

## Bolt Torque Values - GRAPHITE-XF (Sheet Ring Gaskets / Raised Face Flanges)

Sheet Ring Gaskets on ASME B16.5 Raised Face Flanges with ASTM A193 Gr. B7 Bolts / A194 Gr. 2H Nuts

Applicable Products: Graphite-XF TGBE & TGBR

| Sheet Ring Gaskets on ASME B16.5 Raised Face Flange - Class 150 |                         |                       |                         |                       |              |                 |
|---|-------------------------|-----------------------|-------------------------|-----------------------|--------------|-----------------|
| Flange Size (in.)   | 1/16" THK               |                       | 1/8" THK                |                       | No. of Bolts | Bolt Size (in.) |
|   | MIN Torque. (ft.-lbs.)  | MAX Torque (ft.-lbs.) | MIN Torque (ft.-lbs.)   | MAX Torque (ft.-lbs.) |              |                 |
|   | Graphite-XF TGBE & TGBR |                       | Graphite-XF TGBE & TGBR |                       |              |                 |
| 1/2   | 7                       | 20                    | 9                       | 20                    | 4            | 1/2             |
| 3/4   | 10                      | 28                    | 14                      | 28                    | 4            | 1/2             |
| 1   | 13                      | 37                    | 18                      | 37                    | 4            | 1/2             |
| 1-1/4   | 21                      | 57                    | 27                      | 57                    | 4            | 1/2             |
| 1-1/2   | 27                      | 66                    | 36                      | 66                    | 4            | 1/2             |
| 2   | 55                      | 132                   | 73                      | 132                   | 4            | 5/8             |
| 2-1/2   | 64                      | 132                   | 85                      | 132                   | 4            | 5/8             |
| 3   | 94                      | 132                   | 125                     | 132                   | 4            | 5/8             |
| 3-1/2   | 52                      | 132                   | 70                      | 132                   | 8            | 5/8             |
| 4   | 67                      | 132                   | 89                      | 132                   | 8            | 5/8             |
| 5   | 100                     | 238                   | 133                     | 238                   | 8            | 3/4             |
| 6   | 126                     | 238                   | 167                     | 238                   | 8            | 3/4             |
| 8   | 170                     | 238                   | 227                     | 238                   | 8            | 3/4             |
| 10  | 161                     | 385                   | 215                     | 385                   | 12           | 7/8             |
| 12  | 215                     | 385                   | 286                     | 385                   | 12           | 7/8             |
| 14  | 267                     | 578                   | 356                     | 578                   | 12           | 1               |
| 16  | 254                     | 578                   | 339                     | 578                   | 16           | 1               |
| 18  | 388                     | 859                   | 517                     | 859                   | 16           | 1-1/8           |
| 20  | 342                     | 859                   | 456                     | 859                   | 20           | 1-1/8           |
| 24  | 491                     | 1219                  | 654                     | 1219                  | 20           | 1-1/4           |

**NOTES:** 1) The design bolt stress used for calculation is based on 60% of bolt yield at room temperature. 2) Assuming new, non-coated and well lubricated bolts and nuts are used with through-hardened washers. K factor of 0.20 was used in the calculation per ASME PCC-1. Multiply torque values by a factor of "K / 0.20" if using a lubricant with a different K factor. 3) Assuming maximum internal pressure follows ASME B16.5 Pressure-Temperature rating tables. 4) Assuming ASME PCC-1 bolting pattern is followed. 5) Flange imperfections, rotation and deflection are ignored. 6) Bolt torque values in above Tables are for reference only. User is responsible for applying appropriate bolt loads to properly seat the gasket.

