


| Werksnorm EW: <i>Works Standard EW:</i> | | 1810 | | Blatt / sheet: 1 Seite/page:1/2 | |
|---|-----------------------------|---|-------------------------------------|---------------------------------------|--|
|  | | Max. Anzugsmomente in Nm für Flanschschrauben A -70 mit 450 N/mm ² , ab M24 / 7/8" mit 250 N/mm ² ($\mu=0,12$) | | | |
| | | <i>max. torque for imperial fasteners material SS by 450 N/mm², above M24 / 7/8" by 250 N/mm² (U=0,12)</i> | | | |
| Schraube / <i>bolt</i> | Schrauben mit Vollschaft | Bolt Size | Stud Bolts with UNC / 8UN thread | | |
| (mm) | (z.B. DIN EN24014 "DIN931") | (Inch) | (Nm) | (ft lbf) | |
| M10 | 31 | | | | |
| M12 | 53 | 1/2" | 63 | 46 | |
| M16 | 127 | 5/8" | 125 | 92 | |
| M20 | 247 | 3/4" | 216 | 159 | |
| M24 | 237 | 7/8" | 192 | 142 | |
| M27 | 346 | 1" | 285 | 210 | |
| M30 | 473 | 1.1/8" | 412 | 304 | |
| M33 | 635 | 1.1/4" | 573 | 423 | |
| M36 | 818 | 1.3/8" | 768 | 566 | |

| Schraube / <i>bolt</i> | Schrauben mit Dehnschaft / <i>reduced shaft</i> <i>Ts (operating temperature) > 300 °C</i> |
|---------------------------|--|
| (mm) | (z.B. DIN 2510) |
| M10 | 20 |
| M12 | 36 |
| M16 | 94 |
| M20 | 180 |
| M24 | 169 |
| M27 | 246 |
| M30 | 349 |
| M33 | 465 |
| M36 | 380 |

Das tatsächlich benötigte Anzugsdrehmoment kann, je nach Flanschdichtung, bei Verwendung eines anderen Schraubenwerkstoffes oder Schmiermittels, niedriger ausfallen !

The actually allowable locking torque can be less than the values shown in the table. This can depend on what gasket material, what bolt material or lubricant is used.

Hinweis: Bei Armaturen mit Flanschgewindebohrungen (z.B. "Lug"-Gehäuse) sollte die volle Gewindelänge ausgenutzt werden bzw. folgende min. Einschraublänge vorgesehen werden:


When use of tapped holes in the valve body is necessary (for example Lug-Type), the used thread reach should be at least:

Einschraublänge/thread reach $l_e = 1 \times d_{\text{Schraube/bolt}}$ (Stahl, Stahlguss, Sphäroguß/steel, steel casting, ductile iron)

Einschraublänge/thread reach $l_e = 1.25 \times d_{\text{Schraube/bolt}}$ (Gußeisen, Cu-Legierungen/iron casting, copper alloys)

Einschraublänge/thread reach $l_e = 2 \times d_{\text{Schraube/bolt}}$ (Al-Legierungen/aluminium alloys)

| Rev. Revisionsgrund / <i>reason of revision</i> | Datum / <i>date:</i> | Bearbeiter/ <i>created by:</i> | Geprüft/ <i>inspection date:</i> | Prüfer/ <i>inspector</i> |
|--|----------------------|--------------------------------|----------------------------------|--------------------------|
| 0-Erstellung / <i>compilation</i> | 16.12.2008 | Mitschke | 16.12.2008 | G. Kipp |
| 1-Ergänzung / <i>completion</i> | 29.01.2009 | Mitschke | 29.01.2009 | G. Kipp |

| Werksnorm EW: <i>Works Standard EW:</i> | | 1810 | | Blatt / sheet: 2 Seite/page :2/2 | |
|---|-----------------------------|---|---|--|--|
|  | | Max. Anzugsmomente in Nm für Flanschschrauben A -70 mit 250 N/mm ² ($\mu=0,12$) | | | |
| | | <i>max. torque for imperial fasteners material SS by 250 N/mm² (U=0,12)</i> | | | |
| Schraube / <i>bolt</i> | Schrauben mit Vollschaft | <i>Bolt Size</i> | <i>Stud Bolts with UNC / 8UN thread</i> | | |
| (mm) | (z.B. DIN EN24014 "DIN931") | (Inch) | (Nm) | (ft lbf) | |
| M39 | 1055 | 1.1/2" | 1005 | 741 | |
| M42 | 1308 | 1.5/8" | 1293 | 954 | |
| M45 | 1620 | 1.3/4" | 1615 | 1191 | |
| M48 | 1970 | 1.7/8" | 1998 | 1473 | |
| M52 | 2525 | 2" | 2433 | 1794 | |
| M56 | 3150 | 2.1/4" | 3500 | 2581 | |
| | | 2.1/2" | 4813 | 3549 | |
| | | | | | |
| | | | | | |

| Schraube / <i>bolt</i> | Schrauben mit Dehnschaft / reduced shaft <i>Ts (operating temperature) > 300 °C</i> |
|---------------------------|---|
| (mm) | (z.B. DIN 2510) |
| M39 | 788 |
| M42 | 963 |
| M45 | 1225 |
| M48 | 1475 |
| M52 | 1888 |
| M56 | 2350 |
| | |
| | |
| | |

Das tatsächlich benötigte Anzugsdrehmoment kann, je nach Flanschdichtung, bei Verwendung eines anderen Schraubenwerkstoffes oder Schmiermittels, niedriger ausfallen !

The actually allowable locking torque can be less than the values shown in the table. This can depend on what gasket material, what bolt material or lubricant is used.

Hinweis: Bei Armaturen mit Flanschgewindebohrungen (z.B. "Lug"-Gehäuse) sollte die volle Gewindelänge ausgenutzt werden bzw. folgende min. Einschraublänge vorgesehen werden:

When use of tapped holes in the valve body is necessary (for example Lug-Type), the used thread reach should be at least:

Einschraublänge/thread reach $l_e = 1 \times d_{\text{Schraube/bolt}}$ (Stahl, Stahlguss, Sphäroguß/steel, steel casting, ductile iron)

Einschraublänge/thread reach $l_e = 1.25 \times d_{\text{Schraube/bolt}}$ (Gußeisen, Cu-Legierungen/iron casting, copper alloys)

Einschraublänge/thread reach $l_e = 2 \times d_{\text{Schraube/bolt}}$ (Al-Legierungen/aluminium alloys)

| Rev. Revisionsgrund / <i>reason of revision</i> | Datum / date: | Bearbeiter/created by: | Geprüft/inspection date: | Prüfer/inspector |
|--|---------------|------------------------|--------------------------|------------------|
| 0-Erstellung / <i>compilation</i> | 16.12.2008 | Mitschke | 16.12.2008 | G. Kipp |
| 1-Ergänzung / <i>completion</i> | 29.01.2009 | Mitschke | 29.01.2009 | G. Kipp |

HP112 Flansch-Schrauben / flange bolting

max. Anzugsmomente gem. EW 1810 beachten!
respect max. torque acc. EW 1810!

Bei der Schraubenauswahl ist für den Gegenflansch die angegebene Flanschdicke und eine Flansch-Dichtungshöhe von 2 mm berücksichtigt, die tatsächliche vorhandene Flansch-, und Dichtungsdicke ist kundenseitig zu prüfen und die Schraubenlängen entsprechend anzupassen!
*selection of the bolts by allowance counter flange thickness as denoted and flange gasket thickness 2 mm,
the effectively existing flange-, and flange gasket thickness is to check by the customer and the bolt length proportionately customize*

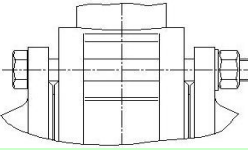
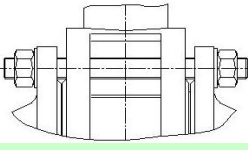
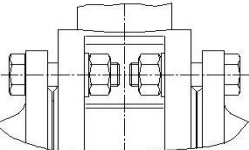
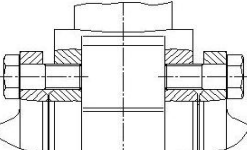
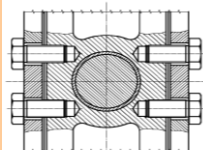
Längenmaße angegeben in mm

length dimensions specified in mm

Bemerkung / comment :

Sonderausführung nach Auftrag!
special type only acc. order!

