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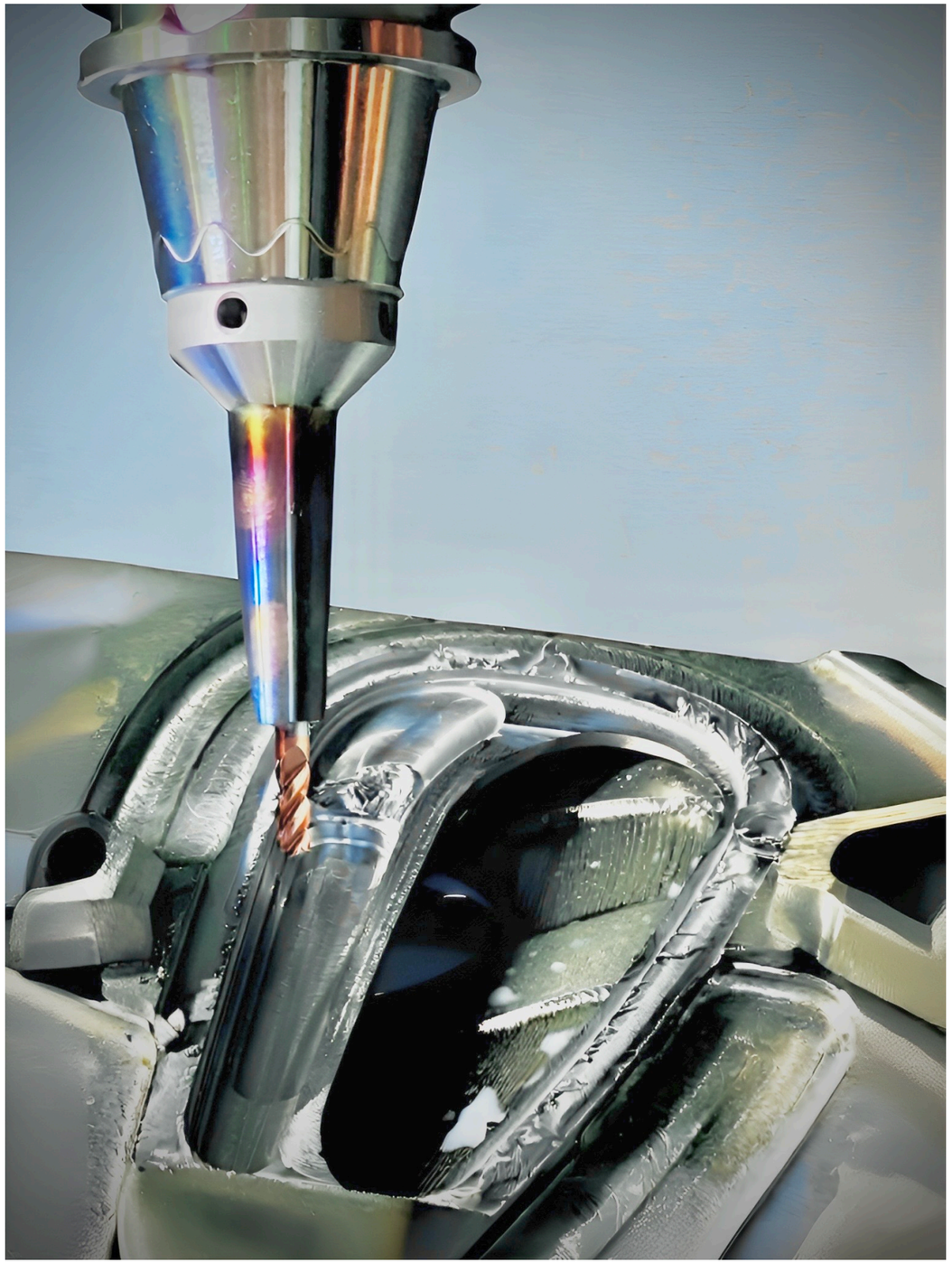
Solid Carbide Endmill

2025.V1



CONTENTS

Basic Information

Tools And Cutting Data

Appendix

Icon Guideline

01 Front Corner Degree

12°	5°	0°	-5°	-12°
12° Front Corner Degree	5° Front Corner Degree	0° Front Corner Degree	-5° Front Corner Degree	-12° Front Corner Degree

02 Helix Angle

30°	35°	35°/38°	43° 45° 47°	45°
30° Helix Angle	35° Helix Angle	35°/38° Helix Angle	43°/45°/47° Helix Angle	45° Helix Angle

03 Coating

TiAlN	AlCrSiN	AlTiSiN	DIA
TiAlN Coating	AlCrSiN Coating	AlTiSiN Coating	Diamond Coating

04 Number of Flutes

2	3	4	5	6
2 Flutes	3 Flutes	4 Flutes	5 Flutes	6 Flutes

05 Corner

Corner Radius	Sharp Edge	Ball Nose	Chamfer	

06 Applications

Slot Milling	Side Milling	Profile Milling		

Product Code (Order Number) Instruction Of Solid Carbide Endmill

U -			S	
{ 1 }			{ 2 }	
Product series	Workpiece material	Remark	Endteeth type	
U	Steel, Cast iron	General machining	S	Square
UC	Steel, Cast iron	General machining	B	Ball nose
UR	Steel, Cast iron	Roughing	R	Corner radious
X	Steel, Cast iron	High efficient machining		
UX	Steel, Cast iron	High efficient machining		
H	Hardened steel	General machining		
HV	Hardened steel	General machining		
A	Aluminum Alloy	Aluminum alloy general machining		
S	Stainless steel	Stainless steel general machining		
S10	Stainless steel	Stainless steel general machining		
T	Titanium alloy	High efficient machining		
G	Graphite	Graphite machining		
UM	Steel, Cast Iron	Small diameter & Deep cavity nachining		

H	2	020	06				
{ 3 }	{ 4 }	{ 5 }	{ 6 }				
Features	Flute number	Flute diameter	Characteristic code				
N	Long neck	2	2mm	020		Type	Represented item	Value instruction
H	Long shank	3	10mm	100	1	Square \ Ball nose	a. neck length b. flute length	06-6mm
L	Long flute	4			2	Corner radious	r value	06-r0.6
S	Short flute	6			3	Chamfer	Chamfer value	06-c0.06
Blank	Standard							

Coating Introduction

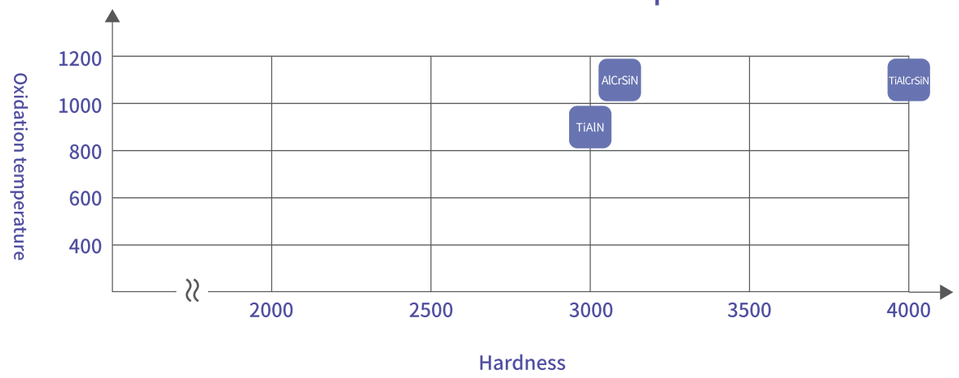
01 Features of Coating

Coating name	Vickers hardness	Friction coefficient	Maximum applicable temperature	Features and function
AlCrSiN	3300	0.4	1100	High oxidation resistance and high adhesion; Suitable for milling of carbon alloy steels, stainless steels, titanium alloys etc. (under 55HRC); Good versatility; Dry and wet cutting can be processed with long life.
TiAlN	2900	0.35	900	High oxidation resistance and high adhesion; Suitable for for milling of stainless steels; Suitable for for dry machining of hardened steels and drilling of titanium alloys.
TiAlCrSiN	4000	0.35	1100	High hardness and high oxidation resistance; Enables long life and high efficiency in machining of high hardness materials; Excellent performance in the cutting of high hardness materials (above 55HRC).
Coarse grained diamond	8500	—	700	High hardness, high thermal conductivity, high wear resistance; Suitable for graphite machining.
Ultrafine grained diamond	8000	—	700	High hardness, high thermal conductivity, high wear resistance, good self-lubrication; Suitable for for processing non-ferrous materials, carbon fiber composite materials, etc.

02 Positioning of Nano PVD Coating

By controlling the crystalline structure at nano level, hardness and oxidization resistance are greatly improved.

Hardness and oxidation temperature



Hardness and lubricant properties

Introduction of Tool Series

U Series Endmill For Steel General Machining

◎ Suitable for application of steel & cast iron (⩽48HRC) general machining

◎ AICr series coating with high oxidation resista nee and high adhesion

◎ Long life for both dry cutting and wet cutting

UC Series Endmill For Steel General Machining

◎ Suitable for rough processing and finishing of Ordinary Steel and Cast Iron(⩽48HRC)

◎ 45° High-helix, Double Cutting lip design, Sharp & strong cutting lip

◎ Suitable for Universal Machining, Side milling and Shallow slotting

UR Series General Rough Machining Series

◎ Suitable for application of steel & cast iron(⩽48HRC) roughing with big cutting depth and width

◎ Special wave teeth design makes fine and short chip, and smooth chip removal.

UX Series High-efficiency Integrated Roughing And Finishing Machining

◎ Suitable for application of steel & cast iron (⩽48HRC) high performance machining

◎ Especially suitable for slot milling, with high cutting edge strength and anti chipping

◎ Variable indexing design of bottom edge, stable cutting process

◎ Parabolic chip tank design, excellent chip removal performance

X Series Endmill For Steel High Efficiencymachining

◎ Suitable for application of steel & cast iron (⩽48HRC) high performance machining

◎ AICr series coating with high oxidation resista nee and high adhesion

◎ Unequal helix angle and unequal spacing of teeth , greatly reduces vibration

◎ Applicable to big cutting depth and width

H Series General Machining For Hardened Steels

◎ Suitable for application of hardened steel (⩽60HRC) semi-finishing and finishing

◎ TiAlCrSiN coating with high hardness and high oxidation resistance

HV Series High Speed Machining Series For Hardened Steels

◎ Suitable for high hardness steel (HRC50~62), prehardened steel precision machining, semi precision machining

◎ Newly developed TiAlCrSiN high hardness coating with excellent wear resistance, effectively extending tool life

◎ Using ultrafine particle superhard alloy (0.2um) to process high hardness materials and achieve excellent performance

A Series General Machining For Aluminum Alloys

◎ Suitable for application of semi-finishing and finishing of aluminum alloy(Si<12%) and copper alloy (<200HB)

◎ Special edge design, reduces vibration effectively.

◎ Special edge preparation, good surface quality

S Series General Machining Series For Stainless Steel

◎ Suitable for application of stainless steel (⩽300HB) general machining

◎ TiAIN coating with high oxidation resistance and high adhesion

◎ Long life in both dry cutting and wet cutting

S10 Series General Machining Series F Or Stainless Stee

◎ Suitable for rough and finish machining of stainless steel (<380HB)

◎ The excellent matrix and TiAlCrSiN coating are used to improve the anti collapse performance of rough machining and the wear resistance of finish machining, and the tool life is long

◎ Suitable for high-speed fast feed, face milling, side milling and shallow groove milling

◎ Recommended oil cooling and water cooling methods

T Series General Machining

◎ Suitable for high-performance processing of titanium alloy and stainless steel materials

◎ Independently developed high-performance and difficult to machine material specialized matrix with strong high-temperature resistance, achieving longer tool cutting life

◎ Adopting unequal tooth pitch and unequal spiral segmentation design, effectively prefabricating vibration to achieve higher surface quality

G Series Endmill For Graphite Machining

◎ Excellent accuracy and excellent surface finish

◎ High purity diamond coating enable high abrasion resistance and better tool life

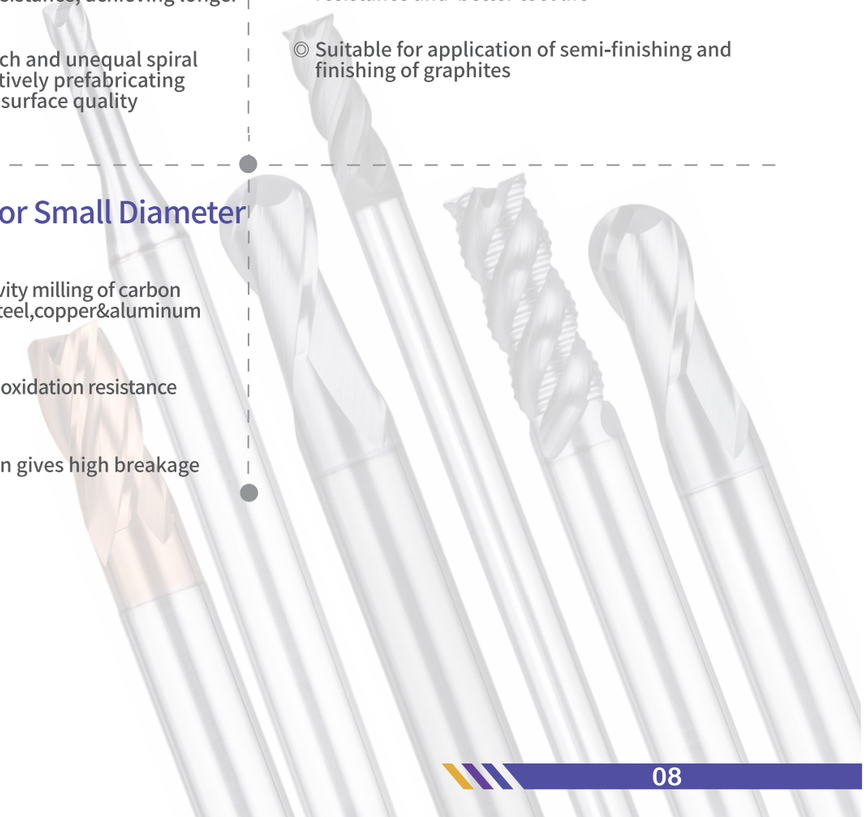
◎ Suitable for application of semi-finishing and finishing of graphites

UM Series Endmill For Small Diameter & Deep Machining

◎ Suitable for small & deep-cavity milling of carbon steel, alloy steel, hardened steel,copper&aluminum alloys etc (⩽55HRC)

◎ AlCr series coating with high oxidation resistance and high adhesion

◎ Special reduced neck design gives high breakage resistance



Endmill Products Directory

Name	Series	Model	Product name	Nose shape	Type	No.of flutes	Flute diameter range	Page		Picture	Coating	Workpiece Material										
								Size list	Cutting parameters			Cast iron	Carbon steel, alloy	Pre-hardened steels ＜45HRC	Hardened steels 45HRC ~55HRC	Hardened steels 55HRC -65HRC	Hardened steels ＞65HRC	Stainless steels	TI alloy	Graphite	Copper alloy	Aluminum alloy
End mills for general machining	U	U-S2	Square, Regular, 2 Flutes	Square	Regular	2	ø1-ø20	23	153		AlCrSiN	◎	◎	◎	○			○			○	
		U-SL2	Square，Long flute，2 Flutes	Square	Long flute	2	ø2-ø20	24	153		AlCrSiN	◎	◎	◎	○			○			○	
		U-SH2	Square, Long shank, 2 Flutes	Square	Long shank	2	ø2-ø20	25	153		AlCrSiN	◎	◎	◎	○			○			○	
		U-S3	Square, Regular, 3 Flutes	Square	Regular	3	ø2-ø20	26	154		AlCrSiN	◎	◎	◎	○			○			○	
		U-S4	Square, Regular, 4 Flutes	Square	Regular	4	ø1-ø20	27	155		AlCrSiN	◎	◎	◎	○			○			○	
		U-SL4	Square，Long flute，2 Flutes	Square	Long flute	4	ø1-ø20	29	155		AlCrSiN	◎	◎	◎	○			○			○	
		U-SH4	Square, Long shank, 4 Flutes	Square	Long shank	4	ø2-ø20	30	155		AlCrSiN	◎	◎	◎	○			○			○	
		U-S6	Square, Regular,6 Flutes	Square	Regular	6	ø6-ø20	31	155		AlCrSiN	◎	◎	◎	○			○			○	
		U-R2	Radius, Regular, 2 Flutes	Radius	Regular	2	ø1-ø20	32	153		AlCrSiN	◎	◎	◎	○			○			○	
		U-RH2	Radius, Long shank, 2 Flutes	Radius	Long shank	2	ø6-ø20	34	153		AlCrSiN	◎	◎	◎	○			○			○	
		U-R4	Radius, Regular, 4 Flutes	Radius	Regular	4	ø1.5-ø20	35	155		AlCrSiN	◎	◎	◎	○			○			○	
		U-RH4	Radius, Long shank, 4 Flutes	Radius	Long shank	4	ø3-ø20	37	155		AlCrSiN	◎	◎	◎	○			○			○	
		U-B2	Ball, Regular, 2 Flutes	Ball	Regular	2	ø1-ø20	38	156		AlCrSiN	◎	◎	◎	○			○			○	
		U-BH2	Ball, Long shank, 2 Flutes	Ball	Long shank	2	ø2-ø20	39	156		AlCrSiN	◎	◎	◎	○			○			○	
		U-B4	Ball, Regular, 4 Flutes	Ball	Regular	4	ø2-ø20	40	156		AlCrSiN	◎	◎	◎	○			○			○	

◎ Best for ○ Suitable for

Endmill Products Directory

Name	Series	Model	Product name	Nose shape	Type	No.of flutes	Flute diameter range	Page		Picture	Coating	Workpiece Material										
								Size list	Cutting parameters			Cast iron	Carbon steel, alloy	Pre-hardened steels ＜45HRC	Hardened steels 45HRC ~55HRC	Hardened steels 55HRC -65HRC	Hardened steels ＞65HRC	Stainless steels	TI alloy	Graphite	Copper alloy	Aluminum alloy
End mills for general machining	UC	UC-S2	Square，Regular，2 Flutes	Square	Regular	2	ø1-ø10	42	157		AlCrSiN	◎			○			○			○	
		UC-S4	Square，Regular，4 Flutes	Square	Regular	4	ø1-ø10	43	158		AlCrSiN	◎			○			○			○	
		UC-SH4	Square，Long shank，4 Flutes	Square	Long shank	4	ø1-ø10	44	158		AlCrSiN	◎			○			○			○	
		UC-R2	Radius，Regular，2 Flutes	Radius	Regular	2	ø1-ø10	45	157		AlCrSiN	◎			○			○			○	
		UC-R4	Radius，Regular，2 Flutes	Radius	Regular	4	ø1-ø10	46	158		AlCrSiN	◎			○			○			○	
		UC-RH4	Radius，Long shank，4 Flutes	Radius	Long shank	4	ø1-ø10	47	158		AlCrSiN	◎			○			○			○	
		UC-B2	Ball，Regular，2 Flutes	Ball	Regular	2	ø1-ø10	48	158		AlCrSiN	◎			○			○			○	
		UC-BH2	Ball，Long shank，2 Flutes	Ball	Long shank	2	ø1-ø10	49	158		AlCrSiN	◎			○			○			○	
End mills for roughing	UR	UR-S4	Square，Regular，4 Flutes with wave teeth	Square	Regular	4	ø6-ø20	51	159		AlCrSiN	◎	◎	◎	○			○			○	
End mills for high efficiency machining	X	X-S3	Square，Regular，3 Flutes	Square	Regular	3	ø3-ø20	54	160		AlCrSiN	◎	◎	◎	○			○			○	
		X-C3	Square，Regular，3 Flutes with Chamfer	Square	Regular	3	ø6-ø16	55	160		AlCrSiN	◎	◎	◎	○			○			○	
		X-S4	Square，Regular，4 Flutes	Square	Regular	4	ø2-ø20	56	161		AlCrSiN	◎	◎	◎	○			○			○	
		X-C4	Square，Regular，4 Flutes with Chamfer	Square	Regular	4	ø3-ø20	57	161		AlCrSiN	◎	◎	◎	○			○			○	
		X-CN4	Square，Long neck，4Flutes with Chamfer	Square	Long neck	4	ø3-ø20	58	161		AlCrSiN	◎	◎	◎	○			○			○	
		X-R4	Radius，Regular，4 Flutes	Radius	Regular	4	ø3-ø16	59	161		AlCrSiN	◎	◎	◎	○			○			○	

◎ Best for ○ Suitable for

Endmill Products Directory

Name	Series	Model	Product name	Nose shape	Type	No.of flutes	Flute diameter range	Page		Picture	Coating	Workpiece Material										
								Size list	Cutting parameters			Cast iron	Carbon steels, alloy	Pre-hardened steels <45HRC	Hardened steels 45HRC ~55HRC	Hardened steels 55HRC -65HRC	Hardened steels >65HRC	Stainless steels	TI alloy	Graphite	Copper alloy	Aluminum alloy
End mills for high efficiency machining	X	X-B2	Ball, Regular, 2 Flutes	Ball	Regular	2	ø1-ø12	60	161		AlCrSiN	◎	◎	◎	○			○			○	
		X-BH2	Ball, Long shank, 2 Flutes	Ball	Long shank	2	ø4-ø12	61	161		AlCrSiN	◎	◎	◎	○			○			○	
End mills for high efficiency machining	UX	UX-S4	Square, Regular, 4 Flutes	Square	Regular	4	ø1-ø20	63	162		AlCrSiN	◎	◎	◎	○			○			○	
		UX-SL4	Square, Long flute, 4 Flute	Square	Long flute	4	ø1-ø20	64	162		AlCrSiN	◎	◎	◎	○			○			○	
		UX-SH4	Square, Long shank, 4 Flutes	Square	Long shank	4	ø1-ø20	65	162		AlCrSiN	◎	◎	◎	○			○			○	
		UX-R4	Radius, Regular, 4 Flutes	Radius	Regular	4	ø1-ø20	66	162		AlCrSiN	◎	◎	◎	○			○			○	
		UX-RH4	Radius, Long shank, 4 Flutes	Radius	Long shank	4	ø1-ø20	67	162		AlCrSiN	◎	◎	◎	○			○			○	
End mills for hardened steel machining	H	H-S4	Square, Regular, 4 Flutes	Square	Regular	4	ø1-ø20	70	163		TiAlSiN		○	◎	◎	○						
		H-SL4	Square, Long flute, 4 Flute	Square	Long flute	4	ø1-ø16	71	163		TiAlSiN		○	◎	◎	○						
		H-S6	Square, Regular, 6 Flutes	Square	Regular	6	ø1-ø12	72	165		TiAlSiN		○	◎	◎	○						
		H-SL6	Square, Long flute, 6 Flutes	Square	Long flute	6	ø1-ø12	73	165		TiAlSiN		○	◎	◎	○						
		H-R4	Radius, Regular, 4 Flutes	Radius	Regular	4	ø1-ø12	74	163		TiAlSiN		○	◎	◎	○						
		H-RH4	corner radius long shank, 4 flute	Radius	Long shank	4	ø1-ø12	75	163		TiAlSiN		○	◎	◎	○						
		H-RN4	Radius, Long neck, 4 Flutes	Radius	Long neck	4	ø1-ø12	76	163		TiAlSiN		○	◎	◎	○						
		H-B2	Ball, Regular, 2 Flutes	Ball	Regular	2	ø0.6-ø16	77	164		TiAlSiN		○	◎	◎	○						
		H-BH2	Ball, Long shank, 2 Flutes	Ball	Long shank	2	ø2-ø12	78	164		TiAlSiN		○	◎	◎	○						

◎ Best for ○ Suitable for

Endmill Products Directory

Name	Series	Model	Product name	Nose shape	Type	No.of flutes	Flute diameter range	Page		Picture	Coating	Workpiece Material										
								Size list	Cutting parameters			Cast iron	Carbon steels, alloy	Pre-hardened steels <45HRC	Hardened steels 45HRC ~55HRC	Hardened steels 55HRC -65HRC	Hardened steels >65HRC	Stainless steels	TI alloy	Graphite	Copper alloy	Aluminum alloy
HV Series High Speed Machining Series for	HV	HV-S4	Square, Regular, 4 Flutes	Square	Regular	4	ø1-ø20	80	166		AlTiSiN		○	◎	◎	○						
		HV-SL4	Square, Long flute, 4 Flutes	Square	Long flute	4	ø1-ø16	81	166		AlTiSiN		○	◎	◎	○						
		HV-S6	Square, Regular, 6 Flutes	Square	Regular	6	ø6-ø20	82	169		AlTiSiN		○	◎	◎	○						
		HV-SL6	Square, Long flute, 6 Flutes	Square	Long flute	6	ø6-ø20	83	169		AlTiSiN		○	◎	◎	○						
		HV-R4	Radius, Regular, 4 Flutes	Radius	Regular	4	ø1-ø12	84	167		AlTiSiN		○	◎	◎	○						
		HV-RN4	Radius, Long neck, 4 Flutes	Radius	Long neck	4	ø1-ø12	85	167		AlTiSiN		○	◎	◎	○						
		HV-RH4	corner Radius Long Shank,4 Flute	Radius	Long shank	4	ø4-ø12	86	167		AlTiSiN		○	◎	◎	○						
		HV-B2	Square, Regular, 2 Flutes	Ball	Regular	2	ø0.6-ø16	87	168		AlTiSiN		○	◎	◎	○						
		HV-BH2	Ball, Long shank, 2 Flutes	Ball	Long shank	4	ø2-ø12	88	168		AlTiSiN		○	◎	◎	○						
Endmill for aluminum alloys machining	A	A-S2/SS2/SL2	Square, Regular, 2 Flutes	Square	Regular/Short /Long flute	2	ø1-ø12	90	170												○	◎
		A-S3/SS3/SL3	Square, Regular, 3 Flutes	Square	Regular/Short /Long flute	3	ø1-ø12	92	171												○	◎
		A-R2/RS2/RL2	Radius, Regular, 2 Flutes	Radius	Regular/Short /Long flute	2	ø1-ø10	93	169												○	◎
		A-R3/RS3	Radius, Regular, 3 Flutes	Radius	Regular/Short flute	3	ø2-ø10	94	171												○	◎
		A-B2	Ball, Regular, 2 Flutes	Ball	Regular	2	ø1-ø10	95	172												○	◎
Endmill for stainless steel machining	S	S-S2	Square, Regular, 2 Flutes	Square	Regular	2	ø0.5-ø8	97	173		TiAlN		○					◎				
		S-SS4	Square, Short Regular, 4 Flutes	Square	Short flute	4	ø2-ø12	98	175		TiAlN		○					◎				
		S-S4	Square, Regular, 4 Flutes	Square	Regular	4	ø1-ø12	99	175		TiAlN		○					◎				
		S-R2	Radius, Regular, 2 Flutes	Radius	Regular	2	ø3-ø8	100	173		TiAlN		○					◎				
		S-R3	Radius, Regular, 3 Flutes	Radius	Regular	3	ø2-ø6	101	174		TiAlN		○					◎				
		S-R4/RS4	Radius, Regualr, 4 Flutes	Radius	Regular/Short flute	4	ø2-ø10	102	175		TiAlN		○					◎				
		S-B2	Ball, Regular, 2 Flutes	Ball	Regular	2	ø1-ø4	103	176		TiAlN		○					◎				

◎ Best for ○ Suitable for

Endmill Products Directory

Name	Series	Model	Product name	Nose shape	Type	No.of flutes	Flute diameter range	Page		Picture	Coating	Workpiece Material										
								Size list	Cutting parameters			Graphite	Carbon steels, alloy	Pre-hardened steels <45HRC	Hardened steels 45HRC ~55HRC	Hardened steels 55HRC -65HRC	Hardened steels >65HRC	Stainless steels	TI alloy	Graphite	Copper alloy	Aluminum alloy
Endmill for stainless steel machining	S10	S10-S2	Square，Regular，2 Flutes	Square	Regular	2	ø0.5-ø8	105	177		TiAlCrSiN		○					◎				
		S10-S4/SS4	Square，Regular/Short Regular，4 Flutes	Square	Regular/Short flute	4	ø1-ø16	106	177		TiAlCrSiN		○					◎				
		S10-R4/RS4	Radius，Regualr，4 Flutes	Radius	Regular/Short flute	4	ø1-ø10	108	177		TiAlCrSiN		○					◎				
Endmill for titanium alloy high-performance machining	T	T-S4	Square，Regular，4 Flutes	Square	Regular	4	ø2-ø20	110	178		AlCrSiN		○					◎	◎	○		
		T-R4	Radius, Regular, 4 Flutes	Radius	Regular	4	ø2-ø20	111	178		AlCrSiN		○					◎	◎	○		
		T-RN4	Radius，Long neck，4 Flutes	Radius	Long neck	4	ø6-ø20	113	178		AlCrSiN		○					◎	◎	○		
		T-R5	Radius，Regular，5Flutes	Radius	Regular	5	ø6-ø20	114	179		AlCrSiN		○				○	◎	◎			
		T-R6	Radius，Regular，6Flutes	Radius	Regular	6	ø8-ø20	116	179		AlCrSiN		○				○	◎	◎			
		T-B2/BH2	Ball，Regular，2 Flutes	Ball	Long shank	2	ø2-ø10	117	179		AlCrSiN		○				○	◎	◎			
		T-B4	Ball，Regular，4 Flutes	Ball	Regular	4	ø6-ø16	118	179		AlCrSiN		○				○	◎	◎			
Endmill for graphite machining	G	G-S2	Square，Regular，2 Flutes	Square	Regular	2	ø0.4-ø12	121	180		DIA	◎								◎	○	○
		G-SN2	Square，Long neck，2 Flutes	Square	Long neck	2	ø1-ø12	122	181		DIA	◎								◎	○	○
		G-S3	Square，Regular，3 Flutes	Square	Regular	3	ø1-ø12	123	181		DIA	◎								◎	○	○
		G-S4	Square，Regular，4 Flutes	Square	Regular	4	ø2-ø12	124	182		DIA	◎								◎	○	○
		G-R2	Radius，Regular，2 Flutes	Radius	Regular	2	ø2-ø12	125	180		DIA	◎								◎	○	○
		G-RN2	Radius，Long neck，2 Flutes	Radius	Long neck	2	ø2-ø10	126	180		DIA	◎								◎	○	○
		G-R4	Radius，Regular，4 Flutes	Radius	Regular	4	ø2-ø12	127	182		DIA	◎								◎	○	○
		G-RN4	Radius，Long neck，4 Flutes	Radius	Long neck	4	ø2-ø12	128	182		DIA	◎								◎	○	○

◎ Best for ○ Suitable for

Endmill Products Directory

Name	Series	Model	Product name	Nose shape	Type	No.of flutes	Flute diameter range	Page		Picture	Coating	Workpiece Material										
								Size list	Cutting parameters			Graphite	Carbon steels, alloy	Pre-hardened steels <45HRC	Hardened steels 45HRC ~55HRC	Hardened steels 55HRC -65HRC	Hardened steels >65HRC	Stainless steels	TI alloy	Graphite	Copper alloy	Aluminum alloy
Endmill for graphite machining	G	G-B2	Ball，Regular，2 Flutes	Ball	Regular	2	ø0.5-ø12	129	182		DIA	◎										
		G-BN2	Ball，Long neck，2 Flutes	Ball	Long neck	2	ø0.5-ø10	130	182		DIA	◎										
Endmill for small diameter & deep machining	UM	UM-SN2	Square，long neck，2 flute	Square	Long neck	2	ø0.1-ø6	133	183		AlCrSiN		◎	◎	○				○	○	◎	○
		UM-BN2	Ball，long neck，2 flute	Ball	Long neck	2	ø0.1-ø6	137	191		AlCrSiN		◎	◎	○				○	○	◎	○
		UM-RN2	Radius，long neck，2 flute	Radius	Long neck	2	ø0.2-ø6	141	201		AlCrSiN		◎	◎	○				○	○	◎	○
		UM-RN4	Radius，long neck，4 flute	Radius	Long neck	4	ø1-ø6	149	219		AlCrSiN		◎	◎	○				○	○	◎	○

◎ Best for ○ Suitable for

U Series Endmills For Steels General Machining

Wide range of workpiece materials

◎ Suitable for semi-finishing, finishing of steel, cast iron, stainless steel (<48HRC);

Wide range of application

◎ Suitable for face milling with small cutting depth and large cutting width, side milling with large cutting depth and small cutting width, and slot milling with less than 0.5D;

Substrate and coating strength

◎ High performance, ultra-fine and super hard substrate;

◎ Use the latest Kila coating furnace from Balzers, with AlCr series coating, which enable stable machining with good high temperature resistance & wear resistance;

Geometry structure

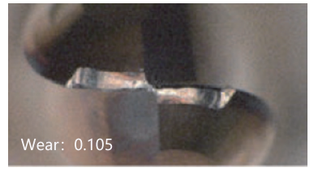
◎ Special cutting edge design, which guarantees the strength & sharpness of the cutting edge.

"Super high performance substrate with high hardness coating, equip the cutting tool with good wear resistance and toughness, which makes the tool maintain good wear resistance and anti-chipping performance."

Process 2 hours later

- Model No:U-BH2-10005
- Specification:R5*18*100*d10
- Workpiece material:5CrNiMo（30-35HRC）
- Cutting speed:3800RPM
- Feed rate:2000mm/min
- Way of cutting:Profile milling
- ap, ae:ap=0.15mm，ae=0.25mm
- Coolant:Gas

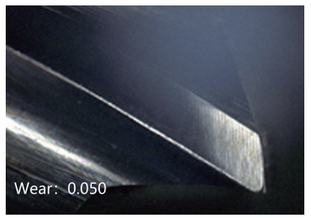
U-BH2-10005



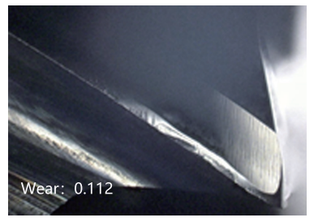
A（Company）

Cutting length:80m

- Model No:U-S4-04011
- Specification:D4*11*50*d4
- Workpiece material:45#steel(180HB)
- Cutting speed:11942RPM
- Feed rate:1194mm/min
- Way of cutting: side milling, climb
- ap, ae:ap=6mm，ae=0.4mm
- Coolant:Water



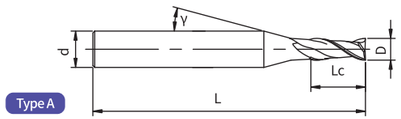
U-S4-04011



A（Company）

U-S2

2 flutes, square end mills for general machining



Ordering Code	Mill Dia (D)	Flute Length (Lc)	Overall Length (L)	Shank Dia. (d)	Type	Stock
U-S2-01003	1	3	50	4	A	●
U-S2-01504	1.5	4	50	4	A	●
U-S2-02006	2	6	50	4	A	●
U-S2-02508	2.5	8	50	4	A	●
U-S2-03009	3	9	50	4	A	●
U-S2-63009	3	9	50	6	A	●
U-S2-03509	3.5	9	50	4	A	●
U-S2-63509	3.5	9	50	6	A	●
U-S2-04011	4	11	50	4	B	●
U-S2-64011	4	11	50	6	A	●
U-S2-05013	5	13	50	6	A	●
U-S2-06016	6	16	50	6	B	●
U-S2-08020	8	20	60	8	B	●
U-S2-10025	10	25	75	10	B	●
U-S2-12030	12	30	75	12	B	●
U-S2-14034	14	34	100	14	B	●
U-S2-16036	16	36	100	16	B	●
U-S2-18040	18	40	100	18	B	●
U-S2-20045	20	45	100	20	B	●

● Standard Stock ○ Reservation required

D	Tol.
D≤12	0 / -0.02
D>12	0 / -0.03

(mm)

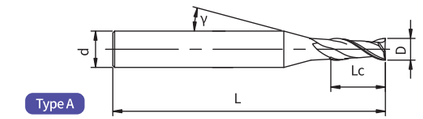
Workpiece Materials

Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Copper alloy	Aluminium alloy
◎	◎	○			○		○	

◎ Best for ○ Suitable for

U-SL2

2 flutes, square long flutes end mills for general machining



Ordering Code	Mill Dia (D)	Flute Length (Lc)	Overall Length (L)	Shank Dia. (d)	Type	Stock
U-SL2-02015	2	15	75	4	A	●
U-SL2-03025	3	25	75	4	A	●
U-SL2-04030	4	30	75	4	B	●
U-SL2-05030	5	30	75	6	A	●
U-SL2-06035	6	35	75	6	B	●
U-SL2-08040	8	40	100	8	B	●
U-SL2-10045	10	45	100	10	B	●
U-SL2-12050	12	50	100	12	B	●
U-SL2-14055	14	55	100	14	B	●
U-SL2-16060	16	60	150	16	B	●
U-SL2-18065	18	65	150	18	B	●
U-SL2-20070	20	70	150	20	B	●

● Standard Stock ○ Reservation required

D	Tol.
D≤12	0 / -0.02
D>12	0 / -0.03

(mm)

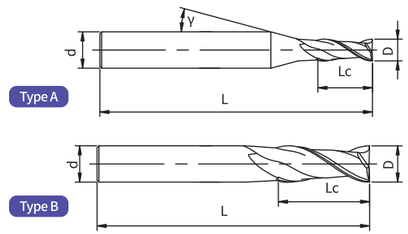
Workpiece Materials

Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Copper alloy	Aluminium alloy
◎	◎	○			○		○	

◎ Best for ○ Suitable for

U-SH2

2 flutes, square long shank end mills for general machining



Ordering Code	Mill Dia (D)	Flute Length (Lc)	Overall Length (L)	Shank Dia. (d)	Type	Stock
U-SH2-02006	2	6	75	4	A	●
U-SH2-03009	3	9	75	4	A	●
U-SH2-04011	4	11	75	4	B	●
U-SH2-05020	5	20	75	6	A	●
U-SH2-06020	6	20	100	6	B	●
U-SH2-08025	8	25	100	8	B	●
U-SH2-10030	10	30	100	10	B	●
U-SH2-12035	12	35	100	12	B	●
U-SH2-14036	14	36	150	14	B	●
U-SH2-16036	16	36	150	16	B	●
U-SH2-18045	18	45	150	18	B	●
U-SH2-20045	20	45	150	20	B	●

● Standard Stock ○ Reservation required

D	Tol.
D≤12	0 / -0.02
D>12	0 / -0.03

(mm)

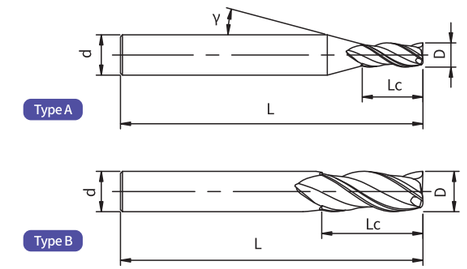
Workpiece Materials

Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Copper alloy	Aluminium alloy
◎	◎	○			○		○	

◎ Best for ○ Suitable for

U-S3

3 flutes, square end mills for general machining



Ordering Code	Mill Dia (D)	Flute Length (Lc)	Overall Length (L)	Shank Dia. (d)	Type	Stock
U-S3-02006	2	6	50	4	A	●
U-S3-03009	3	9	50	4	A	●
U-S3-04011	4	11	50	4	B	●
U-S3-05013	5	13	50	6	A	●
U-S3-06016	6	16	50	6	B	●
U-S3-08020	8	20	60	8	B	●
U-S3-10025	10	25	75	10	B	●
U-S3-12030	12	30	75	12	B	●
U-S3-14032	14	32	100	14	B	●
U-S3-16036	16	36	100	16	B	●
U-S3-18040	18	40	100	18	B	●
U-S3-20045	20	45	100	20	B	●

● Standard Stock ○ Reservation required

D	Tol.
D≤12	0 / -0.02
D>12	0 / -0.03

(mm)

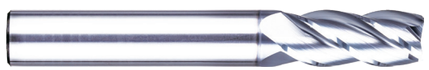
Workpiece Materials

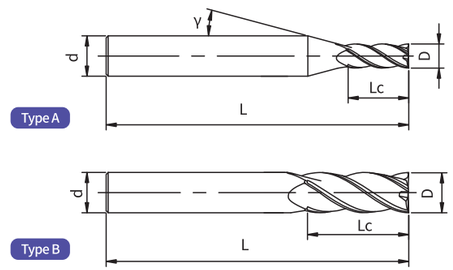
Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Copper alloy	Aluminium alloy
◎	◎	○			○		○	

◎ Best for ○ Suitable for

U-S4

4 flutes, square end mills for general machining





Ordering Code	Mill Dia (D)	Flute Length (Lc)	Overall Length (L)	Shank Dia. (d)	Type	Stock
U-S4-01003	1	3	50	4	A	●
U-S4-61003	1	3	50	6	A	●
U-S4-01505	1.5	5	50	4	A	●
U-S4-61505	1.5	5	50	6	A	●
U-S4-02006	2	6	50	4	A	●
U-S4-62006	2	6	50	6	A	●
U-S4-02508	2.5	8	50	4	A	●
U-S4-62508	2.5	8	50	6	A	●
U-S4-03009	3	9	50	4	A	●
U-S4-63009	3	9	50	6	A	●
U-S4-03511	3.5	11	50	4	A	●
U-S4-63511	3.5	11	50	6	A	●
U-S4-04011	4	11	50	4	B	●
U-S4-64011	4	11	50	6	A	●
U-S4-05013	5	13	50	6	A	●
U-S4-06016	6	16	50	6	B	●

● Standard Stock ○ Reservation required

D	Tol.
D≤12	0 / -0.02
D>12	0 / -0.03

(mm)

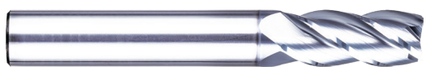
Workpiece Materials

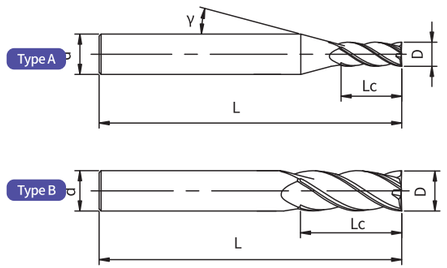
Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Copper alloy	Aluminium alloy
◎	◎	○			○		○	

◎ Best for ○ Suitable for

U-S4

4 flutes, square end mills for general machining





Ordering Code	Mill Dia (D)	Flute Length (Lc)	Overall Length (L)	Shank Dia. (d)	Type	Stock
U-S4-07020	7	20	60	8	A	●
U-S4-08020	8	20	60	8	B	●
U-S4-09023	9	23	75	10	A	●
U-S4-10025	10	25	75	10	B	●
U-S4-12030	12	30	75	12	B	●
U-S4-14034	14	34	100	14	B	●
U-S4-16036	16	36	100	16	B	●
U-S4-16040	16	40	100	16	B	●
U-S4-16045	16	45	100	16	B	●
U-S4-18045	18	45	100	18	B	●
U-S4-20045	20	45	100	20	B	●

● Standard Stock ○ Reservation required

D	Tol.
D≤12	0 / -0.02
D>12	0 / -0.03

(mm)

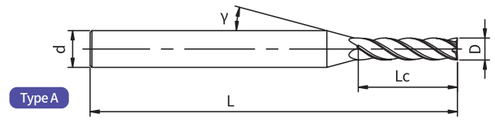
Workpiece Materials

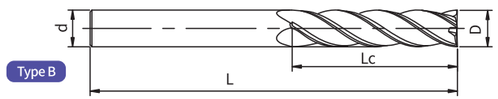
Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Copper alloy	Aluminium alloy
◎	◎	○			○		○	

◎ Best for ○ Suitable for

U-SL4

4 flutes, square long flutes end mills for general machining





Ordering Code	Mill Dia (D)	Flute Length (Lc)	Overall Length (L)	Shank Dia. (d)	Type	Stock
U-SL4-01004	1	4	50	4	A	●
U-SL4-02010	2	10	50	4	A	●
U-SL4-03015	3	15	60	4	A	●
U-SL4-63015	3	15	60	6	A	●
U-SL4-04020	4	20	60	4	B	●
U-SL4-64020	4	20	75	6	A	●
U-SL4-04030	4	30	75	4	B	●
U-SL4-05025	5	25	75	6	A	●
U-SL4-05030	5	30	75	6	A	●
U-SL4-06030	6	30	75	6	B	●
U-SL4-08025	8	25	75	8	B	●
U-SL4-08040	8	40	100	8	B	●
U-SL4-10050	10	50	100	10	B	●
U-SL4-12050	12	50	100	12	B	●
U-SL4-14045	14	45	100	14	B	●
U-SL4-16060	16	60	150	16	B	●
U-SL4-18070	18	70	150	18	B	●
U-SL4-20070	20	70	150	20	B	●

● Standard Stock ○ Reservation required

D	Tol.
D≤12	0 -0.02
D>12	0 -0.03

(mm)

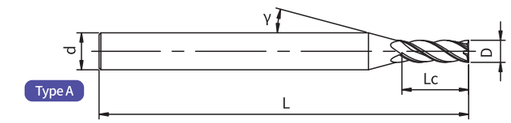
Workpiece Materials

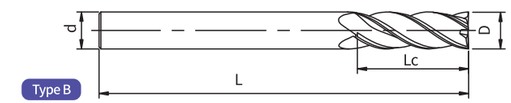
Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Copper alloy	Aluminium alloy
◎	◎	○			○		○	

◎ Best for ○ Suitable for

U-SH4

4 flutes, square long shank end mills for general machining





Ordering Code	Mill Dia (D)	Flute Length (Lc)	Overall Length (L)	Shank Dia. (d)	Type	Stock
U-SH4-02010	2	10	75	4	A	●
U-SH4-03012	3	12	75	4	A	●
U-SH4-04011	4	11	75	4	B	●
U-SH4-04015-100	4	15	100	4	B	●
U-SH4-04015	4	15	75	4	B	●
U-SH4-05020	5	20	75	6	A	●
U-SH4-06016	6	16	75	6	B	●
U-SH4-06020	6	20	75	6	B	●
U-SH4-06020-100	6	20	100	6	B	●
U-SH4-08020	8	20	100	8	B	●
U-SH4-08025	8	25	100	8	B	●
U-SH4-10030	10	30	100	10	B	●
U-SH4-10035	10	35	100	10	B	●
U-SH4-12035	12	35	100	12	B	●
U-SH4-14036	14	36	150	14	B	●
U-SH4-16036	16	36	150	16	B	●
U-SH4-18045	18	45	150	18	B	
U-SH4-20045	20	45	150	20	B	

● Standard Stock ○ Reservation required

D	Tol.
D≤12	0 -0.02
D>12	0 -0.03

(mm)

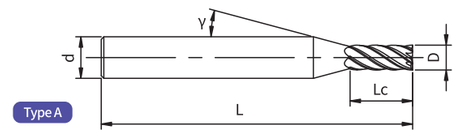
Workpiece Materials

Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Copper alloy	Aluminium alloy
◎	◎	○			○		○	

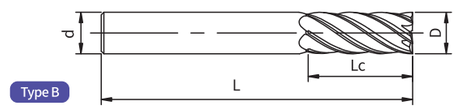
◎ Best for ○ Suitable for

U-S6

6 flutes, square end mills for general machining



Type A



Type B

Ordering Code	Mill Dia (D)	Flute Length (Lc)	Overall Length (L)	Shank Dia. (d)	Type	Stock
U-S6-06015	6	15	50	6	B	●
U-S6-08020	8	20	60	8	B	●
U-S6-10025	10	25	75	10	B	●
U-S6-12030	12	30	75	12	B	●
U-S6-14032	14	32	100	14	B	●
U-S6-16036	16	36	100	16	B	●
U-S6-18040	18	40	100	18	B	●
U-S6-20045	20	45	100	20	B	●

● Standard Stock ○ Reservation required

D	Tol.
D≤12	0 / -0.02
D>12	0 / -0.03

(mm)

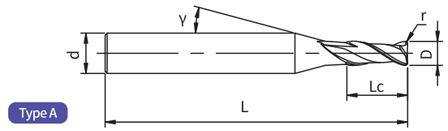
Workpiece Materials

Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Copper alloy	Aluminium alloy
◎	◎	○			○		○	

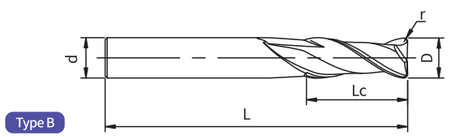
◎ Best for ○ Suitable for

U-R2

2 flutes, corner radius end mills for general machining



Type A



Type B

Ordering Code	Mill Dia (D)	Flute Length (Lc)	Corner (r)	Overall Length (L)	Shank Dia. (d)	Type	Stock
U-R2-01002	1	3	0.2	50	4	A	●
U-R2-01502	1.5	5	0.2	50	4	A	●
U-R2-02002	2	6	0.2	50	4	A	●
U-R2-03002	3	9	0.2	50	4	A	●
U-R2-63002	3	9	0.2	50	6	A	●
U-R2-03005	3	9	0.5	50	4	A	●
U-R2-63005	3	9	0.5	50	6	A	●
U-R2-04002	4	11	0.2	50	4	B	●
U-R2-64002	4	11	0.2	50	6	A	●
U-R2-04005	4	11	0.5	50	4	B	●
U-R2-64005	4	11	0.5	50	6	A	●
U-R2-05002	5	13	0.2	50	6	A	●
U-R2-05005	5	13	0.5	50	6	A	●
U-R2-06005	6	16	0.5	50	6	B	●
U-R2-06010	6	16	1.0	50	6	B	●
U-R2-08005	8	20	0.5	60	8	B	●

● Standard Stock ○ Reservation required

D	Tol.
D≤12	0 / -0.02
D>12	0 / -0.03

(mm)

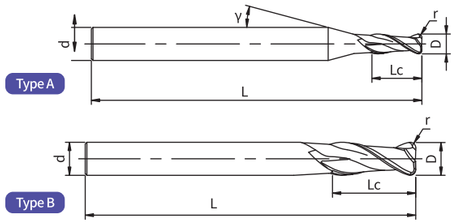
Workpiece Materials

Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Copper alloy	Aluminium alloy
◎	◎	○			○		○	

◎ Best for ○ Suitable for

U-R2

2 flutes, ball nose end mills for general machining



Ordering Code	Mill Dia (D)	Flute Length (Lc)	Corner (r)	Overall Length (L)	Shank Dia. (d)	Type	Stock
U-R2-08010	8	20	1.0	60	8	B	●
U-R2-10005	10	25	0.5	75	10	B	●
U-R2-10010	10	25	1.0	75	10	B	●
U-R2-10020	10	25	2.0	75	10	B	●
U-R2-12005	12	30	0.5	75	12	B	●
U-R2-12010	12	30	1.0	75	12	B	●
U-R2-12020	12	30	2.0	75	12	B	●
U-R2-16005	16	36	0.5	100	16	B	●
U-R2-16010	16	36	1.0	100	16	B	●
U-R2-16020	16	36	2.0	100	16	B	●
U-R2-20010	20	45	1.0	100	20	B	●
U-R2-20020	20	45	2.0	100	20	B	●

● Standard Stock ○ Reservation required

D	Tol.
D≤12	0 / -0.02
D>12	0 / -0.03

(mm)

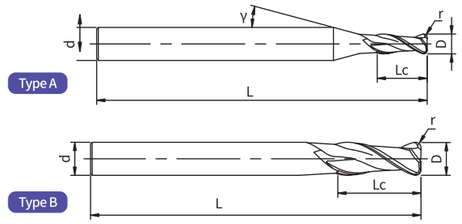
Workpiece Materials

Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Copper alloy	Aluminium alloy
◎	◎	○			○		○	

◎ Best for ○ Suitable for

U-RH2

2 flutes, ball nose, long shank end mills for general machining



Ordering Code	Mill Dia (D)	Flute Length (Lc)	Corner (r)	Overall Length (L)	Shank Dia. (d)	Type	Stock
U-RH2-06005	6	16	0.5	75	6	B	●
U-RH2-06010	6	16	1.0	75	6	B	●
U-RH2-08005	8	20	0.5	100	8	B	●
U-RH2-08010	8	20	1.0	100	8	B	●
U-RH2-10005	10	25	0.5	100	10	B	●
U-RH2-10010	10	25	1.0	100	10	B	●
U-RH2-10020	10	25	2.0	100	10	B	●
U-RH2-12005	12	30	0.5	100	12	B	●
U-RH2-12010	12	30	1.0	100	12	B	●
U-RH2-12020	12	30	2.0	100	12	B	●
U-RH2-16005	16	36	0.5	150	16	B	●
U-RH2-16010	16	36	1.0	150	16	B	●
U-RH2-16020	16	36	2.0	150	16	B	●
U-RH2-20010	20	45	1.0	150	20	B	●
U-RH2-20020	20	45	2.0	150	20	B	●

● Standard Stock ○ Reservation required

D	Tol.
D≤12	0 / -0.02
D>12	0 / -0.03

(mm)

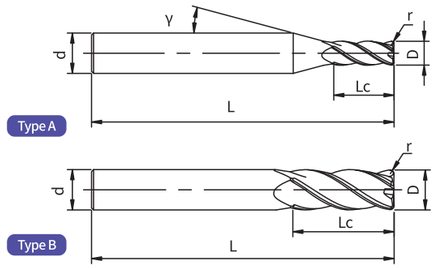
Workpiece Materials

Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Copper alloy	Aluminium alloy
◎	◎	○			○		○	

◎ Best for ○ Suitable for

U-R4

4 flutes, corner radius end mills for general machining



Ordering Code	Mill Dia (D)	Flute Length (Lc)	Corner (r)	Overall Length (L)	Shank Dia. (d)	Type	Stock
U-R4-01002	1	3	0.2	50	4	A	●
U-R4-01502	1.5	5	0.2	50	4	A	●
U-R4-02002	2	6	0.2	50	4	A	●
U-R4-03002	3	9	0.2	50	4	A	●
U-R4-03005	3	9	0.5	50	4	A	●
U-R4-04002	4	11	0.2	50	4	B	●
U-R4-04003	4	11	0.3	50	4	B	●
U-R4-04005	4	11	0.5	50	4	B	●
U-R4-04010	4	11	1	50	4	B	●
U-R4-05002	5	13	0.2	50	6	A	●
U-R4-05005	5	13	0.5	50	6	A	●
U-R4-05010	5	13	1	50	6	A	●
U-R4-06002	6	16	0.2	50	6	B	●
U-R4-06005	6	16	0.5	50	6	B	●
U-R4-06010	6	16	1	50	6	B	●
U-R4-06015	6	16	1.5	50	6	B	●
U-R4-08005	8	20	0.5	60	8	B	●
U-R4-08010	8	20	1	60	8	B	●
U-R4-08020	8	20	2	60	8	B	●
U-R4-10005	10	25	0.5	75	10	B	●

● Standard Stock ○ Reservation required

D	Tol.
D≤12	0 / -0.02
D>12	0 / -0.03

(mm)

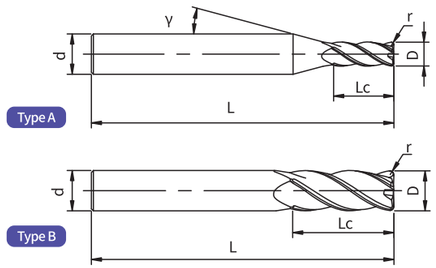
Workpiece Materials

Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Copper alloy	Aluminium alloy
◎	◎	○			○		○	

◎ Best for ○ Suitable for

U-R4

4 flutes, corner radius end mills for general machining



Ordering Code	Mill Dia (D)	Flute Length (Lc)	Corner (r)	Overall Length (L)	Shank Dia. (d)	Type	Stock
U-R4-10010	10	25	1	75	10	B	●
U-R4-10020	10	25	2	75	10	B	●
U-R4-12005	12	30	0.5	75	12	B	●
U-R4-12010	12	30	1	75	12	B	●
U-R4-12020	12	30	2	75	12	B	●
U-R4-12030	12	30	3	75	12	B	●
U-R4-16005	16	36	0.5	100	16	B	●
U-R4-16010	16	36	1	100	16	B	●
U-R4-16020	16	36	2	100	16	B	●
U-R4-16030	16	36	3	100	16	B	●
U-R4-20010	20	45	1	100	20	B	●
U-R4-20020	20	45	2	100	20	B	●
U-R4-20030	20	45	3	100	20	B	●
U-R4-20040	20	45	4	100	20	B	●
U-R4-20050	20	45	5	100	20	B	●

● Standard Stock ○ Reservation required

D	Tol.
D≤12	0 / -0.02
D>12	0 / -0.03

(mm)

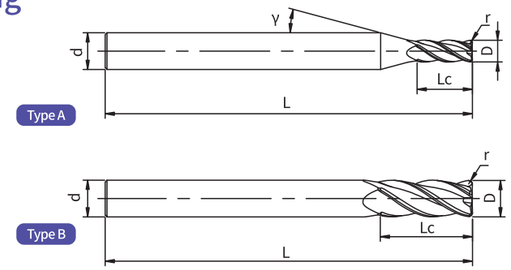
Workpiece Materials

Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Copper alloy	Aluminium alloy
◎	◎	○			○		○	

◎ Best for ○ Suitable for

U-RH4

4 flutes corner radius, with long shank length end mills for general machining



Ordering Code	Mill Dia (D)	Flute Length (Lc)	Corner (r)	Overall Length (L)	Shank Dia. (d)	Type	Stock
U-RH4-03005	3	9	0.5	75	4	A	●
U-RH4-04005	4	11	0.5	75	4	B	●
U-RH4-06005	6	16	0.5	75	6	B	●
U-RH4-06005-100	6	20	0.5	100	6	B	●
U-RH4-06010	6	16	1	75	6	B	●
U-RH4-06010-100	6	20	1	100	6	B	●
U-RH4-08005-75	8	20	0.5	75	8	B	●
U-RH4-08005	8	20	0.5	100	8	B	●
U-RH4-08010-75	8	20	1	75	8	B	●
U-RH4-08010	8	20	1	100	8	B	●
U-RH4-10005	10	25	0.5	100	10	B	●
U-RH4-10010	10	25	1	100	10	B	●
U-RH4-10020	10	25	2	100	10	B	●
U-RH4-12005	12	30	0.5	100	12	B	●
U-RH4-12010	12	30	1	100	12	B	●
U-RH4-12020	12	30	2	100	12	B	●
U-RH4-16005	16	36	0.5	150	16	B	●
U-RH4-16010	16	36	1	150	16	B	●
U-RH4-16020	16	36	2	150	16	B	●
U-RH4-20010	20	45	1	150	20	B	●
U-RH4-20020	20	45	2	150	20	B	●

● Standard Stock ○ Reservation required

D	Tol.
D≤12	0 -0.02
D>12	0 -0.03

(mm)

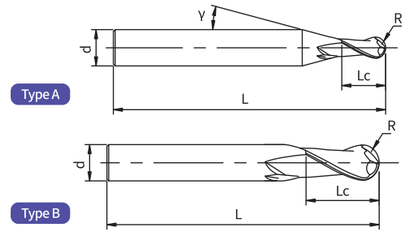
Workpiece Materials

Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Copper alloy	Aluminium alloy
◎	◎	○			○		○	

◎ Best for ○ Suitable for

U-B2

2 flutes, ball nose end mills for general machining



Ordering Code	Mill Dia (D)	Ball Radius (R)	Flute Length (Lc)	Overall Length (L)	Shank Dia. (d)	Type	Stock
U-B2-01002	1	0.5	2	50	4	A	●
U-B2-61002	1	0.5	2	50	6	A	●
U-B2-01503	1.5	0.75	3	50	4	A	●
U-B2-61503	1.5	0.75	3	50	6	A	●
U-B2-02004	2	1	4	50	4	A	●
U-B2-62004	2	1	4	50	6	A	●
U-B2-02505	2.5	1.25	5	50	4	A	●
U-B2-03006	3	1.5	6	50	4	A	●
U-B2-63006	3	1.5	6	50	6	A	●
U-B2-04008	4	2	8	50	4	B	●
U-B2-64008	4	2	8	50	6	A	●
U-B2-05010	5	2.5	10	50	6	A	●
U-B2-06012	6	3	12	50	6	B	●
U-B2-07014	7	3.5	14	60	8	A	●
U-B2-08014	8	4	14	60	8	B	●
U-B2-09016	9	4.5	16	75	10	A	●
U-B2-10018	10	5	18	75	10	B	●
U-B2-12022	12	6	22	75	12	B	●
U-B2-16030	16	8	30	100	16	B	●
U-B2-20038	20	10	38	100	20	B	●

● Standard Stock ○ Reservation required

R	Tol.
R≤1.5	0 -0.01
1.5<R<3	0 -0.015
R≥3	0 -0.02

(mm)

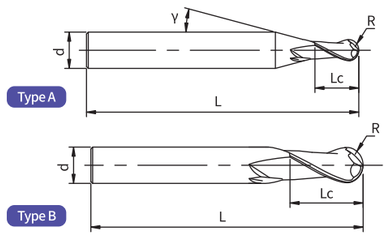
Workpiece Materials

Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Copper alloy	Aluminium alloy
◎	◎	○			○		○	

◎ Best for ○ Suitable for

U-BH2

2 flutes,ball nose, with long shank length end mills for general machining



Ordering Code	Mill Dia (D)	Ball Radius (R)	Flute Length (Lc)	Overall Length (L)	Shank Dia. (d)	Type	Stock
U-BH2-02004	2	1	4	75	4	A	●
U-BH2-62004	2	1	4	75	6	A	●
U-BH2-03006	3	1.5	6	75	4	A	●
U-BH2-63006	3	1.5	6	75	6	A	●
U-BH2-04008	4	2	8	75	4	B	●
U-BH2-64008	4	2	8	75	6	A	●
U-BH2-05010	5	2.5	10	75	6	A	●
U-BH2-06012	6	3	12	75	6	B	●
U-BH2-06012-100	6	3	12	100	6	B	●
U-BH2-08014	8	4	14	75	8	B	●
U-BH2-08014H	8	4	14	100	8	B	●
U-BH2-10018	10	5	18	100	10	B	●
U-BH2-12022	12	6	22	100	12	B	●
U-BH2-16030	16	8	30	150	16	B	●
U-BH2-20038	20	10	38	150	20	B	●

● Standard Stock ○ Reservation required

R	Tol.
R≤1.5	0 / -0.01
1.5<R<3	0 / -0.015
R≥3	0 / -0.02

(mm)

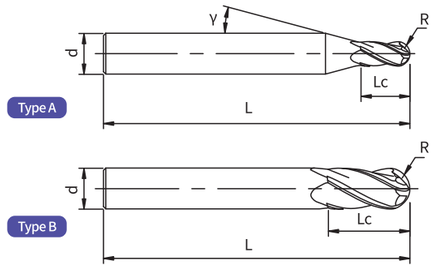
Workpiece Materials

Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Copper alloy	Aluminium alloy
◎	◎	○			○		○	

◎ Best for ○ Suitable for

U-B4

4 flutes, ball nose end mills for general machining



Ordering Code	Mill Dia (D)	Ball Radius (R)	Flute Length (Lc)	Overall Length (L)	Shank Dia. (d)	Type	Stock
U-B4-02004	2	1	4	50	4	A	●
U-B4-03006	3	1.5	6	50	4	A	●
U-B4-63006	3	1.5	6	50	6	A	●
U-B4-04008	4	2	8	50	4	B	●
U-B4-64008	4	2	8	50	6	A	●
U-B4-05010	5	2.5	10	50	6	A	●
U-B4-06012	6	3	12	50	6	B	●
U-B4-08014	8	4	14	60	8	B	●
U-B4-10018	10	5	18	75	10	B	●
U-B4-12022	12	6	22	75	12	B	●
U-B4-16030	16	8	30	100	16	B	●
U-B4-20018	20	10	38	100	20	B	●

● Standard Stock ○ Reservation required

R	Tol.
R≤1.5	0 / -0.01
1.5<R<3	0 / -0.015
R≥3	0 / -0.02

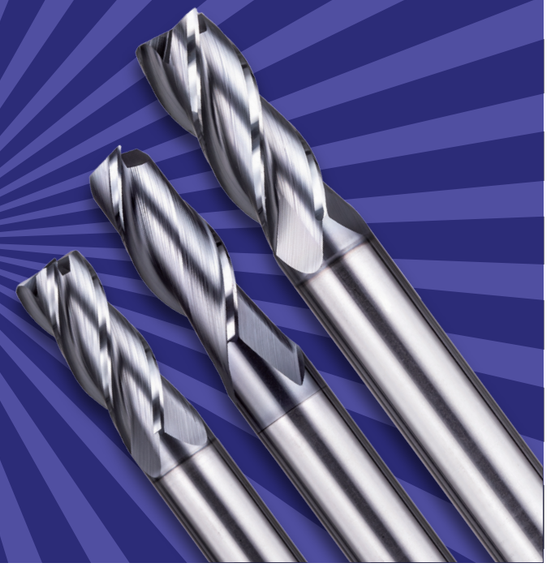
(mm)

Workpiece Materials

Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Copper alloy	Aluminium alloy
◎	◎	○			○		○	

◎ Best for ○ Suitable for

UC Series End Mills For Steels General Machining



Wide range of workpiece materials

◎ Suitable for rough and precision machining of ordinary steel and cast iron (≤ 48HRC)

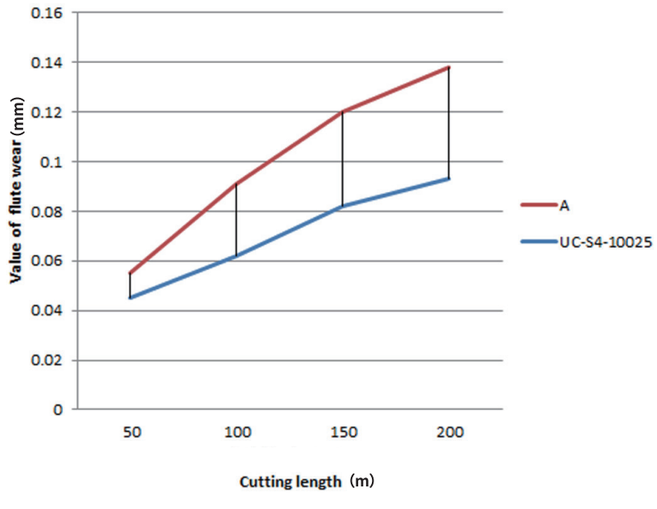
Geometry structure

◎ Adopting a 45 ° large helix angle and a double-edged design, the sharp cutting edge can ensure the strength of the tool edge

Substrate and coating strength

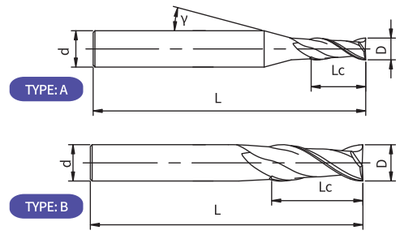
◎ Suitable for general machining, side milling, shallow groove milling

- Model No:UC-S4-10025
- Specification:D10*25*75*d10
- Workpiece material:H13（45HRC）
- Cutting speed:2600RPM
- Feed rate:400mm/min
- Way of cutting: side milling
- ap, ae:ap=10mm，ae=0.5mm
  Coolant:Gas



UC-S2

2 flutes, square end mills for general machining



Ordering Code	Mill Dia (D)	Flute Length (Lc)	Overall Length (L)	Shank Dia. (d)	Type	Stock
UC-S2-01003	1	3	50	4	A	●
UC-S2-01504	1.5	4	50	4	A	●
UC-S2-02006	2	6	50	4	A	●
UC-S2-02508	2.5	8	50	4	A	●
UC-S2-03009	3	9	50	4	A	●
UC-S2-63009	3	9	50	6	A	●
UC-S2-03509	3.5	9	50	4	A	●
UC-S2-63509	3.5	9	50	6	A	●
UC-S2-04011	4	11	50	4	B	●
UC-S2-64011	4	11	50	6	A	●
UC-S2-05013	5	13	50	6	A	●
UC-S2-06016	6	16	50	6	B	●
UC-S2-08020	8	20	60	8	B	●
UC-S2-10025	10	25	75	10	B	●
UC-S2-12030	12	30	75	12	B	●
UC-S2-14034	14	34	100	14	B	●
UC-S2-16036	16	36	100	16	B	●
UC-S2-18040	18	40	100	18	B	●
UC-S2-20045	20	45	100	20	B	●

● Standard Stock ○ Reservation required

D	Tol.
D≤12	0 -0.02
D>12	0 -0.03

(mm)

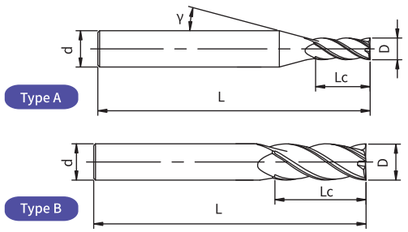
Workpiece Materials

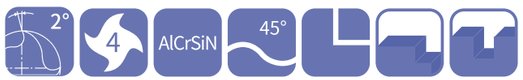
Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Copper alloy	Aluminium alloy
◎	◎	○			○		○	

◎ Best for ○ Suitable for

UC-S4

4 flutes, square end mills for general machining





Ordering Code	Mill Dia (D)	Flute Length (Lc)	Overall Length (L)	Shank Dia. (d)	Type	Stock
UC-S4-01003	1	3	50	4	A	●
U-S4-01505	1.5	5	50	4	A	●
UC-S4-02006	2	6	50	4	A	●
UC-S4-02508	2.5	8	50	4	A	●
UC-S4-03009	3	9	50	4	A	●
UC-S4-63009	3	9	50	6	A	●
UC-S4-03509	3.5	9	50	4	A	●
UC-S4-04011	4	11	50	4	B	●
UC-S4-64011	4	11	50	6	A	●
UC-S4-05013	5	13	50	6	A	●
UC-S4-06016	6	16	50	6	B	●
UC-S4-07020	7	20	60	8	A	●
UC-S4-08020	8	20	60	8	B	●
UC-S4-09023	9	23	75	10	A	●
UC-S4-10025	10	25	75	10	B	●
UC-S4-12030	12	30	75	12	B	●
UC-S4-14034	14	34	100	14	B	●
UC-S4-16036	16	36	100	16	B	●
UC-S4-18045	18	45	100	18	B	●
UC-S4-20045	20	45	100	20	B	●

● Standard Stock ○ Reservation required

D	Tol.
D≤12	0 -0.02
D>12	0 -0.03

(mm)

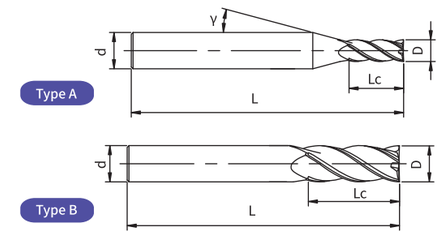
Workpiece Materials

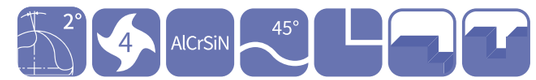
Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Copper alloy	Aluminium alloy
◎	◎	○			○		○	

