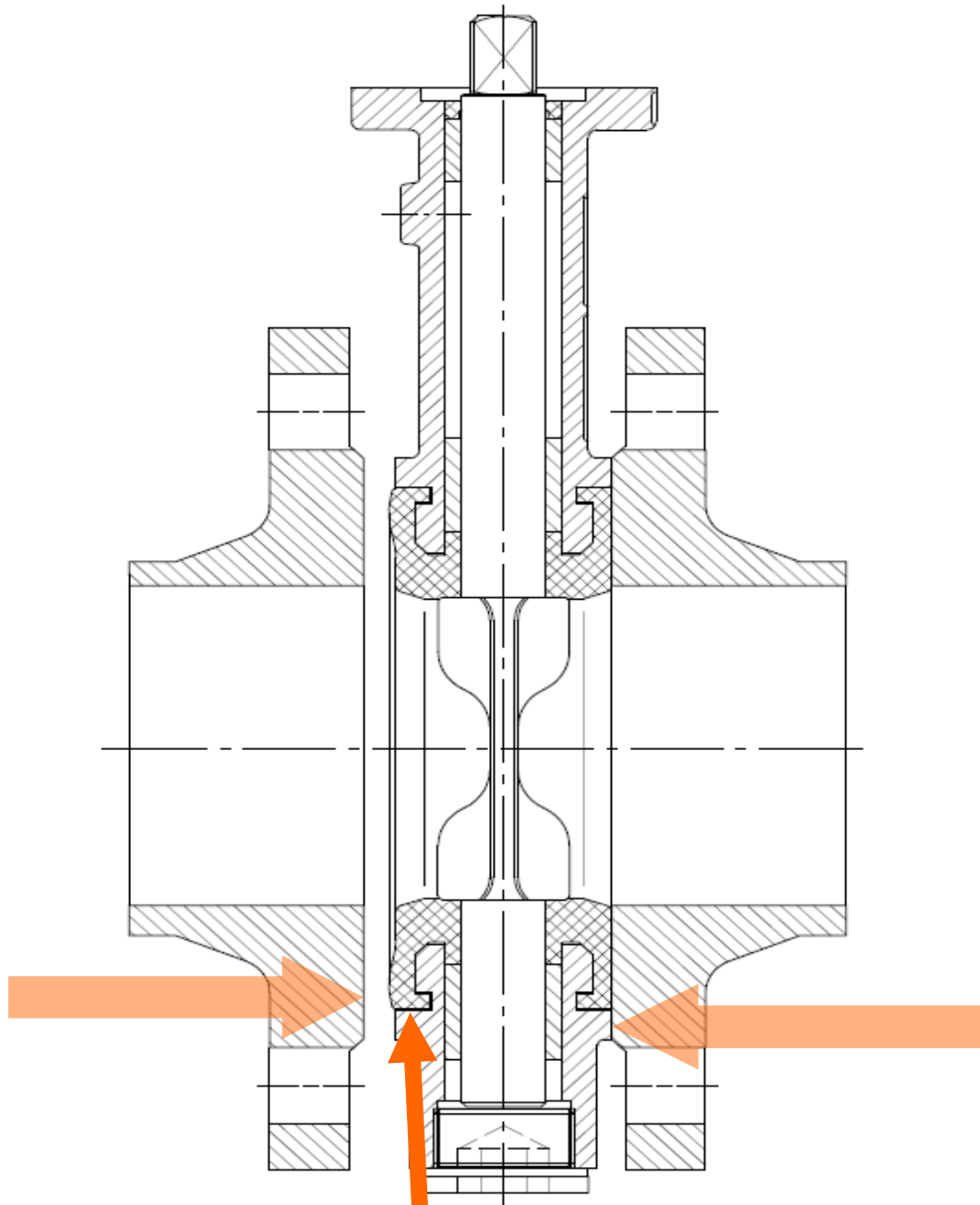


Einbauhinweis weichdichtende Klappen
installation instruction elastic lined valves

Elastische Manschette
elastic liner

Erstens: Kontakt zwischen Flansch
zur elastischen Manschette

First: Contact between flange
to the elastic liner:

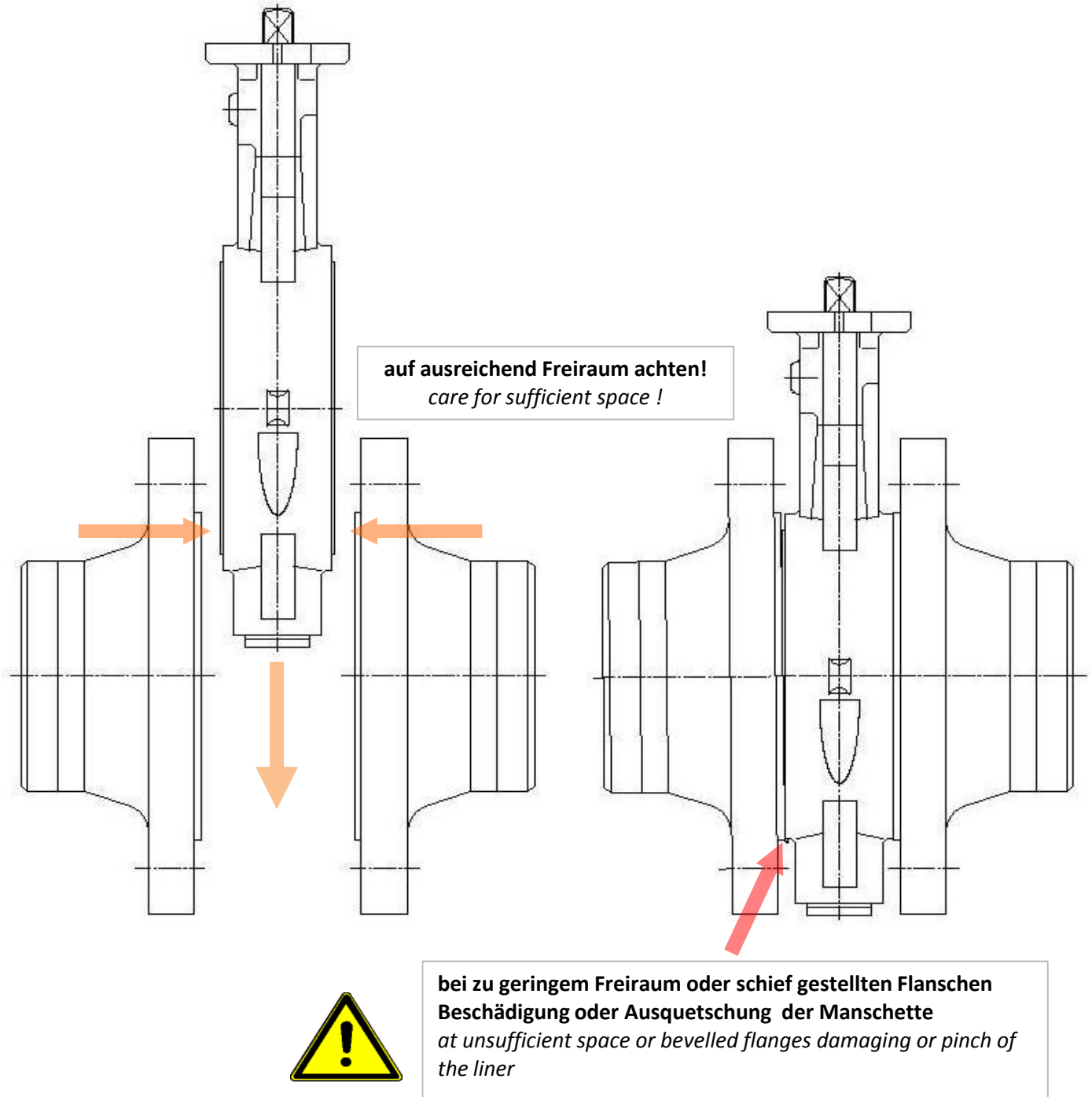
Danach: Flanschkontakt zum
Klappengehäuse = Metall auf Metall

