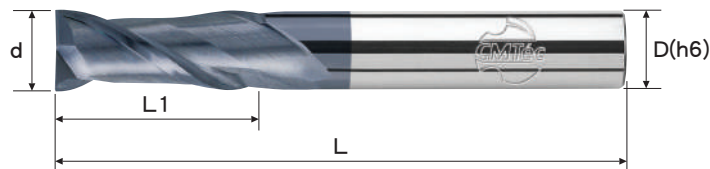


# S220 鎢鋼平銑刀- 標準型- 2刃

S220 MICRO GRAIN CARBIDE END MILLS- Square Type- 2F

· CES20000A



| 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          | ○ |



01



| 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. |
|------|-------|------|------|------|---------------------------------|-------------------------------|
| 1.0  | 3     | 50   | 6    | 2    | CES20100                        | CES20100A                     |
| 1.5  | 4     | 50   | 6    | 2    | CES20150                        | CES20150A                     |
| 2.0  | 5     | 50   | 6    | 2    | CES20200                        | CES20200A                     |
| 2.5  | 6     | 50   | 6    | 2    | CES20250                        | CES20250A                     |
| 3.0  | 8     | 50   | 6    | 2    | CES20300                        | CES20300A                     |
| 3.5  | 9     | 50   | 6    | 2    | CES20350                        | CES20350A                     |
| 4.0  | 10    | 50   | 6    | 2    | CES20400                        | CES20400A                     |
| 4.0  | 12    | 50   | 6    | 2    | CES20400120C                    | CES20400120CA                 |
| 4.5  | 11    | 50   | 6    | 2    | CES20450                        | CES20450A                     |
| 5.0  | 13    | 50   | 6    | 2    | CES20500                        | CES20500A                     |
| 5.5  | 14    | 50   | 6    | 2    | CES20550                        | CES20550A                     |
| 6.0  | 15    | 50   | 6    | 2    | CES20600                        | CES20600A                     |
| 6.0  | 18    | 50   | 6    | 2    | CES20600180C                    | CES20600180CA                 |
| 6.5  | 16    | 60   | 8    | 2    | CES20650                        | CES20650A                     |
| 7.0  | 18    | 60   | 8    | 2    | CES20700                        | CES20700A                     |
| 7.5  | 18    | 60   | 8    | 2    | CES20750                        | CES20750A                     |
| 8.0  | 20    | 60   | 8    | 2    | CES20800                        | CES20800A                     |
| 8.0  | 24    | 60   | 8    | 2    | CES20800240C                    | CES20800240CA                 |
| 8.5  | 20    | 75   | 10   | 2    | CES20850                        | CES20850A                     |
| 9.0  | 22    | 75   | 10   | 2    | CES20900                        | CES20900A                     |
| 9.5  | 22    | 75   | 10   | 2    | CES20950                        | CES20950A                     |
| 10.0 | 25    | 75   | 10   | 2    | CES21000                        | CES21000A                     |
| 10.0 | 30    | 75   | 10   | 2    | CES21000300C                    | CES21000300CA                 |
| 10.5 | 25    | 75   | 12   | 2    | CES21050                        | CES21050A                     |
| 11.0 | 25    | 75   | 12   | 2    | CES21100                        | CES21100A                     |
| 11.5 | 25    | 75   | 12   | 2    | CES21150                        | CES21150A                     |
| 12.0 | 30    | 75   | 12   | 2    | CES21200                        | CES21200A                     |
| 12.0 | 36    | 75   | 12   | 2    | CES21200360C                    | CES21200360CA                 |
| 13.0 | 30    | 75   | 14   | 2    | CES2130014                      | CES2130014A                   |
| 14.0 | 30    | 75   | 14   | 2    | CES2140014                      | CES2140014A                   |
| 15.0 | 35    | 100  | 16   | 2    | CES21500                        | CES21500A                     |
| 16.0 | 35    | 100  | 16   | 2    | CES21600                        | CES21600A                     |
| 16.0 | 45    | 100  | 16   | 2    | CES21600450C                    | CES21600450CA                 |
| 18.0 | 40    | 100  | 18   | 2    | CES2180018                      | CES2180018A                   |
| 18.0 | 40    | 100  | 20   | 2    | CES21800                        | CES21800A                     |
| 20.0 | 45    | 100  | 20   | 2    | CES22000                        | CES22000A                     |
| 25.0 | 45    | 100  | 25   | 2    | CES22500                        | CES22500A                     |



