



**MILLING CUTTERS
&
END MILLS**

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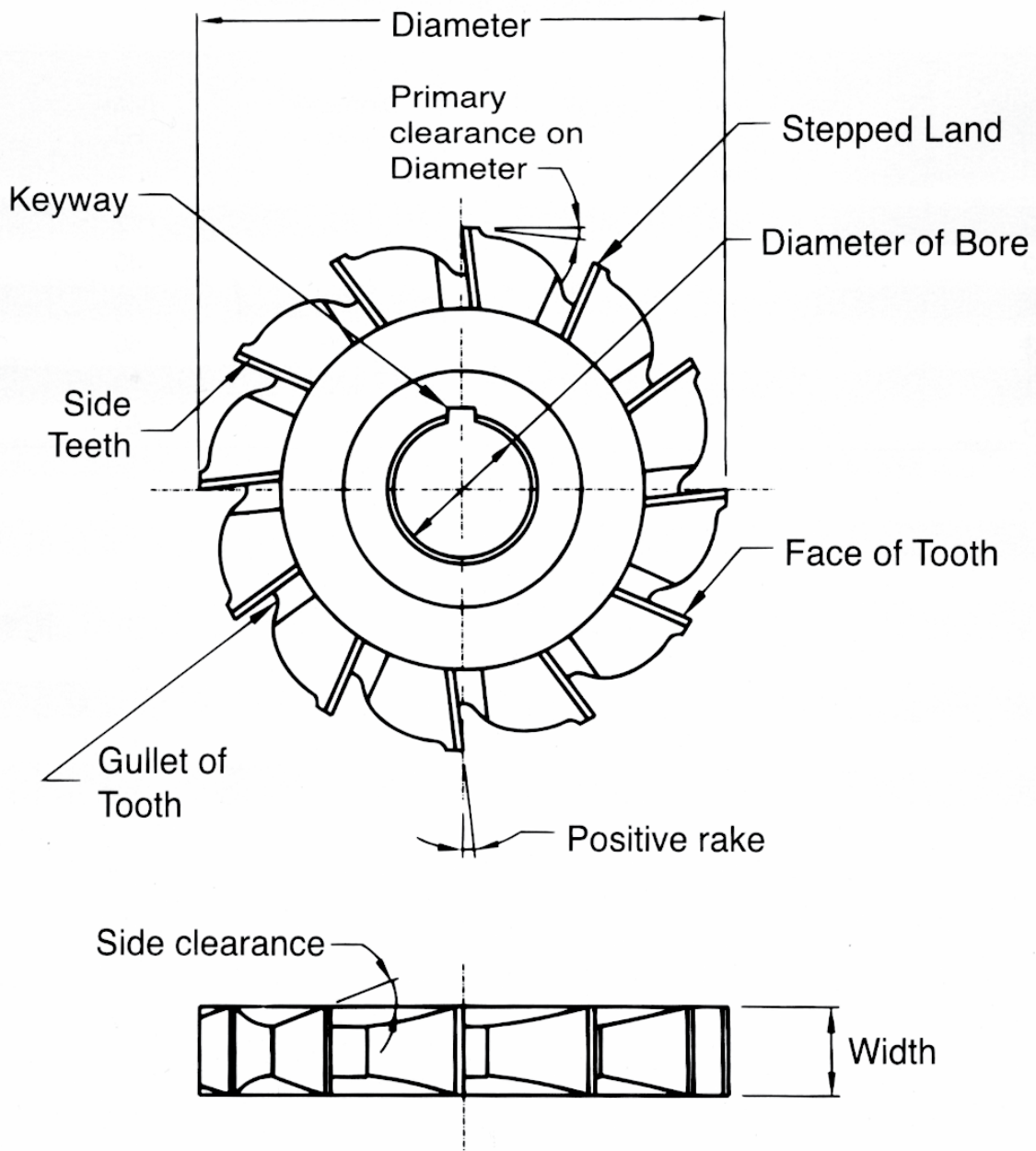
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MILLING CUTTERS - NOMENCLATURE

BORE TYPE CUTTER - NOMENCLATURE





High Speed Steel CYLINDRICAL MILLING CUTTERS

Specifications Conform to
IS : 6309 - 1982
ISO 2584 -1972
Dimensions in mm



Diameter js16	Bore H7	Length js16
50	22	40
50	22	63
50	22	80
63	27	50
63	27	70
80	32	63

Diameter js16	Bore H7	Length js16
80	32	100
100	40	70
100	40	125
125	50	80
125	50	125
160	60	125

Cylindrical milling cutters are profile sharpened cutters having teeth on peripheral surface only. Cylindrical milling cutters produce relatively flat surface parallel to axis of rotation and are ideal for applications that require high rate of stock removal.

Tool type 'N' cutters shall be supplied with right hand helix unless otherwise specified



High Speed Steel
HIGH POWER CYLINDRICAL CUTTERS

Specifications Conform to :
 BS 122 : Part 1 : 1953
 Dimensions in Inches



Diameter + 0.045" 0.000	Bore + 0.00075" + 0.00025"	Length
2.1/2	1	1
2.1/2	1	2
2.1/2	1	3
2.1/2	1	4
3	1.1/4	1
3	1.1/4	2
3	1.1/4	3
3	1.1/4	4
3	1.1/4	5
3	1.1/4	6
3.1/2	1.1/4	2
3.1/2	1.1/4	3
3.1/2	1.1/4	4
3.1/2	1.1/4	5
3.1/2	1.1/4	6

Diameter + 0.045" 0.000	Bore + 0.00075" + 0.00025"	Length
3.1/2	1.1/4	7
4	1.1/4 or 1.1/2	2
4	1.1/4 or 1.1/2	3
4	1.1/4 or 1.1/2	4
4	1.1/4 or 1.1/2	5
4	1.1/4 or 1.1/2	6
4	1.1/4 or 1.1/2	7
4	1.1/4 or 1.1/2	8
4.1/2	1.1/2 or 2	2
4.1/2	1.1/2 or 2	3
4.1/2	1.1/2 or 2	4
4.1/2	1.1/2 or 2	5
4.1/2	1.1/2 or 2	6
4.1/2	1.1/2 or 2	7
4.1/2	1.1/2 or 2	8

Tolerance on length upto & including 6" + 0.030" / 0.000
 Above 6" + 0.060" / 0.000
 Cutters shall be supplied with Left hand helix unless otherwise specified



High Speed Steel HELICAL CYLINDRICAL CUTTERS

Specifications Conform to :
BS 122 : Part 1 : 1953
Dimensions in Inches



Diameter + 0.045'' 0.000	Bore + 0.00075'' + 0.00025''	Length + 0.030'' 0.000
3	1.1/4	2
3	1.1/4	3
3	1.1/4	4
3	1.1/4	6
4	1.1/2	2
4	1.1/2	3

Diameter + 0.045'' 0.000	Bore + 0.00075'' + 0.00025''	Length + 0.030'' 0.000
4	1.1/2	4
4	1.1/2	6
5	1.1/2 or 2	2
5	1.1/2 or 2	3
5	1.1/2 or 2	4
5	1.1/2 or 2	6

A cutter primarily used for heavy surfacing cuts, having a High helix angle relative to the axis of the cutter. It has a less No. of teeth on the periphery only.

Cutters shall be supplied with Left hand helix unless otherwise specified



**High Speed Steel
SIDE AND FACE CUTTERS
Type 'B' Straight Teeth**

Specifications Conform to
IS 6308 - 1982
ISO 2587 :1972
DIN 885 (Part 1): 1981
Dimensions in mm



Diameter js16	Width k11	Bore H7
50	5	16
50	6	16
50	8	16
50	10	16
63	5	22
63	6	22
63	8	22
63	10	22
63	12	22
63	14	22
63	16	22
80	5	27
80	6	27
80	8	27
80	10	27
80	12	27
80	14	27
80	16	27
80	18	27
80	20	27
100	6	32
100	8	32
100	10	32
100	12	32
100	14	32
100	16	32
100	18	32
100	20	32
100	22	32
100	25	32
125	8	32

Diameter js16	Width k11	Bore H7
125	10	32
125	12	32
125	14	32
125	16	32
125	18	32
125	20	32
125	22	32
125	25	32
125	28	32
160	10	40
160	12	40
160	14	40
160	16	40
160	18	40
160	20	40
160	22	40
160	25	40
160	28	40
160	32	40
200	12	40
200	14	40
200	16	40
200	18	40
200	20	40
200	22	40
200	25	40
200	28	40
200	32	40
200	36	40
200	40	40

Side and face milling cutters are profile sharpened cutters, having teeth on periphery and on both sides. Used on horizontal milling M/C to mill slots, shoulders, small width surface etc.

Tool Type 'N' Cutters shall be supplied unless otherwise specified.



High Speed Steel SIDE AND FACE CUTTERS Straight Teeth

Specifications Conform to :
BS 122 : Part 1 : 1953
Dimensions in Inches



Diameter + 0.045" 0.000	Bore + 0.00075" + 0.00025"	Width + 0.005" 0.000
2.1/2	1	1/4
2.1/2	1	5/16
2.1/2	1	3/8
2.1/2	1	1/2
3	1	1/4
3	1	5/16
3	1	3/8
3	1	1/2
3	1	5/8
3.1/2	1	1/4
3.1/2	1	5/16
3.1/2	1	3/8
3.1/2	1	7/16
3.1/2	1	1/2
3.1/2	1	5/8
3.1/2	1	3/4
4	1 or 1.1/4	1/4
4	1 or 1.1/4	3/8
4	1 or 1.1/4	1/2
4	1 or 1.1/4	5/8
4	1 or 1.1/4	3/4
4	1 or 1.1/4	7/8
4	1 or 1.1/4	1

Diameter + 0.045" 0.000	Bore + 0.00075" + 0.00025"	Width + 0.005" 0.000
5	1.1/4	1/2
5	1.1/4	5/8
5	1.1/4	3/4
5	1.1/4	7/8
5	1.1/4	1
6	1.1/4 or 1.1/2	1/2
6	1.1/4 or 1.1/2	5/8
6	1.1/4 or 1.1/2	3/4
6	1.1/4 or 1.1/2	7/8
6	1.1/4 or 1.1/2	1
6	1.1/4 or 1.1/2	1.1/4
7	1.1/2	1/2
7	1.1/2	5/8
7	1.1/2	3/4
7	1.1/2	7/8
7	1.1/2	1
7	1.1/2	1.1/4
8	1.1/2	5/8
8	1.1/2	3/4
8	1.1/2	7/8
8	1.1/2	1
8	1.1/2	1.1/4
8	1.1/2	1.1/2

Cutters of width 3/4" and above shall be supplied with left hand helical flutes.



High Speed Steel SIDE AND FACE CUTTERS Type 'A' Staggered Teeth

Specifications Conform to :
IS 6308 - 1982
ISO 2587 - 1972
DIN 885 - Part 1 : 1981
Dimensions in mm



Diameter Js 16	Width k11	Bore H 7
50	5	16
50	6	16
50	8	16
50	10	16
63	6	22
63	8	22
63	10	22
63	12	22
63	14	22
63	16	22
63	18	22
80	8	27
80	10	27
80	12	27
80	14	27
80	16	27
80	18	27
80	20	27
100	10	32
100	12	32
100	14	32
100	16	32
100	18	32
100	20	32
100	22	32

Diameter Js 16	Width k11	Bore H 7
100	25	32
125	12	32
125	14	32
125	16	32
125	18	32
125	20	32
125	22	32
125	25	32
125	28	32
160	14	40
160	16	40
160	18	40
160	20	40
160	22	40
160	25	40
160	28	40
160	32	40
200	16	40
200	18	40
200	20	40
200	22	40
200	25	40
200	28	40
200	32	40

Side and face milling cutters are profile sharpened cutters, having teeth on periphery and on both sides. Used on horizontal milling M/C to mill slots, shoulders, small width surface etc.

Tool Type 'N'cutters shall be supplied unless otherwise specified.



High Speed Steel SIDE AND FACE CUTTERS Staggered Teeth

Specifications Conform to
BS 122 : Part 1 : 1953
Dimensions in Inches



Diameter + 0.045" 0.000	Bore + 0.00075" + 0.00025"	Width + 0.005" 0.000
3	1	1/4
3	1	5/16
3	1	3/8
3	1	1/2
4	1	1/4
4	1	5/16
4	1	3/8
4	1	1/2
4	1	5/8
5	1.1/4	3/8
5	1.1/4	1/2
5	1.1/4	5/8

Diameter + 0.045" 0.000	Bore + 0.00075" + 0.00025"	Width + 0.005" 0.000
6	1.1/4	3/8
6	1.1/4	1/2
6	1.1/4	5/8
6	1.1/4	3/4
7	1.1/2	1/2
7	1.1/2	5/8
7	1.1/2	3/4
7	1.1/2	7/8
8	1.1/2	5/8
8	1.1/2	3/4
8	1.1/2	7/8
8	1.1/2	1



High Speed Steel SLOTING CUTTERS

Specifications Conform to :
BS 122 : Part 1 : 1953
Dimensions in Inches



Diameter + 0.045" 0.000	Bore + 0.00075" + 0.00025"	Width + 0.001" - 0.001"
2.1/2	1	1/4
2.1/2	1	5/16
2.1/2	1	3/8
2.1/2	1	7/16
2.1/2	1	1/2
3	1	1/4
3	1	5/16
3	1	3/8
3	1	7/16
3	1	1/2
3	1	5/8
3	1	3/4
3.1/2	1	1/4
3.1/2	1	5/16
3.1/2	1	3/8
3.1/2	1	7/16
3.1/2	1	1/2
3.1/2	1	5/8
3.1/2	1	3/4
3.1/2	1	7/8
4	1	1/4
4	1	5/16
4	1	3/8
4	1	7/16

Diameter + 0.045" 0.000	Bore + 0.00075" + 0.00025"	Width + 0.001" - 0.001"
4	1	1/2
4	1	5/8
4	1	3/4
4	1	7/8
4	1	1
5	1.1/4	1/4
5	1.1/4	5/16
5	1.1/4	3/8
5	1.1/4	7/16
5	1.1/4	1/2
5	1.1/4	5/8
5	1.1/4	3/4
5	1.1/4	7/8
5	1.1/4	1
6	1.1/4	1/4
6	1.1/4	5/16
6	1.1/4	3/8
6	1.1/4	7/16
6	1.1/4	1/2
6	1.1/4	5/8
6	1.1/4	3/4
6	1.1/4	7/8
6	1.1/4	1

Cutters of Width 3/4" and above shall be supplied with left hand helical flutes.



