

Key:	
1. Overall Length	12. Chamfer Angle
2. Thread Length (Including Chamfer)	13. Rake Angle
3. Shank Length (Including Square)	14. Width of Land
4. Chamfer Length	15. Width of Flute
5. Shank Diameter	16. Radial Thread Relief
6. Length Of Driving Square	17. Web Diameter
7. Size Across Flars of Square	18. Spiral Point Rake Angle
8. Internal Centre (Female)	19. Spiral Point Angle
9. External Centre	20. Spiral Point Length
10. Back Taper	21. Angle of Spiral (Spiral Flute)
11. Point Diameter (Chamfer)	

Basic Sizes and Tolerances for Taps

If taps were manufactured to basic sizes they would have a very short life. The screw thread has a plus tolerance and the standard allows the taps to be made within this tolerance.

If you measure the outside diameter of a tap it will be approximately 1% larger than the nominal size i.e. a 10mm tap will measure 10.1mm. It can be misleading to measure the outside diameter of the bolt as it will be 2% smaller. The two cannot be compared.

The size of the tap cannot be judged by measuring the major diameter.

Limits of Tolerance

Tolerance is the amount of variation permitted in the manufacture of the tap and takes the form of a further addition to the minimum diameters.

The tolerances of the major and the minor diameters are not given in the tap standards, but the effective diameter is regarded as the most important element and thus the tolerance is rigidly specified.

Example for an M10 tap applying Class 2 thread tolerance.

Basic Effective (Pitch) Diameter	= 9.026
Minimum Oversize	= 0.042
Minimum Effective Diameter	= 9.06
Tap Tolerance	= 0.028
Maximum Effective Diameter	= 9.096
Basic Major Diameter	= 10.000
Minimum Oversize	= 0.056
Minimum Major Diameter	= 10.056

Maximum Major is not specified, common practice is to leave a small flat crest and not out to a sharp point.

Tapping Practice

Tap Drill Size

In the thread charts that follow the correct tapping size is given in the information. We also give the alternative maximum size, as with good modern drills the drilled hole can be small. On tough materials like stainless steel we recommend you take advantage of the extra allowance. It is especially important in deep holes of 2 times diameter and greater (drill sizes from BS1157 appendix "A").



TAPPING PRACTICE

LUBRICANTS

First class tapping can only be done with a copious supply of proper lubricant. Use of the correct lubricants is as important as the decision to use it, it must be kept clean and carefully directed into the hole being tapped, an ample supply is needed on the cutting edges, not only to disperse heat, but to aid in the formation and removal of chips.

SPEEDS

Efficient tapping has its optimum speed, see page 29 for an initial recommendation and guide. Exact figures cannot be given because of the variables such as machinability of the material being tapped, condition of the machine, depth, pitch and length of the thread, holding fixture or tapping attachment. From practical application adjust our recommendations up or down until optimum results are obtained.

When starting a tap do not force or retard the tap, or a bell mouthed hole will be produced with thin threads. Allow the tap to establish its own pitch.

During tapping of a deep hole, avoid the flutes becoming clogged with chips - breakage is inevitable in these circumstances, consider a fluteless tap for very deep holes.

Chip disposal is a large problem on taps of 12mm and smaller where flute space is restricted see description on spiral point and spiral flute taps below.

HAND TAPS

For hand tapping, the conventional set of 3 taps with straight flutes is recommended. It is essential that the tap is presented squarely to the work and that the taps are correctly aligned. When taps are used in a machine it is usual to use only the second lead. Using the bottom tap only, can cause problems and will significantly reduce the life of the tool.

SERIAL FORM HAND TAPS

These are also hand taps. The roughing tap is takes out half the thread area it is marked with a ring on the shank for identification. The Mid-Rougher will take out to 75% of the area of the thread, it is marked with two rings on the shank. Only the plain shanked Finish tap cuts SIZE. This form of hand tap is recommended for materials like stainless steel and large taps over 25mm in diameter make it possible to hand tap right up to 52mm Only two taps are supplied for fine pitch threads.

SPIRAL POINT TAPS

These taps are sometimes called GUN-Nosed, are made with a special leading flute ground at an angle to the tap axis. This left hand flute at the lead pushes the swarf ahead of the tap threads thus allowing the use of smaller flutes since chip clearance is not required. The result is therefore stronger taps which are suitable for through hole tapping in most materials. Blind hole tapping should only be attempted where there is sufficient room at the bottom of the hole to accommodate the swarf.

SPIRAL FLUTE TAPS

These taps have a continuous spiral flute the same hand as the thread, thus forcing the swarf up the hole. The most suitable applications are on blind holes in ductile materials with long continuous chips. Slower 15° spiral may be used on tougher materials.

