



## PERFORMANCE

Reliability

## PRODUCTIVITY

Efficiency

## INNOVATION

Advanced Technology



### FORBES & COMPANY LTD.

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## High Performance Machining & Marking Tools

[www.totem-forbes.com](http://www.totem-forbes.com)



## FORBES & COMPANY LTD.



**Forbes Precision Tools** manufactures of High Speed Steel, Carbon Steel Threading Taps and Dies, Tungsten Carbide Rotary Burrs, Solid Carbide Tools and Spring Washer. **Precision Tools Group** is a part of **FORBES & COMPANY LTD**, which was started in 1767.

This division began its manufacturing during 1963 in collaboration with Nuckey Scott & Company Ltd. UK, the manufacturers of world famous "WARRIOR" brand of tools. The manufacturing of Tungsten Carbide Burrs began in 1968 with the technical know-how from B.O.Morris, U.K. Solid Carbide tools manufacturing began in 1997 under Joint operation with M.A.Ford, USA. The tools are manufactured under 'TOTEM' brand.

'TOTEM' is committed to being the leading manufacturer with quality and reliability for its customers worldwide, with its tools manufactured on latest CNC machines with strict quality procedures and skilled technical team. Also continuous investments are made to keep in pace with the latest technology developments. We had doubled our capacity in the last three years. 'TOTEM' Engineers are there to offer technical support & services to the customers. **At FORBES, the endeavors continue.....**



## HSS GROUND THREAD TAPS



<b>Range:</b>	1.6 mm - 120 mm, 1/16" - 3" Higher diameter on request
<b>Tolerance:</b>	4H, 6H, 7H, Zone2, Zone3, Zone4, Class1, Class2, Class3, Gh1 to Gh7.
<b>Surface Treatment:</b>	TiN/TiCN/TiAlN/Steam Tempered.
<b>Thread Forms:</b>	BSW/BSF/UNF/UNC/MM/BA/BSP/BSPT/BSCY/WF/ME/BSCON/NPT/NGT/ACME.
<b>Variety:</b>	Short machine taps, Serial form taps, Spiral point taps, Spiral fluted taps, Long shank machine taps, Nib taps, Custom made taps.

- Available in HSS & HSSE steel with coating / surface treatment to suit various applications.
- TAPS can be manufactured as per customer drawings.
- TAPS are available in RH and LH Threads.



*Silver cut*

## HIGH PERFORMANCE TAPS



SA

SB

SC

SD

- ▶ 'SA' Series – For through holes.
- ▶ 'SB' Series – For blind holes.
- ▶ 'SC' Series – For through and blind holes.
- ▶ 'SD' Series – For Ductile Materials

- ▶ Surface Treatment – TiN, TiAN, Steam Tempered.
- ▶ Specifications – Manufactured from cobalt grade High speed steel.
- ▶ Size Range – M3 To M24 (equivalent in inches)
- ▶ Thread Forms – MM/UNC/UNF.

### Features and Benefits

- ▶ Material Specific Tool geometry for optional performance.
- ▶ Consistent and Tight thread tolerance.
- ▶ Mass production and long tool life.
- ▶ Surface Treatment to suit application material group.
- ▶ High operating parameters suitable for CNC Machines.



## TUNGSTEN CARBIDE ROTARY BURRS



Fluting Style:



Standard Cut  
(Single Cut)

Supreme Cut  
(Double Cut)

Deluxe Cut  
(Diamond Cut)

Chip Breaker

Aluma Cut

### SHAPES

- ▶ Cylindrical
- ▶ Cylindrical with Endcut
- ▶ Cylindrical with Radius End
- ▶ Ball
- ▶ Oval
- ▶ Tree shape with Radius End
- ▶ Tree with pointed End
- ▶ Flame
- ▶ Cone with Radius End
- ▶ Cone
- ▶ RIM



Assorted set of 8 burrs (1/2" Head Dia)

● C8	- Cylindrical
● B6	- Cylindrical with radius end
● T3	- Tree shape pointed end
● TB3	- Tree shape radius end
● A3	- Conical shape pointed end
● K2	- Conical shape radius end
● S4	- Ball shape
● F4	- Flame shape

Also available in 3/8" Head Dia.

Suitable for Steel, Hardened tool Steel, Stainless Steel, Nickel based alloy, Titanium, Aluminium, Brass etc.  
Available in 3mm, 6mm, 8mm, 1/8" & 1/4" Shank.  
Long Shank Burrs upto 200mm in available.





