

**STUDBOLT**   
**SCOTLAND LIMITED**  
PETROCHEMICAL & INDUSTRIAL GRADE FASTENERS & SUPPLIES



**PETROCHEMICAL**  
**PRODUCT BROCHURE**

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**PETROCHEMICAL**



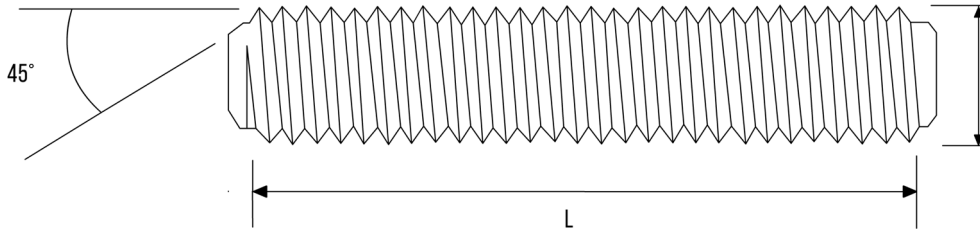
**STUDBOLTS**

Studbolts are widely used in the Petrochemical industry and are covered in the ASTM standards A193, for high temperature or high pressure service, and A320 for low temperature service. Finished studbolts and studbolt assemblies are available from stock in both Imperial and Metric threads and in a range of different finishes.

**CHEMICAL COMPOSITION**

|            | ASTM A193 B7/B7M |                      | ASTM A320 L7/L7M       |                      | ASTM A193 B16           |                      |
|------------|------------------|----------------------|------------------------|----------------------|-------------------------|----------------------|
|            | Range            | Variation Over/Under | Range                  | Variation Over/Under | Range                   | Variation Over/Under |
| Carbon     | 0.37 - 0.49      | 0.02                 | 0.38 - 0.48            | 0.02                 | 0.36 - 0.47             | 0.02                 |
| Manganese  | 0.65 - 1.10      | 0.04                 | 0.75 - 1.00            | 0.04                 | 0.45 - 0.70             | 0.03                 |
| Phosphorus | 0.035 max        | 0.005 over           | 0.035 max              | 0.005 over           | 0.035 max               | 0.005 over           |
| Sulfur     | 0.040 max        | 0.005 over           | 0.040 max              | 0.005 over           | 0.040 max               | 0.005 over           |
| Silicon    | 0.15 - 0.35      | 0.02                 | 0.15 - 0.35            | 0.02                 | 0.15 - 0.35             | 0.02                 |
| Chromium   | 0.75 - 1.20      | 0.05                 | 0.80 - 1.10            | 0.05                 | 0.80 - 1.15             | 0.05                 |
| Molybdenum | 0.15 - 0.25      | 0.02                 | 0.15 - 0.25            | 0.02                 | 0.50 - 0.65             | 0.03                 |
| Vanadium   | -                | -                    | -                      | -                    | 0.25 - 0.35             | 0.03                 |
| Aluminium  | -                | -                    | -                      | -                    | 0.015 max               | -                    |
| Nickel     | -                | -                    | -                      | -                    | -                       | -                    |
|            | ASTM A193 B6     |                      | ASTM A193 B8 CL1 & CL2 |                      | ASTM A193 B8M CL1 & CL2 |                      |
|            | Range            | Variation Over/Under | Range                  | Variation Over/Under | Range                   | Variation Over/Under |
| Carbon     | 0.15 max         | 0.01 over            | 0.08 max               | 0.01 over            | 0.08 max                | 0.01 over            |
| Manganese  | 1.00 max         | 0.03 over            | 2.00 max               | 0.04 over            | 2.00 max                | 0.04 over            |
| Phosphorus | 0.040 max        | 0.005 over           | 0.045 max              | 0.010 over           | 0.045 max               | 0.010 over           |
| Sulfur     | 0.030 max        | 0.005 over           | 0.030 max              | 0.005 over           | 0.030 max               | 0.005 over           |
| Silicon    | 1.00 max         | 0.05 over            | 1.00 max               | 0.05 over            | 1.00 max                | 0.05 over            |
| Chromium   | 11.5 - 13.5      | 0.15                 | 18.0 - 20.0            | 0.20                 | 16.0 - 18.0             | 0.20                 |
| Molybdenum | -                | -                    | -                      | -                    | 2.00 - 3.00             | 0.10                 |
| Vanadium   | -                | -                    | -                      | -                    | -                       | -                    |
| Aluminium  | -                | -                    | -                      | -                    | -                       | -                    |
| Nickel     | -                | -                    | 8.0 - 11.0             | 0.15                 | 10.0 - 14.0             | 0.15                 |

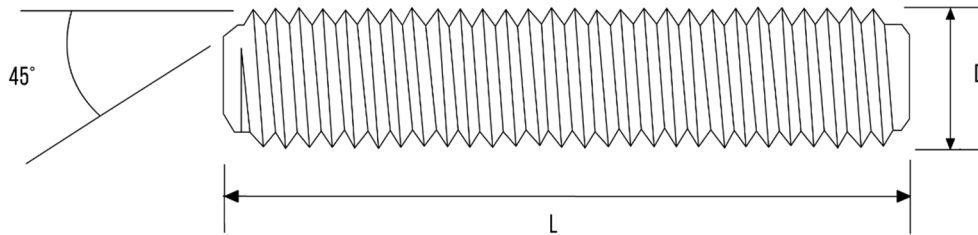
**STUDBOLTS (IMPERIAL) – ASME B16.5**



| DIA (D) |        | TPI (UNC) | TPI (UNS) | DIA (D) |       | TPI (UNC) | TPI (UNS) |
|---------|--------|-----------|-----------|---------|-------|-----------|-----------|
| 1/4"    | 0.25   | 20        | -         | 1.1/2"  | 1.50  | 6         | 8         |
| 5/16"   | 0.3125 | 18        | -         | 1.5/8"  | 1.625 | -         | 8         |
| 3/8"    | 0.375  | 16        | -         | 1.3/4"  | 1.75  | 5         | 8         |
| 7/16"   | 0.4375 | 14        | -         | 1.7/8"  | 1.875 | -         | 8         |
| 1/2"    | 0.50   | 13        | -         | 2"      | 2.00  | 4.5       | 8         |
| 9/16"   | 0.5625 | 12        | -         | 2.1/4"  | 2.25  | 4.5       | 8         |
| 5/8"    | 0.625  | 11        | -         | 2.1/2"  | 2.50  | 4         | 8         |
| 3/4"    | 0.75   | 10        | -         | 2.3/4"  | 2.75  | 4         | 8         |
| 7/8"    | 0.875  | 9         | -         | 3"      | 3.00  | 4         | 8         |
| 1"      | 1.00   | 8         | 8         | 3.1/4"  | 3.25  | 4         | 8         |
| 1.1/8"  | 1.125  | 7         | 8         | 3.1/2"  | 3.50  | 4         | 8         |
| 1.1/4"  | 1.25   | 7         | 8         | 3.3/4"  | 3.75  | 4         | 8         |
| 1.3/8"  | 1.375  | 6         | 8         | 4"      | 4.00  | 4         | 8         |

- The length (L), measured parallel to the axis, is the distance from first thread to first thread
- End points are flat and chamfered both ends
- Length of point on studbolts shall be not less than one nor more than two complete threads as measured from the extreme end parallel to the axis
- Threads are UNC for all studbolt diameters 1" and smaller
- Threads are UNS for all studbolt diameters 1.1/8" and above. These can be supplied as UNC but are non-standard.
- Threads are Class 2A for all studbolts in accordance with ASME B1.1

