

Good Products are Produced by Precise Carbide End Mills

# CUTTING TOOLS 2012 VOL.4 CATALOG

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スクエア  
Square

ラジウス  
Radius

ボール  
Ball

ロングネック  
Long Neck

ラフニング  
Roughing

面取り加工用  
Chamfering

ドリル  
Drill



C-K-K CO., LTD.

# CUTTING TOOLS CATALOG

## 超硬切削工具カタログ



## C.K.K ORIGINAL ENDMILL SERIES

### C.K.Kオリジナルエンドミルシリーズ

Carbide cutting tools are widely required to support the manufacturing industries such as the aircraft, space and automobiles industries, also from the most advanced field to die requiring nanotechnology like semiconductors. We believe we can meet your requests with our original and creative technical skills. On the other hand, we contribute to the resource conservation and the global environmental protection through re-grinding and coating.

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スクエア  
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ボール  
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ロングネック  
Long Neck

**ラフィング**  
Roughing End Mill



ラフィング  
Roughing

**面取り加工用**  
Chamfering End Mill



面取り加工用  
Chamfering

**ドリル**  
Drill



ドリル  
Drill

# スクエア Square End Mill

| 用途 Work                |        | 一般鋼                                                                               |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |
|------------------------|--------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| 刃数 Flute               |        | 2                                                                                 | 2                                                                                 | 4                                                                                 | 4                                                                                 | 3                                                                                 | 3                                                                                 | 4                                                                                   |
| 形状 Shape               |        |  |  |  |  |  |  |  |
| 型番 Mode                |        | EM2                                                                               | CX200-EM2                                                                         | EM4                                                                               | CX200-EM4                                                                         | CX200-HEM3                                                                        | CX200-PHEM3                                                                       | CX200-HEM4                                                                          |
| 表面処理 Coating           |        |                                                                                   | CX200 Coat                                                                        |                                                                                   | CX200 Coat                                                                        | CX200 Coat                                                                        | CX200 Coat                                                                        | CX200 Coat                                                                          |
| 炭素鋼 Carbon Steel       |        | ◎                                                                                 | ◎                                                                                 | ◎                                                                                 | ◎                                                                                 | ◎                                                                                 | ◎                                                                                 | ◎                                                                                   |
| 合金鋼 Alloy Steel        |        | ◎                                                                                 | ◎                                                                                 | ◎                                                                                 | ◎                                                                                 | ◎                                                                                 | ◎                                                                                 | ◎                                                                                   |
| 調質鋼 SUJ, NAK           |        | ○                                                                                 | ◎                                                                                 | ○                                                                                 | ◎                                                                                 | ◎                                                                                 | ◎                                                                                 | ◎                                                                                   |
| 焼入れ鋼 Hardened Steels   | ~45HRC | ○                                                                                 | ◎                                                                                 | ○                                                                                 | ◎                                                                                 | ◎                                                                                 | ◎                                                                                 | ◎                                                                                   |
|                        | ~55HRC |                                                                                   | ○                                                                                 |                                                                                   | ○                                                                                 | ○                                                                                 | ○                                                                                 | ○                                                                                   |
|                        | ~60HRC |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |
|                        | ~65HRC |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |
| 鋳鉄 Cast Iron           |        | ○                                                                                 | ○                                                                                 | ○                                                                                 | ○                                                                                 | ○                                                                                 | ○                                                                                 | ○                                                                                   |
| ステンレス Stainless Steels |        |                                                                                   | ○                                                                                 |                                                                                   | ○                                                                                 | ◎                                                                                 | ◎                                                                                 | ◎                                                                                   |
| アルミ合金 Aluminum Alloys  |        |                                                                                   | ○                                                                                 |                                                                                   | ○                                                                                 | ○                                                                                 | ○                                                                                 | ○                                                                                   |
| 銅合金 Copper Alloys      |        |                                                                                   | ○                                                                                 |                                                                                   | ○                                                                                 | ○                                                                                 | ○                                                                                 | ○                                                                                   |
| チタン合金 Ti/Ni Alloys     |        |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |
| 耐熱合金                   |        |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |
| グラファイト Graphite        |        |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |
| 樹脂 Resin               |        |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |
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## スクエア

Square End Mill

| 用途 Work                 |        | 一般鋼                                                                               |                                                                                   |                                                                                   |                                                                                   | アルミニウム合金                                                                          |                                                                                   |                                                                                    |                                                                                     | チタン合金                                                                               |
|-------------------------|--------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| 刃数 Flute                |        | 4 6                                                                               | 4 6 8                                                                             | 4                                                                                 | 4                                                                                 | 3                                                                                 | 4                                                                                 | 2                                                                                  | 3                                                                                   | 4                                                                                   |
| 形状 Shape                |        |  |  |  |  |  |  |  |  |  |
| 型番 Mode                 |        | CX200-PMER                                                                        | CX500-HMER                                                                        | CX200-ZHE4                                                                        | CX200-MEM4                                                                        | DLC-HEM3                                                                          | DLC-HEM4                                                                          | ALHEM2                                                                             | ALHEM3                                                                              | CX400-TEM4                                                                          |
| 表面処理 Coating            |        | CX200 Coat                                                                        | CX500 Coat                                                                        | CX200 Coat                                                                        | CX200 Coat                                                                        | DLC Coat                                                                          | DLC Coat                                                                          |                                                                                    |                                                                                     | CX400 Coat                                                                          |
| 炭素鋼 Carbon Steel        |        | ◎                                                                                 | ○                                                                                 | ◎                                                                                 | ◎                                                                                 |                                                                                   |                                                                                   |                                                                                    |                                                                                     | ◎                                                                                   |
| 合金鋼 Alloy Steel         |        | ◎                                                                                 | ○                                                                                 | ◎                                                                                 | ◎                                                                                 |                                                                                   |                                                                                   |                                                                                    |                                                                                     | ◎                                                                                   |
| 調質鋼 SUJ, NAK            |        | ◎                                                                                 | ○                                                                                 | ◎                                                                                 | ◎                                                                                 |                                                                                   |                                                                                   |                                                                                    |                                                                                     | ◎                                                                                   |
| 焼入れ鋼 Hardened Steels    | ~45HRC | ◎                                                                                 | ○                                                                                 | ◎                                                                                 | ◎                                                                                 |                                                                                   |                                                                                   |                                                                                    |                                                                                     | ◎                                                                                   |
|                         | ~55HRC | ○                                                                                 | ◎                                                                                 | ○                                                                                 | ○                                                                                 |                                                                                   |                                                                                   |                                                                                    |                                                                                     | ◎                                                                                   |
|                         | ~60HRC |                                                                                   | ◎                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |
|                         | ~65HRC |                                                                                   | ◎                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |
| 鋳鉄 Cast Iron            |        | ○                                                                                 | ◎                                                                                 | ○                                                                                 | ○                                                                                 |                                                                                   |                                                                                   |                                                                                    |                                                                                     | ○                                                                                   |
| ステンレス Stainless Steels  |        | ◎                                                                                 | ○                                                                                 | ◎                                                                                 | ◎                                                                                 |                                                                                   |                                                                                   |                                                                                    |                                                                                     | ◎                                                                                   |
| アルミ合金 Aluminum Alloys   |        | ○                                                                                 |                                                                                   |                                                                                   |                                                                                   | ◎                                                                                 | ◎                                                                                 | ◎                                                                                  | ◎                                                                                   |                                                                                     |
| 銅合金 Copper Alloys       |        | ○                                                                                 |                                                                                   |                                                                                   |                                                                                   | ○                                                                                 | ○                                                                                 | ○                                                                                  | ○                                                                                   |                                                                                     |
| チタン合金 耐熱合金 Ti/Ni Alloys |        |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     | ◎                                                                                   |
| グラファイト Graphite         |        |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | ○                                                                                  | ○                                                                                   |                                                                                     |
| 樹脂 Resin                |        |                                                                                   |                                                                                   |                                                                                   |                                                                                   | ○                                                                                 | ○                                                                                 | ○                                                                                  | ○                                                                                   |                                                                                     |
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|                            |        | ラジウス<br>Corner Radius End Mill                                                    |                                                                                   |                                                                                   | ボール<br>Ball Nose End Mill                                                         |                                                                                   |                                                                                   |                                                                                   |                                                                                     |
|----------------------------|--------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| 用途 Work                    |        | 高硬度鋼                                                                              |                                                                                   |                                                                                   | グラファイト                                                                            | 一般鋼                                                                               |                                                                                   |                                                                                   |                                                                                     |
| 刃数 Flute                   |        | 3                                                                                 | 4                                                                                 | 4                                                                                 | 2                                                                                 | 2                                                                                 | 3                                                                                 | 2                                                                                 | 3                                                                                   |
| 形状 Shape                   |        |  |  |  |  |  |  |  |  |
| 型番 Mode                    |        | CX500-HFR3                                                                        | CX500-HFR4                                                                        | CX200-SEM                                                                         | DIA-BE2                                                                           | BE2                                                                               | BE3                                                                               | CX200-BE2                                                                         | CX200-BE3                                                                           |
| 表面処理 Coating               |        | CX500 Coat                                                                        | CX500 Coat                                                                        | CX200 Coat                                                                        | DIA Coat                                                                          |                                                                                   |                                                                                   | CX200 Coat                                                                        | CX200 Coat                                                                          |
| 炭素鋼 Carbon Steel           |        | ◎                                                                                 | ◎                                                                                 | ◎                                                                                 |                                                                                   | ◎                                                                                 | ◎                                                                                 | ◎                                                                                 | ◎                                                                                   |
| 合金鋼 Alloy Steel            |        | ◎                                                                                 | ◎                                                                                 | ◎                                                                                 |                                                                                   | ◎                                                                                 | ◎                                                                                 | ◎                                                                                 | ◎                                                                                   |
| 調質鋼 SUJ, NAK               |        | ◎                                                                                 | ◎                                                                                 | ◎                                                                                 |                                                                                   | ○                                                                                 | ○                                                                                 | ◎                                                                                 | ◎                                                                                   |
| 焼入れ鋼<br>Hardened Steels    | ~45HRC | ◎                                                                                 | ◎                                                                                 | ◎                                                                                 |                                                                                   | ○                                                                                 | ○                                                                                 | ◎                                                                                 | ◎                                                                                   |
|                            | ~55HRC | ◎                                                                                 | ◎                                                                                 | ○                                                                                 |                                                                                   |                                                                                   |                                                                                   | ○                                                                                 | ○                                                                                   |
|                            | ~60HRC | ◎                                                                                 | ◎                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |
|                            | ~65HRC | ○                                                                                 | ○                                                                                 | ○                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |
| 鋳鉄 Cast Iron               |        | ◎                                                                                 | ◎                                                                                 | ◎                                                                                 |                                                                                   | ○                                                                                 | ○                                                                                 | ○                                                                                 | ○                                                                                   |
| ステンレス Stainless Steels     |        | ○                                                                                 | ○                                                                                 | ○                                                                                 |                                                                                   | ○                                                                                 | ○                                                                                 | ○                                                                                 | ○                                                                                   |
| アルミ合金 Aluminum Alloys      |        |                                                                                   |                                                                                   |                                                                                   | ○                                                                                 | ○                                                                                 | ○                                                                                 | ○                                                                                 | ○                                                                                   |
| 銅合金 Copper Alloys          |        |                                                                                   |                                                                                   |                                                                                   | ○                                                                                 | ○                                                                                 | ○                                                                                 | ○                                                                                 | ○                                                                                   |
| チタン合金<br>耐熱合金 Ti/Ni Alloys |        |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |
| グラファイト Graphite            |        |                                                                                   |                                                                                   |                                                                                   | ◎                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                     |
| 樹脂 Resin                   |        |                                                                                   |                                                                                   |                                                                                   | ○                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                     |
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|                            |        | ボール<br>Ball Nose End Mill                                                         |                                                                                   | ロングネック<br>Long Neck End Mill                                                      |                                                                                   |                                                                                   |                                                                                   | ラフィング<br>Roughing End Mill                                                         |                                                                                     |                                                                                     |
|----------------------------|--------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| 用途 Work                    |        | 高硬度鋼                                                                              |                                                                                   | 一般鋼                                                                               |                                                                                   | 高硬度鋼                                                                              |                                                                                   | 一般鋼                                                                                |                                                                                     | ステンレス                                                                               |
| 刃数 Flute                   |        | 2                                                                                 | 3                                                                                 | 4                                                                                 | 3                                                                                 | 2                                                                                 | 2                                                                                 | 3 4                                                                                | 3 4                                                                                 | 3                                                                                   |
| 形状 Shape                   |        |  |  |  |  |  |  |  |  |  |
| 型番 Mode                    |        | CX500-HBE2                                                                        | CX500-HBE3                                                                        | CX500-QEMSN                                                                       | CX500-HMSN                                                                        | CX500-HBSN                                                                        | CX500-HBPN                                                                        | CX200-RER                                                                          | CX200-HRER                                                                          | CX200-SURE                                                                          |
| 表面処理 Coating               |        | CX500 Coat                                                                        | CX500 Coat                                                                        | CX500 Coat                                                                        | CX500 Coat                                                                        | CX500 Coat                                                                        | CX500 Coat                                                                        | CX200 Coat                                                                         | CX200 Coat                                                                          | CX200 Coat                                                                          |
| 炭素鋼 Carbon Steel           |        | ○                                                                                 | ○                                                                                 | ◎                                                                                 | ◎                                                                                 | ○                                                                                 | ○                                                                                 | ◎                                                                                  | ◎                                                                                   | ◎                                                                                   |
| 合金鋼 Alloy Steel            |        | ○                                                                                 | ○                                                                                 | ◎                                                                                 | ◎                                                                                 | ○                                                                                 | ○                                                                                 | ◎                                                                                  | ◎                                                                                   | ◎                                                                                   |
| 調質鋼 SUJ, NAK               |        | ○                                                                                 | ○                                                                                 | ◎                                                                                 | ◎                                                                                 | ○                                                                                 | ○                                                                                 | ◎                                                                                  | ◎                                                                                   | ◎                                                                                   |
| 焼入れ鋼<br>Hardened Steels    | ~45HRC | ◎                                                                                 | ◎                                                                                 | ◎                                                                                 | ◎                                                                                 | ○                                                                                 | ○                                                                                 | ◎                                                                                  | ◎                                                                                   | ○                                                                                   |
|                            | ~55HRC | ◎                                                                                 | ◎                                                                                 |                                                                                   | ○                                                                                 | ◎                                                                                 | ◎                                                                                 | ○                                                                                  | ○                                                                                   |                                                                                     |
|                            | ~60HRC | ◎                                                                                 | ◎                                                                                 |                                                                                   |                                                                                   | ◎                                                                                 | ◎                                                                                 |                                                                                    |                                                                                     |                                                                                     |
|                            | ~65HRC | ◎                                                                                 | ◎                                                                                 |                                                                                   |                                                                                   | ○                                                                                 | ◎                                                                                 |                                                                                    |                                                                                     |                                                                                     |
| 鋳鉄 Cast Iron               |        | ◎                                                                                 | ◎                                                                                 | ○                                                                                 | ○                                                                                 | ◎                                                                                 | ◎                                                                                 | ○                                                                                  | ○                                                                                   |                                                                                     |
| ステンレス Stainless Steels     |        | ○                                                                                 | ○                                                                                 | ○                                                                                 | ◎                                                                                 | ○                                                                                 | ○                                                                                 | ○                                                                                  | ○                                                                                   | ◎                                                                                   |
| アルミ合金 Aluminum Alloys      |        |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | ○                                                                                  | ○                                                                                   | ○                                                                                   |
| 銅合金 Copper Alloys          |        |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | ○                                                                                  | ○                                                                                   | ○                                                                                   |
| チタン合金<br>耐熱合金 Ti/Ni Alloys |        |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |
| グラファイト Graphite            |        |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |
| 樹脂 Resin                   |        |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                    |                                                                                     |                                                                                     |
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|                            |        | 面取り加工<br>Chamfering                                                               | ドリル<br>Drill                                                                      |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |
|----------------------------|--------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| 用途 Work                    |        | ステンレス                                                                             | 一般鋼                                                                               |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |
| 刃数 Flute                   |        | 2                                                                                 | 2                                                                                 | 2                                                                                 | 3                                                                                 | 3                                                                                 | 2                                                                                 | 2                                                                                   |
| 形状 Shape                   |        |  |  |  |  |  |  |  |
| 型番 Mode                    |        | CX200-SUCH                                                                        | TA-DRS                                                                            | TA-DRR                                                                            | TA-3DS                                                                            | TA-3DR                                                                            | CX500-MD                                                                          | TA-HSD                                                                              |
| 表面処理 Coating               |        | CX200 Coat                                                                        | TiAIN Coat                                                                        | TiAIN Coat                                                                        | TiAIN Coat                                                                        | TiAIN Coat                                                                        | CX500 Coat                                                                        | TiAIN Coat                                                                          |
| 炭素鋼 Carbon Steel           |        | ◎                                                                                 | ◎                                                                                 | ◎                                                                                 | ◎                                                                                 | ◎                                                                                 | ◎                                                                                 | ◎                                                                                   |
| 合金鋼 Alloy Steel            |        | ◎                                                                                 | ◎                                                                                 | ◎                                                                                 | ◎                                                                                 | ◎                                                                                 | ◎                                                                                 | ◎                                                                                   |
| 調質鋼 SUJ, NAK               |        | ◎                                                                                 | ◎                                                                                 | ◎                                                                                 | ◎                                                                                 | ◎                                                                                 | ◎                                                                                 | ◎                                                                                   |
| 焼入れ鋼<br>Hardened Steels    | ~45HRC | ◎                                                                                 | ◎                                                                                 | ◎                                                                                 | ◎                                                                                 | ◎                                                                                 | ◎                                                                                 | ◎                                                                                   |
|                            | ~55HRC | ○                                                                                 | ○                                                                                 | ○                                                                                 | ○                                                                                 | ○                                                                                 | ◎                                                                                 | ○                                                                                   |
|                            | ~60HRC |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | ○                                                                                 |                                                                                     |
|                            | ~65HRC |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |
| 鋳鉄 Cast Iron               |        |                                                                                   | ○                                                                                 | ○                                                                                 | ○                                                                                 | ○                                                                                 | ○                                                                                 | ○                                                                                   |
| ステンレス Stainless Steels     |        | ◎                                                                                 | ◎                                                                                 | ◎                                                                                 | ○                                                                                 | ○                                                                                 | ◎                                                                                 | ○                                                                                   |
| アルミ合金 Aluminum Alloys      |        | ○                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |
| 銅合金 Copper Alloys          |        | ○                                                                                 |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |
| チタン合金<br>耐熱合金 Ti/Ni Alloys |        |                                                                                   | ○                                                                                 | ○                                                                                 |                                                                                   |                                                                                   | ◎                                                                                 |                                                                                     |
| グラファイト Graphite            |        |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |
| 樹脂 Resin                   |        |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                     |
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## コート特性 Coating Characteristic

| コート<br>Coating type                | TiAlN<br>Coat                                                             | CX200<br>Coat                                                             | CX400<br>Coat                                                                      | CX500<br>Coat                                                                      | DLC<br>Coat                                                                      | DIA<br>Coat                                                                                              |
|------------------------------------|---------------------------------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|
| 表面硬度 (HV)<br>Hardness(HV)          | 2,800HV                                                                   | 3,300HV                                                                   | 3,500HV                                                                            | 3,400HV                                                                            | 5,000HV                                                                          | 9,000HV                                                                                                  |
| 膜厚 (μm)<br>Thickness(μm)           | 1~4                                                                       | 0.5~3                                                                     | 0.5~3                                                                              | 0.5~3                                                                              | 1.0~2.0                                                                          | 8                                                                                                        |
| 酸化開始温度 (°C)<br>Oxidation Temp (°C) | 800°C                                                                     | 1,100°C                                                                   | 1,100°C                                                                            | 1,300°C                                                                            | 550°C                                                                            | 600°C                                                                                                    |
| 摩擦係数<br>Friction Coefficient       | 0.35~0.40                                                                 | 0.30~0.35                                                                 | 0.30~0.35                                                                          | 0.25~0.35                                                                          | ≤0.10                                                                            | 0.15                                                                                                     |
| 色調<br>Color                        | 暗紫色<br>Dark Violet                                                        | 快灰色<br>Light grey                                                         | 暗灰色<br>Dark grey                                                                   | 明銅色<br>Light brawn                                                                 | 黒色<br>Black                                                                      | 黒色<br>Black                                                                                              |
| 特性<br>Characteristic               | 一般<br>高耐熱性<br>耐摩耗性<br>Standard<br>High heat resistance<br>Wear resistance | 一般<br>高耐熱性<br>耐摩耗性<br>Standard<br>High heat resistance<br>Wear resistance | 高硬度<br>高耐熱性<br>高速切削向け<br>High hardness<br>High heat resistance<br>High speed grade | 高硬度<br>高耐熱性<br>高速切削向け<br>High hardness<br>High heat resistance<br>High speed grade | 非鉄金属<br>耐溶性<br>耐腐食性<br>Non-Ferrous<br>Welding resistance<br>corrosion resistance | 高硬度<br>非鉄金属<br>耐溶性<br>耐腐食性<br>High hardness<br>Non-Ferrous<br>Welding resistance<br>corrosion resistance |
| 被削材<br>Work Materials              | 普通鋼<br>調質鋼<br>40-52HRC<br>Steel<br>Prehardened Steel                      | 普通鋼<br>調質鋼<br>-45HRC<br>Steel<br>Prehardened Steel                        | 調質鋼<br>高硬度鋼<br>40-65HRC<br>Prehardened Steel<br>Hardened Steel                     | 調質鋼<br>高硬度鋼<br>40-65HRC<br>Prehardened Steel<br>Hardened Steel                     | アルミ合金<br>40-65HRC<br>Non-Ferrous<br>Aluminum                                     | グラファイト<br>樹脂<br>アルミ合金<br>Graphite<br>Non-Ferrous<br>Aluminum                                             |
| 乾式<br>Dry cutting                  | ◎                                                                         | ◎                                                                         | ◎                                                                                  | ◎                                                                                  | ◎                                                                                | ◎                                                                                                        |
| 湿式<br>Wet cutting                  | △                                                                         | ◎                                                                         | ◎                                                                                  | ○                                                                                  | ○                                                                                |                                                                                                          |

※ ◎Best ○Good △Quite good ×No good

※ Regraing to the application implied datum, it show a generally selected datum and could be changeable according to the applicable conditions.

安全使用注意事項  
Attention on Safety

- 工具をケースから取り出す際は、工具の飛び出しや刃先が素手に直接触れないように十分注意して下さい。  
When removing tool from case, be careful of getting-out of tools and don't touch directly the cutting edges.
- 切れ刃を直接素手で触れないようにしてください。  
Never touch the cutting edges directly with bare hand.
- 工具を使用する際は破損する危険がありますので、必ずカバー・保護メガネ等を使用してください。  
Use safety covers and eye protection, as tools may be broken.
- ホルダ等は、工具や加工内容に見合った物を使用してください。  
工具はホルダにしっかりと固定し、振れを抑えるようにして下さい。  
Use holders, etc. that match the tools and nature of the processing operations.  
The tool should be firmly attached to the holder to prevent shaking.
- 被削材はしっかりと固定して下さい。  
The work materials clamp firmly.
- 工具及び被削材の寸法はあらかじめ確認しておいて下さい。  
Make sure of dimensions of tools work pieces before starting operation.
- 切削条件は加工物や使用機械に合わせて、調節する必要があります。  
It is necessary to adjust conditions according to the dimensions of work materials and the machine.
- 用途に応じて切削油を選定して下さい。  
不水溶性切削油を使用する場合は加工時に発生する火花や破損で引火、火災の危険があります。  
防火対策を必ず行って下さい。  
Select a cutting fluid appropriate to the particular usage.  
Using a non-water cutting fluid could lead to fires due to sparks generated during processing or heat caused by breakage.  
Ensure that you take proper fire-prevention measures.
- 使用中に異常(切削音・煙)が発生した場合は、ただちに機械を止めてください。  
If abnormal sound, etc. occurs during processing, stop the machine immediately.
- 工具の改造はしないで下さい。  
Don't modify tools.

## アイコンガイド

Guide Lines to Icons

## 表面処理 Coating

**TiAlN** TiAlN コート  
Coat TiAlN Coating

**CX200** CX200 コート  
Coat CX200 Coating

**CX400** CX400 コート  
Coat CX400 Coating

**CX500** CX500 コート  
Coat CX500 Coating

**DLC** DLC コート  
Coat DLC Coating

**DIA** DIA コート  
Coat DIA Coating

## 先端形状 Shape

**ピンカド**  
Sharp Edge  
Sharp Edge

**アタリ付**  
Corner Protect  
Corner Protect

**ラジラス**  
Radius  
Corner Radius

**ボール**  
Ball  
Ball Nose

**先端角 140°**  
Point Angle  
Point Angle 140°

**先端角 145°**  
Point Angle  
Point Angle 145°

## 工具材料 Tool Material

**MG** 超微粒子超硬合金  
超微粒 Micro Grain Carbide

**SMG** 超々微粒子超硬合金  
超々微粒 Super Micro Grain Carbide

## 刃数 Number of Flutes

**2枚刃**  
2Flutes

**3枚刃**  
3Flutes

**4枚刃**  
4Flutes

**6枚刃**  
6Flutes

**8枚刃**  
8Flutes

## ねじれ角 Helix Angle

**20°** 20°  
Helix Angle 20°

**30°** 30°  
Helix Angle 30°

**40°** 40°  
Helix Angle 40°

**45°** 45°  
Helix Angle 45°

**50°** 50°  
Helix Angle 50°

**53°** 53°  
Helix Angle 53°



# 超硬合金エンドミル

## Solid Carbide End Mills

スクエア  
Square

スクエア  
Square

ラジアス  
Radius

ボール  
Ball

ロングネック  
Long Neck

ラフニング  
Roughing

面取り加工用  
Chamfering

ドリル  
Drill

## 2枚刃スクエアエンドミル

2-Flute Square End Mill

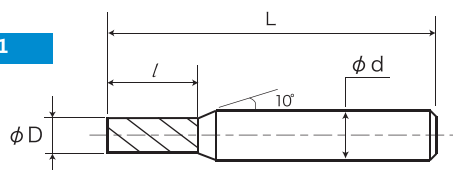
EM2



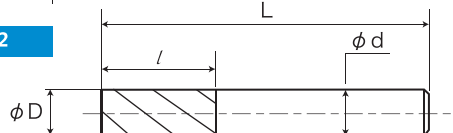
EM2060S

Model Flute D

Type 1



Type 2



## 特性 Features

- Wide Application available in work material from Steel to Alloy steel
- Addition to the original series of precision ultra-micro machining for aluminum alloys and plastic
- Reduce Chattering and provides an excellent machined surface.



| 外径公差 Tolerance |
|----------------|
| 0              |
| -0.02          |

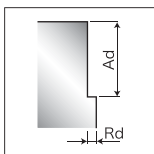
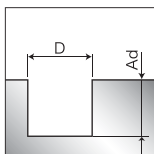


| 炭素鋼<br>Carbon Steel | 合金鋼<br>Alloy Steel | 調質鋼<br>Prehardened Steel | 焼き入れ鋼 Hardened Steel |  |  |  | 鋳鉄<br>Cast Iron | ステンレス鋼<br>Stainless Steels | アルミ合金<br>Aluminium Alloys | 銅合金<br>Copper Alloys | チタン合金<br>耐熱合金<br>Ti/Ni Alloy | グラファイト<br>Graphite | 樹脂<br>Resin |
|---------------------|--------------------|--------------------------|----------------------|--|--|--|-----------------|----------------------------|---------------------------|----------------------|------------------------------|--------------------|-------------|
| ◎                   | ◎                  | ○                        | ○                    |  |  |  | ○               |                            |                           |                      |                              |                    |             |

◎ = Best ○ = Good

| MODEL 型番 | D 外径 | l 刃長 | L 全長 | d シャンク径 | Type |
|----------|------|------|------|---------|------|
| EM2005S  | 0.5  | 1    | 40   | 4       | 1    |
| EM2010S  | 1    | 2.5  | 40   | 4       | 1    |
| EM2015S  | 1.5  | 3    | 40   | 4       | 1    |
| EM2020S  | 2    | 6    | 40   | 4       | 1    |
| EM2025S  | 2.5  | 7    | 40   | 4       | 1    |
| EM2030S  | 3    | 8    | 45   | 6       | 1    |
| EM2035S  | 3.5  | 8.5  | 45   | 6       | 1    |
| EM2040S  | 4    | 11   | 45   | 6       | 1    |
| EM2045S  | 4.5  | 11.5 | 45   | 6       | 1    |
| EM2050S  | 5    | 12   | 45   | 6       | 1    |
| EM2060S  | 6    | 13   | 50   | 6       | 2    |
| EM2080S  | 8    | 19   | 60   | 8       | 2    |
| EM2100S  | 10   | 22   | 70   | 10      | 2    |
| EM2120S  | 12   | 26   | 75   | 12      | 2    |
| EM2160S  | 16   | 32   | 90   | 16      | 2    |
| EM2200S  | 20   | 38   | 100  | 20      | 2    |

## 推奨切削条件 Standard Milling Condition



- The table show standard milling guidance of perforating process as written picture.
- Use a rigid and precise machine and tool holder.
- Select a cutting fluid appropriate to the particular usage.

## 溝切削 Slotting

| 被削材<br>Work Material | 一般構造用炭素鋼、炭素鋼<br>Structural steel, Carbon steel<br>(~ 20HRC)<br>SS400, S45C, S50C 等<br>AISI 1045, AISI1049<br>鋳鉄, FC250<br>Cast Iron |                                           |                               | 炭素鋼, 合金鋼<br>Carbon steel<br>Alloy steel<br>(20 ~ 30HRC)<br>S50C, SCM<br>AISI 1049 |                               | 合金鋼, 工具鋼<br>Alloy steel, Tool steel<br>調質鋼<br>Pre-hardened steel<br>(30 ~ 45HRC)<br>SKD61, NAK<br>AISI H13 |                               | ステンレス鋼<br>Austenitic stainless steels<br>SUS304<br>AISI 304<br>チタン合金<br>Titanium alloy |                               |
|----------------------|-------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|-------------------------------|-----------------------------------------------------------------------------------|-------------------------------|------------------------------------------------------------------------------------------------------------|-------------------------------|----------------------------------------------------------------------------------------|-------------------------------|
|                      | 外径<br>(mm)<br>Diameter                                                                                                              | 回転数<br>(min <sup>-1</sup> )<br>Revolution | 送り速度<br>(mm/min)<br>Feed rate | 回転数<br>(min <sup>-1</sup> )<br>Revolution                                         | 送り速度<br>(mm/min)<br>Feed rate | 回転数<br>(min <sup>-1</sup> )<br>Revolution                                                                  | 送り速度<br>(mm/min)<br>Feed rate | 回転数<br>(min <sup>-1</sup> )<br>Revolution                                              | 送り速度<br>(mm/min)<br>Feed rate |
|                      | 0.5                                                                                                                                 | 17,000                                    | 50                            | 14000                                                                             | 45                            | 11000                                                                                                      | 30                            | 9000                                                                                   | 30                            |
|                      | 1                                                                                                                                   | 10,000                                    | 65                            | 8500                                                                              | 55                            | 6400                                                                                                       | 40                            | 5200                                                                                   | 35                            |
|                      | 2                                                                                                                                   | 5,500                                     | 90                            | 4800                                                                              | 80                            | 3800                                                                                                       | 55                            | 3100                                                                                   | 50                            |
|                      | 3                                                                                                                                   | 4,100                                     | 100                           | 3500                                                                              | 85                            | 2800                                                                                                       | 65                            | 2300                                                                                   | 60                            |
|                      | 4                                                                                                                                   | 3,400                                     | 135                           | 2900                                                                              | 110                           | 2200                                                                                                       | 70                            | 1900                                                                                   | 60                            |
|                      | 6                                                                                                                                   | 2,500                                     | 160                           | 2100                                                                              | 135                           | 1600                                                                                                       | 90                            | 1300                                                                                   | 65                            |
|                      | 8                                                                                                                                   | 1,900                                     | 160                           | 1600                                                                              | 135                           | 1200                                                                                                       | 85                            | 1000                                                                                   | 70                            |
|                      | 10                                                                                                                                  | 1,500                                     | 145                           | 1250                                                                              | 120                           | 950                                                                                                        | 75                            | 800                                                                                    | 65                            |
|                      | 12                                                                                                                                  | 1,250                                     | 120                           | 1050                                                                              | 130                           | 800                                                                                                        | 65                            | 660                                                                                    | 50                            |
|                      | 16                                                                                                                                  | 940                                       | 90                            | 800                                                                               | 75                            | 600                                                                                                        | 50                            | 500                                                                                    | 40                            |
|                      | 20                                                                                                                                  | 750                                       | 70                            | 640                                                                               | 65                            | 480                                                                                                        | 40                            | 400                                                                                    | 30                            |
| 切削深度<br>Depth of Cut | Ad≤0.5D(D>φ3) Ad≤0.3D(φ2≤D≤φ3) Ad≤0.1D(D<φ2)                                                                                        |                                           |                               |                                                                                   |                               |                                                                                                            |                               |                                                                                        |                               |

## 側面切削 Side Milling

| 被削材<br>Work Material | 一般構造用圧延鋼、炭素鋼<br>Structural steel Carbon steel<br>(~20HRC)<br>SS400, S45C, S50C 等<br>AISI 1045, AISI1049<br>鋳鉄, FC250<br>Cast Iron |                                           |                               | 炭素鋼, 合金鋼<br>Carbon steel<br>Alloy steel<br>(20~30HRC)<br>S50C, SCM<br>AISI 1049 |                               | 合金鋼、工具鋼<br>Alloy steel, Tool steel<br>調質鋼<br>Pre-hardened steel<br>(30~45HRC)<br>SKD61, NAK<br>AISI H13 |                               | ステンレス鋼<br>Austenitic stainless steels<br>SUS304<br>AISI 304<br>チタン合金<br>Titanium alloy |                               |
|----------------------|-----------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|-------------------------------|---------------------------------------------------------------------------------|-------------------------------|---------------------------------------------------------------------------------------------------------|-------------------------------|----------------------------------------------------------------------------------------|-------------------------------|
|                      | 外径<br>(mm)<br>Diameter                                                                                                            | 回転数<br>(min <sup>-1</sup> )<br>Revolution | 送り速度<br>(mm/min)<br>Feed rate | 回転数<br>(min <sup>-1</sup> )<br>Revolution                                       | 送り速度<br>(mm/min)<br>Feed rate | 回転数<br>(min <sup>-1</sup> )<br>Revolution                                                               | 送り速度<br>(mm/min)<br>Feed rate | 回転数<br>(min <sup>-1</sup> )<br>Revolution                                              | 送り速度<br>(mm/min)<br>Feed rate |
|                      | 0.5                                                                                                                               | 17,000                                    | 50                            | 14000                                                                           | 45                            | 11000                                                                                                   | 30                            | 9000                                                                                   | 30                            |
|                      | 1                                                                                                                                 | 10,000                                    | 65                            | 8500                                                                            | 55                            | 6400                                                                                                    | 40                            | 5200                                                                                   | 35                            |
|                      | 2                                                                                                                                 | 5,500                                     | 90                            | 4800                                                                            | 80                            | 3800                                                                                                    | 55                            | 3100                                                                                   | 50                            |
|                      | 3                                                                                                                                 | 4,100                                     | 100                           | 3500                                                                            | 85                            | 2800                                                                                                    | 65                            | 2300                                                                                   | 60                            |
|                      | 4                                                                                                                                 | 3,400                                     | 170                           | 2900                                                                            | 140                           | 2200                                                                                                    | 90                            | 1900                                                                                   | 80                            |
|                      | 6                                                                                                                                 | 2,500                                     | 200                           | 2100                                                                            | 170                           | 1600                                                                                                    | 110                           | 1300                                                                                   | 95                            |
|                      | 8                                                                                                                                 | 1,900                                     | 200                           | 1600                                                                            | 170                           | 1200                                                                                                    | 105                           | 1000                                                                                   | 100                           |
|                      | 10                                                                                                                                | 1,500                                     | 180                           | 1250                                                                            | 150                           | 950                                                                                                     | 95                            | 800                                                                                    | 90                            |
|                      | 12                                                                                                                                | 1,250                                     | 150                           | 1050                                                                            | 130                           | 800                                                                                                     | 80                            | 660                                                                                    | 75                            |
|                      | 16                                                                                                                                | 940                                       | 110                           | 800                                                                             | 95                            | 600                                                                                                     | 60                            | 500                                                                                    | 55                            |
|                      | 20                                                                                                                                | 750                                       | 90                            | 640                                                                             | 80                            | 480                                                                                                     | 50                            | 400                                                                                    | 45                            |
| 切削深度<br>Depth of Cut | Ad≤0.5D Rds0.2D                                                                                                                   |                                           |                               |                                                                                 |                               |                                                                                                         |                               |                                                                                        |                               |

## CX200 2枚刃スクエアエンドミル

2-Flute Square End Mill TiAlN Coat

## CX200-EM2



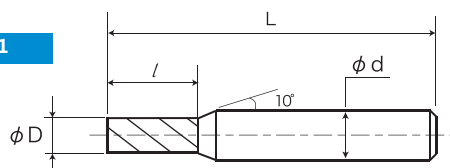
## CX200-EM2060S

Model Flute D

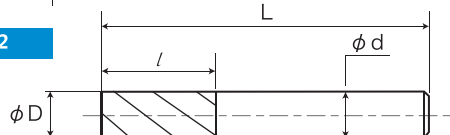
## 特性 Features

- Wide Application available in work material from Steel (HRC45) to Alloy steel
- Addition to the original series of precision ultra-micro machining for aluminum alloys and plastic
- Reduce Chattering and provides an excellent machined surface.
- Employs CX200 Coating

Type 1



Type 2

MG  
超微粒

30°

Corner  
ProtectCX200  
Coat

外径公差 Tolerance

0

-0.02

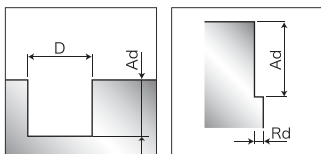
| 炭素鋼<br>Carbon Steel | 合金鋼<br>Alloy Steel | 調質鋼<br>Prehardened Steel | 焼き入れ鋼 Hardened Steel |   |  |  | 鋳鉄<br>Cast Iron | ステンレス鋼<br>Stainless Steels | アルミ合金<br>Aluminium Alloys | 銅合金<br>Copper Alloys | チタン合金<br>耐熱合金<br>Ti/Ni Alloy | グラファイト<br>Graphite | 樹脂<br>Resin |
|---------------------|--------------------|--------------------------|----------------------|---|--|--|-----------------|----------------------------|---------------------------|----------------------|------------------------------|--------------------|-------------|
| ~45HRC              | ~55HRC             | ~60HRC                   | ~65HRC               |   |  |  |                 |                            |                           |                      |                              |                    |             |
| ◎                   | ◎                  | ◎                        | ◎                    | ○ |  |  | ○               | ○                          | ○                         | ○                    |                              |                    |             |

◎ = Best ○ = Good

| MODEL 型番      | D 外径 | l 刃長 | L 全長 | d シャンク径 | Type |
|---------------|------|------|------|---------|------|
| CX200-EM2005S | 0.5  | 1    | 40   | 4       | 1    |
| CX200-EM2010S | 1    | 2.5  | 40   | 4       | 1    |
| CX200-EM2015S | 1.5  | 3    | 40   | 4       | 1    |
| CX200-EM2020S | 2    | 6    | 40   | 4       | 1    |
| CX200-EM2025S | 2.5  | 7    | 40   | 4       | 1    |
| CX200-EM2030S | 3    | 8    | 45   | 6       | 1    |
| CX200-EM2035S | 3.5  | 8.5  | 45   | 6       | 1    |
| CX200-EM2040S | 4    | 11   | 45   | 6       | 1    |
| CX200-EM2045S | 4.5  | 11.5 | 45   | 6       | 1    |
| CX200-EM2050S | 5    | 12   | 45   | 6       | 1    |
| CX200-EM2060S | 6    | 13   | 50   | 6       | 2    |
| CX200-EM2080S | 8    | 19   | 60   | 8       | 2    |
| CX200-EM2100S | 10   | 22   | 70   | 10      | 2    |
| CX200-EM2120S | 12   | 26   | 75   | 12      | 2    |
| CX200-EM2160S | 16   | 32   | 90   | 16      | 2    |
| CX200-EM2200S | 20   | 38   | 100  | 20      | 2    |

## CX200-EM2

## 推奨切削条件 Standard Milling Condition



- The table show standard milling guidance of perforating process as written picture.
- Use a rigid and precise machine and tool holder.
- Select a cutting fluid appropriate to the particular usage.

## 溝切削 Slotting

| 被削材<br>Work Material | 一般構造用圧延鋼，炭素鋼<br>Structural steel,Carbon steel<br>(~20HRC)<br>SS400,S45C,S50C 等<br>AISI 1045,AISI1049<br>鋳鉄，FC250<br>Cast Iron |                                           | 炭素鋼，合金鋼<br>Carbon steel<br>Alloy steel<br>(20 ~ 30HRC)<br>S50C,SCM<br>AISI 1049 |                                           | 合金鋼，工具鋼<br>Alloy steel,Tool steel<br>調質鋼<br>Pre-hardened steel<br>(30 ~ 45HRC)<br>SKD61,NAK<br>AISI H13 |                                           | ステンレス鋼<br>Austenitic stainless steels<br>SUS304<br>AISI 304<br>チタン合金<br>Titanium alloy |                                           | 調質鋼，焼き入れ鋼<br>Pre-hardened Steel,<br>Hardened Steels<br>CENAI,NAK80,SKD<br>(35 ~ 45HRC) |                                           |                               |
|----------------------|-------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|---------------------------------------------------------------------------------|-------------------------------------------|---------------------------------------------------------------------------------------------------------|-------------------------------------------|----------------------------------------------------------------------------------------|-------------------------------------------|----------------------------------------------------------------------------------------|-------------------------------------------|-------------------------------|
|                      | 外径<br>(mm)<br>Diameter                                                                                                        | 回転数<br>(min <sup>-1</sup> )<br>Revolution | 送り速度<br>(mm/min)<br>Feed rate                                                   | 回転数<br>(min <sup>-1</sup> )<br>Revolution | 送り速度<br>(mm/min)<br>Feed rate                                                                           | 回転数<br>(min <sup>-1</sup> )<br>Revolution | 送り速度<br>(mm/min)<br>Feed rate                                                          | 回転数<br>(min <sup>-1</sup> )<br>Revolution | 送り速度<br>(mm/min)<br>Feed rate                                                          | 回転数<br>(min <sup>-1</sup> )<br>Revolution | 送り速度<br>(mm/min)<br>Feed rate |
| 1                    | 32000                                                                                                                         | 300                                       | 14000                                                                           | 100                                       | 9500                                                                                                    | 70                                        | 9000                                                                                   | 67                                        | 8000                                                                                   | 50                                        |                               |
| 2                    | 16000                                                                                                                         | 300                                       | 7100                                                                            | 120                                       | 4800                                                                                                    | 80                                        | 4600                                                                                   | 76                                        | 4000                                                                                   | 50                                        |                               |
| 3                    | 11000                                                                                                                         | 300                                       | 4700                                                                            | 140                                       | 3100                                                                                                    | 90                                        | 2900                                                                                   | 86                                        | 2600                                                                                   | 55                                        |                               |
| 4                    | 8000                                                                                                                          | 300                                       | 3500                                                                            | 140                                       | 2300                                                                                                    | 90                                        | 2200                                                                                   | 86                                        | 1900                                                                                   | 55                                        |                               |
| 6                    | 5300                                                                                                                          | 300                                       | 2300                                                                            | 140                                       | 1500                                                                                                    | 90                                        | 1400                                                                                   | 86                                        | 1300                                                                                   | 55                                        |                               |
| 8                    | 4000                                                                                                                          | 300                                       | 1700                                                                            | 140                                       | 1100                                                                                                    | 90                                        | 1000                                                                                   | 86                                        | 990                                                                                    | 60                                        |                               |
| 10                   | 3200                                                                                                                          | 300                                       | 1400                                                                            | 140                                       | 950                                                                                                     | 95                                        | 900                                                                                    | 90                                        | 790                                                                                    | 60                                        |                               |
| 12                   | 2700                                                                                                                          | 300                                       | 1100                                                                            | 140                                       | 790                                                                                                     | 95                                        | 750                                                                                    | 90                                        | 660                                                                                    | 60                                        |                               |
| 16                   | 2000                                                                                                                          | 300                                       | 800                                                                             | 140                                       | 550                                                                                                     | 95                                        | 500                                                                                    | 90                                        | 450                                                                                    | 60                                        |                               |
| 20                   | 1600                                                                                                                          | 300                                       | 650                                                                             | 140                                       | 450                                                                                                     | 95                                        | 400                                                                                    | 90                                        | 350                                                                                    | 60                                        |                               |
| 切削深度<br>Depth of Cut | Ad≤0.5D(D>φ3) Ad≤0.3D(φ2≤D≤φ3) Ad≤0.1D(D<φ2)                                                                                  |                                           |                                                                                 |                                           |                                                                                                         |                                           |                                                                                        |                                           |                                                                                        |                                           |                               |

## 側面切削 Side Milling

| 被削材<br>Work Material | 一般構造用圧延鋼・炭素鋼<br>Structural steel, Carbon steel<br>(~ 20HRC)<br>SS400, S45C, S50C 等<br>AISI 1045, AISI1049<br>鋳鉄, FC250<br>Cast Iron |                                           | 炭素鋼・合金鋼<br>Carbon steel<br>Alloy steel<br>(20 ~ 30HRC)<br>S50C, SCM<br>AISI 1049 |                                           | 合金鋼・工具鋼<br>Alloy steel, Tool steel<br>調質鋼<br>Pre-hardened steel<br>(30 ~ 45HRC)<br>SKD61, NAK<br>AISI H13 |                                           | ステンレス鋼<br>Austenitic stainless steels<br>SUS304<br>AISI 304<br>チタン合金<br>Titanium alloy |                                           | 調質鋼, 焼き入れ鋼<br>Pre-hardened Steel,<br>Hardened Steels<br>CENAI, NAK80, SKD<br>(35 ~ 45HRC) |                                           |                               |
|----------------------|-------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|----------------------------------------------------------------------------------|-------------------------------------------|-----------------------------------------------------------------------------------------------------------|-------------------------------------------|----------------------------------------------------------------------------------------|-------------------------------------------|-------------------------------------------------------------------------------------------|-------------------------------------------|-------------------------------|
|                      | 外径<br>(mm)<br>Diameter                                                                                                              | 回転数<br>(min <sup>-1</sup> )<br>Revolution | 送り速度<br>(mm/min)<br>Feed rate                                                    | 回転数<br>(min <sup>-1</sup> )<br>Revolution | 送り速度<br>(mm/min)<br>Feed rate                                                                             | 回転数<br>(min <sup>-1</sup> )<br>Revolution | 送り速度<br>(mm/min)<br>Feed rate                                                          | 回転数<br>(min <sup>-1</sup> )<br>Revolution | 送り速度<br>(mm/min)<br>Feed rate                                                             | 回転数<br>(min <sup>-1</sup> )<br>Revolution | 送り速度<br>(mm/min)<br>Feed rate |
|                      | 1                                                                                                                                   | 20000                                     | 600                                                                              | 20000                                     | 220                                                                                                       | 16000                                     | 160                                                                                    | 15200                                     | 150                                                                                       | 12000                                     | 60                            |
|                      | 2                                                                                                                                   | 20000                                     | 700                                                                              | 12000                                     | 250                                                                                                       | 8000                                      | 200                                                                                    | 7600                                      | 190                                                                                       | 6500                                      | 80                            |
|                      | 3                                                                                                                                   | 20000                                     | 750                                                                              | 9500                                      | 280                                                                                                       | 5800                                      | 220                                                                                    | 5500                                      | 210                                                                                       | 4700                                      | 90                            |
|                      | 4                                                                                                                                   | 16000                                     | 800                                                                              | 7100                                      | 280                                                                                                       | 4300                                      | 220                                                                                    | 4100                                      | 210                                                                                       | 3500                                      | 90                            |
|                      | 6                                                                                                                                   | 1060                                      | 900                                                                              | 4700                                      | 280                                                                                                       | 2900                                      | 220                                                                                    | 2800                                      | 210                                                                                       | 2300                                      | 90                            |
|                      | 8                                                                                                                                   | 8000                                      | 950                                                                              | 3500                                      | 280                                                                                                       | 2100                                      | 220                                                                                    | 2000                                      | 210                                                                                       | 1700                                      | 100                           |
|                      | 10                                                                                                                                  | 6400                                      | 950                                                                              | 2800                                      | 280                                                                                                       | 1700                                      | 220                                                                                    | 1600                                      | 210                                                                                       | 1400                                      | 100                           |
|                      | 12                                                                                                                                  | 5300                                      | 950                                                                              | 2300                                      | 280                                                                                                       | 1400                                      | 220                                                                                    | 1300                                      | 210                                                                                       | 1100                                      | 100                           |
|                      | 16                                                                                                                                  | 4000                                      | 950                                                                              | 1700                                      | 280                                                                                                       | 1000                                      | 220                                                                                    | 950                                       | 210                                                                                       | 800                                       | 100                           |
|                      | 20                                                                                                                                  | 3200                                      | 950                                                                              | 1400                                      | 280                                                                                                       | 800                                       | 220                                                                                    | 760                                       | 210                                                                                       | 650                                       | 100                           |
| 切削深度<br>Depth of Cut | Ad≤0.5D Rds0.2D                                                                                                                     |                                           |                                                                                  |                                           |                                                                                                           |                                           |                                                                                        |                                           |                                                                                           |                                           |                               |

スクエア Square

スクエア Square

ラジアス Radius

ボール Ball

ロングネック Long Neck

ラフニング Roughing

面取り加工用 Chamfering

ドリル Drill





## CX200 4枚刃スクエアエンドミル

4-Flute Square End Mill TiAlN Coat

## CX200-EM4



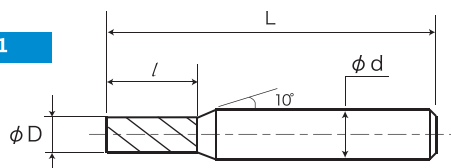
## CX200-EM4060S

Model Flute D

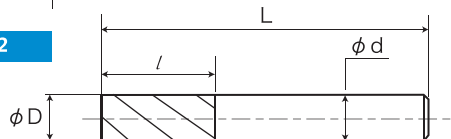
## 特性 Features

- 4 Fluted endmill for general application.
- Employs TiAlN Coating and is applicable for high speed And high feed operations

Type 1



Type 2

MG  
超微粒

30°

| 外径公差 Tolerance |
|----------------|
| 0              |
| -0.02          |



Corner Protect

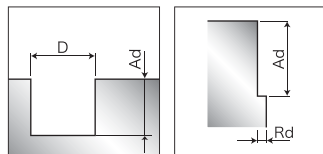
CX200  
Coat

| 炭素鋼<br>Carbon Steel | 合金鋼<br>Alloy Steel | 調質鋼<br>Prehardened Steel | 焼き入れ鋼 Hardened Steel |   |  |  | 鋳鉄<br>Cast Iron | ステンレス鋼<br>Stainless Steels | アルミ合金<br>Aluminium Alloys | 銅合金<br>Copper Alloys | チタン合金<br>耐熱合金<br>Ti/Ni Alloy | グラファイト<br>Graphite | 樹脂<br>Resin |
|---------------------|--------------------|--------------------------|----------------------|---|--|--|-----------------|----------------------------|---------------------------|----------------------|------------------------------|--------------------|-------------|
| ◎                   | ◎                  | ◎                        | ◎                    | ○ |  |  | ○               | ○                          | ○                         | ○                    |                              |                    |             |

◎ = Best ○ = Good

| MODEL 型番      | D 外径 | l 刃長 | L 全長 | d シャンク径 | Type |
|---------------|------|------|------|---------|------|
| CX200-EM4030S | 3    | 8    | 45   | 6       | 1    |
| CX200-EM4040S | 4    | 9    | 45   | 6       | 1    |
| CX200-EM4060S | 6    | 13   | 50   | 6       | 2    |
| CX200-EM4080S | 8    | 19   | 60   | 8       | 2    |
| CX200-EM4100S | 10   | 22   | 70   | 10      | 2    |
| CX200-EM4120S | 12   | 26   | 75   | 12      | 2    |
| CX200-EM4160S | 16   | 32   | 90   | 16      | 2    |
| CX200-EM4200S | 20   | 38   | 100  | 20      | 2    |

## 推奨切削条件 Standard Milling Condition



- The table show standard milling guidance of perforating process as written picture.
- Use a rigid and precise machine and tool holder.
- Select a cutting fluid appropriate to the particular usage.

