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HIGH QUALITY



## 一般鋼材切削系列

超微粒硬質合金立銑刀



Standard Series  
V01.2008 GEN

 **DHF**



# BTA

## 超微粒圓頭立銼刀 Ball Nose End Mills



精銑 Finishing 
  中銑 Semi-finishing 
  粗銑 Roughing



| 型號<br>Type No. | D1<br>Diameter<br>直徑 | L1<br>Flute Length<br>刃長 | L3<br>O.A.L.<br>全長 | D2<br>Shank Dia<br>柄徑 |
|----------------|----------------------|--------------------------|--------------------|-----------------------|
| BTA 0102       | R0.5                 | 2                        | 50                 | 4                     |
| BTA 0152       | R0.75                | 3                        | 50                 | 4                     |
| BTA 0202       | R1                   | 4                        | 50                 | 4                     |
| BTA 0252       | R1.25                | 5                        | 50                 | 4                     |
| BTA 0302       | R1.5                 | 6                        | 50                 | 4                     |
| BTA 0402       | R2                   | 8                        | 50                 | 4                     |
| BTA 0502       | R2.5                 | 10                       | 50                 | 4                     |
| BTA 0602       | R3                   | 12                       | 50                 | 6                     |
| BTA 0802       | R4                   | 16                       | 60                 | 8                     |
| BTA 1002       | R5                   | 20                       | 75                 | 10                    |
| BTA 1202       | R6                   | 24                       | 75                 | 12                    |
| BTA 1602       | R8                   | 32                       | 100                | 16                    |
| BTA 2002       | R10                  | 40                       | 100                | 20                    |

unit:mm

### List of recommended milling conditions for BTA-2T

| 適用材<br>Work Material | Carbon Steels<br>S45C-S55C<br>HB150-230 |                 | Alloy Steels<br>S58Cr, P6, P8, P10, S58Cr<br>HRC35-35 |                 | Prehardened Steels<br>NAK80<br>HRC35-45 |                 | Hardened Steels<br>SKD11<br>HRC50-55 |                 |
|----------------------|---|-----------------|---|-----------------|---|-----------------|--------------------------------------|-----------------|
|                      | Velocity                                | V=100 m/min     | V=80 m/min  | V=70 m/min      | V=60 m/min                              | V=40 m/min      | V=40 m/min                           | V=40 m/min      |
| Type No.             | 進給速度Feed (mm-1)                         | 進給速度Feed (mm-1) | 進給速度Feed (mm-1)                                       | 進給速度Feed (mm-1) | 進給速度Feed (mm-1)                         | 進給速度Feed (mm-1) | 進給速度Feed (mm-1)                      | 進給速度Feed (mm-1) |
| BTA 0202             | 16000                                   | 400-1000        | 12700   | 300-800         | 11000                                   | 200-400         | 6400                                 | 80-250          |
| BTA 0302             | 10600                                   | 400-1000        | 8500  | 300-800         | 7430                                    | 200-400         | 4250                                 | 80-250          |
| BTA 0402             | 8000                                    | 400-1000        | 6400  | 300-800         | 5650                                    | 200-400         | 3200                                 | 80-250          |
| BTA 0602             | 5300                                    | 400-1000        | 4200  | 300-800         | 3750                                    | 200-400         | 2100                                 | 80-250          |
| BTA 0802             | 4000                                    | 400-1000        | 3200  | 300-800         | 2800                                    | 200-400         | 1600                                 | 80-250          |
| BTA 1002             | 3200                                    | 400-1000        | 2500  | 300-800         | 2250                                    | 200-400         | 1200                                 | 80-250          |
| BTA 1202             | 2700                                    | 400-1000        | 2100  | 300-800         | 1900                                    | 200-400         | 1000                                 | 80-250          |

| D Diameter | Diameter Tolerance |        | Diameter Tolerance |        |
|------------|--------------------|--------|--------------------|--------|
|            | ±0.03              | ±0.02  | ±0.02              | ±0.02  |
| φ 4        | ±0.008             | ±0.008 | ±0.008             | ±0.008 |
| φ 5        | ±0.008             | ±0.008 | ±0.008             | ±0.008 |
| φ 6        | ±0.008             | ±0.008 | ±0.008             | ±0.008 |
| φ 8        | ±0.009             | ±0.009 | ±0.009             | ±0.009 |
| φ 10       | ±0.011             | ±0.011 | ±0.011             | ±0.011 |
| φ 12       | ±0.011             | ±0.011 | ±0.011             | ±0.011 |
| φ 16       | ±0.011             | ±0.011 | ±0.011             | ±0.011 |
| φ 20       | ±0.013             | ±0.013 | ±0.013             | ±0.013 |

unit:mm

# BTD

## 超微粒圓頭立銼刀 Ball Nose End Mills



精銑 Finishing 
  中銑 Semi-finishing 
  粗銑 Roughing



| 型號<br>Type No. | D1<br>Diameter<br>直徑 | L1<br>Flute Length<br>刃長 | L3<br>O.A.L.<br>全長 | D2<br>Shank Dia<br>柄徑 |
|----------------|----------------------|--------------------------|--------------------|-----------------------|
| BTD 0102       | R0.5                 | 2                        | 50                 | 4                     |
| BTD 0152       | R0.75                | 3                        | 50                 | 4                     |
| BTD 0202       | R1                   | 4                        | 50                 | 4                     |
| BTD 0252       | R1.25                | 5                        | 50                 | 4                     |
| BTD 0302       | R1.5                 | 6                        | 50                 | 4                     |
| BTD 0402       | R2                   | 8                        | 50                 | 4                     |
| BTD 0502       | R2.5                 | 10                       | 57                 | 6                     |
| BTD 0602       | R3                   | 12                       | 57                 | 6                     |
| BTD 0802       | R4                   | 16                       | 63                 | 8                     |
| BTD 1002       | R5                   | 20                       | 72                 | 10                    |
| BTD 1202       | R6                   | 24                       | 83                 | 12                    |
| BTD 1602       | R8                   | 32                       | 100                | 16                    |
| BTD 2002       | R10                  | 40                       | 100                | 20                    |

unit:mm

### List of recommended milling conditions for BTD-2T

| 適用材<br>Work Material | Carbon Steels<br>S45C-S55C<br>HB150-230 |                 | Alloy Steels<br>S58Cr, P6, P8, P10, S58Cr<br>HRC35-35 |                 | Prehardened Steels<br>NAK80<br>HRC35-45 |                 | Hardened Steels<br>SKD11<br>HRC50-55 |                 |
|----------------------|---|-----------------|---|-----------------|---|-----------------|--------------------------------------|-----------------|
|                      | Velocity                                | V=100 m/min     | V=80 m/min  | V=70 m/min      | V=60 m/min                              | V=40 m/min      | V=40 m/min                           | V=40 m/min      |
| Type No.             | 進給速度Feed (mm-1)                         | 進給速度Feed (mm-1) | 進給速度Feed (mm-1)                                       | 進給速度Feed (mm-1) | 進給速度Feed (mm-1)                         | 進給速度Feed (mm-1) | 進給速度Feed (mm-1)                      | 進給速度Feed (mm-1) |
| BTD 0202             | 16000                                   | 400-1000        | 12700   | 300-800         | 11000                                   | 200-400         | 6400                                 | 80-250          |
| BTD 0302             | 10600                                   | 400-1000        | 8500  | 300-800         | 7430                                    | 200-400         | 4250                                 | 80-250          |
| BTD 0402             | 8000                                    | 400-1000        | 6400  | 300-800         | 5650                                    | 200-400         | 3200                                 | 80-250          |
| BTD 0602             | 5300                                    | 400-1000        | 4200  | 300-800         | 3750                                    | 200-400         | 2100                                 | 80-250          |
| BTD 0802             | 4000                                    | 400-1000        | 3200  | 300-800         | 2800                                    | 200-400         | 1600                                 | 80-250          |
| BTD 1002             | 3200                                    | 400-1000        | 2500  | 300-800         | 2250                                    | 200-400         | 1200                                 | 80-250          |
| BTD 1202             | 2700                                    | 400-1000        | 2100  | 300-800         | 1900                                    | 200-400         | 1000                                 | 80-250          |

| D Diameter | Diameter Tolerance |        | Diameter Tolerance |        |
|------------|--------------------|--------|--------------------|--------|
|            | ±0.03              | ±0.02  | ±0.02              | ±0.02  |
| φ 4        | ±0.008             | ±0.008 | ±0.008             | ±0.008 |
| φ 5        | ±0.008             | ±0.008 | ±0.008             | ±0.008 |
| φ 6        | ±0.008             | ±0.008 | ±0.008             | ±0.008 |
| φ 8        | ±0.009             | ±0.009 | ±0.009             | ±0.009 |
| φ 10       | ±0.011             | ±0.011 | ±0.011             | ±0.011 |
| φ 12       | ±0.011             | ±0.011 | ±0.011             | ±0.011 |
| φ 16       | ±0.011             | ±0.011 | ±0.011             | ±0.011 |
| φ 20       | ±0.013             | ±0.013 | ±0.013             | ±0.013 |

unit:mm



⊙ 精銑 Finishing
⊙ 中銑 Semi-finishing
⊙ 粗銑 Roughing



| 型號<br>Type No. | D1<br>Diameter<br>直徑 | L1<br>Flute Length<br>刃長 | L3<br>O.A.L<br>全長 | D2<br>Shank Dia<br>柄徑 |
|----------------|----------------------|--------------------------|-------------------|-----------------------|
| BTB 0102       | R0.5                 | 2                        | 50                | 6                     |
| BTB 0152       | R0.75                | 3                        | 50                | 6                     |
| BTB 0202       | R1                   | 4                        | 50                | 6                     |
| BTB 0252       | R1.25                | 5                        | 50                | 6                     |
| BTB 0302       | R1.5                 | 6                        | 50                | 6                     |
| BTB 0402       | R2                   | 8                        | 50                | 6                     |
| BTB 0502       | R2.5                 | 10                       | 50                | 6                     |
| BTB 0602       | R3                   | 12                       | 50                | 6                     |
| BTB 0802       | R4                   | 16                       | 60                | 8                     |
| BTB 1002       | R5                   | 20                       | 75                | 10                    |
| BTB 1202       | R6                   | 24                       | 75                | 12                    |
| BTB 1602       | R8                   | 32                       | 100               | 16                    |
| BTB 2002       | R10                  | 40                       | 100               | 20                    |

unit:mm

### List of recommended milling conditions for BTB-2T

| 被銑材<br>Work Material | Carbon Steels<br>S45C S50C<br>HB150-250 | Alloy Steels<br>SCM21 P208 P201 SKD11<br>HRC20-35 | Prehardened Steels<br>NAK80<br>HRC35-45 | Hardened Steels<br>SKD61<br>HRC50-55 |
|----------------------|---|---|---|--------------------------------------|
| Velocity             | V=100 m/min                             | V=80 m/min  | V=65 m/min                              | V=40 m/min                           |
| Type No.             | 進給率Feed (mm³/min)                       | 進給率Feed (mm³/min)                                 | 進給率Feed (mm³/min)                       | 進給率Feed (mm³/min)                    |
| BTB 0202             | 16000 250                               | 12500 250   | 10000 150                               | 6400 120                             |
| BTB 0302             | 10000 500                               | 8500 300  | 7000 250                                | 4250 200                             |
| BTB 0402             | 8000 400                                | 6400 300  | 5000 200                                | 3200 200                             |
| BTB 0602             | 5300 550                                | 4200 400  | 3500 350                                | 2100 200                             |
| BTB 0802             | 4000 600                                | 3200 450  | 2000 400                                | 1600 250                             |
| BTB 1002             | 3200 600                                | 2500 450  | 2250 400                                | 1200 250                             |
| BTB 1202             | 2700 600                                | 2100 450  | 1900 400                                | 1000 250                             |

| D Diameter | (a)<br>HRC45 below 0.1-0.3D<br>a <sub>p</sub> =0.5D | a <sub>p</sub> ± 0.3D below<br>a <sub>p</sub> ± 0.3D below | a <sub>p</sub> ± 0.2D<br>a <sub>p</sub> ± 0.5-0.3D |
|------------|---|--|--|
| R0.5       | ± 0.01  |  |  |
| R0.75      | ± 0.01  |  |  |
| R1.0       | ± 0.01  |  |  |
| R1.5       | ± 0.01  |  |  |
| R2.0       | ± 0.01  |  |  |
| R2.5       | ± 0.01  |  |  |
| R3         | ± 0.01  |  |  |
| R4         | ± 0.01  |  |  |
| R5         | ± 0.015   |  |  |
| R6         | ± 0.015   |  |  |
| R8         | ± 0.02  |  |  |
| R10        | ± 0.02  |  |  |

| 被銑材<br>Work Material | Carbon Steels<br>S45C S50C<br>HB150-250 | Alloy Steels<br>SCM21 P208 P201 SKD11<br>HRC20-35 | Prehardened Steels<br>NAK80<br>HRC35-45 | Hardened Steels<br>SKD61<br>HRC50-55 |
|----------------------|---|---|---|--------------------------------------|
| Velocity             | V=100 m/min                             | V=80 m/min  | V=65 m/min                              | V=40 m/min                           |
| Type No.             | 進給率Feed (mm³/min)                       | 進給率Feed (mm³/min)                                 | 進給率Feed (mm³/min)                       | 進給率Feed (mm³/min)                    |
| BTB 0202             | 20000 3000                              | 16000 3000  | 16000 3000                              | 10000 1200                           |
| BTB 0302             | 20000 3000                              | 16000 3000  | 16000 3000                              | 10000 1200                           |
| BTB 0402             | 20000 3000                              | 16000 3000  | 16000 3000                              | 10000 1200                           |
| BTB 0602             | 20000 4000                              | 16000 4000  | 12000 4000                              | 10000 3200                           |
| BTB 0802             | 15000 3600                              | 12000 3600  | 10000 3600                              | 9500 3000                            |
| BTB 1002             | 10000 4000                              | 10000 4000  | 10000 4000                              | 7500 3000                            |
| BTB 1202             | 8000 3200                               | 8000 3200   | 8000 3200                               | 6200 2500                            |

| D Diameter | a <sub>p</sub> =0.2-0.3D below<br>a <sub>p</sub> =0.4D | a <sub>p</sub> =0.3D below<br>a <sub>p</sub> =0.3D | a <sub>p</sub> =0.05D below<br>a <sub>p</sub> =0.152D |
|------------|--|--|---|
| ⌀ 6        | 0.008  |  |   |
| ⌀ 10       | 0.008  |  |   |
| ⌀ 12       | 0.009  |  |   |
| ⌀ 18       | 0.011  |  |   |
| ⌀ 20       | 0.011  |  |   |
| ⌀ 16       | 0.011  |  |   |
| ⌀ 20       | 0.013  |  |   |

unit:mm

⊙ 精銑 Finishing
⊙ 中銑 Semi-finishing
⊙ 粗銑 Roughing



| 型號<br>Type No. | D1<br>Diameter<br>直徑 | L1<br>Flute Length<br>刃長 | L3<br>O.A.L<br>全長 | D2<br>Shank Dia<br>柄徑 |
|----------------|----------------------|--------------------------|-------------------|-----------------------|
| BTH 0102       | R0.5                 | 2                        | 50                | 4                     |
| BTH 0152       | R0.75                | 3                        | 50                | 4                     |
| BTH 0202       | R1                   | 4                        | 50                | 4                     |
| BTH 0252       | R1.25                | 5                        | 50                | 4                     |
| BTH 0302       | R1.5                 | 6                        | 50                | 4                     |
| BTH 0402       | R2                   | 8                        | 50                | 4                     |
| BTH 0502       | R2.5                 | 10                       | 50                | 4                     |
| BTH 0602       | R3                   | 12                       | 50                | 4                     |
| BTH 0802       | R4                   | 16                       | 60                | 6                     |
| BTH 1002       | R5                   | 20                       | 75                | 10                    |
| BTH 1202       | R6                   | 24                       | 75                | 12                    |
| BTH 1602       | R8                   | 32                       | 100               | 16                    |
| BTH 2002       | R10                  | 40                       | 100               | 20                    |

unit:mm

### List of recommended milling conditions for BTH-2T

| 被銑材<br>Work Material | Carbon Steels<br>S45C S50C<br>HB150-250 | Alloy Steels<br>SCM21 P208 P201 SKD11<br>HRC20-35 | Prehardened Steels<br>NAK80<br>HRC35-45 | Hardened Steels<br>SKD61<br>HRC50-55 |
|----------------------|---|---|---|--------------------------------------|
| Velocity             | V=100 m/min                             | V=80 m/min  | V=65 m/min                              | V=40 m/min                           |
| Type No.             | 進給率Feed (mm³/min)                       | 進給率Feed (mm³/min)                                 | 進給率Feed (mm³/min)                       | 進給率Feed (mm³/min)                    |
| BTH 0202             | 16000 250                               | 12500 250   | 10000 150                               | 6400 120                             |
| BTH 0302             | 10000 500                               | 8500 300  | 7000 250                                | 4250 200                             |
| BTH 0402             | 8000 400                                | 6400 300  | 5000 200                                | 3200 200                             |
| BTH 0602             | 5300 550                                | 4200 400  | 3500 350                                | 2100 200                             |
| BTH 0802             | 4000 600                                | 3200 450  | 2000 400                                | 1600 250                             |
| BTH 1002             | 3200 600                                | 2500 450  | 2250 400                                | 1200 250                             |
| BTH 1202             | 2700 600                                | 2100 450  | 1900 400                                | 1000 250                             |

| D Diameter | (a)<br>HRC45 below 0.1-0.3D<br>a <sub>p</sub> =0.5D | a <sub>p</sub> =0.3D below<br>a <sub>p</sub> =0.3D below | a <sub>p</sub> =0.05-0.3D<br>a <sub>p</sub> =0.2D |
|------------|---|--|---|
| R0.5       | ± 0.01  |  |   |
| R0.75      | ± 0.01  |  |   |
| R1.0       | ± 0.01  |  |   |
| R1.5       | ± 0.01  |  |   |
| R2.0       | ± 0.01  |  |   |
| R2.5       | ± 0.01  |  |   |
| R3         | ± 0.01  |  |   |
| R4         | ± 0.01  |  |   |
| R5         | ± 0.015   |  |   |
| R6         | ± 0.015   |  |   |
| R8         | ± 0.02  |  |   |
| R10        | ± 0.02  |  |   |

| 被銑材<br>Work Material | Carbon Steels<br>S45C S50C<br>HB150-250 | Alloy Steels<br>SCM21 P208 P201 SKD11<br>HRC20-35 | Prehardened Steels<br>NAK80<br>HRC35-45 | Hardened Steels<br>SKD61<br>HRC50-55 |
|----------------------|---|---|---|--------------------------------------|
| Velocity             | V=100 m/min                             | V=80 m/min  | V=65 m/min                              | V=40 m/min                           |
| Type No.             | 進給率Feed (mm³/min)                       | 進給率Feed (mm³/min)                                 | 進給率Feed (mm³/min)                       | 進給率Feed (mm³/min)                    |
| BTH 0202             | 20000 3000                              | 16000 3000  | 16000 3000                              | 10000 1200                           |
| BTH 0302             | 20000 3000                              | 16000 3000  | 16000 3000                              | 10000 1200                           |
| BTH 0402             | 20000 3000                              | 16000 3000  | 16000 3000                              | 10000 1200                           |
| BTH 0602             | 20000 4000                              | 16000 4000  | 12000 4000                              | 10000 3200                           |
| BTH 0802             | 15000 3600                              | 12000 3600  | 10000 3600                              | 9500 3000                            |
| BTH 1002             | 10000 4000                              | 10000 4000  | 10000 4000                              | 7500 3000                            |
| BTH 1202             | 8000 3200                               | 8000 3200   | 8000 3200                               | 6200 2500                            |

| D Diameter | a <sub>p</sub> =0.2-0.3D below<br>a <sub>p</sub> =0.4D | a <sub>p</sub> =0.3D below<br>a <sub>p</sub> =0.3D | a <sub>p</sub> =0.05D below<br>a <sub>p</sub> =0.152D |
|------------|--|--|---|
| ⌀ 6        | 0.008  |  |   |
| ⌀ 10       | 0.008  |  |   |
| ⌀ 8        | 0.008  |  |   |
| ⌀ 10       | 0.009  |  |   |
| ⌀ 12       | 0.011  |  |   |
| ⌀ 16       | 0.011  |  |   |
| ⌀ 20       | 0.013  |  |   |

unit:mm



# BTA

## 超微粒圓頭立銑刀 Ball Nose End Mills

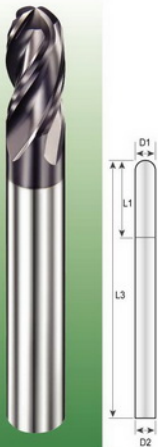


精銑 Finishing  中銑 Semi-finishing  粗銑 Roughing



| 型號<br>Type No. | D1<br>Diameter<br>直徑 | L1<br>Flute Length<br>刃長 | L3<br>O.A.L.<br>全長 | D2<br>Shank Dia<br>柄徑 |
|----------------|----------------------|--------------------------|--------------------|-----------------------|
| BTA 0104       | R0.5                 | 2                        | 50                 | 4                     |
| BTA 0154       | R0.75                | 3                        | 50                 | 4                     |
| BTA 0204       | R1                   | 4                        | 50                 | 4                     |
| BTA 0304       | R1.5                 | 6                        | 50                 | 4                     |
| BTA 0404       | R2                   | 8                        | 50                 | 4                     |
| BTA 0504       | R2.5                 | 10                       | 50                 | 6                     |
| BTA 0604       | R3                   | 12                       | 50                 | 6                     |
| BTA 0804       | R4                   | 16                       | 60                 | 8                     |
| BTA 1004       | R5                   | 20                       | 75                 | 10                    |
| BTA 1204       | R6                   | 24                       | 75                 | 12                    |
| BTA 1604       | R8                   | 32                       | 100                | 16                    |

unit:mm



| 直徑<br>D1 | 球頭公差值<br>R tolerance |
|----------|----------------------|
| R0.5     | ± 0.01               |
| R0.75    | ± 0.01               |
| R1.0     | ± 0.01               |
| R1.5     | ± 0.01               |
| R2.0     | ± 0.01               |
| R2.5     | ± 0.01               |
| R3       | ± 0.01               |
| R4       | ± 0.01               |
| R5       | ± 0.015              |
| R6       | ± 0.015              |
| R8       | ± 0.02               |

| 柄徑<br>shank (h6) | 柄徑公差值<br>D2 tolerance |
|------------------|-----------------------|
| ∅ 4              | 0<br>-0.008           |
| ∅ 6              | 0<br>-0.008           |
| ∅ 8              | 0<br>-0.009           |
| ∅ 10             | 0<br>-0.011           |
| ∅ 12             | 0<br>-0.011           |
| ∅ 16             | 0<br>-0.011           |

unit:mm

# BTD

## 超微粒圓頭立銑刀 Ball Nose End Mills

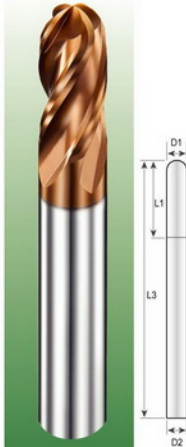


精銑 Finishing  中銑 Semi-finishing  粗銑 Roughing



| 型號<br>Type No. | D1<br>Diameter<br>直徑 | L1<br>Flute Length<br>刃長 | L3<br>O.A.L.<br>全長 | D2<br>Shank Dia<br>柄徑 |
|----------------|----------------------|--------------------------|--------------------|-----------------------|
| BTD 0104       | R0.5                 | 2                        | 50                 | 4                     |
| BTD 0154       | R0.75                | 3                        | 50                 | 4                     |
| BTD 0204       | R1                   | 4                        | 50                 | 4                     |
| BTD 0304       | R1.5                 | 6                        | 50                 | 4                     |
| BTD 0404       | R2                   | 8                        | 50                 | 4                     |
| BTD 0504       | R2.5                 | 10                       | 57                 | 6                     |
| BTD 0604       | R3                   | 12                       | 57                 | 6                     |
| BTD 0804       | R4                   | 16                       | 63                 | 8                     |
| BTD 1004       | R5                   | 20                       | 72                 | 10                    |
| BTD 1204       | R6                   | 24                       | 83                 | 12                    |
| BTD 1604       | R8                   | 32                       | 100                | 16                    |

unit:mm



| 直徑<br>D1 | 球頭公差值<br>R tolerance |
|----------|----------------------|
| R0.5     | ± 0.01               |
| R0.75    | ± 0.01               |
| R1.0     | ± 0.01               |
| R1.5     | ± 0.01               |
| R2.0     | ± 0.01               |
| R2.5     | ± 0.01               |
| R3       | ± 0.01               |
| R4       | ± 0.01               |
| R5       | ± 0.015              |
| R6       | ± 0.015              |
| R8       | ± 0.02               |

| 柄徑<br>shank (h6) | 柄徑公差值<br>D2 tolerance |
|------------------|-----------------------|
| ∅ 4              | 0<br>-0.008           |
| ∅ 6              | 0<br>-0.008           |
| ∅ 8              | 0<br>-0.009           |
| ∅ 10             | 0<br>-0.011           |
| ∅ 12             | 0<br>-0.011           |
| ∅ 16             | 0<br>-0.011           |

unit:mm

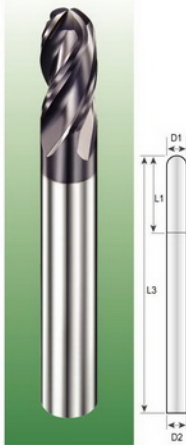


⊗ 精銑 Finishing
⊙ 中銑 Semi-finishing
⊙ 粗銑 Roughing



| 型號<br>Type No. | D1<br>Diameter<br>直徑 | L1<br>Flute Length<br>刃長 | L3<br>O.A.L<br>全長 | D2<br>Shank Dia<br>柄徑 |
|----------------|----------------------|--------------------------|-------------------|-----------------------|
| BTB 0204       | R1                   | 4                        | 50                | 6                     |
| BTB 0304       | R1.5                 | 6                        | 50                | 6                     |
| BTB 0404       | R2                   | 8                        | 50                | 6                     |
| BTB 0504       | R2.5                 | 10                       | 50                | 6                     |
| BTB 0604       | R3                   | 12                       | 50                | 6                     |
| BTB 0804       | R4                   | 16                       | 60                | 8                     |
| BTB 1004       | R5                   | 20                       | 75                | 10                    |
| BTB 1204       | R6                   | 24                       | 75                | 12                    |
| BTB 1604       | R8                   | 32                       | 100               | 16                    |

unit mm



| 直徑<br>D1 | 球頭公差值<br>R tolerance |
|----------|----------------------|
| R1.0     | ± 0.01               |
| R1.5     | ± 0.01               |
| R2.0     | ± 0.01               |
| R2.5     | ± 0.01               |
| R3       | ± 0.01               |
| R4       | ± 0.01               |
| R5       | ± 0.015              |
| R6       | ± 0.015              |
| R8       | ± 0.02               |

List of recommended milling conditions for BTB-4T (Roughing)

| 型號<br>Type No. | 鋼材<br>Work Material |            | 鋼材<br>Work Material |            | 鋼材<br>Work Material |            | 鋼材<br>Work Material |            | 鋼材<br>Work Material |            | 鋼材<br>Work Material |            |
|----------------|---------------------|------------|---------------------|------------|---------------------|------------|---------------------|------------|---------------------|------------|---------------------|------------|
|                | 鋼材<br>FC            | 鋼材<br>S45C | 鋼材<br>FC            | 鋼材<br>S45C | 鋼材<br>FC            | 鋼材<br>S45C | 鋼材<br>FC            | 鋼材<br>S45C | 鋼材<br>FC            | 鋼材<br>S45C | 鋼材<br>FC            | 鋼材<br>S45C |
| BTB 0604       | 11100               | 4060       | 8380                | 3060       | 7960                | 2600       | 6370                | 1830       | 5310                | 1430       | 3240                | 1060       |
| BTB 0804       | 8390                | 3960       | 6290                | 2960       | 5970                | 2520       | 4770                | 1770       | 3980                | 1380       | 3180                | 1020       |
| BTB 1004       | 6690                | 3850       | 5030                | 2900       | 4770                | 2440       | 3820                | 1710       | 3180                | 1320       | 2550                | 975        |
| BTB 1204       | 5570                | 3570       | 4190                | 2560       | 3980                | 2140       | 3180                | 1590       | 2650                | 1220       | 2120                | 815        |
| BTB 1604       | 4180                | 2670       | 3140                | 2010       | 2980                | 1720       | 2390                | 1220       | 1990                | 955        | 1590                | 610        |

• The machining path is on condition of contouring line operation.

List of recommended milling conditions for BTB-4T (Finishing)

| 型號<br>Type No. | 鋼材<br>Work Material |            | 鋼材<br>Work Material |            | 鋼材<br>Work Material |            | 鋼材<br>Work Material |            | 鋼材<br>Work Material |            | 鋼材<br>Work Material |            |
|----------------|---------------------|------------|---------------------|------------|---------------------|------------|---------------------|------------|---------------------|------------|---------------------|------------|
|                | 鋼材<br>FC            | 鋼材<br>S45C | 鋼材<br>FC            | 鋼材<br>S45C | 鋼材<br>FC            | 鋼材<br>S45C | 鋼材<br>FC            | 鋼材<br>S45C | 鋼材<br>FC            | 鋼材<br>S45C | 鋼材<br>FC            | 鋼材<br>S45C |
| BTB 0604       | 11900               | 5270       | 9280                | 3920       | 8750                | 3530       | 7160                | 2610       | 6630                | 2160       | 5840                | 1790       |
| BTB 0804       | 8950                | 4580       | 6960                | 3570       | 6570                | 3030       | 5670                | 2200       | 4970                | 1910       | 4380                | 1570       |
| BTB 1004       | 7160                | 4130       | 5570                | 3210       | 5250                | 2690       | 4300                | 1930       | 3980                | 1660       | 3500                | 1340       |
| BTB 1204       | 5970                | 3820       | 4640                | 2970       | 4380                | 2520       | 3580                | 1790       | 3320                | 1530       | 2920                | 1120       |
| BTB 1604       | 4480                | 2860       | 3480                | 2230       | 3280                | 1890       | 2690                | 1380       | 2490                | 1190       | 2190                | 840        |

• The machining path is on condition of contouring line operation.

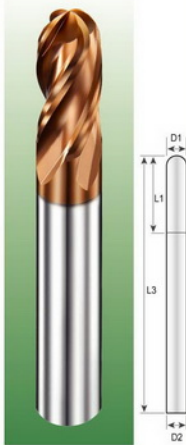


⊗ 精銑 Finishing
⊙ 中銑 Semi-finishing
⊙ 粗銑 Roughing



| 型號<br>Type No. | D1<br>Diameter<br>直徑 | L1<br>Flute Length<br>刃長 | L3<br>O.A.L<br>全長 | D2<br>Shank Dia<br>柄徑 |
|----------------|----------------------|--------------------------|-------------------|-----------------------|
| BTH 0204       | R1                   | 4                        | 50                | 6                     |
| BTH 0304       | R1.5                 | 6                        | 50                | 6                     |
| BTH 0404       | R2                   | 8                        | 50                | 6                     |
| BTH 0504       | R2.5                 | 10                       | 50                | 6                     |
| BTH 0604       | R3                   | 12                       | 50                | 6                     |
| BTH 0804       | R4                   | 16                       | 60                | 8                     |
| BTH 1004       | R5                   | 20                       | 75                | 10                    |
| BTH 1204       | R6                   | 24                       | 75                | 12                    |
| BTH 1604       | R8                   | 32                       | 100               | 16                    |

unit mm



| 直徑<br>D1 | 球頭公差值<br>R tolerance |
|----------|----------------------|
| R1.0     | ± 0.01               |
| R1.5     | ± 0.01               |
| R2.0     | ± 0.01               |
| R2.5     | ± 0.01               |
| R3       | ± 0.01               |
| R4       | ± 0.01               |
| R5       | ± 0.015              |
| R6       | ± 0.015              |
| R8       | ± 0.02               |

List of recommended milling conditions for BTH-4T (Roughing)

| 型號<br>Type No. | 鋼材<br>Work Material |            | 鋼材<br>Work Material |            | 鋼材<br>Work Material |            | 鋼材<br>Work Material |            | 鋼材<br>Work Material |            | 鋼材<br>Work Material |            |
|----------------|---------------------|------------|---------------------|------------|---------------------|------------|---------------------|------------|---------------------|------------|---------------------|------------|
|                | 鋼材<br>FC            | 鋼材<br>S45C | 鋼材<br>FC            | 鋼材<br>S45C | 鋼材<br>FC            | 鋼材<br>S45C | 鋼材<br>FC            | 鋼材<br>S45C | 鋼材<br>FC            | 鋼材<br>S45C | 鋼材<br>FC            | 鋼材<br>S45C |
| BTH 0604       | 11100               | 4060       | 8380                | 3060       | 7960                | 2600       | 6370                | 1830       | 5310                | 1430       | 4240                | 1060       |
| BTH 0804       | 8390                | 3960       | 6290                | 2960       | 5970                | 2520       | 4770                | 1770       | 3980                | 1380       | 3180                | 1020       |
| BTH 1004       | 6690                | 3850       | 5030                | 2900       | 4770                | 2440       | 3820                | 1710       | 3180                | 1320       | 2550                | 975        |
| BTH 1204       | 5570                | 3570       | 4190                | 2560       | 3980                | 2140       | 3180                | 1590       | 2650                | 1220       | 2120                | 815        |
| BTH 1604       | 4180                | 2670       | 3140                | 2010       | 2980                | 1720       | 2390                | 1220       | 1990                | 955        | 1590                | 610        |

• The machining path is on condition of contouring line operation.

