Carbide End Mill



Cutting tools manufacture

NAKAWO INDUSTRIAL CO.,LTD.

Technological manpower . Artistic production

Introducing our Series 目錄索引

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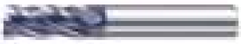
UES4(A) 4 Flutes		Universal endmills、Standard cut length	Φ1~Φ20	P.9
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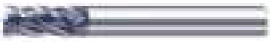
ULS4(A) 4 Flutes		Universal endmills、Standard cut length Long shank	Φ2~Φ16	P.13
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REA3 3 Flutes		Featuring irregular helical geometry for reduced chattering.	Φ4~Φ16	P.16
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Square Type Carbide Endmills 鎢鋼端銑刀

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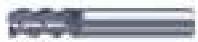
RE3 3 Flutes		Unique geometry- 3 flutes end mill with irregular helix flutes suppressesstability. chatter for increased machining	Φ2~Φ16	P.23
RE3 3 Flutes		Unique geometry- 3 flutes end mill with irregular helix flutes suppressesstability. chatter for increased machining	Φ2~Φ16	P.24
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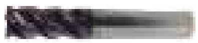
RE3 3 Flutes		Unique geometry- 3 flutes end mill with irregular helix flutes suppressesstability. chatter for increased machining	Φ2~Φ16	P.26
RE4 4 Flutes		Optimized irregular helix angle improves cutting performance.	Φ3~Φ20	P.27
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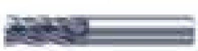
RE4 4 Flutes		Optimized irregular helix angle improves cutting performance.	Φ3~Φ20	P.29
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UEB2 2 Flutes		Ballnose endmills、Standard cut length	R0.5~R10.0	P.32
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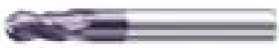
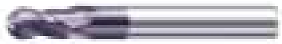
UESB4 4 Flutes		Ballnose endmills、Standard cut length	R0.5~R6.0	P.34

UEB4 4 Flutes		Ballnose endmills、Standard cut length Semi long shank	R1.0~R10.0	P.34
HMRB2 2 Flutes		Ballnose endmills、Short cut length Shank diameter 4.0mm、Long Neck	R0.5~R2.0	P.35
HERB2 2 Flutes		Ballnose endmills、Short cut length Shank diameter 6.0mm、Long Neck	R1.0~R6.0	P.36
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MSBD2 2 Flutes		Mould & die ballnose endmills standard cut length / HSM	R0.5~R8.0	P.39
MBD2 2 Flutes		Mould & die ballnose endmills standard cut length、Reduced neck / HSM	R0.5~R6.0	P.39
MLBD2 2 Flutes		Mould & die ballnose endmills standard cut length、Long shank / HSM	R2.0~R6.0	P.40
MRBD2 2 Flutes		Mould & die ballnose endmills standard cut length、Long shank / HSM	R0.75~R2.5	P.41
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SFR SFRB 2 Flutes		Micro ballnose endmills、Short cut length Long Neck	R0.5~R6.0	P.42
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Corner Radius Type Carbide Endmills 鎢鋼圓鼻刀

MSR2 2 Flutes		Torus endmills、Short cut length Long neck / HSM	Φ1~Φ12	P.46~47
MMR2 2 Flutes		Torus endmills、Short cut length Long neck、Semilong shank/HSM	Φ2~Φ12	P.48
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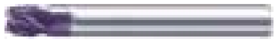
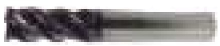
MLCR2(A) 2 Flutes		Torus endmills、Standardt cut length	Φ4~Φ12	P.51
MLCR4(A) 4 Flutes		Torus endmills、Standardt cut length Long shank / HSM	Φ4~Φ16	P.52
MLCRS4 4 Flutes		Torus endmills、Standardt cut length Long shank / HSM	Φ8~Φ12	P.52
MECR4(A) 4 Flutes		Torus endmills、Standardt cut length	Φ3~Φ20	P.52~53

Corner Radius Type Carbide Endmills 鎢鋼圓鼻刀

RER4 4 Flutes		SMART MIRACLE vibration control end mills for reduced chattering and for delivering a stable performance on difficult-to-cut materials and long overhang applications.	Φ3~Φ20	P.54~55
RER4 4 Flutes		SMART MIRACLE vibration control end mills for reduced chattering and for delivering a stable performance on difficult-to-cut materials and long overhang applications.	Φ3~Φ20	P.56~57
RER4 4 Flutes		SMART MIRACLE vibration control end mills for reduced chattering and for delivering a stable performance on difficult-to-cut materials and long overhang applications.	Φ3~Φ20	P.58~59
RER4 4 Flutes		SMART MIRACLE vibration control end mills for reduced chattering and for delivering a stable performance on difficult-to-cut materials and long overhang applications.	Φ3~Φ20	P.60~61
RER4 4 Flutes		SMART MIRACLE vibration control end mills for reduced chattering and for delivering a stable performance on difficult-to-cut materials and long overhang applications.	Φ3~Φ20	P.62~63

Corner Radius Type Carbide Endmills 鎢鋼圓鼻刀

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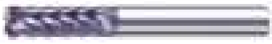
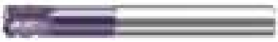
MFCR4(A) 4 Flutes		Torus endmills、Standardt cut length	Φ4~Φ12	P.64
SFCR4 2 Flutes		Torus endmills、Standardt cut length Long shank / HSM	Φ4~Φ12	P.64
MECR6 6 Flutes		Torus endmills、Standardt cut length Long shank / HSM	Φ6~Φ12	P.65
MSR6 6 Flutes		Torus endmills、Short cut length Reduced neck / HSM	Φ6~Φ12	P.65
ASR2 2 Flutes		Torus endmills、Reduced neck For copper & aluminum / HSM	Φ4~Φ16	P.66
AMR2 2 Flutes		Torus endmills、Reduced neck For copper & aluminum / HSM	Φ3~Φ20	P.66~67
AHRN 3 Flutes		Torus endmills、Reduced neck For copper & aluminum / HSM	Φ4~Φ12	P.68
AHR 3 Flutes		Torus endmills、Reduced neck For copper & aluminum / HSM	Φ4~Φ12	P.68

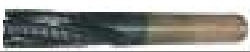
Taper Type Carbide Endmills 鎢鋼斜度刀

HTE2 2 Flutes		Taper endmills、Standard cut length	Φ1~Φ4	P.69~70
HTE4 4 Flutes		Taper endmills、Standard cut length	Φ3~Φ10	P.71~72
HTR2 2 Flutes		Deep rib taper endmills	Φ0.5~Φ1.5	P.73~74

Center Drills 定點鑽

SD/SDL 2 Flutes		Center Drill、Standard Cut Length	Φ3~Φ16	P.75

粗銑刀

UELR2 2 Flutes		Endmills、Roughing 、Long Cut Length	Φ4~Φ12	P.76
UER3 3 Flutes		Endmills、Roughing、Standard Cut Length	Φ6~Φ12	P.76
UER4 4 Flutes		Endmills、Roughing、Standard Cut Length	Φ8~Φ20	P.77
UER5 5 Flutes		Endmills、Roughing、Standard Cut Length	Φ10~Φ20	P.78

Information 技術資料

Guidance of Catalogue 目錄使用簡介

1.Ordering 如何訂購

Please order by designation code 請使用產品編號訂購
Example: If choose UES2 series d1=10mm with ULTRA-TIALN+coated, the designation code should be UES2-100D with uncoated, the designation code should be UES2-100

產品編號訂購範例：訂購UES2系列，直徑d1=10mm ULTRA-TIALN+鍍膜，訂購編號爲UES2-100D；無鍍膜編號爲UES2-100

2.Dimensions and Specifications of Products 產品規格尺寸

The dimensions and specifications of products show in this catalogue may be subjected to change without notice, due to situation of research, development of the products 目錄中產品規格尺寸可能因需要變更

Handing precautions for cutting tools 使用切削刀具注意事項

CAUTION

- ☐ Be very careful with the sharp edges when removing the cutting tool from its cases. Direct contact could result in injury. 將切削刀具由包裝盒取出時候請注意，勿直接接觸切削刃。
- ☐ Use safety cover, safety glasses and safety shoes during operation. 使用切削刀具時請穿戴適當防護。
- ☐ The cutting edge of the tools may chip or fragment during use. 加工過程中注意切屑可能飛出。
- ☐ The cutting edge may break or shatter if improperly used. 切削刀具如不當使用切刃可能破損。
- ☐ Stop cutting when the tool becomes dull. 切削刀具不銳利時候請停止使用。
- ☐ Stop cutting immediately if you hear any strange cutting sounds. 切削過程中如聽到異音請停止使用。
- ☐ Make sure the sizes of cutting tools and work piece as well as direction of rotation in advance.
- ☐ 切削加工前請確定切削刀具尺寸、加工工件、主軸旋轉方向。
- ☐ The list of recommended milling conditions should be referred as a rough idea.
建議的切削條件爲初步參考值，詳細條件應以實際切削狀況調整。

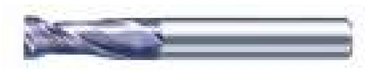
Ultra Fine Grain Carbide Endmills－2 Flutes、Standard Cut Length

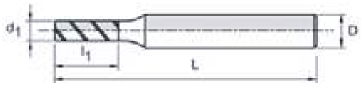
極細微粒鎢鋼、端銑刀 — 2 刃、標準刃長

Size: D1.0 ~ D20.0

UES2 (A)

Carbide	Coating	Helix	HRC	V-Speed	Rake Angle
Grain Ultra-Fine	ULTRA TIALN+	30°	48	N/HSM	Positive





Dimension(mm) / Desig nation	刃徑 d_1	刃長 l_1	全長 L	柄徑 D		刃數 Z	Coating 鍍膜 ULTRA (D)
UES2A-010	1.0	3	50	4 (*)		2	■
UES2A-015	1.5	4	50	4 (*)		2	■
UES2A-020	2.0	6	50	4 (*)		2	■
UES2A-025	2.5	8	50	4 (*)		2	■
UES2A-030	3.0	8	50	4 (*)		2	■
UES2A-035	3.5	10	50	4		2	■
UES2A-040	4.0	11	50	4		2	■
UES2-020	2.0	6	50	6		2	■
UES2-030	3.0	8	50	6		2	■
UES2-040	4.0	11	50	6		2	■
UES2-045	4.5	12	50	6		2	■
UES2-050	5.0	13	50	6		2	■
UES2-055	5.5	14	50	6		2	■
UES2-060	6.0	16	50	6		2	■
UES2-065	6.5	16	60	8		2	■
UES2-070	7.0	18	60	8		2	■
UES2-075	7.5	18	60	8		2	■
UES2-080	8.0	20	60	8		2	■
UES2-085	8.5	25	75	10		2	■
UES2-090	9.0	25	75	10		2	■
UES2-095	9.5	25	75	10		2	■
UES2-100	10.0	30	75	10		2	■
UES2-110	11.0	30	75	12		2	■
UES2-120	12.0	30	75	12		2	■
UES2-140	14.0	35	100	14		2	□
UES2-160	16.0	40	100	16		2	□
UES2-180	18.0	40	100	18		2	□
UES2-200	20.0	50	100	20		2	□

(✱) Mark : Customized orders for shank diameter 3.0 mm is also available 標示(✱)者：可另外訂製柄徑3.0mm

Recommended work material 推薦可加工材料 ■ Preferred suitable 最適用 □ Suitable 適用

ULTRA (D)	Steel < HRC32 碳鋼/合金鋼	HRC32 ~ 48 合金/預硬鋼	HRC49 ~ 55 熱處理鋼	HRC 56 ~ 60 熱處理鋼	Stainless 不鏽鋼	Cast Iron 鑄鐵

FEATURE：Widely used , new ULTRA (D) TIALN+ coating useful for HSM (DRY CUT), covering from carbon steels to hardened steels (Up to HRC 48)

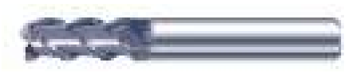
Ultra Fine Grain Carbide Endmills－3 Flutes、Standard Cut Length

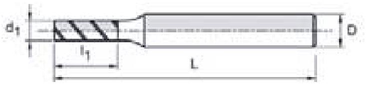
極細微粒鎢鋼、端銑刀 — 3 刃、標準刃長

Size: D1.0 ~ D20.0

UEH3 (A)

Carbide	Coating	Helix	HRC	V-Speed	Rake Angle
Grain Ultra-Fine	ULTRA TIALN+	45°	48	N/HSM	Positive





Dimension(mm) / Desig nation	刃徑 d_1	刃長 l_1	全長 L	柄徑 D		刃數 Z	Coating 鍍膜 ULTRA (D)
UEH3A-010	1.0	3	50	4		3	■
UEH3A-015	1.5	4	50	4		3	■
UEH3A-020	2.0	6	50	4		3	■
UEH3A-025	2.5	6	50	4		3	■
UEH3A-030	3.0	8	50	4		3	■
UEH3A-035	3.5	10	50	4		3	■
UEH3A-040	4.0	11	50	4		3	■

UEH3-030	3.0	8	50	6		3	■
UEH3-040	4.0	11	50	6		3	■
UEH3-050	5.0	13	50	6		3	■
UEH3-060	6.0	16	50	6		3	■
UEH3-070	7.0	18	60	8		3	■
UEH3-080	8.0	20	60	8		3	■
UEH3-090	9.0	25	75	10		3	■
UEH3-100	10.0	30	75	10		3	■
UEH3-120	12.0	30	75	12		3	■
UEH3-160	16.0	40	100	16		3	■
UEH3-200	20.0	50	100	20		3	■

Recommended work material 推薦可加工材料 ■ Preferred suitable 最適用 □ Suitable 適用

ULTRA (D)	Steel < HRC32 碳鋼/合金鋼	HRC32 ~ 48 合金/預硬鋼	HRC49 ~ 55 熱處理鋼	HRC 56 ~ 60 熱處理鋼	Stainless 不鏽鋼	Cast Iron 鑄鐵

FEATURE：Widely used , new ULTRA (D) TIALN+ coating useful for HSM (DRY CUT), covering from carbon steels to hardened steels (Up to HRC 48)

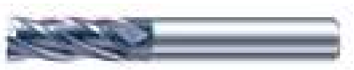
Ultra Fine Grain Carbide Endmills－4 Flutes、Standard Cut Length

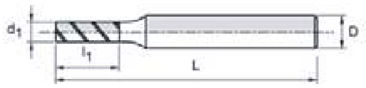
極細微粒鎢鋼、端銑刀 — 4 刃、標準刃長

Size: D1.0 ~ D20.0

UES4 (A)

Carbide	Coating	Helix	HRC	V-Speed	Rake Angle
Grain Ultra-Fine	ULTRA TIALN+	30°	55	N/HSM	Positive





Dimension(mm) / Desig nation	刃徑 d_1	刃長 l_1	全長 L	柄徑 D		刃數 Z	Coating 鍍膜 ULTRA (D)
UES4A-010	1.0	3	50	4 (*)		4	■
UES4A-015	1.5	4	50	4 (*)		4	■
UES4A-020	2.0	6	50	4 (*)		4	■
UES4A-025	2.5	8	50	4 (*)		4	■
UES4A-030	3.0	8	50	4 (*)		4	■
UES4A-035	3.5	10	50	4		4	■
UES4A-040	4.0	11	50	4		4	■
UES4-030	3.0	8	50	6		4	■
UES4-040	4.0	11	50	6		4	■
UES4-045	4.5	12	50	6		4	■
UES4-050	5.0	13	50	6		4	■
UES4-055	5.5	14	50	6		4	■
UES4-060	6.0	16	50	6		4	■
UES4-065	6.5	16	60	8		4	■
UES4-070	7.0	18	60	8		4	■
UES4-080	8.0	20	60	8		4	■
UES4-085	8.5	25	75	10		4	■
UES4-090	9.0	25	75	10		4	■
UES4-095	9.5	25	75	10		4	■
UES4-100	10.0	30	75	10		4	■
UES4-110	11.0	30	75	12		4	■
UES4-120	12.0	30	75	12		4	■
UES4-140	14.0	35	100	14		4	■
UES4-160	16.0	40	100	16		4	■
UES4-180	18.0	40	100	18		4	□
UES4-200	20.0	50	100	20		4	■

(※) Mark : Customized orders for shank diameter 3.0 mm is also available　標示(※)者：可另外訂製柄徑3.0mm

Recommended work material　推薦可加工材料　■ Preferred suitable 最適用　□ Suitable 適用

	Steel < HRC32	HRC32 ~ 48	HRC49 ~ 55	HRC 56 ~ 60	Stainless	Cast Iron
ULTRA (D)	碳鋼/合金鋼	合金/預硬鋼	熱處理鋼	熱處理鋼	不鏽鋼	鑄鐵

FEATURE：Widely used , new ULTRA (D) TIALN+ coating useful for HSM (DRY CUT), covering from carbon steels to hardened steels (Up to HRC 55)

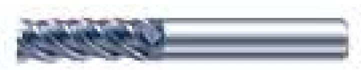
Ultra Fine Grain Carbide Endmills－4 Flutes、Cut Length = Outside Diameter

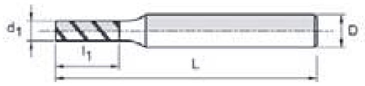
極細微粒鎢鋼、端銑刀 — 4 刃、刃長 = 外徑 X 3倍

Size: D2.0 ~ D20.0

UEH4

Carbide	Coating	Helix	HRC	V-Speed	Rake Angle
Grain Ultra-Fine	ULTRA TIALN+	45°	55	N/HSM	Positive





Dimension(mm) / Desig nation	刃徑 d_1	刃長 l_1	全長 L	柄徑 D		刃數 Z	Coating 鍍膜 ULTRA (D)
UEH4-020-060	2.0	6	50	6		4	■
UEH4-030-090	3.0	9	50	6		4	■
UEH4-040-120	4.0	12	50	6		4	■
UEH4-050-150	5.0	15	50	6		4	■
UEH4-060-180	6.0	18	50	6		4	■
UEH4-070-210	7.0	21	60	8		4	□
UEH4-080-240	8.0	24	60	8		4	■
UEH4-090-270	9.0	27	75	10		4	□
UEH4-100-300	10.0	30	75	10		4	■
UEH4-120-360	12.0	36	75	12		4	■
UEH4-160-480	16.0	48	100	16		4	■
UEH4-200-600	20.0	60	120	20		4	□

Recommended work material 推薦可加工材料 ■ Preferred suitable 最適用 □ Suitable 適用

ULTRA (D)	Steel < HRC32 碳鋼/合金鋼	HRC32 ~ 48 合金/預硬鋼	HRC49 ~ 55 熱處理鋼	HRC 56 ~ 60 熱處理鋼	Stainless 不鏽鋼	Cast Iron 鑄鐵

FEATURE：Widely used , new ULTRA (D) TIALN+ coating useful for HSM (DRY CUT), covering from carbon steels to hardened steels (Up to HRC 55)

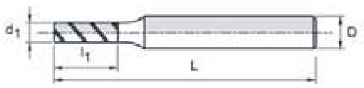
Ultra Fine Grain Carbide Endmills－2 Flutes、Long Cut Length

極細微粒鎢鋼、端銑刀 — 2 刃、長刃

Size: D1.0 ~ D16.0

UELS2 (A)

Carbide	Coating	Helix	HRC	V-Speed	Rake Angle
Grain Ultra-Fine	ULTRA TIALN+	30°	48	N/HSM	Positive



Dimension(mm) / Desig nation	刃徑 d_1	刃長 l_1	全長 L	柄徑 D		刃數 Z	Coating 鍍膜 ULTRA (D)
UELS2A-010	1.0	6	50	4		2	■
UELS2A-015	1.5	8	50	4		2	■
UELS2A-020	2.0	10	50	4		2	■
UELS2A-025	2.5	13	50	4		2	□
UELS2-030	3.0	15	60	6		2	■
UELS2-035	3.5	15	60	6		2	□
UELS2-040	4.0	20	60	6		2	■
UELS2-045	4.5	20	60	6		2	□
UELS2-050	5.0	25	75	6		2	■
UELS2-055	5.5	25	75	6		2	□
UELS2-060	6.0	30	75	6		2	■
UELS2-070	7.0	35	75	8		2	□
UELS2-080	8.0	40	100	8		2	■
UELS2-090	9.0	45	100	10		2	□
UELS2-100	10.0	50	100	10		2	■
UELS2-120	12.0	50	100	12		2	■
UELS2-140	14.0	70	150	14		2	□
UELS2-160	16.0	70	150	16		2	□

Recommended work material 推薦可加工材料 ■ Preferred suitable 最適用 □ Suitable 適用

ULTRA (D)	Steel < HRC32 碳鋼/合金鋼	HRC32 ~ 48 合金/預硬鋼	HRC49 ~ 55 熱處理鋼	HRC 56 ~ 60 熱處理鋼	Stainless 不鏽鋼	Cast Iron 鑄鐵

FEATURE：Widely used , new ULTRA (D) TIALN+ coating useful for HSM (DRY CUT), covering from carbon steels to hardened steels (Up to HRC 48)

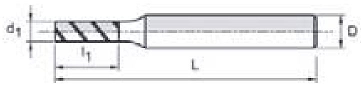
Ultra Fine Grain Carbide Endmills — 4 Flutes、Long Cut Length

極細微粒鎢鋼、端銑刀 — 4 刃、長刃

Size: D1.0 ~ D20.0

UELH4 (A)

Carbide	Coating	Helix	HRC	V-Speed	Rake Angle
Grain Ultra-Fine	ULTRA TIALN+	45°	55	N/HSM	Positive



Dimension(mm) / Desig nation	刃徑 d_1	刃長 l_1	全長 L	柄徑 D		刃數 Z	Coating 鍍膜 ULTRA (D)
UELH4 A-010	1.0	6	50	4		4	□
UELH4 A-015	1.5	8	50	4		4	□
UELH4 A-020	2.0	10	50	4		4	□
UELH4 A-025	2.5	13	50	4		4	□
UELH4-030	3.0	15	60	6		4	■
UELH4-035	3.5	15	60	6		4	□
UELH4-040	4.0	20	60	6		4	■
UELH4-045	4.5	20	60	6		4	□
UELH4-050	5.0	25	75	6		4	■
UELH4-055	5.5	30	75	6		4	■
UELH4-060	6.0	30	75	6		4	■
UELH4-070	7.0	35	75	8		4	□
UELH4-080	8.0	40	100	8		4	■
UELH4-090	9.0	50	100	10		4	□
UELH4-100	10.0	50	100	10		4	■
UELH4-120	12.0	50	100	12		4	■
UELH4-140	14.0	70	150	14		4	□
UELH4-160	16.0	70	150	16		4	■
UELH4-200	20.0	70	150	20		4	■

Recommended work material 推薦可加工材料 ■ Preferred suitable 最適用 □ Suitable 適用

ULTRA (D)	Steel < HRC32 碳鋼/合金鋼	HRC32 ~ 48 合金/預硬鋼	HRC49 ~ 55 熱處理鋼	HRC 56 ~ 60 熱處理鋼	Stainless 不鏽鋼	Cast Iron 鑄鐵

FEATURE：Widely used , new ULTRA (D) TIALN+ coating useful for HSM (DRY CUT), covering from carbon steels to hardened steels (Up to HRC 55)

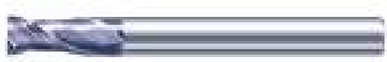
Ultra Fine Grain Carbide Endmills、Long Shank — 2 / 4 Flutes、Standard Cut Length

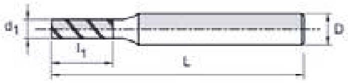
極細微粒鎢鋼、端銑刀、長柄 — 2 / 4 刃、標準刃長

Size: D2.0 ~ D12.0

ULS2 (A)

Carbide	Coating	Helix	HRC	V-Speed	Rake Angle
Grain Ultra-Fine	ULTRA TIALN+	30°	48	N/HSM	Positive



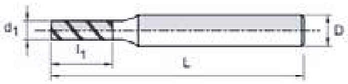


Dimension(mm) / Desig nation	刃徑 d_1	刃長 l_1	全長 L	柄徑 D		刃數 Z	Coating 鍍膜 ULTRA (D)
ULS2A-020	2.0	6	75	4		2	■
ULS2A-030	3.0	8	75	4		2	■
ULS2A-040	4.0	11	75	4		2	■
ULS2-050	5.0	13	100	6		2	■
ULS2-060	6.0	16	100	6		2	■
ULS2-080	8.0	20	100	8		2	■
ULS2-100	10.0	25	100	10		2	■
ULS2-120	12.0	30	100	12		2	■

Size: D2.0 ~ D16.0

ULS4 (A)

Carbide	Coating	Helix	HRC	V-Speed	Rake Angle
Grain Ultra-Fine	ULTRA TIALN+	30°	48	N/HSM	Positive



Dimension(mm) / Desig nation	刃徑 d_1	刃長 l_1	全長 L	柄徑 D		刃數 Z	Coating 鍍膜 ULTRA (D)
ULS4A-020	2.0	6	75	4		4	■
ULS4A-030	3.0	8	75	4		4	■
ULS4A-040	4.0	11	75	4		4	■
ULS4-050	5.0	13	100	6		4	■
ULS4-060	6.0	16	100	6		4	■
ULS4-080	8.0	20	100	8		4	■
ULS4-100	10.0	25	100	10		4	■
ULS4-120	12.0	30	100	12		4	■

Recommended work material 推薦可加工材料 ■ Preferred suitable 最適用 □ Suitable 適用

ULTRA (D)	Steel < HRC32 碳鋼/合金鋼	HRC32 ~ 48 合金/預硬鋼	HRC49 ~ 55 熱處理鋼	HRC 56 ~ 60 熱處理鋼	Stainless 不鏽鋼	Cast Iron 鑄鐵

FEATURE：Widely used , new ULTRA (D) TIALN+ coating useful for HSM (DRY CUT), covering from carbon steels to hardened steels (Up to HRC 48)

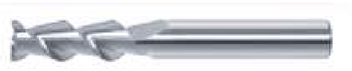
AX Series -Ultra Fine Grain Carbide Endmills / HSM For Copper & Aluminum－2 Flutes、Standard Cut Length

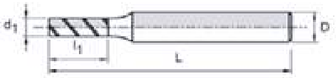
極細微粒鎢鋼、端銑刀 ／ 高速切削－銅鋁加工用2/3刃，標準刃長

Size: D3.0 ~ D20.0

UEA2 (3)

Carbide	Coating	Helix	V-Speed	Rake Angle
Grain Ultra-Fine	TDC	45°	N/HSM	Positive





Dimension(mm) / Desig nation	刃徑 d_1	刃長 l_1	全長 L	柄徑 D			刃數 Z	Coating 鍍膜 UNCOATED	TDC(C)
UEA2-030	3.0	9	50	6			2	■	□
UEA2-040	4.0	12	50	6			2	■	□
UEA2-050	5.0	15	50	6			2	■	□
UEA2/3-060	6.0	18	50	6			2/3	■	□
UEA2/3-080	8.0	24	60	8			2/3	■	□
UEA2/3-100	10.0	30	75	10			2/3	■	□
UEA2/3-120	12.0	32	75	12			2/3	■	□
UEA3-160	16.0	45	100	16			3	■	□
UEA3-200	20.0	50	100	20			3	■	□

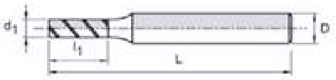
AX Series -Ultra Fine Grain Carbide Endmills / HSM For Copper & Aluminum－2/3 Flutes、Standard Cut Length

極細微粒鎢鋼、端銑刀 ／ 高速切削－銅鋁加工用2/3刃，標準刃長

Size: D4.0 ~ D20.0

UEAS2 (3)

Carbide	Coating	Helix	V-Speed	Rake Angle
Grain Ultra-Fine	TDC	55°	N/HSM	Positive



Dimension(mm) / Desig nation	刃徑 d_1	刃長 l_1	全長 L	柄徑 D			刃數 Z	Coating 鍍膜 UNCOATED	TDC(C)
UEAS2/3-040	4.0	12	50	4			2/3	■	□
UEAS2/3-060	6.0	18	50	6			2/3	■	□
UEAS2/3-080	8.0	24	60	8			2/3	■	□
UEAS2/3-100	10.0	30	75	10			2/3	■	□
UEAS2/3-120	12.0	32	75	12			2/3	■	□
UEAS3-160	16.0	45	100	16			3	■	□
UEAS3-200	20.0	50	100	20			3	■	□

Recommended work material 推薦可加工材料 Preferred suitable 最適用 Suitable 適用

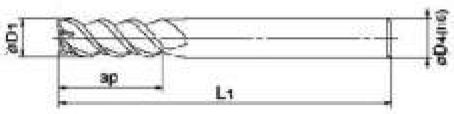
TDC (C)	Al-alloy 鋁合金	Copper 銅	
UNCOATED	Al-alloy 鋁合金	Copper 銅	Synthetics 合成材料

FEATURE：For copper and aluminum alloys , optimized flute design to improved the ability of chip discharge and provide an excellent machined surface

REA3

鋁用圓溝 3 刃銑刀

Square End Mills, 3 flutes for aluminum material.