PIPE TAPS

There are three types of ISO component Pipe Taps Threads:

1. **G** series threads (BSPF) this is a parallel fastening thread for BS2779 where pressure tight joints are not required.
2. **Rc** series (BSPT) threads where pressure tight joints are required. These taps are made to BS949 with ISO shanks and squares. Taper reamers are an advantage on tapping these threads and we stock 1:16 taper reamers for this application. Interrupted thread taps are also available for stainless and other work hardening materials.
3. **Rp** or **BSPPL** are undersize Parallel taps for use on BS21 gas tight application they have tapered plugs assembled into the parallel hole and are destructively dry sealing. We only supply these to order. Details are given on page 37.

AMERICAN PIPE TAPS

NPS taps can be used for NPSC & NPSM parallel threads. NPSC threads are internal couplings and may be used with sealant for low pressure pipe work. NPSM is used as a mechanical fastening thread.

NPSF are parallel undersize threads with truncated crests for dryseal use with tapered fitting.

NPT are standard taper taps and can be assembled with jointing for low pressure work. We can supply tapered pipe reamers to aid tapping, and interrupted thread taps for stainless and other work hardening materials.

NPTF similar to above but with truncated crests to effect a dryseal. We recommend the use of the tapered reamer when tapping this thread.



FLUTELESS ROLL (Cold Forming) TAPS

Fluteless or cold forming taps can be used in a wide variety of materials from steel, aluminium, copper and soft ductile brasses but will also cut stainless's and titanium and nickel materials. As these materials may tear rather than cut cleanly, they tend to clog the flutes of conventional taps. The fluteless tap offers an alternative forming by displacing the material instead of cutting. It should be noted that the biggest change is the requirement of a larger tapping drill, (see thread charts on page 30) the fluteless tap also can tap faster than a standard tap see (speed chart on page 29) Lubrication is of the utmost importance in thread forming, with an extreme pressure additive is advisable in soluble oils.

SOME COMMON REASONS FOR TAP FAILURES

Tap Cuts Oversize

1. Tap out of alignment with the hole or tap not running true.
2. Feed pressure on tap producing thin or deformed threads.
3. Drilled core hole to small see thread charts.
4. Incorrect tap for the material e.g.:
 - (a) Cutting rake too great,
 - (b) Incorrect thread relief,
 - (c) Chamfer lead too short.
5. Incorrect sharpening e.g. chamfer relief uneven or too excessive.

Tap Cutting Edges Chip

6. Tap hitting the bottom of a blind hole.
7. Tap reversing with swarf trapped.
8. Lubrication lacking or wrong quality or specification.
9. Material too hard, or abrasive for the tap type.

Rapid Tap Wear

10. Speed too fast also consider items 3, 4, and 8.

Poor Thread Finish

11. Tap has reached the extent of its life. Consider type of tap used, or items 3, 4, and 8.

Tap Breaks

12. Tap blocked with swarf, is it the correct type of tap, look at items 1, 3, 4c, 5, 6, 7, 8, 9, 10, and 11.

MATERIAL	Hardness	Straight Flute	Through Holes Spiral	Blind Holes Spiral	Fluteless
	Hb	M/min	M/min	M/min	M/Min
CARBON & ALLOY STEEL					
Mild Steel	<120	12 - 24	15 - 28	12 - 24	20 - 40
Low/Medium Carbon Steel	<200	11 - 20	16 - 24	10 - 18	18 - 35
Higher Carbon Steel	<250	8 - 12	10 - 16	8 - 12	12 - 25
Low Alloy Engineering Steel	<250	6 - 10	8 - 12	6 - 10	8 - 16
Alloy Steel - Heat Treated	>300		3 - 9	3 - 5	
Alloy Steel - Heat Treated	>350		3 - 7	2 - 5	
STAINLESS STEEL					
Free Cutting (magnetic) Ferritic	<250	6 - 10	8 - 12	5 - 9	10 - 16
Austenitic (Non Magnetic)	<250		5 - 9	4 - 7	8 - 14
Martensitic / Maraging Duplex Alloys	>300		4 - 6	2 - 5	5 - 8
CAST IRON					
Plain Grey Iron-Ferritic Malleable	<150	9 - 15	10 - 16		
Plain SG Iron-Pearlitic Malleable	<250	6 - 12	5 - 9		
Alloy SG Iron NiHard	>250	3 - 5	4 - 8		
TITANIUM					
Pure Titanium	<200	6 - 12	8 - 10	5 - 8	10 - 15
Titanium Alloys	>300		3 - 6	3 - 6	6 - 12
NICKEL					
Pure Nickel	<300	5 - 9	7 - 11	5 - 8	15 - 22
Nickel, Nimonic 75 Hasteloy Alloys	>300		3 - 7		
Nickel, Inconel718 Alloys	<350		1 - 4		
COPPER					
Pure Copper	<100	6 - 12		9 - 15	14 - 20
Alpha Brass (soft yellow)	<200	24 - 30			20 - 30
Beta Brass	>200	18 - 24			
High Tensile Bronze	<350	8 - 16	9 - 18b	8 - 16	
ALUMINIUM					
Wrought (soft) & Extruded	<150	15-25	25 - 35b	18 - 30	30 - 50
Wrought & Treated	>150	12-20	20 - 35b	16 - 25	25 - 40
Cast Low Silicon 5%	<150	10-15	15 - 22b	12 - 18	20 - 30
Cast High Silicon 10%	>150	8 - 12	10 - 18b	8 - 16	

b = Bright Finish Spiral Point Taps available on request.