## 側面切削 Side Milling

| 被削材<br>Work Material   | 一般構造用圧延鋼, 炭素鋼<br>Structural steel, Carbon steel<br>(~20HRC)<br>S45C, S45C, S50C<br>AISI 1045, AISI 1049<br>焼入れ C250<br>Cast iron |                               | 炭素鋼, 合金鋼<br>Carbon steel, Alloy steel<br>(20 ~ 30HRC)<br>S50C, SCM<br>AISI 1049 |                               | 合金鋼, 工具鋼<br>Alloy steel, Tool steel<br>調質鋼<br>Pre-hardened steel<br>(30 ~ 45HRC)<br>SKD61, NAK<br>AISI H13 |                               | ステンレス鋼<br>Austenitic stainless steels<br>SUS304<br>AISI 304<br>チタン合金<br>Titanium alloy |                               | 調質鋼, 焼き入れ鋼<br>Pre-hardened Steel<br>Hardened Steels<br>CENAL, NAK80, SKD<br>(35 ~ 45HRC) |                               | 焼き入れ鋼, 超耐熱合金<br>Hardened steel,<br>Heat Resistant alloy<br>SKD11<br>(55 ~ 60HRC) |                               |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------|-------------------------------|---------------------------------------------------------------------------------|-------------------------------|------------------------------------------------------------------------------------------------------------|-------------------------------|----------------------------------------------------------------------------------------|-------------------------------|------------------------------------------------------------------------------------------|-------------------------------|----------------------------------------------------------------------------------|-------------------------------|
| 外径<br>(mm)<br>Diameter | 回転数<br>(min <sup>-1</sup> )<br>Revolution                                                                                        | 送り速度<br>(mm/min)<br>Feed rate | 回転数<br>(min <sup>-1</sup> )<br>Revolution                                       | 送り速度<br>(mm/min)<br>Feed rate | 回転数<br>(min <sup>-1</sup> )<br>Revolution                                                                  | 送り速度<br>(mm/min)<br>Feed rate | 回転数<br>(min <sup>-1</sup> )<br>Revolution                                              | 送り速度<br>(mm/min)<br>Feed rate | 回転数<br>(min <sup>-1</sup> )<br>Revolution                                                | 送り速度<br>(mm/min)<br>Feed rate | 回転数<br>(min <sup>-1</sup> )<br>Revolution                                        | 送り速度<br>(mm/min)<br>Feed rate |
| 3                      | 20000                                                                                                                            | 1125                          | 9500                                                                            | 420                           | 5800                                                                                                       | 330                           | 5500                                                                                   | 315                           | 4700                                                                                     | 135                           | 2100                                                                             | 60                            |
| 4                      | 16000                                                                                                                            | 1200                          | 7100                                                                            | 420                           | 4300                                                                                                       | 330                           | 4100                                                                                   | 315                           | 3500                                                                                     | 135                           | 1500                                                                             | 60                            |
| 6                      | 10600                                                                                                                            | 1350                          | 4700                                                                            | 420                           | 2900                                                                                                       | 330                           | 2800                                                                                   | 315                           | 2300                                                                                     | 135                           | 1000                                                                             | 60                            |
| 8                      | 8000                                                                                                                             | 1425                          | 3500                                                                            | 420                           | 2100                                                                                                       | 330                           | 2000                                                                                   | 315                           | 1700                                                                                     | 150                           | 790                                                                              | 67.5                          |
| 10                     | 6400                                                                                                                             | 1425                          | 2800                                                                            | 420                           | 1700                                                                                                       | 330                           | 1600                                                                                   | 315                           | 1400                                                                                     | 150                           | 630                                                                              | 67.5                          |
| 12                     | 5300                                                                                                                             | 1425                          | 2300                                                                            | 420                           | 1400                                                                                                       | 330                           | 1300                                                                                   | 315                           | 1100                                                                                     | 150                           | 530                                                                              | 67.5                          |
| 16                     | 4000                                                                                                                             | 1425                          | 1700                                                                            | 420                           | 1000                                                                                                       | 330                           | 950                                                                                    | 315                           | 800                                                                                      | 150                           | 390                                                                              | 67.5                          |
| 20                     | 3200                                                                                                                             | 1425                          | 1400                                                                            | 420                           | 800                                                                                                        | 330                           | 760                                                                                    | 315                           | 650                                                                                      | 150                           | 310                                                                              | 67.5                          |
| 溝切削<br>Slotting        | Ad ≤ 0.2D (D > φ3) Ad ≤ 0.1D (D ≤ φ3) Rd ≤ 1.5D                                                                                  |                               |                                                                                 |                               |                                                                                                            |                               |                                                                                        |                               |                                                                                          |                               | Ad ≤ 0.05D Rd ≤ 1.5D                                                             |                               |
| 側面切削<br>Side Milling   | Ad ≤ 0.05D (D > φ3) Ad ≤ 0.3D (φ2 ≤ D ≤ φ3)                                                                                      |                               |                                                                                 |                               |                                                                                                            |                               |                                                                                        |                               |                                                                                          |                               | Ad ≤ 0.05D                                                                       |                               |

スクエア Square

スクエア Square

ラジアス Radius

ボール Ball

ロングネック Long Neck

ラフィング Roughing

面取り加工用 Chamfering

ドリル Drill

# CX200 3枚刃スクエアエンドミル

CX200 Series 3-Flute Square End Mill

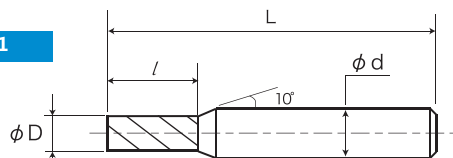
## CX200-HEM3



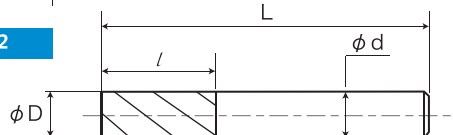
**CX200-HEM3010**

Model Flute D

Type 1



Type 2



### 特性 Features

- CX200-Coating is new epoch-Making Coating for super-long tool life, High-speed processing and dry cutting due to the high acid resistance and hardening if compared with other conventional and opular coating which is existing in the market
- 3-Flutes eliminates chattering and realizes processing from drilling to grooving without steps.
- CKK original designed chip-pocket enables similar or same cutting depth. And then feed rate can be increased more than double if compare with normal square endmill.



MG  
超微粒



| 外径公差 Tolerance |
|----------------|
| 0              |
| -0.02          |



CX200  
Coat

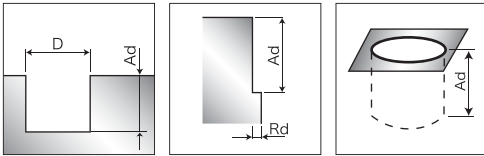
| 炭素鋼<br>Carbon Steel | 合金鋼<br>Alloy Steel | 調質鋼<br>Prehardened Steel | 焼き入れ鋼 Hardened Steel |   |  |  | 鋳鉄<br>Cast Iron | ステンレス鋼<br>Stainless Steels | アルミ合金<br>Aluminium Alloys | 銅合金<br>Copper Alloys | チタン合金<br>耐熱合金<br>Ti/Ni Alloy | グラファイト<br>Graphite | 樹脂<br>Resin |
|---------------------|--------------------|--------------------------|----------------------|---|--|--|-----------------|----------------------------|---------------------------|----------------------|------------------------------|--------------------|-------------|
| ◎                   | ◎                  | ◎                        | ◎                    | ○ |  |  | ○               | ◎                          | ○                         | ○                    |                              |                    |             |

◎ = Best ○ = Good

| MODEL 型番      | D 外径 | l 刃長 | L 全長 | d シャンク径 | Type |
|---------------|------|------|------|---------|------|
| CX200-HEM3010 | 1    | 4    | 60   | 6       | 1    |
| CX200-HEM3015 | 1.5  | 6    | 60   | 6       | 1    |
| CX200-HEM3020 | 2    | 8    | 60   | 6       | 1    |
| CX200-HEM3025 | 2.5  | 10   | 60   | 6       | 1    |
| CX200-HEM3030 | 3    | 16   | 60   | 6       | 1    |
| CX200-HEM3040 | 4    | 18   | 60   | 6       | 1    |
| CX200-HEM3050 | 5    | 21   | 60   | 6       | 1    |
| CX200-HEM3060 | 6    | 21   | 60   | 6       | 2    |
| CX200-HEM3070 | 7    | 24   | 70   | 8       | 1    |
| CX200-HEM3075 | 7.5  | 24   | 70   | 8       | 1    |
| CX200-HEM3080 | 8    | 26   | 75   | 8       | 2    |
| CX200-HEM3090 | 9    | 26   | 80   | 10      | 1    |
| CX200-HEM3100 | 10   | 34   | 90   | 10      | 2    |
| CX200-HEM3110 | 11   | 34   | 100  | 12      | 1    |
| CX200-HEM3120 | 12   | 38   | 100  | 12      | 2    |
| CX200-HEM3160 | 16   | 48   | 110  | 16      | 2    |
| CX200-HEM3200 | 20   | 56   | 130  | 20      | 2    |

## CX200-HEM3

## 推奨切削条件 Standard Milling Condition



- The table shows standard milling guidance of perforating process as written picture.
- Use a rigid and precise machine and tool holder.
- Select a cutting fluid appropriate to the particular usage.
- In case the Revolution could not be increased by the machine used, please reduce feed speed and Revolution at same ratio.
- When mounting End Mills, the run out of the lip will have to be set within 0.01mm.
- In case of milling for stainless steel, please take wet cut milling.

## 溝切削 Slotting

| 被削材<br>Work Material   | 炭素鋼 Carbon Steel<br>S45~S55C  |                                           | 合金鋼 工具鋼 Alloy Steel Tool Steel<br>SKD,SCM |                                           | 調質鋼 プリハードン鋼 Prehardened Steel<br>35~40HRC.HP.M.NAK |                                           |
|------------------------|-------------------------------|-------------------------------------------|-------------------------------------------|-------------------------------------------|----------------------------------------------------|-------------------------------------------|
| 外径<br>(mm)<br>Diameter | 送り速度<br>(mm/min)<br>Feed rate | 回転数<br>(min <sup>-1</sup> )<br>Revolution | 送り速度<br>(mm/min)<br>Feed rate             | 回転数<br>(min <sup>-1</sup> )<br>Revolution | 送り速度<br>(mm/min)<br>Feed rate                      | 回転数<br>(min <sup>-1</sup> )<br>Revolution |
| 1 ~ 1.5                | 277                           | 25000                                     | 150                                       | 22300                                     | 127                                                | 19100                                     |
| 2 ~ 2.5                | 457                           | 14700                                     | 232                                       | 12300                                     | 202                                                | 10700                                     |
| 3                      | 502                           | 10600                                     | 255                                       | 9000                                      | 232                                                | 8000                                      |
| 4                      | 525                           | 8000                                      | 270                                       | 6800                                      | 240                                                | 6000                                      |
| 5                      | 592                           | 6400                                      | 300                                       | 5400                                      | 270                                                | 4800                                      |
| 6                      | 585                           | 5300                                      | 300                                       | 4500                                      | 270                                                | 4000                                      |
| 7 ~ 7.5                | 577                           | 4500                                      | 307                                       | 3900                                      | 262                                                | 3400                                      |
| 8                      | 585                           | 4000                                      | 300                                       | 3400                                      | 270                                                | 3000                                      |
| 9                      | 592                           | 3500                                      | 307                                       | 3000                                      | 277                                                | 2700                                      |
| 10                     | 570                           | 3200                                      | 292                                       | 2700                                      | 262                                                | 2400                                      |
| 11                     | 570                           | 2900                                      | 300                                       | 2500                                      | 262                                                | 2200                                      |
| 12                     | 577                           | 2700                                      | 300                                       | 2300                                      | 262                                                | 2000                                      |
| 16                     | 472                           | 2000                                      | 240                                       | 1700                                      | 210                                                | 1500                                      |
| 20                     | 345                           | 1600                                      | 180                                       | 1400                                      | 157                                                | 1200                                      |

Ad≤0.3D

## 側面切削 Side Milling

| 被削材<br>Work Material   | 炭素鋼 Carbon Steel<br>S45~S55C  |            |                                           |            | 合金鋼 工具鋼 Alloy Steel Tool Steel<br>SKD,SCM |            |                                           |            | 調質鋼 プリハードン鋼 Prehardened Steel<br>35~40HRC.HP.M.NAK |            |                                           |            |
|------------------------|-------------------------------|------------|-------------------------------------------|------------|-------------------------------------------|------------|-------------------------------------------|------------|----------------------------------------------------|------------|-------------------------------------------|------------|
|                        | 送り速度<br>(mm/min)<br>Feed rate |            | 回転数<br>(min <sup>-1</sup> )<br>Revolution |            | 送り速度<br>(mm/min)<br>Feed rate             |            | 回転数<br>(min <sup>-1</sup> )<br>Revolution |            | 送り速度<br>(mm/min)<br>Feed rate                      |            | 回転数<br>(min <sup>-1</sup> )<br>Revolution |            |
| 外径<br>(mm)<br>Diameter | Standard                      | High Speed | Standard                                  | High Speed | Standard                                  | High Speed | Standard                                  | High Speed | Standard                                           | High Speed | Standard                                  | High Speed |
| 1 ~ 1.5                | 412                           | 637        | 25000                                     | 50000      | 277                                       | 427        | 22300                                     | 44600      | 232                                                | 367        | 19100                                     | 38200      |
| 2 ~ 2.5                | 682                           | 1050       | 14700                                     | 29400      | 435                                       | 667        | 12300                                     | 24700      | 375                                                | 577        | 10700                                     | 21500      |
| 3                      | 750                           | 1147       | 10600                                     | 21200      | 480                                       | 735        | 9000                                      | 18000      | 427                                                | 652        | 8000                                      | 15900      |
| 4                      | 787                           | 1200       | 8000                                      | 15900      | 502                                       | 772        | 6800                                      | 13500      | 442                                                | 682        | 6000                                      | 11900      |
| 5                      | 877                           | 1342       | 6400                                      | 12700      | 562                                       | 862        | 5400                                      | 10800      | 495                                                | 757        | 4800                                      | 9500       |
| 6                      | 877                           | 1350       | 5300                                      | 10600      | 562                                       | 862        | 4500                                      | 9000       | 502                                                | 765        | 4000                                      | 8000       |
| 7 ~ 7.5                | 862                           | 1342       | 4500                                      | 9100       | 570                                       | 862        | 3900                                      | 7700       | 495                                                | 757        | 3400                                      | 6800       |
| 8                      | 870                           | 1342       | 4000                                      | 8000       | 562                                       | 862        | 3400                                      | 6800       | 495                                                | 757        | 3000                                      | 6000       |
| 9                      | 885                           | 1380       | 3500                                      | 7100       | 570                                       | 877        | 3000                                      | 6000       | 517                                                | 780        | 2700                                      | 5300       |
| 10                     | 855                           | 1312       | 3200                                      | 6400       | 547                                       | 840        | 2700                                      | 5400       | 487                                                | 742        | 2400                                      | 4800       |
| 11                     | 855                           | 1312       | 2900                                      | 5800       | 555                                       | 832        | 2500                                      | 4900       | 487                                                | 735        | 2200                                      | 4300       |
| 12                     | 862                           | 1305       | 2700                                      | 5300       | 555                                       | 840        | 2300                                      | 4500       | 480                                                | 742        | 2000                                      | 4000       |
| 16                     | 697                           | 1072       | 2000                                      | 4000       | 450                                       | 690        | 1700                                      | 3400       | 397                                                | 607        | 1500                                      | 3000       |
| 20                     | 510                           | 787        | 1600                                      | 3200       | 337                                       | 502        | 1400                                      | 2700       | 292                                                | 450        | 1200                                      | 2400       |

Ad≤1.5D Rd≤0.1D

## 突っ込み切削 Perforating

| 被削材<br>Work Material   | 炭素鋼 Carbon Steel<br>S45~S55C  |                                           | 合金鋼 工具鋼 Alloy Steel Tool Steel<br>SKD,SCM |                                           | 調質鋼 プリハードン鋼 Prehardened Steel<br>35~40HRC.HP.M.NAK |                                           |
|------------------------|-------------------------------|-------------------------------------------|-------------------------------------------|-------------------------------------------|----------------------------------------------------|-------------------------------------------|
| 外径<br>(mm)<br>Diameter | 送り速度<br>(mm/min)<br>Feed rate | 回転数<br>(min <sup>-1</sup> )<br>Revolution | 送り速度<br>(mm/min)<br>Feed rate             | 回転数<br>(min <sup>-1</sup> )<br>Revolution | 送り速度<br>(mm/min)<br>Feed rate                      | 回転数<br>(min <sup>-1</sup> )<br>Revolution |
| 1 ~ 1.5                | 70                            | 15000                                     | 40                                        | 15000                                     | 50                                                 | 15000                                     |
| 2 ~ 2.5                | 100                           | 11000                                     | 60                                        | 9100                                      | 60                                                 | 9100                                      |
| 3                      | 200                           | 9500                                      | 90                                        | 6000                                      | 100                                                | 6000                                      |
| 4                      | 210                           | 7200                                      | 110                                       | 4500                                      | 110                                                | 4500                                      |
| 5                      | 260                           | 5700                                      | 110                                       | 3600                                      | 120                                                | 3600                                      |
| 6                      | 300                           | 4800                                      | 140                                       | 3000                                      | 130                                                | 3000                                      |
| 7 ~ 7.5                | 300                           | 4100                                      | 140                                       | 2600                                      | 110                                                | 2600                                      |
| 8                      | 300                           | 3600                                      | 120                                       | 2300                                      | 100                                                | 2300                                      |
| 9                      | 300                           | 3200                                      | 90                                        | 2000                                      | 90                                                 | 2000                                      |
| 10                     | 290                           | 2900                                      | 90                                        | 1800                                      | 80                                                 | 1800                                      |
| 11                     | 280                           | 2600                                      | 90                                        | 1600                                      | 80                                                 | 1600                                      |
| 12                     | 260                           | 2400                                      | 80                                        | 1500                                      | 70                                                 | 1500                                      |
| 16                     | 210                           | 1800                                      | 60                                        | 1100                                      | 60                                                 | 1100                                      |
| 20                     | 160                           | 1400                                      | 50                                        | 900                                       | 50                                                 | 900                                       |

Ad≤0.3D

スクエア Square

スクエア Square

ラジアス Radius

ボール Ball

ロングネック Long Neck

ラフニング Roughing

面取り加工用 Chamfering

ドリル Drill

## CX200 3枚刃スクエアエンドミル ピンカド

CX200 Series 3-Flute Square End Mill Sharp Edge

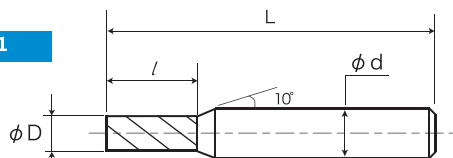
## CX200-PHEM3



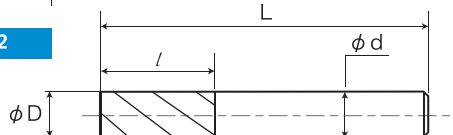
## CX200-PHEM3010

Model Flute D

Type 1



Type 2



## 特性 Features

- CX200-Coating have high oxidation resistance and hardening which exceeds the existing coating and provides long tool life, and suitable for high speed processing and dry milling.
- Combination of Negative radius blade and 45 degree helix blades enables high rigidity and sharpness by high feed speed, with high efficiency
- 3Flute eliminates chattering and suitable for drilling processing
- CKK Original design Chip pocket enables similar or same cutting depth which 3-flutes could realize



| 外径公差 Tolerance |
|----------------|
| 0              |
| -0.02          |



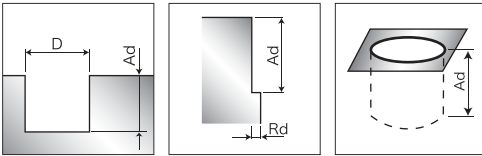
| 炭素鋼<br>Carbon Steel | 合金鋼<br>Alloy Steel | 調質鋼<br>Prehardened Steel | 焼き入れ鋼 Hardened Steel |   |  |  | 鋳鉄<br>Cast Iron | ステンレス鋼<br>Stainless Steels | アルミ合金<br>Aluminium Alloys | 銅合金<br>Copper Alloys | チタン合金<br>耐熱合金<br>Ti/Ni Alloy | グラファイト<br>Graphite | 樹脂<br>Resin |
|---------------------|--------------------|--------------------------|----------------------|---|--|--|-----------------|----------------------------|---------------------------|----------------------|------------------------------|--------------------|-------------|
| ◎                   | ◎                  | ◎                        | ◎                    | ○ |  |  | ○               | ◎                          | ○                         | ○                    |                              |                    |             |

◎ = Best ○ = Good

| MODEL 型番       | D 外径 | l 刃長 | L 全長 | d シャンク径 | Type |
|----------------|------|------|------|---------|------|
| CX200-PHEM3010 | 1    | 4    | 60   | 6       | 1    |
| CX200-PHEM3015 | 1.5  | 6    | 60   | 6       | 1    |
| CX200-PHEM3020 | 2    | 8    | 60   | 6       | 1    |
| CX200-PHEM3025 | 2.5  | 10   | 60   | 6       | 1    |
| CX200-PHEM3030 | 3    | 16   | 60   | 6       | 1    |
| CX200-PHEM3040 | 4    | 18   | 60   | 6       | 1    |
| CX200-PHEM3050 | 5    | 21   | 60   | 6       | 1    |
| CX200-PHEM3060 | 6    | 21   | 60   | 6       | 2    |
| CX200-PHEM3070 | 7    | 24   | 70   | 8       | 1    |
| CX200-PHEM3075 | 7.5  | 24   | 70   | 8       | 1    |
| CX200-PHEM3080 | 8    | 26   | 75   | 8       | 2    |
| CX200-PHEM3090 | 9    | 26   | 80   | 10      | 1    |
| CX200-PHEM3100 | 10   | 34   | 90   | 10      | 2    |
| CX200-PHEM3110 | 11   | 34   | 100  | 12      | 1    |
| CX200-PHEM3120 | 12   | 38   | 100  | 12      | 2    |
| CX200-PHEM3160 | 16   | 48   | 110  | 16      | 2    |
| CX200-PHEM3200 | 20   | 56   | 130  | 20      | 2    |

## CX200-PHEM3

## 推奨切削条件 Standard Milling Condition



- The table shows standard milling guidance of perforating process as written picture.
- Use a rigid and precise machine and tool holder.
- Select a cutting fluid appropriate to the particular usage.
- In case the Revolution could not be increased by the machine used, please reduce feed speed and Revolution at same ratio.
- When mounting End Mills, the run out of the lip will have to be set within 0.01mm.
- In case of milling for stainless steel, please take wet cut milling.

## 溝切削 Slotting

| 被削材<br>Work Material   | 炭素鋼 Carbon Steel<br>S45~S55C  |                                           | 合金鋼 工具鋼 Alloy Steel Tool Steel<br>SKD.SCM |                                           | 調質鋼 プリハードン鋼 Prehardened Steel<br>35~40HRC.HPM.NAK |                                           |
|------------------------|-------------------------------|-------------------------------------------|-------------------------------------------|-------------------------------------------|---------------------------------------------------|-------------------------------------------|
| 外径<br>(mm)<br>Diameter | 送り速度<br>(mm/min)<br>Feed rate | 回転数<br>(min <sup>-1</sup> )<br>Revolution | 送り速度<br>(mm/min)<br>Feed rate             | 回転数<br>(min <sup>-1</sup> )<br>Revolution | 送り速度<br>(mm/min)<br>Feed rate                     | 回転数<br>(min <sup>-1</sup> )<br>Revolution |
| 1 ~ 1.5                | 277                           | 25000                                     | 150                                       | 22300                                     | 127                                               | 19100                                     |
| 2 ~ 2.5                | 457                           | 14700                                     | 232                                       | 12300                                     | 202                                               | 10700                                     |
| 3                      | 502                           | 10600                                     | 255                                       | 9000                                      | 232                                               | 8000                                      |
| 4                      | 525                           | 8000                                      | 270                                       | 6800                                      | 240                                               | 6000                                      |
| 5                      | 592                           | 6400                                      | 300                                       | 5400                                      | 270                                               | 4800                                      |
| 6                      | 585                           | 5300                                      | 300                                       | 4500                                      | 270                                               | 4000                                      |
| 7 ~ 7.5                | 577                           | 4500                                      | 307                                       | 3900                                      | 262                                               | 3400                                      |
| 8                      | 585                           | 4000                                      | 300                                       | 3400                                      | 270                                               | 3000                                      |
| 9                      | 592                           | 3500                                      | 307                                       | 3000                                      | 277                                               | 2700                                      |
| 10                     | 570                           | 3200                                      | 292                                       | 2700                                      | 262                                               | 2400                                      |
| 11                     | 570                           | 2900                                      | 300                                       | 2500                                      | 262                                               | 2200                                      |
| 12                     | 577                           | 2700                                      | 300                                       | 2300                                      | 262                                               | 2000                                      |
| 16                     | 472                           | 2000                                      | 240                                       | 1700                                      | 210                                               | 1500                                      |
| 20                     | 345                           | 1600                                      | 180                                       | 1400                                      | 157                                               | 1200                                      |

Ad≤0.3D

## 側面切削 Side Milling

| 被削材<br>Work Material   | 炭素鋼 Carbon Steel<br>S45~S55C  |            |                                           |            | 合金鋼 工具鋼 Alloy Steel Tool Steel<br>SKD.SCM |            |                                           |            | 調質鋼 プリハードン鋼 Prehardened Steel<br>35~40HRC.HPM.NAK |            |                                           |            |
|------------------------|-------------------------------|------------|-------------------------------------------|------------|-------------------------------------------|------------|-------------------------------------------|------------|---------------------------------------------------|------------|-------------------------------------------|------------|
|                        | 送り速度<br>(mm/min)<br>Feed rate |            | 回転数<br>(min <sup>-1</sup> )<br>Revolution |            | 送り速度<br>(mm/min)<br>Feed rate             |            | 回転数<br>(min <sup>-1</sup> )<br>Revolution |            | 送り速度<br>(mm/min)<br>Feed rate                     |            | 回転数<br>(min <sup>-1</sup> )<br>Revolution |            |
| 外径<br>(mm)<br>Diameter | Standard                      | High Speed | Standard                                  | High Speed | Standard                                  | High Speed | Standard                                  | High Speed | Standard                                          | High Speed | Standard                                  | High Speed |
| 1 ~ 1.5                | 412                           | 637        | 25000                                     | 50000      | 277                                       | 427        | 22300                                     | 44600      | 232                                               | 367        | 19100                                     | 38200      |
| 2 ~ 2.5                | 682                           | 1050       | 14700                                     | 29400      | 435                                       | 667        | 12300                                     | 24700      | 375                                               | 577        | 10700                                     | 21500      |
| 3                      | 750                           | 1147       | 10600                                     | 21200      | 480                                       | 735        | 9000                                      | 18000      | 427                                               | 652        | 8000                                      | 15900      |
| 4                      | 787                           | 1200       | 8000                                      | 15900      | 502                                       | 772        | 6800                                      | 13500      | 442                                               | 682        | 6000                                      | 11900      |
| 5                      | 877                           | 1342       | 6400                                      | 12700      | 562                                       | 862        | 5400                                      | 10800      | 495                                               | 757        | 4800                                      | 9500       |
| 6                      | 877                           | 1350       | 5300                                      | 10600      | 562                                       | 862        | 4500                                      | 9000       | 502                                               | 765        | 4000                                      | 8000       |
| 7 ~ 7.5                | 862                           | 1342       | 4500                                      | 9100       | 570                                       | 862        | 3900                                      | 7700       | 495                                               | 757        | 3400                                      | 6800       |
| 8                      | 870                           | 1342       | 4000                                      | 8000       | 562                                       | 862        | 3400                                      | 6800       | 495                                               | 757        | 3000                                      | 6000       |
| 9                      | 885                           | 1380       | 3500                                      | 7100       | 570                                       | 877        | 3000                                      | 6000       | 517                                               | 780        | 2700                                      | 5300       |
| 10                     | 855                           | 1312       | 3200                                      | 6400       | 547                                       | 840        | 2700                                      | 5400       | 487                                               | 742        | 2400                                      | 4800       |
| 11                     | 855                           | 1312       | 2900                                      | 5800       | 555                                       | 832        | 2500                                      | 4900       | 487                                               | 735        | 2200                                      | 4300       |
| 12                     | 862                           | 1305       | 2700                                      | 5300       | 555                                       | 840        | 2300                                      | 4500       | 480                                               | 742        | 2000                                      | 4000       |
| 16                     | 697                           | 1072       | 2000                                      | 4000       | 450                                       | 690        | 1700                                      | 3400       | 397                                               | 607        | 1500                                      | 3000       |
| 20                     | 510                           | 787        | 1600                                      | 3200       | 337                                       | 502        | 1400                                      | 2700       | 292                                               | 450        | 1200                                      | 2400       |

Ad≤1.5D Rd≤0.1D

Ad≤1.5D Rd≤0.05D

## 突っ込み切削 Perforating

| 被削材<br>Work Material   | 炭素鋼 Carbon Steel<br>S45~S55C  |                                           | 合金鋼 工具鋼 Alloy Steel Tool Steel<br>SKD.SCM |                                           | 調質鋼 プリハードン鋼 Prehardened Steel<br>35~40HRC.HPM.NAK |                                           |
|------------------------|-------------------------------|-------------------------------------------|-------------------------------------------|-------------------------------------------|---------------------------------------------------|-------------------------------------------|
| 外径<br>(mm)<br>Diameter | 送り速度<br>(mm/min)<br>Feed rate | 回転数<br>(min <sup>-1</sup> )<br>Revolution | 送り速度<br>(mm/min)<br>Feed rate             | 回転数<br>(min <sup>-1</sup> )<br>Revolution | 送り速度<br>(mm/min)<br>Feed rate                     | 回転数<br>(min <sup>-1</sup> )<br>Revolution |
| 1 ~ 1.5                | 70                            | 15000                                     | 40                                        | 15000                                     | 50                                                | 15000                                     |
| 2 ~ 2.5                | 100                           | 11000                                     | 60                                        | 9100                                      | 60                                                | 9100                                      |
| 3                      | 200                           | 9500                                      | 90                                        | 6000                                      | 100                                               | 6000                                      |
| 4                      | 210                           | 7200                                      | 110                                       | 4500                                      | 110                                               | 4500                                      |
| 5                      | 260                           | 5700                                      | 110                                       | 3600                                      | 120                                               | 3600                                      |
| 6                      | 300                           | 4800                                      | 140                                       | 3000                                      | 130                                               | 3000                                      |
| 7 ~ 7.5                | 300                           | 4100                                      | 140                                       | 2600                                      | 110                                               | 2600                                      |
| 8                      | 300                           | 3600                                      | 120                                       | 2300                                      | 100                                               | 2300                                      |
| 9                      | 300                           | 3200                                      | 90                                        | 2000                                      | 90                                                | 2000                                      |
| 10                     | 290                           | 2900                                      | 90                                        | 1800                                      | 80                                                | 1800                                      |
| 11                     | 280                           | 2600                                      | 90                                        | 1600                                      | 80                                                | 1600                                      |
| 12                     | 260                           | 2400                                      | 80                                        | 1500                                      | 70                                                | 1500                                      |
| 16                     | 210                           | 1800                                      | 60                                        | 1100                                      | 60                                                | 1100                                      |
| 20                     | 160                           | 1400                                      | 50                                        | 900                                       | 50                                                | 900                                       |

Ad≤0.3D

スクエア Square

スクエア Square

ラジアス Radius

ボール Ball

ロングネック Long Neck

ラフニング Roughing

面取り加工用 Chamfering

ドリル Drill



# CX200 4枚刃スクエアエンドミル

CX200 Series 4-Flute Square End Mill

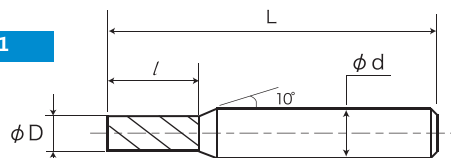
## CX200-HEM4



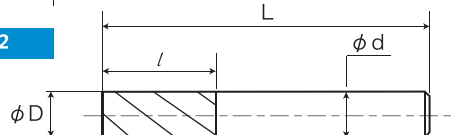
**CX200-HEM4020**

Model Flute D

Type 1



Type 2



### 特性 Features

- CX200-Coating have high oxidation resistance and hardening which exceeds the existing coating and provides long tool life, and suitable for high speed processing and dry milling.
- Combination of Negative radius blade and 45 degree helix blades enables high rigidity and sharpness by high feed speed, with high efficiency
- 4Flute eliminates chattering and suitable for drilling processing
- CKK Original design Chip pocket enables similar or same cutting depth which 2-flutes could realize
- Feed rate can be increased more than double if compared with standard End-Mills



| 外径公差 Tolerance |
|----------------|
| 0              |
| -0.02          |



| 炭素鋼<br>Carbon Steel | 合金鋼<br>Alloy Steel | 調質鋼<br>Prehardened Steel | 焼き入れ鋼 Hardened Steel |   |  |  | 鋳鉄<br>Cast Iron | ステンレス鋼<br>Stainless Steels | アルミ合金<br>Aluminium Alloys | 銅合金<br>Copper Alloys | チタン合金<br>耐熱合金<br>Ti/Ni Alloy | グラファイト<br>Graphite | 樹脂<br>Resin |
|---------------------|--------------------|--------------------------|----------------------|---|--|--|-----------------|----------------------------|---------------------------|----------------------|------------------------------|--------------------|-------------|
| ~45HRC              | ~55HRC             | ~60HRC                   | ~65HRC               |   |  |  |                 |                            |                           |                      |                              |                    |             |
| ◎                   | ◎                  | ◎                        | ◎                    | ○ |  |  | ○               | ◎                          | ○                         | ○                    |                              |                    |             |

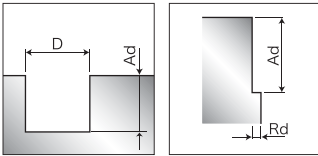
◎ = Best ○ = Good

| MODEL 型番      | D 外径 | l 刃長 | L 全長 | d シャンク径 | Type |
|---------------|------|------|------|---------|------|
| CX200-HEM4020 | 2    | 8    | 60   | 6       | 1    |
| CX200-HEM4025 | 2.5  | 10   | 60   | 6       | 1    |
| CX200-HEM4030 | 3    | 16   | 60   | 6       | 1    |
| CX200-HEM4040 | 4    | 18   | 60   | 6       | 1    |
| CX200-HEM4050 | 5    | 21   | 60   | 6       | 1    |
| CX200-HEM4060 | 6    | 21   | 60   | 6       | 2    |
| CX200-HEM4070 | 7    | 24   | 60   | 8       | 1    |
| CX200-HEM4075 | 7.5  | 24   | 60   | 8       | 1    |
| CX200-HEM4080 | 8    | 26   | 75   | 8       | 2    |
| CX200-HEM4100 | 10   | 34   | 90   | 10      | 2    |
| CX200-HEM4120 | 12   | 38   | 100  | 12      | 2    |
| CX200-HEM4160 | 16   | 48   | 110  | 16      | 2    |
| CX200-HEM4200 | 20   | 56   | 130  | 20      | 2    |



## CX200-HEM4

## 推奨切削条件 Standard Milling Condition



- The table shows standard milling guidance of perforating process as written picture.
- Use a rigid and precise machine and tool holder.
- Select a cutting fluid appropriate to the particular usage.
- In case the Revolution could not be increased by the machine used, please reduce feed speed and Revolution at same ratio.
- When mounting End Mills, the run out of the lip will have to be set within 0.01mm.
- In case of milling for stainless steel, please take wet cut milling.

## 溝切削 Slotting

| 被削材<br>Work Material   | 炭素鋼 Carbon Steel<br>S 45~S55 C |                                           | 合金鋼 工具鋼 Alloy Steel/Tool Steel<br>SKD.5CM |                                           | 調質鋼 プリハードン鋼 Prehardened Steel<br>35 ~ 40HRC.HPM.NAK |                                           |
|------------------------|--------------------------------|-------------------------------------------|-------------------------------------------|-------------------------------------------|-----------------------------------------------------|-------------------------------------------|
|                        | 送り速度<br>(mm/min)<br>Feed rate  | 回転数<br>(min <sup>-1</sup> )<br>Revolution | 送り速度<br>(mm/min)<br>Feed rate             | 回転数<br>(min <sup>-1</sup> )<br>Revolution | 送り速度<br>(mm/min)<br>Feed rate                       | 回転数<br>(min <sup>-1</sup> )<br>Revolution |
| 外径<br>(mm)<br>Diameter |                                |                                           |                                           |                                           |                                                     |                                           |
| 2 ~ 2.5                | 610                            | 14700                                     | 310                                       | 12300                                     | 270                                                 | 10700                                     |
| 3                      | 670                            | 10600                                     | 340                                       | 9000                                      | 310                                                 | 8000                                      |
| 4                      | 700                            | 8000                                      | 360                                       | 6800                                      | 320                                                 | 6000                                      |
| 5                      | 790                            | 6400                                      | 400                                       | 5400                                      | 360                                                 | 4800                                      |
| 6                      | 780                            | 5300                                      | 400                                       | 4500                                      | 360                                                 | 4000                                      |
| 7 ~ 7.5                | 770                            | 4500                                      | 410                                       | 3900                                      | 350                                                 | 3400                                      |
| 8                      | 780                            | 4000                                      | 400                                       | 3400                                      | 360                                                 | 3000                                      |
| 10                     | 760                            | 3200                                      | 390                                       | 2700                                      | 350                                                 | 2400                                      |
| 12                     | 770                            | 2700                                      | 400                                       | 2300                                      | 350                                                 | 2000                                      |
| 16                     | 630                            | 2000                                      | 320                                       | 1700                                      | 280                                                 | 1500                                      |
| 20                     | 460                            | 1600                                      | 240                                       | 1400                                      | 210                                                 | 1200                                      |
| Ad≤0.3D                |                                |                                           |                                           |                                           |                                                     |                                           |

## 側面切削 Side Milling

| 被削材<br>Work Material   | 炭素鋼 Carbon Steel<br>S 45~S55 C |            |                                           |            | 合金鋼 工具鋼 Alloy Steel/Tool Steel<br>SKD.5CM |            |                                           |            | 調質鋼 プリハードン鋼 Prehardened Steel<br>35 ~ 40HRC.HPM.NAK |            |                                           |            |
|------------------------|--------------------------------|------------|-------------------------------------------|------------|-------------------------------------------|------------|-------------------------------------------|------------|-----------------------------------------------------|------------|-------------------------------------------|------------|
|                        | 送り速度<br>(mm/min)<br>Feed rate  |            | 回転数<br>(min <sup>-1</sup> )<br>Revolution |            | 送り速度<br>(mm/min)<br>Feed rate             |            | 回転数<br>(min <sup>-1</sup> )<br>Revolution |            | 送り速度<br>(mm/min)<br>Feed rate                       |            | 回転数<br>(min <sup>-1</sup> )<br>Revolution |            |
| 外径<br>(mm)<br>Diameter | Standard                       | High Speed | Standard                                  | High Speed | Standard                                  | High Speed | Standard                                  | High Speed | Standard                                            | High Speed | Standard                                  | High Speed |
| 2 ~ 2.5                | 910                            | 1400       | 14700                                     | 29400      | 580                                       | 890        | 12300                                     | 24700      | 500                                                 | 770        | 10700                                     | 21500      |
| 3                      | 1000                           | 1530       | 10600                                     | 21200      | 640                                       | 980        | 9000                                      | 18000      | 570                                                 | 870        | 8000                                      | 15900      |
| 4                      | 1050                           | 1600       | 8000                                      | 15900      | 670                                       | 1030       | 6800                                      | 13500      | 590                                                 | 910        | 6000                                      | 11900      |
| 5                      | 1170                           | 1790       | 6400                                      | 12700      | 750                                       | 1150       | 5400                                      | 10800      | 660                                                 | 1010       | 4800                                      | 9500       |
| 6                      | 1170                           | 1800       | 5300                                      | 10600      | 750                                       | 1150       | 4500                                      | 9000       | 670                                                 | 1020       | 4000                                      | 8000       |
| 7 ~ 7.5                | 1150                           | 1790       | 4500                                      | 9100       | 760                                       | 1150       | 3900                                      | 7700       | 660                                                 | 1010       | 3400                                      | 6800       |
| 8                      | 1160                           | 1790       | 4000                                      | 8000       | 750                                       | 1150       | 3400                                      | 6800       | 660                                                 | 1010       | 3000                                      | 6000       |
| 10                     | 1140                           | 1750       | 3200                                      | 6400       | 730                                       | 1120       | 2700                                      | 5400       | 650                                                 | 990        | 2400                                      | 4800       |
| 12                     | 1150                           | 1740       | 2700                                      | 5300       | 740                                       | 1120       | 2300                                      | 4500       | 640                                                 | 990        | 2000                                      | 4000       |
| 16                     | 930                            | 1430       | 2000                                      | 4000       | 600                                       | 920        | 1700                                      | 3400       | 530                                                 | 810        | 1500                                      | 3000       |
| 20                     | 680                            | 1050       | 1600                                      | 3200       | 450                                       | 670        | 1400                                      | 2700       | 390                                                 | 600        | 1200                                      | 2400       |
| Ad≤1.5D Rd≤0.1D        |                                |            |                                           |            | Ad≤1.5D Rd≤0.05D                          |            |                                           |            |                                                     |            |                                           |            |

スクエア Square

スクエア Square

ラジアス Radius

ボール Ball

ロングネック Long Neck

ラフニング Roughing

面取り加工用 Chamfering

ドリル Drill

## CX200 4枚刃スクエアエンドミル ピンカド

CX200 Series 4-Flute Square End Mill Sharp Edge

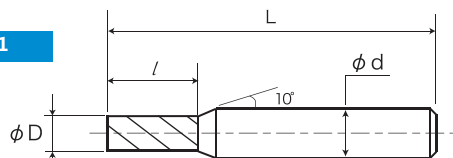
## CX200-PHEM4



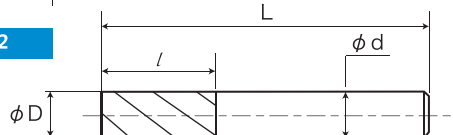
## CX200-PHEM4100

Model Flute D

Type 1



Type 2



## 特性 Features

- New series CX200-HEM4 Shape Edge
- CX200-Coating have high oxidation resistance and hardening which exceeds the existing coating and provides long tool life, and suitable for high speed processing and dry milling.
- Combination of Negative radius blade and 45 degree helix blades enables high rigidity and sharpness by high feed speed, with high efficiency
- 4Flute eliminates chattering and suitable for drilling processing
- CKK Original design Chip pocket enables similar or same cutting depth which 2-flutes can realize
- Feed rate can be increased more than double if compared with standard End-Mills



| 外径公差 Tolerance |
|----------------|
| 0              |
| -0.02          |



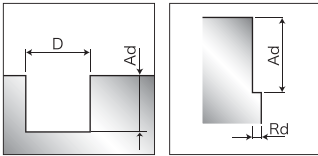
| 炭素鋼<br>Carbon Steel | 合金鋼<br>Alloy Steel | 調質鋼<br>Prehardened Steel | 焼き入れ鋼 Hardened Steel |   |  |  | 鋳鉄<br>Cast Iron | ステンレス鋼<br>Stainless Steels | アルミ合金<br>Aluminium Alloys | 銅合金<br>Copper Alloys | チタン合金<br>耐熱合金<br>Ti/Ni Alloy | グラファイト<br>Graphite | 樹脂<br>Resin |
|---------------------|--------------------|--------------------------|----------------------|---|--|--|-----------------|----------------------------|---------------------------|----------------------|------------------------------|--------------------|-------------|
| ~45HRC              | ~55HRC             | ~60HRC                   | ~65HRC               |   |  |  |                 |                            |                           |                      |                              |                    |             |
| ◎                   | ◎                  | ◎                        | ◎                    | ○ |  |  | ○               | ◎                          | ○                         | ○                    |                              |                    |             |

◎ = Best ○ = Good

| MODEL 型番       | D 外径 | l 刃長 | L 全長 | d シャンク径 | Type |
|----------------|------|------|------|---------|------|
| CX200-PHEM4020 | 2    | 8    | 60   | 6       | 1    |
| CX200-PHEM4025 | 2.5  | 10   | 60   | 6       | 1    |
| CX200-PHEM4030 | 3    | 16   | 60   | 6       | 1    |
| CX200-PHEM4040 | 4    | 18   | 60   | 6       | 1    |
| CX200-PHEM4050 | 5    | 21   | 60   | 6       | 1    |
| CX200-PHEM4060 | 6    | 21   | 60   | 6       | 2    |
| CX200-PHEM4070 | 7    | 24   | 60   | 8       | 1    |
| CX200-PHEM4075 | 7.5  | 24   | 60   | 8       | 1    |
| CX200-PHEM4080 | 8    | 26   | 75   | 8       | 2    |
| CX200-PHEM4100 | 10   | 34   | 90   | 10      | 2    |
| CX200-PHEM4120 | 12   | 38   | 100  | 12      | 2    |
| CX200-PHEM4160 | 16   | 48   | 110  | 16      | 2    |
| CX200-PHEM4200 | 20   | 56   | 130  | 20      | 2    |

## CX200-PHEM4

## 推奨切削条件 Standard Milling Condition



- The table shows standard milling guidance of perforating process as written picture.
- Use a rigid and precise machine and tool holder.
- Select a cutting fluid appropriate to the particular usage.
- In case the Revolution could not be increased by the machine used, please reduce feed speed and Revolution at same ratio.
- When mounting End Mills, the run out of the lip will have to be set within 0.01mm.
- In case of milling for stainless steel, please take wet cut milling.

