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(A member of Amalgamations Group)

Addison & Co Ltd., established in 1873 is a unit company of Amalgamations Ltd., one of the largest Engineering Groups in India.

The Company manufactures a wide range of High Speed Steel & Carbide Tipped Metal Cutting Tools, Solid carbide Tools, Machine Tools and its Attachments and is a major supplier of rough and machined castings. we are also Manufacturing Broaches and Hobs.

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TWIST DRILLS



A Cut Above the Rest

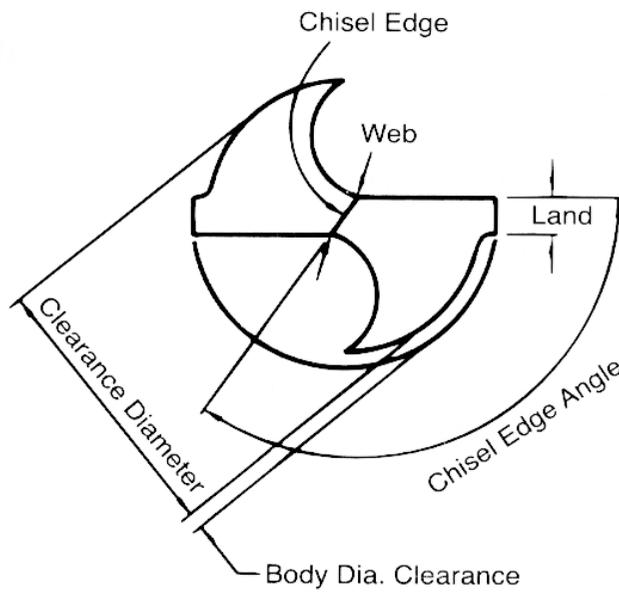
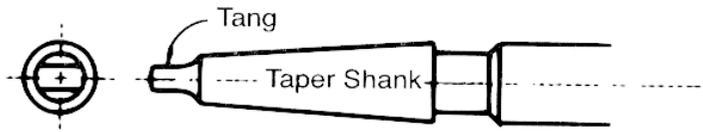
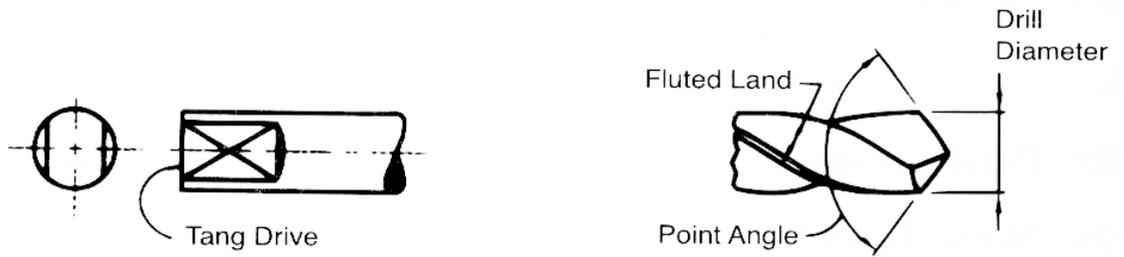
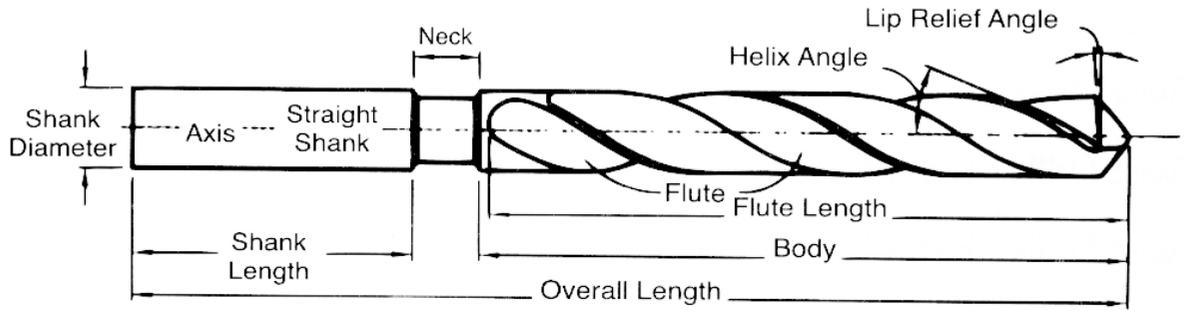


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DRILL - NOMENCLATURE





High Speed Steel PARALLEL SHANK TWIST DRILLS Jobber Series

Specifications Conform to
IS 5101 - 1991
ISO 235 - 1980
DIN 338 - 1978
BS 328 : Part 1 : 1986
Dimensions in mm / Inch



Diameters h8			Flute Length	Overall Length
mm	Inch	Number Series		
0.30			3	19
0.40	1/64		5	20
0.50			6	22
0.60			7	24
0.70			9	28
0.80	1/32	68,67,66	10	30
0.90		65,64,63	11	32
1.00		62,61,60,59	12	34
1.10		58,57	14	36
1.20	3/64	56	16	38
1.30		55	16	38
1.40		54	18	40
1.50			18	40
1.60	1/16	53,52	20	43
1.70			20	43
1.80		51,50	22	46
1.90		49	22	46
2.00	5/64	48,47	24	49
2.10		46,45	24	49
2.20		44	27	53
2.30		43	27	53
2.40	3/32	42,41	30	57
2.50		40,39	30	57
2.60		38,37	30	57
2.70		36	33	61

Diameters h8			Flute Length	Overall Length
mm	Inch	Number Series		
2.80	7/64	35,34	33	61
2.90		33,32	33	61
3.00			33	61
3.10		31	36	65
3.20	1/8		36	65
3.30		30	36	65
3.40			39	70
3.50		29	39	70
3.60	9/64	28	39	70
3.70		27,26	39	70
3.80		25	43	75
3.90		24,23	43	75
4.00	5/32	22,21	43	75
4.10		20	43	75
4.20		19	43	75
4.30		18	47	80
4.40	11/64	17	47	80
4.50		16	47	80
4.60		15,14	47	80
4.70		13	47	80
4.80	3/16	12	52	86
4.90		11,10	52	86
5.00		9	52	86
5.10		9	52	86
5.20	13/64	6,5	52	86

A drill having two flutes and a parallel shank of approximately the same diameter as the cutting end.

Type 'N' Drills shall be supplied unless otherwise specified.



High Speed Steel PARALLEL SHANK TWIST DRILLS Jobber Series

Specifications Conform to
IS 5101 - 1991
ISO 235 - 1980
DIN 338 - 1978
BS328 : Part 1 : 1986
Dimensions in mm / Inch



Diameters h8			Flute Length	Overall Length
mm	Inch	Number & Letter series		
5.30			52	86
5.40		4,3	57	93
5.50			57	93
5.60	7/32	2	57	93
5.70			57	93
5.80		1	57	93
5.90		A	57	93
6.00	15/64		57	93
6.10		B,C	63	101
6.20		D	63	101
6.30			63	101
6.40	1/4	E	63	101
6.50		F	63	101
6.60		G	63	101
6.70			63	101
6.80	17/64	H	69	109
6.90		I	69	109
7.00		J	69	109
7.10	9/32	K	69	109
7.20			69	109
7.30			69	109
7.40		L	69	109
7.50		M	69	109
7.60	19/64		75	117
7.70		N	75	117
7.80			75	117
7.90	5/16		75	117
8.00		O	75	117
8.10			75	117
8.20		P	75	117
8.30	21/64		75	117
8.40		Q	75	117
8.50			75	117

Diameters h8			Flute Length	Overall Length
mm	Inch	Number & Letter series		
8.60		R	81	125
8.70	11/32		81	125
8.80		S	81	125
8.90			81	125
9.00			81	125
9.10	23/64	T	81	125
9.20			81	125
9.30		U	81	125
9.40			81	125
9.50			81	125
9.60	3/8	V	87	133
9.70			87	133
9.80		W	87	133
9.90	25/64		87	133
10.00			87	133
10.10		X	87	133
10.20			87	133
10.30	13/32	Y	87	133
10.40			87	133
10.50		Z	87	133
10.60		-	87	133
10.70	27/64	-	94	142
10.80		-	94	142
10.90		-	94	142
11.00		-	94	142
11.10	7/16	-	94	142
11.20		-	94	142
11.30		-	94	142
11.40		-	94	142
11.50	29/64	-	94	142
11.60		-	94	142
11.70		-	94	142
11.80		-	94	142



**High Speed Steel
PARALLEL SHANK TWIST DRILLS
Jobber Series**

Specifications Conform to
IS 5101 - 1991
ISO 235 - 1980
DIN 338 - 1978
BS328 : Part 1 : 1986
Dimensions in mm / Inch



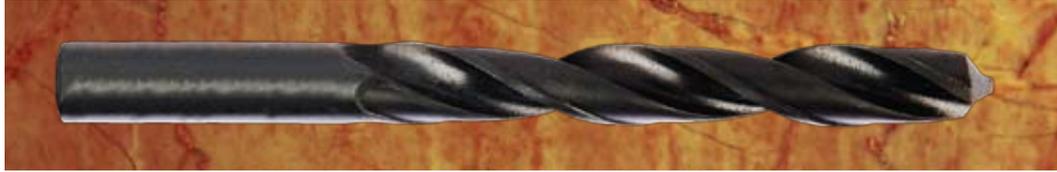
Diameters h8		Flute Length	Overall Length
mm	Inch		
11.90	15/32	101	151
12.00		101	151
12.10		101	151
12.20		101	151
12.30	31/64	101	151
12.40		101	151
12.50		101	151
12.60		101	151
12.70	1/2	101	151
12.80		101	151
12.90		101	151
13.00		101	151
13.10	33/64	101	151
13.20		101	151
13.30		108	160
13.40		108	160
13.50	17/32	108	160

Diameters h8		Flute Length	Overall Length
mm	Inch		
13.60		108	160
13.70		108	160
13.80		108	160
13.90	35/64	108	160
14.00		108	160
14.25	9/16	114	169
14.50		114	169
14.75	37/64	114	169
15.00		114	169
15.25	19/32	120	178
15.50	39/64	120	178
15.75		120	178
16.00	5/8	120	178
17.00		125	184
18.00	11/16	130	191
19.00		135	198
20.00	3/4	140	205



High Speed Steel PARALLEL SHANK TWIST DRILLS Jobber Series

Specifications Conform to:
ASME B94. 11M-1993
Dimensions in mm / Inch



Fraction	Diameter		Flute Length	Overall Length
	Number & Letter Series	mm		
-	-	0.30	2.4	19
1/64	-	0.40	5.0	19
-	-	0.50	5.0	22
-	-	0.60	8.0	29
-	-	0.70	10.0	32
1/32	68,67,66	0.80	13.0	35
-	65,64,63,62	0.90	16.0	38
-	61,60,59,58	1.00	17.0	41
3/64	57,56	1.10	19.0	44
-	-	1.20	22.0	48
-	55	1.30	22.0	48
-	54	1.40	22.0	48
-	53	1.50	22.0	48
1/16	52	1.60	22.0	48
-	51	1.70	25.0	51
-	50	1.80	25.0	51
-	49,48	1.90	25.0	51
5/64	47	2.00	25.0	51
-	46,45,44	2.10	29.0	54
-	-	2.20	32.0	57
3/32	43,42	2.30	32.0	57
-	41	2.40	35.0	60
-	40,39	2.50	35.0	60
-	38,37	2.60	37.0	64
-	36	2.70	37.0	64
7/64	35,34,33	2.80	38.0	67
-	32	2.90	41.0	70
-	31	3.00	41.0	70
-	-	3.10	41.0	70
1/8	30	3.20	41.0	70
-	-	3.30	44	73
-	29	3.40	44	73
9/64	28	3.50	44	73

Fraction	Diameter		Flute Length	Overall Length
	Number & Letter Series	mm		
-	-	3.60	48	76
-	27,26	3.70	48	76
-	25	3.80	48	76
5/32	24,23,22	3.90	51	79
-	21	4.00	54	83
-	20	4.10	54	83
-	19	4.20	54	83
11/64	18	4.30	54	83
-	17	4.40	56	86
-	16	4.50	56	86
-	15,14	4.60	56	86
-	13	4.70	59	89
3/16	12,11	4.80	59	89
-	10	4.90	62	92
-	9	5.00	62	92
13/64	8,7	5.10	62	92
-	6,5	5.20	64	95
-	4	5.30	64	95
-	3	5.40	64	95
7/32	-	5.50	64	95
-	2	5.60	67	98
-	-	5.70	67	98
-	1	5.80	67	98
15/64	A	5.90	67	98
-	B	6.00	70	102
-	C	6.10	70	102
-	D	6.20	70	102
1/4	E	6.30	70	102
-	-	6.40	73	105
-	F	6.50	73	105
-	G	6.60	73	105
17/64	-	6.70	73	105
-	H	6.80	73	105



High Speed Steel PARALLEL SHANK TWIST DRILLS Jobber Series

Specifications Conform to:
ASME B94. 11M-1993
Dimensions in mm / Inch



Diameter			Flute Length	Overall Length
Fraction	Letter Series	mm		
-	I	6.90	73	105
-	J	7.00	73	105
9/32	K	7.10	75	108
-	-	7.20	75	108
-	L	7.30	75	108
-	-	7.40	78	111
19/64	M	7.50	78	111
-	N	7.60	78	111
-	-	7.70	81	114
-	-	7.80	81	114
19/64	-	7.90	81	114
-	O	8.00	81	114
-	-	8.10	84	117
21/64	-	8.20	84	117
-	P	8.30	84	117
-	Q	8.40	87	121
-	-	8.50	87	121
-	R	8.60	87	121
11/32	-	8.70	87	121
-	S	8.80	89	124
-	-	8.90	89	124
-	T	9.00	89	124
23/64	-	9.10	89	124
-	-	9.20	92	127
-	U	9.30	92	127
-	-	9.40	92	127
3/8	V	9.50	92	127
-	-	9.60	95	130
-	-	9.70	95	130
-	W	9.80	95	130
25/64	-	9.90	95	130
-	X	10.00	95	130

Diameter			Flute Length	Overall Length
Fraction	Letter Series	mm		
13/32	Y	10.20	98	133
-	Z	10.50	98	133
27/64	-		100	137
-	-	10.80	103	140
7/16	-	11.00	103	140
-	-	11.20	106	143
29/64	-	11.50	106	143
15/32	-	11.80	110	146
-	-	12.00	111	149
31/64	-	12.20	111	149
-	-	12.50	114	152
1/2	-	12.80	114	152
-	-	13.00	114	152
33/64	-	13.20	122	168
17/32	-	13.50	122	168
35/64	-	13.80	122	168
-	-	14.00	122	168
9/16	-	14.25	122	168
37/64	-	14.50	122	168
-	-	14.75	132	181
19/32	-	15.00	132	181
-	-	15.25	132	181
39/64	-	15.50	132	181
5/8	-	15.75	132	181
-	-	16.00	132	181
41/64	-	16.25	132	181
21/32	-	16.50	132	181
-	-	16.75	143	194
43/64	-	17.00	143	194
-	-	17.25	143	194
11/16	-	17.50	143	194



**High Speed Steel
PARALLEL SHANK TWIST DRILLS
Stub Series**

Specifications Conform to
IS 5100 - 1969
ISO 235 - 1980
DIN 1897 - 1984
BS328 : Part 1 : 1986
Dimensions in mm / Inch



Diameters h8		Flute Length	Overall Length
mm	Inches		
1.00	-	6	26
1.20	3/64	8	30
1.50	-	9	32
-	1/16	10	34
1.80	-	11	36
2.00	5/64	12	38
2.20	-	13	40
2.50	3/32	14	43
2.80	7/64	16	46
3.00	-	16	46
3.20	1/8	18	49
3.50	9/64	20	52
3.80	-	22	55
4.00	5/32	22	55
4.20	-	22	55
4.50	11/64	24	58
4.80	3/16	26	62
5.00	-	26	62
5.20	13/64	26	62
5.50	7/32	28	66
5.80	-	28	66
6.00	15/64	28	66

Diameters h8		Flute Length	Overall Length
mm	Inches		
6.20	-	31	70
6.50	1/4	31	70
6.80	17/64	34	74
7.00	-	34	74
7.20	9/32	34	74
7.50	-	34	74
7.80	19/64	37	79
8.00	5/16	37	79
8.20	21/64	37	79
8.50	-	37	79
8.80	11/32	40	84
9.00	-	40	84
9.20	23/64	40	84
9.50	-	40	84
9.80	3/8	43	89
10.00	25/64	43	89
10.20	13/32	43	89
10.50	-	43	89
10.80	27/64	47	95
11.00	-	47	95
11.20	7/16	47	95
11.50	29/64	47	95

A shortened form of parallel shank jobber series twist drill, the reduction in length being in the flute length.

Type 'N' Drills shall be supplied unless otherwise specified.



High Speed Steel PARALLEL SHANK TWIST DRILLS Stub Series

Specifications Conform to
IS 5100 - 1969
ISO 235 - 1980
DIN 1897 - 1984
BS328 : Part 1 : 1986
Dimensions in mm / Inch



Diameters h8		Flute Length	Overall Length
mm	Inches		
11.80	-	47	95
12.00	15/32	51	102
12.20	31/64	51	102
12.50	-	51	102
12.80	1/2	51	102
13.00	33/64	51	102
13.20	-	51	102
13.50	17/32	54	107
13.80	35/64	54	107
14.00	-	54	107
14.25	9/16	56	111
14.50	-	56	111
14.75	37/64	56	111
15.00	-	56	111
15.25	19/32	58	115
15.50	39/64	58	115
15.75	5/8	58	115
16.00	-	58	115
16.25	41/64	60	119
16.50	-	60	119
16.75	21/32	60	119
17.00	-	60	119
17.25	43/64	62	123
17.50	11/16	62	123
17.75	45/64	62	123
18.00	-	62	123
18.25	23/32	64	127
18.50	-	64	127
18.75	47/64	64	127
19.00	-	64	127

Diameters h8		Flute Length	Overall Length
mm	Inches		
19.25	3/4	66	131
19.50	49/64	66	131
19.75	25/32	66	131
20.00	-	66	131
20.25	51/64	68	136
20.50	-	68	136
20.75	13/16	68	136
21.00	53/64	68	136
21.25	-	70	141
21.50	27/32	70	141
21.75	55/64	70	141
22.00	-	70	141
22.25	7/8	70	141
22.50	-	72	146
22.75	57/64	72	146
23.00	29/32	72	146
23.25	-	72	146
23.50	59/64	72	146
23.75	15/16	75	151
24.00	-	75	151
24.25	61/64	75	151
24.50	31/32	75	151
24.75	-	75	151
25.00	-	75	151
25.25	63/64	78	156
25.50	1	78	156
25.75	-	78	156
26.00	-	78	156
26.25	1 1/32	78	156
26.50	-	78	156



**High Speed Steel
PARALLEL SHANK TWIST DRILLS
Stub Series**

Specifications Conform to
IS 5100 - 1969
ISO 235 - 1980
DIN 1897 - 1984
BS328 : Part 1 : 1986
Dimensions in mm / Inch



Diameters h8		Flute Length	Overall Length
mm	Inches		
26.75	-	81	162
27.00	1.1/16	81	162
27.25	-	81	162
27.50	-	81	162
27.75	1.3/32	81	162
28.00	-	81	162
28.25	-	84	168
28.50	1.1/8	84	168
28.75	-	84	168
29.00	-	84	168
29.25	-	84	168
29.50	1.5/32	84	168
29.75	-	84	168
30.00	-	84	168
30.25	1.3/16	87	174
30.50	-	87	174
30.75	-	87	174
31.00	1.7/32	87	174
31.25	-	87	174

Diameters h8		Flute Length	Overall Length
mm	Inches		
31.50	-	87	174
31.75	1.1/4	90	180
32.00	-	90	180
32.50	1.9/32	90	180
33.00	-	90	180
33.50	1.5/16	90	180
34.00	1.11/32	93	186
34.50	-	93	186
35.00	1.3/8	93	186
35.50	-	93	186
36.00	1.13/32	96	193
36.50	1.7/16	96	193
37.00	-	96	193
37.50	1.15/32	96	193
38.00	1.1/2	100	200
38.50	-	100	200
39.00	-	100	200
39.50	-	100	200
40.00	-	100	200



High Speed Steel PARALLEL SHANK TWIST DRILLS Long Series

Specifications Conform to :
 IS 5102 - 1969
 ISO 494 - 1975
 DIN 340 - 1978
 BS328 : Part 1 : 1986
 Dimensions in mm / Inch



Diameters h8		Flute Length	Overall Length
mm	Inches		
1.00	-	33	56
1.10	-	37	60
1.20	3/64	41	65
1.30	-	41	65
1.40	-	45	70
1.50	-	45	70
1.60	1/16	50	76
1.70	-	50	76
1.80	-	53	80
1.90	-	53	80
2.00	5/64	56	85
2.10	-	56	85
2.20	-	59	90
2.30	-	59	90
2.40	3/32	62	95
2.50	-	62	95
2.60	-	62	95
2.70	-	66	100
2.80	7/64	66	100
2.90	-	66	100
3.00	-	66	100

Diameters h8		Flute Length	Overall Length
mm	Inches		
3.10	-	69	106
3.20	1/8	69	106
3.30	-	69	106
3.40	-	73	112
3.50	-	73	112
3.60	9/64	73	112
3.70	-	73	112
3.80	-	78	119
3.90	-	78	119
4.00	5/32	78	119
4.10	-	78	119
4.20	-	78	119
4.30	-	82	126
4.40	11/64	82	126
4.50	-	82	126
4.60	-	82	126
4.70	-	82	126
4.80	3/16	87	132
4.90	-	87	132
5.00	-	87	132
5.10	-	87	132

A lengthened form of parallel shank jobber series twist drill, the increase in length being in the flute length.

Type 'N' Drills shall be supplied unless otherwise specified.



**High Speed Steel
PARALLEL SHANK TWIST DRILLS
Long Series**

Specifications Conform to
IS 5102 - 1969
ISO 494 - 1975
DIN 340 - 1978
BS328 : Part 1 : 1986
Dimensions in mm / Inch



Diameters h8		Flute Length	Overall Length
mm	Inches		
5.20	13/64	87	132
5.30	-	87	132
5.40	-	91	139
5.50	-	91	139
5.60	7/32	91	139
5.70	-	91	139
5.80	-	91	139
5.90	-	91	139
6.00	15/64	91	139
6.10	-	97	148
6.20	-	97	148
6.30	-	97	148
6.40	1/4	97	148
6.50	-	97	148
6.60	-	97	148
6.70	-	97	148
6.80	17/64	102	156
6.90	-	102	156
7.00	-	102	156
7.10	9/32	102	156
7.20	-	102	156
7.30	-	102	156
7.40	-	102	156
7.50	-	102	156
7.60	19/64	109	165
7.70	-	109	165
7.80	-	109	165
7.90	5/16	109	165
8.00	-	109	165
8.10	-	109	165

Diameters h8		Flute Length	Overall Length
mm	Inches		
8.20	-	109	165
8.30	21/64	109	165
8.40	-	109	165
8.50	-	109	165
8.60	-	115	175
8.70	11/32	115	175
8.80	-	115	175
8.90	-	115	175
9.00	-	115	175
9.10	23/64	115	175
9.20	-	115	175
9.30	-	115	175
9.40	-	115	175
9.50	-	115	175
9.60	3/8	121	184
9.70	-	121	184
9.80	-	121	184
9.90	25/64	121	184
10.00	-	121	184
10.10	-	121	184
10.20	-	121	184
10.30	13/32	121	184
10.40	-	121	184
10.50	-	121	184
10.60	-	121	184
10.70	27/64	128	195
10.80	-	128	195
10.90	-	128	195
11.00	-	128	195
11.10	7/16	128	195



High Speed Steel PARALLEL SHANK TWIST DRILLS Long Series

Specifications Conform to
IS 5102 - 1969
ISO 494 - 1975
DIN 340 - 1978
BS328 : Part 1 : 1986
Dimensions in mm / Inch



Diameters h8		Flute Length	Overall Length
mm	Inches		
11.20	-	128	195
11.30	-	128	195
11.40	-	128	195
11.50	29/64	128	195
11.60	-	128	195
11.70	-	128	195
11.80	-	128	195
11.90	15/32	134	205
12.00	-	134	205
12.10	-	134	205
12.20	-	134	205
12.30	31/64	134	205
12.40	-	134	205
12.50	-	134	205
12.60	-	134	205
12.70	1/2	134	205
12.80	-	134	205
12.90	-	134	205
13.00	-	134	205
13.10	33/64	134	205
13.20	-	134	205
13.30	-	140	214
13.40	-	140	214
13.50	17/32	140	214
13.60	-	140	214
13.70	-	140	214
13.80	-	140	214
13.90	35/64	140	214
14.00	-	140	214
14.25	9/16	144	220

Diameters h8		Flute Length	Overall Length
mm	Inches		
14.50	-	144	220
14.75	37/64	144	220
15.00	-	144	220
15.25	19/32	149	227
15.50	39/64	149	227
15.75	-	149	227
16.00	5/8	149	227
16.25	41/64	154	235
16.50	-	154	235
16.75	21/32	154	235
17.00	-	154	235
17.25	43/64	158	241
17.50	11/16	158	241
17.75	45/64	158	241
18.00	-	158	241
18.25	23/32	162	247
18.50	-	162	247
18.75	47/64	162	247
19.00	-	162	247
19.25	3/4	166	254
19.50	49/64	166	254
19.75	25/32	166	254
20.00	-	166	254
20.25	51/64	171	261
20.50	-	171	261
20.75	13/16	171	261
21.00	53/64	171	261
21.25	-	176	268
21.50	27/32	176	268
21.75	55/64	176	268



**High Speed Steel
PARALLEL SHANK TWIST DRILLS
Long Series**

Specifications Conform to
IS 5102 - 1969
ISO 494 - 1975
DIN 340 - 1978
BS328 : Part 1 : 1986
Dimensions in mm / Inch



Diameters h8		Flute Length	Overall Length
mm	Inches		
22.00	-	176	268
22.25	7/8	176	268
22.50	-	180	275
22.75	57/64	180	275
23.00	29/32	180	275
23.25	-	180	275
23.50	59/64	180	275
23.75	15/16	185	282
24.00	-	185	282
24.25	61/64	185	282
24.50	31/32	185	282
24.75	-	185	282
25.00	-	185	282
25.25	63/64	190	290
25.50	1	190	290
25.75	-	190	290
26.00	-	190	290
26.25	1.1/32	190	290
26.50	-	190	290
26.75	-	195	298

Diameters h8		Flute Length	Overall Length
mm	Inches		
27.00	1.1/16	195	298
27.25	-	195	298
27.50	-	195	298
27.75	1.3/32	195	298
28.00	-	195	298
28.25	-	201	307
28.50	1.1/8	201	307
28.75	-	201	307
29.00	-	201	307
29.25	-	201	307
29.50	1.5/32	201	307
29.75	-	201	307
30.00	-	201	307
30.25	1.3/16	207	316
30.50	-	207	316
30.75	-	207	316
31.00	1.7/32	207	316
31.25	-	207	316
31.50	-	207	316



High Speed Steel PARALLEL SHANK TWIST DRILLS Extra Long Series

Specifications Conform to
IS 7823 - 2005.
ISO 3292 : 1995.
Dimensions in mm / Inch



Diameters h8 mm	Flute length	Overall Length
2	80	125
	100	160
2.5	80	125
	100	160
3	100	160
	150	200
3.5	100	160
	150	200
4	100	160
	150	200
4.5	100	160
	150	200
	200	250
5	150	200
	200	250
	250	315
5.5	150	200
	200	250
	250	315
6	150	200
	200	250
	250	315
6.5	150	200
	200	250
	250	315
7	150	200
	200	250
	250	315
7.5	150	200
	200	250
	250	315

Diameters h8 mm	Flute length	Overall Length
8	200	250
	250	315
	300	400
8.5	200	250
	250	315
	300	400
9	200	250
	250	315
	300	400
9.5	200	250
	250	315
	300	400
10	200	250
	250	315
	300	400
11	200	250
	250	315
	300	400
12	200	250
	250	315
	300	400
13	200	250
	250	315
	300	400
14	200	250
	250	315
	300	400

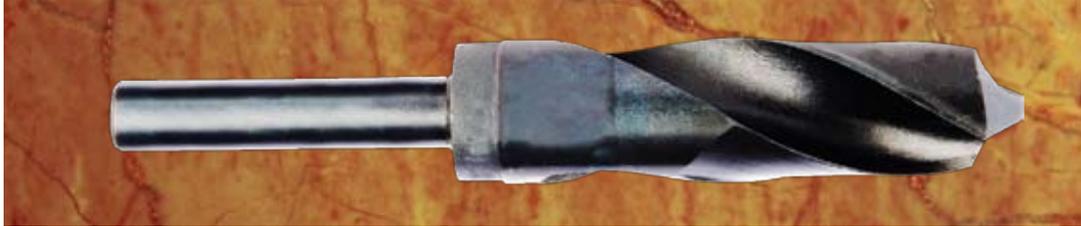
A lengthened form of the Parallel Shank Twist Drill, longer than long series.

Type 'N' Drills shall be supplied unless otherwise specified.



High Speed Steel
SILVER AND DEMING DRILLS - 1/2" SHANK
 (Size of Shank : 1/2" Dia x 2 1/4" Shank Length)

Dimensions in Inches



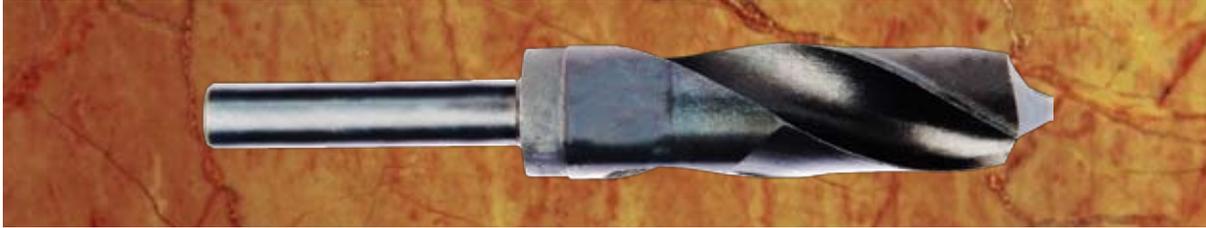
Size	Flute Length	Overall Length
33/64	3	6
17/32	3	6
35/64	3	6
9/16	3	6
37/64	3	6
19/32	3	6
39/64	3	6
5/8	3	6
41/64	3	6
21/32	3	6
43/64	3	6
11/16	3	6
45/64	3	6
23/32	3	6
47/64	3	6
3/4	3	6
49/64	3	6
25/32	3	6
51/64	3	6
13/16	3	6
53/64	3	6
27/32	3	6
55/64	3	6
7/8	3	6

Size	Flute Length	Overall Length
57/64	3	6
29/32	3	6
59/64	3	6
15/16	3	6
61/64	3	6
31/32	3	6
63/64	3	6
1	3	6
1.1/32	3	6
1.1/16	3	6
1.3/32	3	6
1.1/8	3	6
1.5/32	3	6
1.3/16	3	6
1.7/32	3	6
1.1/4	3	6
1.9/32	3	6
1.5/16	3	6
1.11/32	3	6
1.3/8	3	6
1.13/32	3	6
1.7/16	3	6
1.15/32	3	6
1.1/2	3	6



High Speed Steel
SILVER AND DEMING DRILLS - 1/2" SHANK
(Size of Shank : 1/2" Dia x 2 1/4" Shank Length)

Dimensions in mm / Inch



Size	Flute Length	Overall Length
13.50	3. 1/8	6
14.00	3. 1/8	6
14.50	3. 1/8	6
15.00	3. 1/8	6
15.50	3. 1/8	6
16.00	3. 1/8	6
16.50	3. 1/8	6
17.00	3. 1/8	6
17.50	3. 1/8	6
18.00	3. 1/8	6
18.50	3. 1/8	6
19.00	3. 1/8	6
19.50	3. 1/8	6
20.00	3. 1/8	6
20.50	3. 1/8	6
21.00	3. 1/8	6
21.50	3. 1/8	6

Size	Flute Length	Overall Length
22.00	3. 1/8	6
22.50	3. 1/8	6
23.00	3. 1/8	6
23.50	3. 1/8	6
24.00	3. 1/8	6
24.50	3. 1/8	6
25.00	3. 1/8	6
25.50	3. 1/8	6
26.00	3. 1/8	6
26.50	3. 1/8	6
27.00	3. 1/8	6
27.50	3. 1/8	6
28.00	3. 1/8	6
28.50	3. 1/8	6
29.00	3. 1/8	6
29.50	3. 1/8	6
30.00	3. 1/8	6



**HSS PARALLEL SHANK
TWIST DRILL WITH REDUCED SHANK
Jobber Series**

Dimensions in mm



Diameter h8	Over all Length	Flute Length min	Shank Dia f11	Shank Length ±1.50
10.50	133	87	10	30
11.00	142	94		
11.50	142	94		
12.00	151	101		
12.50	151	101		
13.00	151	101		
13.50	160	108		
14.00	160	108		
14.50	169	114		
15.00	169	114		
15.50	178	120		
16.00	178	120		

Diameter h8	Over all Length	Flute Length min	Shank Dia f11	Shank Length ±1.50
16.50	184	125	13	40
17.00	184	125		
17.50	191	130		
18.00	191	130		
18.50	198	135		
19.00	198	135		
19.50	205	140		
20.00	205	140		

Note :

Upto and including Ø13 to be made out of one piece construction (Solid).
Over Ø13 to be made out of two piece construction (Welding).

LENGTH		TOLERANCES	
OVER	UPTO	Flute Length	Overall Length
30	120	+ 3 / - 0	± 1.50
120	315	+ 4 / - 0	± 2.00



High Speed Steel
SILVER AND DEMING DRILLS - 3/4" SHANK Dimensions in Inch
 (Size of Shank : 3/4" Dia x 2 1/4" Shank Length)



Size	Flute Length	Overall Length
25/32	3	6
13/16	3	6
27/32	3	6
7/8	3	6
29/32	3	6
15/16	3	6
31/32	3	6
1	3	6
1.1/32	3	6
1.1/16	3	6
1.3/32	3	6
1.1/8	3	6
1.5/32	3	6
1.3/16	3	6
1.7/32	3	6
1.1/4	3	6
1.9/32	3	6
1.5/16	3	6
1.11/32	3	6
1.3/8	3	6

Size	Flute Length	Overall Length
1.13/32	3	6
1.7/16	3	6
1.15/32	3	6
1.1/2	3	6
1.17/32	3	6
1.9/16	3	6
1.19/32	3	6
1.5/8	3	6
1.21/32	3	6
1.11/16	3	6
1.23/32	3	6
1.3/4	3	6
1.25/32	3	6
1.13/16	3	6
1.27/32	3	6
1.7/8	3	6
1.29/32	3	6
1.15/16	3	6
1.31/32	3	6
2	3	6



High Speed Steel TAPER SHANK TWIST DRILLS

Specifications Conform to
IS 5103 - 1969
ISO 235 - 1980
DIN 345 - 1978
BS 328 : Part 1 : 1986
Dimensions in mm / Inch



Diameters h8		Flute Length	Overall Length	Morse Taper No.
mm	inch			
3.00	-	33	114	1
3.20	1/8	36	117	1
3.50	9/64	39	120	1
3.80	-	43	124	1
4.00	5/32	43	124	1
4.20	-	43	124	1
4.50	11/64	47	128	1
4.80	3/16	52	133	1
5.00	-	52	133	1
5.20	13/64	52	133	1
5.50	7/32	57	138	1
5.80	-	57	138	1
6.00	15/64	57	138	1
6.20	-	63	144	1
6.50	1/4	63	144	1
6.80	17/64	69	150	1
7.00	-	69	150	1
7.20	9/32	69	150	1
7.50	-	69	150	1
7.80	19/64	75	156	1
8.00	5/16	75	156	1

Diameters h8		Flute Length	Overall Length	Morse Taper No.
mm	inch			
8.20	21/64	75	156	1
8.50	-	75	156	1
8.80	11/32	81	162	1
9.00	-	81	162	1
9.20	23/64	81	162	1
9.50	-	81	162	1
9.80	3/8	87	168	1
10.00	25/64	87	168	1
10.20	13/32	87	168	1
10.50	-	87	168	1
10.80	27/64	94	175	1
11.00	-	94	175	1
11.20	7/16	94	175	1
11.50	29/64	94	175	1
11.80	-	94	175	1
12.00	15/32	101	182	1
12.20	31/64	101	182	1
12.50	-	101	182	1
12.80	1/2	101	182	1
13.00	33/64	101	182	1
13.20	-	101	182	1

A drill having two helical flutes and a standard Morse Taper Shank.

Type 'N' Drills shall be supplied unless otherwise specified.



