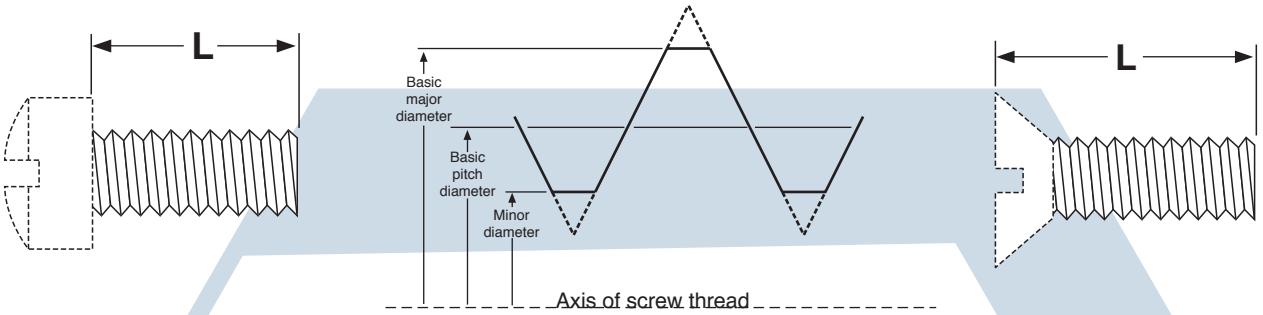
Machine Screws Thread Dimensions



2A External Threads for Machine Screws and SEMS

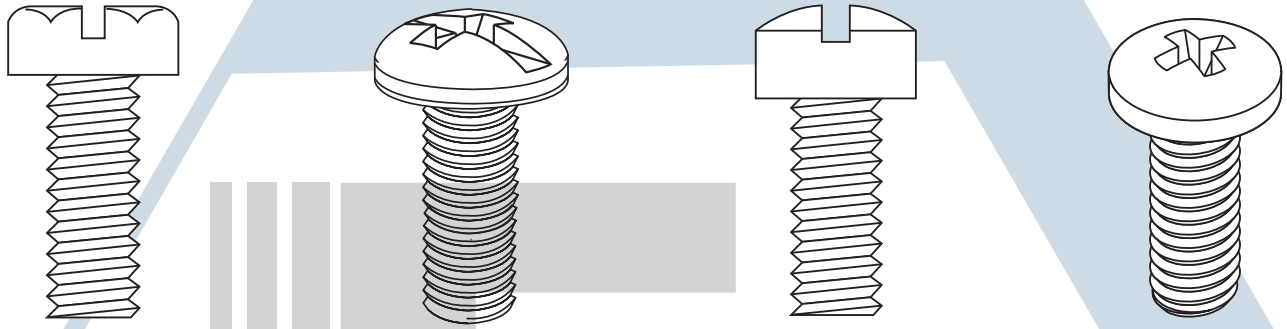
ASME B 1.1 (2002)

Nominal Size & Threads per Inch	Series Designation	Allowance	Major Diameter		Pitch Diameter			Stress Area, in²	Tensile Strength,[a] lb., min. (STEEL screws only)
			Max	Min	Max	Min	Tolerance		
0-80 0.060	UNF	.0005	.0595	.0563	.0514	.0496	.001762	0.00180	-
1-64 0.073	UNC	.0006	.0724	.0686	.0623	.0603	.001970	0.00263	-
1-72 0.073	UNF	.0006	.0724	.0689	.0634	.0615	.001899	0.00278	-
2-56 0.086	UNC	.0006	.0854	.0813	.0738	.0717	.002127	0.00370	-
2-64 0.086	UNF	.0006	.0854	.0816	.0753	.0733	.002040	0.00394	-
3-48 0.099	UNC	.0007	.0983	.0938	.0848	.0825	.002302	0.00487	-
3-56 0.099	UNF	.0007	.0983	.0942	.0867	.0845	.002191	0.00523	-
4-40 0.112	UNC	.0008	.1112	.1061	.0950	.0925	.002507	0.00604	360
4-48 0.112	UNF	.0007	.1113	.1068	.0978	.0954	.002361	0.00661	396
5-40 0.125	UNC	.0008	.1242	.1191	.1080	.1054	.002562	0.00796	470
5-44 0.125	UNF	.0007	.1243	.1195	.1095	.1070	.002484	0.00830	498
6-32 0.138	UNC	.0008	.1372	.1312	.1169	.1141	.002820	0.00909	550
6-40 0.138	UNF	.0008	.1372	.1321	.1210	.1184	.002614	0.01015	609
8-32 0.164	UNC	.0009	.1631	.1571	.1428	.1399	.002916	0.0140	850
8-36 0.164	UNF	.0008	.1632	.1577	.1452	.1424	.002804	0.01474	884
10-24 0.190	UNC	.0010	.1890	.1818	.1619	.1586	.003319	0.0175	1050
10-32 0.190	UNF	.0009	.1891	.1831	.1688	.1658	.003004	0.0200	1200
12-24 0.216	UNC	.0010	.2150	.2078	.1879	.1845	.003400	0.0242	1450
12-28 0.216	UNF	.0010	.2150	.2085	.1918	.1886	.003224	0.0258	1548
1/4-20 0.250	UNC	.0011	.2489	.2408	.2164	.2127	.003731	0.0318	1900
1/4-28 0.250	UNF	.0010	.2490	.2425	.2258	.2225	.003322	0.0364	2200
5/16-18 0.3125	UNC	.0012	.3113	.3026	.2752	.2712	.004041	0.0524	3150
5/16-24 0.3125	UNF	.0011	.3114	.3042	.2843	.2806	.003660	0.0580	3480
3/8-16 0.375	UNC	.0013	.3737	.3643	.3331	.3287	.004363	0.0775	4650
3/8-24 0.375	UNF	.0011	.3739	.3667	.3468	.3430	.003804	0.0878	5268
1/2-13 0.500	UNC	.0015	.4985	.4876	.4485	.4435	.004965	0.1419	8500
1/2-20 0.500	UNF	.0013	.4987	.4906	.4662	.4619	.004288	0.1599	9594