List of recommended milling conditions for BTH-4T (Finishing)

| 型號<br>Type No. | 鋼材<br>Work Material |            | 鋼材<br>Work Material |            | 鋼材<br>Work Material |            | 鋼材<br>Work Material |            | 鋼材<br>Work Material |            | 鋼材<br>Work Material |            |
|----------------|---------------------|------------|---------------------|------------|---------------------|------------|---------------------|------------|---------------------|------------|---------------------|------------|
|                | 鋼材<br>FC            | 鋼材<br>S45C | 鋼材<br>FC            | 鋼材<br>S45C | 鋼材<br>FC            | 鋼材<br>S45C | 鋼材<br>FC            | 鋼材<br>S45C | 鋼材<br>FC            | 鋼材<br>S45C | 鋼材<br>FC            | 鋼材<br>S45C |
| BTH 0604       | 11900               | 5270       | 9280                | 3920       | 8750                | 3530       | 7160                | 2610       | 6630                | 2160       | 5840                | 1790       |
| BTH 0804       | 8950                | 4580       | 6960                | 3570       | 6570                | 3030       | 5670                | 2200       | 4970                | 1910       | 4380                | 1570       |
| BTH 1004       | 7160                | 4130       | 5570                | 3210       | 5250                | 2690       | 4300                | 1930       | 3980                | 1660       | 3500                | 1340       |
| BTH 1204       | 5970                | 3820       | 4640                | 2970       | 4380                | 2520       | 3580                | 1790       | 3320                | 1530       | 2920                | 1120       |
| BTH 1604       | 4480                | 2860       | 3480                | 2230       | 3280                | 1890       | 2690                | 1380       | 2490                | 1190       | 2190                | 840        |

• The machining path is on condition of contouring line operation.

# HBA, IBA, JBA

## 超微粒長柄圓頭立銑刀 (Long Shank) Ball Nose End Mills



精銑 Finishing  
  中銑 Semi-finishing  
  粗銑 Roughing



| 型號<br>Type No. | D1<br>Diameter<br>直徑 | L1<br>Flute Length<br>刃長 | O.A.L<br>全長 | D2<br>Shank Dia<br>柄徑 |
|----------------|----------------------|--------------------------|-------------|-----------------------|
| HBA 0202       | R1                   | 4                        | 75          | 6                     |
| HBA 0252       | R1.25                | 5                        | 75          | 6                     |
| HBA 0302       | R1.5                 | 6                        | 75          | 6                     |
| HBA 0402       | R2                   | 8                        | 75          | 6                     |
| HBA 0502       | R2.5                 | 10                       | 75          | 6                     |
| HBA 0602       | R3                   | 12                       | 75          | 6                     |
| HBA 0802       | R4                   | 16                       | 75          | 8                     |
| IBA 0202       | R1                   | 4                        | 100         | 6                     |
| IBA 0302       | R1.5                 | 6                        | 100         | 6                     |
| IBA 0402       | R2                   | 8                        | 100         | 6                     |
| IBA 0602       | R3                   | 12                       | 100         | 6                     |
| IBA 0802       | R4                   | 16                       | 100         | 8                     |
| IBA 1002       | R5                   | 20                       | 100         | 10                    |
| IBA 1202       | R6                   | 24                       | 100         | 12                    |
| JBA 0602       | R3                   | 12                       | 150         | 6                     |
| JBA 0802       | R4                   | 16                       | 150         | 8                     |
| JBA 1002       | R5                   | 20                       | 150         | 10                    |
| JBA 1202       | R6                   | 24                       | 150         | 12                    |
| JBA 1602       | R8                   | 32                       | 150         | 16                    |

List of recommended milling conditions for HBA, IBA

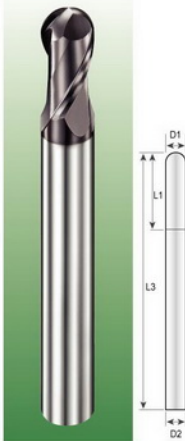
| Work Material<br>加工材料                            | Velocity<br>切削速度 |            |            |            |
|--|------------------|------------|------------|------------|
|  | V=100 m/min      | V=80 m/min | V=65 m/min | V=40 m/min |
| Carbon Steels<br>S45C-S50C<br>HB150-250          | 16000            | 12500      | 9600       | 6400       |
| Alloy Steels<br>SCM P38/P39/P33/SK31<br>HRC20-35 | 13000            | 10000      | 7600       | 5100       |
| Prehardened Steels<br>NAK80<br>HRC35-45          | 11000            | 8500       | 6400       | 4250       |
| Hardened Steels<br>SKD11<br>HRC55-65             | 8000             | 6400       | 4800       | 3180       |

| Work Material<br>加工材料                            | Velocity<br>切削速度 |            |            |            |
|--|------------------|------------|------------|------------|
|  | V=100 m/min      | V=80 m/min | V=65 m/min | V=40 m/min |
| Carbon Steels<br>S45C-S50C<br>HB150-250          | 16000            | 12500      | 9600       | 6400       |
| Alloy Steels<br>SCM P38/P39/P33/SK31<br>HRC20-35 | 11000            | 8500       | 6400       | 4250       |
| Prehardened Steels<br>NAK80<br>HRC35-45          | 8000             | 6400       | 4800       | 3200       |
| Hardened Steels<br>SKD11<br>HRC55-65             | 5000             | 4200       | 3200       | 2100       |

| D Diameter            | Diameter Tolerance |            |
|-----------------------|--------------------|------------|
|                       | (a)                | (b)        |
| HRC45 below 0.1-0.3D  | $\pm 0.015$        | $\pm 0.01$ |
| HRC50 below 0.05-0.2D | $\pm 0.015$        | $\pm 0.01$ |

unit:mm

8007 P9



| D1   | R tolerance |
|------|-------------|
| R1   | $\pm 0.01$  |
| R1.5 | $\pm 0.01$  |
| R2   | $\pm 0.01$  |
| R2.5 | $\pm 0.01$  |
| R3   | $\pm 0.01$  |
| R4   | $\pm 0.015$ |
| R5   | $\pm 0.015$ |
| R6   | $\pm 0.015$ |
| RB   | $\pm 0.02$  |

| Shank (h6) | D2 tolerance |
|------------|--------------|
| Ø 6        | $\pm 0.008$  |
| Ø 8        | $\pm 0.008$  |
| Ø 10       | $\pm 0.009$  |
| Ø 12       | $\pm 0.011$  |
| Ø 16       | $\pm 0.011$  |

# HBH, IBH, JBH

## 超微粒長柄圓頭立銑刀 (Long Shank) Ball Nose End Mills



精銑 Finishing  
  中銑 Semi-finishing  
  粗銑 Roughing



| 型號<br>Type No. | D1<br>Diameter<br>直徑 | L1<br>Flute Length<br>刃長 | O.A.L<br>全長 | D2<br>Shank Dia<br>柄徑 |
|----------------|----------------------|--------------------------|-------------|-----------------------|
| HBH 0202       | R1                   | 4                        | 75          | 6                     |
| HBH 0252       | R1.25                | 5                        | 75          | 6                     |
| HBH 0302       | R1.5                 | 6                        | 75          | 6                     |
| HBH 0402       | R2                   | 8                        | 75          | 6                     |
| HBH 0502       | R2.5                 | 10                       | 75          | 6                     |
| HBH 0602       | R3                   | 12                       | 75          | 6                     |
| HBH 0802       | R4                   | 16                       | 75          | 8                     |
| IBH 0202       | R1                   | 4                        | 100         | 6                     |
| IBH 0302       | R1.5                 | 6                        | 100         | 6                     |
| IBH 0402       | R2                   | 8                        | 100         | 6                     |
| IBH 0602       | R3                   | 12                       | 100         | 6                     |
| IBH 0802       | R4                   | 16                       | 100         | 8                     |
| IBH 1002       | R5                   | 20                       | 100         | 10                    |
| IBH 1202       | R6                   | 24                       | 100         | 12                    |
| JBH 0602       | R3                   | 12                       | 150         | 6                     |
| JBH 0802       | R4                   | 16                       | 150         | 8                     |
| JBH 1002       | R5                   | 20                       | 150         | 10                    |
| JBH 1202       | R6                   | 24                       | 150         | 12                    |
| JBH 1602       | R8                   | 32                       | 150         | 16                    |

List of recommended milling conditions for HBH, IBH

| Work Material<br>加工材料                            | Velocity<br>切削速度 |            |            |            |
|--|------------------|------------|------------|------------|
|  | V=100 m/min      | V=80 m/min | V=65 m/min | V=40 m/min |
| Carbon Steels<br>S45C-S50C<br>HB150-250          | 16000            | 12500      | 9600       | 6400       |
| Alloy Steels<br>SCM P38/P39/P33/SK31<br>HRC20-35 | 13000            | 10000      | 7600       | 5100       |
| Prehardened Steels<br>NAK80<br>HRC35-45          | 11000            | 8500       | 6400       | 4250       |
| Hardened Steels<br>SKD11<br>HRC55-65             | 8000             | 6400       | 4800       | 3180       |

| Work Material<br>加工材料                            | Velocity<br>切削速度 |            |            |            |
|--|------------------|------------|------------|------------|
|  | V=100 m/min      | V=80 m/min | V=65 m/min | V=40 m/min |
| Carbon Steels<br>S45C-S50C<br>HB150-250          | 16000            | 12500      | 9600       | 6400       |
| Alloy Steels<br>SCM P38/P39/P33/SK31<br>HRC20-35 | 11000            | 8500       | 6400       | 4250       |
| Prehardened Steels<br>NAK80<br>HRC35-45          | 8000             | 6400       | 4800       | 3200       |
| Hardened Steels<br>SKD11<br>HRC55-65             | 5000             | 4200       | 3200       | 2100       |

| D Diameter            | Diameter Tolerance |            |
|-----------------------|--------------------|------------|
|                       | (a)                | (b)        |
| HRC45 below 0.1-0.3D  | $\pm 0.015$        | $\pm 0.01$ |
| HRC50 below 0.05-0.2D | $\pm 0.015$        | $\pm 0.01$ |



| D1   | R tolerance |
|------|-------------|
| R1   | $\pm 0.01$  |
| R1.5 | $\pm 0.01$  |
| R2   | $\pm 0.01$  |
| R2.5 | $\pm 0.01$  |
| R3   | $\pm 0.01$  |
| R4   | $\pm 0.015$ |
| R5   | $\pm 0.015$ |
| RB   | $\pm 0.015$ |
| RB   | $\pm 0.02$  |

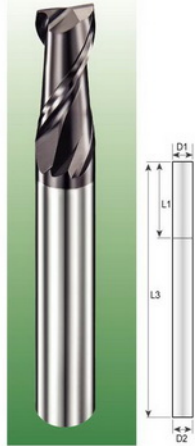
| Shank (h6) | D2 tolerance |
|------------|--------------|
| Ø 6        | $\pm 0.008$  |
| Ø 8        | $\pm 0.008$  |
| Ø 10       | $\pm 0.009$  |
| Ø 12       | $\pm 0.011$  |
| Ø 16       | $\pm 0.011$  |

unit:mm

8007 P10



精銑 Finishing  
  中銑 Semi-finishing  
  粗銑 Roughing



| 型號<br>Type No. | D1<br>Diameter<br>直徑 | L1<br>Flute Length<br>刃長 | L3<br>O.A.L<br>全長 | D2<br>Shank Dia<br>柄徑 |
|----------------|----------------------|--------------------------|-------------------|-----------------------|
| ETA 0102       | 1.0                  | 3                        | 50                | 4                     |
| ETA 0152       | 1.5                  | 4                        | 50                | 4                     |
| ETA 0202       | 2.0                  | 6                        | 50                | 4                     |
| ETA 0252       | 2.5                  | 8                        | 50                | 4                     |
| ETA 0302S      | 3.0                  | 8                        | 50                | 3                     |
| ETA 0302       | 3.0                  | 8                        | 50                | 4                     |
| ETA 0402       | 4.0                  | 11                       | 50                | 4                     |
| ETA 0502S      | 5.0                  | 13                       | 50                | 5                     |
| ETA 0502       | 5.0                  | 13                       | 50                | 6                     |
| ETA 0602       | 6.0                  | 16                       | 50                | 6                     |
| ETA 0802       | 8.0                  | 20                       | 60                | 6                     |
| ETA 1002       | 10.0                 | 25                       | 75                | 10                    |
| ETA 1202       | 12.0                 | 30                       | 75                | 12                    |
| ETA 1602       | 16.0                 | 40                       | 100               | 16                    |
| ETA 2002       | 20.0                 | 45                       | 100               | 20                    |

unit:mm

| 直徑<br>D1 | 直徑公差值<br>R tolerance |
|----------|----------------------|
| 1.0      | ±0.02                |
| 1.5      | ±0.02                |
| 2.0      | ±0.02                |
| 2.5      | ±0.02                |
| 3.0      | ±0.02                |
| 4.0      | ±0.02                |
| 5.0      | ±0.02                |
| 6.0      | ±0.025               |
| 8.0      | ±0.03                |
| 10.0     | ±0.04                |
| 12.0     | ±0.04                |
| 16.0     | ±0.04                |
| 20.0     | ±0.04                |

| 柄徑<br>shank (h6) | 柄徑公差值<br>D2 tolerance |
|------------------|-----------------------|
| ∅ 4              | ±0.008                |
| ∅ 6              | ±0.008                |
| ∅ 8              | ±0.008                |
| ∅ 10             | ±0.008                |
| ∅ 12             | ±0.011                |
| ∅ 16             | ±0.011                |
| ∅ 20             | ±0.013                |

unit:mm

### List of recommended milling conditions for ETA-2T

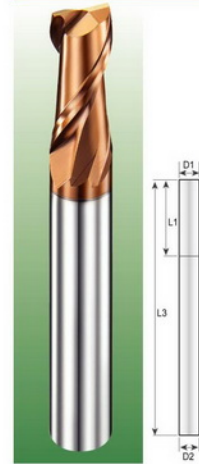
| Work Material | Aluminum alloy<br>(Al7075-T6) |                     | Titanium alloy<br>(Ti6Al4V) |                     | Inconel alloy<br>(In625) |                     | Stainless steel<br>(SUS304) |                     | Hardened steel<br>(S50C) |                     | Prehardened steel<br>(SKD11) |                     |
|---------------|-------------------------------|---------------------|-----------------------------|---------------------|--------------------------|---------------------|-----------------------------|---------------------|--------------------------|---------------------|------------------------------|---------------------|
|               | Feed (mm/rev)                 | Spindle Speed (rpm) | Feed (mm/rev)               | Spindle Speed (rpm) | Feed (mm/rev)            | Spindle Speed (rpm) | Feed (mm/rev)               | Spindle Speed (rpm) | Feed (mm/rev)            | Spindle Speed (rpm) | Feed (mm/rev)                | Spindle Speed (rpm) |
| ETA 0102      | 19500                         | 130                 | 14500                       | 125                 | 12500                    | 90                  | 11000                       | 65                  | 7000                     | 30                  | 5050                         | 25                  |
| ETA 0152      | 14000                         | 130                 | 10500                       | 125                 | 8900                     | 90                  | 7950                        | 65                  | 5500                     | 40                  | 3550                         | 25                  |
| ETA 0202      | 11000                         | 135                 | 8400                        | 125                 | 7000                     | 90                  | 6350                        | 70                  | 3950                     | 40                  | 2750                         | 25                  |
| ETA 0252      | 8900                          | 170                 | 7250                        | 135                 | 6000                     | 95                  | 5200                        | 70                  | 3250                     | 40                  | 2300                         | 25                  |
| ETA 0302      | 7450                          | 200                 | 7200                        | 230                 | 5850                     | 125                 | 5300                        | 100                 | 3200                     | 45                  | 2100                         | 25                  |
| ETA 0352      | 6650                          | 225                 | 6200                        | 230                 | 5000                     | 125                 | 4550                        | 100                 | 2750                     | 45                  | 1800                         | 25                  |
| ETA 0402      | 6000                          | 235                 | 5400                        | 230                 | 4400                     | 125                 | 4000                        | 100                 | 2400                     | 45                  | 1600                         | 25                  |
| ETA 0452      | 5650                          | 270                 | 4800                        | 230                 | 3900                     | 125                 | 3550                        | 100                 | 2100                     | 45                  | 1400                         | 25                  |
| ETA 0502      | 5300                          | 315                 | 4350                        | 235                 | 3500                     | 130                 | 3200                        | 100                 | 1900                     | 55                  | 1300                         | 30                  |
| ETA 0552      | 4800                          | 310                 | 3950                        | 235                 | 3250                     | 130                 | 2750                        | 100                 | 1750                     | 55                  | 1150                         | 30                  |
| ETA 0602      | 4400                          | 310                 | 3600                        | 235                 | 2800                     | 130                 | 2650                        | 100                 | 1600                     | 55                  | 1050                         | 25                  |
| ETA 0802      | 3300                          | 295                 | 2700                        | 235                 | 2200                     | 125                 | 2000                        | 100                 | 1200                     | 50                  | 795                          | 25                  |
| ETA 1002      | 2650                          | 280                 | 2150                        | 230                 | 1750                     | 125                 | 1600                        | 95                  | 955                      | 50                  | 635                          | 25                  |
| ETA 1202      | 2200                          | 280                 | 1800                        | 230                 | 1450                     | 125                 | 1350                        | 95                  | 795                      | 45                  | 530                          | 20                  |

| Depth of cut | ap   |      | aφ   |      | aφ   |      | aφ   |      |
|--------------|------|------|------|------|------|------|------|------|
|              | mm   | mm   | mm   | mm   | mm   | mm   | mm   | mm   |
| ∅ 4          | 0.20 | 0.10 | 0.15 | 0.08 | 0.15 | 0.08 | 0.15 | 0.08 |
| ∅ 6          | 0.25 | 0.12 | 0.18 | 0.10 | 0.18 | 0.10 | 0.18 | 0.10 |
| ∅ 8          | 0.30 | 0.15 | 0.22 | 0.12 | 0.22 | 0.12 | 0.22 | 0.12 |
| ∅ 10         | 0.35 | 0.18 | 0.25 | 0.15 | 0.25 | 0.15 | 0.25 | 0.15 |
| ∅ 12         | 0.40 | 0.20 | 0.30 | 0.18 | 0.30 | 0.18 | 0.30 | 0.18 |
| ∅ 16         | 0.45 | 0.25 | 0.35 | 0.22 | 0.35 | 0.22 | 0.35 | 0.22 |
| ∅ 20         | 0.50 | 0.30 | 0.40 | 0.25 | 0.40 | 0.25 | 0.40 | 0.25 |

unit:mm

精銑 Finishing  
  中銑 Semi-finishing  
  粗銑 Roughing



| 型號<br>Type No. | D1<br>Diameter<br>直徑 | L1<br>Flute Length<br>刃長 | L3<br>O.A.L<br>全長 | D2<br>Shank Dia<br>柄徑 |
|----------------|----------------------|--------------------------|-------------------|-----------------------|
| ETA 0102       | 1.0                  | 3                        | 50                | 4                     |
| ETA 0152       | 1.5                  | 4                        | 50                | 4                     |
| ETA 0202       | 2.0                  | 6                        | 50                | 4                     |
| ETA 0252       | 2.5                  | 8                        | 50                | 4                     |
| ETA 0302S      | 3.0                  | 8                        | 50                | 3                     |
| ETA 0302       | 3.0                  | 8                        | 50                | 4                     |
| ETA 0402       | 4.0                  | 11                       | 50                | 4                     |
| ETA 0502S      | 5.0                  | 13                       | 50                | 5                     |
| ETA 0502       | 5.0                  | 13                       | 50                | 6                     |
| ETA 0602       | 6.0                  | 16                       | 50                | 6                     |
| ETA 0802       | 8.0                  | 20                       | 60                | 6                     |
| ETA 1002       | 10.0                 | 25                       | 72                | 10                    |
| ETA 1202       | 12.0                 | 30                       | 83                | 12                    |
| ETA 1602       | 16.0                 | 40                       | 100               | 16                    |
| ETA 2002       | 20.0                 | 45                       | 100               | 20                    |

unit:mm

| 直徑<br>D1 | 直徑公差值<br>R tolerance |
|----------|----------------------|
| 1.0      | ±0.02                |
| 1.5      | ±0.02                |
| 2.0      | ±0.02                |
| 2.5      | ±0.02                |
| 3.0      | ±0.02                |
| 4.0      | ±0.02                |
| 5.0      | ±0.02                |
| 6.0      | ±0.025               |
| 8.0      | ±0.03                |
| 10.0     | ±0.035               |
| 12.0     | ±0.04                |
| 16.0     | ±0.04                |
| 20.0     | ±0.04                |

| 柄徑<br>shank (h6) | 柄徑公差值<br>D2 tolerance |
|------------------|-----------------------|
| ∅ 4              | ±0.008                |
| ∅ 6              | ±0.008                |
| ∅ 8              | ±0.008                |
| ∅ 10             | ±0.008                |
| ∅ 12             | ±0.011                |
| ∅ 16             | ±0.011                |
| ∅ 20             | ±0.013                |

unit:mm

### List of recommended milling conditions for ETA-2T

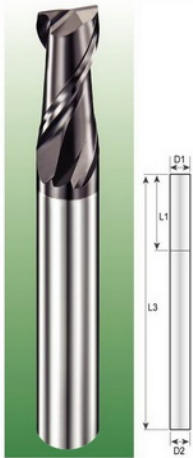
| Work Material | Aluminum alloy<br>(Al7075-T6) |                     | Titanium alloy<br>(Ti6Al4V) |                     | Inconel alloy<br>(In625) |                     | Stainless steel<br>(SUS304) |                     | Hardened steel<br>(S50C) |                     | Prehardened steel<br>(SKD11) |                     |
|---------------|-------------------------------|---------------------|-----------------------------|---------------------|--------------------------|---------------------|-----------------------------|---------------------|--------------------------|---------------------|------------------------------|---------------------|
|               | Feed (mm/rev)                 | Spindle Speed (rpm) | Feed (mm/rev)               | Spindle Speed (rpm) | Feed (mm/rev)            | Spindle Speed (rpm) | Feed (mm/rev)               | Spindle Speed (rpm) | Feed (mm/rev)            | Spindle Speed (rpm) | Feed (mm/rev)                | Spindle Speed (rpm) |
| ETA 0102      | 19500                         | 130                 | 14500                       | 125                 | 12500                    | 90                  | 11000                       | 65                  | 7000                     | 30                  | 5050                         | 25                  |
| ETA 0152      | 14000                         | 130                 | 10500                       | 125                 | 8900                     | 90                  | 7950                        | 65                  | 5500                     | 40                  | 3550                         | 25                  |
| ETA 0202      | 11000                         | 135                 | 8400                        | 125                 | 7000                     | 90                  | 6350                        | 70                  | 3950                     | 40                  | 2750                         | 25                  |
| ETA 0252      | 8900                          | 170                 | 7250                        | 135                 | 6000                     | 95                  | 5200                        | 70                  | 3250                     | 40                  | 2300                         | 25                  |
| ETA 0302      | 7450                          | 200                 | 7200                        | 230                 | 5850                     | 125                 | 5300                        | 100                 | 3200                     | 45                  | 2100                         | 25                  |
| ETA 0352      | 6650                          | 225                 | 6200                        | 230                 | 5000                     | 125                 | 4550                        | 100                 | 2750                     | 45                  | 1800                         | 25                  |
| ETA 0402      | 6000                          | 235                 | 5400                        | 230                 | 4400                     | 125                 | 4000                        | 100                 | 2400                     | 45                  | 1600                         | 25                  |
| ETA 0452      | 5650                          | 270                 | 4800                        | 230                 | 3900                     | 125                 | 3550                        | 100                 | 2100                     | 45                  | 1400                         | 25                  |
| ETA 0502      | 5300                          | 315                 | 4350                        | 235                 | 3500                     | 130                 | 3200                        | 100                 | 1900                     | 55                  | 1300                         | 30                  |
| ETA 0552      | 4800                          | 310                 | 3950                        | 235                 | 3250                     | 130                 | 2750                        | 100                 | 1750                     | 55                  | 1150                         | 30                  |
| ETA 0602      | 4400                          | 310                 | 3600                        | 235                 | 2800                     | 130                 | 2650                        | 100                 | 1600                     | 55                  | 1050                         | 25                  |
| ETA 0802      | 3300                          | 295                 | 2700                        | 235                 | 2200                     | 125                 | 2000                        | 100                 | 1200                     | 50                  | 795                          | 25                  |
| ETA 1002      | 2650                          | 280                 | 2150                        | 230                 | 1750                     | 125                 | 1600                        | 95                  | 955                      | 50                  | 635                          | 25                  |
| ETA 1202      | 2200                          | 280                 | 1800                        | 230                 | 1450                     | 125                 | 1350                        | 95                  | 795                      | 45                  | 530                          | 20                  |

| Depth of cut | ap   |      | aφ   |      | aφ   |      | aφ   |      |
|--------------|------|------|------|------|------|------|------|------|
|              | mm   | mm   | mm   | mm   | mm   | mm   | mm   | mm   |
| ∅ 4          | 0.20 | 0.10 | 0.15 | 0.08 | 0.15 | 0.08 | 0.15 | 0.08 |
| ∅ 6          | 0.25 | 0.12 | 0.18 | 0.10 | 0.18 | 0.10 | 0.18 | 0.10 |
| ∅ 8          | 0.30 | 0.15 | 0.22 | 0.12 | 0.22 | 0.12 | 0.22 | 0.12 |
| ∅ 10         | 0.35 | 0.18 | 0.25 | 0.15 | 0.25 | 0.15 | 0.25 | 0.15 |
| ∅ 12         | 0.40 | 0.20 | 0.30 | 0.18 | 0.30 | 0.18 | 0.30 | 0.18 |
| ∅ 16         | 0.45 | 0.25 | 0.35 | 0.22 | 0.35 | 0.22 | 0.35 | 0.22 |
| ∅ 20         | 0.50 | 0.30 | 0.40 | 0.25 | 0.40 | 0.25 | 0.40 | 0.25 |

unit:mm

精銑 Finishing 
  中銑 Semi-finishing 
  粗銑 Roughing



直徑 D1 直徑公差值 D1 tolerance

| 直徑 D1 | 直徑公差值 D1 tolerance |
|-------|--------------------|
| 1.0   | ±0.02              |
| 1.5   | ±0.02              |
| 2.0   | ±0.02              |
| 2.5   | ±0.02              |
| 3.0   | ±0.02              |
| 4.0   | ±0.02              |
| 5.0   | ±0.02              |
| 6.0   | ±0.02              |
| 8.0   | ±0.02              |
| 10.0  | ±0.03              |
| 12.0  | ±0.035             |
| 16.0  | ±0.04              |
| 20.0  | ±0.04              |

柄徑 D2 柄徑公差值 D2 tolerance

| 柄徑 D2 | 柄徑公差值 D2 tolerance |
|-------|--------------------|
| ∅ 6   | ±0.008             |
| ∅ 8   | ±0.008             |
| ∅ 10  | ±0.009             |
| ∅ 12  | ±0.011             |
| ∅ 16  | ±0.011             |
| ∅ 20  | ±0.013             |

unit:mm



| 型號 Type No. | D1 Diameter 直徑 | L1 Flute Length 刃長 | L3 O.A.L 全長 | D2 Shank Dia 柄徑 |
|-------------|----------------|--------------------|-------------|-----------------|
| ETB 0102    | 1.0            | 3                  | 50          | 6               |
| ETB 0152    | 1.5            | 4                  | 50          | 6               |
| ETB 0202    | 2.0            | 6                  | 50          | 6               |
| ETB 0252    | 2.5            | 8                  | 50          | 6               |
| ETB 0302    | 3.0            | 8                  | 50          | 6               |
| ETB 0402    | 4.0            | 11                 | 50          | 6               |
| ETB 0502    | 5.0            | 13                 | 50          | 6               |
| ETB 0602    | 6.0            | 16                 | 50          | 6               |
| ETB 0802    | 8.0            | 20                 | 60          | 8               |
| ETB 1002    | 10.0           | 30                 | 75          | 10              |
| ETB 1202    | 12.0           | 30                 | 75          | 12              |
| ETB 1602    | 16.0           | 40                 | 100         | 16              |
| ETB 2002    | 20.0           | 45                 | 100         | 20              |

unit:mm

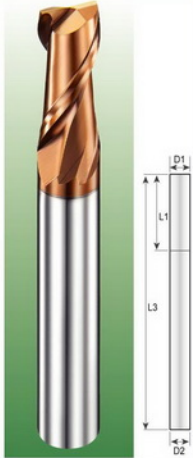
List of recommended milling conditions for ETB-2T

| Work Material | Aluminum alloy (Al7075-T6) |               |                   |                      | Titanium alloy (Ti6Al4V) |               |                   |                      | Inconel alloy (In718) |               |                   |                      | Stainless steel (SUS304) |               |                   |                      | Hardened steel (HRC58) |               |                   |                      |
|---------------|----------------------------|---------------|-------------------|----------------------|--------------------------|---------------|-------------------|----------------------|-----------------------|---------------|-------------------|----------------------|--------------------------|---------------|-------------------|----------------------|------------------------|---------------|-------------------|----------------------|
|               | Spindle Speed (rpm)        | Feed (mm/min) | Depth of Cut (mm) | Chip Load (mm/tooth) | Spindle Speed (rpm)      | Feed (mm/min) | Depth of Cut (mm) | Chip Load (mm/tooth) | Spindle Speed (rpm)   | Feed (mm/min) | Depth of Cut (mm) | Chip Load (mm/tooth) | Spindle Speed (rpm)      | Feed (mm/min) | Depth of Cut (mm) | Chip Load (mm/tooth) | Spindle Speed (rpm)    | Feed (mm/min) | Depth of Cut (mm) | Chip Load (mm/tooth) |
| ETB 0102      | 19500                      | 130           | 14500             | 125                  | 12500                    | 90            | 11000             | 65                   | 7000                  | 30            | 5050              | 25                   |                          |               |                   |                      |                        |               |                   |                      |
| ETB 0152      | 14000                      | 130           | 10500             | 125                  | 8900                     | 90            | 7950              | 65                   | 5050                  | 40            | 3550              | 25                   |                          |               |                   |                      |                        |               |                   |                      |
| ETB 0202      | 11000                      | 135           | 8400              | 125                  | 7000                     | 90            | 6350              | 70                   | 3950                  | 40            | 2750              | 25                   |                          |               |                   |                      |                        |               |                   |                      |
| ETB 0252      | 8900                       | 170           | 7250              | 135                  | 6000                     | 95            | 5200              | 70                   | 3250                  | 40            | 2300              | 25                   |                          |               |                   |                      |                        |               |                   |                      |
| ETB 0302      | 7450                       | 200           | 7200              | 230                  | 5850                     | 125           | 5300              | 100                  | 3200                  | 45            | 2100              | 25                   |                          |               |                   |                      |                        |               |                   |                      |
| ETB 0402      | 6000                       | 235           | 5400              | 230                  | 4400                     | 125           | 4000              | 100                  | 2400                  | 45            | 1600              | 25                   |                          |               |                   |                      |                        |               |                   |                      |
| ETB 0502      | 5300                       | 315           | 4350              | 235                  | 3500                     | 130           | 3200              | 100                  | 1900                  | 55            | 1300              | 30                   |                          |               |                   |                      |                        |               |                   |                      |
| ETB 0602      | 4400                       | 310           | 3600              | 235                  | 2900                     | 130           | 2650              | 100                  | 1600                  | 55            | 1050              | 25                   |                          |               |                   |                      |                        |               |                   |                      |
| ETB 0802      | 3300                       | 295           | 2700              | 235                  | 2200                     | 125           | 2000              | 100                  | 1200                  | 50            | 795               | 25                   |                          |               |                   |                      |                        |               |                   |                      |
| ETB 1002      | 2650                       | 280           | 2150              | 230                  | 1750                     | 125           | 1600              | 95                   | 955                   | 50            | 635               | 25                   |                          |               |                   |                      |                        |               |                   |                      |
| ETB 1202      | 2200                       | 280           | 1800              | 230                  | 1450                     | 125           | 1350              | 95                   | 795                   | 45            | 530               | 20                   |                          |               |                   |                      |                        |               |                   |                      |