Where no speed is given in Straight Flutes, we suggest use of serial form taps when hand tapping.

$$\text{Speed in RPM} = \frac{\text{Peripheral Meters/Min} \times 1000}{3.1416 (\pi) \times \text{Diameter}}$$

NOTE: Fluteless taps have special opening drill sizes, listed in the tap and thread tables from page 30 onwards.

ISO METRIC COARSE

M



Thread Form 60° ISO

Basic Radius "r" = 0.1443P

Height Int Thread "hn" = 0.54127P

Height Ext Thread "hs" = 0.61344P

Triangular Height H = 0.866025P

Nom Dia mm	Pitch mm	Effective Dia mm	Nut Max Core Dia mm	Flutless Tapping Drill Size mm	Tapping Drill Size mm	Clearance Drill Size mm
M1	0.25	0.838	0.785		0.75	1.05
M1.1	0.25	0.938	0.885		0.85	1.15
M1.2	0.25	1.038	0.985		0.95	1.25
M1.4	0.30	1.205	1.160		1.10	1.45
M1.6	0.35	1.373	1.321		1.25	1.65
M1.8	0.35	1.573	1.521		1.45	1.85
M2	0.40	1.740	1.679	1.80	1.60	2.05
M2.2	0.45	1.908	1.838		1.75	2.25
M2.5	0.45	2.208	2.138	2.30	2.05	2.60
M3	0.50	2.675	2.599	2.80	2.50	3.10
M3.5	0.60	3.110	3.010	3.20	2.90	3.60
M4	0.70	3.545	3.422	3.70	3.30	4.10
M5	0.80	4.480	4.334	4.60	4.20	5.10
M6	1.00	5.350	5.153	5.60	5.00	6.10
M7	1.00	6.350	6.153	6.50	6.00	7.20
M8	1.25	7.188	6.912	7.40	6.80	8.20
M9	1.25	8.188	7.912		7.80	9.20
M10	1.50	9.026	8.676	9.30	8.50	10.20
M12	1.75	10.026	10.441	11.20	10.20	12.20
M14	2.00	12.701	12.210		12.00	14.25
M16	2.00	14.701	14.210		14.00	16.25
M18	2.50	16.376	15.744		15.50	18.25
M20	2.50	18.376	17.774		17.50	20.25
M22	2.50	20.376	19.774		19.50	22.25
M24	3.00	22.051	21.252		21.00	24.25
M27	3.00	25.051	24.252		24.00	27.25
M30	3.50	27.727	26.771		26.50	30.50
M33	3.50	30.727	29.771		29.50	33.40
M36	4.00	33.402	32.270		32.00	36.50
M39	4.00	36.402	35.270		35.00	39.50
M42	4.50	39.077	37.799		37.50	42.50
M45	4.50	42.077	40.799		40.50	45.50
M48	5.00	44.752	43.297		43.00	48.50
M52	5.00	48.752	47.297		47.00	53.00
M56	5.50	52.428	50.796		50.50	57.00

Max core given for a 6H fit.

ISO METRIC FINE THREADS

 Thread form as **M** above.

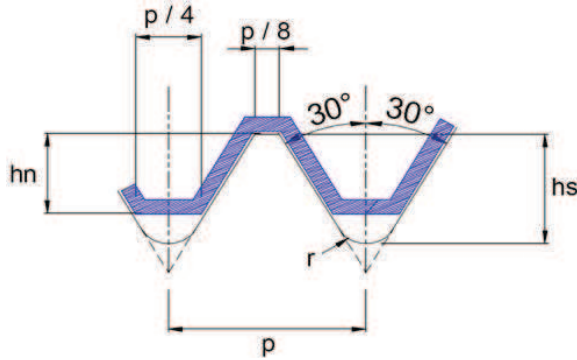
Mf or **M** may be used for identification, always include pitch Mf4 x 0.5.

