
2-Cx

PTFE LINED BUTTERFLY VALVE

TECHNICAL SALES MANUAL



BRAY.COM

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THE HIGH PERFORMANCE COMPANY

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OVERVIEW

PTFE LINED BUTTERFLY VALVE

The 2-Cx lined butterfly valve features a state-of-the-art design which provides excellent shutoff protection and high flow rates with an exceptionally long service life. It has been specifically engineered to meet the stringent demands of the Chemical Industry.

MEDIA

- > Chlorine
- > Chlorine Dioxide
- > Hydriodic Acid
- > Hydrobromic Acid
- > Hydrochloric Acid
- > Hydrofluoric Acid
- > Hydrofluorsilicic Acid
- > Hydrogen Chloride
- > Hydrogen Cyanide
- > Nitric Acid
- > Sodium Chlorate
- > Sodium Chlorite
- > Sodium Hypochlorite
- > Sulfuric Acid



SPECIFICATIONS

| | | |
|--|-------------------|-----------------|
| Size Range¹ | DN 50 to 600 | |
| Temperature Range | -10°C to 200°C | |
| Maximum Operating Pressure (Bidirectional) | DN 50 to 600: | 10 bar |
| Maximum Operating Pressure (Dead End Service²) | DN 50 to 300: | 5 bar |
| | DN 350 to 600: | 3 bar |
| Body Style³ | Series 22-Cx: | Two-piece wafer |
| | Series 23-Cx: | Two-piece lug |
| Tightness Test | EN 12266-1 Rate A | |
| Velocity Limits (On-Off Service) | Fluids: | 9 m/s |
| | Gases: | 54 m/s |

NOTES

- 1 Other sizes on request.
 2 Lug body only.
 3 Series 23-Cx DN 600 body style is double flange only.

DESIGN STANDARDS

| | |
|--------------------------|--------------------------------------|
| Valve Design | EN 12569 EN 593 NE 167 |
| Material Standard | EN 16668 AD2000 W0 |
| Food Contact | EC 1935 |
| Marking | EN 19 DIN EN IEC 61406 DIN 91406 |
| Top Flange | ISO 5211 |
| Flange Drilling | EN 1092-1 PN 10 |
| Face-to-Face | EN 558 Series 20 |
| Testing Standard | EN 12266-1 & 2 |
| AutoID/ID Link | DIN 91406/IEC 61406 |

MATERIAL OPTIONS¹

| | |
|--------------------------|---|
| Body | Ductile Iron, Low Temperature (EN 5.3103) |
| Disc (PTFE-lined) | Stainless Steel (EN 1.4408) |
| Stem | Stainless Steel (EN 1.4542) |
| Seat | PTFE |
| Seat Energizer | FKM |
| Body Fasteners | A4-70 |

NOTES

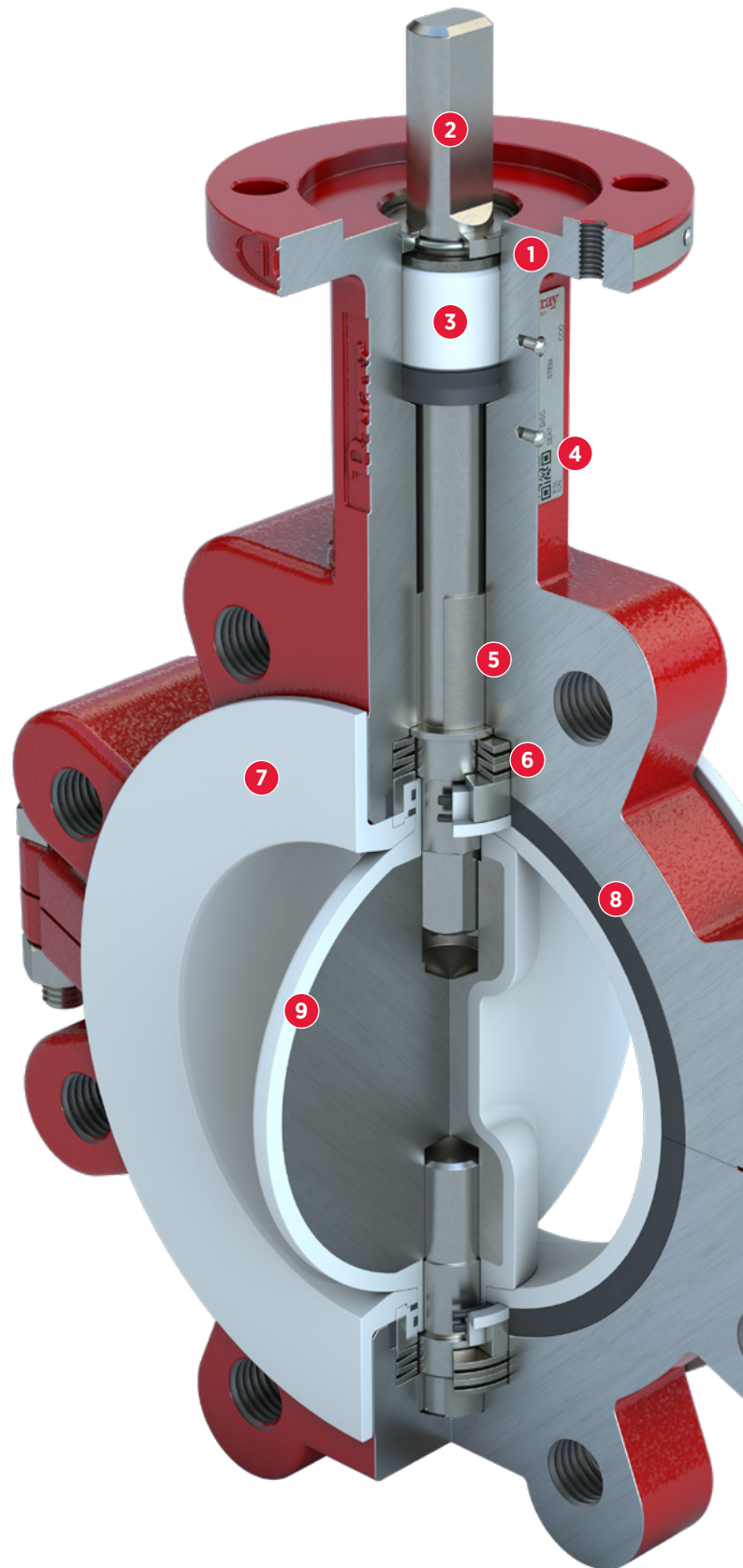
- 1 Other materials are available on request.