High Speed Steel TAPER SHANK TWIST DRILLS

Specifications Conform to
 IS 5103 - 1969
 ISO 235 - 1980
 DIN 345 - 1978
 BS 328 : Part 1 : 1986
 Dimensions in mm / Inch



Diameters h8		Flute Length	Overall Length	Morse Taper No.
mm	inch			
13.50	17/32	108	189	1
13.80	35/64	108	189	1
14.00	-	108	189	1
14.25	9/16	114	212	2
14.50	-	114	212	2
14.75	37/64	114	212	2
15.00	-	114	212	2
15.25	19/32	120	218	2
15.50	39/64	120	218	2
15.75	-	120	218	2
16.00	5/8	120	218	2
16.25	41/64	125	223	2
16.50	-	125	223	2
16.75	21/32	125	223	2
17.00	-	125	223	2
17.25	43/64	130	228	2
17.50	11/16	130	228	2
17.75	-	130	228	2
18.00	45/64	130	228	2
18.25	23/32	135	233	2
18.50	-	135	233	2
18.75	47/64	135	233	2
19.00	-	135	233	2
19.25	3/4	140	238	2
19.50	49/64	140	238	2
19.75	25/32	140	238	2
20.00	-	140	238	2
20.25	51/64	145	243	2
20.50	-	145	243	2
20.75	13/16	145	243	2

Diameters h8		Flute Length	Overall Length	Morse Taper No.
mm	inch			
21.00	53/64	145	243	2
21.25	-	150	248	2
21.50	27/32	150	248	2
21.75	55/64	150	248	2
22.00	-	150	248	2
22.25	7/8	150	248	2
22.50	57/64	155	253	2
22.75	-	155	253	2
23.00	29/32	155	253	2
23.25	-	155	253	3
23.50	59/64	155	253	3
23.75	15/16	160	281	3
24.00	-	160	281	3
24.25	61/64	160	281	3
24.50	31/32	160	281	3
24.75	-	160	281	3
25.00	-	160	281	3
25.25	63/64	165	286	3
25.50	1	165	286	3
25.75	1.1/64	165	286	3
26.00	-	165	286	3
26.25	1.1/32	165	286	3
26.50	-	165	286	3
26.75	1.3/64	170	291	3
27.00	1.1/16	170	291	3
27.25	-	170	291	3
27.50	1.5/64	170	291	3
27.75	1.3/32	170	291	3
28.00	-	170	291	3
28.25	1.7/64	175	296	3



High Speed Steel TAPER SHANK TWIST DRILLS

Specifications Conform to
IS 5103 - 1969
ISO 235 - 1980
DIN 345 - 1978
BS 328 : Part 1 : 1986
Dimensions in mm / Inch



Diameters h8		Flute Length	Overall Length	Morse Taper No.
mm	inch			
28.50	1.1/8	175	296	3
28.75	-	175	296	3
29.00	1.9/64	175	296	3
29.25	-	175	296	3
29.50	1.5/32	175	296	3
29.75	1.11/64	175	296	3
30.00	-	175	296	3
30.25	1.3/16	180	301	3
30.50	1 13/64	180	301	3
30.75	-	180	301	3
31.00	1.7/32	180	301	3
31.25	1.15/64	180	301	3
31.50	-	180	301	3
31.75	1.1/4	185	306	3
32.00	-	185	334	4
32.50	1.9/32	185	334	4
33.00	-	185	334	4
33.50	1.5/16	185	334	4
34.00	1.11/32	190	339	4
34.50	-	190	339	4
35.00	1.3/8	190	339	4
35.50	-	190	339	4
36.00	1.13/32	195	344	4
36.50	1.7/16	195	344	4
37.00	-	195	344	4
37.50	1.15/32	195	344	4
38.00	1.1/2	200	349	4
38.50	-	200	349	4
39.00	1.17/32	200	349	4
39.50	1.9/16	200	349	4
40.00	-	200	349	4

Diameters h8		Flute Length	Overall Length	Morse Taper No.
mm	inch			
40.50	1.19/32	205	354	4
41.00	-	205	354	4
41.50	1.5/8	205	354	4
42.00	1.21/32	205	354	4
42.50	-	205	354	4
43.00	1.11/16	210	359	4
43.50	1.23/32	210	359	4
44.00	-	210	359	4
44.50	1.3/4	210	359	4
45.00	-	210	359	4
45.50	1.25/32	215	364	4
46.00	1.13/16	215	364	4
46.50	-	215	364	4
47.00	1.27/32	215	364	4
47.50	-	215	364	4
48.00	1.7/8	220	369	4
48.50	1.29/32	220	369	4
49.00	1.15/16	220	369	4
49.50	-	220	369	4
50.00	-	220	369	4
50.50	1.31/32,2	225	374	4
51.00	-	225	412	5
52.00	2.1/16	225	412	5
53.00	-	225	412	5
54.00	2.1/8	230	417	5
55.00	-	230	417	5
56.00	2.3/16	230	417	5
57.00	2.1/4	235	422	5
58.00	-	235	422	5
59.00	2.5/16	235	422	5
60.00	-	235	422	5



High Speed Steel TAPER SHANK TWIST DRILLS

Specifications Conform to
 IS 5103 - 1969
 ISO 235 - 1980
 DIN 345 - 1978
 BS 328 : Part 1 : 1986
 Dimensions in mm / Inch



Diameter h8		Flute Length	Overall Length	Morse Taper No.
mm	inch			
61.00	2.3/8	240	427	5
62.00	2.7/16	240	427	5
63.00	-	240	427	5
64.00	2.1/2	245	432	5
65.00	2.9/16	245	432	5
66.00	-	245	432	5
67.00	2.5/8	245	432	5
68.00	2.11/16	250	437	5
69.00	-	250	437	5
70.00	2.3/4	250	437	5
71.00	-	250	437	5
72.00	2.13/16	255	442	5
73.00	2.7/8	255	442	5
74.00	-	255	442	5
75.00	2.15/16	255	442	5
76.00	3	260	447	5
77.00	-	260	514	6
78.00	3.1/16	260	514	6
79.00	3.1/18	260	514	6
80.00	-	260	514	6
81.00	3.3/16	265	519	6

Diameter h8		Flute Length	Overall Length	Morse Taper No.
mm	inch			
82.00	-	265	519	6
83.00	3.1/4	265	519	6
84.00	3.5/16	265	519	6
85.00	-	265	519	6
86.00	3.3/8	270	524	6
87.00	3.7/16	270	524	6
88.00	-	270	524	6
89.00	3.1/2	270	524	6
90.00	-	270	524	6
91.00	3.9/16	275	529	6
92.00	3.5/8	275	529	6
93.00	-	275	529	6
94.00	3.11/16	275	529	6
95.00	-	275	529	6
96.00	3.3/4	280	534	6
97.00	3.13/16	280	534	6
98.00	3.7/8	280	534	6
99.00	-	280	534	6
100.00	-	280	534	6
101.00	3.15/16	285	539	6
102.00	4	285	539	6



High Speed Steel TAPER SHANK TWIST DRILLS

Specifications Conform to
ASME B94.11M - 1993
Dimensions in mm / Inch



Diameter h8		REGULAR SHANK		
Fraction	mm	Flute Length	Overall Length	Morse Taper No.
1/8	3.00	48	130	1
-	3.20	54	137	1
9/64	3.50	54	137	1
5/32	3.80	54	137	1
-	4.00	64	146	1
11/64	4.20	64	146	1
3/16	4.50	64	146	1
-	4.80	70	152	1
-	5.00	70	152	1
13/64	5.20	70	152	1
7/32	5.50	70	152	1
-	5.80	73	156	1
15/64	6.00	73	156	1
1/4	6.20	73	156	1
-	6.50	76	159	1
17/64	6.80	76	159	1
9/32	7.00	76	159	1
-	7.20	79	162	1
19/64	7.50	79	162	1
5/16	7.80	79	162	1
-	8.00	83	165	1

Diameter h8		REGULAR SHANK		
Fraction	mm	Flute Length	Overall Length	Morse Taper No.
21/64	8.20	83	165	1
11/32	8.50	83	165	1
-	8.80	89	171	1
-	9.00	89	171	1
23/64	9.20	89	171	1
3/8	9.50	89	171	1
-	9.80	92	178	1
25/64	10.00	92	178	1
13/32	10.20	92	178	1
-	10.50	98	184	1
27/64	10.80	98	184	1
7/16	11.00	98	184	1
-	11.20	105	190	1
29/64	11.50	105	190	1
15/32	11.80	105	190	1
-	12.00	111	210	2
31/64	12.20	111	210	2
1/2	12.50	111	210	2
-	12.80	117	216	2
33/64	13.00	117	216	2
-	13.20	117	216	2



High Speed Steel TAPER SHANK TWIST DRILLS

Specifications Conform to
ASME B94.11M - 1993
Dimensions in mm / Inch



Diameter h8		REGULAR SHANK		
Fraction	mm	Flute Length	Overall Length	Morse Taper No.
17/32	13.50	117	216	2
35/64	13.80	124	222	2
-	14.00	124	222	2
9/16	14.25	124	222	2
-	14.50	124	222	2
37/64	14.75	124	222	2
19/32	15.00	124	222	2
-	15.25	124	222	2
39/64	15.50	124	222	2
5/8	15.75	124	222	2
-	16.00	130	229	2
41/64	16.25	130	229	2
21/32	16.50	130	229	2
-	16.75	137	235	2
43/64	17.00	137	235	2
11/16	17.25	137	235	2
-	17.50	143	241	2
45/64	18.00	143	241	2
23/32	-	143	241	2
47/64	18.50	149	248	2
3/4	19.00	149	248	2
49/64	19.50	152	251	2
25/32	-	152	251	2
51/64	20.00	156	273	3
13/16	20.50	156	273	3
53/64	21.00	156	273	3
27/32	21.50	156	273	3
55/64	22.00	156	273	3
7/8,57/64	22.50	156	273	3

Diameter h8		REGULAR SHANK		
Fraction	mm	Flute Length	Overall Length	Morse Taper No.
29/32	23.00	156	273	3
59/64,15/16	23.50	156	273	3
61/64	24.00	162	279	3
31/32	24.50	162	279	3
63/64, 1	25.00	162	279	3
1.1/64	25.50	165	283	3
1.1/32	26.00	165	283	3
1.3/64	26.50	165	283	3
1.1/16	27.00	168	286	3
1.5/64,1.3/32	27.50	175	318	4
1.7/64	28.00	181	324	4
1.1/8	28.50	181	324	4
1.9/64,1.5/32	29.00	184	327	4
1.11/64	29.50	187	330	4
1.3/16	30.00	187	330	3
1.13/64,1.7/32	30.50	190	353	4
1.15/64	31.00	200	343	4
1.1/4	31.50	200	343	4
1.17/64	32.00	216	359	4
1.9/32	32.50	216	359	4
1.19/64,1.5/16	33.00	219	362	4
1.21/64	33.50	222	365	4
1.11/32	34.00	222	365	4



High Speed Steel TAPER SHANK TWIST DRILLS

Specifications Conform to
ASME B94.11M - 1993
Dimensions in mm / Inch



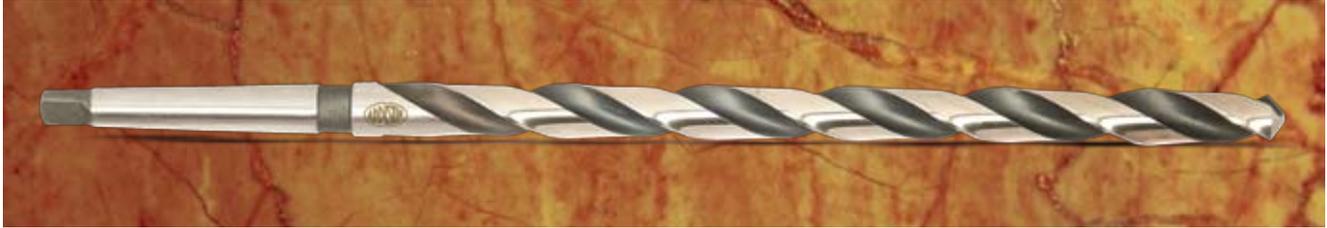
Diameter h8		REGULAR SHANK		
Fraction	mm	Flute Length	Overall Length	Morse Taper No.
1.23/64, 1.3/8	34.50	225	368	4
1.25/64	35.00	229	371	4
1.13/32	35.50	229	371	4
1.27/64	36.00	232	375	4
1.7/16	36.50	232	375	4
	37.00	235	378	4
1.31/64	37.50	238	381	4
1.1/2	38.00	238	381	4
1.17/32	-	238	416	5
1.9/16	39.00	244	422	5
1.19/32	40.00	251	429	5
1.5/8	41.00	254	432	5
1.21/32	42.00	257	435	5
1.11/16	43.00	257	435	5
1.23/32, 1.3/4	44.00	257	435	5
1.25/32	45.00	257	435	5
1.13/16	46.00	257	435	5
1.27/32	-	257	435	5
1.7/8	47.00	264	441	5
1.29/32	48.00	264	441	5
1.15/16	49.00	264	441	5
1.31/32	50.00	264	441	5
2, 2.1/32	51.00	264	441	5
2.1/16	52.00	260	441	5
2.3/32	53.00	260	441	5
2.1/8	54.00	260	441	5

Diameter h8		REGULAR SHANK		
Fraction	mm	Flute Length	Overall Length	Morse Taper No.
2.5/32, 2.3/16	55.00	260	441	5
2.7/32	56.00	257	441	5
2.1/4	57.00	257	441	5
-	58.00	257	441	5
2.5/16	59.00	257	441	5
2.3/8	60.00	257	441	5
-	61.00	286	476	5
2.7/16	62.00	286	476	5
2.1/2	63.00	286	476	5
-	64.00	302	495	5
2.9/16	65.00	302	324	5
2.5/8	66.00	302	495	5
-	67.00	324	518	5
2.11/16	68.00	324	518	5
2.3/4	69.00	324	518	5
-	70.00	340	537	5
2.13/16	71.00	340	537	5
-	72.00	340	537	5
2.7/8	73.00	340	537	5
-	74.00	356	552	5
2.15/16	75.00	356	552	5
3	76.00	356	552	5
-	77.00	371	622	6
	78.00	371	622	6
3.1/8	-	371	622	6
3.1/4	-	394	648	6



High Speed Steel TAPER SHANK TWIST DRILLS Long Series

Specifications Conform to
IS 8305: 1976
DIN 341: 1978
Dimensions in mm



Diameter h8	Flute Length	Overall Length	Morse Taper
5.00	74	155	1
5.10	74	155	1
5.20	74	155	1
5.30	74	155	1
5.40	80	161	1
5.50	80	161	1
5.60	80	161	1
5.70	80	161	1
5.80	80	161	1
5.90	80	161	1
6.00	80	161	1
6.10	86	167	1
6.20	86	167	1
6.30	86	167	1
6.40	86	167	1
6.50	86	167	1
6.60	86	167	1
6.70	86	167	1
6.80	93	174	1
6.90	93	174	1
7.00	93	174	1
7.10	93	174	1

Diameter h8	Flute Length	Overall Length	Morse Taper
7.20	93	174	1
7.30	93	174	1
7.40	93	174	1
7.50	93	174	1
7.60	100	181	1
7.70	100	181	1
7.80	100	181	1
7.90	100	181	1
8.00	100	181	1
8.10	100	181	1
8.20	100	181	1
8.30	100	181	1
8.40	100	181	1
8.50	100	181	1
8.60	107	188	1
8.70	107	188	1
8.80	107	188	1
8.90	107	188	1
9.00	107	188	1
9.10	107	188	1
9.20	107	188	1
9.30	107	188	1

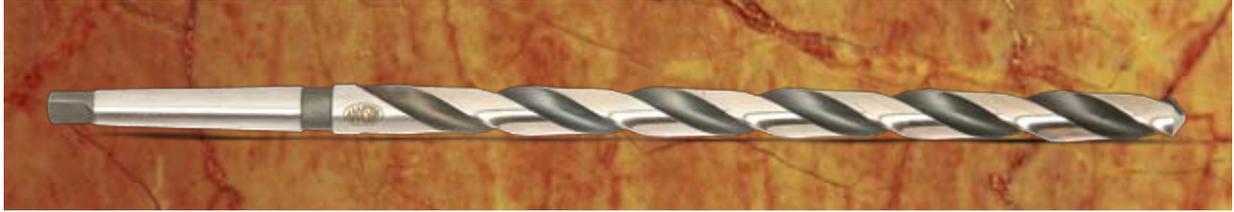
A lengthened form of Taper Shank Twist Drill, the increase in length being in the flute length

Type 'N' Drills shall be supplied unless otherwise specified.



**High Speed Steel
TAPER SHANK TWIST DRILLS
Long Series**

Specifications Conform to
IS 8305: 1976
DIN 341: 1978
Dimensions in mm



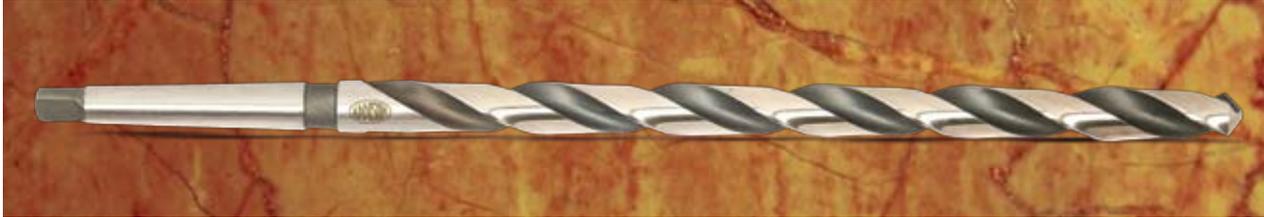
Diameter h8	Flute Length	Overall Length	Morse Taper No.
9.40	107	188	1
9.50	107	188	1
9.60	116	197	1
9.70	116	197	1
9.80	116	197	1
9.90	116	197	1
10.00	116	197	1
10.10	116	197	1
10.20	116	197	1
10.30	116	197	1
10.40	116	197	1
10.50	116	197	1
10.60	116	197	1
10.70	125	206	1
10.80	125	206	1
10.90	125	206	1
11.00	125	206	1
11.10	125	206	1
11.20	125	206	1
11.30	125	206	1
11.40	125	206	1
11.50	125	206	1
11.60	125	206	1
11.70	125	206	1
11.80	125	206	1
11.90	134	215	1
12.00	134	215	1
12.10	134	215	1
12.20	134	215	1
12.30	134	215	1
12.40	134	215	1

Diameter h8	Flute Length	Overall Length	Morse Taper No.
12.50	134	215	1
12.60	134	215	1
12.70	134	215	1
12.80	134	215	1
12.90	134	215	1
13.00	134	215	1
13.10	134	215	1
13.20	134	215	1
13.30	142	223	1
13.40	142	223	1
13.50	142	223	1
13.60	142	223	1
13.70	142	223	1
13.80	142	223	1
13.90	142	223	1
14.00	142	223	1
14.25	147	245	2
14.50	147	245	2
14.75	147	245	2
15.00	147	245	2
15.25	153	251	2
15.50	153	251	2
15.75	153	251	2
16.00	153	251	2
16.25	159	257	2
16.50	159	257	2
16.75	159	257	2
17.00	159	257	2
17.25	165	263	2
17.50	165	263	2
17.75	165	263	2



High Speed Steel TAPER SHANK TWIST DRILLS Long Series

Specifications Conform to
IS 8305: 1976
DIN 341: 1978
Dimensions in mm



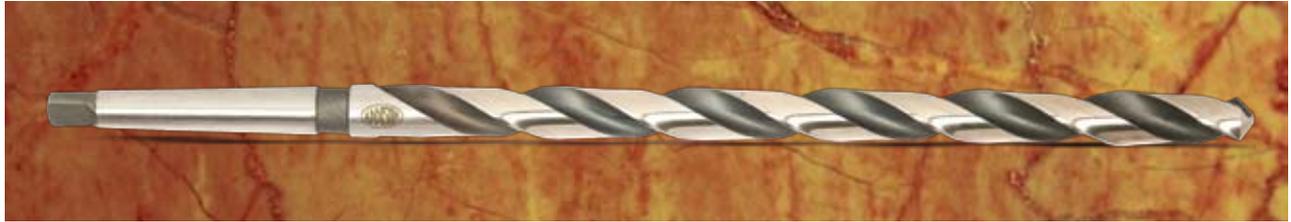
Diameter h8	Flute Length	Overall Length	Morse Taper
18.00	165	263	2
18.25	171	269	2
18.26	171	269	2
18.27	171	269	2
18.28	171	269	2
19.25	177	275	2
19.50	177	275	2
19.75	177	275	2
20.00	177	275	2
20.25	184	282	2
20.50	184	282	2
20.75	184	282	2
21.00	184	282	2
21.25	191	289	2
21.50	191	289	2
21.75	191	289	2
22.00	191	289	2
22.25	191	289	2
22.50	198	296	2
22.75	198	296	2
23.00	198	296	2
23.25	198	319	3
23.50	198	319	3
23.75	206	327	3
24.00	206	327	3
24.25	206	327	3
24.50	206	327	3
24.75	206	327	3
25.00	206	327	3
25.25	214	335	3

Diameter h8	Flute Length	Overall Length	Morse Taper
25.50	214	335	3
25.75	214	335	3
26.00	214	335	3
26.25	214	335	3
26.50	214	335	3
26.75	222	343	3
27.00	222	343	3
27.25	222	343	3
27.50	222	343	3
27.75	222	343	3
28.00	222	343	3
28.25	230	351	3
28.50	230	351	3
28.75	230	351	3
29.00	230	351	3
29.25	230	351	3
29.50	230	351	3
29.75	230	351	3
30.00	230	351	3
30.25	239	360	3
30.50	239	360	3
30.75	239	360	3
31.00	239	360	3
31.25	239	360	3
31.50	239	360	3
31.75	248	369	3
32.00	248	397	4
32.50	248	397	4
33.00	248	397	4
33.50	248	397	4



**High Speed Steel
TAPER SHANK TWIST DRILLS
Long Series**

Specifications Conform to
IS 8305: 1976
DIN 341: 1978
Dimensions in mm



Diameter h8	Flute Length	Overall Length	Morse Taper
34.00	257	406	4
34.25	257	406	4
34.50	257	406	4
35.00	257	406	4
35.50	257	406	4
36.00	267	416	4
36.50	267	416	4
36.75	267	416	4
37.00	267	416	4
37.50	267	416	4
38.00	277	426	4
38.50	277	426	4
39.00	277	426	4
39.50	277	426	4
40.00	277	426	4
40.50	287	436	4
41.00	287	436	4
41.50	287	436	4

Diameter h8	Flute Length	Overall Length	Morse Taper
42.00	287	436	4
42.50	287	436	4
43.00	298	447	4
43.50	298	447	4
44.00	298	447	4
44.50	298	447	4
45.00	298	447	4
45.50	310	459	4
46.00	310	459	4
46.50	310	459	4
47.00	310	459	4
47.50	310	459	4
48.00	321	470	4
48.50	321	470	4
49.00	321	470	4
49.50	321	470	4
50.0	321	470	4



High Speed Steel TAPER SHANK TWIST DRILLS EXTRA LONG SERIES

Specifications Conform to
IS 7822 : 2005.
ISO 3291:1995
Dimensions in mm



Drill dia h8	Flute length	Overall Length	Morse Taper no.
6	110	200	1
	160	250	
	225	315	
6.5	110	200	1
	160	250	
	225	315	
7	110	200	1
	160	250	
	225	315	
7.5	110	200	1
	160	250	
	225	315	
8	110	200	1
	160	250	
	225	315	
8.5	110	200	1
	160	250	
	225	315	
9	110	200	1
	160	250	
	225	315	
9.5	110	200	1
	160	250	
	225	315	
10	160	250	1
	225	315	
	310	400	
11	160	250	1
	225	315	
	310	400	
12	160	250	1
	225	315	
	310	400	
13	160	250	1
	225	315	
	310	400	
14	160	250	1
	225	315	
	310	400	
15	215	315	2
	300	400	
	400	500	
16	215	315	2
	300	400	
	400	500	
17	215	315	2
	300	400	
	400	500	

Drill dia h8	Flute length	Overall Length	Morse Taper no.
18	215	315	2
	300	400	
	400	500	
19	215	315	2
	300	400	
	400	500	
20	215	315	2
	300	400	
	400	500	
21	215	315	2
	300	400	
	400	500	
22	215	315	2
	300	400	
	400	500	
23	215	315	2
	300	400	
	400	500	
24	275	400	3
	375	500	
	505	630	
25	275	400	3
	375	500	
	505	630	
28	275	400	3
	375	500	
	505	630	
30	275	400	3
	375	500	
	505	630	
32	250	400	4
	350	500	
	480	630	
35	250	400	4
	350	500	
	480	630	
38	250	400	4
	350	500	
	480	630	
40	250	400	4
	350	500	
	480	630	
42	350	500	4
	480	630	
	350	500	
45	350	500	4
	480	630	
	350	500	
48	350	500	4
	480	630	
	350	500	
50	350	500	4
	480	630	
	350	500	

A lengthened form of the Morse Taper Shank Twist Drill, longer than long series.
Type 'N' Drills shall be supplied unless otherwise specified.



High Speed Steel TAPER SHANK CORE DRILLS

Specifications Conform to
IS 5366 - 1978
ISO 7079 - 1981
DIN 343 - 1981
BS 328 : 1959
Dimensions in mm / Inch



Diameter h8		Flute Length	Over all Length	Morse Taper No.
mm	inch			
7.00	9/32	69	150	1
8.00	5/16	75	156	1
9.00	11/32	81	162	1
10.00	3/8,13/32	87	168	1
11.00	7/16	94	175	1
12.00	15/32	101	182	1
13.00	1/2	101	182	1
14.00	17/32	108	189	1
15.00	9/16	114	212	2
16.00	19/32,5/8	120	218	2
17.00	21/32	125	223	2
18.00	11/16	130	228	2
19.00	23/32	135	233	2
20.00	3/4, 25/32	140	338	2
21.00	13/16	145	243	2
22.00	27/32,7/8	150	248	2
23.00	29/32	155	253	2
24.00	-	160	281	3
25.00	15/16,31/32	160	281	3
26.00	1,1/32	165	286	3
27.00	1.1/16	170	291	3
28.00	1.3/32	170	291	3

Diameter h8		Flute Length	Over all Length	Morse Taper No.
mm	inch			
29.00	1.1/8,1.5/32	175	296	3
30.00	-	175	296	3
31.00	1.3/16,1.7/32	180	301	3
-	1.1/4	185	306	3
32.00	1.9/32	185	334	4
33.00	1.5/16	185	334	4
34.00	1.11/32	190	339	4
35.00	1.3/8	190	339	4
36.00	1.13/32	195	344	4
37.00	1.7/16,1.15/32	195	344	4
38.00	1.1/2	200	349	4
39.00	-	200	349	4
40.00	1.9/16	200	349	4
41.00	1.5/8	205	354	4
42.00	-	205	354	4
43.00	1.11/16	210	359	4
44.00	1.3/4	210	359	4
45.00	-	210	359	4
46.00	1.13/16	215	364	4
47.00	-	215	364	4
48.00	1.7/8	220	369	4
49.00	1.15/16	220	369	4

A drill having three or more helical flutes and a Standard Morse Taper Shank designed for opening out or enlarging holes.



High Speed Steel TAPER SHANK CORE DRILLS

Specifications Conform to :
 IS 5366 - 1978
 ISO 7079 - 1981
 DIN 343 - 1981
 BS 328 : 1959
 Dimensions in mm / Inch



Diameter h8		Flute Length	Overall Length	Morse Taper No.
mm	inch			
50.00	-	220	369	4
50.50	2	225	374	4
51.00	-	225	412	5
52.00	2.1/16	225	412	5
53.00	-	225	412	5
54.00	2.1/8	230	417	5
55.00	-	230	417	5
56.00	2.3/16	230	417	5
57.00	2.1/4	235	422	5
58.00	-	235	422	5
59.00	2.5/16	235	422	5
60.00	-	235	422	5
61.00	2.3/8	240	427	5
62.00	2.7/16	240	427	5
63.00	-	240	427	5
64.00	2.1/2	245	432	5

Diameter h8		Flute Length	Overall Length	Morse Taper No.
mm	inch			
65.00	2.9/16	245	432	5
66.00	-	245	432	5
67.00	2.5/8	245	432	5
68.00	2.11/16	250	437	5
69.00	-	250	437	5
70.0	2.3/4	250	437	5
71.00	-	250	437	5
72.00	2.13/16	255	442	5
73.00	2.7/8	255	442	5
74.00	-	255	442	5
75.00	2.15/16	255	442	5
76.00	3	260	447	5
77.00	-	260	514	6
78.00	3.1/16	260	514	6
79.00	3.1/8	260	514	6
80.00	-	260	514	6

ISO 7079 : 1981 Specifies the Diameter ranges over 7.5 to 50 mm.
 DIN 343 : 1981 Specifies the Diameter ranges over 8.5 to 50 mm.

- 1) Taper Shank Core drills upto and including 20 mm dia are supplied with 3 flutes, over 20 mm dia to 75 mm dia are supplied with 4 flutes and over 75 mm dia are supplied with 6 flutes.
 (For DIN Specification, the No. of flutes shall be 3 for sizes upto & incl. 50 mm dia.)
- 2) Type 'N' Drills shall be supplied unless otherwise specified.



High Speed Steel CENTRE DRILLS - Type 'A'

Specifications Conform to :
 IS 6708 - 1977
 ISO 866 - 1975
 DIN 333 - 1986
 Dimensions in mm



Pilot Dia k12	Body Dia h9	Overall Length		Pilot Length	
		Maximum	Minimum	Maximum	Minimum
1.00	3.15	33.50	29.50	1.90	1.30
1.25	3.15	33.50	29.50	2.20	1.60
1.60	4.00	37.50	33.50	2.80	2.00
2.00	5.00	42.00	38.00	3.30	2.50
2.50	6.30	47.00	43.00	4.10	3.10
3.15	8.00	52.00	48.00	4.90	3.90
4.00	10.00	59.00	53.00	6.20	5.00
5.00	12.50	66.00	60.00	7.50	6.30
6.30	16.00	74.00	68.00	9.20	8.00
8.00	20.00	83.00	77.00	11.50	10.10
10.00	25.00	103.00	97.00	14.20	12.80

Type - 'A' Centre Drill for centre holes without protecting chamfer.



High Speed Steel CENTRE DRILLS

Specifications Conform to :
 BS 328 : Part 2 : 1950
 Dimensions in inch



B.S.No.	Body Dia	Pilot Dia	Pilot Length		OAL	Tolerance on Overall Length
			Max	Min		
1	1/8	3/64	5/64	1/16	1.1/2	± 1/32
2	3/16	1/16	3/32	5/64	1.3/4	± 1/32
3	1/4	3/32	5/32	1/8	2	± 1/16
4	5/16	1/8	3/16	5/32	2.1/4	± 1/16
5	7/16	3/16	9/32	1/4	2.1/2	± 3/32
6	5/8	1/4	3/8	5/16	3	± 3/32
7	3/4	5/16	15/32	13/32	3.1/2	± 3/32



High Speed Steel CENTRE DRILLS - Type 'B'

Specifications Conform to :
IS 6709 - 1977
ISO 2540 - 1972
DIN 333 - 1986
Dimensions in mm



Pilot Dia k12	Body Dia h9	Overall Length		Pilot Length	
		Maximum	Minimum	Maximum	Minimum
1.60	6.30	47.00	43.00	2.80	2.00
2.00	8.00	52.00	48.00	3.30	2.50
2.50	10.00	59.00	53.00	4.10	3.10
3.15	11.20	63.00	57.00	4.90	3.90
4.00	14.00	70.00	64.00	6.20	5.00
5.00	18.00	78.00	72.00	7.50	6.30
6.30	20.00	83.00	77.00	9.20	8.00
8.00	25.00	103.00	97.00	11.50	10.10

Type - 'B' Centre Drills for centre holes with protecting chamfers.



**High Speed Steel
CENTRE DRILLS - Type 'R'**

Specifications Conform to :
IS 6710 - 1977
ISO 2541 - 1972
DIN 333 - 1986
Dimensions in mm



Pilot Dia k12	Body Dia h9	Overall Length		Pilot Length	Radius	
		Maximum	Minimum		Maximum	Minimum
1.00	3.15	33.50	29.50	3.00	3.15	2.50
1.25	3.15	33.50	29.50	3.35	4.00	3.15
1.60	4.00	37.50	33.50	4.25	5.00	4.00
2.00	5.00	42.00	38.00	5.30	6.30	5.00
2.50	6.30	47.00	43.00	6.70	8.00	6.30
3.15	8.00	52.00	48.00	8.50	10.00	8.00
4.00	10.00	59.00	53.00	10.60	12.50	10.00
5.00	12.50	66.00	60.00	13.20	16.00	12.50
6.30	16.00	74.00	68.00	17.00	20.00	16.00
8.00	20.00	83.00	77.00	21.20	25.00	20.00
10.00	25.00	103.00	97.00	26.50	31.50	25.00

Type - 'R' Centre Drills for centre holes with radius form.



COMBINED DRILLS AND COUNTERSINKS

Specifications Conform to :
ASME B94.11M - 1993
Dimensions in inch.



PLAIN TYPE

Size	Body Diameter	Drill Diameter	Overall Length
1	1/8	3/64	1.1/4
2	3/16	5/64	1.7/8
3	1/4	7/64	2
4	5/16	1/8	2.1/8
5	7/16	3/16	2.3/4
6	1/2	7/32	3
7	5/8	1/4	3.1/4
8	3/4	5/16	3.1/2



BELL TYPE

Size	Body Diameter	Drill Diameter	Overall Length
13	1/4	3/32	2
14	5/16	7/64	2.1/8
15	7/16	5/32	2.3/4
16	1/2	3/16	3
17	5/8	7/32	3.1/4
18	3/4	1/4	3.1/2



High Speed Steel

SUBLAND TWIST DRILLS WITH PARALLEL SHANK

For Clearance holes and countersinks for countersunk head screws

Specifications Conform to :
IS 12692 : 1989
Dimensions in mm



For Medium Series Type - A Countersinks

Body Dia h8	Small Dia h9	Step Length	Flute Length	Overall Length	Suitable for Countersunk Head Screws
13.00	6.60	15.00	101.00	151.00	M6 x 1
17.20	9.00	19.00	130.00	191.00	M8 x 1.25

For Fine Series Type - A Countersinks

Body Dia h8	Small Dia h9	Step Length	Flute Length	Overall Length	Suitable for Countersunk Head Screws
11.50	6.40	15.00	94.00	142.00	M6 x 0.75
15.00	8.40	19.00	114.00	169.00	M8 x 0.75
19.00	10.50	23.00	135.00	198.00	M10 x 0.75

Tool Type 'N' Subland Drills shall be supplied Unless otherwise Specified.



High Speed Steel

SUBLAND TWIST DRILLS WITH PARALLEL SHANK

For Clearance holes and countersinks for countersunk head screws

Specifications Conform to :
IS 12691 : 1989
Dimensions in mm



Body Dia h ₈	Small Dia h ₉	Step Length	Flute Length	Overall Length	Suitable for screw threads
9.00	6.80	21.00	81.00	125.00	M8 x 1.25
11.00	8.50	25.50	94.00	142.00	M10 x 1.50
14.00	10.20	30.00	108.00	160.00	M12 x 1.75
15.50	12.00	34.50	120.00	178.00	M14 x 2.0

Note : For fine pitch threads, subland twist drills shall be manufactured to the same dimensions of 'd' 'L' 'l₁' and 'l₂'. They can be ordered as special tools and diameter 'd₁' must be specified in such cases as given in IS : 10952 - 1984

Tool Type 'N' subland drills shall be supplied unless otherwise specified



High Speed Steel

SUBLAND TWIST DRILLS WITH PARALLEL SHANK

For Clearance holes and counterbores for slotted cheese head screws

Specifications Conform to :
IS 12689 : 1989
Dimensions in mm



Body Dia h8	Small Dia h9	Step Length	Flute Length	Overall Length	Suitable for Cheese Head Screws
11.00	6.60	15.00	94.00	142.00	M6 x 1
15.00	9.00	19.00	114.00	169.00	M8 x 1.25
18.00	11.00	23.00	130.00	191.00	M10 x 1.50

Tool Type 'N' Subland Drills shall be supplied Unless otherwise Specified.



High Speed Steel

SUBLAND TWIST DRILLS WITH MORSE TAPER SHANK

for Clearance holes and countersinks for Countersunk head Screws

Specifications Conform to :
IS 12688 : 1989
Dimensions in mm



Body Dia h8	Small Dia h9	Step Length	Flute Length	Overall Length	Morse Taper No.	Suitable for Countersunk Head Screws
13.00	6.60	15.00	101.00	182.00	1	M6 x 1
17.20	9.00	19.00	130.00	228.00	2	M8 x 1.25
21.50	11.00	23.00	150.00	248.00	2	M10 x 1.50
25.00	13.50	27.00	160.00	281.00	3	M12 x 1.75
28.00	15.50	31.00	170.00	291.00	3	M14 x 2.0

Tool Type 'N' subland drills shall be supplied unless otherwise Specified.



High Speed Steel SUBLAND TWIST DRILLS WITH MORSE TAPER SHANK

for holes prior to tapping Screws threads

Specifications Conform to :
IS 12687 : 1989
Dimensions in mm



Big Dia h8	Small Dia h9	Step Length	Flute Length	Overall Length	Morse Taper No.	Suitable for Screw Threads
9.00	6.80	21.00	81.00	162	1	M8 x 1.25
11.00	8.50	25.50	94.00	175	1	M10 x 1.50
14.00	10.20	30.00	108.00	189	1	M12 x 1.75
16.00	12.00	34.50	120.00	218	2	M14 x 2.00
18.00	14.00	38.50	130.00	228	2	M16 x 2.00
20.00	15.50	43.50	140.00	238	2	M18 x 2.50
22.00	17.50	47.50	150.00	248	2	M20 x 2.50
24.00	19.50	51.50	160.00	281	3	M22 x 2.50
26.00	21.00	56.50	165.00	286	3	M24 x 3.00
30.00	24.00	62.50	175.00	296	3	M27 x 3.00
33.00	26.50	70.00	185.00	334	4	M30 x 3.50

Note : For fine pitch threads, subland twist drills shall be manufactured to the same dimensions of 'Big Diameter', 'Small End Diameter' 'Overall Length' 'Step Length' and 'Flute Length' and Morse Taper Number as given in the above table. But can be ordered as a special tool with 'Big Diameter' and 'Small End Diameter' specified according to IS : 10952 - 1984.

Tool Type 'N' subland drills shall be supplied unless otherwise specified.



**High Speed Steel
SUBLAND TWIST DRILLS WITH
MORSE TAPER SHANK**

Specifications Conform to:
IS 12690 : 1989
Dimensions in mm

for Clearance holes and counterbores for slotted cheese head screws



Big Dia h8	Small Dia h9	Step Length	Flute Length	Overall Length	Morse Taper No.	Suitable for Slotted Cheese head screws
11.00	6.60	15.00	94.00	175	1	M6 x 1.00
15.00	9.00	19.00	114.00	212	2	M8 x 1.25
18.00	11.00	23.00	130.00	228	2	M10 x 1.50
20.00	13.50	27.00	140.00	238	2	M12 x 1.75
24.00	15.50	31.00	160.00	281	3	M14 x 2.00
26.00	17.50	35.00	165.00	286	3	M16 x 2.00
30.00	20.00	39.00	175.00	296	3	M18 x 2.50
33.00	22.00	43.00	185.00	334	4	M20 x 2.50

Tool Type 'N' subland drills shall be supplied unless otherwise Specified.



TECHNICAL INFORMATION

1. High Speed Steels used for Cutting tools
2. Technical calculations Drilling
3. Helix Angle for Twist Drills
4. Recommended "Tool Types" & Point Angles for various materials
5. Peripheral Speeds for HSS Twist Drills -
(Ferrous materials & Non - ferrous materials.)
6. Drilling Speeds for Thermo Plastics
7. Table of Cutting Speeds - Fractional Size Drills
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10. Feeds for HSS Twist Drills
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HIGH SPEED STEELS USED FOR CUTTING TOOLS

Depending on the application, cutting tools are manufactured using different grades of HSS. Non - Cobalt and Cobalt grades are widely in use and material made by Powder route is also gaining increased adaptation., The Work material, its hardness, the machine tool used, part configuration, finish required on the components and volume of components to be produced are a few requirements that influence selection of different grades of HSS for Manufacture of Cutting Tools. Chemical Composition of some grades of High Speed Steels normally used is given below : -

Hss	CHEMICAL COMPOSITION %					
Grades	C	Cr	Mo	W	Co	V
M2	0.90	4.20	5.00	6.40	-	1.80
M7	1.02	3.80	8.60	1.80	-	1.90
M15	1.55	4.50	3.00	6.50	5.00	5.00
M35	0.93	4.20	5.00	6.40	4.80	1.80
M42	1.08	3.80	9.40	1.50	8.00	1.20
ASP2017	0.80	4.20	3.00	3.00	8.00	1.00
ASP 2030	1.28	4.20	5.00	6.40	8.50	3.10
ASP 2060	2.30	4.20	7.00	6.50	10.50	6.50

C - Carbon	Cr - Chromium	Mo - Molybdenum
W - Tungsten	Co - Cobalt	V - Vanadium



TECHNICAL CALCULATIONS - DRILLING

$$\begin{aligned} \text{Cutting Speed } V_c &= \pi DN / 1000 \text{ (m / min.)} \\ \text{Feed Rate } V_f &= f \times N \text{ (mm / min.)} \\ \text{Feed Force } F_f &= 0.5 \times \alpha_p \times f \times K_{CFZ} \times \sin K_f \text{ (N)} \\ \text{Torque } M_c &= \frac{D \times F \times K_{CFZ} \times \alpha_p}{2000} \left(1 - \alpha_p \right) \frac{\text{(NM)}}{D} \\ \text{Power Reqmnt. } P &= \frac{\alpha_p \times F \times K_{CFZ} \times V_c}{60 \times 10^3} \left(1 - \alpha_p \right) \frac{\text{(KW)}}{D} \end{aligned}$$

Where, D = Drill Diameter (mm)	α_p = Cutting Depth (mm)
N = Spindle Speed (rpm)	F = Feed per Revolution (mm/rev.)
K_{CFZ} = Specific Cutting force for (N/mm ²)	K_f = Tool Cutting Angle (Degrees)



HELIX ANGLES FOR TWIST DRILL

DIAMETER		HELIX ANGLES			DIAMETER		HELIX ANGLES		
OVER	Upto and Incl.	Type - N	Type - H	Type - S	OVER	Upto and Incl.	Type - N	Type - H	Type - S
0.70	1.00	20° - 26°	10° - 13°	30° - 35°	20.00	35.00	27° - 34°	13° - 18°	38° - 43°
1.00	3.00	22° - 28°	11° - 14°	31° - 36°	35.00	50.00	28° - 35°	13° - 18°	39° - 44°
3.00	8.00	24° - 30°	12° - 15°	33° - 38°	50.00	80.00	29° - 37°	-	-
8.00	20.00	26° - 32°	12° - 16°	36° - 41°					

The helix angle which corresponds to the rake of the single point tool, depends upon materials and hole to be drilled. The drills are made in three types for Normal (N), Hard(H) and Soft (S) work piece materials. These type designations are based on the material to be cut and design requirements of drills. The range of helix angles for the three types of drills is given above.



RECOMMENDED 'TOOL TYPES' AND POINT ANGLES FOR VARIOUS MATERIALS.

Ref : IS 5099

Material of work piece	Tensile Strength (MPa)	Brinell Hardness HB	Tool Type*	Point Angle ± 3°
Steel and cast steel	400 to 700	115 to 205	N	118°
(alloyed and un alloyed)	700 to 1200	205 to 350	N	130°
Stainless steels			N	140°
Austenitic Steels			H	140°
		140 to 200	N	118°
Cast Iron		200 to 240	N	118°
		Over 240	N (H)	118°
Malleable Cast iron			N	118°
Brass	with copper up to 58%		H (N)	118°
	with copper above 58%		N	118°
German Silver			N	118°
Copper	Up to 30mm Drill Diameter		S (N)	140°
	Over 30mm Drill Diameter		N	140°
Aluminium	Long Chip Type		S (N)	140°
Alloys	Short Chip Type		N	140°
Magnesium Alloys			H (N)	140°
Nickel			N	118°
Zinc Alloys			S (N)	118°
White Metal			S (N)	118°
Moulded	Thickness ≤ Drill Dia		H	80°
Plastics	Thickness > Drill Dia		S	80°
Laminated Plastics			H (N)	80°
Celluloid			S (N)	140°
Hard rubber and thin				
Plastic Materials			H (N)	80°
Marble Slate & Carbon			H	80°

Note : The twist drills are made in three 'tool types', namely, Normal (N), Hard (H) and Soft (S) depending upon the material to be drilled.