High Speed Steel METAL SLITTING SAWS

Specifications Conform to :
 IS 5031 - 1992
 ISO 2296 : 1972
 DIN 1837 : 1970 (FINE)
 DIN 1838 : 1970 (COARSE)
 Dimensions in mm



Diameter	Bore H7	Width js11	No. of Teeth	
			Fine pitch	Coarse pitch
50	13	3	48	24
50	13	4	48	24
50	13	5	48	24
63	16	3	64	32
63	16	4	64	32
63	16	5	48	24
63	16	6	48	24
80	22	3	80	40
80	22	4	64	32
80	22	5	64	32
80	22	6	64	32
100	22	3	80	40
100	22	4	80	40
100	22	5	80	40

Diameter	Bore H7	Width js11	No. of Teeth	
			Fine pitch	Coarse pitch
100	22	6	64	32
125	22	3	100	48
125	22	4	100	48
125	22	5	80	40
125	22	6	80	40
160	32	4	100	48
160	32	5	100	48
160	32	6	100	48
200	32	4	128	64
200	32	5	128	64
200	32	6	100	48
250	32	4	160	80
250	32	5	128	64
250	32	6	128	64

Tolerance on Diameter Js16 for IS & ISO and Js15 for DIN Standard

1. Unless otherwise specified, we shall supply 'coarse pitch' saws with tooth form 'B' and tool type 'N'
2. Slitting saws shall be supplied with the following executions.

PITCH	TOOTH FORM	TOOL TYPE
FINE	A	N
COARSE	B	N

Metal slitting saws are similar to plain or side milling cutters but are relatively thin.

Plain saws have dished sides to provide clearance and prevent binding. They are used for ordinary slitting applications and have peripheral teeth only.



High Speed Steel METAL SLITTING SAWS

Specifications Conform to :
BS 122 : Part 1 : 1953
Dimensions in Inches



Diameter + 0.045" 0.000	Bore 0.00075" + 0.00025"	Width + 0.001" - 0.001"	No of Teeth
2.1/2	1	1/8	26
2.1/2	1	5/32	26
3	1	1/8	28
3	1	5/32	28
4	1	1/8	34
4	1	5/32	34
4	1	3/16	34
5	1	1/8	40
5	1	5/32	40

Diameter + 0.045" 0.000	Bore 0.00075" + 0.00025"	Width + 0.001" - 0.001"	No of Teeth
5	1	3/16	40
6	1	1/8	44
6	1	5/32	44
6	1	1/4	44
7	1	3/16	48
7	1	1/4	48
8	1	3/16	52
8	1	1/4	52

Metal slitting saws are similar to plain or side milling cutters but are relatively thin. Plain saws have dished sides to provide clearance and prevent binding. They are used for ordinary slitting applications and have peripheral teeth only.



High Speed Steel KEYWAY MILLING CUTTERS

Specifications Conform to :
IS 6355 - 1982
Dimensions in mm



Diameter js16	Bore H7	Width d9
50	16	5
50	16	6
50	16	8
50	16	10
63	22	5
63	22	6
63	22	8
63	22	10
63	22	12
63	22	14
80	27	5
80	27	6
80	27	8
80	27	10
80	27	12
80	27	14
80	27	16
80	27	18
100	32	6
100	32	8
100	32	10
100	32	12
100	32	14
100	32	16
100	32	18
100	32	20
100	32	22
100	32	25
125	32	8

Diameter js16	Bore H7	Width d9
125	32	10
125	32	12
125	32	14
125	32	16
125	32	18
125	32	20
125	32	22
125	32	25
160	40	10
160	40	12
160	40	14
160	40	16
160	40	18
160	40	20
160	40	22
160	40	25
160	40	28
160	40	32
200	40	12
200	40	14
200	40	16
200	40	18
200	40	20
200	40	22
200	40	25
200	40	28
200	40	32
200	40	36
200	40	40

A cutter with radially machined form relieved staggered teeth on the periphery for milling keyway slots.

Tool Type 'H' cutters shall be supplied unless otherwise specified.



High Speed Steel SHELL END SINGLE ANGLE MILLING CUTTER

Specifications Conform to :
IS 6256 - 1995
DIN 842 : Part 1 : 1984
Dimensions in mm



Diameter js16	Bore H7	Width js14		Tol. On Angle
		Angle α 45°	Angle α 50°,55°,60°	
40	10	10	13	$\pm 25'$
50	13	13	16	
63	16	18	20	
80	22	22	25	$\pm 20'$
100	27	28	32	
125	32	36	40	
160	40	45	50	

The cutter with teeth on the conical surface, and on large flat side. The nominal angle of the cutter is the angle between the flat side and the conical side measured in a radial plane. These cutters are used mainly for cutting dovetails, serrations and angular slots.

Right Hand cutter with Tool Type 'H' shall be supplied unless otherwise specified.



High Speed Steel SINGLE ANGLE CUTTERS

Specifications Conform to :
IS 6324 - 1971
Dimensions in mm



Diameter js16	Bore H7	Width js16	Angle +1°/-0°
50	16	12	60°, 65°, 70°, 75°, 80°, 85°
63	22	18	60°, 65°, 70°, 75°, 80°, 85°

Diameter js16	Bore H7	Width js16	Angle +1°/-0°
63	22	26	70°, 75°, 80°
80	22	32	70°, 75°, 80°
100	27	36	70°, 75°, 80°

Right Hand cutter with Tool Type 'H' shall be supplied unless otherwise specified.



High Speed Steel SINGLE ANGLE CUTTERS

Specifications Conform to
BS 122 : Part 1 : 1953
Dimensions in Inches

Diameter + 0.045" 0.000	Bore + 0.00075" + 0.00025"	Width + 0.015" 0.000"	Angle
2.3/4	1	5/16	30°
2.3/4	1	7/16	40°
2.3/4	1	1/2	45°, 50°, 60°, 70°, 80°

Diameter + 0.045" 0.000	Bore + 0.00075" + 0.00025"	Width + 0.015" 0.000"	Angle
3	1.1/4	5/16	30°
3	1.1/4	7/16	40°
3	1.1/4	1/2	45°
3	1.1/4	5/8	50°, 60°, 70°, 80°

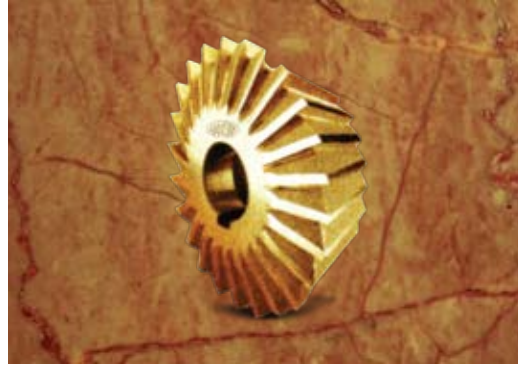
The cutter with teeth on the conical surface, and on large flat side. The nominal angle of the cutter is the angle between the flat side and the conical side, measured in a radial plane. These cutters are used mainly for cutting dovetails, serrations and angular slots.

Right Hand cutter shall be supplied unless otherwise specified.



High Speed Steel DOUBLE ANGLE CUTTERS

Specifications Conform to
IS 6325 - 1971
Dimensions in mm



Diameter js16	Bore H7	Width js16	Small Angle + 1°/ 0°	Included Angle + 1°/ 0°
50	16	12	12°	55°
50	16	12	15°	60°
50	16	12	15°	65°
50	16	12	15°	70°
50	16	12	15°	75°
50	16	12	15°	80°
50	16	14	20°	90°
50	16	16	25°	100°
63	22	18	12°	55°
63	22	18	15°	60°
63	22	18	15°	65°

Diameter js16	Bore H7	Width js16	Small Angle + 1°/ 0°	Included Angle + 1°/ 0°
63	22	18	15°	70°
63	22	18	15°	75°
63	22	18	15°	80°
63	22	20	20°	90°
63	22	22	25°	100°
80	22	32	15°	65°
80	22	32	15°	70°
80	22	32	15°	75°
100	27	36	15°	70°
100	27	36	15°	75°
100	27	36	15°	80°

The cutter with teeth on the conical surfaces and with unequal angles between the conical sides and the plane of intersection of the two cones. The nominal angle of the cutter are the angles between the two conical sides, measured in a radial plane.

Right Hand cutter with Tool Type 'H' shall be supplied unless otherwise specified.



High Speed Steel DOUBLE ANGLE CUTTERS

Specifications Conform to :
BS 122 : Part 1 : 1953
Dimensions in Inches



Diameter + 0.045" 0.000	Bore + 0.00075" + 0.00025"	Width + 0.015" 0.000"	Small Angle x Big Angle
2.3/4	1	5/8	12° x 48°
2.3/4	1	5/8	12° x 53°
2.3/4	1	5/8	12° x 58°
2.3/4	1	5/8	12° x 63°
2.3/4	1	5/8	12° x 68°
2.3/4	1	5/8	12° x 73°

Diameter + 0.045" 0.000	Bore + 0.00075" + 0.00025"	Width + 0.015" 0.000"	Small Angle x Big Angle
3	1.1/4	3/4	12° x 48°
3	1.1/4	3/4	12° x 53°
3	1.1/4	3/4	12° x 58°
3	1.1/4	3/4	12° x 63°
3	1.1/4	3/4	12° x 68°
3	1.1/4	3/4	12° x 73°

The cutter with teeth on the conical surfaces and with unequal angles between the conical sides and the plane of intersection of the two cones. The nominal angle of the cutter are the angle between the two conical sides, measured in a radial plane.

Right Hand cutter with Tool Type 'H' shall be supplied unless otherwise specified.



High Speed Steel EQUAL ANGLE CUTTERS

Specifications Conform to :
IS 6326 - 1996
ISO 6108 - 1978
DIN 847 : Part 1 : 1978
Dimensions in mm



Diameter js16	Bore H7	Width js16	Included Angle
50	16	8	45°
50	16	10	60°
50	16	14	90°
63	22	10	45°
63	22	14	60°
63	22	20	90°

Diameter js16	Bore H7	Width js16	Included Angle
80	27	12	45°
80	27	18	60°
80	27	22	90°
100	32	18	45°
100	32	25	60°
100	32	32	90°

Tolerance on Half of Included Angle = $\pm 15'$

A cutter with teeth on conical surfaces and with equal angles between the conical faces and the plane of intersection of the two cones. The nominal included angle of the cutter is the angle between the two conical sides, measured in a radial plane. Equal angle cutters are used to mill 'V' grooves.

Tool Type 'H' Cutters shall be supplied unless otherwise specified.



High Speed Steel EQUAL ANGLE CUTTERS

Specifications Conform to
BS 122 : Part 1 : 1953
Dimensions in Inches

Diameter + 0.045" 0.000	Bore + 0.00075" + 0.00025"	Width + 0.015" 0.000"	Included Angle
2.3/4	1	5/16	30°
		7/16	40°
		1/2	45°, 60°, 90°

Diameter + 0.045" 0.000	Bore + 0.00075" + 0.00025"	Width + 0.015" 0.000"	Included Angle
3	1.1/4	5/16	30°
		7/16	40°
		1/2	45°
		5/8	60°, 90°



High Speed Steel CONVEX MILLING CUTTERS

Specifications Conform to :
IS 6323 - 1982
Dimensions in mm



Radius k11	Diameter js16	Bore H7	Width
1.60	50	16	3.2
2.00	50	16	4.0
2.50	63	22	5.0
3.00	63	22	6.0
3.15	63	22	6.3
4.00	63	22	8.0
5.00	63	22	10.0
6.00	80	27	12.0

Radius k11	Diameter js16	Bore H7	Width
6.30	80	27	12.6
8.00	80	27	16.0
10.00	100	32	20.0
12.00	100	32	24.0
12.50	100	32	25.0
16.00	125	32	32.0
20.00	125	32	40.0

A milling cutter having a convex half circle, in the form and having radial relief. This cutter is designed to mill a concave surface equal to a half circle or less.



High Speed Steel CONVEX CUTTERS

Specifications Conform to :
BS 122 : Part 1 : 1953
Dimensions in Inches



Diameter + 0.045" 0.000	Width & Diameter of Circle	Bore + 0.00075" + 0.00025"
2.1/4	1/8	1
2.1/4	3/16	1
2.1/4	1/4	1
2.1/2	5/16	1
2.1/2	3/8	1
2.1/2	7/16	1
2.1/2	1/2	1
2.3/4	9/16	1
2.3/4	5/8	1
3	11/16	1

Diameter + 0.045" 0.000	Width & Diameter of Circle	Bore + 0.00075" + 0.00025"
3	3/4	1
3.1/4	13/16	1
3.1/4	7/8	1
3.1/2	15/16	1
3.1/2	1	1
4	1.1/8	1.1/4
4	1.1/4	1.1/4
4.1/4	1.3/8	1.1/4
4.1/4	1.1/2	1.1/4

A milling cutter having a convex half circle, in the form and having radial relief. This cutter is designed to mill a concave surface equal to a half circle or less.

Tolerance on Dia. Of Circle upto & including 5/8" = + 0.002" / 0.000"
Over 5/8" = + 0.004" / 0.000"



High Speed Steel CONCAVE MILLING CUTTERS

Specifications Conform to :
IS 6322 - 1982
Dimensions in mm



Radius N11	Width	Diameter js16	Bore H7
1.6	8	50	16
2.0	9	50	16
2.5	10	63	22
3.0	12	63	22
3.15	12	63	22
4.0	16	63	22
5.0	20	63	22
6.0	24	80	27

Radius N11	Width	Diameter js16	Bore H7
6.3	24	80	27
8.0	32	80	27
10.0	36	100	32
12.0	40	100	32
12.5	40	100	32
16.0	50	125	32
20.0	60	125	32

A milling cutter having a convex half circle, in the form and having radial relief. This cutter is designed to mill convex surfaces of circular contour equal to half circle or less.



