

PRODUCT CATALOGUE 2023



ROHIT has been on the vanguard in the field of HSS Cutting Tools & Solid Carbide Cutting Tools industry. We have been serving the Cutting Tools industry for over six decades. The company started its operations in the year 1963 under the visionary leadership of Mr. K.L Duggal who has taken this company from meager resources from a small Workshop in 1963 to 2-Manufacturing Units spread over 40,000 Square Foot and Cutting Tool Brand to Boast about.

Our Core Strengths:

Manufacturing Expertise

Our R&D Team which boasts of engineers' from India's Top Engineering Colleges is dedicated in providing new designs for the Carbide Drills, End Mills & Reamers so as to enhance productivity, repeatability and reduce CPC.

Heat Treatment Facility

We at ROHIT have over 6 decades of HSS Heat Treatment experience which helps in providing best performing HSS tools over and over again.

Product Know-how

Our employees & engineers have all the knowledge accumulated in the company's 6 Decades of expertise in Cutting Tool Industry. Simultaneously, our R&D center continuously provides Innovations and optimizes tool performance in our testing facility with the assistance of state-of-the-art technologies.

Innovations & New Designs

Our R&D center is the backbone of ROHIT's new designs. Currently our Milling & Drilling tools for machining Alloy Steels, SS, Titanium & other special alloys are leading the market with Lowest CPC guaranteed to the customer.

Regrinding Service

Save your Planet! We at ROHIT, believes that it is everyone's duty to do their bit towards the environment; hence Regrinding makes our companies core in enabling the customer reduce their cost, also helping environment by Recycling and our regrinding ensures customer's with refurbished tool similar to the new ROHIT tool they have used with original Tool Designs and coatings.

We are happy to help our customers reduce their Tooling Costs and improve their Bottom Line!



Chairman



Why Choose RIGPL?

- Quality down to last detail
- Expert advice on optimal tool application
- Highest Productivity, Excellent Economic Efficiency
- Specialized solutions to improve your Bottom Line
- Think Tank to make your Cutting Tools Last that bit Longer

Industry We Support

- Aerospace & Automotive
- Power Generation
- General Engineering
- Die & Mold Industry
- Medical Implants
- Ordnance Manufacturing
- Furniture Manufacturing



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Carbide High Performance Drills (CTHS, CTHL series)

- Newly Developed High Wear Resistance NOVA coating
- Stable Low Thrust Point Form
- Edge Chamfer to provide longer cutting edge life
- Best suited for Drilling Alloy Steel, SS, Titanium & Ni alloys




Carbide High Performance Drills (C3HS, C3HL Series)

- Newly Developed High Wear Resistance NOVA coating
- Edge Honing to provide sturdy drill point
- Edge Chamfer to provide longer cutting edge life
- New chip Curling design for faster chip breakage
- Best suited for Drilling Alloy Steel, SS, Titanium & Ni alloys

“Carbide End Mills 301 or 302 Series

- Especially designed for Hard Machining up to 60HRc
- Use our 401 or 402 series for machining up to 70HRc”

“Wood machining tools to cater to ever so growing needs of the **Wood Routing industry**”



“Carbide Variable Helix
Endmills 330, 333 or 334 Series
are designed for Chatter free
machining of Alloy Steel,
SS & Super alloys”

CARBIDE DRILLS

Series Group	Series	Image	Diameter Range (in mm)	Stock	# of Flutes	Coating Type	Page Number	Internal coolant
GP-Drills	C1GS		2 ~ 20	Yes	2	TiALN	17	
	C1GJ		2 ~ 20	Yes	2	None/TiALN	20	
HP-Drills	C3HS		2 ~ 20	Yes	2	NOVA	25	
	C3HL		2 ~ 20	Yes	2	NOVA	29	
	CTHS		4 ~ 20	++	2	NOVA	32	YES
	CTHL		4 ~ 20	++	2	NOVA	36	YES
	CTHM		4 ~ 12	++	2	NOVA	39	YES
SHP-Drills	C4HT		2 ~ 20	++	2	PEROX	40	
Misc. Drills	C1N1		6 ~ 20	++	2	-	44	
	C1N2		6 ~ 20	++	2	-	44	
	C1CB		BS1 ~ BS7	++	2	-	45	
	C1CD		1.6 ~ 8	++	2	-	46	

CARBIDE REAMERS




Series Group	Series	Image	Diameter Range (in mm)	Stock	# of Flutes	Coating Type	Page Number	Internal coolant
Reamers	C1RS		3 ~ 16	++	4/6	NONE/TiALN	67	
	C1RL		3 ~ 16	++	4/6	NONE/TiALN	69	
	C1RR		3 ~ 16	++	4/6	NONE/TiALN	71	

Table of Contents-cum-Selection Guide



Carbon Steels BHN 180 to 225	Alloy Steels BHN 225 to 355	Pre-hardened Steels HRc 40 to 45	Austenitic Stainless Steel	Precipitation Hardened Stainless Steel	Titanium	HighTemp. Alloy	Grey Cast Iron	Ductile Cast Iron	Hardened Steels HRc 45 to 55	High Hardened Steels HRc 55 to 70	Aluminum	Aluminum Alloys	Plastic	Wood / MDF	Plywood/Laminates	Copper / Brass
2 nd	2 nd		2 nd				1 st	2 nd			1 st	2 nd				1 st
2 nd	2 nd		2 nd				1 st	2 nd			1 st	2 nd				1 st
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1 st	1 st	1 st	1 st	2 nd	2 nd	2 nd	1 st	1 st				1 st				
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GP - General Purpose
HP - High Performance

Delivery Time
+ 1 Week
++ 2 Weeks
+++ 3 Weeks

1st 1st Choice
2nd 2nd choice

Carbon Steels BHN 180 to 225	Alloy Steels BHN 225 to 355	Pre-hardened Steels HRc 40 to 45	Austenitic Stainless Steel	Precipitation Hardened Stainless Steel	Titanium	HighTemp. Alloy	Grey Cast Iron	Ductile Cast Iron	Hardened Steels HRc 45 to 55	High Hardened Steels HRc 55 to 70	Aluminum	Aluminum Alloys	Plastic	Wood / MDF	Plywood/Laminates	Copper / Brass
1 st	1 st	1 st	1 st	1 st	1 st	1 st	1 st	1 st			1 st	1 st				1 st
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CARBIDE END MILLS

Series Group	Series	Image	Dia Range	Stock	# of Flutes	Square End	Ball Nose	Corner Radius	Neck Relief	Coating	Page Number
HP-VHEM*	330		4-20	Yes	4	x		x		AL-PRO	79
	333		6-20	++	5	x		x		AL-PRO	81
	334		6-20	++	4	x				AL-PRO	83
HP-SUS*	222		3-20	Yes	4	x				NOVA	87
	321		3-20	Yes	4	x		x		NOVA	88
	322		4-20	Yes	4	x				NOVA	90
HP-VHEM*	430		4-16	++	4	x		x		AL-PRO	92
	433		6-16	++	5	x		x		AL-PRO	94
HP-4X	401		1-12	++	4	x				NOVA	96
	402		1-12	++	2		x			NOVA	97
	406		2-12	++	2		x		x	NOVA	98
HP-3X	301		1-20	Yes	4	x				NOVA	100
	302		3-16	Yes	4		x			NOVA	102
	304		1-12	Yes	2		x			NOVA	103
	305		1-4	Yes	2	x			x	NOVA	104
	306		1-4	Yes	2		x		x	NOVA	106
	307		2-12	++	2		x		x	NOVA	108
	308		6-20	++	6	x			x	AL-PRO	109



Table of Contents-cum-Selection Guide

Carbon Steels BHN 180 to 225	Alloy Steels BHN 225 to 355	Pre-hardened Steels HRc 40 to 45	Austenitic Stainless Steel	Precipitation Hardened Stainless Steel	Titanium	HighTemp. Alloy	Grey Cast Iron	Ductile Cast Iron	Hardened Steels HRc 45 to 55	High Hardened Steels HRc 55 to 70	Aluminum	Aluminum Alloys	Plastic	Wood / MDF	Plywood/Laminates	Copper / Brass
1st	1st	1st	1st	1st	2nd	2nd		1st				2nd				
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1st	1st	1st	1st	1st	1st	2nd	1st	1st	1st	2nd	1st	1st				

GP - General Purpose
HP - High Performance

Delivery Time	+	1 Week
	++	2 Weeks
	+++	3 Weeks

1st	1st Choice
2nd	2nd choice

CARBIDE END MILLS

























Series Group	Series	Image	Dia Range	Stock	# of Flutes	Square End	Ball Nose	Corner Radius	Neck Relief	Coating	Page Number
GP-1X	201		2-25	Yes	4	x				TiALN	110
	202		3-20	Yes	4		x			TiALN	112
	204		1-12	Yes	2		x			TiALN	113
	205		2-16	Yes	4	x				HYPERLOX	114
	206		1-12	Yes	2		x			HYPERLOX	115
	207		2-10	++	2 & 4	x				TiALN	116
	208		2-10	++	2 & 4		x			TiALN	117
	211		2-20	Yes	2	x				-	118
	212		3-20	Yes	2		x			-	119
	213		3-20	Yes	3	x				-	120
	215		4-16	++	3 & 4					TiALN	121
	219		3-12	+	1	x				-	122
GP-0X	101		2-20	Yes	4	x				TiALN	123
	102		3-20	Yes	4		x			TiALN	124
	110		3-20	Yes	4	x				TiALN	131
GP-0X (NON-Ferrous)	103		1-12	Yes	2	x				-	125
	104		1-12	Yes	2		x			-	126
	107		3-16	Yes	1	x				-	128
	108		1-4	+	2	x				-	129
	109		1-4	+	2		x			-	130
	112		6-12.70	+	2	x				-	132
	114		6-12.70	+	2	x				-	133
	118		3-12	+	2	x				-	134
119		3-12	+	1	x				-	136	

Table of Contents-cum-Selection Guide



Carbon Steels BHN 180 to 225	Alloy Steels BHN 225 to 355	Pre-hardened Steels HRc 40 to 45	Austenitic Stainless Steel	Precipitation Hardened Stainless Steel	Titanium	HighTemp. Alloy	Grey Cast Iron	Ductile Cast Iron	Hardened Steels HRc 45 to 55	High Hardened Steels HRc 55 to 70	Aluminum	Aluminum Alloys	Plastic	Wood / MDF	Plywood/Laminates	Copper / Brass
1st	2nd	2nd	2nd				1st	2nd			2nd	2nd	2nd	2nd		2nd
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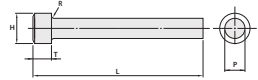
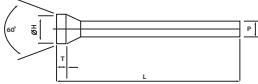
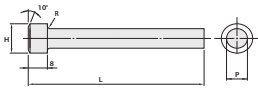
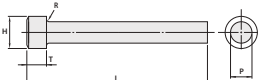
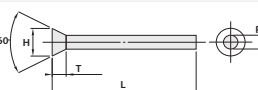
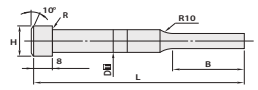
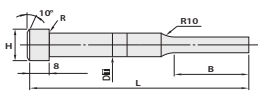
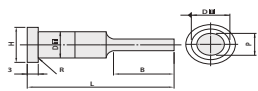
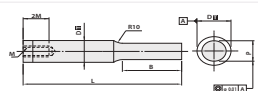
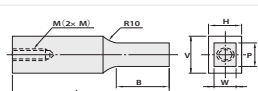

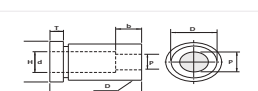
GP - General Purpose
HP - High Performance

Delivery Time	+	1 Week
	++	2 Weeks
	+++	3 Weeks

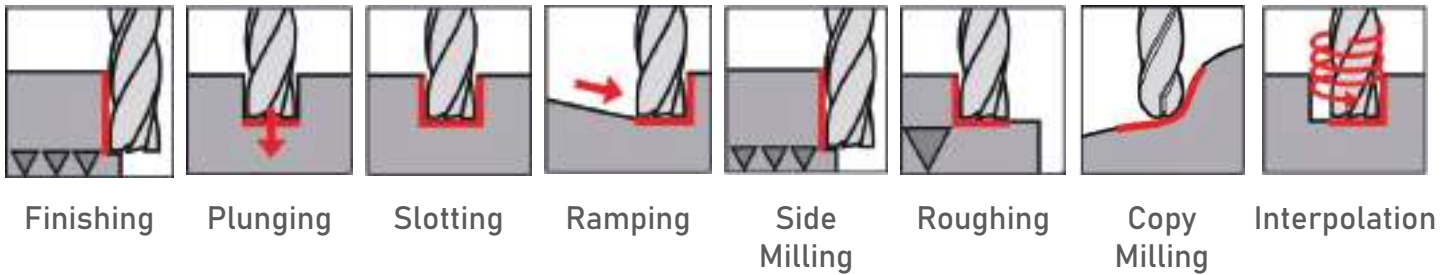
1st	1st Choice
2nd	2nd Choice

Description	Page No
GRADE CHART of HSS CUTTING TOOLS	157
HSS Square Tools Bits (Inch Sizes)	158
HSS Square Tools Bits (Metric Sizes)	159
HSS Rectangular (Flat) Tools Bits (Inch Sizes)	160
HSS Rectangular (Flat) Tools Bits (Metric Sizes)	162
HSS Round Tool Bits (Inch Sizes)	164
HSS Round Tool Bits (Metric Sizes)	166
HSS Parting Blades Cut-Off Blades	169
HSS Parallel Shank End Mills (Imperial Sizes)	174
HSS Parallel Shank End Mills (Metric Sizes)	175
HSS Center Drills Type-A	176
Geometry & Instructions	170

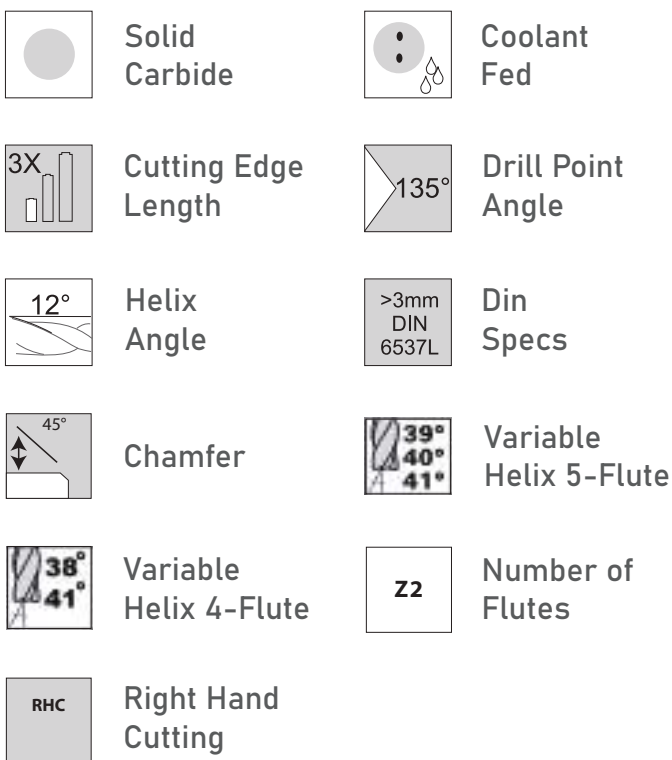


Series	Description	Body/tip Dia "P" (0.1 mm Increments)	Stock Availability	Drawing	Page Number
P101	HSS Straight Punches	1.1-25	Yes		180
P102	HSS Tapered Head Punches	3.0-12	++		181
P103	HSS Straight Punches For Medium Load	2.1-25	++		182
P104	HSS Straight Punches For Heavy Load	2.1-25	++		183
P105	HSS Mini Straight Punches	1-3	++		184
P106	HSS Shoulder Punches	2-24.9	+++		185
P107	HSS Shoulder Punches For Heavy Load	2-24.9	+++		186
P108	HSS Shoulder Punches Short Type	2-9.9	+++		187
P109	HSS Tapped Punches	2-24.9	Ask for Delivery Time		188
P110	HSS Block Punches		Ask for Delivery Time		189
P112	HSS Straight Button Dies		Ask for Delivery Time		190
P113	HSS Headed Button Dies		Ask for Delivery Time		190

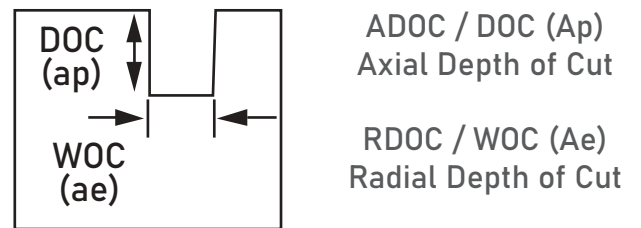
APPLICATION TYPE



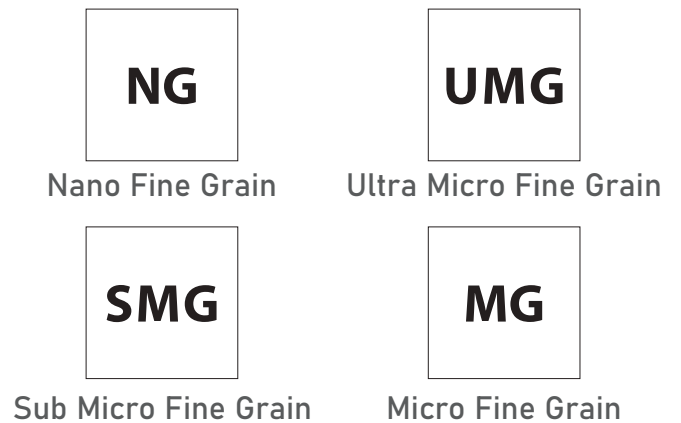
TOOL IDENTIFICATION



TYPES OF CUTTING



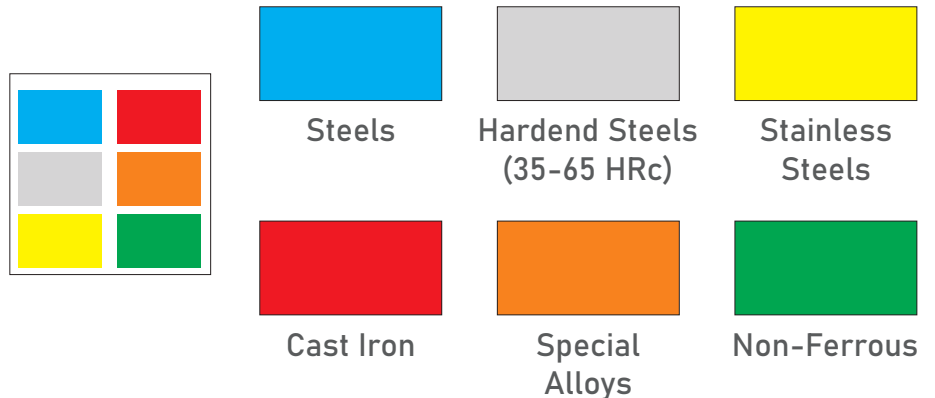
CARBIDE GRAIN SIZE



COATING TYPES



WORKPIECE MATERIAL GROUP



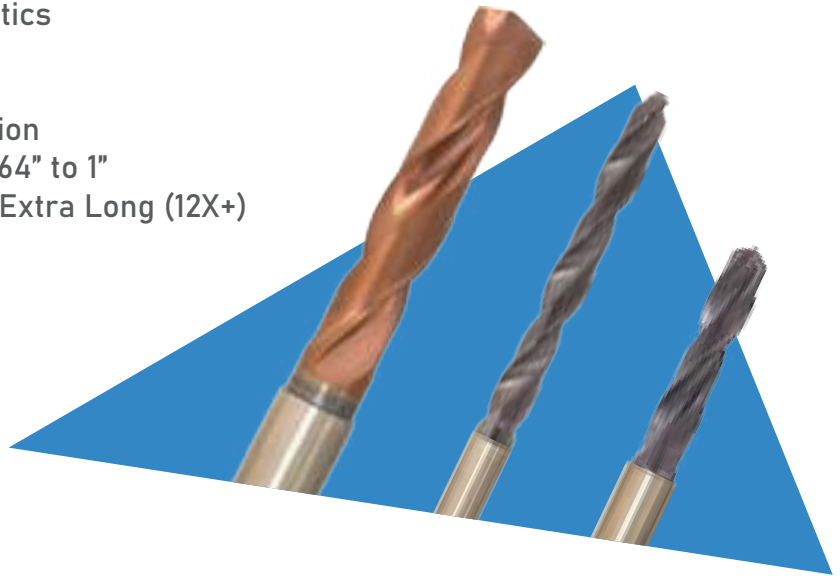
HIGH PERFORMANCE DRILLING

Features

- Advanced “Active Cut” Geometric Design
- Redefined Critical Cut Zone Characteristics
- High-Efficiency Flute Profile
- Stable Low-Thrust Point Form
- Coolant-Fed or Solid Carbide construction
- Diameter Range - 2.0mm to 25.0mm, 5/64” to 1”
- Stub (3X), Regular (5X), Long (7X+) and Extra Long (12X+)

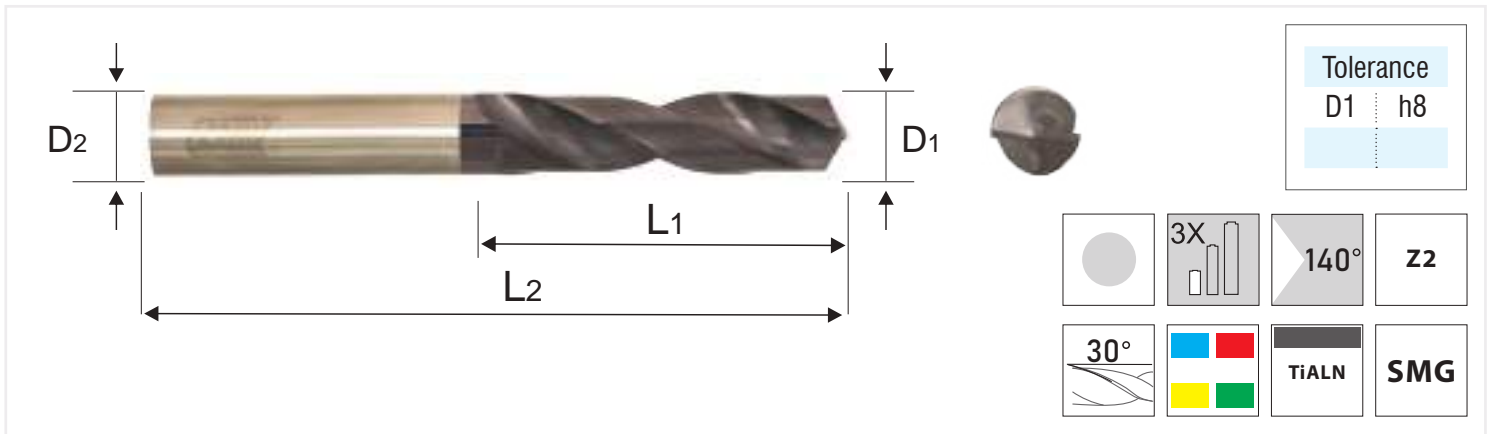
Benefits

- Extended Tool Life
- Elevated Metal Removal Rates (MRR)
- Lower cost Per Hole
- Improved Hole/Part Quality
- Increased Tool Reliability
- Factory Reconditioning Service



Type	Name	Series	Page No
General Purpose Drills	Stub Series	C1GS	17
	Jobber Series	C1GJ	20
High Performance Drills	Short Series	C3HS	25
	Long Series	C3HL	29
	Coolant Fed Short Drills	CTHS	32
	Coolant Fed Long Drills	CTHL	36
	MQL Drills	CTHM	39
SHP-Drills	Super High Performance Drills	C4HT	40
Misc. Drills	NC-Spotting Drills 90*	C1N1	44
	NC-Spotting Drills 120*	C1N2	44
	Centre Drills BS328	C1CB	45
	Centre Drills DIN333	C1CD	46
Technical Information	Feed and Speed Parameters		49





Features:

- Give Better Life & productivity in comparison to HSS Co drills,
- Suited for Drilling various types of materials like Cast Iron, Non-ferrous metals & Free cutting steel

Item Code TiAlN Coated	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR11GDR004U3	2.0	12	39	2.0
CR11GDR004Y4	2.1	14	39	2.1
CR11GDR004Z2	2.2	14	39	2.2
CR11GDR00503	2.3	14	39	2.3
CR11GDR00511	2.4	14	39	2.4
CR11GDR00529	2.5	14	39	2.5
CR11GDR00545	2.6	20	54	2.6
CR11GDR00552	2.7	20	54	2.7
CR11GDR00560	2.8	20	54	2.8
CR11GDR00586	2.9	20	54	2.9
CR11GDR00594	3.0	20	54	3.0
CR11GDR005C2	3.1	20	54	3.1
CR11GDR005E7	3.2	20	54	3.2
CR11GDR005G3	3.3	20	54	3.3
CR11GDR005J6	3.4	20	54	3.4
CR11GDR005M0	3.5	20	54	3.5
CR11GDR005P3	3.6	22	54	3.6
CR11GDR005R9	3.7	22	54	3.7
CR11GDR005T4	3.8	22	54	3.8
CR11GDR005V0	3.9	22	54	3.9

Item Code TiAlN Coated	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR11GDR005X5	4.0	22	54	4.0
CR11GDR005Z1	4.1	24	63	4.1
CR11GDR00610	4.2	24	63	4.2
CR11GDR00636	4.3	24	63	4.3
CR11GDR00651	4.4	24	63	4.4
CR11GDR00677	4.5	24	63	4.5
CR11GDR006A5	4.6	26	63	4.6
CR11GDR006C1	4.7	26	63	4.7
CR11GDR006E6	4.8	26	63	4.8
CR11GDR006G2	4.9	26	63	4.9
CR11GDR006J5	5.0	26	63	5.0
CR11GDR006L1	5.1	28	63	5.1
CR11GDR006N6	5.2	28	63	5.2
CR11GDR006R8	5.3	28	63	5.3
CR11GDR006U1	5.4	28	63	5.4
CR11GDR006W7	5.5	28	63	5.5
CR11GDR006Y2	5.6	28	63	5.6
CR11GDR00701	5.7	28	63	5.7
CR11GDR00727	5.8	28	63	5.8
CR11GDR00743	5.9	28	63	5.9

Item Code TiAlN Coated	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR11GDR00768	6.0	28	63	6.0
CR11GDR00784	6.1	31	63	6.1
CR11GDR007A4	6.2	31	63	6.2
CR11GDR007D7	6.3	31	63	6.3
CR11GDR007F3	6.4	31	63	6.4
CR11GDR007J4	6.5	31	63	6.5
CR11GDR007L0	6.6	34	63	6.6
CR11GDR007N5	6.7	34	63	6.7
CR11GDR007Q9	6.8	34	63	6.8
CR11GDR007T2	6.9	34	63	6.9
CR11GDR007W6	7.0	34	63	7.0
CR11GDR007Y1	7.1	34	79	7.1
CR11GDR00800	7.2	34	79	7.2
CR11GDR00826	7.3	34	79	7.3
CR11GDR00842	7.4	34	79	7.4
CR11GDR00867	7.5	34	79	7.5
CR11GDR008A3	7.6	37	79	7.6
CR11GDR008C9	7.7	37	79	7.7
CR11GDR008E4	7.8	37	79	7.8
CR11GDR008G0	7.9	37	79	7.9
CR11GDR008J3	8.0	37	79	8.0
CR11GDR008L9	8.1	37	79	8.1
CR11GDR008N4	8.2	37	79	8.2
CR11GDR008R6	8.3	37	79	8.3
CR11GDR008T1	8.4	37	79	8.4
CR11GDR008W5	8.5	37	79	8.5
CR11GDR00909	8.6	40	79	8.6
CR11GDR00933	8.7	40	79	8.7
CR11GDR00958	8.8	40	79	8.8
CR11GDR00982	8.9	40	79	8.9
CR11GDR009A2	9.0	40	79	9.0
CR11GDR009E3	9.1	40	79	9.1
CR11GDR009G9	9.2	40	79	9.2

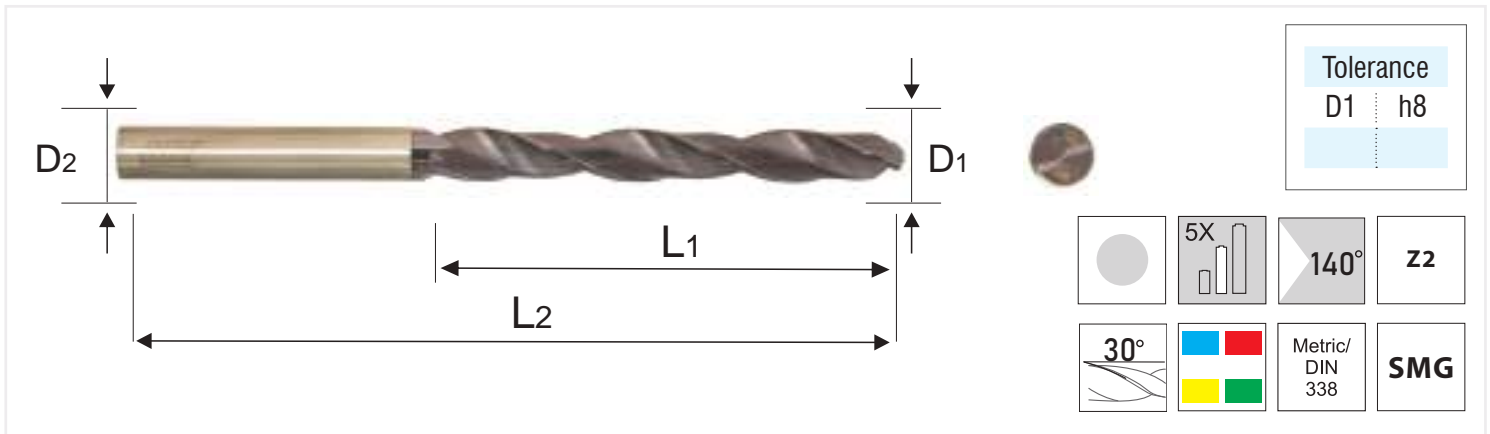
Item Code TiAlN Coated	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR11GDR009J2	9.3	40	79	9.3
CR11GDR009L8	9.4	40	79	9.4
CR11GDR009N3	9.5	40	79	9.5
CR11GDR009Q7	9.6	42	79	9.6
CR11GDR009S2	9.7	42	79	9.7
CR11GDR009V6	9.8	42	79	9.8
CR11GDR009X1	9.9	42	79	9.9
CR11GDR009Z7	10.0	42	79	10.0
CR11GDR00A19	10.1	42	79	10.1
CR11GDR00A27	10.2	42	79	10.2
CR11GDR00A43	10.3	47	100	10.3
CR11GDR00A50	10.4	47	100	10.4
CR11GDR00A68	10.5	47	100	10.5
CR11GDR00A92	10.6	47	100	10.6
CR11GDR00AA4	10.7	47	100	10.7
CR11GDR00AB2	10.8	47	100	10.8
CR11GDR00AD7	10.9	47	100	10.9
CR11GDR00AE5	11.0	47	100	11.0
CR11GDR00AG1	11.1	47	100	11.1
CR11GDR00AH9	11.2	47	100	11.2
CR11GDR00AJ4	11.3	47	100	11.3
CR11GDR00AK2	11.4	47	100	11.4
CR11GDR00AL0	11.5	47	100	11.5
CR11GDR00AN5	11.6	49	100	11.6
CR11GDR00AP1	11.7	49	100	11.7
CR11GDR00AQ9	11.8	49	100	11.8
CR11GDR00AR7	11.9	49	100	11.9
CR11GDR00AS4	12.0	49	100	12.0
CR11GDR00AU0	12.1	51	102	12.1
CR11GDR00AV8	12.2	51	102	12.2
CR11GDR00AW6	12.3	51	102	12.3
CR11GDR00AX3	12.4	51	102	12.4
CR11GDR00AZ9	12.5	51	102	12.5

Item Code TiALN Coated	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR11GDR00B00	12.6	51	102	12.6
CR11GDR00B18	12.7	51	102	12.7
CR11GDR00B34	12.8	51	102	12.8
CR11GDR00B42	12.9	51	102	12.9
CR11GDR00B59	13.0	51	102	13.0
CR11GDR00B67	13.1	54	107	13.1
CR11GDR00B75	13.2	54	107	13.2
CR11GDR00B83	13.3	54	107	13.3
CR11GDR00B91	13.4	54	107	13.4
CR11GDR00BA3	13.5	54	107	13.5
CR11GDR00BB1	13.6	54	107	13.6
CR11GDR00BC9	13.7	54	107	13.7
CR11GDR00BD6	13.8	54	107	13.8
CR11GDR00BE4	13.9	54	107	13.9
CR11GDR00BF2	14.0	54	107	14.0

Item Code TiALN Coated	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR11GDR00BG0	14.1	56	109	14.1
CR11GDR00BH8	14.2	56	109	14.2
CR11GDR00BJ3	14.3	56	109	14.3
CR11GDR00BK1	14.4	56	109	14.4
CR11GDR00BL9	14.5	56	109	14.5
CR11GDR00BM7	14.6	56	109	14.6
CR11GDR00BN4	14.7	56	109	14.7
CR11GDR00BP0	14.8	56	109	14.8
CR11GDR00BQ8	14.9	56	109	14.9
CR11GDR00BS3	15.0	56	109	15.0
CR11GDR00BT1	16.0	56	109	16.0
CR11GDR00BU9	17.0	56	109	18.0
CR11GDR00BV7	18.0	56	109	18.0
CR11GDR00BW5	19.0	56	109	19.0
CR11GDR00BX2	20.0	56	109	20.0

Carbon Steels BHN 180 to 225	Alloy Steels BHN 225 to 355	Prehardened Steels HRc 40 to 45	Austenitic Stainless Steel	Precipitation Hardened Stainless Steel	Titanium	HighTemp. Alloy	Grey Cast Iron	Ductile Cast Iron	Hardened Steels HRc up to 45	High Hardened Steels HRc 45 to 55	Aluminum	Aluminum Alloys	Plastic	Wood / MDF	Copper/Brass
2 nd	2 nd		2 nd				1 st	2 nd			1 st	2 nd			1 st

NOTE: FOR FEED & SPEED Rates, go to page no. PG-49



Features:

- Give Better Life & productivity in comparison to HSS Co drills,
- Suited for Drilling various types of materials like Cast Iron, Non-ferrous metals and Free cutting steel

Item Code (Uncoated)	Ordering Code (TiALN Coated)	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR1XGDR000H7	CR11GDR00P06	2.0	24	61	2.0
CR1XGDR000J2	C1GJ0210-F	2.1	24	61	2.1
CR1XGDR000K0	CR11GDR00T44	2.2	24	61	2.2
CR1XGDR000L8	CR11GDR00P14	2.3	24	61	2.3
CR1XGDR000M6	CR11GDR00T51	2.4	24	61	2.4
CR1XGDR000N3	CR11GDR00099	2.5	24	61	2.5
CR1XGDR000P9	C1GJ0260-F	2.6	33	61	2.6
CR1XGDR000Q7	C1GJ0270-F	2.7	33	61	2.7
CR1XGDR000R5	C1GJ0280-F	2.8	33	61	2.8
CR1XGDR000S2	C1GJ0290-F	2.9	33	61	2.9
CR1XGDR000T0	CR11GDR005A6	3.0	33	61	3.0
CR1XGDR000U8	CR11GDR005D9	3.1	39	70	3.1
CR1XGDR000V6	CR11GDR005F5	3.2	39	70	3.2
CR1XGDR000W4	CR11GDR005H1	3.3	39	70	3.3
CR1XGDR000X1	CR11GDR005K4	3.4	39	70	3.4
CR1XGDR000Y9	CR11GDR005N7	3.5	39	70	3.5
CR1XGDR000Z7	CR11GDR005Q1	3.6	43	75	3.6
CR1XGDR00108	CR11GDR005S6	3.7	43	75	3.7
CR1XGDR00116	CR11GDR005U2	3.8	43	75	3.8
CR1XGDR00124	CR11GDR005W8	3.9	43	75	3.9

Item Code (Uncoated)	Ordering Code (TiAlN Coated)	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR1XGDR00140	CR11GDR005Y3	4.0	43	75	4.0
CR1XGDR00157	CR11GDR00602	4.1	47	80	4.1
CR1XGDR00165	CR11GDR00628	4.2	47	80	4.2
CR1XGDR00173	CR11GDR00644	4.3	47	80	4.3
CR1XGDR00181	CR11GDR00669	4.4	47	80	4.4
CR1XGDR00199	CR11GDR00693	4.5	47	80	4.5
CR1XGDR001B9	CR11GDR006B3	4.6	52	86	4.6
CR1XGDR001C7	CR11GDR006D8	4.7	52	86	4.7
CR1XGDR001D4	CR11GDR006F4	4.8	52	86	4.8
CR1XGDR001E2	CR11GDR006H0	4.9	52	86	4.9
CR1XGDR001G8	CR11GDR006K3	5.0	52	86	5.0
CR1XGDR001H6	CR11GDR006M9	5.1	52	86	5.1
CR1XGDR001J1	CR11GDR006Q0	5.2	52	86	5.2
CR1XGDR001K9	CR11GDR006S5	5.3	57	93	5.3
CR1XGDR001L7	CR11GDR006V9	5.4	57	93	5.4
CR1XGDR001M5	CR11GDR006X4	5.5	57	93	5.5
CR1XGDR001N2	CR11GDR006Z0	5.6	57	93	5.6
CR1XGDR001P8	CR11GDR00719	5.7	57	93	5.7
CR1XGDR001Q6	CR11GDR00735	5.8	57	93	5.8
CR1XGDR001R4	CR11GDR00750	5.9	57	93	5.9
CR1XGDR001S1	CR11GDR00776	6.0	57	93	6.0
CR1XGDR001T9	CR11GDR00792	6.1	63	101	6.1
CR1XGDR001U7	CR11GDR007C0	6.2	63	101	6.2
CR1XGDR001V5	CR11GDR007E5	6.3	63	101	6.3
CR1XGDR001W3	CR11GDR007H9	6.4	63	101	6.4
CR1XGDR001X0	CR11GDR007K2	6.5	63	101	6.5
CR1XGDR001Y8	CR11GDR007M8	6.6	69	109	6.6
CR1XGDR001Z6	CR11GDR007P1	6.7	69	109	6.7
CR1XGDR00207	CR11GDR007S4	6.8	69	109	6.8
CR1XGDR00215	CR11GDR007U0	6.9	69	109	6.9
CR1XGDR00223	CR11GDR007X3	7.0	69	109	7.0
CR1XGDR00231	CR11GDR007Z9	7.1	69	109	7.1
CR1XGDR00249	CR11GDR00818	7.2	69	109	7.2

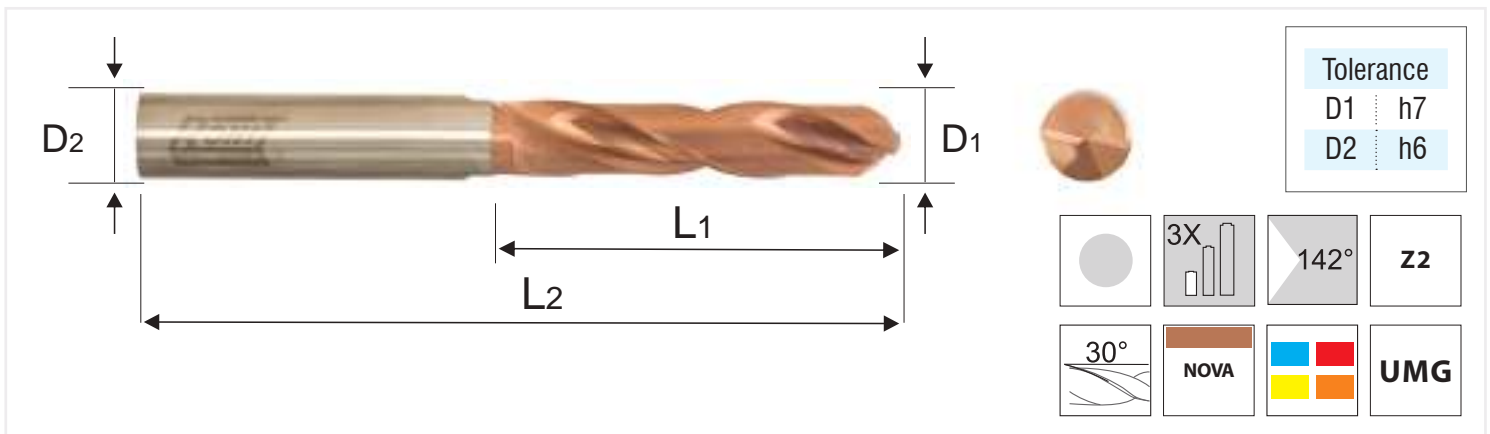
Item Code (Uncoated)	Ordering Code (TiALN Coated)	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR1XGDR00256	CR11GDR00834	7.3	69	109	7.3
CR1XGDR00264	CR11GDR00859	7.4	69	109	7.4
CR1XGDR00272	CR11GDR00891	7.5	69	109	7.5
CR1XGDR00280	CR11GDR008B1	7.6	75	117	7.6
CR1XGDR00298	CR11GDR008D6	7.7	75	117	7.7
CR1XGDR002A0	CR11GDR008F2	7.8	75	117	7.8
CR1XGDR002B8	CR11GDR008H8	7.9	75	117	7.9
CR1XGDR002C6	CR11GDR008K1	8.0	75	117	8.0
CR1XGDR002E1	CR11GDR008M7	8.1	75	117	8.1
CR1XGDR002F9	CR11GDR008Q8	8.2	75	117	8.2
CR1XGDR002G7	CR11GDR008S3	8.3	75	117	8.3
CR1XGDR002H5	CR11GDR008U9	8.4	75	117	8.4
CR1XGDR002J0	CR11GDR008Z8	8.5	75	117	8.5
CR1XGDR002K8	CR11GDR00917	8.6	81	125	8.6
CR1XGDR002L6	CR11GDR00941	8.7	81	125	8.7
CR1XGDR002M4	CR11GDR00974	8.8	81	125	8.8
CR1XGDR002N1	CR11GDR00990	8.9	81	125	8.9
CR1XGDR002P7	CR11GDR009C8	9.0	81	125	9.0
CR1XGDR002Q5	CR11GDR009F1	9.1	81	125	9.1
CR1XGDR002R3	CR11GDR009H7	9.2	81	125	9.2
CR1XGDR002S0	CR11GDR009K0	9.3	81	125	9.3
CR1XGDR002T8	CR11GDR009M6	9.4	81	125	9.4
CR1XGDR002U6	CR11GDR009P9	9.5	81	125	9.5
CR1XGDR002V4	CR11GDR009R5	9.6	87	133	9.6
CR1XGDR002W2	CR11GDR009T0	9.7	87	133	9.7
CR1XGDR002X9	CR11GDR009W4	9.8	87	133	9.8
CR1XGDR002Y7	CR11GDR009Y9	9.9	87	133	9.9
CR1XGDR002Z5	CR11GDR00A01	10.0	87	133	10.0
CR1XGDR00306	C1GJ1010-F	10.1	87	133	10.1
CR1XGDR00322	CR11GDR00A35	10.2	87	133	10.2
CR1XGDR00330	C1GJ1030-F	10.3	87	133	10.3
CR1XGDR00348	CR11GDR00NQ6	10.4	87	133	10.4
CR1XGDR00355	CR11GDR00A84	10.5	87	133	10.5

Item Code (Uncoated)	Ordering Code (TiAlN Coated)	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR1XGDR00363	C1GJ1060-F	10.6	94	142	10.6
CR1XGDR00371	C1GJ1070-F	10.7	94	142	10.7
CR1XGDR00389	C1GJ1080-F	10.8	94	142	10.8
CR1XGDR00397	C1GJ1090-F	10.9	94	142	10.9
CR1XGDR003A9	CR11GDR00AF3	11.0	94	142	11.0
CR1XGDR003B7	C1GJ1110-F	11.1	94	142	11.1
CR1XGDR003C5	C1GJ1120-F	11.2	94	142	11.2
CR1XGDR003D2	C1GJ1130-F	11.3	94	142	11.3
CR1XGDR003E0	C1GJ1140-F	11.4	94	142	11.4
CR1XGDR003F8	CR11GDR00AM8	11.5	94	142	11.5
CR1XGDR003G6	C1GJ1160-F	11.6	101	151	11.6
CR1XGDR003H4	C1GJ1170-F	11.7	101	151	11.7
CR1XGDR003J9	C1GJ1180-F	11.8	101	151	11.8
CR1XGDR003K7	C1GJ1190-F	11.9	101	151	11.9
CR1XGDR003L5	CR11GDR00AT2	12.0	101	151	12.0
CR1XGDR003M3	C1GJ1210-F	12.1	101	151	12.1
CR1XGDR003N0	C1GJ1220-F	12.2	101	151	12.2
CR1XGDR003P6	C1GJ1230-F	12.3	101	151	12.3
CR1XGDR003Q4	C1GJ1240-F	12.4	101	151	12.4
CR1XGDR003R2	C1GJ1250-F	12.5	101	151	12.5
CR1XGDR003S9	C1GJ1260-F	12.6	101	151	12.6
CR1XGDR003T7	C1GJ1270-F	12.7	101	151	12.7
CR1XGDR003U5	C1GJ1280-F	12.8	101	151	12.8
CR1XGDR003V3	C1GJ1290-F	12.9	101	151	12.9
CR1XGDR003W1	CR11GDR00NU7	13.0	101	151	13.0
CR1XGDR003X8	C1GJ1310-F	13.1	101	151	13.1
CR1XGDR003Y6	C1GJ1320-F	13.2	101	151	13.2
CR1XGDR003Z4	C1GJ1330-F	13.3	101	151	13.3
CR1XGDR00405	C1GJ1340-F	13.4	101	151	13.4
CR1XGDR00413	CR11GDR00TZ0	13.5	101	151	13.5
CR1XGDR00421	C1GJ1360-F	13.6	101	151	13.6
CR1XGDR00439	C1GJ1370-F	13.7	101	151	13.7
CR1XGDR00447	C1GJ1380-F	13.8	101	151	13.8

Item Code (Uncoated)	Ordering Code (TiALN Coated)	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR1XGDR00454	C1GJ1390-F	13.9	101	151	13.9
CR1XGDR00462	CR11GDR00TT3	14.0	101	151	14.0
CR1XGDR00470	C1GJ1410-F	14.1	101	151	14.1
CR1XGDR00488	C1GJ1420-F	14.2	101	151	14.2
CR1XGDR00496	C1GJ1430-F	14.3	101	151	14.3
CR1XGDR004A8	C1GJ1440-F	14.4	101	151	14.4
CR1XGDR004C4	C1GJ1450-F	14.5	101	151	14.5
CR1XGDR004D1	C1GJ1460-F	14.6	101	151	14.6
CR1XGDR004E9	C1GJ1470-F	14.7	101	151	14.7
CR1XGDR004F7	C1GJ1480-F	14.8	101	151	14.8
CR1XGDR004G5	C1GJ1490-F	14.9	101	151	14.9
CR1XGDR004H3	C1GJ1500-F	15.0	101	151	15.0
CR1XGDR004J8	C1GJ1600-F	16.0	101	151	16.0
CR1XGDR004K6	C1GJ1700-F	17.0	101	151	17.0
CR1XGDR004L4	C1GJ1800-F	18.0	101	151	18.0
CR1XGDR004M2	C1GJ1900-F	19.0	101	151	19.0
CR1XGDR004N9	C1GJ2000-F	20.0	101	151	20.0

Carbon Steels BHN 180 to 225	Alloy Steels BHN 225 to 355	Prehardened Steels HRC 40 to 45	Austenitic Stainless Steel	Precipitation Hardened Stainless Steel	Titanium	HighTemp. Alloy	Grey Cast Iron	Ductile Cast Iron	Hardened Steels HRC up to 45	High Hardened Steels HRC 45 to 55	Aluminum	Aluminum Alloys	Plastic	Wood / MDF	Copper/Brass
2 nd	2 nd		2 nd				1 st	2 nd			1 st	2 nd			1 st

NOTE: FOR FEED & SPEED Rates, go to page no. PG-49



Features:

- 3~4 Times production compared to General Carbide Drill Bits like C1GS, C1GJ series
 - Multi-Layer NOVA coating to protect carbide tools at machining temp. up to 1,300°C
 - Best Carbide Drill for machining Alloy steel, Cast Iron up to 450BHN, SS & other tough materials
 - Rapid chip curling to promote chip breakage.
 - Improves productivity & achieves unmatched Life
- Superior Flute Form + Design + Honing clubbed with UMG (Ultra Fine carbide grain size) results in Peak Performance for your Carbide Drilling applications in most difficult to drill materials

Item Code (NOVA Coated)	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR3AHDR00C23	2.0	14	50	4.0
CR3AHDR00C31	2.1	14	50	4.0
CR3AHDR00C49	2.2	14	50	4.0
CR3AHDR00C56	2.3	14	50	4.0
CR3AHDR00C64	2.4	14	50	4.0
CR3AHDR00C72	2.5	14	50	4.0
CR3AHDR00C80	2.6	14	50	4.0
CR3AHDR00C98	2.7	14	50	4.0
CR3AHDR00CA0	2.8	14	50	4.0
CR3AHDR00CB8	2.9	14	50	4.0
CR3AHDR00CC6	3.0	20	62	6.0
CR3AHDR00CD3	3.1	20	62	6.0
CR3AHDR00CE1	3.2	20	62	6.0
CR3AHDR00CF9	3.3	20	62	6.0
CR3AHDR00CG7	3.4	20	62	6.0
CR3AHDR00CH5	3.5	20	62	6.0
CR3AHDR00CJ0	3.6	20	62	6.0

Item Code (NOVA Coated)	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR3AHDR00CK8	3.7	20	62	6.0
CR3AHDR00CL6	3.8	24	62	6.0
CR3AHDR00CM4	3.9	24	62	6.0
CR3AHDR00CN1	4.0	24	62	6.0
CR3AHDR00CP7	4.1	24	62	6.0
CR3AHDR00CQ5	4.2	24	62	6.0
CR3AHDR00CR3	4.3	24	62	6.0
CR3AHDR00CS0	4.4	24	62	6.0
CR3AHDR00CT8	4.5	24	62	6.0
CR3AHDR00CU6	4.6	24	62	6.0
CR3AHDR00CV4	4.7	24	62	6.0
CR3AHDR00CW2	4.8	28	62	6.0
CR3AHDR00CX9	4.9	28	62	6.0
CR3AHDR00CY7	5.0	28	62	6.0
CR3AHDR00CZ5	5.1	28	62	6.0
CR3AHDR00D06	5.2	28	62	6.0
CR3AHDR00D14	5.3	28	62	6.0

Item Code (NOVA Coated)	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR3AHDR00D22	5.4	28	62	6.0
CR3AHDR00D30	5.5	28	62	6.0
CR3AHDR00D48	5.6	28	62	6.0
CR3AHDR00D55	5.7	28	62	6.0
CR3AHDR00D63	5.8	28	62	6.0
CR3AHDR00D71	5.9	28	62	6.0
CR3AHDR00D89	6.0	28	62	6.0
CR3AHDR00D97	6.1	34	75	8.0
CR3AHDR00DA9	6.2	34	75	8.0
CR3AHDR00DB7	6.3	34	75	8.0
CR3AHDR00DC5	6.4	34	75	8.0
CR3AHDR00DD2	6.5	34	75	8.0
CR3AHDR00DE0	6.6	34	75	8.0
CR3AHDR00DF8	6.7	34	75	8.0
CR3AHDR00DG6	6.8	34	75	8.0
CR3AHDR00DH4	6.9	34	75	8.0
CR3AHDR00DJ9	7.0	34	75	8.0
CR3AHDR00DK7	7.1	40	80	8.0
CR3AHDR00DL5	7.2	40	80	8.0
CR3AHDR00DM3	7.3	40	80	8.0
CR3AHDR00DN0	7.4	40	80	8.0
CR3AHDR00DP6	7.5	40	80	8.0
CR3AHDR00DQ4	7.6	40	80	8.0
CR3AHDR00DR2	7.7	40	80	8.0
CR3AHDR00DS9	7.8	40	80	8.0
CR3AHDR00DT7	7.9	40	80	8.0
CR3AHDR00DU5	8.0	40	80	8.0
CR3AHDR00P53	8.1	40	80	10.0
CR3AHDR00DV3	8.1	51	100	10.0
CR3AHDR00NV3	8.2	40	80	10.0
CR3AHDR00DW1	8.2	51	100	10.0
CR3AHDR00NP6	8.3	40	75	10.0
CR3AHDR00DX8	8.3	51	100	10.0

Item Code (NOVA Coated)	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR3AHDR00NH4	8.4	40	75	10.0
CR3AHDR00DY6	8.4	51	100	10.0
CR3AHDR00NJ9	8.5	40	75	10.0
CR3AHDR00DZ4	8.5	51	100	10.0
CR3AHDR00NK7	8.6	40	75	10.0
CR3AHDR00E05	8.6	51	100	10.0
CR3AHDR00NR2	8.7	40	75	10.0
CR3AHDR00E13	8.7	51	100	10.0
CR3AHDR00NZ4	8.8	40	80	10.0
CR3AHDR00E21	8.8	51	100	10.0
CR3AHDR00TU9	8.9	40	80	10.0
CR3AHDR00E39	8.9	51	100	10.0
CR3AHDR00NW1	9.0	40	80	10.0
CR3AHDR00E47	9.0	51	100	10.0
CR3AHDR00P79	9.1	40	80	10.0
CR3AHDR00E54	9.1	51	100	10.0
CR3AHDR00TQ8	9.2	40	80	10.0
CR3AHDR00E62	9.2	51	100	10.0
CR3AHDR00P87	9.3	40	80	10.0
CR3AHDR00E70	9.3	51	100	10.0
CR3AHDR00TV7	9.4	40	80	10.0
CR3AHDR00E88	9.4	51	100	10.0
CR3AHDR00P95	9.5	40	80	10.0
CR3AHDR00E96	9.5	51	100	10.0
CR3AHDR00TW5	9.6	40	80	10.0
CR3AHDR00EA8	9.6	51	100	10.0
CR3AHDR00TX2	9.7	40	80	10.0
CR3AHDR00EB6	9.7	51	100	10.0
CR3AHDR00PA7	9.8	40	80	10.0
CR3AHDR00EC4	9.8	51	100	10.0
CR3AHDR00TY0	9.9	40	80	10.0
CR3AHDR00ED1	9.9	51	100	10.0
CR3AHDR00NX8	10.0	40	80	10.0

Item Code (NOVA Coated)	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR3AHDR00EE9	10.0	51	100	10.0
CR3AHDR00EF7	10.1	55	100	12.0
CR3AHDR00EG5	10.2	55	100	12.0
CR3AHDR00NN0	10.3	40	75	12.0
CR3AHDR00EH3	10.3	55	100	12.0
CR3AHDR00NL5	10.4	40	75	12.0
CR3AHDR00EJ8	10.4	55	100	12.0
CR3AHDR00NM3	10.5	40	75	12.0
CR3AHDR00EK6	10.5	55	100	12.0
CR3AHDR00EL4	10.6	55	100	12.0
CR3AHDR00EM2	10.7	55	100	12.0
CR3AHDR00EN9	10.8	55	100	12.0
CR3AHDR00EP5	10.9	55	100	12.0
CR3AHDR00EQ3	11.0	55	100	12.0
CR3AHDR00ER1	11.1	55	100	12.0
CR3AHDR00ES8	11.2	55	100	12.0
CR3AHDR00ET6	11.3	55	100	12.0
CR3AHDR00EU4	11.4	55	100	12.0
CR3AHDR00EV2	11.5	55	100	12.0
CR3AHDR00EW0	11.6	55	100	12.0
CR3AHDR00EX7	11.7	55	100	12.0
CR3AHDR00EY5	11.8	55	100	12.0
CR3AHDR00EZ3	11.9	55	100	12.0

Item Code (NOVA Coated)	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR3AHDR00F04	12.0	55	100	12.0
CR3AHDR00PB5	12.2	55	105	14.0
CR3AHDR00F12	12.5	55	105	14.0
CR3AHDR00P20	12.7	55	105	14.0
CR3AHDR00F20	13.0	55	105	14.0
CR3AHDR00P38	13.1	55	105	14.0
CR3AHDR00P46	13.2	55	105	14.0
CR3AHDR00F38	13.5	55	105	14.0
CR3AHDR00TS3	13.8	55	105	14.0
CR3AHDR00F46	14.0	55	105	14.0
CR3AHDR00F53	14.5	58	105	16.0
CR3AHDR00F61	15.0	58	105	16.0
CR3AHDR00F79	15.5	58	105	16.0
CR3AHDR00NT7	15.8	58	105	16.0
CR3AHDR00F87	16.0	58	105	16.0
CR3AHDR00F95	16.5	58	105	18.0
CR3AHDR00FA7	17.0	58	105	18.0
CR3AHDR00FB5	17.5	58	105	18.0
CR3AHDR00FC3	18.0	58	105	18.0
CR3AHDR00FD0	18.5	58	105	20.0
CR3AHDR00FE8	19.0	58	105	20.0
CR3AHDR00FF6	19.5	58	105	20.0
CR3AHDR00FG4	20.0	58	105	20.0

Carbon Steels BHN 180 to 225	Alloy Steels BHN 225 to 355	Prehardened Steels HRC 40 to 45	Austenitic Stainless Steel	Precipitation Hardened Stainless Steel	Titanium	HighTemp. Alloy	Grey Cast Iron	Ductile Cast Iron	Hardened Steels HRc up to 45	High Hardened Steels HRc 45 to 55	Aluminum	Aluminum Alloys	Plastic	Wood / MDF	Copper/Brass
1 st	1 st	1 st	1 st	2 nd	2 nd	2 nd	1 st	1 st			1 st				

NOTE: FOR FEED & SPEED Rates, go to page no. PG-51

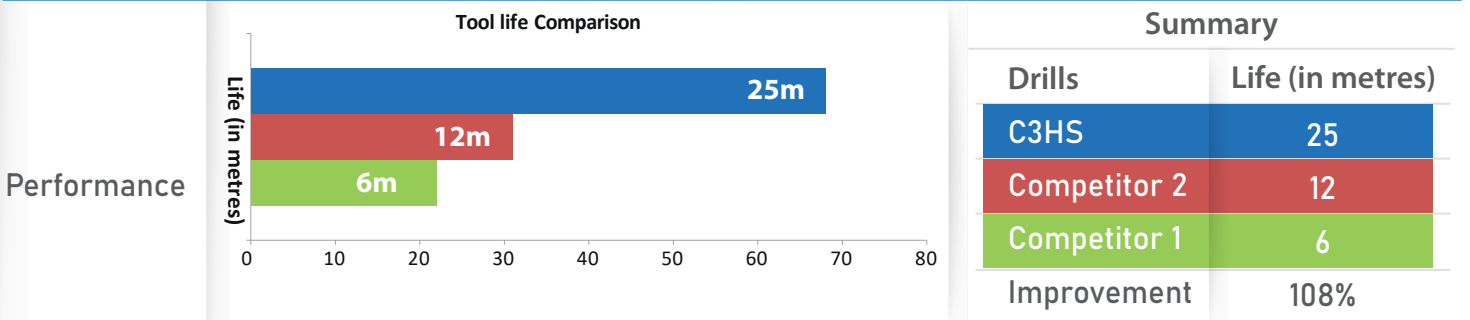
Description: S/C Rohit-3X NOVA HP-DRILL

FØ:3.3 FL:22 SØ:6 OAL:60 Z=2 SERIES-C3HS

Work-Piece Image

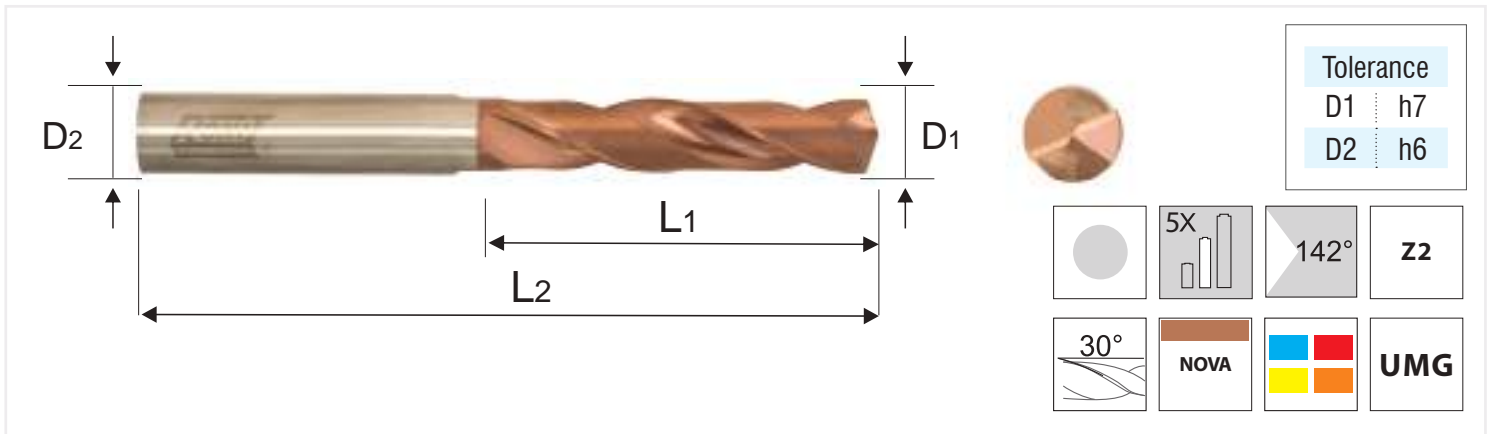


Industry	Auto Components	
Component	Timing Pulley	
Cutting Conditions	Tool Diameter	3.35mm
	Cutting Speed	54m/min
	RPM	5200
	Feed (mm/tooth)	0.1
	Table Feed (mm/min)	520
	PECKING	NONE
	Radial Cut	-
Milling Type	Through Hole Application	
Coolant	6% Mix Water Soluble	
Material	EN8-D	
Hardness	20 HRC	
Machine	Vertical Machining Centre	



Result

~Twice the life from the competition and 20% reduction in cycle time



Features:

- 3~4 Times production compared to General Carbide Drill Bits like C1GS, C1GJ series
- Multi-Layer NOVA coating to protect carbide tools at machining temp. up to 1,300°C
- Best Carbide Drill for machining Alloy steel, Cast Iron up to 450BHN, SS & other tough materials
- Rapid chip curling to promote chip breakage.
- Improves productivity & achieves unmatched Life

Superior Flute Form + Design + Honing clubbed with UMG (Ultra Fine carbide grain size) results in Peak Performance for your Carbide Drilling applications in most difficult to drill materials

Item Code NOVA Coated	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR3AHDR00FH2	2.0	21	57	4.0
CR3AHDR00FJ7	2.1	21	57	4.0
CR3AHDR00FK5	2.2	21	57	4.0
CR3AHDR00FL3	2.3	21	57	4.0
CR3AHDR00FM1	2.4	21	57	4.0
CR3AHDR00FN8	2.5	21	57	4.0
CR3AHDR00FP4	2.6	21	57	4.0
CR3AHDR00FQ2	2.7	21	57	4.0
CR3AHDR00FR0	2.8	21	57	4.0
CR3AHDR00FS7	2.9	21	57	4.0
CR3AHDR00FT5	3.0	28	62	6.0
CR3AHDR00FU3	3.1	28	62	6.0
CR3AHDR00FV1	3.2	28	62	6.0
CR3AHDR00FW9	3.3	28	62	6.0
CR3AHDR00FX6	3.4	28	62	6.0
CR3AHDR00FY4	3.5	28	62	6.0
CR3AHDR00FZ2	3.6	28	62	6.0

Item Code NOVA Coated	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR3AHDR00G03	3.7	28	62	6.0
CR3AHDR00G11	3.8	36	75	6.0
CR3AHDR00G29	3.9	36	75	6.0
CR3AHDR00G37	4.0	36	75	6.0
CR3AHDR00G45	4.1	36	75	6.0
CR3AHDR00G52	4.2	36	75	6.0
CR3AHDR00G60	4.3	36	75	6.0
CR3AHDR00G78	4.4	36	75	6.0
CR3AHDR00G86	4.5	36	75	6.0
CR3AHDR00G94	4.6	36	75	6.0
CR3AHDR00GA6	4.7	36	75	6.0
CR3AHDR00GB4	4.8	42	80	6.0
CR3AHDR00GC2	4.9	42	80	6.0
CR3AHDR00GD9	5.0	42	80	6.0
CR3AHDR00GE7	5.1	42	80	6.0
CR3AHDR00GF5	5.2	42	80	6.0
CR3AHDR00GG3	5.3	42	80	6.0

Item Code NOVA Coated	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR3AHDR00GH1	5.4	42	80	6.0
CR3AHDR00GJ6	5.5	42	80	6.0
CR3AHDR00GK4	5.6	42	80	6.0
CR3AHDR00GL2	5.7	42	80	6.0
CR3AHDR00GM0	5.8	42	80	6.0
CR3AHDR00GN7	5.9	42	80	6.0
CR3AHDR00GP3	6.0	42	80	6.0
CR3AHDR00GQ1	6.1	55	100	8.0
CR3AHDR00GR9	6.2	55	100	8.0
CR3AHDR00GS6	6.3	55	100	8.0
CR3AHDR00GT4	6.4	55	100	8.0
CR3AHDR00GU2	6.5	55	100	8.0
CR3AHDR00GV0	6.6	55	100	8.0
CR3AHDR00GW8	6.7	55	100	8.0
CR3AHDR00GX5	6.8	55	100	8.0
CR3AHDR00GY3	6.9	55	100	8.0
CR3AHDR00GZ1	7.0	55	100	8.0
CR3AHDR00H02	7.1	60	105	8.0
CR3AHDR00H10	7.2	60	105	8.0
CR3AHDR00H28	7.3	60	105	8.0
CR3AHDR00H36	7.4	60	105	8.0
CR3AHDR00H44	7.5	60	105	8.0
CR3AHDR00H51	7.6	60	105	8.0
CR3AHDR00H69	7.7	60	105	8.0
CR3AHDR00H77	7.8	60	105	8.0
CR3AHDR00H85	7.9	60	105	8.0
CR3AHDR00H93	8.0	60	105	8.0
CR3AHDR00HA5	8.1	75	125	10.0
CR3AHDR00HB3	8.2	75	125	10.0
CR3AHDR00HC1	8.3	75	125	10.0
CR3AHDR00HD8	8.4	75	125	10.0
CR3AHDR00HE6	8.5	75	125	10.0
CR3AHDR00HF4	8.6	75	125	10.0

Item Code NOVA Coated	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR3AHDR00HG2	8.7	75	125	10.0
CR3AHDR00HH0	8.8	75	125	10.0
CR3AHDR00HJ5	8.9	75	125	10.0
CR3AHDR00HK3	9.0	75	125	10.0
CR3AHDR00HL1	9.1	75	125	10.0
CR3AHDR00HM9	9.2	75	125	10.0
CR3AHDR00HN6	9.3	75	125	10.0
CR3AHDR00HP2	9.4	75	125	10.0
CR3AHDR00HQ0	9.5	75	125	10.0
CR3AHDR00HR8	9.6	75	125	10.0
CR3AHDR00HS5	9.7	75	125	10.0
CR3AHDR00HT3	9.8	75	125	10.0
CR3AHDR00HU1	9.9	75	125	10.0
CR3AHDR00HV9	10.0	75	125	10.0
CR3AHDR00HW7	10.1	85	140	12.0
CR3AHDR00HX4	10.2	85	140	12.0
CR3AHDR00HY2	10.3	85	140	12.0
CR3AHDR00HZ0	10.4	85	140	12.0
CR3AHDR00J00	10.5	85	140	12.0
CR3AHDR00J18	10.6	85	140	12.0
CR3AHDR00J26	10.7	85	140	12.0
CR3AHDR00J34	10.8	85	140	12.0
CR3AHDR00J42	10.9	85	140	12.0
CR3AHDR00J59	11.0	85	140	12.0
CR3AHDR00J67	11.1	85	140	12.0
CR3AHDR00J75	11.2	85	140	12.0
CR3AHDR00J83	11.3	85	140	12.0
CR3AHDR00J91	11.4	85	140	12.0
CR3AHDR00JA3	11.5	85	140	12.0
CR3AHDR00JB1	11.6	85	140	12.0
CR3AHDR00JC9	11.7	85	140	12.0
CR3AHDR00JD6	11.8	85	140	12.0
CR3AHDR00JE4	11.9	85	140	12.0

Item Code NOVA Coated	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR3AHDR00JF2	12.0	85	140	12.0
CR3AHDR00JG0	12.5	85	140	14.0
CR3AHDR00TR6	12.7	85	140	14.0
CR3AHDR00JH8	13.0	85	140	14.0
CR3AHDR00JJ3	13.5	85	140	14.0
CR3AHDR00JK1	14.0	85	140	14.0
CR3AHDR00JL9	14.5	90	145	16.0
CR3AHDR00JM7	15.0	90	145	16.0
CR3AHDR00JN4	15.5	90	145	16.0

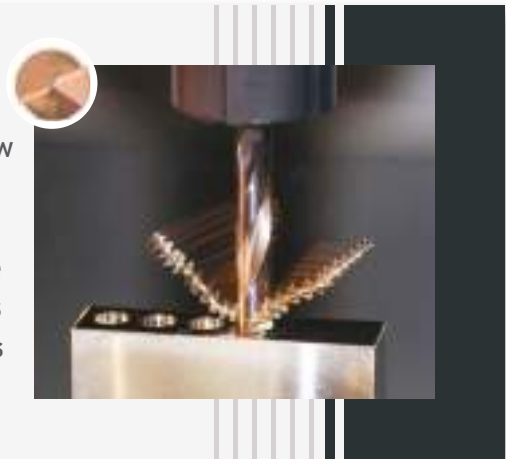
Item Code NOVA Coated	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR3AHDR00JP0	16.0	90	145	16.0
CR3AHDR00JQ8	16.5	95	150	18.0
CR3AHDR00JR6	17.0	95	150	18.0
CR3AHDR00JS3	17.5	95	150	18.0
CR3AHDR00JT1	18.0	95	150	18.0
CR3AHDR00JU9	18.5	98	150	20.0
CR3AHDR00JV7	19.0	98	150	20.0
CR3AHDR00JW5	19.5	98	150	20.0
CR3AHDR00JX2	20.0	98	150	20.0

Note: Machining Austenitic Stainless Steel (300 series) generally requires Drills with Internal Coolant like our CTHS or CTHL Series.

