



Size $\phi 0.2 \sim \phi 12$

CRN-ES2000

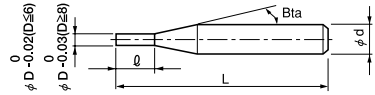


Material Applications (☆ Highly Recommended ● Recommended ○ Suggested)

| Work Material | | | | | | | | | | | | | | | |
|---------------|-----------------|--------------------|-----------------|--------|--------|-----------|-----------------|----------|--------|----------|-----------------------|-----------------|-----------------------|------------------|---------------------------------------|
| Carbon Steels | Alloy Steels | Prehardened Steels | Hardened Steels | | | Cast Iron | Aluminum Alloys | Graphite | Copper | Plastics | Glass Filled Plastics | Titanium Alloys | Heat Resistant Alloys | Cemented Carbide | Hard Brittle (Non-Metallic) Materials |
| | | | ~55HRC | ~60HRC | ~70HRC | | | | | | | | | | |
| S45C S55C | SK / SCM SUS | NAK HPM | | | | | ○ | | ☆ | ○ | | | | | |

Features

CrN COAT offers longer tool life.
Special geometry designed for Copper offers excellent milling performance.
 Refer to page 100 for 4 flute CRN-ES.
 Diameter Tolerance: 0/-0.02(D ≤ 6), 0/-0.03(D ≥ 8)



The shank taper angle shown is not an exact value and to avoid contact with the work piece, we recommend the user controls the precise value of this angle. Shank taper angle should not make contact with the work piece.

Total 26 models

Unit (mm)

| Model Number | Outside Diameter ϕD | Length of Cut l | Shank Taper Angle Bta | Overall Length L | Shank Diameter ϕd | Price (¥) |
|------------------|---------------------------|-------------------|-----------------------|------------------|-------------------------|-----------|
| CRN-ES 2002-0060 | 0.2 | 0.6 | 11° | 40 | 4 | 6,100 |
| CRN-ES 2003-0090 | 0.3 | 0.9 | 11° | 40 | 4 | 6,100 |
| CRN-ES 2004-0120 | 0.4 | 1.2 | 11° | 40 | 4 | 6,100 |
| CRN-ES 2005-0150 | 0.5 | 1.5 | 11° | 40 | 4 | 3,200 |
| CRN-ES 2005-0200 | 0.5 | 2 | 11° | 45 | 4 | 5,500 |
| CRN-ES 2006-0180 | 0.6 | 1.8 | 11° | 40 | 4 | 5,060 |
| CRN-ES 2006-0240 | 0.6 | 2.4 | 11° | 45 | 4 | 5,500 |
| CRN-ES 2008-0240 | 0.8 | 2.4 | 11° | 40 | 4 | 3,200 |
| CRN-ES 2010-0300 | 1 | 3 | 11° | 45 | 4 | 3,200 |
| CRN-ES 2010-0400 | 1 | 4 | 11° | 50 | 4 | 4,950 |
| CRN-ES 2015-0450 | 1.5 | 4.5 | 11° | 45 | 4 | 3,200 |
| CRN-ES 2015-0600 | 1.5 | 6 | 11° | 50 | 4 | 4,950 |
| CRN-ES 2020-0600 | 2 | 6 | 11° | 45 | 4 | 3,200 |
| CRN-ES 2020-0800 | 2 | 8 | 11° | 50 | 4 | 4,950 |
| CRN-ES 2025-0750 | 2.5 | 7.5 | 11° | 45 | 4 | 3,200 |
| CRN-ES 2030-0900 | 3 | 9 | 11° | 50 | 6 | 3,740 |
| CRN-ES 2030-1200 | 3 | 12 | 11° | 55 | 6 | 6,050 |
| CRN-ES 2040-1200 | 4 | 12 | 11° | 50 | 6 | 3,960 |
| CRN-ES 2040-1600 | 4 | 16 | 11° | 55 | 6 | 6,600 |
| CRN-ES 2050-1500 | 5 | 15 | 11° | 55 | 6 | 4,200 |
| CRN-ES 2060-1800 | 6 | 18 | — | 60 | 6 | 4,620 |
| CRN-ES 2060-2400 | 6 | 24 | — | 65 | 6 | 7,480 |
| CRN-ES 2080-2400 | 8 | 24 | — | 80 | 8 | 8,760 |
| CRN-ES 2100-3000 | 10 | 30 | — | 100 | 10 | 10,900 |
| CRN-ES 2100-4000 | 10 | 40 | — | 100 | 10 | 17,280 |
| CRN-ES 2120-3600 | 12 | 36 | — | 100 | 12 | 15,000 |