* 'Tool Types' within brackets are non - preferred.



PERIPHERAL SPEEDS FOR HSS TWIST DRILLS (FERROUS MATERIALS)

TYPE OF STEEL B.S.970 EN Series No.	Cutting Speed, Vc	
	Feet / min.	Meters /min.
NON - ALLOY STEELS (a) Up to 0.40% Carbon Content 2, 3, 4, 5, 6, 7, 8 & 32.	80 - 100	24 - 30
(b) 0.40% to 0.70% Carbon Content 9, 10, 43	60 - 80	18 - 24
(c) Over 0.70% Carbon Content 42, 44	40 - 60	12 - 18
ALLOY STEELS (a) Tensile Strength up to 60 Tons / Sq.Inch (94.50kg/Sq.mm) 11(T), 12, 13, 14, 15, 16 (RST), 17(RST) 18, 19(RST), 20(T), 21, 22, 23(ST), 24(ST), 25(T), 27(T), 29(RST), 31, 33, 34, 35, 37, 38, 39, 40(RST), 41, 51, 52, 53, 100(RST), 110(RST), 111(RST), 160(RST).	50 - 70	15 - 21
(b) Tensile Strength 60 - 80 Tons/Sq.Inch (94.50 to 126 Kg / Sq.mm) 11(V), 16(UV), 17(UV), 18(UVW), 19(UV), 20(V), 23(UV), 24(UVWX), 25(UVWX), 26(UVWX), 27(UVW), 28(UVW), 29(UVW), 40(U), 100(UV), 110(UVW), 111(U), 160(U).	30 - 50	9 - 15
(c) Tensile Over 80 Tons/Sq.Inch (126 Kg/Sq.mm) 19(W), 24(YZ), 25(Y,Z), 26(YZ), 28(Y), 29(Z)	15 - 30	4.50 - 9
MARTENSITIC STAINLESS STEEL (Magnetic) 56, 57.	40 - 60	12 - 18
AUSTENITIC STAINLESS STEEL AND IRONS (Non Magnetic) 54, 55, 58	20 - 40	6 - 12
12 / 14 % MANGANESE STEEL	10 - 12	3.0 - 3.50
GREY CAST - IRON	80 - 100	24 - 30
ALLOYED CAST IRON	50 - 70	15 - 21

PERIPHERAL SPEEDS FOR HSS TWIST DRILLS (NON-FERROUS MATERIALS)

NON - FERROUS MATERIALS	Cutting Speed, Vc	
	Feet/Min	Meters/Min
Aluminium and Aluminium Alloys	100 - 200	30 - 60
Brass	100 - 150	30 - 46
Brass, Leaded	100 - 200	30 - 61
Bronze Ordinary	100 - 200	30 - 60
Bronze, High Tensile	70 - 100	21 - 30
Copper	100 - 150	30 - 46

NON - FERROUS MATERIALS	Cutting Speed, Vc	
	Feet/Min	Meters/Min
Magnesium and Magnesium Alloys	200 - 300	60 - 90
Monel Metal	20 - 50	6 - 15
Nickel	30 - 50	9 - 15
Nimonic Alloys	10 - 20	3 - 6
Zinc Base Alloys (mazak)	150 - 250	45 - 75

The peripheral speeds in these two tables is a suggested basis. In many instances, due to good operating conditions it may be practicable to increase them substantially.



DRILLING SPEEDS FOR THERMOPLASTICS

Material	Type of Helix*	Included Point Angle	Cutting Speed 'Vc' in M/Min	
			Shallow holes upto 3 times Drill Dia	Deep holes 6 times Drill Dia
Cellulose Acetate	Quick	140°	45	30
Cellulose Nitrate	Standard	130°	45	24
Polystyrene	Quick	140°	6	6
High Impact Polystyrene	Quick	140°	45	27
Perspex	Slow	60°	27	6
Ethyl Cellulose	Quick	140°	18	6
Nylon	Quick	140°	45	30
Vulcanised Fibre	Quick	118°	60	45
P.V.C.	Quick	140°	6	6
P.V.C. with Filter	Quick	140°	45	30

*This table applies when using drills upto 12mm dia. Above this diameter standard helix drills can usually be used.

TABLE OF CUTTING SPEEDS - FRACTIONAL SIZE DRILLS

CUTTING SPEED 'Vc'					
Ft/min	50	60	70	80	100
M/min	15	18	21	24	30
Drill Dia. 'Inch'	REVOLUTIONS PER MINUTE				
1/64"	12,224	14,656	17,088	19,520	24,448
1/32"	6,112	7,328	8,544	9,760	12,224
3/64"	4,064	4,896	5,696	6,528	8,160
1/16"	3,056	3,664	4,272	4,880	6,112
5/64"	2,448	2,928	3,424	3,904	4,896
3/32"	2,032	2,448	2,848	3,264	4,080
1/8"	1,528	1,832	2,136	2,440	3,056
5/32"	1,224	1,464	1,712	1,952	2,448
3/16"	1,016	1,224	1,424	1,632	2,040
7/32"	872	1,048	1,224	1,400	1,744
1/4"	764	916	1,068	1,220	1,528
5/16"	612	732	856	976	1,224
3/8"	508	612	712	816	1,020
7/16"	436	524	612	700	872
1/2"	382	458	534	670	764
9/16"	340	408	476	544	680
5/8"	306	366	428	488	612
11/16"	278	334	388	444	556



TABLE OF CUTTING SPEEDS FRACTIONAL SIZE DRILLS

CUTTING SPEED 'Vc'					
Ft/min	50	60	70	80	100
M/min	15	18	21	24	30
Drill Dia. 'Inch'	REVELUTIONS PER MINUTE				
3/4"	254	306	356	408	510
13/16"	234	282	330	376	470
7/8"	218	262	306	350	436
15/16"	204	244	286	326	408
1"	191	229	267	305	382
1.1/8"	170	204	238	272	340
1.1/4"	153	183	214	244	306
1.1/2"	127	153	178	204	255
1.3/4"	109	131	153	175	218
2"	95	114	133	152	191
2.1/4"	85	102	119	136	170
2.1/2"	76	92	107	122	153
2.3/4"	69	83	97	111	139
3"	64	76	89	102	127
4"	48	57	67	76	96

R.P.M. for Cutting Speeds not given. Can be obtained by simple addition or subtraction,
E.g. : 150 ft/Min = 100 + 50 = 1,146 R.P.M. (for 1/2" Dia.)
 30 ft / Min = 80 - 50 = 7,296 R.P.M. (for 1/64" Dia.)

TABLE OF CUTTING SPEEDS - METRIC SIZE DRILLS

CUTTING SPEED 'Vc'					
Ft/min	50	60	70	80	100
M/min	15	18	21	24	30
Drill Dia. 'mm'	REVELUTIONS PER MINUTE				
0.50	9,695	11,634	13,573	15,512	19,390
1.00	4,847	5,817	6,786	7,756	9,695
1.50	3,327	3,884	4,532	5,179	6,474
2.00	2,427	2,912	3,397	3,883	4,854
2.50	1,941	2,329	2,717	3,105	3,882
3.00	1,617	1,940	2,264	2,587	3,234
4.00	1,213	1,455	1,698	1,940	2,425
5.00	970	1,164	1,359	1,553	1,941
6.00	808	970	1,132	1,294	1,617
7.00	693	832	970	1,109	1,386
8.00	606	728	849	970	1,213
9.00	539	647	755	862	1,078
10.00	485	582	679	776	970
11.00	441	529	617	706	882
12.00	404	485	566	647	808
13.00	373	448	522	597	746
14.00	346	416	485	554	693
15.00	323	388	453	517	647
16.00	303	364	424	485	606
17.00	285	342	399	456	571
18.00	269	323	377	431	539
19.00	255	306	357	408	511



TABLE OF CUTTING SPEEDS - NUMBER SIZE DRILLS

CUTTING SPEED 'Vc'						
Ft/min	50	60	70	80	100	
M/min	15	18	21	24	30	
Drill Dia. No. Size	REVOLUTIONS PER MINUTE					
1	838	1,005	1,173	1,340	1,675	
2	864	1,037	1,210	1,382	1,728	
4	914	1,097	1,280	1,462	1,828	
6	936	1,123	1,310	1,498	1,872	
8	960	1,151	1,343	1,535	1,919	
10	987	1,184	1,382	1,579	1,974	
12	1,010	1,213	1,415	1,617	2,021	
14	1,050	1,259	1,469	1,679	2,099	
16	1,079	1,295	1,511	1,726	2,158	
18	1,130	1,356	1,582	1,808	2,260	
20	1,186	1,423	1,600	1,898	2,372	
22	1,217	1,460	1,703	1,946	2,433	
24	1,257	1,508	1,759	2,010	2,513	
26	1,299	1,559	1,819	2,078	2,598	
28	1,360	1,631	1,903	2,175	2,719	
30	1,487	1,784	2,081	2,378	2,973	
32	1,647	1,976	2,305	2,634	3,293	
34	1,721	2,065	2,409	2,753	3,442	
36	1,794	2,152	2,511	2,870	3,587	
38	1,882	2,258	2,634	3,010	3,763	
40	1,949	2,339	2,729	3,118	3,898	
42	2,043	2,451	2,860	3,268	4,085	
44	2,221	2,665	3,109	3,554	4,442	
46	2,358	2,830	3,301	3,773	4,716	
48	2,513	3,016	3,518	4,021	5,026	
50	2,729	3,609	3,820	4,366	5,457	
52	3,008	4,211	4,211	4,812	6,015	
54	3,473	4,167	4,862	5,556	6,945	
56	4,108	4,929	5,751	6,257	8,215	
58	4,547	5,456	6,367	7,275	9,095	
60	4,775	5,729	6,684	7,639	9,549	
62	5,025	6,030	7,035	8,040	10,050	
64	5,305	6,366	7,427	8,488	10,610	
66	5,790	6,948	8,106	9,264	11,580	
68	6,160	7,392	8,624	9,856	12,320	
70	6,820	8,184	9,548	10,912	13,640	
72	7,640	9,168	10,696	12,224	15,280	
74	8,510	10,212	11,914	13,616	17,020	
76	9,550	11,460	13,370	15,280	19,100	
78	11,935	14,322	16,709	19,096	23,870	
80	14,150	16,980	19,810	22,640	28,300	



FEEDS FOR HSS TWIST DRILLS

FOR GENERAL PURPOSE			
Drill Diameter Inches	Feed / Rev Inches	Drill Diameter mm	Feed mm/Rev
1/16 - 3/32	0.0015-0.0025	1.6 - 3.0	0.04 - 0.06
1/8 - 5/32	0.002 - 0.004	3.0 - 4.0	0.05 - 0.10
3/16 - 7/32	0.003 - 0.006	4.0 - 5.50	0.075-0.15
1/4 - 5/16	0.004 - 0.008	5.50 - 8.0	0.10 - 0.20
3/8 - 7/16	0.006 - 0.010	8.0 - 11.0	0.15 - 0.25
1/2 - 9/16	0.008 - 0.012	11.0 - 14.5	0.20 - 0.30
5/8 - 11/16	0.009 - 0.013	14.5 - 17.5	0.23 - 0.33
3/4 - 13/16	0.010 - 0.014	17.5 - 20.5	0.25 - 0.36
7/8 - 15/16	0.011 - 0.015	20.5 - 24.0	0.28 - 0.38
1 - 1 1/8	0.012 - 0.016	24.0 - 28.5	0.30 - 0.40
1-1/4 - 1-1/2	0.014 - 0.018	28.5 - 38.0	0.35 - 0.45
Over 1-1/2	0.016 - 0.020*	Over 38.0	0.40 - 0.50*

FOR AUSTENITIC STAINLESS STEEL AND NIMONIC ALLOYS			
Drill Diameter Inches	Feed / Rev Inches	Drill Diameter mm	Feed mm/Rev
1/16 - 3/32	0.002 - 0.0035	1.6 - 3.0	0.05 - 0.09
1/8 - 5/32	0.0025 - 0.006	3.0 - 4.0	0.06 - 0.15
3/16 - 7/32	0.004 - 0.009	4.0 - 5.50	0.10-0.23
1/4 - 5/16	0.005 - 0.012	5.50 - 8.0	0.125 - 0.30
3/8 - 7/16	0.0075 - 0.015	8.0 - 11.0	0.19 - 0.38
1/2 - 9/16	0.010 - 0.018	11.0 - 14.5	0.25 - 0.45
5/8 - 11/16	0.011 - 0.020	14.5 - 17.5	0.28 - 0.50
3/4 - 13/16	0.0125 - 0.021	17.5 - 20.5	0.31 - 0.53
7/8 - 15/16	0.0135 - 0.022	20.5 - 24.0	0.34 - 0.56
1 - 1 1/8	0.015 - 0.024	24.0 - 28.5	0.38 - 0.60
1-1/4 - 1-1/2	0.0175 - 0.027	28.5 - 38.0	0.44 - 0.68
Over 1-1/2	0.020 - 0.030	Over 38.0	0.50 - 0.750

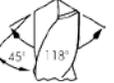
* Or greater according to the work & working Conditions

Note : - On New Work, commence at the slowest appropriate speed and lightest feed, and gradually increase until Optimum output per grind is obtained.



TYPES OF DRILL POINTS

FOR VARIOUS APPLICATIONS

	<p>118° Point - General Purpose Point for most materials where work hardening or chip formation does not present a problem.</p>
	<p>135° Point - A greater point angle is used for tough or hard materials such as highly alloyed steels.</p>
	<p>90° Point - A Smaller point angle is used for soft and highly ductile materials such as plastics and non ferrous metals.</p>
	<p>Standard Point with 45° Chamfer - A corner chamferis used to reduce the burr in soft materials or reduce corner breakdown in abrasive materials.</p>
	<p>Split or Crankshaft Point - This type is used to reduce thrust when hand drilling tough materials or to make self centering for NC equipment.</p>

CUTTING FLUIDS	
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 magnesium alloys	Soluble Oil or neat cutting oil specially produced for light alloys.
Cast Iron	Dry or Compressed Air.
Stainless Steel, Nimonic alloys, Monal metals	Soluble Oils can be used but Sulphurised or chlorinated mineral or fatty oils are most suitable
Zinc base alloys (MAZAK)	Soluble Oil.



DECIMAL EQUIVALENTS

Frac.	mm	Inch
	0.32	0.0126
	0.35	0.0138
	0.38	0.0150
1/64	0.397	0.0156
	0.40	0.0157
	0.42	0.0165
	0.45	0.0177
	0.48	0.0189
	0.50	0.0197
	0.52	0.0205
	0.55	0.0217
	0.58	0.0228
	0.60	0.0236
	0.62	0.0244
	0.65	0.0256
	0.68	0.0268
	0.70	0.0276
	0.72	0.0283
	0.75	0.0295
	0.78	0.0307
1/32	0.7920	0.0312
	0.80	0.0315
	0.82	0.0323
	0.85	0.0335
	0.88	0.0346
	0.90	0.0354
	0.92	0.0362
	0.94	0.0370
	0.98	0.0386
	1.00	0.0394
	1.05	0.0413
	1.10	0.0433
	1.15	0.0453
3/64	1.191	0.0469
	1.20	0.0472
	1.25	0.0492
	1.30	0.0512
	1.35	0.0531
	1.40	0.0551
	1.45	0.0571
	1.50	0.0591
	1.55	0.0610
1/16	1.588	0.0625
	1.60	0.0630
	1.65	0.0650
	1.70	0.0669
	1.75	0.0689
	1.80	0.0709
	1.85	0.0728
	1.90	0.0748
5/64	1.95	0.0768
	1.984	0.0781
	2.00	0.0787
	2.05	0.0807
	2.10	0.0827
	2.15	0.0846
	2.20	0.0866

Frac.	mm	Inch
	2.25	0.0886
	2.30	0.0906
	2.35	0.0925
3/32	2.381	0.0937
	2.40	0.0945
	2.45	0.0965
	2.50	0.0984
	2.55	0.1004
	2.60	0.1024
	2.65	0.1043
	2.70	0.1063
	2.75	0.1083
7/64	2.778	0.1094
	2.80	0.1102
	2.85	0.1122
	2.90	0.1142
	2.95	0.1161
	3.00	0.1181
	3.10	0.1220
1/8	3.175	0.1250
	3.20	0.1260
	3.30	0.1299
	3.40	0.1339
	3.50	0.1378
9/64	3.572	0.1406
	3.60	0.1417
	3.70	0.1457
	3.80	0.1496
	3.90	0.1535
5/32	3.969	0.1562
	4.00	0.1575
	4.10	0.1614
	4.20	0.1654
	4.30	0.1693
11/64	4.366	0.1719
	4.40	0.1732
	4.50	0.1772
	4.60	0.1811
	4.70	0.1850
3/16	4.762	0.1875
	4.80	0.1890
	4.90	0.1929
	5.00	0.1969
	5.10	0.2008
13/64	5.159	0.2031
	5.20	0.2047
	5.30	0.2087
	5.40	0.2126
	5.50	0.2165
7/32	5.556	0.2188
	5.60	0.2205
	5.70	0.2244
	5.80	0.2283
	5.90	0.2323
15/64	5.953	0.2344
	6.00	0.2362
	6.10	0.2402



DECIMAL EQUIVALENTS

Frac.	mm	Inch
	6.20	0.2441
	6.30	0.2480
1/4	6.35	0.2500
	6.40	0.2520
	6.50	0.2559
	6.60	0.2598
	6.70	0.2638
17/64	6.747	0.2656
	6.80	0.2677
	6.90	0.2717
	7.00	0.2756
	7.10	0.2795
9/32	7.144	0.2812
	7.20	0.2835
	7.30	0.2874
	7.40	0.2913
	7.50	0.2953
19/64	7.541	0.2969
	7.60	0.2992
	7.70	0.3031
	7.80	0.3071
	7.90	0.3110
5/16	7.938	0.3125
	8.00	0.3150
	8.10	0.3189
	8.20	0.3228
	8.30	0.3268
21/64	8.334	0.3281
	8.40	0.3307
	8.50	0.3346
	8.60	0.3386
	8.70	0.3425
11/32	8.731	0.3438
	8.80	0.3456
	8.90	0.3504
	9.00	0.3543
	9.10	0.3583
23/64	9.128	0.3594
	9.20	0.3622
	9.30	0.3661
	9.40	0.3701
	9.50	0.3740
3/8	9.525	0.3750
	9.60	0.3780
	9.70	0.3819
	9.80	0.3858
	9.90	0.3898
25/64	9.922	0.3906
	10.00	0.3937
	10.10	0.3976
	10.20	0.4016
	10.30	0.4055
13/32	10.319	0.4062
	10.40	0.4094
	10.50	0.4134
	10.60	0.4173
	10.70	0.4213
27/64	10.716	0.4219

Frac.	mm	Inch
	10.80	0.4252
	10.90	0.4291
	11.00	0.4331
	11.10	0.4370
7/16	11.112	0.4375
	11.20	0.4409
	11.30	0.4449
	11.40	0.4488
	11.50	0.4528
29/64	11.509	0.4531
	11.60	0.4567
	11.70	0.4606
	11.80	0.4646
	11.90	0.4685
15/32	11.906	0.4688
	12.00	0.4724
	12.10	0.4764
	12.20	0.4803
	12.30	0.4843
31/64	12.303	0.4844
	12.40	0.4882
	12.50	0.4921
	12.60	0.4961
1/2	12.70	0.5000
	12.80	0.5039
	12.90	0.5079
	13.00	0.5118
33/64	13.097	0.5156
	13.10	0.5157
	13.20	0.5197
	13.30	0.5236
	13.40	0.5276
17/32	13.494	0.5312
	13.50	0.5315
	13.60	0.5354
	13.70	0.5394
	13.80	0.5433
35/64	13.891	0.5469
	13.90	0.5472
	14.00	0.5512
	14.25	0.5610
9/16	14.288	0.5625
	14.50	0.5709
37/64	14.684	0.5781
	14.75	0.5807
	15.00	0.5906
19/32	15.081	0.5938
	15.25	0.6004
39/64	15.478	0.6094
	15.50	0.6102
	15.75	0.6201
5/8	15.875	0.6250
	16.00	0.6229
	16.25	0.6398
41/64	16.272	0.6406
	16.50	0.6496
21/32	16.669	0.6562



DECIMAL EQUIVALENTS

Frac.	mm	Inch
	16.75	0.6594
	17.00	0.6693
43/64	17.066	0.6719
	17.25	0.6791
11/16	17.462	0.6875
	17.50	0.6890
	17.75	0.6988
45/64	17.859	0.7031
	18.00	0.7087
	18.25	0.7185
23/32	18.256	0.7188
	18.50	0.7283
47/64	18.653	0.7344
	18.75	0.7382
	19.00	0.7480
3/4	19.050	0.7500
	19.25	0.7579
49/64	19.44	0.7656
	19.50	0.7677
	19.75	0.7776
25/32	19.844	0.7812
	20.00	0.7874
51/64	20.241	0.7969
	20.25	0.7972
	20.50	0.8071
13/16	20.638	0.8125
	20.75	0.8169
	21.00	0.8268
53/64	21.034	0.8281
	21.25	0.8366
27/32	21.431	0.8438
	21.50	0.8465
	21.75	0.8563
55/64	21.828	0.8594
	22.00	0.8661
7/8	22.225	0.8750
	22.25	0.8760
	22.50	0.8858
57/64	22.622	0.8906
	22.75	0.8957
	23.00	0.9055
29/32	23.019	0.9062
	23.25	0.9154
59/64	23.416	0.9219
	23.50	0.9252
	23.75	0.9350
15/16	23.812	0.9375
	24.00	0.9449
61/64	24.209	0.9531
	24.25	0.9547
	24.50	0.9646
31/32	24.606	0.9688
	24.75	0.9744
	25.00	0.9843
63/64	25.003	0.9844
1	25.40	1.0000
	25.50	1.0039

Frac.	mm	Inch
1 - 1/64	25.797	1.0156
	26.000	1.0236
1 - 1/32	26.194	1.0312
	26.500	1.0433
1 - 3/64	26.591	1.0469
1 - 1/16	26.988	1.0625
	27.000	1.0630
1 - 5/64	27.384	1.0781
	27.500	1.0827
1 - 3/32	27.781	1.0938
	28.000	1.1024
1 - 7/64	28.178	1.1094
	28.500	1.1220
1 - 1/8	28.575	1.1250
1 - 9/64	28.972	1.1406
	29.000	1.1417
1 - 5/32	29.369	1.1562
	29.500	1.1614
1 - 11/64	29.766	1.1719
	30.000	1.1811
1 - 3/16	30.162	1.1875
	30.500	1.2008
1 - 13/64	30.559	1.2031
1 - 7/32	30.956	1.2188
	31.000	1.2205
1 - 15/64	31.353	1.2344
	31.500	1.2402
1 - 1/4	31.750	1.2500
	32.000	1.2598
1 - 17/64	32.147	1.2656
	32.500	1.2795
1 - 9/32	32.544	1.2812
1 - 19/64	33.941	1.2969
	33.000	1.2992
1 - 5/16	33.338	1.3125
	33.500	1.3189
1 - 21/64	33.734	1.3281
	34.000	1.3386
1 - 11/32	34.131	1.3438
	34.500	1.3583
1 - 23/64	34.528	1.3594
1 - 3/8	34.925	1.3750
	35.000	1.3780
1 - 25/64	35.322	1.3906
	35.500	1.3976
1 - 13/32	35.719	1.4062
	36.000	1.4173
1 - 27/64	36.116	1.4290
	36.500	1.4370
1 - 7/16	36.512	1.4375
1 - 29/64	36.909	1.4531
	37.000	1.4567
1 - 15/32	37.306	1.4688
	37.500	1.4764
1 - 31/64	37.703	1.4844
	38.000	1.4961
1 - 1/2	38.100	1.5000



DECIMAL EQUIVALENTS

Frac.	mm	Inch
1-33/64	38.497	1.5156
	38.50	1.5157
1-17/32	38.894	1.5312
	39.0	1.5354
1-35/64	39.291	1.5469
	39.50	1.5551
1-9/16	39.688	1.5625
	40.00	1.5748
1-37/64	40.084	1.5781
1-19/32	40.481	1.5938
	40.50	1.5945
1-39/64	40.878	1.6094
	41.00	1.6142
1-5/8	41.275	1.6250
	41.50	1.6339
1-41/64	41.672	1.6406
	42.00	1.6535
1 - 21/32	42.069	1.6562
1-43/64	42.466	1.6719
	42.50	1.6732
1-11/16	42.862	1.6875
	43.00	1.6929
1-45/64	43.259	1.7031
	43.50	1.7126
1-23/32	43.656	1.7188
	44.00	1.7223
1-47/64	44.053	1.7344
1-3/4	44.450	1.7500
	44.50	1.7520
1-49/64	44.847	1.7656
	45.00	1.7717
1-25/32	45.244	1.7812
	45.50	1.7913
1-51/64	45.641	1.7969
	46.00	1.8110
1 - 13/16	46.038	1.8125
1 - 53/64	46.434	1.8281
	46.50	1.8307
1 - 27/32	46.831	1.8438
	47.00	1.8504
1-55/64	47.228	1.8594
	47.50	1.8701
1- 7/8	47.625	1.8750
	48.00	1.8898
1 - 57/64	48.022	1.8906
1 - 29/32	48.419	1.9062
	48.50	1.9094
1- 59/64	48.816	1.9219
	49.00	1.9291
1- 15/16	49.212	1.9375
	49.50	1.9488
1- 61/64	49.609	1.9531
	50.00	1.9685
1-31/32	50.006	1.9688
1-63/64	50.403	1.9844
	50.50	1.9882
2	50.800	2.0000

Frac.	mm	Inch
	51.00	2.0079
2 - 1/32	51.594	2.0312
	52.00	2.0472
2 - 1/16	52.388	2.0625
	53.00	2.0866
2 - 3/32	53.181	2.0938
2 - 1/8	53.975	2.1250
	54.00	2.1260
2 - 5/32	54.769	2.1562
	55.00	2.1654
2 - 3/16	55.562	2.1875
	56.00	2.2047
2 - 7/32	56.356	2.2188
	57.00	2.2441
2 - 1/4	57.150	2.2500
2-9/32	57.944	2.2812
	58.00	2.2835
2 - 5/16	58.738	2.3125
	59.00	2.3228
2 - 11/32	59.531	2.3438
	60.00	2.3622
2- 3/8	60.325	2.3750
	61.00	2.4016
2 - 13/32	61.119	2.4062
2 - 7/16	61.912	2.4375
	62.00	2.4409
2 - 15/32	62.706	2.4688
	63.00	2.4803
2 - 1/2	63.50	2.5000
	64.00	2.5197
2-17/32	64.294	2.5312
	65.00	2.5591
2 - 9/16	65.088	2.5625
2 - 19/32	65.881	2.5938
	66.00	2.5984
2 - 5/8	66.675	2.6250
	67.00	2.6378
2 - 21/32	67.469	2.6562
	68.00	2.6772
2 - 11/16	68.262	2.6875
	69.00	2.7165
2 - 23/32	69.056	2.7188
2 - 3/4	69.850	2.7500
	70.00	2.7559
2 - 25/32	70.644	2.7812
	71.00	2.7953
2 -13/16	71.438	2.8125
	72.00	2.8346
2 - 27/32	72.231	2.8438
	73.00	2.8740
2 - 7/8	73.025	2.8750
2 - 29/32	73.819	2.9062
	74.00	2.9134
2-15/16	74.612	2.9375
	75.00	2.9528
2- 31/32	75.406	2.9688
	76.00	2.9921



DECIMAL EQUIVALENTS

Frac.	mm	Inch
3	76.200	3.0000
3 - 1/32	76.994	3.0312
	77.00	3.0315
3 - 1/16	77.788	3.0625
	78.00	3.0709
3 - 3/32	78.581	3.0938
	79.00	3.1102
3 - 1/8	79.375	3.1250
	80.00	3.1496
3 - 5/32	80.169	3.1562
3 - 3/16	80.962	3.1875
	81.00	3.1890
3 - 7/32	81.756	3.2188
	82.00	3.2283
3 - 1/4	82.550	3.2500
	83.00	3.2677
3 - 9/32	83.344	3.2812
	84.00	3.3071
3 - 5/16	84.138	3.3125
3 - 11/32	84.931	3.3438
	85.00	3.3465
3 - 3/8	85.725	3.3750
	86.00	3.3858
3 - 13/32	86.519	3.4062
	87.00	3.4252
3 - 7/16	87.312	3.4375
	88.00	3.4646
3 - 15/32	88.106	3.4688
3 - 1/2	88.90	3.5000
	89.00	3.5039
	90.00	3.5433
3 - 9/16	90.488	3.5625
	91.00	3.5827
	92.00	3.6220
3 - 5/8	92.075	3.6250

Frac.	mm	Inch
	93.00	3.6614
3 - 11/16	93.662	3.6875
	94.00	3.7008
	95.00	3.7402
3 - 3/4	95.250	3.7500
	96.00	3.7795
3 - 13/16	96.838	3.8125
	97.00	3.8189
	98.00	3.8583
3 - 7/8	98.425	3.8750
	99.00	3.8976
	100.00	3.9370
3 - 15/16	100.012	3.9375
4	101.600	4.0000
4 - 1/4	107.950	4.2500
4 - 1/2	114.300	4.5000
4 - 3/4	120.650	4.7500
5	127.000	5.0000
5 - 1/4	133.350	5.2500
5 - 1/2	139.70	5.5000
5 - 3/4	146.050	5.7500
6	152.400	6.0000
6 - 1/2	165.100	6.5000
7	177.800	7.0000
7 - 1/2	190.500	7.5000
8	203.200	8.0000
8 - 1/2	215.900	8.5000
9	228.600	9.0000
9 - 1/2	241.300	9.5000
10	254.000	10.0000
10 - 1/2	266.700	10.5000
11	279.400	11.0000
11 - 1/2	292.100	11.5000
12	304.800	12.0000



DECIMAL AND METRIC EQUIVALENTS FOR GAUGE AND LETTER SIZE DRILLS

Drill Gauge and Letter Size	Decimal Equivalent "Inch"	Metric Equivalent "mm"
68	0.0310	0.787
67	0.0320	0.813
66	0.0330	0.838
65	0.0350	0.889
64	0.0360	0.914
63	0.0370	0.940
62	0.0380	0.965
61	0.0390	0.991
60	0.0400	1.016
59	0.0410	1.041
58	0.0420	1.067
57	0.0430	1.092
56	0.0465	1.181
55	0.0520	1.321
54	0.0550	1.397
53	0.0595	1.511
52	0.0635	1.613
51	0.0670	1.702
50	0.0700	1.778
49	0.0730	1.854
48	0.0760	1.930
47	0.0785	1.994
46	0.0810	2.057
45	0.0820	2.083
44	0.0860	2.184
43	0.0890	2.261
42	0.0935	2.375
41	0.0960	2.438
40	0.0980	2.489
39	0.0995	2.527
38	0.1015	2.578
37	0.1040	2.642
36	0.1065	2.705
35	0.1100	2.794
34	0.1110	2.819
33	0.1130	2.870
32	0.1160	2.946
31	0.1200	3.048
30	0.1285	3.264
29	0.1360	3.454
28	0.1405	3.569
27	0.1440	3.658
26	0.1470	3.734
25	0.1495	3.797
24	0.1520	3.861
23	0.1540	3.912
22	0.1570	3.988

Drill Gauge and Letter Size	Decimal Equivalent Inch	Metric Equivalent "mm"
21	0.1590	4.039
20	0.1610	4.089
19	0.1660	4.216
18	0.1695	4.305
17	0.1730	4.394
16	0.1770	4.496
15	0.1800	4.572
14	0.1820	4.623
13	0.1850	4.699
12	0.1890	4.801
11	0.1910	4.851
10	0.1935	4.915
9	0.1960	4.978
8	0.1990	5.055
7	0.2010	5.105
6	0.2040	5.182
5	0.2055	5.220
4	0.2090	5.309
3	0.2130	5.410
2	0.2210	5.613
1	0.2280	5.791
A	0.2340	5.944
B	0.2380	6.045
C	0.2420	6.147
D	0.2460	6.248
E	0.2500	6.350
F	0.2570	6.528
G	0.2610	6.629
H	0.2660	6.756
I	0.2720	6.909
J	0.2770	7.036
K	0.2810	7.137
L	0.2900	7.366
M	0.2950	7.493
N	0.3020	7.671
O	0.3160	8.026
P	0.3230	8.204
Q	0.3320	8.433
R	0.3390	8.611
S	0.3480	8.839
T	0.3580	9.093
U	0.3680	9.347
V	0.3770	9.576
W	0.3860	9.804
X	0.3970	10.084
Y	0.4040	10.262
Z	0.4130	10.490



STANDARD TOLERANCES AND DEVIATIONS

Ref : IS 919

Diameter Steps in mm		Values of deviations in microns (1 micron = 0.001mm)														
Over	To	d9	d11	e8	e9	f7	f11	g6	h6	h8	h9	h11	h12	h13	h16*	i6
-	3 *	-20	-20	-14	-14	-6	-6	-2	0	0	0	0	0	0	0	+ 4
		-45	-80	-28	-39	-16	-66	-8	-6	-14	-25	-60	-100	-140	-600	-2
3	6	-30	-30	-20	-20	-10	-10	-4	0	0	0	0	0	0	0	+ 6
		-60	-105	-38	-50	-22	-85	-12	-8	-18	-30	-75	-120	-180	-750	-2
6	10	-40	-40	-25	-25	-13	-13	-5	0	0	0	0	0	0	0	+ 7
		-76	-130	-47	-61	-28	-103	-14	-9	-22	-36	-90	-150	-220	-900	-2
10	18	-50	-50	-32	-32	-16	-16	-6	0	0	0	0	0	0	0	+ 8
		-93	-160	-59	-75	-34	-126	-17	-11	-27	-43	-110	-180	-270	-1100	-3
18	30	-65	-65	-40	-40	-20	-20	-7	0	0	0	0	0	0	0	+ 9
		-117	-195	-73	-92	-41	-150	-20	-13	-33	-52	-130	-210	-330	-1300	-4
30	50	-80	-80	-50	-50	-25	-25	-9	0	0	0	0	0	0	0	+ 11
		-142	-240	-89	-112	-50	-185	-25	-16	-39	-62	-160	-250	-390	-1600	-5
50	80	-100	-100	-60	-60	-30	-30	-10	0	0	0	0	0	0	0	+ 12
		-174	-290	-106	-134	-60	-220	-29	-19	-46	-74	-190	-300	-460	-1900	-7
80	120	-120	-120	-72	-72	-36	-36	-12	0	0	0	0	0	0	0	+ 13
		-207	-340	-126	-159	-71	-256	-34	-22	-54	-87	-220	-350	-540	-2200	-9
120	180	-145	-145	-85	-85	-43	-43	-14	0	0	0	0	0	0	0	+ 14
		-245	-395	-148	-185	-83	-293	-39	-25	-63	-100	-250	-400	-630	-2500	-11
180	250	-170	-170	-100	-100	-50	-50	-15	0	0	0	0	0	0	0	+ 16
		-285	-460	-172	-215	-96	-340	-44	-29	-72	-115	-290	-460	-720	-2900	-13

* Upto 1mm, the grade 16 is not given



STANDARD TOLERANCES AND DEVIATIONS

Ref : IS 919

Diameter Steps in mm		Values of deviations in microns (1 micron = 0.001mm)													
Over	To	js4	js10	js11	js12	js14*	js15*	js16*	k11	k12	k16*	m5	m6	C11	H6
-	3*	±1.5	±20	±30	±50	±125	±200	±300	+60	+100	+600	+6	+8	+120	+6
		0	0	0	+2	+2	+60	0							
3	6	±2	±24	±37.5	±60	±150	±240	±375	+75	+120	+750	+9	+12	+145	+8
		0	0	0	+4	+4	+70	0							
6	10	±2	±29	±45	±75	±180	±290	±450	+90	+150	+900	+12	+15	+170	+9
		0	0	0	+6	+6	+80	0							
10	18	±2.5	±35	±55	±90	±215	±350	±550	+110	+180	+1100	+15	+18	+205	+11
		0	0	0	+7	+7	+95	0							
18	30	±3	±42	±65	±105	±260	±420	±650	+130	+210	+1300	+17	+21	+240	+13
		0	0	0	+8	+8	+110	0							
30	50	±3.5	±50	±80	±125	±310	±500	±800	+160	+250	+1600	+20	+25	+250	+16
		0	0	0	+9	+9	0	0							
50	80	±4	±60	±95	±150	±370	±600	±950	+190	+300	+1900	+24	+30	+300	+19
		0	0	0	+11	+11	0	0							
80	120	±5	±70	±110	±175	±435	±700	±1100	+220	+350	+2200	+28	+35	+350	+22
		0	0	0	+13	+13	0	0							
120	180	±6	±80	±125	±200	±500	±800	±1250	+250	+400	+2500	+33	+40	+400	+25
		0	0	0	+15	+15	0	0							
180	250	±7	±92.5	±145	±230	±575	±925	±1450	+290	+460	+2900	+37	+46	+460	+29
		0	0	0	+17	+17	0	0							

* Upto 1mm, the grades 14,15 & 16 are not given

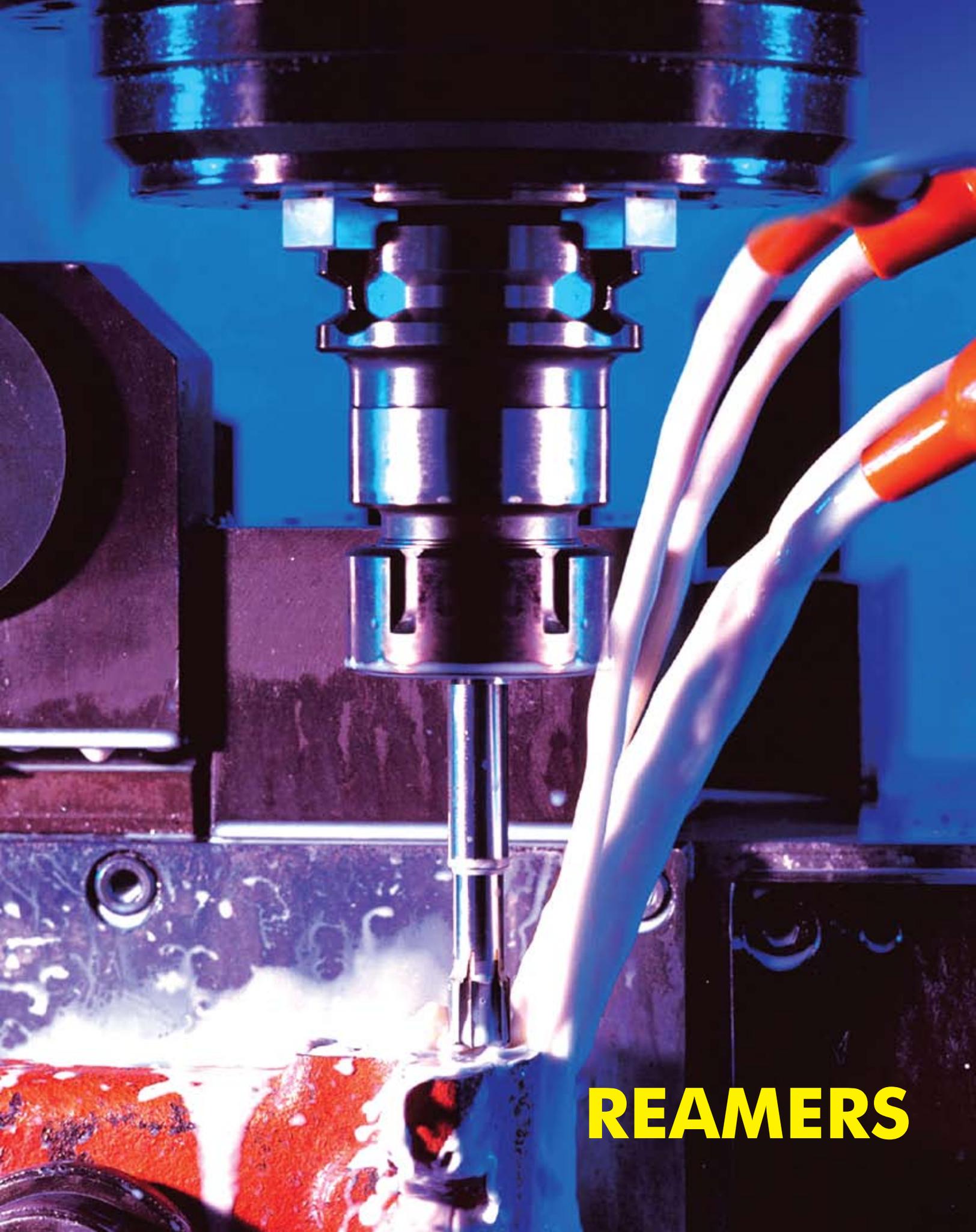


STANDARD TOLERANCES AND DEVIATIONS

Ref : IS 919

Diameter Steps in mm		Values of deviations in microns (1 micron = 0.001mm)											Diameter Steps in mm		
Over	To	H7	H8	H9	H11	H12	H13	H14*	H15*	N9*	N11*	IT16*	Over	To	z9
-	3*	+10 0	+14 0	+25 0	+60 0	+100 0	+140 0	+250 0	+400 0	- 4 - 29	- 4 - 64	600	-	3	+51 +26
3	6	+12 0	+18 0	+30 0	+75 0	+120 0	+180 0	+300 0	+480 0	0 - 30	0 - 75	750	3	6	+65 +35
6	10	+15 0	+22 0	+36 0	+90 0	+150 0	+220 0	+360 0	+580 0	0 - 36	0 - 90	900	6	10	+78 +42
10	18	+18 0	+27 0	+43 0	+110 0	+180 0	+270 0	+430 0	+700 0	0 - 43	0 - 110	1100	10	14	+93 +50
18	30	+21 0	+33 0	+52 0	+130 0	+210 0	+330 0	+520 0	+840 0	0 - 52	0 - 130	1300	14	18	+103 +60
30	50	+25 0	+39 0	+62 0	+160 0	+250 0	+390 0	+620 0	+1000 0	0 - 62	0 - 160	1600	18	24	+125 +73
50	80	+30 0	+46 0	+74 0	+190 0	+300 0	+460 0	+740 0	+1200 0	0 - 74	0 - 190	1900	24	30	+140 +88
80	120	+35 0	+54 0	+87 0	+220 0	+350 0	+540 0	+870 0	+1400 0	0 - 87	0 - 220	2200	30	40	+174 +112
120	180	+40 0	+63 0	+100 0	+250 0	+400 0	+630 0	+1000 0	+1600 0	0 - 100	0 - 250	2500	40	50	+198 +136
180	250	+46 0	+72 0	+115 0	+290 0	+460 0	+720 0	+1150 0	+1850 0	0 - 115	0 - 290	2900	50	65	+246 +172