Problem with High Performance Carbide Drills usage today!

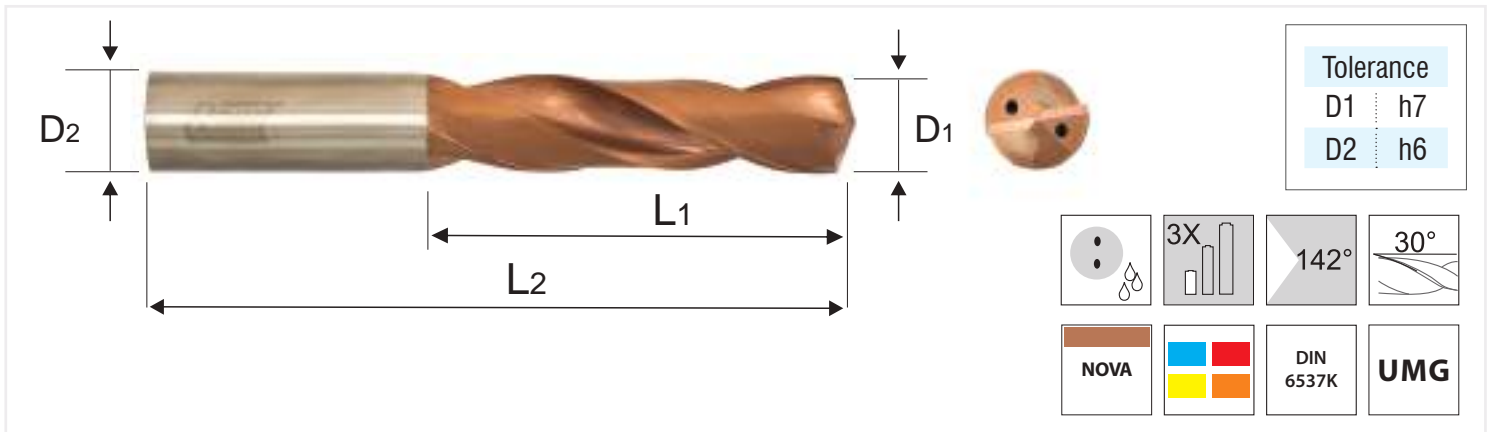
With everyday rising demand of higher productivity and low cost Auto components; High Performance Solid Carbide Drills are becoming the need of the hour however in this endeavor Industries are facing the problem as to what are the best ways to use Carbide Drills. Many CNC shop floors still face a lot of breakage issues, low performance issues due to wrong usages of there Carbide Drills.

[Read more on rigpl.com/blog](http://rigpl.com/blog)



Carbon Steels BHN 180 to 225	Alloy Steels BHN 225 to 355	Prehardened Steels HRC 40 to 45	Austenitic Stainless Steel	Precipitation Hardened Stainless Steel	Titanium	HighTemp. Alloy	Grey Cast Iron	Ductile Cast Iron	Hardened Steels HRC up to 45	High Hardened Steels HRC 45 to 55	Aluminum	Aluminum Alloys	Plastic	Wood / MDF	Copper/Brass
1 st	1 st	1 st	1 st	2 nd	2 nd	2 nd	1 st	1 st				1 st			

NOTE: FOR FEED & SPEED Rates, go to page no. PG-51



Features:

- CTHS Coolant Fed Carbide Drills have new chip curling design to enable chip breakage
- At least 15-Bar of Coolant Pressure is recommended for best of use of these Carbide Drills
- CTHS Coolant Fed Carbide Drills are best suited for drilling MS, Alloy Steel, Cast Iron up to 450BHN, Stainless Steel
- Comes with Edge Chamfer & edge preparation for longer drill life
- CTHS Coolant Fed Carbide Drills comes with NOVA coating for higher Vc and Feed rates to improve your productivity

Item Code NOVA Coated	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR3PHDR00PP9	4.0	24	62	4.0
CR3PHDR00PQ7	4.1	24	62	6.0
CR3PHDR00PR5	4.2	24	62	6.0
CR3PHDR00PS2	4.3	24	62	6.0
CR3PHDR00PT0	4.4	24	62	6.0
CR3PHDR00PU8	4.5	24	62	6.0
CR3PHDR00PV6	4.6	24	62	6.0
CR3PHDR00PW4	4.7	24	62	6.0
CR3PHDR00PX1	4.8	28	62	6.0
CR3PHDR00PY9	4.9	28	62	6.0
CR3PHDR00PZ7	5.0	28	62	6.0
CR3PHDR00Q08	5.1	28	62	6.0
CR3PHDR00Q16	5.2	28	62	6.0
CR3PHDR00Q24	5.3	28	62	6.0
CR3PHDR00Q32	5.4	28	62	6.0
CR3PHDR00Q40	5.5	28	62	6.0
CR3PHDR00Q57	5.6	28	62	6.0

Item Code NOVA Coated	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR3PHDR00Q65	5.7	28	62	6.0
CR3PHDR00Q73	5.8	28	75	6.0
CR3PHDR00Q81	5.9	28	75	6.0
CR3PHDR00Q99	6.0	28	75	6.0
CR3PHDR00QA1	6.1	34	75	8.0
CR3PHDR00QB9	6.2	34	75	8.0
CR3PHDR00QC7	6.3	34	75	8.0
CR3PHDR00QD4	6.4	34	75	8.0
CR3PHDR00QE2	6.5	34	75	8.0
CR3PHDR00QF0	6.6	34	75	8.0
CR3PHDR00QG8	6.7	34	75	8.0
CR3PHDR00QH6	6.8	34	75	8.0
CR3PHDR00QJ1	6.9	34	75	8.0
CR3PHDR00QK9	7.0	34	75	8.0
CR3PHDR00QL7	7.1	40	80	8.0
CR3PHDR00QM5	7.2	40	80	8.0
CR3PHDR00QN2	7.3	40	80	8.0

Item Code NOVA Coated	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR3PHDR00QP8	7.4	40	80	8.0
CR3PHDR00QQ6	7.5	40	80	8.0
CR3PHDR00QR4	7.6	40	80	8.0
CR3PHDR00QS1	7.7	40	80	8.0
CR3PHDR00QT9	7.8	40	80	8.0
CR3PHDR00QU7	7.9	40	80	8.0
CR3PHDR00QV5	8.0	40	80	8.0
CR3PHDR00QW3	8.1	40	80	10.0
CR3PHDR00RG7	8.1	51	100	10.0
CR3PHDR00QX0	8.2	40	80	10.0
CR3PHDR00RH5	8.2	51	100	10.0
CR3PHDR00QY8	8.3	40	80	10.0
CR3PHDR00RJ0	8.3	51	100	10.0
CR3PHDR00QZ6	8.4	40	80	10.0
CR3PHDR00RK8	8.4	51	100	10.0
CR3PHDR00R07	8.5	40	80	10.0
CR3PHDR00RL6	8.5	51	100	10.0
CR3PHDR00R15	8.6	40	80	10.0
CR3PHDR00RM4	8.6	51	100	10.0
CR3PHDR00R23	8.7	40	80	10.0
CR3PHDR00RN1	8.7	51	100	10.0
CR3PHDR00R31	8.8	40	80	10.0
CR3PHDR00RP7	8.8	51	100	10.0
CR3PHDR00R49	8.9	40	80	10.0
CR3PHDR00RQ5	8.9	51	100	10.0
CR3PHDR00R56	9.0	40	80	10.0
CR3PHDR00RR3	9.0	51	100	10.0
CR3PHDR00R64	9.1	40	80	10.0
CR3PHDR00RS0	9.1	51	100	10.0
CR3PHDR00R72	9.2	40	80	10.0
CR3PHDR00RT8	9.2	51	100	10.0
CR3PHDR00R80	9.3	40	80	10.0
CR3PHDR00RU6	9.3	51	100	10.0

Item Code NOVA Coated	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR3PHDR00R98	9.4	40	80	10.0
CR3PHDR00RV4	9.4	51	100	10.0
CR3PHDR00RA0	9.5	40	80	10.0
CR3PHDR00RW2	9.5	51	100	10.0
CR3PHDR00RB8	9.6	40	80	10.0
CR3PHDR00RX9	9.6	51	100	10.0
CR3PHDR00RC6	9.7	40	80	10.0
CR3PHDR00RY7	9.7	51	100	10.0
CR3PHDR00RD3	9.8	40	80	10.0
CR3PHDR00RZ5	9.8	51	100	10.0
CR3PHDR00RE1	9.9	40	80	10.0
CR3PHDR00S06	9.9	51	100	10.0
CR3PHDR00RF9	10.0	40	80	10.0
CR3PHDR00S14	10.0	51	100	10.0
CR3PHDR00S22	10.1	55	100	12.0
CR3PHDR00S30	10.2	55	100	12.0
CR3PHDR00S48	10.3	55	100	12.0
CR3PHDR00S55	10.4	55	100	12.0
CR3PHDR00S63	10.5	55	100	12.0
CR3PHDR00S71	10.6	55	100	12.0
CR3PHDR00S89	10.7	55	100	12.0
CR3PHDR00S97	10.8	55	100	12.0
CR3PHDR00SA9	10.9	55	100	12.0
CR3PHDR00SB7	11.0	55	100	12.0
CR3PHDR00SC5	11.1	55	100	12.0
CR3PHDR00SD2	11.2	55	100	12.0
CR3PHDR00SE0	11.3	55	100	12.0
CR3PHDR00SF8	11.4	55	100	12.0
CR3PHDR00SG6	11.5	55	100	12.0
CR3PHDR00SH4	11.6	55	100	12.0
CR3PHDR00SJ9	11.7	55	100	12.0
CR3PHDR00SK7	11.8	55	100	12.0
CR3PHDR00SL5	11.9	55	100	12.0

Item Code NOVA Coated	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR3PHDR00SM3	12.0	55	100	12.0
CR3PHDR00SN0	12.5	55	105	14.0
CR3PHDR00SP6	13.0	55	105	14.0
CR3PHDR00SQ4	13.5	55	105	14.0
CR3PHDR00SR2	14.0	55	105	14.0
CR3PHDR00SS9	14.5	58	105	16.0
CR3PHDR00ST7	15.0	58	105	16.0
CR3PHDR00SU5	15.5	58	105	16.0
CR3PHDR00SV3	16.0	58	105	16.0

Item Code NOVA Coated	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR3PHDR00SW1	16.5	58	105	18.0
CR3PHDR00SX8	17.0	58	105	18.0
CR3PHDR00SY6	17.5	58	105	18.0
CR3PHDR00SZ4	18.0	58	105	18.0
CR3PHDR00T05	18.5	58	105	20.0
CR3PHDR00T13	19.0	58	105	20.0
CR3PHDR00T21	19.5	58	105	20.0
CR3PHDR00T39	20.0	58	105	20.0



Carbon Steels BHN 180 to 225	Alloy Steels BHN 225 to 355	Prehardened Steels HRc 40 to 45	Austenitic Stainless Steel	Precipitation Hardened Stainless Steel	Titanium	HighTemp. Alloy	Grey Cast Iron	Ductile Cast Iron	Hardened Steels HRc up to 45	High Hardened Steels HRc 45 to 55	Aluminum	Aluminum Alloys	Plastic	Wood / MDF	Copper/Brass
1st	1st	1st	1st	1st	1st	1st	1st	1st				1st			

NOTE: FOR FEED & SPEED Rates, go to page no. PG-53

Description: S/C Rohit-3X NOVA Th.Coolant-DRILL

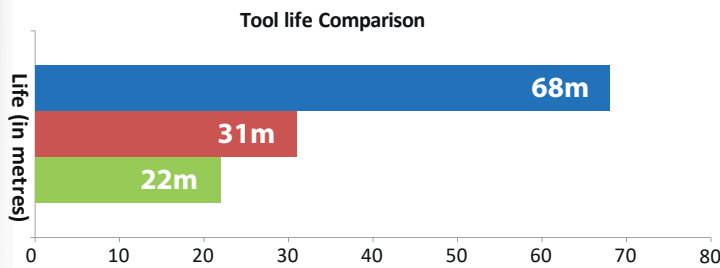
FØ:6.6 FL:34 SØ:8 OAL:75 Z=2 SERIES-CTHS

Work-Piece Image



Industry	Auto Components	
Component	Boss Rotor	
Cutting Conditions	Tool Diameter	6.60 mm coolant fed drill
	Cutting Speed	72 m/min
	RPM	3500
	Feed (mm/tooth)	0.2
	Table Feed (mm/min)	700
	PECKING	6mm
	Radial Cut	None
Milling Type	Through Hole Application	
Coolant	6% Mix Water Soluble	
Material	Forged Steel	
Hardness	280~310BHN	
Machine	Vertical Machining Centre	

Performance

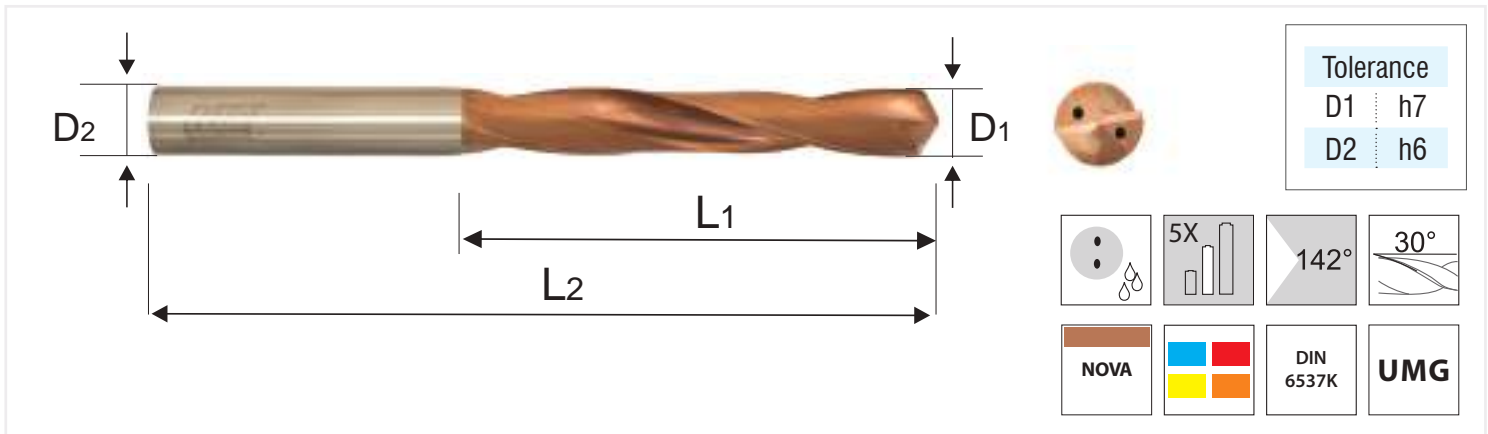


Summary

Drills	Life (in metres)
CTHS	68
Competitor 2	31
Competitor 1	22
Improvement	119%

Result

120% more life than the competition and ~60% Reduction in CPC



Features:

- CTHL Coolant Fed Carbide Drills have new chip curling design to enable chip breakage
- Recommended for drilling depths of greater than 8 L/D
- Coolant Fed Carbide Drills are best suited for drilling MS, Alloy Steel, Cast Iron up to 450BHN, Stainless Steel
- Comes with Edge Chamfer & edge preparation for longer drill life
- CTHL Coolant Fed Carbide Drills comes with NOVA coating for higher Vc and Feed rates to improve your productivity

Ordering Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CTHL0410-N	4.1	36	75	6.0
CTHL0420-N	4.2	36	75	6.0
CTHL0430-N	4.3	36	75	6.0
CTHL0440-N	4.4	36	75	6.0
CTHL0450-N	4.5	36	75	6.0
CTHL0460-N	4.6	36	75	6.0
CTHL0470-N	4.7	36	75	6.0
CTHL0480-N	4.8	42	80	6.0
CTHL0490-N	4.9	42	80	6.0
CTHL0500-N	5.0	42	80	6.0
CTHL0510-N	5.1	42	80	6.0
CTHL0520-N	5.2	42	80	6.0
CTHL0530-N	5.3	42	80	6.0
CTHL0540-N	5.4	42	80	6.0
CTHL0550-N	5.5	42	80	6.0
CTHL0560-N	5.6	42	80	6.0
CTHL0570-N	5.7	42	80	6.0
CTHL0580-N	5.8	42	80	6.0

Ordering Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CTHL0590-N	5.9	42	80	6.0
CTHL0600-N	6.0	42	80	6.0
CTHL0610-N	6.1	55	100	8.0
CTHL0620-N	6.2	55	100	8.0
CTHL0630-N	6.3	55	100	8.0
CTHL0640-N	6.4	55	100	8.0
CTHL0650-N	6.5	55	100	8.0
CTHL0660-N	6.6	55	100	8.0
CTHL0670-N	6.7	55	100	8.0
CTHL0680-N	6.8	55	100	8.0
CTHL0690-N	6.9	55	100	8.0
CTHL0700-N	7.0	55	100	8.0
CTHL0710-N	7.1	60	105	8.0
CTHL0720-N	7.2	60	105	8.0
CTHL0730-N	7.3	60	105	8.0
CTHL0740-N	7.4	60	105	8.0
CTHL0750-N	7.5	60	105	8.0
CTHL0760-N	7.6	60	105	8.0

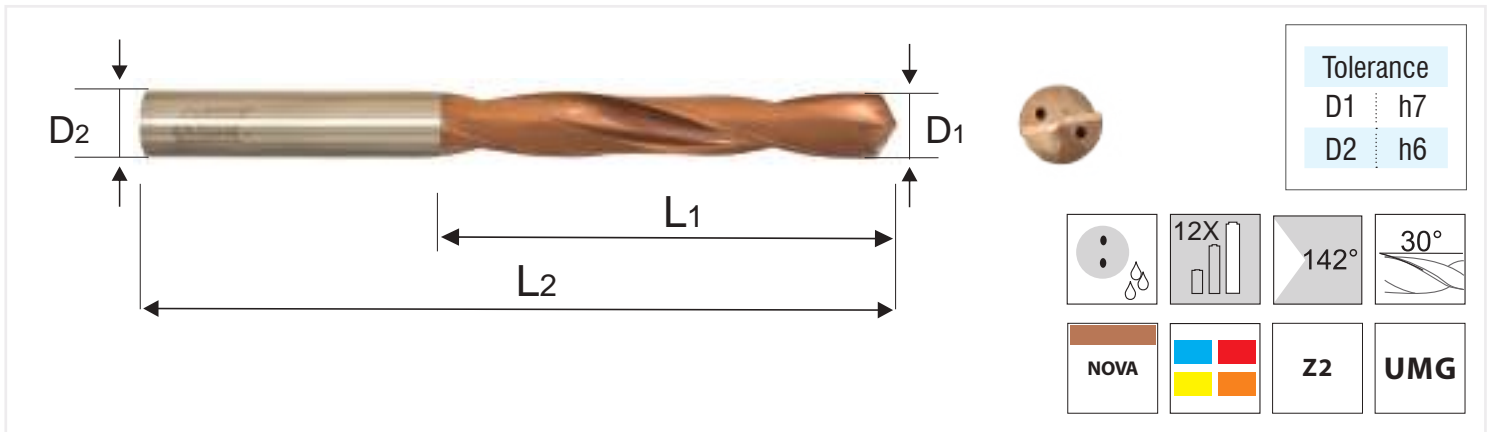
Ordering Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CTHL0770-N	7.7	60	105	8.0
CTHL0780-N	7.8	60	105	8.0
CTHL0790-N	7.9	60	105	8.0
CTHL0800-N	8.0	60	105	8.0
CTHL0810-N	8.1	75	125	10.0
CTHL0820-N	8.2	75	125	10.0
CTHL0830-N	8.3	75	125	10.0
CTHL0840-N	8.4	75	125	10.0
CTHL0850-N	8.5	75	125	10.0
CTHL0860-N	8.6	75	125	10.0
CTHL0870-N	8.7	75	125	10.0
CTHL0880-N	8.8	75	125	10.0
CTHL0890-N	8.9	75	125	10.0
CTHL0900-N	9.0	75	125	10.0
CTHL0910-N	9.1	75	125	10.0
CTHL0920-N	9.2	75	125	10.0
CTHL0930-N	9.3	75	125	10.0
CTHL0940-N	9.4	75	125	10.0
CTHL0950-N	9.5	75	125	10.0
CTHL0960-N	9.6	75	125	10.0
CTHL0970-N	9.7	75	125	10.0
CTHL0980-N	9.8	75	125	10.0
CTHL0990-N	9.9	75	125	10.0
CTHL1000-N	10.0	75	125	10.0
CTHL1010-N	10.1	85	140	12.0
CTHL1020-N	10.2	85	140	12.0
CTHL1030-N	10.3	85	140	12.0
CTHL1040-N	10.4	85	140	12.0
CTHL1050-N	10.5	85	140	12.0
CTHL1060-N	10.6	85	140	12.0

Ordering Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CTHL1070-N	10.7	85	140	12.0
CTHL1080-N	10.8	85	140	12.0
CTHL1090-N	10.9	85	140	12.0
CTHL1100-N	11.0	85	140	12.0
CTHL1110-N	11.1	85	140	12.0
CTHL1120-N	11.2	85	140	12.0
CTHL1130-N	11.3	85	140	12.0
CTHL1140-N	11.4	85	140	12.0
CTHL1150-N	11.5	85	140	12.0
CTHL1160-N	11.6	85	140	12.0
CTHL1170-N	11.7	85	140	12.0
CTHL1180-N	11.8	85	140	12.0
CTHL1190-N	11.9	85	140	12.0
CTHL1200-N	12.0	85	140	12.0
CTHL1250-N	12.5	85	140	14.0
CTHL1300-N	13.0	85	140	14.0
CTHL1350-N	13.5	85	140	14.0
CTHL1400-N	14.0	85	140	14.0
CTHL1450-N	14.5	90	145	16.0
CTHL1500-N	15.0	90	145	16.0
CTHL1550-N	15.5	90	145	16.0
CTHL1600-N	16.0	90	145	16.0
CTHL1650-N	16.5	95	150	18.0
CTHL1700-N	17.0	95	150	18.0
CTHL1750-N	17.5	95	150	18.0
CTHL1800-N	18.0	95	150	18.0
CTHL1850-N	18.5	98	150	20.0
CTHL1900-N	19.0	98	150	20.0
CTHL1950-N	19.5	98	150	20.0
CTHL2000-N	20.0	98	150	20.0



Carbon Steels BHN 180 to 225	Alloy Steels BHN 225 to 355	Prehardened Steels HRc 40 to 45	Austenitic Stainless Steel	Precipitation Hardened Stainless Steel	Titanium	HighTemp. Alloy	Grey Cast Iron	Ductile Cast Iron	Hardened Steels HRc up to 45	High Hardened Steels HRc 45 to 55	Aluminum	Aluminum Alloys	Plastic	Wood / MDF	Copper/Brass
1st	1st	1st	1st	1st	1st	1st	1st	1st				1st			

NOTE: This is Non-stock Item, ask your RIGPL representative for Delivery Period
FOR FEED & SPEED Rates, go to page no. PG-53



Tolerance	
D1	h7
D2	h6

12X

142°

30°

NOVA

Z2

UMG

Features:

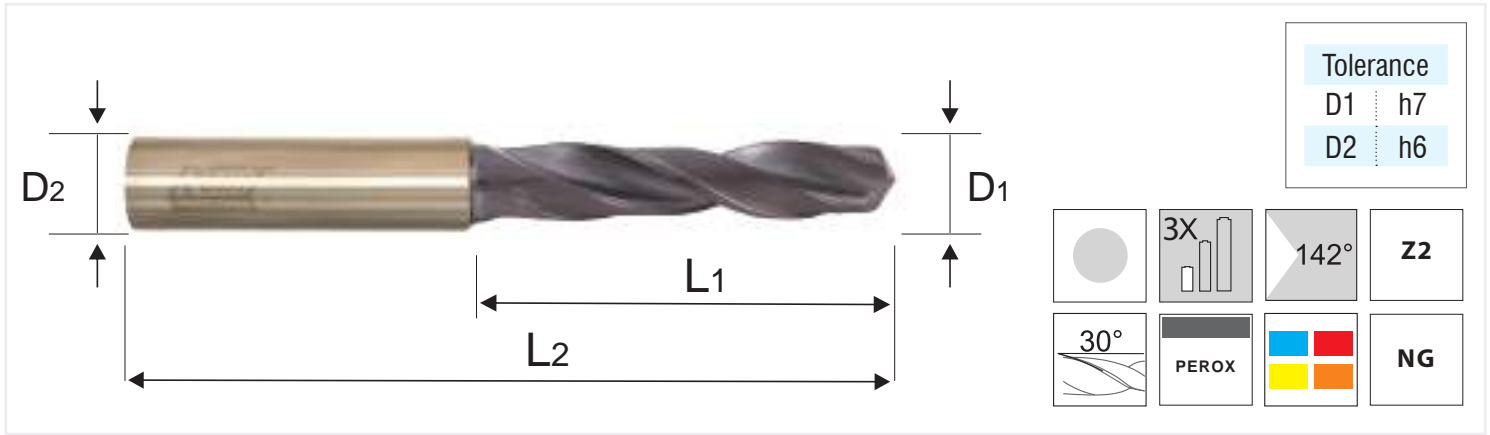
- CTHM Coolant Fed Carbide Drills have new chip curling design to enable chip breakage
- Recommended for drilling depths of Upto 15 L/D
- Coolant Fed Carbide Drills are best suited for drilling MS, Alloy Steel, Cast Iron up to 450BHN, Stainless Steel
- Comes with Edge Chamfer & edge preparation for longer drill life
- CTHM Coolant Fed Carbide Drills comes with NOVA coating for higher Vc and Feed rates to improve your productivity

Ordering Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CTHM0420-N	4.2	57	105	6.0
CTHM0450-N	4.5	57	105	6.0
CTHM0500-N	5.0	65	108	6.0
CTHM0550-N	5.5	72	127	6.0
CTHM0600-N	6.0	78	133	6.0
CTHM0650-N	6.5	85	141	8.0
CTHM0700-N	7.0	91	147	8.0
CTHM0750-N	7.5	98	155	8.0
CTHM0800-N	8.0	104	160	8.0

Ordering Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CTHM0850-N	8.5	111	160	10.0
CTHM0900-N	9.0	117	175	10.0
CTHM0950-N	9.5	124	182	10.0
CTHM1000-N	10.0	130	188	10.0
CTHM1050-N	10.5	137	201	12.0
CTHM1100-N	11.0	143	207	12.0
CTHM1150-N	11.5	150	215	12.0
CTHM1200-N	12.0	156	221	12.0

Carbon Steels BHN 180 to 225	Alloy Steels BHN 225 to 355	Prehardened Steels HRc 40 to 45	Austenitic Stainless Steel	Precipitation Hardened Stainless Steel	Titanium	HighTemp. Alloy	Grey Cast Iron	Ductile Cast Iron	Hardened Steels HRc up to 45	High Hardened Steels HRc 45 to 55	Aluminum	Aluminum Alloys	Plastic	Wood / MDF	Copper/Brass
1st	1st		1st				1st	1st			1st	1st			1st

NOTE: This is Non-stock Item, ask your RIGPL representative for Delivery Period FOR FEED & SPEED Rates, go to page no. PG-55



Features:

- Made from NANO fine Carbide grade for High Performance Drilling in depth of 3 to 5 L/D
- Superior PEROX coating with high Flute Finish clubbed with NG (Nano Fine carbide grain size) results in Brilliant Performance for your Carbide Drilling applications in most difficult to drill materials like Titanium and NiCr Alloys
- 2~3 Times production compared to High Performance Carbide Drill like C3HS, C3HL series
- Highest productivity & reduced Cycle Time with high feeds

Ordering Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
C4HT020050-P	2.0	14	50	4.0
C4HT021050-P	2.1	14	50	4.0
C4HT022050-P	2.2	14	50	4.0
C4HT023050-P	2.3	14	50	4.0
C4HT024050-P	2.4	14	50	4.0
C4HT025050-P	2.5	14	50	4.0
C4HT026050-P	2.6	14	50	4.0
C4HT027050-P	2.7	14	50	4.0
C4HT028050-P	2.8	14	50	4.0
C4HT029050-P	2.9	14	50	4.0
C4HT030062-P	3.0	20	62	6.0
C4HT031062-P	3.1	20	62	6.0
C4HT032062-P	3.2	20	62	6.0
C4HT033062-P	3.3	20	62	6.0
C4HT034062-P	3.4	20	62	6.0
C4HT035062-P	3.5	20	62	6.0
C4HT036062-P	3.6	20	62	6.0
C4HT037062-P	3.7	20	62	6.0

Ordering Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
C4HT038062-P	3.8	24	62	6.0
C4HT039062-P	3.9	24	62	6.0
C4HT040062-P	4.0	24	62	6.0
C4HT041062-P	4.1	24	62	6.0
C4HT042062-P	4.2	24	62	6.0
C4HT043062-P	4.3	24	62	6.0
C4HT044062-P	4.4	24	62	6.0
C4HT045062-P	4.5	24	62	6.0
C4HT046062-P	4.6	24	62	6.0
C4HT047062-P	4.7	24	62	6.0
C4HT048062-P	4.8	28	62	6.0
C4HT049062-P	4.9	28	62	6.0
C4HT050062-P	5.0	28	62	6.0
C4HT051062-P	5.1	28	62	6.0
C4HT052062-P	5.2	28	62	6.0
C4HT053062-P	5.3	28	62	6.0
C4HT054062-P	5.4	28	62	6.0
C4HT055062-P	5.5	28	62	6.0

Ordering Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
C4HT056062-P	5.6	28	62	6.0
C4HT057062-P	5.7	28	62	6.0
C4HT058062-P	5.8	28	62	6.0
C4HT059062-P	5.9	28	62	6.0
C4HT060062-P	6.0	28	62	6.0
C4HT061075-P	6.1	34	75	8.0
C4HT062075-P	6.2	34	75	8.0
C4HT063075-P	6.3	34	75	8.0
C4HT064075-P	6.4	34	75	8.0
C4HT065075-P	6.5	34	75	8.0
C4HT066075-P	6.6	34	75	8.0
C4HT067075-P	6.7	34	75	8.0
C4HT068075-P	6.8	34	75	8.0
C4HT069075-P	6.9	34	75	8.0
C4HT070075-P	7.0	34	75	8.0
C4HT071080-P	7.1	40	80	8.0
C4HT072080-P	7.2	40	80	8.0
C4HT073080-P	7.3	40	80	8.0
C4HT074080-P	7.4	40	80	8.0
C4HT075080-P	7.5	40	80	8.0
C4HT076080-P	7.6	40	80	8.0
C4HT077080-P	7.7	40	80	8.0
C4HT078080-P	7.8	40	80	8.0
C4HT079080-P	7.9	40	80	8.0
C4HT080080-P	8.0	40	80	8.0
C4HT081080-P	8.1	40	80	10.0
C4HT082080-P	8.2	40	80	10.0
C4HT083080-P	8.3	40	80	10.0
C4HT084080-P	8.4	40	80	10.0
C4HT085080-P	8.5	40	80	10.0
C4HT086080-P	8.6	40	80	10.0
C4HT087080-P	8.7	40	80	10.0
C4HT088080-P	8.8	40	80	10.0

Ordering Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
C4HT089080-P	8.9	40	80	10.0
C4HT090080-P	9.0	40	80	10.0
C4HT091080-P	9.1	40	80	10.0
C4HT092080-P	9.2	40	80	10.0
C4HT093080-P	9.3	40	80	10.0
C4HT094080-P	9.4	40	80	10.0
C4HT095080-P	9.5	40	80	10.0
C4HT096080-P	9.6	40	80	10.0
C4HT097080-P	9.7	40	80	10.0
C4HT098080-P	9.8	40	80	10.0
C4HT099080-P	9.9	40	80	10.0
C4HT100080-P	10.0	40	80	10.0
C4HT081100-P	8.1	60	100	10.0
C4HT082100-P	8.2	60	100	10.0
C4HT083100-P	8.3	60	100	10.0
C4HT084100-P	8.4	60	100	10.0
C4HT085100-P	8.5	60	100	10.0
C4HT086100-P	8.6	60	100	10.0
C4HT087100-P	8.7	60	100	10.0
C4HT088100-P	8.8	60	100	10.0
C4HT089100-P	8.9	60	100	10.0
C4HT090100-P	9.0	60	100	10.0
C4HT091100-P	9.1	60	100	10.0
C4HT092100-P	9.2	60	100	10.0
C4HT093100-P	9.3	60	100	10.0
C4HT094100-P	9.4	60	100	10.0
C4HT095100-P	9.5	60	100	10.0
C4HT096100-P	9.6	60	100	10.0
C4HT097100-P	9.7	60	100	10.0
C4HT098100-P	9.8	60	100	10.0
C4HT099100-P	9.9	60	100	10.0
C4HT100100-P	10.0	60	100	10.0
C4HT101100-P	10.1	60	100	12.0

Ordering Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
C4HT102100-P	10.2	60	100	12.0
C4HT103100-P	10.3	60	100	12.0
C4HT104100-P	10.4	60	100	12.0
C4HT105100-P	10.5	60	100	12.0
C4HT106100-P	10.6	60	100	12.0
C4HT107100-P	10.7	60	100	12.0
C4HT108100-P	10.8	60	100	12.0
C4HT109100-P	10.9	60	100	12.0
C4HT110100-P	11.0	60	100	12.0
C4HT111100-P	11.1	60	100	12.0
C4HT112100-P	11.2	60	100	12.0
C4HT113100-P	11.3	60	100	12.0
C4HT114100-P	11.4	60	100	12.0
C4HT115100-P	11.5	60	100	12.0
C4HT116100-P	11.6	60	100	12.0
C4HT117100-P	11.7	60	100	12.0
C4HT118100-P	11.8	60	100	12.0
C4HT119100-P	11.9	60	100	12.0

Ordering Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
C4HT120100-P	12.0	60	100	12.0
C4HT125105-P	12.5	55	105	14.0
C4HT130105-P	13.0	55	105	14.0
C4HT135105-P	13.5	55	105	14.0
C4HT140105-P	14.0	55	105	14.0
C4HT145105-P	14.5	58	105	16.0
C4HT150105-P	15.0	58	105	16.0
C4HT155105-P	15.5	58	105	16.0
C4HT160105-P	16.0	58	105	16.0
C4HT165105-P	16.5	58	105	18.0
C4HT170105-P	17.0	58	105	18.0
C4HT175105-P	17.5	58	105	18.0
C4HT180105-P	18.0	58	105	18.0
C4HT185105-P	18.5	58	105	20.0
C4HT190105-P	19.0	58	105	20.0
C4HT195105-P	19.5	58	105	20.0
C4HT200105-P	20.0	58	105	20.0

Carbon Steels BHN 180 to 225	Alloy Steels BHN 225 to 355	Prehardened Steels HRC 40 to 45	Austenitic Stainless Steel	Precipitation Hardened Stainless Steel	Titanium	HighTemp. Alloy	Grey Cast Iron	Ductile Cast Iron	Hardened Steels HRc up to 45	High Hardened Steels HRc 45 to 55	Aluminum	Aluminum Alloys	Plastic	Wood / MDF	Copper/Brass
1st	1st	1st	1st	1st	1st	1st	1st	1st	1st						

NOTE: This is Non-stock Item, ask your RIGPL representative for Delivery Period
FOR FEED & SPEED Rates, go to page no. PG-56

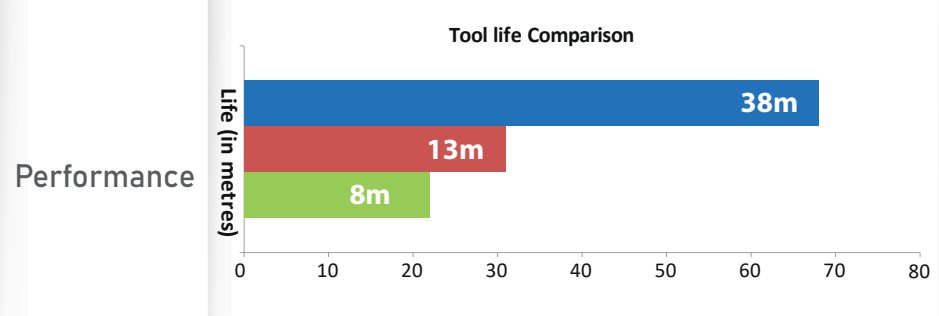
Description: S/C Rohit-4X PEROX HP-DRILL

FØ:6.07 FL:40 SØ:8 OAL:75 Z=2 SERIES-C4HT

Work-Piece Image



Industry	Auto Components	
Component		
Cutting Conditions	Tool Diameter	6.07mm
	Cutting Speed	83m/min
	RPM	4400
	Feed (mm/tooth)	0.1
	Table Feed (mm/min)	440
	PECKING	3mm
	Radial Cut	-
Milling Type	Through Hole Application	
Coolant	6% Mix Water Soluble	
Material	SAE 4140	
Hardness	180-220 BHN	
Machine	Vertical Machining Centre	

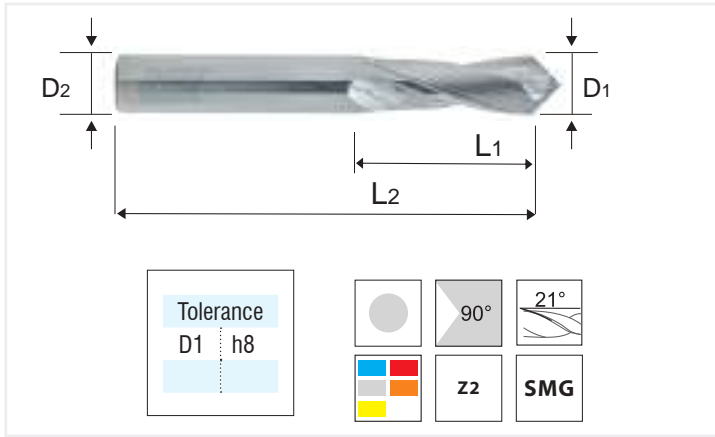


Drill	Life (in metres)
ROHIT-C4HT DRILL	38
ROHIT-C3HS DRILL	13
Competitor 1	8
Improvement	192%

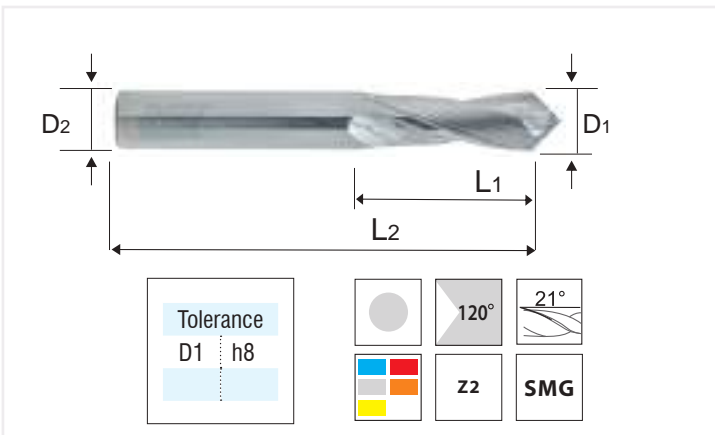
Result ~Thrice the life from the competition and 30% reduction in cycle time

Features:

- Easy to re-point as there is no web taper
- Short Flute Length & No Body Clearance makes this a very rigid tool



Ordering Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
C1N10600-U	6	13	50	6
C1N10800-U	8	23	60	8
C1N11000-U	10	24	70	10
C1N11200-U	12	24	70	12
C1N11600-U	16	29	75	16
C1N12000-U	20	35	100	20



Ordering Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
C1N20600-U	6	13	50	6
C1N20800-U	8	23	60	8
C1N21000-U	10	24	70	10
C1N21200-U	12	24	70	12
C1N21600-U	16	29	75	16
C1N22000-U	20	35	100	20

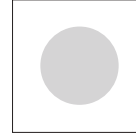
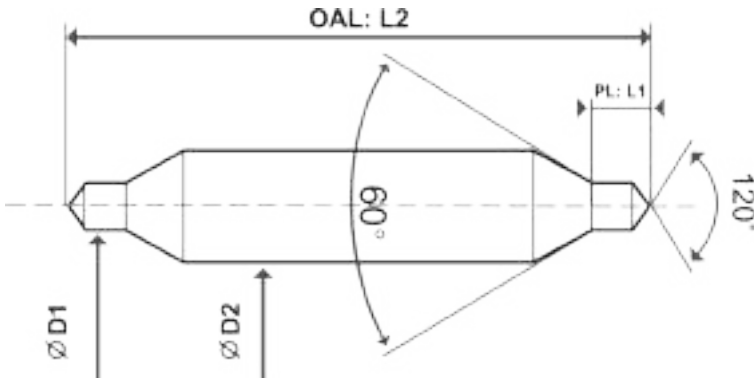
Carbon Steels BHN 180 to 225	Alloy Steels BHN 225 to 355	Prehardened Steels HRc 40 to 45	Austenitic Stainless Steel	Precipitation Hardened Stainless Steel	Titanium	HighTemp. Alloy	Grey Cast Iron	Ductile Cast Iron	Hardened Steels HRc up to 45	High Hardened Steels HRc 45 to 55	Aluminum	Aluminum Alloys	Plastic	Wood / MDF	Copper/Brass
1st	1st	1st	1st	1st	1st	1st	1st	1st			1st	1st			1st

NOTE: This is Non-stock Item, ask your RIGPL representative for Delivery Period
FOR FEED & SPEED Rates, go to page no. PG-58



Tolerance

D1 h8



BSW BS-328
Paet-II
DIN 333 A



Z2

SMG

Applications:

Designed for accurate Spotting on CNC and VMC Machines

Features:

- Designed for accurate Center Holes in long production runs Or when precise centering is required
- Solid Carbide construction helps reduce tool changes when abrasive material is machined
- 60° Counter-sink Angle
- 120° Point Angle
- Can be provided with TiALN Coating

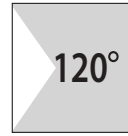
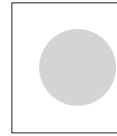
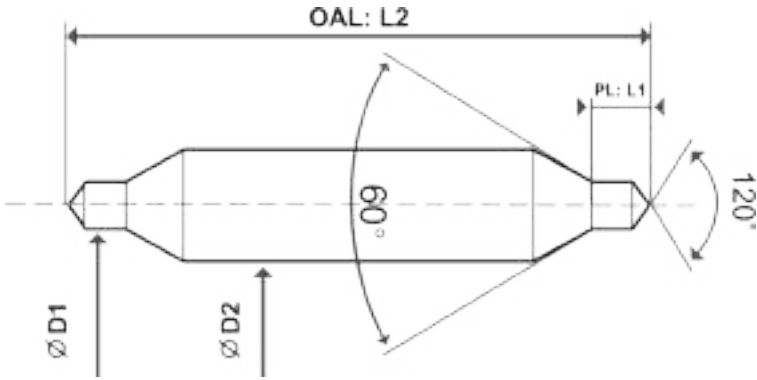
Ordering No.	B.S. NO.	Pilot Dia. (D1)	Body Dia. (D2)	Pilot Length (max.) (L1)	Shank Dia(D2)	OAL (L2)
C1CB-BS1-U	BS1	3/64"	1/8"	5/64"	1/16"	1-1/2"
C1CB-BS2-U	BS2	1/16"	3/16"	3/32"	5/64"	1-3/4"
C1CB-BS3-U	BS3	3/32"	1/4"	5/32"	1/8"	2"
C1CB-BS4-U	BS4	1/8"	5/16"	3/16"	5/32"	2-1/4"
C1CB-BS5-U	BS5	3/16"	7/16"	9/32"	1/4"	2-1/2"
C1CB-BS6-U	BS6	1/4"	5/8"	3/8"	5/16"	3"
C1CB-BS7-U	BS7	5/16"	3/4"	15/32"	13/32"	3-1/2"

NOTE: This is Non-stock Item, ask your RIGPL representative for Delivery Period

FOR FEED & SPEED Rates, go to page no. PG-58



Tolerance
D1 h8



Metric/
DIN
333A



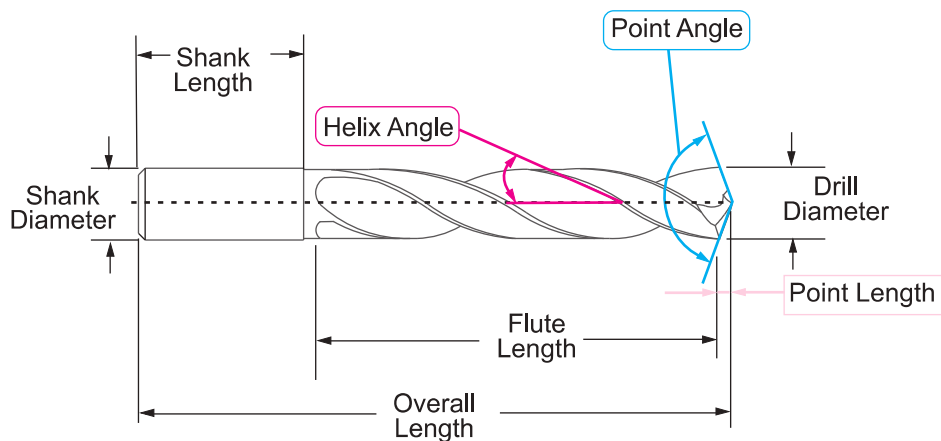
Z2

SMG

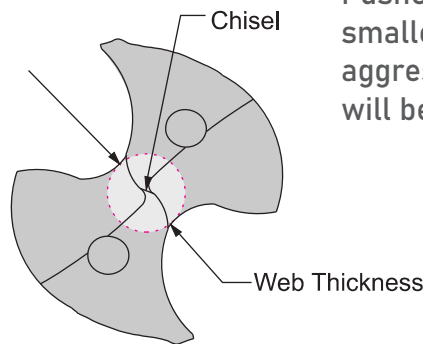
Ordering No.	DIN	Pilot Dia. (D1)	Pilot Length (max.) (L1)	Over All Length (L2)	Body Diameter (D2)
CR1XCA001L0	DIN 333	1.60	2.00	35	4
CR1XCA00028	DIN 333	2.00	2.50	40	5
CR1XCA00044	DIN 333	2.50	3.10	45	6.3
CR1XCA00051	DIN 333	3.15	3.90	50	8
CR1XCA001J4	DIN 333	4.00	5.00	56	10
CR1XCA001M8	DIN 333	5.00	6.80	63	12.5
CR1XCA001N5	DIN 333	6.30	8.50	72	16
C1CD0800-U	DIN 333	8.00	10.80	80	20

Carbon Steels BHN 180 to 225	1st
Alloy Steels BHN 225 to 355	1st
Prehardened Steels HRC 40 to 45	1st
Austenitic Stainless Steel	1st
Precipitation Hardened Stainless Steel	1st
Titanium	1st
HighTemp. Alloy	1st
Grey Cast Iron	1st
Ductile Cast Iron	1st
Hardened Steels HRc up to 45	
High Hardened Steels HRc 45 to 55	
Aluminum	1st
Aluminum Alloys	1st
Plastic	
Wood / MDF	
Copper/Brass	1st

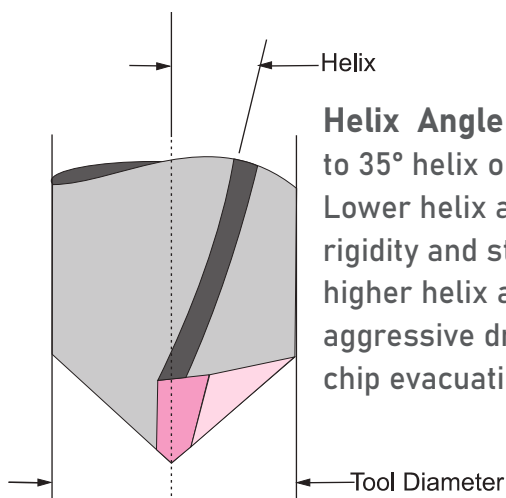
NOTE: This is Non-stock Item, ask your RIGPL representative for Delivery Period
FOR FEED & SPEED Rates, go to page no. PG-58



Chisel Edge – The non-cutting tip of the drill. Pushes, rather than cuts material. Having a smaller chisel means that a tool will cut more aggressively. A larger chisel means that a tool will be stronger.

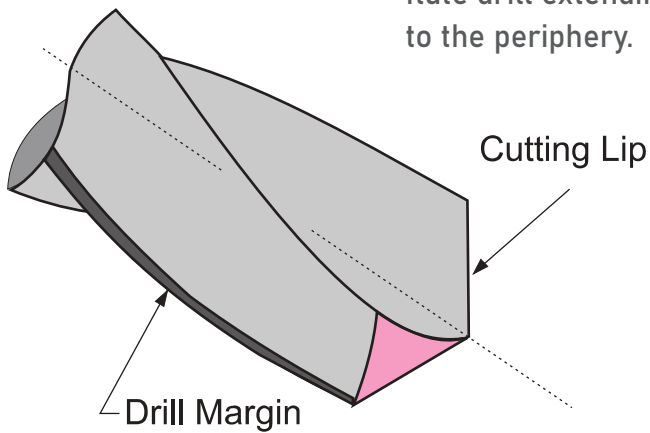


Web – The core of the drill that is left from the fluting operation. A thicker web means added rigidity, while a smaller web means more chip evacuation. On two flute drills, typically varies from 16% - 30% of the tool diameter.

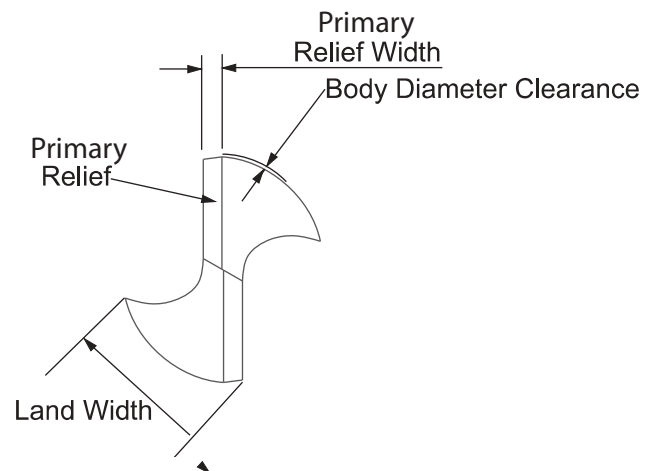


Helix Angle - Varies from 0° to 35° helix on standard tools. Lower helix angle means more rigidity and strength and a higher helix angle means more aggressive drilling and better chip evacuation.

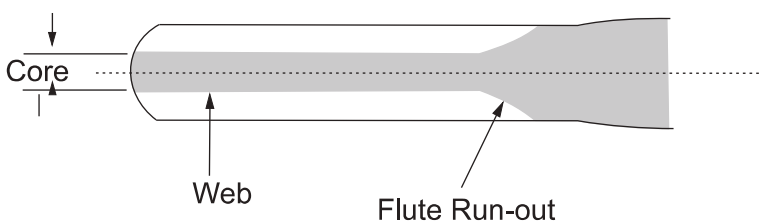
Cutting Lip - The cutting edges of a two flute drill extending from the chisel edge to the periphery.



Margin Width - Provides a surface to support the drill inside the hole during the drilling operation. RIGPL offers single margin geometries. Margin widths are a balancing act between friction build-up vs. tool support in the drilling operation.



Land Width - The amount of material left on the drill per side, from the fluting operation. Larger land widths mean more rigidity, while smaller land widths allow for better chip evacuation.



Material	Hardness	Cutting speed (Vc)	FEED per REVOLUTION								
			<3 mm	4 mm	6 mm	8 mm	10 mm	12 mm	16 mm	20 mm	
		m/min	mm / rev								
Alloy Steel	Common Structural Steels	≤100 BHN	60	0.03	0.07	0.12	0.13	0.14	0.18	0.22	0.28
		100-180 BHN	50	0.03	0.07	0.12	0.13	0.14	0.18	0.22	0.28
	Free Cutting Steels	≤24 HRc	60	0.03	0.09	0.14	0.16	0.18	0.22	0.26	0.3
		>24-30 HRc	50	0.03	0.07	0.12	0.13	0.14	0.18	-	-
	Unalloyed Heat-treatable Steels	≤16 HRc	60	0.03	0.07	0.12	0.13	0.14	0.18	0.22	0.28
		16-24 HRc	50	0.03	0.07	0.12	0.13	0.14	0.18	-	-
	Alloyed Heat-treatable Steels	24-30 HRc	40	0.03	0.07	0.12	0.13	0.14	0.18	-	-
		30-38 HRc	-	-	-	-	-	-	-	-	-
	Unalloyed Case-hardened Steels	≤230 BHN	60	0.03	0.07	0.12	0.13	0.14	0.18	0.22	0.28
	Alloyed Case-hardened Steels	24-30 HRc	-	-	-	-	-	-	-	-	-
		30-38 HRc	-	-	-	-	-	-	-	-	-
	Nitriding Steels	24-30 HRc	40	0.03	0.07	0.12	0.13	0.14	0.18	0.22	0.28
		30-38 HRc	-	-	-	-	-	-	-	-	-
Tool Steels	24-30 HRc	-	-	-	-	-	-	-	-	-	
	30-38 HRc	-	-	-	-	-	-	-	-	-	
High Speed Steel	14-20 HRc	-	-	-	-	-	-	-	-	-	
Spring Steel	≤330 BHN	-	-	-	-	-	-	-	-	-	
Stainless Steel	Austenitic Stainless Steel	≤24 HRc	20	0.02	0.05	0.09	0.11	0.12	0.14	0.18	0.21
	Austenitic Stainless Steel	≤24 HRc	-	-	-	-	-	-	-	-	-
	Martensitic Stainless Steel	>24 HRc	-	-	-	-	-	-	-	-	-
CAST IRON	Grey Cast Iron	≤230 BHN	60	0.03	0.07	0.12	0.13	0.14	0.18	0.22	0.28
		240-300 BHN	50	0.03	0.07	0.12	0.13	0.14	0.18	0.22	0.28
	Ductile Cast Iron	≤230 BHN	50	0.03	0.07	0.12	0.13	0.14	0.18	0.22	0.28
		240-300 BHN	40	0.03	0.07	0.12	0.13	0.14	0.18	0.22	0.28

Material	Hardness	Cutting speed (Vc)	FEED per REVOLUTION								
			<3 mm	4 mm	6 mm	8 mm	10 mm	12 mm	16 mm	20 mm	
		m/min	mm / rev								
Aluminium And Other Non Ferrous Material	Aluminium Up to 3% Si	≤200 BHN	100	0.04	0.14	0.22	0.24	0.28	0.36	0.4	0.44
	Aluminium Cast Alloys Over 3% Si	≤200 BHN	80	0.04	0.12	0.18	0.2	0.22	0.28	0.36	0.4
	Magnesium Alloys	≤150 BHN	120	0.03	0.09	0.14	0.16	0.18	0.22	0.26	0.3
	Copper, Low-alloyed	≤120 BHN	60	0.03	0.09	0.14	0.16	0.18	0.22	0.26	0.3
	Brass, Short-chipping Long-chipping	≤200 BHN	120	0.03	0.09	0.14	0.16	0.18	0.22	0.26	0.3
	Bronze, Short-chipping	≤200 BHN	80	0.03	0.09	0.14	0.16	0.18	0.22	0.26	0.3
	Bronze, Long-chipping	≤24 HRc	60	0.03	0.07	0.12	0.13	0.14	0.18	0.22	0.28
	Duroplastics	-	40	0.03	0.07	0.12	0.13	0.14	0.18	0.22	0.28
	Thermoplastics	-	30	0.02	0.05	0.09	0.11	0.12	0.14	0.18	0.21
	Reinforced Plastics-kevlar	-	-	-	-	-	-	-	-	-	-
	Reinforced Plastics-GFK/ CF	-	60	0.02	0.05	0.09	0.11	0.12	0.14	0.18	0.21
Super Alloys, Titanium & Nickle Alloys	Titanium	24-30 HRc	-	-	-	-	-	-	-	-	-
		30-38 HRc	-	-	-	-	-	-	-	-	-
	Special Alloys	30-38 HRc	-	-	-	-	-	-	-	-	-

Note: For C1GJ-SERIES REDUCE RPM & FEED by 30% to 35%

- These are just the Starting Parameters, you may vary the Speed and Feed depending upon other machining conditions.

Material	Hardness	Cutting speed (Vc)	FEED per REVOLUTION								
			<3 mm	4 mm	6 mm	8 mm	10 mm	12 mm	16 mm	20 mm	
		m/min	mm / rev								
Alloy Steel	Common Structural Steels	≤100 BHN	80	0.08	0.11	0.13	0.16	0.16	0.2	0.2	0.22
		100-180 BHN	70	0.06	0.08	0.1	0.13	0.13	0.16	0.16	0.18
	Free Cutting Steels	≤24 HRc	90	0.1	0.13	0.16	0.2	0.2	0.25	0.25	0.27
		>24-30 HRc	70	0.08	0.1	0.13	0.16	0.16	0.2	0.2	0.22
	Unalloyed Heat-treatable Steels	≤16 HRc	80	0.08	0.1	0.13	0.16	0.16	0.2	0.2	0.22
		16-24 HRc	70	0.08	0.1	0.13	0.16	0.16	0.2	0.2	0.22
	Alloyed Heat-treatable Steels	24-30 HRc	70	0.08	0.1	0.13	0.16	0.16	0.2	0.2	-
		30-38 HRc	70	0.06	0.08	0.1	0.13	0.13	0.16	0.16	-
	Unalloyed Case-hardened Steels	≤230 BHN	80	0.1	0.13	0.16	0.2	0.2	0.25	0.25	-
	Alloyed Case-hardened Steels	24-30 HRc	80	0.08	0.1	0.13	0.16	0.16	0.2	0.2	-
		30-38 HRc	60	0.05	0.06	0.08	0.1	0.1	0.13	0.13	-
	Nitriding Steels	24-30 HRc	70	0.06	0.08	0.1	0.13	0.13	0.16	0.16	-
		30-38 HRc	60	0.05	0.06	0.08	0.1	0.1	0.13	0.13	-
	Tool Steels	24-30 HRc	40	0.06	0.08	0.1	0.13	0.13	0.16	0.16	-
30-38 HRc		40	0.05	0.06	0.08	0.1	0.1	0.13	0.13	-	
High Speed Steel	14-20 HRc	30	0.04	0.05	0.06	0.08	0.08	0.1	0.1	-	
Spring Steel	≤330 BHN	30	0.03	0.04	0.05	0.06	0.06	0.08	0.08	-	
Stainless Steel	Austenitic Stainless Steel	≤24 HRc	40	0.04	0.06	0.06	0.08	0.08	0.1	0.1	-
	Austenitic Stainless Steel	≤24 HRc	30	0.04	0.06	0.06	0.08	0.08	0.1	0.1	-
	Martensitic Stainless Steel	>24 HRc	30	0.03	0.05	0.05	0.06	0.06	0.08	0.08	-
CAST IRON	Grey Cast Iron	≤230 BHN	130	0.1	0.14	0.16	0.2	0.2	0.25	0.25	0.28
		240-300 BHN	100	0.1	0.14	0.16	0.2	0.2	0.25	0.25	-
	Ductile Cast Iron	≤230 BHN	100	0.08	0.1	0.13	0.16	0.16	0.2	0.2	0.22
		240-300 BHN	80	0.08	0.1	0.13	0.16	0.16	0.2	0.2	-
	Chilled Cast Iron	≤350 BHN	30	0.03	0.05	0.05	0.06	0.06	0.08	0.08	-

Material	Hardness	Cutting speed (Vc)	FEED per REVOLUTION								
			<3 mm	4 mm	6 mm	8 mm	10 mm	12 mm	16 mm	20 mm	
		m/min	mm / rev								
Aluminium And Other Non Ferrous Material	Aluminium and Al-alloys	≤120 BHN	160	0.13	0.2	0.2	0.25	0.25	0.31	0.31	0.33
	Al Wrought Alloys	≤150 BHN	160	0.13	0.2	0.2	0.25	0.25	0.31	0.31	0.33
	Al Cast Alloys ≤ 10 %Si	≤200 BHN	140	0.1	0.16	0.16	0.2	0.2	0.25	0.25	-
	Al Cast Alloy > 10 %Si	≤200 BHN	110	0.1	0.16	0.16	0.2	0.2	0.25	0.25	-
	Magnesium alloys	≤150 BHN	160	0.1	0.16	0.16	0.2	0.2	0.25	0.25	-
	Copper, Low-alloyed	≤120 BHN	70	0.08	0.08	0.08	0.13	0.13	0.16	0.16	-
	Brass, Short-chipping	≤200 BHN	170	0.1	0.16	0.16	0.2	0.2	0.25	0.25	-
	Brass, Long-chipping	≤200 BHN	110	0.08	0.13	0.13	0.16	0.16	0.2	0.2	-
	Bronze, Short-chipping	≤200 BHN	70	0.08	0.08	0.08	0.13	0.13	0.16	0.16	-
	Bronze, Short-chipping	>200-260 BHN	70	0.06	0.06	0.06	0.1	0.1	0.13	0.13	-
	Bronze, Long-chipping	≤24 HRc	50	0.06	0.06	0.06	0.1	0.1	0.13	0.13	-
	Bronze, Long-chipping	>24-30 HRc	40	0.06	0.06	0.06	0.1	0.1	0.13	0.13	-
	Duroplastics	-	-	-	-	-	-	-	-	-	-
	Thermoplastics	-	-	-	-	-	-	-	-	-	-
	Reinforced Plastics-kevlar	-	-	-	-	-	-	-	-	-	-
	Reinforced Plastics -GFK/ CFK	-	-	-	-	-	-	-	-	-	-
Super Alloys, Titanium & Nickle Alloys	Titanium	24-30 HRc	30	0.04	0.04	0.06	0.08	0.08	0.1	-	-
		30-38 HRc	30	0.03	0.03	0.05	0.06	0.06	0.08	-	-
	Special Alloys	30-38 HRc	20	0.04	0.04	0.06	0.08	0.08	0.1	-	-
HARDENED STEEL	Hardened Steel (<40 HRc)	<40 HRc	20	0.03	0.03	0.04	0.05	0.05	0.06	-	-

NOTE: FOR C3HL-SERIES REDUCE RPM & FEED BY 20% to 25%

• These are just the Starting Parameters, you may vary the Speed and Feed depending upon other machining conditions.

Material	Hardness	Cutting speed (Vc)	FEED per REVOLUTION								
			<3 mm	4 mm	6 mm	8 mm	10 mm	12 mm	16 mm	20 mm	
		m/min	mm / rev								
Alloy Steel	Common Structural Steels	≤100 BHN	90	0.1	0.15	0.15	0.19	0.19	0.24	0.24	0.27
		100-180 BHN	80	0.08	0.12	0.12	0.15	0.15	0.19	0.19	0.21
	Free Cutting Steels	≤24 HRc	110	0.12	0.19	0.19	0.24	0.24	0.3	0.3	0.34
		>24-30 HRc	90	0.12	0.19	0.19	0.24	0.24	0.3	0.3	0.34
	Unalloyed Heat-treatable Steels	≤16 HRc	80	0.12	0.19	0.19	0.24	0.24	0.3	0.3	0.34
		16-24 HRc	80	0.1	0.15	0.15	0.19	0.19	0.24	0.24	0.27
	Alloyed Heat-treatable Steels	24-30 HRc	80	0.1	0.15	0.15	0.19	0.19	0.24	0.24	0.27
		30-38 HRc	70	0.1	0.15	0.15	0.19	0.19	0.24	0.24	0.27
	Unalloyed Case-hardened Steels	≤230 BHN	90	0.12	0.19	0.19	0.24	0.24	0.3	0.3	0.34
	Alloyed Case-hardened Steels	24-30 HRc	80	0.1	0.15	0.15	0.19	0.19	0.24	0.24	0.27
		30-38 HRc	60	0.06	0.1	0.1	0.12	0.12	0.15	0.15	0.17
	Nitriding Steels	24-30 HRc	70	0.1	0.15	0.15	0.19	0.19	0.24	0.24	0.27
		30-38 HRc	70	0.06	0.1	0.1	0.12	0.12	0.15	0.15	0.17
	Tool Steels	24-30 HRc	50	0.08	0.12	0.12	0.15	0.15	0.19	0.19	0.21
30-38 HRc		40	0.06	0.1	0.1	0.12	0.12	0.15	0.15	0.17	
High Speed Steel	14-20 HRc	40	0.05	0.08	0.08	0.1	0.1	0.12	0.12	0.14	
Spring Steel	≤330 BHN	40	0.04	0.06	0.06	0.08	0.08	0.1	0.1	0.11	
Stainless Steel	Austenitic Stainless Steel	≤24 HRc	40	0.06	0.1	0.1	0.12	0.12	0.15	0.15	0.17
	Austenitic Stainless Steel	≤24 HRc	40	0.06	0.1	0.1	0.12	0.12	0.15	0.15	0.17
	Martensitic Stainless Steel	>24 HRc	40	0.05	0.08	0.08	0.1	0.1	0.12	0.12	0.14
CAST IRON	Grey Cast Iron	≤230 BHN	130	0.15	0.24	0.24	0.3	0.3	0.37	0.37	0.4
		240-300 BHN	100	0.15	0.24	0.24	0.3	0.3	0.37	0.37	0.4
	Ductile Cast Iron	≤230 BHN	90	0.15	0.24	0.24	0.3	0.3	0.37	0.37	0.4
		240-300 BHN	80	0.12	0.19	0.19	0.24	0.24	0.3	0.3	0.34
	Chilled Cast Iron	≤350 BHN	30	0.04	0.06	0.06	0.08	0.08	0.1	0.1	0.11

Material	Hardness	Cutting speed (Vc)	FEED per REVOLUTION								
			<3 mm	4 mm	6 mm	8 mm	10 mm	12 mm	16 mm	20 mm	
		m/min	mm / rev								
Aluminium And Other Non Ferrous Material	Aluminium and Al-alloys	≤120 BHN	190	0.15	0.24	0.24	0.3	0.3	0.37	0.37	0.4
	Al Wrought Alloys	≤150 BHN	190	0.15	0.24	0.24	0.3	0.3	0.37	0.37	0.4
	Al Cast Alloys ≤ 10 %Si	≤200 BHN	160	0.15	0.24	0.24	0.3	0.3	0.37	0.37	0.4
	Al Cast Alloy > 10 %Si	≤200 BHN	140	0.15	0.24	0.24	0.3	0.3	0.37	0.37	0.4
	Magnesium alloys	≤150 BHN	170	0.12	0.19	0.19	0.24	0.24	0.3	0.3	0.34
	Copper, Low-alloyed	≤120 BHN	80	0.1	0.15	0.15	0.19	0.19	0.24	0.24	0.27
	Brass, Short-chipping	≤200 BHN	200	0.12	0.19	0.19	0.24	0.24	0.3	0.3	0.34
	Brass, Long-chipping	≤200 BHN	140	0.1	0.15	0.15	0.19	0.19	0.24	0.24	0.27
	Bronze, Short-chipping	≤200 BHN	80	0.1	0.15	0.15	0.19	0.19	0.24	0.24	0.27
	Bronze, Short-chipping	>200-260 BHN	70	0.08	0.12	0.12	0.15	0.15	0.19	0.19	0.21
	Bronze, Long-chipping	≤24 HRc	60	0.08	0.12	0.12	0.15	0.15	0.19	0.19	0.21
	Bronze, Long-chipping	>24-30 HRc	50	0.08	0.12	0.12	0.15	0.15	0.19	0.19	0.21
	Duroplastics	-	-	-	-	-	-	-	-	-	-
	Thermoplastics	-	-	-	-	-	-	-	-	-	-
	Reinforced Plastics-kevlar	-	-	-	-	-	-	-	-	-	-
	Reinforced Plastics -GFK/ CFK	-	-	-	-	-	-	-	-	-	-
Super Alloys, Titanium & Nickle Alloys	Titanium	24-30 HRc	30	0.05	0.08	0.08	0.1	0.1	0.12	0.12	0.14
		30-38 HRc	30	0.05	0.08	0.08	0.1	0.1	0.12	0.12	0.14
	Special Alloys	30-38 HRC	30	0.05	0.08	0.08	0.1	0.1	0.12	0.12	0.14
HARDENED STEEL	Hardened Steel (<40 HRc)	<40 HRc	30	0.03	0.05	0.05	0.06	0.06	0.08	0.08	0.08

NOTE: FOR CTHL-SERIES REDUCE RPM & FEED BY 20% to 25%

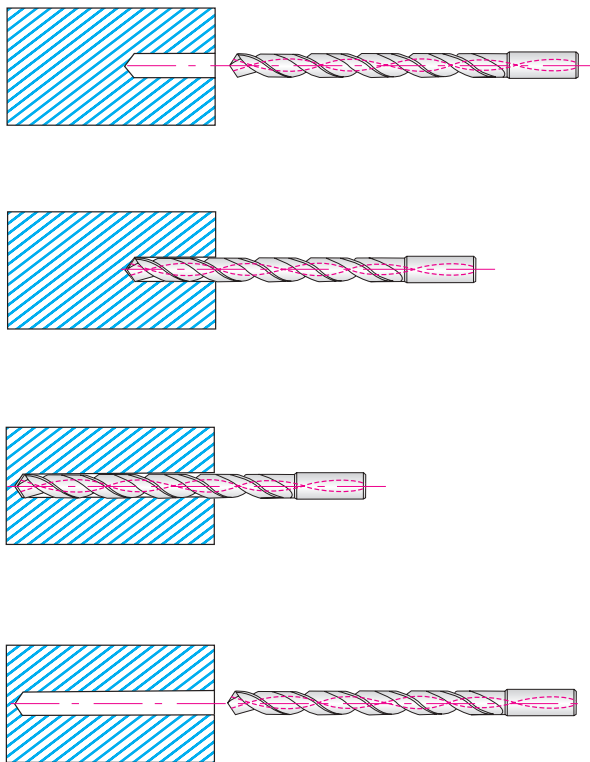
• These are just the Starting Parameters, you may vary the Speed and Feed depending upon other machining conditions.

