

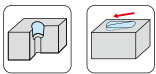
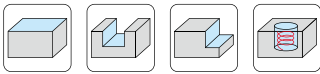
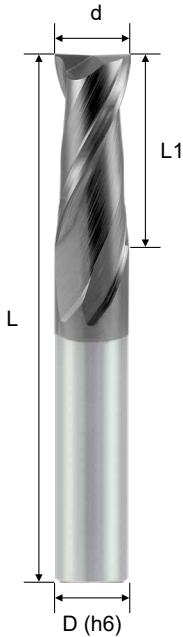
M50X - Square · Standard · 2F

平銑刀 · 標準型 · 2刃

- ANAX (Al, Ti, Cr, N) smooth coating provides a superior wear resistance.
- For Stainless Steel, Alloy Steel & Mold Steel... etc.
- Edge treatment and vibration reduction at high speed machining.



ESSSA



| d Tolerance | |
|-------------|-----------|
| d ≤ 6 | 0 ~ -0.02 |
| 6 < d ≤ 12 | 0 ~ -0.03 |
| d > 12 | 0 ~ -0.04 |

| Order No. | Dia. (d) | CL (L1) | OAL (L) | Shank (D) | Flutes (Z) |
|--------------|----------|---------|---------|-----------|------------|
| ESSSA240500A | 0.5 | 1 | 50 | 4 | 2 |
| ESSSA240800A | 0.8 | 2 | 50 | 4 | 2 |
| ESSSA241000A | 1 | 3 | 50 | 4 | 2 |
| ESSSA242000A | 2 | 5 | 50 | 4 | 2 |
| ESSSA243000A | 3 | 8 | 50 | 4 | 2 |
| ESSSA244000A | 4 | 10 | 50 | 4 | 2 |
| ESSSA204000A | 4 | 10 | 50 | 6 | 2 |
| ESSSA205000A | 5 | 13 | 50 | 6 | 2 |
| ESSSA206000A | 6 | 15 | 50 | 6 | 2 |
| ESSSA208000A | 8 | 20 | 60 | 8 | 2 |
| ESSSA210000A | 10 | 25 | 75 | 10 | 2 |
| ESSSA212000A | 12 | 30 | 75 | 12 | 2 |
| ESSSA214000A | 14 | 30 | 75 | 14 | 2 |
| ESSSA216000A | 16 | 35 | 100 | 16 | 2 |

| WORKING MATERIAL | STAINLESS 304 | | Moderately Difficult SUS | | STAINLESS 316 L | | TITANIUM (ALLOYS) | | SOFT STEEL | | SG CAST IRON | | High Temperature Alloys | |
|------------------|---------------|---------------|--------------------------|---------------|-----------------|---------------|-------------------|---------------|---------------|---------------|--------------|---------------|-------------------------|---------------|
| | Vc | Feed (mm/min) | RPM | Feed (mm/min) | RPM | Feed (mm/min) | RPM | Feed (mm/min) | RPM | Feed (mm/min) | RPM | Feed (mm/min) | RPM | Feed (mm/min) |
| Vc | 72~90 m/min | | 56~70 m/min | | 48~60 m/min | | 40~56 m/min | | 120~160 m/min | | 96~120 m/min | | 20~25 m/min | |
| DIAMETER (d) | RPM | Feed (mm/min) | RPM | Feed (mm/min) | RPM | Feed (mm/min) | RPM | Feed (mm/min) | RPM | Feed (mm/min) | RPM | Feed (mm/min) | RPM | Feed (mm/min) |
| 4mm | 7,452 | 458 | 4,459 | 286 | 3,822 | 183 | 3,185 | 122 | 9,554 | 764 | 7,643 | 611 | 1,592 | 56 |
| 5mm | 4,586 | 440 | 3,567 | 286 | 3,057 | 245 | 2,548 | 122 | 7,643 | 734 | 6,115 | 587 | 1,274 | 45 |
| 6mm | 3,822 | 489 | 2,972 | 333 | 2,548 | 245 | 2,123 | 136 | 6,369 | 815 | 5,096 | 652 | 1,062 | 58 |
| 8mm | 2,866 | 458 | 2,229 | 321 | 1,911 | 245 | 1,592 | 153 | 4,777 | 917 | 3,822 | 734 | 796 | 69 |
| 10mm | 2,293 | 440 | 1,783 | 286 | 1,529 | 220 | 1,274 | 124 | 3,822 | 734 | 3,057 | 587 | 637 | 55 |
| 12mm | 1,911 | 398 | 1,486 | 262 | 1,274 | 204 | 1,062 | 136 | 3,185 | 714 | 2,548 | 570 | 531 | 65 |
| 14mm | 1,638 | 351 | 1,274 | 232 | 1,092 | 185 | 910 | 126 | 2,730 | 637 | 2,184 | 510 | 455 | 65 |
| 16mm | 1,433 | 321 | 1,115 | 214 | 955 | 168 | 796 | 114 | 2,389 | 574 | 1,911 | 458 | 398 | 62 |



ap = 0.2
ae = 1

Solid End Milling

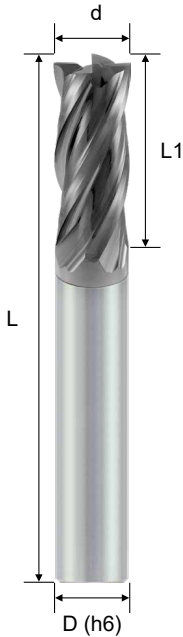
M50X - Square · Standard · 4F

平銑刀 · 標準型 · 4刃

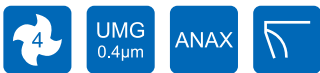
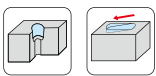
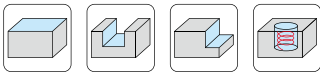
- ANAX (Al, Ti, Cr, N) smooth coating provides a superior wear resistance.
- For Stainless Steel, Alloy Steel & Mold Steel... etc.
- Edge treatment and vibration reduction at high speed machining.



