



PRODUCT CATALOG

ROHIT
SINCE 1963
CUTTING TOOLS
cuts everything* EXCEPT YOUR POCKET





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Carbide High Performance Drills (CTHS, CTHL series)

Newly Developed High Wear Resitance 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

Details on Pg. 28-31



Carbide High Performance Drills (C3HS, C3HL Series)

Newly Developed High Wear Resitance NOVA coating

Edge Honing to provide sturdy drill point

Edge Chamfer to provide longer cutting edge life

New chip Curling design for faster chip breakage

Best suited for Drilling
Alloy Steel, SS, Titanium & Ni alloys

Details on Pg.24-27



"**Carbide End Mills 301** or **302 Series**
especially designed for
Hard Machining up to 60HRc

Use our
401 or 402 series
for machining up to 70HRc"

Details on Pg. 74-75 & 69-70



"Wood machining tools to
cater to ever so growing
needs of the
Wood Routing industry

Details on Pg. 98-105



"Use **High Feed Cutters** or
407 Series for
Roughing operations
on your Hard-die materials
before you use
RIGPL 402 or **302 series**
to finish them"

Details on Pg. 73



"**HSS M2, M35**
or
PM Grade Punches
to cater to Die-Mold, Press Tools,
Rivet & Fastener Industry"

Details on Pg. 144-160

TABLE OF CONTENTS-CUM-SELECTION GUIDE

1st	1st Choice
2nd	2nd choice

CARBIDE DRILLS

Series Group	Name	Series	Coating Type	Diameter Range (in mm)	Page Number	Internal coolant	Low Carbon Steel	Alloy Steel (Upto 35Hrc)	Alloy Steel (35 To 45Hrc)	Austenitic Stainless Steel	Precipitation Hardened Stainless	Cast Iron	Special Alloys	Hardened Steels	Non-Ferrous
General Purpose Drills	Stub Series	C1GS	TiALN	2 ~ 13	18	NO	2nd	2nd	2nd	2nd		2nd			1st
	Jobber Series	C1GJ	NONE / TiALN	2 ~ 13	20	NO	2nd	2nd	2nd	2nd		2nd			1st
High Performance Drills	Parallel Shank	C1HP	TiALN	3~16	22	NO	1st	2nd	2nd	2nd	2nd	1st			
	Short Series	C3HS	NOVA	2 ~ 20	24	NO	1st	1st	1st	1st	1st	1st	1st	1st	
	Long Series	C3HL	NOVA	2 ~ 20	26	NO	1st	1st	1st	1st	1st	1st	1st	1st	
	Coolant Fed Short Drills	CTHS	NOVA	4 ~ 20	28	YES	1st	1st	1st	1st	1st	1st	1st	1st	
	Coolant Fed Long Drills	CTHL	NOVA	4 ~ 20	30	YES	1st	1st	1st	1st	1st	1st	1st	1st	
	MQL Drills	CTHM	NOVA	4 ~ 12	32	YES	1st	1st	2nd	2nd	2nd	1st			
Misc. Drills	NC-Spotting Drills 90*	C1N1	NONE	6 ~ 20	33	NO	1st	1st	1st	1st	1st	1st	1st	1st	
	NC-Spotting Drills 120*	C1N2	NONE	6 ~ 20	33	NO	1st	1st	1st	1st	1st	1st	1st	1st	
	Centre Drills BS328	C1CB	NONE	BS1-BS8	34	NO	1st	1st	1st	1st	1st	1st	1st	1st	
	Centre Drills DIN333	C1CD	NONE	1.25 ~ 8	34	NO	1st	1st	1st	1st	1st	1st	1st	1st	
	Technical Information				38-44										

CARBIDE REAMERS

	Carbide St. Flute Reamers	C1RS	TiALN	3~16	46	No	1st	1st	1st	1st	1st	1st	1st	1st	1st
	Carbide LHS/RHC Reamers	C1RL	TiALN	3~16	47	No	1st	1st	1st	1st	1st	1st	1st	1st	1st
	Carbide RHS/RHC Reamers	C1RR	TiALN	3~16	48	No	1st	1st	1st	1st	1st	1st	1st	1st	1st
	Technical Information	Troubleshooting			50-53										

TABLE OF CONTENTS-CUM-SELECTION GUIDE

GP - General Purpose End Mills	* New Series
HP - High Performance End Mills	

DELIVERY TIME		
	+	1 Week
	++	2 Weeks

1st	1st Choice
2nd	2nd choice

CARBIDE END MILLS

SERIES GROUP	SERIES	COATING TYPE	DIA RANGE	STOCK	# OF FLUTES	SQUARE END	BALL NOSE	CORNER RADIUS	NECK RELIEF	PAGE NUMBER	LOW CARBON STEEL	ALLOY STEEL (UPTO 35HRC)	ALLOY STEEL (35 TO 45HRC)	AUSTENITIC STAINLESS STEEL	PRECIPITATION HARDENED STAINLESS	HIGH TEMP ALLOYS	TITANIUM	GREY CAST IRON	DUCTILE CAST IRON	HARDENED STEEL	NON-FERROUS	PLASTICS	GLASS / CERAMIC	MDF WOOD/ HARD WOOD
HP-STEEL	220	TiALN	4-20	++	4	x				56	1st	2nd	2nd	2nd	2nd									
	320	NOVA	4-16	Yes	4	x				57	1st	1st	1st	2nd	2nd									
HP-SUS*	222	NOVA	4-20	++	4	x				61	2nd	1st	1st	1st	1st	2nd	2nd							
	321	NOVA	4-20	++	4	x		x		62	2nd	1st	1st	1st	1st	2nd	2nd							
	322	NOVA	4-20	++	4	x				63	2nd	1st	1st	1st	1st	2nd	2nd							
	422	NOVA	4-12	++	4	x				66		2nd	2nd	1st	1st	1st	1st							
HP-SSM*	224	NOVA	4-20	++	4	x		NO CR		67	2nd	1st	1st	2nd	2nd									
	324	NOVA	4-20	++	4	x		NO CR		68	2nd	1st	1st	1st	2nd	2nd								
HP-4X	401	ALDURA	2-12	++	4	x				69										< 70HRc				
	402	ALDURA	1-12	++	2		x			70										< 70HRc				
	403	ALDURA	1-12	++	2	x				71										< 70HRc				
	406	ALDURA	2-12	++	2		x		x	72										< 70HRc				
	407	ALDURA	6-12	++	6	x		x	x	73										< 70HRc				
HP-3X	301	NOVA	2-16	Yes	4	x				74										< 60HRc				
	302	NOVA	3-16	Yes	4		x			75										< 60HRc				
	303	NOVA	1-12	++	2	x				76										< 60HRc				
	304	NOVA	1-12	Yes	2		x			77										< 60HRc				
	305	NOVA	1-4	++	2	x			x	78										< 60HRc				
	306	NOVA	1-4	++	2		x		x	79										< 60HRc				
	307	NOVA	2-12	++	2		x		x	80										< 60HRc				
	308	NOVA	6-20	++	6	x		x		81	1st	1st	2nd	2nd	2nd	2nd	2nd	1st	1st					

GP - General Purpose End Mills	* New Series
HP - High Performance End Mills	

DELIVERY TIME		
	+	1 Week
	++	2 Weeks

1st	1st Choice
2nd	2nd choice

CARBIDE END MILLS CONTINUES...

SERIES GROUP	SERIES	COATING TYPE	DIA RANGE	STOCK	# OF FLUTES	SQUARE END	BALL NOSE	CORNER RADIUS	NECK RELIEF	PAGE NUMBER	LOW CARBON STEEL	ALLOY STEEL (UPTO 35HRC)	ALLOY STEEL (35 TO 45HRC)	AUSTENITIC STAINLESS STEEL	PRECIPITATION HARDENED STAINLESS	HIGH TEMP ALLOYS	TITANIUM	GREY CAST IRON	DUCTILE CAST IRON	HARDENED STEEL	NON-FERROUS	PLASTICS	GLASS / CERAMIC	MDF WOOD/ HARD WOOD
GP-1X	201	TiALN	2-25	Yes	4	x				82	1st	1st						1st	1st	<35HRc	2nd	2nd	2nd	
	202	TiALN	3-20	Yes	4		x			83	1st	1st						1st	1st	<35HRc	2nd	2nd	2nd	
	203	TiALN	1-16	++	2	x				84	1st	1st						1st	1st		2nd			2nd
	204	TiALN	1-16	++	2		x			85		2nd							2nd		2nd			2nd
	205	HYPER-LOX	2-16	Yes	4	x				86										<50HRc				
	206	HYPER-LOX	1-12	Yes	2		x			87										<50HRc				
	207	TiALN	2-10	++	4	x				88	1st	1st	2nd	2nd	2nd	2nd	2nd	1st	1st					
	208	TiALN	2-10	++	4		x			89	1st	1st	2nd	2nd	2nd	2nd	2nd	1st	1st					
	209	TiALN	1-4	++	2	x			x	90	1st	1st	2nd	2nd	2nd	2nd	2nd	1st	1st					
	210	TiALN	1-4	++	2		x		x	91	1st	1st	2nd	2nd	2nd	2nd	2nd	1st	1st					
	211	-	4-16	+	2	x				92											1st	1st		2nd
	213	-	4-16	+	3	x				93											1st	1st		
	218	TiALN	4-20	++	4	x		x		94	1st	1st	2nd	2nd	2nd	2nd	2nd	1st	1st					
	219	-	3-12	+	1	x				95	1st	1st		1st				1st	1st	1st				1st
GP-0X	101	TiALN	2-25	Yes	4	x				96	2nd	2nd						2nd	2nd		2nd	2nd	2nd	2nd
	102	TiALN	3-20	Yes	4		x			97	2nd	2nd						2nd	2nd		2nd	2nd	2nd	2nd
	103	-	1-12	Yes	2	x				98											1st	1st	1st	1st
	104	-	1-12	Yes	2		x			100											1st	1st	1st	1st
	105	-	4-16	+	3	x				102	2nd							2nd	2nd		1st	2nd	2nd	2nd
	107	-	3-16	+	1	x				103											1st	1st		1st
	108	-	1-4	+	2	x				104	2nd							2nd			1st	1st		1st
	109	-	1-4	+	2		x			105	2nd							2nd			1st	1st		1st
	110	TiALN	3-20	Yes	4	x				106	2nd	2nd							2nd	<45HRc				
	111	TiALN	3-12	++	4		x			107	2nd	2nd							2nd	<45HRc				
	118	-	3-12	+	2	x				108											2nd	2nd	1st	1st
	119	-	3-12	+	1	x				109	1st								1st	1st	1st			1st

Table of Contents — HSS Tools

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“HSS Square Tools Bits	(Inch Sizes)”	126
“HSS Square Tools Bits	(Metric Sizes)”	127
“HSS Rectangular (Flat) Tools Bits	(Inch Sizes)”	128
“HSS Rectangular (Flat) Tools Bits	(Metric Sizes)”	129
“HSS Round Tool Bits	(Inch Sizes)”	130
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“HSS Parallel Shank End Mills	(Imperial Sizes)”	138
“HSS Parallel Shank End Mills	(Metric Sizes)”	139
“HSS CENTRE DRILLS	Type ‘A’	140
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Table of Contents — HSS Punches

Series	Description	BODY/TIP DIA "P" (0.1 mm increments)	Page	Materials available	Drawing
P101	HSS Straight Punches	1.1-25	144	1X & ASP	
P102	HSS Tapered Head Punches	3.0-12	146	1X & ASP	
P103	HSS Straight Punches For Medium Load	2.1-25	147	1X & ASP	
P104	HSS Straight Punches For Heavy Load	2.1-25	148	1X & ASP	
P105	HSS Mini Straight Punches	1-3	149	1X & ASP	
P106	HSS Shoulder Punches	2-24.9	150	1X & ASP	
P107	HSS Shoulder Punches For Heavy Load	2-24.9	151	1X & ASP	
P108	HSS Shoulder Punches Short Type	2-9.9	152	1X & ASP	
P109	HSS Tapped Punches	2-24.9	153	1X & ASP	
P110	HSS Block Punches	-	154	1X	
P111	HSS Block Punches Tapped	-	156	1X	
P112	HSS Straight Button Dies	-	158	1X	
P113	HSS Headed Button Dies	-	159	1X	
	Variations available in punches	-	160	-	

ICON GLOSSARY

Icons

- Solid Carbide
- Coolant Fed
- 3X Drill Length
- 135° Drill Point Angle
- 12° Helix Angle
- >3mm DIN 6537L DIN Specs
- 45° Chamfer
- RHC Right hand Cutting
- Z2 Number of Flutes

Carbide Grain Size

- NG Nano Fine Grain
- UMG Ultra Micro Fine Grain
- SMG Sub Micro Fine Grain
- MG Micro Fine Grain

Coatings

- HYPERLOX
- NOVA
- TiALN
- ALDURA

Workpiece Material Group

- Steels
- Hardened Steels (35-65Rc)
- Stainless Steels
- Cast Iron
- Special Alloys
- Non-Ferrous

Mini Index Carbide Drills

High Performance Drilling

Features

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



Benefits

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

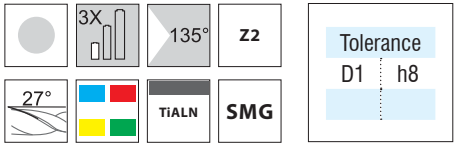
Type	Name	Series	Page No
General Purpose Drills	Stub Series	C1GS	18
	Jobber Series	C1GJ	20
High Performance Drills	Parallel Shank	C1HP	22
	Short Series	C3HS	24
	Long Series	C3HL	26
	Coolant Fed Short Drills	CTHS	28
	Coolant Fed Long Drills	CTHL	30
	MQL Drills	CTHM	32
Misc. Drills	NC-Spotting Drills 90*	C1N1	33
	NC-Spotting Drills 120*	C1N2	33
	Centre Drills BS328	C1CB	34
	Centre Drills DIN333	C1CD	34
	Technical Information	Technical	38-44



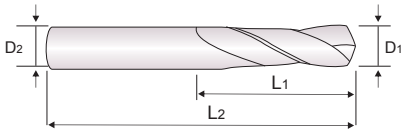








Tolerance	
D1	h8



Application :

- Solid Carbide GP Drills suitable for general purpose Drilling in materials like Cast Iron, high Al-Si Alloys, non-ferrous metals, abrasive plastics etc.

For Feed & Speed Rates go to Page no. 38

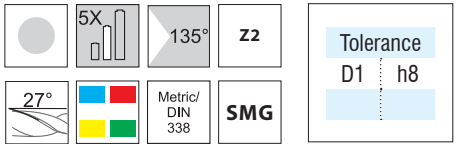
Item Code TiALN Coated	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR11GDR004U3	2.0	12	39	2.0
CR11GDR004Y4	2.1	14	39	2.1
CR11GDR004Z2	2.2	14	39	2.2
CR11GDR00503	2.3	14	39	2.3
CR11GDR00511	2.4	14	39	2.4
CR11GDR00529	2.5	14	39	2.5
CR11GDR00545	2.6	20	54	2.6
CR11GDR00552	2.7	20	54	2.7
CR11GDR00560	2.8	20	54	2.8
CR11GDR00586	2.9	20	54	2.9
CR11GDR00594	3.0	20	54	3.0
CR11GDR005C2	3.1	20	54	3.1
CR11GDR005E7	3.2	20	54	3.2
CR11GDR005G3	3.3	20	54	3.3
CR11GDR005J6	3.4	20	54	3.4
CR11GDR005M0	3.5	20	54	3.5
CR11GDR005P3	3.6	22	54	3.6
CR11GDR005R9	3.7	22	54	3.7
CR11GDR005T4	3.8	22	54	3.8
CR11GDR005V0	3.9	22	54	3.9
CR11GDR005X5	4.0	22	54	4.0
CR11GDR005Z1	4.1	24	63	4.1
CR11GDR00610	4.2	24	63	4.2
CR11GDR00636	4.3	24	63	4.3
CR11GDR00651	4.4	24	63	4.4
CR11GDR00677	4.5	24	63	4.5
CR11GDR006A5	4.6	26	63	4.6

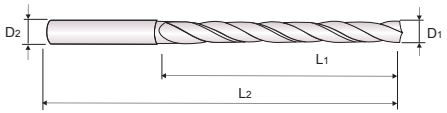
Item Code TiALN Coated	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR11GDR006C1	4.7	26	63	4.7
CR11GDR006E6	4.8	26	63	4.8
CR11GDR006G2	4.9	26	63	4.9
CR11GDR006J5	5.0	26	63	5.0
CR11GDR006L1	5.1	28	63	5.1
CR11GDR006N6	5.2	28	63	5.2
CR11GDR006R8	5.3	28	63	5.3
CR11GDR006U1	5.4	28	63	5.4
CR11GDR006W7	5.5	28	63	5.5
CR11GDR006Y2	5.6	28	63	5.6
CR11GDR00701	5.7	28	63	5.7
CR11GDR00727	5.8	28	63	5.8
CR11GDR00743	5.9	28	63	5.9
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

Item Code TiALN Coated	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR11GDR00842	7.4	34	79	7.4
CR11GDR00867	7.5	34	79	7.5
CR11GDR008A3	7.6	37	79	7.6
CR11GDR008C9	7.7	37	79	7.7
CR11GDR008E4	7.8	37	79	7.8
CR11GDR008G0	7.9	37	79	7.9
CR11GDR008J3	8.0	37	79	8.0
CR11GDR008L9	8.1	37	79	8.1
CR11GDR008N4	8.2	37	79	8.2
CR11GDR008R6	8.3	37	79	8.3
CR11GDR008T1	8.4	37	79	8.4
CR11GDR008W5	8.5	37	79	8.5
CR11GDR00909	8.6	40	79	8.6
CR11GDR00933	8.7	40	79	8.7
CR11GDR00958	8.8	40	79	8.8
CR11GDR00982	8.9	40	79	8.9
CR11GDR009A2	9.0	40	79	9.0
CR11GDR009E3	9.1	40	79	9.1
CR11GDR009G9	9.2	40	79	9.2
CR11GDR009J2	9.3	40	79	9.3
CR11GDR009L8	9.4	40	79	9.4
CR11GDR009N3	9.5	40	79	9.5
CR11GDR009Q7	9.6	42	79	9.6
CR11GDR009S2	9.7	42	79	9.7
CR11GDR009V6	9.8	42	79	9.8
CR11GDR009X1	9.9	42	79	9.9
CR11GDR009Z7	10.0	42	79	10.0
CR11GDR00A19	10.1	42	79	10.1
CR11GDR00A27	10.2	42	79	10.2
CR11GDR00A43	10.3	47	100	10.3
CR11GDR00A50	10.4	47	100	10.4
CR11GDR00A68	10.5	47	100	10.5
CR11GDR00A92	10.6	47	100	10.6
CR11GDR00AA4	10.7	47	100	10.7
CR11GDR00AB2	10.8	47	100	10.8
CR11GDR00AD7	10.9	47	100	10.9
CR11GDR00AE5	11.0	47	100	11.0
CR11GDR00AG1	11.1	47	100	11.1
CR11GDR00AH9	11.2	47	100	11.2
CR11GDR00AJ4	11.3	47	100	11.3
CR11GDR00AK2	11.4	47	100	11.4

Item Code TiALN Coated	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR11GDR00AL0	11.5	47	100	11.5
CR11GDR00AN5	11.6	49	100	11.6
CR11GDR00AP1	11.7	49	100	11.7
CR11GDR00AQ9	11.8	49	100	11.8
CR11GDR00AR7	11.9	49	100	11.9
CR11GDR00AS4	12.0	49	100	12.0
CR11GDR00AU0	12.1	51	102	12.1
CR11GDR00AV8	12.2	51	102	12.2
CR11GDR00AW6	12.3	51	102	12.3
CR11GDR00AX3	12.4	51	102	12.4
CR11GDR00AZ9	12.5	51	102	12.5
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
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	17.0
CR11GDR00BV7	18.0	56	109	18.0
CR11GDR00BW5	19.0	56	109	19.0
CR11GDR00BX2	20.0	56	109	20.0







Application :

- Solid Carbide GP Drills suitable for general purpose Drilling in materials like Cast Iron, high Al-Si Alloys, non-ferrous metals, abrasive plastics etc.

For Feed & Speed Rates go to Page no. 38

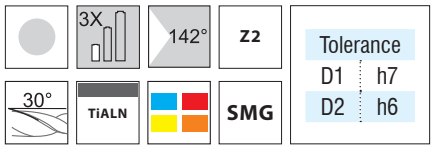
Item Code Uncoated	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR1XGDR000H7	2.0	24	49	2.0
CR1XGDR000J2	2.1	24	49	2.1
CR1XGDR000K0	2.2	27	53	2.2
CR1XGDR000L8	2.3	27	53	2.3
CR1XGDR000M6	2.4	30	57	2.4
CR1XGDR000N3	2.5	30	57	2.5
CR1XGDR000P9	2.6	30	57	2.6
CR1XGDR000Q7	2.7	33	61	2.7
CR1XGDR000R5	2.8	33	61	2.8
CR1XGDR000S2	2.9	33	61	2.9
CR1XGDR000T0	3.0	33	61	3.0
CR1XGDR000U8	3.1	36	65	3.1
CR1XGDR000V6	3.2	36	65	3.2
CR1XGDR000W4	3.3	36	65	3.3
CR1XGDR000X1	3.4	39	70	3.4
CR1XGDR000Y9	3.5	39	70	3.5
CR1XGDR000Z7	3.6	39	70	3.6
CR1XGDR00108	3.7	39	70	3.7
CR1XGDR00116	3.8	43	75	3.8
CR1XGDR00124	3.9	43	75	3.9
CR1XGDR00140	4.0	43	75	4.0
CR1XGDR00157	4.1	43	75	4.1
CR1XGDR00165	4.2	43	75	4.2
CR1XGDR00173	4.3	47	80	4.3
CR1XGDR00181	4.4	47	80	4.4
CR1XGDR00199	4.5	47	80	4.5
CR1XGDR001B9	4.6	47	80	4.6

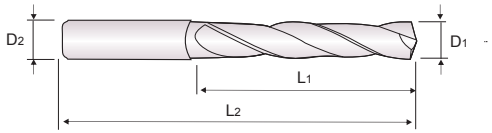
Item Code Uncoated	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR1XGDR001C7	4.7	47	80	4.7
CR1XGDR001D4	4.8	52	86	4.8
CR1XGDR001E2	4.9	52	86	4.9
CR1XGDR001G8	5.0	52	86	5.0
CR1XGDR001H6	5.1	52	86	5.1
CR1XGDR001J1	5.2	52	86	5.2
CR1XGDR001K9	5.3	52	86	5.3
CR1XGDR001L7	5.4	57	93	5.4
CR1XGDR001M5	5.5	57	93	5.5
CR1XGDR001N2	5.6	57	93	5.6
CR1XGDR001P8	5.7	57	93	5.7
CR1XGDR001Q6	5.8	57	93	5.8
CR1XGDR001R4	5.9	57	93	5.9
CR1XGDR001S1	6.0	57	93	6.0
CR1XGDR001T9	6.1	63	101	6.1
CR1XGDR001U7	6.2	63	101	6.2
CR1XGDR001V5	6.3	63	101	6.3
CR1XGDR001W3	6.4	63	101	6.4
CR1XGDR001X0	6.5	63	101	6.5
CR1XGDR001Y8	6.6	63	101	6.6
CR1XGDR001Z6	6.7	63	101	6.7
CR1XGDR00207	6.8	69	109	6.8
CR1XGDR00215	6.9	69	109	6.9
CR1XGDR00223	7.0	69	109	7.0
CR1XGDR00231	7.1	69	109	7.1
CR1XGDR00249	7.2	69	109	7.2
CR1XGDR00256	7.3	69	109	7.3

Item Code Uncoated	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR1XGDR00264	7.4	69	109	7.4
CR1XGDR00272	7.5	69	109	7.5
CR1XGDR00280	7.6	75	117	7.6
CR1XGDR00298	7.7	75	117	7.7
CR1XGDR002A0	7.8	75	117	7.8
CR1XGDR002B8	7.9	75	117	7.9
CR1XGDR002C6	8.0	75	117	8.0
CR1XGDR002E1	8.1	75	117	8.1
CR1XGDR002F9	8.2	75	117	8.2
CR1XGDR002G7	8.3	75	117	8.3
CR1XGDR002H5	8.4	75	117	8.4
CR1XGDR002J0	8.5	75	117	8.5
CR1XGDR002K8	8.6	81	125	8.6
CR1XGDR002L6	8.7	81	125	8.7
CR1XGDR002M4	8.8	81	125	8.8
CR1XGDR002N1	8.9	81	125	8.9
CR1XGDR002P7	9.0	81	125	9.0
CR1XGDR002Q5	9.1	81	125	9.1
CR1XGDR002R3	9.2	81	125	9.2
CR1XGDR002S0	9.3	81	125	9.3
CR1XGDR002T8	9.4	81	125	9.4
CR1XGDR002U6	9.5	81	125	9.5
CR1XGDR002V4	9.6	87	133	9.6
CR1XGDR002W2	9.7	87	133	9.7
CR1XGDR002X9	9.8	87	133	9.8
CR1XGDR002Y7	9.9	87	133	9.9
CR1XGDR002Z5	10.0	87	133	10.0
CR1XGDR00306	10.1	87	133	10.1
CR1XGDR00322	10.2	87	133	10.2
CR1XGDR00330	10.3	87	133	10.3
CR1XGDR00348	10.4	87	133	10.4
CR1XGDR00355	10.5	87	133	10.5
CR1XGDR00363	10.6	87	133	10.6
CR1XGDR00371	10.7	94	142	10.7
CR1XGDR00389	10.8	94	142	10.8
CR1XGDR00397	10.9	94	142	10.9
CR1XGDR003A9	11.0	94	142	11.0
CR1XGDR003B7	11.1	94	142	11.1
CR1XGDR003C5	11.2	94	142	11.2
CR1XGDR003D2	11.3	94	142	11.3
CR1XGDR003E0	11.4	94	142	11.4

Item Code Uncoated	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR1XGDR003F8	11.5	94	142	11.5
CR1XGDR003G6	11.6	94	142	11.6
CR1XGDR003H4	11.7	94	142	11.7
CR1XGDR003J9	11.8	94	142	11.8
CR1XGDR003K7	11.9	101	151	11.9
CR1XGDR003L5	12.0	101	151	12.0
CR1XGDR003M3	12.1	101	151	12.1
CR1XGDR003N0	12.2	101	151	12.2
CR1XGDR003P6	12.3	101	151	12.3
CR1XGDR003Q4	12.4	101	151	12.4
CR1XGDR003R2	12.5	101	151	12.5
CR1XGDR003S9	12.6	101	151	12.6
CR1XGDR003T7	12.7	101	151	12.7
CR1XGDR003U5	12.8	101	151	12.8
CR1XGDR003V3	12.9	101	151	12.9
CR1XGDR003W1	13.0	101	151	13.0
CR1XGDR003X8	13.1	101	151	13.1
CR1XGDR003Y6	13.2	101	151	13.2
CR1XGDR003Z4	13.3	101	151	13.3
CR1XGDR00405	13.4	101	151	13.4
CR1XGDR00413	13.5	101	151	13.5
CR1XGDR00421	13.6	101	151	13.6
CR1XGDR00439	13.7	101	151	13.7
CR1XGDR00447	13.8	101	151	13.8
CR1XGDR00454	13.9	101	151	13.9
CR1XGDR00462	14.0	101	151	14.0
CR1XGDR00470	14.1	101	151	14.1
CR1XGDR00488	14.2	101	151	14.2
CR1XGDR00496	14.3	101	151	14.3
CR1XGDR004A8	14.4	101	151	14.4
CR1XGDR004C4	14.5	101	151	14.5
CR1XGDR004D1	14.6	101	151	14.6
CR1XGDR004E9	14.7	101	151	14.7
CR1XGDR004F7	14.8	101	151	14.8
CR1XGDR004G5	14.9	101	151	14.9
CR1XGDR004H3	15.0	101	151	15.0
CR1XGDR004J8	16.0	101	151	16.0
CR1XGDR004K6	17.0	101	151	17.0
CR1XGDR004L4	18.0	101	151	18.0
CR1XGDR004M2	19.0	101	151	19.0
CR1XGDR004N9	20.0	101	151	20.0







Application :

- High Performance Carbide Drills best for Drilling in Cast Iron up to 350BHN, SG Iron, MS, Low carbon steel etc.