Zoll-Gewinde nach ASME B1.1-1989 UNC bis Gewinde 1"; Für Gewinde >1" gilt Steigung 8 UN / Inch thread acc. ASME B1.1-1989 UNC up to thread 1"; for thread >1" = 8 UN

| DN | Size | Flanschanschluss / Flanged Connection | Einbaumaß Face - to - face | Verbindungsart Connection <small>Verb. 4 = beachte Bemerkung! Conn. 4 = notice comment!</small> | Lochanzahl Number of Bolts | Gegen-Flanschdicke counter flange thickness |  Verbindungsart 1 / Connection 1 Schraube / screw |  Verbindungsart 2 / Connection 2 Gewindestange / threaded both |  Verbindungsart 3 / Connection 3 Schraube / screw |  Verbindungsart 4 / Connection 4 Schraube / screw |  Verbindungsart 5 / Connection 5 Schraube / screw |
|-----|------|---------------------------------------|----------------------------|--|----------------------------|---|---|---|--|--|--|
| 80 | 3" | PN 10 | 114 | 1 or 2 or 3 or 4 | 8 | 20 | 8 x M16 x 180 | 8 x M16 x 200 | 16 x M16 x 70 | 16 x M16 x 50 | not required |
| 80 | 3" | PN 16 | 114 | 1 or 2 or 3 or 4 | 8 | 20 | 8 x M16 x 180 | 8 x M16 x 200 | 16 x M16 x 70 | 16 x M16 x 50 | not required |
| 80 | 3" | PN 25 | 114 | 1 or 2 or 3 or 4 | 8 | 24 | 8 x M16 x 190 | 8 x M16 x 210 | 16 x M16 x 75 | 16 x M16 x 50 | not required |
| 80 | 3" | PN 40 | 114 | 1 or 2 or 3 or 4 | 8 | 24 | 8 x M16 x 190 | 8 x M16 x 210 | 16 x M16 x 75 | 16 x M16 x 50 | not required |
| 80 | 3" | JIS 10K | 114 | 1 or 2 or 3 or 4 | 8 | 18 | 8 x M16 x 180 | 8 x M16 x 200 | 16 x M16 x 65 | 16 x M16 x 45 | not required |
| 80 | 3" | ASME B16.5 cl. 150 | 114 | 1 or 2 or 3 or 4 | 4 | 24 | 4 x 5/8"- 11UNC x 190 | 4 x 5/8"- 11UNC x 210 | 8 x 5/8"- 11UNC x 75 | 8 x 5/8"- 11UNC x 50 | not required |
| 100 | 4" | PN 10 | 127 | 1 or 2 or 3 or 4 | 8 | 20 | 8 x M16 x 200 | 8 x M16 x 220 | 16 x M16 x 70 | 16 x M16 x 50 | not required |
| 100 | 4" | PN 16 | 127 | 1 or 2 or 3 or 4 | 8 | 20 | 8 x M16 x 200 | 8 x M16 x 220 | 16 x M16 x 70 | 16 x M16 x 50 | not required |
| 100 | 4" | PN 25 | 127 | 1 or 2 or 3 or 4 | 8 | 24 | 8 x M20 x 210 | 8 x M20 x 230 | 16 x M20 x 80 | 16 x M20 x 50 | not required |
| 100 | 4" | PN 40 | 127 | 1 or 2 or 3 or 4 | 8 | 24 | 8 x M20 x 210 | 8 x M20 x 230 | 16 x M20 x 80 | 16 x M20 x 50 | not required |
| 100 | 4" | JIS 16K | 127 | 1 or 2 or 3 or 4 | 8 | 22 | 8 x M20 x 200 | 8 x M20 x 230 | 16 x M20 x 75 | 16 x M20 x 50 | not required |
| 100 | 4" | JIS 20K | 127 | 1 or 2 or 3 or 4 | 8 | 22 | 8 x M20 x 200 | 8 x M20 x 230 | 16 x M20 x 75 | 16 x M20 x 50 | not required |
| 100 | 4" | JIS 30K | 127 | 1 or 2 or 3 or 4 | 8 | 32 | 8 x M22 x 230 | 8 x M22 x 250 | 16 x M22 x 85 | 16 x M22 x 60 | not required |
| 100 | 4" | ASME B16.5 cl. 150 | 127 | 1 or 2 or 3 or 4 | 8 | 24 | 8 x 5/8"- 11UNC x 200 | 8 x 5/8"- 11UNC x 230 | 16 x 5/8"- 11UNC x 75 | 16 x 5/8"- 11UNC x 50 | not required |
| 100 | 4" | ISO 7005-1 - PN20 | 127 | 1 or 2 or 3 or 4 | 8 | 24 | 8 x M16 x 200 | 8 x M16 x 220 | 16 x M16 x 70 | 16 x M16 x 50 | not required |
| 100 | 4" | ASME B16.1 cl. 125 | 127 | 1 or 2 or 3 or 4 | 8 | 24 | 8 x 5/8"- 11UNC x 200 | 8 x 5/8"- 11UNC x 230 | 16 x 5/8"- 11UNC x 75 | 16 x 5/8"- 11UNC x 50 | not required |
| 100 | 4" | BS 10 - Table F | 127 | 1 or 2 or 3 or 4 | 8 | 19 | 8 x 5/8"- 11UNC x 190 | 8 x 5/8"- 11UNC x 220 | 16 x 5/8"- 11UNC x 70 | 16 x 5/8"- 11UNC x 45 | not required |
| 100 | 4" | BS 10 - Table H | 127 | 1 or 2 or 3 or 4 | 8 | 25 | 8 x 5/8"- 11UNC x 210 | 8 x 5/8"- 11UNC x 230 | 16 x 5/8"- 11UNC x 75 | 16 x 5/8"- 11UNC x 55 | not required |
| 100 | 4" | BS 10 - Table J | 127 | 1 or 2 or 3 or 4 | 8 | 35 | 8 x 3/4"- 10UNC x 230 | 8 x 3/4"- 10UNC x 250 | 16 x 3/4"- 10UNC x 90 | 16 x 3/4"- 10UNC x 65 | not required |
| 100 | 4" | ASME B16.5 cl. 300 | 127 | 1 or 2 or 3 or 4 | 8 | 32 | 8 x 3/4"- 10UNC x 220 | 8 x 3/4"- 10UNC x 250 | 16 x 3/4"- 10UNC x 85 | 16 x 3/4"- 10UNC x 60 | not required |

| | | | | | | | | | | | |
|-----|----|----------------------|-----|----------------------|----|----|-----------------------|-----------------------|-----------------------|-----------------------|--------------|
| 100 | 4" | ASME B16.1 cl. 250 | 127 | 1 or 2 or 3 or 4 | 8 | 22 | 8 x 3/4"- 10UNC x 200 | 8 x 3/4"- 10UNC x 230 | 16 x 3/4"- 10UNC x 75 | 16 x 3/4"- 10UNC x 50 | not required |
| 100 | 4" | AS 4087 - cl. 35 | 127 | 1 or 2 or 3 or 4 | 8 | 22 | 8 x M16 x 200 | 8 x M16 x 220 | 16 x M16 x 70 | 16 x M16 x 50 | not required |
| 100 | 4" | AWWA C 207 cl. B + D | 127 | 1 or 2 or 3 or 4 | 8 | 13 | 8 x 5/8"- 11UNC x 180 | 8 x 5/8"- 11UNC x 200 | 16 x 5/8"- 11UNC x 60 | 16 x 5/8"- 11UNC x 40 | not required |
| 100 | 4" | AWWA C 207 cl. E | 127 | 1 or 2 or 3 or 4 | 8 | 24 | 8 x 5/8"- 11UNC x 200 | 8 x 5/8"- 11UNC x 230 | 16 x 5/8"- 11UNC x 75 | 16 x 5/8"- 11UNC x 50 | not required |
| 100 | 4" | AWWA C 207 cl. F | 127 | 1 or 2 or 3 or 4 | 8 | 29 | 8 x 3/4"- 10UNC x 220 | 8 x 3/4"- 10UNC x 240 | 16 x 3/4"- 10UNC x 80 | 16 x 3/4"- 10UNC x 60 | not required |
| 100 | 4" | AS 2129 - Table D | 127 | 1 or 2 or 3 or 4 | 4 | 19 | 4 x M16 x 190 | 4 x M16 x 210 | 8 x M16 x 65 | 8 x M16 x 45 | not required |
| 100 | 4" | AS 2129 - Table E | 127 | 1 or 2 or 3 or 4 | 8 | 22 | 8 x M16 x 200 | 8 x M16 x 220 | 16 x M16 x 70 | 16 x M16 x 50 | not required |
| 100 | 4" | AS 2129 - Table F | 127 | 1 or 2 or 3 or 4 | 8 | 22 | 8 x M16 x 200 | 8 x M16 x 220 | 16 x M16 x 70 | 16 x M16 x 50 | not required |
| 100 | 4" | AS 2129 - Table H | 127 | 1 or 2 or 3 or 4 | 8 | 32 | 8 x M16 x 220 | 8 x M16 x 240 | 16 x M16 x 80 | 16 x M16 x 60 | not required |
| 100 | 4" | AS 2129 - Table J | 127 | 1 or 2 or 3 or 4 | 8 | 35 | 8 x M22 x 230 | 8 x M22 x 260 | 16 x M22 x 90 | 16 x M22 x 65 | not required |
| 150 | 6" | PN 10 | 140 | 1 or 2 or 3 or 4 | 8 | 22 | 8 x M20 x 220 | 8 x M20 x 240 | 16 x M20 x 75 | 16 x M20 x 50 | not required |
| 150 | 6" | PN 16 | 140 | 1 or 2 or 3 or 4 | 8 | 22 | 8 x M20 x 220 | 8 x M20 x 240 | 16 x M20 x 75 | 16 x M20 x 50 | not required |
| 150 | 6" | PN 25 | 140 | 1 or 2 or 4 | 8 | 28 | 8 x M24 x 240 | 8 x M24 x 280 | not available | 16 x M24 x 60 | not required |
| 150 | 6" | PN 40 | 140 | 1 or 2 or 4 | 8 | 28 | 8 x M24 x 240 | 8 x M24 x 280 | not available | 16 x M24 x 60 | not required |
| 150 | 6" | JIS 10K | 140 | 1 or 2 or 3 or 4 | 8 | 22 | 8 x M20 x 220 | 8 x M20 x 240 | 16 x M20 x 75 | 16 x M20 x 50 | not required |
| 150 | 6" | JIS 16K | 140 | 1 or 2 or 3 or 4 + 5 | 12 | 24 | 8 x M22 x 220 | 8 x M22 x 250 | 16 x M22 x 85 | 16 x M22 x 60 | 8 x M22 x 55 |
| 150 | 6" | ASME B16.5 cl. 150 | 140 | 1 or 2 or 3 or 4 | 8 | 25 | 8 x 3/4"- 10UNC x 220 | 8 x 3/4"- 10UNC x 250 | 16 x 3/4"- 10UNC x 80 | 16 x 3/4"- 10UNC x 55 | not required |
| 150 | 6" | ISO 7005-1 - PN20 | 140 | 1 or 2 or 3 or 4 | 8 | 26 | 8 x M20 x 220 | 8 x M20 x 250 | 16 x M20 x 80 | 16 x M20 x 55 | not required |
| 150 | 6" | ASME B16.1 cl. 125 | 140 | 1 or 2 or 3 or 4 | 8 | 25 | 8 x 3/4"- 10UNC x 220 | 8 x 3/4"- 10UNC x 250 | 16 x 3/4"- 10UNC x 80 | 16 x 3/4"- 10UNC x 55 | not required |
| 150 | 6" | BS 10 - Table D | 140 | 1 or 2 or 3 or 4 | 8 | 13 | 8 x 5/8"- 11UNC x 190 | 8 x 5/8"- 11UNC x 220 | 16 x 5/8"- 11UNC x 65 | 16 x 5/8"- 11UNC x 40 | not required |

