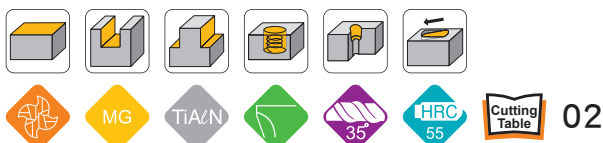


## S220 MICRO GRAIN CARBIDE END MILLS- Square Type- 4F

- **CESM40000A**



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



※ 0.2以上採攻面寬型式。  
From 0.2 and larger have flatland type.  
※ 尖角型式依需求生產。  
Sharp corner type is on request.

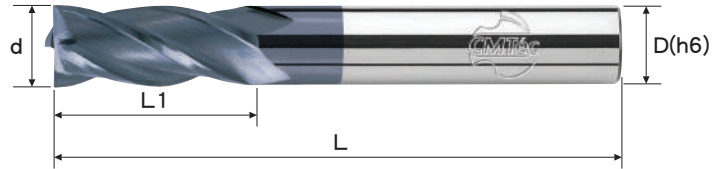
➡ 切削條件表 P.534  
Cutting Condition

→ 技術資料 P.622  
Technical Data

# S220 鎢鋼平銑刀- 標準型- 4刃

S220 MICRO GRAIN CARBIDE END MILLS- Square Type- 4F

· CES40000A



| 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          | — |



02

| 刃徑 d | 刃長 L1 | 全長 L | 柄徑 D | 刃數 F | 白刀訂購編號<br>Uncoated<br>Order No. | 鍍膜訂購編號<br>Coated<br>Order No. |
|------|-------|------|------|------|---------------------------------|-------------------------------|
| 3.0  | 8     | 50   | 6    | 4    | CES40300                        | CES40300A                     |
| 3.0  | 9     | 50   | 6    | 4    | CES40300090C                    | CES40300090CA                 |
| 3.5  | 9     | 50   | 6    | 4    | CES40350                        | CES40350A                     |
| 4.0  | 10    | 50   | 6    | 4    | CES40400                        | CES40400A                     |
| 4.0  | 12    | 50   | 6    | 4    | CES40400120C                    | CES40400120CA                 |
| 4.5  | 11    | 50   | 6    | 4    | CES40450                        | CES40450A                     |
| 5.0  | 13    | 50   | 6    | 4    | CES40500                        | CES40500A                     |
| 5.5  | 14    | 50   | 6    | 4    | CES40550                        | CES40550A                     |
| 6.0  | 15    | 50   | 6    | 4    | CES40600                        | CES40600A                     |
| 6.0  | 18    | 50   | 6    | 4    | CES40600180C                    | CES40600180CA                 |
| 6.5  | 16    | 60   | 8    | 4    | CES40650                        | CES40650A                     |
| 7.0  | 18    | 60   | 8    | 4    | CES40700                        | CES40700A                     |
| 7.5  | 18    | 60   | 8    | 4    | CES40750                        | CES40750A                     |
| 8.0  | 20    | 60   | 8    | 4    | CES40800                        | CES40800A                     |
| 8.0  | 24    | 60   | 8    | 4    | CES40800240C                    | CES40800240CA                 |
| 8.0  | 20    | 75   | 8    | 4    | CES40800075L                    | CES40800075LA                 |
| 8.5  | 20    | 75   | 10   | 4    | CES40850                        | CES40850A                     |
| 9.0  | 22    | 75   | 10   | 4    | CES40900                        | CES40900A                     |
| 9.5  | 22    | 75   | 10   | 4    | CES40950                        | CES40950A                     |
| 10.0 | 25    | 75   | 10   | 4    | CES41000                        | CES41000A                     |
| 10.0 | 30    | 75   | 10   | 4    | CES41000300C                    | CES41000300CA                 |
| 10.5 | 25    | 75   | 12   | 4    | CES41050                        | CES41050A                     |
| 11.0 | 25    | 75   | 12   | 4    | CES41100                        | CES41100A                     |
| 11.5 | 25    | 75   | 12   | 4    | CES41150                        | CES41150A                     |
| 12.0 | 30    | 75   | 12   | 4    | CES41200                        | CES41200A                     |
| 12.0 | 36    | 75   | 12   | 4    | CES41200360C                    | CES41200360CA                 |
| 13.0 | 30    | 75   | 14   | 4    | CES4130014                      | CES4130014A                   |
| 14.0 | 30    | 75   | 14   | 4    | CES4140014                      | CES4140014A                   |
| 15.0 | 35    | 100  | 16   | 4    | CES41500                        | CES41500A                     |
| 16.0 | 35    | 100  | 16   | 4    | CES41600                        | CES41600A                     |
| 16.0 | 45    | 100  | 16   | 4    | CES41600450C                    | CES41600450CA                 |
| 18.0 | 40    | 100  | 18   | 4    | CES4180018                      | CES4180018A                   |
| 18.0 | 40    | 100  | 20   | 4    | CES41800                        | CES41800A                     |
| 20.0 | 45    | 100  | 20   | 4    | CES42000                        | CES42000A                     |
| 25.0 | 45    | 100  | 25   | 4    | CES42500                        | CES42500A                     |



※ 0.2以上採攻面寬型式。  
From 0.2 and larger have flatland type.  
※ 尖角型式依需求生產。  
Sharp corner type is on request.