L/D Ratio	Reduce Feed	Reduce RPM
3XD	100%	100%
5XD	80%	85%
8XD	60%	75%
>8XD	50%	60%

Important Note:

- For all deep hole drilling above 8 L/D guide holes are recommended
- Deep hole drills are prone to breakage without guide holes
- Minimum of 800+psi coolant pressure recommended

FOR MQL DRILLS or DEEP HOLE DRILLS



1. Guide Drilling should be done as Diameter+0.1mm between 3xD and 5xD depth.
2. For Main Drilling, proceed with low RPM at Guide Drilling segment.
(RPM 300, FEED 400mm/min)
3. Just before the end of Guide Drilling segment, reduce feed to zero and increase the RPM according to Recommended Cutting Condition chart (See above).
4. After then, proceed main drilling by increasing feed without step drilling.
5. When coming out from Guide Drilling start point after drilling, RPM should be reduced as 300 and feed should be 1000 mm/min.
6. When coming out from Guide Drilling segment to the outside, the feed should be decreased as 50%.

Material	Hardness	Cutting speed (Vc)	FEED per REVOLUTION								
			<3 mm	4 mm	6 mm	8 mm	10 mm	12 mm	16 mm	20 mm	
		m/min	mm / rev								
Alloy Steel	Common Structural Steels	≤100 BHN	110	0.13	0.13	0.2	0.25	0.25	0.33	0.33	-
		100-180 BHN	90	0.1	0.1	0.16	0.2	0.2	0.25	0.25	-
	Free Cutting Steels	≤24 HRc	120	0.16	0.16	0.25	0.33	0.33	0.41	0.41	-
		>24-30 HRc	90	0.13	0.13	0.2	0.25	0.25	0.33	0.33	-
	Unalloyed Heat-Treatable Steels	≤16 HRc	100	0.13	0.13	0.2	0.25	0.25	0.33	0.33	-
		16-24 HRc	90	0.13	0.13	0.2	0.25	0.25	0.33	0.33	-
	Alloyed Heat-Treatable Steels	24-30 HRc	90	0.13	0.13	0.2	0.25	0.25	0.33	0.33	-
		30-38 HRc	90	0.1	0.1	0.16	0.2	0.2	0.25	0.25	-
	Unalloyed Case-Hardened Steels	≤230 BHN	110	0.16	0.16	0.25	0.33	0.33	0.41	0.41	-
	Alloyed Case-Hardened Steels	24-30 HRc	100	0.13	0.13	0.2	0.25	0.25	0.33	0.33	-
		30-38 HRc	70	0.08	0.08	0.13	0.16	0.16	0.2	0.2	-
	Nitriding Steels	24-30 HRc	90	0.1	0.1	0.16	0.2	0.2	0.25	0.25	-
		30-38 HRc	80	0.08	0.08	0.13	0.16	0.16	0.2	0.2	-
Tool Steels	24-30 HRc	60	0.1	0.1	0.16	0.2	0.2	0.25	0.25	-	
	30-38 HRc	50	0.08	0.08	0.13	0.16	0.16	0.2	0.2	-	
High Speed Steel	14-20 HRc	40	0.06	0.06	0.1	0.13	0.13	0.16	0.16	-	
Spring Steel	≤330 BHN	40	0.05	0.05	0.08	0.1	0.1	0.13	0.13	-	
Stainless Steel	Austenitic Stainless Steel	≤24 HRc	50	0.06	0.06	0.1	0.13	0.13	0.16	0.16	-
	Austenitic Stainless Steel	≤24 HRc	40	0.06	0.06	0.1	0.13	0.13	0.16	0.16	-
	Martensitic Stainless Steel	>24 HRc	40	0.05	0.05	0.08	0.1	0.1	0.13	0.13	-
Cast Iron	Grey Cast Iron	≤230 BHN	170	0.16	0.16	0.25	0.33	0.33	0.41	0.41	-
		240-300 BHN	130	0.16	0.16	0.25	0.33	0.33	0.41	0.41	-
	Ductile Cast Iron	≤230 BHN	130	0.13	0.13	0.2	0.25	0.25	0.33	0.33	-
		240-300 BHN	100	0.13	0.13	0.2	0.25	0.25	0.33	0.33	-
	Chilled Cast Iron	≤350 BHN	30	0.05	0.05	0.08	0.1	0.1	0.13	0.13	-

Material	Hardness	Cutting speed (Vc)	FEED per REVOLUTION								
			<3 mm	4 mm	6 mm	8 mm	10 mm	12 mm	16 mm	20 mm	
		m/min	mm / rev								
Aluminium and Other Non Ferrous Material	Aluminium and Al-alloys	≤120 BHN	210	0.2	0.2	0.33	0.41	0.41	0.5	0.5	-
	Al wrought alloys	≤150 BHN	210	0.2	0.2	0.33	0.41	0.41	0.5	0.5	-
	Al cast alloys ≤ 10 %Si	≤200 BHN	180	0.16	0.16	0.25	0.33	0.33	0.41	0.41	-
	Al cast alloys > 10 %Si	≤200 BHN	150	0.16	0.16	0.25	0.33	0.33	0.41	0.41	-
	Magnesium alloys	≤150 BHN	210	0.16	0.16	0.25	0.33	0.33	0.41	0.41	-
	Copper, low-alloyed	≤120 BHN	90	0.13	0.13	0.13	0.2	0.2	0.25	0.25	-
	Brass, short-chipping	≤200 BHN	220	0.16	0.16	0.25	0.33	0.33	0.41	0.41	-
	Brass, long-chipping	≤120 BHN	150	0.13	0.13	0.2	0.25	0.25	0.33	0.33	-
	Bronze, short-chipping	≤200 BHN	90	0.13	0.13	0.13	0.2	0.2	0.25	0.25	-
	Bronze, short-chipping	>200-260 BHN	90	0.1	0.1	0.1	0.16	0.16	0.2	0.2	-
	Bronze, long-chipping	≤24 HRc	60	0.1	0.1	0.1	0.16	0.16	0.2	0.2	-
	Bronze, long-chipping	>24-30 HRc	60	0.1	0.1	0.1	0.16	0.16	0.2	0.2	-
	Duroplastics	-	-	-	-	-	-	-	-	-	-
	Thermoplastics	-	-	-	-	-	-	-	-	-	-
	Reinforced plastics - Kevlar	-	-	-	-	-	-	-	-	-	-
	Reinforced plastics - GFK/ CFK	-	-	-	-	-	-	-	-	-	-
Super Alloys, Titanium & Nickle Alloys	Titanium	24-30 HRc	40	0.06	0.06	0.1	0.13	0.13	0.16	-	-
		30-38 HRc	30	0.05	0.05	0.08	0.1	0.1	0.13	-	-
	Special Alloys	30-38 HRc	20	0.06	0.06	0.1	0.13	0.13	0.16	-	-
Hardened Steel	Hardened Steel (<40 HRc)	<40 HRc	20	0.03	0.03	0.04	0.05	0.05	0.06	-	-

NOTE: These are just the Starting Parameters, you may vary the Speed and Feed depending upon other machining conditions.

Material	Hardness	Cutting speed (Vc)	FEED per REVOLUTION				
			6 mm	8 mm	10 mm	12 mm	
		m/min	mm / rev				
Alloy Steel	Common Structural Steels	≤100 BHN	50	0.07	0.08	0.1	0.12
		100-180 BHN	40	0.07	0.08	0.1	0.12
	Free Cutting Steels	≤24 HRc	50	0.07	0.08	0.1	0.12
		>24-30 HRc	40	0.07	0.08	0.1	0.12
	Alloyed Heat-treatable Steels	24-30 HRc	50	0.07	0.08	0.1	0.12
		30-38 HRc	40	0.07	0.08	0.1	0.12
Tool Steels	24-30 HRc	40	0.07	0.08	0.1	0.12	
	30-38 HRc	30	0.07	0.08	0.1	0.12	
Stainless Steel	Austenitic Stainless Steel	≤24 HRc	40	0.05	0.07	0.09	0.11
	Austenitic Stainless Steel	≤24 HRc	30	0.05	0.07	0.09	0.11
	Martensitic Stainless Steel	>24 HRc	20	0.05	0.07	0.09	0.11
Cast Iron	Grey Cast Iron	≤230 BHN	80	0.07	0.08	0.1	0.12
		240-300 BHN	70	0.07	0.08	0.1	0.12
	Ductile Cast Iron	≤230 BHN	60	0.07	0.08	0.1	0.12
		240-300 BHN	55	0.07	0.08	0.1	0.12
Chilled Cast Iron	≤350 BHN	35	0.07	0.08	0.1	0.12	
Cast Iron	Titanium	24-30 HRc	15	0.04	0.06	0.08	0.1
		30-38 HRc	10	0.04	0.06	0.08	0.1
	Special Alloys	30-38 HRc	10	0.04	0.06	0.08	0.1
Hardened Steel	Hardened Steel (<40 HRc)	<40 HRc	10	0.04	0.06	0.08	0.1

NOTE: These are just the Starting Parameters, you may vary the Speed and Feed depending upon other machining conditions.

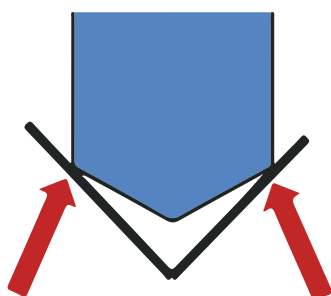


Figure 1
90° Spot Angle
135° Drill Angle

Initial Contact Area Damages Carbide Drills!!

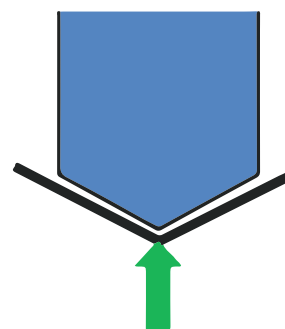


Figure 2
140° Spot Angle
135° Drill Angle

Contact Is At The Drill Point

Drill Selection

Use the shortest drill the application will permit in order to achieve maximum tool rigidity.

HOLDERS

Tool holders and collets must provide good concentricity between the drill and the machine spindle. Use a positive back stop to prevent the tool from backing up into the holder. Never collet the tool over the flutes or over-tighten the holder. Static runout in the tool assembly must be accurately checked and maintained.

Workpiece

A secure and rigid workpiece to minimize deflection is needed, particularly on through-hole applications.

Coolants

Coolants are recommended when drilling mild steel and high temperature alloys. The purpose of the coolant media is to direct the chips away from the cutting tool and workpiece. Excessive coolant pressure and/or too much volume can negatively affect performance. When using coolant fed drills, the coolant pressure that is required should be higher than normal. Suggested pressure for coolant fed drills is minimally 150 PSI. As the diameter of the drill is reduced, the higher the pressure. This is to assist the chip in evacuating from a more confined area.

Component Analysis

Material :

- Machinability
- Chipbreaking
- Hardness

Application Material Group = AMG :

- | | |
|-------------------|---------------------------------|
| ▪ Steel | ▪ Copper/brass |
| ▪ Stainless Steel | ▪ Aluminum / Magnesium |
| ▪ Cast Iron | ▪ Synthetic Materials / Plastic |
| ▪ Titanium | ▪ Hard Materials |
| ▪ Nickel | ▪ Graphite |

The Hole:

DIAMETER

Wall Thickness : Thickness is good enough or very thin

DEPTH

Reach Required : How far drill must be sticking out of the holder

QUALITY

Proper Fixturing : Clamping of the component must be proper

Rotating or Static Operation : Is the drill in rotation or component is in rotation.

Solid Carbide Drilling On Inclined Surfaces

• ENTERING OR EXITING the Workpiece :

► If Entry Angle = 1° To 5°

Feed Rate To Be Reduced To 1/3 (33%)

► If Entry Angle = 5° To 10°

Feed Rate To Be Reduced To Between 1/3 (33%) & 1/4 (25%)

Suggestions :

Perform Centring Operation with a Short Spotting Drill Firstly which has a same or a Greater Point angle. This minimizes the deflection and extends the Tool life. (*Refer Fig.1 and Fig.2 on Pg.58)

► If Entry Angle is Larger Than 10°

Direct Entry With Solid Carbide Drill Not Recommended

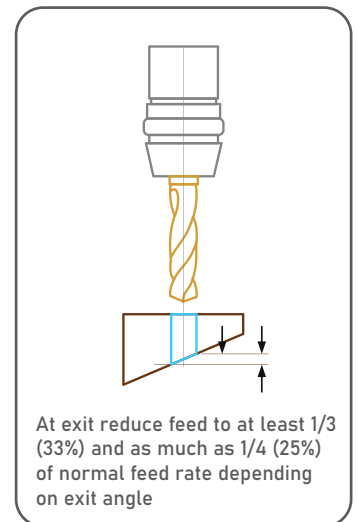
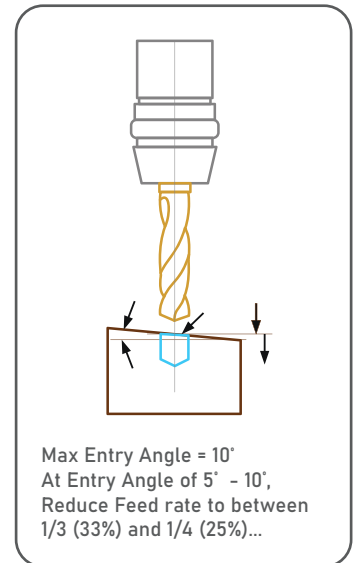
Suggestions :

Caution: Never use our C3HS or CTHS Carbide Drills directly on an inclined surface with Entry angle steeper than 10°. Firstly do milling with our 301 or 322- Series Flat end mill to make a Flat Surface, and then with our recommended parameters do the drilling with either C3HS-High Performance Carbide Drills Or CTHS Coolant Fed Drills

► If EXIT SURFACE is Angled

Feed Rate To Be Reduced To Between 1/3 (33%) & 1/4 (25%)

Extremely Steep Angles may still cause chipping on the Solid Carbide Drill's Lips or outside corner



Solid Carbide Drilling On Irregular Surfaces

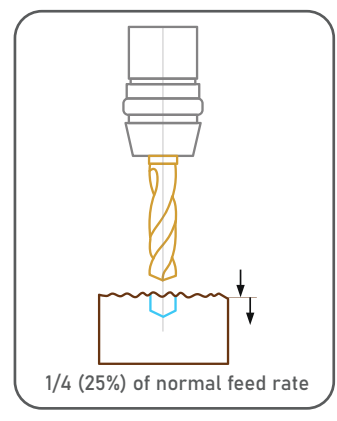
• ENTERING OR EXITING the Workpiece :

Feed Rate To Be Reduced To 1/4 (25%)*

Extremely Rough Surfaces with scale and hard spots may still cause chipping on the Solid Carbide Drill's Lips or outside corners.

Suggestions :

Inspect the drill often to be sure chipping will not compromise hole quality



Solid Carbide Drilling On Concave Surfaces

• ENTERING OR EXITING the Workpiece :

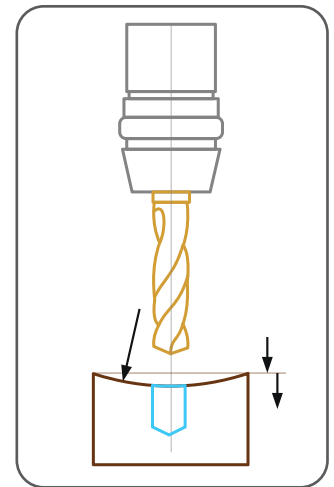
If the part radius is larger than 15 X Drill Diameter

Feed Rate To Be Reduced To 1/3 (33%)

If the part radius is smaller than 15 x Drill Diameter, this is not highly recommended but can be successful in some easy to machine materials (for ex: Aluminum)

Suggestions :

For Curved surface drilling we recommend Flat Bottom Drills.
Contact our RIGPL representative for quote.



Solid Carbide Drilling On Convex Surfaces

• ENTERING OR EXITING the Workpiece :

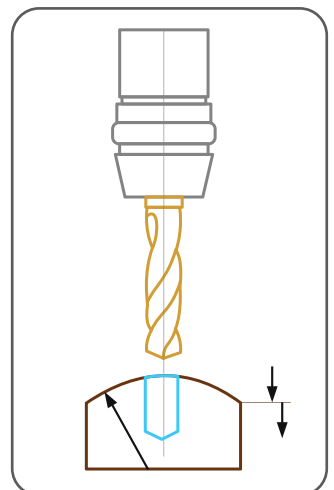
If the part radius is larger than 4 X Drill Diameter

Feed Rate To Be Reduced To 1/2 (50%)

If the part radius is smaller than 4 x Drill Diameter, this is not highly recommended because drill will most likely walk and will not center properly.

Suggestions :

For Curved surface drilling we recommend Flat Bottom Drills.
Contact our RIGPL representative for quote.



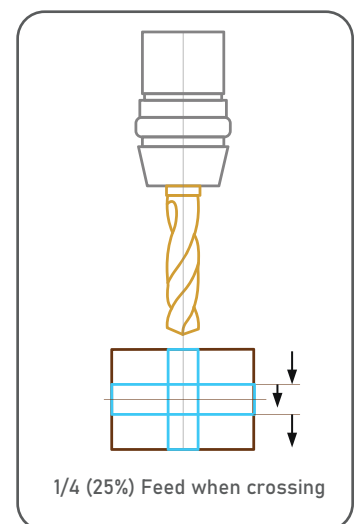
Solid Carbide Cross Hole Drilling

• ENTERING OR EXITING a Cross Hole in the Workpiece :

Feed Rate To Be Reduced To 1/4 (25%) from entering till exiting of cross-hole region Once drill is fully engaged, increase the feed rate back to recommended parameters

Suggestions :

For Cross hole drilling we recommend Double Margin Drills.
Contact our RIGPL representative for quote.



Solid Carbide Stack Drilling

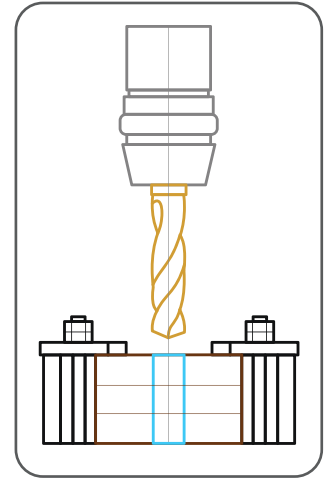
- If the stacked plates are clamped tightly together & gaps are eliminated :

Feed Rate reduction is not required.

- If small gaps remain between the stacked plate :

Suggestions :

Industrial paper shims can be used between stacks to level out the irregularities and reduce the vibrations.



Best Machining Practice

Use of Hydro-Grip or Precision Collet

- By providing even tool grip it reduces runout and tool slip under high rpm and load variation.

Benefits

- ▶ Runout control is much better
- ▶ Lower the run out better the Tool Life
- ▶ Higher Productivity
- ▶ Lower Part Rejections

Clean Tool Holder

- Proper cleaning of tool holder assembly before mounting of new tool to remove fine chips.

Benefits

- ▶ Prevents from avoidable runout
- ▶ Less chances of tool breakage

For more details please read our blog for Best way to use High Performance Carbide Drills.

Check Tool and Spindle Runout

Tool Runout : 12 μ or less

Spindle Runout : 4 μ or less

Puppy Dial with least count of 2 μ or less should be used for accuracy.

Benefits

- ▶ Prevents uneven tool wear
- ▶ Prevents oversizing issue
- ▶ Increases Tool Life & productivity (Lower run-out, higher tool life)

Coolant Pressure & Concentration

Pressure : At least 6 Bar or more is better.

Concentration : At least 5% or mentioned.

Benefits

- ▶ Prevents tool buildup edge and Improves component Surface Finish.
- ▶ Helps in improving productivity

Cleaning for Workpiece Rigidity

- Metal chips removal from tool and work holding device especially component sitting area and around with either pressurised air or coolant to avoid any potential misalignment.

Benefits

- ▶ Prevents from potential component rejection
- ▶ Prevents premature Tool damage / failure due to improper rigidity

Using Troubleshooting Table

- If even after applying above 'Best Machining Practice' problem persist use troubleshooting tables as per application from tool manufacturer's catalog

Benefits

- ▶ To solve any Potential problem

For more details please read our blog for Best way to use High Performance Carbide Drills.

Cutting edge build-up

Cause :

- Low cutting speed
- Excessive honing of cutting lip
- Bright finish cutting lip

Remedy :

- Increase cutting speed
- Reduce cutting lip honing
- Have tool coated



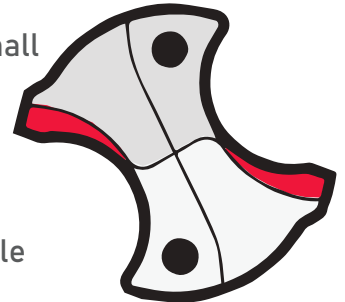
Heavy wear and tear at flank

Cause :

- Cutting speed too high
- Feed too low
- Clearance angle too small

Remedy :

- Decrease cutting speed
- Increase feed
- Increase clearance angle



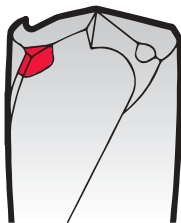
Crumbling of outer corners

Cause :

- Non-rigid conditions, insufficient work piece clamping
- Excessive deviation from concentricity
- Interrupted cut

Remedy :

- Rigid clamping of work piece
- Check and correct concentricity if possible
- Reduce feed



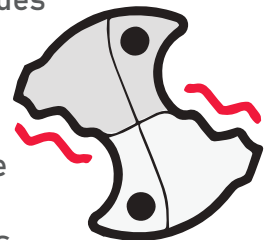
Crumbling on cutting lips

Cause :

- Non-rigid conditions, insufficient work piece clamping
- Interrupted cut
- Maximum wear and tear values have been exceeded
- Wrong tool type

Remedy :

- Rigid clamping of work piece
- Reduce feed
- Reduce tool change intervals
- Apply suitable tool



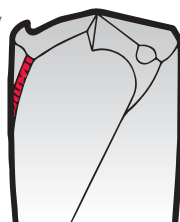
Land wear

Cause:

- Non-rigid conditions, insufficient work piece clamping
- Large deviation from concentricity
- Back taper too small
- Wrong coolant/lubrication (oil), soluble oil too thin

Remedy :

- Rigid clamping of work piece
- Check and correct concentricity if possible
- Increase back taper
- Thicken soluble oil or use neat oil



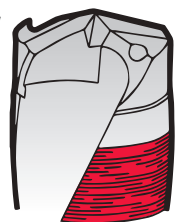
Scoring on tool body

Cause:

- Non-rigid conditions, insufficient work piece clamping
- Large deviation from concentricity
- Interrupted cut
- Abrasive work piece material

Remedy :

- Rigid clamping of work piece
- Check and correct concentricity if possible
- Reduce feed
- Thicken soluble oil or use neat oil



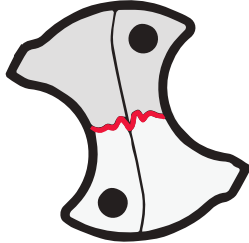
Heavy chisel edge wear & tear

Cause :

- Cutting speed too low
- Feed too high
- Excessive honing of cutting lip

Remedy :

- Increase cutting speed
- Decrease feed
- Reduce cutting lip honing



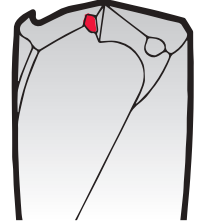
Crumbling at intersection of web thinning and cutting lip

Cause :

- Clearance angle too small
- Excessive honing of cutting lip
- Wrong tool type

Remedy :

- Increase clearance angle
- Reduce cutting lip honing
- Apply suitable tool



Plastic deformation of outer corner

Cause :

- Cutting speed too high
- Incorrect or no honing at corner
- Incorrect or no corner chamfer

Remedy :

- Decrease cutting speed
- Correct honing
- Apply correct corner chamfer



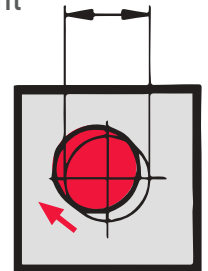
Misalignment, axis shifting

Cause :

- Non-rigid conditions, insufficient work piece clamping
- Excessive deviation from concentricity
- Spotting area transverse
- Chisel edge too large

Remedy :

- Rigid clamping of work piece
- Check and correct concentricity, if possible
- Use twin-fluted milling cutter for spotting
- Reduce chisel edge



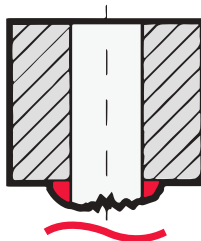
Heavy burring on breakthrough

Cause:

- Feed too high
- Maximum wear and tear values have been exceeded
- Excessive honing of cutting lip

Remedy :

- Decrease feed
- Reduce tool change intervals
- Reduce cutting lip honing



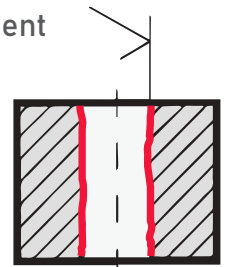
Unsatisfactory surface quality

Cause:

- Non-rigid conditions, insufficient work piece clamping
- Excessive deviation from concentricity
- Insufficient coolant

Remedy :

- Rigid clamping of work piece
- Check and correct concentricity, if possible
- Increase coolant (volume, pressure)

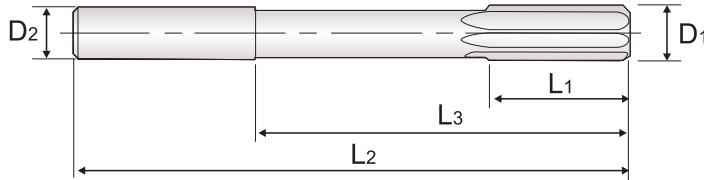


Carbide Reamers

In applications that require high-precision hole finishes, or tighter diameter control ROHIT's Solid Carbide Reamers can be used with confidence in a wide range of sizes for virtually all materials, including cast iron, aluminium, stainless steel, exotic alloys, plastics and other non-ferrous materials.

Description	Series No.	Page No
Carbide St. Flute Reamers	C1RS	67
Carbide LHS/RHC Reamers	C1RL	69
Carbide RHS/RHC Reamers	C1RR	71
Technical Information	Troubleshooting	73





Tolerance	
D1	H7
D2	h6

		SMG	
Metric Din 1420 H7	RHC	Z6/ Z4	

Applications:

- Best suited for General Purpose Reaming in ferrous & non-ferrous materials
- Suited for both Through & blind hole construction
- Special sizes available on request

Features:

- Accurate Size Great Finish
- Manufactured with in 2-3 micron accuracy
- Gives accurate hole size and high finishing

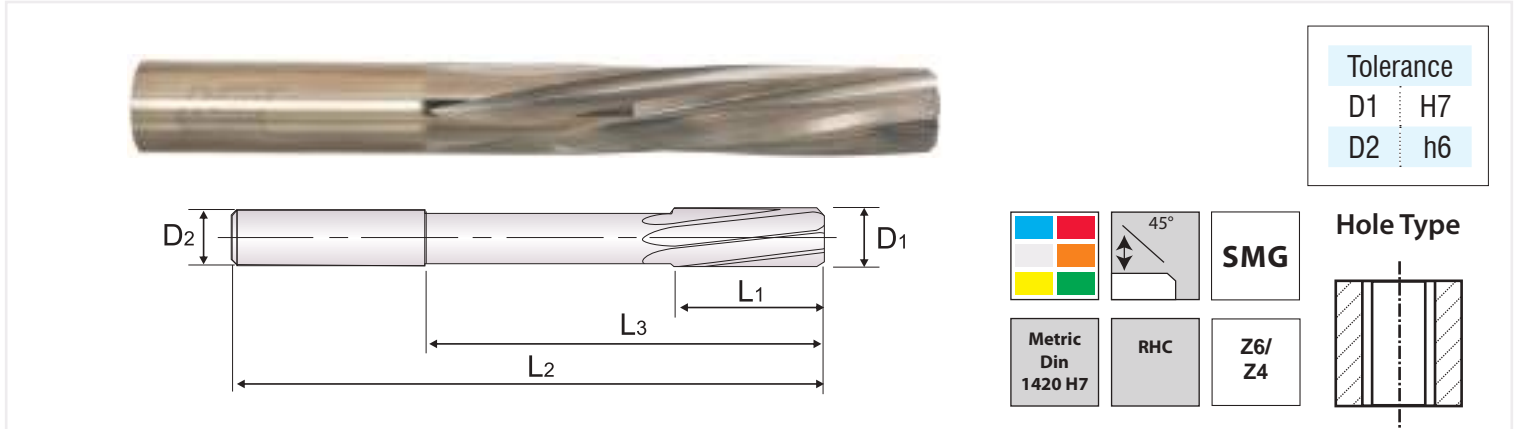
Ordering Code (Uncoated)	Ordering Code (TiAlN Coated)	Flute Dia (D1)	Flute Len (L1)	Reach Len (L3)	Overall Len (L2)	Shank Dia (D2)	# of Flutes
C1RS0300061-U	C1RS0300061-F	3	15	31	61	4	4
C1RS0350070-U	C1RS0350070-F	3.5	18	36	70	4	4
C1RS0400075-U	C1RS0400075-F	4	19	42	75	4	4
C1RS0450080-U	C1RS0450080-F	4.5	21	46	80	5	4
C1RS0500086-U	C1RS0500086-F	5	23	51	86	5	4
C1RS0550093-U	C1RS0550093-F	5.5	26	56	93	6	4
C1RS0600093-U	C1RS0600093-F	6	26	56	93	6	4
C1RS0650101-U	C1RS0650101-F	6.5	28	62	101	7	6
C1RS0700109-U	C1RS0700109-F	7	31	68	109	7	6
C1RS0750109-U	C1RS0750109-F	7.5	31	68	109	8	6
C1RS0800117-U	C1RS0800117-F	8	33	74	117	8	6
C1RS0850117-U	C1RS0850117-F	8.5	33	74	117	9	6
C1RS0900125-U	C1RS0900125-F	9	36	80	125	9	6

Ordering Code (Uncoated)	Ordering Code (TiAlN Coated)	Flute Dia (D1)	Flute Len (L1)	Reach Len (L3)	Overall Len (L2)	Shank Dia (D2)	# of Flutes
C1RS0950125-U	C1RS0950125-F	9.5	36	80	125	10	6
C1RS1000133-U	C1RS1000133-F	10	38	86	133	10	6
C1RS1050133-U	C1RS1050133-F	10.5	38	86	133	12	6
C1RS1100142-U	C1RS1100142-F	11	41	95	142	12	6
C1RS1200151-U	C1RS1200151-F	12	44	104	151	12	6
C1RS1300151-U	C1RS1300151-F	13	44	104	151	14	6
C1RS1400155-U	C1RS1400155-F	14	47	106	155	14	6
C1RS1500160-U	C1RS1500160-F	15	50	110	160	16	6
C1RS1600160-U	C1RS1600160-F	16	52	110	160	16	6



Carbon Steels BHN 180 to 225	Alloy Steels BHN 225 to 355	Pre-hardened Steels HRC 40 to 45	Austenitic Stainless Steel	Precipitation Hardened Stainless Steel	Titanium	HighTemp. Alloy	Grey Cast Iron	Ductile Cast Iron	Hardened Steels HRC 45 to 55	High Hardened Steels HRC 55 to 70	Aluminum	Aluminum Alloys	Plastic	Wood / MDF	Copper / Brass
1 st	1 st	1 st	1 st	1 st	1 st	1 st	1 st	1 st			1 st	1 st			1 st

NOTE: This is Non-stock Item, ask your RIGPL representative for Delivery Period
FOR FEED & SPEED Rates, go to page no. PG-76



Tolerance	
D1	H7
D2	h6

45°

SMG

Metric Din 1420 H7

RHC

Z6/ Z4

Hole Type

Applications:

- Best suited for General Purpose Reaming in ferrous & non-ferrous materials
- Suited for through hole construction
- Special sizes available on request

Features:

- Accurate Size Great Finish
- Manufactured with in 2-3 micron accuracy
- Gives accurate hole size and high finishing

Ordering Code (Uncoated)	Ordering Code (TiAlN Coated)	Flute Dia (D1)	Flute Len (L1)	Reach Len (L3)	Overall Len (L2)	Shank Dia (D2)	# of Flutes
C1RL0300061-U	C1RL0300061-F	3	15	31	61	4	4
C1RL0350070-U	C1RL0350070-F	3.5	18	36	70	4	4
C1RL0400075-U	C1RL0400075-F	4	19	42	75	4	4
C1RL0450080-U	C1RL0450080-F	4.5	21	46	80	5	4
C1RL0500086-U	C1RL0500086-F	5	23	51	86	5	4
C1RL0550093-U	C1RL0550093-F	5.5	26	56	93	6	4
C1RL0600093-U	C1RL0600093-F	6	26	56	93	6	4
C1RL0650101-U	C1RL0650101-F	6.5	28	62	101	7	6
C1RL0700109-U	C1RL0700109-F	7	31	68	109	7	6
C1RL0750109-U	C1RL0750109-F	7.5	31	68	109	8	6
C1RL0800117-U	C1RL0800117-F	8	33	74	117	8	6
C1RL0850117-U	C1RL0850117-F	8.5	33	74	117	9	6
C1RL0900125-U	C1RL0900125-F	9	36	80	125	9	6

Ordering Code (Uncoated)	Ordering Code (TiAlN Coated)	Flute Dia (D1)	Flute Len (L1)	Reach Len (L3)	Overall Len (L2)	Shank Dia (D2)	# of Flutes
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C1RL1050133-U	C1RL1050133-F	10.5	38	86	133	12	6
C1RL1100142-U	C1RL1100142-F	11	41	95	142	12	6
C1RL1200151-U	C1RL1200151-F	12	44	104	151	12	6
C1RL1300151-U	C1RL1300151-F	13	44	104	151	14	6
C1RL1400155-U	C1RL1400155-F	14	47	106	155	14	6
C1RL1500160-U	C1RL1500160-F	15	50	110	160	16	6
C1RL1600160-U	C1RL1600160-F	16	52	110	160	16	6

What is Machinability and Machinability Index or Rating?

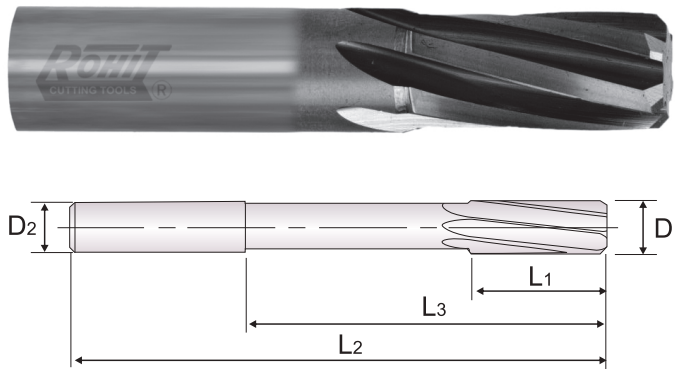
Machinability is the ease with which a Cutting Tool can machine a workpiece material. Machinability ratings (MR) provide understanding of the severity of a metalworking operation in comparison to B1112 steel as the base material whose MR is taken as 1.0. So Lower the MR poor is the machinability of the material.

[Read More on rigpl.com/blog](http://rigpl.com/blog)



Carbon Steels BHN 180 to 225	Alloy Steels BHN 225 to 355	Pre-hardened Steels HRC 40 to 45	Austenitic Stainless Steel	Precipitation Hardened Stainless Steel	Titanium	HighTemp. Alloy	Grey Cast Iron	Ductile Cast Iron	Hardened Steels HRC 45 to 55	High Hardened Steels HRC 55 to 70	Aluminum	Aluminum Alloys	Plastic	Wood / MDF	Copper / Brass
1 st	1 st	1 st	1 st	1 st	1 st	1 st	1 st	1 st			1 st	1 st			1 st

NOTE: This is Non-stock Item, ask your RIGPL representative for Delivery Period
FOR FEED & SPEED Rates, go to page no. PG-76



Tolerance	
D1	H7
D2	h6

		SMG	Hole Type
Metric Din 1420 H7	RHC	Z6/ Z4	

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C1RR0550093-U	C1RR0550093-F	5.5	26	56	93	6	4
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C1RR0800117-U	C1RR0800117-F	8	33	74	117	8	6
C1RR0850117-U	C1RR0850117-F	8.5	33	74	117	9	6
C1RR0900125-U	C1RR0900125-F	9	36	80	125	9	6

Ordering Code (Uncoated)	Ordering Code (TiAlN Coated)	Flute Dia (D1)	Flute Len (L1)	Reach Len (L3)	Overall Len (L2)	Shank Dia (D2)	# of Flutes
C1RR0950125-U	C1RR0950125-F	9.5	36	80	125	10	6
C1RR1000133-U	C1RR1000133-F	10	38	86	133	10	6
C1RR1050133-U	C1RR1050133-F	10.5	38	86	133	12	6
C1RR1100142-U	C1RR1100142-F	11	41	95	142	12	6
C1RR1200151-U	C1RR1200151-F	12	44	104	151	12	6
C1RR1300151-U	C1RR1300151-F	13	44	104	151	14	6
C1RR1400155-U	C1RR1400155-F	14	47	106	155	14	6
C1RR1500160-U	C1RR1500160-F	15	50	110	160	16	6
C1RR1600160-U	C1RR1600160-F	16	52	110	160	16	6



Carbon Steels BHN 180 to 225	Alloy Steels BHN 225 to 355	Pre-hardened Steels HRC 40 to 45	Austenitic Stainless Steel	Precipitation Hardened Stainless Steel	Titanium	HighTemp. Alloy	Grey Cast Iron	Ductile Cast Iron	Hardened Steels HRC 45 to 55	High Hardened Steels HRC 55 to 70	Aluminum	Aluminum Alloys	Plastic	Wood / MDF	Copper / Brass
1st	1st	1st	1st	1st	1st	1st	1st	1st			1st	1st			1st

NOTE: This is Non-stock Item, ask your RIGPL representative for Delivery Period
FOR FEED & SPEED Rates, go to page no. PG-76

Problem	Possible Solution																
	Speed & Feed						Tool Geometry						Coolant & Stock Removal				
	Reduce Feed	Increase Feed	Reduce Speed	Increase Speed	Use Larger Reamer	Use Smaller Reamer	Bad Speed & Feed	Worn Tool Margin	Worn Cutting Edge	Uneven Lip Height	Chip Capacity of Reamer	Too Much Clearance	Grind Larger Back Taper	Bent Reamer	Insufficient Stock	Too Much Stock	Use Coolant
Burnishing		X									X				X		
Reamer Wear	X		X				X									X	X
Hole Quality	X		X				X	X	X	X					X	X	X
Hole Undersize	X		X		X	X		X	X						X	X	X
Hole Oversize		X		X		X		X	X					X		X	X
Accuracy	X									X							X
Chatter		X	X							X	X	X			X		X
Out of Round Hole								X	X	X					X	X	X
Hole Taper						X		X	X	X			X			X	X
Bell Mouth		X					X	X	X				X	X			X
Reamer Life		X	X				X			X	X	X					X
Scoring in Bore							X	X	X	X					X	X	X
Deflection																	

Possible Solution																				
Coolant & Stock Removal						Set Up										Cutting Errors				
Run Dry	Poor Hole Prep	Insufficient Stock	Too Much Stock	Use Coolant	Run Dry	Poor Hole Prep	Alignment	Holder Accuracy	Concentricity	Use Adjustable Holder	Use Floating Holder	Lack of Rigidity in Set-Up	Work Holding Error	Spindle Bearings	Tool Extended Too Far	Poor Regrind	Poor Machinability	Built Up Edge	Wrong Tool	Poor Chip Removal
		X					X						X			X				
	X		X	X		X	X	X					X			X	X			X
	X	X	X	X		X	X		X				X			X	X	X	X	
		X	X	X			X										X			
X	X		X	X	X	X	X		X				X			X	X	X	X	
				X									X			X				
		X		X			X	X				X	X	X	X	X				
		X	X	X			X						X			X				
			X	X			X	X	X	X	X		X			X	X	X		
			X	X			X	X	X	X		X	X	X	X	X				
	X	X	X	X		X			X								X	X		X
							X													

Material	Example	Drill Size (mm)							
		2.8	3.8	4.8	5.8	7.8	9.8	11.8	15.7
		Reamer Diameter (mm)							
		3	4	5	6	8	10	12	16
		Total Stock Allowance							
Magnesium		0.2	0.22	0.22	0.23	0.26	0.3	0.32	0.38
Aluminium	<5%SI	0.2	0.22	0.22	0.23	0.26	0.3	0.32	0.38
	>5%SI	0.2	0.22	0.22	0.23	0.24	0.26	0.29	0.33
Brass & Soft Bronze	Brass	0.2	0.22	0.22	0.23	0.24	0.26	0.29	0.33
	Bronze	0.2	0.22	0.22	0.23	0.25	0.28	0.3	0.35
Copper & Hard Bronze		0.2	0.22	0.22	0.23	0.25	0.28	0.3	0.35
Cast Iron	Cast	0.17	0.19	0.2	0.21	0.23	0.25	0.27	0.33
	Ductile	0.17	0.19	0.2	0.21	0.23	0.25	0.27	0.3
Steel	<35 HRc	0.17	0.19	0.2	0.21	0.23	0.25	0.27	0.33
	>35HRc	0.14	0.16	0.17	0.18	0.2	0.23	0.24	0.3
	Tool STEEL	0.14	0.16	0.17	0.18	0.2	0.23	0.24	0.3
	Hard	0.1	0.12	0.12	0.13	0.15	0.18	0.19	0.25
Stainless Steel		0.14	0.16	0.17	0.18	0.2	0.23	0.24	0.3
High Temp Alloys	Soft	0.14	0.16	0.17	0.18	0.19	0.21	0.24	0.28
	Hard	0.13	0.14	0.15	0.16	0.16	0.18	0.21	0.25
Titanium		0.17	0.19	0.2	0.21	0.23	0.25	0.27	0.33

Material Removal Parameters

For proper finishing with a reamer, the correct amount of material must be left in the hole. If the hole is too close to the finish size, the reamer will tend to burnish the hole, and excessive tool wear will occur. If too much material is left, chips can clog the flutes of the reamer, resulting in a poor finish, poor size control, and possible tool breakage.

Series : C1RS, C1RR, C1RL		Diameter(mm)					
				>1.5 - 3.0	>3.0 - 6.0	>6.0 - 12.0	>12.0-25.0
Material	ISO	Examples	Vc	Feed per rev (mm/rev)			
Steels	P	Free Cutting Steels	45-70	0.035-0.100	0.070-0.175	0.100-0.280	0.175-0.550
		Alloyed Heat-treatable Steels	30-45	0.035-0.070	0.070-0.100	0.100-0.175	0.175-0.350
		Tool Steels 4140/a2/d2	12-30	0.020-0.035	0.035-0.070	0.070-0.100	0.100-0.175
Stainless Steels	M	Austenitic Stainless Steel (304,310)	27-45	0.035-0.070	0.070-0.100	0.100-0.175	0.175-0.350
		Austenitic Stainless Steel	A18-28	0.035-0.070	0.070-0.100	0.100-0.175	0.175-0.350
		Martensitic Stainless Steel	15-25	0.020-0.070	0.035-0.100	0.070-0.175	0.100-0.350
Special Alloys	S	Inconel 625/718	10-15	0.020-0.035	0.035-0.070	0.070-0.100	0.100-0.175
		Stellite/cobalt Chrome	7-12	0.020-0.035	0.035-0.070	0.070-0.100	0.100-0.175
		Titanium 6al-4v	7-12	0.020-0.070	0.035-0.100	0.070-0.175	0.100-0.350
Cast Iron	K	Gray Cast Iron A48 Class 20/G4000	35-60	0.020-0.070	0.035-0.100	0.070-0.175	0.100-0.350
		Malleable/Ductile Cast Iron A536/60-40-18	35-45	0.035-0.070	0.070-0.100	0.100-0.175	0.175-0.350
		Hard (Martensitic) Cast Iron	12-20	0.020-0.035	0.035-0.070	0.070-0.100	0.100-0.175
Non-Ferrous	N	Aluminium/Aluminium Alloys	150-300	0.035-0.100	0.070-0.175	0.100-0.280	0.175-0.550
		Brass/Bronze Free Ma-chining	75- 120	0.035-0.070	0.070-0.100	0.100-0.175	0.175-0.350
		Brass/Bronze (Hard)	45-75	0.035-0.070	0.070-0.100	0.100-0.175	0.175-0.350
		Magnesium/ Magnesium Alloys/Plastics Bakelite Plastic-Glass	110-220	0.035-0.100	0.070-0.175	0.100-0.280	0.175-0.550
		Copper/Hard Bronze	20-35	0.020-0.035	0.035-0.070	0.070-0.100	0.100-0.175
Hardened Steel	H	"Hardened Steels 23-32 HRc"	30-45	0.035-0.070	0.070-0.100	0.100-0.175	0.175-0.350
		"Hardened Steels 32-43 HRc"	10-30	0.020-0.035	0.035-0.070	0.070-0.100	0.100-0.175
		"Hardened Steels 43-52 HRc"	7-12	0.020-0.035	0.035-0.070	0.070-0.100	0.100-0.175

NOTE: These are just the Starting Parameters, you may vary the Speed and Feed depending upon other machining conditions.

High Performance End Mills

- Included in our product line are high performance end mills developed for specific applications.
- Newly developed Variable Helix Endmills (VHEM-series) is suited for machining Stainless steel, Titanium and NiCr Alloys and for High productivity machining in Alloy Steel machining.
- For hardened steel we have HP-3X & HP-4X series
- Our SUS-series is designed especially for Ortho manufacturers for machining stainless steel material like SS-316L.

General Purpose End Mills

In addition to High Performance End Mills we have complete family of standard carbide end mills designed for efficient general purpose milling of all steels, cast iron, aluminium, softer metals, non-ferrous materials etc. these fall under GP-0X & GP-1X group of end mills.

Benefits of Rohit End Mills

- Thousands of end mills in stock
- Over 40 different variants of end mills available
- Aggressive speeds and feeds to maximize MRR
- Standard, Stub, Long and Extended Reach Lengths are available
- Different coatings for different kind of application / material machining are suggested by our trained engineers
- Top of the notch Quality check Equipments (Zoller) to provide accurate tools with great quality
- Utilize our engineering experience to solve your milling trouble

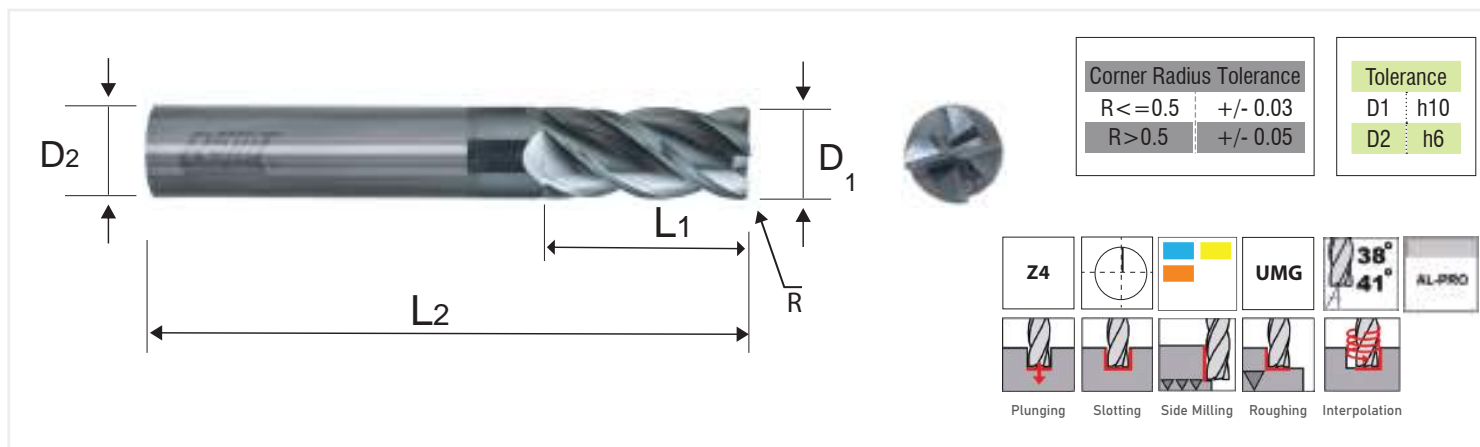
Series Group	Series No.	Page No
HP-VHEM*	330	79
	333	81
	334	83
HP-SUS*	222	87
	321	88
	322	90
HP-VHEM*	430	92
	433	94
HP-4X	401	96
	402	97
	406	98
HP-3X	301	100
	302	102
	304	103
	305	104
	306	106
	307	108
	308	109





Series Group	Series No.	Page No
GP-1X	201	110
	202	112
	204	113
	205	114
	206	115
	207	116
	208	117
	211	118
	212	119
	213	120
	215	121
	219	122

Series Group	Series No.	Page No
GP-0X	101	123
	102	124
	110	131
GP-0X (NON-Ferrous)	103	125
	104	126
	107	128
	108	129
	109	130
	112	132
	114	133
	118	134
	119	136



Features:

- Variable Lead Geometry & Unequal Indexing design for Chatter free milling operations
- High DOC for effective material removal at very high Speeds and Feeds
- Highly Effective in Trochoidal milling
- Improved Surface quality of Work Piece
- Capable of machining wide range of material like Alloy Steel, Stainless Steel and Exotic Materials like Titanium
- AL-PRO is an advanced coating for achieving higher tool life on difficult to machine material. It has remarkable wear resistance at lower speeds and feeds, as well as tremendous heat resistance at high speed

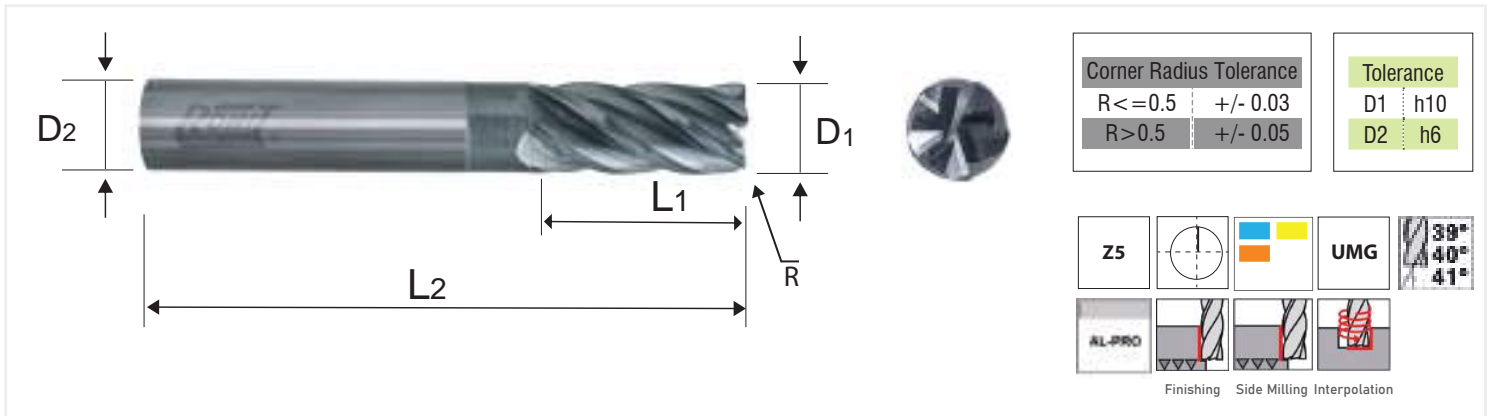
Item Code AL-PRO Coated	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)	Corner Radius (R)
CR35HVH000B3	4	10	54	6	R0.3
CR35HVH00135	4.5	12	50	6	R0.3
CR35HVH00143	5.5	12	50	6	R0.3
CR35HVH00010	6	12	63	6	R0.3
CR35HVH00028	8	19	63	8	R0.5
CR35HVH00036	10	22	72	10	R0.5
CR35HVH00044	12	26	80	12	R0.75
CR35HVH00085	14	26	80	14	R0.75
CR35HVH00051	16	32	92	16	R0.30
CR35HVH00093	16	32	92	16	R0.75
CR35HVH000A5	20	38	100	20	R0.75

Item Code AL-PRO Coated	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)	Corner Radius (R)
CX35HVH00071	1/4	1/2	2+1/2	1/4	R0.015
CX35HVH000C5	1/4	3/4	2+1/2	1/4	R0.015
CX35HVH000H4	5/16	13/16	2+1/2	5/16	R0.015
CX35HVH000E0	3/8	1	3	3/8	R0.015
CX35HVH000D2	1/2	1	3	1/2	R0.015
CX35HVH000J9	1/2	1+1/2	3+1/2	1/2	R0.015
CX35HVH00063	1/2	1	3	1/2	R0.03
CX35HVH000K7	1/2	1+1/2	3+1/2	1/2	R0.03
CX35HVH000L5	5/8	1+1/4	3+1/2	5/8	R0.015
CX35HVH000F8	5/8	1+1/4	3+1/2	5/8	R0.03
CX35HVH000M3	3/4	1+1/2	4	3/4	R0.015
CX35HVH000G6	3/4	1+1/2	4	3/4	R0.03



Carbon Steels BHN 180 to 225	Alloy Steels BHN 225 to 355	Prehardened Steels HRc 40 to 45	Austenitic Stainless Steel	Precipitation Hardened Stainless Steel	Titanium	HighTemp. Alloy	Grey Cast Iron	Ductile Cast Iron	Hardened Steels HRc 45 to 55	High Hardened Steels HRc 55 to 70	Aluminum	Aluminum Alloys	Plastic	Wood / MDF	Copper/Brass
1st	1st	1st	1st	1st	2nd	2nd	1st					2nd			

NOTE: FOR FEED & SPEED Rates, go to page no. PG-139



Features:

- Variable Lead Geometry & Unequal Indexing design for chatter free milling operations
- Excellent for Finishing operations where Ra Value required is less than 5
- High Feed High Speed with Chatter-free machining
- With 5-Flute Larger Core, which helps in Sturdy Machining and increased Productivity
- AL-PRO is an advanced coating for achieving higher tool life on difficult to machine material

Item Code AL-PRO Coated	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)	Corner Radius (R)
CR35HVH000P2	6	12	63	6	R0.3
CR35HVH000Q0	8	16	63	8	R0.5
CR35HVH000R8	10	22	72	10	R0.5
CR35HVH000S5	12	26	80	12	R0.75
CR35HVH000T3	16	32	92	16	R0.75
CR35HVH000U1	20	38	100	20	R0.75

Carbide HP 5-Flute Variable Helix End Mills AL-PRO Coated (Inch)

Item Code AL-PRO Coated	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)	Corner Radius (R)
CX35HVH000V3	1/4	3/4	2-1/2	1/4	R0.015
CX35HVH000W1	5/16	13/16	2-1/2	5/16	R0.015
CX35HVH000X8	3/8	1	3	3/8	R0.015
CX35HVH000Y6	1/2	1	3	1/2	R0.030
CX35HVH000Z4	5/8	1-1/4	3-1/2	5/8	R0.030
CX35HVH00105	3/4	1-1/2	4	3/4	R0.030

Unequal Spacing of End Teeth

for stable, vibration-free milling

Variable Lead

for efficient milling and suppressed vibration

Ideal Flute Shape

for smooth chip evacuation

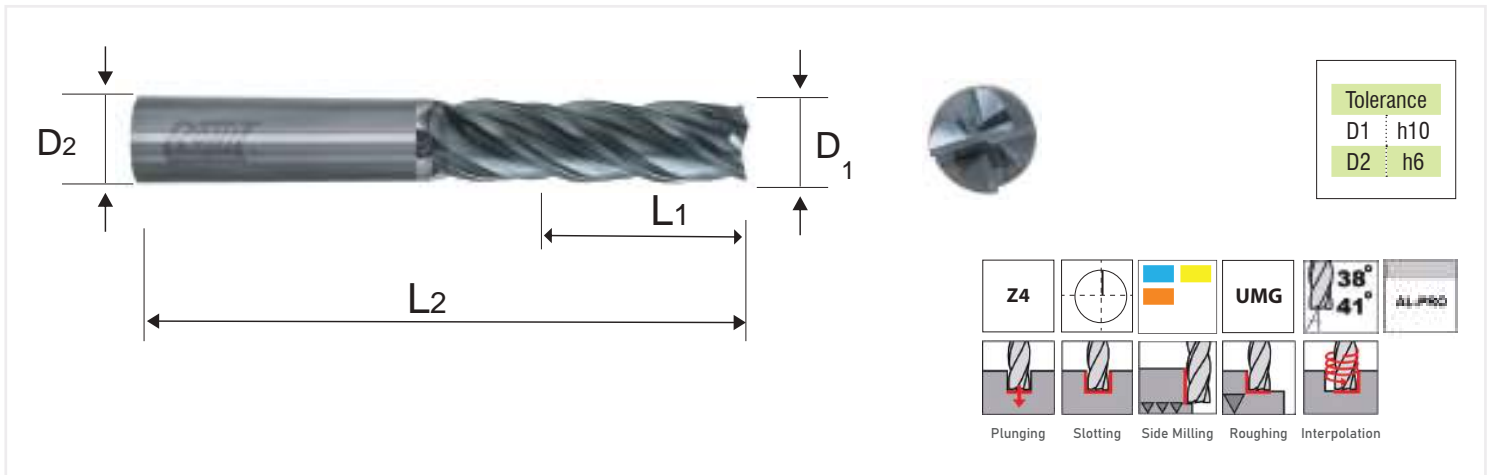
Web Taper

for increased rigidity and high efficient milling



Carbon Steels BHN 180 to 225	Alloy Steels BHN 225 to 355	Prehardened Steels HRc 40 to 45	Austenitic Stainless Steel	Precipitation Hardened Stainless Steel	Titanium	HighTemp. Alloy	Grey Cast Iron	Ductile Cast Iron	Hardened Steels HRc 45 to 55	High Hardened Steels HRc 55 to 70	Aluminum	Aluminum Alloys	Plastic	Wood / MDF	Copper/Brass
	1st	1st	1st	1st	1st	2nd			2nd	1st					

NOTE: FOR FEED & SPEED Rates, go to page no. PG-139



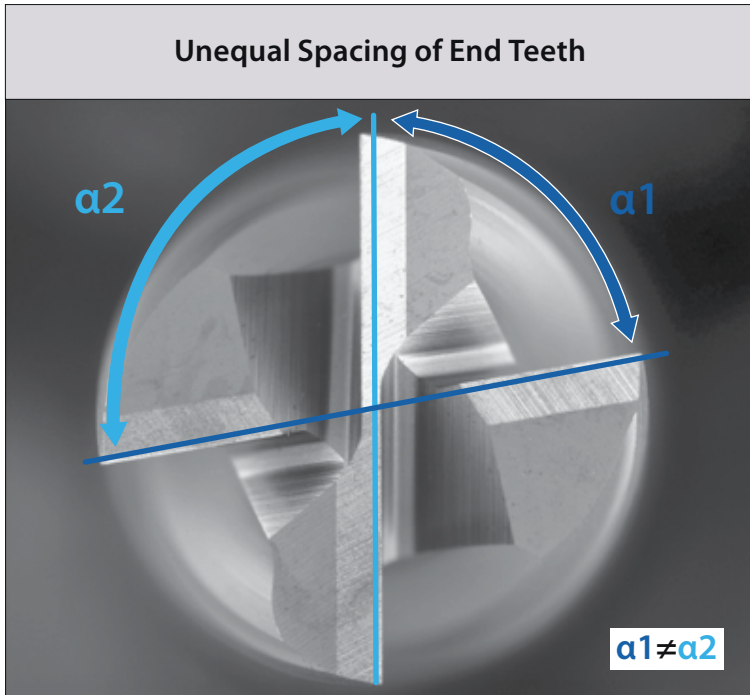
Features:

- Variable Lead Geometry with X-Flute & Unequal Indexing design for Chatter free milling operations
- Long Flute Lengths with Variable Helix helps in effective side milling and slotting application with higher depths
- High DOC for effective material removal at very high Speeds and Feeds
- Highly Effective in Trochoidal milling
- Capable of machining wide range of material like Alloy Steel, Stainless Steel and Exotic Materials like Titanium
- AL-PRO is an advanced coating for achieving higher tool life on difficult to machine material.