◎ Best for ○ Suitable for

UC-SH4

4 flutes, square long shank end mills for general machining





Ordering Code	Mill Dia (D)	Flute Length (Lc)	Overall Length (L)	Shank Dia. (d)	Type	Stock
UC-SH4-03012	3	12	75	4	A	●
UC-SH4-04015	4	15	75	4	B	●
UC-SH4-06020	6	20	75	6	B	●
UC-SH4-06020-100	6	20	100	6	B	●
UC-SH4-08020-75	8	20	75	8	B	●
UC-SH4-08025	8	25	100	8	B	●
UC-SH4-10030	10	30	100	10	B	●
UC-SH4-12035	12	35	100	12	B	●
UC-SH4-14040	14	40	100	14	B	●
UC-SH4-16050	16	50	150	16	B	●
UC-SH4-20055	20	55	150	20	B	●

● Standard Stock ○ Reservation required

D	Tol.
D≤12	0 -0.02
D>12	0 -0.03

(mm)

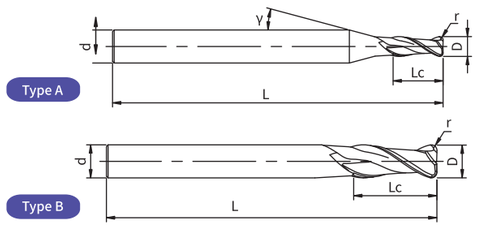
Workpiece Materials

Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Copper alloy	Aluminium alloy
◎	◎	○			○		○	

◎ Best for ○ Suitable for

UC-R2

2 flutes, corner radius end mills for general machining



Ordering Code	Mill Dia (D)	Flute Length (Lc)	Corner (r)	Overall Length (L)	Shank Dia. (d)	Type	Stock
UC-R2-02002	2	6	0.2	50	4	A	●
UC-R2-03005	3	9	0.5	50	4	A	●
UC-R2-04005	4	11	0.5	50	4	B	●
UC-R2-05005	5	13	0.5	50	6	A	●
UC-R2-06005	6	16	0.5	50	6	B	●
UC-R2-06010	6	16	1	50	6	B	●
UC-R2-08005	8	20	0.5	60	8	B	●
UC-R2-08010	8	20	1	60	8	B	●
UC-R2-10005	10	25	0.5	75	10	B	●
UC-R2-10010	10	25	1	75	10	B	●
UC-R2-10020	10	25	2	75	10	B	●

● Standard Stock ○ Reservation required

D	Tol.
D≤12	0 / -0.02
D>12	0 / -0.03

(mm)

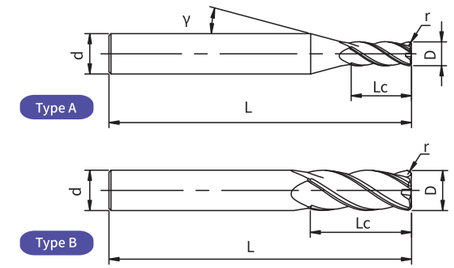
Workpiece Materials

Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Copper alloy	Aluminium alloy
◎	◎	○			○		○	

◎ Best for ○ Suitable for

UC-R4

4 flutes, corner radius end mills for general machining



Ordering Code	Mill Dia (D)	Flute Length (Lc)	Corner (r)	Overall Length (L)	Shank Dia. (d)	Type	Stock
UC-R4-01002	1	3	0.2	50	4	A	●
UC-R4-01502	1.5	5	0.2	50	4	A	●
UC-R4-02002	2	6	0.2	50	4	A	●
UC-R4-03002	3	9	0.2	50	4	A	●
UC-R4-03005	3	9	0.5	50	4	A	●
UC-R4-04002	4	11	0.2	50	4	B	●
UC-R4-04003	4	11	0.3	50	4	B	●
UC-R4-04005	4	11	0.5	50	4	B	●
UC-R4-04010	4	11	1.0	50	4	B	●
UC-R4-05005	5	13	0.5	50	6	A	●
UC-R4-05010	5	13	1.0	50	6	A	●
UC-R4-06002	6	16	0.2	50	6	B	●
UC-R4-06003	6	16	0.3	50	6	B	●
UC-R4-06005	6	16	0.5	50	6	B	●
UC-R4-06010	6	16	1.0	50	6	B	●
UC-R4-08005	8	20	0.5	60	8	B	●
UC-R4-08010	8	20	1.0	60	8	B	●
UC-R4-10005	10	25	0.5	75	10	B	●
UC-R4-10010	10	25	1.0	75	10	B	●
UC-R4-10020	10	25	2.0	75	10	B	●
UC-R4-10030	10	25	3.0	75	10	B	●
UC-R4-12005	12	30	0.5	75	12	B	●
UC-R4-12010	12	30	1	75	12	B	●
UC-R4-12020	12	30	2	75	12	B	●
UC-R4-12030	12	30	3	75	12	B	●

● Standard Stock ○ Reservation required

D	Tol.
D≤12	0 / -0.02
D>12	0 / -0.03

(mm)

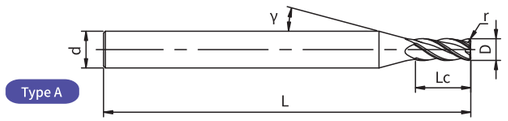
Workpiece Materials

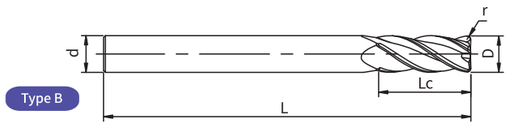
Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Copper alloy	Aluminium alloy
◎	◎	○			○		○	

◎ Best for ○ Suitable for

UC-RH4

4 flutes, corner radius, long shank end mills for general machining





Ordering Code	Mill Dia (D)	Flute Length (Lc)	Corner (r)	Overall Length (L)	Shank Dia. (d)	Type	Stock
UC-RH4-04002	4	11	0.2	75	4	B	●
UC-RH4-04005	4	11	0.5	75	4	B	●
UC-RH4-06005	6	16	0.5	75	6	B	●
UC-RH4-06005-100	6	16	0.5	100	6	B	●
UC-RH4-06010	6	16	1.0	75	6	B	●
UC-RH4-06010-100	6	16	1.0	100	6	B	●
UC-RH4-08005-75	8	20	0.5	75	8	B	●
UC-RH4-08010-75	8	20	1.0	75	8	B	●
UC-RH4-08005	8	20	0.5	100	8	B	●
UC-RH4-08010	8	20	1.0	100	8	B	●
UC-RH4-10005	10	25	0.5	100	10	B	●
UC-RH4-10010	10	25	1.0	100	10	B	●
UC-RH4-10020	10	25	2.0	100	10	B	●
UC-RH4-12005	12	30	0.5	100	12	B	●
UC-RH4-12010	12	30	1.0	100	12	B	●
UC-RH4-12020	12	30	2.0	100	12	B	●
UC-RH4-16010	16	45	1.0	100	16	B	●
UC-RH4-16020	16	45	2.0	100	16	B	●

● Standard Stock ○ Reservation required

D	Tol.
D≤12	0 / -0.02
D>12	0 / -0.03

(mm)

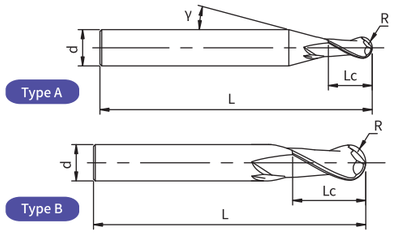
Workpiece Materials

Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Copper alloy	Aluminium alloy
◎	◎	○			○		○	

◎ Best for ○ Suitable for

UC-B2

2 flutes, ball nose end mills for general machining



Ordering Code	Mill Dia (D)	Ball Radius (R)	Flute Length (Lc)	Overall Length (L)	Shank Dia. (d)	Type	Stock
UC-B2-01002	1	0.5	2	50	4	A	●
UC-B2-01503	1.5	0.75	3	50	4	A	●
UC-B2-02004	2	1	4	50	4	A	●
UC-B2-02505	2.5	1.25	5	50	4	A	●
UC-B2-03006	3	1.5	6	50	4	A	●
UC-B2-03507	3.5	1.75	7	50	4	A	●
UC-B2-04008	4	2	8	50	4	B	●
UC-B2-05010	5	2.5	10	50	6	A	●
UC-B2-06012	6	3	12	50	6	B	●
UC-B2-07014	7	3.5	14	60	8	A	●
UC-B2-08014	8	4	14	60	8	B	●
UC-B2-09016	9	4.5	16	75	10	A	●
UC-B2-10018	10	5	18	75	10	B	●

● Standard Stock ○ Reservation required

R	Tol.
R≤1.5	0 / -0.01
1.5<R<3	0 / -0.015
R≥3	0 / -0.02

(mm)

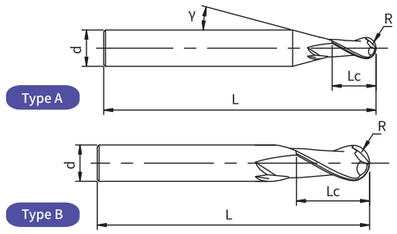
Workpiece Materials

Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Copper alloy	Aluminium alloy
◎	◎	○			○		○	

◎ Best for ○ Suitable for

UC-BH2

2 flutes, ball nose, long shank end mills for general machining



Ordering Code	Mill Dia (D)	Ball Radius (R)	Flute Length (Lc)	Overall Length (L)	Shank Dia. (d)	Type	Stock
UC-BH2-04008	4	2	8	75	4	B	●
UC-BH2-04008-100	4	2	8	100	4	B	●
UC-BH2-06012	6	3	12	75	6	B	●
UC-BH2-06012-100	6	3	12	100	6	B	●
UC-BH2-08014	8	4	14	75	8	B	●
UC-BH2-08014-100	8	4	14	100	8	B	●
UC-BH2-10018	10	5	18	100	10	B	●
UC-BH2-12022	12	6	22	100	12	B	●

● Standard Stock ○ Reservation required

R	Tol.
R≤1.5	0 / -0.01
1.5<R<3	0 / -0.015
R≥3	0 / -0.02

(mm)

Workpiece Materials

Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Copper alloy	Aluminium alloy
◎	◎	○			○		○	

◎ Best for ○ Suitable for

UR Series General Rough Machining Series

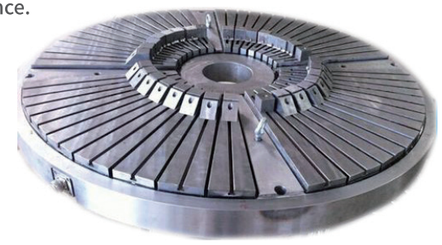
Geometry structure

◎ Special wave flute design, makes small chip and smooth chip exhausting;

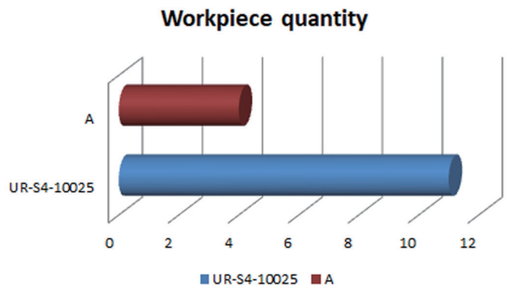
◎ Big helix angle + U groove design, increases machining stability;

Substrate and coating strength

◎ High performance ultra fine substrate, together with high performance AlCrSiN coating, good heat resistance and wear resistance. Also suitable for heavy roughing.

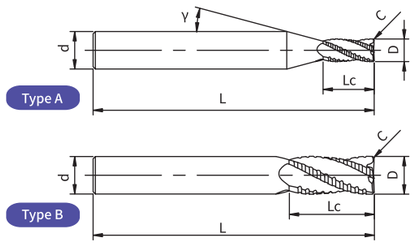


- Model No:UR-S4-10005
- Specification:D10*C0.3*25*75*d10
- Workpiece material:45#（180HB）
- Cutting speed:5500RPM
- Feed rate:600mm/min
- Way of cutting:slotting
- ap, ae: ap=6mm，ae=10mm
- Coolant:emulsion



UR-S4

4 flutes, square end mills for rough machining



Ordering Code	Mill Dia (D)	Flute Length (Lc)	Chamfer (C)	Overall Length (L)	Shank Dia. (d)	Type	Stock
UR-S4-06016	6	16	0.2	50	6	B	●
UR-S4-08020	8	20	0.2	60	8	B	●
UR-S4-10025	10	25	0.3	75	10	B	●
UR-S4-12030	12	30	0.3	75	12	B	●
UR-S4-16036	16	36	0.4	100	16	B	●
UR-S4-20045	20	45	0.5	100	20	B	●

● Standard Stock ○ Reservation required

D	Tol.
D≤6	0 / -0.03
6<D≤10	0 / -0.04
D>10	0 / -0.05

(mm)

Workpiece Materials

Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Copper alloy	Aluminium alloy
◎	◎	○			○		○	

◎ Best for ○ Suitable for

X Series End Mills For Steels High Efficiency Machining

Wide range of application

◎ Suitable for face milling with small cutting depth and large cutting width side milling with large cutting depth and small cutting width; also suitable for slot milling less than 0.5D;

◎ Variable groove depth design considering both tool rigidity and chip pocket, good for high efficient machining with big cutting depth & width;

Suitable for wide range of application

◎ Suitable for facing milling under small ap & big ae, side milling under big ap & small ae, and slotting under condition of less than 0.5D;

Substrate and coating strength

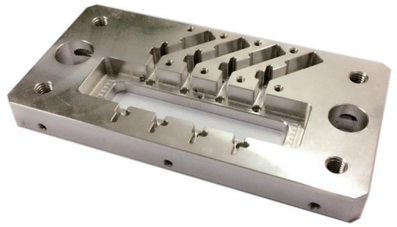
◎ Variable groove depth design, taking into account tool rigidity and chip space, suitable for high efficiency machining with large cutting depth and large cutting width;

◎ High performance ultra-fine substrate guarantees good wear and toughness;

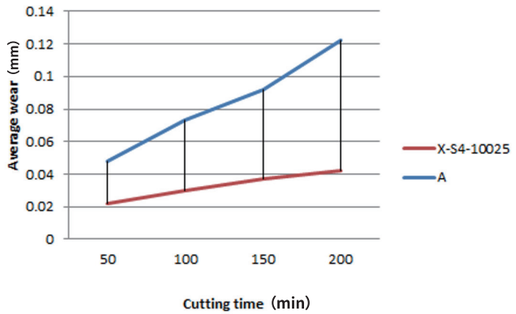
◎ Use the latest Kila coatingfurnace from Balzers, with AlCr series coating;

Geometry structure

◎ Use variable pitch & helix design; Excellent vibration reduction performance.

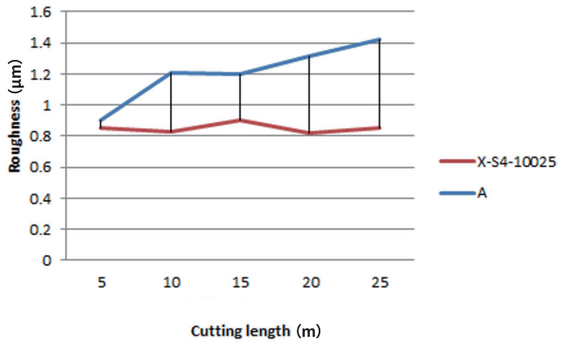


- Model No:X-S4-10005
- Specification:D10*25*75*d10
- Workpiece material:Q235A（HB200）
- Cutting speed:1600mm/min
- Feed rate:2000mm/min
- Way of cutting:Side milling
- ap, ae:ap=12mm，ae=0.15m
- Coolant:Emulsion



Comparison of tool wear trend

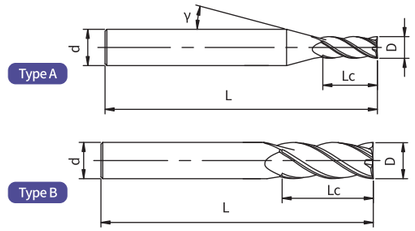
- Model No:X-BH2-08014
- Specification:R4*14*75*d8
- Workpiece material:718（38HRC）
- Cutting speed:8000RPM
- Feed rate:4500mm/min
- Way of cutting: Profile milling
- ap, ae:ap=0.15mm，ae=0.15mm
- Coolant:Oil mist



Workpiece surface roughness test

X-S3

3 flutes, square variable helix endmill for high efficiency machining



Ordering Code	Mill Dia (D)	Flute Length (Lc)	Overall Length (L)	Shank Dia. (d)	Type	Stock
X-S3-03009	3	9	50	4	A	●
X-S3-04011	4	11	50	4	B	●
X-S3-05013	5	13	50	6	B	●
X-S3-06016	6	16	50	6	B	●
X-S3-08020	8	20	60	8	B	●
X-S3-10025	10	25	75	10	B	●
X-S3-12030	12	30	75	12	B	●
X-S3-16036	16	36	100	16	B	●
X-S3-20045	20	45	100	20	B	●

● Standard Stock ○ Reservation required

D	Tol.
D≤12	0 / -0.02
D>12	0 / -0.03

(mm)

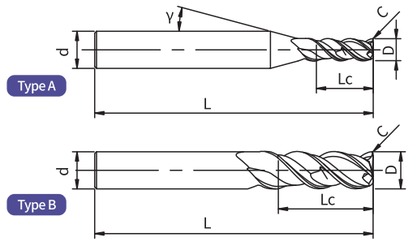
Workpiece Materials

Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Copper alloy	Aluminium alloy
◎	◎	○			○		○	

◎ Best for ○ Suitable for

X-C3

3 flutes, square variable helix endmill for high efficiency machining (chamfer)



Ordering Code	Mill Dia (D)	Flute Length (Lc)	Chamer (C)	Overall Length (L)	Shank Dia. (d)	Type	Stock
X-C3-06020	6	16	0.2	50	6	B	●
X-C3-08020	8	20	0.2	60	8	B	●
X-C3-10030	10	25	0.3	75	10	B	●
X-C3-12030	12	30	0.3	75	12	B	●
X-C3-16030	16	36	0.3	100	16	B	●

● Standard Stock ○ Reservation required

D	Tol.
D≤12	0 -0.02
D>12	0 -0.03

(mm)

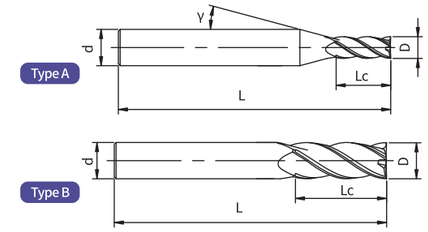
Workpiece Materials

Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Copper alloy	Aluminium alloy
◎	◎	○			○		○	

◎ Best for ○ Suitable for

X-S4

4 flutes, square variable helix endmill for high efficiency machining



Ordering Code	Mill Dia (D)	Flute Length (Lc)	Overall Length (L)	Shank Dia. (d)	Type	Stock
X-S4-02006	2	6	50	4	A	●
X-S4-03009	3	9	50	4	A	●
X-S4-04011	4	11	50	4	B	●
X-S4-05013	5	13	50	6	A	●
X-S4-06016	6	16	50	6	B	●
X-S4-08020	8	20	60	8	B	●
X-S4-10025	10	25	75	10	B	●
X-S4-12030	12	30	75	12	B	●
X-S4-16036	16	36	100	16	B	●
X-S4-20045	20	45	100	20	B	○

● Standard Stock ○ Reservation required

D	Tol.
D≤12	0 -0.02
D>12	0 -0.03

(mm)

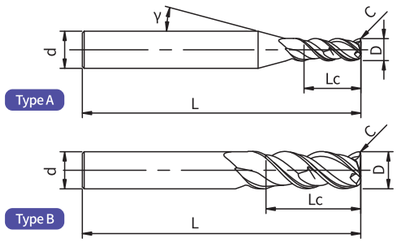
Workpiece Materials

Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Copper alloy	Aluminium alloy
◎	◎	○			○		○	

◎ Best for ○ Suitable for

X-C4

3 flutes, square variable helix endmill for high efficiency machining (chamfer)



Ordering Code	Mill Dia (D)	Flute Length (Lc)	Chamer (C)	Overall Length (L)	Shank Dia. (d)	Type	Stock
X-C4-03003	3	9	0.03	50	4	A	○
X-C4-03013	3	9	0.13	50	4	A	●
X-C4-04004	4	11	0.04	50	4	B	○
X-C4-04018	4	11	0.18	50	4	B	●
X-C4-05005	5	13	0.05	50	6	A	○
X-C4-05013	5	13	0.13	57	6	A	●
X-C4-05020	5	13	0.2	50	6	A	●
X-C4-06006	6	16	0.06	50	6	B	○
X-C4-06013	6	16	0.13	57	6	B	●
X-C4-06020	6	16	0.2	50	6	B	●
X-C4-08008	8	20	0.08	60	8	B	●
X-C4-08020	8	20	0.2	60	8	B	●
X-C4-10010	10	25	0.1	75	10	B	●
X-C4-10030	10	25	0.3	75	10	B	●
X-C4-12012	12	30	0.12	75	12	B	○
X-C4-12030	12	30	0.3	75	12	B	●
X-C4-16015	16	36	0.15	100	16	B	○
X-C4-16040	16	36	0.4	100	16	B	○
X-C4-20015	20	45	0.15	100	20	B	○
X-C4-20050	20	45	0.5	100	20	B	○

● Standard Stock ○ Reservation required

D	Tol.
D≤12	0 / -0.02
D>12	0 / -0.03

(mm)

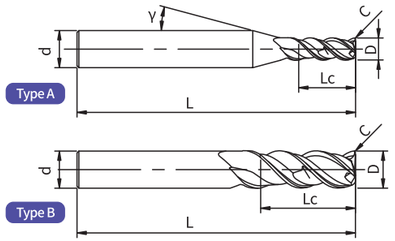
Workpiece Materials

Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Copper alloy	Aluminium alloy
◎	◎	○			○		○	

◎ Best for ○ Suitable for

X-CN4

4 flutes, square variable helix endmill for high efficiency machining (chamfer)



Ordering Code	Mill Dia (D)	Flute Length (Lc)	Under Neck Length (L1)	Neck Dia. (d2)	Chamfer (L1)	Overall Length (L)	Shank Dia. (d)	Type	Stock
X-CN4-03013	3	10	18	2.9	0.13	75	4	A	○
X-CN4-04018	4	12	20	3.8	0.18	75	4	B	●
X-CN4-05020	5	15	35	4.8	0.2	75	6	B	●
X-CN4-06020	6	16	24	5.8	0.2	100	6	B	●
X-CN4-08020	8	20	30	7.5	0.2	100	8	B	○
X-CN4-10030	10	25	40	9.5	0.3	150	10	B	○
X-CN4-12030	12	30	40	11	0.3	150	12	B	○
X-CN4-16040	16	36	50	15	0.4	150	16	B	○
X-CN4-20050	20	45	60	19	0.5	150	20	B	○

● Standard Stock ○ Reservation required

D	Tol.
D≤12	0 / -0.02
D>12	0 / -0.03

(mm)

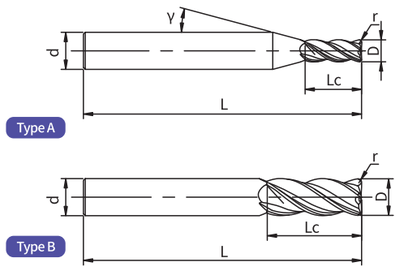
Workpiece Materials

Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Copper alloy	Aluminium alloy
◎	◎	○			○		○	

◎ Best for ○ Suitable for

X-R4

3 flutes, corner radius, variable helix end mills for high efficiency machining



Ordering Code	Mill Dia (D)	Flute Length (Lc)	Corner (r)	Overall Length (L)	Shank Dia. (d)	Type	Stock
X-R4-03003	3	9	0.3	50	4	A	○
X-R4-03005	3	9	0.5	50	4	A	●
X-R4-04003	4	11	0.3	50	4	B	●
X-R4-04005	4	11	0.5	50	4	B	●
X-R4-05003	5	13	0.3	50	6	A	○
X-R4-05005	5	13	0.5	50	6	A	●
X-R4-06005	6	16	0.5	50	6	B	●
X-R4-06010	6	16	1	50	6	B	●
X-R4-08005	8	20	0.5	60	8	B	●
X-R4-08010	8	20	1	60	8	B	●
X-R4-10005	10	25	0.5	75	10	B	●
X-R4-10010	10	25	1	75	10	B	●
X-R4-10020	10	25	2	75	10	B	●
X-R4-12005	12	30	0.5	75	12	B	○
X-R4-12010	12	30	1	75	12	B	●
X-R4-12020	12	30	2	75	12	B	○
X-R4-14020	14	32	2	75	14	B	○
X-R4-16020	16	36	2	100	16	B	○

● Standard Stock ○ Reservation required

D	Tol.
D≤12	0 / -0.02
D>12	0 / -0.03

(mm)

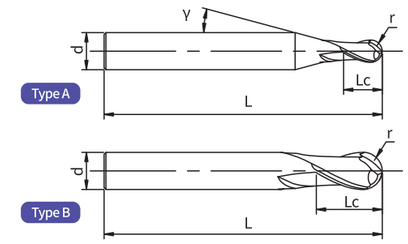
Workpiece Materials

Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Copper alloy	Aluminium alloy
◎	◎	○			○		○	

◎ Best for ○ Suitable for

X-B2

2 flutes, ball nose end mills for high speed machining



Ordering Code	Mill Dia (D)	Ball Radius (R)	Flute Length (Lc)	Overall Length (L)	Shank Dia. (d)	Type	Stock
X-B2-01002	1	0.5	2	50	4	A	●
X-B2-01503	1.5	0.75	3	50	4	A	●
X-B2-02004	2	1	4	50	4	A	●
X-B2-03006	3	1.5	6	50	4	A	●
X-B2-04008	4	2	8	50	4	B	●
X-B2-06012	6	3	12	50	6	B	●
X-B2-08014	8	4	14	60	8	B	●
X-B2-10018	10	5	18	75	10	B	●
X-B2-11020	11	5.5	20	75	12	B	●
X-B2-12022	12	6	22	75	12	B	●

● Standard Stock ○ Reservation required

R	Tol.
R≤1.5	0 / -0.01
1.5<R<3	0 / -0.015
R≥3	0 / -0.02

(mm)

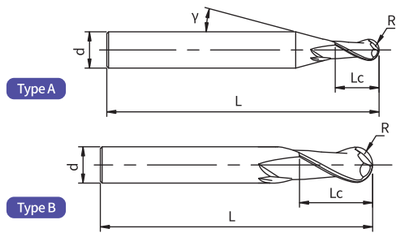
Workpiece Materials

Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Copper alloy	Aluminium alloy
◎	◎	○			○		○	

◎ Best for ○ Suitable for

X-BH2

2 flutes, ball nose, long shank end mills for high speed machining



Ordering Code	Mill Dia (D)	Ball Radius (R)	Flute Length (Lc)	Overall Length (L)	Shank Dia. (d)	Type	Stock
X-BH2-04008	4	2	8	75	4	B	●
X-BH2-06012	6	3	12	60	6	B	●
X-BH2-06012H	6	3	12	75	6	B	●
X-BH2-08014	8	4	14	75	8	B	●
X-BH2-10018	10	5	18	100	10	B	●
X-BH2-12022	12	6	22	100	12	B	●

● Standard Stock ○ Reservation required

R	Tol.
R≤1.5	0 / -0.01
1.5<R<3	0 / -0.015
R≥3	0 / -0.02

(mm)

Workpiece Materials

Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Copper alloy	Aluminium alloy
◎	◎	○			○		○	

◎ Best for ○ Suitable for

UX Series High-efficiency Integrated Roughing And Finishing Machining

Wide range of workpiece materials

◎ U-shaped groove design, taking into account the rigidity of the tool and chip space, is suitable for groove milling with large cutting depth and width;

Geometry structure

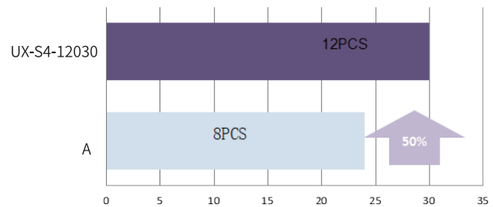
◎ The bottom edge variable index+45 ° large spiral angle design has excellent shock absorption performance and stable cutting process;

Substrate and coating strength

◎ High performance matrix with AlCr coating, the tool has high wear resistance and high toughness.

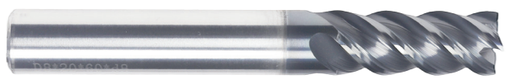
- Model No: UX-S4-12030
- Specification: D12*30*75*D12
- Workpiece Material: Cast
- Processing Parameters: s=4krpm、f=2000mm/min Ap=28mm，ae=1mm
- Way Of Cutting: Dynamic Side Milling
- Coolant: Emulsion

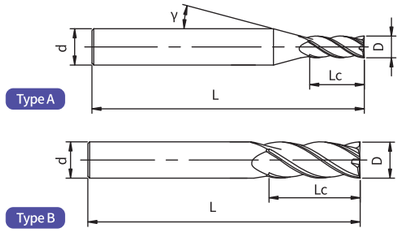
process quantity（PCS）



UX-S4

4 flutes, square end mills for steel high efficiency machining





Ordering Code	Mill Dia (D)	Flute Length (Lc)	Overall Length (L)	Shank Dia. (d)	Type	Stock
UX-S4-01003	1	3	50	4	A	●
UX-S4-01505	1.5	5	50	4	A	●
UX-S4-61505	1.5	5	50	6	A	●
UX-S4-02006	2	6	50	4	A	●
UX-S4-62006	2	6	50	6	A	●
UX-S4-02508	2.5	8	50	4	A	●
UX-S4-62508	2.5	8	50	6	A	●
UX-S4-03009	3	9	50	4	A	●
UX-S4-63009	3	9	50	6	A	●
UX-S4-03511	3.5	11	50	4	A	●
UX-S4-63511	3.5	11	50	6	A	●
UX-S4-04011	4	11	50	4	B	●
UX-S4-64011	4	11	50	6	A	●
UX-S4-05013	5	13	50	6	A	●
UX-S4-06016	6	16	50	6	B	●
UX-S4-07020	7	20	60	8	A	●
UX-S4-08020	8	20	60	8	B	●
UX-S4-09023	9	23	75	10	A	●
UX-S4-10025	10	25	75	10	B	●
UX-S4-12030	12	30	75	12	B	●
UX-S4-14034	14	34	100	14	B	●
UX-S4-16036	16	36	100	16	B	●
UX-S4-18045	18	45	100	18	B	●
UX-S4-20045	20	45	100	20	B	●

● Standard Stock ○ Reservation required

D	Tol.
D≤12	0 -0.02
D>12	0 -0.03

(mm)

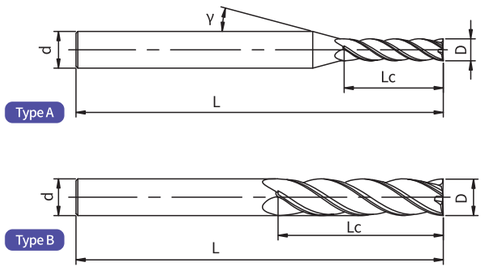
Workpiece Materials

Cast	Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Graphite	Copper alloy	Aluminium alloy
◎	◎	◎	○			○			○	

◎ Best for ○ Suitable for

UX-SL4

4 flutes, square long flutes end mills for steel high efficiency machining



Ordering Code	Mill Dia (D)	Flute Length (Lc)	Overall Length (L)	Shank Dia. (d)	Type	Stock
UX-SL4-01004	1	4	50	4	A	●
UX-SL4-02010	2	10	50	4	A	●
UX-SL4-03015	3	15	60	4	A	●
UX-SL4-63015	3	15	60	6	A	●
UX-SL4-04020	4	20	60	4	B	●
UX-SL4-64020	4	20	75	6	A	●
UX-SL4-05025	5	25	75	6	A	●
UX-SL4-06030	6	30	75	6	B	●
UX-SL4-08040	8	40	100	8	B	●
UX-SL4-10050	10	50	100	10	B	●
UX-SL4-12050	12	50	100	12	B	●
UX-SL4-14045	14	45	100	14	B	●
UX-SL4-16060	16	60	150	16	B	●
UX-SL4-18070	18	70	150	18	B	●
UX-SL4-20070	20	70	150	20	B	●

● Standard Stock ○ Reservation required

D	Tol.
D≤12	0 -0.02
D>12	0 -0.03

(mm)

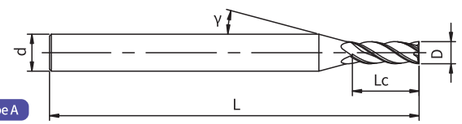
Workpiece Materials

Cast	Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Graphite	Copper alloy	Aluminium alloy
◎	◎	◎	○			○			○	

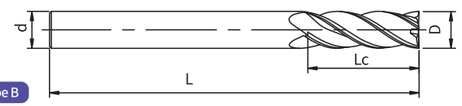
◎ Best for ○ Suitable for

UX-SH4

4 flutes, square long shank end mills for steel high efficiency machining



Type A



Type B

Ordering Code	Mill Dia (D)	Flute Length (Lc)	Overall Length (L)	Shank Dia. (d)	Type	Stock
UX-SH4-02010	2	10	75	4	A	●
UX-SH4-03012	3	12	75	4	A	●
UX-SH4-04011	4	11	75	4	B	●
UX-SH4-04015	4	15	75	4	B	●
UX-SH4-05020	5	20	75	6	A	●
UX-SH4-06016	6	16	75	6	B	●
UX-SH4-06020	6	20	75	6	B	●
UX-SH4-08020	8	20	100	8	B	●
UX-SH4-08025	8	25	100	8	B	●
UX-SH4-10030	10	30	100	10	B	●
UX-SH4-10035	10	35	100	10	B	●
UX-SH4-12035	12	35	100	12	B	●
UX-SH4-14036	14	36	150	14	B	●
UX-SH4-16036	16	36	150	16	B	●
UX-SH4-18045	18	45	150	18	B	●
UX-SH4-20045	20	45	150	20	B	●

● Standard Stock ○ Reservation required

D	Tol.
D≤12	0 / -0.02
D>12	0 / -0.03

(mm)

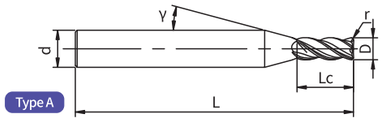
Workpiece Materials

Cast	Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Graphite	Copper alloy	Aluminium alloy
◎	◎	◎	○			○			○	

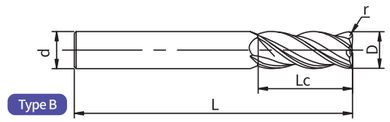
◎ Best for ○ Suitable for

UX-R4

4 flutes, corner radius end mills for steel high efficiency machining



Type A



Type B

Ordering Code	Mill Dia (D)	Flute Length (Lc)	Corner (r)	Overall Length (L)	Shank Dia. (d)	Type	Stock
UX-R4-01502	1.5	5	0.2	50	4	A	●
UX-R4-02002	2	6	0.2	50	4	A	●
UX-R4-03002	3	9	0.2	50	4	A	●
UX-R4-03005	3	9	0.5	50	4	A	●
UX-R4-04002	4	11	0.2	50	4	B	●
UX-R4-04005	4	11	0.5	50	4	B	●
UX-R4-04010	4	11	1	50	4	B	●
UX-R4-05005	5	13	0.5	50	6	A	●
UX-R4-05010	5	13	1	50	6	A	●
UX-R4-06002	6	16	0.2	50	6	B	●
UX-R4-06005	6	16	0.5	50	6	B	●
UX-R4-06010	6	16	1	50	6	B	●
UX-R4-08005	8	20	0.5	60	8	B	●
UX-R4-08010	8	20	1	60	8	B	●
UX-R4-10005	10	25	0.5	75	10	B	●
UX-R4-10010	10	25	1	75	10	B	●
UX-R4-10020	10	25	2	75	10	B	●
UX-R4-12005	12	30	0.5	75	12	B	●
UX-R4-12010	12	30	1	75	12	B	●
UX-R4-12020	12	30	2	75	12	B	●

● Standard Stock ○ Reservation required

D	Tol.
D≤12	0 / -0.02
D>12	0 / -0.03

(mm)

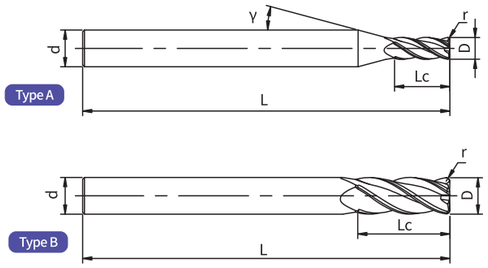
Workpiece Materials

Cast	Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Graphite	Copper alloy	Aluminium alloy
◎	◎	◎	○			○			○	

◎ Best for ○ Suitable for

UX-RH4

4 flutes corner radius, with long shank length end mills for steel high efficiency machining



Ordering Code	Mill Dia (D)	Flute Length (Lc)	Corner (r)	Overall Length (L)	Shank Dia. (d)	Type	Stock
UX-RH4-03005	3	9	0.5	75	4	A	●
UX-RH4-04005	4	11	0.5	75	4	B	●
UX-RH4-06005	6	16	0.5	75	6	B	●
UX-RH4-06010	6	16	1	75	6	B	●
UX-RH4-08005	8	20	0.5	100	8	B	●
UX-RH4-08010	8	20	1	100	8	B	●
UX-RH4-10005	10	25	0.5	100	10	B	●
UX-RH4-10010	10	25	1	100	10	B	●
UX-RH4-10020	10	25	2	100	10	B	●
UX-RH4-12005	12	30	0.5	100	12	B	●
UX-RH4-12010	12	30	1	100	12	B	●
UX-RH4-12020	12	30	2	100	12	B	●
UX-RH4-16005	16	36	0.5	150	16	B	●
UX-RH4-16010	16	36	1	150	16	B	●
UX-RH4-16020	16	36	2	150	16	B	●
UX-RH4-20010	20	45	1	150	20	B	●
UX-RH4-20020	20	45	2	150	20	B	●

● Standard Stock ○ Reservation required

D	Tol.
D≤12	0 / -0.02
D>12	0 / -0.03

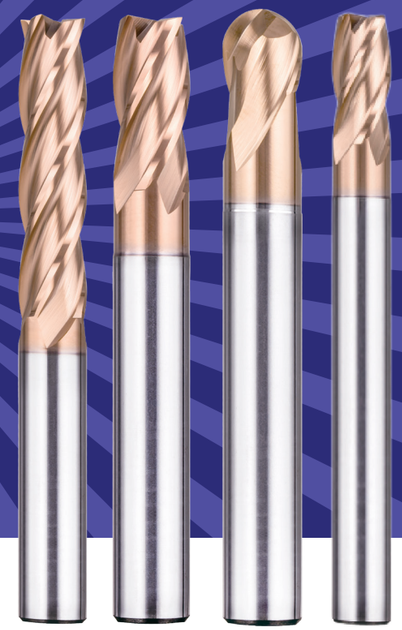
(mm)

Workpiece Materials

Cast	Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Graphite	Copper alloy	Aluminium alloy
◎	◎	◎	○			○			○	

◎ Best for ○ Suitable for

H Series End Mills For Hardened Steels General Machining



High hardness workpiece materials

◎ Suitable for high hardness workpiece;

◎ Suitable for semi-finishing, finishing of pre-hardened steels, hardened steels, and high speed steels(≤60HRC);

Wide range of application

◎ Suitable for wide range of application;

◎ uitable for general machining, high speed machining and part of high efficient machining, Used on injection mould, forging die and die-casting mould;

Substrate and coating strength

◎ High performance, ultra-fine and super hard substrate;

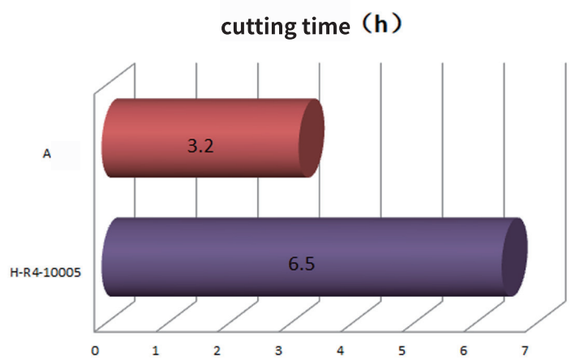
◎ Use the latest Kila coating furnace from Balzers, with our self-developed TiAlCrSiN;

Geometry structure

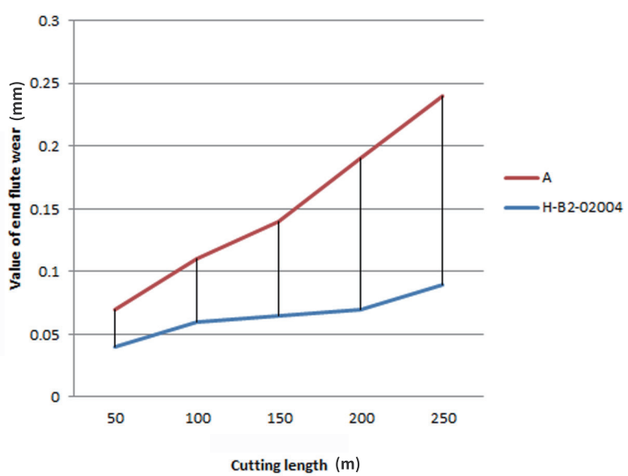
◎ Unique geometry design, fine grinded cutting edge, enable excellent processing on hardened steel.

“New technology makes cutting easier”

- Model No:H-R4-10005
- Specification:D10*R0.5*25*75*d10
- Workpiece material:SKD61（52HRC）
- Cutting speed:3800RPM
- Feed rate:1200mm/min
- Way of cutting:Side milling, face milling
- ap, ae:face milling ap=0.03mm ae=5mm
  side milling ap=0.1mm，ae=0.05mm
- Coolant:Emulsion

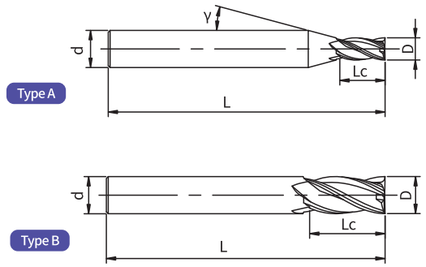


- Model No:H-B2-02004
- Specification:R1*4*50*d4
- Workpiece material:SKD11（60HRC）
- Cutting speed:20000RPM
- Feed rate:2000mm/min
- Way of cutting: face milling
- ap, ae:ap=0.1mm，ae=0.3mm
- Coolant:oil mist



H-S4

4 flutes, square end mills for hardened steel machining



Ordering Code	Mill Dia (D)	Flute Length (Lc)	Overall Length (L)	Shank Dia. (d)	Type	Stock
H-S4-01003	1	3	50	4	A	●
H-S4-01504	1.5	4	50	4	A	●
H-S4-02006	2	6	50	4	A	●
H-S4-62006	2	6	50	6	A	●
H-S4-02508	2.5	8	50	4	A	●
H-S4-03008	3	8	50	4	A	●
H-S4-63008	3	8	50	6	A	●
H-S4-04011	4	11	50	4	B	●
H-S4-64011	4	11	50	6	A	●
H-S4-05013	5	13	50	6	A	●
H-S4-06016	6	16	50	6	B	●
H-S4-08020	8	20	60	8	B	●
H-S4-10025	10	25	75	10	B	●
H-S4-12030	12	30	75	12	B	●
H-S4-14032	14	32	100	14	B	●
H-S4-16040	16	40	100	16	B	●
H-S4-20045	20	45	100	20	B	●

● Standard Stock ○ Reservation required

D	Tol.
D≤6	0 -0.01
6<D≤12	0 -0.02
D>12	0 -0.03

(mm)

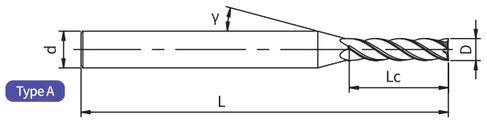
Workpiece Materials

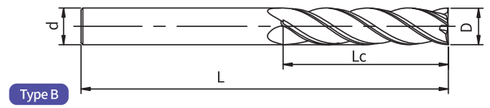
Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Copper alloy	Aluminium alloy
	○	◎	○					

◎ Best for ○ Suitable for

H-SL4

4 flutes, square long flutes end mills for hardened steel machining





Ordering Code	Mill Dia (D)	Flute Length (Lc)	Overall Length (L)	Shank Dia. (d)	Type	Stock
H-SL4-03012	3	12	75	6	A	●
H-SL4-04015	4	15	75	6	A	●
H-SL4-05020	5	20	75	6	A	●
H-SL4-06020	6	20	75	6	B	●
H-SL4-08025	8	25	100	8	B	●
H-SL4-10030	10	30	100	10	B	●
H-SL4-12035	12	35	100	12	B	●
H-SL4-14040	14	40	100	14	B	●
H-SL4-16050	16	50	150	16	B	●
H-SL4-20055	20	55	150	20	B	●

● Standard Stock ○ Reservation required

D	Tol.
D≤6	0 / -0.01
6<D≤12	0 / -0.02
D>12	0 / -0.03

(mm)

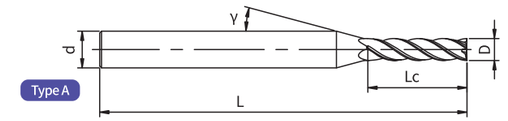
Workpiece Materials

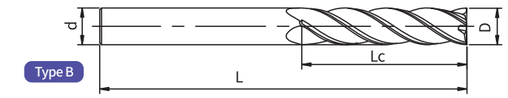
Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Copper alloy	Aluminium alloy
	○	◎	○					

◎ Best for ○ Suitable for

H-S6

6 flutes, square end mills for hardened steel machining





Ordering Code	Mill Dia (D)	Flute Length (Lc)	Overall Length (L)	Shank Dia. (d)	Type	Stock
H-S6-06018	6	18	50	6	B	●
H-S6-08020	8	20	60	8	B	●
H-S6-10030	10	30	75	10	B	●
H-S6-12032	12	32	75	12	B	●
H-S6-16040	16	40	100	16	B	●
H-S6-20045	20	45	100	20	B	●

● Standard Stock ○ Reservation required

D	Tol.
D≤6	0 / -0.01
6<D≤12	0 / -0.02
D>12	0 / -0.03

(mm)

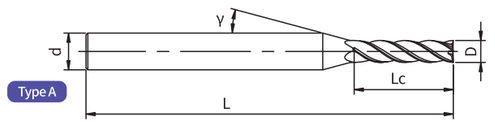
Workpiece Materials

Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Copper alloy	Aluminium alloy
	○	◎	○					

◎ Best for ○ Suitable for

H-SL6

6 flutes, square long flutes end mills for hardened steel machining



Ordering Code	Mill Dia (D)	Flute Length (Lc)	Overall Length (L)	Shank Dia. (d)	Type	Stock
H-SL6-06024	6	24	75	6	B	●
H-SL6-08032	8	32	75	8	B	●
H-SL6-10040	10	40	100	10	B	●
H-SL6-12045	12	45	100	12	B	●
H-SL6-16064	16	64	150	16	B	●
H-SL6-20075	20	75	150	20	B	●

● Standard Stock ○ Reservation required

D	Tol.
D≤6	0 -0.01
6<D≤12	0 -0.02
D>12	0 -0.03

(mm)

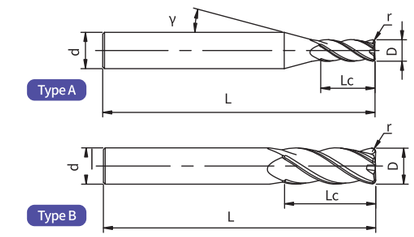
Workpiece Materials

Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Copper alloy	Aluminium alloy
	○	◎	○					

◎ Best for ○ Suitable for

H-R4

4 flutes, corner radius end mills for hardened steel machining



Ordering Code	Mill Dia (D)	Flute Length (Lc)	Corner (r)	Overall Length (L)	Shank Dia. (d)	Type	Stock
H-R4-01002	1	2.5	0.2	50	4	A	●
H-R4-01502	1.5	4	0.2	50	4	A	●
H-R4-02002	2	5	0.2	50	4	A	●
H-R4-02005	2	5	0.2	50	4	A	●
H-R4-03002	3	8	0.2	50	4	A	●
H-R4-03005	3	8	0.5	50	4	A	●
H-R4-04002	4	10	0.2	50	4	B	●
H-R4-04003	4	10	0.3	50	4	B	●
H-R4-04005	4	10	0.5	50	4	B	●
H-R4-04010	4	10	1.0	50	4	B	●
H-R4-05005	5	13	0.5	50	6	A	●
H-R4-06005	6	16	0.5	50	6	B	●
H-R4-06010	6	16	1.0	50	6	B	●
H-R4-08005	8	20	0.5	60	8	B	●
H-R4-08010	8	20	1.0	60	8	B	●
H-R4-10005	10	25	0.5	75	10	B	●
H-R4-10010	10	25	1.0	75	10	B	●
H-R4-12005	12	30	0.5	75	12	B	●
H-R4-12010	12	30	1.0	75	12	B	●
H-R4-12020	12	30	2.0	75	12	B	●

● Standard Stock ○ Reservation required

D	Tol.
D≤6	0 -0.01
6<D≤12	0 -0.02
D>12	0 -0.03

(mm)

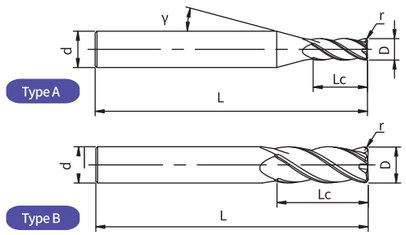
Workpiece Materials

Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Copper alloy	Aluminium alloy
	○	◎	○					

◎ Best for ○ Suitable for

H-RH4

4 flutes, corner radius long shank endmill for hardened steel machining



Ordering Code	Mill Dia. (D)	Flute Length (Lc)	Corner (r)	Overall Length (L)	Shank Dia. (d)	Type	Stock
H-RH4-04002	4	10	0.2	75	4	B	●
H-RH4-04003	4	10	0.3	75	4	B	●
H-RH4-04005	4	10	0.5	75	4	B	●
H-RH4-04010	4	10	1.0	75	4	B	●
H-RH4-06005	6	16	0.5	75	6	B	●
H-RH4-06010	6	16	1.0	75	6	B	●
H-RH4-08005	8	20	0.5	75	8	B	●
H-RH4-08010	8	20	1.0	75	8	B	●
H-RH4-08005-100	8	20	0.5	100	8	B	●
H-RH4-08010-100	8	20	1.0	100	8	B	●
H-RH4-10005	10	25	0.5	100	10	B	●
H-RH4-10010	10	25	1.0	100	10	B	●
H-RH4-12005	12	30	0.5	100	12	B	●
H-RH4-12010	12	30	1.0	100	12	B	●
H-RH4-12020	12	30	2.0	100	12	B	●

● Standard Stock ○ Reservation required

D	Tol.
D≤6	0 / -0.01
6<D≤12	0 / -0.02
D>12	0 / -0.03

(mm)

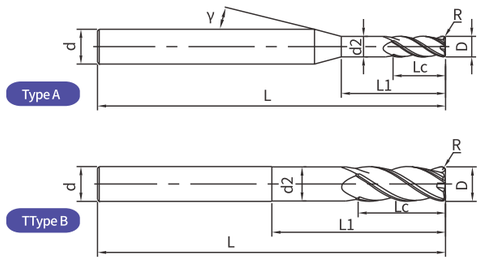
Workpiece Materials

Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Copper alloy	Aluminium alloy
	○	◎	○					

◎ Best for ○ Suitable for

H-RN4

4 flutes, corner radius long neck endmill for hardened steel machining



Ordering Code	Mill Dia. (D)	Flute Length (Lc)	Corner (r)	Under Neck Length (L1)	Neck Dia. (d2)	Overall Length (L)	Shank Dia. (d)	Type	Stock
H-RN4-06005	6	6	0.5	18	5.8	75	6	B	●
H-RN4-06010	6	6	1.0	18	5.8	75	6	B	●
H-RN4-08005-75	8	8	0.5	24	7.8	75	8	B	●
H-RN4-08005	8	8	0.5	24	7.8	100	8	B	●
H-RN4-08010	8	8	1.0	24	7.8	100	8	B	●
H-RN4-10005	10	10	0.5	30	9.6	100	10	B	●
H-RN4-10010	10	10	1.0	30	9.6	100	10	B	●
H-RN4-10020	10	10	2.0	30	9.6	100	10	B	●
H-RN4-12005	12	12	0.5	36	11.5	100	12	B	●
H-RN4-12010	12	12	1.0	36	11.5	100	12	B	●
H-RN4-12020	12	12	2.0	36	11.5	100	12	B	●
H-RN4-16010	16	16	1.0	40	15.5	150	16	B	●
H-RN4-16020	16	16	2.0	40	15.5	150	16	B	●

● Standard Stock ○ Reservation required

D	Tol.
D≤6	0 / -0.01
6<D≤12	0 / -0.02
D>12	0 / -0.03

(mm)

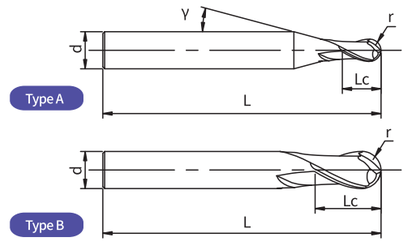
Workpiece Materials

Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Copper alloy	Aluminium alloy
	○	◎	○					

◎ Best for ○ Suitable for

H-B2

2 flutes, ball nose endmil for handened sted machining



Ordering Code	Mill Dia. (D)	Ball Radius (R)	Flute Length (Lc)	Overall Length (L)	Shank Dia. (d)	Type	Stock
H-B2-01002	1	0.5	2	50	4	A	●
H-B2-01503	1.5	0.75	3	50	4	A	●
H-B2-02004	2	1	4	50	4	A	●
H-B2-02505	2.5	1.25	5	50	4	A	●
H-B2-03006	3	1.5	6	50	4	A	●
H-B2-63006	3	1.5	6	50	6	A	●
H-B2-04008	4	2	8	50	4	B	●
H-B2-64008	4	2	8	50	6	A	●
H-B2-05010	5	2.5	10	50	6	A	●
H-B2-06012	6	3	12	50	6	B	●
H-B2-07014	7	3.5	14	60	8	A	●
H-B2-08014	8	4	14	60	8	B	●
H-B2-10020	10	5	20	75	10	B	●
H-B2-12024	12	6	24	75	12	B	●
H-B2-16032	16	8	32	100	16	B	●

● Standard Stock ○ Reservation required

D	Tol.
D≤6	0 / -0.01
6<D≤12	0 / -0.02
D>12	0 / -0.03

(mm)

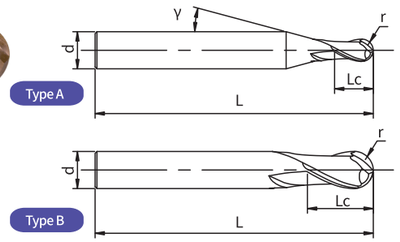
Workpiece Materials

Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Copper alloy	Aluminium alloy
	○	◎	○					

◎ Best for ○ Suitable for

H-BH2

2 flute, ball nose long shank endmill for hardened steel machining



Ordering Code	Mill Dia. (D)	Ball Radius (R)	Flute Length (Lc)	Overall Length (L)	Shank Dia. (d)	Type	Stock
H-BH2-02004	2	1	4	75	4	A	●
H-BH2-03006	3	1.5	6	75	4	A	●
H-BH2-63006-60	3	1.5	6	60	6	A	●
H-BH2-63006	3	1.5	6	75	6	A	●
H-BH2-04008	4	2	8	75	4	B	●
H-BH2-64008-60	4	2	8	60	6	A	●
H-BH2-64008	4	2	8	75	6	A	●
H-BH2-05010	5	2.5	10	75	6	A	●
H-BH2-06012-60	6	3	12	60	6	B	●
H-BH2-06012	6	3	12	75	6	B	●
H-BH2-06012-100	6	3	12	100	6	B	●
H-BH2-08016	8	4	16	75	8	B	●
H-BH2-08016-100	8	4	16	100	8	B	●
H-BH2-10020	10	5	20	100	10	B	●
H-BH2-12024	12	6	24	100	12	B	●
H-BH2-16032	16	8	32	150	16	B	●

● Standard Stock ○ Reservation required

D	Tol.
D≤6	0 / -0.01
6<D≤12	0 / -0.02
D>12	0 / -0.03

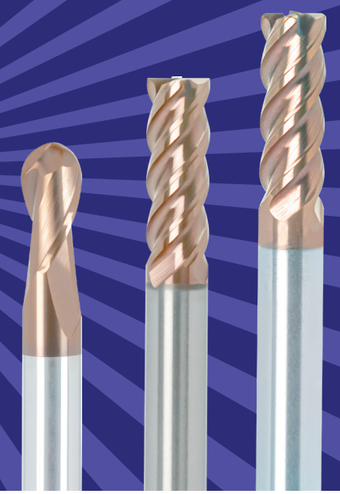
(mm)

Workpiece Materials

Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Copper alloy	Aluminium alloy
	○	◎	○					

◎ Best for ○ Suitable for

HV Series Machining Series for Hardened Steels



- Using ultrafine particle superhard alloy (0.2um) to process high hardness materials and achieve excellent performance
- High hardness AlTiSiN coating, with high coating hardness and excellent high-temperature oxidation resistance, suitable for processinghigh hardness materials
- Unique tool structure, reasonable groove design, achieving excellent high hardness material processing
- After coating treatment, effectively reducing friction, smoother chip removal, and better machining surface quality

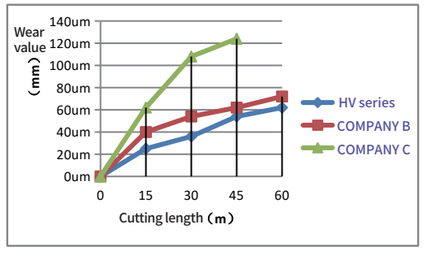
- Tooling：HV-R4-06016
- Workpiece material：SKD 61(60HRC)
- Cutting Speed：114.9
- Feed per revolution：0.053
- Cutting depth：0.03mm
- Cutting width：3mm
- Cooling conditions：air-cool

HV series

COMPANY B

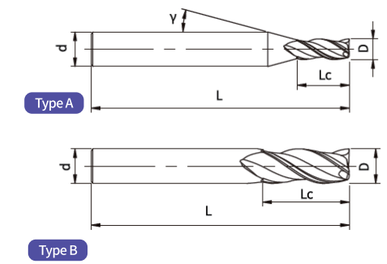
COMPANY C

Bottom blade wear curve：



HV-S4

4 Flutes, Square Length EndMill for Hardened Steels Machining



Ordering Code	Mill Dia (D)	Flute Length (Lc)	Overall Length (L)	Shank Dia. (d)	Type	Stock
HV-S4-01003	1	3	50	4	A	●
HV-S4-61003	1	3	50	6	B	○
HV-S4-01504	1.5	4	50	4	A	●
HV-S4-61504	1.5	4	50	6	B	○
HV-S4-02006	2	6	50	4	A	●
HV-S4-62006	2	6	50	6	A	●
HV-S4-02508	2.5	8	50	4	A	●
HV-S4-03008	3	8	50	4	A	●
HV-S4-63008	3	8	50	6	A	●
HV-S4-04011	4	11	50	4	B	●
HV-S4-64011	4	11	50	6	A	●
HV-S4-05013	5	13	50	6	A	●
HV-S4-06016	6	16	50	6	B	●
HV-S4-08020	8	20	60	8	B	●
HV-S4-10025	10	25	75	10	B	●
HV-S4-10030	10	30	75	10	B	●
HV-S4-12030	12	30	75	12	B	●
HV-S4-14032	14	32	100	14	B	●
HV-S4-16040	16	40	100	16	B	●
HV-S4-20045	20	45	100	20	B	●

● Standard Stock ○ Reservation required

D	Tol.
D≤6	0 -0.01
6<D≤12	0 -0.02
D>12	0 -0.03

(mm)

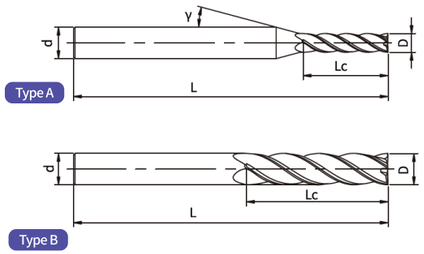
Workpiece Materials

Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Copper alloy	Aluminium alloy
	○	◎	○					

◎ Best for ○ Suitable for

HV-SL4

4 Flutes, With long Flute length EndMill for Hardened Steels Machining



Ordering Code	Mill Dia (D)	Flute Length (Lc)	Overall Length (L)	Shank Dia. (d)	Type	Stock
HV-SL4-03012	3	12	75	6	A	●
HV-SL4-04015	4	15	75	6	A	●
HV-SL4-05020	5	20	75	6	A	●
HV-SL4-06020	6	20	75	6	B	●
HV-SL4-08025	8	25	100	8	B	●
HV-SL4-10030	10	30	100	10	B	●
HV-SL4-12035	12	35	100	12	B	●
HV-SL4-14040	14	40	100	14	B	●
HV-SL4-16050	16	50	150	16	B	●
HV-SL4-20055	20	55	150	20	B	●

● Standard Stock ○ Reservation required

D	Tol.
D≤6	0 -0.01
6<D≤12	0 -0.02
D>12	0 -0.03

(mm)

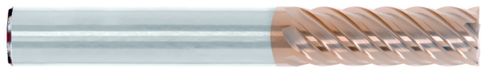
Workpiece Materials

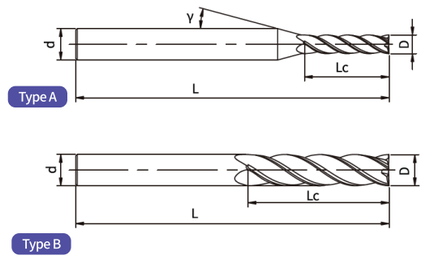
Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Copper alloy	Aluminium alloy
	○	◎	○					

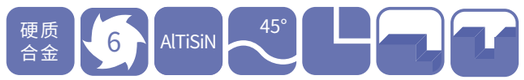
◎ Best for ○ Suitable for

HV-S6

6 Flutes, Square EndMill for General Machining







Ordering Code	Mill Dia (D)	Flute Length (Lc)	Overall Length (L)	Shank Dia. (d)	Type	Stock
HV-S6-06018	6	18	50	6	B	●
HV-S6-08020	8	20	60	8	B	●
HV-S6-10030	10	30	75	10	B	●
HV-S6-12032	12	32	75	12	B	●
HV-S6-16040	16	40	100	16	B	●
HV-S6-20045	20	45	100	20	B	●

● Standard Stock ○ Reservation required

D	Tol.
D≤6	0 -0.01
6<D≤12	0 -0.02
D>12	0 -0.03

(mm)

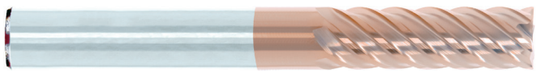
Workpiece Materials

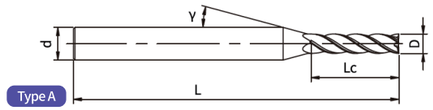
Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Copper alloy	Aluminium alloy
	○	◎	○					

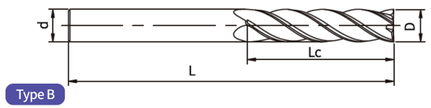
◎ Best for ○ Suitable for

HV-SL6

6 Flutes, Square EndMill for General Machining







Ordering Code	Mill Dia (D)	Flute Length (Lc)	Overall Length (L)	Shank Dia. (d)	Type	Stock
HV-SL6-06024	6	24	75	6	B	●
HV-SL6-08032	8	32	75	8	B	●
HV-SL6-10040	10	40	100	10	B	●
HV-SL6-12045	12	45	100	12	B	●
HV-SL6-16064	16	64	150	16	B	●
HV-SL6-20075	20	75	150	20	B	●

● Standard Stock ○ Reservation required

D	Tol.
D≤6	0 / -0.01
6<D≤12	0 / -0.02
D>12	0 / -0.03

(mm)

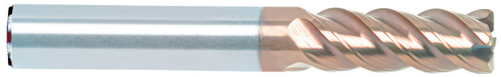
Workpiece Materials

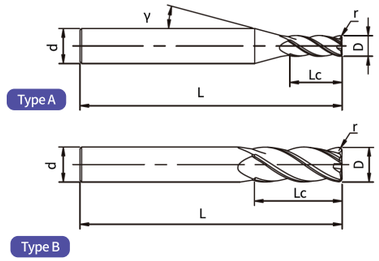
Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Copper alloy	Aluminium alloy
	○	◎	○					

◎ Best for ○ Suitable for

HV-R4

4 Flutes, Corner Radius EndMill for General Machining





Ordering Code	Mill Dia (D)	Flute Length (Lc)	Corner (r)	Overall Length (L)	Shank Dia. (d)	Type	Stock
HV-R4-01002	1	2.5	0.2	50	4	A	●
HV-R4-01502	1.5	4	0.2	50	4	A	●
HV-R4-02002	2	5	0.2	50	4	A	●
HV-R4-02005	2	5	0.5	50	4	A	●
HV-R4-03002	3	8	0.2	50	4	A	●
HV-R4-03005	3	8	0.5	50	4	A	●
HV-R4-04002	4	10	0.2	50	4	B	●
HV-R4-04003	4	10	0.3	50	4	B	●
HV-R4-04005	4	10	0.5	50	4	B	●
HV-R4-05005	5	13	0.5	50	6	A	●
HV-R4-06005	6	16	0.5	50	6	B	●
HV-R4-06010	6	16	1.0	50	6	B	●
HV-R4-08005	8	20	0.5	60	8	B	●
HV-R4-08010	8	20	1.0	60	8	B	●
HV-R4-10005	10	25	0.5	75	10	B	●
HV-R4-10010	10	25	1.0	75	10	B	●
HV-R4-12005	12	30	0.5	75	12	B	●
HV-R4-12010	12	30	1.0	75	12	B	●
HV-R4-12020	12	30	2	75	12	B	●

● Standard Stock ○ Reservation required

D	Tol.
D≤6	0 / -0.01
6<D≤12	0 / -0.02
D>12	0 / -0.03

(mm)

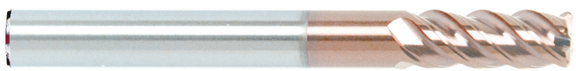
Workpiece Materials

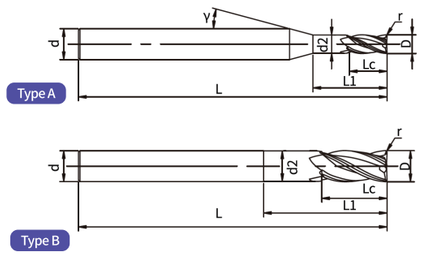
Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Copper alloy	Aluminium alloy
	○	◎	○					

◎ Best for ○ Suitable for

HV-RN4

4 Flutes, Corner Radius,with Long neck Length EndMill for Genera Machining





Ordering Code	Mill Dia.	Flute Length	Corner	Neck Dia	Neck Dia	Overall Length	Shank Dia.	Type	Stock
HV-RN4-06005	6	6	0.5	18	5.8	75	6	A	●
HV-RN4-06010	6	6	1.0	18	5.8	75	6	B	●
HV-RN4-08005-75	8	8	0.5	24	7.8	75	8	B	●
HV-RN4-08005	8	8	0.5	24	7.8	100	8	B	●
HV-RN4-08010	8	8	1.0	24	7.8	100	8	B	●
HV-RN4-10005	10	10	0.5	30	9.6	100	10	B	●
HV-RN4-10010	10	10	1.0	30	9.6	100	10	B	●
HV-RN4-10020	10	10	2.0	30	9.6	100	10	B	●
HV-RN4-12005	12	12	0.5	36	11.5	100	12	B	●
HV-RN4-12010	12	12	1.0	36	11.5	100	12	B	●
HV-RN4-12020	12	12	2.0	36	11.5	100	12	B	●
HV-RN4-16010	16	16	1.0	40	15.5	150	16	B	●
HV-RN4-16020	16	16	2.0	40	15.5	150	16	B	●

● Standard Stock ○ Reservation required

D	Tol.
D≤6	0 -0.01
6<D≤12	0 -0.02
D>12	0 -0.03

(mm)

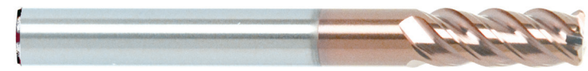
Workpiece Materials

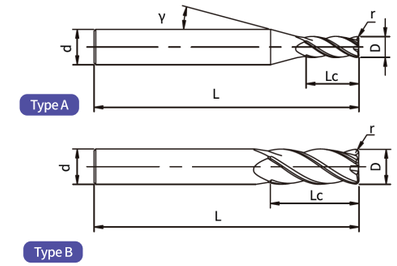
Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Copper alloy	Aluminium alloy
	○	◎	○					

◎ Best for ○ Suitable for

HV-RN4

4 Flutes, Corner Long Shank EndMill for General Machining





Ordering Code	Mill Dia (D)	Flute Length (Lc)	Corner (r)	Overall Length (L)	Shank Dia. (d)	Type	Stock
HV-RH4-04002	4	10	0.2	75	4	B	●
HV-RH4-04003	4	10	0.3	75	4	B	●
HV-RH4-04005	4	10	0.5	75	4	B	●
HV-RH4-04010	4	10	1	75	4	B	●
HV-RH4-06005	6	16	0.5	75	6	B	●
HV-RH4-06010	6	16	1	75	6	B	●
HV-RH4-08005	8	20	0.5	75	8	B	●
HV-RH4-08010	8	20	1	75	8	B	●
HV-RH4-08005-100	8	20	0.5	100	8	B	●
HV-RH4-08010-100	8	20	1	100	8	B	●
HV-RH4-10005	10	25	0.5	100	10	B	●
HV-RH4-10010	10	25	1	100	10	B	●
HV-RH4-12005	12	30	0.5	100	12	B	●
HV-RH4-12010	12	30	1	100	12	B	●
HV-RH4-12020	12	30	2	100	12	B	●

● Standard Stock ○ Reservation required

D	Tol.
D≤6	0 -0.01
6<D≤12	0 -0.02
D>12	0 -0.03

(mm)

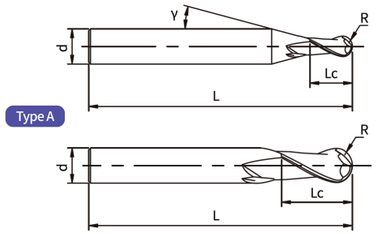
Workpiece Materials

Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Copper alloy	Aluminium alloy
	○	◎	○					

◎ Best for ○ Suitable for

HV-B2

2 Flutes, Ball Nose End Mill for Hardened Steels Machining



Ordering Code	Mill Dia (D)	Flute Length (Lc)	Ball Radius (R)	Overall Length (L)	Shank Dia. (d)	Type	Stock
HV-B2-01002	1	2	0.5	50	4	A	●
HV-B2-01503	1.5	3	0.75	50	4	A	●
HV-B2-02004	2	4	1	50	4	A	●
HV-B2-02505	2.5	5	1.25	50	4	A	●
HV-B2-03006	3	6	1.5	50	4	A	●
HV-B2-63006	3	6	1.5	50	6	A	●
HV-B2-04008	4	8	2	50	4	B	●
HV-B2-64008	4	8	2	50	6	A	●
HV-B2-05010	5	10	2.5	50	6	A	●
HV-B2-06012	6	12	3	50	6	B	●
HV-B2-07014	7	14	3.5	60	8	A	●
HV-B2-08016	8	14	4	60	8	B	●
HV-B2-10020	10	20	5	75	10	B	●
HV-B2-12024	12	24	6	75	12	B	●
HV-B2-16032	16	32	8	100	16	B	●

● Standard Stock ○ Reservation required

D	Tol.
D≤6	0 / -0.01
6<D≤12	0 / -0.02
D>12	0 / -0.03

(mm)

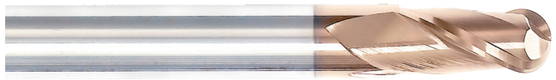
Workpiece Materials

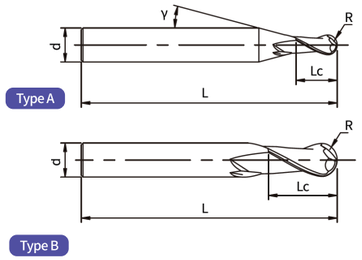
Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Copper alloy	Aluminium alloy
	○	◎	○					

◎ Best for ○ Suitable for

HV-BH2

2 Flutes, Ball Nose with Long Shank Length End Mill for General





Ordering Code	Mill Dia (D)	Flute Length (Lc)	Ball Radius (R)	Overall Length (L)	Shank Dia. (d)	Type	Stock
HV-BH2-02004	2	4	1	75	4	A	●
HV-BH2-03006	3	6	1.5	75	4	A	●
HV-BH2-63006	3	6	1.5	75	6	A	●
HV-BH2-04008	4	8	2	75	4	A	●
HV-BH2-64008	4	8	2	75	6	A	●
HV-BH2-65010	5	10	2.5	75	6	A	●
HV-BH2-06012	6	12	3	75	6	B	●
HV-BH2-06012-100	6	12	3	100	6	B	●
HV-BH2-08016	8	16	4	75	8	B	●
HV-BH2-08016-100	8	16	4	100	8	B	●
HV-BH2-10020	10	20	5	100	10	B	●
HV-BH2-12024	12	24	6	100	12	B	●
HV-BH2-16032	16	32	8	150	16	B	●

● Standard Stock ○ Reservation required

D	Tol.
D≤6	0 / -0.01
6<D≤12	0 / -0.02
D>12	0 / -0.03

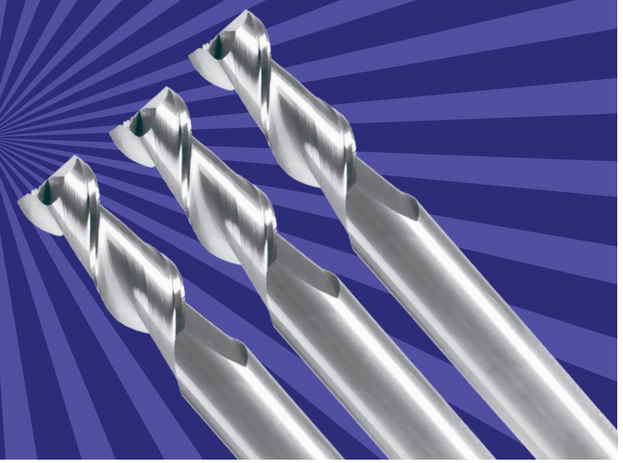
(mm)

Workpiece Materials

Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Copper alloy	Aluminium alloy
	○	◎	○					

◎ Best for ○ Suitable for

A Series General Machining for Aluminum Alloys



Geometry structure

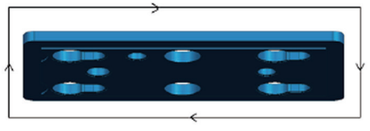
◎ Big rake angle and special flute design effectively prevent build-up-edge, making the tool perform well in finishing;

◎ Special groove design guarantees both tool strength and chip removal performance, greatly increasing the machining stability;

Substrate and coating strength

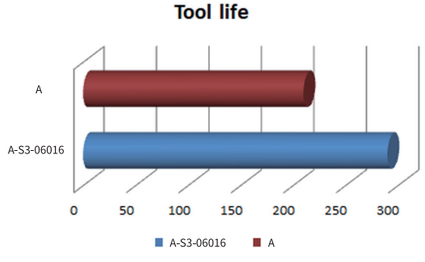
◎ Ultra fine substrate, good wear resistance and cutting edge strength.

