



## Recoil Inserts Standard Taps

Recoil taps differ from standard taps dimensionally and only Recoil Screw Thread Insert (STI) Taps are suitable for use with Recoil Wire Thread Inserts.

Recoil taps are manufactured to precise standards from either High Speed Steel (HSS) or (HSS-E) with ground threads and are available with taper, intermediate and bottoming leads. They have a larger diameter, but the same pitch as a standard tap in order to accommodate the wire insert.

Spiral point and spiral flute machine taps are also available for volume production purposes. For all sparkplug applications, pilot nose taps are recommended and are available for common metric thread sizes.

The Recoil thread insert when installed into a correctly tapped hole will provide the applicable internal thread tolerance for the installed bolt.

Note: Tapped hole size can be significantly affected by variations in drill size, parent material, or lubricant so in close tolerance applications some testing for an optimum combination is recommended.

## Thread Class

### Unified Thread Class

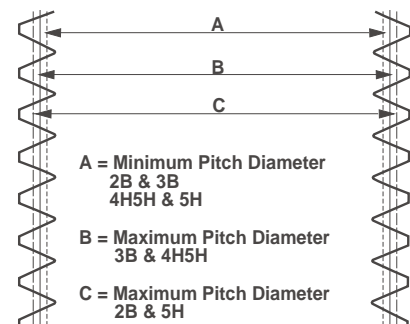
In the unified thread system, the minimum pitch diameter for a 2B hole (medium fit) or 3B hole (close fit) are the same, while the maximum pitch diameter is greater on the 2B hole (medium fit). Recoil taps for unified threads are made to a 3B hole (close fit) tolerance.

### Metric Thread Class

In the metric thread system the minimum pitch diameter for a 5H hole (medium fit) or 4H5H hole (close fit) are the same, while the maximum pitch diameter is greater on the 5H hole (medium fit). Recoil taps for metric threads are made to 4H5H hole (close fit) tolerance.

### Metric thread tolerance equivalents standards

	Standards	Recoil Standards
Medium	Metric 6H	5H
Close	Metric 5H	4H5H



Minimum & Maximum pitch diameter

## Tap Type and Applications

The most commonly used type of Recoil taps are defined together with their typical applications. The Taper, Intermediate and Bottoming are short machine taps (suitable for hand tapping), while the Spiral Point and Spiral Flute are used in production applications.

### Taper

Taper (or Roughing Taps) are used for starting precision and difficult holes. This tap has a lead of eight threads, but no size reduction.



### Intermediate

Intermediate (or Plug/Second), used in most general purpose applications to facilitate thread cutting true to the drilled hole. The tap has a lead of four threads, but no size reduction.



### Bottoming

Bottoming Taps are used to ensure the minimum thread run-out when tapping to the bottom of blind holes. The tap has a lead of two threads and would normally be preceded by a taper or an intermediate tap.



## Spiral Flute

Spiral Flute taps are recommended for machine tapping for all blind hole applications, particularly in soft materials such as copper, magnesium and aluminium which produce long stringy swarf.



## Pilot Nose

Pilot nose Taps have been developed for repairing damaged threads without the need for drilling prior to tapping. This style of tap allows the use of the existing thread as a guide in tapping a straight hole. This style of tap is widely used in repairing damaged spark plug threads.



## Spiral Point

Spiral Point Taps are recommended for machine tapping through holes. These taps provide for chip clearance within the lead of the tap.



Recoil taps can be supplied in different surface coatings for special order requirements.

## Surface Coatings

Benefits of surface coatings include:

- Longer tool life
- Increased productivity
- Tools can be run at higher feeds and speeds
- Lower maintenance costs

## Titanium Carbonitride - TiCNite (TiCN)

TiCNite coated taps have a very high surface hardness and are generally tougher than other coating materials. It has a high resistance to edge chipping.

## Titanium Nitride - TiNite (TiN)

TiNite coating is a good choice for protecting the tap. It can achieve a longer life than uncoated taps and can be used at higher speeds.

## Chromium Nitride (CrN)

This PVD coating was developed for use in non-ferrous areas where titanium based coatings were not successful. It is recommended for the machining and forming of titanium and copper and is harder than conventional chrome plating. The PVD coating process has no environmental side effects.

## Recoil Tap Part Numbering System

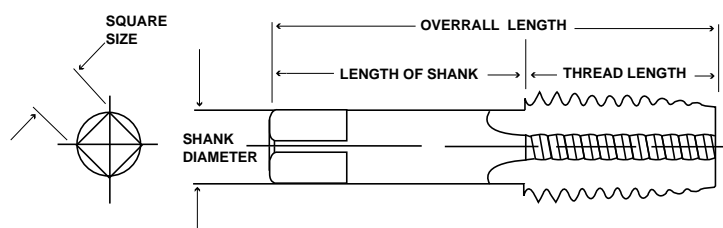
The system of identification used for Recoil taps is categorised into 2 primary sections i). Inch threads, ii). Metric Threads. The tap annotation for both thread designations is very similar and therefore easy to follow.

Tap Part Number	4	3	04	5
<b>Inch series</b>	<b>Product</b>	<b>Thread Type</b>	<b>Thread Size</b> Diameter in 1/16"	<b>Tap Style</b>
	4=Tap	3 = UNC 4= UNF	04 = 1/4"	4= taper 5=intermediate 6=bottoming 7=pilot nose 8=spiral point 9=spiral flute
<b>Metric Series</b>		5=Coarse 7=Medium 8=Extra Fine	04 = 4mm	4= taper 5=intermediate 6=bottoming 7=pilot nose 8=spiral point 9=spiral flute