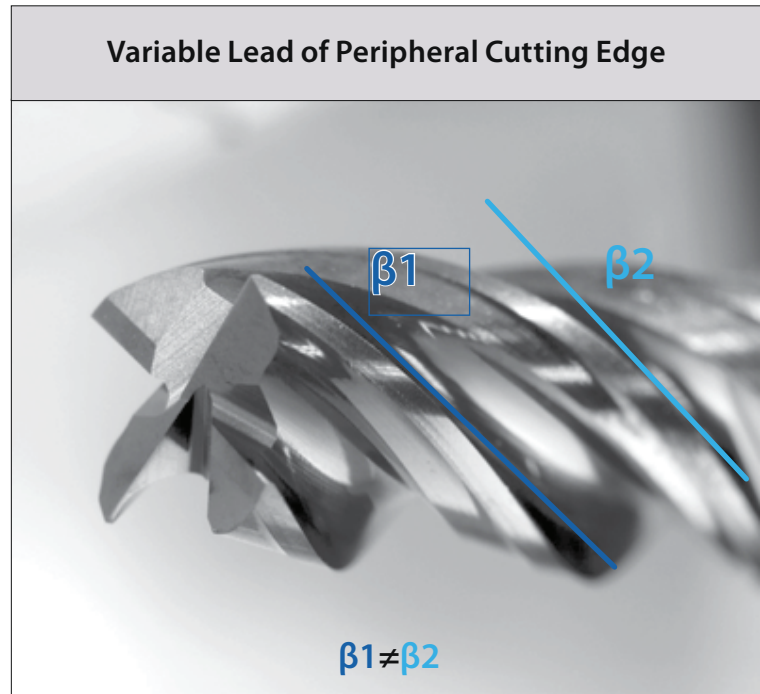
Ordering Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
334060050-A	6	16	50	6
334060060-A	6	20	60	6
334060075-A	6	25	75	6
334060100-A	6	30	100	6
334080060-A	8	20	60	8
334080075-A	8	30	75	8
334080100-A	8	40	100	8
334100075-A	10	30	75	10

Ordering Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
334100100-A	10	45	100	10
334120075-A	12	30	75	12
334120100-A	12	45	100	12
334140100-A	14	50	100	14
334160100-A	16	50	100	16
334180100-A	18	50	100	18
334200100-A	20	50	100	20

Unequal Spacing of End Teeth



Variable Lead of Peripheral Cutting Edge



Carbon Steels BHN 180 to 225	Alloy Steels BHN 225 to 355	Prehardened Steels HRc 40 to 45	Austenitic Stainless Steel	Precipitation Hardened Stainless Steel	Titanium	HighTemp. Alloy	Grey Cast Iron	Ductile Cast Iron	Hardened Steels HRc 45 to 55	High Hardened Steels HRc55 to 70	Aluminum	Aluminum Alloys	Plastic	Wood / MDF	Copper/Brass
1 st	1 st	1 st	1 st	1 st	2 nd	2 nd	1 st	2 nd				2 nd			

NOTE: This is Non-stock Item, ask your RIGPL representative for Delivery Period

FOR FEED & SPEED Rates, go to page no. PG-139

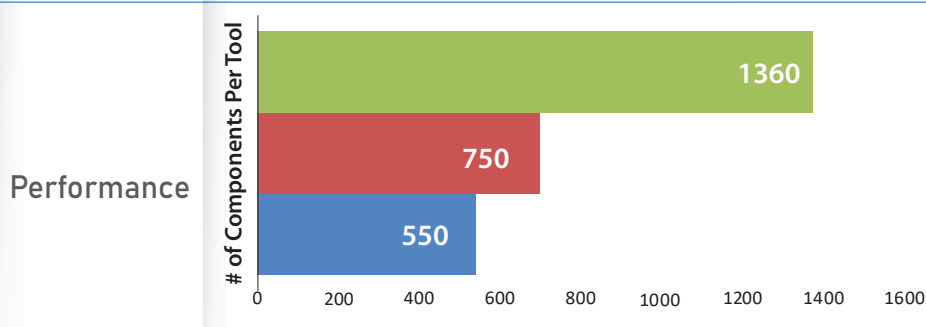
Description: S/C Rohit-3X AL-PRO VHEMAS

CR:0.5 FØ:10 FL:22 SØ:10 OAL:72 Z=4 SERIES C330

Work-Piece Image



Industry	Auto components	
Component	Gear K S Driven	
Cutting Conditions	Tool Diameter	10mm
	Cutting Speed	110m/min
	RPM	3500
	Feed (mm/tooth)	0.05
	Table Feed (mm/min)	700
	DOC	15mm
	Radial Cut	1mm
	Milling Type	Side Milling
Coolant	5% Mix Water Soluble	
Material	Alloy Steel EN8-D	
Hardness	240-290BHN	
Machine	VMC - Haas	



Summary	
Endmill	Life (in components)
ROHIT-330	1360
Competitor 2	750
Competitor 1	550
Improvement	81%

Result

More than 75% improvement in Life

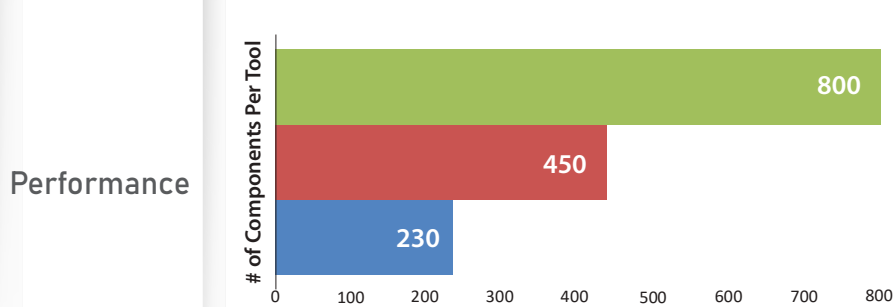
Description: S/C Rohit- 3X AL-PRO (VHEM)

CR:0.5 FØ:8 FL:16 SØ:8 OAL:63 Z=5 SERIES: C333

Work-Piece Image



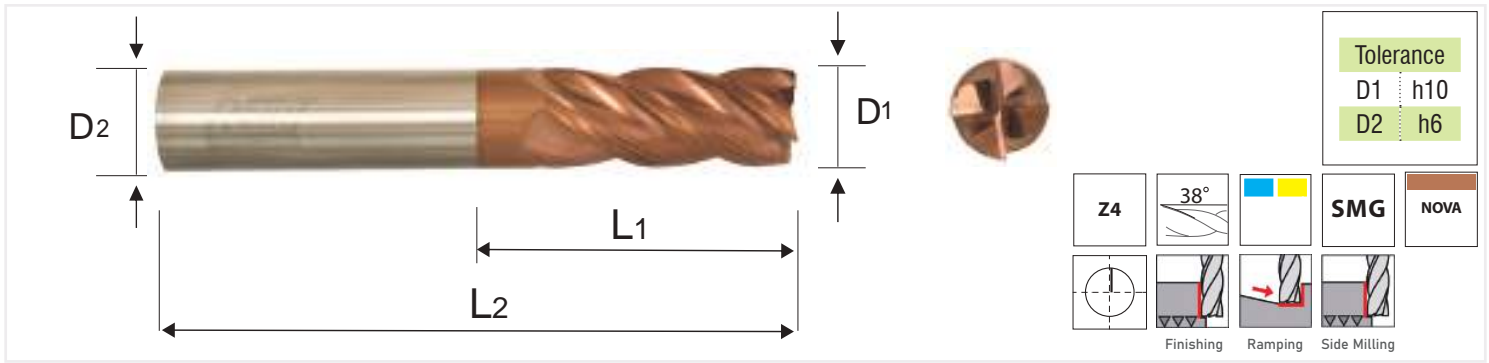
Industry	Auto components	
Component	Gear K S Driven	
Cutting Conditions	Tool Diameter	8mm
	Cutting Speed	125m/min
	RPM	5000
	Feed (mm/tooth)	0.075
	Table Feed (mm/min)	1500
	DOC	4mm
	Radial Cut	0.1mm
	Milling Type	Side Milling
Coolant	5% Mix Water Soluble	
Material	Forged Steel	
Hardness	20-25 HRc	
Machine	VMC	



Summary	
Endmill	Life (in components)
ROHIT-333	800
Competitor 2	450
Competitor 1	230
Improvement	78%

Result

More than 75% improvement in Life



Features:

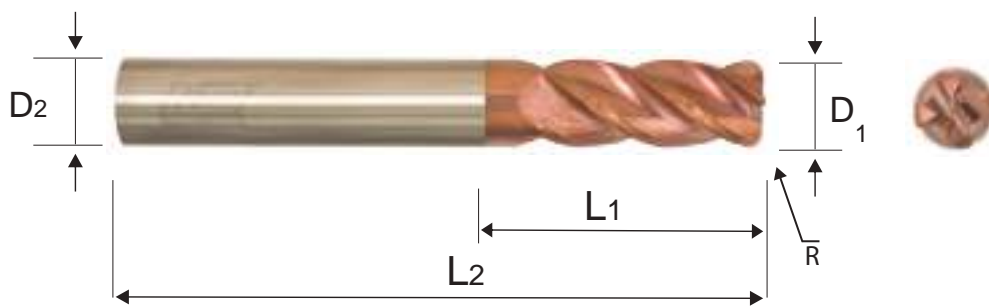
- Best suited for milling all types of Alloy Steel & Stainless Steel (SUS)
- High Wear Resistance NOVA coating
- Excellent performance in machining of Ortho Implants And Material like SS-316L
- Gives optimum performance on Finishing application with lower Ae (WOC) & High Feed

Item Code NOVA Coated	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR1AHSE00LH3	3.0	12	50	4.0
CR1AHSE00SL7	3.0	12	75	3.0
CR1AHSE00MR0	3.5	15	50	4.0
CR1AHSE00MS7	4.0	15	50	4.0
CR1AHSE00LJ8	4.0	16	50	6.0
CR1AHSE00MT5	4.0	25	75	4.0
CR1AHSE00MU3	4.5	15	50	4.5
CR1AHSE00MV1	4.5	25	75	4.5
CR1AHSE00PE5	5.0	16	50	5.0
CR1AHSE00MJ7	5.0	16	50	6.0
CR1AHSE00N37	5.5	16	50	5.5
CR1AHSE00MW9	5.5	25	75	5.5
CR1AHSE00MX6	5.5	35	100	5.5
CR1AHSE00LK6	6.0	16	50	6.0

Item Code NOVA Coated	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR1AHSE00MY4	6.0	20	60	6.0
CR1AHSE00LL4	6.0	25	75	6.0
CR1AHSE00SZ6	6.0	40	100	6.0
CR1AHSE00LM2	8.0	20	60	8.0
CR1AHSE00LN9	8.0	30	75	8.0
CR1AHSE00LP5	8.0	40	100	8.0
CR1AHSE00LQ3	10.0	30	75	10.0
CR1AHSE00LR1	10.0	40	100	10.0
CR1AHSE00LS8	12.0	30	75	12.0
CR1AHSE00LT6	12.0	40	100	12.0
CR1AHSE00LU4	14.0	40	100	14.0
CR1AHSE00LV2	16.0	50	100	16.0
CR1AHSE00LW0	20.0	50	100	20.0

Carbon Steels BHN 180 to 225	Alloy Steels BHN 225 to 355	Prehardened Steels HRc 40 to 45	Austenitic Stainless Steel	Precipitation Hardened Stainless Steel	Titanium	HighTemp. Alloy	Grey Cast Iron	Ductile Cast Iron	Hardened Steels HRc 45 to 55	High Hardened Steels HRc 55 to 70	Aluminum	Aluminum Alloys	Plastic	Wood / MDF	Copper/Brass
1st	1st	2nd	1st	2nd			1st	1st	2nd		2nd				

NOTE: The 222-series End Mills contain CR of 0.15-0.30mm to provide extra strength.
FOR FEED & SPEED Rates, go to page no. PG-141



Corner Radius Tolerance

R ≤ 0.5 +/- 0.03

R > 0.5 +/- 0.05

Tolerance

D1 h10

D2 h6

Z4



38°



UMG



Finishing

Slotting

Side Milling

Interpolation

Features:

- Best suited for milling all types of Alloy Steel & Stainless Steel (SUS)
- High Wear Resistance NOVA coating
- Excellent performance in machining of Ortho Implants And Material like SS-316L
- Gives optimum performance on Finishing application with lower Ae (WOC) & High Feed

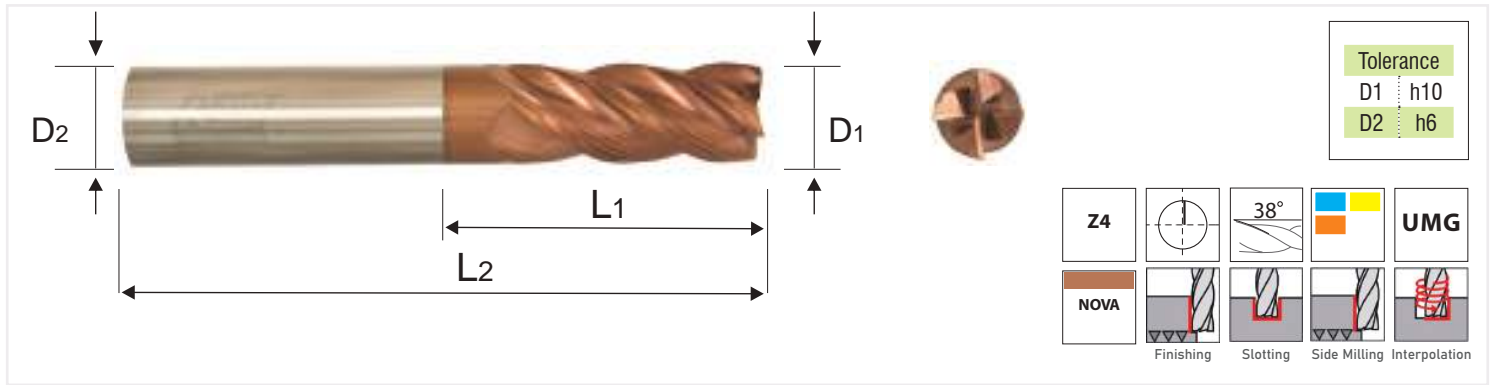
Item Code NOVA Coated	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)	Corner Radius(R)
CR3AHCR00G8	3	12	50	4	0.50
CR3AHCR00Z6	3	12	50	4	1.00
CR3AHCR0016	4	16	50	6	0.50
CR3AHCR00L7	4	16	50	6	1.00
CR3AHCR00F0	5	16	50	6	0.50
CR3AHCR00H6	5	16	50	6	1.00
CR3AHCR0024	6	16	50	6	0.50
CR3AHCR0032	6	25	75	6	0.50
CR3AHCR00K9	6	16	50	6	1.00
CR3AHCR00P8	8	20	60	8	0.50
CR3AHCR00N2	8	30	75	8	0.50
CR3AHCR0040	8	20	60	8	1.00
CR3AHCR0057	8	30	75	8	1.00
CR3AHCR0065	8	40	100	8	1.00
CR3AHCR00J1	10	30	75	10	0.50
CR3AHCR0099	10	30	75	10	1.00
CR3AHCR00D4	10	40	100	10	1.00
CR3AHCR0073	10	30	75	10	1.50
CR3AHCR0081	10	40	100	10	1.50
CR3AHCR00M5	12	30	75	12	0.50
CR3AHCR00B9	12	30	75	12	1.00
CR3AHCR00E2	12	40	100	12	1.00

Item Code NOVA Coated	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)	Corner Radius(R)
CR3AHCR00A1	12	30	75	12	1.50
CR3AHCR00C7	12	40	100	12	1.50
CR3AHCR00U7	14	40	100	14	2.00
CR3AHCR00Y8	16	40	100	16	1.00
CR3AHCR00V5	16	40	100	16	2.00
CR3AHCR00W3	18	40	100	18	2.00
321200100R2.0-N	20	50	100	20	2.00



Carbon Steels BHN 180 to 225	Alloy Steels BHN 225 to 355	Prehardened Steels HRC 40 to 45	Austenitic Stainless Steel	Precipitation Hardened Stainless Steel	Titanium	HighTemp. Alloy	Grey Cast Iron	Ductile Cast Iron	Hardened Steels HRc 45 to 55	High Hardened Steels HRc 55 TO 70	Aluminum	Aluminum Alloys	Plastic	Wood / MDF	Copper/Brass
1 st	1 st	1 st	1 st	1 st	2 nd	2 nd	1 st	1 st	2 nd	2 nd	1 st				

NOTE: FOR FEED & SPEED Rates, go to page no. PG-141



Features:

- Best suited for milling all types of Alloy Steel & Stainless Steel (SUS)
- High Wear Resistance NOVA coating
- Excellent performance in machining of Ortho Implants
- Gives optimum performance on Finishing application with lower Ae & High Feed

Item Code NOVA Coated	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR3AHSE00LZ9	3	12	50	4
CR3AHSE00M00	4	16	50	6
CR3AHSE00PF9	4	20	75	6
CR3AHSE00MK1	5	16	50	6
CR3AHSE00M18	6	16	50	6
CR3AHSE00M26	6	25	75	6
CR3AHSE00M34	8	20	60	8
CR3AHSE00M42	8	30	75	8
CR3AHSE00M59	8	40	100	8

Item Code NOVA Coated	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR3AHSE00M67	10	30	75	10
CR3AHSE00M75	10	40	100	10
CR3AHSE00M83	12	30	75	12
CR3AHSE00MA3	12	40	100	12
CR3AHSE00MB1	14	40	100	14
CR3AHSE00MD6	16	50	100	16
CR3AHSE00MM7	18	40	100	18
CR3AHSE00ME4	20	50	100	20

Carbon Steels BHN 180 to 225	Alloy Steels BHN 225 to 355	Prehardened Steels HRc 40 to 45	Austenitic Stainless Steel	Precipitation Hardened Stainless Steel	Titanium	HighTemp. Alloy	Grey Cast Iron	Ductile Cast Iron	Hardened Steels HRc 45 to 55	High Hardened Steels HRc 55 to 70	Aluminum	Aluminum Alloys	Plastic	Wood / MDF	Copper/Brass
1st	1st	1st	1st	1st	2nd	2nd	1st	1st	2nd	2nd		1st			

NOTE: FOR FEED & SPEED Rates, go to page no. PG-141

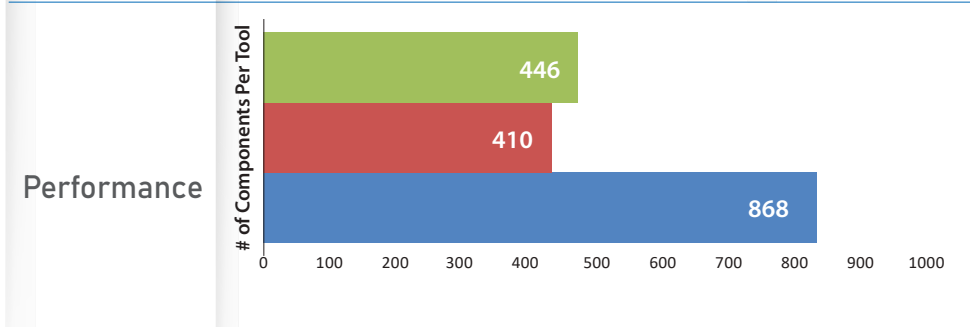
Description: S/C Rohit 3X Nova HP-Flat End Mill SUS

FØ:8 FL:20 SØ:8 OAL:60 Z=4 C322

Work-Piece Image

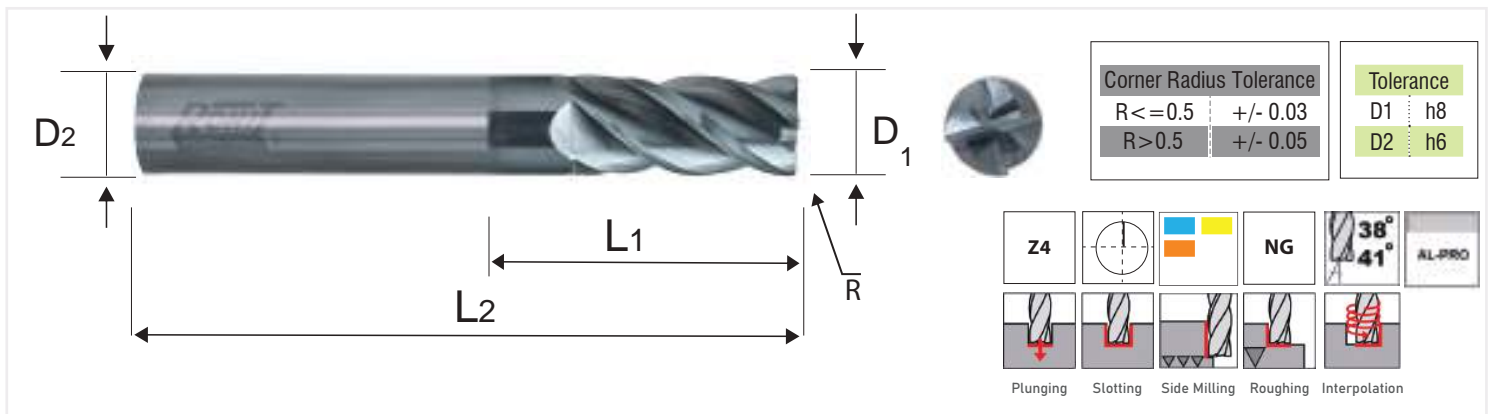


Industry	Automotive	
Component	Gear K S Driven	
Cutting Conditions	Tool Diameter	8mm
	Cutting Speed	100m/min
	RPM	4000
	Feed (mm/tooth)	0.025
	Table Feed (mm/min)	400
	DOC	4mm
	Radial Cut	-
Milling Type	Slotting	
Coolant	6% Mix Water Soluble	
Material	SCM 420M	
Hardness	320BHN	
Machine	Vertical Machining Centre HAAS	



Summary	
Endmill	Life (in components)
Competitor 1	446
Competitor 2	410
ROHIT-322	868
Improvement	95%

Result ~100% higher life than competitor and 30% reduction in cycle time



Features:

- Variable Lead Geometry & Unequal Indexing design for chatter free milling operations
- Upto 60% Higher Feed Rates
- Specially Designed for machining Exotic Materials like Titanium, Ni-Cr based Alloys
- High DOC for effective material removal at very high Speeds and Feeds
- Highly Effective in Trochoidal milling
- Nano Grain Carbide Ensures Longer Tool Life

Ordering Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)	Corner Radius(R)
430040054-A	4	10	54	6	R0.3
430060063-A	6	12	63	6	R0.3
430080063-A	8	19	63	8	R0.5
430100072-A	10	22	72	10	R0.5
430120080-A	12	26	80	12	R0.75
430140080-A	14	26	80	14	R0.75
430160092-A	16	32	92	16	R0.75

Ordering Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)	Corner Radius(R)
4304428702-1/2-A	1/4	3/4	2-1/2	1/4	R0.01"
4304249102-1/2-A	5/16	13/16	2-1/2	5/16	R0.015"
43044411003-A	3/8	1	3	3/8	R0.015"
43044228003-A	1/2	1	3	1/2	R0.03"
4304441303-1/2-A	5/8	1-1/4	3-1/2	5/8	R0.03"

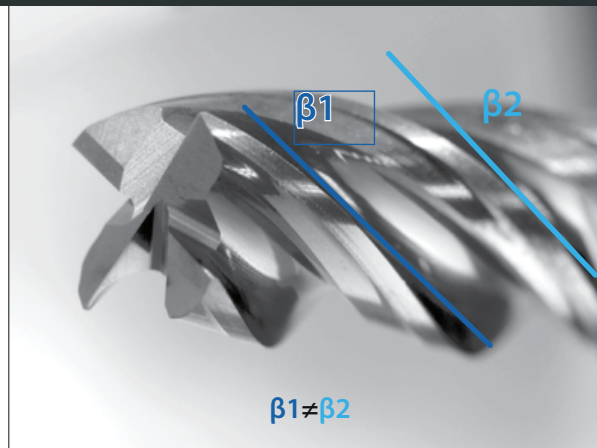
Do you have difficulty milling INCONEL 718 or Other Nickel Alloys? Here is your guide to solving milling problems for nickel alloys

Why Inconel behaves like that for machinist all over the world, Does this material has less affinity with the machinist, yes it does, but this love is not one sided but it is reciprocity in nature...



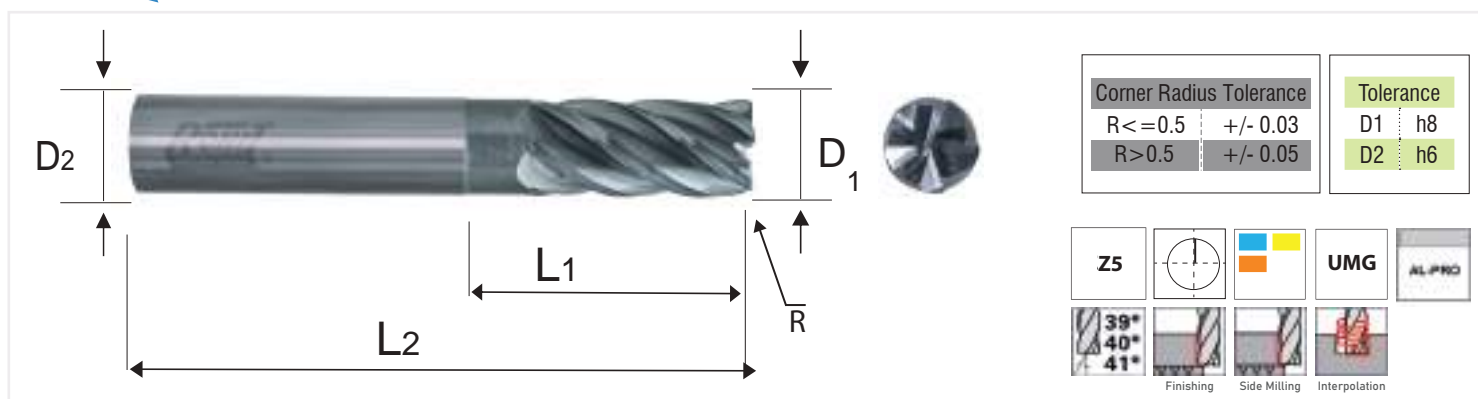
[Read more on rigpl.com/blog](http://rigpl.com/blog)

Variable Lead of Peripheral Cutting Edge



Carbon Steels BHN 180 to 225	Alloy Steels BHN 225 to 355	Prehardened Steels HRc 40 to 45	Austenitic Stainless Steel	Precipitation Hardened Stainless Steel	Titanium	HighTemp. Alloy	Grey Cast Iron	Ductile Cast Iron	Hardened Steels HRc 45 to 55	High Hardened Steels HRc 55 to 70	Aluminum	Aluminum Alloys	Plastic	Wood / MDF	Copper/Brass
	2 nd	1 st	2 nd	1 st	1 st	1 st				2 nd		2 nd			

NOTE: This is Non-stock Item, ask your RIGPL representative for Delivery Period
FOR FEED & SPEED Rates, go to page no. PG-143



Features:

- Variable Lead Geometry & Unequal Indexing design for chatter free milling operations on all types of Alloy Steel, Stainless Steel & Exotic Materials
- Excellent for Finishing operations where Ra Value required is less than 5
- Chatter-free machining
- Capable of machining wide range of Exotic material like Titanium & Nickle Chromium Alloys
- Nano Grain Carbide Ensures Longer Tool Life
- With 5-Flute Larger Core, which helps in Sturdy Machining and increased Productivity

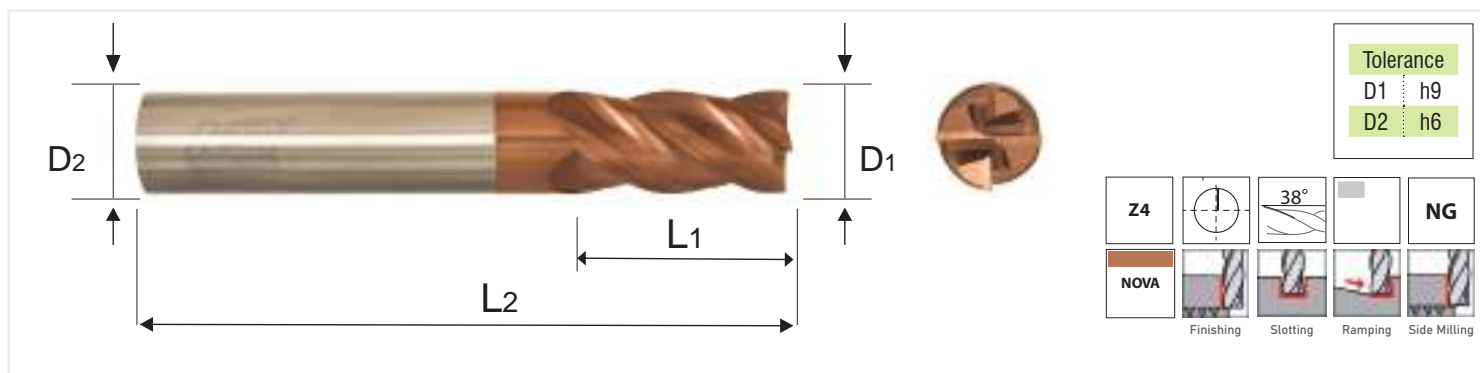
Ordering Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)	Corner Radius(R)
433060063-A	6	12	63	6	R0.3
433080063-A	8	16	63	8	R0.5
433100072-A	10	22	72	10	R0.5
433120080-A	12	26	80	12	R0.75
433140080-A	14	26	80	14	R0.75
433160092-A	16	32	92	16	R0.75

Ordering Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)	Corner Radius(R)
4334428702-1/2-A	1/4	3/4	2-1/2	1/4	R0.01"
4334249102-1/2-A	5/16	13/16	2-1/2	5/16	R0.015"
43344411003-A	3/8	1	3	3/8	R0.015"
43344228003-A	1/2	1	3	1/2	R0.03"
4334441303-1/2-A	5/8	1-1/4	3-1/2	5/8	R0.03"



Carbon Steels BHN 180 to 225	Alloy Steels BHN 225 to 355	Prehardened Steels HRC 40 to 45	Austenitic Stainless Steel	Precipitation Hardened Stainless Steel	Titanium	HighTemp. Alloy	Grey Cast Iron	Ductile Cast Iron	Hardened Steels HRC 45 to 55	High Hardened Steels HRC 55 to 70	Aluminum	Aluminum Alloys	Plastic	Wood / MDF	Copper/Brass
	2 nd	1 st	2 nd	1 st	1 st	1 st				2 nd					

NOTE: This is Non-stock Item, ask your RIGPL representative for Delivery Period
FOR FEED & SPEED Rates, go to page no. PG-143

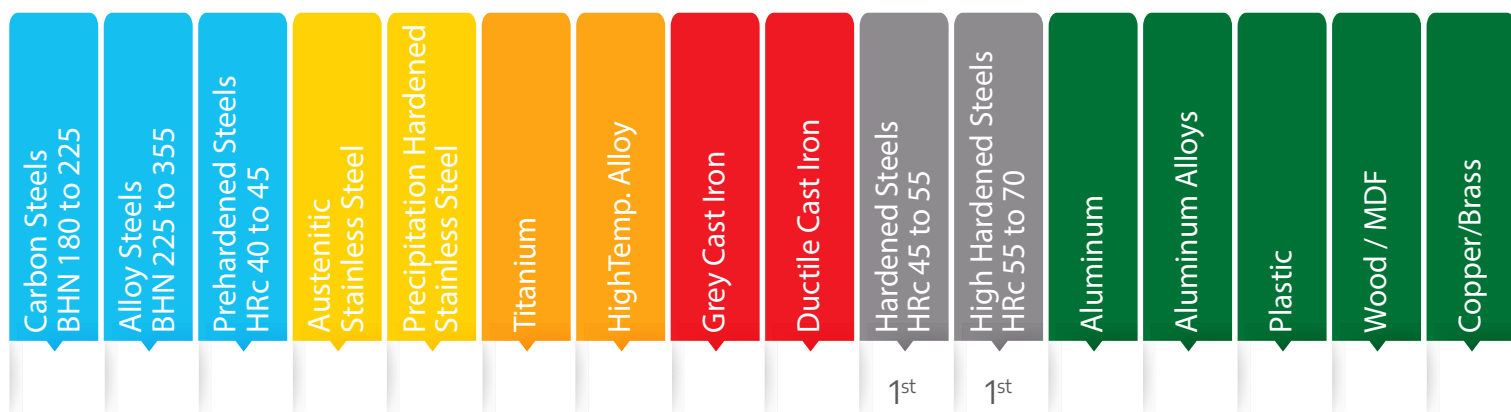


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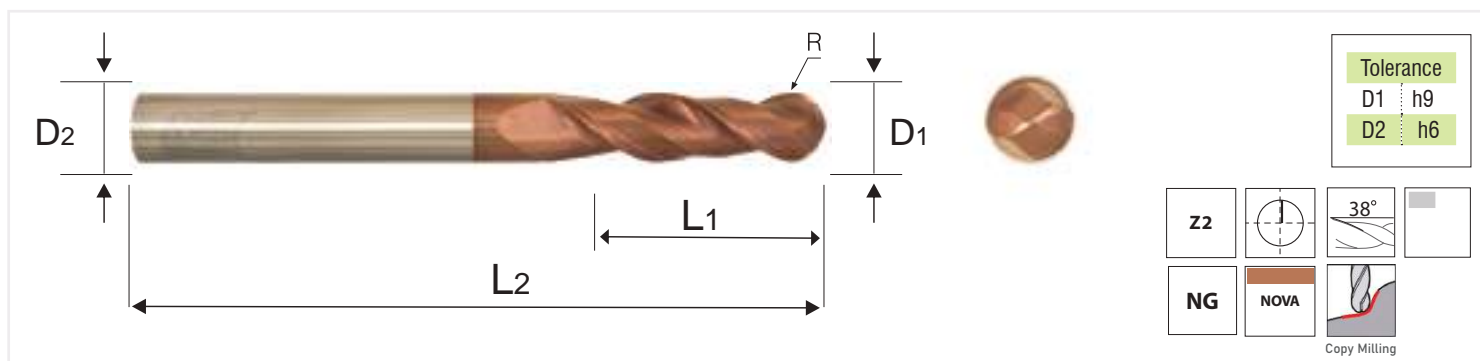
- High Performance Carbide End Mills for Die-Mold Industry developed at RIGPL.
- ~ 2-Times Cutting Tool life is achieved in comparison to 301 Series Carbide End mills.
- ~ 2-Times Cutting Parameters are achieved in comparison to 301 Series Carbide End mills.
- 4-Flute Carbide End Mills manufactured from NG (Nano-Grain) carbide
- Solid Carbide Cutting Tools for milling up to 65-HRc hardened die steel & tool steel like D2, D3, H13 etc.

Item Code NOVA Coated	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR4AHSE00T43	1	2	50	4
CR4AHSE00T68	1.5	3	50	4
CR4AHSE00T50	2	4	50	4
CR4AHSE00T76	2.5	6	50	4
CR49HSE00JU8	3	12	50	4
CR49HSE00JV6	4	12	50	4
CR49HSE00JW4	4	20	75	4
CR49HSE00JX1	6	16	50	6

Item Code NOVA Coated	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR49HSE00JY9	6	25	75	6
CR4AHSE00ML7	8	20	60	8
CR49HSE00JZ7	8	25	75	8
CR49HSE00K08	8	30	100	8
CR49HSE00K16	10	25	75	10
CR49HSE00K24	10	40	100	10
CR49HSE00K32	12	25	75	12
CR49HSE00K40	12	40	100	12



NOTE: FOR FEED & SPEED Rates, go to page no. PG-144



Features:

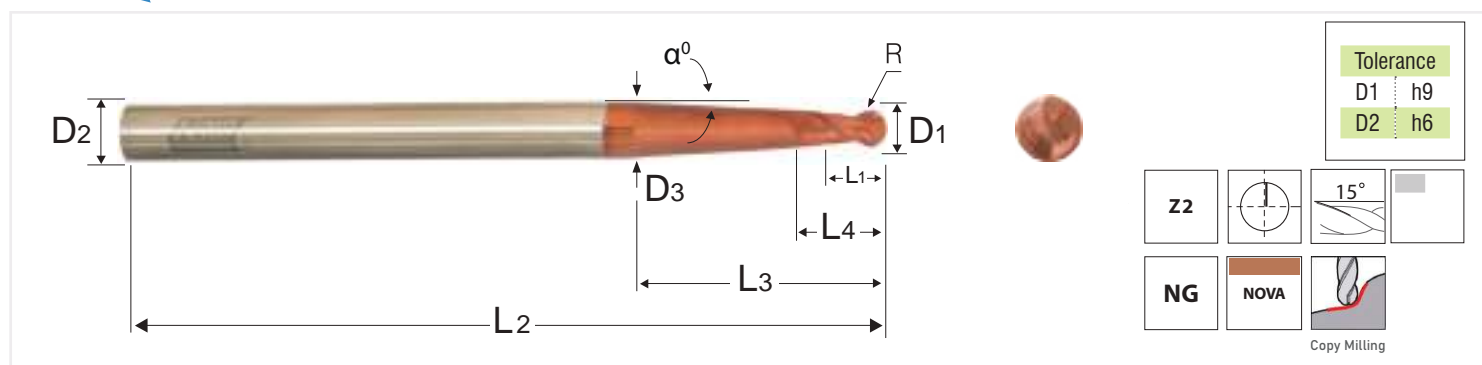
- High Performance Carbide Ball Nose for Die-Mold Industry developed at RIGPL.
- ~ 2-Times Cutting Parameters are achieved in comparison to 302/304 Series Ball Nose End mills
- 2-Flute Carbide Ball Nose End Mills manufactured from NG (Nano-Grain) carbide
- ~ 2-Times Cutting Tool life is achieved in comparison to 302/304 Series Carbide Ball Nose
- Ball Nose End Mills for milling up to 65-HRc hardened die steel & tool steel like D2, D3, H13 etc.

Item Code NOVA Coated	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR4AHBE00FV9	1	2	50	4
CR4AHBE00FX4	1.5	3	50	4
CR4AHBE00FW7	2	4	50	4
CR4AHBE00FY2	2.5	6	50	4
CR49HBE00DE6	3	12	50	4
CR49HBE00DF4	4	12	50	4
CR49HBE00DG2	4	20	75	4
CR49HBE00DH0	6	16	50	6

Item Code NOVA Coated	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR49HBE00DJ5	6	25	75	6
CR4AHBE00FZ0	8	20	60	8
CR49HBE00DK3	8	25	75	8
CR49HBE00DL1	8	30	100	8
CR49HBE00DM9	10	25	75	10
CR49HBE00DN6	10	40	100	10
CR49HBE00DP2	12	25	75	12
CR49HBE00DQ0	12	40	100	12

Carbon Steels BHN 180 to 225	Alloy Steels BHN 225 to 355	Prehardened Steels HRc 40 to 45	Austenitic Stainless Steel	Precipitation Hardened Stainless Steel	Titanium	HighTemp. Alloy	Grey Cast Iron	Ductile Cast Iron	Hardened Steels HRc 45 to 55	High Hardened Steels HRc 55 to 70	Aluminum	Aluminum Alloys	Plastic	Wood / MDF	Copper/Brass
		1 st	2 nd	1 st	1 st	1 st			1 st	1 st					

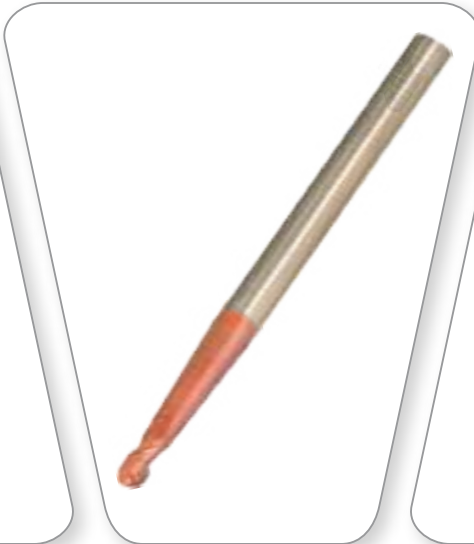
NOTE: FOR FEED & SPEED Rates, go to page no. PG-144



Features:

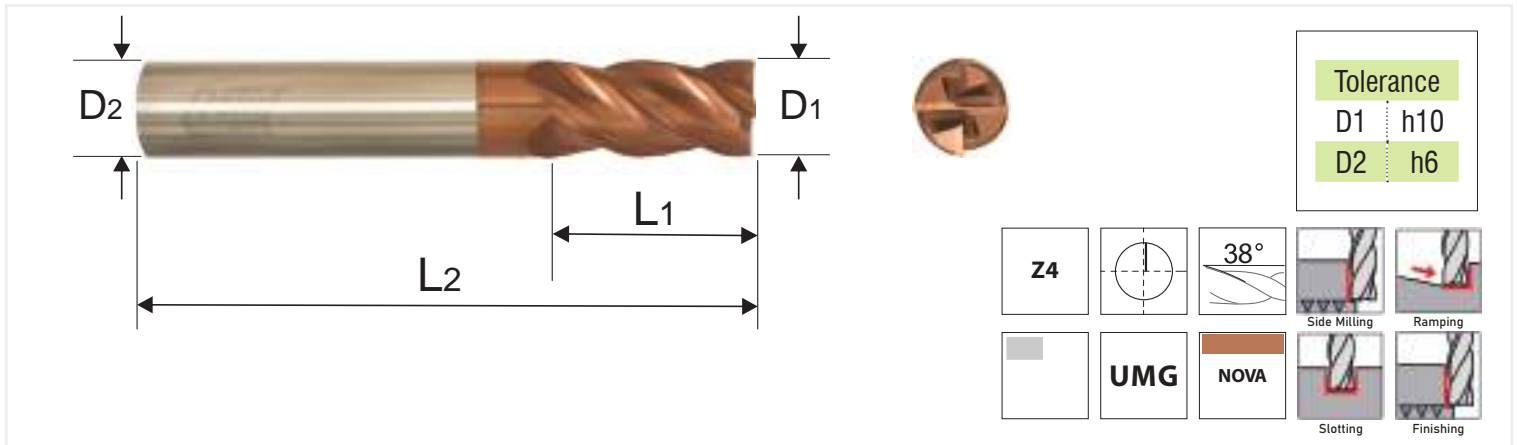
- NOVA coating which work at temperature upto ~1500 deg C
- Suitable for machining Hardened dies & tool steel material upto 65 HRC
- Higher Feeds & Reduced cycle time
- Long neck design for deep machining near walls with LESS Chatter
- Increased Tool Strength and Reduced Tool Deflection

Ordering Code	R	Flute Dia(D1)	Flute Len(L1)	L4	Reach Len(L3)	Overall Len(L2)	Shank Dia(D2)	Neck Dia(D3)	Neck Taper Angle(α°)
40602006006-N	1	2	4	6	23	60	6	2.9	1°30'
40602006006-N	1	2	4	6	23	60	6	5	5°
40602008006-N	1	2	4	6	41	80	6	5.7	3°
40603007506-N	1.5	3	6	8	32	75	6	5.6	3°
40603009006-N	1.5	3	6	8	52	90	6	5.3	1°30'
40604007506-N	2	4	8	10	28	75	6	6	3°
40604009006-N	2	4	8	10	49	90	6	6	1°30'
40605008008-N	2.5	5	10	12	41	80	8	8	3°
40605010008-N	2.5	5	10	12	51	100	8	7	1°30'
40606008008-N	3	6	12	15	34	80	8	8	3°
40606010008-N	3	6	12	15	53	100	8	8	1°30'
40608008010-N	4	8	14	17	36	80	10	10	3°
40608010010-N	4	8	14	17	55	100	10	10	1°30'
40610008012-N	5	10	18	21	40	80	12	12	3°
40610010012-N	5	10	18	21	59	100	12	12	1°30'
40612011016-N	6	12	22	25	63	110	16	16	3°
40612013016-N	6	12	22	25	83	130	16	15	1°30'



Carbon Steels BHN 180 to 225	Alloy Steels BHN 225 to 355	Prehardened Steels HRc 40 to 45	Austenitic Stainless Steel	Precipitation Hardened Stainless Steel	Titanium	HighTemp. Alloy	Grey Cast Iron	Ductile Cast Iron	Hardened Steels HRc 45 to 55	High Hardened Steels HRc 55 to 70	Aluminum	Aluminum Alloys	Plastic	Wood / MDF	Copper/Brass
		1st	2nd	1st	1st	1st			1st	1st					

NOTE: This is Non-stock Item, ask your RIGPL representative for Delivery Period
FOR FEED & SPEED Rates, go to page no. PG-144



Features:

- High Wear Resistance NOVA coating
- Excellent for machining Hardened dies & tool steel material ranging from 55 ~ 60 HRC
- Specially designed for Chatter free machining
- Rigid Flute Design helps in Side Milling operations with higher WOC

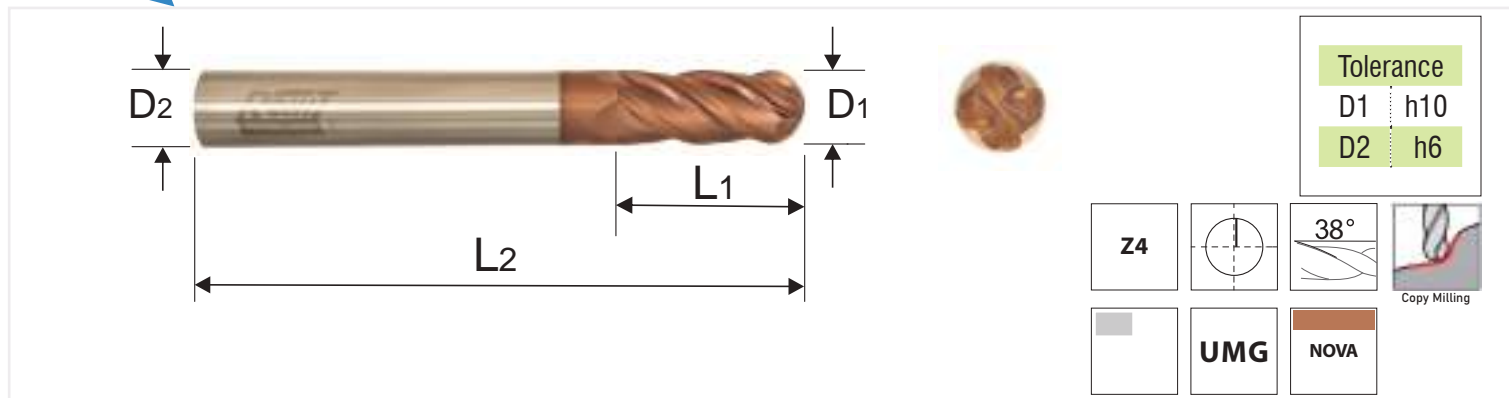
Item Code (NOVA Coated)	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR3AHSE00PA0	1.0	3	50	4
CR3AHSE00PB8	1.5	3	50	4
CR3AHSE00PC6	2.0	6	50	4
CR3AHSE00PD3	2.5	8	50	4
CR33HSE003A3	3.0	15	50	3
CR33HSE003C9	3.0	20	75	3
CR33HSE00FY1	3.0	25	100	3
CR33HSE003D6	4.0	14	50	4
CR33HSE003F2	4.0	20	75	4
CR33HSE00FN5	4.0	25	100	4
CR33HSE00HV6	4.0	50	150	4
CR33HSE003G0	5.0	16	50	5
CR33HSE003H8	5.0	20	75	5
CR33HSE00HH7	5.0	25	100	5
CR33HSE003J3	6.0	16	50	6
CR33HSE003K1	6.0	25	75	6
CR33HSE003L9	6.0	30	100	6
CR33HSE00FP1	6.0	50	150	6

Item Code (NOVA Coated)	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR33HSE003M7	8.0	20	60	8
CR33HSE003N4	8.0	25	75	8
CR33HSE00G59	8.0	30	100	8
CR33HSE003P0	8.0	50	150	8
CR33HSE003R6	10.0	25	75	10
CR33HSE003S3	10.0	40	100	10
CR33HSE003T1	10.0	60	150	10
CR3AHSE00PH5	10.0	60	200	10
CR33HSE00CP4	12.0	25	75	12
CR33HSE003U9	12.0	40	100	12
CR33HSE003V7	12.0	60	150	12
CR3AHSE00T86	12.0	60	200	12
CR33HSE00L54	14.0	40	100	14
CR33HSE003X2	16.0	40	100	16
CR33HSE00HT0	16.0	60	150	16
CR33HSE00L47	20.0	40	100	20
CR3AHSE00R39	20.0	60	150	20



Carbon Steels BHN 180 to 225	Alloy Steels BHN 225 to 355	Pre-hardened Steels HRc 40 to 45	Austenitic Stainless Steel	Precipitation Hardened Stainless Steel	Titanium	HighTemp. Alloy	Grey Cast Iron	Ductile Cast Iron	Hardened Steels HRc 45 to 55	High Hardened Steels HRc 55 to 70	Aluminum	Aluminum Alloys	Plastic	Wood / MDF	Copper / Brass
		2 nd	2 nd	2 nd					1 st	2 nd					

NOTE: FOR FEED & SPEED Rates, go to page no. PG-145



Features:

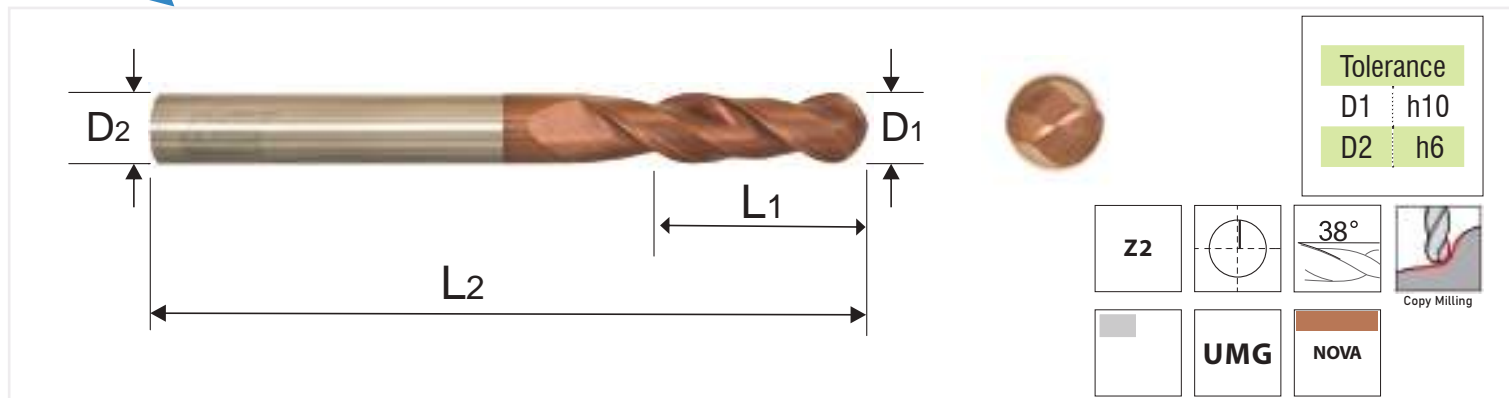
- High Wear Resistance NOVA coating
- Excellent for machining Hardened dies & tool steel material ranging from 55 ~ 60 HRc
- Specially designed tools to provide effective material removal and higher surface finish of Moulds
- Also recommended for machining Stainless Steel material

Item Code (NOVA Coated)	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR33HBE00364	3.0	15	50	3
CR33HBE00AM0	3.0	20	75	3
CR33HBE00BV9	4.0	14	50	4
CR33HBE00AN7	4.0	20	75	4
CR33HBE00AY3	4.0	25	100	4
CR33HBE00C50	5.0	16	50	5
CR33HBE00BU1	5.0	20	75	5
CR33HBE00DX2	5.0	25	100	5
CR33HBE00BW7	6.0	16	50	6
CR33HBE00372	6.0	25	75	6
CR33HBE00BB3	6.0	30	100	6
CR33HBE00CA4	6.0	50	150	6

Item Code (NOVA Coated)	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR33HBE00C92	8.0	20	60	8
CR33HBE00380	8.0	25	75	8
CR33HBE00B36	8.0	30	100	8
CR33HBE00C84	8.0	50	150	8
CR33HBE00BY2	10.0	25	75	10
CR33HBE00398	10.0	40	100	10
CR33HBE00B44	10.0	60	150	10
CR33HBE00AH1	12.0	25	75	12
CR33HBE00CB2	12.0	40	100	12
CR33HBE00CC0	12.0	60	150	12
CR33HBE003A0	16.0	40	100	16

Carbon Steels BHN 180 to 225	Alloy Steels BHN 225 to 355	Pre-hardened Steels HRc 40 to 45	Austenitic Stainless Steel	Precipitation Hardened Stainless Steel	Titanium	HighTemp. Alloy	Grey Cast Iron	Ductile Cast Iron	Hardened Steels HRc 45 to 55	High Hardened Steels HRc 55 to 70	Aluminum	Aluminum Alloys	Plastic	Wood / MDF	Copper / Brass
1 st	1 st	1 st	2 nd				1 st	2 nd							

NOTE: FOR FEED & SPEED Rates, go to page no. PG-147



Features:

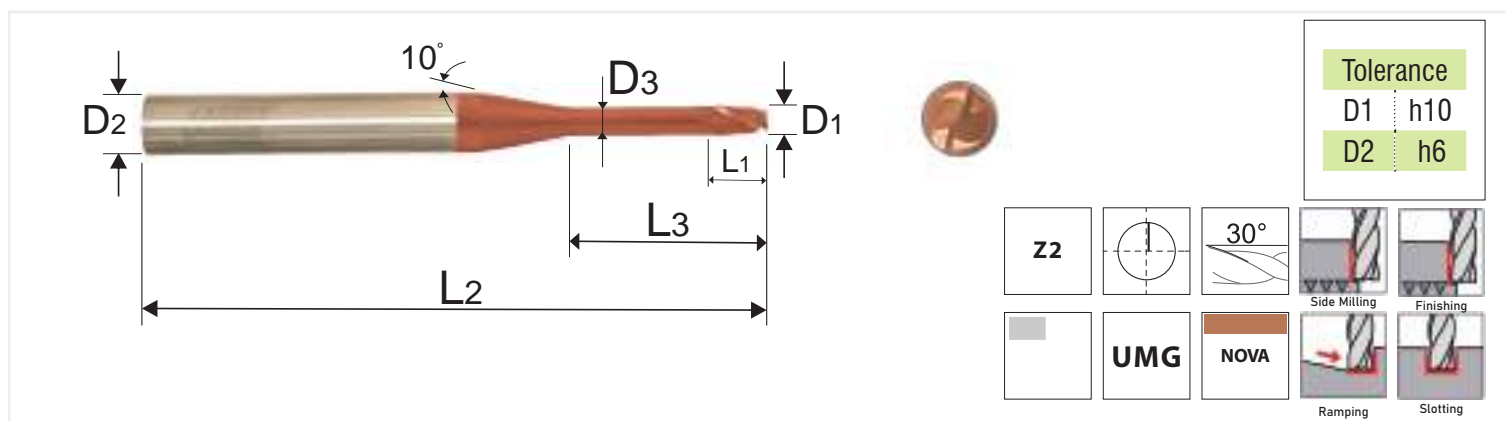
- High Wear Resistance NOVA coating
- Excellent for machining Hardened dies & tool steel material ranging from 55 ~ 60HRc
- Specially designed tools to provide effective material removal and higher surface finish of Moulds

Item Code (NOVA Coated)	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR33HBE008R8	1.0	3	50	4
CR3AHBE00E39	1.5	3	50	4
CR3AHBE00E47	2.0	4	50	4
CR3AHBE00E54	2.5	5	50	4
CR33HBE00BR8	3.0	15	50	3
CR33HBE00AT4	3.0	20	75	3
CR33HBE00B51	3.0	25	100	3
CR33HBE00315	4.0	14	50	4
CR33HBE00AU2	4.0	20	75	4
CR33HBE00B69	4.0	25	100	4
CR33HBE00E09	5.0	16	50	5
CR33HBE00C43	5.0	20	75	5
CR33HBE00B93	6.0	16	50	6

Item Code (NOVA Coated)	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR33HBE00323	6.0	25	75	6
CR33HBE00331	6.0	30	100	6
CR33HBE00BX4	6.0	50	150	6
CR33HBE00BA5	8.0	20	60	8
CR33HBE00BH0	8.0	25	75	8
CR33HBE00B85	8.0	30	100	8
CR33HBE00349	8.0	50	150	8
CR33HBE00356	10.0	25	75	10
CR33HBE00B77	10.0	40	100	10
CR33HBE009M8	10.0	60	150	10
CR33HBE009N5	12.0	25	75	12
CR33HBE00BP2	12.0	40	100	12
CR33HBE009Q9	12.0	60	150	12

Carbon Steels BHN 180 to 225	Alloy Steels BHN 225 to 355	Pre-hardened Steels HRc 40 to 45	Austenitic Stainless Steel	Precipitation Hardened Stainless Steel	Titanium	HighTemp. Alloy	Grey Cast Iron	Ductile Cast Iron	Hardened Steels HRc 45 to 55	High Hardened Steels HRc 55 to 70	Aluminum	Aluminum Alloys	Plastic	Wood / MDF	Copper / Brass
		2 nd	1 st	2 nd					1 st	2 nd					

NOTE: FOR FEED & SPEED Rates, go to page no. PG-147

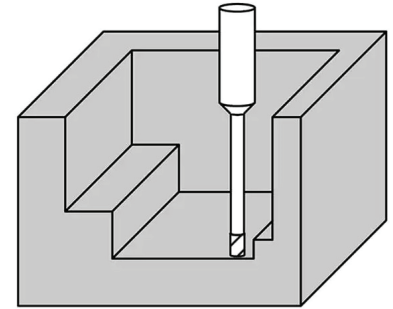


Features:

- For 3-D milling in Dies and Moulds for deep reach applications
- Re-inforced shank to provide High stability
- High Wear Resistance NOVA coating
- Long neck design for Deep Machining near walls
- 4-Flute above Dia 2mm can be available on Special request

Item Code (NOVA Coated)	Flute Dia (D1)	Flute Len (L1)	Overall Len (L2)	Shank Dia (D2)	Reach Len (L3)	Neck Dia (D3)
CR3AHSE00QW1	1.0	2.0	50	4	6	0.95
CR3AHSE00QX8	1.0	2.0	50	4	10	0.95
CR3AHSE00PN1	1.5	2.5	50	4	6	1.45
CR3AHSE00PP7	1.5	2.5	50	4	10	1.45
CR3AHSE00QY6	1.5	2.5	50	4	20	1.45
CR3AHSE00PQ5	2.0	3.0	50	4	8	1.95
CR3AHSE00PR3	2.0	3.0	50	4	12	1.95
CR3AHSE00PS0	2.0	3.0	50	4	16	1.95
CR3AHSE00PT8	2.0	3.0	50	4	20	1.95
CR3AHSE00PU6	2.5	4.0	50	4	8	2.40
CR3AHSE00PV4	2.5	4.0	50	4	12	2.40
CR3AHSE00PW2	2.5	4.0	50	4	16	2.40
CR3AHSE00PX9	2.5	4.0	50	4	20	2.40
CR3AHSE00PY7	3.0	5.0	50	6	8	2.85
CR3AHSE00PZ5	3.0	5.0	50	6	12	2.85
CR3AHSE00Q06	3.0	5.0	60	6	16	2.85
CR3AHSE00Q14	3.0	5.0	60	6	20	2.85
CR3AHSE00Q22	3.0	5.0	75	6	25	2.85

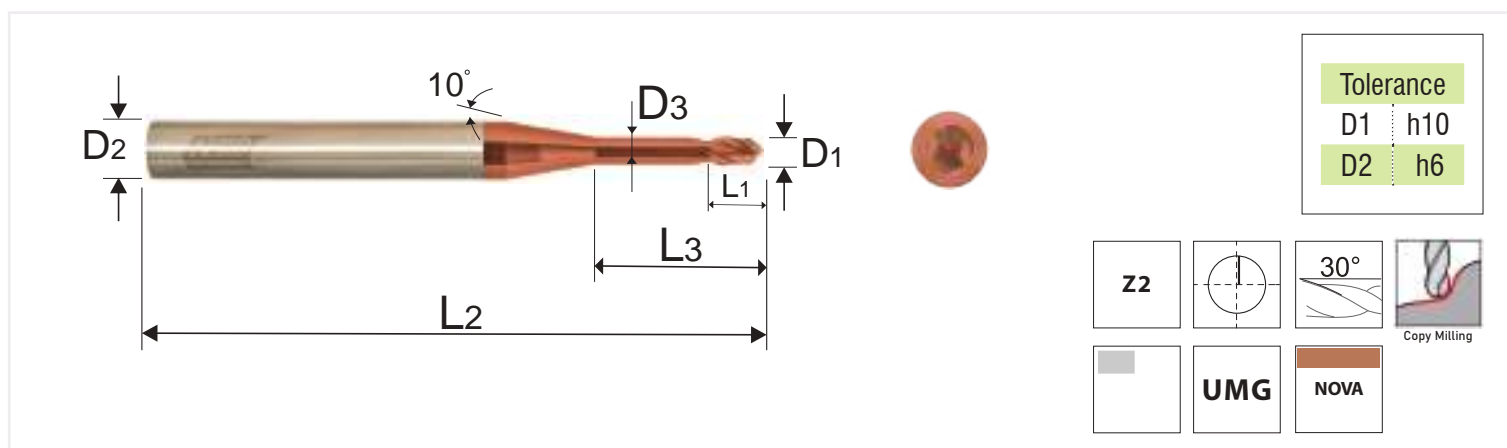
Item Code (NOVA Coated)	Flute Dia (D1)	Flute Len (L1)	Overall Len (L2)	Shank Dia (D2)	Reach Len (L3)	Neck Dia (D3)
CR3AHSE00Q30	4.0	6.0	50	6	12	3.85
CR3AHSE00Q48	4.0	6.0	60	6	16	3.85
CR3AHSE00Q55	4.0	6.0	75	6	20	3.85
CR3AHSE00Q63	4.0	6.0	75	6	25	3.85
CR3AHSE00Q71	4.0	6.0	75	6	30	3.85
CR3AHSE00Q89	4.0	6.0	75	6	35	3.85



In-Depth machining with 305 and 306 series Rib Endmills & Ballnose helps in Effective machining and less chances of Tool breakage

Carbon Steels BHN 180 to 225	Alloy Steels BHN 225 to 355	Pre-hardened Steels HRc 40 to 45	Austenitic Stainless Steel	Precipitation Hardened Stainless Steel	Titanium	HighTemp. Alloy	Grey Cast Iron	Ductile Cast Iron	Hardened Steels HRc 45 to 55	High Hardened Steels HRc 55 to 70	Aluminum	Aluminum Alloys	Plastic	Wood / MDF	Copper / Brass
1 st	1 st	1 st	1 st	1 st					1 st	2 nd		1 st			

NOTE: FOR FEED & SPEED Rates, go to page no. PG-145

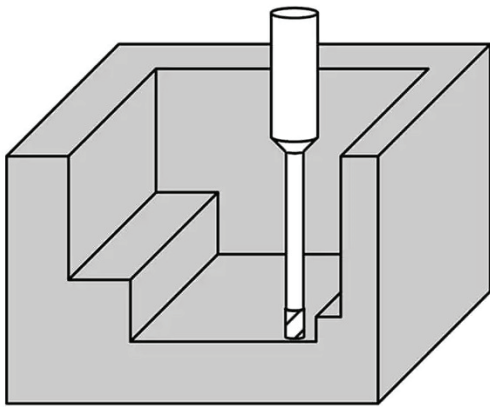


Features:

- For 3-D milling in Dies and Moulds for deep reach applications
- Re-inforced shank to provide High stability
- High Wear Resistance NOVA coating
- Specially designed Ballnose with Long neck for Deep Machining of Moulds with Higher Accuracy
- 4 Flute Ballnose above dia 2mm can be made on Special request

Item Code (NOVA Coated)	Flute Dia (D1)	Flute Len (L1)	Overall Len (L2)	Shank Dia (D2)	Reach Len (L3)	Neck Dia (D3)
CR3AHBE00EV2	1.0	2.0	50	4	6	0.95
CR3AHBE00EW0	1.0	2.0	50	4	10	0.95
CR3AHBE00E88	1.5	2.5	50	4	6	1.45
CR3AHBE00E96	1.5	2.5	50	4	10	1.45
CR3AHBE00EX7	1.5	2.5	50	4	20	1.45
CR3AHBE00EA8	2.0	3.0	50	4	8	1.95
CR3AHBE00EB6	2.0	3.0	50	4	12	1.95
CR3AHBE00EC4	2.0	3.0	50	4	16	1.95
CR3AHBE00ED1	2.0	3.0	50	4	20	1.95
CR3AHBE00EE9	2.5	4.0	50	4	8	2.40
CR3AHBE00EF7	2.5	4.0	50	4	12	2.40
CR3AHBE00EG5	2.5	4.0	50	4	16	2.40
CR3AHBE00EH3	2.5	4.0	50	4	20	2.40
CR3AHBE00EJ8	3.0	5.0	50	6	8	2.85
CR3AHBE00EK6	3.0	5.0	50	6	12	2.85
CR3AHBE00EL4	3.0	5.0	60	6	16	2.85
CR3AHBE00EM2	3.0	5.0	60	6	20	2.85
CR3AHBE00EN9	3.0	5.0	75	6	25	2.85

Item Code (NOVA Coated)	Flute Dia (D1)	Flute Len (L1)	Overall Len (L2)	Shank Dia (D2)	Reach Len (L3)	Neck Dia (D3)
CR3AHBE00EP5	4.0	6.0	50	6	12	3.85
CR3AHBE00EQ3	4.0	6.0	60	6	16	3.85
CR3AHBE00ER1	4.0	6.0	75	6	20	3.85
CR3AHBE00ES8	4.0	6.0	75	6	25	3.85
CR3AHBE00ET6	4.0	6.0	75	6	30	3.85
CR3AHBE00EU4	4.0	6.0	75	6	35	3.85

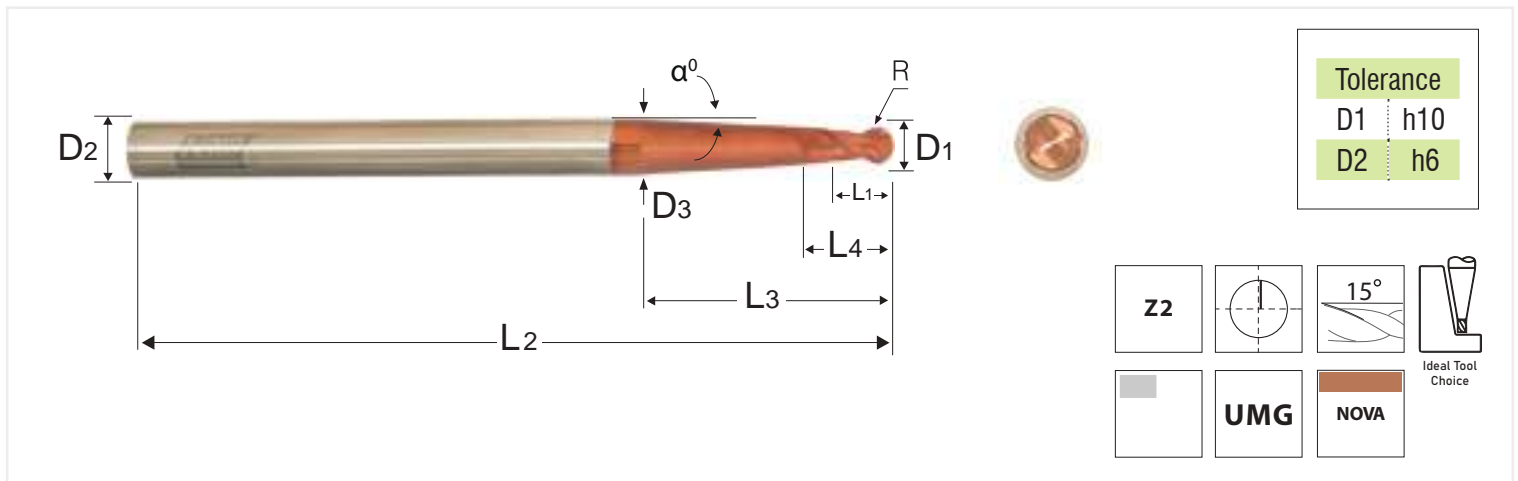


In-Depth machining with 305 and 306 series Rib Endmills & Ballnose helps in Effective machining and less chances of Tool breakage



Carbon Steels BHN 180 to 225	Alloy Steels BHN 225 to 355	Pre-hardened Steels HRc 40 to 45	Austenitic Stainless Steel	Precipitation Hardened Stainless Steel	Titanium	HighTemp. Alloy	Grey Cast Iron	Ductile Cast Iron	Hardened Steels HRc 45 to 55	High Hardened Steels HRc 55 to 70	Aluminum	Aluminum Alloys	Plastic	Wood / MDF	Copper / Brass
1 st	1 st	1 st	1 st	1 st					1 st	2 nd		1 st			

Above Material Selection Table is also applicable for Taperneck Ballnose Series-307
NOTE: FOR FEED & SPEED Rates, go to page no. PG-147



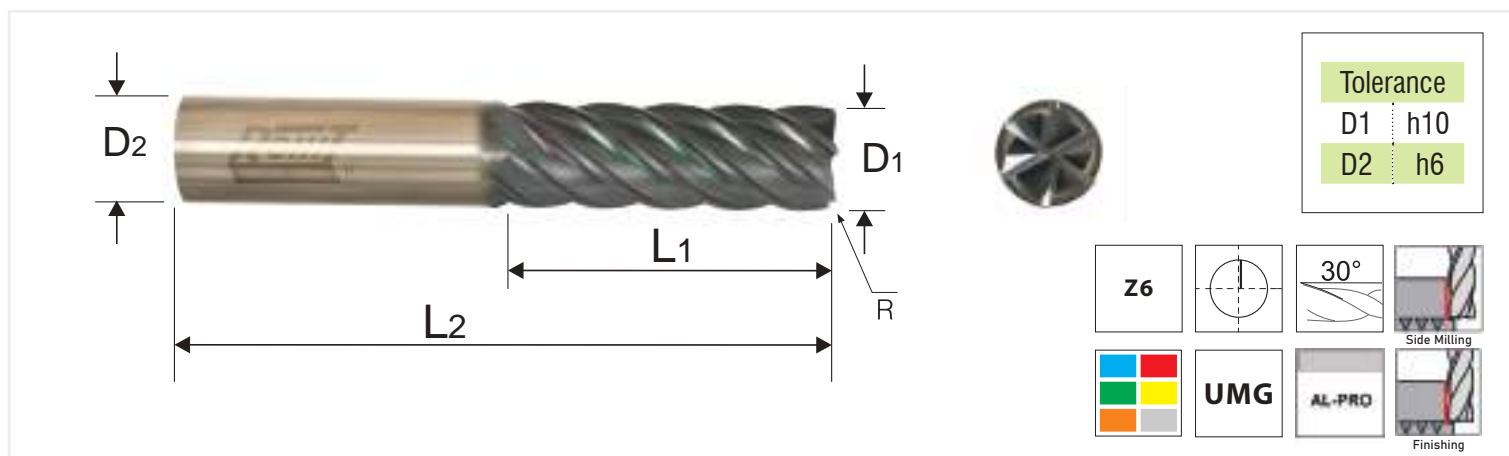
Features:

- Specially designed Ballnose with Long neck for Deep Machining of Moulds with Higher Accuracy

Ordering Code	Flute Dia (D1)	Flute Len (L1)	L4	Reach Len (L3)	Overall Len (L2)	Shank Dia (D2)	Neck Dia (D3)	Neck Taper Angle (α)
3070200601-N	2	4	6	23	60	6	2.9	1°3'
3070200605-N	2	4	6	23	60	6	5	5°
3070200803-N	2	4	6	41	80	6	5.7	3°
3070300753-N	3	6	8	32	75	6	5.6	3°
3070300901-N	3	6	8	52	90	6	5.3	1°3'
3070400753-N	4	8	10	28	75	6	6	3°
3070400901-N	4	8	10	49	90	6	6	1°3'
3070500803-N	5	10	12	41	80	8	8	3°
3070501001-N	5	10	12	51	100	8	7	1°3'
3070600803-N	6	12	15	34	80	8	8	3°
3070601001-N	6	12	15	53	100	8	8	1°3'
3070800803-N	8	14	17	36	80	10	10	3°
3070801001-N	8	14	17	55	100	10	10	1°3'
3071000803-N	10	18	21	40	80	12	12	3°
3071001001-N	10	18	21	59	100	12	12	1°3'
3071201103-N	12	22	25	63	110	16	16	3°
3071201301-N	12	22	25	83	130	16	15	1°3'

Refer Page Pg-107 for Material Selection

NOTE: This is Non-stock Item, ask your RIGPL representative for Delivery Period
 FOR FEED & SPEED Rates, go to page no. PG-147



Features:

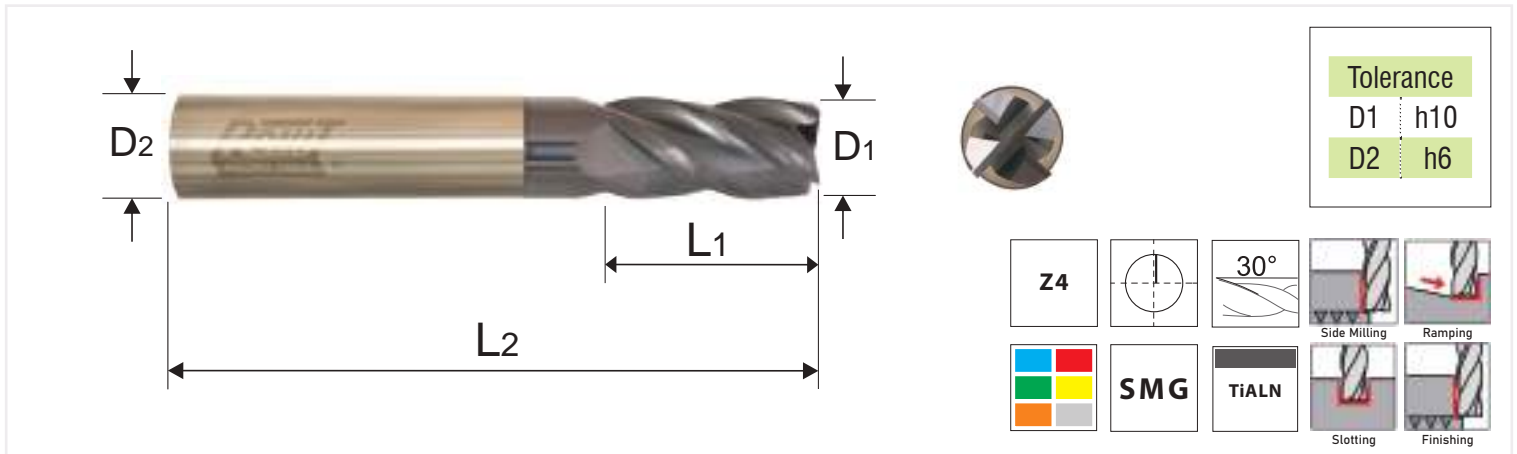
- For machining in FINISHING applications with very LOW width of cut.
- Corner Radius to provide more edge strength.