Features:

- Self Centering - Center Drilling not required
- Excellent Positioning - Bush is not necessary
- Special Design for Powerful Drilling & Good chip removal

For Feed & Speed Rates go to Page no. 39

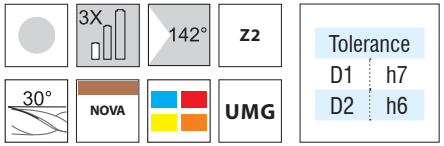
Ordering No.	Flute Dia(**D1**)	Flute Len(**L1**)	Overall Len(**L2**)	Shank Dia(**D2**)
C1HP0300-F	3.0	28	63	3.0
C1HP0310-F	3.1	28	63	3.1
C1HP0320-F	3.2	28	63	3.2
C1HP0330-F	3.3	28	63	3.3
C1HP0340-F	3.4	28	63	3.4
C1HP0350-F	3.5	28	63	3.5
C1HP0360-F	3.6	28	63	3.6
C1HP0370-F	3.7	28	63	3.7
C1HP0380-F	3.8	28	63	3.8
C1HP0390-F	3.9	28	63	3.9
C1HP0400-F	4.0	40	80	4.0
C1HP0410-F	4.1	40	80	4.1
C1HP0420-F	4.2	40	80	4.2
C1HP0430-F	4.3	40	80	4.3
C1HP0440-F	4.4	40	80	4.4
C1HP0450-F	4.5	40	80	4.5
C1HP0460-F	4.6	40	80	4.6
C1HP0470-F	4.7	40	80	4.7
C1HP0480-F	4.8	40	80	4.8
C1HP0490-F	4.9	40	80	4.9
C1HP0500-F	5.0	40	80	5.0
C1HP0510-F	5.1	40	80	5.1
C1HP0520-F	5.2	40	80	5.2

Ordering No.	Flute Dia(**D1**)	Flute Len(**L1**)	Overall Len(**L2**)	Shank Dia(**D2**)
C1HP0530-F	5.3	40	80	5.3
C1HP0540-F	5.4	40	80	5.4
C1HP0550-F	5.5	40	80	5.5
C1HP0560-F	5.6	40	80	5.6
C1HP0570-F	5.7	40	80	5.7
C1HP0580-F	5.8	40	80	5.8
C1HP0590-F	5.9	40	80	5.9
C1HP0600-F	6.0	40	80	6.0
C1HP0610-F	6.1	40	80	6.1
C1HP0620-F	6.2	40	80	6.2
C1HP0630-F	6.3	40	80	6.3
C1HP0640-F	6.4	40	80	6.4
C1HP0650-F	6.5	40	80	6.5
C1HP0660-F	6.6	40	80	6.6
C1HP0670-F	6.7	40	80	6.7
C1HP0680-F	6.8	40	80	6.8
C1HP0690-F	6.9	40	80	6.9
C1HP0700-F	7.0	40	80	7.0
C1HP0710-F	7.1	40	80	7.1
C1HP0720-F	7.2	40	80	7.2
C1HP0730-F	7.3	40	80	7.3
C1HP0740-F	7.4	40	80	7.4
C1HP0750-F	7.5	40	80	7.5

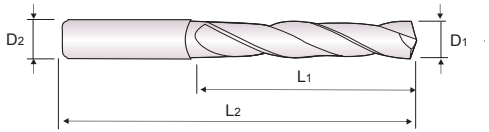
Ordering No.	Flute Dia(**D1**)	Flute Len(**L1**)	Overall Len(**L2**)	Shank Dia(**D2**)
C1HP0760-F	7.6	40	80	7.6
C1HP0770-F	7.7	40	80	7.7
C1HP0780-F	7.8	40	80	7.8
C1HP0790-F	7.9	40	80	7.9
C1HP0800-F	8.0	60	105	8.0
C1HP0810-F	8.1	60	105	8.1
C1HP0820-F	8.2	60	105	8.2
C1HP0830-F	8.3	60	105	8.3
C1HP0840-F	8.4	60	105	8.4
C1HP0850-F	8.5	60	105	8.5
C1HP0860-F	8.6	60	105	8.6
C1HP0870-F	8.7	60	105	8.7
C1HP0880-F	8.8	60	105	8.8
C1HP0890-F	8.9	60	105	8.9
C1HP0900-F	9.0	60	105	9.0
C1HP0910-F	9.1	60	105	9.1
C1HP0920-F	9.2	60	105	9.2
C1HP0930-F	9.3	60	105	9.3
C1HP0940-F	9.4	60	105	9.4
C1HP0950-F	9.5	60	105	9.5
C1HP0960-F	9.6	60	105	9.6
C1HP0970-F	9.7	60	105	9.7
C1HP0980-F	9.8	60	105	9.8
C1HP0990-F	9.9	60	105	9.9
C1HP1000-F	10.0	60	105	10.0
C1HP1010-F	10.1	60	105	10.1

Ordering No.	Flute Dia(**D1**)	Flute Len(**L1**)	Overall Len(**L2**)	Shank Dia(**D2**)
C1HP1020-F	10.2	60	105	10.2
C1HP1030-F	10.3	60	105	10.3
C1HP1020-F	10.4	60	105	10.4
C1HP1050-F	10.5	60	105	10.5
C1HP1020-F	10.6	60	105	10.6
C1HP1070-F	10.7	60	105	10.7
C1HP1020-F	10.8	60	105	10.8
C1HP1090-F	10.9	60	105	10.9
C1HP1020-F	11.0	60	105	11.0
C1HP1110-F	11.1	60	105	11.1
C1HP1020-F	11.2	60	105	11.2
C1HP1130-F	11.3	60	105	11.3
C1HP1020-F	11.4	60	105	11.4
C1HP1150-F	11.5	60	105	11.5
C1HP1020-F	11.6	60	105	11.6
C1HP1170-F	11.7	60	105	11.7
C1HP1020-F	11.8	60	105	11.8
C1HP1190-F	11.9	60	105	11.9
C1HP1200-F	12.0	60	105	12.0
C1HP1300-F	13.0	60	105	13.0
C1HP1350-F	13.5	60	105	13.5
C1HP1400-F	14.0	60	105	14.0
C1HP1450-F	14.5	60	105	14.5
C1HP1500-F	15.0	60	105	15.0
C1HP1550-F	15.5	60	105	15.5
C1HP1600-F	16.0	60	105	16.0





Tolerance	
D1	h7
D2	h6



Applications:

- High Performance Carbide Drills for Drilling Cast Steel, Forged Steel, Cast Iron up to 40HRc.

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

Features:

- Ultra Micro-Fine Carbide Grade
- Multi-Layer NOVA coating to protect carbide tools at machining temp. up to 1,300°C
- Best Caride Drill for machining Alloy steel, Cast Iron up to 450BHN, SS & other tough materials
- Rapid chip curling to promote chip breakage.

For Feed & Speed Rates go to Page no. 39

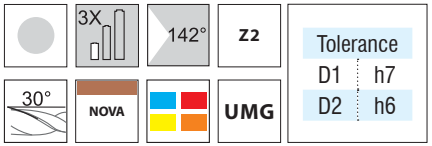
Item Code	Flute Dia(**D1**)	Flute Len(**L1**)	Overall Len(**L2**)	Shank Dia(**D2**)
CR3AHDR00C23	2.0	14	50	4.0
CR3AHDR00C31	2.1	14	50	4.0
CR3AHDR00C49	2.2	14	50	4.0
CR3AHDR00C56	2.3	14	50	4.0
CR3AHDR00C64	2.4	14	50	4.0
CR3AHDR00C72	2.5	14	50	4.0
CR3AHDR00C80	2.6	14	50	4.0
CR3AHDR00C98	2.7	14	50	4.0
CR3AHDR00CA0	2.8	14	50	4.0
CR3AHDR00CB8	2.9	14	50	4.0
CR3AHDR00CC6	3.0	20	62	6.0
CR3AHDR00CD3	3.1	20	62	6.0
CR3AHDR00CE1	3.2	20	62	6.0
CR3AHDR00CF9	3.3	20	62	6.0
CR3AHDR00CG7	3.4	20	62	6.0
CR3AHDR00CH5	3.5	20	62	6.0
CR3AHDR00CJ0	3.6	20	62	6.0
CR3AHDR00CK8	3.7	20	62	6.0
CR3AHDR00CL6	3.8	24	62	6.0

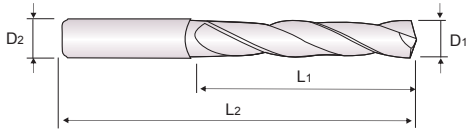
Item Code	Flute Dia(**D1**)	Flute Len(**L1**)	Overall Len(**L2**)	Shank Dia(**D2**)
CR3AHDR00CM4	3.9	24	62	6.0
CR3AHDR00CN1	4.0	24	62	6.0
CR3AHDR00CP7	4.1	24	62	6.0
CR3AHDR00CQ5	4.2	24	62	6.0
CR3AHDR00CR3	4.3	24	62	6.0
CR3AHDR00CS0	4.4	24	62	6.0
CR3AHDR00CT8	4.5	24	62	6.0
CR3AHDR00CU6	4.6	24	62	6.0
CR3AHDR00CV4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

Item Code	Flute Dia(**D1**)	Flute Len(**L1**)	Overall Len(**L2**)	Shank Dia(**D2**)
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
CR3AHDR00DV3	8.1	51	100	10.0
CR3AHDR00DW1	8.2	51	100	10.0
CR3AHDR00DX8	8.3	51	100	10.0
CR3AHDR00DY6	8.4	51	100	10.0
CR3AHDR00DZ4	8.5	51	100	10.0
CR3AHDR00E05	8.6	51	100	10.0
CR3AHDR00E13	8.7	51	100	10.0
CR3AHDR00E21	8.8	51	100	10.0
CR3AHDR00E39	8.9	51	100	10.0
CR3AHDR00E47	9.0	51	100	10.0
CR3AHDR00E54	9.1	51	100	10.0
CR3AHDR00E62	9.2	51	100	10.0
CR3AHDR00E70	9.3	51	100	10.0
CR3AHDR00E88	9.4	51	100	10.0
CR3AHDR00E96	9.5	51	100	10.0
CR3AHDR00EA8	9.6	51	100	10.0

Item Code	Flute Dia(**D1**)	Flute Len(**L1**)	Overall Len(**L2**)	Shank Dia(**D2**)
CR3AHDR00EB6	9.7	51	100	10.0
CR3AHDR00EC4	9.8	51	100	10.0
CR3AHDR00ED1	9.9	51	100	10.0
CR3AHDR00EE9	10.0	51	100	10.0
CR3AHDR00EF7	10.1	55	100	12.0
CR3AHDR00EG5	10.2	55	100	12.0
CR3AHDR00EH3	10.3	55	100	12.0
CR3AHDR00EJ8	10.4	55	100	12.0
CR3AHDR00EK6	10.5	55	100	12.0
CR3AHDR00EL4	10.6	55	100	12.0
CR3AHDR00EM2	10.7	55	100	12.0
CR3AHDR00EN9	10.8	55	100	12.0
CR3AHDR00EP5	10.9	55	100	12.0
CR3AHDR00EQ3	11.0	55	100	12.0
CR3AHDR00ER1	11.1	55	100	12.0
CR3AHDR00ES8	11.2	55	100	12.0
CR3AHDR00ET6	11.3	55	100	12.0
CR3AHDR00EU4	11.4	55	100	12.0
CR3AHDR00EV2	11.5	55	100	12.0
CR3AHDR00EW0	11.6	55	100	12.0
CR3AHDR00EX7	11.7	55	100	12.0
CR3AHDR00EY5	11.8	55	100	12.0
CR3AHDR00EZ3	11.9	55	100	12.0
CR3AHDR00F04	12.0	55	100	12.0
CR3AHDR00F12	12.5	55	105	14.0
CR3AHDR00F20	13.0	55	105	14.0
CR3AHDR00F38	13.5	55	105	14.0
CR3AHDR00F46	14.0	55	105	14.0
CR3AHDR00F53	14.5	58	105	16.0
CR3AHDR00F61	15.0	58	105	16.0
CR3AHDR00F79	15.5	58	105	16.0
CR3AHDR00F87	16.0	58	105	16.0
CR3AHDR00F95	16.5	58	105	18.0
CR3AHDR00FA7	17.0	58	105	18.0
CR3AHDR00FB5	17.5	58	105	18.0
CR3AHDR00FC3	18.0	58	105	18.0
CR3AHDR00FD0	18.5	58	105	20.0
CR3AHDR00FE8	19.0	58	105	20.0
CR3AHDR00FF6	19.5	58	105	20.0
CR3AHDR00FG4	20.0	58	105	20.0







Applications:

- High Performance Carbide Drills for Drilling Cast Steel, Forged Steel, Cast Iron up to 40HRc.

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

Features:

- Ultra Micro-Fine Carbide Grade
- Multi-Layer NOVA coating to protect carbide tools at machining temp. up to 1,300°C.
- Best Carbide Drill for machining Alloy steel, Cast Iron up to 450BHN, SS & other tough materials
- Rapid chip curling to promote chip breakage

For Feed & Speed Rates go to Page no. 39.

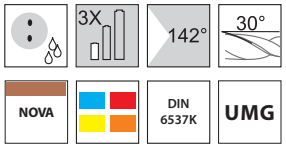
Item Code	Flute Dia(**D1**)	Flute Len(**L1**)	Overall Len(**L2**)	Shank Dia(**D2**)
CR3AHDR00FH2	2.0	21	57	4.0
CR3AHDR00FJ7	2.1	21	57	4.0
CR3AHDR00FK5	2.2	21	57	4.0
CR3AHDR00FL3	2.3	21	57	4.0
CR3AHDR00FM1	2.4	21	57	4.0
CR3AHDR00FN8	2.5	21	57	4.0
CR3AHDR00FP4	2.6	21	57	4.0
CR3AHDR00FQ2	2.7	21	57	4.0
CR3AHDR00FR0	2.8	21	57	4.0
CR3AHDR00FS7	2.9	21	57	4.0
CR3AHDR00FT5	3.0	28	62	6.0
CR3AHDR00FU3	3.1	28	62	6.0
CR3AHDR00FV1	3.2	28	62	6.0
CR3AHDR00FW9	3.3	28	62	6.0
CR3AHDR00FX6	3.4	28	62	6.0
CR3AHDR00FY4	3.5	28	62	6.0
CR3AHDR00FZ2	3.6	28	62	6.0
CR3AHDR00G03	3.7	28	62	6.0

Item Code	Flute Dia(**D1**)	Flute Len(**L1**)	Overall Len(**L2**)	Shank Dia(**D2**)
CR3AHDR00G11	3.8	36	75	6.0
CR3AHDR00G29	3.9	36	75	6.0
CR3AHDR00G37	4.0	36	75	6.0
CR3AHDR00G45	4.1	36	75	6.0
CR3AHDR00G52	4.2	36	75	6.0
CR3AHDR00G60	4.3	36	75	6.0
CR3AHDR00G78	4.4	36	75	6.0
CR3AHDR00G86	4.5	36	75	6.0
CR3AHDR00G94	4.6	36	75	6.0
CR3AHDR00GA6	4.7	36	75	6.0
CR3AHDR00GB4	4.8	42	80	6.0
CR3AHDR00GC2	4.9	42	80	6.0
CR3AHDR00GD9	5.0	42	80	6.0
CR3AHDR00GE7	5.1	42	80	6.0
CR3AHDR00GF5	5.2	42	80	6.0
CR3AHDR00GG3	5.3	42	80	6.0
CR3AHDR00GH1	5.4	42	80	6.0
CR3AHDR00GJ6	5.5	42	80	6.0

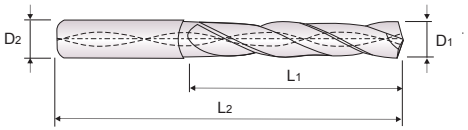
Item Code	Flute Dia(**D1**)	Flute Len(**L1**)	Overall Len(**L2**)	Shank Dia(**D2**)
CR3AHDR00GK4	5.6	42	80	6.0
CR3AHDR00GL2	5.7	42	80	6.0
CR3AHDR00GM0	5.8	42	80	6.0
CR3AHDR00GN7	5.9	42	80	6.0
CR3AHDR00GP3	6.0	42	80	6.0
CR3AHDR00GQ1	6.1	55	100	8.0
CR3AHDR00GR9	6.2	55	100	8.0
CR3AHDR00GS6	6.3	55	100	8.0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

Item Code	Flute Dia(**D1**)	Flute Len(**L1**)	Overall Len(**L2**)	Shank Dia(**D2**)
CR3AHDR00HR8	9.6	75	125	10.0
CR3AHDR00HS5	9.7	75	125	10.0
CR3AHDR00HT3	9.8	75	125	10.0
CR3AHDR00HU1	9.9	75	125	10.0
CR3AHDR00HV9	10.0	75	125	10.0
CR3AHDR00HW7	10.1	85	140	12.0
CR3AHDR00HX4	10.2	85	140	12.0
CR3AHDR00HY2	10.3	85	140	12.0
CR3AHDR00HZ0	10.4	85	140	12.0
CR3AHDR00J00	10.5	85	140	12.0
CR3AHDR00J18	10.6	85	140	12.0
CR3AHDR00J26	10.7	85	140	12.0
CR3AHDR00J34	10.8	85	140	12.0
CR3AHDR00J42	10.9	85	140	12.0
CR3AHDR00J59	11.0	85	140	12.0
CR3AHDR00J67	11.1	85	140	12.0
CR3AHDR00J75	11.2	85	140	12.0
CR3AHDR00J83	11.3	85	140	12.0
CR3AHDR00J91	11.4	85	140	12.0
CR3AHDR00JA3	11.5	85	140	12.0
CR3AHDR00JB1	11.6	85	140	12.0
CR3AHDR00JC9	11.7	85	140	12.0
CR3AHDR00JD6	11.8	85	140	12.0
CR3AHDR00JE4	11.9	85	140	12.0
CR3AHDR00JF2	12.0	85	140	12.0
CR3AHDR00JG0	12.5	85	140	14.0
CR3AHDR00JH8	13.0	85	140	14.0
CR3AHDR00JJ3	13.5	85	140	14.0
CR3AHDR00JK1	14.0	85	140	14.0
CR3AHDR00JL9	14.5	90	145	16.0
CR3AHDR00JM7	15.0	90	145	16.0
CR3AHDR00JN4	15.5	90	145	16.0
CR3AHDR00JP0	16.0	90	145	16.0
CR3AHDR00JQ8	16.5	95	150	18.0
CR3AHDR00JR6	17.0	95	150	18.0
CR3AHDR00JS3	17.5	95	150	18.0
CR3AHDR00JT1	18.0	95	150	18.0
CR3AHDR00JU9	18.5	98	150	20.0
CR3AHDR00JV7	19.0	98	150	20.0
CR3AHDR00JW5	19.5	98	150	20.0
CR3AHDR00JX2	20.0	98	150	20.0





Tolerance	
D1	h7
D2	h6



Applications:

- High Performance Coolant Drills for maximum productivity in Steels, Cast Iron, Stainless Steel (300 series) & non-ferrous metals.
- Extremely high feed & cutting speeds with superior process reliability and surface quality

Features:

- Internal coolant
- Self Centering - Center Drilling not required
- Excellent Positioning - Bush is not necessary
- Special Design for Powerful Drilling & Good chip removal

For Feed & Speed Rates go to Page no. 40

Ordering No.	Flute Dia(**D1**)	Flute Len(**L1**)	Overall Len(**L2**)	Shank Dia(**D2**)
CTHS0410-N	4.1	24	62	6.0
CTHS0420-N	4.2	24	62	6.0
CTHS0430-N	4.3	24	62	6.0
CTHS0440-N	4.4	24	62	6.0
CTHS0450-N	4.5	24	62	6.0
CTHS0460-N	4.6	24	62	6.0
CTHS0470-N	4.7	24	62	6.0
CTHS0480-N	4.8	28	62	6.0
CTHS0490-N	4.9	28	62	6.0
CTHS0500-N	5.0	28	62	6.0
CTHS0510-N	5.1	28	62	6.0
CTHS0520-N	5.2	28	62	6.0
CTHS0530-N	5.3	28	62	6.0
CTHS0540-N	5.4	28	62	6.0
CTHS0550-N	5.5	28	62	6.0
CTHS0560-N	5.6	28	62	6.0
CTHS0570-N	5.7	28	62	6.0
CTHS0580-N	5.8	28	62	6.0
CTHS0590-N	5.9	28	62	6.0
CTHS0600-N	6.0	28	62	6.0
CTHS0610-N	6.1	34	75	8.0

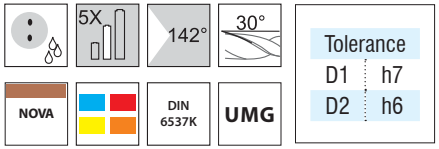
Ordering No.	Flute Dia(**D1**)	Flute Len(**L1**)	Overall Len(**L2**)	Shank Dia(**D2**)
CTHS0620-N	6.2	34	75	8.0
CTHS0630-N	6.3	34	75	8.0
CTHS0640-N	6.4	34	75	8.0
CTHS0650-N	6.5	34	75	8.0
CTHS0660-N	6.6	34	75	8.0
CTHS0670-N	6.7	34	75	8.0
CTHS0680-N	6.8	34	75	8.0
CTHS0690-N	6.9	34	75	8.0
CTHS0700-N	7.0	34	75	8.0
CTHS0710-N	7.1	40	80	8.0
CTHS0720-N	7.2	40	80	8.0
CTHS0730-N	7.3	40	80	8.0
CTHS0740-N	7.4	40	80	8.0
CTHS0750-N	7.5	40	80	8.0
CTHS0760-N	7.6	40	80	8.0
CTHS0770-N	7.7	40	80	8.0
CTHS0780-N	7.8	40	80	8.0
CTHS0790-N	7.9	40	80	8.0
CTHS0800-N	8.0	40	80	8.0
CTHS0810-N	8.1	51	100	10.0
CTHS0820-N	8.2	51	100	10.0

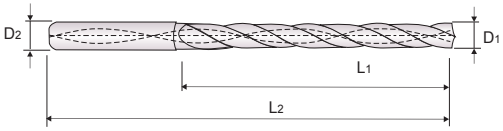
Ordering No.	Flute Dia(**D1**)	Flute Len(**L1**)	Overall Len(**L2**)	Shank Dia(**D2**)
CTHS0830-N	8.3	51	100	10.0
CTHS0840-N	8.4	51	100	10.0
CTHS0850-N	8.5	51	100	10.0
CTHS0860-N	8.6	51	100	10.0
CTHS0870-N	8.7	51	100	10.0
CTHS0880-N	8.8	51	100	10.0
CTHS0890-N	8.9	51	100	10.0
CTHS0900-N	9.0	51	100	10.0
CTHS0910-N	9.1	51	100	10.0
CTHS0920-N	9.2	51	100	10.0
CTHS0930-N	9.3	51	100	10.0
CTHS0940-N	9.4	51	100	10.0
CTHS0950-N	9.5	51	100	10.0
CTHS0960-N	9.6	51	100	10.0
CTHS0970-N	9.7	51	100	10.0
CTHS0980-N	9.8	51	100	10.0
CTHS0990-N	9.9	51	100	10.0
CTHS1000-N	10.0	51	100	10.0
CTHS1010-N	10.1	55	100	12.0
CTHS1020-N	10.2	55	100	12.0
CTHS1030-N	10.3	55	100	12.0
CTHS1040-N	10.4	55	100	12.0
CTHS1050-N	10.5	55	100	12.0
CTHS1060-N	10.6	55	100	12.0
CTHS1070-N	10.7	55	100	12.0
CTHS1080-N	10.8	55	100	12.0
CTHS1090-N	10.9	55	100	12.0
CTHS1100-N	11.0	55	100	12.0
CTHS1110-N	11.1	55	100	12.0
CTHS1120-N	11.2	55	100	12.0
CTHS1130-N	11.3	55	100	12.0
CTHS1140-N	11.4	55	100	12.0
CTHS1150-N	11.5	55	100	12.0
CTHS1160-N	11.6	55	100	12.0
CTHS1170-N	11.7	55	100	12.0
CTHS1180-N	11.8	55	100	12.0
CTHS1190-N	11.9	55	100	12.0
CTHS1200-N	12.0	55	100	12.0
CTHS1250-N	12.5	55	105	14.0
CTHS1300-N	13.0	55	105	14.0

Ordering No.	Flute Dia(**D1**)	Flute Len(**L1**)	Overall Len(**L2**)	Shank Dia(**D2**)
CTHS1350-N	13.5	55	105	14.0
CTHS1400-N	14.0	55	105	14.0
CTHS1450-N	14.5	58	105	16.0
CTHS1500-N	15.0	58	105	16.0
CTHS1550-N	15.5	58	105	16.0
CTHS1600-N	16.0	58	105	16.0
CTHS1650-N	16.5	58	105	18.0
CTHS1700-N	17.0	58	105	18.0
CTHS1750-N	17.5	58	105	18.0
CTHS1800-N	18.0	58	105	18.0
CTHS1850-N	18.5	58	105	20.0
CTHS1900-N	19.0	58	105	20.0
CTHS1950-N	19.5	58	105	20.0
CTHS2000-N	20.0	58	105	20.0









Applications:

- High Performance Coolant Drills for maximum productivity in Steels, Cast Iron, Stainless Steel (300 series) & non-ferrous metals.
- Extremely high feed & cutting speeds with superior process reliability and surface quality

Features:

- Internal coolant
- Self Centering - Center Drilling not required
- Excellent Positioning - Bush is not necessary
- Special Design for Powerful Drilling & Good chip removal

For Feed & Speed Rates go to Page no. 40

Ordering No.	Flute Dia(**D1**)	Flute Len(**L1**)	Overall Len(**L2**)	Shank Dia(**D2**)
CTHL0410-N	4.1	36	75	6.0
CTHL0420-N	4.2	36	75	6.0
CTHL0430-N	4.3	36	75	6.0
CTHL0440-N	4.4	36	75	6.0
CTHL0450-N	4.5	36	75	6.0
CTHL0460-N	4.6	36	75	6.0
CTHL0470-N	4.7	36	75	6.0
CTHL0480-N	4.8	42	80	6.0
CTHL0490-N	4.9	42	80	6.0
CTHL0500-N	5.0	42	80	6.0
CTHL0510-N	5.1	42	80	6.0
CTHL0520-N	5.2	42	80	6.0
CTHL0530-N	5.3	42	80	6.0
CTHL0540-N	5.4	42	80	6.0
CTHL0550-N	5.5	42	80	6.0
CTHL0560-N	5.6	42	80	6.0
CTHL0570-N	5.7	42	80	6.0
CTHL0580-N	5.8	42	80	6.0
CTHL0590-N	5.9	42	80	6.0
CTHL0600-N	6.0	42	80	6.0
CTHL0610-N	6.1	55	100	8.0

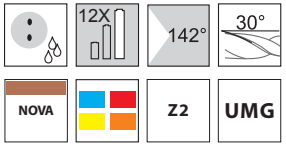
Ordering No.	Flute Dia(**D1**)	Flute Len(**L1**)	Overall Len(**L2**)	Shank Dia(**D2**)
CTHL0620-N	6.2	55	100	8.0
CTHL0630-N	6.3	55	100	8.0
CTHL0640-N	6.4	55	100	8.0
CTHL0650-N	6.5	55	100	8.0
CTHL0660-N	6.6	55	100	8.0
CTHL0670-N	6.7	55	100	8.0
CTHL0680-N	6.8	55	100	8.0
CTHL0690-N	6.9	55	100	8.0
CTHL0700-N	7.0	55	100	8.0
CTHL0710-N	7.1	60	105	8.0
CTHL0720-N	7.2	60	105	8.0
CTHL0730-N	7.3	60	105	8.0
CTHL0740-N	7.4	60	105	8.0
CTHL0750-N	7.5	60	105	8.0
CTHL0760-N	7.6	60	105	8.0
CTHL0770-N	7.7	60	105	8.0
CTHL0780-N	7.8	60	105	8.0
CTHL0790-N	7.9	60	105	8.0
CTHL0800-N	8.0	60	105	8.0
CTHL0810-N	8.1	75	125	10.0
CTHL0820-N	8.2	75	125	10.0

Ordering No.	Flute Dia(**D1**)	Flute Len(**L1**)	Overall Len(**L2**)	Shank Dia(**D2**)
CTHL0830-N	8.3	75	125	10.0
CTHL0840-N	8.4	75	125	10.0
CTHL0850-N	8.5	75	125	10.0
CTHL0860-N	8.6	75	125	10.0
CTHL0870-N	8.7	75	125	10.0
CTHL0880-N	8.8	75	125	10.0
CTHL0890-N	8.9	75	125	10.0
CTHL0900-N	9.0	75	125	10.0
CTHL0910-N	9.1	75	125	10.0
CTHL0920-N	9.2	75	125	10.0
CTHL0930-N	9.3	75	125	10.0
CTHL0940-N	9.4	75	125	10.0
CTHL0950-N	9.5	75	125	10.0
CTHL0960-N	9.6	75	125	10.0
CTHL0970-N	9.7	75	125	10.0
CTHL0980-N	9.8	75	125	10.0
CTHL0990-N	9.9	75	125	10.0
CTHL1000-N	10.0	75	125	10.0
CTHL1010-N	10.1	85	140	12.0
CTHL1020-N	10.2	85	140	12.0
CTHL1030-N	10.3	85	140	12.0
CTHL1040-N	10.4	85	140	12.0
CTHL1050-N	10.5	85	140	12.0
CTHL1060-N	10.6	85	140	12.0
CTHL1070-N	10.7	85	140	12.0
CTHL1080-N	10.8	85	140	12.0
CTHL1090-N	10.9	85	140	12.0
CTHL1100-N	11.0	85	140	12.0
CTHL1110-N	11.1	85	140	12.0
CTHL1120-N	11.2	85	140	12.0
CTHL1130-N	11.3	85	140	12.0
CTHL1140-N	11.4	85	140	12.0
CTHL1150-N	11.5	85	140	12.0
CTHL1160-N	11.6	85	140	12.0
CTHL1170-N	11.7	85	140	12.0
CTHL1180-N	11.8	85	140	12.0
CTHL1190-N	11.9	85	140	12.0
CTHL1200-N	12.0	85	140	12.0
CTHL1250-N	12.5	85	140	14.0

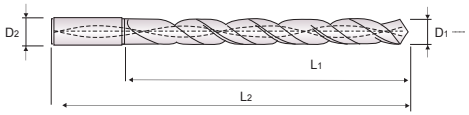
Ordering No.	Flute Dia(**D1**)	Flute Len(**L1**)	Overall Len(**L2**)	Shank Dia(**D2**)
CTHL1300-N	13.0	85	140	14.0
CTHL1350-N	13.5	85	140	14.0
CTHL1400-N	14.0	85	140	14.0
CTHL1450-N	14.5	90	145	16.0
CTHL1500-N	15.0	90	145	16.0
CTHL1550-N	15.5	90	145	16.0
CTHL1600-N	16.0	90	145	16.0
CTHL1650-N	16.5	95	150	18.0
CTHL1700-N	17.0	95	150	18.0
CTHL1750-N	17.5	95	150	18.0
CTHL1800-N	18.0	95	150	18.0
CTHL1850-N	18.5	98	150	20.0
CTHL1900-N	19.0	98	150	20.0
CTHL1950-N	19.5	98	150	20.0
CTHL2000-N	20.0	98	150	20.0

CTHM Series | Carbide Coolant Hole - MQL Drills





Tolerance	
D1	h7
D2	h6



Applications:
- High Performance Coolant Drills for maximum productivity in Steels, Cast Iron, Stainless Steel (300 series) & non-ferrous metals.
- Extremely high feed & cutting speeds with superior process reliability and surface quality

Features:
- Excellent positioning
- Special Design for Powerful Drilling & Good chip removal
- Available for processing MQL (Minimum Quantity Lubrication)

For Feed & Speed Rates go to Page no. 40

Ordering No.	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 No.	Flute Dia(**D1**)	Flute Len(**L1**)	Overall Len(**L2**)	Shank Dia(**D2**)
CTHM0850-S	8.5	111	160	10.0
CTHM0900-S	9.0	117	175	10.0
CTHM0950-S	9.5	124	182	10.0
CTHM1000-S	10.0	130	188	10.0
CTHM1050-S	10.5	137	201	12.0
CTHM1100-S	11.0	143	207	12.0
CTHM1150-S	11.5	150	215	12.0
CTHM1200-S	12.0	156	221	12.0

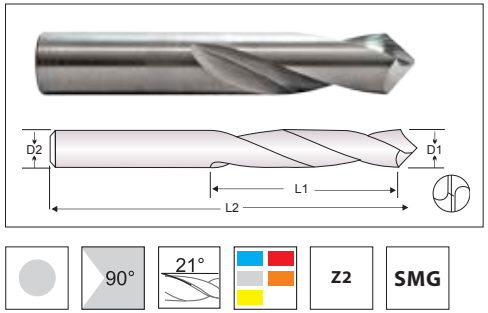
C1N1 Series | Carbide NC-Spotting Drills 90°

Applications:
Designed for accurate Spotting on NC Machines

Features:
- To be used at higher speeds & feeds, compatible with other carbide tooling
- Easy to re-point as there is no web taper
- Short Flute Length & No Body Clearance makes this a very rigid tool

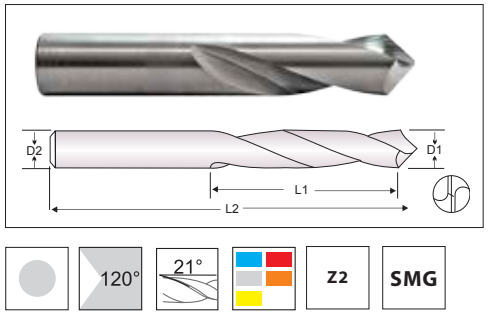
For Feed & Speed Rates go to Page no. 42