# Recoil Tap Part Numbers and Dimensional Data

## Unified Thread Series

THREAD SIZE	TAPER	INTERMEDIATE	BOTTOMING	SPIRAL POINT	SPIRAL FLUTE	OVERALL LENGTH	THREAD LENGTH	SHANK DIAMETER	SQUARE DRIVE
<b>UNC</b>									
2-56	43524	43525	43526	43528	43529	1.875	0.562	0.141	0.110
3-48	43534	43535	43536	43538	43539	1.937	0.625	0.141	0.110
4-40	43544	43545	43546	43548	43549	2.000	0.687	0.141	0.110
5-40	43554	43555	43556	43558	43559	2.125	0.750	0.168	0.131
6-32	43564	43565	43566	43568	43569	2.375	0.875	0.194	0.152
8-32	43584	43585	43586	43588	43589	2.375	0.937	0.220	0.165
10-24	43604	43605	43606	43608	43609	2.500	1.000	0.255	0.191
12-24	43624	43625	43626	43628	43629	2.718	1.125	0.318	0.238
1/4-20	43044	43045	43046	43048	43049	2.718	1.125	0.318	0.238
5/16-18	43054	43055	43056	43058	43059	2.937	1.250	0.381	0.286
3/8-16	43064	43065	43066	43068	43069	3.375	1.656	0.367	0.275
7/16-14	43074	43075	43076	43078	43079	3.593	1.656	0.429	0.322
1/2-13	43084	43085	43086	43088	43089	3.812	1.812	0.480	0.360
9/16-12	43094	43095	43096	43098	43099	4.031	1.812	0.542	0.406
5/8-11	43104	43105	43106	43108	43109	4.250	2.000	0.590	0.442
3/4-10	43124	43125	43126	43128	43129	4.687	2.218	0.697	0.523
7/8-9	43144	43145	43146	43148	43149	5.125	2.500	0.800	0.600
1-8	43164	43165	43166	43168	43169	5.750	2.562	1.021	0.766
1 1/8-7	43184	43185	43186	-	-	6.062	3.000	1.108	0.831
1 1/4-7	43204	43205	43206	-	-	6.375	3.000	1.233	0.925
1 3/8-6	43224	43225	43226	-	-	6.687	3.187	1.305	0.979
1 1/2-6	43244	43245	43246	-	-	7.000	3.187	1.430	1.072
<b>UNF</b>									
3-56	44534	44535	44536	43538	43589	1.937	0.625	0.141	0.110
4-48	44544	44545	44546	44548	44549	2.000	0.687	0.141	0.110
6-40	44564	44565	44566	44568	44569	2.125	0.750	0.168	0.131
8-36	44584	44585	44586	44588	44589	2.375	0.937	0.220	0.165
10-32	44604	44605	44606	44608	44609	2.500	1.000	0.255	0.191
12-28	44624	44625	44626	-	-	2.718	1.125	0.318	0.238
1/4-28	44044	44045	44046	44048	44049	2.718	1.125	0.318	0.238
5/16-24	44054	44055	44056	44058	44059	2.937	1.250	0.381	0.286
3/8-24	44064	44065	44066	44068	44069	3.156	1.438	0.323	0.242
7/16-20	44074	44075	44076	44078	44079	3.375	1.656	0.367	0.275
1/2-20	44084	44085	44086	44088	44089	3.593	1.656	0.429	0.322
9/16-18	44094	44095	44096	44098	44099	3.812	1.812	0.480	0.360
5/8-18	44104	44105	44106	44108	44109	4.031	1.812	0.542	0.406
3/4-16	44124	44125	44126	44128	44129	4.468	2.000	0.652	0.489
7/8-14	44144	44145	44146	44148	44149	5.125	2.500	0.800	0.600
1-12	44164	44165	44166	44168	44169	5.437	2.562	0.896	0.672
1-14	44164-14	44165-14	44166-14	-	-	5.437	2.562	0.896	0.672
1 1/8-12	44184	44185	44186	-	-	5.750	2.562	1.021	0.766
1 1/4-12	44204	44205	44206	-	-	6.062	3.000	1.108	0.831
1 3/8-12	44224	44225	44226	-	-	6.375	3.000	1.233	0.925
1 1/2-12	44244	44245	44246	-	-	6.687	3.187	1.305	0.979



Note: Tap dimensional are based on American Standards (ANSI)

# Recoil Tap Part Numbers and Dimensional Data

## Metric Series

THREAD SIZE	TAPER	INTERMEDIATE	BOTTOMING	SPIRAL POINT	SPIRAL FLUTE	OVERALL LENGTH	THREAD LENGTH	SHANK DIAMETER	SQUARE DRIVE
<b>METRIC COARSE</b>									
M2 x 0.4	45024	45025	45026	45028	45029	45	10	2.80	2.24
M2.2 x 0.45	45014	45015	45016	45018	45019	48	11	3.15	2.50
M2.5 x 0.45	45254	45255	45256	45258	45259	48	11	3.15	2.50
M3 x 0.5	45034	45035	45036	45038	45039	50	13	3.55	2.80
M3.5 x 0.6	45354	45355	45356	45358	45359	53	13	4.50	3.55
M4 x 0.7	45044	45045	45046	45048	45049	58	16	5.00	4.00
M5 x 0.8	45054	45055	45056	45058	45059	66	19	6.30	5.00
M6 x 1	45064	45065	45066	45068	45069	72	22	8.00	6.30
M7 x 1	45074	45075	45076	-	-	72	22	9.00	7.10
M8 x 1.25	45084	45085	45086	45088	45089	80	24	10.00	8.00
M9 x 1.25	45094	45095	45096	-	-	85	25	8.00	6.30
M10 x 1.5	45104	45105	45106	45108	45109	89	29	9.00	7.10
M11 x 1.5	45114	45115	45116	-	-	89	29	9.00	7.10
M12 x 1.75	45124	45125	45126	45128	45129	95	30	11.20	9.00
M14 x 2	45144	45145	45146	-	-	102	32	12.50	10.00
M15 x 2	45154	45155	45156	-	-	112	37	14.00	11.20
M16 x 2	45164	45165	45166	45168	45169	112	37	14.00	11.20
M18 x 2.5	45184	45185	45186	-	-	118	38	16.00	12.50
M20 x 2.5	45204	45205	45206	-	-	130	45	18.00	14.00
M22 x 2.5	45224	45225	45226	-	-	135	48	20.00	16.00
M24 x 3	45244	45245	45246	-	-	135	48	20.00	16.00
M27 x 3	45274	45275	45276	-	-	151	51	22.40	18.00
M30 x 3.5	45304	45305	45306	-	-	162	57	25.00	20.00
M30 x 3	45304-3	45305-3	45306-3	-	-	162	57	25.00	20.00
M33 x 3.5	45334	45335	45336	-	-	170	60	28.00	22.40
M36 x 4	45364	45365	45366	-	-	170	60	28.00	22.40
M39 x 4	45394	45395	45396	-	-	187	67	31.50	25.00
M42 x 4.5	45424	45425	45426	-	-	187	67	31.50	25.00
M42 X 4	45424-4	45425-4	45426-4	-	-	200	70	35.50	28.00
M52 X 5	45524	45525	45526	-	-	221	76	40.00	31.50
<b>METRIC MEDIUM &amp; FINE</b>									
M8 X 1	47084	47085	47086	-	-	80	24	10.00	8.00
M9 X 1	47094	47095	47096	-	-	85	25	8.00	6.30
M10 X 1.25	47104	47105	47106	47108	47109	85	25	8.00	6.30
M10 X 1	48104	48105	48106	48108	48109	85	25	8.00	6.30
M11 x 1.25	47114	47115	47116	-	-	89	29	9.00	7.10
M11 x 1	48114	48115	48116	-	-	89	29	9.00	7.10
M12 x 1.5	47124	47125	47126	-	-	95	30	11.20	9.00
M12 x 1.25	48124	48125	48126	-	-	95	30	11.20	9.00
M14 x 1.5	47144	47145	47146	-	-	102	32	12.50	10.00
M14 x 1.25	48144	48145	48146	-	-	102	32	12.50	10.00
M15 x 1.5	47154	47155	47156	-	-	112	37	14.00	11.20
M16 x 1.5	47164	47165	47166	-	-	112	37	14.00	11.20
M18 x 2	47184	47185	47186	-	-	112	37	14.00	11.20
M18 x 1.5	48184	48185	48186	-	-	112	37	14.00	11.20
M20 x 2	47204	47205	47206	-	-	118	38	16.00	12.50
M20 x 1.5	48204	48205	48206	-	-	118	38	16.00	12.50
M22 x 2	47224	47225	47226	-	-	130	45	18.00	14.00
M22 x 1.5	48224	48225	48226	-	-	130	45	18.00	14.00
M24 x 2	47244	47245	47246	-	-	135	48	20.00	16.00
M24 x 1.5	48244	48245	48246	-	-	135	48	20.00	16.00

