

DEPARTMENT OF THE ARMY TECHNICAL BULLETIN**INSPECTION, USE AND TIGHTENING OF METAL
FASTENERS USED ON
TANK-AUTOMOTIVE EQUIPMENT****HEADQUARTERS, DEPARTMENT OF THE ARMY****REPORTING OF ERRORS**

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SECTION I. INTRODUCTION

1. Purpose. This bulletin was developed as a result of the heightened interest in the inspection, use and tightening of metal fasteners. It includes selection and use of torque wrenches. The information contained in this bulletin will be incorporated into new technical manuals as they are developed and into existing manuals as they are revised.

2. Scope. This bulletin applies to metal fasteners that are inspected or used in maintenance operations.

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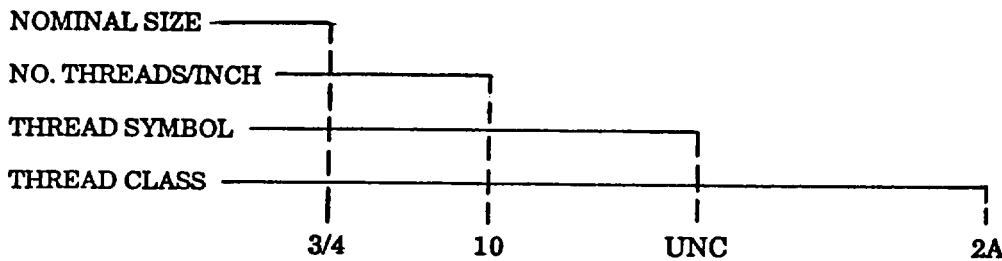
SECTION II. METAL FASTENERS

3. Fastener Size and Thread Pattern. Threaded fasteners are categorized according to diameter of the fastener shank. Thread styles are divided into broad groups, the two most common being coarse (Unified Coarse-UNC) and fine (Unified Fine-UNF). These groups are defined by the number of threads per inch on the bolt shanks. In addition, threads are categorized by thread class, which is a measure of the degree of fit between the threads of the bolt or screw (external threads) and the threads of the attaching nut or tapped hole (internal threads). The most common thread class for bolts and screws is Class 2.

TABLE 2-1. THREAD CLASSES

| EXTERNAL | INTERNAL | FIT |
|----------|----------|------------|
| 1A | 1B | LOOSE FIT |
| 2A | 2B | MEDIUM FIT |
| 3A | 3B | CLOSE FIT |

Thread patterns are designated as follows:



Note: Unless followed with -LH (e.g. 3/4-1 OUNCE-2A-LH), threads are right hand.

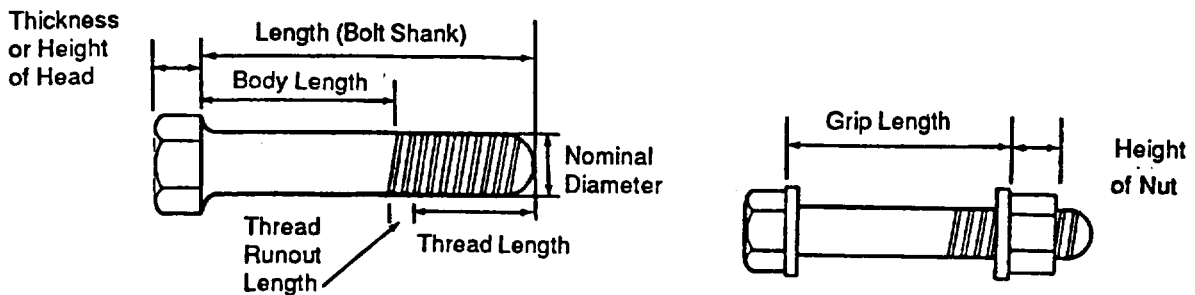


Figure 1. Thread Description

4. Fastener Grade. In addition to being classified by thread type, threaded fasteners are also classified by material. The most familiar fastener classification system is the SAE grading system.

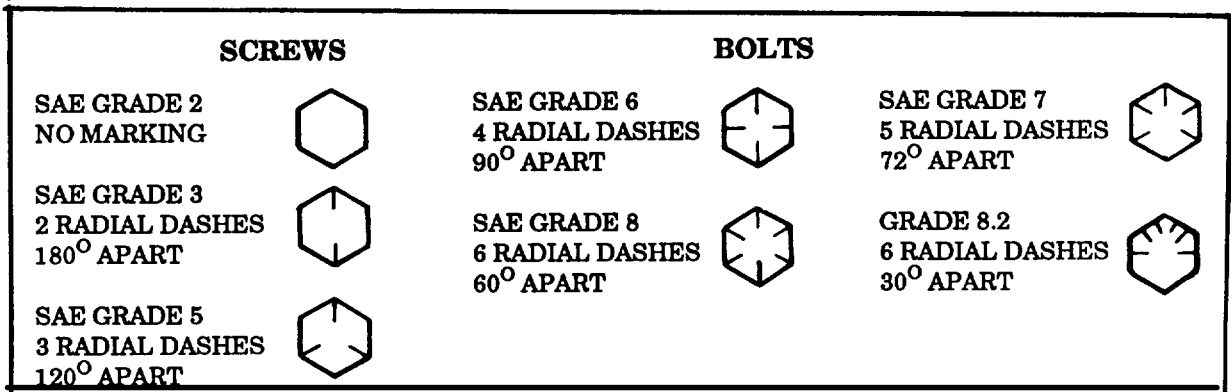


Figure 2. SAE Screw and Bolt Markings

Note:

Torque values for Grade 8.2 bolts are the same as for Grade B.