* Upto 1mm, the grades 14,15, 16, N9 and N11 are not given



REAMERS



A Cut Above the Rest



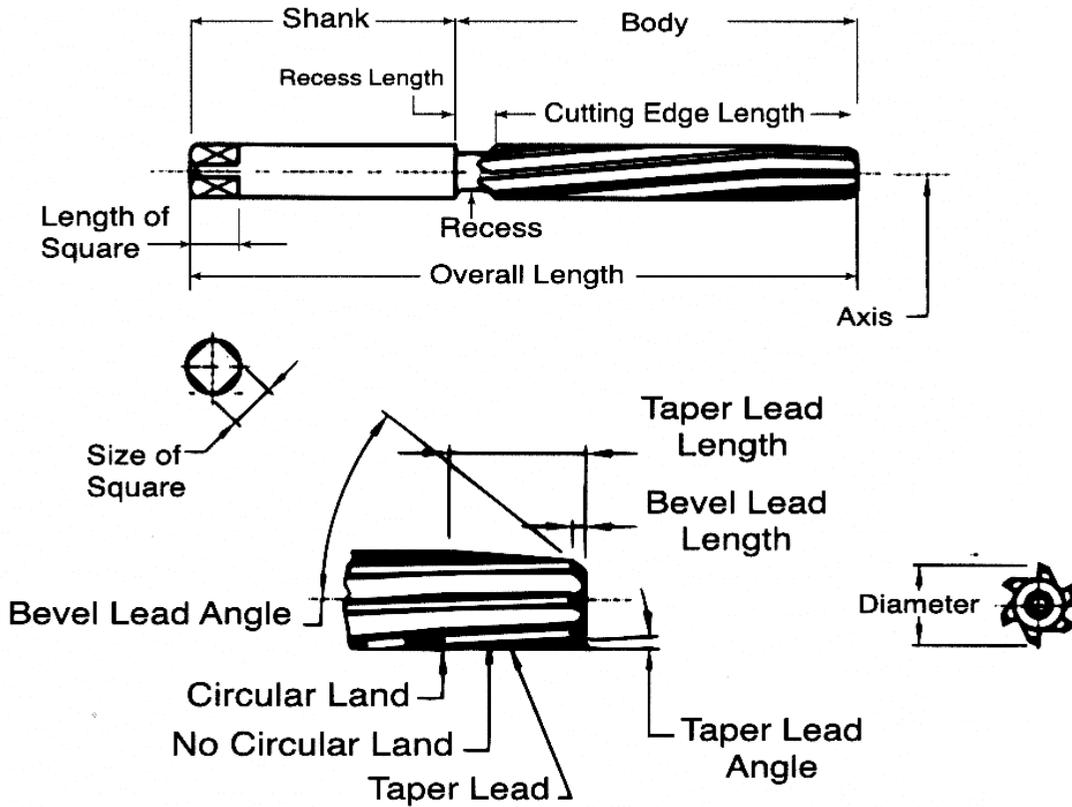
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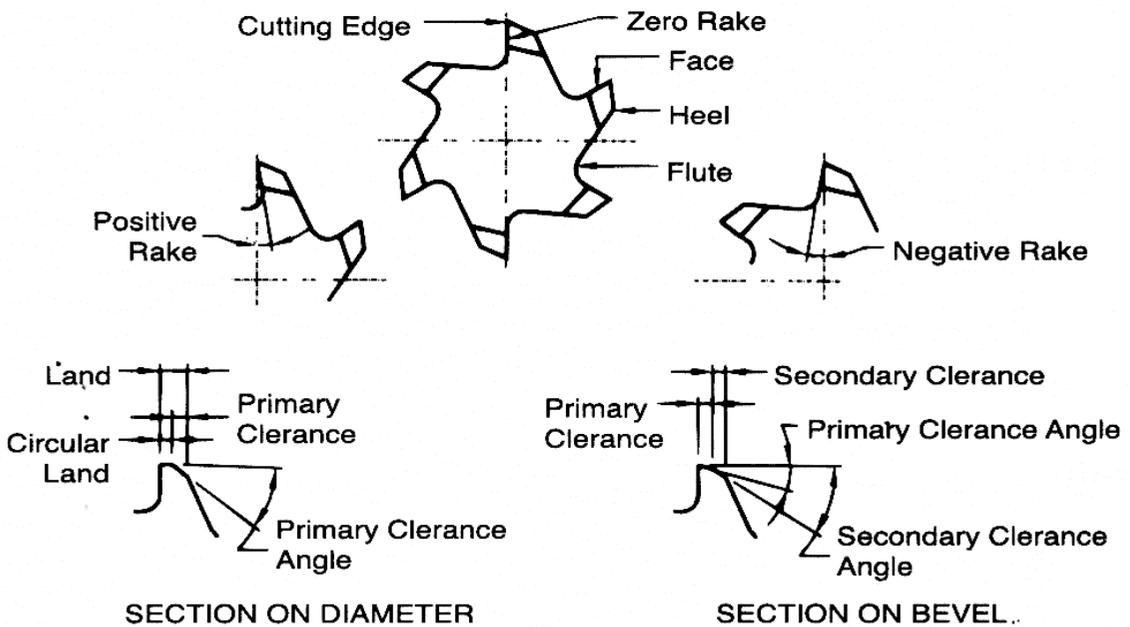


REAMERS - NOMENCLATURE

TERMS RELATING TO REAMERS



TERMS RELATING TO CUTTING GEOMETRY OF REAMERS





High Speed Steel PARALLEL HAND REAMERS

Specifications Conform to :
 IS 5444 - 1978.
 ISO 236/1 - 1976
 DIN 206 - 1979
 BS 328 : Part 4 : 1983.
 Dimensions in mm / Inch



Diameters		Cutting Edge Length	Overall Length
mm	Inch		
3.0	-	31	62
-	1/8	33	66
3.5	-	35	71
4.0	5/32	38	76
4.5	-	41	81
5.0	3/16	44	87
5.5	7/32	47	93
6.0	-	47	93
-	1/4	50	100
7.0	9/32	54	107
8.0	5/16	58	115
9.0	11/32	62	124
10.0	3/8,13/32	66	133
11.0	7/16	71	142
12.0	15/32	76	152
13.0	1/2	76	152
14.0	9/16	81	163
15.0	-	81	163
16.0	5/8	87	175
17.0	-	87	175
18.0	11/16	93	188
19.0	-	93	188

Diameters		Cutting Edge Length	Overall Length
mm	Inch		
20.0	3/4	100	201
21.0	13/16	100	201
22.0	7/8	107	215
23.0	-	107	215
24.0	15/16	115	231
25.0	1	115	231
26.0	-	115	231
27.0	1.1/16	124	247
28.0	1.1/8	124	247
30.0	-	124	247
32.0	1.3/16,1.1/4,1.5/16	133	265
34.0	-	142	284
35.0	1.3/8	142	284
36.0	1.7/16	142	284
38.0	1.1/2	152	305
40.0	-	152	305
42.0	1.5/8	152	305
44.0	1.3/4	163	326
45.0	-	163	326
46.0	-	163	326
48.0	1.7/8	174	347
50.0	2	174	347

A Reamer having virtually parallel cutting edges, with taper & bevel lead integral with a parallel shank of the nominal diameter of the cutting edges, and with a driving square on the end of the shank.

LH Helical flutes for RH cutting shall be supplied unless otherwise specified.



**High Speed Steel
PARALLEL HAND REAMERS**

Specifications Conform to :
 IS 5444 - 1978,
 ISO 236/1 - 1976
 DIN 206 - 1979
 BS 328 : Part 4 : 1983
 Dimensions in mm / Inch



Diameters		Cutting Edge Length	Overall Length
mm	Inch		
52.00	2.1/16	174	347
55.00	2.1/8	184	367
56.00	2.3/16	184	367
58.00	2.1/4	184	367
60.00	2.5/16	184	367
62.00	2.3/8, 2.7/16	194	387
63.00	2.1/2	194	387
67.00	-	194	387
71.00	-	203	406

Tolerance on Reamer diameters is 'm6' for IS, ISO & BS Standards. 'm6' tolerance is expected to produce 'H8' holes. For DIN Standard, Reamer size is to be calculated to suit 'H7' holes.



High Speed Steel LONG FLUTE MACHINE REAMERS

Specifications Conform to
IS 5445 - 1978.
ISO 236/11 - 1976
BS 328 : Part 4 : 1983
Dimensions in mm / Inch



Diameter		Cutting Edge-length	Overall Length	Morse Taper No.
mm	Inch			
3.00	-	31.00	111	1
-	1/8	33.00	113	1
4.00	5/32	38.00	118	1
5.00	3/16	44.00	124	1
6.00	-	47.00	127	1
-	1/4	50.00	130	1
7.00	9/32	54.00	134	1
8.00	5/16	58.00	138	1
9.00	11/32	62.00	142	1
10.00	3/8,13/32	66	146	1
11.00	7/16	71	151	1
12.00	15/32	76	156	1
13.00	1/2	76	156	1
14.00	-	81	161	1
15.00	9/16	81	181	2
16.00	5/8	87	187	2
17.00	-	87	187	2
18.00	11/16	93	193	2
19.00	-	93	193	2
20.00	3/4	100	200	2
21.00	13/16	100	200	2
22.00	7/8	107	207	2
23.00	-	107	207	2
24.00	15/16	115	242	3
25.00	1	115	242	3
26.00	-	115	242	3

Diameter		Cutting Edge length	Overall Length	Morse Taper No.
mm	Inch			
27.00	1.1/16	124	251	3
28.00	1.1/8	124	251	3
30.00	-	124	251	3
-	1.3/16,1.1/4	133	260	3
32.00	1.5/16	133	293	4
34.00	-	142	302	4
35.00	1.3/8	142	302	4
36.00	1.7/16	142	302	4
38.00	1.1/2	152	312	4
40.00	-	152	312	4
42.00	1.5/8	152	312	4
44.00	-	163	323	4
45.00	1.3/4	163	323	4
46.00	-	163	323	4
48.00	1.7/8	174	334	4
50.00	2	174	334	4
52.00	-	174	371	5
55.00	-	184	381	5
56.00	-	184	381	5
58.00	2.1/4	184	381	5
60.00	-	184	381	5
62.00	-	194	391	5
63.00	2.1/2	194	391	5
67.00	-	194	391	5
71.00	-	203	400	5
-	3	212	409	5

A Reamer having virtually parallel cutting edges, with bevel lead, integral with a Morse Taper Shank

LH Helical Flutes for RH Cutting shall be supplied unless otherwise specified.
Reamers with 'm' tolerance are expected to produce 'H8' Holes



**High Speed Steel
MACHINE JIG REAMERS**

Specifications Conform to
IS 11002 - 1984.
Dimensions in mm



Diameter m6	Cutting Edge Length	Overall Length	Morse Taper No.
mm			
6.0	26	138	1
7.0	31	150	1
8.0	33	156	1
9.0	36	162	1
10.0	38	168	1
11.0	41	175	1
12.0	44	182	1
13.0	44	182	1
14.0	47	189	1
15.0	50	204	2
16.0	52	210	2
17.0	54	214	2
18.0	56	219	2
19.0	58	223	2
20.0	60	228	2
22.0	64	237	2
24.0	68	268	3

Diameter m6	Cutting Edge Length	Overall Length	Morse Taper No.
mm			
25.0	68	268	3
26.0	70	273	3
28.0	71	277	3
30.0	73	281	3
32.0	77	317	4
34.0	78	321	4
35.0	78	321	4
36.0	79	325	4
38.0	81	329	4
40.0	81	329	4
42.0	82	333	4
44.0	83	336	4
45.0	83	336	4
46.0	84	340	4
48.0	86	344	4
50.0	86	344	4

A Reamer having short, virtually parallel, cutting edges with bevel lead and a guide between the shank and cutting edges, integral with a Morse Taper Shank.

LH Helical Flutes for RH Cutting shall be supplied unless otherwise specified.
Reamers with 'm6' tolerance are expected to produce 'H8' Holes.



High Speed Steel MACHINE JIG REAMERS

Specifications Conform to:
BS 122 : Part 2 : 1964
Dimensions in mm/Inch



Diameter m6	Cutting Edge Length	Overall Length	Morse Taper No
1/4	7/8	5.5/8	1
5/16	1	5.15/16	1
3/8	1.1/8	6.1/4	1
7/16	1.5/16	6.11/16	1
1/2	1.5/16	6.11/16	1
9/16	1.1/2	7.13/16	2
5/8	1.1/2	7.13/16	2
11/16	1.3/4	8.7/16	2
3/4	1.3/4	8.7/16	2
13/16	1.3/4	8.7/16	2
7/8	2	8.7/8	2
15/16	2	9.15/16	3
1	2	9.15/16	3

Diameter m6	Cutting Edge Length	Overall Length	Morse Taper No
1.1/6	2.3/8	10.3/4	3
1.1/8	2.3/8	10.3/4	3
1.3/16	2.3/8	10.3/4	3
1.1/4	2.3/8	10.3/4	3
1.5/16	2.3/8	12	4
1.3/8	2.3/4	13.1/8	4
1.7/16	2.3/4	13.1/8	4
1.1/2	2.3/4	13.1/8	4
1.5/8	2.3/4	13.1/8	4
1.3/4	3.1/8	14.5/16	4
1.7/8	3.1/8	14.5/16	4
2	3.1/8	14.5/16	4

LH Helical Flutes for RH Cutting shall be supplied unless otherwise specified.
Reamers with 'm6' tolerance are expected to produce 'H8' Holes.



**High Speed Steel
CHUCKING REAMERS WITH
PARALLEL SHANK**

Specifications Conform to:
 IS 5446 - 1978
 ISO 521 - 1975
 BS 328 : Part 4 : 1983
 DIN 212 : Part 1 : 1979 (Type A)
 DIN 212 : Part 2 : 1981 (Type C)
 Dimensions in mm / Inch



Diameter		Dia of Shank	Cutting Edge Length	Overall Length
mm	inch			
3.0	-	3.0	15	61
-	1/8	3.175	16	65
3.2	-	3.2	16	65
3.5	-	3.5	18	70
4.0	5/32	4.0	19	75
4.5	-	4.5	21	80
5.0	3/16	5.0	23	86
5.5	7/32	5.6	26	93
6.0	-	5.6	26	93
-	1/4	6.3	28	101
7.0	9/32	7.1	31	109
8.0	5/16	8.0	33	117

Diameter		Dia of Shank	Cutting Edge Length	Overall Length
mm	inch			
9.0	11/32	9.0	36	125
10.0		10.0	38	133
11.0	7/16	10.0	41	142
12.0	15/32	10.0	44	151
13.0	1/2	10.0	44	151
14.0	-	12.5	47	160
15.0	9/16	12.5	50	162
16.0	5/8	12.5	52	170
17.0	-	14.0	54	175
18.0	-	14.0	56	182
19.0	-	16.0	58	189
20.0	-	16.0	60	195

Tolerance on Reamer diameter is 'm6' for IS, ISO & BS Standards. 'm6' tolerances is expected to produce 'H8' Holes. For DIN standard, Reamer size is to be calculated to suit 'H7' holes.

A reamer having short, virtually parallel cutting edges, with bevel lead, integral with a parralel shank.

Straight Flutes for RH Cutting shall be supplied unless otherwise specified.



High Speed Steel CHUCKING REAMERS WITH TAPER SHANK

Specifications Conform to
IS 5447 - 1978
ISO 521 : 1975
DIN 208 : 1981 (TYPE A)
BS 328 : Part 4 : 1983
Dimensions in mm / Inch



Diameter		Cutting Edge length	Overall Length	Morse Taper No
mm	inch			
3.0	-	15	122	1
3.2	-	16	124	1
3.5	-	18	126	1
4.0	5/32	19	128	1
4.5	-	21	130	1
5.0	3/16	23	133	1
5.5	-	26	138	1
6.0	-	26	138	1
-	1/4	28	144	1
7.0	-	31	150	1
8.0	5/16	33	156	1
9.0	-	36	162	1
10.0	3/8	38	168	1
11.0	7/16	41	175	1
12.0	-	44	182	1
13.0	1/2	44	182	1
14.0	-	47	189	1
15.0	9/16	50	204	2
16.0	5/8	52	210	2
17.0	-	54	214	2
18.0	11/16	56	219	2
19.0	-	58	223	2

Diameter		Cutting Edge length	Overall Length	Morse Taper No
mm	inch			
20.0	3/4	60	228	2
-	13/16	62	232	2
22.0	7/8	64	237	2
24.0	15/16	68	268	3
25.0	-	68	268	3
26.0	1	70	273	3
28.0	1,1/16	71	277	3
30.0	1,1/8	73	281	3
-	1,3/16	75	285	3
-	1,1/4	77	290	3
32.0	1,5/16	77	317	4
34.0	-	78	321	4
35.0	1,3/8	78	321	4
36.0	1,7/16	79	325	4
38.0	1,1/2	81	329	4
40.0	-	81	329	4
42.0	1,5/8	82	333	4
44.00	-	83	336	4
45.00	1,3/4	83	336	4
46.00	-	84	340	4
48.00	1,7/8	86	344	4
50.00	2	86	344	4

Tolerance on Reamers is 'm6' for IS, ISO & BS Standards. 'm6' tolerances is expected to produce H8' Holes. For DIN standard, Reamer size is to be calculated to suit 'H7' holes.

A reamer with short, virtually parallel cutting edges, with bevel lead & along body recess between shank and cutting edges integral with Morse Taper Shank.

Straight Flutes for RH Cutting shall be supplied unless otherwise specified.



High Speed Steel SHELL REAMERS

Specifications Conform to:
IS 5926 - 1970
ISO 2402 - 1972
DIN 219 - 1981 (TYPE A)
Dimensions in mm



Diameter	Large End Dia of Taper Bore	Cutting Edge Length	Overall Length
21	10	28	40
22	10	28	40
23	10	28	40
24	13	32	45
25	13	32	45
26	13	32	45
27	13	32	45
28	13	32	45
29	13	32	45
30	13	32	45
31	16	36	50
32	16	36	50
33	16	36	50
34	16	36	50
35	16	36	50
36	19	40	56
37	19	40	56
38	19	40	56
39	19	40	56
40	19	40	56
41	19	40	56
42	19	40	56

Diameter	Large End Dia of Taper Bore	Cutting Edge Length	Overall Length
43	22	45	63
44	22	45	63
45	22	45	63
46	22	45	63
47	22	45	63
48	22	45	63
49	22	45	63
50	22	45	63
51	27	50	71
52	27	50	71
53	27	50	71
54	27	50	71
55	27	50	71
56	27	50	71
57	27	50	71
58	27	50	71
59	27	50	71
60	27	50	71
61	32	56	80
62	32	56	80
63	32	56	80
64	32	56	80

A short reamer with an axial taper hole generally 1:30 with a cross slot for use on an arbor, and having parallel cutting edges with bevel lead.

Reamers shall be supplied for Right Hand cutting with straight flutes unless otherwise specified



High Speed Steel SHELL REAMERS

Specifications Conform to
IS 5926 - 1970.
ISO 2402 - 1972
DIN 219 - 1981 (TYPE A)
Dimensions in mm.



Diameter	Large End Dia of Taper Bore.	Cutting Edge Length	Overall Length
65	32	56	80
66	32	56	80
67	32	56	80
68	32	56	80
69	32	56	80
70	32	56	80
71	32	56	80
72	40	63	90
73	40	63	90
74	40	63	90
75	40	63	90
76	40	63	90
77	40	63	90
78	40	63	90
79	40	63	90
80	40	63	90
81	40	63	90
82	40	63	90

Diameter	Large End Dia of Taper Bore.	Cutting Edge Length	Overall Length
83	40	63	90
84	40	63	90
85	40	63	90
86	50	71	100
87	50	71	100
88	50	71	100
89	50	71	100
90	50	71	100
91	50	71	100
92	50	71	100
93	50	71	100
94	50	71	100
95	50	71	100
96	50	71	100
97	50	71	100
98	50	71	100
99	50	71	100
100	50	71	100

Tolerance on Reamer diameter is 'm6' for IS & ISO standards. 'm6' tolerance is expected to produce 'H8' holes. For DIN standard, Reamer size is to be calculated to suit 'H7' holes.



**High Speed Steel
SHELL REAMERS**

Specifications Conform to :
BS328 : Part 4 : 1983
Dimensions in Inches.



Diameter m6	Cutting Edge Length	Overall Length	Diameter* of large End of Taper Bore
1	2.1/4	2.3/4	0.625
1.1/16	2.1/4	2.3/4	0.625
1.1/8	2.1/4	2.3/4	0.625
1.3/16	2.1/4	2.3/4	0.625
1,1/4	2.1/4	2.3/4	0.625
1.5/16	2.3/8	3	0.750
1.3/8	2.3/8	3	0.750
1.7/16	2.3/8	3	0.750
1.1/2	2.3/8	3	0.750
1.9/16	2.3/8	3	0.750
1.5/8	2.3/8	3	0.750
1.11/16	2.3/4	3.1/2	1.000
1.3/4	2.3/4	3.1/2	1.000
1.13/16	2.3/4	3.1/2	1.000
1.7/8	2.3/4	3.1/2	1.000
1.15/16	2.3/4	3.1/2	1.000
2	2.3/4	3.1/2	1.000
2.1/16	3	3.3/4	1.250
2.1/8	3	3.3/4	1.250

Diameter m6	Cutting Edge Length	Overall Length	Diameter* of large End of Taper Bore
2.3/16	3	3.3/4	1.250
2.1/4	3	3.3/4	1.250
2.5/16	3	3.3/4	1.250
2.3/8	3	3.3/4	1.250
2.7/16	3	3.3/4	1.250
2.1/2	3.1/4	4	1.500
2.5/8	3.1/4	4	1.500
2.3/4	3.1/4	4	1.500
2.7/8	3.1/4	4	1.500
3	3.1/4	4	1.500
3.1/8	3.3/4	4.1/2	1.750
3.1/4	3.3/4	4.1/2	1.750
3.3/8	3.3/4	4.1/2	1.750
3.1/2	3.3/4	4.1/2	1.750
3.5/8	4.1/4	5	2.000
3.3/4	4.1/4	5	2.000
3.7/8	4.1/4	5	2.000
4	4.1/4	5	2.000

* Taper of the bore is 1/8 inch per foot on diameter.

Reamers shall be supplied for Right Hand cutting with Left Hand Helical flutes unless otherwise specified. Reamers with 'm6' tolerance are expected to produce 'H8' Holes.



High Speed Steel SHELL CORE DRILLS

Specifications Conform to :
IS 7772 - 1975
ISO 3314 - 1975
DIN 222 - 1981
Dimensions in mm.



Diameter h8	Dia of Large end of Taper Bore	Overall Length
25	13	45
26	13	45
27	13	45
28	13	45
29	13	45
30	13	45
31	13	45
32	13	45
33	13	45
34	13	45
35	13	45
36	16	50
37	16	50
38	16	50
39	16	50
40	16	50
42	16	50
44	16	50
45	16	50

Diameter h8	Dia of Large end of Taper Bore	Overall Length
46	19	56
47	19	56
48	19	56
50	19	56
52	19	56
55	22	63
58	22	63
60	22	63
62	22	63
65	27	71
70	27	71
72	27	71
75	27	71
80	32	80
85	32	80
90	32	80
95	40	90
100	40	90

A Short Shell core drill with an axial taper hole generally 1 : 30 with cross slot for use on an arbor, the bevelled lead being provided with clearance for cutting purposes.

RH Helical flutes for RH Cutting shall be supplied unless otherwise specified



**High Speed Steel
SHELL DRILLS**

Specifications Conform to :
BS 122 : Part 2 : 1964
Dimensions in Inches



Diameter h8	Cutting Edge length	Overall Length	Diameter* of large end of Taper bore	Diameter h8	Cutting Edge length	Overall Length	Diameter* of large end of Taper bore
1	2.1/4	2.3/4	0.625	2.3/16	3	3.3/4	1.250
1.1/16	2.1/4	2.3/4	0.625	2.1/4	3	3.3/4	1.250
1.1/8	2.1/4	2.3/4	0.625	2.5/16	3	3.3/4	1.250
1.3/16	2.1/4	2.3/4	0.625	2.3/8	3	3.3/4	1.250
1.1/4	2.1/4	2.3/4	0.625	2.7/16	3	3.3/4	1.250
1.5/16	2.3/8	3	0.750	2.1/2	3.1/4	4	1.500
1.3/8	2.3/8	3	0.750	2.5/8	3.1/4	4	1.500
1.7/16	2.3/8	3	0.750	2.3/4	3.1/4	4	1.500
1.1/2	2.3/8	3	0.750	2.7/8	3.1/4	4	1.500
1.9/16	2.3/8	3	0.750	3	3.1/4	4	1.500
1.5/8	2.3/8	3	0.750	3.1/8	3.3/4	4.1/2	1.750
1.11/16	2.3/4	3.1/2	1.000	3.1/4	3.3/4	4.1/2	1.750
1.3/4	2.3/4	3.1/2	1.000	3.3/8	3.3/4	4.1/2	1.750
1.13/16	2.3/4	3.1/2	1.000	3.1/2	3.3/4	4.1/2	1.750
1.7/8	2.3/4	3.1/2	1.000	3.5/8	4.1/4	5	2.000
1.15/16	2.3/4	3.1/2	1.000	3.3/4	4.1/4	5	2.000
2	2.3/4	3.1/2	1.000	3.7/8	4.1/4	5	2.000
2.1/16	3	3.3/4	1.250	4	4.1/4	5	2.000
2.1/8	3	3.3/4	1.250				

* Taper of the bore is 1/8 inch per foot on diameter.

RH Helical flutes for RH Cutting shall be supplied unless otherwise specified.



High Speed Steel PARALLEL SHANK HAND SOCKET REAMERS

Specifications Conform to :
BS 328 : Part 4 : 1983
IS 5882 - 1970
Dimensions in mm



Designation	Cutting Edge length	Overall Length	Dia. of Shank
Morse No.0	61	93	8
Morse No.1	66	102	10
Morse No.2	79	121	14
Morse No.3	96	146	20

Designation	Cutting Edge length	Overall Length	Dia. of Shank
Morse No.4	119	179	25.0
Morse No.5	150	222	31.5
Morse No.6	208	300	45.0

Roughing Reamers shall be supplied with RH Helix and RH cutting with nicking.
Finishing Reamers shall be supplied with LH helix and RH cutting without nicking.



High Speed Steel TAPER SHANK MACHINE SOCKET REAMERS

Specifications Conform to:
BS 328 : Part 4 : 1983
IS 5907 - 1970
Dimensions in mm



Designation	Cutting Edge Length	Overall Length	Morse Taper No.
Morse No.0	61	137	1
Morse No.1	66	142	1
Morse No.2	79	173	2
Morse No.3	96	212	3

Designation	Cutting Edge Length	Overall Length	Morse Taper No.
Morse No.4	119	263	4
Morse No.5	150	331	5
Morse No.6	208	389	5

Roughing Reamers shall be supplied with RH Helix and RH cutting with nicking.
Finishing Reamers shall be supplied with LH helix and RH cutting without nicking.



**High Speed Steel
HAND TAPER PIN REAMERS**

Specifications Conform to :
IS 5881 - 1984
ISO 3465 - 1975
DIN 9 - 1975
Dimensions in mm



Nom. Diameter	Cutting Edge Length	Overall Length
3	58	80
4	68	93
5	73	100
6	105	135
8	145	180
10	175	215
12	210	255

Nom. Diameter	Cutting Edge Length	Overall Length
16	230	280
20	250	310
25	300	370
30	320	400
40	340	430
50	360	460

A reamer having tapered cutting edges for holes to suit pins with a taper of 1:50 on diameter integral with a parallel shank with driving square at the end.

Reamers with straight flutes and RH cutting shall be supplied unless otherwise specified.



High Speed Steel HAND TAPER PIN REAMERS

Specifications Conform to :
BS 328 : Part 4 : 1983
Dimensions in Inch.



Nom. Diameter	Cutting Edge Length	Overall Length	Large End Dia. and Dia. of Shank	Small End Dia.
1/8	1.3/4	2.3/4	0.127	0.0905
9/64	1.7/8	2.7/8	0.143	0.1039
5/32	2	3	0.158	0.1163
11/64	2.1/4	3.1/2	0.174	0.1271
3/16	2.3/4	4	0.195	0.1377
7/32	2.3/4	4	0.220	0.1627
1/4	3.3/8	4.5/8	0.253	0.1827
9/32	4.1/8	5.5/8	0.292	0.2061
5/16	4.1/8	5.5/8	0.316	0.2301
11/32	4.1/2	6	0.347	0.2533
3/8	5	6.1/2	0.381	0.2768
13/32	5.3/4	7.1/2	0.412	0.2922
7/16	5.3/4	7.1/2	0.443	0.3232
1/2	6.1/2	8.1/4	0.506	0.3706
9/16	6.3/4	8.1/2	0.571	0.4304
5/8	7.1/2	9.1/4	0.633	0.4768
3/4	8.3/4	10.3/4	0.760	0.5777
7/8	9.1/2	12	0.885	0.6871

Taper on diameter 1 in 48.

Straight flutes for RH cutting shall be supplied unless otherwise specified



**High Speed Steel
MACHINE TAPER PIN REAMERS**

Specifications Conform to:
IS 5918 - 1984
ISO 3467 - 1975
DIN 2180 - 1975
Dimensions in mm



Nom. Diameter	Cutting Edge length	Overall Length	Morse Taper No.
3	58	140	1
4	68	150	1
5	73	155	1
6	105	187	1
8	145	227	1
10	175	257	1
12	210	315	2

Nom. Diameter	Cutting Edge length	Overall Length	Morse Taper No.
16	230	335	2
20	250	377	3
25	300	427	3
30	320	475	4
40	340	495	4
50	360	550	5

Nom. Diameter 3 & 4 are not covered in IS, ISO & DIN standard

A reamer having tapered cutting edges for holes to suit pins with a taper of 1:50 on diameter integral with a Morse Taper Shank.

LH Helical flutes for RH Cutting shall be supplied unless otherwise specified



High Speed Steel MACHINE TAPER PIN REAMERS

Specifications Conform to :
BS 328 : Part 4 : 1983
Dimensions in Inches



Nom. Diameter	Cutting Edge Length	Overall length	Large End Dia.	Small End Dia.	Morse Taper No.
3/16	3.1/8	6.1/16	0.199	0.1337	1
7/32	3.3/16	6.1/8	0.225	0.1581	1
1/4	3.7/8	6.13/16	0.258	0.1775	1
9/32	4.5/8	7.5/8	0.297	0.2009	1
5/16	4.5/8	7.5/8	0.321	0.2249	1
11/32	5.3/32	8.3/32	0.353	0.2471	1
3/8	5.13/16	8.7/8	0.389	0.2683	1
13/32	6.9/16	9.5/8	0.420	0.2837	1
7/16	6.11/16	9.3/4	0.453	0.3134	1
1/2	7.7/16	10.1/2	0.516	0.3608	1
9/16	7.3/4	11.1/2	0.581	0.4200	2
5/8	8.1/2	12.1/4	0.643	0.4664	2
3/4	9.3/4	13.1/2	0.770	0.5673	2
7/8	10.1/2	14.1/4	0.895	0.6767	2

Taper on diameter 1 : 48

Left Hand Helical flutes for Right Hand Cutting shall be supplied unless otherwise specified.



High Speed Steel MACHINE BRIDGE REAMERS

Specifications Conform to:
 IS 5919 - 1978
 ISO 2238 - 1972
 DIN 311 - 1975
 BS 328 : Part 4 : 1983
 Dimensions in mm / inch



Diameter k11		Cutting Edge Length	Overall Length	Morse Taper No.
mm	inch			
6.4	1/4	75	151	1
7.4	—	80	156	1
8.4	5/16	85	161	1
9.4	—	90	166	1
10.0	3/8	95	171	1
11.0	7/16	100	176	1
11.5	—	100	176	1
12.0	—	105	199	2
13.0	1/2	105	199	2
13.5	—	115	209	2
14.0	—	115	209	2
15.0	9/16	125	219	2
—	5/8	135	229	2
17.0	—	135	251	3
17.5	—	145	261	3
18.0	—	145	261	3
19.0	11/16	145	261	3
20.0	3/4	155	271	3
21.0	13/16	155	271	3
21.5	—	165	281	3
22.0	—	165	281	3
23.0	7/8	165	281	3
23.5	—	165	281	3
24.0	15/16	180	296	3
25.0	—	180	296	3
26.0	1	180	296	3
27.0	1.1/16	195	311	3
28.0	—	195	311	3
29.0	1.1/8	195	311	3
30.0	—	195	311	3
31.0	1.3/16	210	326	3
32.0	1.1/4	210	354	4
33.0	1.5/16	210	354	4
34.0	—	220	364	4
35.0	1.3/8	220	364	4
36.0	1.7/16	220	364	4
37.0	—	220	364	4
40.0	1.1/2	230	374	4
43.0	—	240	384	4
49.0	—	250	394	4

A reamer having parallel cutting edges with a long taper lead, integral with a Morse Taper Shank

LH Helical flutes for RH Cutting shall be supplied unless otherwise specified



**High Speed Steel
CENTRE REAMERS**
(Included Angle 60° or 90°)

Specifications Conform to :
BS 122 : Part 2 : 1964
Dimensions in Inches



Body Diameter	Overall Length	Length of Shank	Diameter of Shank
1/4	1.1/2	3/4	3/16
3/8	1.3/4	7/8	1/4
1/2	2	1	3/8
5/8	2.1/4	1	3/8
3/4	2.5/8	1.1/4	1/2

A cutter with teeth on the conical cutting face, integral with a parallel shank, designed for reaming a preformed centre or for producing a conical seating



**High Speed Steel
COUNTERBORES WITH MORSE TAPER
SHANKS AND DETACHABLE PILOTS**

Specifications Conform to:
IS 5710 - 1988
ISO 4207 - 1977
DIN 375 - 1975
Dimensions in mm.



Diameter z9	Cutting Edge Length	Over all Length	Morse Taper No.	Pilot Diameter
13.5	22	132	2	5.0 to 11.2
14.5	22	132	2	5.0 to 12.5
16.5	25	140	2	6.3 to 14.0
17.5	25	140	2	6.3 to 14.0
19.5	25	140	2	6.3 to 16.0
20.0	25	140	2	6.3 to 18.0
22.0	30	150	2	8.0 to 18.0
23.0	30	150	2	8.0 to 20.0
25.0	30	150	2	8.0 to 22.4
26.0	35	180	3	10.0 to 22.4
28.0	35	180	3	10.0 to 22.4
29.0	35	180	3	10.0 to 25.0
31.0	35	180	3	10.0 to 25.0
33.0	40	190	3	12.5 to 28.0
34.0	40	190	3	12.5 to 28.0

Diameter z9	Cutting Edge Length	Over all Length	Morse Taper No.	Pilot Diameter
36	40	190	3	12.5 to 31.5
37	40	190	3	12.5 to 31.5
39	40	190	3	12.5 to 31.5
41	50	236	4	16.0 to 35.5
43	50	236	4	16.0 to 35.5
46	50	236	4	16.0 to 40.0
48	50	236	4	16.0 to 40.0
51	63	250	4	20.0 to 40.0
53	63	250	4	20.0 to 45.0
55	63	250	4	20.0 to 45.0
57	63	250	4	20.0 to 50.0
59	63	250	4	20.0 to 50.0
61	63	250	4	20.0 to 50.0
63	63	250	4	20.0 to 56.0

A cutter with teeth on the periphery and the end, integral with a Morse Taper Shank, and having a detachable pilot. The cutter is intended for producing a flat seating for the accomodation of the head of a bolt set screw etc. and is located by means of the pilot with relation to a centre hole.



High Speed Steel COUNTER BORES

Specifications Conform to:
BS 122 : Part 2 : 1964
Dimensions in Inch



Diameter	Cutting Edge Length	Overall Length	Morse Taper No.	Pilot Dia.
1/4	3/8	3.3/4	1	1/8
5/16	7/16	4	1	3/16
3/8	1/2	4.1/4	1	7/32
7/16	5/8	4.1/2	1	1/4
1/2	3/4	4.3/4	1	5/16
9/16	13/16	5.3/8	2	3/8
5/8	7/8	5.5/8	2	7/16
11/16	15/16	5.7/8	2	7/16
3/4	1	5.15/16	2	1/2
13/16	1.1/16	6.3/16	2	9/16
7/8	1.1/8	6.7/16	2	5/8
15/16	1.1/4	7.7/16	3	5/8
1	1.3/8	7.1/2	3	3/4
1.1/8	1.1/2	7.3/4	3	3/4
1.1/4	1.5/8	8	3	3/4
1.3/8	1.3/4	9	4	13/16
1.1/2	1.7/8	9	4	7/8
1.5/8	2	9	4	15/16
1.3/4	2.1/8	9	4	1
1.7/8	2.1/4	9	4	1.1/8
2	2.1/2	9	4	1.1/4

Counterbores of size upto and including 1/2" dia are supplied with solid pilot.

Tolerance on dia. of counterbores:

Sizes from 1/4" upto & including 3/4" = + 0.010"/+0.005"

Over 3/4" upto & including 2" = +0.015"/+0.010"



**High Speed Steel
COUNTER BORES WITH
PARALLEL SHANKS AND SOLID PILOTS**

Specifications Conform to:
IS 5704 - 1988
ISO 4206 - 1977
DIN 373 - 1975
Dimensions in mm



Diameter z9	Dia.of Shank h9	Cutting Edge Length	Overall Length
6	5	14	71
7	5	14	71
8	5	14	71
9	8	18	80
10	8	18	80
11	8	18	80
12	8	18	80
12.5	8	18	80

Diameter z9	Dia.of Shank h9	Cutting Edge Length	Overall Length
13	12.5	22	100
14	12.5	22	100
15	12.5	22	100
16	12.5	22	100
17	12.5	22	100
18	12.5	22	100
19	12.5	22	100
20	12.5	22	100

Pilot Diameter: To be specified to suit pilot hole diameter when ordering. (minimum possible pilot diameter is equal to 1/3rd of counter bore diameter.) Tolerance on pilot diameter is e8

A cutter with teeth on the periphery and end, integral with a parallel shank, and having a pilot. The cutter is intended for producing a flat seating for the accommodation of the head of a bolt set screw etc. and is located by means of the pilot with relation to a centre hole.