Ordering No.	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



C1N2 Series | Carbide NC-Spotting Drills 120°

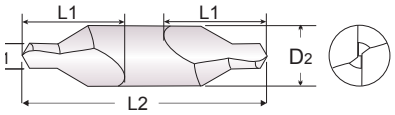
Ordering No.	Flute Dia(**D1**)	Flute Len(**L1**)	Overall Len(**L2**)	Shank Dia(**D2**)
C1N20600-U	6	13	50	6
C1N20800-U	8	23	60	8
C1N21000-U	10	24	70	10
C1N21200-U	12	24	70	12
C1N21600-U	16	29	75	16
C1N22000-U	20	35	100	20



C1CB Series | Carbide Centre Drills BS 328 series



Metric/ DIN 333A | Z2 | SMG



Applications:
Designed for accurate Spotting on NC Machines

Features:
- Designed for accurate Center Holes in long production runs Or when precise centering is required.
- Solid Carbide construction helps reduce tool changes when abrasive material is machined.
- 60° Included Angle
- Other included angles can be provided on request

For Feed & Speed Rates go to Page no. 42

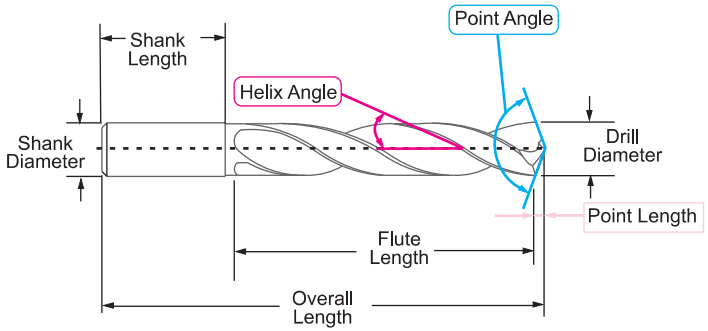
Ordering No.	Size	Flute Dia(**D1**)	Flute Len(**L1**)	Overall Len(**L2**)	Shank Dia(**D2**)
C1CB-BS1-U	BS1	3/64	3/64	1-1/2	1/8
C1CB-BS2-U	BS2	5/64	5/64	1-7/8	3/16
C1CB-BS3-U	BS3	7/64	7/64	2	1/4
C1CB-BS4-U	BS4	1/8	1/8	2-1/4	5/16
C1CB-BS5-U	BS5	3/16	3/16	2-3/4	7/16
C1CB-BS6-U	BS6	7/32	7/32	3	1/2
C1CB-BS7-U	BS7	1/4	1/4	3-1/4	5/8
C1CB-BS8-U	BS8	5/16	5/16	3-1/2	3/4

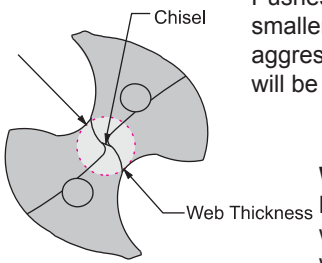
C1CD Series | Carbide Centre Drills DIN 333

For Applications, Advantages etc. pls. refer above C1CB Series

Ordering No.	Flute Dia(**D1**)	Flute Len(**L1**)	Overall Len(**L2**)	Shank Dia(**D2**)
C1CD0125-U	1.25	1.6	32	3.15
C1CD0160-U	1.6	2	36	4
C1CD0200-U	2	2.5	40	5
C1CD0250-U	2.5	3.1	45	6.3
C1CD0315-U	3.15	3.9	50	8
C1CD0400-U	4	5	56	10
C1CD0500-U	5	6.3	63	12.5
C1CD0630-U	6.3	8	71	16
C1CD0800-U	8	10.1	80	20

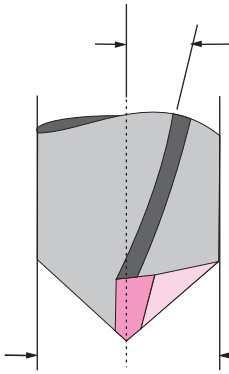






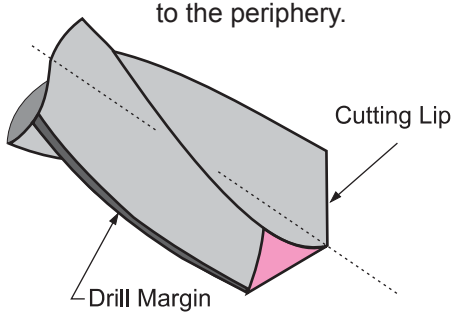
Chisel Edge – The non-cutting tip of the drill. Pushes, rather than cuts material. Having a smaller chisel means that a tool will cut more aggressively. A larger chisel means that a tool will be stronger.

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.

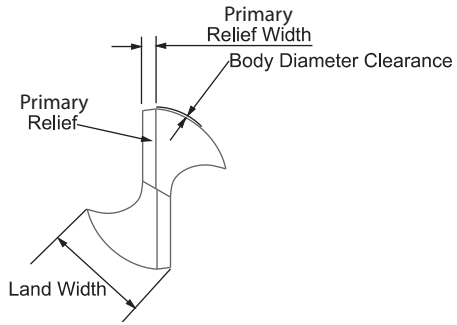


Helix Angle - Varies from 0° to 35° helix on standard tools. Lower helix angle means more rigidity and strength and a higher helix angle means more aggressive drilling and better chip evacuation.

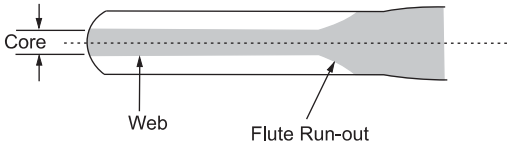
Cutting Lip - The cutting edges of a two flute drill extending from the chisel edge to the periphery.



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.



Series: C1GS, C1GJ		Carbide General Purpose Drills, STUB & JOBBER							
Workpiece Material Group	ISO	Examples	Cutting Speed(Vc)	Tool Diameter (in mm)					
				<3	6	10	12	16	20
			m/min	Feed per revolution (Fr) mm/rev					
Steels	P	Low Carbon Steels 1018	55	0.07	0.14	0.2	0.24	0.26	0.3
		Alloy Steels (up to 35 Rc) 4140	50	0.07	0.14	0.2	0.24	0.26	0.3
		Alloy Steels (36-45 Rc) 4140	45	0.07	0.14	0.2	0.24	0.26	0.3
Austenitic	M	304/316	40	0.07	0.14	0.2	0.24	0.26	0.3
Precipitation Hardened Stainless Steels	M	17-4 PH	X						
Cast Irons	K	Grey Cast Iron A48 Class 20/G4000	85	0.07	0.14	0.2	0.24	0.26	0.3
		Ductile Cast Iron A536/60-40-18	55	0.07	0.14	0.2	0.24	0.26	0.3
Non-Ferrous	N	Plastic	120	0.05	0.07	0.1	0.14	0.2	0.21
		Kevlar/Graphite	120	0.05	0.07	0.1	0.14	0.2	0.21

Series: C3HS, C3HL		Carbide High Performance Drills - SHORT & LONG							
Workpiece Material Group	ISO	Examples	Cutting Speed (Vc)	Tool Diameter (in mm)					
				<3	6	10	12	16	20
			m/min	Feed per revolution (Fr) mm/rev					
Steels	P	Low Carbon Steels 1018	90	0.07	0.15	0.2	0.25	0.3	0.36
		Alloy Steels (up to 35 Rc) 4140	70	0.07	0.15	0.2	0.25	0.3	0.36
		Alloy Steels (36-45 Rc) 4140	55	0.05	0.11	0.13	0.15	0.2	0.23
Austenitic	M	304/316	55	0.07	0.15	0.2	0.25	0.3	0.36
Precipitation Hardened Stainless Steels	M	17-4 PH	40	0.05	0.11	0.13	0.15	0.2	0.23
Cast Irons	K	Grey Cast Iron A48 Class 20/G4000	130	0.07	0.15	0.2	0.25	0.3	0.36
		Ductile Cast Iron A536/60-40-18	70	0.07	0.15	0.2	0.25	0.3	0.36
Special Alloys	S	Titanium 6AL-4V	40	0.05	0.11	0.13	0.15	0.2	0.23
		High Temp Alloys Inconel/Hastelloy/ Waspelloy	25	0.05	0.11	0.13	0.15	0.2	0.23

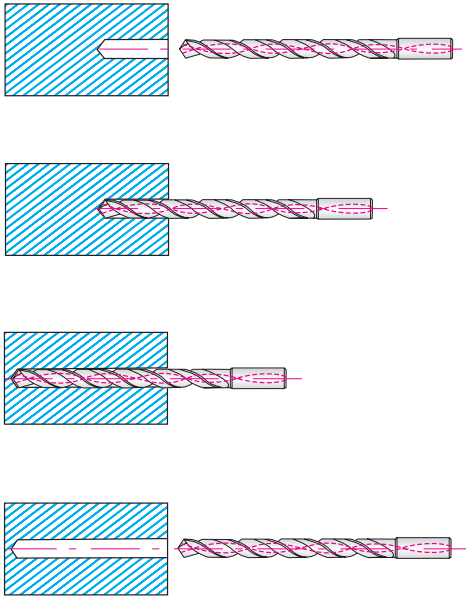
Note:

For C1HP Series Reduce the Feed & Speed by 30% from above table only for Steels (P) & Cast Irons (K) as C1HP is meant only for P & K material group.

Series: CTHS, CTHL, CTHM		Carbide Coolant Fed Drills : SHORT, LONG, MQL Drills							
Workpiece Material Group	ISO	Examples	Cutting Speed (Vc)	Tool Diameter (in mm)					
				≤3	≤6	≤10	≤12	≤16	≤20
			m/min	Feed per revolution (Fr) mm/rev					
Steels	P	Low Carbon Steels 1018	120	0.07	0.15	0.2	0.25	0.3	0.36
		Alloy Steels (up to 35 Rc) 4140	90	0.07	0.15	0.2	0.25	0.3	0.36
		Alloy Steels (36-45 Rc) 4140	70	0.05	0.11	0.13	0.15	0.2	0.23
Austenitic	M	304/316	70	0.07	0.15	0.2	0.25	0.3	0.36
Precipitation Hardened Stainless Steels	M	17-4 PH	55	0.05	0.11	0.13	0.15	0.2	0.23
Cast Irons	K	Grey Cast Iron A48 Class 20/G4000	150	0.07	0.15	0.2	0.25	0.3	0.36
		Ductile Cast Iron A536/60-40-18	90	0.07	0.15	0.2	0.25	0.3	0.36
Special Alloys	S	Titanium 6AL-4V	55	0.05	0.11	0.13	0.15	0.2	0.23
		High Temp Alloys Inconel/Hastelloy/ Waspelloy	40	0.05	0.11	0.13	0.15	0.2	0.23

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

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%.

Important Note:

- For all deep hole drilling over 5XD guide holes are recommended
- Deep hole drills are prone to breakage without guide holes
- Minimum of 800+psi coolant pressure recommended

Series: C1N1, C1N2, C1CB, C1CD		NC Spotting Drills & Centre Drills							
Workpiece Material Group	ISO	Examples	Cutting Speed (Vc)	Tool Diameter (in mm)					
				1	1.5	3	6	10	12
			m/min	Feed per revolution (Fr) mm/rev					
Steels	P	Low Carbon Steels 1018	55	0.01	0.02	0.04	0.07	0.1	0.12
		Alloy Steels (up to 35 Rc) 4140	50	0.01	0.02	0.04	0.07	0.1	0.12
		Alloy Steels (36-45 Rc) 4140	45	0.01	0.02	0.04	0.07	0.1	0.12
Austenitic	M	304/316	40	0.01	0.02	0.04	0.07	0.1	0.12
Precipitation Hardened Stainless Steels	M	17-4 PH	20	0.01	0.02	0.04	0.07	0.1	0.12
Cast Irons	K	Grey Cast Iron A48 Class 20/G4000	85	0.01	0.02	0.04	0.07	0.1	0.12
		Ductile Cast Iron A536/60-40-18	55	0.01	0.02	0.04	0.07	0.1	0.12
Special Alloys	S	Titanium 6AL-4V	25	0.01	0.02	0.04	0.07	0.1	0.12
		High Temp Alloys Inconel/Hastelloy/ Waspelloy	10	0.01	0.02	0.04	0.07	0.1	0.12
"Hardened Steels"	H	">45 Rc A2/52100"	15	0.01	0.02	0.04	0.07	0.1	0.12

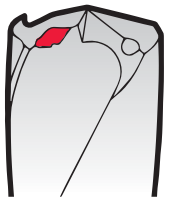
Cutting edge build-up

Cause:

Low cutting speed

Excessive honing of cutting lip

Bright finish cutting lip



Remedy:

Increase cutting speed

Reduce cutting lip honing

Have tool coated

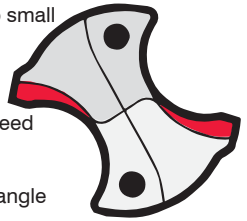
Heavy wear and tear at flank

Cause:

Cutting speed too high

Feed too low

Clearance angle too small



Remedy:

Decrease cutting speed

Increase feed

Increase clearance angle

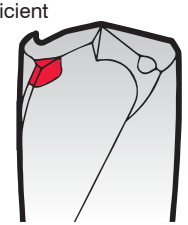
Crumbling of outer corners

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

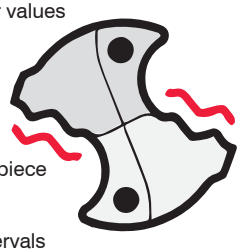
Cause:

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

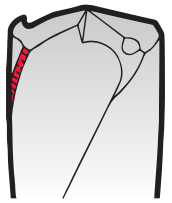
Cause:

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 iol 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

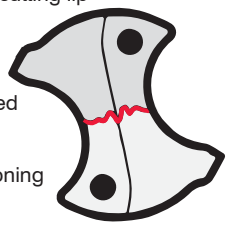
Heavy chisel edge wear & tear

Cause:

Cutting speed too low

Feed too high

Excessive honing of cutting lip



Remedy:

Increase cutting speed

Decrease feed

Reduce cutting lip honing

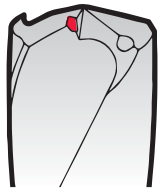
Crumbling at intersection of web thinning and cutting lip

Cause:

Clearance angle too small

Excessive honing of cutting lip

Wrong tool type



Remedy:

Increase clearance angle

Reduce cutting lip honing

Apply suitable tool

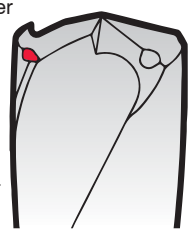
Plastic deformation of outer corner

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

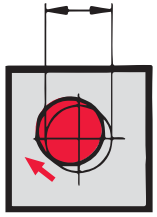
Cause:

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

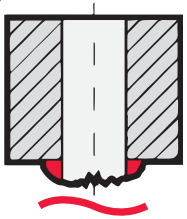
Heavy burring on breakthrough

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

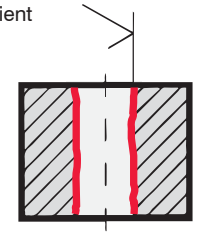
Unsatisfactory surface quality

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.

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.

Description	Series No.	Page No
Carbide St. Flute Reamers	C1RS	46
Carbide LHS/RHC Reamers	C1RL	47
Carbide RHS/RHC Reamers	C1RR	48
Technical Information	Troubleshooting	50-53

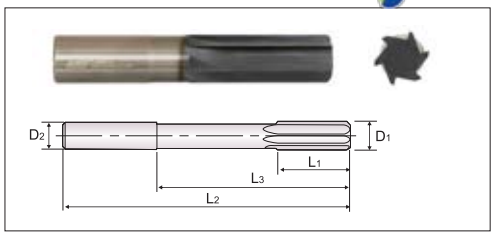


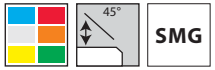
C1RS Series | Carbide Straight Flute Reamers

Applications:

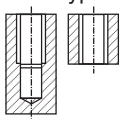
- Best suited for General Purpose Reaming in ferrous & non-ferrous materials
- Suited for both Through & blind hole construction
- Special sizes available on request

For Feed & Speed Rates go to Page No. 53





Hole Type



Tolerance	
D1	H7
D2	h6

Ordering Code	Flute Diameter (D1)	Flute Length (L1)	Reach Length (L3)	Overall Length (L2)	Shank Diameter (D2)	No of Flutes
C1RS0300061-F	3	15	31	61	4	4
C1RS0350070-F	3.5	18	36	70	4	4
C1RS0400075-F	4	19	42	75	4	4
C1RS0450080-F	4.5	21	46	80	5	4
C1RS0500086-F	5	23	51	86	5	4
C1RS0550093-F	5.5	26	56	93	6	4
C1RS0600093-F	6	26	56	93	6	4
C1RS0650101-F	6.5	28	62	101	7	6
C1RS0700109-F	7	31	68	109	7	6
C1RS0750109-F	7.5	31	68	109	8	6
C1RS0800117-F	8	33	74	117	8	6
C1RS0850117-F	8.5	33	74	117	9	6
C1RS0900125-F	9	36	80	125	9	6
C1RS0950125-F	9.5	36	80	125	10	6
C1RS1000133-F	10	38	86	133	10	6
C1RS1050133-F	10.5	38	86	133	12	6
C1RS1100142-F	11	41	95	142	12	6
C1RS1200151-F	12	44	104	151	12	6
C1RS1300151-F	13	44	104	151	14	6
C1RS1400155-F	14	47	106	155	14	6
C1RS1500160-F	15	50	110	160	16	6
C1RS1600160-F	16	52	110	160	16	6

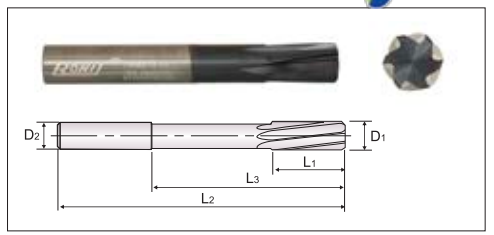


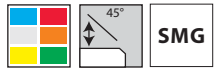
C1RL Series | Carbide Left Hand Spiral Reamers

Applications:

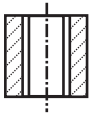
- Best suited for General Purpose Reaming in ferrous & non-ferrous materials
- Suited for Through hole construction
- Better Surface finish & Size control is achieved
- Special sizes available on request.

For Feed & Speed Rates go to Page No. 53





Hole Type



Tolerance	
D1	H7
D2	h6

Ordering Code	Flute Diameter (D1)	Flute Length (L1)	Reach Length (L3)	Overall Length (L2)	Shank Diameter (D2)	No of Flutes
C1RL0300061-F	3	15	31	61	4	4
C1RL0350070-F	3.5	18	36	70	4	4
C1RL0400075-F	4	19	42	75	4	4
C1RL0450080-F	4.5	21	46	80	5	4
C1RL0500086-F	5	23	51	86	5	4
C1RL0550093-F	5.5	26	56	93	6	4
C1RL0600093-F	6	26	56	93	6	4
C1RL0650101-F	6.5	28	62	101	7	6
C1RL0700109-F	7	31	68	109	7	6
C1RL0750109-F	7.5	31	68	109	8	6
C1RL0800117-F	8	33	74	117	8	6
C1RL0850117-F	8.5	33	74	117	9	6
C1RL0900125-F	9	36	80	125	9	6
C1RL0950125-F	9.5	36	80	125	10	6
C1RL1000133-F	10	38	86	133	10	6
C1RL1050133-F	10.5	38	86	133	12	6
C1RL1100142-F	11	41	95	142	12	6
C1RL1200151-F	12	44	104	151	12	6
C1RL1300151-F	13	44	104	151	14	6
C1RL1400155-F	14	47	106	155	14	6
C1RL1500160-F	15	50	110	160	16	6
C1RL1600160-F	16	52	110	160	16	6

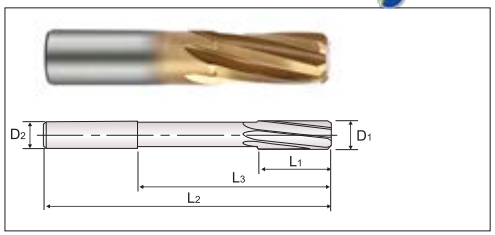


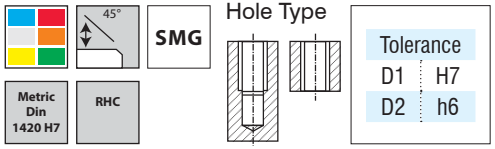
C1RR Series | Carbide Right Hand Spiral Reamers

Applications:

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

For Feed & Speed Rates go to Page No. 53





Tolerance	
D1	H7
D2	h6

Ordering Code	Flute Diameter (D1)	Flute Length (L1)	Reach Length (L3)	Overall Length (L2)	Shank Diameter (D2)	No of Flutes
C1RR0300061-F	3	15	31	61	4	4
C1RR0350070-F	3.5	18	36	70	4	4
C1RR0400075-F	4	19	42	75	4	4
C1RR0450080-F	4.5	21	46	80	5	4
C1RR0500086-F	5	23	51	86	5	4
C1RR0550093-F	5.5	26	56	93	6	4
C1RR0600093-F	6	26	56	93	6	4
C1RR0650101-F	6.5	28	62	101	7	6
C1RR0700109-F	7	31	68	109	7	6
C1RR0750109-F	7.5	31	68	109	8	6
C1RR0800117-F	8	33	74	117	8	6
C1RR0850117-F	8.5	33	74	117	9	6
C1RR0900125-F	9	36	80	125	9	6
C1RR0950125-F	9.5	36	80	125	10	6
C1RR1000133-F	10	38	86	133	10	6
C1RR1050133-F	10.5	38	86	133	12	6
C1RR1100142-F	11	41	95	142	12	6
C1RR1200151-F	12	44	104	151	12	6
C1RR1300151-F	13	44	104	151	14	6
C1RR1400155-F	14	47	106	155	14	6
C1RR1500160-F	15	50	110	160	16	6
C1RR1600160-F	16	52	110	160	16	6



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
Hole Oversize		X		X		X		X	X					X		X	X
Accuracy	X					X				X							X
Chatter		X	X							X	X	X			X		X
Out of Round Hole					X			X	X	X	X				X	X	X
Hole Taper						X		X	X	X			X			X	X
Bell Mouth		X					X	X	X		X		X	X			X
Reamer Life		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														

		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
Material	Example	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% C	0.17	0.19	0.2	0.21	0.23	0.25	0.27	0.33
	>35% C	0.14	0.16	0.17	0.18	0.2	0.23	0.24	0.3
	Tool	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		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

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	Steel - Mild (.2-.3 Carbon) 1018	45-70	.035-.100	.070-.175	.100-.280	.175-.550
		Alloy Steel up to 35 Rc 4140	30-45	.035-.070	.070-.100	.100-0.175	.175-.350
		Alloy Steel 36-45 Rc 4140/A2/D2	12-30	.020-.035	.035-.070	.070-.100	.100-0.175
Stainless Steels	M	Free Machining/Austenitic Stainless 304/316	27-45	.035-.070	.070-.100	.100-0.175	.175-.350
		Ferritic/Martensitic	18-28	.035-.070	.070-.100	.100-0.175	.175-.350
		17-4 PH	15-25	.020-.070	.035-.100	.070-.175	.100-.350
Special Alloys	S	Inconel 625/718	10-15	.020-.035	.035-.070	.070-.100	.100-0.175
		Stellite/Cobalt Chrome	7-12	.020-.035	.035-.070	.070-.100	.100-0.175
		Titanium 6AL-4V	7-12	.020-.070	.035-.100	.070-.175	.100-.350
Cast Iron	K	Gray Cast Iron A48 Class 20/G4000	35-60	.020-.070	.035-.100	.070-.175	.100-.350
		Malleable/Ductile Cast Iron A536/60-40-18	30-45	.035-.070	.070-.100	.100-0.175	.175-.350
		Hard (Martensitic) Cast Iron	12-20	.020-.035	.035-.070	.070-.100	.100-0.175
Non-Ferrous	N	Aluminium/ Aluminium Alloys	150-300	.035-.100	.070-.175	.100-.280	.175-.550
		Brass/Bronze Free Machining	75-120	.035-.070	.070-.100	.100-0.175	.175-.350
		Brass/Bronze (Hard)	45-75	.035-.070	.070-.100	.100-0.175	.175-.350
		Magnesium/ Magnesium Alloys/Plastics/Bakelite Plastic-Glass Filled	110-220	.035-.100	.070-.175	.100-.280	.175-.550
		Copper/Hard Bronze	20-35	.020-.035	.035-.070	.070-.100	.100-0.175
Hardened Steel	H	"Hardened Steels 23-32 Rc"	30-45	.035-.070	.070-.100	.100-0.175	.175-.350
		"Hardened Steels 32-43 Rc"	10-30	.020-.035	.035-.070	.070-.100	.100-0.175
		"Hardened Steels 43-52 Rc"	7-12	.020-.035	.035-.070	.070-.100	.100-0.175

High Performance End Mills

Included in our product line are high performance end mills developed for specific applications such as stainless steels (HP-SUS end mill series), hardened steel (HP-3X & HP-4X series) and HP-Steel series for High productivity machining in alloy steel materials.

General Purpose End Mills

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

Benefits of ROHIT End Mills

- Thousands of end mills in stock
- Over 30 different styles of end mills available
- Aggressive speeds and feeds to maximize MRR
- Standard, Stub, Long and Extended Reach Lengths are available
- Different coatings for different kind of application / material machining are suggested by our trained engineers
- Utilize our engineering experience to solve your milling trouble

Series Group	Series No.	Page No
HP-4X	401	69
	402	70
	403	71
	406	72
	407	73
HP-3X	301	74
	302	75
	303	76
	304	77
	305	78
	306	79
	307	80
	308	81



Series Group	Series No.	Page No
HP-STEEL	220	56
	320	57
HP-SUS*	222	61
	321	62
	322	63
	422	66
HP-SSM*	224	67
	324	68



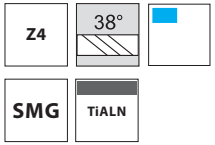


Series Group	Series No.	Page No
GP-1X	201	82
	202	83
	203	84
	204	85
	205	86
	206	87
	207	88
	208	89
	209	90
	210	91
	211	92
	213	93
	218	94
	219	95

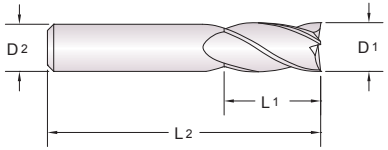
Series Group	Series No.	Page No
GP-0X	101	96
	102	97
	103	98
	104	100
	105	102
	107	103
	108	104
	109	105
	110	106
	111	107
	118	108
	119	109
Technical Information	Technical Information	110-123







Tolerance	
D1	h8
D2	h6



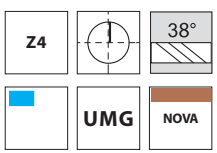
Features:
- Unique flute geometry reduces harmonics
- Best suited for Alloyed Steel in Side milling, face milling & other milling operations
- Designed for extreme productivity
- Variable Pitch End Mills

For Feed & Speed Rates, Go to Page No. 118-120

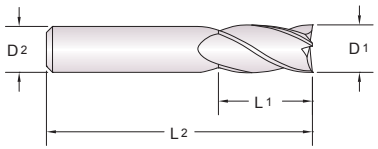
Ordering No.	Flute Dia(**D1**)	Flute Len(**L1**)	Overall Len(**L2**)	Shank Dia(**D2**)
220040050-F	4	15	50	6
220060050-F	6	16	50	6
220060075-F	6	25	75	6
220080060-F	8	20	60	8
220080075-F	8	30	75	8
220080100-F	8	40	100	8
220100075-F	10	30	75	10
220100100-F	10	40	100	10
220120075-F	12	30	75	12
220120100-F	12	40	100	12
220140100-F	14	40	100	14
220160100-F	16	50	100	16
220200100-F	20	50	100	20







Tolerance	
D1	h8
D2	h6



Features
- Suited for Alloyed Steel in Side milling operations
- New High Wear Resistance NOVA coating
- 30% increased productivity than 220 Steel Series

For Feed & Speed Rates, Go to Page No. 118-120

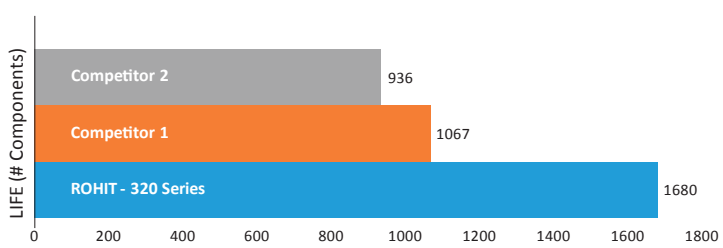
Item Code	Flute Dia(**D1**)	Flute Len(**L1**)	Overall Len(**L2**)	Shank Dia(**D2**)
CR3AHSE00KU1	4	16	50	6
CR3AHSE00KV9	6	16	50	6
CR3AHSE00KW7	6	25	75	6
CR3AHSE00KX4	8	20	60	8
CR3AHSE00KY2	8	40	100	8
CR3AHSE00KZ0	10	30	75	10
CR3AHSE00L01	10	40	100	10
CR3AHSE00L19	12	30	75	12
CR3AHSE00L27	12	40	100	12
CR3AHSE00KT3	16	40	100	16
CR3AHSE00L35	20	50	100	20

APPLICATION SUCCESS DATA

	Description	320 Series
	Industry	Auto components
	Component	Bike-Kick Cam
CUTTING CONDITIONS	Tool Diameter	10mm
	Cutting Speed	100m/min
	RPM	3200
	Feed (mm/ tooth)	0.04
	Table Feed (mm/min)	512
	DOC	20mm
	Radial Cut	0.5mm
	Milling Type	Side Milling
	Coolant	6% Mix Water Soluble
	Material	Alloy Steel
	Hardness	240-290BHN
	Machine	Vertical Machining Centre BFW



PERFORMANCE GRAPH



RESULT

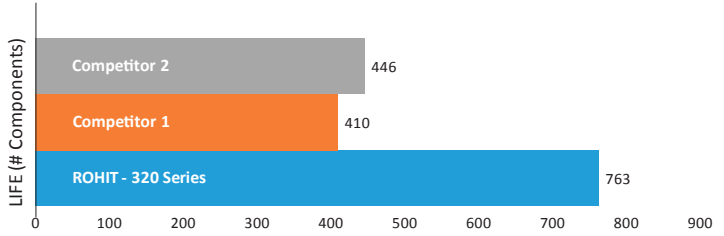
80% more life than the competition and ~40% reduction in cycle time

APPLICATION SUCCESS DATA

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



PERFORMANCE GRAPH



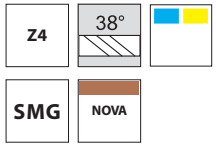
RESULT

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

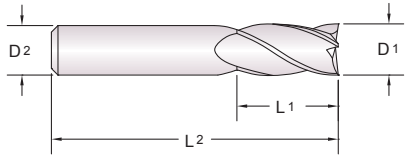
Go to Page 73
Series 407 - HIGH FEED CUTTERS







Tolerance	
D1	h8
D2	h6



Features

- Excellent for Plunging, Slotting & Keyway milling operations at Higher Feeds
- Best suited for milling all types of Alloy Steel &Stainless Steel (SUS)
- New High Wear Resistance NOVA coating
-
- **For Feed & Speed Rates, Go to Page No. 118-120**

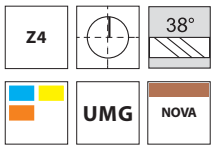
Ordering No.	Flute Dia(**D1**)	Flute Len(**L1**)	Overall Len(**L2**)	Shank Dia(**D2**)
222040050-N	4	16	50	6
222060050-N	6	16	50	6
222060075-N	6	25	75	6
222080060-N	8	20	60	8
222080075-N	8	30	75	8
222080100-N	8	40	100	8
222100075-N	10	30	75	10
222100100-N	10	40	100	10
222120075-N	12	30	75	12
222120100-N	12	40	100	12
222140100-N	14	40	100	14
222160100-N	16	50	100	16
222200100-N	20	50	100	20

Note:

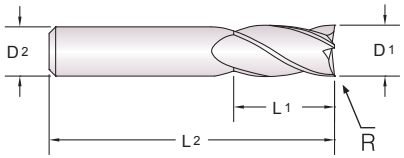
The 222-series End Mills contain CR of 0.15-0.30mm to provide extra strength.