**STUDBOLTS (METRIC) – DIN976**

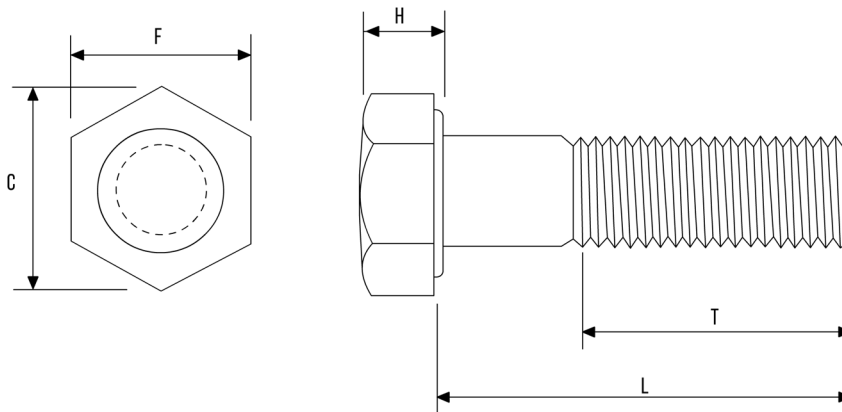


| DIAMETER (D) | PITCH THREAD | DIAMETER (D) | PITCH THREAD |
|--------------|--------------|--------------|--------------|
| M6           | 1            | M36          | 4            |
| M8           | 1.25         | M39          | 4            |
| M10          | 1.5          | M42          | 4.5          |
| M12          | 1.75         | M45          | 4.5          |
| M14          | 2            | M48          | 5            |
| M16          | 2            | M52          | 5            |
| M18          | 2.5          | M56          | 5.5          |
| M20          | 2.5          | M64          | 6            |
| M22          | 2.5          | M72          | 6            |
| M24          | 3            | M76          | 6            |
| M27          | 3            | M80          | 6            |
| M30          | 3.5          | M90          | 6            |
| M33          | 3.5          | M100         | 6            |

- The length (L), measured parallel to the axis, is the distance from end to end
- End points are flat and chamfered both ends
- Length of point on studbolts shall be not less than one nor more than two complete threads as measured from the extreme end parallel to the axis
- Threads are accordance with ISO 261

## HEAVY HEX BOLTS - ASME B18.2.1

Heavy Hex Bolts and Setscrews have a larger head than standard Hex Head Bolts are available off the shelf in grades B7, L7 & B8M. These are available in Imperial and Metric threads and can be coated or plated to suit customer requirements as requested.

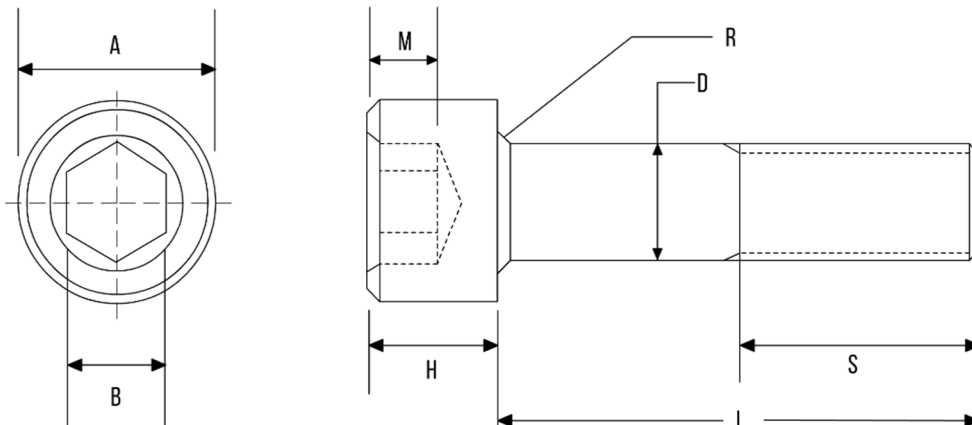


| DIA (D) | A/F (F) |       |       | A/C (C) |       | HEIGHT (H) |       |       | THREAD (T) |        |
|---------|---------|-------|-------|---------|-------|------------|-------|-------|------------|--------|
|         | BASIC   | MAX   | MIN   | MAX     | MIN   | BASIC      | MAX   | MIN   | L ≤ 6"     | L > 6" |
| 1/2     | 7/8     | 0.875 | 0.850 | 1.010   | 0.969 | 11/32      | 0.364 | 0.302 | 1.25       | 1.50   |
| 5/8     | 1.1/6   | 1.062 | 1.031 | 1.227   | 1.175 | 27/64      | 0.444 | 0.378 | 1.50       | 1.75   |
| 3/4     | 1.1/4   | 1.250 | 1.212 | 1.443   | 1.383 | 1/2        | 0.524 | 0.455 | 1.75       | 2.00   |
| 7/8     | 1.7/16  | 1.438 | 1.394 | 1.660   | 1.589 | 37/64      | 0.604 | 0.531 | 2.00       | 2.25   |
| 1       | 1.5/8   | 1.625 | 1.575 | 1.876   | 1.796 | 43/64      | 0.700 | 0.591 | 2.25       | 2.50   |
| 1.1/8   | 1.13/16 | 1.812 | 1.756 | 2.093   | 2.002 | 3/4        | 0.780 | 0.658 | 2.50       | 2.75   |
| 1.1/4   | 2       | 2.000 | 1.938 | 2.309   | 2.209 | 27/32      | 0.876 | 0.749 | 2.75       | 3.00   |
| 1.3/8   | 2.3/16  | 2.188 | 2.119 | 2.526   | 2.416 | 29/32      | 0.940 | 0.810 | 3.00       | 3.25   |
| 1.1/2   | 2.3/8   | 2.375 | 2.300 | 2.742   | 2.622 | 1          | 1.036 | 0.902 | 3.25       | 3.50   |
| 1.5/8   | 2.9/16  | 2.562 | 2.481 | 2.959   | 2.829 | 1.3/32     | 1.116 | 0.978 | 3.50       | 3.75   |
| 1.3/4   | 2.3/4   | 2.750 | 2.662 | 3.175   | 3.035 | 1.5/32     | 1.196 | 1.054 | 3.75       | 4.00   |
| 1.7/8   | 2.15/16 | 2.938 | 2.844 | 3.392   | 3.242 | 1.1/4      | 1.276 | 1.130 | 4.00       | 4.25   |
| 2       | 3.1/8   | 3.125 | 3.025 | 3.608   | 3.449 | 1.11/32    | 1.388 | 1.175 | 4.25       | 4.50   |
| 2.1/4   | 3.1/2   | 3.500 | 3.388 | 4.041   | 3.862 | 1.1/2      | 1.548 | 1.327 | 4.75       | 5.00   |
| 2.1/2   | 3.7/8   | 3.875 | 3.750 | 4.474   | 4.275 | 1.21/32    | 1.708 | 1.479 | 5.25       | 5.50   |
| 2.3/4   | 4.1/4   | 4.250 | 4.112 | 4.907   | 4.688 | 1.13/16    | 1.869 | 1.632 | 5.75       | 6.00   |
| 3       | 4.5/8   | 4.625 | 4.475 | 5.340   | 5.102 | 2          | 2.060 | 1.815 | 6.25       | 6.50   |

- All dimensions are in inches
- Thread lengths apply to bolts only. Setscrews are fully threaded.

**SOCKET HEAD CAPSCREWS (1960 SERIES) - ASME B18.3**

Socket Capscrews are available off the shelf in B7 & L7. These are available in Imperial and Metric threads and can be coated or plated to suit customer requirements as requested. Other grades of material are manufactured to order.