**High Speed Steel
COUNTER SINKS 90° WITH
PARALLEL SHANKS AND
SOLID PILOTS**

Specifications Conform to :
IS 5693 - 1988
ISO 4205 - 1977
DIN 1866 - 1975
Dimensions in mm



Diameter z9	Dia.of Shank h9	Cutting Edge Length	Over all Length
10.0	8.0	18	80
11.0	8.0	18	80
12.0	8.0	18	80
12.5	8.0	18	80
13.0	12.5	22	100
14.0	12.5	22	100
15	12.5	22	100
16	12.5	22	100
17	12.5	22	100
18	12.5	22	100
19	12.5	22	100
20	12.5	22	100

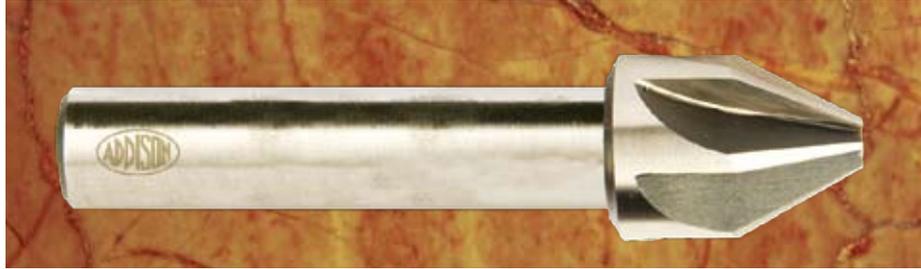
Pilot Diameter: To be specified to suit pilot hole diameter when ordering. (minimum possible pilot diameter is equal to 1/3rd of counter sink diameter) Tolerance on pilot diameter is e8

A cutter with teeth on conical cutting faces, integral with a parallel shank, designed to produce a conical seating to accommodate the conical head of a component such as screw or rivet.



**High Speed Steel
COUNTER SINKS 60°, 90° AND 120°
WITH PARALLEL SHANK**

Specifications Conform to :
IS 13304 - 1992
ISO 3294 - 1975
BS 328 : Part 5 : 1983
Dimensions in mm



Nominal Size	Small Dia.	Overall Length		Body Length		Shank Dia. h9
		$\alpha = 60^\circ$	$\alpha = 90^\circ \text{ \& } 120^\circ$	$\alpha = 60^\circ$	$\alpha = 90^\circ \text{ \& } 120^\circ$	
8.0	1.6	48	44	-	-	8
10.0	2.0	50	46	18	14	8
12.5	2.5	52	48	20	16	8
16.0	3.2	60	56	24	20	10
20.0	4.0	64	60	28	24	10
25.0	7.0	69	65	33	29	10

A cutter with teeth on the conical cutting faces, integral with a parallel shank designed to produce a conical seating to accommodate the conical head of a component such as screw or rivet.

R.H. cutting with straight teeth shall be supplied unless otherwise specified.



**High Speed Steel
COUNTER SINKS 60°, 90° AND 120°
WITH MORSE TAPER SHANK**

Specifications Conform to :
IS 13303 - 1992
ISO 3293 - 1975
BS 328 : Part 5 : 1983
Dimensions in mm



Nominal size	Small Dia.	Overall Length		Body Length		Morse Taper No.
		$\alpha=60^\circ$	$\alpha=90^\circ&120^\circ$	$\alpha=60^\circ$	$\alpha=90^\circ \& 120^\circ$	
16.0	3.2	97	93	24	20	1
20.0	4.0	120	116	28	24	2
25.0	7.0	125	121	33	29	2
31.5	9.0	132	124	40	32	2
40.0	12.5	160	150	45	35	3
50.0	16.0	165	153	50	38	3
63.0	20.0	200	185	58	43	4
80.0	25.0	215	196	73	54	4

A cutter with teeth on conical cutting faces, integral with a Morse Taper Shank designed to produce a conical seating to accommodate the conical head of a component such as screw or rivet.

R.H. cutting with straight teeth shall be supplied unless otherwise specified.



**High Speed Steel
COUNTER SINKS WITH TAPER SHANKS**
Included Angle 60° or 90°

Specifications Conform to :
BSS 122 : Part 2 : 1964
Dimensions in Inches



Body Diameter	Overall length	Small Diameter	Morse Taper No.
1/2	3.1/2	5/32	1
5/8	3.5/8	3/16	1
3/4	4.1/4	1/4	2
7/8	4.1/4	9/32	2
1	4.3/8	5/16	2
1.1/8	4.1/2	3/8	2
1.1/4	5.3/8	13/32	3
1.3/8	5.3/8	7/16	3
1.1/2	5.1/2	1/2	3
1.3/4	6.3/4	9/16	4
2	7	21/32	4
2.1/4	7.1/4	3/4	4
2.1/2	7.3/4	13/16	4
2.3/4	8	7/8	4
3	8.1/4	1	4

Tolerance on Body dia:

Sizes upto and incl. 1" = - 0.001" / - 0.003"

Over 1" = - 0.002" / - 0.005"

RH Cutting with straight flutes shall be supplied unless otherwise specified.



High Speed Steel COUNTER SINKS 60°

Specifications Conform to :
DIN 334 - 1979
Dimensions in mm

Form 'A' - Straight Shank



Nominal Size	Shank dia.	Small end dia.	Overall Length	Body Length
8.0	-	-	50	-
12.5	8	2.0	50	18
16.0	10	3.2	60	24
20.0	10	5.0	63	27

Form 'B' - Morse Taper Shank



Nominal Size	Small end dia.	Overall Length	Body Length	Morse TaperNo.
16.0	3.2	100	24	1
25.0	7.0	125	33	2
31.5	9.0	132	40	2
40.0	12.0	160	45	3
50.0	16.0	170	50	3
63.0	20.0	200	58	4
80.0	25.0	215	73	4

R.H. Cutting with straight teeth shall be supplied unless otherwise specified.



**High Speed Steel
COUNTER SINKS 60°**

Specifications Conform to :
DIN 334 - 1979
Dimensions in mm.

Form 'C' - Straight Shank with 3 cutting edges



Nominal Size	Shank dia.	Small end dia.	Overall Length	Body Length
6.3	5	1.6	45	6.3
8.0	6	2.0	50	8.0
12.5	8	3.2	56	11.2
16.0	10	4.0	63	14.0
20.0	10	5.0	67	17.0
25.0	10	6.3	71	20.0

Form 'D' - Morse Taper Shank 3 cutting edges



Nominal Size	Small end dia	Overall Length	Body Length	Morse Taper No.
16.0	4.0	90	14.0	1
20.0	5.0	106	17.0	2
25.0	6.3	112	20.0	2
31.5	10.0	118	22.4	2
40.0	12.5	150	28.0	3
50.0	16.0	160	35.5	3
63.0	20.0	190	42.5	4
80.0	25.0	200	53.0	4

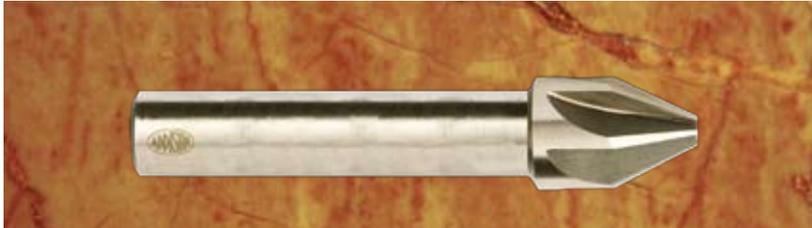
R.H. cutting with straight teeth shall be supplied unless otherwise specified.



High Speed Steel COUNTER SINKS 90°

Specifications Conform to :
DIN 335 - 1979
Dimensions in mm

Form 'A' - Straight Shank



Nominal Size	Shank dia	Small end dia	Overall Length	Body Length
8.0	-	-	48	-
12.5	8	2	48	16
16.0	10	3.2	56	20
20.0	10	5	60	24

Form 'B' - Morse Taper Shank



Nominal Size	Small end dia	Overall Length	Body Length	Morse Taper No.
16.0	3.2	95	20	1
25.0	7.0	118	26	2
31.5	9.0	122	30	2
40.0	12.0	150	35	3
50.0	16.0	155	38	3
63.0	20.0	185	43	4
80.0	25.0	196	54	4

R.H. cutting with straight teeth shall be supplied unless otherwise specified.



High Speed Steel COUNTER SINKS 90°

Specifications Conform to :
DIN 335 - 1979
Dimensions in mm.

Form 'C' - Straight Shank with 3 cutting edges



Nominal Size	Shank Dia.	Small End Dia.	Overall Length	Body Length
4.3	4	1.3	40	3.5
5.0	4	1.5	40	4.0
5.3	4	1.5	40	4.0
5.8	5	1.5	45	4.5
6.0	5	1.5	45	4.5
6.3	5	1.5	45	5.0
7.0	6	1.8	50	5.0
7.3	6	1.8	50	5.6
8.0	6	2.0	50	5.6
8.3	6	2.0	50	6.0
9.4	6	2.2	50	6.7
10.0	6	2.5	50	7.1
10.4	6	2.5	50	7.1

Nominal Size	Shank Dia.	Small End Dia.	Overall Length	Body Length
11.5	8	2.8	56	7.5
12.4	8	2.8	56	8.0
13.4	8	2.9	56	8.5
15.0	10	3.2	60	9.0
16.5	10	3.2	60	10.0
19.0	10	3.5	63	11.2
20.5	10	3.5	63	12.5
23.0	10	3.8	67	13.2
25.0	10	3.8	67	15.0
26.0	10	3.8	67	15.0
28.0	12	4.0	71	16.0
30.0	12	4.2	71	18.0
31.0	12	4.2	71	18.0

R.H. Cutting with straight teeth shall be supplied unless otherwise specified

Form 'D' - Morse Taper Shank with 3 cutting edges



Nominal Size	Small End dia.	Overall Length	Body Length	Morse Taper No.
15.0	3.2	85	9.0	1
16.5	3.2	85	10.0	1
19.0	3.5	100	11.2	2
20.5	3.5	100	12.5	2
23.0	3.8	106	13.2	2
25.0	3.8	106	15.0	2
26.0	3.8	106	15.0	2
28.0	4.0	112	16.0	2

Nominal Size	Small End dia.	Overall Length	Body Length	Morse Taper No.
30	4.2	112	18.0	2
31	4.2	112	18.0	2
34	4.5	118	19.0	2
37	4.8	118	21.2	2
40	10.0	140	20.0	3
50	14.0	150	23.6	3
63	16.0	180	28.0	4
80	22.0	190	35.5	4

R.H. Cutting with straight teeth shall be supplied unless otherwise specified



TECHNICAL INFORMATION

- 1 Stock Removal by Reaming**
- 2 Feeds in Reaming**
- 3 Speeds in Reaming**
- 4 Tolerance for Special Reamers**



STOCK REMOVAL BY REAMING

Size of the reamed hole in mm		Stock removal in mm.	
Over	Upto & incl.	When Pre - drilled	When Pre - core drilled
	10	0.3	0.2
10	14	0.4	0.25
14	18	0.5	0.25
18	30	0.5	0.3
30	50	1	0.4

Insufficient stock for reaming may result in a burnishing rather than a cutting action. The Table above shows the amount of stock to be removed by a Reamer. The first column shows stock removal when a two fluted drill has been used. The second column shows when a core drill has been used as a prefinishing tool.



FEEDS IN REAMING

Diameter of Reamer in mm	Feed mm / Rev
Upto 4	0.06 - 0.2
Over 4 upto 6	0.10 - 0.3
Over 6 upto 10	0.12 - 0.4
Over 10 upto 16	0.16 - 0.6
Over 16 upto 20	0.20 - 0.8
Over 20 upto 25	0.24 - 1.0
Over 25 upto 40	0.30 - 1.2
Over 40 upto 63	0.40 - 1.4

For Reaming, use feeds higher than those used for drilling. The amount of feed may vary between the materials. If the feed is too low, may result in glazing, excessive wear and sometimes chatter. If the feed is too high, it may reduce the accuracy of the hole and finish.



SPEEDS IN REAMING

Material to be reamed	Speed 'Vc'	
	Ft. per min	Meters per min
Aluminium and Aluminium Alloys	135 - 200	41 - 60
Bakelite, Vulcanite, etc.	65 - 100	20 - 30
Brass	100 - 160	30 - 48
Brass - leaded	135 - 200	41 - 60
Bronze : ordinary	65 - 135	20 - 41
high tensile	45 - 65	14 - 20
Cast Iron: Soft	65 - 100	20 - 30
Medium	50 - 60	15 - 18
Hard	35 - 45	11 - 19
Chilled	15 - 25	5 - 8
Copper	65 - 135	20 - 41
Duralumin	65 - 135	20 - 41
Magnesium and Magnesium Alloys	160 - 265	48 - 80
Malleable Iron	45 - 50	14 - 15
Monel Metal	25 - 35	8 - 11
Zinc base die-casting material (Mazak)	135 - 200	41 - 60
Slate, Stone, Marble	10 - 15	3 - 5
Steel: free-cutting	65 - 100	20 - 30
upto 40 tons tensile	50 - 75	5 - 22
40-60 tons tensile	30 - 45	9 - 14
60-80 tons tensile	20 - 30	6 - 9
over 80 tons tensile	10 - 15	3 - 5
Manganese	10 - 15	3 - 5
Stainless Steel-Martensitic, Ferritic and Austenitic	20 - 50	6 - 15
Stainless Steel - free cutting	30 - 80	9 - 24
Wood	200 - 265	60 - 80

The correct cutting speed for machine reaming depends upon the material being reamed, the rigidity of the machine and the tolerance or finish required. The correct speed for reaming is around two thirds of speed used for drilling the same material. Use slower speeds for less rigid machines. If close tolerances and fine finish are required, use slower speeds



TOLERANCE FOR SPECIAL REAMERS
Ref : IS 5443 - 1994.

C - 1 GENERAL

Unless otherwise specified, the diameter of cutting portion of the reamer shall have a tolerance of m6. In this section necessary information is given for determining the tolerance for the diameter of the cutting portion of the reamers where a grade of accuracy other than m6 is required. It is impossible to infer in advance the tolerance of a hole produced by a particular reamer because the actual diameter produced by the reamer depends upon a number of factors. Some of the factors which influence the accuracy of the hole diameter are as follows:

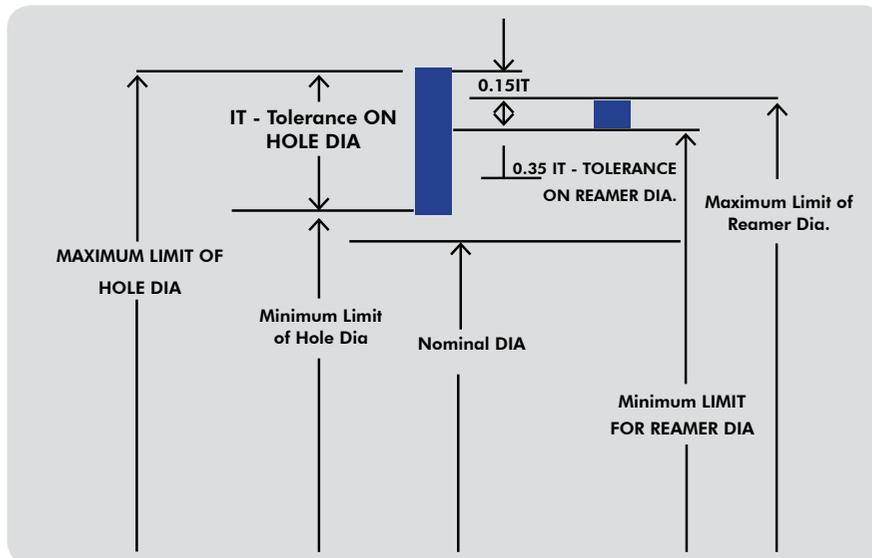
- a) Type and amount of the material to be removed,
- b) Cutting edge design of the reamer,
- c) Method of mounting and operation,
- d) Condition of the reamer at the time of use and
- e) Lubrication

These factors shall be taken into account while determining the special tolerance to be given on a reamer in order to get a hole of given tolerance.

C - 2 METHOD OF DETERMINING THE SPECIAL TOLERANCE

C - 2.1 The maximum limit for the reamer diameter = the maximum limit of the hole - 0.15 IT.
 The value of 0.15 IT is to be rounded to next higher value of 0.001 mm.

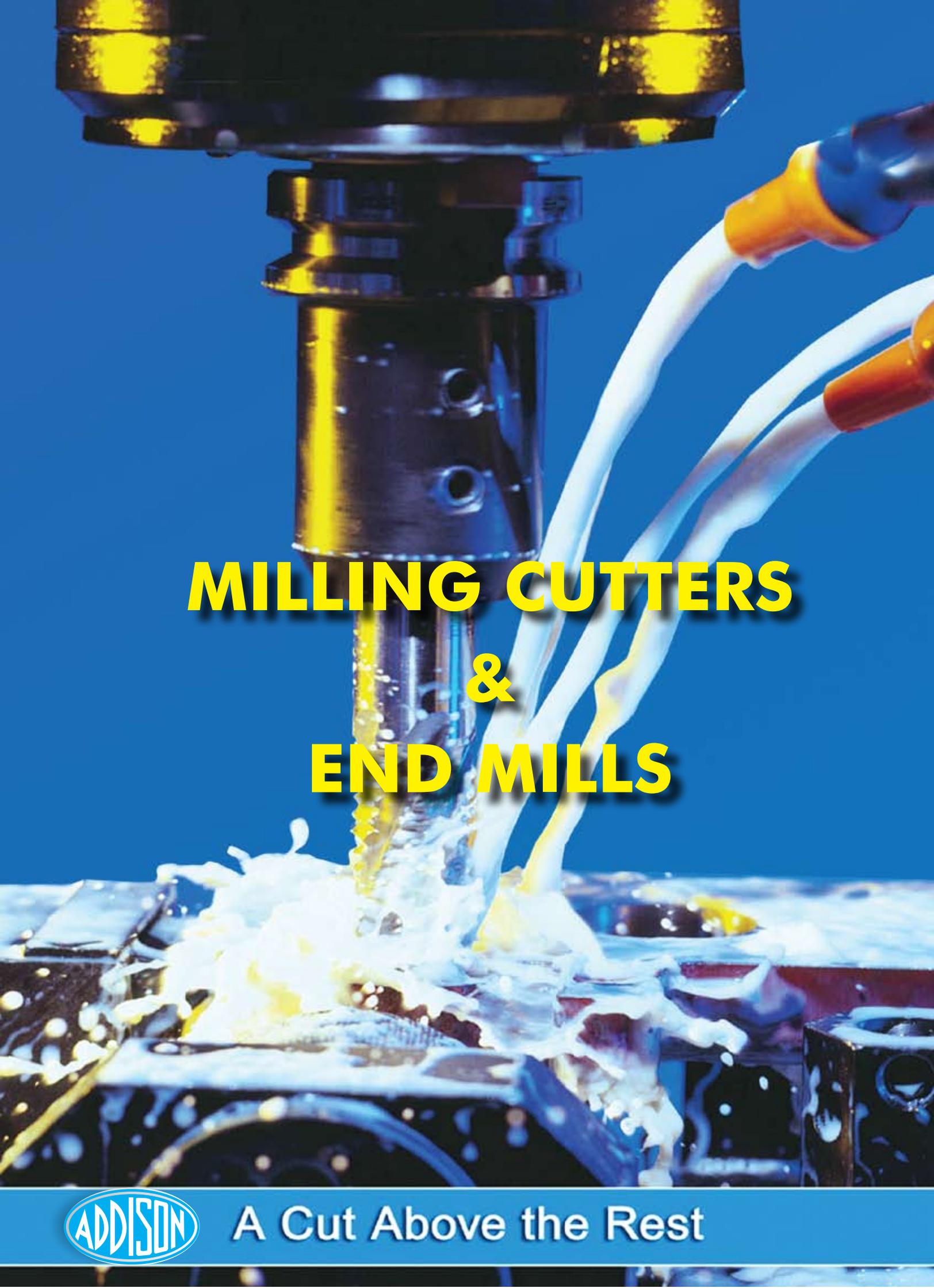
C - 2.2 The minimum limit of the reamer diameter = the maximum limit of the reamer - 0.35 IT.
 The value of 0.35 IT is to be rounded to next higher value of 0.001 mm



Example :

For a 12H7 hole.

IT = 0.018	Hole size maximum limit	=	12.018
	Minimum Limit	=	12.000
Maximum limit of reamer diameter	=	Maximum limit of the hole - 0.15IT	
	=	12.018 - 0.15 x 0.018 = 12.018 - 0.0027	
	=	12.018 - 0.003 = 12.015	
Minimum limit of reamer diameter	=	Maximum limit of the reamer diameter - 0.35 IT.	
	=	12.015 - 0.35 x 0.018 = 12.015 - 0.0063	
	=	12.015 - 0.007 = 12.008.	



**MILLING CUTTERS
&
END MILLS**



A Cut Above the Rest



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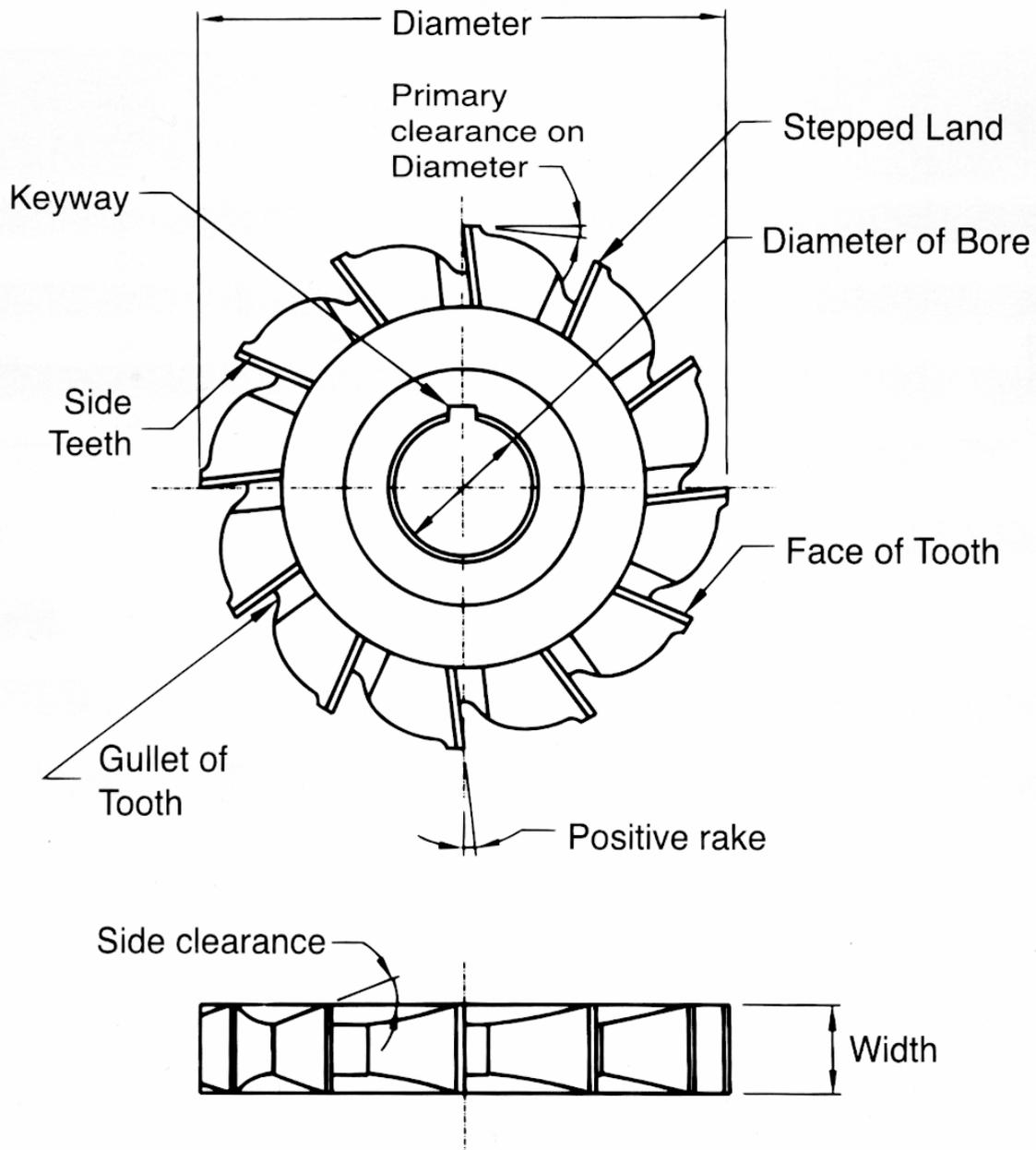
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MILLING CUTTERS - NOMENCLATURE

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	± 25'
50	13	13	16	
63	16	18	20	
80	22	22	25	± 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 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.



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 Pitch	Circular Pitch inch	Module mm	Diametral Pitch	Circular Pitch inch	Module mm	Diametral Pitch	Circular Pitch 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

Specifications Conform to:
BS 2518 : 1954



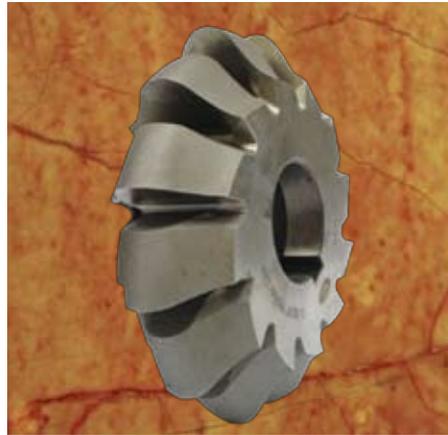
STANDARD CUTTER GROUP (8 CUTTERS)

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



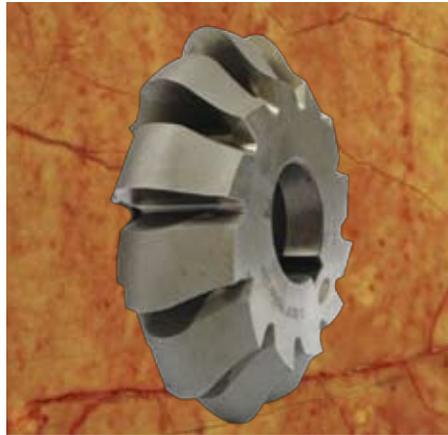
Dia. Of Rollers	Cutter No.	Outside Dia. of Cutter	Width of Cutter	Bore Dia.
0.197	1	2.3/4	0.50	1
0.197	2	2.3/4	0.50	1
0.197	3	2.3/4	0.50	1
0.250	1	2.3/4	0.60	1
0.250	2	2.3/4	0.60	1
0.250	3	2.3/4	0.60	1
0.305	1	2.3/4	0.75	1
0.305	2	2.3/4	0.75	1
0.305	3	2.3/4	0.75	1
0.335	1	2.3/4	0.75	1
0.335	2	2.3/4	0.75	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

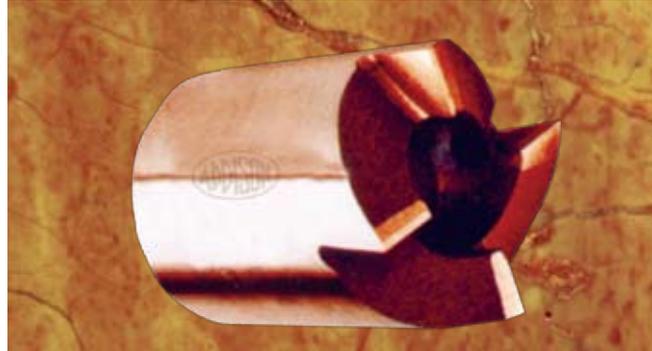
A cutter with teeth on the periphery and face provided with a back face key slot drive on the boss for use in an arbor.

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



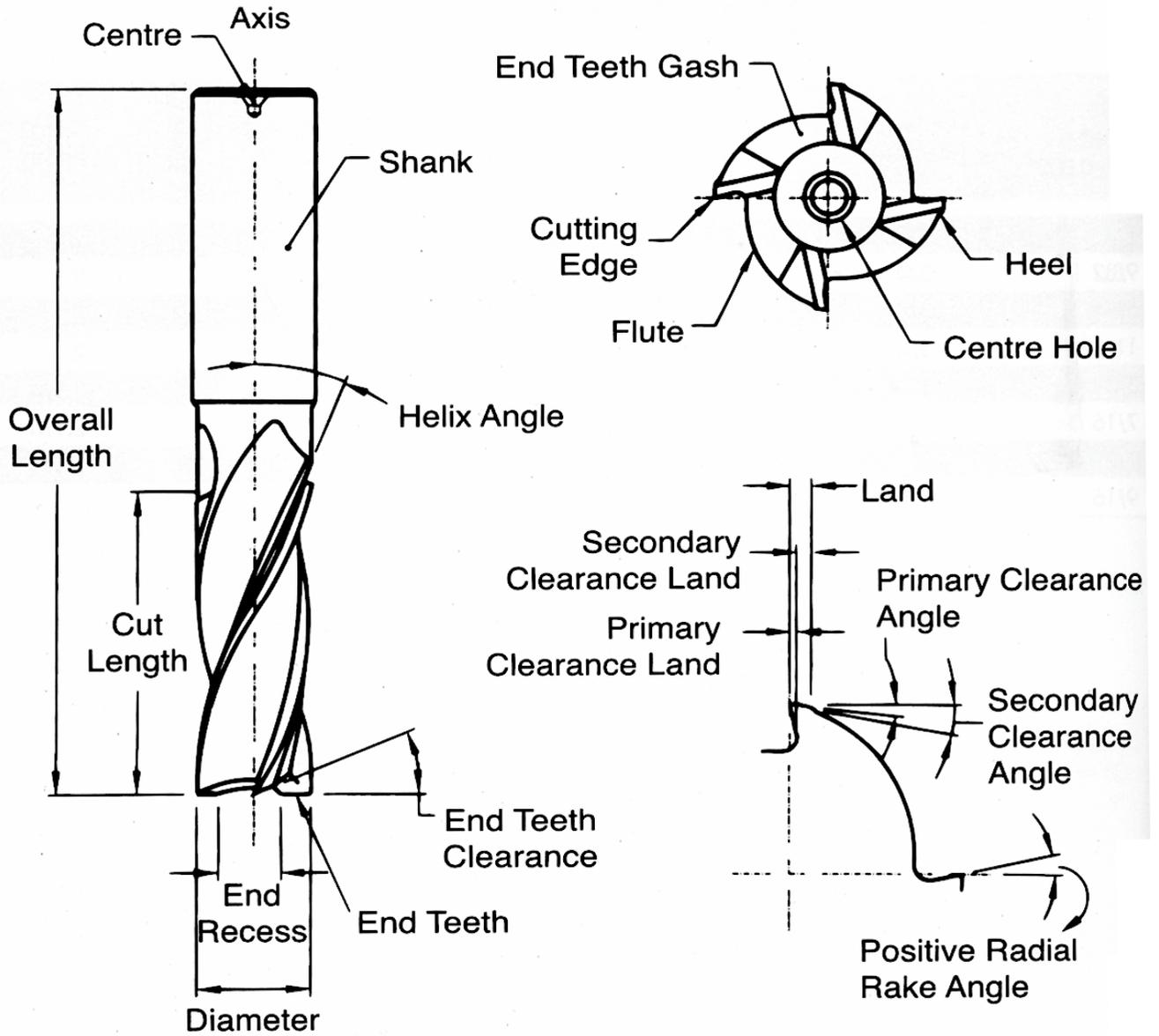
Bore Diameter 0.000 / - 0.002"	Outside Diameter	Overall Length
1/4	5/8	1.1/2
9/32	3/4	1.1/2
5/16	3/4	1.1/2
11/32	3/4	1.1/2
3/8	1	1.3/4
7/16	1	1.3/4
1/2	1	1.3/4
9/16	1.1/4	2

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.



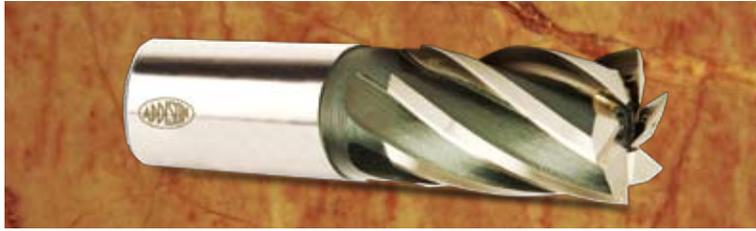
END MILL - NOMENCLATURE





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 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

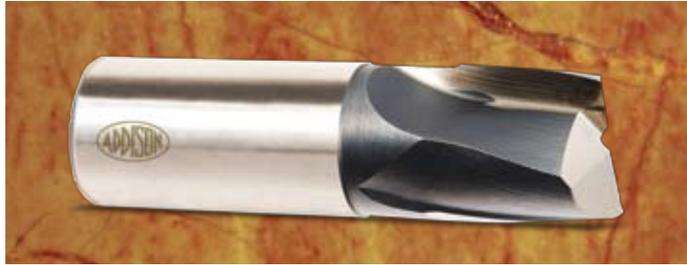
Diameter e8	Shank Dia	Cutting Edge Length	Overall Length
22	20	22	88
24	25	26	102
25	25	26	102
28	25	26	102
32	32	32	112
36	32	32	112
40	40	38	130
45	40	38	130
50	50	45	147
56	50	45	147
63	50	53	155

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 Helical flutes and flat face (Type A) & Tool Type 'H' shall be supplied unless otherwise specified.
Sizes below 10.0 mm are not covered in 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" not covered in BSS

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

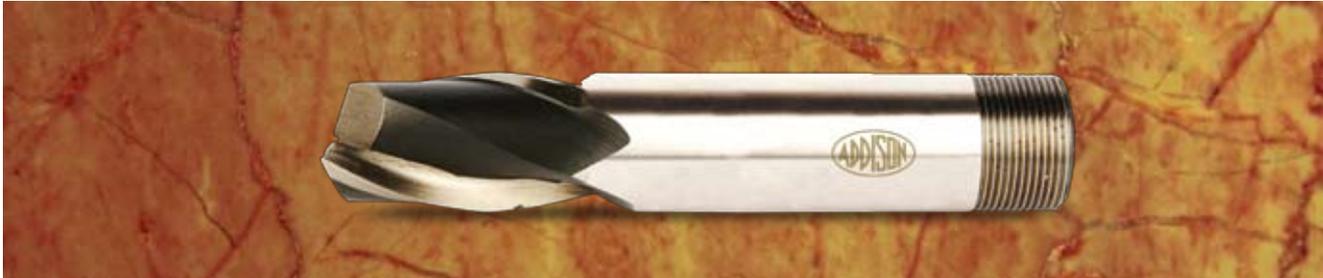


Diameter	Cutting Edge Length	Shank Diameter	Nominal Length below Chuck	Overall length
3.0	7.0	6	13.5	51.0
3.5	7.5	6	15.0	52.5
4.0	9.5	6	15.0	52.5
4.5	9.5	6	15.0	52.5
5.0	9.5	6	15.0	52.5
5.5	11.0	6	18.0	55.5
6.0	11.0	6	19.0	56.5
6.5	11.0	10	20.5	58.5
7.0	11.0	10	20.5	58.5
7.5	11.0	10	20.5	58.5
8.0	12.5	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

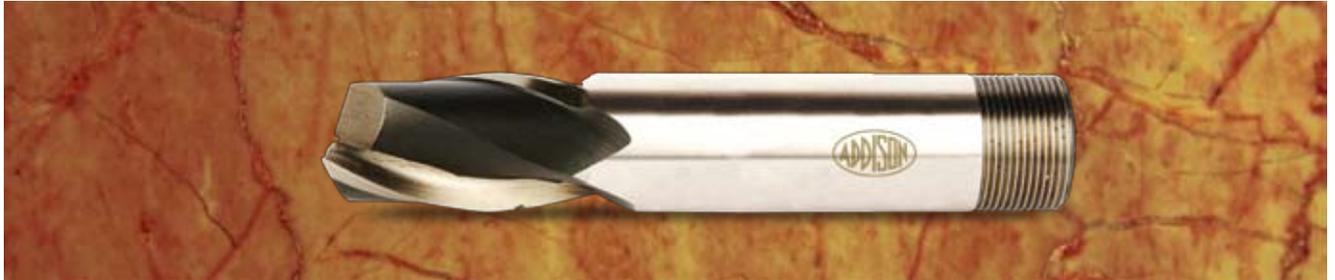
A Cutter with teeth on the periphery and end, integral with a parallel shank. Designed primarily for the purpose of milling shallow slots or keyways, usually having two teeth.

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

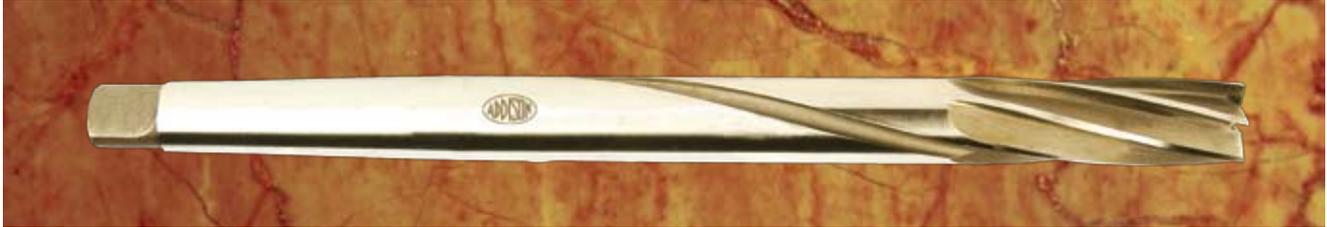
Diameter h7	Cutting Edge Length	Overall Length	Morse Taper No
26.7	60	220	3
27.7	60	220	3
29.7	60	220	3
31.7	60	220	3
33.7	60	250	4
34.7	60	250	4
35.7	60	250	4
37.7	60	250	4
39.7	60	250	4
41.6	60	250	4
44.6	60	250	4
46.6	60	280	4
47.6	60	280	4
49.6	60	280	4

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	

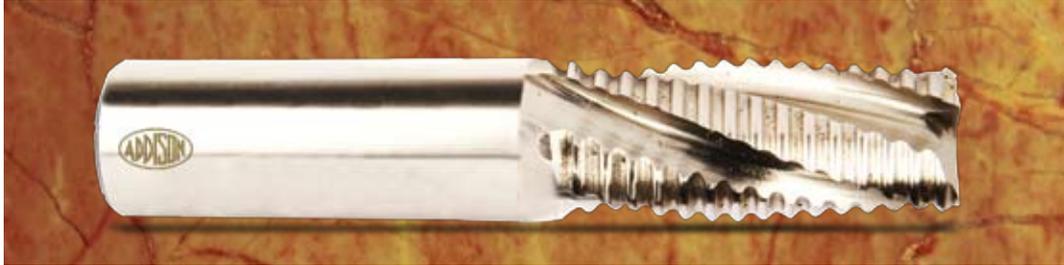
TIN, TiAlN & TiCN coated Roughing End mills are also supplied against specific order.

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.

Unless otherwise specified End Mills with Plain Parallel Shank with '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 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.



TECHNICAL INFORMATION

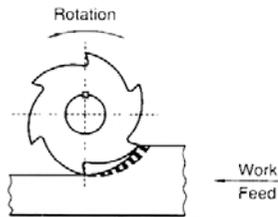
- 1) Types of Milling
- 2) Hand of Cutter
- 3) Calculations for Cutting Speeds and Feeds
- 4) Recommendations for Selection of Milling Cutters
- 5) Recommended Peripheral Speeds for HSS Milling Cutters
- 6) Recommended Feed per Tooth for HSS Milling Cutters
- 7) Cutting Fluids for HSS Milling Cutters



Types of Milling

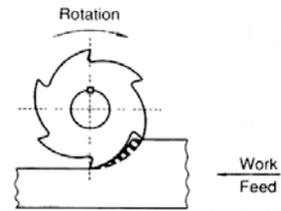
UP (CONVENTIONAL) MILLING

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

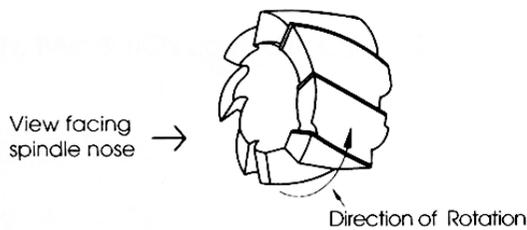
Down or Climb milling results in a cutting action of the tooth in the same direction as the work piece feed



HAND OF CUTTER

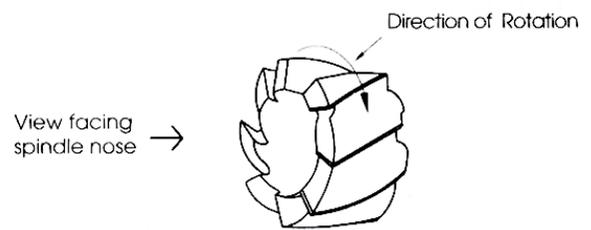
RIGHT HAND CUTTER

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		S or (N)
	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		N
	High Cutting Speed		S
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.