BC0P P13

精銑 Finishing 
  中銑 Semi-finishing 
  粗銑 Roughing



直徑 D1 直徑公差值 D1 tolerance

| 直徑 D1 | 直徑公差值 D1 tolerance |
|-------|--------------------|
| 1.0   | ±0.02              |
| 1.5   | ±0.02              |
| 2.0   | ±0.02              |
| 2.5   | ±0.02              |
| 3.0   | ±0.02              |
| 4.0   | ±0.02              |
| 5.0   | ±0.02              |
| 6.0   | ±0.02              |
| 8.0   | ±0.02              |
| 10.0  | ±0.03              |
| 12.0  | ±0.035             |
| 16.0  | ±0.04              |
| 20.0  | ±0.04              |

柄徑 D2 柄徑公差值 D2 tolerance

| 柄徑 D2 | 柄徑公差值 D2 tolerance |
|-------|--------------------|
| ∅ 6   | ±0.008             |
| ∅ 8   | ±0.008             |
| ∅ 10  | ±0.009             |
| ∅ 12  | ±0.011             |
| ∅ 16  | ±0.011             |
| ∅ 20  | ±0.013             |

unit:mm



| 型號 Type No. | D1 Diameter 直徑 | L1 Flute Length 刃長 | L3 O.A.L 全長 | D2 Shank Dia 柄徑 |
|-------------|----------------|--------------------|-------------|-----------------|
| ETH 0102    | 1.0            | 3                  | 50          | 6               |
| ETH 0152    | 1.5            | 4                  | 50          | 6               |
| ETH 0202    | 2.0            | 6                  | 50          | 6               |
| ETH 0252    | 2.5            | 8                  | 50          | 6               |
| ETH 0302    | 3.0            | 8                  | 50          | 6               |
| ETH 0352    | 3.5            | 10                 | 50          | 6               |
| ETH 0402    | 4.0            | 11                 | 50          | 6               |
| ETH 0452    | 4.5            | 13                 | 50          | 6               |
| ETH 0502    | 5.0            | 13                 | 50          | 6               |
| ETH 0552    | 5.5            | 13                 | 50          | 6               |
| ETH 0602    | 6.0            | 16                 | 50          | 6               |
| ETH 0652    | 6.5            | 16                 | 60          | 8               |
| ETH 0702    | 7.0            | 16                 | 60          | 8               |
| ETH 0752    | 7.5            | 19                 | 60          | 8               |
| ETH 0802    | 8.0            | 20                 | 60          | 8               |
| ETH 0852    | 8.5            | 20                 | 75          | 10              |
| ETH 0902    | 9.0            | 22                 | 75          | 10              |
| ETH 0952    | 9.5            | 25                 | 75          | 10              |
| ETH 1002    | 10.0           | 30                 | 75          | 10              |
| ETH 1052    | 10.5           | 25                 | 75          | 12              |
| ETH 1102    | 11.0           | 28                 | 75          | 12              |
| ETH 1152    | 11.5           | 30                 | 75          | 12              |
| ETH 1202    | 12.0           | 30                 | 75          | 12              |
| ETH 1252    | 12.5           | 30                 | 75          | 14              |
| ETH 1302    | 13.0           | 35                 | 75          | 14              |
| ETH 1352    | 13.5           | 35                 | 75          | 14              |
| ETH 1402    | 14.0           | 40                 | 75          | 14              |
| ETH 1502    | 15.0           | 40                 | 100         | 16              |
| ETH 1602    | 16.0           | 40                 | 100         | 16              |
| ETH 1702    | 17.0           | 45                 | 100         | 18              |
| ETH 1802    | 18.0           | 45                 | 100         | 18              |
| ETH 2002    | 20.0           | 45                 | 100         | 20              |

unit:mm

List of recommended milling conditions for ETH-2T

| Work Material | Aluminum alloy (Al7075-T6) |               |                   |                      | Titanium alloy (Ti6Al4V) |               |                   |                      | Inconel alloy (In718) |               |                   |                      | Stainless steel (SUS304) |               |                   |                      | Hardened steel (HRC58) |               |                   |                      |
|---------------|----------------------------|---------------|-------------------|----------------------|--------------------------|---------------|-------------------|----------------------|-----------------------|---------------|-------------------|----------------------|--------------------------|---------------|-------------------|----------------------|------------------------|---------------|-------------------|----------------------|
|               | Spindle Speed (rpm)        | Feed (mm/min) | Depth of Cut (mm) | Chip Load (mm/tooth) | Spindle Speed (rpm)      | Feed (mm/min) | Depth of Cut (mm) | Chip Load (mm/tooth) | Spindle Speed (rpm)   | Feed (mm/min) | Depth of Cut (mm) | Chip Load (mm/tooth) | Spindle Speed (rpm)      | Feed (mm/min) | Depth of Cut (mm) | Chip Load (mm/tooth) | Spindle Speed (rpm)    | Feed (mm/min) | Depth of Cut (mm) | Chip Load (mm/tooth) |
| ETH 0102      | 19500                      | 130           | 14500             | 125                  | 12500                    | 90            | 11000             | 65                   | 7000                  | 30            | 5050              | 25                   |                          |               |                   |                      |                        |               |                   |                      |
| ETH 0152      | 14000                      | 130           | 10500             | 125                  | 8900                     | 90            | 7950              | 65                   | 5050                  | 40            | 3550              | 25                   |                          |               |                   |                      |                        |               |                   |                      |
| ETH 0202      | 11000                      | 135           | 8400              | 125                  | 7000                     | 90            | 6350              | 70                   | 3950                  | 40            | 2750              | 25                   |                          |               |                   |                      |                        |               |                   |                      |
| ETH 0252      | 8900                       | 170           | 7250              | 135                  | 6000                     | 95            | 5200              | 70                   | 3250                  | 40            | 2300              | 25                   |                          |               |                   |                      |                        |               |                   |                      |
| ETH 0302      | 7450                       | 200           | 7200              | 230                  | 5850                     | 125           | 5300              | 100                  | 3200                  | 45            | 2100              | 25                   |                          |               |                   |                      |                        |               |                   |                      |
| ETH 0402      | 6000                       | 235           | 5400              | 230                  | 4400                     | 125           | 4000              | 100                  | 2400                  | 45            | 1600              | 25                   |                          |               |                   |                      |                        |               |                   |                      |
| ETH 0502      | 5300                       | 315           | 4350              | 235                  | 3500                     | 130           | 3200              | 100                  | 1900                  | 55            | 1300              | 30                   |                          |               |                   |                      |                        |               |                   |                      |
| ETH 0602      | 4400                       | 310           | 3600              | 235                  | 2900                     | 130           | 2650              | 100                  | 1600                  | 55            | 1050              | 25                   |                          |               |                   |                      |                        |               |                   |                      |
| ETH 0802      | 3300                       | 295           | 2700              | 235                  | 2200                     | 125           | 2000              | 100                  | 1200                  | 50            | 795               | 25                   |                          |               |                   |                      |                        |               |                   |                      |
| ETH 1002      | 2650                       | 280           | 2150              | 230                  | 1750                     | 125           | 1600              | 95                   | 955                   | 50            | 635               | 25                   |                          |               |                   |                      |                        |               |                   |                      |
| ETH 1202      | 2200                       | 280           | 1800              | 230                  | 1450                     | 125           | 1350              | 95                   | 795                   | 45            | 530               | 20                   |                          |               |                   |                      |                        |               |                   |                      |



BC0P P14



| 型號<br>Type No. | D1<br>Diameter<br>直徑 | L1<br>Flute Length<br>刃長 | L3<br>O.A.L.<br>全長 | D2<br>Shank Dia<br>柄徑 |
|----------------|----------------------|--------------------------|--------------------|-----------------------|
| ETA 0104       | 1.0                  | 3                        | 50                 | 4                     |
| ETA 0154       | 1.5                  | 4                        | 50                 | 4                     |
| ETA 0204       | 2.0                  | 6                        | 50                 | 4                     |
| ETA 0254       | 2.5                  | 8                        | 50                 | 4                     |
| ETA 0304S      | 3.0                  | 8                        | 50                 | 3                     |
| ETA 0304       | 3.0                  | 8                        | 50                 | 4                     |
| ETA 0404       | 4.0                  | 11                       | 50                 | 4                     |
| ETA 0504S      | 5.0                  | 13                       | 50                 | 5                     |
| ETA 0504       | 5.0                  | 13                       | 50                 | 6                     |
| ETA 0604       | 6.0                  | 16                       | 50                 | 6                     |
| ETA 0804       | 8.0                  | 20                       | 60                 | 6                     |
| ETA 1004       | 10.0                 | 25                       | 75                 | 10                    |
| ETA 1204       | 12.0                 | 30                       | 75                 | 12                    |
| ETA 1604       | 16.0                 | 40                       | 100                | 16                    |
| ETA 2004       | 20.0                 | 45                       | 100                | 20                    |

unit:mm

List of recommended milling conditions for ETA-4T

| 切削材<br>Work Material | Carbon Steels<br>S45C-S50C<br>HB150-250 |                       | Alloy Steels<br>SCM.SUS(HPM)<br>HRC20-35 |                       | Prehardened Steels<br>NAK(HPM)<br>HRC40 |                       | Hardened Steels<br>SKD61<br>HRC50 |                       |
|----------------------|---|-----------------------|--|-----------------------|---|-----------------------|-----------------------------------|-----------------------|
|                      | Type No.                                | 進給速度Speed<br>(mm/min) | 進給率Feed<br>(mm/min)                      | 進給速度Speed<br>(mm/min) | 進給率Feed<br>(mm/min)                     | 進給速度Speed<br>(mm/min) | 進給率Feed<br>(mm/min)               | 進給速度Speed<br>(mm/min) |
| ETA 0104             | 21000                                   | 400                   | 18000                                    | 210                   | 16000                                   | 160                   | 9800                              | 110                   |
| ETA 0204             | 14000                                   | 400                   | 9600                                     | 250                   | 8000                                    | 180                   | 4800                              | 110                   |
| ETA 0304             | 9500                                    | 450                   | 6400                                     | 250                   | 5300                                    | 200                   | 3200                              | 120                   |
| ETA 0404             | 7200                                    | 550                   | 4800                                     | 320                   | 4000                                    | 200                   | 2400                              | 120                   |
| ETA 0504             | 5700                                    | 700                   | 3600                                     | 350                   | 3200                                    | 220                   | 1900                              | 160                   |
| ETA 0604             | 4800                                    | 700                   | 3200                                     | 380                   | 2650                                    | 220                   | 1600                              | 180                   |
| ETA 0804             | 3600                                    | 600                   | 2400                                     | 380                   | 2000                                    | 220                   | 1200                              | 180                   |
| ETA 1004             | 2900                                    | 600                   | 1900                                     | 380                   | 1600                                    | 220                   | 950                               | 180                   |
| ETA 1204             | 2400                                    | 430                   | 1600                                     | 300                   | 1300                                    | 200                   | 800                               | 150                   |

Side Milling  
below #3

Side Milling  
up to #4

Side Milling

| 切削材<br>Work Material | Alloy Steels<br>SCM.SUS(HPM)<br>HRC20-35 |                     | Prehardened Steels<br>NAK(HPM)<br>HRC45-45 |                     | Hardened Steels<br>SKD61<br>HRC45-55 |                     |
|----------------------|--|---------------------|--|---------------------|--------------------------------------|---------------------|
|                      | Velocity                                 | V=170 min/min       | V=110 min/min                              | V=80 min/min        | Velocity                             | V=80 min/min        |
| Type No.             | 進給速度Speed<br>(mm/min)                    | 進給率Feed<br>(mm/min) | 進給速度Speed<br>(mm/min)                      | 進給率Feed<br>(mm/min) | 進給速度Speed<br>(mm/min)                | 進給率Feed<br>(mm/min) |
| ETA 0304             | 18000                                    | 720                 | 11500                                      | 465                 | 8500                                 | 340                 |
| ETA 0404             | 13500                                    | 910                 | 8600                                       | 525                 | 6400                                 | 360                 |
| ETA 0504             | 10800                                    | 650                 | 7000                                       | 420                 | 5100                                 | 300                 |
| ETA 0604             | 9000                                     | 720                 | 5800                                       | 465                 | 4250                                 | 340                 |
| ETA 0804             | 6800                                     | 675                 | 4400                                       | 440                 | 3200                                 | 320                 |
| ETA 1004             | 5400                                     | 755                 | 3500                                       | 490                 | 2550                                 | 355                 |
| ETA 1204             | 4500                                     | 720                 | 2900                                       | 465                 | 2100                                 | 340                 |
| ETA 1604             | 3400                                     | 745                 | 2200                                       | 480                 | 1600                                 | 350                 |

D Diameter



| 型號<br>Type No. | D1<br>Diameter<br>直徑 | L1<br>Flute Length<br>刃長 | L3<br>O.A.L.<br>全長 | D2<br>Shank Dia<br>柄徑 |
|----------------|----------------------|--------------------------|--------------------|-----------------------|
| ETD 0104       | 1.0                  | 3                        | 50                 | 4                     |
| ETD 0154       | 1.5                  | 4                        | 50                 | 4                     |
| ETD 0204       | 2.0                  | 6                        | 50                 | 4                     |
| ETD 0254       | 2.5                  | 8                        | 50                 | 4                     |
| ETD 0304S      | 3.0                  | 8                        | 50                 | 3                     |
| ETD 0304       | 3.0                  | 8                        | 50                 | 4                     |
| ETD 0404       | 4.0                  | 11                       | 50                 | 4                     |
| ETD 0504S      | 5.0                  | 13                       | 50                 | 5                     |
| ETD 0504       | 5.0                  | 13                       | 50                 | 6                     |
| ETD 0604       | 6.0                  | 16                       | 57                 | 6                     |
| ETD 0804       | 8.0                  | 20                       | 63                 | 6                     |
| ETD 1004       | 10.0                 | 25                       | 72                 | 10                    |
| ETD 1204       | 12.0                 | 30                       | 83                 | 12                    |
| ETD 1604       | 16.0                 | 40                       | 100                | 16                    |
| ETD 2004       | 20.0                 | 45                       | 100                | 20                    |

unit:mm

List of recommended milling conditions for ETD-4T

| 切削材<br>Work Material | Carbon Steels<br>S45C-S50C<br>HB150-250 |                       | Alloy Steels<br>SCM.SUS(HPM)<br>HRC20-35 |                       | Prehardened Steels<br>NAK(HPM)<br>HRC40 |                       | Hardened Steels<br>SKD61<br>HRC50 |                       |
|----------------------|---|-----------------------|--|-----------------------|---|-----------------------|-----------------------------------|-----------------------|
|                      | Type No.                                | 進給速度Speed<br>(mm/min) | 進給率Feed<br>(mm/min)                      | 進給速度Speed<br>(mm/min) | 進給率Feed<br>(mm/min)                     | 進給速度Speed<br>(mm/min) | 進給率Feed<br>(mm/min)               | 進給速度Speed<br>(mm/min) |
| ETD 0104             | 21000                                   | 400                   | 18000                                    | 210                   | 16000                                   | 160                   | 9800                              | 110                   |
| ETD 0204             | 14000                                   | 400                   | 9600                                     | 250                   | 8000                                    | 180                   | 4800                              | 110                   |
| ETD 0304             | 9500                                    | 450                   | 6400                                     | 250                   | 5300                                    | 200                   | 3200                              | 120                   |
| ETD 0404             | 7200                                    | 550                   | 4800                                     | 320                   | 4000                                    | 200                   | 2400                              | 120                   |
| ETD 0504             | 5700                                    | 700                   | 3600                                     | 350                   | 3200                                    | 220                   | 1900                              | 160                   |
| ETD 0604             | 4800                                    | 700                   | 3200                                     | 380                   | 2650                                    | 220                   | 1600                              | 180                   |
| ETD 0804             | 3600                                    | 600                   | 2400                                     | 380                   | 2000                                    | 220                   | 1200                              | 180                   |
| ETD 1004             | 2900                                    | 600                   | 1900                                     | 380                   | 1600                                    | 220                   | 950                               | 180                   |
| ETD 1204             | 2400                                    | 430                   | 1600                                     | 300                   | 1300                                    | 200                   | 800                               | 150                   |

Side Milling  
below #3

Side Milling  
up to #4

Side Milling

| 切削材<br>Work Material | Alloy Steels<br>SCM.SUS(HPM)<br>HRC20-35 |                     | Prehardened Steels<br>NAK(HPM)<br>HRC45-45 |                     | Hardened Steels<br>SKD61<br>HRC45-55 |                     |
|----------------------|--|---------------------|--|---------------------|--------------------------------------|---------------------|
|                      | Velocity                                 | V=170 min/min       | V=110 min/min                              | V=80 min/min        | Velocity                             | V=80 min/min        |
| Type No.             | 進給速度Speed<br>(mm/min)                    | 進給率Feed<br>(mm/min) | 進給速度Speed<br>(mm/min)                      | 進給率Feed<br>(mm/min) | 進給速度Speed<br>(mm/min)                | 進給率Feed<br>(mm/min) |
| ETD 0304             | 18000                                    | 720                 | 11500                                      | 465                 | 8500                                 | 340                 |
| ETD 0404             | 13500                                    | 910                 | 8600                                       | 525                 | 6400                                 | 360                 |
| ETD 0504             | 10800                                    | 650                 | 7000                                       | 420                 | 5100                                 | 300                 |
| ETD 0604             | 9000                                     | 720                 | 5800                                       | 465                 | 4250                                 | 340                 |
| ETD 0804             | 6800                                     | 675                 | 4400                                       | 440                 | 3200                                 | 320                 |
| ETD 1004             | 5400                                     | 755                 | 3500                                       | 490                 | 2550                                 | 355                 |
| ETD 1204             | 4500                                     | 720                 | 2900                                       | 465                 | 2100                                 | 340                 |
| ETD 1604             | 3400                                     | 745                 | 2200                                       | 480                 | 1600                                 | 350                 |

D Diameter



⊙ 精銑 Finishing ⊙ 中銑 Semi-finishing ⊙ 粗銑 Roughing



| 型號<br>Type No. | D1<br>直徑<br>Diameter | L1<br>刃長<br>Flute Length | L3<br>O.A.L.<br>全長 | D2<br>柄徑<br>Shank Dia |
|----------------|----------------------|--------------------------|--------------------|-----------------------|
| ETB 0104       | 1.0                  | 3                        | 50                 | 4                     |
| ETB 0154       | 1.5                  | 4                        | 50                 | 4                     |
| ETB 0204S      | 2.0                  | 6                        | 50                 | 4                     |
| ETB 0204       | 2.0                  | 6                        | 50                 | 6                     |
| ETB 0254S      | 2.5                  | 8                        | 50                 | 4                     |
| ETB 0254       | 2.5                  | 8                        | 50                 | 6                     |
| ETB 0304S      | 3.0                  | 8                        | 50                 | 4                     |
| ETB 0304       | 3.0                  | 8                        | 50                 | 6                     |
| ETB 0354       | 3.5                  | 10                       | 50                 | 6                     |
| ETB 0404S      | 4.0                  | 11                       | 50                 | 4                     |
| ETB 0404       | 4.0                  | 11                       | 50                 | 6                     |
| ETB 0454       | 4.5                  | 11                       | 50                 | 6                     |
| ETB 0504       | 5.0                  | 13                       | 50                 | 6                     |
| ETB 0604       | 6.0                  | 16                       | 50                 | 6                     |
| ETB 0804       | 8.0                  | 20                       | 60                 | 8                     |
| ETB 1004Z      | 10.0                 | 25                       | 75                 | 10                    |
| ETB 1004       | 10.0                 | 30                       | 75                 | 10                    |
| ETB 1204       | 12.0                 | 30                       | 75                 | 12                    |
| ETB 1604       | 16.0                 | 40                       | 100                | 16                    |
| ETB 2004       | 20.0                 | 45                       | 100                | 20                    |

unit:mm



| 直徑<br>D1 | 直徑公差值<br>D1 tolerance |
|----------|-----------------------|
| 1.0      | ±0.02                 |
| 1.5      | ±0.02                 |
| 2.0      | ±0.02                 |
| 2.5      | ±0.02                 |
| 3.0      | ±0.02                 |
| 3.5      | ±0.02                 |
| 4.0      | ±0.02                 |
| 4.5      | ±0.02                 |
| 5.0      | ±0.02                 |
| 6.0      | ±0.025                |
| 8.0      | ±0.025                |
| 10.0     | ±0.03                 |
| 12.0     | ±0.035                |
| 16.0     | ±0.04                 |
| 20.0     | ±0.04                 |

| 柄徑<br>D2 tolerance | 柄徑公差值<br>D2 tolerance |
|--------------------|-----------------------|
| ∅ 4                | ±0.006                |
| ∅ 6                | ±0.006                |
| ∅ 8                | ±0.009                |
| ∅ 10               | ±0.009                |
| ∅ 12               | ±0.011                |
| ∅ 16               | ±0.011                |
| ∅ 20               | ±0.013                |

unit:mm

List of recommended milling conditions for ETB-4T (Side milling)

| 型號<br>Type No. | Carbon Steels<br>S45C, S50C<br>HB190-290 |                      | Alloy Steels<br>SCM435, SCM438<br>HRC20-35 |                      | Prehardened Steels<br>NAK80, NAK80M<br>HRC45 |                      | Hardened Steels<br>SKD11<br>HRC55    |                      |
|----------------|--|----------------------|--|----------------------|--|----------------------|--------------------------------------|----------------------|
|                | 迴轉速度 Speed<br>(mm <sup>3</sup> /min)     | 進給率 Feed<br>(mm/min) | 迴轉速度 Speed<br>(mm <sup>3</sup> /min)       | 進給率 Feed<br>(mm/min) | 迴轉速度 Speed<br>(mm <sup>3</sup> /min)         | 進給率 Feed<br>(mm/min) | 迴轉速度 Speed<br>(mm <sup>3</sup> /min) | 進給率 Feed<br>(mm/min) |
| ETB 0104       | 21000                                    | 650                  | 18000                                      | 280                  | 16000  | 220                  | 9800                                 | 180                  |
| ETB 0204       | 14000                                    | 700                  | 9600                                       | 300                  | 8000   | 250                  | 4800                                 | 210                  |
| ETB 0304       | 9500                                     | 800                  | 6400                                       | 400                  | 5300   | 300                  | 3200                                 | 260                  |
| ETB 0404       | 7200                                     | 800                  | 4800                                       | 400                  | 4000   | 300                  | 2400                                 | 260                  |
| ETB 0504       | 5700                                     | 1000                 | 3800                                       | 500                  | 3200   | 400                  | 1900                                 | 300                  |
| ETB 0604       | 4800                                     | 1000                 | 3200                                       | 500                  | 2650   | 400                  | 1600                                 | 300                  |
| ETB 0804       | 3600                                     | 1000                 | 2400                                       | 500                  | 2000   | 400                  | 1200                                 | 300                  |
| ETB 1004       | 2900                                     | 1000                 | 1900                                       | 500                  | 1600   | 400                  | 950                                  | 300                  |
| ETB 1204       | 2400                                     | 1000                 | 1600                                       | 500                  | 1300   | 400                  | 800                                  | 300                  |



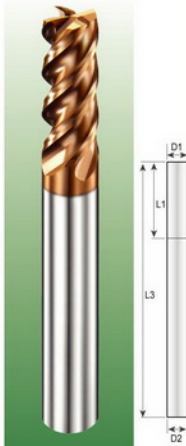
800P P17

⊙ 精銑 Finishing ⊙ 中銑 Semi-finishing ⊙ 粗銑 Roughing



| 型號<br>Type No. | D1<br>直徑<br>Diameter | L1<br>刃長<br>Flute Length | L3<br>O.A.L.<br>全長 | D2<br>柄徑<br>Shank Dia |
|----------------|----------------------|--------------------------|--------------------|-----------------------|
| ETH 0104       | 1.0                  | 3                        | 50                 | 4                     |
| ETH 0154       | 1.5                  | 4                        | 50                 | 4                     |
| ETH 0204       | 2.0                  | 6                        | 50                 | 4                     |
| ETH 0254       | 2.5                  | 8                        | 50                 | 4                     |
| ETH 0304S      | 3.0                  | 8                        | 50                 | 3                     |
| ETH 0304       | 3.0                  | 8                        | 50                 | 4                     |
| ETH 0354       | 3.5                  | 10                       | 50                 | 4                     |
| ETH 0404       | 4.0                  | 11                       | 50                 | 4                     |
| ETH 0454       | 4.5                  | 13                       | 50                 | 6                     |
| ETH 0504S      | 5.0                  | 13                       | 50                 | 5                     |
| ETH 0504       | 5.0                  | 13                       | 50                 | 6                     |
| ETH 0554       | 5.5                  | 13                       | 50                 | 6                     |
| ETH 0604       | 6.0                  | 16                       | 50                 | 6                     |
| ETH 0654       | 6.5                  | 16                       | 60                 | 8                     |
| ETH 0704       | 7.0                  | 19                       | 60                 | 8                     |
| ETH 0754       | 7.5                  | 16                       | 60                 | 8                     |
| ETH 0804       | 8.0                  | 20                       | 60                 | 8                     |
| ETH 0854       | 8.5                  | 20                       | 75                 | 10                    |
| ETH 0904       | 9.0                  | 22                       | 75                 | 10                    |
| ETH 0954       | 9.5                  | 25                       | 75                 | 10                    |
| ETH 1004       | 10.0                 | 25                       | 75                 | 10                    |
| ETH 1054       | 10.5                 | 25                       | 75                 | 12                    |
| ETH 1104       | 11.0                 | 28                       | 75                 | 12                    |
| ETH 1154       | 11.5                 | 30                       | 75                 | 12                    |
| ETH 1204       | 12.0                 | 30                       | 75                 | 12                    |
| ETH 1254       | 12.5                 | 30                       | 75                 | 14                    |
| ETH 1304       | 13.0                 | 35                       | 75                 | 14                    |
| ETH 1354       | 13.5                 | 35                       | 75                 | 14                    |
| ETH 1404       | 14.0                 | 40                       | 75                 | 14                    |
| ETH 1504       | 15.0                 | 40                       | 100                | 16                    |
| ETH 1604       | 16.0                 | 40                       | 100                | 16                    |
| ETH 1704       | 17.0                 | 45                       | 100                | 18                    |
| ETH 1804       | 18.0                 | 45                       | 100                | 18                    |
| ETH 2004       | 20.0                 | 45                       | 100                | 20                    |

unit:mm



| 直徑<br>D1 | 直徑公差值<br>D1 tolerance |
|----------|-----------------------|
| 1.0      | ±0.002                |
| 1.5      | ±0.002                |
| 2.0      | ±0.002                |
| 2.5      | ±0.002                |
| 3.0      | ±0.002                |
| 3.5      | ±0.002                |
| 4.0      | ±0.002                |
| 4.5      | ±0.002                |
| 5.0      | ±0.002                |
| 6.0      | ±0.025                |
| 8.0      | ±0.025                |
| 10.0     | ±0.03                 |
| 12.0     | ±0.035                |
| 16.0     | ±0.04                 |
| 20.0     | ±0.04                 |

| 柄徑<br>D2 tolerance | 柄徑公差值<br>D2 tolerance |
|--------------------|-----------------------|
| ∅ 4                | ±0.006                |
| ∅ 6                | ±0.006                |
| ∅ 8                | ±0.009                |
| ∅ 10               | ±0.009                |
| ∅ 12               | ±0.011                |
| ∅ 16               | ±0.011                |
| ∅ 20               | ±0.013                |

unit:mm

List of recommended milling conditions for ETH-4T (Side milling)

| 型號<br>Type No. | Carbon Steels<br>S45C, S50C<br>HB190-290 |                      | Alloy Steels<br>SCM435, SCM438<br>HRC20-35 |                      | Prehardened Steels<br>NAK80, NAK80M<br>HRC45 |                      | Hardened Steels<br>SKD11<br>HRC55    |                      |
|----------------|--|----------------------|--|----------------------|--|----------------------|--------------------------------------|----------------------|
|                | 迴轉速度 Speed<br>(mm <sup>3</sup> /min)     | 進給率 Feed<br>(mm/min) | 迴轉速度 Speed<br>(mm <sup>3</sup> /min)       | 進給率 Feed<br>(mm/min) | 迴轉速度 Speed<br>(mm <sup>3</sup> /min)         | 進給率 Feed<br>(mm/min) | 迴轉速度 Speed<br>(mm <sup>3</sup> /min) | 進給率 Feed<br>(mm/min) |
| ETH 0104       | 21000                                    | 650                  | 18000                                      | 280                  | 16000  | 220                  | 9800                                 | 180                  |
| ETH 0204       | 14000                                    | 700                  | 9600                                       | 300                  | 8000   | 250                  | 4800                                 | 210                  |
| ETH 0304       | 9500                                     | 800                  | 6400                                       | 400                  | 5300   | 300                  | 3200                                 | 260                  |
| ETH 0404       | 7200                                     | 800                  | 4800                                       | 400                  | 4000   | 300                  | 2400                                 | 260                  |
| ETH 0504       | 5700                                     | 1000                 | 3800                                       | 500                  | 3200   | 400                  | 1900                                 | 300                  |
| ETH 0604       | 4800                                     | 1000                 | 3200                                       | 500                  | 2650   | 400                  | 1600                                 | 300                  |
| ETH 0804       | 3600                                     | 1000                 | 2400                                       | 500                  | 2000   | 400                  | 1200                                 | 300                  |
| ETH 1004       | 2900                                     | 1000                 | 1900                                       | 500                  | 1600   | 400                  | 950                                  | 300                  |
| ETH 1204       | 2400                                     | 1000                 | 1600                                       | 500                  | 1300   | 400                  | 800                                  | 300                  |



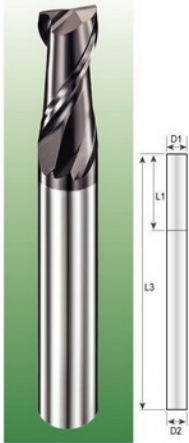
800P P18

○ 精銑 Finishing ○ 中銑 Semi-finishing ○ 粗銑 Roughing



| 型號<br>Type No. | D1<br>Diameter<br>直徑 | L1<br>Flute Length<br>刃長 | L3<br>O.A.L<br>全長 | D2<br>Shank Dia<br>柄徑 |
|----------------|----------------------|--------------------------|-------------------|-----------------------|
| ETG 0102       | 1.0                  | 3                        | 50                | 4                     |
| ETG 0152       | 1.5                  | 4                        | 50                | 4                     |
| ETG 0202       | 2.0                  | 6                        | 50                | 4                     |
| ETG 0252       | 2.5                  | 8                        | 50                | 4                     |
| ETG 0302       | 3.0                  | 8                        | 50                | 4                     |
| ETG 0402       | 4.0                  | 11                       | 50                | 4                     |
| ETG 0502       | 5.0                  | 13                       | 50                | 6                     |
| ETG 0602       | 6.0                  | 16                       | 50                | 6                     |
| ETG 0802       | 8.0                  | 20                       | 60                | 8                     |
| ETG 1002       | 10.0                 | 25                       | 75                | 10                    |
| ETG 1202       | 12.0                 | 30                       | 75                | 12                    |

unit:mm



直徑 D1 直徑公差值 D1 tolerance

|      |        |
|------|--------|
| 1.0  | ±0.02  |
| 1.5  | ±0.02  |
| 2.0  | ±0.02  |
| 2.5  | ±0.02  |
| 3.0  | ±0.02  |
| 4.0  | ±0.02  |
| 5.0  | ±0.02  |
| 6.0  | ±0.025 |
| 8.0  | ±0.03  |
| 10.0 | ±0.035 |
| 12.0 | ±0.04  |