High Speed Steel CONCAVE CUTTERS

Specifications Conform to:
BS 122 : Part 1 : 1953
Dimensions in Inches



Diameter + 0.045" 0.000	Diameter of Circle	Bore + .00075" + .00025"	Width + 0.010" 0.000"
2.1/4	1/8	1	5/16
2.1/4	3/16	1	3/8
2.1/4	1/4	1	1/2
2.1/2	5/16	1	5/8
2.1/2	3/8	1	3/4
2.1/2	7/16	1	7/8
2.1/2	1/2	1	1
2.3/4	9/16	1	1.3/16
2.3/4	5/8	1	1.3/16
3	11/16	1	1.3/8

Diameter + 0.045" 0.000	Diameter of Circle	Bore + .00075" + .00025"	Width + 0.010" 0.000"
3	3/4	1	1.3/8
3.1/4	13/16	1	1.9/16
3.1/4	7/8	1	1.9/16
3.1/2	15/16	1	1.3/4
3.1/2	1	1	1.3/4
4	1.1/8	1.1/4	1.15/16
4	1.1/4	1.1/4	2.1/8
4.1/4	1.3/8	1.1/4	2.5/16
4.1/4	1.1/2	1.1/4	2.1/2

A milling cutter having a concave half circle, in the form and having radial relief. This cutter is designed to mill convex surfaces of circular contour equal to half circle or less.

Tolerance on Dia. of Circle upto & incl. 5/8" = 0.000/- 0.002", Above 5/8" = 0.000/- 0.004"



**High Speed Steel
SINGLE CORNER ROUNDING CUTTERS**

Specifications Conform to :
IS 6314 - 1982
Dimensions in mm



Diameter js16	Bore H7	Width	Corner Radius N11
50	16	5	1.60
50	16	5	2.00
63	22	5	2.50
63	22	6	3.00
63	22	6	3.15
63	22	8	4.00
63	22	10	5.00

Diameter js16	Bore H7	Width	Corner Radius N11
80	27	12	6.00
80	27	12	6.30
80	27	16	8.00
100	32	18	10.00
100	32	20	12.00
100	32	20	12.50
125	32	24	16.00
125	32	28	20.00

A cutter having a concave quarter circle in the form and having radial relief.

Right Hand cutters shall be supplied unless otherwise specified



High Speed Steel SINGLE CORNER ROUNDING CUTTERS

Specifications Conform to:
BS 122 : Part 1 : 1953
Dimensions in Inches



Diameter + 0.045" 0.000	Corner Radius	Bore + 0.00075" + 0.00025"	Width + 0.010" 0.000
2.1/4	1/16	1	5/16
2.1/4	3/32	1	5/16
2.1/4	1/8	1	5/16
2.1/2	5/32	1	7/16
2.1/2	3/16	1	7/16
2.1/2	7/32	1	1/2
2.1/2	1/4	1	1/2
2.3/4	9/32	1	5/8
2.3/4	5/16	1	5/8

Diameter + 0.045" 0.000	Corner Radius	Bore + 0.00075" + 0.00025"	Width + 0.010" 0.000
3	11/32	1	11/16
3	3/8	1	11/16
3.1/4	13/32	1	3/4
3.1/4	7/16	1	3/4
3.1/2	15/32	1	7/8
3.1/2	1/2	1	7/8
3.1/2	9/16	1	1
3.1/2	5/8	1	1
3.3/4	11/16	1	1.1/8
3.3/4	3/4	1	1.1/8

Right Hand cutters shall be supplied unless otherwise specified
Tolerance on Corner radius upto & incl. 5/16" = 0.000 /- 0.001"
Above 5/16" = 0.000/- 0.002"



**High Speed Steel
DOUBLE CORNER ROUNDING CUTTERS**

Specifications Conform to :
BS 122 : Part 1 : 1953
Dimensions in Inches



Diameter + 0.045" 0.000	Corner Radius	Bore + 0.00075" + 0.00025"	Width +0.010" 0.000
2.1/4	1/16	1	7/16
2.1/4	3/32	1	7/16
2.1/4	1/8	1	7/16
2.1/2	5/32	1	5/8
2.1/2	3/16	1	5/8
2.1/2	7/32	1	3/4
2.1/2	1/4	1	3/4
2.3/4	9/32	1	15/16
2.3/4	5/16	1	15/16
3	11/32	1	1.1/16

Diameter + 0.045" 0.000	Corner Radius	Bore + 0.00075" + 0.00025"	Width +0.010" 0.000
3	3/8	1	1.1/16
3.1/4	13/32	1	1.3/16
3.1/4	7/16	1	1.3/16
3.1/2	15/32	1	1.3/8
3.1/2	1/2	1	1.3/8
3.1/2	9/16	1	1.5/8
3.1/2	5/8	1	1.5/8
3.3/4	11/16	1	1.7/8
3.3/4	3/4	1	1.7/8

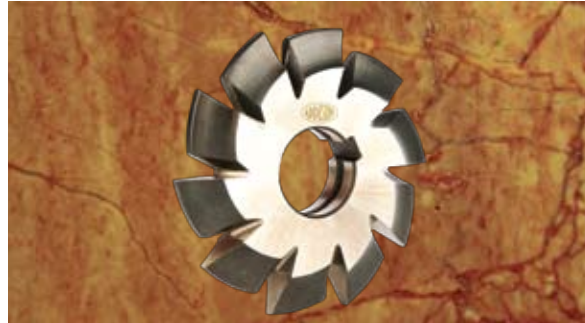
A cutter having two concave quarter circle in the form and having radial relief.

Tolerance on Corner radius upto & incl. 5/16"	= 0.000/ - 0.001"
Above 5/16"	= 0.000/ - 0.002"



**High Speed Steel
ROTARY FORM RELIEVED INVOLUTE
GEAR CUTTERS**
14.1/2° or 20° Pressure Angle

Specifications Conform to:
BS 2518 : 1954
Dimensions in mm



Module in mm	Bore				
	22	27	32	40	50
	Diameter				
0.50	57	—	—	—	—
0.75	57	—	—	—	—
1.00	57	—	—	—	—
1.25	61	—	—	—	—
1.50	64	—	—	—	—
1.75	64	—	—	—	—
2.00	67	67	73	83	—
2.25	67	67	73	83	—
2.50	—	70	77	86	—
2.75	—	70	77	86	—
3.00	—	73	83	92	—
3.25	—	75	83	92	—
3.50	—	77	86	96	—
3.75	—	80	86	96	—
4.00	—	80	89	99	—
4.50	—	86	96	105	—
5.00	—	86	96	105	—
5.50	—	92	102	111	—
6.00	—	96	108	118	—
6.50	—	105	111	121	—
7.00	—	—	115	124	—
8.00	—	—	121	130	—
9.00	—	—	133	134	147
10.00	—	—	133	140	150
11.00	—	—	140	147	158
12.00	—	—	140	147	158
14.00	—	—	158	178	178
16.00	—	—	—	—	191
20.00	—	—	—	—	203

A circular milling cutter having on its periphery teeth of such form that it will cut a single tooth space in a gear. The cutters will have radially machine relieved teeth.



**High Speed Steel
ROTARY FORM RELIEVED INVOLUTE
GEAR CUTTERS**

14.1/2° or 20° Pressure Angle

Specifications Conform to :
BS 2518 : 1954
Dimensions in Inches



Diametral pitch	Bore			
	1	1.1/4	1.1/2	2
	Diameter			
1.1/4	—	—	—	8
1.1/2	—	—	—	7.1/2
1.3/4	—	—	—	7
2	—	5.1/2	5.3/4	—
2.1/4	—	5.1/2	5.3/4	—
2.1/2	—	5.1/4	5.1/2	—
2.3/4	—	5	5.1/4	—
3	—	4.3/4	5.1/8	—
3.1/4	—	4.5/8	5	—
3.1/2	—	4.1/2	4.7/8	—
3.3/4	—	4.3/8	4.3/4	—
4	3.3/4	4.1/4	4.5/8	—
4.1/2	3.5/8	4	4.3/8	—
5	3.3/8	3.3/4	4.1/8	—
5.1/2	3.3/8	3.3/4	4.1/8	—
6	3.1/8	3.1/2	3.7/8	—
7	3	3.3/8	3.3/4	—
8	2.7/8	3.1/4	3.5/8	—
9	2.3/4	3	3.3/8	—
10	2.3/4	3	3.3/8	—
11	2.5/8	2.7/8	3.1/4	—
12	2.5/8	2.7/8	3.1/4	—

A circular milling cutter having on its periphery teeth of such form that it will cut a single tooth space in a gear. The cutters will have radially machine relieved teeth.



High Speed Steel
ROTARY FORM RELIEVED INVOLUTE
GEAR CUTTERS
14.1/2° or 20° Pressure Angle

Specifications Conform to :
 BS 2518 : 1954
 Dimensions in Inches



Diametral pitch	Bore			
	1	1.1/4	1.1/2	2
Diameter				
13	2.5/8	—	—	—
14	2.1/2	—	—	—
15	2.1/2	—	—	—
16	2.1/2	—	—	—
18	2.3/8	—	—	—
20	2.3/8	—	—	—
22	2.1/4	—	—	—
24	2.1/4	—	—	—
26	2.1/4	—	—	—
28	2.1/4	—	—	—
30	2.1/4	—	—	—

Tolerance on Width below 1" = + 0.010"/ 0.000
 1" and above = + 0.015"/ 0.000



High Speed Steel
ROTARY FORM RELIEVED INVOLUTE
GEAR CUTTERS
 Equivalent Pitches

Specifications Conform to:
 BS 2518 : 1954
 Dimensions in mm/Inches



Diametral	Circular inch	Module mm	Diametral	Circular inch	Module mm	Diametral	Circular inch	Module mm
1.2500	2.5133	20.3202	3.0000	1.0472	8.4667	8.4667	0.3711	3.0000
1.2566	2.5000	20.2127	3.1416	1.0000	8.0851	9.0000	0.3491	2.8222
1.2700	2.4737	20.0000	3.1750	0.9895	8.0000	10.0000	0.3142	2.5400
1.3963	2.2500	18.1914	3.3510	0.9375	7.5797	10.0531	0.3125	2.5266
1.4111	2.2263	18.0000	3.5000	0.8976	7.2571	10.1600	0.3092	2.5000
1.5000	2.0944	16.9333	3.5904	0.8750	7.0744	11.0000	0.2856	2.3091
1.5708	2.0000	16.1701	3.6286	0.8658	7.0000	12.0000	0.2618	2.1167
1.5875	1.9790	16.0000	3.8666	0.8125	6.5691	12.5664	0.2500	2.0213
1.6755	1.8750	15.1595	3.9078	0.8040	6.5000	12.7000	0.2474	2.0000
1.6933	1.8553	15.0000	4.0000	0.7854	6.3500	13.0000	0.2417	1.9538
1.7500	1.7952	14.5143	4.1888	0.7500	6.0638	14.0000	0.2244	1.8143
1.7952	1.7500	14.1489	4.2333	0.7421	6.0000	15.0000	0.2094	1.6933
1.8143	1.7316	14.0000	4.5696	0.6875	5.5585	16.0000	0.1963	1.5875
1.9333	1.6250	13.1382	4.6182	0.6803	5.5000	16.7552	0.1875	1.5159
1.9538	1.6079	13.0000	5.0000	0.6283	5.0800	16.9333	0.1855	1.5000
2.0000	1.5708	12.7000	5.0265	0.6250	5.0532	17.0000	0.1848	1.4941
2.0944	1.5000	12.1276	5.0800	0.6184	5.0000	18.0000	0.1745	1.4111
2.1167	1.4842	12.0000	5.5851	0.5625	4.5478	19.0000	0.1653	1.3368
2.2500	1.3963	11.2892	5.6443	0.5566	4.5000	20.0000	0.1571	1.2700
2.2848	1.3750	11.1170	6.0000	0.5236	4.2333	22.0000	0.1428	1.1545
2.3091	1.3605	11.0000	6.2832	0.5000	4.0425	24.0000	0.1309	1.0583
2.5000	1.2566	10.1600	6.3500	0.4947	4.0000	25.0000	0.1257	1.0160
2.5133	1.2500	10.1062	7.0000	0.4488	3.6286	25.1327	0.1250	1.0106
2.5400	1.2368	10.0000	7.1808	0.4375	3.5372	25.4000	0.1237	1.0000
2.7500	1.1424	9.2364	7.2571	0.4329	3.5000	26.0000	0.1208	0.9769
2.7925	1.1250	9.0957	8.0000	0.3927	3.1750	28.0000	0.1122	0.9071
2.8222	1.1132	9.0000	8.3776	0.3750	3.0319	30.0000	0.1047	0.8467



High Speed Steel
ROTARY FORM RELIEVED INVOLUTE
GEAR CUTTERS
Equivalent Pitches

Specifications Conform to:
BS 2518 : 1954



STANDARD CUTTER GROUP (8 CUTTERS)

Cutter No.	Inclusive Range of Teeth for Spur Gear	Cutter No.	Inclusive Range of Teeth for Spur Gear
1	135 to Rack	5	21 to 25
2	55 to 134	6	17 to 20
3	35 to 54	7	14 to 16
4	26 to 34	8	12 & 13



High Speed Steel ROTARY FORM CUTTERS for Roller Chain Wheels

Specifications Conform to :
BS 228 : 1962
Dimensions in Inches



Dia. Of Rollers	Cutter No.	Outside Dia. of Cutter	Width of Cutter	Bore Dia.
0.197	1	2.3/4	0.50	1
0.197	2	2.3/4	0.50	1
0.197	3	2.3/4	0.50	1
0.250	1	2.3/4	0.60	1
0.250	2	2.3/4	0.60	1
0.250	3	2.3/4	0.60	1
0.305	1	2.3/4	0.75	1
0.305	2	2.3/4	0.75	1
0.305	3	2.3/4	0.75	1
0.335	1	2.3/4	0.75	1
0.335	2	2.3/4	0.75	1
0.335	3	2.3/4	0.75	1
0.400	1	2.3/4	0.90	1
0.400	2	2.3/4	0.90	1
0.400	3	2.3/4	0.90	1
0.475	1	3.1/4	1.05	1
0.475	2	3.1/4	1.05	1
0.475	3	3.1/2	1.05	1
0.625	1	4.1/4	1.35	1.1/4
0.625	2	4.1/4	1.30	1.1/4
0.625	3	4.1/4	1.25	1.1/4

These cutters have profile which are suitable for the milling of sprockets. The cutters will have radially machine relieved teeth



**High Speed Steel
ROTARY FORM CUTTERS
for Roller Chain Wheels**

Specifications Conform to :
BS 228 : 1962
Dimensions in Inches



Dia. Of Rollers	Cutter No.	Outside Dia of Cutter	Width of Cutter	Bore Dia
0.750	1	4.1/2	1.70	1.1/4
0.750	2	4.1/2	1.60	1.1/4
0.750	3	4.3/4	1.50	1.1/4
1.000	1	4.3/4	2.00	1.1/4
1.000	2	4.3/4	1.90	1.1/4
1.000	3	5	1.85	1.1/4
1.100	1	5.1/2	2.30	1.3/4
1.100	2	5.1/2	2.20	1.3/4
1.100	3	5.1/2	2.10	1.3/4
1.150	1	5.3/4	2.65	1.3/4
1.150	2	5.3/4	2.50	1.3/4
1.150	3	5.3/4	2.40	1.3/4

No. 1 Cutter to cut 9 to 12 teeth
No. 2 Cutter to cut 13 to 19 teeth
No. 3 Cutter to cut 20 teeth and above.