## CARBON STEEL TAPS



### CARBON STEEL CUT THREADS TAPS

- Available in first grade high Carbon alloy steel
- Range:** M2 TO M50 1/16 " - 2"
- Tolerance:** 7H / Zone 5
- Thread Forms:** MM/BSW/BSF/BSB/BA/BSP/UNF/UNC/NPT/ME/BSCY/WF/BSPT
- Standards:** As per BS 949/1951 / ANSI B 949/1971
- Available in RH & LH Threads



## DIES AND DIENUTS



### ROUND DIES

- Available in HSS / Carbon Steel
- Ground thread & Cut thread Dies.

#### Range:

- SIZE:** 1.6mm to 100mm / 1/8" to 4"
- OUTER DIAMETER:** 16mm to 125mm / 13/16" to 5"

#### Types of Dies:

SOLID DIES (BUTTON)  
SPLIT DIES  
SCREW ADJUSTABLE DIES

#### Thread Forms:

BSW/BSF/BSB/UNF/UNC/MM/BSP/BSCON/BSCY/BA/WF/ME/BSPT/NPT

- Available in RH & LH Threads.

#### Standards:

BS1127 / DIN 223 / IS 1859

### DIENUTS

- Available in HSS / Carbon Steel.

#### Range:

M3 to M64 / 1/8" to 4"

#### Thread Forms:

MM/BSW/BSF/UNF/UNC/BSP/BSPT/NPT





## TAPS AND DIES CASE SETS

<b>Ref. No. : METRIC 1</b> Taps (Second) Dies Accessories	No. of Pieces : 20 M6x1, M8x1.25, M10x1.5, M12x1.75, M14x2, M16x2, M18x2.5, M20x2.5 1"OD - M6 to M10 / 1.1/2"OD - M12 to M20 Tap Wrenches - 2 nos Die Holders - 2 nos	Box Size : 390mm x 280mm x 40mm
<b>Ref. No. : METRIC 2</b> Taps (Tpr & Bot) Dies Accessories	No. of Pieces : 28 M6x1, M8x1.25, M10x1.5, M12x1.75, M14x2, M16x2, M18x2.5, M20x2.5 1"OD - M6 to M12 / 1.1/2"OD - M14 to M20 Tap Wrenches - 2nos Die Holders - 2 nos	Box Size : 395mm x 325mm x 40mm
<b>Ref. No. : METRIC 3</b> Taps (Tpr & Bot) Dies Accessories	No. of Pieces : 21 M3x0.5, M4x0.7, M5x0.8, M6x1, M8x1.25, M10x1.5 13/16"OD - M3 to M5 / 1"OD - M6 to M10 Tap Wrenches - 1 nos Die Holders - 2 nos	Box Size : 285mm x 220mm x 40mm
<b>Ref. No. : METRIC 4P</b> Taps (Tpr & Bot) Dies Accessories	No. of Pieces : 17 M2x0.4, M3x0.5, M4x0.7, M5x0.8, M6x1 13/16"OD - M3 to M6 Tap Wrenches - 1 nos Die Holders - 1 no	Box Size : 240mm x 200mm x 40mm
<b>Ref. No. : METRIC 4S</b> Taps (Tpr, Sec & Bot) Dies Accessories	No. of Pieces : 22 M2x0.4, M3x0.5, M4x0.7, M5x0.8, M6x1 13/16"OD - M3 to M6 Tap Wrenches - 1 nos Die Holders - 1 no	Box Size : 240mm x 200mm x 40mm
<b>Ref. No. : METRIC 5F</b> Taps (Tpr & Bot) Dies Accessories	No. of Pieces : 35 M6x0.75, M8x1, M10x1.25, M12x1.5, M14x1.5, M16x1.5, M18x1.5, M20x1.5, M22x1.5, M24x1.5 1"OD - M6 to M10 / 1.1/2"OD - M14 to M20 / 2"OD - M22 to M24 Tap Wrenches - 2 nos Die Holders - 3 nos	Box Size : 480mm x 390mm x 40mm
<b>Ref. No. : METRIC 5C</b> Taps (Tpr & Bot) Dies Accessories	No. of Pieces : 35 M6x1, M8x1.25, M10x1.5, M12x1.75, M14x2, M16x2.5, M18x2.5, M20x2.5, M22x2.5, M24x3 1"OD - M6 to M10 / 1.1/2"OD - M14 to M20 / 2"OD - M22 to M24 Tap Wrenches - 2 nos Die Holders - 3 nos	Box Size : 480mm x 390mm x 40mm
<b>Ref. No. : METRIC 6P</b> Taps (Tpr & Bot) Dies Accessories	No. of Pieces : 24 M3x0.5, M4x0.7, M5x0.8, M6x1, M8x1.25, M10x1.5, M12x1.75 1"OD - M3 to M12 Tap Wrenches - 2 nos Die Holders - 1 no	Box Size : 390mm x 280mm x 40mm

