

# Acme - The Transversal Motion Thread

## General Purpose

With clearance on all diameters for free movement, general purpose Acmes are used for a wide variety of parts including all types of vise and jack screws where holding major diameter is not a critical consideration.

Three classes of thread fit tolerances are available: 2G, 3G and 4G. Basic Acme dimensions are given in accompanying tables.

## Centralizing

Centralizing Acmes have limited clearance at the major diameter of screw and nut and are used extensively for feed screws. The limited clearance enables a bearing at the major diameter to maintain alignment of the thread axis preventing wedging on the flanks and part sagging.

Five classes are used: 2C, 3C, 4C, 5C, and 6C. Classes 5C and 6C are designed to allow limited backlash, though some backlash will be experienced with any of these classes.

Differences between General Purpose and Centralizing threads are found by referring to the limiting dimensions and tolerances. For example, while a 1/2" diameter, 10 pitch Class 3 General Purpose thread has a .5000" maximum major diameter and .4950" minimum for a tolerance of .0050" - the similar Centralizing Acme has a tolerance of .0011" - the similar Centralizing Acme has a .5000" major O.D. and a minimum major of .4989" for a major diameter tolerance of just .0011". Tolerances for the pitch and minor diameters are the same for both General Purpose and Centralizing Acmes of the same diameter and pitch.

## Types of Acme Threads

ACME FORM BASIC DIMENSIONS

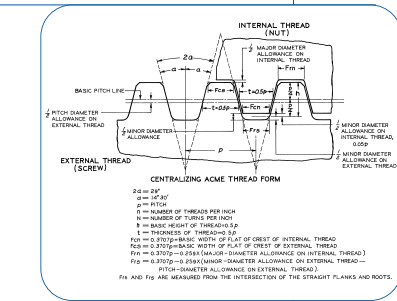
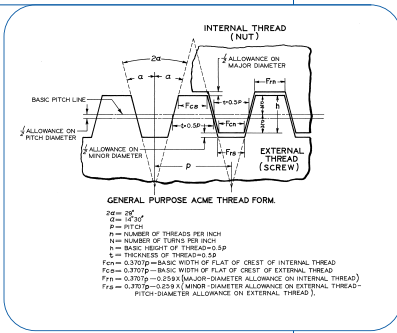
Threads Per Inch.	Pitch P	Depth of thread (basic) h=p/2	Total depth of thread (all screws)	Thread thickness (basic) t	Width of flat		45° chamfer, crest of centralizing screws		Fillet radius at minor diameter of centralizing screws		
					Root of nut <sup>1</sup> Fm=0.3707p-0.259x allowance <sup>a</sup>	Minimum depth 0.05p	Minimum width of flat 0.0707p	Maximum fillet radius of centralizing tapped hole, 0.06p	Minimum classes 5 and 6 only, 0.07p	Maximum all classes 0.10p	
1	2	3	4	5	6	7	8	9	10	11	12
16	.06250	0.03125	0.0362	0.03125	0.0232	0.0206	0.0031	0.0044	0.004	0.0044	0.0062
14	.07143	.03571	.0407	.03571	.0265	.0239	.0036	.005	.004	.0050	.0071
12	.08333	.04167	.0467	.04167	.0309	.0283	.0042	.006	.005	.0058	.0083
10	.10000	.05000	.0600	.05000	.0371	.0319	.0050	.007	.006	.0070	.0100
8	.12500	.06250	.0725	.06250	.0463	.0411	.0062	.009	.0075	.0088	.0125
6	.16667	.08333	.0933	.08333	.0618	.0566	.0083	.012	.010	.0117	.0167
5	.20000	.10000	.1100	.10000	.0741	.0689	.0100	.014	.012	.0140	.0200
4	.25000	.12500	.1350	.12500	.0927	.0875	.0125	.018	.015	.0175	.0250
3	.33333	.16667	.1767	.16667	1.236	.1184	.0167	.024	.020	.0233	.0333
2-1/2	.40000	.20000	.2100	.20000	1.483	1.431	.020	.028	.024	.0280	.0400
2	.50000	.25000	.2600	.25000	1.853	1.802	.025	.035	.030	.0350	.0500

<sup>1</sup>Values tabulated in column 7 are for the general purpose nut only. The basic width of flat at the root screw. Fm is equal to value for Fm in column 7 minus .0259 times the pitch diameter allowance.

<sup>a</sup>For allowance see table XII. 4, column 3 in Screw Thread Standards For Federal Services, Handbook H-28 (1957) Part III.