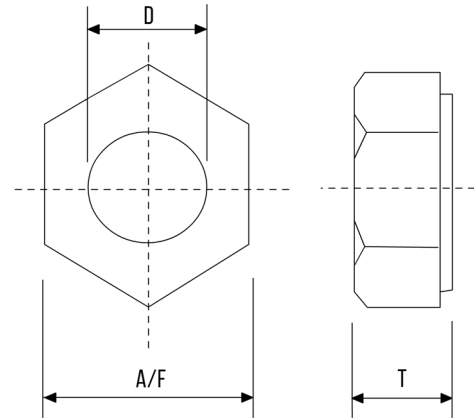


| DIA   | A             | H             | B (NOM)      | M (MIN) | R (MIN) | S (MIN) |
|-------|---------------|---------------|--------------|---------|---------|---------|
| 1/4   | 0.365 - 0.375 | 0.244 - 0.250 | 3/16 (0.188) | 0.120   | 0.007   | 1.000   |
| 5/16  | 0.457 - 0.469 | 0.306 - 0.312 | 1/4 (0.250)  | 1.151   | 0.009   | 1.120   |
| 3/8   | 0.550 - 0.562 | 0.368 - 0.375 | 5/16 (0.312) | 0.182   | 0.012   | 1.250   |
| 7/16  | 0.642 - 0.656 | 0.430 - 0.438 | 3/8 (0.375)  | 0.213   | 0.014   | 1.380   |
| 1/2   | 0.735 - 0.750 | 0.492 - 0.500 | 3/8 (0.375)  | 0.245   | 0.016   | 1.500   |
| 9/16  | 0.827 - 0.843 | 0.554 - 0.562 | 7/16 (0.438) | 0.276   | 0.021   | 1.630   |
| 5/8   | 0.921 - 0.938 | 0.616 - 0.625 | 1/2 (0.500)  | 0.307   | 0.021   | 1.750   |
| 3/4   | 1.107 - 1.125 | 0.740 - 0.750 | 5/8 (0.625)  | 0.370   | 0.025   | 2.000   |
| 7/8   | 1.293 - 1.312 | 0.864 - 0.875 | 3/4 (0.750)  | 0.432   | 0.031   | 2.250   |
| 1     | 1.479 - 1.500 | 0.988 - 1.000 | 3/4 (0.750)  | 0.495   | 0.034   | 2.500   |
| 1-1/8 | 1.665 - 1.688 | 1.111 - 1.125 | 7/8 (0.875)  | 0.557   | 0.039   | 2.810   |
| 1-1/4 | 1.852 - 1.875 | 1.236 - 1.250 | 7/8 (0.875)  | 0.620   | 0.044   | 3.120   |
| 1-3/8 | 2.038 - 2.062 | 1.360 - 1.375 | 1 (1.000)    | 0.682   | 0.048   | 3.440   |
| 1-1/2 | 2.224 - 2.250 | 1.485 - 1.500 | 1 (1.000)    | 0.745   | 0.052   | 3.750   |

- All dimensions are in inches

**HEAVY HEX NUTS – IMPERIAL**

- Dimensions in accordance with ANSI B18.2.2
- Dimensions in Inches
- Single Chamfer and Washer Face
- Sizes from 1/4" up to 4"
- Self-Colour, Zinc & Galvanised finish from stock
- Other coatings available on request

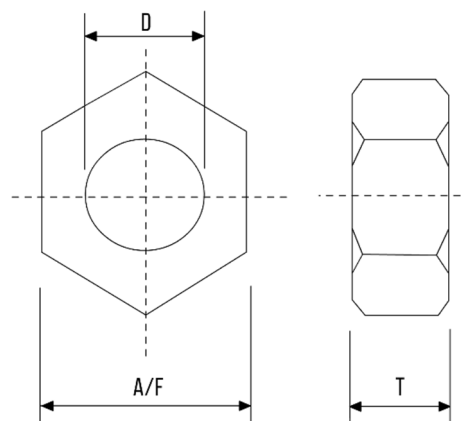


| DIAMETER (D) | TPI (UNC) | TPI (UNS) | A/F     | THICKNESS (T) | WEIGHT (KG/100) |
|--------------|-----------|-----------|---------|---------------|-----------------|
| 1/4          | 20        | -         | 1/2     | 1/4           | 0.3             |
| 5/16         | 18        | -         | 9/16    | 5/16          | 0.4             |
| 3/8          | 16        | -         | 11/16   | 3/8           | 1.4             |
| 7/16         | 14        | -         | 3/4     | 7/16          | 1.9             |
| 1/2          | 13        | -         | 7/8     | 1/2           | 3.0             |
| 9/16         | 12        | -         | 15/16   | 9/16          | 3.7             |
| 5/8          | 11        | -         | 1.1/6   | 5/8           | 5.4             |
| 3/4          | 10        | -         | 1.1/4   | 3/4           | 8.8             |
| 7/8          | 9         | -         | 1.7/16  | 7/8           | 13.5            |
| 1            | 8         | 8         | 1.5/8   | 1             | 19.3            |
| 1.1/8        | 7         | 8         | 1.13/16 | 1.1/8         | 26.9            |
| 1.1/4        | 7         | 8         | 2       | 1.1/4         | 35.7            |
| 1.3/8        | 6         | 8         | 2.3/16  | 1.3/8         | 46.3            |
| 1.1/2        | 6         | 8         | 2.3/8   | 1.1/2         | 59.5            |
| 1.5/8        | -         | 8         | 2.9/16  | 1.5/8         | 73.6            |
| 1.3/4        | 5         | 8         | 2.3/4   | 1.3/4         | 92.7            |
| 1.7/8        | -         | 8         | 2.15/16 | 1.7/8         | 109.5           |
| 2            | 4.5       | 8         | 3.1/8   | 2             | 135.8           |
| 2.1/4        | 4.5       | 8         | 3.1/2   | 2.1/4         | 190.3           |
| 2.1/2        | 4         | 8         | 3.7/8   | 2.1/2         | 256.0           |
| 2.3/4        | 4         | 8         | 4.1/4   | 2.3/4         | 335.0           |
| 3            | 4         | 8         | 4.5/8   | 3             | 432.0           |
| 3.1/4        | 4         | 8         | 5       | 3.1/4         | 543.0           |
| 3.1/2        | 4         | 8         | 5.3/8   | 3.1/2         | 694.0           |



**HEAVY HEX NUTS – METRIC**

- Dimensions in accordance with DIN934 (H=D)
- Dimensions in millimetres
- Double Chamfer no washer face
- Sizes from M8 up to M76
- Self-Colour, Zinc & Galvanised finish from stock
- Other coatings available on request



| DIAMETER (D) | THREAD PITCH | A/F | THICKNESS (T) | WEIGHT (KG/100) |
|--------------|--------------|-----|---------------|-----------------|
| M8           | 1.25         | 13  | 8             | 0.65            |
| M10          | 1.50         | 17  | 10            | 1.45            |
| M12          | 1.75         | 19  | 12            | 2.17            |
| M14          | 2.00         | 22  | 14            | 3.13            |
| M16          | 2.00         | 24  | 16            | 4.16            |
| M18          | 2.50         | 27  | 18            | 6.20            |
| M20          | 2.50         | 30  | 20            | 8.05            |
| M22          | 2.50         | 32  | 22            | 9.85            |
| M24          | 3.00         | 36  | 24            | 13.80           |
| M27          | 3.00         | 41  | 27            | 20.65           |
| M30          | 3.50         | 46  | 30            | 27.90           |
| M33          | 3.50         | 50  | 33            | 36.00           |
| M36          | 4.00         | 55  | 36            | 49.15           |
| M39          | 4.00         | 60  | 39            | 62.75           |
| M42          | 4.50         | 65  | 42            | 81.50           |
| M45          | 4.50         | 70  | 45            | 100.00          |
| M48          | 5.00         | 75  | 48            | 122.00          |
| M52          | 5.00         | 80  | 52            | 152.50          |
| M56          | 5.50         | 85  | 56            | 177.50          |
| M64          | 6.00         | 95  | 64            | 247.50          |
| M72          | 6.00         | 105 | 72            | 334.00          |
| M76          | 6.00         | 110 | 76            | 380.00          |