* 開槽及鑽孔均可使用的 3 刃銑刀。
* 不規則螺旋角度的性能在降低雜音。
* 3 flute end mill for both plunging and slotting.
* Featuring irregular helical geometry for reduced chattering.

產品型號 Item No.	尺寸 Size(mm)				刃數 No.of flutes T	Coating 鍍膜
	刃徑 Diameter D1	刃長 Length of Cut ap	全長 Overall Length L1	柄徑 shank Da D4		UNCOATED
REA3A - UF12-040	4.0	12	50	4	3	■
REA3A - UF12-030	3.0	9	50	6	3	■
REA3A - UF12-040	4.0	12	50	6	3	■
REA3A - UF12-050	5.0	15	50	6	3	■
REA3A - UF12-060	6.0	18	50	6	3	■
REA3A - UF12-080	8.0	24	60	8	3	■
REA3A - UF12-100	10.0	30	10	75	3	■
REA3A - UF12-120	12.0	32	12	75	3	■
REA3A - UF12-140	14.0	40	14	100	3	■
REA3A - UF12-160	16.0	45	16	100	3	■

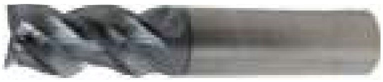
Recommended work material 推薦可加工材料 Preferred suitable 最適用 Suitable 適用

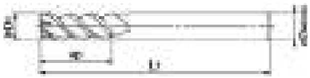
UNCOATED	Aluminum 鋁合金	Composite Materials FRP CFRP Kevlar 玻璃纖維 碳纖維 功夫龍	Copper Alloy 銅合金

REA3

鋁用圓溝 3 刃銑刀

Square End Mills, 3 flutes for aluminum material.





* 開槽及鑽孔均可使用的 3 刃銑刀。
* 不規則螺旋角度的性能在降低雜音。
* 3 flute end mill for both plunging and slotting.
* Featuring irregular helical geometry for reduced chattering.

產品型號 Item No.	尺寸 Size(mm)				刃數 No.of flutes T	Coating 鍍膜
	刃 徑 Diameter D1	刃 長 Length of Cut ap	全 長 Overall Length L1	柄徑 shank Da D4		TDC(D)
REA3A - UF12-040	4.0	12	50	4	3	☐
REA3A - UF12-030	3.0	9	50	6	3	☐
REA3A - UF12-040	4.0	12	50	6	3	☐
REA3A - UF12-050	5.0	15	50	6	3	☐
REA3A - UF12-060	6.0	18	50	6	3	☐
REA3A - UF12-080	8.0	24	60	8	3	☐
REA3A - UF12-100	10.0	30	10	75	3	☐
REA3A - UF12-120	12.0	32	12	75	3	☐
REA3A - UF12-140	14.0	40	14	100	3	☐
REA3A - UF12-160	16.0	45	16	100	3	☐

Recommended work material 推薦可加工材料 Preferred suitable 最適用 Suitable 適用

TDC(D)	Aluminum 鋁合金	Composite Materials FRP CFRP Kevlar 玻璃纖維 碳纖維 功夫龍	Copper Alloy 銅合金	Graphite 石墨

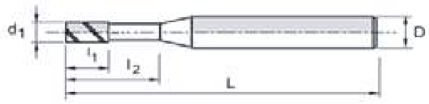
Ultra Fine Grain Carbide Endmills 、 Long Neck－2 Flutes、Short Cut Length

極細微粒鎢鋼、端銑刀、長頸 — 2 刃、短刃

Size: D1.0 ～ D3.0

HEN2

Carbide	Coating	Helix	HRC	V-Speed	Rake Angle
Grain Ultra-Fine	ULTRA TIALN+	30°	55	N/HSM	Positive



Dimension(mm) / Desig nation	刃徑 d_1	有效長 l_2	刃長 l_1	全長 L	柄徑 D	刃數 Z	Coating 鍍膜 ULTRA (D)
HEN2-010-6	1.0	6	1.5	50	4	2	■
HEN2-010-8	1.0	8	1.5	50	4	2	■
HEN2-010-10	1.0	10	1.5	50	4	2	■
HEN2-010-12	1.0	12	1.5	50	4	2	■
HEN2-010-16	1.0	16	1.5	50	4	2	■
HEN2-010-20	1.0	20	1.5	50	4	2	■
HEN2-015-8	1.5	8	2.5	50	4	2	■
HEN2-015-10	1.5	10	2.5	50	4	2	■
HEN2-015-12	1.5	12	2.5	50	4	2	■
HEN2-015-16	1.5	16	2.5	50	4	2	■
HEN2-015-20	1.5	20	2.5	50	4	2	■
HEN2-020-8	2.0	8	3.0	50	4	2	■
HEN2-020-10	2.0	10	3.0	50	4	2	■
HEN2-020-12	2.0	12	3.0	50	4	2	■
HEN2-020-16	2.0	16	3.0	50	4	2	■
HEN2-020-20	2.0	20	3.0	50	4	2	■
HEN2-025-12	2.5	12	3.5	50	4	2	■
HEN2-025-16	2.5	16	3.5	50	4	2	■
HEN2-025-20	2.5	20	3.5	50	4	2	■
HEN2-025-25	2.5	25	3.5	50	4	2	■
HEN2-030-12	3.0	12	4.5	50	6	2	■
HEN2-030-16	3.0	16	4.5	50	6	2	■
HEN2-030-20	3.0	20	4.5	50	6	2	■
HEN2-030-30	3.0	30	4.5	75	6	2	■

Re commended work material 推薦可加工材料 ■ Preferred su itable 最適用 ■ Suit able 適用

ULTRA (D)	Steel < HRC32 碳鋼/合金鋼	HRC32 ~ 48 合金/預硬鋼	HRC49 ~ 55 熱處理鋼	HRC 56 ~ 60 熱處理鋼	Stainless 不鏽鋼	Cast Iron 鑄鐵

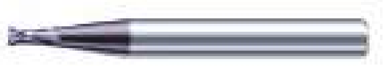
FEATURE：Suitable for rib processing , new ULTRA (D) TIALN+ coating useful for HSM (DRY CUT), covering from carbon steels to hardened steels (Up to HRC 55)

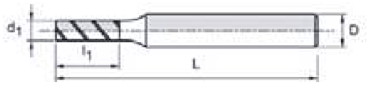
MX 900 Series -Ultra Fine Grain Carbide Micro Endmills－2 Flutes、Cut Length = Outside Diameter X 2

極細微粒鎢鋼、微小徑、端銑刀 — 2 刃、刃長 = 外徑 X2倍
Size: D0.2 ~ D3.0

MES2A

Carbide	Coating	Helix	HRC	V-Speed	Rake Angle
Grain Ultra-Fine	ULTRA TIALN+	30°	55	N/HSM	Positive





Dimension(mm) / Desig nation	刃徑 d_1	刃長 l_1	全長 L	柄徑 D		刃數 Z	Coating 鍍膜 ULTRA (D)
MES2A-002-004	0.2	0.4	50	4 (*)		2	■
MES2A-003-006	0.3	0.6	50	4 (*)		2	■
MES2A-004-008	0.4	0.8	50	4 (*)		2	■
MES2A-005-010	0.5	1.0	50	4 (*)		2	■
MES2A-006-012	0.6	1.2	50	4 (*)		2	■
MES2A-007-014	0.7	1.4	50	4 (*)		2	■
MES2A-008-016	0.8	1.6	50	4 (*)		2	■
MES2A-009-018	0.9	1.8	50	4 (*)		2	■
MES2A-010-020	1.0	2.0	50	4 (*)		2	■
MES2A-012-024	1.2	2.4	50	4 (*)		2	□
MES2A-015-030	1.5	3.0	50	4 (*)		2	□
MES2A-018-036	1.8	3.6	50	4 (*)		2	□
MES2A-020-040	2.0	4.0	50	4 (*)		2	■
MES2A-025-050	2.5	5.0	50	4 (*)		2	□
MES2A-030-060	3.0	6.0	50	4 (*)		2	□

(✱) Mark : Customized orders for shank diameter 3.0 mm is also available 標示(✱)者：可另外訂製柄徑3.0mm

Recommended work material 推薦可加工材料 ■ Preferred suitable 最適用 □ Suitable 適用

	Steel < HRC32 碳鋼/合金鋼	HRC32 ~ 48 合金/預硬鋼	HRC49 ~ 55 熱處理鋼	Stainless 不鏽鋼	Cast Iron 鑄鐵	Copper 銅
ULTRA (D)	■	■	■	□	□	□

FEATURE：Widely used , new ULTRA (D) TIALN+ coating useful for HSM (DRY CUT), covering from carbon steels to hardened steels (Up to HRC 55)

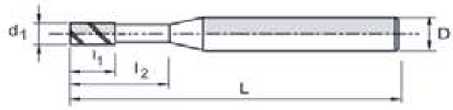
MX 900 Series -Ultra Fine Grain Carbide Micro Endmills、Long Neck－2 Flutes、Short Cut Length

極細微粒鎢鋼、微小徑端銑刀、長頸－２刃、短刃

Size: D0.4 ~ D0.9

MEN2A

Carbide	Coating	Helix	HRC	V-Speed	Rake Angle
Grain Ultra-Fine	ULTRA TIALN+	30°	55	N/HSM	Positive



Dimension(mm) / Desig nation	刃徑 d_1	有效長 l_2	刃長 l_1	全長 L	柄徑 D	刃數 Z	Coating 鍍膜 ULTRA (D)
MEN2A-004-2	0.4	2	0.6	50	4 (*)	2	□
MEN2A-004-3	0.4	3	0.6	50	4 (*)	2	□
MEN2A-004-4	0.4	4	0.6	50	4 (*)	2	□
MEN2A-004-5	0.4	5	0.6	50	4 (*)	2	□
MEN2A-005-2	0.5	2	0.7	50	4 (*)	2	□
MEN2A-005-4	0.5	4	0.7	50	4 (*)	2	□
MEN2A-005-6	0.5	6	0.7	50	4 (*)	2	□
MEN2A-005-8	0.5	8	0.7	50	4 (*)	2	□
MEN2A-006-2	0.6	2	0.9	50	4 (*)	2	□
MEN2A-006-4	0.6	4	0.9	50	4 (*)	2	□
MEN2A-006-6	0.6	6	0.9	50	4 (*)	2	□
MEN2A-006-8	0.6	8	0.9	50	4 (*)	2	□
MEN2A-007-4	0.7	4	1.0	50	4 (*)	2	□
MEN2A-007-6	0.7	6	1.0	50	4 (*)	2	□
MEN2A-007-8	0.7	8	1.0	50	4 (*)	2	□
MEN2A-007-10	0.7	10	1.0	50	4 (*)	2	□
MEN2A-008-4	0.8	4	1.2	50	4 (*)	2	□
MEN2A-008-6	0.8	6	1.2	50	4 (*)	2	□
MEN2A-008-8	0.8	8	1.2	50	4 (*)	2	□
MEN2A-008-12	0.8	12	1.2	50	4 (*)	2	□
MEN2A-009-6	0.9	6	1.3	50	4 (*)	2	□
MEN2A-009-8	0.9	8	1.3	50	4 (*)	2	□
MEN2A-009-10	0.9	10	1.3	50	4 (*)	2	□
MEN2A-009-15	0.9	15	1.3	50	4 (*)	2	□

(⁎) Mark : Customized orders for shank diameter 3.0 mm is also available 標示(⁎)者：可另外訂製柄徑3.0mm

Recommended work material 推薦可加工材料 Preferred suitable 最適用 Suitable 適用

ULTRA (D)	Steel < HRC32 碳鋼/合金鋼	HRC32 ~ 48 合金/預硬鋼	HRC49 ~ 55 熱處理鋼	Stainless 不鏽鋼	Cast Iron 鑄鐵	Copper 銅

FEATURE：Suitable for rib processing , new ULTRA (D) TIALN+ coating useful for HSM (DRY CUT), covering from carbon steels to hardened steels(Up to HRC 55)

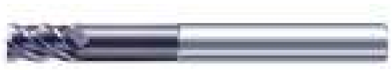
MX 900 Series -Ultra Fine Grain Carbide Endmills、Long Shank一4 Flutes、Short Cut Length

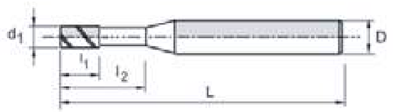
極細微粒鎢鋼、端銑刀— 4 刃、短刃

Size: D3.0 ~ D16.0

MEHD4 / MLHD4

Carbide	Coating	Helix	HRC	V-Speed	Rake Angle
Grain Ultra-Fine	ULTRA TIALN+	30°	65	N/HSM	Positive





Standard 標準長

Dimension(mm) / Desig nation	刃徑 d_1	有效長 l_2	刃長 l_1	全長 L	柄徑 D	刃數 Z	Coating 鍍膜 ULTRA (D)
MEHD4-030-12	3.0	12	4.5	50	6	4	■
MEHD4-040-16	4.0	16	6.0	50	6	4	■
MEHD4-050-18	5.0	18	7.5	50	6	4	■
MEHD4-060-20	6.0	20	9.0	50	6	4	■
MEHD4-080-26	8.0	26	12.0	60	8	4	■
MEHD4-100-30	10.0	30	15.0	75	10	4	■
MEHD4-120-36	12.0	36	18.0	75	12	4	■
MEHD4-160-45	16.0	45	24.0	100	16	4	□

Long Shank 長柄

Dimension(mm) / Desig nation	刃徑 d_1	有效長 l_2	刃長 l_1	全長 L	柄徑 D	刃數 Z	Coating 鍍膜 ULTRA (D)
MLHD4-030-15	3.0	15	4.5	75	6	4	■
MLHD4-040-20	4.0	20	6.0	75	6	4	■
MLHD4-050-25	5.0	25	7.5	75	6	4	■
MLHD4-060-30	6.0	30	9.0	75	6	4	■
MLHD4-080-40	8.0	40	12.0	100	8	4	■
MLHD4-100-40	10.0	40	15.0	100	10	4	■
MLHD4-120-50	12.0	50	18.0	100	12	4	■
MLHD4-160-60	16.0	60	24.0	120	16	4	□

Recommended work material 推薦可加工材料 ■ Preferred suitable 最適用 □ Suitable 適用

ULTRA (D)	HRC32 ~ 48 合金/預硬鋼	HRC49 ~ 55 熱處理鋼	HRC56 ~ 65 熱處理鋼	Ti-alloy 鈦合金	Cast Iron 鑄鐵

FEATURE：New ULTRA (D) TIALN+ coating useful for HSM- and hardened steel milling (Up to HRC 65 - DRY CUT)

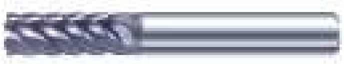
MX 900 Series -Ultra Fine Grain Carbide Multiple Flute Endmills / HSM－6 / 8 Flutes、Standard Cut Length

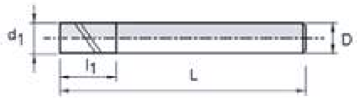
極細微粒鎢鋼、端銑刀 / 高速切削— 6/8 刃、標準刃長

Size: D6.0 ~ D25.0

MEH6 / 8

Carbide	Coating	Helix	HRC	V-Speed	Rake Angle
Grain Ultra-Fine	ULTRA TIALN+	45°	65	HSM	Negative





Dimension(mm) / Desig nation	刃徑 d_1	刃長 l_1	全長 L	柄徑 D		刃數 Z	Coating 鍍膜 ULTRA (D)
MEH6-060	6.0	15	50	6		6	■
MEH6-080	8.0	20	60	8		6	■
MEH6-100	10.0	30	75	10		6	■
MEH6-120	12.0	30	75	12		6	■
MEH6-160	16.0	45	100	16		6	■
MEH8-200	20.0	45	100	20		8	□
MEH8-250	25.0	45	100	25		8	□

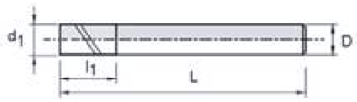
MX 900 Series -Ultra Fine Grain Carbide Multiple Flute Endmills / HSM－6 / 8 Flutes、Long Cut Length

極細微粒鎢鋼、端銑刀 / 高速切銷— 6/8 刃、長刃

Size: D6.0 ~ D25.0

MELH6 / 8

Carbide	Coating	Helix	HRC	V-Speed	Rake Angle
Grain Ultra-Fine	ULTRA TIALN+	45°	65	HSM	Negative



Dimension(mm) / Desig nation	刃徑 d_1	刃長 l_1	全長 L	柄徑 D		刃數 Z	Coating 鍍膜 ULTRA (D)
MEL H6-060	6.0	25	75	6		6	■
MEL H6-080	8.0	40	100	8		6	■
MEL H6-100	10.0	45	100	10		6	■
MEL H6-120	12.0	45	100	12		6	■
MEL H6-160	16.0	70	150	16		6	■
MEL H8-200	20.0	80	150	20		8	□
MEL H8-250	25.0	80	150	25		8	□

Recommended work material 推薦可加工材料 Preferred suitable 最適用 Suitable 適用

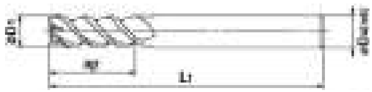
ULTRA (D)	Steel<HRC32 碳鋼/合金鋼	HRC32 ~ 48 合金/預硬鋼	HRC49 ~ 55 熱處理鋼	HRC56 ~ 65 熱處理鋼	Cast Iron 鑄鐵

FEATURE：New ULTRA (D) TIALN+ coating useful for hard finishing （DRY CUT）, covering from carbon steels to hardened steels (Up to HRC 65)

RE3

標準刃長 3 刃端銑刀

Endmill - Standard Cut Length, 3 flutes for plunging and slotting



* 開槽及鑽孔均可使用的 3 刃銑刀。
* 不規則螺旋角度的性能在降低雜音。
* 3 flute end mill for both plunging and slotting.
* Featuring irregular helical geometry for reduced chattering.

產品型號 Item No.	尺寸 Size(mm) 刃 徑 Diameter D1	刃 長 Length of Cut ap	全 長 Overall Length L1	柄徑 shank Da D4	刃數 No.of flutes T	Coating 鍍膜 UNCOATED
RE3A-UF12-SF-020	2.0	6	50	4	3	■
RE3A-UF12-SF-030	3.0	8	50	4	3	■
RE3A-UF12-SF-040	4.0	11	50	4	3	■
RE3-UF12-SF-020	2.0	6	50	6	3	■
RE3-UF12-SF-030	3.0	8	50	6	3	■
RE3-UF12-SF-040	4.0	11	50	6	3	■
RE3-UF12-SF-050	5.0	13	50	6	3	■
RE3-UF12-SF-060	6.0	16	60	6	3	■
RE3-UF12-SF-070	7.0	18	60	8	3	■
RE3-UF12-SF-080	8.0	20	70	8	3	■
RE3-UF12-SF-090	9.0	25	70	10	3	■
RE3-UF12-SF-100	10.0	30	80	10	3	■
RE3-UF12-SF-110	11.0	30	80	12	3	■
RE3-UF12-SF-120	12.0	30	90	12	3	■
RE3-UF12-SF-130	13.0	32	90	12	3	■
RE3-UF12-SF-140	14.0	35	90	12	3	■
RE3-UF12-SF-150	15.0	38	110	16	3	■
RE3-UF12-SF-160	16.0	40	110	16	3	■

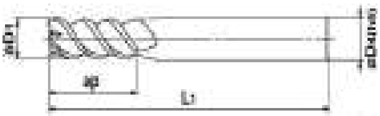
Recommended work material 推薦可加工材料 ■ Preferred suitable 最適用 □ Suitable 適用

UNCOATED	Mild Steels 一般構造用鋼	Pre-Hardened Seels 預硬鋼	Hardened Steels 調質鋼	Carbon steels 碳素鋼	Stainless Steels SUS 3xx SUS 2xx 奧氏體不銹鋼
	Stainless Steels SUS 4xx SUS 6xx 鐵素體 馬氏體不銹鋼	Fe-Base Alloy Fe 351 Fe353 鐵基高溫合金	Ni-Base Alloy Co-Base Alloy 鎳基 鈷基高溫合金	Titanium Alloy 鈦合金	

RE3

標準刃長 3 刃端銑刀

Endmill - Standard Cut Length, 3 flutes for plunging and slotting



* 開槽及鑽孔均可使用的 3 刃銑刀。
* 不規則螺旋角度的性能在降低雜音。
* 3 flute end mill for both plunging and slotting.
* Featuring irregular helical geometry for reduced chattering.

產品型號 Item No.	尺寸 Size(mm) 刃 徑 Diameter D1	刃 長 Length of Cut ap	全 長 Overall Length L1	柄徑 shank Da D4	刃數 No.of flutes T	Coating 鍍膜 UNCOATED
RE3A-UF12-TSI-020	2.0	6	50	4	3	■
RE3A-UF12-TSI-030	3.0	8	50	4	3	■
RE3A-UF12-TSI-040	4.0	11	50	4	3	■
RE3-UF12-TSI-020	2.0	6	50	6	3	■
RE3-UF12-TSI-030	3.0	8	50	6	3	■
RE3-UF12-TSI-040	4.0	11	50	6	3	■
RE3-UF12-TSI-050	5.0	13	50	6	3	■
RE3-UF12-TSI-060	6.0	16	60	6	3	■
RE3-UF12-TSI-070	7.0	18	60	8	3	■
RE3-UF12-TSI-080	8.0	20	70	8	3	■
RE3-UF12-TSI-090	9.0	25	70	10	3	■
RE3-UF12-TSI-100	10.0	30	80	10	3	■
RE3-UF12-TSI-110	11.0	30	80	12	3	■
RE3-UF12-TSI-120	12.0	30	90	12	3	■
RE3-UF12-TSI-130	13.0	32	90	12	3	■
RE3-UF12-TSI-140	14.0	35	90	12	3	■
RE3-UF12-TSI-150	15.0	38	110	16	3	■
RE3-UF12-TSI-160	16.0	40	110	16	3	■

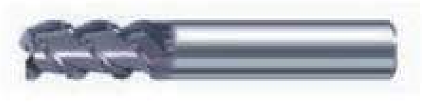
Recommended work material 推薦可加工材料 Preferred suitable 最適用 Suitable 適用

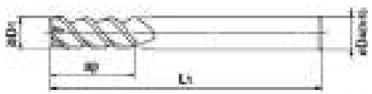
UNCOATED	Mild Steels 一般構造用鋼	Carbon steels 碳素鋼	Pre-Hardened Seels 預硬鋼	Hardened Steels 調質鋼	Hardened Steels 40-50HRC 高硬度鋼
	Hardened Steels 50-60 HRC 高硬度鋼	Ductile Iron FC FCD 灰口鑄鐵 球墨鑄鐵	Malleable Iron KTH KTZ KTB 可鍛鑄鐵	Stainless Steels SUS 3xx SUS 2xx 奧氏體不銹鋼	Stainless Steels SUS 4xx SUS 6xx 鐵素體 馬氏體不銹鋼
	Fe-Base Alloy Fe 351 Fe353 鐵基高溫合金	Ni-Base Alloy Co-Base Alloy 鎳基 鈷基高溫合金	Titanium Alloy 鈦合金		

RE3

標準刃長 3 刃端銑刀

Endmill - Standard Cut Length, 3 flutes for plunging and slotting





* 開槽及鑽孔均可使用的 3 刃銑刀。
* 不規則螺旋角度的性能在降低雜音。
* 3 flute end mill for both plunging and slotting.
* Featuring irregular helical geometry for reduced chattering.

產品型號 Item No.	尺寸 Size(mm) 刃 徑 Diameter D1	刃 長 Length of Cut ap	全 長 Overall Length L1	柄徑 shank Da D4	刃數 No.of flutes T	Coating 鍍膜 UNCOATED
RE3A -UF12-ATC-020	2.0	6	50	4	3	■
RE3A -UF12-ATC-030	3.0	8	50	4	3	■
RE3A -UF12-ATC-040	4.0	11	50	4	3	■
RE3-UF12-ATC-020	2.0	6	50	6	3	■
RE3-UF12-ATC-030	3.0	8	50	6	3	■
RE3-UF12-ATC-040	4.0	11	50	6	3	■
RE3-UF12-ATC-050	5.0	13	50	6	3	■
RE3-UF12-ATC-060	6.0	16	60	6	3	■
RE3-UF12-ATC-070	7.0	18	60	8	3	■
RE3-UF12-ATC-080	8.0	20	70	8	3	■
RE3-UF12-ATC-090	9.0	25	70	10	3	■
RE3-UF12-ATC-100	10.0	30	80	10	3	■
RE3-UF12-ATC-110	11.0	30	80	12	3	■
RE3-UF12-ATC-120	12.0	30	90	12	3	■
RE3-UF12-ATC-130	13.0	32	90	12	3	■
RE3-UF12-ATC-140	14.0	35	90	12	3	■
RE3-UF12-ATC-150	15.0	38	110	16	3	■
RE3-UF12-ATC-160	16.0	40	110	16	3	■

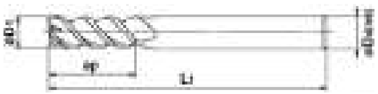
Recommended work material 推薦可加工材料 ■ Preferred suitable 最適用 ■ Suitable 適用

UNCOATED	Stainless Steels SUS 3xx SUS 2xx 奧氏體不銹鋼	Stainless Steels SUS 4xx SUS 6xx 鐵素體 馬氏體不銹鋼	Fe-Base Alloy Fe 351 Fe353 鐵基高溫合金	Ni-Base Alloy Co-Base Alloy 鎳基 鈷基高溫合金	Mild Steels 一般構造用鋼
	Carbon steels 碳素鋼	Pre-Hardened Seels 預硬鋼	Hardened Steels 調質鋼	Hardened Steels 40-50HRC 高硬度鋼	Malleable Iron KTH KTZ KTB 可鍛鑄鐵
	Titanium Alloy 鈦合金	Ductile Iron FC FCD 灰口鑄鐵 球墨鑄鐵			

RE3

標準刃長 3 刃端銑刀

Endmill-Standard Cut Length, 3 flutes for plunging and slotting



* 開槽及鑽孔均可使用的 3 刃銑刀。
* 不規則螺旋角度的性能在降低雜音。
* 3 flute end mill for both plunging and slotting.
* Featuring irregular helical geometry for reduced chattering.

產品型號 Item No.	尺寸 Size(mm) 刃 徑 Diameter D1	刃 長 Length of Cut ap	全 長 Overall Length L1	柄徑 shank Da D4	刃數 No.of flutes T	Coating 鍍膜 UNCOATED
RE3A -UF12-NCB-020	2.0	6	50	4	3	■
RE3A -UF12-NCB-030	3.0	8	50	4	3	■
RE3A -UF12-NCB-040	4.0	11	50	4	3	■
RE3-UF12-NCB-020	2.0	6	50	6	3	■
RE3-UF12-NCB-030	3.0	8	50	6	3	■
RE3-UF12-NCB-040	4.0	11	50	6	3	■
RE3-UF12-NCB-050	5.0	13	50	6	3	■
RE3-UF12-NCB-060	6.0	16	60	6	3	■
RE3-UF12-NCB-070	7.0	18	60	8	3	■
RE3-UF12-NCB-080	8.0	20	70	8	3	■
RE3-UF12-NCB-090	9.0	25	70	10	3	■
RE3-UF12-NCB-100	10.0	30	80	10	3	■
RE3-UF12-NCB-110	11.0	30	80	12	3	■
RE3-UF12-NCB-120	12.0	30	90	12	3	■
RE3-UF12-NCB-130	13.0	32	90	12	3	■
RE3-UF12-NCB-140	14.0	35	90	12	3	■
RE3-UF12-NCB-150	15.0	38	110	16	3	■
RE3-UF12-NCB-160	16.0	40	110	16	3	■

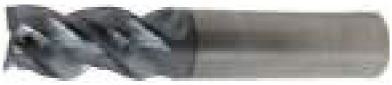
Recommended work material 推薦可加工材料 ■ Preferred suitable 最適用 □ Suitable 適用

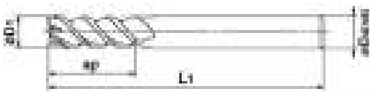
UNCOATED	Mild Steels 一般構造用鋼	Carbon steels 碳素鋼	Pre-Hardened Seels 預硬鋼	Hardened Steels 調質鋼	Hardened Steels 40-50HRC 高硬度鋼
	Hardened Steels 50-60 HRC 高硬度鋼	Ductile Iron FC FCD 灰口鑄鐵 球墨鑄鐵	Malleable Iron KTH KTZ KTB 可鍛鑄鐵	Stainless Steels SUS 3xx SUS 2xx 奧氏體不銹鋼	Stainless Steels SUS 4xx SUS 6xx 鐵素體 馬氏體不銹鋼

RE3

標準刃長 3 刃端銑刀

Endmill - Standard Cut Length, 3 flutes for plunging and slotting





* 開槽及鑽孔均可使用的 3 刃銑刀。
* 不規則螺旋角度的性能在降低雜音。
* 3 flute end mill for both plunging and slotting.
* Featuring irregular helical geometry for reduced chattering.

