

AMERICAN STANDARD (UNC/UNF) THREAD GEOMETRY												
Size # or in.	Threads per in.	Pitch in./rot.	Major Diameter		Top Drill (75%)		Minor Diam.		Nut ID	Str. Area	Typ. Thread Lgh	
			in.	mm	Drill †	Size	in.	mm	in.	in. ²	Bolt<6"	SHCS
#0	80	.0125	.0600	1.52	1/16	3/64	.0469	.0447	1.14	.0465	.0018	.500
#1	64	.0156	.0730	1.85	49	53	.0595	.0538	1.37	.0561	.0026	.625
#2	56	.0179	.0860	2.18	44	50	.0700	.0641	1.63	.0667	.0037	.625
#3	48	.0208	.0990	2.51	39	47	.0785	.0734	1.86	.0764	.0049	.625
#4	40	.0250	.1120	2.84	33	43	.0890	.0813	2.07	.0849	.0060	.750
#5	40	.0250	.1250	3.18	1/8	38	.1015	.0943	2.40	.0979	.0080	.750
#6	32	.0313	.1380	3.51	28	36	.1065	.0997	2.53	.1040	.0091	.750
#8	32	.0313	.1640	4.17	19	29	.1360	.1257	3.19	.1300	.0140	.875
#10	24	.0417	.1900	4.83	11	21	.1495	.1389	3.53	.1450	.0175	.875
#12	24	.0417	.2160	5.49	7/32	16	.1770	.1649	4.19	.1710	.0242	.682
1/4	20	.0500	.2500	6.35	1/4	7	.2010	.1887	4.79	.1960	.0318	.750 1.000
5/16	18	.0556	.3125	7.94	5/16	F	.2570	.2443	6.21	.2520	.0524	.875 1.125
3/8	16	.0625	.3750	9.53	3/8	U	.3320	.3239	8.23	.3300	.0878	1.000 1.250
7/16	14	.0714	.4375	11.11	7/16	Q	.3680	.3499	8.89	.3600	.1063	1.125 1.375
1/2	13	.0769	.5000	12.70	1/2	27/64	.4219	.4056	10.30	.4170	.1419	1.250 1.500
9/16	12	.0833	.5625	14.29	9/16	31/64	.4844	.4603	11.69	.4720	.1820	1.375 1.625
5/8	11	.0909	.6250	15.88	5/8	37/64	.5312	.5135	13.04	.5270	.2260	1.500 1.750

† Drill body size above equals major diameter. Increase drill size by 10% (close fit) to 20% (normal fit) using a mill. Inches times 25.36 gives mm (1 in = 25.36 mm), mm times 0.03943 gives in (1 mm = 0.03943 in), ex: 5/16" = 7.925 mm

AMERICAN STANDARD (UNC/UNF) BOLT GEOMETRY												
Size	Hex Head Wrench	Hex Head Hd Ht	Socket Head Key Size		Button Hd Hd Dia	Flat Hd (82 deg)	Set Screw Key Size	Shoulder Screw Key Size	SH Torx Key Size			
#0-80	5/32		0.050	.096	.060	0.035	0.035	0.028				
#1-64	5/32		1/16	.118	.073	0.050	0.050	0.035				
#2-56	3/16		5/64	.140	.086	0.050	0.050	0.035				
#3-48	3/16		5/64	.161	.099	1/16	1/16	0.050				
#4-40	1/4		3/32	.183	.112	1/16	1/16	0.050				T10
#5-40	5/16		3/32	.205	.125	5/64	5/64	1/16				T10
#6-32	5/16		7/64	.226	.138	5/64	5/64	1/16				T15
#8-32	11/32		9/64	.270	.164	3/32	3/32	5/64				T25
#10-24	3/8		5/32	.312	.190	1/8	1/8	3/32	1/8	1/4		T27
#12-24	7/16											
1/4-20	7/16	5/32	3/16	.375	.250	5/32	5/32	1/8	5/32	5/16		T30
5/16-18	1/2	13/64	1/4	.469	.313	3/16	3/16	5/32	3/16	3/8		T45
3/8-16	9/16	15/64	5/16	.562	.375	7/32	7/32	3/16	1/4	1/2		T50
7/16-14	9/32	3/8		.656	.438	1/4	7/32					T55
1/2-12	3/4	5/16	3/8	.750	.500	5/16	1/4	5/8				T55
9/16-12	13/16	23/64	7/16									T60
5/8-11	15/16	25/64	1/2	.938	.625	3/8	5/16	3/8	3/4			T70

Fr-lbs times 1.356 gives Nm (1 fr-lb = 12 in-lb = 1.356 Nm), Nm times 0.7375 gives fr-lbs (1 Nm = 0.7375 fr-lb = 8.851 in-lb) Ex: 60 fr-lb = 720 in-lb = 60 * 1.356 = 81.36 Nm. Ex: 34 Nm = 34 * 0.7375 = 25.08 fr-lb = 300.1 in-lb.