**MATERIALS – BOLTING GRADES**

| ASTM | MATERIAL GRADE | DESCRIPTION                                      |
|------|----------------|--|
| A193 | B5             | Type 501 Stainless Steel, 4-6% Chromium          |
| A193 | B6             | Type 410 Stainless Steel, 12% Chromium           |
| A193 | B7             | Chromium-Molybdenum, AISI 4140                   |
| A193 | B7M            | Chromium-Molybdenum, AISI 4140                   |
| A193 | B8             | Type 304 Stainless Steel                         |
| A193 | B8 Class 2     | Type 304 Stainless Steel, Strain Hardened        |
| A193 | B8M            | Type 316 Stainless Steel                         |
| A193 | B8M Class 2    | Type 316 Stainless Steel, Strain Hardened        |
| A193 | B8C            | Type 347 Stainless Steel                         |
| A193 | B8T            | Type 321 Stainless Steel                         |
| A193 | B16            | Chromium-Molybdenum-Vanadium                     |
| A320 | L7 / L7M / L43 | Chromium-Molybdenum, AISI 4140, Low Temp Service |
| A453 | 660 A, B & D   | Heat Resistant, Precipitation Hardening Steel    |

**MATERIALS – NUT GRADES**

| ASTM | MATERIAL GRADE | DESCRIPTION                |
|------|----------------|----------------------------|
| A194 | 2H             | Carbon Steel               |
| A194 | 2HM            | Carbon Steel               |
| A194 | 3              | Type 501 Stainless Steel   |
| A194 | 4              | Carbon-Molybdenum          |
| A194 | 6              | Type 410 Stainless Steel   |
| A194 | 7              | Type 4140 / 4142 / 4145    |
| A194 | 7M             | Type 4140H / 4142H / 4145H |
| A194 | 8              | Type 304 Stainless Steel   |
| A194 | 8A             | Type 304 Stainless Steel   |
| A194 | 8C             | Type 347 Stainless Steel   |
| A194 | 8T             | Type 321 Stainless Steel   |
| A194 | 8M             | Type 316 Stainless Steel   |
| A194 | 8MA            | Type 316 Stainless Steel   |

## FLANGE BOLTING CHARTS

### CLASS 150

|        | No. of Bolts | Dia.   | Length |       | No. of Bolts | Dia.   | Length  |       | No. of Bolts | Dia.   | Length |
|--------|--------------|--------|--------|-------|--------------|--------|---------|-------|--------------|--------|--------|
| 1/2"   | 4            | 1/2"   | 2.1/2" | 26" A | 24           | 1.1/4" | 8.3/4"  | 26" B | 36           | 3/4"   | 5.3/4" |
| 3/4"   | 4            | 1/2"   | 2.3/4" | 28" A | 28           | 1.1/4" | 9"      | 28" B | 40           | 3/4"   | 6"     |
| 1"     | 4            | 1/2"   | 2.3/4" | 30" A | 28           | 1.1/4" | 9.1/4"  | 30" B | 44           | 3/4"   | 6"     |
| 1 1/4" | 4            | 1/2"   | 3"     | 32" A | 28           | 1.1/2" | 10.1/4" | 32" B | 48           | 3/4"   | 6"     |
| 1 1/2" | 4            | 1/2"   | 3"     | 34" A | 32           | 1.1/2" | 10.1/2" | 34" B | 40           | 7/8"   | 6.1/2" |
| 2"     | 4            | 5/8"   | 3.1/2" | 36" A | 32           | 1.1/2" | 11"     | 36" B | 44           | 7/8"   | 6.3/4" |
| 2 1/2" | 4            | 5/8"   | 3.3/4" | 38" A | 32           | 1.1/2" | 10.3/4" | 38" B | 40           | 1"     | 7.1/4" |
| 3"     | 4            | 5/8"   | 3.3/4" | 40" A | 36           | 1.1/2" | 11"     | 40" B | 44           | 1"     | 7.1/2" |
| 3 1/2" | 8            | 5/8"   | 3.3/4" | 42" A | 36           | 1.1/2" | 11.1/2" | 42" B | 48           | 1"     | 7.1/2" |
| 4"     | 8            | 5/8"   | 3.3/4" | 44" A | 40           | 1.1/2" | 12"     | 44" B | 52           | 1"     | 7.3/4" |
| 5"     | 8            | 3/4"   | 4"     | 46" A | 40           | 1.1/2" | 12"     | 46" B | 40           | 1.1/8" | 8"     |
| 6"     | 8            | 3/4"   | 4.1/4" | 48" A | 44           | 1.1/2" | 12.1/2" | 48" B | 44           | 1.1/8" | 8.1/4" |
| 8"     | 8            | 3/4"   | 4.1/2" | 50" A | 44           | 1.3/4" | 13.1/4" | 50" B | 48           | 1.1/8" | 8.1/2" |
| 10"    | 12           | 7/8"   | 5"     | 52" A | 44           | 1.3/4" | 13.1/2" | 52" B | 52           | 1.1/8" | 8.3/4" |
| 12"    | 12           | 7/8"   | 5"     | 54" A | 44           | 1.3/4" | 14"     | 54" B | 56           | 1.1/8" | 8.3/4" |
| 14"    | 12           | 1"     | 5.3/4" | 56" A | 48           | 1.3/4" | 14.1/4" | 56" B | 60           | 1.1/8" | 9"     |
| 16"    | 16           | 1"     | 5.3/4" | 58" A | 48           | 1.3/4" | 14.1/2" | 58" B | 48           | 1.1/4" | 9.1/4" |
| 18"    | 16           | 1.1/8" | 6.1/4" | 60" A | 52           | 1.3/4" | 15"     | 60" B | 52           | 1.1/4" | 9.1/2" |
| 20"    | 20           | 1.1/8" | 6.3/4" |       |              |        |         |       |              |        |        |
| 22"    | 20           | 1.1/4" | 7.1/4" |       |              |        |         |       |              |        |        |
| 24"    | 20           | 1.1/4" | 7.1/2" |       |              |        |         |       |              |        |        |

- Studbolt sizes are approximate and to be used for guide purposes only
- Lengths are based on raised face weld neck flanges
- Blind flanges or RTJ flanges may need longer studs

