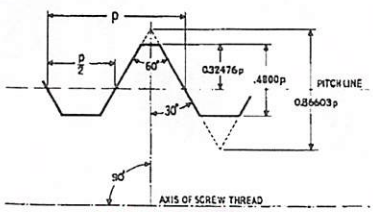
MORRIS Precision Miniature Threads

UNIFIED MINIATURE SCREW THREADS (All dimensions in inches)**

	SIZE DESIGNATION — Preferred *		0.30UNM		0.40UNM		0.50UNM		0.60UNM		0.80UNM		1.00UNM		1.20UNM	
				0.35UNM		0.45UNM		0.55UNM		0.70UNM		0.90UNM		1.10UNM		1.40UNM*
BASIC DIMENSIONS	BASIC MAJOR DIAMETER—D		0.0118	0.0138	0.0157	0.0177	0.0197	0.0217	0.0236	0.0276	0.0315	0.0354	0.0394	0.0433	0.0472	0.0551
	BASIC PITCH DIAMETER—E		0.0098	0.0115	0.0132	0.0152	0.0165	0.0185	0.0198	0.0231	0.0264	0.0297	0.0330	0.0369	0.0409	0.0474
	BASIC MINOR DESIGN DIAMETER		SAME AS MAXIMUM MINOR DIAMETER ON EXTERNAL THREADS AND MINIMUM MINOR DIAMETER ON INTERNAL THREADS													
	THREADS PER INCH		318	282	254	254	203	203	169	145	127	113	102	102	102	85
	LEAD ANGLE AT BASIC P.D.—(λ)		5° 52′	5° 37′	5° 26′	4° 44′	5° 26′	4° 51′	5° 26′	5° 26′	5° 26′	5° 26′	5° 26′	4° 51′	4° 23′	4° 32′
EXTERNAL THREADS	MAJOR DIAMETER	Max.	0.0118	0.0138	0.0157	0.0177	0.0197	0.0217	0.0236	0.0276	0.0315	0.0354	0.0394	0.0433	0.0472	0.0551
		Min.	0.0112	0.0131	0.0150	0.0170	0.0189	0.0208	0.0227	0.0265	0.0303	0.0341	0.0380	0.0419	0.0458	0.0535
	PITCH DIAMETER	Max.	0.0098	0.0115	0.0132	0.0152	0.0165	0.0185	0.0198	0.0231	0.0264	0.0297	0.0330	0.0369	0.0409	0.0474
		Min.	0.0092	0.0109	0.0126	0.0145	0.0158	0.0178	0.0190	0.0222	0.0254	0.0287	0.0319	0.0358	0.0397	0.0462
	MINOR DIAMETER	Max.	0.0082	0.0097	0.0112	0.0132	0.0141	0.0160	0.0169	0.0197	0.0225	0.0253	0.0281	0.0320	0.0360	0.0416
		Min.	0.0074	0.0089	0.0103	0.0122	0.0130	0.0149	0.0156	0.0183	0.0209	0.0235	0.0262	0.0302	0.0341	0.0394
INTERNAL THREADS	MINOR DIAMETER	Max.	0.0103	0.0120	0.0137	0.0157	0.0170	0.0190	0.0203	0.0236	0.0269	0.0302	0.0335	0.0375	0.0414	0.0480
		Min.	0.0088	0.0104	0.0120	0.0139	0.0150	0.0169	0.0180	0.0209	0.0239	0.0269	0.0299	0.0339	0.0378	0.0438
	PITCH DIAMETER	Max.	0.0103	0.0121	0.0138	0.0158	0.0172	0.0192	0.0206	0.0239	0.0273	0.0307	0.0341	0.0380	0.0420	0.0487
		Min.	0.0098	0.0115	0.0132	0.0152	0.0165	0.0185	0.0198	0.0231	0.0264	0.0297	0.0330	0.0369	0.0409	0.0474
	MAJOR DIAMETER ****	Max.	0.0129	0.0149	0.0170	0.0190	0.0212	0.0231	0.0254	0.0295	0.0337	0.0379	0.0420	0.0460	0.0499	0.0583
		Min.	0.0120	0.0140	0.0160	0.0180	0.0200	0.0220	0.0241	0.0281	0.0320	0.0361	0.0401	0.0440	0.0480	0.0560
HOLE SIZE BEFORE TAPPING	LENGTHS OF ENGAGEMENT ⅔D	Max.	0.0095	0.0111	0.0127	0.0147	0.0158	0.0178	0.0190	0.0221	0.0252	0.0283	0.0314	0.0354	0.0393	0.0455
		Min.	0.0089	0.0105	0.0121	0.0141	0.0150	0.0170	0.0181	0.0211	0.0241	0.0270	0.0300	0.0340	0.0379	0.0439
	⅔—1½D	Max.	0.0100	0.0117	0.0134	0.0154	0.0166	0.0186	0.0198	0.0231	0.0263	0.0295	0.0327	0.0367	0.0406	0.0471
		Min.	0.0093	0.0109	0.0125	0.0145	0.0156	0.0176	0.0187	0.0217	0.0248	0.0279	0.0309	0.0349	0.0388	0.0450
	1½—3D***	Max.	0.0104	0.0121	0.0138	0.0158	0.0171	0.0191	0.0204	0.0237	0.0270	0.0304	0.0337	0.0376	0.0415	0.0481
		Min.	0.0096	0.0113	0.0130	0.0149	0.0161	0.0181	0.0193	0.0224	0.0256	0.0287	0.0319	0.0358	0.0397	0.0460