產品型號 Item No.	尺寸 Size(mm) 刃徑 Diameter D1	刃長 Length of Cut ap	全長 Overall Length L1	柄徑 shank Da D4	刃數 No.of flutes T	Coating 鍍膜 UNCOATED
RE3A -UF12-NC-020	2.0	6	50	4	3	■
RE3A -UF12-NC-030	3.0	8	50	4	3	■
RE3A -UF12-NC-040	4.0	11	50	4	3	■
RE3-UF12-NC-020	2.0	6	50	6	3	■
RE3-UF12-NC-030	3.0	8	50	6	3	■
RE3-UF12-NC-040	4.0	11	50	6	3	■
RE3-UF12-NC-050	5.0	13	50	6	3	■
RE3-UF12-NC-060	6.0	16	60	6	3	■
RE3-UF12-NC-070	7.0	18	60	8	3	■
RE3-UF12-NC-080	8.0	20	70	8	3	■
RE3-UF12-NC-090	9.0	25	70	10	3	■
RE3-UF12-NC-100	10.0	30	80	10	3	■
RE3-UF12-NC-110	11.0	30	80	12	3	■
RE3-UF12-NC-120	12.0	30	90	12	3	■
RE3-UF12-NC-130	13.0	32	90	12	3	■
RE3-UF12-NC-140	14.0	35	90	12	3	■
RE3-UF12-NC-150	15.0	38	110	16	3	■
RE3-UF12-NC-160	16.0	40	110	16	3	■

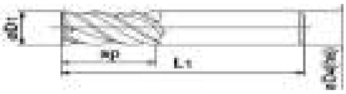
Recommended work material 推薦可加工材料 ■ Preferred suitable 最適用 □ Suitable 適用

UNCOATED	Ni-Base Alloy Co-Base Alloy 鎳基 鈷基高溫合金	Titanium Alloy 鈦合金	Stainless Steels SUS 3xx SUS 2xx 奧氏體不銹鋼	Stainless Steels SUS 4xx SUS 6xx 鐵素體 馬氏體不銹鋼	Fe-Base Alloy Fe 351 Fe353 鐵基高溫合金

RE4

標準刃長４刃，不規則螺旋角端銑刀

Endmill - Standard Cut Length, 4 flutes, Irregular helix flutes



* 智慧塗層振動控制銑刀對難切削的材料及有長形突出物的物件切削時，在減少雜音上表現出穩定的性能。

* SMART MIRACLE vibration control end mills for reduced chattering and for delivering a stable performance on difficult-to-cut materials and long overhang applications.

產品型號 Item No.	尺寸 Size(mm) 刃徑 Diameter D1	刃長 Length of Cut ap	全長 Overall Length L1	柄徑 shank Da D4	刃數 No.of flutes T	Coating 鍍膜 UNCOATED
RE4A-UF12-SF-030	3.0	9	50	4	4	■
RE4A-UF12-SF-040	4.0	12	50	4	4	■
RE4-UF12-SF-020	2.0	4	50	6	4	■
RE4-UF12-SF-025	2.5	5	50	6	4	■
RE4-UF12-SF-030	3.0	9	50	6	4	■
RE4-UF12-SF-035	3.5	8	50	6	4	■
RE4-UF12-SF-040	4.0	12	50	6	4	■
RE4-UF12-SF-050	5.0	14	50	6	4	■
RE4-UF12-SF-060	6.0	16	50	6	4	■
RE4-UF12-SF-070	7.0	19	60	8	4	■
RE4-UF12-SF-080	8.0	20	60	8	4	■
RE4-UF12-SF-090	9.0	22	75	10	4	■
RE4-UF12-SF-100	10.0	30	75	10	4	■
RE4-UF12-SF-110	11.0	30	75	12	4	■
RE4-UF12-SF-120	12.0	30	75	12	4	■
RE4-UF12-SF-140	14.0	36	80	14	4	■
RE4-UF12-SF-160	16.0	40	100	16	4	■
RE4-UF12-SF-180	18.0	40	100	20	4	■
RE4-UF12-SF-200	20.0	45	100	20	4	■

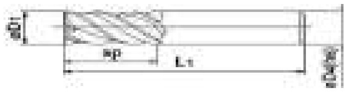
Recommended work material 推薦可加工材料 ■ Preferred suitable 最適用 □ Suitable 適用

UNCOATED	Pre-Hardened Seels 預硬鋼	Hardened Steels 調質鋼	Stainless Steels SUS 3xx SUS 2xx 奧氏體不銹鋼	Stainless Steels SUS 4xx SUS 6xx 鐵素體 馬氏體不銹鋼	Fe-Base Alloy Fe 351 Fe353 鐵基高溫合金
	Ni-Base Alloy Co-Base Alloy 鎳基 鈷基高溫合金	Titanium Alloy 鈦合金	Carbon steels 碳素鋼	Mild Steels 一般構造用鋼	

RE4

標準刃長４刃，不規則螺旋角端銑刀

Endmill - Standard Cut Length, 4 flutes, Irregular helix flutes



* 智慧塗層振動控制銑刀對難切削的材料及有長形突出物的物件切削時，在減少雜音上表現出穩定的性能。

* SMART MIRACLE vibration control end mills for reduced chattering and for delivering a stable performance on difficult-to-cut materials and long overhang applications.

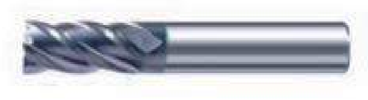
產品型號 Item No.	尺寸 Size(mm)				刃數 No.of flutes T	Coating 鍍膜
	刃 徑 Diameter D1	刃 長 Length of Cut ap	全 長 Overall Length L1	柄徑 shank Da D4		UNCOATED
RE4A-UF12-TSI-030	3.0	9	50	4	4	■
RE4A-UF12-TSI-040	4.0	12	50	4	4	■
RE4-UF12-TSI-020	2.0	4	50	6	4	■
RE4-UF12-TSI-025	2.5	5	50	6	4	■
RE4-UF12-TSI-030	3.0	9	50	6	4	■
RE4-UF12-TSI-035	3.5	8	50	6	4	■
RE4-UF12-TSI-040	4.0	12	50	6	4	■
RE4-UF12-TSI-050	5.0	14	50	6	4	■
RE4-UF12-TSI-060	6.0	16	50	6	4	■
RE4-UF12-TSI-070	7.0	19	60	8	4	■
RE4-UF12-TSI-080	8.0	20	60	8	4	■
RE4-UF12-TSI-090	9.0	22	75	10	4	■
RE4-UF12-TSI-100	10.0	30	75	10	4	■
RE4-UF12-TSI-110	11.0	30	75	12	4	■
RE4-UF12-TSI-120	12.0	30	75	12	4	■
RE4-UF12-TSI-140	14.0	36	80	14	4	■
RE4-UF12-TSI-160	16.0	40	100	16	4	■
RE4-UF12-TSI-180	18.0	40	100	20	4	■
RE4-UF12-TSI-200	20.0	45	100	20	4	■

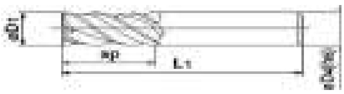
Recommended work material 推薦可加工材料 ■ Preferred suitable 最適用 □ Suitable 適用

UNCOATED	Mild Steels 一般構造用鋼	Carbon steels 碳素鋼	Pre-Hardened Seels 預硬鋼	Hardened Steels 調質鋼	Hardened Steels 40-50HRC 高硬度鋼
	Hardened Steels 50-60 HRC 高硬度鋼	Ductile Iron FC FCD 灰口鑄鐵 球墨鑄鐵	Malleable Iron KTH KTZ KTB 可鍛鑄鐵	Stainless Steels SUS 3xx SUS 2xx 奧氏體不銹鋼	Stainless Steels SUS 4xx SUS 6xx 鐵素體 馬氏體不銹鋼
	Fe-Base Alloy Fe 351 Fe353 鐵基高溫合金	Ni-Base Alloy Co-Base Alloy 鎳基 鈷基高溫合金	Titanium Alloy 鈦合金		

RE4

標準刃長 4 刃，不規則螺旋角端銑刀
Endmill - Standard Cut Length, 4 flutes, Irregular helix flutes





* 智慧塗層振動控制銑刀對難切削的材料及有長形突出物的物件切削時，在減少雜音上表現出穩定的性能。

* SMART MIRACLE vibration control end mills for reduced chattering and for delivering a stable performance on difficult-to-cut materials and long overhang applications.

產品型號 Item No.	尺寸 Size(mm)				刃數	Coating 鍍膜
	刃 徑 Diameter D1	刃 長 Length of Cut ap	全 長 Overall Length L1	柄徑 shank Da D4	No.of flutes T	UNCOATED
RE4A-UF12-ATC-030	3.0	9	50	4	4	■
RE4A-UF12-ATC-040	4.0	12	50	4	4	■
RE4-UF12-ATC-020	2.0	4	50	6	4	■
RE4-UF12-ATC-025	2.5	5	50	6	4	■
RE4-UF12-ATC-030	3.0	9	50	6	4	■
RE4-UF12-ATC-035	3.5	8	50	6	4	■
RE4-UF12-ATC-040	4.0	12	50	6	4	■
RE4-UF12-ATC-050	5.0	14	50	6	4	■
RE4-UF12-ATC-060	6.0	16	50	6	4	■
RE4-UF12-ATC-070	7.0	19	60	8	4	■
RE4-UF12-ATC-080	8.0	20	60	8	4	■
RE4-UF12-ATC-090	9.0	22	75	10	4	■
RE4-UF12-ATC-100	10.0	30	75	10	4	■
RE4-UF12-ATC-110	11.0	30	75	12	4	■
RE4-UF12-ATC-120	12.0	30	75	12	4	■
RE4-UF12-ATC-140	14.0	36	80	14	4	■
RE4-UF12-ATC-160	16.0	40	100	16	4	■
RE4-UF12-ATC-180	18.0	40	100	20	4	■
RE4-UF12-ATC-200	20.0	45	100	20	4	■

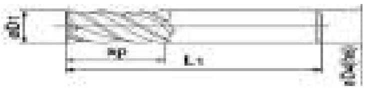
Recommended work material 推薦可加工材料 ■ Preferred suitable 最適用 □ Suitable 適用

UNCOATED	Stainless Steels SUS 3xx SUS 2xx 奧氏體不銹鋼	Stainless Steels SUS 4xx SUS 6xx 鐵素體 馬氏體不銹鋼	Fe-Base Alloy Fe 351 Fe353 鐵基高溫合金	Ni-Base Alloy Co-Base Alloy 鎳基 鈷基高溫合金	Mild Steels 一般構造用鋼
	Carbon steels 碳素鋼	Pre-Hardened Seels 預硬鋼	Hardened Steels 調質鋼	Hardened Steels 40-50HRC 高硬度鋼	Ductile Iron FC FCD 灰口鑄鐵 球墨鑄鐵
	Malleable Iron KTH KTZ KTB 可鍛鑄鐵	Titanium Alloy 鈦合金			

RE4

標準刃長４刃，不規則螺旋角端銑刀

Endmill - Standard Cut Length, 4 flutes, Irregular helix flutes



* 智慧塗層振動控制銑刀對難切削的材料及有長形突出物的物件切削時，在減少雜音上表現出穩定的性能。

* SMART MIRACLE vibration control end mills for reduced chattering and for delivering a stable performance on difficult-to-cut materials and long overhang applications.

產品型號 Item No.	尺寸 Size(mm)				刃數	Coating 鍍膜
	刃 徑 Diameter D1	刃 長 Length of Cut ap	全 長 Overall Length L1	柄徑 shank Da D4	No.of flutes T	UNCOATED
RE4A-UF12-NCB-030	3.0	9	50	4	4	■
RE4A-UF12-NCB-040	4.0	12	50	4	4	■
RE4-UF12-NCB-020	2.0	4	50	6	4	■
RE4-UF12-NCB-025	2.5	5	50	6	4	■
RE4-UF12-NCB-030	3.0	9	50	6	4	■
RE4-UF12-NCB-035	3.5	8	50	6	4	■
RE4-UF12-NCB-040	4.0	12	50	6	4	■
RE4-UF12-NCB-050	5.0	14	50	6	4	■
RE4-UF12-NCB-060	6.0	16	50	6	4	■
RE4-UF12-NCB-070	7.0	19	60	8	4	■
RE4-UF12-NCB-080	8.0	20	60	8	4	■
RE4-UF12-NCB-090	9.0	22	75	10	4	■
RE4-UF12-NCB-100	10.0	30	75	10	4	■
RE4-UF12-NCB-110	11.0	30	75	12	4	■
RE4-UF12-NCB-120	12.0	30	75	12	4	■
RE4-UF12-NCB-140	14.0	36	80	14	4	■
RE4-UF12-NCB-160	16.0	40	100	16	4	■
RE4-UF12-NCB-180	18.0	40	100	20	4	■
RE4-UF12-NCB-200	20.0	45	100	20	4	■

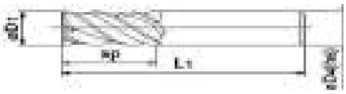
Recommended work material 推薦可加工材料 ■ Preferred suitable 最適用 □ Suitable 適用

UNCOATED	Hardened Steels 40-50HRC 高硬度鋼	Mild Steels 一般構造用鋼	Carbon steels 碳素鋼	Pre-Hardened Seels 預硬鋼	Hardened Steels 調質鋼
	Ductile Iron FC FCD 灰口鑄鐵 球墨鑄鐵	Malleable Iron KTH KTZ KTB 可鍛鑄鐵	Stainless Steels SUS 3xx SUS 2xx 奥氏體不銹鋼	Stainless Steels SUS 4xx SUS 6xx 鐵素體 馬氏體不銹鋼	

RE4

標準刃長４刃，不規則螺旋角端銑刀

Endmill - Standard Cut Length, 4 flutes, Irregular helix flutes



* 智慧塗層振動控制銑刀對難切削的材料及有長形突出物的物件切削時，在減少雜音上表現出穩定的性能。

* SMART MIRACLE vibration control end mills for reduced chattering and for delivering a stable performance on difficult-to-cut materials and long overhang applications.

產品型號 Item No.	尺寸 Size(mm)				刃數 No.of flutes T	Coating 鍍膜
	刃 徑 Diameter D1	刃 長 Length of Cut ap	全 長 Overall Length L1	柄徑 shank Da D4		UNCOATED
RE4A-UF12-NC-030	3.0	9	50	4	4	■
RE4A-UF12-NC-040	4.0	12	50	4	4	■
RE4-UF12-NC-020	2.0	4	50	6	4	■
RE4-UF12-NC-025	2.5	5	50	6	4	■
RE4-UF12-NC-030	3.0	9	50	6	4	■
RE4-UF12-NC-035	3.5	8	50	6	4	■
RE4-UF12-NC-040	4.0	12	50	6	4	■
RE4-UF12-NC-050	5.0	14	50	6	4	■
RE4-UF12-NC-060	6.0	16	50	6	4	■
RE4-UF12-NC-070	7.0	19	60	8	4	■
RE4-UF12-NC-080	8.0	20	60	8	4	■
RE4-UF12-NC-090	9.0	22	75	10	4	■
RE4-UF12-NC-100	10.0	30	75	10	4	■
RE4-UF12-NC-110	11.0	30	75	12	4	■
RE4-UF12-NC-120	12.0	30	75	12	4	■
RE4-UF12-NC-140	14.0	36	80	14	4	■
RE4-UF12-NC-160	16.0	40	100	16	4	■
RE4-UF12-NC-180	18.0	40	100	20	4	■
RE4-UF12-NC-200	20.0	45	100	20	4	■

Recommended work material 推薦可加工材料 ■ Preferred suitable 最適用 □ Suitable 適用

UNCOATED	Stainless Steels SUS 3xx SUS 2xx 奧氏體不銹鋼	Stainless Steels SUS 4xx SUS 6xx 鐵素體 馬氏體不銹鋼	Fe-Base Alloy Fe 351 Fe353 鐵基高溫合金	Ni-Base Alloy Co-Base Alloy 鎳基 鈷基高溫合金	Titanium Alloy 鈦合金

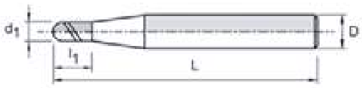
Ultra Fine Grain Carbide Ballnose Endmills — 2 Flutes、Standard Cut Length

極細微粒鎢鋼、球刀 — 2 刃、標準刃長

Size: R0.5 ~ R10.0

UESB2 / UEB2

Carbide	Coating	Helix	HRC	V-Speed
Grain Ultra-Fine	ULTRA TIALN+	30°	56	N/HSM



Dimension(mm) Desig nation	刃徑 d_1	刃長 l_1	全長 L	柄徑 D		刃數 Z	Coating 鍍膜 ULTRA(D)
UESB2-010	R0.5	2.0	50	4 (*)		2	■
UESB2-012	R0.6	2.5	50	4 (*)		2	■
UESB2-014	R0.7	3.0	50	4 (*)		2	■
UESB2-015	R0.75	3.0	50	4 (*)		2	■
UESB2-016	R0.8	3.2	50	4 (*)		2	■
UESB2-018	R0.9	3.6	50	4 (*)		2	■
UESB2-020	R1.0	4.0	50	4 (*)		2	■
UESB2-025	R1.25	5.0	50	4 (*)		2	■
UESB2-030	R1.5	6.0	50	4 (*)		2	■
UESB2-040	R2.0	8.0	50	4		2	■
UESB2-050	R2.5	10	50	6		2	■
UESB2-060	R3.0	12	50	6		2	■
UESB2-070	R3.5	14	60	8		2	■
UESB2-080	R4.0	16	60	8		2	■
UESB2-100	R5.0	20	75	10		2	■
UESB2-120	R6.0	24	75	12		2	■
UESB2-160	R8.0	32	100	16		2	■
UESB2-200	R10.0	40	100	20		2	■
UEB2-010	R0.5	2.0	50	6		2	■
UEB2-015	R0.75	3.0	50	6		2	■
UEB2-020	R1.0	4.0	50	6		2	■
UEB2-025	R1.25	5.0	50	6		2	■
UEB2-030	R1.5	6.0	50	6		2	■
UEB2-040	R2.0	8.0	50	6		2	■
UEB2-050	R2.5	10	75	6		2	■
UEB2-060	R3.0	12	75	6		2	■
UEB2-070	R3.5	14	75	8		2	■
UEB2-080	R4.0	16	75	8		2	■
UEB2-100	R5.0	20	100	10		2	■
UEB2-120	R6.0	24	100	12		2	■
UEB2-160	R8.0	32	150	16		2	■
UEB2-200	R10.0	40	150	20		2	■

(✱) Mark : Customized orders for shank diameter 3.0 mm is also available 標示(✱)者：可另外訂製柄徑3.0mm

Recommended work material 推薦可加工材料 ■ Preferred suitable 最適用 ■ Suitable 適用

ULTRA (D)	Steel < HRC32 碳鋼/合金鋼	HRC32 ~ 48 合金/預硬鋼	HRC49 ~ 56 熱處理鋼	HRC 56 ~ 65 熱處理鋼	Cast Iron 鑄鐵	Ti-alloy 鈦合金

FEATURE：The special geometry of the ball cutting edge with new ULTRA (D) TIALN+ coating useful for HSM and hard milling (Up to HRC 56 - DRY CUT)

Ultra Fine Grain Carbide Endmills－2 Flutes、Standard Cut Length

極細微粒鎢鋼、球刀、長柄 — 2 刃、標準刃長

Size: R1.0 ~R10.0

UELB2 (A) / UXLB2

Carbide	Coating	Helix	HRC	V-Speed
Grain Ultra-Fine	ULTRA TIALN+	30°	56	N/HSM

Long Shan 長柄

Dimension(mm) / Desig nation	刃徑 d_1	刃長 l_1	全長 L	柄徑 D		刃數 Z	Coating 鍍膜 ULTRA(D)
UELB2A-040	R2.0	8	75	4		2	■
UELB2-010	R0.5	2	75	6		2	■
UELB2-015	R0.75	3	75	6		2	■
UELB2-020	R1.0	4	75	6		2	■
UELB2-030	R1.5	6	75	6		2	■
UELB2-040	R2.0	8	75	6		2	■
UELB2-050	R2.5	10	100	6		2	■
UELB2-060	R3.0	12	100	6		2	■
UELB2-080	R4.0	16	100	8		2	■
UELB2-100	R5.0	20	150	10		2	■
UELB2-120	R6.0	24	150	12		2	■
UELB2-160	R8.0	32	200	16		2	□
UELB2-200	R10.0	40	200	20		2	□

Extra Lon 加長柄

Designation	d_1	l_1	L	D		Z	ULTRA(D)
UXLB2-015	R0.75	3	100	6		2	■
UXLB2-020	R1.0	5	100	6		2	■
UXLB2-030	R1.5	6	100	6		2	■
UXLB2-040	R2.0	8	100	6		2	■
UXLB2-060	R3.0	12	150	6		2	■
UXLB2-080	R4.0	16	150	8		2	■
UXLB2-100	R5.0	20	200	10		2	■
UXLB2-120	R6.0	24	200	12		2	■

Recommended work material 推薦可加工材料 ■ Preferred suitable 最適用 □ Suitable 適用

	Steel < HRC32 碳鋼/合金鋼	HRC32 ~ 48 合金/預硬鋼	HRC49 ~ 56 熱處理鋼	HRC 56 ~ 65 熱處理鋼	Cast Iron 鑄鐵	Ti-alloy 鈦合金
ULTRA (D)		■	■			

FEATURE：The special geometry of the ball cutting edge with new ULTRA (D) TIALN+ coating useful for HSM and hard milling (Up to HRC 56 - DRY CUT)

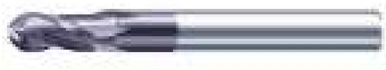
Ultra Fine Grain Carbide Ballnose Endmills — 4 Flutes、Standard Cut Length

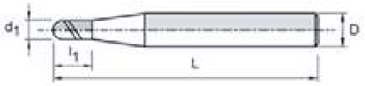
極細微粒鎢鋼、球刀 — 4 刃、標準刃長

Size: R0.5 ~ R10.0

UESB4 / UEB4

Carbide	Coating	Helix	HRC	V-Speed
Grain Ultra-Fine	ULTRA TIALN+	30°	65	N/HSM





Dimension(mm) / Desig nation	刃徑 d_1	刃長 l_1	全長 L	柄徑 D		刃數 Z	Coating 鍍膜 ULTRA(D)
UESB4-010	R0.5	2	50	4		4	■
UESB4-015	R0.75	3	50	4		4	■
UESB4-020	R1.0	4	50	4		4	■
UESB4-030	R1.5	6	50	4		4	■
UESB4-040	R2.0	8	50	4		4	■
UESB4-050	R2.5	10	50	6		4	■
UESB4-060	R3.0	12	50	6		4	■
UESB4-080	R4.0	16	60	8		4	■
UESB4-100	R5.0	20	75	10		4	■
UESB4-120	R6.0	24	75	12		4	■
UESB4-160	R8.0	32.0	100	16		4	□
UESB4-200	R10.0	40.0	100	20		4	□

UEB4-020	R1.0	4.0	50	6		4	□
UEB4-030	R1.5	6.0	50	6		4	□
UEB4-040	R2.0	8.0	50	6		4	□
UEB4-050	R2.5	10.0	75	6		4	□
UEB4-060	R3.0	12.0	75	6		4	■
UEB4-080	R4.0	16.0	75	8		4	■
UEB4-100	R5.0	20.0	100	10		4	■
UEB4-120	R6.0	24.0	100	12		4	■

Recommended work material 推薦可加工材料 ■ Preferred suitable 最適用 □ Suitable 適用

	Steel < HRC32 碳鋼/合金鋼	HRC32 ~ 48 合金/預硬鋼	HRC 56 ~ 65 熱處理鋼	Stainless 不鏽鋼	Cast Iron 鑄鐵	Copper 銅
ULTRA (D)	■	■	■	□	□	□

FEATURE：New ULTRA (D) TIALN+ coating useful for HSM (DRY CUT), covering from carbon steels to hardened steels (UP to HRC 65)

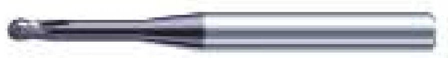
MX900 Series - Ultra Fine Grain Carbide Ballnose Endmills Reduced Neck / HSM - 2 Flutes Short Cut Length

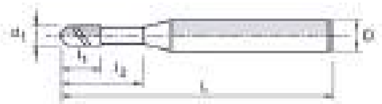
極細微粒鎢鋼、球刀、縮頸 / 高速切削 — 2 刃、短刃

Size: R0.5 ~ R2.0

HMRB2

Carbide	Coating	Helix	HRC	V-Speed
Grain Ultra-Fine	ULTRA TIALN+	30°	55	HSM





Dimension(mm) / Designation	刃徑 d_1	有效長 l_2	刃長 l_1	全長 L	柄徑 D	刃數 Z	Coating 鍍膜 ULTRA (D)
HMRB2-010-4	R0.5	4	0.8	50	4	2	■
HMRB2-010-6	R0.5	6	0.8	50	4	2	■
HMRB2-010-8	R0.5	8	0.8	50	4	2	■
HMRB2-010-10	R0.5	10	0.8	50	4	2	■
HMRB2-010-12	R0.5	12	0.8	50	4	2	■
HMRB2-015-4	R0.75	4	1.2	50	4	2	■
HMRB2-015-6	R0.75	6	1.2	50	4	2	■
HMRB2-015-8	R0.75	8	1.2	50	4	2	■
HMRB2-015-10	R0.75	10	1.2	50	4	2	■
HMRB2-015-12	R0.75	12	1.2	50	4	2	■
HMRB2-015-16	R0.75	16	1.2	50	4	2	■
HMRB2-015-20	R0.75	20	1.2	50	4	2	■
HMRB2-020-4	R1.0	4	1.5	50	4	2	■
HMRB2-020-6	R1.0	6	1.5	50	4	2	■
HMRB2-020-8	R1.0	8	1.5	50	4	2	■
HMRB2-020-10	R1.0	10	1.5	50	4	2	■
HMRB2-020-12	R1.0	12	1.5	50	4	2	■
HMRB2-020-16	R1.0	16	1.5	50	4	2	■
HMRB2-020-20	R1.0	20	1.5	50	4	2	■
HMRB2-030-6	R1.5	6	2.5	50	4	2	■
HMRB2-040-12	R2.0	12	3.5	50	4	2	■

Recommended work material 推薦可加工材料 ■ Preferred suitable 最適用 ■ Suitable 適用

	Steel < HRC32 碳鋼/合金鋼	HRC32 ~ 55 合金/預硬鋼	HRC 56 ~ 70 熱處理鋼	Stainless 不鏽鋼	Cast Iron 鑄鐵	Copper 銅
ULTRA (D)	Preferred suitable	Preferred suitable				

FEATURE：Reduced neck form allows for various surface milling , new ULTRA (D) TIALN+ coating useful for HSM (DRY CUT), covering from carbon steels to hardened steels (Up to HRC 55)

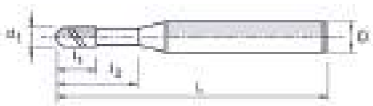
MX900 Series - Ultra Fine Grain Carbide Ballnose Endmills Reduced Neck / HSM - 2 Flutes Short Cut Length

