



PRODUCT CATALOGUE

2025

www.rigpl.com



Core Competencies:

Industry Leadership

ROHIT has consistently positioned itself at the forefront of the HSS and Solid Carbide Cutting Tools industry since its inception in 1963 under the leadership of Mr. K.L. Duggal. The company has evolved from humble beginnings to a recognized brand synonymous with quality and reliability in cutting tools. The strategic direction of ROHIT is guided by our Chairman, whose vision has been instrumental in steering the company towards sustained growth and innovation in the cutting tools sector..

Manufacturing Expertise

With over six decades of experience in the production of HSS and Solid Carbide Cutting Tools, ROHIT has developed a robust manufacturing capability. Our facilities encompass two state-of-the-art manufacturing units, totaling over 40,000 square feet, equipped with advanced machinery to ensure precision and quality.

Research and Development Team

Our RD team comprises highly qualified engineers from India's premier engineering institutions, dedicated to advancing the design and functionality of Carbide Cutting Tools. This team focuses on enhancing productivity, improving repeatability, and minimizing CPC.

Heat Treatment Facility

Leveraging over 60 years of expertise in HSS heat treatment processes, ROHIT ensures the delivery of high-performance HSS tools that consistently meet rigorous industry standards.

Product Knowledge

Our workforce, comprising experienced employees and engineers, possesses extensive knowledge accrued over six decades in the cutting tool industry. Concurrently, our RD center is committed to driving innovation and optimizing tool performance through rigorous testing and the application of cutting-edge technologies.

Innovations and New Designs

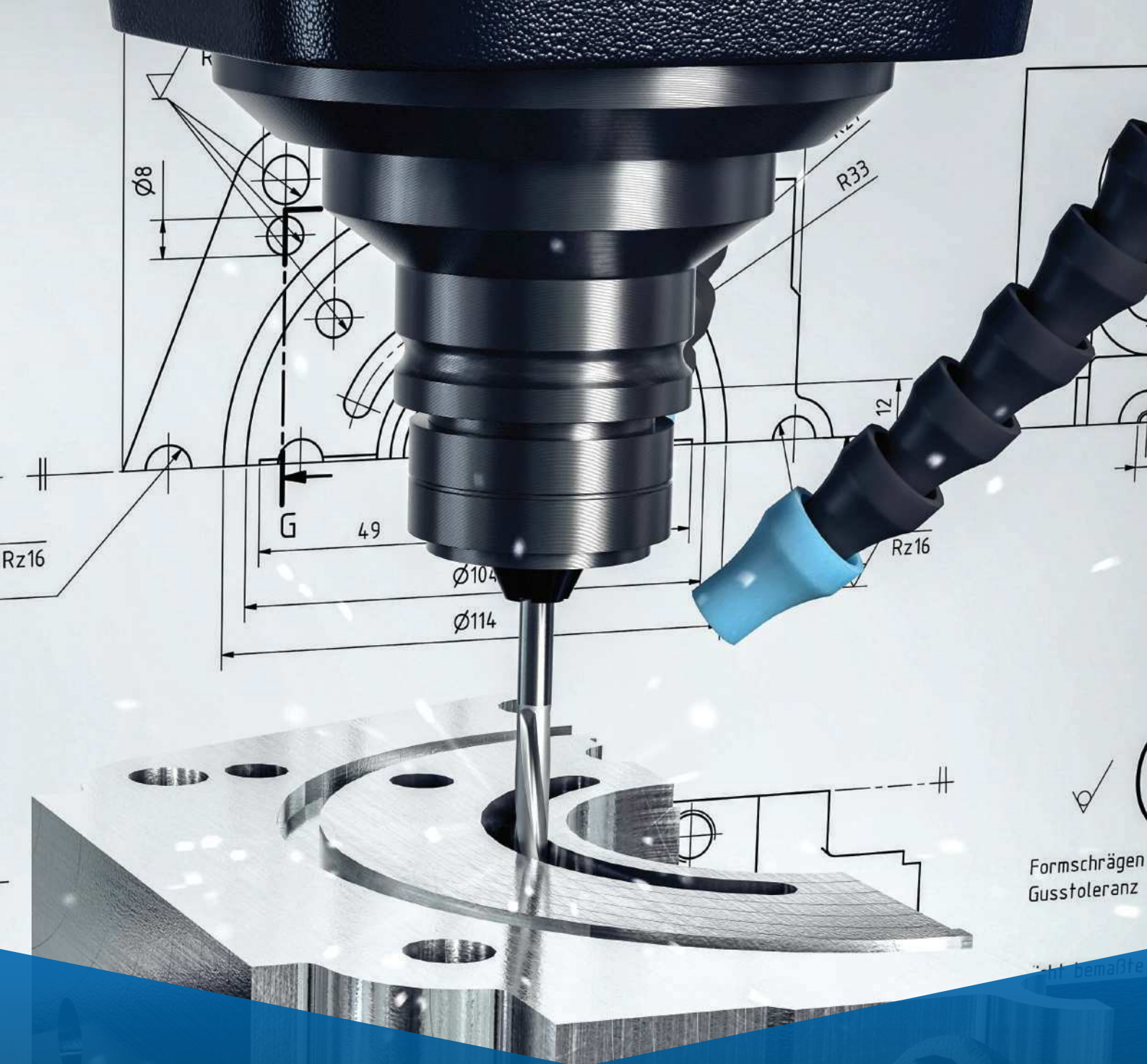
The RD center serves as the cornerstone of ROHIT's design initiatives. Our current portfolio of Milling and Drilling tools is engineered for machining Alloy Steels, Stainless Steel, Titanium, and other specialized alloys, leading the market with the lowest CPC guaranteed for our customers.

Regrinding Services

At ROHIT, we recognize our responsibility towards environmental sustainability. Our regrinding services not only enable customers to reduce costs but also promote recycling efforts. We provide refurbished tools that maintain original designs and coatings, ensuring performance akin to new ROHIT tools while contributing positively to the environment.



Chairman



Formschrägen
Gusstoleranz

mit bemäße

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



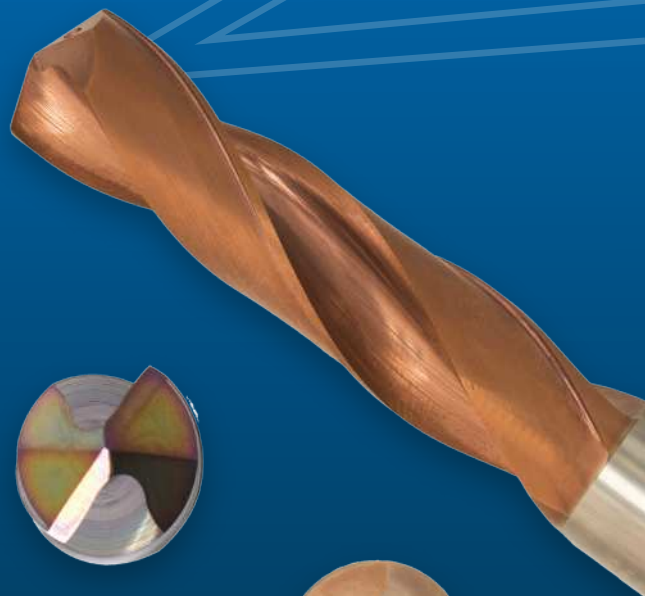
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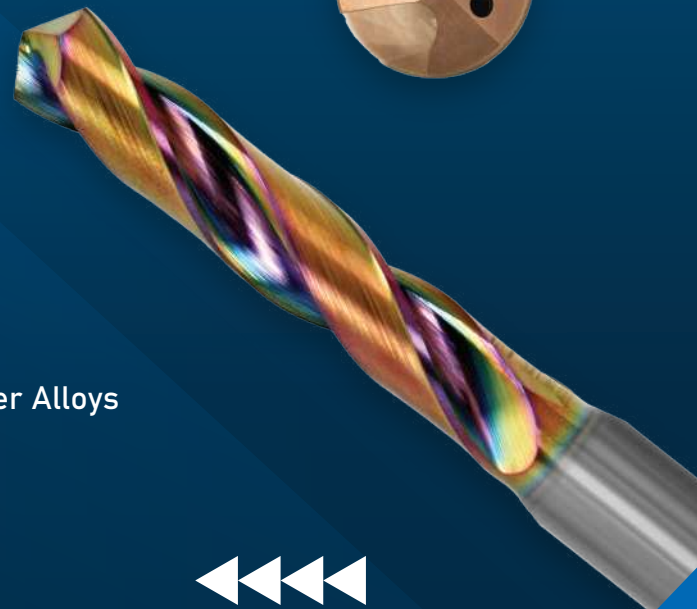
Carbide High Performance Drills CTHS series

- 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 C3AS Series

- Newly Developed High Wear Resistant ALU-IRIS Coated drills for ALU machining
- Edge Honing to provide sturdy drill point



C3HS Series

- C3HS drills comes with Edge Chamfer to provide longer cutting edge life
- C3HS & C3HL are Best suited for Drilling AS, SUS & Super Alloys



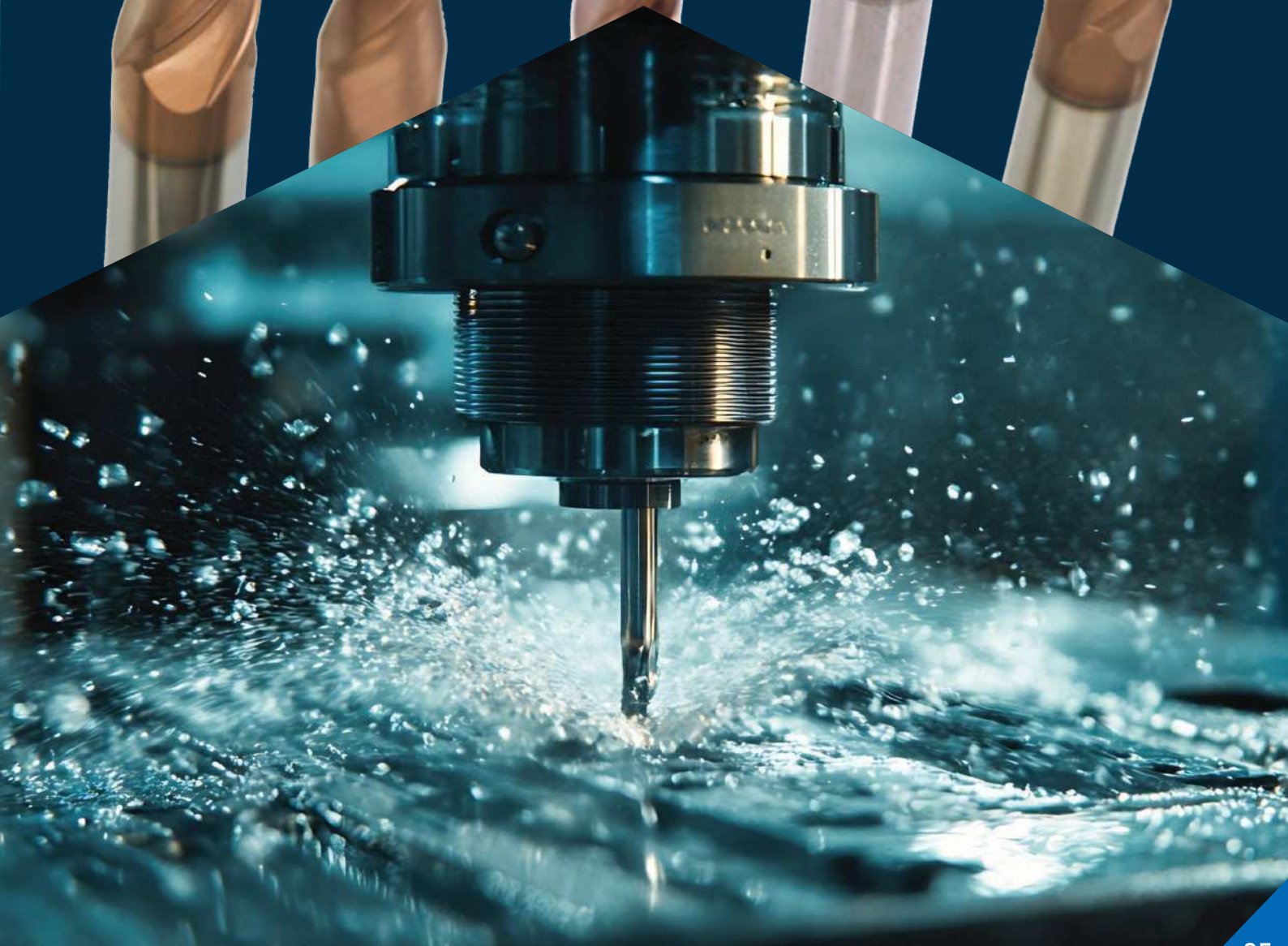
High Performance Endmills

401 & 402 Series

- Developed with Nano-fine grain along with newly Developed Tisinova Coating
- Best Suited for machining upto 65HRc

301 & 302 Series

- Developed with Ultra-fine grain along with Nova Coating
- Best Suited for machining upto 55HRc





Variable Helix Endmills

430, 433 & 434 Series

- Designed for Chatter free machining
- Exceptional performance in machining of Super Alloys

330, 333 & 334 Series

- Variable Helix with Ultra-fine grain along with Al-Pro Coating
- Best Suited for machining Alloy Steel and SS

311 & 313 Series

- High Helix design with ALU-IRIS Coating for machining AL and AL-Alloys



REVISIONS

Rohit Industries Group (P) Ltd.

Issued: October 2026

Product Catalogue 2025 – Discontinued Series & Replacements

The series listed below have been **discontinued**. Please refer to the recommended replacement series when selecting tools or placing orders. Page numbers refer to this catalogue.

CARBIDE DRILLS Pages 16–48

CLOSED SERIES	DESCRIPTION	PAGE		REPLACE WITH	PAGE
C1GS	GP Parallel Shank Drills – Stub	17	→	C0GS	*
C1GJ	GP Parallel Shank Drills – Jobber	20	→	C0GJ	*
C1N1, C1N2	GP Spotting Drills	46	→	C3N1, C3N2	*
C1CB	Centre Drills Type A, BS 328 (Inch)	47		No replacement	—
C1CD	Centre Drills Type A, DIN 333A (Metric)	48		No replacement	—

CARBIDE REAMERS Pages 68–78

CLOSED SERIES	DESCRIPTION	PAGE		REPLACE WITH	PAGE
C1RS	Straight Flute Reamers	69	→	C3RS	*
C1RL	Left Hand Spiral Reamers	71	→	C3RL	*
C1RR	Right Hand Spiral Reamers	73	→	C3RR	*

CARBIDE END MILLS & BALL NOSE Pages 79–141

CLOSED SERIES	DESCRIPTION	PAGE		REPLACE WITH	PAGE
222	1X SUS 4-Flute End Mills, NOVA	88	→	322	91
201	GP-1X 4-Flute Flat End Mills	112	→	122	127
202	GP-1X 4-Flute Ball Nose	114	→	123	129
205	1X 4-Flute Flat End Mills up to 50 HRc	115	→	301	100
206	1X 2-Flute Ball Nose up to 50 HRc	116	→	304	103
211	1X 2-Flute High Helix End Mills (AL)	119	→	311	110
212	1X 2-Flute High Helix Ball Nose (AL)	120	→	312	*
213	1X 3-Flute High Helix End Mills (AL)	121	→	313	111
215	1X Chamfer End Mills, TiAlN	122	→	315	*
102	GP-0X 4-Flute Ball Nose, TiAlN	123	→	123	129
110	GP-0X 4-Flute Flat End Mills, TiAlN	124	→	122	127

NOTE

All series of **Grade 1X (the 200-range series)** are discontinued, including the 207 and 208 taper series (pages 117–118). The **300 series** are available as the upgrade option for these tools.

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		
	C1GJ		2 ~ 20	Yes	2	None/TiALN		
HP Drills	C3HS		1 ~ 20	Yes	2	NOVA	25	-
	C3HL		1 ~ 20	Yes	2	NOVA	29	-
	CTHS		3 ~ 20	Yes	2	NOVA	32	YES
	CTHL		3 ~ 20	Yes	2	NOVA	36	YES
	CTHM		3 ~ 20	++	2	NOVA	39	YES
Micro Drill	C3MS		0.2 ~ 0.9	Yes	2	NOVA	40	-
HP-Drills for Alu Alloys	C3AS		2 ~ 20	+++	2	ALU-IRIS	41	-
SHP-Drills	C4HT		2 ~ 20	+++	2	PEROX	43	-
Spot Drills	C1N1		6 ~ 20	++	2	-		
	C1N2		6 ~ 20	++	2	-		
Centre Drills	C1CB		BS1 ~ BS7	Yes	2	-		
	C1CD		1.6 ~ 8	Yes	2	-		

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		
	C1RL		3 ~ 16	++	4/6	NONE/TiALN		
	C1RR		3 ~ 16	++	4/6	NONE/TiALN		

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
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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
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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	81
	333		6-20	++	5	x		x		AL-PRO	83
	334		3-20	Yes	4	x				AL-PRO	85
HP-SUS* 	222		3-20	Yes	4	x				NOVA	88
	321		3-20	Yes	4	x		x		NOVA	89
	322		4-20	Yes	4	x				NOVA	91
HP-VHEM*	430		3-20	Yes	4	x		x		TISINOVA	92
	433		6-16	+++	5	x		x		TISINOVA	94
	434		3-20	Yes	4	x				TISINOVA	95
HP-4X	401		1-20	Yes	4	x				TISINOVA	96
	402		1-12	Yes	2		x		x	TISINOVA	97
	406		2-12	+++	2		x			TISINOVA	98
	423		3-20	Yes	4		x			TISINOVA	99
HP-3X	301		1-20	Yes	4	x	x			NOVA	100
	302		3-16	Yes	4		x		x	NOVA	102
	304		1-12	Yes	2				x	NOVA	103
	305		1-4	Yes	2	x	x		x	NOVA	104
	306		1-4	Yes	2		x	x		NOVA	106
	307		2-12	Yes	2					NOVA	108
	308		6-20	++	6	x				AL-PRO	109
	311		2-20	+++	2	x				ALU-IRIS	110
	313		3-20	+++	3	x				ALU-IRIS	111

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
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GP - General Purpose
HP - High Performance

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

1 st	1 st Choice
2 nd	2 nd choice

CARBIDE END MILLS

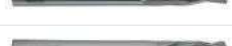
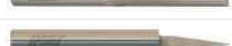
Series Group	Series	Image	Dia Range	Stock	# of Flutes	Square End	Ball Nose	Corner Radius	Neck Relief	Coating	Page Number
GP-1X 	201		3-25	Yes	4	x				TiALN	
	202		3-20	Yes	4		x			TiALN	
	205		2-16	Yes	4	x				HYPERLO	
	206		1-12	Yes	2		x			HYPERLO	
	207		2-10	++	2 & 4	x				TiALN	
	208		2-10	++	2 & 4		x			TiALN	
	211		2-20	Yes	2	x				-	
	212		3-20	Yes	2		x			-	
	213		3-20	Yes	3	x				-	
	215		3-20	Yes	2,3,4					TiALN	
GP-0X	102		3-20	Yes	4		x			TiALN	
	110		3-20	Yes	4	x				TiALN	
	121		3-20	Yes	4	x				NOVA	125
	122		1-20	Yes	4	x				NOVA	127
	123		1-20	Yes	2,4		x			NOVA	129
GP-0X (NON-Ferrous)	103		1-12	Yes	2	x				-	131
	104		1-12	Yes	2		x			-	132
	107		3-16	Yes	1	x				-	134
	108		1-4	+	2	x				-	135
	109		1-4	+	2		x			-	136
	112		6-16	+	2	x				-	137
	114		6-16	+	2	x				-	138
	118		3-12	+	2	x				-	139
	119		3-12	+	1	x				-	141

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
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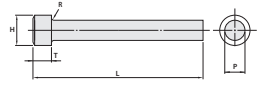
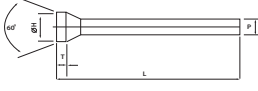
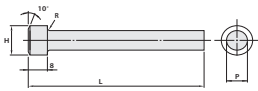
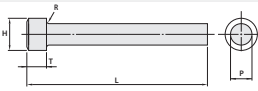
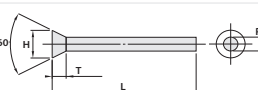
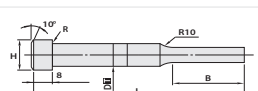
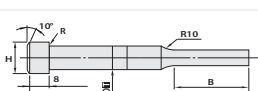
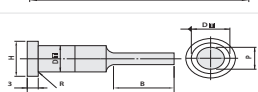
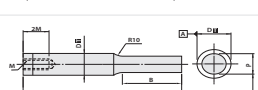
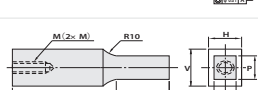
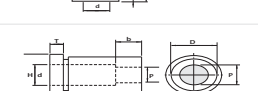
GP - General Purpose
HP - High Performance

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

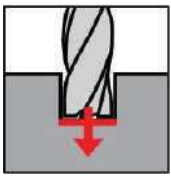
1 st	1 st Choice
2 nd	2 nd Choice

Description	Page No
GRADE CHART of HSS CUTTING TOOLS	163
HSS Square Tools Bits (Inch Sizes)	164
HSS Square Tools Bits (Metric Sizes)	165
HSS Rectangular (Flat) Tools Bits (Inch Sizes)	166
HSS Rectangular (Flat) Tools Bits (Metric Sizes)	168
HSS Round Tool Bits (Inch Sizes)	170
HSS Round Tool Bits (Metric Sizes)	172
HSS Parting Blades Cut-Off Blades	175
HSS Parallel Shank End Mills (Imperial Sizes)	180
HSS Parallel Shank End Mills (Metric Sizes)	181
HSS Center Drills Type-A	182
Geometry & Instructions	176

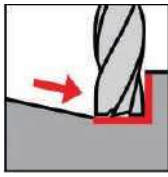


Series	Description	Body/tip Dia "P" (0.1 mm Increments)	Stock Availability	Drawing	Page Number
	Index - HSS Punches				183
P101	HSS Straight Punches	1.1-25	Yes		186
P102	HSS Tapered Head Punches	3.0-12	++		187
P103	HSS Straight Punches For Medium Load	2.1-25	++		188
P104	HSS Straight Punches For Heavy Load	2.1-25	++		189
P105	HSS Mini Straight Punches	1-3	++		190
P106	HSS Shoulder Punches	2-24.9	+++		191
P107	HSS Shoulder Punches For Heavy Load	2-24.9	+++		192
P108	HSS Shoulder Punches Short Type	2-9.9	+++		193
P109	HSS Tapped Punches	2-24.9	Ask for Delivery Time		194
P110	HSS Block Punches		Ask for Delivery Time		195
P112	HSS Straight Button Dies		Ask for Delivery Time		196
P113	HSS Headed Button Dies		Ask for Delivery Time		196

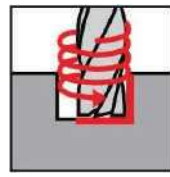
APPLICATION TYPE



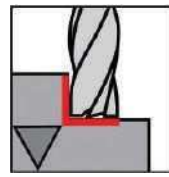
Plunging



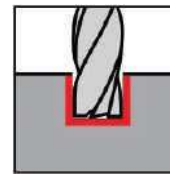
Ramping



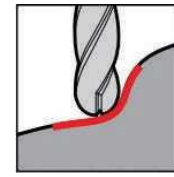
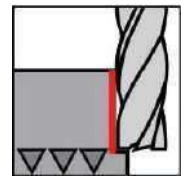
Interpolation



Roughing



Slotting


Copy
Milling


Finishing

TOOL IDENTIFICATION


Solid
Carbide

Coolant
Fed

Cutting Edge
Length

Drill Point
Angle

Helix
Angle

Din
Specs


Chamfer


Variable
Helix 5-Flute

Variable
Helix 4-Flute

Number of
Flutes

Right Hand
Cutting

Shank
Type

CARBIDE GRAIN SIZE



Nano Fine Grain



Ultra Micro Fine Grain



Sub Micro Fine Grain



Micro Fine Grain

COATING TYPES



TiAlN



HYPERLOX



NOVA



AL-PRO



PEROX



TISINOVA



ALU-IRIS

WORKPIECE MATERIAL GROUP



Steels


Hardend Steels
(35-65 HRC)

Stainless
Steels


Cast Iron


Special
Alloys


Non-Ferrous

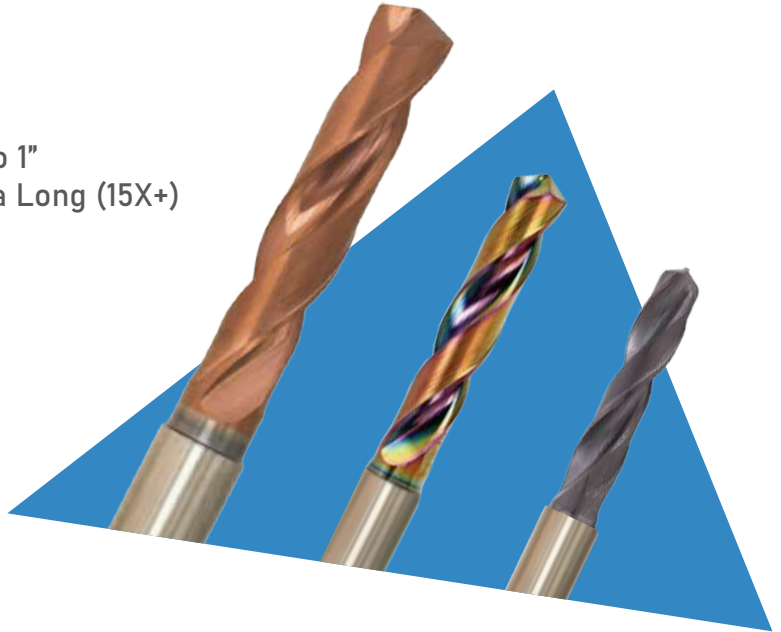
HIGH PERFORMANCE DRILLING

Features

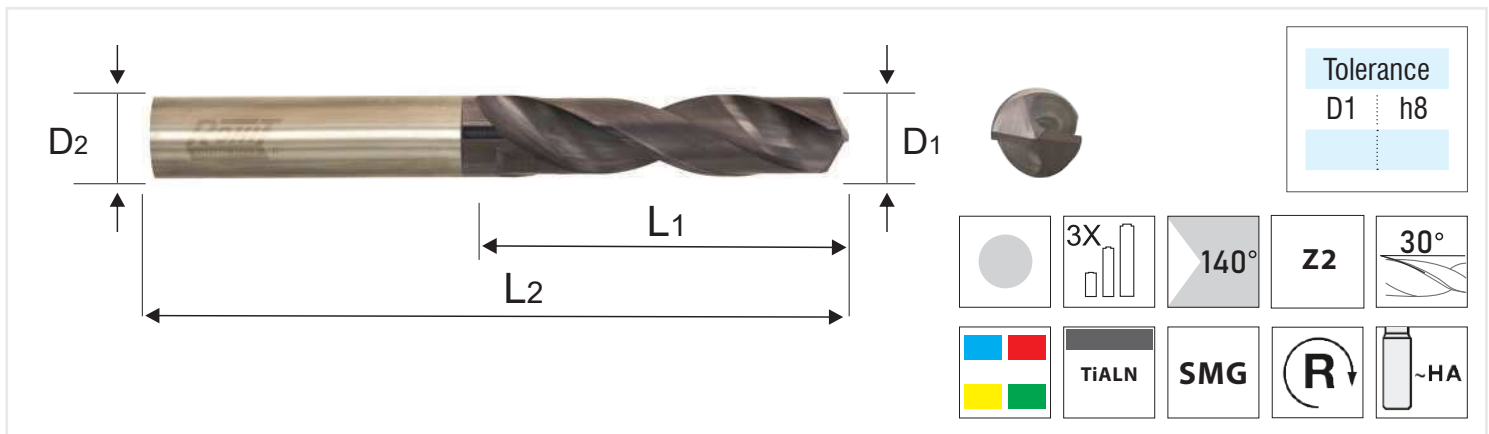
- Advanced “Active Cut” Geometric Design
- Redefined Critical Cut Zone Characteristics
- High-Efficiency Flute Profile
- Stable Low-Thrust Point Form
- Diameter Range - 2.0mm to 25.0mm, 5/64" to 1"
- Stub (3X), Regular (5X), Long (8X+) and Extra Long (15X+)

Benefits of ROHIT Drills

- 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
Micro Drills	Micro Drills	C3MS	40
HP-Drills for Alu-Alloys	High Performance Drills for Alu-Alloys	C3AS	41
SHP-Drills	Super High Performance Drills	C4HT	43
Spot Drills	NC-Spotting Drills 90*	C1N1	46
	NC-Spotting Drills 120*	C1N2	46
Centre Drills	Centre Drills BS328	C1CB	47
	Centre Drills DIN333	C1CD	48
Technical Information	Feed and Speed Parameters		51



Features:

- Give Better Life & productivity in comparison to HSS 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		4.0
CR11GDR004Y4	2.1	14		4.1
CR11GDR004Z2	2.2	14		4.2
CR11GDR00503	2.3	14		4.3
CR11GDR00511	2.4	14		4.4
CR11GDR00529	2.5	14		4.5
CR11GDR00545	2.6	20	54	4.6
CR11GDR00552	2.7	20	54	4.7
CR11GDR00560	2.8	20	54	4.8
CR11GDR00586	2.9	20	54	4.9
CR11GDR00594	3.0	20	54	5.0
CR11GDR005C2	3.1	20	54	5.1
CR11GDR005E7	3.2	20	54	5.2
CR11GDR005G3	3.3	20	54	5.3
CR11GDR005J6	3.4	20	54	5.4
CR11GDR005M0	3.5	20	54	5.5
CR11GDR005P3	3.6	22	54	5.6
CR11GDR005R9	3.7	22	54	5.7
CR11GDR005T4	3.8	22	54	5.8
CR11GDR005V0	3.9	22	54	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	37	79	7.4
CR11GDR00867	7.5	37	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
CR11GDR000A19	10.1	42	79	10.1
CR11GDR000A27	10.2	42	79	10.2
CR11GDR000A43	10.3	47	100	10.3
CR11GDR000A51	10.4	47	100	10.4
CR11GDR000A59	10.5	47	100	10.5
CR11GDR000A67	10.6	47	100	10.6
CR11GDR000A75	10.7	47	100	10.7
CR11GDR000A83	10.8	47	100	10.8
CR11GDR000A91	10.9	47	100	10.9
CR11GDR000AE5	11.0	47	100	11.0
CR11GDR000AG1	11.1	47	100	11.1
CR11GDR000AH9	11.2	47	100	11.2
CR11GDR000AJ4	11.3	47	100	11.3
CR11GDR000AK2	11.4	47	100	11.4
CR11GDR000AL0	11.5	47	100	11.5
CR11GDR000AN5	11.6	49	100	11.6
CR11GDR000AP1	11.7	49	100	11.7
CR11GDR000AQ9	11.8	49	100	11.8
CR11GDR000AR7	11.9	49	100	11.9
CR11GDR000AS4	12.0	49	100	12.0
CR11GDR000AU0	12.1	51	102	12.1
CR11GDR000AV8	12.2	51	102	12.2
CR11GDR000AW6	12.3	51	102	12.3
CR11GDR000AX3	12.4	51	102	12.4
CR11GDR000AZ9	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

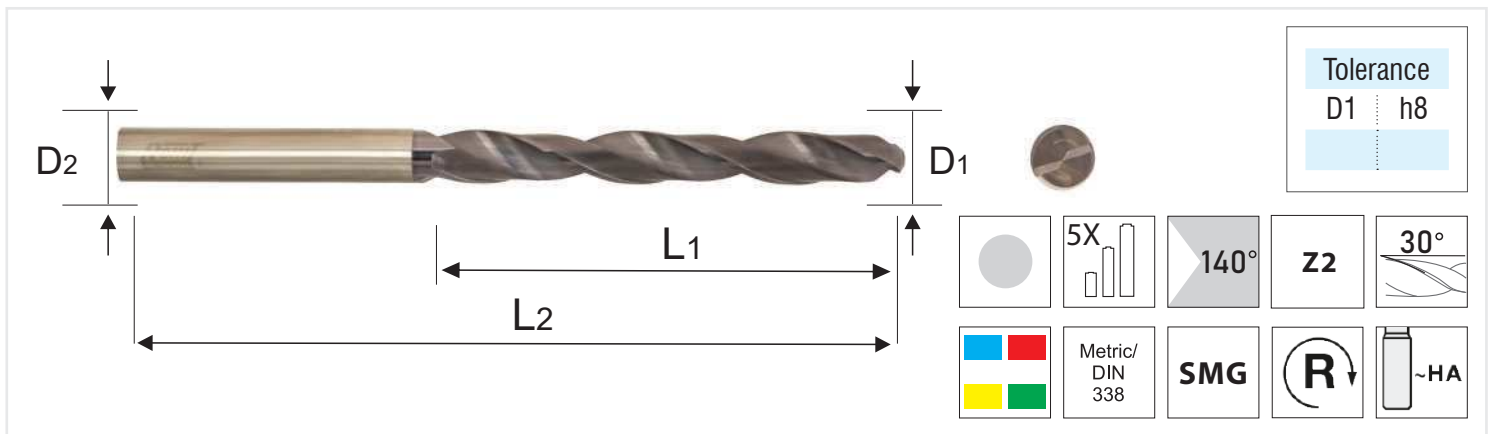
Item Code TiAlN Coated	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR11GDR00BG0	14.1	56	109	14.1
CR11GDR00BH8	14.2	56	109	14.2
CR11GDR00BJ3	14.3	56	109	14.3
CR11GDR00BK1	14.4	56	109	14.4
CR11GDR00BL9	14.5	56	109	14.5
CR11GDR00BM7	14.6	56	109	14.6
CR11GDR00BN4	14.7	56	109	14.7
CR11GDR00BP0	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
CR11GDR00BX3	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-51

Selection-Guide



Features:

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

Item Code (Uncoated)	Ordering Code (TiALN Coated)	Flute Dia (D1)	Overall Len(L2)	Shank Dia(D2)
CR1XGDR000H7	CR11GDR00P06	2.0	61	2.0
CR1XGDR000J2	C1GJ0210	2.1	61	2.1
CR1XGDR000K0	CR11GDR00P08	2.2	61	2.2
CR1XGDR000L8	CR11GDR00P10	2.3	61	2.3
CR1XGDR000M6	CR11GDR00T51	2.4	61	2.4
CR1XGDR000N3	CR11GDR00099	2.5	61	2.5
CR1XGDR000P9	C1GJ0260-F	2.6	61	2.6
CR1XGDR000Q7	C1GJ0270-F	2.7	61	2.7
CR1XGDR000R5	C1GJ0280-F	2.8	61	2.8
CR1XGDR000S2	C1GJ0290-F	2.9	61	2.9
CR1XGDR000T0	CR11GDR005A6	3.0	61	3.0
CR1XGDR000U8	CR11GDR005D9	3.1	70	3.1
CR1XGDR000V6	CR11GDR005F5	3.2	70	3.2
CR1XGDR000W4	CR11GDR005H1	3.3	70	3.3
CR1XGDR000X1	CR11GDR005K4	3.4	70	3.4
CR1XGDR000Y9	CR11GDR005N7	3.5	70	3.5
CR1XGDR000Z7	CR11GDR005Q1	3.6	75	3.6
CR1XGDR00108	CR11GDR005S6	3.7	75	3.7
CR1XGDR00116	CR11GDR005U2	3.8	75	3.8
CR1XGDR00124	CR11GDR005W8	3.9	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		86	4.9
CR1XGDR001G8	CR11GDR006K3			86	5.0
CR1XGDR001H6	CR11GDR006M9			86	5.1
CR1XGDR001J1	CR11GDR006Q0			86	5.2
CR1XGDR001K9	CR11GDR006			93	5.3
CR1XGDR001L7	CR11GDR006			93	5.4
CR1XGDR001M5	CR11GDR006			93	5.5
CR1XGDR001N2	CR11GDR006Z6			93	5.6
CR1XGDR001P8	CR11GDR00719		57	93	5.7
CR1XGDR001Q6	CR11GDR00735		57	93	5.8
CR1XGDR001R4	CR11GDR00750	5.1	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		117	8.2
CR1XGDR002G7	CR11GDR008S3			117	8.3
CR1XGDR002H5	CR11GDR008U9			117	8.4
CR1XGDR002J0	CR11GDR008Z8			117	8.5
CR1XGDR002K8	CR11GDR00			125	8.6
CR1XGDR002L6	CR11GDR			125	8.7
CR1XGDR002M4	CR11GDR0			125	8.8
CR1XGDR002N1	CR11GDR0099			125	8.9
CR1XGDR002P7	CR11GDR009C8		81	125	9.0
CR1XGDR002Q5	CR11GDR009F1		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



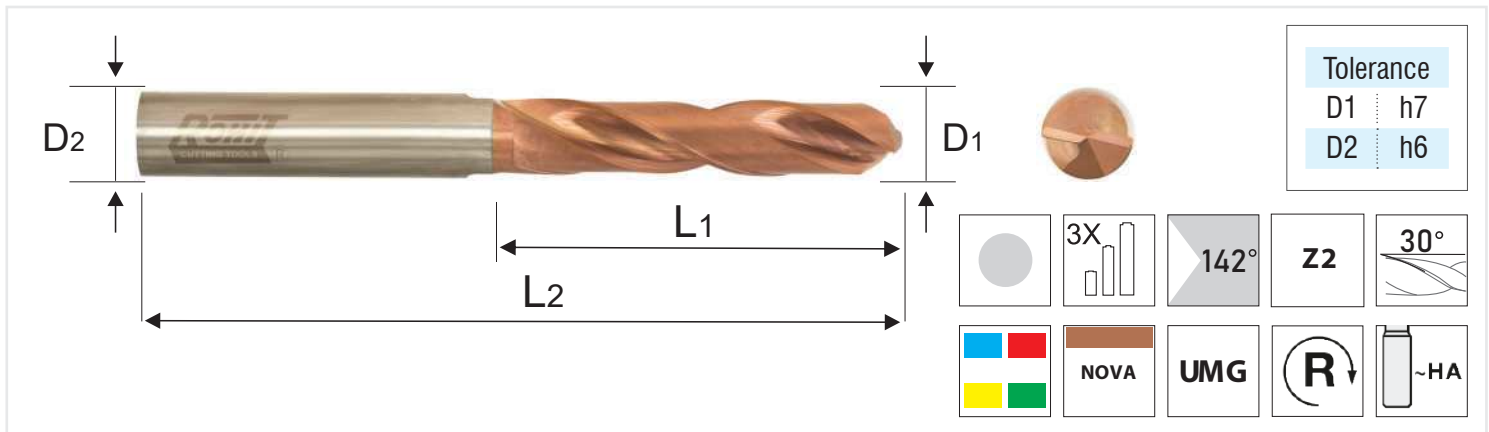
Item Code (Uncoated)	Ordering Code (TiAlN Coated)	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR1XGDR00363	C1GJ1060-F	10.6	94	142	10.6
CR1XGDR00371	C1GJ1070-F	10.7	94	142	10.7
CR1XGDR00389	C1GJ1080-F	10.8	94	142	10.8
CR1XGDR00397	C1GJ1090-F	10.9	94	142	10.9
CR1XGDR003A9	CR11GDR00AF3	11.0	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		142	11.5
CR1XGDR003G6	C1GJ1160-F			151	11.6
CR1XGDR003H4	C1GJ1170-F			151	11.7
CR1XGDR003J9	C1GJ1180-F			151	11.8
CR1XGDR003K7	C1GJ1190-F			151	11.9
CR1XGDR003L5	CR11GDP			151	12.0
CR1XGDR003M3	C1GJ1210-F			151	12.1
CR1XGDR003N0	C1GJ1220-F			151	12.2
CR1XGDR003P6	C1GJ1230-F		101	151	12.3
CR1XGDR003Q4	C1GJ1240-F		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		151	14.8
CR1XGDR004G5	C1GJ1490-F	1		151	14.9
CR1XGDR004H3	C1GJ1500-F			151	15.0
CR1XGDR004J8	C1GJ1600-F			151	16.0
CR1XGDR004K6	C1GJ1700-F			151	17.0
CR1XGDR004L4	C1GJ18			151	18.0
CR1XGDR004M2	C1GJ1900-			151	19.0
CR1XGDR004N9	C1GJ2000-F			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



Features:

- Best Carbide Drill for machining Alloy steel, Cast Iron & SUS material
- Multi-Layer NOVA coating to protect carbide tools at machining temp. up to 1,300°C
- Rapid chip curling to promote chip breakage, improves productivity & achieves unmatched life

Item Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR3AHDR00W49	1.0	7	38	3.0
CR3AHDR00W56	1.1	7	38	3.0
CR3AHDR00W64	1.2	8	38	3.0
CR3AHDR00W72	1.3	8	38	3.0
CR3AHDR00W80	1.4	8	38	3.0
CR3AHDR00U66	1.5	8	50	3.0
CR3AHDR00U74	1.6	8	50	3.0
CR3AHDR00U82	1.7	8	50	3.0
CR3AHDR00U90	1.8	10	50	3.0
CR3AHDR00UA2	1.9	11	50	3.0
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

Item Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
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
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

Item Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
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
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

Item Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
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
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

Item Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
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
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
CR3AHDR00NS9	10.6	40	75	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
CR3AHDR00F04	12.0	55	100	12.0
CR3AHDR00PB5	12.2	55	105	14.0
CR3AHDR00U58	12.3	55	105	14.0

Item Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR3AHDR00VV5	12.4	55	105	14.0
CR3AHDR00F12	12.5	55	105	14.0
CR3AHDR00VW3	12.6	55	105	14.0
CR3AHDR00P20	12.7	55	105	14.0
CR3AHDR00VG8	12.8	40	80	14.0
CR3AHDR00U33	12.8	55	105	14.0
CR3AHDR00VX0	12.9	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
CR3AHDR00VD4	13.3	55	105	14.0
CR3AHDR00VH6	13.4	55	105	14.0
CR3AHDR00F38	13.5	55	105	14.0
CR3AHDR00W07	13.6	55	105	14.0
CR3AHDR00TS3	13.8	55	105	14.0
CR3AHDR00F46	14.0	55	105	14.0
CR3AHDR00X48	14.1	58	105	16.0
CR3AHDR00U41	14.2	58	105	16.0
CR3AHDR00F53	14.5	58	105	16.0
CR3AHDR00NY6	14.6	40	80	16.0
CR3AHDR00F61	15.0	58	105	16.0
CR3AHDR00WL6	15.2	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
CR3AHDR00Z04	16.2	58	105	18.0
CR3AHDR00F95	16.5	58	105	18.0
CR3AHDR00WM4	16.7	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

Item Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR3AHDR00FF6	19.5	58	105	20.0
CR3AHDR00YZ3	19.7	58	105	20.0

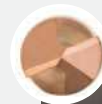
Item Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR3AHDR00FG4	20.0	58	105	20.0

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.