## 溝切削 Slotting

| 被削材<br>Work Material   | 炭素鋼 Carbon Steel<br>S 45~S55 C |                                           | 合金鋼 工具鋼 Alloy Steel Tool Steel<br>SKD.5CM |                                           | 調質鋼<br>35 ~ 40HRC.HPM.NAK     |                                           |
|------------------------|--------------------------------|-------------------------------------------|-------------------------------------------|-------------------------------------------|-------------------------------|-------------------------------------------|
|                        | 送り速度<br>(mm/min)<br>Feed rate  | 回転数<br>(min <sup>-1</sup> )<br>Revolution | 送り速度<br>(mm/min)<br>Feed rate             | 回転数<br>(min <sup>-1</sup> )<br>Revolution | 送り速度<br>(mm/min)<br>Feed rate | 回転数<br>(min <sup>-1</sup> )<br>Revolution |
| 外径<br>(mm)<br>Diameter |                                |                                           |                                           |                                           |                               |                                           |
| 2 ~ 2.5                | 610                            | 14700                                     | 310                                       | 12300                                     | 270                           | 10700                                     |
| 3                      | 670                            | 10600                                     | 340                                       | 9000                                      | 310                           | 8000                                      |
| 4                      | 700                            | 8000                                      | 360                                       | 6800                                      | 320                           | 6000                                      |
| 5                      | 790                            | 6400                                      | 400                                       | 5400                                      | 360                           | 4800                                      |
| 6                      | 780                            | 5300                                      | 400                                       | 4500                                      | 360                           | 4000                                      |
| 7 ~ 7.5                | 770                            | 4500                                      | 410                                       | 3900                                      | 350                           | 3400                                      |
| 8                      | 780                            | 4000                                      | 400                                       | 3400                                      | 360                           | 3000                                      |
| 10                     | 760                            | 3200                                      | 390                                       | 2700                                      | 350                           | 2400                                      |
| 12                     | 770                            | 2700                                      | 400                                       | 2300                                      | 350                           | 2000                                      |
| 16                     | 630                            | 2000                                      | 320                                       | 1700                                      | 280                           | 1500                                      |
| 20                     | 460                            | 1600                                      | 240                                       | 1400                                      | 210                           | 1200                                      |
| Ad≤0.3D                |                                |                                           |                                           |                                           |                               |                                           |

## 側面切削 Side Milling

| 被削材<br>Work Material   | 炭素鋼<br>S 45~S55 C             |            |                                           |            | 合金鋼 工具鋼 Allo Steel Tool Steel<br>SKD.5CM |            |                                           |            | 調質鋼<br>35 ~ 40HRC.HPM.NAK     |            |                                           |            |
|------------------------|-------------------------------|------------|-------------------------------------------|------------|------------------------------------------|------------|-------------------------------------------|------------|-------------------------------|------------|-------------------------------------------|------------|
|                        | 送り速度<br>(mm/min)<br>Feed rate |            | 回転数<br>(min <sup>-1</sup> )<br>Revolution |            | 送り速度<br>(mm/min)<br>Feed rate            |            | 回転数<br>(min <sup>-1</sup> )<br>Revolution |            | 送り速度<br>(mm/min)<br>Feed rate |            | 回転数<br>(min <sup>-1</sup> )<br>Revolution |            |
| 外径<br>(mm)<br>Diameter | Standard                      | High Speed | Standard                                  | High Speed | Standard                                 | High Speed | Standard                                  | High Speed | Standard                      | High Speed | Standard                                  | High Speed |
| 2 ~ 2.5                | 910                           | 1400       | 14700                                     | 29400      | 580                                      | 890        | 12300                                     | 24700      | 500                           | 770        | 10700                                     | 21500      |
| 3                      | 1000                          | 1530       | 10600                                     | 21200      | 640                                      | 980        | 9000                                      | 18000      | 570                           | 870        | 8000                                      | 15900      |
| 4                      | 1050                          | 1600       | 8000                                      | 15900      | 670                                      | 1030       | 6800                                      | 13500      | 590                           | 910        | 6000                                      | 11900      |
| 5                      | 1170                          | 1790       | 6400                                      | 12700      | 750                                      | 1150       | 5400                                      | 10800      | 660                           | 1010       | 4800                                      | 9500       |
| 6                      | 1170                          | 1800       | 5300                                      | 10600      | 750                                      | 1150       | 4500                                      | 9000       | 670                           | 1020       | 4000                                      | 8000       |
| 7 ~ 7.5                | 1150                          | 1790       | 4500                                      | 9100       | 760                                      | 1150       | 3900                                      | 7700       | 660                           | 1010       | 3400                                      | 6800       |
| 8                      | 1160                          | 1790       | 4000                                      | 8000       | 750                                      | 1150       | 3400                                      | 6800       | 660                           | 1010       | 3000                                      | 6000       |
| 10                     | 1140                          | 1750       | 3200                                      | 6400       | 730                                      | 1120       | 2700                                      | 5400       | 650                           | 990        | 2400                                      | 4800       |
| 12                     | 1150                          | 1740       | 2700                                      | 5300       | 740                                      | 1120       | 2300                                      | 4500       | 640                           | 990        | 2000                                      | 4000       |
| 16                     | 930                           | 1430       | 2000                                      | 4000       | 600                                      | 920        | 1700                                      | 3400       | 530                           | 810        | 1500                                      | 3000       |
| 20                     | 680                           | 1050       | 1600                                      | 3200       | 450                                      | 670        | 1400                                      | 2700       | 390                           | 600        | 1200                                      | 2400       |
| Ad≤1.5D Rd≤0.1D        |                               |            |                                           |            | Ad≤1.5D Rd≤0.05D                         |            |                                           |            |                               |            |                                           |            |

スクエア Square

スクエア Square

ラジアス Radius

ボール Ball

ロングネック Long Neck

ラフニング Roughing

面取り加工用 Chamfering

ドリル Drill

# CX200 4・6枚刃 ハイヘリカル スクエアエンドミル

CX200 Series 4・6-Flute High-helical Square End Mill

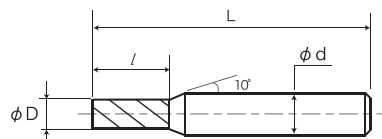
## CX200-PMER



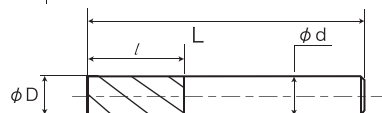
**CX200-PMER6100**

Model Flute D

Type 1



Type 2



### 特 性 Features

- Improvement of CX200 Coating have high oxidation resistance and high hardening exceeding the existing coating meet our own high rigt requirement to ensure exceptional piece-to-piece conformity and tool life in the processing of prehardned steel and carbon steel
- Combination of Negative radius blade and 45 degree helix blades enables high rigidity and sharpness by high feed speed, with high efficiency
- Positive shaped rake angle, bottom edge corner of the shape edge and 53 degree helix flutes provide best processing of steel , prehardened steel , aluminum and finishing of pocket wall process of Mold base



| 外径 Diameter | 公差 Tolerance |
|-------------|--------------|
| 1~3         | -0.014       |
| 4~6         | -0.028       |
| 8~10        | -0.020       |
| 12~16       | -0.038       |
| 20          | -0.025       |
|             | -0.045       |
|             | -0.032       |
|             | -0.059       |
|             | -0.040       |
|             | -0.070       |



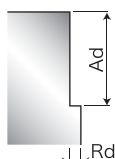
| 炭素鋼<br>Carbon Steel | 合金鋼<br>Alloy Steel | 調質鋼<br>Prehardened Steel | 焼き入れ鋼 Hardened Steel |   |  |  | 鋳鉄<br>Cast Iron | ステンレス鋼<br>Stainless Steels | アルミ合金<br>Aluminium Alloys | 銅合金<br>Copper Alloys | チタン合金<br>耐熱合金<br>Ti/Ni Alloy | グラファイト<br>Graphite | 樹脂<br>Resin |
|---------------------|--------------------|--------------------------|----------------------|---|--|--|-----------------|----------------------------|---------------------------|----------------------|------------------------------|--------------------|-------------|
| ◎                   | ◎                  | ◎                        | ◎                    | ○ |  |  | ○               | ◎                          | ○                         | ○                    |                              |                    |             |

◎ = Best ○ = Good

| MODEL 型番       | D 外径 | l 刃長 | L 全長 | d シャンク径 | Flute 刃数 | Type |
|----------------|------|------|------|---------|----------|------|
| CX200-PMER4010 | 1    | 2.5  | 60   | 6       | 4        | 1    |
| CX200-PMER4020 | 2    | 5    | 60   | 6       | 4        | 1    |
| CX200-PMER4030 | 3    | 10   | 60   | 6       | 4        | 1    |
| CX200-PMER4040 | 4    | 12   | 60   | 6       | 4        | 1    |
| CX200-PMER4050 | 5    | 15   | 60   | 6       | 4        | 1    |
| CX200-PMER6060 | 6    | 15   | 60   | 6       | 6        | 2    |
| CX200-PMER6080 | 8    | 20   | 75   | 8       | 6        | 2    |
| CX200-PMER6100 | 10   | 25   | 80   | 10      | 6        | 2    |
| CX200-PMER6120 | 12   | 30   | 100  | 12      | 6        | 2    |
| CX200-PMER6160 | 16   | 40   | 110  | 16      | 6        | 2    |
| CX200-PMER6200 | 20   | 45   | 130  | 20      | 6        | 2    |

# CX200-PMER

## 推奨切削条件 Standard Milling Condition



- The table shows standard milling guidance of perforating process as written picture.
- Use a rigid and precise machine and tool holder.
- Select a cutting fluid appropriate to the particular usage.
- In case the Revolution could not be increased by the machine used, please reduce feed speed and Revolution at same ratio.
- When mounting End Mills, the run out of the lip will have to be set within 0.01mm.
- Down Cut milling is required for side milling processing.
- Reduce milling condition when chattering is occurred in side milling processing.
- For Groove milling, it is recommended to take 80% of feed speed and Revolution written in the table.
- In case of milling for stainless steel, please take wet cut milling.

| 被削材<br>Work Material | 炭素鋼 Carbon Steel<br>S45~S55C  |            |                                           |            | 合金鋼 工具鋼 Alloy Steel bTool Steel<br>SKD.SCM |            |                                           |            | 調質鋼 プリハードン鋼 Prehardened Steel<br>35~40HRC.HPM.NAK |            |                                           |            |
|----------------------|-------------------------------|------------|-------------------------------------------|------------|--------------------------------------------|------------|-------------------------------------------|------------|---------------------------------------------------|------------|-------------------------------------------|------------|
|                      | 送り速度<br>(mm/min)<br>Feed rate |            | 回転数<br>(min <sup>-1</sup> )<br>Revolution |            | 送り速度<br>(mm/min)<br>Feed rate              |            | 回転数<br>(min <sup>-1</sup> )<br>Revolution |            | 送り速度<br>(mm/min)<br>Feed rate                     |            | 回転数<br>(min <sup>-1</sup> )<br>Revolution |            |
|                      | Standard                      | High Speed | Standard                                  | High Speed | Standard                                   | High Speed | Standard                                  | High Speed | Standard                                          | High Speed | Standard                                  | High Speed |
| 1                    | 600                           | 1600       | 17500                                     | 50000      | 600                                        | 1600       | 17500                                     | 50000      | 500                                               | 1600       | 17500                                     | 50000      |
| 2                    | 1300                          | 3200       | 17500                                     | 45000      | 1300                                       | 3200       | 17500                                     | 45000      | 1100                                              | 2900       | 17500                                     | 43800      |
| 3                    | 1700                          | 3400       | 14000                                     | 30500      | 1700                                       | 3400       | 14000                                     | 30500      | 1300                                              | 3100       | 13000                                     | 29500      |
| 4                    | 1700                          | 3800       | 10500                                     | 22800      | 1700                                       | 3800       | 10500                                     | 22800      | 1300                                              | 3400       | 9500                                      | 22000      |
| 5                    | 2000                          | 4300       | 8600                                      | 18500      | 2000                                       | 4300       | 8600                                      | 18500      | 1400                                              | 3900       | 7800                                      | 17800      |
| 6                    | 2500                          | 5500       | 6900                                      | 15000      | 2500                                       | 5500       | 6900                                      | 15000      | 1900                                              | 5100       | 6400                                      | 14500      |
| 8                    | 2600                          | 5600       | 5200                                      | 11300      | 2600                                       | 5600       | 5200                                      | 11300      | 1900                                              | 5100       | 4800                                      | 11000      |
| 10                   | 2500                          | 5500       | 4100                                      | 9000       | 2500                                       | 5500       | 4100                                      | 9000       | 1800                                              | 5000       | 3800                                      | 8800       |
| 12                   | 2400                          | 5300       | 3500                                      | 7600       | 2400                                       | 5300       | 3500                                      | 7600       | 1800                                              | 4800       | 3200                                      | 7300       |
| 16                   | 2200                          | 4900       | 2600                                      | 5700       | 2200                                       | 4900       | 2600                                      | 5700       | 1700                                              | 4400       | 2400                                      | 5500       |
| 20                   | 2100                          | 4500       | 2200                                      | 4600       | 2100                                       | 4500       | 2200                                      | 4600       | 1600                                              | 4100       | 2100                                      | 4400       |
| Ad                   | ≤1.5D                         |            |                                           |            |                                            |            |                                           |            |                                                   |            |                                           |            |
| Rd 標準                | ≤0.1D                         |            |                                           |            |                                            |            |                                           |            |                                                   |            |                                           |            |
| 高速                   | ≤0.05D                        |            |                                           |            |                                            |            |                                           |            |                                                   |            |                                           |            |

スクエア Square

スクエア Square

ラジアス Radius

ボール Ball

ロングネック Long Neck

ラフニング Roughing

面取り加工用 Chamfering

ドリル Drill

## CX500 高硬度用スクエアエンドミル

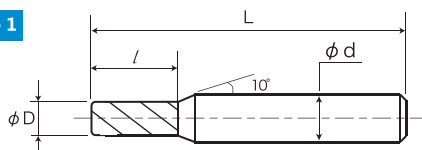
## CX500-HMER



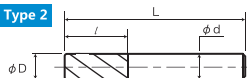
CX500-HMER6100

Model Flute D

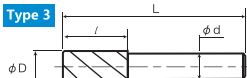
Type 1



Type 2



Type 3



## | 特 征 Features

- CX500-Coating is new epoch-making coating developed for super-long tool life, High-speed processing and dry cutting due to the high acid resistance and hardening if compared with other conventional and popular coating which is existing in the market.
- The blades designed with infinitesimal radius in order to eliminate chattering.(D3 only)
- Minimize falling of tools in side milling processing
- Applied for hardened steel processing (Up to 65 HRC)



| 外径 Diameter | 公差 Tolerance     |
|-------------|------------------|
| 1~25        | -0.005<br>-0.035 |



| 炭素鋼<br>Carbon Steel | 合金鋼<br>Alloy Steel | 調質鋼<br>Prehardened Steel | 焼き入れ鋼 Hardened Steel |   |   |   | 鋳鉄<br>Cast Iron | ステンレス鋼<br>Stainless Steels | アルミ合金<br>Aluminium Alloys | 銅合金<br>Copper Alloys | チタン合金<br>耐熱合金<br>Ti/Ni Alloy | グラファイト<br>Graphite | 樹脂<br>Resin |
|---------------------|--------------------|--------------------------|----------------------|---|---|---|-----------------|----------------------------|---------------------------|----------------------|------------------------------|--------------------|-------------|
| ○                   | ○                  | ○                        | ○                    | ◎ | ◎ | ◎ | ◎               | ○                          |                           |                      |                              |                    |             |

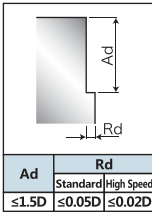
◎ = Best ○ = Good

| MODEL 型番       | D 外径 | l 刃長 | L 全長 | d シャンク径 | Flute 刃数 | Type |
|----------------|------|------|------|---------|----------|------|
| CX500-HMER4010 | 1    | 2.5  | 60   | 6       | 4        | 1    |
| CX500-HMER4015 | 1.5  | 3.8  | 60   | 6       | 4        | 1    |
| CX500-HMER4020 | 2    | 5    | 60   | 6       | 4        | 1    |
| CX500-HMER4025 | 2.5  | 6.3  | 60   | 6       | 4        | 1    |
| CX500-HMER4030 | 3    | 10   | 60   | 6       | 4        | 1    |
| CX500-HMER4035 | 3.5  | 12   | 60   | 6       | 4        | 1    |
| CX500-HMER4040 | 4    | 12   | 60   | 6       | 4        | 1    |
| CX500-HMER4045 | 4.5  | 15   | 60   | 6       | 4        | 1    |
| CX500-HMER4050 | 5    | 15   | 60   | 6       | 4        | 1    |
| CX500-HMER4055 | 5.5  | 15   | 60   | 6       | 4        | 1    |
| CX500-HMER6060 | 6    | 18   | 60   | 6       | 6        | 2    |
| CX500-HMER6080 | 8    | 24   | 75   | 8       | 6        | 2    |
| CX500-HMER6100 | 10   | 30   | 100  | 10      | 6        | 2    |
| CX500-HMER6120 | 12   | 35   | 100  | 12      | 6        | 2    |
| CX500-HMER6140 | 14   | 35   | 105  | 16      | 6        | 1    |
| CX500-HMER6160 | 16   | 45   | 110  | 16      | 6        | 2    |
| CX500-HMER6180 | 18   | 40   | 120  | 20      | 6        | 1    |
| CX500-HMER6200 | 20   | 50   | 125  | 20      | 6        | 2    |
| CX500-HMER6220 | 22   | 50   | 135  | 20      | 6        | 3    |
| CX500-HMER8250 | 25   | 50   | 140  | 25      | 8        | 2    |



## CX500-HMER

## 推奨切削条件 Standard Milling Condition



- The table show standard milling guidance of perforating process as written picture
- Use a rigid and precise machine and tool holder
- Select a cutting fluid appropriate to the particular usage
- In case the Revolution could not be increased by the machine used, Please reduce feed speed and Revolution speed at same ration
- When mounting End Mills, The run out of the till will have to be set within 0.01mm

| 被削材<br>Work Material | 炭素鋼 carbon steel<br>(40 ~ 55RHC) |            |                                          |            | 高硬度鋼 Hardened steel<br>(55 ~ 60RHC) |            |                                          |            | 高硬度鋼 Hardened steel<br>(60 ~ 65RHC) |            |                                          |            |
|----------------------|----------------------------------|------------|------------------------------------------|------------|-------------------------------------|------------|------------------------------------------|------------|-------------------------------------|------------|------------------------------------------|------------|
|                      | 送り速度<br>(mm/min)<br>Feed rate    |            | 回転数<br>(mm <sup>-1</sup> )<br>Revolution |            | 送り速度<br>(mm/min)<br>Feed rate       |            | 回転数<br>(mm <sup>-1</sup> )<br>Revolution |            | 送り速度<br>(mm/min)<br>Feed rate       |            | 回転数<br>(mm <sup>-1</sup> )<br>Revolution |            |
|                      | Standard                         | High Speed | Standard                                 | High Speed | Standard                            | High Speed | Standard                                 | High Speed | Standard                            | High Speed | Standard                                 | High Speed |
| 1                    | 650                              | 1660       | 22300                                    | 50000      | 380                                 | 1140       | 17200                                    | 40700      | 270                                 | 800        | 13700                                    | 32100      |
| 1.5                  | 660                              | 1940       | 14900                                    | 37800      | 400                                 | 1190       | 11500                                    | 27200      | 280                                 | 830        | 9100                                     | 21400      |
| 2                    | 660                              | 1940       | 11100                                    | 28300      | 400                                 | 1190       | 8600                                     | 20400      | 280                                 | 830        | 6800                                     | 16100      |
| 2.5                  | 680                              | 2010       | 8900                                     | 22700      | 410                                 | 1230       | 6900                                     | 16300      | 290                                 | 860        | 5500                                     | 12900      |
| 3                    | 680                              | 2010       | 7400                                     | 18900      | 410                                 | 1230       | 5700                                     | 13600      | 290                                 | 860        | 4600                                     | 10700      |
| 3.5                  | 680                              | 2010       | 6400                                     | 16200      | 420                                 | 1290       | 4900                                     | 11600      | 290                                 | 880        | 3900                                     | 9200       |
| 4                    | 700                              | 2070       | 5600                                     | 14200      | 420                                 | 1290       | 4300                                     | 10200      | 290                                 | 880        | 3400                                     | 8000       |
| 4.5                  | 850                              | 2500       | 5000                                     | 12600      | 500                                 | 1400       | 3800                                     | 9100       | 340                                 | 1000       | 3000                                     | 7100       |
| 5                    | 950                              | 2900       | 4500                                     | 11300      | 550                                 | 1600       | 3400                                     | 8100       | 380                                 | 1110       | 2700                                     | 6400       |
| 5.5                  | 1050                             | 3070       | 4100                                     | 10300      | 630                                 | 1750       | 3100                                     | 7400       | 420                                 | 1250       | 2500                                     | 5800       |
| 6                    | 1050                             | 3070       | 3700                                     | 9400       | 630                                 | 1900       | 2900                                     | 6800       | 450                                 | 1340       | 2300                                     | 5400       |
| 8                    | 1050                             | 3120       | 2800                                     | 7100       | 610                                 | 1900       | 2100                                     | 5100       | 430                                 | 1320       | 1700                                     | 4000       |
| 10                   | 1020                             | 3070       | 2200                                     | 5700       | 610                                 | 1870       | 1700                                     | 4100       | 440                                 | 1290       | 1400                                     | 3200       |
| 12                   | 1020                             | 2940       | 1900                                     | 4700       | 590                                 | 1870       | 1400                                     | 3400       | 350                                 | 1260       | 1100                                     | 2700       |
| 14                   | 900                              | 2500       | 1600                                     | 4000       | 530                                 | 1650       | 1200                                     | 2900       | 350                                 | 1080       | 1000                                     | 2300       |
| 16                   | 770                              | 2310       | 1400                                     | 3500       | 480                                 | 1500       | 1100                                     | 2500       | 350                                 | 1080       | 900                                      | 2000       |
| 18                   | 770                              | 2310       | 1200                                     | 3100       | 480                                 | 1500       | 1000                                     | 2300       | 350                                 | 1080       | 800                                      | 1800       |
| 20                   | 710                              | 2210       | 110                                      | 2800       | 450                                 | 1440       | 900                                      | 2000       | 350                                 | 1080       | 700                                      | 1600       |
| 22                   | 710                              | 2210       | 1000                                     | 2600       | 450                                 | 1440       | 800                                      | 1900       | 350                                 | 1080       | 600                                      | 1500       |
| 25                   | 710                              | 2210       | 900                                      | 2300       | 450                                 | 1440       | 700                                      | 1600       | 350                                 | 1080       | 500                                      | 1300       |

スクエア Square

スクエア Square

Radius Radius

ボール Ball

ロングネック Long Neck

ラフニング Roughing

面取り加工用 Chamfering

ドリル Drill

# CX200 4枚刃 スクエアエンドミル

CX200 Series 4-Flute Square End Mill For Plunge Cutting

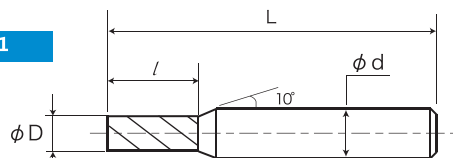
## CX200-ZHEM4



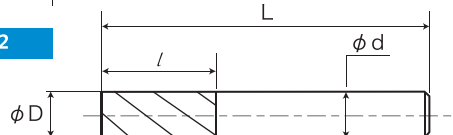
**CX200-ZHEM4010**

Model Flute D

Type 1



Type 2



### 特 性 Features

- CX200-Coating have high oxidation resistance and hardening which exceeds the existing coating and provides long tool life, and suitable for high speed processing and dry milling.
- Combination of Negative radius blade and 45 degree helix blades enables high rigidity and sharpness by high feed speed, with high efficiency
- 4Flute eliminates chattering and suitable for drilling processing
- CKK Original design Chip pocket enables similar or same cutting depth which 2-flutes could realize
- Feed rate can be increased more than double if compared with standard End-Mills



| 外径公差 Tolerance |
|----------------|
| 0              |
| -0.02          |



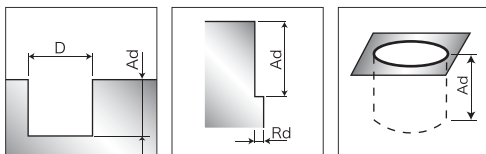
| 炭素鋼<br>Carbon Steel | 合金鋼<br>Alloy Steel | 調質鋼<br>Prehardened Steel | 焼き入れ鋼 Hardened Steel |   |  |  | 鋳鉄<br>Cast Iron | ステンレス鋼<br>Stainless Steels | アルミ合金<br>Aluminium Alloys | 銅合金<br>Copper Alloys | チタン合金<br>耐熱合金<br>Ti/Ni Alloy | グラファイト<br>Graphite | 樹脂<br>Resin |
|---------------------|--------------------|--------------------------|----------------------|---|--|--|-----------------|----------------------------|---------------------------|----------------------|------------------------------|--------------------|-------------|
| ◎                   | ◎                  | ◎                        | ◎                    | ○ |  |  | ○               | ◎                          |                           |                      |                              |                    |             |

◎ = Best ○ = Good

| MODEL 型番       | D 外径 | l 刃長 | L 全長 | d シャンク径 | Type |
|----------------|------|------|------|---------|------|
| CX200-ZHEM4030 | 3    | 8    | 60   | 6       | 1    |
| CX200-ZHEM4040 | 4    | 11   | 60   | 6       | 1    |
| CX200-ZHEM4050 | 5    | 13   | 60   | 6       | 1    |
| CX200-ZHEM4060 | 6    | 13   | 60   | 6       | 2    |
| CX200-ZHEM4080 | 8    | 19   | 75   | 8       | 2    |
| CX200-ZHEM4100 | 10   | 22   | 80   | 10      | 2    |
| CX200-ZHEM4120 | 12   | 26   | 100  | 12      | 2    |

# CX200-ZHEM4

## 推奨切削条件 Standard Milling Condition



- The table shows standard milling guidance of perforating process as written picture.
- Use a rigid and precise machine and tool holder.
- Select a cutting fluid appropriate to the particular usage.
- In case the Revolution could not be increased by the machine used, please reduce feed speed and Revolution at same ratio.
- When mounting End Mills, the run out of the lip will have to be set within 0.01mm.
- In case of milling for stainless steel, please take wet cut milling.

## 溝切削 Slotting

| 被削材<br>Work Material   | 炭素鋼 Carbon Steel<br>S45-S55C  |                                           | 合金鋼 工具鋼 Alloy Steel Tool Steel<br>SKD.SCM |                                           | 調質鋼 プリハードン鋼 Prehardened Steel<br>35-40HRC.HP.M.NAK |                                           |
|------------------------|-------------------------------|-------------------------------------------|-------------------------------------------|-------------------------------------------|----------------------------------------------------|-------------------------------------------|
| 外径<br>(mm)<br>Diameter | 送り速度<br>(mm/min)<br>Feed rate | 回転数<br>(min <sup>-1</sup> )<br>Revolution | 送り速度<br>(mm/min)<br>Feed rate             | 回転数<br>(min <sup>-1</sup> )<br>Revolution | 送り速度<br>(mm/min)<br>Feed rate                      | 回転数<br>(min <sup>-1</sup> )<br>Revolution |
| 3                      | 670                           | 10600                                     | 340                                       | 9000                                      | 310                                                | 8000                                      |
| 4                      | 700                           | 8000                                      | 360                                       | 6800                                      | 320                                                | 6000                                      |
| 5                      | 790                           | 6400                                      | 400                                       | 5400                                      | 360                                                | 4800                                      |
| 6                      | 780                           | 5300                                      | 400                                       | 4500                                      | 360                                                | 4000                                      |
| 8                      | 780                           | 4000                                      | 400                                       | 3400                                      | 360                                                | 3000                                      |
| 10                     | 760                           | 3200                                      | 390                                       | 2700                                      | 350                                                | 2400                                      |
| 12                     | 770                           | 2700                                      | 400                                       | 2300                                      | 350                                                | 2000                                      |

Ad≤0.3D

## 側面切削 Side Milling

| 被削材<br>Work Material | 炭素鋼 Carbon Steel<br>S45-S55C  |            |                                           |            | 合金鋼 工具鋼 Alloy Steel Tool Steel<br>SKD.SCM |            |                                           |            | 調質鋼 プリハードン鋼 Prehardened Steel<br>35-40HRC.HP.M.NAK |            |                                           |            |
|----------------------|-------------------------------|------------|-------------------------------------------|------------|-------------------------------------------|------------|-------------------------------------------|------------|----------------------------------------------------|------------|-------------------------------------------|------------|
|                      | 送り速度<br>(mm/min)<br>Feed rate |            | 回転数<br>(min <sup>-1</sup> )<br>Revolution |            | 送り速度<br>(mm/min)<br>Feed rate             |            | 回転数<br>(min <sup>-1</sup> )<br>Revolution |            | 送り速度<br>(mm/min)<br>Feed rate                      |            | 回転数<br>(min <sup>-1</sup> )<br>Revolution |            |
|                      | Standard                      | High Speed | Standard                                  | High Speed | Standard                                  | High Speed | Standard                                  | High Speed | Standard                                           | High Speed | Standard                                  | High Speed |
| 3                    | 1000                          | 1530       | 10600                                     | 21200      | 640                                       | 980        | 9000                                      | 18000      | 570                                                | 870        | 8000                                      | 15900      |
| 4                    | 1050                          | 1600       | 8000                                      | 15900      | 670                                       | 1030       | 6800                                      | 13500      | 590                                                | 910        | 6000                                      | 11900      |
| 5                    | 1170                          | 1790       | 6400                                      | 12700      | 750                                       | 1150       | 5400                                      | 10800      | 660                                                | 1010       | 4800                                      | 9500       |
| 6                    | 1170                          | 1800       | 5300                                      | 10600      | 750                                       | 1150       | 4500                                      | 9000       | 670                                                | 1020       | 4000                                      | 8000       |
| 8                    | 1160                          | 1790       | 4000                                      | 8000       | 750                                       | 1150       | 3400                                      | 6800       | 660                                                | 1010       | 3000                                      | 6000       |
| 10                   | 1140                          | 1750       | 3200                                      | 6400       | 730                                       | 1120       | 2700                                      | 5400       | 650                                                | 990        | 2400                                      | 4800       |
| 12                   | 1150                          | 1740       | 2700                                      | 5300       | 740                                       | 1120       | 2300                                      | 4500       | 640                                                | 990        | 2000                                      | 4000       |

Ad≤1.5D Rd≤0.1D

Ad≤1.5D Rd≤0.05D

## 突っ込み切削 Perforating

| 被削材<br>Work Material   | 炭素鋼 Carbon Steel<br>S45-S55C  |                                           | 合金鋼 工具鋼 Alloy Steel Tool Steel<br>SKD.SCM |                                           | 調質鋼 プリハードン鋼 Prehardened Steel<br>35-40HRC.HP.M.NAK |                                           |
|------------------------|-------------------------------|-------------------------------------------|-------------------------------------------|-------------------------------------------|----------------------------------------------------|-------------------------------------------|
| 外径<br>(mm)<br>Diameter | 送り速度<br>(mm/min)<br>Feed rate | 回転数<br>(min <sup>-1</sup> )<br>Revolution | 送り速度<br>(mm/min)<br>Feed rate             | 回転数<br>(min <sup>-1</sup> )<br>Revolution | 送り速度<br>(mm/min)<br>Feed rate                      | 回転数<br>(min <sup>-1</sup> )<br>Revolution |
| 3                      | 200                           | 9500                                      | 90                                        | 6000                                      | 100                                                | 6000                                      |
| 4                      | 210                           | 7200                                      | 110                                       | 4500                                      | 110                                                | 4500                                      |
| 5                      | 260                           | 5700                                      | 110                                       | 3600                                      | 120                                                | 3600                                      |
| 6                      | 300                           | 4800                                      | 140                                       | 3000                                      | 130                                                | 3000                                      |
| 8                      | 300                           | 3600                                      | 120                                       | 2300                                      | 100                                                | 2300                                      |
| 10                     | 290                           | 2900                                      | 90                                        | 1800                                      | 80                                                 | 1800                                      |
| 12                     | 260                           | 2400                                      | 80                                        | 1500                                      | 70                                                 | 1500                                      |

Ad≤0.3D

スクエア Square

スクエア Square

ラジアス Radius

ボール Ball

ロングネック Long Neck

ラフニング Roughing

面取り加工用 Chamfering

ドリル Drill

# CX200 不等分割 4 枚刃スクエアエンドミル

CX200 Variable-Lead 4-Flute Square End Mill

## CX200-MEM4



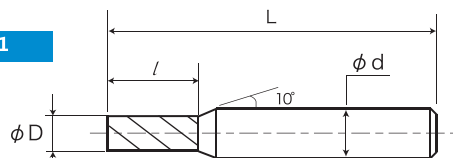
## CX200-MEM4060

Model Flute D

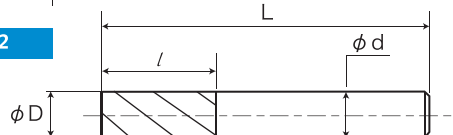
### 特性 Features

- Wide Application available in work material from Steel (HRC45) to SUS, FD/FCD, Ti/Ni Alloy
- Employs CX200 Coating and is applicable for high speed And high feed operations
- Reduce Chattering and provides an excellent machined surface.
- Introducing the highly evolved "Variable-lead" Shape. Suppresses chattering allowing for outstanding milling performance.

Type 1



Type 2



| 外径公差 Tolerance |
|----------------|
| 0              |
| -0.02          |



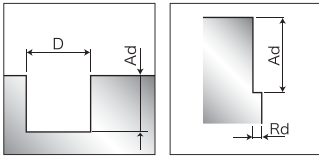
| 炭素鋼<br>Carbon Steel | 合金鋼<br>Alloy Steel | 調質鋼<br>Prehardened Steel | 焼き入れ鋼 Hardened Steel |        |        |        | 鋳鉄<br>Cast Iron | ステンレス鋼<br>Stainless Steels | アルミ合金<br>Aluminium Alloys | 銅合金<br>Copper Alloys | チタン合金<br>耐熱合金<br>Ti/Ni Alloy | グラファイト<br>Graphite | 樹脂<br>Resin |
|---------------------|--------------------|--------------------------|----------------------|--------|--------|--------|-----------------|----------------------------|---------------------------|----------------------|------------------------------|--------------------|-------------|
|                     |                    |                          | ~45HRC               | ~55HRC | ~60HRC | ~65HRC |                 |                            |                           |                      |                              |                    |             |
| ◎                   | ◎                  | ◎                        | ◎                    | ○      |        |        | ○               | ◎                          |                           |                      |                              |                    |             |

◎ = Best ○ = Good

| MODEL 型番      | D 外径 | l 刃長 | L 全長 | d シャンク径 | Type |
|---------------|------|------|------|---------|------|
| CX200-MEM4030 | 3    | 6    | 45   | 6       | 1    |
| CX200-MEM4040 | 4    | 8    | 45   | 6       | 1    |
| CX200-MEM4050 | 5    | 10   | 45   | 6       | 1    |
| CX200-MEM4060 | 6    | 12   | 50   | 6       | 2    |
| CX200-MEM4080 | 8    | 16   | 60   | 8       | 2    |
| CX200-MEM4100 | 10   | 20   | 70   | 10      | 2    |
| CX200-MEM4120 | 12   | 24   | 75   | 12      | 2    |
| CX200-MEM4160 | 16   | 32   | 100  | 16      | 2    |
| CX200-MEM4200 | 20   | 40   | 125  | 20      | 2    |

# CX200-MEM4

## 推奨切削条件 Standard Milling Condition



- The table shows standard milling guidance of perforating process as written picture.
- Use a rigid and precise machine and tool holder.
- Select a cutting fluid appropriate to the particular usage.
- In case the Revolution could not be increased by the machine used, please reduce feed speed and Revolution at same ratio.
- When mounting End Mills, the run out of the lip will have to be set within 0.01mm.
- In case of milling for stainless steel, please take wet cut milling.