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www.totem-forbes.com



## TAPS AND DIES CASE SETS

<b>Ref. No. : METRIC 6S</b> Taps (Tpr, Sec & Bot) Dies Accessories	No. of Pieces : 31 M3x0.5, M4x0.7, M5x0.8, M6x1, M8x1.25, M10x1.5, M12x1.75 1"OD - M3 to M12 Tap Wrenches - 2nos Die Holders - 1no.	Box Size : 390mm x 280mm x 40mm
<b>Ref. No. : METRIC 7</b> Taps (Tpr & Bot) Dies Accessories	No. Of Pieces : 18 M6x1, M8x1.25, M10x1.5, M11x1.5, M12x1.75 1"OD - M6 to M10 / 1.1/2"OD - M11 to M12 Tap Wrenches - 1nos Die Holders - 2nos	Box Size : 390mm x 280mm x 40mm
<b>Ref. No. : INCHES 1**</b> Taps (Tpr & Bot) Dies Accessories	No. of Pieces : 24 1/8", 3/16", 1/4", 5/16", 3/8", 7/16", 1/2" 1"OD - 1/8" to 1/2" Tap Wrenches - 2nos Die Holders - 1no.	Box Size : 390mm x 280mm x 40mm
<b>Ref. No. : INCHES 2*</b> Taps (Tpr & Bot) Dies Accessories	No. Of Pieces : 17 1/4", 5/16", 3/8", 7/16", 1/2" 1"OD - 1/4" to 1/2" Tap Wrenches - 1nos Die Holders - 1nos	Box Size : 396mm x 227mm x 40mm
<b>Ref. No. : INCHES 3*</b> Taps (Tpr & Bot) Dies Accessories	No. Of Pieces : 24 1/4", 5/16", 3/8", 7/16", 1/2", 5/8", 3/4" 1"OD - 1/4" to 3/8", 1.1/2" OD - 7/16" to 3/4" Tap Wrenches - 1nos Die Holders - 2nos	Box Size : 396mm x 227mm x 40mm
<b>Ref. No. : INCHES 4*</b> Taps (Tpr & Bot) Dies Accessories	No. Of Pieces : 32 1/4", 5/16", 3/8", 7/16", 1/2", 5/8", 3/4", 7/8", 1" 1"OD - 1/4" to 3/8" / 1.1/2" OD - 7/16" to 5/8" / 2" OD - 3/4" to 1" Tap Wrenches - 2nos Die Holders - 3nos	Box Size : 635mm x 380mm x 48mm
<b>Ref. No. : INCHES BA</b> Taps (Tpr & Bot) Dies Accessories	No. Of Pieces : 35 0BA, 1BA, 2BA, 3BA, 4BA, 5BA, 6BA, 7BA, 8BA, 9BA, 10BA 13/16"OD - 0BA to 10BA Tap Wrenches - 1nos Die Holders - 1nos	Box Size : 375mm x 227mm x 36mm

\* Available in BSW/BSF/UNC/UNF

\*\* Available in BSW/BSF

To order above please mention Ref. no. and Thread form required.

