PRODUCTION TAPPING SOLUTIONS

Foolproof results developed over five generations.

AEROSPACE TAPS

JARVIS CUTTING TOOLS

119 YEARS
OF EXPERIENCE IN EVERY TOOL

Since 1901, Jarvis Cutting Tools has been a catalyst for quality and inspired innovation in the cutting tool industry while remaining a family owned company.

◆

Throughout the generations our mission has always been to deliver the best possible tool for the application with the best possible customer service and support.

◆

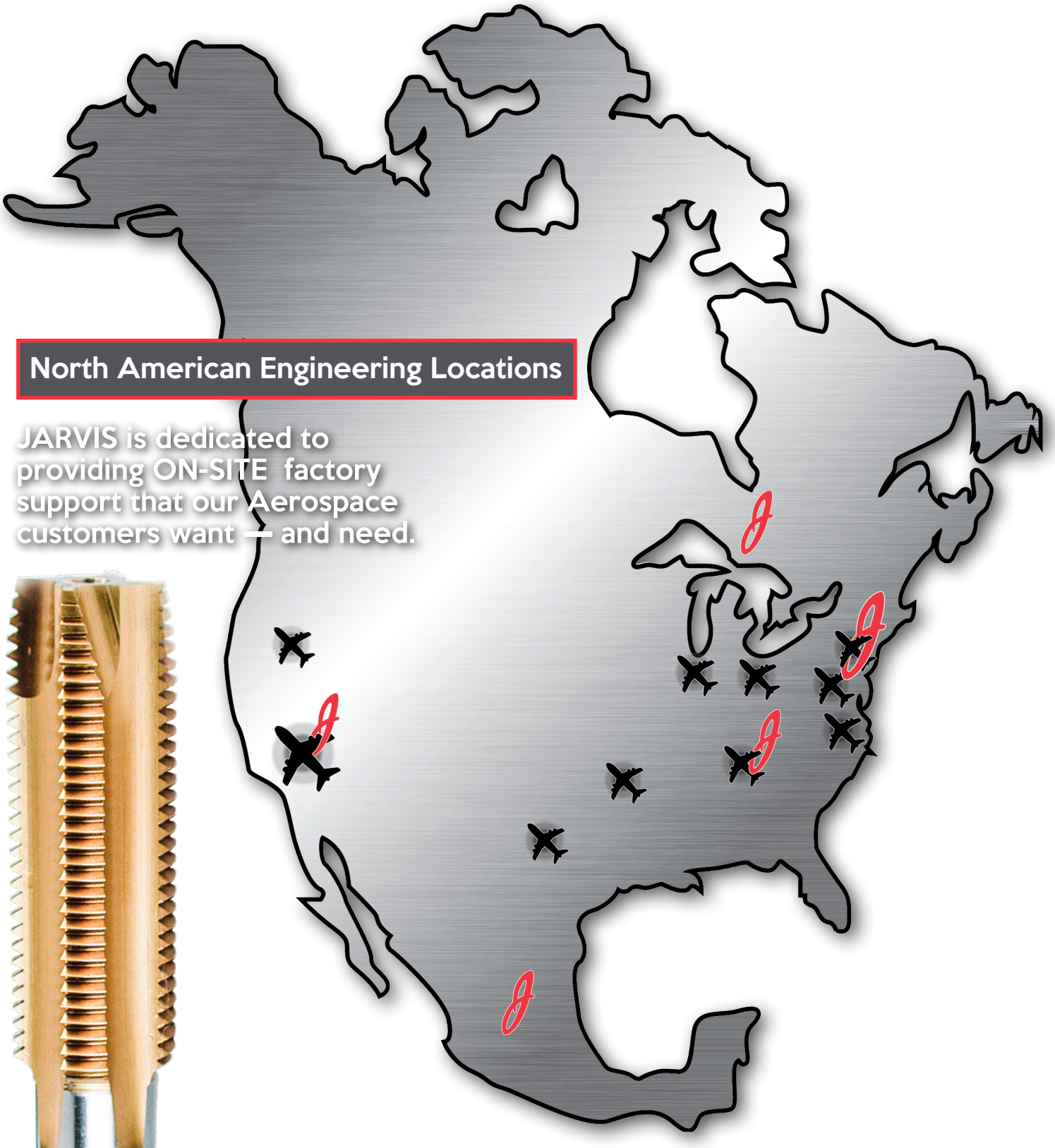
Customers choose Jarvis for our superior tool performance and for the true partnership we are able to provide as a domestic tap source. Our accessibility, engineering expertise and on-site support is unmatched.