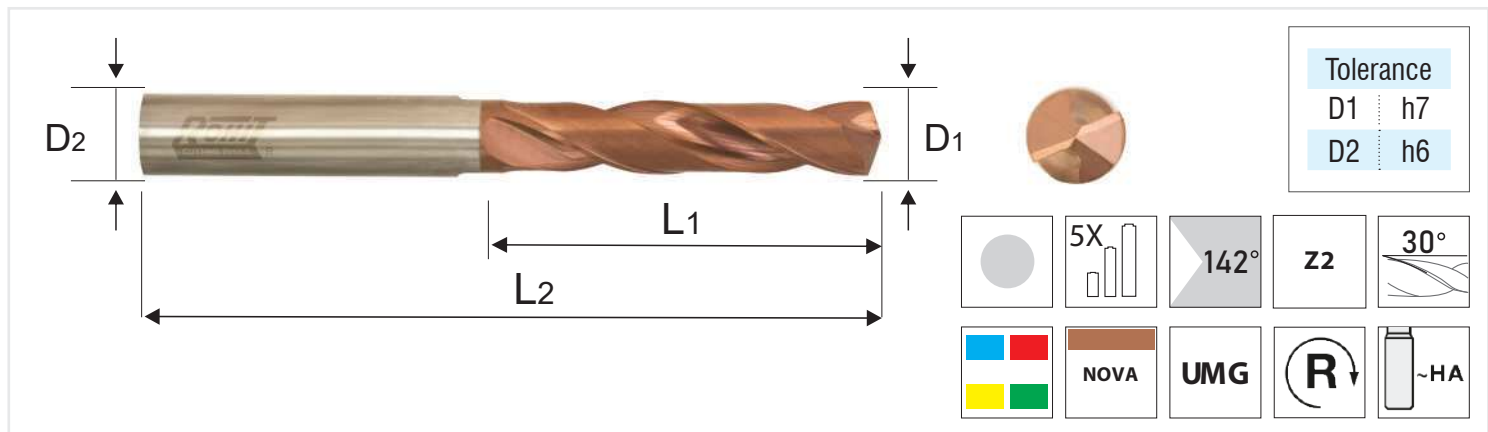
[Read more on rigpl.com/blog](http://rigpl.com/blog)



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-53

Selection-Guide



Features:

- Best Carbide Drill for machining Alloy steel, Cast Iron & SUS material
- Multi-Layer NOVA coating to protect carbide tools at machining temp. up to 1,300°C
- Rapid chip curling to promote chip breakage, improves productivity & achieves unmatched life
- Suitable for drilling depths from 5 to 8 L/D

Item Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR3AHDR00W98	1.0	12	38	3.0
CR3AHDR00WA0	1.1	12	38	3.0
CR3AHDR00WB8	1.2	12	38	3.0
CR3AHDR00WC6	1.3	15	50	3.0
CR3AHDR00WD3	1.4	15	50	3.0
CR3AHDR00UB0	1.5	15	54	3.0
CR3AHDR00UC8	1.6	15	54	3.0
CR3AHDR00UD5	1.7	15	54	3.0
CR3AHDR00UE3	1.8	18	54	3.0
CR3AHDR00UF1	1.9	18	54	3.0
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

Item Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
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
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

Item Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
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
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

Item Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
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
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

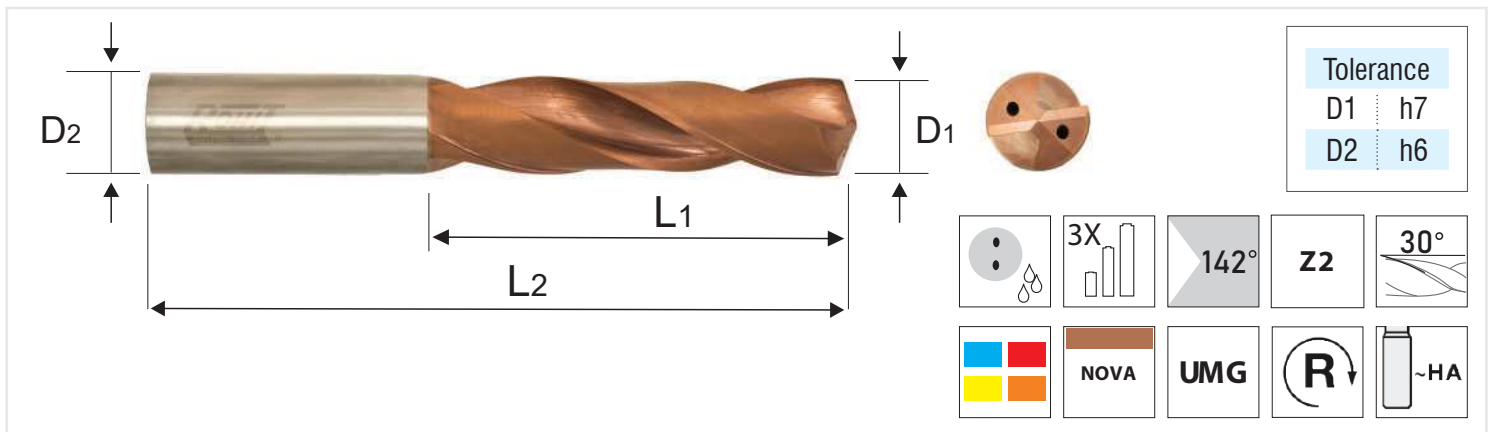
Item Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR3AHDR00JB1	11.6	85	140	12.0
CR3AHDR00JC9	11.7	85	140	12.0
CR3AHDR00JD6	11.8	85	140	12.0
CR3AHDR00JE4	11.9	85	140	12.0
CR3AHDR00JF2	12.0	85	140	12.0
CR3AHDR00JG0	12.5	85	140	14.0
CR3AHDR00TR6	12.7	85	140	14.0
CR3AHDR00JH8	13.0	85	140	14.0
CR3AHDR00JJ3	13.5	85	140	14.0
CR3AHDR00WR3	13.6	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
CR3AHDR00WX9	15.7	90	145	16.0

Item Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR3AHDR00WY7	15.8	90	145	16.0
CR3AHDR00JP0	16.0	90	145	16.0
CR3AHDR00Z12	16.2	95	150	18.0
CR3AHDR00JQ8	16.5	95	150	18.0
CR3AHDR00JR6	17.0	95	150	18.0
CR3AHDR00JS3	17.5	95	150	18.0
CR3AHDR00WV4	17.7	95	150	18.0
CR3AHDR00JT1	18.0	95	150	18.0
CR3AHDR00JU9	18.5	98	150	20.0
CR3AHDR00WU6	18.6	98	150	20.0
CR3AHDR00WW2	18.7	98	150	20.0
CR3AHDR00JV7	19.0	98	150	20.0
CR3AHDR00JW5	19.5	98	150	20.0
CR3AHDR00WK8	19.7	98	150	20.0
CR3AHDR00JX2	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
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-53

Selection-Guide



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, AS, C.I., and SUS

Item Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR3PHDR00UJ7	3.0	20	62	6.0
CR3PHDR00UK5	3.1	20	62	6.0
CR3PHDR00UL3	3.2	20	62	6.0
CR3PHDR00UM1	3.3	20	62	6.0
CR3PHDR00UN8	3.4	20	62	6.0
CR3PHDR00UP4	3.5	20	62	6.0
CR3PHDR00UQ2	3.6	20	62	6.0
CR3PHDR00UR0	3.7	20	62	6.0
CR3PHDR00US7	3.8	24	62	6.0
CR3PHDR00UT5	3.9	24	62	6.0
CR3PHDR00UU3	4.0	24	62	6.0
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

Item Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
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
CR3PHDR00Q65	5.7	28	62	6.0
CR3PHDR00Q73	5.8	28	62	6.0
CR3PHDR00Q81	5.9	28	62	6.0
CR3PHDR00Q99	6.0	28	62	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

Item Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)	Item Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR3PHDR00QH6	6.8	34	75	8.0	CR3PHDR00R64	9.1	40	80	10.0
CR3PHDR00QJ1	6.9	34	75	8.0	CR3PHDR00RS0	9.1	51	100	10.0
CR3PHDR00QK9	7.0	34	75	8.0	CR3PHDR00R72	9.2	40	80	10.0
CR3PHDR00QL7	7.1	40	80	8.0	CR3PHDR00RT8	9.2	51	100	10.0
CR3PHDR00QM5	7.2	40	80	8.0	CR3PHDR00R80	9.3	40	80	10.0
CR3PHDR00QN2	7.3	40	80	8.0	CR3PHDR00RU6	9.3	51	100	10.0
CR3PHDR00QP8	7.4	40	80	8.0	CR3PHDR00R98	9.4	40	80	10.0
CR3PHDR00QQ6	7.5	40	80	8.0	CR3PHDR00RV4	9.4	51	100	10.0
CR3PHDR00QR4	7.6	40	80	8.0	CR3PHDR00RA0	9.5	40	80	10.0
CR3PHDR00QS1	7.7	40	80	8.0	CR3PHDR00RW2	9.5	51	100	10.0
CR3PHDR00QT9	7.8	40	80	8.0	CR3PHDR00RB8	9.6	40	80	10.0
CR3PHDR00QU7	7.9	40	80	8.0	CR3PHDR00RX9	9.6	51	100	10.0
CR3PHDR00QV5	8.0	40	80	8.0	CR3PHDR00RC6	9.7	40	80	10.0
CR3PHDR00QW3	8.1	40	80	10.0	CR3PHDR00RY7	9.7	51	100	10.0
CR3PHDR00RG7	8.1	51	100	10.0	CR3PHDR00RD3	9.8	40	80	10.0
CR3PHDR00QX0	8.2	40	80	10.0	CR3PHDR00RZ5	9.8	51	100	10.0
CR3PHDR00RH5	8.2	51	100	10.0	CR3PHDR00RE1	9.9	40	80	10.0
CR3PHDR00QY8	8.3	40	80	10.0	CR3PHDR00S06	9.9	51	100	10.0
CR3PHDR00RJ0	8.3	51	100	10.0	CR3PHDR00RF9	10.0	40	80	10.0
CR3PHDR00QZ6	8.4	40	80	10.0	CR3PHDR00S14	10.0	51	100	10.0
CR3PHDR00RK8	8.4	51	100	10.0	CR3PHDR00S22	10.1	55	100	12.0
CR3PHDR00R07	8.5	40	80	10.0	CR3PHDR00S30	10.2	55	100	12.0
CR3PHDR00RL6	8.5	51	100	10.0	CR3PHDR00S48	10.3	55	100	12.0
CR3PHDR00R15	8.6	40	80	10.0	CR3PHDR00S55	10.4	55	100	12.0
CR3PHDR00RM4	8.6	51	100	10.0	CR3PHDR00S63	10.5	55	100	12.0
CR3PHDR00R23	8.7	40	80	10.0	CR3PHDR00S71	10.6	55	100	12.0
CR3PHDR00RN1	8.7	51	100	10.0	CR3PHDR00S89	10.7	55	100	12.0
CR3PHDR00R31	8.8	40	80	10.0	CR3PHDR00S97	10.8	55	100	12.0
CR3PHDR00RP7	8.8	51	100	10.0	CR3PHDR00SA9	10.9	55	100	12.0
CR3PHDR00R49	8.9	40	80	10.0	CR3PHDR00SB7	11.0	55	100	12.0
CR3PHDR00RQ5	8.9	51	100	10.0	CR3PHDR00SC5	11.1	55	100	12.0
CR3PHDR00R56	9.0	40	80	10.0	CR3PHDR00SD2	11.2	55	100	12.0
CR3PHDR00RR3	9.0	51	100	10.0	CR3PHDR00SE0	11.3	55	100	12.0

Item Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)	Item Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR3PHDR00SF8	11.4	55	100	12.0	CR3PHDR00SS9	14.5	58	105	16.0
CR3PHDR00SG6	11.5	55	100	12.0	CR3PHDR00ST7	15.0	58	105	16.0
CR3PHDR00SH4	11.6	55	100	12.0	CR3PHDR00SU5	15.5	58	105	16.0
CR3PHDR00SJ9	11.7	55	100	12.0	CR3PHDR00SV3	16.0	58	105	16.0
CR3PHDR00SK7	11.8	55	100	12.0	CR3PHDR00SW1	16.5	58	105	18.0
CR3PHDR00SL5	11.9	55	100	12.0	CR3PHDR00VQ1	16.7	58	105	18.0
CR3PHDR00SM3	12.0	55	100	12.0	CR3PHDR00SX8	17.0	58	105	18.0
CR3PHDR00SN0	12.5	55	105	14.0	CR3PHDR00SY6	17.5	58	105	18.0
CR3PHDR00WS5	12.8	55	105	14.0	CR3PHDR00VP3	17.9	58	105	18.0
CR3PHDR00SP6	13.0	55	105	14.0	CR3PHDR00SZ4	18.0	58	105	18.0
CR3PHDR00SQ4	13.5	55	105	14.0	CR3PHDR00T05	18.5	58	105	20.0
CR3PHDR00WH0	13.6	55	105	14.0	CR3PHDR00T13	19.0	58	105	20.0
CR3PHDR00SR2	14.0	55	105	14.0	CR3PHDR00T21	19.5	58	105	20.0
CR3PHDR00VR9	14.2	58	105	16.0	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
1 st	1 st	1 st	1 st	1 st	1 st	1 st	1 st	1 st				1 st			1 st

NOTE: FOR FEED & SPEED Rates, go to page no. PG-55

Selection-Guide

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

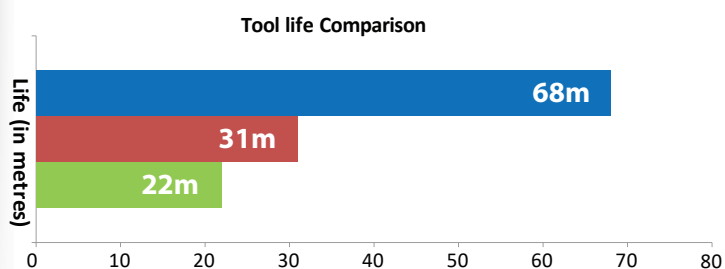
Hardness

280~310BHN

Machine

Vertical Machining Centre

Performance



Summary

Drills

Life (in metres)

CTHS

68

Competitor 2

31

Competitor 1

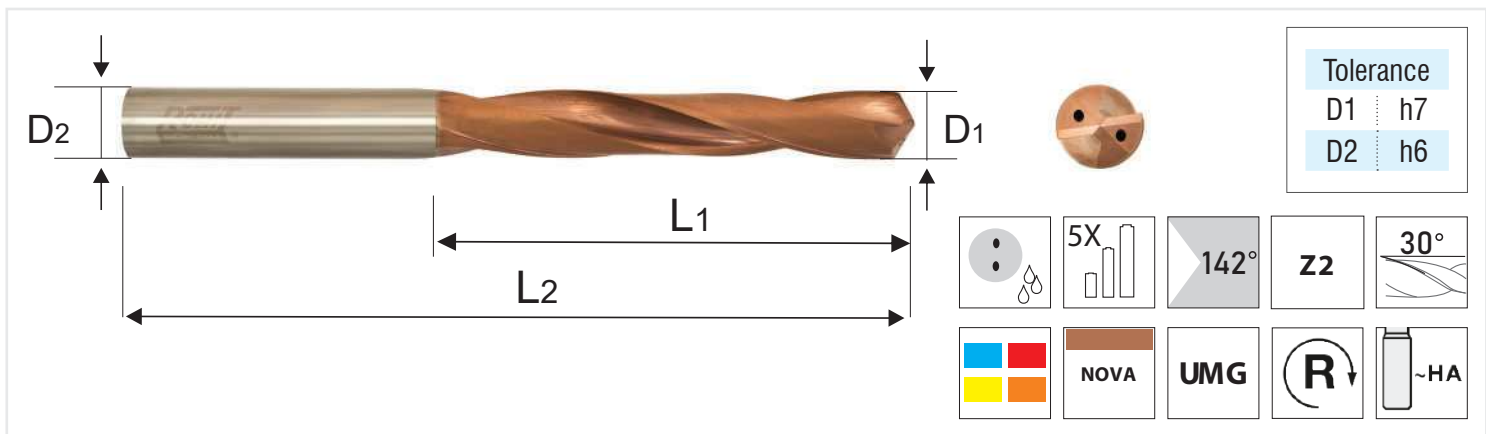
22

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
- Best suited for drilling MS, AS, C.I., and SUS

Item Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR3AHDR00UV6	3.0	36	75	6.0
CR3AHDR00UW4	3.1	36	75	6.0
CR3AHDR00UX1	3.2	36	75	6.0
CR3AHDR00UY9	3.3	36	75	6.0
CR3AHDR00UZ7	3.4	36	75	6.0
CR3AHDR00V08	3.5	36	75	6.0
CR3AHDR00V16	3.6	36	75	6.0
CR3AHDR00V24	3.7	36	75	6.0
CR3AHDR00V40	3.8	36	75	6.0
CR3AHDR00V32	3.9	36	75	6.0
CR3AHDR00V57	4.0	36	75	6.0
CR3AHDR00X55	4.1	36	75	6.0
CR3AHDR00WE1	4.2	36	75	6.0
CR3AHDR00VB9	4.3	36	75	6.0
CR3AHDR00X63	4.4	36	75	6.0
CR3AHDR00X71	4.5	36	75	6.0
CR3AHDR00WG7	4.6	36	75	6.0
CR3AHDR00X89	4.7	36	75	6.0
CR3AHDR00VA1	4.8	42	80	6.0
CR3AHDR00X97	4.9	42	80	6.0

Item Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR3AHDR00VL7	5.0	42	80	6.0
CR3AHDR00VT9	5.1	42	80	6.0
CR3AHDR00XA9	5.2	42	80	6.0
CR3AHDR00VC7	5.3	42	80	6.0
CR3AHDR00WF9	5.4	42	80	6.0
CR3AHDR00WZ5	5.5	42	80	6.0
CR3AHDR00XB7	5.6	42	80	6.0
CR3AHDR00XC5	5.7	42	80	6.0
CR3AHDR00WJ0	5.8	42	80	6.0
CR3AHDR00XD2	5.9	42	80	6.0
CR3AHDR00VS1	6.0	42	80	6.0
CR3AHDR00XE0	6.1	55	100	8.0
CR3AHDR00XF8	6.2	55	100	8.0
CR3AHDR00XG6	6.3	55	100	8.0
CR3AHDR00XH4	6.4	55	100	8.0
CR3AHDR00X06	6.5	55	100	8.0
CR3AHDR00XJ9	6.6	55	100	8.0
CR3AHDR00XK7	6.7	55	100	8.0
CR3AHDR00V73	6.8	55	100	8.0
CR3AHDR00XL5	6.9	55	100	8.0

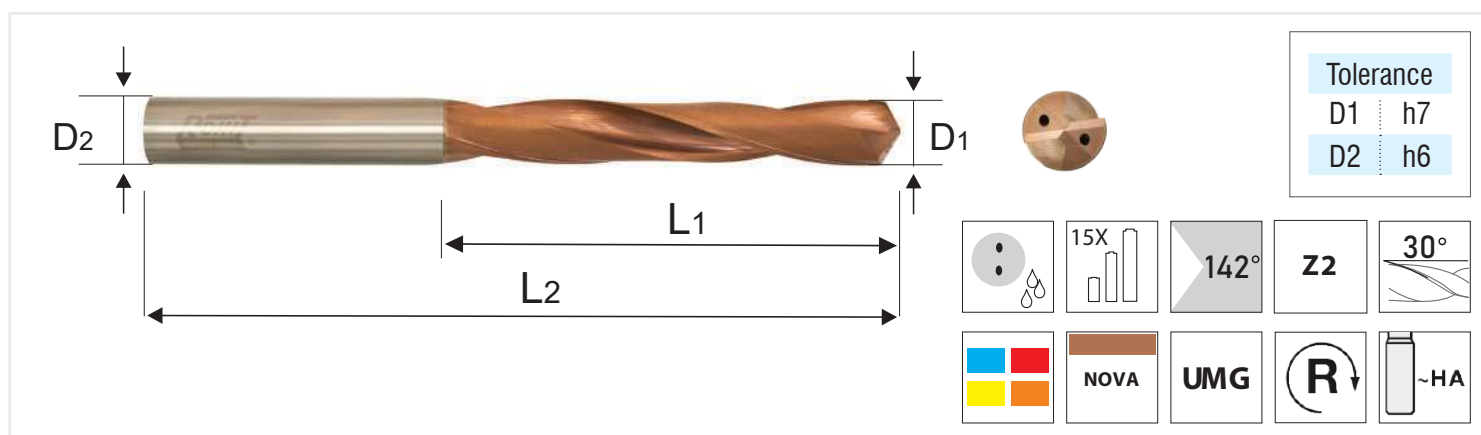
Item Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR3AHDR00V81	7.0	55	100	8.0
CR3AHDR00XM3	7.1	60	105	8.0
CR3AHDR00XN0	7.2	60	105	8.0
CR3AHDR00UH7	7.3	60	105	8.0
CR3AHDR00XP6	7.4	60	105	8.0
CR3AHDR00X14	7.5	60	105	8.0
CR3AHDR00XQ4	7.6	60	105	8.0
CR3AHDR00XR2	7.7	60	105	8.0
CR3AHDR00XS9	7.8	60	105	8.0
CR3AHDR00XT7	7.9	60	105	8.0
CR3AHDR00W31	8.0	60	105	8.0
CR3AHDR00XU5	8.1	75	125	10.0
CR3AHDR00XV3	8.2	75	125	10.0
CR3AHDR00VE2	8.3	75	125	10.0
CR3AHDR00XW1	8.4	75	125	10.0
CR3AHDR00VJ1	8.5	75	125	10.0
CR3AHDR00XX8	8.6	75	125	10.0
CR3AHDR00W15	8.7	75	125	10.0
CR3AHDR00X30	8.8	75	125	10.0
CR3AHDR00XY6	8.9	75	125	10.0
CR3AHDR00UG9	9.0	75	125	10.0
CR3AHDR00XZ4	9.1	75	125	10.0
CR3AHDR00Y05	9.2	75	125	10.0
CR3AHDR00VF0	9.3	75	125	10.0
CR3AHDR00Y13	9.4	75	125	10.0
CR3AHDR00Y21	9.5	75	125	10.0
CR3AHDR00Y39	9.6	75	125	10.0
CR3AHDR00Y47	9.7	75	125	10.0
CR3AHDR00Y54	9.8	75	125	10.0
CR3AHDR00Y62	9.9	75	125	10.0
CR3AHDR00X22	10.0	75	125	10.0
CR3AHDR00Y70	10.1	85	140	12.0
CR3AHDR00Y88	10.2	85	140	12.0
CR3AHDR00VK9	10.3	85	140	12.0

Item Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR3AHDR00Y96	10.4	85	140	12.0
CR3AHDR00W23	10.5	85	140	12.0
CR3AHDR00YA8	10.6	85	140	12.0
CR3AHDR00YB6	10.7	85	140	12.0
CR3AHDR00YC4	10.8	85	140	12.0
CR3AHDR00YD1	10.9	85	140	12.0
CR3AHDR00VU7	11.0	85	140	12.0
CR3AHDR00YE9	11.1	85	140	12.0
CR3AHDR00WN1	11.2	85	140	12.0
CR3AHDR00YF7	11.3	85	140	12.0
CR3AHDR00YG5	11.4	85	140	12.0
CR3AHDR00YH3	11.5	85	140	12.0
CR3AHDR00YJ8	11.6	85	140	12.0
CR3AHDR00YK6	11.7	85	140	12.0
CR3AHDR00YL4	11.8	85	140	12.0
CR3AHDR00YM2	11.9	85	140	12.0
CR3AHDR00VY8	12.0	85	140	12.0
CR3AHDR00YN9	12.5	85	140	14.0
CR3AHDR00VZ6	13.0	85	140	14.0
CR3AHDR00YP5	13.5	85	140	14.0
CR3AHDR00WT8	13.6	85	140	14.0
CR3AHDR00VN2	14.0	85	140	14.0
CR3AHDR00WP7	14.5	90	145	16.0
CR3AHDR00YQ3	15.0	90	145	16.0
CR3AHDR00YR1	15.5	90	145	16.0
CR3AHDR00V65	16.0	90	145	16.0
CR3AHDR00VM5	16.5	95	150	18.0
CR3AHDR00YS8	17.0	95	150	18.0
CR3AHDR00YT6	17.5	95	150	18.0
CR3AHDR00YU4	18.0	95	150	18.0
CR3AHDR00YV2	18.5	100	150	20.0
CR3AHDR00YW0	19.0	100	150	20.0
CR3AHDR00YX7	19.5	100	150	20.0
CR3AHDR00YY5	20.0	100	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
1 st	1 st	1 st	1 st	1 st	1 st	1 st	1 st	1 st				1 st			

NOTE: FOR FEED & SPEED Rates, go to page no. PG-55



Features:

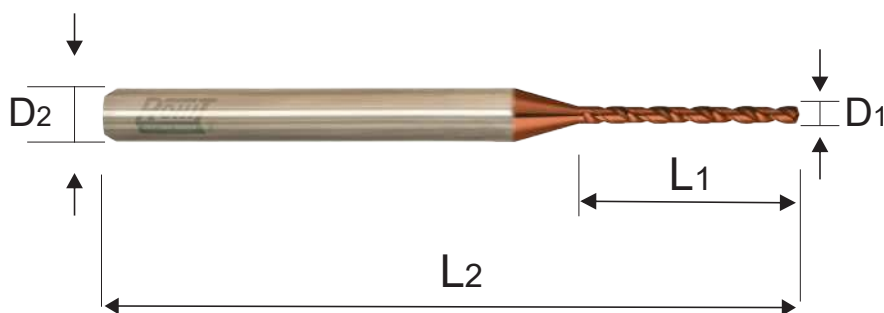
- CTHM Coolant Fed Carbide Drills have new chip curling design to enable chip breakage
- Recommended for drilling depths of Upto 15 L/D
- Coolant Fed Carbide Drills are best suited for drilling MS, Alloy Steel, Cast Iron up to 450BHN, Stainless Steel
- CTHM Coolant Fed Carbide Drills comes with NOVA 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
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-56



Tolerance

D1 +0/-0.005

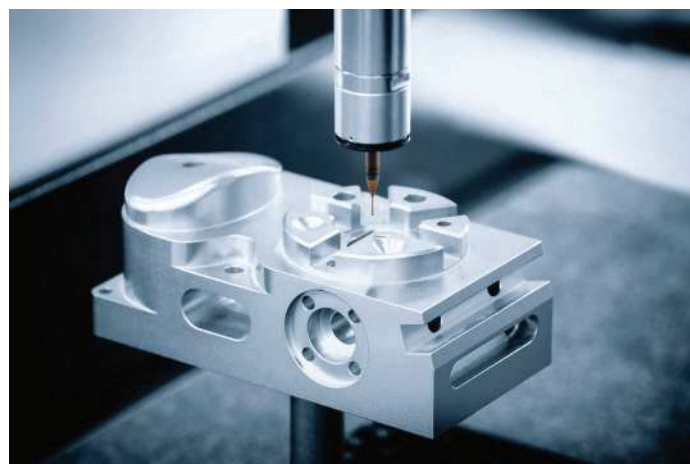
D2 h6



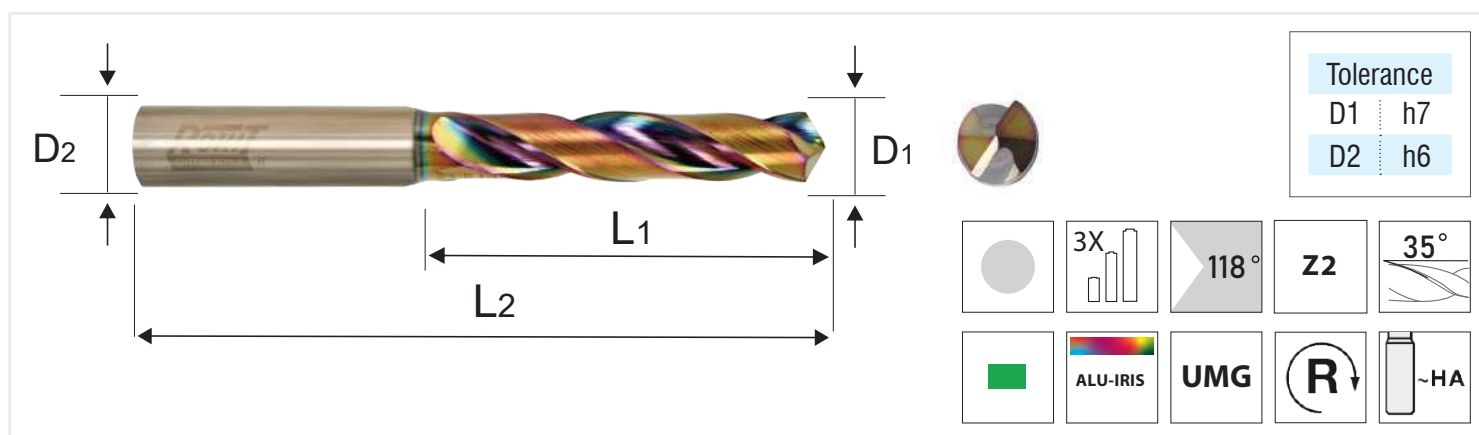
Features:

- Micro Drills from Dia. 0.2 till 0.9mm
- Multi-Layer NOVA coating to protect carbide drills in drilling at High temp
- Best Suited Micro Drill for machining Alloy steel, Stainless Steel and Aluminium Alloys
- Higher Efficiency with longer tool life

Item Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
C3MS020038-N	0.2	2	38	3.0
C3MS030038-N	0.3	3	38	3.0
C3MS040038-N	0.4	4	38	3.0
C3MS050038-N	0.5	5	38	3.0
C3MS060038-N	0.6	6	38	3.0
C3MS070038-N	0.7	6	38	3.0
C3MS080038-N	0.8	6	38	3.0
C3MS090038-N	0.9	6	38	3.0



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		1 st		1 st	1 st	1 st			1 st			1 st



Features:

- Highly Effective C3AS-Series for Drilling Aluminium and AL-Alloys
- Super Thin ALU-IRIS coating retains ultra-sharp cutting edges
- Superior smoothness prevents sticking of material in machining Aluminium
- High Rake geometry enables easier chip-evacuation
- Extreme hardness for advanced wear resistance in Al-Alloys with high Silicon content
- Improves productivity & achieves unmatched Life

Ordering Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)	Ordering Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
C3AS020050040-M	2.0	14	50	4.0	C3AS060062060-M	6.0	28	62	6.0
C3AS022050040-M	2.2	14	50	4.0	C3AS063075080-M	6.3	34	75	8.0
C3AS025050040-M	2.5	14	50	4.0	C3AS063.5075080-M	6.35	34	75	8.0
C3AS027050040-M	2.7	14	50	4.0	C3AS065075080-M	6.5	34	75	8.0
C3AS030062060-M	3.0	20	62	6.0	C3AS066075080-M	6.6	34	75	8.0
C3AS032062060-M	3.2	20	62	6.0	C3AS068075080-M	6.8	34	75	8.0
C3AS035062060-M	3.5	20	62	6.0	C3AS070075080-M	7.0	34	75	8.0
C3AS037062060-M	3.7	20	62	6.0	C3AS075080080-M	7.5	40	80	8.0
C3AS040062060-M	4.0	24	62	6.0	C3AS079080080-M	7.9	40	80	8.0
C3AS042062060-M	4.2	24	62	6.0	C3AS080080080-M	8.0	40	80	8.0
C3AS043062060-M	4.3	24	62	6.0	C3AS082100100-M	8.2	51	100	10.0
C3AS045062060-M	4.5	24	62	6.0	C3AS085100100-M	8.5	51	100	10.0
C3AS046062060-M	4.6	24	62	6.0	C3AS088100100-M	8.8	51	100	10.0
C3AS050062060-M	5.0	28	62	6.0	C3AS090080100-M	9.0	40	80	10.0
C3AS051062060-M	5.1	28	62	6.0	C3AS090100100-M	9.0	51	100	10.0
C3AS052062060-M	5.2	28	62	6.0	C3AS095080100-M	9.5	40	80	10.0
C3AS055062060-M	5.5	28	62	6.0	C3AS095100100-M	9.5	51	100	10.0
C3AS058062060-M	5.8	28	62	6.0	C3AS100080100-M	10.0	40	80	10.0

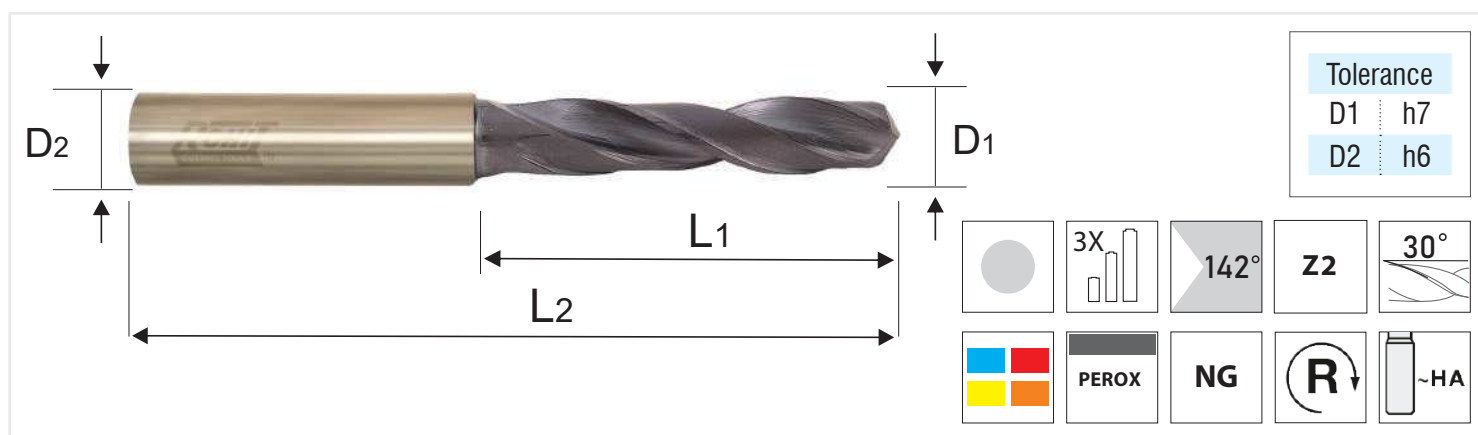
Ordering Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
C3AS100100100-M	10.0	51	100	10.0
C3AS101100120-M	10.1	55	100	12.0
C3AS102100120-M	10.2	55	100	12.0
C3AS105100120-M	10.5	55	100	12.0
C3AS115100120-M	11.5	55	100	12.0
C3AS120100120-M	12.0	55	100	12.0
C3AS125105140-M	12.5	55	105	14.0
C3AS127105140-M	12.7	55	105	14.0
C3AS130105140-M	13.0	55	105	14.0
C3AS135105140-M	13.5	55	105	14.0
C3AS140105140-M	14.0	55	105	14.0

Ordering Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
C3AS145105160-M	14.5	58	105	16.0
C3AS150105160-M	15.0	58	105	16.0
C3AS155105160-M	15.5	58	105	16.0
C3AS160105160-M	16.0	58	105	16.0
C3AS165105180-M	16.5	58	105	18.0
C3AS170105180-M	17.0	58	105	18.0
C3AS175105180-M	17.5	58	105	18.0
C3AS180105180-M	18.0	58	105	18.0
C3AS185105200-M	18.5	58	105	20.0
C3AS190105200-M	19.0	58	105	20.0
C3AS195105200-M	19.5	58	105	20.0
C3AS200105200-M	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			

