

## TAPPING SPEED GUIDE

MATERIALS			SPEED FEET PER MINUTE	MATERIALS			SPEED FEET PER MINUTE
Aluminum Alloys			90-100	(Steel, Cont.) Carbon Steel, Plain	Annealed	40-80	
Brass			60-100		Tempered	15-40	
Bronze			40-60	Cast, Carbon	Annealed	40-50	
Copper			40-60		Tempered	30	
High Temperature Alloys			Cobalt Base	Cast, Corrosion Resistant,	Annealed	20-30	
					Iron Base	as Cast	20-25
					Nickel Base	Low Alloy	Annealed
Iron	Ductile	Annealed	60	Precipitation Hardening, Stainless	Tempered	15-25	
		as Cast	30		Treated	10-15	
		Tempered	15-20		Annealed	15-45	
	Gray,	Annealed	80		Tempered	15-25	
		As Cast	35-60		Annealed	45-75	
	Malleable		60		Tool Steels, High Speed	Annealed	15-25
Magnesium Alloys		Heat Treated	25-50	Water Hardening	Annealed	50	
		Annealed	175	Ultra High Strength Steels	Annealed	35	
Manganese			20		Normalized	20	
Molybdenum Alloys		Stress Relieved	50		Tempered	3-7	
Monel		Annealed	20	Maraging Steels	Annealed	20-15	
Nickel Alloys		Annealed	25		Maraged	5-10	
Plastics,	Reinforced		25	Tantalum Alloys, Stress Relieved		3	
	Thermoplastics		50	Titanium Alloys, Commercial Pure,	Annealed	40-60	
	Thermosetting Plastics		50	Alpha & Alpha Beta Alloys,	Annealed	10-25	
Steels,	Alloys, Annealed or Cold Drawn		40-60	Tungsten Alloys, Pressed & Sintered		50	
	Quenched & Tempered		15-35	Zinc Alloys	Die Cast	150	
	Armor Plate		10				

## CONVERSION TABLE, SURFACE FEET PER MINUTE TO REVOLUTIONS PER MINUTE

SPEED FEET PER MINUTE	20	25	30	40	50	60	70	80	90	100	110	120	130	140	150
TAP SIZE	REVOLUTIONS PER MINUTE														
0	1273	1592	1910	2546	3183	3820	4456	5093	5730	6366	7003	7639	8276	8913	9549
1	1047	1308	1570	2093	2617	3140	3663	4186	4710	5233	5756	6279	6808	7326	7849
2	888	1110	1333	1777	2221	2665	3109	3554	3999	4442	4886	5330	5774	6218	6662
3	772	964	1157	1543	1929	2315	2701	3086	3472	3858	4244	4629	5015	5401	5787
4	682	853	1023	1364	1705	2046	2387	2728	3069	3411	3751	4092	4434	4775	5116
5	611	764	917	1222	1528	1833	2139	2445	2750	3056	3361	3667	3973	4278	4584
6	553	691	829	1106	1382	1658	1934	2211	2487	2764	3040	3316	3592	3869	4145
8	466	583	699	932	1165	1398	1631	1864	2097	2330	2563	2796	3029	3262	3495
10	401	502	603	804	1005	1205	1406	1607	1808	2009	2210	2411	2612	2813	3014
12	354	442	531	707	884	1061	1238	1415	1592	1769	1945	2122	2300	2476	2653
1/4	306	382	458	611	764	917	1070	1222	1375	1528	1681	1833	1986	2139	2292
5/16	245	306	367	489	611	733	856	978	1100	1222	1345	1467	1589	1711	1833
3/8	204	255	306	407	509	611	713	815	917	1019	1120	1222	1324	1426	1528
7/16	175	219	262	349	437	524	611	698	786	873	960	1048	1135	1222	1310
1/2	153	191	229	306	382	458	535	611	688	764	840	917	993	1070	1146
9/16	137	172	206	275	344	412	481	550	619	687	756	825	893	963	1031
5/8	122	153	183	244	306	367	428	489	550	611	672	733	794	856	917
3/4	102	128	153	203	255	306	357	407	458	509	560	611	662	713	764
7/8	87	109	131	175	218	262	306	350	392	437	480	524	568	611	655
1	76	96	115	153	191	230	268	306	344	382	420	458	497	535	573