ESSSA



| Order No. | Dia. (d) | CL (L1) | OAL (L) | Shank (D) | Flutes (Z) |
|--------------|----------|---------|---------|-----------|------------|
| ESSSA441000A | 1 | 3 | 50 | 4 | 4 |
| ESSSA441500A | 1.5 | 4 | 50 | 4 | 4 |
| ESSSA442000A | 2 | 5 | 50 | 4 | 4 |
| ESSSA442500A | 2.5 | 6 | 50 | 4 | 4 |
| ESSSA443000A | 3 | 8 | 50 | 4 | 4 |
| ESSSA443500A | 3.5 | 9 | 50 | 4 | 4 |
| ESSSA444000A | 4 | 10 | 50 | 4 | 4 |
| ESSSA404000A | 4 | 10 | 50 | 6 | 4 |
| ESSSA405000A | 5 | 13 | 50 | 6 | 4 |
| ESSSA406000A | 6 | 15 | 50 | 6 | 4 |
| ESSSA408000A | 8 | 20 | 60 | 8 | 4 |
| ESSSA410000A | 10 | 25 | 75 | 10 | 4 |
| ESSSA412000A | 12 | 30 | 75 | 12 | 4 |
| ESSSA414000A | 14 | 30 | 75 | 14 | 4 |
| ESSSA416000A | 16 | 35 | 100 | 16 | 4 |



| d Tolerance | |
|-------------|-----------|
| d ≤ 6 | 0 ~ -0.02 |
| 6 < d ≤ 12 | 0 ~ -0.03 |
| d > 12 | 0 ~ -0.04 |

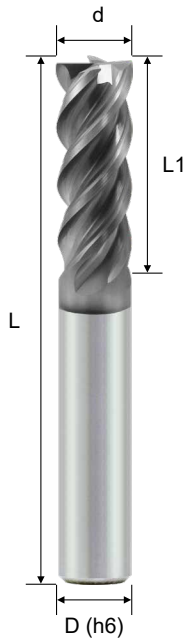
| WORKING MATERIAL | STAINLESS 304 | | Moderately Difficults SUS | | STAINLESS 316 L | | TITANIUM (ALLOYS) | | SOFT STEEL | | SG CAST IRON | | High Temperature Alloys | | |
|------------------|---------------|---------------|---------------------------|---------------|-----------------|---------------|-------------------|---------------|---------------|--------------------|--------------|---------------|-------------------------|---------------|--|
| Vc | 72~90 m/min | | 56~70 m/min | | 48~60 m/min | | 40~56 m/min | | 120~160 m/min | | 96~120 m/min | | 20~25 m/min | | |
| DIAMETER (d) | RPM | Feed (mm/min) | RPM | Feed (mm/min) | RPM | Feed (mm/min) | RPM | Feed (mm/min) | RPM | Feed (mm/min) | RPM | Feed (mm/min) | RPM | Feed (mm/min) | |
| 4mm | 5,732 | 458 | 4,459 | 286 | 3,822 | 183 | 3,185 | 122 | 9,554 | 764 | 7,643 | 611 | 1,592 | 56 | |
| 5mm | 4,586 | 440 | 3,567 | 286 | 3,057 | 245 | 2,548 | 122 | 7,643 | 734 | 6,115 | 587 | 1,274 | 45 | |
| 6mm | 3,822 | 489 | 2,972 | 333 | 2,548 | 245 | 2,123 | 136 | 6,369 | 815 | 5,096 | 652 | 1,062 | 58 | |
| 8mm | 2,866 | 458 | 2,229 | 321 | 1,911 | 245 | 1,592 | 153 | 4,777 | 917 | 3,822 | 734 | 796 | 69 | |
| 10mm | 2,293 | 440 | 1,783 | 286 | 1,529 | 220 | 1,274 | 124 | 3,822 | 734 | 3,057 | 587 | 637 | 55 | |
| 12mm | 1,911 | 398 | 1,486 | 262 | 1,274 | 204 | 1,062 | 136 | 3,185 | 714 | 2,548 | 570 | 531 | 65 | |
| 14mm | 1,638 | 351 | 1,274 | 232 | 1,092 | 185 | 910 | 126 | 2,730 | 637 | 2,184 | 510 | 455 | 65 | |
| 16mm | 1,433 | 321 | 1,115 | 214 | 955 | 168 | 796 | 114 | 2,389 | 574 | 1,911 | 458 | 398 | 62 | |
| | | | | | | | | | | ap = 0.2 ae = 1 | | | | | |

M50X - Square · High Helix · 4F 平銑刀 · 高導高性能型 · 4刃

- ANAX (Al, Ti, Cr, N) smooth coating provides a superior wear resistance.
- U-flute design with high chips volume space and easy to remove chips.
- For Stainless Steel, Pre-Hardened steel, Alloy Steel & Mold Steel... etc.
- UMG carbide grade is suitable for cutting difficult materials.

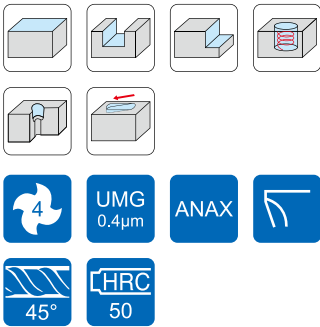


ESSSB



| Order No. | Dia. (d) | CL (L1) | OAL (L) | Shank (D) | Flutes (Z) |
|--------------|----------|---------|---------|-----------|------------|
| ESSSB441000A | 1 | 3 | 50 | 4 | 4 |
| ESSSB442000A | 2 | 5 | 50 | 4 | 4 |
| ESSSB443000A | 3 | 8 | 50 | 4 | 4 |
| ESSSB444000A | 4 | 10 | 50 | 4 | 4 |
| ESSSB404000A | 4 | 10 | 50 | 6 | 4 |
| ESSSB405000A | 5 | 13 | 50 | 6 | 4 |
| ESSSB406000A | 6 | 15 | 50 | 6 | 4 |
| ESSSB408000A | 8 | 20 | 60 | 8 | 4 |
| ESSSB410000A | 10 | 25 | 75 | 10 | 4 |
| ESSSB412000A | 12 | 30 | 75 | 12 | 4 |
| ESSSB416000A | 16 | 35 | 100 | 16 | 4 |