NOTE: This is Non-stock Item, ask your RIGPL representative for Delivery Period
 FOR FEED & SPEED Rates, go to page no. PG-59



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

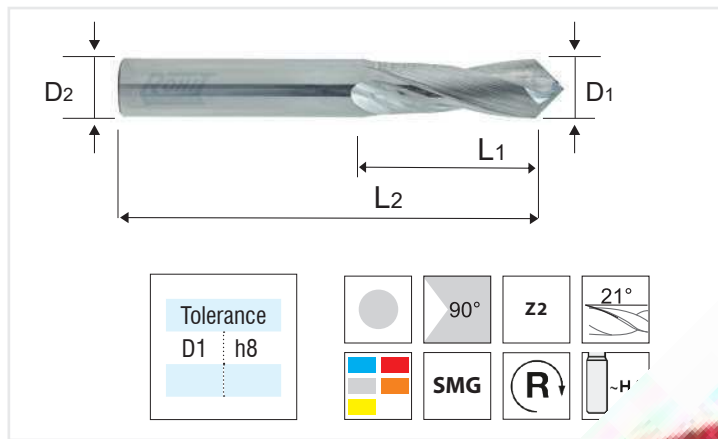
Carbon Steels BHN 180 to 225	Alloy Steels BHN 225 to 355	Prehardened Steels HRC 40 to 45	Austenitic Stainless Steel	Precipitation Hardened Stainless Steel	Titanium	HighTemp. Alloy	Grey Cast Iron	Ductile Cast Iron	Hardened Steels HRC up to 45	High Hardened Steels HRC 45 to 55	Aluminum	Aluminum Alloys	Plastic	Wood / MDF	Copper/Brass
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-58

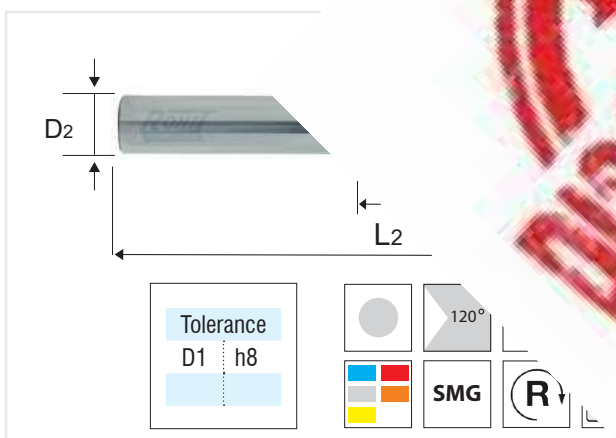
Selection-Guide

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

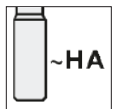
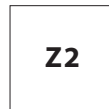
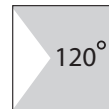
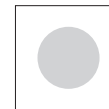
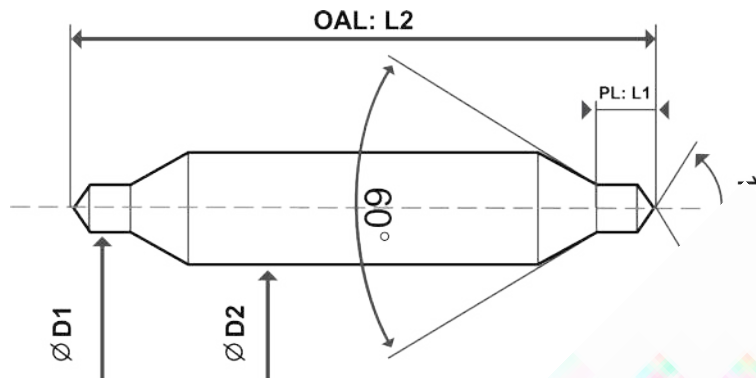
Carbon Steels BHN 180 to 225	Alloy Steels BHN 225 to 355	Prehardened Steels HRc 40 to 45	Austenitic Stainless Steel	Precipitation Hardened Stainless Steel	Titanium	HighTemp. Alloy	Grey Cast Iron	Ductile Cast Iron	Hardened Steels HRc up to 45	High Hardened Steels HRc 45 to 55	Aluminum	Aluminum Alloys	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-60



Tolerance

D1 h8



Features:

- Designed for accurate Centering
- Solid Carbide construction
- 60° Counter-sink Angle
- 120° Point Angle
- Can be provided with Coatings

Centering is required
 for unchained

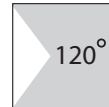
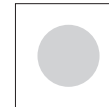
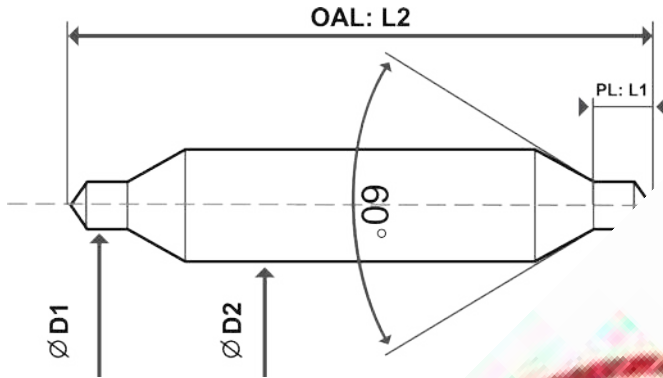
Item Code	Body Dia (D1)	OAL (L2)	Body Dia (D2)
CR1XCA001P1	1/64"	1-1/2"	1/8"
CR1XCA001Q9	3/32"	1-3/4"	3/16"
CR1XCA00036	BS3 1/2"	5/32"	2"
CR1XCA00069	BS4 1/8"	3/16"	2-1/4"
CR1XCA001R7	BS5 3/16"	9/32"	2-1/2"
CR1XCA001S4	BS6 1/4"	3/8"	3"
C1CB-BS7-U	BS7 5/16"	15/32"	3-1/2"

NOTE: FOR FEED & SPEED Rates, go to page no. PG-60



Tolerance

D1 h8



Item

CR

CR1XC

CR1XCA00

C1CD0800-U

0.80

6.3

8

56

10

63

12.5

72

16

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

1st

High Hardened Steels
HRC 45 to 55

1st

Aluminum

1st

Aluminum Alloys

1st

Plastic

1st

Wood / MDF

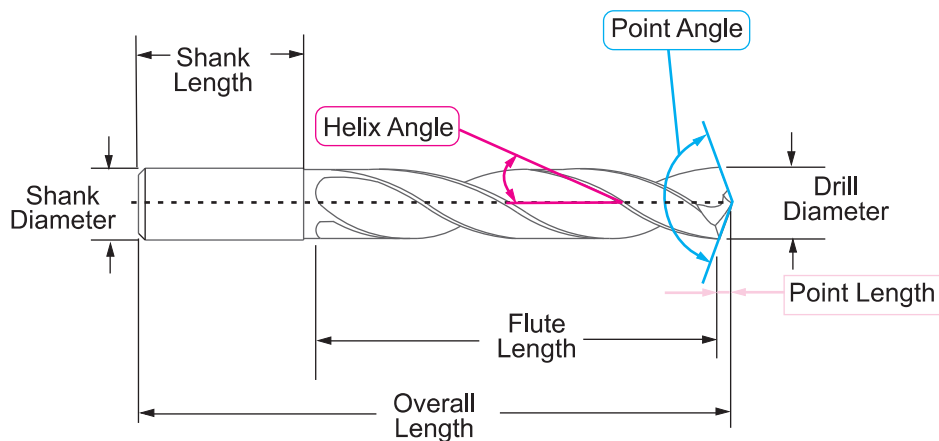
1st

Copper/Brass

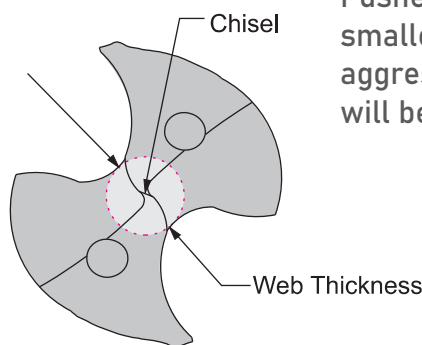
1st

NOTE: FOR FEED & SPEED Rates, go to page no. PG-60

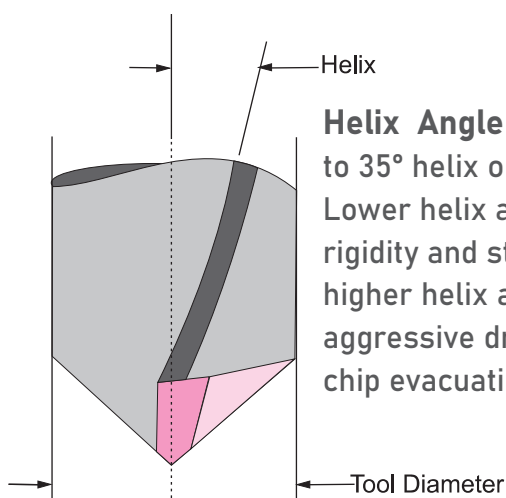
Selection-Guide



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.

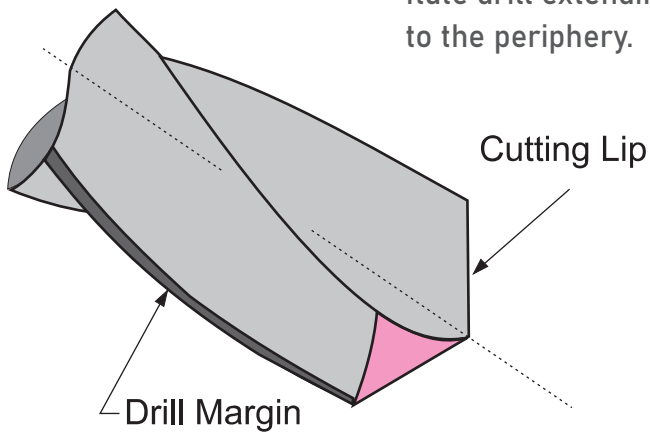


Web – The core of the drill that is left from the fluting operation. A thicker web means added rigidity, while a smaller web means more chip evacuation. On two flute drills, typically varies from 16% - 30% of the tool diameter.

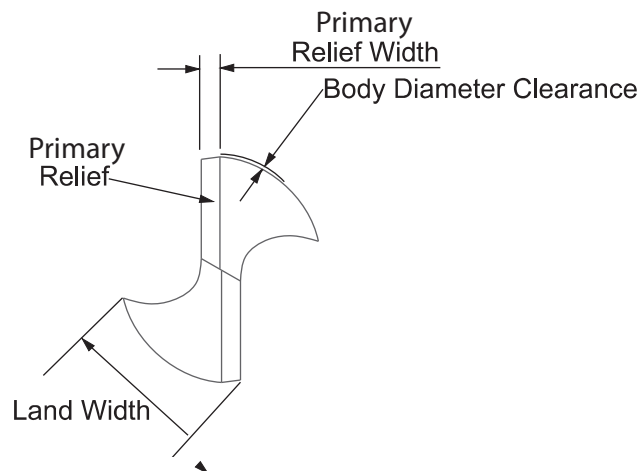


Helix Angle – Varies from 0° to 35° helix on standard tools. Lower helix angle means more rigidity and strength and a higher helix angle means more aggressive drilling and better chip evacuation.

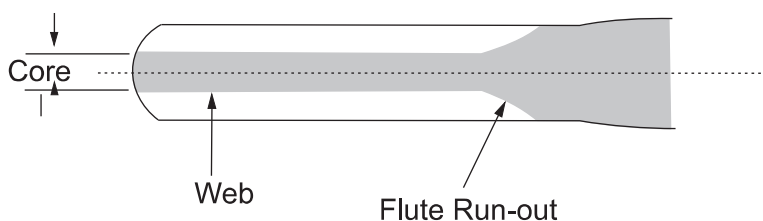
Cutting Lip - The cutting edges of a two flute drill extending from the chisel edge to the periphery.



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	Austentic Stainless Steel	≤24 HRc	20	0.02	0.05	0.09	0.11	0.12	0.14	0.18	0.21
	Austentic 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	Austentic Stainless Steel	≤24 HRc	40	0.04	0.06	0.06	0.08	0.08	0.1	0.1	-
	Austentic 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
				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	-
	Magnesiumalloys	≤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
Stainless Steel	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
	Austentic Stainless Steel	≤24 HRc	40	0.06	0.1	0.1	0.12	0.12	0.15	0.15	0.17
CAST IRON	Austentic 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
	Grey Cast Iron	≤230 BHN	130	0.15	0.24	0.24	0.3	0.3	0.37	0.37	0.4
CAST IRON	Ductile Cast Iron	240-300 BHN	100	0.15	0.24	0.24	0.3	0.3	0.37	0.37	0.4
		≤230 BHN	90	0.15	0.24	0.24	0.3	0.3	0.37	0.37	0.4
	Chilled Cast Iron	240-300 BHN	80	0.12	0.19	0.19	0.24	0.24	0.3	0.3	0.34
		≤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
	Magnesiumalloys	≤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

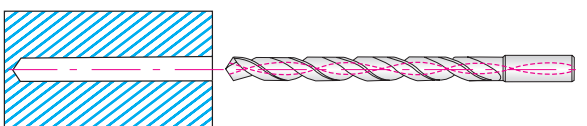
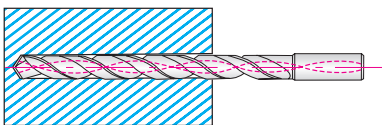
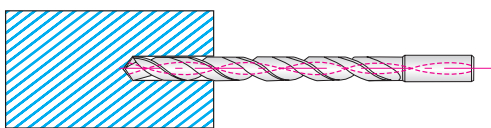
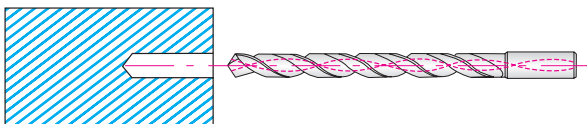
NOTE: FOR CTHL-SERIES REDUCE RPM & FEED BY 20% to 25%

• 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	Austentic Stainless Steel	≤24 HRc	50	0.06	0.06	0.1	0.13	0.13	0.16	0.16	-
	Austentic 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	-
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	-	-

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								
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	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 & Al-alloys	≤120 BHN	190	0.12	0.15	0.2	0.33	0.33	0.41	0.41	0.5
	Al wrought alloys	≤150 BHN	190	0.12	0.15	0.2	0.33	0.33	0.41	0.41	0.5
	Al cast alloys ≤ 10 %Si	≤200 BHN	150	0.12	0.12	0.16	0.25	0.25	0.33	0.33	0.41
	Al cast alloys > 10 %Si	≤200 BHN	120	0.08	0.12	0.16	0.25	0.25	0.33	0.33	0.41
	Magnesiumalloys	≤150 BHN	170	0.08	0.12	0.16	0.25	0.25	0.33	0.33	0.41
	Copper, low-alloyed	≤120 BHN	60	0.08	0.08	0.13	0.13	0.13	0.2	0.2	0.25
	Brass, short-chipping	≤200 BHN	190	0.06	0.08	0.16	0.25	0.25	0.33	0.33	0.41
	Brass, long-chipping	≤120 BHN	120	0.05	0.08	0.13	0.2	0.2	0.25	0.25	0.33
	Bronze, short-chipping	≤200 BHN	60	0.05	0.06	0.13	0.13	0.13	0.2	0.2	0.25
	Bronze, short-chipping	>200-260 BHN	60	0.05	0.05	0.1	0.1	0.1	0.16	0.16	0.2
	Bronze, long-chipping	≤24 HRc	50	0.05	0.05	0.1	0.1	0.1	0.16	0.16	0.2
	Bronze, long-chipping	>24-30 HRc	50	0.05	0.05	0.1	0.1	0.1	0.16	0.16	0.2
	Reinforced plastics - GFK/ CFK	-	-	-	-	-	-	-	-	-	-

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

Selection-Guide

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	Austentic Stainless Steel	≤24 HRc	40	0.05	0.07	0.09	0.11	
	Austentic 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.

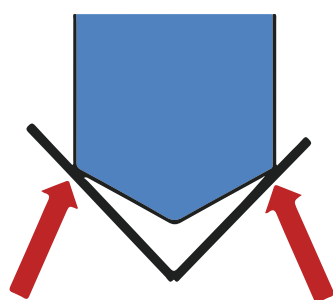


Figure 1

90° Spot Angle
135° Drill Angle

Initial Contact
Area Damages
Carbide Drills!!

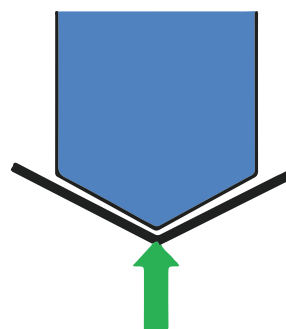


Figure 2

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

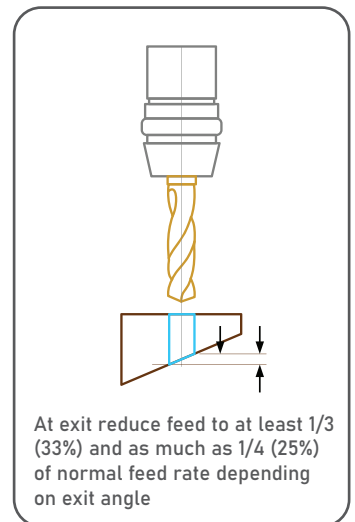
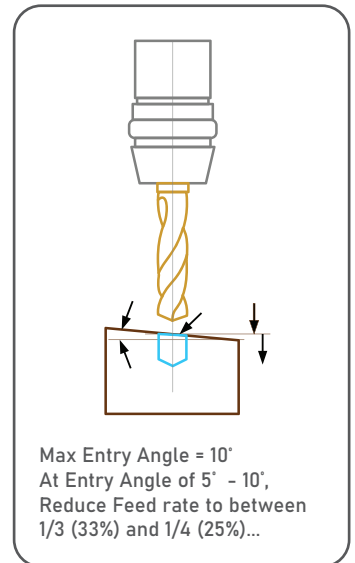
Suggestions :

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

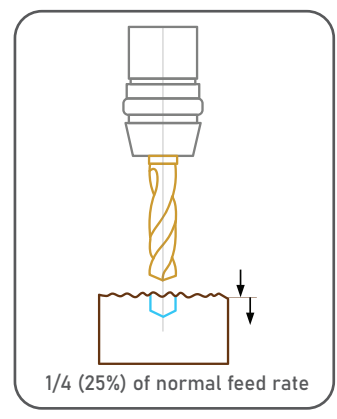
• ENTERING OR EXITING the Workpiece :

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 :

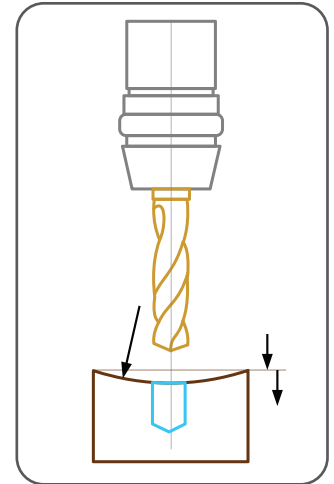
If the part radius is larger than 15 X Drill Diameter

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 :

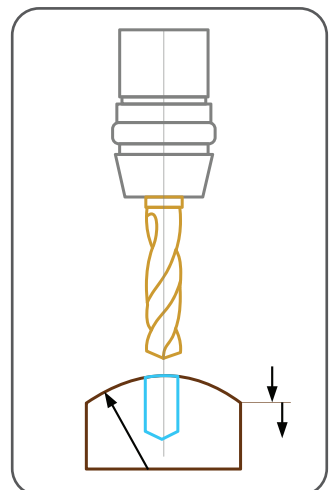
If the part radius is larger than 4 X Drill Diameter

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.



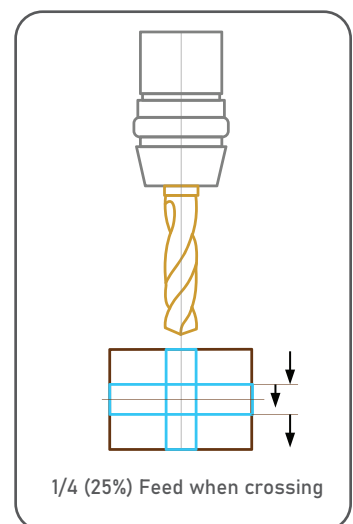
Solid Carbide Cross Hole Drilling

• 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

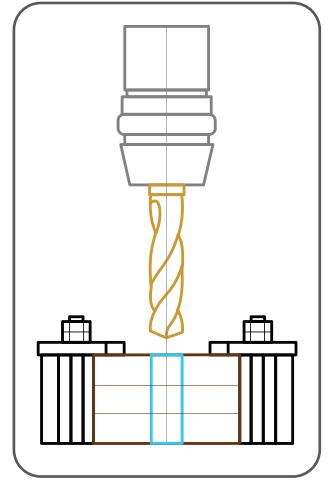
- If the stacked plates are clamped tightly together & gaps are eliminated :

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



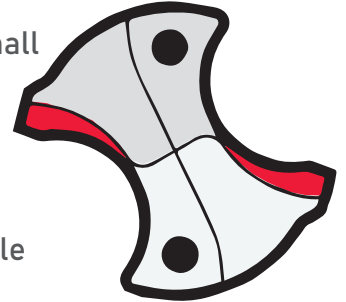
Heavy wear and tear at flank

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



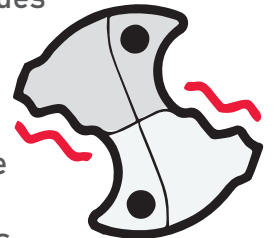
Crumbling on cutting lips

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



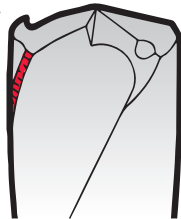
Land wear

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



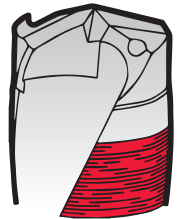
Scoring on tool body

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



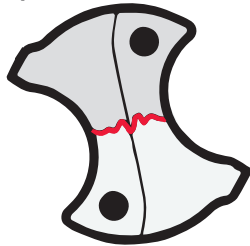
Heavy chisel edge wear & tear

Cause :

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

Remedy :

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



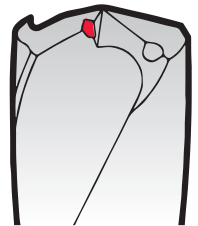
Crumbling at intersection of web thinning and cutting lip

Cause :

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

Remedy :

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



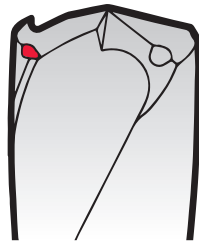
Plastic deformation of outer corner

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



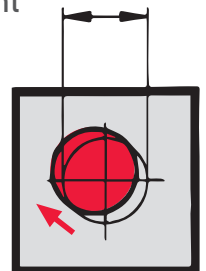
Misalignment, axis shifting

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



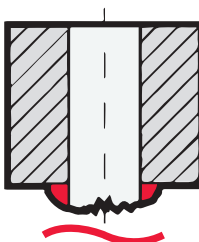
Heavy burring on breakthrough

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



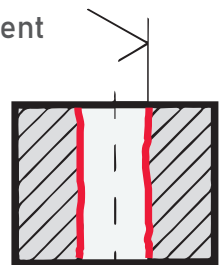
Unsatisfactory surface quality

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)

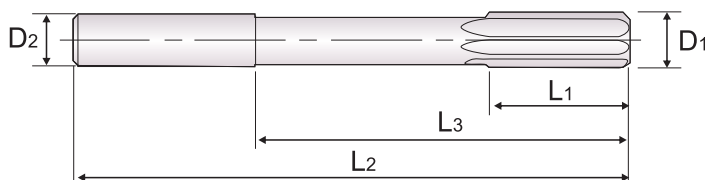


Carbide Reamers

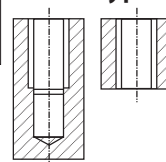
In applications that require high-precision hole finishes, or tighter diameter control ROHIT's Solid Carbide Reamers can be used with confidence in a wide range of sizes for virtually all materials, including cast iron, aluminium, stainless steel, exotic alloys, plastics and other non-ferrous materials.

Description	Series No.	Page No
Carbide St. Flute Reamers	C1RS	69
Carbide LHS/RHC Reamers	C1RL	71
Carbide RHS/RHC Reamers	C1RR	73
Technical Information	Troubleshooting	75





Hole Type



Tolerance

D1 H7

D2 h6



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

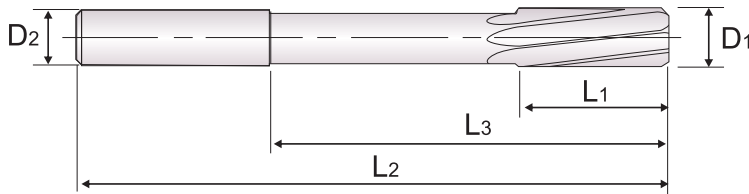
Ordering Code (Uncoated)	Ordering Code (TiALN Coated)	Flute Dia (D1)	Flute Len (L1)	Reach Len (L3)	Overall Len (L2)	Shank Dia (D2)	# of Flutes
C1RS0950125-U	C1RS0950125-F	9.5	36	80	125	10	6
C1RS1000133-U	C1RS1000133-F	10	38	86	133	10	6
C1RS1050133-U	C1RS1050133-F	10.5	38	86	133	12	6
C1RS1100142-U	C1RS1100142-F	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-77 to 78

Selection-Guide

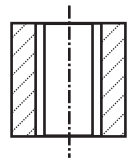


Tolerance

D1 H7

D2 h6

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
C1RL0950125-U	C1RL0950125-F	9.5	36	80	125	10	6
C1RL1000133-U	C1RL1000133-F	10	38	86	133	10	6
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.

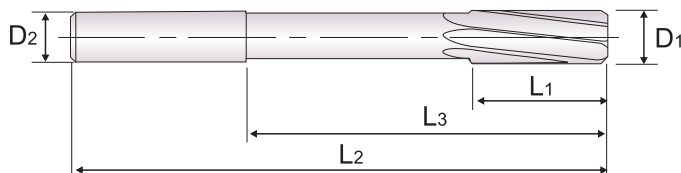
[Read More on rigpl.com/blog](http://rigpl.com/blog)



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-77 to 78

Selection-Guide



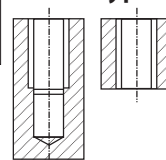
Tolerance

D1 H7

D2 h6

Z6/
Z4Metric
Din
1420 H7

Hole Type



SMG



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
C1RR0300061-U	C1RR0300061-F	3	15	31	61	4	4
C1RR0350070-U	C1RR0350070-F	3.5	18	36	70	4	4
C1RR0400075-U	C1RR0400075-F	4	19	42	75	4	4
C1RR0450080-U	C1RR0450080-F	4.5	21	46	80	5	4
C1RR0500086-U	C1RR0500086-F	5	23	51	86	5	4
C1RR0550093-U	C1RR0550093-F	5.5	26	56	93	6	4
C1RR0600093-U	C1RR0600093-F	6	26	56	93	6	4
C1RR0650101-U	C1RR0650101-F	6.5	28	62	101	7	6
C1RR0700109-U	C1RR0700109-F	7	31	68	109	7	6
C1RR0750109-U	C1RR0750109-F	7.5	31	68	109	8	6
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
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-77 to 78

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	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	Austentic Stainless Steel (304,310)	27-45	0.035-0.070	0.070-0.100	0.100-0.175	0.175-0.350
		Austentic 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 (Mar tensitic) 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 in Alloy Steel machining.
- 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

- Over 40 different variants of end mills available
- State of the art CNC 6-Axis machines for high precision manufacturing with Zero defects
- Standard, Long and Extended Reach Lengths are available
- Top of the notch Quality check Equipments (Zoller) to provide accurate tools with great quality
- Utilize our engineering experience to solve your milling trouble

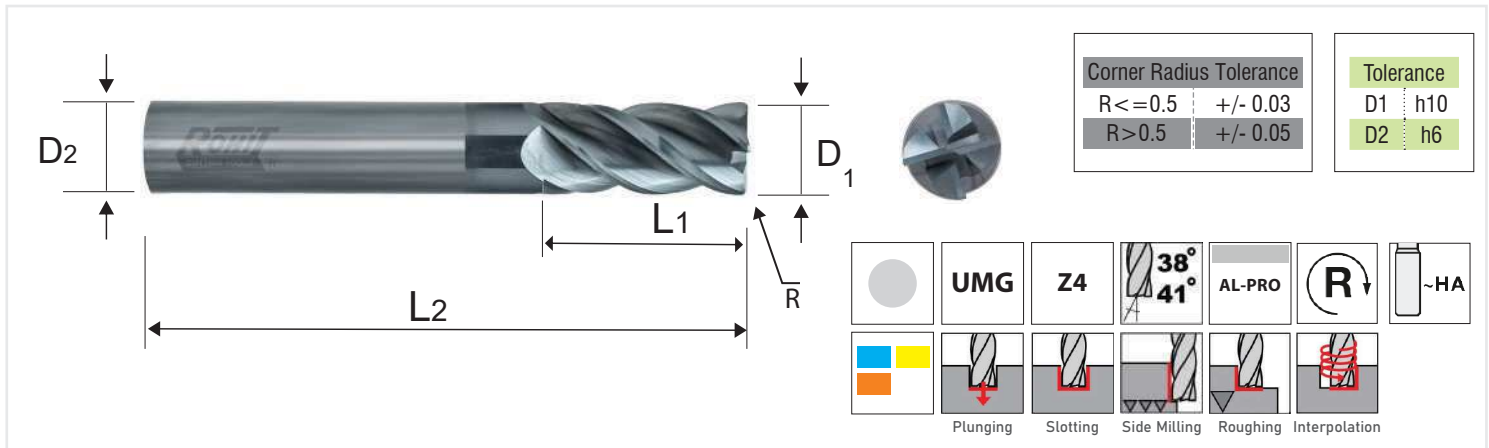
Series Group	Series No.	Page No
HP-VHEM*	330	81
	333	83
	334	85
HP-SUS*	222	88
	321	89
	322	91
HP-VHEM*	430	92
	433	94
	434	95
HP-4X	401	96
	402	97
	406	98
	423	99
HP-3X	301	100
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	304	103
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	306	106
	307	108
	308	109
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	313	111





Series Group	Series No.	Page No
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	206	116
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	208	118
	211	119
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Series Group	Series No.	Page No
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	110	124
	121	125
	122	127
	123	129
GP-0X (NON-Ferrous)	103	131
	104	132
	107	134
	108	135
	109	136
	112	137
	114	138
	118	139
	119	141



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)
CR35HVVH000B3	4	10	54	6	R0.3
CR35HVVH00135	4.5	12	50	6	R0.3
CR35HVVH00143	5.5	12	50	6	R0.3
CR35HVVH00010	6	12	63	6	R0.3
CR35HVVH00028	8	19	63	8	R0.5
CR35HVVH00036	10	22	72	10	R0.5
CR35HVVH00044	12	26	80	12	R0.75
CR35HVVH00085	14	26	80	14	R0.75
CR35HVVH00051	16	32	92	16	R0.30
CR35HVVH00093	16	32	92	16	R0.75
CR35HVVH000A5	20	38	100	20	R0.75

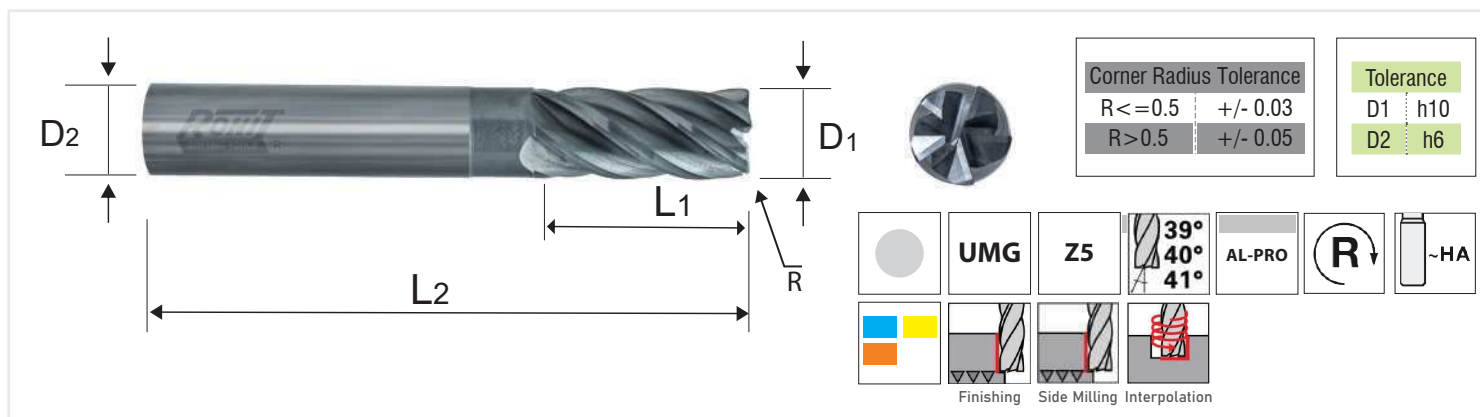
Item Code AL-PRO Coated	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)	Corner Radius (R)
CX35HVVH00071	1/4	1/2	2+1/2	1/4	R0.015
CX35HVVH000C5	1/4	3/4	2+1/2	1/4	R0.015
CX35HVVH000H4	5/16	13/16	2+1/2	5/16	R0.015
CX35HVVH000E0	3/8	1	3	3/8	R0.015
CX35HVVH000D2	1/2	1	3	1/2	R0.015
CX35HVVH000J9	1/2	1+1/2	3+1/2	1/2	R0.015
CX35HVVH00063	1/2	1	3	1/2	R0.03
CX35HVVH000K7	1/2	1+1/2	3+1/2	1/2	R0.03
CX35HVVH000L5	5/8	1+1/4	3+1/2	5/8	R0.015
CX35HVVH000F8	5/8	1+1/4	3+1/2	5/8	R0.03
CX35HVVH000M3	3/4	1+1/2	4	3/4	R0.015
CX35HVVH000G6	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-145

Selection-Guide



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)
CR35HVVH000P2	6	12	63	6	R0.3
CR35HVVH000Q0	8	16	63	8	R0.5
CR35HVVH000R8	10	22	72	10	R0.5
CR35HVVH000S5	12	26	80	12	R0.75
CR35HVVH000T3	16	32	92	16	R0.75
CR35HVVH000U1	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)
CX35HVVH000V3	1/4	3/4	2-1/2	1/4	R0.015
CX35HVVH000W1	5/16	13/16	2-1/2	5/16	R0.015
CX35HVVH000X8	3/8	1	3	3/8	R0.015
CX35HVVH000Y6	1/2	1	3	1/2	R0.030
CX35HVVH000Z4	5/8	1-1/4	3-1/2	5/8	R0.030
CX35HVVH00105	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

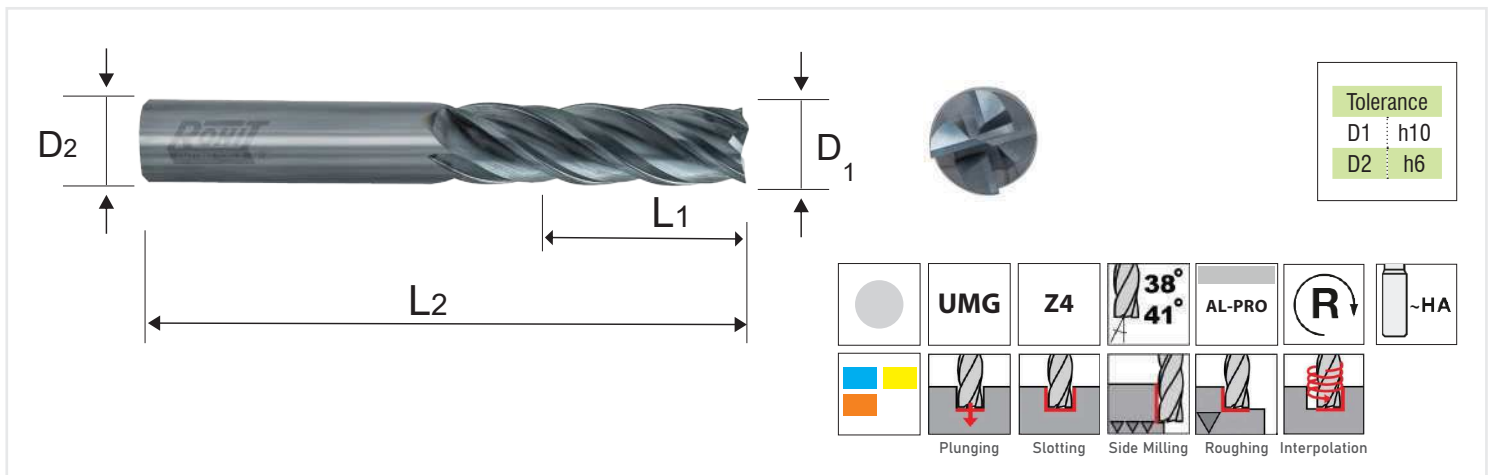
Web Taper

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
	1 st	1 st	1 st	1 st	1 st	2 nd			2 nd	1 st					

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



Features:

- Variable Lead Geometry 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.