Second: Flange contact to the
valve body = metal to metal

Elastische Materialien erhalten die erforderliche Dichtkraft
Elastic materials maintain the necessary seal stress by them selve


| Rev. | Revisionsgrund /reason of revision | Datum / date: | Bearbeiter/created by: | Geprüft/inspection | Prüfer/inspector |
|------|------------------------------------|---------------|------------------------|--------------------|------------------|
| 0 | Erstellung / compilation | 05.11.2009 | B. Mitschke | 05.11.2009 | D. Wyen |

Einbauhinweis weichdichtende Klappen
installation instruction elastic lined valves



| Rev. | Revisionsgrund / reason of revision | Datum / date: | Bearbeiter/created by: | Geprüft/inspection | Prüfer/inspector |
|------|-------------------------------------|---------------|------------------------|--------------------|------------------|
| 0 | Erstellung / compilation | 18.11.2011 | B. Mitschke | 18.11.2011 | G. Kipp |

| | | |
|--|------|--|
| 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 | <i>Bolt Size</i> | <i>Stud Bolts with UNC / 8UN thread</i> | |
|---------------------------|-----------------------------|------------------|---|----------|
| (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 |

Z011-A / A1 / B / GMX Flansch-Schrauben / flange bolting

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

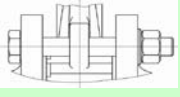

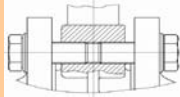
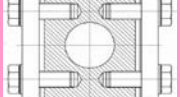
Bei der Schraubenauswahl ist für den Gegenflansch die angegebene Flanschdicke berücksichtigt, die tatsächliche vorhandene Flanschdicke ist kundenseitig zu prüfen und die Schraubenlängen entsprechend anzupassen!

selection of the bolts by allowance counter flange thickness as denoted, the effectively existing flange thickness is to check by the customer and the bolt length proportionately customize