## 溝切削 Slotting

| 被削材<br>Work Material   | 炭素鋼、鋳鉄<br>SS, S50C, FC        |                                          | 合金工具鋼 Tool Steel<br>SKD, SCM  |                                          | 調質鋼 (35~40HRC)<br>HPM, NAK    |                                          | ステンレス、調質鋼<br>(40~50HRC) SUS, SKD |                                          | チタン合金、調質鋼<br>(50HRC-) Titan Alloy |                                          | 超耐熱合金鋼<br>インコネル Inconel       |                                          |
|------------------------|-------------------------------|------------------------------------------|-------------------------------|------------------------------------------|-------------------------------|------------------------------------------|----------------------------------|------------------------------------------|-----------------------------------|------------------------------------------|-------------------------------|------------------------------------------|
| 外径<br>(mm)<br>Diameter | 送り速度<br>(mm/min)<br>Feed rate | 回転数<br>(mm <sup>-1</sup> )<br>Revolution | 送り速度<br>(mm/min)<br>Feed rate | 回転数<br>(mm <sup>-1</sup> )<br>Revolution | 送り速度<br>(mm/min)<br>Feed rate | 回転数<br>(mm <sup>-1</sup> )<br>Revolution | 送り速度<br>(mm/min)<br>Feed rate    | 回転数<br>(mm <sup>-1</sup> )<br>Revolution | 送り速度<br>(mm/min)<br>Feed rate     | 回転数<br>(mm <sup>-1</sup> )<br>Revolution | 送り速度<br>(mm/min)<br>Feed rate | 回転数<br>(mm <sup>-1</sup> )<br>Revolution |
| 3                      | 730                           | 10500                                    | 680                           | 8550                                     | 520                           | 7850                                     | 460                              | 7450                                     | 440                               | 7200                                     | 125                           | 2500                                     |
| 4                      | 730                           | 7750                                     | 775                           | 6400                                     | 520                           | 5900                                     | 515                              | 5550                                     | 495                               | 5400                                     | 135                           | 1900                                     |
| 5                      | 735                           | 6200                                     | 755                           | 5100                                     | 545                           | 4700                                     | 545                              | 4450                                     | 535                               | 4300                                     | 145                           | 1500                                     |
| 6                      | 740                           | 5150                                     | 635                           | 4250                                     | 575                           | 3950                                     | 570                              | 3700                                     | 545                               | 3600                                     | 145                           | 1250                                     |
| 8                      | 600                           | 3850                                     | 550                           | 3200                                     | 550                           | 2950                                     | 525                              | 2800                                     | 510                               | 2700                                     | 155                           | 945                                      |
| 10                     | 580                           | 3100                                     | 540                           | 2550                                     | 480                           | 2350                                     | 475                              | 2250                                     | 455                               | 2150                                     | 145                           | 760                                      |
| 12                     | 560                           | 2600                                     | 475                           | 2150                                     | 460                           | 1950                                     | 440                              | 1850                                     | 435                               | 1800                                     | 145                           | 630                                      |
| 16                     | 555                           | 1950                                     | 430                           | 1600                                     | 370                           | 1500                                     | 370                              | 1400                                     | 365                               | 1350                                     | 110                           | 475                                      |
| 20                     | 450                           | 1600                                     | 340                           | 1250                                     | 300                           | 1200                                     | 290                              | 1100                                     | 290                               | 1100                                     | 87                            | 380                                      |
| Ad                     | ≤1D                           |                                          |                               |                                          |                               |                                          | ≤0.5D                            |                                          | ≤0.2D                             |                                          |                               |                                          |

## 側面切削 Side Milling

| 被削材<br>Work Material   | 炭素鋼、鋳鉄<br>SS, S50C, FC        |                                          | 合金工具鋼 Tool Steel<br>SKD, SCM  |                                          | 調質鋼 (35~40HRC)<br>HPM, NAK    |                                          | ステンレス、調質鋼<br>(40~50HRC) SUS, SKD |                                          | チタン合金、調質鋼<br>(50HRC-) Titan Alloy |                                          | 超耐熱合金鋼<br>インコネル Inconel       |                                          |
|------------------------|-------------------------------|------------------------------------------|-------------------------------|------------------------------------------|-------------------------------|------------------------------------------|----------------------------------|------------------------------------------|-----------------------------------|------------------------------------------|-------------------------------|------------------------------------------|
| 外径<br>(mm)<br>Diameter | 送り速度<br>(mm/min)<br>Feed rate | 回転数<br>(mm <sup>-1</sup> )<br>Revolution | 送り速度<br>(mm/min)<br>Feed rate | 回転数<br>(mm <sup>-1</sup> )<br>Revolution | 送り速度<br>(mm/min)<br>Feed rate | 回転数<br>(mm <sup>-1</sup> )<br>Revolution | 送り速度<br>(mm/min)<br>Feed rate    | 回転数<br>(mm <sup>-1</sup> )<br>Revolution | 送り速度<br>(mm/min)<br>Feed rate     | 回転数<br>(mm <sup>-1</sup> )<br>Revolution | 送り速度<br>(mm/min)<br>Feed rate | 回転数<br>(mm <sup>-1</sup> )<br>Revolution |
| 3                      | 1100                          | 12500                                    | 840                           | 9550                                     | 625                           | 8100                                     | 615                              | 7650                                     | 545                               | 7400                                     | 220                           | 3800                                     |
| 4                      | 1200                          | 9750                                     | 985                           | 7550                                     | 680                           | 6400                                     | 710                              | 6050                                     | 630                               | 5850                                     | 240                           | 3000                                     |
| 5                      | 1300                          | 7950                                     | 1050                          | 6150                                     | 725                           | 5250                                     | 775                              | 4950                                     | 670                               | 4800                                     | 245                           | 2450                                     |
| 6                      | 1600                          | 6750                                     | 1200                          | 5250                                     | 890                           | 4450                                     | 835                              | 4200                                     | 695                               | 4050                                     | 250                           | 2100                                     |
| 8                      | 1550                          | 5050                                     | 1100                          | 3950                                     | 815                           | 3350                                     | 810                              | 3150                                     | 675                               | 3050                                     | 225                           | 1600                                     |
| 10                     | 1450                          | 4100                                     | 1050                          | 3200                                     | 725                           | 2700                                     | 715                              | 2550                                     | 635                               | 2405                                     | 215                           | 1250                                     |
| 12                     | 1400                          | 3400                                     | 1000                          | 2650                                     | 720                           | 2250                                     | 675                              | 2100                                     | 605                               | 2050                                     | 210                           | 1050                                     |
| 16                     | 1200                          | 2550                                     | 940                           | 2000                                     | 635                           | 1700                                     | 555                              | 1600                                     | 505                               | 1550                                     | 210                           | 765                                      |
| 20                     | 930                           | 1550                                     | 2080                          | 1600                                     | 500                           | 1350                                     | 440                              | 1250                                     | 410                               | 1250                                     | 170                           | 600                                      |
| Ad                     | ≤1.5D                         |                                          |                               |                                          |                               |                                          | ≤0.1D                            |                                          | ≤0.05D                            |                                          |                               |                                          |
| Rd                     | ≤0.2D                         |                                          |                               |                                          |                               |                                          | ≤0.1D                            |                                          | ≤0.05D                            |                                          |                               |                                          |

スクエア Square

スクエア Square

ラジアス Radius

ボール Ball

ロングネック Long Neck

ラフニング Roughing

面取り加工用 Chamfering

ドリル Drill

## アルミ加工用 3 枚刃スクエアエンドミル DLCコート

DLC 3-Flute Square End Mill for Aluminum

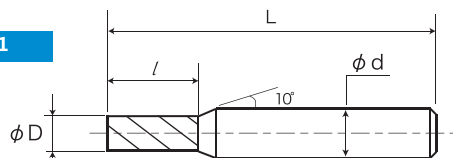
## DLC-HEM3



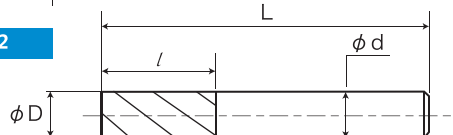
DLC-HEM3010

Model Flute D

Type 1



Type 2



## 特性 Features

- DLC Coating has high abrasion, adhesion and friction resistance.  
Best for aluminum alloy processing
- Best for drilling, Milling of soft material where the adhesion and the chip packing such as aluminum alloy are generated very easily due to the sharp cutting edge
- 3Flute eliminates chatter and suitable for drilling processing
- CKK Original design Chip pocket enables similar or same cutting depth which 2-flutes could realize



| 外径公差 Tolerance |
|----------------|
| 0              |
| -0.02          |

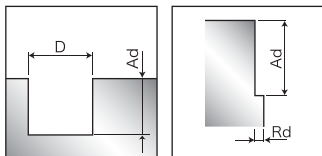


| 炭素鋼<br>Carbon Steel | 合金鋼<br>Alloy Steel | 調質鋼<br>Prehardened Steel | 焼き入れ鋼 Hardened Steel |        |        |        | 鋳鉄<br>Cast Iron | ステンレス鋼<br>Stainless Steels | アルミ合金<br>Aluminium Alloys | 銅合金<br>Copper Alloys | チタン合金<br>耐熱合金<br>Ti/Ni Alloy | グラファイト<br>Graphite | 樹脂<br>Resin |
|---------------------|--------------------|--------------------------|----------------------|--------|--------|--------|-----------------|----------------------------|---------------------------|----------------------|------------------------------|--------------------|-------------|
|                     |                    |                          | ~45HRC               | ~55HRC | ~60HRC | ~65HRC |                 |                            |                           |                      |                              |                    |             |
|                     |                    |                          |                      |        |        |        |                 |                            | ◎                         | ○                    |                              |                    | ○           |

◎ = Best ○ = Good

| MODEL 型番    | D 外径 | l 刃長 | L 全長 | d シャンク径 | Type |
|-------------|------|------|------|---------|------|
| DLC-HEM3010 | 1    | 3    | 40   | 4       | 1    |
| DLC-HEM3015 | 1.5  | 4.5  | 40   | 4       | 1    |
| DLC-HEM3020 | 2    | 6    | 40   | 4       | 1    |
| DLC-HEM3025 | 2.5  | 7.5  | 40   | 4       | 1    |
| DLC-HEM3030 | 3    | 9    | 50   | 6       | 1    |
| DLC-HEM3040 | 4    | 12   | 50   | 6       | 1    |
| DLC-HEM3050 | 5    | 15   | 55   | 6       | 1    |
| DLC-HEM3060 | 6    | 18   | 55   | 6       | 2    |
| DLC-HEM3080 | 8    | 24   | 65   | 8       | 2    |
| DLC-HEM3100 | 10   | 30   | 75   | 10      | 2    |
| DLC-HEM3120 | 12   | 36   | 80   | 12      | 2    |

## 推奨切削条件 Standard Milling Condition



- The table shows standard milling guidance of perforating process as written picture.
- Use a rigid and precise machine and tool holder.
- Select a cutting fluid appropriate to the particular usage.
- In case the revolution could not be increased by the machine used, please reduce feed speed and revolution at same ratio.
- When mounting End Mills, the run out of the lip will have to be set with in 0.01mm.

| 被削材 Work Material | アルミニウム合金 Aluminium Alloy |                   |                                     |
|-------------------|--------------------------|-------------------|-------------------------------------|
|                   | 送り速度 Feed Rate (mm/min)  |                   | 回転数 Revolution (min <sup>-1</sup> ) |
| 外径 (mm) Diameter  | 溝切削 Slotting             | 側面切削 Side Milling |                                     |
| 1                 | 840                      | 1260              | 50000                               |
| 1.5               | 840                      | 1260              | 48850                               |
| 2                 | 840                      | 1260              | 47700                               |
| 2.5               | 967                      | 1455              | 39750                               |
| 3                 | 1095                     | 1650              | 31800                               |
| 4                 | 1095                     | 1650              | 23900                               |
| 5                 | 1095                     | 1650              | 19100                               |
| 6                 | 1095                     | 1650              | 15900                               |
| 8                 | 1095                     | 1650              | 11900                               |
| 10                | 1095                     | 1650              | 9500                                |
| 12                | 1095                     | 1650              | 8000                                |
| 切削深度 Depth of Cut | Ad≤0.2D                  | Ad≤1.5D           | Rd≤0.2D                             |



# アルミ加工用 4枚刃スクエアエンドミル DLCコート

DLC 4-Flute Square End Mill for Aluminum

## DLC-HEM4



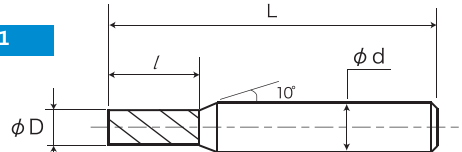
## DLC-HEM4010

Model Flute D

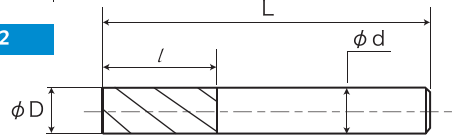
### 特性 Features

- DLC Coating has high abrasion, adhesion and friction resistance. Best for aluminum alloy processing
- Best for drilling, Milling of soft material where the adhesion and the chip packing such as aluminum alloy are generated very easily due to the sharp cutting edge
- 4Flute eliminates chattering and suitable for drilling processing
- CKK Original design Chip pocket enables similar or same cutting depth which 2-flutes could realize

Type 1



Type 2



| 外径公差 Tolerance |
|----------------|
| 0              |
| -0.02          |

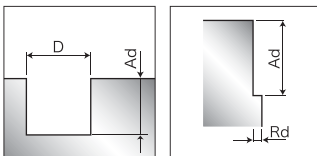


| 炭素鋼<br>Carbon Steel | 合金鋼<br>Alloy Steel | 調質鋼<br>Prehardened Steel | 焼き入れ鋼 Hardened Steel |        |        |        | 鋳鉄<br>Cast Iron | ステンレス鋼<br>Stainless Steels | アルミ合金<br>Aluminium Alloys | 銅合金<br>Copper Alloys | チタン合金<br>耐熱合金<br>Ti/Ni Alloy | グラファイト<br>Graphite | 樹脂<br>Resin |
|---------------------|--------------------|--------------------------|----------------------|--------|--------|--------|-----------------|----------------------------|---------------------------|----------------------|------------------------------|--------------------|-------------|
|                     |                    |                          | ~45HRC               | ~55HRC | ~60HRC | ~65HRC |                 |                            |                           |                      |                              |                    |             |
|                     |                    |                          |                      |        |        |        |                 |                            | ◎                         | ○                    |                              |                    | ○           |

◎ = Best ○ = Good

| MODEL 型番    | D 外径 | l 刃長 | L 全長 | d シャンク径 | Type |
|-------------|------|------|------|---------|------|
| DLC-HEM4010 | 1    | 2.8  | 40   | 4       | 1    |
| DLC-HEM4015 | 1.5  | 4.4  | 40   | 4       | 1    |
| DLC-HEM4020 | 2    | 7    | 40   | 4       | 1    |
| DLC-HEM4025 | 2.5  | 9    | 40   | 4       | 1    |
| DLC-HEM4030 | 3    | 11   | 50   | 6       | 1    |
| DLC-HEM4040 | 4    | 14   | 50   | 6       | 1    |
| DLC-HEM4050 | 5    | 17   | 55   | 6       | 1    |
| DLC-HEM4060 | 6    | 17   | 55   | 6       | 2    |
| DLC-HEM4080 | 8    | 22   | 65   | 8       | 2    |
| DLC-HEM4100 | 10   | 28   | 75   | 10      | 2    |
| DLC-HEM4120 | 12   | 28   | 80   | 12      | 2    |

### 推奨切削条件 Standard Milling Condition



- The table shows standard milling guidance of perforating process as written picture.
- Use a rigid and precise machine and tool holder.
- Select a cutting fluid appropriate to the particular usage.
- In case the revolution could not be increased by the machine used, please reduce feed speed and revolution at same ratio.
- When mounting End Mills, the run out of the lip will have to be set with in 0.01mm.

| 被削材 Work Material | アルミニウム合金 Aluminium Alloy |                   |                                     |         |
|-------------------|--------------------------|-------------------|-------------------------------------|---------|
|                   | 送り速度 Feed Rate (mm/min)  |                   | 回転数 Revolution (min <sup>-1</sup> ) |         |
| 外径 (mm) Diameter  | 溝切削 Slotting             | 側面切削 Side Milling |                                     |         |
| 1                 | 1120                     | 1680              | 50000                               |         |
| 1.5               | 1120                     | 1680              | 48850                               |         |
| 2                 | 1120                     | 1680              | 47700                               |         |
| 2.5               | 1290                     | 1940              | 39700                               |         |
| 3                 | 1460                     | 2200              | 31800                               |         |
| 4                 | 1460                     | 2200              | 23900                               |         |
| 5                 | 1460                     | 2200              | 19100                               |         |
| 6                 | 1460                     | 2200              | 15900                               |         |
| 8                 | 1460                     | 2200              | 11900                               |         |
| 10                | 1460                     | 2200              | 9500                                |         |
| 12                | 1460                     | 2200              | 8000                                |         |
| 切削深度 Depth of Cut | 外径 (mm) Diameter         | Ad                |                                     |         |
|                   | ≤3                       | ≤0.5D             | Ad≤1.5D                             | Rd≤0.2D |
|                   | >3                       | ≤1.0D             |                                     |         |

# アルミ加工用 2 枚刃スクエアエンドミル

2-Flute Square End Mill for Aluminum

## ALHEM2



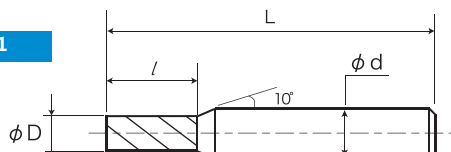
## ALHEM2010

Model Flute D

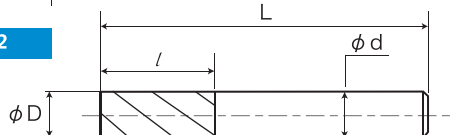
### 特性 Features

●Wide Application available in AC/ADC

Type 1



Type 2



| 外径公差 Tolerance |
|----------------|
| 0              |
| -0.02          |

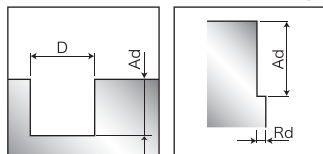


| 炭素鋼<br>Carbon<br>Steel | 合金鋼<br>Alloy Steel | 調質鋼<br>Prehardened<br>Steel | 焼き入れ鋼 Hardened Steel |        |        |        | 鋳鉄<br>Cast Iron | ステンレス鋼<br>Stainless<br>Steels | アルミ合金<br>Aluminium<br>Alloys | 銅合金<br>Copper<br>Alloys | チタン合金<br>耐熱合金<br>Ti/Ni Alloy | グラファイト<br>Graphite | 樹脂<br>Resin |
|------------------------|--------------------|-----------------------------|----------------------|--------|--------|--------|-----------------|-------------------------------|------------------------------|-------------------------|------------------------------|--------------------|-------------|
|                        |                    |                             | ~45HRC               | ~55HRC | ~60HRC | ~65HRC |                 |                               |                              |                         |                              |                    |             |
|                        |                    |                             |                      |        |        |        |                 |                               | ◎                            | ○                       |                              | ○                  | ○           |

◎ = Best ○ = Good

| MODEL 型番  | D 外径 | l 刃長 | L 全長 | d シャンク径 | Type |
|-----------|------|------|------|---------|------|
| ALHEM2010 | 1    | 3    | 40   | 4       | 1    |
| ALHEM2020 | 2    | 6    | 40   | 4       | 1    |
| ALHEM2030 | 3    | 9    | 50   | 6       | 1    |
| ALHEM2040 | 4    | 12   | 50   | 6       | 1    |
| ALHEM2050 | 5    | 15   | 55   | 6       | 1    |
| ALHEM2060 | 6    | 18   | 55   | 6       | 2    |
| ALHEM2080 | 8    | 24   | 65   | 8       | 2    |
| ALHEM2100 | 10   | 30   | 75   | 10      | 2    |
| ALHEM2120 | 12   | 36   | 80   | 12      | 2    |
| ALHEM2160 | 16   | 48   | 110  | 16      | 2    |

### 推奨切削条件 Standard Milling Condition



- The table shows standard milling guidance of perforating process as written picture.
- Use a rigid and precise machine and tool holder.
- Select a cutting fluid appropriate to the particular usage.
- In case the revolution could not be increased by the machine used, please reduce feed speed and revolution at same ratio.
- When mounting End Mills, the run out of the lip will have to be set with in 0.01mm.

| 被削材 Work Material   | アルミニウム合金 Aluminium Alloy |                   |                                     |
|---------------------|--------------------------|-------------------|-------------------------------------|
|                     | 送り速度 Feed Rate (mm/min)  |                   | 回転数 Revolution (min <sup>-1</sup> ) |
| 外径 (mm)<br>Diameter | 溝切削 Slotting             | 側面切削 Side Milling |                                     |
| 1                   | 270                      | 400               | 50000                               |
| 2                   | 270                      | 400               | 31800                               |
| 3                   | 270                      | 400               | 21200                               |
| 4                   | 330                      | 500               | 15900                               |
| 5                   | 330                      | 500               | 12700                               |
| 6                   | 330                      | 500               | 10600                               |
| 8                   | 400                      | 600               | 8000                                |
| 10                  | 400                      | 600               | 6400                                |
| 12                  | 470                      | 700               | 5300                                |
| 16                  | 470                      | 700               | 3930                                |
| 切削深度 Depth of Cut   | Ad≤0.2D                  | Ad≤1.5D           | Rd≤0.2D                             |

# アルミ加工用 3 枚刃スクエアエンドミル

3-Flute Square End Mill for Aluminum

## ALHEM3



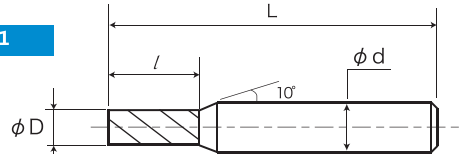
## ALHEM3010

Model Flute D

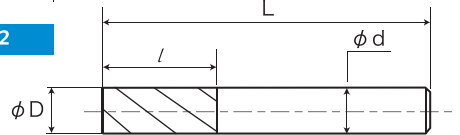
### 特性 Features

- Wide Application available in AC/ADC
- 3Flute eliminates chattering and suitable for drilling processing

Type 1



Type 2



MG  
超微粒



45°



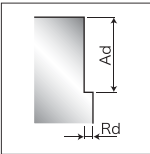
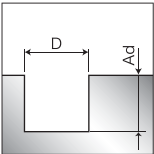
| 外径公差 Tolerance |
|----------------|
| 0              |
| -0.02          |

| 炭素鋼<br>Carbon Steel | 合金鋼<br>Alloy Steel | 調質鋼<br>Prehardened Steel | 焼き入れ鋼 Hardened Steel |        |        |        | 鋳鉄<br>Cast Iron | ステンレス鋼<br>Stainless Steels | アルミ合金<br>Aluminium Alloys | 銅合金<br>Copper Alloys | チタン合金<br>耐熱合金<br>Ti/Ni Alloy | グラファイト<br>Graphite | 樹脂<br>Resin |
|---------------------|--------------------|--------------------------|----------------------|--------|--------|--------|-----------------|----------------------------|---------------------------|----------------------|------------------------------|--------------------|-------------|
|                     |                    |                          | ~45HRC               | ~55HRC | ~60HRC | ~65HRC |                 |                            | ◎                         | ○                    |                              | ○                  | ○           |

◎ = Best ○ = Good

| MODEL 型番  | D 外径 | l 刃長 | L 全長 | d シャンク径 | Type |
|-----------|------|------|------|---------|------|
| ALHEM3010 | 1    | 3    | 40   | 4       | 1    |
| ALHEM3020 | 2    | 6    | 40   | 4       | 1    |
| ALHEM3030 | 3    | 9    | 50   | 6       | 1    |
| ALHEM3040 | 4    | 12   | 50   | 6       | 1    |
| ALHEM3050 | 5    | 15   | 55   | 6       | 1    |
| ALHEM3060 | 6    | 18   | 55   | 6       | 2    |
| ALHEM3080 | 8    | 24   | 65   | 8       | 2    |
| ALHEM3100 | 10   | 30   | 75   | 10      | 2    |
| ALHEM3120 | 12   | 36   | 80   | 12      | 2    |
| ALHEM3160 | 16   | 48   | 110  | 16      | 2    |

### 推奨切削条件 Standard Milling Condition



- The table shows standard milling guidance of perforating process as written picture.
- Use a rigid and precise machine and tool holder.
- Select a cutting fluid appropriate to the particular usage.
- In case the revolution could not be increased by the machine used, please reduce feed speed and revolution at same ratio.
- When mounting End Mills, the run out of the lip will have to be set with in 0.01mm.

| 被削材 Work Material<br>外径 (mm)<br>Diameter | アルミニウム合金 Aluminium Alloy |                    |                                     |
|------------------------------------------|--------------------------|--------------------|-------------------------------------|
|                                          | 送り速度 Feed Rate (mm/min)  |                    | 回転数 Revolution (min <sup>-1</sup> ) |
|                                          | 溝切削 Slotting             | 側面切削 Side Milling  |                                     |
| 1                                        | 405                      | 600                | 50000                               |
| 2                                        | 405                      | 600                | 31800                               |
| 3                                        | 405                      | 600                | 21200                               |
| 4                                        | 495                      | 750                | 15900                               |
| 5                                        | 495                      | 750                | 12700                               |
| 6                                        | 495                      | 750                | 10600                               |
| 8                                        | 600                      | 900                | 8000                                |
| 10                                       | 600                      | 900                | 6400                                |
| 12                                       | 705                      | 1050               | 5300                                |
| 16                                       | 705                      | 1050               | 3930                                |
| 側面切削 Depth of Cut                        | Ad≤0.2D                  | Ad≤1.5D<br>Rd≤0.2D |                                     |

スクエア Square

スクエア Square

ラジアス Radius

ボール Ball

ロングネック Long Neck

ラフィング Roughing

面取り加工用 Chamfering

ドリル Drill

## CX400 チタン加工用 4 枚刃スクエアエンドミル

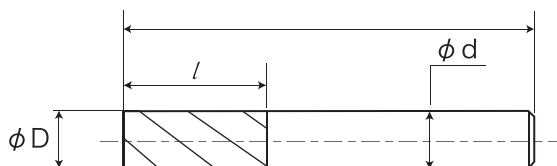
CX400 Series 4-Flute Square End Mill for Titanium Alloy

## CX400-TEM4



CX400-TEM4060

Model Flute D



## 特性 Features

- CX400-Coating have high oxidation resistance and hardening which exceeds the existing coating and provides long tool life, and suitable for high speed processing and dry milling.
- 45 Degree Helix Baled Achieves high-feed operation
- The Fine pitch nick achieves high accurate surface roughness after processing



| 外径公差 Tolerance |
|----------------|
| +0.06          |
| -0.06          |



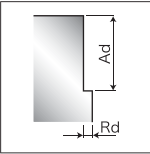
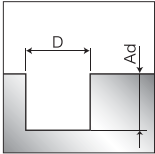
| 炭素鋼<br>Carbon Steel | 合金鋼<br>Alloy Steel | 調質鋼<br>Prehardened Steel | 焼き入れ鋼 Hardened Steel |   |  |  | 鋳鉄<br>Cast Iron | ステンレス鋼<br>Stainless Steels | アルミ合金<br>Aluminium Alloys | 銅合金<br>Copper Alloys | チタン合金<br>耐熱合金<br>Ti/Ni Alloy | グラファイト<br>Graphite | 樹脂<br>Resin |
|---------------------|--------------------|--------------------------|----------------------|---|--|--|-----------------|----------------------------|---------------------------|----------------------|------------------------------|--------------------|-------------|
| ~45HRC              | ~55HRC             | ~60HRC                   | ~65HRC               |   |  |  |                 |                            |                           |                      |                              |                    |             |
| ◎                   | ◎                  | ◎                        | ◎                    | ◎ |  |  | ○               | ◎                          |                           |                      | ◎                            |                    |             |

◎ = Best ○ = Good

| MODEL 型番      | D 外径 | l 刃長 | L 全長 | d シャンク径 |
|---------------|------|------|------|---------|
| CX400-TEM4060 | 6    | 14   | 60   | 6       |
| CX400-TEM4080 | 8    | 18   | 75   | 8       |
| CX400-TEM4100 | 10   | 22   | 90   | 10      |
| CX400-TEM4120 | 12   | 26   | 100  | 12      |
| CX400-TEM4160 | 16   | 34   | 110  | 16      |
| CX400-TEM4200 | 20   | 42   | 120  | 20      |

## CX200-TEM4

## 推奨切削条件 Standard Milling Condition



- The table shows standard milling guidance of perforating process as written picture.
- Use a rigid and precise machine and tool holder.
- Select a cutting fluid appropriate to the particular usage.
- In case the Revolution could not be increased by the machine used, please reduce feed speed and Revolution at same ratio.
- When mounting End Mills, the run out of the lip will have to be set with in 0.01mm.

## 溝切削 Slotting

| 被削材<br>Work Material   | チタン合金・ステンレス<br>Titan Alloy・Stainless |                                           | 炭素鋼 Carbon Steel<br>(S45C~S55C) |                                           | 合金鋼 工具鋼 Alloy Steel Tool Steel<br>(SKD.SCM) |                                           | 調質鋼 (35~40HRC)<br>(HPM.NAK)   |                                           |
|------------------------|--------------------------------------|-------------------------------------------|---------------------------------|-------------------------------------------|---------------------------------------------|-------------------------------------------|-------------------------------|-------------------------------------------|
| 外径<br>(mm)<br>Diameter | 送り速度<br>(mm/min)<br>Feed rate        | 回転数<br>(min <sup>-1</sup> )<br>Revolution | 送り速度<br>(mm/min)<br>Feed rate   | 回転数<br>(min <sup>-1</sup> )<br>Revolution | 送り速度<br>(mm/min)<br>Feed rate               | 回転数<br>(min <sup>-1</sup> )<br>Revolution | 送り速度<br>(mm/min)<br>Feed rate | 回転数<br>(min <sup>-1</sup> )<br>Revolution |
| 6                      | 80                                   | 2700                                      | 140                             | 4200                                      | 120                                         | 3700                                      | 90                            | 2900                                      |
| 8                      | 160                                  | 2000                                      | 250                             | 3200                                      | 220                                         | 2800                                      | 180                           | 2200                                      |
| 10                     | 150                                  | 1600                                      | 240                             | 2500                                      | 210                                         | 2200                                      | 170                           | 1800                                      |
| 12                     | 130                                  | 1300                                      | 200                             | 2100                                      | 180                                         | 1900                                      | 140                           | 11500                                     |
| 16                     | 130                                  | 1000                                      | 200                             | 1600                                      | 180                                         | 1400                                      | 140                           | 1100                                      |
| 20                     | 120                                  | 800                                       | 180                             | 1300                                      | 160                                         | 1100                                      | 130                           | 900                                       |
| Ad                     | ≤0.2D                                |                                           | ≤0.5D                           |                                           | ≤0.3D                                       |                                           |                               |                                           |

## 側面切削 Side Milling

| 被削材<br>Work Material   | チタン合金・ステンレス<br>Titan Alloy・Stainless |                                           | 炭素鋼 Carbon Steel<br>(S45C~S55C) |                                           | 合金鋼 工具鋼 Alloy Steel Tool Steel<br>(SKD.SCM) |                                           | 調質鋼 (35~40HRC)<br>(HPM.NAK)   |                                           |
|------------------------|--------------------------------------|-------------------------------------------|---------------------------------|-------------------------------------------|---------------------------------------------|-------------------------------------------|-------------------------------|-------------------------------------------|
| 外径<br>(mm)<br>Diameter | 送り速度<br>(mm/min)<br>Feed rate        | 回転数<br>(min <sup>-1</sup> )<br>Revolution | 送り速度<br>(mm/min)<br>Feed rate   | 回転数<br>(min <sup>-1</sup> )<br>Revolution | 送り速度<br>(mm/min)<br>Feed rate               | 回転数<br>(min <sup>-1</sup> )<br>Revolution | 送り速度<br>(mm/min)<br>Feed rate | 回転数<br>(min <sup>-1</sup> )<br>Revolution |
| 6                      | 130                                  | 3200                                      | 190                             | 4800                                      | 170                                         | 4200                                      | 140                           | 3400                                      |
| 8                      | 240                                  | 2400                                      | 360                             | 3600                                      | 320                                         | 3200                                      | 260                           | 2600                                      |
| 10                     | 230                                  | 1900                                      | 340                             | 2900                                      | 310                                         | 2500                                      | 250                           | 2100                                      |
| 12                     | 190                                  | 1600                                      | 290                             | 2400                                      | 250                                         | 2100                                      | 210                           | 1700                                      |
| 16                     | 190                                  | 1200                                      | 290                             | 1800                                      | 250                                         | 1600                                      | 210                           | 1300                                      |
| 20                     | 170                                  | 1000                                      | 260                             | 1400                                      | 230                                         | 1300                                      | 190                           | 1000                                      |
| Ad                     | ≤1.0D                                |                                           | ≤1.5D                           |                                           | ≤1.0D                                       |                                           |                               |                                           |
| Rd                     | ≤0.2D                                |                                           | ≤0.5D                           |                                           | ≤0.3D                                       |                                           |                               |                                           |

スクエア Square

スクエア Square

ラジアス Radius

ボール Ball

ロングネック Long Neck

ラフニング Roughing

面取り加工用 Chamfering

ドリル Drill

## CX500 3 枚刃高硬度用ラジアスエンドミル

CX500 Series 3-Flute Radius End Mill for Hard Material

## CX500-HFR3



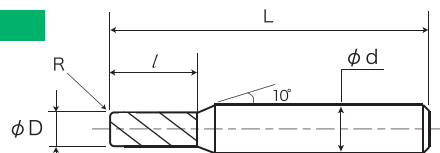
CX500-HFR3100

Model Flute D

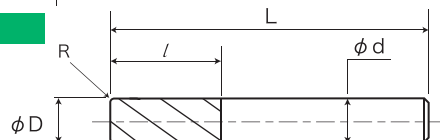
## | 特 性 Features

- CX500-Coating is new epoch-making coating developed for super-long tool life, High-speed processing and dry cutting due to the high acid resistance and hardening if compared with other conventional and popular coating which is existing in the market.
- Combination of negative radius blade and 45 degree helix blades enables high rigidity and sharpness by high feed speed, with high efficiency
- 3Flute eliminates chattering and suitable for drilling processing
- Universal applications for engraving, side milling, radius milling, rough milling and semi-finishing.

Type 1



Type 2

MG  
超微粒

45°



Radius

CX500  
Coat

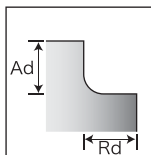
| 外径公差 Tolerance |
|----------------|
| 0              |
| -0.02          |

| 炭素鋼<br>Carbon Steel | 合金鋼<br>Alloy Steel | 調質鋼<br>Prehardened Steel | 焼入れ鋼 Hardened Steel |   |   |   | 鋳鉄<br>Cast Iron | ステンレス鋼<br>Stainless Steels | アルミ合金<br>Aluminium Alloys | 銅合金<br>Copper Alloys | チタン合金<br>耐熱合金<br>Ti/Ni Alloy | グラファイト<br>Graphite | 樹脂<br>Resin |
|---------------------|--------------------|--------------------------|---------------------|---|---|---|-----------------|----------------------------|---------------------------|----------------------|------------------------------|--------------------|-------------|
| ◎                   | ◎                  | ◎                        | ◎                   | ◎ | ◎ | ◎ | ◎               | ○                          |                           |                      |                              |                    |             |

◎ = Best ○ = Good

| MODEL 型番      | D 外径 | R   | l 刃長 | L 全長 | d シャンク径 | Type |
|---------------|------|-----|------|------|---------|------|
| CX500-HFR3020 | 2    | 0.5 | 4    | 50   | 4       | 1    |
| CX500-HFR3030 | 3    | 0.8 | 6    | 50   | 4       | 1    |
| CX500-HFR3040 | 4    | 1   | 8    | 50   | 6       | 1    |
| CX500-HFR3050 | 5    | 1.2 | 10   | 70   | 6       | 1    |
| CX500-HFR3060 | 6    | 1.5 | 12   | 70   | 6       | 2    |
| CX500-HFR3080 | 8    | 2   | 16   | 80   | 8       | 2    |
| CX500-HFR3100 | 10   | 2   | 20   | 90   | 10      | 2    |
| CX500-HFR3120 | 12   | 2   | 24   | 100  | 12      | 2    |

## 推奨切削条件 Standard Milling Condition



- The table show standard milling guidance of perforating process as written picture
- Use a rigid and precise machine and tool holder
- Select a cutting fluid appropriate to the particular usage
- In case the revolution could not be increased by the machine used, Please reduce feed speed and revolution speed at same ration
- When mounting End Mills, The run out of the till will have to be set within 0.01mm

| 被削材<br>Work Material   |            | 炭素鋼 carbon steel<br>(40~55HRC) |          |                                          |          | 合金工具鋼 tool steel<br>(SKD.SUS.SCM) |          |                                          |          | 調質鋼 (35~40HRC)<br>(HPM.NAK)   |          |                                          |          | 高硬度鋼 hardened steel<br>(40~60HRC) |          |                                          |       |
|------------------------|------------|--------------------------------|----------|------------------------------------------|----------|-----------------------------------|----------|------------------------------------------|----------|-------------------------------|----------|------------------------------------------|----------|-----------------------------------|----------|------------------------------------------|-------|
| 外径<br>(mm)<br>Diameter |            | 送り速度<br>(mm/min)<br>Feed rate  |          | 回転数<br>(mm <sup>-1</sup> )<br>Revolution |          | 送り速度<br>(mm/min)<br>Feed rate     |          | 回転数<br>(mm <sup>-1</sup> )<br>Revolution |          | 送り速度<br>(mm/min)<br>Feed rate |          | 回転数<br>(mm <sup>-1</sup> )<br>Revolution |          | 送り速度<br>(mm/min)<br>Feed rate     |          | 回転数<br>(mm <sup>-1</sup> )<br>Revolution |       |
|                        | Standard   | High Speed                     | Standard | High Speed                               | Standard | High Speed                        | Standard | High Speed                               | Standard | High Speed                    | Standard | High Speed                               | Standard | High Speed                        | Standard | High Speed                               |       |
| 2xR0.5                 |            | 3795                           | 6300     | 11500                                    | 19100    | 3210                              | 5160     | 10700                                    | 17200    | 2280                          | 3697     | 9500                                     | 15400    | 525                               | 1200     | 4800                                     | 10400 |
| 3xR0.8                 |            | 4335                           | 7238     | 7600                                     | 12700    | 3622                              | 5865     | 7100                                     | 11500    | 2685                          | 4327     | 6400                                     | 10300    | 600                               | 1350     | 3200                                     | 6900  |
| 4xR1.0                 |            | 4620                           | 7695     | 5700                                     | 9500     | 3817                              | 6195     | 5300                                     | 8600     | 2737                          | 4387     | 4800                                     | 7700     | 675                               | 1425     | 2400                                     | 5200  |
| 5xR1.2                 |            | 4552                           | 7523     | 4600                                     | 7600     | 3870                              | 6210     | 4300                                     | 6900     | 2737                          | 4462     | 3800                                     | 6200     | 675                               | 1425     | 1900                                     | 4100  |
| 6xR1.2                 |            | 4785                           | 8063     | 3800                                     | 6400     | 4102                              | 6495     | 3600                                     | 5700     | 2880                          | 4590     | 3200                                     | 5100     | 675                               | 1500     | 1600                                     | 3500  |
| 8xR2.0                 |            | 4875                           | 8063     | 2900                                     | 4800     | 4132                              | 6577     | 2700                                     | 4300     | 2880                          | 4680     | 2400                                     | 3900     | 675                               | 1500     | 1200                                     | 2600  |
| 10xR2.0                |            | 4830                           | 7980     | 2300                                     | 3800     | 4035                              | 6525     | 2100                                     | 3400     | 2850                          | 4650     | 1900                                     | 3100     | 750                               | 1500     | 1000                                     | 2100  |
| 12xR2.0                |            | 4560                           | 7680     | 1900                                     | 3200     | 3945                              | 6352     | 1800                                     | 2900     | 2737                          | 4447     | 1600                                     | 2600     | 675                               | 1425     | 800                                      | 1700  |
| 16xR3.0                |            | 3780                           | 6480     | 1400                                     | 2400     | 3195                              | 5167     | 1300                                     | 2100     | 2302                          | 3645     | 1200                                     | 1900     | 525                               | 1200     | 600                                      | 1300  |
| 20xR3.0                |            | 3000                           | 5190     | 1100                                     | 1900     | 2737                              | 4230     | 1100                                     | 1700     | 1950                          | 2925     | 1000                                     | 1500     | 450                               | 900      | 500                                      | 1000  |
| Ad                     | Standard   | ≤0.08D                         |          |                                          |          |                                   |          |                                          |          |                               |          |                                          |          | ≤0.04D                            |          |                                          |       |
|                        | High Speed | ≤0.06D                         |          |                                          |          |                                   |          |                                          |          |                               |          |                                          |          | ≤0.02D                            |          |                                          |       |
| Rd                     |            | ≤0.2D                          |          |                                          |          |                                   |          |                                          |          |                               |          |                                          |          |                                   |          |                                          |       |



# CX500 4 枚刃高硬度用ラジラスエンドミル

CX500 Series 3-Flute Radius End Mill for Hard Material

## CX500-HFR4



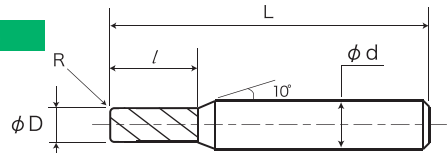
## CX500-HFR4100

Model Flute D

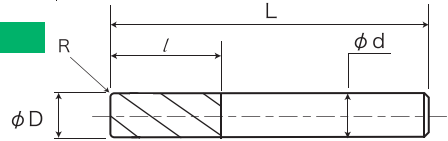
### 特性 Features

- CX500-Coating is new epoch-making coating developed for super-long tool life, High-speed processing and dry cutting due to the high acid resistance and hardening if compared with other conventional and popular coating which is existing in the market.
- Combination of negative radius blade and 45 degree helix blades enables high rigidity and sharpness by high feed speed, with high efficiency
- 3Flute eliminates chattering and suitable for drilling processing
- Universal applications for engraving, side milling, radius milling, rough milling and semi-finishing.

Type 1



Type 2



MG  
超微粒



45°



Radius



CX500  
Coat

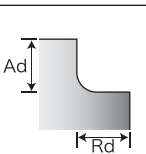
| 外径公差 Tolerance |
|----------------|
| 0              |
| -0.02          |

| 炭素鋼<br>Carbon Steel | 合金鋼<br>Alloy Steel | 調質鋼<br>Prehardened Steel | 焼き入れ鋼 Hardened Steel |   |   |   | 鋳鉄<br>Cast Iron | ステンレス鋼<br>Stainless Steels | アルミ合金<br>Aluminium Alloys | 銅合金<br>Copper Alloys | チタン合金<br>耐熱合金<br>Ti/Ni Alloy | グラファイト<br>Graphite | 樹脂<br>Resin |
|---------------------|--------------------|--------------------------|----------------------|---|---|---|-----------------|----------------------------|---------------------------|----------------------|------------------------------|--------------------|-------------|
| ~45HRC              | ~55HRC             | ~60HRC                   | ~65HRC               |   |   |   |                 |                            |                           |                      |                              |                    |             |
| ◎                   | ◎                  | ◎                        | ◎                    | ◎ | ◎ | ◎ | ◎               | ◎                          | ◎                         | ◎                    | ◎                            | ◎                  | ◎           |

◎ = Best ○ = Good

| MODEL 型番        | D 外径 | R   | l 刃長 | L 全長 | d シャンク径 | Type |
|-----------------|------|-----|------|------|---------|------|
| CX500-HFR4020   | 2    | 0.5 | 4    | 50   | 4       | 1    |
| CX500-HFR4020-6 | 2    | 0.5 | 4    | 50   | 6       | 1    |
| CX500-HFR4030   | 3    | 0.8 | 6    | 50   | 4       | 1    |
| CX500-HFR4030-6 | 3    | 0.8 | 6    | 50   | 6       | 1    |
| CX500-HFR4040   | 4    | 1   | 8    | 50   | 6       | 1    |
| CX500-HFR4050   | 5    | 1.2 | 10   | 70   | 6       | 1    |
| CX500-HFR4060   | 6    | 1.5 | 12   | 70   | 6       | 2    |
| CX500-HFR4080   | 8    | 2   | 16   | 80   | 8       | 2    |
| CX500-HFR4100   | 10   | 2   | 20   | 90   | 10      | 2    |
| CX500-HFR4120   | 12   | 2   | 24   | 100  | 12      | 2    |
| CX500-HFR4160   | 16   | 3   | 32   | 120  | 16      | 2    |
| CX500-HFR4200   | 20   | 3   | 40   | 130  | 20      | 2    |

### 推奨切削条件 Standard Milling Condition



- The table show standard milling guidance of perforating process as written picture
- Use a rigid and precise machine and tool holder
- Select a cutting fluid appropriate to the particular usage
- In case the Rotation could not be increased by the machine used, Please reduce feed speed and Rotation speed at same ration
- When mounting End Mills, The run out of the till will have to be set within 0.01mm

| 被削材<br>Work Material   |                               | 炭素鋼 carbon steel<br>(40~55HRC) |                                        |            |                               | 合金工具鋼 tool steel<br>(SKD.SUS.SCM) |                                        |            |                               | 調質鋼 (35~40HRC)<br>(HPM.NAK) |                                        |            |                               | 高硬度鋼 hardened steel<br>(40~60HRC) |                                        |            |  |
|------------------------|-------------------------------|--------------------------------|----------------------------------------|------------|-------------------------------|-----------------------------------|----------------------------------------|------------|-------------------------------|-----------------------------|----------------------------------------|------------|-------------------------------|-----------------------------------|----------------------------------------|------------|--|
| 外径<br>(mm)<br>Diameter | 送り速度<br>(mm/min)<br>Feed rate |                                | 回転数<br>(mm <sup>-1</sup> )<br>Rotation |            | 送り速度<br>(mm/min)<br>Feed rate |                                   | 回転数<br>(mm <sup>-1</sup> )<br>Rotation |            | 送り速度<br>(mm/min)<br>Feed rate |                             | 回転数<br>(mm <sup>-1</sup> )<br>Rotation |            | 送り速度<br>(mm/min)<br>Feed rate |                                   | 回転数<br>(mm <sup>-1</sup> )<br>Rotation |            |  |
|                        | Standard                      | High Speed                     | Standard                               | High Speed | Standard                      | High Speed                        | Standard                               | High Speed | Standard                      | High Speed                  | Standard                               | High Speed | Standard                      | High Speed                        | Standard                               | High Speed |  |
| 2xR0.5                 | 5060                          | 8400                           | 11500                                  | 19100      | 4280                          | 6880                              | 10700                                  | 17200      | 3040                          | 4930                        | 9500                                   | 15400      | 700                           | 1600                              | 4800                                   | 10400      |  |
| 3xR0.8                 | 5780                          | 9650                           | 7600                                   | 12700      | 4830                          | 7820                              | 7100                                   | 11500      | 3580                          | 5770                        | 6400                                   | 10300      | 800                           | 1800                              | 3200                                   | 6900       |  |
| 4xR1.0                 | 6160                          | 10260                          | 5700                                   | 9500       | 5090                          | 8260                              | 5300                                   | 8600       | 3650                          | 5850                        | 4800                                   | 7700       | 900                           | 1900                              | 2400                                   | 5200       |  |
| 5xR1.2                 | 6070                          | 10030                          | 4600                                   | 7600       | 5160                          | 8260                              | 4300                                   | 6900       | 3650                          | 5950                        | 3800                                   | 6200       | 900                           | 1900                              | 1900                                   | 4100       |  |
| 6xR1.2                 | 6380                          | 10750                          | 3800                                   | 6400       | 5470                          | 8660                              | 3600                                   | 5700       | 3840                          | 6120                        | 3200                                   | 5100       | 900                           | 2000                              | 1600                                   | 3500       |  |
| 8xR2.0                 | 6500                          | 10750                          | 2900                                   | 4800       | 5510                          | 8770                              | 2700                                   | 4300       | 3840                          | 6240                        | 2400                                   | 3900       | 900                           | 2000                              | 1200                                   | 2600       |  |
| 10xR2.0                | 6440                          | 10640                          | 2300                                   | 3800       | 5380                          | 8700                              | 2100                                   | 3400       | 3800                          | 6200                        | 1900                                   | 3100       | 1000                          | 2000                              | 1000                                   | 2100       |  |
| 12xR2.0                | 6080                          | 10240                          | 1900                                   | 3200       | 5260                          | 8470                              | 1800                                   | 2900       | 3650                          | 5930                        | 1600                                   | 2600       | 900                           | 1900                              | 800                                    | 1700       |  |
| 16xR3.0                | 5040                          | 8640                           | 1400                                   | 2400       | 4260                          | 6890                              | 1300                                   | 2100       | 3070                          | 4860                        | 1200                                   | 1900       | 700                           | 1600                              | 600                                    | 1300       |  |
| 20xR3.0                | 4000                          | 6920                           | 1100                                   | 1900       | 3650                          | 5640                              | 1100                                   | 1700       | 2600                          | 3900                        | 1000                                   | 1500       | 600                           | 1200                              | 500                                    | 1000       |  |
| Ad                     | Standard                      | ≤0.08D                         |                                        |            |                               |                                   |                                        |            |                               |                             |                                        |            |                               | ≤0.04D                            |                                        |            |  |
|                        | High Speed                    | ≤0.06D                         |                                        |            |                               |                                   |                                        |            |                               |                             |                                        |            |                               | ≤0.02D                            |                                        |            |  |
| Rd                     | ≤0.2D                         |                                |                                        |            |                               |                                   |                                        |            |                               |                             |                                        |            |                               |                                   |                                        |            |  |

## CX200 4枚刃側面刃無しラジラスエンドミル

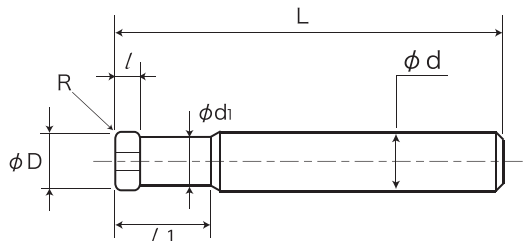
CX200 Series 4-Flute No peripheral cutting edge Radius End Mill for high feed

## CX200-SEM



CX200-SEM4100

Model Flute D



## | 特 性 Features

- CX200-Coating have high oxidation resistance and hardening which exceeds the existing coating and provides long tool life, and suitable for high speed processing and dry milling.
- Negative designed radius flutes and short blade length realize high rigidity and minimize chattering in the pocket corner processing
- Back taper provide fine processing which peripheral blade does not touch with side of work piece
- shorten the processing time from medium finishing to final finishing in the bottom processing



| 外径公差 Tolerance |
|----------------|
| 0              |
| -0.02          |

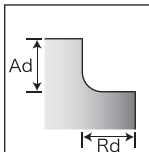


| 炭素鋼<br>Carbon Steel | 合金鋼<br>Alloy Steel | 調質鋼<br>Prehardened Steel | 焼き入れ鋼 Hardened Steel |   |   |   | 鋳鉄<br>Cast Iron | ステンレス鋼<br>Stainless Steels | アルミ合金<br>Aluminium Alloys | 銅合金<br>Copper Alloys | チタン合金<br>耐熱合金<br>Ti/Ni Alloy | グラファイト<br>Graphite | 樹脂<br>Resin |
|---------------------|--------------------|--------------------------|----------------------|---|---|---|-----------------|----------------------------|---------------------------|----------------------|------------------------------|--------------------|-------------|
| ◎                   | ◎                  | ◎                        | ◎                    | ○ | ◎ | ◎ | ◎               | ○                          |                           |                      |                              |                    |             |

◎ = Best ○ = Good

| MODEL 型番      | D 外径 | R    | / 刃長 | d 1 | / 1 | L 全長 | d 柄径 |
|---------------|------|------|------|-----|-----|------|------|
| CX200-SEM4030 | 3    | 0.75 | 1.2  | 2.7 | 7.5 | 60   | 6    |
| CX200-SEM4040 | 4    | 1    | 1.6  | 3.6 | 10  | 70   | 6    |
| CX200-SEM4050 | 5    | 1.2  | 2    | 4.5 | 12  | 80   | 6    |
| CX200-SEM4060 | 6    | 1.5  | 2.5  | 5.4 | 12  | 90   | 6    |
| CX200-SEM4080 | 8    | 2    | 3.5  | 7.2 | 16  | 100  | 8    |
| CX200-SEM4100 | 10   | 2    | 4    | 9   | 20  | 100  | 10   |
| CX200-SEM4120 | 12   | 2    | 5    | 11  | 24  | 110  | 12   |

## 推奨切削条件 Standard Milling Condition



- The table show standard milling guidance of performing process as written picture
- Use a rigid and precise machine and tool holder
- Select a cutting fluid appropriate to the particular usage
- In case the revolution could not be increased by the machine used, Please reduce feed speed and Revolution speed at same ration
- When mounting End Mills, The run out of the till will have to be set within 0.01mm

| 被削材<br>Work Material | 炭素鋼 carbon steel<br>(40~55HRC) |            |                                          |            | 合金鋼 工具鋼 Alloy steel Tool steel<br>(SKD.SUS.SCM) |            |                                          |            | 調質鋼 (35~40HRC)<br>(HPM.NAK)   |            |                                          |            | 高硬度鋼 hardened steel<br>(40~60HRC) |            |                                          |            |
|----------------------|--------------------------------|------------|------------------------------------------|------------|-------------------------------------------------|------------|------------------------------------------|------------|-------------------------------|------------|------------------------------------------|------------|-----------------------------------|------------|------------------------------------------|------------|
|                      | 送り速度<br>(mm/min)<br>Feed rate  |            | 回転数<br>(mm <sup>-1</sup> )<br>Revolution |            | 送り速度<br>(mm/min)<br>Feed rate                   |            | 回転数<br>(mm <sup>-1</sup> )<br>Revolution |            | 送り速度<br>(mm/min)<br>Feed rate |            | 回転数<br>(mm <sup>-1</sup> )<br>Revolution |            | 送り速度<br>(mm/min)<br>Feed rate     |            | 回転数<br>(mm <sup>-1</sup> )<br>Revolution |            |
|                      | Standard                       | High Speed | Standard                                 | High Speed | Standard                                        | High Speed | Standard                                 | High Speed | Standard                      | High Speed | Standard                                 | High Speed | Standard                          | High Speed | Standard                                 | High Speed |
| 4                    | 6600                           | 13000      | 7950                                     | 16000      | 6000                                            | 12000      | 7950                                     | 16000      | 4800                          | 12000      | 6350                                     | 16000      | 1050                              | 3350       | 2400                                     | 7950       |
| 5                    | 7000                           | 14000      | 6350                                     | 12500      | 6350                                            | 12500      | 6350                                     | 12500      | 5100                          | 12500      | 5100                                     | 12500      | 1150                              | 3800       | 1900                                     | 6350       |
| 6                    | 7000                           | 14000      | 5300                                     | 10600      | 6350                                            | 12700      | 5300                                     | 10600      | 5100                          | 12700      | 4250                                     | 10600      | 1150                              | 3800       | 1600                                     | 5300       |
| 8                    | 7000                           | 14000      | 4000                                     | 7950       | 6350                                            | 12700      | 4000                                     | 7950       | 5100                          | 12700      | 3200                                     | 7950       | 1150                              | 3800       | 1200                                     | 4000       |
| 10                   | 7000                           | 14000      | 3200                                     | 6350       | 6350                                            | 12700      | 3200                                     | 6350       | 5100                          | 12700      | 2550                                     | 6350       | 1150                              | 3800       | 955                                      | 3200       |
| 12                   | 7000                           | 14000      | 2650                                     | 5300       | 6350                                            | 12700      | 2650                                     | 5300       | 5100                          | 12700      | 2100                                     | 5300       | 1150                              | 3800       | 795                                      | 2650       |
| Ad                   | ≤0.04D                         |            |                                          |            | ≤0.025D                                         |            |                                          |            | ≤0.02D                        |            |                                          |            | ≤0.01D                            |            |                                          |            |
| Rd                   | ≤0.4D                          |            |                                          |            |                                                 |            |                                          |            |                               |            |                                          |            |                                   |            |                                          |            |

# グラファイト用 2枚刃ボールエンドミル DIAコート

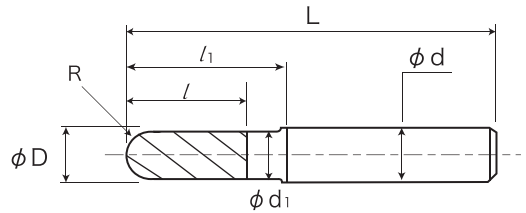
2-Flute Ball Nose End Mill for Graphite / DIA coat

## DIA-BE2



**DIA-BE2040**

Model Flute R



### 特性 Features

- Diamond coating have surface hardness comparable natural diamond and achieves a miraculous durability in processing of graphite/resin aluminum and copper etc.
- long type provides deep die-shank processing



**MG**  
超微粒



**30°**

| 外径公差 Tolerance |
|----------------|
| 0              |
| -0.02          |



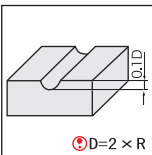
**DIA**  
Coat

| 炭素鋼<br>Carbon Steel | 合金鋼<br>Alloy Steel | 調質鋼<br>Prehardened Steel | 焼き入れ鋼 Hardened Steel |        |        |        | 鋳鉄<br>Cast Iron | ステンレス鋼<br>Stainless Steels | アルミ合金<br>Aluminium Alloys | 銅合金<br>Copper Alloys | チタン合金<br>耐熱合金<br>Ti/Ni Alloy | グラファイト<br>Graphite | 樹脂<br>Resin |
|---------------------|--------------------|--------------------------|----------------------|--------|--------|--------|-----------------|----------------------------|---------------------------|----------------------|------------------------------|--------------------|-------------|
|                     |                    |                          | ~45HRC               | ~55HRC | ~60HRC | ~65HRC |                 |                            |                           | ○                    | ○                            | ◎                  | ○           |

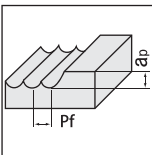
◎ = Best ○ = Good

| MODEL 型番   | D 外径 | R   | / 刃長 | d 1  | / 1 | L 全長 | d 柄径 |
|------------|------|-----|------|------|-----|------|------|
| DIA-BE2010 | 2    | 1   | 10   | 1.9  | 20  | 100  | 4    |
| DIA-BE2015 | 3    | 1.5 | 15   | 2.9  | 25  | 100  | 4    |
| DIA-BE2020 | 4    | 2   | 20   | 3.9  | 30  | 100  | 4    |
| DIA-BE2030 | 6    | 3   | 30   | 5.8  | 40  | 120  | 6    |
| DIA-BE2040 | 8    | 4   | 40   | 7.8  | 50  | 150  | 8    |
| DIA-BE2050 | 10   | 5   | 50   | 9.7  | 60  | 180  | 10   |
| DIA-BE2060 | 12   | 6   | 55   | 11.7 | 65  | 200  | 12   |

### 推奨切削条件 Standard Milling Condition



◎ D=2×R



- The table show standard milling guidance of perforating process as written picture
- Use a rigid and precise machine and tool holder
- Select a cutting fluid appropriate to the particular usage
- In case the Revolution could not be increased by the machine used, Please reduce feed speed and Revolution speed at same ration
- When mounting End Mills, The run out of the till will have to be set within 0.01mm

| 被削材<br>Work Material | グラファイト<br>Graphite         |                                        |
|----------------------|----------------------------|----------------------------------------|
| R 値<br>(mm)          | 送り速度 (mm/min)<br>Feed rate | 回転数 (min <sup>-1</sup> )<br>Revolution |
| 1                    | 250                        | 8000                                   |
| 1.5                  | 380                        | 8000                                   |
| 2                    | 510                        | 8000                                   |
| 3                    | 765                        | 8000                                   |
| 4                    | 1000                       | 8000                                   |
| 5                    | 1250                       | 8000                                   |
| 6                    | 1500                       | 8000                                   |
| Ad                   | ≤0.1D                      |                                        |
| Pf                   | ≤0.03D                     |                                        |

ボール  
Ball

スクエア  
Square

ラジアス  
Radius

ボール  
Ball

ロングネック  
Long Neck

ラフニング  
Roughing

面取り加工用  
Chamfering

ドリル  
Drill

# 2枚刃ボールエンドミル

2-Flute Ball Nose End Mill

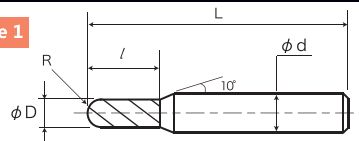
## BE2



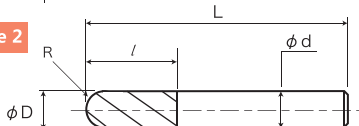
## BE2060S

Model Flute R

Type 1



Type 2



### 特性 Features

- A highly rigid long necked, short tooth endmill.
- The optimum tool for alloy steel, S45C/SCM440
- Recommend oil or water soluble coolant for copper milling.