※ 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 鎢鋼平銑刀系列

# S220 鎢鋼平銑刀- 小柄型/標準型- 3刃

S220 MICRO GRAIN CARBIDE END MILLS- Square Type- 3F

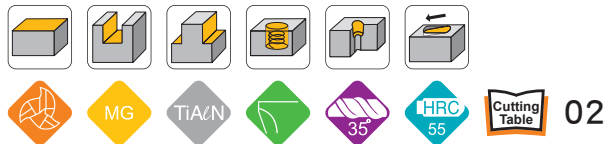
· CESM30000A

· CES30000A



| 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          | ○ |



| 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. |
|------|-------|------|------|------|---------------------------------|-------------------------------|
| 2.0  | 5     | 50   | 4    | 3    | CESM30200                       | CESM30200A                    |
| 2.5  | 6     | 50   | 4    | 3    | CESM30250                       | CESM30250A                    |
| 3.0  | 8     | 50   | 4    | 3    | CESM30300                       | CESM30300A                    |
| 3.5  | 9     | 50   | 4    | 3    | CESM30350                       | CESM30350A                    |
| 4.0  | 10    | 50   | 4    | 3    | CESM30400                       | CESM30400A                    |
| 2.0  | 5     | 50   | 6    | 3    | CES30200                        | CES30200A                     |
| 2.5  | 6     | 50   | 6    | 3    | CES30250                        | CES30250A                     |
| 3.0  | 8     | 50   | 6    | 3    | CES30300                        | CES30300A                     |
| 3.5  | 9     | 50   | 6    | 3    | CES30350                        | CES30350A                     |
| 4.0  | 10    | 50   | 6    | 3    | CES30400                        | CES30400A                     |
| 4.5  | 11    | 50   | 6    | 3    | CES30450                        | CES30450A                     |
| 5.0  | 13    | 50   | 6    | 3    | CES30500                        | CES30500A                     |
| 5.5  | 14    | 50   | 6    | 3    | CES30550                        | CES30550A                     |
| 6.0  | 15    | 50   | 6    | 3    | CES30600                        | CES30600A                     |
| 6.5  | 16    | 60   | 8    | 3    | CES30650                        | CES30650A                     |
| 7.0  | 18    | 60   | 8    | 3    | CES30700                        | CES30700A                     |
| 7.5  | 18    | 60   | 8    | 3    | CES30750                        | CES30750A                     |
| 8.0  | 20    | 60   | 8    | 3    | CES30800                        | CES30800A                     |
| 8.5  | 20    | 75   | 10   | 3    | CES30850                        | CES30850A                     |
| 9.0  | 22    | 75   | 10   | 3    | CES30900                        | CES30900A                     |
| 9.5  | 22    | 75   | 10   | 3    | CES30950                        | CES30950A                     |
| 10.0 | 25    | 75   | 10   | 3    | CES31000                        | CES31000A                     |
| 10.5 | 25    | 75   | 12   | 3    | CES31050                        | CES31050A                     |
| 11.0 | 25    | 75   | 12   | 3    | CES31100                        | CES31100A                     |
| 11.5 | 25    | 75   | 12   | 3    | CES31150                        | CES31150A                     |
| 12.0 | 30    | 75   | 12   | 3    | CES31200                        | CES31200A                     |
| 13.0 | 30    | 75   | 14   | 3    | CES3130014                      | CES3130014A                   |
| 14.0 | 30    | 75   | 14   | 3    | CES3140014                      | CES3140014A                   |
| 15.0 | 35    | 100  | 16   | 3    | CES31500                        | CES31500A                     |
| 16.0 | 35    | 100  | 16   | 3    | CES31600                        | CES31600A                     |

※ 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)<br> |               |                     |               |                     |               | Ap=0.1D<br>(D<3, Ap≦0.05D)<br> |               |                        |               |                         |               | Ap=0.5D<br>(D<3, Ap≦0.25D)<br> |               |  |  |  |  |

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 |  |  |  |  |  |  |  |

- 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.