

ZENSTAR



SOLID CARBIDE TOOLS



CATALOGUE - 2023

SOLID CARBIDE END MILL (2/4 FLUTE)

End Mill Diameter h10	Shank Diameter h6	Cutting Edge Length	Overall Length	Overall Length
3	3	12		38
3.5	4	12		50
4	4	14		50
4.5	5	16		50
5	5	16		50
6	6	19		56
7	7	19		63
8	8	20		63
9	9	22		75
10	10	22		75
11	11	25		75
12	12	25		75
14	14	32		89
16	16	32		89
18	18	38		100
20	20	38		100
25	25	38		100

30° RH HELIX ANGLE, RH CUTTING WITH CENTRE CUTTING

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

RECOMMENDED CUTTING FEED FOR SOLID CARBIDE ENDMILL

CUTTER DIA	Steels 30-40HRC		Steels 40-50 HRC		Steels 50-60 HRC	
	RPM	FEED/TOOTH	RPM	FEED/TOOTH	RPM	FEED/TOOTH
1.0	11040-138	0.006-0.008	8540-10675	0.006-0.008	6451-8064	0.006-0.009
1.5	10368-12960	0.008-0.011	7920-9900	0.008-0.011	6144-7680	0.008-0.011
2.0	9093-11366	0.008-0.012	7864-9830	0.008-0.011	5530-6912	0.010-0.013
3.0	7373-9216	0.013-0.018	6864-8580	0.012-0.016	4792-5990	0.011-0.016
4.0	6672-8340	0.017-0.024	6096-7620	0.016-0.022	4301-5376	0.014-0.020
5.0	6144-7680	0.019-0.028	5616-7020	0.018-0.025	4138-5172	0.015-0.021
6.0	5952-7440	0.021-0.030	5664-7080	0.019-0.027	3744-4680	0.017-0.025
8.0	5400-4320	0.037-0.052	2765-3456	0.049-0.069	1744-2220	0.044-0.064
10.0	2784-3480	0.084-0.121	1440-1800	0.088-0.125	1056-1320	0.060-0.086
12.0	2352-2940	0.071-0.102	979-1224	0.072-0.103	758-948	0.047-0.066
16.0	1344-1680	0.075-0.107	643-804	0.078-0.120	470-588	0.061-0.086
20.0	883-1104	0.105-0.149	422-528	0.084-0.119	298-372	0.068-0.096
25.0	749-936	0.090-0.128	365-456	0.076-0.108	269-336	0.075-0.107

RECOMMENDED CUTTING FEED FOR SOLID CARBIDE BALLNOSE ENDMILL

CUTTER DIA	STEELS 30-40 HRC		STEELS 40-50 HRC		STEELS 50-60 HRC	
	RPM	FEED/TOOTH	RPM	FEED/TOOTH	RPM	FEED/TOOTH
1.0	20000-40000	0.020-0.024	20000-40000	0.016-0.020	20000-40000	0.012-0.016
1.5	20000-40000	0.030-0.036	20000-40000	0.024-0.030	20000-38600	0.018-0.024
2.0	20000-38100	0.040-0.048	20000-38100	0.032-0.040	19400-28900	0.024-0.032
3.0	16100-25400	0.060-0.072	19300-25400	0.048-0.060	12900-19300	0.036-0.048
4.0	12100-19100	0.080-0.096	14500-19100	0.064-0.080	9700-14500	0.048-0.064
5.0	9600-15300	0.100-0.120	11600-15300	0.080-0.100	7800-11600	0.060-0.080
6.0	8000-12700	0.120-0.144	9700-12700	0.096-0.120	6500-9600	0.072-0.096
8.0	6000-9500	0.160-0.192	7200-9500	0.128-0.160	4900-7200	0.096-0.128
10.0	4800-7600	0.200-0.240	5800-7600	0.160-0.200	3900-5800	0.120-0.160
12.0	4000-6400	0.240-0.288	4800-6400	0.192-0.240	3200-4800	0.144-0.192
16.0	3500-5700	0.280-0.300	3500-5700	0.220-0.260	3000-4200	0.160-0.220