* It is recommended that selections be confined to preferred sizes insofar as possible.
**ASME Standard B1.10M-2004 also lists metric equivelents which are interchangeable in assembly with inches.
*** It is not recommended that holes deeper than 3D be used. In tougher materials, use shallowest holes possible.
****For reference only, not gaged. Use max. diameter of external thread as min. gage O. D.



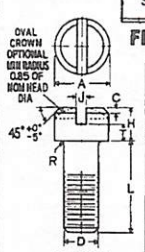
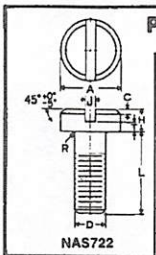
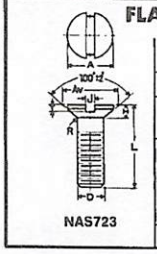
BASIC THREAD FORM

BASIC THREAD FORM FORMULAS

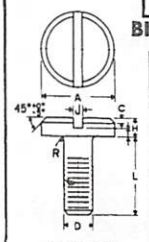
Element	Symbol	Formula (a)
Angle of thread	2∝	60°
Half angle of thread	∝	30°
Pitch of thread	P	--
No. of threads per inch (a)	n	25.4/p (mm)
Height of sharp V thread	H	0.86603p
Addendum of basic thread	h_{ab}	0.32476p
Height of basic thread	h_b	0.48P

(a) Metric units (millimeters) apply in all formulas.