99.4%
ORDER ACCEPTANCE RATE

95%
ON TIME DELIVERY

NEARLY 0%
CUSTOMER CHURN

WE BELIEVE IN SHOWING UP FOR YOU. PERIOD.



North American Engineering Locations

JARVIS is dedicated to providing ON-SITE factory support that our Aerospace customers want — and need.

A286 FASTENERS

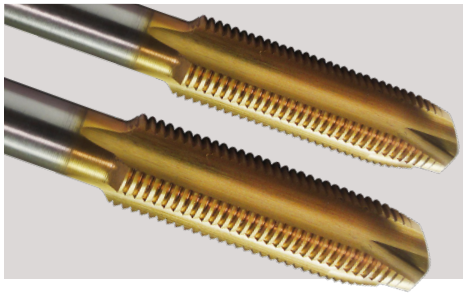
The new and improved Jarhook is the best available tap for A286 fasteners. During extensive testing the Jarhook surpassed all of the competition in tool life and tapping speed. The data speaks for itself, in a controlled test the 10-32 Jarhook achieved an average tool life of 1200 holes at a speed of 1000 RPM in A286 6 point nuts. This outperformed the competition at this speed by over 30%.

DAVENPORT TAPS

Jarvis offers high performance nib taps for tapping on Davenport machines. These taps are available as nibs alone or as a welded assembly of the nib and the shank. The nib tap can be custom made to accommodate any thread length necessary for the application. Jarvis has extensive experience making short thread length spiral pointed nib taps along with long chamfer straight fluted nib taps.

COLLARS

Jarvis has extensive experience tapping collars in a variety of materials ranging from Aluminum to Titanium 6Al 4V. This experience has assisted in the development of the optimum cutting geometries for these material specific applications.

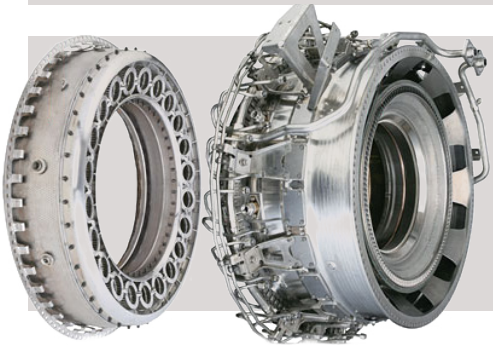


LOCKING THREADS

Locking threads are common on a number of aerospace applications. Unfortunately most of the tap manufacturers making these locking thread form taps only offer a general purpose tap. Jarvis offers material specific Jarlock taps for the aerospace market. Some of the material we work with are Inconel 718, Waspaloy, Titanium 6AL 4V, etc. We guarantee that these taps will work with Spiralok® gages.

MULTI-LEAD TAPS

Jarvis offers both multi-lead cut and form taps for the aerospace market. Some multi-lead applications we are familiar with are Inconel Inserts and A286 panel fasteners. Our material specific multi-lead taps will outperform the competition every day of the week.



JET ENGINE HOUSING

Jarvis excels in tapping 718 Inconel in any condition. One example is our exceptional tool life in tapping engine components made from Inconel 718 super alloy that has gone through the HIP process. These engines components can be found on your general commercial airline. Jarvis has tapped holes in components of the new F-35 fighter jet engine. We successfully increased the customers tool life by 300% in a proprietary super alloy.

BLIND HOLE APPLICATIONS

Jarvis offers the highest performance SPFL taps on the market. Using a wide range of spiral flute helixes and cutting geometries we can solve any blind hole problem you may come across.

CHIP MANAGEMENT

Effectively controlling the direction of the chip is essential for tool and machine up-time. Whether you are tapping a standard length fastener or a long-barreled fastener, Jarvis has designs to insure that the chips are released by the taps and you do not experience “pull back”. Jarvis also has developed solutions to evacuate chips from counter bored parts. If your operators are modifying taps, contact Jarvis for factory ground solutions.

MAXIMIZE SPEED

Jarvis has the answer to maximizing tapping speed and optimizing cycle times. We offer:
- High Performance Surface Treatments
- Free Cutting Geometries
- Proprietary Geometry
- Ground Male Center Taps for shorter tap throw

SPECIAL REQUIREMENTS

Jarvis custom manufactures taps for all special and exotic requirements. Some of the features we offer are:
- CMD
- Coolant Through
- Left Hand
- Nib Taps
- Radius Crest
- Special Thread Forms
- Tapered Threads


JARTUFF
JARHOOK
JARTANIUM
JARTEK

PERFORMANCE ENGINEERED TAPS FOR AEROSPACE AND SPECIALTY FASTENER APPLICATIONS

More information on our Aerospace Taps and their features are on the next page.

