MNP CORPORATION
586-254-1320

Engineering Center

248-307-0567

GENERAL FASTENERS COMPANY
734-452-2400

www.fastenerengineering.com

Useful Fastener Data

Thread Size	Tensile Area in^2
1/4-20	0.0318
1/4-28	0.0364
5/16-18	0.0524
5/16-24	0.0580
3/8-16	0.0775
3/8-24	0.0878
7/16-14	0.1063
7/16-20	0.1187
1/2-13	0.1419
1/2-20	0.1599
9/16-12	0.1820
9/16-18	0.2030
5/8-11	0.2260
5/8-18	0.2560
3/4-10	0.3340
3/4-16	0.3730
7/8-9	0.4620
7/8-16	0.5090
1-8	0.6060
1-12	0.6630
	mm2
M6-1.0	20.125
M8-1.25	36.611
M8-1.0	39.169
M10-1.5	57.994
M10-1.25	61.202
M12-1.75	84.272
M12-1.5	88.131
M12-1.25	92.076
M14-2.0	115.447
M14-1.5	145.118
M16-2.0	156.677
M16-1.5	167.255
M18-1.5	216.242
M20-2.5	244.808
M20-1.5	271.513
M22-2.5	303.415
M22-1.5	333.066
M24-3.0	352.524
M24-2.0	384.431

CONVERSION DATA			
	To convert from...	to...	Multiply by...
Torque	Newton-meter	Foot-pound	0.73756
	Newton-meter	Inch-pound	8.85
Force	Newton	Pound	0.22482
Stress	Mega-Pascal	Pounds/sq. inch	145.038

COMMON AUTOMOTIVE STRENGTH GRADES (English External Thread)

Strength Classification	Material & Treatment	Proof Stress (ksi)	Tensile Strength (ksi)	Core Hardness (HRC)
SAE Grade 5 (covers 1/4" - 1" dia)	medium carbon steel, quenched & tempered	85	120	25 - 34
SAE Grade 5.2 (covers 1/4" - 1 " dia)	low carbon boron steel, quenched & tempered	85	120	26 - 36
SAE Grade 8 (covers 1/4" - 1 1/2" dia)	medium carbon alloy steel, quenched & tempered	120	150	33 - 39
SAE Grade 8.2 (covers 1/4" - 1" dia)	low carbon boron steel, quenched & tempered	120	150	33 - 39
ASTM A574 (covers 1/4" - 4" dia socket head cap screws, high strength)	medium carbon alloy steel, quenched & tempered	140 (up to 1/2") 135 (above 1/2")	180 (up to 1/2") 170 (above 1/2")	39 - 45 (up to 1/2") 37 - 45 (above 1/2")

COMMON AUTOMOTIVE PROPERTY CLASSES (Metric External Thread)

Strength Classification (Property Class)	Material & Treatment	Proof Stress (MPa)	Tensile Strength (MPa)	Core Hardness (HRC)
8.8 (covers M16 - M72)	low carbon martensite, quenched & tempered	600	830	23 - 34
9.8 or 9.8 (covers M1.6 - M16)	medium carbon steel, quenched & tempered or low carbon martensite, quenched & tempered	650	900	27 - 36
10.9 or 10.9 (covers M5 - M20, covers M5 - M36)	medium carbon or med. carbon alloy steel, quenched & tempered or low carbon martensite, quenched & tempered	830	1040	33 - 39
12.9 (covers M1.6 - M100)	alloy steel, quenched & tempered	970	1220	38 - 44

Due to embrittlement concerns, class 12.9 is not recommended unless the application and fastener fabrication process is fully reviewed. Classes 9.8 and 10.9 are not as common as 9.8 and 10.9.