Solid End Milling



| WORKING MATERIAL | Carbon steel (S45C) | | Alloy Steel (SKD) | | Stainless steel (SUS304, SUS316) | |
|------------------|---------------------|-----------|-------------------|-----------|----------------------------------|-----------|
| | Vc | 130 m/min | Vc | 90 m/min | Vc | 80 m/min |
| Diameter (d) | RPM | fz (mm/z) | RPM | fz (mm/z) | RPM | fz (mm/z) |
| 4mm | 10350 | 0.020 | 7170 | 0.020 | 6370 | 0.020 |
| 6mm | 6900 | 0.025 | 4780 | 0.025 | 4250 | 0.025 |
| 8mm | 5180 | 0.035 | 3580 | 0.035 | 3190 | 0.035 |
| 10mm | 4140 | 0.045 | 2870 | 0.040 | 2550 | 0.040 |
| 12mm | 3450 | 0.055 | 2390 | 0.050 | 2120 | 0.050 |
| 16mm | 2590 | 0.072 | 1790 | 0.064 | 1590 | 0.064 |

$ap = 1d$

$ae = 0.1d$

| d Tolerance | |
|-------------|-----------|
| d ≤ 6 | 0 ~ -0.02 |
| 6 < d ≤ 12 | 0 ~ -0.03 |
| d > 12 | 0 ~ -0.04 |

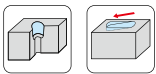
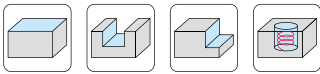
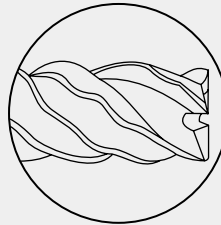
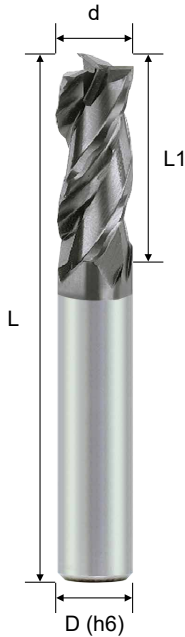
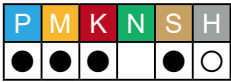
M50X - Square · Wave Edge · 3F

平銑刀 · 波浪型 · 3刃

- ANAX (Al, Ti, Cr, N) smooth coating provides a superior wear resistance.
- For Stainless Steel, Pre-Hardened steel, Alloy Steel & Mold Steel... etc.
- Incredible toughness and vibration reduction at high speeds.
- UMG carbide grade is suitable for cutting difficult materials.
- Wave type increases the performance.



ESSSW



| d Tolerance | |
|-------------|-----------|
| d ≤ 6 | 0 ~ -0.02 |
| 6 < d ≤ 12 | 0 ~ -0.03 |
| d > 12 | 0 ~ -0.04 |

| Order No. | Dia. (d) | CL (L1) | OAL (L) | Shank (D) | Flutes (Z) |
|--------------|----------|---------|---------|-----------|------------|
| ESSSW306000A | 6 | 15 | 50 | 6 | 3 |
| ESSSW308000A | 8 | 20 | 60 | 8 | 3 |
| ESSSW310000A | 10 | 25 | 75 | 10 | 3 |
| ESSSW312000A | 12 | 30 | 75 | 12 | 3 |
| ESSSW316000A | 16 | 40 | 100 | 16 | 3 |
| ESSSW320000A | 20 | 45 | 100 | 20 | 3 |

| WORKING MATERIAL | ALLOY STEEL / TOOL STEEL | | ALLOY STEEL / TOOL STEEL | | ALLOY STEEL / TOOL STEEL | | HARDENED STEEL | | STAINLESS STEEL | | CAST IRON | |
|------------------|--------------------------|---------------|--------------------------|---------------|--------------------------|---------------|----------------|---------------|-----------------|---------------|-----------|---------------|
| CODE | 45C,S50C,SCM | | SCM,SKT,SKD | | SCM,SKT,SKD | | SKT, SKD | | SUS 304 | | FC / FCD | |
| HARDNESS | HRC < 20 | | HRC 20 ~ 30 | | HRC 30 ~ 40 | | HRC 45~45 | | - | | - | |
| Vc | 88 m/min | | 71 m/min | | 59 m/min | | 35 m/min | | 71 m/min | | 103 m/min | |
| DIAMETER (d) | RPM | Feed (mm/min) | RPM | Feed (mm/min) | RPM | Feed (mm/min) | RPM | Feed (mm/min) | RPM | Feed (mm/min) | RPM | Feed (mm/min) |
| | 1mm | 26,000 | 190 | 22,230 | 140 | 18,720 | 100 | 10,400 | 40 | 22,230 | 165 | 32,760 |
| 2mm | 14,040 | 235 | 11,232 | 160 | 9,360 | 110 | 5,616 | 45 | 11,232 | 185 | 16,380 | 270 |
| 3mm | 9,828 | 270 | 7,488 | 175 | 6,084 | 120 | 3,900 | 55 | 7,488 | 205 | 11,232 | 310 |
| 4mm | 7,020 | 260 | 5,616 | 175 | 4,680 | 120 | 2,808 | 50 | 5,616 | 205 | 8,424 | 310 |
| 5mm | 5,850 | 270 | 4,446 | 175 | 3,744 | 120 | 2,340 | 55 | 4,446 | 205 | 6,552 | 300 |
| 6mm | 4,680 | 260 | 3,744 | 175 | 3,042 | 120 | 1,872 | 50 | 3,744 | 205 | 5,616 | 310 |
| 8mm | 3,510 | 260 | 2,808 | 175 | 2,340 | 120 | 1,404 | 50 | 2,808 | 205 | 4,212 | 310 |
| 10mm | 2,808 | 260 | 2,223 | 175 | 1,872 | 120 | 1,131 | 50 | 2,223 | 205 | 3,276 | 300 |
| 12mm | 2,340 | 260 | 1,872 | 175 | 1,560 | 120 | 936 | 50 | 1,872 | 205 | 2,808 | 310 |
| 14mm | 2,340 | 300 | 1,768 | 195 | 1,482 | 135 | 936 | 60 | 1,768 | 230 | 2,600 | 335 |
| 16mm | 2,028 | 300 | 2,730 | 345 | 1,300 | 135 | 819 | 60 | 2,730 | 400 | 2,340 | 345 |
| 18mm | 2,028 | 305 | 1,378 | 175 | 1,144 | 120 | 819 | 60 | 1,378 | 205 | 2,080 | 310 |
| 20mm | 1,560 | 260 | 1,248 | 175 | 1,040 | 120 | 624 | 50 | 1,248 | 205 | 1,820 | 300 |



