PREVAILING-TORQUE TYPE STEEL HEX LOCKNUTS

1.0 SCOPE

1.1 Scope. This standard establishes the dimensional, mechanical and performance requirements for prevailing-torque type steel hexagon locknuts.

1.2 Definition. A prevailing-torque type locknut is a nut which is frictionally resistant to rotation due to a self-contained prevailing-torque feature, and not because of a compressive load developed against the bearing surface of the locknut. ("Locknut" is a generic term used to identify the internally threaded products covered in this standard. The term "locknut" is not intended to imply an indefinite permanency of fixity.)

2.0 DESIGNATIONS

2.1 Grades. There are three grades of prevailing-torque type steel locknuts designated respectively as Grade A, B and C.

Each grade of locknut is suggested for use with bolts having specified minimum tensile strengths within the following values:

Grade of Locknut	Specified Min Ultimate Tensile Strength of Bolt, psi
Grade A	not greater than 90,000
Grade B	not greater than 120,000
Grade C	not less than 105,000, nor greater than 150,000

2.2 Design. The method of producing prevailing-torque characteristics, and the design of the prevailing-torque feature shall be in accordance with the practice of the manufacturer.

3.0 REQUIREMENTS

3.1 Materials and Processes

3.1.1 Material. Locknuts shall be made of carbon or alloy steel of a grade adequate for the locknut to meet the mechanical and performance requirements of this standard. The prevailing-torque element of insert design locknuts may be of a material other than steel.

3.1.2 Heat Treatment. Grade A locknuts shall not be heat treated. Grades B and C locknuts may be heat treated as necessary to meet the mechanical and performance requirements of this standard. Heat treatment is defined as heating the nut to the austenitizing temperature of the material of which the nut is made, quenching in a proper medium to obtain a predominately martensitic microstructure, and tempering to or below the specified maximum hardness.

3.1.3 Finish. Locknuts may be furnished plain (bare metal) or with a protective coating (electrodeposited plating or chemical conversion coating) as specified by the user. All locknuts shall be provided with an additional supplementary lubricant which shall be clean and dry to the touch. The performance of locknuts which are furnished with a protective coating shall not deteriorate when locknuts are stored indoors for a period of six months.

In cases where locknuts are given a protective coating following delivery to the purchaser, the locknut producer shall not be held responsible for failures of the locknut to meet dimensional, mechanical or performance requirements traceable to plating or coating practice.

3.1.4 Hydrogen Embrittlement. Electroplated or phosphate coated heat treated Grade C locknuts shall be suitably treated as soon as practicable after plating or coating to avoid hydrogen embrittlement.

3.2 Dimensional Requirements

3.2.1 Basic Dimensions. Locknuts shall conform to the dimensions given on Page D—36. The portion of the locknut containing the prevailing-torque feature may have a special contour within the maximum permitted width across flats and thickness. The minimum width across flats shall not apply at depressed portion of locknut at prevailing-torque feature.

3.2.2 Thread Form, Series and Tolerances. Threads of locknuts shall be Unified coarse or fine series, as specified in American National Standard ANSI B1.1, except that the portion of the threaded length containing the prevailing-torque element need not conform. Unless otherwise specified locknuts shall be tapped to Class 2B tolerances.

3.2.3 Thread Start. Locknuts 3/8 in. size and

smaller shall assemble a minimum of one-half turn, and locknuts 7/16 in. and larger shall assemble a minimum of one full turn by hand on a basic GO thread plug gage. The plug gage shall be without a chip groove, and shall have a point with dimensions conforming to those for the point on hex cap screws as specified on Page A—10.

3.2.4 Defects. Locknuts shall meet the surface discontinuity limits specified in IFI-106, Page N—42.

3.3 Mechanical Requirements

3.3.1 Proof Load. Locknuts shall withstand the proof load specified for the applicable grade on Pages D—37 and D—38 when tested as specified in 4.1.

3.3.2 Hardness. Locknuts shall have a hardness conforming to the limits specified for the applicable grade on Page D—37 when tested as specified in 4.2.