Including Sparkplug, and Conduit. Preferred ISO Metric Fine are marked *

Nom Dia mm	Pitch mm	Effective Dia Nominal mm	Max Core Diameter mm	Tapping Drill mm	Clearance Drill mm
Mf3 *	0.35	2.773	2.721	2.65	3.10
Mf3.5	0.35	3.273	3.221	3.15	3.60
Mf4 *	0.50	3.675	3.599	3.50	4.10
Mf4.5	0.50	4.175	4.099	4.00	4.60
Mf5	0.50	4.675	4.599	4.50	5.10
M5 (Special)	0.75	4.513	4.378	4.20	5.10
Mf6	0.50	5.675	5.099	5.50	6.10
Mf6 *	0.75	5.513	5.378	5.20	6.10
Mf7	0.75	6.513	6.378	6.25	7.10
Mf8	0.75	7.513	7.378	7.20	8.20
Mf8 *	1.00	7.735	7.153	7.00	8.20
Mf9	1.00	8.350	8.153	8.00	9.20
Mf10	0.75	9.513	9.378	9.20	10.20
Mf10S/plug	1.00	9.350	9.153	9.00	10.20
Mf10 *	1.25	9.188	8.912	8.80	10.20
Mf11	1.00	10.350	10.153	10.00	11.20
Mf12	1.00	11.350	11.153	11.00	12.20
Mf12 * S/plug	1.25	11.188	10.912	10.80	12.20
Mf12	1.50	11.026	10.676	10.50	12.20
Mf14	1.00	13.350	13.153	13.00	14.25
Mf14 S/plug	1.25	13.188	12.912	12.80	14.25
Mf14 *	1.50	13.026	12.676	12.50	14.25
Mf16	1.00	15.350	15.153	15.00	16.25
Mf16 * Conduit	1.50	15.026	14.676	14.50	16.25
Mf18	1.00	17.350	17.153	17.00	18.25
Mf18 * S/plug	1.50	17.026	16.676	16.50	18.25
Mf18	2.00	16.701	16.210	16.00	18.25
Mf20	1.00	19.350	19.153	19.00	20.25
Mf20 * Conduit	1.50	19.026	18.676	18.50	20.25
Mf20	2.00	18.701	18.210	18.00	20.25
Mf22 *	1.50	21.026	20.676	20.50	22.25
Mf22	2.00	20.701	20.210	20.00	22.25
Mf24	1.50	23.026	22.676	22.50	24.25
Mf24 *	2.00	22.701	22.210	22.00	24.25
Mf25 Conduit	1.50	24.026	23.676	23.50	25.25
Mf27	1.50	26.026	25.676	25.50	27.25
Mf27 *	2.00	25.701	25.210	25.00	27.25
Mf30	1.50	29.026	28.676	28.50	30.50
Mf30 *	2.00	28.701	28.210	28.00	30.50
Mf32 Conduit	1.50	31.026	30.676	30.50	32.50
Mf33	2.00	31.701	31.210	31.00	33.50
Mf40 Conduit	1.50	39.026	38.676	38.50	40.50



Unified Coarse UNC, NC



Thread Form 60°

Basic Rad "r" = 0.1443P

Height Int Thread "hn" = 0.54127P

Height Ext Thread "hs" = 0.61344P

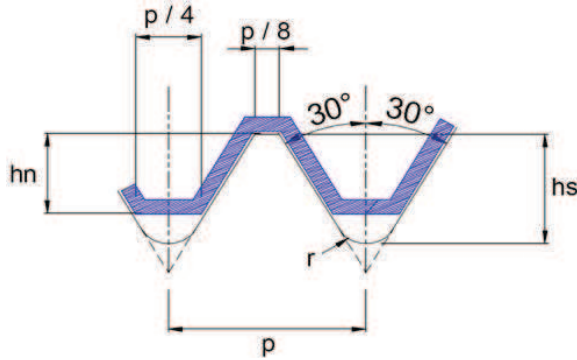
Triangular Height H = 0.866025P

p = Pitch = 1/TPI

Nom Size	T.P.I.	Nom Dia. inch	Basic Effective Dia inch	Max Core Dia mm	Fluteless Tapping Drill Size mm	Tapping Drill Size mm	Clear Drill Size mm
No1	64	0.0730	0.0629	1.582		1.55	1.95
No2	56	0.0860	0.0774	1.872	1.95	1.85	2.30
No3	48	0.0990	0.0855	2.146	2.25	2.10	2.65
No4	40	0.1120	0.0958	2.385	2.55	2.35	2.95
No5	40	0.1250	0.1088	2.697	2.85	2.65	3.30
No6	32	0.1380	0.1177	2.896	3.10	2.85	3.60
No8	24	0.1640	0.1437	3.531	3.80	3.50	4.30
No10	24	0.1900	0.1629	3.962	4.30	3.90	4.90
No12	24	0.2160	0.1889	4.597	4.90	4.50	5.60
1/4	20	0.2500	0.2175	5.268	5.80	5.10	6.50
5/16	18	0.3125	0.2764	6.734	7.30	6.60	8.10
3/8	16	0.3750	0.3344	8.164	8.80	8.00	9.70
7/16	14	0.4375	0.3911	9.550		9.40	11.30
1/2	13	0.5000	0.4500	11.01	11.90	10.80	13.00
9/16	12	0.5625	0.5084	10.40		12.20	14.50
5/8	11	0.6250	0.5660	14.33		13.50	16.25
3/4	10	0.7500	0.6850	16.83		16.50	19.25
7/8	9	0.8750	0.8028	19.75		19.50	22.50
1"	8	1.0000	0.9188	22.60		22.25	25.75
1-1/8	7	1.1250	1.0322	25.35		25.00	29.00
1-1/4	7	1.2500	1.1572	30.98		28.00	32.00
1-3/8	6	1.3750	1.2667	31.12		30.75	35.50
1-1/2	6	1.5000	1.3917	34.30		34.00	38.50
1-3/4	5	1.7500	1.6201	39.81		39.50	45.00
2"	4-1/2	2.0000	1.8557	45.60		45.00	51.00
2-1/4	4-1/2	2.2500	2.1057	51.95		52.00	58.00
2-1/2	4	2.5000	2.3376	57.58		57.00	65.00

Max core size given for a 2B fit.