Note: The Taps listed above represent the most popular of the Recoil Taps available. Other sizes and types are available including BSF, BSW, NPT, BA, 8UN ETC.

Note: Tap dimensions based upon international (ISO) standard

# Recoil Tapped Hole and Fitted Size Data

## Unified Thread Series

### UNC

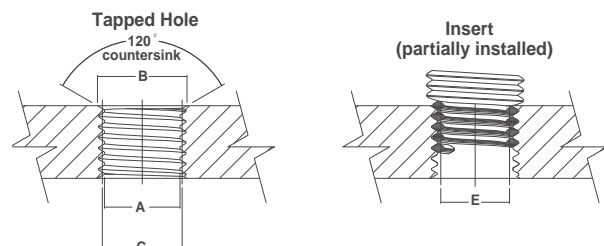
SIZE	T.P.I	DRILL SIZE		TAPPED HOLE							
		MM	INCH	A		B	C		C	E	
				MIN DIA	MAJ DIA	CLASS 2B	CLASS 3B	CLASS 3B	CLASS 3B	INSERTS FITTED	
No.2	56	2.3	3/32	0.094	0.090	0.1092	0.0996	0.0976	0.989	0.0976	0.0667
No.3	48	2.7	No.36	0.108	0.104	0.1261	0.1147	0.1125	0.1139	0.1125	0.0764
No.4	40	3	No.31	0.122	0.118	0.1445	0.1307	0.1282	0.1298	0.1282	0.0849
No.5	40	3.4	No.29	0.135	0.131	0.1575	0.1437	0.1412	0.1429	0.1412	0.0979
No.6	32	3.7	No.25	0.150	0.145	0.1786	0.1611	0.1583	0.1601	0.1583	0.1042
No.8	32	4.4	11/64	0.175	0.171	0.2046	0.1872	0.1843	0.1862	0.1843	0.1302
No.10	24	5.0	13/64	0.205	0.199	0.2441	0.2204	0.2171	0.2193	0.2171	0.1449
No.12	24	5.6	15/64	0.230	0.225	0.2701	0.2465	0.2431	0.2454	0.2431	0.1709
1/4	20	6.7	17/64	0.270	0.261	0.3150	0.2863	0.2825	0.2851	0.2825	0.1959
5/16	18	8.3	21/64	0.334	0.325	0.3847	0.3529	0.3486	0.3515	0.3486	0.2524
3/8	16	9.9	25/64	0.398	0.389	0.4562	0.4203	0.4156	0.4189	0.4156	0.3073
7/16	14	11.5	29/64	0.463	0.453	0.5303	0.4890	0.4839	0.4875	0.4839	0.3602
1/2	13	13.0	17/32	0.527	0.517	0.5999	0.5554	0.5499	0.5537	0.5499	0.4167
9/16	12	14.5	19/32	0.591	0.581	0.6708	0.6225	0.6167	0.6208	0.6167	0.4723
5/8	11	16.5	21/32	0.656	0.645	0.7431	0.6903	0.6841	0.6885	0.6841	0.5266
3/4	10	19.75	25/32	0.783	0.772	0.8799	0.8216	0.8149	0.8196	0.8149	0.6417
7/8	9	23.0	29/32	0.912	0.899	1.0193	0.9543	0.9471	0.9522	0.9471	0.7547
1	8	26.0	1 1/32	1.042	1.027	1.1624	1.0890	1.0812	1.0868	1.0812	0.8647
1 1/8	7	29.5	1 5/32	1.170	1.156	1.3106	1.2262	1.2178	1.2239	1.2178	0.9704
1 1/4	7	33.0	1 9/32	1.295	1.281	1.4356	1.3514	1.3428	1.3490	1.3428	1.0954
1 3/8	6	36.0	1 13/32	1.431	1.411	1.5914	1.4926	1.4832	1.4900	1.4832	1.1946
1 1/2	6	39.0	1 17/32	1.556	1.536	1.7164	1.6177	1.6082	1.6151	1.6082	1.3196