Item Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR35HVVH001P1	3	10	50	6
CR35HVVH001T2	4	15	50	4
CR35HVVH001R7	4	16	50	6
CR35HVVH001U0	5	16	50	5
CR35HVVH001V8	5	16	50	6
CR35HVVH00184	6	16	50	6
CR35HVVH00192	6	20	60	6
CR35HVVH001A4	6	25	75	6
CR35HVVH001B2	6	30	100	6
CR35HVVH001C0	8	20	60	8

Item Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR35HVVH001D7	8	30	75	8
CR35HVVH001E5	8	40	100	8
CR35HVVH001F3	10	30	75	10
CR35HVVH001G1	10	45	100	10
CR35HVVH001H9	12	30	75	12
CR35HVVH001J4	12	45	100	12
CR35HVVH001K2	14	50	100	14
CR35HVVH001L0	16	50	100	16
CR35HVVH001M8	18	50	100	18
CR35HVVH001N5	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 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: FOR FEED & SPEED Rates, go to page no. PG-145

Selection-Guide

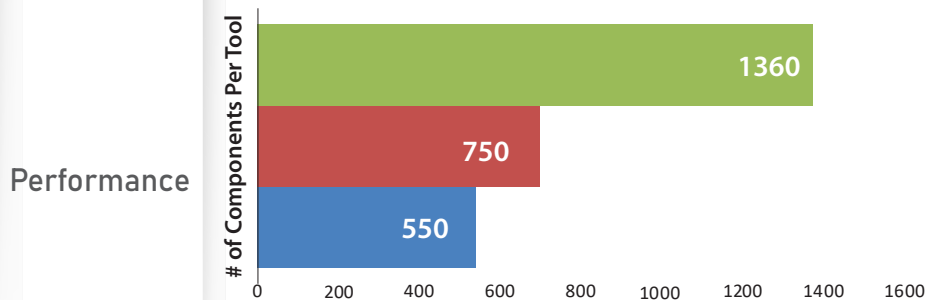
Description: S/C Rohit-3X AL-PRO VHEMAS

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	

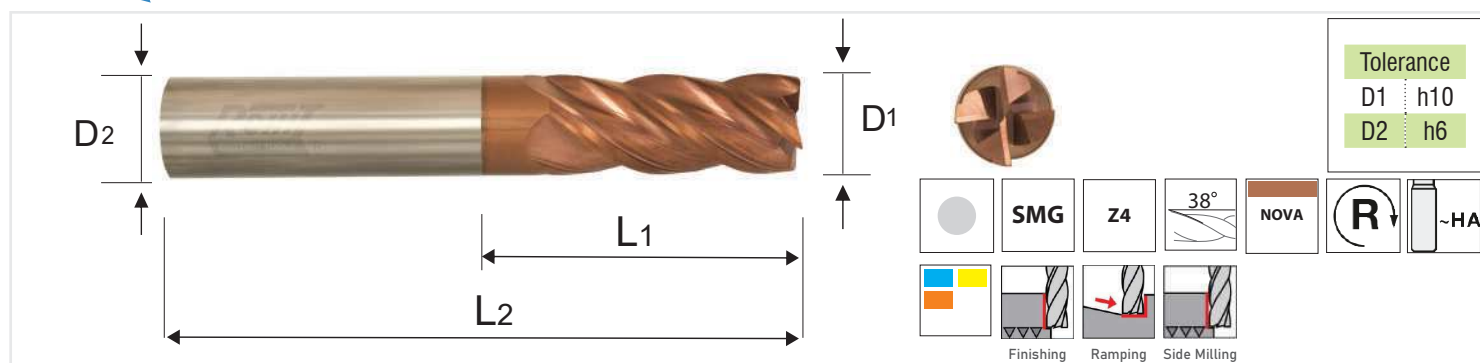


Summary

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

Result

More than 75% improvement in Life



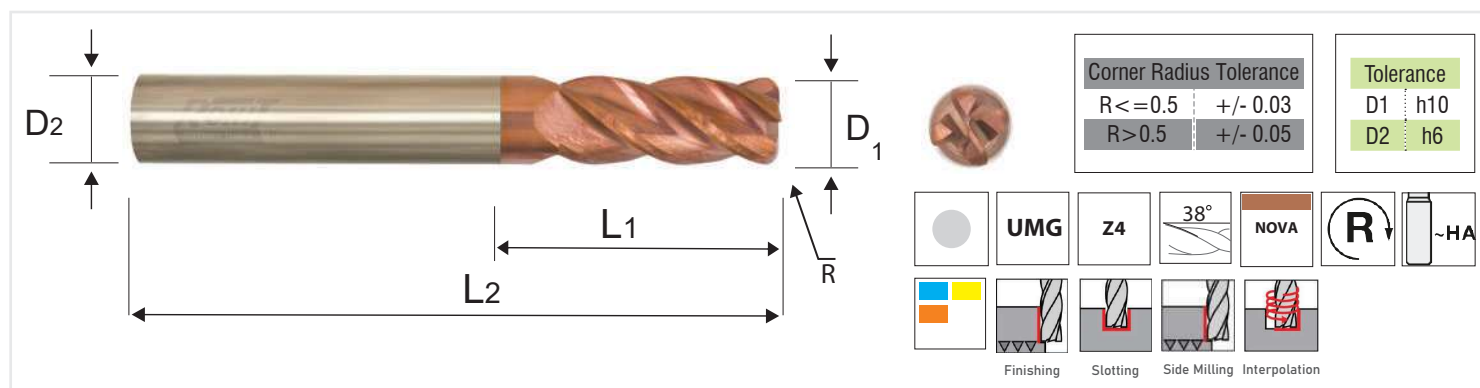
Features:

- Best suited for milling all types of Alloy Steel & Stainless Steel (SUS)
- High Wear Resistance NOVA coating
- Excellent performance in machining of Orthotropic Material like SS-316L

Item Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)				
CR1AHSE00LH3	3.0	12	20	6.0				
CR1AHSE00SL7	3.0	12	25	6.0				
CR1AHSE00MR0	3.5		100	6.0				
CR1AHSE00MS7	4.0		60	8.0				
CR1AHSE00LJ8	4.0		50	8.0				
CR1AHSE00MT5	4.0		40	8.0				
CR1AHSE00MU3	4.0		30	10.0				
CR1AHSE00MV1	4.5		10.0	40	100	10.0		
CR1AHSE00PE5	5.0		38	12.0	30	75	12.0	
CR1AHSE00MJ7	5.0	16	100LT6	12.0	40	100	12.0	
CR1AHSE00N37	5.5	16	CR1AHSE00LU4	14.0	40	100	14.0	
CR1AHSE00MW9	5.5	25	75	CR1AHSE00LV2	16.0	50	100	16.0
CR1AHSE00MX6	5.5	35	100	CR1AHSE00LW0	20.0	50	100	20.0
CR1AHSE00LK6	6.0	16	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
1 st	1 st	2 nd	1 st	2 nd			1 st	1 st	2 nd			2 nd			

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-147



Features:

- Best suited for milling all types of Alloy Steel & Stainless Steel (SUS)
- Gives optimum performance on Finishing application with lower Ae (WOC) & High Feed

Item Code	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

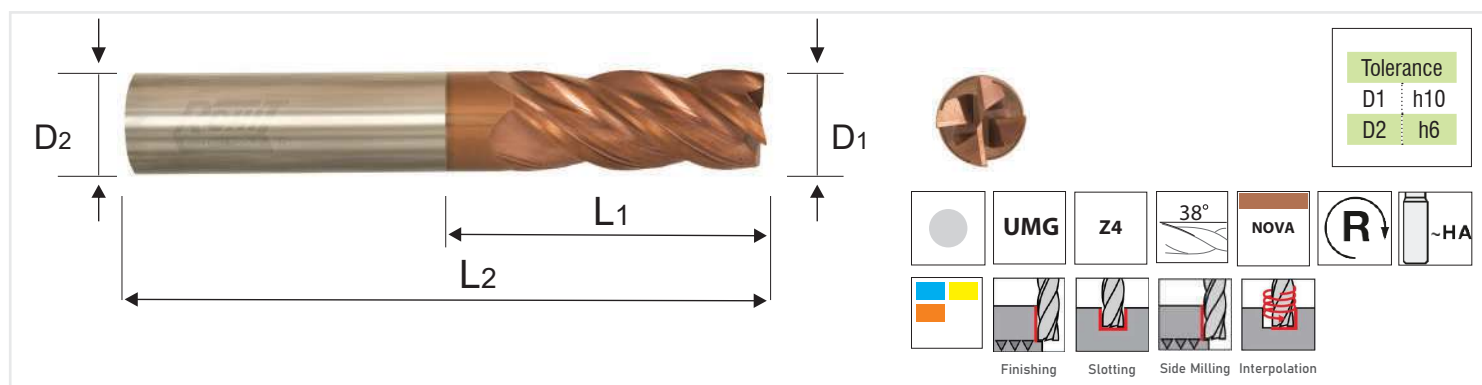
Item Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)	Corner Radius(R)
CR3AHCR00A1	12	30	75	12	1.50
CR3AHCR00C7	12	40	100	12	1.50
CR3AHCR00U7	14	40	100	14	2.00
CR3AHCR00Y8	16	40	100	16	1.00
CR3AHCR00V5	16	40	100	16	2.00
CR3AHCR00W3	18	40	100	18	2.00
321200100R2.0-N	20	50	100	20	2.00



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-147

Selection-Guide



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

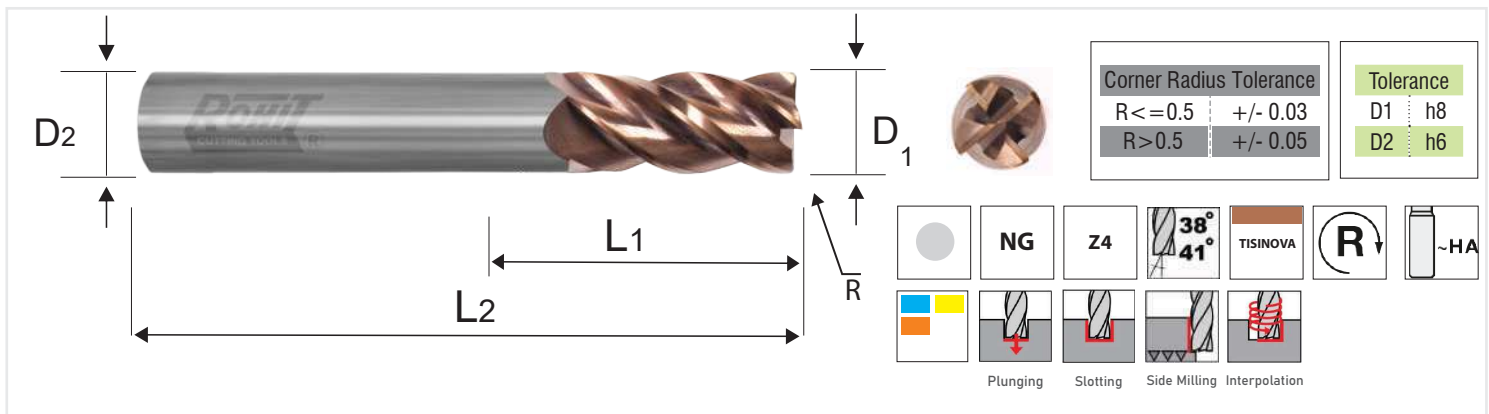
Item Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR3AHSE00LZ9	3	12	50	4
CR3AHSE00M00	4	16	50	6
CR3AHSE00PF9	4	20	75	6
CR3AHSE00MK1	5	16	50	6
CR3AHSE00M18	6	16	50	6
CR3AHSE00M26	6	25	75	6
CR3AHSE00M34	8	20	60	8
CR3AHSE00M42	8	30	75	8
CR3AHSE00M59	8	40	100	8

Item Code	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
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-147

Selection-Guide



Features:

- Variable Lead Geometry & Unequal Indexing design for chatter free milling operations
- 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 with advanced TISINOVA coating ensures longer tool life

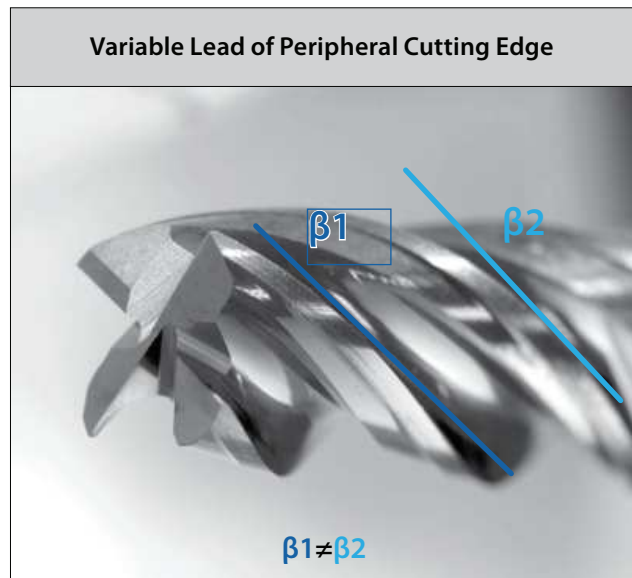
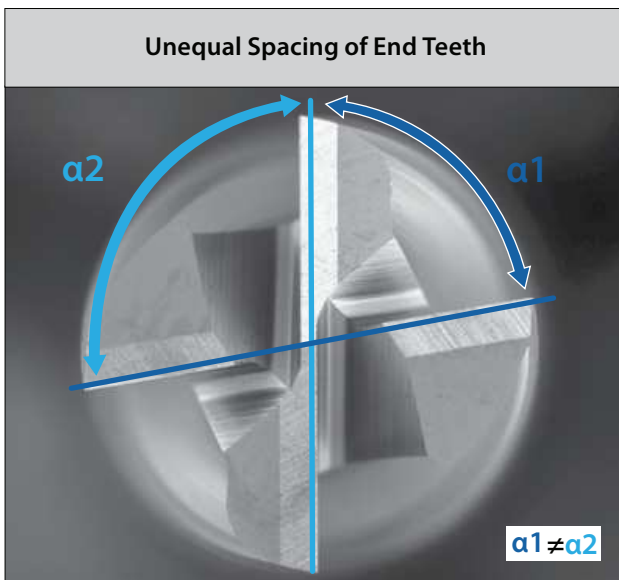
Item Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)	Corner Radius(R)
CR4SHVH00257	3	10	50	4	R0.2
CR4SHVH001W4	4	12	50	6	R0.3
CR4SHVH001X1	5	14	50	6	R0.3
CR4SHVH001Y9	6	16	63	6	R0.3
CR4SHVH001Z7	8	19	63	8	R0.5
CR4SHVH00208	10	22	72	10	R0.5
CR4SHVH00216	12	26	76	12	R0.75
CR4SHVH00224	14	30	80	14	R0.75
CR4SHVH00232	16	32	92	16	R0.75
CR4SHVH00240	20	38	100	20	R0.75

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

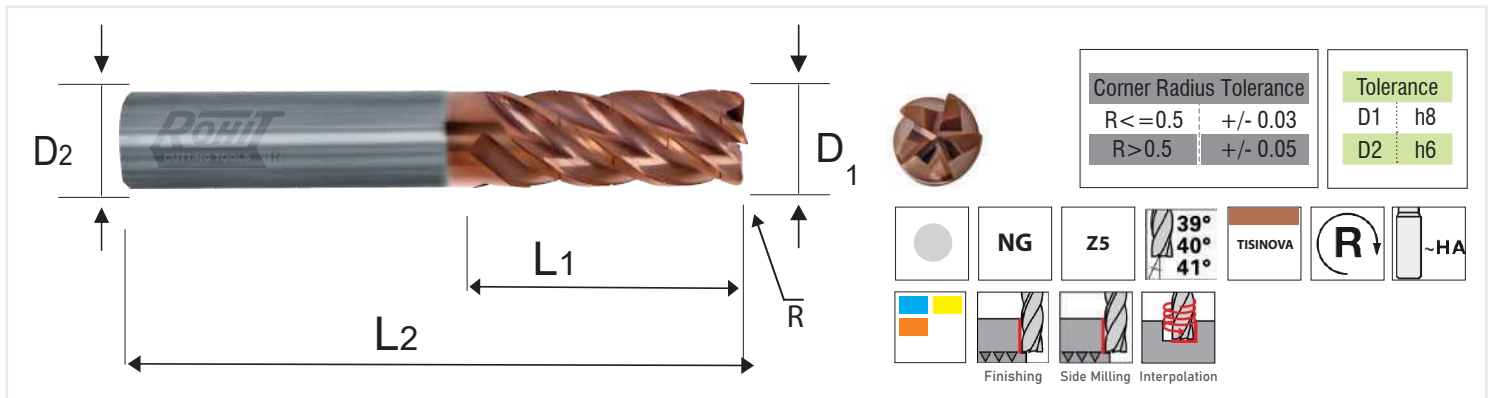
[Read more on rigpl.com/blog](http://rigpl.com/blog)



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: FOR FEED & SPEED Rates, go to page no. PG-149

Selection-Guide



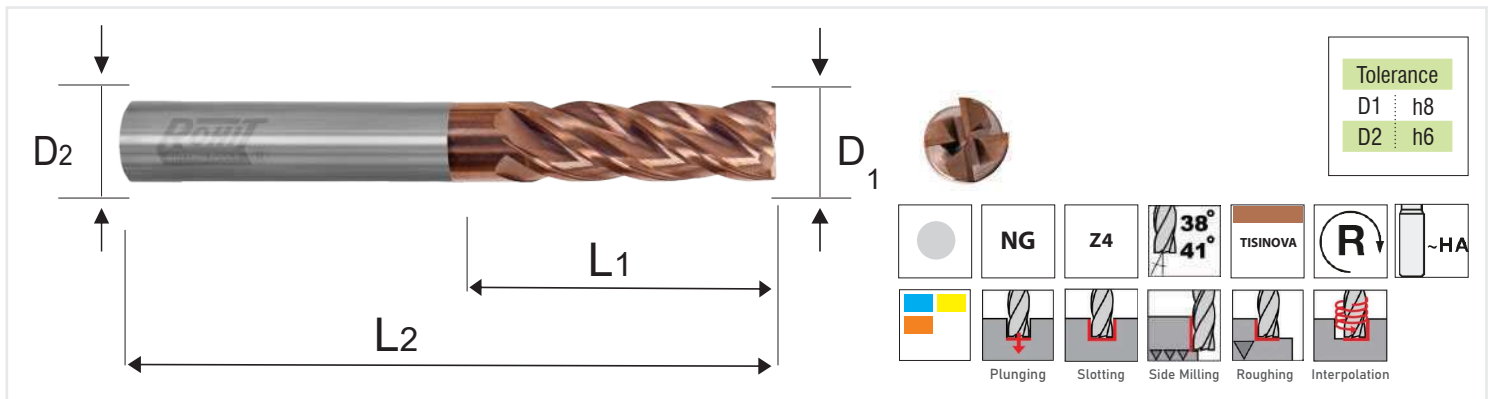
Features:

- Variable Lead Geometry combined with Unequal for chatter free milling operations on all types material
- Capable of machining wide range of Exotic material like Titanium & Nickle Chromium Alloys
- Nano Grain Carbide with advanced TISINOVA coating 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-XTN	6	12	63	6	R0.3
433080063-XTN	8	16	63	8	R0.5
433100072-XTN	10	22	72	10	R0.5
433120076-XTN	12	26	76	12	R0.75
433140080-XTN	14	26	80	14	R0.75
433160092-XTN	16	32	92	16	R0.75
433200100-XTN	20	38	100	20	R0.75

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	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-149



Features:

- Variable Lead Geometry & Unequal Indexing design for Chatter free milling operations
- Long Flute Lengths with Variable Helix helps in High Efficiency Milling like Trochoidal milling
- High DOC for effective material removal at very high Speeds and Feeds
- Capable of machining wide range of Exotic materials like NiCr Alloys, Inconel, SS-316L, Duplex Stainless Steel
- TISINOVA Coating with Nano Fine Grain for achieving higher tool life on difficult to machine material

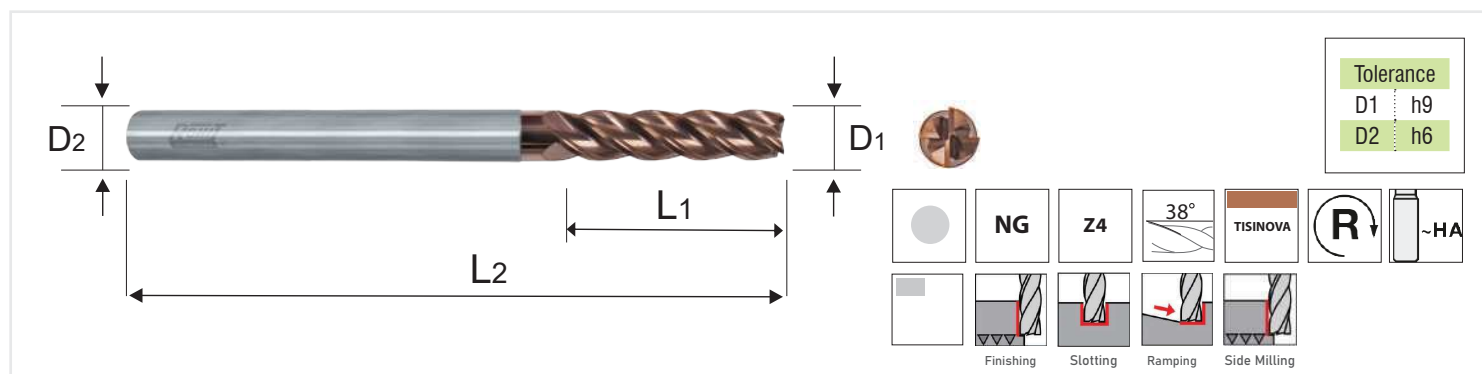
Item Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR4SHVH00265	3	12	50	4
CR4SHVH00273	4	14	50	6
CR4SHVH00281	5	16	50	6
CR4SHVH00299	6	18	50	6
CR4SHVH002A1	6	25	75	6
CR4SHVH002B9	6	30	100	6
CR4SHVH002C7	8	20	60	8
CR4SHVH002D4	8	30	75	8
CR4SHVH002E2	8	40	100	8

Item Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR4SHVH002F0	10	30	75	10
CR4SHVH002G8	10	45	100	10
CR4SHVH002H6	12	30	75	12
CR4SHVH002J1	12	45	100	12
CR4SHVH002K9	14	50	100	14
CR4SHVH002L7	16	50	100	16
CR4SHVH002M5	18	50	100	18
CR4SHVH002N2	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
		1 st	1 st	1 st	1 st	1 st		1 st	1 st	1 st					

NOTE: FOR FEED & SPEED Rates, go to page no. PG-149

Selection-Guide



Features:

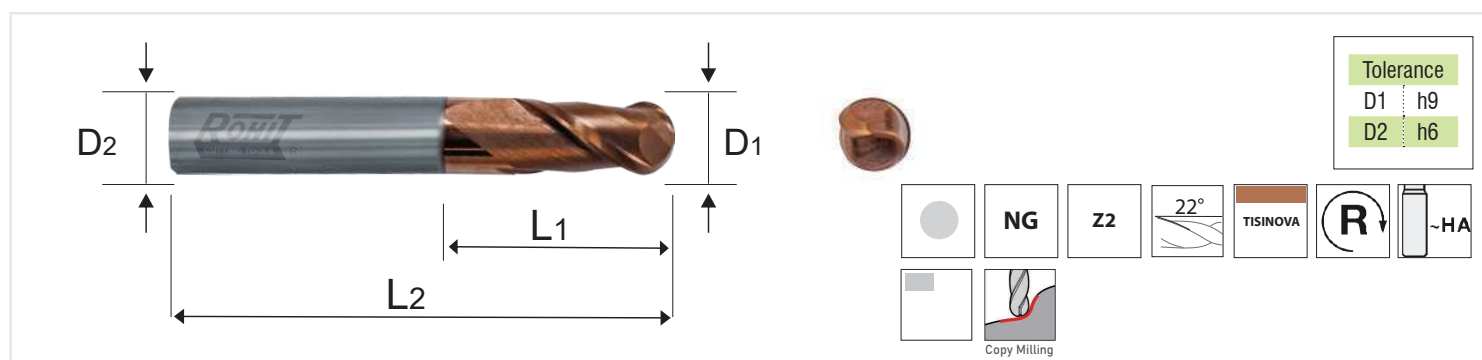
- High Performance Carbide End Mills for Die-Mould Industry
- Best suited for milling up to 65-HRC hardened die steel & tool steel like D2, D3, H13 etc
- Twice the Tool life in comparison to 301 Series Carbide End mills
- Nano Grain Carbide with Advanced TISINOVA Coating in a special 4-Flute design to achieve High Parameters in Hard Materials
- Provides accuracy in important finishing applications in Die and Moulds

Item Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR4SHSE00V92	1	2	50	4
CR4SHSE00VA4	1.5	3	50	4
CR4SHSE00VB2	2	4	50	4
CR4SHSE00VC0	2.5	6	50	4
CR4SHSE00VD7	3	10	50	4
CR4SHSE00VE5	4	12	50	4
CR4SHSE00VF3	4	20	75	4
CR4SHSE00VG1	6	16	50	6
CR4SHSE00VH9	6	25	75	6
CR4SHSE00VJ4	8	20	60	8

Item Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR4SHSE00VK2	8	25	75	8
CR4SHSE00VL0	8	35	100	8
CR4SHSE00VM8	10	25	75	10
CR4SHSE00VN5	10	40	100	10
CR4SHSE00VP1	12	25	75	12
CR4SHSE00VQ9	12	40	100	12
CR4SHSE00VR7	14	40	100	14
CR4SHSE00VS4	16	40	100	16
401180100-TS	18	40	100	18
401200100-TS	20	40	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
									1 st	1 st					

NOTE: FOR FEED & SPEED Rates, go to page no. PG-150



Features:

- High Performance Carbide Ball Nose for Die-Mould Industry
- Best suited for milling up to 65-HRC hardened die steel & tool steel like D2, D3, H13 etc
- Twice the Tool life in comparison to 304 Series Carbide Ball nose
- Nano Grain Carbide with Advanced TISINOVA Coating in a special 2-Flute design to achieve High Parameters in Hard Materials
- Provides accuracy in important finishing applications in Die and Moulds

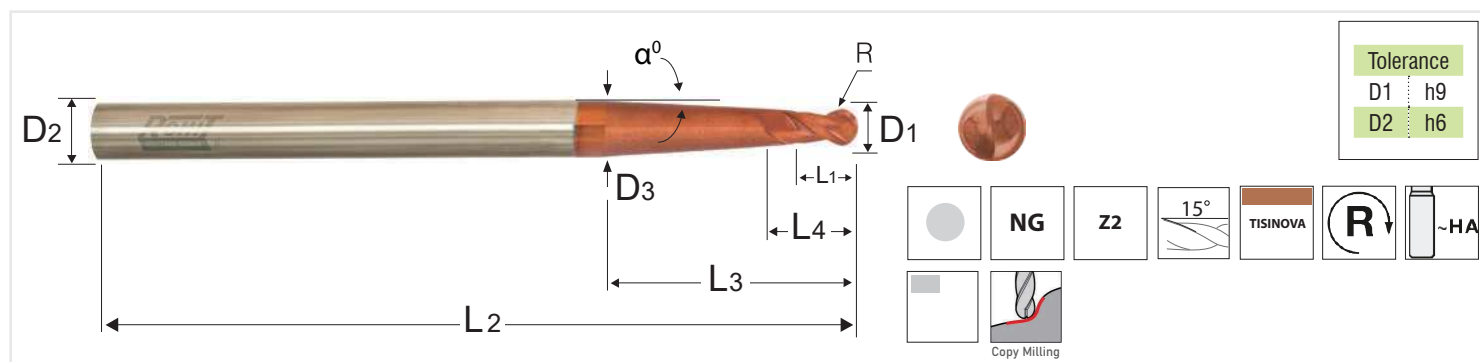
Item Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR4SHBE00H77	1	2	50	4
CR4SHBE00H85	1.5	3	50	4
CR4SHBE00H93	2	4	50	4
CR4SHBE00HA5	2.5	6	50	4
CR4SHBE00HB3	3	8	50	4
CR4SHBE00HC1	4	10	50	4
CR4SHBE00HD8	4	10	75	4
CR4SHBE00HE6	6	12	50	6

Item Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR4SHBE00HF4	6	12	75	6
CR4SHBE00HG2	8	16	60	8
CR4SHBE00HH0	8	16	75	8
CR4SHBE00HJ5	8	16	100	8
CR4SHBE00HK3	10	20	75	10
CR4SHBE00HL1	10	20	100	10
CR4SHBE00HM9	12	25	75	12
CR4SHBE00HN6	12	25	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	1 st					

NOTE: FOR FEED & SPEED Rates, go to page no. PG-150

Selection-Guide

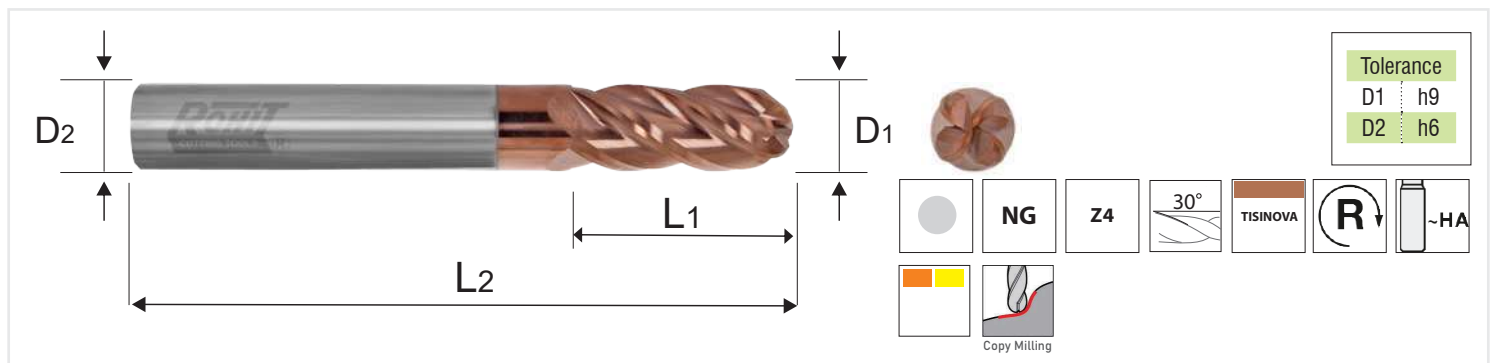


Features:

- Advanced TISINOVA Coating with Nano Grain Carbide
- Suitable for machining Hardened dies & tool steel material upto 65 HRc
- Higher Feeds & Reduced cycle time
- For deep pocketing or deep reach application
- 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°)
4060202306006-TN	1	2	4	6	23	60	6	2.9	1°30'
4060203606006-TN	1	2	4	6	36	60	6	5	5°
4060204108006-TN	1	2	4	6	41	80	6	5.7	3°
4060303207506-TN	1.5	3	6	8	32	75	6	5.6	3°
4060305209006-TN	1.5	3	6	8	52	90	6	5.3	1°30'
4060402807506-TN	2	4	8	10	28	75	6	6	3°
4060404909006-TN	2	4	8	10	49	90	6	6	1°30'
4060504108008-TN	2.5	5	10	12	41	80	8	8	3°
4060505110008-TN	2.5	5	10	12	51	100	8	7	1°30'
4060603408008-TN	3	6	12	15	34	80	8	8	3°
4060605310008-TN	3	6	12	15	53	100	8	8	1°30'
4060803608010-TN	4	8	14	17	36	80	10	10	3°
4060805510010-TN	4	8	14	17	55	100	10	10	1°30'
4061004008012-TN	5	10	18	21	40	80	12	12	3°
4061005910012-TN	5	10	18	21	59	100	12	12	1°30'
4061206311016-TN	6	12	22	25	63	110	16	16	3°
4061208313016-TN	6	12	22	25	83	130	16	15	1°30'

NOTE: This is Non-stock Item, ask your RIGPL representative for Delivery Period
 FOR FEED & SPEED Rates, go to page no. PG-150
 For Material Selection Table, refer Series: C402



Features:

- High Performance Carbide Ball Nose for Aerospace, Oil & Gas Industry
- Best suited for milling Super Alloys like NiCr alloys, Titanium alloys, Martensitic Stainless steel
- Exceptional Performance at High Speed & Feed
- Nano Grain Carbide with Advanced TISINOVA Coating in a special 4-Flute design to give Best Performance in materials like INCONNEL & DUPLEX SS

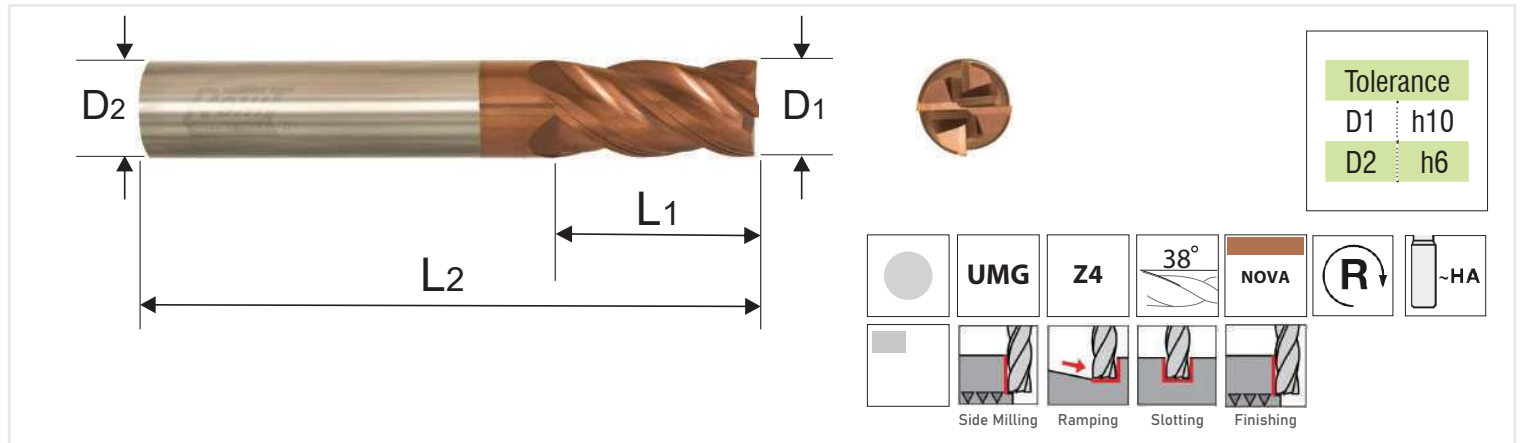
Item Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR4SHBE00HP2	3	10	50	4
CR4SHBE00HQ0	4	12	50	4
CR4SHBE00HR8	4	20	75	4
CR4SHBE00HS5	5	14	50	6
CR4SHBE00HT3	6	18	50	6
CR4SHBE00HU1	6	25	75	6
CR4SHBE00HV9	8	20	60	8
CR4SHBE00HW7	8	25	75	8

Item Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR4SHBE00HX4	8	35	100	8
CR4SHBE00HY2	10	25	75	10
CR4SHBE00HZ0	10	40	100	10
CR4SHBE00J00	12	30	75	12
CR4SHBE00J18	12	40	100	12
CR4SHBE00J26	14	40	100	14
CR4SHBE00J34	16	40	100	16
423180100-TN	18	40	100	18
423200100-TN	20	40	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
			1 st	1 st	1 st	1 st			2 nd	2 nd					

NOTE: FOR FEED & SPEED Rates, go to page no. PG-153

Selection-Guide



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

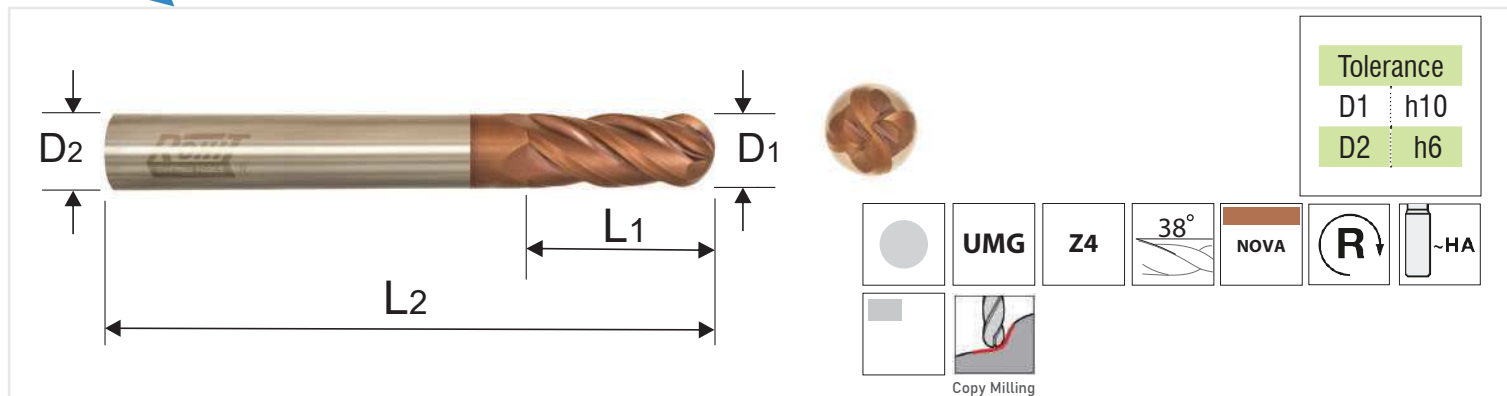
Item Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR3AHSE00PA0	1.0	3	50	4
CR3AHSE00PB8	1.5	3	50	4
CR3AHSE00PC6	2.0	6	50	4
CR3AHSE00PD3	2.5	8	50	4
CR33HSE003A3	3.0	15	50	3
CR33HSE003C9	3.0	20	75	3
CR33HSE00FY1	3.0	25	100	3
CR33HSE003D6	4.0	14	50	4
CR33HSE003F2	4.0	20	75	4
CR33HSE00FN5	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	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-151



Features:

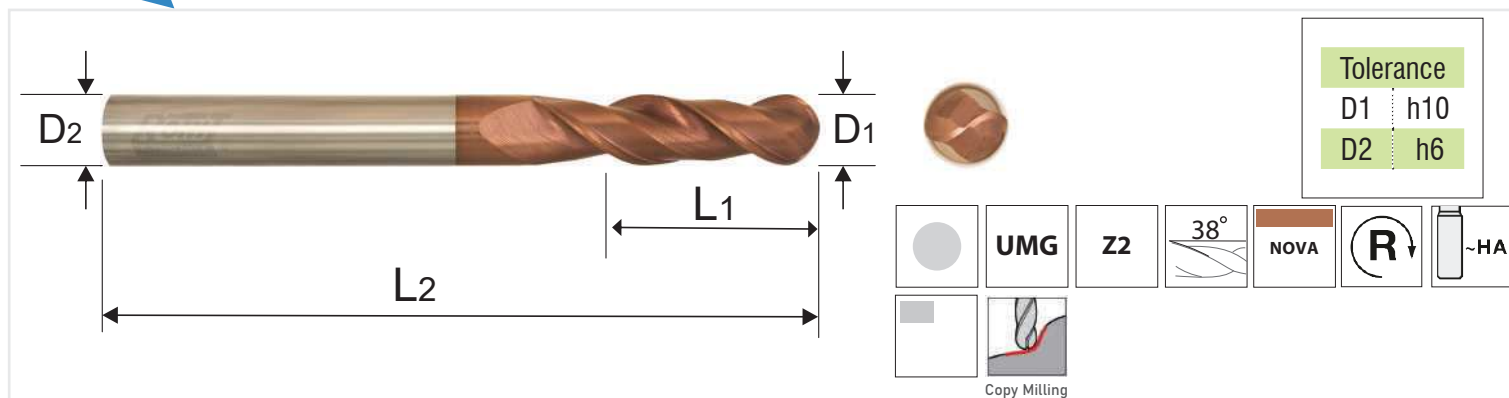
- High Wear Resistance NOVA coating
- Excellent for machining Hardened dies & tool steel material ranging from 55 ~ 60 HRC
- Specially designed tools to provide effective material removal and higher surface finish of Moulds
- Also recommended for machining Stainless Steel material

Item Code	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	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	1 st	2 nd			1 st		1 st	2 nd					

NOTE: FOR FEED & SPEED Rates, go to page no. PG-153



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

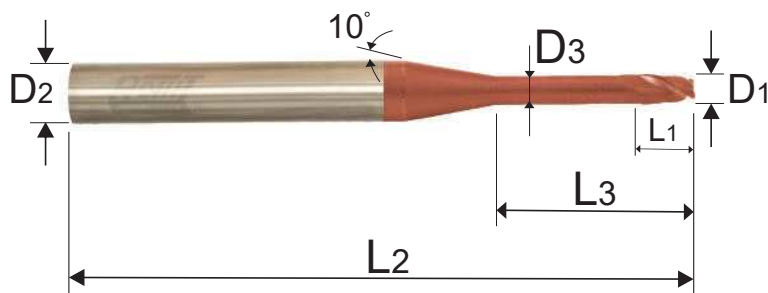
Item Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR33HBE008R8	1.0	3	50	4
CR3AHBE00E39	1.5	3	50	4
CR3AHBE00E47	2.0	4	50	4
CR3AHBE00E54	2.5	5	50	4
CR33HBE00BR8	3.0	15	50	3
CR33HBE00AT4	3.0	20	75	3
CR33HBE00B51	3.0	25	100	3
CR33HBE00315	4.0	14	50	4
CR33HBE00AU2	4.0	20	75	4
CR33HBE00B69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