Längenmaße angegeben in mm

length dimensions specified in mm

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 | Bauform EN-558-1 Grundreihe 20 Face - to - face EN-558-1 Series 20 | Einbaumaß Face - to - face | Verbindungsart Connection od. = oder / or | Number of Bolts Lochanzahl | Gegen - Flanschdicke counter flange thickness |  Verbindungsart 1 / Connection 1 Schraube / screw | Anzahl der Schrauben Qty of screws |  Verbindungsart 2 / Connection 2 Gewindestange / threaded both | Anzahl der Schrauben Qty of screws |  Verbindungsart 4 / Connection 4 Schraube / screw | Anzahl der Schrauben Qty of screws |  Verbindungsart 5 / Connection 5 Schraube / screw | Anzahl der Schrauben Qty of screws |
|----|--------|--|---|-------------------------------|---|-------------------------------|--|---|---------------------------------------|---|---------------------------------------|---|---------------------------------------|---|---------------------------------------|
| 20 | 3/4" | EN 1092-1 PN 10 | K1 | 33 | 1 od. 2 | 4 | 18 | M12 x 90 | 4 | M12 x 110 | 4 | | | | |
| 20 | 3/4" | EN 1092-1 PN 16 | K1 | 33 | 1 od. 2 | 4 | 18 | M12 x 90 | 4 | M12 x 110 | 4 | | | | |
| 20 | 3/4" | ASME B16.1 cl. 125 | K1 | 33 | 1 od. 2 | 4 | 12,7 | 1/2" - 13 UNC x 76,2 | 4 | 1/2" - 13 UNC x 95,3 | 4 | | | | |
| 20 | 3/4" | ASME B16.5 cl. 150 | K1 | 33 | 1 od. 2 | 4 | 12,7 | 1/2" - 13 UNC x 76,2 | 4 | 1/2" - 13 UNC x 95,3 | 4 | | | | |
| 25 | 1" | EN 1092-1 PN 6 | K1 | 33 | 1 od. 2 | 4 | 14 | M10 x 75 | 4 | M10 x 90 | 4 | | | | |
| 25 | 1" | EN 1092-1 PN 10 | K1 | 33 | 1 od. 2 | 4 | 16 | M12 x 85 | 4 | M12 x 100 | 4 | | | | |
| 25 | 1" | EN 1092-1 PN 16 | K1 | 33 | 1 od. 2 | 4 | 16 | M12 x 85 | 4 | M12 x 100 | 4 | | | | |
| 25 | 1" | ASME B16.1 cl. 125 | K1 | 33 | 1 od. 2 | 4 | 11,2 | 1/2" - 13 UNC x 76,2 | 4 | 1/2" - 13 UNC x 95,3 | 4 | | | | |
| 25 | 1" | ASME B16.5 cl. 150 | K1 | 33 | 1 od. 2 | 4 | 14,2 | 1/2" - 13 UNC x 82,6 | 4 | 1/2" - 13 UNC x 101,6 | 4 | | | | |
| 32 | 1 1/4" | EN 1092-1 PN 6 | K1 | 33 | 1 od. 2 | 4 | 16 | M12 x 85 | 4 | M12 x 100 | 4 | | | | |
| 32 | 1 1/4" | EN 1092-1 PN 10 | K1 | 33 | 1 od. 2 | 4 | 18 | M16 x 90 | 4 | M16 x 110 | 4 | | | | |
| 32 | 1 1/4" | EN 1092-1 PN 16 | K1 | 33 | 1 od. 2 | 4 | 18 | M16 x 90 | 4 | M16 x 110 | 4 | | | | |
| 32 | 1 1/4" | ASME B16.1 cl. 125 | K1 | 33 | 1 od. 2 | 4 | 13 | 1/2" - 13 UNC x 76,2 | 4 | 1/2" - 13 UNC x 95,3 | 4 | | | | |
| 32 | 1 1/4" | ASME B16.5 cl. 150 | K1 | 33 | 1 od. 2 | 4 | 15,7 | 1/2" - 13 UNC x 82,6 | 4 | 1/2" - 13 UNC x 101,6 | 4 | | | | |
| 32 | 1 1/4" | AS 2129 Table A - E | K1 | 33 | 1 od. 2 | 4 | 16 | M12 x 85 | 4 | M12 x 100 | 4 | | | | |
| 32 | 1 1/4" | AS 4087 PN 14 + 16 | K1 | 33 | 1 od. 2 | 4 | 16 | M12 x 85 | 4 | M12 x 100 | 4 | | | | |
| 40 | 1 1/2" | EN 1092-1 PN 6 | K1 | 33 | 1 od. 2 | 4 | 16 | M12 x 85 | 4 | M12 x 100 | 4 | | | | |
| 40 | 1 1/2" | EN 1092-1 PN 10 | K1 | 33 | 1 od. 2 | 4 | 18 | M16 x 90 | 4 | M16 x 110 | 4 | | | | |
| 40 | 1 1/2" | EN 1092-1 PN 16 | K1 | 33 | 1 od. 2 | 4 | 18 | M16 x 90 | 4 | M16 x 110 | 4 | | | | |
| 40 | 1 1/2" | ASME B16.1 cl. 125 | K1 | 33 | 1 od. 2 | 4 | 14,2 | 1/2" - 13 UNC x 82,6 | 4 | 1/2" - 13 UNC x 101,6 | 4 | | | | |
| 40 | 1 1/2" | ASME B16.5 cl. 150 | K1 | 33 | 1 od. 2 | 4 | 17,5 | 1/2" - 13 UNC x 88,9 | 4 | 1/2" - 13 UNC x 108 | 4 | | | | |
| 40 | 1 1/2" | BS 10 Table D + E | K1 | 33 | 1 od. 2 | 4 | 15,7 | 1/2" - 13 UNC x 82,6 | 4 | 1/2" - 13 UNC x 101,6 | 4 | | | | |

Z011-A / A1 / B / GMX Flansch-Schrauben / flange bolting

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

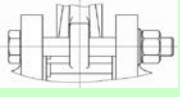

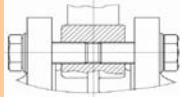
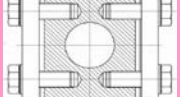
Bei der Schraubenauswahl ist für den Gegenflansch die angegebene Flanschdicke berücksichtigt, die tatsächliche vorhandene Flanschdicke ist kundenseitig zu prüfen und die Schraubenlängen entsprechend anzupassen!

selection of the bolts by allowance counter flange thickness as denoted, the effectively existing flange thickness is to check by the customer and the bolt length proportionately customize