Ordering Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
308060075R0.5-A	6	25	75	R0.5
308060075R1.0-A	6	25	75	R1.0
308080075R0.5-A	8	25	75	R0.5
308080075R1.0-A	8	25	75	R1.0
308080075R1.5-A	8	25	75	R1.5
308100075R0.5-A	10	30	75	R0.5
308100075R1.0-A	10	30	75	R1.0
308100075R1.5-A	10	30	75	R1.5
308120075R1.0-A	12	30	75	R1.0
308120075R1.5-A	12	30	75	R1.5

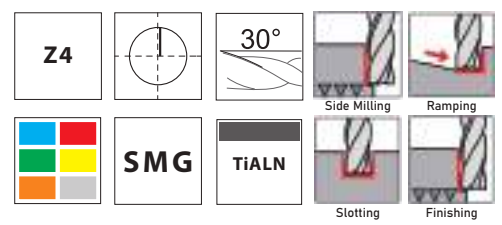
Ordering Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
308120075R2.0-A	12	30	75	R2.0
308160100R1.0-A	16	40	100	R1.0
308160100R2.0-A	16	40	100	R2.0
308160100R3.0-A	16	40	100	R3.0
308180100R1.0-A	18	40	100	R1.0
308180100R2.0-A	18	40	100	R2.0
308180100R3.0-A	18	40	100	R3.0
308200100R1.0-A	20	40	100	R1.0
308200100R2.0-A	20	40	100	R2.0
308200100R3.0-A	20	40	100	R3.0

Carbon Steels BHN 180 to 225	Alloy Steels BHN 225 to 355	Pre-hardened Steels HRC 40 to 45	Austenitic Stainless Steel	Precipitation Hardened Stainless Steel	Titanium	HighTemp. Alloy	Grey Cast Iron	Ductile Cast Iron	Hardened Steels HRC 45 to 55	High Hardened Steels HRC 55 to 70	Aluminum	Aluminum Alloys	Plastic	Wood / MDF	Copper / Brass
1st	1st	1st	1st	1st	1st	2nd	1st	1st	1st	2nd	1st	1st			

NOTE: This is Non-stock Item, ask your RIGPL representative for Delivery Period
FOR FEED & SPEED Rates, go to page no. PG-145



Tolerance	
D1	h10
D2	h6



Features:

- TiALN Coated for Improved Performance
- General Purpose Machining for Stainless Steel, Soft Steel, Cast Iron & Non-ferrous material
- 4-Flute for improved Surface Finish

Item Code (TiALN Coated)	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR11GSE009A5	3	15	50	3
CR11GSE009B3	3	20	75	3
CR11GSE009C1	3	25	100	3
CR11GSE009E6	4	14	50	4
CR11GSE009G2	4	20	75	4
CR11GSE009H0	4	25	100	4
CR11GSE009J5	5	16	50	5
CR11GSE009K3	5	20	75	5
CR11GSE009L1	5	25	100	5
CR11GSE009Q0	6	16	50	6
CR11GSE009R8	6	25	75	6
CR11GSE009S5	6	30	100	6
CR11GSE009T3	6	50	150	6
CR11GSE009X4	7	20	60	7
CR11GSE00A04	8	20	60	8
CR11GSE00A12	8	25	75	8
CR11GSE00A20	8	30	100	8
CR11GSE00A38	8	50	150	8

Item Code (TiALN Coated)	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR11GSE00PJ2	8	50	200	8
CR11GSE00A46	9	25	75	9
CR11GSE00A79	10	25	75	10
CR11GSE00A87	10	40	100	10
CR11GSE00A95	10	60	150	10
CR11GSE00PL8	10	60	200	10
CR11GSE00HB8	11	25	75	11
CR11GSE00AA7	12	25	75	12
CR11GSE00AB5	12	40	100	12
CR11GSE00AC3	12	60	150	12
CR11GSE00AD0	12	60	200	12
CR11GSE00HC6	13	40	100	13
CR11GSE00332	14	30	75	14
CR11GSE00AF6	14	40	100	14
CR11GSE00AG4	14	60	150	14
CR11GSE00AH2	14	60	200	14
CR11GSE00HW2	16	30	75	16
CR11GSE00AJ7	16	40	100	16

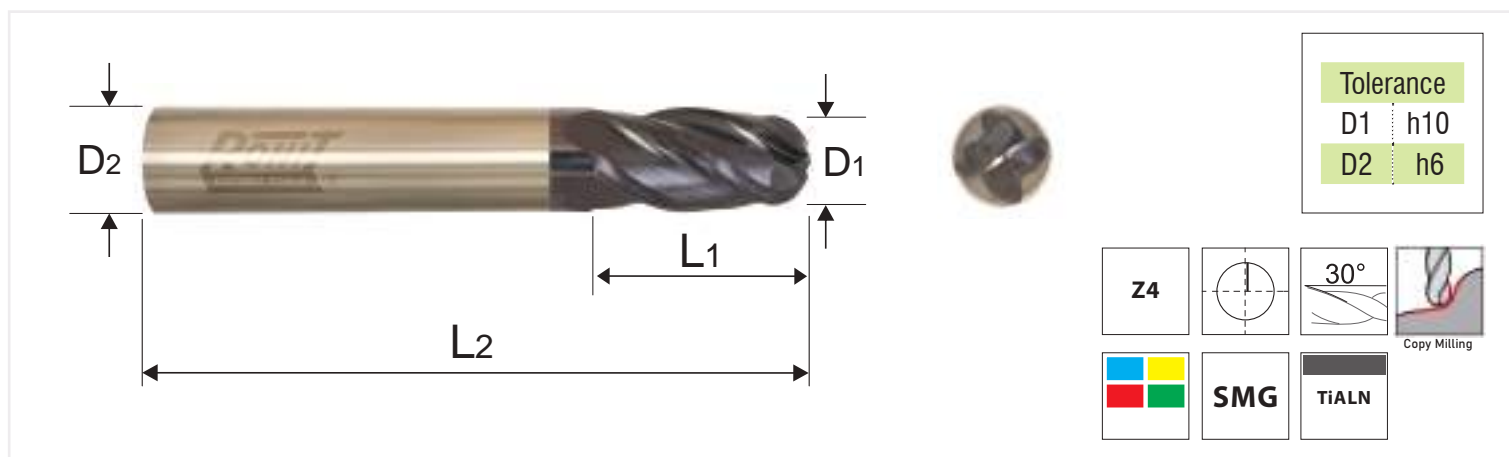
Item Code (TiALN Coated)	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR11GSE00AK5	16	60	150	16
CR11GSE00AL3	16	60	200	16
CR11GSE00AM1	18	40	100	18
CR11GSE00AN8	18	60	150	18
CR11GSE00AP4	18	60	200	18
CR11GSE00AQ2	20	40	100	20

Item Code (TiALN Coated)	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR11GSE00AR0	20	60	150	20
CR11GSE00AS7	20	60	200	20
CR11GSE00PK0	22	40	100	22
CR11GSE00AT5	25	40	100	25
CR11GSE00AU3	25	60	150	25
CR11GSE00AV1	25	60	200	25



Carbon Steels BHN 180 to 225	Alloy Steels BHN 225 to 355	Pre-hardened Steels HRc 40 to 45	Austenitic Stainless Steel	Precipitation Hardened Stainless Steel	Titanium	HighTemp. Alloy	Grey Cast Iron	Ductile Cast Iron	Hardened Steels HRc 45 to 55	High Hardened Steels HRc 55 to 70	Aluminum	Aluminum Alloys	Plastic	Wood / MDF	Copper / Brass
1 st	2 nd	2 nd	2 nd				1 st	2 nd			2 nd	2 nd	2 nd	2 nd	2 nd

NOTE: FOR FEED & SPEED Rates, go to page no. PG-151



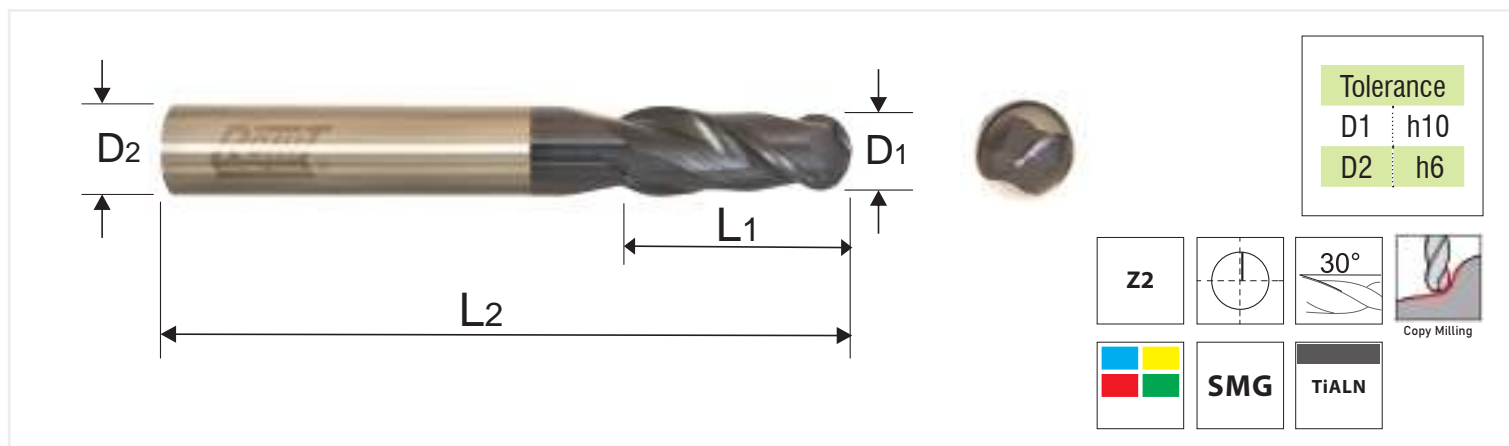
Features:

- TiALN Coated for Improved Performance
- General Purpose Machining for Stainless Steel, Soft Steel, Cast Iron & Non-ferrous material

Item Code (TiALN Coated)	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR11GBE007H9	3	15	50	3
CR11GBE007J4	3	20	75	3
CR11GBE007K2	3	25	100	3
CR11GBE007L0	4	14	50	4
CR11GBE007M8	4	20	75	4
CR11GBE007N5	4	25	100	4
CR11GBE007P1	5	16	50	5
CR11GBE007Q9	5	20	75	5
CR11GBE007R7	5	25	100	5
CR11GBE007S4	6	16	50	6
CR11GBE007T2	6	25	75	6
CR11GBE007U0	6	30	100	6
CR11GBE007V8	6	50	150	6
CR11GBE007W6	7	20	60	7
CR11GBE007X3	8	20	60	8
CR11GBE007Y1	8	25	75	8
CR11GBE007Z9	8	30	100	8
CR11GBE00800	8	50	150	8
CR11GBE00818	9	25	75	9
CR11GBE00826	10	25	75	10
CR11GBE00834	10	40	100	10
CR11GBE00842	10	60	150	10

Item Code (TiALN Coated)	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR11GBE00859	12	25	75	12
CR11GBE00867	12	40	100	12
CR11GBE00875	12	60	150	12
CR11GBE00883	12	60	200	12
CR11GBE00C17	14	30	75	14
CR11GBE00891	14	40	100	14
CR11GBE008A3	14	60	150	14
CR11GBE008B1	14	60	200	14
CR11GBE00C74	16	30	75	16
CR11GBE008C9	16	40	100	16
CR11GBE008D6	16	60	150	16
CR11GBE008E4	16	60	200	16
CR11GBE008F2	18	40	100	18
CR11GBE008G0	18	60	150	18
CR11GBE008H8	18	60	200	18
CR11GBE008J3	20	40	100	20
CR11GBE008K1	20	60	150	20
CR11GBE008L9	20	60	200	20
CR11GBE008M7	25	40	100	25
CR11GBE008N4	25	60	150	25
CR11GBE008P0	25	60	200	25

Refer Page Pg-113 for Material Selection



Features:

- General Purpose Machining for Steel, Cast Iron & Non-ferrous material
- Specifically used for Machining of Hard Wood with UNCOATED BALLNOSE

Item Code (TiALN Coated)	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR11GBE00537	3.0	15	50	3
CR11GBE00545	3.0	20	75	3
CR11GBE00552	3.0	25	100	3
CR11GBE00560	4.0	14	50	4
CR11GBE00578	4.0	20	75	4
CR11GBE00586	4.0	25	100	4
CR11GBE00594	5.0	16	50	5
CR11GBE005A6	5.0	20	75	5
CR11GBE005B4	5.0	25	100	5
CR11GBE005C2	6.0	16	50	6

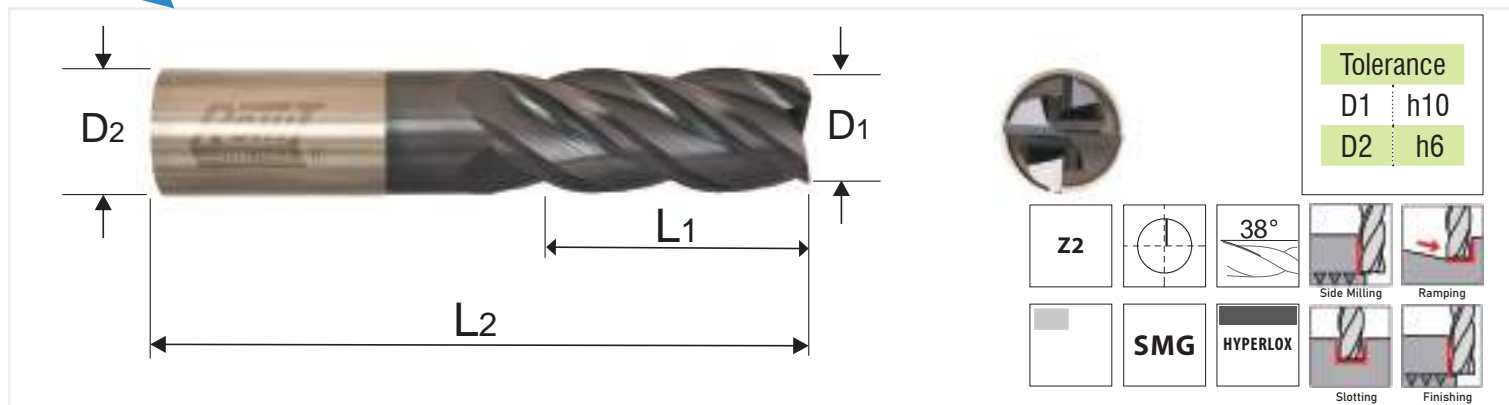
Item Code (TiALN Coated)	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR11GBE005D9	6.0	25	75	6
CR11GBE005E7	6.0	30	100	6

Item Code (Uncoated)	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR1XGBE00EY8	4	22	50	4
CR1XGBE00EZ6	5	22	50	5
CR1XGBE00E16	6	22	50	6

Carbon Steels BHN 180 to 225	Alloy Steels BHN 225 to 355	Pre-hardened Steels HRc 40 to 45	Austenitic Stainless Steel	Precipitation Hardened Stainless Steel	Titanium	HighTemp. Alloy	Grey Cast Iron	Ductile Cast Iron	Hardened Steels HRc 45 to 55	High Hardened Steels HRc 55 to 70	Aluminum	Aluminum Alloys	Plastic	Wood / MDF	Copper / Brass
1 st	2 nd						1 st	2 nd			2 nd	2 nd	2 nd	1 st	2 nd

Above Material Selection Table is also applicable for Ballnose Series-202

NOTE: FOR FEED & SPEED Rates, go to page no. PG-147



Features:

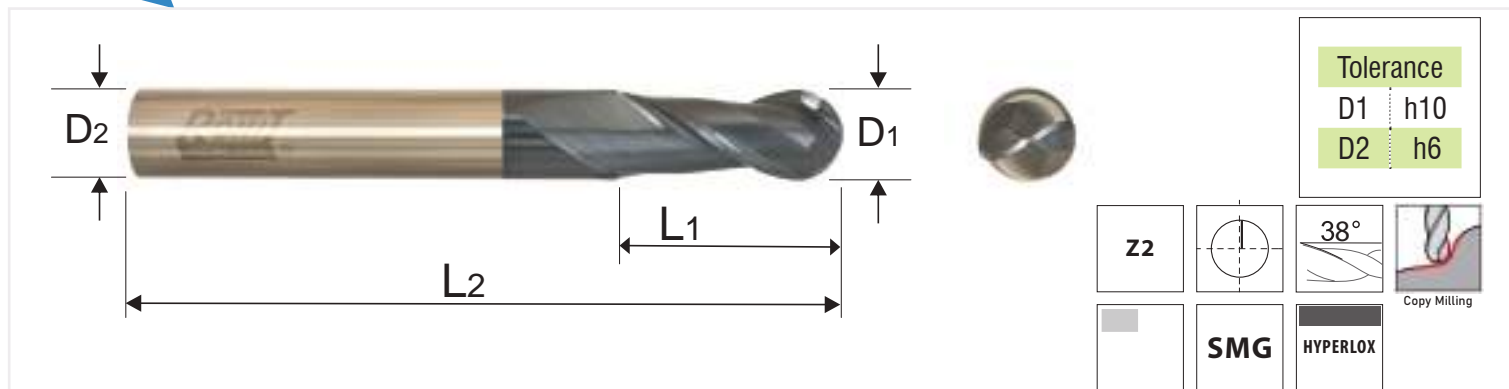
- For Machining Pre-Heat Treated Steels like P20, D2 upto HRc 40-45
- Specially Designed 4-Flute Endmill for Pre-Hardened materials

Item Code (HYPERLOX Coated)	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR16GSE00N14	1	3	50	4
CR16GSE00N22	1.5	4	50	4
CR16GSE00HX4	2	6	50	4
CR16GSE00HY2	2.5	8	50	4
CR16GSE00HZ0	3	12	50	3
CR16GSE00J00	3	20	75	3
CR16GSE00J18	3	25	100	3
CR16GSE00J26	4	14	50	4
CR16GSE00J34	4	20	75	4
CR16GSE00J42	4	25	100	4
CR16GSE00J59	5	16	50	5
CR16GSE00J67	5	20	75	5
CR16GSE00J75	5	25	100	5
CR16GSE00J83	6	16	50	6
CR16GSE00J91	6	25	75	6

Item Code (HYPERLOX Coated)	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR16GSE00JA3	6	30	100	6
CR16GSE00JB1	6	50	150	6
CR16GSE00JC9	8	20	60	8
CR16GSE00JD6	8	30	100	8
CR16GSE00JE4	8	50	150	8
CR16GSE00JF2	10	25	75	10
CR16GSE00JG0	10	40	100	10
CR16GSE00JH8	10	50	150	10
CR16GSE00JJ3	12	25	75	12
CR16GSE00JK1	12	40	100	12
CR16GSE00JL9	12	50	150	12
CR16GSE00JM7	16	40	100	16
CR16GSE00JN4	16	50	150	16
CR16GSE00JP0	20	40	100	20

Carbon Steels BHN 180 to 225	Alloy Steels BHN 225 to 355	Pre-hardened Steels HRc 40 to 45	Austenitic Stainless Steel	Precipitation Hardened Stainless Steel	Titanium	HighTemp. Alloy	Grey Cast Iron	Ductile Cast Iron	Hardened Steels HRc 45 to 55	High Hardened Steels HRc 55 to 70	Aluminum	Aluminum Alloys	Plastic	Wood / MDF	Copper / Brass
2 nd	1 st	2 nd							1 st						

NOTE: FOR FEED & SPEED Rates, go to page no. PG-145



Features:

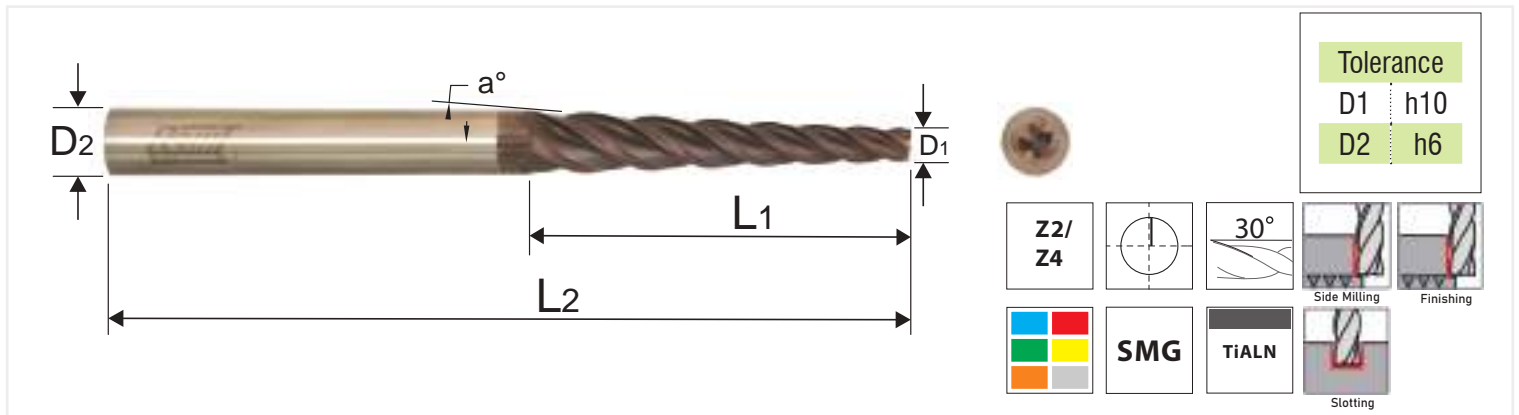
- For Machining Pre-Heat Treated Steels like P20, D2 upto HRc 40-45
- Specially Designed 2-Flute Ballnose for Pre-Hardened materials
- High Quality Coating for Higher Tool life

Item Code (HYPERLOX Coated)	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR16GBE00CJ7	1	3	50	4
CR16GBE00CK5	1.5	4	50	4
CR16GBE00CL3	2	6	50	4
CR16GBE00CM1	2.5	8	50	4
CR16GBE00CN8	3	12	50	3
CR16GBE00CP4	3	20	75	3
CR16GBE00CQ2	3	25	100	3
CR16GBE00CR0	4	16	50	4
CR16GBE00CS7	4	20	75	4
CR16GBE00CT5	4	25	100	4
CR16GBE00CU3	5	16	50	5
CR16GBE00CV1	5	20	75	5
CR16GBE00CW9	5	25	100	5
CR16GBE00CX6	6	16	50	6

Item Code (HYPERLOX Coated)	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR16GBE00CY4	6	25	75	6
CR16GBE00CZ2	6	30	100	6
CR16GBE00D03	6	40	150	6
CR16GBE00D11	8	20	60	8
CR16GBE00D29	8	30	100	8
CR16GBE00D37	8	50	150	8
CR16GBE00D45	10	25	75	10
CR16GBE00D52	10	40	100	10
CR16GBE00D60	10	50	150	10
CR16GBE00D78	12	25	75	12
CR16GBE00D86	12	40	100	12
CR16GBE00D94	12	50	150	12
CR16GBE00DA6	16	40	100	16
CR16GBE00DB4	16	50	150	16

Carbon Steels BHN 180 to 225	Alloy Steels BHN 225 to 355	Pre-hardened Steels HRc 40 to 45	Austenitic Stainless Steel	Precipitation Hardened Stainless Steel	Titanium	HighTemp. Alloy	Grey Cast Iron	Ductile Cast Iron	Hardened Steels HRc 45 to 55	High Hardened Steels HRc 55 to 70	Aluminum	Aluminum Alloys	Plastic	Wood / MDF	Copper / Brass
1st	1st	2nd							1st						

NOTE: FOR FEED & SPEED Rates, go to page no. PG-147



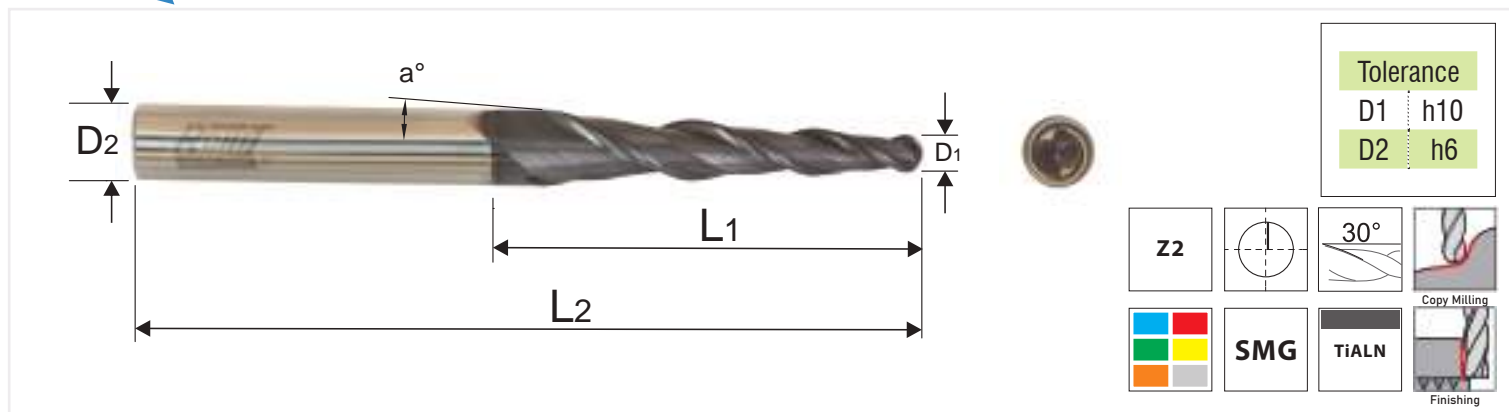
Features:

- Suitable for machining special components such as impellers, blisks, tire profiles, turbine blades
- Widely used in machining of Surgical instruments of Stainless Steel

Ordering Code	Flute Dia (D1)	Flute Len (L1)	Overall Len (L2)	Shank Dia (D2)	Taper Angle (a°)
20703008002-F	3	42	80	6	2°
20705008002-F	5	42	80	8	2°
20707008002-F	7	42	80	10	2°
20709008002-F	9	42	80	12	2°
20702508003-F	2.5	32	80	6	3°
20703008003-F	3	48	80	8	3°
20704008003-F	4	38	80	8	3°
20706008003-F	6	38	80	10	3°
20708010503-F	8	56	105	14	3°
20702506305-F	2.5	20	63	6	5°
20703008005-F	3	28	80	8	5°
20704008005-F	4	34	80	10	5°
20706009005-F	6	34	90	12	5°
20708010005-F	8	45	100	16	5°
20710010505-F	10	56	105	20	5°
20703006307-F	3	20	63	8	7°
20705008007-F	5	28	80	12	7°

Refer Page PG-117 for Material Selection

NOTE: This is Non-stock Item, ask your RIGPL representative for Delivery Period
FOR FEED & SPEED Rates, go to page no. PG-151



Tolerance	
D1	h10
D2	h6

Z2

Features:

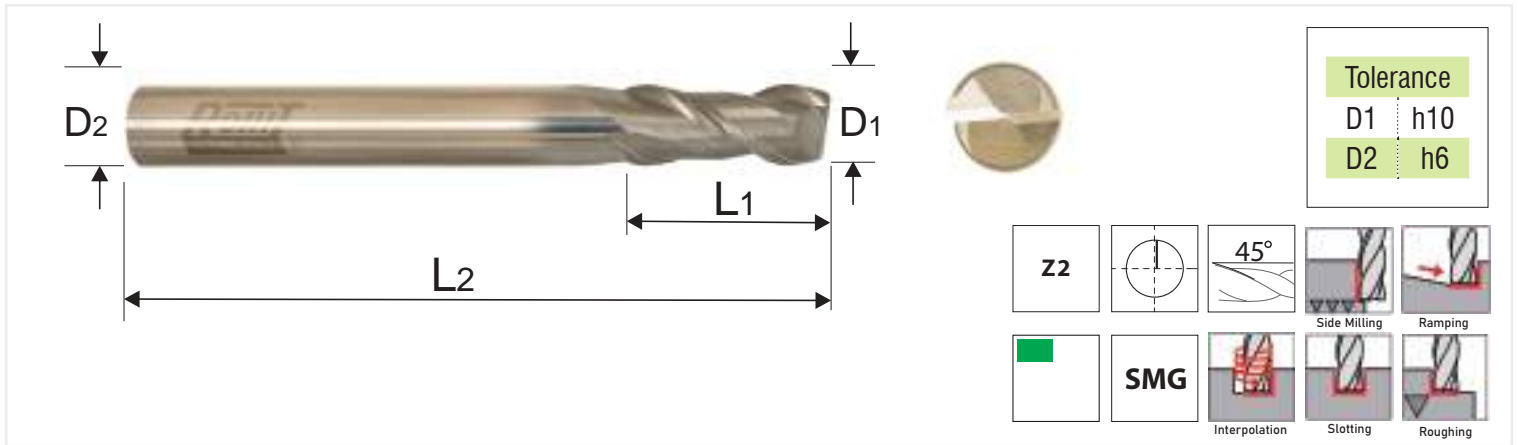
- Suitable for machining special components such as impellers, blisks, tire profiles, turbine blades
- Widely used in machining of Surgical instruments of Stainless Steel

Ordering Code	Flute Dia (D1)	Flute Len (L1)	Overall Len (L2)	Shank Dia (D2)	Taper Angle (a°)
20803008002-F	3	42	80	6	2°
20805008002-F	5	42	80	8	2°
20807008002-F	7	42	80	10	2°
20809008002-F	9	42	80	12	2°
20803008003-F	3	48	80	8	3°
20804008003-F	4	38	80	8	3°
20806008003-F	6	38	80	10	3°
20808010503-F	8	56	105	14	3°
20803008003-F	3	28	80	8	5°
20804008005-F	4	34	80	10	5°
20806009005-F	6	34	90	12	5°
20808010005-F	8	45	100	16	5°
20810010505-F	10	56	105	20	5°

Below material selection Table is also applicable for Series-207

Carbon Steels BHN 180 to 225	Alloy Steels BHN 225 to 355	Pre-hardened Steels HRc 40 to 45	Austenitic Stainless Steel	Precipitation Hardened Stainless Steel	Titanium	HighTemp. Alloy	Grey Cast Iron	Ductile Cast Iron	Hardened Steels HRc 45 to 55	High Hardened Steels HRc 55 to 70	Aluminum	Aluminum Alloys	Plastic	Wood / MDF	Copper / Brass
1st	1st	2nd	2nd	2nd	2nd	2nd	1st	1st			1st	1st	1st	1st	1st

NOTE: This is Non-stock Item, ask your RIGPL representative for Delivery Period
FOR FEED & SPEED Rates, go to page no. PG-147



Features:

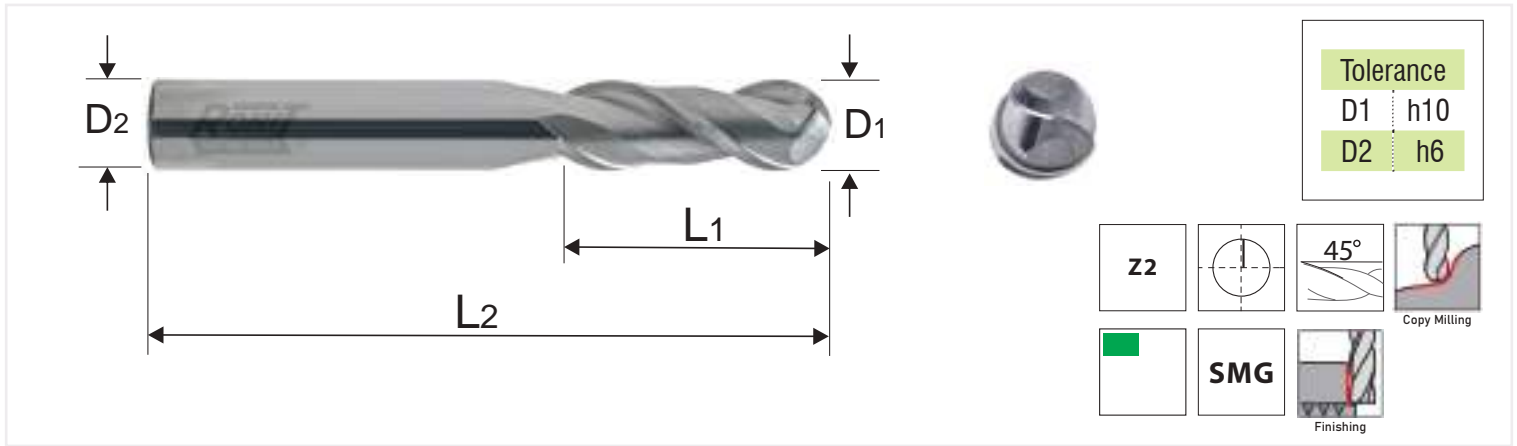
- Effective machining of Aluminium and AL-Alloys
- Higher Helix for Effective Chip Evacuation
- Improved component finish

Item Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR1XGSE00TA9	2	6	50	4
CR1XGSE00QZ7	3	12	50	3
CR1XGSE00NP2	4	14	50	4
CR1XGSE00NQ0	4	25	75	4
CR1XGSE00NR8	4	30	100	4
CR1XGSE00NS5	5	16	50	5
CR1XGSE00NT3	5	25	75	5
CR1XGSE00NU1	5	35	100	5
CR1XGSE00NV9	6	18	50	6
CR1XGSE00NW7	6	30	75	6
CR1XGSE00NX4	6	35	100	6

Item Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR1XGSE00NY2	8	20	60	48
CR1XGSE00NZ0	8	30	75	8
CR1XGSE00P00	8	40	100	8
CR1XGSE00P18	10	30	75	10
CR1XGSE00P26	10	50	100	10
CR1XGSE00P34	12	30	75	12
CR1XGSE00P42	12	50	100	12
CR1XGSE00P59	14	50	100	14
CR1XGSE00P67	16	50	100	16
CR1XGSE00P75	20	50	100	20

Carbon Steels BHN 180 to 225	Alloy Steels BHN 225 to 355	Pre-hardened Steels HRc 40 to 45	Austenitic Stainless Steel	Precipitation Hardened Stainless Steel	Titanium	HighTemp. Alloy	Grey Cast Iron	Ductile Cast Iron	Hardened Steels HRc 45 to 55	High Hardened Steels HRc 55 to 70	Aluminum	Aluminum Alloys	Plastic	Wood / MDF	Copper / Brass
											1 st	1 st	2 nd	2 nd	2 nd

NOTE: FOR FEED & SPEED Rates, go to page no. PG-151



Features:

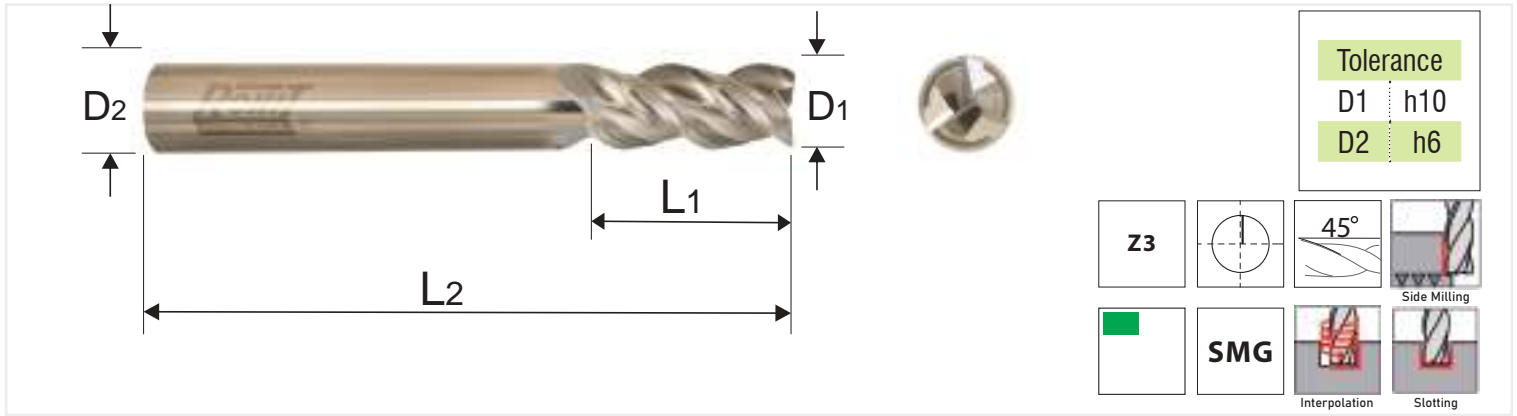
- Effective machining of Aluminium and AL-Alloys
- Higher Helix for Effective Chip Evacuation
- Improved component finish

Item Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR1XGBE00F23	3	12	50	3
CR1XGBE00F31	4	14	50	4
CR1XGBE00F49	4	25	75	4
CR1XGBE00F56	4	30	100	4
CR1XGBE00F64	5	16	50	5
CR1XGBE00F72	5	25	75	5
CR1XGBE00F80	5	35	100	5
CR1XGBE00F98	6	18	50	6
CR1XGBE00FA0	6	30	75	6
CR1XGBE00FB8	6	35	100	6

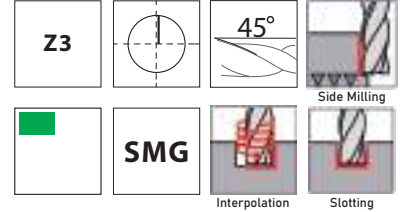
Item Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR1XGBE00FC6	8	20	60	8
CR1XGBE00FD3	8	30	75	8
CR1XGBE00FE1	8	40	100	8
CR1XGBE00FF9	10	30	75	10
CR1XGBE00FG7	10	50	100	10
CR1XGBE00FH5	12	30	75	12
CR1XGBE00FJ0	12	50	100	12
CR1XGBE00FK8	14	50	100	14
CR1XGBE00FL6	16	50	100	16
CR1XGBE00FM4	20	50	100	20

Carbon Steels BHN 180 to 225	Alloy Steels BHN 225 to 355	Pre-hardened Steels HRc 40 to 45	Austenitic Stainless Steel	Precipitation Hardened Stainless Steel	Titanium	HighTemp. Alloy	Grey Cast Iron	Ductile Cast Iron	Hardened Steels HRc 45 to 55	High Hardened Steels HRc 55 to 70	Aluminum	Aluminum Alloys	Plastic	Wood / MDF	Copper / Brass
											1 st	1 st	2 nd	2 nd	2 nd

NOTE: This is Non-stock Item, ask your RIGPL representative for Delivery Period
FOR FEED & SPEED Rates, go to page no. PG-147



Tolerance	
D1	h10
D2	h6



Features:

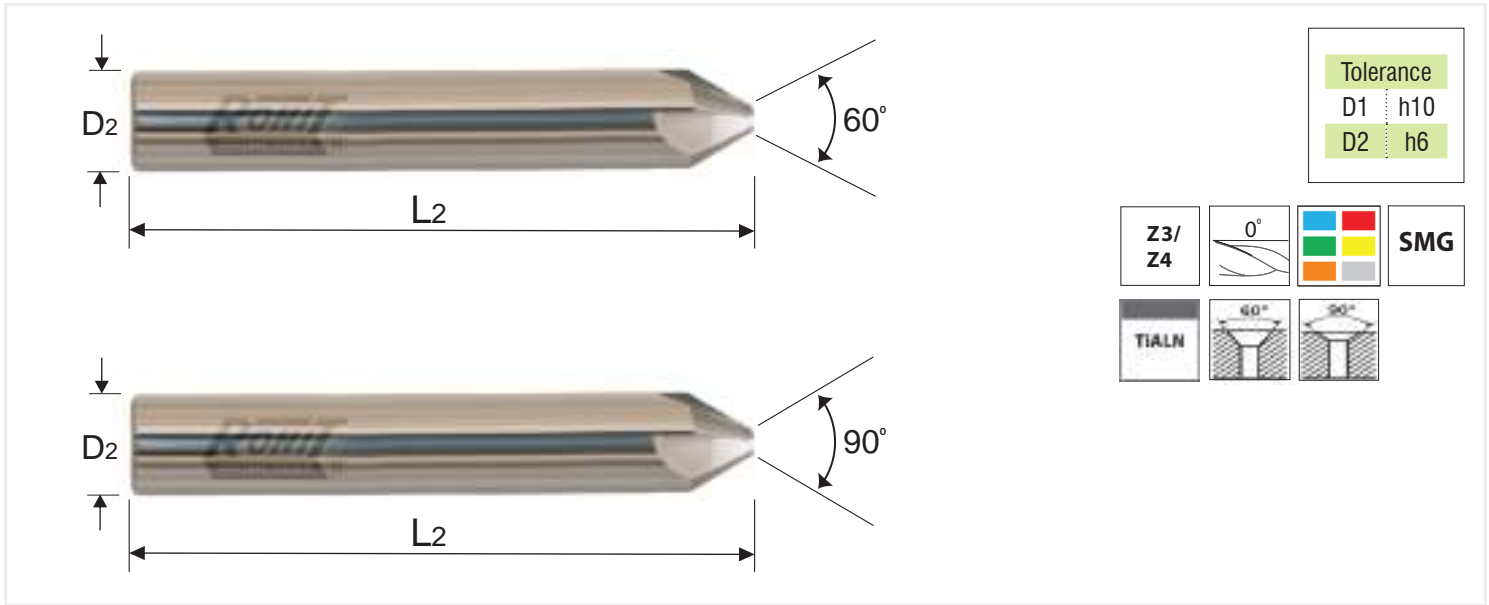
- 3-flute with Special flute form to help in Chip Breakage while milling Aluminium
- 3-Flute also helps in improving productivity as compared to our Carbide 211 Series End Mills for Aluminium
- Designed especially for non-ferrous materials to run at higher cutting speeds

Item Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR1XGSE00T06	2	6	50	4
CR1XGSE00R08	3	12	50	3
CR1XGSE00N44	4	14	50	4
CR1XGSE00N51	4	25	75	4
CR1XGSE00N69	4	30	100	4
CR1XGSE00N77	5	16	50	5
CR1XGSE00N85	5	25	75	5
CR1XGSE00N93	5	35	100	5
CR1XGSE00NA5	6	18	50	6
CR1XGSE00NB3	6	30	75	6
CR1XGSE00NC1	6	35	100	6

Item Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR1XGSE00ND8	8	20	60	8
CR1XGSE00NE6	8	30	75	8
CR1XGSE00NF4	8	40	100	8
CR1XGSE00NG2	10	30	75	10
CR1XGSE00NH0	10	50	100	10
CR1XGSE00NJ5	12	30	75	12
CR1XGSE00NK3	12	50	100	12
CR1XGSE00NL1	14	50	100	14
CR1XGSE00NM9	16	50	100	16
CR1XGSE00NN6	20	50	100	20

Carbon Steels BHN 180 to 225	Alloy Steels BHN 225 to 355	Pre-hardened Steels HRC 40 to 45	Austenitic Stainless Steel	Precipitation Hardened Stainless Steel	Titanium	HighTemp. Alloy	Grey Cast Iron	Ductile Cast Iron	Hardened Steels HRC 45 to 55	High Hardened Steels HRC 55 to 70	Aluminum	Aluminum Alloys	Plastic	Wood / MDF	Copper / Brass
											1 st	1 st		2 nd	2 nd

NOTE: FOR FEED & SPEED Rates, go to page no. PG-151



Features:

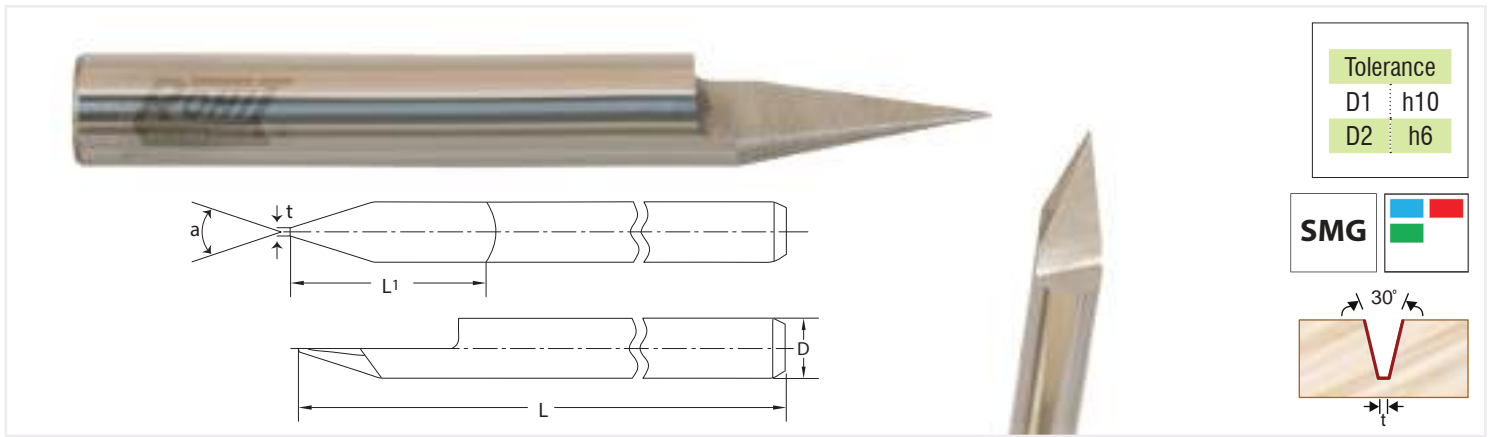
- Smooth cutting operation with low wear
- Long tool life thanks to wear-resistant TiAlN-coating and ultra-tough carbide
- For chamfering, de-burring and contour operations in various materials

Ordering Code	Angle	Shank Dia(D2)	Overall Len(L2)	Flutes
21504005060-F	60	4	50	3
21506005760-F	60	6	57	3
21508006060-F	60	8	60	3
21510007560-F	60	10	75	4
21512008060-F	60	12	80	4
21516009060-F	60	16	90	4

Ordering Code	Angle	Shank Dia(D2)	Overall Len(L2)	Flutes
21504005090-F	90	4	50	3
21506005790-F	90	6	57	3
21508006090-F	90	8	60	3
21510007590-F	90	10	75	4
21512008090-F	90	12	80	4
21516009090-F	90	16	90	4

Carbon Steels BHN 180 to 225	Alloy Steels BHN 225 to 355	Prehardened Steels HRc 40 to 45	Austenitic Stainless Steel	Precipitation Hardened Stainless Steel	Titanium	HighTemp. Alloy	Grey Cast Iron	Ductile Cast Iron	Hardened Steels HRc 45 to 55	High Hardened Steels HRc 55 to 70	Aluminum	Aluminum Alloys	Plastic	Wood / MDF	Copper/Brass
1st	1st	1st	1st	1st	2nd	2nd	1st	1st			1st	1st		1st	1st

NOTE: This is Non-stock Item, ask your RIGPL representative for Delivery Period



Features:

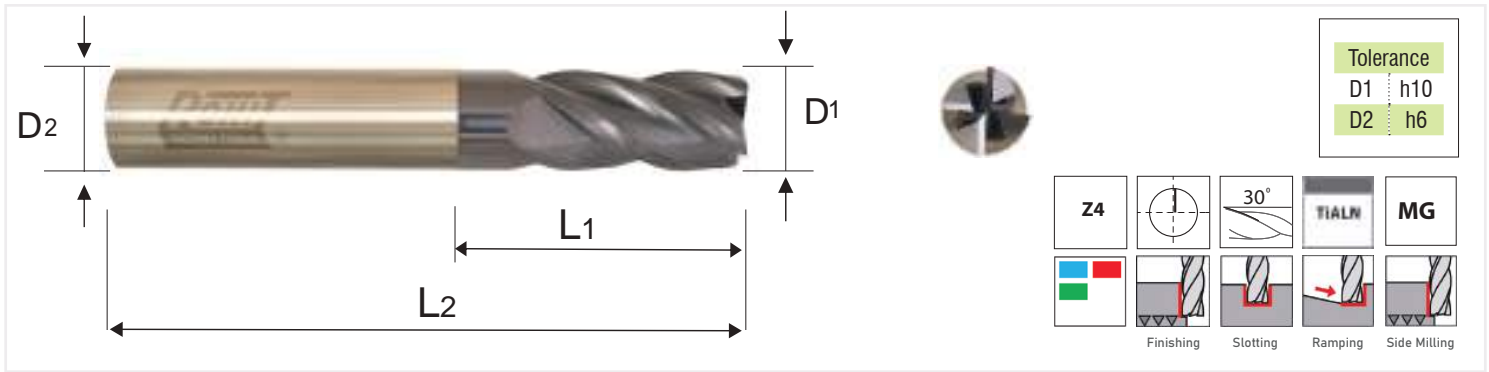
- For Engraving in metals like MS, SS, Die Steel, Alloy Steel and other Hard Materials
- Included Angle: 45, 60 and 90° Can be made on special request. MOQ will apply

Ordering Code	TIP(t)	Angle(a°)	Cutting Len(L1)	Overall Len(L)	Shank Dia(D)
219030050-U	0.2	30°	12	50	3
219040050-U	0.2	30°	12	50	4
219050050-U	0.2	30°	15	50	5
219060050-U	0.2	30°	15	50	6
219080060-U	0.4	30°	25	60	8
219100075-U	0.4	30°	25	75	10
219120075-U	0.4	30°	25	75	12
219127075-U	0.4	30°	25	75	12.7



Carbon Steels BHN 180 to 225	Alloy Steels BHN 225 to 355	Prehardened Steels HRc 40 to 45	Austenitic Stainless Steel	Precipitation Hardened Stainless Steel	Titanium	HighTemp. Alloy	Grey Cast Iron	Ductile Cast Iron	Hardened Steels HRc 45 to 55	High Hardened Steels HRc 55 to 70	Aluminum	Aluminum Alloys	Plastic	Wood / MDF	Copper/Brass
1 st	1 st	1 st	1 st				1 st	1 st	1 st	1 st					

NOTE: This is Non-stock Item, ask your RIGPL representative for Delivery Period



Features:

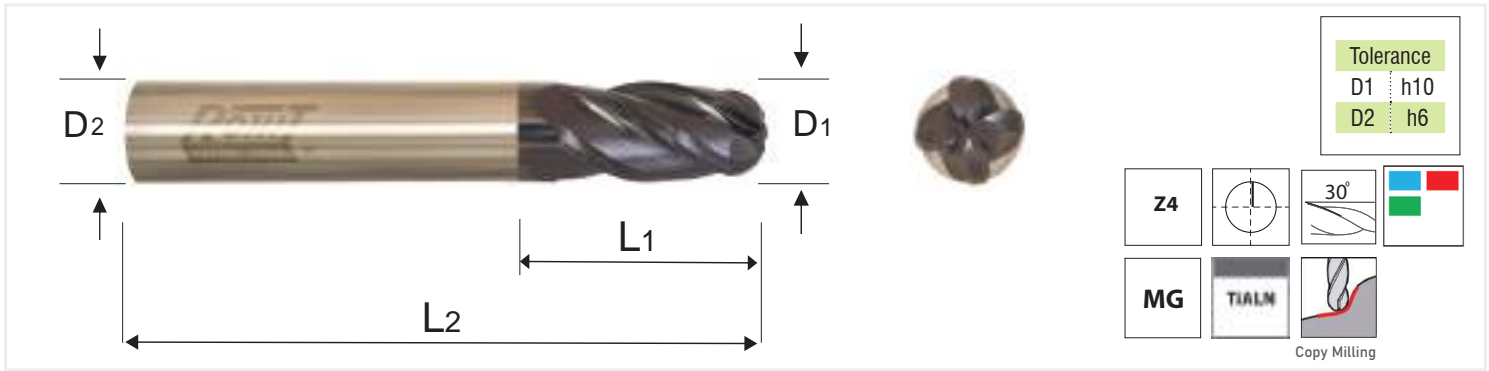
- For milling of easily machinable Al alloys, non-ferrous materials, Pattern Machining
- Economical Carbide End Mills to be used for softer materials up to 35-HRc

Item Code TiALN Coated	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CX01GSE000Y7	2	8	50	3
CX01GSE00106	2.5	8	50	3
CX01GSE00148	3	14	50	3
CX01GSE00155	3	25	75	3
CX01GSE00HM0	3	30	100	3
CX01GSE00171	4	14	50	4
CX01GSE001A9	4	25	75	4
CX01GSE001B7	4	30	100	4
CX01GSE001C5	5	16	50	5
CX01GSE001D2	5	25	75	5
CX01GSE001F8	5	35	100	5
CX01GSE001H4	6	18	50	6
CX01GSE001J9	6	30	75	6
CX01GSE001K7	6	35	100	6
CX01GSE00JQ9	6	50	150	6
CX01GSE001M3	7	20	60	7
CX01GSE001P6	8	20	60	8
CX01GSE001Q4	8	30	75	8
CX01GSE001S9	8	40	100	8
CX01GSE001T7	8	60	150	8
CX01GSE00GZ2	8	30	200	8

Item Code TiALN Coated	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CX01GSE001W1	10	30	75	10
CX01GSE001X8	10	50	100	10
CX01GSE001Y6	10	60	150	10
CX01GSE00G38	10	30	200	10
CX01GSE00LD5	11	30	75	11
CX01GSE00213	12	30	75	12
CX01GSE00247	12	50	100	12
CX01GSE00254	12	60	150	12
CX01GSE00239	12	30	200	12
CX01GSE00270	14	30	75	14
CX01GSE00296	14	50	100	14
CX01GSE002B6	14	60	150	14
CX01GSE002D1	16	30	75	16
CX01GSE002J8	16	50	100	16
CX01GSE002L4	16	60	150	16
CX01GSE002H3	16	30	200	16
CX01GSE00FX7	18	50	100	18
CX01GSE002P5	20	50	100	20
CX01GSE00G61	20	80	150	20
CX01GSE002N9	20	30	200	20

Refer Page PG-124 for material selection

NOTE: FOR FEED & SPEED Rates, go to page no. PG-151



Features:

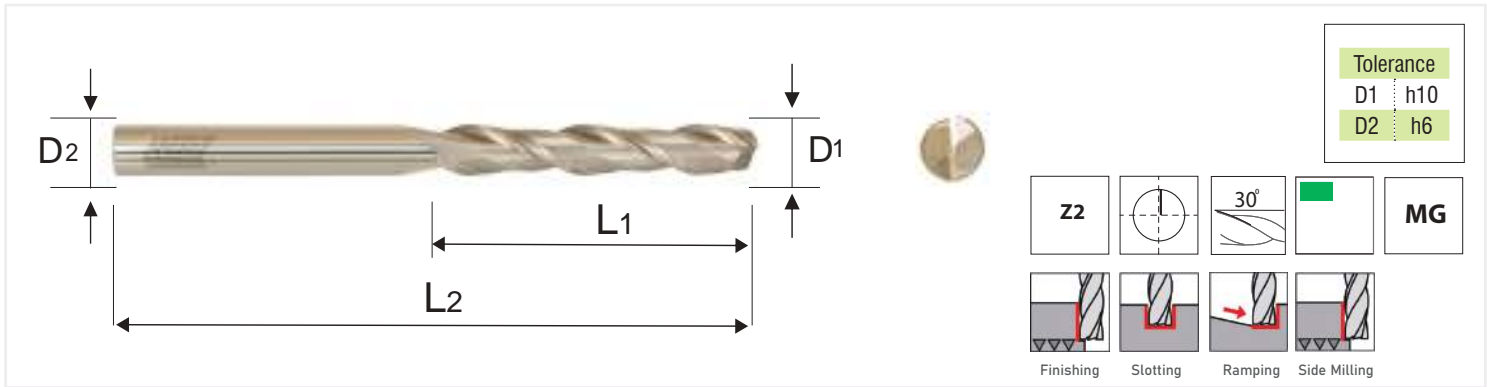
• For milling of easily machinable Al alloys, non-ferrous materials, Pattern Machining

Item Code TiALN Coated	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CX01GBE00186	3	14	50	3
CX01GBE001A6	3	25	75	3
CX01GBE00BT7	3	30	100	3
CX01GBE001B4	4	14	50	4
CX01GBE001D9	4	25	75	4
CX01GBE00AR3	4	30	100	4
CX01GBE001F5	5	16	50	5
CX01GBE001H1	5	25	75	5
CX01GBE001K4	5	35	100	5
CX01GBE001M0	6	18	50	6
CX01GBE001P3	6	30	75	6
CX01GBE001R9	6	35	100	6
CX01GBE001T4	6	40	150	6
CX01GBE001W8	8	20	60	8
CX01GBE00202	8	30	75	8
CX01GBE00210	8	40	100	8
CX01GBE00236	8	50	150	8

Item Code TiALN Coated	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CX01GBE00BG6	8	30	200	8
CX01GBE00277	10	30	75	10
CX01GBE002A5	10	50	100	10
CX01GBE002B3	10	60	150	10
CX01GBE00B14	10	30	200	10
CX01GBE00DU3	11	30	75	11
CX01GBE002E6	12	30	75	12
CX01GBE002H0	12	50	100	12
CX01GBE002J5	12	60	150	12
CX01GBE00B22	12	30	200	12
CX01GBE00DV1	14	30	75	14
CX01GBE00DR0	16	30	75	16
CX01GBE002N6	16	50	100	16
CX01GBE002P2	16	60	150	16
CX01GBE00DS7	16	30	200	16
CX01GBE00CD1	20	50	100	20
CX01GBE00DT5	20	30	200	20

Carbon Steels BHN 180 to 225	Alloy Steels BHN 225 to 355	Prehardened Steels HRC 40 to 45	Austenitic Stainless Steel	Precipitation Hardened Stainless Steel	Titanium	HighTemp. Alloy	Grey Cast Iron	Ductile Cast Iron	Hardened Steels HRC 45 to 55	High Hardened Steels HRC 55 to 70	Aluminum	Aluminum Alloys	Plastic	Wood / MDF	Copper/Brass
2 nd	2 nd						2 nd	2 nd	2 nd			2 nd			2 nd

FOR FEED & SPEED Rates, go to page no. PG-147



Features:

- Especially designed for machining Wood, Plastic & Non-ferrous materials
- 2-Flute construction provides better chip evacuation
- Sharper Rakes for softer metals to cut with ease

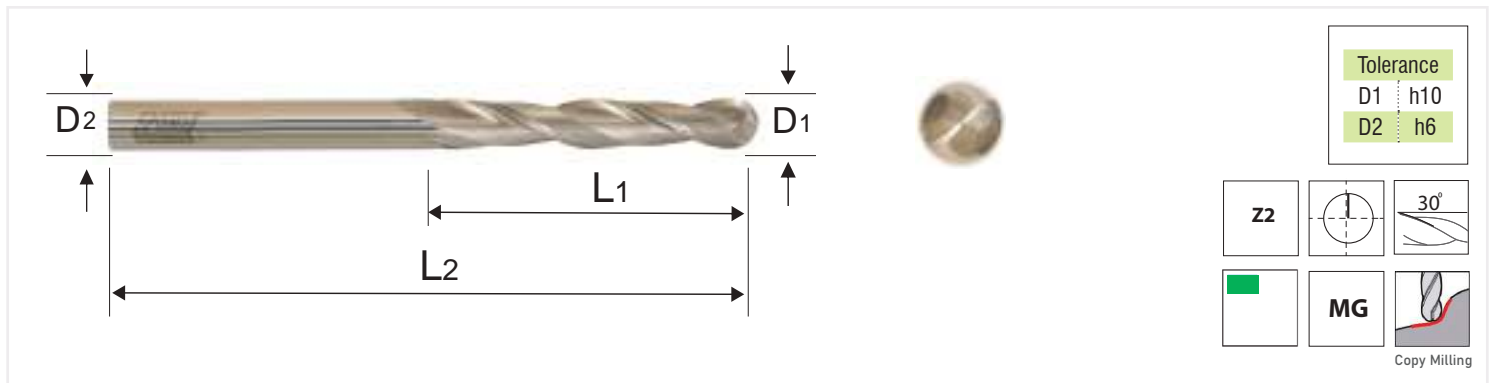
Item Code Uncoated	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CX0XGSE00H46	2	12	50	3
CX0XGSE00016	3	16	50	3
CX0XGSE00032	4	22	50	4
CX0XGSE00HG4	4	30	60	4
CX0XGSE00G13	4	35	75	4
CX0XGSE00G21	4	50	100	4
CX0XGSE00057	5	22	50	5
CX0XGSE00FZ4	5	30	60	5
CX0XGSE00G05	5	35	75	5
CX0XGSE00GQ3	5	50	100	5
CX0XGSE00073	6	22	50	6
CX0XGSE00099	6	30	60	6
CX0XGSE000A1	6	35	75	6
CX0XGSE00G88	6	50	100	6
CX0XGSE00HN8	8	22	50	8
CX0XGSE00FV3	8	30	60	8
CX0XGSE00GY5	8	35	75	8

Item Code TiALN Coated	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CX0XGSE000G8	8	50	100	8
CX0XGSE00K50	10	35	75	10
CX0XGSE00H53	10	50	100	10
CX0XGSE00K68	12	35	75	12
CX0XGSE00H61	12	50	100	12

Item Code TiALN Coated	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CX01GSE000K8	1	6	50	3
CX01GSE000M4	1.5	8	50	3
CX01GSE00HD9	2	8	50	3
CX01GSE000P7	3	14	50	3
CX01GSE000Q5	4	22	50	4
CX01GSE00HE7	5	16	50	5
CX01GSE000R3	5	22	50	5
CX01GSE00H11	6	18	50	6
CX01GSE000S0	6	22	50	6
CX01GSE00G87	6	30	75	6

Refer Page PG-127 for Material Selection

NOTE: FOR FEED & SPEED Rates, go to page no. PG-152



Features:

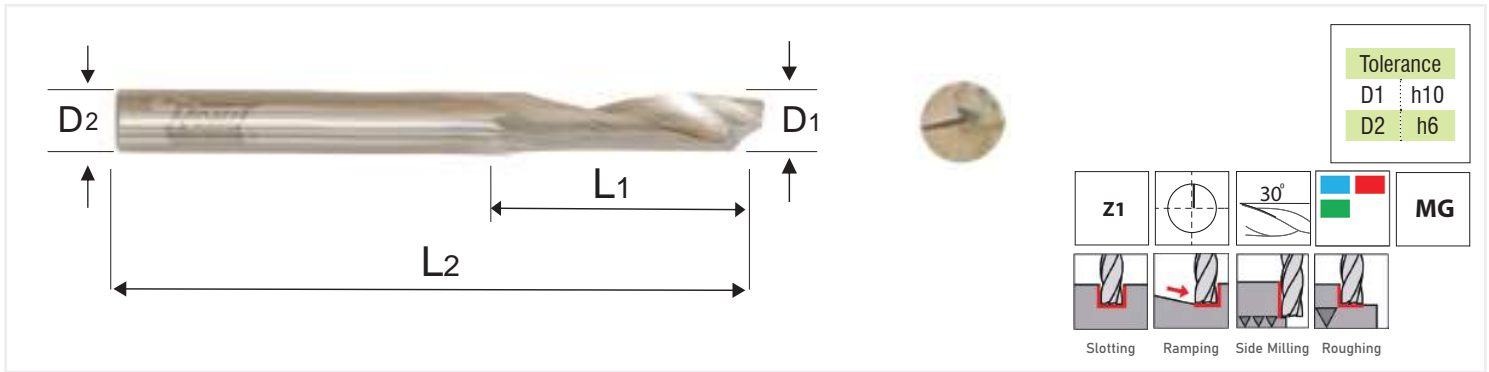
- Especially designed for machining Wood, Plastic & Non-ferrous materials
- 2-Flute construction provides better chip evacuation
- Sharper Rakes for softer metals to cut with ease

Item Code Uncoated	Item Code Coated	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CX0XGBE00BM4	-	2	12	50	3
CX0XGBE003C1	-	3	16	50	3
CX0XGBE003F4	-	4	22	50	4
CX0XGBE00BS0	-	4	30	60	4
CX0XGBE00BD3	-	4	35	75	4
CX0XGBE003J5	-	5	22	50	5
CX0XGBE00054	-	5	30	60	5
CX0XGBE003M9	-	5	35	75	5
CX0XGBE00070	-	5	50	100	5
CX0XGBE003Q0	-	6	22	50	6
CX0XGBE00088	-	6	30	60	6
CX0XGBE000A8	-	6	35	75	6
CX0XGBE000C4	-	6	50	100	6
CX0XGBE000E9	-	8	20	60	8
CX0XGBE00AP8	-	8	22	50	8
CX0XGBE00AQ6	-	8	30	60	8
CX0XGBE00BF9	-	8	35	75	8
CX0XGBE000G5	-	8	50	100	8
CX0XGBE00E20	-	10	30	60	10
CX0XGBE00DY5	-	10	30	75	10
CX0XGBE00BN1	-	10	50	100	10
CX0XGBE00DZ3	-	12	30	75	12
CX0XGBE000H3	-	12	50	100	12

Item Code Uncoated	Item Code TiALN Coated	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
-	CX01GBE00C21	1	6	50	3
-	CX01GBE00AX9	1.5	8	50	3
-	CX01GBE000J7	2	8	50	3
-	CX01GBE00BE0	2.5	8	50	3
-	CX01GBE000N8	3	14	50	3
-	CX01GBE00BJ9	4	14	50	4
-	CX01GBE000P4	4	22	50	4
-	CX01GBE00BD2	4	25	75	4
-	CX01GBE00CF7	4	30	100	4
-	CX01GBE00C62	5	16	50	5
-	CX01GBE000Q2	5	22	50	5
-	CX01GBE000R0	6	18	50	6
-	CX01GBE000T5	6	22	50	6
-	CX01GBE00BZ4	6	30	60	6
-	CX01GBE00CE9	6	35	100	6
-	CX01GBE00CG5	8	20	60	8
-	CX01GBE00BK7	10	30	75	10
-	CX01GBE00AZ5	12	25	150	12
-	CX01GBE00BL5	12	30	75	12
-	CX01GBE00C05	12	30	200	12

Carbon Steels BHN 180 to 225	Alloy Steels BHN 225 to 355	Prehardened Steels HRc 40 to 45	Austenitic Stainless Steel	Precipitation Hardened Stainless Steel	Titanium	HighTemp. Alloy	Grey Cast Iron	Ductile Cast Iron	Hardened Steels HRc 45 to 55	High Hardened Steels HRc 55 to 70	Aluminum	Hard Wood	Soft Wood	MDF	Plywood / Laminates
2 nd	2 nd										2 nd	1 st	1 st	1 st	2 nd

FOR FEED & SPEED Rates, go to page no. PG-147



Features:

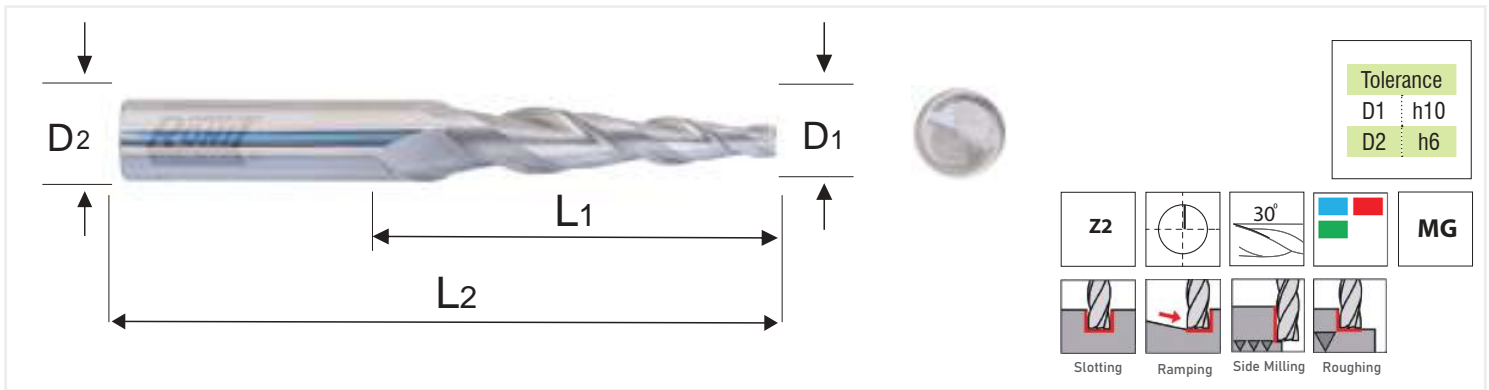
- Especially designed for machining Aluminium, Plastic & Non-ferrous
- Sharper Rakes to cut easily in plastics & wood
- Single Flute Design helps in easy chip evacuation
- Inch sizes & Downtcut Single Flute Router Bits are also manufactured on request