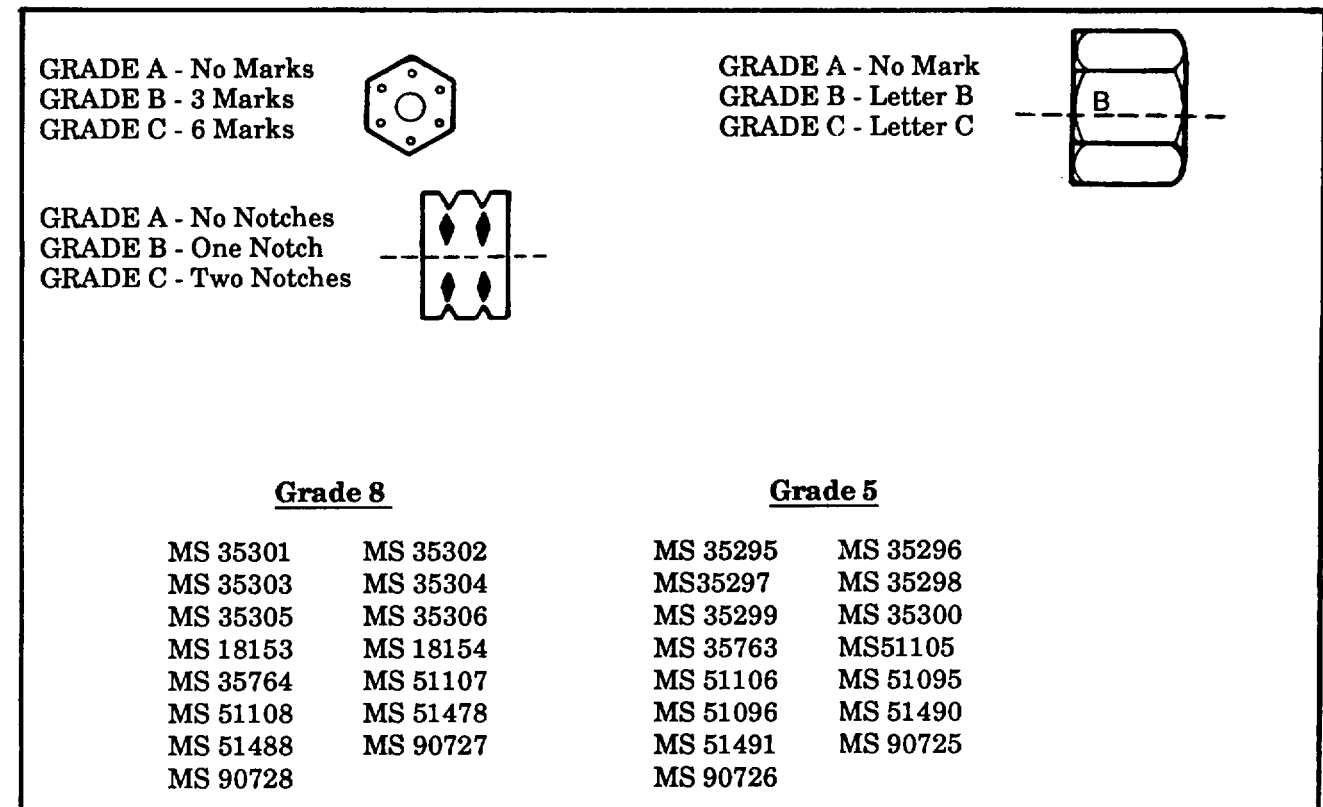


Figure 3. Markings On Hex Locknuts

SECTION III. INSPECTION AND USE

5. Inspection and Use. Cotter pins, lockwashers, lockwire, locking bolts, locking nuts and similar locking devices shall be discarded when removed. Self-locking fasteners that loosen up must be replaced, not tightened. Standard (non-locking) bolts shall be inspected before reuse. Bolts with deformed or damaged threads shall be discarded. Any corroded (rusted) fasteners should be wiped clean. If the surface of the fastener is pitted or rust is not removed by simple wiping, discard the fastener. New bolts and nuts shall be examined before use. Bolt shanks (see Figure 1) shall display no apparent taper. The correct size and grade bolt must be used in each application.

SECTION IV. TIGHTENING METAL FASTENERS

6. Torque Wrenches. Torque wrenches are used to measure the specific degree of tightness during final tightening of nuts and bolts and should not be used for anything else. Since torque wrenches are considered precision instruments they must be calibrated at regular intervals to ensure accuracy. Torque wrenches are a combination wrench and measuring tool. Torque wrenches may be direct reading (dial or gage) or be signaling devices that announce when a predetermined torque is reached. Torque limits commonly used are in pound inch and pound foot.

