

Torque Values

Torque-Tension Relationships for SAE Grades 2, 5 / 5.2 / 8

Nominal Size and Threads/in		Stress Area (1)	Grade 2 Clamp Load	Grade 2 Torque Dry K = 0.2 In-lb	Grade 2 Torque Lub K = 0.15 In-lb	Grade 5 Clamp Load	Grade 5 Torque Dry K = 0.2 In-lb	Grade 5 Torque Lub K = 0.15 In-lb	Grade 8 Clamp Load	Grade 8 Torque Dry K = 0.2 In-lb	Grade 8 Torque Lub K = 0.15 In-lb
		in ²	lb	In-lb	In-lb	lb	In-lb	In-lb	lb	In-lb	In-lb
	0.250-28	0.03637	1500	75.0	56.0	2319	116.0	87.0	3273	164	123
1/4 (20)	0.250-20	0.03182	1313	66.0	49.0	2029	101.0	76.0	2864	143	107
	0.3125-24	0.05806	2395	150.0	112.0	3700	230.0	173.0	5225	327	245
5/16 (18)	0.3125-18	0.05243	2163	135.0	101.0	3342	209.0	157.0	4719	295	221
	0.375-24	0.08783	3623	272.0	204.0	5600	420.0	315.0	7905	593	445
3/8 (16)	0.375-16	0.07749	3196	240.0	180.0	4940	370.0	278.0	6974	523	392
	0.4375-20	0.11870	4896	428.0	321.0	7567	662.0	496.0	10683	935	700
7/16 (14)	0.4375-14	0.10630	4385	384.0	288.0	6777	593.0	445.0	9567	837	628
	0.500-20	0.15995	6598	660.0	495.0	10197	1020.0	764.0	14396	1440	1080
1/2 (13)	0.500-13	0.14190	5853	585.0	439.0	9046	904.0	678.0	12771	1277	958
		in ²	lb	ft-lb	ft-lb	lb	ft-lb	ft-lb	lb	ft-lb	ft-lb
	0.5625-18	0.20298	8373	78	59	12940	121	91	18268	171	128
	0.5625-12	0.18195	7505	70	53	11600	109	82	16376	154	115
	0.625-18	0.25595	10558	110	82	16317	170	127	23036	240	180
5/8 (11)	0.625-11	0.22600	9322	97	73	14407	150	113	20340	212	159
	0.750-16	0.37296	15385	192	144	23776	297	223	33566	420	315
	0.750-10	0.33446	13796	172	129	21532	269	201	30101	376	282
	1.000-12	0.66304	–	–	–	42269	704	528	59674	995	746
	1.000-8	0.60574	–	–	–	38616	644	483	54517	909	681
Tensile Strength Proof Load Stress			74,000 psi 55,000 psi			120,000 psi 85,000 psi			150,000 psi 120,000 psi		

CAUTION – The previously listed torque and resulting tension are provided as an advisory guide. Individual application discretion is recommended. The content has been presented as accurately as possible, but responsibility for its application lies with the user.

EMPIRICAL EQUATION TO OBTAIN TORQUE GUIDE

$$T = KDW$$

where:

T = Torque (in-lb, in-oz)

D = Screw or bolt nominal size (in)

W = Screw or bolt tension (lb-oz)

K = Torque factor

The tension of the screw or bolt is calculated by multiplying the usable screw or bolt tension strength by the tensile-stress core area of the screw or bolt. The nominal clamp load stress is assumed as 75% of proof load.

The torque factor is the critical parameter in Equation 1 influenced primarily by the frictional conditions along the thread flank and at the bearing surfaces.

The other influence on "K" is the relative resiliency of the fastener and joint material.

a. Therefore:

$$K = K1 + K2 + K3$$

where:

K₁ represents the torque factor wasted by friction on the bearing surface of the nut or bolt, approximately 50% of the total torque factor.

K₂ factor represents the wasted friction on the contact flanks of the threads, about 40% of the total "K".

K₃ factor represents the useful torque producing the bolt tension, about 10% of the total "K".

b. K is 0.15/0.20 when bolts, nuts, and washers of the fastener joint are clean and coated with a thin film of protective oil. When dirt, rust, and other defects of field storage and environmental exposure are present, K can be 0.25/0.40. For torque K factors for other conditions refer to following table.

Torque Factors for Surface Conditions of Mating Fasteners

Mating Parts	K
Dry, clean with thin film of oil	0.15/0.20
Additional lubricating coatings of oil, wax, or dissimilar plating or hard washer	0.10/0.15
Thread and head bearing surfaces covered with high-performance lubricants or with anti-seize compounds	can be as low as 0.05
Combinations of certain materials such as Austenitic stainless steel screws/bolts and parts not lubricated or coated	can be as high as 0.35
Stainless fasteners plated with Leland JS600	0.13 ± 0.02

All test results and suggestions are based on laboratory tests. Specific job site conditions should be taken into consideration when specifying the proper fastener. Because applications vary, we assume no liability for use of this information.

Sealing Washer Data Typical Low Density Polyethylene Washer Property Data

PROPERTY	TEST METHOD	UNITS	LOW-DENSITY POLYETHYLENE
MECHANICAL			
Tensile Strength	ASTM D638 DIN 53455	PSI MPA	1,350 - 2,000 10 - 14
Modulus of Elasticity	ASTM D638	PSI MPA	22,000 155
Elongation (Ultimate)	ASTM D638	%	500
Hardness - Shore	ASTM D2240	D SCALE	44 - 55
Flexural Strength	ASTM D790 DIN 53452	PSI MPA	780 5.4
Flexural Modulus	ASTM D790	PSI MPA	16,500 115
THERMAL			
VICAT Softening Temperature	ASTM D1525	°C	85 - 100
Brittleness Temperature	ASTM D746	°C	-75
Heat Distortion Temperature -264 psi	ASTM D648 ASTM D64	°C °C	80 -
PHYSICAL			
Density	ASTM D1505	G/CM ³	0.91 - 0.92

Packaging Programs Recyclable Plastic Packaging



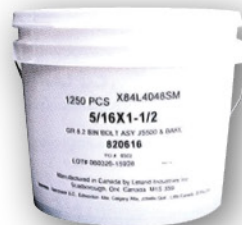
SQUARE PLASTIC PAILS

- Product is bulk packed
- Waterproof - tamper proof & resealable
- Features security strip to indicate pail has been opened



1/4 KEG CARTONS

- Bulk packed



ROUND PLASTIC PAILS

- Bulk packed
- Waterproof & resealable



CUSTOM JOB PACKS

All fasteners and accessories individually packed in quantities to suit bill of material requirement and labeled with job number. Our pallets are compliant to United Nations Food and Agricultural Organization standard ISPM 15 to prevent the spread of wood pests.

EMSEAL AST Hi-Acrylic

AST is a self-adhering tape seal made from resilient, open-cell polyurethane foam impregnated with a water-based acrylic-modified asphalt emulsion and then compressed to a sealing density level appropriate to the application.

Typically, higher compression levels are required for watertightness in water run-off applications. Lower compression can be used, for example, for snow seals at roof ridges.



EMSEAL MST

EMSEAL MST Multi-Use Sealant Tape is a preformed expanding tape seal. MST is made of a resilient cellular foam infused with a hydrophobic, modified-acrylic, liquid adhesive sealant which is then compressed to a sealing density level appropriate to the application. The result is a hybrid sealant that features the best characteristics of foam and liquid sealants while eliminating their respective weaknesses. MST compresses uniformly without overspill to provide a lasting seal.