## PREMIUM STEEL HEAVY DUTY SPIRAL FLUTED TAPS

**LIST 406V**  
CNC DESIGN

**Plug  
Bottom**



**STYLE 1 - #4 THROUGH #10**

**STYLE 2 - 1/4 THROUGH 3/8**

**STYLE 3 - 7/16 THROUGH 3/4**

TAP SIZE	SERIES DESIGN.	H LIMIT	NO. OF FLUTES	406V	
				PLUG EDP NUMBER	BOTTOM EDP NUMBER
4 - 40	NC	H-2	2	84992	84993
5 - 40	NC	H-2	2	84998	84999
6 - 32	NC	H-3	3	85001	85002
8 - 32	NC	H-3	3	85003	85004
10 - 24	NC	H-3	3	85005	85006
10 - 32	NF	H-3	3	85007	85008
1/4 - 20	NC	H-3	3	85009	85011
1/4 - 20	NC	H-5	3	85012	85013
1/4 - 28	NF	H-3	3	85014	85015
5/16 - 18	NC	H-3	3	85016	85017
5/16 - 18	NC	H-5	3	85018	85019
5/16 - 24	NF	H-3	3	85021	85022
3/8 - 16	NC	H-3	3	85023	85024
3/8 - 16	NC	H-5	3	85025	85026
3/8 - 24	NF	H-3	3	85027	85028
7/16 - 14	NC	H-3	3	85029	85031
7/16 - 14	NC	H-5	3	85032	85033
7/16 - 20	NF	H-3	3	85034	85035
1/2 - 13	NC	H-3	3	85036	85037
1/2 - 13	NC	H-5	3	85038	85039
1/2 - 20	NF	H-3	3	85041	85042
9/16 - 12	NC	H-3	3	85043	85044
9/16 - 12	NC	H-5	3	85045	85046
9/16 - 18	NF	H-3	3	85047	85048
5/8 - 11	NC	H-3	3	85049	85051
5/8 - 11	NC	H-5	3	85052	85053
5/8 - 18	NF	H-3	3	85054	85055
3/4 - 10	NC	H-3	3	85056	85057
3/4 - 10	NC	H-5	3	85058	85059
3/4 - 16	NF	H-3	3	85061	85062

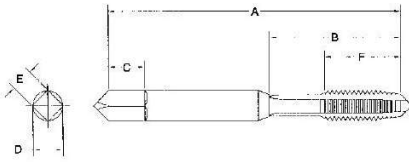
See page 90 for Tap Dimensions.



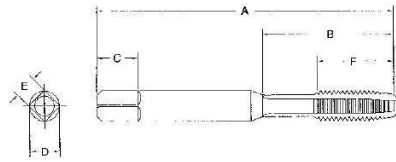
## TAP DRILL SIZES AND PERCENTAGE OF THREADS