## GENERAL PURPOSE AND CENTRALIZING ACME TOLERANCES

Identification	Basic diameters											
	General purpose and centralizing classes 2, 3, and 4						Centralizing, classes 5 and 6			Thread data		
Nominal sizes (all classes)	Threads Per Inch.	Major diameter.	Pitch diameter.	Minor diameter.	Major diameter.	Pitch diameter.	Minor diameter.	Pitch P	Thread thickness at pitch line, t	Basic depth of thread h=0.5p	Basic width of flat, F=0.3707p	
1	2	3	4	5	6	7	8	9	10	11	12	
Inch	Inch	Inch	Inch	Inch	Inch	Inch	Inch	Inch	Inch	Inch	Inch	
1/4	16	0.2500	0.2188	0.1875	—	—	—	0.06250	0.03152	0.03125	0.0232	
5/16	14	.3125	.2768	.2411	—	—	—	.07143	.03571	.03571	.0265	
3/8	12	.3750	.3333	.2917	—	—	—	.08333	.04167	.04167	.0309	
7/16	12	.4375	.3958	.3542	—	—	—	.08333	.04167	.04167	.0309	
1/2	10	.5000	.4500	.4000	.4823	.4323	.3823	1.0000	.05000	.05000	.0371	
5/8	8	.6250	.5265	.5000	.6052	.5427	.4802	1.2500	.06250	.06250	.0463	
3/4	6	.7500	.6667	.5833	.7284	.6451	.5617	1.6667	.08333	.08333	.0618	
7/8	6	.8750	.7917	.7083	.8516	.7683	.6849	1.6667	.08333	.08333	.0618	
1	5	1.0000	.9000	.8000	.9750	.8750	.7750	2.0000	.10000	.10000	.0741	
1-1/8	5	1.1250	1.0250	.9250	1.0985	.9985	.8985	2.0000	.10000	.10000	.0741	
1-1/4	5	1.2500	1.1500	1.0500	1.2220	1.1220	1.0220	2.0000	.10000	.10000	.0741	
1-3/8	4	1.3750	1.2500	1.1250	1.3457	1.2207	1.0957	2.5000	.12500	.12500	.0927	
1-1/2	4	1.5000	1.3750	1.2500	1.4694	1.3444	1.2194	2.5000	.12500	.12500	.0927	
1-3/4	4	1.7500	1.6250	1.5000	1.7169	1.5919	1.4669	2.5000	.12500	.12500	.0927	
2	4	2.0000	1.8750	1.7500	1.9646	1.8396	1.7146	2.5000	.12500	.12500	.0927	
2-1/4	3	2.2500	2.0833	1.9167	2.2125	2.0458	1.8792	3.3333	.16667	.16667	.1236	
2-1/2	3	2.5000	2.3333	2.1667	2.4605	2.2938	2.1272	3.3333	.16667	.16667	.1236	
2-3/4	3	2.7500	2.5833	2.4167	2.7085	2.5418	2.3752	3.3333	.16667	.16667	.1236	
3	2	3.0000	2.7500	2.5000	2.9567	2.7067	2.4567	5.0000	2.5000	2.5000	.1853	
4	2	4.0000	3.7500	3.5000	3.9500	3.7000	3.4500	5.0000	2.5000	2.5000	.1853	
5	2	5.0000	4.7500	4.5000	4.9441	4.6941	4.4441	5.0000	2.5000	2.5000	.1853	



- General Purpose
- Centralizing
- Thread Designation
- Stub Acme
- Modified Stub Acme
- M1/M2 Stub Acme Forms
- Misc. Special Dia.



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## Modified Stub Acme Threads

Recognizing that the Standard Stub Acme does not always provide an accepted thread for all applications, basic data for two other commonly used forms have been tabulated. These are designated Modified Forms 1 and 2. Always use the Standard Stub Acme form in preference to the Modified forms where it is practical.

Where a fit with less backlash is needed, the tolerances and allowances for General Purpose threads can be used to determine limiting dimensions for mating threads. For special designs, allowances and tolerances can be taken directly from the Standard Stub Acme threads.

Therefore, the major diameter and basic thread thickness at the pitch line for both external and internal threads will be the same as those for Standard Stub Acmes.

Pitch and minor diameters will vary from the data shown in Table IV for the following:

For Modified Form 1, (M1) - the pitch and minor diameters will be smaller than similar values for the standard form.

For Modified Form 2, (M2) - the pitch and minor diameters will be larger than the values for the standard form.