The machining surface（20X）



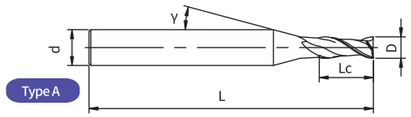
Cutting Path

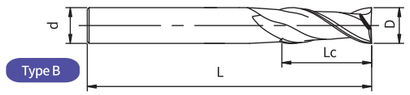
- Model No:A-S3-06016
- Specification:D6*16*50*d6
- Workpiece material:AL6063
- Cutting speed:12000RPM
- Feed rate:600mm/min
- Way of cutting:finishing, side milling
- ap, ae: ap=5mm，ae=0.05mm
- Coolant:emulsion



A-S2/SS2/SL2

2 Flutes, Square Endmill For Aluminium Alloys General Machining





Ordering Code	Mill Dia. (D)	Flute Length (Lc)	Overall Length (L)	Shank Dia. (d)	Type	Stock
A-S2-01003	1	3	50	4	A	●
A-SL2-01005	1	5	50	4	A	○
A-S2-01203	1.2	3	50	4	A	○
A-SS2-01503	1.5	3	50	4	A	○
A-S2-01504	1.5	4	50	4	A	●
A-SL2-01505	1.5	5	50	4	A	○
A-SL2-01506	1.5	6	50	4	A	○
A-SS2-02004	2	4	50	4	A	○
A-S2-02006	2	6	50	4	A	●
A-SL2-02008	2	8	50	4	A	○
A-S2-02508	2.5	8	50	4	A	○
A-SS2-03006	3	6	50	4	A	○
A-S2-03009	3	9	50	4	A	●
A-S2-63009	3	9	50	6	A	○

● Standard Stock ○ Reservation required

D	Tol.
D≤12	0 -0.02

(mm)

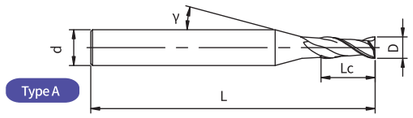
Workpiece Materials

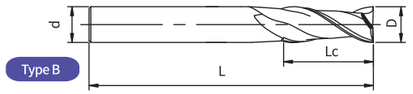
Carbon steels Alloy steels	Pre-hardened steels ＜45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels ＞65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Copper alloy	Aluminium alloy
							○	◎

◎ Best for ○ Suitable for

A-S2/SS2/SL2

2 Flutes, Square Endmill For Aluminium Alloys General Machining





Ordering Code	Mill Dia. (D)	Flute Length (Lc)	Overall Length (L)	Shank Dia. (d)	Type	Stock
A-SS2-04006	4	6	50	4	B	○
A-S2-04011	4	11	50	4	B	●
A-S2-64011	4	11	50	6	A	○
A-S2-05013	5	13	50	6	A	○
A-SS2-06009	6	9	50	6	B	○
A-SS2-06012	6	12	50	6	B	○
A-S2-06016	6	16	50	6	B	●
A-SS2-08009	8	9	60	8	B	○
A-SS2-08015	8	15	60	8	B	○
A-S2-08020	8	20	60	8	B	●
A-SS2-10015	10	15	75	10	B	○
A-S2-10025	10	25	75	10	B	○
A-SS2-12015	12	15	75	10	B	○
A-S2-12030	12	30	75	12	B	○

● Standard Stock ○ Reservation required

D	Tol.
D≤12	0 -0.02

(mm)

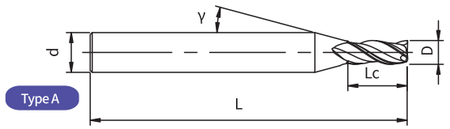
Workpiece Materials

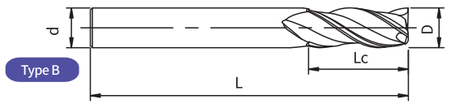
Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Copper alloy	Aluminium alloy
							○	◎

◎ Best for ○ Suitable for

A-S3/SS3/SL3

3 Flutes, Square Endmill For Aluminium Alloys General Machining





Ordering Code	Mill Dia. (D)	Flute Length (Lc)	Overall Length (L)	Shank Dia. (d)	Type	Stock
A-S3-01003	1	3	50	4	A	●
A-SL3-01005	1	5	50	4	A	○
A-S3-01203	1.2	3	50	4	A	○
A-S3-01504	1.5	4	50	4	A	●
A-SL3-01505	1.5	5	50	4	A	○
A-SS3-02004	2	4	50	4	A	○
A-S3-02006	2	6	50	4	A	●
A-S3-02508	2.5	8	50	4	A	●
A-SS3-03006	3	6	50	4	A	○
A-S3-03009	3	9	50	4	A	●
A-SS3-04006	4	6	50	4	B	○
A-S3-04011	4	11	50	4	B	●
A-S3-64011	4	11	50	6	A	○
A-S3-05013	5	13	50	6	A	●
A-SS3-06012	6	12	50	6	B	●
A-S3-06016	6	16	50	6	B	●
A-SS3-08015	8	15	60	8	B	○
A-S3-08020	8	20	60	8	B	●
A-SS3-10015	10	15	75	10	B	○
A-S3-10025	10	25	75	10	B	●
A-SS3-12015	12	15	75	12	B	○
A-S3-12030	12	30	75	12	B	●

● Standard Stock ○ Reservation required

D	Tol.
D≤12	0 -0.02

(mm)

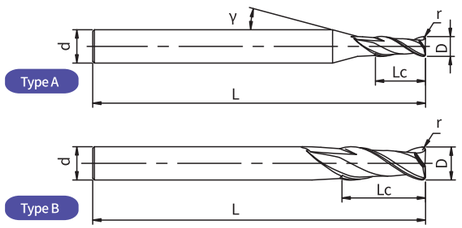
Workpiece Materials

Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Copper alloy	Aluminium alloy
							○	◎

◎ Best for ○ Suitable for

A-R2/RS2/RL2

2 Flutes, Corner Radius Endmill For Aluminium Alloys General Machining



Ordering Code	Mill Dia. (D)	Flute Length (Lc)	Corner Radius (r)	Overall Length (L)	Shank Dia. (d)	Type	Stock
A-R2-01001	1	3	0.1	50	4	A	●
A-R2-01002	1	3	0.2	50	4	A	○
A-R2-01202	1.2	3	0.2	50	4	A	○
A-RL2-01502	1.5	6	0.2	50	4	A	○
A-R2-02002	2	6	0.2	50	4	A	○
A-R2-02005	2	6	0.5	50	4	A	●
A-R2-03002	3	9	0.2	50	4	A	●
A-R2-03003	3	9	0.3	50	4	A	○
A-R2-03005	3	9	0.5	50	4	A	○
A-R2-04002	4	11	0.2	50	4	B	●
A-RS2-04005	4	6	0.5	50	4	B	○
A-R2-05002	5	13	0.2	50	6	A	○
A-R2-05003	5	13	0.3	50	6	A	○
A-R2-06005	6	16	0.5	50	6	B	○
A-R2-06010	6	16	1	50	6	B	○
A-R2-08005	8	20	0.5	60	8	B	○
A-R2-08010	8	20	1	60	8	B	○
A-RS2-10002	10	15	0.2	50	10	B	○
A-R2-10005	10	25	0.5	75	10	B	○
A-R2-10020	10	25	2	75	10	B	○

● Standard Stock ○ Reservation required

D	Tol.
D≤12	0 / -0.02

(mm)

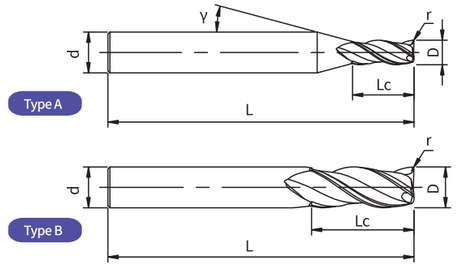
Workpiece Materials

Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Copper alloy	Aluminium alloy
							○	◎

◎ Best for ○ Suitable for

A-R3/RS3

3 Flutes, Corner Radius Endmill For Aluminium Alloys General Machining



Ordering Code	Mill Dia. (D)	Flute Length (Lc)	Corner Radius (r)	Overall Length (L)	Shank Dia. (d)	Type	Stock
A-R3-02002	2	6	0.2	50	4	A	○
A-R3-03002	3	9	0.2	50	4	A	○
A-R3-04002	4	11	0.2	50	4	B	○
A-R3-04005	4	11	0.5	50	4	B	○
A-R3-05002	5	13	0.2	50	6	A	○
A-R3-05005	5	13	0.5	50	6	A	○
A-R3-06005	6	16	0.5	50	6	B	○
A-R3-06010	6	16	1	50	6	B	○
A-RS3-08002	8	9	0.2	60	8	B	○
A-R3-08005	8	20	0.5	60	8	B	○
A-R3-08010	8	20	1	60	8	B	○
A-R3-10005	10	25	0.5	75	10	B	○
A-RS3-10005	10	10	0.5	50	10	B	○
A-R3-10020	10	25	2	75	10	B	○

● Standard Stock ○ Reservation required

D	Tol.
D≤12	0 / -0.02

(mm)

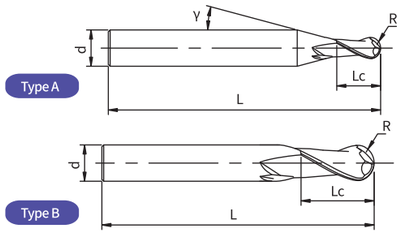
Workpiece Materials

Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Copper alloy	Aluminium alloy
							○	◎

◎ Best for ○ Suitable for

A-B2

2 Flutes, Ballnose Endmill For Aluminium Alloys General Machining



Ordering Code	Mill Dia. (D)	Ball Radius (R)	Flute Length (Lc)	Overall Length (L)	Shank Dia. (d)	Type	Stock
A-B2-01002	1	0.5	2	50	4	A	●
A-B2-02004	2	1	4	50	4	A	●
A-B2-02006	2	1	6	50	4	A	○
A-B2-03006	3	1.5	6	50	4	A	●
A-B2-04008	4	2	8	50	4	B	●
A-B2-64009	4	2	9	50	6	A	○
A-B2-06012	6	3	12	50	6	B	●
A-B2-08014	8	4	14	60	8	B	●
A-B2-10018	10	5	18	75	10	B	●

● Standard Stock ○ Reservation required

R	Tol.
R≤1.5	0 / -0.01
1.5<R<3	0 / -0.015
R≥3	0 / -0.02

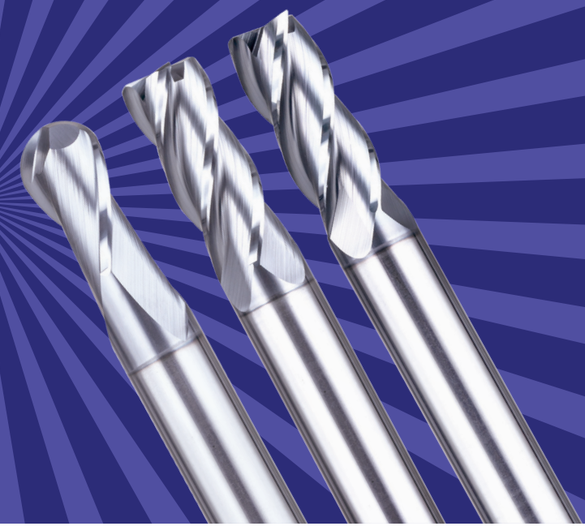
(mm)

Workpiece Materials

Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Copper alloy	Aluminium alloy
							○	◎

◎ Best for ○ Suitable for

S Series General Machining Series for Stainless Steel



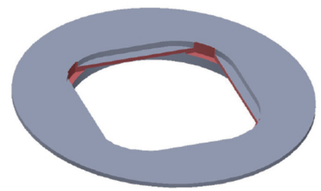
Substrate and coating strength

◎ Use ultra fine carbide and TiAlN coating, with good heat resistance, Smooth coating surface reduces cutting force;

Geometry structure

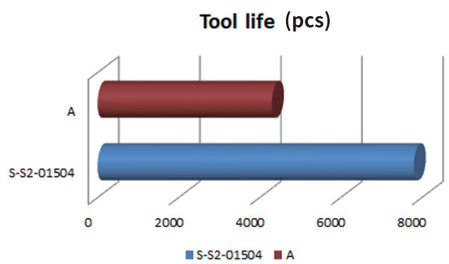
◎ Special cutting edge design, effectively solve the issue of sticky chip on cutting edge;

◎ Full angle protection design gives the tool with good anti-breaking performance, which is suitable for general machining.



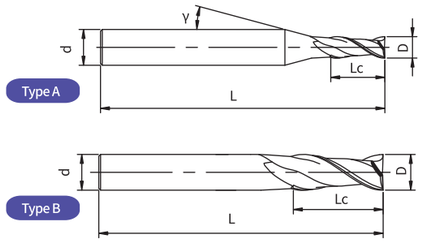
Red represents the processing area

- Model No:S-S2-01504
- Specification:D1.5*4*50*d4
- Workpiece material:SUS316L(HB150-200)
- Cutting speed:12000RPM
- Feed rate:2025mm/min
- Way of cutting:shoulder milling, side milling
- ap, ae: shoulder milling ap=0.6mm，ae=0.3mm
  side milling ap=0.3mm，ae=0.03mm
- Coolant:oil



S-S2

2 Flutes, Square Endmill For Stainless Steel General Machining



Ordering Code	Mill Dia. (D)	Flute Length (Lc)	Overall Length (L)	Shank Dia. (d)	Type	Stock
S-S2-00501	0.5	1	50	4	A	●
S-S2-00802	0.8	2	50	4	A	●
S-S2-01003	1	3	50	4	A	●
S-S2-01504	1.5	4	50	4	A	●
S-S2-02006	2	6	50	4	A	●
S-S2-02508	2.5	8	50	4	A	●
S-S2-03009	3	9	50	4	A	●
S-S2-04011	4	11	50	4	B	●
S-S2-06016	6	16	50	6	B	●
S-S2-08020	8	20	60	8	B	●

● Standard Stock ○ Reservation required

D	Tol.
D≤12	0 / -0.02

(mm)

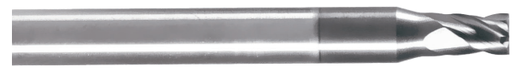
Workpiece Materials

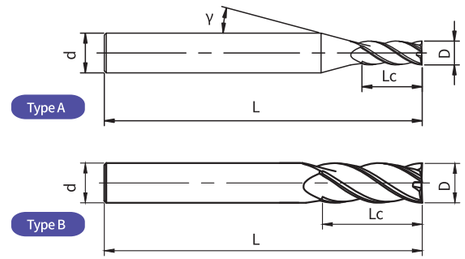
Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Copper alloy	Aluminium alloy
○					◎			

◎ Best for ○ Suitable for

S-SS4

4 Flutes, Square Short Flute Endmill For Stainless Steel General Machining





Ordering Code	Mill Dia. (D)	Flute Length (Lc)	Overall Length (L)	Shank Dia. (d)	Type	Stock
S-SS4-02004	2	4	50	4	A	●
S-SS4-03004	3	4	50	4	A	●
S-SS4-04006	4	6	50	4	B	●
S-SS4-05008	5	8	50	6	A	○
S-SS4-06009	6	9	50	6	B	●
S-SS4-08010	8	10	60	8	B	●
S-SS4-10012	10	12	75	10	B	●

● Standard Stock ○ Reservation required

D	Tol.
D≤12	0 / -0.02

(mm)

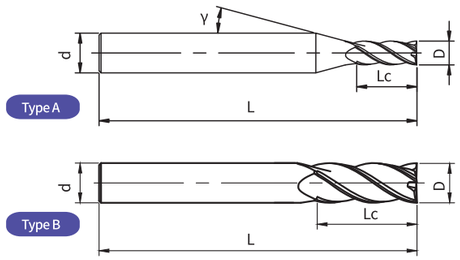
Workpiece Materials

Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Copper alloy	Aluminium alloy
○					◎			

◎ Best for ○ Suitable for

S-S4

4 Flutes, Square Endmill For Stainless Steel General Machining



Ordering Code	Mill Dia. (D)	Flute Length (Lc)	Overall Length (L)	Shank Dia. (d)	Type	Stock
S-S4-01003	1	3	50	4	A	●
S-S4-01504	1.5	4	50	4	A	●
S-S4-02006	2	6	50	4	A	●
S-S4-02508	2.5	8	50	4	A	●
S-S4-03009	3	9	50	4	A	●
S-S4-03510	3.5	10	50	4	A	●
S-S4-04011	4	11	50	4	B	●
S-S4-64011	4	11	50	6	A	●
S-S4-05013	5	13	50	6	A	●
S-S4-06016	6	16	50	6	B	●
S-S4-08020	8	20	60	8	B	●
S-S4-10025	10	25	75	10	B	●
S-S4-12030	12	30	75	12	B	●

● Standard Stock ○ Reservation required

D	Tol.
D≤12	0 / -0.02

(mm)

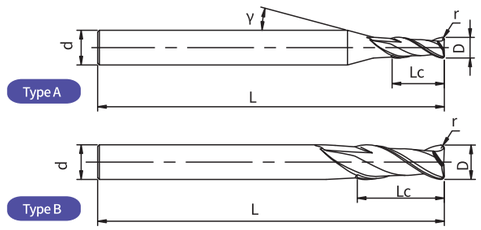
Workpiece Materials

Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Copper alloy	Aluminium alloy
○					◎			

◎ Best for ○ Suitable for

S-R2

2 Flutes, Corner Radius Endmill For Stainless Steel General Machining



Ordering Code	Mill Dia. (D)	Flute Length (Lc)	Corner (r)	Overall Length (L)	Shank Dia. (d)	Type	Stock
S-R2-03003	3	9	0.3	50	4	A	○
S-R2-03005	3	9	0.5	50	4	A	○
S-R2-04003	4	11	0.3	50	4	B	○
S-R2-64002	4	11	0.2	50	6	A	○
S-R2-64003	4	11	0.3	50	6	A	○
S-R2-64005	4	11	0.5	50	6	A	○
S-R2-05002	5	13	0.2	50	6	A	○
S-R2-05003	5	13	0.3	50	6	A	○
S-R2-05005	5	13	0.5	50	6	A	○
S-R2-06002	6	16	0.2	50	6	B	○
S-R2-06003	6	16	0.3	50	6	B	○
S-R2-06005	6	16	0.5	50	6	B	○
S-R2-08005	8	20	0.5	60	8	B	○
S-R2-08010	8	20	1.0	60	8	B	○

● Standard Stock ○ Reservation required

D	Tol.
D≤12	0 / -0.02

(mm)

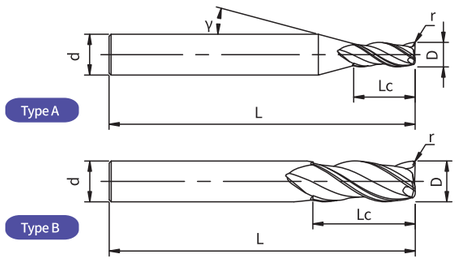
Workpiece Materials

Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Copper alloy	Aluminium alloy
○					◎			

◎ Best for ○ Suitable for

S-R3

3 Flutes, Corner Radius Endmill For Stainless Steel General Machining



Ordering Code	Mill Dia. (D)	Flute Length (Lc)	Corner (r)	Overall Length (L)	Shank Dia. (d)	Type	Stock
S-R3-02001	2	6	0.1	50	4	A	●
S-R3-02002	2	6	0.2	50	4	A	●
S-R3-04002	4	11	0.2	50	4	B	●
S-R3-64005	4	11	0.5	50	6	A	●
S-R3-06002	6	16	0.2	50	6	B	○
S-R3-06005	6	16	0.5	50	6	B	○

● Standard Stock ○ Reservation required

D	Tol.
D≤12	0 -0.02

(mm)

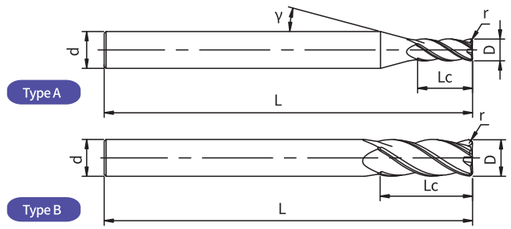
Workpiece Materials

Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Copper alloy	Aluminium alloy
○					◎			

◎ Best for ○ Suitable for

S-R4/RS4

4 Flutes, Corner Radius Short Flute Endmill For Stainless Steel General Machining



Ordering Code	Mill Dia. (D)	Flute Length (Lc)	Corner (r)	Overall Length (L)	Shank Dia. (d)	Type	Stock
S-R4-02002	2	6	0.2	50	4	A	●
S-R4-03003	3	9	0.3	50	4	A	○
S-R4-03005	3	9	0.5	50	4	A	○
S-R4-04003	4	11	0.3	50	4	B	○
S-R4-04005	4	11	0.5	50	4	B	○
S-R4-64002	4	11	0.2	50	6	A	●
S-R4-64003	4	11	0.3	50	6	A	○
S-R4-05005	5	13	0.5	50	6	B	○
S-R4-06005	6	16	0.5	50	6	B	●
S-RS4-06005	6	6	0.5	50	6	B	●
S-R4-08002	8	20	0.2	60	8	B	○
S-R4-08005	8	20	0.5	60	8	B	●
S-R4-08010	8	20	1	60	8	B	○
S-R4-10005	10	25	0.5	75	10	B	○

● Standard Stock ○ Reservation required

D	Tol.
D≤12	0 -0.02

(mm)

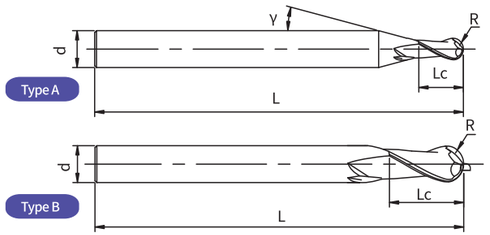
Workpiece Materials

Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Copper alloy	Aluminium alloy
○					◎			

◎ Best for ○ Suitable for

S-B2

2 Flutes, Ballnose Endmill For Stainless Steel General Machining



Ordering Code	Mill Dia. (D)	Ball Radius (R)	Flute Length (Lc)	Overall Length (L)	Shank Dia. (d)	Type	Stock
S-B2-01002	1	0.5	2	50	4	A	○
S-B2-01503	1.5	0.75	3	50	4	A	○
S-B2-02004	2	1	4	50	4	A	○
S-B2-03006	3	1.5	6	50	4	A	○
S-B2-63006	3	1.5	6	50	6	A	○
S-B2-04008	4	2	8	50	4	B	○
S-B2-64008	4	2	8	50	6	A	○
S-B2-05010	5	2.5	10	50	6	A	○
S-B2-06012	6	3	12	50	6	B	○
S-B2-08014	8	4	14	60	8	B	●

● Standard Stock ○ Reservation required

R	Tol.
R≤1.5	0 -0.01
1.5<R<3	0 -0.015
R≥3	0 -0.02

(mm)

Workpiece Materials

Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Copper alloy	Aluminium alloy
○					◎			

◎ Best for ○ Suitable for

S10 Series End Mills For Stainless Steels General Machining

Geometry structure

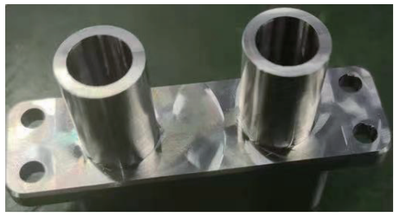
◎ Use high pure diamond coating, perfect adhesiveness between substrate and coating; Good wear resistance enable longer life during machining;

◎ Double edge belt design, arc edge belt is conducive to sharper side edges, and special groove design ensures the rigidity of cutting edges;

◎ New independent research and development of professional tool matrix to ensure the anti collapse performance of rough cutting;

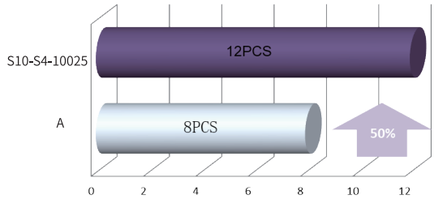
Substrate and coating strength

◎ Balzers AlCr series coating is adopted, which has good high-temperature oxidation resistance and greatly improves tool wear resistance.



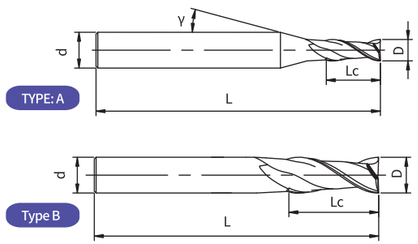
- Model No:S10-S4-10025
- Specification:D10*25*75*d10
- Workpiece material:S316L
- Processing parameters:S=3.2krpm、F=450mm/min
- ap=15mm，ae=0.9mm
- Way of cutting: Side milling rough machining

process quantity（PCS）



S10-S2

2 Flutes, Square Endmill For Stainless Steel General Machining



Ordering Code	Mill Dia. (D)	Flute Length (Lc)	Overall Length (L)	Shank Dia. (d)	Type	Stock
S10-S2-00501	0.5	1	50	4	A	●
S10-S2-00802	0.8	2	50	4	A	●
S10-S2-01003	1	3	50	4	A	●
S10-S2-01504	1.5	4	50	4	A	●
S10-S2-02006	2	6	50	4	A	●
S10-S2-02508	2.5	8	50	4	A	●
S10-S2-03009	3	9	50	4	A	●
S10-S2-04011	4	11	50	4	B	●
S10-S2-06016	6	16	50	6	B	●
S10-S2-08020	8	20	60	8	B	●

● Standard Stock ○ Reservation required

D	Tol.
D≤12	0 / -0.02
D>12	0 / -0.03

(mm)

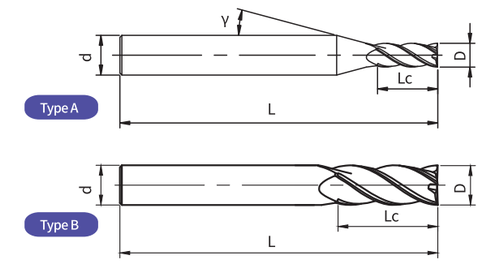
Workpiece Materials

Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Copper alloy	Aluminium alloy
○					◎			

◎ Best for ○ Suitable for

S10-SS4

4 Flutes, Square Short Flute Endmill For Stainless Steel General Machining



Ordering Code	Mill Dia. (D)	Flute Length (Lc)	Overall Length (L)	Shank Dia. (d)	Type	Stock
S10-SS4-02004	2	4	50	4	A	●
S10-SS4-03004	3	4	50	4	A	●
S10-SS4-04006	4	6	50	4	B	●
S10-SS4-05008	5	8	50	6	A	○
S10-SS4-06009	6	9	50	6	B	●
S10-SS4-08010	8	10	60	8	B	●
S10-SS4-10012	10	12	75	10	B	●

D	Tol.
D≤12	0 / -0.02
D>12	0 / -0.03

(mm)

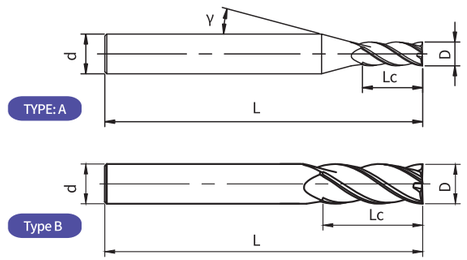
Workpiece Materials

Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Copper alloy	Aluminium alloy
○					◎			

◎ Best for ○ Suitable for

S10-S4

4 Flutes, Square Endmill For Stainless Steel General Machining



Ordering Code	Mill Dia. (D)	Flute Length (Lc)	Overall Length (L)	Shank Dia. (d)	Type	Stock
S10-S4-01003	1	3	50	4	A	●
S10-S4-01504	1.5	4	50	4	A	●
S10-S4-02006	2	6	50	4	A	●
S10-S4-02508	2.5	8	50	4	A	●
S10-S4-03009	3	9	50	4	A	●
S10-S4-03510	3.5	10	50	4	A	●
S10-S4-04011	4	11	50	4	B	●
S10-S4-64011	4	11	50	6	A	●
S10-S4-05013	5	13	50	6	A	●
S10-S4-06016	6	16	50	6	B	●
S10-S4-08020	8	20	60	8	B	●
S10-S4-10025	10	25	75	10	B	●
S10-S4-12030	12	30	75	12	B	●
S10-S4-14034	14	34	100	14	B	●
S10-S4-16036	16	36	100	16	B	●

● Standard Stock ○ Reservation required

D	Tol.
D≤12	0 -0.02
D>12	0 -0.03

(mm)

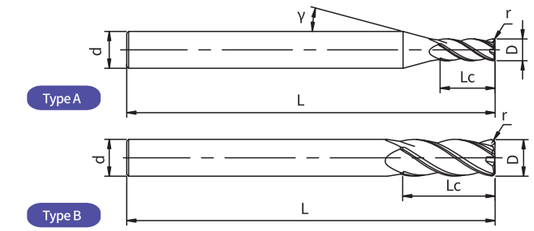
Workpiece Materials

Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Copper alloy	Aluminium alloy
○					◎			

◎ Best for ○ Suitable for

S10-R4/RS4

4 Flutes, Corner Radius Short Flute Endmill For Stainless Steel General Machining



Ordering Code	Mill Dia. (D)	Flute Length (Lc)	Corner (r)	Overall Length (L)	Shank Dia. (d)	Type	Stock
S10-R4-02002	2	6	0.2	50	4	A	●
S10-R4-03003	3	9	0.3	50	4	A	○
S10-R4-03005	3	9	0.5	50	4	A	●
S10-R4-04003	4	11	0.3	50	4	B	○
S10-R4-04005	4	11	0.5	50	4	B	●
S10-R4-64002	4	11	0.2	50	6	A	○
S10-R4-64003	4	11	0.3	50	6	A	○
S10-R4-05005	5	13	0.5	50	6	B	○
S10-R4-06005	6	16	0.5	50	6	B	●
S10-RS4-06005	6	6	0.5	50	6	B	●
S10-R4-08002	8	20	0.2	60	8	B	○
S10-R4-08005	8	20	0.5	60	8	B	●
S10-R4-08010	8	20	1	60	8	B	○
S10-R4-10005	10	25	0.5	75	10	B	●

● Standard Stock ○ Reservation required

D	Tol.
D≤12	0 -0.02
D>12	0 -0.03

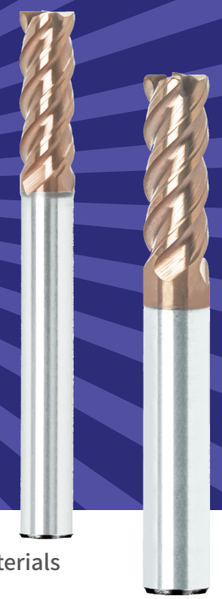
(mm)

Workpiece Materials

Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Copper alloy	Aluminium alloy
○					◎			

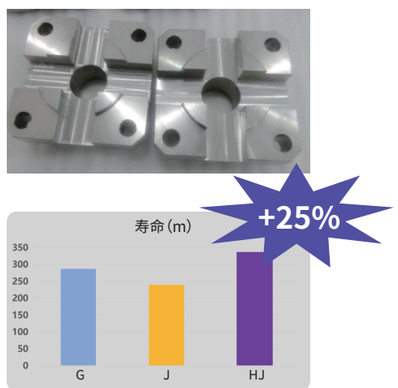
◎ Best for ○ Suitable for

T Series General Machining



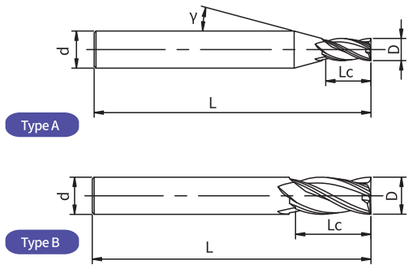
- Suitable for high-performance processing of titanium alloy and stainless steel materials
- Independently developed high-performance and difficult to machine material specialized matrix with strong high-temperature resistance, achieving longer tool cutting life
- Adopting unequal tooth pitch and unequal spiral segmentation design, effectively prefabricating vibration to achieve higher surface quality
- High strength blade design with special arc rake surface treatment ensures the strength and sharpness of the blade tip, enabling stable cutting of the tool
- The use of TiAlCrSiN high-performance nano coating, combined with a special coating process, effectively enhances the wear resistance of the cutting tool

- Model No:T-R4-06003
- Specification:D6*R0.3*13*50L*d6
- Workpiece material:TC4 (HRC45)
- Processing type:semifinishing
- Cut method:side milling
- Cutting Speed:Vc=132 m/min
- Feed rate:fn=0.06mm/rev
- Cutting depth:6mm
- Cutting width:0.3mm
- Slack length:20mm
- 冷却方式 :emulsion



T-S4

4 Flutes, Square Endmill For Titanium Alloy High-performance Machining



Ordering Code	Mill Dia. (D)	Flute Length (Lc)	Overall Length (L)	Shank Dia. (d)	Type	Stock
T-S4-02006	2	6	50	4	A	●
T-S4-02508	2.5	8	50	4	A	●
T-S4-03008	3	8	50	4	A	●
T-S4-04011	4	11	50	4	B	●
T-S4-64011	4	11	50	6	A	●
T-S4-05013	5	13	50	6	A	●
T-S4-06016	6	16	50	6	B	●
T-S4-08020	8	20	60	8	B	●
T-S4-10025	10	25	75	10	B	●
T-S4-12030	12	30	75	12	B	●
T-S4-14032	14	32	100	14	B	○
T-S4-16040	16	40	100	16	B	●
T-S4-20045	20	45	100	20	B	○

● Standard Stock ○ Reservation required

D	Tol.
D≤12	0 -0.02
D>12	0 -0.03

(mm)

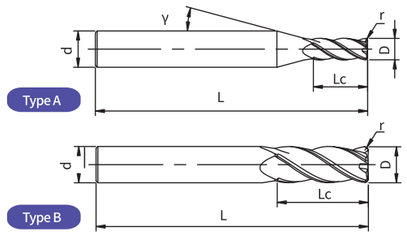
Workpiece Materials

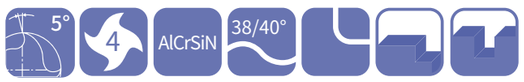
Cast	Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	High temperature alloy	Copper alloy	Aluminium alloy
	○					◎	◎	○		

◎ Best for ○ Suitable for

T-R4

4 flutes, corner radius endmill for titanium alloy high-performance machining





Ordering Code	Mill Dia. (D)	Flute Length (Lc)	Corner (r)	Overall Length (L)	Shank Dia. (d)	Type	Stock
T-R4-02002	2	6	0.2	50	4	A	○
T-R4-03002	3	8	0.2	50	4	A	●
T-R4-04003	4	10	0.3	50	4	B	●
T-R4-04005	4	10	0.5	50	4	B	●
T-R4-05005	5	13	0.5	50	6	A	●
T-R4-06002	6	16	0.2	50	6	B	●
T-R4-06003	6	16	0.3	50	6	B	●
T-R4-06005	6	16	0.5	50	6	B	●
T-R4-06010	6	16	1	50	6	B	○
T-R4-08002	8	20	0.2	60	8	B	●
T-R4-08003	8	20	0.3	60	8	B	●
T-R4-08005	8	20	0.5	60	8	B	●
T-R4-08010	8	20	1	60	8	B	●
T-R4-08020	8	20	2	60	8	B	○
T-R4-10002	10	25	0.2	75	10	B	●
T-R4-10003	10	25	0.3	75	10	B	○
T-R4-10005	10	25	0.5	75	10	B	●
T-R4-10010	10	25	1	75	10	B	●
T-R4-10015	10	25	1.5	75	10	B	○
T-R4-10020	10	25	2	75	10	B	●
T-R4-12002	12	30	0.2	75	12	B	○

● Standard Stock ○ Reservation required

D	Tol.
D≤12	0 -0.02
D>12	0 -0.03

(mm)

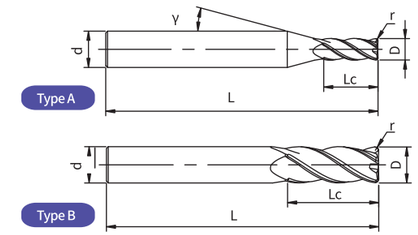
Workpiece Materials

Cast	Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	High temperature alloy	Copper alloy	Aluminium alloy
	○					◎	◎	○		

◎ Best for ○ Suitable for

T-R4

4 flutes, corner radius endmill for titanium alloy high-performance machining



Ordering Code	Mill Dia. (D)	Flute Length (Lc)	Corner (r)	Overall Length (L)	Shank Dia. (d)	Type	Stock
T-R4-12003	12	30	0.3	75	12	B	○
T-R4-12005	12	30	0.5	75	12	B	●
T-R4-12010	12	30	1	75	12	B	●
T-R4-12020	12	30	2	75	12	B	●
T-R4-12030	12	30	3	75	12	B	○
T-R4-14002	14	35	0.2	100	14	B	○
T-R4-14005	14	35	0.5	100	14	B	○
T-R4-14010	14	35	1	100	14	B	○
T-R4-14020	14	35	2	100	14	B	●
T-R4-14030	14	35	3	100	14	B	○
T-R4-16002	16	35	0.2	100	16	B	○
T-R4-16005	16	35	0.5	100	16	B	○
T-R4-16010	16	35	1	100	16	B	●
T-R4-16020	16	35	2	100	16	B	●
T-R4-16050	16	35	3	100	16	B	○
T-R4-20002	20	45	0.2	100	20	B	○
T-R4-20005	20	45	0.5	100	20	B	○
T-R4-20010	20	45	1	100	20	B	○
T-R4-20020	20	45	2	100	20	B	○
T-R4-20050	20	45	3	100	20	B	○

● Standard Stock ○ Reservation required

D	Tol.
D≤12	0 -0.02
D>12	0 -0.03

(mm)

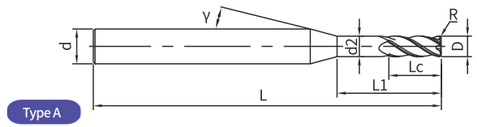
Workpiece Materials

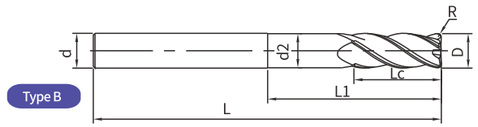
Cast	Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	High temperature alloy	Copper alloy	Aluminium alloy
	○					◎	◎	○		

◎ Best for ○ Suitable for

T-RN4

4 flutes, corner radius long neck endmill for titanium alloy high-performance machining





Ordering Code	Mill Dia.	Flute Length	Corner	Overall Length	Overall Length	Shank Dia.	Type	Stock
T-RN4-06005	6	12	0.5	20	75	6	B	○
T-RN4-06010	6	12	1	20	75	6	B	○
T-RN4-08005	8	16	0.5	25	75	8	B	○
T-RN4-08010	8	16	1	25	75	8	B	○
T-RN4-10005	10	20	0.5	32	75	10	B	○
T-RN4-10010	10	20	1	32	75	10	B	○
T-RN4-10020	10	20	2	32	75	10	B	○
T-RN4-10030	10	20	3	32	75	10	B	○
T-RN4-12005	12	24	0.5	40	100	12	B	○
T-RN4-12010	12	24	1	40	100	12	B	○
T-RN4-12020	12	24	2	40	100	12	B	○
T-RN4-12030	12	24	3	40	100	12	B	○
T-RN4-16005	16	32	0.5	50	100	16	B	○
T-RN4-16010	16	32	1	50	100	16	B	○
T-RN4-16020	16	32	2	50	100	16	B	○
T-RN4-16030	16	32	3	50	100	16	B	○
T-RN4-20005	20	35	0.5	60	150	20	B	○
T-RN4-20010	20	35	1	60	150	20	B	○
T-RN4-20020	20	35	2	60	150	20	B	○
T-RN4-20030	20	35	3	60	150	20	B	○

● Standard Stock ○ Reservation required

D	Tol.
D≤12	0 -0.02
D>12	0 -0.03

(mm)

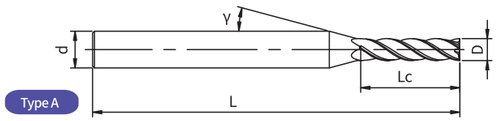
Workpiece Materials

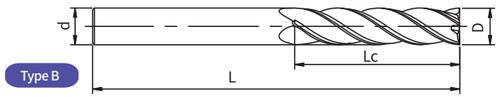
Cast	Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	High temperature alloy	Copper alloy	Aluminium alloy
	○					◎	◎	○		

◎ Best for ○ Suitable for

T-R5

5 flutes, corner radius endmill for titanium alloy high-performance machining





Ordering Code	Mill Dia. (D)	Flute Length (Lc)	Corner (r)	Overall Length (L)	Shank Dia. (d)	Type	Stock
T-R5-06002	6	16	0.2	50	6	B	○
T-R5-06003	6	16	0.3	50	6	B	○
T-R5-06005	6	16	0.5	50	6	B	●
T-R5-06010	6	16	1	50	6	B	○
T-R5-08002	8	20	0.2	60	8	B	○
T-R5-08003	8	20	0.3	60	8	B	○
T-R5-08005	8	20	0.5	60	8	B	●
T-R5-08010	8	20	1	60	8	B	●
T-R5-08020	8	20	2	60	8	B	○
T-R5-10002	10	25	0.2	75	10	B	○
T-R5-10003	10	25	0.3	75	10	B	○
T-R5-10005	10	25	0.5	75	10	B	●
T-R5-10010	10	25	1	75	10	B	○
T-R5-10015	10	25	1.5	75	10	B	○
T-R5-10020	10	25	2	75	10	B	○
T-R5-12002	12	30	0.2	75	12	B	○
T-R5-12003	12	30	0.3	75	12	B	○
T-R5-12005	12	30	0.5	75	12	B	○
T-R5-12010	12	30	1	75	12	B	●
T-R5-12015	12	30	1.5	75	12	B	○
T-R5-12020	12	30	2	75	12	B	○
T-R5-12025	12	30	2.5	75	12	B	○
T-R5-12030	12	30	3	75	12	B	○
T-R5-14002	14	35	0.2	100	14	B	○

● Standard Stock ○ Reservation required

D	Tol.
D≤12	0 -0.02
D>12	0 -0.03

(mm)

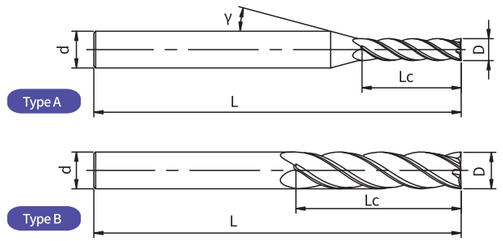
Workpiece Materials

Cast	Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	High temperature alloy	Copper alloy	Aluminium alloy
	○					◎	◎	○		

◎ Best for ○ Suitable for

T-R5

5 flutes, corner radius endmill for titanium alloy high-performance machining



Ordering Code	Mill Dia. (D)	Flute Length (Lc)	Corner (r)	Overall Length (L)	Shank Dia. (d)	Type	Stock
T-R5-14003	14	35	0.3	100	14	B	○
T-R5-14005	14	35	0.5	100	14	B	○
T-R5-14010	14	35	1	100	14	B	○
T-R5-14015	14	35	1.5	100	14	B	○
T-R5-14020	14	35	2	100	14	B	○
T-R5-14025	14	35	2.5	100	14	B	○
T-R5-14030	14	35	3	100	14	B	○
T-R5-16002	16	35	0.2	100	16	B	○
T-R5-16003	16	35	0.3	100	16	B	○
T-R5-16005	16	35	0.5	100	16	B	○
T-R5-16010	16	35	1	100	16	B	○
T-R5-16015	16	35	1.5	100	16	B	○
T-R5-16020	16	35	2	100	16	B	○
T-R5-16025	16	35	2.5	100	16	B	○
T-R5-16050	16	35	3	100	16	B	○
T-R5-16040	16	35	4	100	16	B	○
T-R5-20002	20	45	0.2	100	20	B	○
T-R5-20003	20	45	0.3	100	20	B	○
T-R5-20005	20	45	0.5	100	20	B	○
T-R5-20010	20	45	1	100	20	B	○
T-R5-20015	20	45	1.5	100	20	B	○
T-R5-20020	20	45	2	100	20	B	○
T-R5-20025	20	45	2.5	100	20	B	○
T-R5-20050	20	45	3	100	20	B	○
T-R5-20040	20	45	4	100	20	B	○

● Standard Stock ○ Reservation required

D	Tol.
D≤12	0 / -0.02
D>12	0 / -0.03

(mm)

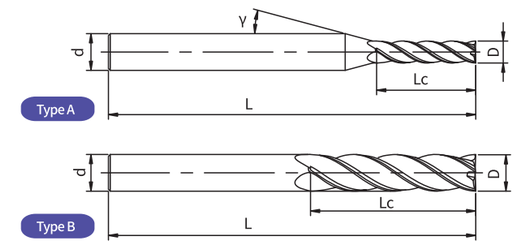
Workpiece Materials

Cast	Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	High temperature alloy	Copper alloy	Aluminium alloy
	○					◎	◎	○		

◎ Best for ○ Suitable for

T-R6

6 flutes, corner radius endmill for titanium alloy high-performance machining



Ordering Code	Mill Dia. (D)	Flute Length (Lc)	Corner (r)	Overall Length (L)	Shank Dia. (d)	Type	Stock
T-R6-08005	8	20	0.5	60	8	B	○
T-R6-08010	8	20	1	60	8	B	○
T-R6-10010	10	25	1	75	10	B	○
T-R6-10020	10	25	2	75	10	B	○
T-R6-12010	12	30	1	75	12	B	○
T-R6-12020	12	30	2	75	12	B	○
T-R6-12030	12	30	3	75	12	B	○
T-R6-14010	14	35	1	100	14	B	○
T-R6-14020	14	35	2	100	14	B	○
T-R6-14030	14	35	3	100	14	B	○
T-R6-16010	16	35	1	100	16	B	○
T-R6-16025	16	35	2.5	100	16	B	○
T-R6-16040	16	35	4	100	16	B	○
T-R6-20010	20	45	1	100	20	B	○
T-R6-20025	20	45	2.5	100	20	B	○
T-R6-20040	20	45	4	100	20	B	○

● Standard Stock ○ Reservation required

D	Tol.
D≤12	0 / -0.02
D>12	0 / -0.03

(mm)

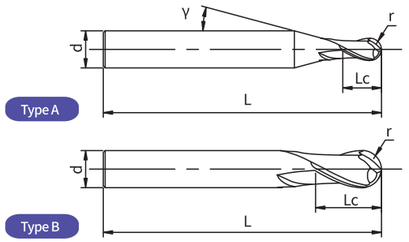
Workpiece Materials

Cast	Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	High temperature alloy	Copper alloy	Aluminium alloy
	○					◎	◎	○		

◎ Best for ○ Suitable for

T-B2/BH2

2flutes, ball nose endmill for titanium alloy high-performance machining



Ordering Code	Mill Dia. (D)	Flute Length (Lc)	Corner (r)	Overall Length (L)	Shank Dia. (d)	Type	Stock
T-B2-02004	2	1	4	50	4	A	○
T-B2-04008	4	2	8	50	4	B	●
T-B2-06012	6	3	12	50	6	B	●
T-B2-08016	8	4	16	60	8	B	●
T-B2-10020	10	5	20	75	10	B	○
T-BH2-04008	4	2	8	75	4	B	○
T-BH2-06012	6	3	12	75	6	B	●
T-BH2-08016	8	4	16	75	8	B	●
T-BH2-10020	10	5	20	100	10	B	○

● Standard Stock ○ Reservation required

D	Tol.
D≤12	0 -0.02
D>12	0 -0.03

(mm)

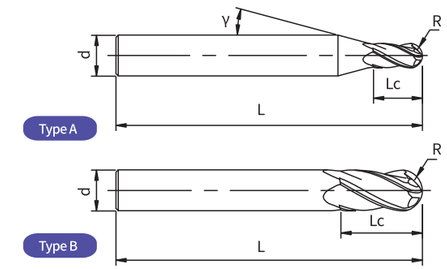
Workpiece Materials

Cast	Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	High temperature alloy	Copper alloy	Aluminium alloy
	○					◎	◎	○		

◎ Best for ○ Suitable for

T-B4/BH4

4 flutes, ball nose endmill for titanium alloy high-performance machining



Ordering Code	Mill Dia. (D)	Flute Length (Lc)	Corner (r)	Overall Length (L)	Shank Dia. (d)	Type	Stock
T-B4-06012	6	3	12	50	6	B	○
T-B4-08016	8	4	16	60	8	B	○
T-B4-10020	10	5	20	75	10	B	○
T-B4-12024	12	6	24	75	12	B	○
T-B4-16032	16	8	32	100	16	B	○

● Standard Stock ○ Reservation required

D	Tol.
D≤12	0 -0.02
D>12	0 -0.03

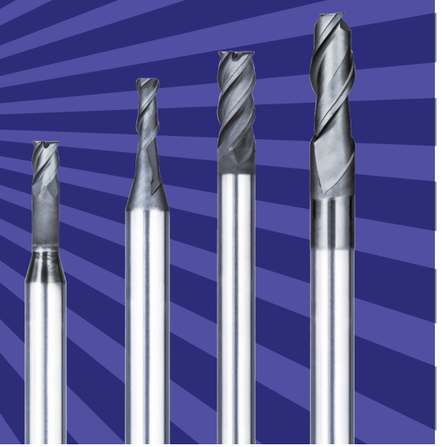
(mm)

Workpiece Materials

Cast	Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	High temperature alloy	Copper alloy	Aluminium alloy
	○					◎	◎	○		

◎ Best for ○ Suitable for

G Series End Mills For Graphite Machining

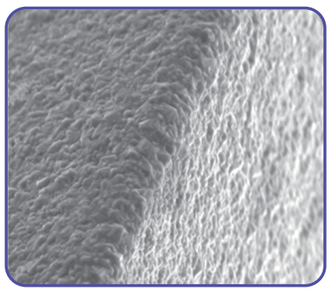


Substrate and coating strength

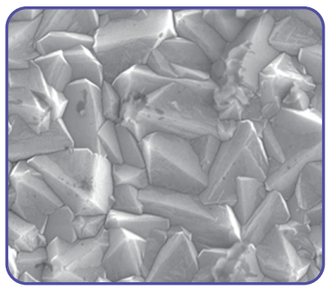
◎ Use high pure diamond coating, perfect adhesiveness between substrate and coating; Good wear resistance enable longer life during machining;

Wide range of application

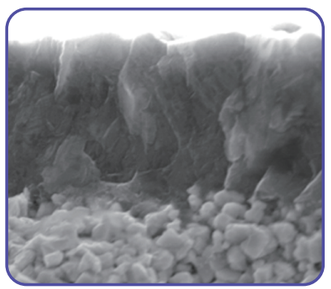
◎ Suitable for finishing & semi-finishing of graphite workpiece such as graphite electrode, graphit mould, etc., recommending gas coolant.



Cutting edge picture of diamond coating tool

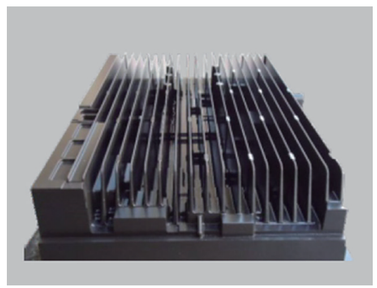


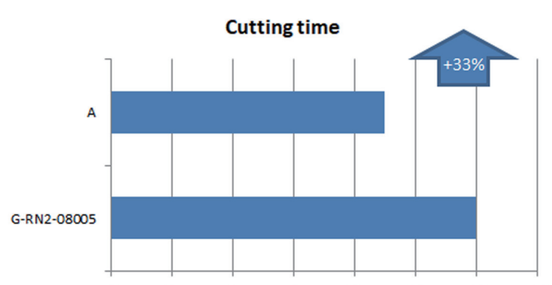
Surface picture of diamond coating tool



Cross section picture of diamond coating tool

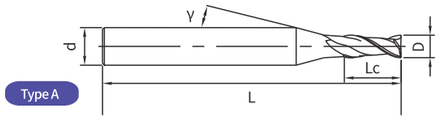
- Model No:G-RN2-08005
- Specification:D8*R0.5*12*30*100*d8
- Workpiece material:Graphite
- Cutting speed:10000RPM
- Feed rate:3000mm/min
- Way of cutting: side milling
- ap, ae: ap=0.15mm，ae=0.2mm
- Coolant:Gas

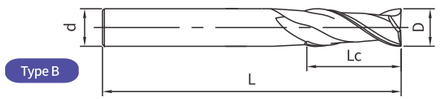




G-S2

2 Flutes, Square Endmill For Graphite Machining





Ordering Code	Mill Dia. (D)	Flute Length (Lc)	Overall Length (L)	Shank Dia. (d)	Type	Stock
G-S2-004008	0.4	0.8	50	4	A	●
G-S2-00802	0.8	2	50	4	A	●
G-S2-01003	1	3	60	4	A	●
G-S2-01506	1.5	6	60	4	A	●
G-S2-02006	2	6	60	4	A	●
G-S2-03009	3	9	60	4	A	●
G-S2-63009	3	9	60	6	A	○
G-S2-04012	4	12	60	4	B	●
G-S2-64012	4	12	60	6	A	○
G-S2-05015	5	15	60	6	A	○
G-S2-06018	6	18	60	6	B	●
G-S2-08024	8	24	75	8	B	●
G-S2-10025	10	25	80	10	B	○
G-S2-12025	12	25	80	12	B	○

● Standard Stock ○ Reservation required

D	Tol.
0.2≤D<6	0 / -0.015
6≤D≤12	0 / -0.025

(mm)

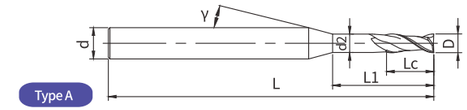
Workpiece Materials

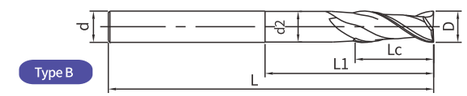
Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Copper alloy	Graphite
							○	◎

◎ Best for ○ Suitable for

G-SN2

2 Flutes, Long Neck Endmill For Graphite Machining





Ordering Code	Mill Dia. (D)	Flute Length (Lc)	Under Neck Length (L1)	Neck Dia. (d2)	Overall Length (L)	Shank Dia. (d)	Type	Stock
G-SN2-01005	1	3	5	0.95	60	4	A	●
G-SN2-01510	1.5	6	10	1.44	60	4	A	●
G-SN2-02015	2	8	15	1.92	60	4	A	●
G-SN2-02020	2	8	20	1.92	60	4	A	○
G-SN2-03015	3	12	15	2.9	60	4	A	●
G-SN2-04020	4	16	20	3.9	60	4	B	○
G-SN2-04025	4	16	25	3.9	75	4	B	●
G-SN2-04040	4	16	40	3.9	75	4	B	○
G-SN2-05030	5	20	30	4.9	75	6	A	●
G-SN2-06030	6	24	30	5.9	75	6	B	●
G-SN2-08040	8	24	40	7.9	150	8	B	●
G-SN2-10040	10	25	40	9.8	150	10	B	○
G-SN2-12040	12	25	40	11.8	150	12	B	●
G-SN2-12060	12	25	60	11.8	150	12	B	○

● Standard Stock ○ Reservation required

D	Tol.
0.2≤D<6	0 / -0.015
6≤D≤12	0 / -0.025

(mm)

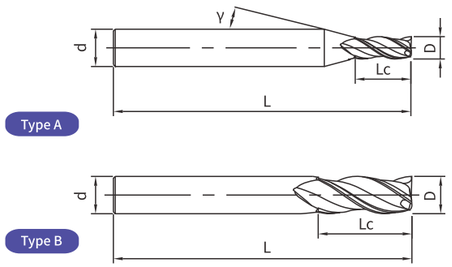
Workpiece Materials

Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Copper alloy	Graphite
							○	◎

◎ Best for ○ Suitable for

G-S3

3 Flutes, Square Endmill For Graphite Machining



Ordering Code	Mill Dia. (D)	Flut Length (Lc)	Overall Length (L)	shank Dia. (d)	Type	Stock
G-S3-01003	1	3	60	4	A	●
G-S3-01506	1.5	6	60	4	A	●
G-S3-02006	2	6	60	4	A	●
G-S3-03009	3	9	60	4	A	●
G-S3-63009	3	9	60	6	A	○
G-S3-04012	4	12	60	4	B	●
G-S3-64012	4	12	60	6	A	○
G-S3-06018	6	18	60	6	B	●
G-S3-08024	8	24	75	8	B	●
G-S3-10025	10	25	80	10	B	●
G-S3-12025	12	25	80	12	B	○

● Standard Stock ○ Reservation required

D	Tol.
0.2≤D<6	0 -0.015
6≤D≤12	0 -0.025

(mm)

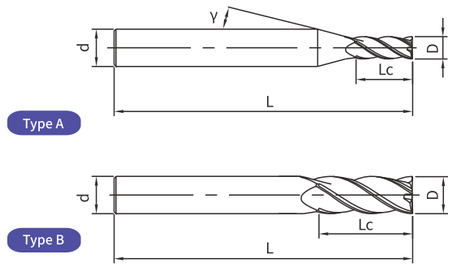
Workpiece Materials

Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Copper alloy	Graphite
							○	◎

◎ Best for ○ Suitable for

G-S4

4 Flutes, Square Endmill For Graphite Machining



Ordering Code	Mill Dia. (D)	Flut Length (Lc)	Overall Length (L)	shank Dia. (d)	Type	Stock
G-S4-02006	2	6	60	4	A	●
G-S4-03009	3	9	60	4	A	●
G-S4-63009	3	9	60	6	A	○
G-S4-04012	4	12	60	4	B	●
G-S4-64012	4	12	60	6	A	○
G-S4-05015	5	15	60	6	A	●
G-S4-06018	6	18	60	6	B	●
G-S4-08024	8	24	75	8	B	●
G-S4-10025	10	25	80	10	B	●
G-S4-12025	12	25	80	12	B	○

● Standard Stock ○ Reservation required

D	Tol.
0.2≤D<6	0 -0.015
6≤D≤12	0 -0.025

(mm)

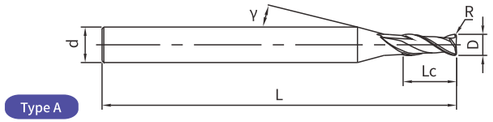
Workpiece Materials

Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Copper alloy	Graphite
							○	◎

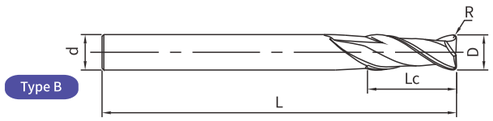
◎ Best for ○ Suitable for

G-R2

2 Flutes, Corner Radius Endmill For Graphite Machining



Type A



Type B

Ordering Code	Mill Dia. (D)	Corner Radius (R)	Flute Length (Lc)	Overal Length (L)	shank Dia. (d)	Type	Stock
G-R2-02002	2	0.2	3.5	60	4	A	●
G-R2-03002	3	0.2	4	60	4	A	●
G-R2-04002	4	0.2	5	60	4	B	●
G-R2-04005	4	0.5	5	60	4	B	●
G-R2-05005	5	0.5	6	75	6	A	●
G-R2-06003	6	0.3	9	75	6	B	●
G-R2-06005	6	0.5	9	75	6	B	●
G-R2-08005	8	0.5	12	75	8	B	●
G-R2-08010	8	1	12	75	8	B	○
G-R2-10005	10	0.5	15	100	10	B	●
G-R2-10010	10	1	15	100	10	B	●
G-R2-10015	10	1.5	15	100	10	B	○
G-R2-12005	12	0.5	18	100	12	B	○
G-R2-12010	12	1	18	100	12	B	○
G-R2-12015	12	1.5	18	100	12	B	○

● Standard Stock ○ Reservation required

r	Tol.
r	±0.01

(mm)

D	Tol.
0.2≤D<6	0 / -0.015
6≤D≤12	0 / -0.025

(mm)

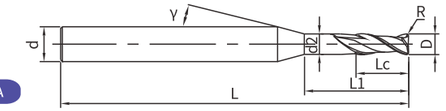
Workpiece Materials

Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Copper alloy	Graphite
							○	◎

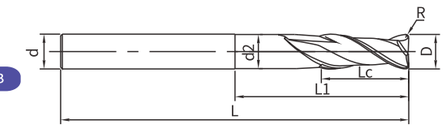
◎ Best for ○ Suitable for

G-RN2

2 Flutes, Corner Radius Long Neck Endmill For Graphite Machining



Type A



Type B

Ordering Code	Mill Dia. (D)	Corner Radius (R)	Flute Length (Lc)	Under Neck Length (L1)	Neck Dia. (d2)	Overall Length (L)	shank Dia. (d)	Type	Stock
G-RN2-02002	2	0.2	3.5	6	1.92	60	4	A	●
G-RN2-02003	2	0.3	3.5	6	1.92	60	4	A	○
G-RN2-02005	2	0.5	3.5	6	1.92	60	4	A	○
G-RN2-03002	3	0.2	4	10	2.9	60	4	A	●
G-RN2-03003	3	0.3	4	10	2.9	60	4	A	○
G-RN2-03005	3	0.5	4	10	2.9	60	4	A	○
G-RN2-04002	4	0.2	5	15	3.9	75	4	B	●
G-RN2-04005	4	0.5	5	15	3.9	75	4	B	●
G-RN2-04010	4	1	5	15	3.9	75	4	B	○
G-RN2-05002	5	0.2	6	15	4.9	100	6	A	○
G-RN2-05005	5	0.5	6	15	4.9	100	6	A	○
G-RN2-06002	6	0.2	7	20	5.9	100	6	B	●
G-RN2-06005	6	0.5	7	20	5.9	100	6	B	●
G-RN2-06010	6	1	7	20	5.9	100	6	B	○
G-RN2-08005	8	0.5	12	30	7.9	100	8	B	●
G-RN2-10005	10	0.5	15	35	9.8	100	10	B	○

● Standard Stock ○ Reservation required

r	Tol.
r	±0.01

(mm)

D	Tol.
0.2≤D<6	0 / -0.015
6≤D≤12	0 / -0.025

(mm)

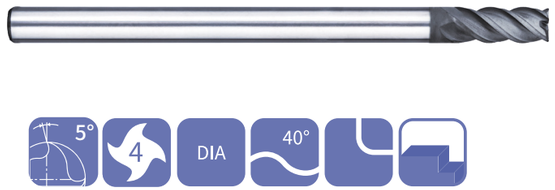
Workpiece Materials

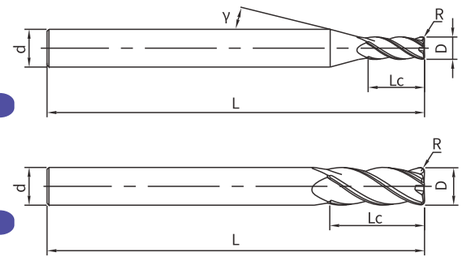
Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Copper alloy	Graphite
							○	◎

◎ Best for ○ Suitable for

G-R4

4 Flutes, Corner Radius Endmill For Graphite Machining





Ordering Code	Mill Dia. (D)	Corner Radius (R)	Flut Length (Lc)	Overall Length (L)	shank Dia. (d)	Type	Stock
G-R4-02002	2	0.2	3.5	60	4	A	●
G-R4-03002	3	0.2	4	60	4	A	○
G-R4-04002	4	0.2	6	60	4	B	●
G-R4-04005	4	0.5	6	60	4	B	●
G-R4-06003	6	0.3	9	75	6	B	○
G-R4-06005	6	0.5	9	75	6	B	●
G-R4-08005	8	0.5	12	75	8	B	●
G-R4-08010	8	1	12	75	8	B	○
G-R4-10005	10	0.5	15	100	10	B	●
G-R4-10010	10	1	15	100	10	B	○
G-R4-12005	12	0.5	18	100	12	B	●
G-R4-12010	12	1	18	100	12	B	○

● Standard Stock ○ Reservation required

r	Tol.
r	±0.01

(mm)

D	Tol.
0.2≤D<6	0 / -0.015
6≤D≤12	0 / -0.025

(mm)

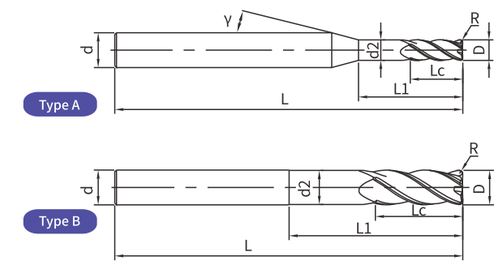
Workpiece Materials

Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Copper alloy	Graphite
							○	◎

◎ Best for ○ Suitable for

G-RN4

4 Flutes, Corner Radius Long Neck Endmill For Graphite Machining



Ordering Code	Mill Dia.(D)	Corner Radius (R)	Flute Length (Lc)	Under Neck Length (L1)	Neck Dia. (d2)	Overall Length (L)	shank Dia. (d)	Type	Stock
G-RN4-020015	2	0.15	3.5	6	1.92	60	4	A	○
G-RN4-02002	2	0.2	3.5	6	1.92	60	4	A	●
G-RN4-03002	3	0.2	4	10	2.9	60	4	A	●
G-RN4-03003	3	0.3	4	20	2.9	60	4	A	○
G-RN4-04002	4	0.2	6	20	3.9	75	4	B	●
G-RN4-04005	4	0.5	6	20	3.9	75	4	B	●
G-RN4-04010	4	1	6	20	3.9	75	4	B	○
G-RN4-06005	6	0.5	9	25	5.9	100	6	B	●
G-RN4-06010	6	1	9	25	5.9	100	6	B	○
G-RN4-06015	6	1.5	9	25	5.9	100	6	B	○
G-RN4-08005	8	0.5	12	30	7.9	100	8	B	●
G-RN4-08010	8	1	12	30	7.9	100	8	B	○
G-RN4-08020	8	2	12	30	7.9	100	8	B	○
G-RN4-10005	10	0.5	15	35	9.8	100	10	B	●
G-RN4-10010	10	1	15	35	9.8	100	10	B	○
G-RN4-12005	12	0.5	18	40	11.8	100	12	B	●
G-RN4-12010	12	1	18	40	11.8	100	12	B	○

● Standard Stock ○ Reservation required

r	Tol.
r	±0.01

(mm)

D	Tol.
0.2≤D<6	0 / -0.015
6≤D≤12	0 / -0.025

(mm)

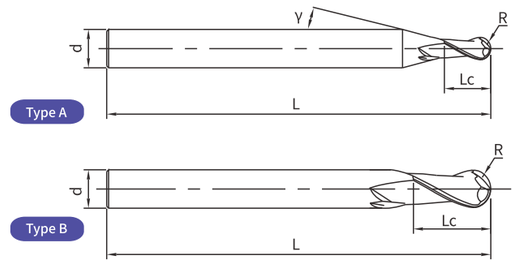
Workpiece Materials

Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Copper alloy	Graphite
							○	◎

◎ Best for ○ Suitable for

G-B2

2 Flutes, Ball Nose Endmill For Graphite Machining



Ordering Code	Mill Dia. (D)	Ball Radius (R)	Flut Length (Lc)	Overall Length (L)	shank Dia. (d)	Type	Stock
G-B2-00502	0.5	0.25	2	50	4	A	●
G-B2-00602	0.6	0.3	2	50	4	A	●
G-B2-00803	0.8	0.4	3	50	4	A	●
G-B2-01003	1	0.5	3	60	4	A	●
G-B2-01505	1.5	0.75	5	60	4	A	●
G-B2-02006	2	1	6	60	4	A	●
G-B2-03008	3	1.5	8	60	4	A	●
G-B2-04016	4	2	16	60	4	B	●
G-B2-06016	6	3	16	60	6	B	●
G-B2-08020	8	4	20	80	8	B	●
G-B2-10025	10	5	25	100	10	B	●
G-B2-12025	12	6	25	100	12	B	●

● Standard Stock ○ Reservation required

R	Tol.
R<3	0 -0.015
3≤R≤6	0 -0.025

(mm)

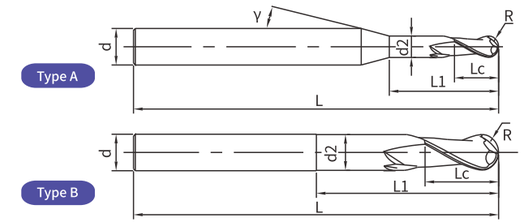
Workpiece Materials

Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Copper alloy	Graphite
							○	◎

◎ Best for ○ Suitable for

G-BN2

2 Flutes, Ball Nose Long Neck Endmill For Graphite Machining



Ordering Code	Mill Dia. (D)	Ball Radius (R)	Under Neck Length (L1)	Flute Length (Lc)	Neck Dia. (d2)	Overall Length (L)	shank Dia. (d)	Type	Stock
G-BN2-00505	0.5	0.25	5	2	0.46	50	4	A	●
G-BN2-00606	0.6	0.3	6	2	0.55	50	4	A	●
G-BN2-00610	0.6	0.3	10	2	0.55	50	4	A	○
G-BN2-00808	0.8	0.4	8	3	0.75	50	4	A	●
G-BN2-00815	0.8	0.4	15	3	0.75	50	4	A	○
G-BN2-01008	1	0.5	8	3	0.95	60	4	A	○
G-BN2-01010	1	0.5	10	3	0.95	60	4	A	●
G-BN2-01508	1.5	0.75	8	5	1.44	75	4	A	●
G-BN2-01515	1.5	0.75	15	5	1.44	75	4	A	●
G-BN2-01525	1.5	0.75	25	5	1.44	75	4	A	○
G-BN2-02010	2	1	10	6	1.92	75	4	A	○
G-BN2-02015	2	1	15	6	1.92	75	4	A	●
G-BN2-02025	2	1	25	6	1.92	75	4	A	○
G-BN2-03015	3	1.5	15	8	2.9	75	4	A	●
G-BN2-03025	3	1.5	25	8	2.9	75	4	A	○
G-BN2-04025	4	2	25	12	3.9	75	4	B	●
G-BN2-04040	4	2	40	12	3.9	100	4	B	○
G-BN2-06025	6	3	25	18	5.9	75	6	B	●
G-BN2-06040	6	3	40	18	5.9	100	6	B	○
G-BN2-08030	8	4	30	20	7.9	100	8	B	●
G-BN2-08040	8	4	40	20	7.9	100	8	B	○
G-BN2-10035	10	5	35	25	9.8	100	10	B	●
G-BN2-10050	10	5	50	25	9.8	100	10	B	○
G-BN2-12050	12	6	50	25	11.8	100	12	B	●

● Standard Stock ○ Reservation required

R	Tol.
R<3	0 -0.015
3≤R≤6	0 -0.025

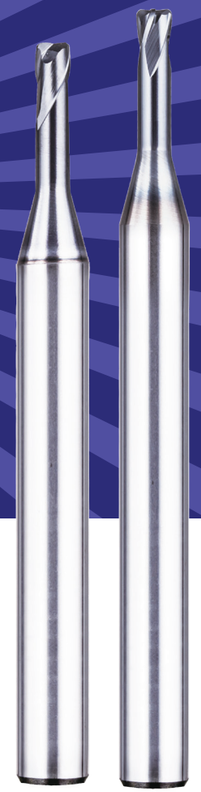
(mm)

Workpiece Materials

Carbon steels Alloy steels	Pre-hardened steels <45HRC	Hardened steels 45HRC-55HRC	Hardened steels 55HRC-65HRC	Hardened steels >65HRC	Stainless steels	Ti alloy Heat-resistant alloy	Copper alloy	Graphite
							○	◎

◎ Best for ○ Suitable for

UM Series End Mills For Deep Machining Of Minor Diameter



Geometry structure

◎ Special reduced neck design gives high breakage resistance;

Wide range of workpiece materials

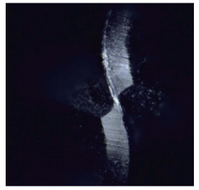
◎ Suitable for small diameter & deep machining of carbon steels, alloysteels, hardened steels, copper, aluminum alloy (<55HRC);

Substrate and coating strength

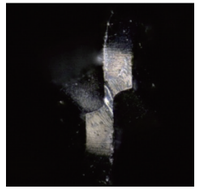
◎ Use high performance ultra fine substrate, together with high performance AlCrSiN coating, good heat resistance and wear resistance. Also suitable for heavy roughing.