TAP		TAP DRILL	DECIM. EQUIV.	THEOR. % OF THREAD	TAP		TAP DRILL	DECIM. EQUIV.	THEOR. % OF THREAD	TAP		TAP DRILL	DECIM. EQUIV.	THEOR. % OF THREAD
NOM. SIZE	TPI				NOM. SIZE	TPI				NOM. SIZE	TPI			
0	80	#56	.0465	83	1/4	20	13/64	.2031	72	5/8	18	9/16	.5625	87
		3/64	.0469	81			#6	.2040	71			0.5687	.5687	78
1	64	#54	.0550	89	1/4	28	#5	.2055	69	5/8	20	37/64	.5781	72
		#53	.0595	67			#3	.2130	80			37/64	.5781	87
1	72	#53	.0595	75	1/4	32	7/32	.2188	67	5/8	24	0.5828	.5828	78
		1/16	.0625	58			7/32	.2188	77			5/8	28	19/32
2	56	#51	.0670	82	1/4	36	#2	.2210	71	5/8	32	19/32	.5938	77
		#50	.0700	69			#2	.2210	80			19/32	.5938	87
2	64	#49	.0730	56	5/16	18	F	.2570	77	11/16	12	39/64	.6094	72
		#50	.0700	79			G	.2610	71			5/8	16	.6250
3	48	#48	.0760	85	5/16	20	F	.2570	85	11/16	20	41/64	.6406	72
		5/64	.0781	77			G	.2610	79			11/16	24	41/64
3	56	#47	.0785	76	5/16	24	H	.2660	72	11/16	28	21/32	.6562	67
		#46	.0810	67			H	.2660	86			11/16	32	21/32
3	40	#45	.0820	63	5/16	28	I	.2720	75	3/4	10	41/64	.6406	84
		#48	.0810	78			J	.2770	66			21/32	.6562	72
4	40	#44	.0860	80	5/16	32	J	.2770	77	3/4	12	21/32	.6562	87
		#43	.0890	71			K	.2810	68			43/64	.6719	72
4	48	#42	.0935	57	5/16	36	9/32	.2812	67	3/4	16	11/16	.6875	77
		3/32	.0938	56			K	.2810	78			3/4	20	45/64
4	48	#43	.0890	85	3/8	16	9/32	.2812	77	3/4	28	23/32	.7188	67
		#42	.0935	68			5/16	.3125	77			3/4	32	23/32
5	40	3/32	.0938	67	3/8	20	O	.3160	73	13/16	12	47/64	.7344	72
		#41	.0960	59			P	.3230	80			13/16	16	3/4
5	44	#40	.0980	83	3/8	24	Q	.3320	66	13/16	20	49/64	.7656	72
		#39	.0995	79			Q	.3320	79			13/16	28	25/32
5	32	#38	.1015	72	3/8	28	R	.3390	67	13/16	32	25/32	.7812	77
		#37	.1040	65			R	.3390	78			7/8	9	49/64
6	40	#38	.1015	80	3/8	32	11/32	.3438	67	7/8	12	25/32	.7812	87
		#37	.1040	71			11/32	.3438	77			7/8	14	51/64
6	48	#36	.1065	63	3/8	36	S	.3480	67	7/8	14	51/64	.7969	84
		#37	.1040	84			S	.3480	75			0.8024	.8024	78
6	40	#36	.1065	78	7/16	14	T	.3580	86	7/8	16	13/16	.8125	67
		7/64	.1094	70			23/64	.3594	84			7/8	20	53/64
6	48	#35	.1100	69	7/16	16	3/8	.3750	77	7/8	28	27/32	.8438	67
		#34	.1110	67			V	.3770	75			7/8	32	27/32
6	32	#34	.1110	83	7/16	20	W	.3860	79	15/16	12	27/32	.8438	87
		#33	.1130	77			25/64	.3906	72			7/8	28	27/32
8	36	#32	.1160	68	7/16	28	Y	.4040	72	15/16	16	55/64	.8594	87
		#29	.1360	69			Y	.4040	83			7/8	16	.8750
8	48	#29	.1360	78	7/16	32	13/32	.4062	77	15/16	20	57/64	.8906	72
		#28	.1405	65			Z	.4130	80			15/16	28	29/32
10	24	9/64	.1406	65	1/2	12	27/64	.4219	72	15/16	32	29/32	.9062	77
		#27	.1440	85			27/64	.4219	78			15/16	1	8
10	32	#26	.1470	79	1/2	13	7/16	.4375	77	1	12	7/8	.8750	77
		#25	.1495	75			1/2	16	29/64			.4531	72	29/32
10	40	#24	.1520	70	1/2	20	15/32	.4688	67	1	14	59/64	.9219	84
		#23	.1540	66			15/32	.4688	77			1	16	15/16
10	48	5/32	.1562	83	9/16	12	15/32	.4688	87	1	16	59/64	.9219	84
		#22	.1570	81			31/64	.4844	72			1	18	15/16
12	24	#21	.1590	76	9/16	16	1/2	.5000	77	1	20	0.9274	.9274	78
		#20	.1610	71			0.5062	.5062	69			1	24	31/32
12	32	#17	.1730	79	9/16	18	1/2	.5000	87	1	28	61/64	.9531	72
		#16	.1770	72			0.5062	.5062	78			1	32	31/32
12	40	#15	.1800	67	9/16	20	33/64	.5156	72	1	32	31/32	.9688	77
		#16	.1770	84			33/64	.5156	87			1 1/16	8	59/64
12	48	#15	.1800	78	9/16	24	0.5203	.5203	78	1 1/16	12	0.9274	.9274	83
		#14	.1820	73			17/32	.5312	67			15/16	.9375	77
12	56	#13	.1850	67	9/16	28	0.5263	.5263	78	1 1/16	16	1	1.0000	77
		#14	.1820	84			17/32	.5312	77			1 1/16	18	1
12	64	#13	.1850	76	9/16	32	17/32	.5312	77	1 1/16	20	11/64	1.0156	72
		#12	.1890	67			5/8	11	17/32			.5312	79	
1/4	20	#9	.1960	83	5/8	12	35/64	.5469	72	1 1/16	18	1	1.0000	87
		#8	.1990	79			9/16	.5625	77			1 1/16	20	11/64
		#7	.2010	75	5/8	16	0.5687	.5687	69					