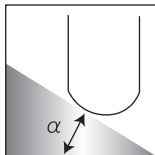
| R 値 Radius | R 精度 Accuracy    |
|------------|------------------|
| 0.5~2      | +0.005<br>-0.005 |
| 3~6        | +0.003<br>-0.007 |
| 8~10       | +0.010<br>-0.010 |

| 炭素鋼<br>Carbon Steel | 合金鋼<br>Alloy Steel | 調質鋼<br>Prehardened Steel | 焼入れ鋼 Hardened Steel |        |        |        | 鋳鉄<br>Cast Iron | ステンレス鋼<br>Stainless Steels | アルミ合金<br>Aluminium Alloys | 銅合金<br>Copper Alloys | チタン合金<br>耐熱合金<br>Ti/Ni Alloy | グラファイト<br>Graphite | 樹脂<br>Resin |
|---------------------|--------------------|--------------------------|---------------------|--------|--------|--------|-----------------|----------------------------|---------------------------|----------------------|------------------------------|--------------------|-------------|
|                     |                    |                          | ~45HRC              | ~55HRC | ~60HRC | ~65HRC |                 |                            |                           |                      |                              |                    |             |
| ◎                   | ◎                  | ○                        | ○                   |        |        |        | ○               | ○                          | ○                         | ○                    |                              |                    |             |

◎ = Best ○ = Good

| MODEL 型番 | R    | / 刃長 | L 全長 | d 柄径 | Type |
|----------|------|------|------|------|------|
| BE2005S  | 0.5  | 2.5  | 50   | 4    | 1    |
| BE20075S | 0.75 | 4    | 50   | 4    | 1    |
| BE2010S  | 1    | 4    | 50   | 4    | 1    |
| BE2015S  | 1.5  | 6    | 60   | 4    | 1    |
| BE2020S  | 2    | 8    | 60   | 4    | 2    |
| BE2025S  | 2.5  | 10   | 80   | 6    | 2    |
| BE2030S  | 3    | 12   | 80   | 6    | 2    |
| BE2040S  | 4    | 14   | 90   | 8    | 2    |
| BE2050S  | 5    | 18   | 100  | 10   | 2    |
| BE2060S  | 6    | 22   | 100  | 12   | 1    |
| BE2080S  | 8    | 30   | 100  | 16   | 1    |
| BE2100S  | 10   | 38   | 105  | 20   | 1    |

### 推奨切削条件 Standard Milling Condition



- The table show standard milling guidance of perforating process as written picture
- Use a rigid and precise machine and tool holder
- Select a cutting fluid appropriate to the particular usage
- In case the revolution could not be increased by the machine used, Please reduce feed speed and Revolution speed at same ration
- When mounting End Mills, The run out of the till will have to be set within 0.01mm

| 被削材<br>Work Material                                       | 炭素鋼・合金鋼<br>Carbon steel/Alloy steel<br>(~30HRC)<br>S55C/SCM<br>AISI 1055 |                                          | 合金鋼・工具鋼<br>Alloy steel/Tool steel<br>プレハードン鋼<br>Pre-hardened steel<br>(30~45HRC)<br>SKD61.NAK<br>AISI H13 |                                          | 炭素鋼・合金鋼<br>Carbon steel/Alloy steel<br>(~30HRC)<br>S55C/SCM<br>AISI 1055 |                                          |                               |                                          | 合金鋼・調質鋼・プレハードン鋼<br>Alloy steel/Tool steel/Pre-hardened steel<br>(30~45HRC)<br>SKD61.NAK<br>AISI H13.AISI D2 |                                          |                               |                                          |                               |
|------------------------------------------------------------|--------------------------------------------------------------------------|------------------------------------------|-----------------------------------------------------------------------------------------------------------|------------------------------------------|--------------------------------------------------------------------------|------------------------------------------|-------------------------------|------------------------------------------|-------------------------------------------------------------------------------------------------------------|------------------------------------------|-------------------------------|------------------------------------------|-------------------------------|
|                                                            |                                                                          |                                          |                                                                                                           |                                          | a≤15°                                                                    |                                          | a>15°                         |                                          | a≤15°                                                                                                       |                                          | a>15°                         |                                          |                               |
|                                                            | R 値<br>(mm)<br>Radius                                                    | 回転数<br>(mm <sup>-1</sup> )<br>Revolution | 送り速度<br>(mm/min)<br>Feed rate                                                                             | 回転数<br>(mm <sup>-1</sup> )<br>Revolution | 送り速度<br>(mm/min)<br>Feed rate                                            | 回転数<br>(mm <sup>-1</sup> )<br>Revolution | 送り速度<br>(mm/min)<br>Feed rate | 回転数<br>(mm <sup>-1</sup> )<br>Revolution | 送り速度<br>(mm/min)<br>Feed rate                                                                               | 回転数<br>(mm <sup>-1</sup> )<br>Revolution | 送り速度<br>(mm/min)<br>Feed rate | 回転数<br>(mm <sup>-1</sup> )<br>Revolution | 送り速度<br>(mm/min)<br>Feed rate |
| R 0.5                                                      | -                                                                        | -                                        | -                                                                                                         | -                                        | 14000                                                                    | 180                                      | 10000                         | 120                                      | 12000                                                                                                       | 150                                      | 7000                          | 80                                       |                               |
| R 1                                                        | 4100                                                                     | 70                                       | 2800                                                                                                      | 40                                       | 10500                                                                    | 350                                      | 7300                          | 210                                      | 8400                                                                                                        | 220                                      | 5500                          | 130                                      |                               |
| R 2                                                        | 2600                                                                     | 120                                      | 1650                                                                                                      | 85                                       | 7200                                                                     | 500                                      | 5100                          | 300                                      | 5900                                                                                                        | 360                                      | 4300                          | 210                                      |                               |
| R 3                                                        | 1900                                                                     | 150                                      | 1200                                                                                                      | 95                                       | 5200                                                                     | 560                                      | 3600                          | 350                                      | 4200                                                                                                        | 410                                      | 2900                          | 240                                      |                               |
| R 4                                                        | 1400                                                                     | 160                                      | 900                                                                                                       | 105                                      | 4000                                                                     | 640                                      | 2700                          | 380                                      | 3100                                                                                                        | 440                                      | 2200                          | 240                                      |                               |
| R 5                                                        | 1100                                                                     | 140                                      | 710                                                                                                       | 95                                       | 3200                                                                     | 700                                      | 2200                          | 380                                      | 2500                                                                                                        | 460                                      | 1750                          | 250                                      |                               |
| R 6                                                        | 940                                                                      | 130                                      | 600                                                                                                       | 85                                       | 2600                                                                     | 640                                      | 1750                          | 350                                      | 2100                                                                                                        | 430                                      | 1450                          | 250                                      |                               |
| R 8                                                        | 700                                                                      | 100                                      | 450                                                                                                       | 60                                       | 1900                                                                     | 620                                      | 1300                          | 330                                      | 1550                                                                                                        | 430                                      | 1100                          | 250                                      |                               |
| R 10                                                       | 560                                                                      | 80                                       | 360                                                                                                       | 50                                       | 1500                                                                     | 590                                      | 1000                          | 310                                      | 1250                                                                                                        | 410                                      | 860                           | 250                                      |                               |
| 粗加工 (φ代 ≤ 0.8 R)    Roughing (Large depth of cut ≤ 0.65 R) |                                                                          |                                          |                                                                                                           |                                          | 精加工 (φ代 ≤ 0.5 R)    Finishing (Large depth of cut ≤ 0.5 R)               |                                          |                               |                                          |                                                                                                             |                                          |                               |                                          |                               |

粗加工 (取代 ≤ 0.8R) Roughing (Large depth of cut ≤ 0.05R)

精加工 (取代 ≤ 0.05R) Finishing (Large depth of cut ≤ 0.05R)

# 3 枚刃ボールエンドミル

3-Flute Ball Nose End Mill

## BE3



## BE3060S

Model Flute R

### 特性 Features

- A highly rigid long necked, short tooth endmill.
- The optimum tool for alloy steel, S45C/SCM440
- Recommend oil or water soluble coolant for copper milling.



MG  
超微粒



| R 精度 Accuracy |
|---------------|
| +0.010        |
| -0.010        |



30°

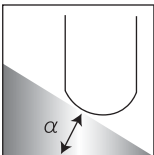


| 炭素鋼<br>Carbon Steel | 合金鋼<br>Alloy Steel | 調質鋼<br>Prehardened Steel | 焼き入れ鋼 Hardened Steel |  |  |  | 鋳鉄<br>Cast Iron | ステンレス鋼<br>Stainless Steels | アルミ合金<br>Aluminium Alloys | 銅合金<br>Copper Alloys | チタン合金<br>耐熱合金<br>Ti/Ni Alloy | グラファイト<br>Graphite | 樹脂<br>Resin |
|---------------------|--------------------|--------------------------|----------------------|--|--|--|-----------------|----------------------------|---------------------------|----------------------|------------------------------|--------------------|-------------|
| ~45HRC              | ~55HRC             | ~60HRC                   | ~65HRC               |  |  |  |                 |                            |                           |                      |                              |                    |             |
| ◎                   | ◎                  | ○                        | ○                    |  |  |  | ○               | ○                          | ○                         | ○                    |                              |                    |             |

◎ = Best ○ = Good

| MODEL 型番 | R    | / 刃長 | L 全長 | d 柄径 | Type |
|----------|------|------|------|------|------|
| BE3005S  | 0.5  | 2.5  | 50   | 4    | 1    |
| BE30075S | 0.75 | 4    | 50   | 4    | 1    |
| BE3010S  | 1    | 4    | 50   | 4    | 1    |
| BE3015S  | 1.5  | 6    | 60   | 4    | 1    |
| BE3020S  | 2    | 8    | 60   | 4    | 2    |
| BE3025S  | 2.5  | 10   | 80   | 6    | 2    |
| BE3030S  | 3    | 12   | 80   | 6    | 2    |
| BE3040S  | 4    | 14   | 90   | 8    | 2    |
| BE3050S  | 5    | 18   | 100  | 10   | 2    |
| BE3060S  | 6    | 22   | 100  | 12   | 1    |
| BE3080S  | 8    | 30   | 100  | 16   | 1    |
| BE3100S  | 10   | 38   | 105  | 20   | 1    |

### 推奨切削条件 Standard Milling Condition



- The table show standard milling guidance of perforating process as written picture
- Use a rigid and precise machine and tool holder
- Select a cutting fluid appropriate to the particular usage
- In case the Revolution could not be increased by the machine used, Please reduce feed speed and Revolution speed at same ration
- When mounting End Mills, The run out of the till will have to be set within 0.01mm

| 被削材<br>Work Material | 炭素鋼・合金鋼<br>Carbon steel・Alloy steel<br>(~30HRC)<br>S55C・SCM<br>AISI 1055 |                                         | 合金鋼・工具鋼<br>Alloy steel・Tool steel<br>プレハードン鋼<br>Pre-hardend steel<br>(30~45HRC)<br>SKD61・NAK<br>AISI H13 |                                         | 炭素鋼・合金鋼<br>Carbon steel・Alloy steel<br>(~30HRC)<br>S55C・SCM<br>AISI 1055 |                                         |                               |                                         | 合金鋼・調質鋼・プレハードン鋼<br>Alloy steel・Tool steel・Pre-hardend steel<br>(30~45HRC)<br>SKD61・NAK<br>AISI H13・AISI D2 |                                         |                               |                                         |                               |                                        |  |
|----------------------|--------------------------------------------------------------------------|-----------------------------------------|----------------------------------------------------------------------------------------------------------|-----------------------------------------|--------------------------------------------------------------------------|-----------------------------------------|-------------------------------|-----------------------------------------|------------------------------------------------------------------------------------------------------------|-----------------------------------------|-------------------------------|-----------------------------------------|-------------------------------|----------------------------------------|--|
|                      |                                                                          |                                         |                                                                                                          |                                         | a≤15°                                                                    |                                         | a>15°                         |                                         | a≤15°                                                                                                      |                                         | a>15°                         |                                         |                               |                                        |  |
|                      | R 値<br>(mm)<br>Radius                                                    | 回転数<br>(mm <sup>2</sup> )<br>Revolution | 送り速度<br>(mm/min)<br>Feed rate                                                                            | 回転数<br>(mm <sup>2</sup> )<br>Revolution | 送り速度<br>(mm/min)<br>Feed rate                                            | 回転数<br>(mm <sup>2</sup> )<br>Revolution | 送り速度<br>(mm/min)<br>Feed rate | 回転数<br>(mm <sup>2</sup> )<br>Revolution | 送り速度<br>(mm/min)<br>Feed rate                                                                              | 回転数<br>(mm <sup>2</sup> )<br>Revolution | 送り速度<br>(mm/min)<br>Feed rate | 回転数<br>(mm <sup>2</sup> )<br>Revolution | 送り速度<br>(mm/min)<br>Feed rate |                                        |  |
| R 1                  | 4100                                                                     | 90                                      | 2800                                                                                                     | 55                                      | 10500                                                                    | 455                                     | 7300                          | 270                                     | 8400                                                                                                       | 290                                     | 5500                          |                                         |                               |                                        |  |
| R 2                  | 2600                                                                     | 160                                     | 1650                                                                                                     | 110                                     | 7200                                                                     | 650                                     | 5100                          | 390                                     | 5900                                                                                                       | 470                                     | 4300                          |                                         |                               |                                        |  |
| R 3                  | 1900                                                                     | 200                                     | 1200                                                                                                     | 125                                     | 5200                                                                     | 730                                     | 3600                          | 460                                     | 4200                                                                                                       | 530                                     | 2900                          |                                         |                               |                                        |  |
| R 4                  | 1400                                                                     | 210                                     | 900                                                                                                      | 135                                     | 4000                                                                     | 830                                     | 2700                          | 500                                     | 3100                                                                                                       | 570                                     | 2200                          |                                         |                               |                                        |  |
| R 5                  | 1100                                                                     | 180                                     | 710                                                                                                      | 125                                     | 3200                                                                     | 910                                     | 2200                          | 500                                     | 2500                                                                                                       | 600                                     | 1750                          |                                         |                               |                                        |  |
| R 6                  | 940                                                                      | 230                                     | 600                                                                                                      | 110                                     | 2600                                                                     | 830                                     | 1750                          | 450                                     | 2100                                                                                                       | 560                                     | 1450                          |                                         |                               |                                        |  |
| R 8                  | 700                                                                      | 130                                     | 450                                                                                                      | 80                                      | 1900                                                                     | 810                                     | 1300                          | 430                                     | 1550                                                                                                       | 560                                     | 1100                          |                                         |                               |                                        |  |
| R 10                 | 560                                                                      | 100                                     | 360                                                                                                      | 65                                      | 1500                                                                     | 770                                     | 1000                          | 400                                     | 1250                                                                                                       | 530                                     | 860                           |                                         |                               |                                        |  |
| 粗加工 (取代 ≤0.8R)       |                                                                          | Roughing (Large depth of cut ≤ 0.05R)   |                                                                                                          |                                         |                                                                          | 精加工 (取代 ≤0.05R)                         |                               |                                         |                                                                                                            |                                         |                               |                                         |                               | Finishing (Large depth of cut ≤ 0.05R) |  |

粗加工 (取代 ≤ 0.8R) Roughing (Large depth of cut ≤ 0.05R)

精加工 (取代 ≤ 0.05R) Finishing (Large depth of cut ≤ 0.05R)

ボール  
Ball

スクエア  
Square

ラジアス  
Radius

ボール  
Ball

ロングネック  
Long Neck

ラフィング  
Roughing

面取り加工用  
Chamfering

ドリル  
Drill



# CX200 2枚刃ボールエンドミル

CX200 Series 2-Flute Ball Nose End Mill

## CX200-BE2



**CX200-BE2060S**

Model Flute R

### 特 性 Features

- A highly rigid long necked, short tooth endmill.
- The optimum tool for alloy steel, S45C/SCM440, NAK to HRC45
- Recommend oil or water soluble coolant for copper milling.
- Employs TiAlN Coating and is applicable for high speed and high feed operations



MG  
超微粒



30°



CX200  
Coat

| R 値 Radius | R 精度 Accuracy    |
|------------|------------------|
| 0.5~2      | +0.005<br>-0.005 |
| 3~6        | +0.003<br>-0.003 |
| 8~10       | +0.010<br>-0.010 |



R  
Ball



CX200  
Coat

| 炭素鋼<br>Carbon Steel | 合金鋼<br>Alloy Steel | 調質鋼<br>Prehardened Steel | 焼き入れ鋼 Hardened Steel |   |  |  | 鋳鉄<br>Cast Iron | ステンレス鋼<br>Stainless Steels | アルミ合金<br>Aluminium Alloys | 銅合金<br>Copper Alloys | チタン合金<br>耐熱合金<br>Ti/Ni Alloy | グラファイト<br>Graphite | 樹脂<br>Resin |
|---------------------|--------------------|--------------------------|----------------------|---|--|--|-----------------|----------------------------|---------------------------|----------------------|------------------------------|--------------------|-------------|
| ~45HRC              | ~55HRC             | ~60HRC                   | ~65HRC               |   |  |  |                 |                            |                           |                      |                              |                    |             |
| ◎                   | ◎                  | ◎                        | ◎                    | ○ |  |  | ○               | ○                          | ○                         | ○                    |                              |                    |             |

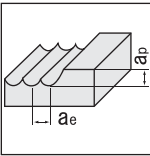
◎ = Best ○ = Good

| MODEL 型番       | R    | / 刃長 | L 全長 | d 柄径 | Type |
|----------------|------|------|------|------|------|
| CX200-BE2005S  | 0.5  | 2.5  | 50   | 4    | 1    |
| CX200-BE20075S | 0.75 | 4    | 50   | 4    | 1    |
| CX200-BE2010S  | 1    | 4    | 50   | 4    | 1    |
| CX200-BE2015S  | 1.5  | 6    | 60   | 4    | 1    |
| CX200-BE2020S  | 2    | 8    | 60   | 4    | 1    |
| CX200-BE2025S  | 2.5  | 10   | 80   | 6    | 1    |
| CX200-BE2030S  | 3    | 12   | 80   | 6    | 2    |
| CX200-BE2040S  | 4    | 14   | 90   | 8    | 2    |
| CX200-BE2050S  | 5    | 18   | 100  | 10   | 2    |
| CX200-BE2060S  | 6    | 22   | 100  | 12   | 2    |
| CX200-BE2080S  | 8    | 30   | 100  | 16   | 2    |
| CX200-BE2100S  | 10   | 38   | 105  | 20   | 2    |



# CX200-BE2

## 推奨切削条件 Standard Milling Condition



- The table show standard milling guidance of perforating process as written picture
- Use a rigid and precise machine and tool holder
- Select a cutting fluid appropriate to the particular usage
- In case the revolution could not be increased by the machine used, Please reduce feed speed and revolution speed at same ration
- When mounting End Mills, The run out of the till will have to be set within 0.01mm

| 被削材<br>Work Material                                 | 合金鋼, 工具鋼<br>Alloy steel, Tool steel<br>SCM, SKD, ARK1<br>(25~35HRC) |                               | プレハードン鋼, 焼き入れ鋼<br>Pre-Harden Steel, Hardened Steel<br>CENAI, NAK80, SKD<br>(35~45HRC) |                               | 鋳鉄, 炭素鋼, 合金鋼, 工具鋼<br>Cast Iron, Carbon Steel, Alloy Steel, Tool Steel<br>FC250, SS400, S50C, SCM440, SNCM, SKD<br>(~35HRC) |                               |                                          |                               |
|------------------------------------------------------|---------------------------------------------------------------------|-------------------------------|---------------------------------------------------------------------------------------|-------------------------------|----------------------------------------------------------------------------------------------------------------------------|-------------------------------|------------------------------------------|-------------------------------|
|                                                      | High Speed                                                          |                               | Standard                                                                              |                               | High Speed                                                                                                                 |                               | Standard                                 |                               |
| R 値<br>(mm)<br>Radius                                | 回転数<br>(mm <sup>-1</sup> )<br>Revolution                            | 送り速度<br>(mm/min)<br>Feed rate | 回転数<br>(mm <sup>-1</sup> )<br>Revolution                                              | 送り速度<br>(mm/min)<br>Feed rate | 回転数<br>(mm <sup>-1</sup> )<br>Revolution                                                                                   | 送り速度<br>(mm/min)<br>Feed rate | 回転数<br>(mm <sup>-1</sup> )<br>Revolution | 送り速度<br>(mm/min)<br>Feed rate |
| R 0.5                                                | 47700                                                               | 3820                          | 47700                                                                                 | 2390                          | 50000                                                                                                                      | 4000                          | 50000                                    | 4000                          |
| R 1                                                  | 23900                                                               | 2870                          | 23900                                                                                 | 1910                          | 47700                                                                                                                      | 5720                          | 31800                                    | 3800                          |
| R 2                                                  | 11900                                                               | 2390                          | 11900                                                                                 | 1670                          | 23900                                                                                                                      | 4780                          | 15900                                    | 3200                          |
| R 3                                                  | 7960                                                                | 2230                          | 7960                                                                                  | 1430                          | 15900                                                                                                                      | 4450                          | 10600                                    | 2970                          |
| R 4                                                  | 5970                                                                | 1910                          | 5970                                                                                  | 1310                          | 11900                                                                                                                      | 3810                          | 7960                                     | 2550                          |
| R 5                                                  | 4770                                                                | 1720                          | 4770                                                                                  | 1240                          | 9550                                                                                                                       | 3440                          | 6370                                     | 2290                          |
| R 6                                                  | 3980                                                                | 1590                          | 3980                                                                                  | 1190                          | 7960                                                                                                                       | 3180                          | 5310                                     | 2120                          |
| R 8                                                  | 2980                                                                | 1340                          | 2980                                                                                  | 1010                          | 5970                                                                                                                       | 2690                          | 3980                                     | 1790                          |
| R 10                                                 | 2390                                                                | 1070                          | 2390                                                                                  | 810                           | 4770                                                                                                                       | 2150                          | 3180                                     | 1430                          |
| 粗加工 (ap=0.1Dc ae=0.3Dc) Roughing (ap=0.1Dc ae=0.3Dc) |                                                                     |                               |                                                                                       |                               | 精加工 (ap=0.05Dc ap=0.05Dc) Finishing (ap=0.05Dc ap=0.05Dc)                                                                  |                               |                                          |                               |

| 被削材<br>Work Material                                      | プレハードン鋼<br>Pre-Harden Steel<br>HPM1, NAK55<br>(35~45HRC) |                               |                                          |                               | 焼き入れ鋼<br>Hardened Steel<br>SKD61, SKT4<br>(45~55HRC) |                               |                                          |                               |
|-----------------------------------------------------------|----------------------------------------------------------|-------------------------------|------------------------------------------|-------------------------------|------------------------------------------------------|-------------------------------|------------------------------------------|-------------------------------|
|                                                           | High Speed                                               |                               | Standard                                 |                               | High Speed                                           |                               | Standard                                 |                               |
| R 値<br>(mm)<br>Radius                                     | 回転数<br>(mm <sup>-1</sup> )<br>Revolution                 | 送り速度<br>(mm/min)<br>Feed rate | 回転数<br>(mm <sup>-1</sup> )<br>Revolution | 送り速度<br>(mm/min)<br>Feed rate | 回転数<br>(mm <sup>-1</sup> )<br>Revolution             | 送り速度<br>(mm/min)<br>Feed rate | 回転数<br>(mm <sup>-1</sup> )<br>Revolution | 送り速度<br>(mm/min)<br>Feed rate |
| R 0.5                                                     | 47700                                                    | 3820                          | 47700                                    | 2390                          | 50000                                                | 4000                          | 50000                                    | 4000                          |
| R 1                                                       | 23900                                                    | 2870                          | 23900                                    | 1910                          | 47700                                                | 5720                          | 31800                                    | 3800                          |
| R 2                                                       | 11900                                                    | 2390                          | 11900                                    | 1670                          | 23900                                                | 4780                          | 15900                                    | 3200                          |
| R 3                                                       | 7960                                                     | 2230                          | 7960                                     | 1430                          | 15900                                                | 4450                          | 10600                                    | 2970                          |
| R 4                                                       | 5970                                                     | 1910                          | 5970                                     | 1310                          | 11900                                                | 3810                          | 7960                                     | 2550                          |
| R 5                                                       | 4770                                                     | 1720                          | 4770                                     | 1240                          | 9550                                                 | 3440                          | 6370                                     | 2290                          |
| R 6                                                       | 3980                                                     | 1590                          | 3980                                     | 1190                          | 7960                                                 | 3180                          | 5310                                     | 2120                          |
| R 8                                                       | 2980                                                     | 1340                          | 2980                                     | 1010                          | 5970                                                 | 2690                          | 3980                                     | 1790                          |
| R 10                                                      | 2390                                                     | 1070                          | 2390                                     | 810                           | 4770                                                 | 2150                          | 3180                                     | 1430                          |
| 精加工 (ap=0.05Dc ap=0.05Dc) Finishing (ap=0.05Dc ap=0.05Dc) |                                                          |                               |                                          |                               |                                                      |                               |                                          |                               |

ボール  
Ball

スクエア  
Square

ラジアス  
Radius

ボール  
Ball

ロングネック  
Long Neck

ラフィング  
Roughing

面取り加工用  
Chamfering

ドリル  
Drill

# CX200 3枚刃ボールエンドミル

CX200 Serie 3-Flute Ball Nose End Mill

## CX200-BE3



**CX200-BE3060S**

Model Flute R

### 特性 Features

- A highly rigid long necked, short tooth endmill.
- The optimum tool for alloy steel, S45C/SCM440, NAK to HRC45
- Recommend oil or water soluble coolant for copper milling.
- Employs TiAlN Coating and is applicable for high speed and high feed operations



MG  
超微粒



| R 精度 Accuracy |
|---------------|
| +0.010        |
| -0.010        |



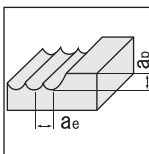
| 炭素鋼<br>Carbon Steel | 合金鋼<br>Alloy Steel | 調質鋼<br>Prehardened Steel | 焼き入れ鋼 Hardened Steel |   |  |  | 鋳鉄<br>Cast Iron | ステンレス鋼<br>Stainless Steels | アルミ合金<br>Aluminium Alloys | 銅合金<br>Copper Alloys | チタン合金<br>耐熱合金<br>Ti/Ni Alloy | グラファイト<br>Graphite | 樹脂<br>Resin |
|---------------------|--------------------|--------------------------|----------------------|---|--|--|-----------------|----------------------------|---------------------------|----------------------|------------------------------|--------------------|-------------|
| ~45HRC              | ~55HRC             | ~60HRC                   | ~65HRC               |   |  |  |                 |                            |                           |                      |                              |                    |             |
| ◎                   | ◎                  | ◎                        | ◎                    | ○ |  |  | ○               | ○                          | ○                         | ○                    |                              |                    |             |

◎ = Best ○ = Good

| MODEL 型番       | R    | / 刃長 | L 全長 | d 柄径 | Type |
|----------------|------|------|------|------|------|
| CX200-BE3005S  | 0.5  | 2.5  | 50   | 4    | 1    |
| CX200-BE30075S | 0.75 | 4    | 50   | 4    | 1    |
| CX200-BE3010S  | 1    | 4    | 50   | 4    | 1    |
| CX200-BE3015S  | 1.5  | 6    | 60   | 4    | 1    |
| CX200-BE3020S  | 2    | 8    | 60   | 4    | 2    |
| CX200-BE3025S  | 2.5  | 10   | 80   | 6    | 2    |
| CX200-BE3030S  | 3    | 12   | 80   | 6    | 2    |
| CX200-BE3040S  | 4    | 14   | 90   | 8    | 2    |
| CX200-BE3050S  | 5    | 18   | 100  | 10   | 2    |
| CX200-BE3060S  | 6    | 22   | 100  | 12   | 1    |
| CX200-BE3080S  | 8    | 30   | 100  | 16   | 1    |
| CX200-BE3100S  | 10   | 38   | 105  | 20   | 1    |

# CX200-BE3

## 推奨切削条件 Standard Milling Condition



- The table show standard milling guidance of perforating process as written picture
- Use a rigid and precise machine and tool holder
- Select a cutting fluid appropriate to the particular usage
- In case the revolution could not be increased by the machine used, Please reduce feed sped and revolution speed at same ration
- When mounting End Mills, The run out of the till will have to be set within 0.01mm

| 被削材<br>Work Material                                 | 合金鋼, 工具鋼<br>Alloy steel.Tool steel<br>SCM.SKD.ARK1<br>(25~35HRC) |                               | プレハードン鋼, 焼き入れ鋼<br>Pre-Harden Steel.Hardened Steel<br>CENAI.NAK80.SKD<br>(35~45HRC) |                               | 鋳鉄, 炭素鋼, 合金鋼, 工具鋼<br>Cast Iron.Carbon Steel.Alloy Steel.Tool Steel<br>FC250.SS400.S50C.SCM440.SNCM.SKD<br>(~35HRC) |                               |                                          |                               |
|------------------------------------------------------|------------------------------------------------------------------|-------------------------------|------------------------------------------------------------------------------------|-------------------------------|--------------------------------------------------------------------------------------------------------------------|-------------------------------|------------------------------------------|-------------------------------|
|                                                      | High Speed                                                       |                               | Standard                                                                           |                               | High Speed                                                                                                         |                               | Standard                                 |                               |
| R 値<br>(mm)<br>Radius                                | 回転数<br>(mm <sup>-1</sup> )<br>Revolution                         | 送り速度<br>(mm/min)<br>Feed rate | 回転数<br>(mm <sup>-1</sup> )<br>Revolution                                           | 送り速度<br>(mm/min)<br>Feed rate | 回転数<br>(mm <sup>-1</sup> )<br>Revolution                                                                           | 送り速度<br>(mm/min)<br>Feed rate | 回転数<br>(mm <sup>-1</sup> )<br>Revolution | 送り速度<br>(mm/min)<br>Feed rate |
| R 1                                                  | 23900                                                            | 3730                          | 23900                                                                              | 2480                          | 47700                                                                                                              | 7430                          | 31800                                    | 4940                          |
| R 2                                                  | 11900                                                            | 3100                          | 11900                                                                              | 2170                          | 23900                                                                                                              | 6210                          | 15900                                    | 4160                          |
| R 3                                                  | 7960                                                             | 2890                          | 7960                                                                               | 1850                          | 15900                                                                                                              | 5780                          | 10600                                    | 3860                          |
| R 4                                                  | 5970                                                             | 2480                          | 5970                                                                               | 1700                          | 11900                                                                                                              | 4950                          | 7960                                     | 3310                          |
| R 5                                                  | 4770                                                             | 2230                          | 4770                                                                               | 1610                          | 9550                                                                                                               | 4470                          | 6370                                     | 2970                          |
| R 6                                                  | 3980                                                             | 2060                          | 3980                                                                               | 1540                          | 7960                                                                                                               | 4130                          | 5310                                     | 2750                          |
| R 8                                                  | 2980                                                             | 1740                          | 2980                                                                               | 1310                          | 5970                                                                                                               | 3490                          | 3980                                     | 2320                          |
| R 10                                                 | 2390                                                             | 1390                          | 2390                                                                               | 1050                          | 4770                                                                                                               | 2790                          | 3180                                     | 1850                          |
| 粗加工 (ap=0.1Dc ae=0.3Dc) Roughing (ap=0.1Dc ae=0.3Dc) |                                                                  |                               |                                                                                    |                               | 精加工 (ap=0.05Dc ap=0.05Dc) Finishing (ap=0.05Dc ap=0.05Dc)                                                          |                               |                                          |                               |

| 被削材<br>Work Material                                      | プレハードン鋼<br>Pre-Harden Steel<br>HPM1.NAK55<br>(35~45HRC) |                               |                                          |                               | 焼き入れ鋼<br>Hardened Steel<br>SKD61.SKT4<br>(45~55HRC) |                               |                                          |                               |
|-----------------------------------------------------------|---------------------------------------------------------|-------------------------------|------------------------------------------|-------------------------------|-----------------------------------------------------|-------------------------------|------------------------------------------|-------------------------------|
|                                                           | High Speed                                              |                               | Standard                                 |                               | High Speed                                          |                               | Standard                                 |                               |
| R 値<br>(mm)<br>Radius                                     | 回転数<br>(mm <sup>-1</sup> )<br>Revolution                | 送り速度<br>(mm/min)<br>Feed rate | 回転数<br>(mm <sup>-1</sup> )<br>Revolution | 送り速度<br>(mm/min)<br>Feed rate | 回転数<br>(mm <sup>-1</sup> )<br>Revolution            | 送り速度<br>(mm/min)<br>Feed rate | 回転数<br>(mm <sup>-1</sup> )<br>Revolution | 送り速度<br>(mm/min)<br>Feed rate |
| R 1                                                       | 47700                                                   | 4960                          | 31800                                    | 3300                          | 39800                                               | 4130                          | 23900                                    | 2480                          |
| R 2                                                       | 23900                                                   | 4350                          | 15900                                    | 2890                          | 19900                                               | 3620                          | 11900                                    | 2170                          |
| R 3                                                       | 15900                                                   | 3710                          | 10600                                    | 2480                          | 13300                                               | 3100                          | 7960                                     | 1850                          |
| R 4                                                       | 11900                                                   | 3400                          | 7960                                     | 2270                          | 9950                                                | 2840                          | 5970                                     | 1700                          |
| R 5                                                       | 9550                                                    | 3220                          | 6370                                     | 2150                          | 7960                                                | 2690                          | 4770                                     | 1610                          |
| R 6                                                       | 7960                                                    | 3100                          | 5310                                     | 2060                          | 6630                                                | 2580                          | 3980                                     | 1540                          |
| R 8                                                       | 5970                                                    | 2630                          | 3980                                     | 1750                          | 4970                                                | 2190                          | 2980                                     | 1310                          |
| R 10                                                      | 4770                                                    | 2100                          | 3180                                     | 1400                          | 3980                                                | 1750                          | 2390                                     | 1050                          |
| 精加工 (ap=0.05Dc ap=0.05Dc) Finishing (ap=0.05Dc ap=0.05Dc) |                                                         |                               |                                          |                               |                                                     |                               |                                          |                               |

ボール  
Ball

スクエア  
Square

ラジアス  
Radius

ボール  
Ball

ロングネック  
Long Neck

ラフィング  
Roughing

面取り加工用  
Chamfering

ドリル  
Drill

## CX500 2枚刃高硬度ボールエンドミル

CX500 2-Flute Ball Nose End Mill for hard material

## CX500-HBE2



CX500-HBE2005-6

Model Flute R d

## 特性 Features

- CX500-Coating is new epoch-making coating developed for super-long tool life, High-speed processing and dry cutting due to the high acid resistance and hardening if compared with other conventional and popular coating which is existing in the market.-The optimum tool for alloy steel, S45C/SCM440, NAK to HRC45
- CKK Original design Chip pocket enables similar or same cutting depth which 3-flutes could realize
- Surface finish is very accurate after reprocessing
- Suitable for hardened steel processing (up to 65 HRC)



| R 値 Radius | R 精度 Accuracy    |
|------------|------------------|
| 0.15~2.5   | +0.005<br>-0.005 |
| 3~6        | +0.003<br>-0.007 |



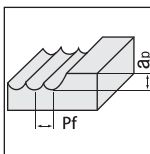
| 炭素鋼<br>Carbon Steel | 合金鋼<br>Alloy Steel | 調質鋼<br>Prehardened Steel | 焼き入れ鋼 Hardened Steel |   |   |   | 鋳鉄<br>Cast Iron | ステンレス鋼<br>Stainless Steels | アルミ合金<br>Aluminium Alloys | 銅合金<br>Copper Alloys | チタン合金<br>耐熱合金<br>Ti/Ni Alloy | グラファイト<br>Graphite | 樹脂<br>Resin |
|---------------------|--------------------|--------------------------|----------------------|---|---|---|-----------------|----------------------------|---------------------------|----------------------|------------------------------|--------------------|-------------|
| ~45HRC              | ~55HRC             | ~60HRC                   | ~65HRC               |   |   |   |                 |                            |                           |                      |                              |                    |             |
| ○                   | ○                  | ○                        | ◎                    | ◎ | ◎ | ◎ | ◎               | ○                          |                           |                      |                              |                    |             |

◎ = Best ○ = Good

| MODEL 型番         | R    | D 外径 | l 刃長 | L 全長 | d 柄径 | Type |
|------------------|------|------|------|------|------|------|
| CX500-HBE20015   | 0.15 | 0.3  | 0.45 | 50   | 4    | 1    |
| CX500-HBE20015-6 | 0.15 | 0.3  | 0.45 | 50   | 6    | 1    |
| CX500-HBE2002-4  | 0.2  | 0.4  | 0.6  | 50   | 4    | 1    |
| CX500-HBE2002-6  | 0.2  | 0.4  | 0.6  | 50   | 6    | 1    |
| CX500-HBE2003-4  | 0.3  | 0.6  | 0.9  | 50   | 4    | 1    |
| CX500-HBE2003-6  | 0.3  | 0.6  | 0.9  | 50   | 6    | 1    |
| CX500-HBE2004-4  | 0.4  | 0.8  | 1.2  | 50   | 4    | 1    |
| CX500-HBE2004-6  | 0.4  | 0.8  | 1.2  | 50   | 6    | 1    |
| CX500-HBE2005-4  | 0.5  | 1    | 1.5  | 50   | 4    | 1    |
| CX500-HBE2005-6  | 0.5  | 1    | 1.5  | 50   | 6    | 1    |
| CX500-HBE20075   | 0.75 | 1.5  | 2    | 50   | 6    | 1    |
| CX500-HBE2010    | 1    | 2    | 3    | 50   | 6    | 1    |
| CX500-HBE2015    | 1.5  | 3    | 4.5  | 60   | 6    | 1    |
| CX500-HBE2020    | 2    | 4    | 6    | 70   | 6    | 1    |
| CX500-HBE2025    | 2.5  | 5    | 7.5  | 80   | 6    | 1    |
| CX500-HBE2030    | 3    | 6    | 9    | 90   | 6    | 2    |
| CX500-HBE2040    | 4    | 8    | 12   | 100  | 8    | 2    |
| CX500-HBE2050    | 5    | 10   | 15   | 100  | 10   | 2    |
| CX500-HBE2060    | 6    | 12   | 18   | 110  | 12   | 2    |
| CX500-HBE2080    | 8    | 16   | 24   | 140  | 16   | 2    |