柄徑 D2 柄徑公差值 D2 tolerance

|      |        |
|------|--------|
| ∅ 4  | ±0.008 |
| ∅ 6  | ±0.008 |
| ∅ 8  | ±0.008 |
| ∅ 10 | ±0.009 |
| ∅ 12 | ±0.011 |

unit:mm

### List of recommended milling conditions for ETG-2T

| Work Material | Mid steels, Carbon steels, Cast Iron, S440, S55C, FC50, 70, 70Mn | Alloy steels, Tool steels, SUS304, SSKT, SKT, SKS, SSK, SSK2, SSK3 | Hardened steels, Prehardened steels, SUS304, SSKT, SKT, SKS, SKS2, SSK2C | Stainless steels, Heat resistant, SUS304, SSKT, SKT, SKS, SKS2, SSK2C | Hardened steels (45-50HRC), Heat resistant, Alloy steels | Hardened steels (55-60HRC) |       |     |      |    |      |    |
|---------------|--|--|--|---|--|----------------------------|-------|-----|------|----|------|----|
| Type No.      | 鋼材 (mm/min)  | 鋁合金 (mm/min)   | 不銹鋼 (mm/min)   | 硬質合金 (mm/min)   | 鈦合金 (mm/min)   | 其他 (mm/min)                |       |     |      |    |      |    |
| ETG 0102      | 19500  | 130  | 14500  | 125   | 12500  | 90                         | 11000 | 65  | 7000 | 30 | 5050 | 25 |
| ETG 0152      | 14000  | 130  | 10500  | 125   | 8900   | 90                         | 7950  | 65  | 5050 | 40 | 3550 | 25 |
| ETG 0202      | 11000  | 135  | 8400   | 125   | 7000   | 90                         | 6350  | 70  | 3950 | 40 | 2750 | 25 |
| ETG 0252      | 8900   | 170  | 7250   | 135   | 6000   | 95                         | 5200  | 70  | 3250 | 40 | 2300 | 25 |
| ETG 0302      | 7450   | 200  | 7200   | 230   | 5850   | 125                        | 5300  | 100 | 3200 | 45 | 2100 | 25 |
| ETG 0402      | 6000   | 235  | 6400   | 230   | 4400   | 125                        | 4000  | 100 | 2400 | 45 | 1600 | 25 |
| ETG 0502      | 5300   | 315  | 4350   | 235   | 3500   | 130                        | 3200  | 100 | 1900 | 55 | 1300 | 30 |
| ETG 0602      | 4400   | 310  | 3600   | 235   | 2900   | 130                        | 2650  | 100 | 1600 | 55 | 1050 | 25 |
| ETG 0802      | 3300   | 295  | 2700   | 235   | 2200   | 125                        | 2000  | 100 | 1200 | 50 | 795  | 25 |
| ETG 1002      | 2650   | 280  | 2150   | 230   | 1750   | 125                        | 1600  | 95  | 955  | 50 | 635  | 25 |
| ETG 1202      | 2200   | 280  | 1800   | 230   | 1450   | 125                        | 1350  | 95  | 795  | 45 | 530  | 20 |

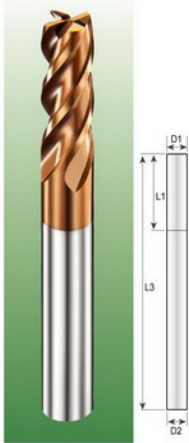


○ 精銑 Finishing ○ 中銑 Semi-finishing ○ 粗銑 Roughing



| 型號<br>Type No. | D1<br>Diameter<br>直徑 | L1<br>Flute Length<br>刃長 | L3<br>O.A.L<br>全長 | D2<br>Shank Dia<br>柄徑 |
|----------------|----------------------|--------------------------|-------------------|-----------------------|
| ETG 0104       | 1.0                  | 3                        | 50                | 4                     |
| ETG 0154       | 1.5                  | 4                        | 50                | 4                     |
| ETG 0204       | 2.0                  | 6                        | 50                | 4                     |
| ETG 0254       | 2.5                  | 8                        | 50                | 4                     |
| ETG 0304       | 3.0                  | 8                        | 50                | 4                     |
| ETG 0404       | 4.0                  | 11                       | 50                | 4                     |
| ETG 0504       | 5.0                  | 13                       | 50                | 6                     |
| ETG 0604       | 6.0                  | 16                       | 50                | 6                     |
| ETG 0804       | 8.0                  | 20                       | 60                | 8                     |
| ETG 1004       | 10.0                 | 25                       | 75                | 10                    |
| ETG 1204       | 12.0                 | 30                       | 75                | 12                    |
| ETG 1604       | 16.0                 | 40                       | 100               | 16                    |

unit:mm



直徑 D1 直徑公差值 D1 tolerance

|      |        |
|------|--------|
| 1.0  | ±0.02  |
| 1.5  | ±0.02  |
| 2.0  | ±0.02  |
| 2.5  | ±0.02  |
| 3.0  | ±0.02  |
| 4.0  | ±0.02  |
| 5.0  | ±0.02  |
| 6.0  | ±0.025 |
| 8.0  | ±0.03  |
| 10.0 | ±0.035 |
| 12.0 | ±0.04  |
| 16.0 | ±0.04  |

柄徑 D2 柄徑公差值 D2 tolerance

|      |        |
|------|--------|
| ∅ 4  | ±0.008 |
| ∅ 6  | ±0.008 |
| ∅ 8  | ±0.008 |
| ∅ 10 | ±0.009 |
| ∅ 12 | ±0.011 |
| ∅ 16 | ±0.011 |

unit:mm

### List of recommended milling conditions for ETG-4T

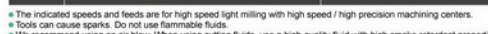
| Work Material | Cast iron, FC, FCD | Mid steels, Carbon steels, S440, S55C, SUS304 | Alloy Steels, Tool steels, SCM, SSKT, SKS, SKS2, SSK2C | Hardened steels, Prehardened steels, SUS304, SSKT, SKT, SKS, SKS2, SSK2C | Stainless steels, Heat resistant, SUS304, SSKT, SKT, SKS, SKS2, SSK2C | Hardened steels (45-50HRC), Heat resistant, Alloy steels | Hardened steels (55-60HRC) |     |      |     |      |    |      |    |
|---------------|--------------------|---|--|--|---|--|----------------------------|-----|------|-----|------|----|------|----|
| Type No.      | 鋼材 (mm/min)        | 鋁合金 (mm/min)                                  | 不銹鋼 (mm/min)   | 硬質合金 (mm/min)  | 鈦合金 (mm/min)  | 其他 (mm/min)  | 其他 (mm/min)                |     |      |     |      |    |      |    |
| ETG 0204      | 15500              | 370   | 1300   | 310  | 11000   | 280  | 7000                       | 110 | 6350 | 100 | 3950 | 60 | 2750 | 40 |
| ETG 0304      | 10500              | 595   | 8900   | 550  | 7400  | 355  | 5300                       | 125 | 4750 | 110 | 2750 | 60 | 2000 | 45 |
| ETG 0404      | 7950               | 635   | 6650   | 530  | 5550  | 370  | 4250                       | 135 | 3700 | 115 | 2200 | 70 | 1550 | 45 |
| ETG 0504      | 6350               | 740   | 5300   | 620  | 4450  | 425  | 3550                       | 140 | 3150 | 125 | 1900 | 75 | 1250 | 40 |
| ETG 0604      | 5300               | 735   | 4450   | 615  | 3700  | 425  | 2950                       | 145 | 2650 | 130 | 1550 | 70 | 1050 | 40 |
| ETG 0804      | 3950               | 710   | 3300   | 590  | 2750  | 420  | 2200                       | 145 | 1950 | 130 | 1150 | 65 | 795  | 35 |
| ETG 1004      | 3150               | 710   | 2650   | 590  | 2200  | 420  | 1750                       | 145 | 1550 | 130 | 955  | 65 | 635  | 35 |
| ETG 1204      | 2650               | 710   | 2200   | 590  | 1850  | 420  | 1450                       | 145 | 1300 | 130 | 795  | 60 | 530  | 30 |



- Use a rigid and precise machine and holder.
- When chatter occurs, reduce the speed and feed simultaneously.
- Use a suitable cutting fluid with high smoke retardant properties.

### High speed milling conditions for ETG-4T

| Work Material | Mid steels, Carbon steels, Cast Iron, S440, S55C, FC50, 70, 70Mn | Alloy Steels, Tool steels, SCM, SSKT, SKS, SKS2, SSK2C | Hardened steels, Prehardened steels, SUS304, SSKT, SKT, SKS, SKS2, SSK2C | Stainless steels, Heat resistant, SUS304, SSKT, SKT, SKS, SKS2, SSK2C | Hardened steels (45-50HRC), Heat resistant, Alloy steels |      |      |     |      |     |
|---------------|--|--|--|---|--|------|------|-----|------|-----|
| Type No.      | 鋼材 (mm/min)  | 鋁合金 (mm/min)   | 不銹鋼 (mm/min)   | 硬質合金 (mm/min)   | 鈦合金 (mm/min)   |      |      |     |      |     |
| ETG 0604      | 21000  | 2450   | 18500  | 2150  | 13000  | 1500 | 7950 | 795 | 4200 | 420 |
| ETG 0804      | 15500  | 2450   | 13500  | 2100  | 9900   | 1450 | 5560 | 795 | 3150 | 420 |
| ETG 1004      | 12500  | 2450   | 11000  | 2100  | 7950   | 1450 | 4750 | 795 | 2500 | 420 |
| ETG 1204      | 10500  | 2450   | 9250   | 2100  | 6600   | 1450 | 3560 | 790 | 2100 | 410 |



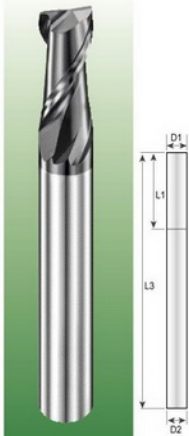
- The indicated speeds and feeds are for high speed light milling with high speed / high precision machining centers.
- Tools can cause sparks. Do not use flammable fluids.
- We recommend using an air blow. When using cutting fluids, use a high-quality fluid with high smoke retardant properties.

○ 精銑 Finishing    ⊙ 中銑 Semi-finishing    — 粗銑 Roughing



| 型號<br>Type No. | D1<br>Diameter<br>直徑 | L1<br>Flute Length<br>刃長 | L3<br>O.A.L.<br>全長 | D2<br>Shank Dia<br>柄徑 |
|----------------|----------------------|--------------------------|--------------------|-----------------------|
| HEA 0302       | 3.0                  | 8                        | 75                 | 3                     |
| HEA 0402       | 4.0                  | 11                       | 75                 | 4                     |
| HEA 0502       | 5.0                  | 13                       | 75                 | 6                     |
| HEA 0602       | 6.0                  | 16                       | 75                 | 6                     |
| HEA 0802       | 8.0                  | 20                       | 75                 | 8                     |
| IEA 0302       | 3.0                  | 8                        | 100                | 3                     |
| IEA 0402       | 4.0                  | 11                       | 100                | 4                     |
| IEA 0502       | 5.0                  | 13                       | 100                | 6                     |
| IEA 0602       | 6.0                  | 16                       | 100                | 6                     |
| IEA 0802       | 8.0                  | 20                       | 100                | 8                     |
| IEA 1002       | 10.0                 | 25                       | 100                | 10                    |
| IEA 1202       | 12.0                 | 30                       | 100                | 12                    |
| JEA 0602       | 6.0                  | 16                       | 150                | 6                     |
| JEA 0802       | 8.0                  | 20                       | 150                | 8                     |
| JEA 1002       | 10.0                 | 25                       | 150                | 10                    |
| JEA 1202       | 12.0                 | 30                       | 150                | 12                    |

unit:mm



| 直徑<br>D1 | 直徑公差值<br>D1 tolerance |
|----------|-----------------------|
| 3.0      | $\pm 0.02$            |
| 4.0      | $\pm 0.02$            |
| 5.0      | $\pm 0.02$            |
| 6.0      | $\pm 0.025$           |
| 8.0      | $\pm 0.025$           |
| 10.0     | $\pm 0.03$            |
| 12.0     | $\pm 0.035$           |

| 柄徑<br>shank (h6) | 柄徑公差值<br>D2 tolerance |
|------------------|-----------------------|
| ∅ 3              | $\pm 0.006$           |
| ∅ 4              | $\pm 0.006$           |
| ∅ 5              | $\pm 0.006$           |
| ∅ 6              | $\pm 0.006$           |
| ∅ 8              | $\pm 0.006$           |
| ∅ 10             | $\pm 0.009$           |
| ∅ 12             | $\pm 0.011$           |

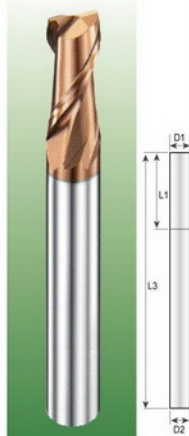
unit:mm

○ 精銑 Finishing    ⊙ 中銑 Semi-finishing    — 粗銑 Roughing



| 型號<br>Type No. | D1<br>Diameter<br>直徑 | L1<br>Flute Length<br>刃長 | L3<br>O.A.L.<br>全長 | D2<br>Shank Dia<br>柄徑 |
|----------------|----------------------|--------------------------|--------------------|-----------------------|
| HEH 0302       | 3.0                  | 8                        | 75                 | 3                     |
| HEH 0402       | 4.0                  | 11                       | 75                 | 4                     |
| HEH 0502       | 5.0                  | 13                       | 75                 | 6                     |
| HEH 0602       | 6.0                  | 16                       | 75                 | 6                     |
| HEH 0802       | 8.0                  | 20                       | 75                 | 8                     |
| IEH 0302       | 3.0                  | 8                        | 100                | 3                     |
| IEH 0402       | 4.0                  | 11                       | 100                | 4                     |
| IEH 0502       | 5.0                  | 13                       | 100                | 6                     |
| IEH 0602       | 6.0                  | 16                       | 100                | 6                     |
| IEH 0802       | 8.0                  | 20                       | 100                | 8                     |
| IEH 1002       | 10.0                 | 25                       | 100                | 10                    |
| IEH 1202       | 12.0                 | 30                       | 100                | 12                    |
| JEH 0602       | 6.0                  | 16                       | 150                | 6                     |
| JEH 0802       | 8.0                  | 20                       | 150                | 8                     |
| JEH 1002       | 10.0                 | 25                       | 150                | 10                    |
| JEH 1202       | 12.0                 | 30                       | 150                | 12                    |

unit:mm



| 直徑<br>D1 | 直徑公差值<br>D1 tolerance |
|----------|-----------------------|
| 3.0      | $\pm 0.02$            |
| 4.0      | $\pm 0.02$            |
| 5.0      | $\pm 0.02$            |
| 6.0      | $\pm 0.025$           |
| 8.0      | $\pm 0.025$           |
| 10.0     | $\pm 0.03$            |
| 12.0     | $\pm 0.035$           |

| 柄徑<br>shank (h6) | 柄徑公差值<br>D2 tolerance |
|------------------|-----------------------|
| ∅ 3              | $\pm 0.006$           |
| ∅ 4              | $\pm 0.006$           |
| ∅ 5              | $\pm 0.006$           |
| ∅ 6              | $\pm 0.006$           |
| ∅ 8              | $\pm 0.006$           |
| ∅ 10             | $\pm 0.009$           |
| ∅ 12             | $\pm 0.011$           |

unit:mm

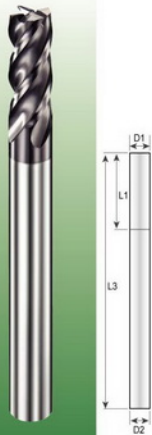


精銑 Finishing 
  中銑 Semi-finishing 
  粗銑 Roughing



| 型號<br>Type No. | D1<br>Diameter<br>直徑 | L1<br>Flute Length<br>刃長 | L3<br>O.A.L.<br>全長 | D2<br>Shank Dia<br>柄徑 |
|----------------|----------------------|--------------------------|--------------------|-----------------------|
| HEA 0304       | 3.0                  | 8                        | 75                 | 3                     |
| HEA 0404       | 4.0                  | 11                       | 75                 | 4                     |
| HEA 0504       | 5.0                  | 13                       | 75                 | 6                     |
| HEA 0604       | 6.0                  | 16                       | 75                 | 6                     |
| HEA 0804       | 8.0                  | 20                       | 75                 | 8                     |
| IEA 0404       | 4.0                  | 11                       | 100                | 4                     |
| IEA 0604       | 6.0                  | 16                       | 100                | 6                     |
| IEA 0804       | 8.0                  | 20                       | 100                | 8                     |
| IEA 1004       | 10.0                 | 25                       | 100                | 10                    |
| IEA 1204       | 12.0                 | 30                       | 100                | 12                    |
| JEA 0604       | 6.0                  | 16                       | 150                | 6                     |
| JEA 0804       | 8.0                  | 20                       | 150                | 8                     |
| JEA 1004       | 10.0                 | 25                       | 150                | 10                    |
| JEA 1204       | 12.0                 | 30                       | 150                | 12                    |
| JEA 1604       | 16.0                 | 45                       | 150                | 16                    |
| JEA 2004       | 20.0                 | 50                       | 150                | 20                    |

unit:mm



| 直徑<br>D1 | 直徑公差值<br>D1 tolerance |
|----------|-----------------------|
| 3.0      | ±0.02                 |
| 4.0      | ±0.02                 |
| 5.0      | ±0.02                 |
| 6.0      | ±0.025                |
| 8.0      | ±0.025                |
| 10.0     | ±0.03                 |
| 12.0     | ±0.035                |
| 16.0     | ±0.04                 |
| 20.0     | ±0.04                 |

| 柄徑<br>shank (h5) | 柄徑公差值<br>D2 tolerance |
|------------------|-----------------------|
| ∅ 3              | ±0.006                |
| ∅ 4              | ±0.006                |
| ∅ 6              | ±0.008                |
| ∅ 8              | ±0.008                |
| ∅ 10             | ±0.009                |
| ∅ 12             | ±0.011                |
| ∅ 16             | ±0.011                |
| ∅ 20             | ±0.013                |

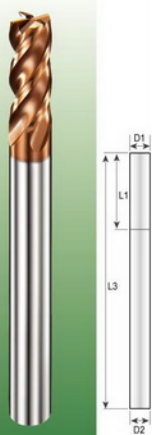
unit:mm

精銑 Finishing 
  中銑 Semi-finishing 
  粗銑 Roughing



| 型號<br>Type No. | D1<br>Diameter<br>直徑 | L1<br>Flute Length<br>刃長 | L3<br>O.A.L.<br>全長 | D2<br>Shank Dia<br>柄徑 |
|----------------|----------------------|--------------------------|--------------------|-----------------------|
| HEH 0304       | 3.0                  | 8                        | 75                 | 3                     |
| HEH 0404       | 4.0                  | 11                       | 75                 | 4                     |
| HEH 0504       | 5.0                  | 13                       | 75                 | 6                     |
| HEH 0604       | 6.0                  | 16                       | 75                 | 6                     |
| HEH 0804       | 8.0                  | 20                       | 75                 | 8                     |
| IEH 0404       | 4.0                  | 11                       | 100                | 4                     |
| IEH 0604       | 6.0                  | 16                       | 100                | 6                     |
| IEH 0804       | 8.0                  | 20                       | 100                | 8                     |
| IEH 1004       | 10.0                 | 25                       | 100                | 10                    |
| IEH 1204       | 12.0                 | 30                       | 100                | 12                    |
| JEH 0604       | 6.0                  | 16                       | 150                | 6                     |
| JEH 0804       | 8.0                  | 20                       | 150                | 8                     |
| JEH 1004       | 10.0                 | 25                       | 150                | 10                    |
| JEH 1204       | 12.0                 | 30                       | 150                | 12                    |
| JEH 1604       | 16.0                 | 45                       | 150                | 16                    |
| JEH 2004       | 20.0                 | 50                       | 150                | 20                    |

unit:mm



| 直徑<br>D1 | 直徑公差值<br>D1 tolerance |
|----------|-----------------------|
| 3.0      | ±0.02                 |
| 4.0      | ±0.02                 |
| 5.0      | ±0.02                 |
| 6.0      | ±0.025                |
| 8.0      | ±0.025                |
| 10.0     | ±0.03                 |
| 12.0     | ±0.035                |
| 16.0     | ±0.04                 |
| 20.0     | ±0.04                 |

| 柄徑<br>shank (h5) | 柄徑公差值<br>D2 tolerance |
|------------------|-----------------------|
| ∅ 3              | ±0.006                |
| ∅ 4              | ±0.006                |
| ∅ 6              | ±0.008                |
| ∅ 8              | ±0.008                |
| ∅ 10             | ±0.009                |
| ∅ 12             | ±0.011                |
| ∅ 16             | ±0.011                |
| ∅ 20             | ±0.013                |

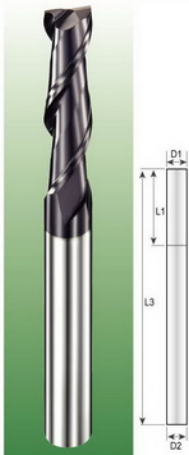
unit:mm

精銑 Finishing 
  中銑 Semi-finishing 
  粗銑 Roughing



| 型號<br>Type No. | D1<br>Diameter<br>直徑 | L1<br>Flute Length<br>刃長 | L3<br>O.A.L.<br>全長 | D2<br>Shank Dia<br>柄徑 |
|----------------|----------------------|--------------------------|--------------------|-----------------------|
| LFTA 0202      | 2.0                  | 12                       | 50                 | 4                     |
| LFTA 0302      | 3.0                  | 20                       | 50                 | 4                     |
| LFTA 0402      | 4.0                  | 25                       | 75                 | 4                     |
| LFTA 0502      | 5.0                  | 30                       | 75                 | 6                     |
| LFTA 0602      | 6.0                  | 30                       | 75                 | 6                     |
| LFTA 0802      | 8.0                  | 40                       | 100                | 8                     |
| LFTA 1002      | 10.0                 | 40                       | 100                | 10                    |
| LFTA 1202      | 12.0                 | 45                       | 100                | 12                    |

unit:mm



| 直徑<br>D1 | 直徑公差值<br>D1 tolerance |
|----------|-----------------------|
| 2.0      | ±0.02                 |
| 3.0      | ±0.02                 |
| 4.0      | ±0.02                 |
| 5.0      | ±0.02                 |
| 6.0      | ±0.025                |
| 8.0      | ±0.03                 |
| 10.0     | ±0.035                |
| 12.0     | ±0.04                 |

| 柄徑<br>D2 tolerance | 柄徑公差值<br>D2 tolerance |
|--------------------|-----------------------|
| ∅ 4                | ±0.008                |
| ∅ 6                | ±0.008                |
| ∅ 8                | ±0.008                |
| ∅ 10               | ±0.009                |
| ∅ 12               | ±0.011                |

unit:mm

List of recommended milling conditions for LFTA-2T

| 被削材<br>Work Material | Carbon Steels<br>S45C-S50C<br>HB150-230 | Alloy Steels<br>SCK1-SUJ1(SPM)<br>HRC20-35 | Prehardened Steels<br>NAK60(P18)<br>HRC40 | Hardened Steels<br>SKD11<br>HRC50 |
|----------------------|---|--|---|-----------------------------------|
| Type No.             | 迴轉速度 Speed (mm-1)                       | 進給速度 Feed (mm/min)                         | 迴轉速度 Speed (mm-1)                         | 進給速度 Feed (mm/min)                |
| LFTA 0202            | 4800 60                                 | 2850 30                                    | 2250 20                                   | 1650 15                           |
| LFTA 0302            | 3700 60                                 | 2250 40                                    | 2000 30                                   | 1800 20                           |
| LFTA 0402            | 3200 80                                 | 1900 50                                    | 1700 40                                   | 1500 30                           |
| LFTA 0502            | 2850 100                                | 1700 65                                    | 1550 50                                   | 1350 45                           |
| LFTA 0602            | 2650 120                                | 1600 70                                    | 1450 60                                   | 1250 55                           |
| LFTA 0802            | 2000 120                                | 1200 70                                    | 1100 60                                   | 950 55                            |
| LFTA 1002            | 1600 120                                | 950 70                                     | 850 60                                    | 750 55                            |
| LFTA 1202            | 1300 120                                | 800 70                                     | 700 60                                    | 600 15                            |

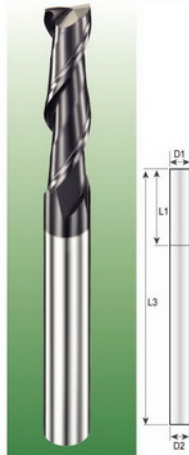
| D Diameter | *Side Milling<br>B <sub>s</sub> =0.30<br>↓ ↑ | B <sub>s</sub> =0.250<br>← → | *Side Milling<br>B <sub>s</sub> =0.30<br>↓ ↑ | B <sub>s</sub> =0.020<br>← → |
|------------|--|------------------------------|--|------------------------------|
|------------|--|------------------------------|--|------------------------------|

精銑 Finishing 
  中銑 Semi-finishing 
  粗銑 Roughing



| 型號<br>Type No. | D1<br>Diameter<br>直徑 | L1<br>Flute Length<br>刃長 | L3<br>O.A.L.<br>全長 | D2<br>Shank Dia<br>柄徑 |
|----------------|----------------------|--------------------------|--------------------|-----------------------|
| LFTG 0202      | 2.0                  | 12                       | 50                 | 4                     |
| LFTG 0302      | 3.0                  | 20                       | 50                 | 6                     |
| LFTG 0402      | 4.0                  | 25                       | 75                 | 6                     |
| LFTG 0502      | 5.0                  | 30                       | 75                 | 6                     |
| LFTG 0602      | 6.0                  | 30                       | 75                 | 6                     |
| LFTG 0802      | 8.0                  | 40                       | 100                | 8                     |
| LFTG 1002      | 10.0                 | 40                       | 100                | 10                    |
| LFTG 1202      | 12.0                 | 45                       | 100                | 12                    |

unit:mm



| 直徑<br>D1 | 直徑公差值<br>D1 tolerance |
|----------|-----------------------|
| 2.0      | ±0.02                 |
| 2.5      | ±0.02                 |
| 3.0      | ±0.02                 |
| 3.5      | ±0.02                 |
| 4.0      | ±0.02                 |
| 4.5      | ±0.02                 |
| 5.0      | ±0.02                 |
| 6.0      | ±0.025                |
| 8.0      | ±0.025                |
| 10.0     | ±0.03                 |
| 12.0     | ±0.035                |

| 柄徑<br>shank (h6) | 柄徑公差值<br>D2 tolerance |
|------------------|-----------------------|
| ∅ 4              | ±0.008                |
| ∅ 6              | ±0.008                |
| ∅ 8              | ±0.008                |
| ∅ 10             | ±0.009                |
| ∅ 12             | ±0.011                |

unit:mm

List of recommended milling conditions for LFTG-2T

| 被削材<br>Work Material | Carbon Steels<br>S45C-S50C<br>HB150-250 | Alloy Steels<br>SCK1-SUJ1(SPM)<br>HRC20-35 | Prehardened Steels<br>NAK60(P18)<br>HRC40 | Hardened Steels<br>SKD11<br>HRC50 |
|----------------------|---|--|---|-----------------------------------|
| Type No.             | 迴轉速度 Speed (mm-1)                       | 進給速度 Feed (mm/min)                         | 迴轉速度 Speed (mm-1)                         | 進給速度 Feed (mm/min)                |
| LFTG 0202            | 4800 60                                 | 2850 30                                    | 2250 20                                   | 1650 15                           |
| LFTG 0302            | 3700 60                                 | 2250 40                                    | 2000 30                                   | 1800 20                           |
| LFTG 0402            | 3200 80                                 | 1900 50                                    | 1700 40                                   | 1500 30                           |
| LFTG 0502            | 2850 100                                | 1700 65                                    | 1550 50                                   | 1350 45                           |
| LFTG 0602            | 2650 120                                | 1600 70                                    | 1450 60                                   | 1250 55                           |
| LFTG 0802            | 2000 120                                | 1200 70                                    | 1100 60                                   | 950 55                            |
| LFTG 1002            | 1600 120                                | 950 70                                     | 850 60                                    | 750 55                            |
| LFTG 1202            | 1300 120                                | 800 70                                     | 700 60                                    | 600 15                            |

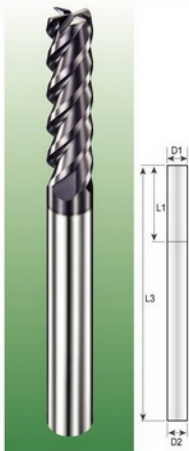
| D Diameter | *Side Milling<br>B <sub>s</sub> =0.30<br>↓ ↑ | B <sub>s</sub> =0.250<br>← → | *Side Milling<br>B <sub>s</sub> =0.30<br>↓ ↑ | B <sub>s</sub> =0.020<br>← → |
|------------|--|------------------------------|--|------------------------------|
|------------|--|------------------------------|--|------------------------------|