3.4 Performance Requirements

3.4.1 Prevailing Torque. The prevailing-torque developed by locknuts during their first installation, or any subsequent installation or removal, shall not exceed the maximum first installation torque specified for the applicable grade on Pages D—37 and D—38 when tested as specified in 4.3. In addition, the maximum and minimum prevailing torques developed by locknuts during their first and fifth removals shall not be less than the respective "highest" and "lowest" reading removal torques specified for the applicable grade on Pages D—37 and D—38 when tested as specified in 4.3.

3.4.2 Definition. The prevailing torque developed by a locknut is the torque necessary to rotate the locknut on its mating externally threaded component, with the torque being measured while the locknut is in motion, and with no axial load in the mating component.

4.0 TEST METHODS

4.1 Proof Load Test. The test sample locknut shall be assembled on a test bolt (4.1.1) or on a hardened mandrel (4.1.2) with a minimum of three threads projecting through the locknut. For referee test purposes, the hardened mandrel shall be used. The maximum torque occurring during the assembly of the locknut on the test bolt or mandrel shall be recorded. A tensile load equal to the specified proof load for the locknut, as given on Pages D—37 and D—38 shall be applied through the test bolt or mandrel against the locknut bearing surface in an axial direction. The locknut shall resist this load without thread stripping or rupture. The torque necessary to remove the locknut from the test bolt or mandrel shall not exceed the maximum torque occurring during assembly.

4.1.1 Test Bolt. The bolt used for proof load testing a locknut shall have threads conforming to Class 2A tolerances as specified in ANSI B1.1. The test bolt shall have a yield strength in excess of the specified proof load of the locknut being tested.

4.1.2 Hardened Mandrel. The hardened mandrel used for proof load testing a locknut shall have threads conforming to Class 3A tolerances as specified in ANSI B1.1, except that the major diameter shall be the minimum major diameter with a plus tolerance of 0.002 in. The mandrel shall be heat treated to a hardness of Rockwell C45 to 50.

4.2 Hardness Test. The Rockwell hardness of a sample locknut shall be determined on the top or bottom face of the locknut. The top or bottom surface of the locknut shall be prepared by grinding, removing sufficient material from the surface to eliminate the effects of plating, coating or other surface condition. Material removal shall also be such as to provide a flat area large enough to allow a hardness test to be made midway between the hex corner and the major diameter of the thread. The opposite surface (i.e. top or bottom of locknut) shall be prepared parallel to the test surface with removal of plating or coating. Further preparation of the test specimen and the method of performing the test shall conform to ASTM Standard E 18.

4.3 Prevailing-Torque Test. The prevailing-torque test shall be conducted using a load measuring device (4.3.1). A test bolt (4.3.2) shall

be inserted in the load measuring device, a hardened washer (4.3.3) placed on the bolt and the sample locknut then assembled on the bolt. The locknut shall be advanced on the bolt until a minimum of two full bolt threads protrude through the locknut. At that time, the maximum torque occurring while the locknut is being advanced through the next 360 deg of locknut rotation shall be recorded. This torque shall not exceed the first installation prevailing torque value as specified for the applicable grade on Pages D—37 and D—38.

Tightening shall be continued until the locknut is seated against the hardened washer. The length of the test bolt should be such that seating of the locknut shall occur when a length equivalent to 6 to 9 thread pitches of test bolt protrude through the top of the locknut. The locknut shall then be tightened until a tensile load equal to the clamp load, as specified for the applicable grade on Pages D—37 and D—38, is developed in the bolt. The hardened washer shall be prevented from turning during locknut tightening. The locknut shall then be backed off by the application of reverse torque until the tensile load in the bolt has been reduced to zero. The maximum and minimum torques occurring while the locknut is being backed off throughout the next 360 deg of rotation shall be recorded. The maximum torque shall not be less than the first removal "highest reading" prevailing torque value as specified on Pages D—37 and D—38, and in addition, shall not be less than 40 per cent of the actual prevailing torque occurring during first installation. The minimum torque shall not be less than the first removal "lowest reading" prevailing torque value as specified on Pages D—37 and D—38. The locknut shall then be backed off until the prevailing-torque element is disengaged from the bolt thread. The locknut shall be reassembled and removed four more times. On each reassembly, the locknut shall be assembled to the initial first off position but no clamp load shall be induced in the bolt. This portion of the test need not be conducted in the load cell; however, regardless of method used, the test washer shall not be removed. At no time during these four additional installations and removals should the torque exceed the maximum first installation prevailing torque value as specified for the applicable grade on Pages D—37 and D—38. During the fifth removal, the maximum and minimum torques occurring while the locknut is being backed off throughout the first 360 deg of rotation shall be recorded. The maximum torque shall not be less than the fifth removal "highest reading" prevailing torque value as specified on Pages D—37 and D—38, and the minimum torque shall not be less than the fifth removal "lowest reading" prevailing torque value as specified on Pages D—37 and D—38. Sufficient time shall elapse between torquing cycles to prevent overheating of the test assembly.

