

Engineering Center

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Minimum Thread Engagement (for Bolt **Failure**) - Coarse Threads

Thread Size	Nominal Diameter (mm)	Stress Area (mm ²)	Nut Material: Low Carbon Steel			Nut Material: Nodular Iron			Nut Material: A356-T6		
			Class 8.8	Class 10.9	Class 12.9	Class 8.8	Class 10.9	Class 12.9	Class 8.8	Class 10.9	Class 12.9
			(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)
M6 x 1.0	6	20.13	6.1	7.7	9.0	5.6	7.1	8.3	12.3	15.5	18.2
M8 x 1.25	8	36.61	8.3	10.5	12.3	7.7	9.6	11.3	16.8	21.1	24.8
M10 x 1.5	10	57.99	10.6	13.3	15.6	9.7	12.2	14.3	21.3	26.8	31.4
M12 x 1.75	12	84.27	12.8	16.1	18.9	11.7	14.8	17.3	25.8	32.4	38.0
M14 x 2.0	14	115.45	15.0	18.9	22.2	13.8	17.4	20.3	30.3	38.1	44.6
M16 x 2.0	16	156.68	17.9	22.5	26.3	16.4	20.6	24.2	35.9	45.2	53.0
M20 x 2.5	20	244.81	22.3	28.1	32.9	20.5	25.8	30.2	44.9	56.5	66.3
M22 x 2.5	22	303.42	25.1	31.7	37.1	23.1	29.0	34.0	50.6	63.7	74.7
M24 x 3.0	24	352.52	26.8	33.7	39.5	24.6	30.9	36.2	53.9	67.8	79.5

Minimum Thread Engagement (for Bolt **Failure**) - Fine Threads

Thread Size	Nominal Diameter (mm)	Stress Area (mm ²)	Nut Material: Low Carbon Steel			Nut Material: Nodular Iron			Nut Material: A356-T6		
			Class 8.8	Class 10.9	Class 12.9	Class 8.8	Class 10.9	Class 12.9	Class 8.8	Class 10.9	Class 12.9
			(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)
M8 x 1.0	8	39.17	8.9	11.2	13.2	8.2	10.3	12.1	18.0	22.6	26.5
M10 x 1.25	10	61.20	11.2	14.0	16.5	10.2	12.9	15.1	22.5	28.3	33.1
M12 x 1.5	12	88.13	13.4	16.9	19.8	12.3	15.5	18.1	26.9	33.9	39.8
M14 x 1.5	14	145.12	18.9	23.8	27.9	17.3	21.8	25.6	38.0	47.9	56.1
M16 x 1.5	16	167.26	19.1	24.0	28.1	17.5	22.0	25.8	38.4	48.3	56.6
M20 x 1.5	20	271.51	24.8	31.2	36.5	22.7	28.6	33.5	49.8	62.7	73.5
M22 x 1.5	22	333.07	27.6	34.8	40.7	25.3	31.9	37.4	55.5	69.9	81.9
M24 x 2.0	24	384.43	29.2	36.8	43.1	26.8	33.7	39.5	58.8	74.0	86.7

Based on the formula: $F = \pi d (.75t) S_{SY}$ where: F=Tensile force to yield screw d=Screw diameter t=Length of thread engagement
 S_{SY} =Shear strength of nut member (.58 times yield strength) Reference: Fundamentals of Machine Component Design, Juvinal/Marshek 1991