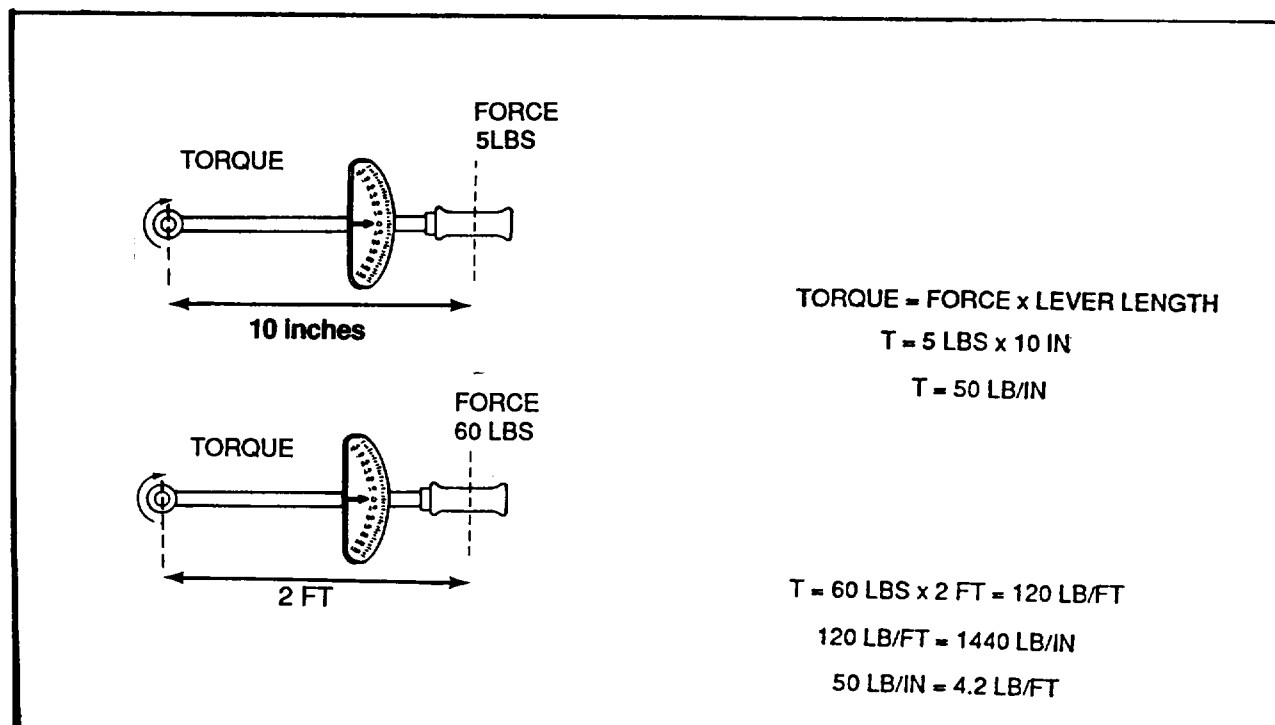


Figure 4. Torque Force

Note

- To convert pound inches to pound feet, divide by 12.
- To convert pound feet to pound inches, multiply by 12.

SECTION IV. TIGHTENING METAL FASTENERS (Cont)

When torquing a fastener, select a wrench whose range fits the required torque value. A torque wrench is most accurate from 25% to 75% of its stated range. A wrench with a stated range of 0 to 100 Pound Feet will be most accurate from 25 to 75 Pound Feet. The accuracy of readings will decrease as you approach 0 Pound Feet or 100 Pound Feet. The following ranges are based on this principle.