◎ 精銑 Finishing    ◎ 中銑 Semi-finishing    — 粗銑 Roughing



| 型號<br>Type No. | D1<br>Diameter<br>直徑 | L1<br>Flute Length<br>刃長 | L3<br>O.A.L.<br>全長 | D2<br>Shank Dia<br>柄徑 |
|----------------|----------------------|--------------------------|--------------------|-----------------------|
| LFTA 0204      | 2.0                  | 15                       | 50                 | 4                     |
| LFTA 0304      | 3.0                  | 20                       | 50                 | 4                     |
| LFTA 0404      | 4.0                  | 25                       | 75                 | 4                     |
| LFTA 0504      | 5.0                  | 30                       | 75                 | 6                     |
| LFTA 0604      | 6.0                  | 30                       | 75                 | 6                     |
| LFTA 0804      | 8.0                  | 40                       | 100                | 8                     |
| LFTA 1004      | 10.0                 | 40                       | 100                | 10                    |
| LFTA 1204      | 12.0                 | 45                       | 100                | 12                    |
| LFTA 1604      | 16.0                 | 60                       | 150                | 16                    |
| LFTA 2004      | 20.0                 | 60                       | 150                | 20                    |

unit:mm



| 直徑<br>D1 | 直徑公差值<br>D1 tolerance |
|----------|-----------------------|
| 2.0      | ±0.02                 |
| 3.0      | ±0.02                 |
| 4.0      | ±0.02                 |
| 5.0      | ±0.02                 |
| 6.0      | ±0.025                |
| 8.0      | ±0.03                 |
| 10.0     | ±0.035                |
| 12.0     | ±0.04                 |
| 16.0     | ±0.04                 |
| 20.0     | ±0.05                 |

| 柄徑<br>shank (h6) | 柄徑公差值<br>D2 tolerance |
|------------------|-----------------------|
| ∅ 4              | 0.008                 |
| ∅ 6              | 0.008                 |
| ∅ 8              | 0.008                 |
| ∅ 10             | 0.008                 |
| ∅ 12             | 0.011                 |
| ∅ 16             | 0.011                 |
| ∅ 20             | 0.013                 |

unit:mm

List of recommended milling conditions for LFTA-4T

| 被削材<br>Work Material | Carbon Steels<br>S45C/S50C<br>HB150-250 |                       | Alloy Steels<br>SCK1/SUJ2(SPM)<br>HRC20-35 |                       | Prehardened Steels<br>NAK80(PM)<br>HRC40 |                       | Hardened Steels<br>SKD11<br>HRC50 |                       |
|----------------------|---|-----------------------|--|-----------------------|--|-----------------------|-----------------------------------|-----------------------|
|                      | Type No.                                | 迴轉速度Speed<br>(mm/min) | 進給率Feed<br>(mm/min)                        | 迴轉速度Speed<br>(mm/min) | 進給率Feed<br>(mm/min)                      | 迴轉速度Speed<br>(mm/min) | 進給率Feed<br>(mm/min)               | 迴轉速度Speed<br>(mm/min) |
| LFTA 0204            | 4800                                    | 70                    | 2850                                       | 40                    | 2250                                     | 35                    | 1650                              | 20                    |
| LFTA 0304            | 3700                                    | 100                   | 2250                                       | 60                    | 2000                                     | 50                    | 1800                              | 40                    |
| LFTA 0404            | 3200                                    | 150                   | 1900                                       | 90                    | 1700                                     | 70                    | 1500                              | 50                    |
| LFTA 0504            | 2850                                    | 160                   | 1700                                       | 100                   | 1550                                     | 80                    | 1350                              | 60                    |
| LFTA 0604            | 2650                                    | 200                   | 1600                                       | 135                   | 1450                                     | 100                   | 1250                              | 80                    |
| LFTA 0804            | 2000                                    | 200                   | 1200                                       | 135                   | 1100                                     | 100                   | 950                               | 80                    |
| LFTA 1004            | 1600                                    | 200                   | 950  | 135                   | 850                                      | 100                   | 750                               | 80                    |
| LFTA 1204            | 1300                                    | 200                   | 800  | 135                   | 700                                      | 100                   | 600                               | 80                    |
| LFTA 1604            | 1000                                    | 160                   | 600  | 90                    | 500                                      | 80                    | 450                               | 65                    |
| LFTA 2004            | 800                                     | 130                   | 500  | 80                    | 400                                      | 60                    | 350                               | 50                    |

| D Diameter | *Side Milling          |                        | Diameter | *Side Milling          |                        |
|------------|------------------------|------------------------|----------|------------------------|------------------------|
|            | +B <sub>2</sub> =0.050 | +B <sub>1</sub> =0.030 |          | +B <sub>2</sub> =0.020 | +B <sub>1</sub> =0.015 |
| ∅ 4        | 0.008                  | 0.008                  | ∅ 4      | 0.008                  | 0.008                  |
| ∅ 6        | 0.008                  | 0.008                  | ∅ 6      | 0.008                  | 0.008                  |
| ∅ 8        | 0.008                  | 0.008                  | ∅ 8      | 0.008                  | 0.008                  |
| ∅ 10       | 0.008                  | 0.008                  | ∅ 10     | 0.008                  | 0.008                  |
| ∅ 12       | 0.011                  | 0.011                  | ∅ 12     | 0.011                  | 0.011                  |
| ∅ 16       | 0.011                  | 0.011                  | ∅ 16     | 0.011                  | 0.011                  |
| ∅ 20       | 0.013                  | 0.013                  | ∅ 20     | 0.013                  | 0.013                  |

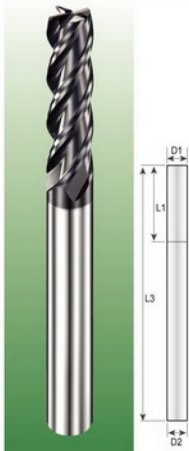
unit:mm

◎ 精銑 Finishing    ◎ 中銑 Semi-finishing    — 粗銑 Roughing



| 型號<br>Type No. | D1<br>Diameter<br>直徑 | L1<br>Flute Length<br>刃長 | L3<br>O.A.L.<br>全長 | D2<br>Shank Dia<br>柄徑 |
|----------------|----------------------|--------------------------|--------------------|-----------------------|
| LFTG 0204      | 2.0                  | 15                       | 50                 | 4                     |
| LFTG 0304      | 3.0                  | 15                       | 50                 | 6                     |
| LFTG 0404      | 4.0                  | 20                       | 75                 | 6                     |
| LFTG 0504      | 5.0                  | 25                       | 75                 | 6                     |
| LFTG 0604      | 6.0                  | 30                       | 75                 | 6                     |
| LFTG 0804      | 8.0                  | 40                       | 100                | 8                     |
| LFTG 1004      | 10.0                 | 40                       | 100                | 10                    |
| LFTG 1204      | 12.0                 | 45                       | 100                | 12                    |
| LFTG 1604      | 16.0                 | 70                       | 150                | 16                    |
| LFTG 2004      | 20.0                 | 75                       | 150                | 20                    |

unit:mm



| 直徑<br>D1 | 直徑公差值<br>D1 tolerance |
|----------|-----------------------|
| 2.0      | ±0.02                 |
| 3.0      | ±0.02                 |
| 4.0      | ±0.02                 |
| 5.0      | ±0.02                 |
| 6.0      | ±0.025                |
| 8.0      | ±0.03                 |
| 10.0     | ±0.035                |
| 12.0     | ±0.04                 |
| 16.0     | ±0.04                 |
| 20.0     | ±0.05                 |

| 柄徑<br>shank (h6) | 柄徑公差值<br>D2 tolerance |
|------------------|-----------------------|
| ∅ 4              | 0.008                 |
| ∅ 6              | 0.008                 |
| ∅ 8              | 0.008                 |
| ∅ 10             | 0.008                 |
| ∅ 12             | 0.011                 |
| ∅ 16             | 0.011                 |
| ∅ 20             | 0.013                 |

unit:mm

List of recommended milling conditions for LFTG-4T

| 被削材<br>Work Material | Carbon Steels<br>S45C/S50C<br>HB150-250 |                       | Alloy Steels<br>SCK1/SUJ2(SPM)<br>HRC20-35 |                       | Prehardened Steels<br>NAK80(PM)<br>HRC40 |                       | Hardened Steels<br>SKD11<br>HRC50 |                       |
|----------------------|---|-----------------------|--|-----------------------|--|-----------------------|-----------------------------------|-----------------------|
|                      | Type No.                                | 迴轉速度Speed<br>(mm/min) | 進給率Feed<br>(mm/min)                        | 迴轉速度Speed<br>(mm/min) | 進給率Feed<br>(mm/min)                      | 迴轉速度Speed<br>(mm/min) | 進給率Feed<br>(mm/min)               | 迴轉速度Speed<br>(mm/min) |
| LFTG 0204            | 4800                                    | 70                    | 2850                                       | 40                    | 2250                                     | 35                    | 1650                              | 20                    |
| LFTG 0304            | 3700                                    | 100                   | 2250                                       | 60                    | 2000                                     | 50                    | 1800                              | 40                    |
| LFTG 0404            | 3200                                    | 150                   | 1900                                       | 90                    | 1700                                     | 70                    | 1500                              | 50                    |
| LFTG 0504            | 2850                                    | 160                   | 1700                                       | 100                   | 1550                                     | 80                    | 1350                              | 60                    |
| LFTG 0604            | 2650                                    | 200                   | 1600                                       | 135                   | 1450                                     | 100                   | 1250                              | 80                    |
| LFTG 0804            | 2000                                    | 200                   | 1200                                       | 135                   | 1100                                     | 100                   | 950                               | 80                    |
| LFTG 1004            | 1600                                    | 200                   | 950  | 135                   | 850                                      | 100                   | 750                               | 80                    |
| LFTG 1204            | 1300                                    | 200                   | 800  | 135                   | 700                                      | 100                   | 600                               | 80                    |
| LFTG 1604            | 1000                                    | 160                   | 600  | 90                    | 500                                      | 80                    | 450                               | 65                    |
| LFTG 2004            | 800                                     | 130                   | 500  | 80                    | 400                                      | 60                    | 350                               | 50                    |

| D Diameter | *Side Milling          |                        | Diameter | *Side Milling          |                        |
|------------|------------------------|------------------------|----------|------------------------|------------------------|
|            | +B <sub>2</sub> =0.050 | +B <sub>1</sub> =0.030 |          | +B <sub>2</sub> =0.020 | +B <sub>1</sub> =0.015 |
| ∅ 4        | 0.008                  | 0.008                  | ∅ 4      | 0.008                  | 0.008                  |
| ∅ 6        | 0.008                  | 0.008                  | ∅ 6      | 0.008                  | 0.008                  |
| ∅ 8        | 0.008                  | 0.008                  | ∅ 8      | 0.008                  | 0.008                  |
| ∅ 10       | 0.008                  | 0.008                  | ∅ 10     | 0.008                  | 0.008                  |
| ∅ 12       | 0.011                  | 0.011                  | ∅ 12     | 0.011                  | 0.011                  |
| ∅ 16       | 0.011                  | 0.011                  | ∅ 16     | 0.011                  | 0.011                  |
| ∅ 20       | 0.013                  | 0.013                  | ∅ 20     | 0.013                  | 0.013                  |

unit:mm

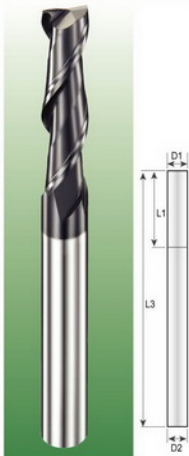


○ 精銑 Finishing    ⊙ 中銑 Semi-finishing    — 粗銑 Roughing



| 型號<br>Type No. | D1<br>Diameter<br>直徑 | L1<br>Flute Length<br>刃長 | L3<br>O.A.L.<br>全長 | D2<br>Shank Dia<br>柄徑 |
|----------------|----------------------|--------------------------|--------------------|-----------------------|
| LFTH 0202      | 2.0                  | 12                       | 50                 | 4                     |
| LFTH 0302      | 3.0                  | 20                       | 50                 | 4                     |
| LFTH 0402      | 4.0                  | 25                       | 75                 | 4                     |
| LFTH 0502      | 5.0                  | 30                       | 75                 | 6                     |
| LFTH 0602      | 6.0                  | 30                       | 75                 | 6                     |
| LFTH 0802      | 8.0                  | 40                       | 100                | 8                     |
| LFTH 1002      | 10.0                 | 40                       | 100                | 10                    |
| LFTH 1202      | 12.0                 | 45                       | 100                | 12                    |

unit:mm



| 直徑<br>D1 | 直徑公差值<br>D1 tolerance | 柄徑<br>D2 tolerance |
|----------|-----------------------|--------------------|
| 2.0      | ±0.02                 | ±0.008             |
| 3.0      | ±0.02                 | ±0.008             |
| 4.0      | ±0.02                 | ±0.008             |
| 5.0      | ±0.02                 | ±0.008             |
| 6.0      | ±0.025                | ±0.008             |
| 8.0      | ±0.03                 | ±0.008             |
| 10.0     | ±0.035                | ±0.008             |
| 12.0     | ±0.04                 | ±0.011             |

unit:mm

List of recommended milling conditions for LFTH-2T

| Type No.  | Carbon Steels<br>S45C/S50C<br>HB150-250 |                      | Alloy Steels<br>S45C/S45NiPM<br>HRC20-35 |                      | Prehardened Steels<br>NAK80(P18)<br>HRC40 |                      | Hardened Steels<br>SKD11<br>HRC50 |                      |
|-----------|---|----------------------|--|----------------------|---|----------------------|-----------------------------------|----------------------|
|           | 迴轉速度Speed<br>(mm-1)                     | 進給進刀Feed<br>(mm/min) | 迴轉速度Speed<br>(mm-1)                      | 進給進刀Feed<br>(mm/min) | 迴轉速度Speed<br>(mm-1)                       | 進給進刀Feed<br>(mm/min) | 迴轉速度Speed<br>(mm-1)               | 進給進刀Feed<br>(mm/min) |
| LFTH 0202 | 4800                                    | 60                   | 2850                                     | 30                   | 2250                                      | 20                   | 1650                              | 15                   |
| LFTH 0302 | 3700                                    | 60                   | 2250                                     | 40                   | 2000                                      | 30                   | 1800                              | 20                   |
| LFTH 0402 | 3200                                    | 80                   | 1900                                     | 50                   | 1700                                      | 40                   | 1500                              | 30                   |
| LFTH 0502 | 2850                                    | 100                  | 1700                                     | 65                   | 1550                                      | 50                   | 1350                              | 45                   |
| LFTH 0602 | 2650                                    | 120                  | 1600                                     | 70                   | 1450                                      | 60                   | 1250                              | 55                   |
| LFTH 0802 | 2000                                    | 120                  | 1200                                     | 70                   | 1100                                      | 60                   | 950                               | 55                   |
| LFTH 1002 | 1600                                    | 120                  | 950                                      | 70                   | 850                                       | 60                   | 750                               | 55                   |
| LFTH 1202 | 1300                                    | 120                  | 800                                      | 70                   | 700                                       | 60                   | 600                               | 15                   |



○ 精銑 Finishing    ⊙ 中銑 Semi-finishing    — 粗銑 Roughing



| 型號<br>Type No. | D1<br>Diameter<br>直徑 | L1<br>Flute Length<br>刃長 | L3<br>O.A.L.<br>全長 | D2<br>Shank Dia<br>柄徑 |
|----------------|----------------------|--------------------------|--------------------|-----------------------|
| LFTH 0204      | 2.0                  | 15                       | 50                 | 4                     |
| LFTH 0304      | 3.0                  | 20                       | 50                 | 4                     |
| LFTH 0404      | 4.0                  | 25                       | 75                 | 4                     |
| LFTH 0504      | 5.0                  | 30                       | 75                 | 6                     |
| LFTH 0604      | 6.0                  | 30                       | 75                 | 6                     |
| LFTH 0804      | 8.0                  | 40                       | 100                | 8                     |
| LFTH 1004      | 10.0                 | 40                       | 100                | 10                    |
| LFTH 1204      | 12.0                 | 45                       | 100                | 12                    |
| LFTH 1604      | 16.0                 | 60                       | 150                | 16                    |
| LFTH 2004      | 20.0                 | 60                       | 150                | 20                    |

unit:mm

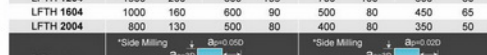


| 直徑<br>D1 | 直徑公差值<br>D1 tolerance | 柄徑<br>D2 tolerance |
|----------|-----------------------|--------------------|
| 2.0      | ±0.02                 | ±0.008             |
| 3.0      | ±0.02                 | ±0.008             |
| 4.0      | ±0.02                 | ±0.008             |
| 5.0      | ±0.02                 | ±0.008             |
| 6.0      | ±0.025                | ±0.008             |
| 8.0      | ±0.03                 | ±0.008             |
| 10.0     | ±0.035                | ±0.008             |
| 12.0     | ±0.04                 | ±0.008             |
| 16.0     | ±0.04                 | ±0.011             |
| 20.0     | ±0.05                 | ±0.013             |

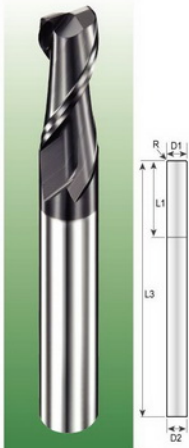
unit:mm

List of recommended milling conditions for LFTH-4T

| Type No.  | Carbon Steels<br>S45C/S50C<br>HB150-250 |                      | Alloy Steels<br>S45C/S45NiPM<br>HRC20-35 |                      | Prehardened Steels<br>NAK80(P18)<br>HRC40 |                      | Hardened Steels<br>SKD11<br>HRC50 |                      |
|-----------|---|----------------------|--|----------------------|---|----------------------|-----------------------------------|----------------------|
|           | 迴轉速度Speed<br>(mm-1)                     | 進給進刀Feed<br>(mm/min) | 迴轉速度Speed<br>(mm-1)                      | 進給進刀Feed<br>(mm/min) | 迴轉速度Speed<br>(mm-1)                       | 進給進刀Feed<br>(mm/min) | 迴轉速度Speed<br>(mm-1)               | 進給進刀Feed<br>(mm/min) |
| LFTH 0204 | 4800                                    | 70                   | 2850                                     | 40                   | 2250                                      | 35                   | 1650                              | 20                   |
| LFTH 0304 | 3700                                    | 60                   | 2250                                     | 60                   | 2000                                      | 50                   | 1800                              | 40                   |
| LFTH 0404 | 3200                                    | 150                  | 1900                                     | 90                   | 1700                                      | 70                   | 1500                              | 50                   |
| LFTH 0504 | 2850                                    | 160                  | 1700                                     | 100                  | 1550                                      | 80                   | 1350                              | 60                   |
| LFTH 0604 | 2650                                    | 200                  | 1600                                     | 135                  | 1450                                      | 100                  | 1250                              | 80                   |
| LFTH 0804 | 2000                                    | 200                  | 1200                                     | 135                  | 1100                                      | 100                  | 950                               | 80                   |
| LFTH 1004 | 1600                                    | 200                  | 950                                      | 135                  | 850                                       | 100                  | 750                               | 80                   |
| LFTH 1204 | 1300                                    | 200                  | 800                                      | 135                  | 700                                       | 100                  | 600                               | 80                   |
| LFTH 1604 | 1000                                    | 160                  | 600                                      | 90                   | 500                                       | 80                   | 450                               | 65                   |
| LFTH 2004 | 800                                     | 130                  | 500                                      | 80                   | 400                                       | 80                   | 350                               | 50                   |



精銑 Finishing 
  中銑 Semi-finishing 
  粗銑 Roughing



| 型號<br>Type No. | D1<br>Diameter<br>直徑 | R<br>Corner R<br>圓鼻角 | L1<br>Flute Length<br>刀長 | L3<br>O.A.L.<br>全長 | D2<br>Shank Dia<br>柄徑 |
|----------------|----------------------|----------------------|--------------------------|--------------------|-----------------------|
| RTA 0205       | 2.0                  | 0.5                  | 6                        | 50                 | 4                     |
| RTA 0305       | 3.0                  | 0.5                  | 8                        | 50                 | 3                     |
| RTA 0405       | 4.0                  | 0.5                  | 10                       | 50                 | 4                     |
| RTA 0410       | 4.0                  | 1.0                  | 10                       | 50                 | 4                     |
| RTA 0505       | 5.0                  | 0.5                  | 13                       | 50                 | 6                     |
| RTA 0510       | 5.0                  | 1.0                  | 13                       | 50                 | 6                     |
| RTA 0605       | 6.0                  | 0.5                  | 16                       | 50                 | 6                     |
| RTA 0610       | 6.0                  | 1.0                  | 16                       | 50                 | 6                     |
| RTA 0805       | 8.0                  | 0.5                  | 19                       | 60                 | 8                     |
| RTA 0810       | 8.0                  | 1.0                  | 19                       | 60                 | 8                     |
| RTA 1005       | 10.0                 | 0.5                  | 25                       | 75                 | 10                    |
| RTA 1010       | 10.0                 | 1.0                  | 25                       | 75                 | 10                    |
| RTA 1015       | 10.0                 | 1.5                  | 25                       | 75                 | 10                    |
| RTA 1020       | 10.0                 | 2.0                  | 25                       | 75                 | 10                    |
| RTA 1210       | 12.0                 | 1.0                  | 30                       | 75                 | 12                    |
| RTA 1220       | 12.0                 | 2.0                  | 30                       | 75                 | 12                    |

unit:mm

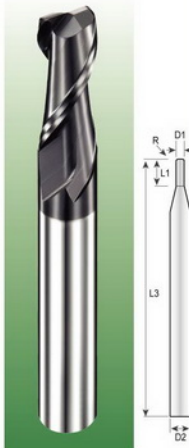
### List of recommended milling conditions for RTA

| Work Material<br>加工材料 | Carbon Steels<br>S50C        |   |                         | Alloy Steels<br>S-Mn, S-K, S-US |   |                         | Prehardened Steels<br>HPM, NAL |   |                         | Hardened Steels<br>SKD61<br>-HRC52 |   |                         |
|-----------------------|------------------------------|---|-------------------------|---------------------------------|---|-------------------------|--------------------------------|---|-------------------------|------------------------------------|---|-------------------------|
|                       | Velocity<br>切削速度<br>(mm/min) | Spindle Speed<br>主軸轉速<br>(mm <sup>-1</sup> / Side Milling / Slotting) | Feed<br>進給量<br>(mm/min) | Velocity<br>切削速度<br>(mm/min)    | Spindle Speed<br>主軸轉速<br>(mm <sup>-1</sup> / Side Milling / Slotting) | Feed<br>進給量<br>(mm/min) | Velocity<br>切削速度<br>(mm/min)   | Spindle Speed<br>主軸轉速<br>(mm <sup>-1</sup> / Side Milling / Slotting) | Feed<br>進給量<br>(mm/min) | Velocity<br>切削速度<br>(mm/min)       | Spindle Speed<br>主軸轉速<br>(mm <sup>-1</sup> / Side Milling / Slotting) | Feed<br>進給量<br>(mm/min) |
| RTA 0205              | 12800                        | 400   | 150                     | 9600                            | 210   | 70                      | 6400                           | 110   | 55                      | 3200                               | 80  | 40                      |
| RTA 0305              | 8500                         | 450   | 160                     | 6400                            | 250   | 80                      | 4300                           | 120   | 60                      | 2100                               | 100   | 50                      |
| RTA 0405              | 6400                         | 450   | 160                     | 4800                            | 250   | 80                      | 3200                           | 120   | 60                      | 1600                               | 100   | 50                      |
| RTA 0410              | 6400                         | 450   | 160                     | 4800                            | 250   | 80                      | 3200                           | 120   | 60                      | 1600                               | 100   | 50                      |
| RTA 0505              | 5100                         | 600   | 200                     | 3800                            | 300   | 90                      | 2600                           | 150   | 75                      | 1300                               | 120   | 60                      |
| RTA 0510              | 5100                         | 600   | 200                     | 3800                            | 300   | 90                      | 2600                           | 150   | 75                      | 1300                               | 120   | 60                      |
| RTA 0605              | 2400                         | 170   | 70                      | 2100                            | 140   | 55                      | 1600                           | 110   | 45                      | 1100                               | 80  | 30                      |
| RTA 0610              | 2400                         | 170   | 70                      | 2100                            | 140   | 55                      | 1600                           | 110   | 45                      | 1100                               | 80  | 30                      |
| RTA 0805              | 1800                         | 170   | 70                      | 1600                            | 140   | 55                      | 1200                           | 110   | 45                      | 800                                | 80  | 30                      |
| RTA 0810              | 1800                         | 170   | 70                      | 1600                            | 140   | 55                      | 1200                           | 110   | 45                      | 800                                | 80  | 30                      |
| RTA 1005              | 1400                         | 170   | 70                      | 1300                            | 140   | 55                      | 1000                           | 110   | 45                      | 650                                | 80  | 30                      |
| RTA 1010              | 1400                         | 170   | 70                      | 1300                            | 140   | 55                      | 1000                           | 110   | 45                      | 650                                | 80  | 30                      |
| RTA 1015              | 1400                         | 170   | 70                      | 1300                            | 140   | 55                      | 1000                           | 110   | 45                      | 650                                | 80  | 30                      |
| RTA 1020              | 1400                         | 170   | 70                      | 1300                            | 140   | 55                      | 1000                           | 110   | 45                      | 650                                | 80  | 30                      |
| RTA 1215              | 1200                         | 170   | 70                      | 1100                            | 140   | 55                      | 800                            | 110   | 45                      | 530                                | 80  | 30                      |
| RTA 1220              | 1200                         | 170   | 70                      | 1100                            | 140   | 55                      | 800                            | 110   | 45                      | 530                                | 80  | 30                      |



- Adjust feed according to inclined angle.
- When corner processing, reduce the feed by approximately 50%-30%.
- When using low speed machine, reduce feed and depth of cut.

精銑 Finishing 
  中銑 Semi-finishing 
  粗銑 Roughing



| 型號<br>Type No. | D1<br>Diameter<br>直徑 | R<br>Corner R<br>圓鼻角 | L1<br>Flute Length<br>刀長 | L3<br>O.A.L.<br>全長 | D2<br>Shank Dia<br>柄徑 |
|----------------|----------------------|----------------------|--------------------------|--------------------|-----------------------|
| RTG 0102       | 1.0                  | 0.2                  | 3                        | 50                 | 4                     |
| RTG 0112       | 1.5                  | 0.2                  | 4                        | 50                 | 4                     |
| RTG 0202       | 2.0                  | 0.2                  | 6                        | 50                 | 4                     |
| RTG 0205       | 2.0                  | 0.5                  | 6                        | 50                 | 4                     |
| RTG 0252       | 2.5                  | 0.2                  | 8                        | 50                 | 4                     |
| RTG 0255       | 2.5                  | 0.5                  | 8                        | 50                 | 4                     |
| RTG 0302       | 3.0                  | 0.2                  | 8                        | 50                 | 4                     |
| RTG 0303       | 3.0                  | 0.3                  | 8                        | 50                 | 4                     |
| RTG 0305       | 3.0                  | 0.5                  | 8                        | 50                 | 4                     |
| RTG 0402       | 4.0                  | 0.2                  | 11                       | 50                 | 4                     |
| RTG 0403       | 4.0                  | 0.3                  | 11                       | 50                 | 4                     |
| RTG 0405       | 4.0                  | 0.5                  | 11                       | 50                 | 4                     |
| RTG 0503       | 5.0                  | 0.3                  | 13                       | 50                 | 6                     |
| RTG 0505       | 5.0                  | 0.5                  | 13                       | 50                 | 6                     |
| RTG 0602       | 6.0                  | 0.2                  | 16                       | 50                 | 6                     |
| RTG 0603       | 6.0                  | 0.3                  | 16                       | 50                 | 6                     |
| RTG 0605       | 6.0                  | 0.5                  | 16                       | 50                 | 6                     |
| RTG 0610       | 6.0                  | 1.0                  | 16                       | 50                 | 6                     |
| RTG 0803       | 8.0                  | 0.3                  | 20                       | 60                 | 8                     |
| RTG 0805       | 8.0                  | 0.5                  | 20                       | 60                 | 8                     |
| RTG 1002       | 10.0                 | 0.2                  | 25                       | 75                 | 10                    |
| RTG 1003       | 10.0                 | 0.3                  | 25                       | 75                 | 10                    |
| RTG 1005       | 10.0                 | 0.5                  | 25                       | 75                 | 10                    |
| RTG 1010       | 10.0                 | 1.0                  | 25                       | 75                 | 10                    |
| RTG 1203       | 12.0                 | 0.3                  | 30                       | 75                 | 12                    |
| RTG 1205       | 12.0                 | 0.5                  | 30                       | 75                 | 12                    |
| RTG 1210       | 12.0                 | 1.0                  | 30                       | 75                 | 12                    |
| RTG 1215       | 12.0                 | 1.5                  | 30                       | 75                 | 12                    |
| RTG 1220       | 12.0                 | 2.0                  | 30                       | 75                 | 12                    |

unit:mm

| 直徑<br>D1 | R公差值<br>R tolerance | 直徑公差值<br>D1 tolerance |
|----------|---------------------|-----------------------|
| 1.0      | +0.002              | 0.002                 |
| 1.5      | 0                   | 0.002                 |
| 2.0      | +0.002              | 0.002                 |
| 2.5      | +0.002              | 0.002                 |
| 3.0      | 0                   | 0.002                 |
| 4.0      | +0.002              | 0.002                 |
| 5.0      | 0                   | 0.002                 |
| 6.0      | +0.002              | 0.0025                |
| 8.0      | +0.002              | 0.0025                |
| 10.0     | +0.002              | 0.003                 |
| 12.0     | +0.002              | 0.0035                |

unit:mm

| 柄徑<br>shank (h6) | 柄徑公差值<br>D2 tolerance |
|------------------|-----------------------|
| ∅ 4              | 0.008                 |
| ∅ 6              | 0.008                 |
| ∅ 8              | 0.008                 |
| ∅ 10             | 0.008                 |
| ∅ 12             | 0.011                 |

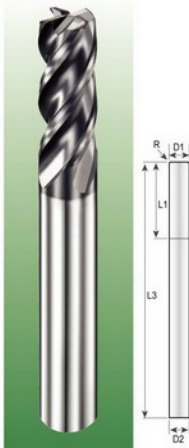
unit:mm

# RTD

## 超微粒圓鼻角立銑刀 Corner Radius End Mills



◎ 精銑 Finishing    ◎ 中銑 Semi-finishing    ◎ 粗銑 Roughing



| 型號<br>Type No. | D1<br>Diameter<br>直徑 | R<br>Corner R<br>圓鼻角 | L1<br>Flute Length<br>刃長 | L3<br>O.A.L.<br>全長 | D2<br>Shank Dia<br>柄徑 |
|----------------|----------------------|----------------------|--------------------------|--------------------|-----------------------|
| RTD 0202       | 2.0                  | 0.2                  | 6                        | 50                 | 4                     |
| RTD 0205       | 2.0                  | 0.5                  | 6                        | 50                 | 4                     |
| RTD 0305       | 3.0                  | 0.5                  | 8                        | 50                 | 3                     |
| RTD 0405       | 4.0                  | 0.5                  | 10                       | 50                 | 4                     |
| RTD 0505       | 5.0                  | 0.5                  | 13                       | 50                 | 6                     |
| RTD 0510       | 5.0                  | 1.0                  | 13                       | 50                 | 6                     |
| RTD 0605       | 6.0                  | 0.5                  | 16                       | 50                 | 6                     |
| RTD 0610       | 6.0                  | 1.0                  | 16                       | 50                 | 6                     |
| RTD 0805       | 8.0                  | 0.5                  | 20                       | 60                 | 8                     |
| RTD 0810       | 8.0                  | 1.0                  | 20                       | 60                 | 8                     |
| RTD 1005Z      | 10.0                 | 0.5                  | 25                       | 75                 | 10                    |
| RTD 1005Z      | 10.0                 | 0.5                  | 30                       | 75                 | 10                    |
| RTD 1010Z      | 10.0                 | 1.0                  | 25                       | 75                 | 10                    |
| RTD 1010       | 10.0                 | 1.0                  | 30                       | 75                 | 10                    |
| RTD 1020Z      | 10.0                 | 2.0                  | 25                       | 75                 | 10                    |
| RTD 1020       | 10.0                 | 2.0                  | 30                       | 75                 | 10                    |
| RTD 1030Z      | 10.0                 | 3.0                  | 25                       | 75                 | 10                    |
| RTD 1030       | 10.0                 | 3.0                  | 30                       | 75                 | 10                    |
| RTD 1210       | 12.0                 | 1.0                  | 30                       | 75                 | 12                    |
| RTD 1220       | 12.0                 | 2.0                  | 30                       | 75                 | 12                    |
| RTD 1230       | 12.0                 | 3.0                  | 30                       | 75                 | 12                    |

List of recommended milling conditions for RTD

| 切削材<br>Work Material | Carbon Steels<br>S45C/S50C<br>HRC20-40 |                        | Alloy Steels<br>NAK80<br>HRC40-50 |                        | Prehardened Steels<br>SKD11<br>HRC50-60 |                        | Hardened Steels<br>SKD11<br>up HRC60 |                        |
|----------------------|--|------------------------|-----------------------------------|------------------------|---|------------------------|--------------------------------------|------------------------|
|                      | Type No.                               | 迴轉速度 Speed<br>(mm/min) | 進給速度 Feed<br>(mm/min)             | 迴轉速度 Speed<br>(mm/min) | 進給速度 Feed<br>(mm/min)                   | 迴轉速度 Speed<br>(mm/min) | 進給速度 Feed<br>(mm/min)                | 迴轉速度 Speed<br>(mm/min) |
| RTD 0605             | 4300                                   | 780                    | 3200                              | 580                    | 2200                                    | 380                    | 1100                                 | 160                    |
| RTD 0610             | 4300                                   | 780                    | 3200                              | 580                    | 2200                                    | 380                    | 1100                                 | 160                    |
| RTD 0805             | 3200                                   | 780                    | 2400                              | 580                    | 1600                                    | 380                    | 800                                  | 160                    |
| RTD 0810             | 3200                                   | 780                    | 2400                              | 580                    | 1600                                    | 380                    | 800                                  | 160                    |
| RTD 1010             | 2600                                   | 780                    | 1900                              | 580                    | 1300                                    | 380                    | 650                                  | 160                    |
| RTD 1020             | 2600                                   | 780                    | 1900                              | 580                    | 1300                                    | 380                    | 650                                  | 160                    |
| RTD 1030             | 2600                                   | 780                    | 1900                              | 580                    | 1300                                    | 380                    | 650                                  | 160                    |
| RTD 1210             | 2100                                   | 780                    | 1600                              | 580                    | 1000                                    | 380                    | 530                                  | 160                    |
| RTD 1220             | 2100                                   | 780                    | 1600                              | 580                    | 1000                                    | 380                    | 530                                  | 160                    |
| RTD 1230             | 2100                                   | 780                    | 1600                              | 580                    | 1000                                    | 380                    | 530                                  | 160                    |

| 柄徑<br>Shank (H6) | 柄徑公差值<br>D2 tolerance |
|------------------|-----------------------|
| ∅ 3              | -0.008                |
| ∅ 4              | -0.008                |
| ∅ 5              | -0.008                |
| ∅ 6              | -0.008                |
| ∅ 8              | -0.008                |
| ∅ 10             | -0.009                |
| ∅ 12             | -0.011                |