Unified Fine UNF, UF



Thread Form 60°

Basic Radius "r" = 0.1443P

Height Int Thread "hn" = 0.54127P

Height Ext Thread "hs" = 0.61344P

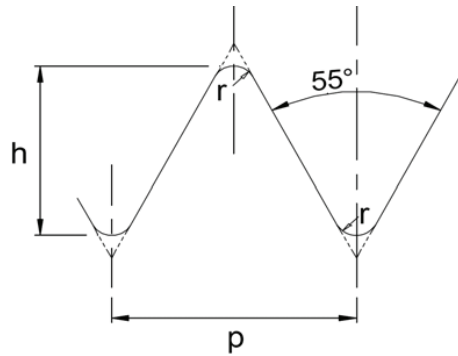
Triangular Height H = 0.866025P

p = Pitch = 1/TPI

Nom Size	T.P.I.	Nom Dia. inch	Basic Effective Dia inch	Max. Core Dia mm	Fluteless Tapping Drill Size mm	Tapping Drill Size mm	Clear Drill Size mm
No0	80	0.0600	0.0519	1.3056	1.35	1.25	1.60
No1	72	0.0730	0.0640	1.6129	1.70	1.55	1.95
No2	64	0.0860	0.7590	1.9126	2.00	1.90	2.30
N03	56	0.0990	0.0874	2.1971	2.30	2.15	2.65
No4	48	0.1120	0.0985	2.4587	2.55	2.40	2.95
No5	44	0.1250	0.1102	2.7407	2.90	2.70	3.30
No6	40	0.1380	0.1218	3.0226	3.20	2.95	3.60
No8	36	0.1640	0.1460	3.6068	3.80	3.50	4.30
No10	32	0.1900	0.1697	4.1656	4.50	4.10	4.90
No12	28	0.2160	0.1928	4.7244		4.70	5.60
1/4	28	0.2500	0.2268	5.5804	5.90	5.50	6.50
5/16	24	0.3125	0.2854	7.0383	7.50	6.90	8.10
3/8	24	0.3750	0.3479	8.6258	9.00	8.50	9.70
7/16	20	0.4375	0.4050	10.030	10.50	9.90	11.30
1/2	20	0.5000	0.4675	11.618	12.20	11.50	13.00
9/16	18	0.5625	0.5264	13.084		12.90	14.50
5/8	18	0.6250	0.5889	14.676		14.50	16.25
3/4	16	0.7500	0.7094	17.689		17.50	19.25
7/8	14	0.8750	0.8289	20.663		20.40	22.50
1"	12	1.0000	0.9459	23.569		23.25	25.75
1-1/8	12	1.1250	1.0709	26.744		26.50	29.00
1-1/4	12	1.2500	1.1959	29.919		29.50	32.00
1-3/8	12	1.3750	1.3209	33.094		32.75	35.50
1-1/2	12	1.5000	1.4459	36.269		36.00	38.50

Max core size given for 2B fit.