Längenmaße angegeben in mm

length dimensions specified in mm

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 | Bauform EN-558-1 Grundreihe 20 Face - to - face EN-558-1 Series 20 | Einbaumaß Face - to - face | Verbindungsart Connection od. = oder / or | Number of Bolts Lochanzahl | Gegen - Flanschdicke counter flange thickness |  Verbindungsart 1 / Connection 1 Schraube / screw | Anzahl der Schrauben Qty of screws |  Verbindungsart 2 / Connection 2 Gewindestange / threaded both | Anzahl der Schrauben Qty of screws |  Verbindungsart 4 / Connection 4 Schraube / screw | Anzahl der Schrauben Qty of screws |  Verbindungsart 5 / Connection 5 Schraube / screw | Anzahl der Schrauben Qty of screws |
|----|------|--|---|-------------------------------|---|-------------------------------|--|---|---------------------------------------|---|---------------------------------------|---|---------------------------------------|---|---------------------------------------|
| 50 | 2" | EN 1092-1 PN 6 | K1 | 43 | 1 od. 2 | 4 | 14 | M12 x 90 | 4 | M12 x 110 | 4 | | | | |
| 50 | 2" | EN 1092-1 PN 10 | K1 | 43 | 1 od. 2 | 4 | 18 | M16 x 100 | 4 | M16 x 130 | 4 | | | | |
| 50 | 2" | EN 1092-1 PN 16 | K1 | 43 | 1 od. 2 | 4 | 18 | M16 x 100 | 4 | M16 x 130 | 4 | | | | |
| 50 | 2" | ASME B16.1 cl. 125 | K1 | 43 | 1 od. 2 | 4 | 16 | 5/8" - 11 UNC x 101,6 | 4 | 5/8" - 11 UNC x 127 | 4 | | | | |
| 50 | 2" | ASME B16.5 cl. 150 | K1 | 43 | 1 od. 2 | 4 | 19,1 | 5/8" - 11 UNC x 108 | 4 | 5/8" - 11 UNC x 127 | 4 | | | | |
| 65 | 2½" | EN 1092-1 PN6 | K1 | 46 | 1 od. 2 | 4 | 14 | M12 x 90 | 4 | M12 x 110 | 4 | | | | |
| 65 | 2½" | EN 1092-1 PN10 | K1 | 46 | 1 od. 2 | 4 | 18 | M16 x 110 | 4 | M16 x 130 | 4 | | | | |
| 65 | 2½" | EN 1092-1 PN16 | K1 | 46 | 1 od. 2 | 4 | 18 | M16 x 110 | 4 | M16 x 130 | 4 | | | | |
| 65 | 2½" | ASME B16.1 cl. 125 | K1 | 46 | 1 od. 2 | 4 | 17,5 | 5/8" - 11 UNC x 108 | 4 | 5/8" - 11 UNC x 127 | 4 | | | | |
| 65 | 2½" | ASME B16.5 cl. 150 | K1 | 46 | 1 od. 2 | 4 | 22,4 | 5/8" - 11 UNC x 114,3 | 4 | 5/8" - 11 UNC x 139,7 | 4 | | | | |
| 80 | 3" | EN 1092-1 PN 6 | K1 | 46 | 1 od. 2 | 4 | 16 | M16 x 100 | 4 | M16 x 130 | 4 | | | | |
| 80 | 3" | EN 1092-1 PN 10 | K1 | 46 | 1 od. 2 | 8 | 20 | M16 x 110 | 8 | M16 x 130 | 8 | | | | |
| 80 | 3" | EN 1092-1 PN 16 | K1 | 46 | 1 od. 2 | 8 | 20 | M16 x 110 | 8 | M16 x 130 | 8 | | | | |
| 80 | 3" | ASME B16.1 cl. 125 | K1 | 46 | 1 od. 2 | 4 | 19 | 5/8" - 11 UNC x 108 | 4 | 5/8" - 11 UNC x 133,4 | 4 | | | | |
| 80 | 3" | ASME B16.5 cl. 150 | K1 | 46 | 1 od. 2 | 4 | 23,9 | 5/8" - 11 UNC x 120,7 | 4 | 5/8" - 11 UNC x 139,7 | 4 | | | | |
| 80 | 3" | JIS B 2211 5K | K1 | 46 | 1 od. 2 | 4 | 14 | M16 x 100 | 4 | M16 x 120 | 4 | | | | |
| 80 | 3" | JIS B 2211 10K | K1 | 46 | 1 od. 2 | 8 | 18 | M16 x 110 | 8 | M16 x 130 | 8 | | | | |

Z011-A / A1 / B / GMX Flansch-Schrauben / flange bolting

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

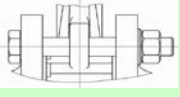

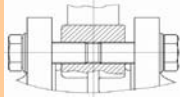
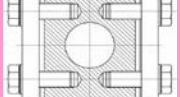
Bei der Schraubenauswahl ist für den Gegenflansch die angegebene Flanschdicke berücksichtigt, die tatsächliche vorhandene Flanschdicke ist kundenseitig zu prüfen und die Schraubenlängen entsprechend anzupassen!

selection of the bolts by allowance counter flange thickness as denoted, the effectively existing flange thickness is to check by the customer and the bolt length proportionately customize

Längenmaße angegeben in mm

length dimensions specified in mm

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 | Bauform EN-558-1 Grundreihe 20 Face-to-face EN-558-1 Series 20 | Einbaumaß Face-to-face | Verbindungsart Connection od. = oder / or | Number of Bolts Lochanzahl | Gegen - Flanschdicke counter flange thickness |  Verbindungsart 1 / Connection 1 Schraube / screw | Anzahl der Schrauben Qty of screws |  Verbindungsart 2 / Connection 2 Gewindestange / threaded both | Anzahl der Schrauben Qty of screws |  Verbindungsart 4 / Connection 4 Schraube / screw | Anzahl der Schrauben Qty of screws |  Verbindungsart 5 / Connection 5 Schraube / screw | Anzahl der Schrauben Qty of screws |
|-----|------|--|---|---------------------------|---|-------------------------------|--|---|---------------------------------------|---|---------------------------------------|---|---------------------------------------|---|---------------------------------------|
| 100 | 4" | EN 1092-1 PN 6 | K1 | 52 | 1 od. 2 | 4 | 16 | M16 x 110 | 4 | M16 x 130 | 4 | | | | |
| 100 | 4" | EN 1092-1 PN 10 | K1 | 52 | 1 od. 2 | 8 | 20 | M16 x 120 | 8 | M16 x 140 | 8 | | | | |
| 100 | 4" | EN 1092-1 PN 16 | K1 | 52 | 1 od. 2 | 8 | 20 | M16 x 120 | 8 | M16 x 140 | 8 | | | | |
| 100 | 4" | JIS B 2211 10K | K1 | 52 | 1 od. 2 | 8 | 18 | M16 x 110 | 8 | M16 x 130 | 8 | | | | |
| 100 | 4" | ASME B16.1 cl. 125 | K1 | 52 | 1 od. 2 | 8 | 23,9 | 5/8" - 11 UNC x 127 | 8 | 5/8" - 11 UNC x 146,1 | 8 | | | | |
| 100 | 4" | ASME B16.5 cl. 150 | K1 | 52 | 1 od. 2 | 8 | 23,9 | 5/8" - 11 UNC x 127 | 8 | 5/8" - 11 UNC x 146,1 | 8 | | | | |
| 125 | 5" | EN 1092-1 PN6 | K1 | 56 | 1 od. 2 | 8 | 18 | M16 x 120 | 8 | M16 x 140 | 8 | | | | |
| 125 | 5" | EN 1092-1 PN10 | K1 | 56 | 1 od. 2 | 8 | 22 | M16 x 120 | 8 | M16 x 150 | 8 | | | | |
| 125 | 5" | EN 1092-1 PN16 | K1 | 56 | 1 od. 2 | 8 | 22 | M16 x 120 | 8 | M16 x 150 | 8 | | | | |
| 125 | 5" | ASME B16.1 cl. 125 | K1 | 56 | 1 od. 2 | 8 | 23,9 | 3/4" - 10 UNC x 133,4 | 8 | 3/4" - 10 UNC x 158,8 | 8 | | | | |
| 125 | 5" | ASME B16.5 cl. 150 | K1 | 56 | 1 od. 2 | 8 | 23,9 | 3/4" - 10 UNC x 133,4 | 8 | 3/4" - 10 UNC x 158,8 | 8 | | | | |
| 150 | 6" | EN 1092-1 PN 6 | K1 | 56 | 1 od. 2 | 8 | 18 | M16 x 120 | 8 | M16 x 140 | 8 | | | | |
| 150 | 6" | EN 1092-1 PN 10 | K1 | 56 | 1 od. 2 | 8 | 22 | M20 x 130 | 8 | M20 x 150 | 8 | | | | |
| 150 | 6" | EN 1092-1 PN 16 | K1 | 56 | 1 od. 2 | 8 | 22 | M20 x 130 | 8 | M20 x 150 | 8 | | | | |
| 150 | 6" | ASME B16.1 cl. 125 | K1 | 56 | 1 od. 2 | 8 | 25,4 | 3/4" - 10 UNC x 133,4 | 8 | 3/4" - 10 UNC x 165,1 | 8 | | | | |
| 150 | 6" | ASME B16.5 cl. 150 | K1 | 56 | 1 od. 2 | 8 | 25,4 | 3/4" - 10 UNC x 133,4 | 8 | 3/4" - 10 UNC x 165,1 | 8 | | | | |