MINIATURE SCREWS (All dimensions in inches)**

	SIZE DESIGNATION — Preferred *		.30UNM		.40UNM		.50UNM		.60UNM		.80UNM		1.00UNM		1.20UNM	
				.35UNM		.45UNM		.55UNM		.70UNM		.90UNM		1.10UNM		1.40UNM
 NAS721	**FILLISTER HEAD**															
	HEAD DIAMETER—A	Max.	0.021	0.023	0.025	0.029	0.033	0.037	0.041	0.045	0.051	0.056	0.062	0.072	0.082	0.092
		Min.	0.019	0.021	0.023	0.027	0.031	0.035	0.039	0.043	0.049	0.054	0.058	0.068	0.078	0.088
	HEAD HEIGHT—H	Max.	0.012	0.014	0.016	0.018	0.020	0.022	0.025	0.028	0.032	0.036	0.040	0.045	0.050	0.055
		Min.	0.010	0.012	0.013	0.015	0.017	0.019	0.021	0.024	0.028	0.032	0.035	0.040	0.045	0.050
	SLOT WIDTH—J	Max.	0.004	0.004	0.005	0.005	0.006	0.006	0.008	0.008	0.010	0.010	0.012	0.012	0.016	0.016
		Min.	0.003	0.003	0.003	0.003	0.004	0.004	0.005	0.005	0.007	0.007	0.008	0.008	0.012	0.012
	SLOT DEPTH—T(a)	Max.	0.006	0.007	0.008	0.009	0.010	0.011	0.012	0.014	0.016	0.018	0.020	0.022	0.025	0.028
		Min.	0.004	0.005	0.006	0.007	0.007	0.008	0.009	0.011	0.012	0.014	0.016	0.018	0.020	0.023
	CHAMFER—C	Max.	0.002	0.002	0.002	0.002	0.003	0.003	0.004	0.004	0.005	0.005	0.006	0.006	0.008	0.008
	RADIUS—R(b)	Max.	0.002	0.002	0.002	0.002	0.002	0.002	0.003	0.003	0.004	0.004	0.005	0.005	0.006	0.006
 NAS722	**PAN HEAD**															
	HEAD DIAMETER—A	Max.	0.025	0.029	0.033	0.037	0.041	0.045	0.051	0.056	0.062	0.072	0.082	0.092	0.103	0.113
		Min.	0.023	0.027	0.031	0.035	0.039	0.043	0.049	0.054	0.058	0.068	0.078	0.088	0.097	0.107
	HEAD HEIGHT—H	Max.	0.010	0.011	0.012	0.014	0.016	0.018	0.020	0.022	0.025	0.028	0.032	0.036	0.040	0.045
		Min.	0.008	0.009	0.010	0.012	0.013	0.015	0.017	0.019	0.021	0.024	0.028	0.032	0.035	0.040
	SLOT WIDTH—J	Max.	0.005	0.005	0.006	0.006	0.008	0.008	0.010	0.010	0.012	0.012	0.016	0.016	0.020	0.020
		Min.	0.003	0.003	0.004	0.004	0.005	0.005	0.007	0.007	0.008	0.008	0.012	0.012	0.015	0.015
	SLOT DEPTH—T(a)	Max.	0.005	0.006	0.006	0.007	0.008	0.009	0.010	0.011	0.012	0.014	0.018	0.018	0.020	0.022
		Min.	0.003	0.004	0.004	0.005	0.006	0.007	0.007	0.008	0.009	0.011	0.014	0.014	0.016	0.018
	CHAMFER—C	Max.	0.002	0.002	0.002	0.002	0.003	0.003	0.004	0.004	0.005	0.005	0.006	0.006	0.008	0.008
	RADIUS—R(b)	Max.	0.002	0.002	0.002	0.002	0.002	0.002	0.003	0.003	0.004	0.004	0.005	0.005	0.006	0.006
 NAS723	**FLAT HEAD (100 DEG.)**															
	HEAD DIAMETER—A	Max.	0.023	0.025	0.029	0.033	0.037	0.041	0.045	0.051	0.056	0.062	0.072	0.082	0.092	0.103
		Min.	0.021	0.023	0.027	0.031	0.035	0.039	0.043	0.049	0.054	0.058	0.068	0.078	0.088	0.097
	AV. DIA. at MAX—H		0.0285	0.0305	0.0348	0.0392	0.0459	0.0503	0.0546	0.0610	0.0696	0.0759	0.0847	0.0957	0.1068	0.1195
	HEAD HEIGHT—H	Max.	0.007	0.007	0.008	0.009	0.011	0.012	0.013	0.014	0.016	0.017	0.019	0.022	0.025	0.027
		Min.	0.005	0.005	0.006	0.007	0.008	0.009	0.010	0.011	0.012	0.013	0.015	0.018	0.020	0.022
	SLOT WIDTH—J	Max.	0.004	0.004	0.005	0.005	0.006	0.006	0.008	0.008	0.010	0.010	0.012	0.012	0.016	0.016
		Min.	0.003	0.003	0.003	0.003	0.004	0.004	0.005	0.005	0.007	0.007	0.008	0.008	0.012	0.012
	SLOT DEPTH—T	Max.	0.004	0.004	0.005	0.005	0.006	0.006	0.008	0.008	0.010	0.010	0.012	0.012	0.016	0.016
		Min.	0.002	0.002	0.003	0.003	0.004	0.004	0.005	0.005	0.006	0.006	0.008	0.008	0.010	0.010
	RADIUS—R(b)	Max.	0.005	0.005	0.006	0.006	0.008	0.008	0.010	0.010	0.012	0.012	0.016	0.016	0.020	0.020

