CAUTION! PLEASE READ NOTES FOLLOWING TABLE CAREFULLY

TABLE 14 TORQUE-TENSION DATA

Nominal Size	Basic Screw Diameter	Tension Induced in Screws Torqued as Recommended* (Pounds)		Suggested Seating Torque** (Inch-Pounds)	
		UNRC	UNRF	UNRC	UNRF
0	0.0600		220		2.7
1	0.0730	320	340	4.9	5.2
2	0.0860	450	480	8.1	8.6
3	0.0990	590	630	12.3	13.2
4	0.1120	730	800	17.2	18.9
5	0.1250	970	1,010	25.4	26.5
6	0.1380	1,100	1,230	32.0	35.7
8	0.1640	1,700	1,790	58.6	61.6
10	0.1900	2,130	2,430	84.8	97.0
1/4	0.2500	3,860	4,420	202.8	232.3
5/16	0.3125	6,370	7,050	417.8	462.4
3/8	0.3750	9,416	10,670	741.5	840.2
7/16	0.4375	12,910	14,420	1,186.6	1,325.1
1/2	0.5000	17,240	19,430	1,810.5	2,040.0
5/8	0.6250	25,910	29,560	3,401.0	3,854.0
3/4	0.7500	38,320	42,790	6,036.0	6,739.0
7/8	0.8750	53,020	53,390	9,743.0	10,728.0
1	1.0000	69,525	76,087	14,600.0	15,978.0
1-1/4	1.2500	111,120	123,113	29,186.0	32,317.0
1-1/2	1.5000	161,212	181,425	50,782.0	57,149.0

* Caluculated to be 75% of yield

** Seating torques calculated to create listed tension using a "K" factor of .21

NOTES FOR TABLE 14:

This data for Camcar Textron inch socket screws was developed through laboratory testing under controlled conditions. The testing was performed with alloy steel socket head cap screws with a black finish, utilizing hardened steel plates and nuts. The threads and bearing areas were lubricated to create the desired testing environment.

The suggested seating torques listed in Table 14 were developed by preloading the fasteners to 75% of their yield strength. This will create a bearing stress under the head of approximately 80,000 psi, which should prevent indentation in joint materials with hardness values of Rockwell B85 and higher. If the joint materials are less than this, it is recommended that washers be used to prevent indentation. However, in some soft joints, much lower preloads may be required.

This information is provided to facilitate joint design and proper installation procedures. However, because of the diversity of potential assembly and service conditions, it is not possible to make general recommendations. Each assembly, particularly those of a critical nature, should be analyzed and tested to ensure the desired preload and service life are achieved by the joint. For further design assistance, please contact the applications specialists at Camcar Textron.

Determining Torque Values

Desired seating torque values can easily be determined using the formula T= KDP. "T" is the tightening torque expressed in pounds/inch; "K" (also called "K-factor") is the torque coefficient; "D" is the nominal diameter of the fastener in inches; and "P" is the tension induced in the fastener when it is torqued as recommended. Using a 1/2" socket screw with UNRC threads, and a "K" factor of .21, we can determine a seating torque using Table 14.

T = .21 x .5000 x 17,240
T = 1,801 lbs./in.

One item to be aware of is the impact changes in the torque coefficient can have on seating torques and the outcome of the final joint. The "K" factor is a variable figure that is dependent upon the fastener and joint material, their finish and the lubricity of the threads and bearing surface. Typically, alloy steel socket screws have a "K" factor range of 0.19 to 0.25. However, lubricants and other anti-seize compounds which are used in some joints can change the "K" factor by 0.05. Or, austenitic stainless steel or uncoated parts can have a "K" factor over 0.35. These ranges can cause significant variations in seating torques, and ultimately impact the life of the fastened joint.

Therefore, these suggested seating torques should be used with caution. It is the recommendation of Camcar Textron that actual seating torques be determined through proper testing, especially in joints where the control of preload in the joint is critical.