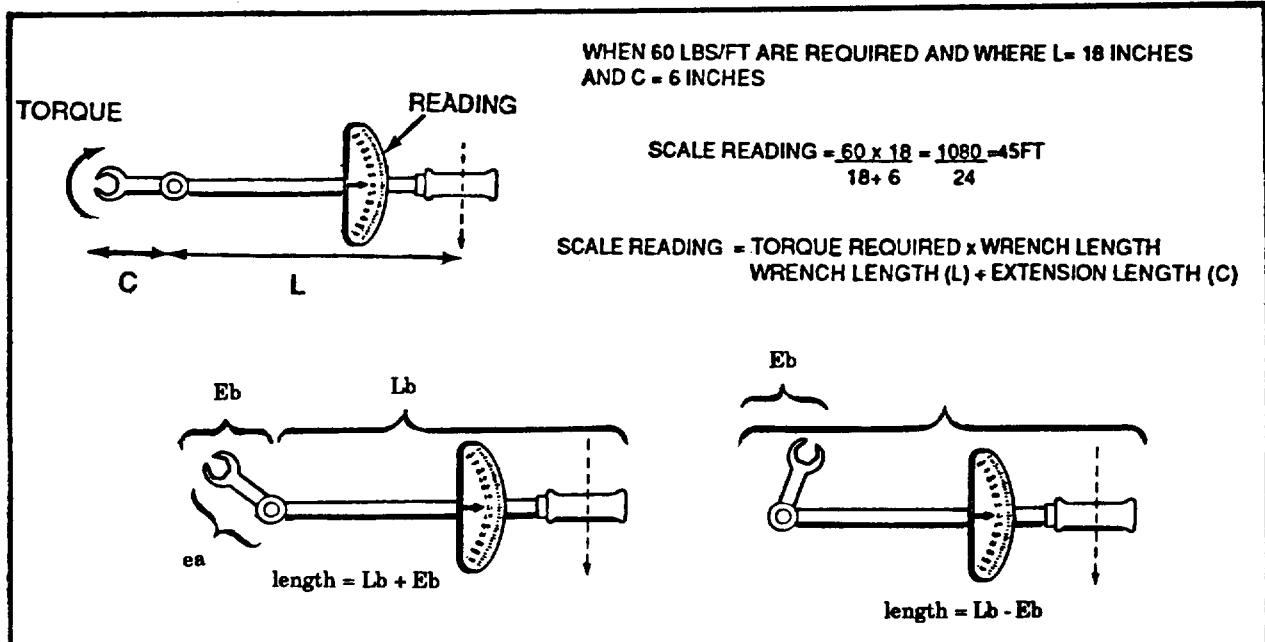


Figure 5. Torque Readings

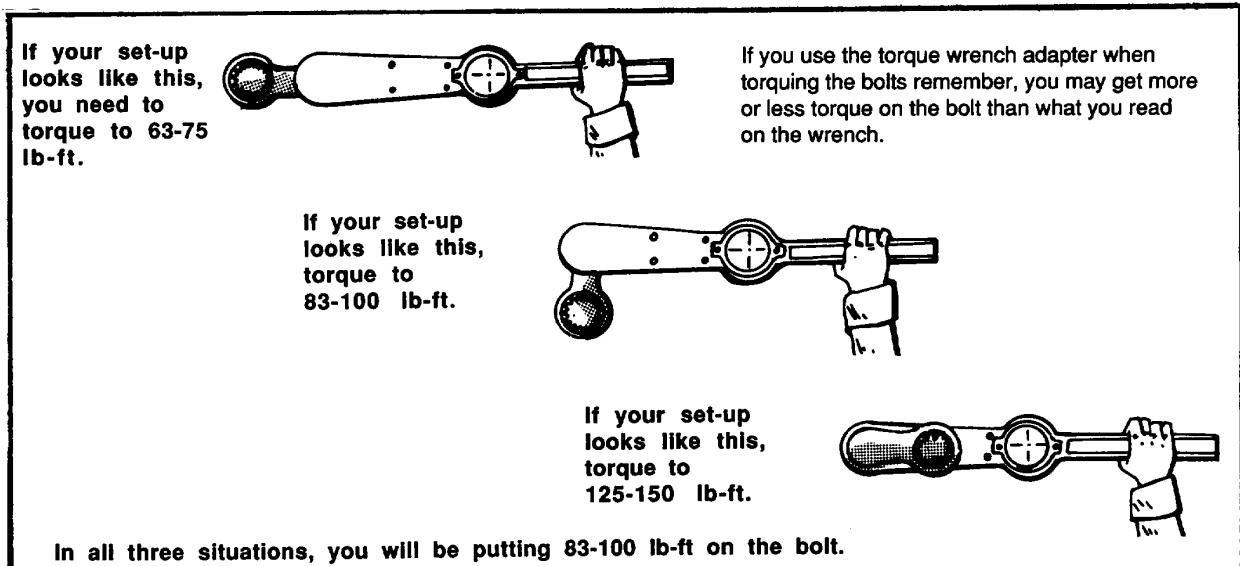


Figure 6. Ranges of Torque

TABLE 3-1. TORQUE RANGES

| <u>STATED RANGE</u> | <u>MOST EFFECTIVE RANGE</u> |
|---------------------|-----------------------------|
| 0-200 LB/IN | 50-150 LB/IN |
| 0-600 LB/FT | 50-450 LB/FT |
| 0-170 LB/FT | 44-131 LB/FT |
| 15-75 LB/FT | 30-60 LB/FT |

7. Installation and Torquing.

a. Matching Nuts. Matching nuts require a minimum height (see Figure 1) equal to the basic diameter of the bolt. The same is true of tapped holes. In tapped softer materials, the depth of the tapped hole should be 1-1/2 times the basic diameter of the bolt.

b. Thread Protrusion. In all installations, bolts, studs and screws must extend through the nut at least a length equivalent to two complete threads (see Figure1). This applies to both self-locking and plain nuts.

c. Torquing Self-Locking Nuts. To obtain the correct recommended torque value on self-locking nuts, the nut must be tightened until it is one turn from the beginning of seating. At this point, if the torque is less than 1/3 of the recommended torque, it should be disregarded and the nut tightened to the recommended torque value. If the torque is 1/3 or more of the recommended torque, it should be added to the recommended torque. Example: The recommended torque is 50 to 70 LB/IN (6 to 8 NM). The torque at one turn from seating is 30 LB/IN (3 NM). The correct torque wrench reading would be 80 to 100 LB/IN (9 to 11 NM).

d. Retorquing Fasteners. Procedures intended for installing metal fasteners can cause an incorrect reading when used to check or retorquer already installed fasteners during maintenance. Before checking or retorquing an already installed threaded fastener, first mark the fastener and its companion components so the marks are in line. Second, back it off a ¼ turn to loosen it. Torque it to the specification with an even steady pull on the torque wrench. The marks should be in line; if not, the marks will indicate the fastener was under or over torqued.

e. Standard Torque Charts. Standard torque charts have been established for dry and wet torque conditions. Surface variations such as thread roughness, scale paint, lubrication (oil, grease, etc.) hardening and plating may alter these values considerably. The following are standard torque charts. If vehicle technical manuals list different torques always use the readings listed in the vehicle technical manuals.