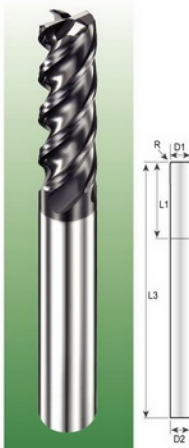
| D Diameter | *Side Milling<br>below HRC45 | ±<br>B <sub>1</sub> +0.10<br>B <sub>2</sub> -0.10 | *Side Milling<br>up HRC45 | ±<br>B <sub>1</sub> +0.050<br>B <sub>2</sub> -0.10 |
|------------|------------------------------|---|---------------------------|--|
| ∅ 3        | -0.008                       |   | -0.008                    |  |
| ∅ 4        | -0.008                       |   | -0.008                    |  |
| ∅ 5        | -0.008                       |   | -0.008                    |  |
| ∅ 6        | -0.008                       |   | -0.008                    |  |
| ∅ 8        | -0.008                       |   | -0.008                    |  |
| ∅ 10       | -0.009                       |   | -0.009                    |  |
| ∅ 12       | -0.011                       |   | -0.011                    |  |

# RTB

## 超微粒圓鼻角立銑刀 Corner Radius End Mills



◎ 精銑 Finishing    ◎ 中銑 Semi-finishing    ◎ 粗銑 Roughing



| 型號<br>Type No. | D1<br>Diameter<br>直徑 | R<br>Corner R<br>圓鼻角 | L1<br>Flute Length<br>刃長 | L3<br>O.A.L.<br>全長 | D2<br>Shank Dia<br>柄徑 |
|----------------|----------------------|----------------------|--------------------------|--------------------|-----------------------|
| RTB 0305       | 3.0                  | 0.5                  | 8                        | 50                 | 3                     |
| RTB 0405       | 4.0                  | 0.5                  | 10                       | 50                 | 4                     |
| RTB 0505       | 5.0                  | 0.5                  | 13                       | 50                 | 6                     |
| RTB 0510       | 5.0                  | 1.0                  | 13                       | 50                 | 6                     |
| RTB 0605       | 6.0                  | 0.5                  | 16                       | 50                 | 6                     |
| RTB 0610       | 6.0                  | 1.0                  | 16                       | 50                 | 6                     |
| RTB 0805       | 8.0                  | 0.5                  | 20                       | 60                 | 8                     |
| RTB 0810       | 8.0                  | 1.0                  | 20                       | 60                 | 8                     |
| RTB 1005Z      | 10.0                 | 0.5                  | 25                       | 75                 | 10                    |
| RTB 1005       | 10.0                 | 0.5                  | 30                       | 75                 | 10                    |
| RTB 1010Z      | 10.0                 | 1.0                  | 25                       | 75                 | 10                    |
| RTB 1010       | 10.0                 | 1.0                  | 30                       | 75                 | 10                    |
| RTB 1020Z      | 10.0                 | 2.0                  | 25                       | 75                 | 10                    |
| RTB 1020       | 10.0                 | 2.0                  | 30                       | 75                 | 10                    |
| RTB 1030Z      | 10.0                 | 3.0                  | 25                       | 75                 | 10                    |
| RTB 1030       | 10.0                 | 3.0                  | 30                       | 75                 | 10                    |
| RTB 1210       | 12.0                 | 1.0                  | 30                       | 75                 | 12                    |
| RTB 1220       | 12.0                 | 2.0                  | 30                       | 75                 | 12                    |
| RTB 1230       | 12.0                 | 3.0                  | 30                       | 75                 | 12                    |

unit:mm

List of recommended milling conditions for RTB

| 切削材<br>Work Material | Carbon Steels<br>S45C/S50C<br>HRC20-40 |                        | Alloy Steels<br>NAK80<br>HRC40-50 |                        | Prehardened Steels<br>SKD11<br>HRC50-60 |                        | Hardened Steels<br>SKD11<br>up HRC60 |                        |
|----------------------|--|------------------------|-----------------------------------|------------------------|---|------------------------|--------------------------------------|------------------------|
|                      | Type No.                               | 迴轉速度 Speed<br>(mm/min) | 進給速度 Feed<br>(mm/min)             | 迴轉速度 Speed<br>(mm/min) | 進給速度 Feed<br>(mm/min)                   | 迴轉速度 Speed<br>(mm/min) | 進給速度 Feed<br>(mm/min)                | 迴轉速度 Speed<br>(mm/min) |
| RTB 0605             | 4300                                   | 780                    | 3200                              | 580                    | 2200                                    | 380                    | 1100                                 | 160                    |
| RTB 0610             | 4300                                   | 780                    | 3200                              | 580                    | 2200                                    | 380                    | 1100                                 | 160                    |
| RTB 0805             | 3200                                   | 780                    | 2400                              | 580                    | 1600                                    | 380                    | 800                                  | 160                    |
| RTB 0810             | 3200                                   | 780                    | 2400                              | 580                    | 1600                                    | 380                    | 800                                  | 160                    |
| RTB 1010             | 2600                                   | 780                    | 1900                              | 580                    | 1300                                    | 380                    | 650                                  | 160                    |
| RTB 1020             | 2600                                   | 780                    | 1900                              | 580                    | 1300                                    | 380                    | 650                                  | 160                    |
| RTB 1030             | 2600                                   | 780                    | 1900                              | 580                    | 1300                                    | 380                    | 650                                  | 160                    |
| RTB 1210             | 2100                                   | 780                    | 1600                              | 580                    | 1000                                    | 380                    | 530                                  | 160                    |
| RTB 1220             | 2100                                   | 780                    | 1600                              | 580                    | 1000                                    | 380                    | 530                                  | 160                    |
| RTB 1230             | 2100                                   | 780                    | 1600                              | 580                    | 1000                                    | 380                    | 530                                  | 160                    |

| 柄徑 D2<br>(mm) | 柄徑 D2 公差值<br>tolerance |
|---------------|------------------------|
| ∅ 3           | -0.008                 |
| ∅ 4           | -0.008                 |
| ∅ 5           | -0.008                 |
| ∅ 6           | -0.008                 |
| ∅ 8           | -0.008                 |
| ∅ 10          | -0.009                 |
| ∅ 12          | -0.011                 |

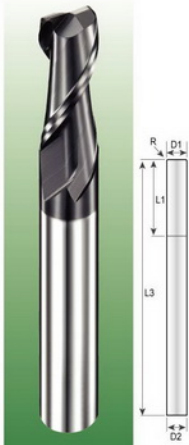
| D Diameter | *Side Milling<br>below HRC45 | ±<br>B <sub>1</sub> +0.10<br>B <sub>2</sub> -0.10 | *Side Milling<br>up HRC45 | ±<br>B <sub>1</sub> +0.050<br>B <sub>2</sub> -0.10 |
|------------|------------------------------|---|---------------------------|--|
| ∅ 3        | -0.008                       |   | -0.008                    |  |
| ∅ 4        | -0.008                       |   | -0.008                    |  |
| ∅ 5        | -0.008                       |   | -0.008                    |  |
| ∅ 6        | -0.008                       |   | -0.008                    |  |
| ∅ 8        | -0.008                       |   | -0.008                    |  |
| ∅ 10       | -0.009                       |   | -0.009                    |  |
| ∅ 12       | -0.011                       |   | -0.011                    |  |

精銑 Finishing 
  中銑 Semi-finishing 
  粗銑 Roughing



| 型號<br>Type No. | D1<br>Diameter<br>直徑 | R<br>Corner R<br>圓鼻角 | L1<br>Flute Length<br>刃長 | L3<br>O.A.L.<br>全長 | D2<br>Shank Dia<br>柄徑 |
|----------------|----------------------|----------------------|--------------------------|--------------------|-----------------------|
| LRTA 0405      | 4.0                  | 0.5                  | 11                       | 75                 | 4                     |
| LRTA 0410      | 4.0                  | 1.0                  | 11                       | 75                 | 4                     |
| LRTA 0602      | 6.0                  | 0.2                  | 16                       | 75                 | 6                     |
| LRTA 0603      | 6.0                  | 0.3                  | 16                       | 75                 | 6                     |
| LRTA 0605      | 6.0                  | 0.5                  | 16                       | 75                 | 6                     |
| LRTA 0610      | 6.0                  | 1.0                  | 16                       | 75                 | 6                     |
| LRTA 0803      | 8.0                  | 0.3                  | 19                       | 100                | 8                     |
| LRTA 0805      | 8.0                  | 0.5                  | 19                       | 100                | 8                     |
| LRTA 0810      | 8.0                  | 1.0                  | 19                       | 100                | 8                     |
| LRTA 1002      | 10.0                 | 0.2                  | 25                       | 100                | 10                    |
| LRTA 1003      | 10.0                 | 0.3                  | 25                       | 100                | 10                    |
| LRTA 1005      | 10.0                 | 0.5                  | 25                       | 100                | 10                    |
| LRTA 1010      | 10.0                 | 1.0                  | 25                       | 100                | 10                    |
| LRTA 1020      | 10.0                 | 2.0                  | 25                       | 100                | 10                    |
| LRTA 1205      | 12.0                 | 0.5                  | 30                       | 100                | 12                    |
| LRTA 1210      | 12.0                 | 1.0                  | 30                       | 100                | 12                    |
| LRTA 1220      | 12.0                 | 2.0                  | 30                       | 100                | 12                    |

unit:mm



| 直徑<br>D1 | R徑公差值<br>R tolerance | 直徑公差值<br>D1 tolerance |
|----------|----------------------|-----------------------|
| 4.0      | ± 0.02               | 0.02                  |
| 6.0      | ± 0.02               | 0.025                 |
| 8.0      | ± 0.02               | 0.025                 |
| 10.0     | ± 0.02               | 0.03                  |
| 12.0     | ± 0.02               | 0.035                 |

| 柄徑<br>shank (h6) | 柄徑公差值<br>D2 tolerance |
|------------------|-----------------------|
| ∅ 4              | -0.008                |
| ∅ 6              | -0.008                |
| ∅ 8              | -0.008                |
| ∅ 10             | -0.009                |
| ∅ 12             | -0.011                |

unit:mm

精銑 Finishing 
  中銑 Semi-finishing 
  粗銑 Roughing



| 型號<br>Type No. | D1<br>Diameter<br>直徑 | R<br>Corner R<br>圓鼻角 | L1<br>Flute Length<br>刃長 | L3<br>O.A.L.<br>全長 | D2<br>Shank Dia<br>柄徑 |
|----------------|----------------------|----------------------|--------------------------|--------------------|-----------------------|
| LRTD 0405      | 4.0                  | 0.5                  | 11                       | 75                 | 4                     |
| LRTD 0410      | 4.0                  | 1.0                  | 11                       | 75                 | 4                     |
| LRTD 0602      | 6.0                  | 0.2                  | 16                       | 75                 | 6                     |
| LRTD 0603      | 6.0                  | 0.3                  | 16                       | 75                 | 6                     |
| LRTD 0605      | 6.0                  | 0.5                  | 16                       | 75                 | 6                     |
| LRTD 0610      | 6.0                  | 1.0                  | 16                       | 75                 | 6                     |
| LRTD 0803      | 8.0                  | 0.3                  | 19                       | 100                | 8                     |
| LRTD 0805      | 8.0                  | 0.5                  | 19                       | 100                | 8                     |
| LRTD 0810      | 8.0                  | 1.0                  | 19                       | 100                | 8                     |
| LRTD 1002      | 10.0                 | 0.2                  | 25                       | 100                | 10                    |
| LRTD 1003      | 10.0                 | 0.3                  | 25                       | 100                | 10                    |
| LRTD 1005      | 10.0                 | 0.5                  | 25                       | 100                | 10                    |
| LRTD 1010      | 10.0                 | 1.0                  | 25                       | 100                | 10                    |
| LRTD 1020      | 10.0                 | 2.0                  | 25                       | 100                | 10                    |
| LRTD 1205      | 12.0                 | 0.5                  | 30                       | 100                | 10                    |
| LRTD 1210      | 12.0                 | 1.0                  | 30                       | 100                | 12                    |
| LRTD 1220      | 12.0                 | 2.0                  | 30                       | 100                | 12                    |
| LRTD 1610      | 16.0                 | 1.0                  | 45                       | 150                | 16                    |
| LRTD 1620      | 16.0                 | 2.0                  | 45                       | 150                | 16                    |

unit:mm



| 直徑<br>D1 | R徑公差值<br>R tolerance | 直徑公差值<br>D1 tolerance |
|----------|----------------------|-----------------------|
| 4.0      | ± 0.02               | 0.025                 |
| 6.0      | ± 0.02               | 0.03                  |
| 8.0      | ± 0.02               | 0.035                 |
| 10.0     | ± 0.02               | 0.04                  |
| 12.0     | ± 0.02               | 0.04                  |
| 16.0     | ± 0.02               | 0.04                  |

| 柄徑<br>shank (h6) | 柄徑公差值<br>D2 tolerance |
|------------------|-----------------------|
| ∅ 4              | 0.008                 |
| ∅ 6              | 0.008                 |
| ∅ 8              | 0.008                 |
| ∅ 10             | 0.009                 |
| ∅ 12             | 0.011                 |
| ∅ 16             | 0.011                 |

unit:mm



精銑 Finishing 
  中銑 Semi-finishing 
  粗銑 Roughing



| 型號<br>Type No. | D1<br>Diameter<br>直徑 | L1<br>Flute Length<br>刃長 | L3<br>O.A.L<br>全長 | D2<br>Shank Dia<br>柄徑 |
|----------------|----------------------|--------------------------|-------------------|-----------------------|
| HTA 0203       | 2.0                  | 6                        | 50                | 4                     |
| HTA 0303       | 3.0                  | 8                        | 50                | 4                     |
| HTA 0403       | 4.0                  | 11                       | 50                | 4                     |
| HTA 0503       | 5.0                  | 13                       | 50                | 6                     |
| HTA 0603       | 6.0                  | 16                       | 50                | 6                     |
| HTA 0803       | 8.0                  | 20                       | 60                | 8                     |
| HTA 1003       | 10.0                 | 25                       | 75                | 10                    |
| HTA 1203       | 12.0                 | 30                       | 75                | 12                    |
| HTA 1603       | 16.0                 | 40                       | 100               | 16                    |
| HTA 2003       | 20.0                 | 45                       | 100               | 20                    |

unit:mm

List of recommended milling conditions for HTA

| 加工物<br>Work Material | Carbon Steels<br>S50C.SCM55<br>below HRC30 | Alloy Steels<br>SUS304.SUS316     | Prehardened Steels<br>NAK80.SKD11<br>HRC35-45 | Hardened Steels<br>SKD11.SKD11<br>HRC45-55 |
|----------------------|--|-----------------------------------|---|--|
| Type No.             | 進給率Feed (mm/min) 進給率Feed (mm/min)          | 進給率Feed (mm/min) 進給率Feed (mm/min) | 進給率Feed (mm/min) 進給率Feed (mm/min)             | 進給率Feed (mm/min) 進給率Feed (mm/min)          |
| HTA 0203             | 9500 150                                   | 8000 120                          | 6400 80                                       | 3200 25                                    |
| HTA 0303             | 6400 150                                   | 5300 100                          | 4200 80                                       | 2100 30                                    |
| HTA 0403             | 4800 180                                   | 4000 150                          | 3200 100                                      | 1600 40                                    |
| HTA 0503             | 3800 240                                   | 3200 180                          | 2550 100                                      | 1300 40                                    |
| HTA 0603             | 3200 260                                   | 2700 200                          | 2100 130                                      | 1000 50                                    |
| HTA 0803             | 2400 260                                   | 2000 200                          | 1600 130                                      | 800 45                                     |
| HTA 1003             | 1900 260                                   | 1600 200                          | 1300 130                                      | 650 45                                     |
| HTA 1203             | 1600 260                                   | 1300 200                          | 1000 130                                      | 530 40                                     |
| HTA 1603             | 1200 180                                   | 1000 140                          | 800 90  | 400 30                                     |



| 加工物<br>Work Material | Carbon Steels<br>S50C.SCM55<br>below HRC30 | Alloy Steels<br>SUS304.SUS316     | Prehardened Steels<br>NAK80.SKD11<br>HRC35-45 | Hardened Steels<br>SKD11.SKD11<br>HRC45-55 |
|----------------------|--|-----------------------------------|---|--|
| Type No.             | 進給率Feed (mm/min) 進給率Feed (mm/min)          | 進給率Feed (mm/min) 進給率Feed (mm/min) | 進給率Feed (mm/min) 進給率Feed (mm/min)             | 進給率Feed (mm/min) 進給率Feed (mm/min)          |
| HTA 0203             | 8000 90                                    | 6400 40                           | 6400 30                                       | 3200 20                                    |
| HTA 0303             | 5300 100                                   | 4200 50                           | 4200 40                                       | 2100 20                                    |
| HTA 0403             | 4000 120                                   | 3200 60                           | 3200 50                                       | 1600 25                                    |
| HTA 0503             | 3200 170                                   | 2550 75                           | 2550 65                                       | 1300 30                                    |
| HTA 0603             | 2700 180                                   | 1500 85                           | 1500 70                                       | 1100 35                                    |
| HTA 0803             | 2000 190                                   | 1100 95                           | 1100 80                                       | 800 35                                     |
| HTA 1003             | 1600 190                                   | 960 90                            | 960 85  | 650 35                                     |
| HTA 1203             | 1300 190                                   | 800 90                            | 800 70  | 530 25                                     |
| HTA 1603             | 1000 120                                   | 600 60                            | 600 50  | 400 20                                     |



精銑 Finishing 
  中銑 Semi-finishing 
  粗銑 Roughing



| 型號<br>Type No. | D1<br>Diameter<br>直徑 | L1<br>Flute Length<br>刃長 | L3<br>O.A.L<br>全長 | D2<br>Shank Dia<br>柄徑 |
|----------------|----------------------|--------------------------|-------------------|-----------------------|
| HTD 0203       | 2.0                  | 6                        | 50                | 4                     |
| HTD 0303       | 3.0                  | 8                        | 50                | 4                     |
| HTD 0403       | 4.0                  | 11                       | 50                | 4                     |
| HTD 0503       | 5.0                  | 13                       | 50                | 6                     |
| HTD 0603       | 6.0                  | 16                       | 50                | 6                     |
| HTD 0803       | 8.0                  | 20                       | 60                | 8                     |
| HTD 1003       | 10.0                 | 25                       | 75                | 10                    |
| HTD 1203       | 12.0                 | 30                       | 75                | 12                    |
| HTD 1603       | 16.0                 | 40                       | 100               | 16                    |
| HTD 2003       | 20.0                 | 45                       | 100               | 20                    |

unit:mm

List of recommended milling conditions for HTD

| 加工物<br>Work Material | Carbon Steels<br>S50C.SCM55<br>below HRC30 | Alloy Steels<br>SUS304.SUS316     | Prehardened Steels<br>NAK80.SKD11<br>HRC35-45 | Hardened Steels<br>SKD11.SKD11<br>HRC45-55 |
|----------------------|--|-----------------------------------|---|--|
| Type No.             | 進給率Feed (mm/min) 進給率Feed (mm/min)          | 進給率Feed (mm/min) 進給率Feed (mm/min) | 進給率Feed (mm/min) 進給率Feed (mm/min)             | 進給率Feed (mm/min) 進給率Feed (mm/min)          |
| HTD 0203             | 9500 150                                   | 8000 120                          | 6400 80                                       | 3200 25                                    |
| HTD 0303             | 6400 150                                   | 5300 100                          | 4200 80                                       | 2100 30                                    |
| HTD 0403             | 4800 180                                   | 4000 150                          | 3200 100                                      | 1600 40                                    |
| HTD 0503             | 3800 240                                   | 3200 180                          | 2550 100                                      | 1300 40                                    |
| HTD 0603             | 3200 260                                   | 2700 200                          | 2100 130                                      | 1000 50                                    |
| HTD 0803             | 2400 260                                   | 2000 200                          | 1600 130                                      | 800 45                                     |
| HTD 1003             | 1900 260                                   | 1600 200                          | 1300 130                                      | 650 45                                     |
| HTD 1203             | 1600 260                                   | 1300 200                          | 1000 130                                      | 530 40                                     |
| HTD 1603             | 1200 180                                   | 1000 140                          | 800 90  | 400 30                                     |



| 加工物<br>Work Material | Carbon Steels<br>S50C.SCM55<br>below HRC30 | Alloy Steels<br>SUS304.SUS316     | Prehardened Steels<br>NAK80.SKD11<br>HRC35-45 | Hardened Steels<br>SKD11.SKD11<br>HRC45-55 |
|----------------------|--|-----------------------------------|---|--|
| Type No.             | 進給率Feed (mm/min) 進給率Feed (mm/min)          | 進給率Feed (mm/min) 進給率Feed (mm/min) | 進給率Feed (mm/min) 進給率Feed (mm/min)             | 進給率Feed (mm/min) 進給率Feed (mm/min)          |
| HTD 0203             | 8000 90                                    | 6400 40                           | 6400 30                                       | 3200 20                                    |
| HTD 0303             | 5300 100                                   | 4200 50                           | 4200 40                                       | 2100 20                                    |
| HTD 0403             | 4000 120                                   | 3200 60                           | 3200 50                                       | 1600 25                                    |
| HTD 0503             | 3200 170                                   | 2550 75                           | 2550 65                                       | 1300 30                                    |
| HTD 0603             | 2700 180                                   | 1500 85                           | 1500 70                                       | 1100 35                                    |
| HTD 0803             | 2000 190                                   | 1100 95                           | 1100 80                                       | 800 35                                     |
| HTD 1003             | 1600 190                                   | 960 90                            | 960 85  | 650 35                                     |
| HTD 1203             | 1300 190                                   | 800 90                            | 800 70  | 530 25                                     |
| HTD 1603             | 1000 120                                   | 600 60                            | 600 50  | 400 20                                     |

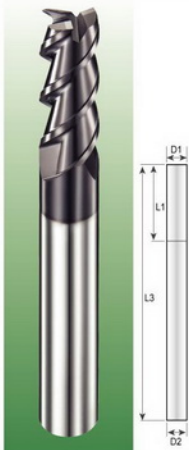


精銑 Finishing 
  中銑 Semi-finishing 
  粗銑 Roughing



| 型號<br>Type No. | D1<br>Diameter<br>直徑 | L1<br>Flute Length<br>刃長 | L3<br>O.A.L<br>全長 | D2<br>Shank Dia<br>柄徑 |
|----------------|----------------------|--------------------------|-------------------|-----------------------|
| ITA 0303       | 3.0                  | 8                        | 50                | 6                     |
| ITA 0403       | 4.0                  | 12                       | 50                | 6                     |
| ITA 0603       | 6.0                  | 16                       | 50                | 6                     |
| ITA 0803       | 8.0                  | 20                       | 60                | 8                     |
| ITA 1003       | 10.0                 | 25                       | 75                | 10                    |
| ITA 1203       | 12.0                 | 30                       | 75                | 12                    |
| ITA 1603       | 16.0                 | 45                       | 100               | 16                    |
| ITA 2003       | 20.0                 | 45                       | 100               | 20                    |

unit:mm



| 直徑<br>D1 | 直徑公差值<br>D1 tolerance |
|----------|-----------------------|
| 3.0      | $\pm 0.02$            |
| 4.0      | $\pm 0.02$            |
| 6.0      | $\pm 0.03$            |
| 8.0      | $\pm 0.03$            |
| 10.0     | $\pm 0.035$           |
| 12.0     | $\pm 0.04$            |
| 16.0     | $\pm 0.04$            |
| 20.0     | $\pm 0.05$            |

| 柄徑<br>shank (h6) | 柄徑公差值<br>D2 tolerance |
|------------------|-----------------------|
| ∅ 6              | $\pm 0.008$           |
| ∅ 8              | $\pm 0.008$           |
| ∅ 10             | $\pm 0.009$           |
| ∅ 12             | $\pm 0.011$           |
| ∅ 16             | $\pm 0.011$           |
| ∅ 20             | $\pm 0.013$           |

unit:mm

List of recommended milling conditions for ITA

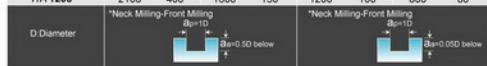
| 被削材<br>Work Material | Carbon Steels<br>S50C, S45C, SS<br>below HRC30 |                       | Alloy Steels<br>SUS304, SUS316 |                       | Prehardened Steels<br>SKD11, SKD61<br>HRC25-35 |                       | Hardened Steels<br>SKD11, SKD11<br>HRC45-55 |                       |
|----------------------|--|-----------------------|--------------------------------|-----------------------|--|-----------------------|---|-----------------------|
| Type No.             | 調磨速度 Speed<br>(mm-1)                           | 進給速度 Feed<br>(mm/min) | 調磨速度 Speed<br>(mm-1)           | 進給速度 Feed<br>(mm/min) | 調磨速度 Speed<br>(mm-1)                           | 進給速度 Feed<br>(mm/min) | 調磨速度 Speed<br>(mm-1)                        | 進給速度 Feed<br>(mm/min) |
| ITA 0303             | 8500   | 600                   | 6400                           | 340                   | 4800   | 180                   | 3200  | 130                   |
| ITA 0403             | 6400   | 600                   | 4800                           | 340                   | 3600   | 180                   | 2400  | 130                   |
| ITA 0603             | 4300   | 820                   | 3200                           | 400                   | 2400   | 200                   | 1600  | 150                   |
| ITA 0803             | 3200   | 820                   | 2400                           | 400                   | 1800   | 200                   | 1200  | 150                   |
| ITA 1003             | 2600   | 820                   | 1900                           | 400                   | 1400   | 200                   | 1000  | 150                   |
| ITA 1203             | 2100   | 820                   | 1600                           | 400                   | 1200   | 200                   | 800   | 150                   |

| 被削材<br>Work Material | Carbon Steels<br>S50C, S45C, SS<br>below HRC30 |                       | Alloy Steels<br>SUS304, SUS316 |                       | Prehardened Steels<br>SKD11, SKD61<br>HRC25-35 |                       | Hardened Steels<br>SKD11, SKD11<br>HRC45-55 |                       |
|----------------------|--|-----------------------|--------------------------------|-----------------------|--|-----------------------|---|-----------------------|
| Type No.             | 調磨速度 Speed<br>(mm-1)                           | 進給速度 Feed<br>(mm/min) | 調磨速度 Speed<br>(mm-1)           | 進給速度 Feed<br>(mm/min) | 調磨速度 Speed<br>(mm-1)                           | 進給速度 Feed<br>(mm/min) | 調磨速度 Speed<br>(mm-1)                        | 進給速度 Feed<br>(mm/min) |
| ITA 0303             | 8500   | 300                   | 6400                           | 110                   | 4800   | 80                    | 3200  | 60                    |
| ITA 0403             | 6400   | 300                   | 4800                           | 110                   | 3600   | 80                    | 2400  | 60                    |
| ITA 0603             | 4300   | 400                   | 3200                           | 150                   | 2400   | 100                   | 1600  | 80                    |
| ITA 0803             | 3200   | 400                   | 2400                           | 150                   | 1800   | 100                   | 1200  | 80                    |
| ITA 1003             | 2600   | 400                   | 1900                           | 150                   | 1400   | 100                   | 1000  | 80                    |
| ITA 1203             | 2100   | 400                   | 1600                           | 150                   | 1200   | 100                   | 800   | 80                    |

| 被削材<br>Work Material | Carbon Steels<br>S50C, S45C, SS<br>below HRC30 |                       | Alloy Steels<br>SUS304, SUS316 |                       | Prehardened Steels<br>SKD11, SKD61<br>HRC25-35 |                       | Hardened Steels<br>SKD11, SKD11<br>HRC45-55 |                       |
|----------------------|--|-----------------------|--------------------------------|-----------------------|--|-----------------------|---|-----------------------|
| Type No.             | 調磨速度 Speed<br>(mm-1)                           | 進給速度 Feed<br>(mm/min) | 調磨速度 Speed<br>(mm-1)           | 進給速度 Feed<br>(mm/min) | 調磨速度 Speed<br>(mm-1)                           | 進給速度 Feed<br>(mm/min) | 調磨速度 Speed<br>(mm-1)                        | 進給速度 Feed<br>(mm/min) |
| ITA 0303             | 8500   | 300                   | 6400                           | 110                   | 4800   | 80                    | 3200  | 60                    |
| ITA 0403             | 6400   | 300                   | 4800                           | 110                   | 3600   | 80                    | 2400  | 60                    |
| ITA 0603             | 4300   | 400                   | 3200                           | 150                   | 2400   | 100                   | 1600  | 80                    |
| ITA 0803             | 3200   | 400                   | 2400                           | 150                   | 1800   | 100                   | 1200  | 80                    |
| ITA 1003             | 2600   | 400                   | 1900                           | 150                   | 1400   | 100                   | 1000  | 80                    |
| ITA 1203             | 2100   | 400                   | 1600                           | 150                   | 1200   | 100                   | 800   | 80                    |