If End Mill required with No CR, please use our 224-series SSM End Mills.





Tolerance	
D1	h8
D2	h6



Features

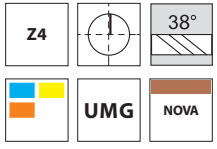
- Excellent for Plunging, Slotting & Keyway milling operations at Higher Feeds
- Best suited for milling all types of Alloy Steel, Stainless Steel (SUS) & Special Titanium Alloys
- New High Wear Resistance NOVA coating

For Feed & Speed Rates, Go to Page No. 118-120

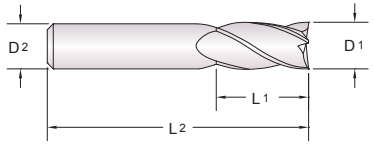
Ordering No.	Flute Dia(**D1**)	Flute Len(**L1**)	Overall Len(**L2**)	Shank Dia(**D2**)	Corner Radius (R)
321040050R0.5-N	4	16	50	6	R0.5
321060050R0.5-N	6	16	50	6	R0.5
321060075R0.5-N	6	25	75	6	R0.5
321080060R1.0-N	8	20	60	8	R1.0
321080075R1.0-N	8	30	75	8	R1.0
321080100R1.0-N	8	40	100	8	R1.0
321100075R1.5-N	10	30	75	10	R1.5
321100100R1.5-N	10	40	100	10	R1.5
321120075R1.5-N	12	30	75	12	R1.5
321120100R1.5-N	12	40	100	12	R1.5
321140100R2.0-N	14	40	100	14	R2.0
321160100R2.0-N	16	40	100	16	R2.0
321200100R2.0-N	20	50	100	20	R2.0







Tolerance	
D1	h8
D2	h6



Features

- Excellent for Plunging, Slotting & Keyway milling operations at Higher Feeds
- Best suited for milling all types of Alloy Steel, Stainless Steel (SUS) & Special Titanium Alloys
- New High Wear Resistance NOVA coating

For Feed & Speed Rates, Go to Page No. 118-120

Item Code	Flute Dia(**D1**)	Flute Len(**L1**)	Overall Len(**L2**)	Shank Dia(**D2**)
322040050-N	4	16	50	6
322050050-N	5	16	50	6
322060050-N	6	16	50	6
322060075-N	6	25	75	6
322080060-N	8	20	60	8
322080075-N	8	30	75	8
322080100-N	8	40	100	8
322100075-N	10	30	75	10
322100100-N	10	40	100	10
322100150-N	10	50	150	10
322120075-N	12	30	75	12
322120100-N	12	40	100	12
322120150-N	12	50	150	12
322140100-N	14	40	100	14
322160100-N	16	50	100	16
322200100-N	20	50	100	20

Note:

The 322-series End Mills contain CR of 0.15-0.30mm to provide extra strength.

If End Mill required with No CR, please use our 324-series SSM End Mills

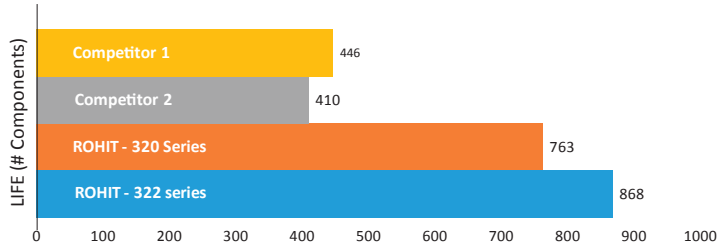


APPLICATION SUCCESS DATA

	Description	322 Series
	Industry	Automotive
	Component	Gear K S Driven
CUTTING CONDITIONS	Tool Diameter	8mm
	Cutting Speed	100m/min
	RPM	4000
	Feed (mm/ tooth)	0.025
	Table Feed (mm/min)	400
	DOC	4mm
	Radial Cut	-
	Milling Type	Slotting
	Coolant	6% Mix Water Soluble
	Material	SCM 420M
	Hardness	320BHN
	Machine	Vertical Machining Centre HAAS



PERFORMANCE GRAPH



RESULT

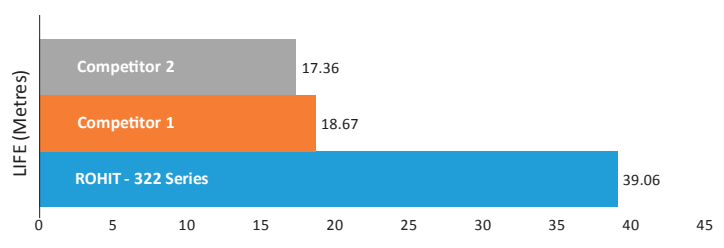
~220% increase in life from the competition and 30% reduction in cycle time.
~15% higher life than 320 Series

APPLICATION SUCCESS DATA

	Description	322 Series
	Industry	Aerospace
	Component	IWS Plates
CUTTING CONDITIONS	Tool Diameter	20mm
	Cutting Speed	60m/min
	RPM	950
	Feed (mm/ tooth)	0.12
	Table Feed (mm/min)	456
	DOC	50mm
	Radial Cut	2mm
	Milling Type	Side Milling
	Coolant	6% Mix Water Soluble
	Material	SS304B4
	Hardness	300-360BHN
	Machine	Vertical Machining Centre



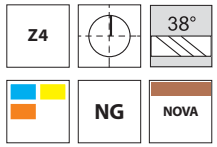
PERFORMANCE GRAPH



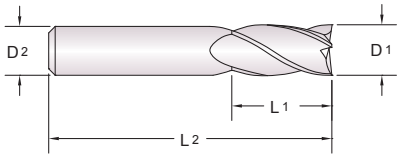
RESULT

~100% increase in tool life &
~60% reduction in CPC





Tolerance	
D1	h8
D2	h6



Features

- Excellent for Production run applications
- Best suited for milling all types of Stainless Steel, Special Titanium Alloys, Ni-Cr Alloys
- New High Wear Resistance NOVA coating

For Feed & Speed Rates, Go to Page No. 118-120

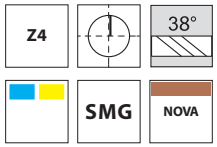
Ordering No.	Flute Dia(**D1**)	Flute Len(**L1**)	Overall Len(**L2**)	Shank Dia(**D2**)
422040050-N	4	16	50	6
422050050-N	5	16	50	6
422060050-N	6	16	50	6
422060075-N	6	25	75	6
422080060-N	8	20	60	8
422080075-N	8	30	75	8
422080100-N	8	40	100	8
422100075-N	10	30	75	10
422100100-N	10	40	100	10
422120075-N	12	30	75	12
422120100-N	12	40	100	12

Note:

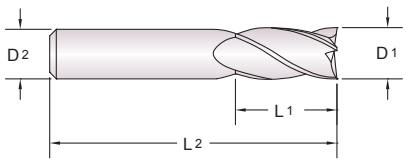
The 422-series End Mills contain CR of **0.15~0.30mm** to provide extra strength.







Tolerance	
D1	h8
D2	h6



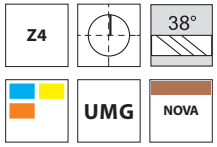
Features

- With NO Radius, it is especially designed for Side-milling operations at Higher Feeds
- Best suited for milling all types of Alloy Steel
- New High Wear Resistance NOVA coating

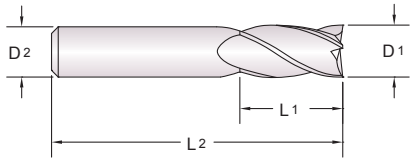
For Feed & Speed Rates, Go to Page No. 118-120

Ordering No.	Flute Dia(**D1**)	Flute Len(**L1**)	Overall Len(**L2**)	Shank Dia(**D2**)
224040050-N	4	16	50	6
224060050-N	6	16	50	6
224060075-N	6	25	75	6
224080060-N	8	20	60	8
224080075-N	8	30	75	8
224080100-N	8	40	100	8
224100075-N	10	30	75	10
224100100-N	10	40	100	10
224120075-N	12	30	75	12
224120100-N	12	40	100	12
224140100-N	14	40	100	14
224160100-N	16	50	100	16
224200100-N	20	50	100	20





Tolerance	
D1	h8
D2	h6



Features

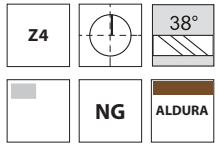
- NO radius end mills Excellent for Side milling & Keyway milling operations to achieve desirable Surface finish
- Best suited for milling all types of Alloy Steel
- New High Wear Resistance NOVA coating

For Feed & Speed Rates, Go to Page No. 118-120

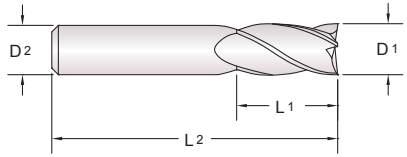
Ordering No.	Flute Dia(**D1**)	Flute Len(**L1**)	Overall Len(**L2**)	Shank Dia(**D2**)
324040050-N	4	16	50	6
324050050-N	5	16	50	6
324060050-N	6	16	50	6
324060075-N	6	25	75	6
324080060-N	8	20	60	8
324080075-N	8	30	75	8
324080100-N	8	40	100	8
324100075-N	10	30	75	10
324100100-N	10	40	100	10
324100150-N	10	50	150	10
324120075-N	12	30	75	12
324120100-N	12	40	100	12
324120150-N	12	50	150	12
324140100-N	14	40	100	14
324160100-N	16	50	100	16
324200100-N	20	50	100	20







Tolerance	
D1	h10
D2	h6



Features

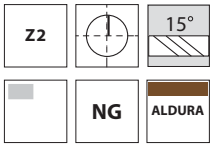
- Special PVD coating which work at temperature upto ~1500 deg C
- Suitable for machining Hardened dies & tool steel material upto 70 HRC
- Higher Feeds & Reduced cycle time

For Feed & Speed Rates, Go to Page No. 116-117

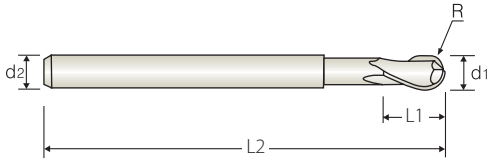
Item Code	Flute Dia(**D1**)	Flute Len(**L1**)	Overall Len(**L2**)	Shank Dia(**D2**)
CR49HSE00JT0	2	6	50	4
CR49HSE00JU8	3	12	50	4
CR49HSE00JV6	4	12	50	4
CR49HSE00JW4	4	20	75	4
CR49HSE00JX1	6	16	50	6
CR49HSE00JY9	6	25	75	6
CR49HSE00JZ7	8	25	75	8
CR49HSE00K08	8	30	100	8
CR49HSE00K16	10	25	75	10
CR49HSE00K24	10	40	100	10
CR49HSE00K32	12	25	75	12
CR49HSE00K40	12	40	100	12

402 Series | Carbide 4X Series 2-Flute Ball Nose upto 70HRC





Tolerance	
D1	h10
D2	h6



Features

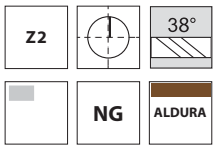
- Special PVD coating which work at temperature upto ~1500 deg C
- Most effective in Profiliing on Hardened dies of D2, H13, P20 with hardness upto 70 HRC
- Higher Feeds & Reduced cycle time

For Feed & Speed Rates, Go to Page No. 116-117

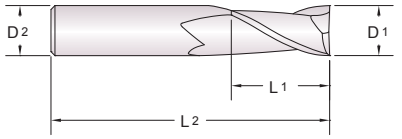
Ordering No.	Flute Dia(**D1**)	Flute Len(**L1**)	Overall Len(**L2**)	Shank Dia(**D2**)
CR49HBE00DC1	1	4	50	4
CR49HBE00DD8	2	6	50	4
CR49HBE00DE6	3	12	50	4
CR49HBE00DF4	4	12	50	4
CR49HBE00DG2	4	20	75	4
CR49HBE00DH0	6	16	50	6
CR49HBE00DJ5	6	25	75	6
CR49HBE00DK3	8	25	75	8
CR49HBE00DL1	8	30	100	8
CR49HBE00DM9	10	25	75	10
CR49HBE00DN6	10	40	100	10
CR49HBE00DP2	12	25	75	12
CR49HBE00DQ0	12	40	100	12

403 Series | Carbide 4X Series 2-Flute End Mills upto 70HRC





Tolerance	
D1	h10
D2	h6



Features

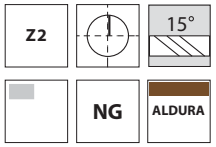
- Special PVD coating which work at temperature upto ~1500 deg C
- Suitable for machining Hardened dies & tool steel material upto 70 HRC
- Higher Feeds & Reduced cycle time

For Feed & Speed Rates, Go to Page No. 116-117

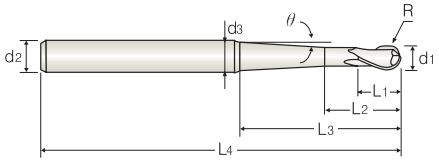
Ordering No.	Flute Dia(**D1**)	Flute Len(**L1**)	Overall Len(**L2**)	Shank Dia(**D2**)
403010050-L	1	4	50	4
403020050-L	2	6	50	4
403030050-L	3	12	50	4
403040050-L	4	12	50	4
403060050-L	6	16	50	6
403080075-L	8	25	75	8
403100075-L	10	25	75	10
403120075-L	12	25	75	12

406 Series | Carbide 4X Series 2-Flute Ball Nose with Taper Neck upto 70HRC





Tolerance	
D1	h10
D2	h6



Features

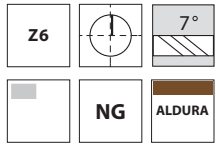
- For deep pocketing or deep reach application
- Suitable for dry machining on Hardened die and moulds upto 70 HRC
- Designed to work at Higher RPM to achieve desired surface finish of the dies/moulds
- Long neck design for deep machining near walls.

For Feed & Speed Rates, Go to Page No. 116-117

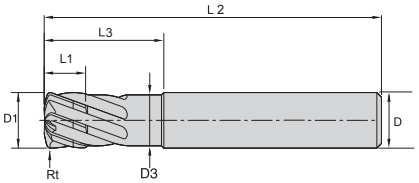
Ordering No.	R	Flute Dia(D1)	Flute Len(L1)	L2	Reach Len(L3)	Overall Len(L4)	Shank Dia(D2)	Neck Dia(D3)	Neck Taper Angle
406020601-L	1	2	4	6	23	60	6	2.9	1°30'
406020605-L	1	2	4	6	23	60	6	5	5°
406020803-L	1	2	4	6	41	80	6	5.7	3°
406030753-L	1.5	3	6	8	32	75	6	5.6	3°
406030901-L	1.5	3	6	8	52	90	6	5.3	1°30'
406040753-L	2	4.0	8	10	28	75	6	6	3°
406040901-L	2	4.0	8	10	49	90	6	6	1°30'
406050803-L	2.5	5.0	10	12	41	80	8	8	3°
406051001-L	2.5	5.0	10	12	61	100	8	7	1°30'
406060803-L	3	6	12	15	34	80	8	8	3°
406061001-L	3	6	12	15	53	100	8	8	1°30'
406080803-L	4	8	14	17	36	80	10	10	3°
406081001-L	4	8	14	17	55	100	10	10	1°30'
406100803-L	5	10	18	21	40	80	12	12	3°
406101001-L	5	10	18	21	59	100	12	12	1°30'
406121103-L	6	12	22	25	63	110	16	16	3°
406121301-L	6	12	22	25	83	130	16	15	1°30'

407 Series | Carbide SUPER-CUT END MILLS (High Feed Cutter)





Tolerance	
D1	h10
D2	h6



Features

- Non-centre cutting
- Excellent wear resistance at higher feed rates on hardened materials
- Innovative new geometry increases Metal Removal Rates
- Designed with Shorter Flute lengths & Corner Radius for edge strength
- Necked shanks provides extended reach in deep cavities

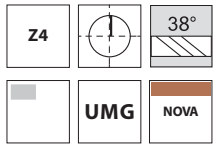
For Feed & Speed Rates, Go to Page No. 116-117

Ordering No.	R	Flute Dia(D1)	Flute Len(L1)	Reach Len(L3)	Neck Dia(D3)	Overall Len(L2)	Shank Dia(D2)
40706060R0.5-L	R0.5	6	3	12	5.5	60	6
40706060R1.0-L	R1.0	6	3	12	5.5	60	6
40708075R1.0-L	R1.0	8	4	16	7.5	75	8
40708100R1.0-L	R1.0	8	4	16	7.5	100	8
40708075R2.0-L	R2.0	8	4	16	7.5	75	8
40708100R2.0-L	R2.0	8	4	16	7.5	100	8
40710075R1.0-L	R1.0	10	5	20	9.2	75	10
40710100R1.0-L	R1.0	10	5	20	9.2	100	10
40710075R2.0-L	R2.0	10	5	20	9.2	75	10
40710100R2.0-L	R2.0	10	5	20	9.2	100	10
40712075R2.0-L	R2.0	12	6	25	11.2	75	12
40712100R2.0-L	R2.0	12	6	25	11.2	100	12
40712075R3.0-L	R3.0	12	6	25	11.2	75	12
40712100R3.0-L	R3.0	12	6	25	11.2	100	12

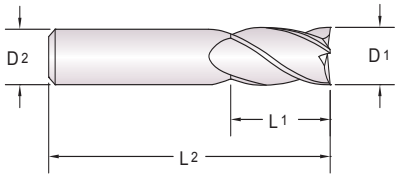


301 Series | Carbide 3X Series 4-Flute End Mills upto 60HRC





Tolerance	
D1	h10
D2	h6



Features

- New High Wear Resistance NOVA coating
- Suitable for machining Hardened dies & tool steel material upto ~60HRc
- Specially designed tools to provide Chatter free machining

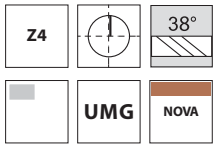
For Feed & Speed Rates, Go to Page No. 114-115

Item Code	Flute Dia(**D1**)	Flute Len(**L1**)	Overall Len(**L2**)	Shank Dia(**D2**)
CR33HSE00BW0	2	4	50	3
CR33HSE00BY5	2.5	5	50	3
CR33HSE00H82	3	12	38	3
CR33HSE003A3	3	15	50	3
CR33HSE003C9	3	20	75	3
CR33HSE00FY1	3	25	100	3
CR33HSE003D6	4	14	50	4
CR33HSE003F2	4	20	75	4
CR33HSE00FN5	4	25	100	4
CR33HSE00HV6	4	50	150	4
CR33HSE003G0	5	16	50	5
CR33HSE003H8	5	20	75	5
CR33HSE00HH7	5	25	100	5
CR33HSE003J3	6	16	50	6
CR33HSE003K1	6	25	75	6
CR33HSE003L9	6	30	100	6
CR33HSE00FP1	6	50	150	6
CR33HSE003M7	8	20	60	8
CR33HSE003N4	8	25	75	8
CR33HSE00G59	8	30	100	8
CR33HSE003P0	8	50	150	8
CR33HSE003R6	10	25	75	10
CR33HSE003S3	10	40	100	10

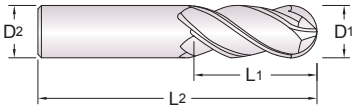
Item Code	Flute Dia(**D1**)	Flute Len(**L1**)	Overall Len(**L2**)	Shank Dia(**D2**)
CR33HSE003T1	10	60	150	10
CR33HSE00CP4	12	25	75	12
CR33HSE003U9	12	40	100	12
CR33HSE003V7	12	60	150	12
CR33HSE00L54	14	40	100	14
CR33HSE003X2	16	40	100	16
CR33HSE00HT0	16	60	150	16
CR33HSE00L47	20	40	100	20

302 Series | Carbide 3X Series 4-Flute Ball Nose upto 60HRC





Tolerance	
D1	h10
D2	h6



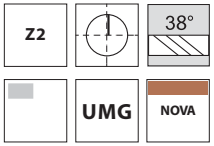
Features

- New High Wear Resistance NOVA coating
- Best Suited for profiling on Hardened dies & moulds upto ~60HRc
- Specially designed tools to provide effective material removal and higher surface finish of Moulds

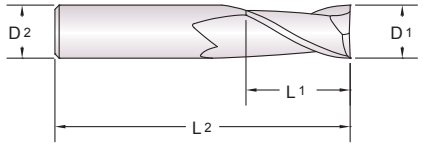
For Feed & Speed Rates, Go to Page No. 114-115

Item Code	Flute Dia(**D1**)	Flute Len(**L1**)	Overall Len(**L2**)	Shank Dia(**D2**)
CR33HBE00364	3	15	50	3
CR33HBE00AM0	3	20	75	3
CR33HBE00BV9	4	14	50	4
CR33HBE00AN7	4	20	75	4
CR33HBE00AY3	4	25	100	4
CR33HBE00C50	5	16	50	5
CR33HBE00BU1	5	20	75	5
CR33HBE00BW7	6	16	50	6
CR33HBE00372	6	25	75	6
CR33HBE00BB3	6	30	100	6
CR33HBE00CA4	6	50	150	6
CR33HBE00C92	8	20	60	8
CR33HBE00380	8	25	75	8
CR33HBE00B36	8	30	100	8
CR33HBE00C84	8	50	150	8
CR33HBE00BY2	10	25	75	10
CR33HBE00398	10	40	100	10
CR33HBE00B44	10	60	150	10
CR33HBE00AH1	12	25	75	12
CR33HBE00CB2	12	40	100	12
CR33HBE00CC0	12	60	150	12
CR33HBE003A0	16	40	100	16





Tolerance	
D1	h10
D2	h6



Features

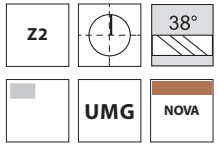
- New High Wear Resistance NOVA coating
- Suitable for machining Hardened dies & tool steel material upto ~60HRc
- Specially designed tools to provide Chatter free machining

For Feed & Speed Rates, Go to Page No. 114-115

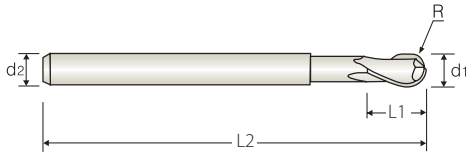
Item Code	Flute Dia(**D1**)	Flute Len(**L1**)	Overall Len(**L2**)	Shank Dia(**D2**)
CR33HSE00AW1	1	3	50	3
CR33HSE00AZ4	1.5	3	50	3
CR33HSE00B21	2	4	50	3
CR33HSE00B47	2.5	5	50	3
CR33HSE00LF7	3	15	50	3
CR33HSE00LG5	3	20	75	3
CR33HSE00B96	4	14	50	4
CR33HSE00BA8	4	20	75	4
CR33HSE00BB6	4	25	100	4
CR33HSE00BC4	5	16	50	5
CR33HSE00BD1	5	20	75	5
CR33HSE00BE9	5	25	100	5
CR33HSE00HS2	6	16	50	6
CR33HSE00BG5	6	25	75	6
CR33HSE00HU8	6	30	100	6
CR33HSE00HR5	8	20	60	8
CR33HSE00BL4	8	25	75	8
CR33HSE00BM2	8	30	100	8
CR33HSE00BN9	8	50	150	8
CR33HSE00HQ7	10	25	75	10
CR33HSE00BQ3	10	40	100	10
CR33HSE00BR1	10	60	150	10
CR33HSE00BS8	12	25	75	12

Item Code	Flute Dia(**D1**)	Flute Len(**L1**)	Overall Len(**L2**)	Shank Dia(**D2**)
CR33HSE00BT6	12	40	100	12
CR33HSE00BU4	12	60	150	12





Tolerance	
D1	h10
D2	h6



Features

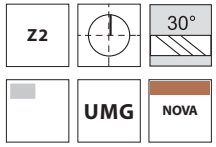
- New High Wear Resistance NOVA coating
- Best Suited for profiling on Hardened dies & moulds upto ~60HRc
- Specially designed tools to provide effective material removal and higher surface finish of Moulds

For Feed & Speed Rates, Go to Page No. 114-115

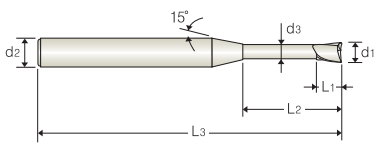
Item Code	Flute Dia(**D1**)	Flute Len(**L1**)	Overall Len(**L2**)	Shank Dia(**D2**)
CR33HBE008Q0	1	3	50	3
CR33HBE008T3	1.5	3	50	3
CR33HBE008W7	2	4	50	3
CR33HBE008Z0	2.5	5	50	3
CR33HBE00BR8	3	15	50	3
CR33HBE00AT4	3	20	75	3
CR33HBE00B51	3	25	100	3
CR33HBE00315	4	14	50	4
CR33HBE00AU2	4	20	75	4
CR33HBE00B69	4	25	100	4
CR33HBE00B93	6	16	50	6
CR33HBE00323	6	25	75	6
CR33HBE00331	6	30	100	6
CR33HBE00BA5	8	20	60	8
CR33HBE00BH0	8	25	75	8
CR33HBE00B85	8	30	100	8
CR33HBE00356	10	25	75	10
CR33HBE00B77	10	40	100	10
CR33HBE009M8	10	60	150	10
CR33HBE009N5	12	25	75	12
CR33HBE00BP2	12	40	100	12
CR33HBE009Q9	12	60	150	12

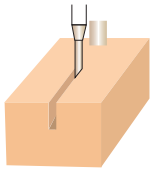
305 Series | Carbide 3X Series 2-Flute Rib Processing End Mills upto 60HRC





Tolerance	
D1	h10
D2	h6





Features

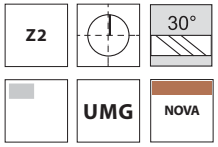
- For 3-D milling in dies for deep reach application
- Also available in 4-Flute above 2mm diameter
- Designed with reinforced shank for higher stability
- Long neck design for deep machining near walls

For Feed & Speed Rates, Go to Page No. 114-115

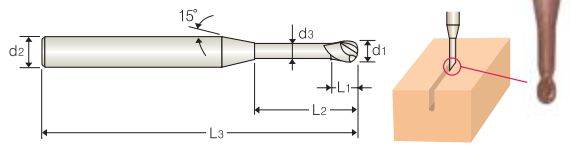
Ordering No.	Flute Dia(**D1**)	Flute Len(**L1**)	Overall Len(**L3**)	Shank Dia(**D2**)	Reach Len(**L2**)	Neck Dia(**D3**)
30501006-N	1	2	50	4	6	0.95
30501010-N	1	2	50	4	10	0.95
30501506-N	1.5	2	50	4	6	1.45
30501510-N	1.5	2	50	4	10	1.45
30502008-N	2	3	50	4	8	1.95
30502012-N	2	3	50	4	12	1.95
30502016-N	2	3	50	4	16	1.95
30502020-N	2	3	50	4	20	1.95
30502508-N	2.5	4	50	4	8	2.40
30502512-N	2.5	4	50	4	12	2.40
30502516-N	2.5	4	50	4	16	2.40
30502520-N	2.5	4	50	4	20	2.40
30503008-N	3	5	50	6	8	2.85
30503012-N	3	5	50	6	12	2.85
30503016-N	3	5	60	6	16	2.85
30503020-N	3	5	60	6	20	2.85
30503025-N	3	5	75	6	25	2.85
30504012-N	4	6	50	6	12	3.85
30504016-N	4	6	60	6	16	3.85
30504020-N	4	6	75	6	20	3.85
30504025-N	4	6	75	6	25	3.85
30504030-N	4	6	75	6	30	3.85
30504035-N	4	6	75	6	35	3.85

306 Series | Carbide 3X Series 2-Flute Rib Processing Ball Nose upto 60HRC





Tolerance	
D1	h10
D2	h6



Features

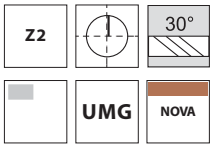
- For 3-D milling in dies for deep reach application
- Also available in 4-Flute above 2mm diameter
- Designed with reinforced shank for higher stability
- Long neck design for deep machining near walls

For Feed & Speed Rates, Go to Page No. 114-115

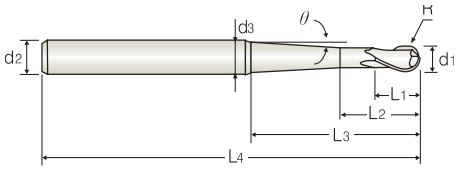
Ordering No.	R	Flute Dia(**D1**)	Flute Len(**L1**)	Overall Len(**L3**)	Shank Dia(**D2**)	Reach Len(**L2**)	Neck Dia(**D3**)
30601006-N	0.5	1	2	50	4	6	0.95
30601010-N	0.5	1	2	50	4	10	0.95
30601506-N	0.75	1.5	2	50	4	6	1.45
30601510-N	0.75	1.5	2	50	4	10	1.45
30602008-N	1	2	3	50	4	8	1.95
30602012-N	1	2	3	50	4	12	1.95
30602016-N	1	2	3	50	4	16	1.95
30602020-N	1	2	3	50	4	20	1.95
30602508-N	1.25	2.5	4	50	4	8	2.40
30602512-N	1.25	2.5	4	50	4	12	2.40
30602516-N	1.25	2.5	4	50	4	16	2.40
30602520-N	1.25	2.5	4	50	4	20	2.40
30603008-N	1.5	3	5	50	6	8	2.85
30603012-N	1.5	3	5	50	6	12	2.85
30603016-N	1.5	3	5	60	6	16	2.85
30603020-N	1.5	3	5	60	6	20	2.85
30603025-N	1.5	3	5	75	6	25	2.85
30604012-N	2	4	6	50	6	12	3.85
30604016-N	2	4	6	60	6	16	3.85
30604020-N	2	4	6	75	6	20	3.85
30604025-N	2	4	6	75	6	25	3.85
30604030-N	2	4	6	75	6	30	3.85
30604035-N	2	4	6	75	6	35	3.85