Torque wrenches shall be accurate within plus or minus 2 per cent of the maximum of the specified torque range of the wrench.

4.3.1 Load Measuring Device. The load measuring device used in the prevailing torque test shall be an instrument capable of measuring the actual tension induced in the test bolt as the locknut is tightened. The device shall be accurate within plus or minus 5 per cent of the test clamp load being used. Diameter of the bolt clearance hole in the backing plate should be the same diameter and tolerances as the test washer.

4.3.2 Test Bolt. The test bolt used in the prevailing-torque test shall have a zinc phosphate and oil finish (dry to the touch) meeting a 72 hour salt spray life when tested in accordance with ASTM Specification B117.

The bolt shall have threads conforming to Class 2A tolerances as specified in ANSI B1.1. Threads on all bolts 1 in. diameter and smaller shall be produced by rolling. Bolt length shall be such that a minimum length equivalent to 6 thread pitches as measured from the end of the bolt will protrude through the locknut when the locknut is seated against the test washer. Thread length shall be such that a minimum of two full threads are within the grip after the locknut is seated. The bolt shall be pointed in accordance with the dimensional requirements for hex cap screws as given on Page A—10. The thread surface shall be free of burrs or other contamination that might affect an accurate determination of the prevailing torque developed by the locknut.

The bolt shall have an ultimate tensile strength

not less than the specified proof load of the locknut to be tested. The threads of heat-treated bolts shall have a metallurgical surface condition equal to Class B or Class C as specified in Federal Specification FF-S-85b.

A new bolt shall be used for testing each locknut.

4.3.3 Test Washer. Washers shall conform to the dimensional, metallurgical and mechanical requirements given on Page K—20. Optionally, multi-hole plates or strips may be used providing they conform to the requirements for material, hardness, hole diameter, surface texture and plating as given on Page K—20.

A new washer shall be used for testing each locknut.

5.0 MARKING

Grade A locknuts are not required to be marked for grade identification.

Grade B locknuts shall be marked with three equally spaced identical symbols (dot, line, letter or other character) 120 degrees apart on the chamfered surface of the top of locknut. Grade C locknuts shall be marked with six symmetrically spaced identical symbols on the chamfered surface of the top of locknut. Additional marks or alteration of one or more of the three or six Grade B or C marking symbols shall be used to identify the manufacturer. Marks may be raised or depressed at manufacturer's option, however, raised marks shall not project beyond the specified maximum height or width of locknut, as given on Page D—36.

Alternatively, at manufacturer's option, marks to identify the manufacturer may be located on one or more of the side flats of the locknut. Such markings shall not be raised.