GROUND THREAD TAPS



A Cut Above the Rest

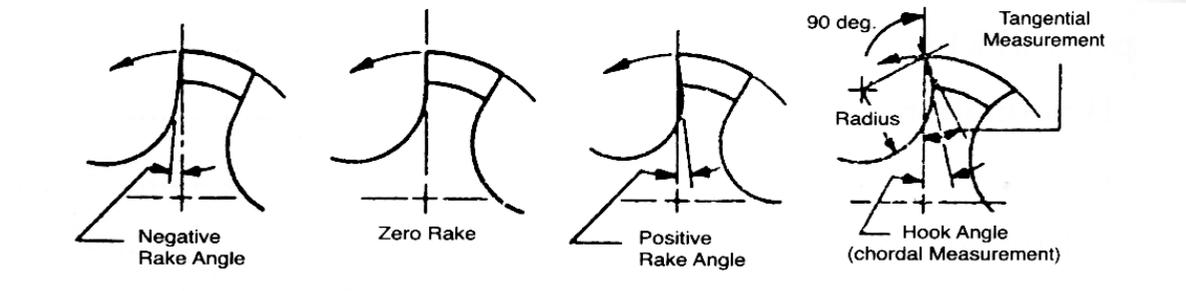
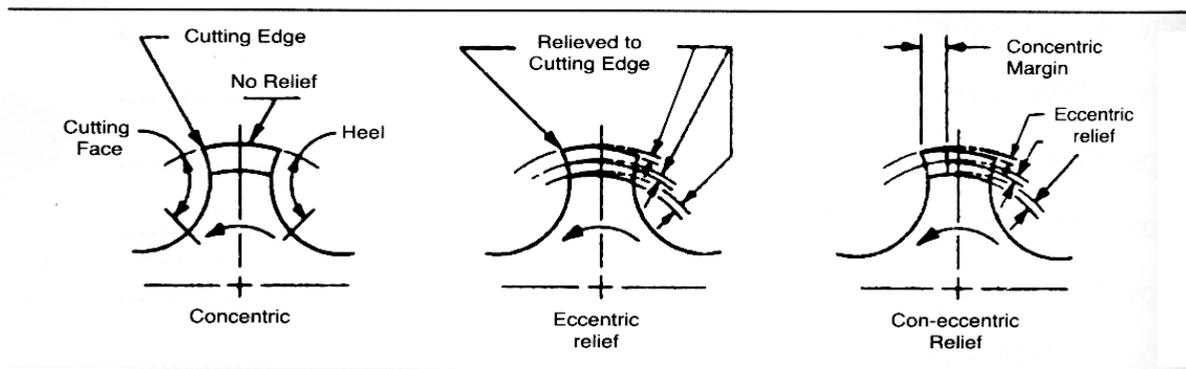
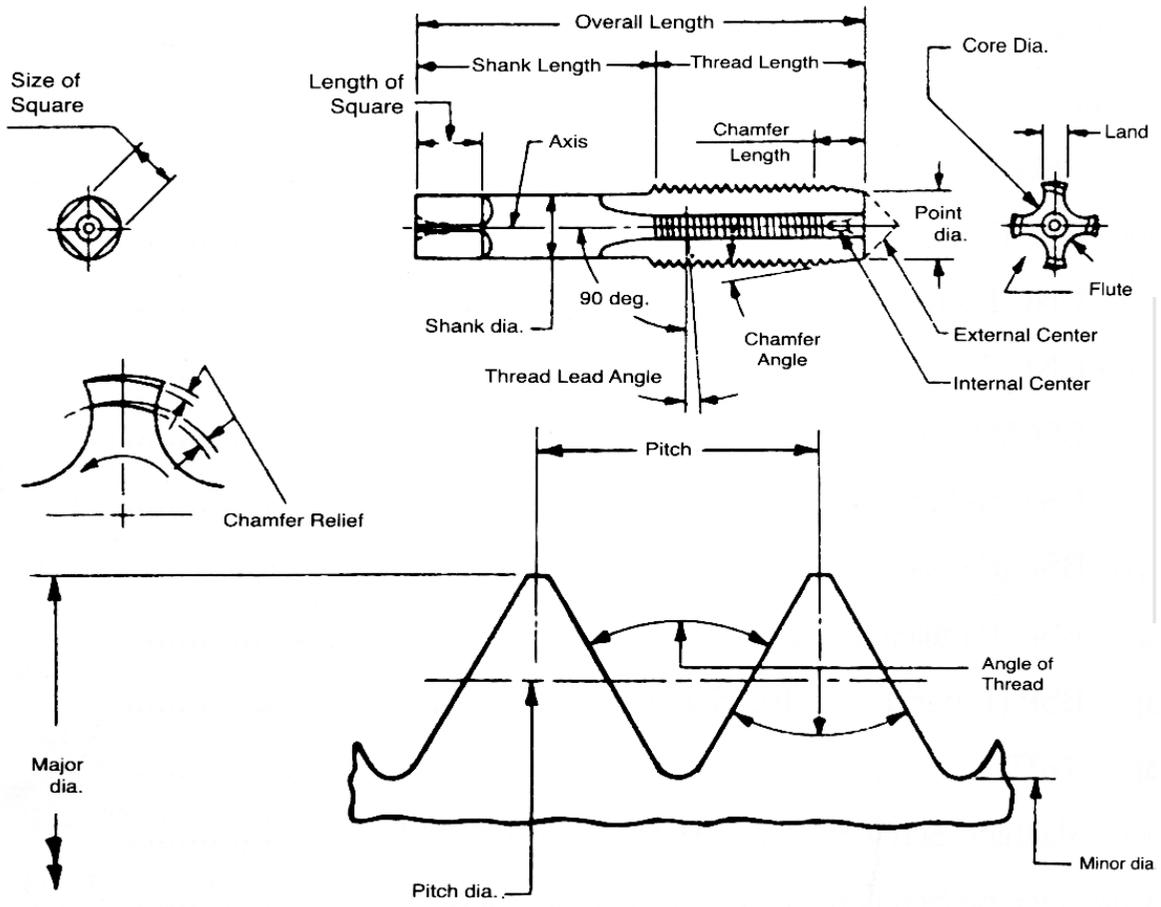


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SCREWING TAPS - NOMENCLATURE





**High Speed Steel
GROUND THREAD HAND AND
SHORT MACHINE SCREWING TAPS
For ISO Metric Screw Threads**

Specifications Conform to :
IS 6175 : Part 2 : 1992
Dimensions in mm



TABLE I : ISO Metric Screw Threads Coarse Pitch

Nominal Diameter	Pitch	Thread Length	Oveall Length	Shank Dia	Square Size
3.0	0.50	11	48	3.15	2.50
4.0	0.70	13	53	4.00	3.15
4.5	0.75	13	53	4.50	3.55
5.0	0.80	16	58	5.00	4.00
6.0	1.00	19	66	6.30	5.00
7.0	1.00	19	66	7.10	5.60
8.0	1.25	22	72	8.00	6.30
9.0	1.25	22	72	9.00	7.10
10.0	1.50	24	80	10.00	8.00

TABLE II : ISO Metric Screw Threads Fine Pitch

Nominal Diameter	Pitch	Thread Length	Oveall Length	Shank Dia	Square Size
4.0	0.50	13	53	4.00	3.15
4.5	0.50	13	53	4.50	3.55
5.0	0.50	16	58	5.00	4.00
5.5	0.50	17	62	5.60	4.50
6.0	0.75	19	66	6.30	5.00
7.0	0.75	19	66	7.10	5.60
8.0	0.75	16	66	8.0	6.30
8.0	1.00	19	69	8.0	6.30
9.0	0.75	16	66	9.0	7.10
9.0	1.00	19	69	9.0	7.10
10.0	0.75	17	73	10.0	8.00
10.0	1.00	20	76	10.0	8.00
10.0	1.25	20	76	10.0	8.00

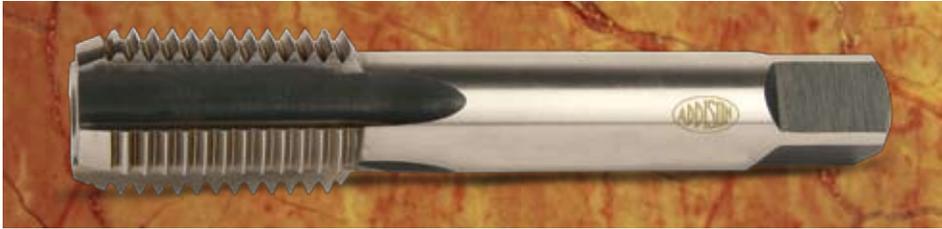
Manufactured with straight flutes and a shank with square for driving.

- 1) Unless otherwise specified, the Screwing taps shall be supplied with tolerance class '6H', non - serial and with Straight flutes.
- 2) Usually supplied in sets consisting of three taps, viz. Taper , Second , Bottoming , for Coarse Pitch and Taper and Bottoming for Fine Pitch.



**High Speed Steel
GROUND THREAD HAND AND
SHORT MACHINE SCREWING TAPS
For ISO Metric Coarse Pitch Threads**

Specifications Conform to :
IS 6175 : Part 3 : 1992
Dimensions in mm



Nominal Diameter	Pitch	Thread Length	Overall Length	Shank Dia	Square Size
11	1.50	25	85	8.0	6.30
12	1.75	29	89	9.0	7.10
14	2.00	30	95	11.20	9.00
16	2.00	32	102	12.50	10.00
18	2.50	37	112	14.00	11.20
20	2.50	37	112	14.00	11.20
22	2.50	38	118	16.00	12.50
24	3.00	45	130	18.00	14.00
27	3.00	45	135	20.00	16.00
30	3.50	48	138	20.00	16.00
33	3.50	51	151	22.40	18.00

Nominal Diameter	Pitch	Thread Length	Overall Length	Shank Dia	Square Size
36	4.00	57	162	25.00	20.00
39	4.00	60	170	28.00	22.40
42	4.50	60	170	28.00	22.40
45	4.50	67	187	31.50	25.00
48	5.00	67	187	31.50	25.00
52	5.00	70	200	35.50	28.00
56	5.50	70	200	35.50	28.00
60	5.50	76	221	40.00	31.50
64	6.00	79	224	40.00	31.50
68	6.00	79	234	45.00	35.50

- 1) Unless otherwise specified, the Screwing taps shall be supplied with tolerance class '6H', non - serial and with Straight flutes.
- 2) Usually supplied in sets consisting of three taps, viz. Taper, Second, Bottoming.



**High Speed Steel
GROUND THREAD HAND AND
SHORT MACHINE SCREWING TAPS
For ISO Metric Fine Pitch Threads**

Specifications Conform to :
IS 6175 : Part 3 : 1992
Dimensions in mm



Nominal Diameter	Pitch	Thread Length	Overall Length	Shank Dia	Square Size
11	0.75	20	80	8.00	6.30
11	1.00	20	80	8.00	6.30
12	1.00	20	80	9.00	7.10
12	1.25	24	84	9.00	7.10
12	1.50	29	89	9.00	7.10
14	1.00	22	87	11.20	9.00
14	1.25	25	90	11.20	9.00
14	1.50	30	95	11.20	9.00
15	1.00	22	87	11.20	9.00
15	1.50	30	95	11.20	9.00
16	1.00	22	92	12.50	10.00
16	1.50	32	102	12.50	10.00
17	1.00	22	92	12.50	10.00
17	1.50	32	102	12.50	10.00
18	1.00	22	97	14.00	11.20
18	1.50	29	104	14.00	11.20
18	2.00	37	112	14.00	11.20
20	1.00	27	102	14.00	11.20
20	1.50	29	104	14.00	11.20
20	2.00	37	112	14.00	11.20
22	1.00	29	109	16.00	12.50
22	1.50	33	113	16.00	12.50

Nominal Diameter	Pitch	Thread Length	Overall Length	Shank Dia	Square Size
22	2.00	38	118	16.00	12.50
24	1.00	29	114	18.00	14.00
24	1.50	35	120	18.00	14.00
24	2.00	35	120	18.00	14.00
25	1.00	29	114	18.00	14.00
25	1.50	35	120	18.00	14.00
25	2.00	35	120	18.00	14.00
26	1.50	35	120	18.00	14.00
27	1.00	30	120	20.00	16.00
27	1.50	37	127	20.00	16.00
27	2.00	37	127	20.00	16.00
28	1.00	30	120	20.00	16.00
28	1.50	37	127	20.00	16.00
28	2.00	37	127	20.00	16.00
30	1.00	30	120	20.00	16.00
30	1.50	37	127	20.00	16.00
30	2.00	37	127	20.00	16.00
30	3.00	48	138	20.00	16.00
32	1.50	37	137	22.40	18.00
32	2.00	37	137	22.40	18.00
33	1.50	37	137	22.40	18.00
33	2.00	37	137	22.40	18.00

Manufactured with straight flutes and a shank with square for driving.



High Speed Steel GROUND THREAD HAND AND SHORT MACHINE SCREWING TAPS For ISO Metric Fine Pitch Threads

Specifications Conform to :
IS 6175 : Part 3 : 1992
Dimensions in mm



Nominal Diameter	Pitch	Thread Length	Overall Length	Shank Dia	Square Size
33	3.0	51	151	22.4	18.0
35	1.5	39	144	25.0	20.0
36	1.5	39	144	25.0	20.0
36	2.0	39	144	25.0	20.0
36	3.0	57	162	25.0	20.0
38	1.5	39	149	28.0	22.4
39	1.5	39	149	28.0	22.4
39	2.0	39	149	28.0	22.4
39	3.0	60	170	28.0	22.4
40	1.5	39	149	28.0	22.4
40	2.0	39	149	28.0	22.4
40	3.0	60	170	28.0	22.4
42	1.5	39	149	28.0	22.4
42	2.0	39	149	28.0	22.4
42	3.0	60	170	28.0	22.4
42	4.0	60	170	28.0	22.4
45	1.5	45	165	31.5	25.0
45	2.0	45	165	31.5	25.0
45	3.0	67	187	31.5	25.0
45	4.0	67	187	31.5	25.0
48	1.5	45	165	31.5	25.0
48	2.0	45	165	31.5	25.0
48	3.0	67	187	31.5	25.0
48	4.0	67	187	31.5	25.0
50	1.5	45	165	31.5	25.0
50	2.0	45	165	31.5	25.0
50	3.0	67	187	31.5	25.0
52	1.5	45	175	35.5	28.0
52	2.0	45	175	35.5	28.0
52	3.0	70	200	35.5	28.0
52	4.0	70	200	35.5	28.0
55	1.5	45	175	35.5	28.0

Nominal Diameter	Pitch	Thread Length	Overall Length	Shank Dia	Square Size
55	2.0	45	175	35.5	28.0
55	3.0	70	200	35.5	28.0
55	4.0	70	200	35.5	28.0
56	1.5	45	175	35.5	28.0
56	2.0	45	175	35.5	28.0
56	3.0	70	200	35.5	28.0
56	4.0	70	200	35.5	28.0
58	1.5	48	193	40.0	31.5
58	2.0	48	193	40.0	31.5
58	3.0	64	209	40.0	31.5
58	4.0	64	209	40.0	31.5
60	1.5	48	193	40.0	31.5
60	2.0	48	193	40.0	31.5
60	3.0	64	209	40.0	31.5
60	4.0	64	209	40.0	31.5
62	1.5	48	193	40.0	31.5
62	2.0	48	193	40.0	31.5
62	3.0	64	209	40.0	31.5
62	4.0	64	209	40.0	31.5
64	1.5	48	193	40.0	31.5
64	2.0	48	193	40.0	31.5
64	3.0	64	209	40.0	31.5
64	4.0	64	209	40.0	31.5
65	1.5	48	193	40.0	31.5
65	2.0	48	193	40.0	31.5
65	3.0	64	209	40.0	31.5
65	4.0	64	209	40.0	31.5
68	1.5	48	203	45.0	35.5
68	2.0	48	203	45.0	35.5
68	3.0	64	219	45.0	35.5
68	4.0	64	219	45.0	35.5
70	1.5	48	203	45.0	35.5



**High Speed Steel
GROUND THREAD HAND AND
SHORT MACHINE SCREWING TAPS
For ISO Metric Fine Pitch Threads**

Specifications Conform to :
IS 6175 : Part 3 : 1992
Dimensions in mm



Nominal Diameter	Pitch	Thread Length	Overall Length	Shank Dia	Square Size
70	2.0	48	203	45	35.5
70	3.0	64	219	45	35.5
70	4.0	64	219	45	35.5
70	6.0	79	234	45	35.5
72	1.5	48	203	45	35.5
72	2.0	48	203	45	35.5
72	3.0	64	219	45	35.5
72	4.0	64	219	45	35.5
72	6.0	79	234	45	35.5
75	1.5	48	203	45	35.5
75	2.0	48	203	45	35.5
75	3.0	64	219	45	35.5
75	4.0	64	219	45	35.5
76	1.5	51	226	50	40.0
76	2.0	51	226	50	40.0
76	3.0	67	242	50	40.0
76	4.0	67	242	50	40.0
76	6.0	83	258	50	40.0
78	2.0	51	226	50	40.0
80	1.5	51	226	50	40.0
80	2.0	51	226	50	40.0

Nominal Diameter	Pitch	Thread Length	Overall Length	Shank Dia	Square Size
80	3.0	67	242	50	40.0
80	4.0	67	242	50	40.0
80	6.0	83	258	50	40.0
82	2.0	51	226	50	40.0
85	2.0	51	226	50	40.0
85	3.0	67	242	50	40.0
85	4.0	67	242	50	40.0
85	6.0	86	261	50	40.0
90	2.0	51	226	50	40.0
90	3.0	67	242	50	40.0
90	4.0	67	242	50	40.0
90	6.0	86	261	50	40.0
95	2.0	54	244	56	45.0
95	3.0	70	260	56	45.0
95	4.0	70	260	56	45.0
95	6.0	89	279	56	45.0
100	2.0	54	244	56	45.0
100	3.0	70	260	56	45.0
100	4.0	70	260	56	45.0
100	6.0	89	279	56	45.0

- 1) Unless otherwise specified, the Screwing taps shall be supplied with tolerance class '6H'. non - serial and with Straight flutes.
- 2) Usually supplied in sets consisting of two taps viz. Taper and Bottoming.



High Speed Steel GROUND THREAD HAND TAPS BSW Form

Specifications Conform to:
BS 949: Part 2 : 1979
(Class 2, Corresponds to Zone 3)
Dimensions in Inch / mm



Nominal Diameter Inch	Thread per Inch	Thread Length mm	Overall Length mm	Shank Dia mm	Square Size mm
3/16	24	16	58	5.00	4.00
1/4	20	19	66	6.30	5.00
5/16	18	22	72	8.00	6.30
3/8	16	24	80	10.00	8.00
7/16	14	25	85	8.00	6.30
1/2	12	29	89	9.00	7.10
9/16	12	30	95	11.20	9.00
5/8	11	32	102	12.50	10.00
11/16	11	37	112	14.00	11.20
3/4	10	37	112	14.00	11.20
7/8	9	38	118	16.00	12.50

Nominal Diameter Inch	Thread per Inch	Thread Length mm	Overall Length mm	Shank Dia mm	Square Size mm
1	8	45	130	18.0	14.0
1.1/8	7	48	138	20.0	16.0
1.1/4	7	51	151	22.4	18.0
1.3/8	6	57	162	25.0	20.0
1.1/2	6	60	170	28.0	22.4
1.3/4	5	67	187	31.5	25.0
2	4.1/2	70	200	35.5	28.0
2.1/4	4	76	221	40.0	31.5
2.1/2	4	79	224	40.0	31.5
2.3/4	3.1/2	79	234	45.0	35.5
3	3.1/2	83	258	50.0	40.0

Taps upto and including 3/8" dia, are supplied with full diameter shank and a neck between threaded portion and shank.

Manufactured with Straight flutes and a shank with square for driving.

Usually supplied in sets consisting of three taps, viz. Taper, Second and Bottoming.



**High Speed Steel
GROUND THREAD HAND TAPS
BSF Form**

Specifications Conform to
BS 949: Part 2 : 1979
(Class 2, Corresponds to Zone 3)
Dimensions in Inch / mm



Nominal Diameter Inch	Thread per Inch	Thread Length mm	Overall Length mm	Shank Dia mm	Square Size mm
3/16	32	16	58	5.00	4.00
1/4	26	19	66	6.30	5.00
5/16	22	22	72	8.00	6.30
3/8	20	24	80	10.00	8.00
7/16	18	25	85	8.00	6.30
1/2	16	29	89	9.00	7.10
9/16	16	30	95	11.20	9.00
5/8	14	32	102	12.50	10.00
11/16	14	37	112	14.00	11.20
3/4	12	37	112	14.00	11.20
7/8	11	38	118	16.00	12.50
1	10	45	130	18.00	14.00

Nominal Diameter Inch	Thread per Inch	Thread Length mm	Overall Length mm	Shank Dia mm	Square Size mm
1.1/8	9	48	138	20.0	16.0
1.1/4	9	51	151	22.4	18.0
1.3/8	8	57	162	25.0	20.0
1.1/2	8	60	170	28.0	22.4
1.5/8	8	60	170	28.0	22.4
1.3/4	7	67	187	31.5	25.0
2	7	70	200	35.5	28.0
2.1/4	6	76	221	40.0	31.5
2.1/2	6	79	224	40.0	31.5
2.3/4	6	79	234	45.0	35.5
3	5	83	258	50.0	40.0

Taps upto and including 3/8" dia, are supplied with full diameter shank and a neck between threaded portion and shank.

Manufactured with Straight flutes and a shank with square for driving.

Usually supplied in sets consisting of three taps , viz. Taper, Second and Bottoming.



High Speed Steel GROUND THREAD HAND TAPS UNC Form

Specifications Conform to:
BS 949:Part 2 : 1979
(Class 2, Corresponds to Zone 3)
Dimensions in Inch / mm



Nominal Diameter Inch	Thread per Inch	Thread Length mm	Overall Length mm	Shank Dia mm	Square Size mm
1/4	20	19	66	6.30	5.00
5/16	18	22	72	8.00	6.30
3/8	16	24	80	10.00	8.00
7/16	14	25	85	8.00	6.30
1/2	13	29	89	9.00	7.10
9/16	12	30	95	11.20	9.00
5/8	11	32	102	12.50	10.00
3/4	10	37	112	14.00	11.20
7/8	9	38	118	16.00	12.50
1	8	45	130	18.00	14.00

Nominal Diameter Inch	Thread per Inch	Thread Length mm	Overall Length mm	Shank Dia mm	Square Size mm
1.1/8	7	48	138	20.0	16.0
1.1/4	7	51	151	22.4	18.0
1.3/8	6	57	162	25.0	20.0
1.1/2	6	60	170	28.0	22.4
1.3/4	5	67	187	31.5	25.0
2	4.1/2	70	200	35.5	28.0
2.1/4	4.1/2	76	221	40.0	31.5
2.1/2	4	79	224	40.0	31.5
2.3/4	4	79	234	45.0	35.5
3	4	83	258	50.0	40.0

Taps upto and including 3/8" dia, are supplied with full diameter shank and a neck between threaded portion and shank.

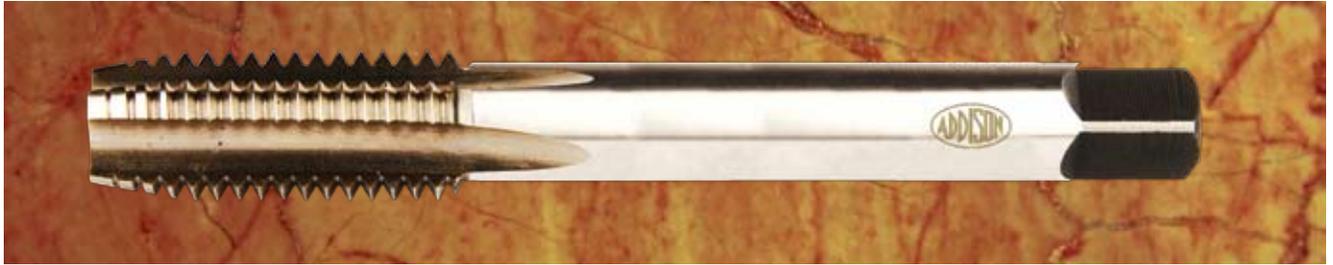
Manufactured with Straight flutes and a shank with square for driving.

Usually supplied in sets consisting of three taps , viz. Taper, Second and Bottoming.



**High Speed Steel
GROUND THREAD HAND TAPS
UNF Form**

Specifications Conform to :
BS 949: Part 2 : 1979
(Class 2, Corresponds to Zone 3)
Dimensions in Inch / mm



Nominal Diameter Inch	Thread per Inch	Thread Length mm	Overall Length mm	Shank Dia mm	Square Size mm
1/4	28	19	66	6.30	5.00
5/16	24	19	69	8.0	6.30
3/8	24	20	76	10.00	8.00
7/16	20	22	82	8.00	6.30
1/2	20	24	84	9.00	7.10
9/16	18	25	90	11.20	9.00
5/8	18	25	95	12.50	10.00

Nominal Diameter Inch	Thread per Inch	Thread Length mm	Overall Length mm	Shank Dia mm	Square Size mm
3/4	16	29	104	14	11.2
7/8	14	33	113	16	12.50
1	12	35	120	18	14.0
1.1/8	12	37	127	20.0	16.0
1.1/4	12	37	137	22.4	18.0
1.3/8	12	39	144	25.0	20.0
1.1/2	12	39	149	28.0	22.4

Taps upto and including 3/8" dia, are supplied with full diameter shank and a neck between threaded portion and shank.

Manufactured with Straight flutes and a shank with square for driving.

Usually supplied in sets consisting of three taps , viz. Taper, Second and Bottoming.



High Speed Steel GROUND THREAD HAND TAPS BSCY Form

Specifications Conform to :
BS 949:1951 | (Zone 3)
Dimensions in Inches



Nominal Diameter Inch	Thread per Inch	Thread Length	Overall Length	Shank Dia	Square Size
1/4	26	1	2.1/2	0.253	0.197
5/16	26	1.1/8	2.3/4	0.315	0.242
3/8	26	1.1/4	2.15/16	0.377	0.294
7/16	26	1.1/4	3	0.323	0.242
1/2	26	1.1/4	3	0.367	0.275
9/16	26	1.1/4	3	0.429	0.322
5/8	26	1.1/4	3	0.480	0.360
11/16	26	1.1/4	3	0.542	0.406
3/4	26	1.1/2	3.1/4	0.590	0.442

Nominal Diameter Inch	Thread per Inch	Thread Length	Overall Length	Shank Dia	Square Size
7/8	24	1.1/2	3.1/4	0.697	0.523
1	24	1.1/2	3.1/4	0.800	0.600
1.1/8	26	1.1/2	4	0.896	0.672
1.290	24	1.1/2	4	1.021	0.766
1.370	24	1.1/2	4	1.108	0.831
1.450	26	1.1/2	4	1.233	0.925
1.9/16	24	2	5	1.305	0.979
1.5/8	24	2	5	1.305	0.979

Manufactured with Straight flutes and a shank with square for driving.

Usually supplied in sets consisting of three taps, viz. Taper, Second and Bottoming.



**High Speed Steel
GROUND THREAD HAND TAPS
BS Conduit Form**

Specifications Conform to :
BS 949: 1951 | (Zone 3)
Dimensions in Inches



Nominal Diameter Inch	Thread per Inch	Thread Length	Overall Length	Shank Dia	Square Size
1/2	18	1.1/4	3	0.367	0.275
5/8	18	1.1/4	3	0.480	0.360
3/4	16	1.1/2	3.1/4	0.590	0.442
1	16	1.1/2	3.1/4	0.800	0.600

Nominal Diameter Inch	Thread per Inch	Thread Length	Overall Length	Shank Dia	Square Size
1.1/4	16	1.1/2	4	1.021	0.766
1.1/2	14	1.1/2	4	1.233	0.925
2	14	2	5	1.644	1.233
2.1/2	14	2	5.1/4	2.100	1.575

Manufactured with whitworth thread form with Straight flutes and a shank with square for driving.

Usually supplied in sets consisting of three taps, viz. Taper, Second and Bottoming.



High Speed Steel GROUND THREAD HAND TAPS BSP (Parallel)

Specifications Conform to :
BS 949:1951 | (Zone 3)
Dimensions in Inches



Nominal Diameter Inch	Thread per Inch	Thread Length	Overall Length	Shank Dia	Square Size
1/8	28	3/4	2.1/8	0.318	0.238
1/4	19	1.1/16	2.7/16	0.429	0.322
3/8	19	1.1/16	2.9/16	0.542	0.406
1/2	14	1.3/8	3.1/8	0.687	0.515
5/8	14	1.3/8	3.3/16	0.800	0.600
3/4	14	1.3/8	3.1/4	0.906	0.679
7/8	14	1.9/16	3.1/2	1.093	0.812
1	11	1.3/4	3.3/4	1.125	0.843
1.1/4	11	1.3/4	4	1.312	0.984

Nominal Diameter Inch	Thread per Inch	Thread Length	Overall Length	Shank Dia	Square Size
1.1/2	11	1.3/4	4.1/4	1.500	1.125
1.3/4	11	1.3/4	4.3/8	1.625	1.218
2	11	1.3/4	4.1/2	1.875	1.406
2.1/4	11	2.1/8	5	2.000	1.500
2.1/2	11	2.9/16	5.1/2	2.250	1.687
2.3/4	11	2.9/16	5.3/4	2.375	1.781
3	11	2.5/8	6	2.625	1.968
3.1/2	11	2.11/16	6.1/2	2.812	2.108
4	11	2.3/4	6.3/4	3.000	2.250

Manufactured with whitworth thread form with Straight flutes and a shank with square for driving.

Usually supplied in sets consisting of two taps, viz. Taper and Bottoming.



**High Speed Steel
GROUND THREAD HAND TAPS
BSP (Parallel) 'G' Series**

Specifications Conform to :
BS 949: Part 3 :1982
Dimensions in Inch / mm



Nominal Diameter Inch	Thread per Inch	Thread Length mm	Overall Length mm	Shank Dia mm	Square Size mm
1/8	28	15	59	8.0	6.3
1/4	19	19	67	10.0	8.0
3/8	19	21	75	12.5	10.0
1/2	14	26	87	16.0	12.5
5/8	14	26	91	18.0	14.0
3/4	14	28	96	20.0	16.0
7/8	14	29	102	22.4	18.0
1	11	33	109	25.0	20.0
1.1/8	11	34	115	28.0	22.40
1.1/4	11	36	119	31.5	25.0

Nominal Diameter Inch	Thread per Inch	Thread Length mm	Overall Length mm	Shank Dia mm	Square Size mm
1.1/2	11	37	125	35.5	28.0
1.3/4	11	39	132	35.5	28.0
2	11	41	140	40.0	31.5
2.1/4	11	42	142	40.0	31.5
2.1/2	11	45	153	45.0	35.5
2.3/4	11	46	160	50.0	40.0
3	11	48	164	50.0	40.0
3.1/2	11	50	173	63.0	50.0
4	11	53	185	71.0	56.0

Manufactured with whitworth thread form with Straight flutes and a shank with square for driving.

Usually supplied in sets consisting of two taps, viz. Taper and Bottoming.



High Speed Steel GROUND THREAD HAND TAPS BSP (Taper) 'Rc' Series

Specifications Conform to :
BS 949: Part 3 : 1982
Dimensions in Inch / mm



Nominal Diameter Inch	Thread per Inch	Thread Length mm	Overall Length mm	Shank Dia mm	Square Size mm
1/8	28	15	59	8.0	6.3
1/4	19	19	67	10.0	8.0
3/8	19	21	75	12.5	10.0
1/2	14	26	87	16.0	12.5
3/4	14	28	96	20.0	16.0
1	11	33	109	25.0	20.0

Nominal Diameter Inch	Thread per Inch	Thread Length mm	Overall Length mm	Shank Dia mm	Square Size mm
1.1/4	11	36	119	31.5	25.0
1.1/2	11	37	125	35.5	28.0
2	11	41	140	40.0	31.5
2.1/2	11	45	153	45.0	35.5
3	11	48	164	50.0	40.0
4	11	53	185	71.0	56.0

Manufactured with Straight flutes and a shank with square for driving.

Usually supplied in sets consisting of two taps, viz. Taper and Bottoming.



**High Speed Steel
GROUND THREAD HAND TAPS**
American National Taper Pipe Taps (NPT)

Specifications Conform to :
BS 949: 1969
Dimensions in Inches



Nominal Diameter Inch	Thread per Inch	Thread Length	Overall Length	Shank Dia	Square Size
1/8	27	3/4	2.1/8	0.318	0.238
1/4	18	1.1/16	2.7/16	0.429	0.322
3/8	18	1.1/16	2.9/16	0.542	0.406
1/2	14	1.3/8	3.1/8	0.687	0.515
3/4	14	1.3/8	3.1/4	0.906	0.679
1	11.1/2	1.3/4	3.3/4	1.125	0.843
1.1/4	11.1/2	1.3/4	4	1.312	0.984

Nominal Diameter Inch	Thread per Inch	Thread Length	Overall Length	Shank Dia	Square Size
1.1/2	11.1/2	1.3/4	4.1/4	1.500	1.125
2	11.1/2	1.3/4	4.1/2	1.875	1.406
2.1/2	8	2.9/16	5.1/2	2.250	1.687
3	8	2.5/8	6	2.625	1.968
3.1/2	8	2.11/16	6.1/2	2.812	2.108
4	8	2.3/4	6.3/4	3.000	2.250

Manufactured with Straight flutes and a shank with square for driving.

Usually supplied in sets consisting of two taps , viz. Taper and Bottoming.



**High Speed Steel
GROUND THREAD LONG SHANK
MACHINE SCREWING TAPS**
For ISO Metric Coarse Pitch Threads

Specifications Conform to :
IS 6175 : Part 4 : 1991
Dimensions in mm



Nominal Diameter	Pitch	Thread Length	Overall Length	Shank Dia	Square Size
6	1.00	19	89.0	4.5	3.55
7	1.00	19	89.0	5.6	4.50
8	1.25	22	97.0	6.3	5.00
9	1.25	22	97.0	7.1	5.60
10	1.50	24	108.0	8.0	6.30
11	1.50	25	115.0	8.0	6.30
12	1.75	29	119.0	9.0	7.10
14	2.00	30	127.0	11.2	9.00
16	2.00	32	137.0	12.5	10.00
18	2.50	37	149.0	14.0	11.20
20	2.50	37	149.0	14.0	11.20
22	2.50	38	158.0	16.0	12.50
24	3.00	45	172.0	18.0	14.00

Nominal Diameter	Pitch	Thread Length	Overall Length	Shank Dia	Square Size
27	3.00	45	180.0	20.0	16.0
30	3.50	48	183.0	20.0	16.0
33	3.50	51	201.0	22.4	18.0
36	4.00	57	214.5	25.0	20.0
39	4.00	60	225.0	28.0	22.4
42	4.50	60	225.0	28.0	22.4
45	4.50	67	247.0	31.5	25.0
48	5.00	67	247.0	31.5	25.0
52	5.00	70	265.0	35.5	28.0
56	5.50	70	265.0	35.5	28.0
60	5.50	76	293.5	40.0	31.5
64	6.00	79	296.5	40.0	31.5
68	6.00	79	311.5	45.00	35.5

Manufactured with Straight flutes and a long shank with a driving square for machine tapping.

Type 'A' - 5 Degree Taper Angle with Long Taper Lead.

Type 'B' - 10 Degree Taper Angle with Spiral Point.

Type 'C' - 20 Degree Taper Angle with Shorter Taper Lead.

Type 'D' - 10 Degree Taper Angle without Spiral Point.

Unless otherwise specified the Screwing Taps shall be supplied with tolerance class 6H .



**High Speed Steel
GROUND THREAD LONG SHANK
MACHINE SCREWING TAPS**
For ISO Metric Fine Pitch Threads

Specifications Conform to :
IS 6175 : Part 4 : 1991
Dimensions in mm



Nominal Diameter	Pitch	Thread Length	Overall Length	Shank Dia	Square Size
6	0.75	19	89	4.5	3.55
7	0.75	19	89	5.6	4.50
8	0.75	16	91	6.3	5.00
8	1.00	19	97	6.3	5.00
9	0.75	16	94	7.1	5.60
9	1.00	19	97	7.1	5.60
10	0.75	17	104	8.0	6.30
10	1.00	20	108	8.0	6.30
10	1.25	20	108	8.0	6.30
11	0.75	20	110	8.0	6.30
11	1.00	20	110	8.0	6.30
12	1.00	20	110	9.0	7.10
12	1.25	24	119	9.0	7.10
12	1.50	29	119	9.0	7.10
14	1.00	22	124	11.2	9.00
14	1.25	25	127	11.2	9.00
14	1.50	30	127	11.2	9.00
15	1.00	22	124	11.2	9.00
15	1.50	30	127	11.2	9.00
16	1.00	22	127	12.5	10.00
16	1.50	32	137	12.5	10.00
17	1.00	22	127	12.5	10.00

Nominal Diameter	Pitch	Thread Length	Overall Length	Shank Dia	Square Size
17	1.50	32	137	12.5	10.0
18	1.00	22	135	14.0	11.2
18	1.50	29	142	14.0	11.2
18	2.00	37	149	14.0	11.2
20	1.00	27	140	14.0	11.2
20	1.50	29	142	14.0	11.2
20	2.00	37	149	14.0	11.2
22	1.00	29	149	16.0	12.5
22	1.50	33	153	16.0	12.5
22	2.00	38	158	16.0	12.5
24	1.00	29	157	18.0	14.0
24	1.50	35	172	18.0	14.0
24	2.00	35	172	18.0	14.0
25	1.00	29	157	18.0	14.0
25	1.50	35	163	18.0	14.0
25	2.00	35	163	18.0	14.0
26	1.50	35	163	18.0	14.0
26	2.00	35	163	18.0	14.0
27	1.00	30	165	20.0	16.0
27	1.50	37	172	20.0	16.0
27	2.00	37	172	20.0	16.0
28	1.00	30	165	20.0	16.0



**High Speed Steel
GROUND THREAD LONG SHANK
MACHINE SCREWING TAPS**
For ISO Metric Fine Pitch Threads

Specifications Conform to :
IS 6175 : Part 4 : 1991
Dimensions in mm



Nominal Diameter	Pitch	Thread Length	Overall Length	Shank Dia	Square Size
28	1.5	37	172.0	20.0	16.0
28	2.0	37	172.0	20.0	16.0
30	1.0	30	165.0	20.0	16.0
30	1.5	37	172.0	20.0	16.0
30	2.0	37	172.0	20.0	16.0
30	3.0	48	183.0	20.0	16.0
32	1.5	37	187.0	22.4	18.0
32	2.0	37	187.0	22.4	18.0
33	1.5	37	187.0	22.4	18.0
33	2.0	37	187.0	22.4	18.0
33	3.0	51	201.0	22.4	18.0
35	1.5	39	196.5	25.0	20.0
36	1.5	39	196.5	25.0	20.0
36	2.0	39	196.5	25.0	20.0
36	3.0	57	214.5	25.0	20.0
38	1.5	39	204.0	28.0	22.4
39	1.5	39	204.0	28.0	22.4
39	2.0	39	204.0	28.0	22.4
39	3.0	60	225.0	28.0	22.4
40	1.5	39	204.0	28.0	22.4
40	2.0	39	204.0	28.0	22.4

Nominal Diameter	Pitch	Thread Length	Overall Length	Shank Dia	Square Size
40	3.0	60	225.0	28.0	22.4
42	1.5	39	204.0	28.0	22.4
42	2.0	39	204.0	28.0	22.4
42	3.0	60	225.0	28.0	22.4
42	4.0	60	225.0	28.0	22.4
45	1.5	45	225.0	31.5	25.0
45	2.0	45	225.0	31.5	25.0
45	3.0	67	247.0	31.5	25.0
45	4.0	67	247.0	31.5	25.0
48	1.5	45	225.0	31.5	25.0
48	2.0	45	225.0	31.5	25.0
48	3.0	67	247.0	31.5	25.0
48	4.0	67	247.0	31.5	25.0
50	1.5	45	225.0	31.5	25.0
50	2.0	45	225.0	31.5	25.0
50	3.0	67	247.0	31.5	25.0
52	1.5	45	240.0	35.5	28.0
52	2.0	45	240.0	35.5	28.0
52	3.0	70	265.0	35.5	28.0
52	4.0	70	265.0	35.5	28.0

Type 'A' - 5 Degree Taper Angle with Long Taper Lead.

Type 'B' - 10 Degree Taper Angle with Spiral Point.

Type 'C' - 20 Degree Taper Angle with Shorter Taper Lead.

Type 'D' - 10 Degree Taper Angle without Spiral Point.

Unless otherwise specified the Screwing Taps shall be supplied with tolerance class 6H .