| | | | | | | | | | | | |
|-----|----|----------------------|-----|----------------------|----|----|-----------------------|-----------------------|-----------------------|-----------------------|----------------------|
| 150 | 6" | BS 10 - Table E | 140 | 1 or 2 or 3 or 4 | 8 | 18 | 8 x 3/4"- 10UNC x 210 | 8 x 3/4"- 10UNC x 230 | 16 x 3/4"- 10UNC x 70 | 16 x 3/4"- 10UNC x 45 | not required |
| 150 | 6" | BS 10 - Table F | 140 | 1 or 2 or 3 or 4 + 5 | 12 | 22 | 8 x 3/4"- 10UNC x 220 | 8 x 3/4"- 10UNC x 240 | 16 x 3/4"- 10UNC x 80 | 16 x 3/4"- 10UNC x 55 | 8 x 3/4"- 10UNC x 50 |
| 150 | 6" | BS 10 - Table H | 140 | 1 or 2 or 3 or 4 + 5 | 12 | 29 | 8 x 3/4"- 10UNC x 230 | 8 x 3/4"- 10UNC x 260 | 16 x 3/4"- 10UNC x 85 | 16 x 3/4"- 10UNC x 60 | 8 x 3/4"- 10UNC x 55 |
| 150 | 6" | BS 10 - Table J | 140 | 1 or 2 or 3 or 4 + 5 | 12 | 38 | 8 x 7/8"- 9UNC x 250 | 8 x 7/8"- 9UNC x 280 | 16 x 7/8"- 9UNC x 100 | 16 x 7/8"- 9UNC x 70 | 8 x 7/8"- 9UNC x 65 |
| 150 | 6" | BS 10 - Table K | 140 | 1 or 2 or 3 or 4 + 5 | 12 | 41 | 8 x 7/8"- 9UNC x 260 | 8 x 7/8"- 9UNC x 290 | 16 x 7/8"- 9UNC x 110 | 16 x 7/8"- 9UNC x 75 | 8 x 7/8"- 9UNC x 70 |
| 150 | 6" | BS 10 - Table R | 140 | 1 or 2 or 3 or 4 + 5 | 12 | 45 | 8 x 7/8"- 9UNC x 270 | 8 x 7/8"- 9UNC x 290 | 16 x 7/8"- 9UNC x 110 | 16 x 7/8"- 9UNC x 80 | 8 x 7/8"- 9UNC x 70 |
| 150 | 6" | ASME B16.5 cl. 300 | 140 | 1 or 2 or 3 or 4 + 5 | 12 | 37 | 8 x 3/4"- 10UNC x 250 | 8 x 3/4"- 10UNC x 270 | 16 x 3/4"- 10UNC x 95 | 16 x 3/4"- 10UNC x 70 | 8 x 3/4"- 10UNC x 65 |
| 150 | 6" | AWWA C 207 cl. B + D | 140 | 1 or 2 or 3 or 4 | 8 | 14 | 8 x 3/4"- 10UNC x 200 | 8 x 3/4"- 10UNC x 230 | 16 x 3/4"- 10UNC x 70 | 16 x 3/4"- 10UNC x 45 | not required |
| 150 | 6" | AWWA C 207 cl. E | 140 | 1 or 2 or 3 or 4 | 8 | 25 | 8 x 3/4"- 10UNC x 220 | 8 x 3/4"- 10UNC x 250 | 16 x 3/4"- 10UNC x 80 | 16 x 3/4"- 10UNC x 55 | not required |
| 150 | 6" | AS 2129 - Table D | 140 | 1 or 2 or 3 or 4 | 8 | 21 | 8 x M16 x 210 | 8 x M16 x 230 | 16 x M16 x 70 | 16 x M16 x 50 | not required |
| 150 | 6" | AS 2129 - Table E | 140 | 1 or 2 or 3 or 4 | 8 | 22 | 8 x M20 x 220 | 8 x M20 x 240 | 16 x M20 x 75 | 16 x M20 x 50 | not required |
| 200 | 8" | PN 10 | 152 | 1 or 2 or 3 or 4 | 8 | 24 | 8 x M20 x 230 | 8 x M20 x 260 | 16 x M20 x 80 | 16 x M20 x 55 | not required |
| 200 | 8" | PN 16 | 152 | 1 or 2 or 3 or 4 | 12 | 24 | 12 x M20 x 230 | 12 x M20 x 260 | 24 x M20 x 80 | 24 x M20 x 55 | not required |
| 200 | 8" | PN 25 | 152 | 1 or 2 or 3 or 4 + 5 | 12 | 30 | 8 x M24 x 250 | 8 x M24 x 280 | 16 x M24 x 95 | 16 x M24 x 65 | 8 x M24 x 65 |
| 200 | 8" | PN 40 | 152 | 1 or 2 or 3 or 4 + 5 | 12 | 34 | 8 x M27 x 260 | 8 x M27 x 290 | 16 x M27 x 100 | 16 x M27 x 70 | 8 x M27 x 65 |
| 200 | 8" | JIS 16K | 152 | 1 or 2 or 3 or 4 + 5 | 12 | 26 | 8 x M22 x 240 | 8 x M22 x 260 | 16 x M22 x 85 | 16 x M22 x 60 | 8 x M22 x 60 |
| 200 | 8" | JIS 20K | 152 | 1 or 2 or 3 or 4 + 5 | 12 | 30 | 8 x M22 x 250 | 8 x M22 x 270 | 16 x M22 x 90 | 16 x M22 x 65 | 8 x M22 x 60 |
| 200 | 8" | JIS 30K | 152 | 1 or 2 or 3 or 4 + 5 | 12 | 42 | 8 x M24 x 270 | 8 x M24 x 300 | 16 x M24 x 110 | 16 x M24 x 75 | 8 x M24 x 75 |
| 200 | 8" | ASME B16.5 cl. 150 | 152 | 1 or 2 or 3 or 4 | 8 | 28 | 8 x 3/4"- 10UNC x 240 | 8 x 3/4"- 10UNC x 270 | 16 x 3/4"- 10UNC x 85 | 16 x 3/4"- 10UNC x 60 | not required |
| 200 | 8" | ISO 7005-1 - PN20 | 152 | 1 or 2 or 3 or 4 | 8 | 29 | 8 x M20 x 240 | 8 x M20 x 270 | 16 x M20 x 85 | 16 x M20 x 60 | not required |