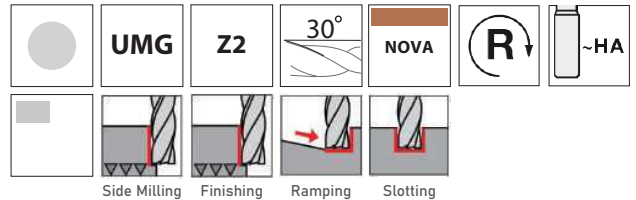
Carbon Steels BHN 180 to 225	Alloy Steels BHN 225 to 355	Pre-hardened Steels HRc 40 to 45	Austenitic Stainless Steel	Precipitation Hardened Stainless Steel	Titanium	HighTemp. Alloy	Grey Cast Iron	Ductile Cast Iron	Hardened Steels HRc 45 to 55	High Hardened Steels HRc 55 to 70	Aluminum	Aluminum Alloys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

NOTE: FOR FEED & SPEED Rates, go to page no. PG-153

Selection-Guide



Tolerance	
D1	h10
D2	h6

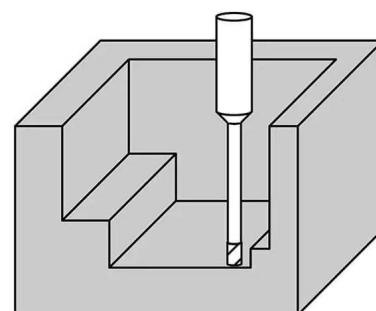


Features:

- 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	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	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

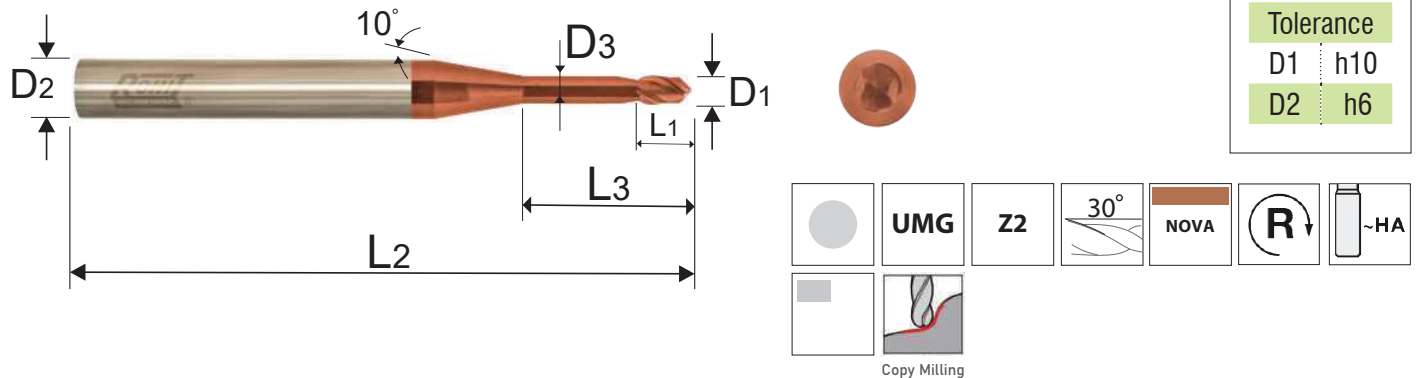


In-Depth machining with 305 and 306 series Rib Endmills & Ballnose helps in Effective machining and less chances of Tool breakage

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			1 st

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

Selection-Guide

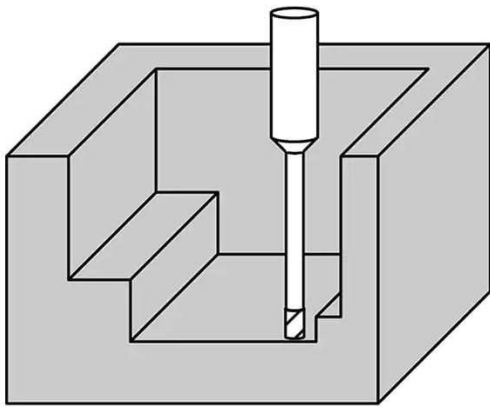


Features:

- 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	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	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



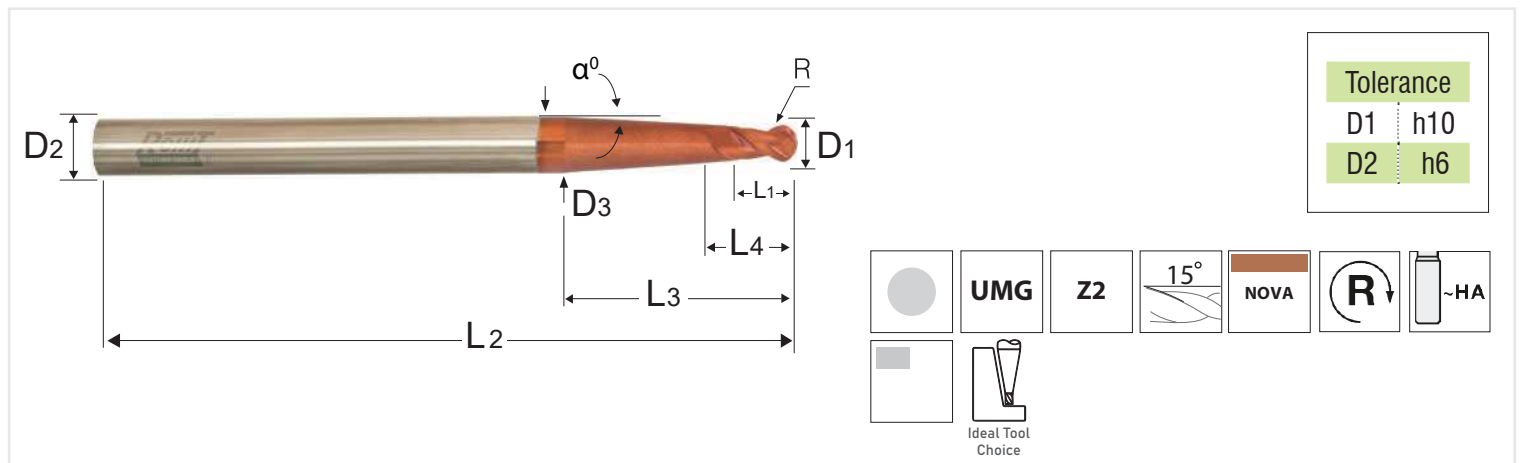
In-Depth machining with 305 and 306 series Rib Endmills & Ballnose helps in Effective machining and less chances of Tool breakage



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-153



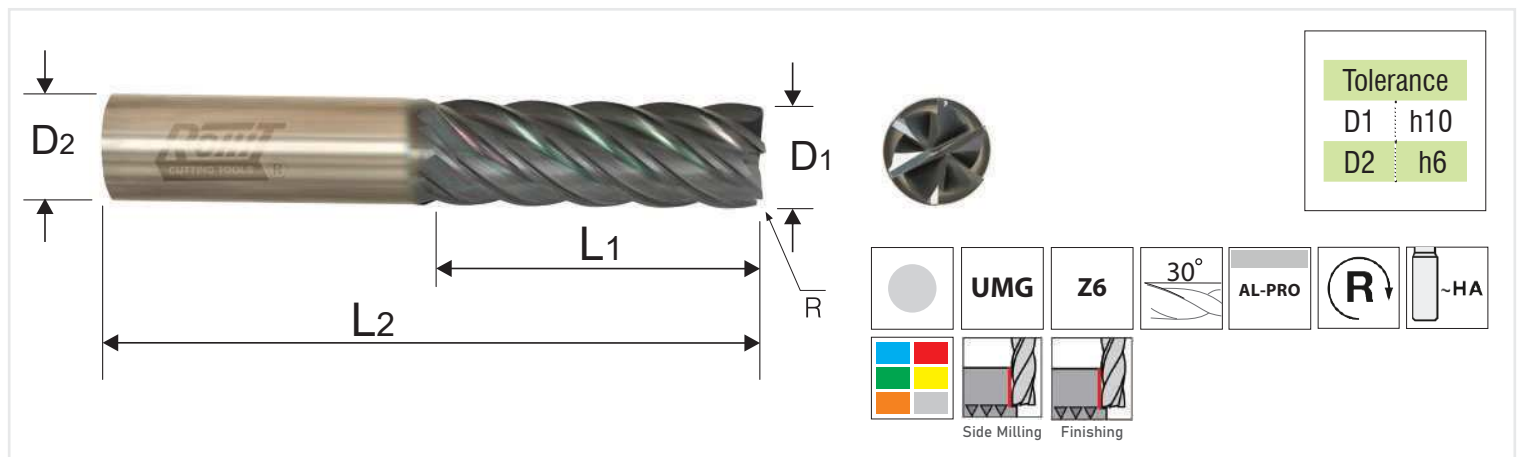
Features:

- 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)
CR3AHBE00J42	2	4	6	23	60	6	2.9	1°30'
CR3AHBE00J59	2	4	6	23	60	6	5	5°
CR3AHBE00J67	2	4	6	41	80	6	5.7	3°
CR3AHBE00G37	3	6	8	32	75	6	5.6	3°
CR3AHBE00J75	3	6	8	52	90	6	5.3	1°30'
CR3AHBE00G45	4	8	10	28	75	6	6	3°
CR3AHBE00J83	4	8	10	49	90	6	6	1°30'
CR3AHBE00J91	5	10	12	41	80	8	8	3°
CR3AHBE00JA3	5	10	12	51	100	8	7	1°30'
CR3AHBE00G60	6	12	15	34	80	8	8	3°
CR3AHBE00G52	6	12	15	53	100	8	8	1°30'
CR3AHBE00JB1	8	14	17	36	80	10	10	3°
CR3AHBE00JC9	8	14	17	55	100	10	10	1°30'
CR3AHBE00JD6	10	18	21	40	80	12	12	3°
CR3AHBE00JE4	10	18	21	59	100	12	12	1°30'
CR3AHBE00JF2	12	22	25	63	110	16	16	3°
CR3AHBE00JG0	12	22	25	83	150	16	15	1°30'

Refer Page Pg-107 for Material Selection

NOTE: FOR FEED & SPEED Rates, go to page no. PG-153



Features:

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

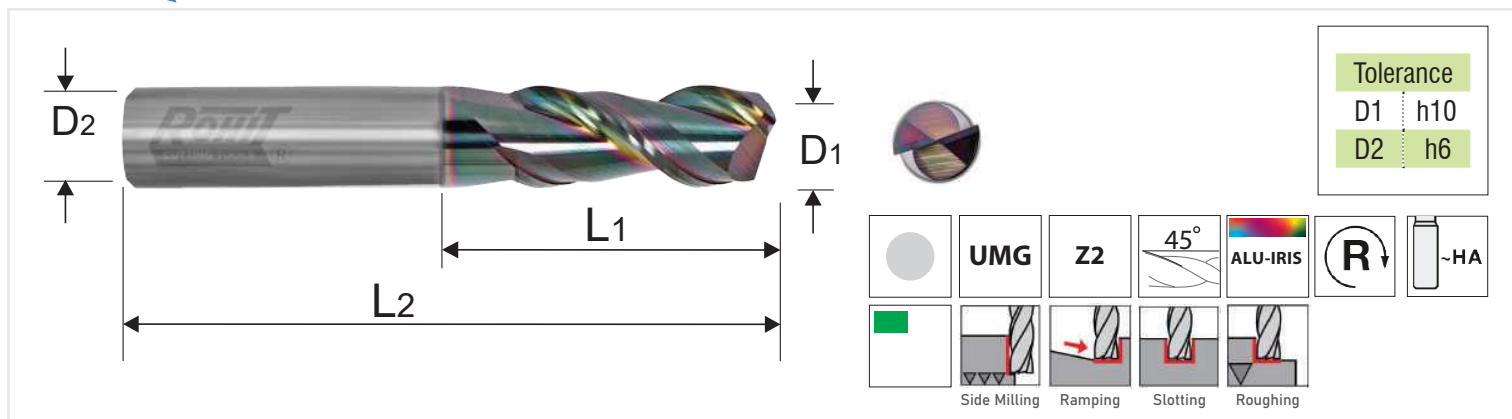
Ordering Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
308060075R0.5-A	6	25	75	R0.5
308060075R1.0-A	6	25	75	R1.0
308080075R0.5-A	8	25	75	R0.5
308080075R1.0-A	8	25	75	R1.0
308080075R1.5-A	8	25	75	R1.5
308100075R0.5-A	10	30	75	R0.5
308100075R1.0-A	10	30	75	R1.0
308100075R1.5-A	10	30	75	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
1 st	1 st	1 st	1 st	1 st	1 st	2 nd	1 st	1 st	1 st	2 nd	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

Selection-Guide



Features:

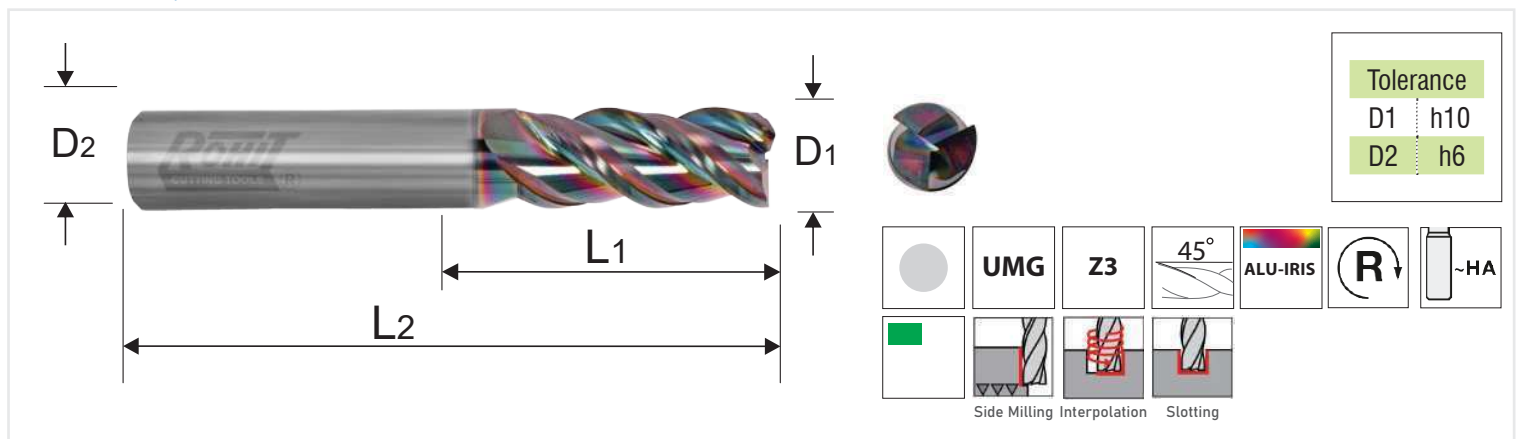
- High Performance Carbide Endmill in 2-flute for Aluminium alloys
- Best suited for milling Aluminium and AL-Alloys with Higher Silicon content
- Exceptional Performance and Finishing with higher DOCs at High Speed & Feed
- Ultra Fine Grain Carbide with ALU-IRIS Coating in a special 2-Flute design to give Best Performance in materials like T6-Aluminium, 6061-AL-Alloy

Ordering Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
311020050-M	2	6	50	4
311030050-M	3	12	50	3
311040050-M	4	14	50	4
311040075-M	4	25	75	4
311040100-M	4	30	100	4
311050050-M	5	16	50	5
311050075-M	5	25	75	5
311050100-M	5	35	100	5
311060050-M	6	18	50	6
311060075-M	6	30	75	6

Ordering Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
311060100-M	6	35	100	6
311080060-M	8	20	60	8
311080075-M	8	30	75	8
311080100-M	8	40	100	8
311100075-M	10	30	75	10
311100100-M	10	50	100	10
311120075-M	12	30	75	12
311120100-M	12	50	100	12
311140100-M	14	50	100	14
311160100-M	16	50	100	16
311200100-M	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

NOTE: FOR FEED & SPEED Rates, go to page no. PG-157



Features:

- High Performance Carbide Endmill in 3-flute for Aluminium alloys
- Best suited for milling AL-Alloys with >8% Silicon content
- ALU-IRIS Coated combined with Ultra Fine Grain Carbide in a special 3-Flute design

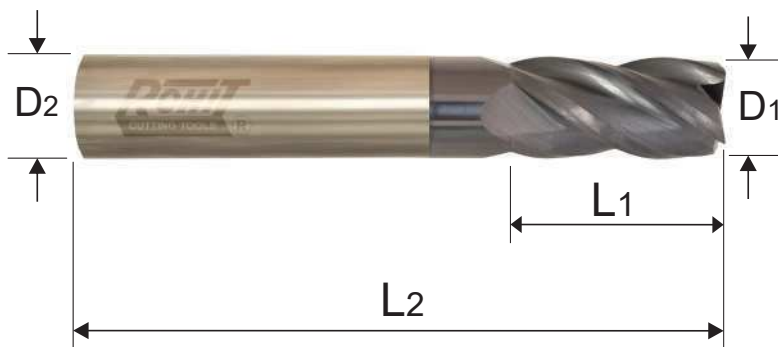
Ordering Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
313020050-M	2	6	50	4
313030050-M	3	12	50	3
313040050-M	4	14	50	4
313040075-M	4	25	75	4
313040100-M	4	30	100	4
313050050-M	5	16	50	5
313050075-M	5	25	75	5
313050100-M	5	35	100	5
313060050-M	6	18	50	6
313060075-M	6	30	75	6
313060100-M	6	35	100	6

Ordering Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
313080060-M	8	20	60	8
313080075-M	8	30	75	8
313080100-M	8	40	100	8
313100075-M	10	30	75	10
313100100-M	10	50	100	10
313120075-M	12	30	75	12
313120100-M	12	50	100	12
313140100-M	14	50	100	14
313160100-M	16	50	100	16
313200100-M	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

NOTE: FOR FEED & SPEED Rates, go to page no. PG-157

Selection-Guide



Tolerance

D1 h10

D2 h6



Side Milling

Ramping

Slotting

Finishing

Features:

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

Item Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR11GSE009A5	3	15		8
CR11GSE009B3	3	20		9
CR11GSE009C1	3	25		10
CR11GSE009E6	4	14		10
CR11GSE009G2	4	20	75	10
CR11GSE009H0	4	25	100	10
CR11GSE009J5	5	16	50	11
CR11GSE009K3	5	20	75	12
CR11GSE009L1	5	25	100	12
CR11GSE009Q0	6	16	50	12
CR11GSE009R8	6	25	75	12
CR11GSE009S5	6	30	100	13
CR11GSE009T3	6	50	150	14
CR11GSE009X4	7	20	60	14
CR11GSE00A04	8	20	60	14
CR11GSE00A12	8	25	75	14
CR11GSE00A20	8	30	100	16
CR11GSE00A38	8	50	150	16



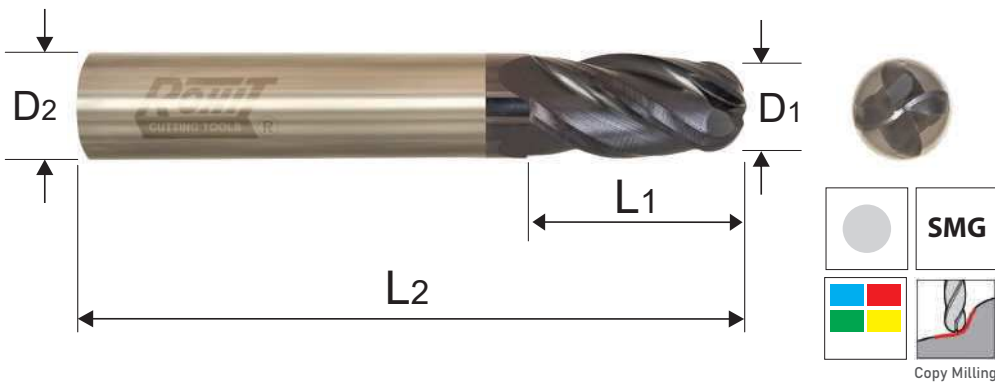
Item Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR11GSE00AK5	16	60	150	16
CR11GSE00AL3	16	60	200	16
CR11GSE00AM1	18	40	100	18
CR11GSE00AN8	18	60	150	18
CR11GSE00AP4	18	60	200	18
CR11GSE00AQ2	20	40	100	20

Item Code	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-157



Tolerance

D1 h10

D2 h6



SMG

Z4



30°



TIALN



~HA



Copy Milling

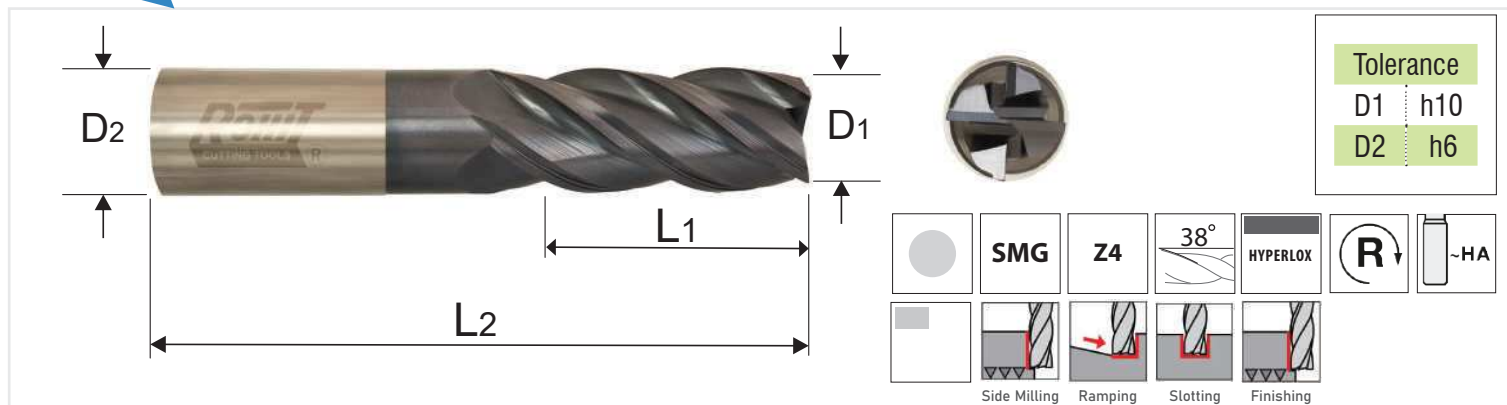
Features:

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

Cast Iron & Non-ferrous material

Item Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)	Item Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR11GBE007H9	3	15	50	3	CR11GBE007H9	12	25	75	12
CR11GBE007J4	3	20	50	3	CR11GBE007J4	12	40	100	12
CR11GBE007K2	3	25	50	3	CR11GBE007K2	12	60	150	12
CR11GBE007L0	4	15	50	4	CR11GBE007L0	12	60	200	12
CR11GBE007M8	4	20	50	4	CR11GBE007M8	14	30	75	14
CR11GBE007N5	4	25	50	4	CR11GBE007N5	14	40	100	14
CR11GBE007P1	5	16	50	5	CR11GBE007P1	14	60	150	14
CR11GBE007Q9	5	20	75	5	CR11GBE007Q9	14	60	200	14
CR11GBE007R7	5	25	100	5	CR11GBE007R7	16	30	75	16
CR11GBE007S4	6	16	50	6	CR11GBE007S4	16	40	100	16
CR11GBE007T2	6	25	75	6	CR11GBE007T2	16	60	150	16
CR11GBE007U0	6	30	100	6	CR11GBE007U0	16	60	200	16
CR11GBE007V8	6	50	150	6	CR11GBE007V8	18	40	100	18
CR11GBE007W6	7	20	60	7	CR11GBE007W6	18	60	150	18
CR11GBE007X3	8	20	60	8	CR11GBE007X3	18	60	200	18
CR11GBE007Y1	8	25	75	8	CR11GBE007Y1	20	40	100	20
CR11GBE007Z9	8	30	100	8	CR11GBE007Z9	20	60	150	20
CR11GBE00800	8	50	150	8	CR11GBE00800	20	60	200	20
CR11GBE00818	9	25	75	9	CR11GBE00818	25	40	100	25
CR11GBE00826	10	25	75	10	CR11GBE00826	25	60	150	25
CR11GBE00834	10	40	100	10	CR11GBE00834	25	60	200	25
CR11GBE00842	10	60	150	10	CR11GBE00842	25	60	200	25

Refer Page Pg-113 for Material Selection



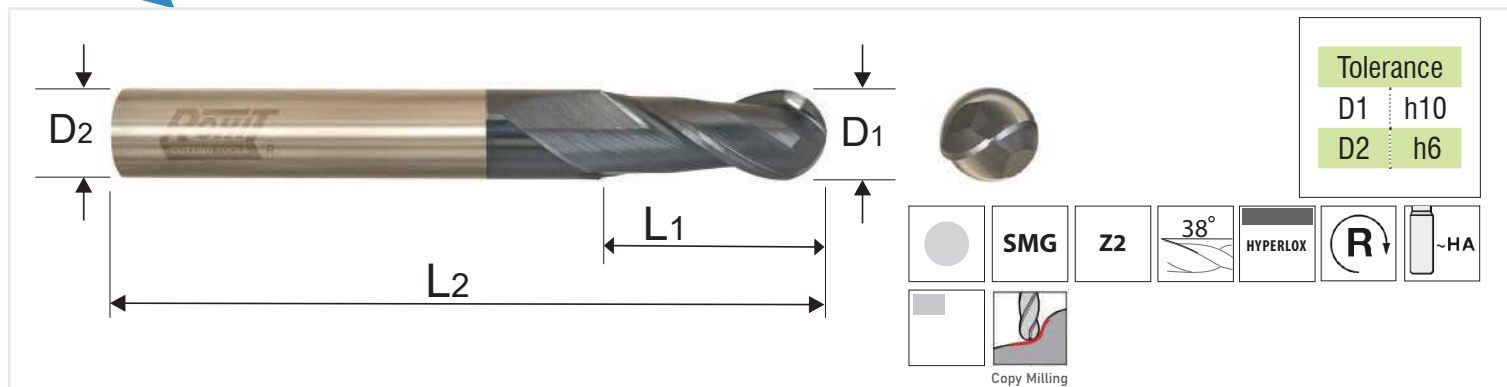
Features:

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

Item Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)	Item Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR16GSE00N14	1	3	50	4	CR16GSE00JA3	6	30	100	6
CR16GSE00N22	1.5	4	50		CR16GSE00J1	6	50	150	6
CR16GSE00HX4	2	6	50		CR16GSE00J8	8	20	60	8
CR16GSE00HY2	2.5	8			CR16GSE00J3		30	100	8
CR16GSE00HZ0	3	12			CR16GSE00J5	8	50	150	8
CR16GSE00J00	3	2			CR16GSE00J10	10	25	75	10
CR16GSE00J18	3	25			CR16GSE00JG0	10	40	100	10
CR16GSE00J26	4	14			CR16GSE00JH8	10	50	150	10
CR16GSE00J34	4	20	75		CR16GSE00JJ3	12	25	75	12
CR16GSE00J42	4	25	100		CR16GSE00JK1	12	40	100	12
CR16GSE00J59	5	16	50	5	CR16GSE00JL9	12	50	150	12
CR16GSE00J67	5	20	75	5	CR16GSE00JM7	16	40	100	16
CR16GSE00J75	5	25	100	5	CR16GSE00JN4	16	50	150	16
CR16GSE00J83	6	16	50	6	CR16GSE00JP0	20	40	100	20
CR16GSE00J91	6	25	75	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
2 nd	1 st	2 nd							1 st						

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



Features:

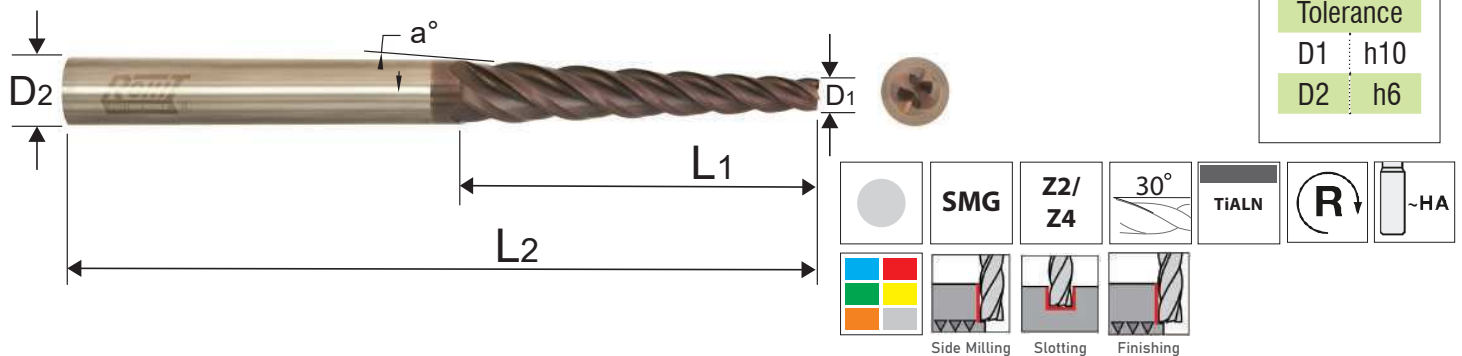
- For Machining Pre-Heat Treated Steels like P20, D2 upto HRc 40-45
- Specially Designed 2-Flute Ballnose for Pre-Hardened materials
- High Quality Coating for Higher Tool life

Item Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)	Item Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR16GBE00CJ7	1	3	50		CR16GBE00CY4	6	25	75	6
CR16GBE00CK5	1.5	4	50		CR16GBE00D45	6	30	100	6
CR16GBE00CL3	2	6	50		CR16GBE00D52	6	40	150	6
CR16GBE00CM1	2.5	8	50		CR16GBE00D60	8	20	60	8
CR16GBE00CN8	3	12	50		CR16GBE00D78	8	30	100	8
CR16GBE00CP4	3	20	50		CR16GBE00D86	8	50	150	8
CR16GBE00CQ2	3	25	50		CR16GBE00D94	10	25	75	10
CR16GBE00CR0	4	16	50		CR16GBE00DA6	10	40	100	10
CR16GBE00CS7	4	20	75		CR16GBE00DB4	10	50	150	10
CR16GBE00CT5	4	25	100						
CR16GBE00CU3	5	16	50	5					
CR16GBE00CV1	5	20	75	5					
CR16GBE00CW9	5	25	100	5					
CR16GBE00CX6	6	16	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
1st	1st	2nd							1st						

NOTE: FOR FEED & SPEED Rates, go to page no. PG-153

Selection-Guide



Features:

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

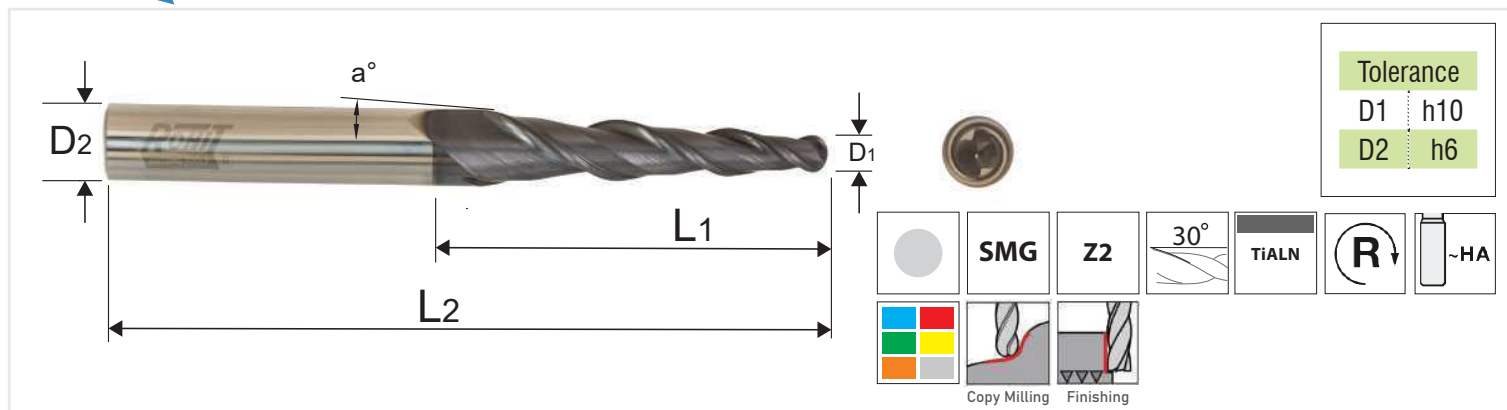
Ordering Code	Flute Dia (D1)	Flute Length (L1)	Shank Dia (D2)	Taper Angle (a°)
20703008002-F	3	28	6	2°
20705008002-F	5	28	8	2°
20707008002-F	7	28	10	2°
20709008002-F	9	28	12	2°
20702508003-F	2.5	20	6	3°
20703008003-F	3	20	8	3°
20704008003-F	4	20	8	3°
20706008003-F	6	20	10	3°
20708010503-F	8	56	14	3°
20702506305-F	2.5	20	6	5°
20703008005-F	3	28	8	5°
20704008005-F	4	34	10	5°
20706009005-F	6	34	12	5°
20708010005-F	8	45	16	5°
20710010505-F	10	56	20	5°
20703006307-F	3	20	8	7°
20705008007-F	5	28	12	7°

Refer Page PG-118 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-157

Selection-Guide



Features:

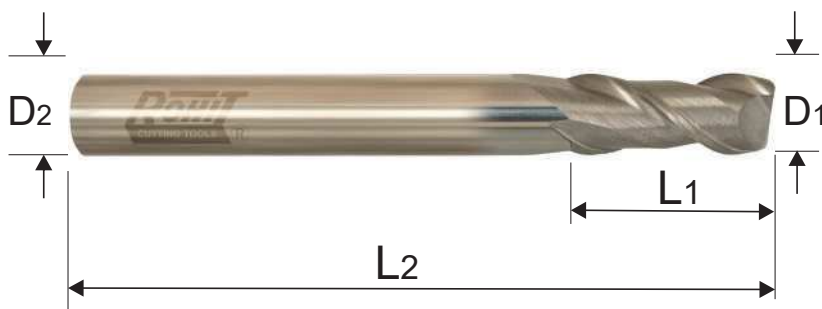
- Suitable for machining special components such as impellers, blisks, tire profiles, turbine blades
- Widely used in machining of Surgical instruments of Stainless Steel

Ordering Code	Flute Dia (D1)	Flute Len (L1)	Overall Len (L2)	Shank Dia (D2)	Taper Angle (a0)
20803008002-F	3	6	10	6	2°
20805008002-F	5	8	12	8	2°
20807008002-F	7	10	14	10	2°
20809008002-F	9	12	16	12	2°
20803008003-F	3	8	12	8	3°
20804008003-F	4	10	14	8	3°
20806008003-F	6	12	16	10	3°
20808010503-F	8	14	18	14	3°
20803008003-F	3	80	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

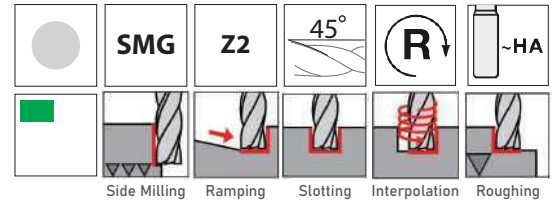
NOTE: This is Non-stock Item, ask your RIGPL representative for Delivery Period
 FOR FEED & SPEED Rates, go to page no. PG-153



Tolerance

D1 h10

D2 h6



Features:

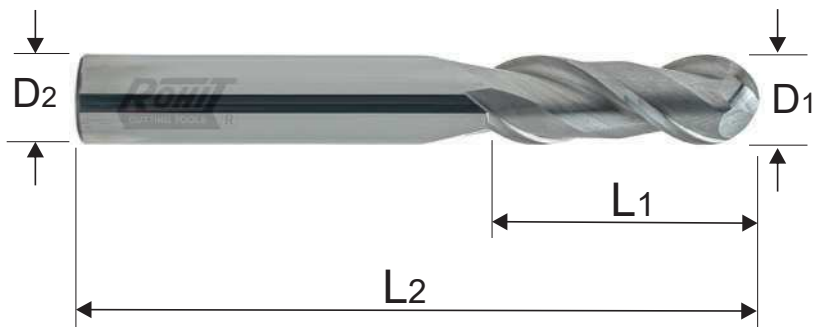
- Effective machining of Aluminium and AL-Alloys
- Higher Helix for Effective Chip Evacuation
- Improved component finish

Item Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR1XGSE00TA9	2	6	5	8
CR1XGSE00QZ7	3	12	7	8
CR1XGSE00NP2	4	17	10	8
CR1XGSE00NQ0	4	25	18	10
CR1XGSE00NR8	4	30	26	10
CR1XGSE00NS5	5	16	50	12
CR1XGSE00NT3	5	25	75	12
CR1XGSE00NU1	5	35	100	14
CR1XGSE00NV9	6	18	50	16
CR1XGSE00NW7	6	30	75	16
CR1XGSE00NX4	6	35	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-157

Selection-Guide



Tolerance

D1 h10

D2 h6



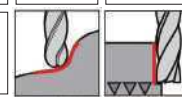
SMG

Z2

45°

R

~HA



Copy Milling Finishing

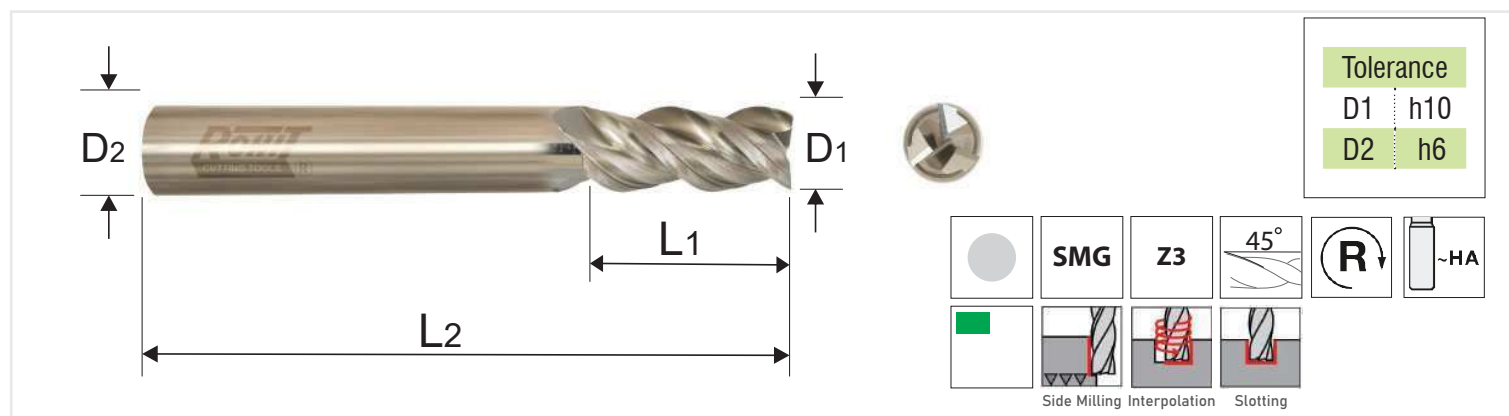
Features:

