.

### Temperature vs Working Pressure

| Temperature     | Pressure (psig) @ Temperature Rating |       |               |           |
|-----------------|--------------------------------------|-------|---------------|-----------|
|                 | ASME Group                           | 2.2   | NA            | 3.4       |
|                 | Materials                            | SS316 | Carbon Steel† | Alloy 400 |
|                 | ASME Class                           | 2500  | NA            | 2500      |
| -65 °F (-54 °C) | 100 °F ( 38 °C)                      | 6000  | 6000          | 5000      |
|                 | 200 °F ( 93 °C)                      | 5160  | 5420          | 4400      |
|                 | 300 °F (148 °C)                      | 4660  | 5320          | 4120      |
|                 | 350 °F (176 °C)                      | 4470  | 5230          | 4050      |
|                 | 400 °F (204 °C)                      | 4280  | -             | 3980      |
|                 | 450 °F (232 °C)                      | 4130  | -             | 3970      |

† Rated at a low temperature of -20 °F (-29 °C)

- To determine kPa, multiply psig by 6.89 and bar by 0.0689.
- When valves with Hy-Lok fitting end connections are connected to tubing, the working pressure of tubing must be considered in the calculation of total system working pressure.

### Testing

- Each valve is tested with nitrogen @ 1000psig (69bar) to a max leak rate of 0.1 SCCM.
- Hydrostatic shell test is performed at 1.5 times the working pressure.
- Optional tests are available upon request.

### Temperature and Pressure Rating

| Body Material       | Stem Tip                    | Temperature Rating                | Pressure Rating @ -65°F ~ 100°F (-54°C ~ 38°C) |
|---------------------|-----------------------------|-----------------------------------|--|
| 316 Stainless Steel | NR Vee, NR Ball, Regulating | -65 °F ~ 450 °F (-54 °C ~ 232 °C) | 6000 psig                                      |
|                     | NR Soft Seat (PCTFE)        | -65 °F ~ 200 °F (-54 °C ~ 93 °C)  |  |
| Carbon Steel        | NR Vee, NR Ball, Regulating | -20 °F ~ 350 °F (-29 °C ~ 176 °C) | 6000 psig                                      |
|                     | NR Soft Seat (PCTFE)        | -65 °F ~ 200 °F (-54 °C ~ 93 °C)  |  |
| Alloy 400 (monel)   | NR Vee, NR Ball, Regulating | -65 °F ~ 450 °F (-54 °C ~ 232 °C) | 5000 psig                                      |
|                     | NR Soft Seat (PCTFE)        | -65 °F ~ 200 °F (-54 °C ~ 93 °C)  |  |

- NR stands for non-rotating.
- The above ratings are for a standard valve with PTFE packing. For optional packing materials, refer to the table shown below.
- Extreme temperature fluctuations may require packing adjustment.

### Packing and Body Materials vs Temperature and Pressure Rating

| Packing Material | Body Material       | Temperature                        | Pressure @ Temp Rating            |
|------------------|---------------------|------------------------------------|-----------------------------------|
| PTFE (Standard)  | 316 Stainless Steel | -65 °F ~ 450 °F (-54 °C ~ 232 °C)  | 4130 psig                         |
|                  | Alloy 400 *         |                                    | 3970 psig                         |
| PEEK†            | 316 Stainless Steel | -65 °F ~ 600 °F (-54 °C ~ 315 °C)  | 3760 psig                         |
|                  | Alloy 400 *         |                                    | -65 °F ~ 500 °F (-54 °C ~ 260 °C) |
| Graphite         | 316 Stainless Steel | -65 °F ~ 1200 °F (-54 °C ~ 648 °C) | 1715 psig                         |
|                  | Carbon Steel        | -20 °F ~ 350 °F (-29 °C ~ 176 °C)  | 52300 psig                        |
|                  | Alloy 400 *         | -65 °F ~ 500 °F (-54 °C ~ 260 °C)  | 3960 psig                         |

\* Not applicable over 500 °F (260 °C).

† PEEK is not recommended for service with aromatic heat transfer fluids or concentrated sulfuric and nitric acids. Other limitations may apply.

### Sour Gas Service

- is provided to meet NACE Standard MR - 01 - 75.