Z011-A / A1 / B / GMX 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 berücksichtigt, die tatsächliche vorhandene Flanschdicke ist kundenseitig zu prüfen und die Schraubenlängen entsprechend anzupassen!

selection of the bolts by allowance counter flange thickness as denoted, the effectivently existing flange thickness is to check by the customer and the bolt length proportionately customize

Längenmaße angegeben in mm

length dimensions specified in mm

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 | Bauform EN-558-1 Grundreihe 20 Face - to - face EN-558-1 Series 20 | Einbaumaß Face - to - face | Verbindungsart Connection od. = oder / or | Number of Bolts Lochanzahl | Gegen - Flanschdicke counter flange thickness | Verbindungsart 1 / Connection 1 Schraube / screw | Anzahl der Schrauben Qty of screws | Verbindungsart 2 / Connection 2 Gewindestange / threaded both | Anzahl der Schrauben Qty of screws | Verbindungsart 4 / Connection 4 Schraube / screw | Anzahl der Schrauben Qty of screws | Verbindungsart 5 / Connection 5 Schraube / screw | Anzahl der Schrauben Qty of screws |
|-----|------|--|---|-------------------------------|---|-------------------------------|--|--|---------------------------------------|--|---------------------------------------|--|---------------------------------------|--|---------------------------------------|
| 200 | 8" | EN 1092-1 PN 6 | K1 | 60 | 1 od. 2 | 8 | 20 | M16 x 120 | 8 | M16 x 150 | 8 | | | | |
| 200 | 8" | EN 1092-1 PN 10 | K1 | 60 | 1 od. 2 | 8 | 24 | M20 x 140 | 8 | M20 x 160 | 8 | | | | |
| 200 | 8" | EN 1092-1 PN 16 | K1 | 60 | 1 od. 2 | 12 | 24 | M20 x 140 | 12 | M20 x 160 | 12 | | | | |
| 200 | 8" | ASME B16.1 cl. 125 | K1 | 60 | 1 od. 2 | 8 | 28,4 | 3/4" - 10 UNC x 146,1 | 8 | 3/4" - 10 UNC x 171,5 | 8 | | | | |
| 200 | 8" | ASME B16.5 cl. 150 | K1 | 60 | 1 od. 2 | 8 | 28,4 | 3/4" - 10 UNC x 146,1 | 8 | 3/4" - 10 UNC x 171,5 | 8 | | | | |
| 250 | 10" | EN 1092-1 PN 6 | K1 | 68 | 1 od. 2 | 12 | 22 | M16 x 140 | 12 | M16 x 160 | 12 | | | | |
| 250 | 10" | EN 1092-1 PN 10 | K1 | 68 | 1 od. 2 | 12 | 26 | M20 x 150 | 12 | M20 x 180 | 12 | | | | |
| 250 | 10" | EN 1092-1 PN 16 | K1 | 68 | 1 od. 2 | 12 | 26 | M24 x 150 | 12 | M24 x 190 | 12 | | | | |
| 250 | 10" | ASME B16.1 cl. 125 | K1 | 68 | 1 od. 2 | 12 | 30,2 | 7/8" - 9 UNC x 158,8 | 12 | 7/8" - 9 UNC x 190,5 | 12 | | | | |
| 250 | 10" | ASME B16.5 cl. 150 | K1 | 68 | 1 od. 2 | 12 | 30,2 | 7/8" - 9 UNC x 158,8 | 12 | 7/8" - 9 UNC x 190,5 | 12 | | | | |
| 300 | 12" | EN 1092-1 PN 6 | K1 | 78 | 1 od. 2 | 12 | 22 | M20 x 150 | 12 | M20 x 180 | 12 | | | | |
| 300 | 12" | EN 1092-1 PN 10 | K1 | 78 | 1 od. 2 | 12 | 26 | M20 x 160 | 12 | M20 x 180 | 12 | | | | |
| 300 | 12" | EN 1092-1 PN 16 | K1 | 78 | 1 od. 2 | 12 | 28 | M24 x 170 | 12 | M24 x 200 | 12 | | | | |
| 300 | 12" | ASME B16.1 cl. 125 | K1 | 78 | 1 od. 2 | 12 | 31,8 | 7/8" - 9 UNC x 171,5 | 12 | 7/8" - 9 UNC x 203,2 | 12 | | | | |
| 300 | 12" | ASME B16.5 cl. 150 | K1 | 78 | 1 od. 2 | 12 | 31,8 | 7/8" - 9 UNC x 171,5 | 12 | 7/8" - 9 UNC x 203,2 | 12 | | | | |

Z011-A / A1 / B / GMX Flansch-Schrauben / flange bolting

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

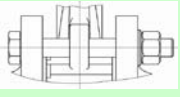
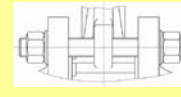
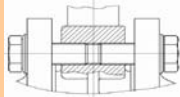
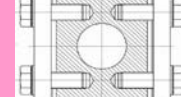
Bei der Schraubenauswahl ist für den Gegenflansch die angegebene Flanschdicke berücksichtigt, die tatsächliche vorhandene Flanschdicke ist kundenseitig zu prüfen und die Schraubenlängen entsprechend anzupassen!

