



### British Standard Cycle thread (BSC)

This thread is identical in thread form to the CEI system which it replaced. All taps and dies currently available conform to the BSC system although there is ever-increasing pressure on the few remaining British cycle manufacturers to adopt the metric system.

The reader would be well advised to purchase a set of cycle thread (BSC) taps and dies while they are still available. Generally such sets include the following sizes:-

- 1/4 in. x 26 tpi (3 taps and one die)
- 5/16 in. x 26 tpi (3 taps and one die)
- 3/18 in. x 26 tpi (3 taps and one die)
- 7/16 in. x 26 tpi (3 taps and one die)
- 1/2 in. x 26 tpi (3 taps and one die)

Three taps for each diameter comprise a taper, second, and plug tap. At the time of writing most of the odd sizes are available, such as 1.290 x 24 tpi left hand (for sprocket locking rings), and certain 20 tpi tools. Obviously, with falling demand, this situation cannot continue indefinitely.

### Spark plug threads

Recommended by the British Standards Institution for sparking plug threads, the following tables apply to most vintage motorcycles:-

CYCLE ENGINEERS' INSTITUTE THREAD				
60° ANGLE THREAD, ROUNDED AT TOP AND BOTTOM				
DIA.	THREADS PER in.	WIRE GAUGE	CORE DIA.	APPLICATIONS
0.056	62	17	0.0388	SPOKES
0.064	62	16	0.0468	"
0.072	62	15	0.0548	"
0.080	62	14	0.0628	"
0.092	56	13	0.0729	"
0.104	44	12	0.0798	"
0.125	40	—	0.0984	SMALL SCREWS
0.154	40	—	0.1274	CHAIN COUPLINGS
0.175	32	—	0.1417	—
0.1875	32	—	0.1542	CHAIN ADJUSTERS, MISC. SCREWS
0.250	26	—	0.2091	CRANK LOTTERS
0.266	26	—	—	—
0.281	26	—	—	—
0.3125	26	—	0.2715	FRONT WHEEL SPINDLES, HEAD PINS, SADDLE STEM BOLTS ETC.
0.375	26	—	0.3341	REAR WHEEL SPINDLES.
0.5625	20	—	0.448	PEDAL PINS R.H AND L.H.
0.9675	30	—	0.932	STEERING COLUMNS
1.000	26	—	0.959	" "
1.290	24	—	1.2456	HUB LOCK-RINGS, L.H.
1.370	24	—	1.3256	HUB CHAIN WHEELS
1.4375	24	—	1.393	HUBS, L.H.
1.500	24	—	1.4556	CHAIN WHEELS

# CHAPTER ONE

SPARKING PLUG THREADS							
THE STANDARD SPARKING PLUG THREAD ADOPTED BY MOST MOTORCYCLE MAKERS WAS IN ACCORDANCE WITH THE SYSTEME INTERNATIONAL (SI) EXCEPT THAT THE PITCH DIFFERS :-							
14 mm PLUG THREAD = 1.25 mm PITCH							
18 mm " " = 1.50 mm PITCH							
PLUG SIZE	PITCH	FULL DIA.		EFFECTIVE DIA.		CORE DIA.	
		PLUG	TAPPED HOLE	PLUG	TAPPED HOLE	PLUG	TAPPED HOLE
14 mm	1.25	13.977	14.125	13.035 TO 13.165	13.188 TO 13.278	12.250	12.390
		17.950 TO 17.750	18.337 TO 18.162	16.976 TO 16.776	17.201 TO 17.026	15.839 TO 15.639	16.226 TO 16.051
(ALL DIMENSIONS IN MM)							
NOTE :-							
THE FOLLOWING SIZES ARE OCCASIONALLY ENCOUNTERED :							
3/8 in AMERICAN THREAD (A.L.A.M.)							
1/2 in GAS TAPER (LODGE TYPE AF)							
12 mm, 10mm (LODGE TYPES C12/C10 CL10)							
3/8 in x 24 TPI MODEL PLUGS							