- 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	8
CR1XGBE00F31	4	14	60	8
CR1XGBE00F49	4	25	100	8
CR1XGBE00F56	4	30	100	10
CR1XGBE00F64	5	16	75	10
CR1XGBE00F72	5	25	75	12
CR1XGBE00F80	5	35	100	12
CR1XGBE00F98	6	18	50	14
CR1XGBE00FA0	6	30	75	16
CR1XGBE00FB8	6	35	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-153



Features:

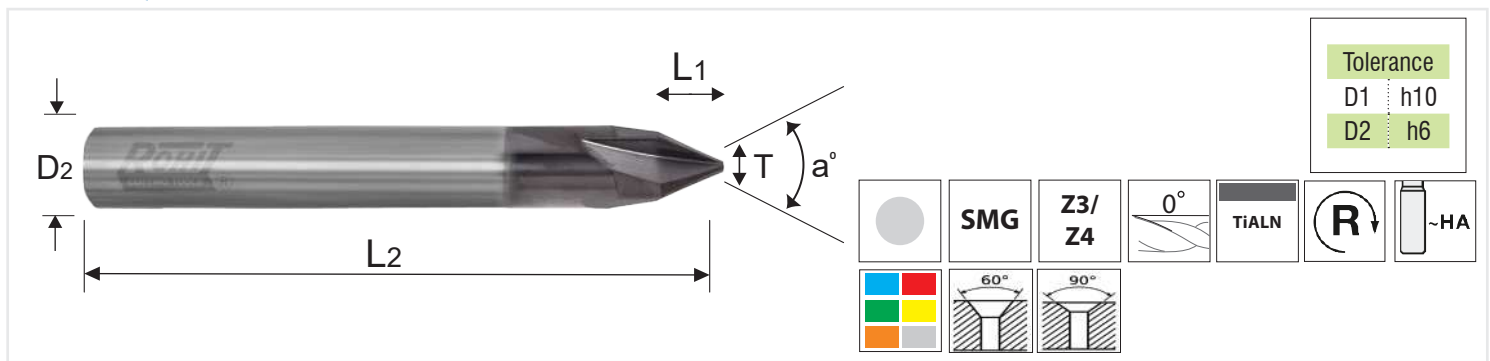
- 3-flute with Special flute form to help in Chip Breakage while milling Aluminium
- Designed especially for non-ferrous materials to run at higher cutting speeds

Item Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)	Item Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR1XGSE00T06	2	6	50		CR1XGSE00H0	8	20	60	8
CR1XGSE00R08	3	12			CR1XGSE00NJ5	12	30	75	12
CR1XGSE00N44	4	14			CR1XGSE00NK3	12	50	100	12
CR1XGSE00N51	4	25			CR1XGSE00NL1	14	50	100	14
CR1XGSE00N69	4	30			CR1XGSE00NM9	16	50	100	16
CR1XGSE00N77	5	16			CR1XGSE00NN6	20	50	100	20
CR1XGSE00N85	5	25	75						
CR1XGSE00N93	5	35	100						
CR1XGSE00NA5	6	18	50	6					
CR1XGSE00NB3	6	30	75	6					
CR1XGSE00NC1	6	35	100	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		2 nd	2 nd

NOTE: FOR FEED & SPEED Rates, go to page no. PG-157

Selection-Guide

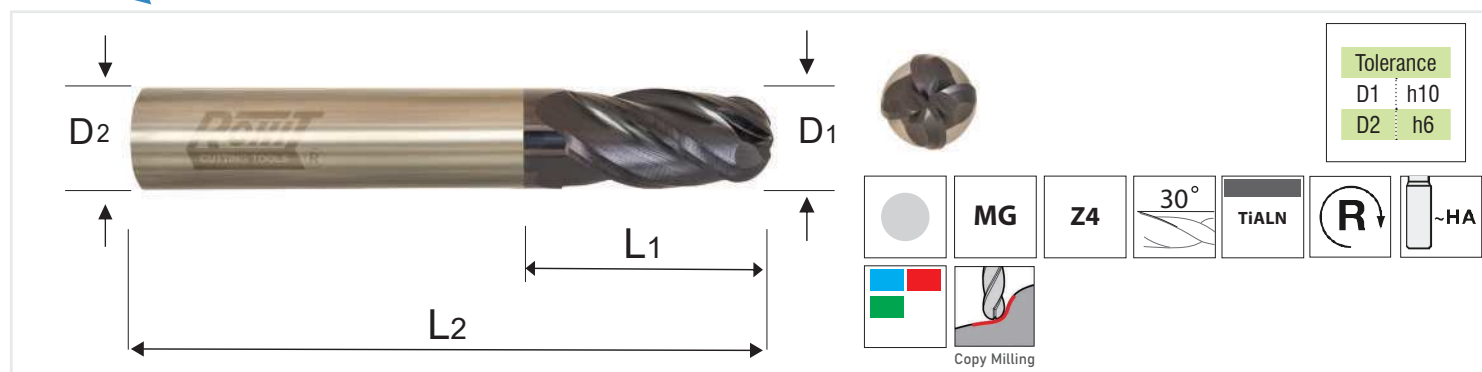


Features:

- 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

Item Code	Angle (a°)	Tip Dia. (T)	Overall Length (L2)	Shank Dia. (D2)	# OF FLUTE
CR11GCE00015	60°	0.2	50	3	2
CR11GCE00023	60°	0.3	50	4	3
CR11GCE00031	60°	0.4	50	5	3
CR11GCE00049	60°	0.5	50	6	3
CR11GCE00056	60°	0.6	50	8	3
CR11GCE00064	60°	0.8	50	10	4
CR11GCE00072	60°	1.0	75	12	4
21516009060°-F	60°	1.5	90	16	4
21520010060°-F	60°	2.0	100	20	4
CR11GCE00080	90°	0.2	50	3	2
CR11GCE00098	90°	0.3	50	4	3
CR11GCE000A0	90°	0.4	50	5	3
CR11GCE000B8	90°	0.5	50	6	3
CR11GCE000C6	90°	0.6	60	8	3
CR11GCE000D3	90°	1.0	75	10	4
CR11GCE000E1	90°	1.0	75	12	4
21516009090°-F	90°	1.5	90	16	4
21520010090°-F	90°	2.0	100	20	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

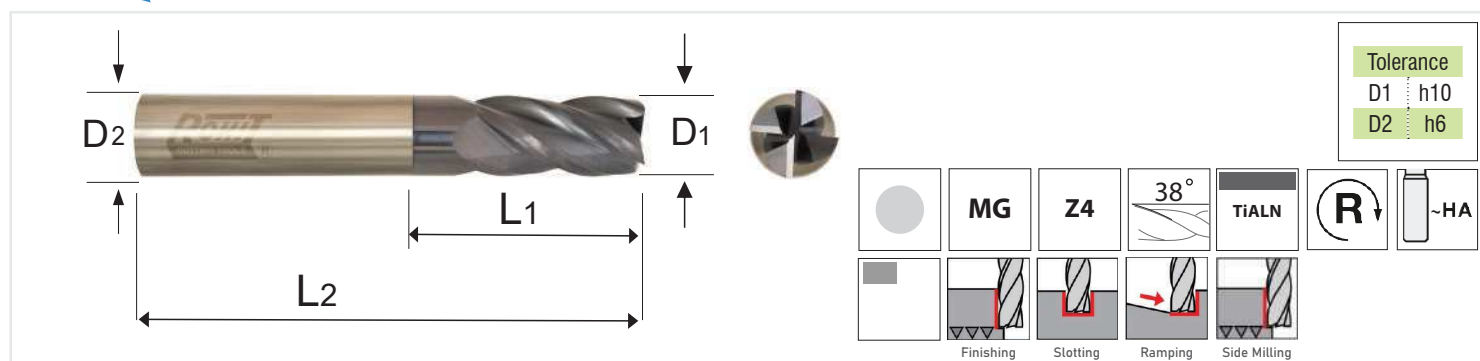


Features:

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

Item Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)	Item Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CX01GBE00186	3	14	50	3	CX01GBE00BG6	8	30	200	8
CX01GBE001A6	3	25	75	3	CX01GBE00277	10	30	75	10
CX01GBE00BT7	3	30	100	3	CX01GBE00A5	10	50	100	10
CX01GBE001B4	4	14	50	4	CX01GBE001	10	60	150	10
CX01GBE001D9	4	25	75	4	CX01GBE002	10	30	200	10
CX01GBE00AR3	4	30	100	4	CX01GBE003	12	30	75	11
CX01GBE001F5	5	14	50	5	CX01GBE004	12	30	75	12
CX01GBE001H1	5	25	75	5	CX01GBE005	12	50	100	12
CX01GBE001K4	5	35	100	5	CX01GBE002J5	12	60	150	12
CX01GBE001M0	6	18	50	6	CX01GBE00B22	12	30	200	12
CX01GBE001P3	6	30	75	6	CX01GBE00DV1	14	30	75	14
CX01GBE001R9	6	35	100	6	CX01GBE00DR0	16	30	75	16
CX01GBE001T4	6	40	150	6	CX01GBE002N6	16	50	100	16
CX01GBE001W8	8	20	60	8	CX01GBE002P2	16	60	150	16
CX01GBE00202	8	30	75	8	CX01GBE00DS7	16	30	200	16
CX01GBE00210	8	40	100	8	CX01GBE00CD1	20	50	100	20
CX01GBE00236	8	50	150	8	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



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	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)	Item Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CX01GSE00K75	3	14	50	3	CX01GSE00KN4	8	40	100	8
CX01GSE00KE4	3	25	75	3	CX01GSE00K22	8	50	100	8
CX01GSE00K83	4	14	50	4	CX01GSE00K50	8	50	150	8
CX01GSE00KF2	4	25	75	4	CX01GSE00K30	9	30	75	9
CX01GSE00KG0	4	30	75	4	CX01GSE00K30	10	30	75	10
CX01GSE00K91	5	14	50	5	CX01GSE00K10	10	50	100	10
CX01GSE00KH8	5	25	75	5	CX01GSE00K60	10	60	150	10
CX01GSE00KJ3	5	35	100	5	CX01GSE00K33	11	30	75	11
CX01GSE00L66	5	40	100	5	CX01GSE00KD6	12	30	75	12
CX01GSE00KA3	6	18	50	6	CX01GSE00KQ8	12	50	100	12
CX01GSE00KK1	6	30	75	6	CX01GSE00L90	12	60	150	12
CX01GSE00KL9	6	35	100	6	CX01GSE00MG8	14	50	100	14
CX01GSE00L74	6	40	100	6	CX01GSE00KR6	16	50	100	16
CX01GSE00V41	7	20	60	7	CX01GSE00LC8	16	60	150	16
CX01GSE00KB1	8	20	60	8	CX01GSE00MF0	18	50	100	18
CX01GSE00KM7	8	30	75	8	CX01GSE00KS3	20	50	100	20

Carbon Steels
BHN 180 to 2252ndAlloy Steels
BHN 225 to 3552ndPrehardened Steels
HRc 40 to 45Austenitic
Stainless SteelPrecipitation Hardened
Stainless Steel

Titanium

HighTemp. Alloy

Grey Cast Iron

2nd

Ductile Cast Iron

Hardened Steels
HRc 45 to 552ndHigh Hardened Steels
HRc 55 to 70

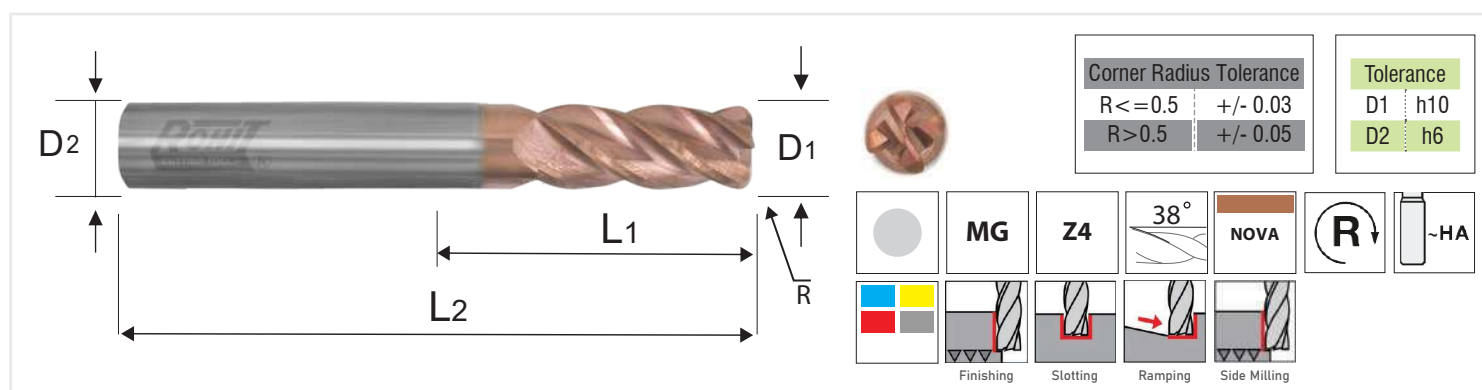
Aluminum

Aluminum Alloys

Plastic

Wood / MDF

Copper/Brass



Features:

- 4-Flute Carbide Radius End Mills comes with Nova coating
- Economical Carbide End Mills to be used for softer materials up to 45-HRc
- Good for milling metals like MS, Cast Iron, Alloy Steel and other easy to machine materials
- Gives optimum performance on all kind of General Milling applications

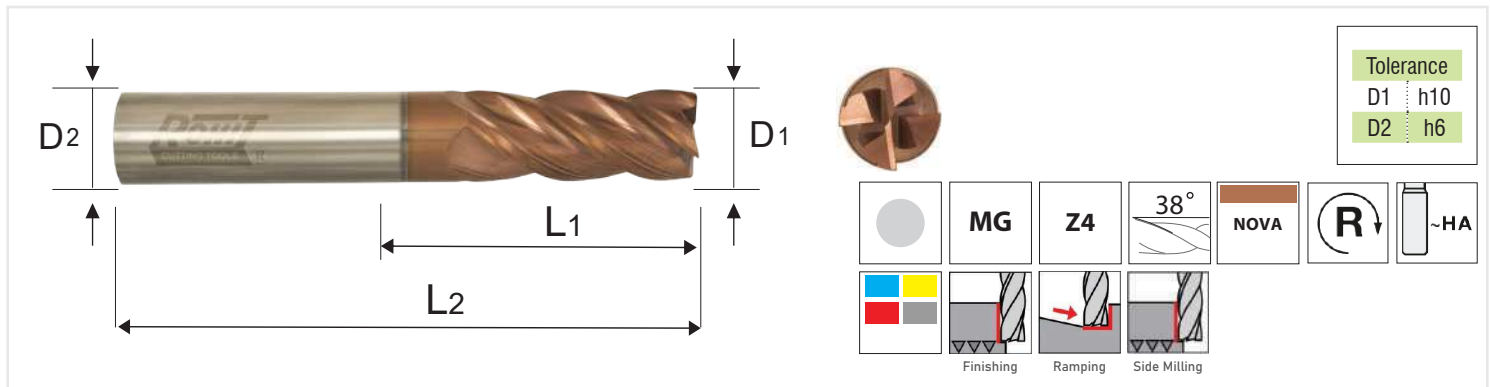
Item Code	Flute Dia (D1)	Flute Len (L1)	Overall Len (L2)	Shank Dia (D2)	Corner Radius (R)
CR0AGCR0135	3	14	50	3	R0.5
CR0AGCR0150	3	25	75	3	R0.5
CR0AGCR0143	3	14	50	3	R1.0
CR0AGCR0168	4	14	50	4	R0.5
CR0AGCR0184	4	25	75	4	R0.5
CR0AGCR0192	4	30	100	4	R0.5
CR0AGCR0176	4	14	50	4	R1.0
CR0AGCR01A4	5	16	50	5	R0.5
CR0AGCR01B2	5	25	75	5	R0.5
CR0AGCR01C0	5	40	100	5	R0.5
CR0AGCR01D7	6	18	50	6	R0.5
CR0AGCR01F3	6	30	75	6	R0.5
CR0AGCR01H9	6	40	100	6	R0.5
CR0AGCR01E5	6	18	50	6	R1.0
CR0AGCR01G1	6	30	75	6	R1.0
CR0AGCR01J4	6	40	100	6	R1.0
CR0AGCR01K2	8	20	60	8	R0.5
CR0AGCR01M8	8	30	75	8	R0.5
CR0AGCR01P1	8	40	100	8	R0.5
CR0AGCR01R7	8	50	150	8	R0.5

Item Code	Flute Dia (D1)	Flute Len (L1)	Overall Len (L2)	Shank Dia (D2)	Corner Radius (R)
CR0AGCR01L0	8	20	60	8	R1.0
CR0AGCR01N5	8	30	75	8	R1.0
CR0AGCR01Q9	8	40	100	8	R1.0
CR0AGCR01S4	10	30	75	10	R0.5
CR0AGCR01U0	10	50	100	10	R0.5
CR0AGCR01W6	10	60	150	10	R0.5
CR0AGCR01T2	10	30	75	10	R1.0
CR0AGCR01V8	10	50	100	10	R1.0
CR0AGCR01X3	12	30	75	12	R0.5
CR0AGCR01Z9	12	50	100	12	R0.5
CR0AGCR0226	12	60	150	12	R0.5
CR0AGCR01Y1	12	30	75	12	R1.0
CR0AGCR0200	12	50	100	12	R1.0
CR0AGCR0218	12	50	100	12	R2.0
CR0AGCR0234	14	50	100	14	R1.0
CR0AGCR0242	16	50	100	16	R1.0
CR0AGCR0259	16	60	150	16	R1.0
CR0AGCR0267	18	50	100	18	R1.0
CR0AGCR0275	20	50	100	20	R1.0

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
2 nd	2 nd	2 nd					2 nd	2 nd	2 nd			2 nd			2 nd

NOTE : FOR FEED & SPEED Rates, go to page no. PG-157

Selection-Guide



Features:

- 4-Flute Carbide Flat End Mills comes with Nova coating
- Economical Carbide End Mills to be used for softer materials up to 45-HRc
- 40% higher Productivity compared to 101 Series Carbide Endmill
- Good for milling metals like MS, Cast Iron, Alloy Steel and other easy to machine materials
- Gives optimum performance on all kind of General Milling applications

Item Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR0AGSE00UW5	1.0	3.0	50	4
CR0AGSE00UX2	1.5	4.5	50	4
CR0AGSE00UY0	2.0	6.0	50	4
CR0AGSE00UZ8	2.5	7.0	50	4
CR0AGSE00V66	3.0	9.0	50	4
CR0AGSE00TJ4	3.0	14	50	3
CR0AGSE00TK2	3.0	25	75	3
CR0AGSE00V09	3.0	30	100	3
CR0AGSE00TL0	3.5	14	50	3.5
CR0AGSE00TM8	4.0	14	50	4
CR0AGSE00TN5	4.0	25	75	4
CR0AGSE00TP1	4.0	30	100	4
CR0AGSE00TQ9	4.5	16	50	4.5
CR0AGSE00TR7	4.5	25	75	4.5
CR0AGSE00TS4	5.0	16	50	5
CR0AGSE00TT2	5.0	25	75	5
CR0AGSE00TU0	5.0	40	100	5

Item Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR0AGSE00TV8	5.5	18	50	5.5
CR0AGSE00TW6	5.5	30	75	5.5
CR0AGSE00TX3	5.5	40	100	5.5
CR0AGSE00TY1	6.0	18	50	6
CR0AGSE00TZ9	6.0	30	75	6
CR0AGSE00U00	6.0	40	100	6
CR0AGSE00V17	6.0	50	150	6
CR0AGSE00U18	6.5	20	60	6.5
CR0AGSE00U26	7.0	20	60	7
CR0AGSE00U34	8.0	20	60	8
CR0AGSE00U42	8.0	30	75	8
CR0AGSE00U59	8.0	40	100	8
CR0AGSE00U67	8.0	60	150	8
CR0AGSE00U75	9.0	30	75	9
CR0AGSE00U83	10.0	30	75	10
CR0AGSE00U91	10.0	50	100	10
CR0AGSE00UA3	10.0	60	150	10

Item Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR0AGSE00UB1	12.0	30	75	12
CR0AGSE00UC9	12.0	50	100	12
CR0AGSE00UD6	12.0	60	150	12
CR0AGSE00UE4	14.0	50	100	14
CR0AGSE00UF2	16.0	50	100	16

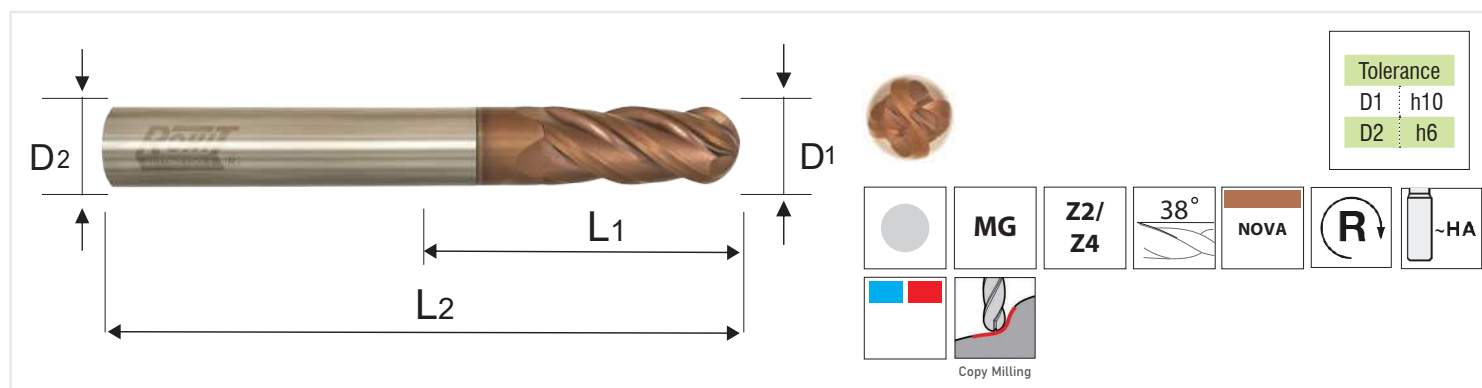
Item Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR0AGSE00UG0	16.0	60	150	16
CR0AGSE00V82	16.0	60	200	16
CR0AGSE00UH8	18.0	50	100	18
CR0AGSE00UJ3	20.0	50	100	20
CR0AGSE00V25	20.0	80	150	20



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

NOTE: FOR FEED & SPEED Rates, go to page no. PG-157

Selection-Guide



Features:

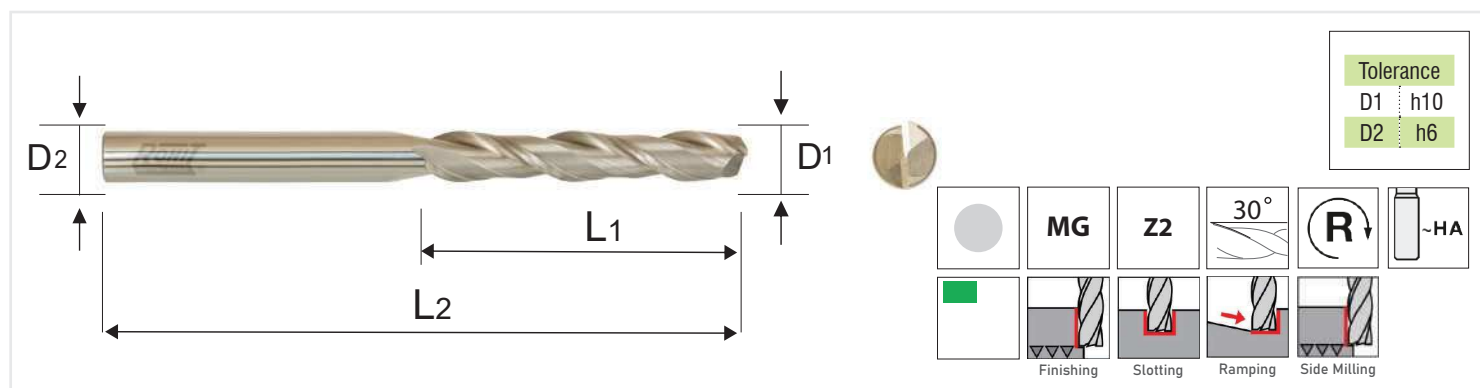
- 2-F & 4-F Carbide Ballnose comes with Nova coating
- Economical Carbide Ballnose to be used for softer materials up to 45-HRc
- 40% higher Productivity compared to 102 Series Carbide Ballnose
- Good for milling metals like MS, Cast Iron, Alloy Steel and other easy to machine materials
- Gives optimum performance on all kind of General Milling applications

Item Code	Flute Dia (D1)	Flute Len (L1)	Overall Len (L2)	Shank Dia (D2)	# of Flutes
CR0ABE00G78	1.0	2	50	4	2
CR0ABE00G86	1.5	3	50	4	2
CR0ABE00G94	2.0	4	50	4	2
CR0ABE00GA6	2.5	5	50	4	2
CR0AGBE00H59	3.0	6	50	4	2
CR0ABE00GB4	3.0	14	50	3	4
CR0ABE00GC2	3.0	25	75	3	4
CR0ABE00GD9	3.0	30	100	3	4
CR0ABE00GE7	4.0	14	50	4	4
CR0ABE00GF5	4.0	25	75	4	4
CR0ABE00GG3	4.0	30	100	4	4
CR0ABE00GH1	5.0	16	50	5	4
CR0ABE00GJ6	5.0	25	75	5	4
CR0ABE00GK4	5.0	35	100	5	4
CR0ABE00GL2	6.0	18	50	6	4
CR0ABE00GM0	6.0	30	75	6	4
CR0ABE00GN7	6.0	35	100	6	4
CR0ABE00GP3	6.0	40	150	6	4
CR0ABE00GQ1	8.0	20	60	8	4

Item Code	Flute Dia (D1)	Flute Len (L1)	Overall Len (L2)	Shank Dia (D2)	# of Flutes
CR0ABE00GR9	8.0	30	75	8	4
CR0ABE00GS6	8.0	40	100	8	4
CR0ABE00GT4	8.0	50	150	8	4
CR0ABE00GU2	10.0	30	75	10	4
CR0ABE00GV0	10.0	50	100	10	4
CR0ABE00GW8	10.0	60	150	10	4
CR0ABE00GX5	11.0	30	75	11	4
CR0ABE00GY3	12.0	30	75	12	4
CR0ABE00GZ1	12.0	50	100	12	4
CR0ABE00H02	12.0	60	150	12	4
CR0ABE00H10	14.0	50	100	14	4
CR0ABE00H28	16.0	50	100	16	4
CR0ABE00H36	16.0	60	150	16	4
CR0ABE00H44	20.0	50	100	20	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
2 nd	2 nd	2 nd					2 nd	2 nd				2 nd			2 nd

NOTE: FOR FEED & SPEED Rates, go to page no. PG-153



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

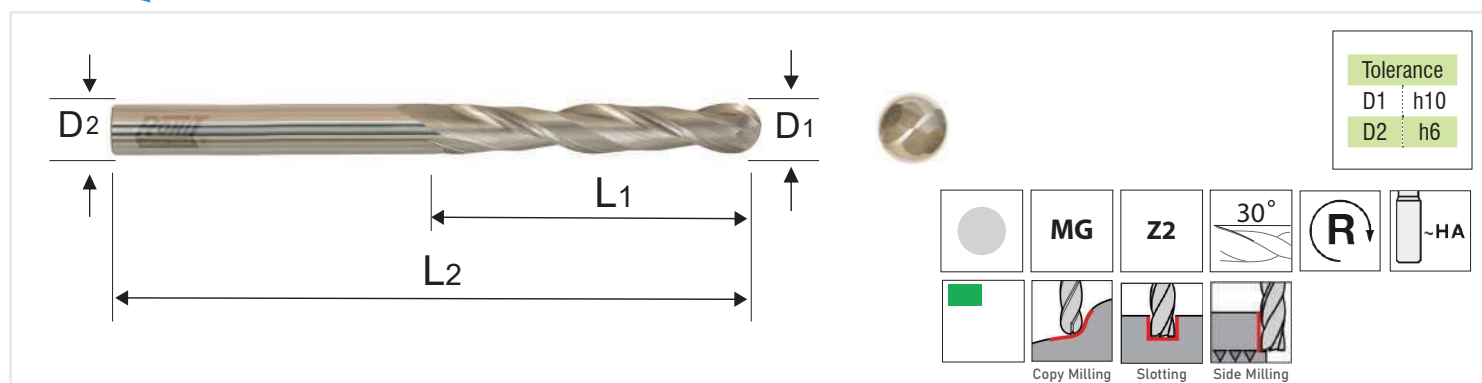
Item Code TiALN Coated	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CX0XGSE000G8	8	50	100	8
CX0XGSE00K50	10	35	75	10
CX0XGSE00H53	10	50	100	10
CX0XGSE00K68	12	35	75	12
CX0XGSE00H61	12	50	100	12

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-128 for Material Selection

NOTE: FOR FEED & SPEED Rates, go to page no. PG-158

Selection-Guide



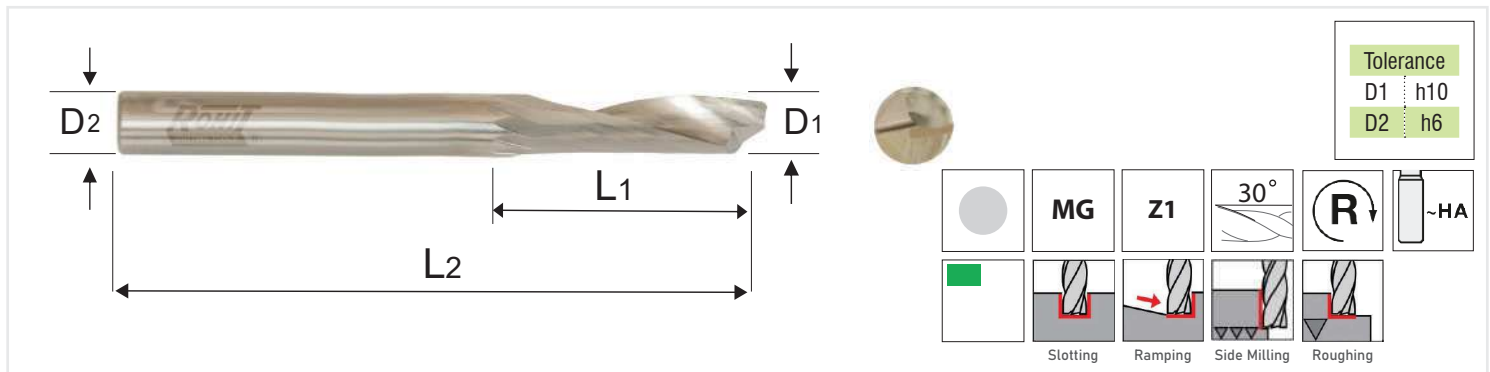
Features:

- 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



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 & Downcut 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 225Alloy Steels
BHN 225 to 355Prehardened Steels
HRC 40 to 45Austenitic
Stainless SteelPrecipitation Hardened
Stainless Steel

Titanium

HighTemp. Alloy

Grey Cast Iron

Ductile Cast Iron

Hardened Steels
HRC 45 to 55High Hardened Steels
HRC 55 to 70

Aluminum

Aluminum Alloys

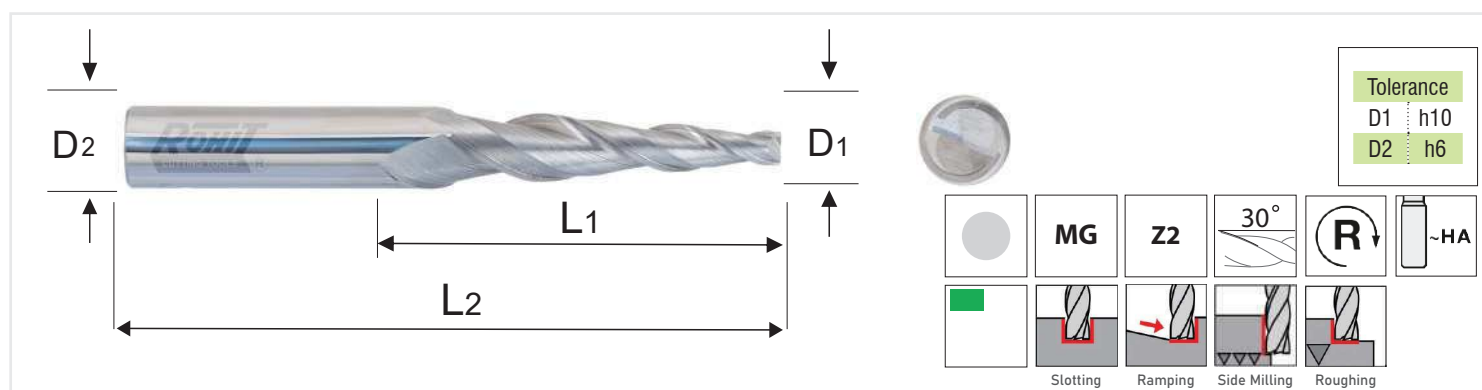
Plastic

Wood / MDF

Copper/Brass

1st2nd1st1st1st

FOR FEED & SPEED Rates, go to page no. PG-158



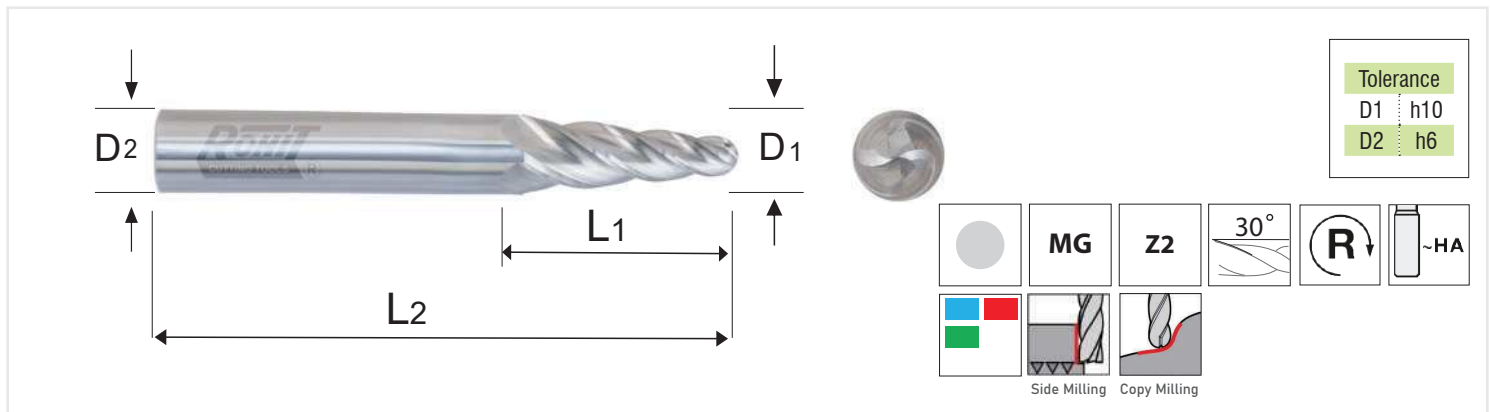
Features:

- 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(a0)
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-158



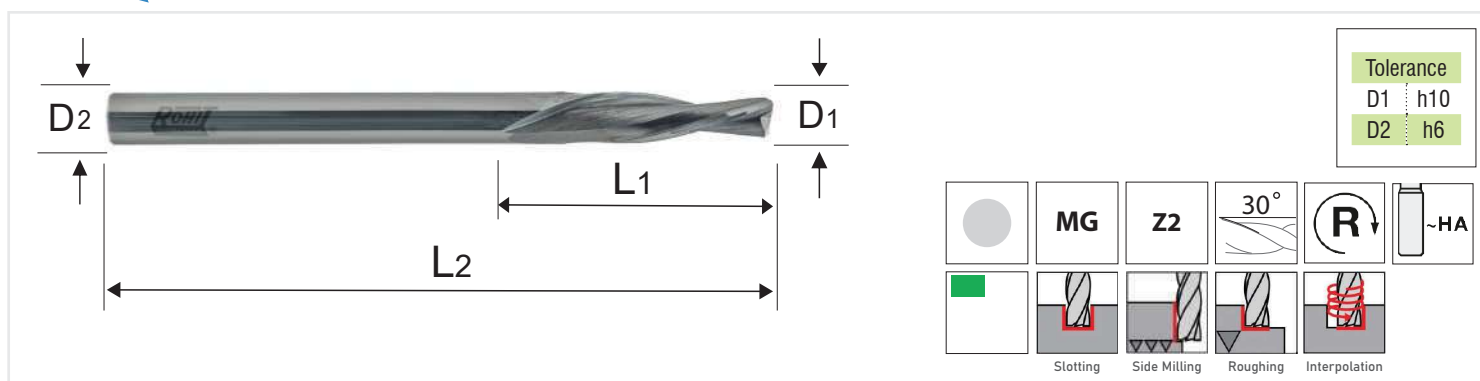
Features:

- 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(a0)
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

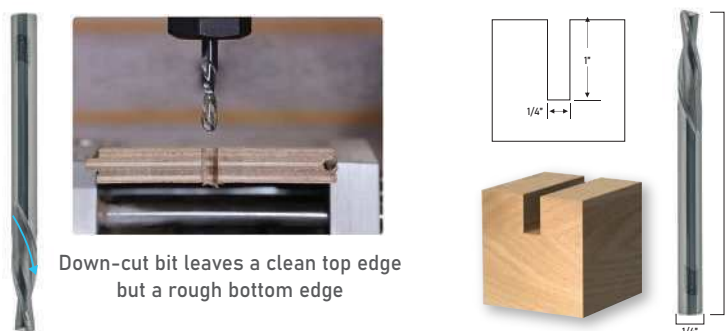
NOTE: This is Non-stock Item, ask your RIGPL representative for Delivery Period
FOR FEED & SPEED Rates, go to page no. PG-153