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www.totem-forbes.com



## High Performance Cutting Tools

### SOLID CARBIDE END MILLS



- ◀ Made from Ultrafine grade 12% cobalt carbide and micrograin grade 10% cobalt carbide.
- ◀ Ideal for CNC milling on tough or abrasive materials
- ◀ Application specific series available for machining of Stainless steel, Aluminum and Hardened steels upto 62RC.
- ◀ Available in 2,3, and 4 flute geometries of
  - ◀ Centre Cutting End Mills
  - ◀ Ball Nose End Mills
  - ◀ Stub Length End Mills & Ball Nose End Mills
  - ◀ Extended Length & Extra long End Mills
  - ◀ Long Reach End Mills
  - ◀ Rouging End Mills
  - ◀ Taper End Mills / Draft cutters
  - ◀ Corner radius End Mills
  - ◀ Hi-Helix End Mills
- ◀ Size range - 1mm 32mm (and equivalent sizes in inches )
- ◀ Surface treatment - TiN, TiAlN, TiCN coatings



## High Performance Cutting Tools

### SOLID CARBIDE DRILLS



#### JOBBER DRILLS:

- ◀ Ideal for Cast Iron, Aluminium, Bronze, Magnesium Alloys.
- ◀ Also available in stub length ensuring low deflection & vibration.
- ◀ **Size Range:** 1mm to 20mm (1mm to 12mm increment of 0.1mm / above 12mm increment of 0.5mm)

#### HI-TUFF DRILLS:

- ◀ Ideal for stainless steel , tool steel , titanium, nickel based alloys.
- ◀ Web thinned drill point reduces power requirements, lowers temperature & extends tool life.
- ◀ **Size Range:** 1mm to 20mm (1mm to 12mm increment of 0.1mm / above 12mm increment of 0.5mm)

#### THROUGH COOLANT DRILLS:

- ◀ Ideal for deep hole drilling on medium/low carbon steel, cast iron, stainless steel & aluminium.
- ◀ Available as per DIN 6537 & DIN 6535.
- ◀ **Size Range:** 4mm to 20mm (4mm to 12mm increment of 0.5mm / above 12mm increment of 1.0mm)

#### STEP DRILLS:

- ◀ Multiple diameter carbide step drills combine two or more separate operations, reducing costs & shortening overall machining time.
- ◀ Also available in through coolant design and TiAlN, TiN coatings.
- ◀ **Size:** As per customer drawings.





## High Performance Cutting Tools

### HIGH PERFORMANCE SOLID CARBIDE END MILLS AND DRILLS

PROTON™

HELITRON™



#### Features

- ▶ Proprietary High performance COATING
- ▶ High performance special geometry for longer contact time.
- ▶ Tried & tested performance on Harden Steel  $\geq 45Rc$  to 62 Rc
- ▶ Suitable for high speed machining up to  $Vc - 250mtrs/min$ .
- ▶ Common shank for tools  $< 3mm$ , reduced breakage

#### Advantages

- ▶ High performance milling solution for harden steel machining
- ▶ Extended tool life, more contact time per cutting edge.
- ▶ Improved surface finish on the work piece
- ▶ Competitive pricing
- ▶ Easy availability of complete range
- ▶ Increased tool performance reliability
- ▶ Trained Network of Application & Technical Specialists

#### Machining Parameters

- ▶ Speed -  $Vc = 150mtrs/min$  to  $250mtrs/min$
- ▶ Feed -  $0.15mm/rev.$  to  $0.20mm/rev$
- ▶ DOC -  $ae: 0.05mm - 0.15mm$   
 $ap: 0.05mm - 0.15mm$
- ▶ Coolant - Dry machining with air blast, Soluble oil
- ▶ Holding - Shrink fit, Hydro grip, Precision collets

#### Features

- ▶ New High performance CARBIDE
- ▶ Proprietary High performance COATING
- ▶ Special Geometry, 140 degree point, radius gash.
- ▶ Tried & tested performance on all ferrous materials
- ▶ Suitable for high speed drilling
- ▶ Common shank design for maximum rigidity

#### Advantages

- ▶ High performance drilling solution for all ferrous materials.
- ▶ Extended tool life, more holes per regrinding
- ▶ Improved hole finish & tolerances.
- ▶ Competitive pricing
- ▶ Easy availability of complete range.
- ▶ Increased tool performance reliability.
- ▶ Trained Network of Application & Technical Specialist.