CERTIFICATIONS & APPROVALS

| | |
|---------------------------|--------------------|
| Certifications | CE: PED 2014/68/EU |
| | SIL 3 capable |
| Fugitive Emissions | ISO 15848-1 |
| | TA-Luft 2021 |
| Approvals | ATEX 2014/34/EU |

FEATURES & BENEFITS

- 1 ANTI-STATIC:** Electrostatic discharge through anti-static design (grounding device and top flange drilling).
- 2 STEM DESIGN:** The high-strength stem design includes blowout-proof functionality for safe operation and exceptional service life.
- 3 STEM BUSHING:** Non-corrosive, heavy duty acetal bushing absorbs actuator side thrust.
- 4 DIGITAL TAG:** Each valve is uniquely and easily identifiable by simply scanning the QR Code on the product identification tag in accordance to IEC 61406.
- 5 BEARINGS:** PTFE impregnated steel bearings precisely align the upper and lower stem.
- 6 STEM SEAL SYSTEM:** The live-loaded, self-adjusting packing design features a primary and secondary sealing principle to comply with the most stringent fugitive emission requirements.
- 7 SEAT:** The unique virgin-PTFE (minimum 3 mm thick) seat features a geometry that lowers seating and unseating torque while reducing wear on the contacting parts.
- 8 SEAT ENERGIZER:** A resilient seat energizer extends completely around the seat, including the disc hub providing uniform force sufficient for zero-leakage.
- 9 DISC:** The disc is encapsulated in virgin-PTFE (minimum 3 mm thick) for superior sealing against the most aggressive media.



VALVE SELECTION

VALVE PART NUMBERING SYSTEM

Select one code from each category to build a complete valve order number.

22C-XXXX-1XXXX-XXX

| SERIES 22/23 Cx | | SIZE XXXX | | BASE NUMBER 1XXXX | | TRIM ¹ XXX | | |
|--------------------|------------|-------------------|-----|----------------------|---------------------------------------|--------------------------|------|--|
| Code | Body Style | Code | DN | Code | Description | Code | Item | Material |
| 22C | Wafer | M050 | 50 | 1107V | 10 bar rated PN 10 flange drilling | D2C | Body | Ductile Iron - Low Temperature (5.3103) |
| 23C | Lug | M080 | 80 | | | | Disc | Stainless Steel (EN 1.4408) PTFE lined |
| | | M100 | 100 | | | | Stem | Stainless Steel (EN 1.4542) |
| | | M150 | 150 | | | | Seat | PTFE |
| | | M200 | 200 | | | | | |
| | | M250 | 250 | | | | | |
| | | M300 | 300 | | | | | |
| | | M350 | 350 | | | | | |
| | | M400 | 400 | | | | | |
| | | M500 | 500 | | | | | |
| | | M600 ² | 600 | | | | | |

NOTES

- 1 Other materials are available on request.
Contact Bray for additional information.
- 2 DN 600 only available as double flange body style.