Flute diameter tolerence	0.1≤D≤0.5: $^{0}_{-0.007}$ 0.6≤D≤0.9: $^{0}_{-0.010}$ 1.0≤D≤6.0: $^{0}_{-0.015}$
R profile tolerance	R±0.005
Ball nose profile tolerance	R≤0.25, R±0.003 R>0.25, R±0.005
Shank diameter tolerance	h5

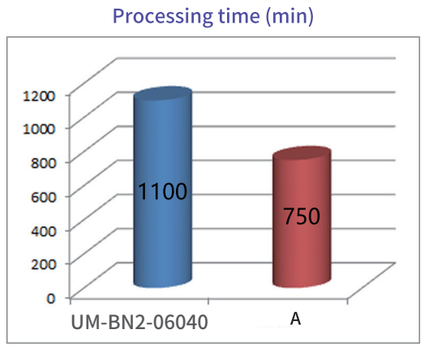
- Model No:UM-BN2-006040
- Specification:R0.3*0.48*4*50*d4
- Workpiece material:Coper tungsten alloy（25~30HRC）
- Cutting speed:30000RPM
- Feed rate:500mm/min
- Way of cutting:profile finish milling
- ap, ae:ap=0.01mm，ae=0.02mm
- Coolant:Oil mist



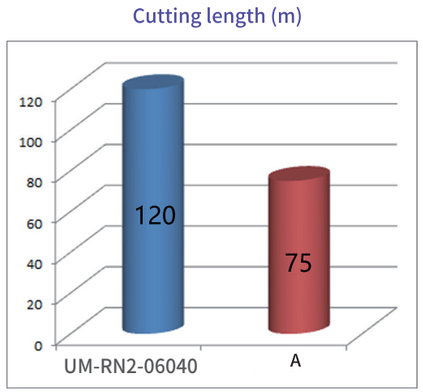
UM-BN2-006040

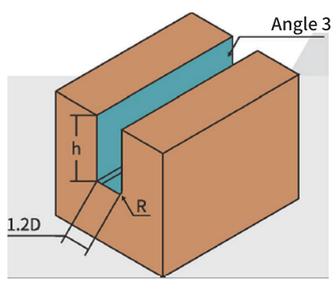


A



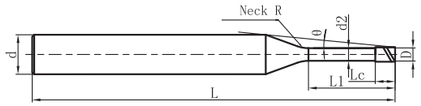
- Model No:UM-RN2-101008
- Specification:D1*R0.1*0.8*10*50*d4
- Workpiece material:NAK80（42HRC）
- Cutting speed:26438RPM
- Feed rate:634mm/min
- Way of cutting: contour milling
- ap, ae:ap=0.016mm
- Coolant:air coolant





UM-SN2

2 Flutes, Square End Mills For Minor Diameter & Deep Machining



Ordering Code	Mill Dia. (D)	Under Neck Length (L1)	Flute Length (Lc)	Neck Dia. (d2)	Overall Length (L)	shank Dia. (d)	Neck (R)	Interference Angel (⊖)	The effective under-neck length for the various draft angles					Stock
									0.5°	1°	1.5°	2°	3°	
UM-SN2-01002		0.3						14.39	0.31	0.33	0.35	0.37	0.40	●
UM-SN2-01005	0.1	0.5	0.15	0.08	50	4	1	14.03	0.52	0.55	0.58	0.60	0.65	●
UM-SN2-01010		1						13.22	1.05	1.09	1.13	1.18	1.27	●
UM-SN2-02005		0.5						14.03	0.52	0.54	0.57	0.59	0.64	●
UM-SN2-02010		1						13.20	1.04	1.08	1.12	1.16	1.26	●
UM-SN2-02015	0.2	1.5	0.3	0.17	50	4	1	12.45	1.56	1.62	1.67	1.74	1.88	●
UM-SN2-02020		2						11.79	2.08	2.15	2.23	2.31	2.50	●
UM-SN2-02030		3						10.65	3.11	3.22	3.34	3.46	3.74	●
UM-SN2-03010		1						13.06	1.06	1.12	1.18	1.23	1.33	●
UM-SN2-03015		1.5						12.31	1.59	1.67	1.74	1.81	1.95	●
UM-SN2-03020	0.3	2	0.45	0.27	50	4	2	11.65	2.12	2.21	2.29	2.38	2.57	●
UM-SN2-03025		2.5						11.05	2.64	2.75	2.85	2.96	3.20	●
UM-SN2-03030		3						10.51	3.16	3.28	3.40	3.53	3.82	●
UM-SN2-04010		1						13.01	1.06	1.12	1.18	1.23	1.33	●
UM-SN2-04015		1.5						12.25	1.59	1.67	1.74	1.81	1.95	●
UM-SN2-04020		2						11.57	2.12	2.21	2.29	2.38	2.57	●
UM-SN2-04025		2.5						10.97	2.64	2.75	2.85	2.96	3.20	●
UM-SN2-04030		3						10.42	3.16	3.28	3.40	3.53	3.82	●
UM-SN2-04035	0.4	3.5	0.6	0.37	50	4	2	9.92	3.68	3.82	3.96	4.11	4.44	●
UM-SN2-04040		4						9.47	4.20	4.35	4.51	4.68	5.06	●
UM-SN2-04050		5						8.68	5.24	5.42	5.62	5.83	6.30	●
UM-SN2-04060		6						8.01	6.27	6.49	6.73	6.98	7.55	●
UM-SN2-04080		8						6.94	8.34	8.63	8.94	9.28	10.03	●
UM-SN2-04100		10						6.12	10.41	10.77	11.16	11.58	12.52	●
UM-SN2-05010		1						12.96	1.06	1.12	1.18	1.23	1.33	●
UM-SN2-05015		1.5						12.19	1.59	1.67	1.74	1.81	1.95	●
UM-SN2-05020		2						11.50	2.12	2.21	2.29	2.38	2.57	●
UM-SN2-05025		2.5						10.88	2.64	2.75	2.85	2.96	3.20	●
UM-SN2-05030	0.5	3	0.75	0.47	50	4	2	10.33	3.16	3.28	3.40	3.53	3.82	●
UM-SN2-05040		4						9.37	4.20	4.35	4.51	4.68	5.06	●
UM-SN2-05050		5						8.58	5.24	5.42	5.62	5.83	6.30	●
UM-SN2-05060		6						7.91	6.27	6.49	6.73	6.98	7.55	●
UM-SN2-05080		8						6.84	8.34	8.63	8.94	9.28	10.03	●
UM-SN2-05100		10						6.02	10.41	10.77	11.16	11.58	12.52	●
UM-SN2-06020		2						11.21	2.17	2.31	2.44	2.56	2.78	●
UM-SN2-06030		3						10.07	3.24	3.42	3.58	3.72	4.02	●
UM-SN2-06040		4						9.13	4.30	4.51	4.69	4.87	5.26	●
UM-SN2-06050		5						8.36	5.35	5.59	5.80	6.02	6.50	●
UM-SN2-06060	0.6	6	0.9	0.57	50	4	4	7.70	6.40	6.67	6.91	7.17	7.75	●
UM-SN2-06070		7						7.14	7.44	7.74	8.02	8.32	8.99	●
UM-SN2-06080		8						6.66	8.49	8.81	9.12	9.47	10.23	●
UM-SN2-06090		9						6.23	9.53	9.88	10.23	10.62	11.48	●
UM-SN2-06100		10						5.86	10.57	10.94	11.34	11.77	12.72	●

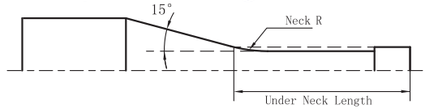
● Standard Stock ○ Reservation required

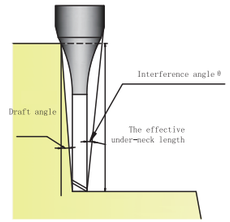
D	Tol.	D	Tol.	D	Tol.
0.1≤D≤0.5	0 -0.007	0.6≤D≤0.9	0 -0.01	1.0≤D≤6.0	0 -0.015

(mm)

UM-SN2

2 Flutes, Square End Mills For Minor Diameter & Deep Machining





Ordering Code	Mill Dia. (D)	Under Neck Length (L1)	Flute Length (Lc)	Neck Dia. (d2)	Overall Length (L)	shank Dia. (d)	Neck (R)	Interference Angel (⊖)	The effective under-neck length for the various draft angles					Stock
									0.5°	1°	1.5°	2°	3°	
UM-SN2-07020		2						11.13	2.17	2.31	2.44	2.56	2.78	●
UM-SN2-07040		4						9.02	4.30	4.51	4.69	4.87	5.26	●
UM-SN2-07060	0.7	6	1.05	0.67	50	4	4	7.59	6.40	6.67	6.91	7.17	7.75	●
UM-SN2-07080		8						6.54	8.49	8.81	9.12	9.47	10.23	●
UM-SN2-07100		10						5.75	10.57	10.94	11.34	11.77	12.72	●
UM-SN2-08040		4			50			8.94	4.27	4.48	4.65	4.83	5.22	●
UM-SN2-08060		6			50			7.49	6.37	6.63	6.87	7.13	7.70	●
UM-SN2-08080	0.8	8	1.2	0.76	50	4	4	6.45	8.46	8.77	9.09	9.43	10.19	●
UM-SN2-08100		10			50			5.65	10.54	10.91	11.30	11.73	12.68	●
UM-SN2-08120		12			55			5.04	12.61	13.05	13.52	14.03	15.16	●
UM-SN2-09060		6			50			7.37	6.37	6.63	6.87	7.13	7.70	●
UM-SN2-09080	0.9	8	1.35	0.86	50	4	4	6.33	8.46	8.77	9.09	9.43	10.19	●
UM-SN2-09100		10			50			5.54	10.54	10.91	11.30	11.73	12.68	●
UM-SN2-09120		12			55			4.93	12.61	13.05	13.52	14.03	15.16	●
UM-SN2-10020		2			50			10.89	2.15	2.29	2.41	2.52	2.73	●
UM-SN2-10030		3			50			9.68	3.21	3.39	3.54	3.68	3.98	●
UM-SN2-10040		4			50			8.71	4.27	4.48	4.65	4.83	5.22	●
UM-SN2-10050		5			50			7.91	5.32	5.56	5.76	5.98	6.46	●
UM-SN2-10060		6			50			7.25	6.37	6.63	6.87	7.13	7.70	●
UM-SN2-10070		7			50			6.69	7.41	7.7	7.98	8.28	8.95	●
UM-SN2-10080	1	8	1.5	0.96	50	4	4	6.21	8.46	8.77	9.09	9.43	10.19	●
UM-SN2-10090		9			50			5.79	9.50	9.84	10.19	10.58	11.43	●
UM-SN2-10100		10			50			5.43	10.54	10.91	11.30	11.73	12.68	●
UM-SN2-10120		12			55			4.82	12.61	13.05	13.52	14.03	15.16	●
UM-SN2-10140		14			55			4.34	14.67	15.19	15.73	16.32	17.65	●
UM-SN2-10160		16			55			3.94	16.74	17.33	17.95	18.62	20.14	●
UM-SN2-10200		20			60			3.33	20.88	21.6	22.38	23.22	25.11	●
UM-SN2-10250		25			65			2.79	26.05	26.95	27.93	28.97	-	●
UM-SN2-12060		6			50			7.01	6.35	6.6	6.84	7.09	7.67	●
UM-SN2-12080		8			50			5.97	8.43	8.74	9.05	9.39	10.16	●
UM-SN2-12100	1.2	10	1.8	1.15	50	4	4	5.20	10.51	10.88	11.27	11.69	12.64	●
UM-SN2-12120		12			55			4.61	12.58	13.02	13.49	13.99	15.13	●
UM-SN2-12160		16			55			3.75	16.71	17.3	17.92	18.59	20.10	●
UM-SN2-14060	1.4	6	2.1	1.34	50	4	4	6.74	6.33	6.57	6.81	7.07	7.64	●
UM-SN2-14120		12			55			4.38	12.55	12.99	13.46	13.97	15.10	●
UM-SN2-15040		4			50			8.08	4.24	4.43	4.59	4.77	5.15	●
UM-SN2-15060		6			50			6.60	6.33	6.57	6.81	7.07	7.64	●
UM-SN2-15080		8			50			5.58	8.41	8.71	9.03	9.37	10.13	●
UM-SN2-15100	1.5	10	2.25	1.44	50	4	4	4.83	10.48	10.85	11.24	11.67	12.61	●
UM-SN2-15120		12			55			4.26	12.55	12.99	13.46	13.97	15.10	●
UM-SN2-15140		14			55			3.81	14.62	15.13	15.68	16.26	17.58	●
UM-SN2-15160		16			55			3.44	16.69	17.27	17.89	18.56	20.07	●
UM-SN2-15180		18			60			3.14	18.76	19.41	20.11	20.86	22.56	●

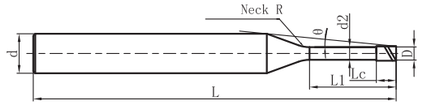
● Standard Stock
○ Reservation required

D	Tol.	D	Tol.	D	Tol.
0.1≤D≤0.5	0 -0.007	0.6≤D≤0.9	0 -0.01	1.0≤D≤6.0	0 -0.015

(mm)

UM-SN2

2 Flutes, square End Mills For Minor Diameter & Deep Machining



Ordering Code	Mill Dia. (D)	Under Neck Length (L1)	Flute Length (Lc)	Neck Dia. (d2)	Overall Length (L)	shank Dia. (d)	Neck (R)	Interference Angel (⊙)	The effective under-neck length for the various draft angles					Stock
									0.5°	1°	1.5°	2°	3°	
UM-SN2-15200	1.5	20	2.25	1.44	60	4	4	2.89	20.82	21.55	22.33	23.16	-	●
UM-SN2-15250		25			65			2.41	25.99	26.9	27.87	28.91	-	●
UM-SN2-15300		30			70			2.06	31.16	32.25	33.41	34.66	-	●
UM-SN2-15350		35			75			1.80	36.33	37.59	38.95	-	-	●
UM-SN2-15400		40			80			1.60	41.50	42.94	44.49	-	-	●
UM-SN2-16060	1.6	6	2.4	1.54	50	4	4	6.45	6.33	6.57	6.81	7.07	7.64	●
UM-SN2-16080		8			50			5.43	8.41	8.71	9.03	9.37	10.13	●
UM-SN2-18060	1.8	6	2.7	1.73	50	4	4	6.14	6.31	6.55	6.79	7.04	7.61	●
UM-SN2-18080		8			50			5.14	8.39	8.69	9.00	9.34	10.10	●
UM-SN2-20040	2	4	3	1.92	50	4	4	7.27	4.21	4.39	4.55	4.72	5.11	●
UM-SN2-20060		6			50			5.81	6.30	6.53	6.77	7.02	7.59	●
UM-SN2-20080		8			50			4.83	8.38	8.67	8.99	9.32	10.08	●
UM-SN2-20100		10			50			4.14	10.45	10.81	11.20	11.62	12.57	●
UM-SN2-20120		12			55			3.62	12.51	12.95	13.42	13.92	15.05	●
UM-SN2-20140		14			55			3.21	14.58	15.09	15.64	16.22	17.54	●
UM-SN2-20160		16			55			2.89	16.65	17.23	17.85	18.52	-	●
UM-SN2-20180		18			60			2.63	18.72	19.37	20.07	20.82	-	●
UM-SN2-20200		20			60			2.41	20.78	21.51	22.28	23.12	-	●
UM-SN2-20250		25			65			1.99	25.95	26.86	27.83	-	-	●
UM-SN2-20300		30			70			1.70	31.12	32.2	33.37	-	-	●
UM-SN2-20350		35			75			1.48	36.29	37.55	-	-	-	●
UM-SN2-20400		40			80			1.31	41.46	42.9	-	-	-	●
UM-SN2-20500		50			90			1.07	51.79	53.6	-	-	-	●
UM-SN2-25080	2.5	8	3.75	2.4	50	4	4	3.95	8.35	8.64	8.95	9.29	10.04	●
UM-SN2-25120		12			55			2.89	12.48	12.92	13.39	13.89	-	●
UM-SN2-25160		16			55			2.28	16.62	17.2	17.82	18.49	-	●
UM-SN2-25200		20			60			1.88	20.75	21.48	22.25	-	-	●
UM-SN2-25300		30			70			1.31	31.09	32.17	-	-	-	●
UM-SN2-25400		40			80			1.01	41.43	42.87	-	-	-	●
UM-SN2-25500		50			90			0.82	51.76	-	-	-	-	●
UM-SN2-30080	3	8	4.5	2.88	55	6	4	6.27	8.33	8.62	8.93	9.26	10.02	●
UM-SN2-30120		12			60			4.86	12.46	12.9	13.36	13.86	14.99	●
UM-SN2-30160		16			60			3.97	16.60	17.17	17.79	18.46	19.96	●
UM-SN2-30200		20			65			3.35	20.73	21.45	22.23	23.06	24.93	●
UM-SN2-30250		25			70			2.81	25.90	26.8	27.77	28.81	-	●
UM-SN2-30300		30			75			2.41	31.07	32.15	33.31	34.56	-	●
UM-SN2-30400		40			90			1.89	41.40	42.85	44.39	-	-	●
UM-SN2-30500		50			100			1.55	51.74	53.54	55.48	-	-	●
UM-SN2-40120	4	12	6	3.86	60	6	4	3.63	12.44	12.88	13.34	13.84	14.97	●
UM-SN2-40160		16			60			2.90	16.58	17.16	17.78	18.44	-	●
UM-SN2-40200		20			70			2.41	20.71	21.43	22.21	23.04	-	●
UM-SN2-40250		25			70			2.00	25.88	26.78	27.75	-	-	●
UM-SN2-40300		30			80			1.70	31.05	32.13	33.29	-	-	●

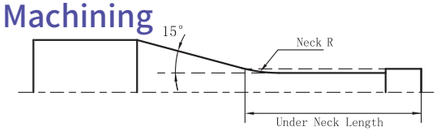
● Standard Stock ○ Reservation required

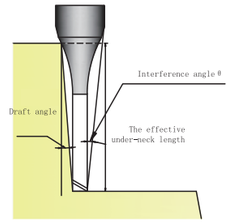
D	Tol.	D	Tol.	D	Tol.
0.1≤D≤0.5	0 -0.007	0.6≤D≤0.9	0 -0.01	1.0≤D≤6.0	0 -0.015

(mm)

UM-SN2

2 Flutes, Square End Mills For Minor Diameter & Deep Machining





Ordering Code	Mill Dia. (D)	Under Neck Length (L1)	Flute Length (Lc)	Neck Dia. (d2)	Overall Length (L)	shank Dia. (d)	Neck (R)	Interference Angel (⊙)	The effective under-neck length for the various draft angles					Stock
									0.5°	1°	1.5°	2°	3°	
UM-SN2-40350	4	35	6	3.86	80	6	4	1.48	36.22	37.48	-	-	-	●
UM-SN2-40400		40			90			1.31	41.39	42.83	-	-	-	●
UM-SN2-40500		50			100			1.07	51.72	53.52	-	-	-	●
UM-SN2-50200	5	20	7.5	4.85	70	6	4	1.31	20.71	21.43	-	-	-	●
UM-SN2-50250		25			70			1.07	25.87	26.78	-	-	-	●
UM-SN2-50300		30			80			0.90	31.04	-	-	-	-	●
UM-SN2-50400		40			90			0.69	41.38	-	-	-	-	●
UM-SN2-50500		50			100			0.56	51.72	-	-	-	-	●
UM-SN2-60200	6	20	9	5.85	70	6	-	-	-	-	-	-	-	●
UM-SN2-60300		30			80			-	-	-	-	-	-	●
UM-SN2-60400		40			90			-	-	-	-	-	-	●
UM-SN2-60500		50			100			-	-	-	-	-	-	●

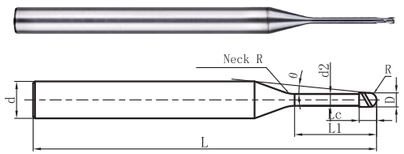
● Standard Stock ○ Reservation required

D	Tol.
0.1≤D≤0.5	0 -0.007
0.6≤D≤0.9	0 -0.01
1.0≤D≤6.0	0 -0.015

(mm)

UM-BN2

2 Flutes, Ball Nose End Mills For Minor Diameter & Deep Machining



Ordering Code	Mill Dia. (D)	Ball Radius (R)	Under Neck Length (L1)	Flute Length (Lc)	Neck Dia. (d2)	Overall Length (L)	shank Dia. (d)	Neck (R)	Interference Angel (θ)	The effective under-neck length for the various draft angles					Stock
										0.5°	1°	1.5°	2°	3°	
UM-BN2-01002	0.1	0.05	0.2	0.08	0.08	50	4	1	14.66	0.2	0.21	0.22	0.24	0.26	●
UM-BN2-01003			0.3						14.48	0.31	0.33	0.34	0.36	0.39	●
UM-BN2-01005			0.5						14.12	0.52	0.55	0.57	0.59	0.64	●
UM-BN2-02005	0.2	0.1	0.5	0.16	0.17	50	4	1	14.21	0.51	0.53	0.55	0.57	0.61	●
UM-BN2-020075			0.75						13.77	0.78	0.8	0.83	0.86	0.92	●
UM-BN2-02010			1						13.36	1.04	1.07	1.11	1.15	1.23	●
UM-BN2-020125			1.25						12.97	1.3	1.34	1.39	1.43	1.54	●
UM-BN2-02015			1.5						12.6	1.56	1.61	1.66	1.72	1.85	●
UM-BN2-02020			2						11.92	2.07	2.14	2.22	2.3	2.48	●
UM-BN2-02025			2.5						11.31	2.59	2.68	2.77	2.87	3.1	●
UM-BN2-02030			3						10.76	3.11	3.21	3.33	3.45	3.72	●
UM-BN2-03005	0.3	0.15	0.5	0.24	0.27	50	4	2	14.17	0.52	0.55	0.57	0.6	0.66	●
UM-BN2-030075			0.75						13.72	0.79	0.83	0.87	0.91	0.98	●
UM-BN2-03010			1						13.3	1.05	1.11	1.16	1.2	1.29	●
UM-BN2-030125			1.25						12.9	1.32	1.38	1.44	1.5	1.61	●
UM-BN2-03015			1.5						12.53	1.58	1.66	1.72	1.78	1.92	●
UM-BN2-03020			2						11.84	2.11	2.2	2.28	2.36	2.54	●
UM-BN2-03025			2.5						11.22	2.63	2.74	2.83	2.93	3.16	●
UM-BN2-03030			3						10.66	3.15	3.27	3.39	3.51	3.78	●
UM-BN2-040075	0.4	0.2	0.75	0.32	0.37	50	4	2	13.78	0.78	0.82	0.86	0.9	0.97	●
UM-BN2-04010			1						13.34	1.05	1.1	1.15	1.19	1.28	●
UM-BN2-04015			1.5						12.55	1.58	1.65	1.72	1.78	1.9	●
UM-BN2-04020			2						11.84	2.11	2.19	2.27	2.35	2.53	●
UM-BN2-04025			2.5						11.2	2.63	2.73	2.83	2.93	3.15	●
UM-BN2-04030			3						10.63	3.15	3.27	3.38	3.5	3.77	●
UM-BN2-04035			3.5						10.12	3.67	3.8	3.94	4.08	4.39	●
UM-BN2-04040			4						9.65	4.19	4.34	4.49	4.65	5.01	●
UM-BN2-04045			4.5						9.22	4.71	4.87	5.04	5.23	5.63	●
UM-BN2-05010	0.5	0.25	1	0.4	0.47	50	4	2	13.39	1.05	1.09	1.14	1.19	1.27	●
UM-BN2-05015			1.5						12.56	1.58	1.65	1.71	1.77	1.89	●
UM-BN2-05020			2						11.83	2.1	2.19	2.27	2.34	2.51	●
UM-BN2-05025			2.5						11.18	2.63	2.73	2.82	2.92	3.14	●
UM-BN2-05030			3						10.6	3.15	3.27	3.38	3.49	3.76	●
UM-BN2-05040			4						9.6	4.19	4.34	4.48	4.64	5	●
UM-BN2-05050			5						8.77	5.23	5.41	5.59	5.79	6.24	●
UM-BN2-05055			5.5						8.4	5.75	5.94	6.15	6.37	6.86	●
UM-BN2-05060			6						8.07	6.27	6.48	6.7	6.94	7.49	●
UM-BN2-05080			8						6.96	8.33	8.62	8.92	9.24	9.97	●
UM-BN2-06010	0.6	0.3	1	0.48	0.57	50	4	4	13.15	1.07	1.14	1.2	1.27	1.41	●
UM-BN2-06020			2						11.61	2.15	2.28	2.39	2.5	2.7	●
UM-BN2-06025			2.5						10.96	2.68	2.84	2.97	3.09	3.32	●
UM-BN2-06030			3						10.38	3.22	3.39	3.54	3.67	3.95	●
UM-BN2-06035			3.5						9.86	3.75	3.94	4.1	4.25	4.57	●

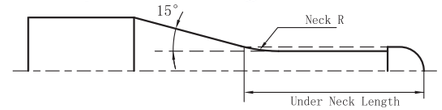
● Standard Stock ○ Reservation required

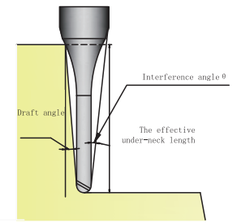
R	Tol.
R≤0.25	±0.003
R>0.25	±0.005

(mm)

UM-BN2

2 Flutes, Ball Nose End Mills For Minor Diameter & Deep Machining





Ordering Code	Mill Dia. (D)	Ball Radius (R)	Under Neck Length (L1)	Flute Length (Lc)	Neck Dia. (d2)	Overall Length (L)	shank Dia. (d)	Neck (R)	Interference Angel (θ)	The effective under-neck length for the various draft angles					Stock
										0.5°	1°	1.5°	2°	3°	
UM-BN2-06040	0.6	0.3	4	0.48	0.57	50	4	4	9.39	4.28	4.48	4.66	4.82	5.19	●
UM-BN2-06045			4.5			50			8.97	4.81	5.03	5.21	5.4	5.81	●
UM-BN2-06050			5			50			8.57	5.33	5.57	5.77	5.97	6.43	●
UM-BN2-06055			5.5			50			8.22	5.86	6.11	6.32	6.55	7.05	●
UM-BN2-06060			6			50			7.89	6.38	6.64	6.87	7.12	7.67	●
UM-BN2-06070			7			50			7.3	7.43	7.71	7.98	8.27	8.92	●
UM-BN2-06080			8			50			6.79	8.48	8.78	9.09	9.42	10.16	●
UM-BN2-06090			9			50			6.35	9.52	9.85	10.2	10.57	11.4	●
UM-BN2-06100			10			50			5.97	10.56	10.92	11.31	11.72	12.65	●
UM-BN2-06120			12			50			5.32	12.63	13.06	13.52	14.02	15.13	●
UM-BN2-07020	0.7	0.35	2	0.56	0.67	50	4	4	11.6	2.14	2.27	2.39	2.49	2.69	●
UM-BN2-07040			4			50			9.33	4.27	4.48	4.65	4.81	5.18	●
UM-BN2-07060			6			50			7.81	6.38	6.64	6.87	7.11	7.66	●
UM-BN2-07080			8			50			6.71	8.47	8.78	9.09	9.41	10.15	●
UM-BN2-08020	0.8	0.4	2	0.64	0.76	50	4	4	11.64	2.12	2.24	2.35	2.45	2.63	●
UM-BN2-08040			4			50			9.3	4.25	4.44	4.61	4.77	5.12	●
UM-BN2-08050			5			50			8.45	5.3	5.53	5.72	5.92	6.36	●
UM-BN2-08060			6			50			7.74	6.35	6.6	6.83	7.07	7.61	●
UM-BN2-08080			8			50			6.63	8.44	8.74	9.04	9.37	10.09	●
UM-BN2-08100			10			50			5.8	10.52	10.88	11.26	11.67	12.58	●
UM-BN2-09020	0.9	0.45	2	0.72	0.86	50	4	4	11.63	2.12	2.23	2.34	2.44	2.62	●
UM-BN2-09040			4			50			9.24	4.25	4.44	4.6	4.76	5.11	●
UM-BN2-09060			6			50			7.66	6.35	6.6	6.82	7.06	7.6	●
UM-BN2-09080			8			50			6.54	8.44	8.74	9.04	9.36	10.08	●
UM-BN2-10020	1	0.5	2	0.8	0.96	50	4	4	11.62	2.12	2.23	2.33	2.43	2.61	●
UM-BN2-10030			3			50			10.25	3.18	3.34	3.48	3.6	3.85	●
UM-BN2-10040			4			50			9.17	4.24	4.43	4.6	4.75	5.1	●
UM-BN2-10050			5			50			8.29	5.3	5.52	5.71	5.9	6.34	●
UM-BN2-10060			6			50			7.57	6.35	6.59	6.81	7.05	7.58	●
UM-BN2-10070			7			50			6.96	7.39	7.66	7.92	8.2	8.83	●
UM-BN2-10080			8			50			6.44	8.44	8.73	9.03	9.35	10.07	●
UM-BN2-10090			9			50			5.99	9.48	9.8	10.14	10.5	11.31	●
UM-BN2-10100			10			50			5.6	10.52	10.87	11.25	11.65	12.56	●
UM-BN2-10120			12			55			4.96	12.59	13.01	13.46	13.95	15.04	●
UM-BN2-10130			13			55			4.69	13.62	14.08	14.57	15.1	16.29	●
UM-BN2-10140			14			55			4.45	14.66	15.15	15.68	16.25	17.53	●
UM-BN2-10160			16			55			4.03	16.73	17.29	17.9	18.55	20.01	●
UM-BN2-10180			18			60			3.69	18.79	19.43	20.11	20.85	22.5	●
UM-BN2-10200			20			60			3.4	20.86	21.57	22.33	23.15	24.99	●
UM-BN2-11020	1.1	0.55	2	0.88	1.06	50	4	4	11.61	2.11	2.22	2.32	2.42	2.6	●
UM-BN2-11040			4			50			9.09	4.24	4.43	4.59	4.74	5.08	●
UM-BN2-11060			6			50			8.57	5.33	5.57	5.77	5.97	6.43	●
UM-BN2-11080			8			50			6.34	8.43	8.73	9.03	9.34	10.06	●

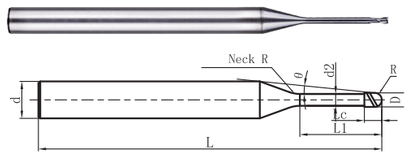
R	Tol.
R≤0.25	±0.003
R>0.25	±0.005

(mm)

● Standard Stock ○ Reservation required

UM-BN2

2 Flutes, Ball Nose End Mills For Minor Diameter & Deep Machining



Ordering Code	Mill Dia. (D)	Ball Radius (R)	Under Neck Length (L1)	Flute Length (Lc)	Neck Dia. (d2)	Overall Length (L)	shank Dia. (d)	Neck (R)	Interference Angel (Θ)	The effective under-neck length for the various draft angles					Stock
										0.5°	1°	1.5°	2°	3°	
UM-BN2-11100	1.1	0.55	10	0.88	1.06	50	4	4	5.5	10.51	10.87	11.24	11.64	12.54	●
UM-BN2-12040	1.2	0.6	4	0.96	1.15	50	4	4	9.05	4.22	4.4	4.55	4.7	5.04	●
UM-BN2-12080			8			50			6.25	8.41	8.7	8.99	9.3	10.01	●
UM-BN2-12100			10			50			5.41	10.49	10.84	11.21	11.6	12.5	●
UM-BN2-12120			12			55			4.77	12.56	12.97	13.42	13.9	14.98	●
UM-BN2-14080	1.4	0.7	8	1.12	1.34	50	4	4	6.04	8.38	8.66	8.95	9.26	9.96	●
UM-BN2-14120			12			55			4.56	12.53	12.94	13.38	13.86	14.93	●
UM-BN2-14160			16			55			3.67	16.66	17.22	17.82	18.46	19.9	●
UM-BN2-15040	1.5	0.75	4	1.2	1.44	50	4	4	8.82	4.2	4.36	4.51	4.65	4.97	●
UM-BN2-15060			6			50			7.08	6.29	6.52	6.73	6.95	7.46	●
UM-BN2-15080			8			50			5.92	8.38	8.66	8.95	9.25	9.94	●
UM-BN2-15100			10			50			5.08	10.46	10.8	11.16	11.55	12.43	●
UM-BN2-15120			12			55			4.45	12.53	12.94	13.38	13.85	14.92	●
UM-BN2-15140			14			55			3.96	14.6	15.08	15.6	16.15	17.4	●
UM-BN2-15160			16			55			3.57	16.66	17.22	17.81	18.45	19.89	●
UM-BN2-15180			18			60			3.25	18.73	19.36	20.03	20.75	22.38	●
UM-BN2-15200			20			60			2.98	20.8	21.5	22.25	23.05	-	●
UM-BN2-16080	1.6	0.8	8	1.28	1.54	50	4	4	5.8	8.38	8.66	8.94	9.25	9.93	●
UM-BN2-16120			12			55			4.34	12.53	12.94	13.37	13.85	14.9	●
UM-BN2-16160			16			55			3.47	16.66	17.21	17.81	18.44	19.88	●
UM-BN2-16200			20			60			2.89	20.8	21.49	22.24	23.04	-	●
UM-BN2-18080	1.8	0.9	8	1.44	1.73	50	4	4	5.55	8.36	8.63	8.91	9.21	9.88	●
UM-BN2-18120			12			55			4.11	12.5	12.91	13.34	13.81	14.85	●
UM-BN2-18160			16			55			3.26	16.64	17.19	17.77	18.41	19.83	●
UM-BN2-18200			20			60			2.7	20.77	21.46	22.21	23.01	-	●
UM-BN2-20030	2	1	3	1.6	1.92	50	4	4	9.72	3.11	3.22	3.32	3.42	3.62	●
UM-BN2-20040			4			50			8.32	4.16	4.31	4.44	4.57	4.86	●
UM-BN2-20060			6			50			6.46	6.26	6.46	6.66	6.87	7.35	●
UM-BN2-20080			8			50			5.27	8.34	8.6	8.88	9.17	9.84	●
UM-BN2-20100			10			50			4.46	10.41	10.74	11.09	11.47	12.32	●
UM-BN2-20120			12			55			3.86	12.48	12.88	13.31	13.77	14.81	●
UM-BN2-20130			13			55			3.62	13.51	13.95	14.42	14.92	16.05	●
UM-BN2-20140			14			55			3.4	14.55	15.02	15.53	16.07	17.29	●
UM-BN2-20160			16			55			3.04	16.62	17.16	17.74	18.37	19.78	●
UM-BN2-20180			18			60			2.75	18.68	19.3	19.96	20.67	-	●
UM-BN2-20200			20			60			2.51	20.75	21.44	22.18	22.97	-	●
UM-BN2-20220			22			60			2.31	22.82	23.58	24.39	25.27	-	●
UM-BN2-20250			25			65			2.06	25.92	26.79	27.72	28.72	-	●
UM-BN2-20300			30			70			1.75	31.09	32.14	33.26	-	-	●
UM-BN2-20350			35			75			1.52	36.26	37.48	38.8	-	-	●
UM-BN2-20400			40			80			1.34	41.42	42.83	-	-	-	●
UM-BN2-25060	2.5	1.25	6	2	2.4	50	4	4	5.62	6.22	6.41	6.6	6.8	7.25	●
UM-BN2-25100			10			50			3.69	10.37	10.69	11.03	11.4	12.23	●

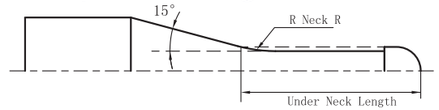
● Standard Stock ○ Reservation required

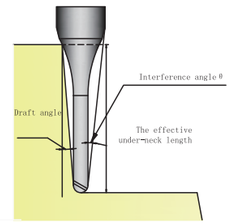
R	Tol.
R≤0.25	±0.003
R>0.25	±0.005

(mm)

UM-BN2

2 Flutes, Ball Nose End Mills For Minor Diameter & Deep Machining





Ordering Code	Mill Dia. (D)	Ball Radius (R)	Under Neck Length (L1)	Flute Length (Lc)	Neck Dia. (d2)	Overall Length (L)	shank Dia. (d)	Neck (R)	Interference Angel (Θ)	The effective under-neck length for the various draft angles					Stock
										0.5°	1°	1.5°	2°	3°	
UM-BN2-25150	2.5	1.25	15	2	2.4	55	4	4	2.59	15.54	16.04	16.58	17.15	-	○
UM-BN2-25200			20			60			1.99	20.71	21.39	22.12	-	-	●
UM-BN2-25250			25			65			1.62	25.88	26.74	27.66	-	-	●
UM-BN2-25300			30			70			1.36	31.05	32.09	-	-	-	●
UM-BN2-30080	3	1.5	8	2.4	2.88	55	6	4	7.04	8.27	8.51	8.77	9.04	9.65	●
UM-BN2-30100			10			55			6.05	10.34	10.65	10.98	11.34	12.14	●
UM-BN2-30130			13			60			5	13.44	13.86	14.31	14.79	15.87	●
UM-BN2-30160			16			60			4.26	16.55	17.07	17.63	18.24	19.6	●
UM-BN2-30200			20			65			3.56	20.68	21.35	22.07	22.84	24.57	●
UM-BN2-30250			25			70			2.95	25.85	26.7	27.61	28.59	-	●
UM-BN2-30300			30			75			2.52	31.02	32.05	33.15	34.34	-	●
UM-BN2-30350			35			80			2.2	36.19	37.39	38.69	40.08	-	●
UM-BN2-35150	3.5	1.75	15	2.8	3.36	60	6	4	3.99	15.49	15.96	16.48	17.03	18.27	●
UM-BN2-35250			25			70			2.56	25.82	26.66	27.56	28.53	-	●
UM-BN2-35350			35			80			1.89	36.16	37.36	38.64	-	-	●
UM-BN2-35450			45			90			1.5	46.5	48.05	-	-	-	●
UM-BN2-40100	4	2	10	3.2	3.86	55	6	4	4.86	10.31	10.6	10.91	11.24	11.99	●
UM-BN2-40130			13			60			3.88	13.41	13.81	14.23	14.69	15.72	●
UM-BN2-40160			16			60			3.23	16.51	17.02	17.56	18.14	19.45	●
UM-BN2-40200			20			65			2.63	20.65	21.3	21.99	22.74	-	●
UM-BN2-40250			25			70			2.14	25.81	26.64	27.53	28.49	-	●
UM-BN2-40300			30			75			1.81	30.98	31.99	33.08	-	-	●
UM-BN2-40350			35			80			1.56	36.15	37.34	38.62	-	-	●
UM-BN2-40400			40			80			1.38	41.32	42.69	-	-	-	●
UM-BN2-40450			45			90			1.23	46.49	48.04	-	-	-	●
UM-BN2-40500			50			100			1.11	51.66	53.39	-	-	-	●
UM-BN2-50200	5	2.5	20	4	4.85	65	6	4	1.48	20.62	21.25	-	-	-	●
UM-BN2-50250			25			70			1.18	25.79	26.6	-	-	-	●
UM-BN2-50300			30			75			0.98	30.96	-	-	-	-	●
UM-BN2-50400			40			80			0.73	41.29	-	-	-	-	●
UM-BN2-60120	6	3	12	6	5.85	60	6	-	-	-	-	-	-	-	●
UM-BN2-60200			20			65			-	-	-	-	-	-	●
UM-BN2-60300			30			75			-	-	-	-	-	-	●
UM-BN2-60500			50			100			-	-	-	-	-	-	●

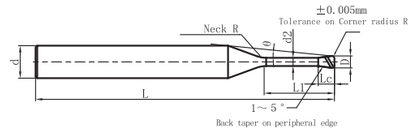
● Standard Stock ○ Reservation required

R	Tol.
R≤0.25	±0.003
R>0.25	±0.005

(mm)

UM-RN2

2 Flutes, Corner Radius End Mills For Minor Diameter & Deep Machining



Ordering Code	Mill Dia. (D)	Ball Radius (R)	Under Neck Length (L1)	Flute Length (Lc)	Neck Dia. (d2)	Overall Length (L)	shank Dia. (d)	Neck (R)	Interference Angel (⊙)	The effective under-neck length for the various draft angles					Stock
										0.5°	1°	1.5°	2°	3°	
UM-RN2-0202005	0.2	0.02	0.5	0.16	0.17	50	4	1	14.07	0.52	0.54	0.56	0.58	0.63	●
UM-RN2-020201			1						13.23	1.04	1.08	1.12	1.16	1.25	●
UM-RN2-020202			2						11.82	2.08	2.15	2.23	2.31	2.50	●
UM-RN2-0205005		0.05	0.5						14.12	0.52	0.54	0.56	0.58	0.62	●
UM-RN2-020501			1						13.28	1.04	1.08	1.11	1.15	1.24	●
UM-RN2-0205015			1.5						12.53	1.56	1.61	1.67	1.73	1.87	●
UM-RN2-020502			2						11.85	2.08	2.15	2.22	2.30	2.49	●
UM-RN2-030201	0.3	0.02	1	0.24	0.27	50	4	2	13.09	1.06	1.12	1.17	1.23	1.33	●
UM-RN2-030202			2						11.67	2.11	2.21	2.29	2.38	2.57	●
UM-RN2-030203			3						10.53	3.16	3.28	3.40	3.53	3.81	●
UM-RN2-030501		0.05	1						13.14	1.06	1.12	1.17	1.22	1.32	●
UM-RN2-0305015			1.5						12.38	1.59	1.66	1.73	1.80	1.94	●
UM-RN2-030502			2						11.71	2.11	2.21	2.29	2.37	2.56	●
UM-RN2-0305025			2.5						11.11	2.64	2.75	2.84	2.95	3.18	●
UM-RN2-030503			3						10.56	3.16	3.28	3.40	3.52	3.81	●
UM-RN2-040201	0.4	0.02	1	0.32	0.37	50	4	2	13.04	1.06	1.12	1.17	1.23	1.33	●
UM-RN2-040202			2						11.60	2.11	2.21	2.29	2.38	2.57	●
UM-RN2-040203			3						10.44	3.16	3.28	3.40	3.53	3.81	●
UM-RN2-040204			4						9.49	4.20	4.35	4.51	4.68	5.06	●
UM-RN2-040501		0.05	1						13.09	1.06	1.12	1.17	1.22	1.32	●
UM-RN2-0405015			1.5						12.32	1.59	1.66	1.73	1.80	1.94	●
UM-RN2-040502			2						11.64	2.11	2.21	2.29	2.37	2.56	●
UM-RN2-0405025			2.5						11.03	2.64	2.75	2.84	2.95	3.18	●
UM-RN2-040503			3						10.47	3.16	3.28	3.40	3.52	3.81	●
UM-RN2-0405035			3.5						9.97	3.68	3.82	3.95	4.10	4.43	●
UM-RN2-040504			4						9.52	4.20	4.35	4.51	4.67	5.05	●
UM-RN2-041001		0.1	1						13.17	1.06	1.11	1.16	1.21	1.31	●
UM-RN2-041002			2						11.70	2.11	2.20	2.28	2.37	2.55	●
UM-RN2-041003			3						10.53	3.16	3.28	3.39	3.52	3.79	●
UM-RN2-041004			4						9.56	4.20	4.35	4.50	4.67	5.04	●
UM-RN2-050201	0.5	0.02	1	0.4	0.47	50	4	2	13.00	1.06	1.12	1.17	1.23	1.33	●
UM-RN2-050202			2						11.53	2.11	2.21	2.29	2.38	2.57	●
UM-RN2-050203			3						10.35	3.16	3.28	3.40	3.53	3.81	●
UM-RN2-050204			4						9.39	4.20	4.35	4.51	4.68	5.06	●
UM-RN2-050206			6						7.92	6.27	6.49	6.73	6.98	7.54	●
UM-RN2-050501		0.05	1						13.05	1.06	1.12	1.17	1.22	1.32	●
UM-RN2-050502			2						11.56	2.11	2.21	2.29	2.37	2.56	●
UM-RN2-050503			3						10.38	3.16	3.28	3.40	3.52	3.81	●
UM-RN2-050504			4						9.42	4.20	4.35	4.51	4.67	5.05	●
UM-RN2-050505			5						8.62	5.24	5.42	5.61	5.82	6.29	●
UM-RN2-050506			6						7.94	6.27	6.49	6.72	6.97	7.53	●
UM-RN2-051001		0.1	1						13.13	1.06	1.11	1.16	1.21	1.31	●
UM-RN2-051002			2						11.63	2.11	2.20	2.28	2.37	2.55	●

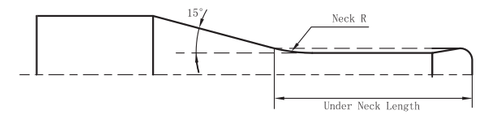
● Standard Stock ○ Reservation required

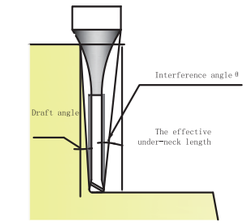
r	Tol.
r	±0.005

(mm)

UM-RN2

2 Flutes, Corner Radius End Mills For Minor Diameter & Deep Machining





Ordering Code	Mill Dia. (D)	Ball Radius (R)	Under Neck Length (L1)	Flute Length (Lc)	Neck Dia. (d2)	Overall Length (L)	shank Dia. (d)	Neck (R)	Interference Angel (⊙)	The effective under-neck length for the various draft angles					Stock
										0.5°	1°	1.5°	2°	3°	
UM-RN2-051003	0.5	0.1	3	0.4	0.47	50	4	2	10.44	3.16	3.28	3.39	3.52	3.79	●
UM-RN2-051004			4						9.46	4.20	4.35	4.50	4.67	5.04	●
UM-RN2-051005			5						8.65	5.24	5.42	5.61	5.82	6.28	●
UM-RN2-051006			6						7.97	6.27	6.49	6.72	6.97	7.52	●
UM-RN2-060202	0.6	0.02	2	0.48	0.57	50	4	4	11.24	2.17	2.31	2.44	2.55	2.77	●
UM-RN2-060204			4						9.15	4.29	4.51	4.69	4.86	5.26	●
UM-RN2-060206			6						7.71	6.40	6.66	6.90	7.16	7.74	●
UM-RN2-060502		0.05	2						11.27	2.17	2.31	2.43	2.55	2.76	●
UM-RN2-060504			4						9.18	4.29	4.51	4.68	4.86	5.25	●
UM-RN2-060506			6						7.73	6.40	6.66	6.90	7.16	7.74	●
UM-RN2-060508			8						6.68	8.49	8.80	9.12	9.46	10.22	●
UM-RN2-060510			10						5.88	10.57	10.94	11.33	11.76	12.71	●
UM-RN2-061002		0.1	2						11.34	2.16	2.30	2.43	2.54	2.75	●
UM-RN2-061004			4						9.22	4.29	4.50	4.68	4.85	5.24	●
UM-RN2-061006			6						7.76	6.39	6.66	6.90	7.15	7.72	●
UM-RN2-061008			8						6.70	8.48	8.80	9.11	9.45	10.21	●
UM-RN2-061010			10						5.89	10.57	10.94	11.33	11.75	12.70	●
UM-RN2-070504	0.7	0.05	4	0.56	0.67	50	4	4	9.07	4.29	4.51	4.68	4.86	5.25	●
UM-RN2-070506			6						7.62	6.40	6.66	6.90	7.16	7.74	●
UM-RN2-071004		0.1	4						9.11	4.29	4.50	4.68	4.85	5.24	●
UM-RN2-071006			6						7.65	6.39	6.66	6.90	7.15	7.72	●
UM-RN2-080204	0.8	0.02	4	0.64	0.76	50	4	4	8.96	4.27	4.47	4.65	4.82	5.21	●
UM-RN2-080206			6			50			7.51	6.37	6.63	6.87	7.12	7.70	●
UM-RN2-080504		0.05	4			50			8.99	4.27	4.47	4.65	4.82	5.21	●
UM-RN2-080506			6			50			7.52	6.37	6.63	6.86	7.12	7.69	●
UM-RN2-080508			8			50			6.47	8.45	8.76	9.08	9.42	10.18	●
UM-RN2-080512			12			55			5.05	12.61	13.04	13.51	14.02	15.15	●
UM-RN2-081004		0.1	4			50			9.03	4.26	4.47	4.64	4.81	5.19	●
UM-RN2-081006			6			50			7.55	6.37	6.62	6.86	7.11	7.68	●
UM-RN2-081008			8			50			6.49	8.45	8.76	9.07	9.41	10.17	●
UM-RN2-081012			12			55			5.06	12.60	13.04	13.51	14.01	15.14	●
UM-RN2-082004		0.2	4			50			9.12	4.26	4.46	4.63	4.80	5.17	●
UM-RN2-082006			6			50			7.62	6.36	6.61	6.85	7.10	7.66	●
UM-RN2-082008			8			50			6.54	8.45	8.75	9.06	9.40	10.14	●
UM-RN2-082012			12			55			5.09	12.60	13.03	13.50	14.00	15.11	●
UM-RN2-100202	1	0.02	2	0.8	0.96	50	4	4	10.92	2.15	2.28	2.40	2.52	2.73	●
UM-RN2-100204			4			50			8.72	4.27	4.47	4.65	4.82	5.21	●
UM-RN2-100206			6			50			7.26	6.37	6.63	6.87	7.12	7.70	●
UM-RN2-100208			8			50			6.22	8.46	8.77	9.08	9.42	10.19	●
UM-RN2-100210			10			50			5.44	10.53	10.91	11.30	11.72	12.67	●
UM-RN2-100212			12			55			4.83	12.61	13.05	13.52	14.02	15.16	●
UM-RN2-100502		0.05	2			50			10.96	2.15	2.28	2.40	2.51	2.72	●
UM-RN2-100503			3			50			9.73	3.21	3.38	3.53	3.67	3.96	●

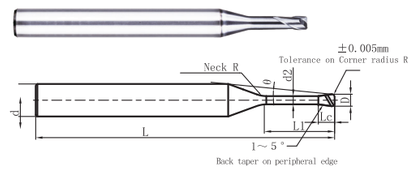
r	Tol.
r	±0.005

(mm)

● Standard Stock ○ Reservation required

UM-RN2

2 Flutes, Corner Radius End Mills For Minor Diameter & Deep Machining



Ordering Code	Mill Dia. (D)	Ball Radius (R)	Under Neck Length (L1)	Flute Length (Lc)	Neck Dia. (d2)	Overall Length (L)	shank Dia. (d)	Neck (R)	Interference Angel (θ)	The effective under-neck length for the various draft angles					Stock
										0.5°	1°	1.5°	2°	3°	
UM-RN2-100504	1	0.05	4	0.8	0.96	50	4	4	8.75	4.27	4.47	4.65	4.82	5.21	○
UM-RN2-100505			5			50			7.95	5.32	5.55	5.75	5.97	6.45	○
UM-RN2-100506			6			50			7.28	6.37	6.63	6.86	7.12	7.69	○
UM-RN2-100508			8			50			6.23	8.45	8.76	9.08	9.42	10.18	○
UM-RN2-100510			10			50			5.45	10.53	10.90	11.30	11.72	12.67	○
UM-RN2-100512			12			55			4.84	12.61	13.04	13.51	14.02	15.15	○
UM-RN2-100516			16			60			3.95	16.74	17.32	17.95	18.62	20.12	○
UM-RN2-100520			20			60			3.34	20.88	21.60	22.38	23.22	25.10	○
UM-RN2-101002		0.1	2			50			11.03	2.14	2.27	2.39	2.50	2.71	○
UM-RN2-101003			3			50			9.79	3.21	3.38	3.53	3.66	3.95	○
UM-RN2-101004			4			50			8.80	4.26	4.47	4.64	4.81	5.19	○
UM-RN2-101005			5			50			7.99	5.32	5.55	5.75	5.96	6.44	○
UM-RN2-101006			6			50			7.31	6.37	6.62	6.86	7.11	7.68	○
UM-RN2-101008			8			50			6.25	8.45	8.76	9.07	9.41	10.17	○
UM-RN2-101010			10			50			5.46	10.53	10.90	11.29	11.71	12.65	○
UM-RN2-101012			12			55			4.85	12.60	13.04	13.51	14.01	15.14	○
UM-RN2-101016			16			60			3.96	16.74	17.32	17.94	18.61	20.11	○
UM-RN2-101020			20			60			3.35	20.87	21.60	22.37	23.21	25.08	○
UM-RN2-102002		0.2	2			50			11.17	2.14	2.26	2.38	2.48	2.68	○
UM-RN2-102003			3			50			9.90	3.20	3.37	3.51	3.65	3.93	○
UM-RN2-102004			4			50			8.89	4.26	4.46	4.63	4.80	5.17	○
UM-RN2-102005			5			50			8.06	5.31	5.54	5.74	5.95	6.41	○
UM-RN2-102006			6			50			7.37	6.36	6.61	6.85	7.10	7.66	○
UM-RN2-102008			8			50			6.30	8.45	8.75	9.06	9.40	10.14	○
UM-RN2-102010			10			50			5.50	10.53	10.89	11.28	11.70	12.63	○
UM-RN2-102012			12			55			4.88	12.60	13.03	13.50	14.00	15.11	○
UM-RN2-102016			16			60			3.98	16.74	17.31	17.93	18.59	20.09	○
UM-RN2-102020			20			60			3.36	20.87	21.59	22.36	23.19	25.06	○
UM-RN2-103002		0.3	2			50			11.32	2.13	2.25	2.36	2.47	2.66	○
UM-RN2-103003			3			50			10.01	3.20	3.36	3.50	3.63	3.90	○
UM-RN2-103004			4			50			8.98	4.25	4.45	4.62	4.78	5.15	○
UM-RN2-103005			5			50			8.14	5.31	5.53	5.73	5.93	6.39	○
UM-RN2-103006			6			50			7.44	6.36	6.61	6.84	7.08	7.63	○
UM-RN2-103008			8			50			6.35	8.44	8.75	9.05	9.38	10.12	○
UM-RN2-103010			10			50			5.53	10.52	10.89	11.27	11.68	12.60	○
UM-RN2-103012			12			55			4.90	12.60	13.03	13.49	13.98	15.09	○
UM-RN2-103016			16			60			4.00	16.73	17.30	17.92	18.58	20.06	○
UM-RN2-103020			20			60			3.37	20.87	21.58	22.35	23.18	25.04	○
UM-RN2-1251005	1.25	0.1	5	1	1.2	50	4	4	7.68	5.30	5.52	5.72	5.93	6.40	○
UM-RN2-1251010			10			50			5.17	10.50	10.87	11.26	11.68	12.62	○
UM-RN2-1251015			15			55			3.90	15.68	16.22	16.80	17.43	18.83	○
UM-RN2-1251020			20			60			3.13	20.84	21.57	22.34	23.18	25.05	○
UM-RN2-1252005		0.2	5			50			7.75	5.29	5.51	5.71	5.91	6.38	○

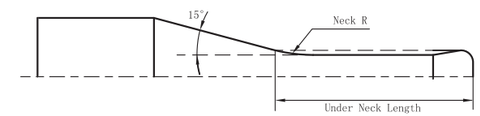
● Standard Stock ○ Reservation required

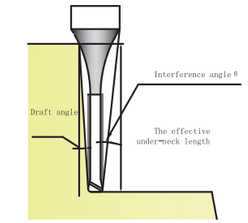
r	Tol.
r	±0.005

(mm)

UM-RN2

2 Flutes, Corner Radius End Mills For Minor Diameter & Deep Machining



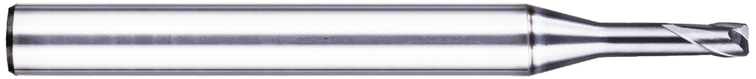


Ordering Code	Mill Dia. (D)	Ball Radius (R)	Under Neck Length (L1)	Flute Length (Lc)	Neck Dia. (d2)	Overall Length (L)	shank Dia. (d)	Neck (R)	Interference Angel (θ)	The effective under-neck length for the various draft angles					Stock
										0.5°	1°	1.5°	2°	3°	
UM-RN2-1252010	1.25	0.2	10	1	1.2	50	4	4	5.21	10.50	10.86	11.25	11.66	12.59	○
UM-RN2-1252015			15			55			3.92	15.67	16.21	16.79	17.41	18.81	○
UM-RN2-1252020			20			60			3.14	20.84	21.56	22.33	23.16	25.02	○
UM-RN2-1253005		0.3	5			50			7.83	5.29	5.50	5.70	5.90	6.35	○
UM-RN2-1253010			10			50			5.24	10.50	10.86	11.24	11.65	12.57	○
UM-RN2-1253015			15			55			3.94	15.67	16.20	16.78	17.40	18.78	○
UM-RN2-1253020			20			60			3.15	20.84	21.55	22.32	23.15	25.00	○
UM-RN2-151004	1.5	0.1	4	1.2	1.44	50	4	4	8.17	4.23	4.42	4.58	4.75	5.13	○
UM-RN2-151006			6			50			6.66	6.32	6.57	6.80	7.05	7.62	○
UM-RN2-151008			8			50			5.62	8.41	8.71	9.02	9.35	10.10	○
UM-RN2-151012			12			55			4.28	12.55	12.98	13.45	13.95	15.07	○
UM-RN2-151015			15			55			3.63	15.65	16.19	16.77	17.40	18.80	○
UM-RN2-151020			20			60			2.90	20.82	21.54	22.32	23.15	-	○
UM-RN2-152004		0.2	4			50			8.26	4.23	4.41	4.57	4.74	5.10	○
UM-RN2-152006			6			50			6.72	6.32	6.56	6.79	7.04	7.59	○
UM-RN2-125008			8			50			5.66	8.40	8.70	9.01	9.34	10.08	○
UM-RN2-152012			12			55			4.31	12.55	12.98	13.44	13.94	15.05	○
UM-RN2-152015			15			55			3.65	15.65	16.19	16.76	17.38	18.78	○
UM-RN2-152020			20			60			2.91	20.82	21.53	22.31	23.13	-	○
UM-RN2-153004		0.3	4			50			8.36	4.22	4.40	4.56	4.72	5.08	○
UM-RN2-153006			6			50			6.78	6.31	6.55	6.78	7.02	7.57	○
UM-RN2-153008			8			50			5.71	8.40	8.69	8.99	9.32	10.05	○
UM-RN2-153012			12			55			4.33	12.54	12.97	13.43	13.92	15.03	○
UM-RN2-153015			15			55			3.67	15.64	16.18	16.75	17.37	18.76	○
UM-RN2-153020			20			60			2.92	20.81	21.53	22.29	23.12	-	○
UM-RN2-155004		0.5	4			50			8.55	4.21	4.39	4.54	4.69	5.03	○
UM-RN2-155006			6			50			6.91	6.31	6.54	6.76	6.99	7.52	○
UM-RN2-155008			8			50			5.80	8.39	8.68	8.97	9.29	10.00	○
UM-RN2-155012			12			55			4.39	12.54	12.96	13.41	13.89	14.98	○
UM-RN2-155015			15			55			3.71	15.64	16.17	16.73	17.34	18.71	○
UM-RN2-155020			20			60			2.95	20.81	21.51	22.27	23.09	-	○
UM-RN2-1751005	1.75	0.1	5	1.4	1.68	50	4	4	6.96	5.26	5.47	5.67	5.88	6.35	○
UM-RN2-1751010			10			50			4.53	10.46	10.82	11.21	11.63	12.56	○
UM-RN2-1751015			15			55			3.35	15.63	16.17	16.75	17.38	18.78	○
UM-RN2-1751020			20			60			2.66	20.80	21.52	22.29	23.13	-	○
UM-RN2-1752005		0.2	5			50			7.03	5.26	5.47	5.66	5.86	6.32	○
UM-RN2-1752010			10			50			4.56	10.46	10.82	11.20	11.61	12.54	○
UM-RN2-1752015			15			55			3.37	15.63	16.16	16.74	17.36	18.75	○
UM-RN2-1752020			20			60			2.67	20.80	21.51	22.28	23.11	-	○
UM-RN2-1753005		0.3	5			50			7.11	5.25	5.46	5.65	5.85	6.30	○
UM-RN2-1753010			10			50			4.59	10.45	10.81	11.19	11.60	12.51	○
UM-RN2-1753015			15			55			3.39	15.62	16.16	16.73	17.35	18.73	○
UM-RN2-1753020			20			60			2.69	20.79	21.51	22.27	23.10	-	○

r	Tol.
r	±0.005

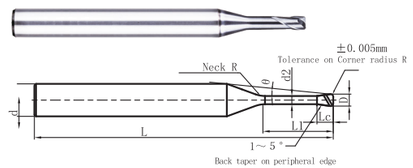
(mm)

● Standard Stock ○ Reservation required



UM-RN2

2 Flutes, Corner Radius End Mills For Minor Diameter & Deep Machining



Ordering Code	Mill Dia. (D)	Ball Radius (R)	Under Neck Length (L1)	Flute Length (Lc)	Neck Dia. (d2)	Overall Length (L)	shank Dia. (d)	Neck (R)	Interference Angel (Θ)	The effective under-neck length for the various draft angles					Stock
										0.5°	1°	1.5°	2°	3°	
UM-RN2-201004	2	0.1	4	1.6	1.92	50	4	4	7.36	4.21	4.38	4.54	4.71	5.08	○
UM-RN2-201006			6			50			5.86	6.29	6.53	6.76	7.01	7.57	○
UM-RN2-201008			8			50			4.87	8.37	8.66	8.97	9.31	10.05	○
UM-RN2-201012			12			55			3.64	12.51	12.94	13.41	13.91	15.03	○
UM-RN2-201016			16			55			2.90	16.65	17.22	17.84	18.51	-	○
UM-RN2-201020			20			60			2.42	20.78	21.50	22.27	23.11	-	○
UM-RN2-201025			25			65			2.00	25.95	26.85	27.82	-	-	○
UM-RN2-201030			30			70			1.70	31.12	32.20	33.36	-	-	○
UM-RN2-202004		0.2	4			50			7.46	4.20	4.37	4.53	4.69	5.06	○
UM-RN2-202006			6			50			5.93	6.29	6.52	6.75	6.99	7.54	○
UM-RN2-202008			8			50			4.91	8.37	8.66	8.96	9.29	10.30	○
UM-RN2-202012			12			55			3.66	12.51	12.94	13.40	13.89	15.00	○
UM-RN2-202016			16			55			2.92	16.64	17.22	17.83	18.49	-	○
UM-RN2-202020			20			60			2.43	20.78	21.49	22.26	23.09	-	○
UM-RN2-202025			25			65			2.00	25.95	26.84	27.80	-	-	○
UM-RN2-202030			30			70			1.71	31.11	32.19	33.35	-	-	○
UM-RN2-203004		0.3	4			50			7.56	4.20	4.37	4.52	4.68	5.30	○
UM-RN2-203006			6			50			5.99	6.28	6.51	6.74	6.98	7.52	○
UM-RN2-203008			8			50			4.96	8.36	8.65	8.95	9.28	10.01	○
UM-RN2-203012			12			55			3.69	12.50	12.93	13.39	13.88	14.98	○
UM-RN2-203016			16			55			2.93	16.64	17.21	17.82	18.48	-	○
UM-RN2-203020			20			60			2.44	20.77	21.49	22.25	23.08	-	○
UM-RN2-203025			25			65			2.01	25.94	26.84	27.79	28.82	-	○
UM-RN2-203030			30			70			1.71	31.11	32.18	33.34	-	-	○
UM-RN2-205006		0.5	6			50			6.11	6.28	6.50	6.71	6.95	7.47	○
UM-RN2-205008			8			50			5.04	8.36	8.64	8.93	9.25	9.96	○
UM-RN2-205012			12			55			3.73	12.50	12.92	13.36	13.85	14.93	○
UM-RN2-205016			16			55			2.96	16.63	17.19	17.80	18.45	-	○
UM-RN2-205020			20			60			2.46	20.77	21.47	22.23	23.50	-	○
UM-RN2-205025			25			65			2.30	25.94	26.82	27.77	28.79	-	○
UM-RN2-205030			30			70			1.72	31.10	32.17	33.31	-	-	○
UM-RN2-208006		0.8	6			50			6.31	6.26	6.48	6.68	6.90	7.40	○
UM-RN2-208008			8			50			5.18	8.35	8.62	8.90	9.20	9.88	○
UM-RN2-208012			12			55			3.81	12.49	12.89	13.33	13.80	14.86	○
UM-RN2-208016			16			55			3.01	16.62	17.17	17.77	18.40	19.83	○
UM-RN2-208020			20			60			2.49	20.76	21.45	22.20	23.00	-	○
UM-RN2-208025			25			65			2.50	25.93	26.80	27.74	28.75	-	○
UM-RN2-208030			30			70			1.74	31.09	32.15	33.28	-	-	○
UM-RN2-251010	2.5	0.1	10	2	2.4	50	4	4	3.36	10.41	10.77	11.16	11.57	12.50	○
UM-RN2-251020			20			60			1.89	20.75	21.47	22.24	-	-	○
UM-RN2-251030			30			70			1.32	31.09	32.17	-	-	-	○
UM-RN2-252010		0.2	10			50			3.39	10.41	10.77	11.15	11.56	12.48	○
UM-RN2-252020			20			60			1.90	20.75	21.46	22.23	-	-	○