RECOMMENDED PARAMETERS FOR SOLID CARBIDE END MILLS

Material	Cutting Speed m/min	End Mill Size / Feed / Tooth (mm)			
		upto Ø6	upto Ø7-12	upto Ø13-19	upto Ø20-25
Aluminium	140-300	0.05	0.10	0.15	0.20
Aluminium Alloys	240-300	0.05	0.10	0.15	0.20
Brass	75-100	0.05	0.08	0.10	0.13
Bronze	240-300	0.05	0.08	0.10	0.13
Copper & its Alloys	240-300	0.05	0.08	0.13	0.18
Cast Iron Soft	90-100	0.05	0.10	0.15	0.20
Hard	75-90	0.03	0.5	0.08	0.10
Malleable Iron	60-100	0.03	0.08	0.13	0.20
Magnesium and its	300	0.05	0.10	0.15	0.20
Monel	60-75	0.05	0.05	0.08	0.10
Plastic	220-300	0.08	0.15	0.25	0.38
Steel Low Carbon	100-180	0.03	0.08	0.13	0.15
Med Carbon	60-120	0.03	0.08	0.13	0.15
Steel High Nickel	60-75	0.03	0.05	0.08	0.10
40-45 Rc	45-75	0.03	0.03	0.05	0.08
46-50 Rc	20-45	0.03	0.03	0.05	0.08
51-55 Rc	10-20	0.03	0.03	0.05	0.08
Stainless Steel					
Free Machining	90-120	0.03	0.05	0.10	0.15
Work Hardening	60-90	0.03	.03	0.06	0.13
Titanium	20-50	0.03	0.05	0.10	0.15

* **Cutting Speed** : The figures in the tables are starting speeds only. They may get changed to suit the working condition with respect to job.

Customised Drills (Burnishing, through coolant, etc.) with different parameters can be manufactured as per requirement.

SOLID CARBIDE - JOBBER SERIES STRAIGHT SHANK DRILLS

Drill Diameter h7	Flute Length	Overall Length		Drill Diameter h7	Flute Length	Overall Length
1.00	12	34		3.50	39	70
1.10	14	36		3.60	39	70
1.20	16	38		3.70	39	70
1.30	16	38		3.80	43	75
1.40	18	40		3.90	43	75
1.50	18	40		4.00	43	75
1.60	20	43		4.10	43	75
1.70	20	43		4.20	43	75
1.80	22	46		4.30	47	80
1.90	22	46		4.40	47	80
2.00	24	49		4.50	47	80
2.10	24	49		4.60	47	80
2.20	27	53		4.70	47	80
2.30	27	53		4.80	52	86
2.40	30	57		4.90	52	86
2.50	30	57		5.00	52	86
2.60	30	57		5.10	52	86
2.70	33	61		5.20	52	86
2.80	33	61		5.30	52	86
2.90	33	61		5.40	57	93
3.00	33	61		5.50	57	93
3.10	36	65		5.60	57	93
3.20	36	65		5.70	57	93
3.30	36	65		5.80	57	93
3.40	39	70		5.90	57	93

Spiral Angle : 30° & Point Angle : 118°
Above items will be available in Tin, Tich and tialn coating

Confirming to IS 5101 / DIN 338

SOLID CARBIDE - JOBBER SERIES STRAIGHT SHANK DRILLS

Drill Diameter h7	Flute Length	Overall Length		Drill Diameter h7 2	Flute Length4	Overall Length5
6.00	57	93		9.30	81	125
6.10	63	101		9.40	81	125
6.20	63	101		9.50	81	125
6.30	63	101		9.60	87	133
6.40	63	101		9.70	87	133
6.50	63	101		9.80	87	133
6.60	63	101		9.90	87	133
6.70	63	101		10.00	87	133
6.80	69	109		10.10	87	133
6.90	69	109		10.20	87	133
7.00	69	109		10.30	87	133
7.10	69	109		10.40	87	133
7.20	69	109		10.50	87	133
7.30	69	109		10.60	87	133
7.40	69	109		10.70	94	142
7.50	69	109		10.80	94	142
7.60	75	117		10.90	94	142
7.70	75	117		11.00	94	142
7.80	75	117		11.10	94	142
7.90	75	117		11.20	94	142
8.00	75	117		11.30	94	142
8.10	75	117		11.40	94	142
8.20	75	117		11.50	94	142
8.30	75	117		11.60	94	142
8.40	75	117		11.70	94	142
8.50	75	117		11.80	94	142
8.60	81	125		11.90	101	151
8.70	81	125		12.00	101	151
8.80	81	125		12.10	101	151
8.90	81	125		12.20	101	151
9.00	81	125		12.30	101	151
9.10	81	125		12.40	101	151
9.20	81	125		12.50	101	151