## CX500-HBE2

## 推奨切削条件 Standard Milling Condition



- The table show standard milling guidance of perforating process as written picture
- Use a rigid and precise machine and tool holder
- Select a cutting fluid appropriate to the particular usage
- In case the revolution could not be increased by the machine used, Please reduce feed speed and revolution speed at same ration
- When mounting End Mills, The run out of the till will have to be set within 0.01mm

| 被削材<br>Work Material | 高硬度鋼 Hardened Steel<br>( 40 ~ 55HRC ) |            |                                          |            | 高硬度鋼 Hardened Steel<br>( 55 ~ 60HRC ) |            |                                          |            | 高硬度鋼 Hardened Steel<br>( 60 ~ 65HRC ) |            |                                          |            |
|----------------------|---------------------------------------|------------|------------------------------------------|------------|---------------------------------------|------------|------------------------------------------|------------|---------------------------------------|------------|------------------------------------------|------------|
|                      | 送り速度<br>(mm/min)<br>Feed rate         |            | 回転数<br>(mm <sup>-1</sup> )<br>Revolution |            | 送り速度<br>(mm/min)<br>Feed rate         |            | 回転数<br>(mm <sup>-1</sup> )<br>Revolution |            | 送り速度<br>(mm/min)<br>Feed rate         |            | 回転数<br>(mm <sup>-1</sup> )<br>Revolution |            |
|                      | Standard                              | High Speed | Standard                                 | High Speed | Standard                              | High Speed | Standard                                 | High Speed | Standard                              | High Speed | Standard                                 | High Speed |
| 0.2                  | 650                                   | -          | 50000                                    | -          | 600                                   | -          | 50000                                    | -          | 550                                   | -          | 50000                                    | -          |
| 0.3                  | 1040                                  | -          | 50000                                    | -          | 960                                   | -          | 50000                                    | -          | 780                                   | -          | 50000                                    | -          |
| 0.4                  | 1460                                  | -          | 50000                                    | -          | 1180                                  | -          | 43800                                    | -          | 900                                   | -          | 38200                                    | -          |
| 0.5                  | 2240                                  | 2650       | 47700                                    | 50000      | 1430                                  | 2300       | 35000                                    | 50000      | 1120                                  | 1950       | 30600                                    | 50000      |
| 0.75                 | 2310                                  | 4800       | 31800                                    | 50000      | 1450                                  | 3900       | 23300                                    | 50000      | 1460                                  | 2740       | 20400                                    | 38200      |
| 1                    | 1740                                  | 3670       | 23900                                    | 43000      | 1080                                  | 2620       | 17500                                    | 36600      | 1000                                  | 1940       | 15300                                    | 28600      |
| 1.5                  | 1730                                  | 3430       | 15900                                    | 28600      | 1080                                  | 2570       | 11700                                    | 24400      | 950                                   | 1880       | 10200                                    | 19100      |
| 2                    | 1590                                  | 3280       | 11900                                    | 21500      | 1020                                  | 2510       | 8800                                     | 18300      | 930                                   | 1820       | 7600                                     | 14300      |
| 2.5                  | 1540                                  | 3620       | 9500                                     | 17200      | 990                                   | 2600       | 7000                                     | 14600      | 1040                                  | 1900       | 6100                                     | 11500      |
| 3                    | 1390                                  | 2860       | 8000                                     | 14300      | 890                                   | 2200       | 5800                                     | 12200      | 840                                   | 1670       | 5100                                     | 9500       |
| 4                    | 1250                                  | 2710       | 6000                                     | 10700      | 800                                   | 2110       | 4400                                     | 9200       | 760                                   | 1570       | 3800                                     | 7200       |
| 5                    | 1130                                  | 2530       | 4800                                     | 8600       | 700                                   | 1910       | 3500                                     | 7300       | 700                                   | 1440       | 3100                                     | 5700       |
| 6                    | 1010                                  | 2340       | 4000                                     | 7200       | 600                                   | 1670       | 2900                                     | 6100       | 620                                   | 1280       | 2500                                     | 4800       |
| 加工内容 Processing      | Ad                                    |            | Pf                                       |            | Ad                                    |            | Pf                                       |            | Ad                                    |            | Pf                                       |            |
| 粗加工                  | ≦0.1D                                 | ≦0.08D     | ≦0.3D                                    | ≦0.24D     | ≦0.07D                                | ≦0.05D     | ≦0.21D                                   | ≦0.15D     | ≦0.07D                                | ≦0.05D     | ≦0.21D                                   | ≦0.15D     |
| 精加工                  | ≦0.03D                                | ≦0.02D     | ≦0.1D                                    | ≦0.05D     | ≦0.02D                                | ≦0.01D     | ≦0.05D                                   | ≦0.05D     | ≦0.02D                                | ≦0.01D     | ≦0.05D                                   | ≦0.05D     |

ボール  
Ballスクエア  
Squareラジアス  
Radiusボール  
Ballロングネック  
Long Neckラフニング  
Roughing面取り加工用  
Chamferingドリル  
Drill

## CX500 3枚刃高硬度ボールエンドミル

CX500 3-Flute Ball Nose End Mill for hard material

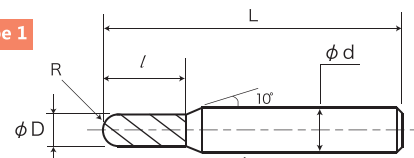
## CX500-HBE3



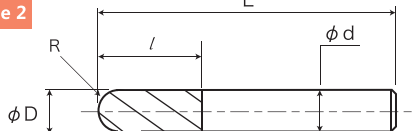
CX500-HBE3050

Model Flute R

Type 1



Type 2



## 特性 Features

- CX500-Coating is new epoch-making coating developed for super long tool life, High-speed processing and dry cutting due to the high acid resistance and hardening if compared with other conventional and popular coating which is existing in the market.-The optimum tool for alloy steel, S45C/SCM440, NAK to HRC45
- CKK Original design Chip pocket enables similar or same cutting depth which 3-flutes could realize
- Surface finish is very accurate after reprocessing
- Suitable for hardened steel processing (up to 65 HRC)

SMG  
超超微粒

| R 値 Radius | R 精度 Accuracy    |
|------------|------------------|
| 0.5~2      | +0.005<br>-0.005 |
| 3~6        | +0.003<br>-0.007 |

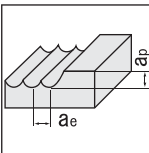


| 炭素鋼<br>Carbon Steel | 合金鋼<br>Alloy Steel | 調質鋼<br>Prehardened Steel | 焼き入れ鋼 Hardened Steel |   |   |   | 鋳鉄<br>Cast Iron | ステンレス鋼<br>Stainless Steels | アルミ合金<br>Aluminium Alloys | 銅合金<br>Copper Alloys | チタン合金<br>耐熱合金<br>Ti/Ni Alloy | グラファイト<br>Graphite | 樹脂<br>Resin |
|---------------------|--------------------|--------------------------|----------------------|---|---|---|-----------------|----------------------------|---------------------------|----------------------|------------------------------|--------------------|-------------|
| ~45HRC              | ~55HRC             | ~60HRC                   | ~65HRC               |   |   |   |                 |                            |                           |                      |                              |                    |             |
| ○                   | ○                  | ○                        | ◎                    | ◎ | ◎ | ◎ | ◎               | ○                          |                           |                      |                              |                    |             |

◎ = Best ○ = Good

| MODEL 型番      | R   | D 外径 | l 刃長 | L 全長 | d 柄径 | Type |
|---------------|-----|------|------|------|------|------|
| CX500-HBE3005 | 0.5 | 1    | 1.5  | 50   | 4    | 1    |
| CX500-HBE3010 | 1   | 2    | 3    | 50   | 6    | 1    |
| CX500-HBE3015 | 1.5 | 3    | 4.5  | 60   | 6    | 1    |
| CX500-HBE3020 | 2   | 4    | 6    | 70   | 6    | 1    |
| CX500-HBE3025 | 2.5 | 5    | 7.5  | 80   | 6    | 1    |
| CX500-HBE3030 | 3   | 6    | 9    | 90   | 6    | 2    |
| CX500-HBE3040 | 4   | 8    | 12   | 100  | 8    | 2    |
| CX500-HBE3050 | 5   | 10   | 15   | 100  | 10   | 2    |
| CX500-HBE3060 | 6   | 12   | 18   | 110  | 12   | 2    |

## 推奨切削条件 Standard Milling Condition



- The table show standard milling guidance of perforating process as written picture
- Use a rigid and precise machine and tool holder
- Select a cutting fluid appropriate to the particular usage
- In case the revolution could not be increased by the machine used, Please reduce feed sped and revolution speed at same ration
- When mounting End Mills, The run out of the till will have to be set within 0.01mm

| 被削材<br>Work Material | 高硬度鋼 Hardened Steel (40 ~ 55HRC) |            |                                    |            | 高硬度鋼 Hardened Steel (55 ~ 60HRC) |            |                                    |            | 高硬度鋼 Hardened Steel (60 ~ 65HRC) |            |                                    |            |
|----------------------|----------------------------------|------------|------------------------------------|------------|----------------------------------|------------|------------------------------------|------------|----------------------------------|------------|------------------------------------|------------|
|                      | 送り速度 (mm/min) Feed rate          |            | 回転数 (mm <sup>-1</sup> ) Revolution |            | 送り速度 (mm/min) Feed rate          |            | 回転数 (mm <sup>-1</sup> ) Revolution |            | 送り速度 (mm/min) Feed rate          |            | 回転数 (mm <sup>-1</sup> ) Revolution |            |
|                      | Standard                         | High Speed | Standard                           | High Speed | Standard                         | High Speed | Standard                           | High Speed | Standard                         | High Speed | Standard                           | High Speed |
| R 値 (mm) Radius      |                                  |            |                                    |            |                                  |            |                                    |            |                                  |            |                                    |            |
| 0.5                  | 3360                             | 3975       | 47700                              | 50000      | 2145                             | 3450       | 35000                              | 50000      | 1680                             | 2925       | 30600                              | 50000      |
| 1                    | 2610                             | 5505       | 23900                              | 43000      | 1620                             | 3930       | 17500                              | 36600      | 1500                             | 2910       | 15300                              | 28600      |
| 1.5                  | 2595                             | 5145       | 15900                              | 28600      | 1620                             | 3855       | 11700                              | 24400      | 1425                             | 2820       | 10200                              | 19100      |
| 2                    | 2385                             | 4920       | 11900                              | 21500      | 1530                             | 3765       | 8800                               | 18300      | 1395                             | 2730       | 7600                               | 14300      |
| 2.5                  | 2310                             | 5430       | 9500                               | 17200      | 1485                             | 3900       | 7000                               | 14600      | 1560                             | 2850       | 6100                               | 11500      |
| 3                    | 2085                             | 4290       | 8000                               | 14300      | 1335                             | 3300       | 5800                               | 12200      | 1260                             | 2505       | 5100                               | 9500       |
| 4                    | 1875                             | 4065       | 6000                               | 10700      | 1200                             | 3165       | 4400                               | 9200       | 1140                             | 2355       | 3800                               | 7200       |
| 5                    | 1695                             | 3795       | 4800                               | 8600       | 1050                             | 2865       | 3500                               | 7300       | 1050                             | 2160       | 3100                               | 5700       |
| 6                    | 1515                             | 3510       | 4000                               | 7200       | 900                              | 2502       | 2900                               | 6100       | 930                              | 1920       | 2500                               | 4800       |
| 加工内容 Processing      | Ad                               |            | Pf                                 |            | Ad                               |            | Pf                                 |            | Ad                               |            | Pf                                 |            |
| 粗加工                  | ≤0.1D                            | ≤0.08D     | ≤0.3D                              | ≤0.24D     | ≤0.07D                           | ≤0.05D     | ≤0.21D                             | ≤0.15D     | ≤0.07D                           | ≤0.05D     | ≤0.21D                             | ≤0.15D     |
| 精加工                  | ≤0.03D                           | ≤0.02D     | ≤0.1D                              | ≤0.05D     | ≤0.02D                           | ≤0.01D     | ≤0.05D                             | ≤0.05D     | ≤0.02D                           | ≤0.01D     | ≤0.05D                             | ≤0.05D     |



# CX500 4枚刃ロングネックラジアスエンドミル

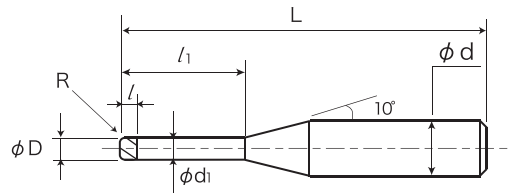
CX500 4-Flute Long Neck Radius End Mill

## CX500-QEMSN



**CX500-QEMSN4-2-10-R0.3**

Model Flute D / 1 R



### 特 性 Features

- Provide high accurate deep rib processing with  $\pm 5\mu\text{m}$  radius accuracy
- Suitable for carbon steel processing and radius positive blade designed for tougher and shaper cutting
- Seamless shape (from peripheral blade to radius blade and bottom center are made by one process)
- Minimize deflection of tool due to tapered radius neck design
- Improvement of CX500-Coating having high oxidation resistance (1300°C) and high hardening exceeding the existing coating meet our own high rig requirement to ensure exceptional piece-to-piece conformity in the processing of prehardened steel and carbon steel



MG  
超微粒



30°



Radius

| 外径公差 Tolerance |
|----------------|
| 0              |
| -0.02          |

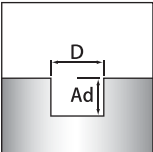
CX500  
Coat

| 炭素鋼<br>Carbon Steel | 合金鋼<br>Alloy Steel | 調質鋼<br>Prehardened Steel | 焼き入れ鋼 Hardened Steel |   |   |   | 鋳鉄<br>Cast Iron | ステンレス鋼<br>Stainless Steels | アルミ合金<br>Aluminium Alloys | 銅合金<br>Copper Alloys | チタン合金<br>耐熱合金<br>Ti/Ni Alloy | グラファイト<br>Graphite | 樹脂<br>Resin |
|---------------------|--------------------|--------------------------|----------------------|---|---|---|-----------------|----------------------------|---------------------------|----------------------|------------------------------|--------------------|-------------|
| ◎                   | ◎                  | ◎                        | ◎                    | ◎ | ◎ | ◎ | ◎               | ◎                          | ◎                         | ◎                    | ◎                            | ◎                  | ◎           |

◎ = Best ○ = Good

| MODEL 型番          | D 外径 | R       | / 刃長 | / 1 | d 1  | L 全長 | d 柄径 | Actual effective length in indine angles |       |       |       |
|-------------------|------|---------|------|-----|------|------|------|------------------------------------------|-------|-------|-------|
| CX500-QEMSN4-2-10 | 2    | 0.2 0.5 | 3    | 10  | 1.95 | 50   | 4    | 30°                                      | 1     | 2     | 3     |
| CX500-QEMSN4-2-12 |      |         |      | 12  |      |      |      | 10.47                                    | 10.99 | 12.21 | 13.73 |
| CX500-QEMSN4-2-16 |      |         |      | 16  |      |      |      | 12.57                                    | 13.19 | 14.65 | 16.48 |
| CX500-QEMSN4-2-20 |      |         |      | 20  |      |      |      | 16.75                                    | 17.58 | 19.53 | Free  |
| CX500-QEMSN4-2-20 | 3    | 0.3 0.5 | 4.5  | 20  | 2.9  | 70   | 6    | 20.94                                    | 21.98 | 24.41 | Free  |
| CX500-QEMSN4-3-16 |      |         |      | 16  |      |      |      | 16.75                                    | 17.58 | 19.53 | 21.97 |
| CX500-QEMSN4-3-20 |      |         |      | 20  |      |      |      | 20.94                                    | 21.98 | 24.41 | 27.46 |
| CX500-QEMSN4-3-25 |      |         |      | 25  |      |      |      | 26.18                                    | 27.47 | 30.51 | Free  |
| CX500-QEMSN4-3-30 | 4    | 0.2 0.5 | 6    | 30  | 3.8  | 70   | 6    | 31.41                                    | 32.97 | 36.62 | Free  |
| CX500-QEMSN4-3-40 |      |         |      | 40  |      |      |      | 41.88                                    | 43.96 | Free  | Free  |
| CX500-QEMSN4-4-16 |      |         |      | 16  |      |      |      | 16.75                                    | 17.58 | 19.53 | Free  |
| CX500-QEMSN4-4-20 |      |         |      | 20  |      |      |      | 20.94                                    | 21.98 | 24.41 | Free  |
| CX500-QEMSN4-4-30 | 4    | 0.2 0.5 | 6    | 30  |      | 100  | 6    | 31.41                                    | 32.97 | 36.62 | Free  |
| CX500-QEMSN4-4-40 |      |         |      | 40  |      |      |      | 41.88                                    | 43.96 | Free  | Free  |

### 推奨切削条件 Standard Milling Condition



- The table show standard milling guidance of perforating process as written picture
- Use a rigid and precise machine and tool holder
- Select a cutting fluid appropriate to the particular usage
- In case the revolution could not be increased by the machine used, Please reduce feed speed and revolution speed at same ration
- When mounting End Mills, The run out of the till will have to be set within 0.01mm

| 被削材<br>Work Material |     |             | 炭素鋼 Carbon Steel<br>(S45C ~ S55C) |                              | 合金鋼・工具鋼 Alloy steel・Tool steel<br>(SKD.SUS.SCM) |                              | 調質鋼 (35~40HRC)<br>(HRM.NAK)   |                              |
|----------------------|-----|-------------|-----------------------------------|------------------------------|-------------------------------------------------|------------------------------|-------------------------------|------------------------------|
| D                    | / 1 | Ad (mm)     | 送り速度<br>(mm/min)<br>Feed rate     | 回転数<br>(min⁻¹)<br>Revolution | 送り速度<br>(mm/min)<br>Feed rate                   | 回転数<br>(min⁻¹)<br>Revolution | 送り速度<br>(mm/min)<br>Feed rate | 回転数<br>(min⁻¹)<br>Revolution |
| 2                    | 10  | 0.037~0.088 | 1000                              | 13000                        | 700                                             | 10500                        | 500                           | 8900                         |
|                      | 12  | 0.018~0.044 | 830                               | 11700                        | 580                                             | 9500                         | 420                           | 8000                         |
|                      | 16  | 0.018~0.044 | 630                               | 9500                         | 440                                             | 7700                         | 310                           | 6500                         |
|                      | 20  | 0.010~0.025 | 500                               | 7700                         | 350                                             | 6200                         | 250                           | 5300                         |
| 3                    | 16  | 0.028~0.067 | 1000                              | 8900                         | 700                                             | 7200                         | 500                           | 5900                         |
|                      | 20  | 0.028~0.067 | 800                               | 8000                         | 560                                             | 6500                         | 400                           | 5300                         |
|                      | 25  | 0.015~0.036 | 640                               | 7200                         | 450                                             | 5900                         | 320                           | 4800                         |
|                      | 30  | 0.015~0.036 | 530                               | 6500                         | 370                                             | 5300                         | 270                           | 4300                         |
| 4                    | 40  | 0.005~0.012 | 400                               | 5900                         | 280                                             | 4800                         | 200                           | 3900                         |
|                      | 16  | 0.045~0.015 | 1000                              | 6500                         | 700                                             | 5400                         | 500                           | 4450                         |
|                      | 20  | 0.045~0.015 | 1000                              | 6500                         | 700                                             | 5400                         | 500                           | 4450                         |
|                      | 30  | 0.023~0.076 | 670                               | 6000                         | 470                                             | 4900                         | 330                           | 4000                         |
|                      | 40  | 0.017~0.046 | 500                               | 5400                         | 350                                             | 4400                         | 250                           | 3600                         |

ロングネック Long Neck

スクエア Square

ラジアス Radius

ボール Ball

ロングネック Long Neck

ラフィング Roughing

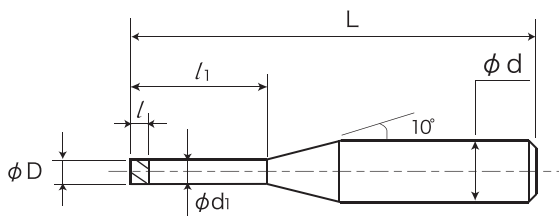
面取り加工用 Chamfering

ドリル Drill

# CX500 3枚刃ロングネックスクエアエンドミル

CX500 3-Flute Long Neck Square End Mill

## CX500-HMSN



### 特 性 Features

- CX500-Coating have high oxidation resistance and hardening which exceeds existing coating and provides long tool life and suitable for high speed processing and dry milling
- Best for rib groove processing of plastic mold (Please select long neck length according to the work piece)
- Long neck prevents tool interference when applying for deep rib processing
- Enable high-efficiency surface finishing of work-piece



| 外径公差 Tolerance |
|----------------|
| 0              |
| -0.02          |



| 炭素鋼<br>Carbon Steel | 合金鋼<br>Alloy Steel | 調質鋼<br>Prehardened Steel | 焼き入れ鋼 Hardened Steel |   |  |  | 鋳鉄<br>Cast Iron | ステンレス鋼<br>Stainless Steels | アルミ合金<br>Aluminium Alloys | 銅合金<br>Copper Alloys | チタン合金<br>耐熱合金<br>Ti/Ni Alloy | グラファイト<br>Graphite | 樹脂<br>Resin |
|---------------------|--------------------|--------------------------|----------------------|---|--|--|-----------------|----------------------------|---------------------------|----------------------|------------------------------|--------------------|-------------|
| ◎                   | ◎                  | ◎                        | ◎                    | ○ |  |  | ○               | ◎                          |                           |                      |                              |                    |             |

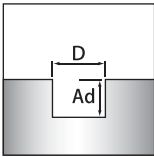
◎ = Best ○ = Good

| MODEL 型番           | D 外径 | / 刃長  | / 1   | d 1   | L 全長  | d 柄径 | Actual effective length in incline angles |       |       |       |
|--------------------|------|-------|-------|-------|-------|------|-------------------------------------------|-------|-------|-------|
|                    |      |       |       |       |       |      | 30'                                       | 1     | 2     | 3     |
| CX500-HMSN3-1-4    | 1    | 1.5   | 4     | 0.95  | 50    | 4    | 4.19                                      | 4.4   | 4.88  | 5.49  |
| CX500-HMSN3-1-6    |      |       | 6     |       |       |      | 6.28                                      | 6.59  | 7.32  | 8.24  |
| CX500-HMSN3-1-8    |      |       | 8     |       |       |      | 8.38                                      | 8.79  | 9.76  | 10.98 |
| CX500-HMSN3-1-10   |      |       | 10    |       |       |      | 10.47                                     | 10.99 | 12.21 | 13.73 |
| CX500-HMSN3-1-12   |      |       | 12    |       |       |      | 12.57                                     | 13.19 | 14.65 | 16.48 |
| CX500-HMSN3-1-14   |      |       | 14    |       | 14.66 |      | 15.39                                     | 17.09 | 19.22 |       |
| CX500-HMSN3-1-16   |      |       | 16    |       | 16.75 |      | 17.58                                     | 19.53 | 21.97 |       |
| CX500-HMSN3-1-20   |      |       | 20    |       | 20.94 |      | 21.98                                     | 24.41 | 27.46 |       |
| CX500-HMSN3-1-25   |      |       | 25    |       | 26.18 |      | 27.47                                     | 30.51 | Free  |       |
| CX500-HMSN3-1-30   |      |       | 30    |       | 31.41 |      | 32.97                                     | 36.61 | Free  |       |
| CX500-HMSN3-1.2-6  | 1.2  | 1.8   | 6     | 1.15  | 50    | 4    | 6.28                                      | 6.59  | 7.32  | 8.24  |
| CX500-HMSN3-1.2-8  |      |       | 8     |       |       |      | 8.34                                      | 8.79  | 9.76  | 10.98 |
| CX500-HMSN3-1.2-10 |      |       | 10    |       |       |      | 10.47                                     | 10.99 | 12.21 | 13.73 |
| CX500-HMSN3-1.2-12 |      |       | 12    |       | 12.57 |      | 13.19                                     | 14.65 | 16.48 |       |
| CX500-HMSN3-1.2-16 |      |       | 16    |       | 16.75 |      | 17.58                                     | 19.53 | 21.97 |       |
| CX500-HMSN3-1.5-6  | 1.5  | 2.3   | 6     | 1.45  | 50    | 4    | 6.28                                      | 6.59  | 7.32  | 8.24  |
| CX500-HMSN3-1.5-8  |      |       | 8     |       |       |      | 8.38                                      | 8.79  | 9.76  | 10.98 |
| CX500-HMSN3-1.5-10 |      |       | 10    |       |       |      | 10.47                                     | 10.99 | 12.21 | 13.73 |
| CX500-HMSN3-1.5-12 |      |       | 12    |       |       |      | 12.57                                     | 13.19 | 14.65 | 16.48 |
| CX500-HMSN3-1.5-14 |      |       | 14    |       |       |      | 14.66                                     | 15.39 | 17.09 | 19.22 |
| CX500-HMSN3-1.5-16 |      |       | 16    |       | 16.75 |      | 17.58                                     | 19.53 | 21.97 |       |
| CX500-HMSN3-1.5-18 |      |       | 18    |       | 18.85 |      | 19.78                                     | 21.97 | 24.71 |       |
| CX500-HMSN3-1.5-20 |      |       | 20    |       | 20.94 |      | 21.98                                     | 24.41 | Free  |       |
| CX500-HMSN3-2-6    |      |       | 6     |       | 6.28  |      | 6.59                                      | 7.32  | 8.24  |       |
| CX500-HMSN3-2-8    |      |       | 8     |       | 8.38  |      | 8.79                                      | 9.76  | 10.98 |       |
| CX500-HMSN3-2-10   | 10   | 10.47 | 10.99 | 12.21 | 13.73 |      |                                           |       |       |       |
| CX500-HMSN3-2-12   | 12   | 12.57 | 13.19 | 14.65 | 16.48 |      |                                           |       |       |       |
| CX500-HMSN3-2-14   | 14   | 14.66 | 15.39 | 17.09 | 19.22 |      |                                           |       |       |       |
| CX500-HMSN3-2-16   | 16   | 16.75 | 17.58 | 19.53 | Free  |      |                                           |       |       |       |
| CX500-HMSN3-2-18   | 18   | 20.94 | 21.98 | 24.41 | Free  |      |                                           |       |       |       |
| CX500-HMSN3-2-20   | 20   | 26.18 | 27.47 | Free  | Free  |      |                                           |       |       |       |
| CX500-HMSN3-2-25   | 25   | 31.41 | 32.97 | Free  | Free  |      |                                           |       |       |       |
| CX500-HMSN3-2-30   | 30   | 31.41 | 32.97 | Free  | Free  |      |                                           |       |       |       |
| CX500-HMSN3-2.5-8  | 2.5  | 3.75  | 8     | 2.4   | 50    | 4    | 8.38                                      | 8.79  | 9.76  | 10.98 |
| CX500-HMSN3-2.5-12 |      |       | 12    |       |       |      | 12.57                                     | 13.19 | 14.65 | 16.48 |
| CX500-HMSN3-2.5-16 |      |       | 16    |       | 16.75 |      | 17.58                                     | 19.53 | Free  |       |
| CX500-HMSN3-2.5-20 |      |       | 20    |       | 20.94 |      | 21.98                                     | 24.41 | Free  |       |
| CX500-HMSN3-2.5-25 |      |       | 25    |       | 26.18 |      | 27.47                                     | Free  | Free  |       |
| CX500-HMSN3-2.5-30 |      |       | 30    |       | 31.41 |      | 32.97                                     | Free  | Free  |       |
| CX500-HMSN3-3-8    | 3    | 4.5   | 8     | 2.9   | 70    | 6    | 8.38                                      | 8.79  | 9.76  | 10.98 |
| CX500-HMSN3-3-12   |      |       | 12    |       |       |      | 12.57                                     | 13.19 | 14.65 | 16.48 |
| CX500-HMSN3-3-16   |      |       | 16    |       |       |      | 16.75                                     | 17.58 | 19.53 | Free  |
| CX500-HMSN3-3-20   |      |       | 20    |       |       |      | 20.94                                     | 21.98 | 24.41 | Free  |
| CX500-HMSN3-3-25   |      |       | 25    |       |       |      | 26.18                                     | 27.47 | Free  | Free  |
| CX500-HMSN3-3-30   |      |       | 30    |       |       |      | 31.41                                     | 32.97 | Free  | Free  |
| CX500-HMSN3-3-40   |      |       | 40    |       |       |      | 41.88                                     | 43.96 | Free  | Free  |

# CX500-HMSN

| MODEL 型番         | D 外径 | / 刃長 | / 1 | d 1 | L 全長 | d 柄径 | Actual effective length in incline angles |       |       |       |
|------------------|------|------|-----|-----|------|------|-------------------------------------------|-------|-------|-------|
|                  |      |      |     |     |      |      | 30°                                       | 1     | 2     | 3     |
| CX500-HMSN3-4-12 | 4    | 4.5  | 12  | 2.9 | 50   | 6    | 12.57                                     | 13.19 | 14.65 | 16.48 |
| CX500-HMSN3-4-16 |      |      | 16  |     |      |      | 16.75                                     | 17.58 | 19.53 | Free  |
| CX500-HMSN3-4-20 |      |      | 20  |     |      |      | 20.94                                     | 21.98 | 24.41 | Free  |
| CX500-HMSN3-4-30 |      |      | 30  |     |      |      | 31.41                                     | 32.97 | Free  | Free  |
| CX500-HMSN3-4-40 |      |      | 40  |     |      |      | 41.88                                     | 43.96 | Free  | Free  |
| CX500-HMSN3-5-16 | 5    | 7.5  | 16  | 4.8 | 70   | 6    | 16.75                                     | 17.58 | Free  | Free  |
| CX500-HMSN3-5-25 |      |      | 25  |     |      |      | 26.18                                     | 27.47 | Free  | Free  |
| CX500-HMSN3-5-35 |      |      | 35  |     |      |      | 36.65                                     | Free  | Free  | Free  |
| CX500-HMSN3-5-50 |      |      | 50  |     |      |      | 52.35                                     | Free  | Free  | Free  |
| CX500-HMSN3-6-20 | 6    | 9    | 20  | 5.8 | 100  | 6    | Free                                      | Free  | Free  | Free  |
| CX500-HMSN3-6-30 |      |      | 30  |     |      |      | Free                                      | Free  | Free  | Free  |
| CX500-HMSN3-6-40 |      |      | 40  |     |      |      | Free                                      | Free  | Free  | Free  |
| CX500-HMSN3-6-50 |      |      | 50  |     |      |      | Free                                      | Free  | Free  | Free  |
| CX500-HMSN3-6-60 |      |      | 60  |     |      |      | Free                                      | Free  | Free  | Free  |

## 推奨切削条件 Standard Milling Condition



- The table show standard milling guidance of perforating process as written picture
- Use a rigid and precise machine and tool holder
- Select a cutting fluid appropriate to the particular usage
- In case the revolution could not be increased by the machine used, Please reduce feed speed and revolution speed at same ration
- When mounting End Mills, The run out of the till will have to be set within 0.01mm

| 被削材 Work Material |     |               | 炭素鋼 Carbon Steel (S45C ~ S55C) |                                    | 合金鋼 工具鋼 Alloy steel - Tool steel (SKD.SUS.SCM) |                                    | 調質鋼 (35~40HRC) (HRM.NAK) |                                    |
|-------------------|-----|---------------|--------------------------------|------------------------------------|------------------------------------------------|------------------------------------|--------------------------|------------------------------------|
| D                 | / 1 | Ad (mm)       | 送り速度 (mm/min) Feed rate        | 回転数 (mm <sup>-1</sup> ) Revolution | 送り速度 (mm/min) Feed rate                        | 回転数 (mm <sup>-1</sup> ) Revolution | 送り速度 (mm/min) Feed rate  | 回転数 (mm <sup>-1</sup> ) Revolution |
| 1                 | 6   | 0.01 ~ 0.025  | 470                            | 23900                              | 330                                            | 19400                              | 230                      | 15800                              |
|                   | 8   | 0.01 ~ 0.025  | 350                            | 21500                              | 250                                            | 17500                              | 175                      | 14200                              |
|                   | 10  | 0.005 ~ 0.014 | 280                            | 19400                              | 750                                            | 19000                              | 140                      | 12800                              |
|                   | 12  | 0.005 ~ 0.012 | 230                            | 17500                              | 160                                            | 14200                              | 120                      | 11500                              |
| 1.5               | 6   | 0.03 ~ 0.075  | 700                            | 17500                              | 490                                            | 14000                              | 350                      | 11500                              |
|                   | 8   | 0.016 ~ 0.038 | 700                            | 17500                              | 490                                            | 14000                              | 350                      | 11500                              |
|                   | 10  | 0.016 ~ 0.038 | 560                            | 15800                              | 400                                            | 12600                              | 280                      | 10400                              |
|                   | 12  | 0.016 ~ 0.038 | 470                            | 14200                              | 330                                            | 11300                              | 230                      | 9400                               |
| 2                 | 10  | 0.037 ~ 0.038 | 700                            | 13000                              | 490                                            | 10500                              | 350                      | 8900                               |
|                   | 12  | 0.018 ~ 0.044 | 510                            | 11700                              | 400                                            | 9500                               | 290                      | 8000                               |
|                   | 14  | 0.018 ~ 0.044 | 500                            | 10500                              | 350                                            | 8600                               | 250                      | 7200                               |
|                   | 16  | 0.018 ~ 0.044 | 440                            | 9500                               | 310                                            | 7700                               | 220                      | 6500                               |
| 3                 | 20  | 0.01 ~ 0.025  | 350                            | 7700                               | 250                                            | 6200                               | 180                      | 5300                               |
|                   | 16  | 0.028 ~ 0.067 | 700                            | 8900                               | 490                                            | 7200                               | 350                      | 5900                               |
|                   | 20  | 0.028 ~ 0.067 | 560                            | 8000                               | 390                                            | 6500                               | 280                      | 5300                               |
|                   | 25  | 0.015 ~ 0.036 | 450                            | 7200                               | 320                                            | 5900                               | 220                      | 4800                               |
| 4                 | 30  | 0.015 ~ 0.036 | 370                            | 6500                               | 260                                            | 5300                               | 190                      | 4300                               |
|                   | 40  | 0.005 ~ 0.012 | 280                            | 5900                               | 200                                            | 4800                               | 140                      | 3900                               |
|                   | 16  | 0.045 ~ 0.15  | 700                            | 6650                               | 490                                            | 5400                               | 350                      | 4450                               |
|                   | 20  | 0.045 ~ 0.15  | 700                            | 6650                               | 490                                            | 5400                               | 350                      | 4450                               |
| 5                 | 30  | 0.023 ~ 0.076 | 470                            | 6000                               | 330                                            | 4900                               | 230                      | 4000                               |
|                   | 40  | 0.017 ~ 0.046 | 350                            | 5400                               | 250                                            | 4400                               | 180                      | 3600                               |
|                   | 25  | 0.079 ~ 0.189 | 700                            | 5300                               | 490                                            | 4300                               | 350                      | 3550                               |
|                   | 35  | 0.04 ~ 0.096  | 340                            | 4800                               | 350                                            | 3900                               | 250                      | 3200                               |
| 6                 | 30  | 0.079 ~ 0.189 | 700                            | 4450                               | 490                                            | 3600                               | 350                      | 2950                               |
|                   | 40  | 0.04 ~ 0.096  | 530                            | 4000                               | 370                                            | 3200                               | 270                      | 2700                               |

ロングネック Long Neck

スクエア Square

ラジアス Radius

ボール Ball

ロングネック Long Neck

ラフニング Roughing

面取り加工用 Chamfering

ドリル Drill

# CX500 2枚刃ロングネックボールエンドミル

CX500 4-Flute Long Neck Ball End Mill

## CX500-HBSN



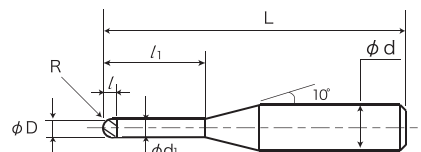
**CX500-HBSN2-0.4-10-4**

Model Flute R / 1 d

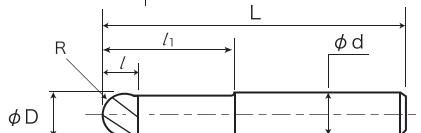
### 特性 Features

- CX500-Coating have high oxidation resistance and hardening which exceeds existing coating and provides long tool life and suitable for high speed processing and dry milling
- Suitable for high efficiency 3-D processing of Mold due to high chip ejection
- Enable high-efficiency surface finishing of work-piece
- Application for hardened steel processing up to 65HRC
- Long Neck prevent tool interference when processing deep holes
- Cutting edge chipping is minimum and stable high efficiency milling is possible in deep rib flute slotting of mold or radius milling of deep holes.

Type 1



Type 2



SMG  
超々微粒



| R 値 Radius | R 精度 Accuracy    |
|------------|------------------|
| 0.5~2      | +0.005<br>-0.005 |
| 3~6        | +0.003<br>-0.007 |



| 炭素鋼<br>Carbon Steel | 合金鋼<br>Alloy Steel | 調質鋼<br>Prehardened Steel | 焼き入れ鋼 Hardened Steel |   |   |   | 鋳鉄<br>Cast Iron | ステンレス鋼<br>Stainless Steels | アルミ合金<br>Aluminium Alloys | 銅合金<br>Copper Alloys | チタン合金<br>耐熱合金<br>Ti/Ni Alloy | グラファイト<br>Graphite | 樹脂<br>Resin |
|---------------------|--------------------|--------------------------|----------------------|---|---|---|-----------------|----------------------------|---------------------------|----------------------|------------------------------|--------------------|-------------|
| ○                   | ○                  | ○                        | ○                    | ◎ | ◎ | ◎ | ◎               | ○                          |                           |                      |                              |                    |             |

◎ = Best ○ = Good

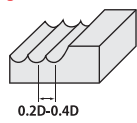
| MODEL 型番               | R    | / 刃長 | / 1 | d 1  | L 全長 | d 柄径 | Actual effective length in incline angles |       |       |       | Type |
|------------------------|------|------|-----|------|------|------|-------------------------------------------|-------|-------|-------|------|
|                        |      |      |     |      |      |      | 30°                                       | 1     | 2     | 3     |      |
| CX500-HBSN2-0.1-0.5-4  | 0.1  | 0.15 | 0.5 | 0.18 | 50   | 4    | 0.52                                      | 0.54  | 0.59  | 0.65  | 1    |
| CX500-HBSN2-0.1-1-4    |      |      | 1   |      |      |      | 1.04                                      | 1.08  | 1.18  | 1.31  |      |
| CX500-HBSN2-0.1-2-4    |      |      | 2   |      |      |      | 2.08                                      | 2.16  | 2.36  | 2.63  |      |
| CX500-HBSN2-0.15-1-4   | 0.15 | 0.20 | 1   | 0.28 | 50   | 4    | 1.04                                      | 1.08  | 1.18  | 1.31  | 1    |
| CX500-HBSN2-0.15-1.5-4 |      |      | 1.5 |      |      |      | 1.56                                      | 1.62  | 1.77  | 1.97  |      |
| CX500-HBSN2-0.15-2-4   |      |      | 2   |      |      |      | 2.08                                      | 2.16  | 2.36  | 2.63  |      |
| CX500-HBSN2-0.2-1-4    | 0.2  | 0.3  | 1   | 0.37 | 50   | 4    | 1.04                                      | 1.08  | 1.18  | 1.31  | 1    |
| CX500-HBSN2-0.2-1.5-4  |      |      | 1.5 |      |      |      | 1.56                                      | 1.62  | 1.77  | 1.97  |      |
| CX500-HBSN2-0.2-2-4    |      |      | 2   |      |      |      | 2.08                                      | 2.16  | 2.36  | 2.63  |      |
| CX500-HBSN2-0.2-3-4    |      |      | 3   |      |      |      | 3.12                                      | 3.24  | 3.55  | 3.94  |      |
| CX500-HBSN2-0.2-4-4    |      |      | 4   |      |      |      | 4.16                                      | 4.33  | 4.73  | 5.26  |      |
| CX500-HBSN2-0.2-5-4    |      |      | 5   |      |      |      | 5.2                                       | 5.41  | 5.91  | 6.57  |      |
| CX500-HBSN2-0.3-2-4    | 0.3  | 0.45 | 2   | 0.56 | 50   | 4    | 2.08                                      | 2.16  | 2.36  | 2.63  | 1    |
| CX500-HBSN2-0.3-3-4    |      |      | 3   |      |      |      | 3.12                                      | 3.24  | 3.55  | 3.94  |      |
| CX500-HBSN2-0.3-4-4    |      |      | 4   |      |      |      | 4.16                                      | 4.33  | 4.73  | 5.26  |      |
| CX500-HBSN2-0.3-5-4    |      |      | 5   |      |      |      | 5.2                                       | 5.41  | 5.91  | 6.57  |      |
| CX500-HBSN2-0.3-6-4    |      |      | 6   |      |      |      | 6.24                                      | 6.49  | 7.1   | 7.89  |      |
| CX500-HBSN2-0.3-8-4    |      |      | 8   |      |      |      | 8.32                                      | 8.66  | 9.46  | 10.52 |      |
| CX500-HBSN2-0.4-4-4    | 0.4  | 0.6  | 4   | 0.76 | 50   | 4    | 4.16                                      | 4.33  | 4.73  | 5.26  | 1    |
| CX500-HBSN2-0.4-6-4    |      |      | 6   |      |      |      | 6.24                                      | 6.49  | 7.1   | 7.89  |      |
| CX500-HBSN2-0.4-8-4    |      |      | 8   |      |      |      | 8.32                                      | 8.66  | 9.46  | 10.52 |      |
| CX500-HBSN2-0.4-10-4   |      |      | 10  |      |      |      | 10.4                                      | 10.83 | 11.83 | 13.15 |      |

# CX500-HBSN

| MODEL 型番              | R    | / 刃長 | / 1 | d 1  | L 全長 | d 柄径 | Actual effective length in incline angles |       |        |       | Type |
|-----------------------|------|------|-----|------|------|------|-------------------------------------------|-------|--------|-------|------|
|                       |      |      |     |      |      |      | 30°                                       | 1     | 2      | 3     |      |
| CX500-HBSN2-0.5-3-4   | 0.5  | 0.75 | 3   | 0.95 | 50   | 4    | 3.12                                      | 3.24  | 3.55   | 3.94  | 1    |
| CX500-HBSN2-0.5-4-4   |      |      | 4   |      |      | 6    | 4.16                                      | 4.33  | 4.73   | 5.26  |      |
| CX500-HBSN2-0.5-4-6   |      |      | 4   |      |      | 4    | 4.1                                       | 4.22  | 4.48   | 4.83  |      |
| CX500-HBSN2-0.5-5-4   |      |      | 5   |      |      | 4    | 5.2                                       | 5.41  | 5.91   | 6.57  |      |
| CX500-HBSN2-0.5-6-4   |      |      | 6   |      |      | 6    | 6.24                                      | 6.49  | 7.1    | 7.89  |      |
| CX500-HBSN2-0.5-6-6   |      |      | 6   |      |      | 6    | 6.16                                      | 6.34  | 6.72   | 7.25  |      |
| CX500-HBSN2-0.5-7-4   |      |      | 7   |      |      | 4    | 7.28                                      | 7.58  | 8.28   | 9.2   |      |
| CX500-HBSN2-0.5-8-4   |      |      | 8   |      |      | 6    | 8.32                                      | 8.66  | 9.46   | 10.52 |      |
| CX500-HBSN2-0.5-8-6   |      |      | 8   |      |      | 4    | 8.21                                      | 8.45  | 8.96   | 9.66  |      |
| CX500-HBSN2-0.5-10-4  |      |      | 10  |      |      | 4    | 10.4                                      | 10.83 | 11.83  | 13.15 |      |
| CX500-HBSN2-0.5-10-6  |      |      | 10  |      |      | 6    | 10.26                                     | 10.56 | 11.21  | 12.08 |      |
| CX500-HBSN2-0.5-12-4  |      |      | 12  |      |      | 4    | 12.48                                     | 12.99 | 14.2   | 15.78 |      |
| CX500-HBSN2-0.5-14-4  |      |      | 14  |      |      |      | 14.57                                     | 15.16 | 16.57  | 18.41 |      |
| CX500-HBSN2-0.5-16-4  |      |      | 16  |      |      |      | 16.65                                     | 17.33 | 18.93  | 21.04 |      |
| CX500-HBSN2-0.5-18-4  |      |      | 18  |      |      |      | 18.73                                     | 19.49 | 21.3   | 23.67 |      |
| CX500-HBSN2-0.5-20-4  |      |      | 20  |      |      |      | 20.81                                     | 21.66 | 23.67  | 26.3  |      |
| CX500-HBSN2-0.6-6-4   | 0.6  | 0.9  | 6   | 1.15 | 50   | 4    | 6.24                                      | 6.49  | 7.1    | 7.89  | 1    |
| CX500-HBSN2-0.6-8-4   |      |      | 8   |      |      | 4    | 8.32                                      | 8.66  | 9.46   | 10.52 |      |
| CX500-HBSN2-0.6-10-4  |      |      | 10  |      |      | 4    | 10.4                                      | 10.83 | 11.83  | 13.15 |      |
| CX500-HBSN2-0.6-12-4  |      |      | 12  |      |      | 4    | 12.48                                     | 12.99 | 14.2   | 15.78 |      |
| CX500-HBSN2-0.75-6-4  | 0.75 | 1    | 6   | 1.45 | 50   | 4    | 6.24                                      | 6.49  | 7.1    | 7.89  | 1    |
| CX500-HBSN2-0.75-8-4  |      |      | 8   |      |      | 4    | 8.32                                      | 8.66  | 9.46   | 10.52 |      |
| CX500-HBSN2-0.75-10-4 |      |      | 10  |      |      | 4    | 10.4                                      | 10.83 | 11.83  | 13.15 |      |
| CX500-HBSN2-0.75-12-4 |      |      | 12  |      |      | 4    | 12.48                                     | 12.99 | 14.2   | 15.78 |      |
| CX500-HBSN2-0.75-16-4 |      |      | 16  |      |      | 4    | 16.65                                     | 17.33 | 18.93  | 21.04 |      |
| CX500-HBSN2-0.75-20-4 |      |      | 20  |      |      | 4    | 20.81                                     | 21.66 | 23.67  | 26.3  |      |
| CX500-HBSN2-0.8-8-4   | 0.8  | 1.2  | 8   | 1.55 | 50   | 4    | 8.32                                      | 8.66  | 9.46   | 10.52 | 1    |
| CX500-HBSN2-0.8-12-4  |      |      | 12  |      |      | 4    | 12.48                                     | 12.99 | 14.2   | 15.78 |      |
| CX500-HBSN2-1-4-4     | 1    | 1.5  | 4   | 1.95 | 50   | 4    | 4.16                                      | 4.33  | 4.73   | 5.26  | 1    |
| CX500-HBSN2-1-6-4     |      |      | 6   |      |      | 6    | 6.24                                      | 6.49  | 7.1    | 7.89  |      |
| CX500-HBSN2-1-6-6     |      |      | 6   |      |      | 4    | 6.16                                      | 6.43  | 6.72   | 7.25  |      |
| CX500-HBSN2-1-8-4     |      |      | 8   |      |      | 4    | 8.32                                      | 8.66  | 9.46   | 10.52 |      |
| CX500-HBSN2-1-8-6     |      |      | 8   |      |      | 6    | 8.21                                      | 8.45  | 8.96   | 9.66  |      |
| CX500-HBSN2-1-10-4    |      |      | 10  |      |      | 4    | 10.4                                      | 10.83 | 11.83  | 13.15 |      |
| CX500-HBSN2-1-10-6    |      |      | 10  |      |      | 6    | 10.26                                     | 10.56 | 11.21  | 12.08 |      |
| CX500-HBSN2-1-12-4    |      |      | 12  |      |      | 4    | 12.48                                     | 12.99 | 14.2   | 15.78 |      |
| CX500-HBSN2-1-12-6    |      |      | 12  |      |      | 6    | 12.32                                     | 12.68 | 13.45  | 14.5  |      |
| CX500-HBSN2-1-14-4    |      |      | 14  |      |      | 4    | 14.57                                     | 15.16 | 16.57  | 18.41 |      |
| CX500-HBSN2-1-16-4    |      |      | 16  |      |      | 4    | 15.65                                     | 17.33 | 18.93  | 21.04 |      |
| CX500-HBSN2-1-18-4    |      |      | 18  |      |      | 4    | 18.73                                     | 19.49 | 21.3   | Free  |      |
| CX500-HBSN2-1-20-4    |      |      | 20  |      |      | 4    | 20.81                                     | 21.66 | 23.67  | Free  |      |
| CX500-HBSN2-1-22-4    |      |      | 22  |      | 70   | 4    | 22.89                                     | 23.83 | 26.04  | Free  |      |
| CX500-HBSN2-1-25-4    |      |      | 25  |      |      | 4    | 26.02                                     | 27.08 | 29.59  | Free  |      |
| CX500-HBSN2-1-30-4    |      |      | 30  |      |      | 4    | 31.22                                     | 32.49 | 35.51  | Free  |      |
| CX500-HBSN2-1-35-4    |      |      | 35  |      | 110  | 4    | 36.42                                     | 37.91 | Free   | Free  |      |
| CX500-HBSN2-1-40-4    |      |      | 40  |      |      | 4    | 41.63                                     | 43.32 | Free   | Free  |      |
| CX500-HBSN2-1.5-8-6   | 1.5  | 2.5  | 8   | 2.9  | 50   | 6    | 8.32                                      | 8.66  | 9.46   | 10.52 | 1    |
| CX500-HBSN2-1.5-10-6  |      |      | 10  |      |      | 6    | 10.4                                      | 10.83 | 11.83  | 13.15 |      |
| CX500-HBSN2-1.5-16-6  |      |      | 16  |      |      | 6    | 16.65                                     | 17.33 | 18.93  | 21.04 |      |
| CX500-HBSN2-1.5-20-6  |      |      | 20  |      |      | 6    | 20.81                                     | 21.66 | 23.67  | 26.3  |      |
| CX500-HBSN2-1.5-25-6  |      |      | 25  |      | 70   | 6    | 26.02                                     | 27.08 | 29.59  | 32.87 |      |
| CX500-HBSN2-1.5-30-6  |      |      | 30  |      |      | 6    | 31.22                                     | 32.49 | 35.51  | Free  |      |
| CX500-HBSN2-1.5-35-6  |      |      | 35  |      |      | 6    | 36.42                                     | 37.91 | 41.42  | Free  |      |
| CX500-HBSN2-1.5-40-6  |      |      | 40  |      |      | 6    | 41.63                                     | 43.32 | 47.347 | Free  |      |
| CX500-HBSN2-2-10-6    | 2    | 3    | 10  | 3.85 | 50   | 6    | 10.40                                     | 10.83 | 11.83  | 13.15 | 1    |
| CX500-HBSN2-2-12-6    |      |      | 12  |      |      | 6    | 12.48                                     | 12.99 | 14.2   | 15.78 |      |
| CX500-HBSN2-2-16-6    |      |      | 16  |      |      | 6    | 16.65                                     | 17.33 | 18.93  | 21.04 |      |
| CX500-HBSN2-2-20-6    |      |      | 20  |      |      | 6    | 20.81                                     | 21.66 | 23.67  | Free  |      |
| CX500-HBSN2-2-25-6    |      |      | 25  |      | 70   | 6    | 26.02                                     | 27.08 | 29.59  | Free  |      |
| CX500-HBSN2-2-30-6    |      |      | 30  |      |      | 6    | 31.22                                     | 32.49 | 35.51  | Free  |      |
| CX500-HBSN2-2-35-6    |      |      | 35  |      |      | 6    | 36.42                                     | 37.91 | Free   | Free  |      |
| CX500-HBSN2-2-40-6    |      |      | 40  |      |      | 6    | 41.63                                     | 43.32 | Free   | Free  |      |
| CX500-HBSN2-2-45-6    |      |      | 45  |      | 110  | 6    | 46.83                                     | 48.74 | Free   | Free  |      |
| CX500-HBSN2-2-50-6    |      |      | 50  |      |      | 6    | 52.04                                     | 54.16 | Free   | Free  |      |
| CX500-HBSN2-3-30-6    | 3    | 6    | 30  | 5.85 | 70   | 6    | Free                                      | Free  | Free   | Free  | 2    |
| CX500-HBSN2-3-50-6    |      |      | 50  |      | 110  | 6    | Free                                      | Free  | Free   | Free  |      |