**High Speed Steel
SHELL END MILLS**

Specifications Conform to
IS 6257 - 1982
ISO 2586 - 1985
Dimensions in mm



Diameter js16	Bore H7	Width k 16
40	16	32
50	22	36
63	27	40
80	27	45

Diameter js16	Bore H7	Width k 16
100	32	50
125	40	56
160	50	63

A cutter with teeth on the periphery and one end provided with a back face key slot drive for use on an arbor. Shell end mills are used for end and face milling operation either in horizontal or in vertical milling M/C.

Tool type 'N' Cutters shall be supplied with Right Hand Helical Flutes for Right Hand Cutting unless otherwise specified.



**High Speed Steel
SHELL END MILLS**

Specifications Conform to:
BS 122 : Part 1 : 1953
Dimensions in Inches

Diameter 0.015" 0.000	Length + 0.030" 0.000"	Bore + 0.00075" + 0.00025"
1.1/4	1	1/2
1.1/2	1.1/8	1/2
1.3/4	1.1/4	3/4
2	1.3/8	3/4
2.1/4	1.1/2	1
2.1/2	1.5/8	1
2.3/4	1.5/8	1

Diameter 0.015" 0.000	Length + 0.030" 0.000"	Bore + 0.00075" + 0.00025"
3	1.3/4	1.1/4
3.1/2	1.7/8	1.1/4
4	2.1/4	1.1/2
4.1/2	2.1/4	1.1/2
5	2.1/4	1.1/2
5.1/2	2.1/4	2
6	2.1/4	2

The cutters shall be supplied with Right Hand Helical flutes for Right Hand cutting unless otherwise specified.



High Speed Steel SHELL END MILLS

Specifications Conform to :
DIN 1880 (Part 1) : 1993
Dimensions in mm



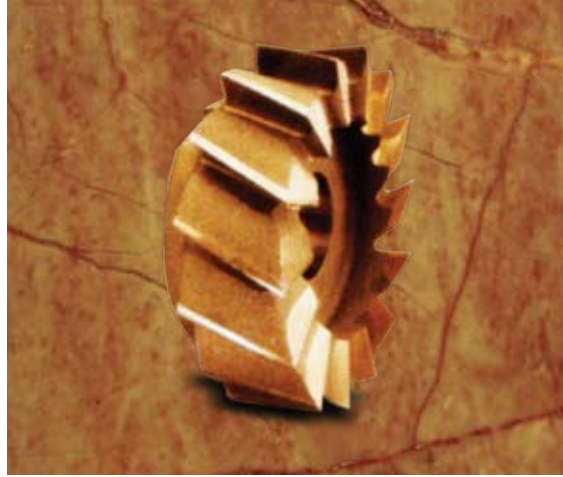
Diameter js16	Width k16	Bore H7
40	32	16
50	36	22
63	40	27
80	45	27
100	50	32
125	56	40
160	63	50

The cutters shall be supplied with Right Hand Helical flutes for Right Hand cutting unless otherwise specified.



High Speed Steel FACE CUTTERS

Specifications Conform to :
BS 122 : Part 1 : 1953
Dimensions in Inches



Diameter + 0.045" 0.000	Length + 0.030" 0.000"	Bore + 0.00075" + 0.00025"
1.3/4	1.1/4	3/4
2	1.1/4	3/4
2.1/2	1.1/4	3/4

Diameter + 0.045" 0.000	Length + 0.030" 0.000"	Bore + 0.00075" + 0.00025"
3	1.11/16	1.1/8
4	1.3/4	1.1/8
5	2	1.1/2

A cutter with teeth on the periphery and face provided with a back face key slot drive on the boss for use in an arbor.

The cutters shall be supplied with Right Hand Helical flutes for Right Hand cutting unless otherwise specified.



High Speed Steel HOLLOW MILLS

Specifications Conform to :
BS 122 : Part 1 : 1953
Dimensions in Inches



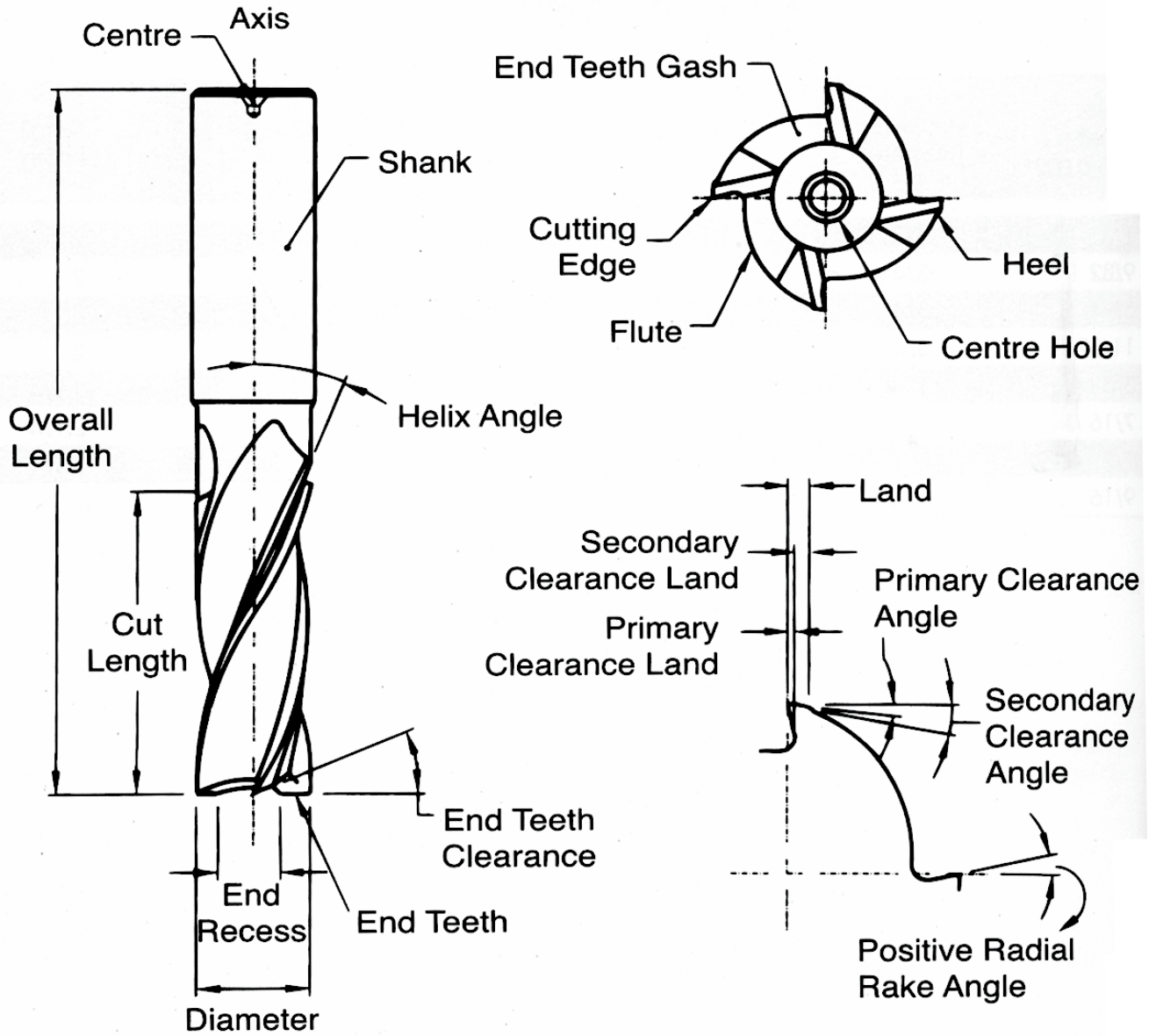
Bore Diameter 0.000 / - 0.002"	Outside Diameter	Overall Length
1/4	5/8	1.1/2
9/32	3/4	1.1/2
5/16	3/4	1.1/2
11/32	3/4	1.1/2
3/8	1	1.3/4
7/16	1	1.3/4
1/2	1	1.3/4
9/16	1.1/4	2

Bore Diameter 0.000 / - 0.002"	Outside Diameter	Overall Length
5/8	1.1/4	2
11/16	1.1/2	2
3/4	1.1/2	2
13/16	1.1/2	2
7/8	1.3/4	2.1/4
15/16	1.3/4	2.1/4
1	1.3/4	2.1/4

A tool of shell design having teeth to cut on the end face for reducing material to the bore size of the cutter.



END MILL - NOMENCLATURE





High Speed Steel PARALLEL SHANK END MILLS

Specifications Conform to :
IS 6353 - 1991
ISO 1641 : Part 1 : 1978
Dimensions in mm



Diameter js14	Shank dia h8	Length			
		Standard Series		Long Series	
		Cutting Edge Length	Overall Length	Cutting Edge Length	Overall Length
3	4	8	40	12	44
4	4	11	43	19	51
5	5	13	47	24	58
6	6	13	57	24	68
7	8	16	60	30	74
8	8	19	63	38	82
9	10	19	69	38	88
10	10	22	72	45	95
11	12	22	79	45	102
12	12	26	83	53	110
14	12	26	83	53	110
16	16	32	92	63	123
18	16	32	92	63	123
20	20	38	104	75	141
22	20	38	104	75	141
25	25	45	121	90	166
28	25	45	121	90	166
32	32	53	133	106	186
36	32	53	133	106	186
40	40	63	155	125	217
45	40	63	155	125	217
50	50	75	177	150	252
56	50	75	177	150	252
63	50	90	192	180	282
71	63	90	202	180	292

Endmills are integral shank cutters capable of cutting on the periphery and end. These cutters are used for profile milling, facing narrow surfaces and producing open slots and pockets where a 'plunge' feed is not required.

Note: Unless otherwise specified End mills with flat end, plain parallel shank of Standard series in Tool type-N with Right Hand Helical flutes for Right Hand cutting shall be supplied.



High Speed Steel PARALLEL SHANK END MILLS

Specifications Conform to:
BS 122 : Part 1 : 1953
Dimensions in Inches



Diameter	Shank dia	Cutting Edge Length	Overall Length
1/8	1/4	3/8	1.7/8
5/32	1/4	3/8	1.7/8
3/16	1/4	1/2	2
7/32	1/4	1/2	2
1/4	1/4	5/8	2.1/8
5/16	3/8	3/4	2.1/2
3/8	3/8	7/8	2.5/8
7/16	1/2	7/8	2.5/8
1/2	1/2	1	2.3/4
9/16	1/2	1.1/8	2.7/8
5/8	5/8	1.1/4	3.1/4
11/16	5/8	1.3/8	3.3/8
3/4	5/8	1.1/2	3.1/2
13/16	3/4	1.5/8	3.5/8
7/8	3/4	1.5/8	3.5/8

Diameter	Shank dia	Cutting Edge Length	Overall Length
1	3/4	1.3/4	3.3/4
1.1/8	1	1.7/8	4.1/8
1.1/4	1	2	4.1/4
1.3/8	1	2.1/8	4.5/8
1.1/2	1	2.1/4	4.3/4
1.5/8	1.1/4	2.3/8	4.7/8
1.3/4	1.1/4	2.1/2	5.1/8
1.7/8	1.1/4	2.5/8	5.1/4
2	1.1/2	3	5.1/2
2.1/8	1.1/2	3	5.1/2
2.1/4	1.1/2	3	5.5/8
2.3/8	1.1/2	3.1/4	5.7/8
2.1/2	1.1/2	3.1/2	6.1/8
2.3/4	1.1/2	3.1/2	6.1/2
3	2	3.1/2	6.1/2

Parallel Shank End Mills for Right Hand cutting with Right Hand Helical flutes shall be supplied unless otherwise specified.

Intermediate sizes shall be supplied with the same dimensions other than diameter as the next larger standard size unless otherwise specified.

Sizes 1.5/8" & above are not covered in BSS.