## Bolt Torque Values - GRAPHITE-XF (Sheet Ring Gaskets / Raised Face Flanges)

Sheet Ring Gaskets on ASME B16.5 Raised Face Flanges with ASTM A193 Gr. B7 Bolts / A194 Gr. 2H Nuts

Applicable Products: Graphite-XF TGBE & TGBR

| Sheet Ring Gaskets on ASME B16.5 Raised Face Flange - Class 300 |                         |                       |                         |                       |              |                 |
|---|-------------------------|-----------------------|-------------------------|-----------------------|--------------|-----------------|
| Flange Size (in.)   | 1/16" THK               |                       | 1/8" THK                |                       | No. of Bolts | Bolt Size (in.) |
|   | MIN Torque. (ft.-lbs.)  | MAX Torque (ft.-lbs.) | MIN Torque (ft.-lbs.)   | MAX Torque (ft.-lbs.) |              |                 |
|   | Graphite-XF TGBE & TGBR |                       | Graphite-XF TGBE & TGBR |                       |              |                 |
| 1/2   | 11                      | 20                    | 13                      | 20                    | 4            | 1/2             |
| 3/4   | 19                      | 35                    | 23                      | 35                    | 4            | 5/8             |
| 1   | 25                      | 47                    | 30                      | 47                    | 4            | 5/8             |
| 1-1/4   | 39                      | 71                    | 46                      | 71                    | 4            | 5/8             |
| 1-1/2   | 62                      | 114                   | 73                      | 114                   | 4            | 3/4             |
| 2   | 41                      | 76                    | 49                      | 76                    | 8            | 5/8             |
| 2-1/2   | 58                      | 107                   | 68                      | 107                   | 8            | 3/4             |
| 3   | 84                      | 156                   | 100                     | 156                   | 8            | 3/4             |
| 3-1/2   | 94                      | 175                   | 112                     | 175                   | 8            | 3/4             |
| 4   | 120                     | 222                   | 142                     | 222                   | 8            | 3/4             |
| 5   | 149                     | 238                   | 177                     | 238                   | 8            | 3/4             |
| 6   | 126                     | 233                   | 149                     | 233                   | 12           | 3/4             |
| 8   | 198                     | 367                   | 235                     | 367                   | 12           | 7/8             |
| 10  | 208                     | 385                   | 246                     | 385                   | 16           | 1               |
| 12  | 310                     | 575                   | 368                     | 575                   | 16           | 1-1/8           |
| 14  | 271                     | 501                   | 321                     | 501                   | 20           | 1-1/8           |
| 16  | 381                     | 706                   | 452                     | 706                   | 20           | 1-1/4           |
| 18  | 431                     | 798                   | 511                     | 798                   | 24           | 1-1/4           |
| 20  | 475                     | 879                   | 563                     | 879                   | 24           | 1-1/4           |
| 24  | 736                     | 1363                  | 872                     | 1363                  | 24           | 1-1/2           |

**NOTES:** 1) The design bolt stress used for calculation is based on 60% of bolt yield at room temperature. 2) Assuming new, non-coated and well lubricated bolts and nuts are used with through-hardened washers. K factor of 0.20 was used in the calculation per ASME PCC-1. Multiply torque values by a factor of "K / 0.20" if using a lubricant with a different K factor. 3) Assuming maximum internal pressure follows ASME B16.5 Pressure-Temperature rating tables. 4) Assuming ASME PCC-1 bolting pattern is followed. 5) Flange imperfections, rotation and deflection are ignored. 6) Bolt torque values in above Tables are for reference only. User is responsible for applying appropriate bolt loads to properly seat the gasket.

## Bolt Torque Values - GRAPHITE-XF (Full Face Gaskets / Flat Face Flanges)

Full Face Gaskets on ASME B16.5 Flat Face Flanges with ASTM A193 Gr. B7 Bolts / A194 Gr. 2H Nuts