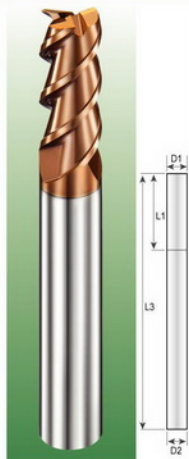


精銑 Finishing 
  中銑 Semi-finishing 
  粗銑 Roughing



| 型號<br>Type No. | D1<br>Diameter<br>直徑 | L1<br>Flute Length<br>刃長 | L3<br>O.A.L<br>全長 | D2<br>Shank Dia<br>柄徑 |
|----------------|----------------------|--------------------------|-------------------|-----------------------|
| ITH 0303       | 3.0                  | 8                        | 50                | 6                     |
| ITH 0403       | 4.0                  | 12                       | 50                | 6                     |
| ITH 0603       | 6.0                  | 16                       | 50                | 6                     |
| ITH 0803       | 8.0                  | 20                       | 60                | 8                     |
| ITH 1003       | 10.0                 | 25                       | 75                | 10                    |
| ITH 1203       | 12.0                 | 30                       | 75                | 12                    |
| ITH 1603       | 16.0                 | 45                       | 100               | 16                    |
| ITH 2003       | 20.0                 | 45                       | 100               | 20                    |

unit:mm



| 直徑<br>D1 | 直徑公差值<br>D1 tolerance |
|----------|-----------------------|
| 3.0      | $\pm 0.02$            |
| 4.0      | $\pm 0.02$            |
| 6.0      | $\pm 0.03$            |
| 8.0      | $\pm 0.03$            |
| 10.0     | $\pm 0.035$           |
| 12.0     | $\pm 0.04$            |
| 16.0     | $\pm 0.04$            |
| 20.0     | $\pm 0.05$            |

| 柄徑<br>shank (h6) | 柄徑公差值<br>D2 tolerance |
|------------------|-----------------------|
| ∅ 6              | $\pm 0.008$           |
| ∅ 8              | $\pm 0.008$           |
| ∅ 10             | $\pm 0.009$           |
| ∅ 12             | $\pm 0.011$           |
| ∅ 16             | $\pm 0.011$           |
| ∅ 20             | $\pm 0.013$           |

unit:mm

List of recommended milling conditions for ITH

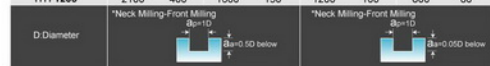
| 被削材<br>Work Material | Carbon Steels<br>S50C, S45C, SS<br>below HRC30 |                       | Alloy Steels<br>SUS304, SUS316 |                       | Prehardened Steels<br>SKD11, SKD61<br>HRC25-35 |                       | Hardened Steels<br>SKD11, SKD11<br>HRC45-55 |                       |
|----------------------|--|-----------------------|--------------------------------|-----------------------|--|-----------------------|---|-----------------------|
| Type No.             | 調磨速度 Speed<br>(mm-1)                           | 進給速度 Feed<br>(mm/min) | 調磨速度 Speed<br>(mm-1)           | 進給速度 Feed<br>(mm/min) | 調磨速度 Speed<br>(mm-1)                           | 進給速度 Feed<br>(mm/min) | 調磨速度 Speed<br>(mm-1)                        | 進給速度 Feed<br>(mm/min) |
| ITH 0303             | 8500   | 600                   | 6400                           | 340                   | 4800   | 180                   | 3200  | 130                   |
| ITH 0403             | 6400   | 600                   | 4800                           | 340                   | 3600   | 180                   | 2400  | 130                   |
| ITH 0603             | 4300   | 820                   | 3200                           | 400                   | 2400   | 200                   | 1600  | 150                   |
| ITH 0803             | 3200   | 820                   | 2400                           | 400                   | 1800   | 200                   | 1200  | 150                   |
| ITH 1003             | 2600   | 820                   | 1900                           | 400                   | 1400   | 200                   | 1000  | 150                   |
| ITH 1203             | 2100   | 820                   | 1600                           | 400                   | 1200   | 200                   | 800   | 150                   |

| 被削材<br>Work Material | Carbon Steels<br>S50C, S45C, SS<br>below HRC30 |                       | Alloy Steels<br>SUS304, SUS316 |                       | Prehardened Steels<br>SKD11, SKD61<br>HRC25-35 |                       | Hardened Steels<br>SKD11, SKD11<br>HRC45-55 |                       |
|----------------------|--|-----------------------|--------------------------------|-----------------------|--|-----------------------|---|-----------------------|
| Type No.             | 調磨速度 Speed<br>(mm-1)                           | 進給速度 Feed<br>(mm/min) | 調磨速度 Speed<br>(mm-1)           | 進給速度 Feed<br>(mm/min) | 調磨速度 Speed<br>(mm-1)                           | 進給速度 Feed<br>(mm/min) | 調磨速度 Speed<br>(mm-1)                        | 進給速度 Feed<br>(mm/min) |
| ITH 0303             | 8500   | 300                   | 6400                           | 110                   | 4800   | 80                    | 3200  | 60                    |
| ITH 0403             | 6400   | 300                   | 4800                           | 110                   | 3600   | 80                    | 2400  | 60                    |
| ITH 0603             | 4300   | 400                   | 3200                           | 150                   | 2400   | 100                   | 1600  | 80                    |
| ITH 0803             | 3200   | 400                   | 2400                           | 150                   | 1800   | 100                   | 1200  | 80                    |
| ITH 1003             | 2600   | 400                   | 1900                           | 150                   | 1400   | 100                   | 1000  | 80                    |
| ITH 1203             | 2100   | 400                   | 1600                           | 150                   | 1200   | 100                   | 800   | 80                    |

| 被削材<br>Work Material | Carbon Steels<br>S50C, S45C, SS<br>below HRC30 |                       | Alloy Steels<br>SUS304, SUS316 |                       | Prehardened Steels<br>SKD11, SKD61<br>HRC25-35 |                       | Hardened Steels<br>SKD11, SKD11<br>HRC45-55 |                       |
|----------------------|--|-----------------------|--------------------------------|-----------------------|--|-----------------------|---|-----------------------|
| Type No.             | 調磨速度 Speed<br>(mm-1)                           | 進給速度 Feed<br>(mm/min) | 調磨速度 Speed<br>(mm-1)           | 進給速度 Feed<br>(mm/min) | 調磨速度 Speed<br>(mm-1)                           | 進給速度 Feed<br>(mm/min) | 調磨速度 Speed<br>(mm-1)                        | 進給速度 Feed<br>(mm/min) |
| ITH 0303             | 8500   | 300                   | 6400                           | 110                   | 4800   | 80                    | 3200  | 60                    |
| ITH 0403             | 6400   | 300                   | 4800                           | 110                   | 3600   | 80                    | 2400  | 60                    |
| ITH 0603             | 4300   | 400                   | 3200                           | 150                   | 2400   | 100                   | 1600  | 80                    |
| ITH 0803             | 3200   | 400                   | 2400                           | 150                   | 1800   | 100                   | 1200  | 80                    |
| ITH 1003             | 2600   | 400                   | 1900                           | 150                   | 1400   | 100                   | 1000  | 80                    |
| ITH 1203             | 2100   | 400                   | 1600                           | 150                   | 1200   | 100                   | 800   | 80                    |



# VTA

## 高硬度用立銼刀 End Mills(High Hardness)



◎ 精銑 Finishing    ○ 中銑 Semi-finishing    — 粗銑 Roughing



| 型號<br>Type No. | D1<br>Diameter<br>直徑 | L1<br>Flute Length<br>刃長 | L3<br>O.A.L.<br>全長 | D2<br>Shank Dia<br>柄徑 |
|----------------|----------------------|--------------------------|--------------------|-----------------------|
| VTA 0606       | 6.0                  | 16                       | 50                 | 6                     |
| VTA 0806       | 8.0                  | 20                       | 60                 | 8                     |
| VTA 1006       | 10.0                 | 25                       | 75                 | 10                    |
| VTA 1206       | 12.0                 | 30                       | 75                 | 12                    |
| VTA 1606       | 16.0                 | 40                       | 100                | 16                    |

unit:mm



List of recommended milling conditions for VTA

| 切削材<br>Work Material | Alloy Steels<br><HRC50 |                      | Prehardened Steels<br>HRC35-60 |                      | Hardened Steels<br>>HRC60 |                      |
|----------------------|------------------------|----------------------|--------------------------------|----------------------|---------------------------|----------------------|
|                      | V=170 (min/m)          |                      | V=110 (min/m)                  |                      | V=80 (min/m)              |                      |
| Type No.             | 迴轉速度Sped<br>(rpm-1)    | 進給速度Feed<br>(mm/min) | 迴轉速度Sped<br>(rpm-1)            | 進給速度Feed<br>(mm/min) | 迴轉速度Sped<br>(rpm-1)       | 進給速度Feed<br>(mm/min) |
| VTA 0606             | 9000                   | 800                  | 5800                           | 525                  | 4250                      | 380                  |
| VTA 0806             | 6800                   | 1000                 | 4400                           | 660                  | 3200                      | 480                  |
| VTA 1006             | 5400                   | 980                  | 3500                           | 630                  | 2500                      | 460                  |
| VTA 1206             | 4500                   | 950                  | 2900                           | 615                  | 2100                      | 450                  |
| VTA 1606             | 3400                   | 1200                 | 2200                           | 790                  | 1600                      | 570                  |

| D Diameter | + Ra → Rp |   | Rp=0.2D<br>(Rp)<br>HRC45 below 0.1-0.3D<br>HRC50 below 0.05-0.02D |
|------------|-----------|---|---|
|            | Ba        | → |   |
| ∅ 6        | 0.008     | → |   |
| ∅ 8        | 0.008     | → |   |
| ∅ 10       | 0.009     | → |   |
| ∅ 12       | 0.011     | → |   |
| ∅ 16       | 0.011     | → |   |

unit:mm

# VTB

## 難切削材用立銼刀 End Mills(Difficult-to-cut)



◎ 精銑 Finishing    ○ 中銑 Semi-finishing    — 粗銑 Roughing



| 型號<br>Type No. | D1<br>Diameter<br>直徑 | L1<br>Flute Length<br>刃長 | L3<br>O.A.L.<br>全長 | D2<br>Shank Dia<br>柄徑 |
|----------------|----------------------|--------------------------|--------------------|-----------------------|
| VTB 0606       | 6.0                  | 16                       | 50                 | 6                     |
| VTB 0806       | 8.0                  | 20                       | 60                 | 8                     |
| VTB 1006       | 10.0                 | 25                       | 75                 | 10                    |
| VTB 1206       | 12.0                 | 30                       | 75                 | 12                    |
| VTB 1606       | 16.0                 | 40                       | 100                | 16                    |

unit:mm



List of recommended milling conditions for VTB

| 切削材<br>Work Material | Alloy Steels<br><HRC50 |                      | Prehardened Steels<br>HRC35-60 |                      | Hardened Steels<br>>HRC60 |                      |
|----------------------|------------------------|----------------------|--------------------------------|----------------------|---------------------------|----------------------|
|                      | V=170 (min/m)          |                      | V=110 (min/m)                  |                      | V=80 (min/m)              |                      |
| Type No.             | 迴轉速度Sped<br>(rpm-1)    | 進給速度Feed<br>(mm/min) | 迴轉速度Sped<br>(rpm-1)            | 進給速度Feed<br>(mm/min) | 迴轉速度Sped<br>(rpm-1)       | 進給速度Feed<br>(mm/min) |
| VTB 0606             | 9000                   | 800                  | 5800                           | 525                  | 4250                      | 380                  |
| VTB 0806             | 6800                   | 1000                 | 4400                           | 660                  | 3200                      | 480                  |
| VTB 1006             | 5400                   | 980                  | 3500                           | 630                  | 2500                      | 460                  |
| VTB 1206             | 4500                   | 950                  | 2900                           | 615                  | 2100                      | 450                  |
| VTB 1606             | 3400                   | 1200                 | 2200                           | 790                  | 1600                      | 570                  |

| D Diameter | + Ra → Rp |   | (Rp)<br>HRC45 below 0.1-0.3D<br>HRC50 below 0.05-0.02D<br>Rp=0.2D |
|------------|-----------|---|---|
|            | Ba        | → |   |
| ∅ 6        | 0.008     | → |   |
| ∅ 8        | 0.008     | → |   |
| ∅ 10       | 0.009     | → |   |
| ∅ 12       | 0.011     | → |   |
| ∅ 16       | 0.011     | → |   |

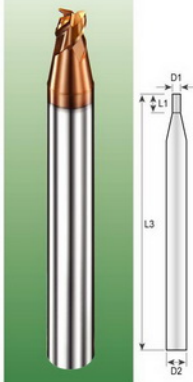
unit:mm

○ 精銑 Finishing ○ 中銑 Semi-finishing ○ 粗銑 Roughing



| 型號<br>Type No. | D1<br>Diameter<br>直徑 | L1<br>Flute Length<br>刃長 | L3<br>O.A.L.<br>全長 | D2<br>Shank Dia<br>柄徑 |
|----------------|----------------------|--------------------------|--------------------|-----------------------|
| PEH 0303       | 3.0                  | 3                        | 50                 | 6                     |
| PEH 0403       | 4.0                  | 4                        | 50                 | 6                     |
| PEH 0503       | 5.0                  | 5                        | 50                 | 6                     |
| PEH 0603       | 6.0                  | 6                        | 50                 | 8                     |
| PEH 0803       | 8.0                  | 8                        | 60                 | 10                    |
| PEH 1003       | 10.0                 | 10                       | 60                 | 12                    |

unit:mm



| 直徑<br>D1 | 直徑公差值<br>D1 tolerance |
|----------|-----------------------|
| 3.0      | $\pm 0.02$            |
| 4.0      | $\pm 0.02$            |
| 5.0      | $\pm 0.02$            |
| 6.0      | $\pm 0.025$           |
| 8.0      | $\pm 0.03$            |
| 10.0     | $\pm 0.035$           |

| 柄徑<br>shank (h6) | 柄徑公差值<br>D2 tolerance |
|------------------|-----------------------|
| ∅ 6              | $\pm 0.008$           |
| ∅ 8              | $\pm 0.008$           |
| ∅ 10             | $\pm 0.009$           |
| ∅ 12             | $\pm 0.011$           |

unit:mm

List of recommended milling conditions for PEH

| 切削材<br>Work Material | Carbon Steels<br>S45C/S50C<br>HRB90/250 |                       | Alloy Steels<br>SCM435/US(HPM)<br>HRC20-25 |                       | Prehardened Steels<br>NAK1(HPM)<br>HRc20 |                       | Hardened Steels<br>SKD61<br>HRc50 |                       |
|----------------------|---|-----------------------|--|-----------------------|--|-----------------------|-----------------------------------|-----------------------|
|                      | 切削速度 Speed<br>(mm-1)                    | 進給速度 Feed<br>(mm/min) | 切削速度 Speed<br>(mm-1)                       | 進給速度 Feed<br>(mm/min) | 切削速度 Speed<br>(mm-1)                     | 進給速度 Feed<br>(mm/min) | 切削速度 Speed<br>(mm-1)              | 進給速度 Feed<br>(mm/min) |
| Type No.             |   |                       |  |                       |  |                       |                                   |                       |
| PEH 0303             | 5300                                    | 100                   | 4200                                       | 50                    | 4200                                     | 50                    | 2100                              | 20                    |
| PEH 0403             | 4000                                    | 120                   | 3200                                       | 60                    | 3200                                     | 60                    | 1600                              | 25                    |
| PEH 0503             | 3200                                    | 170                   | 2550                                       | 75                    | 2550                                     | 75                    | 1300                              | 30                    |
| PEH 0603             | 2700                                    | 180                   | 1500                                       | 85                    | 1500                                     | 85                    | 1100                              | 35                    |
| PEH 0803             | 2000                                    | 190                   | 1100                                       | 90                    | 1100                                     | 90                    | 800                               | 35                    |
| PEH 1003             | 1600                                    | 190                   | 900  | 90                    | 900                                      | 90                    | 650                               | 35                    |

D Diameter

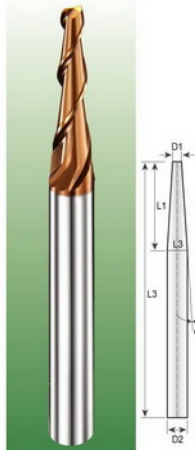


○ 精銑 Finishing ○ 中銑 Semi-finishing ○ 粗銑 Roughing



| 型號<br>Type No. | D1<br>Small Mill Dia<br>直徑 | L1<br>Flute Length<br>刃長 | α<br>Taper Angle<br>斜角 | D3<br>Large Mill Dia<br>刃長 | L3<br>O.A.L.<br>全長 | D2<br>Shank Dia<br>柄徑 |
|----------------|----------------------------|--------------------------|------------------------|----------------------------|--------------------|-----------------------|
| TTH 01005      | 1.0                        | 10                       | 30'                    | 1.17                       | 50                 | 4                     |
| TTH 01010      | 1.0                        | 10                       | 1°                     | 1.35                       | 50                 | 4                     |
| TTH 01015      | 1.0                        | 10                       | 1° 30'                 | 1.52                       | 50                 | 4                     |
| TTH 01020      | 1.0                        | 10                       | 2°                     | 1.70                       | 50                 | 4                     |
| TTH 01025      | 1.0                        | 10                       | 2° 30'                 | 1.87                       | 50                 | 4                     |
| TTH 01030      | 1.0                        | 10                       | 3°                     | 2.05                       | 50                 | 4                     |
| TTH 01050      | 1.0                        | 10                       | 5°                     | 2.74                       | 50                 | 4                     |
| TTH 01070      | 1.0                        | 10                       | 7°                     | 3.44                       | 50                 | 4                     |
| TTH 01505      | 1.5                        | 10                       | 30'                    | 1.67                       | 50                 | 4                     |
| TTH 01510      | 1.5                        | 10                       | 1°                     | 1.87                       | 50                 | 4                     |
| TTH 01515      | 1.5                        | 10                       | 1° 30'                 | 2.02                       | 50                 | 4                     |
| TTH 01520      | 1.5                        | 10                       | 2°                     | 2.20                       | 50                 | 4                     |
| TTH 01525      | 1.5                        | 10                       | 2° 30'                 | 2.37                       | 50                 | 4                     |
| TTH 01530      | 1.5                        | 10                       | 3°                     | 2.55                       | 50                 | 4                     |
| TTH 02005      | 2.0                        | 13                       | 30'                    | 2.22                       | 50                 | 4                     |
| TTH 02010      | 2.0                        | 13                       | 1°                     | 2.45                       | 50                 | 4                     |
| TTH 02015      | 2.0                        | 13                       | 1° 30'                 | 2.68                       | 50                 | 4                     |
| TTH 02020      | 2.0                        | 13                       | 2°                     | 2.90                       | 50                 | 4                     |
| TTH 02025      | 2.0                        | 13                       | 2° 30'                 | 3.13                       | 50                 | 4                     |
| TTH 02030      | 2.0                        | 13                       | 3°                     | 3.35                       | 50                 | 4                     |
| TTH 02050      | 2.0                        | 10                       | 5°                     | 3.75                       | 50                 | 4                     |
| TTH 02505      | 2.5                        | 15                       | 30'                    | 2.78                       | 50                 | 4                     |
| TTH 02510      | 2.5                        | 15                       | 1°                     | 3.03                       | 50                 | 4                     |
| TTH 02515      | 2.5                        | 15                       | 1° 30'                 | 3.29                       | 50                 | 4                     |
| TTH 02520      | 2.5                        | 15                       | 2°                     | 3.55                       | 50                 | 4                     |
| TTH 02525      | 2.5                        | 15                       | 2° 30'                 | 3.61                       | 50                 | 4                     |
| TTH 02530      | 2.5                        | 13                       | 3°                     | 3.86                       | 50                 | 4                     |
| TTH 02550      | 2.5                        | 15                       | 5°                     | 5.13                       | 50                 | 6                     |
| TTH 03005      | 3.0                        | 20                       | 30'                    | 3.35                       | 60                 | 6                     |
| TTH 03010      | 3.0                        | 20                       | 1°                     | 3.70                       | 60                 | 6                     |
| TTH 03015      | 3.0                        | 20                       | 1° 30'                 | 4.05                       | 60                 | 6                     |
| TTH 03020      | 3.0                        | 20                       | 2°                     | 4.39                       | 60                 | 6                     |
| TTH 03025      | 3.0                        | 20                       | 2° 30'                 | 4.75                       | 60                 | 6                     |
| TTH 03030      | 3.0                        | 20                       | 3°                     | 5.10                       | 60                 | 6                     |
| TTH 03050      | 3.0                        | 16                       | 5°                     | 5.80                       | 60                 | 6                     |
| TTH 04005      | 4.0                        | 25                       | 30'                    | 4.44                       | 60                 | 6                     |
| TTH 04010      | 4.0                        | 25                       | 1°                     | 4.88                       | 60                 | 6                     |
| TTH 04015      | 4.0                        | 25                       | 1° 30'                 | 5.31                       | 60                 | 6                     |
| TTH 04020      | 4.0                        | 25                       | 2°                     | 5.75                       | 60                 | 6                     |
| TTH 04025      | 4.0                        | 25                       | 2° 30'                 | 6.91                       | 60                 | 8                     |
| TTH 04030      | 4.0                        | 25                       | 3°                     | 6.62                       | 60                 | 8                     |
| TTH 04050      | 4.0                        | 22                       | 5°                     | 7.85                       | 60                 | 8                     |

unit:mm



| 柄徑<br>shank (h6) | 柄徑公差值<br>D2 tolerance |
|------------------|-----------------------|
| ∅ 4              | $\pm 0.008$           |
| ∅ 6              | $\pm 0.008$           |

unit:mm

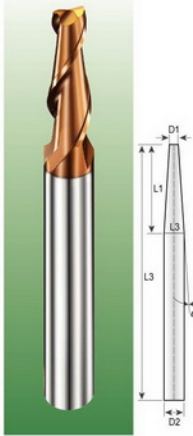


# TH

## 極超微粒斜度立銼刀 Taper End Mills



精銑 Finishing 
  中銑 Semi-finishing 
  粗銑 Roughing



| 柄徑<br>shank (h6) | 柄徑公差值<br>D2 tolerance |
|------------------|-----------------------|
| ∅ 4              | 0<br>-0.008           |
| ∅ 6              | 0<br>-0.008           |
| ∅ 8              | 0<br>-0.008           |
| ∅ 10             | 0<br>-0.008           |
| ∅ 12             | 0<br>-0.011           |
| ∅ 16             | 0<br>-0.011           |

unit:mm

| 型號<br>Type No. | D1<br>Small Mill Dia<br>柄徑 | L1<br>Flute Length<br>刃長 | α<br>Taper Angle<br>錐角 | D3<br>Large Mill Dia<br>刃長 | L3<br>O.A.L.<br>全長 | D2<br>Shank Dia<br>柄徑 |   |
|----------------|----------------------------|--------------------------|------------------------|----------------------------|--------------------|-----------------------|---|
| TH 005005      | 0.5                        | 2                        | 30°                    | 0.6                        | 50                 | 4                     |   |
| TH 005015      | 0.5                        | 2                        | 1°                     | 0.6                        | 50                 | 4                     |   |
| TH 005015      | 0.5                        | 2                        | 1°                     | 30°                        | 0.6                | 50                    | 4 |
| TH 005020      | 0.5                        | 2                        | 2°                     | 0.6                        | 50                 | 4                     |   |
| TH 005025      | 0.5                        | 2                        | 2°                     | 30°                        | 0.6                | 50                    | 4 |
| TH 005030      | 0.5                        | 2                        | 3°                     | 0.6                        | 50                 | 4                     |   |
| TH 005050      | 0.5                        | 2                        | 5°                     | 0.6                        | 50                 | 4                     |   |
| TH 005070      | 0.5                        | 2                        | 7°                     | 0.6                        | 50                 | 4                     |   |
| TH 005100      | 0.5                        | 2                        | 10°                    | 0.6                        | 50                 | 4                     |   |
| TH 010005      | 1.0                        | 4                        | 30°                    | 1.7                        | 50                 | 4                     |   |
| TH 010010      | 1.0                        | 4                        | 1°                     | 1.14                       | 50                 | 4                     |   |
| TH 010015      | 1.0                        | 4                        | 1°                     | 30°                        | 1.21               | 50                    | 4 |
| TH 010020      | 1.0                        | 4                        | 2°                     | 1.28                       | 50                 | 4                     |   |
| TH 010025      | 1.0                        | 4                        | 2°                     | 30°                        | 1.35               | 50                    | 4 |
| TH 010030      | 1.0                        | 4                        | 3°                     | 1.42                       | 50                 | 4                     |   |
| TH 010050      | 1.0                        | 4                        | 5°                     | 1.70                       | 50                 | 4                     |   |
| TH 010070      | 1.0                        | 4                        | 7°                     | 1.98                       | 50                 | 4                     |   |
| TH 010100      | 1.0                        | 4                        | 10°                    | 2.41                       | 50                 | 4                     |   |
| TH 015005      | 1.5                        | 5                        | 30°                    | 1.59                       | 50                 | 4                     |   |
| TH 015010      | 1.5                        | 5                        | 1°                     | 1.67                       | 50                 | 4                     |   |
| TH 015015      | 1.5                        | 5                        | 1°                     | 30°                        | 1.76               | 50                    | 4 |
| TH 015020      | 1.5                        | 5                        | 2°                     | 1.85                       | 50                 | 4                     |   |
| TH 015025      | 1.5                        | 5                        | 2°                     | 30°                        | 1.93               | 50                    | 4 |
| TH 015030      | 1.5                        | 5                        | 3°                     | 2.02                       | 50                 | 4                     |   |
| TH 015050      | 1.5                        | 5                        | 5°                     | 2.37                       | 50                 | 4                     |   |
| TH 015070      | 1.5                        | 5                        | 7°                     | 2.72                       | 50                 | 4                     |   |
| TH 015100      | 1.5                        | 5                        | 10°                    | 3.26                       | 50                 | 4                     |   |
| TH 020005      | 2.0                        | 6                        | 30°                    | 2.10                       | 50                 | 4                     |   |
| TH 020010      | 2.0                        | 6                        | 1°                     | 2.21                       | 50                 | 4                     |   |
| TH 020015      | 2.0                        | 6                        | 1°                     | 30°                        | 2.31               | 50                    | 4 |
| TH 020020      | 2.0                        | 6                        | 2°                     | 2.41                       | 50                 | 4                     |   |
| TH 020025      | 2.0                        | 6                        | 2°                     | 30°                        | 2.52               | 50                    | 4 |
| TH 020030      | 2.0                        | 6                        | 3°                     | 2.62                       | 50                 | 4                     |   |
| TH 020050      | 2.0                        | 6                        | 5°                     | 3.05                       | 50                 | 4                     |   |
| TH 020070      | 2.0                        | 6                        | 7°                     | 3.47                       | 50                 | 4                     |   |
| TH 020100      | 2.0                        | 6                        | 10°                    | 3.76                       | 50                 | 4                     |   |
| TH 025005      | 2.5                        | 8                        | 30°                    | 2.64                       | 50                 | 4                     |   |
| TH 025010      | 2.5                        | 8                        | 1°                     | 2.71                       | 50                 | 4                     |   |
| TH 025015      | 2.5                        | 8                        | 1°                     | 30°                        | 2.91               | 50                    | 4 |
| TH 025020      | 2.5                        | 8                        | 2°                     | 3.05                       | 50                 | 4                     |   |
| TH 025025      | 2.5                        | 8                        | 2°                     | 30°                        | 3.20               | 50                    | 4 |
| TH 025030      | 2.5                        | 8                        | 3°                     | 3.33                       | 50                 | 4                     |   |
| TH 025050      | 2.5                        | 8                        | 5°                     | 3.90                       | 50                 | 4                     |   |
| TH 025070      | 2.5                        | 8                        | 7°                     | 4.46                       | 50                 | 6                     |   |
| TH 025100      | 2.5                        | 8                        | 10°                    | 5.32                       | 50                 | 6                     |   |
| TH 030005      | 3.0                        | 10                       | 30°                    | 3.17                       | 50                 | 6                     |   |
| TH 030010      | 3.0                        | 10                       | 1°                     | 3.35                       | 50                 | 6                     |   |

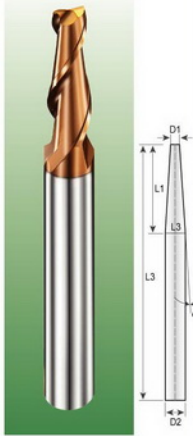
unit:mm

# TH

## 極超微粒斜度立銼刀 Taper End Mills



精銑 Finishing 
  中銑 Semi-finishing 
  粗銑 Roughing



| 柄徑<br>shank (h6) | 柄徑公差值<br>D2 tolerance |
|------------------|-----------------------|
| ∅ 4              | 0<br>-0.008           |
| ∅ 6              | 0<br>-0.008           |
| ∅ 8              | 0<br>-0.008           |
| ∅ 10             | 0<br>-0.008           |
| ∅ 12             | 0<br>-0.011           |
| ∅ 16             | 0<br>-0.011           |

unit:mm

| 型號<br>Type No. | D1<br>Small Mill Dia<br>柄徑 | L1<br>Flute Length<br>刃長 | α<br>Taper Angle<br>錐角 | D3<br>Large Mill Dia<br>刃長 | L3<br>O.A.L.<br>全長 | D2<br>Shank Dia<br>柄徑 |    |
|----------------|----------------------------|--------------------------|------------------------|----------------------------|--------------------|-----------------------|----|
| TH 030015      | 3.0                        | 10                       | 1°                     | 30°                        | 3.52               | 50                    | 6  |
| TH 030020      | 3.0                        | 10                       | 2°                     | 3.69                       | 50                 | 6                     |    |
| TH 030025      | 3.0                        | 10                       | 2°                     | 30°                        | 3.87               | 50                    | 6  |
| TH 030030      | 3.0                        | 10                       | 3°                     | 4.05                       | 50                 | 6                     |    |
| TH 030050      | 3.0                        | 10                       | 5°                     | 4.75                       | 50                 | 6                     |    |
| TH 030070      | 3.0                        | 10                       | 7°                     | 5.45                       | 50                 | 6                     |    |
| TH 030100      | 3.0                        | 8                        | 10°                    | 5.82                       | 50                 | 6                     |    |
| TH 040005      | 4.0                        | 15                       | 30°                    | 4.26                       | 50                 | 6                     |    |
| TH 040010      | 4.0                        | 15                       | 1°                     | 4.52                       | 50                 | 6                     |    |
| TH 040015      | 4.0                        | 15                       | 1°                     | 30°                        | 4.79               | 50                    | 6  |
| TH 040020      | 4.0                        | 15                       | 2°                     | 5.04                       | 50                 | 6                     |    |
| TH 040025      | 4.0                        | 15                       | 2°                     | 30°                        | 5.31               | 50                    | 6  |
| TH 040030      | 4.0                        | 15                       | 3°                     | 5.57                       | 50                 | 6                     |    |
| TH 040050      | 4.0                        | 15                       | 5°                     | 6.63                       | 60                 | 8                     |    |
| TH 040070      | 4.0                        | 15                       | 7°                     | 7.68                       | 60                 | 8                     |    |
| TH 050005      | 5.0                        | 20                       | 30°                    | 5.34                       | 60                 | 6                     |    |
| TH 050010      | 5.0                        | 20                       | 1°                     | 5.70                       | 60                 | 6                     |    |
| TH 050015      | 5.0                        | 18                       | 1°                     | 30°                        | 5.94               | 60                    | 6  |
| TH 050020      | 5.0                        | 20                       | 2°                     | 6.39                       | 60                 | 8                     |    |
| TH 050025      | 5.0                        | 20                       | 2°                     | 30°                        | 6.74               | 60                    | 8  |
| TH 050030      | 5.0                        | 20                       | 3°                     | 7.10                       | 60                 | 8                     |    |
| TH 050050      | 5.0                        | 20                       | 5°                     | 8.50                       | 75                 | 10                    |    |
| TH 050070      | 5.0                        | 20                       | 7°                     | 9.91                       | 75                 | 10                    |    |
| TH 060005      | 6.0                        | 20                       | 30°                    | 6.35                       | 60                 | 8                     |    |
| TH 060010      | 6.0                        | 20                       | 1°                     | 6.70                       | 60                 | 8                     |    |
| TH 060015      | 6.0                        | 20                       | 1°                     | 30°                        | 7.05               | 60                    | 8  |
| TH 060020      | 6.0                        | 20                       | 2°                     | 7.40                       | 60                 | 8                     |    |
| TH 060025      | 6.0                        | 20                       | 2°                     | 30°                        | 7.75               | 60                    | 8  |
| TH 060030      | 6.0                        | 18                       | 3°                     | 7.69                       | 60                 | 8                     |    |
| TH 060050      | 6.0                        | 20                       | 5°                     | 9.50                       | 75                 | 10                    |    |
| TH 080005      | 8.0                        | 25                       | 30°                    | 8.44                       | 75                 | 10                    |    |
| TH 080010      | 8.0                        | 25                       | 1°                     | 8.87                       | 75                 | 10                    |    |
| TH 080015      | 8.0                        | 25                       | 1°                     | 30°                        | 9.31               | 75                    | 10 |
| TH 080020      | 8.0                        | 25                       | 2°                     | 9.74                       | 75                 | 10                    |    |
| TH 080025      | 8.0                        | 22                       | 2°                     | 30°                        | 9.92               | 75                    | 10 |
| TH 080030      | 8.0                        | 25                       | 3°                     | 10.62                      | 75                 | 12                    |    |
| TH 080050      | 8.0                        | 22                       | 5°                     | 11.85                      | 75                 | 12                    |    |
| TH 100005      | 10.0                       | 35                       | 30°                    | 10.61                      | 100                | 12                    |    |
| TH 100010      | 10.0                       | 35                       | 1°                     | 11.22                      | 100                | 12                    |    |
| TH 100015      | 10.0                       | 35                       | 1°                     | 30°                        | 11.83              | 100                   | 12 |
| TH 100020      | 10.0                       | 28                       | 2°                     | 11.96                      | 100                | 12                    |    |
| TH 100025      | 10.0                       | 35                       | 2°                     | 30°                        | 13.06              | 100                   | 16 |
| TH 100030      | 10.0                       | 35                       | 3°                     | 13.67                      | 100                | 16                    |    |
| TH 100050      | 10.0                       | 33                       | 5°                     | 15.77                      | 100                | 16                    |    |

