

Recommended Bolt Torques

**Basis for the calculations.** Bolts : No. of bolts x Diameter  
Flange Standard ASME B16.5 ASTM A193 Grae B7  
Coefficient of Friction  $\mu = 0.14$  1/2" to 1" shall be UNC standard  
Bolt Utilisation / Yield = 50% 1. 1/8" and lar

For Klinger C-4430 Thickness 1.5mm.

For Klinger PSM-AS 1.5 mm Thick

| 150#  |       |           | 300#  |           |       | 600#      |       |           |
|-------|-------|-----------|-------|-----------|-------|-----------|-------|-----------|
| Class | Bolts | Torque Nm | Bolts | Torque Nm | Bolts | Torque Nm | Bolts | Torque Nm |
| NB    | 15    | 4x1/2"    | 82    | 4x1/2"    | 82    | 4x1/2"    | 82    | 4x1/2"    |
|       | 20    | 4x1/2"    | 82    | 4x5/8"    | 162   | 4x5/8"    | 162   | 4x5/8"    |
|       | 25    | 4x1/2"    | 82    | 4x5/8"    | 162   | 4x5/8"    | 162   | 4x5/8"    |
|       | 32    | 4x1/2"    | 82    | 4x5/8"    | 162   | 4x5/8"    | 162   | 4x5/8"    |
|       | 40    | 4x1/2"    | 82    | 4x3/4"    | 283   | 4x3/4"    | 283   | 4x3/4"    |
|       | 50    | 4x5/8"    | 162   | 8x5/8"    | 162   | 8x5/8"    | 162   | 8x5/8"    |
|       | 65    | 4x5/8"    | 162   | 8x3/4"    | 283   | 8x3/4"    | 283   | 8x3/4"    |
|       | 80    | 4x5/8"    | 162   | 8x3/4"    | 283   | 8x3/4"    | 283   | 8x3/4"    |
|       | 100   | 4x5/8"    | 162   | 8x3/4"    | 283   | 8x7/8"    | 452   | 8x7/8"    |
|       | 125   | 8x3/4"    | 283   | 8x3/4"    | 283   | 8x1"      | 676   | 8x1"      |
|       | 150   | 8x3/4"    | 283   | 12x3/4"   | 283   | 12x1"     | 676   | 12x1"     |
|       | 200   | 8x3/4"    | 283   | 12x7/8"   | 452   | 12x1 1/8" | 956   | 12x1 1/8" |
|       | 250   | 12x7/8"   | 452   | 16x1"     | 676   | 16x1 1/4" | 1334  | 16x1 1/4" |
|       | 300   | 12x7/8"   | 452   | 16x1 1/8" | 956   | 20x1 1/4" | 1334  | 20x1 1/4" |
|       | 350   | 12x1"     | 676   | 20x1 1/8" | 956   | 20x1 3/8" | 1753  | 20x1 3/8" |
|       | 400   | 16x1"     | 676   | 20x1 1/4" | 1334  | 20x1 1/2" | 2312  | 20x1 1/2" |
|       | 450   | 16x1 1/8" | 956   | 24x1 1/4" | 1334  | 20x1 5/8" | 2880  | 20x1 5/8" |
|       | 500   | 20x1 1/8" | 956   | 24x1 1/4" | 1334  | 24x1 5/8" | 2880  | 24x1 5/8" |
|       | 600   | 20x1 1/4" | 1334  | 24x1 1/2" | 2312  | 24x1 7/8" | 4525  | 24x1 7/8" |

