UNIFIED MINIATURE SCREW THREADS - ASME B1.10M 2004

DIMENSIONAL DATA

Table 1 Thread Size Dimensions, Basic and Design

Size Designation	Pitch P, mm	Nominal and Basic Major Diameter, D, d, mm	Basic Pitch Diameter D_2 d_2 mm	Design Minor Diameter External Threads d - 1.145185P = d_3, mm	Design Minor Diameter Internal Threads D-0.96P, mm	Design Major Diameter Internal Threads, D+ 0.07216889, mm	Lead Angle at Basic Pitch Diameter, λ deg	min	Sectional Area at Minor Diameter, d_3, sq mm
0.30 UNM	0.080	0.300	0.248	0.208	0.223	0.306	5	52	0.034
0.35 UNM	0.090	0.350	0.292	0.247	0.264	0.356	5	37	0.048
0.40 UNM	0.100	0.400	0.335	0.285	0.304	0.407	5	26	0.064
0.45 UNM	0.100	0.450	0.385	0.335	0.354	0.457	4	44	0.088
0.50 UNM	0.125	0.500	0.419	0.357	0.380	0.509	5	26	0.100
0.55 UNM	0.125	0.550	0.469	0.407	0.430	0.559	4	51	0.130
0.60 UNM	0.150	0.600	0.503	0.428	0.456	0.611	5	26	0.144
0.70 UNM	0.175	0.700	0.586	0.500	0.532	0.713	5	26	0.196
0.80 UNM	0.200	0.800	0.670	0.571	0.608	0.814	5	26	0.256
0.90 UNM	0.225	0.900	0.754	0.642	0.684	0.916	5	26	0.324
1.00 UNM	0.250	1.000	0.838	0.714	0.760	1.018	5	26	0.400
1.10 UNM	0.250	1.100	0.938	0.814	0.860	1.118	4	51	0.520
1.20 UNM	0.250	1.200	1.038	0.914	0.960	1.218	4	23	0.656
1.40 UNM	0.300	1.400	1.205	1.056	1.112	1.422	4	32	0.877

GENERAL NOTES

(a) Sizes shown in bold type are preferred. It is recommended that selection be confined to these sizes insofar as possible.

(b) For inch conversion of Table 1, see Table 2

Table 2 Limits of Size and Tolerances

		External Threads,mm								Internal Threads,mm							
								Minor Diamter								Major Diameter	
Size Designation	Pitch P, mm	Major Diameter Max.	Major Diameter Min.	Major Diameter Tol.	Pitch Diameter Max.	Pitch Diameter Min.	Pitch Diameter Tol.	Max.	Min. [Not (1)]	Minor Diameter Min.	Minor Diameter Max.	Minor Diameter Tol.	Pitch Diameter Min	Pitch Diameter Max	Pitch Diameter Tol	Min.	Max. [Note (1)]
0.30 UNM	0.080	0.300	0.284	0.016	0.248	0.234	0.014	0.208	0.187	0.223	0.261	0.038	0.248	0.262	0.014	0.306	0.327
0.35 UNM	0.090	0.350	0.333	0.017	0.292	0.277	0.015	0.247	0.225	0.264	0.305	0.041	0.292	0.307	0.015	0.356	0.379
0.40 UNM	0.100	0.400	0.382	0.018	0.335	0.319	0.016	0.285	0.261	0.304	0.348	0.044	0.355	0.351	0.016	0.407	0.432
0.45 UNM	0.100	0.450	0.432	0.018	0.385	0.369	0.016	0.335	0.311	0.354	0.398	0.044	0.385	0.401	0.016	0.457	0.482
0.50 UNM	0.125	0.500	0.479	0.021	0.419	0.401	0.018	0.357	0.329	0.380	0.432	0.052	0.419	0.437	0.018	0.509	0.538
0.55 UNM	0.125	0.550	0.529	0.021	0.469	0.451	0.018	0.407	0.379	0.430	0.482	0.052	0.469	0.487	0.018	0.559	0.588
0.60 UNM	0.150	0.600	0.576	0.024	0.503	0.483	0.020	0.428	0.396	0.456	0.516	0.060	0.503	0.523	0.020	0.611	0.644
0.70 UNM	0.175	0.700	0.673	0.027	0.586	0.564	0.022	0.500	0.464	0.532	0.600	0.068	0.586	0.608	0.022	0.713	0.750
0.80 UNM	0.200	0.800	0.770	0.030	0.670	0.646	0.024	0.571	0.531	0.608	0.684	0.076	0.670	0.694	0.024	0.814	0.856
0.90 UNM	0.225	0.900	0.867	0.033	0.754	0.728	0.026	0.642	0.598	0.684	0.768	0.084	0.754	0.780	0.026	0.916	0.962
1.00 UNM	0.250	1.000	0.964	0.036	0.838	0.810	0.028	0.714	0.666	0.760	0.852	0.092	0.838	0.866	0.028	1.018	1.068
1.10 UNM	0.250	1.100	1.064	0.036	0.938	0.910	0.028	0.814	0.766	0.860	0.952	0.092	0.938	0.966	0.028	1.118	1.168

1.20 UNM	0.250	1.200	1.164	0.036	1.038	1.010	0.028	0.914	0.866	0.960	1.052	0.092	1.038	1.066	0.028	1.218	1.268
1.40 UNM	0.300	1.400	1.358	0.042	1.205	1.173	0.032	1.056	1.000	1.112	1.220	0.108	1.205	1.237	0.032	1.422	1.480

GENERAL NOTES

(a) Sizes shown in bold type are preferred. It is recommended that selection be confined to these sizes insofar as possible.