High Speed Steel
GROUND THREAD NUT SCREWING TAPS
 For ISO Metric Coarse Pitch Threads

Specifications Conform to :
 IS 6175 : Part 5 : 1991
 Dimensions in mm



Nominal Diameter	Pitch	Thread Length	Overall Length	Shank Dia	Square Size
6	1.00	32	110	4.5	3.55
7	1.00	36	110	5.6	4.50
8	1.25	40	125	6.3	5.00
9	1.25	40	140	7.1	5.60
10	1.50	45	140	8.0	6.30
11	1.50	45	160	8.0	6.30
12	1.75	50	180	9.0	7.10
14	2.00	56	200	11.2	9.00
16	2.00	63	200	12.5	10.00
18	2.50	63	220	14.0	11.20
20	2.50	70	250	14.0	11.20

Nominal Diameter	Pitch	Thread Length	Overall Length	Shank Dia	Square Size
22	2.50	80	280	16.0	12.50
24	3.00	80	280	18.0	14.00
27	3.00	90	315	20.0	16.0
30	3.50	100	315	20.0	16.0
33	3.50	110	355	22.4	18.0
36	4.00	110	400	25.0	20.0
39	4.00	125	400	28.0	22.4
42	4.50	125	450	28.0	22.4
45	4.50	140	500	31.5	25.0
48	5.00	140	500	31.5	25.0

Manufactured with Straight flutes and a long shank with a driving square for machine tapping of nuts.

Unless otherwise specified the Screwing Taps shall be supplied with tolerance class 6H .



High Speed Steel GROUND THREAD NUT TAPS BSW FORM

Specifications Conform to:
BS 949 - 1969
(Zone 3)
Dimensions in mm



Nominal Diameter Inch	Thread per Inch	Thread Length mm	Overall Length mm	Shank Dia mm	Square Size mm
1/4	20	38	110	4.5	3.55
5/16	18	42	120	6.00	4.50
3/8	16	48	140	7.00	5.60
7/16	14	55	160	8.00	6.30
1/2	12	64	180	9.50	7.50
9/16	12	64	200	11.20	9.00
5/8	11	70	200	12.50	10.00
3/4	10	76	250	14.00	11.20

Nominal Diameter Inch	Thread per Inch	Thread Length mm	Overall Length mm	Shank Dia mm	Square Size mm
7/8	9	85	280	16.0	12.5
1	8	95	280	18.0	14.0
1.1/8	7	109	315	20.0	16.0
1.1/4	7	109	355	22.4	18.0
1.1/2	6	127	400	28.0	22.4
1.3/4	5	153	500	31.5	25.0
2	4.1/2	170	560	35.5	28.0

Manufactured with Straight flutes and a long shank with a square for machine tapping of nuts.



**High Speed Steel
GROUND THREAD NUT SCREWING TAPS
BSF FORM**

Specifications Conform to:
BS 949 - 1969
(Zone 3)
Dimensions in mm



Nominal Diameter Inch	Thread per Inch	Thread Length mm	Overall Length mm	Shank Dia mm	Square Size mm
1/4	26	30	110	4.5	3.55
5/16	22	35	120	6.00	4.50
3/8	20	38	140	7.00	5.60
7/16	18	43	160	8.00	6.30
1/2	16	48	180	9.50	7.50
9/16	16	48	200	11.20	9.00
5/8	14	55	200	12.50	10.00
3/4	12	64	250	14.00	11.20
7/8	11	70	280	16.0	12.5

Nominal Diameter Inch	Thread per Inch	Thread Length mm	Overall Length mm	Shank Dia mm	Square Size mm
1	10	76	280	18.0	14.0
1.1/8	9	85	315	20.0	16.0
1.1/4	9	85	355	22.4	18.0
1.3/8	8	95	400	25.0	20.0
1.1/2	8	95	400	28.0	22.4
1.5/8	8	95	450	28.0	22.4
1.3/4	7	109	500	31.5	25.0
2	7	109	560	35.5	28.0

Manufactured with Straight flutes and a long shank with a driving square for machine tapping of nuts.



High Speed Steel GROUND THREAD NUT TAPS UNC FORM

Specifications Conform to:
BS 949 - 1969
(Zone 3)
Dimensions in mm



Nominal Diameter Inch	Thread per Inch	Thread Length mm	Overall Length mm	Shank Dia mm	Square Size mm
1/4	20	38	110	4.5	3.55
5/16	18	43	125	6.00	4.50
3/8	16	48	140	7.00	5.60
7/16	14	55	160	8.00	6.30
1/2	13	59	180	9.50	7.50
9/16	12	64	200	11.20	9.00
5/8	11	70	200	12.50	10.00
3/4	10	76	250	14.00	11.20
7/8	9	85	280	16.0	12.5

Nominal Diameter Inch	Thread per Inch	Thread Length mm	Overall Length mm	Shank Dia mm	Square Size mm
1	8	95	280	18.0	14.0
1.1/8	7	109	315	20.0	16.0
1.1/4	7	109	355	22.4	18.0
1.3/8	6	127	400	25	20
1.1/2	6	127	400	28.0	22.4
1.3/4	5	153	500	31.5	25.0
2	4.1/2	170	560	35.5	28.0

Manufactured with Straight flutes and a long shank with a square for machine tapping of nuts.



**High Speed Steel
GROUND THREAD NUT TAPS
UNF FORM**

Specifications Conform to :
BS 949 - 1969
(Zone 3)
Dimensions in mm



Nominal Diameter Inch	Thread per Inch	Thread Length mm	Overall Length mm	Shank Dia mm	Square Size mm
1/4	28	28	110	4.5	3.55
5/16	24	32	125	6.00	4.50
3/8	24	32	140	7.00	5.60
7/16	20	38	160	8.00	6.30
1/2	20	38	180	9.50	7.50
9/16	18	43	200	11.20	9.00
5/8	18	43	200	12.50	10.00

Nominal Diameter Inch	Thread per Inch	Thread Length mm	Overall Length mm	Shank Dia mm	Square Size mm
3/4	16	48	250	14.00	11.20
7/8	14	55	280	16.0	12.5
1	12	64	280	18.0	14.0
1.1/8	12	64	315	20.0	16.0
1.1/4	12	64	355	22.4	18.0
1.3/8	12	64	400	25.0	20.0
1.1/2	12	64	400	28.0	22.4

Manufactured with Straight flutes and a long shank with a square for machine tapping of nuts.



High Speed Steel GROUND THREAD HAND TAPS For ISO Metric Coarse Pitch Threads

Specifications Conform to
DIN 352 - 1981
Dimensions in mm



Nominal Diameter	Pitch	Thread Length	Overall Length	Shank Dia	Square Size
3.0	0.5	11	40	3.5	2.7
3.5	0.6	13	45	4.0	3.0
4.0	0.7	13	45	4.5	3.4
4.5	0.75	16	50	6.0	4.9
5.0	0.8	16	50	6.0	4.9
6.0	1.0	19	50	6.0	4.9
7.0	1.0	19	50	6.0	4.9
8.0	1.25	22	56	6.0	4.9
9.0	1.25	22	63	7.0	5.5
10.0	1.5	24	70	7.0	5.5
11.0	1.5	24	70	8.0	6.2
12.0	1.75	29	75	9.0	7.0
14.0	2.0	30	80	11.0	9.0
16.0	2.0	32	80	12.0	9.0
18.0	2.5	40	95	14.0	11.0
20.0	2.5	40	95	16.0	12.0

Nominal Diameter	Pitch	Thread Length	Overall Length	Shank Dia	Square Size
22	2.5	40	100	18.0	14.5
24	3.0	50	110	18.0	14.5
27	3.0	50	110	20.0	16.0
30	3.5	56	125	22.0	18.0
33	3.5	56	125	25.0	20.0
36	4.0	63	150	28.0	22.0
39	4.0	63	150	32.0	24.0
42	4.5	63	150	32.0	24.0
45	4.5	70	160	36.0	29.0
48	5.0	75	180	36.0	29.0
52	5.0	75	180	40.0	32.0
56	5.5	85	200	45.0	35.0
60	5.5	85	200	45.0	35.0
64	6.0	90	220	50.0	39.0
68	6.0	90	220	50.0	39.0

Manufactured with Straight flutes and a shank with square for driving.

Usually supplied in sets consisting of Three serial Hand Taps viz., Rougher, Intermediate and Finisher tap. Unless otherwise Specified, the screwing taps shall be supplied with tolerance class '6H'.



High Speed Steel
GROUND THREAD HAND TAPS
 For ISO Metric Fine Pitch Threads

Specifications Conform to
 DIN 2181 - 1981
 Dimensions in mm



Nominal Diameter	Pitch	Thread Length	Overall Length	Shank Dia	Square Size
4.0	0.5	10	45	4.5	3.4
5.0	0.5	12	50	6.0	4.9
5.5	0.5	12	50	6.0	4.9
6.0	0.75	14	50	6.0	4.9
7.0	0.75	14	50	6.0	4.9
8.0	0.75	19	50	6.0	4.9
8.0	1.0	22	56	6.0	4.9
9.0	0.75	19	56	7.0	5.5
9.0	1.0	22	63	7.0	5.5
10.0	0.75	20	63	7.0	5.5
10.0	1.0	20	63	7.0	5.5
10.0	1.25	24	70	7.0	5.5
11.0	0.75	20	63	8.0	6.2
11.0	1.0	20	63	8.0	6.2
12.0	1.0	22	70	9.0	7.0
12.0	1.25	22	70	9.0	7.0

Nominal Diameter	Pitch	Thread Length	Overall Length	Shank Dia	Square Size
12	1.5	22	70	9.0	7.0
14	1.0	22	70	11.0	9.0
14	1.25	22	70	11.0	9.0
14	1.5	22	70	11.0	9.0
15	1.0	22	70	12.0	9.0
15	1.5	22	70	12.0	9.0
16	1.0	22	70	12.0	9.0
16	1.5	22	70	12.0	9.0
18	1.0	22	80	14.0	11.0
18	1.5	22	80	14.0	11.0
20	1.0	22	80	16.0	12.0
20	1.5	22	80	16.0	12.0
22	1.0	22	80	18.0	14.5
22	1.5	22	80	18.0	14.5
24	1.0	22	90	18.0	14.5
24	1.5	22	90	18.0	14.5

Manufactured with Straight flutes and a shank with square for driving.

Usually supplied in sets consisting of Two serial Hand Taps viz., Rougher and Finisher tap.
 Unless otherwise Specified, the screwing taps shall be supplied with tolerance class '6H'.



High Speed Steel GROUND THREAD HAND TAPS For ISO Metric Fine Pitch Threads

Specifications Conform to :
DIN 2181 - 1981
Dimensions in mm



Nominal Diameter	Pitch	Thread Length	Overall Length	Shank Dia	Square Size
24	2.0	22	90	18	14.5
25	1.5	22	90	18	14.5
25	2.0	22	90	18	14.5
27	1.5	22	90	20	16.0
27	2.0	22	90	20	16.0
28	1.5	22	90	20	16.0
28	2.0	22	90	20	16.0
30	1.5	22	90	22	18.0
30	2.0	22	90	22	18.0
32	1.5	22	90	22	18.0
32	2.0	22	90	22	18.0
33	1.5	25	100	25	20.0
33	2.0	25	100	25	20.0
36	1.5	25	100	28	22.0
36	2.0	40	125	28	22.0
36	3.0	40	125	28	22.0
39	1.5	25	110	32	24.0
39	2.0	40	125	32	24.0
39	3.0	40	125	32	24.0

Nominal Diameter	Pitch	Thread Length	Overall Length	Shank Dia	Square Size
40	1.5	25	110	32	24.0
40	2.0	40	125	32	24.0
40	3.0	40	125	32	24.0
42	1.5	25	110	32	24.0
42	2.0	40	125	32	24.0
42	3.0	40	125	32	24.0
45	1.5	25	110	36	29.0
45	2.0	40	125	36	29.0
45	3.0	40	125	36	29.0
48	1.5	40	140	36	29.0
48	2.0	40	140	36	29.0
48	3.0	40	140	36	29.0
50	1.5	40	140	36	29.0
50	2.0	40	140	36	29.0
50	3.0	40	140	36	29.0
52	1.5	40	140	40	32.0
52	2.0	40	140	40	32.0
52	3.0	40	140	40	32.0



TECHNICAL INFORMATION

1. Tap Drill Sizes
2. Calculation of Thread Dimensions of Serial Screwing Taps
3. Chamfer Dimensions
4. Cutting Parameters in Tapping & Recommended Cutting fluids



TAP DRILL SIZES
Recommendations for drills for use prior to tapping
Screw Threads - ISO metric thread
(Nut Tolerance : 5H, 6H & 7H.)

Ref: IS 10952 - 1984

Nominal Diameter mm	Pitch mm	Drill Dia mm
1.0	0.25	0.75
1.1	0.25	0.85
1.2	0.25	0.95
1.4	0.30	1.10
1.6	0.35	1.25
1.8	0.35	1.45
2.0	0.40	1.60
2.2	0.45	1.75
2.5	0.35	2.15
2.5	0.45	2.05
3.0	0.35	2.65
3.0	0.50	2.50
3.5	0.35	3.15
3.5	0.60	2.90
4.0	0.50	3.50
4.0	0.70	3.30
4.5	0.50	4.00
4.5	0.75	3.70
5.0	0.50	4.50
5.0	0.80	4.20
5.5	0.50	5.00
6.0	0.75	5.20
6.0	1.0	5.00
7.0	0.75	6.20
7.0	1.0	6.00
8.0	0.75	7.20
8.0	1.00	7.00
8.0	1.25	6.80
9.0	0.75	8.20
9.0	1.00	8.00
9.0	1.25	7.80
10.0	0.75	9.20
10.0	1.00	9.00
10.0	1.25	8.80
10.0	1.50	8.50
11.0	0.75	10.20
11.0	1.00	10.00

Nominal Diameter mm	Pitch mm	Drill Dia mm
11.0	1.50	9.5
12.0	1.00	11.0
12.0	1.25	10.8
12.0	1.50	10.5
12.0	1.75	10.2
14.0	1.00	13.0
14.0	1.25	12.8
14.0	1.50	12.5
14.0	2.00	12.0
15.0	1.00	14.0
15.0	1.50	13.50
16.0	1.00	15.0
16.0	1.50	14.5
16.0	2.00	14.0
17.0	1.00	16.0
17.0	1.50	15.5
18.0	1.00	17.0
18.0	1.50	16.5
18.0	2.00	16.0
18.0	2.50	15.5
20.0	1.00	19.0
20.0	1.50	18.5
20.0	2.00	18.0
20.0	2.50	17.5
22.0	1.00	21.0
22.0	1.50	20.5
22.0	2.00	20.0
22.0	2.50	19.5
24.0	1.00	23.0
24.0	1.50	22.5
24.0	2.00	22.0
24.0	3.00	21.0
25.0	1.00	24.0
25.0	1.50	23.5
25.0	2.00	23.0
26.0	1.50	24.5
27.0	1.00	26.0



TAP DRILL SIZES
Recommendations for drills for use prior to tapping
Screw Threads - ISO metric thread
(Nut Tolerance : 5H, 6H & 7H.)

Ref: IS 10952 - 1984

Nominal Diameter mm	Pitch mm	Drill Dia mm
27	1.5	25.5
27	2.0	25.0
27	3.0	24.0
28	1.0	27.0
28	1.5	26.5
28	2.0	26.0
30	1.0	29.0
30	1.5	28.5
30	2.0	28.0
30	3.0	27.0
30	3.5	26.5
32	1.5	30.5
32	2.0	30.0
33	1.5	31.5
33	2.0	31.0
33	3.0	30.0
33	3.5	29.5
35	1.5	33.5
36	1.5	34.5
36	2.0	34.0
36	3.0	33.0
36	4.0	32.0
38	1.5	36.5
39	1.5	37.5
39	2.0	37.0
39	3.0	36.0
39	4.0	35.0

Nominal Diameter mm	Pitch mm	Drill Dia mm
40	1.5	38.5
40	2.0	38.0
40	3.0	37.0
42	1.5	40.5
42	2.0	40.0
42	3.0	39.0
42	4.0	38.0
42	4.5	37.5
45	1.5	43.5
45	2.0	43.0
45	3.0	42.0
45	4.0	41.0
45	4.5	40.5
48	1.5	46.5
48	2.0	46.0
48	3.0	45.0
48	4.0	44.0
48	5.0	43.0
50	1.5	48.5
50	2.0	48.0
50	3.0	47.0
52	1.5	50.5
52	2.0	50.0
52	3.0	49.0
52	4.0	48.0
52	5.0	47.0
56	5.5	50.5

NOTE:

- 1) Specified sizes of drills to be used prior to tapping parallel screw threads are for normal length of engagement (Ref: IS 4218 -Part IV).
- 2) The diameter of a hole produced by a drill depends to some extent upon the degree of accuracy to which the drill point is ground, the material being drilled, lubricant used, and the alignment feed and speed of operation.
- 3) When tapping relatively soft material there is a tendency for the material to be squeezed down towards the root and in such cases, the minor diameter of the tapped hole may become smaller than the diameter of the drill used. The tendency is very much less with harder materials, and in some cases, is entirely absent.



TAP DRILL SIZES
Recommendations for drills for use prior to tapping
Screw Threads - BSW and BSF Forms

BSW : BRITISH STD. WHITWORTH		
Nominal Dia Inch	TPI	Drill dia. mm
1/8	40.0	2.55
3/16	24.0	3.70
1/4	20.0	5.10
5/16	18.0	6.50
3/8	16.0	7.90
7/16	14.0	9.30
1/2	12.0	10.50
9/16	12.0	12.10
5/8	11.0	13.50
11/16	11.0	15.00
3/4	10.0	16.25
7/8	9.0	19.25
1	8.0	22.00
1 - 1/8	7.0	24.75
1 - 1/4	7.0	28.00
1 - 1/2	6.0	33.50
1 - 3/4	5.0	39.00
2	4.5	44.50

BSF : BRITISH STD. FINE		
Nominal Dia Inch	TPI	Drill dia. mm
3/16	32	4.00
7/32	28	4.60
1/4	26	5.30
9/32	26	6.10
5/16	22	6.80
3/8	20	8.30
7/16	18	9.70
1/2	16	11.10
9/16	16	12.70
5/8	14	14.00
11/16	14	15.50
3/4	12	16.75
7/8	11	19.75
1	10	22.75
1 - 1/8	9	25.50
1 - 1/4	9	28.50
1 - 3/8	8	31.50
1 - 1/2	8	34.50

NOTE :

1. The diameter of a hole produced by a drill depends to some extent upon the degree of accuracy to which the drill point is ground, the material being drilled, lubricant used, and the alignment, feed and speed of operation.
2. When tapping relatively soft material there is a tendency for the material to be squeezed down towards the root and in such cases, the minor diameter of the tapped hole may become smaller than the diameter of the drill used. The tendency is very much less with harder materials, and in some cases, is entirely absent.



TAP DRILL SIZES
Recommendations for drills for use prior to tapping
Screw Threads - UNC and UNF Forms

UNC : UNIFIED COARSE		
Nominal Dia. Inch	TPI	Drill dia. mm
No.1	64.0	1.55
No.2	56.0	1.85
No.3	48.0	2.10
No.4	40.0	2.35
No.5	40.0	2.65
No.6	32.0	2.85
No.8	32.0	3.50
No.10	24.0	3.90
No.12	24.0	4.50
1/4	20.0	5.10
5/16	18.0	6.60
3/8	16.0	8.00
7/16	14.0	9.40
1/2	13.0	10.80
9/16	12.0	12.20
5/8	11.0	13.50
3/4	10.0	16.50
7/8	9.0	19.50
1	8.0	22.25
1 - 1/8	7.0	25.00
1 - 1/4	7.0	28.00
1 - 3/8	6.0	30.75
1 - 1/2	6.0	34.00
1 - 3/4	5.0	39.50
2	4.5	45.00

UNF : UNIFIED FINE		
Nominal Dia. Inch	TPI	Drill dia. mm
No.0	80	1.25
No.1	72	1.55
No.2	64	1.90
No.3	56	2.15
No.4	48	2.40
No.5	44	2.70
No.6	40	2.95
No.8	36	3.50
No.10	32	4.10
No.12	28	4.70
1/4	28	5.50
5/16	24	6.90
3/8	24	8.50
7/16	20	9.90
1/2	20	11.50
9/16	18	12.90
5/8	18	14.50
3/4	16	17.50
7/8	14	20.40
1	12	23.25
1 - 1/8	12	26.50
1 - 1/4	12	29.50
1 - 3/8	12	32.75
1 - 1/2	12	36.00



TAP DRILL SIZES

Pipe Threads - Taper 'Rc' Series			
Nominal Dia Inch	Threads Per Inch	Hole Diameter Cylinder. mm	Hole Diameter Tapered. mm*
1/8	28	8.3	8.5
1/4	19	11.0	11.4
3/8	19	14.5	14.9
1/2	14	18.1	18.5
3/4	14	23.5	24.0
1	11	29.6	30.1
1 - 1/4	11	38.1	38.8
1 - 1/2	11	44.0	44.7
2	11	55.6	56.5

Pipe Threads - Parallel 'Rp' Series		
Nominal Dia Inch	Threads Per Inch	Hole Diameter Cylinder mm
1/8	28	8.60
1/4	19	11.50
3/8	19	15.00
1/2	14	18.50
3/4	14	24.00
1	11	30.25
1 - 1/4	11	39.00
1 - 1/2	11	45.00
2	11	56.50

* Large Dia

Pipe Threads - Parallel 'G' Series		
Nominal Dia Inch	Threads Per Inch	Drill dia mm
1/8	28	8.80
1/4	19	11.80
3/8	19	15.25
1/2	14	19.00
5/8	14	21.00
3/4	14	24.50
7/8	14	28.25
1	11	30.75
1 - 1/4	11	39.50
1 - 1/2	11	45.00
1.3/4	11	51.00
2	11	57.00

American National Taper Pipe Hand Taps (NPT)			
Nominal Dia Inch	Threads Per Inch	Hole Dia. Cylinder. mm	Hole Diameter Tapered. mm*
1/8	27	8.5	8.7
1/4	18	11.0	11.3
3/8	18	14.4	14.7
1/2	14	17.8	18.2
3/4	14	23.1	23.6
1	11.1/2	29.1	29.6
1 - 1/4	11.1/2	37.8	38.3
1 - 1/2	11.1/2	43.9	44.4
2	11.1/2	55.9	56.4

* Large Dia



CALCULATION OF THREAD DIMENSIONS OF SERIAL SCREWING TAPS

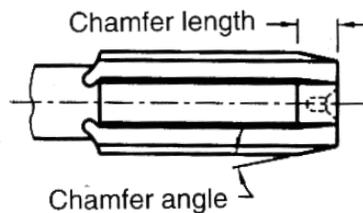
No. of Taps in a set.	Type	Major Diameter Min	Pitch Diameter	
			Min	Max
3	Rougher	$dB \text{ Min} - 0.75 P$	$d2B \text{ Min} - 0.25P$	$d2B \text{ Max} - 0.25P$
	Intermediate	$dB \text{ Min} - 0.35 P$	$d2B \text{ Min} - 0.08P$	$d2B \text{ Max} - 0.08P$
	Finisher	$dB \text{ Min}$	$d2B \text{ Min}$	$d2B \text{ Max}$
2	Rougher	$dB \text{ Min} - 0.45 P$	$d2B \text{ Min} - 0.12P$	$d2B \text{ Max} - 0.12P$
	Finisher	$dB \text{ Min}$	$d2B \text{ Min}$	$d2B \text{ Max}$

Where,

- $dB \text{ Min}$ = Minimum Major Diameter of finisher tap
- $d2B \text{ Min}$ = Minimum Pitch Diameter of finisher tap
- $d2B \text{ Max}$ = Maximum Pitch Diameter of finisher tap
- P = Pitch of the Tap Threads.



CHAMFER DIMENSIONS



Taps in set	Types of Taps		Chamfer angle in degrees	Chamfer length approx.
	Serial	Non - Serial		
3 (for Coarse Pitch)	Rougher	Taper	5	8 threads
	Intermediate	Second	10	4 threads
	Finisher	Bottoming	20	* 2 to 3 threads
2 (for fine Pitch)	Rougher	Taper	7	6 threads
	Finisher	Bottoming	20	* 2 to 3 threads
1	Nut		2	20 threads

* The approximate word indicated in the column heading is not applicable here as the range has been specified.



CUTTING PARAMETERS IN TAPPING & RECOMMENDED CUTTING FLUIDS

The Suggested peripheral speed shown in the following table is only starting points which must be varied considerably to suit service conditions.

Work Material	Speed ' Vc '		Fluids
	Metre / Min	Ft. / Min	
Aluminium	15 - 45	50 - 150	Kerosene & Lard Oil or Kerosene & Light Oil
Aluminum Bronze	6 - 24	20 - 80	Soluble Oil
Backelite	15 - 30	50 - 100	Dry
Brass	15 - 60	50 - 200	Soluble Oil or Light Base Oil
Cast Iron	15 - 30	50 - 100	Dry or Soluble Oil
Copper	9 - 18	30 - 60	Mineral Oil with Lard or Light Base Oil.
Fibre	24 - 27	80 - 90	Dry
Magnesium	22 - 60	75 - 200	Light Base Oil Diluted with 40% - 50 % Kerosene.
Malleable Iron	10 - 18	35 - 60	Soluble Oil or Sulphur Base Oil.
Manganese Bronze	9 - 18	30 - 60	Mineral Oil with lard or Light base oil.
Monel Metal.	6 - 12	20 - 40	Sulphur Base Oil.
Naval Brass	24 - 30	80 - 100	Mineral Oil with Lard or Light Base Oil.
Phosphor Bronze	9 - 18	30 - 60	Mineral Oil with Lard or Light Base Oil.
PLASTICS :			
Thermo - plastic	15 - 30	50 - 100	Dry or Air Jet
Thermo - Setting	15 - 30	50 - 100	Dry or Air Jet
STEELS :			
Free Machining AISI 1100 Series	18 - 30	60 - 100	Soluble or Sulphur Base Oil.
Low carbon (upto 0.25%)	12 - 24	60 - 80	Soluble or Sulphur Base Oil.
Medium Carbon Annealed (0.3 to 0.6%)	9 - 18	30 - 60	Sulphur Base Oil
Heat Treated (0.3 to 0.6 % Carbon) 224 - 283 Brinell	7 - 15	25 - 50	Chlorinated Sulphur Base Oil
Stainless Steel	1.5 - 10	5 - 35	Chlorinated Sulphur Base Oil
Titanium Alloys	3 - 12	10 - 40	Chlorinated Sulphur Base Oil
Zinc - Die Castings	18 - 45	60 - 150	Kerosene & Lard Oil.



MICRO GRAIN SOLID CARBIDE TOOLS



A Cut Above the Rest



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**MICRO GRAIN SOLID CARBIDE
STRAIGHT SHANK DRILLS
(JOBBER SERIES)**

Specifications Conform to:
IS 5101 / DIN 338
Dimensions in mm



Drill Diameter h7	Shank Diameter h6	Flute Length	Overall Length
1.00	1.00	12	34
1.10	1.10	14	36
1.20	1.20	16	38
1.30	1.30	16	38
1.40	1.40	18	40
1.50	1.50	18	40
1.60	1.60	20	43
1.70	1.70	20	43
1.80	1.80	22	46
1.90	1.90	22	46
2.00	2.00	24	49
2.10	2.10	24	49
2.20	2.20	27	53
2.30	2.30	27	53
2.40	2.40	30	57
2.50	2.50	30	57
2.60	2.60	30	57
2.70	2.70	33	61
2.80	2.80	33	61
2.90	2.90	33	61
3.00	3.00	33	61
3.10	3.10	36	65
3.20	3.20	36	65
3.30	3.30	36	65
3.40	3.40	39	70

Drill Diameter h7	Shank Diameter h6	Flute Length	Overall Length
3.50	3.50	39	70
3.60	3.60	39	70
3.70	3.70	39	70
3.80	3.80	43	75
3.90	3.90	43	75
4.00	4.00	43	75
4.10	4.10	43	75
4.20	4.20	43	75
4.30	4.30	47	80
4.40	4.40	47	80
4.50	4.50	47	80
4.60	4.60	47	80
4.70	4.70	47	80
4.80	4.80	52	86
4.90	4.90	52	86
5.00	5.00	52	86
5.10	5.10	52	86
5.20	5.20	52	86
5.30	5.30	52	86
5.40	5.40	57	93
5.50	5.50	57	93
5.60	5.60	57	93
5.70	5.70	57	93
5.80	5.80	57	93
5.90	5.90	57	93

SPIRAL ANGLE : 30° | POINT ANGLE : 118°
Drills are also available with Coating - TiN / TiAlN / TiCN



**MICRO GRAIN SOLID CARBIDE
STRAIGHT SHANK DRILLS
(JOBBER SERIES)**

Specifications Conform to :
IS 5101 / DIN 338
Dimensions in mm



Drill Diameter h7	Shank Diameter h6	Flute Length	Overall Length
6.00	6.00	57	93
6.10	6.10	63	101
6.20	6.20	63	101
6.30	6.30	63	101
6.40	6.40	63	101
6.50	6.50	63	101
6.60	6.60	63	101
6.70	6.70	63	101
6.80	6.80	69	109
6.90	6.90	69	109
7.00	7.00	69	109
7.10	7.10	69	109
7.20	7.20	69	109
7.30	7.30	69	109
7.40	7.40	69	109
7.50	7.50	69	109
7.60	7.60	75	117
7.70	7.70	75	117
7.80	7.80	75	117
7.90	7.90	75	117
8.00	8.00	75	117
8.10	8.10	75	117
8.20	8.20	75	117
8.30	8.30	75	117
8.40	8.40	75	117
8.50	8.50	75	117
8.60	8.60	81	125
8.70	8.70	81	125
8.80	8.80	81	125
8.90	8.90	81	125
9.00	9.00	81	125
9.10	9.10	81	125
9.20	9.20	81	125

Drill Diameter h7	Shank Diameter h6	Flute Length	Overall Length
9.30	9.30	81	125
9.40	9.40	81	125
9.50	9.50	81	125
9.60	9.60	87	133
9.70	9.70	87	133
9.80	9.80	87	133
9.90	9.90	87	133
10.00	10.00	87	133
10.10	10.10	87	133
10.20	10.20	87	133
10.30	10.30	87	133
10.40	10.40	87	133
10.50	10.50	87	133
10.60	10.60	87	133
10.70	10.70	94	142
10.80	10.80	94	142
10.90	10.90	94	142
11.00	11.00	94	142
11.10	11.10	94	142
11.20	11.20	94	142
11.30	11.30	94	142
11.40	11.40	94	142
11.50	11.50	94	142
11.60	11.60	94	142
11.70	11.70	94	142
11.80	11.80	94	142
11.90	11.90	101	151
12.00	12.00	101	151
12.10	12.10	101	151
12.20	12.20	101	151
12.30	12.30	101	151
12.40	12.40	101	151
12.50	12.50	101	151

HELIX ANGLE : 30° | POINT ANGLE : 118°
Drills are also available with Coating - TIN / TIALN / TiCN



**MICRO GRAIN SOLID CARBIDE
STRAIGHT SHANK DRILLS**
(JOBBER SERIES)

Specifications Conform to :
IS 5101 / DIN 338
Dimensions in mm



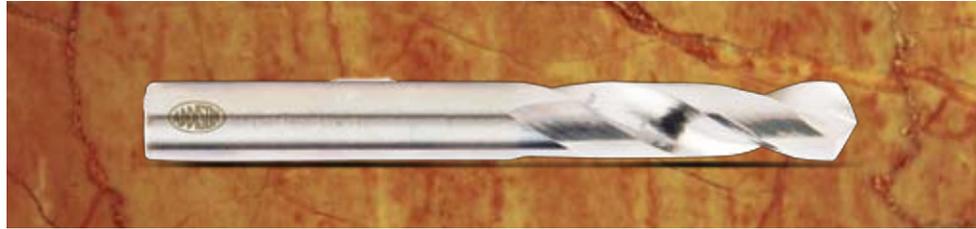
Drill Diameter h7	Shank Diameter h6	Flute Length	Overall Length
12.60	12.60	101	151
12.70	12.70	101	151
12.80	12.80	101	151
12.90	12.90	101	151
13.00	13.00	101	151
13.10	13.10	101	151
13.20	13.20	101	151
13.30	13.30	108	160
13.40	13.40	108	160
13.50	13.50	108	160
13.60	13.60	108	160
13.70	13.70	108	160
13.80	13.80	108	160
13.90	13.90	108	160
14.00	14.00	108	160
14.25	14.25	114	169
14.50	14.50	114	169
14.75	14.75	114	169
15.00	15.00	114	169
15.25	15.25	120	178
15.50	15.50	120	178
15.75	15.75	120	178
16.00	16.00	120	178
17.00	17.00	125	184
18.00	18.00	130	191
19.00	19.00	135	198
20.00	20.00	140	205

HELIX ANGLE : 30° | POINT ANGLE : 118°
Drills are also available with Coating - TIN / TiAlN / TiCN



**MICRO GRAIN SOLID CARBIDE
STRAIGHT SHANK DRILLS
(STUB SERIES)**

Specifications Conform to :
DIN 6539
Dimensions in mm



Drill Diameter h7	Shank Diameter h6	Flute Length	Overall Length
1.00	1.00	6	26
1.10	1.10	7	28
1.20	1.20	8	30
1.30	1.30	8	30
1.40	1.40	9	32
1.50	1.50	9	32
1.60	1.60	10	34
1.70	1.70	10	34
1.80	1.80	11	36
1.90	1.90	11	36
2.00	2.00	12	38
2.10	2.10	12	38
2.20	2.20	13	40
2.30	2.30	13	40
2.40	2.40	14	43
2.50	2.50	14	43
2.60	2.60	14	43
2.70	2.70	16	46
2.80	2.80	16	46
2.90	2.90	16	46
3.00	3.00	16	46
3.10	3.10	18	49
3.20	3.20	18	49
3.30	3.30	18	49
3.40	3.40	20	52

Drill Diameter h7	Shank Diameter h6	Flute Length	Overall Length
3.50	3.50	20	52
3.60	3.60	20	52
3.70	3.70	20	52
3.80	3.80	22	55
3.90	3.90	22	55
4.00	4.00	22	55
4.10	4.10	22	55
4.20	4.20	22	55
4.30	4.30	24	58
4.40	4.40	24	58
4.50	4.50	24	58
4.60	4.60	24	58
4.70	4.70	24	58
4.80	4.80	26	62
4.90	4.90	26	62
5.00	5.00	26	62
5.20	5.20	26	62
5.50	5.50	28	66
5.80	5.80	28	66
6.00	6.00	28	66
6.10	6.10	31	70
6.20	6.20	31	70
6.30	6.30	31	70
6.40	6.40	31	70
6.50	6.50	31	70

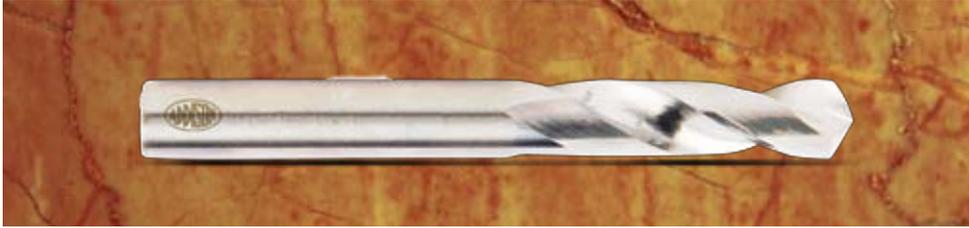
Drill Diameter h7	Shank Diameter h6	Flute Length	Overall Length
6.60	6.60	31	70
6.70	6.70	31	70
6.80	6.80	34	74
6.90	6.90	34	74
7.00	7.00	34	74
7.10	7.10	34	74
7.20	7.20	34	74
7.30	7.30	34	74
7.40	7.40	34	74
7.50	7.50	34	74
7.60	7.60	37	79
8.00	8.00	37	79
8.10	8.10	37	79
8.20	8.20	37	79
8.30	8.30	37	79
8.40	8.40	37	79
8.50	8.50	37	79
8.60	8.60	40	84
8.70	8.70	40	84
8.80	8.80	40	84
8.90	8.90	40	84
9.00	9.00	40	84

HELIX ANGLE : 30° | POINT ANGLE : 118°
Drills are also available with Coating - TIN / TIALN / TiCN



**MICRO GRAIN SOLID CARBIDE
STRAIGHT SHANK DRILLS
(STUB SERIES)**

Specifications Conform to :
DIN 6539
Dimensions in mm



Drill Diameter h7	Shank Diameter h6	Flute Length	Overall Length
9.10	9.10	40	84
9.20	9.20	40	84
9.30	9.30	40	84
9.40	9.40	40	84
9.50	9.50	40	84
9.60	9.60	43	89
9.70	9.70	43	89
9.80	9.80	43	89
9.90	9.90	43	89
10.00	10.00	43	89
10.10	10.10	43	89
10.20	10.20	43	89
10.30	10.30	43	89
10.40	10.40	43	89
10.50	10.50	43	89
10.60	10.60	43	89
10.70	10.70	47	95
10.80	10.80	47	95
10.90	10.90	47	95
11.00	11.00	47	95
11.10	11.10	47	95
11.20	11.20	47	95
11.30	11.30	47	95
11.40	11.40	47	95
11.50	11.50	47	95
11.60	11.60	47	95
11.70	11.70	47	95
11.80	11.80	47	95
11.90	11.90	51	102
12.00	12.00	51	102
12.10	12.10	51	102

Drill Diameter h7	Shank Diameter h6	Flute Length	Overall Length
12.20	12.20	51	102
12.30	12.30	51	102
12.40	12.40	51	102
12.50	12.50	51	102
12.60	12.60	51	102
12.70	12.70	51	102
12.80	12.80	51	102
12.90	12.90	51	102
13.00	13.00	51	102
13.10	13.10	51	102
13.20	13.20	51	102
13.30	13.30	54	107
13.40	13.40	54	107
13.50	13.50	54	107
13.60	13.60	54	107
13.70	13.70	54	107
13.80	13.80	54	107
13.90	13.90	54	107
14.00	14.00	54	107
14.50	14.50	56	111
15.00	15.00	56	111
15.50	15.50	58	115
16.00	16.00	58	115
16.50	16.50	60	119
17.00	17.00	60	119
17.50	17.50	62	123
18.00	18.00	62	123
18.50	18.50	64	127
19.00	19.00	64	127
19.50	19.50	66	131
20.00	20.00	66	131

HELIX ANGLE : 30° | POINT ANGLE : 118°
Drills are also available with Coating - TIN / TiAlN / TiCN



**MICRO GRAIN SOLID CARBIDE
STEPPED SHANK DRILLS (SHORT SERIES)
WITH INTERNAL COOLANT HOLES**

Specifications Conform to :
DIN 6537
Dimensions in mm



Drill Diameter m7	Shank Diameter h6	Flute Length	Overall Length
5.00	6.0	28	66
5.10	6.0	28	66
5.20	6.0	28	66
5.50	6.0	28	66
5.55	6.0	28	66
5.80	6.0	28	66
6.00	6.0	28	66
6.10	8.0	34	79
6.20	8.0	34	79
6.30	8.0	34	79
6.50	8.0	34	79
6.60	8.0	34	79
6.80	8.0	34	79
6.90	8.0	34	79
7.00	8.0	34	79
7.10	8.0	41	79
7.40	8.0	41	79
7.50	8.0	41	79
7.80	8.0	41	79
8.00	8.0	41	79
8.10	10.0	47	89
8.40	10.0	47	89
8.50	10.0	47	89
8.60	10.0	47	89
8.70	10.0	47	89
8.80	10.0	47	89
9.00	10.0	47	89
9.30	10.0	47	89
9.50	10.0	47	89
9.60	10.0	47	89
9.80	10.0	47	89
10.00	10.0	47	89
10.20	12.0	55	102
10.40	12.0	55	102
10.50	12.0	55	102
10.60	12.0	55	102
10.80	12.0	55	102
11.00	12.0	55	102

Drill Diameter m7	Shank Diameter h6	Flute Length	Overall Length
11.20	12.0	55	102
11.50	12.0	55	102
11.80	12.0	55	102
12.00	12.0	55	102
12.20	14.0	60	107
12.25	14.0	60	107
12.50	14.0	60	107
12.70	14.0	60	107
12.75	14.0	60	107
12.80	14.0	60	107
13.00	14.0	60	107
13.10	14.0	60	107
13.50	14.0	60	107
13.80	14.0	60	107
14.00	14.0	60	107
14.25	16.0	65	115
14.50	16.0	65	115
14.75	16.0	65	115
14.80	16.0	65	115
15.00	16.0	65	115
15.10	16.0	65	115
15.50	16.0	65	115
15.80	16.0	65	115
16.00	16.0	65	115
16.50	18.0	73	123
16.75	18.0	73	123
16.80	18.0	73	123
17.00	18.0	73	123
17.50	18.0	73	123
17.80	18.0	73	123
18.00	18.0	73	123
18.50	20.0	79	131
18.80	20.0	79	131
19.00	20.0	79	131
19.50	20.0	79	131
19.80	20.0	79	131
20.00	20.0	79	131

TYPE OF SHANK : Parallel Shank as per DIN 6535 HA. | **HELIX ANGLE :** 30° | **POINT ANGLE :** 140°

Drills are also available with - TIN Coating / TiAlN Coating / TiCN Coating

Application:- Machining for steels and Heat Resistant steels.