British Standard Whitworth



BSW

Thread Form 55°

Basic Radius "r" = 0.137239P

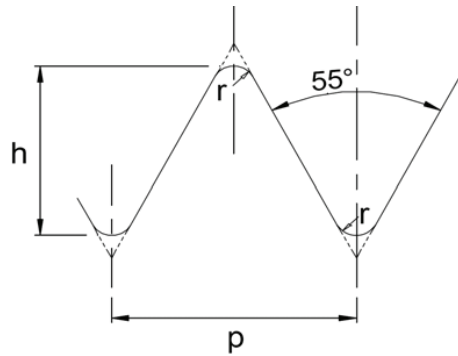
Basic Depth Of Thread = 0.640327P

p = Pitch = 1/TPI

Nom. Size	T.P.I.	Nominal Dia inch	Basic Effective Dia inch	Max Core Dia mm	Fluteless Tapping Drill Size mm	Tapping Drill Size mm
1/16	60	0.0625	0.0518	1.221		1.15
3/32	48	0.0938	0.0805	1.907		1.85
1/8	40	0.1250	0.1090	2.591	2.90	2.55
5/32	32	0.1562	0.1362	2.954		3.10
3/16	24	0.1875	0.1608	3.744	4.20	3.70
7/32	24	0.2188	0.1921	4.201		4.40
1/4	20	0.2500	0.2180	5.156	5.70	5.10
5/16	18	0.3125	0.2769	6.589	7.20	6.50
3/8	16	0.3750	0.3350	7.988	8.70	7.90
7/16	14	0.4375	0.3918	9.332		9.30
1/2	12	0.5000	0.4466	10.589		10.50
9/16	12	0.5625	0.5091	12.177		12.10
5/8	11	0.6250	0.5668	13.559		13.50
11/16	11	0.6875	0.6293	15.146		15.00
3/4	10	0.7500	0.6860	16.485		16.25
7/8	9	0.8750	0.8039	19.355		19.25
1"	8	1.0000	0.9200	22.149		22.00
1-1/8	7	1.1250	1.0335	24.831		24.75
1-1/4	7	1.2500	1.1585	28.006		28.00
1-3/8	6	1.3750	1.2683	29.505		30.50
1-1/2	6	1.5000	1.3933	33.703		33.50
1-3/4	5	1.7500	1.6219	39.136		39.00
2"	4½	2.0000	1.8577	44.877		44.50
2-1/4	4	2.2500	2.0899	50.465		51.00
2-1/2	4	2.5000	2.3399	56.815		57.00

Maximum core diameter given for medium fit.

British Standard Fine



BSF

Thread Form 55°

Basic Radius "r" = 0.137239P

Basic Depth Of Thread = 0.640327P

p = Pitch = 1/TPI

Nom Size	T.P.I.	Nom Dia inch	Basic Effective Dia inch	Max Core Dia mm	Fluteless Tapping Drill Size mm	Tapping Drill Size mm
3/16	32	0.1875	0.1675	4.006		4.00
7/32	28	0.2188	0.1959	4.676		4.60
1/4	26	0.2500	0.2254	5.398	5.90	5.30
5/16	22	0.3125	0.2834	6.817	7.40	6.80
3/8	20	0.3750	0.3430	8.331	9.00	8.30
7/16	18	0.4375	0.4019	9.764		9.70
1/2	16	0.5000	0.4600	11.163		11.10
9/16	16	0.5625	0.5225	12.751		12.70
5/8	14	0.6250	0.5793	14.094		14.00
11/16	14	0.6875	0.6418	15.682		15.50
3/4	12	0.7500	0.6966	16.939		16.75
7/8	11	0.8750	0.8168	19.909		19.75
1"	10	1.0000	0.9360	22.835		22.75
1-1/8	9	1.1250	1.0539	25.705		25.50
1-1/4	9	1.2500	1.1789	28.880		28.50
1-3/8	8	1.3750	1.2950	31.674		31.50
1-1/2	8	1.5000	1.4200	34.849		34.50
1-3/4	7	1.7500	1.6585	40.706		41.00
2"	7	2.0000	1.9085	47.056		47.00
2-1/4	6	2.2500	2.1433	52.753		53.00
2-1/2	6	2.5000	2.3933	59.103		58.00

Max core diameter given for medium fit.

British Association BA

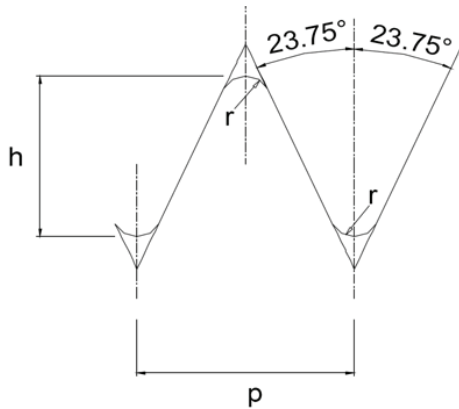
47½° Thread Angle

Thread Form

Basic Radius "r" = 0.1808346P

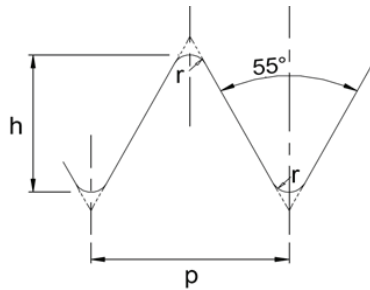
Basic Depth Of Thread = 0.6P

p = Pitch = 1/TPI



B.A. Num	Pitch mm	Nom Dia mm	Effective Dia Nominal mm	Max Core Dia mm	Fluteless Tapping Drill Size mm	Tapping Drill Size mm
14	0.23	1.00	0.8611	0.805		0.80
13	0.25	1.20	1.0490	0.995		0.98
12	0.28	1.30	1.1303	1.065		1.05
11	0.31	1.50	1.3157	1.245		1.20
10	0.35	1.70	1.4910	1.410	1.55	1.40
9	0.39	1.90	1.6662	1.575		1.55
8	0.43	2.20	2.4790	1.840	2.00	1.80
7	0.48	2.50	2.2098	2.100		2.05
6	0.53	2.80	2.4790	2.360	2.60	2.30
5	0.59	3.20	2.8448	2.710	2.95	2.65
4	0.66	3.60	3.2055	3.060	3.30	3.00
3	0.73	4.10	3.6601	3.495	3.80	3.40
2	0.81	4.70	4.2139	4.035	4.40	4.00
1	0.90	5.30	4.7600	4.560		4.50
0	1.00	6.00	5.3975	5.175	5.60	5.10

B.A. Threads are basically a metric thread based on 6mm With the diameter reducing by approx. 88% on each step and the pitch reducing by 90% to give a useful step to the next size for instrument, watch and clock use.



