



# 鎢鋼複合材料用銑刀

## Carbide Composites Router End Mills

- 特殊溝槽設計搭配DIA鑽石鍍層、新RD彩鑽鍍層，使排屑更加優異。  
Special flute geometry design, DIA coating and RD coating for better chip removal.
- 適合加工非金屬(碳纖維、玻璃纖維)。  
For Non-metal(Glass Fiber, Carbon Fiber).
- 適合中加工、精加工用。  
Use for semi finishing cutting, finishing.



# 高硬度鋼 加工用銑刀

## 6 Flutes High Speed 45° Helix End Mills

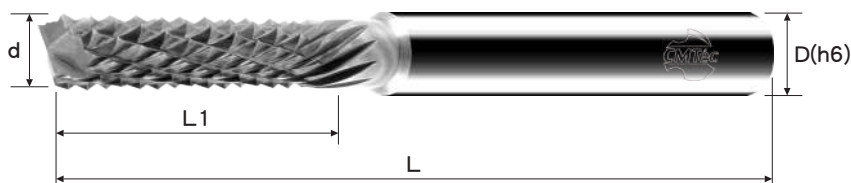
- 高剛性幾何設計，切削刃具有優異的加工性能。  
Strong geometry design has excellent cutting ability of cutting edges.
- 45度螺旋角設計適合高轉速、高進給加工。  
45 degree helix design for high speed, feed condition.
- 適合加工高硬度鋼材(HRC50~60° )。  
For hardened steel(45~60° HRC) machining.
- 適合中加工、精加工用。  
Use for semi finishing cutting, finishing.

# 鎢鋼複合材料用銑刀- 小柄/標準型

## CARBIDE ROUTER END MILLS FOR COMPOSITES- Square Type

· CEFM00000D

· CEF00000D



| 刃徑 d                  | 公差 Tolerance  |
|-----------------------|---------------|
| $\phi < 3$            | 0 ~ -0.02     |
| $3 \leq \phi \leq 10$ | -0.01 ~ -0.03 |
| $10 < \phi$           | -0.01 ~ -0.04 |

|                      |   |
|----------------------|---|
| 超精銑 Bright Finishing | — |
| 精銑 Finishing         | — |
| 中銑 Semi Finishing    | ◎ |
| 粗銑 Roughing          | ◎ |



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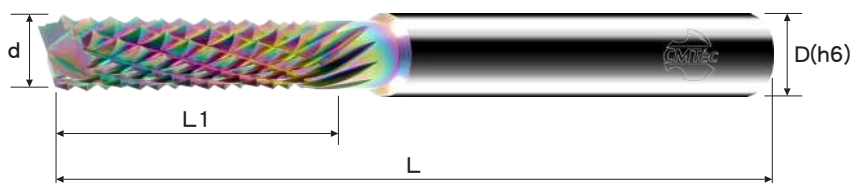
| 刃徑 d | 刃長 L1 | 全長 L | 柄徑 D | 刃數 F | DIA 鍍膜訂購編號<br>DIA Coated<br>Order No. |
|------|-------|------|------|------|---------------------------------------|
| 4.0  | 20    | 60   | 4    | 8    | CEFM80400D                            |
| 6.0  | 25    | 60   | 6    | 11   | CEF110600D                            |
| 8.0  | 25    | 60   | 8    | 14   | CEF140800D                            |
| 10.0 | 30    | 75   | 10   | 16   | CEF161000D                            |
| 12.0 | 32    | 100  | 12   | 17   | CEF171200D                            |

# 鎢鋼複合材料用銑刀- 小柄/標準型

## CARBIDE ROUTER END MILLS FOR COMPOSITES- Square Type

· CEFM00000A

· CEF00000A



| 刃徑 d                  | 公差 Tolerance  |
|-----------------------|---------------|
| $\phi < 3$            | 0 ~ -0.02     |
| $3 \leq \phi \leq 10$ | -0.01 ~ -0.03 |
| $10 < \phi$           | -0.01 ~ -0.04 |

|                      |   |
|----------------------|---|
| 超精銑 Bright Finishing | — |
| 精銑 Finishing         | — |
| 中銑 Semi Finishing    | ◎ |
| 粗銑 Roughing          | ◎ |



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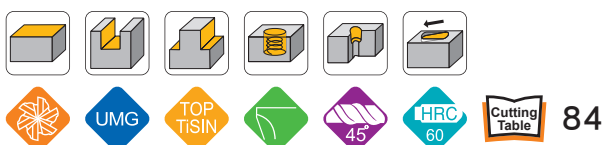
| 刃徑 d | 刃長 L1 | 全長 L | 柄徑 D | 刃數 F | RD 鍍膜訂購編號<br>RD Coated<br>Order No. |
|------|-------|------|------|------|-------------------------------------|
| 4.0  | 20    | 60   | 4    | 8    | CEFM80400A                          |
| 6.0  | 25    | 60   | 6    | 11   | CEF110600A                          |
| 8.0  | 25    | 60   | 8    | 14   | CEF140800A                          |
| 10.0 | 30    | 75   | 10   | 16   | CEF161000A                          |
| 12.0 | 32    | 100  | 12   | 17   | CEF171200A                          |