selection of the bolts by allowance counter flange thickness as denoted, the effectively existing flange thickness is to check by the customer and the bolt length proportionately customize

Längenmaße angegeben in mm

length dimensions specified in mm

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 | Bauform EN-558-1 Grundreihe 20 Face - to - face EN-558-1 Series 20 | Einbaumaß Face - to - face | Verbindungsart Connection od. = oder / or | Number of Bolts Lochanzahl | Gegen - Flanschdicke counter flange thickness |  Verbindungsart 1 / Connection 1 Schraube / screw | Anzahl der Schrauben Qty of screws |  Verbindungsart 2 / Connection 2 Gewindestange / threaded both | Anzahl der Schrauben Qty of screws |  Verbindungsart 4 / Connection 4 Schraube / screw | Anzahl der Schrauben Qty of screws |  Verbindungsart 5 / Connection 5 Schraube / screw | Anzahl der Schrauben Qty of screws |
|-----|------|--|---|-------------------------------|---|-------------------------------|--|---|---------------------------------------|---|---------------------------------------|---|---------------------------------------|---|---------------------------------------|
| 350 | 14" | EN 1092-1 PN 6 (Gewinde) | K1 | 78 | 1 od. 2 + 4 | 12 | 22 | M20 x 150 | 8 | M20 x 180 | 8 | M20 x 55 | 8 | | |
| 350 | 14" | EN 1092-1 PN 10 (Gewinde) | K1 | 78 | 1 od. 2 + 4 | 16 | 36 | M20 x 180 | 12 | M20 x 200 | 12 | M20 x 70 | 8 | | |
| 350 | 14" | EN 1092-1 PN 16 (Gewinde) | K1 | 78 | 1 od. 2 + 4 | 16 | 30 | M24 x 170 | 12 | M24 x 200 | 12 | M24 x 70 | 8 | | |
| 350 | 14" | JIS 5K (Gewinde) | K1 | 78 | 1 od. 2 + 4 | 12 | 24 | M22 x 160 | 8 | M22 x 180 | 8 | M22 x 60 | 8 | | |
| 350 | 14" | JIS 10K (Gewinde) | K1 | 78 | 1 od. 2 + 4 | 16 | 26 | M22 x 160 | 12 | M22 x 190 | 12 | M22 x 60 | 8 | | |
| 350 | 14" | AS 2129 Table D (Gewinde) | K1 | 78 | 1 od. 2 + 4 | 12 | 29 | M24 x 170 | 8 | M24 x 200 | 8 | M24 x 70 | 8 | | |
| 350 | 14" | AS 2129 Table C + E (Gewinde) | K1 | 78 | 1 od. 2 + 4 | 12 | 32 | M24 x 180 | 8 | M24 x 210 | 8 | M24 x 70 | 8 | | |
| 350 | 14" | ASME B16.1 cl. 125 (Gewinde) | K1 | 78 | 1 od. 2 + 4 | 12 | 35,1 | 1" - 8 UNC x 184,2 | 8 | 1" - 8 UNC x 215,9 | 8 | 1" - 8 UNC x 69,9 | 8 | | |
| 350 | 14" | ASME B16.5 cl. 150 (Gewinde) | K1 | 78 | 1 od. 2 + 4 | 12 | 35,1 | 1" - 8 UNC x 184,2 | 8 | 1" - 8 UNC x 215,9 | 8 | 1" - 8 UNC x 69,9 | 8 | | |
| 350 | 14" | EN 1092-1 PN 6 | K1 | 78 | 1 od. 2 | 12 | 22 | M20 x 150 | 12 | M20 x 180 | 12 | | | | |
| 350 | 14" | EN 1092-1 PN 10 | K1 | 78 | 1 od. 2 | 16 | 36 | M20 x 180 | 16 | M20 x 200 | 16 | | | | |
| 350 | 14" | EN 1092-1 PN 16 | K1 | 78 | 1 od. 2 | 16 | 30 | M24 x 170 | 16 | M24 x 200 | 16 | | | | |
| 350 | 14" | JIS 5K | K1 | 78 | 1 od. 2 | 12 | 24 | M22 x 160 | 12 | M22 x 180 | 12 | | | | |
| 350 | 14" | JIS 10K | K1 | 78 | 1 od. 2 | 16 | 26 | M22 x 160 | 16 | M22 x 190 | 16 | | | | |
| 350 | 14" | AS 2129 Table D | K1 | 78 | 1 od. 2 | 12 | 29 | M24 x 170 | 12 | M24 x 200 | 12 | | | | |
| 350 | 14" | AS 2129 Table C + E | K1 | 78 | 1 od. 2 | 12 | 32 | M24 x 180 | 12 | M24 x 210 | 12 | | | | |
| 350 | 14" | ASME B16.1 cl. 125 | K1 | 78 | 1 od. 2 | 12 | 35,1 | 1" - 8 UNC x 184,2 | 12 | 1" - 8 UNC x 215,9 | 12 | | | | |
| 350 | 14" | ASME B16.5 cl. 150 | K1 | 78 | 1 od. 2 | 12 | 35,1 | 1" - 8 UNC x 184,2 | 12 | 1" - 8 UNC x 215,9 | 12 | | | | |
| 350 | 14" | DIN 1882 | K1 | 78 | 1 od. 2 | 10 | 30 | M24 x 170 | 10 | M24 x 200 | 10 | | | | |

Z011-A / A1 / B / GMX Flansch-Schrauben / flange bolting

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

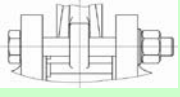

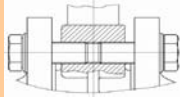
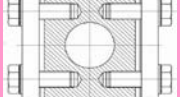
Bei der Schraubenauswahl ist für den Gegenflansch die angegebene Flanschdicke berücksichtigt, die tatsächliche vorhandene Flanschdicke ist kundenseitig zu prüfen und die Schraubenlängen entsprechend anzupassen!

selection of the bolts by allowance counter flange thickness as denoted, the effectively existing flange thickness is to check by the customer and the bolt length proportionately customize