(cont.) MINIATURE SCREWS (All dimensions in inches)**



NAS724

SIZE DESIGNATION Preferred *		.40UNM	.45UNM	.50UNM	.55UNM	.60UNM	.70UNM	.80UNM	.90UNM	1.00UNM	1.10UNM	1.20UNM	1.40UNM
BINDING HEAD													
HEAD DIAMETER—A	Max.	0.041	0.045	0.051	0.056	0.062	0.072	0.082	0.092	0.103	0.113	0.124	0.144
	Min.	0.039	0.043	0.049	0.054	0.058	0.068	0.078	0.088	0.097	0.107	0.116	0.136
HEAD HEIGHT—H	Max.	0.010	0.011	0.012	0.014	0.016	0.018	0.020	0.022	0.025	0.028	0.032	0.036
	Min.	0.008	0.009	0.010	0.012	0.013	0.015	0.017	0.019	0.021	0.024	0.028	0.032
SLOT WIDTH—J	Max.	0.006	0.006	0.008	0.008	0.010	0.010	0.012	0.012	0.016	0.016	0.020	0.020
	Min.	0.004	0.004	0.005	0.005	0.007	0.007	0.008	0.008	0.012	0.012	0.015	0.015
SLOT DEPTH—T(a)	Max.	0.005	0.006	0.006	0.007	0.008	0.009	0.010	0.011	0.012	0.014	0.016	0.018
	Min.	0.003	0.004	0.004	0.005	0.006	0.007	0.007	0.008	0.009	0.011	0.012	0.014
CHAMFER—C	Max.	0.002	0.002	0.003	0.003	0.004	0.004	0.005	0.005	0.006	0.006	0.008	0.008
RADIUS—R	Max.	0.004	0.004	0.004	0.004	0.006	0.006	0.008	0.008	0.010	0.010	0.012	0.012
	Min.	0.002	0.002	0.002	0.002	0.003	0.003	0.004	0.004	0.005	0.005	0.006	0.006

* It is recommended that selections be confined to preferred sizes insofar as possible.
** ASA Standard B1.10-1958 also lists metric equivelents which are interchangeable in assembly with inches.
(a) Slot Depth "T" measured from bearing surface.
(b) Radius "R" relative to max. major dia.
There is no standard for nuts available or under consideration at the present time.

STANDARD LENGTHS (C)

Length (In.) Max.	Length (In.) Min.	(d).30UNM* (e) (0.0118)	.35UNM* (0.0138)	.40UNM (0.0157)	.45UNM (0.0177)	.50UNM (0.0197)	.55UNM (0.0217)	.60UNM (0.0236)	.70UNM (0.0276)	.80UNM (0.0315)	.90UNM (0.0354)	1.00UNM (0.0394)	1.10UNM (0.0433)	1.20UNM (0.0472)	1.40UNM (0.0551)
0.020	0.016	**30-020**													
0.025	0.021	**30-025**	35-025	**40-025**											
0.032	0.027	**30-032**	35-032	**40-032**	45-032	**50-032**									
0.040	0.035	**30-040**	35-040	**40-040**	45-040	**50-040**	55-040	**60-040**							
0.050	0.044	**30-050**	35-050	**40-050**	45-050	**50-050**	55-050	**60-050**	70-050	**80-050**					
0.060	0.054	**30-060**	35-060	**40-060**	45-060	**50-060**	55-060	**60-060**	70-060	**80-060**	90-060	**100-060**			
0.080	0.072	**30-080**	35-080	**40-080**	45-080	**50-080**	55-080	**60-080**	70-080	**80-080**	90-080	**100-080**	110-080	**120-080**	
0.100	0.092	**30-100**	35-100	**40-100**	45-100	**50-100**	55-100	**60-100**	70-100	**80-100**	90-100	**100-100**	110-100	**120-100**	140-100
0.120	0.110	**30-120**	35-120	**40-120**	45-120	**50-120**	55-120	**60-120**	70-120	**80-120**	90-120	**100-120**	110-120	**120-120**	140-120
0.160	0.150	30-160	35-160	**40-160**	45-160	**50-160**	55-160	**60-160**	70-160	**80-160**	90-160	**100-160**	110-160	**120-160**	140-160
0.200	0.188		35-200	40-200	45-200	**50-200**	55-200	**60-200**	70-200	**80-200**	90-200	**100-200**	110-200	**120-200**	140-200
0.250	0.238				45-250	50-250	55-250	**60-250**	70-250	**80-250**	90-250	**100-250**	110-250	**120-250**	140-250
0.320	0.304						55-320	60-320	70-320	**80-320**	90-320	**100-320**	110-320	**120-320**	140-320
0.400	0.384								70-400	80-400	90-400	**100-400**	110-400	**120-400**	140-400
0.500	0.480										90-500	100-500	110-500	**120-500**	140-500
0.600	0.580												110-600	120-600	140-600

(c) Bold face type indicates preferred sizes. (d) Size Designation (e) Basic Major Diam.

