



TORQUE VALUES SELECTION GUIDE

**ROCKSIDE
EXPORT LIMITED**

The proper tightening of threaded fasteners can have a significant effect on their performance. Many application problems such as self-loosening and fatigue can be eliminated by proper torque. It should be understood that the subject of torque tension loading is beyond the scope of this manual. The information supplied here is an acceptable guide for normal conditions; for critical applications, however further information and research will be necessary.

In preparing this guide to torque values, the following basic assumptions have been made:

- (a) bolts and nuts are new, standard finish, uncoated and not lubricated*
- (b) the load will be 90% of the bolt yield strength
- (c) the coefficient of friction (μ) is 0.14
- (d) the final tightening sequence is achieved smoothly and slowly, until the torque tool indicates full torque has been obtained.

* If lubrication has been applied to the bolt and/or the nut (other than the normal protective oil film), multiply the recommended torque by the appropriate factor shown in the table.

Example: Bolt and nut are both phosphated;
required torque = torque recommended x 0.75.

LUBRICATION FACTOR

		Surface condition of bolt			
		Self	Electroplated		
Surface condition of nut	Self	1.00	Zinc	Cadmium	Phosphate
	Zinc	1.15	1.00	0.80	0.90
	Cadmium	0.85	1.20	1.35	1.15
	Phosphate and oil	0.70	0.90	1.20	1.00
	zinc with wax	0.60	0.65	0.70	0.75
		0.55	0.65	0.55	

N.B. Antiseize lubricants can reduce torque required by approximately 20%

CONVERSION FACTORS

Torque

lbf.ft x 1.36 = N.m
N m x 0.737 = lbf.ft

Force

lbf x 4.45 = N
N x 0.225 = lbf

Pressure

lbf/in² x 0.069 = bar
bar x 14.504 = lbf/in²

Flow

l/s x 2.119 = cu.ft/min
cu.ft/min x 0.472 = l/s

Power

hp x 0.746 = kW
kW = $\frac{N \cdot m \cdot rev/min}{95555}$

FORMULAE

Accepted formulae relating torque and tension, based on any tests, are:-

$$M = \frac{P \times D}{60}$$

or for metric sizes:-

$$M = \frac{P \times D}{5000}$$

M = torque lbf.ft
P = bolt tension lbf
D = bolt dia. ins

M = torque N.m
P = bolt tension Newtons
D = bolt dia. mm

These formulae may be used for bolts outside the range of the tables.

FORMULA FOR CALCULATING THE EFFECT OF TORQUE WERNCH EXTENSIONS

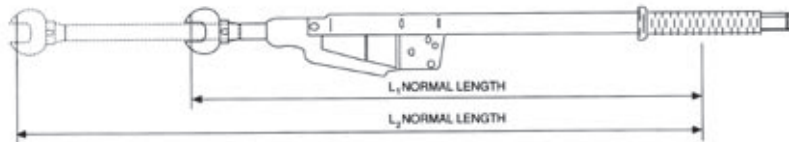
where L1 is the normal length and L2 is the extended length, M1 is the set torque and M2 the actual torque applied to the nut.

Example: Torque setting 100 N.m.

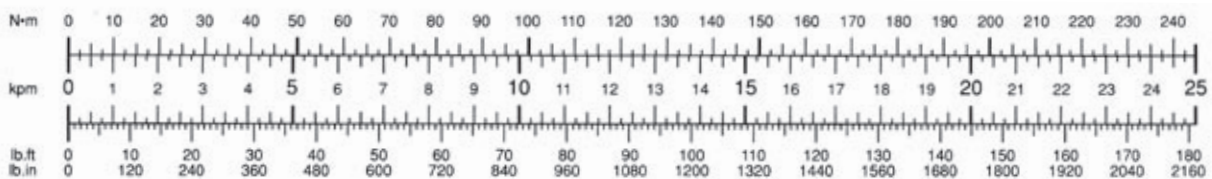
L1 = 500 L2 = 650 (units of length not important, this is a ratio)

$$M2 = M1 \times \frac{L2}{L1}$$

$$M2 = 100 \times \frac{650}{500} = 130 \text{ N.m}$$



TORQUE CONVERSION SCALE



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