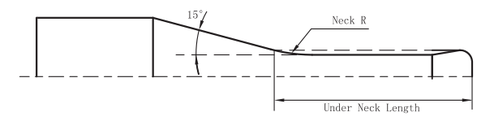
● Standard Stock ○ Reservation required

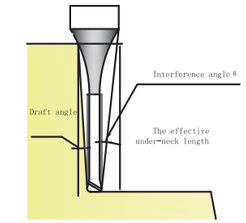
r	Tol.
r	±0.005

(mm)

UM-RN2

2 Flutes, Corner Radius End Mills For Minor Diameter & Deep Machining





Ordering Code	Mill Dia. (D)	Ball Radius (R)	Under Neck Length (L1)	Flute Length (Lc)	Neck Dia. (d2)	Overall Length (L)	shank Dia. (d)	Neck (R)	Interference Angel (Θ)	The effective under-neck length for the various draft angles					Stock
										0.5°	1°	1.5°	2°	3°	
UM-RN2-252030	2.5	0.2	30	2	2.4	70	4	4	1.32	31.08	32.16	-	-	-	○
UM-RN2-253010		0.3	10			50			3.42	10.41	10.76	11.14	11.54	12.46	○
UM-RN2-253020			20			60			1.91	20.74	21.46	22.22	-	-	○
UM-RN2-253030			30			70			1.32	31.08	32.15	-	-	-	○
UM-RN2-255010		0.5	10			50			3.47	10.40	10.75	11.12	11.51	12.41	○
UM-RN2-255020			20			60			1.92	20.74	21.44	22.20	-	-	○
UM-RN2-255030			30			70			1.33	31.07	32.14	-	-	-	○
UM-RN2-301006	3	0.1	6	2.4	2.88	50	6	4	7.40	6.25	6.47	6.70	6.95	7.50	○
UM-RN2-301008			8			55			6.32	8.32	8.61	8.92	9.25	9.99	○
UM-RN2-301012			12			60			4.89	12.46	12.89	13.35	13.85	14.96	○
UM-RN2-301016			16			60			3.99	16.59	17.17	17.78	18.45	19.94	○
UM-RN2-301018			18			65			3.65	18.66	19.31	20.00	20.75	22.42	○
UM-RN2-301020			20			65			3.36	20.73	21.45	22.22	23.50	24.91	○
UM-RN2-301030			30			75			2.42	31.06	32.14	33.30	34.55	-	○
UM-RN2-301035			35			80			2.12	36.23	37.49	38.84	40.29	-	○
UM-RN2-302006		0.2	6			50			7.46	6.25	6.46	6.69	6.93	7.48	○
UM-RN2-302008			8			55			6.36	8.32	8.60	8.91	9.23	9.97	○
UM-RN2-302012			12			60			4.92	12.45	12.88	13.34	13.83	14.94	○
UM-RN2-302016			16			60			4.00	16.59	17.16	17.77	18.43	19.91	○
UM-RN2-302018			18			65			3.66	18.66	19.30	19.99	20.73	22.40	○
UM-RN2-302020			20			65			3.38	20.72	21.44	22.21	23.30	24.88	○
UM-RN2-302030			30			75			2.43	31.06	32.14	33.29	34.53	-	○
UM-RN2-302035			35			80			2.13	36.23	37.48	38.83	40.28	-	○
UM-RN2-303006		0.3	6			50			7.53	6.24	6.46	6.68	6.92	7.46	○
UM-RN2-303008			8			55			6.41	8.32	8.60	8.90	9.22	9.94	○
UM-RN2-303012			12			60			4.94	12.45	12.87	13.33	13.82	14.91	○
UM-RN2-303016			16			60			4.02	16.59	17.15	17.76	18.42	19.89	○
UM-RN2-303018			18			65			3.68	18.65	19.29	19.98	20.72	22.37	○
UM-RN2-303020			20			65			3.39	20.72	21.43	22.20	23.02	24.86	○
UM-RN2-303030			30			75			2.43	31.06	32.13	33.28	34.52	-	○
UM-RN2-303035			35			80			2.13	36.23	37.48	38.82	40.26	-	○
UM-RN2-305008		0.5	8			55			6.51	8.31	8.58	8.87	9.19	9.89	○
UM-RN2-305012			12			60			5.00	12.44	12.86	13.31	13.79	14.87	○
UM-RN2-305016			16			60			4.06	16.58	17.14	17.74	18.39	19.84	○
UM-RN2-305018			18			65			3.71	18.65	19.28	19.96	20.69	22.33	○
UM-RN2-305020			20			65			3.42	20.71	21.42	22.17	22.99	24.81	○
UM-RN2-305030			30			75			2.45	31.50	32.12	33.26	34.49	-	○
UM-RN2-305035			35			80			2.14	36.22	37.46	38.80	40.23	-	○
UM-RN2-30A008		1	8			55			6.76	8.29	8.55	8.82	9.11	9.77	○
UM-RN2-30A012			12			60			5.15	12.43	12.83	13.25	13.71	14.74	○
UM-RN2-30A016			16			55			4.16	16.56	17.10	17.69	18.31	19.72	○
UM-RN2-30A018			18			60			3.79	18.63	19.24	19.90	20.61	22.20	○
UM-RN2-30A020			20			50			3.49	20.70	21.38	22.12	22.91	24.69	○

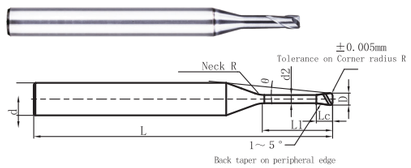
r	Tol.
r	±0.005

(mm)

● Standard Stock ○ Reservation required

UM-RN2

2 Flutes, Corner Radius End Mills For Minor Diameter & Deep Machining



Ordering Code	Mill Dia. (D)	Ball Radius (R)	Under Neck Length (L1)	Flute Length (Lc)	Neck Dia. (d2)	Overall Length (L)	shank Dia. (d)	Neck (R)	Interference Angel (Θ)	The effective under-neck length for the various draft angles					Stock
										0.5°	1°	1.5°	2°	3°	
UM-RN2-30A030	3	1	30	2.4	2.88	50	6	4	2.48	31.30	32.08	33.20	34.41	-	○
UM-RN2-30A035			35			50			2.17	36.20	37.43	38.74	40.16	-	○
UM-RN2-401008	4	0.1	8	3.2	3.86	55	6	4	4.90	8.31	8.59	8.90	9.23	9.97	○
UM-RN2-401012			12			55			3.66	12.44	12.87	13.33	13.83	14.94	○
UM-RN2-401016			16			60			2.91	16.57	17.15	17.76	18.43	-	○
UM-RN2-401020			20			65			2.42	20.71	21.43	22.20	23.30	-	○
UM-RN2-401030			30			70			1.71	31.50	32.12	33.28	-	-	○
UM-RN2-401035			35			50			1.49	36.21	37.47	-	-	-	○
UM-RN2-401045			45			50			1.18	46.55	48.17	-	-	-	○
UM-RN2-402008		0.2	8			50			4.94	8.30	8.58	8.89	9.21	9.94	○
UM-RN2-402012			12			55			3.68	12.44	12.86	13.32	13.81	14.92	○
UM-RN2-402016			16			55			2.93	16.57	17.14	17.75	18.41	-	○
UM-RN2-402020			20			60			2.43	20.71	21.42	22.19	23.01	-	○
UM-RN2-402030			30			65			1.71	31.04	32.12	33.27	-	-	○
UM-RN2-402035			35			70			1.49	36.21	37.47	-	-	-	○
UM-RN2-402045			45			50			1.18	46.55	48.16	-	-	-	○
UM-RN2-403008		0.3	8			50			4.99	8.30	8.58	8.88	9.20	9.92	○
UM-RN2-403012			12			50			3.70	12.43	12.86	13.31	13.80	14.89	○
UM-RN2-403016			16			55			2.94	16.57	17.13	17.74	18.40	-	○
UM-RN2-403020			20			55			2.44	20.70	21.41	22.18	23.00	-	○
UM-RN2-403030			30			60			1.72	31.04	32.11	33.26	-	-	○
UM-RN2-403035			35			65			1.49	36.21	37.46	-	-	-	○
UM-RN2-403045			45			70			1.19	46.54	48.16	-	-	-	○
UM-RN2-405012		0.5	12			50			3.75	12.43	12.84	13.29	13.77	14.84	○
UM-RN2-405016			16			50			2.97	16.56	17.12	17.72	18.37	-	○
UM-RN2-405020			20			55			2.47	20.70	21.40	22.15	22.97	-	○
UM-RN2-405030			30			55			1.73	31.03	32.10	33.24	-	-	○
UM-RN2-405035			35			60			1.50	36.20	37.44	-	-	-	○
UM-RN2-405045			45			65			1.19	46.54	48.14	-	-	-	○
UM-RN2-40A012		1	12			70			3.88	12.41	12.81	13.23	13.69	14.72	○
UM-RN2-40A016			16			50			3.50	16.54	17.09	17.67	18.29	19.70	○
UM-RN2-40A020			20			50			2.52	20.68	21.36	22.10	22.89	-	○
UM-RN2-40A030			30			55			1.75	31.02	32.06	33.18	-	-	○
UM-RN2-40A035			35			55			1.52	36.18	37.41	38.73	-	-	○
UM-RN2-40A045			45			60			1.20	46.52	48.11	-	-	-	○
UM-RN2-501020	5	0.1	20	4	4.85	65	6	4	1.32	20.70	21.42	-	-	-	○
UM-RN2-501040			40			70			0.69	41.38	-	-	-	-	○
UM-RN2-502020		0.2	20			50			1.32	20.70	21.41	-	-	-	○
UM-RN2-502040			40			60			0.69	41.37	-	-	-	-	○
UM-RN2-503020		0.3	20			70			1.33	20.69	21.41	-	-	-	○
UM-RN2-503040			40			50			0.69	41.37	-	-	-	-	○
UM-RN2-505020		0.5	20			60			1.34	20.69	21.39	-	-	-	○
UM-RN2-505040			40			85			0.70	41.36	-	-	-	-	○

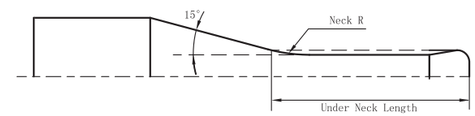
● Standard Stock ○ Reservation required

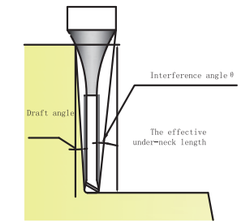
r	Tol.
r	±0.005

(mm)

UM-RN2

2 Flutes, Corner Radius End Mills For Minor Diameter & Deep Machining





Ordering Code	Mill Dia. (D)	Ball Radius (R)	Under Neck Length (L1)	Flute Length (Lc)	Neck Dia. (d2)	Overall Length (L)	shank Dia. (d)	Neck (R)	Interference Angel (Θ)	The effective under-neck length for the various draft angles					Stock
										0.5°	1°	1.5°	2°	3°	
UM-RN2-50A020	5	1	20	4	4.85	65	6	4	1.38	20.67	21.36	-	-	-	○
UM-RN2-50A040			40			85			0.71	41.34	-	-	-	-	○
UM-RN2-601012	6	0.1	12	4.8	5.85	50	6	-	-	-	-	-	-	-	○
UM-RN2-601018			18			60			-	-	-	-	-	-	○
UM-RN2-601024			24			70			-	-	-	-	-	-	○
UM-RN2-601035			35			80			-	-	-	-	-	-	○
UM-RN2-601055			55			100			-	-	-	-	-	-	○
UM-RN2-602012		0.2	12			50			-	-	-	-	-	-	○
UM-RN2-602018			18			60			-	-	-	-	-	-	○
UM-RN2-602024			24			70			-	-	-	-	-	-	○
UM-RN2-602035			35			80			-	-	-	-	-	-	○
UM-RN2-602055			55			100			-	-	-	-	-	-	○
UM-RN2-603012		0.3	12			50			-	-	-	-	-	-	○
UM-RN2-603018			18			60			-	-	-	-	-	-	○
UM-RN2-603024			24			70			-	-	-	-	-	-	○
UM-RN2-603035			35			80			-	-	-	-	-	-	○
UM-RN2-603055			55			100			-	-	-	-	-	-	○
UM-RN2-605018		0.5	18			60			-	-	-	-	-	-	○
UM-RN2-605024			24			70			-	-	-	-	-	-	○
UM-RN2-605035			35			80			-	-	-	-	-	-	○
UM-RN2-605055			55			100			-	-	-	-	-	-	○
UM-RN2-60A018		1	18			60			-	-	-	-	-	-	○
UM-RN2-60A024			24			70			-	-	-	-	-	-	○
UM-RN2-60A035			35			80			-	-	-	-	-	-	○
UM-RN2-60A055			55			100			-	-	-	-	-	-	○

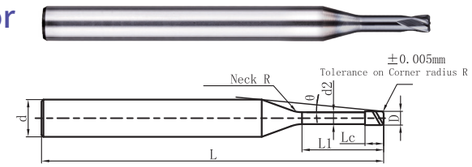
● Standard Stock ○ Reservation required

r	Tol.
r	±0.005

(mm)

UM-RN4

4 Flutes, Corner Radius End Mills For Minor Diameter & Deep Machining



Ordering Code	Mill Dia. (D)	Ball Radius (R)	Under Neck Length (L1)	Flute Length (Lc)	Neck Dia. (d2)	Overall Length (L)	shank Dia. (d)	Neck (R)	Interference Angel (Θ)	The effective under-neck length for the various draft angles					Stock
										0.5°	1°	1.5°	2°	3°	
UM-RN4-100504	1	0.05	4	0.8	0.96	50	4	4	8.75	4.27	4.47	4.65	4.82	5.21	●
UM-RN4-100506			6			50			7.28	6.37	6.63	6.86	7.12	7.69	●
UM-RN4-100508			8			50			6.23	8.45	8.76	9.08	9.42	10.18	●
UM-RN4-100510			10			50			5.45	10.53	10.90	11.30	11.72	12.67	●
UM-RN4-100512			12			60			4.84	12.61	13.04	13.51	14.02	15.15	●
UM-RN4-100516			16			60			3.95	16.74	17.32	17.95	18.62	20.12	●
UM-RN4-100520			20			60			3.34	20.88	21.60	22.38	23.22	25.10	●
UM-RN4-101004		0.1	4			50			8.80	4.26	4.47	4.64	4.81	5.19	●
UM-RN4-101006			6			50			7.31	6.37	6.62	6.86	7.11	7.68	●
UM-RN4-101008			8			50			6.25	8.45	8.76	9.07	9.41	10.17	●
UM-RN4-101010			10			50			5.46	10.53	10.90	11.29	11.71	12.65	●
UM-RN4-101012			12			60			4.85	12.60	13.04	13.51	14.01	15.14	●
UM-RN4-101016			16			60			3.96	16.74	17.32	17.94	18.61	20.11	●
UM-RN4-101020			20			60			3.35	20.87	21.60	22.37	23.21	25.08	●
UM-RN4-150504	1.5	0.05	4	1.2	1.44	50			8.12	4.23	4.42	4.59	4.76	5.14	●
UM-RN4-150508			8			50			5.60	8.41	8.71	9.02	9.36	10.11	●
UM-RN4-150512			12			60			4.27	12.55	12.99	13.46	13.96	15.09	●
UM-RN4-150515			15			60			3.62	15.65	16.20	16.78	17.41	18.82	●
UM-RN4-150520			20			60			2.89	20.82	21.55	22.32	23.16	-	●
UM-RN4-151004		0.1	4			50			8.17	4.23	4.42	4.58	4.75	5.13	●
UM-RN4-151008			8			50			5.62	8.41	8.71	9.02	9.35	10.10	●
UM-RN4-151012			12			60			4.28	12.55	12.98	13.45	13.95	15.07	●
UM-RN4-151015			15			60			3.63	15.65	16.19	16.77	17.40	18.80	●
UM-RN4-151020			20			60			2.90	20.82	21.54	22.32	23.15	-	●
UM-RN4-200504	2	0.05	4	1.6	1.92	50			7.32	4.21	4.39	4.55	4.72	5.09	●
UM-RN4-200506			6			50			5.84	6.30	6.53	6.76	7.01	7.58	●
UM-RN4-200508			8			50			4.85	8.37	8.67	8.98	9.31	10.07	●
UM-RN4-200512			12			60			3.63	12.51	12.95	13.41	13.91	15.04	●
UM-RN4-200516			16			60			2.90	16.65	17.23	17.85	18.51	-	●
UM-RN4-200520			20			60			2.41	20.78	21.50	22.28	23.11	-	●
UM-RN4-201004		0.1	4			50			7.36	4.21	4.38	4.54	4.71	5.08	●
UM-RN4-201006			6			50			5.86	6.29	6.53	6.76	7.01	7.57	●
UM-RN4-201008			8			50			4.87	8.37	8.66	8.97	9.31	10.05	●
UM-RN4-201012			12			60			3.64	12.51	12.94	13.41	13.91	15.03	●
UM-RN4-201016			16			60			2.90	16.65	17.22	17.84	18.51	-	●
UM-RN4-201020			20			60			2.42	20.78	21.50	22.27	23.11	-	●
UM-RN4-202004		0.2	4			50			7.46	4.20	4.37	4.53	4.69	5.06	●
UM-RN4-202006			6			50			5.93	6.29	6.52	6.75	6.99	7.54	●
UM-RN4-202008			8			50			4.91	8.37	8.66	8.96	9.29	10.03	●
UM-RN4-202012			12			60			3.66	12.51	12.94	13.40	13.89	15.00	●
UM-RN4-202016			16			60			2.92	16.64	17.22	17.83	18.49	-	●
UM-RN4-202020			20			60			2.43	20.78	21.49	22.26	23.09	-	●
UM-RN4-202025			25			70			2.00	25.95	26.84	27.80	-	-	●

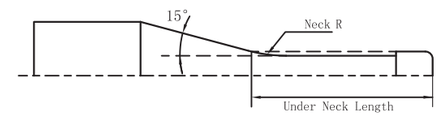
● Standard Stock ○ Reservation required

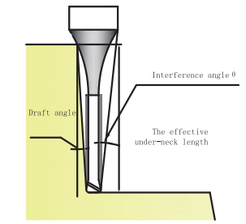
r	Tol.
r	±0.005

(mm)

UM-RN4

4 Flutes, Corner Radius End Mills For Minor Diameter & Deep Machining





Ordering Code	Mill Dia. (D)	Ball Radius (R)	Under Neck Length (L1)	Flute Length (Lc)	Neck Dia. (d2)	Overall Length (L)	shank Dia. (d)	Neck (R)	Interference Angel (Θ)	The effective under-neck length for the various draft angles					Stock
										0.5°	1°	1.5°	2°	3°	
UM-RN4-202030	2	0.2	30	1.6	1.92	70	4	4	1.71	31.11	32.19	33.35	-	-	●
UM-RN4-203004		0.3	4			50			7.56	4.20	4.37	4.52	4.68	5.03	●
UM-RN4-203008			8			50			4.96	8.36	8.65	8.95	9.28	10.01	●
UM-RN4-203012			12			60			3.69	12.50	12.93	13.39	13.88	14.98	●
UM-RN4-203016			16			60			2.93	16.64	17.21	17.82	18.48	-	●
UM-RN4-203020			20			60			2.44	20.77	21.49	22.25	23.08	-	●
UM-RN4-205004		0.5	4			50			7.76	4.19	4.35	4.50	4.65	4.98	●
UM-RN4-205006			6			50			6.11	6.28	6.50	6.71	6.95	7.47	●
UM-RN4-205008			8			50			5.04	8.36	8.64	8.93	9.25	9.96	●
UM-RN4-205012			12			60			3.73	12.50	12.92	13.36	13.85	14.93	●
UM-RN4-205016			16			60			2.96	16.63	17.19	17.80	18.45	-	●
UM-RN4-205020			20			60			2.46	20.77	21.47	22.23	23.05	-	●
UM-RN4-205025			25			70			2.03	25.94	26.82	27.77	28.79	-	●
UM-RN4-205030			30			70			1.72	31.10	32.17	33.31	-	-	●
UM-RN4-251008	2.5	0.1	8	2	2.4	50			3.98	8.34	8.63	8.94	9.27	10.02	●
UM-RN4-251016			16			60			2.29	16.62	17.19	17.81	18.47	-	●
UM-RN4-251020			20			60			1.89	20.75	21.47	22.24	-	-	●
UM-RN4-252008		0.2	8			50			4.02	8.34	8.63	8.93	9.26	9.99	●
UM-RN4-252016			16			60			2.30	16.61	17.18	17.80	18.46	-	●
UM-RN4-252020			20			60			1.90	20.75	21.46	22.23	-	-	●
UM-RN4-253012		0.3	12			60			2.95	12.47	12.90	13.35	13.84	-	●
UM-RN4-253020			20			60			1.91	20.74	21.46	22.22	-	-	●
UM-RN4-255020		0.5	12			60			2.99	12.47	12.88	13.33	13.81	-	●
UM-RN4-255020			20			60			1.92	20.74	21.44	22.20	-	-	●
UM-RN4-301008	3	0.1	8	2.4	2.88	60	6		6.32	8.32	8.61	8.92	9.25	9.99	●
UM-RN4-301016			16			60			3.99	16.59	17.17	17.78	18.45	19.94	●
UM-RN4-301025			25			70			2.82	25.90	26.79	27.76	28.80	-	●
UM-RN4-301030			30			80			2.42	31.06	32.14	33.30	34.55	-	●
UM-RN4-302008		0.2	8			60			6.36	8.32	8.60	8.91	9.23	9.97	●
UM-RN4-302012			12			60			4.92	12.45	12.88	13.34	13.83	14.94	●
UM-RN4-302016			16			60			4.00	16.59	17.16	17.77	18.43	19.91	●
UM-RN4-302020			20			70			3.38	20.72	21.44	22.21	23.03	24.88	●
UM-RN4-302025			25			70			2.82	25.89	26.79	27.75	28.78	-	●
UM-RN4-302030			30			80			2.43	31.06	32.14	33.29	34.53	-	●
UM-RN4-303008		0.3	8			60			6.41	8.32	8.60	8.90	9.22	9.94	●
UM-RN4-303016			16			60			4.02	16.59	17.15	17.76	18.42	19.89	●
UM-RN4-303020			20			70			3.39	20.72	21.43	22.20	23.02	24.86	●
UM-RN4-303025			25			70			2.83	25.89	26.78	27.74	28.77	-	●
UM-RN4-303030			30			80			2.43	31.06	32.13	33.28	34.52	-	●
UM-RN4-305008		0.5	8			60			6.51	8.31	8.58	8.87	9.19	9.89	●
UM-RN4-305012			12			60			5.00	12.44	12.86	13.31	13.79	14.87	●
UM-RN4-305016			16			60			4.06	16.58	17.14	17.74	18.39	19.84	●
UM-RN4-305020			20			70			3.42	20.71	21.42	22.17	22.99	24.81	●

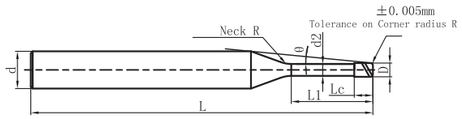
r	Tol.
r	±0.005

(mm)

● Standard Stock ○ Reservation required

UM-RN4

4 Flutes, Corner Radius End Mills For Minor Diameter & Deep Machining



Ordering Code	Mill Dia. (D)	Ball Radius (R)	Under Neck Length (L1)	Flute Length (Lc)	Neck Dia. (d2)	Overall Length (L)	shank Dia. (d)	Neck (R)	Interference Angel (⊙)	The effective under-neck length for the various draft angles					Stock
										0.5°	1°	1.5°	2°	3°	
UM-RN4-305025	3	0.5	25	2.4	2.88	70	6	4	2.85	25.88	26.77	27.72	28.74	-	●
UM-RN4-305030			30			80			2.45	31.05	32.12	33.26	34.49	-	●
UM-RN4-305035			35			80			2.14	36.22	37.46	38.80	40.23	-	●
UM-RN4-401012	4	0.1	12	3.2	3.86	60			3.66	12.44	12.87	13.33	13.83	14.94	●
UM-RN4-401020			20			60			2.42	20.71	21.43	22.20	23.03	-	●
UM-RN4-401030			30			80			1.71	31.05	32.12	33.28	-	-	●
UM-RN4-401040			40			80			1.32	41.38	42.82	-	-	-	●
UM-RN4-402012		0.2	12			60			3.68	12.44	12.86	13.32	13.81	14.92	●
UM-RN4-402020			20			60			2.43	20.71	21.42	22.19	23.01	-	●
UM-RN4-402030			30			80			1.71	31.04	32.12	33.27	-	-	●
UM-RN4-402040			40			80			1.32	41.38	42.81	-	-	-	●
UM-RN4-403012		0.3	12			60			3.70	12.43	12.86	13.31	13.80	14.89	●
UM-RN4-403020			20			60			2.44	20.70	21.41	22.18	23.00	-	●
UM-RN4-403030			30			80			1.72	31.04	32.11	33.26	-	-	●
UM-RN4-403040			40			80			1.32	41.38	42.81	-	-	-	●
UM-RN4-405012		0.5	12			60			3.75	12.43	12.84	13.29	13.77	14.84	●
UM-RN4-405020			20			60			2.47	20.70	21.40	22.15	22.97	-	●
UM-RN4-405030			30			80			1.73	31.03	32.10	33.24	-	-	●
UM-RN4-405040			40			80			1.33	41.37	42.79	-	-	-	●
UM-RN4-501020	5	0.1	20	4	4.85	70			1.32	20.70	21.42	-	-	-	●
UM-RN4-501040			40			90			0.69	41.38	-	-	-	-	●
UM-RN4-502020		0.2	20			70			1.32	20.70	21.41	-	-	-	●
UM-RN4-502040			40			90			0.69	41.37	-	-	-	-	●
UM-RN4-503020		0.3	20			70			1.33	20.69	21.41	-	-	-	●
UM-RN4-503040			40			90			0.69	41.37	-	-	-	-	●
UM-RN4-505020		0.5	20			70			1.34	20.69	21.39	-	-	-	●
UM-RN4-505040			40			90			0.70	41.36	-	-	-	-	●
UM-RN4-50A020		1	20			70			1.38	20.67	21.36	-	-	-	●
UM-RN4-50A040			40			90			0.71	41.34	-	-	-	-	●
UM-RN4-602030	6	0.2	30	4	4.85	80			-	-	-	-	-	-	●
UM-RN4-602054			54			100			-	-	-	-	-	-	●
UM-RN4-602072			72			120			-	-	-	-	-	-	●
UM-RN4-603030		0.3	30			80			-	-	-	-	-	-	●
UM-RN4-603054			54			100			-	-	-	-	-	-	●
UM-RN4-603072			72			120			-	-	-	-	-	-	●
UM-RN4-605030		0.5	30			80			-	-	-	-	-	-	●
UM-RN4-605054			54			100			-	-	-	-	-	-	●
UM-RN4-605072			72			120			-	-	-	-	-	-	●
UM-RN4-60A030		1	30			80			-	-	-	-	-	-	●
UM-RN4-60A054			54			100			-	-	-	-	-	-	●
UM-RN4-60A072			72			120			-	-	-	-	-	-	●

● Standard Stock ○ Reservation required

r	Tol.
r	±0.005

(mm)

RECOMMENDED CUTTING PARAMETERS

U-S2/SL2/SH2/R2/RH2 Recommended cutting parameters

Side Milling

Workpiece Materials	Carbon Steels,Alloy Steels, Cast Iron (180-250HB)		Stainless Steels,Tool Steels (25-35HRC)		Pre-Hardened Steels (35-48HRC)	
Cutting depth (mm)	ap≤1.5D ae≤0.15D		ap≤1.5D ae≤0.15D		ap≤1D ae≤0.12D	
Mill Dia. (mm)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)
3	20060	1120	14490	720	14490	640
4	15040	1080	10860	690	10860	600
6	10020	960	7240	610	7240	570
8	7520	970	5430	680	5430	650
10	6010	960	4340	640	4340	580
12	5010	900	3620	610	3620	520
16	3750	900	2710	510	2710	430
20	3010	900	2170	480	2170	380

Slot Milling

Workpiece Materials	Carbon Steels,Alloy Steels, Cast Iron (180-250HB)		Stainless Steels,Tool Steels (25-35HRC)		Pre-Hardened Steels (35-48HRC)	
Cutting depth (mm)	ap≤0.8D		ap≤0.3D		ap≤0.3D	
Mill Dia. (mm)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)
3	8910	450	6130	140	6680	270
4	6680	560	4590	160	5010	320
6	4460	460	3060	210	3340	280
8	3340	420	2290	210	2500	240
10	2670	380	1830	210	2000	230
12	2220	360	1530	190	1660	230
16	1660	420	1150	170	1240	240
20	1330	430	920	160	1000	240

NOTE

1.Prefer to use the high-rigidity and high accuracy machine.
2.Recommended Cutting parameters are for your reference. Please adjust the parameter to fulfill your own purpose.
3.Please adjust the parameters when chatter or abnormal vibration occurs.

U-S3 Recommended cutting parameters

Side Milling

Workpiece Materials	Carbon Steels,Alloy Steels, Cast Iron (180-250HB)		Stainless Steels,Tool Steels (25-35HRC)		Pre-Hardened Steels (35-48HRC)	
Cutting depth (mm)	ap≤1.5D ae≤0.15D		ap≤1.5D ae≤0.15D		ap≤1D ae≤0.12D	
Mill Dia. (mm)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)
3	20060	1690	14490	1090	14490	950
4	15040	1620	10860	1030	10860	910
6	10020	1440	7240	930	7240	870
8	7520	1470	5430	1020	5430	970
10	6010	1440	4340	960	4340	890
12	5010	1350	3620	920	3620	790
16	3750	1350	2710	770	2710	650
20	3010	1350	2170	710	2170	580

Slot Milling

Workpiece Materials	Carbon Steels,Alloy Steels, Cast Iron (180-250HB)		Stainless Steels,Tool Steels (25-35HRC)		Pre-Hardened Steels (35-48HRC)	
Cutting depth (mm)	ap≤0.8D		ap≤0.3D		ap≤0.3D	
Mill Dia. (mm)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)
3	8910	670	6130	220	6680	390
4	6680	840	4590	250	5010	480
6	4460	690	3060	320	3340	420
8	3340	610	2290	310	2500	350
10	2670	570	1830	300	2000	340
12	2220	540	1530	300	1660	340
16	1660	630	1150	270	1240	350
20	1330	640	920	250	1000	350

NOTE

1.Prefer to use the high-rigidity and high accuracy machine.
2.Recommended Cutting parameters are for your reference. Please adjust the parameter to fulfill your own purpose.
3.Please adjust the parameters when chatter or abnormal vibration occurs.

U-S4/SL4/SH4/R4/RH4 Recommended cutting parameters

Side Milling

Workpiece Materials	Carbon Steels,Alloy Steels, Cast Iron (180-250HB)		Stainless Steels,Tool Steels (25-35HRC)		Pre-Hardened Steels (35-48HRC)	
Cutting depth (mm)	ap≤1.5D ae≤0.15D		ap≤1.5D ae≤0.15D		ap≤1D ae≤0.12D	
Mill Dia. (mm)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)
3	20060	2240	14490	1440	14490	1270
4	15040	2160	10860	1390	10860	1210
6	10020	1920	7240	1240	7240	1150
8	7520	1950	5430	1360	5430	1300
10	6010	1920	4340	1290	4340	1180
12	5010	1800	3620	1220	3620	1060
16	3750	1800	2710	1020	2710	870
20	3010	1800	2170	950	2170	780

U-S6 Recommend cutting parameters

Side Milling

Workpiece Materials	Carbon Steels,Alloy Steels, Cast Iron (180-250HB)		Stainless Steels,Tool Steels (25-35HRC)		Pre-Hardened Steels (35-48HRC)	
Cutting depth (mm)	ap≤1.5D ae≤0.15D		ap≤1.5D ae≤0.15D		ap≤1D ae≤0.12D	
Mill Dia. (mm)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)
3	20060	3370	14490	2170	14490	1910
4	15040	3250	10860	2080	10860	1820
6	10020	2880	7240	1860	7240	1740
8	7520	2940	5430	2050	5430	1950
10	6010	2880	4340	1930	4340	1770
12	5010	2700	3620	1840	3620	1580
16	3750	2700	2710	1550	2710	1300
20	3010	2700	2170	1430	2170	1170

NOTE

1.Prefer to use the high-rigidity and high accuracy machine.
2.Recommended Cutting parameters are for your reference. Please adjust the parameter to fulfill your own purpose.
3.Please adjust the parameters when chatter or abnormal vibration occurs.

U-B2/BH2 Recommended cutting parameters

Profiling

Workpiece Materials	Carbon Steels,Alloy Steels, Cast Iron (180-250HB)		Stainless Steels,Tool Steels (25-35HRC)		Pre-Hardened Steels (35-48HRC)	
Cutting depth (mm)	ap≤0.2D ae≤0.3D		ap≤0.2D ap≤0.2D		ap≤0.15D ae≤0.15D	
Mill Dia. (mm)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)
4	13370	1070	9190	640	10020	640
5	10690	1070	7360	660	8020	670
6	8910	1070	6130	670	6680	690
7	7640	1070	5260	660	5730	660
8	6680	1070	4590	660	5010	650
9	5940	1070	4080	650	4460	640
10	5350	1070	3670	660	4010	640
11	4860	1070	3340	670	3640	640
12	4460	1070	3060	670	3340	640

U-B4 Recommend cutting parameters

Profiling

Workpiece Materials	Carbon Steels,Alloy Steels, Cast Iron (180-250HB)		Stainless Steels,Tool Steels (25-35HRC)		Pre-Hardened Steels (35-48HRC)	
Cutting depth (mm)	ap≤0.2D ae≤0.3D		ap≤0.2D ap≤0.2D		ap≤0.15D ae≤0.15D	
Mill Dia. (mm)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)
4	13370	2140	9190	1290	10020	1280
5	10690	2140	7360	1320	8020	1340
6	8910	2140	6130	1350	6680	1390
7	7640	2140	5260	1320	5730	1330
8	6680	2140	4590	1320	5010	1300
9	5940	2140	4080	1310	4460	1280
10	5350	2140	3670	1320	4010	1280
11	4860	2140	3340	1330	3640	1270
12	4460	2140	3060	1350	3340	1270

NOTE

1.Prefer to use the high-rigidity and high accuracy machine.
2.Recommended Cutting parameters are for your reference. Please adjust the parameter to fulfill your own purpose.
3.Please adjust the parameters when chatter or abnormal vibration occurs.

UC-S2/R2 Recommended cutting parameters

Side Milling

Workpiece Materials	Carbon Steels,Alloy Steels, Cast Iron (180-250HB)		Stainless Steels,Tool Steels (25-35HRC)		Pre-Hardened Steels (35-48HRC)	
Cutting depth (mm)	ap≤1.5D ae≤0.15D		ap≤1.5D ae≤0.15D		ap≤1D ae≤0.12D	
Mill Dia. (mm)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)
3	20060	900	14490	570	14490	510
4	15040	860	10860	550	10860	480
6	10020	760	7240	500	7240	450
8	7520	770	5430	540	5430	520
10	6010	760	4340	510	4340	460

Slot Milling

Workpiece Materials	Carbon Steels,Alloy Steels, Cast Iron (180-250HB)		Stainless Steels,Tool Steels (25-35HRC)		Pre-Hardened Steels (35-48HRC)	
Cutting depth (mm)	ap≤0.8D		ap≤0.3D		ap≤0.3D	
Mill Dia. (mm)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)
3	8910	360	6130	110	6680	220
4	6680	450	4590	120	5010	250
6	4460	360	3060	160	3340	220
8	3340	330	2290	160	2500	190
10	2670	300	1830	160	2000	180

NOTE

1.Prefer to use the high-rigidity and high accuracy machine.
2.Recommended Cutting parameters are for your reference. Please adjust the parameter to fulfill your own purpose.
3.Please adjust the parameters when chatter or abnormal vibration occurs.

UC-S4/SH4/R4/RH4 Recommended cutting parameters

Side Milling

Workpiece Materials	Carbon Steels,Alloy Steels, Cast Iron (180-250HB)		Stainless Steels,Tool Steels (25-35HRC)		Pre-Hardened Steels (35-48HRC)	
Cutting depth (mm)	ap≤1.5D ae≤0.15D		ap≤1.5D ae≤0.15D		ap≤1D ae≤0.12D	
Mill Dia. (mm)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)
3	20060	1790	14490	1150	14490	1020
4	15040	1730	10860	1110	10860	970
6	10020	1530	7240	990	7240	920
8	7520	1560	5430	1090	5430	1040
10	6010	1530	4340	1030	4340	940

UC-B2/BH2 Recommend cutting parameters

Profiling

Workpiece Materials	Carbon Steels,Alloy Steels, Cast Iron (180-250HB)		Stainless Steels,Tool Steels (25-35HRC)		Pre-Hardened Steels (35-48HRC)	
Cutting depth (mm)	ap≤0.2D ae≤0.3D		ap≤0.2D ap≤0.2D		ap≤0.15D ae≤0.15D	
Mill Dia. (mm)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)
4	13370	850	9190	510	10020	510
5	10690	850	7360	530	8020	530
6	8910	850	6130	530	6680	550
7	7640	850	5260	530	5730	530
8	6680	850	4590	530	5010	520
9	5940	850	4080	520	4460	510
10	5350	850	3670	530	4010	510

NOTE

1.Prefer to use the high-rigidity and high accuracy machine.
2.Recommended Cutting parameters are for your reference. Please adjust the parameter to fulfill your own purpose.
3.Please adjust the parameters when chatter or abnormal vibration occurs.

UR-S4 Recommended cutting parameters

Side Milling

Workpiece Materials	Carbon Steels,Alloy Steels, Cast Iron(180-250HB)		Stainless Steels,Tool Steels(25-35HRC)		Pre-Hardened Steels (35-48HRC)		Hardened Steels (45-55HRC)	
Cutting depth (mm)	ap≤1.5D ae≤0.3D		ap≤1.5D ap≤0.3D		ap≤1D ae≤0.25D		ap≤1D ae≤0.125D	
Mill Dia. (mm)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)
6	7800	1120	6130	600	6680	660	5560	550
8	5840	1120	4590	640	5010	690	4170	500
10	4680	1120	3670	660	4010	720	3340	470
12	3900	1120	3060	670	3340	730	2780	440
16	2920	1050	2290	550	2500	590	2080	420
20	2340	940	1830	510	2000	560	1660	390

Slot Milling

Workpiece Materials	Carbon Steels,Alloy Steels, Cast Iron (180-250HB)		Stainless Steels,Tool Steels (25-35HRC)		Pre-Hardened Steels (35-48HRC)	
Cutting depth (mm)	ap≤1D		ap≤0.75D		ap≤0.75D	
Mill Dia. (mm)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)
6	6680	670	5000	390	5570	450
8	5010	660	3750	370	4200	420
10	4010	640	3000	420	3340	470
12	3340	670	2500	390	2780	440
16	2500	590	1870	330	2080	370
20	2000	560	1500	290	1660	330

NOTE

1.Prefer to use the high-rigidity and high accuracy machine.
2.Recommended Cutting parameters are for your reference. Please adjust the parameter to fulfill your own purpose.
3.Please adjust the parameters when chatter or abnormal vibration occurs.

X-S3/C3 Recommended cutting parameters

Side Milling

Workpiece Materials	Carbon Steels,Alloy Steels, Cast Iron (180-250HB)		Stainless Steels,Tool Steels (25-35HRC)		Pre-Hardened Steels (35-48HRC)	
Cutting depth (mm)	ap≤1.5D ae≤0.15D		ap≤1.5D ae≤0.15D		ap≤1D ae≤0.12D	
Mill Dia. (mm)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)
3	22290	2140	16710	1650	16710	1350
4	16710	2050	12530	1390	12530	1230
6	11150	1770	8350	1200	8350	1130
8	8350	1750	6260	1280	6260	1210
10	6680	1700	5010	1180	5010	1100
12	5570	1660	4170	1130	4170	970
16	4170	1560	3130	940	3130	790
20	3340	1550	2500	860	2500	710

Slot Milling

Workpiece Materials	Carbon Steels,Alloy Steels, Cast Iron (180-250HB)		Stainless Steels,Tool Steels (25-35HRC)		Pre-Hardened Steels (35-48HRC)	
Cutting depth (mm)	ap≤1D		ap≤0.3D		ap≤0.5D	
Mill Dia. (mm)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)
3	8910	820	6130	330	6680	520
4	6680	960	4590	330	5010	570
6	4460	760	3060	360	3340	470
8	3340	670	2290	350	2500	380
10	2670	610	1830	330	2000	370
12	2220	590	1530	330	1660	370
16	1660	670	1150	290	1240	380
20	1330	680	920	270	1000	380

NOTE

1.Prefer to use the high-rigidity and high accuracy machine.
2.Recommended Cutting parameters are for your reference. Please adjust the parameter to fulfill your own purpose.
3.Please adjust the parameters when chatter or abnormal vibration occurs.

X-C4/S4/CN4/R4 Recommended cutting parameters

Side Milling

Workpiece Materials	Carbon Steels,Alloy Steels, Cast Iron (180-250HB)		Stainless Steels,Tool Steels (25-35HRC)		Pre-Hardened Steels (35-48HRC)	
Cutting depth (mm)	ap≤1.5D ae≤0.15D		ap≤1.5D ap≤0.15D		ap≤1D ae≤0.12D	
Mill Dia. (mm)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)
3	22290	2850	16710	2200	16710	1800
4	16710	2740	12530	1850	12530	1650
6	11150	2360	8350	1600	8350	1500
8	8350	2340	6260	1700	6260	1620
10	6680	2270	5010	1580	5010	1470
12	5570	2220	4170	1500	4170	1300
16	4170	2080	3130	1240	3130	1070
20	3340	2070	2500	1150	2500	950

Slot Milling

Workpiece Materials	Carbon Steels,Alloy Steels, Cast Iron (180-250HB)		Stainless Steels,Tool Steels (25-35HRC)		Pre-Hardened Steels (35-48HRC)	
Cutting depth (mm)	ap≤1D		ap≤0.3D		ap≤0.5D	
Mill Dia. (mm)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)
3	8910	1100	6130	440	6680	690
4	6680	1280	4590	440	5010	760
6	4460	1010	3060	490	3340	630
8	3340	890	2290	470	2500	520
10	2670	820	1830	450	2000	490
12	2220	790	1530	450	1660	500
16	1660	890	1150	390	1240	510
20	1330	910	920	360	1000	520

X-B2/BH2 Recommended cutting parameters

Profiling

Workpiece Materials	Carbon Steels,Alloy Steels, Cast Iron (180-250HB)		Stainless Steels,Tool Steels (25-35HRC)		Pre-Hardened Steels (35-48HRC)	
Cutting depth (mm)	ap≤0.04D ae≤0.04D		ap≤0.04D ae≤0.04D		ap≤0.02D ae≤0.02D	
Mill Dia. (mm)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)
1	52500	2940	52500	2640	52500	2040
2	36780	2940	36780	2570	30090	2110
3	24520	2940	24520	2690	20060	2080
4	18390	2940	18390	2760	15040	2110
6	12260	2940	12260	2690	10020	2110
8	9190	2940	9190	2660	7520	2110
10	7360	2940	7360	2640	6010	2100
12	6130	2940	6130	2650	5010	2100

UX-S4/SL4/SH4/R4/RH4 Recommended cutting parameters

Side Milling

Workpiece Materials	Carbon Steels,Alloy Steels, Cast Iron (180-250HB)		Stainless Steels,Tool Steels (25-35HRC)		Pre-Hardened Steels (35-48HRC)	
Cutting depth (mm)	ap≤1.5D ae≤0.15D		ap≤1.5D ae≤0.15D		ap≤1D ae≤0.12D	
Mill Dia. (mm)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)
3	22290	2850	16710	2200	16710	1800
4	16710	2740	12530	1850	12530	1650
6	11150	2360	8350	1600	8350	1500
8	8350	2340	6260	1700	6260	1620
10	6680	2270	5010	1580	5010	1470
12	5570	2220	4170	1500	4170	1300
16	4170	2080	3130	1240	3130	1070
20	3340	2070	2500	1150	2500	950

Slot Milling

Workpiece Materials	Carbon Steels,Alloy Steels, Cast Iron (180-250HB)		Stainless Steels,Tool Steels (25-35HRC)		Pre-Hardened Steels (35-48HRC)	
Cutting depth (mm)	ap≤1D		ap≤0.3D		ap≤0.5D	
Mill Dia. (mm)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)
3	8910	1100	6130	440	6680	690
4	6680	1280	4590	440	5010	760
6	4460	1010	3060	490	3340	630
8	3340	890	2290	470	2500	520
10	2670	820	830	450	2000	490
12	2220	790	1530	450	1660	500
16	1660	890	1150	390	1240	510
20	1330	910	920	360	1000	520

NOTE

1.Prefer to use the high-rigidity and high accuracy machine.

2.Recommended Cutting parameters are for your reference. Please adjust the parameter to fulfill your own purpose.

3.Please adjust the parameters when chatter or abnormal vibration occurs.

H-S4/SL4/R4/RN4 Recommended cutting parameters

High speed side milling

Workpiece Materials	Alloy steel, Pre-Hardened Steels(30-45HRC)		Hardened Steels (45-55HRC)		Hardened Steels (55-60HRC)	
Cutting depth (mm)	ap≤1.2D ae≤0.08D		ap≤1.0D ae≤0.04D		ap≤0.8D ae≤0.02D	
Mill Dia. (mm)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)
3	21000	1260	18900	950	15750	830
4	10500	1470	9660	1210	8400	950
6	7350	1680	6410	1370	5570	1090
8	5460	1890	4830	1470	4200	1160
10	4410	1680	3780	1370	3360	1050
12	3780	1580	3150	1260	2840	950

Slot Milling

Workpiece Materials	Alloy steel, Pre-Hardened Steels(30-45HRC)		Hardened Steels (45-55HRC)		Hardened Steels (55-60HRC)	
Cutting depth (mm)	ap≤1.2D ae≤0.08D		ap≤1.0D ae≤0.04D		ap≤0.8D ae≤0.02D	
Mill Dia. (mm)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)
3	14700	840	13130	530	11550	460
4	7560	950	6720	630	5880	530
6	5040	1050	4410	740	3890	610
8	3780	1160	3360	840	2940	660
10	3050	1100	2630	740	2310	600
12	2520	1050	2210	670	2000	580

NOTE

1.Prefer to use the high-rigidity and high accuracy machine.
2.Recommended Cutting parameters are for your reference. Please adjust the parameter to fulfill your own purpose.
3.Please adjust the parameters when chatter or abnormal vibration occurs.

H-B2/BH2 Recommended cutting parameters

High speed profiling

Workpiece Materials	Alloy steel, Pre-Hardened Steels(30-45HRC)		Hardened Steels (45-55HRC)		Hardened Steels (55-60HRC)	
Cutting depth (mm)	ap≤0.05-0.1D ae≤0.02D		ap≤0.05-0.1D ae≤0.04D		ap≤0.05-0.1D ae≤0.02D	
Mill Dia. (mm)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)
3	36750	2730	30030	2310	26670	1890
4	18380	2840	15020	2420	13340	1890
6	12180	2840	9980	2420	8930	1890
8	9140	2990	7560	2470	6720	1580
10	7350	2990	5990	2470	5250	1580
12	6300	3050	4730	2520	2000	1580

Standard profiling

Workpiece Materials	Alloy steel, Pre-Hardened Steels(30-45HRC)		Hardened Steels (45-55HRC)		
Cutting depth (mm)	ap≤0.05-0.1D ae≤0.02D		ap≤0.05-0.1D ae≤0.04D		
Mill Dia. (mm)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)
3	21000	1580	16700	1260	12600
4	10820	1730	8400	1370	6300
6	7250	1730	5570	1370	4200
8	5360	1790	4200	1420	3050
10	4310	1790	3360	1420	2520
12	3570	1840	2730	1470	2210

NOTE

1.Prefer to use the high-rigidity and high accuracy machine.
2.Recommended Cutting parameters are for your reference. Please adjust the parameter to fulfill your own purpose.
3.Please adjust the parameters when chatter or abnormal vibration occurs.

H-S6/SL6 Recommended cutting parameters

Side Milling

Workpiece Materials	Alloy steel, Pre-Hardened Steels(30-45HRC)		Hardened Steels (45-55HRC)		Hardened Steels (55-60HRC)	
Cutting depth (mm)	ap≤1.5D ae≤0.05D		ap≤1.5D ae≤0.03D		ap≤0.5D ae≤0.02D	
Mill Dia. (mm)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)
6	6200	1674	4500	1215	3100	744
8	4800	1584	3600	1188	2400	720
10	4000	1560	3000	1170	2000	720
12	3200	1440	2400	1080	1600	627
16	2400	1296	1800	972	1200	576
20	1600	960	1200	720	800	432

NOTE

1.Prefer to use the high-rigidity and high accuracy machine.
2.Recommended Cutting parameters are for your reference. Please adjust the parameter to fulfill your own purpose.
3.Please adjust the parameters when chatter or abnormal vibration occurs.

HV-S4/SL4 Recommended Cutting Parameters

High speed side milling

Workpiece Materials	Alloy steel, Pre-Hardened Steels(30-45HRC)		Hardened Steels (45-55HRC)		Hardened Steels (55-60HRC)	
Cutting depth (mm)	ap≤1.5D ae≤0.08D		ap≤1.5D ae≤0.04D		ap≤1.5D ae≤0.02D	
Mill Dia. (mm)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)
2	40000	2910	32000	1830	24000	1250
4	20000	3360	16000	2110	12000	1440
6	13000	4390	11000	3270	8000	2160
8	10000	4500	8000	3170	6000	2160
10	8000	4320	6400	3040	4800	2070
12	6600	3960	5300	2800	4000	1920

Slotting

Workpiece Materials	Alloy steel, Pre-Hardened Steels(30-45HRC)		Hardened Steels (45-55HRC)		Hardened Steels (55-60HRC)	
Cutting depth (mm)	ap≤1.5D ae≤0.08D		ap≤1.5D ae≤0.04D		ap≤0.5D ae≤0.02D	
Mill Dia. (mm)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)
2	15000	680	13000	520	9600	350
4	8000	840	6000	520	4800	380
6	5300	870	4200	870	3200	600
8	4000	890	3200	890	2400	600
10	3200	830	2500	830	1900	570
12	2700	780	2100	780	1600	540

NOTE

1.Prefer to use the high-rigidity and high accuracy machine.
2.Recommended Cutting parameters are for your reference. Please adjust the parameter to fulfill your own purpose.
3.Please adjust the parameters when chatter or abnormal vibration occurs.

HV-R4/RN4/RH4 Recommended Cutting Parameters

High speed side milling

Workpiece Materials	Alloy steel, Pre-Hardened Steels(30-45HRC)		Hardened Steels (45-55HRC)		Hardened Steels (55-60HRC)	
Cutting depth (mm)	ap≤1.5D ae≤0.08D		ap≤1.5D ae≤0.04D		ap≤1.5D ae≤0.02D	
Mill Dia. (mm)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)
2	40000	2910	32000	1830	24000	1250
4	20000	3360	16000	2110	12000	1440
6	13000	4390	11000	3270	8000	2160
8	10000	4500	8000	3170	6000	2160
10	8000	4320	6400	3040	4800	2070
12	6600	3960	5300	2800	4000	1920

Slotting

Workpiece Materials	Alloy steel, Pre-Hardened Steels(30-45HRC)		Hardened Steels (45-55HRC)		Hardened Steels (55-60HRC)	
Cutting depth (mm)	ap≤1.5D ae≤0.08D		ap≤1.5D ae≤0.04D		ap≤0.5D ae≤0.02D	
Mill Dia. (mm)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)
2	15000	680	13000	520	9600	350
4	8000	840	6000	520	4800	380
6	5300	870	4200	870	3200	600
8	4000	890	3200	890	2400	600
10	3200	830	2500	830	1900	570
12	2700	780	2100	780	1600	540

NOTE

1.Prefer to use the high-rigidity and high accuracy machine.
2.Recommended Cutting parameters are for your reference. Please adjust the parameter to fulfill your own purpose.
3.Please adjust the parameters when chatter or abnormal vibration occurs.

HV-B2/BH2 Recommended Cutting Parameters

High speed side milling

Workpiece Materials	Alloy steel, Pre-Hardened Steels(30-45HRC)		Hardened Steels (45-55HRC)		Hardened Steels (55-60HRC)	
Cutting depth (mm)	ap≤0.05~0.1 ae≤0.02D		ap=0.05~0.1 ae≤0.02D		ap=0.05~0.1 ae≤0.02D	
Mill Dia. (mm)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)
2	35000	2600	28600	2200	25400	1800
4	17500	2700	14300	2300	12700	1800
6	11600	2700	9500	2300	8500	1800
8	8700	2850	7200	2350	6400	1500
10	7000	2850	5700	2350	5000	1500
12	6000	2900	4500	2400	1900	1500

Slotting

Workpiece Materials	Alloy steel, Pre-Hardened Steels(30-45HRC)		Hardened Steels (45-55HRC)		Hardened Steels (55-60HRC)	
Cutting depth (mm)	ap=0.05~0.1 ae≤0.02D		ap=0.05~0.1 ae≤0.02D		ap=0.05~0.1 ae≤0.02D	
Mill Dia. (mm)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)
2	20000	1500	15900	1200	12000	900
4	10300	1650	8000	1300	6000	960
6	6900	1650	5300	1300	4000	960
8	5100	1700	4000	1350	2900	920
10	4100	1700	3200	1350	2400	920
12	3400	1750	2600	1400	2100	900

NOTE

1.Prefer to use the high-rigidity and high accuracy machine.
2.Recommended Cutting parameters are for your reference. Please adjust the parameter to fulfill your own purpose.
3.Please adjust the parameters when chatter or abnormal vibration occurs.

HV-S6/SL6 Recommended Cutting Parameters

High speed side milling

Workpiece Materials	Alloy steel, Pre-Hardened Steels(30-45HRC)		Hardened Steels (45-55HRC)		Hardened Steels (55-60HRC)	
Cutting depth (mm)	ap≤1.5D ae≤0.08D		ap≤1.5D ae≤0.04D		ap≤1.5D ae≤0.02D	
Mill Dia. (mm)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)
2	43000	3910	32500	2550	25800	1400
4	21500	4360	16800	2650	12900	1660
6	14400	5294	11300	3615	8600	2304
8	10800	5294	8400	3468	6500	2280
10	8600	5140	6900	3380	5300	2220
12	7200	4720	5600	3100	4400	2007

Slotting

Workpiece Materials	Alloy steel, Pre-Hardened Steels(30-45HRC)		Hardened Steels (45-55HRC)		Hardened Steels (55-60HRC)	
Cutting depth (mm)	ap≤1.5D ae≤0.08D		ap≤1.5D ae≤0.04D		ap≤0.5D ae≤0.02D	
Mill Dia. (mm)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)
2	16000	1600	13500	1000	11400	500
4	9300	1650	6500	1020	5700	600
6	6200	1774	4500	1215	3800	744
8	4800	1684	3600	1188	2900	720
10	4000	1650	3000	1170	2400	720
12	3200	1540	2400	1080	2000	627

NOTE

1.Prefer to use the high-rigidity and high accuracy machine.
2.Recommended Cutting parameters are for your reference. Please adjust the parameter to fulfill your own purpose.
3.Please adjust the parameters when chatter or abnormal vibration occurs.

A-S2/SS2/SL2/R2/RS2/RL2 Recommended cutting parameters

Side Milling

Workpiece Materials	Forging and Casting Aluminum Alloy (Si<12%)		Copper Alloy (HB<200)	
Cutting depth (mm)	ap≤1D ae≤0.1D		ap≤1D ae≤0.1D	
Mill Dia. (mm)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)
1	16000	580	16000	520
2	12700	710	12700	650
4	12000	1200	12000	1070
6	10600	1280	10600	1150
8	10000	1390	10000	1250
10	9500	1720	9500	1550
12	9280	2400	9280	2170

Slot Milling

Workpiece Materials	Forging and Casting Aluminum Alloy (Si<12%)		Copper Alloy (HB<200)	
Cutting depth (mm)	ap≤0.5D ae≤1D		ap≤0.5D ae≤1D	
Mill Dia. (mm)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)
1	16000	400	16000	380
2	10000	500	10000	450
4	9000	810	9000	800
6	8000	920	8000	830
8	7800	1100	7800	1000
10	8000	1280	8000	1150
12	6800	1300	6800	1130

NOTE

1.Prefer to use the high-rigidity and high accuracy machine.
2.Recommended Cutting parameters are for your reference. Please adjust the parameter to fulfill your own purpose.
3.Please adjust the parameters when chatter or abnormal vibration occurs.

A-S3/SS3/SL3/R3/RS3 Recommended cutting parameters

Side Milling

Workpiece Materials	Forging and Casting Aluminum Alloy (Si<12%)		Copper Alloy (HB<200)	
Cutting depth (mm)	ap≤1D ae≤0.1D		ap≤1D ap≤0.1D	
Mill Dia. (mm)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)
2	12700	900	13000	850
4	12000	1430	12000	1200
6	10600	1530	10600	1200
8	10000	1670	10000	1500
10	9500	2050	9500	1800
12	9280	2800	9280	2225

Slot Milling

Workpiece Materials	Forging and Casting Aluminum Alloy (Si<12%)		Copper Alloy (HB<200)	
Cutting depth (mm)	ap≤0.5D ae≤1D		ap≤0.5D ae≤1D	
Mill Dia. (mm)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)
2	10000	570	10000	520
4	9000	960	9000	860
6	8000	1050	8000	830
8	7800	1300	7800	960
10	8000	1500	8000	1240
12	6800	1620	6800	1500

NOTE

1.Prefer to use the high-rigidity and high accuracy machine.
2.Recommended Cutting parameters are for your reference. Please adjust the parameter to fulfill your own purpose.
3.Please adjust the parameters when chatter or abnormal vibration occurs.

A-B2 Recommended cutting parameters

Profiling

Workpiece Materials	Forging and Casting Aluminum Alloy (Si<12%)		Copper Alloy (HB<200)	
Cutting depth (mm)	ap≤1D ae≤0.1D		ap≤1D ae≤0.1D	
Mill Dia. (mm)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)
2	12700	900	13000	850
4	12000	1430	12000	1200
6	10600	1530	10600	1200
8	10000	1670	10000	1500
10	9500	2050	9500	1900
12	9280	2800	9280	2225

NOTE

1.Prefer to use the high-rigidity and high accuracy machine.
2.Recommended Cutting parameters are for your reference. Please adjust the parameter to fulfill your own purpose.
3.Please adjust the parameters when chatter or abnormal vibration occurs.

S-S2/R2 Recommended cutting parameters

Side Milling

Workpiece Materials	Carbon Steels,Alloy Steels, Cast Iron (180-250HB)		Stainless Steels,Tool Steels (25-35HRC)		Pre-Hardened Steels (35-45HRC)	
Cutting depth (mm)	ap≤1D ae≤0.1D		ap≤1D ae≤0.1D		ap≤1D ae≤0.1D	
Mill Dia. (mm)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)
1	20000	115	25000	220	20000	195
2	15000	185	15900	254	11150	165
4	10800	325	7960	340	5500	180
6	7000	350	5300	340	3700	180
8	5200	345	3980	365	2800	180
10	4200	340	3180	330	2200	180
12	3500	340	2650	300	1850	180

Slot Milling

Workpiece Materials	Carbon Steels,Alloy Steels, Cast Iron (180-250HB)		Stainless Steels,Tool Steels (25-35HRC)		Pre-Hardened Steels (35-45HRC)	
Cutting depth (mm)	ap≤0.1D ae≤1D		ap≤0.1D ae≤1D		ap≤0.1D ae≤1D	
Mill Dia. (mm)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)
3	7000	160	4200	120	6000	120
4	6000	160	3580	120	4800	125
6	4200	170	2390	155	3180	135
8	3100	170	1790	155	240	130
10	2500	170	1430	155	1960	130
12	2100	170	1195	155	1590	130

NOTE

1.Prefer to use the high-rigidity and high accuracy machine.
2.Recommended Cutting parameters are for your reference. Please adjust the parameter to fulfill your own purpose.
3.Please adjust the parameters when chatter or abnormal vibration occurs.

S-R3 Recommended cutting parameters

Side Milling

Workpiece Materials	Carbon Steels,Alloy Steels, Cast Iron (180-250HB)		Stainless Steels,Tool Steels (25-35HRC)		Pre-Hardened Steels (35-45HRC)	
Cutting depth (mm)	ap≤1D ae≤0.1D		ap≤1D ae≤0.1D		ap≤1D ae≤0.1D	
Mill Dia. (mm)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)
2	15000	345	15900	480	15000	305
4	10800	605	7960	525	8000	460
6	7000	650	5300	510	5300	500
8	5200	645	3980	550	4000	495
10	4200	630	3180	500	3200	480
12	3500	630	2650	450	2650	480

Slot Milling

Workpiece Materials	Carbon Steels,Alloy Steels, Cast Iron (180-250HB)		Stainless Steels,Tool Steels (25-35HRC)		Pre-Hardened Steels (35-45HRC)	
Cutting depth (mm)	ap≤0.1D ae≤1D		ap≤0.1D ae≤1D		ap≤0.1D ae≤1D	
Mill Dia. (mm)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)
2	9000	170	7165	300	9000	150
4	6480	300	3580	180	4800	230
6	4200	325	2390	235	3180	250
8	3120	320	1790	235	2400	250
10	2520	315	1430	230	1920	240
12	1950	315	1195	230	1590	240

NOTE

1.Prefer to use the high-rigidity and high accuracy machine.
2.Recommended Cutting parameters are for your reference. Please adjust the parameter to fulfill your own purpose.
3.Please adjust the parameters when chatter or abnormal vibration occurs.

S-SS4/S4/R4 Recommended cutting parameters

Side Milling

Workpiece Materials	Carbon Steels,Alloy Steels, Cast Iron (180-250HB)		Stainless Steels,Tool Steels (25-35HRC)		Pre-Hardened Steels (35-45HRC)	
Cutting depth (mm)	ap≤1D ae≤0.1D		ap≤1D ae≤0.1D		ap≤1D ae≤0.1D	
Mill Dia. (mm)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)
1	20000	225	25000	700	20000	180
2	15000	360	15900	635	15000	315
4	10800	630	7960	700	8000	480
6	7000	675	5300	680	5300	515
8	5200	665	3980	730	4000	510
10	4200	660	3180	660	3800	505
12	3500	660	2650	600	3200	505

Slot Milling

Workpiece Materials	Carbon Steels,Alloy Steels, Cast Iron (180-250HB)		Stainless Steels,Tool Steels (25-35HRC)		Pre-Hardened Steels (35-45HRC)	
Cutting depth (mm)	ap≤0.1D ae≤1D		ap≤0.1D ae≤1D		ap≤0.1D ae≤1D	
Mill Dia. (mm)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)
2	9000	180	7165	280	9000	150
4	6480	315	3580	240	4800	240
6	4200	335	2390	310	3180	255
8	3120	330	1790	310	2400	255
10	2520	330	1430	310	1920	250
12	1950	330	1195	310	1590	250

NOTE

1.Prefer to use the high-rigidity and high accuracy machine.
2.Recommended Cutting parameters are for your reference. Please adjust the parameter to fulfill your own purpose.
3.Please adjust the parameters when chatter or abnormal vibration occurs.

S-B2 Recommended cutting parameters

Profiling

Workpiece Materials	Carbon Steels,Alloy Steels, Cast Iron (180-250HB)		Stainless Steels,Tool Steels (25-35HRC)		Pre-Hardened Steels (35-45HRC)	
Cutting depth (mm)	ap≤0.2D ae≤0.2D		ap≤0.2D ae≤0.2D		ap≤0.2D ae≤0.2D	
Mill Dia. (mm)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)
1	40000	800	25000	525	32000	420
2	24000	900	15900	480	16000	450
4	11500	950	7960	525	8000	480
6	8000	920	5300	510	5300	450
8	6000	880	3980	550	4000	400
10	4800	850	3180	540	3200	400
12	4000	800	2650	520	2650	380

NOTE

1.Prefer to use the high-rigidity and high accuracy machine.
2.Recommended Cutting parameters are for your reference. Please adjust the parameter to fulfill your own purpose.
3.Please adjust the parameters when chatter or abnormal vibration occurs.

S10-S2 Recommended cutting parameters

Side Milling

Workpiece Materials	Cutting depth (mm)	VC m/min	Flute Dia. (mm)	1	2	4	6	8
Stainless Steels	ap≤1D	80~120	n (r/min)	25000	15900	7960	5300	3980
	ae≤0.1D		Vf (mm/min)	290	330	450	450	480

Slot Milling

Workpiece Materials	Cutting depth (mm)	VC m/min	Flute Dia. (mm)	1	2	4	6	8
Stainless Steels	ap≤1D	35~55	n (r/min)	14330	7165	3580	2390	1790
	ae≤0.1D		Vf (mm/min)	200	140	120	155	155

S10-SS4/S4/R4/RS4Recommend cutting parameters

Side Milling

Workpiece Materials	Cutting depth (mm)	VC m/min	Flute Dia. (mm)	1	2	4	6	8	10	12
Stainless Steels	ap≤1D	80~120	n (r/min)	25000	15900	7960	5300	3980	3180	2650
	ae≤0.1D		Vf (mm/min)	950	850	950	900	950	900	850

Face Milling

Workpiece Materials	Cutting depth (mm)	VC m/min	Flute Dia. (mm)	1	2	4	6	8	10	12
Stainless Steels	ap≤0.3D	35~55	n (r/min)	14300	7165	3580	2390	1790	1430	1195
	ae≤0.1D		Vf (mm/min)	350	300	400	400	400	400	400

NOTE

1.Prefer to use the high-rigidity and high accuracy machine.
2.Recommended Cutting parameters are for your reference. Please adjust the parameter to fulfill your own purpose.
3.Please adjust the parameters when chatter or abnormal vibration occurs.

T-S4/R4/RN4 Recommended Cutting Parameters

Side Milling

Workpiece Materials	titanium alloy		Stainless Steels	
Depth of cut (mm)	ap≤1.5D ae≤0.25D		ap≤1.5D ae≤0.25D	
Mill Dia.(mm)	(r/min)	(mm/min)	(r/min)	(mm/min)
2	9550	380	12750	760
3	6360	310	8490	575
4	4785	285	6380	510
5	3820	305	5095	510
6	3180	300	4245	510
8	2395	320	3185	510
10	1915	340	2545	510
12	1590	350	2020	485
16	1190	310	1590	445
20	960	305	1280	430

Slotting

Workpiece Materials	titanium alloy		Stainless Steels	
Depth of cut (mm)	ap≤1D ae≤1D		ap≤1D ae≤1D	
Mill Dia.(mm)	(r/min)	(mm/min)	(r/min)	(mm/min)
2	6370	255	9550	390
3	4245	200	6375	310
4	3180	200	4775	290
5	2550	180	3830	310
6	2130	180	3180	320
8	1590	200	2395	340
10	1280	200	1910	350
12	1060	215	1600	360
16	800	195	1200	320
20	630	195	960	310

NOTE

1.Prefer to use the high-rigidity and high accuracy machine.
2.Recommended Cutting parameters are for your reference. Please adjust the parameter to fulfill your own purpose.
3.Please adjust the parameters when chatter or abnormal vibration occurs.

T-R5/R6 Recommended Cutting Parameters

Side Milling

Workpiece Materials	titanium alloy	
Depth of cut (mm)	ap≤1.8D ae≤0.1D	
Mill Dia.(mm)	(r/min)	(mm/min)
6	5300	400
8	3980	500
10	3185	600
12	2250	700
16	1995	800
20	1590	760

T-B2/BH2/B4 Recommended Cutting Parameters

Face Milling

Workpiece Materials	titanium alloy	
Depth of cut (mm)	ap≤0.2D ae≤0.3D	
Mill Dia.(mm)	(r/min)	(mm/min)
2	8000	800
4	5580	1000
6	3720	680
8	2235	540
12	1865	485
16	1390	450

NOTE

1.Prefer to use the high-rigidity and high accuracy machine.
2.Recommended Cutting parameters are for your reference. Please adjust the parameter to fulfill your own purpose.
3.Please adjust the parameters when chatter or abnormal vibration occurs.

G-S2/SN2/R2/RN2 Recommended cutting parameters

Side Milling

Workpiece Materials	Graphite		Aluminium Alloy (Si>12%)	
Cutting depth (mm)	ap≤1.5D ae≤0.5D		ap≤1D ae≤0.15D	
Mill Dia. (mm)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)
2	39810	3980	31850	1910
4	19900	2790	15920	1590
6	13270	2390	10620	1270
8	9950	2190	7960	1120
10	7960	2390	6370	1080
12	6640	2390	5310	1380

Slot Milling

Workpiece Materials	Graphite		Aluminium Alloy (Si>12%)	
Cutting depth (mm)	ap≤0.5D		ap≤0.5D	
Mill Dia. (mm)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)
2	31850	1910	28660	1150
4	15920	1430	14330	1150
6	10620	1380	9550	960
8	7960	1350	7170	860
10	6370	1400	5730	800
12	5310	1590	4780	860

NOTE

1.Prefer to use the high-rigidity and high accuracy machine.
2.Recommended Cutting parameters are for your reference. Please adjust the parameter to fulfill your own purpose.
3.Please adjust the parameters when chatter or abnormal vibration occurs.