NOTE

- Grades B and C apply to SAE class nuts only.
- Table 4-1 applies to **COARSE** threads.

TABLE 4-1. STEEL HEX LOCKNUTS
RELATIONSHIP OF THREAD SIZE, TORQUE AND GRADE

| SIZE & # THREADS | GRADE B | GRADE C | GRADE B | GRADE C |
|------------------|---------------|---------------------|-------------|-------------|
| 1/4-20 | 60-85 LB/IN | 85-125 LB/IN | 7-10 N/M | 10-14 N/M |
| 5/16-18 | 110-150 LB/IN | 130-190 LB/IN | 15-21 N/M | 15-21 N/M |
| 3/8-16 | 15-20 LB/FT | 20-28 LB/FT | 20-27N/M | 27-38 N/M |
| 7/16-14 | 23-32 LB/FT | 31-43 LB/FT | 31-43N/M | 42-58 N/M |
| 1/2-13 | 37-50 LB/FT | 45-63 LB/FT | 50-68 N/M | 61-85 N/M |
| 9/16-12 | 50-70 LB/FT | 70-90 LB/FT | 68-95 N/M | 95-122 N/M |
| 5/8-11 | 70-95 LB/FT | 90-123 LB/FT | 95-129 N/M | 122-166 N/M |
| 3/4-10 | 125-165 LB/FT | 155-210 LB/FT | 170-224 N/M | 210-285 N/M |
| 7/8-9 | 185-250 LB/FT | 225-313LB/FT | 251-339 NM | 305-423 NM |
| 1/8 | 275-375 LB/FT | 350-463LB/F | T373-509 NM | 475-627 NM |

NOTE

- Grades B and C apply to SAE class nuts only.
- The following table applies to **FINE** threads.

TABLE 4-2. STEEL HEX LOCKNUTS
RELATIONSHIP OF THREAD SIZE, TORQUE AND GRADE

| SIZE & # THREADS | GRADE B | GRADE C | GRADE B | GRADE C |
|------------------|-------------------|---------------------|-------------|-------------|
| 1/4-28 | 65-90 LB/IN | 85-125 LB/IN | 7-10 N/M | 10-14 N/M |
| 5/16-24 | 120-160 LB/IN | 140-200 LB/FT | 14-18 N/M | 16-23 N/M |
| 3/8-24 | 16-22 LB/FT | 21-29 LB/FT | 22-30 N/M | 28-39 N/M |
| 7/16-20 | 24-34 LB/FT | 31-43 LB/FT | 33-46 NM | 42-58 N/M |
| 1/2-20 | 38-53LB/FT | 50-70 LB/FT | 51-71 N/M | 68-95 N/M |
| 9/16-18 | 58-78LB/FT | 70-95 LB/FT | 78-105 N/M | 95-129 N/M |
| 5/8-18 | 120-165 LB/FT | 155-210 LB/FT | 163-224 N/M | 210-285 N/M |
| 7/8-14 | 200-270 LB/FT | 225-313LB/FT | 271-366 N/M | 305-424 N/M |
| 1-14 | 300-400 LB/FT | 363-500LB/FT | 407-542 N/M | 492-678 N/M |

SECTION V. TORQUE LIMITS

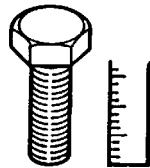
8. General. This section provides general torque limits for screws used on Tank-Automotive Equipment. Special torque limits are indicated in the maintenance procedures for applicable components. The general torque limits given in this section shall be used when specific torque limits are not indicated in the maintenance procedure. These general torque limits cannot be applied to screws that retain rubber components. The rubber components will be damaged before the torque limit is reached. If a special torque limit is not given in the maintenance instructions, tighten the screw or nut until it touches the metal surface, then tighten it one more turn.

9. Torque Limits. Table 5-1 lists dry torque limits. Dry torque limits are used on screws that do not have lubricants applied to the threads. Table 5-2 lists wet torque limits. Wet torque limits are used on screws that have high pressure lubricants applied to the threads. Table 5-3 lists torque limits for metric fasteners.

10. How To Use Torque Table.



a. Measure the diameter of the screw you are installing.



b. Count the number of threads per inch.
 c. Under the heading SIZE, look down the left hand column until you find the diameter of the screw you are installing (there will usually be two lines beginning with

the same size).

d. In the second column under SIZE, find the number of threads per inch that matches the number of threads you counted in step 2. (Not required for metric screws).

CAPSCREW HEAD MARKINGS

Manufacturer's marks may vary. These are all SAE Grade 5 (3-line).

Metric screws are of three grades: 8.8, 10.9, and 12.9. Grades & Manufacturer's marks appear on the screw head.



e. To find the grade screw you are installing, match the markings on the head to the correct picture of CAPSCREW HEAD MARKINGS on the torque table.

f. Look down the column under the picture you found in step 5 until you find the torque limit (IN/LB/Fr or NM) for the diameter and threads per inch of the screw you are installing.