EXAMPLE

23C-M250-1107V-D2C

- > Lug body
- > DN 250
- > PN 10
- > Trim D2C

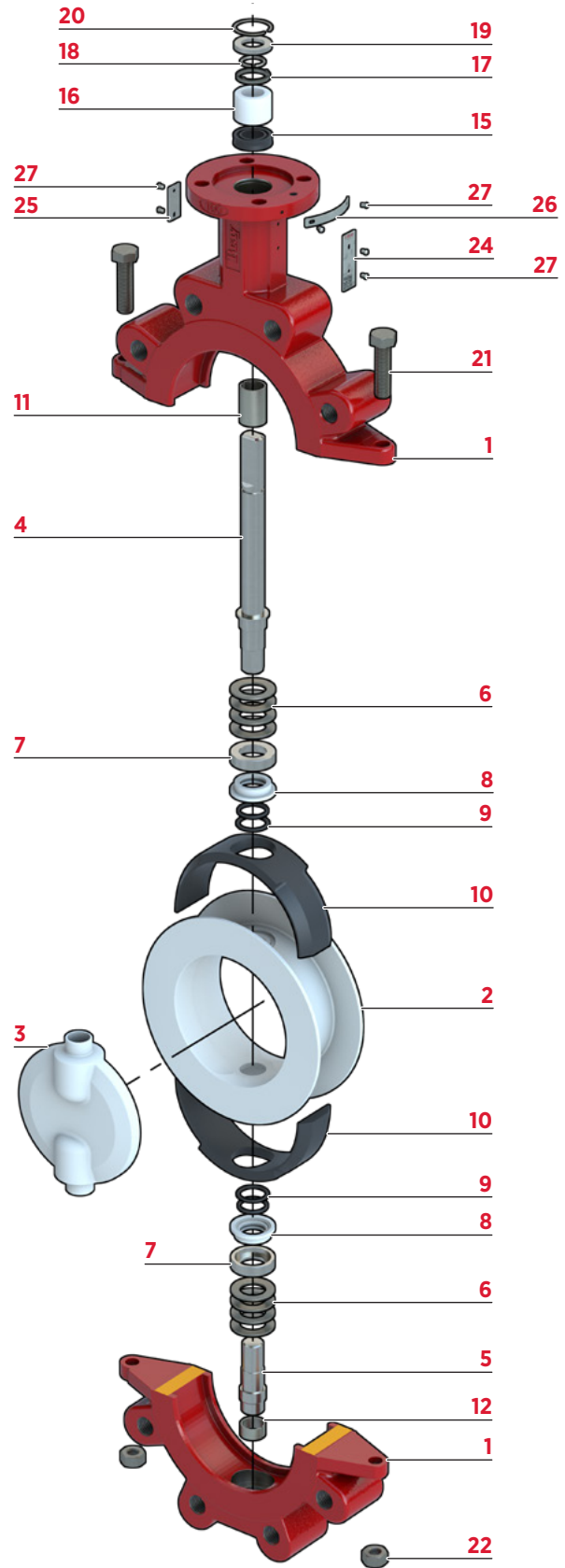
PARTS LIST AND MATERIAL SPECIFICATIONS

| ITEM | DESCRIPTION | MATERIAL | | |
|------|---------------------|--|--|--|
| | | DN50 to DN100 | DN125 to DN300 | DN350 to DN600 |
| 1 | Body | Ductile Iron - Low Temperature (EN 5.3103) | Ductile Iron - Low Temperature (EN 5.3103) | Ductile Iron - Low Temperature (EN 5.3103) |
| 2 | Seat | PTFE | PTFE | PTFE |
| 3 | Disc | PTFE molded over Stainless Steel | PTFE molded over Stainless Steel | PTFE molded over Stainless Steel |
| 4 | Upper stem | Stainless Steel (EN 1.4542) | Stainless Steel (EN 1.4542) | Stainless Steel (EN 1.4542) |
| 5 | Lower Stem | Stainless Steel (EN 1.4542) | Stainless Steel (EN 1.4542) | Stainless Steel (EN 1.4542) |
| 6 | Disc Spring | Stainless Steel (17-7PH) | Stainless Steel (17-7PH) | Stainless Steel (17-7PH) |
| 7 | Thrust Ring | Stainless Steel | Stainless Steel | Stainless Steel |
| 8 | PTFE Sleeve | PTFE | PTFE | PTFE |
| 9 | O-ring | FKM | FKM | FKM |
| 10 | Seat Energizer | FKM | FKM | FKM |
| 11 | Upper Bearing | PTFE Lined Stainless Steel | PTFE Lined Stainless Steel | PTFE Lined Stainless Steel |
| 12 | Lower Bearing | PTFE Lined Stainless Steel | PTFE Lined Stainless Steel | PTFE Lined Stainless Steel |
| 13 | Bottom Plug | — | — | Stainless Steel (EN 1.4401) |
| 14 | Bottom Plug O-ring | — | — | FKM |
| 15 | Stem Seal | FKM | FKM | FKM |
| 16 | Stem Bushing | Acetal | Acetal | Acetal |
| 17 | Anti-Static Device | Stainless Steel | Stainless Steel | Stainless Steel |
| 18 | Retaining Ring | Stainless Steel | Stainless Steel | Stainless Steel |
| 19 | Thrust Washer | Stainless Steel | Stainless Steel | Stainless Steel |
| 20 | Retainer Clip | Stainless Steel | Stainless Steel | Stainless Steel |
| 21 | Body Bolt/Cap Screw | A4-70 | A4-70 | A4-70 |
| 22 | Body Nut | A4-70 | A4-70 | A4-70 |
| 23 | Key | — | — | Stainless Steel |
| 24 | Identification Tag | Stainless Steel | Stainless Steel | Stainless Steel |
| 25 | Certification Tag | Stainless Steel | Stainless Steel | Stainless Steel |
| 26 | Torque Tag | Stainless Steel | Stainless Steel | Stainless Steel |
| 27 | Drive Screws | Stainless Steel | Stainless Steel | Stainless Steel |