	GOOD	BETTER	BEST
4140/8740		JARTEK	JARHOOK
STAINLESS STEEL (303, 304, 316)		JARTEK	JARHOOK
17-4PH			JARHOOK
A286 SOFT (>31RC)		JARTEK	JARHOOK
A286 HARD (>32RC)	JARHOOK	JARTEK	JARTUFF
WASPALOY		JARTEK	JARTUFF
INCO 718 (SOLUTION TREATED)		JARTUFF	INCOHOOK
INCO 718 (AGED)		INCOHOOK	JARTUFF
TITANIUM 6AL4V (GRADE 5)			JARTANIUM
TITANIUM 3AL2.5V			JARHOOK
ALUMINUM	JARTEK		JARHOOK

JARTEK

General Purpose Tap

Y | PHSS | TiN | 4-5 PLG | P

JARHOOK

Works Excellent on A286 Fasteners

Y | PHSSX | TiCN | 4-5 PLG | P

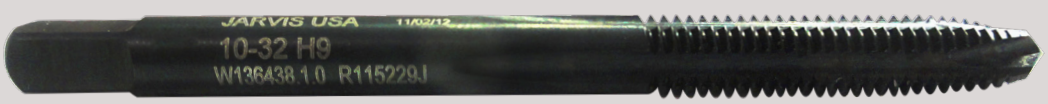
JARTUFF

Excellent for HIgh Hardness Applications

Y | PHSS | PHSSX | TiN | 4-5 PLG | P

JARTANIUM

The Best for 6AL-4LV Fasteners



PHSSX | OX | 4-5 PLG

TOOL MATERIALS:

PHSS — Premium High Speed Steel

PHSSX — Ultra Premium High Speed Steel

SURFACE TREATMENTS:

TiN — TiN Coating

TiCN — TiCN Coating

OX — Oxide Coating

BR — Bright

CRN — Chromium Nitride

N — Nitride Coating

DLC — Diamond Like Coating

NANO — Titanium Aluminum Nitride

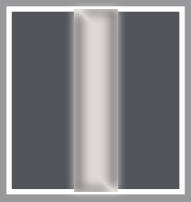
P — Multi-layer Aluminum P Coating

CR/OX — Chrome Plate / Oxide Coating

Y — Multi-layer Aluminum Y Coating

TOOL DIMENSIONS:

4-5 PLG — Plug / 4-5 Threads



Thru Hole

UNJ vs. UN THREADS

The UNJ thread standard (ASME B1.15) defines a system of threads for highly stressed applications requiring high fatigue strength. It was derived from a military specification (MIL-S-8879) originally published in December 1965. MIL-S-8879 was primarily thought of an used for aerospace fastener and threaded component applications. Due to the increase in both its use and types of applications, the American Society of Mechanical Engineers developed and published ASME B1.15 in 1995.

Form. UNJ screw threads are the same form as Unified Screw Threads to ASME/ANSI B1.1 except:

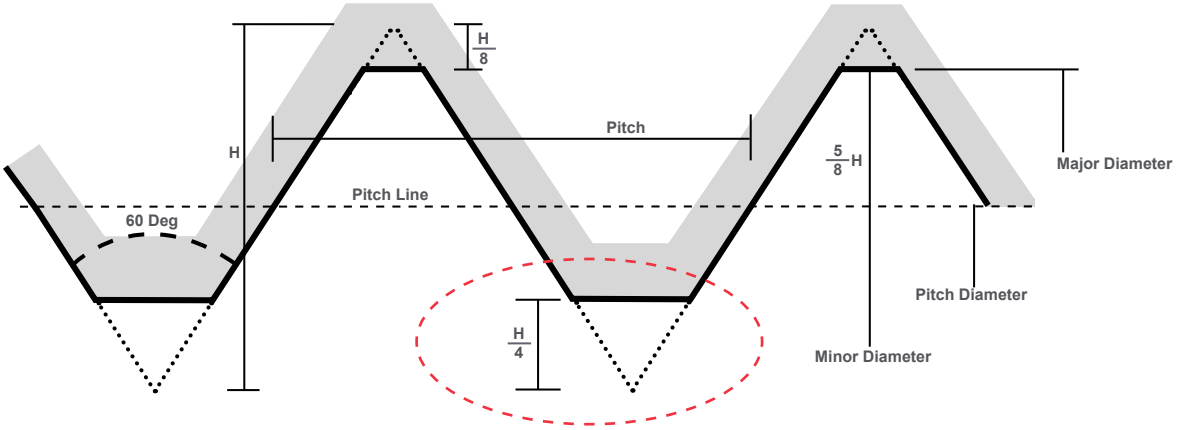
External threads: the root has a maximum and minimum prescribed continuous radius, and is not merely rounded due to tool wear.