→ 切削條件表  
Cutting Condition P.534

→ 技術資料  
Technical Data P.622

S220

S220 Carbide End Mills

S220 鎢鋼銑刀系列

Table 01

S220 鎢鋼銑刀- 2 / 3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        |               | 調質鋼<br>Hardened Steels                                                               |               | 調質鋼<br>Hardened Steels     |               | 不銹鋼<br>Stainless Steels                                                               |               | 鑄鐵<br>Cast Iron            |               |
|----------------------------|----------------------------|---------------|-------------------------------------------------------------------------------------|---------------|----------------------------|---------------|--------------------------------------------------------------------------------------|---------------|----------------------------|---------------|---------------------------------------------------------------------------------------|---------------|----------------------------|---------------|
| 工件料號<br>Material Code      | S35C,S45C,S50C             |               | SCM,SKT,SKD                                                                         |               | SCM,SKT,SKD                |               | SKT,SKD                                                                              |               | SKT,SKD                    |               | SUS304                                                                                |               | FC,FCD                     |               |
| 硬度<br>Hardness             | HRC<20                     |               | HRC20~30                                                                            |               | HRC30~45                   |               | HRC45~55                                                                             |               | HRC55~63                   |               | —                                                                                     |               | HRC<30                     |               |
| 切削速度 Vc                    | 68m/min                    |               | 54m/min                                                                             |               | 45m/min                    |               | 27m/min                                                                              |               | 20m/min                    |               | 54m/min                                                                               |               | 79m/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) | S<br>(rpm)                 | F<br>(mm/min) | S<br>(rpm)                                                                            | F<br>(mm/min) | S<br>(rpm)                 | F<br>(mm/min) |
| 1mm                        | 20,000                     | 120           | 17,100                                                                              | 100           | 14,400                     | 65            | 8,000                                                                                | 50            | 6,000                      | 35            | 17,100                                                                                | 100           | 25,200                     | 270           |
| 2mm                        | 10,800                     | 155           | 8,640                                                                               | 120           | 7,200                      | 85            | 4,320                                                                                | 65            | 3,240                      | 45            | 8,640                                                                                 | 120           | 12,600                     | 290           |
| 3mm                        | 7,560                      | 155           | 5,760                                                                               | 135           | 4,680                      | 90            | 3,000                                                                                | 65            | 2,230                      | 45            | 5,760                                                                                 | 135           | 8,640                      | 290           |
| 4mm                        | 5,400                      | 165           | 4,320                                                                               | 135           | 3,600                      | 100           | 2,160                                                                                | 65            | 1,620                      | 50            | 4,320                                                                                 | 135           | 6,480                      | 290           |
| 5mm                        | 4,500                      | 180           | 3,420                                                                               | 135           | 2,880                      | 100           | 1,800                                                                                | 75            | 1,350                      | 55            | 3,420                                                                                 | 135           | 5,040                      | 325           |
| 6mm                        | 3,600                      | 180           | 2,880                                                                               | 135           | 2,340                      | 100           | 1,440                                                                                | 75            | 1,080                      | 55            | 2,880                                                                                 | 135           | 4,320                      | 360           |
| 8mm                        | 2,700                      | 180           | 2,160                                                                               | 155           | 1,800                      | 110           | 1,080                                                                                | 75            | 810                        | 55            | 2,160                                                                                 | 155           | 3,240                      | 360           |
| 10mm                       | 2,160                      | 180           | 1,710                                                                               | 155           | 1,440                      | 120           | 870                                                                                  | 75            | 650                        | 55            | 1,710                                                                                 | 155           | 2,520                      | 380           |
| 12mm                       | 1,800                      | 180           | 1,440                                                                               | 155           | 1,200                      | 120           | 720                                                                                  | 75            | 540                        | 55            | 1,440                                                                                 | 155           | 2,160                      | 400           |
| 14mm                       | 1,800                      | 200           | 1,360                                                                               | 170           | 1,140                      | 130           | 720                                                                                  | 80            | 540                        | 60            | 1,360                                                                                 | 170           | 2,000                      | 440           |
| 16mm                       | 1,560                      | 220           | 2,100                                                                               | 180           | 1,000                      | 140           | 630                                                                                  | 90            | 470                        | 65            | 2,100                                                                                 | 180           | 1,800                      | 480           |
| 18mm                       | 1,560                      | 220           | 1,060                                                                               | 180           | 880                        | 140           | 630                                                                                  | 90            | 470                        | 65            | 1,060                                                                                 | 180           | 1,600                      | 480           |
| 20mm                       | 1,200                      | 220           | 960                                                                                 | 180           | 800                        | 140           | 480                                                                                  | 90            | 360                        | 65            | 960                                                                                   | 180           | 1,400                      | 480           |
| 切削量<br>Cutting Amount (mm) | Ap=0.5D<br>(D<3, Ap≤0.25D) |               |  |               | Ap=0.1D<br>(D<3, Ap≤0.05D) |               |  |               | Ap=0.5D<br>(D<3, Ap≤0.25D) |               |  |               | Ap=0.5D<br>(D<3, Ap≤0.25D) |               |

