



THREAD CHECK INC.

PRECISION GAGE SOLUTIONS

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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 External Threads $d - 1.145185P = d_s$, mm	Design Minor Internal Threads $D - 0.96P, D_1$, mm	Design Major Diameter Internal Threads, $D + 0.07216889P$, mm	Lead Angle at Basic Pitch Diameter, λ , deg	Sectional Area at Minor Diameter, d_s , sq mm
0.30 UNM	0.080	0.300	0.248	0.208	0.223	0.306	5	0.034
0.35 UNM	0.090	0.350	0.292	0.247	0.264	0.356	5	0.048
0.40 UNM	0.100	0.400	0.335	0.285	0.304	0.407	5	0.064
0.45 UNM	0.100	0.450	0.385	0.335	0.354	0.457	4	0.088
0.50 UNM	0.125	0.500	0.419	0.357	0.380	0.509	5	0.100
0.55 UNM	0.125	0.550	0.469	0.407	0.430	0.559	4	0.130
0.60 UNM	0.150	0.600	0.503	0.428	0.456	0.611	5	0.144
0.70 UNM	0.175	0.700	0.586	0.500	0.532	0.713	5	0.196
0.80 UNM	0.200	0.800	0.670	0.571	0.608	0.814	5	0.256
0.90 UNM	0.225	0.900	0.754	0.642	0.684	0.916	5	0.324
1.00 UNM	0.250	1.000	0.838	0.714	0.760	1.018	5	0.400
1.10 UNM	0.250	1.100	0.938	0.814	0.860	1.118	4	0.520
1.20 UNM	0.250	1.200	1.038	0.914	0.960	1.218	4	0.656
1.40 UNM	0.300	1.400	1.205	1.056	1.112	1.422	4	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

Size Designation	Pitch P , mm	External Threads, mm								Internal Threads, mm							
		Major Diameter			Pitch Diameter			Minor Diameter		Minor Diameter			Pitch Diameter			Major Diameter	
		Max.	Min.	Tol.	Max.	Min.	Tol.	Max.	Min. [Not (1)]	Min.	Max.	Tol.	Min.	Max.	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 conversion 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	$2a$	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}	$0.3247595P$ ($0.375H$)
Height of basic thread	h_b	$0.4800P$ ($0.554H$)
Design Form - External Thread		
Addendum	h_{as}	$0.3247595P$ ($0.375H$)
Height	h_s	$0.5725907P$ ($0.661H$)
Flat at crest	F_{cs}	$0.12500P$
Radius at root	r_{rs}	$0.1851815P$
Design Form - Internal Thread		
Height of engagement	h_e	$0.4800P$ ($0.554H$)
Height of thread	h_n	$0.4800P$ ($0.554H$)
Flat at crest	F_{en}	$0.3207437P$
Radius at root	r_m	$0.0721688P$

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

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	$D_{bsc} + r_m = D_{bsc} + 0.0721688P$
Pitch diameter, basic	D_2, d_2	$D_2, d_2 = D_{bsc} - 2h_{ab} = D_{bsc} - 0.6495191P$
Pitch diameter of external thread, design	d_2	d_2, d_{bsc}
Pitch diameter of internal thread, design	D_2	D_2, d_{bsc}
Minor diameter, basic	D_1, d_1	$D_1, d_1 = D_{bsc} - 2h_{ab} = d_{bsc} - 0.6495191P$
Minor diameter of external thread, design	d_1	$d_{bsc} - 2h_s = d_{bsc} - 1.1451815P$
Minor diameter of internal thread, design	D_1	$D_{bsc} - 2h_n = d_{bsc} - 0.9600P$

Table 6 Tolerance Formulas for Limits of Size

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

NOTE:

(1) Tolerance is used in the design of tools