Thread Form 55° (Whitworth)

Basic Radius "r" = 0.137239P

Basic Depth Of Thread = 0.640327P

p = Pitch = 1/TPI

**British Standard Pipe Fastener
"G" Series, BSPF, BSP (Medium Class)**

Nom Size	T.P.I.	Major Basic Dia. mm	Effective Dia. Nominal mm	Max Core Dia. mm	Fluteless Tapping Drill Size mm	Tapping Drill Size mm
1/16	28	7.722	7.142	6.843		6.80
1/8	28	9.728	9.147	8.848	9.25	8.80
1/4	19	13.157	12.301	11.890	12.60	11.80
3/8	19	16.662	15.806	15.395	16.10	15.25
1/2	14	20.955	19.794	19.172		19.00
5/8	14	22.911	21.750	21.128		21.00
3/4	14	26.441	25.279	24.658		24.50
7/8	14	30.201	29.040	28.418		28.25
1"	11	33.249	31.770	30.931		30.75
1-1/4	11	41.910	40.431	39.592		39.50
1-1/2	11	47.803	46.324	45.485		45.00
1-3/4	11	53.746	52.268	51.428		51.00
2"	11	59.614	58.135	57.296		57.00
2-1/4	11	65.710	64.232			62.75
2-1/2	11	75.184	73.705			72.50

Rp (BSP PI)

Reduced effective diameter for BS 21 Gas fittings.

Nom Size	T.P.I.	Major Minimum Dia. mm	Special Effective Taper Gauge		Max Core Dia. mm	Tapping Drill Size mm
			Nom mm	Turns of Gauge		
1/8	28	9.685	9.147	±1¼	8.637	8.60
1/4	19	13.094	12.301	±1¼	11.549	11.50
3/8	19	16.599	15.806	±1¼	15.054	15.00
1/2	14	20.869	19.794	±1¼	18.773	18.75
3/4	14	26.355	25.281	±1¼	24.259	24.25
1"	11	33.140	31.770	±1¼	30.471	30.40
1-1/4	11	41.801	40.432	±1¼	39.132	39.00
1-1/2	11	47.694	46.325	±1¼	45.025	45.00
2"	11	59.505	58.136	±1¼	56.836	56.75

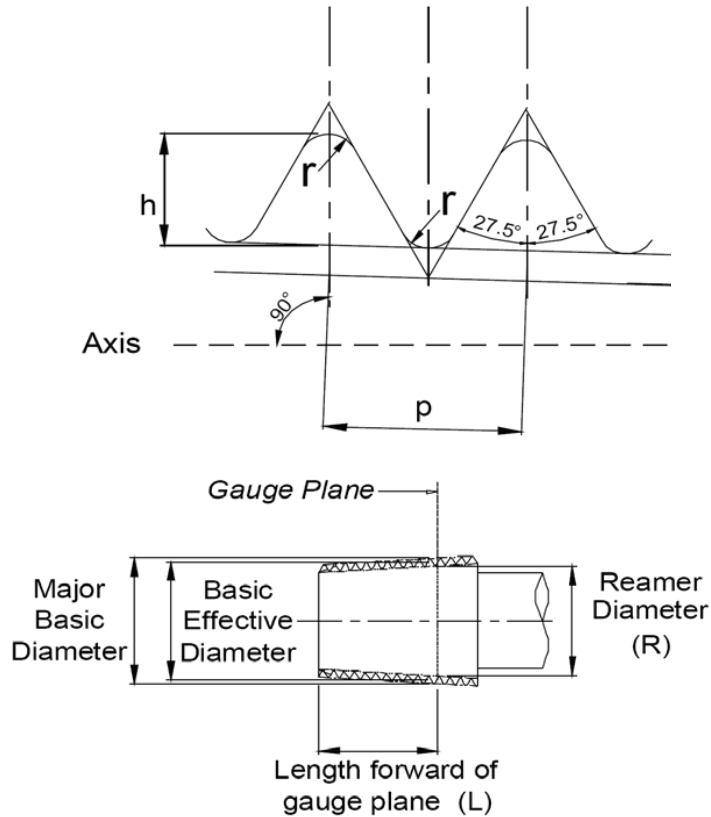
Taps for Rp are supplied only to special order.

These are made to a negative tolerance on the nominal.

Parallel tapped hole - use tapered notch gauge.