Applicable Products: Graphite-XF TGBE & TGBR

| Full Face Gaskets on ASME B16.5 Flat Face Flange - Class 150 |                        |                  |                                    |                       |                  |                                    |              |                 |
|--|------------------------|------------------|------------------------------------|-----------------------|------------------|------------------------------------|--------------|-----------------|
| Flange Size (in.)  | 1/16" THK              |                  |                                    | 1/8" THK              |                  |                                    | No. of Bolts | Bolt Size (in.) |
|  | MIN Torque. (ft.-lbs.) |                  | MAX Torque (ft.-lbs.)              | MIN Torque (ft.-lbs.) |                  | MAX Torque (ft.-lbs.)              |              |                 |
|  | Graphite-XF TGBE       | Graphite-XF TGBR | Graphite-XF TGBE, Graphite-XF TGBR | Graphite-XF TGBE      | Graphite-XF TGBR | Graphite-XF TGBE, Graphite-XF TGBR |              |                 |
| 1/2  | 12                     | 18               | 66                                 | 12                    | 18               | 66                                 | 4            | 1/2             |
| 3/4  | 14                     | 21               | 66                                 | 14                    | 21               | 66                                 | 4            | 1/2             |
| 1  | 16                     | 24               | 66                                 | 16                    | 24               | 66                                 | 4            | 1/2             |
| 1-1/4  | 19                     | 26               | 66                                 | 19                    | 26               | 66                                 | 4            | 1/2             |
| 1-1/2  | 21                     | 30               | 66                                 | 21                    | 30               | 66                                 | 4            | 1/2             |
| 2  | 37                     | 49               | 132                                | 37                    | 49               | 132                                | 4            | 5/8             |
| 2-1/2  | 49                     | 62               | 132                                | 49                    | 62               | 132                                | 4            | 5/8             |
| 3  | 55                     | 66               | 132                                | 55                    | 66               | 132                                | 4            | 5/8             |
| 3-1/2  | 35                     | 40               | 132                                | 35                    | 40               | 132                                | 8            | 5/8             |
| 4  | 38                     | 43               | 132                                | 38                    | 43               | 132                                | 8            | 5/8             |
| 5  | 54                     | 58               | 238                                | 54                    | 58               | 238                                | 8            | 3/4             |
| 6  | 64                     | 64               | 238                                | 64                    | 64               | 238                                | 8            | 3/4             |
| 8  | 92                     | 92               | 238                                | 92                    | 92               | 238                                | 8            | 3/4             |
| 10   | 97                     | 97               | 385                                | 97                    | 97               | 385                                | 12           | 7/8             |
| 12   | 134                    | 134              | 385                                | 134                   | 134              | 385                                | 12           | 7/8             |
| 14   | 185                    | 185              | 578                                | 185                   | 185              | 578                                | 12           | 1               |
| 16   | 171                    | 171              | 578                                | 171                   | 171              | 578                                | 16           | 1               |
| 18   | 213                    | 213              | 859                                | 213                   | 213              | 859                                | 16           | 1-1/8           |
| 20   | 203                    | 203              | 859                                | 203                   | 203              | 859                                | 20           | 1-1/8           |
| 24   | 299                    | 299              | 1219                               | 299                   | 299              | 1219                               | 20           | 1-1/4           |

**NOTES:** 1) The design bolt stress used for calculation is based on 60% of bolt yield at room temperature. 2) Assuming new, non-coated and well lubricated bolts and nuts are used with through-hardened washers. K factor of 0.20 was used in the calculation per ASME PCC-1. Multiply torque values by a factor of "K / 0.20" if using a lubricant with a different K factor. 3) Assuming maximum internal pressure follows ASME B16.5 Pressure-Temperature rating tables. 4) Assuming ASME PCC-1 bolting pattern is followed. 5) Flange imperfections, rotation and deflection are ignored. 6) Bolt torque values in above Tables are for reference only. User is responsible for applying appropriate bolt loads to properly seat the gasket.