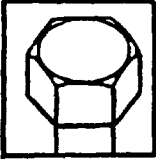
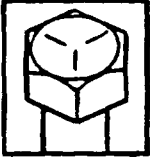


Section V. - Torque Limits (Cont)

TABLE 5-1. TORQUE LIMITS FOR DRY FASTENERS

| CAPSCREW HEAD MARKINGS | | | SAE GRADE NO.2 | | SAE GRADE NO.5 | | SAE GRADE NO. 6 OR 7 | | SAE GRADE NO.8 | |
|-------------------------------------------------------------------|------------------|-------------|----------------|---------------|----------------|---------------|----------------------|---------------|----------------|---------------|
| MANUFACTURER'S MARKS MAY VARY. THESE ARE ALL SAE GRADE 5 (3-line) | | | | | | | | | | |
| Dia. Inches | Threads Per Inch | Millimeters | Pound Feet | Newton Meters | Pound Feet | Newton Meters | Pound Feet | Newton Meters | Pound Feet | Newton Meters |
| 1/4 | 20 | 6.35 | 5 | 7 | 8 | 11 | 10 | 14 | 12 | 16 |
| 1/4 | 28 | 6.35 | 6 | 9 | 10 | 14 | 12 | 16 | 14 | 19 |
| 5/16 | 18 | 7.94 | 11 | 15 | 17 | 23 | 21 | 28 | 25 | 34 |
| 5/16 | 24 | 7.94 | 12 | 16 | 19 | 26 | 24 | 33 | 25 | 34 |
| 3/8 | 16 | 9.63 | 20 | 27 | 30 | 41 | 40 | 54 | 45 | 61 |
| 3/8 | 24 | 9.53 | 23 | 31 | 35 | 47 | 45 | 61 | 50 | 68 |
| 7/16 | 14 | 11.11 | 30 | 41 | 50 | 68 | 60 | 81 | 70 | 95 |
| 7/16 | 20 | | 35 | 47 | 55 | 75 | 70 | 95 | 80 | 108 |
| 1/2 | 13 | 12.70 | 50 | 68 | 75 | 102 | 95 | 129 | 110 | 149 |
| 1/2 | 20 | | 55 | 75 | 90 | 122 | 100 | 136 | 120 | 163 |
| 9/16 | 12 | 14.29 | 65 | 88 | 110 | 149 | 135 | 183 | 150 | 203 |
| 9/16 | 18 | | 75 | 102 | 120 | 163 | 150 | 203 | 170 | 231 |
| 5/8 | 11 | 15.88 | 90 | 122 | 150 | 203 | 190 | 258 | 220 | 298 |
| 5/8 | 18 | | 100 | 136 | 180 | 244 | 210 | 285 | 240 | 325 |
| 3/4 | 10 | 19.05 | 160 | 217 | 260 | 353 | 320 | 434 | 380 | 515 |
| 3/4 | 16 | | 180 | 244 | 300 | 407 | 360 | 488 | 420 | 597 |
| 7/8 | 9 | 22.23 | 140 | 190 | 400 | 542 | 520 | 705 | 600 | 814 |
| 7/8 | 14 | | 155 | 210 | 440 | 597 | 580 | 786 | 660 | 895 |
| 1 | 8 | 25.40 | 220 | 298 | 580 | 786 | 800 | 1085 | 900 | 1220 |
| 1 | 12 | | 240 | 325 | 640 | 868 | 860 | 1166 | 1000 | 1356 |
| 1-1/8 | 7 | 25.58 | 300 | 407 | 800 | 1085 | 1120 | 1519 | 1280 | 1736 |
| 1-1/8 | 12 | | 340 | 461 | 880 | 1193 | 1260 | 1709 | 1440 | 953 |
| 1-1/4 | 7 | 31.75 | 420 | 570 | 1120 | 1519 | 1580 | 2142 | 1820 | 2468 |
| 1-1/4 | 12 | | 460 | 624 | 1240 | 1681 | 1760 | 2387 | 2000 | 2712 |
| 1-3/8 | 6 | 34.93 | 560 | 759 | 1460 | 1980 | 2080 | 2820 | 2380 | 3227 |
| 1-3/8 | 12 | | 640 | 868 | 1680 | 2278 | 2380 | 3227 | 2720 | 3688 |
| 1-1/2 | 6 | 38.10 | 740 | 1003 | 1940 | 2631 | 2780 | 3700 | 3160 | 4285 |
| 1-1/2 | 12 | | 840 | 1139 | 2200 | 2983 | 3100 | 4204 | 3560 | 4827 |

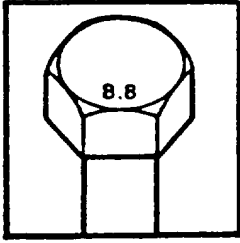
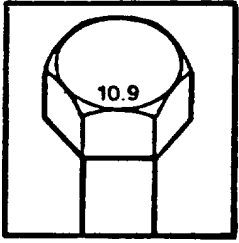
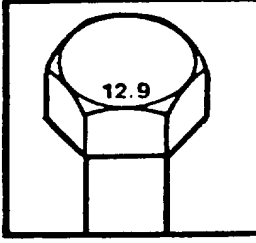
SECTION V - TORQUE LIMITS - (Cont)