極細微粒鎢鋼、球刀、縮頸 / 高速切削 — 2 刃、短刃

Size: R1.0 ~ R6.0

HERB2

Carbide	Coating	Helix	HRC	V-Speed
Grain Ultra-Fine	ULTRA TIALN+	30°	55	HSM



Dimension(mm) / Designation	刃徑 d_1	有效長 l_2	刃長 l_1	全長 L	柄徑 D	刃數 Z	Coating 鍍膜 ULTRA (D)
HERB2-020-6	R1.0	6	1.5	50	6	2	□
HERB2-020-8	R1.0	8	1.5	50	6	2	□
HERB2-020-10	R1.0	10	1.5	50	6	2	□
HERB2-030-9	R1.5	9	3.0	50	6	2	□
HERB2-030-12	R1.5	12	3.0	50	6	2	□
HERB2-030-15	R1.5	15	3.0	50	6	2	□
HERB2-030-24	R1.5	24	3.0	75	6	2	□
HERB2-040-12	R2.0	12	4.0	50	6	2	□
HERB2-040-20	R2.0	20	4.0	75	6	2	□
HERB2-040-32	R2.0	32	4.0	75	6	2	□
HERB2-050-15	R2.5	15	5.0	50	6	2	□
HERB2-050-25	R2.5	25	5.0	75	6	2	□
HERB2-060-18	R3.0	18	6.0	50	6	2	□
HERB2-060-30	R3.0	30	6.0	75	6	2	□
HERB2-080-24	R4.0	24	8	60	8	2	□
HERB2-100-30	R5.0	30	10	75	10	2	□
HERB2-120-30	R6.0	30	12	75	12	2	□

Recommended work material 推薦可加工材料 ■ Preferred suitable 最適用 ■ Suitable 適用

	Steel < HRC32 碳鋼/合金鋼	HRC32 ~ 55 合金/預硬鋼	HRC 56 ~ 70 熱處理鋼	Stainless 不鏽鋼	Cast Iron 鑄鐵	Copper 銅
ULTRA (D)						

FEATURE：Reduced neck form allows for various surface milling , new ULTRA (D) TIALN+ coating useful for HSM (DRY CUT), covering from carbon steels to hardened steels (Up to HRC 55)

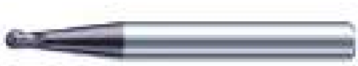
MX900 Series - Ultra Fine Grain Carbide Micro Ballnose Endmills - 2 Flutes、Standard cut Length

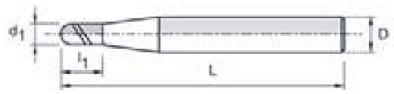
極細微粒鎢鋼、微小徑球刀 / 高速切削 — 2 刃、 標準刃長

Size: R0.1 ~ R0.45

MSB2

Carbide	Coating	Helix	HRC	V-Speed
Grain Ultra-Fine	ULTRA TIALN+	30°	48	N/HSM





Dimension(mm) / Desig nation	刃徑 d_1	刃長 l_1	全長 L	柄徑 D	刃數 Z	Coating 鍍膜 ULTRA(D)
MSB2-004-008	R0.2	0.8	50	4 (*)	2	■
MSB2-005-010	R0.25	1.0	50	4 (*)	2	■
MSB2-006-012	R0.3	1.2	50	4 (*)	2	■
MSB2-007-014	R0.35	1.4	50	4 (*)	2	■
MSB2-008-016	R0.4	1.6	50	4 (*)	2	■
MSB2-009-018	R0.45	1.8	50	4 (*)	2	■

(⁎) Mark : Customized orders for shank diameter 3.0 mm is also available 標示(⁎)者：可另外訂製柄徑3.0mm

Recommended work material 推薦可加工材料 ■ Preferred suitable 最適用 ■ Suitable 適用

	Steel < HRC32 碳鋼/合金鋼	HRC32 ~ 48 合金/預硬鋼	HRC 49 ~ 55 熱處理鋼	Stainless 不鏽鋼	Cast Iron 鑄鐵	Copper 銅
ULTRA (D)	Preferred suitable	Preferred suitable				

FEATURE : New ULTRA (D) TIALN+ coating useful for HSM (DRY CUT), covering from carbon steels to hardened steels (UP to HRC 48)

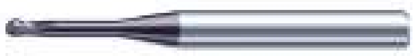
MX900 Series - Ultra Fine Grain Carbide Micro Ballnose Endmills、Long Neck - 2 Flutes、Short Cut Lengh

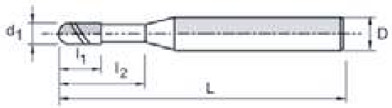
極細微粒鎢鋼、微小徑球刀、長頸 — 2 刃、短刃

Size: R0.2 ~ R0.4

MSRB2

Carbide	Coating	Helix	HRC	V-Speed
Grain Ultra-Fine	ULTRA TIALN+	30°	48	N/HSM





Dimension(mm) / Desig nation	刃徑 d_1	有效長 l_2	刃長 l_1	全長 L	柄徑 D	刃數 Z	Coating 鍍膜 ULTRA(D)
MSRB2-004-1	R0.2	1	0.4	50	4 (*)	2	□
MSRB2-004-2	R0.2	2	0.4	50	4 (*)	2	□
MSRB2-004-3	R0.2	3	0.4	50	4 (*)	2	□
MSRB2-005-2	R0.25	2	0.5	50	4 (*)	2	□
MSRB2-005-4	R0.25	4	0.5	50	4 (*)	2	□
MSRB2-005-6	R0.25	6	0.5	50	4 (*)	2	□
MSRB2-005-8	R0.25	8	0.5	50	4 (*)	2	□
MSRB2-006-2	R0.3	2	0.6	50	4 (*)	2	□
MSRB2-006-4	R0.3	4	0.6	50	4 (*)	2	□
MSRB2-006-6	R0.3	6	0.6	50	4 (*)	2	□
MSRB2-006-8	R0.3	8	0.6	50	4 (*)	2	□
MSRB2-007-2	R0.35	2	0.7	50	4 (*)	2	□
MSRB2-007-4	R0.35	4	0.7	50	4 (*)	2	□
MSRB2-007-6	R0.35	6	0.7	50	4 (*)	2	□
MSRB2-007-8	R0.35	8	0.7	50	4 (*)	2	□
MSRB2-008-2	R0.4	2	0.8	50	4 (*)	2	□
MSRB2-008-4	R0.4	4	0.8	50	4 (*)	2	□
MSRB2-008-6	R0.4	6	0.8	50	4 (*)	2	□
MSRB2-008-8	R0.4	8	0.8	50	4 (*)	2	□
MSRB2-008-10	R0.4	10	0.6	50	4 (*)	2	□

(⁎) Mark : Customized orders for shank diameter 3.0 mm is also available 標示(⁎)者：可另外訂製柄徑3.0mm

Recommended work material 推薦可加工材料 ■ Preferred suitable 最適用 □ Suitable 適用

ULTRA (D)	Steel < HRC32 碳鋼/合金鋼	HRC32 ~ 48 合金/預硬鋼	HRC 49 ~ 55 熱處理鋼	Stainless 不鏽鋼	Cast Iron 鑄鐵	Copper 銅

FEATURE：Long neck form allows for various surface milling , new ULTRA (D) TIALN+ coating useful for HSM (DRY CUT), covering from carbon steels to hardened steels (Up to HRC 48)

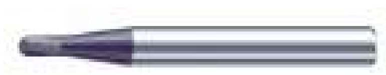
MX900 Series - Ultra Fine Grain Carbide Ballnose Mould & Die Endmills / HSM - 2 Flutes

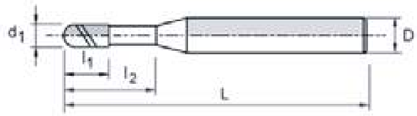
極細微粒鎢鋼、模具加工用球刀 / 高速切削 — 2 刃

Size: R0.5 ~ R8.0

MSBD2 / MBD2

Carbide	Coating	Helix	HRC	V-Speed	Rake Angle
Grain Ultra-Fine	ULTRA TIALN+	7 °	65	HSM	Negative





Dimension(mm) / Designation	刃徑 d_1	有效長 l_2	刃長 l_1	全長 L	柄徑 D	刃數 Z	Coating 鍍膜 ULTRA (D)
MSBD2-010	R0.5	-	1.5	50	4	2	■
MSBD2-015	R0.75	-	2.0	50	4	2	■
MSBD2-020	R1.0	-	3.0	50	4	2	■
MSBD2-025	R1.25	-	3.5	50	4	2	■
MSBD2-030	R1.5	-	4.0	50	4	2	■
MSBD2-040	R2.0	-	5.0	50	4	2	■
MSBD2-050	R2.5	-	6.5	50	6	2	■
MSBD2-060	R3.0	-	8.0	50	6	2	■
MSBD2-080	R4.0	-	10.0	60	8	2	■
MSBD2-100	R5.0	-	12.0	75	10	2	■
MSBD2-120	R6.0	-	15.0	75	12	2	■
MSBD2-160	R8.0	-	20.0	100	16	2	□
MBD2-010	R0.5	3	1.0	50	6	2	■
MBD2-015	R0.75	4	1.2	50	6	2	■
MBD2-020	R1.0	5	1.5	50	6	2	■
MBD2-025	R1.25	6	2.0	50	6	2	■
MBD2-030	R1.5	8	2.5	50	6	2	■
MBD2-035	R1.75	9	3.0	50	6	2	■
MBD2-040	R2.0	12	3.5	50	6	2	■
MBD2-050	R2.5	15	4.0	75	6	2	■
MBD2-060	R3.0	–	8.0	75	6	2	■
MBD2-080	R4.0	–	10.0	75	8	2	■
MBD2-100	R5.0	–	12.0	100	10	2	■
MBD2-120	R6.0	–	15.0	100	12	2	■

Recommended work material 推薦可加工材料 Preferred suitable 最適用 Suitable 適用

ULTRA (D)	Steel < HRC32 碳鋼/合金鋼	HRC32 ~ 48 合金/預硬鋼	HRC 49 ~ 65 熱處理鋼	Stainless 不鏽鋼	Cast Iron 鑄鐵	Super Alloy 高溫合金

FEATURE : The special geometry of the ball cutting edge with new ULTRA (D) TIALN+ coating useful for HSM and hard milling (DRY CUT in mould and die operation (Up to HRC 65) , excellent for contor linen (constant Z) roughing / semi-finishing and profile finishing

MX900 Series - Ultra Fine Grain Carbide Ballnose Mould & Die Endmills 、Long Shank / HSM - 2 Flutes

極細微粒鎢鋼、模具加工用球刀、長柄 / 高速切削 — 2 刃

Size: R2.0~R6.0

MLBD2

Carbide	Coating	Helix	HRC	V-Speed	Rake Angle
Grain Ultra-Fine	ULTRA TIALN+	7 °	65	HSM	Negative

Dimension(mm) / Desig nation	刃徑 d_1	有效長 l_2	刃長 l_1	全長 L	柄徑 D	刃數 Z	Coating 鍍膜 ULTRA (D)
MLBD2-040	R2.0	12	3.5	75	6	2	■
MLBD2-050	R2.5	15	4.0	100	6	2	■
MLBD2-060	R3.0	-	8.0	100	6	2	■
MLBD2-080	R4.0	-	10.0	100	8	2	■
MLBD2-100	R5.0	-	12.0	150	10	2	■
MLBD2-120	R6.0	-	15.0	150	12	2	■

Recommended work material 推薦可加工材料 Preferred suitable 最適用 Suitable 適用

ULTRA (D)	Steel < HRC32 碳鋼/合金鋼	HRC32 ~ 48 合金/預硬鋼	HRC 49 ~ 65 熱處理鋼	Stainless 不鏽鋼	Cast Iron 鑄鐵	Super Alloy 高溫合金

FEATURE : The special geometry of the ball cutting edge with new ULTRA (D) TIALN+ coating useful for HSM and hard milling (DRY CUT in mould and die operation (Up to HRC 65)

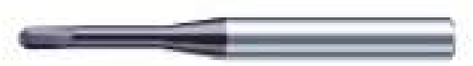
MX900 Series - Ultra Fine Grain Carbide Ballnose Mould & Die Endmills、Long Neck / HSM - 2 Flutes

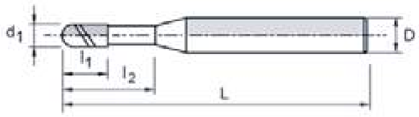
極細微粒鎢鋼、模具加工專用球刀、長頸 / 高速切削 — 2 刃

Size: R0.75 ~ R2.5

MRBD2

Carbide	Coating	Helix	HRC	V-Speed	Rake Angle
Grain Ultra-Fine	ULTRA TIALN+	7 °	65	HSM	Negative





Dimension(mm) / Desig nation	刃徑 d_1	有效長 l_2	刃長 l_1	全長 L	柄徑 D	刃數 Z	Coating 鍍膜 ULTRA(D)
MRBD2-015-6	R0.75	6	1.2	50	6	2	□
MRBD2-015-8	R0.75	8	1.2	50	6	2	□
MRBD2-015-10	R0.75	10	1.2	50	6	2	□
MRBD2-015-12	R0.75	12	1.2	50	6	2	□
MRBD2-020-6	R1.0	6	1.5	50	6	2	□
MRBD2-020-8	R1.0	8	1.5	50	6	2	□
MRBD2-020-10	R1.0	10	1.5	50	6	2	□
MRBD2-020-12	R1.0	12	1.5	50	6	2	□
MRBD2-020-16	R1.0	16	1.5	50	6	2	□
MRBD2-020-20	R1.0	20	1.5	50	6	2	□
MRBD2-030-10	R1.5	10	2.5	50	6	2	□
MRBD2-030-12	R1.5	12	2.5	50	6	2	□
MRBD2-030-16	R1.5	16	2.5	50	6	2	□
MRBD2-030-20	R1.5	20	2.5	50	6	2	□
MRBD2-030-25	R1.5	25	2.5	75	6	2	□
MRBD2-030-30	R1.5	30	2.5	75	6	2	□
MRBD2-040-16	R2.0	16	3.5	50	6	2	□
MRBD2-040-20	R2.0	20	3.5	50	6	2	□
MRBD2-040-25	R2.0	25	3.5	75	6	2	□
MRBD2-040-32	R2.0	32	3.5	75	6	2	□
MRBD2-040-40	R2.0	40	3.5	75	6	2	□
MRBD2-050-20	R2.5	20	4.0	75	6	2	□
MRBD2-050-25	R2.5	25	4.0	75	6	2	□
MRBD2-050-30	R2.5	30	4.0	75	6	2	□
MRBD2-050-40	R2.5	40	4.0	75	6	2	□

Recommended work material 推薦可加工材料 ■ Preferred suitable 最適用 ■ Suitable 適用

	Steel < HRC32 碳鋼/合金鋼	HRC32 ~ 48 合金/預硬鋼	HRC 49 ~ 65 熱處理鋼	Stainless 不鏽鋼	Cast Iron 鑄鐵	Super Alloy 高溫合金
ULTRA (D)						

FEATURE : The special geometry of the ball cutting edge with new ULTRA (D) TIALN+ coating useful for HSM and hard milling (DRY CUT in mould and die operation (Up to HRC 65)，excellent for contor linen (constant Z) roughing / semi-finishing and profile finishing

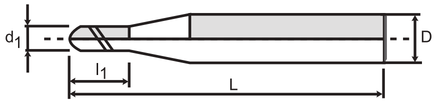
Ultra Fine Grain Carbide Mirco Ballnose Endmills - 2 Flutes 、Short Cut Length

極細微粒鎢鋼、球刀/硬材切削—2刃

Size: R0.1~R0.4

SFRM

Carbide	Coating	Helix	V-Speed	HRC
Grain Ultra-Fine	ULTRA TIALN+	30°	N/HSM	68



Dimension(mm) / Designati on	刃徑 d_1	刃長 l_1	全長 L	柄徑 D	刃數 Z	Coating 鍍膜 ULTRA(D)
SFRM-003	R0.15	0.3	50	4	2	■
SFRM-004	R0.2	0.4	50	4	2	■
SFRM-005	R0.25	0.5	50	4	2	■
SFRM-006	R0.3	0.6	50	4	2	■
SFRM-008	R0.4	0.8	50	4	2	■

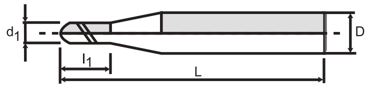
Ultra Fine Grain Carbide Ballnose Endmills - 2 Flutes、Short Cut Length

極細微粒鎢鋼、球刀/硬材切削—2刃

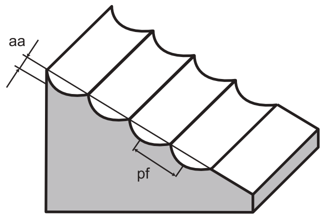
Size: R0.5~R6.0

SFR / SFRB

Carbide	Coating	Helix	V-Speed	HRC
Grain Ultra-Fine	ULTRA TIALN+	30°	N/HSM	68



Dimension(mm) / Designation	刃徑 d_1	刃長 l_1	全長 L	柄徑 D	刃數 Z	Coating 鍍膜 ULTRA(D)
SFR-010	R0.5	1.0	50	4	2	■
SFR-015	R0.75	1.5	50	4	2	■
SFR-020	R1.0	2.0	50	4	2	■
SFR-030	R1.5	3.0	50	4	2	■
SFR-040	R2.0	4.0	50	4	2	■
SFR-050	R2.5	5.0	50	6	2	■
SFR-060	R3.0	6.0	50	6	2	■
SFR-080	R4.0	8.0	60	8	2	■
SFR-100	R5.0	10.0	75	10	2	■
SFR-120	R6.0	12.0	75	12	2	■
SFRB-010	R0.5	1.0	75	6	2	■
SFRB-015	R0.75	1.5	75	6	2	■
SFRB-020	R1.0	2.0	75	6	2	■
SFRB-030	R1.5	3.0	75	6	2	■
SFRB-040	R2.0	4.0	75	6	2	■
SFRB-050	R2.5	5.0	75	6	2	■
SFRB-060	R3.0	6.0	75	6	2	■
SFRB-080	R4.0	8.0	75	8	2	■
SFRB-100	R5.0	10.0	100	10	2	■
SFRB-120	R6.0	12.0	100	12	2	■



For specifications of cutting conditions, please refer to page 54.55

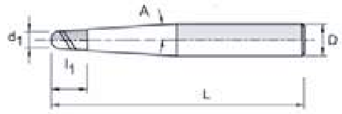
MX900 Series - Ultra Fine Grain Carbide Ballnose Endmills、Taper Neck / HSM - 2 Flutes

極細微粒鎢鋼、球刀、斜頸 / 高速切削 — 2 刃

Size: R1.0 ~ R3.0

MTB2

Carbide	Coating	Helix	HRC	V-Speed
Grain Ultra-Fine	ULTRA TIALN+	30°	65	HSM



Dimension(mm) / Desig nation	刃徑 d_1	斜角 A	刃長 l_1	全長 L	柄徑 D	刃數 Z	Coating 鍍膜 ULTRA(D)
MTB2-020-T3.0	R1.0	3.0	3.0	75	6	2	■
MTB2-020-T5.0	R1.0	5.0	3.0	75	6	2	■
MTB2-030-T3.0	R1.5	3.0	4.5	75	6	2	■
MTB2-030-T1.5	R1.5	1.5	4.5	100	6	2	■
MTB2-040-T3.0	R2.0	3.0	6.0	75	6	2	■
MTB2-040-T1.5	R2.0	1.5	6.0	100	6	2	■
MTB2-060-T3.0	R3.0	3.0	9.0	75	8	2	□
MTB2-060-T1.5	R3.0	1.5	9.0	100	8	2	□

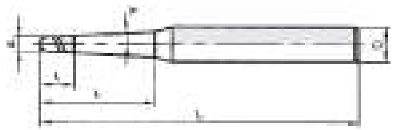
MX900 Series - Ultra Fine Grain Carbide Ballnose Endmills、Long Taper Neck / HSM - 2 Flutes

極細微粒鎢鋼、球刀、長斜頸 / 高速切削 — 2 刃

Size: R1.0 ~ R2.0

MLTB2

Carbide	Coating	Helix	HRC	V-Speed
Grain Ultra-Fine	ULTRA TIALN+	30°	65	HSM



Dimension(mm) / Desig nation	刃徑 d_1	斜角 A	刃長 l_1	有效長 l_2	全長 L	柄徑 D	刃數 Z	Coating 鍍膜 ULTRA(D)
MLTB2-020-T0.5	R1.0	0.5	3.0	60	100	6	2	■
MLTB2-020-T1.0	R1.0	1.0	3.0	60	100	6	2	■
MLTB2-020-T1.5	R1.0	1.5	3.0	60	100	6	2	■
MLTB2-030-T0.5	R1.5	0.5	4.0	60	100	6	2	■
MLTB2-030-T1.0	R1.5	1.0	4.0	60	100	6	2	■
MLTB2-040-T0.5	R2.0	0.5	5.0	60	100	6	2	■
MLTB2-040-T1.0	R2.0	1.0	5.0	60	100	6	2	■

Recommended work material 推薦可加工材料 ■ Preferred suitable 最適用 □ Suitable 適用

ULTRA (D)	Steel < HRC32 碳鋼/合金鋼	HRC32 ~ 48 合金/預硬鋼	HRC 49 ~ 65 熱處理鋼	Stainless 不鏽鋼	Cast Iron 鑄鐵	Super Alloy 高溫合金

FEATURE : Long taper neck is applied increase tool rigidity than straight neck , new ULTRA (D) TIALN+ coating useful for HSM and hard milling (DRY CUT) in mould and die operation (Up to HRC 65), excellent for profile finishing and deep rib processing

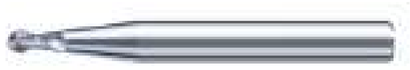
AX Series - Ultra Fine Grain Carbide Ballnose Mould & Die Endmills / HSM - 2 Flutes

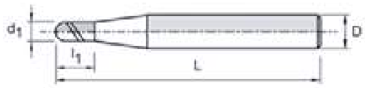
極細微粒鎢鋼、球刀 / 高速切削 / 銅鋁加工用— 2 刃、標準刃長

Size: R0.5 ~ R8.0

AESB2 / AEB2

Carbide	Coating	Helix	V-Speed	Rake Angle
Grain Ultra-Fine	TDC	30°	N/HSM	Positive





Dimension(mm) / Desig nation	刃徑 d_1	刃長 l_1	全長 L	柄徑 D	刃數 Z	Coating 鍍膜 UNCOATED	TDC(C)
AESB2-010	R0.5	2	50	4	2	■	□
AESB2-015	R0.75	3	50	4	2	■	□
AESB2-020	R1.0	4	50	4	2	■	□
AESB2-030	R1.5	6	50	4	2	■	□
AESB2-040	R2.0	8	50	4	2	■	□
AESB2-050	R2.5	10	50	6	2	■	□
AESB2-060	R3.0	12	50	6	2	■	□
AESB2-080	R4.0	16	75	8	2	■	□
AESB2-100	R5.0	20	75	10	2	■	□
AESB2-120	R6.0	24	75	12	2	■	□
AEB2-030	R1.5	6.0	75	6	2	■	□
AEB2-040	R2.0	8.0	75	6	2	■	□
AEB2-050	R2.5	10.0	75	6	2	■	□
AEB2-060	R3.0	12.0	75	6	2	■	□
AEB2-080	R4.0	16.0	100	8	2	■	□
AEB2-100	R5.0	20.0	100	10	2	■	□
AEB2-120	R6.0	24.0	100	12	2	■	□

Recommended work material 推薦可加工材料 Preferred suitable 最適用 Suitable 適用

TDC (C)	Copper 銅	Al-alloy 鋁合金	
UNCOATED	Copper 銅	Al-alloy 鋁合金	Synthetics 合成材料

FEATURE：For copper and aluminum alloys , optimized flute design to improved the ability of chip discharge and provide an excellent machined surface

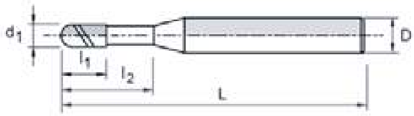
AX Series - Ultra Fine Grain Carbide Ballnose Endmills、Long Neck / HSM For Copper & Aluminum - 2 Flutes

極細微粒鎢鋼、球刀、長頸 / 高速切削 / 銅鋁加工用— 2 刃、短刃

Size: R0.5 ~ R2.0

AERB2

Carbide	Coating	Helix	V-Speed	Rake Angle
Grain Ultra-Fine	TDC	30°	N/HSM	Positive



Dimension(mm) / Desig nation	刃徑 d_1	有效長 l_2	刃長 l_1	全長 L	柄徑 D	刃數 Z	Coating 鍍膜 UNCOATED	TDC(C)
AERB2-010-4	R0.5	4	1.0	50	4	2	☐	☐
AERB2-010-6	R0.5	6	1.0	50	4	2	☐	☐
AERB2-010-8	R0.5	8	1.0	50	4	2	☐	☐
AERB2-010-10	R0.5	10	1.0	50	4	2	☐	☐
AERB2-010-12	R0.5	12	1.0	50	4	2	☐	☐
AERB2-015-6	R0.75	6	1.5	50	4	2	☐	☐
AERB2-015-8	R0.75	8	1.5	50	4	2	☐	☐
AERB2-015-10	R0.75	10	1.5	50	4	2	☐	☐
AERB2-015-12	R0.75	12	1.5	50	4	2	☐	☐
AERB2-015-16	R0.75	16	1.5	50	4	2	☐	☐
AERB2-020-8	R1.0	8	2.0	50	4	2	☐	☐
AERB2-020-10	R1.0	10	2.0	50	4	2	☐	☐
AERB2-020-12	R1.0	12	2.0	50	4	2	☐	☐
AERB2-020-16	R1.0	16	2.0	50	4	2	☐	☐
AERB2-020-20	R1.0	20	2.0	50	4	2	☐	☐
AERB2-020-25	R1.0	25	2.0	50	4	2	☐	☐
AERB2-030-12	R1.5	12	3.0	50	6	2	☐	☐
AERB2-030-16	R1.5	16	3.0	50	6	2	☐	☐
AERB2-030-25	R1.5	25	3.0	50	6	2	☐	☐
AERB2-030-35	R1.5	35	3.0	75	6	2	☐	☐
AERB2-040-30	R2.0	30	4.0	75	6	2	☐	☐
AERB2-040-40	R2.0	40	4.0	100	6	2	☐	☐

Recommended work material 推薦可加工材料 Preferred suitable 最適用 Suitable 適用

TDC (C)	Copper 銅	Al-alloy 鋁合金	
UNCOATED	Copper 銅	Al-alloy 鋁合金	Synthetics 合成材料

FEATURE：For copper and aluminum alloys , optimized flute design to improved the ability of chip discharge and provide an excellent machined surface

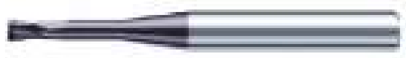
MX900 Series - Ultra Fine Grain Carbide Torus Endmills、Long Neck / HSM - 2 Flutes、Short Cut Lengh

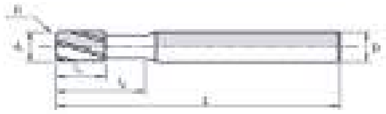
極細微粒鎢鋼、圓鼻刀、長頸 / 高速切削 — 2 刃、短刃

Size: D1.0 ~ D3.0

MSR2

Carbide	Coating	Helix	HRC	V-Speed
Grain Ultra-Fine	ULTRA TIALN+	30°	62	HSM





Dimension(mm) / Designation	刃徑 d_1	R 角 R	有效長 l_2	刃長 l_1	全長 L	柄徑 D	刃數 Z	Coating 鍍膜 ULTRA (D)
MSR2010-001-5	1.0	0.1	5	1.5	50	4	2	■
MSR2010-001-8	1.0	0.1	8	1.5	50	4	2	■
MSR2010-002-5	1.0	0.2	5	1.5	50	4	2	■
MSR2010-002-8	1.0	0.2	8	1.5	50	4	2	■
MSR2015-001-6	1.5	0.1	6	2	50	4	2	□
MSR2015-001-10	1.5	0.1	10	2	50	4	2	□
MSR2015-002-6	1.5	0.2	6	2	50	4	2	■
MSR2015-002-10	1.5	0.2	10	2	50	4	2	■
MSR2020-001-8	2.0	0.1	8	3	50	4	2	□
MSR2020-001-12	2.0	0.1	12	3	50	4	2	□
MSR2020-002-8	2.0	0.2	8	3	50	4	2	■
MSR2020-002-12	2.0	0.2	12	3	50	4	2	■
MSR2020-003-8	2.0	0.3	8	3	50	4	2	■
MSR2020-003-12	2.0	0.3	12	3	50	4	2	■
MSR2020-005-8	2.0	0.5	8	3	50	4	2	■
MSR2020-005-12	2.0	0.5	12	3	50	4	2	■
MSR2025-002-10	2.5	0.2	10	3	60	6	2	□
MSR2025-005-10	2.5	0.5	10	3	60	6	2	□
MSR2030-002-10	3.0	0.2	10	4	60	6	2	■
MSR2030-002-16	3.0	0.2	16	4	60	6	2	■
MSR2030-003-10	3.0	0.3	10	4	60	6	2	■
MSR2030-003-16	3.0	0.3	16	4	60	6	2	■
MSR2030-005-10	3.0	0.5	10	4	60	6	2	■
MSR2030-005-16	3.0	0.5	16	4	60	6	2	■
MSR2030-010-10	3.0	1.0	10	4	60	6	2	■
MSR2030-010-16	3.0	1.0	16	4	60	6	2	■