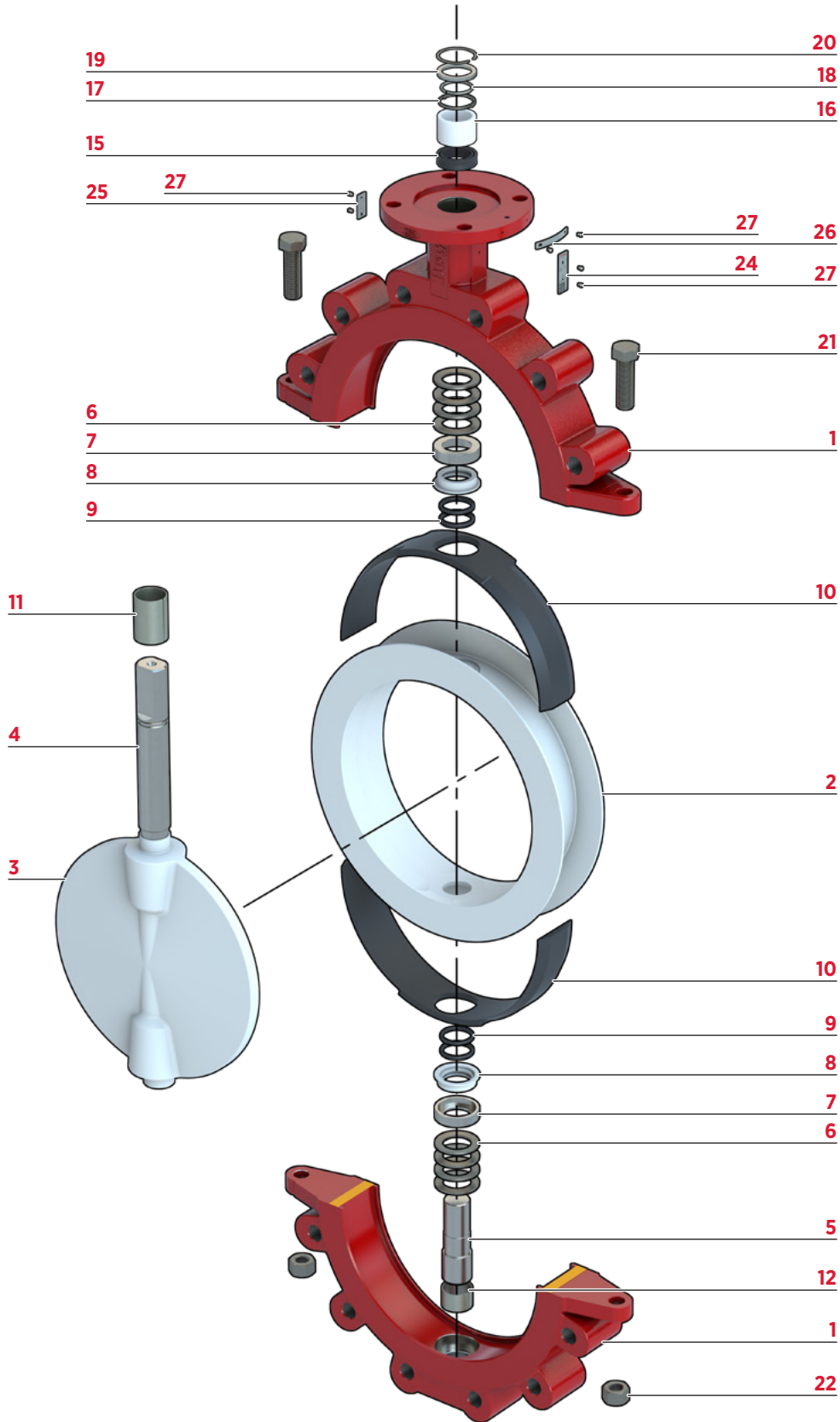
NOTES

- 1 Material specifications provided for reference only, and are subject to change without notice.
- 2 Additional materials available upon request.

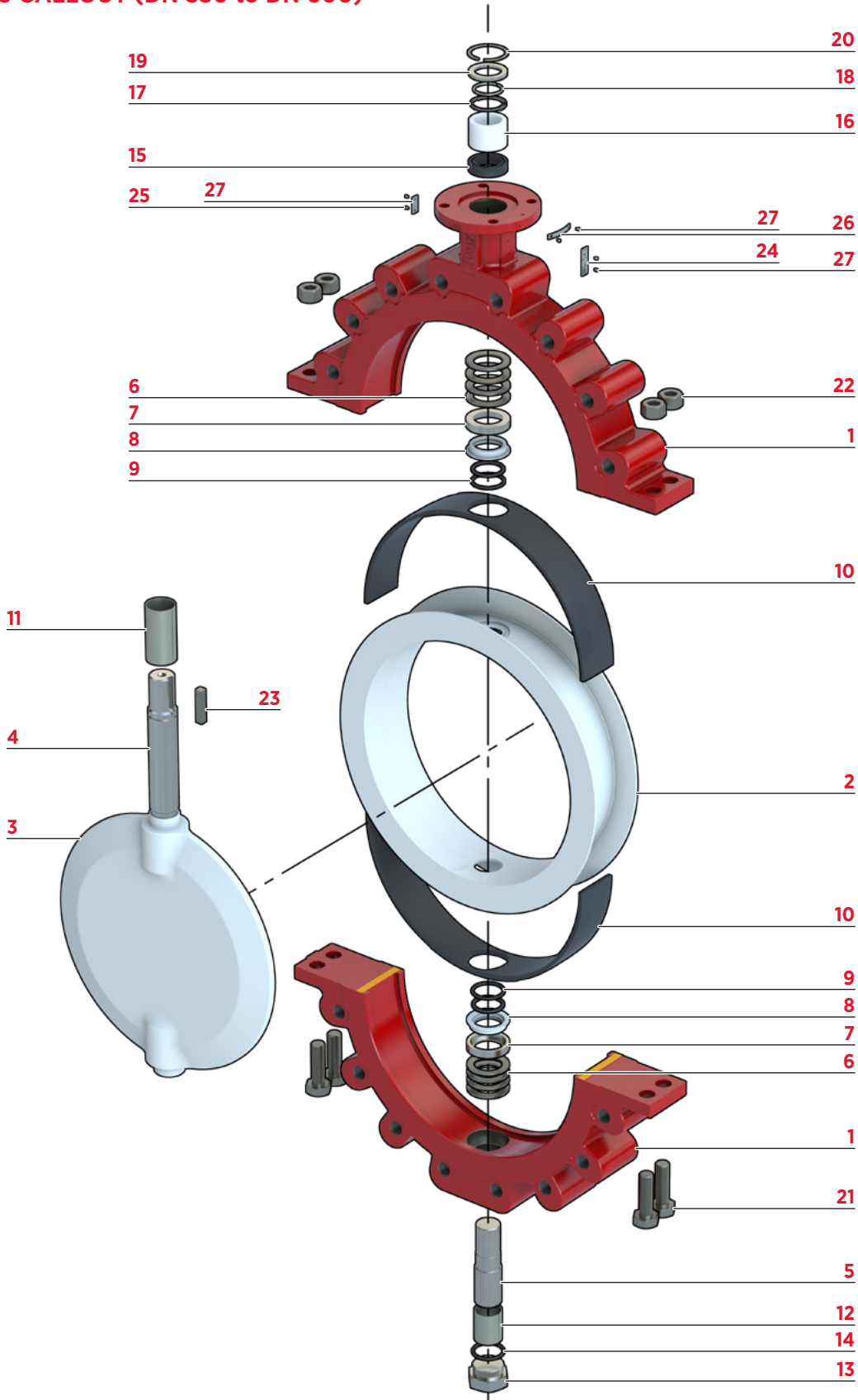
PARTS CALLOUT (DN 50 to DN 100)