BRITISH STANDARD CYCLE THREAD						
FORMERLY KNOWN AS THE CEI THREAD, THE FORM IS IDENTICAL (60° ANGLE)						
DIA.	THREADS PER IN.	PITCH	THREAD DEPTH	DIAMETERS		
				FULL	EFFECTIVE	CORE
1/8	40	.025	.0133	.125	.1117	.0984
5/32	32	.03125	.0166	.1563	.1397	.1231
3/16	32	.03125	.0166	.1875	.1709	.1543
1/4	26	.03846	.0205	.2188	.1983	.1778
5/16	"	"	"	.250	.2295	.2090
3/8	"	"	"	.2813	.2608	.2403
7/16	"	"	"	.3125	.2920	.2715
1/2	"	"	"	.375	.3545	.3340
5/8	"	"	"	.4375	.4170	.3965
3/4	"	"	"	.500	.4795	.4590
7/8	"	"	"	.5625	.5420	.5215
1 1/8	"	"	"	.625	.6045	.5840
1 1/4	"	"	"	.6875	.6670	.6465
1 1/2	"	"	"	.750	.7295	.7090
SPECIAL SIZES						
DIA.	THREADS PER IN.	PITCH	APPLICATION			
1 1/4	26	.03846	BICYCLE AND MOTOR CYCLE COTTERS			
7/8	24	.04167	SMALL STEERING COLUMNS			
3/32	30	.03333	STEERING COLUMNS (CYCLE)			
1.000	24	.04167	" " " "			
1 1/8	26	.03846	STEERING COLUMNS (MOTOR CYCLE)			
1.290	24 L.H.	.04167	REAR HUB/SPROCKET LOCK RINGS			
1.370	24	.04167	BOTTOM BRACKETS L.H. AND R.H. THREAD			
1.450	26	.03846	" " " "			
1 1/16	24 L.H.	.04167	SPROCKET CENTRES			
1 5/8	24	.04167	" " " "			

BSW THREAD THREAD ANGLE 55°					
DIA. in.	TPI	PITCH (in)	CORE (in)	TAPPING DRILL	CLEARANCE DRILL
3/16	24	.04167	.1341	3.7mm	4.9mm
7/32	24	.04167	.1654	4.5mm	5.7mm
1/4	20	.05000	.1860	5.1mm	6.5mm
5/16	18	.05556	.2413	6.5mm	8.1mm
3/8	16	.0625	.2950	5/16 in	9.7mm
7/16	14	.07143	.3461	9.3mm	11.3mm
1/2	12	.08333	.3932	10.5mm	13.0mm
9/16	12	.08333	.4557	12.1mm	37/64 in
5/8	11	.09091	.5086	13.5mm	41/64 in
11/16	11	.09091	.5711	19/32 in	45/64 in
3/4	10	.1000	.6220	41/64 in	49/64 in
13/16	10	.1000	.6844	18 mm	53/64 in
7/8	9	.11111	.7328	19.25mm	57/64 in
1	8	.1250	.8400	22mm	1 1/64 in

TAPPING DRILLS FOR CYCLE THREAD					
SIZE	T.P.I.	DIA.	TAPPING DRILLS		
			SIZE	DIA.	
17swg	62	.056	61	.0390	EARLY 'CUT' SPOKES (ie. NOT ROLLED)
16 "	62	.064	3/64 in	.0469	
15 "	62	.072	54	.0550	
14 "	62	.080	52	.0635	
13 "	56	.092	49	.0730	
12 "	44	.104	46	.0810	
1/8 in	40	.125	39	.0995	APPROX. METRIC EQUIVALENTS
.154 in	40	.154	30	.1285	
.175 in	32	.175	27	.1417	
3/16 in	32	.185	5/32 in	.1562	
1/4 in	26	.250	No.3	.2130	
.266 in	26	.266	No.1	.2280	
.281 in	26	.281	Letter D	.2460	
5/16 in	26	.3125	" J	.2770	
3/8 in	26	.375	" R	.3390	
9/16 in	20	.562	33/64 in	.5156	
1 in	26	1.000	31/32 in	.9687	
1.290 in	24	1.290	1/4 in	1.2500	
1.370 in	24	1.370	1 21/64 in	1.3281	
1 7/16 in	24	1.4375	1 13/32 in	1.4062	
1 1/2 in	24	1.500	1 15/32 in	1.4687	

## British Standard Whitworth (BSW)

BSW threads are likely to be found in crankcases and other aluminium components. Sometimes BSW nuts and bolts were used for minor applications such as mudguard stay bolts, saddle mountings and acetylene lamp fittings. It is not good practice to thread engine bolts BSW as the nuts are almost

certain to vibrate loose.