Customized orders for other length of neck and corner radius is also available

Recommended work material 推薦可加工材料 ■ Preferred suitable 最適用 ■ Suitable 適用

	Steel < HRC32 碳鋼/合金鋼	HRC32 ~ 48 合金/預硬鋼	HRC 49 ~ 62 熱處理鋼	Stainless 不鏽鋼	Cast Iron 鑄鐵	Copper 銅
ULTRA (D)	■	■	■	■	■	■

FEATURE：Different length of neck with new ULTRA (D) TIALN+ coating useful for HSM and hard milling (Up to HRC 62 - DRY CUT)

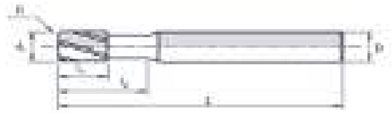
MX900 Series - Ultra Fine Grain Carbide Torus Endmills、Long Neck / HSM - 2 Flutes、Short Cut Lengh

極細微粒鎢鋼、圓鼻刀、長頸 / 高速切削 — 2 刃、短刃

Size: D4.0 ~ D12.0

MSR2

Carbide	Coating	Helix	HRC	V-Speed
Grain Ultra-Fine	ULTRA TIALN+	30°	62	HSM



Dimension(mm) / Designation	刃徑 d_1	R 角 R	有效長 l_2	刃長 l_1	全長 L	柄徑 D	刃數 Z	Coating 鍍膜 ULTRA (D)
MSR2040-002-12	4.0	0.2	12	5	60	6	2	■
MSR2040-002-20	4.0	0.2	20	5	60	6	2	■
MSR2040-003-12	4.0	0.3	12	5	60	6	2	■
MSR2040-003-20	4.0	0.3	20	5	60	6	2	■
MSR2040-005-12	4.0	0.5	12	5	60	6	2	■
MSR2040-005-20	4.0	0.5	20	5	60	6	2	■
MSR2040-010-12	4.0	1.0	12	5	60	6	2	■
MSR2040-010-20	4.0	1.0	20	5	60	6	2	■
MSR2050-003-15	5.0	0.3	15	6	60	6	2	□
MSR2050-003-25	5.0	0.3	25	6	60	6	2	□
MSR2050-005-15	5.0	0.5	15	6	60	6	2	□
MSR2050-005-25	5.0	0.5	25	6	60	6	2	□
MSR2050-010-15	5.0	1.0	15	6	60	6	2	□
MSR2050-010-25	5.0	1.0	25	6	60	6	2	□
MSR2060-002-18	6.0	0.2	18	7	60	6	2	■
MSR2060-003-18	6.0	0.3	18	7	60	6	2	■
MSR2060-005-18	6.0	0.5	18	7	60	6	2	■
MSR2060-010-18	6.0	1.0	18	7	60	6	2	■
MSR2060-015-18	6.0	1.5	18	7	60	6	2	■
MSR2080-003-24	8.0	0.3	24	9	60	8	2	□
MSR2080-005-24	8.0	0.5	24	9	60	8	2	■
MSR2080-010-24	8.0	1.0	24	9	60	8	2	■
MSR2080-020-24	8.0	2.0	24	9	60	8	2	□
MSR2100-005-30	10.0	0.5	30	11	75	10	2	■
MSR2100-010-30	10.0	1.0	30	11	75	10	2	■
MSR2100-020-30	10.0	2.0	30	11	75	10	2	■
MSR2120-010-36	12.0	1.0	36	13	75	12	2	■
MSR2120-020-36	12.0	2.0	36	13	75	12	2	■

Customized orders for other length of neck and corner radius is also available

Recommended work material 推薦可加工材料 ■ Preferred suitable 最適用 ■ Suitable 適用

ULTRA (D)	Steel < HRC32 碳鋼/合金鋼	HRC32 ~ 48 合金/預硬鋼	HRC 49 ~ 62 熱處理鋼	Stainless 不鏽鋼	Cast Iron 鑄鐵	Copper 銅

FEATURE：Different length of neck with new ULTRA (D) TIALN+ coating useful for HSM and hard milling (Up to HRC 62 - DRY CUT)

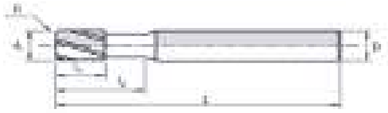
MX900 Series - Ultra Fine Grain Carbide Torus Endmills、Long Neck / HSM - 2 Flutes、Short Cut Lengh

極細微粒鎢鋼、圓鼻刀、長頸 / 高速切削 — 2 刃、短刃

Size: D2.0 ~ D12.0

MMR2

Carbide	Coating	Helix	HRC	V-Speed
Grain Ultra-Fine	ULTRA TIALN+	30°	62	HSM



Designation \ Dimension(mm)	刃徑 d_1	R 角 R	有效長 l_2	刃長 l_1	全長 L	柄徑 D	刃數 Z	Coating 鍍膜 ULTRA (D)
MMR2020-002-8	2.0	0.2	8	3	60	6	2	■
MMR2020-002-15	2.0	0.2	15	3	60	6	2	■
MMR2020-005-8	2.0	0.5	8	3	60	6	2	■
MMR2020-005-15	2.0	0.5	15	3	60	6	2	■
MMR2030-002-15	3.0	0.2	15	4	75	6	2	■
MMR2030-005-15	3.0	0.5	15	4	75	6	2	■
MMR2040-005-16	4.0	0.5	16	5	75	6	2	■
MMR2040-010-16	4.0	1.0	16	5	75	6	2	■
MMR2050-005-20	5.0	0.5	20	6	75	6	2	■
MMR2050-010-20	5.0	1.0	20	6	75	6	2	■
MMR2060-003-30	6.0	0.3	30	7	75	6	2	■
MMR2060-005-30	6.0	0.5	30	7	75	6	2	■
MMR2060-010-30	6.0	1.0	30	7	75	6	2	■
MMR2060-015-30	6.0	1.5	30	7	75	6	2	■
MMR2080-005-36	8.0	0.5	36	9	75	8	2	■
MMR2080-010-36	8.0	1.0	36	9	75	8	2	■
MMR2080-020-36	8.0	2.0	36	9	75	8	2	□
MMR2100-005-50	10.0	0.5	50	11	100	10	2	■
MMR2100-010-50	10.0	1.0	50	11	100	10	2	■
MMR2100-020-50	10.0	2.0	50	11	100	10	2	□
MMR2100-030-50	10.0	3.0	50	11	100	10	2	□
MMR2120-005-50	12.0	0.5	50	13	100	12	2	■
MMR2120-010-50	12.0	1.0	50	13	100	12	2	■
MMR2120-020-50	12.0	2.0	50	13	100	12	2	■
MMR2120-030-50	12.0	3.0	50	13	100	12	2	■

Customized orders for other length of neck and corner radius is also available

Recommended work material 推薦可加工材料 ■ Preferred suitable 最適用 ■ Suitable 適用

ULTRA (D)	Steel < HRC32 碳鋼/合金鋼	HRC32 ~ 48 合金/預硬鋼	HRC 49 ~ 62 熱處理鋼	Stainless 不鏽鋼	Cast Iron 鑄鐵	Copper 銅

FEATURE：Different length of neck with new ULTRA (D) TIALN+ coating useful for HSM and hard milling (Up to HRC 62 - DRY CUT)

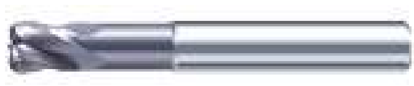
MX900 Series - Ultra Fine Grain Carbide Torus Endmills、Reduced Neck / HSM - 4 Flutes、Short Cut Lengh

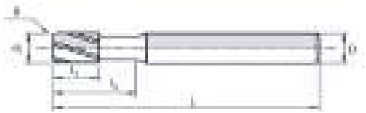
極細微粒鎢鋼、圓鼻刀、縮頸 / 高速切削 — 4 刃、短刃

Size: D3.0 ~ D16.0

MSR4

Carbide	Coating	Helix	HRC	V-Speed
Grain Ultra-Fine	ULTRA TIALN+	30°	65	HSM





Designation \ Dimension(mm)	刃徑 d_1	R 角 R	有效長 l_2	刃長 l_1	全長 L	柄徑 D	刃數 Z	Coating 鍍膜 ULTRA (D)
MSR4030-002-10	3.0	0.2	10	4	60	6	4	■
MSR4030-003-10	3.0	0.3	10	4	60	6	4	■
MSR4030-005-10	3.0	0.5	10	4	60	6	4	■
MSR4030-010-10	3.0	1.0	10	4	60	6	4	■
MSR4040-002-12	4.0	0.2	12	5	60	6	4	■
MSR4040-003-12	4.0	0.3	12	5	60	6	4	■
MSR4040-005-12	4.0	0.5	12	5	60	6	4	■
MSR4040-010-12	4.0	1.0	12	5	60	6	4	■
MSR4050-003-15	5.0	0.3	15	6	60	6	4	□
MSR4050-005-15	5.0	0.5	15	6	60	6	4	□
MSR4050-010-15	5.0	1.0	15	6	60	6	4	□
MSR4060-002-18	6.0	0.2	18	7	60	6	4	■
MSR4060-003-18	6.0	0.3	18	7	60	6	4	■
MSR4060-005-18	6.0	0.5	18	7	60	6	4	■
MSR4060-010-18	6.0	1.0	18	7	60	6	4	■
MSR4060-020-18	6.0	2.0	18	7	60	6	4	■
MSR4080-003-24	8.0	0.3	24	9	60	8	4	■
MSR4080-005-24	8.0	0.5	24	9	60	8	4	■
MSR4080-010-24	8.0	1.0	24	9	60	8	4	■
MSR4080-020-24	8.0	2.0	24	9	60	8	4	■
MSR4100-005-30	10.0	0.5	30	11	75	10	4	■
MSR4100-010-30	10.0	1.0	30	11	75	10	4	■
MSR4100-020-30	10.0	2.0	30	11	75	10	4	■
MSR4100-030-30	10.0	3.0	30	11	75	10	4	■
MSR4120-005-32	12.0	0.5	32	13	75	12	4	■
MSR4120-010-32	12.0	1.0	32	13	75	12	4	□
MSR4120-020-32	12.0	2.0	32	13	75	12	4	□
MSR4120-030-32	12.0	3.0	32	13	75	12	4	□
MSR4160-010-45	16.0	1.0	45	17	100	16	4	□
MSR4160-030-45	16.0	3.0	45	17	100	16	4	□

Customized orders for other length of neck and corner radius is also available

Recommended work material 推薦可加工材料 ■ Preferred suitable 最適用 ■ Suitable 適用

ULTRA (D)	Steel < HRC32 碳鋼/合金鋼	HRC32 ~ 48 合金/預硬鋼	HRC 49 ~ 65 熱處理鋼	Stainless 不鏽鋼	Cast Iron 鑄鐵	Super Alloys 高溫合金

FEATURE : Short length of cut with reduced neck ensures high rigidity , new ULTRA (D) TIALN+ coating useful for HSM and hard milling (Up to HRC 65 - DRY CUT)

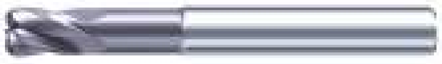
MX900 Series - Ultra Fine Grain Carbide Torus Endmills、Semi Long Shank / HSM - 4 Flutes、Short Cut Lengh

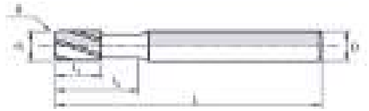
極細微粒鎢鋼、圓鼻刀、中長柄 / 高速切削 — 4 刃、短刃

Size: D6.0 ~ D8.0

MMR4

Carbide	Coating	Helix	HRC	V-Speed
Grain Ultra-Fine	ULTRA TIALN+	30°	65	HSM





Dimension(mm) / Designation	刃徑 d_1	R 角 R	有效長 l_2	刃長 l_1	全長 L	柄徑 D	刃數 Z	Coating 鍍膜 ULTRA (D)
MMR4060-005-30	6.0	0.5	30	7	75	6	4	■
MMR4060-010-30	6.0	1.0	30	7	75	6	4	■
MMR4060-015-30	6.0	1.5	30	7	75	6	4	■
MMR4080-005-36	8.0	0.5	36	9	75	8	4	■
MMR4080-010-36	8.0	1.0	36	9	75	8	4	■
MMR4080-020-36	8.0	2.0	36	9	75	8	4	■

Customized orders for other length of neck、corner radius is also available

Recommended work material 推薦可加工材料 ■ Preferred suitable 最適用 ■ Suitable 適用

	Steel < HRC32 碳鋼/合金鋼	HRC32 ~ 48 合金/預硬鋼	HRC 49 ~ 65 熱處理鋼	Stainless 不鏽鋼	Cast Iron 鑄鐵
ULTRA (D)	Preferred suitable	Preferred suitable	Preferred suitable	Suitable	Suitable

FEATURE : Short length of cut with reduced neck ensures high rigidity , new ULTRA (D) TIALN+ coating useful for HSM and hard milling (Up to HRC 65 - DRY CUT)

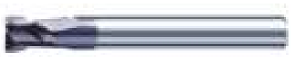
MX900 Series - Ultra Fine Grain Carbide Torus Endmills -2 Flutes、Standard Cut Lengh

極細微粒鎢鋼、圓鼻刀 — 2刃標準刃長

Size: D1.0~D12.0

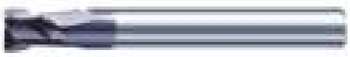
Carbide	Coating	Helix	HRC	V-Speed	Rake Angle
Grain Ultra-Fine	ULTRA TIALN+	30°	65	HSM	Positive

MECR2 (A)


Dimension(mm) / Desig nation	刃徑 d_1	R 角 R	刃長 l_1	全長 L	柄徑 D	刃數 Z	Coating 鍍膜 ULTRA(D)
MECR2A-030-002-3D	3.0	0.2	7.5	50	3	2	■
MECR2A010-002	1.0	0.2	3	50	4	2	■
MECR2A015-002	1.5	0.2	4	50	4	2	■
MECR2A020-002	2.0	0.2	5	50	4	2	■
MECR2A020-003	2.0	0.3	5	50	4	2	■
MECR2A020-005	2.0	0.5	5	50	4	2	■
MECR2A030-002	3.0	0.2	7.5	50	4	2	■
MECR2A030-003	3.0	0.3	7.5	50	4	2	■
MECR2A030-005	3.0	0.5	7.5	50	4	2	■
MECR2A030-010	3.0	1.0	7.5	50	4	2	■
MECR2A040-002	4.0	0.2	10	50	4	2	■
MECR2A040-003	4.0	0.3	10	50	4	2	■
MECR2A040-005	4.0	0.5	10	50	4	2	■
MECR2A040-010	4.0	1.0	10	50	4	2	■
MECR2-060-005	6.0	0.5	16	50	6	2	■
MECR2-060-010	6.0	1.0	16	50	6	2	■
MECR2-080-005	8.0	0.5	20	60	8	2	■
MECR2-080-010	8.0	1.0	20	60	8	2	■
MECR2-100-005	10.0	0.5	25	75	10	2	■
MECR2-100-010	10.0	1.0	25	75	10	2	■
MECR2-120-005	12.0	0.5	30	75	12	2	■
MECR2-120-010	12.0	1.0	30	75	12	2	■

MLCR2 (A)




Dimension(mm) / Desig nation	刃徑 d_1	R 角 R	刃長 l_1	全長 L	柄徑 D	刃數 Z	Coating 鍍膜 ULTRA(D)
MLCR2A040-002	4.0	0.2	10	75	4	2	■
MLCR2A040-005	4.0	0.5	10	75	4	2	■
MLCR2A040-010	4.0	1.0	10	75	4	2	■
MLCR2-060-005	6.0	0.5	16	100	6	2	■
MLCR2-060-010	6.0	1.0	16	100	6	2	■
MLCR2-080-005	8.0	0.5	20	100	8	2	■
MLCR2-080-010	8.0	1.0	20	100	8	2	■
MLCR2-100-005	10.0	0.5	25	100	10	2	■
MLCR2-100-010	10.0	1.0	25	100	10	2	■
MLCR2-120-005	12.0	0.5	30	100	12	2	■
MLCR2-120-010	12.0	1.0	30	100	12	2	■

Recommended work material 推薦可加工材料 ■ Preferred suitable 最適用 □ Suitable 適用

	Steel < HRC32 碳鋼/合金鋼	HRC32 ~ 48 合金/預硬鋼	HRC 49 ~ 65 熱處理鋼	Stainless 不鏽鋼	Cast Iron 鑄鐵
ULTRA (D)	■	■	■	□	□

FEATURE : New ULTRA (D) TIALN+ coating useful for HSM and hard milling (Up HRC 65 - DRY CUT)

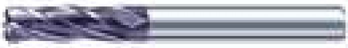
MX900 Series - Ultra Fine Grain Carbide Torus Endmills、(Semi)Long Shank/HSM-4 Flutes

極細微粒鎢鋼、圓鼻刀、(中)長柄/高速切削—4刃、標準刃長

Size: D4.0~D16.0

MLCR4

Carbide	Coating	Helix	HRC	V-Speed	Rake Angle
Grain Ultra-Fine	ULTRA TIALN+	30°	65	HSM	Positive



Dimension(mm) / Desig nation	刃徑 d_1	R角 R	刃長 l_1	全長 L	柄徑 D	刃數 Z	Coating 鍍膜 ULTRA(D)
MLCR4A040-002	4.0	0.2	10	75	4	4	■
MLCR4A040-005	4.0	0.5	10	75	4	4	■
MLCR4A040-010	4.0	1.0	10	75	4	4	■
MLCR4060-005	6.0	0.5	16	100	6	4	■
MLCR4060-010	6.0	1.0	16	100	6	4	■
MLCR4060-015	6.0	1.5	16	100	6	4	■
MLCR4060-020	6.0	2.0	16	100	6	4	■
MLCR4080-005	8.0	0.5	20	100	8	4	■
MLCR4080-010	8.0	1.0	20	100	8	4	■
MLCR4080-020	8.0	2.0	20	100	8	4	■
MLCR4100-005	10.0	0.5	25	100	10	4	■
MLCR4100-010	10.0	1.0	25	100	10	4	■
MLCR4100-020	10.0	2.0	25	100	10	4	■
MLCR4100-030	10.0	3.0	25	100	10	4	■
MLCR4120-005	12.0	0.5	30	100	12	4	■
MLCR4120-010	12.0	1.0	30	100	12	4	■
MLCR4120-020	12.0	2.0	30	100	12	4	■
MLCR4120-030	12.0	3.0	30	100	12	4	■
MLCR4160-010	16.0	1.0	40	150	16	4	□
MLCR4160-040	16.0	4.0	40	150	16	4	□

MX900 Series - Ultra Fine Grain Carbide Torus Endmills-4 Flutes、Standard Cut Length

極細微粒鎢鋼、圓鼻刀、(中)長柄 — 4刃、短刃

Size: D8.0~D12.0

MLCRS4、MECRS4

Carbide	Coating	Helix	HRC	V-Speed	Rake Angle
Grain Ultra-Fine	ULTRA TIALN+	30°	65	HSM	Positive

Dimension(mm) / Desig nation	刃徑 d_1	R角 R	刃長 l_1	全長 L	柄徑 D	刃數 Z	Coating 鍍膜 ULTRA(D)
MLCRS4-060-005	6.0	0.5	6	100	6	4	■
MLCRS4-080-005	8.0	0.5	8	100	8	4	■
MLCRS4-080-010	8.0	1.0	8	100	8	4	■
MLCRS4-100-005	10.0	0.5	10	100	10	4	■
MLCRS4-100-010	10.0	1.0	10	100	10	4	■
MLCRS4-120-005	12.0	0.5	12	100	12	4	■
MLCRS4-120-010	12.0	1.0	12	100	12	4	■
MECRS4UF12ATC060003	6.0	0.3	6	75	6	4	■
MECRS4UF12ATC060005	6.0	0.5	6	75	6	4	■
MECRS4UF12ATC060010	6.0	1.0	6	75	6	4	■
MECRS4UF12ATC080003	8.0	0.3	8	75	8	4	■
MECRS4UF12ATC080005	8.0	0.5	8	75	8	4	■
MECRS4UF12ATC080010	8.0	1.0	8	75	8	4	■
MECRS4UF12ATC010005	10.0	0.5	10	75	10	4	■
MECRS4UF12ATC010010	10.0	1.0	10	75	10	4	■
MECRS4UF12ATC010015	10.0	1.5	10	75	10	4	■
MECRS4UF12ATC010020	10.0	2.0	10	75	10	4	■
MECRS4UF12ATC120005	12.0	0.5	12	75	12	4	■
MECRS4UF12ATC120010	12.0	1.0	12	75	12	4	■
MECRS4UF12ATC120015	12.0	2.0	12	75	12	4	■
MECRS4UF12ATC120020	12.0	3.0	12	75	12	4	■

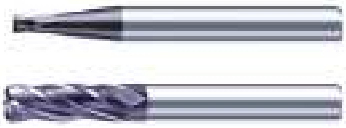
MX900 Series - Ultra Fine Grain Carbide Torus Endmills - 4 Flutes、Standard Cut Length

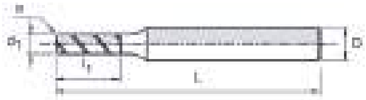
極細微粒鎢鋼、圓鼻刀 — 4 刃、標準刃長

Size: D3.0~D20.0

MECR4（A）

Carbide	Coating	Coating	Helix	HRC	V-Speed	Rake Angle
Grain Ultra-Fine	NT-WET	ULTRA TIALN+	30°	62	HSM	Positive





Dimension(mm) / Desig nation	刃徑 d_1	R 角 R	刃長 l_1	全長 L	柄徑 D	刃數 Z	Coating 鍍膜 ULTRA(D)
MECR4A-010-002	1.0	0.2	3	50	4	4	■
MECR4A-015-002	1.5	0.2	4	50	4	4	■
MECR4A-020-002	2.0	0.2	5	50	4	4	■
MECR4A-020-003	2.0	0.3	5	50	4	4	■
MECR4A-020-005	2.0	0.5	5	50	4	4	■
MECR4A030-002	3.0	0.2	7.5	50	4	4	■
MECR4A030-003	3.0	0.3	7.5	50	4	4	■
MECR4A030-005	3.0	0.5	7.5	50	4	4	■
MECR4A030-010	3.0	1.0	7.5	50	4	4	■
MECR4A040-002	4.0	0.2	10	50	4	4	■
MECR4A040-003	4.0	0.3	10	50	4	4	■
MECR4A040-005	4.0	0.5	10	50	4	4	■
MECR4A040-010	4.0	1.0	10	50	4	4	■
MECR4-060-005	6.0	0.5	16	50	6	4	■
MECR4-060-010	6.0	1.0	16	50	6	4	■
MECR4-060-015	6.0	1.5	16	50	6	4	■
MECR4-060-020	6.0	2.0	16	50	6	4	■
MECR4-080-005	8.0	0.5	20	60	8	4	■
MECR4-080-010	8.0	1.0	20	60	8	4	■
MECR4-080-015	8.0	1.5	20	60	8	4	■
MECR4-080-020	8.0	2.0	20	60	8	4	■
MECR4-100-005	10.0	0.5	25	75	10	4	■
MECR4-100-010	10.0	1.0	25	75	10	4	■
MECR4-100-015	10.0	1.5	25	75	10	4	■
MECR4-100-020	10.0	2.0	25	75	10	4	■
MECR4-100-030	10.0	3.0	25	75	10	4	■
MECR4-120-005	12.0	0.5	30	75	12	4	■
MECR4-120-010	12.0	1.0	30	75	12	4	■
MECR4-120-015	12.0	1.5	30	75	12	4	■
MECR4-120-020	12.0	2.0	30	75	12	4	■
MECR4-120-030	12.0	3.0	30	75	12	4	■
MECR4-160-010	16.0	1.0	40	100	16	4	■
MECR4-160-020	16.0	2.0	40	100	16	4	■
MECR4-160-030	16.0	3.0	40	100	16	4	■
MECR4-160-040	16.0	4.0	40	100	16	4	□
MECR4-200-010	20.0	1.0	50	100	20	4	□
MECR4-200-020	20.0	2.0	50	100	20	4	□
MECR4-200-030	20.0	3.0	50	100	20	4	□
MECR4-200-040	20.0	4.0	50	100	20	4	□
MECR4-200-050	20.0	5.0	50	100	20	4	□

Recommended work material 推薦可加工材料 ■ Preferred suitable 最適用 □ Suitable 適用

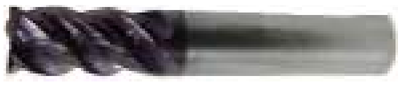
ULTRA (D)	Steel < HRC32 碳鋼/合金鋼	HRC32 ~ 48 合金/預硬鋼	HRC 49 ~ 62 熱處理鋼	Stainless 不鏽鋼	Cast Iron 鑄鐵	Copper 銅

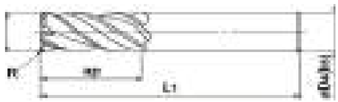
FEATURE : New ULTRA (D) TIALN+ coating useful for HSM and hard milling (Up HRC 62 - DRY CUT)

RER4

標準刃長４刃，不規則螺旋角圓鼻刀

Coner radius endmill-Standard Cut Length, 4 flutes, Irregular helix flutes





* 智慧塗層振動控制銑刀對難切削的材料及有長形突出物的物件切削時，在減少雜音上表現出穩定的性能。

* SMART MIRACLE vibration control end mills for reduced chattering and for delivering a stable performance on difficult-to-cut materials and long overhang applications.