Tolerance on Cutting Edge dia. Upto & including 3/4" = + 0.005"/ 0.000

Over 3/4" = + 0.010"/ 0.000



High Speed Steel PARALLEL SHANK END MILLS

Specifications Conform to :
DIN 844 (Part 1) : 1989
Dimensions in mm



Diameter js14	Shank dia	Short Series (K)		Long Series (L)	
		Cutting Edge Length	Overall Length	Cutting Edge Length	Overall Length
3	6	8	52	12	56
4	6	11	55	19	63
5	6	13	57	24	68
6	6	13	57	24	68
7	10	16	66	30	80
8	10	19	69	38	88
10	10	22	72	45	95
12	12	26	83	53	110
14	12	26	83	53	110
16	16	32	92	63	123
18	16	32	92	63	123
20	20	38	104	75	141
22	20	38	104	75	141
25	25	45	121	90	166
28	25	45	121	90	166
32	32	53	133	106	186
36	32	53	133	106	186
40	40	63	155	125	217
45	40	63	155	125	217
50	50	75	177	150	252
56	50	75	177	150	252
63	50	90	192	180	282

Note: Unless otherwise specified End mills with Plain parallel shank of short series (type A) in tool type - N with Right Hand Helical flutes for Right Hand cutting shall be supplied.



**High Speed Steel
TAPER SHANK END MILLS**
WITH TANGED END
(Standard Series & Long Series)

Specifications Conform to :
IS 6354-1971
Dimensions in mm



Diameter js14	Standard Series		Long Series		Morse Taper No.
	Cutting Edge Length	Overall Length	Cutting Edge Length	Overall Length	
3.0	10	84	—	—	1
3.5	11	85	—	—	1
4.0	11	85	—	—	1
4.5	13	87	—	—	1
5.0	13	87	—	—	1
5.5	16	90	—	—	1
6.0	16	90	30	104	1
7.0	16	90	30	104	1
8.0	19	93	38	112	1
9.0	19	93	38	112	1
10.0	22	96	45	119	1
11.0	22	96	45	119	1
12.0	26	100	53	127	1
14.0	26	100	53	127	1
16.0	32	124	63	155	2
18.0	32	124	63	155	2
20.0	38	130	75	167	2
22.0	38	130	75	167	2
25.0	45	157	90	202	3
28.0	45	157	90	202	3
32.0	53	165	106	218	3
35.0	53	193	106	246	4
40.0	63	203	125	265	4
45.0	63	203	125	265	4
50.0	75	250	150	325	5
56.0	75	250	150	325	5
63.0	90	265	180	355	5

Note: Unless otherwise specified, Standard series in Tool type-N with Left Hand Helical flutes for Right Hand cutting shall be supplied.
Sizes below 6 mm not covered in ISS.



**High Speed Steel
TAPER SHANK END MILLS
(TAPPED END)
(Standard series & long series)**

Specifications Conform to :
IS 6354-1991
ISO 1641 : Part II : 1978
Dimensions in mm



Diameter js14	Standard Series		Long Series		Morse Taper No.	Thread Size of Tapped Hole
	Cutting Edge Length	Overall Length	Cutting Edge Length	Overall Length		
6	13	83	24	94	1	M6
7	16	86	30	100	1	M6
8	19	89	38	108	1	M6
9	19	89	38	108	1	M6
10	22	92	45	115	1	M6
11	22	92	45	115	1	M6
12	26	96	53	123	1	M6
14	26	96	53	123	1	M6
16	32	117	63	148	2	M10
18	32	117	63	148	2	M10
20	38	123	75	160	2	M10
22	38	123	75	160	2	M10
25	45	147	90	192	3	M12
28	45	147	90	192	3	M12
32	53	155	106	208	3	M12
36	53	178	106	231	4	M16
40	63	188	125	250	4	M16
45	63	188	125	250	4	M16
50	75	233	150	308	5	M20
56	75	233	150	308	5	M20
63	90	248	180	338	5	M20

Endmills are integral shank cutters capable of cutting on the periphery and end. These cutters are used for profile milling, facing narrow surfaces and producing open slots and pockets where a 'plunge' feed is not required.

Note: Unless otherwise specified End Mills with flat end of Standard series in Tool type-N with Right Hand Helical flutes for Right Hand cutting shall be supplied.



High Speed Steel
TAPER SHANK END MILLS
With Tanged End/Tapped End

Specifications Conform to :
 BS 122 : Part 1 : 1953
 Dimensions in Inches



Diameter	Cutting Edge Length	Overall length		Thread Size of Tapped Hole	Morse Taper No.
		Tanged Shank	Tapped Shank		
1/8	3/8	3.3/8	—	—	1
5/32	3/8	3.3/8	—	—	1
3/16	1/2	3.1/2	—	—	1
7/32	1/2	3.1/2	—	—	1
1/4	5/8	3.5/8	—	—	1
5/16	3/4	3.3/4	—	—	1
3/8	7/8	3.7/8	—	—	1
7/16	7/8	3.7/8	—	—	1
1/2	1	4	—	—	1
9/16	1.1/8	4.3/4	4.3/8	3/8 BSW	2
5/8	1.1/4	4.7/8	4.1/2	3/8 BSW	2
11/16	1.3/8	5	4.5/8	3/8 BSW	2
3/4	1.1/2	5.1/8	4.3/4	3/8 BSW	2
13/16	1.5/8	5.1/4	4.7/8	3/8 BSW	2
7/8	1.5/8	5.1/4	4.7/8	3/8 BSW	2
1	1.3/4	6.1/8	5.5/8	1/2 BSW	3
1.1/8	1.7/8	6.1/4	5.3/4	1/2 BSW	3
1.1/4	2	6.3/8	5.7/8	1/2 BSW	3
1.3/8	2.1/8	7.5/8	7.1/8	5/8 BSW	4
1.1/2	2.1/4	7.3/4	7.1/4	5/8 BSW	4
1.5/8	2.3/8	7.7/8	7.3/8	5/8 BSW	4



High Speed Steel
TAPER SHANK END MILLS (TAPPED END)
With Tanged End/Tapped End

Specifications Conform to :
 BS 122 : Part 1 : 1953
 Dimensions in Inches



Diameter	Cutting Edge Length	Overall length		Thread Size of Tapped Hole	Morse Taper No.
		Tanged Shank	Tapped Shank		
1.3/4	2.1/2	8	7.1/2	5/8 BSW	4
1.7/8	2.5/8	8.1/8	7.5/8	5/8 BSW	4
2	2.3/4	8.1/4	7.3/4	5/8 BSW	4
2.1/8	3	9.7/8	9.3/32	5/8 BSW	5
2.1/4	3	9.7/8	9.3/32	5/8 BSW	5
2.3/8	3.1/4	10.1/8	9.11/32	5/8 BSW	5
2.1/2	3.1/2	10.3/8	9.19/32	5/8 BSW	5
2.3/4	3.1/2	10.5/8	9.27/32	5/8 BSW	5
3	3.1/2	10.5/8	9.27/32	5/8 BSW	5

Tanged end Taper Shank End Mills will be supplied with RH cutting with LH Helical flutes unless otherwise specified. Intermediate sizes shall be supplied with the same dimensions other than diameter as the next larger standard size unless otherwise specified.

Sizes 2.1/8" & above are not covered in BSS.

Tolerance on Cutting Edge dia. Upto & including 3/4" = + 0.005" / 0.000

Over 3/4" = + 0.010" / 0.000



**High Speed Steel
PARALLEL SHANK SLOT DRILLS**

Specifications Conform to:
IS 6352-1991
ISO 1641 : Part 1 : 1978
Dimensions in mm



Diameter e8	Shank Dia h8	Cutting Edge Length	Overall Length
3	4	5	37
4	4	7	39
5	5	8	42
6	6	8	52
7	8	10	54
8	8	11	55
9	10	11	61
10	10	13	63
11	12	13	70
12	12	16	73
14	12	16	73
16	16	19	79
18	16	19	79

Diameter e8	Shank Dia h8	Cutting Edge Length	Overall Length
20	20	22	88
22	20	22	88
25	25	26	102
28	25	26	102
32	32	32	112
36	32	32	112
40	40	38	130
45	40	38	130
50	50	45	147
56	50	45	147
63	50	53	155
71	63	53	165

A cutter with teeth on the periphery and end, integral with a parallel shank. Usually having two teeth and designed primarily for the purpose of milling shallow slots or keyways and to cut whilst sinking or traversing.

Unless other wise specified slot drills with flat face, Helical fluted with plain parallel shank of short series with Right Hand Helical Flutes for Right Hand cutting and tool type 'H' shall be supplied.



High Speed Steel PARALLEL SHANK SLOT DRILLS

Specifications Conform to :
DIN 327 (Part 1) : 1989
Dimensions in mm



Diameter e8	Shank Dia	Cutting Edge Length	Overall Length
3	6	5	49
4	6	7	51
5	6	8	52
6	6	8	52
7	10	10	60
8	10	11	61
10	10	13	63
12	12	16	73
14	12	16	73
16	16	19	79
18	16	19	79
20	20	22	88

Diameter e8	Shank Dia	Cutting Edge Length	Overall Length
22	20	22	88
24	25	26	102
25	25	26	102
28	25	26	102
32	32	32	112
36	32	32	112
40	40	38	130
45	40	38	130
50	50	45	147
56	50	45	147
63	50	53	155

Note: Unless otherwise specified Type 'B' slot drills with Right Hand Helical flutes for Right Hand cutting shall be supplied.



**High Speed Steel
PARALLEL SHANK SLOT DRILLS**

Specifications Conform to :
BS 122 : Part 1 : 1953
Dimensions in Inches



Diameter	Cutting Edge Length	Overall Length	Dia of Shank
1/8	3/8	1.7/8	1/4
5/32	3/8	1.7/8	1/4
3/16	1/2	2	1/4
7/32	1/2	2	1/4
1/4	5/8	2.1/8	1/4
5/16	3/4	2.1/2	3/8
3/8	7/8	2.5/8	3/8
7/16	7/8	2.5/8	1/2
1/2	1	2.3/4	1/2

Diameter	Cutting Edge Length	Overall Length	Dia of Shank
9/16	1.1/8	2.7/8	1/2
5/8	1.1/4	3.1/4	5/8
11/16	1.3/8	3.3/8	5/8
3/4	1.1/2	3.1/2	5/8
7/8	1.5/8	3.5/8	3/4
1	1.3/4	3.3/4	3/4
1.1/8	1.7/8	4.1/8	1
1.1/4	2	4.1/4	1
1.3/8	2.1/8	4.5/8	1
1.1/2	2.1/4	4.3/4	1

Slot drills for Right Hand cutting with Right Hand Helical flutes shall be supplied unless otherwise specified. Intermediate sizes shall be supplied with the same dimensions, other than diameter, as the next larger standard size unless otherwise specified.

Tolerance on Cutting Edge dia. Upto & including 1/2" = + 0.0 / - 0.0005"
Over 1/2" = + 0.0 / - 0.001"



**High Speed Steel
TAPER SHANK SLOT MILLING CUTTERS
with Tanged End**

Specifications Conform to:
IS 6388 - 1971
Dimensions in mm



Diameter d9	Cutting Edge Length	Overall Length	Morse Taper No.
3	6	80	1
4	6	80	1
5	8	82	1
6	8	82	1
7	10	84	1
8	10	84	1
9	10	84	1
10	16	90	1
11	16	90	1
12	16	90	1
14	16	90	1
15	18	110	2
16	18	110	2
18	18	110	2
20	20	114	2

Diameter d9	Cutting Edge Length	Overall Length	Morse Taper No.
21	20	114	2
22	22	118	2
23	22	118	2
24	25	143	3
25	25	143	3
26	25	143	3
28	25	143	3
30	28	148	3
32	28	148	3
34	32	179	4
35	32	179	4
36	32	179	4
38	36	186	4
40	36	186	4

A cutter with teeth on the periphery and end, integral with a Morse Taper shank. Usually having two teeth and designed primarily for the purpose of milling shallow slots or keyways and to cut whilst sinking or traversing.

Tanged end Taper Shank Slot milling cutters for right hand cutting with Right Hand Helicat flutes and flat face (Type A) & Tool Type 'H' shall be supplied unless otherwise specified.
Sizes below 10.0 mm are not covered is ISS



High Speed Steel TAPER SHANK SLOT DRILLS With Tapped End

Specifications Conform to :
IS 6388 - 1991
ISO 1641 : Part II : 1978
Dimensions in mm



Diameter e8	Cutting Edge Length	Overall Length	Morse Taper No.	Thread Size of Tapped Hole
6	8	78	1	M6
7	10	80	1	M6
8	11	81	1	M6
9	11	81	1	M6
10	13	83	1	M6
11	13	83	1	M6
12	16	86	1	M6
14	16	86	1	M6
16	19	104	2	M10
18	19	104	2	M10
20	22	107	2	M10
22	22	107	2	M10
25	26	128	3	M12
28	26	128	3	M12
32	32	134	3	M12
36	32	157	4	M16
40	38	163	4	M16
45	38	163	4	M16
50	45	203	5	M20
56	45	203	5	M20
63	53	211	5	M20

Tapped end Taper Shank Slot drills of short series with flat face with Right Hand Helical Flute for Right Hand Cutting and Tool Type 'H' shall be supplied Unless otherwise specified.



High Speed Steel TAPER SHANK SLOT DRILLS With Tanged End

Specifications Conform to:
BS 122 : Part 1 : 1953
Dimensions in Inches



Diameter	Cutting Edge Length	Morse Taper No.	Overall Length
1/8	3/8	1	3.3/8
5/32	3/8	1	3.3/8
3/16	1/2	1	3.1/2
7/32	1/2	1	3.1/2
1/4	5/8	1	3.5/8
5/16	3/4	1	3.3/4
3/8	7/8	1	3.7/8
7/16	7/8	1	3.7/8
1/2	1	1	4
9/16	1.1/8	2	4.3/4

Diameter	Cutting Edge Length	Morse Taper No.	Overall Length
5/8	1.1/4	2	4.7/8
11/16	1.3/8	2	5
3/4	1.1/2	2	5.1/8
7/8	1.5/8	2	5.1/4
1	1.3/4	3	6.1/8
1.1/8	1.7/8	3	6.1/4
1.1/4	2	3	6.3/8
1.3/8	2.1/8	4	7.5/8
1.1/2	2.1/4	4	7.3/4

Cutters with Right Hand Helical flutes for Right Hand cutting shall be supplied unless otherwise specified. Intermediate sizes shall be supplied with the same dimensions, other than diameter, as the next larger standard size unless otherwise specified.