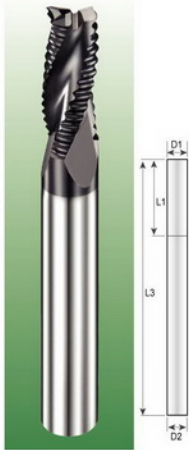
unit:mm

——精銑 Finishing ——中銑 Semi-finishing **◎**粗銑 Roughing



| 型號<br>Type No. | D<br>Diameter<br>直徑 | L1<br>Flute Length<br>刃長 | L3<br>O.A.L.<br>全長 | D2<br>Shank Dia<br>柄徑 |
|----------------|---------------------|--------------------------|--------------------|-----------------------|
| WJA 0603       | 6.0                 | 16                       | 50                 | 6                     |
| WJA 0803       | 8.0                 | 20                       | 60                 | 8                     |
| WJA 1003       | 10.0                | 25                       | 75                 | 10                    |
| WJA 1203       | 12.0                | 30                       | 75                 | 12                    |
| WJA 1403       | 14.0                | 35                       | 100                | 16                    |
| WJA 1603       | 16.0                | 40                       | 100                | 16                    |
| WJA 1803       | 18.0                | 40                       | 100                | 20                    |
| WJA 2003       | 20.0                | 45                       | 100                | 20                    |

unit:mm



| 柄徑<br>shank (h6) | 柄徑公差值<br>D2 tolerance |
|------------------|-----------------------|
| ∅ 6              | -0.008                |
| ∅ 8              | -0.008                |
| ∅ 10             | -0.009                |
| ∅ 12             | -0.011                |
| ∅ 16             | -0.011                |
| ∅ 20             | -0.013                |

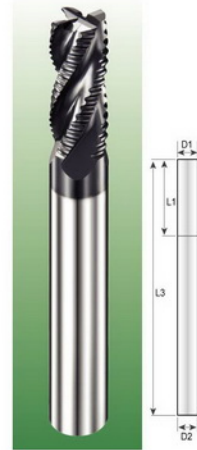
unit:mm

——精銑 Finishing ——中銑 Semi-finishing **◎**粗銑 Roughing



| 型號<br>Type No. | D1<br>Diameter<br>直徑 | L1<br>Flute Length<br>刃長 | L3<br>O.A.L.<br>全長 | D2<br>Shank Dia<br>柄徑 |
|----------------|----------------------|--------------------------|--------------------|-----------------------|
| WJA 0604       | 6.0                  | 16                       | 50                 | 6                     |
| WJA 0804       | 8.0                  | 20                       | 60                 | 8                     |
| WJA 1004       | 10.0                 | 25                       | 75                 | 10                    |
| WJA 1204       | 12.0                 | 30                       | 75                 | 12                    |
| WJA 1404       | 14.0                 | 35                       | 100                | 16                    |
| WJA 1604       | 16.0                 | 40                       | 100                | 16                    |
| WJA 1804       | 18.0                 | 40                       | 100                | 20                    |
| WJA 2004       | 20.0                 | 45                       | 100                | 20                    |

unit:mm



| 柄徑<br>shank (h6) | 柄徑公差值<br>D2 tolerance |
|------------------|-----------------------|
| ∅ 6              | -0.008                |
| ∅ 8              | -0.008                |
| ∅ 10             | -0.009                |
| ∅ 12             | -0.011                |
| ∅ 16             | -0.011                |
| ∅ 20             | -0.013                |

unit:mm

### List of recommended milling conditions for WUA (Side Milling)

| 被削材<br>Work Material | Cast iron,<br>FC, FCD                     | Mid steels, Carbon<br>steels, S45C,<br>S50C<br>(750N/mm²) | Alloy steels, Tool steels,<br>SCM, SKT, SKS,<br>SKD (-30HRC) | Prehardened steels,<br>SKT, SKD, NAK55,<br>HPM1(30-38HRC) | Stainless steels,<br>SUS304, SKD<br>(38-45HRC) |
|----------------------|---|---|--|---|--|
| Velocity             | 80-140 m/min                              | 80-120 m/min  | 70-100 m/min   | 50-80 m/min   | 35-65 m/min                                    |
| Type No.             | 進給率Feed<br>(mm-1)<br>進給速度Feed<br>(mm/min) | 進給率Feed<br>(mm-1)<br>進給速度Feed<br>(mm/min)                 | 進給率Feed<br>(mm-1)<br>進給速度Feed<br>(mm/min)                    | 進給率Feed<br>(mm-1)<br>進給速度Feed<br>(mm/min)                 | 進給率Feed<br>(mm-1)<br>進給速度Feed<br>(mm/min)      |
| WJA 0604             | 6350 760                                  | 5300 640  | 4500 360   | 3450 280  | 2650 210                                       |
| WJA 0804             | 4750 760                                  | 4000 640  | 3400 410   | 2600 310  | 2000 240                                       |
| WJA 1004             | 3800 760                                  | 3200 640  | 2700 430   | 2050 330  | 1600 260                                       |
| WJA 1204             | 3200 770                                  | 2650 640  | 2250 450   | 1700 340  | 1350 270                                       |
| WJA 1404             | 2750 770                                  | 2250 650  | 1950 470   | 1500 360  | 1150 280                                       |
| WJA 1604             | 2400 770                                  | 2000 640  | 1700 780   | 1300 360  | 1000 280                                       |
| WJA 1804             | 2100 760                                  | 1750 630  | 1500 480   | 1150 350  | 900 270  |
| WJA 2004             | 1900 760                                  | 1600 610  | 1350 470   | 1050 350  | 800 260  |

| D Diameter | $f_z$<br>$f_z$ | $a_p$<br>$a_p$ | $a_e=1.5D$<br>$a_e=0.4D$ | $a_e=1.5D$<br>$a_e=0.3D$ |
|------------|----------------|----------------|--------------------------|--------------------------|
|------------|----------------|----------------|--------------------------|--------------------------|

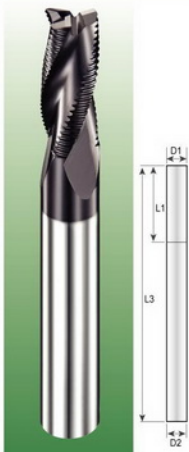
### List of recommended milling conditions for WUA (Slotting)

| 被削材<br>Work Material | Cast iron,<br>FC, FCD                     | Mid steels, Carbon<br>steels, S45C, S50C<br>(750N/mm²) | Alloy steels, Tool steels,<br>SCM, SKT, SKS,<br>SKD (-30HRC) | Prehardened steels,<br>SKT, SKD, NAK55,<br>HPM1(30-38HRC) | Stainless steels,<br>SUS304, SKD<br>(38-45HRC) |
|----------------------|---|--|--|---|--|
| Velocity             | 80+120 m/min                              | 70-100 m/min   | 55-85 m/min  | 40-70 m/min   | 30-60 m/min                                    |
| Type No.             | 進給率Feed<br>(mm-1)<br>進給速度Feed<br>(mm/min) | 進給率Feed<br>(mm-1)<br>進給速度Feed<br>(mm/min)              | 進給率Feed<br>(mm-1)<br>進給速度Feed<br>(mm/min)                    | 進給率Feed<br>(mm-1)<br>進給速度Feed<br>(mm/min)                 | 進給率Feed<br>(mm-1)<br>進給速度Feed<br>(mm/min)      |
| WJA 0604             | 5300 640                                  | 4500 540   | 3700 300   | 2900 230  | 2400 190                                       |
| WJA 0804             | 4000 640                                  | 3400 540   | 2800 340   | 2200 260  | 1800 220                                       |
| WJA 1004             | 3200 640                                  | 2700 540   | 2250 360   | 1750 280  | 1450 230                                       |
| WJA 1204             | 2650 640                                  | 2250 540   | 1850 370   | 1450 290  | 1200 240                                       |
| WJA 1404             | 2250 630                                  | 1950 570   | 1600 380   | 1250 300  | 1000 240                                       |
| WJA 1604             | 2000 640                                  | 1700 540   | 1400 390   | 1100 310  | 900 250  |
| WJA 1804             | 1750 630                                  | 1500 540   | 1250 400   | 950 290   | 800 240  |
| WJA 2004             | 1600 640                                  | 1350 510   | 1100 390   | 900 300   | 700 230  |

| D Diameter | $a_e=0.7D$ | $a_e=0.5D$ |
|------------|------------|------------|
|------------|------------|------------|

——精銑 Finishing ——中銑 Semi-finishing **◎**粗銑 Roughing



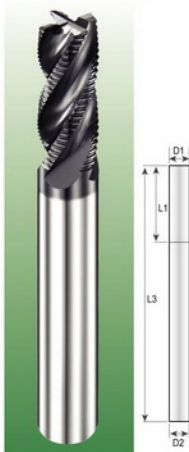
| 型號<br>Type No. | D1<br>Diameter<br>直徑 | L1<br>Flute Length<br>刃長 | L3<br>O.A.L.<br>全長 | D2<br>Shank Dia<br>柄徑 |
|----------------|----------------------|--------------------------|--------------------|-----------------------|
| WWA 0603       | 6.0                  | 16                       | 50                 | 6                     |
| WWA 0803       | 8.0                  | 20                       | 60                 | 8                     |
| WWA 1003       | 10.0                 | 25                       | 75                 | 10                    |
| WWA 1203       | 12.0                 | 30                       | 75                 | 12                    |
| WWA 1403       | 14.0                 | 35                       | 100                | 16                    |
| WWA 1603       | 16.0                 | 40                       | 100                | 16                    |
| WWA 1803       | 18.0                 | 40                       | 100                | 20                    |
| WWA 2003       | 20.0                 | 45                       | 100                | 20                    |

unit:mm

| 柄徑<br>shank (h6) | 柄徑公差值<br>D2 tolerance |
|------------------|-----------------------|
| ∅ 6              | ±0.008                |
| ∅ 8              | ±0.008                |
| ∅ 10             | ±0.009                |
| ∅ 12             | ±0.011                |
| ∅ 16             | ±0.011                |
| ∅ 20             | ±0.013                |

unit:mm

——精銑 Finishing ——中銑 Semi-finishing **◎**粗銑 Roughing



| 型號<br>Type No. | D1<br>Diameter<br>直徑 | L1<br>Flute Length<br>刃長 | L3<br>O.A.L.<br>全長 | D2<br>Shank Dia<br>柄徑 |
|----------------|----------------------|--------------------------|--------------------|-----------------------|
| WWA 0604       | 6.0                  | 16                       | 50                 | 6                     |
| WWA 0804       | 8.0                  | 20                       | 60                 | 8                     |
| WWA 1004       | 10.0                 | 25                       | 75                 | 10                    |
| WWA 1204       | 12.0                 | 30                       | 75                 | 12                    |
| WWA 1404       | 14.0                 | 35                       | 100                | 16                    |
| WWA 1604       | 16.0                 | 40                       | 100                | 16                    |
| WWA 1804       | 18.0                 | 40                       | 100                | 20                    |
| WWA 2004       | 20.0                 | 45                       | 100                | 20                    |

unit:mm

| 柄徑<br>shank (h6) | 柄徑公差值<br>D2 tolerance |
|------------------|-----------------------|
| ∅ 6              | ±0.008                |
| ∅ 8              | ±0.008                |
| ∅ 10             | ±0.009                |
| ∅ 12             | ±0.011                |
| ∅ 16             | ±0.011                |
| ∅ 20             | ±0.013                |

unit:mm

### List of recommended milling conditions for WWA (Side Milling)

| 適用材<br>Work Material | Cast iron,<br>FC, FCD | Mild steels, Carbon<br>steels, S45C, S55C<br>(750N/mm <sup>2</sup> ) | Alloy steels, Tool steels,<br>SCM SKT, SKS,<br>SKD (-30HRC) | Phosphorized steels,<br>SKT, SKD, NAK55,<br>HPM1(30-38HRC) | Stainless steels,<br>SUS304, SKD<br>(38-45HRC) |
|----------------------|-----------------------|--|---|--|--|
| Velocity             | 100-140 m/min         | 80-120 m/min   | 70-100 m/min  | 50-80 m/min  | 35-65 m/min                                    |
| Type No.             | 進給Speed<br>(mm/min)   | 進給Speed<br>(mm/min)  | 進給Speed<br>(mm/min)   | 進給Speed<br>(mm/min)  | 進給Speed<br>(mm/min)                            |
| WWA 0604             | 6350 760              | 5300 640   | 4500 360  | 3450 280   | 2650 210                                       |
| WWA 0804             | 4750 760              | 4000 640   | 3400 410  | 2600 310   | 2000 240                                       |
| WWA 1004             | 3800 760              | 3200 640   | 2700 430  | 2050 330   | 1600 260                                       |
| WWA 1204             | 3200 770              | 2650 640   | 2250 450  | 1700 340   | 1350 270                                       |
| WWA 1404             | 2750 770              | 2250 650   | 1950 470  | 1500 360   | 1150 280                                       |
| WWA 1604             | 2400 770              | 2000 640   | 1700 780  | 1300 360   | 1000 280                                       |
| WWA 1804             | 2100 760              | 1750 630   | 1500 480  | 1150 350   | 900 270  |
| WWA 2004             | 1900 760              | 1600 610   | 1350 470  | 1050 350   | 800 260  |

- Use an air blow. When using cutting fluids, use high-quality fluid with high smoke retardant properties.
- When chattering occurs, reduce the speed and feed simultaneously.
- Use a rigid and precise machine and holder.

### List of recommended milling conditions for WWA (Slotting)

| 適用材<br>Work Material | Cast iron,<br>FC, FCD | Mild steels, Carbon<br>steels, S45C, S55C<br>(750N/mm <sup>2</sup> ) | Alloy steels, Tool steels,<br>SCM SKT, SKS,<br>SKD (-30HRC) | Phosphorized steels,<br>SKT, SKD, NAK55,<br>HPM1(30-38HRC) | Stainless steels,<br>SUS304, SKD<br>(38-45HRC) |
|----------------------|-----------------------|--|---|--|--|
| Velocity             | 80-120 m/min          | 70-100 m/min   | 55-85 m/min   | 40-70 m/min  | 30-60 m/min                                    |
| Type No.             | 進給Speed<br>(mm/min)   | 進給Speed<br>(mm/min)  | 進給Speed<br>(mm/min)   | 進給Speed<br>(mm/min)  | 進給Speed<br>(mm/min)                            |
| WWA 0604             | 5300 640              | 4500 540   | 3700 300  | 2900 230   | 2400 190                                       |
| WWA 0804             | 4000 640              | 3400 540   | 2800 340  | 2200 260   | 1800 220                                       |
| WWA 1004             | 3200 640              | 2700 540   | 2250 360  | 1750 280   | 1450 230                                       |
| WWA 1204             | 2650 640              | 2250 540   | 1850 370  | 1450 290   | 1200 240                                       |
| WWA 1404             | 2250 630              | 1950 570   | 1600 380  | 1250 300   | 1000 240                                       |
| WWA 1604             | 2000 640              | 1700 540   | 1400 390  | 1100 310   | 900 250  |
| WWA 1804             | 1750 630              | 1500 540   | 1250 400  | 950 290  | 800 240  |
| WWA 2004             | 1600 640              | 1350 510   | 1100 390  | 900 300  | 700 230  |

- Use an air blow. When using cutting fluids, use high-quality fluid with high smoke retardant properties.
- When chattering occurs, reduce the speed and feed simultaneously.
- Use a rigid and precise machine and holder.

| 故 障             | 原 因                                  | 對 策                                  |
|-----------------|--------------------------------------|--------------------------------------|
| 刀刃部份有碎裂<br>(剝落) | 每刃切削量太多                              | 減少每刃切削量                              |
|                 | 伸出量太長                                | 刃長及突出減到最小                            |
|                 | 迴轉軸鬆動                                | 調整迴轉軸                                |
|                 | 進給速度太快                               | 調慢進給速度                               |
|                 | 夾具的剛性不足                              | 變換切削條件                               |
|                 | 刀刃端角太小(太尖)                           | 研磨少許的外周前傾角                           |
|                 | 研磨過的狀況不佳                             | 刀刃研磨至平均(清除削屑片)                       |
|                 | 夾具安裝不精密                              | 好好清除筒夾(有碎屑在裡面)                       |
|                 | 被切削的工件安裝不良,會振動                       | 裝置補助配具加強韌性裝置注意夾具夾持                   |
|                 | 向上切削(逆銑法) 較易沾碎屑                      | 檢附向下切削(順銑法)方式                        |
| 切削油之故           | 切削油是否太多太濃(試試噴風乾式<br>(加工作業時千萬不可中途注油)) | 計畫將內部組織均一化                           |
|                 | 被削材的不好                               | 處理適合的硬度、消除硬度的不均<br>調查是否有異物或砂等物質      |
| 刀刃外徑快速磨耗        | 切削速度過快(V)                            | 減低切削速度(V)                            |
|                 | 材料太硬                                 | 加強冷卻                                 |
|                 | 進給太慢(下)                              | 增加進給速度                               |
|                 | 迴轉軸鬆動                                | 調整迴轉軸                                |
|                 | 切削屑黏住刀刃                              | 三刃變一刃, 刀刃數降一刃,<br>用噴風乾式吹掉切削屑         |
|                 | 向上切削(逆銑法)                            | 檢附向下切削(順銑法)                          |
|                 | 切削速度不適當                              | 請參考切削條件再作檢討                          |
|                 | 前傾角不適當                               | 查看螺旋角之刀具角度, 加以選擇                     |
|                 | 切削油之故                                | 切削油是否太多太濃, 試試噴風乾式<br>(加工作業時千萬不可中途注油) |
|                 | 工件材質的不好                              | 計畫將材質內部組織均一化<br>消除硬度的不平均             |
| 端銑刀的切削性能差       | 改變比較好的端銑刀                            |                                      |
|                 | 改變適當的鍍層                              |                                      |
| 切削屑排除不良         | 切削量過多                                | 下降切削速度和切入量                           |
|                 | 排屑槽過於狹小                              | 使用刃數較少的立銑刀, 使用R型槽銑刀                  |
|                 | 切削屑量增多                               | 利用空氣噴風吹掉或使用吸塵器                       |
|                 | 切削油(液)太少                             | 增加油量或提高注油壓力                          |

| 故 障                 | 原 因                | 對 策   |
|---------------------|--------------------|---|
| 處理加工表面不良            | 迴轉軸鬆動              | 調整迴轉軸   |
|                     | 進給速度太快             | 調慢進給速度  |
|                     | 切削量過多              | 減少切入量, 使用比較短刃長                                |
|                     | 刀刃突出量太多            | 突出量限於最小範圍或刀刃                                  |
|                     | 支持工件面直角度不良         | 調整支持工件的直角度, 檢查筒夾                              |
|                     | 切削速度太慢             | 調快切削速度  |
| 刀刃容易鈍化<br>(感覺刀刃不鋒利) | 立銑刀刃端鈍化, 磨耗太多      | 再研磨後, 下降切削速度                                  |
|                     | 迴轉軸鬆動              | 調整迴轉軸   |
| 立銑刀折斷               | 工作和銑刀配合檢討查看鈍化角度    | 檢查工件與工具是否合適透角與前傾角, 再度化研磨                      |
|                     | 迴轉軸鬆動              | 調整迴轉軸   |
|                     | 立銑刀會振動             | 調整振動至最少, 特別須注意深溝細徑                            |
|                     | 進給速度太快             | 調慢進給速度  |
| 有振動異常               | 切入太深               | 切入量放少   |
|                     | 夾具夾柄部太短, 刀刃伸出太長    | 夾具夾柄部, 露出最少限度的刀刃長度                            |
|                     | 刀刃損傷太大             | 刀刃已鈍, 應事先再研磨, 再檢討切削條件                         |
|                     | 立銑刀不安定(有時異聲, 有時振動) | 調慢入刀、出刀時的進刀速度                                 |
|                     | 工件固定不良             | 工件確定保持, 改善配具、夾具                               |
|                     | 過快的切削速度(轉速)        | 降低切削速度(轉速)                                    |
| 表面處理加工尺寸<br>精度不良    | 迴轉軸鬆動              | 調整迴轉軸   |
|                     | 夾具(頭) 鋼性不足         | 迴轉數下降15%-20%前加工面沒有振動現象時, 請檢討變換切削條件, 改變立銑刀螺旋角度 |
|                     | 切削速度, 進給(送刀) 速度不良  | 夾頭內清除屑物, 更換夾頭                                 |
|                     | 外周二番角過大            | 外周二番角研磨修小                                     |
|                     | 外刃部太長              | 刀刃縮短, 露出最低限度的刀刃長度                             |
| 工件配具材料鬆緩, 韌性不足      | 變換韌性治具, 裝置補助具      |   |
| 表面處理加工尺寸<br>精度不良    | 迴轉軸鬆動              | 調整迴轉軸   |
|                     | 立銑刀振動              | 檢查立銑刀, 擦拭乾淨後重新安裝                              |
|                     | 刀刃數太少              | 改為較多刃數的立銑刀                                    |



# 主軸速度表 SPINDLE SPEED TABLE



| 直徑 Ø<br>Mill Dia.<br>(mm) | 切削速度 V Cutting Speed (mm/min) |       |       |       |       |       |       |       |       |       |       |       |       |       |        |  |
|---------------------------|-------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|--|
|                           | 20                            | 30    | 40    | 50    | 60    | 70    | 80    | 90    | 100   | 120   | 150   | 180   | 200   | 250   | 300    |  |
| 0.5                       | 12740                         | 19110 | 25480 | 31850 | 38220 | 44590 | 50960 | 57320 | 63690 | 70060 | 76430 | 82800 | 89170 | 95540 | 101910 |  |
| 0.6                       | 10620                         | 15920 | 21230 | 26540 | 31850 | 37150 | 42460 | 47770 | 53080 | 58390 | 63700 | 69010 | 74320 | 79630 | 84940  |  |
| 0.7                       | 9100                          | 13650 | 18200 | 22750 | 27300 | 31850 | 36400 | 40950 | 45500 | 50050 | 54600 | 59150 | 63700 | 68250 | 72800  |  |
| 0.8                       | 7960                          | 11940 | 15920 | 19900 | 23890 | 27870 | 31850 | 35830 | 39810 | 43790 | 47770 | 51750 | 55730 | 59710 | 63690  |  |
| 0.9                       | 7080                          | 10620 | 14150 | 17690 | 21230 | 24770 | 28310 | 31850 | 35390 | 38930 | 42470 | 46010 | 49550 | 53090 | 56630  |  |
| 1                         | 6370                          | 9550  | 12740 | 15920 | 19110 | 22290 | 25480 | 28660 | 31850 | 35040 | 38220 | 41410 | 44600 | 47790 | 50980  |  |
| 2                         | 3180                          | 4780  | 6370  | 7960  | 9550  | 11150 | 12740 | 14330 | 15920 | 19110 | 23990 | 28860 | 33740 | 38610 | 43490  |  |
| 3                         | 2120                          | 3180  | 4250  | 5310  | 6370  | 7430  | 8490  | 9550  | 10620 | 12740 | 15920 | 19110 | 22300 | 25490 | 28680  |  |
| 4                         | 1590                          | 2390  | 3180  | 3980  | 4780  | 5570  | 6370  | 7170  | 7960  | 9550  | 11940 | 14330 | 16720 | 19110 | 23890  |  |
| 5                         | 1270                          | 1910  | 2550  | 3180  | 3820  | 4460  | 5100  | 5730  | 6370  | 7640  | 9550  | 11460 | 12740 | 15920 | 19110  |  |
| 6                         | 1060                          | 1590  | 2120  | 2650  | 3180  | 3720  | 4250  | 4780  | 5310  | 6370  | 7960  | 9550  | 10620 | 13270 | 15920  |  |
| 8                         | 800                           | 1190  | 1590  | 1990  | 2390  | 2790  | 3180  | 3580  | 3980  | 4780  | 5970  | 7170  | 7960  | 9550  | 11940  |  |
| 10                        | 640                           | 960   | 1270  | 1590  | 1910  | 2230  | 2550  | 2870  | 3180  | 3820  | 4780  | 5730  | 6370  | 7960  | 9550   |  |
| 12                        | 530                           | 800   | 1060  | 1330  | 1590  | 1860  | 2120  | 2390  | 2650  | 3180  | 3980  | 4780  | 5310  | 6630  | 7960   |  |
| 14                        | 450                           | 680   | 910   | 1140  | 1360  | 1590  | 1820  | 2050  | 2270  | 2730  | 3410  | 4090  | 4550  | 5690  | 6820   |  |
| 15                        | 420                           | 640   | 850   | 1060  | 1270  | 1490  | 1700  | 1910  | 2120  | 2550  | 3180  | 3820  | 4250  | 5310  | 6370   |  |
| 16                        | 400                           | 600   | 800   | 1000  | 1190  | 1390  | 1590  | 1790  | 1990  | 2390  | 2990  | 3580  | 3980  | 4980  | 5970   |  |
| 20                        | 320                           | 480   | 640   | 800   | 960   | 1110  | 1270  | 1430  | 1590  | 1910  | 2390  | 2870  | 3180  | 3980  | 4780   |  |
| 25                        | 250                           | 380   | 510   | 640   | 760   | 890   | 1020  | 1150  | 1270  | 1530  | 1910  | 2290  | 2550  | 3180  | 3820   |  |

## 換算公式

$$V = \frac{\pi DN}{1000}$$

$$F = N \times Z \times f$$

## REDUCTINO FORMULA

V : 切削速度 Cutting Speed (m/min)

π : 圓周率 Circular Constant (3.14)

D : 銑刀直徑 Diameter (mm)

N : 轉速 RPM (min-1)

Z : 銑刀刃數 Number of Flutes

f : 每刃進給 Feed per Tooth (mm/tooth)

F : 進給 Feed (mm/min)

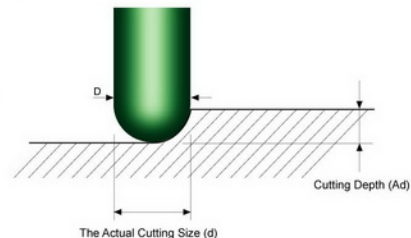
# 球刀實際切削直徑 BALL NOSE REAL CUTTING DIAMETER





| 球徑 R<br>Ball R<br>(mm) | 直徑 Ø<br>Mill Dia.<br>(mm) | 切削深度 (Ad) Depth of Cut (mm/min) |       |       |       |       |       |      |      |      |      |      |      |      |       |       |  |
|------------------------|---------------------------|---------------------------------|-------|-------|-------|-------|-------|------|------|------|------|------|------|------|-------|-------|--|
|                        |                           | 0.01                            | 0.02  | 0.03  | 0.04  | 0.05  | 0.08  | 0.1  | 0.15 | 0.2  | 0.3  | 0.5  | 0.8  | 1.0  | 2.0   | 3.0   |  |
| 0.1                    | 0.2                       | 0.087                           | 0.12  | 0.143 | 0.16  | 0.173 | 0.196 | 0.2  | ---  | ---  | ---  | ---  | ---  | ---  | ---   | ---   |  |
| 0.2                    | 0.4                       | 0.125                           | 0.174 | 0.211 | 0.24  | 0.265 | 0.32  | 0.35 | 0.39 | 0.4  | ---  | ---  | ---  | ---  | ---   | ---   |  |
| 0.3                    | 0.6                       | 0.154                           | 0.215 | 0.262 | 0.299 | 0.32  | 0.41  | 0.45 | 0.52 | 0.57 | 0.6  | ---  | ---  | ---  | ---   | ---   |  |
| 0.4                    | 0.8                       | 0.178                           | 0.25  | 0.304 | 0.349 | 0.387 | 0.48  | 0.53 | 0.62 | 0.63 | 0.77 | 0.77 | ---  | ---  | ---   | ---   |  |
| 0.5                    | 1                         | 0.199                           | 0.28  | 0.341 | 0.392 | 0.436 | 0.54  | 0.6  | 0.71 | 0.8  | 0.92 | 1    | ---  | ---  | ---   | ---   |  |
| 1                      | 2                         | 0.282                           | 0.398 | 0.486 | 0.56  | 0.624 | 0.78  | 0.87 | 1.05 | 1.2  | 1.43 | 1.73 | 1.96 | 2    | ---   | ---   |  |
| 1.5                    | 3                         | 0.346                           | 0.488 | 0.597 | 0.688 | 0.768 | 0.97  | 1.08 | 1.31 | 1.5  | 1.8  | 2.24 | 2.65 | 2.83 | 2.83  | ---   |  |
| 2                      | 4                         | 0.399                           | 0.564 | 0.69  | 0.796 | 0.889 | 1.12  | 1.25 | 1.52 | 1.74 | 2.11 | 2.65 | 3.2  | 3.46 | 4     | ---   |  |
| 2.5                    | 5                         | 0.447                           | 0.631 | 0.772 | 0.891 | 0.995 | 1.25  | 1.4  | 1.71 | 1.96 | 2.37 | 3    | 3.67 | 4    | 4.9   | 4.9   |  |
| 3                      | 6                         | 0.489                           | 0.692 | 0.846 | 0.977 | 1.091 | 1.38  | 1.54 | 1.87 | 2.15 | 2.62 | 3.32 | 4.08 | 4.47 | 5.66  | 6     |  |
| 4                      | 8                         | 0.565                           | 0.799 | 0.978 | 1.129 | 1.261 | 1.59  | 1.78 | 2.17 | 2.5  | 3.04 | 3.87 | 4.8  | 5.29 | 6.93  | 7.7   |  |
| 5                      | 10                        | 0.632                           | 0.894 | 1.094 | 1.262 | 1.411 | 1.78  | 1.99 | 2.43 | 2.8  | 3.41 | 4.36 | 5.43 | 6    | 8     | 9.17  |  |
| 6                      | 12                        | 0.693                           | 0.979 | 1.198 | 1.383 | 1.546 | 1.95  | 2.18 | 2.67 | 3.07 | 3.75 | 4.8  | 5.99 | 6.63 | 8.94  | 10.39 |  |
| 7                      | 14                        | 0.748                           | 1.058 | 1.295 | 1.495 | 1.67  | 2.11  | 2.36 | 2.88 | 3.32 | 4.05 | 5.2  | 6.65 | 7.21 | 9.8   | 11.49 |  |
| 8                      | 16                        | 0.8                             | 1.131 | 1.384 | 1.598 | 1.786 | 2.26  | 2.52 | 3.08 | 3.56 | 4.34 | 5.57 | 6.97 | 7.75 | 10.58 | 12.49 |  |
| 9                      | 18                        | 0.848                           | 1.199 | 1.468 | 1.695 | 1.895 | 2.39  | 2.68 | 3.27 | 3.77 | 4.61 | 5.92 | 7.42 | 8.25 | 11.31 | 13.42 |  |
| 10                     | 20                        | 0.894                           | 1.264 | 1.548 | 1.787 | 1.997 | 2.52  | 2.82 | 3.45 | 3.98 | 4.86 | 6.24 | 7.84 | 8.27 | 12    | 14.28 |  |

## 實際直徑計算

$$d = 2\sqrt{Ad(D-Ad)}$$



|   |  |   |  |   |                             |                                     |  |
|---|--|---|--|---|-----------------------------|-------------------------------------|--|
| 客戶名稱/   |  |   |  |   |                             |                                     |  |
| 產品型號  |  | 被加工材質   |  |   |                             | 硬度(HRC)                             |  |
|   |  | 是否經過熱處理 <input type="checkbox"/> 是 <input type="checkbox"/> 否 |  |   |                             |                                     |  |
| 使用機台型式  |  | 使用軟體版本  |  |   |                             |                                     |  |
|   |  | <input type="checkbox"/> UG                                   |  | <input type="checkbox"/> GIMATRON   |                             | <input type="checkbox"/> Power-Mill |  |
| 型號  |  | <input type="checkbox"/> Pro-E                                |  | <input type="checkbox"/> Work NC  |                             | <input type="checkbox"/> Master CAM |  |
| 挾持方式  |  | <input type="checkbox"/> ER夾頭                                 |  | <input type="checkbox"/> 後拉式夾頭  |                             | <input type="checkbox"/> 油壓夾頭       |  |
| 所使用夾頭的品牌  |  |   |  |   |                             |                                     |  |
| 冷卻方式  |  | <input type="checkbox"/> 乾式切削                                 |  | <input type="checkbox"/> 油霧方式   |                             | <input type="checkbox"/> 油性切削 (大量)  |  |
| 加工方式  |  | <input type="checkbox"/> 順銑                                   |  |   | <input type="checkbox"/> 逆銑 |                                     |  |
|  |  |   |  |  |                             |                                     |  |
| 1.球刀  |  | 2.平刀  |  |   |                             |                                     |  |
| 轉速 min <sup>-1</sup>  |  | 進給 m/min  |  | 轉速 min <sup>-1</sup>  |                             | 進給 m/min                            |  |
|   |  |   |  |   |                             |                                     |  |
| a <sub>a</sub> = mm   |  | a <sub>a</sub> = mm   |  | a <sub>a</sub> = mm   |                             | a <sub>a</sub> = mm                 |  |
| 結果  |  | 結果  |  |   |                             |                                     |  |
|   |  |   |  |   |                             |                                     |  |