G-S3 Recommended cutting parameters

Side Milling

Workpiece Materials	Graphite		Aluminium Alloy (Si>12%)	
Cutting depth (mm)	ap≤1.5D ae≤0.5D		ap≤1D ae≤0.15D	
Mill Dia. (mm)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)
2	39810	5970	31850	2870
4	19900	4180	15920	2390
6	13270	3580	10620	1910
8	9950	3280	7960	1670
10	7960	3580	6370	1620
12	6640	3580	5310	2070

Slot Milling

Workpiece Materials	Graphite		Aluminium Alloy (Si>12%)	
Cutting depth (mm)	ap≤0.5D		ap≤0.5D	
Mill Dia. (mm)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)
2	31850	2870	28660	1720
4	15920	2150	14330	1720
6	10620	2070	9550	1430
8	7960	2030	7170	1290
10	6370	2100	5730	1200
12	5310	2390	4780	1290

NOTE

1.Prefer to use the high-rigidity and high accuracy machine.
2.Recommended Cutting parameters are for your reference. Please adjust the parameter to fulfill your own purpose.
3.Please adjust the parameters when chatter or abnormal vibration occurs.

G-S4/R4/RN4 Recommended cutting parameters

Side Milling

Workpiece Materials	Graphite		Aluminium Alloy (Si>12%)	
Cutting depth (mm)	ap≤1.5D ae≤0.5D		ap≤1D ae≤0.15D	
Mill Dia. (mm)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)
2	39810	7960	31850	3820
4	19900	5570	15920	3190
6	13270	4780	10620	2550
8	9950	4380	7960	2230
10	7960	4780	6370	2170
12	6640	4780	5310	2760

G-B2/BN2 Recommend cutting parameters

Profiling

Workpiece Materials	Graphite		Aluminium Alloy (Si>12%)	
Cutting depth (mm)	ap≤0.5D ae≤0.4D		ap≤0.3D ae≤0.3D	
Mill Dia. (mm)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)
2	31850	2790	31850	2040
4	19900	1990	15920	1430
6	13270	1860	10620	1270
8	9950	1790	7960	1270
10	7960	1910	6370	1400
12	6640	1990	5310	1380

NOTE

1.Prefer to use the high-rigidity and high accuracy machine.
2.Recommended Cutting parameters are for your reference. Please adjust the parameter to fulfill your own purpose.
3.Please adjust the parameters when chatter or abnormal vibration occurs.

UM-SN2 Recommended cutting parameters

Workpiece Materials			1		2		3		4		5		6	
			Copper		Carbon Steels, Alloy Steels (180-250HB)		Stainless Steels, Tool Steels (25-35HRC)		Pre-Hardened Steels (35-45HRC)		Hardened Steels (45-55HRC)		Hardened Steels (55-65HRC)	
Ratio to standard Cutting depth (ap)			120%		100%		90%		80%		65%		60%	
Mill Dia. (mm)	Under Neck Length (mm)	ap	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)
0.1	0.3	0.006	50,000	500	50,000	500	50,000	475	46,170	331	40,613	242	38,048	198
	0.5	0.004	50,000	500	50,000	500	50,000	475	46,170	331	40,613	242	38,048	198
	1	0.003	50,000	455	50,000	455	46,170	409	41,515	299	36,575	220	34,248	178
0.2	0.5	0.02	50,000	708	42,750	606	38,475	545	36,338	383	32,063	286	29,925	230
	1	0.014	50,000	708	42,750	606	38,475	545	36,338	383	32,063	286	29,925	230
	1.5	0.008	46,170	599	38,475	499	34,628	448	32,704	344	28,856	257	26,933	207
	2	0.005	41,040	479	34,200	399	30,780	359	29,070	272	25,650	203	23,940	163
	3	0.003	41,040	431	34,200	359	30,780	323	29,070	244	25,650	183	23,940	147
0.3	1	0.021	45,600	646	38,000	539	34,200	485	32,300	340	28,500	254	26,600	205
	1.5	0.021	45,600	646	38,000	539	34,200	485	32,300	340	28,500	254	26,600	205
	2	0.012	41,040	532	34,200	444	30,780	399	29,070	306	25,650	229	23,940	184
	2.5	0.01	41,040	532	34,200	444	30,780	399	29,070	306	25,650	229	23,940	184
	3	0.008	41,040	532	34,200	444	30,780	399	29,070	306	25,650	229	23,940	184
0.4	1	0.04	36,480	805	30,400	671	27,360	603	25,840	424	22,800	316	21,280	255
	1.5	0.028	36,480	805	30,400	671	27,360	603	25,840	424	22,800	316	21,280	255
	2	0.028	36,480	805	30,400	671	27,360	603	25,840	424	22,800	316	21,280	255
	2.5	0.022	32,832	662	27,360	552	24,624	497	23,256	381	20,520	284	19,152	229
	3	0.016	32,832	662	27,360	552	24,624	497	23,256	381	20,520	284	19,152	229
	3.5	0.012	32,832	662	27,360	552	24,624	497	23,256	381	20,520	284	19,152	229
	4	0.01	32,832	662	27,360	552	24,624	497	23,256	381	20,520	284	19,152	229
	5	0.01	29,184	515	24,320	429	21,888	386	20,672	247	18,240	219	17,024	172
	6	0.006	29,184	515	24,320	429	21,888	386	20,672	247	18,240	219	17,024	172
	8	0.003	25,536	392	21,280	327	19,152	295	18,088	190	15,960	163	14,896	124
	10	0.002	21,888	289	18,240	240	16,416	217	15,504	140	13,680	121	12,768	91
0.5	1	0.05	36,480	805	30,400	671	27,360	603	25,840	508	22,800	316	21,280	255
	1.5	0.05	36,480	805	30,400	671	27,360	603	25,840	508	22,800	316	21,280	255
	2	0.035	36,480	805	30,400	671	27,360	603	25,840	508	22,800	316	21,280	255
	2.5	0.03	32,832	662	27,360	552	24,624	497	23,256	419	20,520	284	19,152	229
	3	0.02	32,832	662	27,360	552	24,624	497	23,256	419	20,520	284	19,152	229
	4	0.02	32,832	662	27,360	552	24,624	497	23,256	381	20,520	284	19,152	229
	5	0.013	32,832	662	27,360	552	24,624	497	23,256	381	20,520	284	19,152	229
	6	0.013	29,184	515	24,320	429	21,888	386	20,672	247	18,240	219	17,024	172
	8	0.008	29,184	441	24,320	368	21,888	331	20,672	235	18,240	184	17,024	140
	10	0.004	25,536	342	21,280	285	19,152	257	18,088	165	15,960	143	14,896	108
0.6	2	0.042	36,480	1,150	30,400	958	27,360	862	25,840	604	22,800	451	21,280	364
	3	0.035	32,832	945	27,360	788	24,624	709	23,256	544	20,520	407	19,152	328
	4	0.024	32,832	945	27,360	788	24,624	709	23,256	544	20,520	407	19,152	328
	5	0.02	32,832	945	27,360	788	24,624	709	23,256	544	20,520	407	19,152	328
	6	0.015	32,832	945	27,360	788	24,624	709	23,256	544	20,520	407	19,152	328
	7	0.015	29,184	816	24,320	680	21,888	612	20,672	469	18,240	351	17,024	283
	8	0.015	29,184	735	24,320	613	21,888	552	20,672	353	18,240	312	17,024	245

Workpiece Materials			1		2		3		4		5		6	
			Copper		Carbon Steels, Alloy Steels (180-250HB)		Stainless Steels, Tool Steels (25-35HRC)		Pre-Hardened Steels (35-45HRC)		Hardened Steels (45-55HRC)		Hardened Steels (55-65HRC)	
Ratio to standard Cutting depth (ap)			120%		100%		90%		80%		65%		60%	
Mill Dia. (mm)	Under Neck Length (mm)	ap	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)
0.6	9	0.012	29,184	735	24,320	613	21,888	552	20,672	353	18,240	312	17,024	245
	10	0.009	29,184	735	24,320	613	21,888	552	20,672	353	18,240	312	17,024	245
0.7	2	0.07	36,480	1,150	30,400	958	27,360	862	25,840	604	22,800	451	21,280	365
	4	0.049	32,832	945	27,360	788	24,624	709	23,256	544	20,520	407	19,152	328
	6	0.018	32,832	945	27,360	788	24,624	709	23,256	544	20,520	407	19,152	328
	8	0.018	29,184	735	24,320	613	21,888	552	20,672	353	18,240	312	17,024	245
	10	0.018	29,184	735	24,320	613	21,888	552	20,672	353	18,240	312	17,024	245
0.8	4	0.056	36,480	1,150	30,400	958	27,360	862	25,840	741	22,800	654	21,280	401
	6	0.032	32,832	945	27,360	788	24,624	709	23,256	644	22,800	632	19,152	360
	8	0.02	32,832	945	27,360	788	24,624	709	23,256	544	20,520	407	19,152	328
	10	0.02	29,184	735	24,320	613	21,888	552	20,672	353	18,240	312	17,024	245
	12	0.012	29,184	735	24,320	613	21,888	552	20,672	353	18,240	312	17,024	245
0.9	6	0.036	32,832	1,039	27,360	944	24,624	850	23,256	653	20,520	528	19,152	393
	8	0.023	32,832	1,039	27,360	865	24,624	779	23,256	599	20,520	487	19,152	360
	10	0.023	29,184	735	24,320	613	21,888	552	20,672	353	18,240	312	17,024	245
	12	0.023	29,184	735	24,320	613	21,888	552	20,672	353	18,240	312	17,024	245
1	2	0.1	32,832	1,547	27,360	1,288	24,624	1,159	23,256	1,093	21,784	958	19,152	804
	3	0.085	32,832	1,547	27,360	1,288	24,624	1,159	23,256	1,093	21,784	958	19,152	804
	4	0.07	32,832	1,547	27,360	1,288	24,624	1,159	23,256	1,023	21,784	915	19,152	728
	5	0.055	32,832	1,547	27,360	1,288	24,624	1,159	23,256	977	21,784	827	19,152	651
	6	0.04	29,549	1,277	24,624	1,064	22,162	958	20,930	858	19,665	708	17,237	442
	7	0.04	29,549	1,277	24,624	1,064	22,162	958	20,930	795	19,665	668	17,237	442
	8	0.04	29,549	1,277	24,624	1,064	22,162	958	20,930	795	19,665	591	17,237	442
	9	0.033	29,549	1,277	24,624	1,064	22,162	958	20,930	734	18,468	548	17,237	442
	10	0.025	29,549	1,277	24,624	1,064	22,162	958	20,930	734	18,468	548	17,237	442
	12	0.025	26,266	993	21,888	827	19,699	745	18,605	477	16,416	421	15,322	331
	14	0.025	26,266	993	21,888	827	19,699	745	18,605	477	16,416	421	15,322	331
	16	0.015	26,266	851	21,888	709	19,699	638	18,605	452	16,416	354	15,322	269
	20	0.01	23,587	695	19,656	580	21,228	522	16,708	331	14,742	290	13,759	215
	25	0.005	19,950	541	16,625	450	17,955	406	14,131	257	12,469	225	11,638	166
1.2	6	0.084	29,184	1,379	24,320	1,150	21,888	1,035	20,672	827	18,240	542	17,024	437
	8	0.048	26,266	1,134	21,888	945	19,699	851	18,605	744	16,416	487	15,322	393
	10	0.03	26,266	1,134	21,888	945	19,699	851	18,605	707	16,416	487	15,322	393
	12	0.03	26,266	1,134	21,888	945	19,699	851	18,605	653	16,416	487	15,322	393
	16	0.02	23,347	1,008	19,456	840	17,510	756	16,538	580	14,592	433	13,619	350
1.4	6	0.1	25,536	1,207	21,280	1,005	19,152	905	18,088	635	15,960	474	14,896	383
	12	0.035	22,982	993	19,152	827	17,237	745	16,279	571	14,364	427	13,406	344
1.5	4	0.11	25,536	1,327	21,280	1,105	19,152	996	18,088	761	15,960	616	14,896	458
	6	0.11	25,536	1,327	21,280	1,105	19,152	996	18,088	761	15,960	592	14,896	458
	8	0.08	22,982	1,092	19,152	910	17,237	893	16,279	685	14,364	511	13,406	395
	10	0.06	22,982	1,092	19,152	827	17,237	819	16,279	685	14,364	511	13,406	395

UM-SN2 Recommended cutting parameters

Workpiece Materials			1		2		3		4		5		6	
			Copper		Carbon Steels, Alloy Steels (180-250HB)		Stainless Steels, Tool Steels (25-35HRC)		Pre-Hardened Steels (35-45HRC)		Hardened Steels (45-55HRC)		Hardened Steels (55-65HRC)	
Ratio to standard Cutting depth (ap)			120%		100%		90%		80%		65%		60%	
Mill Dia. (mm)	Under Neck Length (mm)	ap	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)
1.5	12	0.06	22,982	993	19,152	827	17,237	745	16,279	685	14,364	427	13,406	344
	14	0.038	22,982	993	19,152	827	17,237	745	16,279	685	14,364	427	13,406	344
	16	0.038	20,429	772	17,024	643	15,322	580	14,470	371	12,768	328	11,917	257
	18	0.038	20,429	772	17,024	643	15,322	580	14,470	371	12,768	328	11,917	257
	20	0.038	20,429	772	17,024	643	15,322	580	14,470	371	12,768	328	11,917	257
	25	0.023	15,322	497	12,768	413	11,491	372	10,853	264	9,576	207	8,938	157
	30	0.015	12,768	337	10,640	281	11,491	253	9,044	169	7,980	132	7,448	106
	35	0.01	12,768	337	10,640	281	11,491	253	9,044	169	7,980	132	7,448	106
	40	0.005	10,214	181	8,512	150	7,661	135	7,235	90	6,384	70	5,958	57
1.6	6	0.11	23,712	1,245	19,760	1,141	17,784	1,074	16,796	721	14,820	538	13,832	433
	8	0.11	23,712	1,245	19,760	1,141	17,784	934	16,796	656	14,820	538	13,832	433
1.8	6	0.13	23,712	1,245	19,760	1,141	17,784	1,120	16,796	721	14,820	587	13,832	473
	8	0.13	23,712	1,245	19,760	1,141	17,784	1,027	16,796	656	14,820	587	13,832	473
2	4	0.2	19,152	1,327	15,960	1,115	14,364	996	13,566	697	11,970	521	11,172	421
	6	0.2	19,152	1,327	15,960	1,115	14,364	996	13,566	697	11,970	521	11,172	421
	8	0.14	19,152	1,327	15,960	1,115	14,364	996	13,566	697	11,970	521	11,172	421
	10	0.14	19,152	1,327	15,960	1,115	14,364	996	13,566	697	11,970	521	11,172	421
	12	0.1	17,237	1,092	14,364	910	12,928	819	12,209	628	10,773	468	10,055	378
	14	0.08	17,237	1,092	14,364	910	12,928	819	12,209	628	10,773	468	10,055	344
	16	0.08	17,237	993	14,364	868	12,928	819	12,209	571	10,773	427	10,055	344
	18	0.05	17,237	993	14,364	868	12,928	819	12,209	571	10,773	427	10,055	344
	20	0.05	17,237	993	14,364	827	12,928	745	12,209	571	10,773	427	10,055	344
	25	0.05	15,322	772	12,768	643	11,491	580	10,853	371	9,576	328	8,938	257
	30	0.03	15,322	772	12,768	643	11,491	580	10,853	371	9,576	328	8,938	257
	35	0.02	13,406	554	11,172	462	10,055	415	9,496	268	8,379	217	7,820	176
	40	0.01	13,406	554	11,172	462	10,055	415	9,496	268	8,379	217	7,820	176
	50	0.005	11,491	337	9,576	281	8,618	253	8,140	163	7,182	132	6,703	106
2.5	8	0.18	16,416	1,422	13,680	1,185	12,312	1,067	11,628	748	10,260	610	9,576	450
	12	0.18	16,416	1,197	13,680	1,185	12,312	1,067	11,628	680	10,260	559	9,576	409
	16	0.1	14,774	1,064	12,312	1,019	11,081	918	10,465	612	9,234	503	8,618	369
	20	0.1	14,774	1,064	12,312	886	11,081	798	10,465	612	9,234	503	8,618	369
	30	0.06	13,133	827	10,944	689	9,850	620	9,302	413	8,208	324	7,661	262
	40	0.03	11,491	594	9,576	495	8,618	446	8,140	297	7,182	233	6,703	188
	50	0.01	11,491	594	9,576	495	8,618	446	8,140	297	7,182	233	6,703	188
3	8	0.3	14,592	1,264	12,160	1,053	10,944	947	10,336	664	10,070	542	8,512	401
	12	0.21	14,592	1,264	12,160	1,053	10,944	947	10,336	664	10,070	542	8,512	401
	16	0.15	13,133	1,087	10,944	944	9,850	779	9,302	599	8,978	487	7,661	360
	20	0.12	13,133	945	10,944	865	9,850	779	9,302	599	8,978	487	7,661	360
	25	0.08	13,133	945	10,944	865	9,850	779	9,302	599	8,978	487	7,661	360
	30	0.08	13,133	945	10,944	788	9,850	709	9,302	599	8,978	487	7,661	330
	40	0.05	11,674	840	9,728	700	8,755	630	8,269	484	7,296	361	6,810	292

Workpiece Materials			1		2		3		4		5		6	
			Copper		Carbon Steels, Alloy Steels (180-250HB)		Stainless Steels, Tool Steels (25-35HRC)		Pre-Hardened Steels (35-45HRC)		Hardened Steels (45-55HRC)		Hardened Steels (55-65HRC)	
Ratio to standard Cutting depth (ap)			120%		100%		90%		80%		65%		60%	
Mill Dia. (mm)	Under Neck Length (mm)	ap	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)
3	50	0.02	10,214	528	8,512	440	7,661	396	7,235	264	6,384	207	5,958	167
4	12	0.4	10,925	2,185	8,930	1,786	8,037	1,448	7,591	1,290	6,698	857	6,251	692
	16	0.28	10,925	2,185	8,930	1,786	8,037	1,448	7,591	1,290	6,698	857	6,251	692
	20	0.28	9,833	1,967	8,037	1,607	7,233	1,302	6,831	1,161	6,028	771	5,626	622
	25	0.16	9,833	1,770	8,037	1,448	7,233	1,171	6,831	1,045	6,028	771	5,626	622
	30	0.16	9,833	1,770	8,037	1,448	7,233	1,171	6,831	1,045	6,028	771	5,626	622
	35	0.1	8,680	1,563	7,233	1,302	6,510	1,055	6,148	941	5,425	694	5,064	560
	40	0.1	8,680	1,563	7,233	1,302	6,510	1,055	6,148	941	5,425	694	5,064	560
	50	0.06	7,501	1,072	6,251	893	5,626	804	5,313	625	4,688	420	4,376	339
5	20	0.3	8,563	1,712	7,136	1,569	6,423	1,413	6,066	998	5,352	671	4,995	542
	25	0.3	7,706	1,540	6,422	1,283	5,780	1,155	5,459	899	4,817	603	4,495	487
	30	0.2	7,706	1,388	6,422	1,156	5,780	1,039	5,459	808	4,817	544	4,495	439
	40	0.15	6,936	1,249	5,780	1,041	5,202	937	4,912	729	4,335	489	4,046	395
	50	0.1	6,936	1,249	5,780	1,041	5,202	937	4,912	729	4,335	489	4,046	395
	20	0.5	7,047	1,548	5,873	1,407	5,286	1,266	4,992	984	4,405	728	4,111	534
6	30	0.4	6,407	1,406	5,339	1,279	4,805	1,151	4,538	895	4,004	661	3,737	485
	40	0.3	6,407	1,265	5,339	1,054	4,805	948	4,538	805	4,004	594	3,737	436
	50	0.2	5,700	1,036	4,750	937	4,275	843	4,038	656	3,563	489	3,325	360

NOTE

1. For different materials, adjust the cutting depth (ap) according to the cutting depth factors in the above table. E.g. for hardened steels (45～55HRC), ap*0.5.
2. Use the appropriate coolant such as air cooling or emulsion for the work material and machining shape.
3. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
4. If the rpm of the machine is low, lower the feed rate also to put the rpm and feed rate in the same ratio.

UM-SN2 Recommended cutting datas to high accuracy machining

Workpiece Materials			1		2		3		4		5		6	
			Copper		Carbon Steels, Alloy Steels (180-250HB)		Stainless Steels, Tool Steels (25-35HRC)		Pre-Hardened Steels (35-45HRC)		Hardened Steels (45-55HRC)		Hardened Steels (55-65HRC)	
Ratio to standard Cutting depth (ap)			120%		100%		90%		80%		65%		60%	
Mill Dia. (mm)	Under Neck Length (mm)	ap	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)
0.1	0.3	0.006	50,000	333	50,000	333	50,000	315	46,170	230	40,613	169	38,048	137
	0.5	0.004	50,000	333	50,000	333	50,000	315	46,170	230	40,613	169	38,048	137
	1	0.003	50,000	302	50,000	302	46,170	286	41,515	209	36,575	154	34,248	123
0.2	0.5	0.015	50,000	470	42,750	424	38,475	381	36,338	268	32,063	200	29,925	161
	1	0.011	50,000	470	42,750	424	38,475	381	36,338	268	32,063	200	29,925	161
	1.5	0.006	46,170	419	38,475	349	34,628	314	32,704	240	28,856	180	26,933	144
	2	0.004	41,040	334	34,200	279	30,780	251	29,070	190	25,650	157	23,940	140
	3	0.002	41,040	301	34,200	251	30,780	226	29,070	170	25,650	157	23,940	126
0.3	1	0.021	45,600	517	38,000	430	34,200	388	32,300	272	28,500	228	26,600	183
	1.5	0.021	45,600	517	38,000	430	34,200	388	32,300	272	28,500	228	26,600	183
	2	0.012	41,040	426	34,200	354	30,780	319	29,070	244	25,650	182	23,940	147
	2.5	0.01	41,040	426	34,200	354	30,780	319	29,070	244	25,650	182	23,940	147
	3	0.008	41,040	426	34,200	354	30,780	319	29,070	244	25,650	171	23,940	138
0.4	1	0.04	36,480	724	30,400	603	27,360	542	25,840	381	22,800	282	21,280	229
	1.5	0.028	36,480	724	30,400	603	27,360	542	25,840	381	22,800	282	21,280	229
	2	0.028	36,480	724	30,400	603	27,360	542	25,840	381	22,800	282	21,280	229
	2.5	0.022	32,832	529	27,360	441	24,624	397	23,256	304	20,520	227	19,152	182
	3	0.016	32,832	529	27,360	441	24,624	397	23,256	304	20,520	227	19,152	182
	3.5	0.012	32,832	529	27,360	441	24,624	397	23,256	304	20,520	227	19,152	182
	4	0.01	32,832	529	27,360	441	24,624	397	23,256	304	20,520	227	19,152	182
	5	0.01	29,184	386	24,320	300	21,888	270	20,672	198	18,240	175	17,024	137
	6	0.006	29,184	386	24,320	300	21,888	270	20,672	198	18,240	175	17,024	137
	8	0.003	25,536	275	21,280	228	19,152	206	18,088	152	15,960	134	14,896	122
	10	0.002	21,888	201	18,240	168	16,416	151	15,504	111	13,680	98	12,768	89
0.5	1	0.05	36,480	724	30,400	603	27,360	542	25,840	424	22,800	284	21,280	229
	1.5	0.05	36,480	724	30,400	603	27,360	542	25,840	424	22,800	284	21,280	229
	2	0.035	36,480	724	30,400	603	27,360	542	25,840	424	22,800	284	21,280	229
	2.5	0.03	32,832	529	27,360	441	24,624	397	23,256	336	20,520	227	19,152	182
	3	0.02	32,832	529	27,360	441	24,624	397	23,256	336	20,520	227	19,152	182
	4	0.02	32,832	529	27,360	441	24,624	397	23,256	304	20,520	227	19,152	182
0.6	5	0.013	32,832	529	27,360	441	24,624	397	23,256	304	20,520	227	19,152	182
	6	0.013	29,184	411	24,320	343	21,888	308	20,672	198	18,240	175	17,024	137
	8	0.008	29,184	352	24,320	294	21,888	264	20,672	163	18,240	147	17,024	111
	10	0.004	25,536	274	21,280	228	19,152	205	18,088	115	15,960	100	14,896	75
	2	0.042	36,480	1,035	30,400	862	27,360	775	25,840	543	22,800	406	21,280	327
	3	0.035	32,832	850	27,360	709	24,624	637	23,256	489	20,520	366	19,152	295
	4	0.024	32,832	850	27,360	709	24,624	637	23,256	489	20,520	366	19,152	295
	5	0.02	32,832	756	27,360	630	24,624	566	23,256	435	20,520	325	19,152	262
	6	0.015	32,832	756	27,360	630	24,624	566	23,256	435	20,520	325	19,152	262
	7	0.015	29,184	653	24,320	543	21,888	489	20,672	375	18,240	280	17,024	226
	8	0.015	29,184	565	24,320	490	21,888	441	20,672	282	18,240	249	17,024	196

Workpiece Materials			1		2		3		4		5		6	
			Copper		Carbon Steels, Alloy Steels (180-250HB)		Stainless Steels, Tool Steels (25-35HRC)		Pre-Hardened Steels (35-45HRC)		Hardened Steels (45-55HRC)		Hardened Steels (55-65HRC)	
Ratio to standard Cutting depth (ap)			120%		100%		90%		80%		65%		60%	
Mill Dia. (mm)	Under Neck Length (mm)	ap	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)
0.6	9	0.012	29,184	565	24,320	490	21,888	441	20,672	282	18,240	249	17,024	196
	10	0.009	29,184	565	24,320	490	21,888	441	20,672	282	18,240	249	17,024	196
0.7	2	0.07	36,480	1,035	30,400	862	27,360	775	25,840	543	22,800	406	21,280	327
	4	0.049	32,832	756	27,360	630	24,624	566	23,256	435	20,520	325	19,152	262
	6	0.018	32,832	756	27,360	630	24,624	566	23,256	435	20,520	325	19,152	262
	8	0.018	29,184	514	24,320	428	21,888	386	20,672	247	18,240	218	17,024	171
	10	0.018	29,184	514	24,320	428	21,888	386	20,672	247	18,240	218	17,024	171
0.8	4	0.056	36,480	1,035	30,400	862	27,360	775	25,840	604	22,800	451	21,280	364
	6	0.032	32,832	756	27,360	630	24,624	566	23,256	544	20,520	407	19,152	328
	8	0.02	32,832	756	27,360	630	24,624	566	23,256	435	20,520	325	19,152	262
	10	0.02	29,184	514	24,320	428	21,888	386	20,672	247	18,240	218	17,024	171
	12	0.012	29,184	514	24,320	428	21,888	386	20,672	247	18,240	218	17,024	171
0.9	6	0.036	32,832	945	27,360	788	24,624	709	23,256	544	20,520	407	19,152	328
	8	0.023	32,832	945	27,360	709	24,624	709	23,256	544	20,520	407	19,152	328
	10	0.023	29,184	588	24,320	490	21,888	441	20,672	282	18,240	249	17,024	196
	12	0.023	29,184	514	24,320	428	21,888	393	20,672	282	18,240	249	17,024	196
1	2	0.09	32,832	1,392	27,360	1,159	24,624	1,043	23,256	889	20,520	664	19,152	535
	3	0.07	32,832	1,392	27,360	1,159	24,624	1,043	23,256	889	20,520	664	19,152	535
	4	0.065	32,832	1,392	27,360	1,159	24,624	1,043	23,256	889	20,520	664	19,152	535
	5	0.05	32,832	1,392	27,360	1,159	24,624	1,043	23,256	889	20,520	664	19,152	535
	6	0.035	29,549	1,212	24,624	958	22,162	862	20,930	734	18,468	548	17,237	397
	7	0.035	29,549	1,212	24,624	958	22,162	862	20,930	734	18,468	548	17,237	397
	8	0.035	29,549	1,149	24,624	958	22,162	862	20,930	734	18,468	548	17,237	397
	9	0.03	29,549	1,149	24,624	958	22,162	862	20,930	660	18,468	438	17,237	353
	10	0.022	29,549	1,149	24,624	851	22,162	775	20,930	660	18,468	438	17,237	353
	12	0.022	26,266	794	21,888	661	19,699	596	18,605	381	16,416	336	15,322	264
	14	0.022	26,266	794	21,888	661	19,699	596	18,605	381	16,416	336	15,322	264
	16	0.012	26,266	680	21,888	566	19,699	510	18,605	361	16,416	283	15,322	215
	20	0.008	23,587	557	19,656	464	17,690	417	16,708	264	14,742	202	13,759	150
	25	0.005	19,950	432	16,625	360	14,963	324	14,131	205	12,469	157	11,638	116
1.2	6	0.084	29,184	1,241	24,320	1,035	21,888	931	20,672	722	18,240	487	17,024	393
	8	0.048	26,266	1,020	21,888	850	19,699	766	18,605	650	16,416	438	15,322	353
	10	0.03	26,266	1,020	21,888	850	19,699	766	18,605	650	16,416	438	15,322	353
	12	0.03	26,266	907	21,888	680	19,699	610	18,605	522	16,416	390	15,322	314
	16	0.02	23,347	806	19,456	672	17,510	529	16,538	464	14,592	346	13,619	279
1.4	6	0.1	25,536	1,086	21,280	904	19,152	814	18,088	571	15,960	427	14,896	343
	12	0.035	22,982	893	19,152	744	17,237	670	16,279	513	14,364	384	13,406	309
1.5	4	0.11	25,536	1,207	21,280	1,005	19,152	905	18,088	635	15,960	474	14,896	382
	6	0.11	25,536	1,086	21,280	904	19,152	823	18,088	635	15,960	474	14,896	382
	8	0.06	22,982	993	19,152	827	17,237	745	16,279	571	14,364	427	13,406	344
	10	0.06	22,982	993	19,152	744	17,237	670	16,279	571	14,364	427	13,406	344

UM-SN2 Recommended cutting datas to high accuracy machining

Workpiece Materials			1		2		3		4		5		6	
			Copper		Carbon Steels, Alloy Steels (180-250HB)		Stainless Steels, Tool Steels (25-35HRC)		Pre-Hardened Steels (35-45HRC)		Hardened Steels (45-55HRC)		Hardened Steels (55-65HRC)	
Ratio to standard Cutting depth (ap)			120%		100%		90%		80%		65%		60%	
Mill Dia. (mm)	Under Neck Length (mm)	ap	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)
1.5	12	0.06	22,982	893	19,152	744	17,237	670	16,279	571	14,364	384	13,406	309
	14	0.038	22,982	893	19,152	744	17,237	670	16,279	571	14,364	384	13,406	309
	16	0.038	20,429	694	17,024	579	15,322	522	14,470	333	12,768	295	11,917	231
	18	0.038	20,429	694	17,024	579	15,322	522	14,470	333	12,768	295	11,917	231
	20	0.038	20,429	694	17,024	579	15,322	464	14,470	296	12,768	262	11,917	205
	25	0.023	15,322	447	12,768	371	11,491	297	10,853	211	9,576	165	8,938	125
	30	0.015	12,768	303	10,640	253	11,491	201	9,044	142	7,980	105	7,448	85
	35	0.01	12,768	270	10,640	224	11,491	177	9,044	142	7,980	105	7,448	85
	40	0.005	10,214	144	8,512	120	7,661	107	7,235	72	6,384	56	5,958	46
1.6	6	0.11	23,712	1,120	19,760	928	17,784	840	16,796	656	14,820	489	13,832	394
	8	0.11	23,712	1,120	19,760	928	17,784	840	16,796	590	14,820	489	13,832	394
1.8	6	0.13	23,712	1,120	19,760	947	17,784	840	16,796	656	14,820	489	13,832	394
	8	0.13	23,712	1,120	19,760	947	17,784	840	16,796	590	14,820	489	13,832	394
2	4	0.2	19,152	1,207	15,960	904	14,364	818	13,566	622	11,970	474	11,172	382
	6	0.2	19,152	1,207	15,960	904	14,364	818	13,566	622	11,970	474	11,172	382
	8	0.14	19,152	1,207	15,960	904	14,364	818	13,566	622	11,970	474	11,172	382
	10	0.14	19,152	1,207	15,960	904	14,364	818	13,566	622	11,970	474	11,172	382
	12	0.08	17,237	993	14,364	827	12,928	745	12,209	561	10,773	427	10,055	344
	14	0.08	17,237	993	14,364	827	12,928	745	12,209	561	10,773	427	10,055	309
	16	0.08	17,237	893	14,364	744	12,928	672	12,209	513	10,773	405	10,055	309
	18	0.05	17,237	893	14,364	744	12,928	672	12,209	513	10,773	384	10,055	275
	20	0.05	17,237	844	14,364	661	12,928	596	12,209	456	10,773	341	10,055	275
	25	0.05	15,322	694	12,768	579	11,491	522	10,853	296	9,576	295	8,938	220
	30	0.03	15,322	618	12,768	514	11,491	464	10,853	259	9,576	262	8,938	205
	35	0.02	13,406	443	11,172	369	10,055	332	9,496	214	8,379	173	7,820	141
	40	0.01	13,406	388	11,172	323	10,057	291	9,496	187	8,379	151	7,820	123
	50	0.005	11,491	270	9,576	224	8,618	177	8,140	114	7,182	92	6,703	74
2.5	8	0.18	16,416	1,293	13,680	1,077	12,312	970	11,628	680	10,260	508	9,576	409
	12	0.18	16,416	1,077	13,680	969	12,312	886	11,628	612	10,260	494	9,576	368
	16	0.1	14,774	958	12,312	797	11,081	720	10,465	550	9,234	428	8,618	332
	20	0.1	14,774	798	12,312	754	11,081	675	10,465	489	9,234	428	8,618	295
	30	0.06	13,133	661	10,944	551	9,850	434	9,302	331	8,208	258	7,661	209
	40	0.03	11,491	415	9,576	346	8,618	312	8,140	238	7,182	186	6,703	150
	50	0.01	11,491	356	9,576	321	8,618	289	8,140	193	7,182	162	6,703	131
3	8	0.3	14,592	1,150	12,160	958	10,944	862	10,336	604	9,120	451	8,512	364
	12	0.21	14,592	1,150	12,160	958	10,944	862	10,336	604	9,120	451	8,512	364
	16	0.12	13,133	945	10,944	788	9,850	709	9,302	544	8,208	407	7,661	327
	20	0.12	13,133	850	10,944	748	9,850	670	9,302	544	8,208	407	7,661	327
	25	0.08	13,133	850	10,944	748	9,850	670	9,302	544	8,208	407	7,661	327
	30	0.08	13,133	756	10,944	630	9,850	571	9,302	544	8,208	407	7,661	295
	40	0.05	11,674	587	9,728	489	8,755	441	8,269	338	7,296	289	6,810	233

Workpiece Materials			1		2		3		4		5		6	
			Copper		Carbon Steels, Alloy Steels (180-250HB)		Stainless Steels, Tool Steels (25-35HRC)		Pre-Hardened Steels (35-45HRC)		Hardened Steels (45-55HRC)		Hardened Steels (55-65HRC)	
Ratio to standard Cutting depth (ap)			120%		100%		90%		80%		65%		60%	
Mill Dia. (mm)	Under Neck Length (mm)	ap	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)
3	50	0.02	10,214	370	8,512	330	7,661	276	7,235	184	6,384	144	5,958	117
4	12	0.4	10,925	1,967	8,930	1,607	8,037	1,302	7,591	1,161	6,698	770	6,251	621
	16	0.28	10,925	1,967	8,930	1,607	8,037	1,302	7,591	1,161	6,698	770	6,251	621
	20	0.28	9,833	1,770	8,037	1,446	7,233	1,171	6,831	1,044	6,028	694	5,626	559
	25	0.16	9,833	1,592	8,037	1,302	7,233	1,054	6,831	941	6,028	694	5,626	559
	30	0.16	9,833	1,592	8,037	1,302	7,233	1,054	6,831	836	6,028	617	5,626	559
	35	0.1	8,680	1,250	7,233	1,041	6,510	844	6,148	752	5,425	555	5,064	447
	40	0.1	8,680	1,093	7,233	911	6,510	738	6,148	658	5,425	485	5,064	391
	50	0.06	7,501	750	6,251	625	6,751	562	5,313	437	4,688	294	4,376	237
5	20	0.3	8,563	1,540	7,136	1,283	6,423	1,155	6,066	898	5,352	603	4,995	487
	25	0.3	7,706	1,385	6,422	1,154	5,780	1,039	5,459	808	4,817	542	4,495	438
	30	0.2	7,706	1,247	6,422	1,039	5,780	935	5,459	727	4,817	488	4,495	394
	40	0.15	6,936	999	5,780	832	5,202	749	4,912	582	4,335	391	4,046	315
	50	0.1	6,936	937	5,780	832	5,202	656	4,912	546	4,335	342	4,046	276
6	20	0.5	7,047	1,407	5,873	1,172	5,286	1,055	4,992	821	4,405	551	4,111	446
	30	0.4	6,407	1,279	5,339	1,066	4,805	960	4,538	746	4,004	501	3,737	405
	40	0.3	6,407	1,150	5,339	959	4,805	863	4,538	671	4,004	450	3,737	364
	50	0.2	5,700	932	4,750	776	4,275	698	4,038	604	3,563	406	3,325	328

NOTE

1. For different materials, adjust the cutting depth (ap) according to the cutting depth factors in the above table. E.g. for hardened steels (45～55HRC), ap*0.5.
2. Use the appropriate coolant such as air cooling or emulsion for the work material and machining shape.
3. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
4. If the rpm of the machine is low, lower the feed rate also to put the rpm and feed rate in the same ratio.

UM-BN2 Recommended cutting parameters

Workpiece Materials				1		2		3		4		5		6	
				Copper		Carbon Steels, Alloy Steels (180-250HB)		Stainless Steels, Tool Steels (25-35HRC)		Pre-Hardened Steels (35-45HRC)		Hardened Steels (45-55HRC)		Hardened Steels (55-65HRC)	
Ratio to standard Cutting depth (ap)				120%		100%		90%		80%		65%		60%	
Ball Radius (mm)	Mill Dia. (mm)	Under Neck Length (mm)	ap	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)
0.05	0.1	0.2	0.008	50,000	300	50,000	250	50,000	250	50,000	225	50,000	200	50,000	188
		0.3	0.006	50,000	300	50,000	250	50,000	250	50,000	225	50,000	200	50,000	188
		0.5	0.004	50,000	300	50,000	250	50,000	250	50,000	225	50,000	200	50,000	188
0.1	0.2	0.5	0.02	50,000	420	50,000	350	50,000	350	50,000	325	43,225	259	39,900	200
		0.75	0.017	50,000	420	50,000	350	50,000	350	50,000	325	43,225	259	39,900	200
		1	0.014	50,000	420	50,000	350	50,000	350	50,000	325	43,225	259	39,900	200
		1.25	0.011	50,000	378	50,000	315	46,170	291	43,605	256	38,475	208	35,910	162
		1.5	0.008	50,000	378	50,000	315	46,170	291	43,605	256	38,475	208	35,910	162
		2	0.008	50,000	378	50,000	315	46,170	291	43,605	256	38,475	208	35,910	162
		2.5	0.006	45,600	307	45,600	256	41,040	230	38,760	201	34,200	164	31,920	127
		3	0.004	45,600	307	45,600	256	41,040	230	38,760	201	34,200	164	31,920	127
0.15	0.3	0.5	0.027	50,000	600	50,000	500	50,000	500	50,000	450	42,750	364	39,900	319
		0.75	0.024	50,000	600	50,000	500	50,000	500	50,000	450	42,750	364	39,900	319
		1	0.021	50,000	600	50,000	500	50,000	500	50,000	450	42,750	364	39,900	319
		1.25	0.019	50,000	600	50,000	500	50,000	500	50,000	450	42,750	364	39,900	319
		1.5	0.016	50,000	600	50,000	500	50,000	500	50,000	450	42,750	364	39,900	319
		2	0.012	50,000	540	50,000	450	46,170	415	43,605	353	38,475	295	35,910	258
		2.5	0.01	50,000	540	50,000	450	46,170	415	43,605	353	38,475	295	35,910	258
		3	0.008	50,000	540	50,000	450	46,170	415	43,605	353	38,475	295	35,910	258
0.2	0.4	0.75	0.043	50,000	967	50,000	840	50,000	839	50,000	770	44,460	622	41,496	581
		1	0.04	50,000	967	50,000	840	50,000	839	50,000	770	44,460	622	41,496	581
		1.5	0.034	50,000	829	50,000	720	50,000	719	50,000	660	44,460	445	41,496	415
		2	0.028	50,000	691	50,000	600	50,000	600	50,000	550	44,460	445	41,496	415
		2.5	0.022	50,000	560	41,040	444	36,936	399	34,884	346	30,780	277	34,474	258
		3	0.016	50,000	560	41,040	444	36,936	399	34,884	346	30,780	277	34,474	258
		3.5	0.012	50,000	560	41,040	444	36,936	399	34,884	346	30,780	277	34,474	258
		4	0.01	50,000	560	41,040	444	36,936	399	34,884	346	30,780	277	34,474	258
		4.5	0.008	43,776	447	36,480	372	32,832	335	31,008	290	27,360	233	25,536	217
0.25	0.5	1	0.045	50,000	1,500	50,000	1,500	44,460	1,334	41,990	1,133	37,050	1,000	34,580	706
		1.5	0.04	50,000	1,500	50,000	1,500	44,460	1,334	41,990	1,133	37,050	1,000	34,580	647
		2	0.035	50,000	1,200	50,000	1,200	44,460	1,067	41,990	907	37,050	800	34,580	647
		2.5	0.033	50,000	1,081	50,000	1,000	40,014	720	37,791	613	33,345	540	31,122	477
		3	0.03	50,000	900	44,460	800	40,014	720	37,791	613	33,345	540	23,940	367
		4	0.02	41,040	739	34,200	616	30,780	554	29,070	471	30,780	498	23,940	367
		5	0.018	41,040	739	34,200	616	30,780	554	29,070	471	30,780	498	23,940	367
		5.5	0.015	36,480	620	30,400	517	27,360	466	25,840	395	22,800	349	21,280	308
		6	0.013	36,480	620	30,400	517	27,360	466	25,840	395	22,800	349	21,280	308
		8	0.008	36,480	620	30,400	517	27,360	466	25,840	395	22,800	349	21,280	308
0.3	0.6	1	0.075	50,000	2,250	50,000	2,250	50,000	2,250	50,000	1,950	45,600	1,642	42,560	1,277
		2	0.063	50,000	2,250	50,000	2,250	50,000	2,250	50,000	1,950	45,600	1,642	42,560	1,277
		2.5	0.046	50,000	1,800	50,000	1,800	50,000	1,800	50,000	1,560	45,600	1,313	42,560	937

Workpiece Materials				1		2		3		4		5		6	
				Copper		Carbon Steels, Alloy Steels (180-250HB)		Stainless Steels, Tool Steels (25-35HRC)		Pre-Hardened Steels (35-45HRC)		Hardened Steels (45-55HRC)		Hardened Steels (55-65HRC)	
Ratio to standard Cutting depth (ap)				120%		100%		90%		80%		65%		60%	
Ball Radius (mm)	Mill Dia. (mm)	Under Neck Length (mm)	ap	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)
0.3	0.6	3	0.041	50,000	1,800	50,000	1,800	50,000	1,800	50,000	1,560	45,600	1,313	42,560	937
		3.5	0.035	50,000	1,710	50,000	1,710	50,000	1,709	46,512	1,379	41,040	1,124	38,304	801
		4	0.026	50,000	1,710	50,000	1,710	50,000	1,709	46,512	1,379	41,040	1,124	38,304	728
		4.5	0.022	50,000	1,350	50,000	1,350	46,170	1,247	43,605	1,020	38,475	831	35,910	647
		5	0.02	50,000	1,350	44,460	1,201	40,014	1,081	37,791	884	33,345	720	31,122	561
		5.5	0.017	50,000	1,350	44,460	1,201	40,014	1,081	37,791	884	33,345	720	31,122	561
		6	0.015	50,000	1,350	44,460	1,201	40,014	1,081	37,791	884	33,345	720	31,122	561
		7	0.015	36,480	930	30,400	775	27,360	837	25,840	571	22,800	466	21,280	470
		8	0.015	36,480	930	30,400	775	27,360	697	25,840	571	22,800	466	21,280	362
		9	0.012	36,480	930	30,400	775	27,360	697	25,840	571	22,800	466	21,280	362
		10	0.009	31,920	814	26,600	678	23,940	611	22,610	500	19,950	407	18,620	316
		12	0.007	27,360	656	22,800	547	20,520	492	19,380	403	17,100	329	15,960	256
0.35	0.7	2	0.092	50,000	2,475	50,000	2,475	50,000	2,475	50,000	2,155	45,600	1,835	39,900	1,129
		4	0.041	50,000	1,880	50,000	1,880	50,000	1,880	46,512	1,523	41,040	1,255	35,910	804
		6	0.027	50,000	1,485	44,460	1,321	40,014	1,188	37,791	977	33,345	806	28,728	609
		8	0.02	36,480	962	30,400	802	27,360	722	25,840	594	22,800	489	21,280	401
0.4	0.8	2	0.12	50,000	2,700	50,000	2,700	50,000	2,700	50,000	2,400	45,600	2,462	42,560	1,788
		4	0.078	50,000	2,700	50,000	2,700	50,000	2,700	50,000	2,400	45,600	2,462	42,560	1,788
		5	0.059	50,000	2,431	50,000	2,429	50,000	2,431	46,512	2,008	41,040	2,017	38,304	1,448
		6	0.042	50,000	2,269	50,000	2,267	43,092	1,955	40,698	1,641	35,910	1,358	33,516	1,183
		8	0.02	47,424	1,536	39,520	1,281	35,568	1,152	33,592	967	29,640	800	27,664	696
		10	0.02	36,480	1,116	30,400	930	27,360	837	25,840	703	22,800	581	21,280	506
0.45	0.9	2	0.135	50,000	3,197	50,000	3,197	50,000	3,197	50,000	2,821	43,320	2,290	40,432	2,031
		4	0.081	50,000	2,771	50,000	2,771	50,000	2,771	46,028	2,251	40,613	1,861	37,905	1,650
		6	0.05	50,000	2,302	45,486	1,919	40,937	1,727	38,663	1,439	34,115	1,190	31,840	1,055
		8	0.036	41,587	1,595	34,656	1,329	31,190	1,196	29,458	997	25,992	825	24,259	732
		2	0.2	50,000	3,750	50,000	3,750	46,170	3,463	43,605	2,943	41,040	2,586	35,910	2,155
		3	0.2	50,000	3,750	50,000	3,750	46,170	3,463	43,605	2,943	41,040	2,586	35,910	2,155
		4	0.14	50,000	3,750	50,000	3,750	46,170	3,463	43,605	2,943	41,040	2,586	35,910	2,155
		5	0.09	50,000	3,500	44,460	3,112	40,014	2,801	37,791	2,466	41,040	2,413	31,122	1,743
0.5	1	6	0.06	50,000	3,151	40,014	2,521	38,783	2,430	36,628	2,203	36,936	2,235	28,010	1,310
		7	0.06	44,323	1,995	36,936	1,663	33,242	1,495	31,396	1,271	30,011	1,257	25,855	1,008
		8	0.06	44,323	1,995	36,936	1,663	33,242	1,495	31,396	1,271	30,011	1,257	25,855	930
		9	0.045	44,323	1,995	36,936	1,663	33,242	1,495	31,396	1,271	30,011	1,257	25,855	930
		10	0.038	44,323	1,995	36,936	1,663	33,242	1,495	31,396	1,271	30,011	1,257	25,855	930
		12	0.025	32,832	1,396	27,360	1,163	24,624	1,047	23,256	889	20,520	732	19,152	651
		13	0.023	32,832	1,396	27,360	1,163	24,624	1,047	23,256	889	20,520	732	19,152	651
		14	0.02	32,832	1,396	27,360	1,163	24,624	1,047	23,256	889	20,520	732	19,152	651
		16	0.015	32,832	1,396	27,360	1,163	24,624	1,047	23,256	889	20,520	732	19,152	651
		18	0.012	28,728	1,150	23,940	958	21,546	862	20,349	732	17,955	603	16,758	536
		20	0.01	24,624	985	20,520	821	18,468	739	17,442	628	15,390	517	14,364	460

UM-BN2 Recommended cutting parameters

Workpiece Materials				1		2		3		4		5		6	
				Copper		Carbon Steels, Alloy Steels (180-250HB)		Stainless Steels, Tool Steels (25-35HRC)		Pre-Hardened Steels (35-45HRC)		Hardened Steels (45-55HRC)		Hardened Steels (55-65HRC)	
Ratio to standard Cutting depth (ap)				120%		100%		90%		80%		65%		60%	
Ball Radius (mm)	Mill Dia. (mm)	Under Neck Length (mm)	ap	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)
0.55	1.1	2	0.2	50,000	3,924	50,000	3,924	43,092	3,382	40,698	2,781	35,910	2,329	33,516	2,067
		4	0.14	50,000	3,924	50,000	3,924	43,092	3,382	40,698	2,781	35,910	2,329	33,516	2,067
		6	0.06	45,349	2,629	37,791	2,191	34,012	1,971	32,122	1,621	28,343	1,359	26,454	1,205
		8	0.06	45,349	2,191	37,791	2,191	34,012	1,643	29,651	1,246	26,163	1,045	24,419	926
		10	0.038	45,349	2,191	37,791	1,685	34,012	1,643	29,651	1,246	26,163	1,045	24,419	926
0.6	1.2	4	0.16	50,000	3,924	43,846	3,556	39,461	3,097	37,269	2,581	35,077	2,427	30,692	1,767
		8	0.06	42,682	2,442	35,568	2,035	32,011	1,998	30,233	1,966	28,728	1,959	24,898	996
		10	0.053	39,398	1,843	32,832	1,623	29,549	1,383	27,907	1,256	25,650	1,016	22,982	827
		12	0.045	39,398	1,843	32,832	1,537	29,549	1,383	27,907	1,256	24,624	975	22,982	827
0.75	1.4	8	0.11	37,346	2,689	31,122	2,241	28,010	2,017	26,454	1,715	23,342	1,456	21,785	1,307
		12	0.053	34,474	1,862	28,728	1,551	25,855	1,397	24,419	1,187	21,546	1,009	20,110	905
		16	0.035	25,536	1,302	21,280	1,085	19,152	977	18,088	830	15,960	706	14,896	633
0.75	1.5	4	0.2	50,000	4,951	39,900	3,950	35,910	3,555	33,915	3,052	29,925	2,424	27,930	2,095
		6	0.2	50,000	4,951	39,900	3,950	35,910	3,555	33,915	3,052	29,925	2,424	27,930	2,095
		8	0.09	37,346	2,662	31,122	2,496	28,010	1,996	26,454	1,715	23,342	1,362	21,785	1,177
		10	0.09	34,474	2,457	28,728	2,048	25,855	1,843	24,419	1,583	21,546	1,257	20,110	1,086
		12	0.09	34,474	2,047	28,728	1,706	25,855	1,535	24,419	1,319	21,546	1,048	20,110	905
		14	0.075	30,643	1,720	28,728	1,706	22,982	1,289	21,706	1,107	19,152	879	17,875	759
		16	0.038	25,536	1,433	21,280	1,194	19,152	1,074	18,088	922	15,960	732	14,896	633
		18	0.038	25,536	1,433	21,280	1,194	19,152	1,074	18,088	922	15,960	732	14,896	633
		20	0.038	25,536	1,433	21,280	1,194	19,152	1,074	18,088	922	15,960	732	14,896	633
0.8	1.6	8	0.22	41,496	3,486	34,580	2,905	31,122	2,614	29,393	2,368	25,935	2,023	22,477	1,511
		12	0.098	37,346	3,294	31,122	2,745	28,010	2,471	26,454	2,067	23,342	1,765	20,229	1,225
		16	0.06	32,011	2,017	26,676	1,681	24,008	1,512	22,675	1,265	20,007	1,081	18,673	941
		20	0.04	23,712	1,411	19,760	1,176	17,784	1,058	16,796	885	14,820	756	13,832	658
0.9	1.8	8	0.26	38,532	3,699	32,110	3,083	28,899	2,774	27,294	2,292	24,083	1,908	22,477	1,619
		12	0.105	32,011	2,305	26,676	1,921	24,008	1,728	22,675	1,429	20,007	1,188	18,673	1,009
		16	0.068	32,011	2,305	26,676	1,921	24,008	1,728	22,675	1,429	20,007	1,188	18,673	1,009
		20	0.045	23,712	1,612	19,760	1,343	17,784	1,209	16,796	999	14,820	831	13,832	706
1	2	3	0.4	35,910	5,387	29,925	4,489	26,933	4,040	25,436	3,435	22,444	2,897	20,948	2,514
		4	0.4	35,910	5,387	29,925	4,489	26,933	4,040	25,436	3,435	22,444	2,897	20,948	2,514
		6	0.4	35,910	4,848	29,925	4,040	26,933	3,636	25,436	3,052	22,444	2,558	20,948	2,262
		8	0.28	35,910	4,848	29,925	4,040	26,933	3,636	25,436	3,052	22,444	2,558	20,948	2,262
		10	0.21	33,516	4,022	27,930	3,352	25,137	3,016	23,741	2,564	20,948	2,137	18,155	1,395
		12	0.12	30,164	3,619	25,137	3,016	22,623	2,715	21,366	2,309	18,853	1,948	16,339	1,255
		13	0.12	30,164	3,619	25,137	3,016	22,623	2,715	21,366	2,309	18,853	1,923	15,082	965
		14	0.12	30,164	3,136	25,137	2,614	22,623	2,353	21,366	2,001	17,507	1,548	15,082	965
		16	0.12	28,010	2,017	23,342	1,681	21,007	1,513	19,841	1,285	17,507	1,394	15,082	868
		18	0.09	25,855	1,862	21,546	1,551	19,391	1,397	18,314	1,187	17,507	1,286	15,082	868
		20	0.075	25,855	1,862	21,546	1,551	19,391	1,397	18,314	1,187	17,507	1,072	15,082	868
		22	0.05	20,349	1,384	16,958	1,153	15,262	1,037	14,414	883	12,719	735	14,244	775

Workpiece Materials				1		2		3		4		5		6	
				Copper		Carbon Steels, Alloy Steels (180-250HB)		Stainless Steels, Tool Steels (25-35HRC)		Pre-Hardened Steels (35-45HRC)		Hardened Steels (45-55HRC)		Hardened Steels (55-65HRC)	
Ratio to standard Cutting depth (ap)				120%		100%		90%		80%		65%		60%	
Ball Radius (mm)	Mill Dia. (mm)	Under Neck Length (mm)	ap	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)	n (r/min)	Vf (mm/min)
1	2	25	0.05	19,152	1,302	15,960	1,085	14,364	977	13,566	830	11,970	692	13,406	730
		30	0.03	19,152	1,302	15,960	1,085	14,364	977	13,566	830	11,970	692	13,406	730
		35	0.025	16,758	1,073	13,965	894	12,569	805	11,870	684	10,474	570	9,776	501
		40	0.022	14,364	920	11,970	766	10,773	690	10,175	586	8,978	488	8,379	429
1.25	2.5	6	0.5	31,635	5,771	26,363	4,810	23,726	4,328	22,409	3,607	19,772	2,934	18,454	2,404
		10	0.34	31,635	5,771	26,363	4,810	23,726	4,328	22,409	3,607	19,772	2,934	18,454	2,404
		15	0.15	24,675	3,240	20,563	2,700	18,507	2,430	17,478	2,025	15,422	1,922	14,394	1,350
		20	0.12	22,777	2,493	18,981	2,077	17,083	1,870	16,134	1,558	15,422	1,373	13,287	1,038
		25	0.098	22,777	2,242	18,981	1,869	17,083	1,682	16,134	1,401	14,236	1,140	13,287	934
		30	0.055	16,872	1,744	14,060	1,454	12,654	1,308	11,951	1,091	10,545	886	9,842	727
1.5	3	8	0.6	27,360	6,156	22,800	5,130	20,520	4,617	19,380	3,895	17,100	3,232	15,960	2,873
		10	0.42	27,360	6,156	22,800	5,130	20,520	4,617	19,380	3,895	17,100	3,232	15,960	2,873
		13	0.315	25,536	4,596	21,280	3,830	19,152	3,448	18,088	2,908	15,960	2,413	14,896	2,145
		16	0.315	25,536	4,137	21,280	3,448	19,152	3,103	18,088	2,617	15,960	2,172	13,832	1,794
		20	0.18	21,341	2,881	17,784	2,401	16,006	2,161	15,116	1,823	13,338	1,513	11,491	1,242
		25	0.12	21,341	2,881	17,784	2,401	16,006	2,161	15,116	1,823	13,338	1,513	11,491	1,242
		30	0.12	19,699	2,660	16,416	2,216	14,774	1,995	13,954	1,682	12,312	1,397	11,491	1,242
		35	0.08	14,592	1,860	12,160	1,550	10,944	1,396	10,336	1,177	9,120	977	10,214	1,042
1.75	3.5	15	0.36	20,378	4,179	16,981	3,483	15,284	3,134	14,434	2,613	12,736	2,124	11,887	1,741
		25	0.21	16,929	2,599	14,108	2,166	12,697	1,949	11,992	1,625	10,581	1,321	9,875	1,083
		35	0.09	16,929	2,599	14,108	2,166	12,697	1,949	11,992	1,625	10,581	1,321	9,875	1,083
		45	0.09	12,540	1,822	10,450	1,518	9,405	1,366	8,883	1,139	7,838	926	7,315	759
2	4	10	0.6	19,665	5,900	16,388	4,916	14,749	4,425	13,930	3,762	12,291	3,134	11,471	2,753
		13	0.48	19,665	5,900	16,388	4,916	14,749	4,425	13,930	3,762	12,291	3,134	11,471	2,753
		16	0.42	19,665	5,900	16,388	4,916	14,749	4,425	13,930	3,762	12,291	3,134	11,471	2,753
		20	0.42	17,043	4,091	14,203	3,409	12,782	3,068	12,073	2,609	10,652	2,173	9,942	1,909
		25	0.24	15,339	3,314	12,782	2,761	11,505	2,485	10,865	2,112	9,587	2,054	8,948	1,546
		30	0.16	14,159	2,549	11,799	2,124	10,619	1,911	10,030	1,625	8,850	1,355	8,259	1,189
		35	0.1	14,159	2,549	11,799	2,124	10,619	1,911	10,030	1,625	8,850	1,355	8,259	1,189
		40	0.1	14,159	2,549	11,799	2,124	10,619	1,911	10,030	1,625	8,850	1,355	8,259	1,189
		45	0.1	10,488	1,783	8,740	1,486	7,866	1,338	7,429	1,136	6,555	947	6,118	832
		50	0.1	10,488	1,783	8,740	1,486	7,866	1,338	7,429	1,136	6,555	947	6,118	832
2.5	5	20	0.525	14,364	5,171	11,970	4,309	10,773	3,878	10,175	3,052	8,978	2,693	8,379	2,262
		25	0.525	13,338	4,801	11,115	3,468	10,004	3,601	9,448	2,835	8,336	2,501	7,781	2,100
		30	0.3	12,004	4,322	10,004	2,641	9,003	3,242	8,503	2,551	7,503	2,251	7,002	1,891
		40	0.2	11,081	2,394	9,234	1,995	8,311	1,796	7,849	1,413	6,926	1,247	6,464	1,048
3	6	12	0.6	15,390	6,464	12,825	5,387	11,543	4,848	10,901	4,040	9,619	3,286	8,978	2,693
		20	0.5	14,535	5,669	12,113	4,724	10,901	4,251	10,296	3,543	9,085	2,881	8,479	2,362
		30	0.42	11,856	3,414	9,880	2,845	8,892	2,561	8,398	2,016	7,410	1,927	6,916	1,493
		50	0.15	9,850	2,553	8,208	2,127	7,387	1,915	6,977	1,508	6,156	1,330	5,746	1,116

UM-BN2 Recommended Cutting Parameters

| NOTE |

1. For diferent materials, adjust the cutting depth (ap) according to the cutting depth factors in the above table.E.g. for hardened steels(45~55HRC),ap*0.5.
2. When performing cutting where cutting chips may cause clogging, such as for rib cutting, blind grooves, etc, cuting depth setting should be set by multiplying a cutting depth factor to calculate the cuting depth amount, and this amount should then be reduced to 80% ofthe calculated value.
3. Adjust by setting ae to (3 to 5)x(ap)x(cutting depth ratio). When performing finishing processing, calculate the theoretical cusp height and set accordingly.
4. Use the appropriate coolant such as air cooling or emulsion for the work material and machining shape.
5. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
6. If the rpm of the machine is low, lower the feed rate also to put the rpm and feed rate in the same ratio.