### UNF

SIZE	T.P.I	DRILL SIZE		TAPPED HOLE							
		MM	INCH	A		B	C		C	E	
				MIN DIA	MAJ DIA	CLASS 2B	CLASS 3B	CLASS 3B	CLASS 3B	INSERTS FITTED	
No.3	56	2.65	-	0.106	0.103	0.1222	0.1126	0.1106	0.1119	0.1106	0.0797
No.4	48	3.0	No.31	0.120	0.117	0.1391	0.1278	0.1255	0.1270	0.1255	0.0894
No.5	44	3.3	-	0.134	0.130	0.1545	0.1422	0.1398	0.1414	0.1398	0.1004
No.6	40	3.7	No.26	0.148	0.144	0.1705	0.1568	0.1542	0.1559	0.1542	0.1109
No.8	36	4.4	11/64	0.174	0.170	0.2001	0.1848	0.1820	0.1839	0.1820	0.1339
No.10	32	5.1	13/64	0.201	0.197	0.2306	0.2133	0.2103	0.2123	0.2103	0.1562
1/4	28	6.6	17/64	0.264	0.258	0.2964	0.2765	0.2732	0.2754	0.2732	0.2113
5/16	24	8.2	21/64	0.328	0.322	0.3666	0.3433	0.3395	0.3421	0.3395	0.2674
3/8	24	9.8	25/64	0.390	0.384	0.4291	0.4059	0.4020	0.4047	0.4020	0.3299
7/16	20	11.5	29/64	0.456	0.449	0.5025	0.4744	0.4700	0.4731	0.4700	0.3834
1/2	20	13.0	33/64	0.518	0.511	0.5650	0.5371	0.5325	0.5357	0.5325	0.4459
9/16	18	14.5	37/64	0.582	0.575	0.6347	0.6035	0.5986	0.6020	0.5986	0.5024
5/8	18	16.25	41/64	0.644	0.637	0.6972	0.6661	0.6611	0.6646	0.6611	0.5649
3/4	16	19.5	49/64	0.771	0.764	0.8312	0.7961	0.7906	0.7945	0.7906	0.6823
7/8	14	22.5	57/64	0.899	0.891	0.9678	0.9274	0.9214	0.9257	0.9214	0.7977
1	12	26.0	1 1/54	1.028	1.018	1.1083	1.0608	1.0542	1.0589	1.0542	0.9098
1 1/8	12	29.5	1 5/32	1.153	1.143	1.2333	1.1860	1.1792	1.1841	1.1792	1.0348
1 1/4	12	32.5	1 9/32	1.278	1.268	1.3583	1.3112	1.3042	1.3092	1.3042	1.1598
1 3/8	12	36.0	1 13/32	1.403	1.393	1.4833	1.4364	1.4292	1.4343	1.4292	1.2848
1 1/2	12	39.0	1 17/32	1.528	1.518	1.6083	1.5615	1.5542	1.5595	1.5542	1.4098

\*Standard size drills are suggested even though in these sizes they vary slightly from minor diameter limits. Drill sizes are recommended only and test should be carried out to select the one suitable for the material involved.

**Countersinking:** It is recommended that a 120° countersink is provided before tapping to prevent a 'feather edge' at the start of the lead thread. When design prevents the use of a countersink, any feather edges or deformed material at the thread lead should be removed before tapping. This will facilitate insert installation and reduce the effects of removing the countersinking operation.



# Drill, Tapping and Installation Depths

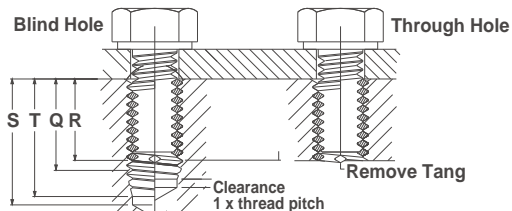
## Unified Thread Series

### Specifications for Drilling, Tapping and Installation depths

UNC THREAD SIZE	1 1/2 D										2 D										2 1/2 D										3 D									
	Q	R	S	T	Q	R	S	T	Q	R	S	T	Q	R	S	T	Q	R	S	T	Q	R	S	T	Q	R	S	T	Q	R	S	T	Q	R	S	T	Q	R	S	T
2-56	0.086	0.068	0.166	0.148	0.129	0.111	0.209	0.191	0.172	0.154	0.252	0.234	0.215	0.197	0.295	0.277	0.258	0.240	0.338	0.320																				
3-48	0.099	0.078	0.193	0.172	0.148	0.127	0.242	0.221	0.198	0.177	0.292	0.271	0.248	0.227	0.342	0.321	0.297	0.276	0.391	0.370																				
4-40	0.112	0.087	0.224	0.199	0.168	0.143	0.28	0.255	0.224	0.199	0.336	0.311	0.280	0.255	0.392	0.367	0.336	0.311	0.448	0.423																				
5-40	0.125	0.100	0.237	0.212	0.187	0.162	0.300	0.275	0.250	0.225	0.362	0.337	0.312	0.287	0.425	0.400	0.375	0.350	0.487	0.462																				
6-32	0.138	0.107	0.279	0.247	0.207	0.176	0.348	0.316	0.276	0.245	0.417	0.385	0.345	0.314	0.486	0.454	0.414	0.383	0.555	0.523																				
8-32	0.164	0.133	0.305	0.273	0.246	0.215	0.387	0.355	0.328	0.297	0.469	0.437	0.410	0.379	0.551	0.519	0.492	0.461	0.633	0.601																				
10-24	0.190	0.148	0.377	0.336	0.285	0.243	0.472	0.431	0.380	0.338	0.567	0.526	0.475	0.433	0.662	0.621	0.570	0.528	0.757	0.716																				
12-24	0.216	0.174	0.404	0.362	0.324	0.282	0.512	0.470	0.432	0.390	0.620	0.578	0.540	0.498	0.727	0.686	0.648	0.606	0.836	0.794																				
14-20	0.250	0.200	0.475	0.425	0.375	0.500	0.600	0.550	0.500	0.450	0.725	0.675	0.625	0.575	0.850	0.800	0.750	0.700	0.975	0.925																				
5/16-18	0.312	0.257	0.562	0.507	0.469	0.413	0.719	0.663	0.625	0.569	0.875	0.819	0.781	0.726	1.031	0.976	0.937	0.882	1.187	1.132																				
3/8-16	0.375	0.312	0.656	0.594	0.562	0.500	0.844	0.781	0.750	0.687	1.031	0.969	0.937	0.875	1.219	1.156	1.125	1.062	1.406	1.344																				
7/16-14	0.437	0.366	0.759	0.687	0.656	0.585	0.978	0.906	0.875	0.804	1.196	1.125	1.094	1.022	1.415	1.343	1.312	1.241	1.634	1.562																				
1/2-13	0.500	0.423	0.846	0.769	0.750	0.673	1.096	1.019	1.000	0.923	1.346	1.269	1.250	1.173	1.596	1.519	1.500	1.423	1.846	1.769																				
9/16-12	0.562	0.479	0.937	0.854	0.844	0.760	1.219	1.135	1.125	1.042	1.500	1.417	1.406	1.323	1.781	1.698	1.687	1.604	2.062	1.979																				
5/8-11	0.625	0.534	1.034	0.943	0.937	0.846	1.347	1.256	1.250	1.159	1.659	1.568	1.562	1.471	1.972	1.881	1.875	1.784	2.284	2.193																				
3/4-10	0.750	0.650	1.200	1.100	1.125	1.025	1.575	1.475	1.500	1.400	1.950	1.850	1.875	1.775	2.325	2.225	2.250	2.150	2.700	2.600																				
7/8-9	0.875	0.764	1.375	1.264	1.312	1.201	1.812	1.701	1.750	1.639	2.250	2.139	2.187	2.076	2.687	2.576	2.625	2.514	3.125	3.014																				
1 8	1.000	0.875	1.563	1.437	1.500	1.375	2.062	1.937	2.000	1.875	2.562	2.437	2.500	2.375	3.062	2.937	3.000	2.875	3.562	3.437																				
1 1/8-7	1.125	0.982	1.768	1.625	1.687	1.545	2.330	2.187	2.250	2.107	2.893	2.750	2.812	2.670	3.455	3.312	3.375	3.232	4.018	3.875																				
1 1/4-7	1.250	1.107	1.893	1.750	1.875	1.732	2.518	2.375	2.500	2.357	3.143	3.000	3.125	2.982	3.768	3.625	3.750	3.607	4.450	4.250																				
1 3/8-6	1.375	1.208	2.125	1.958	2.062	1.896	2.812	2.646	2.750	2.583	3.500	3.333	3.437	3.270	4.187	4.021	4.125	3.958	4.875	4.708																				
1 1/2-6	1.500	1.333	2.250	2.083	2.250	2.083	3.000	2.833	3.000	2.833	3.750	3.583	3.750	3.583	4.500	4.333	4.500	4.333	5.250	5.083																				