Tolerance on Length L	Nominal Screw Size	Nominal Screw Length			
		Up to 1/2 in., incl.	Over 1/2 to 1 in., incl.	Over 1 to 2 in., incl.	Over 2 in.
	0 thru 12	-0.02	-0.03	-0.06	-0.09
	1/4 thru 3/4	-0.03	-0.03	-0.06	-0.09

[a]Tensile strength values are based on 60,000 psi. and apply to carbon steel screws and SEMS only. Hex and Hex Washer head machine screws of sufficient length may be wedge tensile tested. Other head styles may be axial tensile tested.

Steel & Stainless Mechanical & Performance Requirements Machine Screws



Description	A straight shank fastener with external threads designed to go through a hole or nut that is pre-tapped to form a mating thread for the screw.				
Applications/ Advantages	Machine screws form a fastening superior in strength to spaced thread screws.				
	Steel	***Stainless***			***Aluminum***
	Steel Zinc is the most common and most popular variety of steel machine screws ***Steel Zinc yellow*** screws are popular in electronics applications. ***Steel Zinc Black*** and Black Oxide screws are used to blend in with black-colored components.	***18-8 Stainless steel*** machine screws are used in applications which require general atmospheric corrosion resistance, in food processing machinery and refrigeration equipment. Stainless is also superior to steel in withstanding some elevation in application operating temperature while maintaining its strength. ***316 Stainless steel*** offers superior corrosion resistance to 18-8 and is superior at maintaining its strength at high temperatures. ***410 Stainless steel*** is recommended in applications where greater tensile strength is needed such as control mechanisms or valves under high stress. 410 is not as corrosion resistant as are 18-8 or 316 stainless			In some applications, aluminum machine screws can be a less expensive alternative to stainless screws because of their resistance to corrosion and high rate of conductivity. Aluminum machine screws should be fastened with aluminum nuts to minimize the chance of galvanic corrosion.
Material	AISI 1006 - 1022 or equivalent steel.	SAE 18-8 stainless steel	316 stainless steel	410 stainless steel	2024-T4 alloy
Hardness	Rockwell B70 - B100.	Rockwell B85 - B95 (approximate)*	Rockwell B85 - B95 (approximate)*	Rockwell C34 (approximate)	-
Tensile Strength	60,000 psi. minimum.	80,000 psi. minimum (100,000 psi after cold working)*	85,000 - 140,000 psi.	180,000 psi.	62,000 psi. minimum
	Steel machine screws which have a nominal diameter smaller than #4 are not subject to tensile testing. No. 4 and No. 5 machine screws which are shorter than 1/2" are not subject to tensile testing. Steel machine screws of diameters No. 6 to 1/2" inclusive, which are shorter than either 1/2" or 3D (where D is the nominal screw size in inches) are not subject to tensile testing. Such steel machine screws of a size to be tested shall meet the tensile load requirements listed above. Tensile strength values for stainless screws are offered as approximations only; there is no single standard for the performance requirements of stainless machine screws.				
Plating	See Appendix-A for information on the plating of steel machine screws	Stainless machine screws are usually supplied plain or with a black oxide finish.			Aluminum machine screws are usually supplied without any additional finish.

*Hardness and tensile strength standards are offered as guides only for stainless machine screws. There is currently no national standard for these performance requirements for stainless machine screws.