(b) For inch coversion of Table 2, see Table 1

NOTE:

(1) Dimension is used in the design of tools. Generally, diameter acceptance is based upon maximum material condition gaging.

Table 3 Thread Form Formulas

Element	Symbol	Formula
Basic Thread Form		
Angle of thread	2*a*	60 deg
Half angle of thread	*a*	30deg
Pitch of thread	P	...
Height of sharp V thread	*H*	0.8660254P
Addendum of basic thread	h_{ab}	0.3247595*P* (0.375*H)*
Height of basic thread	h_b	0.4800*P* (0.554*H)*
Design Form - External Thread		
Addendum	h_{as}	0.3247595*P* (0.375*H*)
Height	h_s	0.5725907*P* (0.661*H*)
Flat at crest	F_{cs}	0.12500*P*
Radius at root	r_{rs}	0.1851815*P*
Design Form - Internal Thread		
Height of engagement	h_e	0.4800*P* (0.554*H*)
Height of thread	h_n	0.4800P (0.554H)
Flat at crest	F_{en}	0.3207437*P*
Radius at root	r_m	0.0721688*P*

GENERAL NOTE: For standardization, this tabular listing of thread values has been established based on a function of pitch, *P*. The thread values based on a functional height, *H* , are used as reference only.

Table 4 Thread Form Dimensions, Basic and Design

		Basic Thread Form,mm		External Thread Design Form,mm			Internal Thread Design Form,mm		
	Height of Sharp V,	Height of Internal Thread and Depth of Thread Engagement, $h_b =$	Dedendum of Internal Thread and Addendum of External Thread, $h_{as} =$	Height $h_s =$	Flat at Crest, $F_{cs} =$	Radius at Root, r_{ra}	Rounded Root Height,	Flat at Crest, $F_{cn} =$	Radius at Root, $r_m =$
Pitch, *P*	*H* = 0.8660254*P*	(0.554*H*) 0.4800*P*	(0.375*H*) 0.3247595*P*	(0.661*H*) 0.5725907*P*	0.12500*P*	0.1851815*P*	(0.596*H)* 0.5160844*P*	0.3207437*P*	0.0721688*P*

0.080	0.06928	0.03840	0.02598	0.04581	0.0100	0.015	0.04129	0.0257	0.006
0.090	0.07794	0.04320	0.02923	0.05153	0.0113	0.017	0.04645	0.0289	0.006
0.100	0.08660	0.04800	0.03248	0.05726	0.0125	0.019	0.05161	0.0321	0.007
0.125	0.10825	0.06000	0.04059	0.07157	0.0156	0.023	0.06451	0.0401	0.009
0.150	0.12990	0.07200	0.04871	0.08589	0.0188	0.028	0.07741	0.0481	0.011
0.175	0.15155	0.08400	0.05683	0.10020	0.0219	0.032	0.09031	0.0561	0.013
0.200	0.17321	0.09600	0.06495	0.11452	0.0250	0.037	0.10322	0.0641	0.014
0.225	0.19486	0.10800	0.07307	0.12883	0.0281	0.042	0.11612	0.0722	0.016
0.250	0.21651	0.12000	0.08119	0.14315	0.0313	0.046	0.12902	0.0802	0.018
0.300	0.25981	0.14400	0.09743	0.17178	0.0375	0.056	0.15483	0.0962	0.022

GENERAL NOTES

(a) For standardization, this listing of tabulated thread values has been established based on a function of pitch, *P* . The thread values based on a functional height, *H*, are used as reference only.

(b) For inch conversion of Table 4, see Table 1

Table 5 Thread Size Formulas, Basic and Design

Dimensions	Symbol	Formula [Note(1)]
Major diameter, design and basic	*D* bsc, *d* bsc	
Major diameter of external thread, design	*d*	*d* bsc
Major diameter of internal thread, design	*D*	$Dbsc + r_m = Dbsc + 0.0721688P$
Pitch diameter, basic	$D_2bsc,$ d_2bsc	$D_2bsc = Dbsc - 2h_{ab} = Dbsc - 0.6495191P$ $d_2bsc = dbsc - 2h_{ab} = dbsc - 0.6495191P$
Pitch diameter of external thread, design	d_2	d_2bsc
Pitch diameter of internal thread, design	D_2	D_2bsc
Minor diameter, basic	$D_1bsc,$ d_1bsc	$D_1bsc = Dbsc - 2h_{ab} = dbsc - 0.6495191P$
Minor diameter of external thread, design	d_1	$dbsc - 2h_s = dbsc - 1.1451815P$
Minor diameter of internal thead, design	D_1	$Dbsc - 2h_n = dbsc - 0.9600P$

Table 6 Tolerance Formulas for Limits of Size

Dimension	Formula
External thread, major diameter	0.1200*P* + 0.006
External thread, pitch diameter	0.0800*P* + 0.008
External thread, minor diameter [Note (1)]	0.1600*P* + 0.008
Internal thread, major diameter [Note (1)]	0.1680*P* + 0.008
Internal thread, pitch diameter	0.0800*P* + 0.008
Internal thread, minor diameter	0.3200*P* + 0.012

NOTE:

(1) Tolerance is used in the design of tools