Längenmaße angegeben in mm

length dimensions specified in mm

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 | Bauform EN-558-1 Grundreihe 20 Face - to - face EN-558-1 Series 20 | Einbaumaß Face - to - face | Verbindungsart Connection od. = oder / or | Number of Bolts Lochanzahl | Gegen - Flanschdicke counter flange thickness |  Verbindungsart 1 / Connection 1 Schraube / screw | Anzahl der Schrauben Qty of screws |  Verbindungsart 2 / Connection 2 Gewindestange / threaded both | Anzahl der Schrauben Qty of screws |  Verbindungsart 4 / Connection 4 Schraube / screw | Anzahl der Schrauben Qty of screws |  Verbindungsart 5 / Connection 5 Schraube / screw | Anzahl der Schrauben Qty of screws |
|-----|------|--|---|-------------------------------|---|-------------------------------|--|---|---------------------------------------|---|---------------------------------------|---|---------------------------------------|---|---------------------------------------|
| 400 | 16" | EN 1092-1 PN 6 | K1 | 102 | 1 od. 2 | 16 | 22 | M20 x 170 | 16 | M20 x 200 | 16 | | | | |
| 400 | 16" | EN 1092-1 PN 10 | K1 | 102 | 1 od. 2 | 16 | 26 | M24 x 190 | 16 | M24 x 220 | 16 | | | | |
| 400 | 16" | EN 1092-1 PN 16 | K1 | 102 | 1 od. 2 | 16 | 32 | M27 x 200 | 16 | M27 x 230 | 16 | | | | |
| 400 | 16" | ISO 7005-1 PN 20 | K1 | 102 | 1 od. 2 | 16 | 37 | M27 x 210 | 16 | M27 x 245 | 16 | | | | |
| 400 | 16" | EN 1092-1 PN 25 | K1 | 102 | 1 od. 2 | 16 | 46 | M33 x 240 | 16 | M33 x 275 | 16 | | | | |
| 400 | 16" | JIS 5K | K1 | 102 | 1 od. 2 | 16 | 24 | M22 x 180 | 16 | M22 x 210 | 16 | | | | |
| 400 | 16" | JIS 10K | K1 | 102 | 1 od. 2 | 16 | 28 | M24 x 190 | 16 | M24 x 220 | 16 | | | | |
| 400 | 16" | JIS 16K | K1 | 102 | 1 od. 2 | 16 | 38 | M30 x 220 | 16 | M30 x 250 | 16 | | | | |
| 400 | 16" | ASME B16.1 cl. 125 | K1 | 102 | 1 od. 2 | 16 | 36,6 | 1" - 8 UNC x 209,6 | 16 | 1" - 8 UNC x 241,3 | 16 | | | | |
| 400 | 16" | ASME B16.5 cl. 150 | K1 | 102 | 1 od. 2 | 16 | 36,6 | 1" - 8 UNC x 209,6 | 16 | 1" - 8 UNC x 241,3 | 16 | | | | |
| 400 | 16" | AS 2129 Table D | K1 | 102 | 1 od. 2 | 12 | 29 | M24 x 190 | 12 | M24 x 220 | 12 | | | | |
| 400 | 16" | AS 2129 Table C + E | K1 | 102 | 1 od. 2 | 12 | 32 | M24 x 200 | 12 | M24 x 230 | 12 | | | | |
| 450 | 18" | EN 1092-1 PN 6 (Gewinde) | K1 | 114 | 1 od. 2 + 4 | 16 | 22 | M20 x 190 | 12 | M20 x 210 | 12 | M20 x 60 | 8 | | |
| 450 | 18" | EN 1092-1 PN 10 (Gewinde) | K1 | 114 | 1 od. 2 + 5 | 20 | 28 | M24 x 200 | 16 | M24 x 230 | 16 | | | M24 x 60 | 8 |
| 450 | 18" | EN 1092-1 PN 16 (Gewinde) | K1 | 114 | 1 od. 2 + 5 | 20 | 40 | M27 x 230 | 16 | M27 x 260 | 16 | | | M27 x 75 | 8 |
| 450 | 18" | JIS 5K (Gewinde) | K1 | 114 | 1 od. 2 + 4 | 16 | 24 | M22 x 190 | 12 | M22 x 220 | 12 | M22 x 60 | 8 | | |
| 450 | 18" | JIS 10K (Gewinde) | K1 | 114 | 1 od. 2 + 5 | 20 | 30 | M24 x 210 | 16 | M24 x 240 | 16 | | | M24 x 65 | 8 |
| 450 | 18" | ASME B16.1 cl. 125 (Gewinde) | K1 | 114 | 1 od. 2 + 4 | 16 | 39,6 | 1-1/8" - 8 UN x 228,6 | 12 | 1-1/8" - 8 UN x 266,7 | 12 | 1-1/8" - 8 UN x 82,6 | 8 | | |
| 450 | 18" | ASME B16.5 cl. 150 (Gewinde) | K1 | 114 | 1 od. 2 + 4 | 16 | 39,6 | 1-1/8" - 8 UN x 228,6 | 12 | 1-1/8" - 8 UN x 266,7 | 12 | 1-1/8" - 8 UN x 82,6 | 8 | | |
| 450 | 18" | EN 1092-1 PN 6 | K1 | 114 | 1 od. 2 | 16 | 22 | M20 x 190 | 16 | M20 x 210 | 16 | | | | |
| 450 | 18" | JIS 5K | K1 | 114 | 1 od. 2 | 16 | 24 | M22 x 190 | 16 | M22 x 220 | 16 | | | | |
| 450 | 18" | BS10 Table D | K1 | 114 | 1 od. 2 | 12 | 25,4 | 7/8" - 9 UNC x 196,9 | 12 | 7/8" - 9 UNC x 228,6 | 12 | | | | |
| 450 | 18" | ASME B16.1 cl. 125 | K1 | 114 | 1 od. 2 | 16 | 39,6 | 1-1/8" - 8 UN x 228,6 | 16 | 1-1/8" - 8 UN x 266,7 | 16 | | | | |
| 450 | 18" | ASME B16.5 cl. 150 | K1 | 114 | 1 od. 2 | 16 | 39,6 | 1-1/8" - 8 UN x 228,6 | 16 | 1-1/8" - 8 UN x 266,7 | 16 | | | | |