ap = 1d
ae = 0.2d

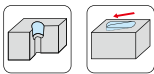
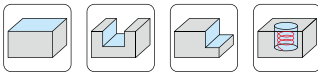
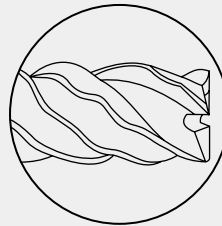
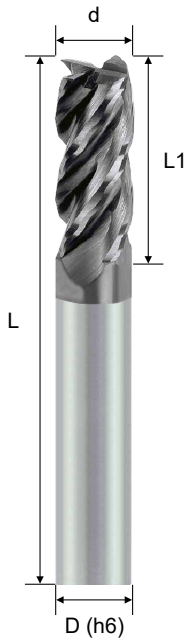
M50X - Square · Wave Edge · 4F

平銑刀 · 波浪型 · 4 刃

- ANAX (Al, Ti, Cr, N) smooth coating provides a superior wear resistance.
- For Stainless Steel, Pre-Hardened steel, Alloy Steel & Mold Steel... etc.
- Incredible toughness and vibration reduction at high speeds.
- UMG carbide grade is suitable for cutting difficult materials.
- Wave type increases the performance.

ASIA
(Metric)

ESSSW



| d Tolerance | |
|-------------|-----------|
| d ≤ 6 | 0 ~ -0.02 |
| 6 < d ≤ 12 | 0 ~ -0.03 |
| d > 12 | 0 ~ -0.04 |

| Order No. | Dia. (d) | CL (L1) | OAL (L) | Shank (D) | Flutes (Z) |
|--------------|-------------|------------|------------|--------------|---------------|
| ESSSW406000A | 6 | 15 | 50 | 6 | 4 |
| ESSSW408000A | 8 | 20 | 60 | 8 | 4 |
| ESSSW410000A | 10 | 25 | 75 | 10 | 4 |
| ESSSW412000A | 12 | 30 | 75 | 12 | 4 |
| ESSSW416000A | 16 | 40 | 100 | 16 | 4 |
| ESSSW420000A | 20 | 45 | 100 | 20 | 4 |

| WORKING MATERIAL | ALLOY STEEL / TOOL STEEL | | ALLOY STEEL / TOOL STEEL | | ALLOY STEEL / TOOL STEEL | | HARDENED STEEL | | STAINLESS STEEL | | CAST IRON | |
|------------------|--------------------------|---------------|--------------------------|---------------|--------------------------|---------------|----------------|---------------|-----------------|---------------|-----------|---------------|
| CODE | 45C,S50C,SCM | | SCM,SKT,SKD | | SCM,SKT,SKD | | SKT, SKD | | SUS 304 | | FC / FCD | |
| HARDNESS | HRC < 20 | | HRC 20 ~ 30 | | HRC 30 ~ 40 | | HRC 45~45 | | - | | - | |
| Vc | 88 m/min | | 71 m/min | | 59 m/min | | 35 m/min | | 71 m/min | | 103 m/min | |
| DIAMETER (d) | RPM | Feed (mm/min) | RPM | Feed (mm/min) | RPM | Feed (mm/min) | RPM | Feed (mm/min) | RPM | Feed (mm/min) | RPM | Feed (mm/min) |
| | 1mm | 26,000 | 190 | 22,230 | 140 | 18,720 | 100 | 10,400 | 40 | 22,230 | 165 | 32,760 |
| 2mm | 14,040 | 235 | 11,232 | 160 | 9,360 | 110 | 5,616 | 45 | 11,232 | 185 | 16,380 | 270 |
| 3mm | 9,828 | 270 | 7,488 | 175 | 6,084 | 120 | 3,900 | 55 | 7,488 | 205 | 11,232 | 310 |
| 4mm | 7,020 | 260 | 5,616 | 175 | 4,680 | 120 | 2,808 | 50 | 5,616 | 205 | 8,424 | 310 |
| 5mm | 5,850 | 270 | 4,446 | 175 | 3,744 | 120 | 2,340 | 55 | 4,446 | 205 | 6,552 | 300 |
| 6mm | 4,680 | 260 | 3,744 | 175 | 3,042 | 120 | 1,872 | 50 | 3,744 | 205 | 5,616 | 310 |
| 8mm | 3,510 | 260 | 2,808 | 175 | 2,340 | 120 | 1,404 | 50 | 2,808 | 205 | 4,212 | 310 |
| 10mm | 2,808 | 260 | 2,223 | 175 | 1,872 | 120 | 1,131 | 50 | 2,223 | 205 | 3,276 | 300 |
| 12mm | 2,340 | 260 | 1,872 | 175 | 1,560 | 120 | 936 | 50 | 1,872 | 205 | 2,808 | 310 |
| 14mm | 2,340 | 300 | 1,768 | 195 | 1,482 | 135 | 936 | 60 | 1,768 | 230 | 2,600 | 335 |
| 16mm | 2,028 | 300 | 2,730 | 345 | 1,300 | 135 | 819 | 60 | 2,730 | 400 | 2,340 | 345 |
| 18mm | 2,028 | 305 | 1,378 | 175 | 1,144 | 120 | 819 | 60 | 1,378 | 205 | 2,080 | 310 |
| 20mm | 1,560 | 260 | 1,248 | 175 | 1,040 | 120 | 624 | 50 | 1,248 | 205 | 1,820 | 300 |



ap = 1d
ae = 0.2d

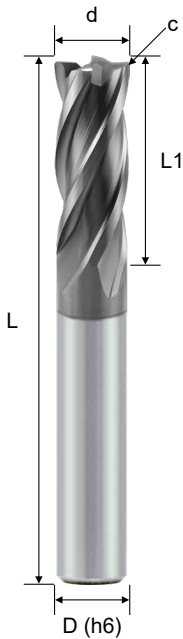
M50X - Square · Chamfer · High Feed · 4F

平銑刀 · 高進給倒角型 · 4刃

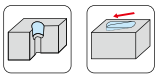
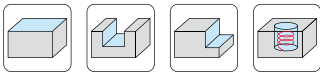
- ANAX (Al, Ti, Cr, N) smooth coating provides a superior wear resistance.
- Honing & chamfering at the cutting edge geometries for high feed milling.
- Outstanding results for HRC 30 to HRC 55 steel, such as Alloy steel, cast Iron ...etc.
- Achieve long tool life, perfect surfaces and considerable reduction of machining time.