307 Series | Carbide 3X Series 2-Flute Ball Nose with Taper Neck upto 60HRC





Tolerance	
D1	h10
D2	h6



Features

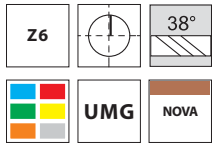
- For deep pocketing or deep reach application
- Also available in 4-Flute above 2mm diameter
- Designed with reinforced shank for higher stability
- Long neck design for deep machining near walls

For Feed & Speed Rates, Go to Page No. 114-115

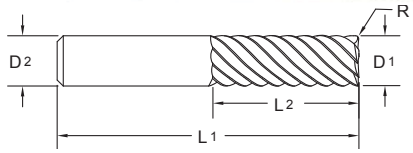
Ordering No.	R	Flute Dia(D1)	Flute Len(L1)	L2	Reach Len(L3)	Overall Len(L4)	Shank Dia(D2)	Neck Dia(D3)	Neck Taper Angle
3070200601-N	1	2	4	6	23	60	6	2.9	1°30'
3070200605-N	1	2	4	6	23	60	6	5	5°
3070200803-N	1	2	4	6	41	80	6	5.7	3°
3070300753-N	1.5	3	6	8	32	75	6	5.6	3°
3070300901-N	1.5	3	6	8	52	90	6	5.3	1°30'
3070400753-N	2	4	8	10	28	75	6	6	3°
3070400901-N	2	4	8	10	49	90	6	6	1°30'
3070500803-N	2.5	5	10	12	41	80	8	8	3°
3070501001-N	2.5	5	10	12	61	100	8	7	1°30'
3070600803-N	3	6	12	15	34	80	8	8	3°
3070601001-N	3	6	12	15	53	100	8	8	1°30'
3070800803-N	4	8	14	17	36	80	10	10	3°
3070801001-N	4	8	14	17	55	100	10	10	1°30'
3071000803-N	5	10	18	21	40	80	12	12	3°
3071001001-N	5	10	18	21	59	100	12	12	1°30'
3071201103-N	6	12	22	25	63	110	16	16	3°
3071201301-N	6	12	22	25	83	130	16	15	1°30'

308 Series | Carbide 3X Series 6-Flute Radius End Mills





Tolerance	
D1	h10
D2	h6



Features

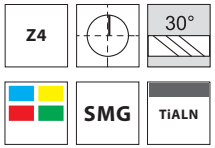
- Best End Mills for achieving Higher Surface Finish
- Corner Radius to provide more edge strength
- New High Wear Resistance NOVA coating

For Feed & Speed Rates, Go to Page No. 114-115

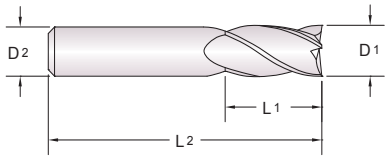
Ordering No.	Flute Dia(D1)	Flute Len(L2)	Overall Len(L1)	Shank Dia(D2)	Corner Radius (R)
308060075R0.5-N	6	25	75	6	R0.5
308060075R1.0-N	6	25	75	6	R1.0
308080075R0.5-N	8	25	75	8	R0.5
308080075R1.0-N	8	25	75	8	R1.0
308080075R1.5-N	8	25	75	8	R1.5
308100075R0.5-N	10	30	75	10	R0.5
308100075R1.0-N	10	30	75	10	R1.0
308100075R1.5-N	10	30	75	10	R1.5
308120075R1.0-N	12	30	75	12	R1.0
308120075R1.5-N	12	30	75	12	R1.5
308120075R2.0-N	12	30	75	12	R2.0
308160100R1.0-N	16	40	100	16	R1.0
308160100R2.0-N	16	40	100	16	R2.0
308160100R3.0-N	16	40	100	16	R3.0
308180100R1.0-N	18	40	100	18	R1.0
308180100R2.0-N	18	40	100	18	R2.0
308180100R3.0-N	18	40	100	18	R3.0
308200100R1.0-N	20	40	100	20	R1.0
308200100R2.0-N	20	40	100	20	R2.0
308200100R3.0-N	20	40	100	20	R3.0

201 Series | Carbide GP-1X Series 4-Flute Flat End Mills





Tolerance	
D1	h10
D2	h6



Features

- Machining Cast Iron up to 320BHN, MS, Al-Si alloys, EN series Steels & Steels up to 35HRC
- 4-Flute for improved surface finishes

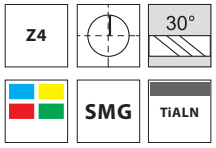
For Feed & Speed Rates, Go to Page No. 112-113

Item Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR11GSE00944	2	9	38	3
CR11GSE00969	2.5	12	38	3
CR11GSE00993	3	12	38	3
CR11GSE009A5	3	15	50	3
CR11GSE009B3	3	20	75	3
CR11GSE009C1	3	25	100	3
CR11GSE009E6	4	14	50	4
CR11GSE009G2	4	20	75	4
CR11GSE009H0	4	25	100	4
CR11GSE009J5	5	16	50	5
CR11GSE009K3	5	20	75	5
CR11GSE009L1	5	25	100	5
CR11GSE009Q0	6	16	50	6
CR11GSE009R8	6	25	75	6
CR11GSE009S5	6	30	100	6
CR11GSE009T3	6	50	150	6
CR11GSE009X4	7	20	60	7
CR11GSE00A04	8	20	60	8
CR11GSE00A12	8	25	75	8
CR11GSE00A20	8	30	100	8
CR11GSE00A38	8	50	150	8
CR11GSE00A46	9	25	75	9
CR11GSE00A79	10	25	75	10

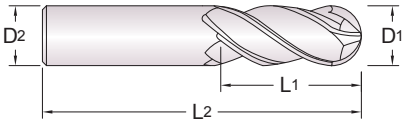
Item Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR11GSE00A87	10	40	100	10
CR11GSE00A95	10	60	150	10
CR11GSE00AA7	12	25	75	12
CR11GSE00AB5	12	40	100	12
CR11GSE00AC3	12	60	150	12
CR11GSE00AD0	12	60	200	12
CR11GSE00332	14	30	75	14
CR11GSE00AF6	14	40	100	14
CR11GSE00AG4	14	60	150	14
CR11GSE00AH2	14	60	200	14
CR11GSE00HW2	16	30	75	16
CR11GSE00AJ7	16	40	100	16
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
CR11GSE00AR0	20	60	150	20
CR11GSE00AS7	20	60	200	20
CR11GSE00AT5	25	40	100	25
CR11GSE00AU3	25	60	150	25
CR11GSE00AV1	25	60	200	25

202 Series | Carbide GP-1X Series 4-Flute Ball Nose





Tolerance	
D1	h10
D2	h6



Features

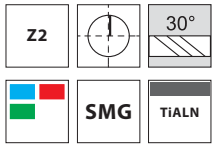
- Machining Cast Iron up to 320BHN, MS, Al-Si alloys, EN series Steels & Steels up to 35HRC
- 4-Flute for improved surface finishes

For Feed & Speed Rates, Go to Page No. 112-113

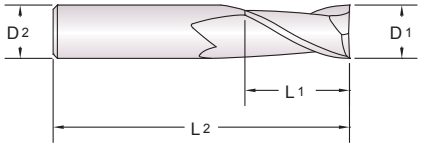
Item Code	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
CR11GBE007G1	3	12	38	3
CR11GBE007H9	3	15	50	3
CR11GBE007J4	3	20	75	3
CR11GBE007K2	3	25	100	3
CR11GBE007L0	4	14	50	4
CR11GBE007M8	4	20	75	4
CR11GBE007N5	4	25	100	4
CR11GBE007P1	5	16	50	5
CR11GBE007Q9	5	20	75	5
CR11GBE007R7	5	25	100	5
CR11GBE007S4	6	16	50	6
CR11GBE007T2	6	25	75	6
CR11GBE007U0	6	30	100	6
CR11GBE007V8	6	50	150	6
CR11GBE007W6	7	20	60	7
CR11GBE007X3	8	20	60	8
CR11GBE007Y1	8	25	75	8
CR11GBE007Z9	8	30	100	8
CR11GBE00800	8	50	150	8
CR11GBE00818	9	25	75	9
CR11GBE00826	10	25	75	10
CR11GBE00834	10	40	100	10
CR11GBE00842	10	60	150	10

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





Tolerance	
D1	h10
D2	h6



Features

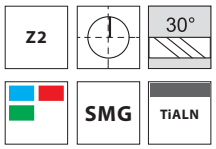
- Machining Cast Iron up to 320BHN, MS, Al-Si alloys, EN Steels & Steels up to 35HRC

For Feed & Speed Rates, Go to Page No. 112-113

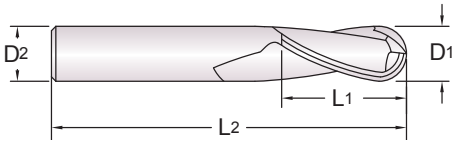
Item Code	Flute Dia(**D1**)	Flute Len(**L1**)	Overall Len(**L2**)	Shank Dia(**D2**)
CR11GSE006G5	1	4	38	3
CR11GSE006H3	1.5	6	38	3
CR11GSE006J8	2	9	38	3
CR11GSE006K6	2.5	12	38	3
CR11GSE006M2	3	12	38	3
CR11GSE006N9	3	15	50	3
CR11GSE006R1	4	14	50	4
CR11GSE006S8	4	20	75	4
CR11GSE006U4	5	16	50	5
CR11GSE006X7	6	16	50	6
CR11GSE00720	8	20	60	8
CR11GSE00738	8	25	75	8
CR11GSE007B5	10	25	75	10
CR11GSE007C3	10	40	100	10
CR11GSE007E8	12	25	75	12
CR11GSE007F6	12	40	100	12
CR11GSE007J7	14	40	100	14
CR11GSE007M1	16	40	100	16







Tolerance	
D1	h10
D2	h6



Features

- Machining Cast Iron up to 320BHN, MS, Al-Si alloys, EN Steels & Steels up to 35HRC

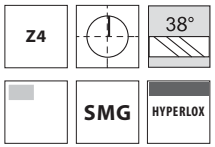
For Feed & Speed Rates, Go to Page No. 112-113

Item Code	Flute Dia(**D1**)	Flute Len(**L1**)	Overall Len(**L2**)	Shank Dia(**D2**)
CR11GBE004Y4	1	4	38	3
CR11GBE004Z2	1.5	6	38	3
CR11GBE00503	2	9	38	3
CR11GBE00511	2.5	12	38	3
CR11GBE00529	3	12	38	3
CR11GBE00537	3	15	50	3
CR11GBE00560	4	14	50	4
CR11GBE00578	4	20	75	4
CR11GBE00594	5	16	50	5
CR11GBE005C2	6	16	50	6
CR11GBE005D9	6	25	75	6
CR11GBE005J6	8	20	60	8
CR11GBE005K4	8	25	75	8
CR11GBE005P3	10	25	75	10
CR11GBE005Q1	10	40	100	10
CR11GBE005S6	12	25	75	12
CR11GBE005T4	12	40	100	12
CR11GBE005W8	14	40	100	14
CR11GBE005Z1	16	40	100	16

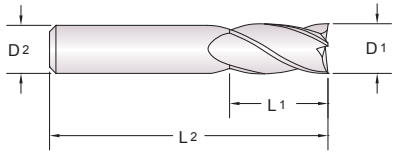


205 Series | Carbide TX Series 4-Flute Flat End Mills





Tolerance	
D1	h10
D2	h6



Features

- For machining pre-heat treated steels like P20, etc. up to hardness of 50HRC
- Specially designed for pre-hardened materials

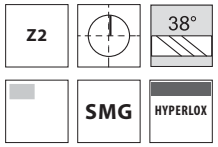
For Feed & Speed Rates, Go to Page No. 114-115

Item Code	Flute Dia(**D1**)	Flute Len(**L1**)	Overall Len(**L2**)	Shank Dia(**D2**)
CR16GSE00HX4	2	6	50	4
CR16GSE00HY2	2.5	8	50	4
CR16GSE00HZ0	3	12	50	3
CR16GSE00J00	3	20	75	3
CR16GSE00J18	3	25	100	3
CR16GSE00J26	4	14	50	4
CR16GSE00J34	4	20	75	4
CR16GSE00J42	4	25	100	4
CR16GSE00J59	5	16	50	5
CR16GSE00J67	5	20	75	5
CR16GSE00J75	5	25	100	5
CR16GSE00J83	6	16	50	6
CR16GSE00J91	6	25	75	6
CR16GSE00JA3	6	30	100	6
CR16GSE00JB1	6	50	150	6
CR16GSE00JC9	8	20	60	8
CR16GSE00JD6	8	30	100	8
CR16GSE00JE4	8	50	150	8
CR16GSE00JF2	10	25	75	10
CR16GSE00JG0	10	40	100	10
CR16GSE00JH8	10	50	150	10
CR16GSE00JJ3	12	25	75	12
CR16GSE00JK1	12	40	100	12

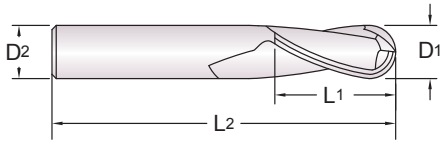
Item Code	Flute Dia(**D1**)	Flute Len(**L1**)	Overall Len(**L2**)	Shank Dia(**D2**)
CR16GSE00JL9	12	50	150	12
CR16GSE00JM7	16	40	100	16
CR16GSE00JN4	16	50	150	16
CR16GSE00JP0	20	40	100	20

206 Series | Carbide TX Series 2-Flute Ball Nose





Tolerance	
D1	h10
D2	h6



Features

- For machining pre-heat treated steels like P20, etc. up to hardness of 50HRC
- Specially designed for pre-hardened materials

For Feed & Speed Rates, Go to Page No. 114-115

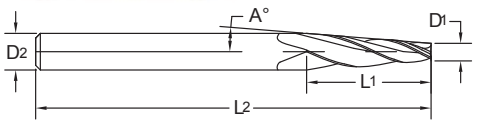
Item Code	Flute Dia(**D1**)	Flute Len(**L1**)	Overall Len(**L2**)	Shank Dia(**D2**)
CR16GBE00CJ7	1	3	50	4
CR16GBE00CK5	1.5	4	50	4
CR16GBE00CL3	2	6	50	4
CR16GBE00CM1	2.5	8	50	4
CR16GBE00CN8	3	12	50	3
CR16GBE00CP4	3	20	75	3
CR16GBE00CQ2	3	25	100	3
CR16GBE00CR0	4	16	50	4
CR16GBE00CS7	4	20	75	4
CR16GBE00CT5	4	25	100	4
CR16GBE00CU3	5	16	50	5
CR16GBE00CV1	5	20	75	5
CR16GBE00CW9	5	25	100	5
CR16GBE00CX6	6	16	50	6
CR16GBE00CY4	6	25	75	6
CR16GBE00CZ2	6	30	100	6
CR16GBE00D03	6	40	150	6
CR16GBE00D11	8	20	60	8
CR16GBE00D29	8	30	100	8
CR16GBE00D37	8	50	150	8
CR16GBE00D45	10	25	75	10
CR16GBE00D52	10	40	100	10
CR16GBE00D60	10	50	150	10

Item Code	Flute Dia(**D1**)	Flute Len(**L1**)	Overall Len(**L2**)	Shank Dia(**D2**)
CR16GBE00D78	12	25	75	12
CR16GBE00D86	12	40	100	12
CR16GBE00D94	12	50	150	12
CR16GBE00DA6	16	40	100	16
CR16GBE00DB4	16	50	150	16



Z4 | 30° | SMG | TiALN

Tolerance	
D1	h10
D2	h6



Features

- Suitable for machining special components such as impellers, blisks, tire profiles, turbine blades
- Widely used in machining of Surgical instruments of Stainless Steel
- Manufactured in 2-Flute & 3-Flute on request
- Other Taper Angles also manufactured on request

For Feed & Speed Rates, Go to Page No. 112-113

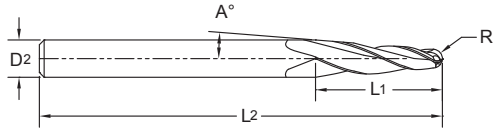
Ordering No.	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)	Taper Angle
20703008002-F	3	40	80	6	2
20705008002-F	5	40	80	8	2
20707008002-F	7	40	80	10	2
20709008002-F	9	40	80	12	2
20702508003-F	2.5	32	80	6	3
20703008003-F	3	40	80	8	3
20704008003-F	4	38	80	8	3
20706008003-F	6	38	80	10	3
20708010503-F	8	55	105	14	3
20702506305-F	2.5	20	63	6	5
20703008005-F	3	28	80	8	5
20704008005-F	4	32	80	10	5
20706009005-F	6	32	90	12	5

Ordering No.	Flute Dia(D1)	Flute Len(L2)	Overall Len(L1)	Shank Dia(D2)	Taper Angle
20708010005-F	8	45	100	16	5
20710010505-F	10	55	105	20	5
20703006307-F	3	20	63	8	7
20705008007-F	5	28	80	12	7
20702507510-F	2.5	20	75	10	10
20703008010-F	3	30	80	14	10
20705008010-F	5	30	80	16	10
20708010010-F	8	32	100	20	10
20702506315-F	2.5	16	63	12	15
20704008015-F	4	18	80	14	15
20706508015-F	6.5	25	80	20	15
20708008015-F	8	20	80	20	15



Z2 | 30° | SMG | TiALN

Tolerance	
D1	h10
D2	h6



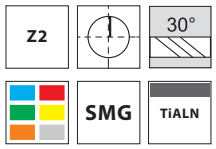
Features

- Suitable for machining special components such as impellers, blisks, tire profiles, turbine blades
- Widely used in machining of Surgical instruments of Stainless Steel
- Other Taper Angles also manufactured on request

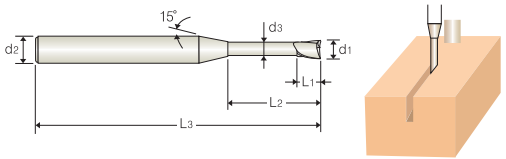
For Feed & Speed Rates, Go to Page No. 112-113

Ordering No.	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)	Taper Angle (A*)
20803008002-F	3	40	80	6	2
20805008002-F	5	40	80	8	2
20807008002-F	7	40	80	10	2
20809008002-F	9	40	80	12	2
20803008003-F	3	40	80	8	3
20804008003-F	4	38	80	8	3
20806008003-F	6	38	80	10	3
20808010503-F	8	55	105	14	3
20803008003-F	3	28	80	8	5
20804008005-F	4	32	80	10	5
20806009005-F	6	32	90	12	5
20808010005-F	8	45	100	16	5
20810010505-F	10	55	105	20	5
20803006305-F	3	20	63	8	7
20805008005-F	5	28	80	12	7
20803008007-F	3	30	80	14	10
20805008007-F	5	30	80	16	10
20808010010-F	8	32	100	20	10
20804008010-F	4	18	80	14	15
20806508010-F	6.5	25	80	20	15
20808008010-F	8	20	80	20	15





Tolerance	
D1	h10
D2	h6



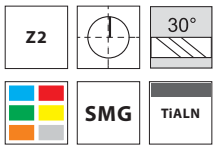
Features

- For deep pocketing or deep reach Features
- Also available in 4-Flute above 2mm diameter
- Designed with reinforced shank for higher stability
- Long neck design for deep machining near walls

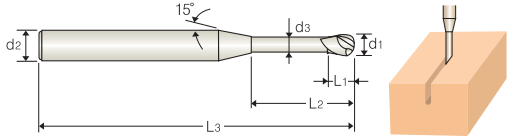
For Feed & Speed Rates, Go to Page No. 112-113

Ordering No.	Flute Dia(D1)	Flute Len(L1)	Overall Len(L3)	Shank Dia(D2)	Reach Len(L2)	Neck Dia(D3)
20901006-F	1	2	50	4	6	0.95
20901010-F	1	2	50	4	10	0.95
20901506-F	1.5	2	50	4	6	1.45
20901510-F	1.5	2	50	4	10	1.45
20902008-F	2	3	50	4	8	1.95
20902012-F	2	3	50	4	12	1.95
20902016-F	2	3	50	4	16	1.95
20902020-F	2	3	50	4	20	1.95
20902508-F	2.5	4	50	4	8	2.40
20902512-F	2.5	4	50	4	12	2.40
20902516-F	2.5	4	50	4	16	2.40
20902520-F	2.5	4	50	4	20	2.40
20903008-F	3	5	50	6	8	2.85
20903012-F	3	5	50	6	12	2.85
20903016-F	3	5	60	6	16	2.85
20903020-F	3	5	60	6	20	2.85
20903025-F	3	5	75	6	25	2.85
20904012-F	4	6	50	6	12	3.85
20904016-F	4	6	60	6	16	3.85
20904020-F	4	6	75	6	20	3.85
20904025-F	4	6	75	6	25	3.85
20904030-F	4	6	75	6	30	3.85
20904035-F	4	6	75	6	35	3.85





Tolerance	
D1	h10
D2	h6



Features

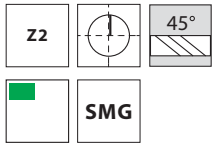
- For 3-D milling, deep slotting & pocketing
- Also available in 4-Flute above 2mm diameter
- Designed with reinforced shank for higher stability
- Long neck design for deep machining near walls

For Feed & Speed Rates, Go to Page No. 112-113

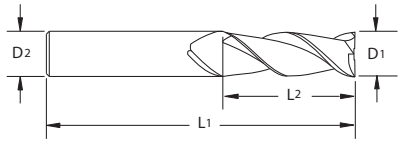
Ordering No.	R	Flute Dia(D1)	Flute Len(L1)	Overall Len(L3)	Shank Dia(D2)	Reach Len(L2)	Neck Dia(D3)
21001006-F	0.5	1	2	50	4	6	0.95
21001010-F	0.5	1	2	50	4	10	0.95
21001506-F	0.75	1.5	2	50	4	6	1.45
21001510-F	0.75	1.5	2	50	4	10	1.45
21002008-F	1	2	3	50	4	8	1.95
21002012-F	1	2	3	50	4	12	1.95
21002016-F	1	2	3	50	4	16	1.95
21002020-F	1	2	3	50	4	20	1.95
21002508-F	1.25	2.5	4	50	4	8	2.40
21002512-F	1.25	2.5	4	50	4	12	2.40
21002516-F	1.25	2.5	4	50	4	16	2.40
21002520-F	1.25	2.5	4	50	4	20	2.40
21003008-F	1.5	3	5	50	6	8	2.85
21003012-F	1.5	3	5	50	6	12	2.85
21003016-F	1.5	3	5	60	6	16	2.85
21003020-F	1.5	3	5	60	6	20	2.85
21003025-F	1.5	3	5	75	6	25	2.85
21004012-F	2	4	6	50	6	12	3.85
21004016-F	2	4	6	60	6	16	3.85
21004020-F	2	4	6	75	6	20	3.85
21004025-F	2	4	6	75	6	25	3.85
21004030-F	2	4	6	75	6	30	3.85
21004035-F	2	4	6	75	6	35	3.85

211 Series | Carbide 1X Series 2-Flute High Helix End Mills





Tolerance	
D1	h10
D2	h6



Features

- High performance aluminium finisher out performs competitors
- Higher Helix for low power consumption
- Available with Corner Radius upon request

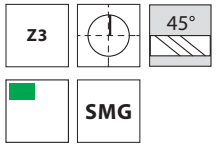
For Feed & Speed Rates, Go to Page No. 114-115

Ordering No.	Flute Dia(**D1**)	Flute Len(**L2**)	Overall Len(**L1**)	Shank Dia(**D2**)
211040050-U	4	14	50	4
211040075-U	4	25	75	4
211040100-U	4	30	100	4
211050050-U	5	16	50	5
211050075-U	5	25	75	5
211050100-U	5	35	100	5
211060050-U	6	18	50	6
211060075-U	6	30	75	6
211060100-U	6	35	100	6
211080060-U	8	20	60	8
211080100-U	8	40	100	8
211100075-U	10	30	75	10
211100100-U	10	50	100	10
211120075-U	12	30	75	12
211120100-U	12	50	100	12
211140100-U	14	50	100	14
211160100-U	16	50	100	16

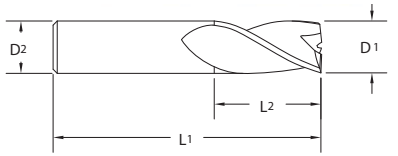


213 Series | Carbide 1X Series 3-Flute High Helix End Mills





Tolerance	
D1	h10
D2	h6



Features

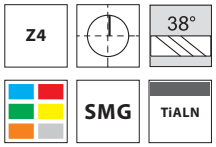
- Series 213 takes the Aluminium machining to new level
- Designed for extreme productivity
- Designed especially for non-ferrous materials to run at higher cutting speeds

For Feed & Speed Rates, Go to Page No. 114-115

Ordering No.	Flute Dia(**D1**)	Flute Len(**L2**)	Overall Len(**L1**)	Shank Dia(**D2**)
213040050-U	4	14	50	4
213040075-U	4	25	75	4
213040100-U	4	30	100	4
213050050-U	5	16	50	5
213050075-U	5	25	75	5
213050100-U	5	35	100	5
213060050-U	6	18	50	6
213060075-U	6	30	75	6
213060100-U	6	35	100	6
213080060-U	8	20	60	8
213080100-U	8	40	100	8
213100075-U	10	30	75	10
213100100-U	10	50	100	10
213120075-U	12	30	75	12
213120100-U	12	50	100	12
213140100-U	14	50	100	14
213160100-U	16	50	100	16







Tolerance	
D1	h10
D2	h6



Features:
- Corner Radius to provide more edge strength
- 4-Flute to provide better finishes
- Increased production

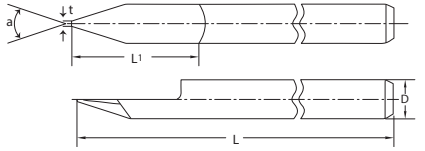
For Feed & Speed Rates, Go to Page No. 112-113

Ordering No.	Flute Dia(**D1**)	Flute Len(**L2**)	Overall Len(**L1**)	Shank Dia(**D2**)	Corner Radius (R)
218040050R0.5-F	4	14	50	4	R0.5
218050050R0.5-F	5	16	50	5	R0.5
218060050R0.5-F	6	16	50	6	R0.5
218060050R1.0-F	6	16	50	6	R1.0
218080075R0.5-F	8	25	75	8	R0.5
218080075R1.0-F	8	25	75	8	R1.0
218080075R1.5-F	8	25	75	8	R1.5
218100075R0.5-F	10	30	75	10	R0.5
218100075R1.0-F	10	30	75	10	R1.0
218100075R1.5-F	10	30	75	10	R1.5
218120075R0.5-F	12	30	75	12	R0.5
218120075R1.0-F	12	30	75	12	R1.0
218120075R1.5-F	12	30	75	12	R1.5
218120075R2.0-F	12	30	75	12	R2.0
218160100R1.0-F	16	50	100	16	R1.0
218160100R1.5-F	16	50	100	16	R1.5
218160100R2.0-F	16	50	100	16	R2.0
218180100R1.0-F	18	50	100	18	R1.0
218180100R2.0-F	18	50	100	18	R2.0
218180100R3.0-F	18	50	100	18	R3.0
218200100R1.0-F	20	50	100	20	R1.0
218200100R2.0-F	20	50	100	20	R2.0
218200100R3.0-F	20	50	100	20	R3.0





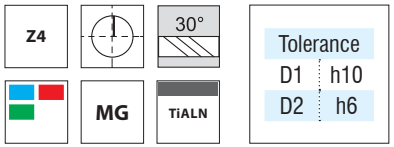
Tolerance	
D1	h10
D2	h6



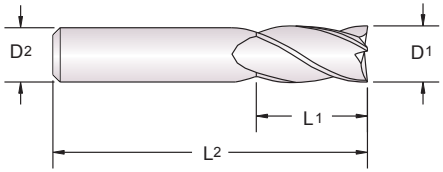
Features
- For engraving in metals like MS, SS, Steel, Die Steel & other hard materials etc.