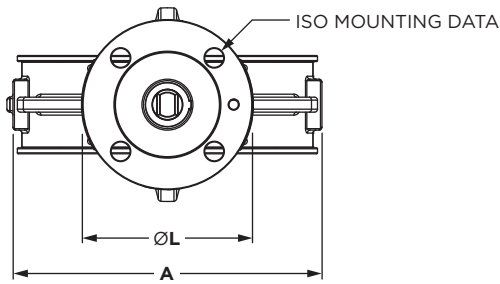
PARTS CALLOUT (DN 125 to DN 300)



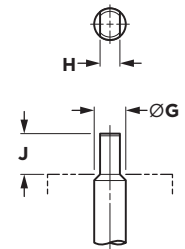
PARTS CALLOUT (DN 350 to DN 600)



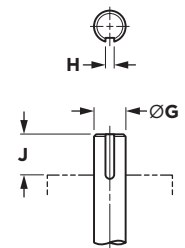
WAFER | PN 10



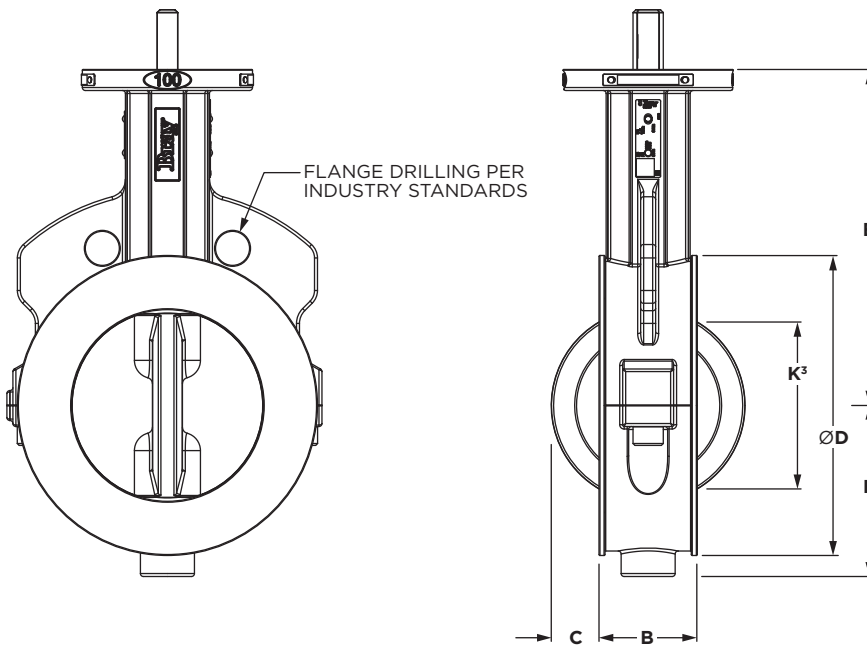
STEM DETAILS



Stem With Flats
≤ DN 300



Stem With Keyway
≥ DN 350



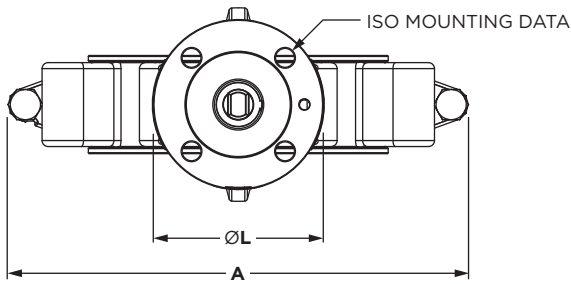
DIMENSIONS (mm)

| DN ¹ | A | B | C | ØD | E | F | ØG | H | J | K ³ | ØL | Top Plate Drilling | | | | Weight ² (Kg) |
|-----------------|-----|-----|-----|-----|-----|-----|----|-------|----|----------------|-----|--------------------|-------------|----------|-----------|--------------------------|
| | | | | | | | | | | | | ISO | Bolt Circle | Hole Qty | Hole Dia. | |
| 50 | 114 | 43 | 6 | 98 | 140 | 56 | 14 | 10 | 32 | 29 | 90 | F07 | 70 | 4 | 10 | 2 |
| 80 | 133 | 46 | 18 | 127 | 159 | 71 | 14 | 10 | 32 | 62 | 90 | F07 | 70 | 4 | 10 | 3 |
| 100 | 163 | 52 | 27 | 159 | 178 | 91 | 16 | 11 | 32 | 88 | 90 | F07 | 70 | 4 | 10 | 5 |
| 150 | 222 | 56 | 47 | 216 | 203 | 121 | 19 | 13 | 32 | 136 | 90 | F07 | 70 | 4 | 10 | 8 |
| 200 | 282 | 60 | 72 | 270 | 241 | 153 | 22 | 16 | 32 | 189 | 150 | F12 | 125 | 4 | 15 | 14 |
| 250 | 341 | 68 | 94 | 324 | 273 | 188 | 30 | 22 | 51 | 240 | 150 | F12 | 125 | 4 | 15 | 21 |
| 300 | 392 | 78 | 114 | 378 | 311 | 214 | 30 | 22 | 51 | 290 | 150 | F12 | 125 | 4 | 15 | 30 |
| 350 | 470 | 78 | 133 | 430 | 346 | 255 | 35 | 10x10 | 51 | 327 | 150 | F12 | 125 | 4 | 15 | 46 |
| 400 | 524 | 102 | 147 | 488 | 375 | 305 | 35 | 10x10 | 51 | 374 | 150 | F12 | 125 | 4 | 15 | 72 |
| 500 | 642 | 127 | 185 | 590 | 438 | 380 | 50 | 10x12 | 64 | 472 | 210 | F16 | 165 | 4 | 21 | 141 |

