



# Nickel Systems Torque Tables

## 2205 Duplex

Min Yield Strength ( $\sigma_y$ )	65.0	KSI	65,000	PSI	UNS S31803, S32205	
					Fastener Torque	
					K value	
					Dry	0.18
					Lubricated	0.16
Bolt Nominal Diameter (D)	Threads	Stress Area (A)	Proof Load	Clamping Load	Dry	Lubricated
in	#/in	in <sup>2</sup>	lbf	lbf	ft-lbf	ft-lbf
1/4	20	0.0318	1,860.3	1,395.2	5.2	4.7
1/4	28	0.0364	2,129.4	1,597.1	6.0	5.3
5/16	18	0.0524	3,133.5	2,350.1	11.0	9.8
5/16	24	0.0580	3,468.4	2,601.3	12.2	10.8
3/8	16	0.0775	4,634.5	3,475.9	19.6	17.4
3/8	24	0.0878	5,250.4	3,937.8	22.2	19.7
7/16	14	0.1063	6,356.7	4,767.6	31.3	27.8
7/16	20	0.1187	7,098.3	5,323.7	34.9	31.1
1/2	13	0.1419	8,485.6	6,364.2	47.7	42.4
1/2	20	0.1599	9,562.0	7,171.5	53.8	47.8
9/16	12	0.1820	10,883.6	8,162.7	68.9	61.2
9/16	18	0.2030	12,139.4	9,104.6	76.8	68.3
5/8	11	0.2260	13,514.8	10,136.1	95.0	84.5
5/8	18	0.2560	15,308.8	11,481.6	107.6	95.7
3/4	10	0.3340	19,973.2	14,979.9	168.5	149.8
3/4	16	0.3730	22,305.4	16,729.1	188.2	167.3
7/8	9	0.4620	27,627.6	20,720.7	272.0	241.7
7/8	14	0.5090	30,438.2	22,828.7	299.6	266.3
1	8	0.6060	36,238.8	27,179.1	407.7	362.4
1	12	0.6630	39,647.4	29,735.6	446.0	396.5
1 1/4	7	0.9690	57,946.2	43,459.7	814.9	724.3
1 1/4	12	1.0730	64,165.4	48,124.1	902.3	802.1
1 1/2	6	1.4050	84,019.0	63,014.3	1,417.8	1,260.3
1 1/2	12	1.5800	94,484.0	70,863.0	1,594.4	1,417.3

### 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 S32205 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. Typical machine oil 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.*