OMNIBUS OF FASTENER DATA

DESCRIBES DIVERS USEFUL & FASCINATING PROPERTIES OF
INFOCHIMPS.ORG
 ✦ SCREWS NUTS BOLTS AND OTHER FASTENERS ✦
 INCLUDES THE METRIC SIZES POPULAR IN PRUSSIA AND EUROPE
 DOUBLE CHECKED & COMPILED AGAINST MULTIPLE SOURCES BY OUR METICULOUS STAFF. IF IT'S IN THIS CHART, IT'S ON HERE!

DRILLING SPEEDS FOR COMMON MATERIALS										
	500	1000	1500	2000	2500	3000	3500	4000	4500	5000
Steel	>	3/8	1/4	3/16	1/8	3/16	1/8	3/16	1/8	3/16
Cast Iron	>	3/8	1/4	3/16	1/8	3/16	1/8	3/16	1/8	3/16
Plastics	>	3/8	1/4	3/16	1/8	3/16	1/8	3/16	1/8	3/16
Soft Metals	>	3/8	1/4	3/16	1/8	3/16	1/8	3/16	1/8	3/16
Wood	>	3/4-1	1/2	<1/4	carving & routing					
Glass	All									

(Treat torque vals skeptically; sources wildly disagree. Here's a conservative consensus)

UNC/UNF GENERIC TORQUE SETTINGS (FT-LBS)												
Size	Aircraft Dry, Cad		SHCS Dry Oil		Gr. 8 Dry Oil		Gr. 5 Dry Oil		Gr. 2 Dry Oil		Set Sc	
	3-4	14 11	12 9	8 6	4 3	7 6	4 3	7 6				
1/4-20	3-4	14 11	12 9	8 6	4 3	7 6	4 3	7 6				
5/16-18	8-12	29 23	25 18	17 13	9 7	14 9	7 6	14 9				
3/8-16	13-16	49 39	45 35	30 23	16 12	24 16	12 9	24 16				
7/16-14	20-21	76 61	70 55	50 35	24 17	35 24	17 13	35 24				
1/2-12	33-40	113 90	110 80	75 55	38 31	51 38	31 24	51 38				
9/16-12	42-58	163 130	150 110	110 80	52 42							
5/8-11	58-75	230 184	220 170	150 110	98 78							
1-8	92-108	255 204	240 180	180 130	115 93							

SAE Torques are in fr-lbs or in-lbs; Metric torques are in Nm!
 For clean, rolled threads; turning (not static) friction; rigid steel parts and steel nuts

METRIC THREAD GEOMETRY												
Size mm	Pitch mm/rot	Major Diameter		Top Drill (81.5%)		Minor Diam		Nut ID	Str. Area	Typ. Thread Lgh		
		mm	in.	Metric	Eqv. Eq. (in.)	Eq. (mm)	mm	in.	mm	mm ²	HHCS	SHCS
M3	0.50*	3.0	.1181	2.5	#39	.100	2.5	2.39	.094	2.46	5.0	12 18
M4	0.70*	4.0	.1575	3.3	#30	.129	3.3	3.14	.124	3.24	8.8	14 20
M5	0.80*	5.0	.1969	4.2	#19	.166	4.2	4.02	.158	4.13	14.2	16 22
M6	1.00*	6.0	.2362	5.0	#9	.196	5.0	4.77	.188	4.92	20.1	18 24
M8	1.25*	8.0	.3150	6.8	17/64	.266	6.7	6.47	.255	6.65	37	22 28
M10	1.5*	10.0	.3937	8.5	R	.339	8.6	8.16	.321	8.38	58	26 32
M12	1.75*	12.0	.4724	10.2	13/32	.406	10.3	9.85	.388	10.11	84	30 36
M14	2.00*	14.0	.5512	12.0	15/32	.469	11.9			115	34 40	
M16	2*	16.0	.6299	14.0	35/64	.547	13.9	13.55	.533	13.84	157	38 44

* An asterisk (*) indicates Metric Coarse (DIN standard) threads - the ones you usually meet.