Tolerance on Cutting Edge diameters Upto & including 1/2" = 0.000 / - 0.0005"
Over 1/2" = 0.000 / - 0.0010"



High Speed Steel
WOODRUFF KEY SLOT MILLING CUTTERS
Type A - Straight Teeth

Specifications Conform to :
IS 2669 - 1971
Dimensions in mm



Diameter h11	Width e8	Dia.of shank	Overall Length	Woodruff Keys To IS 2294
10.5	2	6	50	2 x 3.7
10.5	2.5	6	50	2.5 x 3.7
10.5	3	6	50	3 x 3.7
13.5	3	10	56	3 x 5.0
13.5	4	10	56	4 x 5.0
16.5	3	10	56	3 x 6.5
16.5	4	10	56	4 x 6.5
16.5	5	10	56	5 x 6.5
19.5	4	10	56	4 x 7.5
19.5	5	10	56	5 x 7.5
19.5	6	10	63	6 x 7.5
22.5	5	10	63	5 x 9.0
22.5	6	10	63	6 x 9.0
22.5	8	10	63	8 x 9.0
25.5	6	10	63	6 x 10
28.5	6	10	63	6 x 11
28.5	8	10	63	8 x 11
28.5	10	12	71	10 x 11
32.5	8	10	63	8 x 13
32.5	10	12	71	10 x 13
45.5	10	12	71	10 x 16

A Cutter having definite diameter and width, with sides slightly concave, designed for cutting seatings in shafts for woodruff keys and integral with a parallel shank.

Right Hand Cutter with straight flutes shall be supplied unless otherwise specified.



**High Speed Steel
CUTTERS FOR WOODRUFF KEYSEATS**

Specifications Conform to :
BS 122 : Part 1 : 1953
Dimensions in Inches



BS Cutter and Key No.	Dia. of Cutter + 0.010"/ 0.000	Width of Cutter + 0.001"/ 0.000	Overall Length	Dia. of Shank
204	0.505	0.061	2	1/2
304	0.505	0.093	2	1/2
404	0.505	0.124	2	1/2
305	0.630	0.093	2	1/2
405	0.630	0.124	2	1/2
505	0.630	0.155	2	1/2
406	0.755	0.124	2.1/4	1/2
506	0.755	0.155	2.1/4	1/2
606	0.755	0.187	2.1/4	1/2
507	0.88	0.155	2.1/2	1/2
607	0.88	0.187	2.1/2	1/2
807	0.88	0.249	2.1/2	1/2
608	1.005	0.187	2.3/4	1/2
808	1.005	0.249	2.3/4	1/2
1008	1.005	0.311	2.3/4	1/2
609	1.130	0.187	2.3/4	1/2
809	1.130	0.249	2.3/4	1/2
1009	1.130	0.311	2.3/4	1/2
810	1.255	0.249	2.3/4	1/2
1010	1.255	0.311	2.3/4	1/2
1210	1.255	0.374	2.3/4	1/2
1011	1.380	0.311	3	1/2
1211	1.380	0.374	3	1/2
812	1.505	0.249	3	1/2
1012	1.505	0.311	3	1/2
1212	1.505	0.374	3	1/2

Right Hand Cutter shall be supplied unless otherwise specified.



**High Speed Steel
CUTTERS FOR WOODRUFF KEYSEATS**

Specifications Conform to :
DIN 850 (Part 1) : 1981
Dimensions in mm



Diameter h11	Width e8	Dia.of shank	Overall Length	Woodruff Key Seats as per DIN 6888
10.5	2.0	6	50	2.0 x 3.7
10.5	2.5	6	50	2.5 x 3.7
10.5	3.0	6	50	3.0 x 3.7
13.5	3.0	10	56	3.0 x 5
13.5	4.0	10	56	4.0 x 5
16.5	3.0	10	56	3.0 x 6.5
16.5	4.0	10	56	4.0 x 6.5
16.5	5.0	10	56	5.0 x 6.5
19.5	4.0	10	56	4.0 x 7.5
19.5	5.0	10	56	5.0 x 7.5
19.5	6.0	10	56	6.0 x 7.5

Diameter h11	Width e8	Dia.of shank	Overall Length	Woodruff Key Seats as per DIN 6888
22.5	5	10	56	5 x 9
22.5	6	10	56	6 x 9
22.5	8	10	56	8 x 9
25.5	6	10	56	6 x 10
28.5	6	10	56	6 x 11
28.5	8	10	56	8 x 11
28.5	10	12	63	10 x 11
32.5	7	10	56	*
32.5	8	10	56	8 x 13
32.5	10	12	63	10 x 13
45.5	10	12	63	10 x 16

* For key ways of 7mm width, Refer DIN 138



High Speed Steel
T' SLOT CUTTERS WITH TAPER SHANK
WITH TAPPED HOLE

Specifications Conform to :
IS 2668 - 2004
ISO 3337 - 2000
Dimensions in mm



Nominal Size of T-Slot	Diameter of Cutter h12	Width of Cutter h12	Overall Length	Morse Taper No	Thread size of Tapped Hole
10	18	8	82	1	M6
12	21	9	98	2	M10
14	25	11	103	2	M10
18	32	14	111	2	M10
22	40	18	138	3	M12
28	50	22	173	4	M16
36	60	28	188	4	M16
42	72	35	229	5	M20
48	85	40	240	5	M20
54	95	44	251	5	M20

A Cutter having the characteristics of a side and face cutter, integral with a Morse Taper Shank and designed for cutting 'T' slots.

RH Cutting with staggered teeth and tool type 'N' shall be supplied unless otherwise specified.



High Speed Steel
T' SLOT CUTTERS WITH TAPER SHANK
 WITH TAPPED HOLE

Specifications Conform to:
 BS 122 : Part 1 : 1953
 Dimensions in Inches



Nominal Size of Slot	Diameter of Cutter 0.000 -0.010"	Width of Cutter 0.000 -0.005"	Morse Taper No.	Thread size of Tapped Hole	Overall Length
1/4	37/64	1/4	2	3/8 BSW	3.9/16
5/16	45/64	5/16	2	3/8 BSW	3.3/4
3/8	53/64	23/64	2	3/8 BSW	3.7/8
7/16	61/64	27/64	2	3/8 BSW	4.1/16
1/2	1.5/64	15/32	2	3/8 BSW	4.3/16
5/8	1.21/64	37/64	3	1/2 BSW	5.1/8
3/4	1.33/64	11/16	3	1/2 BSW	5.7/16
7/8	1.45/64	51/64	3	1/2 BSW	5.3/4
1	1.61/64	29/32	4	5/8 BSW	7.1/16
1.1/8	2.1/8	1.1/16	4	5/8 BSW	7.1/8
1.1/4	2.5/16	1.3/16	4	5/8 BSW	7.3/8
1.3/8	2.1/2	1.5/16	5	5/8 BSW	8.7/8
1.1/2	2.3/4	1.7/16	5	5/8 BSW	9.1/8

Nom. Sizes over 1" as BSS 122:1938

A Cutter having characteristics of a side and face cutter, integral with a Morse Taper Shank and designed for cutting 'T' slots.

Unless otherwise specified straight teeth for Right Hand cutting shall be supplied.



**High Speed Steel
T' SLOT CUTTERS WITH
PARALLEL SHANK**

Specifications Conform to :
IS 2668 - 2004
ISO 3337 - 2000
Dimensions in mm



Nominal Size of T-Slot	Diameter of cutter h12	Width of Cutter h12	Dia of Shank h8	Overall Length
10	18	8	12	70
12	21	9	12	74
14	25	11	16	82
18	32	14	16	90
22	40	18	25	108
28	50	22	32	124
36	60	28	32	139

A Cutter having characteristics of a side and face cutter, integral with a Parallel Shank and designed for cutting 'T' slots.

Plain parallel Shank with RH Cutting with staggered teeth and tool type 'N' shall be supplied unless otherwise specified.



**High Speed Steel
SCREWED SHANK END MILLS
Normal Series (Short Series)**

Specifications Conform to :
BS 122 : Part 4 : 1980
Dimensions in mm



Diameter	Cutting Edge Length	Shank Diameter	Nominal Length below Chuck	Overall length
3.0	9.5	6	16.5	54.0
3.5	12.5	6	19.5	57.0
4.0	12.5	6	19.5	57.0
4.5	12.5	6	19.5	57.0
5.0	16.0	6	23.0	60.5
5.5	16.0	6	23.0	60.5
6.0	16.0	6	23.0	60.5
6.5	16.0	10	22.5	60.5
7.0	15.0	10	22.5	60.5
7.5	18.0	10	25.5	63.5
8.0	18.0	10	25.5	63.5
8.5	21.0	10	28.5	66.5
9.0	21.0	10	28.5	66.5
9.5	21.0	10	28.5	66.5
10.0	21.0	10	28.5	66.5
10.5	19.0	12	28.5	66.5
11.0	19.0	12	28.5	66.5
11.5	22.5	12	32.0	70.0
12.0	24.0	12	32.0	70.0
13.0	24.5	12	32.0	70.0
14.0	28.5	12	35.0	73.0
15.0	26.5	16	38.0	77.0



High Speed Steel
SCREWED SHANK END MILLS
Normal Series (Short Series)

Specifications Conform to :
 BS 122 : Part 4 : 1980
 Dimensions in mm



Diameter	Cutting Edge Length	Shank Diameter	Nominal Length below Chuck	Overall length
16.0	26.5	16	38.0	77.0
17.0	32	16	41.0	80.0
18.0	35	16	41.0	80.0
19.0	38	16	44.5	83.5
20.0	38.0	16	44.5	83.5
21.0	38.0	25	42.5	95.0
22.0	41.5	25	46.0	98.5
23.0	41.5	25	46.0	98.5
24.0	41.5	25	46.0	98.5
25.0	44.5	25	49.0	101.5
26.0	43.0	25	49.0	101.5
28.0	46.0	25	52.0	104.5
30.0	46.0	25	52.0	104.5
32.0	49.0	25	55.5	108.0
34.0	49.0	25	55.5	108.0
35.0	52.5	25	58.5	111.0
36.0	52.5	25	58.5	111.0
38.0	55.5	25	62.0	114.5
40.0	58.5	25	65.0	117.5
42.0	60.5	25	65.0	117.5
44.0	63.5	25	68.0	120.5
45.0	63.5	25	68.0	120.5

RH Helical flutes with RH cutting.



High Speed Steel
SCREWED SHANK END MILLS
Normal Series (Short Series)
 (in imperial units)

Specifications Conform to :
 BS 122 : Part 4 : 1980
 Dimensions in Inches



Diameter	Cutting Edge Length	Shank Diameter	Nominal Length below Chuck	Overall length
1/8	3/8	1/4	21/32	2.1/8
5/32	1/2	1/4	25/32	2.1/4
3/16	1/2	1/4	25/32	2.1/4
7/32	5/8	1/4	29/32	2.3/8
1/4	5/8	1/4	29/32	2.3/8
9/32	19/32	3/8	7/8	2.3/8
5/16	23/32	3/8	1	2.1/2
11/32	27/32	3/8	1.1/8	2.5/8
3/8	27/32	3/8	1.1/8	2.5/8
13/32	7/8	3/8	1.1/8	2.5/8
7/16	3/4	1/2	1.1/8	2.5/8
15/32	7/8	1/2	1.1/4	2.3/4
1/2	15/16	1/2	1.1/4	2.3/4
9/16	1.1/8	1/2	1.3/8	2.7/8
5/8	1.1/16	5/8	1.1/2	3.1/32
11/16	1.3/8	5/8	1.5/8	3.5/32
3/4	1.1/2	5/8	1.3/4	3.9/32
13/16	1.1/2	1	1.11/16	3.3/4
7/8	1.5/8	1	1.13/16	3.7/8
15/16	1.5/8	1	1.13/16	3.7/8
1	1.11/16	1	1.15/16	4
1.1/16	1.11/16	1	1.15/16	4



High Speed Steel
SCREWED SHANK END MILLS
Normal Series (Short Series)
 (in imperial units)

Specifications Conform to :
 BS 122 : Part 4 : 1980
 Dimensions in Inches



Diameter	Cutting Edge Length	Shank Diameter	Nominal Length below Chuck	Overall length
1.1/8	1.13/16	1	2.1/16	4.1/8
1.3/16	1.13/16	1	2.1/16	4.1/8
1.1/4	1.15/16	1	2.3/16	4.1/4
1.5/16	1.15/16	1	2.3/16	4.1/4
1.3/8	2.1/16	1	2.5/16	4.3/8
1.7/16	2.1/16	1	2.5/16	4.3/8
1.1/2	2.3/16	1	2.7/16	4.1/2
1.5/8	2.3/8	1	2.9/16	4.5/8
1.3/4	2.1/2	1	2.11/16	4.3/4
1.7/8	2.5/8	1	2.13/16	4.7/8
2	2.3/4	1	2.15/16	5

RH Helical flutes with RH cutting.