**FLANGE BOLTING CHARTS**

**CLASS 300**

|        | No. of Bolts | Dia.   | Length |       | No. of Bolts | Dia.   | Length  |       | No. of Bolts | Dia.   | Length  |
|--------|--------------|--------|--------|-------|--------------|--------|---------|-------|--------------|--------|---------|
| 1/2"   | 4            | 1/2"   | 2.3/4" | 26" A | 28           | 1.5/8" | 10.1/2" | 26" B | 32           | 1.1/4" | 10.1/2" |
| 3/4"   | 4            | 5/8"   | 3.1/4" | 28" A | 28           | 1.5/8" | 11"     | 28" B | 36           | 1.1/4" | 10.1/2" |
| 1"     | 4            | 5/8"   | 3.1/4" | 30" A | 28           | 1.3/4" | 11.3/4" | 30" B | 36           | 1.3/8" | 11"     |
| 1 1/4" | 4            | 5/8"   | 3.1/2" | 32" A | 28           | 1.7/8" | 12.1/2" | 32" B | 32           | 1.1/2" | 12"     |
| 1 1/2" | 4            | 5/8"   | 3.3/4" | 34" A | 28           | 1.7/8" | 12.3/4" | 34" B | 36           | 1.1/2" | 12"     |
| 2"     | 8            | 5/8"   | 3.3/4" | 36" A | 32           | 2"     | 13.1/4" | 36" B | 32           | 1.5/8" | 12.1/4" |
| 2 1/2" | 8            | 3/4"   | 4.1/4" | 38" A | 32           | 1.1/2" | 12.1/2" | 38" B | 36           | 1.5/8" | 13"     |
| 3"     | 8            | 3/4"   | 4.1/4" | 40" A | 32           | 1.5/8" | 13.1/4" | 40" B | 40           | 1.5/8" | 13.1/4" |
| 3 1/2" | 8            | 3/4"   | 4.1/2" | 42" A | 32           | 1.5/8" | 13.3/4" | 42" B | 36           | 1.3/4" | 13.3/4" |
| 4"     | 8            | 3/4"   | 4.3/4" | 44" A | 32           | 1.3/4" | 14.1/4" | 44" B | 40           | 1.3/4" | 14.1/2" |
| 5"     | 8            | 3/4"   | 5"     | 46" A | 28           | 1.7/8" | 14.3/4" | 46" B | 36           | 1.7/8" | 14.3/4" |
| 6"     | 12           | 3/4"   | 5"     | 48" A | 32           | 1.7/8" | 15.1/4" | 48" B | 40           | 1.7/8" | 14.3/4" |
| 8"     | 12           | 7/8"   | 5.3/4" | 50" A | 32           | 2"     | 16"     | 50" B | 44           | 1.7/8" | 15.1/2" |
| 10"    | 16           | 1"     | 6.3/4" | 52" A | 32           | 2"     | 16.1/4" | 52" B | 48           | 1.7/8" | 16"     |
| 12"    | 16           | 1.1/8" | 7.1/2" | 54" A | 28           | 2.1/4" | 17.1/2" | 54" B | 48           | 1.7/8" | 15.1/2" |
| 14"    | 20           | 1.1/8" | 7.1/2" | 56" A | 28           | 2.1/4" | 17.1/2" | 56" B | 36           | 2.1/4" | 17.1/2" |
| 16"    | 20           | 1.1/4" | 8"     | 58" A | 32           | 2.1/4" | 18"     | 58" B | 40           | 2.1/4" | 17.1/2" |
| 18"    | 24           | 1.1/4" | 8.1/4" | 60" A | 32           | 2.1/4" | 18.1/4" | 60" B | 40           | 2.1/4" | 17.1/4" |
| 20"    | 24           | 1.1/4" | 8.3/4" |       |              |        |         |       |              |        |         |
| 22"    | 24           | 1.1/4" | 9.1/2" |       |              |        |         |       |              |        |         |
| 24"    | 24           | 1.1/2" | 9.3/4" |       |              |        |         |       |              |        |         |

- Studbolt sizes are approximate and to be used for guide purposes only
- Lengths are based on raised face weld neck flanges
- Blind flanges or RTJ flanges may need longer studs

**FLANGE BOLTING CHARTS**

**CLASS 600**

|        | No. of Bolts | Dia.   | Length  |       | No. of Bolts | Dia.   | Length  |       | No. of Bolts | Dia.   | Length  |
|--------|--------------|--------|---------|-------|--------------|--------|---------|-------|--------------|--------|---------|
| 1/2"   | 4            | 1/2"   | 3.1/4"  | 26" A | 28           | 1.7/8" | 13.1/2" | 26" B | 28           | 1.5/8" | 13.1/4" |
| 3/4"   | 4            | 5/8"   | 3.3/4"  | 28" A | 28           | 2"     | 14"     | 28" B | 28           | 1.3/4" | 14"     |
| 1"     | 4            | 5/8"   | 3.3/4"  | 30" A | 28           | 2"     | 14.1/4" | 30" B | 28           | 1.7/8" | 15"     |
| 1 1/4" | 4            | 5/8"   | 4"      | 32" A | 28           | 2.1/4" | 15"     | 32" B | 28           | 2"     | 15.1/2" |
| 1 1/2" | 4            | 3/4"   | 4.1/2"  | 34" A | 28           | 2.1/4" | 15.1/4" | 34" B | 24           | 2.1/4" | 17"     |
| 2"     | 8            | 5/8"   | 4.1/2"  | 36" A | 28           | 2.1/2" | 16"     | 36" B | 28           | 2.1/4" | 17.1/4" |
| 2 1/2" | 8            | 3/4"   | 5"      | 38" A | 28           | 2.1/4" | 17.3/4" | 38" B | 28           | 2.1/4" | 17.3/4" |
| 3"     | 8            | 3/4"   | 5.1/4"  | 40" A | 32           | 2.1/4" | 18.1/4" | 40" B | 32           | 2.1/4" | 18.1/4" |
| 3 1/2" | 8            | 7/8"   | 5.3/4"  | 42" A | 28           | 2.1/2" | 19.1/2" | 42" B | 28           | 2.1/2" | 19.1/2" |
| 4"     | 8            | 7/8"   | 6"      | 44" A | 32           | 2.1/2" | 20"     | 44" B | 32           | 2.1/2" | 20"     |
| 5"     | 8            | 1"     | 7"      | 46" A | 32           | 2.1/2" | 20.1/2" | 46" B | 32           | 2.1/2" | 20.1/2" |
| 6"     | 12           | 1"     | 7.1/4"  | 48" A | 32           | 2.3/4" | 21.3/4" | 48" B | 32           | 2.3/4" | 21.3/4" |
| 8"     | 12           | 1.1/8" | 8"      | 50" A | 28           | 3"     | 22.3/4" | 50" B | 28           | 3"     | 22.3/4" |
| 10"    | 16           | 1.1/4" | 9"      | 52" A | 32           | 3"     | 23.1/4" | 52" B | 32           | 3"     | 23.1/4" |
| 12"    | 20           | 1.1/4" | 9.1/4"  | 54" A | 32           | 3"     | 23.3/4" | 54" B | 32           | 3"     | 23.3/4" |
| 14"    | 20           | 1.3/8" | 9.3/4"  | 56" A | 32           | 3.1/4" | 25"     | 56" B | 32           | 3.1/4" | 25"     |
| 16"    | 20           | 1.1/2" | 10.1/2" | 58" A | 32           | 3.1/4" | 25.1/4" | 58" B | 32           | 3.1/4" | 25.1/4" |
| 18"    | 20           | 1.5/8" | 11.1/4" | 60" A | 28           | 3.1/2" | 26.3/4" | 60" B | 28           | 3.1/2" | 26.3/4" |
| 20"    | 24           | 1.5/8" | 12"     |       |              |        |         |       |              |        |         |
| 22"    | 24           | 1.3/4" | 12.3/4" |       |              |        |         |       |              |        |         |
| 24"    | 24           | 1.7/8" | 13.1/2" |       |              |        |         |       |              |        |         |

- Studbolt sizes are approximate and to be used for guide purposes only
- Lengths are based on raised face weld neck flanges
- Blind flanges or RTJ flanges may need longer studs