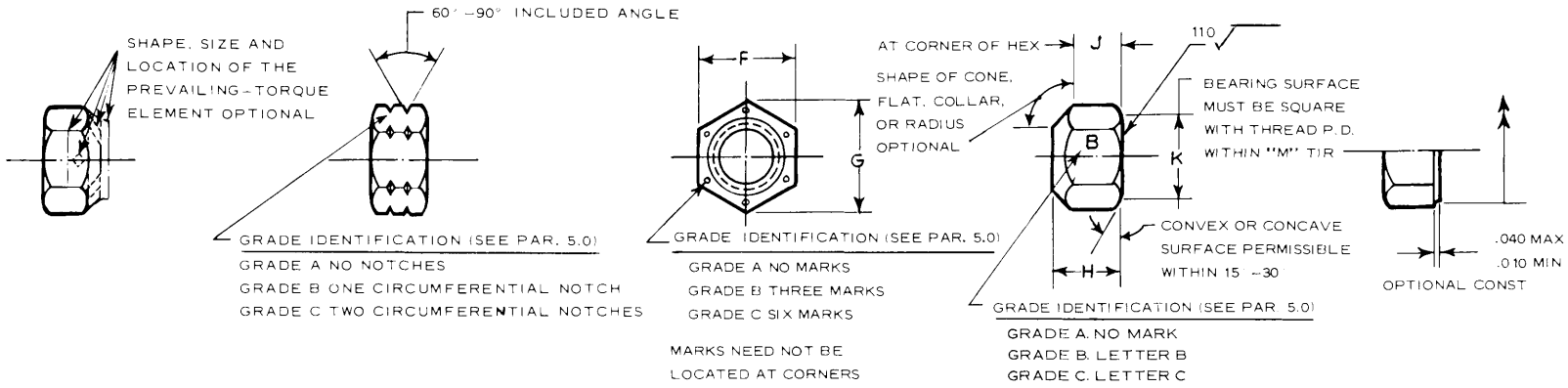
Alternatively, at the manufacturer's option, Grades B and C locknuts may be marked respectively with the letters B and C located on one or more of the side flats of the locknut. Such markings shall not be raised. Such locknuts shall also be marked to identify the manufacturer.

As a second alternative, at the manufacturer's option, Grade B and C locknuts may be marked respectively with one and two small notches cut circumferentially into each of the six corners of the locknut at approximately its mid-height. Such locknuts shall also be marked to identify the manufacturer.

6.0 INSPECTION

6.1 Inspection Procedure. Locknuts shall be inspected to determine conformance with dimensional, mechanical and performance requirements. Inspection shall be performed in accordance with sampling plans given in MIL-STD-105D. Alternate inspection procedures may be specified by the purchaser on the purchase order or engineering drawing.

PREVAILING-TORQUE TYPE STEEL HEX LOCKNUTS



Nominal Size or Basic Major Dia of Thread	F			G		H	H	H	J	K		M
	Width Across Flats			Width Across Corners		Thickness			Height of Hex	Dia of Bearing Surface		Angularity of Bearing Surface FIR
						Insert Type Locknut	All Metal Type Locknut	All Types of Locknuts				
	Basic	Max	Min	Max	Min	Max	Max	Min	Min	Max	Min	Max
No. 4 0.1120	1/4	0.251	0.241	0.289	0.275	0.163	0.163	0.087	0.066	0.251	0.238	0.008
6 0.1380	5/16	0.313	0.302	0.361	0.344	0.188	0.171	0.102	0.075	0.313	0.297	0.008