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

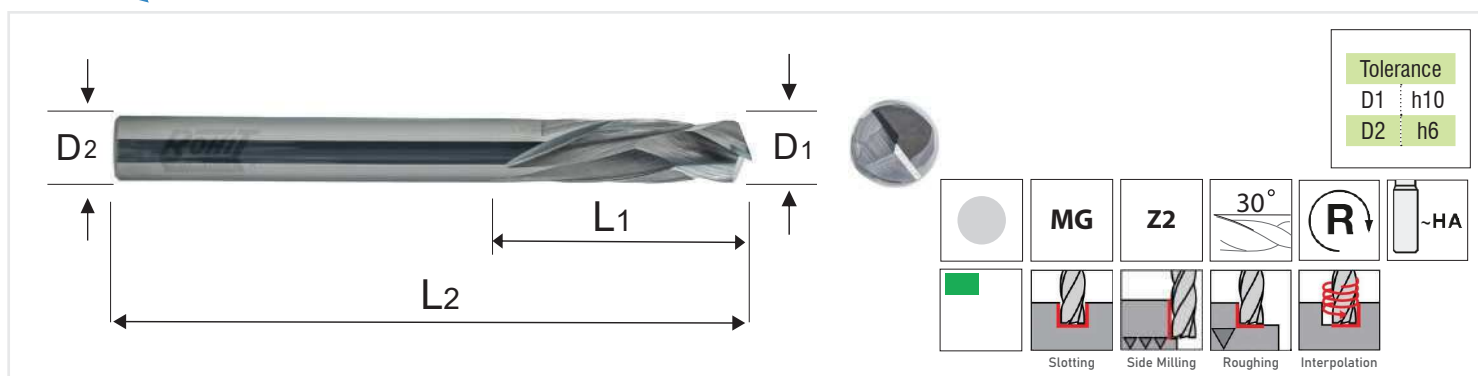
Ordering Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
112060075-DOWN-U	6	25	75	6
1124392203"-DOWN-U	1/4	1"	3"	1/4
112080075-DOWN-U	8	25	75	8
112100075-DOWN-U	10	25	75	10
112120075-DOWN-U	12	25	75	12
1124386203"-DOWN-U	1/2	1"	3"	1/2



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-158

Selection-Guide

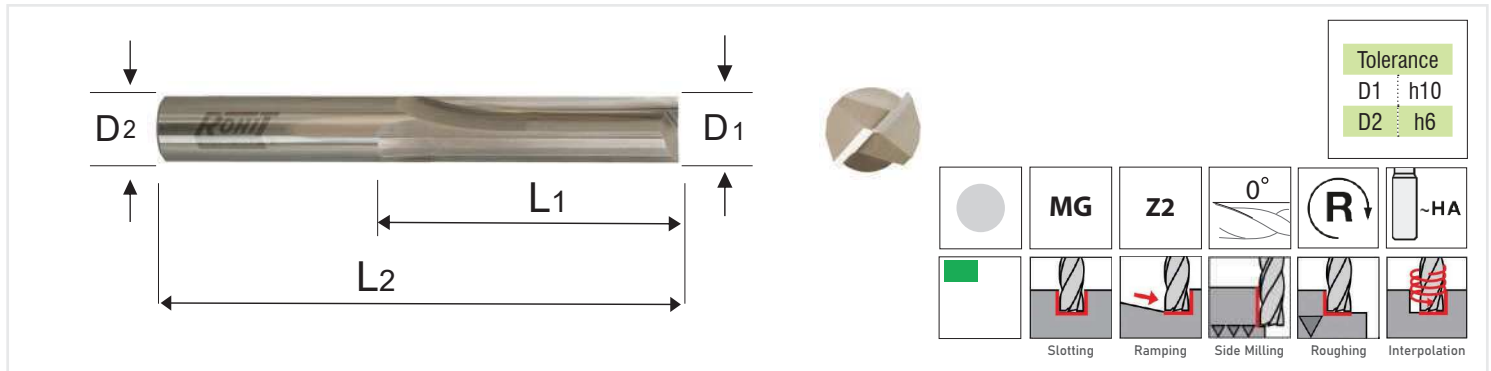


Features:

- 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-158

Selection-Guide

Straight Flute C118



ADVANTAGES

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

UPCut C103



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

DownCut C112



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

Compression Bit C114



- 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

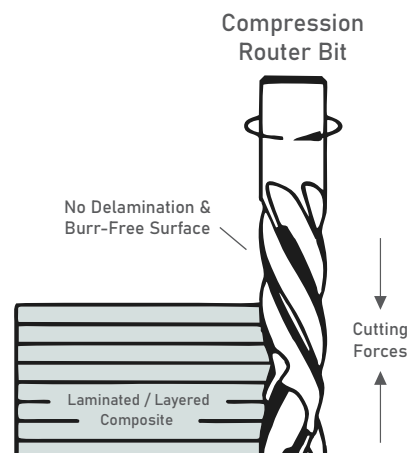
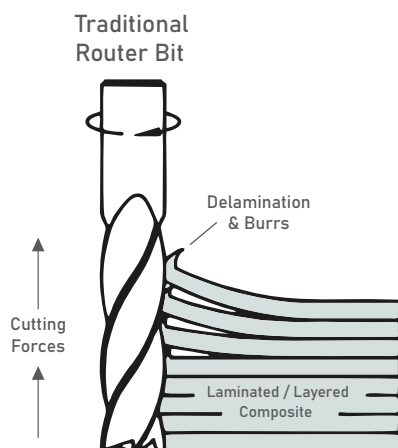
SUITABLE MATERIAL

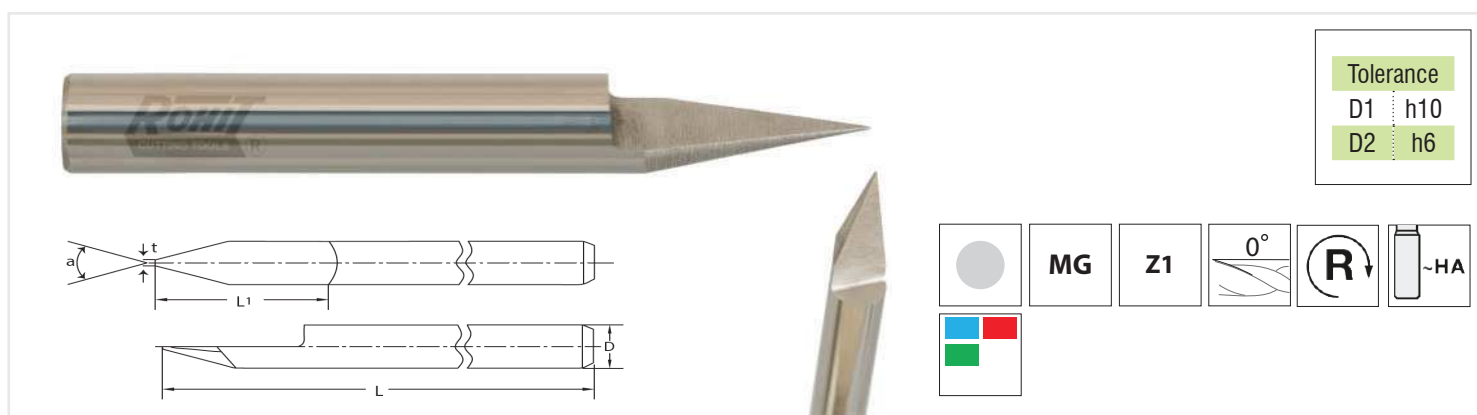
- Fit mostly material

- 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)



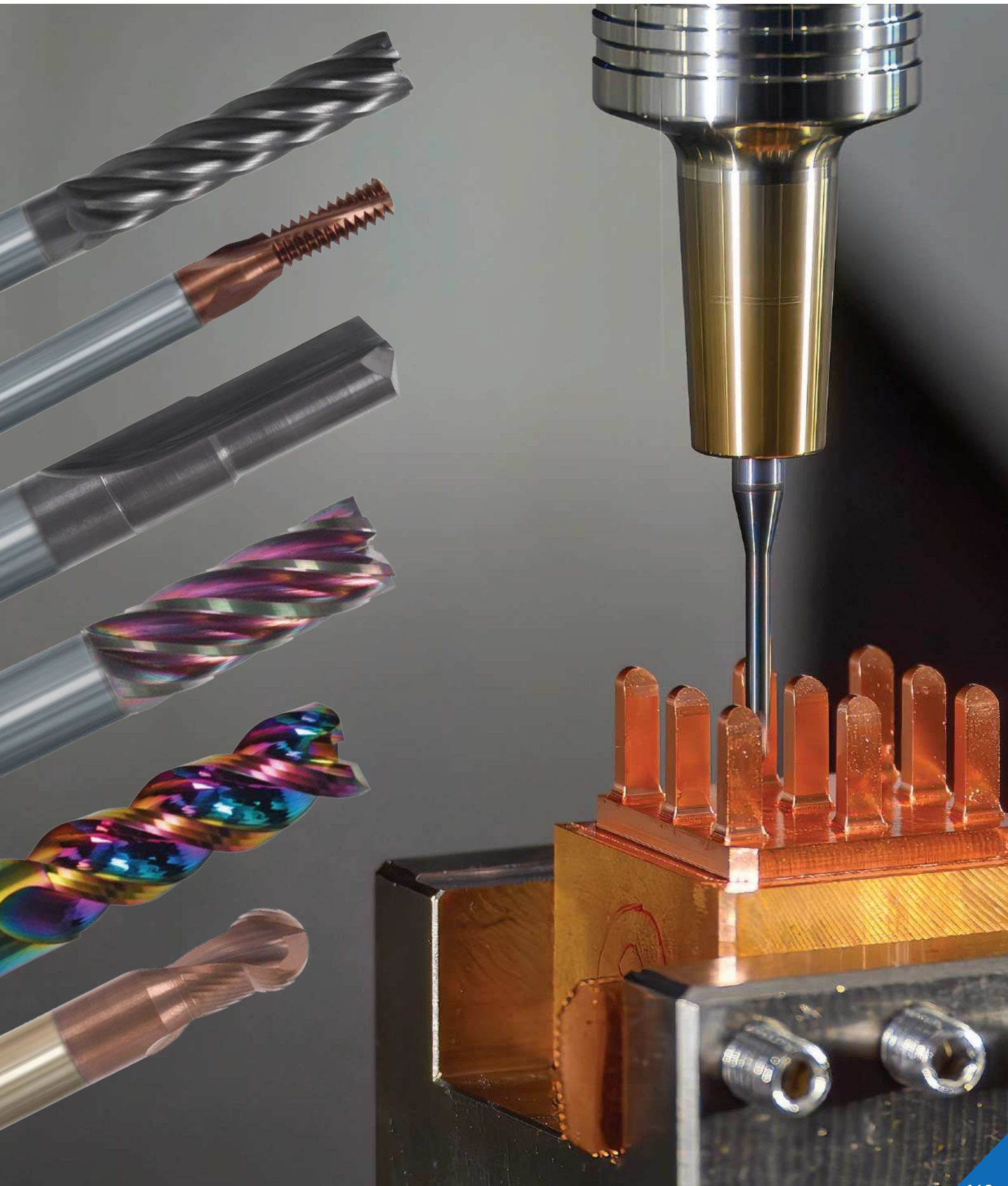


Features:

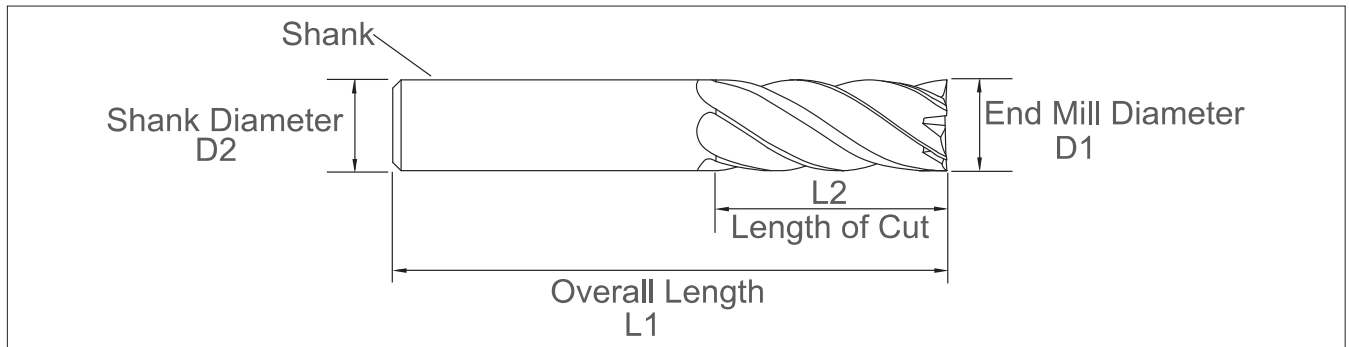
- For engraving in Soft Wood, Hard Wood, MDF, Plastics, Non-ferrous materials etc.
- Included Angle: 45, 60 and 90 deg. Can be made on special request. MOQ will apply
- Engraving bit tip diameters range from 0.10mm to 0.40mm ; so for your delicate Engraving work Opt for these Bits

Ordering Code	TIP (t)	Included Angle (a0)	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

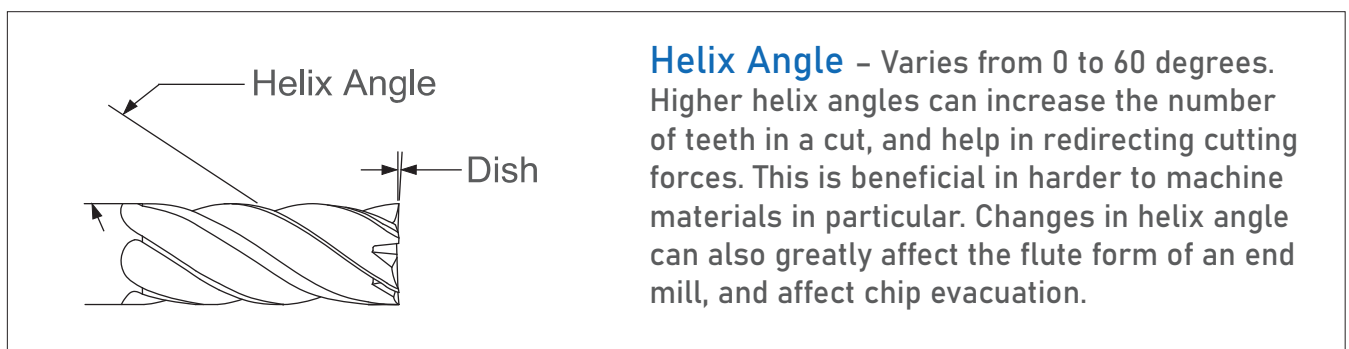


End Mill Terminology



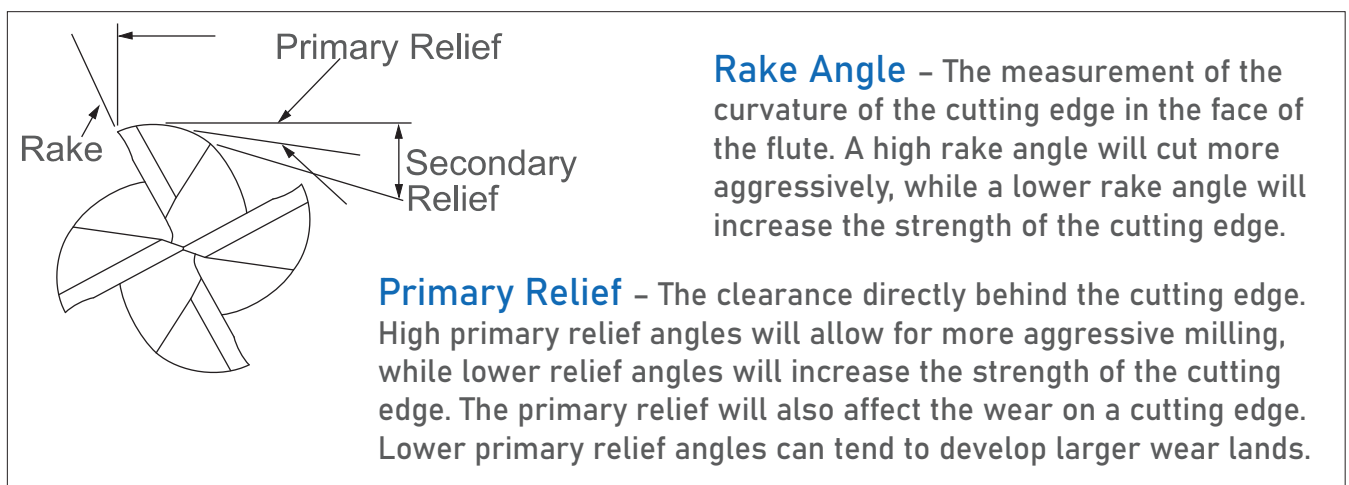
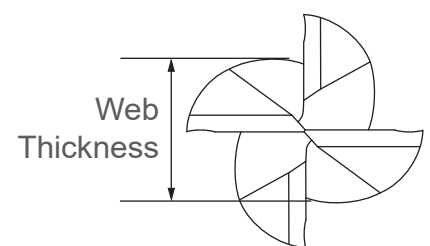
Length of Cut (Flute Length) – Always select the shortest Flute Length possible for your application. By selecting the shortest Flute Length, you can increase rigidity and allow for higher feed rates.

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

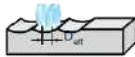
English to Metric

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		$D(eff) = 2 \times \sqrt{D \times ap - ap^2}$

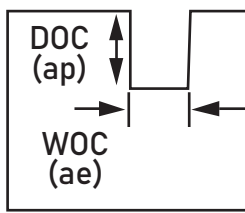
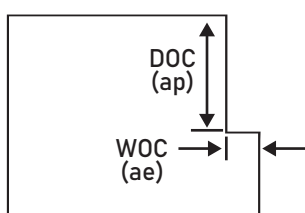
symbol key : $\pi = 3.1416$ D = tool diameter (mm) z = no. of flutes ap = depth of cut

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, 3Al-8V-6Cr4Mo-4Zr, 10V-2Fe-3Al, 13V-11Cr-3Al	<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

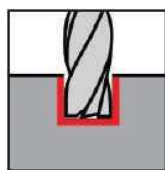
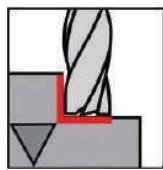
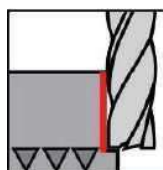
RDOC / WOC (Ae)
Radial Depth of Cut

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

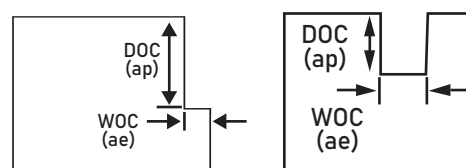
2. Always select shortest possible flute length to prevent breakage & vibration rising due to over hang.

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

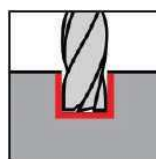
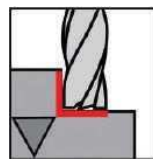
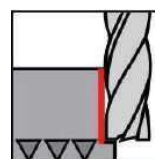


ADOC / DOC (Ap)
Axial Depth of Cut

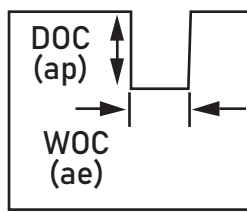
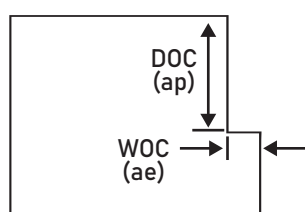
RDOC / WOC (Ae)
Radial Depth of Cut

- 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

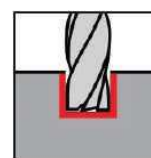
Slotting
(SLT)Roughing
(RGH)Finishing
(FIN)

Material	Hardness	Application	DOC (Ap) max	WOC (Ae) max	Cutting speed (Vc)	FEED per TOOTH					
						4 mm	6 mm	8 mm	10 mm	12 mm	16 mm
					m/min	mm / Z					
Alloy Steel	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
	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	<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	<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

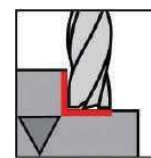


ADOC / DOC (Ap)
Axial Depth of Cut

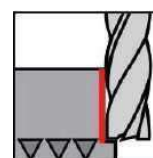
RDOC / WOC (Ae)
Radial Depth of Cut



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.

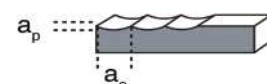
2. Always select shortest possible flute length to prevent breakage & vibration rising due to overhang.

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	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
	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
	> 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	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
	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
	> 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_e = Width of cut
 a_p = Depth of cut

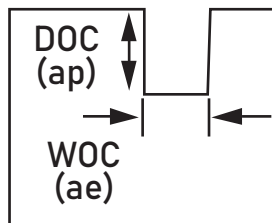
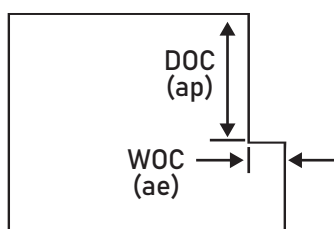


NOTE: Coolant Preference: Mist Spray

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

Selection-Guide

	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



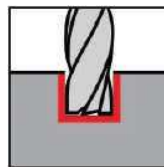
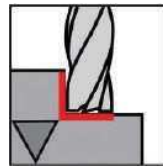
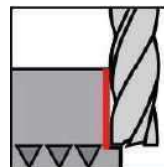
ADOC / DOC (Ap)
Axial Depth of Cut

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: 423, 302, 304, 306, 307 & 202, 206, 208, 212 & 102, 123, 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, 206, 208, 123	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, 206, 208, 123	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, 206, 208, 123	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, 206, 208, 123	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, 206, 208, 123	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, 206, 208, 123	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-302, 306, 307	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-302, 306, 307	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-302, 306, 307	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, 423, 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, 423, 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, 423, 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, 423, 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, 423, 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, 423, 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, 423, 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, 423, 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, 423, 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-423, 406	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-423, 406	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-423, 406	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-423, 406	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-423, 406	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-423, 406	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°.

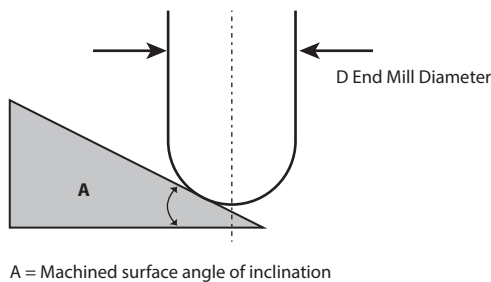
3 - Reduce feeds and speeds 20% for tool projection greater than 5xD.

4 - Use Endmill dia. (D1) to calculate RPM (do not use effective diameter).

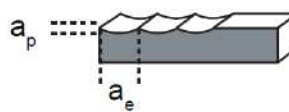
5 - ALL VALUES IN METRIC.

Series: 423, 302, 304, 306, 307 & 202, 206, 208, 212 & 102, 123, 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, 208, 123	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, 208, 123	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, 208, 123	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-102, 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-102, 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-102, 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-202, 208, 102, 123	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-202, 208, 102, 123	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-202, 208, 102, 123	0.01 x D	140-160	0.009	0.011	0.013	0.014	0.018	0.027	0.036	0.045	0.055



a_e = Width of cut
 a_p = Depth of cut



Copy Milling

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

	Material	Hardness	Application	Ap 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	Ap 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 110-series Lower the Feed and Speed rates by 30%

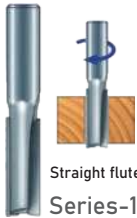
These are just the Starting Parameters, you may vary the Speed and Feed depending upon other machining condition.

Feed & Speed Parameters for Wood & Plastic machining

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



Material		Cutting speed (Vc)	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 -



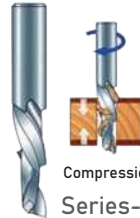
Straight flute
Series-118



Spiral up-cut
Series-103



Spiral down-cut
Series-112



Compression
Series-114

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)



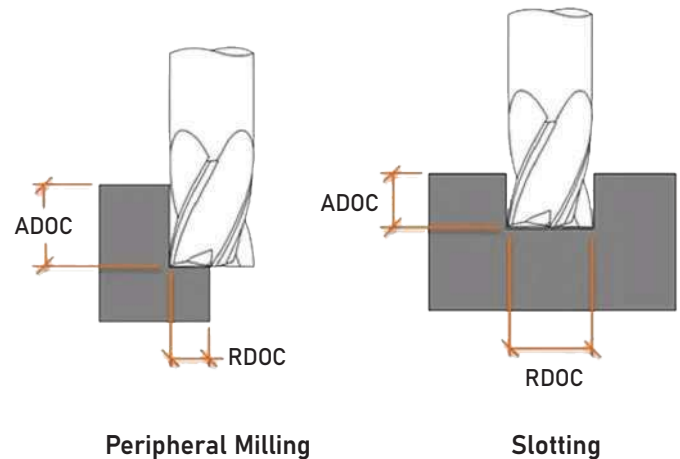
Radial Depth of Cut (RDOC): The distance a tool is stepping over into a workpiece. Also referred to as Stepover, Cut Width

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)

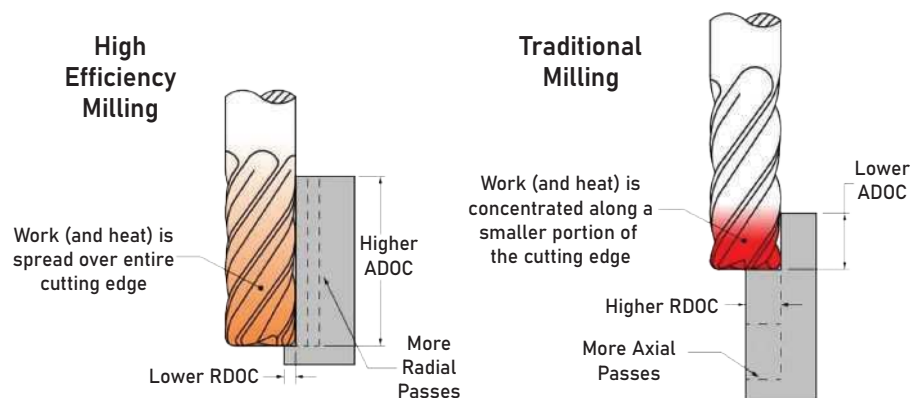
Pairing a light RDOC and heavy ADOC with high performance toolpaths is a machining strategy known as High Efficiency Milling or HEM. With this machining style, feed rates can be increased and cuts are kept uniform to evenly distribute stresses across the cutting portion of the tool, prolonging tool life.

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.

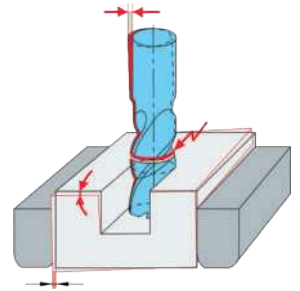
1. Workpiece Clamping

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



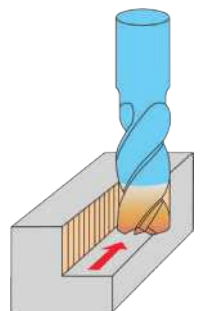
3. Surface Finish Quality

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

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

Alternative:

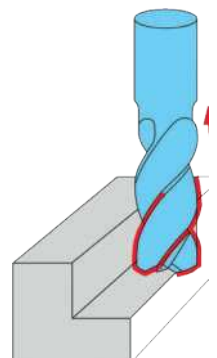
- reduce feed and feed rate
- increase cutting speed



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



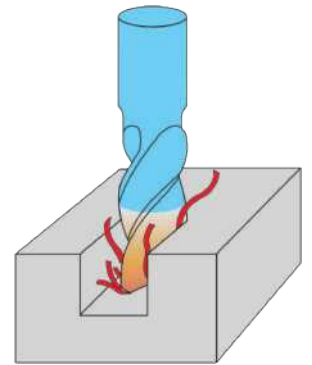
5. Chip Congestion / Cooling

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:

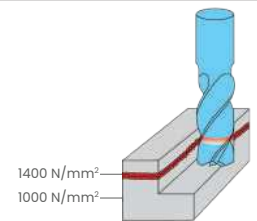
- increase volume flow
- adjust coolant flow
- apply compressed air cooling (according to tool and material)
- reduce feed rate
- modify cutting distribution
- select end mill with fewer flutes



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

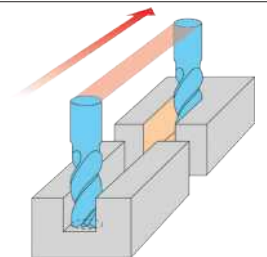
- Reduce cutting rates
- Select tool for materials with a higher tensile strength



7. Loss in Tool Life Due to Interrupted Cutting

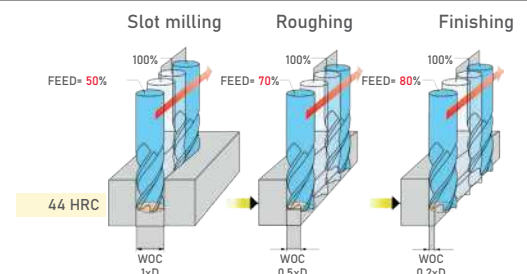
Significant loss in tool life through interrupted cutting (especially with milling angles of 90°)

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



8. Entry in Hardened Materials

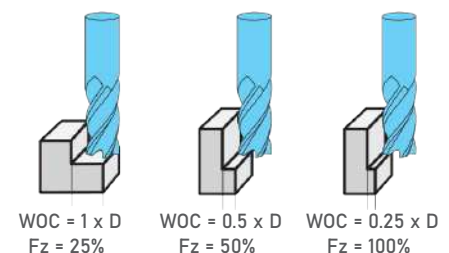
For entering materials over 45 HRC, reduce the feed rate in accordance with the image illustration on the right



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

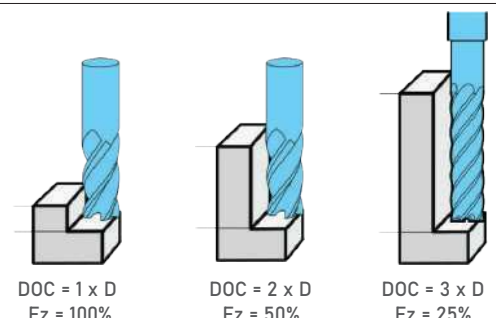
- Cutting speed or revolutions remain unchanged
- Double reduction applies when also modifying the cutting depth DOC!



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!



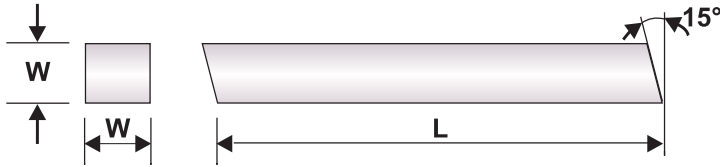
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Features

- 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)

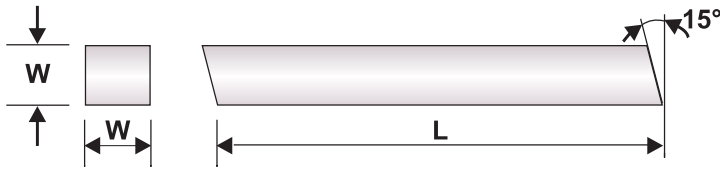


Tolerance (Width/Thickness)	h13
Tolerance (Length)	+/- 1.0mm
End Bevel	15°
Optional Bevel	0°/ 10°

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	HR2XSQ000658	HR3XSQ000G68	HR4XSQ000CM1	HR44SQ000AA9
1/8	1/8	4	HR1XSQ000L5	HR2XSQ000666	HR3XSQ000G76	HR4XSQ000CN8	HR44SQ000AB7
3/16	3/16	3	HR1XSQ000Z4	HR2XSQ0006F1	HR3XSQ000GC0	HR4XSQ000CV1	HR44SQ000AG6
3/16	3/16	4	HR1XSQ000105	HR2XSQ0006H7	HR3XSQ000GD7	HR4XSQ000CW9	HR44SQ000AH4
3/16	3/16	6	HR1XSQ000113	HR2XSQ0006K0	HR3XSQ000GE5	HR4XSQ000CX6	HR44SQ000AJ9
1/4	1/4	3	HR1XSQ0001Q3	HR2XSQ0006X1	HR3XSQ000GQ9	HR4XSQ000D94	HR44SQ000AS9
1/4	1/4	4	HR1XSQ0001S8	HR2XSQ0006Z7	HR3XSQ000GR7	HR4XSQ000DB4	HR44SQ000AT7
1/4	1/4	6	HR1XSQ0001U4	HR2XSQ000716	HR3XSQ000GS4	HR4XSQ000DC2	HR44SQ000AU5
1/4	1/4	8	HR1XSQ0001V2	HR2XSQ000724	HR3XSQ000GT2	HR4XSQ000DD9	HR44SQ000AV3
5/16	5/16	3	HR1XSQ000204	HR2XSQ000773	HR3XSQ000GX3	HR4XSQ000DL2	HR44SQ000AX8
5/16	5/16	4	HR1XSQ000220	HR2XSQ000799	HR3XSQ000GY1	HR4XSQ000DN7	HR44SQ000AY6
5/16	5/16	6	HR1XSQ000238	HR2XSQ0007B9	HR3XSQ000GZ9	HR4XSQ000DP3	HR44SQ000AZ4
5/16	5/16	8	HR1XSQ000246	HR2XSQ0007C7	HR3XSQ000H00	HR4XSQ000DQ1	HR44SQ000B05
3/8	3/8	3	HR1XSQ0002W9	HR2XSQ0007X0	HR3XSQ000HC9	HR4XSQ000E36	HR44SQ000BA8
3/8	3/8	4	HR1XSQ0002Y4	HR2XSQ0007Z6	HR3XSQ000HE4	HR4XSQ000E51	HR44SQ000BB6
3/8	3/8	6	HR1XSQ000303	HR2XSQ000807	HR3XSQ000HF2	HR4XSQ000E69	HR44SQ000BC4
3/8	3/8	8	HR1XSQ000329	HR2XSQ000823	HR3XSQ000HG0	HR4XSQ000E77	HR44SQ000BD1
3/8	3/8	10	HR1XSQ000345	HR2XSQ000849	HR3XSQ000HH8	HR4XSQ000E85	HR44SQ000BE9
1/2	1/2	3	HR1XSQ0003W8	HR2XSQ0008S0	HR3XSQ000HU9	HR4XSQ000EN6	HR44SQ000BR1
1/2	1/2	4	HR1XSQ0003Y3	HR2XSQ0008U6	HR3XSQ000HV7	HR4XSQ000EQ0	HR44SQ000BS8
1/2	1/2	6	HR1XSQ000402	HR2XSQ0008W2	HR3XSQ000HW5	HR4XSQ000ER8	HR44SQ000BT6
1/2	1/2	8	HR1XSQ000428	HR2XSQ0008X9	HR3XSQ000HX2	HR4XSQ000ES5	HR44SQ000BU4
1/2	1/2	10	HR1XSQ000444	HR2XSQ0008Z5	HR3XSQ000HY0	HR4XSQ000ET3	HR44SQ000BV2
5/8	5/8	4	HR1XSQ0004G2	HR2XSQ000955	HR3XSQ000J16	HR4XSQ000EZ0	HR44SQ000BW0
5/8	5/8	6	HR1XSQ0004J5	HR2XSQ000971	HR3XSQ000J32	HR4XSQ000F19	HR44SQ000BX7
5/8	5/8	8	HR1XSQ0004K3	HR2XSQ000989	HR3XSQ000J40	HR4XSQ000F27	HR44SQ000BY5
3/4	3/4	4	HR1XSQ0004Y2	HR2XSQ0009G6	HR3XSQ000JB9	HR4XSQ000FA4	HR44SQ000C53
3/4	3/4	6	HR1XSQ000519	HR2XSQ0009K7	HR3XSQ000JD4	HR4XSQ000FC0	HR44SQ000C61
3/4	3/4	8	HR1XSQ000527	HR2XSQ0009L5	HR3XSQ000JE2	HR4XSQ000FD7	HR44SQ000C79
1	1	5	-	HR2XSQ0009Y6	-	-	-
1	1	6	HR1XSQ0005H9	HR2XSQ000A08	HR3XSQ000JQ6	HR4XSQ000FQ9	HR44SQ000CD0
1	1	8	HR1XSQ0005K2	HR2XSQ000A24	HR3XSQ000JS1	HR4XSQ000FR7	HR44SQ000CE8

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)

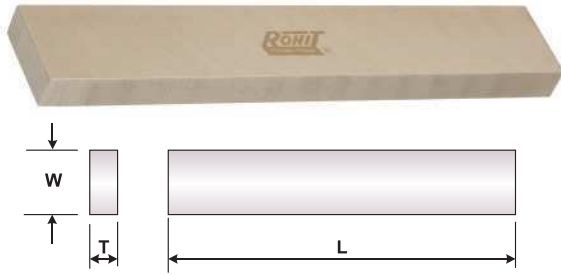


Tolerance (Width/Thickness)	h13
Tolerance (Length)	+/- 1.0mm
End Bevel	15°
Optional Bevel	0°/ 10°

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	HR2XSQ000617	HR3XSQ000G35	HR4XSQ000CK5	HR44SQ00A89
3	3	100	HR1XSQ000C5	HR2XSQ000625	HR3XSQ000G43	HR4XSQ000CL3	HR44SQ00A97
5	5	75	HR1XSQ00139	HR2XSQ0006L8	HR3XSQ000GF3	HR4XSQ000CZ2	HR44SQ00AK7
5	5	100	HR1XSQ00154	HR2XSQ0006M6	HR3XSQ000GG1	HR4XSQ000D03	HR44SQ00AL5
5	5	150	HR1XSQ00162	HR2XSQ0006N3	HR3XSQ000GH9	HR4XSQ000D11	HR44SQ00AM3
6	6	75	HR1XSQ001B6	HR2XSQ0006R5	HR3XSQ000GK2	HR4XSQ000D45	HR44SQ00AN0
6	6	100	HR1XSQ001D1	HR2XSQ0006S2	HR3XSQ000GL0	HR4XSQ000D52	HR44SQ00AP6
6	6	150	HR1XSQ001F7	HR2XSQ0006T0	HR3XSQ000GM8	HR4XSQ000D60	HR44SQ00AQ4
6	6	200	HR1XSQ001G5	HR2XSQ0006U8	HR3XSQ000GN5	HR4XSQ000D78	HR44SQ00AR2
8	8	75	HR1XSQ00261	HR2XSQ0007G8	HR3XSQ000H26	HR4XSQ000DS6	HR44SQ00B13
8	8	100	HR1XSQ00295	HR2XSQ0007H6	HR3XSQ000H34	HR4XSQ000DT4	HR44SQ00B21
8	8	150	HR1XSQ002B5	HR2XSQ0007J1	HR3XSQ000H42	HR4XSQ000DU2	HR44SQ00B39
8	8	200	HR1XSQ002C3	HR2XSQ0007K9	HR3XSQ000H59	HR4XSQ000DV0	HR44SQ00B47
10	10	75	HR1XSQ00352	HR2XSQ000864	HR3XSQ000HJ3	HR4XSQ000EA5	HR44SQ00BF7
10	10	100	HR1XSQ00378	HR2XSQ000880	HR3XSQ000HK1	HR4XSQ000EB3	HR44SQ00BG5
10	10	150	HR1XSQ00394	HR2XSQ000898	HR3XSQ000HL9	HR4XSQ000EC1	HR44SQ00BH3
10	10	200	HR1XSQ003A6	HR2XSQ0008A0	HR3XSQ000HM7	HR4XSQ000ED8	HR44SQ00BJ8
10	10	250	HR1XSQ003B4	HR2XSQ0008B8	HR3XSQ000HN4	HR4XSQ000EE6	HR44SQ00BK6
12	12	75	HR1XSQ003K4	HR2XSQ0008D3	HR3XSQ000HP0	HR4XSQ000EH0	HR44SQ00BL4
12	12	100	HR1XSQ003L2	HR2XSQ0008F9	HR3XSQ000HQ8	HR4XSQ000EJ5	HR44SQ00BM2
12	12	150	HR1XSQ003M0	HR2XSQ0008J0	HR3XSQ000HR6	HR4XSQ000EK3	HR44SQ00BN9
12	12	200	HR1XSQ003N7	HR2XSQ0008K8	HR3XSQ000HS3	HR4XSQ000EL1	HR44SQ00BP5
12	12	250	HR1XSQ003P3	HR2XSQ0008L6	HR3XSQ000HT1	HR4XSQ000EM9	HR44SQ00BQ3
16	16	100	HR1XSQ004M9	HR2XSQ000997	HR3XSQ000J57	HR4XSQ000F35	HR44SQ00BZ3
16	16	150	HR1XSQ004P2	HR2XSQ0009A9	HR3XSQ000J65	HR4XSQ000F43	HR44SQ000C04
16	16	200	HR1XSQ004Q0	HR2XSQ0009B7	HR3XSQ000J73	HR4XSQ000F50	HR44SQ000C12
20	20	100	HR1XSQ00543	HR2XSQ0009M3	HR3XSQ000JF0	HR4XSQ000FF3	HR44SQ000C87
20	20	150	HR1XSQ00550	HR2XSQ0009N0	HR3XSQ000JG8	HR4XSQ000FG1	HR44SQ000C95
20	20	200	HR1XSQ00568	HR2XSQ0009Q4	HR3XSQ000JH6	HR4XSQ000FH9	HR44SQ000CA7
25	25	150	HR1XSQ005B2	HR2XSQ0009V3	HR3XSQ000JL7	HR4XSQ000FL0	HR44SQ000CB5
25	25	200	HR1XSQ005D7	HR2XSQ0009W1	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

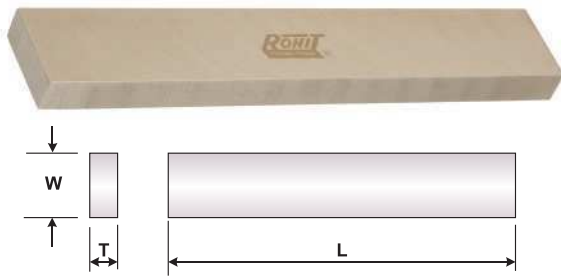
Thickness (T) (Inches)	Width (W) (Inches)	Overall Length (L) (Inches)	1X (M2, 0%Co)	2X (M35, 5%Co)	3X (T42, 10%Co)
3/8	1+1/4	6	HR1XRE00912	HR2XRE00G17	HR4XRE00TS7
3/8	1+1/4	8	HR1XRE00920	HR2XRE00G25	HR4XRE00TT5
3/8	1+1/2	6	HR1XRE00938	HR2XRE00G33	HR4XRE00TY4
3/8	1+1/2	8	HR1XRE00946	HR2XRE00G41	HR4XRE00TZ2
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

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

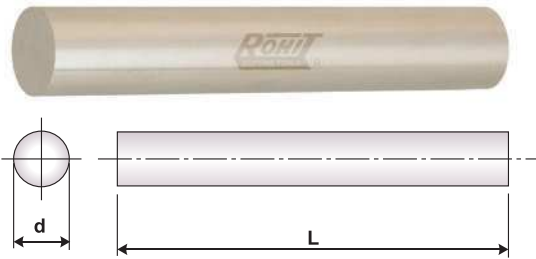
- Flat Tool Bits comes with 0° End Bevel Angles, but on special requirement or drawings bevel angles are provided.
- Standard tolerance of h13 is followed for all our Rectangular tool bits, specific tolerance can be manufactured on request.