Table 02

S220 鎢鋼銑刀- 3 / 4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 |               | 調質鋼<br>Hardened Steels                                                               |               | 調質鋼<br>Hardened Steels |               | 不銹鋼<br>Stainless Steels                                                               |               | 鑄鐵<br>Cast Iron    |               |
|----------------------------|----------------------|---------------|-------------------------------------------------------------------------------------|---------------|---------------------|---------------|--------------------------------------------------------------------------------------|---------------|------------------------|---------------|---------------------------------------------------------------------------------------|---------------|--------------------|---------------|
| 工件料號<br>Material Code      | S35C,S45C,S50C       |               | SCM,SKT,SKD                                                                         |               | SCM,SKT,SKD         |               | SKT,SKD                                                                              |               | SKT,SKD                |               | SUS304                                                                                |               | FC,FCD             |               |
| 硬度<br>Hardness             | HRC<20               |               | HRC20~30                                                                            |               | HRC30~45            |               | HRC45~55                                                                             |               | HRC55~63               |               | —                                                                                     |               | HRC<30             |               |
| 切削速度 Vc                    | 68m/min              |               | 54m/min                                                                             |               | 45m/min             |               | 27m/min                                                                              |               | 20m/min                |               | 54m/min                                                                               |               | 79m/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) | S<br>(rpm)             | F<br>(mm/min) | S<br>(rpm)                                                                            | F<br>(mm/min) | S<br>(rpm)         | F<br>(mm/min) |
| 3mm                        | 7,560                | 490           | 5,760                                                                               | 345           | 4,680               | 165           | 3,020                                                                                | 200           | 2,300                  | 150           | 5,760                                                                                 | 345           | 8,640              | 900           |
| 4mm                        | 5,400                | 490           | 4,320                                                                               | 345           | 3,600               | 165           | 2,160                                                                                | 200           | 1,620                  | 150           | 4,320                                                                                 | 345           | 6,480              | 1,080         |
| 5mm                        | 4,500                | 490           | 3,420                                                                               | 345           | 2,880               | 165           | 1,800                                                                                | 200           | 1,350                  | 150           | 3,420                                                                                 | 345           | 5,040              | 1,080         |
| 6mm                        | 3,600                | 490           | 2,880                                                                               | 345           | 2,340               | 165           | 1,440                                                                                | 200           | 1,080                  | 150           | 2,880                                                                                 | 345           | 4,320              | 1,080         |
| 8mm                        | 2,700                | 490           | 2,160                                                                               | 345           | 1,800               | 175           | 1,080                                                                                | 200           | 810                    | 150           | 2,160                                                                                 | 345           | 3,240              | 1,080         |
| 10mm                       | 2,160                | 505           | 1,710                                                                               | 360           | 1,440               | 175           | 860                                                                                  | 210           | 650                    | 155           | 1,710                                                                                 | 360           | 2,520              | 1,170         |
| 12mm                       | 1,800                | 505           | 1,440                                                                               | 360           | 1,200               | 175           | 720                                                                                  | 210           | 540                    | 155           | 1,440                                                                                 | 360           | 2,160              | 1,260         |
| 14mm                       | 1,800                | 560           | 1,360                                                                               | 400           | 1,140               | 190           | 720                                                                                  | 230           | 540                    | 170           | 1,360                                                                                 | 400           | 2,000              | 1,400         |
| 16mm                       | 1,560                | 600           | 1,200                                                                               | 420           | 1,000               | 200           | 620                                                                                  | 240           | 470                    | 180           | 1,200                                                                                 | 420           | 1,800              | 1,500         |
| 18mm                       | 1,400                | 600           | 1,060                                                                               | 420           | 880                 | 200           | 560                                                                                  | 240           | 420                    | 180           | 1,060                                                                                 | 420           | 1,600              | 1,500         |
| 20mm                       | 1,200                | 600           | 960                                                                                 | 420           | 800                 | 200           | 480                                                                                  | 240           | 360                    | 180           | 960                                                                                   | 420           | 1,490              | 1,400         |
| 切削量<br>Cutting Amount (mm) | Ap=1.5D<br>Ae≤0.1D   |               |  |               | Ap=1.5D<br>Ae≤0.05D |               |  |               | Ap=1.5D<br>Ae≤0.1D     |               |  |               | Ap=1.5D<br>Ae≤0.1D |               |

- 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%).
- 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%).
- 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%).
- 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.