Item Code Uncoated	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CX0XGRB00014	3	16	50	3
CX0XGRB00022	4	22	50	4
CX0XGRB00030	4	30	60	4
CX0XGRB00048	4	35	75	4
CX0XGRB00055	4	50	100	4
CX0XGRB00063	5	22	50	5
CX0XGRB00071	5	30	60	5
CX0XGRB00089	5	35	75	5
CX0XGRB00097	5	50	100	5
CX0XGRB000A9	6	22	50	6
CX0XGRB000B7	6	30	60	6
CX0XGRB000C5	6	35	75	6
CX0XGRB000D2	6	50	100	6

Item Code Uncoated	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CX0XGRB000E0	8	22	50	8
CX0XGRB000F8	8	30	60	8
CX0XGRB000G6	8	35	75	8
CX0XGRB000H4	8	50	100	8
CX0XGRB000S9	10	22	50	10
CX0XGRB000J9	10	30	60	10
CX0XGRB000K7	10	35	75	10
CX0XGRB000L5	10	50	100	10
CX0XGRB000M3	12	30	60	12
CX0XGRB000N0	12	35	75	12
CX0XGRB000P6	12	50	100	12
CX0XGRB000Q4	14	50	100	14
CX0XGRB000R2	16	50	100	16

Carbon Steels BHN 180 to 225	Alloy Steels BHN 225 to 355	Prehardened Steels HRc 40 to 45	Austenitic Stainless Steel	Precipitation Hardened Stainless Steel	Titanium	HighTemp. Alloy	Grey Cast Iron	Ductile Cast Iron	Hardened Steels HRc 45 to 55	High Hardened Steels HRc 55 to 70	Aluminum	Aluminum Alloys	Plastic	Wood / MDF	Copper/Brass
											1 st	2 nd	1 st	1 st	1 st

FOR FEED & SPEED Rates, go to page no. PG-152



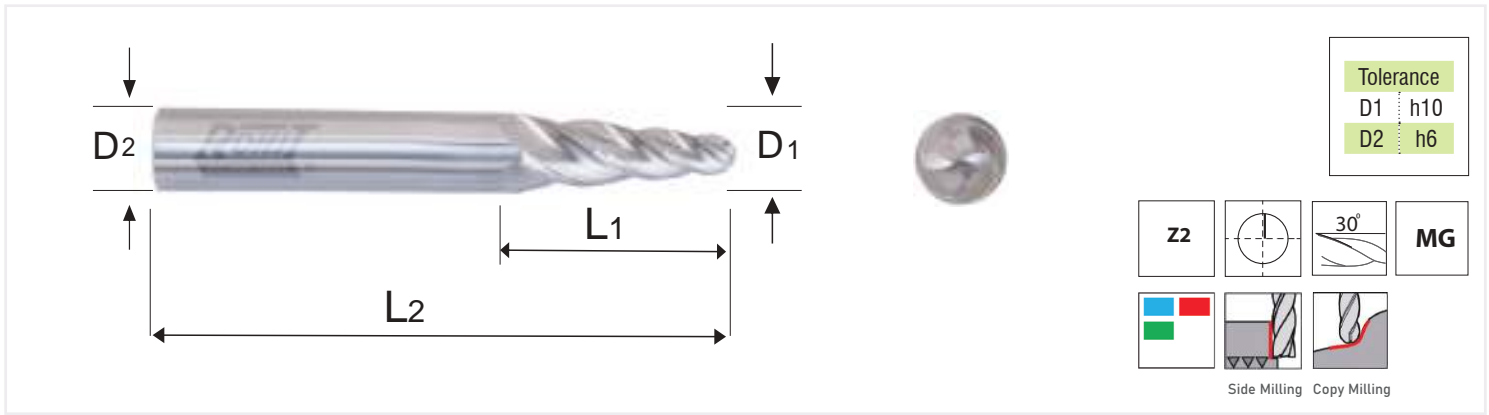
Features:

- Suitable for making V-shaped slots in wood and other softer materials.
- Other Taper Angles also manufactured on request

Ordering Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)	Taper Angle(a°)
10801006048-U	1.00	30	60	6	4° 50'
10801506043-U	1.50	30	60	6	4° 20'
10802006038-U	2.00	30	60	6	3° 50'
10803006029-U	3.00	30	60	6	2° 50'
10804006019-U	4.00	30	60	6	1° 50'
10804007538-U	4.00	30	75	8	3° 50'

Carbon Steels BHN 180 to 225	Alloy Steels BHN 225 to 355	Prehardened Steels HRc 40 to 45	Austenitic Stainless Steel	Precipitation Hardened Stainless Steel	Titanium	HighTemp. Alloy	Grey Cast Iron	Ductile Cast Iron	Hardened Steels HRc 45 to 55	High Hardened Steels HRc 55 to 70	Aluminum	Aluminum Alloys	Plastic	Wood / MDF	Copper/Brass
2 nd							2 nd				1 st	2 nd	1 st	1 st	1 st

NOTE: This is Non-stock Item, ask your RIGPL representative for Delivery Period FOR FEED & SPEED Rates, go to page no. PG-151



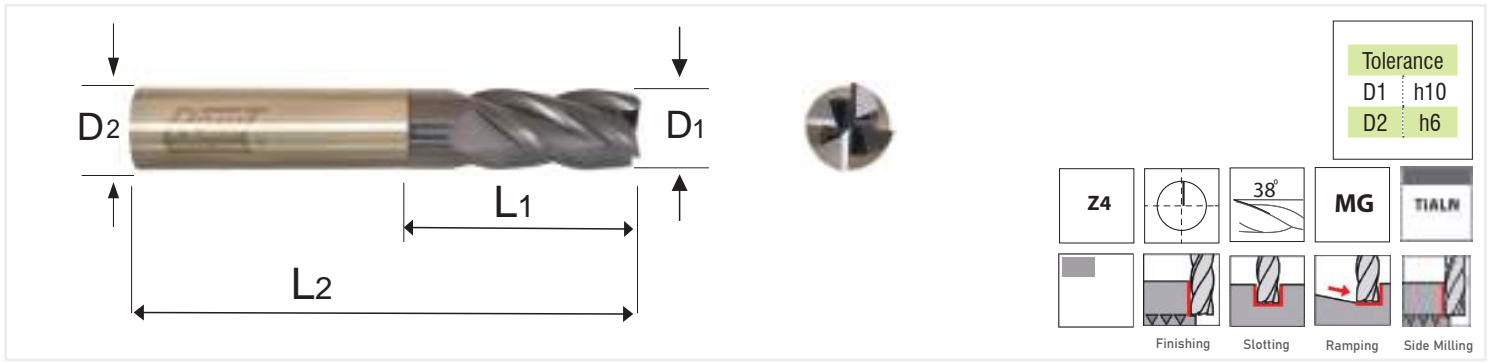
Features:

- Suitable for making V-shaped slots in wood and other softer materials.
- Other Taper Angles also manufactured on request

Ordering Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)	Taper Angle(a°)
10901006048-U	1.00	30	60	6	4° 50'
10901506043-U	1.50	30	60	6	4° 20'
10902006038-U	2.00	30	60	6	3° 50'
10903006029-U	3.00	30	60	6	2° 50'
10904006019-U	4.00	30	60	6	1° 50'
10904007538-U	4.00	30	75	8	3° 50'

Carbon Steels BHN 180 to 225	Alloy Steels BHN 225 to 355	Prehardened Steels HRc 40 to 45	Austenitic Stainless Steel	Precipitation Hardened Stainless Steel	Titanium	HighTemp. Alloy	Grey Cast Iron	Ductile Cast Iron	Hardened Steels HRc 45 to 55	High Hardened Steels HRc 55 to 70	Aluminum	Aluminum Alloys	Plastic	Wood / MDF	Copper/Brass
2 nd							2 nd				1 st	2 nd	1 st	1 st	1 st

NOTE: This is Non-stock Item, ask your RIGPL representative for Delivery Period FOR FEED & SPEED Rates, go to page no. PG-147



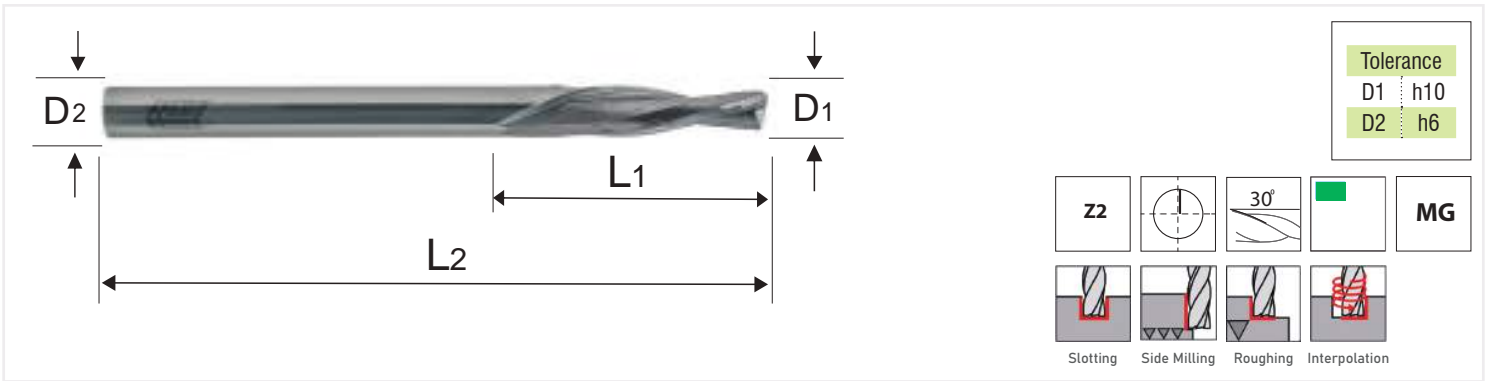
Features:

- 4-Flute Carbide End Mills comes with TiALN coating on end mills
- Economical Carbide End Mills to be used for die-mold up to 45-HRc

Item Code TiALN Coated	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CX01GSE00K75	3	14	50	3
CX01GSE00KE4	3	25	75	3
CX01GSE00K83	4	14	50	4
CX01GSE00KF2	4	25	75	4
CX01GSE00KG0	4	30	100	4
CX01GSE00K91	5	16	50	5
CX01GSE00KH8	5	25	75	5
CX01GSE00KJ3	5	35	100	5
CX01GSE00L66	5	40	100	5
CX01GSE00KA3	6	18	50	6
CX01GSE00KK1	6	30	75	6
CX01GSE00KL9	6	35	100	6
CX01GSE00L74	6	40	100	6
110070060-F	7	20	60	7
CX01GSE00KB1	8	20	60	8
CX01GSE00KM7	8	30	75	8

Item Code TiALN Coated	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CX01GSE00KN4	8	40	100	8
CX01GSE00L82	8	50	100	8
CX01GSE00LA2	8	50	150	8
110090075-F	9	30	75	9
CX01GSE00KC9	10	30	75	10
CX01GSE00KP0	10	50	100	10
CX01GSE00LB0	10	60	150	10
110110075-F	11	30	75	11
CX01GSE00KD6	12	30	75	12
CX01GSE00KQ8	12	50	100	12
CX01GSE00L90	12	60	150	12
CX01GSE00MG8	14	50	100	14
CX01GSE00KR6	16	50	100	16
CX01GSE00LC8	16	60	150	16
CX01GSE00MF0	18	50	100	18
CX01GSE00KS3	20	50	100	20

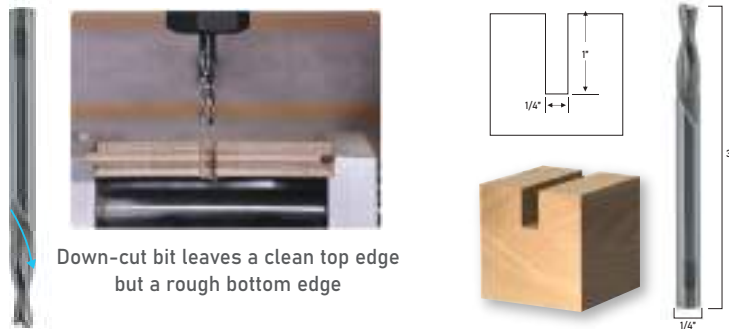
Carbon Steels BHN 180 to 225	Alloy Steels BHN 225 to 355	Prehardened Steels HRc 40 to 45	Austenitic Stainless Steel	Precipitation Hardened Stainless Steel	Titanium	HighTemp. Alloy	Grey Cast Iron	Ductile Cast Iron	Hardened Steels HRc 45 to 55	High Hardened Steels HRc 55 to 70	Aluminum	Aluminum Alloys	Plastic	Wood / MDF	Copper/Brass
2 nd	2 nd						2 nd		2 nd						



Features:

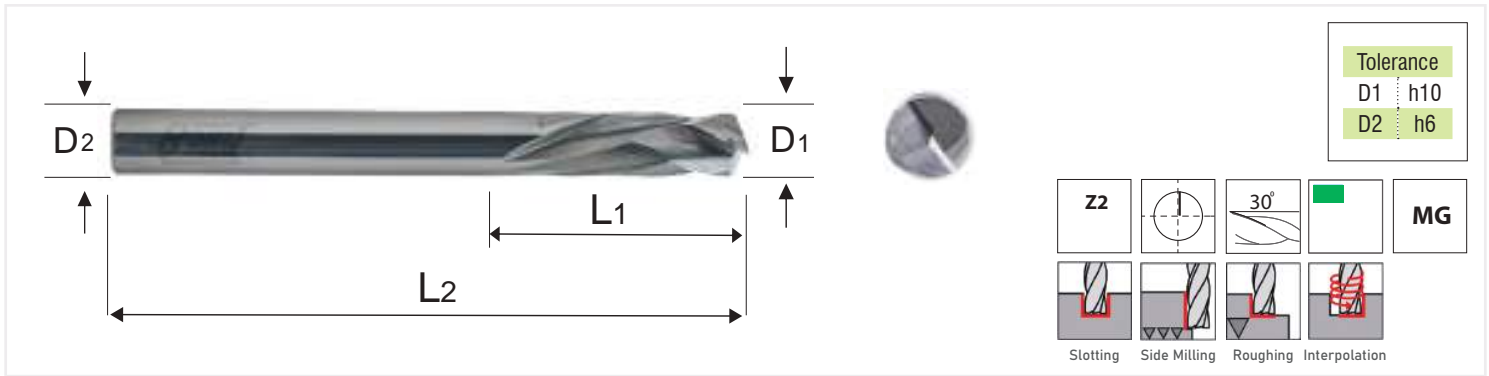
- Clear Chips down, good edge quality on Top face
- Downward Force helps in cutting thin sheets
- Especially designed for machining Plywood, MDF & Hardwood
- Pocket Cutting Applications

Ordering Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
112060075-DOWN-U	6	25	75	6
1124392203"-DOWN-U	1/4"	1"	3"	1/4"
112080075-DOWN-U	8	25	75	8
112100075-DOWN-U	10	25	75	10
112120075-DOWN-U	12	25	75	12
1124386203"-DOWN-U	1/2"	1"	3"	1/2"



Carbon Steels BHN 180 to 225	Alloy Steels BHN 225 to 355	Prehardened Steels HRc 40 to 45	Austenitic Stainless Steel	Precipitation Hardened Stainless Steel	Titanium	HighTemp. Alloy	Grey Cast Iron	Ductile Cast Iron	Hardened Steels HRc 45 to 55	High Hardened Steels HRc 55 to 70	Aluminum	Hard Wood	Soft Wood	MDF	Plywood / Laminates
												2 nd	1 st	1 st	2 nd

NOTE: This is Non-stock Item, ask your RIGPL representative for Delivery Period FOR FEED & SPEED Rates, go to page no. PG-152

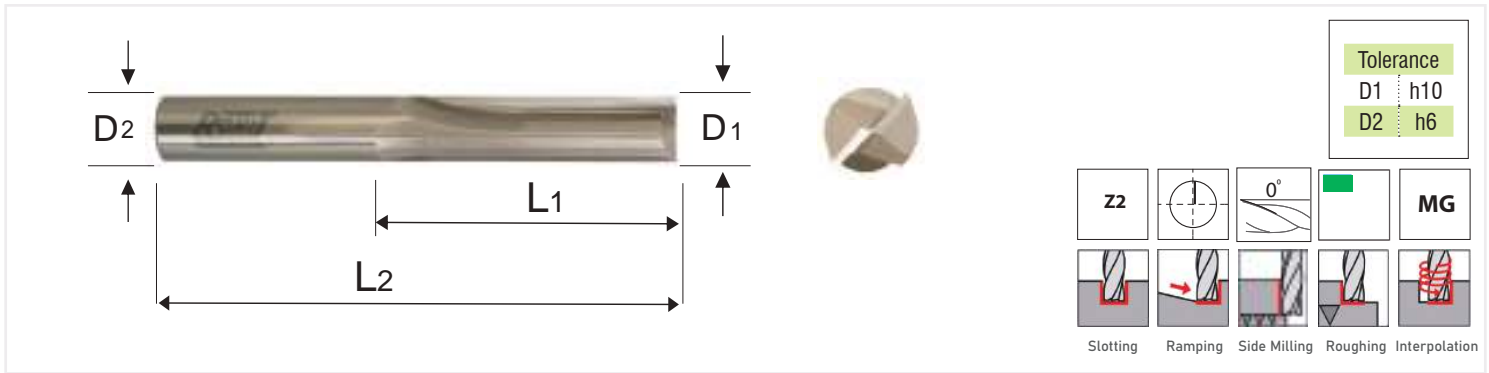


Features:

- Especially Designed to cut Laminated sheets at full depth in single pass

Item Code	Flute Dia(D1)	Flute Len(L1)	Reach Length (L3)	Overall Len(L2)	Shank Dia(D2)
CX0XGCP00018	6	25	-	75	6
1140635090-COMP-U	1/4"	7/8"	-	3"	1/4"
CX0XGCP00026	8	25	-	75	8
1140950090-COMP-U	3/8"	1"	-	3"	3/8"
CX0XGCP00059	10	25	-	75	10
CX0XGCP00034	10	25	-	100	10
CX0XGCP00067	12	25	-	75	12
CX0XGCP00042	12	25	-	100	12
114127100-COMP-U	1/2"	1-5/16"	-	3"	1/2"
114060100-COMP-L-U	6	25	40	75	6
1140635100-COMP-L-U	1/4"	7/8"	1-1/2"	3"	1/4"
114080100-COMP-L-U	8	25	40	75	8
114095100-COMP-L-U	3/8"	1"	1-5/16"	3"	3/8"
114100090-COMP-L-U	10	25	40	75	10
114120090-COMP-L-U	12	25	40	75	12
114127100-COMP-L-U	1/2	1-5/16"	2"	4"	1/2"

Carbon Steels BHN 180 to 225	Alloy Steels BHN 225 to 355	Prehardened Steels HRC 40 to 45	Austenitic Stainless Steel	Precipitation Hardened Stainless Steel	Titanium	HighTemp. Alloy	Grey Cast Iron	Ductile Cast Iron	Hardened Steels HRC 45 to 55	High Hardened Steels HRC 55 to 70	Aluminum	Hard Wood	Soft Wood	MDF	Plywood / Laminates
												1 st	1 st	1 st	1 st



Features:

- For machining Hard Wood and MDF wood
- Specially designed for effective cutting in Hard wood.
- Straight Flute design with higher Flute Depth to ensure smooth flow of chips

Item Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CX0XGSE00QH3	3	15	50	4
CX0XGSE00Q96	3	15	50	6
CX0XGSE00QA8	3	20	50	6
CX0XGSE00QB6	4	16	50	6
CX0XGSE00QJ8	4	20	50	4
CX0XGSE00QC4	4	22	50	6
CX0XGSE00QK6	5	22	50	5
CX0XGSE00QD1	5	22	50	6
CX0XGSE00QE9	6	22	50	6
CX0XGSE00QL4	6	25	60	6
CX0XGSE00QG5	6	30	60	8

Item Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CX0XGSE00QF7	6	35	75	6
CX0XGSE00QM2	8	30	60	8
CX0XGSE00QN9	8	35	75	8
CX0XGSE00QP5	8	50	100	8
CX0XGSE00QQ3	10	30	60	10
CX0XGSE00QR1	10	40	75	10
CX0XGSE00QS8	10	50	100	10
CX0XGSE00QT6	12	30	60	12
CX0XGSE00QU4	12	35	75	12
CX0XGSE00QV2	12	50	100	12

Carbon Steels BHN 180 to 225	Alloy Steels BHN 225 to 355	Prehardened Steels HRc 40 to 45	Austenitic Stainless Steel	Precipitation Hardened Stainless Steel	Titanium	HighTemp. Alloy	Grey Cast Iron	Ductile Cast Iron	Hardened Steels HRc 45 to 55	High Hardened Steels HRc 55 to 70	Aluminum	Hard Wood	Soft Wood	MDF	Plywood / Laminates
												1 st	1 st	1 st	1 st

NOTE: For FEED & SPEED Rates, go to page no. PG-152

Benefits of Compression Router Bits

Straight Flute C118



UPCut C103



DownCut C112



Compression Bit C114



ADVANTAGES

- Good edge quality on most materials
- Moderate chip clear ability

- Clear chips from the kerf left good quality on bottom face when through-cutting
- Allow faster feed rates than Down cut spiral bit

- Clear chips down, good edge quality on top face
- Downwards force help with cutting thin sheets

- Designed to cut veneer or laminated materials at full depth in one pass
- Clean edge on both top and bottom face

DISADVANTAGES

- Lower processing efficiency than the spiral bit

- May chip or fray on top face
- Upwards force may cause part lifting via bit

- Downwards force help with cutting thin sheets
- Chip or fray bottom face when through-cutting
- Require slower feed rate than up cut

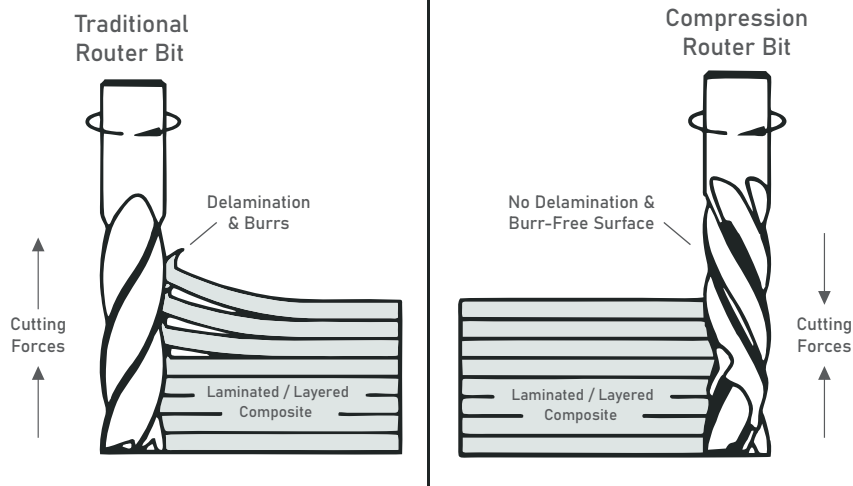
SUITABLE MATERIAL

- Fit mostly material

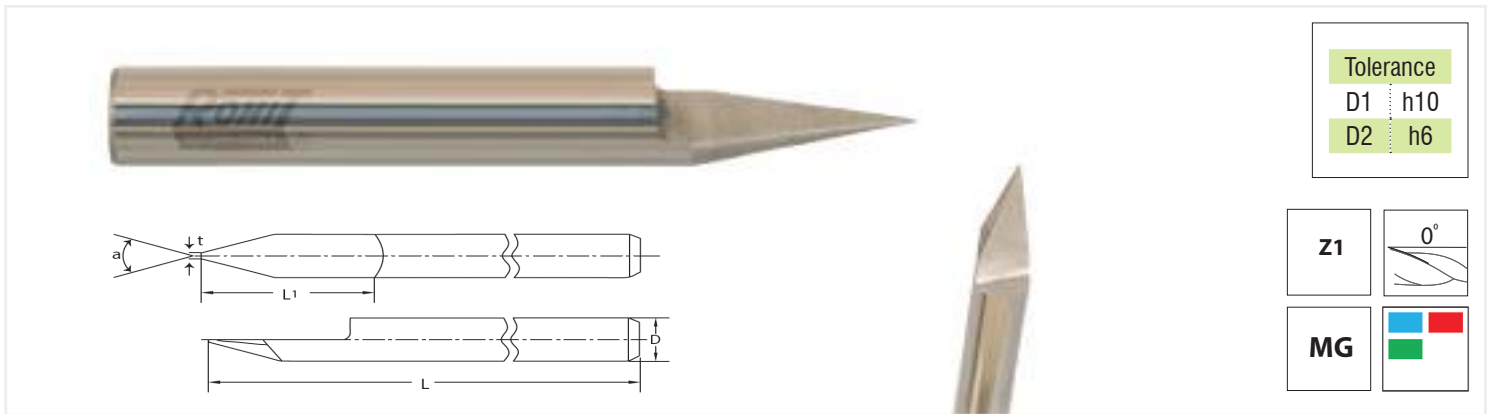
- Plastics, Aluminum, or material of which heat buildup on the concerning

- Plywood, Laminates, MDF, Hard wood, Soft wood (Pocketing cutting)

- Plywood, Laminates, MDF, Hard wood, Soft wood (Pocketing cutting)



NOTE: For FEED & SPEED Rates, go to page no. PG-152



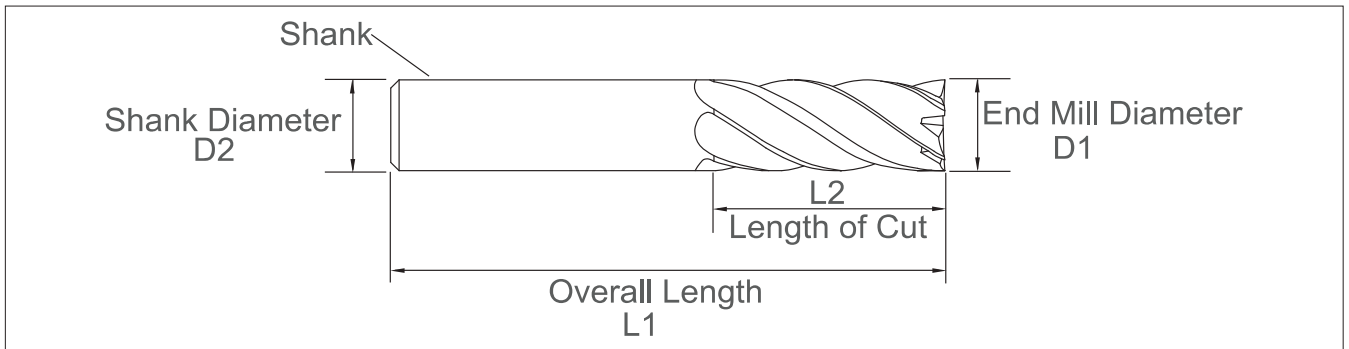
Features:

- For engraving in Soft Wood, Hard Wood, MDF, Plastics, Non-ferrous materials etc.
- Included Angle: 45, 60 and 90 deg. Can be made on special request. MOQ will apply
- Engraving bit tip diameters range from 0.10mm to 0.40mm ; so for your delicate Engraving work Opt for these Bits

Ordering Code	TIP (t)	Included Angle (a°)	Cutting Length (L1)	Overall Length(L)	Shank Dia(D)
CX0XEB00013	0.2-0.5	30°	12	50	3
CX0XEB00021	0.2-0.5	30°	12	50	4
CX0XEB00039	0.2-0.5	30°	15	50	5
CX0XEB00047	0.2-0.5	30°	15	50	6
CX0XEB00054	0.4-0.8	30°	25	60	8
119100075-U	0.4-0.8	30°	25	75	10
119120075-U	0.4-0.8	30°	25	75	12
119127075-U	0.4-0.8	30°	25	75	12.7

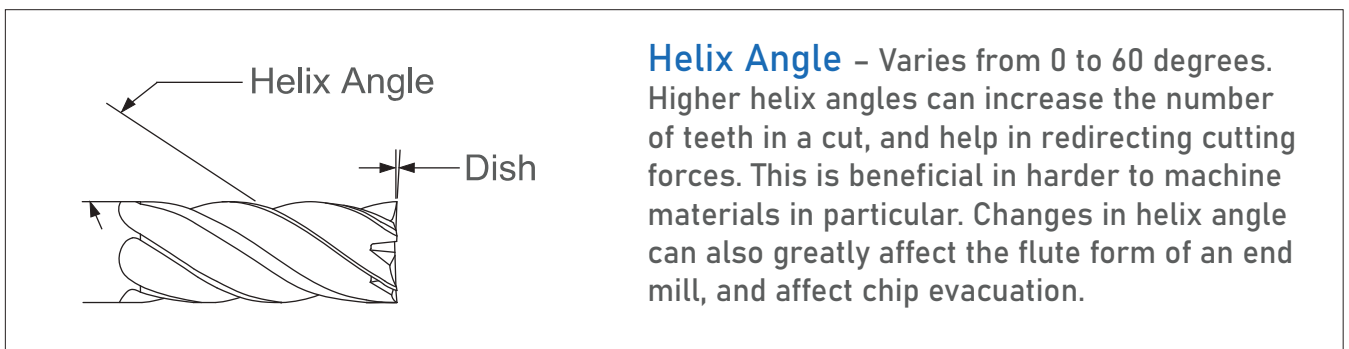
Carbon Steels BHN 180 to 225	Alloy Steels BHN 225 to 355	Prehardened Steels HRC 40 to 45	Austenitic Stainless Steel	Precipitation Hardened Stainless Steel	Titanium	HighTemp. Alloy	Grey Cast Iron	Ductile Cast Iron	Hardened Steels HRC 45 to 55	High Hardened Steels HRC 55 to 70	Aluminum	Aluminum Alloys	Plastic	Wood / MDF	Copper/Brass
1st	1st	2nd	1st	2nd							1st	2nd	1st	1st	1st

End Mill Terminology



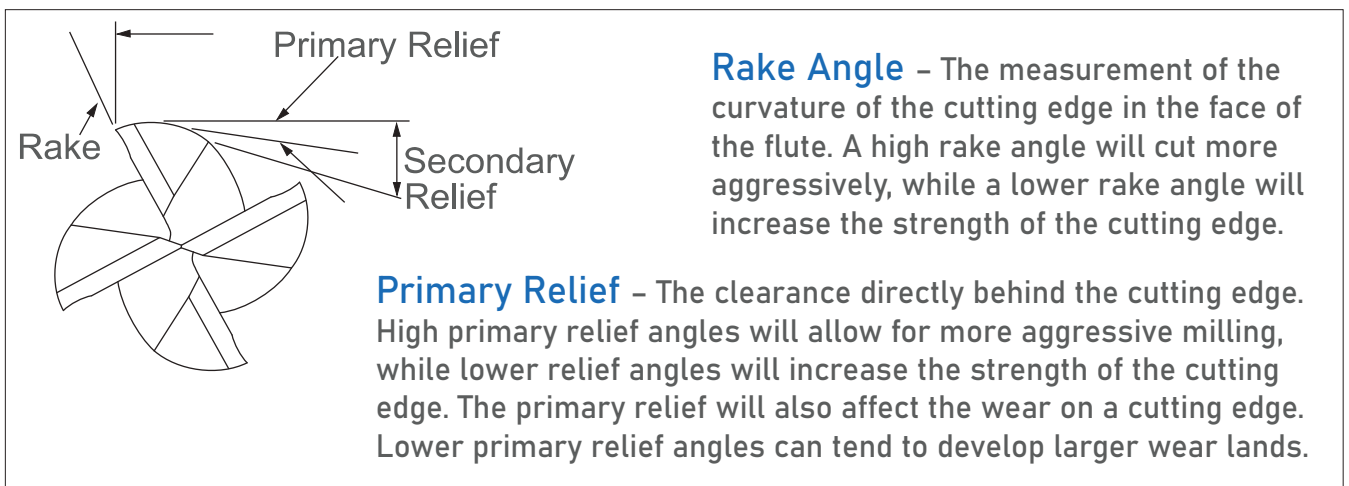
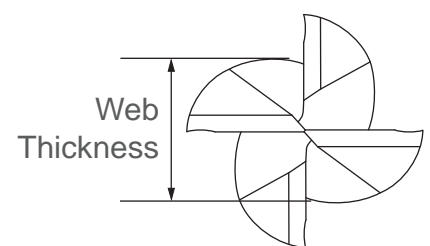
Length of Cut (Flute Length) – Always select the shortest Flute Length possible for your application. By selecting the shortest Flute Length, you can increase rigidity and allow for higher feed rates.

End Mill Diameter – Always select the largest diameter possible for your milling operation. Increasing your diameter by just 10%, can increase your rigidity by 25%.



Helix Angle – Varies from 0 to 60 degrees. Higher helix angles can increase the number of teeth in a cut, and help in redirecting cutting forces. This is beneficial in harder to machine materials in particular. Changes in helix angle can also greatly affect the flute form of an end mill, and affect chip evacuation.

Web Thickness – The cross section of the fluting of the end mill. Larger webs allow for more rigidity, while smaller webs allow for better chip evacuation. This feature is highly dependent on the material being machined.



Rake Angle – The measurement of the curvature of the cutting edge in the face of the flute. A high rake angle will cut more aggressively, while a lower rake angle will increase the strength of the cutting edge.

Primary Relief – The clearance directly behind the cutting edge. High primary relief angles will allow for more aggressive milling, while lower relief angles will increase the strength of the cutting edge. The primary relief will also affect the wear on a cutting edge. Lower primary relief angles can tend to develop larger wear lands.

Conversion charts


English to Metric

MULTIPLY	BY	TO OBTAIN
Inches	25.4	Millimetres
Inches	2.54	Centimetres
Feet	.3048	Metres
Inches per minute	25.4	Millimetres per minute
Cubic Inches per minute	16.387	Cubic Centimetres per minute
Surface Feet per minute	.3048	Surface Metres per minute

Metric to English


MULTIPLY	BY	TO OBTAIN
Millimetres	.0394	Inches
Centimetres	.3937	Inches
Metres	3.2808	Feet
Millimetres per minute	.0394	Inches per minute
Cubic Centimetres per minute	.0610	Cubic Inches per minute
Surface Metres per minute	3.2808	Surface Feet per minute

Milling Formulas - METRIC Values

Symbol	Description		Formula
Vc	Surface Meters / Minute		$Vc = \frac{\pi \times D \times n}{1000}$
n	Revolutions / Minute		$n = \frac{Vc \times 1000}{\pi \times D}$
fz	Feed / Tooth		$Fz = \frac{vf}{n \times z}$
Vf	Millimeters / Minute		$vf = (n) \times (z) \times (fz)$
D(eff)	Effective Diameter		$D(eff) = 2 \times \sqrt{D \times ap - ap^2}$

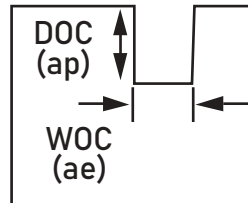
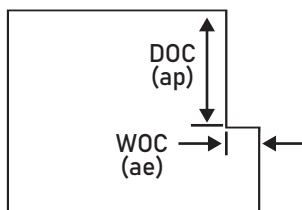
symbol key : $\pi = 3.1416$ D = tool diameter (mm) z = no. of flutes ap = depth of cut

Milling Formulas - INCH Values

Symbol	Description		Formula
SFM	Surface Meters / Minute		$SFM = \frac{RPM \times D}{3.82}$
RPM	Revolutions / Minute		$RPM = \frac{SFM \times 3.82}{D}$
IPT	Feed / Tooth		$IPT = \frac{IPM}{z \times RPM}$
IPM	Inches / Minute		$IPM = IPT \times RPM \times z$
D _(eff)	Effective Diameter		$D(eff) = 2 \times \sqrt{R^2 - (R - D_1)^2}$

symbol key : D = tool diameter (in.) z = no. of flutes R = Radius D₁ = DOC (ap)

	Material	Hardness
Alloy Steel	Free Machining & Low Carbon Steels 1006, 1008, 1015, 1018, 1020, 1022, 1025, 1117, 1140, 1141, 11L08, 11L14, 1213, 12L13, 12L14, 1215, 1330	BHN 180 to 225
	Medium Carbon & High Carbon Steels, Alloy Steels & Easy to Machine Tool Steels 1030, 1035, 1040, 1045, 1050, 1052, 1055, 1060, 1085, 1095, 1541, 1551, 9255, 2515, 3135, 3415, 4130, 4137, 4140, 4150, 4320, 4340, 4520, 5015, 5115, 5120, 5132, 5140, 5155, 6150, 8620, 9262, 9840, 52100, O1, O2, O6, S2, W1 to W310 Alloy Steels	BHN 225 to 355
	Alloyed heat-treatable, Tool and High Speed Steels O7, M1, M2, M3, M4, M7, T1, T2, T4, T5, T8, T15, H10, H11, H12, H13, H19, H21, L3, L6, L7, P2, P20, S1, S5, S7, 52100, A 128, D2, D3, D4, D5, D7	40-45 HRc
Stainless Steel	Austenitic SS: Easy to Machine 430F, 301, 303, 410, 416 Annealed, 420F, 430, 430F	<28 HRc
	Austenitic SS Moderately Difficult: 301, 302, 303 High Tensile, 304, 304L, 305, 420, 15-5PH, 17-4PH, 17-7PH	<28 HRc
	Precip. Hardened SS Difficult to Machine: 302B, 304B, 309, 310, 316, 316B, 316L, 316Ti, 317, 317L, 321, PH13-8MO, Nitronic	>28 HRc
Super Alloys	Titanium Alloys 6Al-4V, 5Al-2.5 Sn, 6Al-2Sn-4Zr-6Mo, 3Ai-8V-6Cr4Mo-4Zr, 10V-2Fe-3Ai, 13V-11Cr-3Ai	<42 HRc
	High-Temperature Alloys Inconel, Nimonic, Monel, Hastelloy, Waspalloy, A286, Rene41, Udimet, Stellite	<42 HRc
CAST IRON	Cast Iron - Gray CG ASTM A48, CLASS 20, 25, 30, 35, SAE J431C, GRADES G1800, G3000, G3500, GG 10, 15, 20, 25, 30, 35, 40	<240 HB
	Cast Iron - Ductile & Malleable CGI 60-40-18, 65-45-12, D4018, D4512, D5506, 32510, 35108, M3210, M4504, M5503, 250, 300, 350	>240 HB



ADOC / DOC (Ap)
Axial Depth of Cut

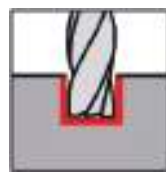
RDOC / WOC (Ae)
Radial Depth of Cut

NOTE: 1. These are just the Starting Parameters, you may vary the Speed and Feed depending upon other machining condition.

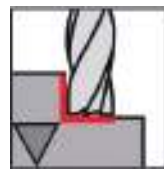
2. Always select shortest possible flute length to prevent breakage & vibration rising due to over hang.

3. Always wear protective gear as high speed tools may break & cause harm

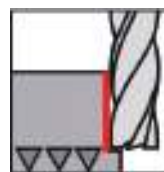
Application	DOC (Ap) max	WOC (Ae) max	Cutting speed (Vc)	FEED per TOOTH								
				4 mm	5 mm	6 mm	8 mm	10 mm	12 mm	14 mm	16 mm	20 mm
			m/min	mm / Z								
SLT	0.04 x D	1.00 x D	110-130	0.011	0.014	0.016	0.026	0.033	0.04	0.048	0.053	0.066
RGH	1.00 x D	0.15 x D	110-130	0.02	0.023	0.031	0.05	0.063	0.075	0.088	0.1	0.125
FIN	2.00 x D	0.02 x D	130-150	0.015	0.018	0.023	0.037	0.046	0.055	0.064	0.074	0.092
SLT	0.04 x D	1.00 x D	90-100	0.011	0.014	0.016	0.024	0.03	0.036	0.044	0.048	0.06
RGH	1.00 x D	0.15 x D	90-100	0.02	0.023	0.031	0.046	0.057	0.068	0.078	0.091	0.114
FIN	2.00 x D	0.02 x D	100-120	0.015	0.018	0.023	0.034	0.042	0.05	0.059	0.067	0.084
SLT	0.03 x D	1.00 x D	60-70	0.011	0.014	0.016	0.024	0.03	0.036	0.044	0.048	0.06
RGH	0.5 x D	0.1 x D	70-80	0.02	0.023	0.031	0.046	0.057	0.068	0.078	0.091	0.114
FIN	1.00 x D	0.01 x D	90-100	0.015	0.018	0.023	0.034	0.042	0.05	0.059	0.067	0.084
SLT	0.03 x D	1.00 x D	60-70	0.008	0.011	0.013	0.017	0.021	0.025	0.031	0.034	0.042
RGH	0.5 x D	0.10 x D	80-90	0.019	0.022	0.029	0.038	0.049	0.058	0.065	0.077	0.097
FIN	1.00 x D	0.02 x D	80-90	0.012	0.015	0.017	0.023	0.029	0.035	0.041	0.047	0.059
SLT	0.03 x D	1.00 x D	50-60	0.008	0.011	0.013	0.017	0.021	0.025	0.031	0.034	0.042
RGH	0.5 x D	0.10 x D	60-70	0.019	0.022	0.029	0.038	0.049	0.058	0.065	0.077	0.097
FIN	1.00 x D	0.02 x D	65-75	0.012	0.015	0.017	0.023	0.029	0.035	0.041	0.047	0.059
SLT	0.02 x D	1.00 x D	30-40	0.008	0.011	0.013	0.017	0.021	0.025	0.031	0.034	0.042
RGH	0.5 x D	0.07 x D	45-55	0.021	0.024	0.032	0.042	0.053	0.063	0.075	0.084	0.105
FIN	1.00 x D	0.01 x D	50-60	0.015	0.018	0.023	0.03	0.038	0.046	0.055	0.061	0.076
SLT	0.02 x D	1.00 x D	30-40	0.008	0.011	0.013	0.017	0.021	0.025	0.031	0.034	0.042
RGH	0.3 x D	0.05 x D	45-55	0.021	0.024	0.032	0.042	0.053	0.063	0.075	0.084	0.105
FIN	0.5 x D	0.01 x D	50-60	0.015	0.018	0.023	0.03	0.038	0.046	0.055	0.061	0.076
SLT	0.01 x D	1.00 x D	20-30	0.007	0.01	0.011	0.014	0.018	0.022	0.025	0.029	0.036
RGH	0.2 x D	0.05 x D	30-40	0.018	0.021	0.027	0.036	0.045	0.054	0.065	0.072	0.09
FIN	0.2 x D	0.01 x D	40-50	0.013	0.016	0.019	0.026	0.032	0.039	0.045	0.052	0.065
SLT	0.04 x D	1.00 x D	110-130	0.011	0.014	0.016	0.026	0.033	0.04	0.048	0.053	0.066
RGH	1.00 x D	0.15 x D	110-130	0.02	0.023	0.031	0.05	0.063	0.075	0.088	0.1	0.125
FIN	2.00 x D	0.02 x D	130-150	0.015	0.018	0.023	0.037	0.046	0.055	0.064	0.074	0.092
SLT	0.04 x D	1.00 x D	90-100	0.011	0.014	0.016	0.024	0.03	0.036	0.044	0.048	0.06
RGH	1.00 x D	0.15 x D	90-100	0.02	0.023	0.031	0.046	0.057	0.068	0.078	0.091	0.114
FIN	2.00 x D	0.02 x D	100-120	0.015	0.018	0.023	0.034	0.042	0.05	0.059	0.067	0.084



Slotting
(SLT)

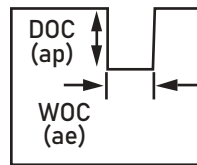
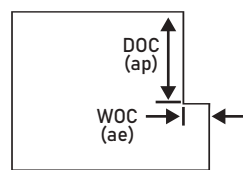


Roughing
(RGH)



Finishing
(FIN)

	Material	Hardness
Alloy Steel	Free Machining & Low Carbon Steels 1006, 1008, 1015, 1018, 1020, 1022, 1025, 1117, 1140, 1141, 11L08, 11L14, 1213, 12L13, 12L14, 1215, 1330	BHN 180 to 225
	Medium Carbon & High Carbon Steels, Alloy Steels & Easy to Machine Tool Steels: 1030, 1035, 1040, 1045, 1050, 1052, 1055, 1060, 1085, 1095, 1541, 1551, 9255, 2515, 3135, 3415, 4130, 4137, 4140, 4150, 4320, 4340, 4520, 5015, 5115, 5120, 5132, 5140, 5155, 6150, 8620, 9262, 9840, 52100, O1, O2, O6, S2, W1 to W310 Alloy Steels	BHN 225 to 355
	Alloyed heat-treatable, Tool and High Speed Steels O7, M1, M2, M3, M4, M7, T1, T2, T4, T5, T8, T15, H10, H11, H12, H13, H19, H21, L3, L6, L7, P2, P20, S1, S5, S7, 52100, A 128, D2, D3, D4, D5, D7	40-45 HRc
Hardened Steel	Hardened Steel Carbon and Alloy Steels, Tool & Die Steels L3, L6, L7, P2, P20, S1, S5, S7, 52100, A 128, D2, D3, D4, D5, D7	<55 HRc
	High Hardened Steel, Die Steels, High Speed Steel	55-65 HRc
Stainless Steel	Austenitic SS: Easy to Machine 430F, 301, 303, 410, 416 Annealed, 420F, 430, 430F	<28 HRc
	Austenitic SS Moderately Difficult: 301, 302, 303 High Tensile, 304, 304L, 305, 420, 15-5PH, 17-4PH, 17-7PH	<28 HRc
	Precip. Hardened SS Difficult to Machine: 302B, 304B, 309, 310, 316, 316B, 316L, 316Ti, 317, 317L, 321, PH13-8MO, Nitronic	>28 HRc
Super Alloys	Titanium Alloys: 6Al-4V, 5Al-2.5 Sn, 6Al-2Sn-4Zr-6Mo, 3Al-8V-6Cr4Mo-4Zr	<42 HRc
CAST IRON	Cast Iron - Gray CG ASTM A48, CLASS 20, 25, 30, 35, SAE J431C, GRADES G1800, G3000, G3500, GG 10, 15, 20, 25, 30, 35, 40	<240 HB
	CCast Iron - Ductile & Malleable CGI 60-40-18, 65-45-12, D4018, D4512, D5506, 32510, 35108, M3210, M4504, M5503, 250, 300, 350	>240 HB
Non Ferrous	Aluminium-Cast alloys, Al-Alloys: High Silicon - A380, A390, Castings, 3.2131 G-ALSi-5Cu1, 3.2153 G-ALSi7Cu3, 3.2573 G-ALSi9, 3.2581 G-ALSi12, 3.2583 G-ALSi12Cu.	above 3% Si

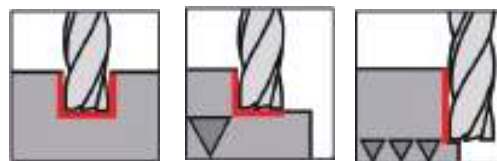


ADOC / DOC (Ap)
Axial Depth of Cut

RDOC / WOC (Ae)
Radial Depth of Cut

- NOTE: 1. These are just the Starting Parameters, you may vary the Speed and Feed depending upon other machining condition.
 2. Always select shortest possible flute length to prevent breakage & vibration rising due to over hang.
 3. Always wear protective gear as high speed tools may break & cause harm

Application	Ap max	Ae max	Cutting speed (Vc)	FEED per TOOTH								
				3 mm	4 mm	6 mm	8 mm	10 mm	12 mm	14 mm	16 mm	20 mm
			m/min	mm / Z								
SLT	0.02 x D	1.00 x D	80-90	0.006	0.009	0.013	0.021	0.026	0.032	0.038	0.042	0.053
RGH	-	-	-	-	-	-	-	-	-	-	-	-
FIN	1.00 x D	0.02 x D	110-120	0.008	0.012	0.018	0.030	0.037	0.044	0.051	0.059	0.074
SLT	0.02 x D	1.00 x D	60-70	0.006	0.009	0.013	0.019	0.024	0.029	0.035	0.038	0.048
RGH	-	-	-	-	-	-	-	-	-	-	-	-
FIN	1.00 x D	0.02 x D	90-100	0.008	0.012	0.018	0.027	0.034	0.040	0.047	0.054	0.067
SLT	-	-	-	-	-	-	-	-	-	-	-	-
RGH	-	-	-	-	-	-	-	-	-	-	-	-
FIN	1.00 x D	0.02 x D	90-100	0.007	0.012	0.018	0.027	0.034	0.040	0.047	0.054	0.067
SLT	-	-	-	-	-	-	-	-	-	-	-	-
RGH	-	-	-	-	-	-	-	-	-	-	-	-
FIN	0.01 x D	0.1 x D	60-70	0.007	0.012	0.018	0.027	0.034	0.04	0.047	0.054	0.067
SLT	-	-	-	-	-	-	-	-	-	-	-	-
RGH	-	-	-	-	-	-	-	-	-	-	-	-
FIN	0.01 x D	0.1 x D	40-50	0.005	0.01	0.015	0.024	0.031	0.038	0.044	0.051	0.062
SLT	0.03 x D	1.00 x D	50-60	0.005	0.006	0.01	0.014	0.017	0.02	0.025	0.027	0.034
RGH	0.5 x D	0.10 x D	60-70	0.008	0.015	0.023	0.03	0.039	0.046	0.052	0.062	0.078
FIN	1.00 x D	0.02 x D	60-70	0.007	0.01	0.014	0.018	0.023	0.028	0.033	0.038	0.047
SLT	0.03 x D	1.00 x D	50-60	0.005	0.006	0.01	0.014	0.017	0.02	0.025	0.027	0.034
RGH	-	-	-	-	-	-	-	-	-	-	-	-
FIN	1.00 x D	0.02 x D	65-75	0.007	0.01	0.014	0.018	0.023	0.028	0.033	0.038	0.047
SLT	0.02 x D	1.00 x D	30-40	0.005	0.006	0.01	0.014	0.017	0.02	0.025	0.027	0.034
RGH	-	-	-	-	-	-	-	-	-	-	-	-
FIN	1.00 x D	0.01 x D	50-60	0.007	0.012	0.018	0.024	0.03	0.037	0.044	0.049	0.061
SLT	-	-	-	-	-	-	-	-	-	-	-	-
RGH	-	-	-	-	-	-	-	-	-	-	-	-
FIN	0.01 x D	0.01 x D	30-40	0.006	0.011	0.016	0.021	0.027	0.032	0.039	0.043	0.053
SLT	0.04 x D	1.00 x D	80-90	0.006	0.009	0.013	0.021	0.026	0.032	0.038	0.042	0.053
RGH	1.00 x D	0.15 x D	90-100	-	0.016	0.025	0.04	0.05	0.06	0.07	0.08	0.1
FIN	2.00 x D	0.02 x D	100-110	0.008	0.012	0.018	0.03	0.037	0.044	0.051	0.059	0.074
SLT	0.04 x D	1.00 x D	70-80	0.005	0.008	0.012	0.019	0.024	0.029	0.035	0.038	0.048
RGH	1.00 x D	0.15 x D	70-80	-	-	-	-	-	-	-	-	-
FIN	2.00 x D	0.02 x D	80-90	0.007	0.012	0.018	0.027	0.034	0.04	0.047	0.054	0.067
SLT	1.00 x D	1.00 x D	140-160	0.02	0.025	0.035	0.045	0.053	0.062	0.075	0.092	0.135
RGH	2.00 x D	1.00 x D	140-160	0.024	0.03	0.04	0.05	0.06	0.07	0.082	0.102	0.15
FIN	2.00 x D	0.5 x D	160-180	0.026	0.03	0.04	0.05	0.06	0.07	0.082	0.102	0.15

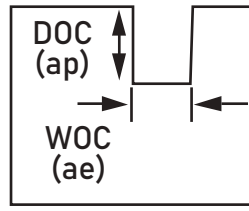
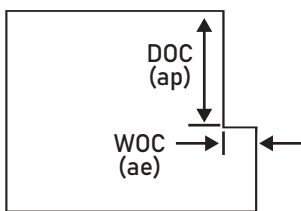


Slotting (SLT)

Roughing (RGH)

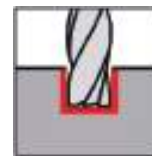
Finishing (FIN)

Material	Hardness	Application	DOC (Ap) max	WOC (Ae) max	Cutting speed (Vc)	FEED per TOOTH						
						mm / Z						
					m/min	4 mm	6 mm	8 mm	10 mm	12 mm	16 mm	
Alloy Steel Medium Carbon & High Carbon Steels, Alloy Steels & Easy to Machine Tool Steels: 1030, 1035, 1040, 1045, 1050, 1052, 1055, 1060, 085, 1095, 1541, 1551, 9255, 2515, 3135, 3415, 4130, 4137, 4140, 4150, 4320, 4340, 4520, 5015, 5115, 5120, 5132, 5140, 5155, 6150, 8620, 9262, 9840, 52100, O1, O2, O6, S2, W1 to W310 Alloy Steels	BHN 225 TO 355	SLT	0.06 x D	1.00 x D	130-140	0.014	0.022	0.032	0.04	0.048	0.064	
		RGH	1.00 x D	0.15 x D	150-160	0.027	0.041	0.061	0.076	0.091	0.122	
		FIN	2.00 x D	0.02 x D	180-190	0.02	0.03	0.045	0.056	0.067	0.09	
	Aligned heat-treatable, Tool and High Speed Steels O7, M1, M2, M3, M4, M7, T1, T2, T4, T5, T8, T15, H10, H11, H12, H13, H19, H21, L3, L6, L7, P2, P20, S1, S5, S7, 2100, A 128, D2, D3, D4, D5, D7	40-45 HRc	SLT	0.05 x D	1.00 x D	90-100	0.013	0.020	0.029	0.036	0.043	0.058
			RGH	1.00 x D	0.1 x D	130-140	0.024	0.037	0.055	0.068	0.082	0.110
			FIN	2.00 x D	0.01 x D	150-160	0.018	0.027	0.041	0.050	0.060	0.081
Stainless Steel Austenitic Stainless Steel Moderately Difficult: 301, 302, 303 High Tensile, 304, 304L, 305, 420, 15-5PH, 17-4PH, 17-7PH Precip. Hardened Stainless Steel Difficult to Machine: 302B, 304B, 309, 310, 316, 316B, 316L, 316Ti, 317, 317L, 321, PH13-8MO, Nitronic	<28 HRc	SLT	0.05 x D	1.00 x D	60-70	0.011	0.017	0.022	0.028	0.034	0.045	
		RGH	1.00 x D	0.10 x D	90-100	0.026	0.038	0.051	0.065	0.078	0.103	
		FIN	2.00 x D	0.02 x D	110-130	0.016	0.023	0.031	0.039	0.047	0.062	
	>28 HRc	SLT	0.05 x D	1.00 x D	45-55	0.011	0.017	0.022	0.028	0.034	0.045	
		RGH	0.5 x D	0.07 x D	70-80	0.028	0.042	0.056	0.07	0.084	0.112	
		FIN	1.00 x D	0.01 x D	90-100	0.02	0.03	0.04	0.05	0.061	0.081	
Super Alloys Titanium Alloys: 6Al-4V, 5Al-2.5 Sn, 6Al-2Sn-4Zr-6Mo, 3Al-8V-6Cr4Mo-4Zr, High-Temperature Alloys Inconel, Nimonic, Waspalloy, Stellite	<42 HRc	SLT	0.05 x D	1.00 x D	45-55	0.011	0.017	0.022	0.028	0.034	0.045	
		RGH	0.5 x D	0.05 x D	50-70	0.028	0.042	0.056	0.07	0.084	0.112	
		FIN	1.00 x D	0.01 x D	70-80	0.02	0.03	0.04	0.05	0.061	0.081	
	>42 HRc	SLT	0.03 x D	1.00 x D	30-40	0.01	0.014	0.019	0.024	0.029	0.038	
		RGH	0.5 x D	0.03 x D	40-50	0.024	0.036	0.048	0.06	0.072	0.096	
		FIN	0.5 x D	0.01 x D	50-60	0.018	0.026	0.034	0.043	0.052	0.069	

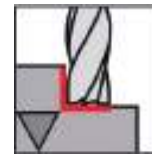


ADOC / DOC (Ap)
Axial Depth of Cut

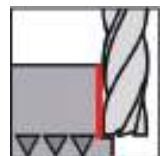
RDOC / WOC (Ae)
Radial Depth of Cut



Slotting (SLT)



Roughing (RGH)



Finishing (FIN)

NOTE: 1. These are just the Starting Parameters, you may vary the Speed and Feed depending upon other machining condition.

2. Always select shortest possible flute length to prevent breakage & vibration rising due to overhang.

3. Always wear protective gear as high speed tools may break & cause harm

Material	Hardness	Application	Ap max	Ae max	Cutting speed (Vc)	FEED per TOOTH						
						1 to 3 mm	4 mm	6 mm	8 mm	10 mm	12 mm	
					m/min	mm / Z						
Hardened Steel Hardened Steel Carbon and Alloy Steels	50-55 HRc	SLT	-	-	-	-	-	-	-	-	-	
		RGH	-	-	-	-	-	-	-	-	-	
		FIN	0.01 x D	1 x D	80-100	0.009	0.015	0.025	0.038	0.045	0.051	
	High Hardened Steels Tool & Die Steels P2, P20, S1, S5, S7, 52100, A 128, D2, D3, D4, D5, D7	55-60 HRc	SLT	-	-	-	-	-	-	-	-	-
			RGH	-	-	-	-	-	-	-	-	-
			FIN	0.01 x D	1 x D	60-70	0.007	0.012	0.02	0.032	0.041	0.045
	High Hardened Steels Die Steels & High Speed Steel: M1, M2, M3, M4, M7, T1, T2, T4, T5, T8, T15, H10, H11, H12, H13, H19, H21, L3, L6, L7, P2, P20, S1, S5, S7, 52100, A 128, D2, D3, D4, D5, D7	> 60 HRc	RGH	-	-	-	-	-	-	-	-	-
			FIN	0.01 x D	1 x D	25-50	0.005	0.01	0.017	0.027	0.034	0.038

Material	Hardness	Application	Ap max	Ae max	Cutting speed (Vc)	FEED per TOOTH						
						1 to 3 mm	4 mm	6 mm	8 mm	10 mm	12 mm	
					m/min	mm / Z						
Hardened Steel Hardened Steel Carbon and Alloy Steels	50-55 HRc	SLT	-	-	-	-	-	-	-	-	-	
		RGH	-	-	-	-	-	-	-	-	-	
		FIN	0.1-0.3	0.02 x D	130-150	0.01	0.015	0.022	0.03	0.041	0.052	
	High Hardened Steels Tool & Die Steels P2, P20, S1, S5, S7, 52100, A 128, D2, D3, D4, D5, D7	55-60 HRc	SLT	-	-	-	-	-	-	-	-	-
			RGH	-	-	-	-	-	-	-	-	-
			FIN	0.1-0.2	0.01 x D	110-120	0.007	0.009	0.011	0.014	0.021	0.028
	High Hardened Steels Die Steels & High Speed Steel: M1, M2, M3, M4, M7, T1, T2, T4, T5, T8, T15, H10, H11, H12, H13, H19, H21, L3, L6, L7, P2, P20, S1, S5, S7, 52100, A 128, D2, D3, D4, D5, D7	> 60 HRc	RGH	-	-	-	-	-	-	-	-	-
			FIN	0.05-0.1	0.01 x D	70-100	0.005	0.007	0.009	0.011	0.018	0.023

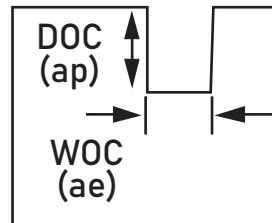
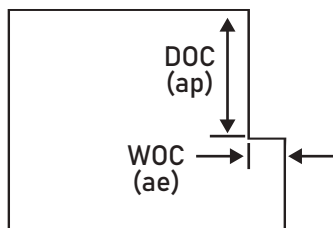
a_v = Width of cut
 a_p = Depth of cut



NOTE: Coolant Preference: Mist Spray

These are just the Starting Parameters, you may vary the Speed and Feed depending upon other machining condition.

	Material	Hardness
Alloy Steel	Free Machining & Low Carbon Steels 1006, 1008, 1015, 1018, 1020, 1022, 1025, 1117, 1140, 1141, 11L08, 11L14, 1213, 12L13, 12L14, 1215, 1330	BHN 180 to 225
	Medium Carbon & High Carbon Steels, Alloy Steels & Easy to Machine Tool Steels: 1030, 1035, 1040, 1045, 1050, 1052, 1055, 1060, 1085, 1095, 1541, 1551, 9255, 2515, 3135, 3415, 4130, 4137, 4140, 4150, 4320, 4340, 4520, 5015, 5115, 5120, 5132, 5140, 5155, 6150, 8620, 9262, 9840, 52100, O1, O2, O6, S2, W1 to W310 Alloy Steels	BHN 225 to 355
	Alloyed heat-treatable, Tool and High Speed Steels O7, M1, M2, M3, M4, M7, T1, T2, T4, T5, T8, T15, H10, H11, H12, H13, H19, H21, L3, L6, L7, P2, P20, S1, S5, S7, 52100, A 128, D2, D3, D4, D5, D7	40-45 HRc
Stainless Steel	Hardened Steel Carbon and Alloy Steels, Tool & Die Steels	<55 HRc
	High Hardened Steel, Die Steels, High Speed Steel	55-65 HRc
Super Alloys	Austenitic SS: Easy to Machine 430F, 301, 303, 410, 416 Annealed, 420F, 430, 430F	<28 HRc
	Austenitic SS Moderately Difficult: 301, 302, 303 High Tensile, 304, 304L, 305, 420, 15-5PH, 17-4PH, 17-7PH	< 28 HRc
	Precip. Hardened SS Difficult to Machine: 302B, 304B, 309, 310, 316, 316B, 316L, 316Ti, 317, 317L, 321, PH13-8MO, Nitronic	>28 HRc

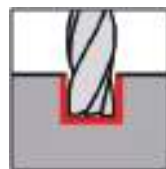


ADOC / DOC (Ap)
Axial Depth of Cut

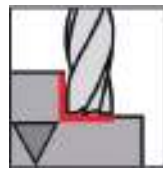
RDOC / WOC (Ae)
Radial Depth of Cut

- NOTE: 1. These are just the Starting Parameters, you may vary the Speed and Feed depending upon other machining condition.
 2. Always select shortest possible flute length to prevent breakage & vibration rising due to over hang.
 3. Always wear protective gear as high speed tools may break & cause harm

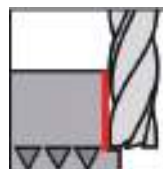
Application	DOC (Ap) max	WOC (Ae) max	Cutting speed (Vc)	FEED per TOOTH									
				1-3 mm	4 mm	5 mm	6 mm	8 mm	10 mm	12 mm	14 mm	16 mm	20 mm
			m/min	mm / Z									
SLT	0.05 x D	1.00 x D	60-80	0.008	0.011	0.016	0.021	0.032	0.038	0.045	0.054	0.061	0.07
RGH	-	-	-	-	-	-	-	-	-	-	-	-	-
FIN	-	-	-	-	-	-	-	-	-	-	-	-	-
SLT	0.03 x D	1.00 x D	50-70	0.007	0.01	0.015	0.02	0.03	0.036	0.043	0.052	0.059	0.068
RGH	-	-	-	-	-	-	-	-	-	-	-	-	-
FIN	-	-	-	-	-	-	-	-	-	-	-	-	-
SLT	0.01 x D	1.00 x D	40-60	0.005	0.08	0.013	0.018	0.029	0.035	0.041	0.05	0.057	0.065
RGH	-	-	-	-	-	-	-	-	-	-	-	-	-
FIN	2.00 x D	0.02 x D	70-90	0.006	0.009	0.012	0.016	0.027	0.034	0.040	0.047	0.054	0.062
SLT	-	-	-	-	-	-	-	-	-	-	-	-	-
RGH	-	-	-	-	-	-	-	-	-	-	-	-	-
FIN	0.01 x D	0.1 x D	40-50	0.006	0.009	0.015	0.018	0.027	0.034	0.04	0.047	0.054	0.062
SLT	-	-	-	-	-	-	-	-	-	-	-	-	-
RGH	-	-	-	-	-	-	-	-	-	-	-	-	-
FIN	0.01 x D	0.01 x D	20-40	0.004	0.007	0.012	0.015	0.024	0.03	0.035	0.042	0.05	0.057
SLT	0.02 x D	1.00 x D	50-70	0.008	0.011	0.019	0.021	0.032	0.038	0.045	0.054	0.061	0.07
RGH	-	-	-	-	-	-	-	-	-	-	-	-	-
FIN	1.00 x D	0.02 x D	70-90	0.006	0.009	0.015	0.018	0.027	0.034	0.04	0.047	0.054	0.062
SLT	-	-	-	-	-	-	-	-	-	-	-	-	-
RGH	-	-	-	-	-	-	-	-	-	-	-	-	-
FIN	0.03 x D	0.01 x D	20-40	0.004	0.007	0.012	0.015	0.024	0.031	0.036	0.043	0.05	0.057
SLT	-	-	-	-	-	-	-	-	-	-	-	-	-
RGH	-	-	-	-	-	-	-	-	-	-	-	-	-
FIN	0.01 x D	0.01 x D	20-40	0.003	0.004	0.008	0.01	0.02	0.027	0.032	0.039	0.046	0.054



Slotting
(SLT)



Roughing
(RGH)



Finishing
(FIN)

NOTE: For 308-Series parameters of Finishing application only to be applied.
Reduce WOC by 40% and increase FEED by 30%

Material

Alloy Steel	Free Machining & Low Carbon Steels 1006, 1008, 1015, 1018, 1020, 1022, 1025, 1117, 1140, 1141, 11L08, 11L14, 1213, 12L13, 12L14, 1215, 1330
	Medium Carbon & High Carbon Steels, Alloy Steels & Easy to Machine Tool Steels: 1030, 1035, 1040, 1045, 1050, 1052, 1055, 1060, 1085, 1095, 1541, 1551, 9255, 2515, 3135, 3415, 4130, 4137, 4140, 4150, 4320, 4340, 4520, 5015, 5115, 5120, 5132, 5140, 5155, 6150, 8620, 9262, 9840, 52100, O1, O2, O6, S2, W1 to W310 Alloy Steels
	Alloyed heat-treatable, Tool and High Speed Steels O7, M1, M2, M3, M4, M7, T1, T2, T4, T5, T8, T15, H10, H11, H12, H13, H19, H21, L3, L6, L7, P2, P20, S1, S5, S7, 52100, A 128, D2, D3, D4, D5, D7
Hardened Steel	Hardened Steel Carbon and Alloy Steels, Tool & Die Steels
	High Hardened Steel, Die Steels, High Speed Steel
Stainless Steel	Austenitic SS: Easy to Machine 430F, 301, 303, 410, 416 Annealed, 420F, 430, 430F
	Austenitic SS Moderately Difficult: 301, 302, 303 High Tensile, 304, 304L, 305, 420, 15-5PH, 17-4PH, 17-7PH
	Precip. Hardened SS Difficult to Machine: 302B, 304B, 309, 310, 316, 316B, 316L, 316Ti, 317, 317L, 321, PH13-8MO, Nitronic
Super Alloys	Titanium Alloys: 6Al-4V, 5Al-2.5 Sn, 6Al-2Sn-4Zr-6Mo, 3Al-8V-6Cr4Mo-4Zr
	High-Temperature Alloys Inconel, Nimonic, Waspalloy, Stellite

Series: 302, 304, 306, 307 & 202, 204, 206, 208, 212 & 102, 104, 109

Hardness	Ballnose Series	Ae max	Cutting speed (Vc)	FEED per TOOTH								
				3 mm	4 mm	5 mm	6 mm	8 mm	10 mm	12 mm	16 mm	20 mm
			m/min	mm / Z								
BHN 180 to 225	C-202, 204, 208	0.1 x D	60-70	0.015	0.018	0.020	0.023	0.030	0.045	0.060	0.075	0.090
	C-202, 204, 208	0.03 x D	90-100	0.011	0.013	0.015	0.016	0.021	0.032	0.042	0.055	0.065
	C-202, 204, 208	0.01 x D	100-120	0.009	0.01	0.012	0.014	0.018	0.027	0.036	0.051	0.055
BHN 225 to 355	C-202, 204, 208	0.1 x D	60-70	0.015	0.018	0.020	0.023	0.030	0.045	0.060	0.075	0.090
	C-202, 204, 208	0.03 x D	90-100	0.011	0.013	0.015	0.016	0.021	0.032	0.042	0.055	0.065
	C-202, 204, 208	0.01 x D	100-120	0.01	0.011	0.013	0.015	0.020	0.030	0.039	0.055	0.060
40-45 HRc	C-206, 302, 306	0.1 x D	50-60	0.007	0.009	0.01	0.011	0.014	0.022	0.029	0.036	0.042
	C-206, 302, 306	0.03 x D	80-90	0.005	0.007	0.007	0.008	0.01	0.015	0.02	0.024	0.03
	C-206, 302, 306	0.01 x D	90-100	0.005	0.007	0.007	0.007	0.009	0.014	0.019	0.024	0.027
< 55 HRc	C-206, 302, 306	0.1 x D	40-50	0.01	0.011	0.013	0.014	0.019	0.029	0.038	0.048	0.056
	C-206, 302, 306	0.02 x D	50-60	0.007	0.009	0.01	0.01	0.014	0.02	0.027	0.032	0.04
	C-206, 302, 306	0.01 x D	60-70	0.006	0.007	0.007	0.009	0.012	0.017	0.023	0.028	0.036
55-65 HRC	C-302, 304, 306, 307	0.02 x D	40-50	0.006	0.007	0.007	0.008	0.011	0.017	0.022	0.028	0.032
	-	-	-	-	-	-	-	-	-	-	-	-
	C-302, 304, 306, 307	0.01 x D	50-60	0.005	0.006	0.007	0.007	0.01	0.014	0.019	0.024	0.028
<28 HRc	C-302, 304, 306, 307	0.1 x D	80-90	0.01	0.012	0.014	0.016	0.021	0.031	0.042	0.052	0.064
	C-302, 304, 306, 307	0.03 x D	100-115	0.007	0.008	0.009	0.011	0.014	0.022	0.029	0.036	0.044
	C-302, 304, 306, 307	0.01 x D	100-120	0.006	0.007	0.009	0.01	0.012	0.019	0.025	0.032	0.036
<28 HRc	C-302, 304, 306, 307	0.1 x D	50-60	0.01	0.011	0.012	0.014	0.019	0.029	0.038	0.048	0.056
	C-302, 304, 306, 307	0.03 x D	80-90	0.007	0.008	0.009	0.01	0.014	0.02	0.027	0.032	0.04
	C-302, 304, 306, 307	0.01 x D	60-70	0.006	0.007	0.008	0.009	0.012	0.017	0.023	0.028	0.036
>28 HRc	C-302, 304, 306, 307	0.1 x D	30-40	0.008	0.009	0.011	0.012	0.016	0.024	0.032	0.04	0.048
	C-302, 304, 306, 307	0.02 x D	40-50	0.006	0.007	0.008	0.008	0.011	0.017	0.022	0.028	0.032
	C-302, 304, 306, 307	0.01 x D	30-40	0.005	0.007	0.012	0.007	0.01	0.014	0.019	0.024	0.028
<42 HRc	C-302, 304, 306, 307	0.1 x D	40-50	0.01	0.011	0.012	0.014	0.019	0.029	0.038	0.048	0.056
	C-302, 304, 306, 307	0.02 x D	60-70	0.007	0.008	0.009	0.01	0.014	0.02	0.027	0.032	0.04
	C-302, 304, 306, 307	0.01 x D	60-70	0.006	0.007	0.008	0.009	0.012	0.017	0.023	0.028	0.036
<42 HRc	C-302, 304, 306, 307	0.1 x D	20-30	0.008	0.009	0.011	0.012	0.016	0.024	0.032	0.04	0.048
	C-302, 304, 306, 307	0.02 x D	30-40	0.006	0.007	0.008	0.008	0.011	0.017	0.022	0.028	0.032
	C-302, 304, 306, 307	0.01 x D	30-40	0.005	0.007	0.012	0.007	0.01	0.014	0.019	0.024	0.028

Material

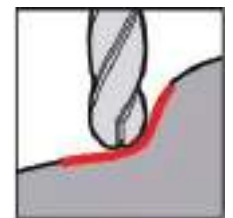
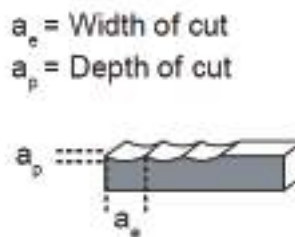
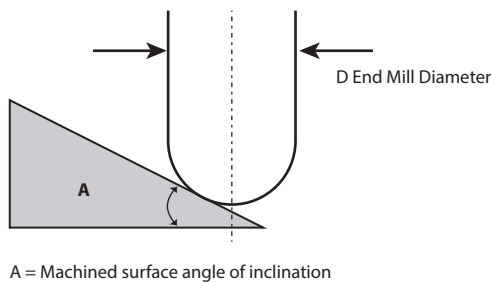
CAST IRON	Cast Iron - Gray CG ASTM A48, CLASS 20, 25, 30, 35, SAE J431C, GRADES G1800, G3000, G3500, GG 10, 15, 20, 25, 30, 35, 40
	Cast Iron - Ductile & Malleable CGI 60-40-18, 65-45-12, D4018, D4512, D5506, 32510, 35108, M3210, M4504, M5503, 250, 300, 350
Non Ferrous	Aluminum, Al-wrought alloys 2024, 6061, 7075, 1050, 6351, 5005, 2017, 7075
	Aluminium-Cast alloys, Al-Alloys: High Silicon - A380, A390, Castings, 3.2131 G-ALSi-5Cu1, 3.2153 G-ALSi7Cu3, 3.2573 G-ALSi9, 3.2581 G-ALSi12, 3.2583 G-ALSi12Cu.
	Magnesium-alloys MgMn2, G-MgAl8Zn1, G-MgAl6Zn3
	Wood, Hard Wood, MDF, Plyboards, Plastics
	Non-ferrous metals (copper, short- or long-chipping brass or bronze)

Application	Width/ Depth		Ballnose Diameter (mm)									
			1	2	3	4	6	8	10	12	16	20
Roughing A < 15°	Ae	(mm)	0.2	0.5	0.8	1.2	1.6	2.2	2.8	3.4	4.6	5.8
	Ap	(mm)	0.07	0.12	0.19	0.26	0.58	0.78	1	1.2	1.6	2
Finishing A > 15°	Ae	(mm)	0.01	0.02	0.04	0.06	0.1	0.14	0.18	0.22	0.28	0.32
	Ap	(mm)	0.04	0.08	0.13	0.18	0.27	0.37	0.5	0.6	0.8	0.9

- 1 - Roughing = surface milling, machined surface angle A less than 15°.
- 2 - Finishing = contour milling, machined surface angle A between 15° and 90°.
- 3 - Reduce feeds and speeds 20% for tool projection greater than 5xD.
- 4 - Use Endmill dia. (D1) to calculate RPM (do not use effective diameter).
- 5 - ALL VALUES IN METRIC.