**MICRO GRAIN SOLID CARBIDE
STEPPED SHANK DRILLS (LONG SERIES)
WITH INTERNAL COOLANT HOLES**

Specifications Conform to :
DIN 6537
Dimensions in mm



Drill Diameter m7	Shank Diam- eter h6	Flute Length	Overall Length
5.00	6.0	44	82
5.10	6.0	44	82
5.20	6.0	44	82
5.50	6.0	44	82
5.55	6.0	44	82
5.80	6.0	44	82
6.00	6.0	44	82
6.10	8.0	53	91
6.20	8.0	53	91
6.30	8.0	53	91
6.50	8.0	53	91
6.60	8.0	53	91
6.80	8.0	53	91
6.90	8.0	53	91
7.00	8.0	53	91
7.10	8.0	53	91
7.40	8.0	53	91
7.50	8.0	53	91
7.80	8.0	53	91
8.00	8.0	53	91
8.10	10.0	61	103
8.40	10.0	61	103
8.50	10.0	61	103
8.60	10.0	61	103
8.70	10.0	61	103
8.80	10.0	61	103
9.00	10.0	61	103
9.30	10.0	61	103
9.50	10.0	61	103
9.60	10.0	61	103
9.80	10.0	61	103
10.00	10.0	61	103
10.20	12.0	71	118
10.40	12.0	71	118
10.50	12.0	71	118
10.60	12.0	71	118
10.80	12.0	71	118
11.00	12.0	71	118

Drill Diameter m7	Shank Diam- eter h6	Flute Length	Overall Length
11.20	12.0	71	118
11.50	12.0	71	118
11.80	12.0	71	118
12.00	12.0	71	118
12.20	14.0	77	124
12.25	14.0	77	124
12.50	14.0	77	124
12.70	14.0	77	124
12.75	14.0	77	124
12.80	14.0	77	124
13.00	14.0	77	124
13.10	14.0	77	124
13.50	14.0	77	124
13.80	14.0	77	124
14.00	14.0	77	124
14.25	16.0	83	133
14.50	16.0	83	133
14.75	16.0	83	133
14.80	16.0	83	133
15.00	16.0	83	133
15.10	16.0	83	133
15.50	16.0	83	133
15.80	16.0	83	133
16.00	16.0	83	133
16.50	18.0	93	143
16.75	18.0	93	143
16.80	18.0	93	143
17.00	18.0	93	143
17.50	18.0	93	143
17.80	18.0	93	143
18.00	18.0	93	143
18.50	20.0	101	153
18.80	20.0	101	153
19.00	20.0	101	153
19.50	20.0	101	153
19.80	20.0	101	153
20.00	20.0	101	153

TYPE OF SHANK : Parallel Shank as per DIN 6535 HA. | **HELIX ANGLE :** 30° | **POINT ANGLE :** 140° |
Drills are also available with TIN Coating / TIALN Coating/ TICN Coating

Application :- Machining for steels and Heat Resistant steels.



MICRO GRAIN SOLID CARBIDE INTERNAL COOLANT BURNISHING DRILLS (SHORT SERIES)

Specifications Conform to :
DIN 6537
Dimensions in mm



Drill Diameter m7	Shank Diameter h6	Flute Length	Overall Length
5.00	6.0	28	66
5.10	6.0	28	66
5.20	6.0	28	66
5.50	6.0	28	66
5.55	6.0	28	66
5.80	6.0	28	66
6.00	6.0	28	66
6.10	8.0	34	79
6.20	8.0	34	79
6.30	8.0	34	79
6.50	8.0	34	79
6.60	8.0	34	79
6.80	8.0	34	79
6.90	8.0	34	79
7.00	8.0	34	79
7.10	8.0	41	79
7.40	8.0	41	79
7.50	8.0	41	79
7.80	8.0	41	79
8.00	8.0	41	79
8.10	10.0	47	89
8.40	10.0	47	89
8.50	10.0	47	89
8.60	10.0	47	89
8.70	10.0	47	89
8.80	10.0	47	89
9.00	10.0	47	89
9.30	10.0	47	89
9.50	10.0	47	89
9.60	10.0	47	89
9.80	10.0	47	89
10.00	10.0	47	89
10.20	12.0	55	102
10.40	12.0	55	102
10.50	12.0	55	102
10.60	12.0	55	102
10.80	12.0	55	102
11.00	12.0	55	102

Drill Diameter m7	Shank Diameter h6	Flute Length	Overall Length
11.20	12.0	55	102
11.50	12.0	55	102
11.80	12.0	55	102
12.00	12.0	55	102
12.20	14.0	60	107
12.25	14.0	60	107
12.50	14.0	60	107
12.70	14.0	60	107
12.75	14.0	60	107
12.80	14.0	60	107
13.00	14.0	60	107
13.10	14.0	60	107
13.50	14.0	60	107
13.80	14.0	60	107
14.00	14.0	60	107
14.25	16.0	65	115
14.50	16.0	65	115
14.75	16.0	65	115
14.80	16.0	65	115
15.00	16.0	65	115
15.10	16.0	65	115
15.50	16.0	65	115
15.80	16.0	65	115
16.00	16.0	65	115
16.50	18.0	73	123
16.75	18.0	73	123
16.80	18.0	73	123
17.00	18.0	73	123
17.50	18.0	73	123
17.80	18.0	73	123
18.00	18.0	73	123
18.50	20.0	79	131
18.80	20.0	79	131
19.00	20.0	79	131
19.50	20.0	79	131
19.80	20.0	79	131
20.00	20.0	79	131

Drills are also available with TIN Coating / TiAlN Coating/ TiCN Coating | TYPE OF FLUTE : Two Straight Flute with Four Margins | POINT ANGLE : 120°

TYPE OF SHANK : Parallel Shank as per DIN 6535 HA

Application:- Machining for Cast Iron, Aluminium Silicon Alloy and Aluminium Alloy only.



**MICRO GRAIN SOLID CARBIDE INTERNAL
COOLANT BURNISHING DRILLS
(LONG SERIES)**

Specifications Conform to :
DIN 6537
Dimensions in mm



Drill Diameter m7	Shank Diameter h6	Flute Length	Overall Length
5.00	6.0	44	82
5.10	6.0	44	82
5.20	6.0	44	82
5.50	6.0	44	82
5.55	6.0	44	82
5.80	6.0	44	82
6.00	6.0	44	82
6.10	8.0	53	91
6.20	8.0	53	91
6.30	8.0	53	91
6.50	8.0	53	91
6.60	8.0	53	91
6.80	8.0	53	91
6.90	8.0	53	91
7.00	8.0	53	91
7.10	8.0	53	91
7.40	8.0	53	91
7.50	8.0	53	91
7.80	8.0	53	91
8.00	8.0	53	91
8.10	10.0	61	103
8.40	10.0	61	103
8.50	10.0	61	103
8.60	10.0	61	103
8.70	10.0	61	103
8.80	10.0	61	103
9.00	10.0	61	103
9.30	10.0	61	103
9.50	10.0	61	103
9.60	10.0	61	103
9.80	10.0	61	103
10.00	10.0	61	103
10.20	12.0	71	118
10.40	12.0	71	118
10.50	12.0	71	118
10.60	12.0	71	118
10.80	12.0	71	118
11.00	12.0	71	118

Drill Diameter m7	Shank Diameter h6	Flute Length	Overall Length
11.20	12.0	71	118
11.50	12.0	71	118
11.80	12.0	71	118
12.00	12.0	71	118
12.20	14.0	77	124
12.25	14.0	77	124
12.50	14.0	77	124
12.70	14.0	77	124
12.75	14.0	77	124
12.80	14.0	77	124
13.00	14.0	77	124
13.10	14.0	77	124
13.50	14.0	77	124
13.80	14.0	77	124
14.00	14.0	77	124
14.25	16.0	83	133
14.50	16.0	83	133
14.75	16.0	83	133
14.80	16.0	83	133
15.00	16.0	83	133
15.10	16.0	83	133
15.50	16.0	83	133
15.80	16.0	83	133
16.00	16.0	83	133
16.50	18.0	93	143
16.75	18.0	93	143
16.80	18.0	93	143
17.00	18.0	93	143
17.50	18.0	93	143
17.80	18.0	93	143
18.00	18.0	93	143
18.50	20.0	101	153
18.80	20.0	101	153
19.00	20.0	101	153
19.50	20.0	101	153
19.80	20.0	101	153
20.00	20.0	101	153

Drills are also available with TIN Coating / TiAlN Coating / TiCN Coating

TYPE OF SHANK : Parallel Shank as per DIN 6535 HA | **TYPE OF FLUTE :** Two Straight Flutes with Four Margins

POINT ANGLE : 120°

Application:- Machining for Cast Iron, Aluminium Silicon Alloy and Aluminium Alloy only.



**MICRO GRAIN SOLID CARBIDE
CENTRE DRILLS TYPE 'A'.**

Specifications Conform to :
IS 6708
Dimensions in mm



Pilot Dia k12	Body Dia h9	Overall Length		Pilot Length	
		Maximum	Minimum	Maximum	Minimum
2.00	5.00	42.00	38.00	3.30	2.50
2.50	6.30	47.00	43.00	4.10	3.10
3.15	8.00	52.00	48.00	4.90	3.90
4.00	10.00	59.00	53.00	6.20	5.00
5.00	12.50	66.00	60.00	7.50	6.30
6.30	16.00	74.00	68.00	9.20	8.00
8.00	20.00	83.00	77.00	11.50	10.10

POINT ANGLE: 120° / COUNTER SINK ANGLE: 60°



**MICRO GRAIN SOLID
CARBIDE CENTRE DRILLS**

Specifications Conform to
BS 328 - Part 2 - 1950
Dimensions in Inches



B.S.No.	Pilot Dia	Body Dia	Pilot Length		OAL	Tolerance on Overall Length
			Max	Min		
2	1/16	3/16	3/32	5/64	1.3/4	+ / - 1/32
3	3/32	1/4	5/32	1/8	2	+ / - 1/16
4	1/8	5/16	3/16	5/32	2.1/4	+ / - 1/16
5	3/16	7/16	9/32	1/4	2.1/2	+ / - 3/32
6	1/4	5/8	3/8	5/16	3	+ / - 3/32
7	5/16	3/4	15/32	13/32	3.1/2	+ / - 3/32

POINT ANGLE : 120° / COUNTER SINK ANGLE: 60°

Centre Drills are also available with TIN Coating / TIALN Coating / TiCN Coating



**MICRO GRAIN SOLID CARBIDE
MACHINE CHUCKING REAMER
WITH PARALLEL SHANK**

Specifications Conform to :
IS 5446 & BS 328- Part 4
Dimensions in mm



Reamer Dia. 'm6'	Shank Dia. 'h9'	Cutting Edge Length	Overall Length	No. of Flutes
5.0	5.0	23	86	4
5.5	5.6	26	93	4
6.0	5.6	26	93	4
6.5	6.3	28	101	4
7.0	7.1	31	109	6
7.5	7.1	31	109	6
8.0	8.0	33	117	6
8.5	8.0	33	117	6
9.0	9.0	36	125	6
9.5	9.0	36	125	6
10.0	10.0	38	133	6
10.5	10.0	38	133	6
11.0	10.0	41	142	6
11.5	10.0	41	142	6
12.0	10.0	44	151	6
12.5	10.0	44	151	6
13.0	10.0	44	151	6
13.5	12.5	47	160	8
14.0	12.5	47	160	8
14.5	12.5	50	162	8
15.0	12.5	50	162	8
15.5	12.5	52	170	8
16.0	12.5	52	170	8

Reamers are also available with - TIN Coating / TiAlN Coating / TiCN Coating



MICRO GRAIN SOLID CARBIDE END MILLS
(STANDARD SERIES) (2 FLUTES/ 4 FLUTES)

Dimensions in mm

SQUARE END MILLS



BALL NOSE END MILLS



End Mill Diameter h10	Shank Diameter h6	Cutting Edge Length	Overall length
3.0	3	12	38
3.5	4	12	50
4.0	4	14	50
4.5	5	16	50
5.0	5	16	50
6.0	6	19	56
7.0	7	19	63
8.0	8	20	63
9.0	9	22	75
10.0	10	22	75
11.0	11	25	75
12.0	12	25	75
14.0	14	32	89
16.0	16	32	89
18.0	18	38	100
20.0	20	38	100
25.0	25	38	100

30° RH HELIX ANGLE AND RH CUTTING WITH CENTRE CUTTING

End Mills are also available with TIN Coating / TIALN Coating / TiCN Coating.



MICRO GRAIN SOLID CARBIDE END MILLS (LONG SERIES) (2 FLUTES/ 4 FLUTES)

Dimensions in mm

SQUARE END MILLS



BALL NOSE END MILLS



Diameter h10	Shank Diameter h6	Cutting Edge Length	Overall length
3	3	25	75
4	4	25	75
5	5	25	75
6	6	25	75
8	8	25	75
10	10	38	100
12	12	50	100
12	12	75	150
14	14	75	150
16	16	75	150
18	18	75	150
20	20	75	150
25	25	75	150

30° RH HELIX ANGLE , RH CUTTING WITH CENTRE CUTTING

End Mills are also available with - TIN Coating / TiAlN Coating / TiCN Coating



**MICRO GRAIN SOLID CARBIDE
END MILLS**
(STUB SERIES) (2 FLUTES/ 4 FLUTES)

Dimensions in mm

SQUARE END MILLS



BALL NOSE END MILLS



Diameter, h10	Shank Diameter h6	Cutting Edge Length	Overall length
3	3	6	38
3.5	4	7	50
4	4	8	50
4.5	5	9.5	50
5	5	10	50
6	6	12	50
7	7	12	50
8	8	12	50
9	9	14	56
10	10	16	56
11	11	19	63
12	12	19	63

30° RH HELIX ANGLE, RH CUTTING WITH CENTRE CUTTING

End Mills are also available with TIN Coating / TIALN Coating / TiCN Coating



RECOMMENDED PARAMETERS FOR SOLID CARBIDE DRILLS

MATERIAL		SPEED m/min	FEED (mm / rev.)				
			ø 1 - 3	ø > 3 - 6	ø > 6 - 9	ø > 9 - 12	ø > 12 - 20
STRUCTURAL STEEL	< 500 N / mm ²	95	0.05 - 0.08	0.085 - 0.1	0.1 - 0.15	0.15 - 0.2	0.2 - 0.25
	< 650 N / mm ²	85					
	< 850 N / mm ²	75					
CASE HARDENING STEEL	< 800 N / mm ²	80	0.05 - 0.08	0.085 - 0.1	0.1 - 0.15	0.15 - 0.2	0.2 - 0.25
	< 1000 N / mm ²	75	0.03 - 0.05	0.05 - 0.085	0.085 - 0.12	0.1 - 0.18	0.15 - 0.2
NITRIDING STEEL	< 1000 N / mm ²	75	0.03 - 0.05	0.05 - 0.085	0.085 - 0.12	0.1 - 0.18	0.15 - 0.2
	< 1300 N / mm ²	65					
HEAT TREATABLE STEEL	< 700 N / mm ²	90	0.05 - 0.08	0.085 - 0.1	0.1 - 0.15	0.15 - 0.2	0.2 - 0.25
	< 900 N / mm ²	80					
	< 1200 N / mm ²	65	0.01 - 0.02	0.025 - 0.06	0.06 - 0.09	0.085 - 0.13	0.1 - 0.15
	< 1400 N / mm ²	50					
TOOL STEEL	< 800 N / mm ²	50	0.01 - 0.03	0.02 - 0.06	0.05 - 0.08	0.075 - 0.1	0.08 - 0.12
	< 1000 N / mm ²	40					
	< 1200 N / mm ²	35	0.01 - 0.02	0.015 - 0.04	0.035 - 0.055	0.045 - 0.08	0.075 - 0.1
	< 1400 N / mm ²	30					
	> 1400 N / mm ²	25					
STAINLESS STEEL	< 700 N / mm ²	50	0.015 - 0.03	0.025 - 0.06	0.05 - 0.1	0.075 - 0.13	0.1 - 0.17
	< 850 N / mm ²	30	0.01 - 0.02	0.015 - 0.04	0.035 - 0.055	0.045 - 0.08	0.075 - 0.1
	< 950 N / mm ²	25					
CAST STEEL	< 500 N / mm ²	75	0.02 - 0.06	0.05 - 0.09	0.07 - 0.12	0.09 - 0.15	0.1 - 0.18
	< 650 N / mm ²	60					
	> 650 N / mm ²	40					
CAST STEEL- HARD		40	0.01 - 0.03	0.02 - 0.06	0.05 - 0.08	0.06 - 0.09	0.07 - 0.1
HIGH TEMP. ALLOYS	< 700 N / mm ²	35	0.01 - 0.03	0.02 - 0.05	0.04 - 0.055	0.05 - 0.075	0.06 - 0.1
	< 900 N / mm ²	23					
	< 1100 N / mm ²	20					
	< 1250 N / mm ²	18	0.01 - 0.02	0.015 - 0.04	0.035 - 0.045	0.04 - 0.06	0.05 - 0.08
	< 1400 N / mm ²	15					
	> 1400 N / mm ²	10					
TITANIUM ALLOYS	< 550 N / mm ²	40	0.01 - 0.03	0.02 - 0.05	0.04 - 0.055	0.05 - 0.075	0.06 - 0.1
	< 950 N / mm ²	30					
	> 1200 N / mm ²	20					
MALLEABLE CAST IRON	< 200 HB	80	0.03 - 0.06	0.04 - 0.1	0.08 - 0.15	0.09 - 0.17	0.12 - 0.23
	> 200 HB	60					
GRAY CAST IRON	< 200 HB	100	0.03 - 0.06	0.04 - 0.1	0.08 - 0.15	0.09 - 0.17	0.12 - 0.23
	> 200 HB	80					
COPPER	< 500 N / mm ²	80	0.015 - 0.03	0.025 - 0.06	0.05 - 0.08	0.075 - 0.09	0.08 - 0.12
COPPER ALLOYS - BRITTLE		110	0.015 - 0.03	0.025 - 0.06	0.05 - 0.08	0.075 - 0.09	0.08 - 0.12
ALUMINIUM - LOW SILICON		180	0.03 - 0.05	0.05 - 0.125	0.1 - 0.18	0.15 - 0.2	0.17 - 0.3
ALUMINIUM - HIGH SILICON		110	0.03 - 0.05	0.05 - 0.125	0.1 - 0.18	0.15 - 0.2	0.17 - 0.3
MAGNESIUM ALLOYS		160	0.03 - 0.06	0.04 - 0.1	0.08 - 0.15	0.09 - 0.17	0.12 - 0.23
ZINK ALLOYS		120	0.03 - 0.05	0.05 - 0.085	0.085 - 0.12	0.1 - 0.18	0.15 - 0.2
PLASTIC		120	0.03 - 0.06	0.04 - 0.1	0.08 - 0.15	0.09 - 0.17	0.12 - 0.23
FIBER PLASTIC		100	0.01 - 0.02	0.015 - 0.04	0.035 - 0.055	0.045 - 0.08	0.075 - 0.1



RECOMMENDED PARAMETERS FOR SOLID CARBIDE END MILLS

MATERIAL		SPEED m / min	FEED (mm / TOOTH)		
			1 - 6	> 6 - 12	> 12 - 25
STRUCTURAL STEEL	< 500 N / mm ²	150	0.015 - 0.035	0.025 - 0.075	0.07 - 0.18
	< 650 N / mm ²	125	0.015 - 0.035	0.025 - 0.075	0.06 - 0.1
	< 850 N / mm ²	90	0.015 - 0.025	0.025 - 0.055	0.055 - 0.08
CASE HARDENING STEEL	< 800 N / mm ²	100	0.025 - 0.035	0.035 - 0.08	0.08 - 0.18
	< 1000 N / mm ²	80	0.015 - 0.025	0.025 - 0.06	0.06 - 0.08
NITRIDING STEEL	< 1000 N / mm ²	90	0.015 - 0.025	0.025 - 0.06	0.06 - 0.08
	< 1300 N / mm ²	70	0.01 - 0.02	0.025 - 0.05	0.035 - 0.06
HEAT TREATABLE STEEL	< 700 N / mm ²	80	0.015 - 0.04	0.025 - 0.085	0.055 - 0.17
	< 900 N / mm ²	60	0.015 - 0.035	0.025 - 0.065	0.055 - 0.12
	< 1200 N / mm ²	50	0.01 - 0.025	0.025 - 0.035	0.035 - 0.1
	< 1400 N / mm ²	35	0.01 - 0.015	0.015 - 0.03	0.035 - 0.06
TOOL STEEL	< 800 N / mm ²	90	0.025 - 0.032	0.055 - 0.065	0.1 - 0.15
	< 1000 N / mm ²	70	0.015 - 0.025	0.035 - 0.055	0.055 - 0.1
	< 1200 N / mm ²	60	0.01 - 0.02	0.025 - 0.035	0.035 - 0.1
	< 1400 N / mm ²	45	0.01 - 0.015	0.025 - 0.035	0.025 - 0.1
	> 1400 N / mm ²	30	0.005 - 0.015	0.02 - 0.03	0.02 - 0.08
STAINLESS STEEL	< 700 N / mm ²	80	0.01 - 0.015	0.025 - 0.04	0.035 - 0.08
	< 850 N / mm ²	60	0.01 - 0.015	0.02 - 0.03	0.025 - 0.065
	< 950 N / mm ²	40	0.005 - 0.015	0.01 - 0.025	0.02 - 0.05
CAST STEEL	< 500 N / mm ²	110	0.015 - 0.025	0.03 - 0.05	0.08 - 0.15
	< 650 N / mm ²	80	0.010 - 0.02	0.015 - 0.035	0.08 - 0.1
	> 650 N / mm ²	60	0.005 - 0.015	0.015 - 0.03	0.05 - 0.08
CAST STEEL - HARD		40	0.08 - 0.015	0.015 - 0.035	0.03 - 0.15
HIGH TEMP. ALLOYS	< 700 N / mm ²	35	0.015 - 0.025	0.025 - 0.03	0.04 - 0.05
	< 900 N / mm ²	20	0.01 - 0.015	0.02 - 0.025	0.035 - 0.045
	< 1100 N / mm ²	18	0.01 - 0.015	0.02 - 0.025	0.035 - 0.045
	< 1250 N / mm ²	18	0.01 - 0.015	0.015 - 0.02	0.03 - 0.04
	< 1400 N / mm ²	12	0.01 - 0.015	0.015 - 0.02	0.02 - 0.035
	> 1400 N / mm ²	8	0.005 - 0.01	0.01 - 0.018	0.01 - 0.03
TITANIUM ALLOYS	< 550 N / mm ²	100	0.01 - 0.02	0.02 - 0.05	0.05 - 0.08
	< 750 N / mm ²	70	0.01 - 0.02	0.02 - 0.05	0.05 - 0.08
	< 1000 N / mm ²	30	0.005 - 0.015	0.015 - 0.03	0.03 - 0.065
	< 1500 N / mm ²	10	0.005 - 0.01	0.01 - 0.025	0.025 - 0.05
MALLEABLE CAST IRON	< 200 HB	170	0.01 - 0.025	0.02 - 0.065	0.05 - 0.12
	> 200 HB	110	0.005 - 0.02	0.02 - 0.05	0.05 - 0.1
GRAY CAST IRON	< 200 HB	120	0.02 - 0.032	0.02 - 0.065	0.05 - 0.18
	> 200 HB	80	0.01 - 0.02	0.02 - 0.05	0.05 - 0.1
COPPER	< 500 N / mm ²	250	0.01 - 0.02	0.02 - 0.05	0.05 - 0.15
COPPER ALLOYS - SOFT		180	0.015 - 0.04	0.05 - 0.1	0.1 - 0.15
COPPER ALLOYS - BRITTLE		150	0.015 - 0.04	0.05 - 0.1	0.1 - 0.15
COPPER ALLOYS - TOUGH		140	0.015 - 0.04	0.05 - 0.1	0.1 - 0.15
ALLUMINIUM - LOW SILICON		360	0.03 - 0.07	0.1 - 0.15	0.13 - 0.25
ALLUMINIUM - HIGH SILICON		200	0.03 - 0.05	0.05 - 0.1	0.1 - 0.2
MAGNESIUM ALLOYS		400	0.03 - 0.05	0.05 - 0.1	0.15 - 0.3
ZINC ALLOYS		350	0.035 - 0.05	0.06 - 0.1	0.12 - 0.3

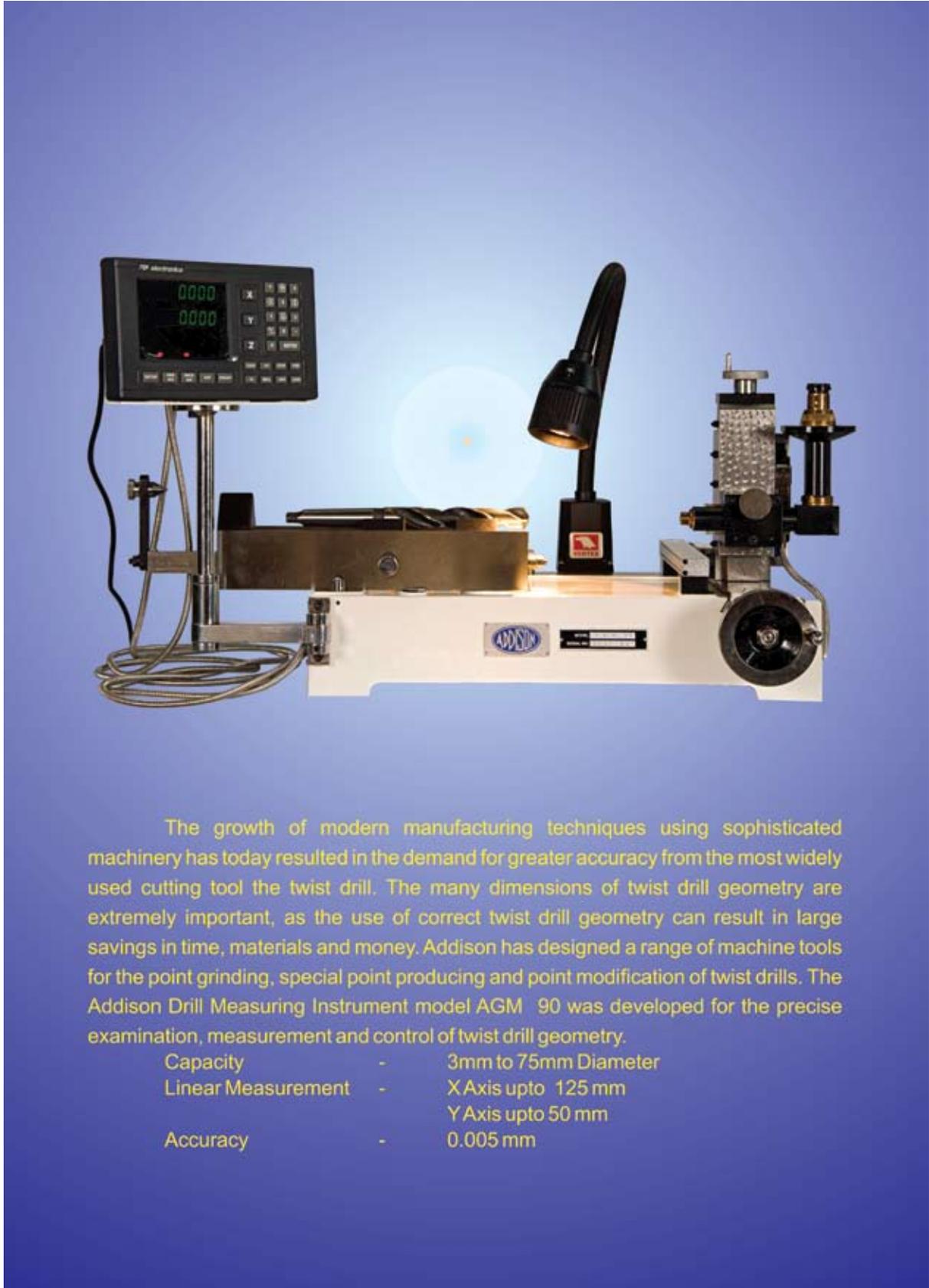
MACHINE TOOLS



A Cut Above the Rest



ADDISON DRILL MEASURING INSTRUMENT MODEL - AGM 90



The growth of modern manufacturing techniques using sophisticated machinery has today resulted in the demand for greater accuracy from the most widely used cutting tool the twist drill. The many dimensions of twist drill geometry are extremely important, as the use of correct twist drill geometry can result in large savings in time, materials and money. Addison has designed a range of machine tools for the point grinding, special point producing and point modification of twist drills. The Addison Drill Measuring Instrument model AGM 90 was developed for the precise examination, measurement and control of twist drill geometry.

Capacity	-	3mm to 75mm Diameter
Linear Measurement	-	X Axis upto 125 mm Y Axis upto 50 mm
Accuracy	-	0.005 mm



TOOL & CUTTER GRINDER MODEL TC 30



This is a versatile machine capable of sharpening a vast range of High Speed Steel and Carbide Tipped Tools - Cylindrical Cutters, Side & Face Cutters Involute Gear Convex & Concave Cutters, End Mills & Slot Drills. Also grinds bevel lead angles of Reamers and cutting face through the flutes of Taps. With special attachments, which are optional equipment, it grinds Drill points, Tap leads and does radius grinding.

**TOOL & CUTTER GRINDER MODEL TC - 810**

This is a versatile machine capable of sharpening a vast range of High Speed Steel and Carbide Tipped Tools - Cylindrical Cutters, Side & Face Cutters, Involute Gear Convex & Concave Cutters, End Mills & Slot Drills. Also grinds bevel lead angles of Reamers and cutting face through the flutes of Taps. With special attachments, which are optional equipment, it grinds Drill points, Tap leads and does radius grinding.



TOOL & CUTTER GRINDER MODEL - TC 816



This is a versatile machine capable of sharpening a vast range of High Speed Steel and Carbide Tipped Tools - Cylindrical Cutters, Side & Face Cutters, Involute Gear Convex & Concave Cutters, End Mills & Slot Drills. Also grinds bevel lead angles of Reamers and cutting face through the flutes of Taps. With special attachments, which are optional equipment, it grinds Drill points, Tap leads and does radius grinding.



TOOL & CUTTER GRINDER MODEL GRIND - 3X



ADDISON TOOL & CUTTER GRINDERS



ADDISON CNC TOOL & CUTTER GRINDER
MODEL ADD GRIND - 3X





TOOL & CUTTER GRINDER MODEL SPECIFICATIONS

ADDISON CNC TOOL & CUTTER GRINDER MODEL ADD GRIND - 3X

- The machine is fitted with Linear Motion Guide System for its longitudinal movement with C1 Class ball Screws.
- The outstanding features of the system provides smooth movement with no clearance and higher running precision with high Rigidity.
- The smooth cross travel movement is achieved through hand operated high precision ball screw free from backlash.
- Main Spindle is provided with Super Precision Angular Contact bearings which facilitates smooth running at higher RPM.
- The work head fixture is a fully adjustable with swivel base with BT 50 holder.
- This Machine is operated with FANUC Series Oi Mate MD operating system .
- This Machine is also provided with sufficient cooling system for Control panel.
- This Machine is provided with Tail Stock Support to accommodate Extra Long Tools.

ADDISON TOOL & CUTTER GRINDER MODEL TC 810

- The work head fixture is fully adjustable with a swivel base. Graduations are provided for accurately setting up the tools for grinding. Indexing System is provided for 2,3,4,6,8,12 & 24 flute cutters. Other flutes can be set with finger rest.
- The machine is fitted with hardened and ground guide ways in cross travel and longitudinal to have very smooth movement.
- The tilting arrangement has been provided so that the wheel head be swung 30 degrees on either side.
- Cutter upto 203mm (8") can be accommodated on this machine.
- The grinding spindle runs on super precision angular contact ball bearings and is provided with AC drive which can steplessly vary the speed upto 5000 rpm. Drive from the motor to the spindle is through coupling. The spindle speed is easily changed by selector switch for the use of conventional and super abrasive grinding wheels.

ADDISON TOOL & CUTTER GRINDER MODEL TC 816

- The work head fixture is fully adjustable with a swivel base. Graduations are provided for accurately setting up the tools for regrinding. Indexing System is provided for 2,3,4,6,8,12 & 24 flute cutters. Other flutes can be set with finger rest.
- The machine is fitted with hardened and ground guide ways in cross travel and longitudinal to have very smooth movement.
- The tilting arrangement has been provided so that the wheel head be swung 30 degrees on either side.
- Cutter upto 203mm (8") can be accommodated on this machine.
- The grinding spindle runs on super precision angular contact ball bearings and is fixed on a rigid wheel base which can swivel 360 Degree in the horizontal plane. Drive from the motor to spindle is through a Flat Belt. The spindle speed is easily changed through step pulley for the use of conventional and super abrasive grinding wheels.

ADDISON TOOL & CUTTER GRINDER MODEL TC 30

- The Work head holding fixture is fully adjustable with a swivel base. Graduations are provided for accurately setting up the tools for grinding.
- An Adjustable stopper limits the longitudinal table traverse at forward and backward strokes. The table has a swivel base for easy setting up of the tools at various angles on the horizontal plane and has a locking arrangement.
- The tilting arrangement has been provided at the rear and the wheel head can be swung through 20 degrees on either side. Readily visible graduations on the tilting bracket make it easier for setting up of clearance angle on the cutters accurately.
- Cutter up to 203mm ("8") can be accommodated on this machine. The outstanding feature of this machine is "TILTING HEAD".
- The wheel head spindle runs on roller bearings and has two speeds 2800 RPM and 5000 RPM. Drive from the motor to spindle is by endless flat belt, the Spindle is easily altered by changing the belt.



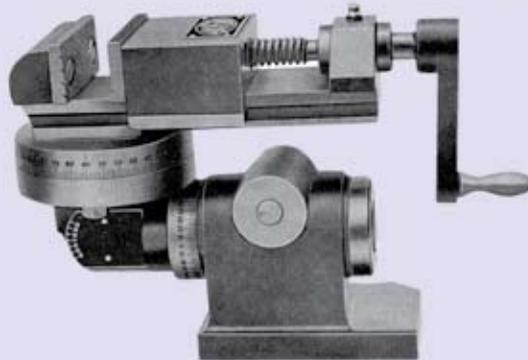
**TOOL & CUTTER GRINDER
TECHNICAL SPECIFICATIONS**

ADDISON		Tool & Cutter Grinder Technical Specifications			
	TC30	TC810	ADD GRIND 3X	TC816	
Max Dia Ground	203 mm	203 mm	304 mm	203 mm	
Max Admit Between Centres	254 mm	330 mm	500 mm	480 mm	
Max Length of Cutting Edge / Ground	127 mm	250 mm	400 mm	400 mm	
Grinding Spindle Speed	2800/5000 RPM	2800/5000 RPM Variable Speed Control	MAX 9000 RPM Variable Speed Control	2800/5000 RPM	
Working Surface of 'T' Slot Table	330 x 160mm	550 x 105mm	980 x 160mm	690 x 110mm	
Longtudinal Traverse	152 mm	250 mm	400 mm	400 mm	
Cross Traverse	136 mm	105 mm	200 mm	127 mm	
Motor Capacity	0.75 HP	0.75 HP	1.5 HP	0.75 HP	
Machine Base	470 x 476mm	690 x 920mm	690 x 920 mm	520 x 520mm	
Floor Space	762 x 1016mm	920 x 1070 mm	2300 x 2600 mm	920 x 1500 mm	
Height of the Machine	1400 mm	1600 mm	2200 mm	1300 mm	
Weight of the Machine with STD Accessories	350 kgs	850 Kgs	1.5 tone	650 Kgs	

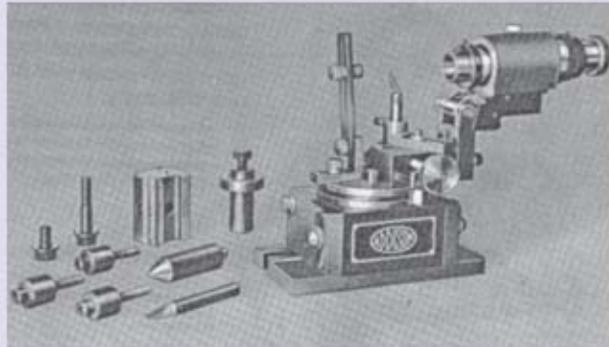


**ADDISON MACHINE TOOLS OPTIONAL
ACCESSORIES FOR CUTTING TOOL RESHARPENING**

UNIVERSAL MACHINE VICE



RADIUS GRINDING ATTACHMENT



**DRILL POINT AND TAP LEAD
GRINDING ATTACHMENT**





ADDISON MACHINE TOOLS OPTIONAL ACCESSORIES FOR CUTTING TOOL RESHARPENING

ADDISON DRILL POINT AND TAP LEAD GRINDING ATTACHMENT

- It is a simple unit to carry out point grinding of drills 3mm to 20mm and Tap Cone Grinding of 3 and 4 flute taps.
- Point grinding of drills with standard geometry 118 Degrees to 140 Degrees is feasible. Web thinning on drills shall be carried out with this attachment.
- This attachment is suitable for "ADDISON" Model Tool & Cutter Grinder such as TC30.TC810.TC816 & TC 810E, For other manufacturer's Tool & Cutter Grinding machines, it can be made suitable on request.
- This attachment is provided with 18 Sizes of Collets ranging from 3 to 20mm to facilitate quick setting for resharpening and for taps with Pin Collets for 3 and 4 Flute Taps. Apart from the above it is provided with Morse Taper Shank MT1 and MT2 with "C" Spanner.

ADDISON RADIUS GRINDING ATTACHMENT

- It is designed to carry out, Ball Nosing of Slot drills including those gashed on the spiral, Radius Grinding on End Mills, Forming and regrinding corner rounding cutters and Grinding Radii on Side and Face Cutters.
- The attachment can accommodate cutters with 1" Shank Dia and Smaller Shanks also be accompanied by using Bushes which are supplied along with this as Standard Equipment.
- ADDISON Radius Grinding Attachment is supplied with Work holder, Centre, Swan neck, extension block, finger rest and three spacers. (Spacers for our TC 30 Model Only.)

ADDISON UNIVERSAL MACHINE VICE

- Addison Universal Machine vice is fully universal in three planes and is designed for rapid setting of work piece to any compound angle desired with readily visible graduations.
- It is possible to convert the Universal vice in to Swivel Vice with minimum loss of time using the conversion attachment supplied along with the unit and the swivel vice is adjustable in one plane through 360 Degrees.
- By Specification, the width of Jaws is 70mm; Depth of Jaws is 25mm. Admit between jaws is 40mm. The Overall height of Universal Vice is 150mm and the Overall height of Swivel vice is 90mm.

We reserve the right to deviate from the specifications given above as it is our constant endeavour to make improvements in the design of our products.

FOR ENQUIRES PLEASE CONTACT



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ADDISON DRILL GRINDER MODEL - ADG 350



Addison Drill Point Grinding Machine is a versatile and compact machines designed to provide simple but, effective means of resharpening of wide varieties of both HSS and Solid Carbide Drills, Taps and End Mills accurately with minimum skill.

Tools can be Ground	: Drills, Taps, End mills
Dia of the Drill that can be Ground	: 3mm - 50mm
Max Drill admit length	: Standard
Number of LIPS that can be Ground	: 2 Lips for Drills with RH & LH Cutting 2, 3 & 4 Flutes for Taps and End Mills with RH Cutting Only
Point Angle	: 40 Degrees / 180 Degrees
Grinding Wheel	: Flat Wheel 180 x 40 x 31.75AA60, Dish wheel 150 x 19 x 31.75AA46
Motor	: ½ HP 2800 rpm, 3 Phase 415V50HZ
Coolant Pump	: 0.25kw 2900rpm
Total Power Consumption	: 1.5 kw



**ADDISON DRILL GRINDER
MODEL - ADG 80 & ADG 100**



Addison Automatic Drill Point Grinder Model ADG 80 & ADG 100 are a versatile compact & sturdy machine and designed for sharpening the Point of the Twist Drills in a wide range of Two, Three & Four flutes accurately and quickly. This machine can accommodate drills From Diameter 10mm to 80mm(for ADG 80) and 10mm -100mm (for ADG 100) with overall length up to 1000 mm.

Tools can be Ground	:	Drills
Dia of the Drill that can be Ground	:	10mm to 80mm(for ADG 80) & 10mm - 100mm (for ADG 100)
Max Drill admit length	:	1,000 mm
Number of LIPS that can be Ground	:	2, 3 & 4 Lips for Drills with RH Cutting
Point Angle	:	100 Degrees / 160 Degrees
Grinding Wheel	:	Flat Wheel 254 x 50 x 100mm, 3A46 Kv5
Motor	:	3kw - 2900rpm
Coolant Pump	:	0.25kw 2900rpm
Total Power Consumption	:	3.75 kw