Together with BSF components the Whitworth thread, first formulated in 1841 by Joseph Whitworth, is gradually being phased out. Non-preferred threads are what the suppliers call them these days and it is anticipated that the metric

## SCREW THREADS FOR THE VINTAGENT

system will eventually apply to all threaded fasteners.

### British Standard Fine (BSF)

First introduced in 1908, the BSF series of threads complements the BSW range and is used when finer pitches are required. Popular with motorcycle manufacturers.

It is worth noting that the  $\frac{3}{16}$  BSF size can be confused with 2BA, having the same diameter. The pitches are different and so screws are not interchangeable. This point is worth remembering when overhauling electrical fittings and accessories.

BSF THREAD. THREAD ANGLE 55°					
DIA. (in)	TPI	PITCH (in)	CORE (in)	TAPPING DRILL	CLEARANCE DRILL
$\frac{3}{16}$	32	.03125	.1475	No. 23 OR 4mm	4.9mm
$\frac{7}{32}$	28	.03571	.1730	No. 15 OR 4.6mm	5.7mm
$\frac{1}{4}$	26	.03846	.2008	No. 4 OR $\frac{13}{64}$ in	6.5mm
$\frac{9}{32}$	26	.03846	.2320	B OR 6mm	7.5mm
$\frac{5}{16}$	22	.04545	.2543	G OR 6.8mm	8.1mm
$\frac{3}{8}$	20	.0500	.3110	D OR 8.3mm	9.7mm
$\frac{7}{16}$	18	.05556	.3663	$\frac{3}{8}$ in	11.3mm
$\frac{1}{2}$	16	.0625	.4200	$\frac{27}{64}$ in OR 11mm	13.0mm
$\frac{9}{16}$	16	.0625	.4825	$\frac{31}{64}$ in OR 12.5mm	$\frac{37}{64}$ in
$\frac{5}{8}$	14	.07143	.5336	$\frac{35}{64}$ in OR 14mm	$\frac{41}{64}$ in
$\frac{11}{16}$	14	.07143	.5961	$\frac{39}{64}$ in OR 15.5mm	$\frac{45}{64}$ in
$\frac{3}{4}$	12	.08333	.6432	$\frac{21}{32}$ in OR 16.75mm	$\frac{49}{64}$ in
$\frac{13}{16}$	12	.08333	.7057	$\frac{23}{32}$ in OR 18.25mm	$\frac{53}{64}$ in
$\frac{7}{8}$	11	.09091	.7586	$\frac{25}{32}$ in OR 19.85mm	$\frac{57}{64}$ in
1	10	.1000	.8720	$\frac{57}{64}$ in OR 22.75mm	$1\frac{1}{64}$ in

### British Association (BA) threads

Many small screws on motorcycle fittings are of BA type. This thread series has been with us for a long time — it was originally formulated in 1884 and standardised in 1903. Although screws as tiny as .013 in. in diameter (23 BA) were mentioned in the original tables it is most unlikely that these will be encountered. Most motorcyclists will be familiar with 2BA and 4BA screws, which are often found in electrical components. Some "tin" primary chaincases are fastened together with a myriad of small BA screws.

BA THREAD. THREAD ANGLE 47½°					
BA No.	PITCH (in)	BASIC MAJOR DIA. (in)	CORE DIA. (in)	TAPPING DRILL	CLEARANCE DRILL
0	.0394	.2362	.1890	5.1mm	6.1mm
1	.0354	.2087	.1661	4.5mm	5.4mm
2	.0319	.1850	.1468	4.0mm	4.8mm
3	.0287	.1614	.1268	3.4mm	4.2mm
4	.0260	.1417	.1106	3.0mm	3.7mm
5	.0232	.1260	.0980	2.65mm	3.3mm
6	.0209	.1102	.0850	2.3mm	2.9mm
7	.0189	.0984	.0756	2.05mm	2.6mm
8	.0169	.0866	.0661	1.8mm	2.25mm

Notes:-  
THE BA SERIES CONTINUES DOWN TO No.16 (.0266in) DIAMETER BUT IT IS UNLIKELY THE SMALLER SIZES WILL BE ENCOUNTERED.  
No. '0' BA IS, FOR PRACTICAL PURPOSES, INTERCHANGEABLE WITH 6mm, ALTHOUGH THREAD ANGLES DIFFER.