#### Machining Parameters

- ▶ Speed -  $Vc = 120mtrs/min$  to  $150mtrs/min$
- ▶ Feed -  $0.15mm/rev.$  to  $0.20mm/rev$
- ▶ Coolant - Soluble oil
- ▶ Holding - Shrink fit, Hydro grip, Precision collets

# Bradma

## Conventional Marking Systems

### INTERCHANGEABLE STEEL TYPES AND NUMERATORS



#### Features

- ▶ Types made from High Quality special Tool Steel, Hard ened and tempered for high wear resistance with retention of toughness at the same time.
- ▶ Letters and Numbers formed by unique Cold forming process for longer tool life.
- ▶ Bevel Angels, Character Depth & "Bradma" Calligraphy also maximize Types' Life.
- ▶ Dull Nickel plated for longer rust free shelf life

#### Range

- ▶ 1 mm to 16 mm of Character Size.
- ▶ Fount Sets in Wooden Box packing in 60 & 100 Nos. in Alphabets and Numbers with special Characters
- ▶ Special Types:
  - Grooved, Segmental, Radial, Stepped, L-Shaped, T-Shaped, Low Stress, Convex, Concave
  - Special Calligraphy, Small Case
  - Male & Female embossing Types

#### Applications

- ▶ Suitable for marking on Steels, castings, forgings, non-ferrous metals, plastics etc. in Light, Medium & Heavy Engineering applications
- ▶ High Temperature markings
- ▶ Packaging & Pharmaceuticals : Carton & Blister pack marking, Collapsible Tubes of Ointment
- ▶ Consumer Goods : Tetra Pack, Toothpaste, Skin care Tubes' marking

#### Features

- ▶ Marking Wheels made from High Quality Special Grade Tool Steels
- ▶ Perfectly aligned marking for lengthy numbers, letters
- ▶ Long service life of wheels with uniform, clear marking Quality
- ▶ Integrated mechanism for Cam Advancement for Serially marking

#### Range

- ▶ 6 Wheels to 13 Wheels depending on the size of the characters
- ▶ 1.6 mm to 8 mm Letter Sizes
- ▶ Special Composite Numerators for Combined Logo and Serial Numbers marking
- ▶ Concave and Convex Numerators

#### Applications

- ▶ Suitable for marking on Steels, castings, forgings, non-ferrous metals, etc. in Medium & Heavy Engineering applications
- ▶ Serial Number Marking
- ▶ Tube /Pipe Markings



# Bradma

## Conventional Marking Systems

### LABEL MARKER AND ROLL MARKER



#### Features

- Mark wide range of Lable Materials like Aluminium, Brass, Steel
- Clear and deep marking with Dial Mounted hardened Types
- Versatile for marking various sizes of Lables and frequently changing marking Data
- High Quality balanced Body Casting for very long service life.

#### Range

- Character Sizes of 1.6, 2, 3 & 4 mm
- Max. Table size: 100 x 200 mm

#### Applications

- Marking on Labels/Tags of Aluminium, Brass, Steel, or any other metal
- Wide range of label/tag sizes need to be marked
- Variable data marking on labels
- Short production runs of labels/tags

#### Features

- Ideal for Circumferential marking on round cylindrical components
- Simple and Rugged Design
- Fine Control of Marking Depth
- Low set-up time, High Production Rates

#### Range

- Stroke Length 75- 125 mm
- Work piece Diameter: Min. 6 mm - Max. 140 mm
- Mode of Operation:
  - Manual
  - Pneumatic
    - Foot Pedal Operated
    - Hand Operated Air Switch

#### Applications

- Marking on Pinions, Engine Valves, Drills, Taps, Bomb Shells Sockets, Fuel Injection Nozzles, Hose pipe end Fittings, Connectors, Pneumatic Tools, Shafts, Couplings, Bushes, Tooling accessories like Chucks, Collets