## 推奨切削条件 Standard Milling Condition

① D=2 × R



- The table show standard milling guidance of perforating process as written picture
- Use a rigid and precise machine and tool holder
- Select a cutting fluid appropriate to the particular usage
- In case the revolution could not be increased by the machine used, Please reduce feed speed and revolution speed at same ration
- When mounting End Mills, The run out of the till will have to be set within 0.01mm

ロングネック Long Neck

スクエア Square

ラジアス Radius

ボール Ball

ロングネック Long Neck

ラフニング Roughing

面取り加工用 Chamfering

ドリル Drill



推奨切削条件 Standard Milling Condition

CX500-HBSN

| 被削材<br>Work Material |     | 炭素鋼 carbon steel<br>(S45C ~ S55C) |                                          |            | 高硬度鋼 hardened Steel<br>(S5 ~ 60RHC) |                                          |            | 高硬度鋼 hardened Steel<br>(60 ~ 65RHC) |                                          |            |
|----------------------|-----|-----------------------------------|------------------------------------------|------------|-------------------------------------|------------------------------------------|------------|-------------------------------------|------------------------------------------|------------|
| R                    | / 1 | 送り速度<br>(mm/min)<br>Feed rate     | 回転数<br>(mm <sup>-1</sup> )<br>Revolution | Ad<br>(mm) | 送り速度<br>(mm/min)<br>Feed rate       | 回転数<br>(mm <sup>-1</sup> )<br>Revolution | Ad<br>(mm) | 送り速度<br>(mm/min)<br>Feed rate       | 回転数<br>(mm <sup>-1</sup> )<br>Revolution | Ad<br>(mm) |
| 0.1                  | 0.5 | 320                               | 50000                                    | 0.015      | 320                                 | 50000                                    | 0.012      | 240                                 | 50000                                    | 0.011      |
| 0.1                  | 1   | 320                               | 50000                                    | 0.011      | 320                                 | 50000                                    | 0.008      | 240                                 | 50000                                    | 0.008      |
| 0.1                  | 2   | 320                               | 50000                                    | 0.011      | 320                                 | 50000                                    | 0.008      | 240                                 | 50000                                    | 0.008      |
| 0.15                 | 1   | 480                               | 50000                                    | 0.016      | 320                                 | 38200                                    | 0.013      | 270                                 | 34000                                    | 0.012      |
| 0.15                 | 1.5 | 480                               | 50000                                    | 0.011      | 320                                 | 38200                                    | 0.009      | 270                                 | 34000                                    | 0.008      |
| 0.15                 | 2   | 480                               | 50000                                    | 0.009      | 320                                 | 38200                                    | 0.007      | 270                                 | 34000                                    | 0.007      |
| 0.2                  | 1   | 640                               | 44600                                    | 0.030      | 360                                 | 28600                                    | 0.024      | 300                                 | 25500                                    | 0.022      |
| 0.2                  | 1.5 | 640                               | 44600                                    | 0.026      | 360                                 | 28600                                    | 0.021      | 300                                 | 25500                                    | 0.019      |
| 0.2                  | 2   | 490                               | 38000                                    | 0.021      | 260                                 | 23000                                    | 0.017      | 240                                 | 21000                                    | 0.015      |
| 0.2                  | 3   | 490                               | 38000                                    | 0.012      | 260                                 | 23000                                    | 0.010      | 240                                 | 21000                                    | 0.009      |
| 0.2                  | 4   | 490                               | 38000                                    | 0.012      | 260                                 | 23000                                    | 0.010      | 240                                 | 21000                                    | 0.009      |
| 0.2                  | 5   | 490                               | 38000                                    | 0.012      | 260                                 | 23000                                    | 0.010      | 240                                 | 21000                                    | 0.009      |
| 0.3                  | 2   | 620                               | 29700                                    | 0.032      | 350                                 | 19100                                    | 0.025      | 280                                 | 17000                                    | 0.023      |
| 0.3                  | 3   | 620                               | 29700                                    | 0.027      | 350                                 | 19100                                    | 0.022      | 280                                 | 17000                                    | 0.02       |
| 0.3                  | 4   | 620                               | 29700                                    | 0.018      | 350                                 | 19100                                    | 0.014      | 280                                 | 17000                                    | 0.013      |
| 0.3                  | 5   | 620                               | 29700                                    | 0.015      | 350                                 | 19100                                    | 0.012      | 280                                 | 17000                                    | 0.011      |
| 0.3                  | 6   | 500                               | 24000                                    | 0.011      | 290                                 | 16000                                    | 0.009      | 220                                 | 14000                                    | 0.008      |
| 0.3                  | 8   | 500                               | 24000                                    | 0.011      | 290                                 | 16000                                    | 0.009      | 220                                 | 14000                                    | 0.008      |
| 0.4                  | 4   | 650                               | 22300                                    | 0.042      | 360                                 | 14300                                    | 0.034      | 290                                 | 12700                                    | 0.031      |
| 0.4                  | 6   | 640                               | 22300                                    | 0.024      | 360                                 | 14300                                    | 0.019      | 280                                 | 12700                                    | 0.018      |
| 0.4                  | 8   | 460                               | 16000                                    | 0.015      | 270                                 | 10800                                    | 0.012      | 220                                 | 9800                                     | 0.011      |
| 0.4                  | 10  | 460                               | 16000                                    | 0.015      | 270                                 | 10800                                    | 0.012      | 220                                 | 9800                                     | 0.011      |
| 0.5                  | 3   | 620                               | 17800                                    | 0.075      | 350                                 | 11500                                    | 0.06       | 290                                 | 10200                                    | 0.055      |
| 0.5                  | 4   | 620                               | 17800                                    | 0.053      | 350                                 | 11500                                    | 0.042      | 290                                 | 10200                                    | 0.039      |
| 0.5                  | 5   | 620                               | 17800                                    | 0.045      | 350                                 | 11500                                    | 0.036      | 290                                 | 10200                                    | 0.033      |
| 0.5                  | 6   | 530                               | 15000                                    | 0.030      | 290                                 | 9600                                     | 0.024      | 260                                 | 9000                                     | 0.022      |
| 0.5                  | 7   | 530                               | 15000                                    | 0.030      | 290                                 | 9600                                     | 0.024      | 260                                 | 9000                                     | 0.022      |
| 0.5                  | 8   | 530                               | 15000                                    | 0.030      | 290                                 | 9600                                     | 0.024      | 260                                 | 9000                                     | 0.022      |
| 0.5                  | 10  | 480                               | 13800                                    | 0.019      | 260                                 | 8500                                     | 0.015      | 230                                 | 8100                                     | 0.014      |
| 0.5                  | 12  | 480                               | 13800                                    | 0.019      | 260                                 | 8500                                     | 0.015      | 230                                 | 8100                                     | 0.014      |
| 0.5                  | 14  | 480                               | 13800                                    | 0.015      | 260                                 | 8500                                     | 0.012      | 230                                 | 8100                                     | 0.011      |
| 0.5                  | 16  | 460                               | 13000                                    | 0.011      | 230                                 | 7600                                     | 0.009      | 210                                 | 7300                                     | 0.008      |
| 0.5                  | 18  | 460                               | 13000                                    | 0.010      | 230                                 | 7600                                     | 0.008      | 210                                 | 7300                                     | 0.007      |
| 0.5                  | 20  | 460                               | 13000                                    | 0.008      | 230                                 | 7600                                     | 0.006      | 210                                 | 7300                                     | 0.006      |
| 0.6                  | 6   | 620                               | 14900                                    | 0.030      | 350                                 | 9500                                     | 0.024      | 300                                 | 8500                                     | 0.022      |
| 0.6                  | 8   | 620                               | 14900                                    | 0.030      | 350                                 | 9500                                     | 0.024      | 300                                 | 8500                                     | 0.022      |
| 0.6                  | 10  | 520                               | 12500                                    | 0.030      | 270                                 | 8000                                     | 0.024      | 260                                 | 7300                                     | 0.022      |
| 0.6                  | 12  | 520                               | 12500                                    | 0.023      | 270                                 | 8000                                     | 0.018      | 260                                 | 7300                                     | 0.017      |
| 0.75                 | 6   | 630                               | 11900                                    | 0.045      | 350                                 | 7600                                     | 0.036      | 300                                 | 6800                                     | 0.033      |
| 0.75                 | 8   | 630                               | 11900                                    | 0.045      | 350                                 | 7600                                     | 0.036      | 300                                 | 6800                                     | 0.033      |
| 0.75                 | 10  | 540                               | 10200                                    | 0.045      | 290                                 | 6300                                     | 0.036      | 270                                 | 6100                                     | 0.033      |
| 0.75                 | 12  | 540                               | 10200                                    | 0.045      | 290                                 | 6300                                     | 0.036      | 270                                 | 6100                                     | 0.033      |
| 0.75                 | 16  | 660                               | 9600                                     | 0.029      | 270                                 | 5800                                     | 0.023      | 240                                 | 5500                                     | 0.021      |
| 0.75                 | 20  | 660                               | 9600                                     | 0.029      | 270                                 | 5800                                     | 0.023      | 240                                 | 5500                                     | 0.021      |
| 0.8                  | 8   | 620                               | 11100                                    | 0.083      | 350                                 | 7200                                     | 0.066      | 290                                 | 6400                                     | 0.061      |
| 0.8                  | 12  | 620                               | 11100                                    | 0.049      | 350                                 | 7200                                     | 0.039      | 290                                 | 6400                                     | 0.036      |
| 1                    | 4   | 610                               | 8900                                     | 0.150      | 340                                 | 5700                                     | 0.120      | 280                                 | 5100                                     | 0.110      |
| 1                    | 6   | 610                               | 8900                                     | 0.150      | 340                                 | 5700                                     | 0.120      | 280                                 | 5100                                     | 0.110      |
| 1                    | 8   | 610                               | 8900                                     | 0.105      | 340                                 | 5700                                     | 0.084      | 280                                 | 5100                                     | 0.077      |
| 1                    | 10  | 520                               | 7500                                     | 0.105      | 290                                 | 4800                                     | 0.084      | 240                                 | 4400                                     | 0.077      |
| 1                    | 12  | 520                               | 7500                                     | 0.060      | 290                                 | 4800                                     | 0.048      | 240                                 | 4400                                     | 0.044      |
| 1                    | 14  | 520                               | 7500                                     | 0.060      | 290                                 | 4800                                     | 0.048      | 240                                 | 4400                                     | 0.044      |
| 1                    | 16  | 520                               | 7500                                     | 0.060      | 290                                 | 4800                                     | 0.048      | 240                                 | 4400                                     | 0.044      |
| 1                    | 18  | 520                               | 7500                                     | 0.049      | 290                                 | 4800                                     | 0.039      | 240                                 | 4400                                     | 0.036      |
| 1                    | 20  | 460                               | 6600                                     | 0.038      | 240                                 | 4000                                     | 0.030      | 210                                 | 3700                                     | 0.028      |
| 1                    | 22  | 460                               | 6600                                     | 0.038      | 240                                 | 4000                                     | 0.030      | 210                                 | 3700                                     | 0.028      |
| 1                    | 25  | 460                               | 6600                                     | 0.038      | 240                                 | 4000                                     | 0.030      | 210                                 | 3700                                     | 0.028      |
| 1                    | 30  | 370                               | 5400                                     | 0.023      | 210                                 | 3500                                     | 0.018      | 180                                 | 3200                                     | 0.017      |
| 1                    | 35  | 370                               | 5400                                     | 0.023      | 210                                 | 3500                                     | 0.018      | 180                                 | 3200                                     | 0.017      |
| 1                    | 40  | 370                               | 5400                                     | 0.023      | 210                                 | 3500                                     | 0.018      | 180                                 | 3200                                     | 0.017      |
| 1.5                  | 8   | 760                               | 5900                                     | 0.225      | 420                                 | 3800                                     | 0.180      | 360                                 | 3400                                     | 0.165      |
| 1.5                  | 10  | 760                               | 5900                                     | 0.158      | 420                                 | 3800                                     | 0.126      | 360                                 | 3400                                     | 0.116      |
| 1.5                  | 16  | 640                               | 5000                                     | 0.158      | 360                                 | 3200                                     | 0.126      | 300                                 | 2900                                     | 0.116      |
| 1.5                  | 20  | 640                               | 5000                                     | 0.090      | 360                                 | 3200                                     | 0.072      | 300                                 | 2900                                     | 0.066      |
| 1.5                  | 25  | 640                               | 5000                                     | 0.060      | 360                                 | 3200                                     | 0.048      | 300                                 | 2900                                     | 0.044      |
| 1.5                  | 30  | 350                               | 4300                                     | 0.060      | 300                                 | 2700                                     | 0.048      | 250                                 | 2400                                     | 0.044      |
| 1.5                  | 35  | 550                               | 4300                                     | 0.060      | 300                                 | 2700                                     | 0.048      | 250                                 | 2400                                     | 0.044      |
| 1.5                  | 10  | 500                               | 3900                                     | 0.060      | 270                                 | 2400                                     | 0.048      | 220                                 | 2100                                     | 0.044      |
| 2                    | 10  | 720                               | 4500                                     | 0.300      | 410                                 | 2900                                     | 0.240      | 330                                 | 2500                                     | 0.220      |
| 2                    | 12  | 720                               | 4500                                     | 0.263      | 410                                 | 2900                                     | 0.210      | 330                                 | 2500                                     | 0.193      |
| 2                    | 16  | 630                               | 3900                                     | 0.210      | 320                                 | 2300                                     | 0.168      | 260                                 | 2000                                     | 0.154      |
| 2                    | 20  | 630                               | 3900                                     | 0.210      | 320                                 | 2300                                     | 0.168      | 260                                 | 2000                                     | 0.154      |
| 2                    | 25  | 620                               | 3900                                     | 0.120      | 320                                 | 2300                                     | 0.096      | 260                                 | 2000                                     | 0.088      |
| 2                    | 30  | 540                               | 3400                                     | 0.120      | 290                                 | 2100                                     | 0.096      | 240                                 | 1800                                     | 0.088      |
| 2                    | 35  | 540                               | 3400                                     | 0.075      | 290                                 | 2100                                     | 0.060      | 240                                 | 1800                                     | 0.055      |
| 2                    | 40  | 450                               | 2800                                     | 0.075      | 240                                 | 1700                                     | 0.060      | 210                                 | 1600                                     | 0.055      |
| 2                    | 45  | 450                               | 2800                                     | 0.075      | 240                                 | 1700                                     | 0.060      | 210                                 | 1600                                     | 0.055      |
| 2                    | 50  | 400                               | 2500                                     | 0.075      | 210                                 | 1500                                     | 0.060      | 170                                 | 1300                                     | 0.055      |
| 3                    | 30  | 670                               | 3000                                     | 0.315      | 370                                 | 1900                                     | 0.252      | 310                                 | 1700                                     | 0.231      |
| 3                    | 50  | 670                               | 3000                                     | 0.113      | 370                                 | 1900                                     | 0.090      | 310                                 | 1700                                     | 0.083      |



# CX500 2枚刃テーパネックボールエンドミル

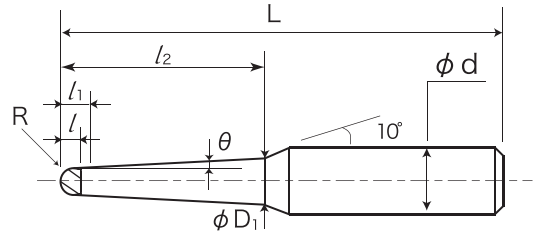
CX500 2-Flute Taper Neck Ball Nose End Mill

## CX500-HBPN



**CX500-HBPN2-1.5-1-50**

Model Flute R  $\theta$  / 2



### 特性 Features

- CX500-Coating have high oxidation resistance and hardening which exceeds existing coating and provides long tool life and suitable for high speed processing and dry milling
- Enable high-efficiency surface finishing of work-piece
- Taper neck prevent chattering
- Application for hardened steel processing up to 65HRC
- Long Neck prevent tool interference when processing deep holes



| 炭素鋼<br>Carbon Steel | 合金鋼<br>Alloy Steel | 調質鋼<br>Prehardened Steel | 焼き入れ鋼 Hardened Steel |   |   |   | 鋳鉄<br>Cast Iron | ステンレス鋼<br>Stainless Steels | アルミ合金<br>Aluminium Alloys | 銅合金<br>Copper Alloys | チタン合金<br>耐熱合金<br>Ti/Ni Alloy | グラファイト<br>Graphite | 樹脂<br>Resin |
|---------------------|--------------------|--------------------------|----------------------|---|---|---|-----------------|----------------------------|---------------------------|----------------------|------------------------------|--------------------|-------------|
| ○                   | ○                  | ○                        | ○                    | ◎ | ◎ | ◎ | ◎               | ○                          |                           |                      |                              |                    |             |

◎ = Best ○ = Good

| MODEL 型番                | R    | / 刃長 | / 1 | $\theta$ | / 2 | D1   | L 全長 | d 柄径 |
|-------------------------|------|------|-----|----------|-----|------|------|------|
| CX500-HBPN2-0.1-0.5-1.5 | 0.1  | 0.15 | 0.4 | 0.5°     | 1.5 | 0.22 | 50   | 4    |
| CX500-HBPN2-0.1-0.5-2   |      |      |     |          | 2   | 0.23 |      |      |
| CX500-HBPN2-0.1-1-1.5   |      |      |     | 1°       | 1.5 | 0.24 |      |      |
| CX500-HBPN2-0.1-1-2     |      |      |     |          | 2   | 0.26 |      |      |
| CX500-HBPN2-0.1-1.5-1.5 |      |      |     | 1.5°     | 1.5 | 0.26 |      |      |
| CX500-HBPN2-0.1-1.5-2   |      |      |     |          | 2   | 0.29 |      |      |
| CX500-HBPN2-0.1-2-1.5   |      |      |     | 2°       | 1.5 | 0.28 |      |      |
| CX500-HBPN2-0.1-2-2     |      |      |     |          | 2   | 0.32 |      |      |
| CX500-HBPN2-0.1-3-1.5   |      |      |     | 3°       | 1.5 | 0.32 |      |      |
| CX500-HBPN2-0.1-3-2     |      |      |     |          | 2   | 0.37 |      |      |
| CX500-HBPN2-0.1-5-2     |      |      |     | 5°       | 2   | 0.48 |      |      |
| CX500-HBPN2-0.15-0.5-3  | 0.15 | 0.2  | 0.6 | 0.5°     | 3   | 0.35 | 50   | 4    |
| CX500-HBPN2-0.15-1-2    |      |      |     |          | 2   | 0.35 |      |      |
| CX500-HBPN2-0.15-1-3    |      |      |     | 1°       | 3   | 0.39 |      |      |
| CX500-HBPN2-0.15-1.5-2  |      |      |     |          | 2   | 0.38 |      |      |
| CX500-HBPN2-0.15-1.5-3  |      |      |     | 1.5°     | 3   | 0.43 |      |      |
| CX500-HBPN2-0.15-2-3    |      |      |     |          | 3   | 0.47 |      |      |
| CX500-HBPN2-0.15-3-2    |      |      |     | 3°       | 2   | 0.45 |      |      |
| CX500-HBPN2-0.15-5-2    |      |      |     |          | 2   | 0.55 |      |      |
| CX500-HBPN2-0.2-0.5-2   | 0.2  | 0.3  | 0.8 | 0.5°     | 2   | 0.43 | 50   | 4    |
| CX500-HBPN2-0.2-0.5-3   |      |      |     |          | 3   | 0.44 |      |      |
| CX500-HBPN2-0.2-0.5-4   |      |      |     | 1°       | 4   | 0.46 |      |      |
| CX500-HBPN2-0.2-1-2     |      |      |     |          | 2   | 0.45 |      |      |
| CX500-HBPN2-0.2-1-3     |      |      |     | 1°       | 3   | 0.48 |      |      |
| CX500-HBPN2-0.2-1-4     |      |      |     |          | 4   | 0.52 |      |      |
| CX500-HBPN2-0.2-1.5-2   |      |      |     | 1.5°     | 2   | 0.47 |      |      |
| CX500-HBPN2-0.2-1.5-3   |      |      |     |          | 3   | 0.52 |      |      |
| CX500-HBPN2-0.2-1.5-4   |      |      |     | 2°       | 4   | 0.57 |      |      |
| CX500-HBPN2-0.2-2-2     |      |      |     |          | 2   | 0.49 |      |      |
| CX500-HBPN2-0.2-2-3     | 0.25 | 0.35 | 1   | 2°       | 3   | 0.56 | 50   | 4    |
| CX500-HBPN2-0.2-2-4     |      |      |     |          | 4   | 0.63 |      |      |
| CX500-HBPN2-0.2-3-2     |      |      |     | 3°       | 2   | 0.53 |      |      |
| CX500-HBPN2-0.2-3-4     |      |      |     |          | 4   | 0.74 |      |      |
| CX500-HBPN2-0.2-5-4     |      |      |     | 5°       | 4   | 0.96 |      |      |
| CX500-HBPN2-0.25-0.5-4  |      |      |     |          | 4   | 0.56 |      |      |
| CX500-HBPN2-0.25-0.5-6  |      |      |     | 0.5°     | 6   | 0.59 |      |      |
| CX500-HBPN2-0.25-0.5-8  |      |      |     |          | 8   | 0.63 |      |      |
| CX500-HBPN2-0.25-1-4    |      |      |     | 1°       | 4   | 0.61 |      |      |
| CX500-HBPN2-0.25-1-6    |      |      |     |          | 6   | 0.68 |      |      |
| CX500-HBPN2-0.25-1-8    |      |      |     | 1.5°     | 8   | 0.75 |      |      |
| CX500-HBPN2-0.25-1.5-4  |      |      |     |          | 4   | 0.66 |      |      |
| CX500-HBPN2-0.25-1.5-6  |      |      |     | 2°       | 6   | 0.77 |      |      |
| CX500-HBPN2-0.25-1.5-8  |      |      |     |          | 8   | 0.87 |      |      |
| CX500-HBPN2-0.25-2-4    |      |      |     | 3°       | 4   | 0.71 |      |      |
| CX500-HBPN2-0.25-2-6    |      |      |     |          | 6   | 0.85 |      |      |
| CX500-HBPN2-0.25-3-4    |      |      |     | 5°       | 4   | 0.82 |      |      |
| CX500-HBPN2-0.25-3-6    |      |      |     |          | 6   | 1.03 |      |      |
| CX500-HBPN2-0.25-5-6    |      |      |     |          | 6   | 1.38 |      |      |

テーパネック Taper Neck

スクエア Square

ラジアス Radius

ボール Ball

ロングネック Long Neck

ラフィング Roughing

面取り加工用 Chamfering

ドリル Drill

# CX500-HBPN

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| MODEL 型番                | R    | / 刃長 | / 1  | θ    | / 2 | D1   | L 全長 | d 柄径 |
|-------------------------|------|------|------|------|-----|------|------|------|
| CX500-HBPN2-0.3-0.5-4   | 0.3  | 0.45 | 1.2  | 0.5° | 4   | 0.65 | 50   | 4    |
| CX500-HBPN2-0.3-0.5-6   |      |      |      |      | 6   | 0.69 |      |      |
| CX500-HBPN2-0.3-0.5-8   |      |      |      |      | 8   | 0.72 |      |      |
| CX500-HBPN2-0.3-0.5-10  |      |      |      |      | 10  | 0.76 |      |      |
| CX500-HBPN2-0.3-1-4     |      |      |      | 1°   | 4   | 0.7  |      |      |
| CX500-HBPN2-0.3-1-6     |      |      |      |      | 6   | 0.77 |      |      |
| CX500-HBPN2-0.3-1-8     |      |      |      |      | 8   | 0.84 |      |      |
| CX500-HBPN2-0.3-1.5-6   |      |      |      |      | 6   | 0.86 |      |      |
| CX500-HBPN2-0.3-1.5-8   |      |      |      | 2°   | 8   | 0.96 |      |      |
| CX500-HBPN2-0.3-2-6     |      |      |      |      | 6   | 0.94 |      |      |
| CX500-HBPN2-0.3-2-8     |      |      |      | 3°   | 8   | 1.08 |      |      |
| CX500-HBPN2-0.3-3-6     |      |      |      |      | 6   | 1.11 |      |      |
| CX500-HBPN2-0.3-3-8     | 5°   | 8    | 1.32 |      |     |      |      |      |
| CX500-HBPN2-0.3-5-8     |      | 8    | 1.79 |      |     |      |      |      |
| CX500-HBPN2-0.4-0.5-8   | 0.4  | 0.6  | 1.6  | 0.5° | 8   | 0.92 | 50   | 4    |
| CX500-HBPN2-0.4-0.5-10  |      |      |      |      | 10  | 0.95 |      |      |
| CX500-HBPN2-0.4-1-8     |      |      |      | 1°   | 8   | 1.03 |      |      |
| CX500-HBPN2-0.4-1-10    |      |      |      |      | 10  | 1.1  |      |      |
| CX500-HBPN2-0.4-1.5-8   |      |      |      | 1.5° | 8   | 1.14 |      |      |
| CX500-HBPN2-0.4-1.5-10  |      |      |      |      | 10  | 1.24 |      |      |
| CX500-HBPN2-0.4-2-10    |      |      |      | 2°   | 10  | 1.39 |      |      |
| CX500-HBPN2-0.4-3-10    | 10   | 1.69 |      |      |     |      |      |      |
| CX500-HBPN2-0.5-0.5-10  | 0.5  | 0.75 | 2    | 0.5° | 10  | 1.14 | 50   | 4    |
| CX500-HBPN2-0.5-0.5-15  |      |      |      |      | 15  | 1.23 | 70   |      |
| CX500-HBPN2-0.5-0.5-20  |      |      |      |      | 20  | 1.32 |      |      |
| CX500-HBPN2-0.5-1-5     |      |      |      | 1°   | 5   | 1.11 | 50   |      |
| CX500-HBPN2-0.5-1-10    |      |      |      |      | 10  | 1.28 |      |      |
| CX500-HBPN2-0.5-1-15    |      |      |      |      | 15  | 1.46 | 70   |      |
| CX500-HBPN2-0.5-1-20    |      |      |      |      | 20  | 1.63 |      |      |
| CX500-HBPN2-0.5-1-25    |      |      |      | 1.5° | 25  | 1.18 | 50   |      |
| CX500-HBPN2-0.5-1.5-5   |      |      |      |      | 5   | 1.16 |      |      |
| CX500-HBPN2-0.5-1.5-10  |      |      |      |      | 10  | 1.42 | 70   |      |
| CX500-HBPN2-0.5-1.5-15  |      |      |      |      | 15  | 1.69 |      |      |
| CX500-HBPN2-0.5-1.5-20  |      |      |      | 2°   | 20  | 1.95 | 70   |      |
| CX500-HBPN2-0.5-2-15    |      |      |      |      | 15  | 1.91 | 50   |      |
| CX500-HBPN2-0.5-2-20    |      |      |      |      | 20  | 2.26 | 70   |      |
| CX500-HBPN2-0.5-3-15    |      |      |      | 3°   | 15  | 2.37 | 50   |      |
| CX500-HBPN2-0.5-3-20    |      |      |      |      | 20  | 2.89 | 70   |      |
| CX500-HBPN2-0.5-5-25    |      |      |      |      | 25  | 5.03 | 70   |      |
| CX500-HBPN2-0.6-0.5-15  | 0.6  | 0.9  | 2.4  | 0.5° | 15  | 1.42 | 50   | 4    |
| CX500-HBPN2-0.6-0.5-20  |      |      |      |      | 20  | 1.51 | 70   |      |
| CX500-HBPN2-0.6-1-10    |      |      |      | 1°   | 10  | 1.47 | 50   |      |
| CX500-HBPN2-0.6-1-20    |      |      |      |      | 20  | 1.82 | 70   |      |
| CX500-HBPN2-0.6-1.5-10  |      |      |      | 1.5° | 10  | 1.6  | 50   |      |
| CX500-HBPN2-0.6-1.5-20  |      |      |      |      | 20  | 2.13 | 70   |      |
| CX500-HBPN2-0.6-2-10    |      |      |      | 2°   | 10  | 1.74 | 50   |      |
| CX500-HBPN2-0.6-2-20    |      |      |      |      | 20  | 2.43 | 70   |      |
| CX500-HBPN2-0.6-3-15    |      |      |      | 3°   | 15  | 2.53 | 50   |      |
| CX500-HBPN2-0.6-5-15    |      |      |      |      | 15  | 3.41 | 50   |      |
| CX500-HBPN2-0.75-0.5-10 | 0.75 | 1.1  | 3    | 0.5° | 10  | 1.63 | 50   | 4    |
| CX500-HBPN2-0.75-0.5-15 |      |      |      |      | 15  | 1.71 | 70   |      |
| CX500-HBPN2-0.75-0.5-20 |      |      |      |      | 20  | 1.8  |      |      |
| CX500-HBPN2-0.75-1-10   |      |      |      | 1°   | 10  | 1.75 | 50   |      |
| CX500-HBPN2-0.75-1-15   |      |      |      |      | 15  | 1.92 | 70   |      |
| CX500-HBPN2-0.75-1-20   |      |      |      | 1.5° | 20  | 2.1  | 70   |      |
| CX500-HBPN2-0.75-1.5-10 |      |      |      |      | 10  | 1.87 | 50   |      |
| CX500-HBPN2-0.75-1.5-15 |      |      |      |      | 15  | 2.13 | 70   |      |
| CX500-HBPN2-0.75-1.5-20 |      |      |      |      | 20  | 2.39 |      |      |
| CX500-HBPN2-0.75-2-10   |      |      |      | 2°   | 10  | 1.99 | 50   |      |
| CX500-HBPN2-0.75-2-15   |      |      |      |      | 15  | 2.34 | 70   |      |
| CX500-HBPN2-0.75-2-20   |      |      |      |      | 20  | 2.69 |      |      |
| CX500-HBPN2-0.75-2-30   |      |      |      | 3°   | 30  | 3.39 | 70   |      |
| CX500-HBPN2-0.75-3-15   |      |      |      |      | 15  | 2.76 | 50   |      |
| CX500-HBPN2-0.75-3-20   |      |      |      | 5°   | 20  | 3.29 | 70   |      |
| CX500-HBPN2-0.75-5-15   |      |      |      |      | 15  | 3.6  | 50   |      |
| CX500-HBPN2-1-0.5-15    | 1    | 1.5  | 4    | 0.5° | 15  | 2.20 | 50   | 6    |
| CX500-HBPN2-1-0.5-20    |      |      |      |      | 20  | 2.28 | 70   |      |
| CX500-HBPN2-1-0.5-30    |      |      |      |      | 30  | 2.46 | 110  |      |
| CX500-HBPN2-1-0.5-40    |      |      |      |      | 40  | 2.63 |      |      |
| CX500-HBPN2-1-0.5-50    |      |      |      |      | 50  | 2.81 |      |      |
| CX500-HBPN2-1-1-15      |      |      |      | 1°   | 15  | 2.39 | 50   |      |
| CX500-HBPN2-1-1-20      |      |      |      |      | 20  | 2.56 | 70   |      |
| CX500-HBPN2-1-1-25      |      |      |      |      | 25  | 2.74 |      |      |
| CX500-HBPN2-1-1-30      |      |      |      |      | 30  | 2.91 |      |      |
| CX500-HBPN2-1-1-35      |      |      |      |      | 35  | 3.09 |      |      |
| CX500-HBPN2-1-1-40      |      |      |      |      | 40  | 3.26 |      |      |
| CX500-HBPN2-1-1-50      |      |      |      |      | 50  | 3.61 |      |      |

# CX500-HBPN

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Long Neck

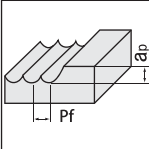
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Roughing

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Chamfering

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Drill

| MODEL 型番               | R   | / 刃長 | / 1   | θ    | / 2  | D1   | L 全長 | d 柄径 |       |      |     |    |
|------------------------|-----|------|-------|------|------|------|------|------|-------|------|-----|----|
| CX500-HBPN2-1-1.5-15   | 1   | 1.5  | 4     | 1.5° | 15   | 2.58 | 50   | 6    |       |      |     |    |
| CX500-HBPN2-1-1.5-20   |     |      |       |      | 20   | 2.84 | 70   |      |       |      |     |    |
| CX500-HBPN2-1-1.5-25   |     |      |       |      | 25   | 3.10 |      |      |       |      |     |    |
| CX500-HBPN2-1-1.5-30   |     |      |       |      | 30   | 3.37 |      |      |       |      |     |    |
| CX500-HBPN2-1-1.5-40   |     |      |       |      | 40   | 3.89 | 110  |      |       |      |     |    |
| CX500-HBPN2-1-1.5-50   |     |      |       | 50   | 4.41 |      |      |      |       |      |     |    |
| CX500-HBPN2-1-2-30     |     |      |       | 2°   | 30   | 3.82 | 70   |      |       |      |     |    |
| CX500-HBPN2-1-2-40     |     |      |       |      | 40   | 4.52 | 110  |      |       |      |     |    |
| CX500-HBPN2-1-3-30     |     |      |       | 3°   | 30   | 4.73 | 70   |      |       |      |     |    |
| CX500-HBPN2-1-3-40     |     |      |       |      | 40   | 5.78 | 110  |      |       |      |     |    |
| CX500-HBPN2-1.5-0.5-20 | 1.5 | 2.5  | 6     | 0.5° | 20   | 3.25 | 70   | 6    |       |      |     |    |
| CX500-HBPN2-1.5-0.5-30 |     |      |       |      | 30   | 3.42 | 110  |      |       |      |     |    |
| CX500-HBPN2-1.5-0.5-40 |     |      |       |      | 40   | 3.6  |      |      |       |      |     |    |
| CX500-HBPN2-1.5-0.5-50 |     |      |       |      | 50   | 3.77 |      |      |       |      |     |    |
| CX500-HBPN2-1.5-1-20   |     |      |       | 1°   | 20   | 3.49 | 70   |      |       |      |     |    |
| CX500-HBPN2-1.5-1-30   |     |      |       |      | 30   | 3.84 | 110  |      |       |      |     |    |
| CX500-HBPN2-1.5-1-40   |     |      |       |      | 40   | 4.19 |      |      |       |      |     |    |
| CX500-HBPN2-1.5-1-50   |     |      |       |      | 50   | 4.54 |      |      |       |      |     |    |
| CX500-HBPN2-1.5-1.5-20 |     |      |       | 1.5° | 20   | 3.74 | 70   |      |       |      |     |    |
| CX500-HBPN2-1.5-1.5-30 |     |      |       |      | 30   | 4.26 | 110  |      |       |      |     |    |
| CX500-HBPN2-1.5-1.5-40 |     |      |       |      | 40   | 4.79 |      |      |       |      |     |    |
| CX500-HBPN2-1.5-1.5-50 |     |      |       |      | 50   | 5.31 |      |      |       |      |     |    |
| CX500-HBPN2-1.5-2-40   |     |      |       | 2°   | 40   | 5.38 |      |      | 110   |      |     |    |
| CX500-HBPN2-1.5-2-48   |     |      |       |      | 48   | 5.94 |      |      |       |      |     |    |
| CX500-HBPN2-1.5-3-34   |     |      |       | 3°   | 34   | 5.94 |      |      |       |      |     |    |
| CX500-HBPN2-2-0.5-40   |     |      |       | 2    | 3    | 8    | 0.5° |      | 40    | 4.56 | 110 | 6  |
| CX500-HBPN2-2-0.5-50   |     |      |       |      |      |      |      |      | 50    | 4.47 |     |    |
| CX500-HBPN2-2-0.5-60   |     |      |       |      |      |      |      |      | 60    | 4.91 |     |    |
| CX500-HBPN2-2-1-40     |     |      |       |      |      |      | 1°   |      | 40    | 5.12 |     |    |
| CX500-HBPN2-2-1-50     |     |      |       |      |      |      |      |      | 50    | 5.47 |     |    |
| CX500-HBPN2-2-1-60     |     |      |       |      |      |      |      |      | 60    | 5.82 |     |    |
| CX500-HBPN2-2-1.5-40   |     |      |       |      |      |      | 1.5° |      | 40    | 5.68 |     |    |
| CX500-HBPN2-2-1.5-46   |     |      |       |      |      |      |      |      | 46    | 6.00 |     |    |
| CX500-HBPN2-2-3-27     |     |      |       |      |      |      |      |      | 3°    | 27   |     |    |
| CX500-HBPN2-3-1-40     | 3   | 6    | 12    |      |      |      | 1°   | 40   | 6.98  | 110  |     |    |
| CX500-HBPN2-3-1-50     |     |      |       | 50   | 7.33 |      |      |      |       |      |     |    |
| CX500-HBPN2-3-1-60     |     |      |       | 60   | 7.68 |      |      |      |       |      |     |    |
| CX500-HBPN2-3-1.5-40   |     |      |       | 1.5° | 40   | 7.47 |      |      |       |      |     |    |
| CX500-HBPN2-3-1.5-50   |     |      |       |      | 50   | 8.00 |      |      |       |      |     |    |
| CX500-HBPN2-3-3-31     |     |      |       |      | 31   | 8.00 |      |      |       |      |     |    |
| CX500-HBPN2-5-1.5-54   |     |      |       | 5    | 8    | 16   | 1.5° | 54   | 12.00 |      | 110 | 12 |
| CX500-HBPN2-5-2-44     | 2°  | 44   | 11.96 |      |      |      |      |      |       |      |     |    |
| CX500-HBPN2-5-3-35     | 3°  | 35   | 12.00 |      |      |      |      |      |       |      |     |    |

## 推奨切削条件 Standard Milling Condition



- The table show standard milling guidance of perforating process as written picture
- Use a rigid and precise machine and tool holder
- Select a cutting fluid appropriate to the particular usage
- In case the revolution could not be increased by the machine used, Please reduce feed speed and revolution speed at same ration
- When mounting End Mills, The run out of the till will have to be set within 0.01mm

| 被削材<br>Work Material  | 高硬度鋼<br>(40 ~ 55HRC)          |            |                               |            | 高硬度鋼 Hardened Steel<br>(55 ~ 60HRC) |            |                               |            | 高硬度鋼 Hardened Steel<br>(60 ~ 65HRC) |            |                               |            |
|-----------------------|-------------------------------|------------|-------------------------------|------------|-------------------------------------|------------|-------------------------------|------------|-------------------------------------|------------|-------------------------------|------------|
|                       | 送り速度<br>(mm/min)<br>Feed rate |            | 回転数<br>(mm/min)<br>Revolution |            | 送り速度<br>(mm/min)<br>Feed rate       |            | 回転数<br>(mm/min)<br>Revolution |            | 送り速度<br>(mm/min)<br>Feed rate       |            | 回転数<br>(mm/min)<br>Revolution |            |
|                       | Standard                      | High Speed | Standard                      | High Speed | Standard                            | High Speed | Standard                      | High Speed | Standard                            | High Speed | Standard                      | High Speed |
| R 値<br>(mm)<br>Radius |                               |            |                               |            |                                     |            |                               |            |                                     |            |                               |            |
| 0.2                   | 320                           | -          | 25000                         | -          | 300                                 | -          | 25000                         | -          | 270                                 | -          | 25000                         | -          |
| 0.3                   | 520                           | -          | 25000                         | -          | 480                                 | -          | 25000                         | -          | 390                                 | -          | 25000                         | -          |
| 0.4                   | 730                           | -          | 25000                         | -          | 590                                 | -          | 21900                         | -          | 450                                 | -          | 19100                         | -          |
| 0.5                   | 1120                          | 1320       | 23850                         | 25000      | 710                                 | 1150       | 17500                         | 25000      | 560                                 | 970        | 15300                         | 25000      |
| 0.75                  | 1150                          | 2400       | 15900                         | 25000      | 720                                 | 1850       | 11650                         | 25000      | 730                                 | 1370       | 10200                         | 19100      |
| 1                     | 870                           | 1830       | 11950                         | 21500      | 540                                 | 1310       | 8750                          | 18300      | 500                                 | 970        | 7650                          | 14300      |
| 1.5                   | 860                           | 1710       | 7950                          | 14300      | 540                                 | 1280       | 5850                          | 1200       | 470                                 | 940        | 5100                          | 9550       |
| 2                     | 800                           | 1640       | 5950                          | 10750      | 510                                 | 1250       | 4400                          | 9150       | 460                                 | 910        | 3800                          | 7150       |
| 2.5                   | 770                           | 1810       | 4750                          | 8600       | 490                                 | 1300       | 3500                          | 7300       | 420                                 | 950        | 3050                          | 5750       |
| 3                     | 700                           | 1430       | 4000                          | 7150       | 440                                 | 1100       | 2900                          | 6100       | 420                                 | 830        | 2550                          | 4750       |
| 4                     | 620                           | 1350       | 3000                          | 5350       | 400                                 | 1050       | 2200                          | 4600       | 380                                 | 780        | 1900                          | 3600       |
| 5                     | 560                           | 1260       | 2400                          | 4300       | 350                                 | 950        | 1750                          | 3650       | 350                                 | 720        | 1550                          | 2850       |
| 6                     | 500                           | 1170       | 2000                          | 3600       | 300                                 | 830        | 1450                          | 3050       | 310                                 | 640        | 1250                          | 2400       |
| 加工内容 Processing       | Ad                            |            | Pf                            |            | Ad                                  |            | Pf                            |            | Ad                                  |            | Pf                            |            |
| 粗加工                   | ≤0.1 D                        | ≤0.08 D    | ≤0.3 D                        | ≤0.24 D    | ≤0.07 D                             | ≤0.05 D    | ≤0.21 D                       | ≤0.15 D    | ≤0.07 D                             | ≤0.05 D    | ≤0.21 D                       | ≤0.15 D    |
| 精加工                   | ≤0.03 D                       | ≤0.02 D    | ≤0.1 D                        | ≤0.05 D    | ≤0.02 D                             | ≤0.01 D    | ≤0.05 D                       | ≤0.05 D    | ≤0.02 D                             | ≤0.01 D    | ≤0.05 D                       | ≤0.05 D    |

## CX200 3枚刃 / 4枚刃 20° ラフィングエンドミル

CX200 3・4-Flute 20° Roughing End Mill

## CX200-RER



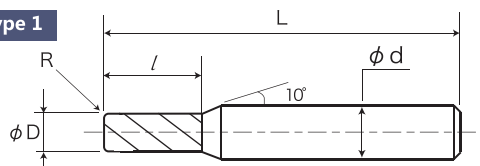
CX200-RER4100

Model Flute D

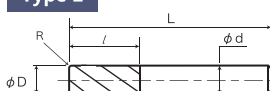
## | 特 性 Features

- CX200-Coating have high oxidation resistance and hardening which exceeds the existing coating and provides long tool life, and suitable for high speed processing and dry milling.
- Best for high speed processing and groove milling due to the high chip ejection.
- The fine pitch nick, will hardly cause chipping when processing stainless steel, alloy steel and other hard-to-cut material. also, ensure tool long life and high-efficiency surface finishing after processing.
- CKK Original design Chip pocket enables similar or same cutting depth which 3-flutes could realize

Type 1



Type 2



Type 3



| 外径公差 Tolerance |
|----------------|
| +0.06          |
| -0.06          |



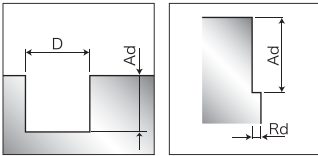
| 炭素鋼<br>Carbon Steel | 合金鋼<br>Alloy Steel | 調質鋼<br>Prehardened Steel | 焼き入れ鋼 Hardened Steel |   |  |  | 鋳鉄<br>Cast Iron | ステンレス鋼<br>Stainless Steels | アルミ合金<br>Aluminium Alloys | 銅合金<br>Copper Alloys | チタン合金<br>耐熱合金<br>Ti/Ni Alloy | グラファイト<br>Graphite | 樹脂<br>Resin |
|---------------------|--------------------|--------------------------|----------------------|---|--|--|-----------------|----------------------------|---------------------------|----------------------|------------------------------|--------------------|-------------|
| ◎                   | ◎                  | ◎                        | ◎                    | ○ |  |  | ○               | ○                          | ○                         | ○                    |                              |                    |             |