| | | | | | | | | | | | |
|-----|-----|----------------------|-----|----------------------|----|----|-----------------------|-----------------------|-----------------------|-----------------------|----------------------|
| 200 | 8" | ASME B16.1 cl. 125 | 152 | 1 or 2 or 3 or 4 | 8 | 28 | 8 x 3/4"- 10UNC x 240 | 8 x 3/4"- 10UNC x 270 | 16 x 3/4"- 10UNC x 85 | 16 x 3/4"- 10UNC x 60 | not required |
| 200 | 8" | BS 10 - Table D | 152 | 1 or 2 or 3 or 4 | 8 | 13 | 8 x 5/8"- 11UNC x 210 | 8 x 5/8"- 11UNC x 230 | 16 x 5/8"- 11UNC x 65 | 16 x 5/8"- 11UNC x 50 | not required |
| 200 | 8" | BS 10 - Table E | 152 | 1 or 2 or 3 or 4 | 8 | 19 | 8 x 3/4"- 10UNC x 220 | 8 x 3/4"- 10UNC x 250 | 16 x 3/4"- 10UNC x 75 | 16 x 3/4"- 10UNC x 50 | not required |
| 200 | 8" | BS 10 - Table F | 152 | 1 or 2 or 3 or 4 + 5 | 12 | 25 | 8 x 3/4"- 10UNC x 240 | 8 x 3/4"- 10UNC x 260 | 16 x 3/4"- 10UNC x 85 | 16 x 3/4"- 10UNC x 60 | 8 x 3/4"- 10UNC x 55 |
| 200 | 8" | BS 10 - Table H | 152 | 1 or 2 or 3 or 4 + 5 | 12 | 32 | 8 x 3/4"- 10UNC x 250 | 8 x 3/4"- 10UNC x 270 | 16 x 3/4"- 10UNC x 90 | 16 x 3/4"- 10UNC x 65 | 8 x 3/4"- 10UNC x 65 |
| 200 | 8" | BS 10 - Table J | 152 | 1 or 2 or 3 or 4 + 5 | 12 | 41 | 8 x 7/8"- 9UNC x 270 | 8 x 7/8"- 9UNC x 300 | 16 x 7/8"- 9UNC x 110 | 16 x 7/8"- 9UNC x 75 | 8 x 7/8"- 9UNC x 75 |
| 200 | 8" | BS 10 - Table K | 152 | 1 or 2 or 3 or 4 + 5 | 12 | 48 | 8 x 1"- 8UNC x 290 | 8 x 1"- 8UNC x 320 | 16 x 1"- 8UNC x 120 | 16 x 1"- 8UNC x 80 | 8 x 1"- 8UNC x 80 |
| 200 | 8" | BS 10 - Table R | 152 | 1 or 2 or 3 or 4 + 5 | 12 | 51 | 8 x 1"- 8UNC x 290 | 8 x 1"- 8UNC x 330 | 16 x 1"- 8UNC x 120 | 16 x 1"- 8UNC x 85 | 8 x 1"- 8UNC x 80 |
| 200 | 8" | ASME B16.5 cl. 300 | 152 | 1 or 2 or 3 or 4 + 5 | 12 | 41 | 8 x 7/8"- 9UNC x 270 | 8 x 7/8"- 9UNC x 300 | 16 x 7/8"- 9UNC x 110 | 16 x 7/8"- 9UNC x 75 | 8 x 7/8"- 9UNC x 75 |
| 200 | 8" | AWWA C 207 cl. B + D | 152 | 1 or 2 or 3 or 4 | 8 | 14 | 8 x 3/4"- 10UNC x 210 | 8 x 3/4"- 10UNC x 240 | 16 x 3/4"- 10UNC x 70 | 16 x 3/4"- 10UNC x 45 | not required |
| 200 | 8" | AWWA C 207 cl. E | 152 | 1 or 2 or 3 or 4 | 8 | 29 | 8 x 3/4"- 10UNC x 240 | 8 x 3/4"- 10UNC x 270 | 16 x 3/4"- 10UNC x 85 | 16 x 3/4"- 10UNC x 60 | not required |
| 200 | 8" | AS 2129 - Table D | 152 | 1 or 2 or 3 or 4 | 8 | 22 | 8 x M16 x 220 | 8 x M16 x 250 | 16 x M16 x 75 | 16 x M16 x 55 | not required |
| 200 | 8" | AS 2129 - Table E | 152 | 1 or 2 or 3 or 4 | 8 | 25 | 8 x M20 x 230 | 8 x M20 x 260 | 16 x M20 x 80 | 16 x M20 x 60 | not required |
| 200 | 8" | AS 2129 - Table F | 152 | 1 or 2 or 3 or 4 + 5 | 12 | 29 | 8 x M20 x 240 | 8 x M20 x 270 | 16 x M20 x 90 | 16 x M20 x 65 | 8 x M20 x 60 |
| 200 | 8" | AS 2129 - Table H | 152 | 1 or 2 or 3 or 4 + 5 | 12 | 38 | 8 x M20 x 260 | 8 x M20 x 290 | 16 x M20 x 100 | 16 x M20 x 75 | 8 x M20 x 70 |
| 200 | 8" | AS 2129 - Table J | 152 | 1 or 2 or 3 or 4 + 5 | 12 | 41 | 8 x M24 x 270 | 8 x M24 x 300 | 16 x M24 x 110 | 16 x M24 x 75 | 8 x M24 x 75 |
| 200 | 8" | AS 2129 - Table K | 152 | 1 or 2 or 3 or 4 + 5 | 12 | 48 | 8 x M27 x 290 | 8 x M27 x 320 | 16 x M27 x 120 | 16 x M27 x 85 | 8 x M27 x 80 |
| 200 | 8" | AS 2129 - Table R | 152 | 1 or 2 or 3 or 4 + 5 | 12 | 51 | 8 x M27 x 290 | 8 x M27 x 330 | 16 x M27 x 120 | 16 x M27 x 85 | 8 x M27 x 85 |
| 250 | 10" | PN 10 | 165 | 1 or 2 or 3 or 4 | 12 | 26 | 12 x M20 x 250 | 12 x M20 x 270 | 24 x M20 x 85 | 24 x M20 x 60 | not required |
| 250 | 10" | PN 16 | 165 | 1 or 2 or 3 or 4 | 12 | 26 | 12 x M24 x 260 | 12 x M24 x 290 | 24 x M24 x 90 | 24 x M24 x 60 | not required |

