



# Nickel Systems Torque Tables

## AL6XN

| Min Yield Strength<br>( $\sigma_y$ ) | 45.0    | KSI             | 45,000     | PSI           | UNS N08367<br>Fastener Torque |            |
|--------------------------------------|---------|-----------------|------------|---------------|-------------------------------|------------|
| Bolt Nominal<br>Diameter (D)         | Threads | Stress Area (A) | Proof Load | Clamping Load | K value                       |            |
|                                      |         |                 |            |               | Dry                           | 0.20       |
|                                      |         |                 |            |               | Lubricated                    | 0.13       |
|                                      |         |                 |            |               | Dry                           | Lubricated |
| in                                   | #/in    | in <sup>2</sup> | lbf        | lbf           | ft-lbf                        | ft-lbf     |
| 1/4                                  | 20      | 0.0318          | 1,287.9    | 965.9         | 4.0                           | 2.6        |
| 1/4                                  | 28      | 0.0364          | 1,474.2    | 1,105.7       | 4.6                           | 3.0        |
| 5/16                                 | 18      | 0.0524          | 2,169.4    | 1,627.0       | 8.5                           | 5.5        |
| 5/16                                 | 24      | 0.0580          | 2,401.2    | 1,800.9       | 9.4                           | 6.1        |
| 3/8                                  | 16      | 0.0775          | 3,208.5    | 2,406.4       | 15.0                          | 9.8        |
| 3/8                                  | 24      | 0.0878          | 3,634.9    | 2,726.2       | 17.0                          | 11.1       |
| 7/16                                 | 14      | 0.1063          | 4,400.8    | 3,300.6       | 24.1                          | 15.6       |
| 7/16                                 | 20      | 0.1187          | 4,914.2    | 3,685.6       | 26.9                          | 17.5       |
| 1/2                                  | 13      | 0.1419          | 5,874.7    | 4,406.0       | 36.7                          | 23.9       |
| 1/2                                  | 20      | 0.1599          | 6,619.9    | 4,964.9       | 41.4                          | 26.9       |
| 9/16                                 | 12      | 0.1820          | 7,534.8    | 5,651.1       | 53.0                          | 34.4       |
| 9/16                                 | 18      | 0.2030          | 8,404.2    | 6,303.2       | 59.1                          | 38.4       |
| 5/8                                  | 11      | 0.2260          | 9,356.4    | 7,017.3       | 73.1                          | 47.5       |
| 5/8                                  | 18      | 0.2560          | 10,598.4   | 7,948.8       | 82.8                          | 53.8       |
| 3/4                                  | 10      | 0.3340          | 13,827.6   | 10,370.7      | 129.6                         | 84.3       |
| 3/4                                  | 16      | 0.3730          | 15,442.2   | 11,581.7      | 144.8                         | 94.1       |
| 7/8                                  | 9       | 0.4620          | 19,126.8   | 14,345.1      | 209.2                         | 136.0      |
| 7/8                                  | 14      | 0.5090          | 21,072.6   | 15,804.5      | 230.5                         | 149.8      |
| 1                                    | 8       | 0.6060          | 25,088.4   | 18,816.3      | 313.6                         | 203.8      |
| 1                                    | 12      | 0.6630          | 27,448.2   | 20,586.2      | 343.1                         | 223.0      |
| 1 1/4                                | 7       | 0.9690          | 40,116.6   | 30,087.5      | 626.8                         | 407.4      |
| 1 1/4                                | 12      | 1.0730          | 44,422.2   | 33,316.7      | 694.1                         | 451.2      |
| 1 1/2                                | 6       | 1.4050          | 58,167.0   | 43,625.3      | 1,090.6                       | 708.9      |
| 1 1/2                                | 12      | 1.5800          | 65,412.0   | 49,059.0      | 1,226.5                       | 797.2      |

### Equations

$$= \pi / 4 * (D - 0.9743 / n)^2$$

$$= \sigma_y * A * 90\%$$

$$= \text{Proof Load} * 75\%$$

$$= k * D * \text{Clamp Load} * (1\text{ft}/12\text{in})$$

**Assumptions:** (1) Yield Strength is chosen based on ASTM A276 minimum standard for N08367 0.2% offset at room temperature. (2) This is for standard bolt, washer and nut connection. (3) This is for uniform materials for the bolt, washer & the nut. (4) This is for full thread engagement. (5) This is for new bolts and nuts without corrosion. (6) Our k values are typical. Nickel-based anti-seize or moly lubricant were considered for lubrication. These values can fluctuate depending upon the source, type of oil and a variety of other factors. (7) This is considered under static load. Other factors such as vibration or dynamic applications were not considered. (8) These values are only appropriate for bolts under 6 inches. *This table was reviewed by an engineer & is believed by Nickel Systems to be accurate. However, it is not to be used as a substitute for professional engineering bolt design. Please consult a professional engineer. Nickel Systems assumes no liability for any use of this table beyond its intended purpose.*