Series: 302, 304, 306, 307 & 202, 204, 206, 208, 212 & 102, 104, 109

Hardness	Ballnose Series	Ae max	Cutting speed (Vc)	FEED per TOOTH								
				3 mm	4 mm	5 mm	6 mm	8 mm	10 mm	12 mm	16 mm	20 mm
			m/min	mm / Z								
<240 HB	C-202, 204, 208	0.1 x D	90-100	0.012	0.014	0.016	0.018	0.024	0.036	0.048	0.06	0.072
	C-202, 204, 208	0.03 x D	110-130	0.008	0.01	0.012	0.013	0.017	0.025	0.034	0.044	0.052
	C-202, 204, 208	0.01 x D	130-150	0.007	0.008	0.01	0.011	0.014	0.022	0.029	0.036	0.044
>240 HB	C-206, 302, 306	0.1 x D	70-80	0.01	0.012	0.014	0.016	0.021	0.031	0.042	0.052	0.064
	C-206, 302, 306	0.02 x D	90-100	0.007	0.009	0.01	0.011	0.014	0.022	0.029	0.036	0.042
	C-206, 302, 306	0.01 x D	100-120	0.006	0.007	0.009	0.01	0.012	0.019	0.025	0.032	0.036
up to 3% Si	C-202, 212, 208	0.1 x D	240-250	0.016	0.019	0.02	0.024	0.032	0.048	0.064	0.08	0.095
	C-202, 212, 208	0.03 x D	300-320	0.011	0.013	0.015	0.017	0.023	0.034	0.045	0.055	0.065
	C-202, 212, 208	0.01 x D	340-360	0.01	0.012	0.014	0.015	0.019	0.029	0.039	0.05	0.06
above 3% Si	C-202, 212, 208	0.1 x D	110-120	0.015	0.018	0.02	0.023	0.03	0.045	0.06	0.075	0.09
	C-202, 212, 208	0.03 x D	150-160	0.011	0.013	0.014	0.016	0.021	0.032	0.042	0.055	0.065
	C-202, 212, 208	0.01 x D	180-200	0.009	0.011	0.013	0.014	0.018	0.027	0.036	0.045	0.055
-	C-202, 212, 208	0.1 x D	70-80	0.013	0.015	0.017	0.02	0.026	0.039	0.052	0.065	0.08
	C-202, 212, 208	0.03 x D	90-110	0.009	0.011	0.013	0.014	0.018	0.028	0.037	0.045	0.055
	C-202, 212, 208	0.01 x D	100-120	0.008	0.01	0.011	0.012	0.016	0.024	0.031	0.04	0.045
-	C-204, 208, 104, 109	0.1 x D	200-250	0.016	0.019	0.02	0.024	0.032	0.048	0.064	0.08	0.095
	C-204, 208, 104, 109	0.03 x D	270-320	0.011	0.013	0.015	0.017	0.023	0.034	0.045	0.055	0.065
	C-204, 208, 104, 109	0.01 x D	300-360	0.01	0.012	0.014	0.015	0.019	0.029	0.039	0.05	0.06
-	C-204, 208, 104, 109	0.1 x D	100-120	0.015	0.018	0.02	0.023	0.03	0.045	0.06	0.075	0.09
	C-204, 208, 104, 109	0.03 x D	140-160	0.011	0.013	0.014	0.016	0.021	0.032	0.042	0.055	0.065
	C-204, 208, 104, 109	0.01 x D	140-160	0.009	0.011	0.013	0.014	0.018	0.027	0.036	0.045	0.055



Copy Milling

NOTE: These are just the Starting Parameters, you may vary the Speed and Feed depending upon other machining condition.

	Material	Hardness	Application	Ae max	Ae max	Cutting speed (Vc)	FEED per TOOTH						
							4 mm	6 mm	8 mm	10 mm	12 mm	16 mm	20 mm
						m/min	mm / Z						
Non Ferrous	Aluminum, Al-wrought alloys 2024, 6061, 7075, 1050, 6351, 5005, 2017, 7075	<3% Si	SLT	1.00 x D	1.00 x D	Max.	0.02	0.045	0.06	0.07	0.085	0.1	0.12
			RGH	3.00 x D	0.8 x D	Max.	0.02	0.045	0.06	0.07	0.085	0.1	0.12
			FIN	1.00 x D	0.3 x D	Max.	0.025	0.05	0.07	0.08	0.095	0.12	0.15
	Aluminium-Cast alloys, Al-Alloys: High Silicon - A380, A390, Castings, 3.2131 G-ALSi-5Cu1, 3.2153 G-ALSi7Cu3, 3.2573 G-ALSi9, 3.2581 G-ALSi12, 3.2583 G-ALSi12Cu.	>3% Si	SLT	0.5 x D	1.00 x D	150-300	0.016	0.036	0.048	0.056	0.068	0.08	0.096
			RGH	2.00 x D	0.6 x D	150-300	0.016	0.036	0.048	0.056	0.068	0.08	0.096
			FIN	1.00 x D	0.2 x D	250-300	0.02	0.04	0.056	0.064	0.076	0.096	0.12
	Magnesium-alloys MgMn2, G-MgAl8Zn1, G-MgAl6Zn3	-	SLT	0.5 x D	1.00 x D	150-300	0.016	0.036	0.048	0.056	0.068	0.08	0.096
			RGH	2.00 x D	0.5 x D	150-300	0.016	0.036	0.048	0.056	0.068	0.08	0.096
			FIN	1.00 x D	0.1 x D	250-300	0.02	0.04	0.056	0.064	0.076	0.096	0.12
	Non-ferrous metals (copper, short- or long-chippingbrass or bronze)	-	SLT	0.5 x D	1.00 x D	120-150	0.016	0.036	0.048	0.056	0.068	0.08	0.096
			RGH	1.00 x D	0.3 x D	120-150	0.016	0.036	0.048	0.056	0.068	0.08	0.096
			FIN	1.00 x D	0.1 x D	160-180	0.02	0.04	0.056	0.064	0.076	0.096	0.12

	Material	Hardness	Application	Ae max	Ae max	Cutting speed (Vc)	FEED per TOOTH						
							4 mm	6 mm	8 mm	10 mm	12 mm	16 mm	20 mm
						m/min	mm / Z						
Alloy Steel	Free Machining & Low Carbon Steels	BHN 180-225		1.00 x D	0.02 x D	80-100	0.012	0.018	0.027	0.034	0.040	0.054	0.067
	Medium Carbon & High Carbon Steels, Alloy Steels & Easy to Machine Tool Steels	BHN 25-355		0.50 x D	0.01 x D	65-85	0.009	0.013	0.019	0.024	0.029	0.038	0.048
CAST IRON	Cast Iron - Gray CG	up to 240HB)		1.00 x D	0.02 x D	80-100	0.012	0.018	0.027	0.034	0.04	0.054	0.067
Non Ferrous	Aluminum, Al-wrought alloys	<3% Si		1.00 x D	0.05 x D	120-140	0.025	0.035	0.045	0.053	0.062	0.092	0.135
	Aluminium-Cast alloys, Al-Alloys: High Silicon	>3% Si		0.50 x D	0.03 x D	100-110	0.025	0.035	0.045	0.053	0.062	0.092	0.135
	Wood, Hard Wood, MDF, Plyboards, Plastics	-		1.00 x D	0.05 x D	100-120	0.035	0.053	0.062	0.075	0.092	0.092	0.135
	Non-ferrous metals (copper, short- or long-chippingbrass or bronze)	-		1.00 x D	0.05 x D	90-100	0.025	0.035	0.045	0.053	0.062	0.092	0.135

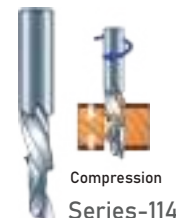
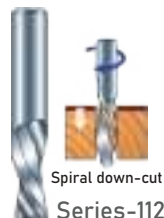
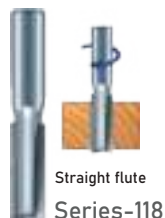
NOTE: For 101 & 110-series Lower the Feed and Speed rates by 30%

These are just the Starting Parameters, you may vary the Speed and Feed depending upon other machining condition.

Feed & Speed Parameters for Wood & Plastic machining

Series: 103, 107, 108, 112, 114 & 118

Material	Cutting speed (Vc) m/min	Ap max	Ae max	FEED per TOOTH						
				3 mm	4 mm	6 mm	8 mm	10 mm	12 mm	
				mm / Z						
WOOD / PLASTIC	HARD WOOD: maple, oak, teak, and walnut.	Max. Available	2 X D	0.5 X D	0.08 -	0.13 -	0.23 -	0.32 -	0.38 -	0.48 -
	SOFTWOOD / PLYWOOD: cedar, Douglas fir, juniper, pine, redwood, spruce, and yew.	250-400	3 X D	1 X D	0.1 -	0.17 -	0.28 -	0.35 -	0.43 -	0.53 -
	Medium Density Fiberboard (MDF) / Laminated Plywood	250-400	2 X D	1 X D	0.1 -	0.2 -	0.33 -	0.42 -	0.51 -	0.64 -
	SOFT PLASTIC	150-180	3 X D	1 X D	0.1 -	0.18 -	0.2 -	0.2 -	0.2 -	0.25 -
	HARD PLASTIC	120-150	2 X D	0.5 X D	0.15 -	0.2 -	0.25 -	0.25 -	0.25 -	0.3 -



Good edge quality on most materials	May chip or fray top face, good quality on bottom face when through-cutting	Best edge quality on top face, may chip or fray bottom face when through-cutting	Clean edge on both top and bottom face
Moderate chip clearing abilities	Excels at clearing chips and dissipating heat, especially with "o-flute" bits	May compact chips in a groove	Designed to cut veneered or laminated materials at full depth in one pass
	Upwards force may cause part lifting concern	Downwards force may help with cutting thin sheets	
Ideal for : general- purpose cutting	Ideal for: plastics, aluminum, or any material where heat buildup is a concern	Ideal for : plywood and laminates (pocketing)	Ideal for: plywood and laminates (profile cutting)

Types of CNC Router Bits and there use

CNC Router machines & Handheld routers are being used increasingly in industries like construction, wood furniture, stone carving, aluminium door industry and many more. Hence the right use of the Router Bits & knowledge of the same is must. [Read more on rigpl.com/blog](http://rigpl.com/blog)



Best Machining with High Efficiency Milling (HEM)

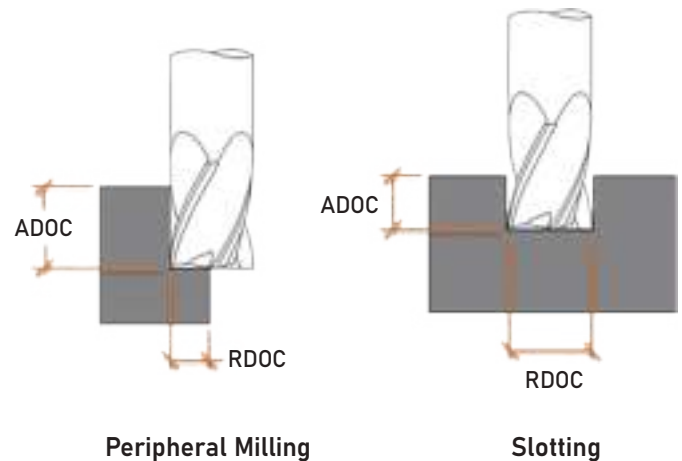
Radial Depth of Cut (RDOC): The distance a tool is stepping over into a workpiece. Also referred to as Stepover, Cut Width

Axial Depth of Cut (ADOC): The distance a tool engages a workpiece along its centerline. Also referred to as Stepdown, or Cut Depth.

Peripheral Milling: An application in which only a percentage of the tool's cutter diameter is engaging a part.

Slotting: An application in which the tool's entire cutter diameter is engaging a part.

High Efficiency Milling (HEM): A newer machining strategy in which a light RDOC and heavy ADOC is paired with increased feed rates to achieve higher material removal rates and decreased tool wear.



Depth of Cut Strategy for High Efficiency Milling (HEM)

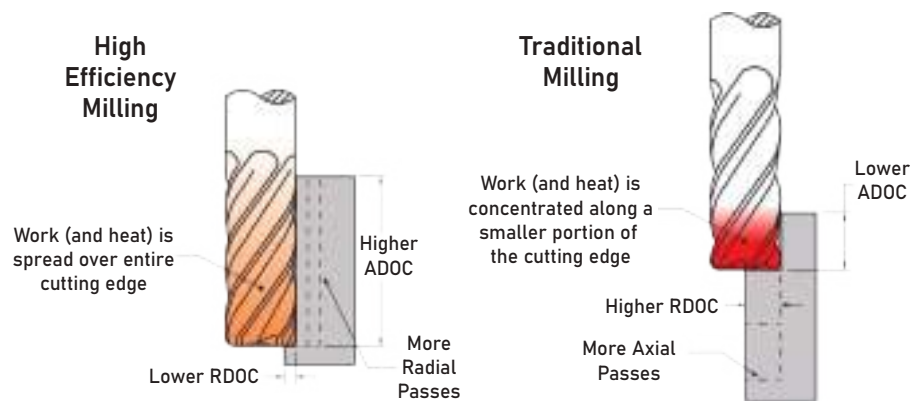
Pairing a light RDOC and heavy ADOC with high performance toolpaths is a machining strategy known as High Efficiency Milling or HEM. With this machining style, feed rates can be increased and cuts are kept uniform to evenly distribute stresses across the cutting portion of the tool, prolonging tool life.

Traditional Strategy

- Heavy RDOC
- Light ADOC
- Conservative Feed Rate

Newer Strategy – High Efficiency Milling (HEM)

- Light RDOC
- Heavy ADOC
- Increased Feed Rate



HEM involves using 7-30% of the tool diameter radially and up to twice the cutter diameter axially, paired with increased feed rates. Accounting for chip thinning, this combination of running parameters can result in noticeably higher metal removal rates (MRR). Modern CAM software often offers a complete high performance solution with built-in features for HEM toolpaths. These principals can also be applied to trochoidal toolpaths for slotting applications.

Best Tools for HEM:

- High flute count for increased MRR.
- Large core diameter for added strength.
- Tool coating optimized for the workpiece material for increased lubricity.
- Variable Pitch/Variable Helix design for reduced harmonics.

General notes:

- All the cutting rate recommendations specified in this catalog are standard values valid exclusively for new tools or tools re-ground to RIGPL specifications.
- Pre-requisites are stable machines, optimal cooling, optimal tool clamping and maximum concentricity of the tool and the machine spindle.
- Our recommended cutting rates must be reduced if the conditions deviate.
- The values may also be adjusted to influence Surface finish quality, machining rate or tool life.

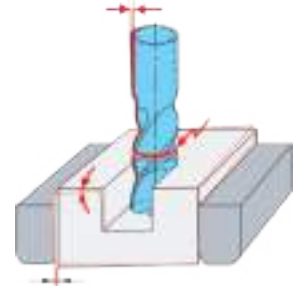
1. Workpiece Clamping

Loss of tool life or tool breakage through unstable clamping

Improve workpiece clamping

Alternative:

- reduce feed
- reduce cutting width or depth



2. Tool Clamping

Loss of tool life or tool breakage through unstable, worn or too small/long/thin tool holder

Apply new or larger tool holder or holder with increased clamping force and increased concentricity

Alternative:

- reduce cutting rates
- reduce clamping length
- apply tool with smaller diameter
- check clamping screws for wear



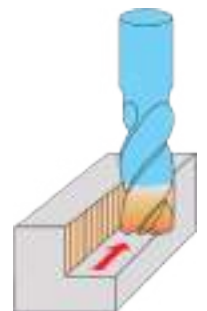
3. Surface Finish Quality

Excessive peak-to-valley height Ra/Rz at the tool Surface finish through excessive feed rates or vibrations

Improve workpiece clamping and tool clamping (see points 1 & 2)

Alternative:

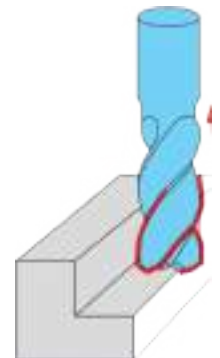
- reduce feed and feed rate
- increase cutting speed



4. Vibrations

High tool wear, insufficient workpiece Surface finish quality and insufficient dimensional accuracy through vibration

- Improve workpiece and tool clamping (see points 1 and 2)
- Increase tooth feed, because the chip centre thickness is too small
- Modify speed
- Modify milling strategy, i.e. select alternative cutting distribution
- Change tool selection, i.e. reduce no. of teeth or spiral



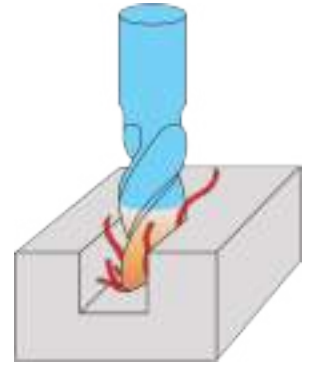
5. Chip Congestion / Cooling

Significant reduction in tool life, chipping on cutting edges, edge build-up of flutes through insufficient chip evacuation

Select milling cutters with internal cooling

Alternative:

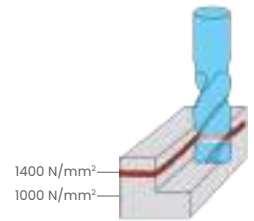
- increase volume flow
- adjust coolant flow
- apply compressed air cooling (according to tool and material)
- reduce feed rate
- modify cutting distribution
- select end mill with fewer flutes



6. Thermal Influence on Materials

Through welding or torch cutting, the material characteristics at the parting line do not correspond with the specified material class

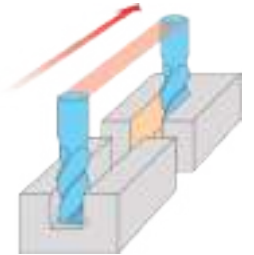
- Reduce cutting rates
- Select tool for materials with a higher tensile strength



7. Loss in Tool Life Due to Interrupted Cutting

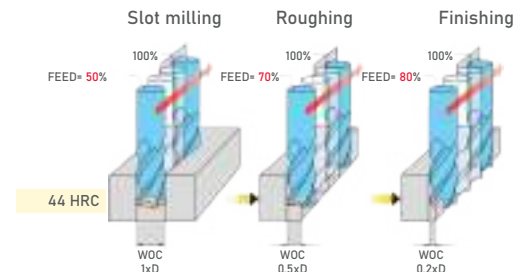
Significant loss in tool life through interrupted cutting (especially with milling angles of 90°)

- Modify cutting distribution
- Reduce feed rate for entry and exit
- Reduce approach angle



8. Entry in Hardened Materials

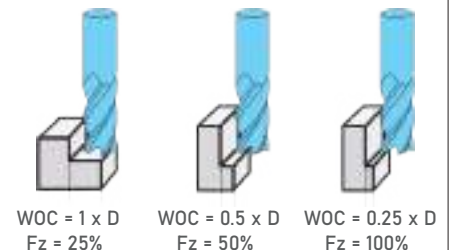
For entering materials over 45 HRC, reduce the feed rate in accordance with the image illustration on the right



9. Feed Rate Adjustment: Modifying the Cutting Width:

When modifying the cutting width WOC, the feed rate must be reduced in accordance with the illustration on the right

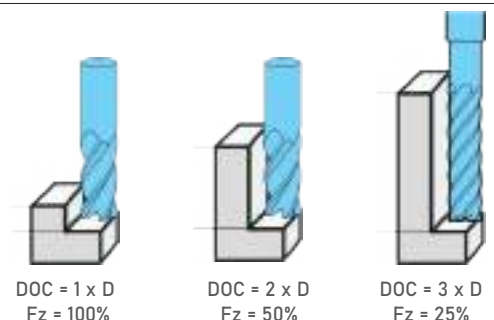
- Cutting speed or revolutions remain unchanged
- Double reduction applies when also modifying the cutting depth DOC!



10. Feed Rate Adjustment: Modifying the Cutting Depth:

When modifying the cutting depth DOC, the feed rate must be reduced in accordance with the illustration on the right

- Cutting speed or revolutions remain unchanged up to cutting depths of 3 x D, must only be adapted over 3 x D
- Double reduction applies when also modifying the cutting width WOC!



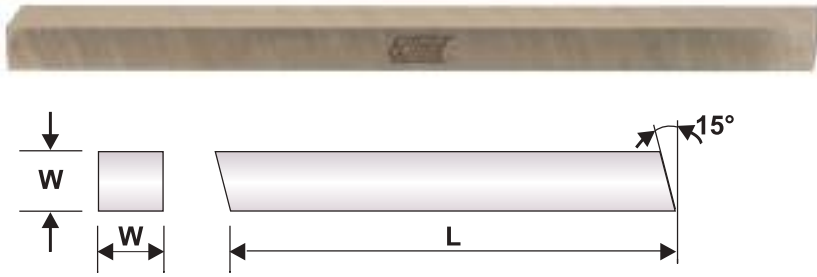
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Features

- ROHIT HSS Tool Bits are available in ROHIT - 1X, 2X, SPECIAL, 3X, EC-500 grades
- Micro-structure & Hardness is checked thoroughly for consistency of tool bits to match our world class standards.
- Our 3X (T42) / EC500 (Cryo-T42) grade are especially meant for machining SS, harder alloy Steels & harder Cast Iron.
- Square HSS Tool Bits comes with 15° End Bevel Angles, having standard tolerance of h13.
- More than 8000+ sizes of Square HSS Tool bits are in stock to choose from.
- Flat Tool Bits comes with 0° End Bevel Angles, having standard tolerance of h13.
- Round Tool Bits comes with 0° End Bevel Angles, having standard tolerance of h9.
- Parting tools can be manufactured in FORM E & INDEX Type as per customer requirement, having standard tolerance of h13.
- Our HSS Cutting Tools can withstand any type of difficult cutting application known.

Grade	Description	HRC	End - Use
ROHIT-1X	AISI M2; HS 6 - 5 - 2	62-65	Recommended for use on non-ferrous metals like Aluminium, Copper and other free cutting metals like mild steel, EN-1A or soft materials
ROHIT-2X 5%Co.	AISI M35; HS 6 - 5 - 2 - 5	63-66	Exceptionally good toughness and red hardness, most suitable for heavy work on difficult materials and an ideal general purpose tool bit for machine shops. As a single point cutting tool, this quality is used to bring about the best advantage with tools which have to take deep cuts at high speeds. These tools are recommended for free cutting materials where high production is required.
ROHIT SPECIAL - 8%Co."	AISI M-42; HS 2 - 9 - 1 - 8	65-68	Recommended for use in cutting high alloy steel in annealed condition. This tool has a very long cutting life.
ROHIT-3X 10%Co.	AISI T-42; HS 10 - 4 - 3 - 10	65-67	This quality of tool bit retains its hardness even at very high temperatures and is recommended where the generation of heat is very high and the tool should not get blunt at high temperatures. This type is recommended for use in cutting of high alloy steels and stainless steels, such as EN-8M, EN-31, SS-304 etc. As the cutting life of the tool is longer than any quality of tool bit, it is recommended for use in automats (TRAUB M/C) where continuous processes are involved with multi-tools.
ROHIT-3X EC500	AISI T42 CRYOGENICALLY TREATED	65-67	Manufactured from High Speed Steel containing 10% Cobalt are cryogenically treated by cooling down tool bits at a pre-determined rate to liquid nitrogen temperature levels of 77° K resulting in a thermally stabilized material with a coherent, improved micro-structure that exhibits outstanding wear resistance and improved performance.

HSS Square Tools Bits | (Inch Sizes)

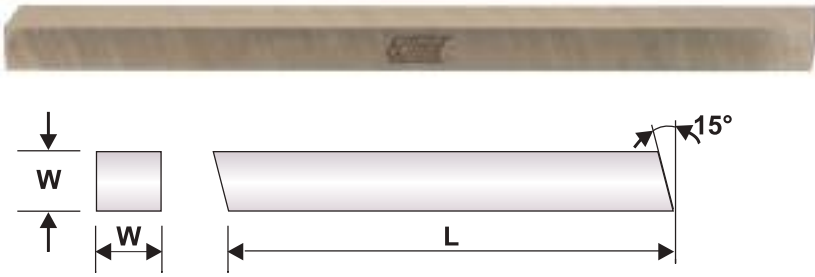


Tolerance (Width/Thickness)	h13
Tolerance (Length)	+/- 1.0mm
End Bevel	15°
Optional Bevel	0°/ 10°

Width (W) (Inches)	Width (W) (Inches)	Overall Length (L) (Inches)	1X (M2, 0%Co)	2X (M35, 5%Co)	Sp (M42, 8%Co)	3X (T42, 10%Co)	EC-500 (T42-Cryo)
1/8	1/8	3	HR1XSQ000J9	HR2XSQ00658	HR3XSQ00G68	HR4XSQ00CM1	HR44SQ00AA9
1/8	1/8	4	HR1XSQ000L5	HR2XSQ00666	HR3XSQ00G76	HR4XSQ00CN8	HR44SQ00AB7
3/16	3/16	3	HR1XSQ000Z4	HR2XSQ006F1	HR3XSQ00GC0	HR4XSQ00CV1	HR44SQ00AG6
3/16	3/16	4	HR1XSQ00105	HR2XSQ006H7	HR3XSQ00GD7	HR4XSQ00CW9	HR44SQ00AH4
3/16	3/16	6	HR1XSQ00113	HR2XSQ006K0	HR3XSQ00GE5	HR4XSQ00CX6	HR44SQ00AJ9
1/4	1/4	3	HR1XSQ001Q3	HR2XSQ006X1	HR3XSQ00GQ9	HR4XSQ00D94	HR44SQ00AS9
1/4	1/4	4	HR1XSQ001S8	HR2XSQ006Z7	HR3XSQ00GR7	HR4XSQ00DB4	HR44SQ00AT7
1/4	1/4	6	HR1XSQ001U4	HR2XSQ00716	HR3XSQ00GS4	HR4XSQ00DC2	HR44SQ00AU5
1/4	1/4	8	HR1XSQ001V2	HR2XSQ00724	HR3XSQ00GT2	HR4XSQ00DD9	HR44SQ00AV3
5/16	5/16	3	HR1XSQ00204	HR2XSQ00773	HR3XSQ00GX3	HR4XSQ00DL2	HR44SQ00AX8
5/16	5/16	4	HR1XSQ00220	HR2XSQ00799	HR3XSQ00GY1	HR4XSQ00DN7	HR44SQ00AY6
5/16	5/16	6	HR1XSQ00238	HR2XSQ007B9	HR3XSQ00GZ9	HR4XSQ00DP3	HR44SQ00AZ4
5/16	5/16	8	HR1XSQ00246	HR2XSQ007C7	HR3XSQ00H00	HR4XSQ00DQ1	HR44SQ00B05
3/8	3/8	3	HR1XSQ002W9	HR2XSQ007X0	HR3XSQ00HC9	HR4XSQ00E36	HR44SQ00BA8
3/8	3/8	4	HR1XSQ002Y4	HR2XSQ007Z6	HR3XSQ00HE4	HR4XSQ00E51	HR44SQ00BB6
3/8	3/8	6	HR1XSQ00303	HR2XSQ00807	HR3XSQ00HF2	HR4XSQ00E69	HR44SQ00BC4
3/8	3/8	8	HR1XSQ00329	HR2XSQ00823	HR3XSQ00HG0	HR4XSQ00E77	HR44SQ00BD1
3/8	3/8	10	HR1XSQ00345	HR2XSQ00849	HR3XSQ00HH8	HR4XSQ00E85	HR44SQ00BE9
1/2	1/2	3	HR1XSQ003W8	HR2XSQ008S0	HR3XSQ00HU9	HR4XSQ00EN6	HR44SQ00BR1
1/2	1/2	4	HR1XSQ003Y3	HR2XSQ008U6	HR3XSQ00HV7	HR4XSQ00EQ0	HR44SQ00BS8
1/2	1/2	6	HR1XSQ00402	HR2XSQ008W2	HR3XSQ00HW5	HR4XSQ00ER8	HR44SQ00BT6
1/2	1/2	8	HR1XSQ00428	HR2XSQ008X9	HR3XSQ00HX2	HR4XSQ00E55	HR44SQ00BU4
1/2	1/2	10	HR1XSQ00444	HR2XSQ008Z5	HR3XSQ00HY0	HR4XSQ00ET3	HR44SQ00BV2
5/8	5/8	4	HR1XSQ004G2	HR2XSQ00955	HR3XSQ00J16	HR4XSQ00EZ0	HR44SQ00BW0
5/8	5/8	6	HR1XSQ004J5	HR2XSQ00971	HR3XSQ00J32	HR4XSQ00F19	HR44SQ00BX7
5/8	5/8	8	HR1XSQ004K3	HR2XSQ00989	HR3XSQ00J40	HR4XSQ00F27	HR44SQ00BY5
3/4	3/4	4	HR1XSQ004Y2	HR2XSQ009G6	HR3XSQ00JB9	HR4XSQ00FA4	HR44SQ00C53
3/4	3/4	6	HR1XSQ00519	HR2XSQ009K7	HR3XSQ00JD4	HR4XSQ00FC0	HR44SQ00C61
3/4	3/4	8	HR1XSQ00527	HR2XSQ009L5	HR3XSQ00JE2	HR4XSQ00FD7	HR44SQ00C79
1	1	5	-	HR2XSQ009Y6	-	-	-
1	1	6	HR1XSQ005H9	HR2XSQ00A08	HR3XSQ00JQ6	HR4XSQ00FQ9	HR44SQ00CD0
1	1	8	HR1XSQ005K2	HR2XSQ00A24	HR3XSQ00JS1	HR4XSQ00FR7	HR44SQ00CE8

NOTE: TIN COATED HSS Tools are also available on request. Intermediate Sizes are available on request. Packing: Plastic Boxes only

HSS Square Tools Bits | (Metric Sizes)

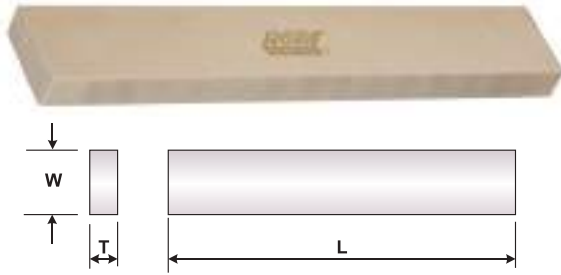


Tolerance (Width/Thickness)	h13
Tolerance (Length)	+/- 1.0mm
End Bevel	15°
Optional Bevel	0°/ 10°

Width (W) (mm)	Width (W) (mm)	Overall Length (L) (mm)	1X (M2, 0%Co)	2X (M35, 5%Co)	Sp (M42, 8%Co)	3X (T42, 10%Co)	EC-500 (T42-Cryo)
3	3	75	HR1XSQ000B7	HR2XSQ00617	HR3XSQ000G35	HR4XSQ000CK5	HR44SQ00A89
3	3	100	HR1XSQ000C5	HR2XSQ00625	HR3XSQ000G43	HR4XSQ000CL3	HR44SQ00A97
5	5	75	HR1XSQ00139	HR2XSQ006L8	HR3XSQ000GF3	HR4XSQ000CZ2	HR44SQ00AK7
5	5	100	HR1XSQ00154	HR2XSQ006M6	HR3XSQ000GG1	HR4XSQ000D03	HR44SQ00AL5
5	5	150	HR1XSQ00162	HR2XSQ006N3	HR3XSQ000GH9	HR4XSQ000D11	HR44SQ00AM3
6	6	75	HR1XSQ001B6	HR2XSQ006R5	HR3XSQ000GK2	HR4XSQ000D45	HR44SQ00AN0
6	6	100	HR1XSQ001D1	HR2XSQ006S2	HR3XSQ000GL0	HR4XSQ000D52	HR44SQ00AP6
6	6	150	HR1XSQ001F7	HR2XSQ006T0	HR3XSQ000GM8	HR4XSQ000D60	HR44SQ00AQ4
6	6	200	HR1XSQ001G5	HR2XSQ006U8	HR3XSQ000GN5	HR4XSQ000D78	HR44SQ00AR2
8	8	75	HR1XSQ00261	HR2XSQ007G8	HR3XSQ000H26	HR4XSQ000DS6	HR44SQ00B13
8	8	100	HR1XSQ00295	HR2XSQ007H6	HR3XSQ000H34	HR4XSQ000DT4	HR44SQ00B21
8	8	150	HR1XSQ002B5	HR2XSQ007J1	HR3XSQ000H42	HR4XSQ000DU2	HR44SQ00B39
8	8	200	HR1XSQ002C3	HR2XSQ007K9	HR3XSQ000H59	HR4XSQ000DV0	HR44SQ00B47
10	10	75	HR1XSQ00352	HR2XSQ00864	HR3XSQ000HJ3	HR4XSQ000EA5	HR44SQ00BF7
10	10	100	HR1XSQ00378	HR2XSQ00880	HR3XSQ000HK1	HR4XSQ000EB3	HR44SQ00BG5
10	10	150	HR1XSQ00394	HR2XSQ00898	HR3XSQ000HL9	HR4XSQ000EC1	HR44SQ00BH3
10	10	200	HR1XSQ003A6	HR2XSQ008A0	HR3XSQ000HM7	HR4XSQ000ED8	HR44SQ00BJ8
10	10	250	HR1XSQ003B4	HR2XSQ008B8	HR3XSQ000HN4	HR4XSQ000EE6	HR44SQ00BK6
12	12	75	HR1XSQ003K4	HR2XSQ008D3	HR3XSQ000HP0	HR4XSQ000EH0	HR44SQ00BL4
12	12	100	HR1XSQ003L2	HR2XSQ008F9	HR3XSQ000HQ8	HR4XSQ000EJ5	HR44SQ00BM2
12	12	150	HR1XSQ003M0	HR2XSQ008J0	HR3XSQ000HR6	HR4XSQ000EK3	HR44SQ00BN9
12	12	200	HR1XSQ003N7	HR2XSQ008K8	HR3XSQ000HS3	HR4XSQ000EL1	HR44SQ00BP5
12	12	250	HR1XSQ003P3	HR2XSQ008L6	HR3XSQ000HT1	HR4XSQ000EM9	HR44SQ00BQ3
16	16	100	HR1XSQ004M9	HR2XSQ00997	HR3XSQ000J57	HR4XSQ000F35	HR44SQ00BZ3
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16	16	200	HR1XSQ004Q0	HR2XSQ009B7	HR3XSQ000J73	HR4XSQ000F50	HR44SQ000C12
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20	20	150	HR1XSQ00550	HR2XSQ009N0	HR3XSQ000JG8	HR4XSQ000FG1	HR44SQ000C95
20	20	200	HR1XSQ00568	HR2XSQ009Q4	HR3XSQ000JH6	HR4XSQ000FH9	HR44SQ000CA7
25	25	150	HR1XSQ005B2	HR2XSQ009V3	HR3XSQ000JL7	HR4XSQ000FL0	HR44SQ000CB5
25	25	200	HR1XSQ005D7	HR2XSQ009W1	HR3XSQ000JM5	HR4XSQ000FM8	HR44SQ000CC3

NOTE: TIN COATED HSS Tools are also available on request. Intermediate Sizes are available on request.
Packing: Plastic Boxes only

HSS Rectangular (Flat) Tools Bits | (Inch Sizes)



Tolerance (Width/Thickness)	h13
Tolerance (Length)	+/- 1.0mm
End Bevel	0°
Optional Bevel	As per Requirement

Thickness (T) (Inches)	Width (W) (Inches)	Overall Length (L) (Inches)	1X (M2, 0%Co)	2X (M35, 5%Co)	3X (T42, 10%Co)
1/8	3/8	8	HR1XRE002M8	HR2XRE00C45	HR4XRE00PA1
1/8	1/2	6	HR1XRE002P1	HR2XRE00C52	HR4XRE00PC7
1/8	1/2	8	HR1XRE002Q9	HR2XRE00C60	HR4XRE00PD4
1/8	5/8	6	HR1XRE002S4	HR2XRE00C78	HR4XRE00PE2
1/8	5/8	8	HR1XRE002T2	HR2XRE00C86	HR4XRE00PF0
1/8	3/4	6	HR1XRE002W6	HR2XRE00CA6	HR4XRE00PG8
1/8	3/4	8	HR1XRE002X3	HR2XRE00CB4	HR4XRE00PH6
1/8	1	6	HR1XRE00318	HR2XRE00CC2	HR4XRE00PJ1
1/8	1	8	HR1XRE00326	HR2XRE00CD9	HR4XRE00PK9
5/32	3/4	6	HR1XRE003H8	HR2XRE00CJ6	HR4XRE00PT9
5/32	3/4	8	HR1XRE003J3	HR2XRE00CK4	HR4XRE00PU7
3/16	1/2	6	HR1XRE004P9	HR2XRE00D44	HR4XRE00QH5
3/16	1/2	8	HR1XRE004Q7	HR2XRE00D51	HR4XRE00QJ0
3/16	3/4	6	HR1XRE004U8	HR2XRE00D85	HR4XRE00QM4
3/16	3/4	8	HR1XRE004V6	HR2XRE00D93	HR4XRE00QN1
3/16	1	6	HR1XRE004X1	HR2XRE00DB3	HR4XRE00QP7
3/16	1	8	HR1XRE004Y9	HR2XRE00DC1	HR4XRE00QQ5
1/4	5/8	6	HR1XRE006L6	HR2XRE00ED7	HR4XRE00RR2
1/4	5/8	8	HR1XRE006M4	HR2XRE00EE5	HR4XRE00RS9
1/4	3/4	6	HR1XRE006P7	HR2XRE00EF3	HR4XRE00RU5
1/4	3/4	8	HR1XRE006Q5	HR2XRE00EG1	HR4XRE00RV3
1/4	1	6	HR1XRE006T8	HR2XRE00EH9	HR4XRE00RW1
1/4	1	8	HR1XRE006U6	HR2XRE00EJ4	HR4XRE00RX8
5/16	3/4	6	HR1XRE007G6	HR2XRE00ES4	HR4XRE00SD1
5/16	3/4	8	HR1XRE007H4	HR2XRE00ET2	HR4XRE00SE9
3/8	1/2	4	HR1XRE008K6	HR2XRE00FN4	HR4XRE00TC3
3/8	1/2	6	HR1XRE008L4	HR2XRE00FP0	HR4XRE00TD0
3/8	1/2	8	HR1XRE008M2	HR2XRE00FQ8	HR4XRE00TE8
3/8	3/4	6	HR1XRE008U4	HR2XRE00FW5	HR4XRE00TK5
3/8	3/4	8	HR1XRE008V2	HR2XRE00FX2	HR4XRE00TL3
3/8	1	6	HR1XRE008Y5	HR2XRE00FY0	HR4XRE00TP4
3/8	1	8	HR1XRE008Z3	HR2XRE00FZ8	HR4XRE00TQ2

HSS Rectangular (Flat) Tools Bits | (Inch Sizes)

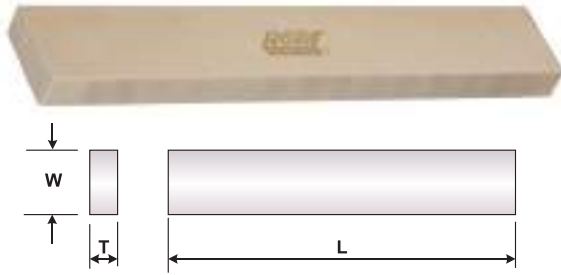
Thickness (T) (Inches)	Width (W) (Inches)	Overall Length (L) (Inches)	1X (M2, 0%Co)	2X (M35, 5%Co)	3X (T42, 10%Co)
3/8	1+1/4	6	HR1XRE00912	HR2XRE00G17	HR4XRE00TS7
3/8	1+1/4	8	HR1XRE00920	HR2XRE00G25	HR4XRE00TT5
3/8	1+1/2	6	HR1XRE00938	HR2XRE00G33	HR4XRE00TY4
3/8	1+1/2	8	HR1XRE00946	HR2XRE00G41	HR4XRE00TZ2
1/2	5/8	6	HR1XRE00A89	HR2XRE00GY9	HR4XRE00UU2
1/2	5/8	8	HR1XRE00A97	HR2XRE00GZ7	HR4XRE00UV0
1/2	3/4	6	HR1XRE00AB7	HR2XRE00H08	HR4XRE00UW8
1/2	3/4	8	HR1XRE00AC5	HR2XRE00H16	HR4XRE00UX5
1/2	1	6	HR1XRE00AF8	HR2XRE00H24	HR4XRE00V28
1/2	1	8	HR1XRE00AH4	HR2XRE00H32	HR4XRE00V36
1/2	1+1/4	6	HR1XRE00AL5	HR2XRE00H40	HR4XRE00V44
1/2	1+1/4	8	HR1XRE00AM3	HR2XRE00H57	HR4XRE00V51
1/2	1+1/2	6	HR1XRE00AN0	HR2XRE00H65	HR4XRE00V77
1/2	1+1/2	8	HR1XRE00AP6	HR2XRE00H73	HR4XRE00V85
5/8	3/4	6	HR1XRE00AT7	HR2XRE00H81	HR4XRE00VC1
5/8	3/4	8	HR1XRE00AU5	HR2XRE00H99	HR4XRE00VD8
5/8	1	6	HR1XRE00AV3	HR2XRE00HA1	HR4XRE00VE6
5/8	1	8	HR1XRE00AW1	HR2XRE00HC7	HR4XRE00VF4
3/4	1	6	HR1XRE00B47	HR2XRE00HJ1	HR4XRE00VP2
3/4	1	8	HR1XRE00B62	HR2XRE00HK9	HR4XRE00VQ0

Features

- Flat Tool Bits comes with 0° End Bevel Angles , but on special requirement or drawings bevel angles are provided.
- Standard tolerance of h13 is followed for all our Rectangular tool bits, specific tolerance can be manufactured on request.

NOTE: TIN COATED HSS Tools are also available on request. Intermediate Sizes are available on request.
Packing: Plastic Boxes only

HSS Rectangular (Flat) Tools Bits | (Metric Sizes)



Tolerance (Width/Thickness)	h13
Tolerance (Length)	+/- 1.0mm
End Bevel	0°
Optional Bevel	As per Requirement

Thickness (T) (mm)	Width (W) (mm)	Overall Length (L) (mm)	1X (M2, 0%Co)	2X (M35, 5%Co)	3X (T42, 10%Co)
2	12	200	HR1XRE00151	HR2XRE00BL3	HR4XRE00NH8
2	19.05	203.2	HR1XRE001C1	HR2XRE00BM1	HR4XRE00NK1
2.2	19.05	203.2	HR1XRE001J5	-	-
2.5	12	200	HR1XRE001Q0	HR2XRE00BP4	HR4XRE00NM7
2.5	19.05	203.2	HR1XRE001V9	HR2XRE00BS7	HR4XRE00NQ8
3	12	150	HR1XRE00235	HR2XRE00BW9	HR4XRE00NZ8
3	12	200	HR1XRE00250	HR2XRE00BX6	HR4XRE00P08
3	16	150	HR1XRE00276	HR2XRE00BY4	HR4XRE00P16
3	16	200	HR1XRE00292	HR2XRE00BZ2	HR4XRE00P24
3	19	150	HR1XRE002B2	HR2XRE00C03	HR4XRE00P32
3	19	200	HR1XRE002C0	HR2XRE00C11	HR4XRE00P40
3	25	150	HR1XRE002F3	HR2XRE00C29	HR4XRE00P65
3	25	200	HR1XRE002G1	HR2XRE00C37	HR4XRE00P73
4	16	150	HR1XRE00433	HR2XRE00CT4	HR4XRE00Q15
4	16	200	HR1XRE00441	HR2XRE00CU2	HR4XRE00Q23
4	19	150	HR1XRE00458	HR2XRE00CV0	HR4XRE00Q49
4	19	200	HR1XRE00466	HR2XRE00CW8	HR4XRE00Q56
4	20	150	HR1XRE00474	HR2XRE00CY3	HR4XRE00Q64
4	20	200	HR1XRE00482	HR2XRE00CZ1	HR4XRE00Q72
4	25	150	HR1XRE00490	HR2XRE00D02	HR4XRE00Q80
4	25	200	HR1XRE004A2	HR2XRE00D10	HR4XRE00Q98
5	16	150	HR1XRE005A1	HR2XRE00DM9	HR4XRE00QX9
5	16	200	HR1XRE005B9	HR2XRE00DN6	HR4XRE00QY7
5	19	150	HR1XRE005D4	HR2XRE00DP2	HR4XRE00QZ5
5	19	200	HR1XRE005E2	HR2XRE00DQ0	HR4XRE00R06
5	25	150	HR1XRE005L7	HR2XRE00DS5	HR4XRE00R22
5	25	200	HR1XRE005M5	HR2XRE00DT3	HR4XRE00R30
6	12	150	HR1XRE005Y8	HR2XRE00DX4	HR4XRE00R63
6	12	200	HR1XRE00607	HR2XRE00DY2	HR4XRE00R71
6	16	150	HR1XRE00615	HR2XRE00E01	HR4XRE00RA9
6	16	200	HR1XRE00623	HR2XRE00E19	HR4XRE00RB7

HSS Rectangular (Flat) Tools Bits | (Metric Sizes)

Thickness (T) (mm)	Width (W) (mm)	Overall Length (L) (mm)	1X (M2, 0%Co)	2X (M35, 5%Co)	3X (T42, 10%Co)
6	19	150	HR1XRE00631	HR2XRE00E27	HR4XRE00RD2
6	19	200	HR1XRE00649	HR2XRE00E35	HR4XRE00RE0
6	25	150	HR1XRE00672	HR2XRE00E50	HR4XRE00RG6
6	25	200	HR1XRE00680	HR2XRE00E68	HR4XRE00RH4
8	16	150	HR1XRE007V3	HR2XRE00F18	HR4XRE00SR1
8	16	200	HR1XRE007W1	HR2XRE00F26	HR4XRE00SS8
8	19	150	HR1XRE007X8	HR2XRE00F34	HR4XRE00ST6
8	19	200	HR1XRE007Y6	HR2XRE00F42	HR4XRE00SU4
8	20	63	HR1XRE007Z4	-	-
8	25	150	HR1XRE00813	HR2XRE00F67	HR4XRE00SV2
8	25	200	HR1XRE00821	HR2XRE00F75	HR4XRE00SW0
10	16	150	HR1XRE009B5	HR2XRE00GA2	HR4XRE00U52
10	16	200	HR1XRE009C3	HR2XRE00GB0	HR4XRE00U60
10	25	150	HR1XRE009J7	HR2XRE00GF1	HR4XRE00U94
10	25	200	HR1XRE009K5	HR2XRE00GG9	-
12	16	150	HR1XRE009R0	HR2XRE00GN3	HR4XRE00UF5
12	16	200	HR1XRE009S7	HR2XRE00GP9	HR4XRE00UG3
12	25	150	HR1XRE009Y4	HR2XRE00GS2	HR4XRE00UM0
12	25	200	HR1XRE009Z2	HR2XRE00GT0	HR4XRE00UN7
16	25	150	HR1XRE00B13	HR2XRE00HF0	HR4XRE00VL1
16	25	200	HR1XRE00B21	HR2XRE00HG8	HR4XRE00VM9
20	25	150	HR1XRE00BB6	HR2XRE00HM5	HR4XRE00VR8
20	25	200	HR1XRE00BC4	HR2XRE00HN2	HR4XRE00VS5

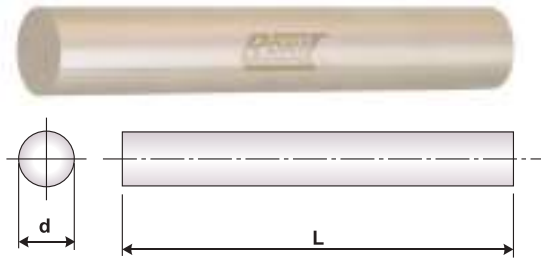
Features

- Flat Tool Bits comes with 0* End Bevel Angles , but on special requirement or drawings bevel angles are provided.
- Standard tolerance of h13 is followed for all our Rectangular tool bits, specific tolerance can be manufactured on request.

NOTE: TIN COATED HSS Tools are also available on request.

Intermediate Sizes are available on request.

Packing: Plastic Boxes only



Tolerance (Diameter)	h9
Tolerance (Length)	+/- 1.0mm
End Bevel	0°

Diameter (d) (Inches)	Overall Length (L) (Inches)	1X (M2, 0%Co)	2X (M35, 5%Co)	Sp (M42, 8%Co)	3X (T42, 10%Co)
1/8	3	HR1XRD005H8	HR2XRD01E35	HR3XRD01RJ0	HR4XRD01KF5
1/8	4	HR1XRD005J3	HR2XRD01E43	HR3XRD01RK8	HR4XRD01KG3
5/32	3	HR1XRD00724	HR2XRD01EF3	-	HR4XRD01KQ1
5/32	4	HR1XRD00732	HR2XRD01EG1	-	HR4XRD01KR9
3/16	3	HR1XRD008Q5	HR2XRD01EU0	HR3XRD01RU6	HR4XRD01L51
3/16	4	HR1XRD008R3	HR2XRD01EV8	HR3XRD01RV4	HR4XRD01L69
3/16	6	HR1XRD008S0	HR2XRD01EW6	HR3XRD01RW2	HR4XRD01L77
7/32	3	HR1XRD00AB9	HR2XRD01F75	-	HR4XRD01LH0
7/32	4	HR1XRD00AC7	HR2XRD01F83	-	HR4XRD01LJ5
7/32	6	HR1XRD00AD4	HR2XRD01F91	-	HR4XRD01LK3
1/4	3	HR1XRD00BY7	HR2XRD01FP0	HR3XRD01SB7	HR4XRD01LU1
1/4	4	HR1XRD00BZ5	HR2XRD01FQ8	HR3XRD01SC5	HR4XRD01LV9
1/4	6	HR1XRD00C06	HR2XRD01FR6	HR3XRD01SD2	HR4XRD01LW7
1/4	8	HR1XRD00C14	HR2XRD01FS3	HR3XRD01SE0	HR4XRD01LX4
5/16	3	HR1XRD00F11	HR2XRD01G33	HR3XRD01SN0	HR4XRD01MB2
5/16	4	HR1XRD00F29	HR2XRD01G41	HR3XRD01SP6	HR4XRD01MC0
5/16	6	HR1XRD00F37	HR2XRD01G58	HR3XRD01SQ4	HR4XRD01MD7
5/16	8	HR1XRD00F45	HR2XRD01G66	HR3XRD01SR2	HR4XRD01ME5
3/8	3	HR1XRD00J82	HR2XRD01GP9	HR3XRD01T39	HR4XRD01MU0
3/8	4	HR1XRD00J90	HR2XRD01GQ7	HR3XRD01T47	HR4XRD01MV8
3/8	6	HR1XRD00JA2	HR2XRD01GR5	HR3XRD01T54	HR4XRD01MW6
3/8	8	HR1XRD00JB0	HR2XRD01GS2	HR3XRD01T62	HR4XRD01MX3
3/8	10	HR1XRD00JC8	HR2XRD01GT0	HR3XRD01T70	HR4XRD01MY1
1/2	3	HR1XRD00Q51	HR2XRD01HD4	HR3XRD01TQ3	HR4XRD01NL9
1/2	4	HR1XRD00Q77	HR2XRD01HE2	HR3XRD01TR1	HR4XRD01NM7
1/2	6	HR1XRD00Q85	HR2XRD01HF0	HR3XRD01TS8	HR4XRD01NN4
1/2	8	HR1XRD00Q93	HR2XRD01HG8	HR3XRD01TT6	HR4XRD01NP0
1/2	10	HR1XRD00QA5	HR2XRD01HH6	HR3XRD01TU4	HR4XRD01NQ8
5/8	4	HR1XRD00VW2	HR2XRD01J22	HR3XRD01U38	HR4XRD01PF0
5/8	6	HR1XRD00VZ5	HR2XRD01J30	HR3XRD01U46	HR4XRD01PG8
5/8	8	HR1XRD00W06	HR2XRD01J48	HR3XRD01U53	HR4XRD01PH6

HSS Round Tool Bits | (Inch Sizes)

Diameter (d) (Inches)	Overall Length (L) (Inches)	1X (M2, 0%Co)	2X (M35, 5%Co)	Sp (M42, 8%Co)	3X (T42, 10%Co)
3/4	4	HR1XRD011V9	HR2XRD01JE0	HR3XRD01UC3	HR4XRD01Q07
3/4	6	HR1XRD011W7	HR2XRD01JF8	HR3XRD01UD0	HR4XRD01Q15
3/4	8	HR1XRD011X4	HR2XRD01JG6	HR3XRD01UE8	HR4XRD01Q23
7/8	4	HR1XRD017R2	HR2XRD01JM3	HR3XRD01UJ7	-
7/8	6	HR1XRD017S9	HR2XRD03AQ9	-	-
7/8	8	HR1XRD017T7	-	-	HR4XRD01Q80
1	4	HR1XRD01CW9	HR2XRD01JR2	HR3XRD01UP4	HR4XRD01QF9
1	6	HR1XRD01CX6	HR2XRD01JS9	HR3XRD01UQ2	HR4XRD01QG7
1	8	HR1XRD01CY4	HR2XRD01JT7	HR3XRD01UR0	HR4XRD01QH5

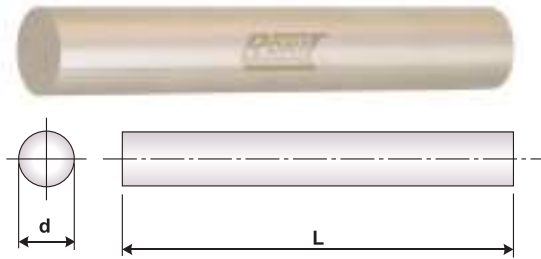
Features

- Round Tool Bits comes with 0* End Bevel Angles.
- Standard tolerance of h9 is followed for all our Round tool bits.
- More than 12000+ sizes of Round HSS Tool bits are in stock to choose from in all materials put together.

Application : Used for making special HSS punches, special tools, engraving bits, other types of tools or used as tool bits in lather or auto-mat machines.

NOTE: TIN COATED HSS Tools are also available on request. Intermediate Sizes are available on request.
Packing: Plastic Boxes only

HSS Round Tool Bits | (Metric Sizes)



Tolerance (Diameter)	h9
Tolerance (Length)	+/- 1.0mm
End Bevel	0°

Diameter (d) (mm)	Overall Length (L) (mm)	1X (M2, 0%Co)	2X (M35, 5%Co)	Sp (M42, 8%Co)	3X (T42, 10%Co)
2	75	HR1XRD00377	HR2XRD01DE6	HR3XRD01R80	HR4XRD01K11
2	100	HR1XRD00385	HR2XRD01DF4	-	HR4XRD01K29
2.5	75	HR1XRD00484	HR2XRD01DS5	HR3XRD01RC6	HR4XRD01K86
2.5	100	HR1XRD00492	-	HR3XRD01RD3	HX4XRD01K66
3	75	HR1XRD00567	HR2XRD01DZ0	HR3XRD01RG7	HR4XRD01KB4
3	100	HR1XRD00575	HR2XRD01E01	HR3XRD01RH5	HX4XRD01KA2
3.5	75	HR1XRD00641	HR2XRD01E76	HR3XRD01RL6	HR4XRD01KM0
3.5	100	HR1XRD00666	HR2XRD01E84	HR3XRD01RM4	HX4XRD01KL8
4	75	HR1XRD007A1	HR2XRD01EJ4	HR3XRD01RQ5	HR4XRD01KT4
4	100	HR1XRD007B9	HR2XRD01EK2	HR3XRD01RR3	HX4XRD01KS2
4.5	75	HR1XRD00880	HR2XRD01EQ9	HR3XRD02W83	HR4XRD01L28
4.5	100	HR1XRD00898	HR2XRD01ER7	HR3XRD01RT8	HX4XRD01L16
5	75	HR1XRD00989	HR2XRD01EY1	HR3XRD01RY7	HR4XRD01L93
5	100	HR1XRD009A9	HR2XRD01EZ9	HR3XRD01RZ5	HR4XRD01LA5
5	150	HR1XRD009B7	HR2XRD01F00	HX3XRD01RX5	HX4XRD01L81
5.5	75	HR1XRD00A65	HR2XRD01F26	HR3XRD01S14	HR4XRD01LE6
5.5	100	HR1XRD00A73	HR2XRD01F34	HR3XRD01S22	HR4XRD01LF4
5.5	150	HR1XRD00A81	HR2XRD01F42	HR3XRD01S30	HR4XRD01LG2
6	75	HR1XRD00B98	HR2XRD01FH8	HR3XRD01S71	HR4XRD01LN6
6	100	HR1XRD00BA0	HR2XRD01FJ3	HR3XRD01S89	HR4XRD01LP2
6	150	HR1XRD00BB8	HR2XRD01FK1	HR3XRD01S97	HR4XRD01LQ0
6	200	HR1XRD00BC6	HR2XRD01FL9	HR3XRD01SA9	HR4XRD01LR8
6.5	75	HR1XRD00C89	HR2XRD01FT1	HR3XRD01SF8	HR4XRD01LY2
6.5	100	HR1XRD00C97	HR2XRD01FU9	HR3XRD01SG6	HR4XRD01LZ0
6.5	150	HR1XRD00CA9	HR2XRD01FV7	HR3XRD01SH4	HR4XRD01M01
6.5	200	HR1XRD00CB7	-	-	HR4XRD01M19
7	75	HR1XRD00D88	HR2XRD01FX2	HR3XRD01SJ9	HR4XRD01M27
7	100	HR1XRD00D96	HR2XRD01FY0	HR3XRD01SK7	HR4XRD01M35
7	150	HR1XRD00DA8	HR2XRD01FZ8	-	HR4XRD01M43
7	200	HR1XRD00DB6	HR2XRD03AT2	-	HR4XRD01M50
7.5	75	HR1XRD00E53	HR2XRD01G09	HR3XRD036J4	HR4XRD01M76
7.5	100	HR1XRD00E61	HR2XRD01G17	HR3XRD01SM3	HR4XRD01M84
7.5	150	HR1XRD00E79	HR2XRD01G25	-	HR4XRD01M92

HSS Round Tool Bits | (Metric Sizes)



Diameter (d) (mm)	Overall Length (L) (mm)	1X (M2, 0%Co)	2X (M35, 5%Co)	Sp (M42, 8%Co)	3X (T42, 10%Co)
8	75	HR1XRD00F86	HR2XRD01G82	HR3XRD01SS9	HR4XRD01MF3
8	100	HR1XRD00F94	HR2XRD01G90	HR3XRD01ST7	HR4XRD01MG1
8	150	HR1XRD00FB4	HR2XRD01GA2	HR3XRD01SU5	HR4XRD01MH9
8	200	HR1XRD00FC2	HR2XRD01GB0	HR3XRD01SV3	HR4XRD01MJ4
8.5	75	HR1XRD00G85	HR2XRD01GE3	-	-
8.5	100	HR1XRD00G93	HR2XRD036D8	-	HR4XRD01MM8
8.5	150	HR1XRD00GA5	HR2XRD01GF1	HR3XRD03825	-
9	75	HR1XRD00H50	HR2XRD01GG9	HR3XRD01SX8	HR4XRD01MP1
9	100	HR1XRD00H68	HR2XRD01GH7	HR3XRD01SY6	HR4XRD01MQ9
9	150	HR1XRD00H76	HR2XRD01GJ2	HR3XRD01T05	HR4XRD01MR7
9	200	HR1XRD00H84	HR2XRD01GK0	HR3XRD01T13	HR4XRD01MS4
9	250	HR1XRD00H92	HR2XRD01GL8	HR3XRD01T21	HR4XRD01MT2
9.5	75	HR1XRD00J17	-	-	-
9.5	100	HR1XRD00J25	-	-	-
9.5	150	HR1XRD00J41	HR2XRD01GM6	-	-
9.5	200	HR1XRD00J58	-	-	HR4XRD03675
10	75	HR1XRD00K57	HR2XRD01GV6	HR3XRD01T88	HR4XRD01MZ9
10	100	HR1XRD00K65	HR2XRD01GW4	HX3XRD02YW9	HR4XRD01N00
10	150	HR1XRD00K81	HR2XRD01GX1	HR3XRD01TA8	HR4XRD01N18
10	200	HR1XRD00K99	HR2XRD01GY9	HR3XRD01TB6	HR4XRD01N26
10	250	HR1XRD00KA1	HR2XRD01GZ7	HR3XRD01TC4	HR4XRD01N34
11	75	HR1XRD00M06	HR2XRD01H24	-	HR4XRD01N42
11	100	HR1XRD00M22	HR2XRD01H32	HR3XRD01TE9	HR4XRD01N59
11	150	HR1XRD00M48	HR2XRD01H40	HR3XRD039B9	HR4XRD01N67
12	75	HR1XRD00P11	HR2XRD01H73	HR3XRD01TK6	HR4XRD01NB1
12	100	HR1XRD00P37	HR2XRD01H81	HR3XRD01TL4	HR4XRD01NC9
12	150	HR1XRD00P52	HR2XRD01H99	HR3XRD01TM2	HR4XRD01ND6
12	200	HR1XRD00P60	HR2XRD01HA1	HR3XRD01TN9	HR4XRD01NE4
12	250	HR1XRD00P78	HR2XRD01HB9	HR3XRD01TP5	HR4XRD01NF2
13	75	HR1XRD00QN6	HR2XRD01HK9	HR3XRD01TV2	HR4XRD01NR6
13	100	HR1XRD00QQ0	HR2XRD01HL7	-	HR4XRD01NS3
13	150	HR1XRD00QR8	HR2XRD01HM5	-	HR4XRD01NT1
14	75	HR1XRD00SG0	HR2XRD01HR4	-	HR4XRD01NY0
14	100	HR1XRD00SH8	HR2XRD01HS1	HR3XRD01TZ3	HR4XRD01NZ8
14	150	HR1XRD00SJ3	HR2XRD01HT9	HR3XRD01U04	HR4XRD01P08
14	200	HR1XRD00SK1	HR2XRD03H38	-	HR4XRD01P24
15	100	HR1XRD00U99	HR2XRD01HY8	HR3XRD01U12	HR4XRD01P81
15	150	HR1XRD00UA1	HR2XRD01HZ6	HR3XRD02T29	HR4XRD01P99
16	100	HR1XRD00W97	HR2XRD01J63	HR3XRD01U61	HR4XRD01PK9
16	150	HR1XRD00WA9	HX2XRD02XX8	HR3XRD01U79	HR4XRD01PL7
16	200	HR1XRD00WB7	HR2XRD01J89	HR3XRD01U87	HR4XRD01PN2

Diameter (d) (mm)	Overall Length (L) (mm)	1X (M2, 0%Co)	2X (M35, 5%Co)	Sp (M42, 8%Co)	3X (T42, 10%Co)
17	100	HR1XRD00Y12	-	-	HR4XRD03097
17	150	HR1XRD00Y20	HR2XRD01JA9	-	HR4XRD01PP8
18	100	HR1XRD00ZY3	HR2XRD03HP4	-	HR4XRD01PR4
18	150	HR1XRD00ZZ1	-	HR3XRD03GX6	HR4XRD01PS1
19	100	HR1XRD011Q0	HR2XRD01JB7	HR3XRD01U95	HR4XRD01PW3
19	150	HR1XRD011R8	HR2XRD01JC5	HR3XRD01UA7	HR4XRD01PX0
19	200	HR1XRD011S5	HR2XRD01JD2	HR3XRD01UB5	HR4XRD01PY8
20	100	HR1XRD013M7	HR2XRD01JH4	HR3XRD01UF6	HX4XRD02XT5
20	150	HR1XRD013N4	HR2XRD01JJ9	HR3XRD01UG4	HR4XRD01Q56
20	200	HR1XRD013P0	HR2XRD01JK7	HR3XRD01UH2	HR4XRD01Q64
22	100	HR1XRD017A9	-	-	HR4XRD01Q72
22	150	HR1XRD017B7	-	-	-
25	100	HR1XRD01CR0	HR2XRD01JN0	HR3XRD01UL3	HR4XRD01QC6
25	150	HR1XRD01CS7	HR2XRD01JP6	HR3XRD01UM1	HR4XRD01QD3
25	200	HR1XRD01CT5	HR2XRD01JQ4	HR3XRD01UN8	HR4XRD01QE1

Features

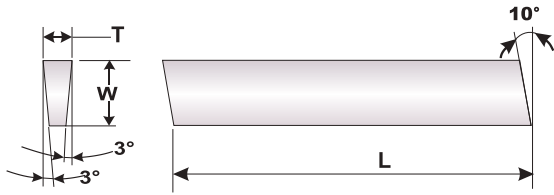
- Round Tool Bits comes with 0* End Bevel Angles.
- Standard tolerance of h9 is followed for all our Round tool bits.
- More than 12000+ sizes of Round HSS Tool bits are in stock to choose from in all materials put together.