| | | | | | | | | | | | |
|-----|-----|----------------------|-----|----------------------|----|----|------------------------|------------------------|-----------------------|-----------------------|---------------------|
| 250 | 10" | PN 25 | 165 | 1 or 2 or 3 or 4 + 5 | 12 | 32 | 8 x M27 x 270 | 8 x M27 x 300 | 16 x M27 x 110 | 16 x M27 x 75 | 8 x M27 x 70 |
| 250 | 10" | PN 40 | 165 | 1 or 2 or 3 or 4 + 5 | 12 | 38 | 8 x M30 x 280 | 8 x M30 x 320 | 16 x M30 x 120 | 16 x M30 x 80 | 8 x M30 x 75 |
| 250 | 10" | JIS 10K | 165 | 1 or 2 or 3 or 4 | 12 | 24 | 12 x M22 x 250 | 12 x M22 x 270 | 24 x M22 x 85 | 24 x M22 x 60 | not required |
| 250 | 10" | JIS 16K | 165 | 1 or 2 or 3 or 4 + 5 | 12 | 28 | 8 x M24 x 260 | 8 x M24 x 290 | 16 x M24 x 100 | 16 x M24 x 70 | 8 x M24 x 65 |
| 250 | 10" | JIS 20K | 165 | 1 or 2 or 3 or 4 + 5 | 12 | 34 | 8 x M24 x 270 | 8 x M24 x 300 | 16 x M24 x 110 | 16 x M24 x 75 | 8 x M24 x 70 |
| 250 | 10" | JIS 30K | 165 | 1 or 2 or 3 or 4 + 5 | 12 | 48 | 8 x M30 x 300 | 8 x M30 x 340 | 16 x M30 x 130 | 16 x M30 x 90 | 8 x M30 x 85 |
| 250 | 10" | ASME B16.5 cl. 150 | 165 | 1 or 2 or 3 or 4 | 12 | 30 | 12 x 7/8"- 9UNC x 260 | 12 x 7/8"- 9UNC x 290 | 24 x 7/8"- 9UNC x 90 | 24 x 7/8"- 9UNC x 65 | not required |
| 250 | 10" | ISO 7005-1 - PN20 | 165 | 1 or 2 or 3 or 4 | 12 | 31 | 12 x M24 x 260 | 12 x M24 x 290 | 24 x M24 x 95 | 24 x M24 x 65 | not required |
| 250 | 10" | ISO 7005-1 - PN50 | 165 | 1 or 2 or 3 or 4 + 5 | 16 | 48 | 12 x M27 x 300 | 12 x M27 x 330 | 24 x M27 x 120 | 24 x M27 x 90 | 8 x M27 x 85 |
| 250 | 10" | ASME B16.1 cl. 125 | 165 | 1 or 2 or 3 or 4 | 12 | 30 | 12 x 7/8"- 9UNC x 260 | 12 x 7/8"- 9UNC x 290 | 24 x 7/8"- 9UNC x 90 | 24 x 7/8"- 9UNC x 65 | not required |
| 250 | 10" | BS 10 - Table D | 165 | 1 or 2 or 3 or 4 | 8 | 16 | 8 x 3/4"- 10UNC x 230 | 8 x 3/4"- 10UNC x 250 | 16 x 3/4"- 10UNC x 75 | 16 x 3/4"- 10UNC x 50 | not required |
| 250 | 10" | BS 10 - Table E | 165 | 1 or 2 or 3 or 4 | 12 | 22 | 12 x 3/4"- 10UNC x 240 | 12 x 3/4"- 10UNC x 270 | 24 x 3/4"- 10UNC x 80 | 24 x 3/4"- 10UNC x 55 | not required |
| 250 | 10" | BS 10 - Table F | 165 | 1 or 2 or 3 or 4 + 5 | 12 | 29 | 8 x 7/8"- 9UNC x 260 | 8 x 7/8"- 9UNC x 290 | 16 x 7/8"- 9UNC x 100 | 16 x 7/8"- 9UNC x 70 | 8 x 7/8"- 9UNC x 65 |
| 250 | 10" | BS 10 - Table H | 165 | 1 or 2 or 3 or 4 + 5 | 12 | 35 | 8 x 7/8"- 9UNC x 270 | 8 x 7/8"- 9UNC x 300 | 16 x 7/8"- 9UNC x 110 | 16 x 7/8"- 9UNC x 75 | 8 x 7/8"- 9UNC x 70 |
| 250 | 10" | BS 10 - Table J | 165 | 1 or 2 or 3 or 4 + 5 | 12 | 48 | 8 x 1"- 8UNC x 300 | 8 x 1"- 8UNC x 330 | 16 x 1"- 8UNC x 120 | 16 x 1"- 8UNC x 90 | 8 x 1"- 8UNC x 85 |
| 250 | 10" | BS 10 - Table K | 165 | 1 or 2 or 3 or 4 + 5 | 16 | 51 | 12 x 1"- 8UNC x 310 | 12 x 1"- 8UNC x 340 | 24 x 1"- 8UNC x 130 | 24 x 1"- 8UNC x 90 | 8 x 1"- 8UNC x 85 |
| 250 | 10" | BS 10 - Table R | 165 | 1 or 2 or 3 or 4 + 5 | 16 | 60 | 12 x 1"- 8UNC x 330 | 12 x 1"- 8UNC x 360 | 24 x 1"- 8UNC x 140 | 24 x 1"- 8UNC x 100 | 8 x 1"- 8UNC x 95 |
| 250 | 10" | ASME B16.1 cl. 250 | 165 | 1 or 2 or 3 or 4 + 5 | 16 | 48 | 12 x 1"- 8UNC x 300 | 12 x 1"- 8UNC x 330 | 24 x 1"- 8UNC x 120 | 24 x 1"- 8UNC x 90 | 8 x 1"- 8UNC x 85 |
| 250 | 10" | ASME B16.5 cl. 300 | 165 | 1 or 2 or 3 or 4 + 5 | 16 | 48 | 12 x 1"- 8UNC x 300 | 12 x 1"- 8UNC x 330 | 24 x 1"- 8UNC x 120 | 24 x 1"- 8UNC x 90 | 8 x 1"- 8UNC x 85 |
| 250 | 10" | AWWA C 207 cl. B + D | 165 | 1 or 2 or 3 or 4 | 12 | 17 | 12 x 7/8"- 9UNC x 240 | 12 x 7/8"- 9UNC x 260 | 24 x 7/8"- 9UNC x 80 | 24 x 7/8"- 9UNC x 50 | not required |
| 250 | 10" | AWWA C 207 cl. E | 165 | 1 or 2 or 3 or 4 | 12 | 30 | 12 x 7/8"- 9UNC x 260 | 12 x 7/8"- 9UNC x 290 | 24 x 7/8"- 9UNC x 90 | 24 x 7/8"- 9UNC x 65 | not required |
| 250 | 10" | AWWA C 207 cl. F | 165 | 1 or 2 or 3 or 4 + 5 | 16 | 38 | 12 x 1"- 8UNC x 280 | 12 x 1"- 8UNC x 310 | 24 x 1"- 8UNC x 110 | 24 x 1"- 8UNC x 80 | 8 x 1"- 8UNC x 75 |
| 250 | 10" | AS 4087 PN 14/16 | 165 | 1 or 2 or 3 or 4 | 8 | 30 | 8 x M20 x 260 | 8 x M20 x 280 | 16 x M20 x 90 | 16 x M20 x 65 | not required |
| 250 | 10" | AS 2129 - Table C | 165 | 1 or 2 or 3 or 4 | 8 | 25 | 8 x M20 x 250 | 8 x M20 x 270 | 16 x M20 x 85 | 16 x M20 x 60 | not required |
| 250 | 10" | AS 2129 - Table D | 165 | 1 or 2 or 3 or 4 | 8 | 25 | 8 x M20 x 250 | 8 x M20 x 270 | 16 x M20 x 85 | 16 x M20 x 60 | not required |
| 250 | 10" | AS 2129 - Table E | 165 | 1 or 2 or 3 or 4 | 12 | 25 | 12 x M20 x 250 | 12 x M20 x 270 | 24 x M20 x 85 | 24 x M20 x 60 | not required |
| 250 | 10" | AS 2129 - Table F | 165 | 1 or 2 or 3 or 4 + 5 | 12 | 29 | 8 x M24 x 260 | 8 x M24 x 290 | 16 x M24 x 100 | 16 x M24 x 70 | 8 x M24 x 65 |
| 250 | 10" | AS 2129 - Table H | 165 | 1 or 2 or 3 or 4 + 5 | 12 | 41 | 8 x M24 x 290 | 8 x M24 x 320 | 16 x M24 x 110 | 16 x M24 x 80 | 8 x M24 x 75 |
| 250 | 10" | AS 2129 - Table J | 165 | 1 or 2 or 3 or 4 + 5 | 12 | 48 | 8 x M27 x 300 | 8 x M27 x 330 | 16 x M27 x 120 | 16 x M27 x 90 | 8 x M27 x 85 |
| 250 | 10" | AS 2129 - Table K | 165 | 1 or 2 or 3 or 4 + 5 | 16 | 51 | 12 x M27 x 310 | 12 x M27 x 340 | 24 x M27 x 130 | 24 x M27 x 90 | 8 x M27 x 85 |
| 250 | 10" | AS 2129 - Table R | 165 | 1 or 2 or 3 or 4 + 5 | 16 | 60 | 12 x M27 x 330 | 12 x M27 x 360 | 24 x M27 x 140 | 24 x M27 x 100 | 8 x M27 x 95 |
| 300 | 12" | PN 6 | 178 | 1 or 2 or 3 or 4 + 5 | 12 | 22 | 10 x M20 x 250 | 10 x M20 x 280 | 20 x M20 x 80 | 20 x M20 x 60 | 4 x M20 x 50 |
| 300 | 12" | PN 10 | 178 | 1 or 2 or 3 or 4 + 5 | 12 | 26 | 10 x M20 x 260 | 10 x M20 x 290 | 20 x M20 x 85 | 20 x M20 x 60 | 4 x M20 x 55 |
| 300 | 12" | PN 16 | 178 | 1 or 2 or 3 or 4 + 5 | 12 | 28 | 10 x M24 x 270 | 10 x M24 x 300 | 20 x M24 x 95 | 20 x M24 x 65 | 4 x M24 x 55 |
| 300 | 12" | PN 25 | 178 | 1 or 2 or 3 or 4 + 5 | 16 | 34 | 12 x M27 x 290 | 12 x M27 x 320 | 24 x M27 x 120 | 24 x M27 x 90 | 8 x M27 x 80 |
| 300 | 12" | JIS 5K | 178 | 1 or 2 or 3 or 4 + 5 | 12 | 22 | 10 x M20 x 250 | 10 x M20 x 280 | 20 x M20 x 80 | 20 x M20 x 60 | 4 x M20 x 50 |
| 300 | 12" | JIS 30K | 178 | 1 or 2 or 3 or 4 + 5 | 16 | 52 | 12 x M30 x 320 | 12 x M30 x 360 | 24 x M30 x 140 | 24 x M30 x 110 | 8 x M30 x 95 |
| 300 | 12" | ASME B16.5 cl. 150 | 178 | 1 or 2 or 3 or 4 + 5 | 12 | 32 | 10 x 7/8"- 9UNC x 280 | 10 x 7/8"- 9UNC x 310 | 20 x 7/8"- 9UNC x 95 | 20 x 7/8"- 9UNC x 65 | 4 x 7/8"- 9UNC x 60 |
| 300 | 12" | ISO 7005-1 - PN20 | 178 | 1 or 2 or 3 or 4 + 5 | 12 | 32 | 10 x M24 x 280 | 10 x M24 x 310 | 20 x M24 x 100 | 20 x M24 x 70 | 4 x M24 x 60 |
| 300 | 12" | ISO 7005-1 - PN50 | 178 | 1 or 2 or 3 or 4 + 5 | 16 | 51 | 12 x M30 x 320 | 12 x M30 x 360 | 24 x M30 x 140 | 24 x M30 x 110 | 8 x M30 x 95 |

