



# Nickel Systems Torque Tables

## Inconel 686

Min Yield Strength ( $\sigma_y$ )	45.0	KSI	45,000	PSI	UNS N06686 Fastener Torque	
Bolt Nominal Diameter (D)	Threads	Stress Area (A)	Proof Load	Clamping Load	K value	
					Dry	0.20
					Lubricated	0.12
					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	2.4
1/4	28	0.0364	1,474.2	1,105.7	4.6	2.8
5/16	18	0.0524	2,169.4	1,627.0	8.5	5.1
5/16	24	0.0580	2,401.2	1,800.9	9.4	5.6
3/8	16	0.0775	3,208.5	2,406.4	15.0	9.0
3/8	24	0.0878	3,634.9	2,726.2	17.0	10.2
7/16	14	0.1063	4,400.8	3,300.6	24.1	14.4
7/16	20	0.1187	4,914.2	3,685.6	26.9	16.1
1/2	13	0.1419	5,874.7	4,406.0	36.7	22.0
1/2	20	0.1599	6,619.9	4,964.9	41.4	24.8
9/16	12	0.1820	7,534.8	5,651.1	53.0	31.8
9/16	18	0.2030	8,404.2	6,303.2	59.1	35.5
5/8	11	0.2260	9,356.4	7,017.3	73.1	43.9
5/8	18	0.2560	10,598.4	7,948.8	82.8	49.7
3/4	10	0.3340	13,827.6	10,370.7	129.6	77.8
3/4	16	0.3730	15,442.2	11,581.7	144.8	86.9
7/8	9	0.4620	19,126.8	14,345.1	209.2	125.5
7/8	14	0.5090	21,072.6	15,804.5	230.5	138.3
1	8	0.6060	25,088.4	18,816.3	313.6	188.2
1	12	0.6630	27,448.2	20,586.2	343.1	205.9
1 1/4	7	0.9690	40,116.6	30,087.5	626.8	376.1
1 1/4	12	1.0730	44,422.2	33,316.7	694.1	416.5
1 1/2	6	1.4050	58,167.0	43,625.3	1,090.6	654.4
1 1/2	12	1.5800	65,412.0	49,059.0	1,226.5	735.9

### 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 B574 minimum standard for N06686 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. Inconel 686 is susceptible to galling corrosion. Nickel-graphite or moly based anti-seize lubricant was 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.*