8 0.1640	11/32	0.345	0.332	0.397	0.378	0.239	0.191	0.117	0.083	0.345	0.357	0.009
10 0.1900	3/8	0.376	0.362	0.433	0.413	0.249	0.241	0.117	0.083	0.376	0.357	0.009
12 0.2160	7/16	0.438	0.423	0.505	0.482	0.328	0.241	0.148	0.103	0.438	0.416	0.010
1/4 0.2500	7/16	0.4385	0.428	0.505	0.488	0.328	0.288	0.212	0.145	0.438	0.416	0.010
5/16 0.3125	1/2	0.5020	0.489	0.577	0.557	0.359	0.336	0.258	0.166	0.502	0.475	0.011
3/8 0.3750	9/16	0.5645	0.551	0.650	0.628	0.469	0.415	0.320	0.198	0.564	0.534	0.012
7/16 0.4375	11/16	0.6895	0.675	0.794	0.768	0.524	0.463	0.365	0.223	0.689	0.653	0.013
1/2 0.5000	3/4	0.7520	0.736	0.866	0.840	0.609	0.573	0.427	0.262	0.752	0.712	0.014
9/16 0.5625	7/8	0.8770	0.861	1.010	0.982	0.656	0.621	0.473	0.286	0.877	0.830	0.015
5/8 0.6250	15/16	0.9395	0.922	1.083	1.051	0.765	0.731	0.535	0.329	0.939	0.890	0.016
3/4 0.7500	1-1/8	1.1270	1.088	1.299	1.240	0.890	0.827	0.617	0.382	1.127	1.069	0.018
7/8 0.8750	1-5/16	1.3145	1.269	1.516	1.447	0.999	0.922	0.724	0.450	1.314	1.246	0.020
1 1.0000	1-1/2	1.5020	1.450	1.732	1.653	1.124	1.018	0.831	0.513	1.502	1.425	0.022
1-1/8 1.1250	1-11/16	1.6895	1.631	1.949	1.859	1.281	1.176	0.939	0.576	1.689	1.603	0.025
1-1/4 1.2500	1-7/8	1.8770	1.812	2.165	2.066	1.422	1.272	1.030	0.628	1.877	1.781	0.028
1-3/8 1.3750	2-1/16	2.0645	1.994	2.382	2.273	1.609	1.399	1.138	0.681	2.064	1.959	0.031
1-1/2 1.5000	2-1/4	2.2520	2.175	2.598	2.480	1.671	1.526	1.245	0.757	2.252	2.138	0.034