Ordering Code	TIP (t)	Angle (a*)	Cutting Len(**L1**)	Overall Len(**L**)	Shank Dia(**D**)
219030033-U	0.2-0.5	10 / 12.5 / 15 / 20 / 25 / 30 / 45 / 60	12	33	3
219040033-U	0.2-0.5	12.5 / 15 / 20 / 25 / 30 / 45 / 60	12	33	4
219050033-U	0.2-0.5	12.5 / 15 / 20 / 25 / 30 / 45 / 60	15	33	5
219060033-U	0.2-0.5	12.5 / 15 / 20 / 25 / 30 / 45 / 60	15	33	6
219080060-U	0.4-0.8	15 / 20 / 25 / 30 / 45 / 60 / 75	25	60	8
219100075-U	0.4-0.8	15 / 20 / 25 / 30 / 45 / 60 / 75	25	75	10
219120075-U	0.4-0.8	15 / 20 / 25 / 30 / 45 / 60 / 75	25	75	12
219127075-U	0.4-0.8	15 / 20 / 25 / 30 / 45 / 60 / 75	25	75	12.7





Tolerance	
D1	h10
D2	h6



Features

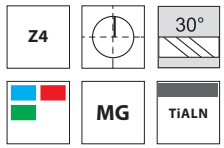
- For milling of easily machinable Al alloys, non-ferrous materials, Pattern Machining,
- Cast Iron up to 200BHN & other softer metals.
- Sharper Rakes for softer metals to cut with ease

For Feed & Speed Rates Go to Page No. 110-111

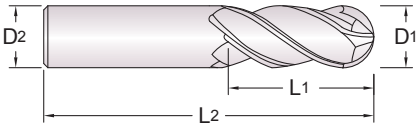
Item Code	Flute Dia(**D1**)	Flute Len(**L1**)	Overall Len(**L2**)	Shank Dia(**D2**)
CX01GSE000X9	2	6	38	3
CX01GSE000Y7	2	8	50	3
CX01GSE00106	2.5	8	50	3
CX01GSE00130	3	12	38	3
CX01GSE00148	3	14	50	3
CX01GSE00155	3	25	75	3
CX01GSE00HM0	3	30	100	3
CX01GSE00171	4	14	50	4
CX01GSE001A9	4	25	75	4
CX01GSE001B7	4	30	100	4
CX01GSE001C5	5	16	50	5
CX01GSE001D2	5	25	75	5
CX01GSE001F8	5	35	100	5
CX01GSE001H4	6	18	50	6
CX01GSE001J9	6	30	75	6
CX01GSE001K7	6	35	100	6
CX01GSE00G46	6	30	150	6
CX01GSE00JQ9	6	50	150	6
CX01GSE001M3	7	20	60	7
CX01GSE001P6	8	20	60	8
CX01GSE001Q4	8	30	75	8
CX01GSE001S9	8	40	100	8
CX01GSE001T7	8	60	150	8
CX01GSE001R2	8	30	150	8
CX01GSE00GZ2	8	30	200	8

Item Code	Flute Dia(**D1**)	Flute Len(**L1**)	Overall Len(**L2**)	Shank Dia(**D2**)
CX01GSE001W1	10	30	75	10
CX01GSE001X8	10	50	100	10
CX01GSE001Y6	10	60	150	10
CX01GSE00H78	10	30	150	10
CX01GSE00G38	10	30	200	10
CX01GSE00213	12	30	75	12
CX01GSE00247	12	50	100	12
CX01GSE00254	12	60	150	12
CX01GSE00221	12	30	150	12
CX01GSE00239	12	30	200	12
CX01GSE00262	12	75	150	12
CX01GSE00270	14	30	75	14
CX01GSE00296	14	50	100	14
CX01GSE002B6	14	60	150	14
CX01GSE002D1	16	30	75	16
CX01GSE002J8	16	50	100	16
CX01GSE002L4	16	60	150	16
CX01GSE002H3	16	30	200	16
CX01GSE00FX7	18	50	100	18
CX01GSE002P5	20	50	100	20
CX01GSE00G61	20	80	150	20
CX01GSE002N9	20	30	200	20
CX01GSE00HF5	25	50	100	25
CX01GSE00HJ6	25	60	150	25





Tolerance	
D1	h10
D2	h6



Features

- For milling of easily machinable Al alloys, non-ferrous materials, Pattern Machining,
- Cast Iron up to 200BHN & other softer metals.
- Sharper Rakes for softer metals to cut with ease

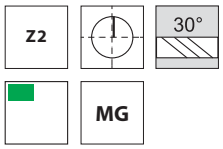
For Feed & Speed Rates, Go to Page No. 110-111

Item Code	Flute Dia(**D1**)	Flute Len(**L1**)	Overall Len(**L2**)	Shank Dia(**D2**)
CX01GBE00160	3	12	38	3
CX01GBE00186	3	14	50	3
CX01GBE001A6	3	25	75	3
CX01GBE00BT7	3	30	100	3
CX01GBE001B4	4	14	50	4
CX01GBE001D9	4	25	75	4
CX01GBE00AR3	4	30	100	4
CX01GBE001F5	5	16	50	5
CX01GBE001H1	5	25	75	5
CX01GBE001K4	5	35	100	5
CX01GBE001M0	6	18	50	6
CX01GBE001P3	6	30	75	6
CX01GBE001R9	6	35	100	6
CX01GBE001T4	6	40	150	6
CX01GBE001W8	8	20	60	8
CX01GBE00202	8	30	75	8
CX01GBE00210	8	40	100	8
CX01GBE00236	8	50	150	8

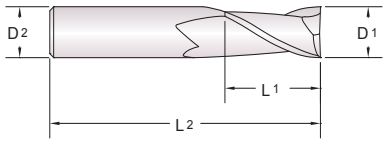
Item Code	Flute Dia(**D1**)	Flute Len(**L1**)	Overall Len(**L2**)	Shank Dia(**D2**)
CX01GBE00BG6	8	30	200	8
CX01GBE00277	10	30	75	10
CX01GBE002A5	10	50	100	10
CX01GBE002B3	10	60	150	10
CX01GBE00B14	10	30	200	10
CX01GBE002E6	12	30	75	12
CX01GBE002H0	12	50	100	12
CX01GBE002J5	12	60	150	12
CX01GBE00B22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







Tolerance	
D1	h10
D2	h6



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

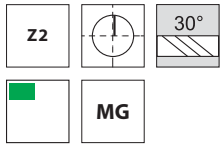
For Feed & Speed Rates, Go to Page No. 110-111

Item Code Uncoated	Item Code Coated	Flute Dia(**D1**)	Flute Len(**L1**)	Overall Len(**L2**)	Shank Dia(**D2**)
-	CX01GSE000J0	1	4	38	3
-	CX01GSE000K8	1	6	50	3
-	CX01GSE000L6	1.5	6	38	3
-	CX01GSE000M4	1.5	8	50	3
-	CX01GSE00HD9	2	8	50	3
-	CX01GSE000P7	3	14	50	3
CX0XGSE00016	-	3	16	50	3
CX0XGSE00032	-	4	22	50	4
-	CX01GSE000Q5	4	22	50	4
CX0XGSE00HG4	-	4	30	60	4
CX0XGSE00G13	-	4	35	75	4
CX0XGSE00G21	-	4	50	100	4
-	CX01GSE00HE7	5	16	50	5
CX0XGSE00057	-	5	22	50	5
CX0XGSE00FZ4	-	5	30	60	5
CX0XGSE00G05	-	5	35	75	5
CX0XGSE00GQ3	-	5	50	100	5
	CX01GSE00H11	6	18	50	6
CX0XGSE00073	-	6	22	50	6
CX0XGSE00099	-	6	30	60	6
CX0XGSE000A1	-	6	35	75	6
CX0XGSE00G88	-	6	50	100	6
-	CX01GSE000T8	8	20	60	8

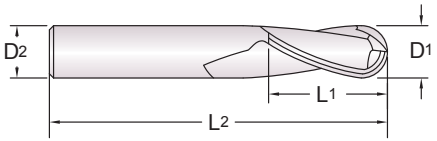
Item Code Uncoated	Item Code Coated	Flute Dia(**D1**)	Flute Len(**L1**)	Overall Len(**L2**)	Shank Dia(**D2**)
CX0XGSE00HN8	-	8	22	50	8
CX0XGSE00FV3	-	8	30	60	8
CX0XGSE00GY5	-	8	35	75	8
CX0XGSE000G8	-	8	50	100	8
-	CX01GSE00H29	10	30	75	10
CX0XGSE00K50	-	10	35	75	10
CX0XGSE00H53	-	10	50	100	10
-	CX01GSE00H37	12	30	75	12
CX0XGSE00K68	-	12	35	75	12
CX0XGSE00H61	-	12	50	100	12







Tolerance	
D1	h10
D2	h6



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

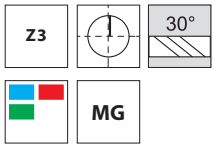
For Feed & Speed Rates Go to Page No. 110-111

Item Code Uncoated	Item Code Coated	Flute Dia(**D1**)	Flute Len(**L1**)	Overall Len(**L2**)	Shank Dia(**D2**)
-	CX01GBE00BQ4	1	4	38	3
-	CX01GBE00C21	1	6	50	3
-	CX01GBE00AX9	1.5	8	50	3
-	CX01GBE00DW9	2	6	38	3
-	CX01GBE000J7	2	8	50	3
-	CX01GBE00BE0	2.5	8	50	3
-	CX01GBE000N8	3	14	50	3
CX0XGBE003C1	-	3	16	50	3
-	CX01GBE00BJ9	4	14	50	4
CX0XGBE003F4	-	4	22	50	4
CX0XGBE00BS0	-	4	30	60	4
CX0XGBE00BD3	-	4	35	75	4
CX01GBE00CF7	-	4	30	100	4
-	CX01GBE00C62	5	16	50	5
CX0XGBE003J5	-	5	22	50	5
CX0XGBE00054	-	5	30	60	5
CX0XGBE003M9	-	5	35	75	5
CX0XGBE00070	-	5	50	100	5
-	CX01GBE000R0	6	18	50	6
CX0XGBE003Q0	-	6	22	50	6
CX0XGBE00088	-	6	30	60	6
CX0XGBE000A8	-	6	35	75	6

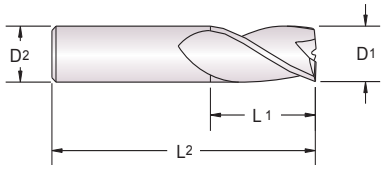
Item Code Uncoated	Item Code Coated	Flute Dia(**D1**)	Flute Len(**L1**)	Overall Len(**L2**)	Shank Dia(**D2**)
CX0XGBE000C4	-	6	50	100	6
-	CX01GBE00CG5	8	20	60	8
CX0XGBE00AP8	-	8	22	50	8
CX0XGBE00AQ6	-	8	30	60	8
CX0XGBE00BF9	-	8	35	75	8
CX0XGBE000G5	-	8	50	100	8
-	CX01GBE00BK7	10	30	75	10
CX0XGBE00BN1	-	10	50	100	10
-	CX01GBE00BL5	12	30	75	12
CX0XGBE000H3	-	12	50	100	12
-	CX01GBE00AZ5	12	25	150	12
-	CX01GBE00C05	12	30	200	12







Tolerance	
D1	h10
D2	h6



Features

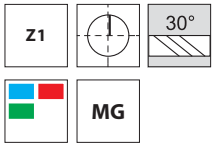
- Especially designed for machining Aluminium & Non-ferrous materials
- 3-Flutes to prevent harmonics & thus providing chatter free machining

For Feed & Speed Rates Go to Page No. 110-111

Ordering No.	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
105040050-U	4	14	50	4
105040075-U	4	25	75	4
105040100-U	4	30	100	4
105050050-U	5	16	50	5
105050075-U	5	25	75	5
105050100-U	5	35	100	5
105060050-U	6	18	50	6
105060075-U	6	30	75	6
105060100-U	6	35	100	6
105060150-U	6	50	150	6
105080060-U	8	20	60	8
105080075-U	8	30	75	8
105080100-U	8	40	100	8
105080150-U	8	50	150	8
105100075-U	10	30	75	10
105100100-U	10	50	100	10
105100150-U	10	60	150	10
105120075-U	12	30	75	12
105120100-U	12	50	100	12
105120150-U	12	60	150	12
105140075-U	14	30	75	14
105140100-U	14	50	100	14
105140150-U	14	60	150	14
105160075-U	16	30	75	16
105160100-U	16	50	100	16
105160150-U	16	75	150	16







Tolerance	
D1	h10
D2	h6

Features

- Especially designed for machining Wood, Plastic & Non-ferrous
- Sharper Rakes to cut easily in plastics & wood

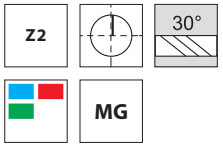
For Feed & Speed Rates, Go to Page No. 110-111

Ordering No.	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
107030050-U	3	16	50	3
107040050-U	4	22	50	4
107040060-U	4	30	60	4
107040075-U	4	35	75	4
107040100-U	4	50	100	4
107050050-U	5	22	50	5
107050060-U	5	30	60	5
107050075-U	5	35	75	5
107050100-U	5	50	100	5
107060050-U	6	22	50	6
107060060-U	6	30	60	6
107060075-U	6	35	75	6
107060100-U	6	50	100	6
107080050-U	8	22	50	8
107080060-U	8	30	60	8
107080075-U	8	35	75	8
107080100-U	8	50	100	8
107100050-U	10	22	50	10
107100060-U	10	30	60	10
107100075-U	10	35	75	10
107100100-U	10	50	100	10
107120050-U	12	22	50	12
107120060-U	12	30	60	12
107120075-U	12	35	75	12
107120100-U	12	50	100	12

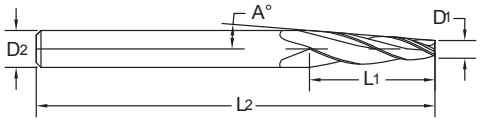
Ordering No.	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)
107140100-U	14	50	100	14
107160100-U	16	50	100	16







Tolerance	
D1	h10
D2	h6



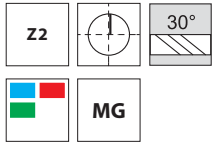
Features

- Suitable for making V-shaped slots in wood and other softer materials.
- Suited for machining components such as impellers, blisks, tire profiles, turbine blades
- Other Taper Angles also manufactured on request

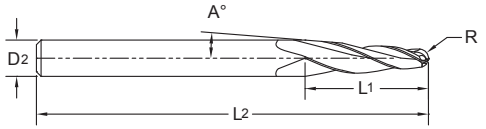
For Feed & Speed Rates Go to Page No. 110-111

Ordering No.	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)	Taper Angle(A*)
10801008002-U	1	43	80	4	2
10801508002-U	1.5	36	80	4	2
10802008002-U	2	29	80	4	2
10802010002-U	2	57	100	6	2
10802510002-U	2.5	50	100	6	2
10801008003-U	1	29	80	4	3
10801506003-U	1.5	24	60	4	3
10802006003-U	2	19	60	4	3
10801010003-U	1	48	100	6	3
10801508003-U	1.5	43	80	6	3
10802008003-U	2	38	80	6	3
10803006003-U	3	29	60	6	3
10804005003-U	4	19	50	6	3





Tolerance	
D1	h10
D2	h6



Features

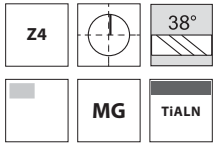
- Suitable for making V-shaped slots in wood and other softer materials.
- Suited for machining components such as impellers, blisks, tire profiles, turbine blades
- Other Taper Angles also manufactured on request

For Feed & Speed Rates, Go to Page No. 110-111

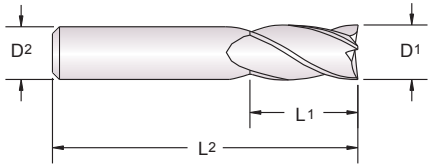
Ordering No.	Flute Dia(D1)	Flute Len(L1)	Overall Len(L2)	Shank Dia(D2)	Taper Angle
10901008002-U	1	43	80	4	2
10901508002-U	1.5	36	80	4	2
10902008002-U	2	29	80	4	2
10902010002-U	2	57	100	6	2
10902510002-U	2.5	50	100	6	2
10901008003-U	1	29	80	4	3
10901506003-U	1.5	24	60	4	3
10902006003-U	2	19	60	4	3
10901010003-U	1	48	100	6	3
10901508003-U	1.5	43	80	6	3
10902008003-U	2	38	80	6	3
10903006003-U	3	29	60	6	3
10904005003-U	4	19	50	6	3







Tolerance	
D1	h10
D2	h6



Features

- For machining Tool steels like D2/H13/P20 upto hardness of 45HRC
- Specially designed for pre-hardened materials.

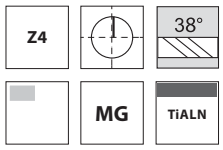
For Feed & Speed Rates Go to Page No. 110-111

Item Code	Flute Dia(**D1**)	Flute Len(**L1**)	Overall Len(**L2**)	Shank Dia(**D2**)
CX01GSE00K75	3	14	50	3
CX01GSE00KE4	3	25	75	3
CX01GSE00K83	4	14	50	4
CX01GSE00KF2	4	25	75	4
CX01GSE00KG0	4	30	100	4
CX01GSE00K91	5	16	50	5
CX01GSE00KH8	5	25	75	5
CX01GSE00KJ3	5	35	100	5
CX01GSE00L66	5	40	100	5
CX01GSE00KA3	6	18	50	6
CX01GSE00KK1	6	30	75	6
CX01GSE00KL9	6	35	100	6
CX01GSE00L74	6	40	100	6
CX01GSE00KB1	8	20	60	8
CX01GSE00KM7	8	30	75	8
CX01GSE00KN4	8	40	100	8
CX01GSE00L82	8	50	100	8
CX01GSE00LA2	8	50	150	8
CX01GSE00KC9	10	30	75	10
CX01GSE00KP0	10	50	100	10
CX01GSE00LB0	10	60	150	10
CX01GSE00KD6	12	30	75	12
CX01GSE00KQ8	12	50	100	12

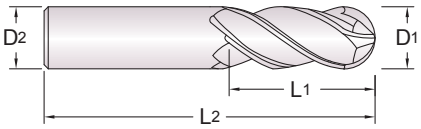
Item Code	Flute Dia(**D1**)	Flute Len(**L1**)	Overall Len(**L2**)	Shank Dia(**D2**)
CX01GSE00L90	12	60	150	12
CX01GSE00KR6	16	50	100	16
CX01GSE00LC8	16	60	150	16
CX01GSE00KS3	20	50	100	20







Tolerance	
D1	h10
D2	h6



Features

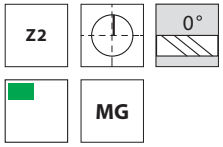
- For machining Tool steels like D2/H13/P20 upto hardness of 45HRC
- Specially designed for pre-hardened materials

For Feed & Speed Rates, Go to Page No.110-111

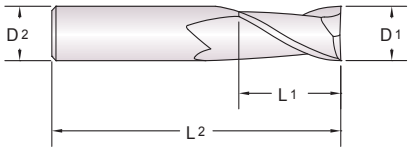
Ordering No.	Flute Dia(**D1**)	Flute Len(**L1**)	Overall Len(**L2**)	Shank Dia(**D2**)
111030050-F	3	12	50	3
111030075-F	3	25	75	3
111040050-F	4	14	50	4
111040075-F	4	25	75	4
111040100-F	4	30	100	4
111050050-F	5	16	50	5
111050075-F	5	25	75	5
111050100-F	5	35	100	5
111060050-F	6	18	50	6
111060075-F	6	30	75	6
111060100-F	6	35	100	6
111080060-F	8	20	60	8
111080100-F	8	40	100	8
111100075-F	10	30	75	10
111100100-F	10	50	100	10
111100150-F	10	60	150	10
111120075-F	12	30	75	12
111120100-F	12	50	100	12
111120150-F	12	60	150	12

118 Series | Carbide GP-0X Series 2-Flute ST.Flute End Mills for HARD Wood





Tolerance	
D1	h10
D2	h6



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

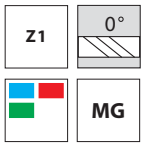
For Feed & Speed Rates, Go to Page No. 110-111

Ordering No.	Flute Dia(**D1**)	Flute Len(**L1**)	Overall Len(**L2**)	Shank Dia(**D2**)
11803005006-U	3	15	50	6
11803005006-U	3	20	50	6
11804005006-U	4	18	50	6
11804005006-U	4	22	50	6
11805005006-U	5	22	50	6
118060050-U	6	22	50	6
118060075-U	6	35	75	6
11806006008-U	6	30	60	8
11803005004-U	3	15	50	4
118040050-U	4	20	50	4
118050050-U	5	22	50	5
118080060-U	8	30	60	8
118080075-U	8	35	75	8
118080100-U	8	50	100	8
118100060-U	10	30	60	10
118100075-U	10	40	75	10
118100100-U	10	50	100	10
118120060-U	12	30	60	12
118120075-U	12	35	75	12
118120100-U	12	50	100	12

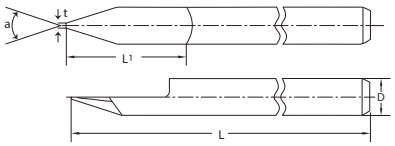


119 Series | Carbide GP-0X Series Engraving Bit V-shape





Tolerance	
D1	h10
D2	h6



Features

- For engraving in Soft Wood, Hard Wood, MDF, Plastics, Non-ferrous materials etc.

Ordering Code	TIP (t)	Angle (a*)	Cutting Len(**L1**)	Overall Len(**L**)	Shank Dia(**D**)
119030033-U	0.2-0.5	10 / 12.5 / 15 / 20 / 25 / 30 / 45 / 60	12	33	3
119040033-U	0.2-0.5	12.5 / 15 / 20 / 25 / 30 / 45 / 60	12	33	4
119050033-U	0.2-0.5	12.5 / 15 / 20 / 25 / 30 / 45 / 60	15	33	5
119060033-U	0.2-0.5	12.5 / 15 / 20 / 25 / 30 / 45 / 60	15	33	6
119080060-U	0.4-0.8	15 / 20 / 25 / 30 / 45 / 60 / 75	25	60	8
119100075-U	0.4-0.8	15 / 20 / 25 / 30 / 45 / 60 / 75	25	75	10
119120075-U	0.4-0.8	15 / 20 / 25 / 30 / 45 / 60 / 75	25	75	12
119127075-U	0.4-0.8	15 / 20 / 25 / 30 / 45 / 60 / 75	25	75	12.7



IMPORTANT NOTES :

1. Technical data provided should be used as advisory only as variations may be necessary depending on application.

Technical Information (Carbide Endmills)

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.

Series: 101, 102, 103, 104, 105, 107, 108, 109, 110, 111, 118		Examples	Cutting Speed (Vc)	Tool Diameter (mm)								
				3	5	6	8	10	12	16	20	25
			m/min	mm/Tooth								
Steels	P	Low Carbon Steels 1018	50-75	.006-.010	.010-.015	.019-.025	.019-.025	.026-.038	.025-.045	.029-.051	.030-.055	.040-.065
		Alloy Steels (up to 35 Rc) 4140	35-50									
		Tool Steels (1.2 carbon) A2/D2/H13/ P20	30-40	.004-.065	.010-.015	.015-.020	.017-.023	.020-.026	.024-.030	.028-.038	.030-.041	.030-.041
		Forgings	20-40									
Cast Irons	K	Iron - Cast (Soft)	70-90	.006-.010	.010-.015	.019-.025	.019-.025	.026-.038	.025-.045	.029-.051	.030-.055	.040-.065
		Iron - Cast (Medium Hard)	45-60									
		Iron (Hard Chilled)	35-45									
		Iron (Malleable)	35-45									
Stainless Steels	M	Stainless Steel Free Machining	45-60	.006-.010	.010-.015	.019-.025	.019-.025	.026-.038	.025-.045	.029-.051	.030-.055	.040-.065
		Ferritic	30-40									
		Austenitic Stainless 304/316	25-35	.004-.065	.010-.015	.015-.020	.017-.023	.020-.026	.024-.030	.028-.038	.030-.041	.030-.041
		Martensitic	20-30									
		PH Stainless 17-4 PH	20-30									
Special Alloys	S	Titanium 6AL-4V	x	x	x	x	x	x	x	x	x	x
		Cobalt-Based Alloys Stellite	x									
		Nickel-Based Alloys Inconel 625/718	x									
		Iron-Based Alloys Incoloy 800-802	x									
Hardened Steels	H	Hardened Steels 35-45 Rc	30-40	.004-.065	.007-.019	.007-.019	.012-.025	.012-.025	.012-.038	.025-.038	.032-.045	.032-.045
		Hardened Steels 45-55 Rc	x									
		Hardened Steels 55-65 Rc	x									
Non-Ferrous	N	Aluminium/ Aluminium Alloys	75-105	.010-.019	.019-.025	.025-.032	.032-.038	.038-.045	.045-..065	..068-.110	.100-.120	.108-.130
		Brass/Bronze	60-90									
		Magnesium/ Magnesium Alloys	90-160									
		Plastics/Bakelite	110-200									

Technical Information (Carbide Endmills)

Series: 201, 202, 203, 204, 207, 208, 209, 210, 218		Examples	Cutting Speed (Vc)	Tool Diameter (mm)							
				3	5	6	8	10	12	16	20	25
			m/min	mm/Tooth								
Steels	P	Low Carbon Steels 1018	75-105	.010-.015	.017-.021	.027-.036	.027-.036	.037-.054	.040-.063	.040-.072	.040-.080	.057-.090
		Alloy Steels (up to 35 Rc) 4140	50-70									
		Tool Steels (1.2 carbon) A2/D2/H13/ P20	40-50	.005-.010	.013-.020	.020-.030	.025-.032	.030-.036	.035-.041	.040-.054	.042-.058	.042-.058
		Forgings	30-50									
Cast Irons	K	Iron - Cast (Soft)	90-140	.010-.015	.017-.021	.027-.036	.027-.036	.037-.054	.040-.063	.040-.072	.040-.080	.057-.090
		Iron - Cast (Medium Hard)	60-90									
		Iron (Hard Chilled)	50-65									
		Iron (Malleable)	45-65									
Stainless Steels	M	Stainless Steel Free Machining	60-85	.010-.015	.017-.021	.027-.036	.027-.036	.037-.054	.040-.063	.040-.072	.040-.080	.057-.090
		Ferritic	35-50									
		Austenitic Stainless 304/316	40-60	.005-.010	.013-.020	.020-.030	.025-.032	.030-.036	.035-.041	.040-.054	.042-.058	.042-.058
		Martensitic	30-45									
		PH Stainless 17-4 PH	25-45									
Special Alloys	S	Titanium 6AL-4V	x	x	x	x	x	x	x	x	x	x
		Cobalt-Based Alloys Stellite	x									
		Nickel-Based Alloys Inconel 625/718	x									
		Iron-Based Alloys Incoloy 800-802	x									
Hardened Steels	H	Hardened Steels 35-45 Rc	40-50	.005-.010	.009-.020	.009-.028	.018-.037	.018-.037	.019-.050	.035-.050	.042-.065	.042-.065
		Hardened Steels 45-55 Rc	x									
		Hardened Steels 55-65 Rc	x									
Non-Ferrous	N	Aluminium/ Aluminium Alloys	100-160	.014-.028	.027-.036	.036-.045	.045-.054	.053-.063	.062-.090	.090-.150	.135-.170	.150-.180
		Brass/Bronze	85-130									
		Magnesium/ Magnesium Alloys	150-220									
		Plastics/Bakelite	170-260									

Series: 205, 206		Examples	Cutting Speed (Vc)	Tool Diameter (mm)									
				3	5		6	8	10	12	16	20	25
			m/min	mm/Tooth									
Hardened Steels	H	Hardened Steels 35-45 Rc	60-75	.006-.012	.011-.022		.011-.032	.020-.041	.023-.041	.023-.055	.040-.055	.046-.073	.046-.073
		Hardened Steels 45-55 Rc	45-60										
		Hardened Steels 55-65 Rc	x										

Series: 211, 213		Examples	Cutting Speed (Vc)	Tool Diameter (mm)									
				<=3	5		6	8	10	12	16	20	25
			m/min	mm/Tooth									
Non-Ferrous	N	Aluminium & Alloys	150-215	.015-.03	.03-.04		.04-.055	.055-.065	.060-.075	.072-.100	.105-.180	.155-.200	.155-.200
		Brass/Bronze	120-185										
		Magnesium & Alloys	215-305										
		Plastics/Bakelite	245-365										

Series: 301, 302, 303, 304, 305, 306, 307, 308		Examples	Cutting Speed (Vc)	Tool Diameter (mm)							
				3	5		6	8	10	12	16
			m/min	mm/Tooth							
Stainless Steels	M	Stainless Steel Free Machining	90-120	.010-.015	.017-.025		.030-.040	.030-.040	.040-.055	.040-.070	.055-.085
		Ferritic	55-70								
		Austenitic Stainless 304/316	60-85	.007-.014	.014-.025		.020-.030	.025-.035	.030-.040	.035-.045	.045-.060
		Martensitic	45-60								
		PH Stainless 17-4 PH	40-60								
Special Alloys	S	Titanium 6AL-4V	55-115	.007-.014	.014-.025		.020-.030	.025-.035	.030-.040	.035-.045	.045-.060
		Cobalt-Based Alloys Stellite	30-60								
		Nickel-Based Alloys Inconel 625/718	30-60								
		Iron-Based Alloys Incoloy 800-802	40-60								
Hardened Steels	H	Hardened Steels 35-45 Rc	70-85	.008-.014	.015-.025		.02-.04	.030-.050	.030-.055	.035-.065	.050-.070
		Hardened Steels 45-55 Rc	50-70								
		Hardened Steels 55-60 Rc	25-50								

Technical Information (Carbide Endmills)

Series: 401, 402, 403, 406		Examples	Cutting Speed (Vc)	Tool Diameter (mm)							
				3	5		6	8	10	12	16
			m/min	mm/Tooth							
Hardened Steels	H	Hardened Steels 45-55 Rc	80-100	.008-.014	.015-.025		.02-.04	.030-.050	.030-.055	.035-.065	.050-.070
		Hardened Steels 50-60 Rc	60-85								
		Hardened Steels 60-70Rc	25-50								

SERIES : 407 — CUTTING PARAMETERS:

Material [Hardened Steel : P20, D2, D3, H13, or other Die / Tool Steels]	Coolant	Copy Milling Roughing			
		VC (m/min)	FZ (mm/tooth)	AP (mm)	AE (mm)
48 to 54HRc	Mist Spray	140-200	0.02D	0.10D	0.30D
54 to 60HRc	Mist Spray	100-140	0.015D	0.07D	0.025D
60 to 65HRc	Mist Spray	60-100	0.013D	0.05D	0.20D
> 65HRc	Mist Spray	40-60	0.010D	0.04D	0.15D

SERIES : 407 — CUTTING PARAMETERS:

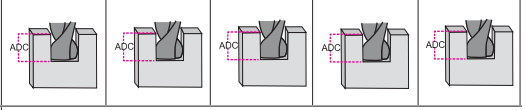
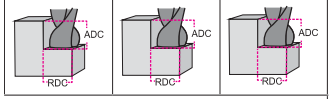
Material [Hardened Steel : P20, D2, D3, H13, or other Die / Tool Steels]	Coolant	Copy Milling Finishing			
		VC (m/min)	FZ (mm/tooth)	AP (mm)	AE (mm)
48 to 54HRc	Mist Spray	210-350	0.013D	0.02D	0.01D
54 to 60HRc	Mist Spray	130-210	0.012D	0.02D	0.01D
60 to 65HRc	Mist Spray	90-130	0.010D	0.01D	0.01D
> 65HRc	Mist Spray	70-90	0.010D	0.01D	0.01D

Where D is the Cutting Diameter of the tool

Series 222, 322, 422 are recommended for Slotting , Plunging & other difficult to machine operations

Series 224, 324 are non Corner Radius End Mill series so reduce parameters accordingly from below table.

NOTE:
- For 220, 222, 224 series reduce cutting speed and feed by 20% from the below table
- 220, 320 series are meant especially for Alloy steel machining
- 422 series is meant especially for Special alloys machining

Workpiece Material Group		Examples	Coolant		Slotting					Profile Milling		
					30% Axial	40% Axial	50% Axial	75% Axial	100% Axial	10% Radial	25% Radial	50% Radial
			Max	Air								
			Type		Cutting Speed (Vc) m/min.							
Steels	P	Alloy & Tool Steels 4140/P20/H13	•	•	105	100	95	85	75	105	95	75
Stainless Steels	M	Free Machining	•		120	115	110	100	90	120	110	90
		Austenitic 303/304/316	•		90	85	80	70	60	90	80	60
		Ferritic 416F/420F	•		75	70	65	55	45	75	65	45
		Martensitic 403/410/416	•		75	55	55	50	45	75	55	45
		Precipitation Hardened 13-8/15-5	•		60	55	50	40	30	60	50	30
Special Alloys	S	Titanium 6AL-4V	•		80	75	70	60	50	80	70	50
		Inconel 625/718 Stellite/ Haynes 25/188 Incoloy 800/ Multimet	•		60	55	50	40	30	60	50	30

Technical Information (Carbide Endmills)

Series 222, 322, 422 are recommended for Slotting , Plunging & other difficult to machine operations

Series 224, 324 are non Corner Radius End Mill series so reduce parameters accordingly from below table.