# TOTEM

### BRITISH STANDARD WHITWORTH FORM THREADS

55° INC. ANGLE

Nominal Dia	B.S.W.		B.S.F.		B.S.B.		B.S.P. & B.S.P.T.		B.S. Cond.		M.E.		WHITWORTH FORM SPECIAL	
Fractional	TPI	Drill Size in mm	TPI	Drill Size in mm	TPI	Drill Size in mm	TPI	Drill Size in mm	TPI	Drill Size in mm	TPI	Drill Size in mm	TPI	Drill Size in mm
1/16"	60	1.20	--	--	--	--	--	--	--	--	--	--	--	--
3/32"	48	1.90	--	--	--	--	--	--	--	--	--	--	--	--
1/8"	40	2.55	--	--	26	--	28	8.80	--	--	40	2.55	--	--
5/32"	32	3.20	--	--	--	--	--	--	--	--	40	3.30	--	--
3/16"	24	3.70	32	4.00	--	--	--	--	--	--	40	4.00	--	--
7/32"	24	4.50	28	4.60	--	--	--	--	--	--	40	4.80	--	--
1/4"	20	5.10	26	5.30	26	5.30	19	11.80	--	--	40	5.50	24/28/32	5.3, 5.4, 5.5
9/32"	20	5.80	26	6.00	26	6.10	--	--	--	--	32	6.10	--	--
5/16"	18	6.50	22	6.80	26	6.90	--	--	--	--	32	7.00	24/40	6.75, 7.3
3/8"	16	7.90	20	8.30	26	8.40	19	15.25	--	--	32	8.60	24.40	8.4, 8.9
7/16"	14	9.30	18	9.70	26	10.00	--	--	--	--	26	10.00	20/24/40	9.8/10, 10.5
1/2"	12	10.50	16	11.10	26	11.50	14	19.00	18	11.50	26	11.50	20/24/40	11.5, 11.9, 12
9/16"	12	12.10	16	12.70	26	13.10	--	--	--	--	--	--	20	13.1
5/8"	11	13.50	14	14.00	26	14.70	14	21.00	18	14.20	--	--	20	14.5
11/16"	11	15.10	14	15.50	26	16.50	--	--	--	--	--	--	20	16.2
3/4"	10	16.25	12	16.75	26	17.80	14	24.50	16	17.50	--	--	14/20	17.1, 17.8
7/8"	9	19.25	11	19.75	26	21.00	14	26.25	16	20.60	--	--	14/18/20	20.0, 20.6, 21.0
15/16"	8	20.60	11	21.50	--	--	--	--	--	--	--	--	--	--
1"	8	22.00	10	22.75	26	24.20	11	30.75	16	23.80	--	--	12/20	23.0, 24.0
1.1/8"	7	24.75	9	25.50	26	27.50	--	--	--	--	--	--	--	--
1.1/4"	7	28.00	9	28.50	26	30.50	11	39.50	16	30.10	--	--	--	--
1.3/8"	6	30.10	8	31.50	26	33.70	--	--	--	--	--	--	--	--
1.1/2"	6	33.50	8	34.50	26	36.90	11	45.00	14	36.10	--	--	--	--
1.5/8"	5	35.70	8	37.70	26	40.00	--	--	--	--	--	--	--	--
1.3/4"	5	39.00	7	41.00	26	43.50	11	51.00	--	--	--	--	--	--
1.7/8"	4 1/2	41.30	7	43.70	26	46.50	--	--	--	--	--	--	--	--
2"	4 1/2	44.50	7	47.00	26	49.80	11	57.00	14	48.80	--	--	--	--

### AMERICAN NATIONAL FORM THREADS

60° INC. ANGLE

Nominal Dia	N.C. & U.N.C.		N.F. & U.N.F.		N.P.T. & N.P.S.		N.S.		N.E.F.	
Fractional	TPI	Drill Size in mm	TPI	Drill Size in mm	TPI	Drill Size in mm	TPI	Drill Size in mm	TPI	Drill Size in mm
1/16"	--	--	--	--	27	6.80	6.30	64	1.20	--
3/32"	--	--	--	--	27	8.40	8.70	48	1.65	--
1/8"	--	--	--	--	--	--	--	40	2.60	--
5/32"	--	--	--	--	--	--	32 & 35	3.20 & 3.30	--	--
3/16"	--	--	--	--	--	--	24 & 32	3.80 & 4.00	--	--
7/32"	--	--	--	--	--	--	24 & 32	4.50 & 4.80	--	--
1/4"	20	5.10	28	5.50	18	10.70	11.10	24 & 32	5.30 & 5.60	32
5/16"	18	6.60	24	6.90	--	--	20 & 32	6.70 & 7.30	32	8
3/8"	16	8.00	24	8.50	18	14.25	14.50	20	8.30	32
7/16"	14	9.40	20	9.90	--	--	24	10.80	28	12
1/2"	13	10.80	20	11.50	14	17.50	18.00	12 & 24/10.50 & 11.50	28	16
9/16"	12	12.20	18	12.90	--	--	12	13.90	24	18
5/8"	11	13.50	18	14.50	--	--	11 & 16/15.00 & 15.90	24	24	20
11/16"	--	--	--	--	--	--	12	16.70	20	22
3/4"	10	16.50	18	17.50	14	22.75	23.25	--	--	26
13/16"	--	--	--	--	--	--	12	20.20	20	24
7/8"	9	19.50	14	20.40	--	--	12	20.20	20	26
15/16"	--	--	--	--	--	--	12	20.20	20	28
1"	8	22.25	12	23.25	11.50	28.50	29.00	14	23.50	20
1.1/8"	7	25.00	12	26.50	--	--	--	--	--	18
1.1/4"	7	28.00	12	29.50	11.50	37.50	38.00	--	--	18
1.3/8"	6	30.75	12	32.75	--	--	--	--	--	18
1.1/2"	6	34.00	12	36.00	11.50	43.50	44.00	--	--	18
1.5/8"	--	--	--	--	--	--	5.5	36.80	18	20
1.3/4"	5	39.50	--	--	--	--	--	5	42.90	16
1.7/8"	--	--	--	--	--	--	--	5	42.90	16
2"	--	--	--	--	11.50	53.00	56.00	--	--	16