| | | | | | | | | | | | |
|-----|-----|----------------------|-----|----------------------|----|----|------------------------|------------------------|------------------------|------------------------|-----------------------|
| 300 | 12" | ASME B16.1 cl. 125 | 178 | 1 or 2 or 3 or 4 + 5 | 12 | 32 | 10 x 7/8"- 9UNC x 280 | 10 x 7/8"- 9UNC x 310 | 20 x 7/8"- 9UNC x 95 | 20 x 7/8"- 9UNC x 65 | 4 x 7/8"- 9UNC x 60 |
| 300 | 12" | BS 10 - Table D | 178 | 1 or 2 or 3 or 4 + 5 | 12 | 19 | 10 x 3/4"- 10UNC x 250 | 10 x 3/4"- 10UNC x 270 | 20 x 3/4"- 10UNC x 80 | 20 x 3/4"- 10UNC x 55 | 4 x 3/4"- 10UNC x 50 |
| 300 | 12" | BS 10 - Table E | 178 | 1 or 2 or 3 or 4 + 5 | 12 | 25 | 10 x 7/8"- 9UNC x 270 | 10 x 7/8"- 9UNC x 290 | 20 x 7/8"- 9UNC x 90 | 20 x 7/8"- 9UNC x 60 | 4 x 7/8"- 9UNC x 55 |
| 300 | 12" | ASME B16.5 cl. 300 | 178 | 1 or 2 or 3 or 4 + 5 | 16 | 51 | 12 x 1 1/8"- 8UN x 320 | 12 x 1 1/8"- 8UN x 360 | 24 x 1 1/8"- 8UN x 140 | 24 x 1 1/8"- 8UN x 110 | 8 x 1 1/8"- 8UN x 95 |
| 300 | 12" | AWWA C 207 cl. B + D | 178 | 1 or 2 or 3 or 4 + 5 | 12 | 17 | 10 x 7/8"- 9UNC x 250 | 10 x 7/8"- 9UNC x 280 | 20 x 7/8"- 9UNC x 80 | 20 x 7/8"- 9UNC x 55 | 4 x 7/8"- 9UNC x 45 |
| 300 | 12" | AWWA C 207 cl. E | 178 | 1 or 2 or 3 or 4 + 5 | 12 | 32 | 10 x 7/8"- 9UNC x 280 | 10 x 7/8"- 9UNC x 310 | 20 x 7/8"- 9UNC x 95 | 20 x 7/8"- 9UNC x 65 | 4 x 7/8"- 9UNC x 60 |
| 300 | 12" | AS 4087 PN 14/16 | 178 | 1 or 2 or 3 or 4 + 5 | 12 | 30 | 10 x M20 x 270 | 10 x M20 x 300 | 20 x M20 x 90 | 20 x M20 x 65 | 4 x M20 x 60 |
| 300 | 12" | AS 2129 - Table A | 178 | 1 or 2 or 3 or 4 + 5 | 8 | 24 | 6 x M20 x 270 | 6 x M20 x 290 | 12 x M20 x 85 | 12 x M20 x 60 | 4 x M20 x 55 |
| 300 | 12" | AS 2129 - Table D | 178 | 1 or 2 or 3 or 4 + 5 | 12 | 25 | 10 x M20 x 260 | 10 x M20 x 290 | 20 x M20 x 85 | 20 x M20 x 60 | 4 x M20 x 55 |
| 300 | 12" | AS 2129 - Table E | 178 | 1 or 2 or 3 or 4 + 5 | 12 | 29 | 10 x M24 x 270 | 10 x M24 x 300 | 20 x M24 x 95 | 20 x M24 x 65 | 4 x M24 x 60 |
| 350 | 14" | PN 16 | 190 | 1 or 2 or 3 or 4 + 5 | 16 | 30 | 12 x M24 x 290 | 12 x M24 x 320 | 24 x M24 x 100 | 24 x M24 x 70 | 8 x M24 x 65 |
| 350 | 14" | PN 25 | 190 | 1 or 2 or 3 or 4 + 5 | 16 | 38 | 12 x M30 x 310 | 12 x M30 x 340 | 24 x M30 x 130 | 24 x M30 x 95 | 8 x M30 x 85 |
| 350 | 14" | PN 40 | 190 | 1 or 2 or 3 or 4 + 5 | 16 | 46 | 12 x M33 x 330 | 12 x M33 x 370 | 24 x M33 x 140 | 24 x M33 x 110 | 8 x M33 x 95 |
| 350 | 14" | JIS 16K | 190 | 1 or 2 or 3 or 4 + 5 | 16 | 34 | 12 x M30 x 300 | 12 x M30 x 340 | 24 x M30 x 110 | 24 x M30 x 75 | 8 x M30 x 70 |
| 350 | 14" | JIS 20K | 190 | 1 or 2 or 3 or 4 + 5 | 16 | 40 | 12 x M30 x 310 | 12 x M30 x 350 | 24 x M30 x 130 | 24 x M30 x 100 | 8 x M30 x 90 |
| 350 | 14" | JIS 30K | 190 | 1 or 2 or 3 or 4 + 5 | 16 | 54 | 12 x M30 x 340 | 12 x M30 x 380 | 24 x M30 x 150 | 24 x M30 x 110 | 8 x M30 x 100 |
| 350 | 14" | ASME B16.5 cl. 150 | 190 | 1 or 2 or 3 or 4 + 5 | 12 | 35 | 8 x 1"- 8UNC x 300 | 8 x 1"- 8UNC x 330 | 16 x 1"- 8UNC x 110 | 16 x 1"- 8UNC x 75 | 8 x 1"- 8UNC x 70 |
| 350 | 14" | ISO 7005-1 - PN20 | 190 | 1 or 2 or 3 or 4 + 5 | 12 | 35 | 8 x M27 x 300 | 8 x M27 x 330 | 16 x M27 x 100 | 16 x M27 x 75 | 8 x M27 x 70 |
| 350 | 14" | ISO 7005-1 - PN50 | 190 | 1 or 2 or 3 or 4 + 5 | 20 | 54 | 16 x M30 x 340 | 16 x M30 x 380 | 32 x M30 x 150 | 32 x M30 x 110 | 8 x M30 x 100 |
| 350 | 14" | ASME B16.1 cl. 125 | 190 | 1 or 2 or 3 or 4 + 5 | 12 | 35 | 8 x 1"- 8UNC x 300 | 8 x 1"- 8UNC x 330 | 16 x 1"- 8UNC x 110 | 16 x 1"- 8UNC x 75 | 8 x 1"- 8UNC x 70 |
| 350 | 14" | BS 10 - Table D | 190 | 1 or 2 or 3 or 4 + 5 | 12 | 22 | 8 x 7/8"- 9UNC x 270 | 8 x 7/8"- 9UNC x 300 | 16 x 7/8"- 9UNC x 90 | 16 x 7/8"- 9UNC x 60 | 8 x 7/8"- 9UNC x 60 |
| 350 | 14" | BS 10 - Table E | 190 | 1 or 2 or 3 or 4 + 5 | 12 | 29 | 8 x 7/8"- 9UNC x 280 | 8 x 7/8"- 9UNC x 310 | 16 x 7/8"- 9UNC x 100 | 16 x 7/8"- 9UNC x 65 | 8 x 7/8"- 9UNC x 65 |
| 350 | 14" | ASME B16.5 cl. 300 | 190 | 1 or 2 or 3 or 4 + 5 | 20 | 54 | 16 x 1 1/8"- 8UN x 340 | 16 x 1 1/8"- 8UN x 380 | 32 x 1 1/8"- 8UN x 150 | 32 x 1 1/8"- 8UN x 110 | 8 x 1 1/8"- 8UN x 100 |
| 350 | 14" | AWWA C 207 cl. B + D | 190 | 1 or 2 or 3 or 4 + 5 | 12 | 19 | 8 x 1"- 8UNC x 270 | 8 x 1"- 8UNC x 300 | 16 x 1"- 8UNC x 90 | 16 x 1"- 8UNC x 60 | 8 x 1"- 8UNC x 55 |
| 350 | 14" | AWWA C 207 cl. E | 190 | 1 or 2 or 3 or 4 + 5 | 12 | 35 | 8 x 1"- 8UNC x 300 | 8 x 1"- 8UNC x 330 | 16 x 1"- 8UNC x 110 | 16 x 1"- 8UNC x 75 | 8 x 1"- 8UNC x 70 |
| 350 | 14" | AS 4087 PN 14/16 | 190 | 1 or 2 or 3 or 4 + 5 | 12 | 33 | 8 x M24 x 290 | 8 x M24 x 320 | 16 x M24 x 100 | 16 x M24 x 70 | 8 x M24 x 70 |
| 350 | 14" | AS 2129 - Table D | 190 | 1 or 2 or 3 or 4 + 5 | 12 | 29 | 8 x M24 x 290 | 8 x M24 x 320 | 16 x M24 x 100 | 16 x M24 x 70 | 8 x M24 x 65 |
| 350 | 14" | AS 2129 - Table E | 190 | 1 or 2 or 3 or 4 + 5 | 12 | 32 | 8 x M24 x 290 | 8 x M24 x 320 | 16 x M24 x 100 | 16 x M24 x 70 | 8 x M24 x 70 |
| 350 | 14" | AS 2129 - Table F | 190 | 1 or 2 or 3 or 4 + 5 | 16 | 35 | 12 x M27 x 300 | 12 x M27 x 330 | 24 x M27 x 130 | 24 x M27 x 95 | 8 x M27 x 85 |
| 350 | 14" | AS 2129 - Table H | 190 | 1 or 2 or 3 or 4 + 5 | 16 | 48 | 12 x M27 x 330 | 12 x M27 x 360 | 24 x M27 x 140 | 24 x M27 x 110 | 8 x M27 x 95 |
| 350 | 14" | AS 2129 - Table J | 190 | 1 or 2 or 3 or 4 + 5 | 16 | 57 | 12 x M30 x 350 | 12 x M30 x 380 | 24 x M30 x 150 | 24 x M30 x 120 | 8 x M30 x 100 |
| 350 | 14" | AS 2129 - Table K | 190 | 1 or 2 or 4 + 5 | 16 | 67 | 12 x M33 x 370 | 12 x M33 x 410 | not available | 24 x M33 x 130 | 8 x M33 x 110 |
| 350 | 14" | AS 2129 - Table R | 190 | 1 or 2 or 4 + 5 | 16 | 79 | 12 x M33 x 400 | 12 x M33 x 430 | not available | 24 x M33 x 140 | 8 x M33 x 130 |
| 400 | 16" | PN 10 | 216 | 1 or 2 or 3 or 4 + 5 | 16 | 26 | 12 x M24 x 310 | 12 x M24 x 340 | 24 x M24 x 100 | 24 x M24 x 70 | 8 x M24 x 65 |
| 400 | 16" | PN 16 | 216 | 1 or 2 or 3 or 4 + 5 | 16 | 32 | 12 x M27 x 320 | 12 x M27 x 350 | 24 x M27 x 110 | 24 x M27 x 70 | 8 x M27 x 70 |
| 400 | 16" | PN 25 | 216 | 1 or 2 or 3 or 4 + 5 | 16 | 40 | 12 x M33 x 340 | 12 x M33 x 380 | 24 x M33 x 130 | 24 x M33 x 90 | 8 x M33 x 80 |
| 400 | 16" | JIS 10K | 216 | 1 or 2 or 3 or 4 + 5 | 16 | 28 | 12 x M24 x 310 | 12 x M24 x 340 | 24 x M24 x 100 | 24 x M24 x 70 | 8 x M24 x 70 |
| 400 | 16" | ASME B16.1 cl. 125 | 216 | 1 or 2 or 3 or 4 + 5 | 16 | 37 | 12 x 1"- 8UNC x 330 | 12 x 1"- 8UNC x 360 | 24 x 1"- 8UNC x 110 | 24 x 1"- 8UNC x 75 | 8 x 1"- 8UNC x 75 |
| 400 | 16" | ASME B16.5 cl. 150 | 216 | 1 or 2 or 3 or 4 + 5 | 16 | 37 | 12 x 1"- 8UNC x 330 | 12 x 1"- 8UNC x 360 | 24 x 1"- 8UNC x 110 | 24 x 1"- 8UNC x 75 | 8 x 1"- 8UNC x 75 |
| 400 | 16" | ASME B16.1 cl. 250 | 216 | 1 or 2 or 3 or 4 + 5 | 20 | 57 | 16 x 1 1/4"- 8UN x 380 | 16 x 1 1/4"- 8UN x 420 | 32 x 1 1/4"- 8UN x 150 | 32 x 1 1/4"- 8UN x 110 | 8 x 1 1/4"- 8UN x 95 |