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

Intermediate Sizes are available on request.

Packing: Plastic Boxes only

HSS Round Tool Bits | (Inch Sizes)



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

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

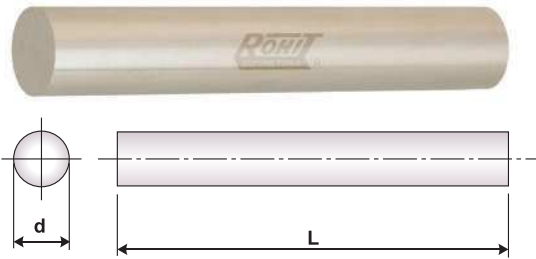
Features

- 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 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

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	HR3XRD02YW9	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	HR2XRD02XX8	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

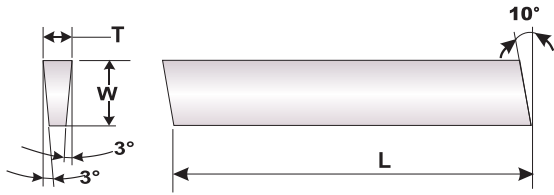
- Round Tool Bits comes with 0° End Bevel Angles.
- Standard tolerance of h9 is followed for all our Round tool bits.
- More than 12000+ sizes of Round HSS Tool bits are in stock to choose from in all materials put together.

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	-	-

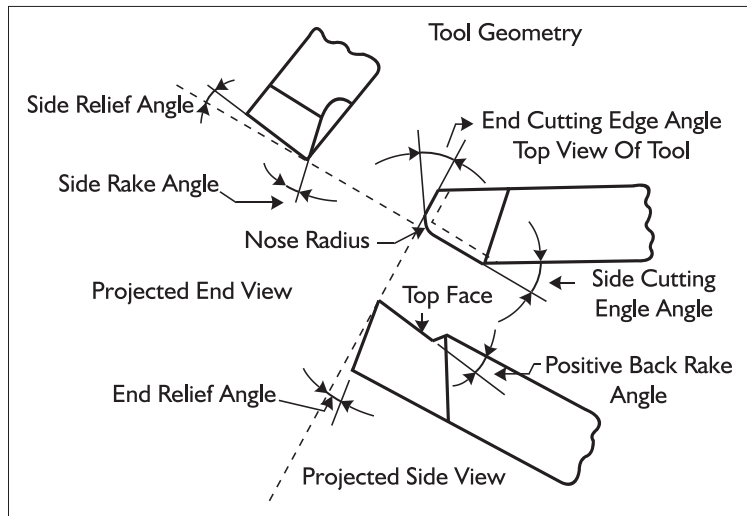
Features

- 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



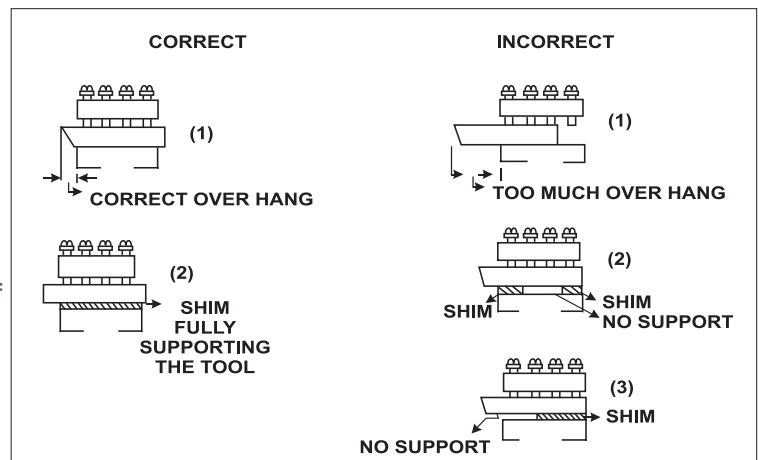
Machining Instructions

- 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 (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

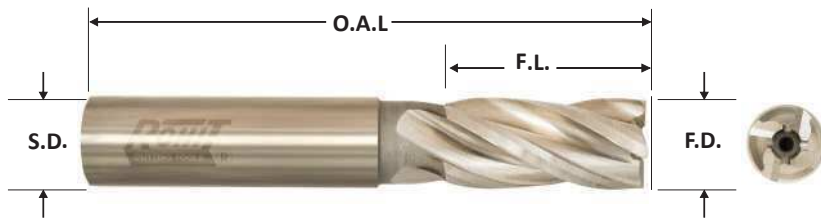
Recommended Depth of cut

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	Too Keen a cutting edge. Chatter. Incorrect tool material. Too much relief. Lack of rigidity. Improper grinding.	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.
Cracking or Breaking	Feed too heavy. Worn out cutting edges Improperly applied coolant. Too much rake or relief. Too much over hang. Lack of rigidity. Too much variation in depth of cut for the size of Tool bit. Improper clamping.	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. 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.
Chatter	Tool not in centre. Insufficient relief or clearance. Too much rake angle. Nose radius too large. Insufficient H.P.	Reset. Grind with adequate relief. Grind to recommended rake angle. Reduce the nose radius on the tool. Reduce depth of cut & feed.
Tom Finish	Speed too low. Dull tool. Improper grinding.	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
Flank wear	Speed too high. Feed too light. Improper grinding.	Reduce speed as recommended. Increase suitably. See grinding.
Crater wear	Speed too high. Feed too high. Tool of incorrect grade.	Reduce speed. Reduce feed. Select tool material of better hot Hardness.
Glaze	Speed too low. Tool finish rough. Tool little rake.	Use recommended speed. Grind tool with finer grit wheel give finer wheel and give finer finish on the cutting faces. Provide adequate rake.



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

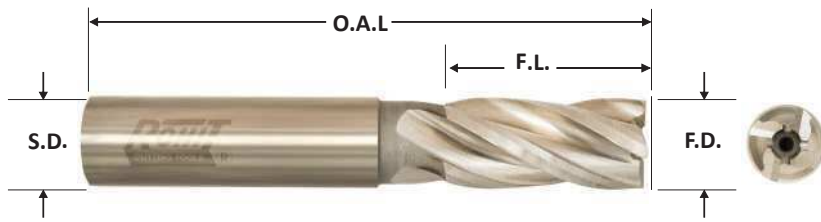
Features

- 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.



Tolerance	
F.D.	js14
S.D.	h8

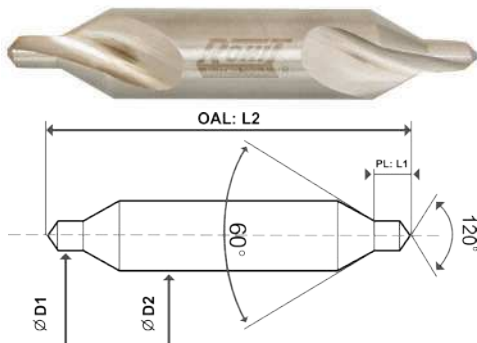
Features

- 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.



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	186
P102	HSS Tapered Head Punches	187
P103	HSS Straight Punches For Medium Load	188
P104	HSS Straight Punches For Heavy Load	189
P105	HSS Mini Straight Punches	190
P106	HSS Shoulder Punches	191
P107	HSS Shoulder Punches For Heavy Load	192
P108	HSS Shoulder Punches Short Type	193
P109	HSS Tapped Punches	194
P110	HSS Block Punches	195
P112	HSS Straight Button Dies	196
P113	HSS Headed Button Dies	196

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



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

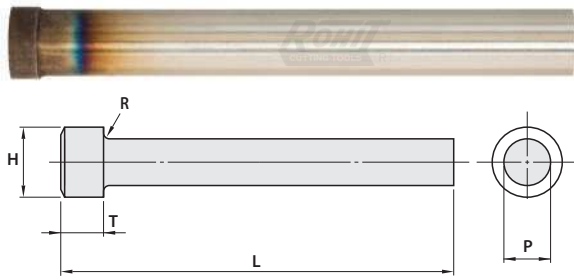
Sr. No	For Series P106-P108	Types / Size	Example
1	Select Series	P106 - P109	P106
2	Select HSS Grade	1X / AS	1X
3	Select Head Diameter ("H")	15mm	15
4	Select TIP Diameter ("P")	10.9mm	1090
5	Select OAL (Overall Length - "L")	100mm	100
6	Select TIP Length ("B")	13mm	13
	Ordering Code		P106-1X-15-1090-100-13

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



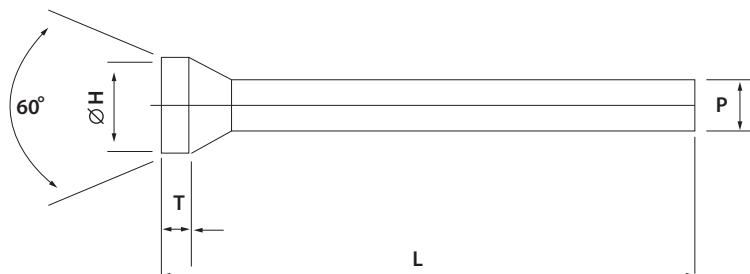
Tolerance	
H	0, -0.2
L	+/-0.5
P	0, -0.02
T	+/-0.3

- 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)			
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)			
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



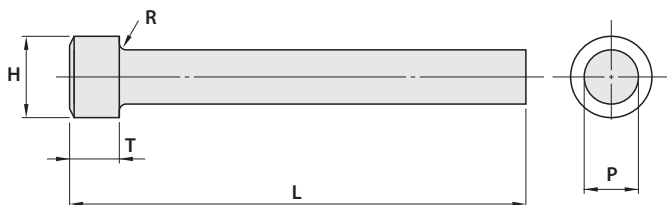
Tolerance	
H	0, -0.2
L	+/-0.5
P	0, -0.02
T	+/-0.3

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

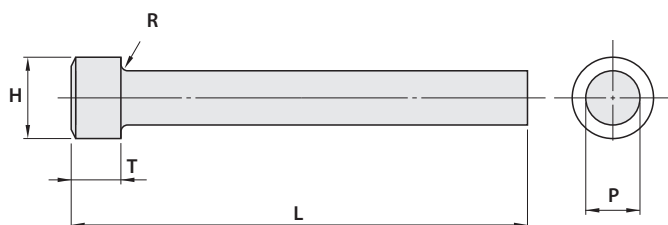


HEAD DIA "H" (mm)	BODY DIA "P" (0.1 mm increments) min. "P" max.	OVERALL LEN "L" (mm)				
5	2.1~3.0	50	70	80		
6	3.1~4.0	50	70	80		
7	4.1~5.0	50	70	80		
8	5.1~6.0	50	70	80		
9	6.1~7.0	50	70	80	100	
10	7.1~8.0	50	70	80	100	
11	8.1~9.0	50	70	80	100	
12	9.1~10.0	50	70	80	100	120
13	10.1~11.0	50	70	80	100	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

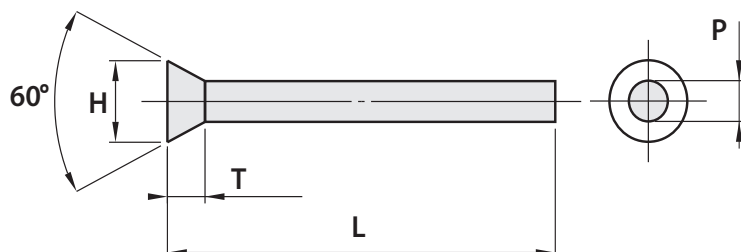


Tolerance	
H	0, -0.2
L	+/-0.5
P	0, -0.02



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

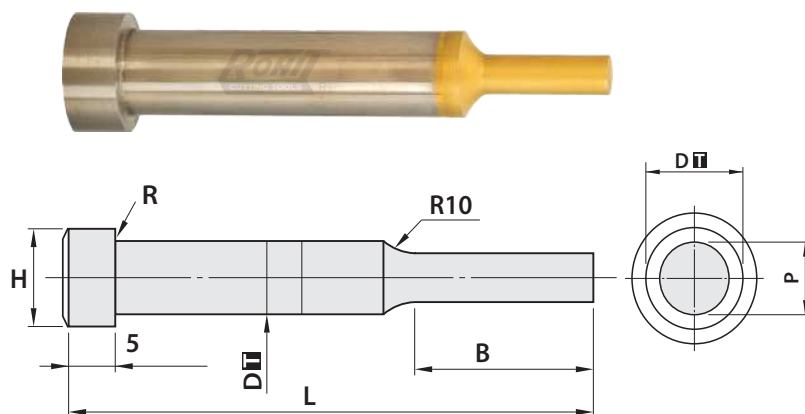


Tolerance	
H	0, -0.2
L	+/-0.5
P	0, -0.02

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	
3.6	2	
3.8	2.1	
3.9	2.2	
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	

25mm
35mm
40mm
50mm

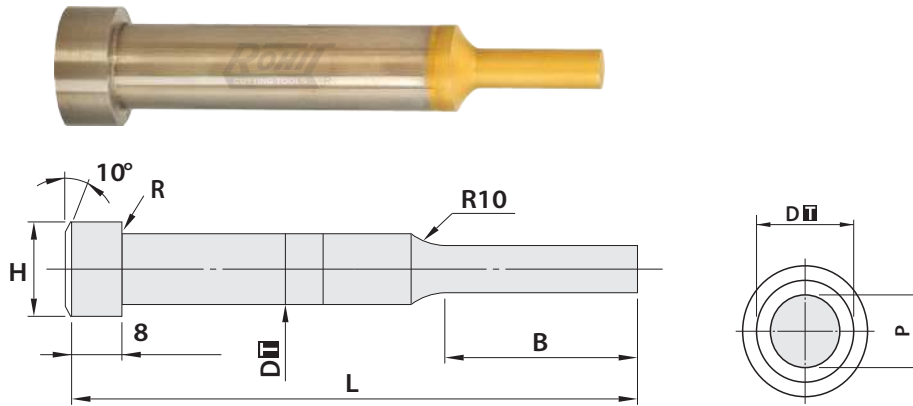
NOTE: This is Non-stock Item, ask your RIGPL representative for Delivery Period



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

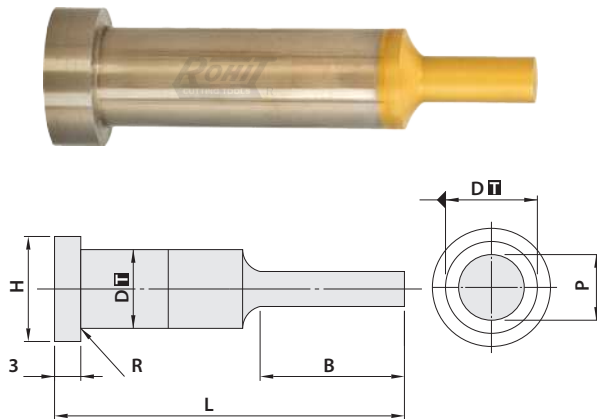
NOTE: This is Non-stock Item, ask your RIGPL representative for Delivery Period



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

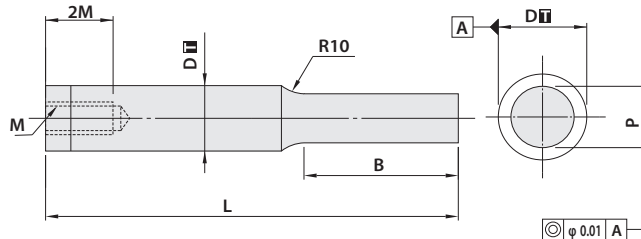
NOTE: This is Non-stock Item, ask your RIGPL representative for Delivery Period



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

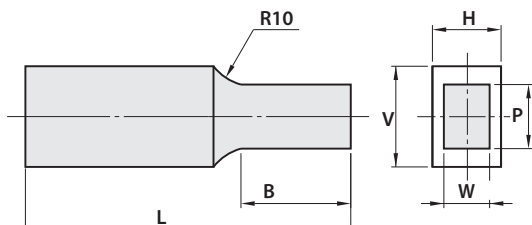
NOTE: This is Non-stock Item, ask your RIGPL representative for Delivery Period



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

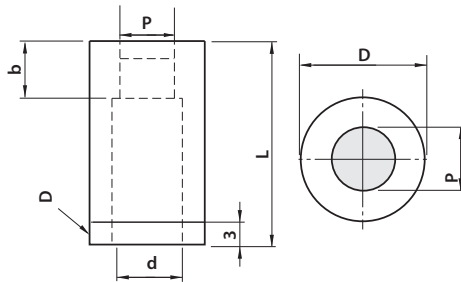
NOTE: This is Non-stock Item, ask your RIGPL representative for Delivery Period



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

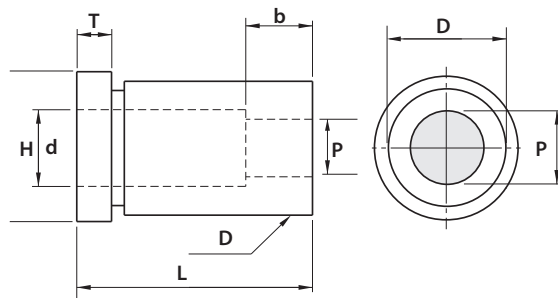
HEAD WID "H" (mm)	TIP WIDTH "W" (0.1 mm increments) min. "W" max.	HEAD HEIGHT "V" mm									OAL "L" (mm)	TIP LEN "B" (mm)	
		8	10	13	16	20	22	25	28	30		S	L
		TIP HEIGHT "P" min~max (0.1 mm increments)											
		3~8	3~10	4~13	5~16	6~20	7~22	8~25	18~28	10~30			
8	3.0~8.0	o	o	o	o	o	o	o	o	o	70	8	13
10	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



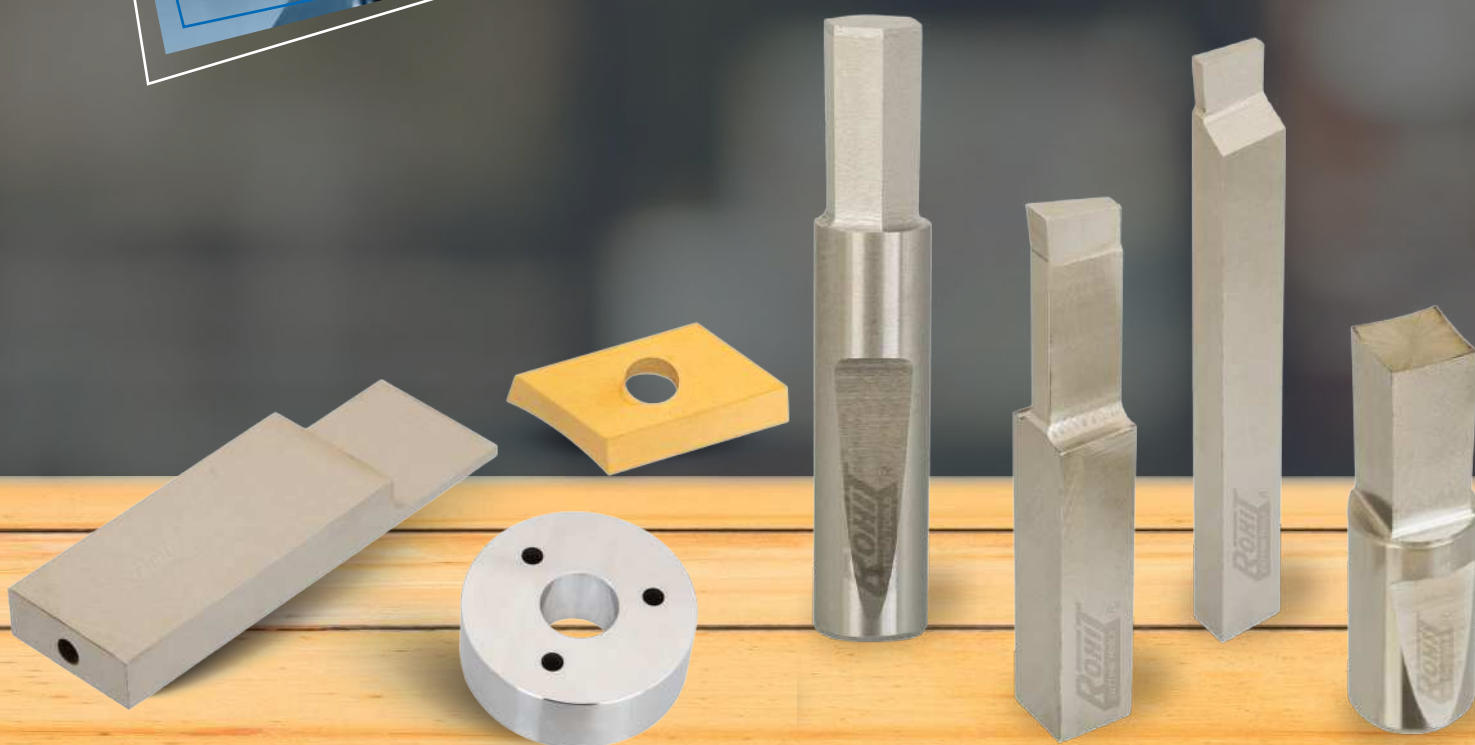
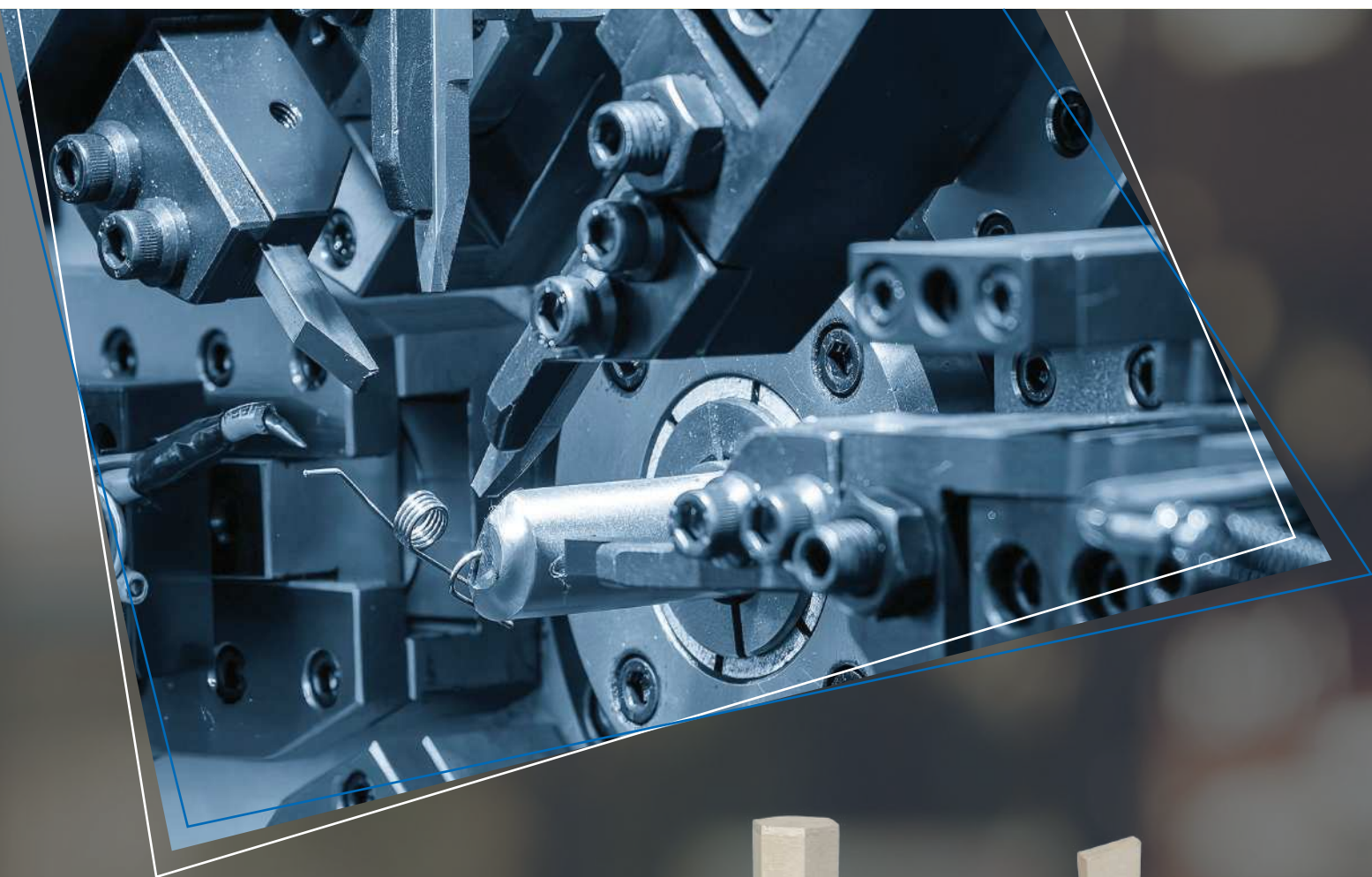
Tolerance	
b	0, +0.5
D, P, d	+/-0.02
L	+/-0.5

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



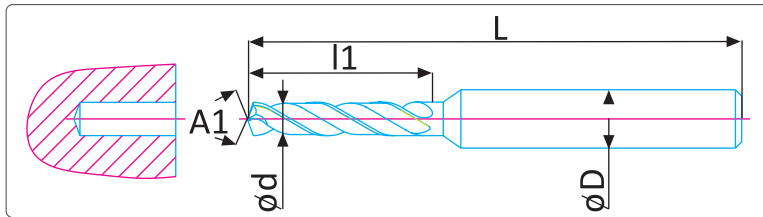
1. Fill in information requested on drawing. (*Required Fields)

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

☐ Request Approval Drawing

Step Drill

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

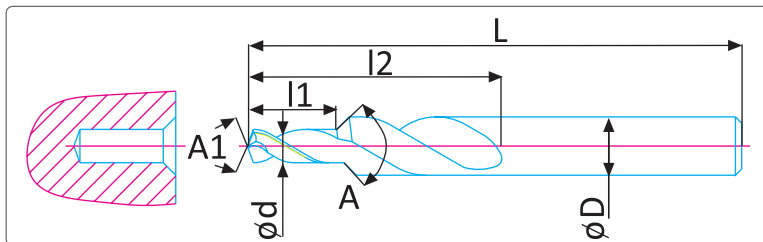


d :

l1 :

A° :

d1 :

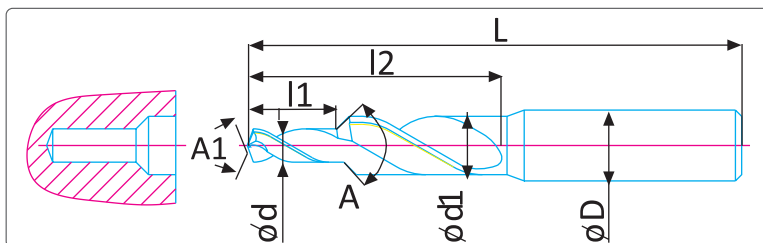


l2 :

A1° :

D :

L :



No. of flute :

Helix :

Coating :

Quantity, pcs :

Customer Name:

Phone:

*Work Material Machined:

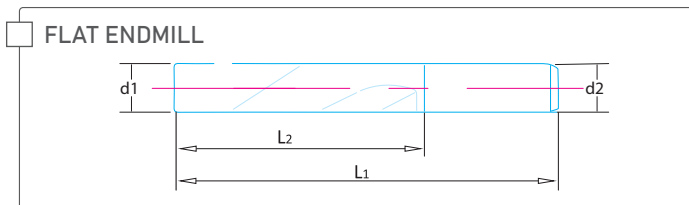
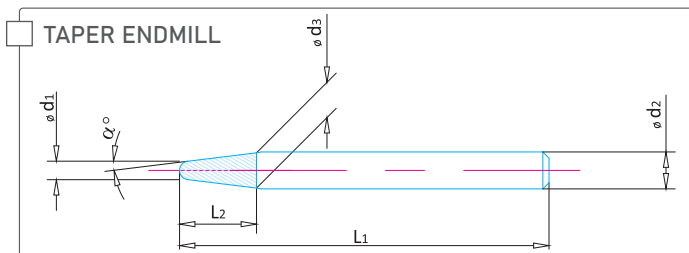
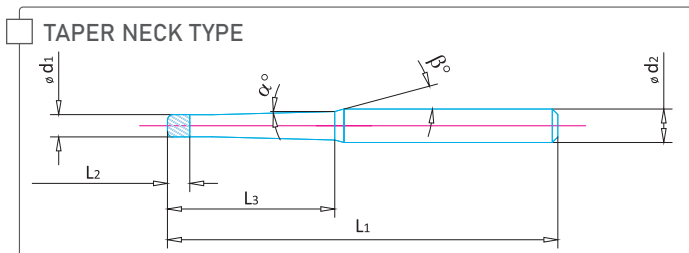
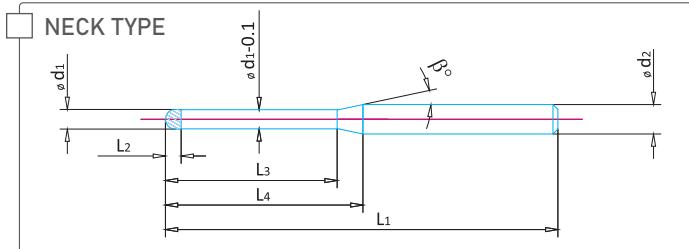
Hardness:

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**



TiALN

Titanium Aluminum Nitride or TiALN is a high performance coating allowing tools to run at higher speeds and feeds in a wide array of materials in milling & drilling applications.

HYPERLOX

Aluminum Titanium Supernitride : NanoComposite or HYPERLOX is especially designed for milling hardened steels above 40 HRC.

NOVA

AlTiN/TiSiXN based material composition with multi layer coating up to 4 microns thickness. This coating is versatile in its use for drilling and milling materials up to hardness of 60HRC.

AL-PRO

AlCrN-based material composition with multi layer coating up to 2~4 microns thickness allows tools to be run at higher cutting speeds and feeds, which can increase productivity while machining AS & SUS material.

PEROX

Nanocrystalline AlTiN-based coating features excellent hot hardness, resistance to oxidation & thermal insulating properties which provides tool protection at elevated temperatures while drilling Exotic Materials.

TISINOVA

AlTiSiN based coating done with advanced S3p technology, which produces exceptionally smooth and defect-free surfaces. Outstanding tool life and greater reliability in machining High-temperature alloys and Hardened Steel upto 70HRC. This coating can be used for both wet & dry machining applications.

ALU-IRIS

New Carbon based coating with high hardness and smoother finish which minimises material adhesion. It is extremely thin, which keeps cutting edges sharp and gives exceptional finishing on Aluminium and its alloys

COATING PROPERTIES

Coating	RIGPL Tool Number	Coating Thickness [μm]	Coating Hardness HIT (GPa)	Coefficient of Friction	Max. Working Temperature (°C)	Coating Color
TiALN	- F	5~6	35 +/- 3	0.3 - 0.4	800 °C	Black Grey
HYPERLOX	- H	5~6	36 +/- 3	0.3 - 0.35	1000 °C	Black Grey
NOVA	- N	3~5	37 +/- 3	0.35 - 0.4	1100 °C	Copper
AL-PRO	- A	3~5	36 +/- 3	0.3 - 0.35	1000 °C	Bright Grey
PEROX	- P	2~4	38 +/- 3	0.35 - 0.4	1100 °C	Aubergine Grey
TISINOVA	- TN	2~4	38 +/- 3	0.4 - 0.45	1000 °C	Bright Bronze
ALU-IRIS	- M	0.2~0.3	65 +/- 3	<0.1	800 °C	Rainbow

See something you like to try?



RIGPL

Application Mapper

Customer Details

Date:	
Customer & Location:	
Contact Person: Name, Dept, Desig, Mob, Mail	
# of VMC / SPM Machines	
Dealer Name & Location	
Dealer Representative	
RIGPL Representative	

Solid Carbide (₹/Month)

Application Details

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, (DxFLxOALxSH; 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: +91-85869-23456

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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H.O. / Unit-I : Plot # 653-656, MIE PART-A, BAHADURGARH, HARYANA-124507, INDIA

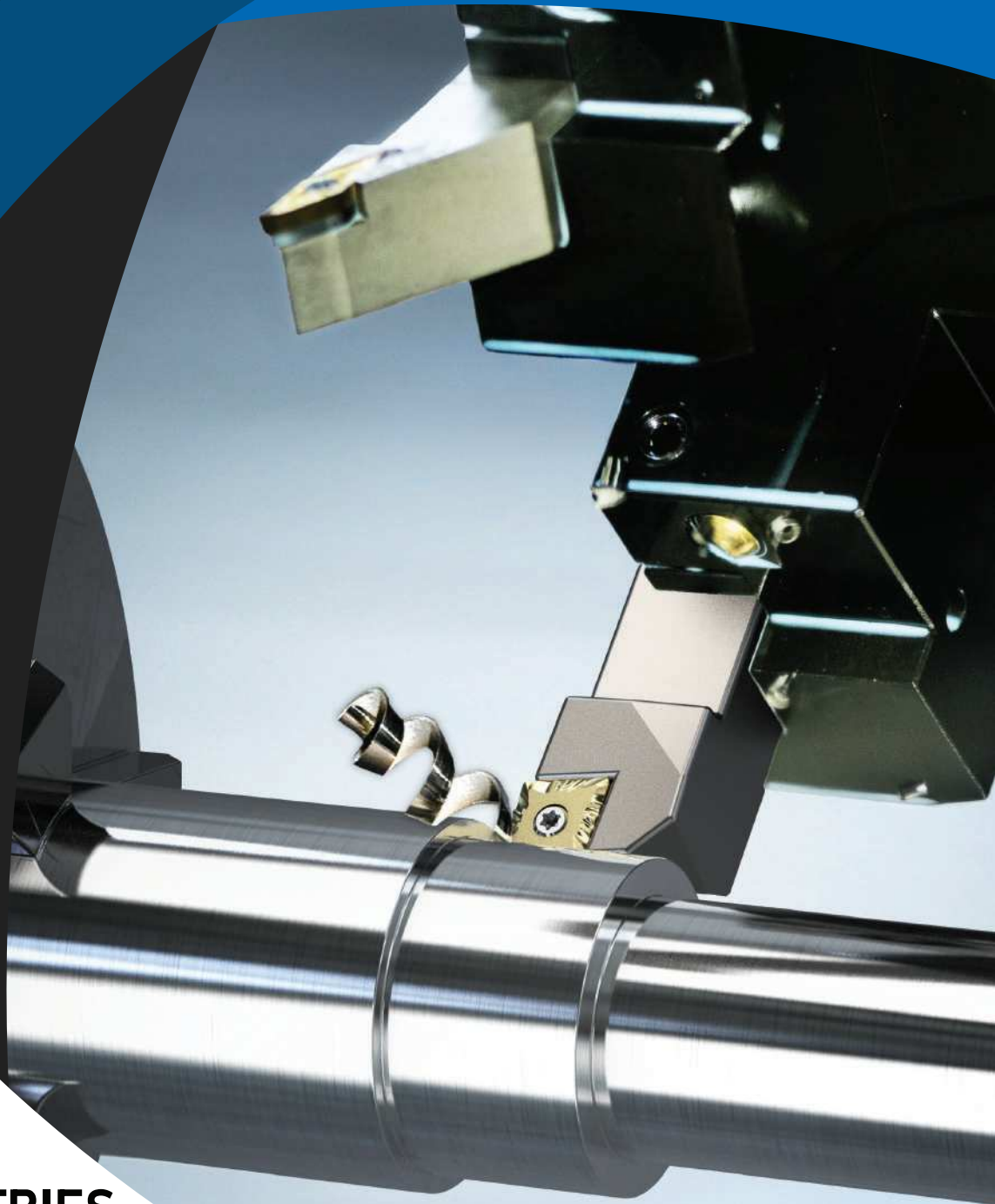
Unit-II : Plot # 337, MIE PART-A, BAHADURGARH, HARYANA-124507, INDIA

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

ISO Tolerance	Nominal Diameter of Tool (mm)					
Designation	≤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



Authorized Distributor



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