產品型號 Item No.	尺寸 Size(mm) 刃 徑 Diameter D1	半 徑 Corner Radius R	刃 長 Length of Cut ap	全 長 Overall Length L1	柄徑 shank Da D4	刃數 No.of flutes T	Coating 鍍膜 UNCOATED
RER4A-UF12-SF-030-002	3.0	0.2	7.5	50	4	4	■
RER4A-UF12-SF-030-005	3.0	0.5	7.5	50	4	4	■
RER4A-UF12-SF-040-002	4.0	0.2	10	50	4	4	■
RER4A-UF12-SF-040-005	4.0	0.5	10	50	4	4	■
RER4-UF12-SF-030-002	3.0	0.2	7.5	50	6	4	■
RER4-UF12-SF-030-005	3.0	0.5	7.5	50	6	4	■
RER4-UF12-SF-040-002	4.0	0.2	10	50	6	4	■
RER4-UF12-SF-040-005	4.0	0.5	10	50	6	4	■
RER4-UF12-SF-050-002	5.0	0.2	13	50	6	4	■
RER4-UF12-SF-050-005	5.0	0.5	13	50	6	4	■
RER4-UF12-SF-050-010	5.0	1.0	13	50	6	4	■
RER4-UF12-SF-060-002	6.0	0.2	16	50	6	4	■
RER4-UF12-SF-060-005	6.0	0.5	16	50	6	4	■
RER4-UF12-SF-060-010	6.0	1.0	16	50	6	4	■

Recommended work material 推薦可加工材料 ■ Preferred suitable 最適用 □ Suitable 適用

UNCOATED	Mild Steels 一般構造用鋼	Hardened Steels 調質鋼	Pre-Hardened Seels 預硬鋼	Carbon steels 碳素鋼	Stainless Steels SUS 3xx SUS 2xx 奧氏體不銹鋼
	Stainless Steels SUS 4xx SUS 6xx 鐵素體 馬氏體不銹鋼	Fe-Base Alloy Fe 351 Fe353 鐵基高溫合金	Ni-Base Alloy Co-Base Alloy 鎳基 鈷基高溫合金	Titanium Alloy 鈦合金	

產品型號 Item No.	尺寸 Size(mm) 刃 徑 Diameter D1	半 徑 Corner Radius R	刃 長 Length of Cut ap	全 長 Overall Length L1	柄徑 shank Da D4	刃數 No.of flutes T	Coating 鍍膜 UNCOATED
RER4-UF12-SF-080-002	8.0	0.2	20	60	8	4	■
RER4-UF12-SF-080-005	8.0	0.5	20	60	8	4	■
RER4-UF12-SF-080-010	8.0	1.0	20	60	8	4	■
RER4-UF12-SF-080-015	8.0	1.5	20	60	8	4	■
RER4-UF12-SF-100-005	10.0	0.5	25	75	10	4	■
RER4-UF12-SF-100-010	10.0	1.0	25	75	10	4	■
RER4-UF12-SF-100-015	10.0	1.5	25	75	10	4	■
RER4-UF12-SF-100-020	10.0	2.0	25	75	10	4	■
RER4-UF12-SF-100-030	10.0	3.0	25	75	10	4	■
RER4-UF12-SF-120-005	12.0	0.5	30	75	12	4	■
RER4-UF12-SF-120-010	12.0	1.0	30	75	12	4	■
RER4-UF12-SF-120-015	12.0	1.5	30	75	12	4	■
RER4-UF12-SF-120-020	12.0	2.0	30	75	12	4	■
RER4-UF12-SF-120-025	12.0	2.5	30	75	12	4	■
RER4-UF12-SF-120-030	12.0	3.0	30	75	12	4	■
RER4-UF12-SF-160-005	16.0	0.5	40	100	16	4	■
RER4-UF12-SF-160-010	16.0	1.0	40	100	16	4	■
RER4-UF12-SF-160-015	16.0	1.5	40	100	16	4	■
RER4-UF12-SF-160-020	16.0	2.0	40	100	16	4	■
RER4-UF12-SF-160-025	16.0	2.5	40	100	16	4	■
RER4-UF12-SF-160-030	16.0	3.0	40	100	16	4	■
RER4-UF12-SF-160-040	16.0	4.0	40	100	16	4	■
RER4-UF12-SF-160-050	16.0	5.0	40	100	16	4	■
RER4-UF12-SF-200-010	20.0	1.0	50	100	20	4	■
RER4-UF12-SF-200-015	20.0	1.5	50	100	20	4	■
RER4-UF12-SF-200-020	20.0	2.0	50	100	20	4	■
RER4-UF12-SF-200-025	20.0	2.5	50	100	20	4	■
RER4-UF12-SF-200-030	20.0	3.0	50	100	20	4	■
RER4-UF12-SF-200-040	20.0	4.0	50	100	20	4	■
RER4-UF12-SF-200-050	20.0	5.0	50	100	20	4	■

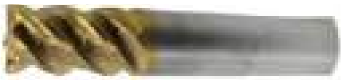
Recommended work material 推薦可加工材料 ■ Preferred suitable 最適用 □ Suitable 適用

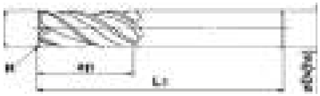
UNCOATED	Mild Steels 一般構造用鋼	Hardened Steels 調質鋼	Pre-Hardened Seels 預硬鋼	Carbon steels 碳素鋼	Stainless Steels SUS 3xx SUS 2xx 奧氏體不銹鋼
	Stainless Steels SUS 4xx SUS 6xx 鐵素體 馬氏體不銹鋼	Fe-Base Alloy Fe 351 Fe353 鐵基高溫合金	Ni-Base Alloy Co-Base Alloy 鎳基 鈷基高溫合金	Titanium Alloy 鈦合金	

RER4

標準刃長４刃，不規則螺旋角圓鼻刀

Coner radius endmill - Standard Cut Length, 4 flutes, Irregular helix flutes





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* SMART MIRACLE vibration control end mills for reduced chattering and for delivering a stable performance on difficult-to-cut materials and long overhang applications.

產品型號 Item No.	尺寸 Size(mm) 刃 徑 Diameter D1	半 徑 Corner Radius R	刃 長 Length of Cut ap	全 長 Overall Length L1	柄徑 shank Da D4	刃數 No.of flutes T	Coating 鍍膜 UNCOATED
RER4A-UF12-TSI-030-002	3.0	0.2	7.5	50	4	4	■
RER4A-UF12-TSI-030-005	3.0	0.5	7.5	50	4	4	■
RER4A-UF12-TSI-040-002	4.0	0.2	10	50	4	4	■
RER4A-UF12-TSI-040-005	4.0	0.5	10	50	4	4	■
RER4-UF12-TSI-030-002	3.0	0.2	7.5	50	6	4	■
RER4-UF12-TSI-030-005	3.0	0.5	7.5	50	6	4	■
RER4-UF12-TSI-040-002	4.0	0.2	10	50	6	4	■
RER4-UF12-TSI-040-005	4.0	0.5	10	50	6	4	■
RER4-UF12-TSI-050-002	5.0	0.2	13	50	6	4	■
RER4-UF12-TSI-050-005	5.0	0.5	13	50	6	4	■
RER4-UF12-TSI-050-010	5.0	1.0	13	50	6	4	■
RER4-UF12-TSI-060-002	6.0	0.2	16	50	6	4	■
RER4-UF12-TSI-060-005	6.0	0.5	16	50	6	4	■
RER4-UF12-TSI-060-010	6.0	1.0	16	50	6	4	■

Recommended work material 推薦可加工材料 ■ Preferred suitable 最適用 □ Suitable 適用

UNCOATED	Mild Steels 一般構造用鋼	Carbon steels 碳素鋼	Pre-Hardened Seels 預硬鋼	Hardened Steels 調質鋼	Hardened Steels 40-50HRC 高硬度鋼
	Hardened Steels 50-60 HRC 高硬度鋼	Ductile Iron FC FCD 灰口鑄鐵 球墨鑄鐵	Malleable Iron KTH KTZ KTB 可鍛鑄鐵	Stainless Steels SUS 3xx SUS 2xx 奧氏體不銹鋼	Stainless Steels SUS 4xx SUS 6xx 鐵素體 馬氏體不銹鋼
	Fe-Base Alloy Fe 351 Fe353 鐵基高溫合金	Ni-Base Alloy Co-Base Alloy 鎳基 鈷基高溫合金	Titanium Alloy 鈦合金		

產品型號 Item No.	尺寸 Size(mm) 刃 徑 Diameter D1	半 徑 Corner Radius R	刃 長 Length of Cut ap	全 長 Overall Length L1	柄徑 shank Da D4	刃數 No.of flutes T	Coating 鍍膜 UNCOATED
RER4-UF12-TSI-080-002	8.0	0.2	20	60	8	4	■
RER4-UF12-TSI-080-005	8.0	0.5	20	60	8	4	■
RER4-UF12-TSI-080-010	8.0	1.0	20	60	8	4	■
RER4-UF12-TSI-080-015	8.0	1.5	20	60	8	4	■
RER4-UF12-TSI-100-005	10.0	0.5	25	75	10	4	■
RER4-UF12-TSI-100-010	10.0	1.0	25	75	10	4	■
RER4-UF12-TSI-100-015	10.0	1.5	25	75	10	4	■
RER4-UF12-TSI-100-020	10.0	2.0	25	75	10	4	■
RER4-UF12-TSI-100-030	10.0	3.0	25	75	10	4	■
RER4-UF12-TSI-120-005	12.0	0.5	30	75	12	4	■
RER4-UF12-TSI-120-010	12.0	1.0	30	75	12	4	■
RER4-UF12-TSI-120-015	12.0	1.5	30	75	12	4	■
RER4-UF12-TSI-120-020	12.0	2.0	30	75	12	4	■
RER4-UF12-TSI-120-025	12.0	2.5	30	75	12	4	■
RER4-UF12-TSI-120-030	12.0	3.0	30	75	12	4	■
RER4-UF12-TSI-160-005	16.0	0.5	40	100	16	4	■
RER4-UF12-TSI-160-010	16.0	1.0	40	100	16	4	■
RER4-UF12-TSI-160-015	16.0	1.5	40	100	16	4	■
RER4-UF12-TSI-160-020	16.0	2.0	40	100	16	4	■
RER4-UF12-TSI-160-025	16.0	2.5	40	100	16	4	■
RER4-UF12-TSI-160-030	16.0	3.0	40	100	16	4	■
RER4-UF12-TSI-160-040	16.0	4.0	40	100	16	4	■
RER4-UF12-TSI-160-050	16.0	5.0	40	100	16	4	■
RER4-UF12-TSI-200-010	20.0	1.0	50	100	20	4	■
RER4-UF12-TSI-200-015	20.0	1.5	50	100	20	4	■
RER4-UF12-TSI-200-020	20.0	2.0	50	100	20	4	■
RER4-UF12-TSI-200-025	20.0	2.5	50	100	20	4	■
RER4-UF12-TSI-200-030	20.0	3.0	50	100	20	4	■
RER4-UF12-TSI-200-040	20.0	4.0	50	100	20	4	■
RER4-UF12-TSI-200-050	20.0	5.0	50	100	20	4	■

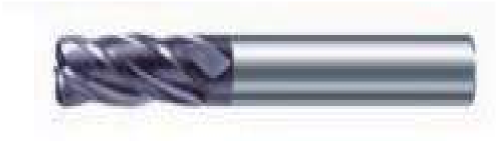
Recommended work material 推薦可加工材料 ■ Preferred suitable 最適用 □ Suitable 適用

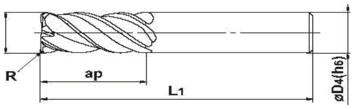
UNCOATED	Mild Steels 一般構造用鋼	Carbon steels 碳素鋼	Pre-Hardened Seels 預硬鋼	Hardened Steels 調質鋼	Hardened Steels 40-50HRC 高硬度鋼
	Hardened Steels 50-60 HRC 高硬度鋼	Ductile Iron FC FCD 灰口鑄鐵 球墨鑄鐵	Malleable Iron KTH KTZ KTB 可鍛鑄鐵	Stainless Steels SUS 3xx SUS 2xx 奧氏體不銹鋼	Stainless Steels SUS 4xx SUS 6xx 鐵素體 馬氏體不銹鋼
	Fe-Base Alloy Fe 351 Fe353 鐵基高溫合金	Ni-Base Alloy Co-Base Alloy 鎳基 鈷基高溫合金	Titanium Alloy 鈦合金		

RER4

標準刃長 4 刃，不規則螺旋角圓鼻刀

Coner radius endmill - Standard Cut Length, 4 flutes, Irregular helix flutes





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* SMART MIRACLE vibration control end mills for reduced chattering and for delivering a stable performance on difficult-to-cut materials and long overhang applications.

產品型號 Item No.	尺寸 Size(mm)					刃數	Coating 鍍膜
	刃 徑 Diameter D1	半 徑 Corner Radius R	刃 長 Length of Cut ap	全 長 Overall Length L1	柄徑 shank Da D4	No.of flutes T	UNCOATED
RER4A-UF12-ATC-030-002	3.0	0.2	7.5	50	4	4	■
RER4A-UF12-ATC-030-005	3.0	0.5	7.5	50	4	4	■
RER4A-UF12-ATC-040-002	4.0	0.2	10	50	4	4	■
RER4A-UF12-ATC-040-005	4.0	0.5	10	50	4	4	■
RER4-UF12-ATC-030-002	3.0	0.2	7.5	50	6	4	■
RER4-UF12-ATC-030-005	3.0	0.5	7.5	50	6	4	■
RER4-UF12-ATC-040-002	4.0	0.2	10	50	6	4	■
RER4-UF12-ATC-040-005	4.0	0.5	10	50	6	4	■
RER4-UF12-ATC-050-002	5.0	0.2	13	50	6	4	■
RER4-UF12-ATC-050-005	5.0	0.5	13	50	6	4	■
RER4-UF12-ATC-050-010	5.0	1.0	13	50	6	4	■
RER4-UF12-ATC-060-002	6.0	0.2	16	50	6	4	■
RER4-UF12-ATC-060-005	6.0	0.5	16	50	6	4	■
RER4-UF12-ATC-060-010	6.0	1.0	16	50	6	4	■

Recommended work material 推薦可加工材料 ■ Preferred suitable 最適用 □ Suitable 適用

UNCOATED	Stainless Steels SUS 3xx SUS 2xx 奧氏體不銹鋼	Stainless Steels SUS 4xx SUS 6xx 鐵素體 馬氏體不銹鋼	Fe-Base Alloy Fe 351 Fe353 鐵基高溫合金	Ni-Base Alloy Co-Base Alloy 鎳基 鈷基高溫合金	Mild Steels 一般構造用鋼
	Carbon steels 碳素鋼	Pre-Hardened Seels 預硬鋼	Hardened Steels 調質鋼	Hardened Steels 40-50HRC 高硬度鋼	Ductile Iron FC FCD 灰口鑄鐵 球墨鑄鐵
	Malleable Iron KTH KTZ KTB 可鍛鑄鐵	Titanium Alloy 鈦合金			

產品型號 Item No.	尺寸 Size(mm) 刃 徑 Diameter D1	半 徑 Corner Radius R	刃 長 Length of Cut ap	全 長 Overall Length L1	柄徑 shank Da D4	刃數 No.of flutes T	Coating 鍍膜 UNCOATED
RER4-UF12-ATC-080-002	8.0	0.2	20	60	8	4	■
RER4-UF12-ATC-080-005	8.0	0.5	20	60	8	4	■
RER4-UF12-ATC-080-010	8.0	1.0	20	60	8	4	■
RER4-UF12-ATC-080-015	8.0	1.5	20	60	8	4	■
RER4-UF12-ATC-100-005	10.0	0.5	25	75	10	4	■
RER4-UF12-ATC-100-010	10.0	1.0	25	75	10	4	■
RER4-UF12-ATC-100-015	10.0	1.5	25	75	10	4	■
RER4-UF12-ATC-100-020	10.0	2.0	25	75	10	4	■
RER4-UF12-ATC-100-030	10.0	3.0	25	75	10	4	■
RER4-UF12-ATC-120-005	12.0	0.5	30	75	12	4	■
RER4-UF12-ATC-120-010	12.0	1.0	30	75	12	4	■
RER4-UF12-ATC-120-015	12.0	1.5	30	75	12	4	■
RER4-UF12-ATC-120-020	12.0	2.0	30	75	12	4	■
RER4-UF12-ATC-120-025	12.0	2.5	30	75	12	4	■
RER4-UF12-ATC-120-030	12.0	3.0	30	75	12	4	■
RER4-UF12-ATC-160-005	16.0	0.5	40	100	16	4	■
RER4-UF12-ATC-160-010	16.0	1.0	40	100	16	4	■
RER4-UF12-ATC-160-015	16.0	1.5	40	100	16	4	■
RER4-UF12-ATC-160-020	16.0	2.0	40	100	16	4	■
RER4-UF12-ATC-160-025	16.0	2.5	40	100	16	4	■
RER4-UF12-ATC-160-030	16.0	3.0	40	100	16	4	■
RER4-UF12-ATC-160-040	16.0	4.0	40	100	16	4	■
RER4-UF12-ATC-160-050	16.0	5.0	40	100	16	4	■
RER4-UF12-ATC-200-010	20.0	1.0	50	100	20	4	■
RER4-UF12-ATC-200-015	20.0	1.5	50	100	20	4	■
RER4-UF12-ATC-200-020	20.0	2.0	50	100	20	4	■
RER4-UF12-ATC-200-025	20.0	2.5	50	100	20	4	■
RER4-UF12-ATC-200-030	20.0	3.0	50	100	20	4	■
RER4-UF12-ATC-200-040	20.0	4.0	50	100	20	4	■
RER4-UF12-ATC-200-050	20.0	5.0	50	100	20	4	■

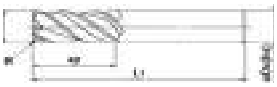
Recommended work material 推薦可加工材料 ■ Preferred suitable 最適用 □ Suitable 適用

UNCOATED	Stainless Steels SUS 3xx SUS 2xx 奧氏體不銹鋼	Stainless Steels SUS 4xx SUS 6xx 鐵素體 馬氏體不銹鋼	Fe-Base Alloy Fe 351 Fe353 鐵基高溫合金	Ni-Base Alloy Co-Base Alloy 鎳基 鈷基高溫合金	Mild Steels 一般構造用鋼
	Carbon steels 碳素鋼	Pre-Hardened Seels 預硬鋼	Hardened Steels 調質鋼	Hardened Steels 40-50HRC 高硬度鋼	Ductile Iron FC FCD 灰口鑄鐵 球墨鑄鐵
	Malleable Iron KTH KTZ KTB 可鍛鑄鐵	Titanium Alloy 鈦合金			

RER4

標準刃長 4 刃，不規則螺旋角圓鼻刀

Coner radius endmill - Standard Cut Length, 4 flutes, Irregular helix flutes



* 智慧塗層振動控制銑刀對難切削的材料及有長形突出物的物件切削時，在減少雜音上表現出穩定的性能。
* SMART MIRACLE vibration control end mills for reduced chattering and for delivering a stable performance on difficult-to-cut materials and long overhang applications.

產品型號 Item No.	尺寸 Size(mm)					刃數	Coating 鍍膜
	刃 徑 Diameter D1	半 徑 Corner Radius R	刃 長 Length of Cut ap	全 長 Overall Length L1	柄徑 shank Da D4	No.of flutes T	UNCOATED
RER4A-UF12-NCB-030-002	3.0	0.2	7.5	50	4	4	■
RER4A-UF12-NCB-030-005	3.0	0.5	7.5	50	4	4	■
RER4A-UF12-NCB-040-002	4.0	0.2	10	50	4	4	■
RER4A-UF12-NCB-040-005	4.0	0.5	10	50	4	4	■
RER4A-UF12-NCB-030-002	3.0	0.2	7.5	50	6	4	■
RER4A-UF12-NCB-030-005	3.0	0.5	7.5	50	6	4	■
RER4A-UF12-NCB-040-002	4.0	0.2	10	50	6	4	■
RER4A-UF12-NCB-040-005	4.0	0.5	10	50	6	4	■
RER4A-UF12-NCB-050-002	5.0	0.2	13	50	6	4	■
RER4A-UF12-NCB-050-005	5.0	0.5	13	50	6	4	■
RER4A-UF12-NCB-050-010	5.0	1.0	13	50	6	4	■
RER4A-UF12-NCB-060-002	6.0	0.2	16	50	6	4	■
RER4A-UF12-NCB-060-005	6.0	0.5	16	50	6	4	■
RER4A-UF12-NCB-060-010	6.0	1.0	16	50	6	4	■

Recommended work material 推薦可加工材料 ■ Preferred suitable 最適用 □ Suitable 適用

UNCOATED	Mild Steels 一般構造用鋼	Carbon steels 碳素鋼	Pre-Hardened Seels 預硬鋼	Hardened Steels 調質鋼	Hardened Steels 40-50HRC 高硬度鋼
	Hardened Steels 50-60 HRC 高硬度鋼	Ductile Iron FC FCD 灰口鑄鐵 球墨鑄鐵	Malleable Iron KTH KTZ KTB 可鍛鑄鐵	Stainless Steels SUS 3xx SUS 2xx 奧氏體不銹鋼	Stainless Steels SUS 4xx SUS 6xx 鐵素體 馬氏體不銹鋼

產品型號 Item No.	尺寸 Size(mm) 刃 徑 Diameter D1	半 徑 Corner Radius R	刃 長 Length of Cut ap	全 長 Overall Length L1	柄徑 shank Da D4	刃數 No.of flutes T	Coating 鍍膜 UNCOATED
RER4A-UF12-NCB-080-002	8.0	0.2	20	60	8	4	■
RER4A-UF12-NCB-080-005	8.0	0.5	20	60	8	4	■
RER4A-UF12-NCB-080-010	8.0	1.0	20	60	8	4	■
RER4A-UF12-NCB-080-015	8.0	1.5	20	60	8	4	■
RER4A-UF12-NCB-100-005	10.0	0.5	25	75	10	4	■
RER4A-UF12-NCB-100-010	10.0	1.0	25	75	10	4	■
RER4A-UF12-NCB-100-015	10.0	1.5	25	75	10	4	■
RER4A-UF12-NCB-100-020	10.0	2.0	25	75	10	4	■
RER4A-UF12-NCB-100-030	10.0	3.0	25	75	10	4	■
RER4A-UF12-NCB-120-005	12.0	0.5	30	75	12	4	■
RER4A-UF12-NCB-120-010	12.0	1.0	30	75	12	4	■
RER4A-UF12-NCB-120-015	12.0	1.5	30	75	12	4	■
RER4A-UF12-NCB-120-020	12.0	2.0	30	75	12	4	■
RER4A-UF12-NCB-120-025	12.0	2.5	30	75	12	4	■
RER4A-UF12-NCB-120-030	12.0	3.0	30	75	12	4	■
RER4A-UF12-NCB-160-005	16.0	0.5	40	100	16	4	■
RER4A-UF12-NCB-160-010	16.0	1.0	40	100	16	4	■
RER4A-UF12-NCB-160-015	16.0	1.5	40	100	16	4	■
RER4A-UF12-NCB-160-020	16.0	2.0	40	100	16	4	■
RER4A-UF12-NCB-160-025	16.0	2.5	40	100	16	4	■
RER4A-UF12-NCB-160-030	16.0	3.0	40	100	16	4	■
RER4A-UF12-NCB-160-040	16.0	4.0	40	100	16	4	■
RER4A-UF12-NCB-160-050	16.0	5.0	40	100	16	4	■
RER4A-UF12-NCB-200-010	20.0	1.0	50	100	20	4	■
RER4A-UF12-NCB-200-015	20.0	1.5	50	100	20	4	■
RER4A-UF12-NCB-200-020	20.0	2.0	50	100	20	4	■
RER4A-UF12-NCB-200-025	20.0	2.5	50	100	20	4	■
RER4A-UF12-NCB-200-030	20.0	3.0	50	100	20	4	■
RER4A-UF12-NCB-200-040	20.0	4.0	50	100	20	4	■
RER4A-UF12-NCB-200-050	20.0	5.0	50	100	20	4	■

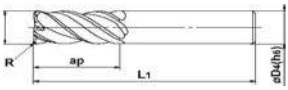
Recommended work material 推薦可加工材料 ■ Preferred suitable 最適用 □ Suitable 適用

UNCOATED	Mild Steels 一般構造用鋼 (Preferred suitable)	Carbon steels 碳素鋼 (Preferred suitable)	Pre-Hardened Seels 預硬鋼 (Preferred suitable)	Hardened Steels 調質鋼 (Preferred suitable)	Hardened Steels 40-50HRC 高硬度鋼 (Preferred suitable)
	Hardened Steels 50-60 HRC 高硬度鋼 (Preferred suitable)	Ductile Iron FC FCD 灰口鑄鐵 球墨鑄鐵 (Preferred suitable)	Malleable Iron KTH KTZ KTB 可鍛鑄鐵 (Preferred suitable)	Stainless Steels SUS 3xx SUS 2xx 奧氏體不銹鋼 (Suitable)	Stainless Steels SUS 4xx SUS 6xx 鐵素體 馬氏體不銹鋼 (Suitable)

RER4

標準刃長４刃，不規則螺旋角圓鼻刀

Coner radius endmill-Standard Cut Length, 4 flutes, Irregular helix flutes



* 智慧塗層振動控制銑刀對難切削的材料及有長形突出物的物件切削時，在減少雜音上表現出穩定的性能。

* SMART MIRACLE vibration control end mills for reduced chattering and for delivering a stable performance on difficult-to-cut materials and long overhang applications.

產品型號 Item No.	尺寸 Size(mm)					刃數	Coating 鍍膜
	刃 徑 Diameter D1	半 徑 Corner Radius R	刃 長 Length of Cut ap	全 長 Overall Length L1	柄徑 shank Da D4	No.of flutes T	UNCOATED
RER4A-UF12-NC-030-002	3.0	0.2	7.5	50	4	4	■
RER4A-UF12-NC-030-005	3.0	0.5	7.5	50	4	4	■
RER4A-UF12-NC-040-002	4.0	0.2	10	50	4	4	■
RER4A-UF12-NC-040-005	4.0	0.5	10	50	4	4	■
RER4-UF12-NC-030-002	3.0	0.2	7.5	50	6	4	■
RER4-UF12-NC-030-005	3.0	0.5	7.5	50	6	4	■
RER4-UF12-NC-040-002	4.0	0.2	10	50	6	4	■
RER4-UF12-NC-040-005	4.0	0.5	10	50	6	4	■
RER4-UF12-NC-050-002	5.0	0.2	13	50	6	4	■
RER4-UF12-NC-050-005	5.0	0.5	13	50	6	4	■
RER4-UF12-NC-050-010	5.0	1.0	13	50	6	4	■
RER4-UF12-NC-060-002	6.0	0.2	16	50	6	4	■
RER4-UF12-NC-060-005	6.0	0.5	16	50	6	4	■
RER4-UF12-NC-060-010	6.0	1.0	16	50	6	4	■

Recommended work material 推薦可加工材料 ■ Preferred suitable 最適用 □ Suitable 適用

UNCOATED	Ni-Base Alloy Co-Base Alloy 鎳基 鈷基高溫合金	Titanium Alloy 鈦合金	Stainless Steels SUS 3xx SUS 2xx 奧氏體不銹鋼	Stainless Steels SUS 4xx SUS 6xx 鐵素體 馬氏體不銹鋼	Fe-Base Alloy Fe 351 Fe353 鐵基高溫合金

產品型號 Item No.	尺寸 Size(mm)					刃數	Coating 鍍膜
	刃 徑 Diameter D1	半 徑 Corner Radius R	刃 長 Length of Cut ap	全 長 Overall Length L1	柄徑 shank Da D4	No.of flutes T	UNCOATED
RER4-UF12-NC-080-002	8.0	0.2	20	60	8	4	■
RER4-UF12-NC-080-005	8.0	0.5	20	60	8	4	■
RER4-UF12-NC-080-010	8.0	1.0	20	60	8	4	■
RER4-UF12-NC-080-015	8.0	1.5	20	60	8	4	■
RER4-UF12-NC-100-005	10.0	0.5	25	75	10	4	■
RER4-UF12-NC-100-010	10.0	1.0	25	75	10	4	■
RER4-UF12-NC-100-015	10.0	1.5	25	75	10	4	■
RER4-UF12-NC-100-020	10.0	2.0	25	75	10	4	■
RER4-UF12-NC-100-030	10.0	3.0	25	75	10	4	■
RER4-UF12-NC-120-005	12.0	0.5	30	75	12	4	■
RER4-UF12-NC-120-010	12.0	1.0	30	75	12	4	■
RER4-UF12-NC-120-015	12.0	1.5	30	75	12	4	■
RER4-UF12-NC-120-020	12.0	2.0	30	75	12	4	■
RER4-UF12-NC-120-025	12.0	2.5	30	75	12	4	■
RER4-UF12-NC-120-030	12.0	3.0	30	75	12	4	■
RER4-UF12-NC-160-005	16.0	0.5	40	100	16	4	■
RER4-UF12-NC-160-010	16.0	1.0	40	100	16	4	■
RER4-UF12-NC-160-015	16.0	1.5	40	100	16	4	■
RER4-UF12-NC-160-020	16.0	2.0	40	100	16	4	■
RER4-UF12-NC-160-025	16.0	2.5	40	100	16	4	■
RER4-UF12-NC-160-030	16.0	3.0	40	100	16	4	■
RER4-UF12-NC-160-040	16.0	4.0	40	100	16	4	■
RER4-UF12-NC-160-050	16.0	5.0	40	100	16	4	■
RER4-UF12-NC-200-010	20.0	1.0	50	100	20	4	■
RER4-UF12-NC-200-015	20.0	1.5	50	100	20	4	■
RER4-UF12-NC-200-020	20.0	2.0	50	100	20	4	■
RER4-UF12-NC-200-025	20.0	2.5	50	100	20	4	■
RER4-UF12-NC-200-030	20.0	3.0	50	100	20	4	■
RER4-UF12-NC-200-040	20.0	4.0	50	100	20	4	■
RER4-UF12-NC-200-050	20.0	5.0	50	100	20	4	■

Recommended work material 推薦可加工材料 ■ Preferred suitable 最適用 □ Suitable 適用

UNCOATED	Ni-Base Alloy Co-Base Alloy 鎳基 鈷基高溫合金	Titanium Alloy 鈦合金	Stainless Steels SUS 3xx SUS 2xx 奧氏體不銹鋼	Stainless Steels SUS 4xx SUS 6xx 鐵素體 馬氏體不銹鋼	Fe-Base Alloy Fe 351 Fe353 鐵基高溫合金

MX900 Series - Ultra Fine Grain Carbide Torus Endmills -2 Flutes、Standard Cut Lengh

極細微粒鎢鋼、圓鼻刀 — 2刃標準刃長

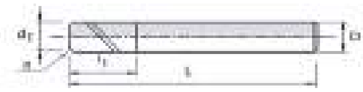
Size: D1.0~D4.0

Carbide	Coating	Helix	HRC	V-Speed	Rake Angle
Grain Ultra-Fine	ULTRA TIALN+	30°	65	HSM	Positive

MFCR2 (A)