### Foreign threads

It is not generally realised that several metric thread systems existed at one time. Owners of early continental machines may find screws which do not correspond with the modern ISO metric system.

In the early days (1898) the Zurich Congress standardised a thread system which came to be known as the International System but this did not deter other countries from adopting their own variations on the theme. Thus we had the French Series Metric Thread, which had screws under 3

UNF (COMMON SIZES) THREAD ANGLE 60°					
DIA. (in)	TPI	BASIC DIA. (in)	CORE (in)	TAPPING DRILL	CLEARANCE DRILL
No. 8	36	.1640	.1299	$\frac{9}{64}$ in	4.3mm
$\frac{1}{4}$	28	.2500	.2062	5.5mm	6.5mm
$\frac{5}{16}$	24	.3125	.2614	6.9mm	8.1mm
$\frac{3}{8}$	24	.3750	.3239	8.5mm	9.7mm
$\frac{7}{16}$	20	.4375	.3762	9.9mm	11.3mm
$\frac{1}{2}$	20	.5000	.4387	11.5mm	13mm
$\frac{9}{16}$	18	.5625	.4943	12.9mm	$\frac{37}{64}$ in
$\frac{5}{8}$	18	.6250	.5568	14.5mm	$\frac{41}{64}$ in
$\frac{3}{4}$	16	.7500	.6733	$1\frac{1}{16}$ in	$\frac{49}{64}$ in
$\frac{7}{8}$	14	.8750	.7874	.804in	$\frac{57}{64}$ in
1	12	1.0000	.8978	23.25mm	$1\frac{1}{64}$ in

## CHAPTER ONE

mm of both 50 degrees and 60 degrees thread angle, Metric Fine Thread (German and Swiss) and French Fine Thread.

All this may sound confusing. However, suffice it to say that most of these strange threaded fasteners can be replaced with modern metric bolts. In some cases it may be necessary to run a tap through the original threaded object to accept a modern bolt. There may be a slight difference in pitches but this is of little consequence.

### American threads

The National Coarse and National Fine series of threads were standardised in 1918 at a USA Congress Commission, so amalgamating the traditions of the American Society of Mechanical Engineers (ASME) and the Society of Automotive Engineers (SAE).

Today, American standard threads are called the UNC and UNF series (refer to table). They are rarely found on British or continental machines but are of course encountered on motorcycles made in the country of origin.

UNC (COMMON SIZES) THREAD ANGLE 60°					
DIA. (in)	TPI	BASIC DIA. (in)	CORE (in)	TAPPING DRILL	CLEARANCE DRILL
No8	32	.1640	.1257	3.5mm	4.3mm
$\frac{1}{4}$	20	.2500	.1887	5.2mm	6.5mm
$\frac{5}{16}$	18	.3125	.2443	6.6mm	8.1mm
$\frac{3}{8}$	16	.3750	.2983	8.0mm	9.7mm
$\frac{7}{16}$	14	.4375	.3499	9.4mm	11.3mm
$\frac{1}{2}$	13	.5000	.4056	10.8mm	13mm
$\frac{9}{16}$	12	.5625	.4603	12.2mm	$\frac{37}{64}$ in
$\frac{5}{8}$	11	.6250	.5135	13.5mm	$\frac{41}{64}$ in
$\frac{3}{4}$	10	.7500	.6273	16.5mm	$\frac{49}{64}$ in
$\frac{7}{8}$	9	.8750	.7387	$\frac{49}{64}$ in	$\frac{57}{64}$ in
1	8	1.0000	.8466	22.5mm	$1\frac{1}{64}$ in