ESSSU



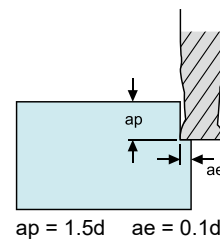
| Order No. | Dia. (d) | Chamfer (c) | CL (L1) | OAL (L) | Shank (D) | Flutes (Z) |
|--------------|----------|-------------|---------|---------|-----------|------------|
| ESSSU403000A | 3 | 0.10 | 8 | 50 | 6 | 4 |
| ESSSU404000A | 4 | 0.10 | 10 | 50 | 6 | 4 |
| ESSSU405000A | 5 | 0.15 | 13 | 50 | 6 | 4 |
| ESSSU406000A | 6 | 0.15 | 15 | 50 | 6 | 4 |
| ESSSU408000A | 8 | 0.15 | 20 | 60 | 8 | 4 |
| ESSSU410000A | 10 | 0.20 | 25 | 75 | 10 | 4 |
| ESSSU412000A | 12 | 0.20 | 30 | 75 | 12 | 4 |
| ESSSU416000A | 16 | 0.20 | 35 | 100 | 16 | 4 |



| d Tolerance | |
|-------------|-----------|
| d ≤ 6 | 0 ~ -0.02 |
| 6 < d ≤ 12 | 0 ~ -0.03 |
| d > 12 | 0 ~ -0.04 |

Feed recommend table

| Dia (d) (mm) | fz (mm/z) |
|--------------|--------------|
| 4 | 0.006 ~ 0.1 |
| 6 | 0.009 ~ 0.15 |
| 10 | 0.15 ~ 0.25 |

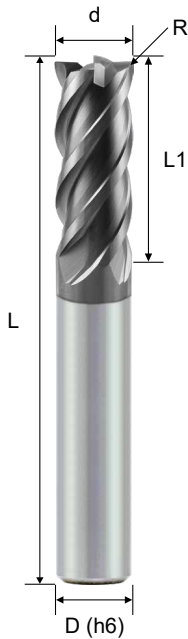


M50X - Square · Radius · High Feed · 4F 平銑刀 · 高進給圓角型 · 4 刃

- ANAX (Al, Ti, Cr, N) smooth coating provides a superior wear resistance.
- With "Small positive" rake angle and small corner radius geometries for high feed cutting.
- Outstanding results and tool life for 2-D and 3-D machining of HRC 30 to HRC 55 steel, such as Alloy steel, cast Iron...etc.
- Achieve long tool life, perfect surfaces and considerable reduction of machining time.

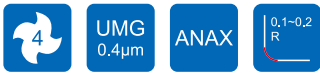
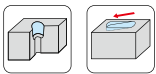
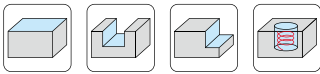


ESCSU



| Order No. | Dia. (d) | Radius (R) | CL (L1) | OAL (L) | Shank (D) | Flutes (Z) |
|--------------|----------|------------|---------|---------|-----------|------------|
| ESCSU403000A | 3 | 0.10 | 8 | 50 | 6 | 4 |
| ESCSU404000A | 4 | 0.10 | 10 | 50 | 6 | 4 |
| ESCSU405000A | 5 | 0.15 | 13 | 50 | 6 | 4 |
| ESCSU406000A | 6 | 0.15 | 15 | 50 | 6 | 4 |
| ESCSU408000A | 8 | 0.15 | 20 | 60 | 8 | 4 |
| ESCSU410000A | 10 | 0.20 | 25 | 75 | 10 | 4 |
| ESCSU412000A | 12 | 0.20 | 30 | 75 | 12 | 4 |
| ESCSU416000A | 16 | 0.20 | 35 | 100 | 16 | 4 |

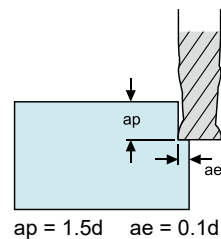
Solid End Milling



| d Tolerance | |
|-------------|-----------|
| d ≤ 6 | 0 ~ -0.02 |
| 6 < d ≤ 12 | 0 ~ -0.03 |
| d > 12 | 0 ~ -0.04 |

Feed recommend table

| Dia (d) (mm) | fz (mm/z) |
|--------------|--------------|
| 4 | 0.006 ~ 0.1 |
| 6 | 0.009 ~ 0.15 |
| 10 | 0.15 ~ 0.25 |



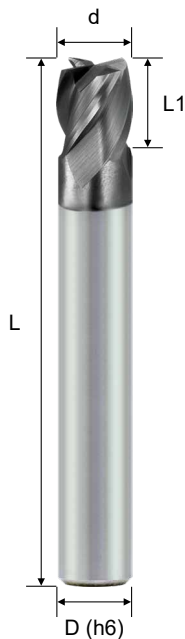
M50X - Square · Short Flute · 4F

平銑刀 · 短刃型 · 4刃

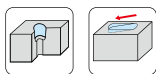
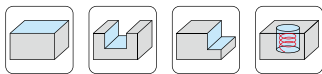
- ANAX (Al, Ti, Cr, N) smooth coating provides a superior wear resistance.
- For Stainless Steel, Alloy Steel & Mold Steel... etc.
- Edge treatment and vibration reduction at high speed machining.