**Drilling Depth:** The minimum drilling depth "S" allows for one pitch chip clearance between the tip of the tap and the bottom of the drilled hole. "S" minimum allows for tap clearance, the maximum amount of insert set-down and the countersink. Where a spiral pointed tap is used, the drill depths shown should be increased to allow for chip clearance.

UNF THREAD SIZE	1 D										1 1/2 D										2 D										2 1/2 D										3 D									
	Q	R	S	T	Q	R	S	T	Q	R	S	T	Q	R	S	T	Q	R	S	T	Q	R	S	T	Q	R	S	T	Q	R	S	T	Q	R	S	T														
2-64	0.086	0.070	0.156	0.141	0.129	0.113	0.199	0.184	0.172	0.156	0.242	0.227	0.215	0.199	0.285	0.270	0.258	0.242	0.328	0.313																														
3-56	0.099	0.081	0.179	0.161	0.148	0.130	0.228	0.210	0.198	0.180	0.278	0.260	0.248	0.230	0.328	0.310	0.297	0.279	0.377	0.359																														
4-48	0.112	0.091	0.206	0.185	0.168	0.147	0.262	0.241	0.224	0.203	0.318	0.297	0.280	0.259	0.374	0.353	0.336	0.315	0.430	0.409																														
5-44	0.125	0.102	0.227	0.205	0.188	0.165	0.290	0.268	0.250	0.227	0.352	0.330	0.312	0.289	0.414	0.392	0.375	0.352	0.477	0.455																														
6-40	0.138	0.113	0.250	0.225	0.207	0.182	0.319	0.294	0.276	0.251	0.388	0.363	0.345	0.320	0.457	0.432	0.414	0.389	0.526	0.501																														
8-36	0.164	0.136	0.289	0.261	0.246	0.218	0.371	0.343	0.328	0.300	0.453	0.425	0.410	0.382	0.535	0.507	0.492	0.464	0.617	0.589																														
10-32	0.190	0.159	0.331	0.299	0.285	0.254	0.426	0.394	0.380	0.349	0.521	0.489	0.475	0.444	0.616	0.584	0.570	0.539	0.711	0.679																														
1/4-28	0.250	0.214	0.411	0.375	0.375	0.339	0.536	0.500	0.500	0.464	0.661	0.625	0.625	0.589	0.786	0.750	0.750	0.714	0.911	0.875																														
5/16-24	0.312	0.271	0.500	0.458	0.469	0.428	0.656	0.615	0.625	0.583	0.812	0.771	0.781	0.740	0.969	0.927	0.937	0.896	1.125	1.083																														
3/8-24	0.375	0.333	0.562	0.521	0.562	0.521	0.750	0.708	0.750	0.708	0.937	0.896	0.937	0.896	1.125	1.083	1.125	1.083	1.312	1.271																														
7/16-20	0.437	0.387	0.662	0.612	0.656	0.606	0.881	0.831	0.875	0.825	1.100	1.050	1.094	1.044	1.319	1.269	1.312	1.262	1.537	1.488																														
1/2-20	0.500	0.450	0.725	0.675	0.750	0.700	0.975	0.925	1.000	0.950	1.225	1.175	1.250	1.200	1.475	1.425	1.500	1.450	1.725	1.675																														
9/16-18	0.562	0.507	0.812	0.757	0.844	0.788	1.094	1.038	1.125	1.068	1.375	1.319	1.406	1.351	1.656	1.601	1.687	1.632	1.937	1.882																														
5/8-18	0.625	0.569	0.875	0.819	0.937	0.882	1.187	1.132	1.250	1.194	1.500	1.444	1.562	1.507	1.812	1.757	1.875	1.819	2.125	2.069																														
3/4-16	0.750	0.687	1.031	0.969	1.125	1.062	1.406	1.344	1.500	1.437	1.781	1.719	1.875	1.812	2.156	2.094	2.250	2.187	2.531	2.469																														
7/8-14	0.875	0.804	1.196	1.125	1.312	1.241	1.634	1.562	1.750	1.679	2.071	2.000	2.187	2.116	2.509	2.437	2.625	2.554	2.946	2.875																														
1 1/2	1.000	0.917	1.375	1.292	1.500	1.417	1.875	1.792	2.000	1.917	2.375	2.292	2.500	2.417	2.875	2.792	3.000	2.917	3.375	3.292																														
1 1/8-12	1.125	1.042	1.500	1.417	1.687	1.604	2.062	1.979	2.250	2.167	2.625	2.542	2.812	2.729	3.187	3.104	3.375	3.292	3.750	3.667																														
1 1/4-12	1.250	1.167	1.625	1.542	1.875	1.792	2.250	2.167	2.500	2.417	2.875	2.792	3.125	3.042	3.500	3.417	3.750	3.667	4.125	4.042																														
1 3/8-12	1.375	1.292	1.750	1.667	2.062	1.979	2.437	2.354	2.750	2.667	3.125	3.042	3.437	3.354	3.812	3.729	4.125	4.042	4.500	4.417																														
1 1/2-12	1.500	1.417	1.875	1.792	2.250	2.167	2.625	2.542	3.000	2.917	3.375	3.292	3.750	3.667	4.125	4.042	4.500	4.417	4.875	4.792																														