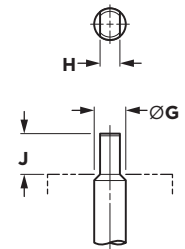
NOTES

- 1 For sizes not shown, contact Bray for more information.
- 2 Weights are for ductile iron bodies.
- 3 K dimension is disc chordal dimension at valve face.

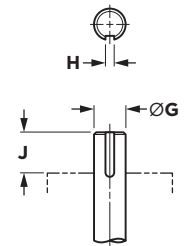
LUG | PN 10



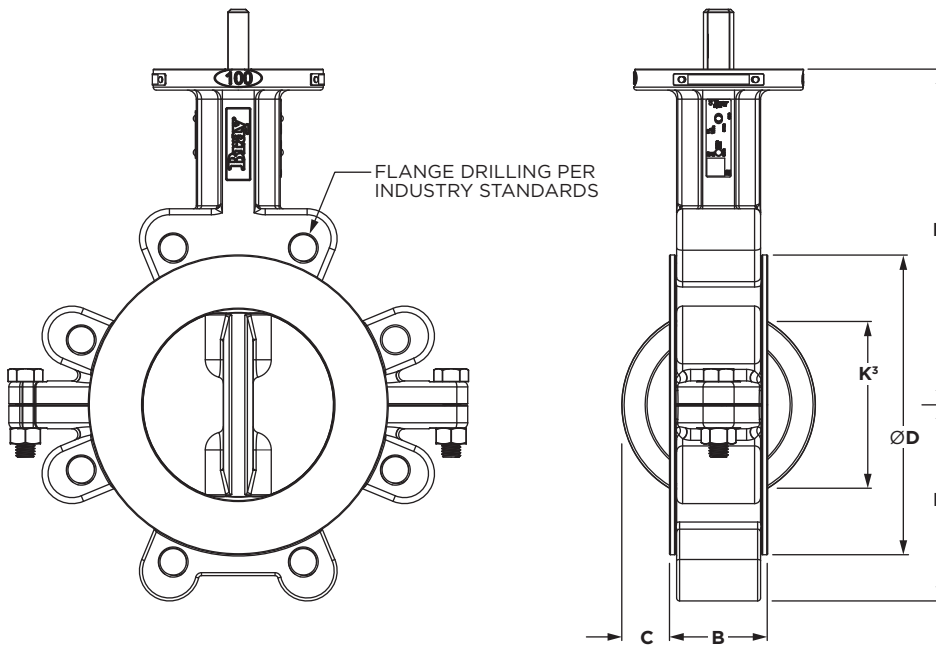
STEM DETAILS



Stem With Flats
≤ DN 300



Stem With Keyway
≥ DN 350



DIMENSIONS (mm)

| DN ¹ | A | B | C | ØD | E | F | ØG | H | J | K ³ | ØL | Top Plate Drilling | | | | Weight ² (Kg) |
|------------------|-----|-----|-----|-----|-----|-----|----|-------|-----|----------------|-----|--------------------|-------------|----------|-----------|--------------------------|
| | | | | | | | | | | | | ISO | Bolt Circle | Hole Qty | Hole Dia. | |
| 50 | 149 | 43 | 6 | 98 | 140 | 59 | 14 | 10 | 32 | 29 | 90 | F07 | 70 | 4 | 10 | 3 |
| 80 | 213 | 46 | 18 | 127 | 159 | 90 | 14 | 10 | 32 | 62 | 90 | F07 | 70 | 4 | 10 | 5 |
| 100 | 243 | 52 | 27 | 159 | 178 | 104 | 16 | 11 | 32 | 88 | 90 | F07 | 70 | 4 | 10 | 8 |
| 150 | 305 | 56 | 47 | 216 | 203 | 131 | 19 | 13 | 32 | 136 | 90 | F07 | 70 | 4 | 10 | 12 |
| 200 | 359 | 60 | 72 | 270 | 241 | 157 | 22 | 16 | 32 | 189 | 150 | F12 | 125 | 4 | 15 | 18 |
| 250 | 451 | 68 | 94 | 324 | 273 | 195 | 30 | 22 | 51 | 240 | 150 | F12 | 125 | 4 | 15 | 29 |
| 300 | 530 | 78 | 114 | 378 | 311 | 226 | 30 | 22 | 51 | 290 | 150 | F12 | 125 | 4 | 15 | 43 |
| 350 | 610 | 78 | 133 | 430 | 346 | 255 | 35 | 10x10 | 51 | 327 | 150 | F12 | 125 | 4 | 15 | 59 |
| 400 | 676 | 102 | 147 | 488 | 375 | 305 | 35 | 10x10 | 51 | 374 | 150 | F12 | 125 | 4 | 15 | 98 |
| 500 | 813 | 127 | 185 | 590 | 438 | 380 | 50 | 10x12 | 64 | 472 | 210 | F16 | 165 | 4 | 21 | 179 |
| 600 ⁴ | 940 | 154 | 222 | 838 | 496 | 453 | 64 | 16x16 | 102 | 570 | 210 | F16 | 165 | 4 | 21 | 311 |

NOTES

- For sizes not shown, contact Bray for more information.
- Weights are for ductile iron bodies.
- K dimension is disc chordal dimension at valve face.
- Series 23-Cx DN 600 body style is double flange only.