Internal threads: the minor diameter is increased to accommodate the maximum root radius of the external thread. There is no radius requirement for either the crest or the root of the internal thread.

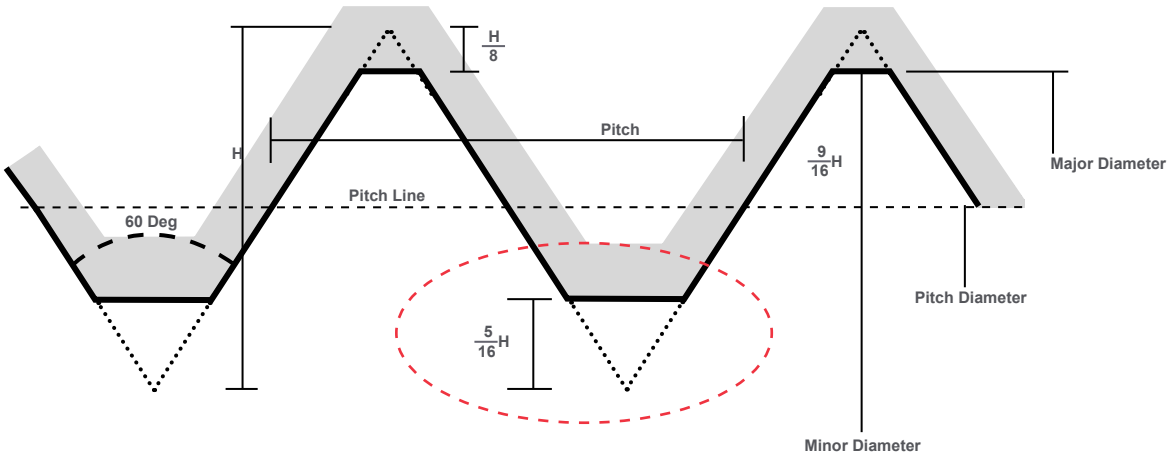
Designation. UNJ product threads are identified by the letter "J" in the thread symbol, and a thread class symbol including an "A" for external threads or a "B" for internal threads. Use of Unified Tooling. Many of the UNJ thread form characteristics are the same as for a UN threads. Therefore, some of the tooling used to produce one form can be used to produce the other.

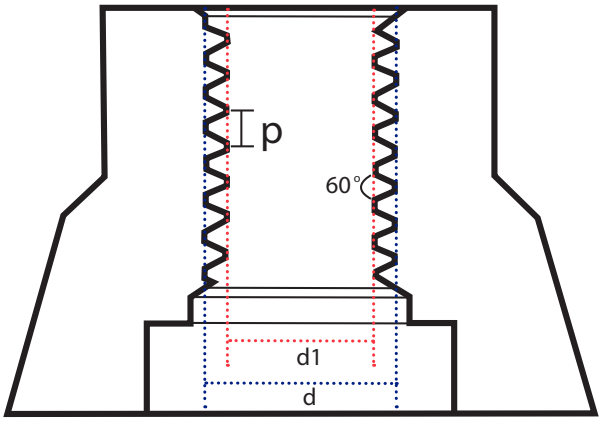
External UNJ threads must be produced with a prescribed root radius; therefore, standard Unified Screw Thread (UN) may not be used. **Internal UNJ threads** are not required to have a root radius; therefore, ground-thread taps designed to produce Unified Screw Threads of the proper class of fit may be used. The letter "J" need not be marked on the tap. The larger product minor diameter of the UNJ internal thread requires the use of a larger tap drill than is used when producing Unified Screw Threads.[1]