UM-BN2 Recommended cutting parameters to high parameters machining

Workpiece Materials				1		2		3		4		5		6	
				Copper		(180-250HB) Carbon Steels, Alloy Steels		(25-35HRC) Stainless Steels, Tool Steels		(35-45HRC) Pre-Hardened Steels		(45-55HRC) Hardened Steels		(55-65HRC) Hardened Steels	
Ratio to standard Cutting depth(ap)				120%		100%		90%		80%		65%		60%	
Ball Radius (mm)	Mill Dia (mm)	Under Neck Length (mm)	ap	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)
0.05	0.1	0.2	0.004	50,000	300	50,000	250	50,000	250	50,000	225	50,000	200	50,000	188
		0.3	0.003	50,000	300	50,000	250	50,000	250	50,000	225	50,000	200	50,000	188
		0.5	0.002	50,000	300	50,000	250	50,000	250	50,000	225	50,000	200	50,000	188
0.1	0.2	0.5	0.015	50,000	420	50,000	350	50,000	350	50,000	325	43,225	259	39,900	200
		0.75	0.013	50,000	420	50,000	350	50,000	350	50,000	325	43,225	259	39,900	200
		1	0.011	50,000	420	50,000	350	50,000	350	50,000	325	43,225	259	39,900	200
		1.25	0.008	50,000	378	50,000	315	46,170	291	43,605	256	38,475	208	35,910	162
		1.5	0.007	50,000	378	50,000	315	46,170	291	43,605	256	38,475	208	35,910	162
		2	0.006	50,000	378	50,000	315	46,170	291	43,605	256	38,475	208	35,910	162
		2.5	0.005	45,600	307	45,600	256	41,040	230	38,760	201	34,200	164	31,920	127
		3	0.003	45,600	307	45,600	256	41,040	230	38,760	201	34,200	164	31,920	127
0.15	0.3	0.5	0.02	50,000	600	50,000	500	50,000	500	50,000	450	42,750	364	39,900	319
		0.75	0.018	50,000	600	50,000	500	50,000	500	50,000	450	42,750	364	39,900	319
		1	0.016	50,000	600	50,000	500	50,000	500	50,000	450	42,750	364	39,900	319
		1.25	0.014	50,000	600	50,000	500	50,000	500	50,000	450	42,750	364	39,900	319
		1.5	0.012	50,000	600	50,000	500	50,000	500	50,000	450	42,750	364	39,900	319
		2	0.009	50,000	540	50,000	450	46,170	415	43,605	353	38,475	295	35,910	258
		2.5	0.008	50,000	540	50,000	450	46,170	415	43,605	353	38,475	295	35,910	258
		3	0.006	50,000	540	50,000	450	46,170	415	43,605	353	38,475	295	35,910	258
0.2	0.4	0.75	0.043	50,000	691	45,600	547	41,040	492	38,760	427	34,200	342	31,920	319
		1	0.04	50,000	691	45,600	547	41,040	492	38,760	427	34,200	342	31,920	319
		1.5	0.034	50,000	691	45,600	547	41,040	492	38,760	427	34,200	342	31,920	319
		2	0.028	50,000	691	45,600	547	41,040	492	38,760	427	34,200	342	31,920	319
		2.5	0.016	50,000	560	41,040	444	36,936	399	34,884	346	30,780	277	28,728	258
		3	0.011	50,000	560	41,040	444	36,936	399	34,884	346	30,780	277	28,728	258
		3.5	0.008	50,000	560	41,040	444	36,936	399	34,884	346	30,780	277	28,728	258
		4	0.005	50,000	560	41,040	444	36,936	399	34,884	346	30,780	277	28,728	258
		4.5	0.004	43,776	447	36,480	372	32,832	335	31,008	290	27,360	233	25,536	217
0.25	0.5	1	0.045	45,600	912	38,000	760	34,200	684	32,300	581	28,500	513	26,600	452
		1.5	0.04	45,600	912	38,000	760	34,200	684	32,300	581	28,500	513	26,600	452
		2	0.035	45,600	912	38,000	760	34,200	684	32,300	581	28,500	513	26,600	452
		2.5	0.033	41,040	739	38,000	760	30,780	554	29,070	471	25,650	415	23,940	367
		3	0.03	41,040	739	34,200	616	30,780	554	29,070	471	25,650	415	23,940	367
		4	0.02	41,040	739	34,200	616	30,780	554	29,070	471	25,650	415	23,940	367
		5	0.018	41,040	739	34,200	616	30,780	554	29,070	471	25,650	415	23,940	367
		5.5	0.008	36,480	620	30,400	517	27,360	466	25,840	395	22,800	349	21,280	308
		6	0.007	36,480	620	30,400	517	27,360	466	25,840	395	22,800	349	21,280	308
		8	0.004	36,480	620	30,400	517	27,360	466	25,840	395	22,800	349	21,280	308
0.3	0.6	1	0.05	45,600	1,368	38,000	1,140	34,200	1,026	32,300	840	28,500	684	26,600	532
		2	0.042	45,600	1,368	38,000	1,140	34,200	1,026	32,300	840	28,500	684	26,600	532
		2.5	0.038	45,600	1,368	38,000	1,140	34,200	1,026	32,300	840	28,500	684	26,600	532

UM-BN2 Recommended cutting parameters to high parameters machining

Workpiece Materials				1		2		3		4		5		6	
				Copper		(180-250HB) Carbon Steels, Alloy Steels		(25-35HRC) Stainless Steels, Tool Steels		(35-45HRC) Pre-Hardened Steels		(45-55HRC) Hardened Steels		(55-65HRC) Hardened Steels	
Ratio to standard Cutting depth(ap)				120%		100%		90%		80%		65%		60%	
Ball Radius (mm)	Mill Dia (mm)	Under Neck Length (mm)	ap	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)
0.3	0.6	3	0.034	45,600	1,368	38,000	1,140	34,200	1,026	32,300	840	28,500	684	26,600	532
		3.5	0.029	41,040	1,169	34,200	975	30,780	877	29,070	718	25,650	585	23,940	455
		4	0.024	41,040	1,169	34,200	975	30,780	877	29,070	718	25,650	585	23,940	455
		4.5	0.022	41,040	1,108	34,200	923	30,780	831	29,070	680	25,650	554	23,940	431
		5	0.02	41,040	1,108	34,200	923	30,780	831	29,070	680	25,650	554	23,940	431
		5.5	0.017	41,040	1,108	34,200	923	30,780	831	29,070	680	25,650	554	23,940	431
		6	0.015	41,040	1,108	34,200	923	30,780	831	29,070	680	25,650	554	23,940	431
		7	0.008	36,480	930	30,400	775	27,360	697	25,840	571	22,800	466	21,280	362
		8	0.008	36,480	930	30,400	775	27,360	697	25,840	571	22,800	466	21,280	362
		9	0.006	36,480	930	30,400	775	27,360	697	25,840	571	22,800	466	21,280	362
		10	0.005	31,920	814	26,600	678	23,940	611	22,610	500	19,950	407	18,620	316
		12	0.004	27,360	656	22,800	547	20,520	492	19,380	403	17,100	329	15,960	256
0.35	0.7	2	0.061	45,600	1,505	38,000	1,254	34,200	1,129	32,300	928	28,500	765	26,600	627
		4	0.034	41,040	1,286	34,200	1,072	30,780	964	29,070	793	25,650	654	23,940	536
		6	0.027	41,040	1,219	34,200	1,016	30,780	914	29,070	751	25,650	619	23,940	508
		8	0.01	36,480	962	30,400	802	27,360	722	25,840	594	22,800	489	21,280	401
0.4	0.8	2	0.08	45,600	1,642	38,000	1,368	34,200	1,231	32,300	1,034	28,500	855	26,600	745
		4	0.056	45,600	1,642	38,000	1,368	34,200	1,231	32,300	1,034	28,500	855	26,600	745
		5	0.045	41,040	1,330	34,200	1,108	30,780	998	29,070	837	25,650	693	23,940	603
		6	0.032	41,040	1,330	34,200	1,108	30,780	998	29,070	837	25,650	693	23,940	603
		8	0.02	36,480	1,182	30,400	985	27,360	886	25,840	744	22,800	616	21,280	536
		10	0.01	36,480	1,116	30,400	930	27,360	837	25,840	703	22,800	581	21,280	506
0.45	0.9	2	0.09	43,320	1,847	36,100	1,539	32,490	1,385	30,685	1,154	27,075	954	25,270	846
		4	0.058	43,320	1,847	36,100	1,539	32,490	1,385	30,685	1,154	27,075	954	25,270	846
		6	0.042	38,988	1,495	32,490	1,246	29,241	1,122	27,617	935	24,368	772	22,743	686
		8	0.03	34,656	1,329	28,880	1,108	25,992	997	24,548	831	21,660	687	20,216	609
0.5	1	2	0.1	41,040	2,052	34,200	1,710	30,780	1,539	29,070	1,308	25,650	1,077	23,940	958
		3	0.1	41,040	2,052	34,200	1,710	30,780	1,539	29,070	1,308	25,650	1,077	23,940	958
		4	0.07	41,040	2,052	34,200	1,710	30,780	1,539	29,070	1,308	25,650	1,077	23,940	958
		5	0.06	41,040	2,052	34,200	1,710	30,780	1,539	29,070	1,308	25,650	1,077	23,940	958
		6	0.04	36,936	1,663	30,780	1,385	27,702	1,246	26,163	1,059	23,085	873	21,546	775
		7	0.04	36,936	1,663	30,780	1,385	27,702	1,246	26,163	1,059	23,085	873	21,546	775
		8	0.04	36,936	1,663	30,780	1,385	27,702	1,246	26,163	1,059	23,085	873	21,546	775
		9	0.03	36,936	1,663	30,780	1,385	27,702	1,246	26,163	1,059	23,085	873	21,546	775
		10	0.025	36,936	1,663	30,780	1,385	27,702	1,246	26,163	1,059	23,085	873	21,546	775
		12	0.013	32,832	1,396	27,360	1,163	24,624	1,047	23,256	889	20,520	732	19,152	651
		13	0.011	32,832	1,396	27,360	1,163	24,624	1,047	23,256	889	20,520	732	19,152	651
		14	0.01	32,832	1,396	27,360	1,163	24,624	1,047	23,256	889	20,520	732	19,152	651
		16	0.008	32,832	1,396	27,360	1,163	24,624	1,047	23,256	889	20,520	732	19,152	651
		18	0.006	28,728	1,150	23,940	958	21,546	862	20,349	732	17,955	603	16,758	536
		20	0.005	24,624	985	20,520	821	18,468	739	17,442	628	15,390	517	14,364	460

Workpiece Materials				1		2		3		4		5		6	
				Copper		(180-250HB) Carbon Steels, Alloy Steels		(25-35HRC) Stainless Steels, Tool Steels		(35-45HRC) Pre-Hardened Steels		(45-55HRC) Hardened Steels		(55-65HRC) Hardened Steels	
Ratio to standard Cutting depth(ap)				120%		100%		90%		80%		65%		60%	
Ball Radius (mm)	Mill Dia (mm)	Under Neck Length (mm)	ap	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)
0.55	1.1	2	0.1	38,304	2,005	31,920	1,670	28,728	1,503	27,132	1,236	23,940	1,036	22,344	919
		4	0.07	38,304	2,005	31,920	1,670	28,728	1,503	27,132	1,236	23,940	1,036	22,344	919
		6	0.04	34,884	1,685	29,070	1,404	26,163	1,264	24,710	1,039	21,803	870	20,349	772
		8	0.04	34,884	1,685	29,070	1,404	26,163	1,264	24,710	1,039	21,803	870	20,349	772
		10	0.025	34,884	1,685	29,070	1,404	26,163	1,264	24,710	1,039	21,803	870	20,349	772
0.6	1.2	4	0.08	35,077	1,835	29,231	1,530	26,307	1,377	24,846	1,148	21,923	948	20,461	842
		8	0.04	32,832	1,707	27,360	1,423	24,624	1,281	23,256	1,047	20,520	903	19,152	766
		10	0.035	32,832	1,536	27,360	1,352	24,624	1,152	23,256	1,047	20,520	812	19,152	690
		12	0.03	32,832	1,536	27,360	1,281	24,624	1,152	23,256	1,047	20,520	812	19,152	690
0.7	1.4	8	0.055	28,728	1,723	23,940	1,436	21,546	1,293	20,349	1,099	17,955	934	16,758	838
		12	0.035	28,728	1,551	23,940	1,293	21,546	1,164	20,349	989	17,955	841	16,758	754
		16	0.017	25,536	1,302	21,280	1,085	19,152	977	18,088	830	15,960	706	14,896	633
0.75	1.5	4	0.1	31,920	2,107	26,600	1,756	23,940	1,580	22,610	1,357	19,950	1,077	18,620	931
		6	0.1	31,920	2,107	26,600	1,756	23,940	1,580	22,610	1,357	19,950	1,077	18,620	931
		8	0.06	28,728	1,706	23,940	1,422	21,546	1,280	20,349	1,099	17,955	873	16,758	754
		10	0.06	28,728	1,706	23,940	1,422	21,546	1,280	20,349	1,099	17,955	873	16,758	754
		12	0.06	28,728	1,706	23,940	1,422	21,546	1,280	20,349	1,099	17,955	873	16,758	754
		14	0.05	25,536	1,433	23,940	1,422	19,152	1,074	18,088	922	15,960	732	14,896	633
		16	0.019	25,536	1,433	21,280	1,194	19,152	1,074	18,088	922	15,960	732	14,896	633
		18	0.019	25,536	1,433	21,280	1,194	19,152	1,074	18,088	922	15,960	732	14,896	633
		20	0.019	25,536	1,433	21,280	1,194	19,152	1,074	18,088	922	15,960	732	14,896	633
0.8	1.6	8	0.11	29,640	2,075	24,700	1,729	22,230	1,556	20,995	1,302	18,525	1,112	17,290	968
		12	0.065	26,676	1,681	22,230	1,400	20,007	1,261	18,896	1,055	16,673	901	15,561	785
		16	0.04	26,676	1,681	22,230	1,400	20,007	1,261	18,896	1,055	16,673	901	15,561	785
		20	0.02	23,712	1,411	19,760	1,176	17,784	1,058	16,796	885	14,820	756	13,832	658
0.9	1.8	8	0.13	29,640	2,371	24,700	1,976	22,230	1,778	20,995	1,470	18,525	1,223	17,290	1,037
		12	0.07	26,676	1,921	22,230	1,601	20,007	1,440	18,896	1,190	16,673	990	15,561	841
		16	0.045	26,676	1,921	22,230	1,601	20,007	1,440	18,896	1,190	16,673	990	15,561	841
		20	0.022	23,712	1,612	19,760	1,343	17,784	1,209	16,796	999	14,820	831	13,832	706
1	2	3	0.2	23,940	2,394	19,950	1,995	17,955	1,796	16,958	1,527	14,963	1,287	13,965	1,117
		4	0.2	23,940	2,394	19,950	1,995	17,955	1,796	16,958	1,527	14,963	1,287	13,965	1,117
		6	0.2	23,940	2,155	19,950	1,796	17,955	1,616	16,958	1,357	14,963	1,137	13,965	1,005
		8	0.14	23,940	2,155	19,950	1,796	17,955	1,616	16,958	1,357	14,963	1,137	13,965	1,005
		10	0.14	23,940	1,915	19,950	1,596	17,955	1,436	16,958	1,221	14,963	1,017	13,965	894
		12	0.080	21,546	1,723	17,955	1,436	16,160	1,293	15,262	1,099	13,466	916	12,569	805
		13	0.080	21,546	1,723	17,955	1,436	16,160	1,293	15,262	1,099	13,466	916	12,569	805
		14	0.080	21,546	1,723	17,955	1,436	16,160	1,293	15,262	1,099	13,466	916	12,569	805
		16	0.080	21,546	1,551	17,955	1,293	16,160	1,164	15,262	989	13,466	825	12,569	724
		18	0.060	21,546	1,551	17,955	1,293	16,160	1,164	15,262	989	13,466	825	12,569	724
		20	0.050	21,546	1,551	17,955	1,293	16,160	1,164	15,262	989	13,466	825	12,569	724
		22	0.042	20,349	1,384	16,958	1,153	15,262	1,037	14,414	883	12,719	735	11,870	646

UM-BN2 Recommended cutting parameters to high parameters machining

Workpiece Materials				1		2		3		4		5		6	
				Copper		(180-250HB) Carbon Steels, Alloy Steels		(25-35HRC) Stainless Steels, Tool Steels		(35-45HRC) Pre-Hardened Steels		(45-55HRC) Hardened Steels		(55-65HRC) Hardened Steels	
Ratio to standard Cutting depth(ap)				120%		100%		90%		80%		65%		60%	
Ball Radius (mm)	Mill Dia (mm)	Under Neck Length (mm)	ap	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)
1	2	25	0.035	19,152	1,302	15,960	1,085	14,364	977	13,566	830	11,970	692	11,172	608
		30	0.015	19,152	1,302	15,960	1,085	14,364	977	13,566	830	11,970	692	11,172	608
		35	0.012	16,758	1,073	13,965	894	12,569	805	11,870	684	10,474	570	9,776	501
		40	0.010	14,364	920	11,970	766	10,773	690	10,175	586	8,978	488	8,379	429
1.25	2.5	6	0.250	21,090	2,565	17,575	2,138	15,818	1,924	14,939	1,604	13,181	1,304	12,303	1,069
		10	0.170	21,090	2,565	17,575	2,138	15,818	1,924	14,939	1,604	13,181	1,304	12,303	1,069
		15	0.100	18,981	2,077	15,818	1,731	14,236	1,558	13,445	1,299	11,864	1,055	11,072	865
		20	0.080	18,981	2,077	15,818	1,731	14,236	1,558	13,445	1,299	11,864	1,055	11,072	865
		25	0.065	18,981	1,869	15,818	1,557	14,236	1,401	13,445	1,168	11,864	950	11,072	779
		30	0.044	16,872	1,744	14,060	1,454	12,654	1,308	11,951	1,091	10,545	886	9,842	727
1.5	3	8	0.300	18,240	2,736	15,200	2,280	13,680	2,052	12,920	1,731	11,400	1,436	10,640	1,277
		10	0.210	18,240	2,736	15,200	2,280	13,680	2,052	12,920	1,731	11,400	1,436	10,640	1,277
		13	0.210	18,240	2,736	15,200	2,280	13,680	2,052	12,920	1,731	11,400	1,436	10,640	1,277
		16	0.210	18,240	2,462	15,200	2,052	13,680	1,847	12,920	1,558	11,400	1,293	10,640	1,150
		20	0.120	16,416	2,216	13,680	1,847	12,312	1,663	11,628	1,402	10,260	1,164	9,576	1,035
		25	0.080	16,416	2,216	13,680	1,847	12,312	1,663	11,628	1,402	10,260	1,164	9,576	1,035
		30	0.080	16,416	2,216	13,680	1,847	12,312	1,663	11,628	1,402	10,260	1,164	9,576	1,035
		35	0.064	14,592	1,860	12,160	1,550	10,944	1,396	10,336	1,177	9,120	977	8,512	868
1.75	3.5	15	0.240	15,675	2,679	13,063	2,233	11,756	2,009	11,104	1,675	9,797	1,362	9,144	1,116
		25	0.140	14,108	2,166	11,756	1,805	10,581	1,625	9,993	1,354	8,817	1,101	8,230	903
		35	0.090	14,108	2,166	11,756	1,805	10,581	1,625	9,993	1,354	8,817	1,101	8,230	903
		45	0.072	12,540	1,822	10,450	1,518	9,405	1,366	8,883	1,139	7,838	926	7,315	759
2	4	10	0.400	13,110	2,622	10,925	2,185	9,833	1,967	9,286	1,672	8,194	1,393	7,648	1,224
		13	0.320	13,110	2,622	10,925	2,185	9,833	1,967	9,286	1,672	8,194	1,393	7,648	1,224
		16	0.280	13,110	2,622	10,925	2,185	9,833	1,967	9,286	1,672	8,194	1,393	7,648	1,224
		20	0.280	13,110	2,622	10,925	2,185	9,833	1,967	9,286	1,672	8,194	1,393	7,648	1,224
		25	0.160	11,799	2,124	9,833	1,770	8,849	1,593	8,358	1,354	7,375	1,129	6,883	991
		30	0.160	11,799	2,124	9,833	1,770	8,849	1,593	8,358	1,354	7,375	1,129	6,883	991
		35	0.100	11,799	2,124	9,833	1,770	8,849	1,593	8,358	1,354	7,375	1,129	6,883	991
		40	0.100	11,799	2,124	9,833	1,770	8,849	1,593	8,358	1,354	7,375	1,129	6,883	991
		45	0.080	10,488	1,783	8,740	1,486	7,866	1,338	7,429	1,136	6,555	947	6,118	832
		50	0.070	10,488	1,783	8,740	1,486	7,866	1,338	7,429	1,136	6,555	947	6,118	832
2.5	5	20	0.350	10,260	2,462	8,550	2,052	7,695	1,847	7,268	1,454	6,413	1,283	5,985	1,077
		25	0.350	10,260	2,462	8,550	2,052	7,695	1,847	7,268	1,454	6,413	1,283	5,985	1,077
		30	0.200	9,234	2,216	7,695	1,847	6,926	1,663	6,541	1,308	5,771	1,154	5,387	970
		40	0.200	9,234	1,995	7,695	1,663	6,926	1,496	6,541	1,177	5,771	1,039	5,387	873
3	6	12	0.600	10,260	2,873	8,550	2,394	7,695	2,155	7,268	1,796	6,413	1,460	5,985	1,197
		20	0.500	9,690	2,519	8,075	2,100	7,268	1,890	6,864	1,575	6,056	1,281	5,653	1,050
		30	0.420	9,120	2,189	7,600	1,824	6,840	1,642	6,460	1,292	5,700	1,140	5,320	958
		50	0.150	8,208	1,773	6,840	1,477	6,156	1,330	5,814	1,047	5,130	923	4,788	775

| NOTE |

1. For diferent materials, adjust the cutting depth (ap) according to the cutting depth factors in the above table. E.g. for hardened steels(45~55HRC),ap*0.5.
2. When performing cutting where cutting chips may cause clogging, such as for rib cutting, blind grooves, etc., cutting depth setting should be set by multiplying a cutting depth factor to calculate the cutting depth amount. and this amount should then be reduced to 80% of the calculated value.
3.Adjust by setting ae to (3 to 5)×(ap)×(cutting depth ratio). When performing finishing processing, calculate the theoretical cusp height and set accordingly.
4. Use the appropriate coolant such as air cooling or emulsion for the work material and machining shape.
5. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
6. If the rpm of the machine is low, lower the feed rate also to put the rpm and feed rate in the same ratio.

UM-RN2 Recommended Cutting Parameters

Workpiece Materials				1		2		3		4		5		6	
				Copper		(180-250HB) Carbon Steels,Al-		(25-35HRC) Stainless		(35-45HRC) Pre-Hardened		(45-55HRC) Hardened Steels		(55-65HRC) Hardened Steels	
Ratio to standard Cutting depth(ap)				120%		100%		90%		80%		65%		60%	
Mill Dia. (mm)	(R) (mm)	Unde Neck Length (mm)	ap	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)
0.2	0.02	0.5	0.016	50,000	922	50,000	922	42,750	788	40,375	670	35,625	525	33,250	429
		1	0.011	50,000	922	50,000	922	42,750	788	40,375	670	35,625	525	33,250	429
		2	0.007	50,000	809	39,900	735	38,475	709	36,338	603	32,063	473	29,925	386
	0.05	0.5	0.02	50,000	922	50,000	922	42,750	788	40,375	670	35,625	525	33,250	429
		1	0.014	50,000	922	50,000	922	42,750	788	40,375	670	35,625	525	33,250	429
		1.5	0.008	50,000	809	44,650	823	40,613	749	38,356	637	33,844	499	31,588	408
		2	0.008	50,000	809	39,900	735	38,475	709	36,338	603	32,063	473	29,925	386
0.3	0.02	1	0.016	50,000	1,208	45,600	1,103	41,040	993	38,760	696	34,200	520	31,920	419
		2	0.011	42,750	948	36,936	817	33,242	735	31,396	564	27,702	421	25,855	339
		3	0.007	40,613	837	35,089	722	31,580	650	29,826	499	26,317	372	24,562	300
	0.05	1	0.021	50,000	1,208	45,600	1,103	41,040	993	38,760	696	34,200	520	31,920	419
		1.5	0.016	45,125	1,090	43,320	1,048	38,988	943	36,822	662	32,490	494	30,324	398
		2	0.012	42,750	948	36,936	817	33,242	735	31,396	564	27,702	421	25,855	339
		2.5	0.01	42,750	948	36,936	817	33,242	735	31,396	564	27,702	421	25,855	339
		3	0.008	40,613	837	35,089	722	31,580	650	29,826	499	26,317	372	24,562	300
0.4	0.02	1	0.016	43,776	1,177	36,385	980	32,832	883	30,643	753	27,360	589	25,390	483
		2	0.013	43,776	1,059	36,385	883	32,832	794	30,643	678	27,360	529	25,390	434
		3	0.01	33,488	741	27,859	617	25,115	556	23,441	474	20,929	371	19,423	304
		4	0.007	27,578	610	22,943	508	20,683	457	19,304	390	17,236	305	15,995	250
	0.05	1	0.025	43,776	1,177	36,385	980	32,832	883	30,643	753	27,360	589	25,390	483
		1.5	0.02	43,776	1,177	36,385	980	32,832	883	30,643	753	27,360	589	25,390	483
		2	0.016	43,776	1,059	36,385	883	32,832	794	30,643	678	27,360	529	25,390	434
		2.5	0.015	41,040	1,009	34,200	841	30,780	756	29,070	643	25,650	504	23,940	412
		3	0.014	33,488	741	27,859	617	25,115	556	23,441	474	20,929	371	19,423	304
		3.5	0.012	31,396	694	26,163	579	23,547	521	22,239	444	19,622	347	18,314	284
		4	0.008	27,578	610	22,943	508	20,683	457	19,304	390	17,236	305	15,995	250
	0.1	1	0.033	43,776	1,177	36,385	980	32,832	883	30,643	753	27,360	589	25,390	483
		2	0.028	43,776	1,059	36,385	883	32,832	794	30,643	678	27,360	529	25,390	434
		3	0.016	33,488	741	27,859	617	25,115	556	23,441	474	20,929	371	19,423	304
		4	0.01	27,578	610	22,943	508	20,683	457	19,304	390	17,236	305	15,995	250
0.5	0.02	1	0.016	43,776	1,177	36,385	980	32,832	883	30,643	753	27,360	589	25,390	483
		2	0.013	43,776	1,177	36,385	980	32,832	883	30,643	753	27,360	589	25,390	483
		3	0.01	35,459	950	29,549	797	26,594	713	25,116	602	22,162	449	20,684	362
		4	0.008	31,519	845	26,266	709	23,639	633	22,326	535	19,699	399	18,386	322
		6	0.006	24,515	633	20,429	527	18,386	474	17,364	304	15,322	268	14,300	211
	0.05	1	0.03	43,776	1,177	36,385	980	32,832	883	30,643	753	27,360	589	25,390	483
		2	0.023	43,776	1,177	36,385	980	32,832	883	30,643	753	27,360	589	25,390	483
		3	0.017	35,459	950	29,549	797	26,594	713	25,116	602	22,162	449	20,684	362
		4	0.017	31,519	845	26,266	709	23,639	633	22,326	535	19,699	399	18,386	322
		5	0.011	27,579	739	22,982	620	20,684	554	19,535	468	17,237	350	16,087	282
		6	0.008	24,515	633	20,429	527	18,386	474	17,364	304	15,322	268	14,300	211

Workpiece Materials				1		2		3		4		5		6	
				Copper		(180-250HB) Carbon Steels,Al-		(25-35HRC) Stainless		(35-45HRC) Pre-Hardened		(45-55HRC) Hardened Steels		(55-65HRC) Hardened Steels	
Ratio to standard Cutting depth(ap)				120%		100%		90%		80%		65%		60%	
Mill Dia. (mm)	(R) (mm)	Unde Neck Length (mm)	ap	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)
0.5	0.1	1	0.035	43,776	1,177	36,385	980	32,832	883	30,643	753	27,360	589	25,390	483
		2	0.03	43,776	1,177	36,385	980	32,832	883	30,643	753	27,360	589	25,390	483
		3	0.02	35,459	950	29,549	797	26,594	713	25,116	602	22,162	449	20,684	362
		4	0.02	31,519	845	26,266	709	23,639	633	22,326	535	19,699	399	18,386	322
		5	0.013	27,579	739	22,982	620	20,684	554	19,535	468	17,237	350	16,087	282
		6	0.013	24,515	633	20,429	527	18,386	474	17,364	304	15,322	268	14,300	211
0.6	0.02	2	0.016	43,776	1,663	36,385	1,382	32,832	1,247	30,643	941	27,360	735	25,390	603
		4	0.013	35,459	1,307	29,549	1,090	26,594	980	25,116	752	22,162	561	20,684	453
		6	0.01	27,579	1,017	22,982	847	20,684	763	19,535	585	17,237	437	16,087	352
	0.05	2	0.028	43,776	1,663	36,385	1,382	32,832	1,247	30,643	941	27,360	735	25,390	603
		4	0.019	35,459	1,307	29,549	1,090	26,594	980	25,116	752	22,162	561	20,684	453
		6	0.012	27,579	1,017	22,982	847	20,684	763	19,535	585	17,237	437	16,087	352
		8	0.01	26,200	966	21,833	805	19,650	725	18,558	556	16,375	415	15,284	334
		10	0.007	23,442	773	19,535	644	17,582	580	16,605	465	14,651	337	13,674	273
	0.1	2	0.035	43,776	1,663	36,385	1,382	32,832	1,247	30,643	941	27,360	735	25,390	603
		4	0.024	35,459	1,307	29,549	1,090	26,594	980	25,116	752	22,162	561	20,684	453
		6	0.015	27,579	1,017	22,982	847	20,684	763	19,535	585	17,237	437	16,087	352
		8	0.013	26,200	966	21,833	805	19,650	725	18,558	556	16,375	415	15,284	334
		10	0.009	23,442	773	19,535	644	17,582	580	16,605	465	14,651	337	13,674	273
0.7	0.05	4	0.024	35,459	1,307	29,549	1,090	26,594	980	25,116	752	22,162	561	20,684	453
		6	0.015	27,579	1,017	22,982	847	20,684	763	19,535	585	17,237	437	16,087	352
	0.1	4	0.029	35,459	1,307	29,549	1,090	26,594	980	25,116	752	22,162	561	20,684	453
		6	0.018	27,579	1,017	22,982	847	20,684	763	19,535	585	17,237	437	16,087	352
0.8	0.02	4	0.016	45,600	1,681	38,000	1,401	34,200	1,261	32,300	1,072	28,500	841	26,600	687
		6	0.013	34,884	1,157	29,070	964	26,163	868	24,710	820	21,803	643	20,349	525
	0.05	4	0.026	45,600	1,681	38,000	1,401	34,200	1,261	32,300	1,072	28,500	841	26,600	687
		6	0.015	34,884	1,157	29,070	964	26,163	868	24,710	820	21,803	643	20,349	525
		8	0.012	27,907	861	23,256	717	20,930	646	19,768	610	17,442	479	16,279	390
		12	0.01	25,116	721	20,930	600	18,838	541	17,791	510	15,698	400	14,651	327
	0.1	4	0.032	45,600	1,681	38,000	1,401	34,200	1,261	32,300	1,072	28,500	841	26,600	687
		6	0.019	34,884	1,157	29,070	964	26,163	868	24,710	820	21,803	643	20,349	525
		8	0.015	27,907	861	23,256	717	20,930	646	19,768	610	17,442	479	16,279	390
		12	0.012	25,116	721	20,930	600	18,838	541	17,791	510	15,698	400	14,651	327
	0.2	4	0.056	45,600	1,681	38,000	1,401	34,200	1,261	32,300	1,072	28,500	841	26,600	687
		6	0.032	34,884	1,157	29,070	964	26,163	868	24,710	820	21,803	643	20,349	525
		8	0.018	27,907	861	23,256	717	20,930	646	19,768	610	17,442	479	16,279	390
		12	0.015	25,116	721	20,930	600	18,838	541	17,791	510	15,698	400	14,651	327
1	0.02	2	0.016	45,382	2,723	37,516	2,251	33,885	2,033	31,767	1,715	28,136	1,350	26,322	1,105
		4	0.013	41,040	2,459	34,200	2,049	30,780	1,844	29,070	1,568	25,650	1,229	23,940	1,004
		6	0.01	33,242	1,793	27,702	1,493	27,834	1,669	23,547	1,269	20,777	996	19,391	813
		8	0.008	29,549	1,593	24,624	1,327	24,932	1,344	20,930	1,129	18,468	885	17,237	723

UM-RN2 Recommended Cutting Parameters

Workpiece Materials				1		2		3		4		5		6	
				Copper		(180-250HB) Carbon Steels,Al-		(25-35HRC) Stainless		(35-45HRC) Pre-Hardened		(45-55HRC) Hardened Steels		(55-65HRC) Hardened Steels	
Ratio to standard Cutting depth(ap)				120%		100%		90%		80%		65%		60%	
Mill Dia. (mm)	(R) (mm)	Unde Neck Length (mm)	ap	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)
1	0.02	10	0.006	25,855	1,394	21,546	1,162	22,162	1,195	18,314	987	16,160	774	15,082	633
		12	0.005	22,982	1,101	19,152	918	19,391	1,045	16,279	683	14,364	602	13,406	482
	0.05	2	0.046	45,382	2,723	37,516	2,251	33,885	2,033	31,767	1,715	28,136	1,350	26,322	1,105
		3	0.035	45,382	2,723	37,516	2,251	33,885	2,033	31,767	1,715	28,136	1,350	26,322	1,105
		4	0.027	41,040	2,459	34,200	2,049	30,780	1,844	29,070	1,568	25,650	1,229	23,940	1,004
		5	0.021	37,818	2,269	30,255	1,815	27,834	1,669	26,322	1,421	23,296	1,118	21,783	915
		6	0.017	33,242	1,793	27,702	1,493	24,932	1,344	23,547	1,269	20,777	996	19,391	813
		8	0.016	29,549	1,593	24,624	1,327	22,162	1,195	20,930	1,129	18,468	885	17,237	723
		10	0.011	25,855	1,394	21,546	1,162	19,391	1,045	18,314	987	16,160	774	15,082	633
		12	0.01	22,982	1,101	19,152	918	17,237	827	16,279	683	14,364	602	13,406	482
		16	0.006	22,982	963	19,152	803	17,237	723	16,279	634	14,364	516	13,406	402
		20	0.004	17,237	723	14,364	602	12,928	542	12,209	475	10,773	388	10,055	301
	0.1	2	0.065	45,382	2,723	37,516	2,251	33,885	2,033	31,767	1,715	28,136	1,350	26,322	1,105
		3	0.05	45,382	2,723	37,516	2,251	33,885	2,033	31,767	1,715	28,136	1,350	26,322	1,105
		4	0.038	41,040	2,459	34,200	2,049	30,780	1,844	29,070	1,568	25,650	1,229	23,940	1,004
		5	0.03	37,818	2,269	30,255	1,815	27,834	1,669	26,322	1,421	23,296	1,118	21,783	915
		6	0.024	33,242	1,793	27,702	1,493	24,932	1,344	23,547	1,269	20,777	996	19,391	813
		8	0.024	29,549	1,593	24,624	1,327	22,162	1,195	20,930	1,129	18,468	885	17,237	723
		10	0.015	25,855	1,394	21,546	1,162	19,391	1,045	18,314	987	16,160	774	15,082	633
		12	0.015	22,982	1,101	19,152	918	17,237	827	16,279	683	14,364	602	13,406	482
		16	0.009	22,982	963	19,152	803	17,237	723	16,279	634	14,364	516	13,406	402
		20	0.006	17,237	723	14,364	602	12,928	542	12,209	475	10,773	388	10,055	301
	0.2	2	0.11	45,382	2,723	37,516	2,251	33,885	2,033	31,767	1,715	28,136	1,350	26,322	1,105
		3	0.09	45,382	2,723	37,516	2,251	33,885	2,033	31,767	1,715	28,136	1,350	26,322	1,105
		4	0.07	41,040	2,459	34,200	2,049	30,780	1,844	29,070	1,568	25,650	1,229	23,940	1,004
		5	0.05	37,818	2,269	30,255	1,815	27,834	1,669	26,322	1,421	23,296	1,118	21,783	915
		6	0.04	33,242	1,793	27,702	1,493	24,932	1,344	23,547	1,269	20,777	996	19,391	813
		8	0.04	29,549	1,593	24,624	1,327	22,162	1,195	20,930	1,129	18,468	885	17,237	723
		10	0.025	25,855	1,394	21,546	1,162	19,391	1,045	18,314	987	16,160	774	15,082	633
		12	0.025	22,982	1,101	19,152	918	17,237	827	16,279	683	14,364	602	13,406	482
		16	0.015	22,982	963	19,152	803	17,237	723	16,279	634	14,364	516	13,406	402
		20	0.01	17,237	723	14,364	602	12,928	542	12,209	475	10,773	388	10,055	301
	0.3	2	0.11	45,382	2,723	37,516	2,251	33,885	2,033	31,767	1,715	28,136	1,350	26,322	1,105
		3	0.09	45,382	2,723	37,516	2,251	33,885	2,033	31,767	1,715	28,136	1,350	26,322	1,105
		4	0.07	41,040	2,459	34,200	2,049	30,780	1,844	29,070	1,568	25,650	1,229	23,940	1,004
		5	0.05	37,818	2,269	30,255	1,815	27,834	1,669	26,322	1,421	23,296	1,118	21,783	915
		6	0.04	33,242	1,793	27,702	1,493	24,932	1,344	23,547	1,269	20,777	996	19,391	813
		8	0.04	29,549	1,593	24,624	1,327	22,162	1,195	20,930	1,129	18,468	885	17,237	723
		10	0.025	25,855	1,394	21,546	1,162	19,391	1,045	18,314	987	16,160	774	15,082	633
		12	0.025	22,982	1,101	19,152	918	17,237	827	16,279	683	14,364	602	13,406	482
		16	0.015	22,982	963	19,152	803	17,237	723	16,279	634	14,364	516	13,406	402

Workpiece Materials				1		2		3		4		5		6	
				Copper		(180-250HB) Carbon Steels,Al-		(25-35HRC) Stainless		(35-45HRC) Pre-Hardened		(45-55HRC) Hardened Steels		(55-65HRC) Hardened Steels	
Ratio to standard Cutting depth(ap)				120%		100%		90%		80%		65%		60%	
Mill Dia. (mm)	(R) (mm)	Unde Neck Length (mm)	ap	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)
1	0.3	20	0.01	17,237	723	14,364	602	12,928	542	12,209	475	10,773	388	10,055	301
1.25	0.1	5	0.03	37,818	2,269	30,255	1,815	27,834	1,669	26,322	1,421	23,296	1,113	21,783	915
		10	0.015	25,855	1,394	24,624	1,327	19,391	1,045	18,314	987	16,160	774	15,082	633
		15	0.01	22,982	963	19,152	803	17,237	723	16,279	634	14,364	516	13,406	402
		20	0.006	17,237	723	14,364	602	12,928	542	12,209	475	10,773	388	10,055	301
	0.2	5	0.05	37,818	2,269	30,255	1,815	27,834	1,669	26,322	1,421	23,296	1,118	21,783	915
		10	0.025	25,855	1,394	24,624	1,327	19,391	1,045	18,314	987	16,160	774	15,082	633
		15	0.016	22,982	963	19,152	803	17,237	723	16,279	634	14,364	516	13,406	402
		20	0.01	17,237	723	14,364	602	12,928	542	12,209	475	10,773	388	10,055	301
	0.3	5	0.05	37,818	2,269	30,255	1,815	27,834	1,669	26,322	1,421	23,296	1,118	21,783	915
		10	0.025	25,855	1,394	24,624	1,327	19,391	1,045	18,314	987	16,160	774	15,082	633
		15	0.016	22,982	963	19,152	803	17,237	723	16,279	634	14,364	516	13,406	402
		20	0.01	17,237	723	14,364	602	12,928	542	12,209	475	10,773	388	10,055	301
1.5	0.1	4	0.042	31,601	2,045	26,315	1,703	23,701	1,533	22,121	1,309	19,751	1,022	18,328	839
		6	0.04	30,255	1,954	25,212	1,628	22,590	1,459	21,380	1,265	18,959	981	17,547	803
		8	0.036	28,728	1,858	23,940	1,549	21,546	1,394	20,349	1,205	17,955	930	16,758	767
		12	0.036	22,982	1,487	19,152	1,239	17,237	1,115	16,279	963	14,364	744	13,406	614
		15	0.023	17,875	1,028	14,896	857	13,406	771	12,662	637	11,172	562	10,427	449
		20	0.018	17,875	929	14,896	774	13,406	696	12,662	582	11,172	513	10,427	407
	0.2	4	0.07	31,601	2,045	26,315	1,703	23,701	1,533	22,121	1,309	19,751	1,022	18,328	839
		6	0.065	30,255	1,954	25,212	1,628	22,590	1,459	21,380	1,265	18,959	981	17,547	803
		8	0.06	28,728	1,858	23,940	1,549	21,546	1,394	20,349	1,205	17,955	930	16,758	767
		12	0.06	22,982	1,487	19,152	1,239	17,237	1,115	16,279	963	14,364	744	13,406	614
		15	0.038	17,875	1,028	14,896	857	13,406	771	12,662	637	11,172	562	10,427	449
		20	0.03	17,875	929	14,896	774	13,406	696	12,662	582	11,172	513	10,427	407
	0.3	4	0.07	31,601	2,045	26,315	1,703	23,701	1,533	22,121	1,309	19,751	1,022	18,328	839
		6	0.065	30,255	1,954	25,212	1,628	22,590	1,459	21,380	1,265	18,959	981	17,547	803
		8	0.06	28,728	1,858	23,940	1,549	21,546	1,394	20,349	1,205	17,955	930	16,758	767
		12	0.06	22,982	1,487	19,152	1,239	17,237	1,115	16,279	963	14,364	744	13,406	614
		15	0.038	17,875	1,028	14,896	857	13,406	771	12,662	637	11,172	562	10,427	449
		20	0.03	17,875	929	14,896	774	13,406	696	12,662	582	11,172	513	10,427	407
	0.5	4	0.085	31,601	2,045	26,315	1,703	23,701	1,533	22,121	1,309	19,751	1,022	18,328	839
		6	0.08	30,255	1,954	25,212	1,628	22,590	1,459	21,380	1,265	18,959	981	17,547	803
		8	0.07	28,728	1,858	23,940	1,549	21,546	1,394	20,349	1,205	17,955	930	16,758	767
		12	0.065	22,982	1,487	19,152	1,239	17,237	1,115	16,279	963	14,364	744	13,406	614
		15	0.045	17,875	1,028	14,896	857	13,406	771	12,662	637	11,172	562	10,427	449
		20	0.035	17,875	929	14,896	774	13,406	696	12,662	582	11,172	513	10,427	407
	0.1	5	0.04	30,255	1,954	25,212	1,628	22,590	1,459	21,380	1,265	18,959	981	17,547	803
		10	0.036	22,982	1,487	19,152	1,239	17,237	1,115	16,279	963	14,364	744	13,406	614
		15	0.023	17,875	1,028	14,896	857	13,406	771	12,662	637	11,172	562	10,427	449
		20	0.018	17,875	929	14,896	774	13,406	696	12,662	582	11,172	513	10,427	407

UM-RN2 Recommended Cutting Parameters

Workpiece Materials				1		2		3		4		5		6	
				Copper		(180-250HB) Carbon Steels,Al-		(25-35HRC) Stainless		(35-45HRC) Pre-Hardened		(45-55HRC) Hardened Steels		(55-65HRC) Hardened Steels	
Ratio to standard Cutting depth(ap)				120%		100%		90%		80%		65%		60%	
Mill Dia. (mm)	(R) (mm)	Unde Neck Length (mm)	ap	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)
1.75	0.2	5	0.065	30,255	1,954	25,212	1,628	22,590	1,459	21,380	1,265	18,959	981	17,547	803
		10	0.06	22,982	1,487	19,152	1,239	17,237	1,115	16,279	963	14,364	744	13,406	614
		15	0.038	17,875	1,028	14,896	857	13,406	771	12,662	637	11,172	562	10,427	449
		20	0.03	17,875	929	14,896	774	13,406	696	12,662	582	11,172	513	10,427	407
	0.3	5	0.065	30,255	1,954	25,212	1,628	22,590	1,459	21,380	1,265	18,959	981	17,547	803
		10	0.06	22,982	1,487	19,152	1,239	17,237	1,115	16,279	963	14,364	744	13,406	614
		15	0.038	17,875	1,028	14,896	857	13,406	771	12,662	637	11,172	562	10,427	449
		20	0.03	17,875	929	14,896	774	13,406	696	12,662	582	11,172	513	10,427	407
2	0.1	4	0.08	27,229	3,060	22,993	2,584	20,724	2,329	19,514	2,193	17,244	1,549	16,186	1,272
		6	0.07	26,334	2,958	21,945	2,465	19,751	2,218	18,653	2,095	16,459	1,479	15,362	1,207
		8	0.055	23,940	2,689	19,950	2,241	17,955	2,017	16,958	1,905	14,963	1,344	13,965	1,098
		12	0.03	19,391	1,960	16,160	1,634	14,544	1,471	13,736	1,389	12,120	1,089	11,312	889
		16	0.03	17,237	1,742	14,364	1,452	12,928	1,307	12,209	1,234	10,773	968	10,055	790
		20	0.025	15,082	1,525	12,569	1,270	11,312	1,144	10,684	1,080	9,427	761	8,798	620
		25	0.015	15,082	1,525	12,569	1,270	11,312	1,144	10,684	1,080	9,427	761	8,798	620
		30	0.01	14,328	1,449	11,941	1,207	10,746	1,086	10,149	1,026	8,955	723	8,358	590
	0.2	4	0.1	27,229	3,060	22,993	2,584	20,724	2,329	19,514	2,193	17,244	1,549	16,186	1,272
		6	0.08	26,334	2,958	21,945	2,465	19,751	2,218	18,653	2,095	16,459	1,479	15,362	1,207
		8	0.07	23,940	2,689	19,950	2,241	17,955	2,017	16,958	1,905	14,963	1,344	13,965	1,098
		12	0.04	19,391	1,960	16,160	1,634	14,544	1,471	13,736	1,389	12,120	1,089	11,312	889
		16	0.04	17,237	1,742	14,364	1,452	12,928	1,307	12,209	1,234	10,773	968	10,055	790
		20	0.035	15,082	1,525	12,569	1,270	11,312	1,144	10,684	1,080	9,427	761	8,798	620
		25	0.025	15,082	1,525	12,569	1,270	11,312	1,144	10,684	1,080	9,427	761	8,798	620
		30	0.017	14,328	1,449	11,941	1,207	10,746	1,086	10,149	1,026	8,955	723	8,358	590
	0.3	4	0.13	27,229	3,060	22,993	2,584	20,724	2,329	19,514	2,193	17,244	1,549	16,186	1,272
		6	0.11	26,334	2,958	21,945	2,465	19,751	2,218	18,653	2,095	16,459	1,479	15,362	1,207
		8	0.09	23,940	2,689	19,950	2,241	17,955	2,017	16,958	1,905	14,963	1,344	13,965	1,098
		12	0.06	19,391	1,960	16,160	1,634	14,544	1,471	13,736	1,389	12,120	1,089	11,312	889
		16	0.06	17,237	1,742	14,364	1,452	12,928	1,307	12,209	1,234	10,773	968	10,055	790
		20	0.037	15,082	1,525	12,569	1,270	11,312	1,144	10,684	1,080	9,427	761	8,798	620
		25	0.03	15,082	1,525	12,569	1,270	11,312	1,144	10,684	1,080	9,427	761	8,798	620
		30	0.021	14,328	1,449	11,941	1,207	10,746	1,086	10,149	1,026	8,955	723	8,358	590
	0.5	6	0.17	26,334	2,958	21,945	2,465	19,751	2,218	18,653	2,095	16,459	1,479	15,362	1,207
		8	0.14	23,940	2,689	19,950	2,241	17,955	2,017	16,958	1,905	14,963	1,344	13,965	1,098
		12	0.08	19,391	1,960	16,160	1,634	14,544	1,471	13,736	1,389	12,120	1,089	11,312	889
		16	0.08	17,237	1,742	14,364	1,452	12,928	1,307	12,209	1,234	10,773	968	10,055	790
		20	0.05	15,082	1,525	12,569	1,270	11,312	1,144	10,684	1,080	9,427	761	8,798	620
		25	0.05	15,082	1,525	12,569	1,270	11,312	1,144	10,684	1,080	9,427	761	8,798	620
		30	0.03	14,328	1,449	11,941	1,207	10,746	1,086	10,149	1,026	8,955	723	8,358	590
	0.8	6	0.22	26,334	2,958	21,945	2,465	19,751	2,218	18,653	2,095	16,459	1,479	15,362	1,207
		8	0.2	23,940	2,689	19,950	2,241	17,955	2,017	16,958	1,905	14,963	1,344	13,965	1,098

Workpiece Materials				1		2		3		4		5		6	
				Copper		(180-250HB) Carbon Steels,Al-		(25-35HRC) Stainless		(35-45HRC) Pre-Hardened		(45-55HRC) Hardened Steels		(55-65HRC) Hardened Steels	
Ratio to standard Cutting depth(ap)				120%		100%		90%		80%		65%		60%	
Mill Dia. (mm)	(R) (mm)	Unde Neck Length (mm)	ap	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)
2	0.8	12	0.13	19,391	1,960	16,160	1,634	14,544	1,471	13,736	1,389	12,120	1,089	11,312	889
		16	0.1	17,237	1,742	14,364	1,452	12,928	1,307	12,209	1,234	10,773	968	10,055	790
		20	0.06	15,082	1,525	12,569	1,270	11,312	1,144	10,684	1,080	9,427	761	8,798	620
		25	0.057	15,082	1,525	12,569	1,270	11,312	1,144	10,684	1,080	9,427	761	8,798	620
		30	0.045	14,328	1,449	11,941	1,207	10,746	1,086	10,149	1,026	8,955	723	8,358	590
2.5	0.1	10	0.05	19,391	2,178	16,160	1,634	14,544	1,471	13,736	1,389	12,120	1,089	11,312	889
		20	0.03	15,082	1,694	12,569	1,270	11,312	1,144	10,684	1,080	9,427	761	8,798	620
		30	0.015	14,328	1,449	11,941	1,207	10,746	1,086	10,149	1,026	8,955	723	8,358	590
	0.2	10	0.07	19,391	2,178	16,160	1,634	14,544	1,471	13,736	1,389	12,120	1,089	11,312	889
		20	0.04	15,082	1,694	12,569	1,270	11,312	1,144	10,684	1,080	9,427	761	8,798	620
		30	0.025	14,328	1,449	11,941	1,207	10,746	1,086	10,149	1,026	8,955	723	8,358	590
		10	0.07	19,391	2,178	16,160	1,634	14,544	1,471	13,736	1,389	12,120	1,089	11,312	889
		20	0.04	15,082	1,694	12,569	1,270	11,312	1,144	10,684	1,080	9,427	761	8,798	620
		30	0.025	14,328	1,449	11,941	1,207	10,746	1,086	10,149	1,026	8,955	723	8,358	590
	0.3	10	0.09	19,391	2,178	16,160	1,634	14,544	1,471	13,736	1,389	12,120	1,089	11,312	889
		20	0.06	15,082	1,694	12,569	1,270	11,312	1,144	10,684	1,080	9,427	761	8,798	620
		30	0.03	14,328	1,449	11,941	1,207	10,746	1,086	10,149	1,026	8,955	723	8,358	590
	0.5	10	0.12	19,391	2,178	16,160	1,634	14,544	1,471	13,736	1,389	12,120	1,089	11,312	889
		20	0.08	15,082	1,694	12,569	1,270	11,312	1,144	10,684	1,080	9,427	761	8,798	620
		30	0.05	14,328	1,449	11,941	1,207	10,746	1,086	10,149	1,026	8,955	723	8,358	590
3	0.1	6	0.08	18,240	2,561	15,200	2,134	13,680	1,921	12,920	1,814	11,400	1,281	10,640	1,046
		8	0.07	18,240	2,561	15,200	2,134	13,680	1,921	12,920	1,814	11,400	1,281	10,640	1,046
		12	0.05	18,240	2,561	15,200	2,134	13,680	1,921	12,920	1,814	11,400	1,281	10,640	1,046
		16	0.035	18,240	2,561	15,200	2,134	13,680	1,921	12,920	1,814	11,400	1,281	10,640	1,046
		18	0.035	16,136	2,265	13,614	1,911	12,101	1,699	11,598	1,628	10,084	1,133	9,580	942
		20	0.035	14,774	2,075	12,312	1,729	11,081	1,556	10,465	1,470	9,234	1,037	8,618	847
		30	0.027	11,491	1,448	9,576	1,207	8,618	1,086	8,140	1,025	7,182	732	6,703	590
		35	0.02	11,491	1,448	9,576	1,207	8,618	1,086	8,140	1,025	7,182	732	6,703	590
	0.2	6	0.1	18,240	2,561	15,200	2,134	13,680	1,921	12,920	1,814	11,400	1,281	10,640	1,046
		8	0.09	18,240	2,561	15,200	2,134	13,680	1,921	12,920	1,814	11,400	1,281	10,640	1,046
		12	0.07	18,240	2,561	15,200	2,134	13,680	1,921	12,920	1,814	11,400	1,281	10,640	1,046
		16	0.05	18,240	2,561	15,200	2,134	13,680	1,921	12,920	1,814	11,400	1,281	10,640	1,046
		18	0.05	16,136	2,265	13,614	1,911	12,101	1,699	11,598	1,628	10,084	1,133	9,580	942
		20	0.05	14,774	2,075	12,312	1,729	11,081	1,556	10,465	1,470	9,234	1,037	8,618	847
		30	0.04	11,491	1,448	9,576	1,207	8,618	1,086	8,140	1,025	7,182	732	6,703	590
		35	0.035	11,491	1,448	9,576	1,207	8,618	1,086	8,140	1,025	7,182	732	6,703	590
	0.3	6	0.145	18,240	2,561	15,200	2,134	13,680	1,921	12,920	1,814	11,400	1,281	10,640	1,046
		8	0.13	18,240	2,561	15,200	2,134	13,680	1,921	12,920	1,814	11,400	1,281	10,640	1,046
		12	0.1	18,240	2,561	15,200	2,134	13,680	1,921	12,920	1,814	11,400	1,281	10,640	1,046
		16	0.075	18,240	2,561	15,200	2,134	13,680	1,921	12,920	1,814	11,400	1,281	10,640	1,046
		18	0.075	16,136	2,265	13,614	1,911	12,101	1,699	11,598	1,628	10,084	1,133	9,580	942

UM-RN2 Recommended Cutting Parameters

Workpiece Materials				1		2		3		4		5		6	
				Copper		(180-250HB) Carbon Steels,Al-		(25-35HRC) Stainless		(35-45HRC) Pre-Hardened		(45-55HRC) Hardened Steels		(55-65HRC) Hardened Steels	
Ratio to standard Cutting depth(ap)				120%		100%		90%		80%		65%		60%	
Mill Dia. (mm)	(R) (mm)	Unde Neck Length (mm)	ap	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)
3	0.3	20	0.075	14,774	2,075	12,312	1,729	11,081	1,556	10,465	1,470	9,234	1,037	8,618	847
		30	0.06	11,491	1,448	9,576	1,207	8,618	1,086	8,140	1,025	7,182	732	6,703	590
		35	0.05	11,491	1,448	9,576	1,207	8,618	1,086	8,140	1,025	7,182	732	6,703	590
	0.5	8	0.18	18,240	2,561	15,200	2,134	13,680	1,921	12,920	1,814	11,400	1,281	10,640	1,046
		12	0.13	18,240	2,561	15,200	2,134	13,680	1,921	12,920	1,814	11,400	1,281	10,640	1,046
		16	0.1	18,240	2,561	15,200	2,134	13,680	1,921	12,920	1,814	11,400	1,281	10,640	1,046
		18	0.1	16,136	2,265	13,614	1,911	12,101	1,699	12,920	1,814	10,084	1,133	9,580	942
		20	0.1	14,774	2,075	12,312	1,729	11,081	1,556	10,465	1,470	9,234	1,037	8,618	847
		30	0.08	11,491	1,448	9,576	1,207	8,618	1,086	8,140	1,025	7,182	732	6,703	590
		35	0.065	11,491	1,448	9,576	1,207	8,618	1,086	8,140	1,025	7,182	732	6,703	590
	1	8	0.2	18,240	2,561	15,200	2,134	13,680	1,921	12,920	1,814	11,400	1,281	10,640	1,046
		12	0.15	18,240	2,561	15,200	2,134	13,680	1,921	12,920	1,814	11,400	1,281	10,640	1,046
		16	0.12	18,240	2,561	15,200	2,134	13,680	1,921	12,920	1,814	11,400	1,281	10,640	1,046
		18	0.11	16,136	2,265	13,614	1,911	12,101	1,699	12,920	1,814	10,084	1,133	9,580	942
		20	0.11	14,774	2,075	12,312	1,729	11,081	1,556	10,465	1,470	9,234	1,037	8,618	847
		30	0.09	11,491	1,448	9,576	1,207	8,618	1,086	8,140	1,025	7,182	732	6,703	590
		35	0.075	11,491	1,448	9,576	1,207	8,618	1,086	8,140	1,025	7,182	732	6,703	590
4	0.1	8	0.08	15,732	2,736	13,110	2,280	11,799	2,052	11,144	1,938	9,833	1,368	9,177	1,117
		12	0.065	15,732	2,736	13,110	2,280	11,799	2,052	11,144	1,938	9,833	1,368	9,177	1,117
		16	0.06	13,046	2,269	10,873	1,891	9,567	1,663	9,132	1,587	7,828	1,089	7,393	900
		20	0.055	13,046	2,269	10,873	1,891	9,567	1,663	9,132	1,587	7,828	1,089	7,393	900
		30	0.045	10,436	1,633	8,696	1,361	7,827	1,226	7,392	1,157	6,523	817	6,088	667
		35	0.04	10,436	1,633	8,696	1,361	7,827	1,226	7,392	1,157	6,523	817	6,088	667
		45	0.03	8,350	1,045	6,958	871	6,262	784	5,915	741	5,219	526	4,871	424
	0.2	8	0.16	15,732	2,736	13,110	2,280	11,799	2,052	11,144	1,938	9,833	1,368	9,177	1,117
		12	0.14	15,732	2,736	13,110	2,280	11,799	2,052	11,144	1,938	9,833	1,368	9,177	1,117
		16	0.13	13,046	2,269	10,873	1,891	9,567	1,663	9,132	1,587	7,828	1,089	7,393	900
		20	0.11	13,046	2,269	10,873	1,891	9,567	1,663	9,132	1,587	7,828	1,089	7,393	900
		30	0.1	10,436	1,633	8,696	1,361	7,827	1,226	7,392	1,157	6,523	817	6,088	667
		35	0.08	10,436	1,633	8,696	1,361	7,827	1,226	7,392	1,157	6,523	817	6,088	667
		45	0.06	8,350	1,045	6,958	871	6,262	784	5,915	741	5,219	526	4,871	424
	0.3	8	0.24	15,732	2,736	13,110	2,280	11,799	2,052	11,144	1,938	9,833	1,368	9,177	1,117
		12	0.22	15,732	2,736	13,110	2,280	11,799	2,052	11,144	1,938	9,833	1,368	9,177	1,117
		16	0.2	13,046	2,269	10,873	1,891	9,567	1,663	9,132	1,587	7,828	1,089	7,393	900
		20	0.18	13,046	2,269	10,873	1,891	9,567	1,663	9,132	1,587	7,828	1,089	7,393	900
		30	0.16	10,436	1,633	8,696	1,361	7,827	1,226	7,392	1,157	6,523	817	6,088	667
		35	0.14	10,436	1,633	8,696	1,361	7,827	1,226	7,392	1,157	6,523	817	6,088	667
		45	0.12	8,350	1,045	6,958	871	6,262	784	5,915	741	5,219	526	4,871	424
	0.5	12	0.35	15,732	2,736	13,110	2,280	11,799	2,052	11,144	1,938	9,833	1,368	9,177	1,117
		16	0.25	13,046	2,269	10,873	1,891	9,567	1,663	9,132	1,587	7,828	1,089	7,393	900
		20	0.2	13,046	2,269	10,873	1,891	9,567	1,663	9,132	1,587	7,828	1,089	7,393	900

Workpiece Materials				1		2		3		4		5		6	
				Copper		(180-250HB) Carbon Steels,Al-		(25-35HRC) Stainless		(35-45HRC) Pre-Hardened		(45-55HRC) Hardened Steels		(55-65HRC) Hardened Steels	
Ratio to standard Cutting depth(ap)				120%		100%		90%		80%		65%		60%	
Mill Dia. (mm)	(R) (mm)	Unde Neck Length (mm)	ap	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)
4	0.5	30	0.15	10,436	1,633	8,696	1,361	7,827	1,226	7,392	1,157	6,523	817	6,088	667
		35	0.1	10,436	1,633	8,696	1,361	7,827	1,226	7,392	1,157	6,523	817	6,088	667
		45	0.05	8,350	1,045	6,958	871	6,262	784	5,915	741	5,219	526	4,871	424
	1	12	0.4	15,732	2,736	13,110	2,280	11,799	2,052	11,144	1,938	9,833	1,368	9,177	1,117
		16	0.29	13,046	2,269	10,873	1,891	9,567	1,663	9,132	1,587	7,828	1,089	7,393	900
		20	0.23	13,046	2,269	10,873	1,891	9,567	1,663	9,132	1,587	7,828	1,089	7,393	900
		30	0.17	10,436	1,633	8,696	1,361	7,827	1,226	7,392	1,157	6,523	817	6,088	667
		35	0.12	10,436	1,633	8,696	1,361	7,827	1,226	7,392	1,157	6,523	817	6,088	667
		45	0.06	8,350	1,045	6,958	871	6,262	784	5,915	741	5,219	526	4,871	424
5	0.1	20	0.08	12,520	2,722	10,434	2,269	9,390	2,042	8,869	1,928	7,825	1,361	7,304	1,112
		40	0.06	11,275	2,196	9,396	1,830	8,456	1,647	7,987	1,555	7,047	1,098	6,577	897
	0.2	20	0.16	12,520	2,722	10,434	2,269	9,390	2,042	8,869	1,928	7,825	1,361	7,304	1,112
		40	0.13	11,275	2,196	9,396	1,830	8,456	1,647	7,987	1,555	7,047	1,098	6,577	897
	0.3	20	0.24	12,520	2,722	10,434	2,269	9,390	2,042	8,869	1,928	7,825	1,361	7,304	1,112
		40	0.2	11,275	2,196	9,396	1,830	8,456	1,647	7,987	1,555	7,047	1,098	6,577	897
	0.5	20	0.35	12,520	2,722	10,434	2,269	9,390	2,042	8,869	1,928	7,825	1,361	7,304	1,112
		40	0.135	11,275	2,196	9,396	1,830	8,456	1,647	7,987	1,555	7,047	1,098	6,577	897
	1	20	0.4	12,520	2,722	10,434	2,269	9,390	2,042	8,869	1,928	7,825	1,361	7,304	1,112
		40	0.15	11,275	2,196	9,396	1,830	8,456	1,647	7,987	1,555	7,047	1,098	6,577	897
6	0.1	12	0.08	10,436	2,723	8,696	2,269	7,827	2,042	7,392	1,929	6,523	1,361	6,088	1,112
		18	0.065	10,436	2,723	8,696	2,269	7,827	2,042	7,392	1,929	6,523	1,361	6,088	1,112
		24	0.06	10,436	2,723	8,696	2,269	7,827	2,042	7,392	1,929	6,523	1,361	6,088	1,112
		35	0.05	9,387	2,204	7,822	1,836	7,040	1,653	6,649	1,561	5,867	1,102	5,476	900
		55	0.04	7,303	1,715	6,086	1,429	5,477	1,286	5,173	1,214	4,565	857	4,260	700
	0.2	12	0.16	10,436	2,723	8,696	2,269	7,827	2,042	7,392	1,929	6,523	1,361	6,088	1,112
		18	0.14	10,436	2,723	8,696	2,269	7,827	2,042	7,392	1,929	6,523	1,361	6,088	1,112
		24	0.13	10,436	2,723	8,696	2,269	7,827	2,042	7,392	1,929	6,523	1,361	6,088	1,112
		35	0.11	9,387	2,204	7,822	1,836	7,040	1,653	6,649	1,561	5,867	1,102	5,476	900
		55	0.08	7,303	1,715	6,086	1,429	5,477	1,286	5,173	1,214	4,565	857	4,260	700
	0.3	12	0.24	10,436	2,723	8,696	2,269	7,827	2,042	7,392	1,929	6,523	1,361	6,088	1,112
		18	0.22	10,436	2,723	8,696	2,269	7,827	2,042	7,392	1,929	6,523	1,361	6,088	1,112
		24	0.2	10,436	2,723	8,696	2,269	7,827	2,042	7,392	1,929	6,523	1,361	6,088	1,112
		35	0.18	9,387	2,204	7,822	1,836	7,040	1,653	6,649	1,561	5,867	1,102	5,476	900
		55	0.14	7,303	1,715	6,086	1,429	5,477	1,286	5,173	1,214	4,565	857	4,260	700
	0.5	18	0.35	10,436	2,723	8,696	2,269	7,827	2,042	7,392	1,929	6,523	1,361	6,088	1,112
		24	0.29	10,436	2,723	8,696	2,269	7,827	2,042	7,392	1,929	6,523	1,361	6,088	1,112
		35	0.24	9,387	2,204	7,822	1,836	7,040	1,653	6,649	1,561	5,867	1,102	5,476	900
		55	0.165	7,303	1,715	6,086	1,429	5,477	1,286	5,173	1,214	4,565	857	4,260	700
	1	18	0.4	10,436	2,723	8,696	2,269	7,827	2,042	7,392	1,929	6,523	1,361	6,088	1,112
		24	0.35	10,436	2,723	8,696	2,269	7,827	2,042	7,392	1,929	6,523	1,361	6,088	1,112
		35	0.28	9,387	2,204	7,822	1,836	7,040	1,653	6,649	1,561	5,867	1,102	5,476	900
		55	0.2	7,303	1,715	6,086	1,429	5,477	1,286	5,173	1,214	4,565	857	4,260	700

UM-RN2 Recommended Cutting Parameters

| NOTE |

1. For diferent materials, adjust the cutting depth (ap) according to the cutting depth factors in the above table.E.g. for hardened steels(45~55HRC),ap*0.5.
2. When performing cutting where cutting chips may cause clogging, such as for rib cutting, blind grooves, etc, cuting depth setting should be set by multiplying a cutting depth factor to calculate the cuting depth amount, and this amount should then be reduced to 80% ofthe calculated value.
3. Adjust by setting ae to (3 to 5)x(ap)x(cutting depth ratio). When performing finishing processing, calculate the theoretical cusp height and set accordingly.
4. Use the appropriate coolant such as air cooling or emulsion for the work material and machining shape.
5. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.
6. If the rpm of the machine is low, lower the feed rate also to put the rpm and feed rate in the same ratio.

UM-RN2 Recommended cutting parameters to high parameters machining

Workpiece Materials				1		2		3		4		5		6	
				Copper		(180-250HB) Carbon Steels,Al-		(25-35HRC) Stainless		(35-45HRC) Pre-Hardened		(45-55HRC) Hardened Steels		(55-65HRC) Hardened Steels	
Ratio to standard Cutting depth(ap)				120%		100%		90%		80%		65%		60%	
Mill Dia. (mm)	(R) (mm)	Unde Neck Length (mm)	ap	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)
0.2	0.02	0.5	0.016	50,000	292	50,000	245	50,000	219	50,000	195	50,000	171	50,000	152
		1	0.011	50,000	292	50,000	245	50,000	219	50,000	195	50,000	171	50,000	152
		2	0.007	50,000	234	39,900	192	35,910	172	34,865	167	34,865	154	34,865	140
	0.05	0.5	0.02	50,000	292	50,000	245	50,000	219	50,000	195	50,000	171	50,000	152
		1	0.014	50,000	292	50,000	245	50,000	219	50,000	195	50,000	171	50,000	152
		1.5	0.008	50,000	262	50,000	228	46,170	212	43,605	192	43,605	162	43,605	145
		2	0.008	50,000	234	39,900	192	35,910	172	34,865	167	34,865	154	34,865	140
0.3	0.02	1	0.016	50,000	661	50,000	556	50,000	490	50,000	433	50,000	319	50,000	304
		2	0.011	42,750	589	42,750	504	42,750	437	42,750	399	42,750	285	42,750	276
		3	0.007	38,000	479	33,250	391	33,250	340	33,250	310	28,500	190	28,500	184
	0.05	1	0.021	50,000	661	50,000	556	50,000	490	50,000	433	50,000	319	50,000	304
		1.5	0.016	50,000	661	50,000	556	42,750	490	42,750	433	42,750	319	42,750	304
		2	0.012	42,750	589	42,750	504	42,750	437	42,750	399	42,750	285	42,750	276
		2.5	0.01	38,000	523	38,000	447	38,000	389	38,000	354	38,000	254	38,000	245
		3	0.008	38,000	479	33,250	391	33,250	340	33,250	310	28,500	190	28,500	184
0.4	0.02	1	0.016	50,000	656	50,000	551	50,000	492	50,000	438	38,000	304	34,200	257
		2	0.013	42,750	589	42,750	494	42,750	447	42,750	390	34,200	276	32,300	228
		3	0.01	38,000	456	38,000	390	38,000	352	38,000	314	31,160	228	24,320	190
		4	0.007	28,500	352	28,500	304	28,500	266	28,500	238	20,520	152	18,240	143
	0.05	1	0.025	50,000	656	50,000	551	50,000	492	50,000	438	38,000	304	34,200	257
		1.5	0.02	50,000	656	50,000	551	50,000	492	50,000	438	38,000	304	34,200	257
		2	0.016	42,750	589	42,750	494	42,750	447	42,750	390	34,200	276	32,300	228
		2.5	0.015	38,475	532	38,475	456	38,475	380	38,475	352	31,730	257	29,070	209
		3	0.014	38,000	456	38,000	390	38,000	352	38,000	314	31,160	228	24,320	190
		3.5	0.012	34,200	399	34,200	361	34,200	304	34,200	285	27,930	190	21,774	171
		4	0.008	28,500	352	28,500	304	28,500	266	28,500	238	20,520	152	18,240	143
	1	1	0.033	50,000	656	50,000	551	50,000	492	50,000	438	38,000	304	34,200	257
		2	0.028	42,750	589	42,750	494	42,750	447	42,750	390	34,200	276	32,300	228
		3	0.016	38,000	456	38,000	390	38,000	352	38,000	314	31,160	228	24,320	190
		4	0.01	28,500	352	28,500	304	28,500	266	28,500	238	20,520	152	18,240	143
0.5	0.02	1	0.016	50,000	1,017	50,000	853	50,000	718	38,000	441	28,500	359	26,600	299
		2	0.013	50,000	1,017	50,000	853	50,000	718	38,000	441	28,500	359	26,600	299
		3	0.01	42,750	912	42,750	770	42,750	650	34,200	393	25,650	299	23,275	248
		4	0.008	38,000	808	38,000	684	38,000	573	30,400	359	22,800	265	19,000	222
		6	0.006	28,500	542	27,360	456	22,800	361	18,430	247	17,100	238	14,250	190
	0.05	1	0.03	50,000	1,017	50,000	853	50,000	718	38,000	441	28,500	359	26,600	299
		2	0.023	50,000	1,017	50,000	853	50,000	718	38,000	441	28,500	359	26,600	299
		3	0.017	42,750	912	42,750	770	42,750	650	34,200	393	25,650	299	23,275	248
		4	0.017	38,000	808	38,000	684	38,000	573	30,400	359	22,800	265	19,000	222
		5	0.011	28,500	608	27,360	513	22,800	361	18,430	266	17,100	238	14,250	190
		6	0.008	28,500	542	27,360	456	22,800	361	18,430	247	17,100	238	14,250	190

UM-RN2 Recommended cutting parameters to high parameters machining

Workpiece Materials				1		2		3		4		5		6	
				Copper		(180-250HB) Carbon Steels,Al-		(25-35HRC) Stainless		(35-45HRC) Pre-Hardened		(45-55HRC) Hardened Steels		(55-65HRC) Hardened Steels	
Ratio to standard Cutting depth(ap)				120%		100%		90%		80%		65%		60%	
Mill Dia. (mm)	(R) (mm)	Unde Neck Length (mm)	ap	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)
0.5	0.1	1	0.035	50,000	1,017	50,000	853	50,000	718	38,000	441	28,500	359	26,600	299
		2	0.03	50,000	1,017	50,000	853	50,000	718	38,000	441	28,500	359	26,600	299
		3	0.02	42,750	912	42,750	770	42,750	650	34,200	393	25,650	299	23,275	248
		4	0.02	38,000	808	38,000	684	38,000	573	30,400	359	22,800	265	19,000	222
		5	0.013	28,500	608	27,360	513	22,800	361	18,430	266	17,100	238	14,250	190
		6	0.013	28,500	542	27,360	456	22,800	361	18,430	247	17,100	238	14,250	190
0.6	0.02	2	0.016	50,000	1,311	50,000	1,101	44,460	874	35,939	570	26,790	371	21,850	304
		4	0.013	38,000	931	38,000	789	32,775	589	26,410	418	22,420	266	19,950	219
		6	0.01	28,500	551	22,800	466	19,000	342	17,100	285	16,910	228	14,250	200
	0.05	2	0.028	50,000	1,311	50,000	1,101	44,460	874	35,939	570	26,790	371	21,850	304
		4	0.019	38,000	931	38,000	789	32,775	589	26,410	418	22,420	266	19,950	219
		6	0.012	28,500	551	22,800	466	19,000	342	17,100	285	16,910	228	14,250	200
		8	0.01	28,500	523	22,800	443	19,000	325	17,100	271	16,910	217	14,250	190
		10	0.007	28,500	507	22,800	428	19,000	314	17,100	262	16,910	210	14,250	183
	0.1	2	0.035	50,000	1,311	50,000	1,101	44,460	874	35,939	570	26,790	371	21,850	304
		4	0.024	38,000	931	38,000	789	32,775	589	26,410	418	22,420	266	19,950	219
		6	0.015	28,500	551	22,800	466	19,000	342	17,100	285	16,910	228	14,250	200
		8	0.013	28,500	523	22,800	443	19,000	325	17,100	271	16,910	217	14,250	190
		10	0.009	28,500	507	22,800	428	19,000	314	17,100	262	16,910	210	14,250	183
0.7	0.05	4	0.024	38,000	931	38,000	789	32,775	589	26,410	418	22,420	266	19,950	219
		6	0.015	28,500	551	22,800	466	19,000	342	17,100	285	16,910	228	14,250	200
	0.1	4	0.029	38,000	931	38,000	789	32,775	589	26,410	418	22,420	266	19,950	219
		6	0.018	28,500	551	22,800	466	19,000	342	17,100	285	16,910	228	14,250	200
0.8	0.02	4	0.016	50,000	1,246	45,600	1,047	34,200	713	26,600	492	19,000	304	19,000	274
		6	0.013	38,000	903	36,765	760	24,700	504	23,750	438	17,100	274	17,100	243
	0.05	4	0.026	50,000	1,246	45,600	1,047	34,200	713	26,600	492	19,000	304	19,000	274
		6	0.015	38,000	903	36,765	760	24,700	504	23,750	438	17,100	274	17,100	243
		8	0.012	28,500	677	27,574	570	19,760	403	19,000	351	15,390	246	15,390	219
		12	0.01	28,500	643	27,574	542	19,760	383	19,000	333	15,390	234	15,390	208
	0.1	4	0.032	50,000	1,246	45,600	1,047	34,200	713	26,600	492	19,000	304	19,000	274
		6	0.019	38,000	903	36,765	760	24,700	504	23,750	438	17,100	274	17,100	243
		8	0.015	28,500	677	27,574	570	19,760	403	19,000	351	15,390	246	15,390	219
		12	0.012	28,500	643	27,574	542	19,760	383	19,000	333	15,390	234	15,390	208
	0.2	4	0.056	50,000	1,246	45,600	1,047	34,200	713	26,600	492	19,000	304	19,000	274
		6	0.032	38,000	903	36,765	760	24,700	504	23,750	438	17,100	274	17,100	243
		8	0.018	28,500	677	27,574	570	19,760	403	19,000	351	15,390	246	15,390	219
		12	0.015	28,500	643	27,574	542	19,760	383	19,000	333	15,390	234	15,390	208
1	0.02	2	0.016	40,541	1,783	33,885	1,491	30,472	1,340	28,779	1,151	25,394	914	23,701	758
		4	0.013	36,936	1,549	30,780	1,291	27,702	1,162	26,163	987	23,085	774	21,546	633
		6	0.01	29,918	1,130	24,932	941	22,439	846	21,192	800	18,699	627	17,452	512
		8	0.008	26,594	1,003	22,162	836	19,945	752	18,838	711	16,621	558	15,514	455

Workpiece Materials				1		2		3		4		5		6	
				Copper		(180-250HB) Carbon Steels,Al-		(25-35HRC) Stainless		(35-45HRC) Pre-Hardened		(45-55HRC) Hardened Steels		(55-65HRC) Hardened Steels	
Ratio to standard Cutting depth(ap)				120%		100%		90%		80%		65%		60%	
Mill Dia. (mm)	(R) (mm)	Unde Neck Length (mm)	ap	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)
1	0.02	10	0.006	20,684	878	19,391	732	17,452	658	16,483	622	14,544	488	13,574	398
		12	0.005	20,684	694	17,237	579	15,514	521	14,651	430	12,928	379	12,066	304
	0.05	2	0.046	40,541	1,783	33,885	1,491	30,472	1,340	28,741	1,150	25,394	914	23,701	758
		3	0.035	38,756	1,666	32,319	1,389	29,087	1,251	28,779	1,151	24,239	824	22,623	678
		4	0.027	36,936	1,549	30,780	1,291	27,702	1,162	27,471	1,072	23,085	774	21,546	633
		5	0.021	32,977	1,319	27,425	1,096	24,683	987	26,163	987	20,568	691	19,198	564
		6	0.017	29,918	1,130	24,932	941	22,439	846	23,311	882	18,699	627	17,452	512
		8	0.016	26,594	1,003	22,162	836	19,945	752	18,838	711	16,621	558	15,514	455
		10	0.011	23,269	878	19,391	732	17,452	658	16,483	622	14,544	488	13,574	398
		12	0.01	20,684	694	17,237	579	15,514	521	14,651	430	12,928	379	12,066	304
		16	0.006	20,684	607	17,237	506	15,514	455	14,651	399	12,928	325	12,066	253
		20	0.004	15,514	455	12,928	379	11,635	341	10,989	299	9,696	244	9,050	190
	0.1	2	0.065	40,541	1,783	33,885	1,491	30,472	1,340	28,779	1,151	25,394	914	23,701	758
		3	0.05	38,756	1,666	32,319	1,389	29,087	1,251	27,471	1,072	24,239	824	22,623	678
		4	0.038	36,936	1,549	30,780	1,291	27,702	1,162	26,163	987	23,085	774	21,546	633
		5	0.03	32,977	1,319	27,425	1,096	24,683	987	23,311	882	20,568	691	19,198	564
		6	0.024	29,918	1,130	24,932	941	22,439	846	21,192	800	18,699	627	17,452	512
		8	0.024	26,594	1,003	22,162	836	19,945	752	18,838	711	16,621	558	15,514	455
		10	0.015	23,269	878	19,391	732	17,452	658	16,483	622	14,544	488	13,574	398
		12	0.015	20,684	694	17,237	579	15,514	521	14,651	430	12,928	379	12,066	304
		16	0.009	20,684	607	17,237	506	15,514	455	14,651	399	12,928	325	12,066	253
		20	0.006	15,514	455	12,928	379	11,635	341	10,989	299	9,696	244	9,050	190
	0.2	2	0.11	40,541	1,783	33,885	1,491	30,472	1,340	28,779	1,151	25,394	914	23,701	758
		3	0.09	38,756	1,666	32,319	1,389	29,087	1,251	27,471	1,072	24,239	824	22,623	678
		4	0.07	36,936	1,549	30,780	1,291	27,702	1,162	26,163	987	23,085	774	21,546	633
		5	0.05	32,977	1,319	27,425	1,096	24,683	987	23,311	882	20,568	691	19,198	564
		6	0.04	29,918	1,130	24,932	941	22,439	846	21,192	800	18,699	627	17,452	512
		8	0.04	26,594	1,003	22,162	836	19,945	752	18,838	711	16,621	558	15,514	455
		10	0.025	23,269	878	19,391	732	17,452	658	16,483	622	14,544	488	13,574	398
		12	0.025	20,684	694	17,237	579	15,514	521	14,651	430	12,928	379	12,066	304
		16	0.015	20,684	607	17,237	506	15,514	455	14,651	399	12,928	325	12,066	253
		20	0.01	15,514	455	12,928	379	11,635	341	10,989	299	9,696	244	9,050	190
	0.3	2	0.11	40,541	1,783	33,885	1,491	30,472	1,340	28,779	1,151	25,394	914	23,701	758
		3	0.09	38,756	1,666	32,319	1,389	29,087	1,251	27,471	1,072	24,239	824	22,623	678
		4	0.07	36,936	1,549	30,780	1,291	27,702	1,162	26,163	987	23,085	774	21,546	633
		5	0.05	32,977	1,319	27,425	1,096	24,683	987	23,311	882	20,568	691	19,198	564
		6	0.04	29,918	1,130	24,932	941	22,439	846	21,192	800	18,699	627	17,452	512
		8	0.04	26,594	1,003	22,162	836	19,945	752	18,838	711	16,621	558	15,514	455
		10	0.025	23,269	878	19,391	732	17,452	658	16,483	622	14,544	488	13,574	398
		12	0.025	20,684	694	17,237	579	15,514	521	14,651	430	12,928	379	12,066	304
		16	0.015	20,684	607	17,237	506	15,514	455	14,651	399	12,928	325	12,066	253

