



**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 6537K
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 6537K
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 6537K
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 6537L
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 1977
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)

Specifications Conform to :
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**
(2 FLUTES/ 4 FLUTES) (Stub Series)

Specifications Conform to:
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	0.01 - 0.025	0.015 - 0.04	0.035 - 0.045	0.04 - 0.06	0.05 - 0.08
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 DRILLS

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
GRAY CAST IRON	> 200 HB	110	0.005 - 0.02	0.02 - 0.05	0.05 - 0.1
	< 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
ALLUMINUM - LOW SILICON		360	0.03 - 0.07	0.1 - 0.15	0.13 - 0.25
ALLUMINUM - 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