Z011-A / A1 / B / GMX Flansch-Schrauben / flange bolting

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

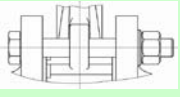

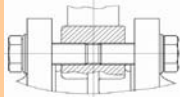
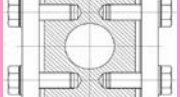
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selection of the bolts by allowance counter flange thickness as denoted, the effectively existing flange thickness is to check by the customer and the bolt length proportionately customize

Längenmaße angegeben in mm

length dimensions specified in mm

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 | Bauform EN-558-1 Grundreihe 20 Face - to - face EN-558-1 Series 20 | Einbaumaß Face - to - face | Verbindungsart Connection od. = oder / or | Number of Bolts Lochanzahl | Gegen - Flanschdicke counter flange thickness |  Verbindungsart 1 / Connection 1 Schraube / screw | Anzahl der Schrauben Qty of screws |  Verbindungsart 2 / Connection 2 Gewindestange / threaded both | Anzahl der Schrauben Qty of screws |  Verbindungsart 4 / Connection 4 Schraube / screw | Anzahl der Schrauben Qty of screws |  Verbindungsart 5 / Connection 5 Schraube / screw | Anzahl der Schrauben Qty of screws |
|-----|------|--|---|-------------------------------|---|-------------------------------|--|---|---------------------------------------|---|---------------------------------------|---|---------------------------------------|---|---------------------------------------|
| 500 | 20" | EN 1092-1 PN 6 (Gewinde) | K1 | 127 | 1 od. 2 + 4 | 20 | 24 | M20 x 200 | 16 | M20 x 230 | 16 | M20 x 70 | 8 | | |
| 500 | 20" | EN 1092-1 PN 10 (Gewinde) | K1 | 127 | 1 od. 2 + 4 | 20 | 28 | M24 x 220 | 16 | M24 x 250 | 16 | M24 x 75 | 8 | | |
| 500 | 20" | EN 1092-1 PN 16 (Gewinde) | K1 | 127 | 1 od. 2 + 4 | 20 | 44 | M30 x 250 | 16 | M30 x 290 | 16 | M30 x 100 | 8 | | |
| 500 | 20" | ISO 7005-1 PN 20 (Gewinde) | K1 | 127 | 1 od. 2 + 5 | 20 | 43 | M30 x 250 | 16 | M30 x 290 | 16 | | | M30 x 80 | 8 |
| 500 | 20" | EN 1092-1 PN 25 (Gewinde) | K1 | 127 | 1 od. 2 + 5 | 20 | 48 | M33 x 270 | 16 | M33 x 310 | 16 | | | M33 x 90 | 8 |
| 500 | 20" | JIS 5K (Gewinde) | K1 | 127 | 1 od. 2 + 4 | 20 | 24 | M22 x 210 | 16 | M22 x 230 | 16 | M22 x 70 | 8 | | |
| 500 | 20" | JIS 10K (Gewinde) | K1 | 127 | 1 od. 2 + 4 | 20 | 30 | M24 x 220 | 16 | M24 x 250 | 16 | M24 x 80 | 8 | | |
| 500 | 20" | ASME B16.1 cl. 125 (Gewinde) | K1 | 127 | 1 od. 2 + 5 | 20 | 42,9 | 1-1/8" - 8 UN x 254 | 16 | 1-1/8" - 8 UN x 292,1 | 16 | | | 1-1/8" - 8 UN x 82,6 | 8 |
| 500 | 20" | ASME B16.5 cl. 150 (Gewinde) | K1 | 127 | 1 od. 2 + 5 | 20 | 42,9 | 1-1/8" - 8 UN x 254 | 16 | 1-1/8" - 8 UN x 292,1 | 16 | | | 1-1/8" - 8 UN x 82,6 | 8 |
| 600 | 24" | EN 1092-1 PN 6 (Gewinde) | K1 | 154 | 1 od. 2 + 4 | 20 | 30 | M24 x 250 | 16 | M24 x 280 | 16 | M24 x 70 | 8 | | |
| 600 | 24" | EN 1092-1 PN 10 (Gewinde) | K1 | 154 | 1 od. 2 + 4 | 20 | 28 | M27 x 250 | 16 | M27 x 280 | 16 | M27 x 75 | 8 | | |
| 600 | 24" | EN 1092-1 PN 16 (Gewinde) | K1 | 154 | 1 od. 2 + 4 | 20 | 54 | M33 x 300 | 16 | M33 x 350 | 16 | M33 x 110 | 8 | | |
| 600 | 24" | JIS 5K (Gewinde) | K1 | 154 | 1 od. 2 + 4 | 20 | 26 | M24 x 240 | 16 | M24 x 270 | 16 | M24 x 70 | 8 | | |
| 600 | 24" | ASME B16.1 cl. 125 (Gewinde) | K1 | 154 | 1 od. 2 + 4 | 20 | 47,8 | 1-1/4" - 8 UN x 292,1 | 16 | 1-1/4" - 8 UN x 330,2 | 16 | 1-1/4" - 8 UN x 101,6 | 8 | | |
| 600 | 24" | ASME B16.5 cl. 150 (Gewinde) | K1 | 154 | 1 od. 2 + 4 | 20 | 47,8 | 1-1/4" - 8 UN x 292,1 | 16 | 1-1/4" - 8 UN x 330,2 | 16 | 1-1/4" - 8 UN x 101,6 | 8 | | |
| 600 | 24" | EN 1092-1 PN 6 | K1 | 154 | 1 od. 2 | 20 | 30 | M24 x 250 | 20 | M24 x 280 | 20 | | | | |
| 600 | 24" | EN 1092-1 PN 10 | K1 | 154 | 1 od. 2 | 20 | 28 | M27 x 250 | 20 | M27 x 280 | 20 | | | | |
| 600 | 24" | EN 1092-1 PN 16 | K1 | 154 | 1 od. 2 | 20 | 54 | M33 x 300 | 20 | M33 x 350 | 20 | | | | |
| 600 | 24" | JIS B 2211 5K | K1 | 154 | 1 od. 2 | 20 | 26 | M24 x 240 | 20 | M24 x 270 | 20 | | | | |