## M520 ULTRA CARBIDE END MILLS FOR HIGH HARDNESS- Standard- 6F

Technical drawing of a double-flute drill bit. The drawing shows the bit's profile with the following dimensions and labels:

- $d$ : Diameter of the drill bit.
- $L_1$ : Length of the double-flute section.
- $L$ : Total length of the drill bit.
- $D(h6)$ : Diameter of the drill bit shank, indicating a tolerance of h6.

|                      |   |
|----------------------|---|
| 超精銑 Bright Finishing | ○ |
| 精銑 Finishing         | ◎ |
| 中銑 Semi Finishing    | ◎ |
| 粗銑 Roughing          | — |



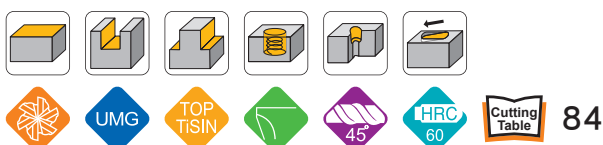
➡ 切削條件表 P.581  
Cutting Condition

➡ 技術資料 P.622  
Technical Data

## M520 ULTRA CARBIDE END MILLS FOR HIGH HARDNESS- Long Flute- 6F

Technical drawing of a double-flute drill bit. The drawing shows a side view of the drill bit with dimensions labeled. The diameter is  $d$  at the tip and  $D(h6)$  at the shank. The length of the cutting edge is  $L1$ , and the total length is  $L$ . The brand 'EXM HRC' is visible on the shank.

|                      |   |
|----------------------|---|
| 超精銑 Bright Finishing | ○ |
| 精銑 Finishing         | ◎ |
| 中銑 Semi Finishing    | ◎ |
| 粗銑 Roughing          | — |

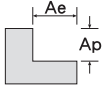


[➡ 切削條件表](#) [P.581](#)
[➡ 技術資料](#) [P.622](#)

Table 80

鎢鋼複合材料用銑刀- DIA鑽石塗層- 切削條件表

SOLID CARBIDE END MILLS- CUTTING CONDITION TABLE

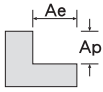
| 加工材質<br>Material              | 非金屬<br>Non-metal                                                                                                    |               |                             |               |
|-------------------------------|---------------------------------------------------------------------------------------------------------------------|---------------|-----------------------------|---------------|
| 工件料號<br>Material Code         | 碳纖維<br>Carbon Fiber<br>CFRP                                                                                         |               | 玻璃纖維<br>Glass Fiber<br>GFRP |               |
| 硬度<br>Hardness                | —                                                                                                                   |               | —                           |               |
| 切削速度 Vc                       | 100m/min                                                                                                            |               | 70m/min                     |               |
| 外徑<br>Diameter                | S<br>(rpm)                                                                                                          | F<br>(mm/min) | S<br>(rpm)                  | F<br>(mm/min) |
| 3                             | 10,610                                                                                                              | 640           | 7,430                       | 450           |
| 4                             | 7,960                                                                                                               | 720           | 5,570                       | 500           |
| 5                             | 6,370                                                                                                               | 960           | 4,450                       | 670           |
| 6                             | 5,310                                                                                                               | 1,110         | 3,710                       | 780           |
| 8                             | 3,980                                                                                                               | 1,310         | 2,780                       | 910           |
| 10                            | 3,180                                                                                                               | 1,530         | 2,230                       | 1,060         |
| 12                            | 2,650                                                                                                               | 1,700         | 1,860                       | 1,190         |
| 切削量<br>Cutting Amount<br>(mm) | $A_p \leq 2D$<br>$A_e \leq 0.35D$  |               |                             |               |

※ 切削公式 Cutting Formula :  $S(\text{主軸轉速}) = V_c(\text{切削速度}) \times 1000 / D(\text{外徑}) / \pi (3.14)$   $F(\text{進給速度}) = f_z(\text{每刃進給量}) \times Z(\text{刃數}) \times S(\text{主軸轉速})$

Table 81

鎢鋼複合材料用銑刀- RD彩鑽塗層- 切削條件表

SOLID CARBIDE END MILLS- CUTTING CONDITION TABLE

| 加工材質<br>Material              | 非金屬<br>Non-metal                                                                                                      |               |                             |               |
|-------------------------------|-----------------------------------------------------------------------------------------------------------------------|---------------|-----------------------------|---------------|
| 工件料號<br>Material Code         | 碳纖維<br>Carbon Fiber<br>CFRP                                                                                           |               | 玻璃纖維<br>Glass Fiber<br>GFRP |               |
| 硬度<br>Hardness                | —                                                                                                                     |               | —                           |               |
| 切削速度 Vc                       | 100m/min                                                                                                              |               | 70m/min                     |               |
| 外徑<br>Diameter                | S<br>(rpm)                                                                                                            | F<br>(mm/min) | S<br>(rpm)                  | F<br>(mm/min) |
| 3                             | 10,610                                                                                                                | 260           | 7,430                       | 180           |
| 4                             | 7,960                                                                                                                 | 290           | 5,570                       | 200           |
| 5                             | 6,370                                                                                                                 | 380           | 4,450                       | 270           |
| 6                             | 5,310                                                                                                                 | 440           | 3,710                       | 310           |
| 8                             | 3,980                                                                                                                 | 520           | 2,780                       | 360           |
| 10                            | 3,180                                                                                                                 | 610           | 2,230                       | 420           |
| 12                            | 2,650                                                                                                                 | 680           | 1,860                       | 480           |
| 切削量<br>Cutting Amount<br>(mm) | $A_p \leq 2D$<br>$A_e \leq 0.35D$  |               |                             |               |