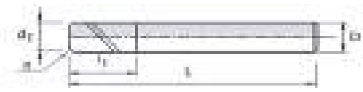
Dimension(mm) / Desig nation	刃徑 d_1	R角 R	刃長 l_1	全長 L	柄徑 L	刃數 Z	Coating 鍍膜 ULTRA(D)
MFCR2A010-002	1.0	0.2	3	50	4	2	■
MFCR2A015-002	1.5	0.2	4	50	4	2	■
MFCR2A020-002	2.0	0.2	5	50	4	2	■
MFCR2A020-003	2.0	0.3	5	50	4	2	■
MFCR2A020-005	2.0	0.5	5	50	4	2	■
MFCR2A030-002	3.0	0.2	7.5	50	4	2	■
MFCR2A030-003	3.0	0.3	7.5	50	4	2	■
MFCR2A030-005	3.0	0.5	7.5	50	4	2	■
MFCR2A030-010	3.0	1.0	7.5	50	4	2	■
MFCR2A040-002	4.0	0.2	10	50	4	2	■
MFCR2A040-003	4.0	0.3	10	50	4	2	■
MFCR2A040-005	4.0	0.5	10	50	4	2	■
MFCR2A040-010	4.0	1.0	10	50	4	2	■

MFCR4 (A)



Dimension(mm) / Desig nation	刃徑 d_1	R角 R	刃長 l_1	全長 L	柄徑 L	刃數 Z	Coating 鍍膜 ULTRA(D)
MFCR4A030-002	3.0	0.2	7.5	50	4	4	■
MFCR4A030-003	3.0	0.3	7.5	50	4	4	■
MFCR4A030-005	3.0	0.5	7.5	50	4	4	■
MFCR4A030-010	3.0	1.0	7.5	50	4	4	■
MFCR4A040-002	4.0	0.2	10	50	4	4	■
MFCR4A040-003	4.0	0.3	10	50	4	4	■
MFCR4A040-005	4.0	0.5	10	50	4	4	■
MFCR4A040-010	4.0	1.0	10	50	4	4	■
MFCR4-060-005	6.0	0.5	16	50	6	4	■
MFCR4-060-010	6.0	1.0	16	50	6	4	■

SFCR4



Dimension(mm) / Desig nation	刃徑 d_1	R角 R	刃長 l_1	全長 L	柄徑 L	刃數 Z	Coating 鍍膜 ULTRA(D)
SFCR4-080-005	8.0	0.5	8	100	8	4	■
SFCR4-080-010	8.0	1.0	8	100	8	4	■
SFCR4-100-005	10.0	0.5	10	100	10	4	■
SFCR4-100-010	10.0	1.0	10	100	10	4	■
SFCR4-120-005	12.0	0.5	12	100	12	4	■
SFCR4-120-010	12.0	1.0	12	100	12	4	■

Recommended work material 推薦可加工材料　Preferred suitable 最適用　Suitable 適用

ULTRA (D)	Steel < HRC32 碳鋼/合金鋼	HRC32 ~ 48 合金/預硬鋼	HRC 49 ~ 65 熱處理鋼	Stainless 不鏽鋼	Cast Iron 鑄鐵

FEATURE : New ULTRA (D) TIALN+ coating useful for HSM and hard milling (Up HRC 65 - DRY CUT)

MX900 Series - Ultra Fine Grain Carbide Torus Endmills / HSM - 6 Flutes、Standard Cut Length

極細微粒鎢鋼、圓鼻刀 / 高速切削 — 6 刃、標準刃長

Size: D6.0 ~ D12.0

MECR6

Carbide	Coating	Helix	HRC	V-Speed
Grain Ultra-Fine	ULTRA TIALN+	45°	65	HSM

Dimension(mm) / Designation	刃徑 d_1	R角 R	刃長 l_1	全長 L	柄徑 D	刃數 Z	Coating 鍍膜 ULTRA (D)
MECR6060-002	6.0	0.2	16	50	6	6	□
MECR6060-005	6.0	0.5	16	50	6	6	■
MECR6060-010	6.0	1.0	16	50	6	6	■
MECR6080-002	8.0	0.2	20	60	8	6	□
MECR6080-005	8.0	0.5	20	60	8	6	■
MECR6080-010	8.0	1.0	20	60	8	6	■
MECR6100-002	10.0	0.2	25	75	10	6	□
MECR6100-005	10.0	0.5	25	75	10	6	■
MECR6100-010	10.0	1.0	25	75	10	6	■
MECR6120-005	12.0	0.5	30	75	12	6	■
MECR6120-010	12.0	1.0	30	75	12	6	■

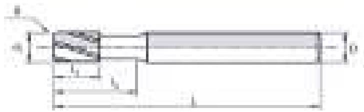
MX900 Series - Ultra Fine Grain Carbide Torus Endmills Reduced Neck / HSM - 6 Flutes、Short Cut Length

極細微粒鎢鋼、圓鼻刀、縮頸 / 高速切削 — 6 刃、短刃

Size: D6.0 ~ D12.0

MSR6

Carbide	Coating	Helix	HRC	V-Speed
Grain Ultra-Fine	ULTRA TIALN+	45°	65	HSM



Dimension(mm) / Designation	刃徑 d_1	R角 R	有效長 l_2	刃長 l_1	全長 L	柄徑 D	刃數 Z	ULTRA (D)
MSR6060-005-18	6.0	0.5	18	7	50	6	6	■
MSR6060-010-18	6.0	1.0	18	7	50	6	6	■
MSR6080-005-24	8.0	0.5	24	9	60	8	6	■
MSR6080-010-24	8.0	1.0	24	9	60	8	6	■
MSR6100-005-30	10.0	0.5	30	11	75	10	6	■
MSR6100-010-30	10.0	1.0	30	11	75	10	6	■
MSR6120-005-32	12.0	0.5	32	13	75	12	6	■
MSR6120-010-32	12.0	1.0	32	13	75	12	6	■

Recommended work material 推薦可加工材料 Preferred suitable 最適用 Suitable 適用

	Steel < HRC32 碳鋼/合金鋼	HRC32 ~ 48 合金/預硬鋼	HRC 49 ~ 65 熱處理鋼	Stainless 不鏽鋼	Cast Iron 鑄鐵
ULTRA (D)	Preferred suitable	Preferred suitable	Preferred suitable	Suitable	Suitable

FEATURE : New ULTRA (D) TIALN+ coating useful for HSM and hard milling (Up HRC 65 - DRY CUT)

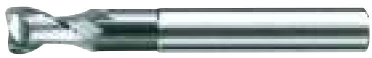
AX Series - Ultra Fine Grain Carbide Torus Endmills、Reduced Neck / HSM For Copper & Aluminum

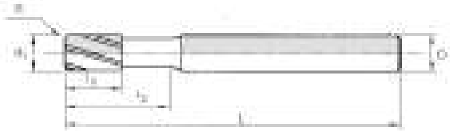
極細微粒鎢鋼、圓鼻刀、縮頸 / 高速切削 - 銅鋁加工用 — 2 刃、短刃

Size: D3.0 ~ D20.0

ASR2 / AMR2

Carbide	Coating	Helix	V-Speed	Rake Angle
Grain Ultra-Fine	TDC	45°	N/HSM	Positive





Dimension(mm) / Designation	刃徑 d_1	R 角 R	有效長 l_2	刃長 l_1	全長 L	柄徑 D	刃數 Z	Coating 鍍膜 UNCOATED	TDC (C)
ASR2040-005-16	4.0	0.5	16	5	50	6	2	■	□
ASR2040-010-16	4.0	1.0	16	5	50	6	2	■	□
ASR2060-005-20	6.0	0.5	20	7	50	6	2	■	□
ASR2060-010-20	6.0	1.0	20	7	50	6	2	■	□
ASR2080-005-26	8.0	0.5	26	9	60	8	2	■	□
ASR2080-010-26	8.0	1.0	26	9	60	8	2	■	□
ASR2100-005-30	10.0	0.5	30	11	75	10	2	■	□
ASR2100-010-30	10.0	1.0	30	11	75	10	2	■	□
ASR2120-005-36	12.0	0.5	36	13	100	12	2	■	□
ASR2120-010-36	12.0	1.0	36	13	100	12	2	■	□
ASR2160-010-40	16.0	1.0	40	17	100	16	2	□	□
ASR2160-020-40	16.0	2.0	40	17	100	16	2	□	□

AMR2030-002	3.0	0.2	—	9	50	6	2	□	□
AMR2030-005	3.0	0.5	—	9	50	6	2	■	□
AMR2030-010	3.0	1.0	—	9	50	6	2	■	□
AMR2040-002	4.0	0.2	—	12	50	6	2	□	□
AMR2040-005	4.0	0.5	—	12	50	6	2	■	□
AMR2040-010	4.0	1.0	—	12	50	6	2	■	□
AMR2060-005	6.0	0.5	—	18	50	6	2	■	□
AMR2060-010	6.0	1.0	—	18	50	6	2	■	□
AMR2060-015	6.0	1.5	—	18	50	6	2	□	□
AMR2060-020	6.0	2.0	—	18	50	6	2	□	□
AMR2080-005	8.0	0.5	—	24	60	8	2	■	□
AMR2080-010	8.0	1.0	—	24	60	8	2	■	□
AMR2080-015	8.0	1.5	—	24	60	8	2	□	□
AMR2080-020	8.0	2.0	—	24	60	8	2	□	□
AMR2100-005	10.0	0.5	—	30	75	10	2	■	□
AMR2100-010	10.0	1.0	—	30	75	10	2	■	□
AMR2100-015	10.0	1.5	—	30	75	10	2	□	□
AMR2100-020	10.0	2.0	—	30	75	10	2	□	□
AMR2100-030	10.0	3.0	—	30	75	10	2	□	□

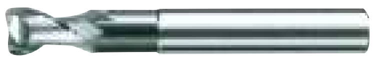
AX Series - Ultra Fine Grain Carbide Torus Endmills、Reduced Neck / HSM For Copper & Aluminum

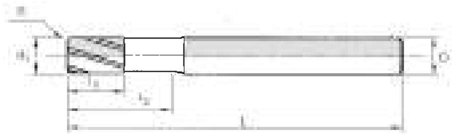
極細微粒鎢鋼、圓鼻刀、縮頸 / 高速切削 - 銅鋁加工用 — 2刃、短刃

Size: D3.0 ~ D20.0

AMR2

Carbide	Coating	Helix	V-Speed	Rake Angle
Grain Ultra-Fine	TDC	45°	N/HSM	Positive





Designation \ Dimension(mm)	刃徑 d_1	R 角 R	有效長 l_2	刃長 l_1	全長 L	柄徑 D	刃數 Z	Coating 鍍膜 UNCOATED	TDC (C)
AMR2120-005	12.0	0.5	—	32	75	12	2	■	□
AMR2120-010	12.0	1.0	—	32	75	12	2	■	□
AMR2120-015	12.0	1.5	—	32	75	12	2	□	□
AMR2120-020	12.0	2.0	—	32	75	12	2	□	□
AMR2120-030	12.0	3.0	—	32	75	12	2	□	□
AMR2160-010	16.0	1.0	—	45	100	16	2	■	□
AMR2160-020	16.0	2.0	—	45	100	16	2	□	□
AMR2160-030	16.0	3.0	—	45	100	16	2	□	□
AMR2200-010	20.0	1.0	—	50	100	20	2	□	□
AMR2200-020	20.0	2.0	—	50	100	20	2	□	□
AMR2200-030	20.0	3.0	—	50	100	20	2	□	□

Recommended work material 推薦可加工材料　Preferred suitable 最適用　Suitable 適用

TDC (C)	Copper 銅	Al-alloy 鋁合金	
UNCOATED	Copper 銅	Al-alloy 鋁合金	Synthetics 合成材料

FEATURE : Optimized flute design to improved the ability of chip discharge and provide an excellent machined surface。

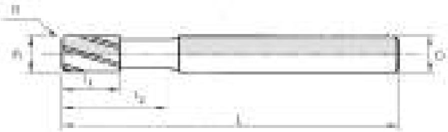
AX Series - Ultra Fine Grain Carbide Torus Endmills Reduced Neck/HSM For Copper & Aluminum

極細微粒鎢鋼、圓鼻刀、縮頸 / 高速切削 - 銅鋁加工用 — 3 刃、短刃

Size: D4.0~12.0

Carbide	Coating	Helix	V-Speed	Rake Angle
Grain Ultra-Fine	TDC	45°	N/HSM	Positive

AHRN



Dimension(mm) / Designation	刃徑 d_1	R 角 R	有效長 l_2	刃長 l_1	全長 L	柄徑 D	刃數 Z	Coating 鍍膜 UNCOATED	TDC (C)
AHRN-040-005	4.0	0.5	12	6	50	4	3	■	□
AHRN-040-010	4.0	1.0	12	6	50	4	3	■	□
AHRN-060-005	6.0	0.5	15	9	50	6	3	■	□
AHRN-060-010	6.0	1.0	15	9	50	6	3	■	□
AHRN-080-005	8.0	0.5	20	12	60	8	3	■	□
AHRN-080-010	8.0	1.0	20	12	60	8	3	■	□
AHRN-100-005	10.0	0.5	25	15	75	10	3	■	□
AHRN-100-010	10.0	1.0	25	15	75	10	3	■	□
AHRN-120-005	12.0	0.5	30	18	75	12	3	■	□
AHRN-120-010	12.0	1.0	30	18	75	12	3	■	□

AX Series - Ultra Fine Grain Carbide Torus Endmills HSM For Copper & Aluminum

極細微粒鎢鋼、圓鼻刀、高速切削 - 銅鋁加工用 — 3 刃、標準刃長

Size: D4.0~12.0

Carbide	Coating	Helix	V-Speed	Rake Angle
Grain Ultra-Fine	TDC	45°	N/HSM	Positive

AHR

Dimension(mm) / Designation	刃徑 d_1	R 角 R	刃長 l_1	全長 L	柄徑 D	刃數 Z	Coating 鍍膜 UNCOATED	TDC (C)
AHR-040-005	4.0	0.5	11	50	4	3	■	□
AHR-040-010	4.0	1.0	11	50	4	3	■	□
AHR-060-005	6.0	0.5	13	50	6	3	■	□
AHR-060-010	6.0	1.0	13	50	6	3	■	□
AHR-080-005	8.0	0.5	20	60	8	3	■	□
AHR-080-010	8.0	1.0	20	60	8	3	■	□
AHR-100-005	10.0	0.5	25	75	10	3	■	□
AHR-100-010	10.0	1.0	25	75	10	3	■	□
AHR-120-005	12.0	0.5	30	75	12	3	■	□
AHR-120-010	12.0	1.0	30	75	12	3	■	□

Customized orders for other length of neck and corner radius is also available

Recommended work material 推薦可加工材料 　Preferred suitable 最適用 　Suitable 適用

TDC (C)	Copper 銅	Al-alloy 鋁合金	
UNCOATED	Copper 銅	Al-alloy 鋁合金	Synthetics 合成材料

FEATURE： Optimized flute design to improved the ability of chip discharge and provide an excellent machined surface。

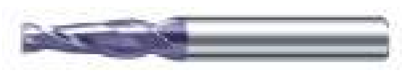
Ultra Fine Grain Carbide Taper Endmills — 2 Flutes、Standard Cut Length

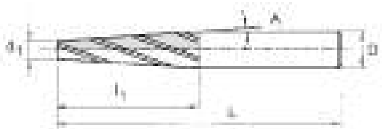
極細微粒鎢鋼、斜度端銑刀 — 2 刃 / 標準刃長

Size: D1.0 ~ D2.0

HTE2

Carbide	Coating	Helix	HRC	V-Speed	Rake Angle
Grain Ultra-Fine	ULTRA TIALN+	30°	60	N/HSM	Positive





Dimension(mm) / Designation	刃徑 d_1	斜度角 A	刃長 l_1	全長 L	柄徑 D	刃數 Z	Coating 鍍膜 ULTRA (D)
HTE2-010-4-1		30"			4	2	■
HTE2-010-4-2		1°			4	2	■
HTE2-010-4-3		1°30"			4	2	■
HTE2-010-4-4		2°			4	2	■
HTE2-010-4-5		2°30"			4	2	■
HTE2-010-4-6	1.0	3°	4	50	4	2	■
HTE2-010-4-10		5°			4	2	■
HTE2-010-4-14		7°			4	2	■
HTE2-010-4-20		10°			4	2	■
HTE2-010-4-24		12°			4	2	■
HTE2-010-4-30		15°			6	2	■
HTE2-015-5-1		30"			4	2	■
HTE2-015-5-2		1°			4	2	■
HTE2-015-5-3		1°30"			4	2	■
HTE2-015-5-4		2°			4	2	■
HTE2-015-5-5		2°30"			4	2	■
HTE2-015-5-6	1.5	3°	5	50	4	2	■
HTE2-015-5-10		5°			4	2	■
HTE2-015-5-14		7°			4	2	■
HTE2-015-5-20		10°			4	2	■
HTE2-015-5-24		12°			4	2	■
HTE2-015-5-30		15°			6	2	■
HTE2-020-6-1		30"			4	2	■
HTE2-020-6-2		1°			4	2	■
HTE2-020-6-3		1°30"			4	2	■
HTE2-020-6-4		2°			4	2	■
HTE2-020-6-5		2°30"			4	2	■
HTE2-020-6-6	2.0	3°	6	50	4	2	■
HTE2-020-6-10		5°			4	2	■
HTE2-020-6-14		7°			4	2	■
HTE2-020-6-20		10°			6	2	■
HTE2-020-6-24		12°			6	2	■
HTE2-020-6-30		15°			6	2	■

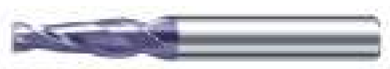
Ultra Fine Grain Carbide Taper Endmills — 2 Flutes、Standard Cut Length

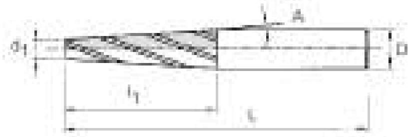
極細微粒鎢鋼、斜度端銑刀 — 2 刃 / 標準刃長

Size: D2.5 ~ D4.0

HTE2

Carbide	Coating	Helix	HRC	V-Speed	Rake Angle
Grain Ultra-Fine	ULTRA TIALN+	30°	60	N/HSM	Positive





Dimension(mm) / Designation	刃徑 d_1	斜度角 A	刃長 l_1	全長 L	柄徑 D	刃數 Z	Coating 鍍膜 ULTRA (D)
HTE2-025-8-1	2.5	30"	8	50	4	2	■
HTE2-025-8-2		1°			4	2	■
HTE2-025-8-3		1°30"			4	2	■
HTE2-025-8-4		2°			4	2	■
HTE2-025-8-5		2°30"			4	2	■
HTE2-025-8-6		3°			4	2	■
HTE2-025-8-10		5°			4	2	■
HTE2-025-8-14		7°			6	2	■
HTE2-025-8-20		10°			6	2	■
HTE2-025-8-24		12°		60	8	2	■
HTE2-025-8-30		15°			8	2	■
HTE2-030-10-1	3.0	30"	10	50	6	2	■
HTE2-030-10-2		1°			6	2	■
HTE2-030-10-3		1° 30"			6	2	■
HTE2-030-10-4		2°			6	2	■
HTE2-030-10-5		2° 30"			6	2	■
HTE2-030-10-6		3°			6	2	■
HTE2-030-10-10		5°			6	2	■
HTE2-030-10-14		7°			6	2	■
HTE2-040-15-1	4.0	30"	15	50	6	2	■
HTE2-040-15-2		1°			6	2	■
HTE2-040-15-3		1° 30"			6	2	■
HTE2-040-15-4		2°			6	2	■
HTE2-040-15-5		2° 30"			6	2	■
HTE2-040-15-6		3°			6	2	■
HTE2-040-15-10		5°		60	8	2	■
HTE2-040-15-14		7°			8	2	■

Recommended work material 推薦可加工材料 ■ Preferred suitable 最適用 ■ Suitable 適用

ULTRA (D)	Steel < HRC32 碳鋼/合金鋼	HRC32 ~ 48 合金/預硬鋼	HRC49 ~ 55 熱處理鋼	HRC56 ~ 60 熱處理鋼	Stainless 不鏽鋼	Cast Iron 鑄鐵

FEATURE : Widely used , new ULTRA (D) TIALN+ coating useful for HSM (DRY CUT), covering from carbon steels to hardened steels (Up to HRC 60)。

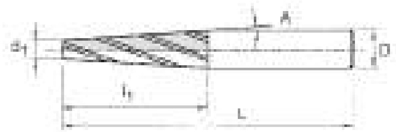
Ultra Fine Grain Carbide Taper Endmills — 4 Flutes、Standard Cut Length

極細微粒鎢鋼、斜度端銑刀 — 4 刃 / 標準刃長

Size: D3.0 ~ D6.0

HTE4

Carbide	Coating	Helix	HRC	V-Speed	Rake Angle
Grain Ultra-Fine	ULTRA TIALN+	30°	60	N/HSM	Positive



Dimension(mm) / Designation	刃徑 d_1	斜度角 A	刃長 l_1	全長 L	柄徑 D	刃數 Z	Coating 鍍膜 ULTRA (D)
HTE4-030-10-1	3.0	30"	10	50	6	4	■
HTE4-030-10-2		1°			6	4	■
HTE4-030-10-3		1°30"			6	4	■
HTE4-030-10-4		2°			6	4	■
HTE4-030-10-5		2°30"			6	4	■
HTE4-030-10-6		3°			6	4	■
HTE4-030-10-10		5°			6	4	■
HTE4-030-10-14		7°			6	4	■
HTE4-040-15-1	4.0	30"	15	50	6	4	■
HTE4-040-15-2		1°			6	4	■
HTE4-040-15-3		1°30"			6	4	■
HTE4-040-15-4		2°			6	4	■
HTE4-040-15-5		2°30"			6	4	■
HTE4-040-15-6		3°			6	4	■
HTE4-040-15-10		5°		60	8	4	■
HTE4-040-15-14		7°			8	4	■
HTE4-050-20-1	5.0	30"	20	60	8	4	■
HTE4-050-20-2		1°			8	4	■
HTE4-050-20-3		1°30"			8	4	■
HTE4-050-20-4		2°			8	4	■
HTE4-050-20-5		2°30"			8	4	■
HTE4-050-20-6		3°			8	4	■
HTE4-050-20-10		5°		75	10	4	■
HTE4-050-20-14		7°			10	4	■
HTE4-060-20-1	6.0	30"	20	60	8	4	■
HTE4-060-20-2		1°			8	4	■
HTE4-060-20-3		1°30"			8	4	■
HTE4-060-20-4		2°			8	4	■
HTE4-060-20-5		2°30"			8	4	■
HTE4-060-20-6		3°		75	10	4	■
HTE4-060-20-10		5°			10	4	■
HTE4-060-20-14		7°			12	4	■

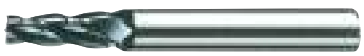
Ultra Fine Grain Carbide Taper Endmills — 4 Flutes、Standard Cut Length

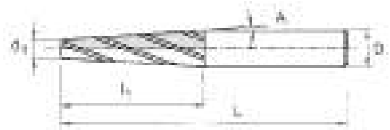
極細微粒鎢鋼、斜度端銑刀 — 4 刃 / 標準刃長

Size: D8.0 ~ D10.0

HTE4

Carbide	Coating	Helix	HRC	V-Speed	Rake Angle
Grain Ultra-Fine	ULTRA TIALN+	30°	60	N/HSM	Positive





Dimension(mm) / Designation	刃徑 d_1	斜度角 A	刃長 l_1	全長 L	柄徑 D	刃數 Z	Coating 鍍膜 ULTRA (D)
HTE4-080-25-1	8.0	30"	25	75	10	4	■
HTE4-080-25-2		1°				4	■
HTE4-080-25-3		1°30"				4	■
HTE4-080-25-4		2°				4	■
HTE4-080-25-5		2°30"			12	4	■
HTE4-080-25-6		3°				4	■
HTE4-080-25-10		5°			16	4	□
HTE4-100-35-1	10.0	30 "	35	75	12	4	■
HTE4-100-35-2		1°				4	■
HTE4-100-35-3		1°30"				4	■
HTE4-100-35-4		2°				4	■
HTE4-100-35-5		2°30"				4	■
HTE4-100-35-6		3°				4	■
HTE4-100-35-10		5°			16	4	□

Recommended work material 推薦可加工材料 ■ Preferred suitable 最適用 ■ Suitable 適用

ULTRA (D)	Steel < HRC32 碳鋼/合金鋼	HRC32 ~ 48 合金/預硬鋼	HRC49 ~ 55 熱處理鋼	HRC56 ~ 60 熱處理鋼	Stainless 不鏽鋼	Cast Iron 鑄鐵

FEATURE : Widely used , new ULTRA (D) TIALN+ coating useful for HSM (DRY CUT), covering from carbon steels to hardened steels (Up to HRC 60)。

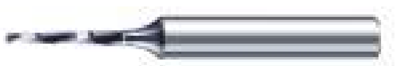
Ultra Fine Grain Carbide Deep Rib Taper Endmills — Point 2 Flutes, Peripheral Edge 6 Flutes

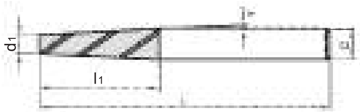
極細微粒鎢鋼、左旋斜度端刀 — 先端 2 外周 6 刃模具肋材加工

Size: D0.5 ~ D1.5

HTR2

Carbide	Coating	HRC	V-Speed
Grain Ultra-Fine	ULTRA TIALN+	60	N/HSM





Dimension(mm) / Designation	刃徑 d_1	斜度角 A	刃長 l_1	全長 L	柄徑 D	刃數 Z	Coating 鍍膜 ULTRA (D)
HTR2-005-4-1	0.5	30"	4	50	4	2	■
HTR2-005-6-1		30"	6		4	2	■
HTR2-005-4-2		1°	4		4	2	■
HTR2-005-6-2		1°	6		4	2	■
HTR2-005-4-3		1° 30"	4		4	2	■
HTR2-005-6-3		1° 30"	6		4	2	■
HTR2-005-4-4		2°	4		4	2	■
HTR2-005-6-4		2°	6		4	2	■
HTR2-005-4-6		3°	4		4	2	■
HTR2-005-6-6		3°	6		4	2	■
HTR2-005-4-10		5°	4		4	2	■
HTR2-005-6-10		5°	6		4	2	■
HTR2-006-4-1	0.6	30"	4	50	4	2	■
HTR2-006-6-1		30"	6		4	2	■
HTR2-006-4-2		1°	4		4	2	■
HTR2-006-6-2		1°	6		4	2	■
HTR2-006-4-3		1° 30"	4		4	2	■
HTR2-006-6-3		1° 30"	6		4	2	■
HTR2-006-4-4		2°	4		4	2	■
HTR2-006-6-4		2°	6		4	2	■
HTR2-006-4-6		3°	4		4	2	■
HTR2-006-6-6		3°	6		4	2	■
HTR2-006-4-10		5°	4		4	2	■
HTR2-006-6-10		5°	6		4	2	■
HTR2-007-6-1	0.7	30"	6	50	4	2	■
HTR2-007-8-1		30"	8		4	2	■
HTR2-007-6-2		1°	6		4	2	■
HTR2-007-8-2		1°	8		4	2	■
HTR2-007-6-3		1° 30"	6		4	2	■
HTR2-007-8-3		1° 30"	8		4	2	■
HTR2-007-6-4		2°	6		4	2	■
HTR2-007-8-4		2°	8		4	2	■
HTR2-007-6-6		3°	6		4	2	■
HTR2-007-8-6		3°	8		4	2	■
HTR2-007-6-10		5°	6		4	2	■
HTR2-007-8-10		5°	8		4	2	■