| 150#  |       |           | 300#  |           |       | 600#      |       |           |
|-------|-------|-----------|-------|-----------|-------|-----------|-------|-----------|
| Class | Bolts | Torque Nm | Bolts | Torque Nm | Bolts | Torque Nm | Bolts | Torque Nm |
| NB    | 15    | 4x1/2"    | 49    | 4x1/2"    | 49    | 4x1/2"    | 49    | 4x1/2"    |
|       | 20    | 4x1/2"    | 74    | 4x5/8"    | 91    | 4x5/8"    | 91    | 4x5/8"    |
|       | 25    | 4x1/2"    | 82    | 4x5/8"    | 130   | 4x5/8"    | 130   | 4x5/8"    |
|       | 32    | 4x1/2"    | 82    | 4x5/8"    | 162   | 4x5/8"    | 162   | 4x5/8"    |
|       | 40    | 4x1/2"    | 82    | 4x3/4"    | 283   | 4x3/4"    | 283   | 4x3/4"    |
|       | 50    | 4x5/8"    | 162   | 8x5/8"    | 162   | 8x5/8"    | 162   | 8x5/8"    |
|       | 65    | 4x5/8"    | 162   | 8x3/4"    | 283   | 8x3/4"    | 283   | 8x3/4"    |
|       | 80    | 4x5/8"    | 162   | 8x3/4"    | 283   | 8x3/4"    | 283   | 8x3/4"    |
|       | 100   | 8x5/8"    | 162   | 8x3/4"    | 283   | 8x7/8"    | 452   | 8x7/8"    |
|       | 125   | 8x3/4"    | 283   | 8x3/4"    | 283   | 8x1"      | 676   | 8x1"      |
|       | 150   | 8x3/4"    | 283   | 12x3/4"   | 283   | 12x1"     | 676   | 12x1"     |
|       | 200   | 8x3/4"    | 283   | 12x7/8"   | 452   | 12x1 1/8" | 956   | 12x1 1/8" |
|       | 250   | 12x7/8"   | 452   | 16x1"     | 676   | 16x1 1/4" | 1334  | 16x1 1/4" |
|       | 300   | 12x7/8"   | 452   | 16x1 1/8" | 956   | 20x1 1/4" | 1334  | 20x1 1/4" |
|       | 350   | 12x1"     | 676   | 20x1 1/8" | 956   | 20x1 3/8" | 1753  | 20x1 3/8" |
|       | 400   | 16x1"     | 676   | 20x1 1/4" | 1334  | 20x1 1/2" | 2312  | 20x1 1/2" |
|       | 450   | 16x1 1/8" | 956   | 24x1 1/4" | 1334  | 20x1 5/8" | 2880  | 20x1 5/8" |
|       | 500   | 20x1 1/8" | 956   | 24x1 1/4" | 1334  | 24x1 5/8" | 2880  | 24x1 5/8" |
|       | 600   | 20x1 1/4" | 1334  | 24x1 1/2" | 2312  | 24x1 7/8" | 4525  | 24x1 7/8" |

Torque reduced due to gasket load capability.  
Yield =30% for 150/300/600#  
Yield =45% for 150#, 28% for 300/600#  
Yield =40% for 300/600#