NOTES: 1. Dimensions. All dimensions are in inches.

2. Application of Dimensions. Except as noted dimensions apply to all grades of locknuts.

3. Tapped Holes. Tapped holes shall be countersunk on the bearing face. The maximum countersink diameter shall be the thread basic (nominal) major diameter plus .030 in. for 3/8 in. nuts or smaller, and 1.08 times the basic major diameter for nuts larger than 3/8 in. No part of the threaded portion shall project beyond the bearing surface.

4. Concentricity of Tapped Hole. Axis of tapped hole shall be concentric with axis of locknut body within a tolerance of 1.5 per cent (3 per cent FIR) of the maximum width across flats.

MECHANICAL PROPERTY REQUIREMENTS

Grade	Locknut Size (Bolt Dia) in.	Proof Load Stress psi	Rockwell Hardness
A	No. 4 thru 1-1/2	90,000	C28 max
B	No. 4 thru 1	120,000	C28 max
	Over 1 thru 1-1/2	105,000	C28 max
C	No. 4 thru 5/8	150,000	C24/32
	Over 5/8 thru 1		C26/34
	Over 1 thru 1-1/2		C26/36

PROOF LOAD, CLAMP LOAD, AND PREVAILING TORQUES FOR LOCKNUTS COARSE THREAD SERIES

Nut Size and Threads Per Inch	Grade A Locknuts							Grade B Locknuts							Grade C Locknuts						
			Prevailing Torque							Prevailing Torque							Prevailing Torque				
				First Removal		Fifth Removal					First Removal		Fifth Removal					First Removal		Fifth Removal	
	Proof Load lb	Clamp Load lb	First Install in. lb max	Highest Reading min in. lb	Lowest Reading min in. lb	Highest Reading min in. lb	Lowest Reading min in. lb	Proof Load lb	Clamp Load lb	First Install in. lb max	Highest Reading min in. lb	Lowest Reading min in. lb	Highest Reading min in. lb	Lowest Reading min in. lb	Proof Load lb	Clamp Load lb	First Install in. lb max	Highest Reading min in. lb	Lowest Reading min in. lb	Highest Reading min in. lb	Lowest Reading min in. lb
No. 4 -40	540	250	3.0	1.0	0.5	0.5	0.2	720	380	3.0	1.0	0.5	0.5	0.2	910	550	4.0	1.0	0.5	0.5	0.2
6 -32	820	370	6.0	1.5	0.5	1.0	0.5	1,100	580	8.0	1.5	0.5	1.0	0.5	1,350	810	8.0	2.0	1.0	1.5	0.5
8 -32	1,250	580	9.0	2.0	1.0	1.5	0.5	1,700	900	12.0	2.0	1.0	1.5	0.5	2,100	1,250	12	2.5	1.0	2.0	1.0
10 -24	1,550	720	13	2.5	1.0	2.0	1.0	2,100	1,100	13	2.5	1.0	2.0	1.0	2,600	1,550	17	3.5	1.5	2.5	1.0
12 -24	2,200	1,000	20	3.5	1.5	2.5	1.0	2,900	1,550	20	3.5	1.5	2.5	1.0	3,650	2,200	27	4.5	2	3.0	1.5
1/4 -20	2,900	1,300	30	5.0	2.5	3.5	1.5	3,800	2,000	30	5.0	2.5	3.5	1.5	4,750	2,850	40	6.0	3	4.5	2
5/16 -18	4,700	2,150	60	8.0	4	5.5	2.5	6,300	3,350	60	8.0	4	5.5	2.5	7,850	4,700	80	10.5	5	7.5	3
3/8 -16	7,000	3,200	80	12	5	8.5	4	9,300	4,950	80	12	5	8.5	4	11,600	6,950	110	16	7.5	11.5	5
7/16 -14	9,550	4,400	100	17	7.5	12	5	12,800	6,800	100	17	7.5	12	5	15,900	9,600	135	23	10	16	7.5
1/2 -13	12,800	5,850	150	22	10	15	7.5	17,000	9,050	150	22	10	15	7.5	21,300	12,800	17*	30	15	20	10
			*ft lb							*ft lb							*ft lb				
9/16 -12	16,400	7,550	17*	30	15	21	10	21,800	11,600	17*	30	15	21	10	27,300	16,400	25*	40	20	28	12.5
5/8 -11	20,300	9,300	25*	39	17.5	27	12.5	27,200	14,500	25*	39	17.5	27	12.5	33,900	20,300	35*	52	25	36	15
3/4 -10	30,000	13,800	35*	58	25	41	20	40,100	21,300	35*	58	25	41	20	50,100	30,100	45*	78	35	54	25
7/8 - 9	41,600	11,400	50*	88	40	62	30	55,400	29,500	50*	88	40	62	30	69,300	41,600	70*	117	50	82	40
1 - 8	54,500	15,000	70*	120	60	84	40	72,700	38,700	70*	120	60	84	40	90,900	54,600	90*	160	80	112	50
1-1/8 - 7	68,700	18,900	75*	150	70	105	50	80,100	42,100	75*	150	70	105	50	115,000	69,000	100*	200	100	140	70
1-1/4 - 7	87,200	24,000	85*	188	90	132	60	101,700	53,500	85*	188	90	132	60	145,000	87,000	110*	250	120	176	80
1-3/8 - 6	104,000	28,700	100*	220	110	154	70	121,300	63,800	100*	220	110	154	70	173,000	104,000	135*	293	140	205	100
1-1/2 - 6	126,000	34,800	110*	260	130	182	90	147,500	77,600	110*	260	130	182	90	211,000	127,000	150*	346	170	242	120

NOTE: Clamp loads for Grades A, B and C locknuts respectively equal 75% of the proof loads specified for Grades 2, 5 and 8 bolts in SAE J429. Clamp loads for Grades B and C locknuts also respectively equal 75% of the proof loads specified for ASTM A449 and ASTM A354 Grade BD bolts.

(continued)