UM-RN2 Recommended cutting parameters to high parameters machining

Workpiece Materials				1		2		3		4		5		6	
				Copper		(180-250HB) Carbon Steels,Al-		(25-35HRC) Stainless		(35-45HRC) Pre-Hardened		(45-55HRC) Hardened Steels		(55-65HRC) Hardened Steels	
Ratio to standard Cutting depth(ap)				120%		100%		90%		80%		65%		60%	
Mill Dia. (mm)	(R) (mm)	Unde Neck Length (mm)	ap	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)
1	0.3	20	0.01	15,514	455	12,928	379	11,635	341	10,989	299	9,696	244	9,050	190
1.25	0.1	5	0.03	32,977	1,319	27,425	1,096	24,683	987	23,311	882	20,568	691	19,198	564
		10	0.015	23,269	878	19,391	732	17,452	658	16,483	622	14,544	488	13,574	398
		15	0.01	20,684	607	17,237	506	15,514	521	14,651	430	12,928	325	12,066	253
		20	0.006	15,514	455	12,928	379	11,635	341	10,989	299	9,696	244	9,050	190
	0.2	5	0.05	32,977	1,319	27,425	1,096	24,683	987	23,311	882	20,568	691	19,198	564
		10	0.025	23,269	878	19,391	732	17,452	658	16,483	622	14,544	488	13,574	398
		15	0.016	20,684	607	17,237	506	15,514	521	14,651	430	12,928	325	12,066	253
		20	0.01	15,514	455	12,928	379	11,635	341	10,989	299	9,696	244	9,050	190
	0.3	5	0.05	32,977	1,319	27,425	1,096	24,683	987	23,311	882	20,568	691	19,198	564
		10	0.025	23,269	878	19,391	732	17,452	658	16,483	622	14,544	488	13,574	398
		15	0.016	20,684	607	17,237	506	15,514	521	14,651	430	12,928	325	12,066	253
		20	0.01	15,514	455	12,928	379	11,635	341	10,989	299	9,696	244	9,050	190
1.5	0.1	4	0.042	28,441	1,288	23,684	1,074	21,330	966	19,908	900	17,775	714	16,496	580
		6	0.04	27,028	1,221	22,590	1,020	20,371	921	19,363	875	16,942	680	15,732	553
		8	0.036	25,855	1,171	21,546	976	19,391	878	18,314	829	16,160	651	15,082	531
		12	0.036	20,684	937	17,237	781	15,514	703	14,651	663	12,928	521	12,066	425
		15	0.023	16,087	648	13,406	540	12,066	485	11,395	402	10,055	354	9,384	283
		20	0.018	16,087	648	13,406	540	12,066	485	11,395	402	10,055	354	9,384	283
	0.2	4	0.042	28,441	1,288	23,684	1,074	21,330	966	19,908	825	17,775	644	16,496	528
		6	0.04	27,028	1,221	22,590	1,020	20,371	921	19,363	875	16,942	680	15,732	553
		8	0.036	25,855	1,171	21,546	976	19,391	878	18,314	829	16,160	651	15,082	531
		12	0.036	20,684	937	17,237	781	15,514	703	14,651	663	12,928	521	12,066	425
		15	0.023	16,087	648	13,406	540	12,066	485	11,395	402	10,055	354	9,384	283
		20	0.018	16,087	648	13,406	540	12,066	485	11,395	402	10,055	354	9,384	283
	0.3	4	0.07	28,441	1,288	23,684	1,074	21,330	966	19,908	825	17,775	644	16,496	528
		6	0.065	27,028	1,221	22,590	1,020	20,371	921	19,363	875	16,942	680	15,732	553
		8	0.06	25,855	1,171	21,546	976	19,391	878	18,314	829	16,160	651	15,082	531
		12	0.06	20,684	937	17,237	781	15,514	703	14,651	663	12,928	521	12,066	425
		15	0.038	16,087	648	13,406	540	12,066	485	11,395	402	10,055	354	9,384	283
		20	0.03	16,087	648	13,406	540	12,066	485	11,395	402	10,055	354	9,384	283
	0.5	4	0.07	28,441	1,288	23,684	1,074	21,330	966	19,908	825	17,775	644	16,496	528
		6	0.065	27,028	1,221	22,590	1,020	20,371	921	19,363	875	16,942	680	15,732	553
		8	0.07	25,855	1,171	21,546	976	19,391	878	18,314	829	16,160	651	15,082	531
		12	0.065	20,684	937	17,237	781	15,514	703	14,651	663	12,928	521	12,066	425
		15	0.045	16,087	648	13,406	540	12,066	485	11,395	402	10,055	354	9,384	283
		20	0.035	16,087	648	13,406	540	12,066	485	11,395	402	10,055	354	9,384	283
1.75	0.1	5	0.04	28,441	1,288	23,684	1,074	21,330	966	19,908	825	17,775	644	16,496	528
		10	0.036	25,855	1,171	21,546	976	19,391	878	18,314	829	16,160	651	15,082	531
		15	0.023	16,087	648	13,406	540	12,066	485	11,395	402	10,055	354	9,384	283
		20	0.018	16,087	648	13,406	540	12,066	485	11,395	402	10,055	354	9,384	283

Workpiece Materials				1		2		3		4		5		6	
				Copper		(180-250HB) Carbon Steels,Al-		(25-35HRC) Stainless		(35-45HRC) Pre-Hardened		(45-55HRC) Hardened Steels		(55-65HRC) Hardened Steels	
Ratio to standard Cutting depth(ap)				120%		100%		90%		80%		65%		60%	
Mill Dia. (mm)	(R) (mm)	Unde Neck Length (mm)	ap	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)
1.75	0.2	5	0.065	28,441	1,288	23,684	1,074	21,330	966	19,908	825	17,775	644	16,496	528
		10	0.06	25,855	1,171	21,546	976	19,391	878	18,314	829	16,160	651	15,082	531
		15	0.038	16,087	648	13,406	540	12,066	485	11,395	402	10,055	354	9,384	283
		20	0.03	16,087	648	13,406	540	12,066	485	11,395	402	10,055	354	9,384	283
	0.3	5	0.065	28,441	1,288	23,684	1,074	21,330	966	19,908	825	17,775	644	16,496	528
		10	0.06	25,855	1,171	21,546	976	19,391	878	18,314	829	16,160	651	15,082	531
		15	0.038	16,087	648	13,406	540	12,066	485	11,395	402	10,055	354	9,384	283
		20	0.03	16,087	648	13,406	540	12,066	485	11,395	402	10,055	354	9,384	283
2	0.1	4	0.08	24,808	1,949	20,875	1,641	18,758	1,473	17,547	1,378	15,581	981	14,522	798
		6	0.07	23,701	1,864	19,751	1,553	17,775	1,397	16,788	1,320	14,813	932	13,825	761
		8	0.055	21,546	1,694	17,955	1,412	16,160	1,270	15,262	1,200	13,466	847	12,569	692
		12	0.03	17,452	1,235	14,544	1,029	13,089	926	12,362	875	10,908	686	10,180	561
		16	0.03	15,514	1,098	12,928	915	11,635	824	10,989	777	9,696	610	9,050	498
		20	0.025	13,574	960	11,312	801	10,180	720	9,615	680	8,484	534	7,918	436
		25	0.015	13,574	863	11,312	719	10,180	647	9,615	611	8,484	480	7,918	390
		30	0.01	12,895	820	10,746	683	9,671	615	9,134	580	8,060	456	7,522	371
	0.2	4	0.1	24,808	1,949	20,875	1,641	18,758	1,473	17,547	1,378	15,581	981	14,522	798
		6	0.08	23,701	1,864	19,751	1,553	17,775	1,397	16,788	1,320	14,813	932	13,825	761
		8	0.07	21,546	1,694	17,955	1,412	16,160	1,270	15,262	1,200	13,466	847	12,569	692
		12	0.04	17,452	1,235	14,544	1,029	13,089	926	12,362	875	10,908	686	10,180	561
		16	0.04	15,514	1,098	12,928	915	11,635	824	10,989	777	9,696	610	9,050	498
		20	0.035	13,574	960	11,312	801	10,180	720	9,615	680	8,484	534	7,918	436
		25	0.025	13,574	863	11,312	719	10,180	647	9,615	611	8,484	480	7,918	390
		30	0.017	12,895	820	10,746	683	9,671	615	9,134	580	8,060	456	7,522	371
	0.3	4	0.13	24,808	1,949	20,875	1,641	18,758	1,473	17,547	1,378	15,581	981	14,522	798
		6	0.11	23,701	1,864	19,751	1,553	17,775	1,397	16,788	1,320	14,813	932	13,825	761
		8	0.09	21,546	1,694	17,955	1,412	16,160	1,270	15,262	1,200	13,466	847	12,569	692
		12	0.06	17,452	1,372	14,544	1,029	13,089	926	12,362	875	10,908	686	10,180	561
		16	0.06	15,514	1,220	12,928	915	11,635	824	10,989	777	9,696	610	9,050	498
		20	0.037	13,574	1,067	11,312	801	10,180	720	9,615	680	8,484	534	7,918	436
		25	0.03	13,574	863	11,312	719	10,180	647	9,615	611	8,484	480	7,918	390
		30	0.021	12,895	820	10,746	683	9,671	615	9,134	580	8,060	456	7,522	371
	0.5	6	0.17	23,701	1,864	19,751	1,553	17,775	1,397	16,788	1,320	14,813	932	13,825	761
		8	0.14	21,546	1,694	17,955	1,412	16,160	1,270	15,262	1,200	13,466	847	12,569	692
		12	0.08	17,452	1,372	14,544	1,029	13,089	926	12,362	972	10,908	686	10,180	561
		16	0.08	15,514	1,220	12,928	915	11,635	824	10,989	777	9,696	610	9,050	498
		20	0.05	13,574	1,067	11,312	801	10,180	720	9,615	680	8,484	534	7,918	436
		25	0.05	13,574	863	11,312	719	10,180	647	9,615	611	8,484	480	7,918	390
		30	0.03	12,895	820	10,746	683	9,671	615	9,134	580	8,060	456	7,522	371
	0.8	6	0.22	23,701	1,864	19,751	1,553	17,775	1,397	16,788	1,320	14,813	932	13,825	761
		8	0.2	21,546	1,694	17,955	1,412	16,160	1,270	15,262	1,200	13,466	847	12,569	692

UM-RN2 Recommended cutting parameters to high parameters machining

Workpiece Materials				1		2		3		4		5		6	
				Copper		(180-250HB) Carbon Steels,Al-		(25-35HRC) Stainless		(35-45HRC) Pre-Hardened		(45-55HRC) Hardened Steels		(55-65HRC) Hardened Steels	
Ratio to standard Cutting depth(ap)				120%		100%		90%		80%		65%		60%	
Mill Dia. (mm)	(R) (mm)	Unde Neck Length (mm)	ap	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)
2	0.8	12	0.13	17,452	1,372	14,544	1,029	13,089	926	12,362	875	10,908	686	10,180	561
		16	0.1	15,514	1,220	12,928	915	11,635	824	10,989	777	9,696	610	9,050	498
		20	0.06	13,574	1,067	11,312	801	10,180	720	9,615	680	8,484	534	7,918	436
		25	0.057	13,574	863	11,312	719	10,180	647	9,615	611	8,484	480	7,918	390
		30	0.045	12,895	820	10,746	683	9,671	615	9,134	580	8,060	456	7,522	371
2.5	0.1	10	0.055	21,546	1,694	17,955	1,412	16,160	1,270	15,262	1,200	13,466	847	12,569	692
		20	0.03	15,514	1,220	12,928	915	11,635	824	10,989	777	9,696	610	9,050	498
		30	0.015	13,574	958	11,312	719	10,180	647	9,615	611	8,484	480	7,918	390
	0.2	10	0.07	21,546	1,694	17,955	1,412	16,160	1,270	15,262	1,200	13,466	847	12,569	692
		20	0.04	15,514	1,220	12,928	915	11,635	824	10,989	777	9,696	610	9,050	498
		30	0.025	13,574	958	11,312	719	10,180	647	9,615	611	8,484	480	7,918	390
	0.3	10	0.09	21,546	1,694	17,955	1,412	16,160	1,270	15,262	1,200	13,466	847	12,569	692
		20	0.06	15,514	1,220	12,928	915	11,635	824	10,989	777	9,696	610	9,050	498
		30	0.03	13,574	958	11,312	719	10,180	647	9,615	611	8,484	480	7,918	390
	0.5	10	0.14	21,546	1,694	17,955	1,412	16,160	1,270	15,262	1,200	13,466	847	12,569	692
		20	0.08	15,514	1,220	12,928	915	11,635	824	10,989	777	9,696	610	9,050	498
		30	0.05	13,574	958	11,312	719	10,180	647	9,615	611	8,484	480	7,918	390
3	0.1	6	0.08	16,416	1,613	13,680	1,344	12,312	1,210	11,628	1,143	10,260	807	9,576	658
		8	0.07	16,416	1,613	13,680	1,344	12,312	1,210	11,628	1,143	10,260	807	9,576	658
		12	0.05	16,416	1,613	13,680	1,344	12,312	1,210	11,628	1,143	10,260	807	9,576	658
		16	0.035	16,416	1,613	13,680	1,344	12,312	1,210	11,628	1,143	10,260	807	9,576	658
		18	0.035	14,723	1,445	12,303	1,207	11,093	1,092	10,387	1,019	9,278	729	8,572	589
		20	0.035	13,297	1,307	11,081	1,089	9,973	980	9,418	925	8,311	653	7,757	533
		30	0.027	10,342	914	8,618	761	7,757	685	7,325	647	6,464	456	6,033	373
		35	0.02	10,342	914	8,618	761	7,757	685	7,325	647	6,464	456	6,033	373
	0.2	6	0.1	16,416	1,613	13,680	1,344	12,312	1,210	11,628	1,143	10,260	807	9,576	658
		8	0.09	16,416	1,613	13,680	1,344	12,312	1,210	11,628	1,143	10,260	807	9,576	658
		12	0.07	16,416	1,613	13,680	1,344	12,312	1,210	11,628	1,143	10,260	807	9,576	658
		16	0.05	16,416	1,613	13,680	1,344	12,312	1,210	11,628	1,143	10,260	807	9,576	658
		18	0.05	14,723	1,445	12,303	1,207	11,093	1,092	10,387	1,019	9,278	729	8,572	589
		20	0.05	13,297	1,307	11,081	1,089	9,973	980	9,418	925	8,311	653	7,757	533
		30	0.04	10,342	914	8,618	761	7,757	685	7,325	647	6,464	456	6,033	373
		35	0.035	10,342	914	8,618	761	7,757	685	7,325	647	6,464	456	6,033	373
	0.3	6	0.145	16,416	1,613	13,680	1,344	12,312	1,210	11,628	1,143	10,260	807	9,576	658
		8	0.13	16,416	1,613	13,680	1,344	12,312	1,210	11,628	1,143	10,260	807	9,576	658
		12	0.1	16,416	1,613	13,680	1,344	12,312	1,210	11,628	1,143	10,260	807	9,576	658
		16	0.075	16,416	1,613	13,680	1,344	12,312	1,210	11,628	1,143	10,260	807	9,576	658
		18	0.075	14,723	1,445	12,303	1,207	11,093	1,092	10,387	1,019	9,278	729	8,572	589
		20	0.075	13,297	1,307	11,081	1,089	9,973	980	9,418	925	8,311	653	7,757	533
		30	0.06	10,342	914	8,618	761	7,757	685	7,325	647	6,464	456	6,033	373
		35	0.05	10,342	914	8,618	761	7,757	685	7,325	647	6,464	456	6,033	373

Workpiece Materials				1		2		3		4		5		6	
				Copper		(180-250HB) Carbon Steels,Al-		(25-35HRC) Stainless		(35-45HRC) Pre-Hardened		(45-55HRC) Hardened Steels		(55-65HRC) Hardened Steels	
Ratio to standard Cutting depth(ap)				120%		100%		90%		80%		65%		60%	
Mill Dia. (mm)	(R) (mm)	Unde Neck Length (mm)	ap	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)
3	0.5	8	0.18	16,416	1,613	13,680	1,344	12,312	1,210	11,628	1,143	10,260	807	9,576	658
		12	0.13	16,416	1,613	13,680	1,344	12,312	1,210	11,628	1,143	10,260	807	9,576	658
		16	0.1	16,416	1,613	13,680	1,344	12,312	1,210	11,628	1,143	10,260	807	9,576	658
		18	0.1	14,723	1,445	12,303	1,207	11,093	1,092	10,387	1,019	9,278	729	8,572	589
		20	0.1	13,297	1,307	11,081	1,089	9,973	980	9,418	925	8,311	653	7,757	533
		30	0.08	10,342	914	8,618	761	7,757	685	7,325	647	6,464	456	6,033	373
		35	0.065	10,342	914	8,618	761	7,757	685	7,325	647	6,464	456	6,033	373
	1	8	0.2	16,416	1,613	13,680	1,344	12,312	1,210	11,628	1,143	10,260	807	9,576	658
		12	0.15	16,416	1,613	13,680	1,344	12,312	1,210	11,628	1,143	10,260	807	9,576	658
		16	0.12	16,416	1,613	13,680	1,344	12,312	1,210	11,628	1,143	10,260	807	9,576	658
		18	0.11	14,723	1,445	12,303	1,207	11,093	1,092	10,387	1,019	9,278	729	8,572	589
		20	0.11	13,297	1,307	11,081	1,089	9,973	980	9,418	925	8,311	653	7,757	533
		30	0.09	10,342	914	8,618	761	7,757	685	7,325	647	6,464	456	6,033	373
		35	0.075	10,342	914	8,618	761	7,757	685	7,325	647	6,464	456	6,033	373
4	0.1	8	0.08	12,782	2,223	10,652	1,853	9,586	1,667	9,054	1,575	7,990	1,112	7,457	908
		12	0.065	12,782	2,223	10,652	1,853	9,586	1,667	9,054	1,575	7,990	1,112	7,457	908
		16	0.06	11,742	2,042	9,742	1,694	8,697	1,512	8,262	1,436	7,219	1,004	6,350	773
		20	0.055	11,742	2,042	9,742	1,694	8,697	1,512	8,262	1,436	7,219	1,004	6,350	773
		30	0.045	11,742	2,042	9,742	1,694	8,697	1,512	6,524	1,021	5,216	654	4,868	533
		35	0.04	11,742	2,042	9,742	1,694	8,697	1,512	6,524	1,021	5,216	654	4,868	533
		45	0.03	9,394	1,225	7,828	1,021	6,958	907	5,305	692	4,697	490	3,913	340
	0.2	8	0.16	12,782	2,223	10,652	1,853	9,586	1,667	9,054	1,575	7,990	1,112	7,457	908
		12	0.14	12,782	2,223	10,652	1,853	9,586	1,667	9,054	1,575	7,990	1,112	7,457	908
		16	0.13	11,742	2,042	9,742	1,694	8,697	1,512	8,262	1,436	7,219	1,004	6,350	773
		20	0.11	11,742	2,042	9,742	1,694	8,697	1,512	8,262	1,436	7,219	1,004	6,350	773
		30	0.1	11,742	2,042	9,742	1,694	8,697	1,512	6,524	1,021	5,216	654	4,868	533
		35	0.08	11,742	2,042	9,742	1,694	8,697	1,512	6,524	1,021	5,216	654	4,868	533
		45	0.06	9,394	1,225	7,828	1,021	6,958	907	5,305	692	4,697	490	3,913	340
	0.3	8	0.24	12,782	2,223	10,652	1,853	9,586	1,667	9,054	1,575	7,990	1,112	7,457	908
		12	0.22	12,782	2,223	10,652	1,853	9,586	1,667	9,054	1,575	7,990	1,112	7,457	908
		16	0.2	11,742	2,042	9,742	1,694	8,697	1,512	8,262	1,436	7,219	1,004	6,350	773
		20	0.18	11,742	2,042	9,742	1,694	8,697	1,512	8,262	1,436	7,219	1,004	6,350	773
		30	0.16	11,742	2,042	9,742	1,694	8,697	1,512	6,524	1,021	5,216	654	4,868	533
		35	0.14	11,742	2,042	9,742	1,694	8,697	1,512	6,524	1,021	5,216	654	4,868	533
		45	0.12	9,394	1,225	7,828	1,021	6,958	907	5,305	692	4,697	490	3,913	340
	0.5	12	0.35	12,782	2,223	10,652	1,853	9,586	1,667	9,054	1,575	7,990	1,112	7,457	908
		16	0.25	11,742	2,042	9,742	1,694	8,697	1,512	8,262	1,436	7,219	1,004	6,350	773
		20	0.2	11,742	2,042	9,742	1,694	8,697	1,512	8,262	1,436	7,219	1,004	6,350	773
		30	0.15	11,742	2,042	9,742	1,694	8,697	1,512	6,524	1,021	5,216	654	4,868	533
		35	0.1	11,742	2,042	9,742	1,694	8,697	1,512	6,524	1,021	5,216	654	4,868	533
		45	0.05	9,394	1,225	7,828	1,021	6,958	907	5,305	692	4,697	490	3,913	340

UM-RN2 Recommended cutting parameters to high parameters machining

Workpiece Materials				1		2		3		4		5		6	
				Copper		(180-250HB) Carbon Steels,Al-		(25-35HRC) Stainless		(35-45HRC) Pre-Hardened		(45-55HRC) Hardened Steels		(55-65HRC) Hardened Steels	
Ratio to standard Cutting depth(ap)				120%		100%		90%		80%		65%		60%	
Mill Dia. (mm)	(R) (mm)	Unde Neck Length (mm)	ap	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)
4	1	12	0.4	12,782	2,223	10,652	1,853	9,586	1,667	9,054	1,575	7,990	1,112	7,457	908
		16	0.29	11,742	2,042	9,742	1,694	8,697	1,512	8,262	1,436	7,219	1,004	6,350	773
		20	0.23	11,742	2,042	9,742	1,694	8,697	1,512	8,262	1,436	7,219	1,004	6,350	773
		30	0.17	11,742	2,042	9,742	1,694	8,697	1,512	6,524	1,021	5,216	654	4,868	533
		35	0.12	11,742	2,042	9,742	1,694	8,697	1,512	6,524	1,021	5,216	654	4,868	533
		45	0.06	9,394	1,225	7,828	1,021	6,958	907	5,305	692	4,697	490	3,913	340
5	0.1	20	0.08	10,436	2,269	8,696	1,891	7,827	1,701	7,392	1,607	6,523	1,134	6,088	926
		40	0.06	7,512	1,463	6,261	1,220	5,634	1,097	5,322	1,036	4,696	732	4,382	598
	0.2	20	0.16	10,436	2,269	8,696	1,891	7,827	1,701	7,392	1,607	6,523	1,134	6,088	926
		40	0.13	7,512	1,463	6,261	1,220	5,634	1,097	5,322	1,036	4,696	732	4,382	598
	0.3	20	0.24	10,436	2,269	8,696	1,891	7,827	1,701	7,392	1,607	6,523	1,134	6,088	926
		40	0.2	7,512	1,463	6,261	1,220	5,634	1,097	5,322	1,036	4,696	732	4,382	598
	0.5	20	0.35	10,436	2,269	8,696	1,891	7,827	1,701	7,392	1,607	6,523	1,134	6,088	926
		40	0.135	7,512	1,463	6,261	1,220	5,634	1,097	5,322	1,036	4,696	732	4,382	598
	1	20	0.4	10,436	2,269	8,696	1,891	7,827	1,701	7,392	1,607	6,523	1,134	6,088	926
		40	0.15	7,512	1,463	6,261	1,220	5,634	1,097	5,322	1,036	4,696	732	4,382	598
6	0.1	12	0.08	8,698	2,270	7,249	1,891	6,525	1,701	6,162	1,607	5,436	1,134	5,075	926
		18	0.065	8,698	2,270	7,249	1,891	6,525	1,701	6,162	1,607	5,436	1,134	5,075	926
		24	0.06	8,698	2,270	7,249	1,891	6,525	1,701	6,162	1,607	5,436	1,134	5,075	926
		35	0.05	7,394	1,736	6,162	1,447	5,545	1,302	5,237	1,229	4,622	868	4,313	709
		55	0.04	6,261	1,197	5,216	998	4,696	898	4,435	847	3,912	592	3,652	483
	0.2	12	0.16	8,698	2,270	7,249	1,891	6,525	1,701	6,162	1,607	5,436	1,134	5,075	926
		18	0.14	8,698	2,270	7,249	1,891	6,525	1,701	6,162	1,607	5,436	1,134	5,075	926
		24	0.13	8,698	2,270	7,249	1,891	6,525	1,701	6,162	1,607	5,436	1,134	5,075	926
		35	0.11	7,394	1,736	6,162	1,447	5,545	1,302	5,237	1,229	4,622	868	4,313	709
		55	0.08	6,261	1,197	5,216	998	4,696	898	4,435	847	3,912	592	3,652	483
	0.3	12	0.24	8,698	2,270	7,249	1,891	6,525	1,701	6,162	1,607	5,436	1,134	5,075	926
		18	0.22	8,698	2,270	7,249	1,891	6,525	1,701	6,162	1,607	5,436	1,134	5,075	926
		24	0.2	8,698	2,270	7,249	1,891	6,525	1,701	6,162	1,607	5,436	1,134	5,075	926
		35	0.18	7,394	1,736	6,162	1,447	5,545	1,302	5,237	1,229	4,622	868	4,313	709
		55	0.14	6,261	1,197	5,216	998	4,696	898	4,435	847	3,912	592	3,652	483
	0.5	18	0.35	8,698	2,270	7,249	1,891	6,525	1,701	6,162	1,607	5,436	1,134	5,075	926
		24	0.29	8,698	2,270	7,249	1,891	6,525	1,701	6,162	1,607	5,436	1,134	5,075	926
		35	0.24	7,394	1,736	6,162	1,447	5,545	1,302	5,237	1,229	4,622	868	4,313	709
		55	0.165	6,261	1,197	5,216	998	4,696	898	4,435	847	3,912	592	3,652	483
	1	18	0.4	8,698	2,270	7,249	1,891	6,525	1,701	6,162	1,607	5,436	1,134	5,075	926
		24	0.35	8,698	2,270	7,249	1,891	6,525	1,701	6,162	1,607	5,436	1,134	5,075	926
		35	0.28	7,394	1,736	6,162	1,447	5,545	1,302	5,237	1,229	4,622	868	4,313	709
		55	0.2	6,261	1,197	5,216	998	4,696	898	4,435	847	3,912	592	3,652	483

| NOTE |

1.For diferent materials, adjust the cutting depth (ap) according to the cutting depth factors in the above table. E.g. for hardened steels(45~55HRC),ap*0.5.

2. Use the appropriate coolant such as air cooling or emulsion for the work material and machining shape.

3. ln actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.

4. lf the rpm of the machine is low, lower the feed rate also to put the rpm and feed rate in the same ratio.

UM-RN4 Recommended cutting parameters to high parameters machining

Workpiece Materials				1		2		3		4		5		6	
				Copper		(180-250HB) Carbon Steels,Al-		(25-35HRC) Stainless		(35-45HRC) Pre-Hardened		(45-55HRC) Hardened Steels		(55-65HRC) Hardened Steels	
Ratio to standard Cutting depth(ap)				120%		100%		90%		80%		65%		60%	
Mill Dia. (mm)	(R) (mm)	Unde Neck Length (mm)	ap	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)
1	0.05	4	0.012	38,900	2,440	31,120	1,952	28,008	1,757	26,608	1,669	23,947	1,230	22,749	1,000
		6	0.01	31,500	1,780	25,200	1,424	22,680	1,282	21,546	1,218	19,391	990	18,422	810
		8	0.008	28,000	1,580	22,400	1,264	20,160	1,138	19,152	1,081	17,237	880	16,375	720
		10	0.005	24,500	1,390	19,600	1,112	17,640	1,001	16,758	951	15,082	770	14,328	630
		12	0.004	21,800	1,100	17,440	880	15,696	792	14,911	752	13,420	600	12,749	480
		16	0.003	21,800	960	17,440	768	15,696	691	14,911	657	13,420	510	12,749	400
		20	0.002	16,300	720	13,040	576	11,736	518	11,149	492	10,034	385	9,533	300
	0.1	4	0.02	38,900	2,440	31,120	1,952	28,008	1,757	26,608	1,669	23,947	1,230	22,749	1,000
		6	0.018	31,500	1,780	25,200	1,424	22,680	1,282	21,546	1,218	19,391	990	18,422	810
		8	0.014	28,000	1,580	22,400	1,264	20,160	1,138	19,152	1,081	17,237	880	16,375	720
		10	0.01	24,500	1,390	19,600	1,112	17,640	1,001	16,758	951	15,082	770	14,328	630
		12	0.008	21,800	1,100	17,440	880	15,696	792	14,911	752	13,420	600	12,749	480
		16	0.006	21,800	960	17,440	768	15,696	691	14,911	657	13,420	510	12,749	400
		20	0.004	16,300	720	13,040	576	11,736	518	11,149	492	10,034	385	9,533	300
1.5	0.05	4	0.02	29,900	2,030	23,920	1,624	21,528	1,462	20,452	1,389	18,406	1,020	17,486	830
		8	0.014	27,200	1,850	21,760	1,480	19,584	1,332	18,605	1,265	16,744	1,030	15,907	840
		12	0.007	21,800	1,480	17,440	1,184	15,696	1,066	14,911	1,012	13,420	820	12,749	670
		15	0.006	16,900	1,020	13,520	816	12,168	734	11,560	698	10,404	560	9,883	450
		20	0.004	16,900	1,020	13,520	816	12,168	734	11,560	698	10,404	560	9,883	450
	0.1	4	0.027	29,900	2,030	23,920	1,624	21,528	1,462	20,452	1,389	18,406	1,020	17,486	830
		8	0.02	27,200	1,850	21,760	1,480	19,584	1,332	18,605	1,265	16,744	1,030	15,907	840
		12	0.017	21,800	1,480	17,440	1,184	15,696	1,066	14,911	1,012	13,420	820	12,749	670
		15	0.014	16,900	1,020	13,520	816	12,168	734	11,560	698	10,404	560	9,883	450
		20	0.01	16,900	1,020	13,520	816	12,168	734	11,560	698	10,404	560	9,883	450
2	0.05	4	0.035	24,900	2,940	20,800	2,450	18,700	2,210	17,700	2,080	15,600	1,470	14,600	1,200
		6	0.03	24,900	2,940	20,800	2,450	18,700	2,210	17,700	2,080	15,600	1,470	14,600	1,200
		8	0.025	22,700	2,670	18,900	2,230	17,000	2,010	16,100	1,890	14,200	1,340	13,200	1,090
		12	0.02	18,400	1,950	15,300	1,620	13,800	1,460	13,000	1,380	11,500	1,080	10,700	890
		16	0.015	16,300	1,730	13,600	1,440	12,200	1,300	11,600	1,230	10,200	960	9,500	790
		20	0.01	14,300	1,520	11,900	1,260	10,700	1,140	10,100	1,070	8,900	840	8,300	690
	0.1	4	0.042	24,900	2,940	20,800	2,450	18,700	2,210	17,700	2,080	15,600	1,470	14,600	1,200
		6	0.042	24,900	2,940	20,800	2,450	18,700	2,210	17,700	2,080	15,600	1,470	14,600	1,200
		8	0.036	22,700	2,670	18,900	2,230	17,000	2,010	16,100	1,890	14,200	1,340	13,200	1,090
		12	0.036	18,400	1,950	15,300	1,620	13,800	1,460	13,000	1,380	11,500	1,080	10,700	890
		16	0.023	16,300	1,730	13,600	1,440	12,200	1,300	11,600	1,230	10,200	960	9,500	790
		20	0.018	14,300	1,520	11,900	1,260	10,700	1,140	10,100	1,070	8,900	840	8,300	690
	0.2	4	0.08	24,900	2,940	20,800	2,450	18,700	2,210	17,700	2,080	15,600	1,470	14,600	1,200
		6	0.08	24,900	2,940	20,800	2,450	18,700	2,210	17,700	2,080	15,600	1,470	14,600	1,200
		8	0.07	22,700	2,670	18,900	2,230	17,000	2,010	16,100	1,890	14,200	1,340	13,200	1,090
		12	0.04	18,400	1,950	15,300	1,620	13,800	1,460	13,000	1,380	11,500	1,080	10,700	890
		16	0.04	16,300	1,730	13,600	1,440	12,200	1,300	11,600	1,230	10,200	960	9,500	790

Workpiece Materials				1		2		3		4		5		6	
				Copper		(180-250HB) Carbon Steels,Al-		(25-35HRC) Stainless		(35-45HRC) Pre-Hardened		(45-55HRC) Hardened Steels		(55-65HRC) Hardened Steels	
Ratio to standard Cutting depth(ap)				120%		100%		90%		80%		65%		60%	
Mill Dia. (mm)	(R) (mm)	Unde Neck Length (mm)	ap	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)
2	0.2	20	0.035	14,300	1,520	11,900	1,260	10,700	1,140	10,100	1,070	8,900	840	8,300	690
		25	0.025	14,300	1,520	11,900	1,260	10,700	1,140	10,100	1,070	8,900	840	8,300	690
		30	0.017	13,600	1,440	11,300	1,200	10,200	1,080	9,600	1,020	8,500	800	7,900	650
	0.3	4	0.11	24,900	2,940	20,800	2,450	18,700	2,210	17,700	2,080	15,600	1,470	14,600	1,200
		8	0.09	22,700	2,850	18,900	2,350	17,000	2,100	16,100	1,950	14,200	1,490	13,200	1,210
		12	0.06	18,400	2,170	15,300	1,810	13,800	1,620	13,000	1,530	11,500	1,200	10,700	980
		16	0.06	16,300	1,930	13,600	1,610	12,200	1,440	11,600	1,360	10,200	1,070	9,500	870
		20	0.037	14,300	1,680	11,900	1,400	10,700	1,260	10,100	1,190	8,900	940	8,300	770
	0.5	4	0.17	24,900	2940	20,800	2450	18,700	2210	17,700	2,080	15,600	1,470	14,600	1,200
		6	0.17	24,900	2940	20,800	2450	18,700	2210	17,700	2,080	15,600	1,470	14,600	1,200
		8	0.14	22,700	2850	18,900	2350	17,000	2100	16,100	1,950	14,200	1,490	13,200	1,210
		12	0.08	18,400	2170	15,300	1810	13,800	1620	13,000	1,530	11,500	1,200	10,700	980
		16	0.08	16,300	1930	13,600	1610	12,200	1440	11,600	1,360	10,200	1,070	9,500	870
		20	0.05	14,300	1680	11,900	1400	10,700	1260	10,100	1,190	8,900	940	8,300	770
		25	0.05	14,300	1680	11,900	1400	10,700	1260	10,100	1,190	8,900	940	8,300	770
		30	0.03	13,600	1600	11,300	1330	10,200	1200	9,600	1,130	8,500	850	7,900	730
2.5	0.1	8	0.047	22,700	2970	18,900	2480	17,000	2230	16,100	2,100	14,200	1,490	13,200	1,210
		16	0.037	16,300	1930	13,600	1610	12,200	1440	11,600	1,360	10,200	1,070	9,500	870
		20	0.025	14,300	1680	11,900	1400	10,700	1260	10,100	1,190	8,900	940	8,300	770
	0.2	8	0.08	19,400	2570	16,200	2140	14,600	1920	13,800	1,820	12,200	1,280	11300	1,100
		16	0.045	16,900	2130	14,100	1770	12,700	1600	12,000	1,510	10,600	1,110	9,900	960
		20	0.042	14,100	1750	11,800	1410	10,600	1270	10,000	1,200	8,800	930	8,200	790
	0.3	12	0.09	17,700	2350	14,800	1960	13,300	1760	12,500	1,660	11,100	1,230	10,300	1,010
		20	0.052	14,100	1870	11,800	1560	10,600	1400	10,000	1,330	8,800	1,040	8,200	850
	0.5	12	0.1	17,700	2,350	14,800	1,960	13,300	1,760	12,500	1,660	11,100	1,230	10,300	1,010
		20	0.07	14,100	1,870	11,800	1,560	10,600	1,400	10,000	1,330	8,800	1,040	8,200	850
3	0.1	8	0.055	17,300	2,550	14,400	2,120	13,000	1,910	12,200	1,800	10,800	1,270	10,100	1,040
		16	0.035	17,300	2,550	14,400	2,120	13,000	1,910	12,200	1,800	10,800	1,270	10,100	1,040
		25	0.022	14,000	2,060	11,700	1,720	10,500	1,550	9,900	1,460	8,700	1,150	8,200	940
		30	0.014	10,900	2,060	9,100	1,720	8,200	1,550	7,700	1,460	6,800	1,150	6,400	940
	0.2	8	0.09	17,300	2,550	14,400	2,120	13,000	1,910	12,200	1,800	10,800	1,270	10,100	1,040
		12	0.07	17,300	2,550	14,400	2,120	13,000	1,910	12,200	1,800	10,800	1,270	10,100	1,040
		16	0.05	17,300	2,550	14,400	2,120	13,000	1,910	12,200	1,800	10,800	1,270	10,100	1,040
		20	0.05	14,000	2,060	11,700	1,720	10,500	1,550	9,900	1,460	8,700	1,150	8,200	940
		25	0.045	14,000	2,060	11,700	1,720	10,500	1,550	9,900	1,460	8,700	1,150	8,200	940
		30	0.04	10,900	2,060	9,100	1,720	8,200	1,550	7,700	1,460	6,800	1,150	6,400	940
	0.3	8	0.13	17,300	2,830	14,400	2,360	13,000	2,120	12,200	2,010	10,800	1,410	10,100	1,160
		16	0.075	17,300	2,830	14,400	2,360	13,000	2,120	12,200	2,010	10,800	1,410	10,100	1,160
		20	0.075	14,000	2,290	11,700	1,910	10,500	1,720	9,900	1,620	8,700	1,270	8,200	1,040
		25	0.067	14,000	2,290	11,700	1,910	10,500	1,720	9,900	1,620	8,700	1,270	8,200	1,040
		30	0.06	10,900	2,290	9,100	1,910	8,200	1,720	7,700	1,620	6,800	1,270	6,400	1,040

UM-RN4 Recommended cutting parameters to high parameters machining

Workpiece Materials				1		2		3		4		5		6	
				Copper		(180-250HB) Carbon Steels,Al-		(25-35HRC) Stainless		(35-45HRC) Pre-Hardened		(45-55HRC) Hardened Steels		(55-65HRC) Hardened Steels	
Ratio to standard Cutting depth(ap)				120%		100%		90%		80%		65%		60%	
Mill Dia. (mm)	(R) (mm)	Unde Neck Length (mm)	ap	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)
3	0.5	8	0.18	17,300	2,830	14,400	2,360	13,000	2,120	12,200	2,010	10,800	1,410	10,100	1,160
		12	0.13	17,300	2,830	14,400	2,360	13,000	2,120	12,200	2,010	10,800	1,410	10,100	1,160
		16	0.1	17,300	2,830	14,400	2,360	13,000	2,120	12,200	2,010	10,800	1,410	10,100	1,160
		20	0.1	14,000	2,290	11,700	1,910	10,500	1,720	9,900	1,620	8,700	1,270	8,200	1,040
		25	0.09	14,000	2,290	11,700	1,910	10,500	1,720	9,900	1,620	8,700	1,270	8,200	1,040
		30	0.08	10,900	2,290	9,100	1,910	8,200	1,720	7,700	1,620	6,800	1,270	6,400	1,040
		35	0.065	10,900	2,290	9,100	1,910	8,200	1,720	7,700	1,620	6,800	1,270	6,400	1,040
4	0.1	12	0.065	12,400	3,350	10,400	2,790	9,300	2,520	8,800	2,240	7,800	1,750	7,200	1,300
		20	0.055	12,400	3,350	10,400	2,790	9,300	2,520	8,800	2,240	7,800	1,750	7,200	1,300
		30	0.045	11,200	3,020	9,300	2,520	8,400	2,010	7,900	1,830	7000	1,470	6500	1,170
		40	0.03	11,200	3,020	9,300	2,520	8,400	2,010	7,900	1,830	7000	1,470	6,500	1,170
	0.2	12	0.13	12,400	3,350	10,400	2,790	9,300	2,520	8,800	2,240	7,800	1,750	7,200	1,300
		20	0.1	12,400	3,350	10,400	2,790	9,300	2,520	8,800	2,240	7,800	1,750	7,200	1,300
		30	0.08	11,200	3,020	9,300	2,520	8,400	2,010	7,900	1,830	7000	1,470	6500	1,170
		40	0.06	11,200	3,020	9,300	2,520	8,400	2,010	7,900	1,830	7000	1,470	6,500	1,170
	0.3	12	0.17	12,400	3,350	10,400	2,790	9,300	2,520	8,800	2,380	7,800	1,860	7,200	1,410
		20	0.13	12,400	3,350	10,400	2,790	9,300	2,520	8,800	2,380	7,800	1,860	7,200	1,410
		30	0.1	11,200	3,020	9,300	2,520	8,400	2,260	7,900	1,900	7,000	1,570	6,500	1,170
		40	0.08	11,200	3,020	9,300	2,520	8,400	2,260	7,900	1,900	7,000	1,570	6,500	1,170
	0.5	12	0.24	12,400	3,350	10,400	2,790	9,300	2,520	8,800	2,380	7,800	1,860	7,200	1,410
		20	0.2	12,400	3,350	10,400	2,790	9,300	2,520	8,800	2,380	7,800	1,860	7,200	1,410
		30	0.17	11,200	3,020	9,300	2,520	8,400	2,260	7,900	1,900	7,000	1,570	6,500	1,170
		40	0.1	11,200	3,020	9,300	2,520	8,400	2,260	7,900	1,900	7,000	1,570	6,500	1,170
5	0.1	20	0.07	9,700	2,620	8,100	2,190	7,300	1,970	6,900	1,760	6,100	1,370	5,700	1,020
		40	0.035	8,700	2,360	7,300	1,970	6,600	1,570	6,200	1,430	5,500	1,150	5,100	920
	0.2	20	0.15	9,700	2,620	8,100	2,190	7,300	1,970	6,900	1,760	6,100	1,370	5,700	1,020
		40	0.08	8,700	2,360	7,300	1,970	6,600	1,570	6,200	1,430	5,500	1,150	5,100	920
	0.3	20	0.21	9,700	2,620	8,100	2,190	7,300	1,970	6,900	1,860	6,100	1,460	5,700	1,110
		40	0.1	8,700	2,360	7,300	1,970	6,600	1,770	6,200	1,490	5,500	1,230	5,100	920
	0.5	20	0.28	9,700	2,620	8,100	2,190	7,300	1,970	6,900	1,860	6,100	1,460	5,700	1,110
		40	0.14	8,700	2,360	7,300	1,970	6,600	1,770	6,200	1,490	5,500	1,230	5,100	920
	1	20	0.35	9,700	2,620	8,100	2,190	7,300	1,970	6,900	1,860	6,100	1,460	5,700	1,110
		40	0.18	8,700	2,360	7,300	1,970	6,600	1,770	6,200	1,490	5,500	1,230	5,100	920
6	0.2	30	0.15	8,600	2,330	7,200	1,940	6,500	1,750	6,100	1,560	5,400	1,220	5,000	910
		54	0.1	7,800	2,100	6,500	1,750	5,800	1,400	5,500	1,270	4,900	1,020	4,500	820
		72	0.07	7,800	2,100	6,500	1,750	5,800	1,400	5,500	1,270	4,900	1,020	4,500	820
	0.3	30	0.25	8,600	2,330	7,200	1,940	6,500	1,750	6,100	1,560	5,400	1,300	5,000	980
		54	0.18	7,800	2,100	6,500	1,750	5,800	1,570	5,500	1,270	4,900	1,090	4,500	820
		72	0.1	7,800	2,100	6,500	1,750	5,800	1,570	5,500	1,270	4,900	1,090	4,500	820
	0.5	30	0.35	8,600	2,330	7,200	1,940	6,500	1,750	6,100	1,650	5,400	1,300	5,000	980
		54	0.25	7,800	2,100	6,500	1,750	5,800	1,570	5,500	1,320	4,900	1,090	4,500	820

Workpiece Materials				1		2		3		4		5		6	
				Copper		(180-250HB) Carbon Steels,Al-		(25-35HRC) Stainless		(35-45HRC) Pre-Hardened		(45-55HRC) Hardened Steels		(55-65HRC) Hardened Steels	
Ratio to standard Cutting depth(ap)				120%		100%		90%		80%		65%		60%	
Mill Dia. (mm)	(R) (mm)	Unde Neck Length (mm)	ap	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)	(n) (r/min)	(vf) (mm/min)
6	0.5	72	0.15	7,800	2,100	6,500	1,750	5,800	1,570	5,500	1,320	4,900	1,090	4,500	820
	1	30	0.55	8,600	2,330	7,200	1,940	6,500	1,750	6,100	1,650	5,400	1,300	5,000	980
		54	0.4	7,800	2,100	6,500	1,750	5,800	1,570	5,500	1,320	4,900	1,090	4,500	820
		72	0.22	7,800	2,100	6,500	1,750	5,800	1,570	5,500	1,320	4,900	1,090	4,500	820

| NOTE |

1.For diferent materials, adjust the cutting depth (ap) according to the cutting depth factors in the above table. E.g. for hardened steels(45~55HRC),ap*0.5.

2. Use the appropriate coolant such as air cooling or emulsion for the work material and machining shape.

3. In actual machining, the condition should be adjusted according to the machining shape, purpose and the machine type.

4. If the rpm of the machine is low, lower the feed rate also to put the rpm and feed rate in the same ratio.

Appendix

Recommended cutting parameters and general calculation formula

Parameter and Unit

D	Diameter		fn	Feeding per Revolution	(mm/rev)
ap	Cutting Depth		fz	Feeding per Tooth	(mm/tooth)
ae	Cutting Width	(mm)	Z	Teeth Number	
Vf	Feed Speed		n	Spindle Speed	(rev/min)
Vc	Cutting Speed		L	Length: (workpiece length+milling cutter diameter :l+D)	(mm)
Tc	Processing Time		Q	Metal Removal Rate	(cm^3/min)

General Formula

n	Spindle Speed	$n = \frac{Vc \times 1000}{\pi \times D}$ (r/min)
Vc	Cutting Depth	$Vc = \frac{\pi \times D \times n}{1000}$ (m/min)
fz	Feeding per Tooth	$fz = \frac{Vf}{z \times n}$ (mm)
Vf	Feed Speed	$Vf = n \times fz \times Z$ (mm/min)
Q	Metal Removal Rate	$Q = \frac{ae \times ap \times Vf}{1000}$ (mm)
Tc	Processing Time	$Tc = \frac{L}{Vf}$ (min)

Workpiece code table

ISO Material Group	MC TAIFENG	Workpiece Material	Content	Tensile Strength (N/mm2)	Brinell Hardness (HB)	Rockwell Hardness (HRC)
P Steels	P1	Low-carbon Steels, Long Chipping	C<0.25%	<530	<125	—
	P2	Low-carbon Steels, Short Chipping, Free-cutting Steels	C<0.25%	<530	<125	—
	P3	High-carbon Steels, Medium-carbon Steels	C>0.25%	>530	<220	<25
	P4	Alloy Steels, Tool Steels	C>0.25%	600-850	<330	<35
	P5	Alloy Steels, Tool Steels	C>0.25%	850-1400	340-450	35-48
	P6	Ferritic Stainless Steels, Martensitic Stainless Steels, Ph Stainless Steels	C=(0-0.4)%	600-900	<330	<35
	P7	High-strength Ferritic Stainless Steels, Martensitic Stainless Steels, Ph Stainless Steels	C=(0.1-0.6)%	900-1350	330-450	35-48
M Stainless Steels	M1	Austenitic Stainless Steels	C=(0.05-0.15)%	<600	130-200	—
	M2	High-strength Austenitic Stainless Steels And Cast Stainless Steels	C=(0.05-0.15)%	600-800	150-230	<25
	M3	Duplex Stainless Steels	C=(0.05-0.20)%	<800	135-275	<30
K Cast Iron	K1	Grey Cast Iron	—	125-500	120-290	<32
	K2	Moderately Difficult Alloy Cast Iron, Nodular Cast Iron	—	<600	130-260	<28
	K3	Difficult High-alloy Cast Iron, Nodular Cast Iron	—	>600	180-350	<43
N Non-ferrous Materials	N1	Wrought Aluminium Alloys	—	<520	60-90	—
	N2	Cast Aluminium Alloys	Si<12%	<350	70-100	—
	N3	Cast Aluminium Alloys	Si>12%	200-320	60-120	—
	N4	Copper, Copper Alloys	—	200-650	60-200	—
	N5	Graphite, Composite Materials	—	600-1500	—	—
	N6	Aluminium-based Composite Materials	—	<700	<210	—
S Heat-resistant Alloys, Titanium Alloys	S1	Iron-based Heat-resistant Alloys	—	500-1200	160-260	25-48
	S2	Cobalt-based Heat-resistant Alloys	—	1000-1450	250-450	25-48
	S3	Nickel-based Heat-resistant Alloys	—	600-1700	160-450	<48
	S4	Titanium And Titanium Alloys	—	900-1600	300-400	33-48
H High Hardened Materials	H1	Hardened Steels	—	—	—	45-55
	H2	Hardened Steels	—	—	—	55-60
	H3	Hardened Steels	—	—	—	60-65
	H4	Hardened Steels	—	—	—	>65

Appendix

Reference table of workpiece materials

Workpiece Materials	China	Germany		Japan	America	France	Britain	Europe
	GB	Material number	DIN	JIS	AISI/SAE	AFNOR	BS	EN
P1	15	1.0401	C 15	S 15 C	1015	C 12	080 M 15	C 15
P1	20; ML20	1.0402	C 22	S 22 C	1020	C 20	050 A 20	1 C 22
P1	15	1.1141	Ck 15	S 15 C	1015	XC 15	080 M 15	2 C 15
P2	Y15	1.0715	9 SMn 28; 11 SMn 30	SUM 22	1213	S 250	230 M 07	11 SMn 28
P2	Y15Pb	1.0718	9 SMnPb 28	SUM 22 L	12L13	S 250 Pb	—	11 SMnPb 28
P2	Y13	1.0736	9 SMn 36; 11 S Mn 37	SUM 25	1215	S 300	240 M 07	11 SMn 37
P2	—	1.0737	9 SMnPb 36; 11 SMnPb 37	—	12L14	S 300 Pb SMnPb 36	—	11 SMnPb 37
P3	35	1.0501	C 35	S 35 C	1035	CC 35	060 A 35	1 C 35
P3	45	1.0503	C 45	S 45 C	1045	CC 45	080 M 46	1 C 45
P3	ZG340-640;55	1.0535	C 55	S 55 C	1055	C 55	070 M 55	1 C 55
P3	60	1.0601	C 60	S 60 C- CSP	1060	AF 70 C 55	080 A 62	1 C 60
P3	Y35; Y30	1.0726	35 S 20	—	1140	35 MF 4	212 M 36	35 S 20
P3	60Si2CrA; 60Si2Mn	1.0961	60 SiCr 7	SUP 7	9262	60 SC 7	250 A 61	60 SiCr 8
P3	40Mn	1.1157	40 Mn 4	—	1039	35 M 5	150 M 36	—
P3	25; ML25	1.1158	Ck 25	S 25 C	1025	XC 25	070 M 26	2 C 25
P3	35Mn2	1.1167	36 Mn 5	SMn 438 (H)	1335	40 M 5	150 M 36	—
P3	30Mn2	1.1170	28 Mn 6	SCMn 1	1330	35 M 5	150 M 28	28 Mn 6
P3	35Mn	1.1183	Cf 35	S 35 C	1035	XC 38 TS	060 A 35	C 35 G
P3	Ck45; 45; Mn45Mn; ZG310-570	1.1191	Ck 45	S 45 C	1045	XC 42	080 M 46	2 C 45
P3	55	1.1203	Ck 55	S 55 C	1055	XC 55 H1	070 M 55	2 C 55
P3	50	1.1213	Cf 53	S 50 C	1050	XC 48 TS	060 A 57	C 53 G
P3	60Mn; 60	1.1221	Ck 60	S 58 C	1060	XC 60	060 A 62	2 C 60

GB—Chinese Standard DIN—German Institute for Standardization JIS—Japanese Industrial Standards

Reference table of workpiece materials

Workpiece Materials	China	Germany		Japan	America	France	Britain	Europe
	GB	Material number	DIN	JIS	AISI/SAE	AFNOR	BS	EN
P3	—	1.1274	Ck 101	SUP_4	1095	XC 100	060 A 96	C 100 S
P3	T10	1.1545	C 105 W1	—	W 110	Y 105	B W 1 A	C 105 U
P3	CrV; 9SiCr; Cr2; 9Cr2	1.2067	100 Cr 6	—	L3	Y 100 C 6	B L 3	102 Cr 6
P3	CrWMo; CrWMn; 9CrWMn	1.2419	105 WCr 6	SKS 31	—	(107 WCr 13)	—	105 WCr 5
P3	5CrNiMo; 5CrW2Si	1.2542	45 WCrV 7	—	S1	45 WCr V 8	BS 1	45 WCrV 8
P3	5CrNiMo	1.2713	55 NiCrMoV 6	SKT 4	L6	55 NCDV 7	BH 224/5	55 NiCrMoV 7
P3	—	1.5415	15 Mo 3	STFA 12-240	A 204 Gr. A	15 D3	1501	16 Mo 3
P3	—	1.5622	14 Ni 6	SL2N26	A 350-LF 5	15 N 6	—	FeE 285 Ni 6
P3	—	1.6511	36 CrNiMo 4	—	9840	40 NCD 3	816 M 40	36 CrNiMo 4
P3	40CrNiMoA	1.6582	34 CrNiMo 6	SNCM 447	4340	35 NCD 6	817 M 40	34 CrNiMo 6
P3	—	1.6587	17 CrNiMo 6	SNCM 815	—	18 NCD 6	820 A 16	17 CrNiMo 7
P3	15Cr	1.7015	15 Cr 3	SCr 415 H	5015	12 C 3	523 M15	15 Cr 2
P3	35Cr	1.7033	34 Cr 4	SCr 430 H	5130 H	32 C 4	530 A 32	34 Cr 4 KD
P3	40Cr	1.7045	42 Cr 4	SCr 440	5140	42 C 4 TS	530 A 40	40 NiCrMo 3
P3	—	1.7035	41Cr4	SCr440(H)	5140	42C4	530M40	24
P3	—	1.7380	Mo910	—	ASTM A182 F.22	12CD9; 12CD10	1501-622 Cr31, 45	—
P3	40Cr	1.7045	42 Cr 4	SCr 440	5140	42 C 4 TS	530 A 40	40 NiCrMo 3
P3	18CrMn;	1.7131	16 MnCr 5	SCR 415	5115	16 MC 5	527 M 17	16 MnCr 5 KD
P3	20CrMn; 50CrMn	1.7176	55 Cr 3	SUP 9 (A)	5155	55 C 3	527 A 60	55 Cr 3
P3	30CrMn;	1.7218	25 CrMo 4	SCM 420	4130	25 CD 4	708 A 25	25 CrMo 4 KD
P3	50CrVA	1.8159	—	SUP 10	6150	50 CV 4	735 A 50	51 CrV 4
P3	35CrMo	1.7220	34CrMo4	SCm432; SCCrM3	4137; 4135	35CD4	708A37	—

AISI/SA—Americal Iron and Steel Institute
Society of Automotive Engineer

BS—British Standards EN—European Standards

Appendix

Reference table of workpiece materials

Workpiece Materials	China	Germany		Japan	America	France	Britain	Europe
	GB	Material number	DIN	JIS	AISI/SAE	AFNOR	BS	EN
P3	40CrMoA	1.7223	41 CrMo 4	SCM 440	4142	42 CD 4 TS	708 M 40	41 CrMo 4
P3	42CrMo; 42CrMnMo	1.7225	42 CrMo 4	SCM 440 H	4140	42 CD 4	708 A 42	42 CrMo 4
P3	15CrMo	1.7262	15 CrMo 5	SCM 415 H	—	12 CD 4	—	—
P3	12CrMo	1.7335	13 CrMo 4 4	SFVA F 12	A182-F11	15 CD 4.05	1501-621	13 CrMo 4-5
P3	—	1.7361	32 CrMo 12	—	—	30 CD 12	722 M 24	32 CrMo 12
P4	55Si2Mn	1.0904	55 Si 7	SKH 1; SKT 4	9255	55 S 7	250 A 53	55 NiCrMoV 7
P4	V	1.2833	100 V 1	SKS 43	W 210	Y1 105 V	BW 2	100 V 2
P4	12CrNi2	1.5732	14 NiCr 10	SNC 415 H	3415	14 NC 12	—	—
P4	12CrNi3	1.5752	14 NiCr 14	SNC	E	16 NC 11	655 M 13	13 NiCr 12
P4	20CrNiMo	1.6523	21 NiCrMo 2	SNCM 220 H	8620	20 NCD 2	805 M 20	20 NiCrMo 2 KD
P4	—	1.6546	40 NiCrMo 7 2 KB	SNCM 240	8640	40 NCD 2	—	40 NiCrMo 2 KD
P4	—	1.8523	39 CrMoV 13 9	—	—	—	897 M 39	39 CrMoV 13 9
P4	—	1.5710	36NiCr6	SNC236	3135	35NC6	640A35	111A
P6	ZGMn13-1; ZGMn13-2	1.3401	X 120 Mn 12	SCMnH 1	A 128	Z 120 M 12	BW 10	—
P6	Cr6WV; 100CrMoV5	1.2363	X 100 CrMoV	SKD 12	A-2 5 1	Z 100 CDV 5	BA 2	X 100 CrMoV 5 1
P6	Cr12W	1.2436	X 210 CrW 12	SKD 2	—	Z 210 CW 1 2	—	X 210 CrW 12
P6	3Cr2W8V; 30WCrV9; 5CrMnMo	1.2581	X 30 WCrV 93	SKD 5	H 21	Z 30 WCV 9	BH 21	X 30 WCrV 9 3
P6	4Cr5MoVSi1; 40CrMoV5	1.2344	X 40 CrMoV 5 1	SKD 61	H 13	Z 40 CDV 5	BH 13	X 40 CrMoV 5 1
P6	W18Cr4V	1.3355	S 1-8-0-1	SKH 2	T 1	Z80WCV 18-04-01	BT 1	HS 1-8-0-1
P6	W18Cr4VCo5	1.3255	S 1-8-1-2-5	SKH 3	T 4	Z80 WKCV 18-05-04-01	BT 4	(HS18-1-1-5)
P6	W6Mo5Cr4V 2Co5	1.3243	S 6-5-2-5	SKH 55	M 35	KCV 06-05-05-04-02	BM 35	(HS6-5-2-5)
P6	—	1.5662	X 8 Ni 9	SL 9 N 53	A 353	9 Ni	509	FeE 490 Ni 36

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Workpiece Materials	China	Germany		Japan	America	France	Britain	Europe
	GB	Material number	DIN	JIS	AISI/SAE	AFNOR	BS	EN
P6	Cr12MoV	1.2601	X 165 CrMoV 12	—	—	—	—	X 165 CrMoV 12
P6	Cr12	1.2080	X210Cr12	SKD1	D3 ASTM D3	Z200C12	BD3	—
P6	—	1.3343	S6-5-2	SUH3	D3	Z40CSD10	4959BA2	—
P6	M7	1.3348	S 2-9-2	—	M 7	Z100DCWV 09-04-02-02	—	HS 2-9-2
M1	—	1.4408	GX 6 CrNiMo 18 10	SCS 14	CF-8M	GX5CrNiMo 19-11-2	316 C 16	GX 5 CrNiMo 19-11-2
M1	OCr27Ni12 Mo3	1.4435	X 2 CrNiMo 18 14 3	SCS 16	316 L	Z 2 CND 17.13	316 S 11	X 2 CrNiMo 18 16
M1	1Cr18Ni12 Mo2Ti	1.4581	GX 5 CrNi MoNb 18 10	SCS 22	—	Z 4 CNDNb 18.12 M	318 C 17	GX 5 CrNiMo Nb 19-11-2
M1	1Cr23Ni13; 2Cr23Ni13	1.4828	X 15 CrNiSi 20 12	SUH 309	309	Z 15 CNS 20.12	309 S 24	X 15 CrNiSi 20 12
M1	00Cr18Ni10N; 0Cr19Ni9	1.4311	X 2 CrNiN 18 10	SUS 304 LN	304	Z 8 CN 18.12	304 S 62	X 2 CrNiN 18 10
M1	0Cr25Ni20; 2Cr25Ni21	1.4845	X 12 CrNi 25 21	SUS 310 S	310 S	Z 12 CN 25.20	310 S 24	X 8 CrNi 25 21
M1	0Cr17Ni11Mo2; 0Cr17Ni12Mo2	1.4401	X 5 CrNiMo 17 12 2	SUS 316	316	Z 6 CND 17.11	316 S 16	X6 CrNiMo 17 X 12 2 KD
M1	0Cr17Ni12 Mo2	1.4436	X 5 CrNiMo 17 1 3 3	SUS 316	316	Z 6 CND 17.12	316 S 16	X6 CrNiMo 18 13 3 KD
M1	00Cr17Ni14 Mo2	1.4404	X 2 CrNiMo 17 13 2	SUS 316 L	316 L	Z 3 CND 19.10 M	316 S 12	GX 3 CrNiMo 17 12 2 KD
M1	OCr17Ni13Mo; 00Cr17Ni13Mo2N	1.4429	X 2 CrNiMoN 17 13 3	SUS 316 LN	316 LN	Z 2 CND 17.13 Az	316 S 62	X 3 CrNiMoN 17 13 3
M1	—	1.4406	X 2 CrNiMoN 17	SUS 316 LN 12 2	316	Z 2 CND 17.12 Az	316 S 61 LN	X 3 CrNiMoN 17 12 2
M1	Cr18Ni12 Mo2Ti	1.4571	X 6 CrNiMoTi 17 12 2	SUS 316 Ti	316 Ti	Z 6 CNDT 17.12	320 S 31	X 6 CrNiMoTi 17 12 2
M1	00Cr19Ni13 Mo3	1.4438	X 2 CrNiMo 18 16 4	SUS 317 L	317 L	Z 2 CND 19.15	317 S 12	X 3 CrNiMo 18 16 4
M1	1Cr18Ni9Ti	1.4541	X 6 CrNiTi 18 10	SUS 321	321	Z 6 CNT 18.10	321 S 12	X 6 CrNiTi 18
M1	1Cr18Ni10Ti; 1Cr18Ni9Ti	1.4878	X 12 CrNiTi 18 9	SUS 321	321	Z 6 CNT 18.12	321 S 20	X 10 CrNiTi 18 10
M1	Cr17Ni12Mo3 Nb	1.4583	X 10 CrNi MoNb 18 12	—	318	—	—	—
M1	—	1.4539	X 1 NiCrMo CuN	—	—	Z 1 NCDU 25-20-5	904 S 13 25 20	X 1 NiCrMoCu
M1	—	1.4003	—	—	405	Z8CA12	405S17	—

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	GB	Material number	DIN	JIS	AISI/SAE	AFNOR	BS	EN
M1	—	1.4521	X1CrMoTi182	—	S44400	—	—	—
M1	—	1.4542	—	—	630	Z7CNU17-04	—	—
M1	00Cr19Ni13 Mo3	1.4438	X 2 CrNiMo 18 16 4	SUS 317 L	317 L	Z 2 CND 19.15	317 S 12	X 3 CrNiMo 18 16 4
M1	1Cr18Ni9Ti	1.4541	X 6 CrNiTi 18 10	SUS 321	321	Z 6 CNT 18.10	321 S 12	X 6 CrNiTi 18
M1	1Cr18Ni10T; 1Cr18Ni9Ti	1.4878	X 12 CrNiTi 18 9	SUS 321	321	Z 6 CNT 18.12	321 S 20	X 10 CrNiTi 18 10
M1	1Cr18Ni11Nb	1.4550	X 6 CrNiNb 18 10	SUS 347	347	Z 6 CNNb 18.10	347 S 17	X 6 CrNiNb 18 10
M1	1Cr17	1.4016	X6Cr17	SUS 430	430	—	430 S 17; 430 S 18	
M1	0Cr15NiMo2Al	1.4532	X 8 CrNiMoAl 15 7 2	—	15-7 PH	X15D2	—	X 8 CrNiMoAl 15-7-2
M1	Cr17Ni12 Mo3Nb	1.4583	X 10 CrNiMoNb 18 12	—	318	—	—	—
M1	—	1.4539;52662	X 1 NiCrMo CuN	—	—	Z 1 NCDU 25-20-5	904 S 13 25 20	X 1 NiCrMoCu
M1	0Cr17Ni4 Cu4Nb	1.4542	X 5 CrNiCuNb 16 4	SUS 630	630	Z6CNU17.04		X 5 CrNiCuNb 16-4
M2	0Cr17Ni7Al	1.4568	X 7 CrNiAl 17 7	SUS 631	—	X7CrNiAl17-7; Z9CNA17-07	301 S 81	X 7 CrNiAl 17-7
M2	—	1.4504	—	—	—	—	—	—
M2	—	1.4504	—	—	—	—	—	—
M2	0Cr17Ni7Al	1.4568	X 7 CrNiAl 17 7	SUS 631	—	X7CrNiAl1-7; Z9CNA17-07	301 S 81	X 7 CrNiAl 17-7
M3	0Cr26Ni5Mo2	1.4460	X 4 CrNiMo 27 5 2	SUS 329 J1	329	X 2 CrNiMo 25-7-3	—	X 3 CrNiMo 27 5 2
M3	—	1.4462	X 2 CrNiMoN 22 5 3	SUS 329J 3L	S318 03	Z 3 CND 22.05 AZ	318 S 13	X 2 CrNiMoN 22 5 3
K1	HT300	0.6030	GG- 30	FC 300	A48-45 B	FGL 300	Grade 300	GJL-300
K1	HT350	0.6035	GG- 35	FC 350	A48-50 B	FGL 350	Grade 350	GJL-350
K1	HT400	0.6040	GG- 40	—	A48-55 B	FGL 400	Grade 400	GJL-400
K2	—	0.7033	GGG-35.3	—	—	—	—	GJS-350-22
K2	QT400-18	0.7040	GGG-40	FCD400	60-40-18	FCS 400-12	SNG 420/12	—

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	GB	Material number	DIN	JIS	AISI/SAE	AFNOR	BS	EN
K2	—	—	GGG-40.3	—	—	FGS 370-17	SNG 370/17	—
K2	QT500-7	0.7050	GGG-50	FCD500	80-55-06	FGS 500-7	SNG 500/7	—
K2	—	0.7660	GGG-NiCr202	—	A43D2	S-NC202	Grade S6	—
K2	—	—	GGG-NiMo137	—	—	L-MN 137	L-NiMn 137	—
K2	QT600-3	—	GGG-60	FCD600	—	FGS 600-3	SNG 600/3	—
K2	QT700-18	0.7070	GGG-70	FCD700	100-70-03	FGS 700-2	SNG 700/2	—
K3	—	0.8145	GTS-45-06	FCMP440	40010	P 45-06	P 440/7	MN 450 - 6
K3	—	0.8155	GTS-55-04	FCMP490	50005	P 55-04	P 510/4	MN 550-4
K3	—	0.8165	GTS-65-02	FCMP540	70003	P 65-02	P 570/3	MN 650-3
K3	—	—	—	FCMB310	—	MN 32-8	56 1/3	—
K3	—	—	GTS-35	FCMW330	GTS-35	MN 35-10	B 340/12	—
K3	—	—	GTS-65	FCMP540	GTS-65	MP60-3	P 570/3	—
K3	—	—	GTS-70-02	FCMP690	GTS-70-02	MN 700-2	P 690/2	—
K3	—	0.8145	GTS-45-06	FCMP440	40010	P 45-06	P 440/7	MN 450 - 6
K3	—	0.8155	GTS-55-04	FCMP490	50005	P 55-04	P 510/4	MN 550-4
K3	—	0.8165	GTS-65-02	FCMP 540	70003	P 65-02	P 570/3	MN 650-3
H	—	0.9620	GX 260 NiCr 42	0512-00	A 532 IB NiCr-LC	—	—	GJH-X260Ni Cr 4-2
	—	0.9625	G-X 330 NiCr 42	0513-00	A 532 IA NiCr-HC	FB Ni 4 Cr2 HC	—	GJH-X330Ni Cr 4-2
	—	0.9630	G-X 300 CrNiSi 95 2	0457-00	A 532 ID Ni-HiCr	—	—	GJH-X300 Cr NiSi 9-5-2
	—	0.9635	G-X 300 CrMo 15 3	—	A 532 IIC15% CrMo-HC	—	—	GJH-X300 CrMo 15-3
	—	0.9640	G-X 300 CrMoNi 15 2 1	—	—	—	—	GJH-X300 CrMoNi 15-2-1
	—	0.9645	GX 260 CrMoNi 20 2 1	—	A 532 IID20% CrMo-HC	—	—	GJH-X260 CrMoNi 20-2-1
	—	0.9650	GX 260 Cr 27	0466-00	A 532 IIA25% Cr	—	—	GJH-X260 Cr 27
	—	0.9655	G-X 300 CrMo 27 1	—	A 532 IIA25% Cr	—	—	GJH-X300 CrMo 27-1

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