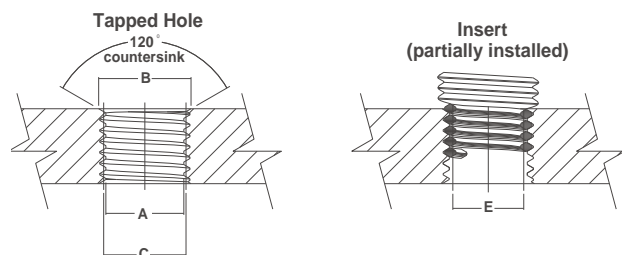
# Recoil Tapped Hole and Fitted Size Data

## Metric Thread Series

METRIC (ISO)		TAPPED HOLE							
SIZE	DRILL SIZE	A		B	C		C	E	
		MINOR DIA		MAJOR DIA	CLASS 5H		CLASS 6H	INSERTS FITTED	
M2 X 0.4	2.10	2.177	2.087	2.520	2.295	2.260	2.310	2.260	1.567
M2.2 X 0.45	2.30	2.397	2.297	2.785	2.532	2.492	2.547	2.492	1.713
M2.5 X 0.45	2.60	2.697	2.597	3.085	2.832	2.792	2.847	2.792	2.013
M3 X 0.5	3.10	3.220	3.108	3.650	3.367	3.325	3.384	3.325	2.459
M3.5 X 0.6	3.60	3.755	3.630	4.279	3.940	3.890	3.959	3.890	2.850
M4 X 0.7	4.10	4.292	4.152	4.909	4.509	4.455	4.529	4.455	3.242
M5 X 0.8	5.20	5.333	5.173	6.039	5.577	5.520	5.597	5.520	4.134
M6 X 1.0	6.20	6.406	6.216	7.299	6.719	6.650	6.742	6.650	4.917
M7 X 1.0	7.20	7.406	7.216	8.299	7.719	7.650	7.742	7.650	5.917
M8 X 1.0	8.20	8.406	8.216	9.299	8.719	8.650	8.742	8.650	6.917
M8 X 1.25	8.30	8.483	8.271	9.624	8.886	8.812	8.912	8.812	6.647
M9 X 1.25	9.30	9.483	9.271	10.624	9.886	9.812	9.912	9.812	7.647
M10 X 1.25	10.30	10.483	10.271	11.624	10.886	10.812	10.912	10.812	8.647
M10 X 1.5	10.30	10.561	10.325	11.949	11.061	10.974	11.089	10.974	8.376
M11 X 1.5	11.30	11.561	11.325	12.949	12.061	11.974	12.089	11.974	9.376
M12 X 1.25	12.30	12.483	12.271	13.624	12.898	12.812	12.926	12.812	10.647
M12 X 1.5	12.5	12.56	13.324	14.131	12.974	13.067	12.974	13.099	10.376
M12 X 1.75	12.40	12.644	12.379	14.273	13.236	13.137	13.271	13.137	10.106
M14 X 1.5	14.30	14.561	14.325	15.949	15.067	14.974	15.099	14.974	12.376
M14 X 2.0	14.40	14.733	14.433	16.598	15.406	15.299	15.444	15.299	11.835
M16 X 1.5	16.25	16.561	16.325	17.949	17.067	16.974	17.099	16.974	14.376
M16 X 2.0	16.50	16.733	16.433	18.598	17.406	17.299	17.444	17.299	13.835
M18 X 1.5	18.25	18.561	18.325	19.949	19.067	18.974	19.099	18.974	16.376
M18 X 2.0	18.50	18.733	18.433	20.598	19.406	19.299	19.444	19.299	15.835
M18 X 2.5	18.50	18.896	18.541	21.248	19.738	19.624	19.778	19.624	15.294
M20 X 1.5	20.25	20.561	20.325	21.949	21.067	20.974	21.099	20.974	18.376
M20 X 2.0	20.50	20.733	20.433	22.598	21.406	21.299	21.444	21.299	17.835
M20 X 2.5	20.50	20.896	20.541	23.248	21.738	21.624	21.778	21.624	17.294
M22 X 1.5	22.50	22.561	22.325	23.949	23.067	22.974	23.099	22.974	20.376
M22 X 2.0	22.50	22.733	22.433	24.598	23.406	23.299	23.444	23.299	19.835
M22 X 2.5	22.50	22.896	22.541	25.248	23.738	23.624	23.778	23.624	19.294
M24 X 2.0	24.25	24.733	24.433	26.598	25.414	25.299	25.454	25.299	21.835
M24 X 3.0	24.75	25.050	24.650	27.897	26.093	25.949	26.135	25.949	20.752
M27 X 3.0	27.50	28.050	27.650	30.897	29.093	28.949	29.135	28.949	23.752
M30 X 3.5	30.50	31.208	30.758	34.547	32.428	32.273	32.472	32.273	26.211
M33 X 3.5	33.50	34.208	33.758	37.547	35.428	35.273	35.472	35.273	29.211
M36 X 4.0	36.50	37.341	36.866	41.196	38.763	38.598	38.809	38.598	31.670
M39 X 4.0	39.50	40.341	39.866	44.196	41.763	41.598	41.809	41.598	34.670

\*Standard size drills are suggested even though in these sizes they vary slightly from minor diameter limits. Drill sizes are recommended only and test should be carried out to select the one suitable for the material involved.