For Klinger spiral wound gaskets

Wrench Table

| 150#  |       |           | 300#  |           |       | 600#      |       |           | 900#  |           |       | 1500#     |       |           | 2500#    |           |           |
|-------|-------|-----------|-------|-----------|-------|-----------|-------|-----------|-------|-----------|-------|-----------|-------|-----------|----------|-----------|-----------|
| Class | Bolts | Torque Nm | Bolts | Torque Nm | Bolts | Torque Nm | Bolts | Torque Nm | Bolts | Torque Nm | Bolts | Torque Nm | Bolts | Torque Nm | Bolts    | Torque Nm | Tools     |
| NB    | 15    | 4x1/2"    | 82    | 4x1/2"    | 82    | 4x1/2"    | 82    | 4x3/4"    | 283   | 4x3/4"    | 283   | 4x3/4"    | 283   | 4x3/4"    | 4x3/4"   | 283       | Manual    |
|       | 20    | 4x1/2"    | 82    | 4x5/8"    | 162   | 4x5/8"    | 162   | 4x3/4"    | 283   | 4x3/4"    | 283   | 4x3/4"    | 283   | 4x3/4"    | 4x3/4"   | 283       |           |
|       | 25    | 4x1/2"    | 82    | 4x5/8"    | 162   | 4x5/8"    | 162   | 4x7/8"    | 452   | 4x7/8"    | 452   | 4x7/8"    | 452   | 4x7/8"    | 4x7/8"   | 452       |           |
|       | 32    | 4x1/2"    | 82    | 4x5/8"    | 162   | 4x5/8"    | 162   | 4x7/8"    | 452   | 4x7/8"    | 452   | 4x7/8"    | 452   | 4x7/8"    | 4x1"     | 676       |           |
|       | 40    | 4x1/2"    | 82    | 4x3/4"    | 283   | 4x3/4"    | 283   | 4x1"      | 676   | 4x1"      | 676   | 4x1"      | 676   | 4x1 1/8"  | 4x1 1/8" | 956       | Hydraulic |
|       | 50    | 4x5/8"    | 162   | 8x5/8"    | 162   | 8x5/8"    | 162   | 8x7/8"    | 452   | 8x7/8"    | 452   | 8x7/8"    | 452   | 8x1       | 8x1      | 676       |           |
|       | 65    | 4x5/8"    | 162   | 8x3/4"    | 283   | 8x3/4"    | 283   | 8x1"      | 676   | 8x1"      | 676   | 8x1"      | 676   | -         | -        | -         |           |
|       | 80    | 4x5/8"    | 162   | 8x3/4"    | 283   | 8x3/4"    | 283   | 8x7/8"    | 452   | 8x1 1/8"  | 452   | 8x1 1/8"  | 956   | -         | -        | -         |           |
|       | 100   | 8x5/8"    | 162   | 8x3/4"    | 283   | 8x7/8"    | 452   | 8x1 1/8"  | 956   | 8x1 1/4"  | 1334  | 8x1 1/4"  | 1334  | -         | -        | -         | Tensioner |
|       | 125   | 8x3/4"    | 283   | 8x3/4"    | 283   | 8x1"      | 676   | 12x1 1/8" | 1334  | 8x1 1/2"  | 2312  | 12x1 3/8" | 1753  | -         | -        | -         |           |
|       | 150   | 8x3/4"    | 283   | 12x3/4"   | 283   | 12x1"     | 676   | 12x1 3/8" | 1753  | 12x1 5/8" | 2880  | 12x1 5/8" | 2880  | -         | -        | -         |           |
|       | 200   | 8x3/4"    | 283   | 12x7/8"   | 452   | 12x1 1/8" | 956   | 16x1 3/8" | 1753  | 16x1 1/4" | 1334  | 16x1 1/4" | 1334  | -         | -        | -         |           |
|       | 250   | 12x7/8"   | 452   | 16x1"     | 676   | 16x1 1/4" | 1334  | 20x1 3/8" | 1753  | 20x1 1/2" | 2312  | 20x1 1/2" | 2312  | -         | -        | -         |           |
|       | 300   | 12x7/8"   | 452   | 16x1 1/8" | 956   | 20x1 1/4" | 1334  | 20x1 5/8" | 2880  | 20x1 1/4" | 1334  | 20x1 1/4" | 1334  | -         | -        | -         |           |
|       | 350   | 12x1"     | 676   | 20x1 1/8" | 956   | 20x1 3/8" | 1753  | 20x1 1/2" | 2312  | 20x1 1/2" | 2312  | 20x1 1/2" | 2312  | -         | -        | -         |           |
|       | 400   | 16x1"     | 676   | 20x1 1/4" | 1334  | 20x1 1/2" | 2312  | 20x1 5/8" | 2880  | 20x1 1/2" | 2312  | 20x1 1/2" | 2312  | -         | -        | -         |           |
|       | 450   | 16x1 1/8" | 956   | 24x1 1/4" | 1334  | 20x1 5/8" | 2880  | 20x1 1/4" | 1334  | 20x1 1/4" | 1334  | 20x1 1/4" | 1334  | -         | -        | -         |           |
|       | 500   | 20x1 1/8" | 956   | 24x1 1/4" | 1334  | 24x1 5/8" | 2880  | 20x2"     | 5449  | 20x2"     | 5449  | 20x2"     | 5449  | -         | -        | -         |           |
|       | 600   | 20x1 1/4" | 1334  | 24x1 1/2" | 2312  | 24x1 7/8" | 4525  | -         | -     | -         | -     | -         | -     | -         | -        | -         |           |

| Hex Nut AF | AF       | Stud   | Tools     |
|------------|----------|--------|-----------|
| 22         | 7/8"     | 1/2"   | Manual    |
| 27         | 1-1/16"  | 5/8"   |           |
| 32         | 1-1/4"   | 3/4"   |           |
| 36         | 1-7/16"  | 7/8"   |           |
| 41         | 1-5/8"   | 1"     | Hydraulic |
| 46         | 1-13/16" | 1-1/8" |           |
| 50         | 2"       | 1-1/4" |           |
| 55         | 2-3/16"  | 1-3/8" |           |
| 60         | 2-3/8"   | 1-1/2" | Tensioner |
| 65         | 2-9/16"  | 1-5/8" |           |
| 70         | 2-3/4"   | 1-3/4" |           |
| 75         | 2-15/16" | 1-7/8" |           |
| 80         | 3-1/8"   | 2"     |           |
| 90         | 3-1/2"   | 2-1/4" |           |
| 95         | 3-7/8"   | 2-1/2" |           |
| 105        | 4-1/4"   | 2-3/4" |           |
| 115        | 4-5/8"   | 3"     |           |
| 130        | 5"       | 3-1/4" |           |
| 135        | 5-3/8"   | 3-1/2" |           |