### Steam and Severe Service

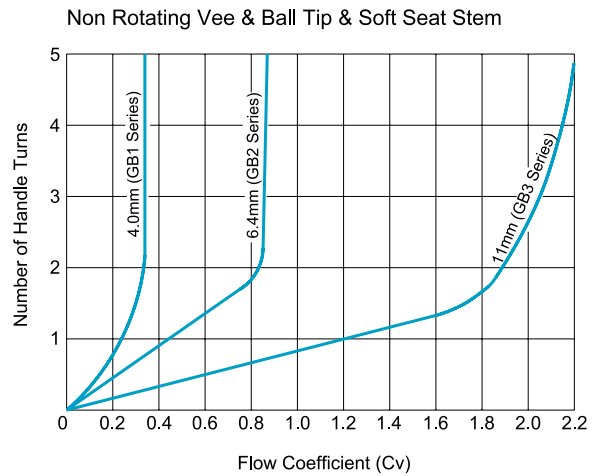
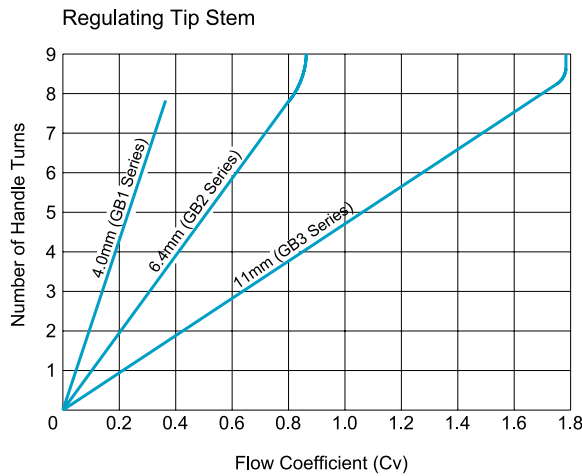
- To order, add-SB (Stellite Ball) to the valve ordering number.

### Handles

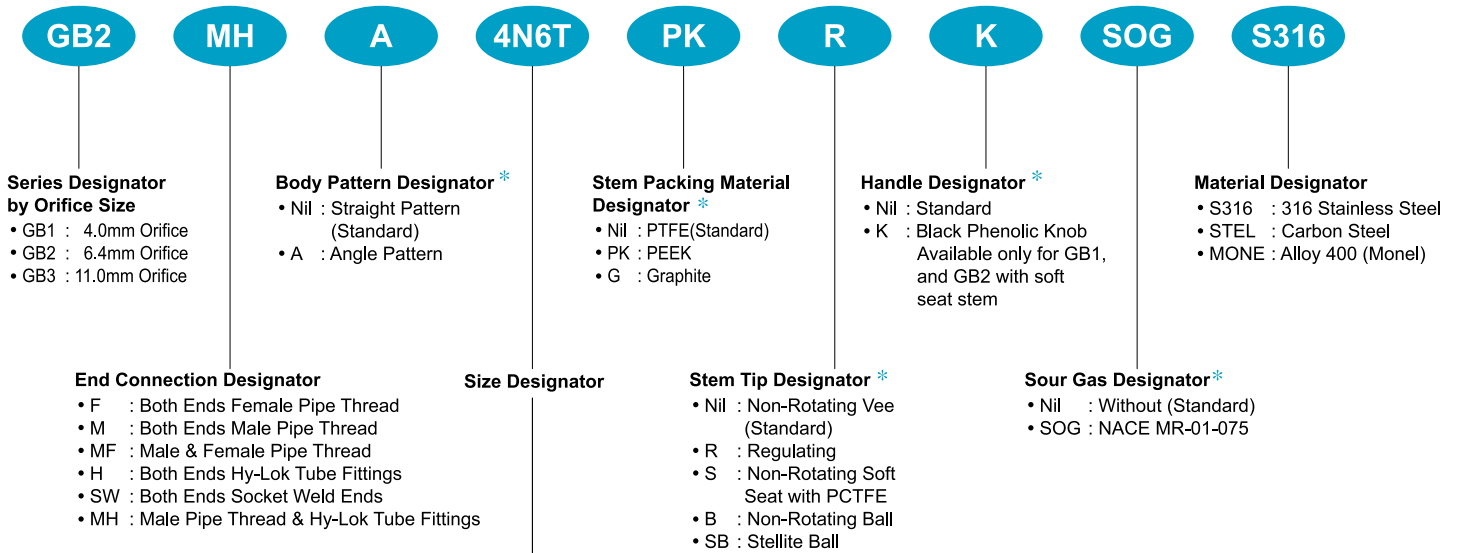
- Standards are black aluminum bar for carbon steel body and stainless steel bar for SS316 and Alloy 400 body.

# Union Bonnet Valves

## Flow Coefficient (Cv) vs Number of Handle Turns



## Ordering Information



| Thread (in.) | 1/8   | 1/4   | 3/8   | 1/2   | 3/4    | 1      |
|--------------|-------|-------|-------|-------|--------|--------|
| Designator   | 2N(R) | 4N(R) | 6N(R) | 8N(R) | 12N(R) | 16N(R) |

| Fractional Tube | O.D. (in.) | 1/8 | 1/4 | 3/8 | 1/2 | 3/4 | 1   |
|-----------------|------------|-----|-----|-----|-----|-----|-----|
|                 | Designator |     | 2T  | 4T  | 6T  | 8T  | 12T |
| Metric Tube     | O.D. (mm)  | 3   | 6   | 10  | 12  | 20  | 25  |
|                 | Designator |     | 3M  | 6M  | 10M | 12M | 20M |

**Note \*** : No designator is required for standard, e.g. GB2MH-4N6T-S316.

## SAFETY in VALVE SELECTION

Proper installation, materials compatibility, operation and maintenance of these valves are the responsibility of the user. The total system design must be taken into consideration to ensure optimal performance and safety