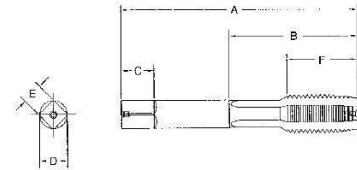
## CNC DESIGN TAP DIMENSIONS, GROUND THREAD



STYLE 1



STYLE 2



STYLE 3

NOMINAL DIAMETER RANGE - INCHES		MACHINE SCREW SIZE NO.	NOMINAL FRACTIONAL DIAMETER INCHES	NOMINAL METRIC DIAMETER MILLIMETER	STYLE	TAP DIMENSIONS - INCHES				
OVER	TO (INCL.)					OVERALL LENGTH A	THREAD LENGTH F	REACH B	SHANK DIAMETER D	SQUARE SIZE C/E
.104	.117	4			1	1-7/8	5/16	25/32	.141	3/16X.110
.117	.130	5	1/8	M3, M3.15	1	1-15/16	5/16	25/32	.141	3/16X.110
.130	.145	6		M3.5	1	2	3/8	13/16	.141	3/16X.110
.145	.171	8	5/32	M4	1	2-1/8	3/8	7/8	.168	1/4X.131
.171	.197	10	3/16	M4.5, M5	1	2-3/8	1/2	1	.194	1/4X.152
.197	.223	12	7/32		1	2-3/8	1/2	1-1/16	.220	9/32X.165
.223	.260	14	1/4	M6, M6.3	2	2-1/2	5/8	1-1/8	.255	5/16X.191
.260	.323		5/16	M7, M8	2	2-23/32	11/16	1-1/4	.318	3/8X.238
.323	.395		3/8	M10	2	2-15/16	3/4	1-5/16	.381	7/16X.286
.395	.448		7/16		3	3-5/32	7/8	-	.323	13/32X.242
.448	.510		1/2	M12, M12.5	3	3-3/8	15/16	-	.367	7/16X.275
.510	.573		9/16	M14	3	3-19/32	1	-	.429	1/2X.322
.573	.635		5/8	M16	3	3-13/16	1-1/8	-	.480	9/16X.360
.635	.709		11/16	M18	3	4-1/32	1-3/16	-	.542	5/8X.406
.709	.760		3/4		3	4-1/4	1-1/4	-	.590	11/16X.422