**Countersinking:** It is recommended that a 120° countersink is provided before tapping to prevent a 'feather edge' at the start of the lead thread. When design prevents the use of a countersink, any feather edges or deformed material at the thread lead should be removed prior to tapping. This will facilitate insert installation and reduce the effects of removing the countersinking operation.



# Drilling, Tapping and Installation Depths

## Metric Thread Series

### Specifications for Drilling, Tapping and Installation depths

METRIC (ISO) BASIC LENGTH OF INSERT IN TERMS OF NOMINAL DIAMETER OF SCREW "D" THREAD SIZE	1D										2D										2 1/2 D										3D																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
	Q	R	S	T	T	Q	R	S	T	T	Q	R	S	T	T	Q	R	S	T	T	Q	R	S	T	T	Q	R	S	T	T	Q	R	S	T	T																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
	2.00	1.60	3.80	3.40	3.40	3.00	2.60	4.80	4.40	4.40	4.00	3.60	5.80	5.40	5.40	5.00	4.60	6.80	6.40	6.40	6.00	5.60	7.80	7.40	7.40	7.00	6.60	8.80	8.40	8.40	8.00	7.60	9.80	9.40	9.40	9.00	8.60	10.80	10.40	10.40	10.00	9.60	11.80	11.40	11.40																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
M2 X 0.4	2.00	1.60	3.80	3.40	3.40	3.00	2.60	4.80	4.40	4.40	4.00	3.60	5.80	5.40	5.40	5.00	4.60	6.80	6.40	6.40	6.00	5.60	7.80	7.40	7.40	7.00	6.60	8.80	8.40	8.40	8.00	7.60	9.80	9.40	9.40	9.00	8.60	10.80	10.40	10.40	10.00	9.60	11.80	11.40	11.40	11.00	10.60	12.80	12.40	12.40	12.00	11.60	13.80	13.40	13.40	13.00	12.60	14.80	14.40	14.40	14.00	13.60	15.80	15.40	15.40	15.00	14.60	16.80	16.40	16.40	16.00	15.60	17.80	17.40	17.40	17.00	16.60	18.80	18.40	18.40	18.00	17.60	19.80	19.40	19.40	19.00	18.60	20.80	20.40	20.40	20.00	19.60	21.80	21.40	21.40	21.00	20.60	22.80	22.40	22.40	22.00	21.60	23.80	23.40	23.40	23.00	22.60	24.80	24.40	24.40	24.00	23.60	25.80	25.40	25.40	25.00	24.60	26.80	26.40	26.40	26.00	25.60	27.80	27.40	27.40	27.00	26.60	28.80	28.40	28.40	28.00	27.60	29.80	29.40	29.40	29.00	28.60	30.80	30.40	30.40	30.00	29.60	31.80	31.40	31.40	31.00	30.60	32.80	32.40	32.40	32.00	31.60	33.80	33.40	33.40	33.00	32.60	34.80	34.40	34.40	34.00	33.60	35.80	35.40	35.40	35.00	34.60	36.80	36.40	36.40	36.00	35.60	37.80	37.40	37.40	37.00	36.60	38.80	38.40	38.40	38.00	37.60	39.80	39.40	39.40	39.00	38.60	40.80	40.40	40.40	40.00	39.60	41.80	41.40	41.40	41.00	40.60	42.80	42.40	42.40	42.00	41.60	43.80	43.40	43.40	43.00	42.60	44.80	44.40	44.40	44.00	43.60	45.80	45.40	45.40	45.00	44.60	46.80	46.40	46.40	46.00	45.60	47.80	47.40	47.40	47.00	46.60	48.80	48.40	48.40	48.00	47.60	49.80	49.40	49.40	49.00	48.60	50.80	50.40	50.40	50.00	49.60	51.80	51.40	51.40	51.00	50.60	52.80	52.40	52.40	52.00	51.60	53.80	53.40	53.40	53.00	52.60	54.80	54.40	54.40	54.00	53.60	55.80	55.40	55.40	55.00	54.60	56.80	56.40	56.40	56.00	55.60	57.80	57.40	57.40	57.00	56.60	58.80	58.40	58.40	58.00	57.60	59.80	59.40	59.40	59.00	58.60	60.80	60.40	60.40	60.00	59.60	61.80	61.40	61.40	61.00	60.60	62.80	62.40	62.40	62.00	61.60	63.80	63.40	63.40	63.00	62.60	64.80	64.40	64.40	64.00	63.60	65.80	65.40	65.40	65.00	64.60	66.80	66.40	66.40	66.00	65.60	67.80	67.40	67.40	67.00	66.60	68.80	68.40	68.40	68.00	67.60	69.80	69.40	69.40	69.00	68.60	70.80	70.40	70.40	70.00	69.60	71.80	71.40	71.40	71.00	70.60	72.80	72.40	72.40	72.00	71.60	73.80	73.40	73.40	73.00	72.60	74.80	74.40	74.40	74.00	73.60	75.80	75.40	75.40	75.00	74.60	76.80	76.40	76.40	76.00	75.60	77.80	77.40	77.40	77.00	76.60	78.80	78.40	78.40	78.00	77.60	79.80	79.40	79.40	79.00	78.60	80.80	80.40	80.40	80.00	79.60	81.80	81.40	81.40	81.00	80.60	82.80	82.40	82.40	82.00	81.60	83.80	83.40	83.40	83.00	82.60	84.80	84.40	84.40	84.00	83.60	85.80	85.40	85.40	85.00	84.60	86.80	86.40	86.40	86.00	85.60	87.80	87.40	87.40	87.00	86.60	88.80	88.40	88.40	88.00	87.60	89.80	89.40	89.40	89.00	88.60	90.80	90.40	90.40	90.00	89.60	91.80	91.40	91.40	91.00	90.60	92.80	92.40	92.40	92.00	91.60	93.80	93.40	93.40	93.00	92.60	94.80	94.40	94.40	94.00	93.60	95.80	95.40	95.40	95.00	94.60	96.80	96.40	96.40	96.00	95.60	97.80	97.40	97.40	97.00	96.60	98.80	98.40	98.40	98.00	97.60	99.80	99.40	99.40	99.00	98.60	100.80	100.40	100.40	100.00	99.60	101.80	101.40	101.40	101.00	100.60	102.80	