TABLE 5-2. TORQUE LIMITS FOR WET FASTENERS

| CAPSCREW HEAD MARKINGS | | | TORQUE | | | | | | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|-------------|-----------------------------------------------------------------------------------|---------------|-----------------------------------------------------------------------------------|---------------|------------------------------------------------------------------------------------|---------------|-------------------------------------------------------------------------------------|---------------|
|  Manufacturer's marks may vary These are all SAE Grade 5 (3-line) | | |  | |  | |  | |  | |
| | | | SIZE | | SAE GRADE NO.2 | | SAE GRADE NO.5 | | SAE GRADE O6 OR 7 | |
| Dia. Inches | Threads Per Inch | Millimeters | Pound Feet | Newton Meters | Pound Feet | Newton Meters | Pound Feet | Newton Meters | Pound Feet | Newton Meters |
| 1/4 | 20 | 6.35 | 4 | 6 | 6 | 8 | 8 | 11 | 9 | 12 |
| 1/4 | 28 | 6.35 | 5 | 7 | 7 | 9 | 9 | 12 | 10 | 14 |
| 5/16 | 18 | 7.94 | 8 | 11 | 3 | 18 | 16 | 22 | 18 | 24 |
| 6/16 | 24 | 7.94 | 9 | 12 | 14 | 19 | 18 | 24 | 20 | 27 |
| 3/8 | 16 | 9.53 | 15 | 20 | 23 | 31 | 30 | 41 | 35 | 47 |
| 3/8 | 24 | 9.53 | 17 | 23 | 25 | 34 | 30 | 41 | 35 | 47 |
| 7/16 | 14 | 11.11 | 24 | 33 | 35 | 47 | 45 | 61 | 55 | 75 |
| 7/16 | 20 | | 25 | 34 | 40 | 54 | 50 | 68 | 60 | 81 |
| 1/2 | 13 | 12.70 | 35 | 47 | 55 | 75 | 70 | 95 | 80 | 108 |
| 1/2 | 20 | | 40 | 54 | 65 | 88 | 80 | 108 | 90 | 122 |
| 9/16 | 12 | 14.29 | 50 | 68 | 80 | 108 | 100 | 136 | 110 | 149 |
| 9/16 | 18 | | 55 | 75 | 90 | 122 | 110 | 149 | 130 | 176 |
| 5/8 | 11 | 15.88 | 70 | 95 | 110 | 149 | 140 | 190 | 170 | 231 |
| 5/8 | 18 | | 80 | 108 | 130 | 176 | 160 | 217 | 180 | 244 |
| 3/4 | 10 | 19.05 | 120 | 163 | 200 | 271 | 240 | 325 | 280 | 380 |
| 3/4 | 16 | | 140 | 190 | 220 | 298 | 280 | 380 | 320 | 434 |
| 7/8 | 9 | 22.23 | 110 | 149 | 300 | 407 | 400 | 542 | 460 | 624 |
| 7/8 | 14 | | 120 | 163 | 320 | 434 | 440 | 597 | 500 | 678 |
| 1 | 8 | 25.40 | 160 | 217 | 440 | 597 | 600 | 814 | 680 | 922 |
| 1 | 12 | | 170 | 231 | 480 | 651 | 660 | 895 | 740 | 1003 |
| 1-1/8 | 7 | 25.58 | 220 | 298 | 600 | 814 | 840 | 1139 | 960 | 1302 |
| 1-1/8 | 12 | | 260 | 353 | 660 | 895 | 940 | 1275 | 1080 | 1464 |
| 1-1/4 | 7 | 31.75 | 320 | 434 | 840 | 1139 | 1100 | 1492 | 1360 | 1844 |
| 1-1/4 | 12 | | 360 | 488 | 920 | 1248 | 1320 | 1790 | 1500 | 2034 |
| 1-3/8 | 6 | 34.93 | 420 | 570 | 1100 | 1492 | 1560 | 2115 | 1780 | 2414 |
| 1-3/8 | 12 | | 460 | 624 | 1260 | 1709 | 1780 | 2414 | 2040 | 2766 |
| 1-1/2 | 6 | 38.10 | 560 | 760 | 1460 | 1980 | 2080 | 2820 | 2360 | 3200 |
| 1-1/2 | 12 | | 620 | 841 | 1640 | 2224 | 2320 | 3146 | 2660 | 3607 |

SECTION V. - TORQUE LIMITS (Cont)