Spiral Angle : 30° & Point Angle : 118°

Confirming to IS 5101 / DIN 338

Above items will be available in Tin, T1cn and tialn coating

SOLID CARBIDE - JOBBER SERIES STRAIGHT SHANK DRILLS

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

Spiral Angle : 30° & Point Angle : 118°
Above items will be available in Tin, Ticon and TiAlN coating

Confirming to IS 5101 / DIN 338

SOLID CARBIDE - STUB SERIES STRAIGHT SHANK DRILLS

Drill Diameter h7	Flute Length	Overall Length		Drill Diameter h7	Flute Length	Overall Length		Drill Diameter h7	Flute Length	Overall Length
1.00	6	26		3.50	20	52		6.60	31	70
1.10	7	28		3.60	20	52		6.70	31	70
1.20	8	30		3.70	20	52		6.80	34	74
1.30	8	30		3.80	22	55		6.90	34	74
1.40	9	32		3.90	22	55		7.00	34	74
1.50	9	32		4.00	22	55		7.10	34	74
1.60	10	34		4.10	22	55		7.20	34	74
1.70	10	34		4.20	22	55		7.30	34	74
1.80	11	36		4.30	24	58		7.40	34	74
1.90	11	36		4.40	24	58		7.50	34	74
2.00	12	38		4.50	24	58		7.60	37	79
2.10	12	38		4.60	24	58		8.00	37	79
2.20	13	40		4.70	24	58		8.10	37	79
2.30	13	40		4.80	26	62		8.20	37	79
2.40	14	43		4.90	26	62		8.30	37	79
2.50	14	43		5.00	26	62		8.40	37	79
2.60	14	43		5.20	26	62		8.50	37	79
2.70	16	46		5.50	28	66		8.60	40	84
2.80	16	46		5.80	28	66		8.70	40	84
2.90	16	46		6.00	28	66		8.80	40	84
3.00	16	46		6.10	31	70		8.90	40	84
3.10	18	49		6.20	31	70		9.00	40	84
3.20	18	49		6.30	31	70				
3.30	18	49		6.40	31	70				
3.40	20	52		6.50	31	70				

Spiral Angle : 30° & Point Angle : 118°
Above items will be available in Tin, Ticon and tialn coating

Confirming to DIN 6539

SOLID CARBIDE - STUB SERIES STRAIGHT SHANK DRILLS

Drill Diameter h7	Flute Length	Overall Length		Drill Diameter h7	Flute Length	Overall Length
9.10	40	84		12.20	51	102
9.20	40	84		12.30	51	102
9.30	40	84		12.40	51	102
9.40	40	84		12.50	51	102
9.50	40	84		12.60	51	102
9.60	43	89		12.70	51	102
9.70	43	89		12.80	51	102
9.80	43	89		12.90	51	102
9.90	43	89		13.00	51	102
10.00	43	89		13.10	51	102
10.10	43	89		13.20	51	102
10.20	43	89		13.30	54	107
10.30	43	89		13.40	54	107
10.40	43	89		13.50	54	107
10.50	43	89		13.60	54	107
10.60	43	89		13.70	54	107
10.70	47	95		13.80	54	107
10.80	47	95		13.90	54	107
10.90	47	95		14.00	54	107
11.00	47	95		14.50	56	111
11.10	47	95		15.00	56	111
11.20	47	95		15.50	58	115
11.30	47	95		16.00	58	115
11.40	47	95		16.50	60	119
11.50	47	95		17.00	60	119
11.60	47	95		17.50	62	123
11.70	47	95		18.00	62	123
11.80	47	95		18.50	64	127
11.90	51	102		19.00	64	127
12.00	51	102		19.50	66	131
12.10	51	102		20.00	66	131