**FLANGE BOLTING CHARTS**

**CLASS 900**

|        | No. of Bolts | Dia.   | Length  |       | No. of Bolts | Dia.   | Length  |       | No. of Bolts | Dia.   | Length  |
|--------|--------------|--------|---------|-------|--------------|--------|---------|-------|--------------|--------|---------|
| 1/2"   | 4            | 3/4"   | 4.1/4"  | 26" A | 20           | 2.3/4" | 17.3/4" | 26" B | 20           | 2.1/2" | 17"     |
| 3/4"   | 4            | 3/4"   | 4.3/4"  | 28" A | 20           | 3"     | 18.1/2" | 28" B | 20           | 2.3/4" | 18.1/2" |
| 1"     | 4            | 7/8"   | 5.1/4"  | 30" A | 20           | 3"     | 19"     | 30" B | 20           | 3"     | 19.1/2" |
| 1 1/4" | 4            | 7/8"   | 5.1/4"  | 32" A | 20           | 3.1/4" | 20.1/4" | 32" B | 20           | 3"     | 20"     |
| 1 1/2" | 4            | 1"     | 6"      | 34" A | 20           | 3.1/2" | 21.1/4" | 34" B | 20           | 3.1/4" | 21.1/4" |
| 2"     | 8            | 7/8"   | 6"      | 36" A | 20           | 3.1/2" | 21.3/4" | 36" B | 24           | 3"     | 21"     |
| 2 1/2" | 8            | 1"     | 6.3/4"  | 38" A | 20           | 3.1/2" | 23.1/4" | 38" B | 20           | 3.1/2" | 23.1/4" |
| 3"     | 8            | 7/8"   | 6"      | 40" A | 24           | 3.1/2" | 23.3/4" | 40" B | 24           | 3.1/2" | 23.3/4" |
| 4"     | 8            | 1.1/8" | 7.1/4"  | 42" A | 24           | 3.1/2" | 24.1/2" | 42" B | 24           | 3.1/2" | 24.1/2" |
| 5"     | 8            | 1.1/4" | 8"      | 44" A | 24           | 3.3/4" | 25.3/4" | 44" B | 24           | 3.3/4" | 25.3/4" |
| 6"     | 12           | 1.1/8" | 8"      | 46" A | 24           | 4"     | 27"     | 46" B | 24           | 4"     | 27"     |
| 8"     | 12           | 1.3/8" | 9.1/4"  | 48" A | 24           | 4"     | 27.3/4" | 48" B | 24           | 4"     | 27.3/4" |
| 10"    | 16           | 1.3/8" | 9.3/4"  |       |              |        |         |       |              |        |         |
| 12"    | 20           | 1.3/8" | 10.1/2" |       |              |        |         |       |              |        |         |
| 14"    | 20           | 1.1/2" | 11.1/4" |       |              |        |         |       |              |        |         |
| 16"    | 20           | 1.5/8" | 11.3/4" |       |              |        |         |       |              |        |         |
| 18"    | 20           | 1.7/8" | 13.1/2" |       |              |        |         |       |              |        |         |
| 20"    | 20           | 2"     | 14.1/2" |       |              |        |         |       |              |        |         |
| 24"    | 20           | 2.1/2" | 18"     |       |              |        |         |       |              |        |         |

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- Blind flanges or RTJ flanges may need longer studs

**FLANGE BOLTING CHARTS – DIN FLANGES**

| DN   | No of Bolts | PN10   |        | No of Bolts | PN16   |        | No of Bolts | PN25   |        | No of Bolts | PN25   |        |
|------|-------------|--------|--------|-------------|--------|--------|-------------|--------|--------|-------------|--------|--------|
|      |             | Dia.   | Length |             | Dia.   | Length |             | Dia.   | Length |             | Dia.   | Length |
| 10   | 4           | 1/2"   | 65     | 4           | 1/2"   | 65     | 4           | 1/2"   | 65     | 4           | 1/2"   | 65     |
| 15   | 4           | 1/2"   | 65     | 4           | 1/2"   | 65     | 4           | 1/2"   | 65     | 4           | 1/2"   | 65     |
| 20   | 4           | 1/2"   | 70     | 4           | 1/2"   | 70     | 4           | 1/2"   | 70     | 4           | 1/2"   | 70     |
| 25   | 4           | 1/2"   | 70     | 4           | 1/2"   | 70     | 4           | 1/2"   | 70     | 4           | 1/2"   | 70     |
| 32   | 4           | 5/8"   | 80     | 4           | 5/8"   | 80     | 4           | 5/8"   | 80     | 4           | 5/8"   | 80     |
| 40   | 4           | 5/8"   | 80     | 4           | 5/8"   | 80     | 4           | 5/8"   | 80     | 4           | 5/8"   | 80     |
| 50   | 4           | 5/8"   | 80     | 4           | 5/8"   | 80     | 4           | 5/8"   | 80     | 4           | 5/8"   | 80     |
| 65   | 8           | 5/8"   | 80     | 8           | 5/8"   | 80     | 8           | 5/8"   | 85     | 8           | 5/8"   | 85     |
| 80   | 8           | 5/8"   | 80     | 8           | 5/8"   | 80     | 8           | 5/8"   | 90     | 8           | 5/8"   | 90     |
| 100  | 8           | 5/8"   | 80     | 8           | 5/8"   | 80     | 8           | 3/4"   | 95     | 8           | 3/4"   | 95     |
| 125  | 8           | 5/8"   | 85     | 8           | 5/8"   | 85     | 8           | 7/8"   | 110    | 8           | 7/8"   | 110    |
| 150  | 8           | 3/4"   | 95     | 8           | 3/4"   | 95     | 8           | 7/8"   | 115    | 8           | 7/8"   | 115    |
| 200  | 8           | 3/4"   | 95     | 12          | 3/4"   | 95     | 12          | 7/8"   | 115    | 12          | 1"     | 130    |
| 250  | 12          | 3/4"   | 100    | 12          | 7/8"   | 110    | 12          | 1"     | 130    | 12          | 1.1/8" | 145    |
| 300  | 12          | 3/4"   | 100    | 12          | 7/8"   | 110    | 16          | 1"     | 130    | 16          | 1.1/8" | 155    |
| 350  | 16          | 3/4"   | 100    | 16          | 7/8"   | 115    | 16          | 1.1/8" | 145    | 16          | 1.1/4" | 170    |
| 400  | 16          | 7/8"   | 110    | 16          | 1"     | 130    | 16          | 1.1/4" | 160    | 16          | 1.3/8" | 185    |
| 450  | 20          | 7/8"   | 110    | 20          | 1"     | 130    | 20          | 1.1/4" | 170    | 20          | 1.3/8" | 200    |
| 500  | 20          | 7/8"   | 110    | 20          | 1.1/8" | 145    | 20          | 1.1/4" | 175    | 20          | 1.1/2" | 205    |
| 600  | 20          | 1"     | 125    | 20          | 1.1/4" | 160    | 20          | 1.3/8" | 180    | 20          | 1.3/4" | 250    |
| 700  | 24          | 1"     | 135    | 24          | 1.1/4" | 160    | 24          | 1.1/2" | 195    |             |        |        |
| 800  | 24          | 1.1/8" | 145    | 24          | 1.3/8" | 210    | 24          | 1.3/4" | 215    |             |        |        |
| 900  | 28          | 1.1/8" | 145    | 28          | 1.3/8" | 215    | 28          | 1.3/4" | 220    |             |        |        |
| 1000 | 28          | 1.1/4" | 165    | 28          | 1.1/2" | 230    | 28          | 2"     | 250    |             |        |        |
| 1200 | 32          | 1.3/8" | 195    | 32          | 1.3/4" | 265    |             |        |        |             |        |        |
| 1400 | 36          | 1.1/2" | 225    | 36          | 1.3/4" | 275    |             |        |        |             |        |        |
| 1600 | 40          | 1.3/4" | 260    | 40          | 2"     | 325    |             |        |        |             |        |        |
| 1800 | 44          | 1.3/4" | 280    | 44          | 2"     | 345    |             |        |        |             |        |        |
| 2000 | 48          | 1.3/4" | 290    | 48          | 2.1/4" | 385    |             |        |        |             |        |        |

- Studbolt sizes are approximate and to be used for guide purposes only
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- Blind flanges or RTJ flanges may need longer studs