British Standard Pipe Taper Rc (BSPT)

Thread Form 55°, Taper 1 in 16 on Diameter, Basic Radius "r" = 0.137278p, Basic Depth of Thread "h" = 0.640327p, "p" = 1/TPI



Nom Size	T.P.I.	Major Basic Dia. mm	Effective Dia. At Gauge P. mm	Position of Gauge "L" on tap mm	Ream Dia. (R) at "L" mm	Tapping with Reamer mm	Drill Size without Reamer mm
1/16	28	7.723	7.142	10.1	6.56		6.40
1/8	28	9.728	9.147	10.1	8.57	8.00	8.40
1/4	19	13.157	12.301	15.0	11.45	10.80	11.20
3/8	19	16.662	15.806	15.4	14.95	14.25	14.75
1/2	14	20.955	19.793	20.5	18.63	17.75	18.25
3/4	14	26.441	25.279	21.8	24.12	23.00	23.75
1"	11	33.249	31.770	26.0	30.29	29.00	30.00
1-1/4	11	41.910	40.431	28.3	38.95	37.50	38.50
1-1/2	11	47.803	46.324	28.3	44.85	43.50	44.50
2"	11	59.614	58.135	32.7	56.65	55.00	56.00
2-1/2	11	75.184	73.705	37.1	72.23	70.00	71.00

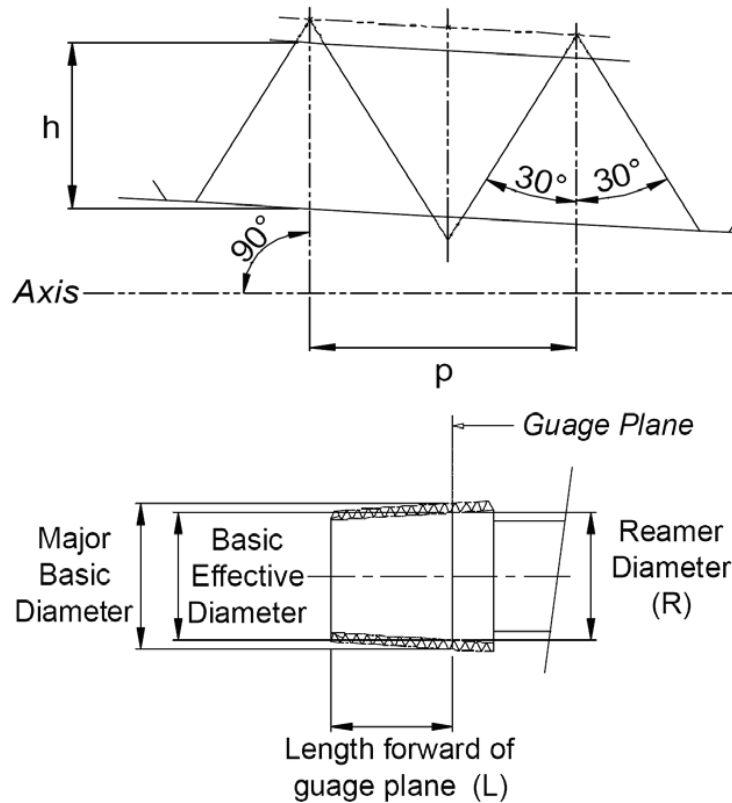
Position of gauge plane "L" is \pm one thread on the tap.

We strongly recommend the use of the reamer for Rc threads.

1:16 taper pipe reamers are available in the reamer section of the catalogue.

NPT National Pipe Taper (API, ANPT, Briggs Taper)

Thread Form 60°, Taper 1 in 16 on Diameter, Basic Depth of Thread "h" = 0.8p, Pitch "p" = 1/TPI



Nom Size	T.P.I.	Outside Pipe Dia. inch	Effective Dia. at Gauge inch	Position of Gauge "L" on Tap inch*	Ream Dia. (R) at "L" inch	Tapping Drill Size with Reamer mm	Drill Size without Reamer mm
1/16	27	0.313	0.2812	0.472	0.2515	6.00	6.30
1/8	27	0.405	0.3736	0.474	0.3440	8.40	8.70
1/4	18	0.540	0.4916	0.687	0.4472	10.70	11.10
3/8	18	0.675	0.6270	0.694	0.5826	14.25	14.50
1/2	14	0.840	0.7784	0.899	0.7213	17.50	18.00
3/4	14	1.050	0.9889	0.904	0.9317	22.75	23.25
1"	11½	1.315	1.2386	1.078	1.1691	28.50	29.00
1-1/4	11½	1.660	1.5834	1.106	1.5138	37.50	38.00
1-1/2	11½	1.900	1.8223	1.119	1.7528	43.50	44.00
2"	11½	2.375	2.2960	1.103	2.2267	55.00	56.00

* up to 3/4 ± 1/16", 1" and over ± 3/32"

We strongly recommend the use of the reamer for NPT Threads.
1:16 taper pipe reamers are available in the reamer section of the catalogue.