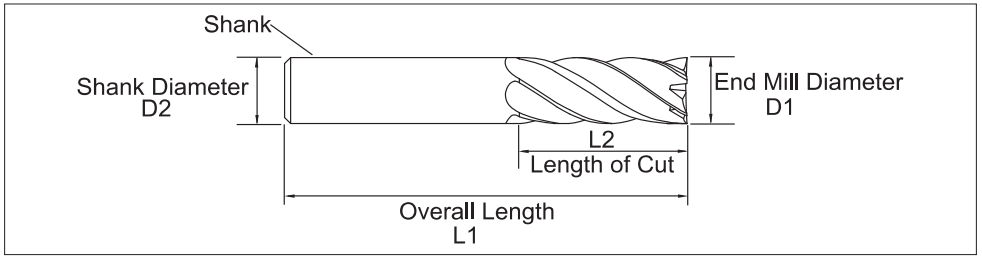
NOTE:
- For 220, 222, 224 series reduce cutting speed and feed by 20% from the below table
- 220, 320 series are meant especially for Alloy steel machining
- 422 series is meant especially for Special alloys machining

Workpiece Material Group		Examples	Tool Diameter (mm)				
			Decimal				
			3	6	12	19	25
			.1181	.2362	.4724	.7480	.9842
			mm/Tooth				
Steels	P	Alloy & Tool Steels 4140/P20/H13	0.013	0.038	0.064	0.089	0.127
Stainless Steels	M	Free Machining	.013-.018	0.025	0.076	0.127	0.152
		Austenitic 303/ 04/316	.008-.020	.025-.051	.025-.076	.064-.127	.102-.203
		Ferritic 416F/420F	.005-.013	.013-.025	.018-.038	.038-.076	.076-.127
		Martensitic 403/410/416	.008-.020	.025-.051	.025-.076	.064-.127	.102-.203
		Precipitation Hardened 13-8/15-5	.005-.013	.013-.025	.018-.038	.038-.076	.076-.127
Special Alloys	S	Titanium 6AL-4V	.003-.008	.008-.013	.013-.025	.025-.051	.051-.102
		Inconel 625/718 Stellite Haynes 25/188 Incoloy 800 Multimet	.013-.018	.013-.025	.025-.051	.051-.076	.076-.102

Radial Depth in Percentage of Cutter Diameter	Increase Chip Load Factor
50%	1.00
30%	1.10
20%	1.20
15%	1.40
10%	1.80
5%	2.30
1%	5.00

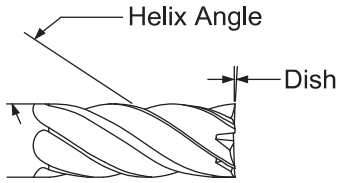
During Profile Milling less than 50% of the cutter diameter radial depth, the actual chipload at the cutting edge is less than the programmed chip load. Below are Chip Load factors depending on Radial Depth Percentage. Multiply your inches per tooth by the factor before figuring your IPM.

End Mill Terminology



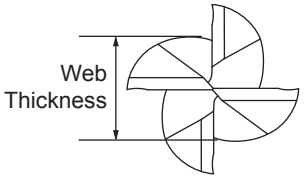
Length of Cut (Flute Length) – Always select the shortest Flute Length possible for your application. By selecting the shortest Flute Length, you can increase rigidity and allow for higher feed rates.

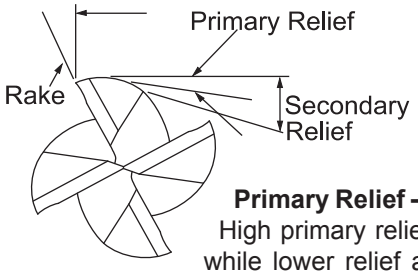
End Mill Diameter – Always select the largest diameter possible for your milling operation. Increasing your diameter by just 10%, can increase your rigidity by 25%.



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.

End Mill Troubleshooting with Possible Solutions

Problem	Rigidity	Increase Inches/tooth	Reduce Inches/tooth	Material	Recutting Chips	Increase Rake Angle	Handling	Runout	Reduce Speed	Increase Speed	Depth of Cut	Fixturing	Coolant	Finish	Dull Tool
Chipping	x		x	x	x		x	x							
Chatter	x	x							x		x	x			
Built Up Edge		x				x				x			x	x	
Breakage	x		x								x				x
Chip Packing															
Poor Slotting	x	x	x						x		x	x			
Premature Wear				x					x	x			x		
Chip Welding			x			x			x				x	x	
Cratering															

Chip Evacuation	Inadequate Number of Flutes	Insufficient Coolant	Plunge Cutting	Reduce Feed	Increase Feed	Tool Holder	Balance Holder & Tool
						x	
						x	
x						x	
	x	x	x				
				x			
				x	x	x	
							x

Formulas

Inch
RPM=SFM x 3.82/Tool Diameter
IPM=RPM x number of teeth x (inches/tooth)

Conversion Inch to Metric
SMM=SFM x .3048
mm/min.= IPM x 25.4

Metric
RPM=SMM x 318.057/Tool Diameter
mm/min.=RPM x number of teeth x (mm/tooth)

Conversion Metric to Inch
SFM=SMM/.3048
IPM= (mm/min.)/25.4

Mini Index — HSS Tools

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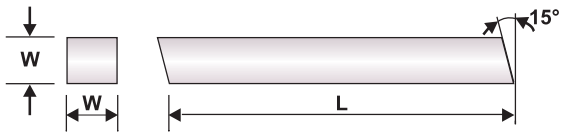
GRADE CHART of HSS CUTTING TOOLS

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)	h12
Tolerance (Length)	+/- 1.0mm
End Bevel	15°
Optional Bevel	0°/ 10°



ROHIT Square Tool Bits are available in ROHIT - 1X, 2X, SPECIAL, 3X, EC-500 grades

Note: Intermediate Sizes are available on request.

Packing: Plastic or Cardboard Boxes

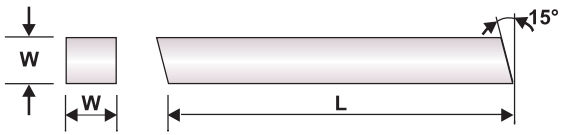
Width (W) (Inches)	Width (W) (Inches)	Length (L) (Inches)
1/8	1/8	2-1/2
1/8	1/8	3
1/8	1/8	4
3/16	3/16	2-1/2
3/16	3/16	3
3/16	3/16	4
3/16	3/16	6
1/4	1/4	2-1/2
1/4	1/4	3
1/4	1/4	4
1/4	1/4	6
1/4	1/4	8
5/16	5/16	3
5/16	5/16	4
5/16	5/16	6
5/16	5/16	8
3/8	3/8	3
3/8	3/8	4
3/8	3/8	6
3/8	3/8	8
3/8	3/8	10
1/2	1/2	3
1/2	1/2	4
1/2	1/2	6
1/2	1/2	8
1/2	1/2	10
5/8	5/8	4
5/8	5/8	6
5/8	5/8	8
3/4	3/4	4

Width (W) (Inches)	Width (W) (Inches)	Length (L) (Inches)
3/4	3/4	6
3/4	3/4	8
1	1	4
1	1	5
1	1	6
1	1	8
1-1/4	1-1/4	6
1-1/4	1-1/4	8
1-1/2	1-1/2	6
1-1/2	1-1/2	8

HSS Square Tools Bits | (Metric Sizes)



Tolerance (Width/Thickness)	h12
Tolerance (Length)	+/- 1.0mm
End Bevel	15°
Optional Bevel	0°/ 10°



ROHIT Square Tool Bits are available in ROHIT - 1X, 2X, SPECIAL, 3X, EC-500 grades

Note: Intermediate Sizes are available on request.

Packing: Plastic or Cardboard Boxes

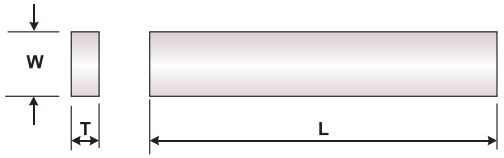
Width (W) (mm)	Width (W) (mm)	Length (L) (mm)
3	3	63
3	3	75
3	3	100
4	4	63
4	4	75
4	4	100
5	5	75
5	5	100
5	5	150
6	6	63
6	6	75
6	6	100
6	6	150
6	6	200
8	8	75
8	8	100
8	8	150
8	8	200
10	10	75
10	10	100
10	10	150
10	10	200
10	10	250
12	12	75
12	12	100
12	12	150
12	12	200
12	12	250
16	16	100
16	16	150

Width (W) (mm)	Width (W) (mm)	Length (L) (mm)
16	16	200
19	19	100
19	19	150
19	19	200
20	20	100
20	20	150
20	20	200
25	25	150
25	25	200

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



Tolerance (Width/Thickness)	h12
Tolerance (Length)	+/- 1.0mm
End Bevel	0°
Optional Bevel	As per Requirement



ROHIT Flat Tool Bits are available in ROHIT - 1X, 2X & 3X grades

Note: Intermediate Sizes are available on request.

Packing: Plastic or Cardboard Boxes

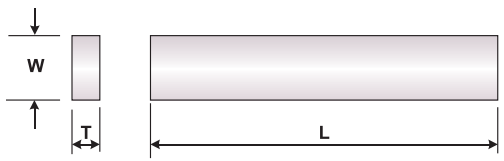
Thickness (T) (inches)	Width (W) (inches)	Length (L) (inches)
1/8	3/8	8
1/8	1/2	6
1/8	1/2	8
1/8	5/8	6
1/8	5/8	8
1/8	3/4	6
1/8	3/4	8
1/8	1	6
1/8	1	8
5/32	3/8	8
5/32	5/8	6
5/32	3/4	6
5/32	3/4	8
3/16	3/8	8
3/16	1/2	6
3/16	1/2	8
3/16	3/4	6
3/16	3/4	8
3/16	1	6
3/8	1	8
1/4	1/2	4
1/4	1/2	6
1/4	1/2	8
1/4	5/8	6
1/4	5/8	8
1/4	3/4	6
1/4	3/4	8
1/4	1	6
1/4	1	8
5/16	3/4	6

Thickness (T) (inches)	Width (W) (inches)	Length (L) (inches)
5/16	3/4	8
3/8	1/2	4
3/8	1/2	6
3/8	1/2	8
3/8	5/8	6
3/8	5/8	8
3/8	3/4	6
3/8	3/4	8
3/8	1	6
3/8	1	8
3/8	1-1/4	6
3/8	1-1/4	8
3/8	1-1/2	6
3/8	1-1/2	8
1/2	5/8	6
1/2	5/8	8
1/2	3/4	6
1/2	3/4	8
1/2	1	6
1/2	1	8
1/2	1-1/4	6
1/2	1-1/4	8
1/2	1-1/2	6
1/2	1-1/2	8
5/8	3/4	6
5/8	3/4	8
5/8	1	6
5/8	1	8
3/4	1	6
3/4	1	8

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



Tolerance (Width/Thickness)	h12
Tolerance (Length)	+/- 1.0mm
End Bevel	0°
Optional Bevel	As per Requirement



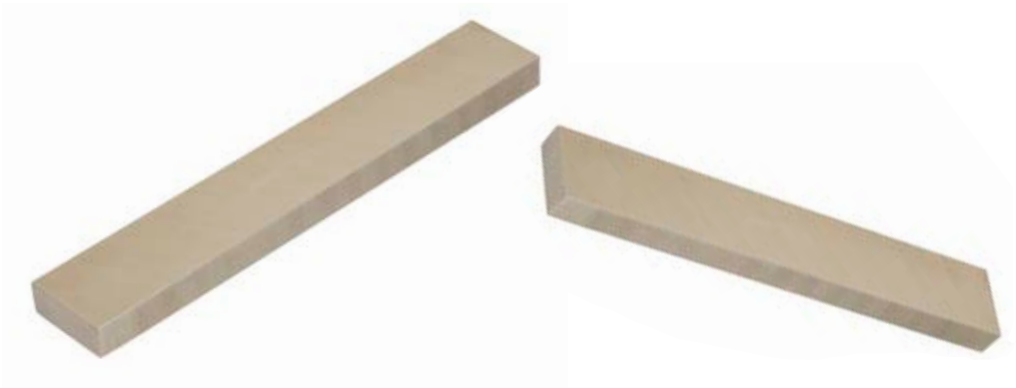
ROHIT Flat Tool Bits are available in ROHIT - 1X, 2X & 3X grades

Note: Intermediate Sizes are available on request.

Packing: Plastic or Cardboard Boxes

Thickness (T) (mm)	Width (W) (mm)	Length (L) (mm)
2	12	200
2	19.05	200
2.5	12	200
2.5	19.05	200
3	12	150
3	12	200
3	16	150
3	16	200
3	25	150
3	25	200
4	16	150
5	16	150
5	16	200
5	25	150
5	25	200
6	12	100

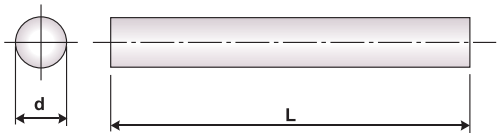
Thickness (T) (mm)	Width (W) (mm)	Length (L) (mm)
6	12	150
6	12	200
6	16	150
6	16	200
6	25	150
6	25	200
8	20	63
12	16	150
12	16	200
12	25	150
12	25	200
16	25	150
16	25	200
20	25	150
20	25	200



HSS Round Tool Bits | (Inch Sizes)



Tolerance (Diameter)	h8
Tolerance (Length)	+/- 1.0mm
End Bevel	0°



ROHIT Round Tool Bits are available in ROHIT - 1X, 2X, SPECIAL & 3X

Note: Intermediate Sizes & ASP grade rounds are available on request.

Packing: Plastic or Cardboard Boxes

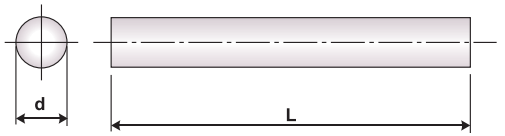
Diameter(d) (inches)	Length(L) (inches)
1/8	3
1/8	4
5/32	3
5/32	4
3/16	3
3/16	4
3/16	6
7/32	3
7/32	4
7/32	6
1/4	3
1/4	4
1/4	6
1/4	8
5/16	3
5/16	4
5/16	6
5/16	8
3/8	3
3/8	4
3/8	6
3/8	8
3/8	10
1/2	3
1/2	4
1/2	6
1/2	8
1/2	10
5/8	4
5/8	6

Diameter(d) (inches)	Length(L) (inches)
5/8	8
3/4	4
3/4	6
3/4	8
7/8	4
7/8	6
7/8	8
1	4
1	6
1	8

HSS Round Tool Bits | (Metric Sizes)



Tolerance (Diameter)	h8
Tolerance (Length)	+/- 1.0mm
End Bevel	0°



ROHIT Round Tool Bits are available in ROHIT - 1X, 2X, SPECIAL & 3X

Note: Intermediate Sizes & ASP grade rounds are available on request.

Packing: Plastic or Cardboard Boxes

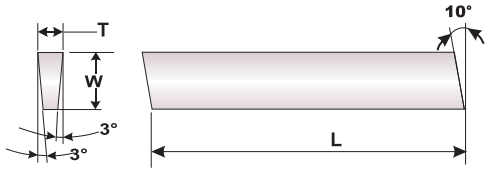
Diameter(d) (mm)	Length(L) (mm)
2.0	75
2.0	100
3.0	75
3.0	100
4.0	75
4.0	100
4.0	150
4.5	75
4.5	100
4.5	150
5.0	75
5.0	100
5.0	150
5.5	75
5.5	100
5.5	150
6.0	75
6.0	100
6.0	150
6.0	200
6.5	100
6.5	150
6.5	200
7.0	75
7.0	100
7.0	150

Diameter(d) (mm)	Length(L) (mm)
7.0	200
8.0	75
8.0	100
8.0	150
8.0	200
9.0	75
9.0	100
9.0	150
9.0	200
9.0	250
10.0	75
10.0	100
10.0	150
10.0	200
10.0	250
11.0	75
11.0	100
11.0	150
12.0	75
12.0	100
12.0	150
12.0	200
12.0	250
13.0	75
13.0	100
13.0	150
14.0	75
14.0	100
14.0	150
14.0	200

Diameter(d) (mm)	Length(L) (mm)
16.0	100
16.0	150
16.0	200
19.0	100
19.0	150
19.0	200
20.0	100
20.0	150
20.0	200
25.0	100
25.0	150
25.0	200



Tolerance (Width/Thickness)	H12
Tolerance (Length)	+/- 1.0mm
End Bevel	0°
Optional Bevel	As Per Requirement



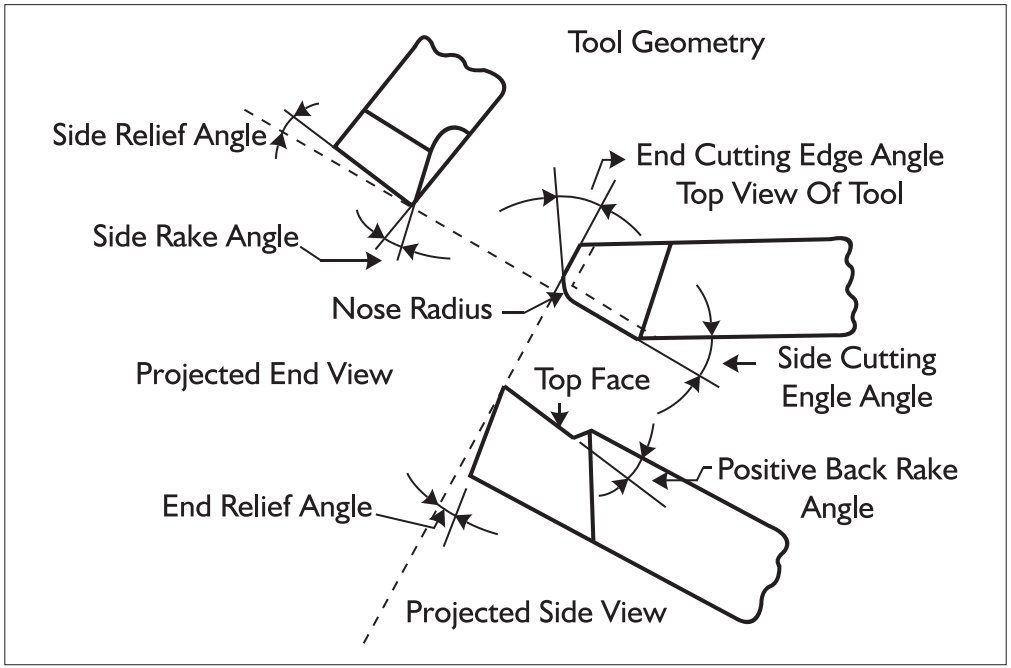
ROHIT Parting Tool Bits are available in ROHIT - 1X, 2X, SPECIAL & 3X

Note: Intermediate Sizes are available on request.

Packing: Plastic or Cardboard Boxes

Thickness (T) in mm	Width (W) in mm	Length (L) in mm
1.5	12.7	101.6
1.75	12.7	101.6
1.75	15.875	127
2	12	100
2	12.7	101.6
2	15.875	127
2	16	125
2.38	12.7	101.6
2.38	15.875	127
2.5	16	160
3	16	160
3.17	19.05	152.4
3.17	22.22	152.4
4	21	150
4.76	25.4	152.4
5	21	150

TOOL GEOMETRY



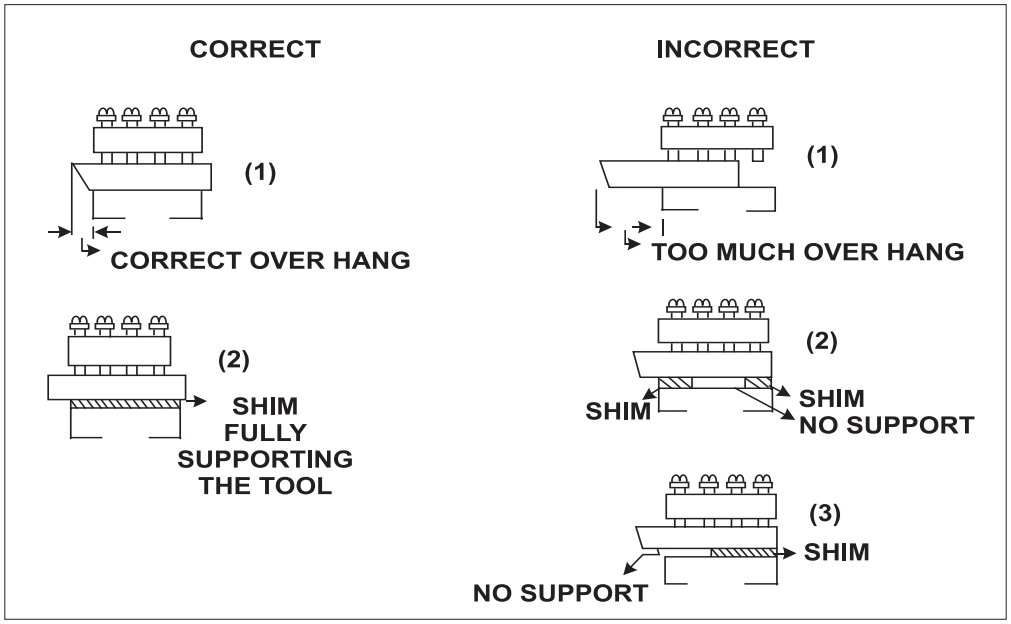
MACHINING INSTRUCTIONS

- 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.

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.

HOW TO CLAMP THE TOOL



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 l6	0 to -2	0 to -2

Recommended Cutting Speed & Feed

RECOMMENDED CUTTING SPEEDS METRE PER MINUTE

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 SO 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.	15-13	15-12	14-11	10-Dec

RECOMMENDED DEPTH OF CUT

OPERATION	DEPTH OF CUT mm
Rough turning	Depth of cut = machining allowance
Semi finish turning	0.50 to 0.20mm
Finish turning	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 >50	0.3-0.5 0.4-0.55	0.45-0.6 0.55-0.65	0.55-0.7 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 >50	0.18-0.25 0.25-0.3	0.25-0.3 0.3-0.35	0.3-0.4 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 50- 100 >100	0.1 0.11-0.16 0.16-0.2	0.11-0.15 0.16-0.25 0.2-0.25	0.15-0.22 0.25-0.35 0.25-0.35
	Cast Iron, Bronze & Aluminium Alloys	All range	0.1-0.15	0.15-0.2	0.2-0.35

Common Tool problems, Causes and Remedies

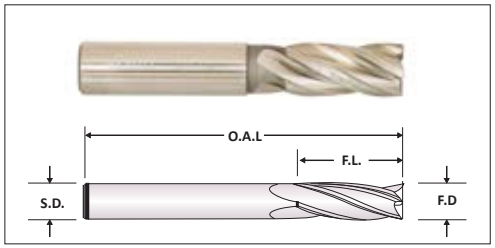
INDICATIONS	CAUSES	REMEDIES
Chipping	Too Keen a cutting edge. Chatter. Incorrect tool material. Too much relief. Lack of rigidity. Improper grinding.	Select Correct tool geometry. Prevent Chattering (See Chatter Below). Select suitable grade/quality. Reduce relief. Clamp rigidity. Use suitable grade of wheel for Grinding. Grind to give satisfactory finish to the cutting faces.
Cracking or Breaking	Feed to 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 to 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.

HSS Parallel Shank End Mills | (Imperial Sizes)

ROHIT PARALLEL SHANK ENDMILLS are available in ROHIT - 1X & 2X GRADES, AISI M42 (8% Cobalt) or ROHIT Special Grade also manufactured on order basis.

Note: Intermediate sizes available only on request as per company MOQ, Specifications Conform to BS122: Part1: 1953, All dimensions are in inches.

Packing: Single piece plastic boxes



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

F.D.	Flute Diameter
S.D.	Shank Diameter
C.E.L	Cutting Edge Length / Flute Length
O.A.L	Overall Length

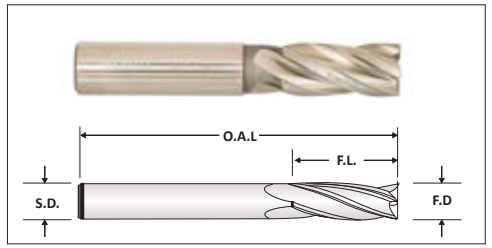
F.D. (inches)	C.E.L (inches)	S.D. (inches)	O.A.L (inches)	No. of Flute
1/8	3/8	1/4	1-7/8	4
5/32	3/8	1/4	1-7/8	4
3/16	1/2	1/4	2	4
7/32	1/2	1/4	2	4
1/4	5/8	1/4	2-1/8	4
5/16	3/4	3/8	2-1/2	4
3/8	7/8	3/8	2-5/8	4
7/16	7/8	1/2	2-5/8	4
1/2	1	1/2	2-3/4	4
9/16	1-1/8	1/2	2-7/8	4
5/8	1-1/4	5/8	3-1/4	4
11/16	1-3/8	5/8	3-3/8	4
3/4	1-1/2	5/8	3-1/2	4
13/16	1-5/8	3/4	3-5/8	4
7/8	1-5/8	3/4	3-5/8	6
1	1-3/4	3/4	3-3/4	6
1-1/8	1-7/8	1	4-1/8	6
1-1/4	2	1	4-1/4	6

HSS Parallel Shank End Mills | (Metric Sizes)

ROHIT PARALLEL SHANK ENDMILLS are available in ROHIT - 1X & 2X GRADES, AISI M42 (8% Cobalt) or ROHIT Special Grade also manufactured on order basis.

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

Packing: Single piece plastic boxes.



TOLERANCE	
F.D.	j.s.14
S.D.	h8

F.D.	Flute Diameter
S.D.	Shank Diameter
C.E.L	Cutting Edge Length / Flute Length
O.A.L	Overall Length

F.D. (mm)	C.E.L (mm)	S.D. (mm)	O.A.L (mm)	No. of Flute
2	8	4	42	4
3	10	4	42	4
4	11	4	43	4
4	16	6	52	4
5	13	5	47	4
5	16	6	52	4
6	16	6	52	4
7	16	8	52	4
8	19	8	59	4
9	19	10	59	4
10	22	10	67	4
11	22	12	67	4
12	26	12	76	4
13	26	12	76	4
14	26	12	76	4
14	32	16	88	4
15	32	12	88	4
15	32	16	88	4
16	32	16	88	4
17	32	16	88	4
18	32	16	88	4
19	38	16	101	6

F.D. (mm)	C.E.L (mm)	S.D. (mm)	O.A.L (mm)	No. of Flute
20	38	20	101	6
21	38	20	101	6
22	38	20	101	6
23	45	25	116	6
24	45	25	116	6
25	45	25	116	6
26	45	25	116	6
27	45	25	116	6
28	45	25	116	6
29	53	25	140	6
30	53	25	140	6

HSS CENTRE DRILLS | Type 'A'

ROHIT PARALLEL SHANK ENDMILLS are available in ROHIT - 1X & 2X GRADES, AISI M42 (8% Cobalt) or ROHIT Special Grade also manufactured on order basis.

Note: Type "A" Centre Drill for centre holes without protecting chamfer.

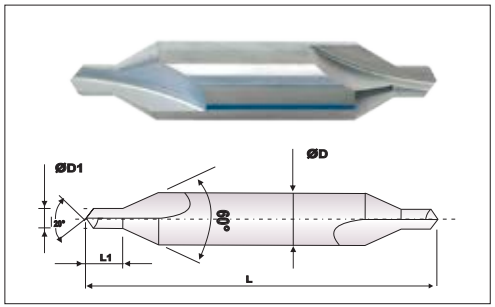
Packing: Single piece plastic boxes.

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

HSS CENTRE DRILLS | Type 'A'

Pilot Dia (D1)	Body Dia (D)	Pilot Length (L1)	OAL (L)
1.25	3.15	1.8	31.5
1.6	4	2.4	35.5
2	5	2.9	40
2.5	6.3	3.6	45
3.15	8	4.4	50
4	10	5.6	56
5	12.5	6.9	63
6.3	16	8.6	71
8	20	10.8	80
10	25	13.5	100

Note: Type "A" Centre Drill for centre holes without protecting chamfer.