ESSHA



| Order No. | Dia. (d) | CL (L1) | OAL (L) | Shank (D) | Flutes (Z) |
|--------------|----------|---------|---------|-----------|------------|
| ESSHA443000A | 3 | 3 | 50 | 4 | 4 |
| ESSHA444000A | 4 | 4 | 50 | 4 | 4 |
| ESSHA404000A | 4 | 4 | 50 | 6 | 4 |
| ESSHA405000A | 5 | 5 | 50 | 6 | 4 |
| ESSHA406000A | 6 | 7 | 50 | 6 | 4 |
| ESSHA408000A | 8 | 9 | 60 | 8 | 4 |
| ESSHA410000A | 10 | 11 | 75 | 10 | 4 |
| ESSHA412000A | 12 | 13 | 75 | 12 | 4 |
| ESSHA414000A | 14 | 15 | 75 | 14 | 4 |
| ESSHA416000A | 16 | 17 | 100 | 16 | 4 |



| d Tolerance | |
|-------------|-----------|
| d ≤ 6 | 0 ~ -0.02 |
| 6 < d ≤ 12 | 0 ~ -0.03 |
| d > 12 | 0 ~ -0.04 |

| WORKING MATERIAL | STAINLESS 304 | | Moderately Difficults SUS | | STAINLESS 316 L | | TITANIUM (ALLOYS) | | SOFT STEEL | | SG CAST IRON | | High Temperature Alloys | |
|------------------|---------------|---------------|---------------------------|---------------|-----------------|---------------|-------------------|---------------|------------|---------------|--------------|---------------|-------------------------|---------------|
| | Vc | 72~90 m/min | 56~70 m/min | 48~60 m/min | 40~56 m/min | 120~160 m/min | 96~120 m/min | 20~25 m/min | | | | | | |
| DIAMETER (d) | RPM | Feed (mm/min) | RPM | Feed (mm/min) | RPM | Feed (mm/min) | RPM | Feed (mm/min) | RPM | Feed (mm/min) | RPM | Feed (mm/min) | RPM | Feed (mm/min) |
| 4mm | 5,732 | 458 | 4,459 | 286 | 3,822 | 183 | 3,185 | 122 | 9,554 | 764 | 7,643 | 611 | 1,592 | 56 |
| 5mm | 4,586 | 440 | 3,567 | 286 | 3,057 | 245 | 2,548 | 122 | 7,643 | 734 | 6,115 | 587 | 1,274 | 45 |
| 6mm | 3,822 | 489 | 2,972 | 333 | 2,548 | 245 | 2,123 | 136 | 6,369 | 815 | 5,096 | 652 | 1,062 | 58 |
| 8mm | 2,866 | 458 | 2,229 | 321 | 1,911 | 245 | 1,592 | 153 | 4,777 | 917 | 3,822 | 734 | 796 | 69 |
| 10mm | 2,293 | 440 | 1,783 | 286 | 1,529 | 220 | 1,274 | 124 | 3,822 | 734 | 3,057 | 587 | 637 | 55 |
| 12mm | 1,911 | 398 | 1,486 | 262 | 1,274 | 204 | 1,062 | 136 | 3,185 | 714 | 2,548 | 570 | 531 | 65 |
| 14mm | 1,638 | 351 | 1,274 | 232 | 1,092 | 185 | 910 | 126 | 2,730 | 637 | 2,184 | 510 | 455 | 65 |
| 16mm | 1,433 | 321 | 1,115 | 214 | 955 | 168 | 796 | 114 | 2,389 | 574 | 1,911 | 458 | 398 | 62 |

ap = 0.2
ae = 1

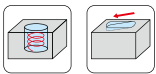
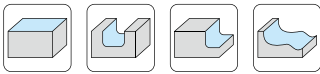
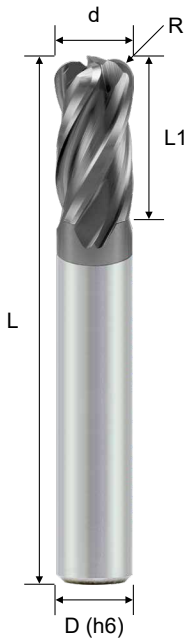
M50X - Corner Radius · Standard · 4F

圓鼻銑刀 · 標準型 · 4 刃

- ANAX (Al, Ti, Cr, N) smooth coating provides a superior wear resistance.
- For Stainless Steel, Alloy Steel & Mold Steel... etc.
- Edge treatment and vibration reduction at high speed machining.
- Corner geometry and stronger design makes it suitable for cutting stainless steel.

ASIA
(Metric)

ESCSA



| d Tolerance | |
|-------------|-----------|
| d ≤ 6 | 0 ~ -0.02 |
| 6 < d ≤ 12 | 0 ~ -0.03 |
| d > 12 | 0 ~ -0.04 |

| R Tolerance | |
|-------------|--------|
| R < 2 | ±0.015 |
| R ≥ 2 | ±0.020 |

| Order No. | Dia. (d) | Radius (R) | CL (L1) | OAL (L) | Shank (D) | Flutes (Z) |
|--------------|-------------|---------------|------------|------------|--------------|---------------|
| ESCSA441002A | 1 | 0.2R | 2 | 50 | 4 | 4 |
| ESCSA441502A | 1.5 | 0.2R | 3 | 50 | 4 | 4 |
| ESCSA442002A | 2 | 0.2R | 4 | 50 | 4 | 4 |
| ESCSA443002A | 3 | 0.2R | 6 | 50 | 4 | 4 |
| ESCSA443003A | 3 | 0.3R | 6 | 50 | 4 | 4 |
| ESCSA403003A | 3 | 0.3R | 6 | 50 | 6 | 4 |
| ESCSA443005A | 3 | 0.5R | 6 | 50 | 4 | 4 |
| ESCSA403005A | 3 | 0.5R | 6 | 50 | 6 | 4 |
| ESCSA403010A | 3 | 1.0R | 6 | 50 | 6 | 4 |
| ESCSA444002A | 4 | 0.2R | 8 | 50 | 4 | 4 |
| ESCSA404003A | 4 | 0.3R | 8 | 50 | 6 | 4 |
| ESCSA444005A | 4 | 0.5R | 8 | 50 | 4 | 4 |
| ESCSA404005A | 4 | 0.5R | 8 | 50 | 6 | 4 |
| ESCSA404010A | 4 | 1.0R | 8 | 50 | 6 | 4 |
| ESCSA405003A | 5 | 0.3R | 10 | 50 | 6 | 4 |
| ESCSA405005A | 5 | 0.5R | 10 | 50 | 6 | 4 |
| ESCSA406003A | 6 | 0.3R | 12 | 50 | 6 | 4 |
| ESCSA406005A | 6 | 0.5R | 12 | 50 | 6 | 4 |
| ESCSA406010A | 6 | 1.0R | 12 | 50 | 6 | 4 |
| ESCSA408005A | 8 | 0.5R | 16 | 60 | 8 | 4 |
| ESCSA408010A | 8 | 1.0R | 16 | 60 | 8 | 4 |
| ESCSA408015A | 8 | 1.5R | 16 | 60 | 8 | 4 |
| ESCSA410005A | 10 | 0.5R | 20 | 75 | 10 | 4 |
| ESCSA410010A | 10 | 1.0R | 20 | 75 | 10 | 4 |
| ESCSA410015A | 10 | 1.5R | 20 | 75 | 10 | 4 |
| ESCSA410020A | 10 | 2.0R | 20 | 75 | 10 | 4 |
| ESCSA412005A | 12 | 0.5R | 24 | 75 | 12 | 4 |
| ESCSA412010A | 12 | 1.0R | 24 | 75 | 12 | 4 |
| ESCSA412015A | 12 | 1.5R | 24 | 75 | 12 | 4 |
| ESCSA412020A | 12 | 2.0R | 24 | 75 | 12 | 4 |
| ESCSA412030A | 12 | 3.0R | 24 | 75 | 12 | 4 |