102.40	102.40	102.00	101.60	103.80	103.40	103.40	103.00	102.60	104.80	104.40	104.40	104.00	103.60	105.80	105.40	105.40	105.00	104.60	106.80	106.40	106.40	106.00	105.60	107.80	107.40	107.40	107.00	106.60	108.80	108.40	108.40	108.00	107.60	109.80	109.40	109.40	109.00	108.60	110.80	110.40	110.40	110.00	109.60	111.80	111.40	111.40	111.00	110.60	112.80	112.40	112.40	112.00	111.60	113.80	113.40	113.40	113.00	112.60	114.80	114.40	114.40	114.00	113.60	115.80	115.40	115.40	115.00	114.60	116.80	116.40	116.40	116.00	115.60	117.80	117.40	117.40	117.00	116.60	118.80	118.40	118.40	118.00	117.60	119.80	119.40	119.40	119.00	118.60	120.80	120.40	120.40	120.00	119.60	121.80	121.40	121.40	121.00	120.60	122.80	122.40	122.40	122.00	121.60	123.80	123.40	123.40	123.00	122.60	124.80	124.40	124.40	124.00	123.60	125.80	125.40	125.40	125.00	124.60	126.80	126.40	126.40	126.00	125.60	127.80	127.40	127.40	127.00	126.60	128.80	128.40	128.40	128.00	127.60	129.80	129.40	129.40	129.00	128.60	130.80	130.40	130.40	130.00	129.60	131.80	131.40	131.40	131.00	130.60	132.80	132.40	132.40	132.00	131.60	133.80	133.40	133.40	133.00	132.60	134.80	134.40	134.40	134.00	133.60	135.80	135.40	135.40	135.00	134.60	136.80	136.40	136.40	136.00	135.60	137.80	137.40	137.40	137.00	136.60	138.80	138.40	138.40	138.00	137.60	139.80	139.40	139.40	139.00	138.60	140.80	140.40	140.40	140.00	139.60	141.80	141.40	141.40	141.00	140.60	142.80	142.40	142.40	142.00	141.60	143.80	143.40	143.40	143.00	142.60	144.80	144.40	144.40	144.00	143.60	145.80	145.40	145.40	145.00	144.60	146.80	146.40	146.40	146.00	145.60	147.80	147.40	147.40	147.00	146.60	148.80	148.40	148.40	148.00	147.60	149.80	149.40	149.40	149.00	148.60	150.80	150.40	150.40	150.00	149.60	151.80	151.40	151.40	151.00	150.60	152.80	152.40	152.40	152.00	151.60	153.80	153.40	153.40	153.00	152.60	154.80	154.40	154.40	154.00	153.60	155.80	155.40	155.40	155.00	154.60	156.80	156.40	156.40	156.00	155.60	157.80	157.40	157.40	157.00	156.60	158.80	158.40	158.40	158.00	157.60	159.80	159.40	159.40	159.00	158.60	160.80	160.40	160.40	160.00	159.60	161.80	161.40	161.40	161.00	160.60	162.80	162.40	162.40	162.00	161.60	163.80	163.40	163.40	163.00	162.60	164.80	164.40	164.40	164.00	163.60	165.80	165.40	165.40	165.00	164.60	166.80	166.40	166.40	166.00	165.60	167.80	167.40	167.40	167.00	166.60	168.80	168.40	168.40	168.00	167.60	169.80	169.40	169.40	169.00	168.60	170.80	170.40	170.40	170.00	169.60	171.80	171.40	171.40	171.00	170.60	172.80	172.40	172.40	172.00	171.60	173.80	173.40	173.40	173.00	172.60	174.80	174.40	174.40	174.00	173.60	175.80	175.40	175.40	175.00	174.60	176.80	176.40	176.40	176.00	175.60	177.80	177.40	177.40	177.00	176.60	178.80	178.40	178.40	178.00	177.60	179.80	179.40	179.40	179.00	178.60	180.80	180.40	180.40	180.00	179.60	181.80	181.40	181.40	181.00	180.60	182.80	182.40	182.40	182.00	181.60	183.80	183.40	183.40	183.00	182.60	184.80	184.40	184.40	184.00	183.60	185.80	185.40	185.40	185.00	184.60	186.80	186.40	186.40	186.00	185.60	187.80	187.40	187.40	187.00	186.60	188.80	188.40	188.40	188.00	187.60	189.80	189.40	189.40	189.00	188.60	190.80	190.40	190.40	190.00	189.60	191.80	191.40	191.40	191.00	190.60	192.80	192.40	192.40	192.00	191.60	193.80	193.40	193.40	193.00	192.60	194.80	194.40	194.40	194.00	193.60	195.80	195.40	195.40	195.00	194.60	196.80	196.40	196.40	196.00	195.60	197.80	197.40	197.40	197.00	196.60	198.80	198.40	198.40	198.00	197.60	199.80	199.40	199.40	199.00	198.60	200.80	200.40	200.40	200.00	199.60	201.80	201.40	201.40	201.00	200.60	202.80	202.40	202.40	202.00	201.60	203.80	203.40	203.40	203.00	202.60	204.80	204.40	204.40	204.00	203.60	205.80	205.40	205.40	205.00	204.60	206.80	206.40	206.40	206.00	205.60	207.80	207.40	207.40	207.00	206.60	208.80	208.40	208.40	208.00	207.60	209.80	209.40	209.40	209.00	208.60	210.80	210.40	210.40	210.00	209.60	211.80	211.40	211.40	211.00	210.60	212.80	212.40	212.40	212.00	211.60	213.80	213.40	213.40	213.00	212.60	214.80	214.40	214.40	214.00	213.60	215.80	215.40	215.40	215.00	214.60	216.80	216.40	216.40	216.00	215.60	217.80	217.40	217.40	217.00	216.60	218.80	218.40	218.40	218.00	217.60	219.80	219.40	219.40	219.00	218.60	220.80	220.40	220.40</