TOLERANCE	
Pilot Dia (D1)	K12
Body Dia (D)	h9

INDEX-HSS PUNCHES

Series	Description	Page No
P101	HSS Straight Punches	144
P102	HSS Tapered Head Punches	146
P103	HSS Straight Punches For Medium Load	147
P104	HSS Straight Punches For Heavy Load	148
P105	HSS Mini Straight Punches	149
P106	HSS Shoulder Punches	150
P107	HSS Shoulder Punches For Heavy Load	151
P108	HSS Shoulder Punches Short Type	152
P109	HSS Tapped Punches	153
P110	HSS Block Punches	154
P111	HSS Block Punches Tapped	156
P112	HSS Straight Button Dies	158
P113	HSS Headed Button Dies	159
	Variations available in punches	160

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	64-66



HOW TO ORDER

S.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**

S.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**

S.No.	For Series P109	Types / Size	Example
1	Select Series	P109	P109
2	Select HSS Grade	1X / AS	AS
3	Select Body Diameter ("D")	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**

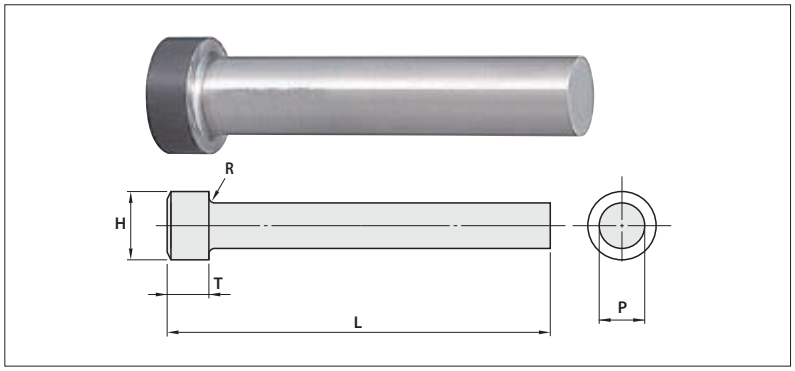
S.No.	For Series P110	Types / Size	Example
1	Select Series	P110	P110
2	Select HSS Grade	1X	1X
3	Select Head Width ("H")	20	20
4	Select Head Height ("V")	8	08
5	Select TIP Width ("W")	6	0600
6	Select TIP Height ("P")	5.5	0550
7	Select TIP Length ("B")	13	13
8	Select OAL (Overall Length - "L")	70mm	070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

HOW TO ORDER

S.No.	For Series P111	Types / Size	Example
1	Select Series	P111	P111
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")	4	0400
7	Select TIP Length ("B")	19	19
8	Select OAL (Overall Length - "L")	80mm	080
9	Tap Size ("M")	M6	M6
	Ordering Code		**P111-1X-20-08-0600-0400-19-080-M6**

S.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**

S.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 TIP Diameter ("P")	5.5	0550
5	Select OAL (Overall Length - "L")	40mm	040
	Ordering Code		**P113-1X-13-0550-040**

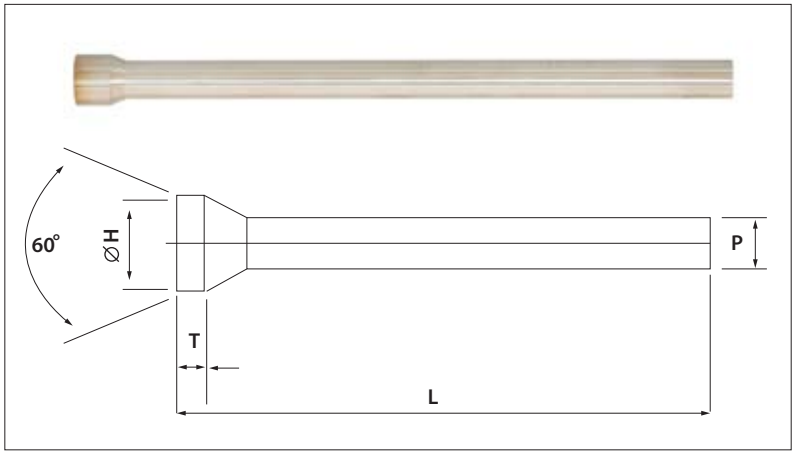


Tolerance	
H	0, -0.2
L	+/-0.5
P	0, -0.02
T	+/-0.3

HEAD DIA "H" (mm)	BODY DIA "P" (0.1 mm increments) min. "P" max.	OVERALL LENGTH "L" (mm)						
3	1.1~2.0	50	70	75				
3.5	2.1~2.5	50	70	75				
4	2.5~3.0	50	70	75				
4.5	3.1~3.5	50	70	75				
5	3.6~4.0	50	70	75	80	100	125	
5.5	4.1~4.5	50	70	75	80	100	125	
6	4.6~5.0	50	70	75	80	100	125	
6.5	5.1~5.5	50	70	75	80	100	125	150
7	5.6~6.0	50	70	75	80	100	125	150
7.5	6.1~6.5	50	70	75	80	100	125	150
8	6.6~7.0	50	70	75	80	100	125	150
8.5	7.1~7.5	50	70	75	80	100	125	150
9	7.6~8.0	50	70	75	80	100	125	150
9.5	8.1~8.5	50	70	75	80	100	125	150
10	8.6~9.0	50	70	75	80	100	125	150
10.5	9.1~9.5		70	75	80	100	125	150
11	9.6~10.0		70	75	80	100	125	150
11.5	10.1~10.5		70	75	80	100	125	150

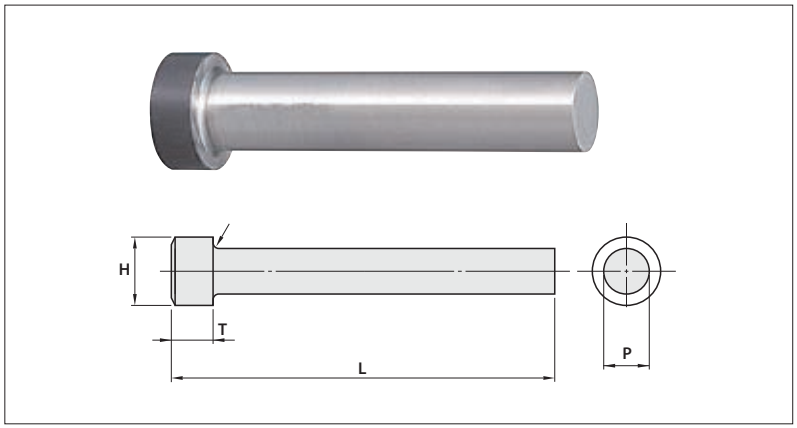
- Head Length "T" of 50mm Punch - 3mm
- Head Length "T" of above 50mm Length Punches - 5mm
- Note: These are company standard punches available in stock or cut to lengths in ROHIT-1X grade only
- *Sizes below 4mm : No Head Annealing is done

HEAD DIA "H" (mm)	BODY DIA "P" (0.1 mm increments) min. "P" max.	OVERALL LENGTH "L" (mm)						
12	10.6~11.0		70	75	80	100	125	150
12.5	11.1~11.5		70	75	80	100	125	150
13	11.6~12.0		70	75	80	100	125	150
13.5	12.1~12.5		70	75	80	100	125	150
14	12.6~13.0		70	75	80	100	125	150
14.5	13.1~13.5		70	75	80	100	125	150
15	13.6~14.0		70	75	80	100	125	150
16	14.1~15		70	75	80	100	125	150
17	15.1~16		70	75	80	100	125	150
18	16.1~17		70	75	80	100	125	150
19	17.1~18		70	75	80	100	125	150
20	18.1~19		70	75	80	100	125	150
21	19.1~20		70	75	80	100	125	150
22	20.1~21		70	75	80	100	125	150
23	21.1~22		70	75	80	100	125	150
24	22.1~23		70	75	80	100	125	150
25	23.1~24		70	75	80	100	125	150
26	24.1~25		70	75	80	100	125	150



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

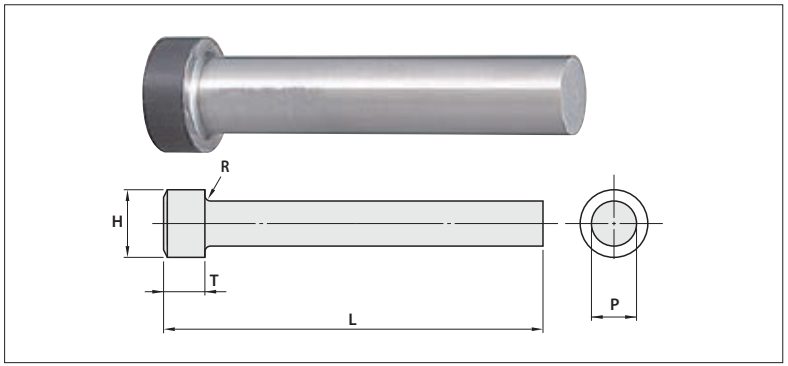
HEAD DIA "H" (mm)	BODY DIA "P" (0.1 mm increments) min. "P" max.	OVERALL LENGTH "L" (mm)					HEAD LENGTH "T" (mm)
4.5	3.0~3.5	50	70	75			0.5
5	3.5~4.0	50	70	75			
5.5	4.0~4.5	50	70	75	80	100	
6	4.5~5.0	50	70	75	80	100	
6.5	5.0~5.5	50	70	75	80	100	
7	5.5~6.0	50	70	75	80	100	
8	6.0~6.5	50	70	75	80	100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



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 LENGTH "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

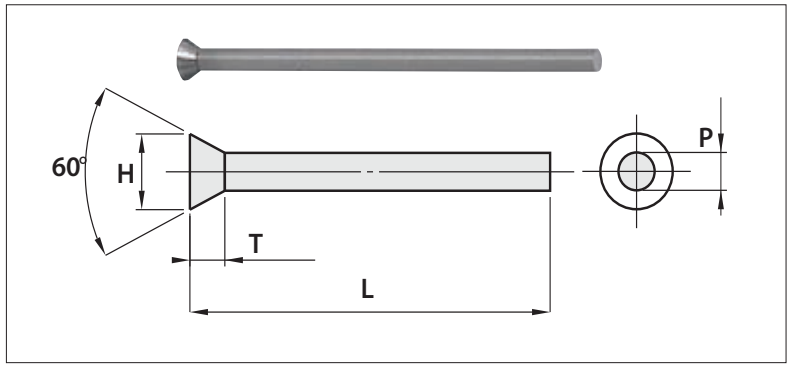
P104 series | HSS Straight Punches For Heavy Load



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 LENGTH "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

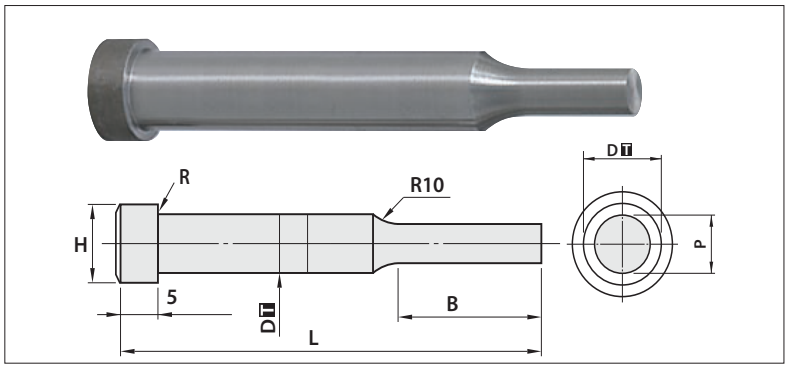
P105 series | HSS Mini Straight Punches



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

HEAD DIA"H" (mm)	BODY DIA "P" (mm)	OVERALL LENGTH "L" (mm)
1.8	1	25mm 35mm 40mm 50mm
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	

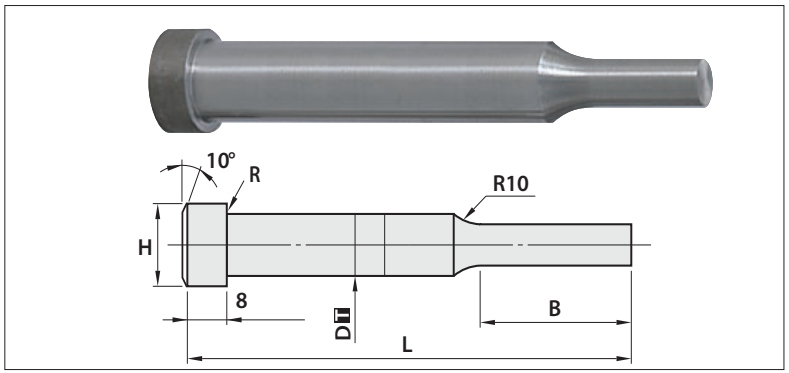
P106 Series | HSS Shoulder Punches



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

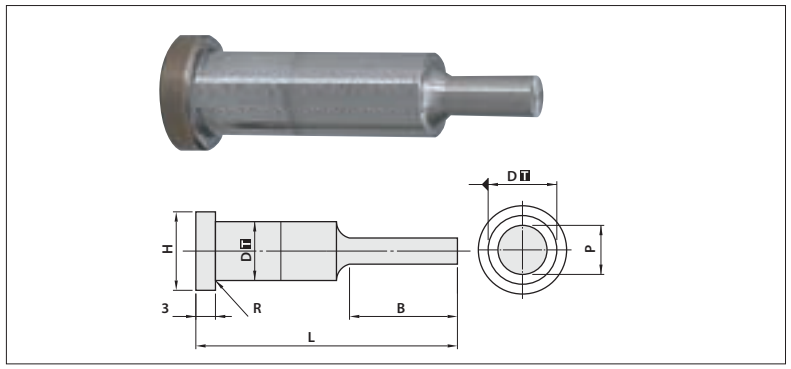
P107 Series | HSS Shoulder Punches For Heavy Load



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 LENGTH "B" (mm)	OVERALL LENGTH "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		50	70	80	100		2.00~5.9
13	8	13		70	80	100	120	3.00~7.9
15	10			70	80	100	120	3.00~9.9
18	13			70	80	100	120	6.00~12.9
21	16	19		70	80	100	120	10.00~15.9
25	20			70	80	100	120	13.00~19.9
30	25			70	80	100	120	18.00~24.9
10	5	13		70	80	100		2.00~4.9
11	6			70	80	100		2.00~5.9
13	8	19		70	80	100	120	3.00~7.9
15	10			70	80	100	120	3.00~9.9
18	13			70	80	100	120	6.00~12.9
21	16	25		70	80	100	120	10.00~15.9
25	20			70	80	100	120	13.00~19.9
30	25			70	80	100	120	18.00~24.9

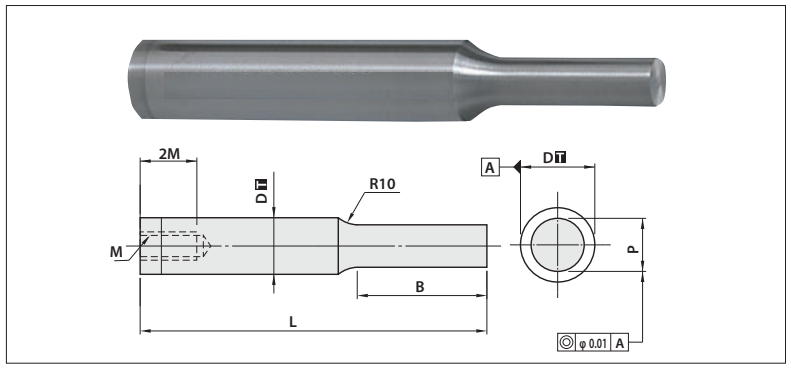
P108 Series | HSS Shoulder Punches Short Type



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

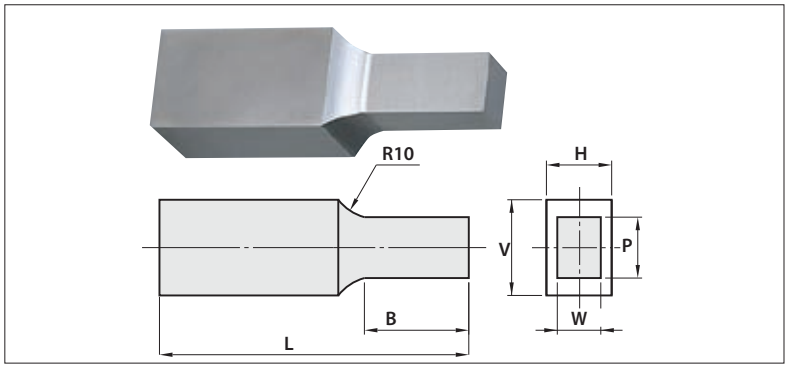
HEAD DIA "H" (mm)	BODY DIA "D" (mm)	TIP LENGTH "B" (mm)	OVERALL LENGTH "L" (mm)				TIP DIA "P" (0.1 mm increments) min. "P" max.
7	4	8	25	30	35	40	2.0~3.9
8	5		25	30	35	40	2.0~4.9
9	6		25	30	35	40	2.50~5.9
11	8		25	30	35	40	5.0~7.9
13	10		25	30	35	40	7.0~9.9
7	4	13		30	35	40	2.0~3.9
8	5			30	35	40	2.0~4.9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

P109 Series | HSS Tapped Punches



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

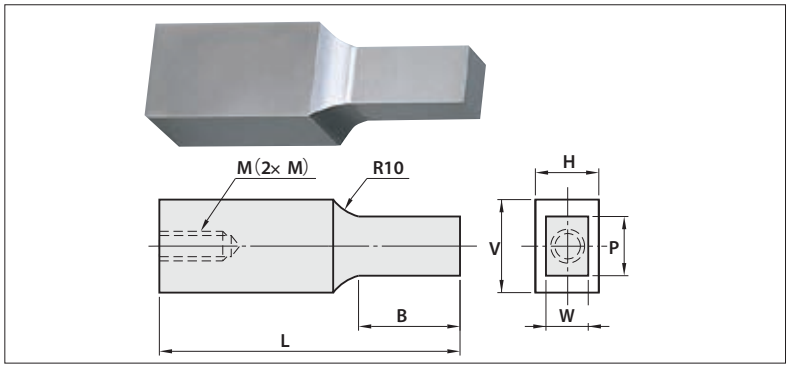
BODY DIA "D" (mm)	TIP LENGTH "B" (mm)	TAP SIZE "M" (mm)	OVERALL LENGTH "L" (mm)				TIP DIA "P" (0.1 mm increments) min. "P" max.
5	8	3	50	70	80	100	2.0~4.9
6		3	50	70	80	100	2.0~5.9
8	13	4	50	70	80	100	3.0~7.9
10		5	50	70	80	100	3.0~9.9
13		6		70	80	100	6.0~12.9
16	19	6		70	80	100	10.0~15.9
20		6		70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



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

HEAD WIDTH "H" (mm)	TIP WIDTH "W" (0.1 mm increments) min. "W" max	HEAD HEIGHT "V" mm									OAL "L" (mm)	TIP LENGTH "B" (mm)	
		8	10	13	16	20	22	25	28	30		S	L
		TIP HEIGHT "P" min~max (0.1 mm increments)											
		3.0~8.0	3.0~10.0	4.0~13.0	5.0~16.0	6.0~20.0	7.0~22.0	8.0~25.0	8.0~28.0	10.0~30.0			
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		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		13	19
20	6.0~20.0	o	o	o	o	o	o	o	o	o		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		19	25
28	8.0~28.0	o	o	o	o	o	o	o	o	o		19	25
30	10.0~30.0	o	o	o	o	o	o	o	o	o		19	25

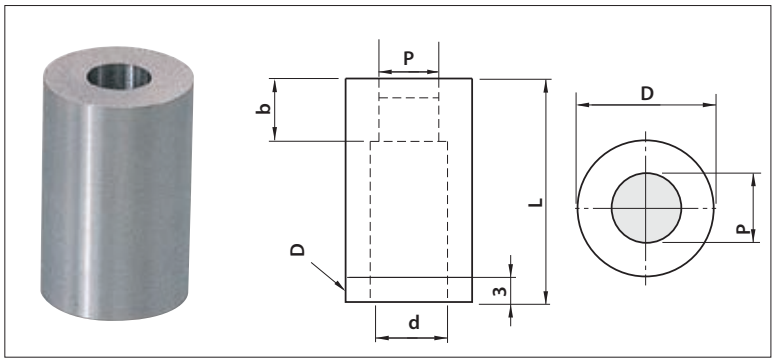
P110 Series | HSS Block Punches



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

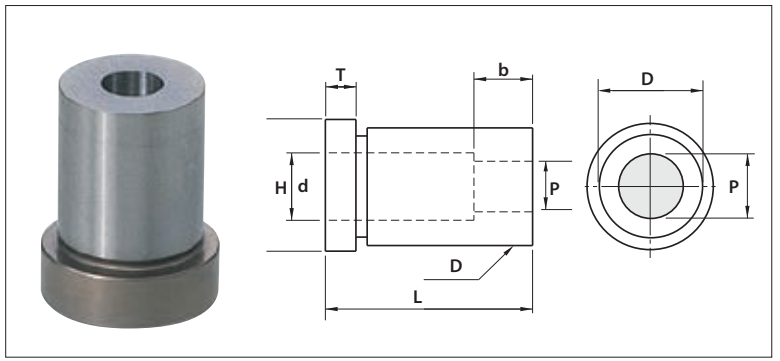
HEAD WIDTH "H" (mm)	TIP WIDTH "W" (0.1 mm increments) min. "W" max	HEAD HEIGHT "V" mm: 8	10	13	16	20	22	25	28	30	OAL "L" (mm)	TIP LENGTH "B" (mm) S	L	TIP SIZE "M"
		TIP HEIGHT "P" min~max (0.1 mm increments): 2.0~8.0	2.0~10.0	4.0~13.0	5.0~16.0	6.0~20.0	7.0~22.0	8.0~25.0	8.0~28.0	10.0~30.0				
8	2.0~8.0	o	o	o	o	o	o	o	o	o	70	8	13	4
10	2.0~10.0	o	o	o	o	o	o	o	o	o		8	13	
13	4.0~13.0	o	o	o	o	o	o	o	o	o	80	13	19	6
16	5.0~16.0	o	o	o	o	o	o	o	o	o		13	19	
20	6.0~20.0	o	o	o	o	o	o	o	o	o		19	25	
22	7.0~22.0	o	o	o	o	o	o	o	o	o	100	19	25	8
25	8.0~25.0	o	o	o	o	o	o	o	o	o		19	25	
28	8.0~28.0	o	o	o	o	o	o	o	o	o		19	25	
30	10.0~30.0	o	o	o	o	o	o	o	o	o		19	25	

P111 Series | HSS Block Punches Tapped



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

BODY DIA "D" (mm)	OVERALL LENGTH "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		8.4
16	20	25	30	35	40	5.0~10.0		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		14.6
25	20	25	30	35	40	10.0~16.0		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 LENGTH "L" (mm)					TIP DIA "P" (0.1 mm increments) min. "P" max.	"b" (mm)	"d" (mm)	
9	6	20	25	30	35		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		8.4	
19	16	20	25	30	35	40	5.0~10.0		10.6	5
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		14.6	
28	25	20	25	30	35	40	10.0~16.0		16.6	

Variations available in Punches

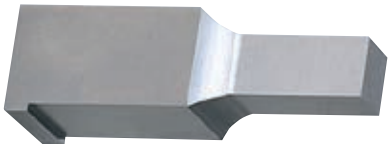
KEY FLAT SHANK SHOULDER PUNCHES
- The below variation is available for punches P106, P107 & P108 series



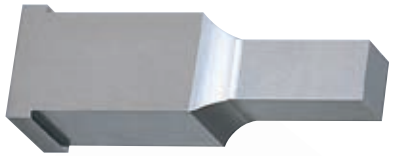
PUNCHES WITH KEY GROOVES
- The below variation is available for punches P109 where instead of TAP, keyway is provided



SINGLE FLANGE BLOCK PUNCHES
- The below variation is available for punches P110 & P111 series



DOUBLE FLANGE BLOCK PUNCHES
- The below variation is available for punches P110 & P111 series



HEXAGONAL PUNCHES
- This variation is provided for following series P103, P104, P106, P107, P108 and P109



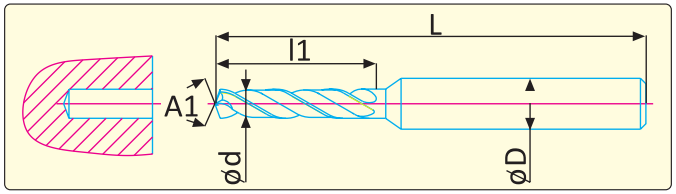
Step Drill Form

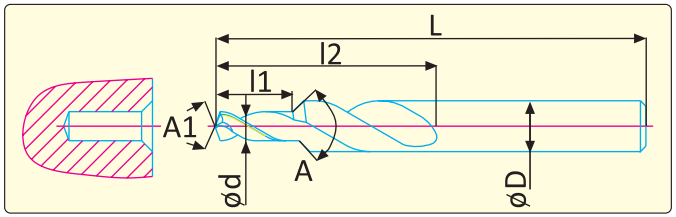
1. Fill in information requested on drawing. (*Required Fields)
2. E-mail to RIGPL at : sales@rigpl.com
3. Fax to : +91-11-25920493

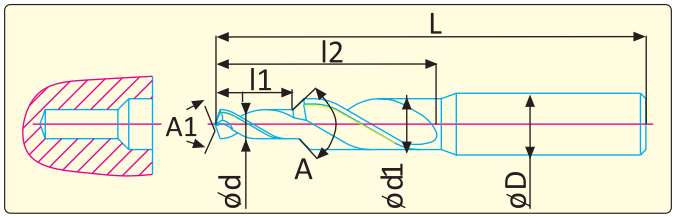
☐ Request Approval Drawing

STEP DRILL

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







od : _____
l1 : _____
A° : _____
ød1 : _____
l2 : _____
A1° : _____
øD : _____
L : _____

No. of flute : _____
Helix : _____
Coating : _____
Quantity, pcs : _____

Customer Name: _____

Phone: _____

*Work Material Machined: _____

Hardness: _____

Dealer: _____

Quantities: (6 Piece Minimum) _____

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Email: sales@rigpl.com • Visit us at: www.rigpl.com
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Ph.: 91-11-41427321, 25920492, 41021800, 25429804 • Fax : 91-11-25920493, 25431800
Plant: Plot No. 655-656, M.I.E, Part-A, Bahadurgarh, Haryana - 124507, Ph.: 91-85869-23422/23

Special End Mill Form

1. Fill in information requested on drawing. (*Required Fields)
2. E-mail to RIGPL at : sales@rigpl.com
3. Fax to : +91-11-25920493

d1= _____

d2= _____

α° = _____

β° = _____

L1= _____

L2= _____

L3= _____

L4= _____

Helix: _____

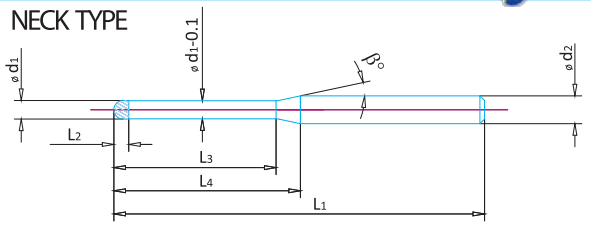
No. of flute : _____

Coating : _____

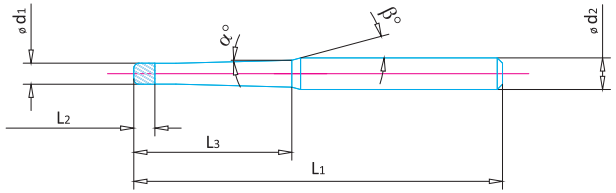
Quantity, pcs : _____

Corner Radius : _____

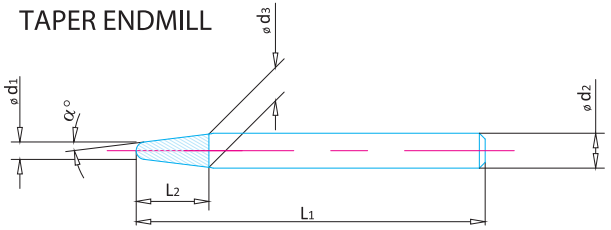
☐ NECK TYPE



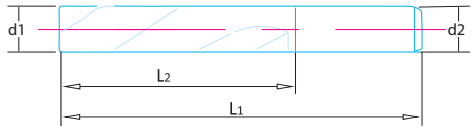
☐ TAPER NECK TYPE



☐ TAPER ENDMILL



☐ FLAT ENDMILL



Customer Name: _____

Phone: _____

*Work Material Machined: _____

Hardness: _____

Dealer: _____

Quantities: (6 Piece Minimum) _____

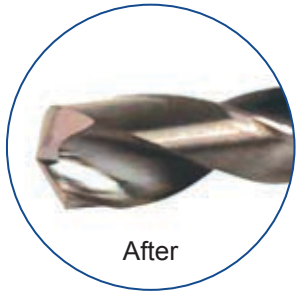
ROHIT INDUSTRIES GROUP PVT. LTD.
Email: sales@rigpl.com • Visit us at: www.rigpl.com
Reg. Off.: UG-10, Shivlok House No. 2, Karampura Commerical Complex , N. Delhi 15,
Ph.: 91-11-41427321, 25920492, 41021800, 25429804 • Fax : 91-11-25920493, 25431800
Plant: Plot No. 655-656, M.I.E, Part-A, Bahadurgarh, Haryana - 124507, Ph.: 91-85869-23422/23

Reconditioning Services

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.


Before


After

- 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

RETURN • RECONDITION • REDUCE COST

Coatings

TiN

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

TiAIN

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

DLC (Diamon Like Carbon)

DLC is RIGPL's answer to milling graphite & aluminum materials. It has the hardness of diamond, the smoothness of typical PVD coatings, and excellent thermal stability.

HYPERLOX

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

NOVA

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

ALDURA

The nanocrystalline AlCrN-based coating features excellent hot hardness, resistance to oxidation and thermal insulating properties which provides tool protection at elevated temperatures while machining >60HRc Dies & Moulds.
This coating is preferable to use for Dry milling applications.

COATING PROPERTIES

Coating	RIGPL Tool Number Designation	Vicker Hardness (HV)	Coefficient of Friction	Max. Working Temperature (oC)
TiN	- T	1,800~2,000	0.35	600
TiALN	- F	2,000~3,000	0.4	800
DLC	- D	2,000~3,500	0.1	400
HYPERLOX	- H	2500~3700	0.3	1,100
NOVA	- N	3,200~4200	0.4	1,100
ALDURA	- L	3700~4500	0.35 - 0.4	1,200

See something you like to try?

Complete this form to request your tool!*

Company Information:	
Dealer Name:	End User Name:
Requested By:	Contact :
Address:	Ship to Address:
City, State, Zip:	City, State, Zip:
Phone:	Phone: Ship Via:
Mobile:	Mobile:
e-mail Address:	e-mail Address:

RIGPL Sales Rep.: _____

RIGPL Trial Tool Requested:

Qty/Tool # _____ Qty/Tool # _____ Qty/Tool # _____

Comments: _____

Additional Information:			
Application Description:			
Machine Type	Horizontal ☐	Vertical ☐	Other ☐
RPM		Horsepower	
Condition	Good ☐	Fair ☐	Poor ☐
Material		Hardness	
Coolant?	Yes ☐	No ☐	Type

Current Tooling Appraisal:	
Current Tool:	
Mfg.	Part #
Feed Rate:	
RPM:	
Width/Depth of Cut:	
Hole Depth:	
No. Holes Produced:	
No. Parts Produced:	
Production Rate:	

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

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Trial Tool Results Form

Company Information:	
Contact:	Date:
Company Name:	Phone:
Address:	Order Number:
City, State, Zip	e-mail Address:

RIGPL Sales Rep

Work Material:
Hardness:
Machine Type:
Coolant Type:

Application		
Drilling ☐	Milling ☐	Other ☐
Explain:		
Spindle		
Horizontal ☐	Vertical ☐	Other ☐
Explain:		

	Competitor	RIGPL
Company Name		
RPM		
Feed Rate		
Tool Life in metres (drilling) / hours (milling)		
Failure Type		

Comments:	
Report Made By:	**Report Approved By:**

For Internal Use: **(RIGPL)**	
Results Approved?	Need More Information

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Hardness Conversion Chart

Rockwell			Brinell (HB) or BHN		Vickers (HV)	
A	B	C	3000 kg	500 kg	136	Tensile Strength (N/mm2) or Mpa
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
63.8	103	27	264	---	279	890

Rockwell			Brinell (HB) or BHN		Vickers (HV)	
A	B	C	3000 kg	500 kg	136	Tensile Strength (N/mm2) or Mpa
60kg Brale	100kg 1/16" Ball	150kg Brale	10mm Ball Steel	10mm Ball Steel	Diamond Pyramid	
63.3	103	26	258	---	272	869
62.8	102	25	253	---	266	855
62.4	101	24	247	---	260	834
62	100	23	240	201	254	814
61.5	99	22	234	195	248	793
61	98	21	228	189	243	772
60.5	97	20	222	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	---	132	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

ISO Tolerance Designation						
	<=3mm	3-6mm	6-10mm	10-18mm	18-30mm	30-50mm
h6	-6	-8	-9	-11	-13	-16
h7	-10	-12	-15	-18	-21	-25
h8	-14	-18	-22	-27	-33	-39
h9	-25	-30	-36	-43	-52	-62
h10	-40	-48	-58	-70	-84	-100
h11	-60	-75	-90	-110	-130	-160
h12	-100	-120	-150	-180	-210	-250
h13	-140	-180	-220	-270	-330	-390
js11	+/- 30	+/- 37	+/- 45	+/- 55	+/- 65	+/- 80
js12	+/- 50	+/- 60	+/- 75	+/- 90	+/- 105	+/- 125
js14	+/- 125	+/- 150	+/- 180	+/- 215	+/- 260	+/- 310
k12	+90 0	+120 0	+150 0	+180 0	+210 0	+250 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
H7	+12	+12	+15	+18	+21	+25
m7	+16, +4	+16, +4	+21, +6	+25, +7	+29, +8	+34, +9