PROFILE OF UNC/UNF INTERNAL SCREW THREAD



PROFILE OF UNJC/UNF INTERNAL SCREW THREAD





UNJC - UNIFIED COARSE THREAD SAE ASD8879D

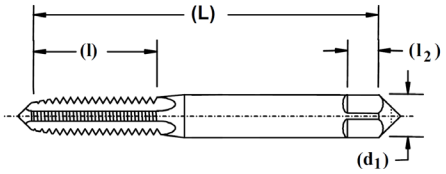
Normal Size (inch) D	P (T.P.I)	Minor Diameter of the Internal Thread (D1) min (inch)	max (inch)	Recommended Drill Size Drill Size	Decimal Inch
No. 4 (0.112)	40	0.0877	0.0942	2.30mm	0.0906
No. 5 (0.125)	40	0.1007	0.1072	2.60mm	0.1024
No. 6 (0.138)	32	0.1076	0.1157	#33	0.1130
No. 8 (0.164)	32	0.1336	0.1417	3.50mm	0.1378
No. 10 (0.190)	24	0.1494	0.1600	3.90mm	0.1535
No. 12 (0.216)	24	0.1754	0.1852	4.60mm	0.1811
1/4 (0.250)	20	0.2013	0.2121	5.30mm	0.2087
5/16 (0.313)	18	0.2584	0.2690	6.70mm	0.2638
3/8 (0.375)	16	0.3141	0.3250	8.10mm	0.3189
7/16 (0.438)	14	0.3680	0.3795	9.50mm	0.3740
1/2 (0.500)	13	0.4251	0.4368	10.90mm	0.4291
9/16 (0.563)	12	0.4814	0.4914	31/64”	0.4844
5/8 (0.625)	11	0.5365	0.5474	13.80mm	0.5433
3/4 (0.750)	10	0.6526	0.6646	16.75mm	0.6594
7/8 (0.875)	9	0.7668	0.7801	19.60mm	0.7717
1 (1.000)	8	0.8783	0.8933	22.50mm	0.8858

UNJF - UNIFIED THREAD SAE ASD8879D

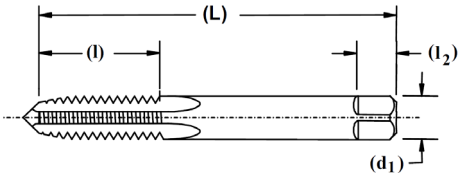
Normal Size (inch) D	P (T.P.I)	Minor Diameter of the Internal Thread (D1) min (inch)	max (inch)	Recommended Drill Size Drill Size	Decimal Inch
No. 4 (0.112)	48	0.0917	0.0971	2.40mm	0.0945
No. 5 (0.125)	44	0.1029	0.1088	2.70mm	0.1063
No. 6 (0.138)	40	0.1137	0.1202	3.00mm	0.1181
No. 8 (0.164)	36	0.1370	0.1442	#28	0.1405
No. 10 (0.190)	32	0.1596	0.1675	4.20mm	0.1654
No. 12 (0.216)	28	0.1812	0.1896	#13	0.1850
1/4 (0.250)	28	0.2152	0.2229	7/32”	0.2188
5/16 (0.313)	24	0.2719	0.2799	7.00mm	0.2756
3/8 (0.375)	24	0.3344	0.3417	8.60mm	0.3386
7/16 (0.438)	20	0.3888	0.3970	10.00mm	0.3937
1/2 (0.500)	20	0.4513	0.4591	11.60mm	0.4567
9/16 (0.563)	18	0.5084	0.5166	13.00mm	0.5118
5/8 (0.625)	18	0.5709	0.5788	14.60mm	0.5748
3/4 (0.750)	16	0.6892	0.6977	17.60mm	0.6929
7/8 (0.875)	14	0.8055	0.8152	13/16”	0.8125
1 (1.000)	12	0.9189	0.9289	59/64”	0.9219