**STUDBOLT WEIGHT CHART – IMPERIAL**

|         | 3/8" | 7/16" | 1/2" | 9/16" | 5/8" | 3/4" | 7/8" | 1"    | 1-1/8" | 1-1/4" |
|---------|------|-------|------|-------|------|------|------|-------|--------|--------|
| 2 1/2"  | 5.5  | 7.6   | 10.8 | 13.5  |      |      |      |       |        |        |
| 2 3/4"  | 5.9  | 8.2   | 11.6 | 14.5  | 19.8 |      |      |       |        |        |
| 3 1/4"  | 6.3  | 8.8   | 12.4 | 15.5  | 21   | 32.4 |      |       |        |        |
| 3 1/2"  | 6.7  | 9.4   | 13.2 | 16.5  | 22.2 | 34.3 | 50   |       |        |        |
| 4"      | 7.1  | 10.0  | 14.0 | 17.5  | 23.4 | 36.2 | 52.6 | 71.8  |        |        |
| 4 1/2"  | 7.5  | 10.6  | 14.8 | 18.5  | 24.6 | 38.1 | 55.5 | 75.2  | 102    |        |
| 4 3/4"  | 7.9  | 11.2  | 15.6 | 19.5  | 25.8 | 40   | 57.8 | 78.6  | 106    | 137    |
| 5"      | 8.5  | 11.8  | 16.4 | 20.5  | 27   | 41.9 | 60.4 | 82.0  | 111    | 142    |
| 5 1/2"  | 8.9  | 12.2  | 17.2 | 21.5  | 28.2 | 43.8 | 63   | 85.4  | 115    | 147    |
| 6"      | 9.4  | 12.8  | 18.0 | 22.5  | 29.4 | 45.7 | 65.6 | 88.8  | 119    | 153    |
| 6 1/4"  |      | 13.4  | 18.8 | 23.5  | 30.6 | 47.6 | 68.2 | 92.2  | 123    | 158    |
| 6 1/2"  |      | 14.0  | 19.6 | 24.5  | 31.3 | 49.5 | 70.8 | 95.6  | 128    | 164    |
| 7"      |      | 14.7  | 20.4 | 25.5  | 33.5 | 50.8 | 73.4 | 99.0  | 132    | 169    |
| 7 1/2"  |      |       | 21.2 | 26.5  | 34.8 | 52.7 | 75.5 | 103.0 | 136    | 174    |
| 8"      |      |       |      | 27.6  | 36.1 | 54.5 | 78   | 106.0 | 141    | 180    |
| 8 1/4"  |      |       |      | 28.6  | 37.3 | 56.3 | 80.5 | 108.0 | 145    | 185    |
| 8 3/4"  |      |       |      | 29.6  | 38.6 | 58.1 | 83.1 | 112.0 | 149    | 191    |
| 9"      |      |       |      | 30.6  | 39.8 | 60.0 | 85.6 | 115.0 | 153    | 196    |
| 9 1/2"  |      |       |      |       | 41.1 | 61.8 | 88.2 | 118.0 | 158    | 201    |
| 10"     |      |       |      |       |      | 63.7 | 90.7 | 122.0 | 162    | 206    |
| 10 1/4" |      |       |      |       |      |      | 93.3 | 125.0 | 166    | 212    |
| 10 1/2" |      |       |      |       |      |      |      | 128.0 | 171    | 217    |
| 11"     |      |       |      |       |      |      |      | 132.0 | 175    | 223    |
| 11 1/2" |      |       |      |       |      |      |      | 135.0 | 179    | 228    |
| 12"     |      |       |      |       |      |      |      | 138.0 | 184    | 233    |
| 12 3/4" |      |       |      |       |      |      |      |       | 192    | 244    |
| 13 1/4" |      |       |      |       |      |      |      |       | 201    | 255    |
| 14"     |      |       |      |       |      |      |      |       | 210    | 266    |
| 14 3/4" |      |       |      |       |      |      |      |       |        | 277    |
| 15 3/4" |      |       |      |       |      |      |      |       |        | 288    |

- All weights in kilos per 100 pieces with 2 assembled nuts



**PETROCHEMICAL**



|         | 1-3/8" | 1-1/2" | 1-5/8" | 1-3/4" | 1-7/8" | 2"   | 2-1/4" | 2-1/2" | 2-3/4" | 3"   |
|---------|--------|--------|--------|--------|--------|------|--------|--------|--------|------|
| 6"      | 193    | 242    | 289    |        |        |      |        |        |        |      |
| 6 1/4"  | 200    | 250    | 298    | 363    |        |      |        |        |        |      |
| 6 1/2"  | 206    | 258    | 308    | 374    | 437    |      |        |        |        |      |
| 7"      | 213    | 266    | 317    | 385    | 449    |      |        |        |        |      |
| 7 1/2"  | 220    | 275    | 326    | 396    | 462    |      |        |        |        |      |
| 8"      | 226    | 23     | 336    | 407    | 475    |      |        |        |        |      |
| 8 1/4"  | 233    | 291    | 345    | 418    | 488    |      |        |        |        |      |
| 8 3/4"  | 240    | 299    | 354    | 429    | 500    | 593  |        |        |        |      |
| 9"      | 246    | 307    | 364    | 440    | 513    | 607  | 811    |        |        |      |
| 9 1/2"  | 253    | 316    | 373    | 451    | 526    | 622  | 830    |        |        |      |
| 10"     | 260    | 324    | 382    | 463    | 538    | 637  | 849    |        |        |      |
| 10 1/2" | 273    | 340    | 401    | 485    | 564    | 666  | 887    |        |        |      |
| 11"     | 279    | 345    | 410    | 496    | 576    | 680  | 906    |        |        |      |
| 11 1/2" | 285    | 350    | 419    | 507    | 589    | 695  | 925    |        |        |      |
| 12"     | 292    | 358    | 429    | 518    | 602    | 710  | 944    |        |        |      |
| 12 3/4" | 305    | 374    | 449    | 540    | 627    | 739  | 982    | 1255   |        |      |
| 13 1/4" | 319    | 390    | 468    | 562    | 653    | 768  | 1020   | 1301   | 1629   |      |
| 14"     | 332    | 406    | 487    | 583    | 678    | 797  | 1058   | 1347   | 1685   |      |
| 14 3/4" | 345    | 422    | 506    | 605    | 703    | 826  | 1096   | 1394   | 1742   | 2147 |
| 15 3/4" | 359    | 437    | 524    | 627    | 731    | 856  | 1126   | 1440   | 1798   | 2214 |
| 16 1/2" | 372    | 453    | 543    | 649    | 756    | 884  | 1164   | 1487   | 1854   | 2282 |
| 17 1/2" | 385    | 469    | 562    | 672    | 781    | 913  | 1201   | 1533   | 1911   | 2350 |
| 18"     | 399    | 485    | 581    | 690    | 801    | 942  | 1239   | 1579   | 1967   | 2417 |
| 19"     |        | 501    | 600    | 716    | 832    | 971  | 1276   | 1626   | 2024   | 2484 |
| 19 1/2" |        | 517    | 619    | 738    | 858    | 1000 | 1313   | 172    | 2080   | 2552 |
| 20 1/2" |        |        | 638    | 760    | 884    | 1029 | 1350   | 1719   | 2136   | 2620 |
| 21 1/4" |        |        | 656    | 782    | 909    | 1058 | 1388   | 1765   | 2193   | 2687 |
| 22"     |        |        | 675    | 804    | 935    | 1088 | 1425   | 1811   | 2249   | 2755 |
| 23"     |        |        |        |        | 960    | 1117 | 1462   | 1859   | 2306   | 2822 |
| 24 1/2" |        |        |        |        | 986    | 1146 | 1500   | 1904   | 2362   | 2860 |
| 25"     |        |        |        |        | 1010   | 1176 | 1537   | 1951   | 2419   | 2957 |
| 26"     |        |        |        |        |        | 1205 | 1574   | 1997   | 2475   | 3025 |
| 27"     |        |        |        |        |        | 1233 | 1611   | 2043   | 2531   | 3092 |
| 27 1/2" |        |        |        |        |        |      | 1649   | 2090   | 2588   | 3160 |