## Bolt Torque Values - GRAPHITE-XF (Full Face Gaskets / Flat Face Flanges)

Full Face Gaskets on ASME B16.5 Flat Face Flanges with ASTM A193 Gr. B7 Bolts / A194 Gr. 2H Nuts

Applicable Products: Graphite-XF TGBE & TGBR

| Full Face Gaskets on ASME B16.5 Flat Face Flange - Class 300 |                      |                  |                                    |                      |                  |                                    |              |                 |
|--|----------------------|------------------|------------------------------------|----------------------|------------------|------------------------------------|--------------|-----------------|
| Flange Size (in.)  | 1/16" THK            |                  |                                    | 1/8" THK             |                  |                                    | No. of Bolts | Bolt Size (in.) |
|  | MIN Torque (ft-lbs.) |                  | MAX Torque (ft-lbs.)               | MIN Torque (ft-lbs.) |                  | MAX Torque (ft-lbs.)               |              |                 |
|  | Graphite-XF TGBE     | Graphite-XF TGBR | Graphite-XF TGBE, Graphite-XF TGBR | Graphite-XF TGBE     | Graphite-XF TGBR | Graphite-XF TGBE, Graphite-XF TGBR |              |                 |
| 1/2  | 34                   | 34               | 66                                 | 34                   | 34               | 66                                 | 4            | 1/2             |
| 3/4  | 62                   | 62               | 132                                | 62                   | 62               | 132                                | 4            | 5/8             |
| 1  | 68                   | 68               | 132                                | 68                   | 68               | 132                                | 4            | 5/8             |
| 1-1/4  | 77                   | 77               | 132                                | 77                   | 77               | 132                                | 4            | 5/8             |
| 1-1/2  | 123                  | 123              | 238                                | 123                  | 123              | 238                                | 4            | 3/4             |
| 2  | 56                   | 56               | 132                                | 56                   | 56               | 132                                | 8            | 5/8             |
| 2-1/2  | 88                   | 88               | 238                                | 88                   | 88               | 238                                | 8            | 3/4             |
| 3  | 103                  | 103              | 238                                | 103                  | 103              | 238                                | 8            | 3/4             |
| 3-1/2  | 120                  | 120              | 238                                | 120                  | 120              | 238                                | 8            | 3/4             |
| 4  | 146                  | 146              | 238                                | 146                  | 146              | 238                                | 8            | 3/4             |
| 5  | 171                  | 171              | 238                                | 171                  | 171              | 238                                | 8            | 3/4             |
| 6  | 143                  | 143              | 238                                | 143                  | 143              | 238                                | 12           | 3/4             |
| 8  | 231                  | 231              | 385                                | 231                  | 231              | 385                                | 12           | 7/8             |
| 10   | 261                  | 261              | 578                                | 261                  | 261              | 578                                | 16           | 1               |
| 12   | 393                  | 393              | 859                                | 393                  | 393              | 859                                | 16           | 1-1/8           |
| 14   | 392                  | 392              | 859                                | 392                  | 392              | 859                                | 20           | 1-1/8           |
| 16   | 526                  | 526              | 1219                               | 526                  | 526              | 1219                               | 20           | 1-1/4           |
| 18   | 520                  | 520              | 1219                               | 520                  | 520              | 1219                               | 24           | 1-1/4           |
| 20   | 609                  | 609              | 1219                               | 609                  | 609              | 1219                               | 24           | 1-1/4           |
| 24   | 998                  | 998              | 2213                               | 998                  | 998              | 2213                               | 24           | 1-1/2           |

**NOTES:** 1) The design bolt stress used for calculation is based on 60% of bolt yield at room temperature. 2) Assuming new, non-coated and well lubricated bolts and nuts are used with through-hardened washers. K factor of 0.20 was used in the calculation per ASME PCC-1. Multiply torque values by a factor of "K / 0.20" if using a lubricant with a different K factor. 3) Assuming maximum internal pressure follows ASME B16.5 Pressure-Temperature rating tables. 4) Assuming ASME PCC-1 bolting pattern is followed. 5) Flange imperfections, rotation and deflection are ignored. 6) Bolt torque values in above Tables are for reference only. User is responsible for applying appropriate bolt loads to properly seat the gasket.