High Speed Steel SCREWED SHANK END MILLS (Long Series)

Specifications Conform to :
BS 122 : Part 4 : 1980
Dimensions in mm



Diameter	Cutting Edge Length	Shank Diameter	Nominal Length below Chuck	Overall length
3.0	19.0	6	26.0	63.5
3.5	25.5	6	32.5	70.0
4.0	25.5	6	32.5	70.0
4.5	25.5	6	32.5	70.0
5.0	31.5	6	38.5	76.0
5.5	31.5	6	38.5	76.0
6.0	31.5	6	38.5	76.0
6.5	35.0	10	41.5	79.5
7.0	34.0	10	41.5	79.5
7.5	34.0	10	41.5	79.5
8.0	34.0	10	41.5	79.5
8.5	37.0	10	44.5	82.5
9.0	37.0	10	44.5	82.5
10.0	37.0	10	44.5	82.5
11.0	41.5	12	51.0	89.0
12.0	49.5	12	57.0	95.0
13.0	50.0	12	57.0	95.0
14.0	57.0	12	63.5	101.5
15.0	58.5	16	69.5	108.5
16.0	58.5	16	69.5	108.5
17.0	67.0	16	76.0	115.0



High Speed Steel SCREWED SHANK END MILLS (Long Series)

Specifications Conform to :
BS 122 : Part 4 : 1980
Dimensions in mm



Diameter	Cutting Edge Length	Shank Diameter	Nominal Length below Chuck	Overall length
18	70.0	16	76.0	115.0
19	76.0	16	82.5	121.5
20	76.0	16	82.5	121.5
22	85.5	25	90.5	143.0
24	92.0	25	96.5	149.0
25	100.0	25	104.5	157.0
26	98.5	25	104.5	157.0
28	98.5	25	104.5	157.0
30	98.5	25	104.5	157.0
32	100.0	25	106.5	159.0
34	100.0	25	106.5	159.0
35	100.0	25	106.5	159.0
36	100.0	25	106.5	159.0
38	100.0	25	106.5	159.0
40	101.5	25	106.5	159.0
45	101.5	25	106.5	159.0

RH Helical flutes with RH cutting.



High Speed Steel
SCREWED SHANK END MILLS
(Long Series)
(in imperial units)

Specifications Conform to :
 BS 122 : Part 4 : 1980
 Dimensions in Inches



Diameter	Cutting Edge Length	Shank Diameter	Nominal Length below Chuck	Overall length
1/8	3/4	1/4	1.1/32	2.1/2
5/32	1	1/4	1.9/32	2.3/4
3/16	1	1/4	1.9/32	2.3/4
7/32	1.1/4	1/4	1.17/32	3
1/4	1.1/4	1/4	1.17/32	3
9/32	1.11/32	3/8	1.5/8	3.1/8
5/16	1.11/32	3/8	1.5/8	3.1/8
11/32	1.15/32	3/8	1.3/4	3.1/4
3/8	1.15/32	3/8	1.3/4	3.1/4
13/32	1.1/2	3/8	1.3/4	3.1/4
7/16	1.5/8	1/2	2	3.1/2
15/32	1.7/8	1/2	2.1/4	3.3/4
1/2	1.15/16	1/2	2.1/4	3.3/4
9/16	2.1/4	1/2	2.1/2	4
5/8	2.5/16	5/8	2.3/4	4.9/32
11/16	2.3/4	5/8	3	4.17/32
3/4	3	5/8	3.1/4	4.25/32
13/16	3.1/16	1	3.5/16	5.3/8
7/8	3.3/8	1	3.9/16	5.5/8
15/16	3.5/8	1	3.13/16	5.7/8



High Speed Steel
SCREWED SHANK END MILLS
 (Long Series)
 (in imperial units)

Specifications Conform to :
 BS 122 : Part 4 : 1980
 Dimensions in Inches



Diameter	Cutting Edge Length	Shank Diameter	Nominal Length below Chuck	Overall length
1	3.15/16	1	4.1/8	6.3/16
1.1/16	3.7/8	1	4.1/8	6.3/16
1.1/8	3.7/8	1	4.1/8	6.3/16
1.3/16	3.7/8	1	4.1/8	6.3/16
1.1/4	3.15/16	1	4.3/16	6.1/4
1.5/16	3.15/16	1	4.3/16	6.1/4
1.3/8	3.15/16	1	4.3/16	6.1/4
1.7/16	3.15/16	1	4.3/16	6.1/4
1.1/2	3.15/16	1	4.3/16	6.1/4
1.5/8	4	1	4.3/16	6.1/4
1.3/4	4	1	4.3/16	6.1/4
1.7/8	4	1	4.3/16	6.1/4
2	4	1	4.3/16	6.1/4

RH Helical flutes with RH cutting.



High Speed Steel
SCREWED SHANK SLOT DRILLS
 (Normal Series) (Short Series)

Specifications Conform to :
 BS 122 : Part 4 : 1980
 Dimensions in mm



Diameter	Cutting Edge Length	Shank Diameter	Nominal Length below Chuck	Overall length
3.0	7.0	6	13.5	51.0
3.5	7.5	6	15.0	52.5
4.0	9.5	6	15.0	52.5
4.5	9.5	6	15.0	52.5
5.0	9.5	6	15.0	52.5
5.5	11.0	6	18.0	55.5
6.0	11.0	6	19.0	56.5
6.5	11.0	10	20.5	58.5
7.0	11.0	10	20.5	58.5
7.5	11.0	10	20.5	58.5
8.0	12.5	10	21.5	59.5
8.5	14.5	10	22.5	60.5
9.0	14.5	10	22.5	60.5
9.5	14.5	10	22.5	60.5
10.0	14.5	10	22.5	60.5
10.5	17.5	12	27.0	65.0
11.0	17.5	12	27.0	65.0
11.5	17.5	12	27.0	65.0
12.0	19.0	12	28.5	66.5
13.0	19.0	12	28.5	66.5
14.0	22.0	12	30.5	68.5
15.0	22.0	16	33.0	72.0



High Speed Steel
SCREWED SHANK SLOT DRILLS
 (Normal Series) (Short Series)

Specifications Conform to :
 BS 122 : Part 4 : 1980
 Dimensions in mm



Diameter	Cutting Edge Length	Shank Diameter	Nominal Length below Chuck	Overall length
16	22.0	16	33.0	72.0
17	24.0	16	35.0	74.0
18	24.0	16	35.0	74.0
19	25.5	16	38.0	77.0
20	25.5	16	38.0	77.0
21	25.5	25	46.0	98.5
22	25.5	25	47.5	100.0
23	25.5	25	49.0	101.5
24	25.5	25	50.5	103.0
25	27.0	25	42.5	95.0
26	27.0	25	42.5	95.0
27	28.5	25	41.0	93.5
28	30.0	25	42.5	95.0
29	30.0	25	41.0	93.5
30	30.0	25	41.0	93.5
32	38.0	25	49.0	101.5
34	38.0	25	49.0	101.5
35	39.5	25	50.5	103.0
36	39.5	25	50.5	103.0
38	43.0	25	54.0	106.5
40	46.0	25	58.5	111.0
42	47.5	25	60.0	112.5
44	51.0	25	63.5	116.0
45	51.0	25	63.5	116.0

A Cutter with teeth on the periphery and end, integral with a parallel shank. Designed primarily for the purpose of milling shallow slots or keyways, usually having two teeth.

RH Helical flutes with RH cutting.



High Speed Steel
SCREWED SHANK SLOT DRILLS
(Normal Series) (Short Series)
 (in imperial units)

Specifications Conform to
 BS 122 : Part 4 : 1980
 Dimensions in Inches



Diameter	Cutting Edge Length	Shank Diameter	Nominal Length below Chuck	Overall length
1/8	9/32	1/4	17/32	2
5/32	3/8	1/4	19/32	2.1/16
3/16	3/8	1/4	19/32	2.1/16
7/32	7/16	1/4	23/32	2.3/16
1/4	7/16	1/4	3/4	2.7/32
9/32	7/16	3/8	13/16	2.5/16
5/16	1/2	3/8	27/32	2.11/32
11/32	9/16	3/8	7/8	2.3/8
3/8	9/16	3/8	7/8	2.3/8
13/32	5/8	3/8	7/8	2.3/8
7/16	11/16	1/2	1.1/16	2.9/16
15/32	11/16	1/2	1.1/16	2.9/16
1/2	3/4	1/2	1.1/8	2.5/8
9/16	27/32	1/2	1.7/32	2.23/32
5/8	7/8	5/8	1.5/16	2.27/32
11/16	15/16	5/8	1.3/8	2.29/32
3/4	1	5/8	1.1/2	3.1/32
13/16	1	1	1.13/16	3.7/8
7/8	1	1	1.7/8	3.15/16
15/16	1	1	2	4.1/16
1	1.1/16	1	1.11/16	3.3/4
1.1/16	1.1/8	1	1.5/8	3.11/16



High Speed Steel
SCREWED SHANK SLOT DRILLS
Normal Series (Short Series)
 (in imperial units)

Specifications Conform to :
 BS 122 : Part 4 : 1980
 Dimensions in Inches



Diameter	Cutting Edge Length	Shank Diameter	Nominal Length below Chuck	Overall length
1.1/8	1.3/16	1	1.11/16	3.3/4
1.3/16	1.3/16	1	1.5/8	3.11/16
1.1/4	1.1/2	1	1.15/16	4
1.5/16	1.1/2	1	1.15/16	4
1.3/8	1.9/16	1	2	4.1/16
1.7/16	1.9/16	1	2	4.1/16
1.1/2	1.11/16	1	2.1/8	4.3/16
1.5/8	1.7/8	1	2.3/8	4.7/16
1.3/4	2	1	2.1/2	4.9/16
1.7/8	2.1/8	1	2.5/8	4.11/16
2	2.1/4	1	2.3/4	4.13/16

RH Helical flutes with RH cutting.



High Speed Steel
SCREWED SHANK SLOT DRILLS
(Long Series)

Specifications Conform to :
BS 122 : Part 4 : 1980
Dimensions in mm



Diameter	Cutting Edge Length	Shank Diameter	Nominal Length below Chuck	Overall length
3.0	11.0	6	23.0	60.5
3.5	12.5	6	29.0	66.5
4.0	12.5	6	29.0	66.5
4.5	12.5	6	29.0	66.5
5.0	12.5	6	32.5	70.0
5.5	16.0	6	38.5	76.0
6.0	16.0	6	38.5	76.0
6.5	16.0	10	38.0	76.0
7.0	16.0	10	38.0	76.0
7.5	16.0	10	38.0	76.0
8.0	19.0	10	41.5	79.5
8.5	22.0	10	44.5	82.5
9.0	22.0	10	44.5	82.5
10.0	22.0	10	44.5	82.5
11.0	22.0	12	51.0	89.0
12.0	25.5	12	57.0	95.0
13.0	25.5	12	57.0	95.0
14.0	28.5	12	63.5	101.5
15.0	31.5	16	69.0	108.0
16.0	31.5	16	69.0	108.0
17.0	35.0	16	75.5	114.5



High Speed Steel
SCREWED SHANK SLOT DRILLS
(Long Series)

Specifications Conform to :
BS 122 : Part 4 : 1980
Dimensions in mm



Diameter	Cutting Edge Length	Shank Diameter	Nominal Length below Chuck	Overall length
18	35.0	16	75.50	114.5
19	38.0	16	81.50	120.5
20	38.0	16	81.50	120.5
22	41.5	25	87.50	140.0
24	41.5	25	100.00	152.5
25	44.5	25	106.50	159.0
26	44.5	25	106.50	159.0
28	47.5	25	106.50	159.0
30	51.0	25	106.50	159.0
32	51.0	25	106.50	159.0
34	51.0	25	106.50	159.0
35	54.0	25	106.50	159.0
36	54.0	25	106.50	159.0
38	57.0	25	106.50	159.0
40	57.0	25	106.50	159.0
45	57.0	25	106.50	159.0

RH Helical flutes with RH cutting.



High Speed Steel
SCREWED SHANK SLOT DRILLS
Long Series
 (in imperial units)

Specifications Conform to :
 BS 122 : Part 4 : 1980
 Dimensions in Inches



Diameter	Cutting Edge Length	Shank Diameter	Nominal Length below Chuck	Overall length
1/8	7/16	1/4	1.1/32	2.1/2
5/32	1/2	1/4	1.9/32	2.3/4
3/16	1/2	1/4	1.9/32	2.3/4
7/32	5/8	1/4	1.17/32	3
1/4	5/8	1/4	1.17/32	3
9/32	5/8	3/8	1.1/2	3
5/16	3/4	3/8	1.5/8	3.1/8
11/32	7/8	3/8	1.3/4	3.1/4
3/8	7/8	3/8	1.3/4	3.1/4
13/32	7/8	3/8	2	3.1/2
7/16	7/8	1/2	2	3.1/2
15/32	1	1/2	2.1/4	3.3/4
1/2	1	1/2	2.1/4	3.3/4
9/16	1.1/8	1/2	2.1/2	4
5/8	1.1/4	5/8	2.23/32	4.1/4
11/16	1.3/8	5/8	2.31/32	4.1/2
3/4	1.1/2	5/8	3.7/32	4.3/4
13/16	1.1/2	1	3.7/16	5.1/2
7/8	1.5/8	1	3.7/16	5.1/2
15/16	1.5/8	1	3.15/16	6



High Speed Steel
SCREWED SHANK SLOT DRILLS
Long Series
(in imperial units)

Specifications Conform to :
BS 122 : Part 4 : 1980
Dimensions in Inches



Diameter	Cutting Edge Length	Shank Diameter	Nominal Length below Chuck	Overall length
1	1.3/4	1	4.3/16	6.1/4
1.1/16	1.3/4	1	4.3/16	6.1/4
1.1/8	1.7/8	1	4.3/16	6.1/4
1.3/16	2	1	4.3/16	6.1/4
1.1/4	2	1	4.3/16	6.1/4
1.3/8	2.1/8	1	4.3/16	6.1/4
1.7/16	2.1/8	1	4.3/16	6.1/4
1.1/2	2.1/4	1	4.3/16	6.1/4
1.5/8	2.1/2	1	4.3/16	6.1/4
1.3/4	2.1/2	1	4.3/16	6.1/4
1.7/8	2.1/2	1	4.3/16	6.1/4
2	2.1/2	1	4.3/16	6.1/4

RH Helical flutes with RH cutting.