STANDARD TAP DIMENSIONS

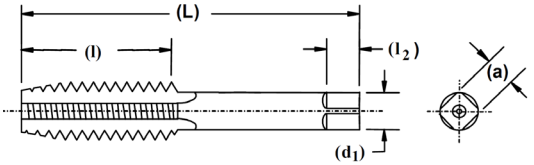
GROUND THREAD



Blank Design 1



Blank Design 2



Blank Design 3

Nominal Diameter Range - Inches		Tap Dimensions - Inches								
Over	To (Inc.)	Machine Screw Size No.	Nominal Fractional Diameter Inches	Nominal Metric Diameter Millimeters (Inches)	Blank Design Number	Overall Length **L**	Thread Length **l**	Square Length l_2	Shank Diameter d_1	Size fo Square **a**
.052	.065	0(.0600)		M1.6 (.0630)	1	1.63	.31	.19	.1410	.110
.065	.078	1 (.0730)		M1.8 (.0709)	1	1.69	.38	.19	.1410	.110
.078	.091	2 (.0860)		M2 (.0787); M2.2 (.0866)	1	1.75	.44	.19	.1410	.110
.091	.104	3 (.0990)		M2.5 (.0984)	1	1.81	.50	.19	.1410	.110
.104	.117	4 (.1120)			1	1.88	.56	.19	.1410	.110
.117	.130	5 (.1250)		M3 (.1181)	1	1.94	.63	.19	.1410	.110
.130	.145	6 (.1380)		M3.5 (.1378)	1	2.00	.69	.19	.1410	.110
.145	.171	8 (.1640)		M4 (.1575)	1	2.13	.75	.25	.1680	.131
.171	.197	10 (.1900)		M4.5 (.1772); M5 (.1969)	1	2.38	.88	.25	.1940	.152
.197	.223	12 (.2160)			1	2.38	.94	.28	.2200	.165
.223	.260		1/4 (.2500)	M6 (.2362)	2	2.50	1.00	.31	.2550	.191
.260	.323		5/16 (.3125)	M7 (.2756); M8 (.3150)	2	2.72	1.13	.38	.3180	.238
.323	.395		3/8 (.3750)	M10 (.3937)	2	2.94	1.25	.44	.3810	.286
.395	.448		7/16 (.4375)		3	3.16	1.44	.41	.3230	.242
.448	.510		1/2 (.5000)	M12 (.4724)	3	3.38	1.66	.44	.3670	.275
.510	.573		9/16 (.5625)	9/16 (.5625)	3	3.59	1.66	.50	.4290	.322
.573	.635		5/8 (.6250)	M16 (.6299)	3	3.81	1.81	.56	.4800	.360
.635	.709		11/16 (.6875)	M18 (.7087)	3	4.03	1.81	.63	.5420	.406
.709	.760		3/4 (.7500)		3	4.25	2.00	.69	.5900	.442
.760	.823		13/16 (.8125)	M20 (.7874)	3	4.47	2.00	.69	.6520	.489
.823	.885		7/8 (.8750)	M22 (.8661)	3	4.69	2.22	.75	.6970	.523
.885	.948		15/16 (.9375)	M24 (.9449)	3	4.91	2.22	.75	.7600	.570
.948	1.010		1 (1.0000)	M25 (.9843)	3	5.13	2.50	.81	.8000	.600

TAPPING SPEEDS

CONVERSION CHART

Surface Ft.	5	10	15	20	25	30	35	40	50	60	70	80	90	100	120	130	150
Tap Size	Revolutions Per Minute (RPM)																
6 .1380	138	276	415	555	690	830	970	1105	1385	1660	1935	2315	2490	2765	3320	3595	4150
8 .1640	116	233	350	465	580	700	815	930	1165	1395	1630	1865	2095	2330	2795	3030	3495
10 .1900	100	201	300	400	500	605	705	805	1005	1205	1405	1610	1810	2010	2410	2615	3015
12 .2160	88	177	265	355	440	530	620	705	885	1060	1240	1415	1590	1770	2120	2300	2650
¼ .2500	76	153	230	305	380	460	535	610	765	915	1070	1220	1375	1530	1835	1985	2230
5/16 .3125	61	122	185	245	305	365	425	490	610	735	855	980	1100	1220	1465	1590	1835
3/8 .3125	51	102	155	205	255	305	355	410	510	610	715	815	915	1220	1325	1465	1530
7/16 .4375	44	87	130	175	220	260	305	350	435	525	610	700	785	875	1050	1135	1310
½ .5000	38	76	115	155	190	230	270	305	380	460	535	610	690	765	915	995	1145
9/16 .5325	34	68	100	135	170	205	240	270	340	405	475	545	610	680	815	885	1020
5/8 .6250	31	61	90	125	155	185	215	245	305	365	430	490	550	610	735	795	915
¾ .7500	25	51	75	100	125	155	180	205	225	305	355	410	460	510	610	660	765
7/8 .8750	23	44	66	87	109	131	153	175	219	262	306	349	392	438	526	585	655
1 .0000	19	38	57	76	95	115	134	153	191	229	267	306	344	382	458	497	573