Milling Conditions for CRN-ES (2 Flutes)

◆3D flute length type

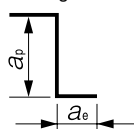
| WORK MATERIAL | | COPPER C1100 | | | |
|---------------|-----------------------|------------------------------------|--------------------|------------------------------------|--------------------|
| Model Number | Outside Diameter (mm) | Side Milling | | Slotting | |
| | | Spindle Speed (min ⁻¹) | Feed Rate (mm/min) | Spindle Speed (min ⁻¹) | Feed Rate (mm/min) |
| 2002-0060 | 0.2 | 40,000 | 100 | 40,000 | 85 |
| 2003-0090 | 0.3 | 38,000 | 100 | 38,000 | 85 |
| 2004-0120 | 0.4 | 35,000 | 100 | 35,000 | 85 |
| 2005-0150 | 0.5 | 32,000 | 120 | 32,000 | 100 |
| 2006-0180 | 0.6 | 29,000 | 150 | 26,000 | 120 |
| 2008-0240 | 0.8 | 22,000 | 180 | 21,000 | 150 |
| 2010-0300 | 1 | 18,000 | 180 | 16,000 | 150 |
| 2015-0450 | 1.5 | 17,500 | 250 | 11,000 | 150 |
| 2020-0600 | 2 | 17,000 | 340 | 7,500 | 150 |
| 2025-0750 | 2.5 | 16,500 | 450 | 6,000 | 150 |
| 2030-0900 | 3 | 16,000 | 630 | 5,000 | 170 |
| 2040-1200 | 4 | 12,000 | 650 | 5,000 | 200 |
| 2050-1500 | 5 | 10,000 | 750 | 5,000 | 250 |
| 2060-1800 | 6 | 8,000 | 800 | 4,500 | 250 |
| 2080-2400 | 8 | 6,000 | 700 | 4,000 | 250 |
| 2100-3000 | 10 | 5,000 | 600 | 4,000 | 350 |
| 2120-3600 | 12 | 4,000 | 500 | 4,000 | 450 |

◆4D flute length type

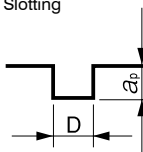
| WORK MATERIAL | | COPPER C1100 | | | |
|---------------|-----------------------|------------------------------------|--------------------|------------------------------------|--------------------|
| Model Number | Outside Diameter (mm) | Side Milling | | Slotting | |
| | | Spindle Speed (min ⁻¹) | Feed Rate (mm/min) | Spindle Speed (min ⁻¹) | Feed Rate (mm/min) |
| 2005-0200 | 0.5 | 16,000 | 60 | 16,000 | 50 |
| 2006-0240 | 0.6 | 14,500 | 75 | 14,500 | 65 |
| 2010-0400 | 1 | 9,000 | 90 | 8,000 | 75 |
| 2015-0600 | 1.5 | 9,000 | 150 | 8,000 | 130 |
| 2020-0800 | 2 | 5,000 | 140 | 4,500 | 120 |
| 2030-1200 | 3 | 3,500 | 140 | 2,500 | 85 |
| 2040-1600 | 4 | 3,500 | 200 | 2,500 | 100 |
| 2060-2400 | 6 | 3,000 | 200 | 2,500 | 150 |
| 2100-4000 | 10 | 2,500 | 230 | 2,000 | 175 |

| Length of Cut Milling | 3D Flute Length Type | 4D Flute Length Type |
|--------------------------|--|--|
| | Side Milling | a_p 1.5D a_e 0.02D ($D \leq \phi 1.0$) a_e 0.1D ($D > \phi 1.0$) |
| Slotting | a_p 0.05D ($D \leq \phi 1.0$) a_p 0.1D ($D > \phi 1.0$) | a_p 0.05D ($D \leq \phi 1.0$) a_p 0.1D ($D > \phi 1.0$) |

Side Milling



Slotting



a_p : Axial Depth (mm)
 a_e : Radial Depth (mm)
 D : Outside Diameter (mm)

Note:

- Decrease both spindle speed and feed rate proportionally in case of chattering.
- Adjust the milling amount and feed rate in accordance with required precision.
- Recommend water soluble or oil coolant.
- Recommended for Pure Copper. Not suitable for Tungsten Copper.

Square

Square
Long Neck
Square

Radius

Radius
Long Neck
RadiusBall / Long
Shank BallBall
Long Neck
BallTaper Neck
BallTaper
TaperSpiral
V CutterDrill
Thread Mill

EURO Series

Technical Data