Standard lengths in all sizes are available in Fillister, Pan, 100° Flat, and Binding Heads with the following exceptions:

***BINDING HEADS HAVE NO STANDARD LENGTHS IN 30 AND 35 UNM.**

GREEN SHADING
Figures in this area are standard only for Fillister, Pan, and Binding (except 30 & 35 UNM Binding) Heads. Not standard for 100° Flat.

GREEN FIGURES (30-160, etc)
Standard for 100° Flat Head only.

Above lengths are considered standard only and do not imply stock availability from j. i. morris co. See page 8 for stock items.

MANUFACTURING SPECIFICATIONS

DEPTH OR SLOT: Slot depth on Fillister, Pan and Binding Head screws is measured from the bearing surface to the intersection of the slot with the head diameter. Slots of heads with a conical bearing surface are measured parallel with the axis of the screw from the flat top surface to the intersection of the slot bottom with the bearing surface. Maximum slot concavity shall not exceed 3% of the mean head diameter.

BEARING SURFACE: shall be at right angles to the axis of the body with 2° on Fillister, Pan and Binding screws.

ECCENTRICITY: Heads shall be concentric with the body within 2% of max. head diam. or .001", whichever is greater. Slots shall be central to the screw body within 5% of the nominal body diameter.

UNDERHEAD FILLETS: radius of the Fillet on perpendicular bearing surface type heads shall not exceed 1/2 times the pitch of the thread. On conical type heads this shall not exceed twice the pitch.

UNTHREADED DIAMETER: shall not exceed the maximum major diameter or be less than the minimum pitch diameter of thread.

LENGTH: shall be measured from the bearing surface to the extreme end of the screw parallel with the axis except conical which are measured from the top surface to the end of the screw. Preferred lengths are noted above.

LENGTH OF THREAD: On screws having a length of less than four times the nominal body diameter, threads shall be full within two of the head. Longer screws shall have minimum complete threads equal to four body diameters. the end of the thread shall be normally flat with a 45o chamfer to the minor diameter of the thread as a minimum depth.

MACHINED FINISH: shall not exceed AA63. Screws furnished to NAS Standard Parts shall be free of projecting burrs under 3X magnification.

NAS DESIGNATIONS AND MATERIAL SPECIFICATIONS

MATERIAL:
Corrosion Resistant Steels: Federal Specification QQ-S-763
Class 303 Cond A. **Class 416** Cond A., Heat treat to approx. 120,000-150,000 PSI (Rockwell C28-34)
Class 420 Cond A., Heat treat to approx. 240,000-260,000 PSI (Rockwell C50-53)
Brass: Federal Specification QQ-B-626, Comp 4, temper half hard
Nickel Silver: Federal Specification QQ-C-586, Comp 4, temper hard

APPLIED COATINGS:
Corrosion Resistant Steels: Passivate per Federal Specification FF-S-85
Brass: Bare, Black Oxide or Nickel Flash
Nickel Silver: None

NAS DESIGNATIONS:
Add **CE** before dash number for passivated #303SS Screws
Add **CK** before dash number for passivated #416SS Screws
Add **CW** before dash number for passivated #420SS Screws
Add **B** before dash number and **P** after for Plain Brass
Add **B** before dash number and **K** after for Brass Black Oxide
Add **B** before dash number and **W** after for Brass Nickel Plate
Add **E** before dash number and **P** after for plain Nickel Silver

Example:

NAS722B100-120P

NAS722	B	100-120	P
(basic number-head type) Pan Head Screws	(material) Brass	(size & length-dash number) 100UNM (.0394-102 x .120" long)	(finish) Plain

Data on UNIFIED MINIATURE SCREW THREADS was extracted from ASA B1. 10-1958 and data on MINIATURE SCREWS from ASA B18.11-1961 with permission from the publisher, The American Society of Mechanical Engineers, 29 West 39th Street, New york 18, New York. NAS data was reproduced from the applicable standards copyright 1958 with permission of the publisher, Aerospace Industries Association of America, 610 Shoreham Building, Washington 5, D. C.