Modified Stub Acmes are designated as follows:

1/2" -20 Stub Acme M1 indicates a Modified Form 1 right hand thread.

Changing M1 to M2 changes the designation to a Modified Form 2 thread.

Adding LH after M1 or M2 (e.g. 1/2 - 20 Stub Acme - M1 - LH) changes the designation from a right to a left hand thread.

## M1 AND M2 STUB ACME THREAD FORMS, BASIC DIMENSIONS

Threads Per Inch, n	Pitch, P	Height of thread (basic), h=0.375p	Total height of thread hs=h+1/2 allowance	Thread thickness (basic), t=p/2	Width of flat at crest of internal thread (basic), Fcn=0.4030p	Threads per inch, n	Pitch P	Height of thread (basic), h=0.250p	Total height of thread hs=h+1/2 allowance	Thread thickness (basic), t=p/2	Width of flat at crest of internal thread (basic), Fcn=0.4353p	
											Inch	Inch
16	0.06250	0.02344	0.0284	0.03125	0.0252	16	0.06250	0.01563	0.0206	0.03125	0.0272	
14	0.07143	0.02679	0.0318	0.03572	0.0288	14	0.07143	0.01786	0.0229	0.03571	0.0311	
12	0.08333	0.03125	0.0363	0.04167	0.0336	12	0.08333	0.02083	0.0258	0.04167	0.0363	
10	0.10000	0.03750	0.0475	0.05000	0.0403	10	0.10000	0.02500	0.0350	0.5000	0.0435	
9	0.11111	0.04167	0.0517	0.05556	0.0448	9	0.11111	0.02778	0.0378	0.05556	0.0484	
8	0.12500	0.04688	0.0569	0.06250	0.0504	8	0.12500	0.03125	0.0413	0.06250	0.0544	
7	0.14286	0.05357	0.0636	0.07143	0.0576	7	0.14286	0.03571	0.0457	0.07143	0.0622	
6	0.16667	0.06250	0.0725	0.08333	0.0672	6	0.16667	0.04167	0.0517	0.8333	0.0726	
5	0.20000	0.07500	0.0850	0.10000	0.0806	5	0.20000	0.05000	0.0600	0.10000	0.0871	
4	0.25000	0.09375	0.1038	0.12500	0.1008	4	0.25000	0.06250	0.0725	0.12500	0.1088	
3-1/2	0.28571	0.10714	0.1171	0.14286	0.1151	3-1/2	0.28571	0.7143	0.0814	0.14286	0.1244	
3	0.33333	0.12500	0.1350	0.16667	0.1343	3	0.33333	0.08333	0.0933	0.16667	0.1451	
2-1/2	0.40000	0.15000	0.1600	0.20000	0.1612	2-1/2	0.40000	0.10000	0.1100	0.20000	0.1741	
2	0.50000	0.18750	0.1975	0.25000	0.2015	2	0.50000	0.12500	0.1350	0.25000	0.2177	
1-1/2	0.66667	0.25000	0.2600	0.33333	0.2687	1-1/2	0.66667	0.16667	0.1767	0.33333	0.2902	
1-1/3	0.75000	0.28125	0.2913	0.37500	0.3023	1-1/3	0.75000	0.18750	0.1975	0.37500	0.3265	
1	1.00000	0.37500	0.3850	0.50000	0.4030	1	1.00000	0.25000	0.2600	0.50000	0.4353	

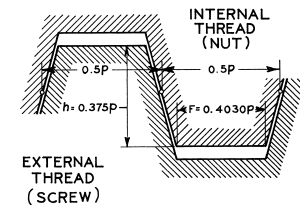
\*Allowance is shown in table XIII. 3, column 4 in Screw-Thread Standards for Federal Services, Handbook H-28, part III.

## Special Diameter/Pitches

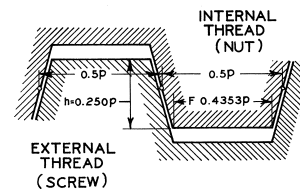
While standard series for Acme threads have been established, information on a wide range of special diameter and pitch combinations (with corresponding tolerances for special applications) is available from Landis Threading Systems.

Standard Acmes can be produced with a die head on diameters ranging from 1/2 to 4".

Acmes larger than 4" can also be threaded if finer pitches are involved.



Modified Form 1 Stub Acme thread with basic height of 0.375 pitch.



Modified Form 2 Stub Acme thread with basic height of 0.25 pitch.