High Speed Steel
HOLE MILLS UNGUIDED - TYPE 'A'

Specifications Conform to :
 IS 5989 - 1998
 Dimensions in mm



Diameter h7	Cutting Edge Length	Overall Length	Morse Taper No
5.9	25	110	1
7.9	25	120	1
9.9	30	125	1
11.8	35	140	1
12.8	35	140	1
13.8	35	160	1
14.8	35	160	2
15.8	40	160	2
17.8	45	180	2
19.8	45	180	2
21.7	45	200	2
23.7	55	200	3
24.7	55	200	3
25.7	60	200	3

Diameter h7	Cutting Edge Length	Overall Length	Morse Taper No
26.7	60	220	3
27.7	60	220	3
29.7	60	220	3
31.7	60	220	3
33.7	60	250	4
34.7	60	250	4
35.7	60	250	4
37.7	60	250	4
39.7	60	250	4
41.6	60	250	4
44.6	60	250	4
46.6	60	280	4
47.6	60	280	4
49.6	60	280	4

Unless otherwise specified Right Hand Helical Flutes with Right Hand cutting shall be supplied.



High Speed Steel
HOLE MILLS GUIDED - TYPE 'B'

Specifications Conform to :
 IS 5989 - 1998
 Dimensions in mm



Diameter		Cutting Edge Length	Overall Length	Morse Taper No.
Roughing 'h6'	Finishing 'm6'			
5.9	6	25	150	1
7.9	8	25	170	1
9.9	10	30	180	1
11.8	12	35	190	1
12.8	13	35	200	1
13.8	14	35	200	1
14.8	15	35	210	2
15.8	16	40	230	2
17.8	18	45	235	2
19.8	20	45	245	2
21.7	22	45	255	2
23.7	24	55	290	3
24.7	25	55	290	3
25.7	26	60	305	3
26.7	27	60	305	3
27.7	28	60	305	3
29.7	30	60	320	3
31.7	32	60	320	3
33.7	34	60	360	4
34.7	35	60	360	4
35.7	36	60	360	4
37.7	38	60	390	4
39.7	40	60	390	4
41.6	42	60	390	4

Unless otherwise specified Right Hand Helical Flutes with Right Hand cutting shall be supplied. Rougher hole mill is recommended to use prior to reaming operations and then expected to produce a 'H8' Hole by the finisher hole mill or Reamer.



**High Speed Steel
TAPER SHANK ROUGHING END MILLS
Tapped End**

Specifications Conform to :
IS 6354 - 1991
Dimensions in mm



Diameter js 14	Cutting Edge Length	Overall Length	Morse Taper No.	Thread Size of tapped hole
10	22	92	1	M6
11	22	92	1	M6
12	26	96	1	M6
14	26	96	1	M6
16	32	117	2	M10
18	32	117	2	M10
20	38	123	2	M10
22	38	123	2	M10
25	45	147	3	M12
28	45	147	3	M12
32	53	155	3	M12
36	53	178	4	M16
40	63	188	4	M16
45	63	188	4	M16
50	75	233	5	M20
56	75	233	5	M20
63	90	248	5	M20

TYPE	PROFILE	FORM
Roughing	Normal(Coarse) Pitch	
Roughing - Finishing	Normal Pitch	

TIN, TiAlN & TiCN coated Roughing End mills are also supplied against specific order.
Roughing End Mills with fine pitch profile is suitable for harder materials such as inconel and hastalloy.

Unless otherwise specified Tapped End Taper Shank End Mill in Tool Type 'N' with Right Hand Helical flutes for Right Hand cutting shall be supplied.
Unless otherwise specified 'Roughing type' coarse pitch shall be supplied.



**High Speed Steel
PARALLEL SHANK ROUGHING
END MILLS**

Specifications Conform to :
IS 6353 - 1991
Dimensions in mm



Diameter 'js14'	Shank Dia 'h8'	Standard Series	
		Cutting Edge Length	Overall Length
6	6	13	57
8	8	19	63
10	10	22	72
11	12	22	79
12	12	26	83
14	12	26	83
16	16	32	92
18	16	32	92
20	20	38	104
22	20	38	104
25	25	45	121
28	25	45	121
32	32	53	133
36	32	53	133
40	40	63	155
45	40	63	155
50	50	75	177
56	50	75	177
63	50	90	192
71	63	90	202

TYPE	PROFILE	FORM
Roughing	Normal (Coarse) Pitch	
Roughing - Finishing	Normal Pitch	

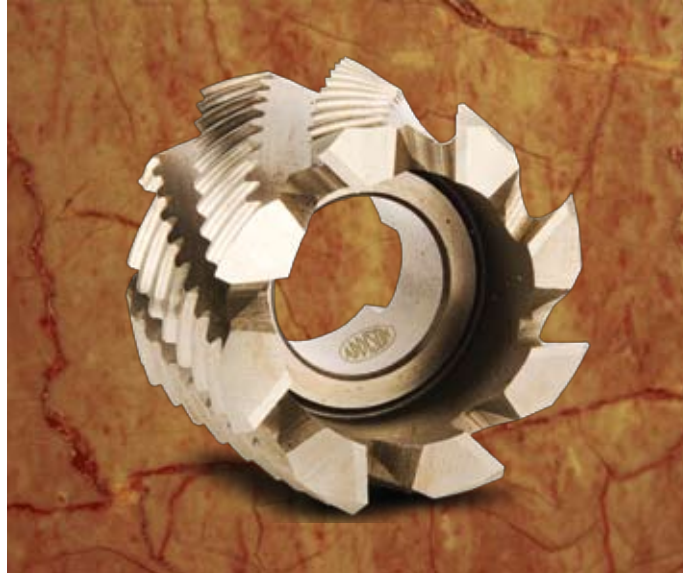
TIN, TiAlN & TiCN coated Roughing End mills are also supplied against specific order.
Roughing End Mills with fine pitch profile is suitable for harder materials such as inconel and hastalloy.

Unless otherwise specified End Mills with Plain Parallel Shank with 'Tool Type 'N' with Right and Helical flutes for Right Hand Cutting shall be supplied.
Unless otherwise specified 'Roughing type' coarse pitch shall be supplied.



High Speed Steel ROUGHING SHELL END MILLS

Specifications Conform to :
IS 6257 - 1982
Dimensions in mm



Diameter 'js16'	Bore 'H7'	Width k16
40	16	32
50	22	36
63	27	40
80	27	45

Diameter 'js16'	Bore 'H7'	Width k16
100	32	50
125	40	56
160	50	63

TYPE	PROFILE	FORM
Roughing	Normal(Coarse) Pitch	
Roughing - Finishing	Normal Pitch	

TIN, TiAlN & TiCN coated Roughing End mills are also supplied against specific order.

Unless otherwise specified Shell End Mills with 'Tool Type 'N' with Right Hand Helical flutes for Right Hand Cutting and with Roughing type shall be supplied.



High Speed Steel **TECHNICAL INFORMATION**

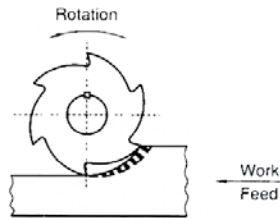
- 1) Types of Milling
- 2) Hand of Cutter
- 3) Calculations for Cutting Speeds and Feeds
- 4) Recommendations for Selection of Milling Cutters
- 5) Recommended Peripheral Speeds for HSS Milling Cutters
- 6) Recommended Feed per Tooth for HSS Milling Cutters
- 7) Cutting Fluids for HSS Milling Cutters



Types of Milling

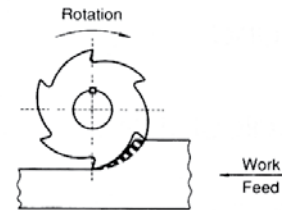
UP (CONVENTIONAL) MILLING

Up or Conventional milling results in the cutting action of the tooth being opposite to the direction of feed. This creates a force on the work piece that directly opposes the table feed.



DOWN (CLIMB) MILLING

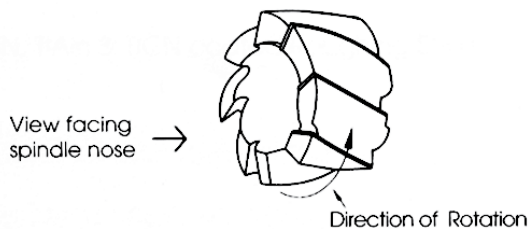
Down or Climb milling results in a cutting action of the tooth in the same direction as the work piece feed



HAND OF CUTTER

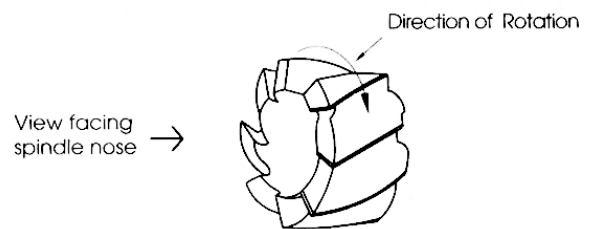
RIGHT HAND CUTTER

A right hand cutter is one which rotates in a counter clockwise direction, when viewed facing the spindle nose.



LEFT HAND CUTTER

A left hand cutter is one which rotates in a clockwise direction when viewed facing the spindle nose.





CALCULATIONS FOR CUTTING SPEEDS AND FEEDS

To find	Having	Formula
Speed of Cutter in meters per Minute(S)	Diameter of cutter and revolutions per minute	$S = \pi DN/1000$
Revolutions per minute (N)	Speed and Diameter of the cutter	$N = S \times 1000 / \pi \times D$
Feed per revolution (fr)	Feed per minute and revolutions per minute	$fr = F / N$
Feed per tooth (ft)	Feed per minute and number of teeth in the cutter	$ft = F / Z \times N$
Feed per minute (F)	Feed per tooth No. of teeth in the cutter and revolutions per minute	$F = ft \times Z \times N$
Feed per minute (F)	Feed per revolution and revolutions per minute	$F = fr \times N$

N - revolutions per minute
Z - teeth in the cutter
D - Diameter of the cutter in MM

F - Feed per Minute in MM
fr - Feed per Revolutions in MM
ft - Feed per tooth
S - Speed of cutter in meters per minute.

Recommendations for SELECTION OF MILLING CUTTERS (Ref : IS 1830)

Tool Type N - for mild steel, Maleable cast Iron and medium hard non - ferrous metals.

Tool Type H - For Specially hard and tough materials

Tool Type S - For Soft and ductile materials

Material to be Cut	Tensile Strength MN / m ²	Brinell Hardness HB	Tool Type*
Carbon Steel	Up to 500		N or (S)
	Above 500 up to 800		N
	Above 800 up to 1000		N or (H)
	Above 1000 up to 1300		H
Steel Castings			H
Grey Cast Iron		up to 180	N
		Over 180	H
Malleable Cast Iron			N
Copper Alloy	Soft		
	Brittle		N or (H)
Zinc Alloy			S or (N)
Aluminium Alloy	Soft		S
	Medium		N or (S)
	Hard		N or (S)
Aluminium Alloy age hardened	Low Cutting Speed		
	High Cutting Speed		N
Magnesium alloy			S or (N)
Plastics	Unlaminated		N or (S)
	laminated		S

* Tool types within brackets are non-preferred.



Recommended Peripheral Speeds for HIGH SPEED STEEL MILLING CUTTERS

Work Material	Cutting Speed 'Vc'. m/min
Non Alloy Steels	
Up to 0.4% C incl. 150 / 220 BHN	26 - 36
Over 0.4% C to 0.7% C incl 180 / 255 BHN	18 - 30
Over 0.7% C. 200 / 280 BHN	12 - 24
Alloy Steels	
Up to 60 tons / in ² (94.50 kg / mm ²)	15 - 24
Over 60 - 80 tons / in ² (94.50 kg / mm ² - 126 kg / mm ²)	9 - 18
Grey Cast Iron	24 - 36
Alloyed Cast Iron	12 - 21
Aluminium and Aluminium Alloys	30 - 76
Brass	30 - 45
Brass Leaded	30 - 60
Bronze	30 - 60
Bronze High tensile	15 - 30
Copper	40 - 60
Stainless Steel	15 - 20

N.B. These recommendations are based on modern machines in good conditions. The finish desired, condition of material, rigidity of fixture, type of machine and the available horse power all affect performance.

RECOMMENDED FEED PER TOOTH for High Speed Steel Milling Cutters

Work Material	Feed per Tooth in mm			
	Face Mills	End Mills	Slot Drills	Saws
Non Alloy Steels				
Up to 0.4% C incl. 150 / 220 BHN	0.25	0.08	0.10	0.008
Over 0.4% C to 0.7% C incl 180 / 255 BHN	0.20	0.05	0.08	0.005
Over 0.7% C. 200 / 280 BHN	0.15	0.05	0.08	0.005
Alloy Steels				
Up to 60 tons / in ² (94.50 kg / mm ²)	0.20	0.05	0.08	0.005
Over 60 - 80 tons / in ² (94.50 kg / mm ² - 126 kg / mm ²)	0.15	0.05	0.05	0.0025
Grey Cast Iron	0.30	0.10	0.12	0.01
Alloyed Cast Iron	0.20	0.05	0.05	0.0025
Aluminium and Aluminium Alloys	0.40	0.12	0.15	0.01
Brass	0.30	0.10	0.12	0.008
Brass Leaded	0.40	0.12	0.15	0.01
Bronze	0.30	0.10	0.12	0.008
Bronze High tensile	0.25	0.08	0.10	0.005

N.B. These recommendations are based on modern machines in good conditions. The finish desired, condition of material, rigidity of fixture, type of machine and the available horse power all affect performance.



Cutting Fluids for HSS Milling Cutters

Type of Material	Recommendations
Hard tool and alloy steel	Soluble oil compound or neat cutting oil
Low Carbon Steel	Soluble Oil.
Copper , Brass or Bronze	Soluble oil or dry.
Aluminium and Aluminium alloys.	Soluble oil or neat cutting oil Specially produced for light alloys
Magnesium	Dry or Compressed air.
Cast Iron	Dry or Compressed air.
Stainless steel Nimonic alloys	Soluble oil can be used but sulphurised or chlorinated Mineral oil or fatty oil are most suitable.
Zinc base alloys	Soluble oil.