TABLE 5-3. DRY TORQUE LIMITS FOR METRIC FASTENERS

| CAPSCREW HEAD MARKINGS | |  | |  | |  | |
|------------------------|-------------|-----------------------------------------------------------------------------------|---------------|------------------------------------------------------------------------------------|---------------|-------------------------------------------------------------------------------------|---------------|
| SIZE | | METRIC GRADE 8.8 | | METRIC GRADE 10.9 | | METRIC GRADE 12.9 | |
| DIA INCHES | MILLIMETERS | POUND FEET | NEWTON METERS | POUND FEET | NEWTON METERS | POUND FEET | NEWTON METERS |
| .157 | 4 | 2 | 3 | 3 | 4 | 4 | 5 |
| .197 | 5 | 4 | 5 | 6 | 8 | 7 | 9 |
| .237 | 6 | 7 | 9 | 10 | 14 | 11 | 15 |
| .276 | 7 | 11 | 15 | 16 | 22 | 20 | 27 |
| .315 | 8 | 18 | 24 | 25 | 34 | 29 | 39 |
| .394 | 10 | 32 | 43 | 47 | 64 | 68 | 79 |
| .473 | 12 | 68 | 79 | 83 | 113 | 100 | 136 |
| .630 | 16 | 144 | 195 | 196 | 266 | 235 | 319 |
| .709 | 18 | 190 | 258 | 269 | 366 | 323 | 438 |
| .788 | 20 | 260 | 353 | 366 | 496 | 440 | 597 |
| .867 | 22 | 368 | 499 | 520 | 705 | 678 | 919 |
| .946 | 24 | 470 | 637 | 664 | 900 | 794 | 1077 |
| 1.064 | 27 | 707 | 959 | 996 | 1351 | 1235 | 1675 |
| 1.182 | 30 | 967 | 1311 | 1357 | 1840 | 1630 | 2210 |

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THE METRIC SYSTEM AND EQUIVALENTS

WEIGHT MEASURE

1 Centimeter = 10 Millimeters = 0.01 Meters = 0.3937 Inches
 1 Meter = 100 Centimeters = 1000 Millimeters = 39.37 Inches
 1 Kilometer = 1000 Meters = 0.621 Miles

WEIGHTS

1 Gram = 0.001 Kilograms = 1000 Milligrams = 0.035 Ounces
 1 Kilogram = 1000 Grams = 2.2 lb.
 1 Metric Ton = 1000 Kilograms = 1 Megagram = 1.1 Short Tons

LIQUID MEASURE

1 Milliliter = 0.001 Liters = 0.0338 Fluid Ounces
 1 Liter = 1000 Milliliters = 33.82 Fluid Ounces

SQUARE MEASURE

1 Sq. Centimeter = 100 Sq. Millimeters = 0.155 Sq. Inches
 1 Sq. Meter = 10,000 Sq. Centimeters = 10.76 Sq. Feet
 1 Sq. Kilometer = 1,000,000 Sq. Meters = 0.386 Sq. Miles

CUBIC MEASURE

1 Cu. Centimeter = 1000 Cu. Millimeters = 0.06 Cu. Inches
 1 Cu. Meter = 1,000,000 Cu. Centimeters = 35.31 Cu. Feet

TEMPERATURE

$5/9(^{\circ}\text{F} - 32) = ^{\circ}\text{C}$
 212° Fahrenheit is equivalent to 100° Celsius
 90° Fahrenheit is equivalent to 32.2° Celsius
 32° Fahrenheit is equivalent to 0° Celsius
 $9/5^{\circ}\text{C} + 32 = ^{\circ}\text{F}$

APPROXIMATE CONVERSION FACTORS

| TO CHANGE | TO | MULTIPLY BY |
|------------------------|----------------------|-------------|
| Inches | Centimeters | 2.540 |
| Feet | Meters | 0.305 |
| Yards | Meters | 0.914 |
| Miles | Kilometers | 1.609 |
| Square Inches | Square Centimeters | 6.451 |
| Square Feet | Square Meters | 0.093 |
| Square Yards | Square Meters | 0.836 |
| Square Miles | Square Kilometers | 2.590 |
| Acres | Square Hectometers | 0.405 |
| Cubic Feet | Cubic Meters | 0.028 |
| Cubic Yards | Cubic Meters | 0.765 |
| Fluid Ounces | Milliliters | 29.573 |
| its | Liters | 0.473 |
| arts | Liters | 0.946 |
| allons | Liters | 3.785 |
| Ounces | Grams | 28.349 |
| Pounds | Kilograms | 0.454 |
| Short Tons | Metric Tons | 0.907 |
| Pound-Feet | Newton-Meters | 1.356 |
| Pounds per Square Inch | Kilopascals | 6.895 |
| Miles per Gallon | Kilometers per Liter | 0.425 |
| Miles per Hour | Kilometers per Hour | 1.609 |

| TO CHANGE | TO | MULTIPLY BY |
|--------------------|------------------------|-------------|
| Centimeters | Inches | 0.394 |
| Meters | Feet | 3.280 |
| Meters | Yards | 1.094 |
| Kilometers | Miles | 0.621 |
| Square Centimeters | Square Inches | 0.155 |
| Square Meters | Square Feet | 10.764 |
| Square Meters | Square Yards | 1.196 |
| Square Kilometers | Square Miles | 0.386 |
| Square Hectometers | Acres | 2.471 |
| Cubic Meters | Cubic Feet | 35.315 |
| Cubic Meters | Cubic Yards | 1.308 |
| Milliliters | Fluid Ounces | 0.034 |
| Liters | Pints | 2.113 |
| Liters | Quarts | 1.057 |
| ers | Gallons | 0.264 |
| ms | Ounces | 0.035 |
| ograms | Pounds | 2.205 |
| Metric Tons | Short Tons | 1.102 |
| Newton-Meters | Pounds-Feet | 0.738 |
| Kilopascals | Pounds per Square Inch | 0.145 |
| ometers per Liter | Miles per Gallon | 2.354 |
| ometers per Hour | Miles per Hour | 0.621 |



PIN: 049179-000