Designation \ Dimension(mm)	刃徑 d_1	斜度角 A	刃長 l_1	全長 L	柄徑 D	刃數 Z	Coating鍍膜 ULTRA(D)
HTR2-008-4-1	0.8	30"	4	50	4	2	■
HTR2-008-6-1		30"	6		4	2	■
HTR2-008-8-1		30"	8		4	2	■
HTR2-008-10-1		30"	10		4	2	■
HTR2-008-4-2		1°	4		4	2	■
HTR2-008-6-2		1°	6		4	2	■
HTR2-008-8-2		1°	8		4	2	■
HTR2-008-10-2		1°	10		4	2	■
HTR2-008-4-3		1°30"	4		4	2	■
HTR2-008-6-3		1°30"	6		4	2	■
HTR2-008-8-3		1°30"	8		4	2	■
HTR2-008-10-3		1°30"	10		4	2	■
HTR2-008-4-4		2°	4		4	2	■
HTR2-008-6-4		2°	6		4	2	■
HTR2-008-8-4		2°	8		4	2	■
HTR2-008-10-4		2°	10		4	2	■
HTR2-008-6-6		3°	6		4	2	■
HTR2-008-10-6		3°	10		4	2	■
HTR2-008-6-10		5°	6		4	2	■
HTR2-008-10-10		5°	10		4	2	■
HTR2-009-6-1	0.9	30"	6	50	4	2	■
HTR2-009-8-1		30"	8		4	2	■
HTR2-009-6-2		1°	6		4	2	■
HTR2-009-8-2		1°	8		4	2	■
HTR2-009-6-3		1°30"	6		4	2	■
HTR2-009-10-3		1°30"	10		4	2	■
HTR2-009-6-4		2°	6		4	2	■
HTR2-009-10-4		2°	10		4	2	■
HTR2-009-6-6		3°	6		4	2	■
HTR2-009-10-6		3°	10		4	2	■
HTR2-009-6-10		5°	6		4	2	■
HTR2-009-10-10		5°	10		4	2	■
HTR2-010-6-1	1.0	30"	6	50	4	2	■
HTR2-010-8-1		30"	8		4	2	■
HTR2-010-12-1		30"	12		4	2	■
HTR2-010-6-2		1°	6		4	2	■
HTR2-010-8-2		1°	8		4	2	■
HTR2-010-12-2		1°	12		4	2	■
HTR2-012-8-1	1.2	30"	8	50	4	2	■
HTR2-012-12-1		30"	12		4	2	■
HTR2-012-8-2		1°	8		4	2	■
HTR2-012-12-2		1°	12		4	2	■
HTR2-015-8-1	1.5	30"	8	50	4	2	■
HTR2-015-12-1		30"	12		4	2	■
HTR2-015-16-1		30"	16		4	2	■
HTR2-015-8-2		1°	8		4	2	■
HTR2-015-12-2		1°	12		4	2	■
HTR2-015-16-2		1°	16		4	2	■

Recommended work material 推薦可加工材料 ■ Preferred suitable 最適用 ■ Suitable 適用

ULTRA(D)	HRC < 48 合金/預硬鋼	HRC49 ~ 55 熱處理鋼	HRC 56 ~ 60 熱處理鋼

FEATURE : For deep rib processing , new UTRA (D) TIALN+ coating useful for HSM (DRY CUT), covering from carbon steels to hardened steels (Up to HRC 60)

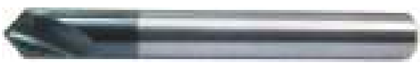
Ultra Fine Grain Carbide Endmills — 2 Flutes、Standard Cut Length

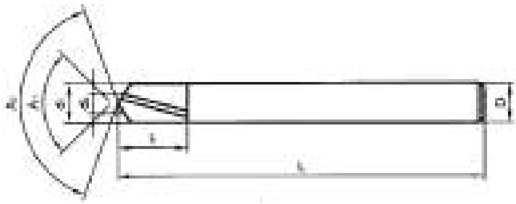
極細微粒鎢鋼、定點鑽—2刃標準刃長

Size:D3.0~D16.0

Carbide	Coating	Helix	HRC	V-Speed	Rake Angle
Grain Ultra-Fine	ULTRA TIALN+	15°	55	N/HSM	Positive

SD/SDL (90°)





Dimension(mm) / Desig nation	刃徑 d_1	d_2	刃長 l_1	全長 L	柄徑 D	角度 A_1	角度 A_2	刃數 Z	Coating 鍍膜 ULTRA (D)
SD-030-090	3.0	0.6	8	50	3	90	140	2	■
SD-040-090	4.0	0.8	10	50	4	90	140	2	■
SD-060-090	6.0	1.2	12	50	6	90	140	2	■
SD-080-090	8.0	1.6	16	60	8	90	140	2	■
SD-100-090	10.0	2.0	20	75	10	90	140	2	■
SD-120-090	12.0	2.4	20	75	12	90	140	2	■
SDL-060-090	6.0	1.2	12	100	6	90	140	2	■
SDL-080-090	8.0	1.6	16	100	8	90	140	2	■
SDL-100-090	10.0	2.0	20	100	10	90	140	2	■
SDL-120-090	12.0	2.4	20	100	12	90	140	2	■
SDL-160-090	16.0	3.2	20	100	16	90	140	2	■

Recommended work material 推薦可加工材料 ■ Preferred suitable 最適用 □ Suitable 適用

ULTRA (D)	Steel < HRC32 碳鋼/合金鋼	HRC32 ~ 48 合金/預硬鋼	HRC 49 ~ 55 熱處理鋼	HRC 56 ~ 60 熱處理鋼	Stainless 不鏽鋼	Cast Iron 鑄鐵

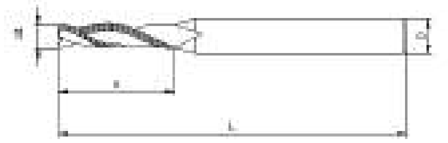
FEATURE : Widely used , new ULTRA (D) TIALN+ coating useful for HSM (DRY CUT), covering from carbon steels to hardened steels (Up to HRC 55)。

Uitra Fine Grain Carbide Endmills、Roughing — 2Flutes、Long Cut Length

極細微粒鎢鋼、粗銑刀—2刃、加長刃

UELR2

Carbide	Coating	Helix	HRC	V-Speed	Rake Angle
Grain Ultra-Fine		45°	48°	N/HSM	Positive



Dimension(mm) / Desig nation	刃徑 d_1	刃長 l_1	全長 L	柄徑 D	刃數 Z	Coating 鍍膜 ULTRA(D)
UELR2-040	4	20	60	6	2	□
UELR2-060	6	30	75	6	2	□
UELR2-080	8	40	100	8	2	□
UELR2-100	10	50	100	10	2	□
UELR2-120	12	50	100	12	2	□

Recommended work material 推薦可加工材料 ■ Preferred suitable 最適用 □ Suitable 適用

ULTRA (D)	Steel < HRC32 碳鋼/合金鋼	HRC32 ~ 48 合金/預硬鋼	HRC49 ~ 55 熱處理鋼	HRC 56 ~ 60 熱處理鋼	Stainless 不鏽鋼	Cast Iron 鑄鐵

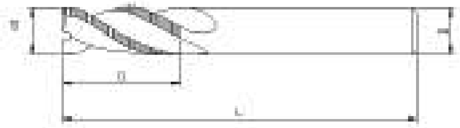
FEATURE：Widely used , new ULTRA (D) TIALN+ coating useful for HSM (DRY CUT), covering from carbon steels to hardened steels U to HRC 48

Uitra Fine Grain Carbide Endmills、Roughing — 3Flutes、Standard Cut Length

極細微粒鎢鋼、粗銑刀—3刃、標準刃長

UER3

Carbide	Coating	Helix	HRC	V-Speed	Rake Angle
Grain Ultra-Fine	TISIN	30°	48°	N/HSM	Positive



Dimension(mm) / Desig nation	刃徑 d_1	刃長 l_1	全長 L	柄徑 D	刃數 Z	Coating 鍍膜 ULTRA(D)
UER3-060	6	16	50	6	3	□
UER3-070	7	18	60	8	3	□
UER3-080	8	20	60	8	3	□
UER3-090	9	22	75	10	3	□
UER3-100	10	25	75	10	3	□
UER3-110	11	28	75	12	3	□
UER3-120	12	30	75	12	3	□

Recommended work material 推薦可加工材料 ■ Preferred suitable 最適用 □ Suitable 適用

ULTRA (D)	Steel < HRC32 碳鋼/合金鋼	HRC32 ~ 48 合金/預硬鋼	HRC49 ~ 55 熱處理鋼	HRC 56 ~ 60 熱處理鋼	Stainless 不鏽鋼	Cast Iron 鑄鐵

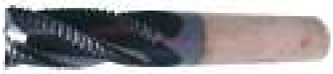
FEATURE：Widely used , new ULTRA (D) TIALN+ coating useful for HSM (DRY CUT), covering from carbon steels to hardened steels (Up to HRC 48)

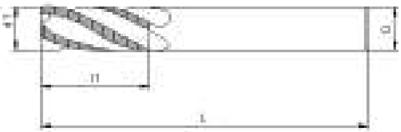
Uitra Fine Grain Carbide Endmills、Roughing — 4Flutes、Standard Cut Length

極細微粒鎢鋼、粗銑刀—４刃、標準刃長

UER4

Carbide	Coating	Helix	HRC	V-Speed	Rake Angle
Grain Ultra-Fine	TISIN	30°	48°	N/HSM	Positive





Dimension(mm) / Desig nation	刃徑 d_1	刃長 l_1	全長 L	柄徑 D	刃數 Z	Coating 鍍膜 ULTRA(D)
UER4-080	8	20	60	8	4	☐
UER4-090	9	22	75	10	4	☐
UER4-100	10	25	75	10	4	☐
UER4-110	11	28	75	12	4	☐
UER4-120	12	30	75	12	4	☐
UER4-130	13	32	80	14	4	☐
UER4-140	14	35	80	14	4	☐
UER4-150	15	38	100	16	4	☐
UER4-160	16	40	100	16	4	☐
UER4-200	20	45	100	20	4	☐

Recommended work material 推薦可加工材料 ■ Preferred suitable 最適用 ■ Suitable 適用

	Steel < HRC32 碳鋼/合金鋼	HRC32 ~ 48 合金/預硬鋼	HRC49 ~ 55 熱處理鋼	HRC 56 ~ 60 熱處理鋼	Stainless 不鏽鋼	Cast Iron 鑄鐵
ULTRA (D)						

FEATURE：Widely used , new ULTRA (D) TIALN+ coating useful for HSM (DRY CUT), covering from carbon steels to hardened steels U to HRC 48

Uitra Fine Grain Carbide Endmills、Roughing — 5Flutes、Standard Cut Length

極細微粒鎢鋼、粗銑刀—5 刃、標準刃長

UER5

Carbide	Coating	Helix	HRC	V-Speed	Rake Angle
Grain Ultra-Fine	TISIN	15°	55°	N/HSM	Negative

Dimension(mm) / Desig nation	刃徑 d_1	刃長 l_1	全長 L	柄徑 D	刃數 Z	Coating 鍍膜 ULTRA(D)
UER5-100	10	25	75	10	5	☐
UER5-120	12	30	75	12	5	☐
UER5-140	14	35	80	14	5	☐
UER5-160	16	40	100	16	5	☐
UER5-200	20	45	100	20	5	☐

Recommended work material 推薦可加工材料 Preferred suitable 最適用 Suitable 適用

ULTRA (D)	Steel < HRC32 碳鋼/合金鋼	HRC32 ~ 48 合金/預硬鋼	HRC 49 ~ 55 熱處理鋼	Stainless 不鏽鋼	Cast Iron 鑄鐵	Super Alloy 高溫合金

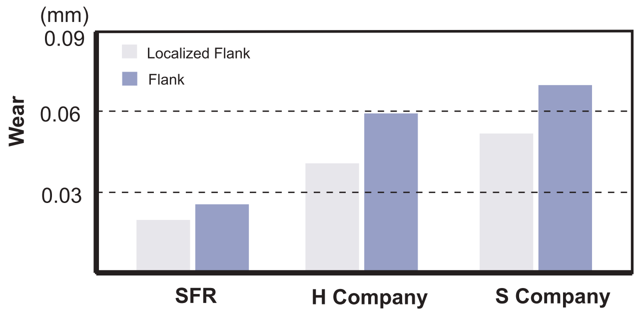
FEATURE : The special geometry of the ball cutting edge with new ULTRA (D) TIALN+ coating useful for HSM and hard milling (DRY CUT in mould and die operation (Up to HRC 55) , excellent for contor linen (constant Z) roughing / semi-finishing and profile finishing

Performance

SFR

H Company

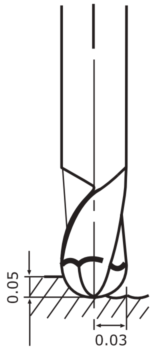
S Company



Testing Mold

Milling Condition

Tool : R2 mm
Speed : 27,000 rpm
Feed : 3,000 mm/min
Work Material : SKD11 (60HRC)
Milling Length : 250m
Cutting Fluid : Air Blow

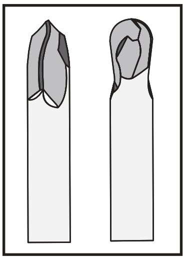


SFR

PATENT PASSES

Work Materials

- Hardened Steels (45~68HRC)
- Pre-hardened Steels
- Mold Steels
- High Speed Steels



SFRM

Work (Hardness)	Condition Range	Cutting Condition	R Tool Dia.(mm)					
			R0.1	R0.15	R0.2	R0.25	R0.3	R0.4
Hardened Steels, Pre-Hardened Steels 30~38HRC	High Speed	RPM	60,000	60,000	60,000	60,000	60,000	60,000
		F	560	840	1,000	1,150	1,300	1,700
	General	RPM	32,000	32,000	32,000	32,000	32,000	32,000
		F	300	450	520	620	700	930
Stainless Steels, Hardened Steels 38~45HRC	High Speed	RPM	60,000	60,000	60,000	60,000	60,000	60,000
		F	480	700	940	1,100	1,200	1,600
	General	RPM	32,000	32,000	32,000	32,000	32,000	32,000
		F	250	375	500	600	640	850
Hardened Steels 45~55HRC	High Speed	RPM	48,000	48,000	48,000	48,000	48,000	48,000
		F	240	360	480	600	720	960
	General	RPM	32,000	32,000	32,000	32,000	32,000	32,000
		F	160	240	320	400	480	640
Hardened Steels 55~60HRC	High Speed	RPM	48,000	48,000	48,000	48,000	48,000	48,000
		F	180	280	380	480	570	750
	General	RPM	32,000	32,000	32,000	32,000	32,000	25,000
		F	125	190	255	320	380	400

SFR / SFRB

Work (Hardness)	Condition Range	mm	Cutting Condition	R Tool Dia.(mm)							
				R0.5	R1	R1.5	R2	R3	R4	R5	R6
Hardened Steels, Pre-Hardened Steels 30~38HRC	High Speed	aa=0.05~0.1	RPM	50,000	32,000	25,000	22,000	16,000	12,000	10,000	8,000
		pf=0.02D	F	5,000	3,840	3,500	3,740	3,520	2,880	2,600	2,160
	General	aa=0.05~0.1	RPM	20,000	20,000	17,000	13,000	8,500	6,400	5,100	4,200
		pf=0.02D	F	2,000	2,400	2,380	2,210	1,870	1,540	1,330	1,130
Stainless Steels, Hardened Steels 38~45HRC	High Speed	aa=0.05~0.1	RPM	50,000	32,000	24,000	20,000	13,000	10,000	8,000	6,600
		pf=0.02D	F	4,000	3,200	2,880	3,200	2,730	2,300	2,000	1,720
	General	aa=0.05~0.1	RPM	20,000	20,000	14,000	10,000	6,900	5,200	4,100	3,500
		pf=0.02D	F	1,600	2,000	1,880	1,600	1,450	1,200	1,030	910
Hardened Steels 45~55HRC	High Speed	aa=0.05~0.1	RPM	50,000	32,000	21,000	16,000	11,000	8,000	6,400	5,300
		pf=0.02D	F	2,500	2,880	2,520	2,400	2,200	1,760	1,540	1,330
	General	aa=0.05~0.1	RPM	15,000	15,000	13,000	9,600	6,400	4,800	3,800	3,200
		pf=0.02D	F	750	1,350	1,560	1,440	1,280	1,060	910	800
Hardened Steels 55~60HRC	High Speed	aa=0.05~0.1	RPM	48,000	24,000	16,000	12,000	8,000	6,000	48,000	4,000
		pf=0.02D	F	2,400	2,160	1,920	1,800	1,600	1,320	1,150	1,000
	General	aa=0.05~0.1	RPM	15,000	14,000	10,000	7,200	4,800	3,600	2,900	2,400
		pf=0.02D	F	750	1,260	1,200	1,080	960	790	700	600

符號標記說明 / 簡介
Guide lines to icons / Introducing

鎢鋼材料 Carbide

Carbide Grain Ultra-Fine — Carbide MG12

極細微粒鎢鋼圓棒，硬度1680HV. 含鈷12%具有極佳的硬度與強度，適用於一般切削與高速切削；廣泛適用於加工鋼材、熱處理鋼、鑄鐵、不鏽鋼、鈦合金與非鐵金屬。
Ultra fine-grain carbide. Hardness 1680HV. Co-content 12% provides high hardness coupled with high transverse repture strength, recommend for low / HSM in steels, hardened steels, cast iron, stainless steels, titanium alloys and non ferrous metals.

Carbide Grain Ultra-Fine — Carbide MG9

極細微粒鎢鋼圓棒，硬度1950HV. 含鈷9%，同時具備極佳的韌性與極高的硬度，極佳的刀刃強度與優秀的耐磨性，適用於高速切削熱處理鋼材、鋁合金、合成材料與塑膠。
Ultra fine-grain carbide. Hardness 1950HV. Co-content 9% provides very high toughness with optimised hardness at the same time, very sharp cutting edges and high wear resistance, recommend for HSM in hardened steels, unalloyed steels aluminum alloys, fibre-reinforced materials and plastic.

鍍膜 Coating

Coating ULTRA TIALN+

新式單層TIALN鍍膜，具有高硬度、優越的抗磨耗，高速切削與高硬材切削具有極佳的效果，適用於乾式切削(吹氣或少許油霧)硬度(HV 0.05)3600，最大耐溫850˚C
Single-layer coatings based on TIALN for HSM and hard milling (DRY CUT) Hardness (HV 0.05) 3600, Max work temperature 850˚C

Coating TDC

TDC 鍍膜具有極佳的抗磨損與優秀的潤滑性能，適用於高速切削銅與鋁合金，具備極佳的加工表面與刀具壽命。
TDC coatings suitable for HSM in copper & aluminum with benefit of smooth surface and long tool life

螺旋角 Helix angle

Helix 30°

表示該銑刀螺旋角爲30度。
Displays helix angle of flute for end mills

加工材料硬度 Machining material symbols

HRC 60

表示適用於加工HRC60度以內材料
Displays a good until sufficient suitability of the tool for this material

切削狀態 Machining conditions

V-Speed N/HSM

表示適用於一般切削與高速切削
Displays a good until sufficient suitability of the tool for normal and high speed machining

V-Speed HSM

表示適用於高速切削
Displays a good until sufficient suitability of the tool for high speed machining

切削角 Rake angle

Rake Angle Positive

表示正的切削角
Displays a positive rake angle

Rake Angle Negative

表示負的切削角
Displays a negative rake angle

Best Choice For HSM and High Performance Cutting

NAKAWO tools are pre-engineered to incorporate the leading and appropriate carbide, cutting geometry and coatings to ensuring optimum machining performance. Through the years we has developed a reputation for Hihg performance & High Quality with reasonable price in die & mold Industry, toolmakers automotive, aerospace and other professionals in the metal-removing industry. If you want to reduce your cost and improve your machining efficiency, NAKAWO are your best choice.

Formed-Tools Service 成形刀訂做服務

We provide a formed-tools service (like center drill、Twist / step drill 、Burnishing drill、T-slot cutter、chamfer cutter、etc) which guarantee best cutting performance.

Re-Sharpening Service 刀具再研磨服務

We are able to regrind standard and some special cutting tools which guarantee best cutting performance. Upon request, we can also organize coating of the tools after regrinding.

利用精密CNC磨刀機再研磨服務，以確保再研磨刀具品質；並依據您的需求提供再研磨刀鍍膜服務。

OEM Service

We provide an end-to-end service and a well-recognized OEM manufacturer in various markets worldwide. Our OEM service is specialized in rapid, client-specific modification of tools from our total products.

Our commitment to integrity, professionalism and credibility will enable us to pursue continuous improvement and promise to satisfy your requirements with high-quality, reasonable price and perfect services.

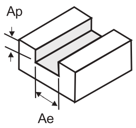
We are proud of our reputation and strive with every job to maintain the highest standards. Give us a call, e-mail or fax us a print for a prompt competitive quote.

類別	HRC	JIS	大同	日立	百樂	瑞典 ASSAB	THY SSEN	FINKL	高週波	神戶	NACHI	用途介紹
構造鋼	13	SC 系	RDS1	HIT81	V945		1730 1740		KPM1	KTSM 21		一般塑膠模具鋼
冷模鋼	58～62	SKD11 系	DC11	SLD	K105	XW41	2767		DC11	KTSM 181	CDS11	耐沖壓剪刀鋼
	58～63		DC53	SLD8			2379		KD21		MCR 12	精密沖模鋼
預硬鋼	26～28	SCM 系(改)	PDS3	HIT82			2331	GS4	KPM2	KTSM 31		塑膠模具鋼
	28～32		PDS25	HPM2				GS5 TR55	KPM25	KTSM 3M		塑膠模具鋼
	28～32		-	-	-		2311	P20	-	-	-	塑膠模具鋼
	28～32		-	-	-	718	2730	-	-	-	-	塑膠模具鋼
	38～40	快削析出硬化系	NAK55	HPM1				FX	KAP	KTSM 40EF		高級鏡面模具鋼
	38～45		NAK80	HPM50				FX	KAP2	KTSM 40E		高級鏡面模具鋼
淬火型塑膠鋼	56～61	SDK11 系(改)	PD613	HPM31	K110		THY-RODUR		KSP2			高鏡面塑膠模具鋼
鍛造模具鋼	48～55	SKT4 系	GFA	DM	W500	SCMDIE	2713	6F2	KTV	KTH3		鍛造模具鋼
熱模鋼	44～53	SKD61 系	DHA1	DAC	W302	8407M 8407HS	2344E FS	DC	KDA	KTD2	HDS61	擠型模具鋼
	40～44	SKD61 系(改)	DH2F	FDAC	W300	ORVAR		EX	FDAS	KTSM-41		壓鑄模具鋼
耐腐蝕鋼	27～30		-	-	-	-	2316	-	-	-	-	耐酸模具鋼
	30～35	SUS系	NAK101	PS2					U630	KTSM 420		耐酸模具鋼
	50～56		PD555	HPM38	M310	STAVAX	2083	420	KSP1	KTSM 60		光學鏡片
高速鋼	60～64	SKH55 SKH51 系	MH55	YXM	S705	KM35	3243		HM35	KMC3	HM35	鉸刀鑽頭
	60～63		HU51	YXM1	S600	KM2	3243		H51	KM1	SKH9	耐磨耗耐衝擊
	60～65		DEX20	HAP10	S390 PM	ASP23				KHA32	FAX31	精密沖模
	60～68		DEX60	HAP40		ASP60				KHA50	FAX70	沖模冷鍛模具鋼
碳素工具鋼	60～63	SKS93 系	YK30	YSC3					K30M		SK3M	工具鋼
	60～63	SK23 系	YK2	YC2					K2			碳素工具
	60～63		YK3	YC3	K990	UHB20	1645		K3			碳素工具
鎢合金鋼	60～62	SKS3 系	GOA	SGT	K460	ARNE DF-2	2510		KS3		SKS3	工具剪刀

3 List of recommended milling conditions (general purpose) 建議切削條件 (一般切削)

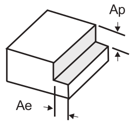
Slot & Pocket

Ap=0.3D
Ae=D



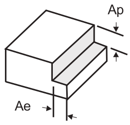
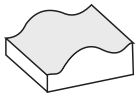
Shouldering

Ap=D
Ae=0.25~0.6D



Material 工件材料	Hardness HB 硬度	Cutting Speed m/min 切削速度	Roughing 粗加工 Table Feed Vf=mm/min 進給 Slot & Pocket 槽(口袋)加工 2 Flute	Roughing 粗加工 Table Feed Vf=mm/min 進給 Slot & Pocket 槽(口袋)加工 3 Flute	Roughing 粗加工 Table Feed Vf=mm/min 進給 Shouldering 側面加工 3 Flute	Roughing 粗加工 Table Feed Vf=mm/min 進給 Shouldering 側面加工 4 Flute
Carbon steel -Low carbon 0.2%	150	150	500	760	660	880
Carbon steel-Medium carbon 0.45%	190	115	380	560	495	650
Alloy steel-Medium carbon	250 ~ 325	115	380	560	495	650
Alloy steel-High carbon	325 ~ 375	75	225	340	295	395
Alloy steel-High carbon	52HRC	30	56	75	70	88
Tool steel	~ 250	45	155	190	190	154
Maraging steel	24 ~ 45HRC	45	155	190	190	154
Tool steel	50HRC	30	56	75	70	95
Stainless steel - Martensitic	300	75	225	340	295	395
Stainless steel - Austenitic	225 ~ 250	45	155	190	190	154
Nickel base alloys	300	30	56	75	70	95
Titanium base alloys	235	45	155	190	190	154
Malleable cast iron	130	75	225	340	295	395
Nodular cast iron, cast iron high tensile	250	75	225	340	295	395
Grey cast iron, cast iron low tensile	180	75	225	340	295	395
Aluminium alloys >10% Si	100	155	500	790	665	875
Aluminium alloys <10% Si	100	310	1000	1500	1320	1750

In drilling feed rate should be 25 % of the shown values.
The cutting conditions are a starting point which may be adjusted by ±25 % to optimize results.
The list of recommended milling conditions should be referred as a rough idea.

Contouring		Profiling		
Ap=1.5 ~ 2.0D Ae=0.1D		Depth of cut Pitch	Ap=0.3D Ae=0.5D	Ap=0.1D Ae=0.2D 

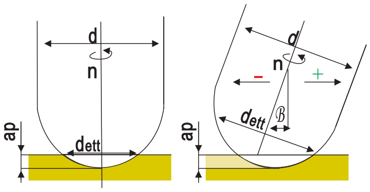
Material 工件材料	Hardness HB 硬度	Cutting Speed m/min 切削速度	Finishing 精加工			
			Table Feed Vf=mm/min 進給			
			Contouring 形狀輪廓		Profiling 曲面	
			2 Flute	3 Flute	3 Flute	4 Flute
Carbon steel -Low carbon 0.2%	150	270	2800	3700	1850	3700
Carbon steel-Medium carbon 0.45%	190	220	1400	1850	935	1850
Alloy steel-Medium carbon	250 ~ 325	220	1400	1850	935	1850
Alloy steel-High carbon	325 ~ 375	130	740	985	500	985
Alloy steel-High carbon	50HRC	60	280	378	190	378
Tool steel	~ 250	80	450	600	205	415
Maraging steel	24 ~ 45HRC	80	450	600	205	415
Tool steel	50HRC	60	280	375	190	375
Stainless steel - Martensitic	300	115	665	985	500	985
Stainless steel - Austenitic	225 ~ 250	80	450	660	205	415
Nickel base alloys	300	60	280	378	190	375
Titanium base alloys	235	90	510	660	205	415
Malleable cast iron	130	130	750	1000	500	985
Nodular cast iron, cast iron high tensile	250	130	750	1000	500	985
Grey cast iron, cast iron low tensile	180	130	750	1000	500	985
Aluminium alloys >10% Si	100	300	3100	4100	2080	4100
Aluminium alloys <10% Si	100	600	6200	8000	4150	8000

The list of recommended milling conditions should be referred as a rough idea.

1 End mills Tolerance 銑刀公差表 (mm)

Diameter 直徑範圍	Cutting diameter 刃徑	Shank 柄徑
Range	h8	h6
d ≤ 3	0 to -0.014	0 to -0.006
3 < d ≤ 6	0 to -0.018	0 to -0.008
6 < d ≤ 10	0 to -0.022	0 to -0.009
10 < d < 18	0 to -0.027	0 to -0.011
18 < d ≤ 30	0 to -0.033	0 to -0.013

2 Calculation of cutting conditions 切削條件的計算

Explain 描述	Symbol and formula 符號和公式
N : Spindle speed 主軸轉速 (min^{-1})	$Vc = \dfrac{\pi \times d \times N}{1000}$
Vc : Cutting speed 切削速度 (m/min)	
F : Feed speed 進給速度 (mm/min)	$F = N \times Z \times f_z$
Q : Chip removal rate 切削屑移除率 (mm^3/min)	$Q = A_p \times A_e \times F$
d eff : Effective diameter of end mills 銑刀有效直徑 (mm) 	$d_{eff} = 2 \times \sqrt{Ap(d-Ap)}$ $\beta = 0$ $d_{eff} = d \times \sin$ $\{\beta \pm \arccos((d-2\,Ap)/d)\}$

Vc : m/min	Cutting speed 切削速度 (m/min)
Vceff : m/min	Effective Cutting Speed 有效切削速度 (m/min)
N : min^{-1}	Spindle speed 主軸轉速 (min^{-1})
F : mm/min	Feed speed 進給速度 (mm/min)
fz : mm	Feed per tooth 每刃進給 (mm/tooth)
Z :	Number of teeth 刃數
d : mm	Diameter of end mills 銑刀直徑
deff : mm	Effective diameter of end mills 銑刀有效直徑
Q : mm^3/min	Chip removal rate 切削屑移除率
β :	Angle of inclination 切刃傾斜角
Ap :	Milling amount(Axial) 軸向切削深度
Ae :	Radial depth of cut 徑向切削速度