※ 切削公式 Cutting Formula :  $S(\text{主軸轉速}) = V_c(\text{切削速度}) \times 1000 / D(\text{外徑}) / \pi (3.14)$   $F(\text{進給速度}) = f_z(\text{每刃進給量}) \times Z(\text{刃數}) \times S(\text{主軸轉速})$

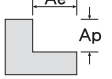
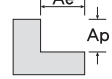
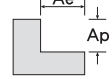
1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統...等而改變。

These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.

Table 84

M520 極細鎢鋼高硬型銑刀-6刃(鍍膜) 切削條件表

## SOLID CARBIDE END MILLS- CUTTING CONDITION TABLE

| 加工材質<br>Material           | 碳素鋼<br>Carbon Steels                                                              |               | 合金鋼<br>Alloy Steels                                                                 |               | 合金鋼<br>Alloy Steels                                                                 |               | 不銹鋼<br>Stainless Steels                                                             |               |
|----------------------------|-----------------------------------------------------------------------------------|---------------|-------------------------------------------------------------------------------------|---------------|-------------------------------------------------------------------------------------|---------------|-------------------------------------------------------------------------------------|---------------|
| 工件料號<br>Material Code      | S35C,S45C,S50C                                                                    |               | SCM,SKT,SKD                                                                         |               | SCM,SKT,SKD                                                                         |               | SUS304                                                                              |               |
| 硬度<br>Hardness             | HRC<20                                                                            |               | HRC20~30                                                                            |               | HRC30~45                                                                            |               | —                                                                                   |               |
| 切削速度 Vc                    | 110m/min                                                                          |               | 95m/min                                                                             |               | 75m/min                                                                             |               | 75m/min                                                                             |               |
| 外徑<br>Diameter             | S<br>(rpm)                                                                        | F<br>(mm/min) | S<br>(rpm)                                                                          | F<br>(mm/min) | S<br>(rpm)                                                                          | F<br>(mm/min) | S<br>(rpm)                                                                          | F<br>(mm/min) |
| 6mm                        | 5,840                                                                             | 1,060         | 5,040                                                                               | 900           | 3,980                                                                               | 710           | 3,980                                                                               | 540           |
| 8mm                        | 4,380                                                                             | 1,050         | 3,780                                                                               | 840           | 2,990                                                                               | 690           | 2,990                                                                               | 530           |
| 10mm                       | 3,500                                                                             | 970           | 3,030                                                                               | 780           | 2,390                                                                               | 610           | 2,390                                                                               | 480           |
| 12mm                       | 2,920                                                                             | 900           | 2,520                                                                               | 760           | 1,990                                                                               | 1,120         | 1,990                                                                               | 450           |
| 16mm                       | 2,190                                                                             | 810           | 1,890                                                                               | 700           | 1,490                                                                               | 980           | 1,490                                                                               | 390           |
| 切削量<br>Cutting Amount (mm) | Ae=0.03D~0.1D                                                                     |               | Ae=0.02D~0.1D                                                                       |               | Ae=0.02D~0.1D                                                                       |               | Ae=0.02D~0.05D                                                                      |               |
|                            |  |               |  |               |  |               |  |               |

※ 切削公式 Cutting Formula :  $S(\text{主軸轉速}) = Vc(\text{切削速度}) \times 1000 / D(\text{外徑}) / \pi (3.14)$   $F(\text{進給速度}) = f(\text{每刃進給量}) \times Z(\text{刃數}) \times S(\text{主軸轉速})$

※ 切削公式 Cutting Formula :  $S(\text{主軸轉速}) = Vc(\text{切削速度}) \times 1000 / D(\text{外徑}) / \pi (3.14)$   $F(\text{進給速度}) = f(\text{每轉進給量}) \times S(\text{主軸轉速})$

1. 當加工聲音尖銳時，請調降主軸轉速(S) (10~40%)。When the sound is piercing, please lower the spindle speed(S) (10~40%).
2. 當機台震動太大時，請調降進給速度(F) (10~40%)。When the machine is vibrating, please decrease the feed rate(F) (10~40%).
3. 當主軸負載太大時，請調降進給速度(F) (10~40%)。When the spindle load is high, please decrease the feed rate(F) (10~40%).
4. 以上數據為建議值，適當的條件仍需視機台狀況，夾治具品質，潤滑冷卻系統...等而改變。

These are recommended values which depend on the condition of the machine, fixture, lubricating & cooling systems... etc. They may have to be adapted.