| WORKING MATERIAL | ALLOY STEEL / TOOL STEEL | | ALLOY STEEL / TOOL STEEL | | ALLOY STEEL / TOOL STEEL | | HARDENED STEEL | | STAINLESS STEEL | | CAST IRON | |
|------------------|--------------------------|---------------|--------------------------|---------------|--------------------------|---------------|----------------|---------------|-----------------|---------------|-----------|---------------|
| CODE | 45C,S50C,SCM | | SCM,SKT,SKD | | SCM,SKT,SKD | | SKT, SKD | | SUS 304 | | FC / FCD | |
| HARDNESS | HRC < 20 | | HRC 20 ~ 30 | | HRC 30 ~ 40 | | HRC 45~45 | | - | | - | |
| Vc | 88 m/min | | 71 m/min | | 59 m/min | | 35 m/min | | 71 m/min | | 103 m/min | |
| Diameter (d) | RPM | Feed (mm/min) | RPM | Feed (mm/min) | RPM | Feed (mm/min) | RPM | Feed (mm/min) | RPM | Feed (mm/min) | RPM | Feed (mm/min) |
| 3mm | 9,828 | 455 | 7,098 | 295 | 6,084 | 195 | 3,900 | 90 | 7,488 | 345 | 11,232 | 520 |
| 4mm | 7,020 | 430 | 5,616 | 295 | 4,680 | 200 | 2,808 | 85 | 5,616 | 345 | 8,424 | 520 |
| 5mm | 5,850 | 450 | 4,446 | 290 | 3,744 | 200 | 2,340 | 90 | 4,446 | 345 | 6,552 | 505 |
| 6mm | 4,680 | 430 | 3,744 | 295 | 3,042 | 195 | 1,872 | 85 | 3,744 | 345 | 5,616 | 520 |
| 8mm | 3,510 | 430 | 2,808 | 295 | 2,340 | 200 | 1,404 | 85 | 2,808 | 345 | 4,212 | 520 |
| 10mm | 2,808 | 430 | 2,223 | 290 | 1,872 | 200 | 1,131 | 85 | 2,223 | 340 | 3,276 | 505 |
| 12mm | 2,340 | 430 | 1,872 | 295 | 1,560 | 200 | 936 | 85 | 1,872 | 345 | 2,808 | 520 |

ap = 1d

ae = 0.02d

Solid End Milling

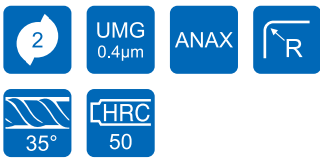
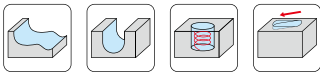
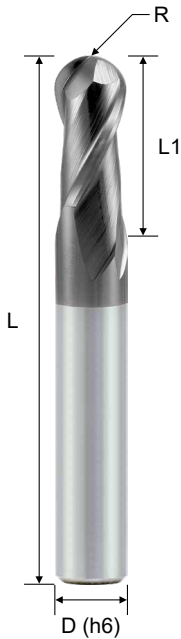
M50X - Ball Nose · Standard · 2F

球型銑刀 · 標準型 · 2 刃

- ANAX (Al, Ti, Cr, N) smooth coating provides a superior wear resistance.
- For Stainless Steel, Alloy Steel & Mold Steel... etc.
- Edge treatment and vibration reduction at high speed machining, suitable for high performance profile milling.
- New ball nose geometry increases tool life and decreased cutting force.



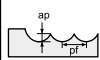
ESBSA



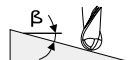
| R Tolerance | |
|-------------|--------|
| R ≤ 3 | ±0.015 |
| R > 3 | ±0.020 |

| Order No. | Radius (R) | Dia. (d) | CL (L1) | OAL (L) | Shank (D) | Flutes (Z) |
|--------------|------------|----------|---------|---------|-----------|------------|
| ESBSA240500A | 0.25R | 0.5 | 1 | 50 | 4 | 2 |
| ESBSA241000A | 0.5R | 1 | 2 | 50 | 4 | 2 |
| ESBSA241500A | 0.75R | 1.5 | 3 | 50 | 4 | 2 |
| ESBSA242000A | 1.0R | 2 | 4 | 50 | 4 | 2 |
| ESBSA242500A | 1.25R | 2.5 | 5 | 50 | 4 | 2 |
| ESBSA243000A | 1.5R | 3 | 6 | 50 | 4 | 2 |
| ESBSA244000A | 2.0R | 4 | 8 | 50 | 4 | 2 |
| ESBSA204000A | 2.0R | 4 | 8 | 50 | 6 | 2 |
| ESBSA205000A | 2.5R | 5 | 10 | 50 | 6 | 2 |
| ESBSA206000A | 3.0R | 6 | 12 | 50 | 6 | 2 |
| ESBSA208000A | 4.0R | 8 | 16 | 60 | 8 | 2 |
| ESBSA210000A | 5.0R | 10 | 20 | 75 | 10 | 2 |
| ESBSA212000A | 6.0R | 12 | 24 | 75 | 12 | 2 |
| ESBSA216000A | 8.0R | 16 | 32 | 100 | 16 | 2 |