Application : Used for making special HSS punches, special tools, engraving bits, other types of tools or used as tool bits in lathe or auto-mat machines.

NOTE: TIN COATED HSS Tools are also available on request.

Intermediate Sizes are available on request.

Packing: Plastic Boxes only



Tolerance (Width/Thickness)	h13
Tolerance (Length)	+/- 1.0mm
End Bevel	10°
Optional Bevel	As per Requirement

Thickness (T) (Inches, * >> mm)	Width (W) (Inches)	Overall Length (L) (Inches)	1X (M2, 0%Co)	2X (M35, 5%Co)	3X (T42, 10%Co)
3/32	1/2	4	HR1XPA000Z2	HR2XPA00250	HR4XPA00357
3/32	5/8	5	HR1XPA00129	HR2XPA00276	HR4XPA00365
1/8	3/4	6	HR1XPA001G3	HR2XPA002E5	HR4XPA003D4
1/8	7/8	6	HR1XPA001H1	HR2XPA002F3	HR4XPA003E2
3/16	1	6	HR1XPA001N7	HR2XPA002K2	HR4XPA003G8
1.5*	1/2	4	HR1XPA000P4	HR2XPA001Y2	-
1.75*	1/2	4	HR1XPA000R0	HR2XPA001Z0	-
1.75*	5/8	5	HR1XPA000S7	-	-

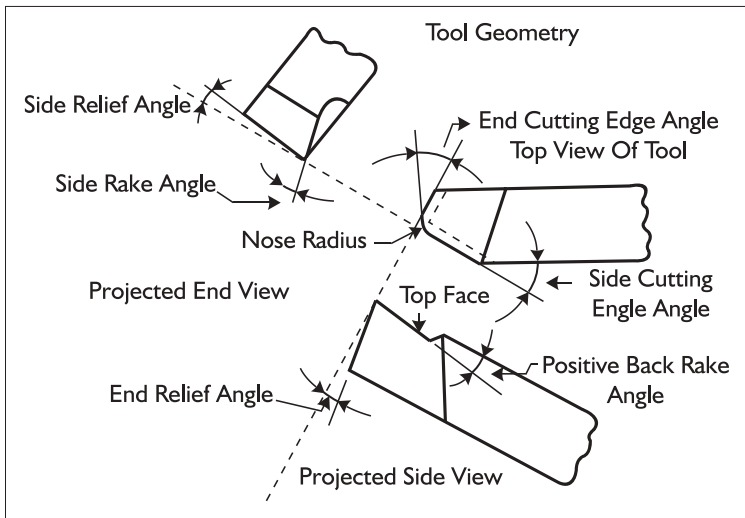
Features

- Parting tools can be manufactured in FORM E & INDEX Type as per customer requirement,
- Standard tolerance of h13 is followed for all our Parting tool bits.
- More than 50+ sizes of Parting Tool bits are in stock to choose from in all grades.
- Parting tool bits are manufactured at RIGPL in varying HSS material grades ranging from ROHIT 1X i.e. M2 or SKH51 grade suitable for Free Cutting Metals to ROHIT EC500 suitable for machining difficult to machine materials like alloy Steels, SS, etc.

NOTE: TIN COATED HSS Tools are also available on request.

Intermediate Sizes are available on request.

Packing: Plastic Boxes only



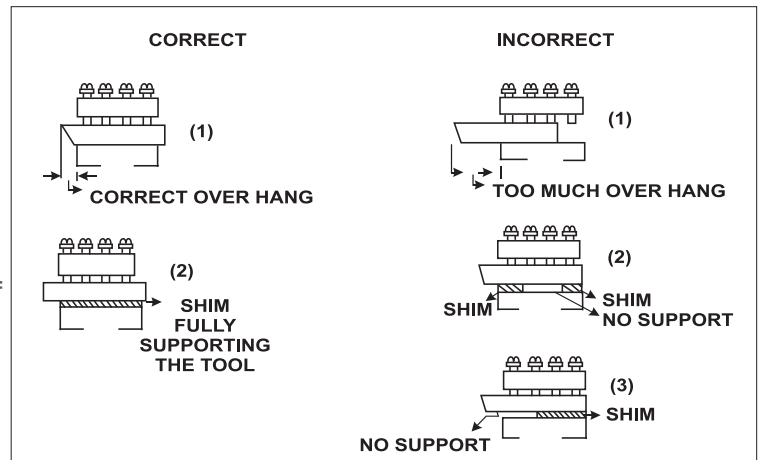
Machining Instructions

- The tool must be kept sharp.
- Tool overhang should be kept to a minimum less than 1:1 ratio of overhang to the shank section, to avoid vibrations.
- The finishing point of the tool must be set on the centre line of the work piece.
- Re-grind at the appropriate time to minimise cutting forces. Worn out edges need a higher force.
- Use positive rake angles. Do not use a negative rake angle unless called for.
- The machine must be kept rigid.
- The machine should be of adequate power.
- The work piece and tool should be well clamped.
- The depth of cut should be deep enough to avoid glazing.
- The feed should be positive to avoid work hardening.
- Minimum chip colourisation is desirable.

How To Clamp The Tool

TOOL CLAMPING

- Tool bits should be fitted in the tool post or tool holder with a minimum of overhang as in figure (in the ratio of 1:1 of the tool size or less).
- The base of the tool bit should be flush with the tool post.
- When shims are used they should cover the entire length of the tool bit that rests on the tool post.
- It is not advisable to use a bent shim.



Recommended Angles for High Speed Steel Single Point Tools



Material	Side Relief angle degrees	End Relief angle degrees	Back Rake angle degrees	Side Rake angle degrees
High Speed, Alloy & High Carbon Tool Steels & Stainless Steel	7 to 9	6 to 8	5 to 7	8 to 10
SAE Steels:				
1020, 1035, 1040	8 to 10	8 to 10	10 to 12	10 to 12
1045, 1095	7 to 9	8 to 10	10 to 12	10 to 12
11,121,120	7 to 9	7 to 9	12 to 14	12 to 14
1314, 1315	7 to 9	7 to 9	12 to 14	14 to 16
1335	7 to 9	7 to 9	12 to 14	14 to 16
23,152,320	7 to 9	7 to 9	8 to 10	10 to 12
233,023,352,340	7 to 9	7 to 9	8 to 10	10 to 12
23,452,350	7 to 9	7 to 9	6 to 8	8 to 10
311,531,203,130	7 to 9	7 to 9	8 to 10	10 to 12
31,353,140	7 to 9	7 to 9	8 to 10	8 to 10
325,041,404,340	7 to 9	7 to 9	6 to 8	8 to 10
61,406,145	7 to 9	7 to 9	6 to 8	8 to 10
Aluminium	12 to 14	8 to 10	30 to 35	14 to 16
Bakelite	10 to 12	8 to 10	0	0
Brass, Free Cutting	10 to 12	8 to 10	0	1 to 3
Red, Yellow, Bronze Cast & Bronze Commercial	8 to 10	8 to 10	0	-2 to -4
Bronze Free Cutting	8 to 10	8 to 10	0	2 to 4
Hard Phosphor Bronze	8 to 10	6 to 8	0	0
Cast Iron, Grey	8 to 10	6 to 8	3 to 5	10 to 12
Copper	12 to 14	12 to 14	14 to 16	18 to 20
Copper Alloys :				
Hard	8 to 10	6 to 8	0	0
Soft	10 to 12	8 to 10	0 to 2	0
Fibre	14 to 16	12 to 14	0 to 2	0
Fernico	14 to 16	10 to 12	14 to 16	10 to 12
Nickel Iron	14 to 16	10 to 12	6 to 8	12 to 14
Micarta	14 to 16	10 to 12	14 to 16	10 to 12
Monel & Nickel	14 to 16	12 to 14	8 to 10	12 to 14
Nickel, Silver	10 to 12	10 to 12	8 to 10	0 to -2
Rubber, Hard	18 to 20	14 to 16	0 to -2	0 to -2

Recommended Cutting Speed & Feed

Recommended Cutting Speed (m/min.)

Material	10% Cobalt T42	8% Cobalt M42	5% Cobalt M35	M2
Mild Steel, Wrought Iron, Soft Brass, Copper, Bronze and Aluminium with tensile strength of less than 25 tons per square inch.	79-50	70-45	60-40	59-36
Steel & Steel Castings such as slightly hard Mild Steel, Soft Cut Iron & other metals like hard Brass, Copper & Aluminium with tensile strength upto 38 tons per square inch.	39-26	36-24	33-32	30-21
Steel & Steel Castings such as Carbon Steel, medium hard cast Iron & other metals like hard Brass, Copper, Bronze & Aluminium with a tensile strength upto 45 tons per square inch.	29-21	26-18	24-16	22-15
Steel & Steel Castings such as Oil Hardened Steel, Chrome Steel, Hard Cut Iron, etc. With a tensile strength upto 50 tons per square inch.	22-16	21-15	20-14	18-23
Steel & Steel Castings including annealed High Speed Steel, with a tensile strength upto 65 tons per square inch.	18-23	15-12	14-11	10-12

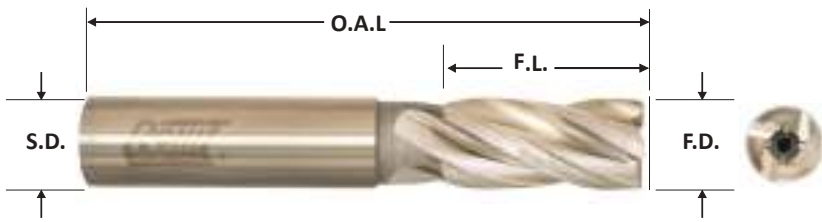
Recommended Depth of cut

Operation	Depth of Cut (mm)
Rough turning	Depth of cut = machining allowance
Semi finish turning	0.50 to 0.20mm
0.50 to 0.20mm	0.40 to 0.10mm

Recommended Feed

Surface Finish μ	Work Material	Range of Cutting Speed m/min.	Nose Radius in mm		
			0.5	1	2
			Feed in mm/rev.		
10	Carbon steel & Alloy steel	<50	0.3-0.5	0.45-0.6	0.55-0.7
		>50	0.4-0.55	0.55-0.65	0.65-0.7
	Cut Iron Bronze & Aluminium Alloys	All range	0.25-0.4	0.40-0.5	0.5-0.6
5	Carbon steels & Alloy steels	<50	0.18-0.25	0.25-0.3	0.3-0.4
		>50	0.25-0.3	0.3-0.35	0.35-0.5
	Cast Iron, Bronze & Aluminium Alloys	All range	0.15-0.25	0.25-0.4	0.4-0.6
2.5	Carbon steel & Alloy steel	<50	0.1	0.11-0.15	0.15-0.22
		50- 100	0.11-0.16	0.16-0.25	0.25-0.35
		>100	0.16-0.2	0.2 - 0.25	0.25-0.35
	Cast Iron, Bronze & Aluminium Alloys	All range	0.1-0.15	0.15-0.2	0.2-0.35

Indications	Causes	Remedies
Chipping	<p>Too Keen a cutting edge. Chatter. Incorrect tool material. Too much relief. Lack of rigidity. Improper grinding.</p>	<p>Select Correct tool geometry. Prevent Chattering (See Chatter Below). Select suitable grade/quality. Reduce relief. Clamp rigidity. Use suitable grade of wheel for Grinding. Grind to give satisfactory finish to the cutting faces.</p>
Cracking or Breaking	<p>Feed to heavy. Worn out cutting edges Improperly applied coolant. Too much rake or relief. Too much over hang.</p> <p>Lack of rigidity. Too much variation in depth of cut for the size of Tool bit. Improper clamping.</p>	<p>Reduce feed to recommended range. Re-grind the cutting edges. Apply copious flow of coolant. Grind to recommended rake/relief angles. Reduce overhang to the minimum possible extent. Clamp both the work & the tool rigidly. Minimize variation in depth of cut.</p> <p>Tool post or Tool holder worn out replace it. The tool must be supported at the bottom with a perfect flat (Parallel) plate shown & should be clamped rigidly. Check the work-clamping.</p>
Chatter	<p>Tool not in centre. Insufficient relief or clearance. Too much rake angle. Nose radius too large. Insufficient H.P.</p>	<p>Reset. Grind with adequate relief. Grind to recommended rake angle. Reduce the nose radius on the tool. Reduce depth of cut & feed.</p>
Tom Finish	<p>Speed too low. Dull tool. Improper grinding.</p>	<p>Increase speed as recommended. Re-sharpen the tool. Grind the tool to required angles with a suitable grade of wheel to give good finish on the cutting faces</p>
Flank wear	<p>Speed too high. Feed to light. Improper grinding.</p>	<p>Reduce speed as recommended. Increase suitably. See grinding.</p>
Crater wear	<p>Speed too high. Feed too high. Tool of incorrect grade.</p>	<p>Reduce speed. Reduce feed. Select tool material of better hot Hardness.</p>
Glaze	<p>Speed too low. Tool finish rough. Tool little rake.</p>	<p>Use recommended speed. Grind tool with finer grit wheel give finer wheel and give finer finish on the cutting faces. Provide adequate rake.</p>



Tolerance	
F.D. < 3/4"	(+ 0.005"/ - 0.000)
F.D. > 3/4"	(+ 0.010"/ - 0.000)

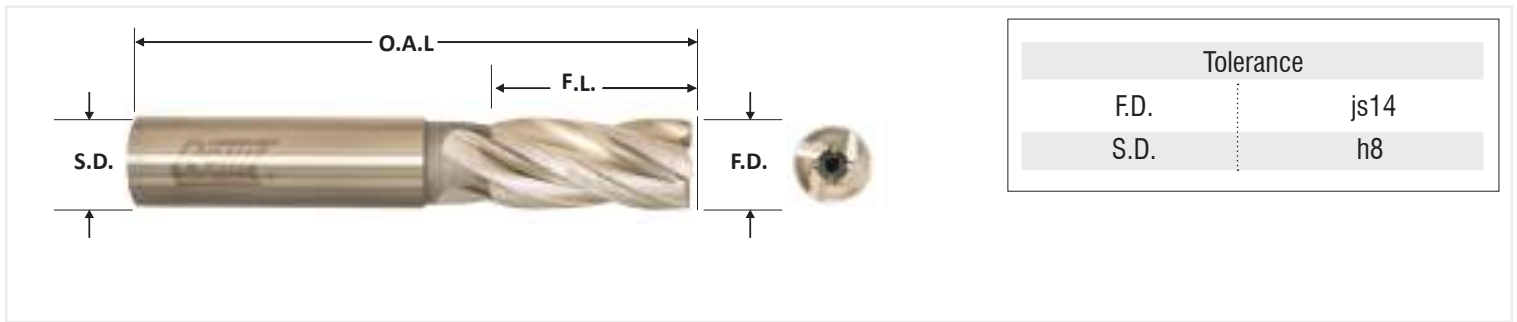
Features

- All HSS End Mills have 30° helical flutes and unmatched hardness to provide longer tool life.
- Sharper cutting edges of HSS End Mills provide longer life,
- HSS end mills comes with 4Flute & 6Flute (for bigger diameter)
- All in-house heat treatment equipment enables RIGPL to provide better hardness & micro structure control of these end mills.

Flute Dia (inch)	Flut Length (inch)	Shank Dia (inch)	Overall Length (inch)	1X (M2, 0%Co)	2X (M35, 5%Co)
1/8	3/8	1/4	1+7/8	HR1XGSE00CU1	HR2XGSE00EB9
5/32	3/8	1/4	1+7/8	HR1XGSE00CV9	HR2XGSE00EC7
3/16	1/2	1/4	2	HR1XGSE00CY2	HR2XGSE00EE2
7/32	1/2	1/4	2	HR1XGSE00D19	HR2XGSE00EG8
1/4	5/8	1/4	2+1/8	HR1XGSE00D35	HR2XGSE00EJ1
5/16	3/4	3/8	2+1/2	HR1XGSE00D50	HR2XGSE00EL7
3/8	7/8	3/8	2+5/8	HR1XGSE00D84	HR2XGSE00EP8
7/16	7/8	1/2	2+5/8	HR1XGSE00DB2	HR2XGSE00ES1
1/2	1	1/2	2+3/4	HR1XGSE00DD7	HR2XGSE00EU7
9/16	1+1/8	1/2	2+7/8	HR1XGSE00DH9	HR2XGSE00EX0
5/8	1+1/4	5/8	3+1/4	HR1XGSE00DL0	HR2XGSE00EZ6
11/16	1+3/8	5/8	3+3/8	HR1XGSE00DP1	HR2XGSE00F23
3/4	1+1/2	5/8	3+1/2	HR1XGSE00DS4	HR2XGSE00F56
13/16	1+5/8	3/4	3+5/8	HR1XGSE00DU0	HR2XGSE00F72
7/8	1+5/8	3/4	3+5/8	HR1XGSE00DX3	HR2XGSE00FA0
1	1+3/4	3/4	3+3/4	HR1XGSE00E18	HR2XGSE00FE1
1+1/8	1+7/8	1	4+1/8	HR1XGSE00E59	HR2XGSE00FJ0

NOTE: Intermediate sizes available only on request as per company MOQ, Specifications Conform to BS122: Part1: 1953

Packing: Single piece plastic boxes.



Features

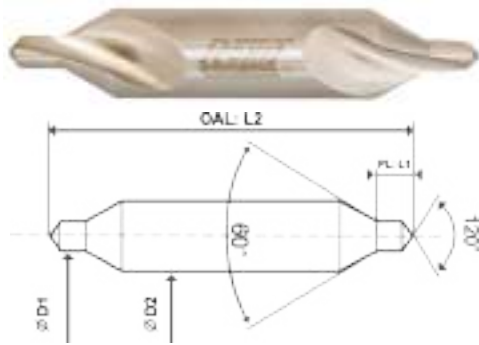
- All HSS End Mills have 30° helical flutes and unmatched hardness to provide longer tool life.
- Sharper cutting edges of HSS End Mills provide longer life,
- HSS end mills comes with 4Flute & 6Flute (for bigger diameter)
- All in-house heat treatment equipment enables RIGPL to provide better hardness & micro structure control of these end mills.

Flute Dia (mm)	Flut Length (mm)	Shank Dia (mm)	Overall Length (mm)	1X (M2, 0%Co)	2X (M35, 5%Co)
3	10	4	42	HR1XGSE00CT3	HR2XGSE00EA1
4	11	4	43	HR1XGSE00CW7	HR2XGSE00ED4
5	13	5	47	HR1XGSE00CZ0	HR2XGSE00EF0
6	16	6	52	HR1XGSE00D27	HR2XGSE00EH6
7	16	8	52	HR1XGSE00D43	HR2XGSE00EK9
8	19	8	59	HR1XGSE00D68	HR2XGSE00EM5
9	19	10	59	HR1XGSE00D76	HR2XGSE00EN2
10	22	10	67	HR1XGSE00D92	HR2XGSE00EQ6
11	22	12	67	HR1XGSE00DA4	HR2XGSE00ER4
12	26	12	76	HR1XGSE00DC0	HR2XGSE00ET9
13	26	12	76	HR1XGSE00DE5	HR2XGSE00EV5
14	26	12	76	HR1XGSE00DF3	HR2XGSE00EW3
15	32	12	88	HR1XGSE00DJ4	HR2XGSE00EY8
16	32	16	88	HR1XGSE00DM8	HR2XGSE00F07
17	32	16	88	HR1XGSE00DN5	HR2XGSE00F15
18	32	16	88	HR1XGSE00DQ9	HR2XGSE00F31
19	38	16	101	HR1XGSE00DR7	HR2XGSE00F49
20	38	20	101	HR1XGSE00DT2	HR2XGSE00F64
22	38	20	101	HR1XGSE00DW6	HR2XGSE00F98
25	45	25	116	HR1XGSE00E00	HR2XGSE00FD3

NOTE: Intermediate sizes available only on request as per company MOQ, Specifications Conform to IS6353:1991.

Packing: Single piece plastic boxes.

HSS CENTRE DRILLS | Type 'A'



Tolerance	
Pilot Dia (D1)	K12
Body Dia (D2)	h9

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

Features

- BSW & DIN 333 Standards sizes are manufactured for HSS Center Drills
- Unmatched precise hardness (HRC) to provide long lasting Center Drill life
- All in-house heat treatment equipment enables RIGPL to provide better hardness & micro structure control of these Centre Drills.
- Type "A" Centre Drill for centre holes without protecting chamfer.

Type	Pilot Dia (inch)	Pilot Length (inch)	Body Dia (inch)	Overall Length (inch)	1X (M2, 0%Co)	2X (M35, 5%Co)
BS1	1/32	1/16	1/8	1+1/2	HR1XCA000B8	HR2XCA000U5
BS2	1/16	5/64	3/16	1+3/4	HR1XCA000D3	HR2XCA000W1
BS3	3/32	1/8	1/4	2	HR1XCA000G7	HR2XCA000Z4
BS4	1/8	5/32	5/16	2+1/4	HR1XCA000K8	HR2XCA00121
BS5	3/16	1/4	7/16	2+1/2	HR1XCA000M4	HR2XCA00147
BS6	1/4	5/16	5/8	3	HR1XCA000Q5	HR2XCA00170
BS7	5/16	13/32	3/4	3+1/2	HR1XCA000R3	HR2XCA00188

Type	Pilot Dia (mm)	Pilot Length (mm)	Body Dia (mm)	Overall Length (mm)	1X (M2, 0%Co)	2X (M35, 5%Co)
DIN 333	1.25	1.8	3.15	31.5	HR1XCA000C6	HR2XCA000V3
DIN 333	1.6	2.4	4	35.5	HR1XCA000E1	HR2XCA000X8
DIN 333	2	2.9	5	40	HR1XCA000F9	HR2XCA000Y6
DIN 333	2.5	3.6	6.3	45	HR1XCA000H5	HR2XCA00105
DIN 333	3.15	4.4	8	50	HR1XCA000J0	HR2XCA00113
DIN 333	4	5.6	10	56	HR1XCA000L6	HR2XCA00139
DIN 333	5	6.9	12.5	63	HR1XCA000N1	HR2XCA00154
DIN 333	6.3	8.6	16	71	HR1XCA000P7	HR2XCA00162
DIN 333	8	10.8	20	80	HR1XCA000S0	HR2XCA00196
DIN 333	10	13.5	25	100	HR1XCA000T8	HR2XCA001A8

NOTE: For TIN COATED HSS Centre Drills contact us for Delivery time & Quote.
Packing: Single piece plastic boxes.

Series	Description	Page No
P101	HSS Straight Punches	180
P102	HSS Tapered Head Punches	181
P103	HSS Straight Punches For Medium Load	182
P104	HSS Straight Punches For Heavy Load	183
P105	HSS Mini Straight Punches	184
P106	HSS Shoulder Punches	185
P107	HSS Shoulder Punches For Heavy Load	186
P108	HSS Shoulder Punches Short Type	187
P109	HSS Tapped Punches	188
P110	HSS Block Punches	189
P112	HSS Straight Button Dies	190
P113	HSS Headed Button Dies	190

Code	Grade	Description	HRc
1X	ROHIT-1X	AISI M2; HS 6 - 5 - 2	60-63
AS	ROHIT-ASP	ASP-2030; HS 6 - 5 -3 -8	62-65



How to Order

Sr. No	For Series P101-P105	Types / Size	Example
1	Select Series	P101 - P105	P103
2	Select HSS Grade	1X / AS	1X
3	Select Head Diameter ("H")	9mm	09
4	Select Body Diameter ("P")	5.5mm	0550
5	Select OAL (Overall Length - "L")	80mm	080
	Ordering Code		P103-1X-09-0550-080

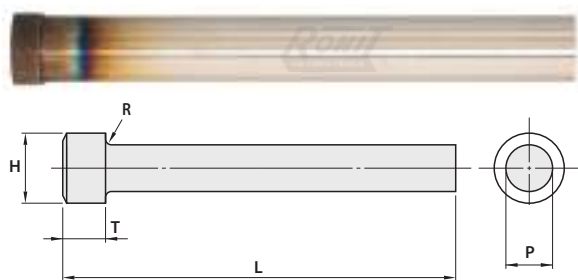
Sr. No	For Series P106-P108	Types / Size	Example
1	Select Series	P106 - P109	P106
2	Select HSS Grade	1X / AS	1X
3	Select Head Diameter ("H")	15mm	15
4	Select TIP Diameter ("P")	10.9mm	1090
5	Select OAL (Overall Length - "L")	100mm	100
6	Select TIP Length ("B")	13mm	13
	Ordering Code		P106-1X-15-1090-100-13

Sr. No	For Series P109	Types / Size	Example
1	Select Series	P109	P109
2	Select HSS Grade	1X / AS	AS
3	Select Head Diameter ("H")	10mm	10
4	Select TIP Diameter ("P")	5.5mm	0550
5	Select OAL (Overall Length - "L")	100mm	100
6	Select TIP Length ("B")	13mm	13
7	Tap Size ("M")	M5	M5
	Ordering Code		P109-AS-10-0550-100-13-M5

Sr. No	For Series P110	Types / Size	Example
1	Select Series	P110	P110
2	Select HSS Grade	1X	1X
3	Select Head Width ("H")	20	20
4	Select Head Height ("V")	8	08
5	Select TIP Width ("W")	6	0600
6	Select TIP Height ("P")	5.5	0550
7	Select TIP Length ("B")	13	13
8	Select OAL (Overall Length - "L")	70mm	070
	Ordering Code		P110- 1X-20-08-0600-0550-13-070

Sr. No	For Series P112	Types / Size	Example
1	Select Series	P112	P112
2	Select HSS Grade	1X	1X
3	Select Body Diameter ("D")	10mm	10
4	Select TIP Diameter ("P")	5.5	0550
5	Select OAL (Overall Length - "L")	30mm	030
	Ordering Code		P112-1X-10-0550-030

Sr. No	For Series P113	Types / Size	Example
1	Select Series	P113	P113
2	Select HSS Grade	1X	1X
3	Select Head Diameter ("H")	13mm	13
4	Select Body Diameter ("P")	5.5	0550
5	Select OAL (Overall Length - "L")	40mm	040
	Ordering Code		P113-1X-13-0550-040



Tolerance	
H	0, -0.2
L	+/-0.5
P	0, -0.02
T	+/-0.3

- Head Length "T" of 50mm Punch - 3mm
- Head Length "T" of above 50mm Length Punches - 5mm
- Sizes below 4mm : No Head Annealing is done

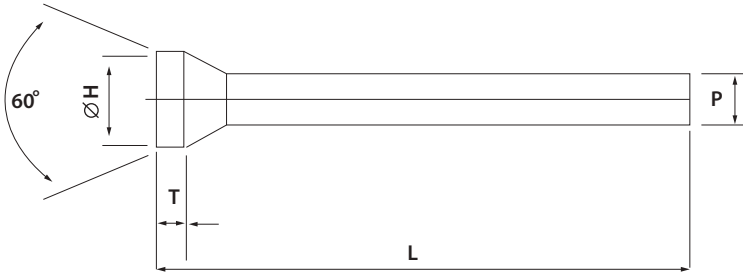
HEAD DIA "H" (mm)	BODY DIA "P" (0.1 mm increments) min. "P" max.	OVERALL LENGTH "L" (mm)			
		50	75	100	150
3	1.1~2.0	50	75		
3.5	2.1~2.5	50	75		
4	2.5~3.0	50	75		
4.5	3.1~3.5	50	75		
5	3.6~4.0	50	75	100	
5.5	4.1~4.5	50	75	100	
6	4.6~5.0	50	75	100	
6.5	5.1~5.5	50	75	100	150
7	5.6~6.0	50	75	100	150
7.5	6.1~6.5	50	75	100	150
8	6.6~7.0	50	75	100	150
8.5	7.1~7.5	50	75	100	150
9	7.6~8.0	50	75	100	150
9.5	8.1~8.5	50	75	100	150
10	8.6~9.0	50	75	100	150
10.5	9.1~9.5		75	100	150
11	9.6~10.0		75	100	150
11.5	10.1~10.5		75	100	150

HEAD DIA "H" (mm)	BODY DIA "P" (0.1 mm increments) min. "P" max.	OVERALL LENGTH "L" (mm)		
		75	100	150
12	10.6~11.0	75	100	150
12.5	11.1~11.5	75	100	150
13	11.6~12.0	75	100	150
13.5	12.1~12.5	75	100	150
14	12.6~13.0	75	100	150
14.5	13.1~13.5	75	100	150
15	13.6~14.0	75	100	150
16	14.1~15	75	100	150
17	15.1~16	75	100	150
18	16.1~17	75	100	150
19	17.1~18	75	100	150
20	18.1~19	75	100	150
21	19.1~20	75	100	150
22	20.1~21	75	100	150
23	21.1~22	75	100	150
24	22.1~23	75	100	150
25	23.1~24	75	100	150
26	24.1~25	75	100	150

NOTE: These are company standard punches available in stock or cut to lengths in ROHIT- 1X grade only



Tolerance	
H	0, -0.2
L	+/-0.5
P	0, -0.02
T	+/-0.3

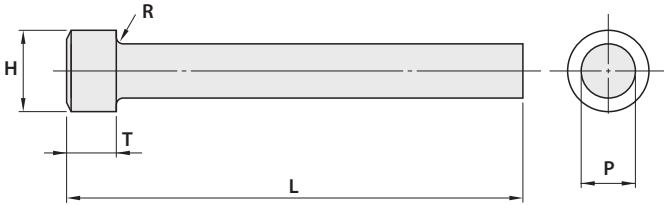


HEAD DIA "H" (mm)	BODY DIA "P" (0.1 mm increments) min. "P" max.	OVERALL LEN "L" (mm)				HEAD LEN "T" (mm)	
4.5	3.0~3.5	50	70	75		0.5	
5	3.5~4.0	50	70	75		0.5	
5.5	4.0~4.5	50	70	75	80	100	0.5
6	4.5~5.0	50	70	75	80	100	0.5
6.5	5.0~5.5	50	70	75	80	100	0.5
7	5.5~6.0	50	70	75	80	100	0.5
8	6.0~6.5	50	70	75	80	100	0.5
9	6.5~7.0	50	70	75	80	100	1
10	7.0~8.0	50	70	75	80	100	1
11	8.0~9.0		70	75	80	100	1
12	9.0~10.0		70	75	80	100	1
13	10.0~11.0		70	75	80	100	1
14	11.0~12.0		70	75	80	100	1

NOTE: This is Non-stock Item, ask your RIGPL representative for Delivery Period



Tolerance	
H	0, -0.2
L	+/-0.5
P	0, -0.02

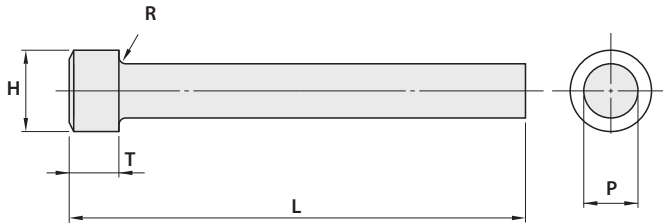


HEAD DIA "H" (mm)	BODY DIA "P" (0.1 mm increments) min. "P" max.	OVERALL LEN "L" (mm)				
5	2.1~3.0	50	70	80		
6	3.1~4.0	50	70	80		
7	4.1~5.0	50	70	80		
8	5.1~6.0	50	70	80		
9	6.1~7.0	50	70	80	100	
10	7.1~8.0	50	70	80	100	
11	8.1~9.0	50	70	80	100	
12	9.1~10.0	50	70	80	100	120
13	10.1~11.0	50	70	80	100	120
14	11.1~12.0	50	70	80	100	120
15	12.1~13.0	50	70	80	100	120
16	13.1~14.0		70	80	100	120
17	14.1~15.0		70	80	100	120
18	15.1~16.0		70	80	100	120
19	16.1~17.0		70	80	100	120
20	17.1~18.0		70	80	100	120
21	18.1~19.0		70	80	100	120
22	19.1~20.0		70	80	100	120
23	20.1~21.0		70	80	100	120
24	21.1~22.0		70	80	100	120
25	22.1~23.0		70	80	100	120
26	23.1~24.0		70	80	100	120
27	24.1~25.0		70	80	100	120

NOTE: This is Non-stock Item, ask your RIGPL representative for Delivery Period



Tolerance	
H	0, -0.2
L	+/-0.5
P	0, -0.02

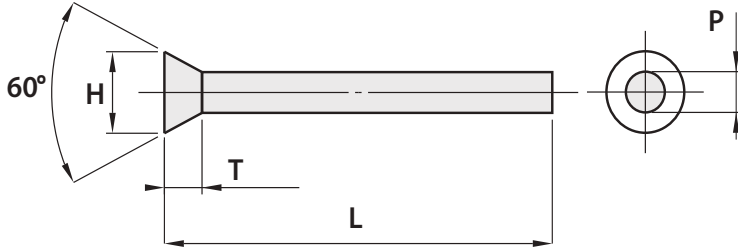


HEAD DIA "H" (mm)	BODY DIA "P" (0.1 mm increments) min. "P" max.	OVERALL LEN "L" (mm)				
6	2.1~3.0	50	70	80		
7	3.1~4.0	50	70	80		
8	4.1~5.0	50	70	80		
9	5.1~6.0	50	70	80		
10	6.1~7.0	50	70	80	100	
11	7.1~8.0	50	70	80	100	
12	8.1~9.0	50	70	80	100	
13	9.1~10.0	50	70	80	100	120
14	10.1~11.0	50	70	80	100	120
15	11.1~12.0	50	70	80	100	120
16	12.1~13.0	50	70	80	100	120
17	13.1~14.0		70	80	100	120
18	14.1~15.0		70	80	100	120
19	15.1~16.0		70	80	100	120
20	16.1~17.0		70	80	100	120
21	17.1~18.0		70	80	100	120
22	18.1~19.0		70	80	100	120
23	19.1~20.0		70	80	100	120
24	20.1~21.0		70	80	100	120
25	21.1~22.0		70	80	100	120
26	22.1~23.0		70	80	100	120
27	23.1~24.0		70	80	100	120
28	24.1~25.0		70	80	100	120

NOTE: This is Non-stock Item, ask your RIGPL representative for Delivery Period

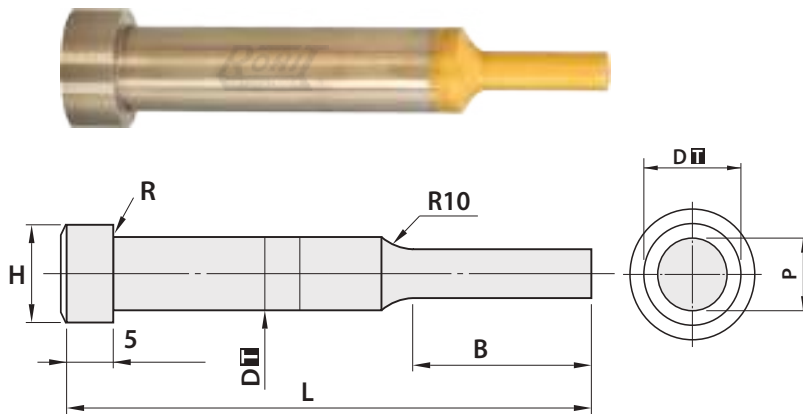


Tolerance	
H	0, -0.2
L	+/-0.5
P	0, -0.02



HEAD DIA "H" (mm)	BODY DIA "P" (mm)	OVERALL LEN "L" (mm)
1.8	1	
2	1.1	
2.1	1.2	
2.3	1.3	
2.6	1.4	
2.8	1.5	
2.9	1.6	
3.1	1.7	
3.3	1.8	
3.4	1.9	25mm
3.6	2	35mm
3.8	2.1	40mm
3.9	2.2	50mm
4.1	2.3	
4.4	2.4	
4.5	2.5	
4.7	2.6	
4.9	2.7	
5.1	2.8	
5.2	2.9	
5.4	3	

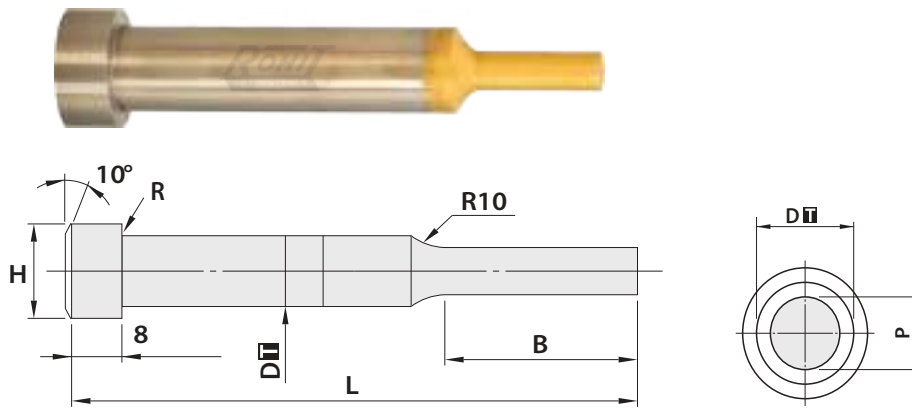
NOTE: This is Non-stock Item, ask your RIGPL representative for Delivery Period



Tolerance	
H	0, -0.2
L	+/-0.5
P	0, -0.02
D	0, -0.05
B	0, +0.5

HEAD DIA "H" (mm)	BODY DIA "D" (mm)	BODY LEN "B" (mm)	OVERALL LEN "L" (mm)				TIP DIA "P" (0.1 mm increments) min. "P" max.
6	4	8	50	70	80	100	2.0~3.9
7	5	8	50	70	80	100	2.0~4.9
8	6	8	50	70	80	100	2.0~5.9
10	8	13	50	70	80	100	3.0~7.9
12	10	13	50	70	80	100	3.0~9.9
15	13	13	50	70	80	100	6.0~12.9
18	16	19		70	80	100	10.0~15.9
22	20	19		70	80	100	13.0~19.9
27	25	19	50	70	80		18.0~24.9
6	4	13	50	70	80	100	2.0~3.9
7	5	13	50	70	80	100	2.0~4.9
8	6	13	50	70	80	100	2.0~5.9
10	8	19	50	70	80	100	3.0~7.9
12	10	19	50	70	80	100	3.0~9.9
15	13	19	50	70	80	100	6.0~12.9
18	16	25		70	80	100	10.0~15.9
22	20	25		70	80	100	13.0~19.9
27	25	25		70	80	100	18.0~24.9
18	16	40		70	80	100	10.0~15.9
22	20	40		70	80	100	13.0~19.9
27	25	40		70	80	100	18.0~24.9

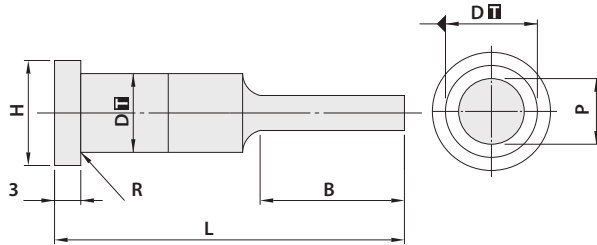
NOTE: This is Non-stock Item, ask your RIGPL representative for Delivery Period



Tolerance	
H	0, -0.2
L	+/-0.5
P	0, -0.02
D	0, -0.05
B	0, +0.5

HEAD DIA "H" (mm)	BODY DIA "D" (mm)	BODY LEN "B" (mm)	OVERALL LEN "L" (mm)				TIP DIA "P" (0.1 mm increments) min. "P" max.	
10	5	8	50	70	80	100	2.00~4.9	
11	6	8	50	70	80	100	2.00~5.9	
13	8	13		70	80	100	120	3.00~7.9
15	10	13		70	80	100	120	3.00~9.9
18	13	13		70	80	100	120	6.00~12.9
21	16	19		70	80	100	120	10.00~15.9
25	20	19		70	80	100	120	13.00~19.9
30	25	19		70	80	100	120	18.00~24.9
10	5	13		70	80	100		2.00~4.9
11	6	13		70	80	100		2.00~5.9
13	8	19		70	80	100	120	3.00~7.9
15	10	19		70	80	100	120	3.00~9.9
18	13	19		70	80	100	120	6.00~12.9
21	16	25		70	80	100	120	10.00~15.9
25	20	25		70	80	100	120	13.00~19.9
30	25	25		70	80	100	120	18.00~24.9

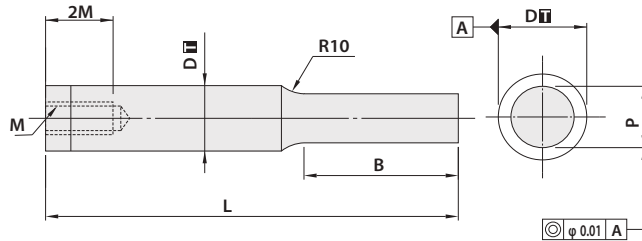
NOTE: This is Non-stock Item, ask your RIGPL representative for Delivery Period



Tolerance	
H	0, -0.2
L	+/-0.5
P	0, -0.02
D	0, -0.05
B	0, +0.5

HEAD DIA "H" (mm)	BODY DIA "D" (mm)	TIP LEN "B" (mm)	OVERALL LEN "L" (mm)				TIP DIA "P" (0.1 mm increments) min. "P" max.
7	4	8	25	30	35	40	2.0~3.9
8	5	8	25	30	35	40	2.0~4.9
9	6	8	25	30	35	40	2.50~5.9
11	8	8	25	30	35	40	5.0~7.9
13	10	8	25	30	35	40	7.0~9.9
7	4	13		30	35	40	2.0~3.9
8	5	13		30	35	40	2.0~4.9
9	6	13		30	35	40	2.50~5.9
11	8	13		30	35	40	5.0~7.9
13	10	13		30	35	40	7.0~9.9

NOTE: This is Non-stock Item, ask your RIGPL representative for Delivery Period



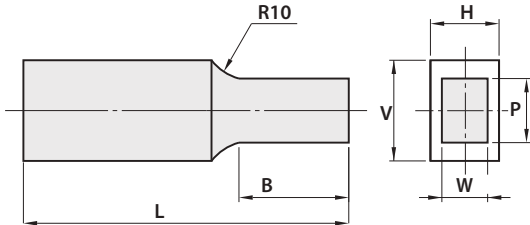
Tolerance	
D	0, -0.02
L	+/-0.5
P	0, -0.02
B	0, +0.5

BODY DIA "D" (mm)	TIP LENGTH "B" (mm)	TAP SIZE "M" (mm)	OVERALL LENGTH "L" (mm)				TIP DIA "P" (0.1 mm increments) min. "P" max.
5	8	3	50	70	80	100	2.0~4.9
6	8	3	50	70	80	100	2.0~5.9
8	13	4	50	70	80	100	3.0~7.9
10	13	5	50	70	80	100	3.0~9.9
13	13	6		70	80	100	6.0~12.9
16	19	6		70	80	100	10.0~15.9
20	19	6		70	80	100	13.0~19.9
25	19	6		70	80	100	18.0~24.9
5	13	3	50	70	80	100	2.0~4.9
6	13	3	50	70	80	100	2.0~5.9
8	19	4	50	70	80	100	3.0~7.9
10	19	5	50	70	80	100	3.0~9.9
13	19	6		70	80	100	6.0~12.9
16	25	6		70	80	100	10.0~15.9
20	25	6		70	80	100	13.0~19.9
25	25	6		70	80	100	18.0~24.9
5	25	3		70	80	100	2.0~4.9
6	25	3		70	80	100	2.0~5.9
8	30	4		70	80	100	3.0~7.9
10	30	5		70	80	100	3.0~9.9
13	30	6		70	80	100	6.0~12.9
16	40	6		70	80	100	10.0~15.9
20	40	6		70	80	100	13.0~19.9
25	40	6		70	80	100	18.0~24.9

NOTE: This is Non-stock Item, ask your RIGPL representative for Delivery Period

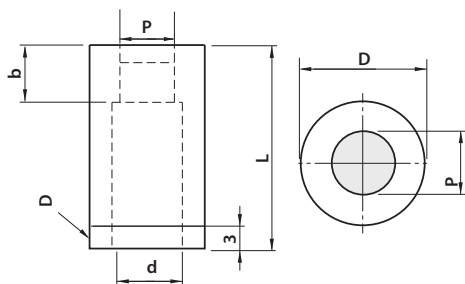


Tolerance	
B	0, +0.5
P, H, V, W	+/-0.02
L	+/-0.5



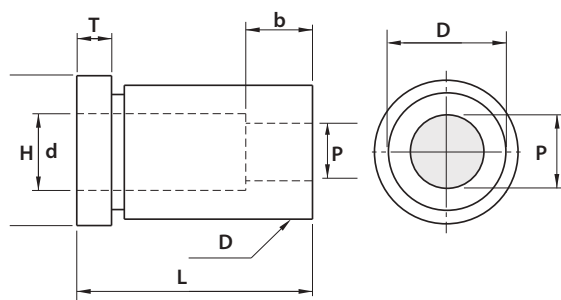
HEAD WID "H" (mm)	TIP WIDTH "W" (0.1 mm increments) min. "W" max.	HEAD HEIGHT "V" mm									OAL "L" (mm)	TIP LEN "B" (mm)	
		8	10	13	16	20	22	25	28	30		S	L
		TIP HEIGHT "P" min~max (0.1 mm increments)											
		3~8	3~10	4~13	5~16	6~20	7~22	8~25	18~28	10~30			
8	3.0~8.0	o	o	o	o	o	o	o	o	o	70	8	13
10	3.0~10.0	o	o	o	o	o	o	o	o	o	70	8	13
13	4.0~13.0	o	o	o	o	o	o	o	o	o	80	13	19
16	5.0~16.0	o	o	o	o	o	o	o	o	o	80	13	19
20	6.0~20.0	o	o	o	o	o	o	o	o	o	80	19	25
22	7.0~22.0	o	o	o	o	o	o	o	o	o	100	19	25
25	8.0~25.0	o	o	o	o	o	o	o	o	o	100	19	25
28	8.0~28.0	o	o	o	o	o	o	o	o	o	100	19	25
30	10.0~30.0	o	o	o	o	o	o	o	o	o	100	19	25

NOTE: This is Non-stock Item, ask your RIGPL representative for Delivery Period



Tolerance	
b	0, +0.5
D, P, d	+/-0.02
L	+/-0.5

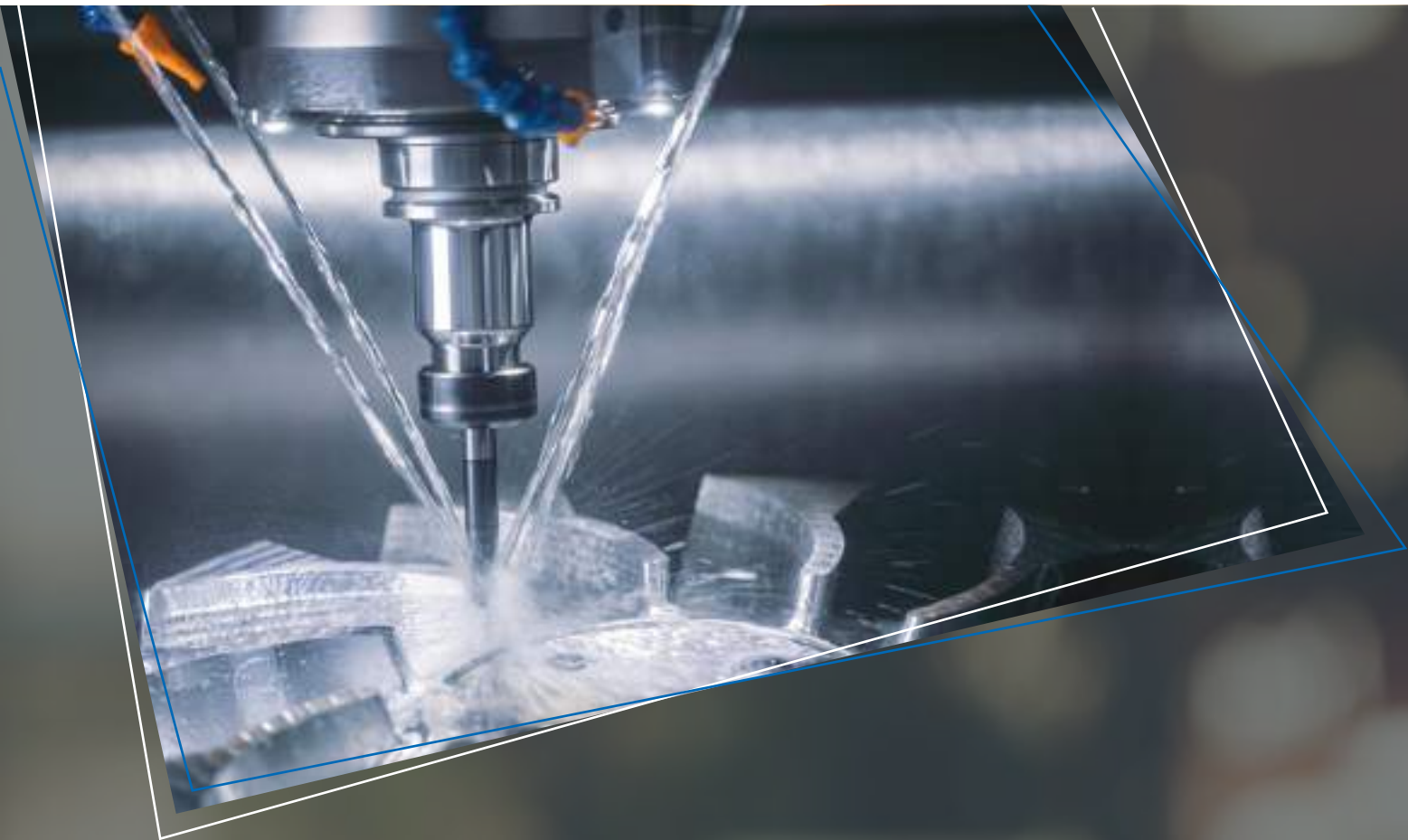
BODY DIA "D" (mm)	OVERALL LEN "L" (mm)					TIP DIA "P" (0.1 mm increments) min. "P" max.	"b" (mm)	"d" (mm)
6	20	25	30	35		2.0~3.0	3	3.4
8	20	25	30	35	40	2.0~4.0	4	4.4
10	20	25	30	35	40	2.0~6.0	6	6.4
13	20	25	30	35	40	3.0~8.0	8	8.4
16	20	25	30	35	40	5.0~10.0	8	10.6
20	20	25	30	35	40	7.0~12.0	8	12.6
22	20	25	30	35	40	8.0~14.0	8	14.6
25	20	25	30	35	40	10.0~16.0	8	16.6



Tolerance	
b, T	0, +0.5
D, P, d	+/-0.02
L	+/-0.5
H	0, -0.2

HEAD DIA "H" (mm)	BODY DIA "D" (mm)	OVERALL LEN "L" (mm)					TIP DIA "P" (0.1 mm increments) min. "P" max.	"b" (mm)	"d" (mm)
9	6	20	25	30	35	40	2.0~3.0	3	3.4
11	8	20	25	30	35	40	2.0~4.0	4	4.4
13	10	20	25	30	35	40	2.0~6.0	6	6.4
16	13	20	25	30	35	40	3.0~8.0	8	8.4
19	16	20	25	30	35	40	5.0~10.0	8	10.6
23	20	20	25	30	35	40	7.0~12.0	8	12.6
25	22	20	25	30	35	40	8.0~14.0	8	14.6
28	25	20	25	30	35	40	10.0~16.0	8	16.6

5



Step Drill Form

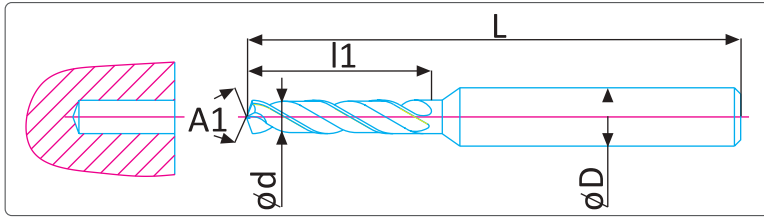
1. Fill in information requested on drawing. (*Required Fields)

2. E-mail to RIGPL at : sales@rigpl.com

Request Approval Drawing

Step Drill

NOTE: Specify TOLERANCES for ALL Length(s) and Diameter(s).



d :

l1 :

A° :

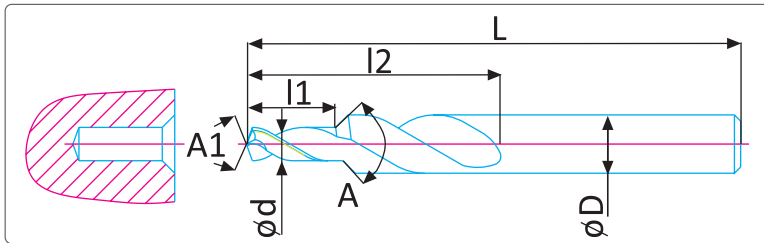
d1 :

l2 :

A1° :

D :

L :

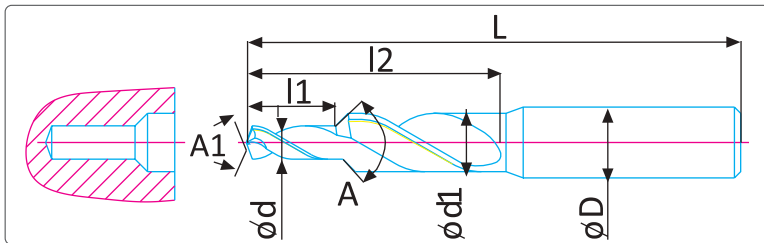


No. of flute :

Helix :

Coating :

Quantity, pcs :



Customer Name: _____

Phone: _____

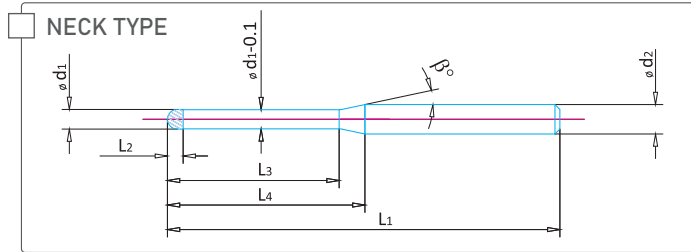
*Work Material Machined: _____

Hardness: _____

Dealer: _____

Quantities: _____

1. Fill in information requested on drawing. (*Required Fields)
2. E-mail to RIGPL at : sales@rigpl.com

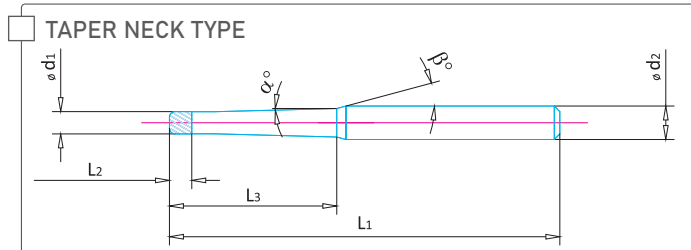


d1 =

d2 =

α° =

β° =

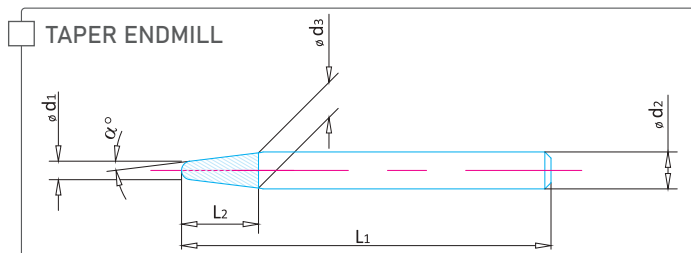


L1 =

L2 =

L3 =

L4 =



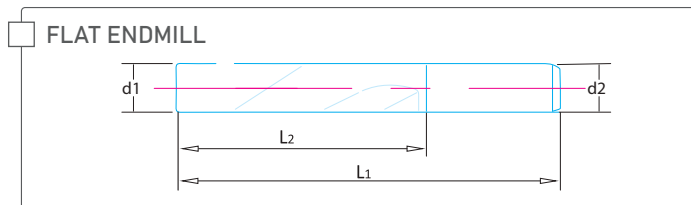
Helix :

No. of flute :

Coating :

Quantity, pcs :

Corner Radius :



Customer Name: _____

Phone: _____

*Work Material Machined: _____

Hardness: _____

Dealer: _____

Quantities: _____

Help us conserve environment by utilising RIGPL's reconditioning service for your worn out tools

Extend the life of your Cutting Tools with RIGPL Factory Reconditioning / Recoating Service.



- Simplified Pricing Structure.
- No Minimum Order Value.
- Original Coatings.
- RIGPL Quality Workmanship.
- Tools Reground to Factory Specifications.
- Quick Turnaround.

Drills
End Mills
Ball Nose
Reamers

**SAVE &
GO GREEN**



TiN

Titanium Nitride or TiN coating has shown good results in low carbon steels and many iron-based applications. It is a very popular coating used in the industry today. Used in HSS Tool Bits, Punches & HSS End Mills.

NOVA

AlTiN/TiSiXN-based material composition with multi layer coating up to 2~4 microns thickness. This coating is versatile in its use for drilling and milling materials up to hardness of 60HRC. This coating can be used for both wet & dry machining applications.

TiAlN

Titanium Aluminum Nitride or TiAlN is the original high performance coating, also commonly known as LATUMA. This coating allows tools to be run at higher speeds and feeds in a wide array of materials in milling & drilling applications.

AL-PRO / ALP

The AlCrN-based material composition with multi layer coating up to 2~4 microns thickness. This coating is suitable for milling Exotic materials like titanium and NiCr alloys and Die Steel up to hardness of 55HRc. This coating is preferable to use for both Dry and Wet milling applications.

HYPERLOX

Aluminum Titanium Supernitride : NanoComposite or HYPERLOX is especially designed for milling hardened steels above 40 Rc. This coating is mainly for milling hardened steel applications.

PEROX

The nanocrystalline AlTiN-based coating features excellent hot hardness, resistance to oxidation and thermal insulating properties which provides tool protection at elevated temperatures while machining or drilling Exotic Materials and Martensic Stainless Steel. This coating combine with excellent Finishing (MMP) is best suited for effective Chip Evacuation in Drilling.

COATING PROPERTIES

Coating	RIGPL Tool Number	Vicker Hardness (HV)	Coating Hardness HIT (GPa)	Coefficient of Friction	Max. Working Temperature (°C)	Coating Color
TiN	- T	1,800~2,000	30 +/- 3	0.3 - 0.4	600 °C	Golden Yellow
TiAlN	- F	2,000~3,000	35 +/- 3	0.3 - 0.4	800 °C	Black Grey
HYPERLOX	- H	2,500~3,700	36 +/- 3	0.3 - 0.35	1000 °C	Black Grey
NOVA	- N	3,200~4,200	37 +/- 3	0.35 - 0.4	1100 °C	Bronze
AL-PRO	- A	3,000~4,000	36 +/- 3	0.3 - 0.35	1000 °C	Bright Grey
PEROX	- P	3,400~4,400	38 +/- 3	0.35 - 0.4	1100 °C	Aubergine Grey

See something you like to try?



RIGPL

Application Mapper

Customer Details		Application #1		Application #2	
Date:					
Customer & Location:					
Contact Person: Name, Dept, Desig, Mob, Mail					
# of VMC / SPM Machines		Solid Carbide (₹/Month)			
Dealer Name & Location					
Dealer Representative					
RIGPL Representative					
Sr No		Application #1		Application #2	
Application (Dia, Tool & Operation Type)					
Component Name					
Material & Hardness					
M/c Type, m/c Make & Model, Holding Device, M/c Coolant is (Through/Flood), M/c-ing condition is (Poor/Fair/Good).					
Production/Month					
Cycle Time on m/c (sec)					
Application Time on m/c (sec)					
Current Tool Avg Life					
Current Tool Make, Details Engraved, (ØxFLxOALxSH; xRxZ), Coating & Shank Type.					
Current Tool Price					
Feed					
RPM					
if drill	if mill				
D	ap				
L	L				
L/D	W				
# of Holes/Passes per comp					
Remarks					
Cost Per Component (₹)					
Calc Details					
Cost Per Component (₹)					
Tool Life (m)					
Tools req / Month (nos)					
m/c-ing Vol/Comp (cm3)					
m/c-ing Vol/Tool (m3)					
ChipFlowRate (cm3/min)					
RIGPL Suggested Tool					
Image					
Component					
Current Tool					

NOTE: All requests subject to approval. An RIGPL representative will contact you to discuss your application.

ROHIT INDUSTRIES GROUP PVT. LTD.

Ph: +91-124-4744333, +91-124-4744344

H.O. / Unit-I : Plot #: 653-656, MIE Part-A, Bahadurgarh, Haryana-124507, India

Unit-II : Plot #: 337, MIE Part-A, Bahadurgarh, Haryana-124507, India

Email: sales@rigpl.com | Website: www.rigpl.com

Hardness Conversion Chart

Rockwell			Brinell (HB) or BHN		Vickers (HV)	Tensile Strength (N/mm ²) or Mpa
A	B	C	3000 kg	500 kg	136	
60kg Brale	100kg 1/16" Ball	150kg Brale	10mm Ball Steel	10mm Ball Steel	Diamond Pyramid	
86.5	-	70	-	-	1076	-
86	-	69	-	-	1044	-
85.6	-	68	-	-	940	-
85	-	67	-	-	900	-
84.5	-	66	-	-	865	-
83.9	-	65	739	-	832	-
83.4	-	64	722	-	800	-
82.8	-	63	705	-	772	-
82.3	-	62	688	-	746	-
81.8	-	61	670	-	720	-
81.2	-	60	654	-	697	2,207
80.7	-	59	634	-	674	2,138
80.1	-	58	615	-	653	2,069
79.6	-	57	595	-	633	2,000
79	-	56	577	-	613	1,945
78.5	120	55	560	-	595	1,890
78	120	54	543	-	577	1,834
77.4	119	53	525	-	560	1,772
76.8	119	52	500	-	544	1,690
76.3	118	51	487	-	528	1,648
75.9	117	50	475	-	513	1,607
75.2	117	49	464	-	498	1,566
74.7	116	48	451	-	484	1,524
74.1	116	47	442	-	471	1,497
73.6	115	46	432	-	458	1,462
73.1	115	45	421	-	446	1,421
72.5	114	44	409	-	434	1,379
72	113	43	400	-	423	1,352
71.5	113	42	390	-	412	1,317
70.9	112	41	381	-	402	1,290
70.4	112	40	371	-	392	1,255
69.9	111	39	362	-	382	1,221
69.4	110	38	353	-	372	1,193
68.9	110	37	344	-	363	1,166
68.4	109	36	336	-	354	1,138
67.9	109	35	327	-	345	1,103
67.4	108	34	319	-	336	1,076
66.8	108	33	311	-	327	1,048
66.3	107	32	301	-	318	1,014
65.8	106	31	294	-	310	993
65.3	105	30	286	-	302	966
64.7	104	29	279	-	294	945
64.3	104	28	271	-	286	917

Rockwell			Brinell (HB) or BHN		Vickers (HV)	Tensile Strength (N/mm ²) or Mpa
A	B	C	3000 kg	500 kg	136	
60kg Brale	100kg 1/16" Ball	150kg Brale	10mm Ball Steel	10mm Ball Steel	Diamond Pyramid	
36.8	103	27	264	-	279	890
63.3	103	26	258	-	272	869
62.8	102	25	253	-	256	855
62.4	101	24	247	-	260	834
62	10	23	240	201	254	814
61.5	99	22	234	195	248	793
61	98	21	228	189	243	772
60.5	97	20	22	184	238	752
59	96	18	216	179	230	731
58	95	16	210	175	222	710
57.5	94	15	205	171	213	690
57	93	13	200	167	208	676
56.5	92	12	195	163	204	662
56	91	10	190	160	196	641
55.5	90	9	185	157	192	628
55	89	8	180	154	188	607
54	88	7	176	151	184	593
53.5	87	6	172	148	180	579
53	86	5	169	145	176	572
52.5	85	4	165	142	173	559
52	84	3	162	140	170	545
51	83	2	159	137	166	538
50.5	82	1	156	135	163	524
50	81	0	153	133	160	517
49.5	80	-	150	130	-	503
49	79	-	147	128	-	495
48.5	78	-	144	126	-	480
48	77	-	141	124	-	470
47	76	-	139	122	-	465
46.5	75	-	137	120	-	460
46	74	-	135	118	-	453
45.5	73	-	133	116	-	445
45	72	-	130	114	-	435
44.5	71	-	127	112	-	425
44	70	-	125	110	-	420
43.5	69	-	123	109	-	410
43	68	-	121	107	-	405
42.5	67	-	119	106	-	400
42	66	-	117	104	-	395
41.8	65	-	116	102	-	390
41.5	64	-	114	101	-	385
41	63	-	112	99	-	378
40.5	62	-	110	98	-	370

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Unit-II : Plot #: 337, MIE Part-A, Bahadurgarh, Haryana-124507, India

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ISO Tolerance Designation	Nominal Diameter of Tool (mm)					
	≤3	>3-6	>6-10	>10-18	>18-30	>30-50
Tolerance (Unit = 0.001 mm)						
d9	-65	-90	-116	-143	-182	-222
d11	-100	-135	-170	-210	-260	-320
e8	-42	-58	-72	-91	-113	-139
e9	-53	-70	-86	-107	-132	-162
f8	-26	-38	-48	-59	-73	-89
f9	-37	-50	-62	-75	-92	-112
h6	0, -6	0, -8	0, -9	0,-11	0,-13	0,-16
h7	0,-10	0,-12	0,-15	0,-18	0,-21	0,-25
h8	0,-14	0,-18	0,-22	0,-27	0,-33	0,-39
h9	0,-25	0,-30	0,-36	0,-43	0,-52	0,-62
h10	0,-40	0,-48	0,-58	0,-70	0,-84	0,-100
h11	0,-60	0,-75	0,-90	0,-110	0,-130	0,-160
h12	0,-100	0,-120	0,-150	0,-180	0,-210	0,-250
h13	0,-140	0,-180	0,-220	0,-270	0,-330	0,-390
js11	+/- 30	+/- 37	+/- 45	+/- 55	+/- 65	+/- 80
js12	+/- 50	+/- 60	+/- 75	+/- 90	+/- 105	+/- 125
js14	+/- 125	+/- 150	+/- 180	+/- 215	+/- 260	+/- 310
js16	+/- 300	+/- 375	+/- 450	+/- 550	+/- 650	+/- 800
k9	+25,0	+30,0	+36,0	+43,0	+52,0	+62,0
k10	+40,0	+48,0	+58,0	+70,0	+84,0	+100,0
k11	+60,0	+75,0	+90,0	+110,0	+130,0	+160,0
k12	+90,0	+120,0	+150,0	+180,0	+210,0	+250,0
H5	+4,0	+5,0	+6,0	+8,0	+9,0	+11,0
H6	+6,0	+8,0	+9,0	+11,0	+13,0	+16,0
H7	+10,0	+12,0	+15,0	+18,0	+21,0	+25,0
H11	+60,0	+75,0	+90,0	+110,0	+130,0	+160,0
H12	+100,0	+120,0	+150,0	+180,0	+210,0	+250,0



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