- All weights in kilos per 100 pieces with 2 assembled nuts

**STUDBOLT WEIGHT CHART – METRIC**

|     | M10  | M12  | M14  | M16  | M18  | M20  | M22   | M24   | M27   | M30 |
|-----|------|------|------|------|------|------|-------|-------|-------|-----|
| 60  | 5.6  | 8.1  | 12.0 | 15.6 |      |      |       |       |       |     |
| 70  | 6.1  | 8.9  | 13.0 | 16.9 | 23.7 |      |       |       |       |     |
| 80  | 6.6  | 9.6  | 14.0 | 18.2 | 25.4 | 32.5 |       |       |       |     |
| 90  | 7.1  | 10.3 | 15.0 | 19.6 | 27.1 | 34.5 | 45.5  |       |       |     |
| 100 | 7.6  | 11.0 | 16.0 | 21.0 | 28.8 | 36.7 | 47.2  | 54.2  |       |     |
| 110 | 8.1  | 11.7 | 17.0 | 22.2 | 30.4 | 38.7 | 48.3  | 58.2  | 80.0  |     |
| 120 | 8.6  | 12.4 | 18.0 | 23.6 | 32.1 | 40.7 | 50.9  | 60.2  | 84.7  | 107 |
| 130 | 9.1  | 13.2 | 19.0 | 24.9 | 33.7 | 42.8 | 53.4  | 63.2  | 88.6  | 111 |
| 140 | 9.6  | 14.2 | 20.0 | 26.2 | 35.4 | 44.9 | 55.9  | 66.2  | 92.4  | 116 |
| 150 | 10.1 | 14.9 | 20.8 | 27.5 | 36.9 | 46.9 | 58.5  | 69.2  | 96.3  | 119 |
| 160 | 10.6 | 15.6 | 21.8 | 29.1 | 38.6 | 49.0 | 61.0  | 72.2  | 100.0 | 126 |
| 170 |      | 16.4 | 22.8 | 30.4 | 40.2 | 51.1 | 63.5  | 75.2  | 104.0 | 130 |
| 180 |      |      | 23.8 | 31.8 | 41.9 | 52.3 | 66.1  | 78.1  | 108.0 | 135 |
| 190 |      |      |      | 33.1 | 43.5 | 54.4 | 68.4  | 81.1  | 112.0 | 140 |
| 200 |      |      |      | 34.5 | 45.2 | 56.5 | 71.0  | 84.0  | 116.0 | 144 |
| 210 |      |      |      | 35.8 | 46.8 | 58.5 | 73.5  | 88.4  | 120.0 | 149 |
| 220 |      |      |      | 37.1 | 48.4 | 60.6 | 76.1  | 91.4  | 124.0 | 154 |
| 230 |      |      |      | 38.5 | 50.1 | 62.6 | 78.6  | 94.4  | 127.0 | 159 |
| 240 |      |      |      | 39.8 | 51.7 | 64.7 | 81.2  | 97.4  | 130.0 | 164 |
| 250 |      |      |      | 41.1 | 53.4 | 66.8 | 83.7  | 100.0 | 134.0 | 172 |
| 260 |      |      |      |      | 55.0 | 68.8 | 86.3  | 103.0 | 138.0 | 177 |
| 270 |      |      |      |      | 56.6 | 70.9 | 88.8  | 106.0 | 142.0 | 182 |
| 280 |      |      |      |      | 58.3 | 73.0 | 91.4  | 109.0 | 146.0 | 187 |
| 290 |      |      |      |      |      | 75.0 | 93.9  | 112.0 | 150.0 | 192 |
| 300 |      |      |      |      |      | 77.1 | 96.5  | 115.0 | 154.0 | 196 |
| 320 |      |      |      |      |      |      | 101.0 | 121.0 | 161.0 | 206 |
| 340 |      |      |      |      |      |      |       | 127.0 | 169.0 | 215 |
| 360 |      |      |      |      |      |      |       | 133.0 | 177.0 | 224 |
| 380 |      |      |      |      |      |      |       |       | 184.0 | 231 |
| 400 |      |      |      |      |      |      |       |       | 192.0 | 243 |
| 420 |      |      |      |      |      |      |       |       |       | 252 |
| 440 |      |      |      |      |      |      |       |       |       | 262 |


- All weights in kilos per 100 pieces with 2 assembled nuts

**PETROCHEMICAL**



|     | M33 | M36 | M39 | M42 | M45 | M48 | M52  | M56  | M60  | M64  |
|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|
| 140 | 147 | 185 |     |     |     |     |      |      |      |      |
| 150 | 153 | 192 | 237 |     |     |     |      |      |      |      |
| 160 | 159 | 199 | 245 | 302 |     |     |      |      |      |      |
| 170 | 165 | 206 | 253 | 312 | 378 |     |      |      |      |      |
| 180 | 171 | 213 | 261 | 322 | 389 | 467 |      |      |      |      |
| 190 | 176 | 219 | 269 | 332 | 400 | 480 | 566  |      |      |      |
| 200 | 182 | 226 | 278 | 342 | 411 | 493 | 581  |      |      |      |
| 210 | 188 | 233 | 286 | 352 | 423 | 506 | 596  | 692  |      |      |
| 220 | 194 | 240 | 294 | 362 | 434 | 519 | 612  | 709  | 830  |      |
| 230 | 201 | 247 | 302 | 372 | 446 | 532 | 627  | 726  | 850  | 981  |
| 240 | 208 | 253 | 310 | 382 | 457 | 545 | 643  | 743  | 869  | 1003 |
| 250 | 214 | 260 | 319 | 391 | 468 | 558 | 658  | 760  | 889  | 1025 |
| 260 | 220 | 267 | 327 | 401 | 480 | 571 | 674  | 777  | 908  | 1047 |
| 270 | 224 | 274 | 335 | 411 | 492 | 584 | 689  | 794  | 929  | 1069 |
| 280 | 230 | 281 | 343 | 421 | 505 | 597 | 705  | 811  | 947  | 1092 |
| 290 | 236 | 291 | 360 | 431 | 517 | 610 | 720  | 828  | 967  | 1114 |
| 300 | 241 | 298 | 368 | 441 | 530 | 623 | 736  | 845  | 987  | 1136 |
| 320 | 253 | 312 | 380 | 461 | 553 | 649 | 767  | 878  | 1026 | 1180 |
| 340 | 265 | 326 | 395 | 480 | 570 | 676 | 795  | 912  | 1065 | 1225 |
| 360 | 276 | 340 | 411 | 495 | 592 | 702 | 826  | 946  | 1104 | 1269 |
| 380 | 288 | 353 | 428 | 510 | 615 | 728 | 857  | 980  | 1143 | 1314 |
| 400 | 299 | 367 | 444 | 529 | 630 | 754 | 888  | 1014 | 1182 | 1358 |
| 420 | 311 | 381 | 430 | 548 | 650 | 780 | 900  | 1047 | 1221 | 1402 |
| 440 | 322 | 394 | 477 | 566 | 670 | 806 | 930  | 1081 | 1260 | 1447 |
| 460 | 334 | 408 | 493 | 585 | 690 | 832 | 960  | 1115 | 1299 | 1491 |
| 480 | 345 | 422 | 509 | 604 | 710 | 858 | 990  | 1149 | 1338 | 1536 |
| 500 | 357 | 436 | 526 | 623 | 730 | 884 | 1020 | 1183 | 1378 | 1580 |
| 520 |     |     |     |     |     |     |      |      | 1417 | 1624 |
| 540 |     |     |     |     |     |     |      |      | 1456 | 1669 |
| 560 |     |     |     |     |     |     |      |      | 1495 | 1713 |
| 580 |     |     |     |     |     |     |      |      | 1534 | 1758 |
| 600 |     |     |     |     |     |     |      |      | 1573 | 1802 |
| 640 |     |     |     |     |     |     |      |      | 1651 | 1891 |
| 680 |     |     |     |     |     |     |      |      |      | 1980 |

- All weights in kilos per 100 pieces with 2 assembled nuts

**STUDBOLT**   
**SCOTLAND LIMITED**  
PETROCHEMICAL AND INDUSTRIAL GRADE FASTENERS AND SUPPLIES



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