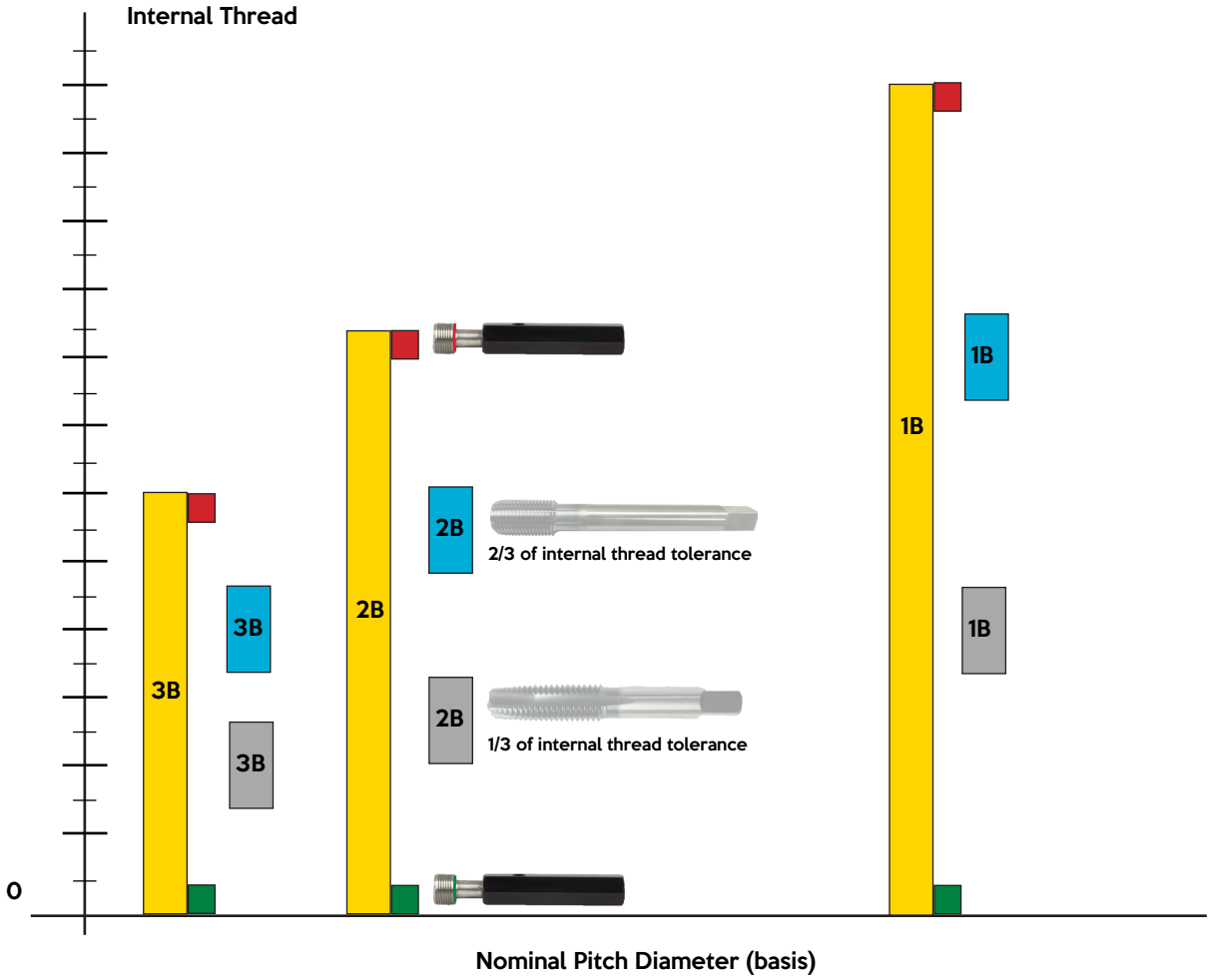
Formula: RPM = $\dfrac{\textbf{3.82 x Surface feet per minute}}{\textbf{Diameter}}$

Metric Sizes - Apply the Formula

Metalforming Taps (Jarflo's) may be run at 1 1/2 to 2 times faster than cutting taps.