SEATING/UNSEATING TORQUES

| TORQUE VALUES (N m) | |
|---------------------|--------|
| DN | 10 bar |
| 50 | 33 |
| 80 | 59 |
| 100 | 81 |
| 150 | 129 |
| 200 | 215 |
| 250 | 434 |
| 300 | 615 |
| 350 | 904 |
| 400 | 1243 |
| 500 | 2181 |
| 600 | 3446 |

MAXIMUM ALLOWABLE STEM TORQUES

| TORQUE VALUES (N m) | |
|---------------------|-----------------------------|
| DN | Stainless Steel (EN 1.4542) |
| 50 | 154 |
| 80 | 154 |
| 100 | 227 |
| 150 | 325 |
| 200 | 539 |
| 250 | 1555 |
| 300 | 1555 |
| 350 | 2609 |
| 400 | 3112 |
| 500 | 8323 |
| 600 | 17785 |

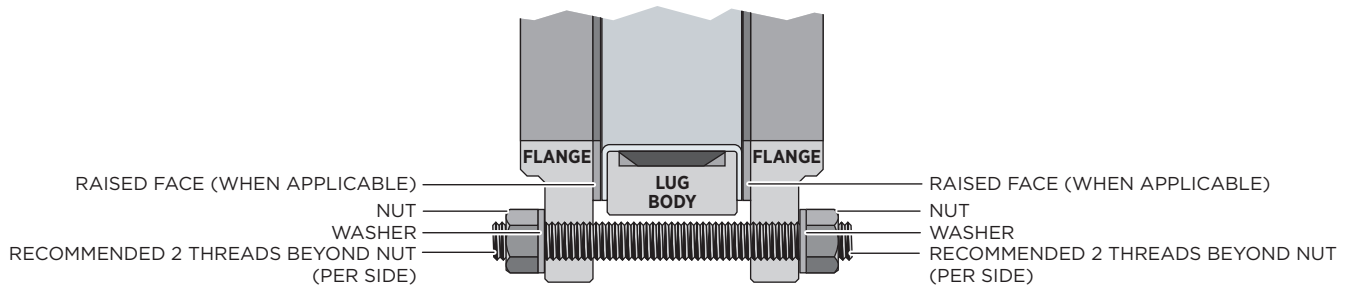
VALVE SIZING COEFFICIENTS

| VALVE SIZING COEFFICIENTS (Kv Values ¹) | | | | | | | | | |
|---|-------------------------|-------|-------|------|------|------|------|-----|-----|
| DN ² | Disc Position (Degrees) | | | | | | | | |
| | 90° | 80° | 70° | 60° | 50° | 40° | 30° | 20° | 10° |
| 50 | 126 | 99 | 74 | 54 | 38 | 23 | 14 | 6 | 1 |
| 80 | 507 | 357 | 247 | 137 | 85 | 53 | 30 | 13 | 2 |
| 100 | 909 | 702 | 435 | 247 | 153 | 94 | 54 | 23 | 3 |
| 150 | 1569 | 1503 | 907 | 502 | 315 | 195 | 112 | 49 | 5 |
| 200 | 3766 | 2718 | 1650 | 961 | 604 | 367 | 209 | 90 | 10 |
| 250 | 5911 | 4304 | 2598 | 1523 | 956 | 581 | 333 | 143 | 17 |
| 300 | 8728 | 6394 | 3823 | 2241 | 1387 | 843 | 484 | 208 | 25 |
| 350 | 11141 | 8088 | 4931 | 2855 | 1817 | 1107 | 623 | 260 | 30 |
| 400 | 14619 | 10657 | 6488 | 3806 | 2379 | 1427 | 735 | 303 | 39 |
| 500 | 23788 | 17214 | 10553 | 6142 | 3875 | 2336 | 1341 | 562 | 69 |
| 600 | 30102 | 24653 | 16349 | 9775 | 6055 | 3979 | 2119 | 865 | 156 |

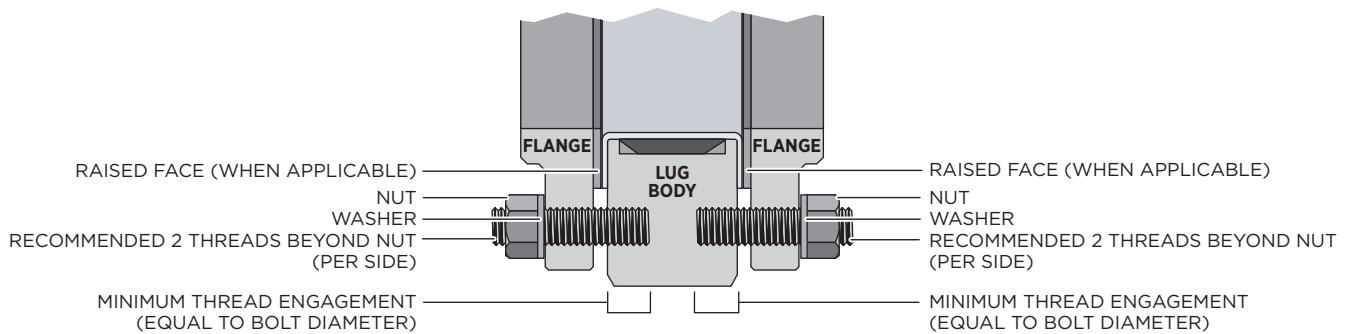
- NOTES**
- 1 Kv value is the volume of water in cubic meters/hour (m³/hr) that will flow through a given restriction or valve opening with a pressure drop of one (1) bar at room temperature. (Kv varies with the valve size, angle of opening, and the manufacturer's valve style.)
 - 2 For sizes not shown, contact Bray for more information.