METRIC BOLT GEOMETRY												
Size	Hex Head Wrench	Hex Head Hd Ht	Socket Head Key Size		Button Hd Hd Dia	Flat Hd (90 deg)	Set Screw Key Size	Shoulder Screw Key Size	SH Torx Key Size			
M3	5.5	2	2.5	5.5	3.0	2	2	1.5				T10
M4	7	2.8	3	7.0	4.0	2.5	2.5	2				T25
M5	8	3.5	4	8.5	5.0	3	3	2.5	3	6		T27
M6	10	4	5	10.0	6.0	4	4	3	4	8		T30
M8	13	5.3	6	13.0	8.0	5	5	4	5	10		T45
M10	17	6.4	8	16.0	10.0	6	6	5	6	12		T50
M12	19	7.5	10	18.0	12.0	8	8	6	8	16		T55
M14	22	8.8	12			10	6					T60
M16	24	10	14	24.0	16.0	10	10	8				T70

Metric tap drill size is major diameter minus pitch, truncated to first decimal. Ex: M8-1.25 = 6.75 = 6.7mm (17/64")
 Rule of thumb: A set screw is tight enough when long end of the hex key bends the distance of about one hour.

DECIMAL, SCREW, AND METRIC EQUIVALENTS													
Size	in.	mm	Size	in.	mm	Size	in.	mm	Size	in.	mm	Size	in.
1/32"	.0313	0.79	3/16"	.1875	4.76	13 mm	.5118	13					
1 mm	.0394	1	# 10	.1900	4.83	14 mm	.5512	14					
# 0	.0600	1.52	5 mm	.1969	5	9/16"	.5625	14.29					
1/16"	.0625	1.59	# 12	.2160	5.49	15 mm	.5906	15					
# 1	.0730	1.85	7/32"	.2188	5.56	5/8"	.6250	15.88					
5/64"	.0781	1.98	6 mm	.2362	6	16 mm	.6299	16					
2 mm	.0787	2	1/4"	.2500	6.35	17 mm	.6693	17					
# 2	.0860	2.18	7 mm	.2756	7	11/16"	.6875	17.46					
3/32"	.0938	2.38	9/32"	.2813	7.14	18 mm	.7087	18					
# 3	.0990	2.51	5/16"	.3125	7.94	18 mm	.7480	19					
# 4	.1120	2.84	8 mm	.3150	8	3/4"	.7500	19.05					
3 mm	.1181	3	11/32"	.3438	8.73	20 mm	.7874	20					
1/8"	.1250	3.18	9 mm	.3543	9	13/16"	.8125	20.64					
# 5	.1250	3.18	3/8"	.3750	9.53	22 mm	.8661	22					
# 6	.1380	3.51	10 mm	.3937	10	7/8"	.8750	22.23					
9/64"	.1406	3.57	11 mm	.4331	11	15/16"	.9375	23.81					
5/32"	.1563	3.97	7/16"	.4375	11.11	24 mm	.9449	24					
4 mm	.1575	4	12 mm	.4724	12	25 mm	.9843	25					
# 8	.1640	4.17	1/2"	.5000	12.70	1"	1	25.40					

PIPE			
Pipe Size	Tapered Top Drill	Straight D	Straight Tap Dr.
1/16 - 27	D	1/4	
1/8 - 27	R	11/32	
1/4 - 18	7/16	1/2	
3/8 - 18	37/64	37/64	
1/2 - 14	45/64	23/32	
5/8 - 14	59/64	59/64	
1 - 11.5	15/32	15/32	
1 1/4 - 11.5	1 1/2	1 1/2	
1 1/2 - 11.5	1 7/8	1 7/8	
2 - 11.5	2 1/8	2 1/8	
2 1/2 - 8	2 5/8	2 1/2	2 1/2
3 - 8	3 1/4		

SCREW EXTRACTORS												
Screw Extr'r	Diameter	Length	SAE Screws From	Metric Screws From	Pipe	Use Drill Size						
1	.054	5/32	2	3/16 1/4	4.8 6.4	5/64						
2	.080	3/16	2 3/8 1/4	5/16 6.4	8.0	7/64						
3	1/8	1/4	2 11/16 5/16	7/16 8.0	11.2	5/32						
4	3/16	21/64	2 7/8 7/16	9/16 11.2	14.4	1/4						
5	1/4	7/16	3 3/8 9/16	3/4 14.4	19.2	1/8, 1/4						
6	3/8	19/32	3 3/4 3/4	1 19.2	25.6	3/8"						
7	1/2	3/4	4 1/8 1 1/8	1 3								