| | | | | | | | | | | | |
|-----|-----|----------------------|-----|----------------------|----|----|------------------------|------------------------|------------------------|------------------------|-----------------------|
| 400 | 16" | ASME B16.5 cl. 300 | 216 | 1 or 2 or 3 or 4 + 5 | 20 | 57 | 16 x 1 1/4"- 8UN x 380 | 16 x 1 1/4"- 8UN x 420 | 32 x 1 1/4"- 8UN x 150 | 32 x 1 1/4"- 8UN x 110 | 8 x 1 1/4"- 8UN x 95 |
| 450 | 18" | PN 10 | 222 | 1 or 2 or 3 or 4 + 5 | 20 | 28 | 16 x M24 x 320 | 16 x M24 x 350 | 32 x M24 x 100 | 32 x M24 x 70 | 8 x M24 x 70 |
| 450 | 18" | PN 16 | 222 | 1 or 2 or 3 or 4 + 5 | 20 | 40 | 16 x M27 x 340 | 16 x M27 x 370 | 32 x M27 x 120 | 32 x M27 x 85 | 8 x M27 x 85 |
| 450 | 18" | PN 25 | 222 | 1 or 2 or 3 or 4 + 5 | 20 | 46 | 16 x M33 x 360 | 16 x M33 x 400 | 32 x M33 x 140 | 32 x M33 x 100 | 8 x M33 x 85 |
| 450 | 18" | PN 40 | 222 | 1 or 2 or 3 or 4 + 5 | 20 | 57 | 16 x M36 x 390 | 16 x M36 x 430 | 32 x M36 x 160 | 32 x M36 x 115 | 8 x M36 x 95 |
| 450 | 18" | JIS 5K | 222 | 1 or 2 or 3 or 4 + 5 | 16 | 24 | 12 x M22 x 300 | 12 x M22 x 330 | 24 x M22 x 95 | 24 x M22 x 70 | 8 x M22 x 70 |
| 450 | 18" | JIS 10K | 222 | 1 or 2 or 3 or 4 + 5 | 20 | 30 | 16 x M24 x 320 | 16 x M24 x 350 | 32 x M24 x 110 | 32 x M24 x 75 | 8 x M24 x 75 |
| 450 | 18" | ASME B16.1 cl. 125 | 222 | 1 or 2 or 3 or 4 + 5 | 16 | 40 | 12 x 1 1/8"- 8UN x 340 | 12 x 1 1/8"- 8UN x 380 | 24 x 1 1/8"- 8UN x 120 | 24 x 1 1/8"- 8UN x 85 | 8 x 1 1/8"- 8UN x 85 |
| 450 | 18" | ASME B16.5 cl. 150 | 222 | 1 or 2 or 3 or 4 + 5 | 16 | 40 | 12 x 1 1/8"- 8UN x 340 | 12 x 1 1/8"- 8UN x 380 | 24 x 1 1/8"- 8UN x 120 | 24 x 1 1/8"- 8UN x 85 | 8 x 1 1/8"- 8UN x 85 |
| 450 | 18" | ASME B16.1 cl. 250 | 222 | 1 or 2 or 3 or 4 + 5 | 24 | 61 | 20 x 1 1/4"- 8UN x 390 | 20 x 1 1/4"- 8UN x 430 | 40 x 1 1/4"- 8UN x 160 | 40 x 1 1/4"- 8UN x 120 | 8 x 1 1/4"- 8UN x 100 |
| 450 | 18" | ASME B16.5 cl. 300 | 222 | 1 or 2 or 3 or 4 + 5 | 24 | 61 | 20 x 1 1/4"- 8UN x 390 | 20 x 1 1/4"- 8UN x 430 | 40 x 1 1/4"- 8UN x 160 | 40 x 1 1/4"- 8UN x 120 | 8 x 1 1/4"- 8UN x 100 |
| 450 | 18" | BS 10 - Table E | 222 | 1 or 2 or 3 or 4 + 5 | 16 | 35 | 12 x 7/8"- 9UNC x 330 | 12 x 7/8"- 9UNC x 360 | 24 x 7/8"- 9UNC x 110 | 24 x 7/8"- 9UNC x 80 | 8 x 7/8"- 9UNC x 80 |
| 450 | 18" | AWWA C 207 cl. B + D | 222 | 1 or 2 or 3 or 4 + 5 | 16 | 19 | 12 x 1 1/8"- 8UN x 300 | 12 x 1 1/8"- 8UN x 340 | 24 x 1 1/8"- 8UN x 100 | 24 x 1 1/8"- 8UN x 65 | 8 x 1 1/8"- 8UN x 65 |
| 450 | 18" | AWWA C 207 cl. E | 222 | 1 or 2 or 3 or 4 + 5 | 16 | 40 | 12 x 1 1/8"- 8UN x 340 | 12 x 1 1/8"- 8UN x 380 | 24 x 1 1/8"- 8UN x 120 | 24 x 1 1/8"- 8UN x 85 | 8 x 1 1/8"- 8UN x 85 |
| 450 | 18" | AS 4087 PN 21 | 222 | 1 or 2 or 3 or 4 + 5 | 20 | 38 | 16 x M30 x 340 | 16 x M30 x 380 | 32 x M30 x 130 | 32 x M30 x 95 | 8 x M30 x 75 |
| 450 | 18" | AS 4087 PN 35 | 222 | 1 or 2 or 3 or 4 + 5 | 20 | 46 | 16 x M30 x 360 | 16 x M30 x 390 | 32 x M30 x 140 | 32 x M30 x 100 | 8 x M30 x 85 |
| 450 | 18" | AS 2129 - Table E | 222 | 1 or 2 or 3 or 4 + 5 | 16 | 35 | 12 x M24 x 330 | 12 x M24 x 360 | 24 x M24 x 110 | 24 x M24 x 80 | 8 x M24 x 80 |
| 500 | 20" | PN 10 | 229 | 1 or 2 or 3 or 4 + 5 | 20 | 28 | 16 x M24 x 320 | 16 x M24 x 350 | 32 x M24 x 110 | 32 x M24 x 75 | 8 x M24 x 70 |
| 500 | 20" | PN 25 | 229 | 1 or 2 or 3 or 4 + 5 | 20 | 48 | 12 x M33 x 370 | 12 x M33 x 410 | 24 x M33 x 150 | 24 x M33 x 110 | 16 x M33 x 95 |
| 500 | 20" | PN 40 | 229 | 1 or 2 or 3 or 4 + 5 | 20 | 57 | 12 x M39 x 400 | 12 x M39 x 440 | 24 x M39 x 160 | 24 x M39 x 120 | 16 x M39 x 100 |
| 500 | 20" | JIS 10K | 229 | 1 or 2 or 3 or 4 + 5 | 20 | 30 | 16 x M24 x 330 | 16 x M24 x 360 | 32 x M24 x 110 | 32 x M24 x 75 | 8 x M24 x 70 |
| 500 | 20" | ASME B16.1 cl. 125 | 229 | 1 or 2 or 3 or 4 + 5 | 20 | 43 | 16 x 1 1/8"- 8UN x 360 | 16 x 1 1/8"- 8UN x 390 | 32 x 1 1/8"- 8UN x 130 | 32 x 1 1/8"- 8UN x 90 | 8 x 1 1/8"- 8UN x 85 |
| 500 | 20" | ASME B16.5 cl. 150 | 229 | 1 or 2 or 3 or 4 + 5 | 20 | 43 | 16 x 1 1/8"- 8UN x 360 | 16 x 1 1/8"- 8UN x 390 | 32 x 1 1/8"- 8UN x 130 | 32 x 1 1/8"- 8UN x 90 | 8 x 1 1/8"- 8UN x 85 |
| 500 | 20" | ASME B16.1 cl. 250 | 229 | 1 or 2 or 3 or 4 + 5 | 24 | 64 | 20 x 1 1/4"- 8UN x 400 | 20 x 1 1/4"- 8UN x 440 | 40 x 1 1/4"- 8UN x 160 | 40 x 1 1/4"- 8UN x 120 | 8 x 1 1/4"- 8UN x 110 |
| 500 | 20" | ASME B16.5 cl. 300 | 229 | 1 or 2 or 3 or 4 + 5 | 24 | 64 | 20 x 1 1/4"- 8UN x 400 | 20 x 1 1/4"- 8UN x 440 | 40 x 1 1/4"- 8UN x 160 | 40 x 1 1/4"- 8UN x 120 | 8 x 1 1/4"- 8UN x 110 |
| 500 | 20" | AWWA C 207 cl. B + D | 229 | 1 or 2 or 3 or 4 + 5 | 20 | 19 | 16 x 1 1/8"- 8UN x 310 | 16 x 1 1/8"- 8UN x 350 | 32 x 1 1/8"- 8UN x 100 | 32 x 1 1/8"- 8UN x 65 | 8 x 1 1/8"- 8UN x 60 |
| 500 | 20" | AWWA C 207 cl. E | 229 | 1 or 2 or 3 or 4 + 5 | 20 | 43 | 16 x 1 1/8"- 8UN x 360 | 16 x 1 1/8"- 8UN x 390 | 32 x 1 1/8"- 8UN x 130 | 32 x 1 1/8"- 8UN x 90 | 8 x 1 1/8"- 8UN x 85 |
| 500 | 20" | AS 4087 PN 21 | 229 | 1 or 2 or 3 or 4 + 5 | 24 | 41 | 20 x M30 x 350 | 20 x M30 x 390 | 40 x M30 x 140 | 40 x M30 x 100 | 8 x M30 x 85 |
| 500 | 20" | AS 4087 PN 35 | 229 | 1 or 2 or 3 or 4 + 5 | 24 | 49 | 20 x M30 x 370 | 20 x M30 x 400 | 40 x M30 x 140 | 40 x M30 x 110 | 8 x M30 x 95 |
| 500 | 20" | AS 2129 - Table F | 229 | 1 or 2 or 3 or 4 + 5 | 24 | 41 | 20 x M30 x 350 | 20 x M30 x 390 | 40 x M30 x 140 | 40 x M30 x 100 | 8 x M30 x 85 |
| 500 | 20" | AS 2129 - Table H | 229 | 1 or 2 or 3 or 4 + 5 | 24 | 57 | 20 x M30 x 390 | 20 x M30 x 420 | 40 x M30 x 150 | 40 x M30 x 120 | 8 x M30 x 100 |
| 500 | 20" | AS 2129 - Table J | 229 | 1 or 2 or 3 or 4 + 5 | 24 | 79 | 20 x M33 x 430 | 20 x M33 x 470 | 40 x M33 x 180 | 40 x M33 x 140 | 8 x M33 x 120 |
| 600 | 24" | PN 10 | 267 | 1 or 2 or 3 or 4 + 5 | 20 | 28 | 16 x M27 x 360 | 16 x M27 x 400 | 32 x M27 x 110 | 32 x M27 x 80 | 8 x M27 x 65 |
| 600 | 24" | PN 25 | 267 | 1 or 2 or 3 or 4 + 5 | 20 | 58 | 16 x M36 x 430 | 16 x M36 x 480 | 32 x M36 x 170 | 32 x M36 x 130 | 8 x M36 x 110 |
| 600 | 24" | PN 40 | 267 | 1 or 2 or 3 or 4 + 5 | 20 | 72 | 16 x M45 x 470 | 16 x M45 x 520 | 32 x M45 x 190 | 32 x M45 x 140 | 8 x M45 x 130 |
| 600 | 24" | JIS 10K | 267 | 1 or 2 or 3 or 4 + 5 | 24 | 32 | 20 x M30 x 370 | 20 x M30 x 410 | 40 x M30 x 120 | 40 x M30 x 85 | 8 x M30 x 75 |
| 600 | 24" | ASME B16.5 cl. 150 | 267 | 1 or 2 or 3 or 4 + 5 | 20 | 48 | 16 x 1 1/4"- 8UN x 410 | 16 x 1 1/4"- 8UN x 450 | 32 x 1 1/4"- 8UN x 140 | 32 x 1 1/4"- 8UN x 100 | 8 x 1 1/4"- 8UN x 95 |
| 600 | 24" | ASME B16.1 cl. 250 | 267 | 1 or 2 or 3 or 4 + 5 | 24 | 70 | 20 x 1 1/2"- 8UN x 460 | 20 x 1 1/2"- 8UN x 510 | 40 x 1 1/2"- 8UN x 190 | 40 x 1 1/2"- 8UN x 140 | 8 x 1 1/2"- 8UN x 120 |
| 600 | 24" | ASME B16.5 cl. 300 | 267 | 1 or 2 or 3 or 4 + 5 | 24 | 70 | 20 x 1 1/2"- 8UN x 460 | 20 x 1 1/2"- 8UN x 510 | 40 x 1 1/2"- 8UN x 190 | 40 x 1 1/2"- 8UN x 140 | 8 x 1 1/2"- 8UN x 120 |
| 600 | 24" | AWWA C 207 cl. B + D | 267 | 1 or 2 or 3 or 4 + 5 | 20 | 25 | 16 x 1 1/4"- 8UN x 370 | 16 x 1 1/4"- 8UN x 410 | 32 x 1 1/4"- 8UN x 120 | 32 x 1 1/4"- 8UN x 75 | 8 x 1 1/4"- 8UN x 70 |