PROOF LOAD, CLAMP LOAD, AND PREVAILING TORQUE FOR LOCKNUTS
FINE THREAD SERIES

Nut Size and Threads Per Inch	Grade A Locknuts							Grade B Locknuts							Grade C Locknuts						
			Prevailing Torque							Prevailing Torque							Prevailing Torque				
				First Removal		Fifth Removal					First Removal		Fifth Removal					First Removal		Fifth Removal	
	Proof Load lb	Clamp Load lb	First Install in. lb max	Highest Reading min in. lb	Lowest Reading min in. lb	Highest Reading min in. lb	Lowest Reading min in. lb	Proof Load lb	Clamp Load lb	First Install in. lb max	Highest Reading min in. lb	Lowest Reading min in. lb	Highest Reading min in. lb	Lowest Reading min in. lb	Proof Load lb	Clamp Load lb	First Install in. lb max	Highest Reading min in. lb	Lowest Reading min in. lb	Highest Reading min in. lb	Lowest Reading min in. lb
No. 4 -48	600	270	3.0	1.0	0.5	0.5	0.2	790	420	3.0	1.0	0.5	0.5	0.2	990	600	4.0	1.0	0.5	0.5	0.2
6 -40	900	420	6.0	1.5	0.5	1.0	0.5	1,200	640	8.0	1.5	0.5	1.0	0.5	1,500	900	8.0	2.0	1.0	1.0	0.5
8 -36	1,350	610	9.0	2.0	1.0	1.5	0.5	1,750	930	12	2.0	1.0	1.5	0.5	2,200	1,300	12	2.5	1.0	2.0	1.0
10 -32	1,800	840	13	2.5	1.0	2.0	1.0	2,400	1,300	13	2.5	1.5	2.0	1.0	3,000	1,800	17	3.5	1.5	2.5	1.0
12 -28	2,300	1,050	20	3.5	1.5	2.5	1.0	3,100	1,650	20	3.5	1.5	2.5	1.0	3,900	2,350	27	4.5	2	3.0	1.5
1/4 -28	3,300	1,500	30	5	2.5	3.5	1.5	4,350	2,300	30	5.0	2.5	3.5	1.5	5,450	3,250	40	6.0	3	4.5	2
5/16-24	5,200	2,400	60	8	4	5.5	2.5	6,950	3,700	60	8.0	4	5.5	2.5	8,700	5,200	80	10.5	5	7.5	3
3/8 -24	7,900	3,600	80	12	5	8.5	4	10,500	5,600	80	12	5	8.5	4	13,200	7,900	110	16	7.5	11.5	5
7/16-20	10,700	4,900	100	17	7.5	12	5	14,200	7,550	100	17	7.5	12	5	17,800	10,700	135	23	10	16	7.5
1/2 -20	14,400	6,550	150	22	10	15	7.5	19,200	10,200	150	22	10	15	7.5	24,000	14,400	17*	30	15	20	10
			*ft lb							*ft lb							*ft lb				
9/16-18	18,300	8,350	17*	30	15	21	10	24,400	13,000	17*	30	15	21	10	30,400	18,300	25*	40	20	28	12.5
5/8 -18	22,900	10,500	25*	39	17.5	27	12.5	30,700	16,300	25*	39	17.5	27	12.5	38,400	23,000	35*	52	25	36	15
3/4 -16	33,600	15,400	35*	58	25	41	20	44,800	23,800	35*	58	25	41	20	56,000	33,600	45*	78	35	54	25
7/8 -14	45,800	12,600	50*	88	40	62	30	61,100	32,400	50*	88	40	62	30	76,400	45,800	70*	117	50	82	40
1 -14	61,100	16,800	70*	120	60	84	40	81,500	43,300	70*	120	60	84	40	101,900	61,100	90*	160	80	112	50
1 -12	59,700	16,400	70*	120	60	84	40	79,600	42,300	70*	120	60	84	40	99,500	59,700	90*	160	80	112	50
1-1/8 -12	76,900	21,200	75*	150	70	105	50	89,900	47,500	75*	150	70	105	50	128,000	76,800	100*	200	100	140	70
1-1/4 -12	96,600	26,600	85*	188	90	132	60	113,000	59,700	85*	188	90	132	60	161,000	96,600	110*	250	120	176	80
1-3/8 -12	118,000	32,500	100*	220	110	154	70	138,000	72,900	100*	220	110	154	70	197,000	118,000	135*	293	140	205	100
1-1/2 -12	142,000	39,100	110*	260	130	182	90	166,000	87,700	110*	260	130	182	90	237,000	142,000	150*	346	170	242	120

NOTE: Clamp loads for Grades A, B and C locknuts respectively equal 75 % of the proof loads specified for Grades 2, 5 and 8 bolts in SAE J429. Clamp loads for Grades B and C locknuts also respectively equal 75% of the proof loads specified for ASTM A449 and ASTM A354 Grade BD bolts.