### AMERICAN NATIONAL THREADS

60° INC. ANGLE

Size No.	N.C.		N.F.		U.N.C.		U.N.F.	
TPI	Drill Size in mm	TPI	Drill Size in mm	TPI	Drill Size in mm	TPI	Drill Size in mm	
0	--	--	80	1.25	--	--	--	--
1	64	1.65	72	1.95	--	--	--	--
2	56	1.85	64	1.90	--	--	--	--
3	48	2.10	56	2.15	--	--	--	--
4	40	2.35	48	2.40	40	2.35	--	--
5	40	2.65	44	2.70	--	--	--	--
6	32	2.85	40	2.95	32	2.85	--	--
8	32	3.50	36	3.50	32	3.50	--	--
10	24	3.90	32	4.10	24	3.90	32	4.10
12	24	4.50	28	4.70	--	--	--	--

### METRIC

60° INC. ANGLE

SIZE in mm	PITCH	DRILL SIZE in mm		SIZE in mm	PITCH	DRILL SIZE in mm
		Fluted	Fluteless			
2.0	0.40	1.60	1.80	14.0	1.50	12.50
2.5	0.45	1.75	1.90	14.0	2.00	12.00
2.5	0.40	1.90	2.10	16.0	1.50	14.50
2.5	0.45	2.05	2.25	16.0	2.00	14.00
2.6	0.45	2.15	2.40	18.0	1.50	16.50
3.0	0.50	2.50	2.65	18.0	2.50	15.50
3.5	0.60	2.90	3.20	20.0	1.50	18.50
4.0	0.70	3.30	3.60	20.0	2.50	17.50
4.5	0.75	3.70	4.00	22.0	1.50	20.50
5.0	0.80	4.20	4.50	22.0	2.50	19.50
6.0	1.00	5.00	5.30	24.0	1.50	22.50
7.0	1.00	6.00	6.35	24.0	3.00	21.00
8.0	1.00	7.00	7.40	27.0	3.00	24.00
8.0	1.25	6.80	7.20	30.0	3.50	26.50
10.0	1.00	9.00	9.50	33.0	3.50	29.50
10.0	1.50	8.50	9.00	36.0	4.00	32.00
11.0	1.50	9.50	10.00	39.0	4.00	35.00
12.0	1.50	10.50	11.00	42.0	4.50	37.50
12.0	1.75	10.20	10.70	45.0	4.50	40.50

### BRITISH ASSOCIATION

47.5° INC. ANGLE

SIZE	DIA.	TPI	DRILL SIZE in mm
0	0.2362	25.4	5.10
1	0.2087	28.2	4.50
2	0.1850	31.4	4.00
3	0.1614	34.8	3.40
4	0.1417	38.5	3.00
5	0.1260	43.0	2.65
6	0.1102	47.9	2.30
7	0.0984	52.9	2.05
8	0.0866	59.1	1.80
9	0.0748	65.1	1.55
10	0.0669	72.6	1.40
11	0.0591	81.9	1.20
12	0.0512	90.9	1.05

### BRITISH STANDARD CYCLE

60° INC. ANGLE

SIZE	TPI	DRILL SIZE in mm
1/8"	40	2.65
5/32"	32	3.30
3/16"	32	4.10
7/32"	26	4.80
1/4"	26	5.60
5/16"	26	7.20
3/8"	26	8.70
7/16"	26	10.30
1/2"	26	11.90
9/16"	26	13.50
5/8"	26	15.00
3/4"	26	16.20
1"	24	24.30