RECOMMENDED PARAMETERS FOR SOLID CARBIDE DRILLS

MATERIAL		SPEED m/min	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	0.05-0.08	0.085-0.1	0.1-0.15	0.15-0.2	0.2-0.25
	< 850 N / mm ²	75	0.03-0.05	0.05-0.085	0.085-0.12	0.1-0.18	0.15-0.2
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	0.03-0.05	0.05-0.085	0.085-0.12	0.1-0.18	0.15-0.2
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	0.05-0.08	0.085-0.1	0.1-0.15	0.15-0.2	0.2-0.25
	< 1200 N / mm ²	65	0.05-0.08	0.085-0.1	0.1-0.15	0.15-0.2	0.2-0.25
	< 1400 N / mm ²	50	0.01-0.02	0.025-0.06	0.06-0.09	0.085-0.13	0.1-0.15
TOOL STEEL	< 800 N / mm ²	50	0.01-0.02	0.025-0.06	0.06-0.09	0.085-0.13	0.1-0.15
	< 1000 N / mm ²	40	0.01-0.02	0.025-0.06	0.06-0.09	0.085-0.13	0.1-0.15
	< 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	0.01-0.02	0.015-0.04	0.035-0.055	0.045-0.08	0.075-0.1
	> 1400 N / mm ²	25	0.01-0.02	0.015-0.04	0.035-0.055	0.045-0.08	0.075-0.1
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	0.01-0.02	0.015-0.04	0.035-0.055	0.045-0.08	0.075-0.1
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	0.02-0.06	0.05-0.09	0.07-0.12	0.09-0.15	0.1-0.18
	> 650 N / mm ²	40	0.02-0.06	0.05-0.09	0.07-0.12	0.09-0.15	0.1-0.18
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	0.01-0.03	0.02-0.05	0.04-0.055	0.05-0.075	0.06-0.1
	< 1100 N / mm ²	20	0.01-0.03	0.02-0.05	0.04-0.055	0.05-0.075	0.06-0.1
	< 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	0.008-0.01	0.01-0.03	0.025-0.035	0.03-0.04	0.035-0.05
	> 1400 N / mm ²	10	0.008-0.01	0.01-0.03	0.025-0.035	0.03-0.04	0.035-0.05
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	0.01-0.025	0.015-0.04	0.035-0.045	0.04-0.06	0.05-0.08
	> 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	0.03-0.06	0.04-0.1	0.08-0.15	0.09-0.17	0.12-0.23
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	0.03-0.06	0.04-0.1	0.08-0.15	0.09-0.17	0.12-0.23
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

Customised Drills (Burnishing, through coolant, etc.) with different parameters can be manufactured as per requirement.

SOLID CARBIDE CENTRE DRILLS TYPE 'A'

Pilot Dia	Body Dia h9	Overall	Length	Pilot	Length2
		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°

Confirming to IS 1977

SOLID CARBIDE CENTRE DRILLS

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°
Above items will be available in Tin, Tich and tialn coating

Conforming to BS 328 - Part 2 - 1950

SOLID CARBIDE WITH PARALLEL SHANK CHUCKING REAMER

Shank Dia. 'h9'	Cutting Edge Length	Overall Length	No. of Flutes
5.0	23	86	4
5.6	26	93	4
5.6	26	93	4
6.3	28	101	4
7.1	31	109	6
7.1	31	109	6
8.0	33	117	6
8.0	33	117	6
9.0	36	125	6
9.0	36	125	6
10.0	38	133	6
10.0	38	133	6
10.0	41	142	6
10.0	41	142	6
10.0	44	151	6
10.0	44	151	6
10.0	44	151	6
12.5	47	160	8
12.5	47	160	8
12.5	50	162	8
12.5	50	162	8
12.5	52	170	8
12.5	52	170	8

Above items will be available in Tin, T1cn and T1aln coating

*“Products are made in the factory,
but brands are created in the mind”*

We at Zenstar ensure highest quality level and have our own in-house design facilities utilising the latest trends and developments.

All the latest technological machines are used to create the finished products

The tools are completely inspected on zoller cnc tool inspection machine for quality to ensure highest amount of precision



TECHNO TOOLS IMPEX



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