TOLERANCE ZONES

PITCH DIAMETER LOCATION



Pitch diameter tolerance of the internal thread ASME B1.1

Pitch diameter tolerance of the cut tap

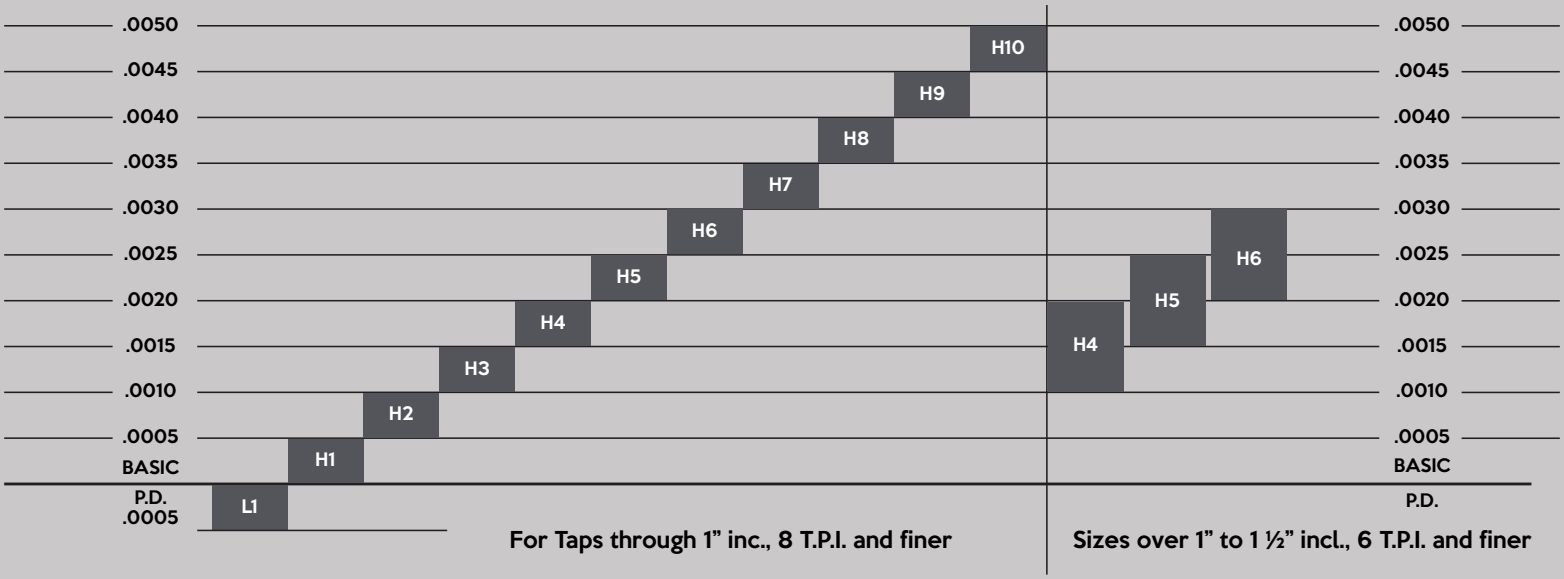
Pitch diameter tolerance of the form tap (Jarflo)

Pitch diameter tolerance of the NO-GO thread plug gauge ANSI/ASME B1.2

Pitch diameter tolerance of the GO thread plug gauge ANSI/ASME B1.2

In addition to the nominal size and pitch of tap, there is another important dimensional factor to be considered in selecting a ground thread tap for a given job. This is the matter of the H and L pitch diameter tap limits. H means (high) above basic pitch diameter and L (low) below basic pitch diameter. Tap limits have been established to provide a choice in the selection of the tap size best suited to produce the class of thread desired.

The chart below illustrates the numbering system and the .0005" diameter increment separation between successive limits. Since the starting point is basic pitch diameter, dividing the limit number by 2 establishes in thousands of an inch the amount of maximum tap pitch diameter is above the basic in the H series and the amount the minimum tap pitch diameters under basic in the L series.



CONSTANTS FOR CALCULATING BASIC THREAD PITCH DIAMETER

Basic Pitch Diameter = Basic Major Diameter - Basic Thread Height

Unified Inch Screw Threads

THREADS PER INCH	P PITCH (Inches)	BASIC THREAD HEIGHT (Inches) 0.64951905P	THREADS PER INCH	P PITCH (Inches)	BASIC THREAD HEIGHT (Inches) 0.64951905P
4	.25000000	.162380	18	.05555556	.036084
4½	.22222222	.144338	20	.05000000	.032476
5	.20000000	.129904	24	.04166667	.027063
6	.16666667	.108253	27	.03703703	.024056
7	.14285714	.092788	28	.03571429	.023197
8	.12500000	.081190	32	.031250000	.020297
9	.11111111	.072169	36	.02777778	.018042
10	.10000000	.064952	40	.02500000	.016238
11	.09090909	.059047	44	.02272727	.014762
11½	.08695652	.056480	48	.02083333	.013532
12	.08333333	.054127	56	.01785714	.011599
13	.07692308	.049963	64	.01562500	.010149
14	.07142857	.046394	72	.01388889	.009021
16	.06250000	.040595	80	.01250000	.008119

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