FLANGE TO VALVE BOLTING DATA

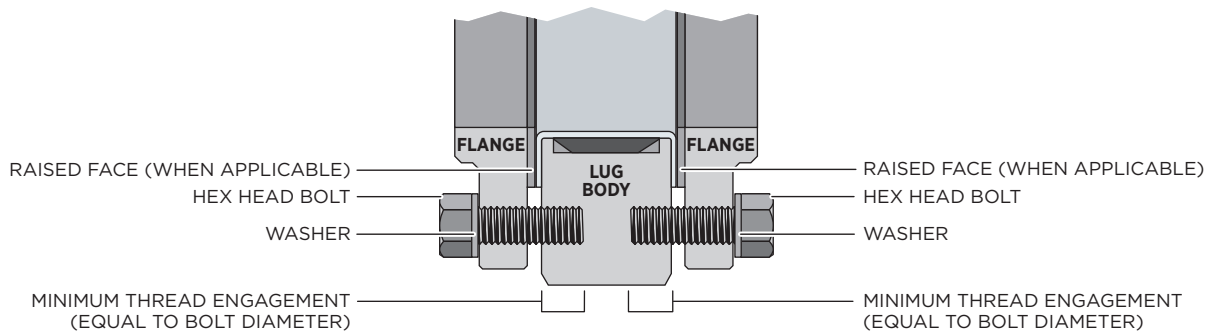
WAFER | THROUGH-STUDS



LUG | STUDS

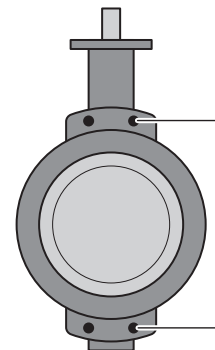


LUG | HEX HEAD BOLTS



IMPORTANT INFORMATION

- > Refer to appropriate Bray dimensional drawings for specific valve drilling information.
- > Lug threads may be tapped from both sides, and therefore tap may not be continuous.
- > Minimum bolt engagement must be equal to the diameter of the bolt.
- > When bolting the valve into the line, use standard bolting torque as recommended by applicable piping standards. Additional force from the flange bolts is not required.



CAUTION
Tapped holes at neck locations **do not** permit through-holes.

PN 10 | WAFER | THROUGH-STUD

| Valve Size | Fastener Size | Through Stud | Washer | Nut |
|------------|---------------|--------------|--------|-----|
| DN | Ø-Thread | Qty | Qty | Qty |
| 50 | M16 x 2.0 | 4 | 8 | 8 |
| 80 | M16 x 2.0 | 8 | 16 | 16 |
| 100 | M16 x 2.0 | 8 | 16 | 16 |
| 150 | M20 x 2.5 | 8 | 16 | 16 |
| 200 | M20 x 2.5 | 8 | 16 | 16 |
| 250 | M20 x 2.5 | 12 | 24 | 24 |
| 300 | M20 x 2.5 | 12 | 24 | 24 |
| 350 | M20 x 2.5 | 16 | 32 | 32 |
| 400 | M24 x 3.0 | 16 | 32 | 32 |
| 500 | M24 x 3.0 | 20 | 40 | 40 |

PN 10 | LUG | STUDS

| Valve Size | Fastener Size | Stud | Washer | Nut |
|------------|---------------|------|--------|-----|
| DN | Ø-Thread | Qty | Qty | Qty |
| 50 | M16 x 2.0 | 8 | 8 | 8 |
| 80 | M16 x 2.0 | 16 | 16 | 16 |
| 100 | M16 x 2.0 | 16 | 16 | 16 |
| 150 | M20 x 2.5 | 16 | 16 | 16 |
| 200 | M20 x 2.5 | 16 | 16 | 16 |
| 250 | M20 x 2.5 | 24 | 24 | 24 |
| 300 | M20 x 2.5 | 24 | 24 | 24 |
| 350 | M20 x 2.5 | 32 | 32 | 32 |
| 400 | M24 x 3.0 | 32 | 32 | 32 |
| 500 | M24 x 3.0 | 40 | 40 | 40 |

PN 10 | LUG | BOLTS

| Valve Size | Fastener Size | Hex Head Bolt | Washer | Nut |
|------------|---------------|---------------|--------|-----|
| DN | Ø-Thread | Qty | Qty | Qty |
| 50 | M16 x 2.0 | 8 | 8 | — |
| 80 | M16 x 2.0 | 16 | 16 | — |
| 100 | M16 x 2.0 | 16 | 16 | — |
| 150 | M20 x 2.5 | 16 | 16 | — |
| 200 | M20 x 2.5 | 16 | 16 | — |
| 250 | M20 x 2.5 | 24 | 24 | — |
| 300 | M20 x 2.5 | 24 | 24 | — |
| 350 | M20 x 2.5 | 32 | 32 | — |
| 400 | M24 x 3.0 | 32 | 32 | — |
| 500 | M24 x 3.0 | 40 | 40 | — |

PN 10 | DOUBLE FLANGE | STUDS

| Valve Size | Fastener Size | Flange Stud | Blind Hole Stud | Washer | Nut |
|------------|---------------|-------------|-----------------|--------|-----|
| DN | Ø-Thread | Qty | Qty | Qty | Qty |
| 600 | M27 x 3.0 | 48 | 16 | 64 | 64 |

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Bray International, Inc.

13333 Westland East Blvd.

Houston, Texas 77041

Tel: +1.281.894.5454

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