| | | | | | | | | | | | |
|-----|-----|-------------------|-----|----------------------|----|----|------------------------|------------------------|------------------------|------------------------|----------------------|
| 600 | 24" | AWWA C 207 cl. E | 267 | 1 or 2 or 3 or 4 + 5 | 20 | 48 | 16 x 1 1/4"- 8UN x 410 | 16 x 1 1/4"- 8UN x 450 | 32 x 1 1/4"- 8UN x 140 | 32 x 1 1/4"- 8UN x 100 | 8 x 1 1/4"- 8UN x 95 |
| 600 | 24" | AS 4087 PN 21 | 267 | 1 or 2 or 3 or 4 + 5 | 24 | 44 | 20 x M33 x 400 | 20 x M33 x 440 | 40 x M33 x 150 | 40 x M33 x 110 | 8 x M33 x 100 |
| 600 | 24" | AS 4087 PN 35 | 267 | 1 or 2 or 3 or 4 + 5 | 24 | 54 | 20 x M33 x 420 | 20 x M33 x 460 | 40 x M33 x 160 | 40 x M33 x 120 | 8 x M33 x 110 |
| 600 | 24" | AS 2129 - Table F | 267 | 1 or 2 or 3 or 4 + 5 | 24 | 44 | 20 x M33 x 400 | 20 x M33 x 440 | 40 x M33 x 150 | 40 x M33 x 110 | 8 x M33 x 100 |
| 600 | 24" | AS 2129 - Table H | 267 | 1 or 2 or 3 or 4 + 5 | 24 | 64 | 20 x M33 x 440 | 20 x M33 x 480 | 40 x M33 x 170 | 40 x M33 x 130 | 8 x M33 x 120 |
| 600 | 24" | AS 2129 - Table J | 267 | 1 or 2 or 3 or 4 + 5 | 24 | 92 | 20 x M36 x 500 | 20 x M36 x 540 | 40 x M36 x 200 | 40 x M36 x 160 | 8 x M36 x 150 |