| WORKING MATERIAL | ALLOY STEEL / TOOL STEEL | ALLOY STEEL / TOOL STEEL | ALLOY STEEL / TOOL STEEL | HARDENED STEEL | STAINLESS STEEL | CAST IRON | | | | | | |
|------------------|--------------------------|--------------------------|--------------------------|----------------|-----------------|---------------|--------|---------------|--------|---------------|--------|---------------|
| CODE | 45C,S50C,SCM | SCM,SKT,SKD | SCM,SKT,SKD | SKT, SKD | SUS 304 | FC / FCD | | | | | | |
| HARDNESS | HRC < 20 | HRC 20 ~ 30 | HRC 30 ~ 40 | HRC 45~55 | - | - | | | | | | |
| Vc | 94 m/min | 71 m/min | 44 m/min | 38 m/min | 71 m/min | 94 m/min | | | | | | |
| RADIUS (R) | RPM | Feed (mm/min) | RPM | Feed (mm/min) | RPM | Feed (mm/min) | RPM | Feed (mm/min) | RPM | Feed (mm/min) | RPM | Feed (mm/min) |
| 0.5R | 46,800 | 545 | 42,120 | 420 | 28,080 | 230 | 18,720 | 110 | 42,120 | 490 | 58,500 | 685 |
| 1.0R | 26,676 | 700 | 21,060 | 470 | 15,210 | 280 | 10,660 | 140 | 21,060 | 555 | 29,718 | 780 |
| 2.0R | 14,976 | 875 | 11,232 | 560 | 8,190 | 335 | 5,980 | 175 | 11,232 | 655 | 14,976 | 875 |
| 3.0R | 9,828 | 860 | 7,488 | 560 | 4,914 | 300 | 3,926 | 170 | 7,488 | 655 | 9,828 | 860 |
| 4.0R | 7,488 | 875 | 5,616 | 560 | 3,744 | 305 | 2,990 | 175 | 5,616 | 655 | 7,488 | 875 |
| 5.0R | 5,967 | 870 | 4,446 | 550 | 2,808 | 285 | 2,379 | 175 | 4,446 | 650 | 5,967 | 870 |
| 6.0R | 4,914 | 860 | 3,744 | 560 | 2,340 | 285 | 1,976 | 175 | 3,744 | 655 | 4,914 | 860 |
| 8.0R | 4,160 | 970 | 3,120 | 620 | 2,028 | 330 | 1,664 | 195 | 3,120 | 730 | 4,160 | 970 |
| 10.0R | 3,380 | 890 | 2,496 | 560 | 1,690 | 310 | 1,352 | 175 | 2,496 | 655 | 3,380 | 890 |



ap = 0.02d
pf = 0.05d



When β is less than 15° milling speed and feed speed in the table can be increased 1.0-1.2 times.

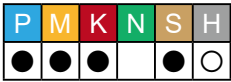
M50X - Ball Nose · Near Center Design · 3F / 4F

球型銑刀 · 刃近中心型 · 3 刃 / 4 刃

- ANAX (Al, Ti, Cr, N) smooth coating provides a superior wear resistance.
- For high temperature alloy and high hardened steel machining.
- Reach to center and near to center flutes design, significantly improves the tool life and surface finish in profile milling.

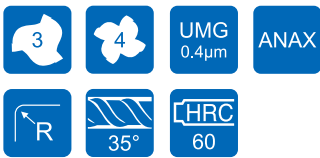
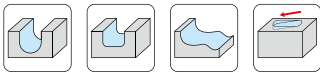
ASIA
(Metric)

ESBHS



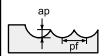
| Order No. | Radius (R) | Dia. (d) | CL (L1) | OAL (L) | Shank (D) | Flutes (Z) |
|--------------|------------|----------|---------|---------|-----------|------------|
| ESBHS342000A | 1R | 2 | 2 | 50 | 4 | 3 |
| ESBHS302000A | 1R | 2 | 2 | 50 | 6 | 3 |
| ESBHS303000A | 1.5R | 3 | 3 | 50 | 6 | 3 |
| ESBHS344000A | 2R | 4 | 4 | 50 | 4 | 3 |
| ESBHS304000A | 2R | 4 | 4 | 50 | 6 | 3 |
| ESBHS406000A | 3R | 6 | 6 | 50 | 6 | 4 |
| ESBHS406007A | 3R | 6 | 6 | 75 | 6 | 4 |
| ESBHS408000A | 4R | 8 | 8 | 60 | 8 | 4 |
| ESBHS408010A | 4R | 8 | 8 | 100 | 8 | 4 |
| ESBHS410000A | 5R | 10 | 10 | 75 | 10 | 4 |
| ESBHS410010A | 5R | 10 | 10 | 100 | 10 | 4 |
| ESBHS412000A | 6R | 12 | 12 | 75 | 12 | 4 |
| ESBHS412010A | 6R | 12 | 12 | 100 | 12 | 4 |
| ESBHS416000A | 8R | 16 | 16 | 100 | 16 | 4 |

Solid End Milling



| R Tolerance | |
|-------------|--------|
| R ≤ 3 | ±0.015 |
| R > 3 | ±0.020 |

| Work Material | High temperature alloy (Nickel Titanium) | | Hardened steel (HRC 40 ~55) (SKD11, SKD61) | | Hardened steel (HRC 50~60) (SKD11, SUS420) | | Hardened steel (HRC 60~65) (SKS, SKH) | |
|---------------|--|---------------|--|---------------|--|---------------|---------------------------------------|---------------|
| | RPM | Feed (mm/min) | RPM | Feed (mm/min) | RPM | Feed (mm/min) | RPM | Feed (mm/min) |
| Radius (R) | | | | | | | | |
| 3R | 15000 | 3400 | 21000 | 8400 | 16000 | 4800 | 8000 | 2300 |
| 4R | 12000 | 2600 | 16000 | 6400 | 12000 | 3600 | 6000 | 1900 |
| 5R | 9600 | 2200 | 13000 | 5200 | 10000 | 3200 | 4800 | 1500 |
| 6R | 7200 | 1700 | 9000 | 3600 | 7000 | 2200 | 3600 | 1100 |
| 8R | 5400 | 1300 | 6800 | 2700 | 5300 | 1700 | 2700 | 830 |



ap = 0.04d
pf ≤ 0.2R