◎ = Best ○ = Good

| MODEL 型番      | D 外径 | l 刃長 | L 全長 | d シャンク径 | Flute | Type |
|---------------|------|------|------|---------|-------|------|
| CX200-RER3030 | 3    | 15   | 60   | 6       | 3     | 1    |
| CX200-RER3040 | 4    | 15   | 60   | 6       | 3     | 1    |
| CX200-RER3050 | 5    | 15   | 60   | 6       | 3     | 1    |
| CX200-RER3060 | 6    | 15   | 60   | 6       | 3     | 2    |
| CX200-RER4080 | 8    | 20   | 75   | 8       | 4     | 2    |
| CX200-RER4090 | 9    | 20   | 75   | 10      | 4     | 1    |
| CX200-RER4100 | 10   | 25   | 75   | 10      | 4     | 2    |
| CX200-RER4110 | 11   | 25   | 75   | 12      | 4     | 1    |
| CX200-RER4120 | 12   | 30   | 100  | 12      | 4     | 2    |
| CX200-RER4130 | 13   | 30   | 100  | 12      | 4     | 3    |
| CX200-RER4140 | 14   | 35   | 100  | 12      | 4     | 3    |
| CX200-RER4160 | 16   | 40   | 110  | 16      | 4     | 2    |
| CX200-RER4180 | 18   | 45   | 110  | 16      | 4     | 3    |
| CX200-RER4200 | 20   | 45   | 130  | 20      | 4     | 2    |

## CX200-RER

## 推奨切削条件 Standard Milling Condition



- The table shows standard milling guidance of perforating process as written picture
- Use a rigid and precise machine and tool holder
- Select a cutting fluid appropriate to the particular usage
- In case the revolution could not be increased by the machine used, Please reduce feed speed and revolution speed at same ration
- When mounting End Mills, The run out of the till will have to be set within 0.01mm

## 溝切削 Slotting

| 被削材<br>Work Material | 炭素鋼 Carbon Steel<br>S45~S55C  |                                          | 合金工具鋼 Alloy Steel Tool Steel<br>SKD.SCM |                                          | 調質鋼 Prehardened Steel<br>35~40HRC.HPMLNAK |                                          |
|----------------------|-------------------------------|------------------------------------------|-----------------------------------------|------------------------------------------|-------------------------------------------|------------------------------------------|
|                      | 送り速度<br>(mm/min)<br>Feed rate | 回転数<br>(mm <sup>-1</sup> )<br>Revolution | 送り速度<br>(mm/min)<br>Feed rate           | 回転数<br>(mm <sup>-1</sup> )<br>Revolution | 送り速度<br>(mm/min)<br>Feed rate             | 回転数<br>(mm <sup>-1</sup> )<br>Revolution |
| 3                    | 340                           | 6800                                     | 240                                     | 5500                                     | 190                                       | 4800                                     |
| 4                    | 340                           | 5100                                     | 230                                     | 4100                                     | 190                                       | 3600                                     |
| 5                    | 340                           | 4500                                     | 240                                     | 3300                                     | 170                                       | 3100                                     |
| 6                    | 340                           | 4000                                     | 240                                     | 2500                                     | 190                                       | 2800                                     |
| 8                    | 380                           | 2900                                     | 270                                     | 2200                                     | 210                                       | 2100                                     |
| 9                    | 400                           | 2700                                     | 290                                     | 2000                                     | 230                                       | 1800                                     |
| 10                   | 390                           | 2400                                     | 280                                     | 1700                                     | 230                                       | 1700                                     |
| 11                   | 400                           | 2200                                     | 270                                     | 1600                                     | 230                                       | 1500                                     |
| 12                   | 390                           | 2000                                     | 280                                     | 1400                                     | 220                                       | 1400                                     |
| 13                   | 350                           | 1800                                     | 250                                     | 1400                                     | 210                                       | 1300                                     |
| 14                   | 330                           | 1700                                     | 250                                     | 1200                                     | 190                                       | 1200                                     |
| 16                   | 290                           | 1500                                     | 210                                     | 1200                                     | 160                                       | 1000                                     |
| 18                   | 270                           | 1400                                     | 190                                     | 1100                                     | 160                                       | 1000                                     |
| 20                   | 230                           | 1200                                     | 180                                     | 1000                                     | 140                                       | 900                                      |
| Ad                   | ≤0.4D                         |                                          |                                         |                                          | ≤0.3D                                     |                                          |

## 側面切削 Side Milling

| 被削材<br>Work Material | 炭素鋼 Carbon Steel<br>S45~S55C  |                                          | 合金工具鋼 Alloy Steel Tool Steel<br>SKD.SCM |                                          | 調質鋼 Prehardened Steel<br>35~40HRC.HPMLNAK |                                          |
|----------------------|-------------------------------|------------------------------------------|-----------------------------------------|------------------------------------------|-------------------------------------------|------------------------------------------|
|                      | 送り速度<br>(mm/min)<br>Feed rate | 回転数<br>(mm <sup>-1</sup> )<br>Revolution | 送り速度<br>(mm/min)<br>Feed rate           | 回転数<br>(mm <sup>-1</sup> )<br>Revolution | 送り速度<br>(mm/min)<br>Feed rate             | 回転数<br>(mm <sup>-1</sup> )<br>Revolution |
| 3                    | 530                           | 8500                                     | 370                                     | 6900                                     | 290                                       | 5900                                     |
| 4                    | 530                           | 6400                                     | 370                                     | 5200                                     | 290                                       | 4500                                     |
| 5                    | 530                           | 5600                                     | 370                                     | 4500                                     | 290                                       | 4200                                     |
| 6                    | 530                           | 5000                                     | 370                                     | 4100                                     | 290                                       | 3500                                     |
| 8                    | 600                           | 3700                                     | 420                                     | 3100                                     | 330                                       | 2600                                     |
| 9                    | 610                           | 3300                                     | 440                                     | 2700                                     | 360                                       | 2300                                     |
| 10                   | 610                           | 3000                                     | 440                                     | 2500                                     | 360                                       | 2100                                     |
| 11                   | 610                           | 2700                                     | 440                                     | 2200                                     | 360                                       | 1900                                     |
| 12                   | 610                           | 2500                                     | 440                                     | 2000                                     | 360                                       | 1800                                     |
| 13                   | 560                           | 2300                                     | 400                                     | 1800                                     | 320                                       | 1600                                     |
| 14                   | 510                           | 2100                                     | 400                                     | 1800                                     | 300                                       | 1500                                     |
| 16                   | 460                           | 1900                                     | 330                                     | 1500                                     | 260                                       | 1300                                     |
| 18                   | 410                           | 1700                                     | 310                                     | 1400                                     | 240                                       | 1200                                     |
| 20                   | 370                           | 1500                                     | 260                                     | 1200                                     | 220                                       | 1100                                     |
| Ad                   | ≤1.5D                         |                                          |                                         |                                          | ≤1.5D                                     |                                          |
| Rd                   | ≤0.3D                         |                                          |                                         |                                          | ≤0.2D                                     |                                          |

ラフィング  
Roughingスクエア  
Squareラジアス  
Radiusボール  
Ballロングネック  
Long Neckラフィング  
Roughing面取り加工用  
Chamferingドリル  
Drill



# CX200 3枚刃 / 4枚刃 45° ラフィングエンドミル

CX200 3・4-Flute 45° Roughing End Mill

## CX200-HRER



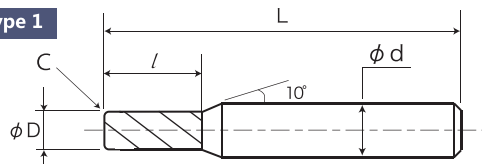
## CX200-HRER4100

Model Flute D

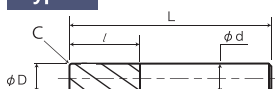
### 特性 Features

- CX200 Coating have high oxidation resistance and hardening which exceed the existing coating and provides long tool life, and suitable for high speed processing and dry milling
- 45° Helix balde achieves high-feed operation.
- The fine pitch nick achieves high accurate surface roughness after processing

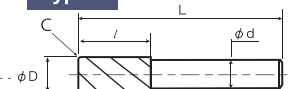
Type 1



Type 2



Type 3



| 外径公差 Tolerance |
|----------------|
| +0.06          |
| -0.06          |



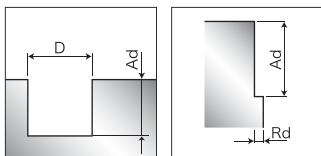
| 炭素鋼<br>Carbon Steel | 合金鋼<br>Alloy Steel | 調質鋼<br>Prehardened Steel | 焼き入れ鋼 Hardened Steel |   |  |  | 鋳鉄<br>Cast Iron | ステンレス鋼<br>Stainless Steels | アルミ合金<br>Aluminium Alloys | 銅合金<br>Copper Alloys | チタン合金<br>耐熱合金<br>Ti/Ni Alloy | グラファイト<br>Graphite | 樹脂<br>Resin |
|---------------------|--------------------|--------------------------|----------------------|---|--|--|-----------------|----------------------------|---------------------------|----------------------|------------------------------|--------------------|-------------|
| ~45HRC              | ~55HRC             | ~60HRC                   | ~65HRC               |   |  |  |                 |                            |                           |                      |                              |                    |             |
| ◎                   | ◎                  | ◎                        | ◎                    | ○ |  |  | ○               | ○                          | ○                         | ○                    |                              |                    |             |

◎ = Best ○ = Good

| MODEL 型番       | D 外径 | l 刃長 | L 全長 | d シャンク径 | Flute | Type |
|----------------|------|------|------|---------|-------|------|
| CX200-HRER3030 | 3    | 15   | 60   | 6       | 3     | 1    |
| CX200-HRER3040 | 4    | 15   | 60   | 6       | 3     | 1    |
| CX200-HRER3050 | 5    | 15   | 60   | 6       | 3     | 1    |
| CX200-HRER3060 | 6    | 15   | 60   | 6       | 3     | 2    |
| CX200-HRER4080 | 8    | 20   | 75   | 8       | 4     | 2    |
| CX200-HRER4090 | 9    | 20   | 75   | 10      | 4     | 1    |
| CX200-HRER4100 | 10   | 25   | 75   | 10      | 4     | 2    |
| CX200-HRER4110 | 11   | 25   | 75   | 12      | 4     | 1    |
| CX200-HRER4120 | 12   | 30   | 100  | 12      | 4     | 2    |
| CX200-HRER4130 | 13   | 30   | 100  | 12      | 4     | 3    |
| CX200-HRER4140 | 14   | 35   | 100  | 12      | 4     | 3    |
| CX200-HRER4160 | 16   | 40   | 110  | 16      | 4     | 2    |
| CX200-HRER4180 | 18   | 45   | 110  | 16      | 4     | 3    |
| CX200-HRER4200 | 20   | 45   | 130  | 20      | 4     | 2    |

## CX200-HRER

## 推奨切削条件 Standard Milling Condition



- The table show standard milling guidance of performing process as written picture
- Use a rigid and precise machine and tool holder
- Select a cutting fluid appropriate to the particular usage
- In case the revolution could not be increased by the machine used, Please reduce feed speed and revolution speed at same ration
- When mounting End Mills, The run out of the till will have to be set within 0.01mm

## 溝切削 Slotting

| 被削材<br>Work Material   | 炭素鋼 Carbon Steel<br>S 45~S55 C |                                          | 合金鋼 工具鋼 Alloy Steel Tool Steel<br>SKD.SCM |                                          | 調質鋼 Prehardened Steel<br>35 ~ 40HRC.HP.M.NAK |                                          |
|------------------------|--------------------------------|------------------------------------------|-------------------------------------------|------------------------------------------|----------------------------------------------|------------------------------------------|
| 外径<br>(mm)<br>Diameter | 送り速度<br>(mm/min)<br>Feed rate  | 回転数<br>(mm <sup>-1</sup> )<br>Revolution | 送り速度<br>(mm/min)<br>Feed rate             | 回転数<br>(mm <sup>-1</sup> )<br>Revolution | 送り速度<br>(mm/min)<br>Feed rate                | 回転数<br>(mm <sup>-1</sup> )<br>Revolution |
| 3                      | 680                            | 11500                                    | 420                                       | 8500                                     | 330                                          | 7100                                     |
| 4                      | 680                            | 9500                                     | 420                                       | 7100                                     | 330                                          | 6000                                     |
| 5                      | 680                            | 8100                                     | 430                                       | 6000                                     | 330                                          | 5000                                     |
| 6                      | 680                            | 7500                                     | 430                                       | 5600                                     | 340                                          | 4700                                     |
| 8                      | 770                            | 5600                                     | 480                                       | 4200                                     | 380                                          | 3500                                     |
| 9                      | 770                            | 5000                                     | 480                                       | 3700                                     | 380                                          | 3100                                     |
| 10                     | 770                            | 4500                                     | 480                                       | 3300                                     | 380                                          | 2800                                     |
| 11                     | 770                            | 4100                                     | 490                                       | 3100                                     | 380                                          | 2500                                     |
| 12                     | 760                            | 3700                                     | 490                                       | 2800                                     | 380                                          | 2300                                     |
| 13                     | 720                            | 3500                                     | 430                                       | 2500                                     | 360                                          | 2200                                     |
| 14                     | 660                            | 3200                                     | 420                                       | 2400                                     | 330                                          | 2000                                     |
| 16                     | 720                            | 2800                                     | 370                                       | 2100                                     | 300                                          | 1800                                     |
| 18                     | 640                            | 2500                                     | 310                                       | 1800                                     | 260                                          | 1600                                     |
| 20                     | 570                            | 2200                                     | 300                                       | 1700                                     | 230                                          | 1400                                     |
| Ad                     | ≤0.4D                          |                                          |                                           |                                          | ≤0.3D                                        |                                          |

## 側面切削 Side Milling

| 被削材<br>Work Material   | 炭素鋼 Carbon Steel<br>S 45~S55 C |                                          | 合金鋼 工具鋼 Alloy Steel Tool Steel<br>SKD.SCM |                                          | 調質鋼 Prehardened Steel<br>35 ~ 40HRC.HP.M.NAK |                                          |
|------------------------|--------------------------------|------------------------------------------|-------------------------------------------|------------------------------------------|----------------------------------------------|------------------------------------------|
| 外径<br>(mm)<br>Diameter | 送り速度<br>(mm/min)<br>Feed rate  | 回転数<br>(mm <sup>-1</sup> )<br>Revolution | 送り速度<br>(mm/min)<br>Feed rate             | 回転数<br>(mm <sup>-1</sup> )<br>Revolution | 送り速度<br>(mm/min)<br>Feed rate                | 回転数<br>(mm <sup>-1</sup> )<br>Revolution |
| 3                      | 900                            | 15900                                    | 660                                       | 10600                                    | 520                                          | 8900                                     |
| 4                      | 900                            | 11900                                    | 660                                       | 8800                                     | 520                                          | 7500                                     |
| 5                      | 900                            | 9500                                     | 660                                       | 7400                                     | 520                                          | 6300                                     |
| 6                      | 900                            | 9300                                     | 660                                       | 6900                                     | 520                                          | 5800                                     |
| 8                      | 1200                           | 7000                                     | 750                                       | 5200                                     | 600                                          | 4400                                     |
| 9                      | 1200                           | 6200                                     | 750                                       | 4600                                     | 600                                          | 3900                                     |
| 10                     | 1200                           | 5600                                     | 750                                       | 4100                                     | 600                                          | 3500                                     |
| 11                     | 1200                           | 5100                                     | 750                                       | 3800                                     | 600                                          | 3200                                     |
| 12                     | 1200                           | 4700                                     | 750                                       | 3400                                     | 600                                          | 2900                                     |
| 13                     | 1100                           | 4300                                     | 690                                       | 3200                                     | 560                                          | 2700                                     |
| 14                     | 1030                           | 4000                                     | 640                                       | 3000                                     | 520                                          | 2500                                     |
| 16                     | 900                            | 3500                                     | 560                                       | 2600                                     | 460                                          | 2200                                     |
| 18                     | 800                            | 3100                                     | 500                                       | 2300                                     | 390                                          | 1900                                     |
| 20                     | 720                            | 2800                                     | 450                                       | 2100                                     | 370                                          | 1800                                     |
| Ad                     | ≤1.5D                          |                                          |                                           |                                          | ≤1.5D                                        |                                          |
| Rd                     | ≤0.3D                          |                                          |                                           |                                          | ≤0.2D                                        |                                          |

ラフィング  
Roughingスクエア  
Squareラジアス  
Radiusボール  
Ballロングネック  
Long Neckラフィング  
Roughing面取り加工用  
Chamferingドリル  
Drill

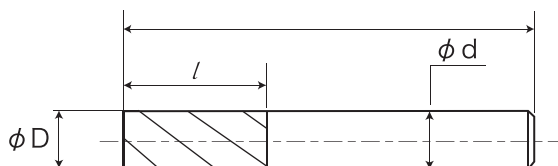
# CX200 3枚刃ステンレス加工用ラフィングエンドミル

CX200 3-Flute Roughing End Mill for Stainless steel

## CX200-SURE


**CX200-SURE3100**

Model Flute D



### 特性 Features

- CX200 Coating have high oxidation resistance and hardening which exceed the existing coating and provides long tool life, and suitable for high speed processing and dry milling
- Flat shape of peripheral blade nick divides chips and minimizes cutting resistance.
- Deep chip pocket design gives efficient chip flow
- 3Flutes minimize chattering when processing and achieves stable processing


**MG**  
超微粒


| 外径 Diameter | 公差 Tolerance  |
|-------------|---------------|
| 6           | $0$<br>-0.035 |
| 8・10        | $0$<br>-0.040 |
| 12・16・20    | $0$<br>-0.045 |

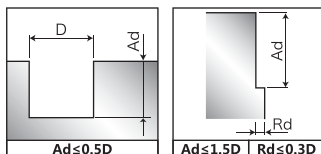

**CX200**  
Coat

| 炭素鋼<br>Carbon Steel | 合金鋼<br>Alloy Steel | 調質鋼<br>Prehardened Steel | 焼き入れ鋼 Hardened Steel |        |        |        | 鋳鉄<br>Cast Iron | ステンレス鋼<br>Stainless Steels | アルミ合金<br>Aluminium Alloys | 銅合金<br>Copper Alloys | チタン合金<br>耐熱合金<br>Ti/Ni Alloy | グラファイト<br>Graphite | 樹脂<br>Resin |
|---------------------|--------------------|--------------------------|----------------------|--------|--------|--------|-----------------|----------------------------|---------------------------|----------------------|------------------------------|--------------------|-------------|
|                     |                    |                          | ~45HRC               | ~55HRC | ~60HRC | ~65HRC |                 |                            |                           |                      |                              |                    |             |
| ◎                   | ◎                  | ◎                        | ○                    |        |        |        |                 | ◎                          | ○                         | ○                    |                              |                    |             |

◎ = Best ○ = Good

| MODEL 型番       | D 外径 | l 刃長 | L 全長 | d シャンク径 |
|----------------|------|------|------|---------|
| CX200-SURE3060 | 6    | 15   | 60   | 6       |
| CX200-SURE3080 | 8    | 20   | 75   | 8       |
| CX200-SURE3100 | 10   | 25   | 75   | 10      |
| CX200-SURE3120 | 12   | 30   | 100  | 12      |
| CX200-SURE3160 | 16   | 40   | 100  | 16      |

### 推奨切削条件 Standard Milling Condition



- The table show standard milling guidance of perforating process as written picture
- Use a rigid and precise machine and tool holder
- Select a cutting fluid appropriate to the particular usage
- In case the revolution could not be increased by the machine used, Please reduce feed speed and revolution speed at same ration
- When mounting End Mills, The run out of the till will have to be set within 0.01mm

| 被削材 Work Material | ステンレス ( SUS303/304 )      |                   |                                      |                   |
|-------------------|---------------------------|-------------------|--------------------------------------|-------------------|
| 外径 (mm) Diameter  | 送り速度 Feed Rate ( mm/min ) |                   | 回転数 Revolution ( min <sup>-1</sup> ) |                   |
|                   | 溝切削 Slotting              | 側面切削 Side Milling | 溝切削 Slotting                         | 側面切削 Side Milling |
| 6                 | 180                       | 590               | 3690                                 | 4100              |
| 8                 | 190                       | 600               | 2790                                 | 3100              |
| 10                | 200                       | 610               | 2250                                 | 2500              |
| 12                | 190                       | 610               | 1800                                 | 2000              |
| 16                | 190                       | 610               | 1350                                 | 1500              |

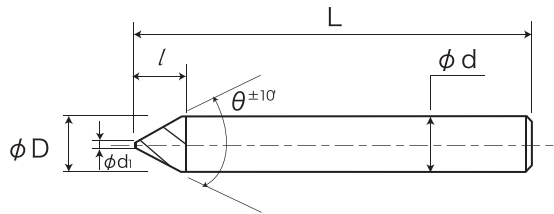
# CX200 ステンレス用面取り加工エンドミル

CX200 Chamfering End Mill for Stainless steel

## CX200-SUCH



**CX200-SUCH10**  
Model d



### 特性 Features

- CX200 Coating have high oxidation resistance and hardening which exceed the existing coating and provides long tool life, and suitable for high speed processing and dry milling
- Sharp helical blades design minimize deburring after processing and achieves high accurate surface finishing

| 外径公差 Tolerance |
|----------------|
| 0              |
| -0.02          |

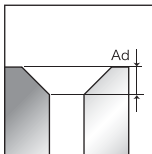


| 炭素鋼<br>Carbon Steel | 合金鋼<br>Alloy Steel | 調質鋼<br>Prehardened Steel | 焼き入れ鋼 Hardened Steel |   |  |  | 鋳鉄<br>Cast Iron | ステンレス鋼<br>Stainless Steels | アルミ合金<br>Aluminium Alloys | 銅合金<br>Copper Alloys | チタン合金<br>耐熱合金<br>Ti/Ni Alloy | グラファイト<br>Graphite | 樹脂<br>Resin |
|---------------------|--------------------|--------------------------|----------------------|---|--|--|-----------------|----------------------------|---------------------------|----------------------|------------------------------|--------------------|-------------|
| ~45HRC              | ~55HRC             | ~60HRC                   | ~65HRC               |   |  |  |                 |                            |                           |                      |                              |                    |             |
| ◎                   | ◎                  | ◎                        | ◎                    | ○ |  |  |                 | ◎                          | ○                         | ○                    |                              |                    |             |

◎ = Best ○ = Good

| MODEL 型番     | d1  | D 外径 | θ  | l 刃長 | L 全長 | d シャンク径 |
|--------------|-----|------|----|------|------|---------|
| CX200-SUCH3  | 0.8 | 3    | 90 | 1.1  | 50   | 3       |
| CX200-SUCH4  | 0.8 | 4    | 90 | 1.6  | 50   | 4       |
| CX200-SUCH6  | 1   | 6    | 90 | 2.5  | 60   | 6       |
| CX200-SUCH8  | 1   | 8    | 90 | 3.5  | 60   | 8       |
| CX200-SUCH10 | 1   | 10   | 90 | 4.5  | 65   | 10      |
| CX200-SUCH12 | 1   | 12   | 90 | 5.5  | 75   | 12      |

### 推奨切削条件 Standard Milling Condition



- The table show standard milling guidance of perforating process as written picture
- Use a rigid and precise machine and tool holder
- Select a cutting fluid appropriate to the particular usage
- In case the revolution could not be increased by the machine used, Please reduce feed speed and revolution speed at same ration
- When mounting End Mills, The run out of the till will have to be set within 0.01mm

| 被削材 Work Material | ステンレス ( SUS303/304 )      |      |                                      |      |
|-------------------|---------------------------|------|--------------------------------------|------|
| 外径 (mm) Diameter  | 送り速度 Feed Rate ( mm/min ) |      | 回転数 Revolution ( min <sup>-1</sup> ) |      |
|                   | 穴面取り                      | 角面取り | 穴面取り                                 | 角面取り |
| 3                 | 360                       | 140  | 4070                                 |      |
| 4                 | 350                       | 170  | 3380                                 |      |
| 6                 | 290                       | 190  | 2040                                 |      |
| 8                 | 280                       | 190  | 1540                                 |      |
| 10                | 260                       | 180  | 1210                                 |      |
| 12                | 260                       | 170  | 1050                                 |      |
| Ad                | ≦0.1D                     |      |                                      |      |

面取り加工用 Chamfering

スクエア Square

ラジアス Radius

ボール Ball

ロングネック Long Neck

ラフィング Roughing

面取り加工用 Chamfering

ドリル Drill

## 複合ネジレドリル ショート

Dual Lead Drill Short

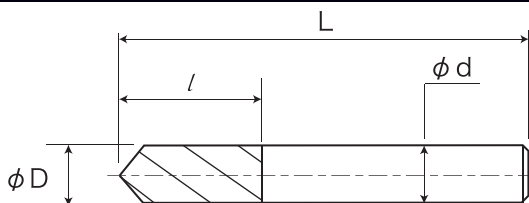
## TA-DRS



TA-DRS 5

Model

D



## 特 性 Features

- Apply variable lead type technology use helix degree 30° at the edge of drill and 20° from middle of drill until shank
- CKK Original design 20° of helix from middle of drill until shank can use extend tool life belong.
- Employs TiAlN Coating.

MG  
超微粒30°→  
20°Point Angle  
145°TiAlN  
Coat

| 炭素鋼<br>Carbon Steel | 合金鋼<br>Alloy Steel | 調質鋼<br>Prehardened Steel | 焼き入れ鋼 Hardened Steel |   |  |  | 鋳鉄<br>Cast Iron | ステンレス鋼<br>Stainless Steels | アルミ合金<br>Aluminium Alloys | 銅合金<br>Copper Alloys | チタン合金<br>耐熱合金<br>Ti/Ni Alloy | グラファイト<br>Graphite | 樹脂<br>Resin |
|---------------------|--------------------|--------------------------|----------------------|---|--|--|-----------------|----------------------------|---------------------------|----------------------|------------------------------|--------------------|-------------|
| ~45HRC              | ~55HRC             | ~60HRC                   | ~65HRC               |   |  |  |                 |                            |                           |                      |                              |                    |             |
| ◎                   | ◎                  | ◎                        | ◎                    | ○ |  |  | ○               | ◎                          |                           |                      | ○                            |                    |             |

◎ = Best ○ = Good

| MODEL 型番  | D 直径 | / 刃長 | L 全長 | d 柄径 |
|-----------|------|------|------|------|
| TA-DRS3   | 3    | 20   | 50   | 4    |
| TA-DRS3.3 | 3.3  |      |      |      |
| TA-DRS3.5 | 3.5  |      |      |      |
| TA-DRS4   | 4    | 24   | 60   | 6    |
| TA-DRS4.2 | 4.2  |      |      |      |
| TA-DRS4.5 | 4.5  |      |      |      |
| TA-DRS5   | 5    | 30   | 80   | 8    |
| TA-DRS5.5 | 5.5  |      |      |      |
| TA-DRS6   | 6    |      |      |      |
| TA-DRS6.5 | 6.5  | 34   | 80   | 8    |
| TA-DRS6.8 | 6.8  |      |      |      |

| MODEL 型番   | D 直径 | / 刃長 | L 全長 | d 柄径 |
|------------|------|------|------|------|
| TA-DRS7    | 7    | 42   | 90   | 8    |
| TA-DRS7.5  | 7.5  |      |      |      |
| TA-DRS7.8  | 7.8  |      |      |      |
| TA-DRS8    | 8    | 47   | 105  | 10   |
| TA-DRS8.5  | 8.5  |      |      |      |
| TA-DRS9    | 9    |      |      |      |
| TA-DRS10   | 10   | 55   | 115  | 12   |
| TA-DRS10.3 | 10.3 |      |      |      |
| TA-DRS11   | 11   |      |      |      |
| TA-DRS12   | 12   | 60   | 120  | 14   |
| TA-DRS13   | 13   |      |      |      |

## 推奨切削条件 Standard Milling Condition

| 被削材<br>Work Material             | 深さ/加工経<br>L/D | 切削速度<br>V(m/min) | N= 回転数 (min) f= 送り量 (mm/rev) |               |               |               |               |               |
|----------------------------------|---------------|------------------|------------------------------|---------------|---------------|---------------|---------------|---------------|
|                                  |               |                  | 直径 D=3                       | 4             | 5             | 6             | 8             | 10            |
| 一般鋼<br>(SS.Steel)                | 5 × D         | 100-120          | N=10620<br>f=0.110           | 7960<br>0.125 | 6370<br>0.160 | 5310<br>0.160 | 3980<br>0.250 | 3190<br>0.300 |
| 合金鋼、工具鋼<br>(SUJ2.SKD11.SKD12)    |               | 50-70            | N=5310<br>f=0.090            | 3980<br>0.125 | 3180<br>0.130 | 2650<br>0.150 | 1990<br>0.180 | 1590<br>0.200 |
| ステンレス鋼<br>(SUS303.SUS304.SUS416) |               | 40-50            | N=4250<br>f=0.096            | 3180<br>0.100 | 2550<br>0.100 | 2120<br>0.120 | 1590<br>0.160 | 1270<br>0.200 |
| 調質鋼<br>(40~48HRC)                |               | 35-45            | N=3720<br>f=0.060            | 2790<br>0.100 | 2230<br>0.100 | 1860<br>0.120 | 1390<br>0.160 | 1120<br>0.200 |
| アルミニウム合金<br>Aluminium Alloy      |               | 100-120          | N=10620<br>f=0.160           | 7960<br>0.200 | 6370<br>0.250 | 5310<br>0.300 | 3980<br>0.315 | 3190<br>0.400 |
|                                  |               |                  |                              |               |               |               |               | 2450<br>0.500 |



## 複合ネジレドリル レギュラー

Dual Lead Drill Regular

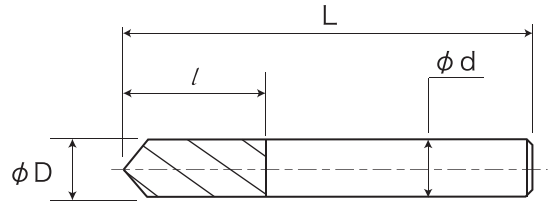
## TA-DRR



## TA-DRR 5

Model

D



## 特性 Features

- 2Flute eliminates chattering and design special gash for increase process efficiently.
- Design 2Flute for absorb resistance when processing
- Use material micro grain carbide.
- Employs TiAlN Coating

| 直径 D    | 公差 (h7)        | 柄径 d  | 公差 (h6)        |
|---------|----------------|-------|----------------|
| 3       | $0$<br>- 0.010 | 4・6   | $0$<br>- 0.008 |
| 3.3~6   | $0$<br>- 0.012 | 8・10  | $0$<br>- 0.009 |
| 6.5~10  | $0$<br>- 0.015 | 12・14 | $0$<br>- 0.011 |
| 10.3~13 | $0$<br>- 0.018 |       |                |

MG  
超微粒

30°→20°

Point Angle  
145°TiAlN  
Coat

| 炭素鋼<br>Carbon Steel | 合金鋼<br>Alloy Steel | 調質鋼<br>Prehardened Steel | 焼き入れ鋼 Hardened Steel |        |        |        | 鋳鉄<br>Cast Iron | ステンレス鋼<br>Stainless Steels | アルミ合金<br>Aluminium Alloys | 銅合金<br>Copper Alloys | チタン合金<br>耐熱合金<br>Ti/Ni Alloy | グラファイト<br>Graphite | 樹脂<br>Resin |
|---------------------|--------------------|--------------------------|----------------------|--------|--------|--------|-----------------|----------------------------|---------------------------|----------------------|------------------------------|--------------------|-------------|
|                     |                    |                          | ~45HRC               | ~55HRC | ~60HRC | ~65HRC |                 |                            |                           |                      |                              |                    |             |
| ◎                   | ◎                  | ◎                        | ◎                    | ○      |        |        | ○               | ◎                          |                           |                      | ○                            |                    |             |

◎ = Best ○ = Good

| MODEL 型番  | D 直径 | / 刃長 | L 全長 | d 柄径 |
|-----------|------|------|------|------|
| TA-DRR3   | 3    | 28   | 60   | 4    |
| TA-DRR3.3 | 3.3  |      |      |      |
| TA-DRR3.5 | 3.5  |      |      |      |
| TA-DRR4   | 4    | 36   | 80   | 6    |
| TA-DRR4.2 | 4.2  |      |      |      |
| TA-DRR4.5 | 4.5  |      |      |      |
| TA-DRR5   | 5    | 44   | 90   | 8    |
| TA-DRR5.5 | 5.5  |      |      |      |
| TA-DRR6   | 6    |      |      |      |
| TA-DRR6.5 | 6.5  | 53   | 110  | 8    |
| TA-DRR6.8 | 6.8  |      |      |      |

| MODEL 型番   | D 直径 | / 刃長 | L 全長 | d 柄径 |
|------------|------|------|------|------|
| TA-DRR7    | 7    | 53   | 110  | 8    |
| TA-DRR7.5  | 7.5  |      |      |      |
| TA-DRR7.8  | 7.8  |      |      |      |
| TA-DRR8    | 8    | 61   | 120  | 10   |
| TA-DRR8.5  | 8.5  |      |      |      |
| TA-DRR9    | 9    |      |      |      |
| TA-DRR10   | 10   | 71   | 130  | 12   |
| TA-DRR10.3 | 10.3 |      |      |      |
| TA-DRR11   | 11   |      |      |      |
| TA-DRR12   | 12   | 73   | 140  | 14   |
| TA-DRR13   | 13   |      |      |      |

## 推奨切削条件 Standard Milling Condition

| 被削材<br>Work Material          | 深さ/加工径<br>L/D | 切削速度<br>V(m/min) | N=回転数 (min) f=送り量 (mm/rev) |               |               |               |               |               |               |
|-------------------------------|---------------|------------------|----------------------------|---------------|---------------|---------------|---------------|---------------|---------------|
|                               |               |                  | 直径 D=3                     | 4             | 5             | 6             | 8             | 10            | 13            |
| 普通鋼 (SS. 鋼)                   | 5 × D         | 100-120          | N=10620<br>f=0.110         | 7960<br>0.125 | 6370<br>0.160 | 5310<br>0.160 | 3980<br>0.250 | 3190<br>0.300 | 2450<br>0.315 |
| 合金工具鋼 (SUJ2.SKD11.SKD12)      |               | 50-70            | N=5310<br>f=0.090          | 3980<br>0.125 | 3180<br>0.130 | 2650<br>0.150 | 1990<br>0.180 | 1590<br>0.200 | 1230<br>0.250 |
| ステンレス鋼 (SUS303.SUS304.SUS416) |               | 40-50            | N=4250<br>f=0.096          | 3180<br>0.100 | 2550<br>0.100 | 2120<br>0.120 | 1590<br>0.160 | 1270<br>0.200 | 980<br>0.21   |
| 調質鋼 (40~48HRC)                |               | 35-45            | N=3720<br>f=0.060          | 2790<br>0.100 | 2230<br>0.100 | 1860<br>0.120 | 1390<br>0.160 | 1120<br>0.200 | 860<br>0.210  |
| アルミニウム合金 Aluminium Alloy      |               | 100-120          | N=10620<br>f=0.160         | 7960<br>0.200 | 6370<br>0.250 | 5310<br>0.300 | 3980<br>0.315 | 3190<br>0.400 | 2450<br>0.500 |

ドリル Drill

スクエア Square

ラジアス Radius

ボール Ball

ロングネック Long Neck

ラフニング Roughing

面取り加工用 Chamfering

ドリル Drill

## 3枚刃ドリル ショート

3-Flute Drill Short

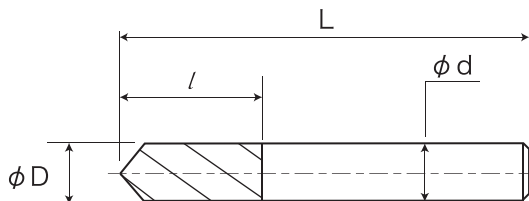
## TA-3DS



TA-3DS 5

Model

D



## 特性 Features

- 3Flute eliminates chattering and design special gash for increase process efficiently.
- Design 3Flute for absorb resistance when processing
- Use material micro grain carbide.
- Employs TiAlN Coating

| 直径 D 柄径 d | 公差 (h6)                                             |
|-----------|-----------------------------------------------------|
| 3         | $\begin{smallmatrix} 0 \\ -0.006 \end{smallmatrix}$ |
| 3.3~6     | $\begin{smallmatrix} 0 \\ -0.008 \end{smallmatrix}$ |
| 6.5~10    | $\begin{smallmatrix} 0 \\ -0.009 \end{smallmatrix}$ |
| 10.3~13   | $\begin{smallmatrix} 0 \\ -0.011 \end{smallmatrix}$ |

MG  
超微粒

30°

Point Angle  
140°TiAlN  
Coat

| 炭素鋼<br>Carbon Steel | 合金鋼<br>Alloy Steel | 調質鋼<br>Prehardened Steel | 焼き入れ鋼 Hardened Steel |        |        |        | 鋳鉄<br>Cast Iron | ステンレス鋼<br>Stainless Steels | アルミ合金<br>Aluminium Alloys | 銅合金<br>Copper Alloys | チタン合金<br>耐熱合金<br>Ti/Ni Alloy | グラファイト<br>Graphite | 樹脂<br>Resin |
|---------------------|--------------------|--------------------------|----------------------|--------|--------|--------|-----------------|----------------------------|---------------------------|----------------------|------------------------------|--------------------|-------------|
|                     |                    |                          | ~45HRC               | ~55HRC | ~60HRC | ~65HRC |                 |                            |                           |                      |                              |                    |             |
| ◎                   | ◎                  | ◎                        | ◎                    | ○      |        |        | ○               | ○                          |                           |                      |                              |                    |             |

◎ = Best ○ = Good

| MODEL 型番  | D 直径 | / 刃長 | L 全長 | d 柄径 |
|-----------|------|------|------|------|
| TA-3DS3   | 3    | 20   | 50   | 4    |
| TA-3DS3.3 | 3.3  |      |      |      |
| TA-3DS3.5 | 3.5  |      |      |      |
| TA-3DS4   | 4    | 24   | 60   | 6    |
| TA-3DS4.2 | 4.2  |      |      |      |
| TA-3DS4.5 | 4.5  |      |      |      |
| TA-3DS5   | 5    | 30   |      |      |
| TA-3DS5.5 | 5.5  |      |      |      |
| TA-3DS6   | 6    |      |      |      |
| TA-3DS6.5 | 6.5  | 34   | 70   | 8    |
| TA-3DS6.8 | 6.8  |      |      |      |

| MODEL 型番   | D 直径 | / 刃長 | L 全長 | d 柄径 |
|------------|------|------|------|------|
| TA-3DS7    | 7    | 34   | 70   | 8    |
| TA-3DS8    | 8    | 41   | 90   |      |
| TA-3DS8.5  | 8.5  | 47   | 100  | 10   |
| TA-3DS9    | 9    |      |      |      |
| TA-3DS10   | 10   |      |      |      |
| TA-3DS10.3 | 10.3 | 55   | 105  | 12   |
| TA-3DS11   | 11   |      |      |      |
| TA-3DS12   | 12   |      |      |      |
| TA-3DS13   | 13   | 60   | 110  | 14   |

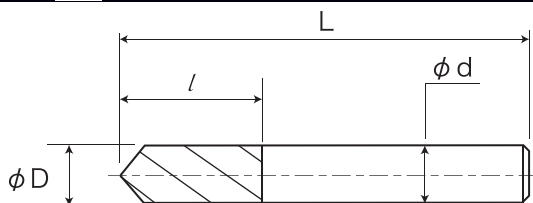
## 推奨切削条件 Standard Milling Condition

| 被削材<br>Work Material  | 普通鋼 Steel<br>S45-S55C     |                                        | 合金鋼 工具鋼 Alloy Steel Tool Steel<br>SKD.SCM |                                        | 調質鋼 Hardened Steel<br>35-40HRC.HPM.NAK |                                        |
|-----------------------|---------------------------|----------------------------------------|-------------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|
| 切削速度<br>Cutting Speed | 60~100(m/min)             |                                        | 70~70(m/min)                              |                                        | 20~50(m/min)                           |                                        |
| 直径 (mm)<br>Diameter   | 送り速度 (m/min)<br>Feed rate | 回転数 (min <sup>-1</sup> )<br>Revolution | 送り速度 (m/min)<br>Feed rate                 | 回転数 (min <sup>-1</sup> )<br>Revolution | 送り速度 (m/min)<br>Feed rate              | 回転数 (min <sup>-1</sup> )<br>Revolution |
| 2                     | 0.083                     | 11090                                  | 0.075                                     | 7940                                   | 0.058                                  | 5550                                   |
| 3                     | 0.10                      | 7400                                   | 0.09                                      | 5300                                   | 0.08                                   | 3700                                   |
| 4                     | 0.12                      | 5600                                   | 0.10                                      | 4000                                   | 0.09                                   | 2800                                   |
| 5                     | 0.14                      | 4500                                   | 0.12                                      | 3200                                   | 0.10                                   | 2200                                   |
| 6                     | 0.18                      | 3700                                   | 0.16                                      | 2700                                   | 0.14                                   | 1900                                   |
| 8                     | 0.20                      | 2800                                   | 0.18                                      | 2000                                   | 0.16                                   | 1400                                   |
| 10                    | 0.25                      | 2200                                   | 0.20                                      | 1600                                   | 0.18                                   | 1100                                   |
| 12                    | 0.30                      | 1700                                   | 0.25                                      | 1200                                   | 0.20                                   | 900                                    |

## 3枚刃ドリル レギュラー

3-Flute Drill Regular

## TA-3DR

TA-3DR 5  
Model D

## 特性 Features

- 3Flute eliminates chattering and design special gash for increase process efficiently.
- Design 3Flute for absorb resistance when processing
- Use material micro grain carbide. And then Employs TiAIN Coating
- Suitable for S45C/SCM440 until steel

| 直径 D 柄径 d | 公差 (h6)                                             |
|-----------|-----------------------------------------------------|
| 2~3       | $\begin{smallmatrix} 0 \\ -0.010 \end{smallmatrix}$ |
| 3.3~6     | $\begin{smallmatrix} 0 \\ -0.012 \end{smallmatrix}$ |
| 6.5~10    | $\begin{smallmatrix} 0 \\ -0.015 \end{smallmatrix}$ |
| 10.3~13   | $\begin{smallmatrix} 0 \\ -0.018 \end{smallmatrix}$ |

MG  
超微粒

30°

Point Angle  
140°TiAIN  
Coat

| 炭素鋼<br>Carbon Steel | 合金鋼<br>Alloy Steel | 調質鋼<br>Prehardened Steel | 焼き入れ鋼 Hardened Steel |        |        |        | 鋳鉄<br>Cast Iron | ステンレス鋼<br>Stainless Steels | アルミ合金<br>Aluminium Alloys | 銅合金<br>Copper Alloys | チタン合金<br>耐熱合金<br>Ti/Ni Alloy | グラファイト<br>Graphite | 樹脂<br>Resin |
|---------------------|--------------------|--------------------------|----------------------|--------|--------|--------|-----------------|----------------------------|---------------------------|----------------------|------------------------------|--------------------|-------------|
|                     |                    |                          | ~45HRC               | ~55HRC | ~60HRC | ~65HRC |                 |                            |                           |                      |                              |                    |             |
| ◎                   | ◎                  | ◎                        | ◎                    | ○      |        |        | ○               | ○                          |                           |                      |                              |                    |             |

◎ = Best ○ = Good

| MODEL 型番  | D 直径 | / 刃長 | L 全長 | d 柄径 |
|-----------|------|------|------|------|
| TA-3DR2   | 2    | 18   | 50   | 3    |
| TA-3DR2.5 | 2.5  | 22   |      |      |
| TA-3DR3   | 3    | 28   | 60   | 4    |
| TA-3DR3.3 | 3.3  |      |      |      |
| TA-3DR3.5 | 3.5  |      |      |      |
| TA-3DR4   | 4    | 36   | 80   | 6    |
| TA-3DR4.2 | 4.2  |      |      |      |
| TA-3DR4.5 | 4.5  |      |      |      |
| TA-3DR5   | 5    | 44   | 90   |      |
| TA-3DR5.5 | 5.5  |      |      |      |
| TA-3DR6   | 6    |      |      |      |

| MODEL 型番   | D 直径 | / 刃長 | L 全長 | d 柄径 |
|------------|------|------|------|------|
| TA-3DR6.5  | 6.5  | 53   | 110  | 8    |
| TA-3DR6.8  | 6.8  |      |      |      |
| TA-3DR7    | 7    |      |      |      |
| TA-3DR8    | 8    | 61   | 120  | 10   |
| TA-3DR8.5  | 8.5  |      |      |      |
| TA-3DR9    | 9    |      |      |      |
| TA-3DR10   | 10   | 71   | 130  | 12   |
| TA-3DR10.3 | 10.3 |      |      |      |
| TA-3DR11   | 11   |      |      |      |
| TA-3DR12   | 12   | 77   | 140  | 14   |
| TA-3DR13   | 13   |      |      |      |

## 推奨切削条件 Standard Milling Condition

| 被削材<br>Work Material   | 普通鋼 Steel<br>S45-S55 C       |                                           | 合金鋼 工具鋼 Alloy Steel Tool Steel<br>SKD,SCM |                                           | 調質鋼 Prehardened Steel<br>35-40HRC,HPM,NAK |                                           |
|------------------------|------------------------------|-------------------------------------------|-------------------------------------------|-------------------------------------------|-------------------------------------------|-------------------------------------------|
| 切削速度<br>Cutting Speed  | 60~100(m/min)                |                                           | 70~70(m/min)                              |                                           | 20~50(m/min)                              |                                           |
| 直径<br>(mm)<br>Diameter | 送り速度<br>(m/min)<br>Feed rate | 回転数<br>(min <sup>-1</sup> )<br>Revolution | 送り速度<br>(m/min)<br>Feed rate              | 回転数<br>(min <sup>-1</sup> )<br>Revolution | 送り速度<br>(m/min)<br>Feed rate              | 回転数<br>(min <sup>-1</sup> )<br>Revolution |
| 2                      | 0.083                        | 11090                                     | 0.075                                     | 7940                                      | 0.058                                     | 5550                                      |
| 3                      | 0.10                         | 7400                                      | 0.09                                      | 5300                                      | 0.08                                      | 3700                                      |
| 4                      | 0.12                         | 5600                                      | 0.10                                      | 4000                                      | 0.09                                      | 2800                                      |
| 5                      | 0.14                         | 4500                                      | 0.12                                      | 3200                                      | 0.10                                      | 2200                                      |
| 6                      | 0.18                         | 3700                                      | 0.16                                      | 2700                                      | 0.14                                      | 1900                                      |
| 8                      | 0.20                         | 2800                                      | 0.18                                      | 2000                                      | 0.16                                      | 1400                                      |
| 10                     | 0.25                         | 2200                                      | 0.20                                      | 1600                                      | 0.18                                      | 1100                                      |
| 12                     | 0.30                         | 1700                                      | 0.25                                      | 1200                                      | 0.20                                      | 900                                       |

ドリル Drill

スクエア Square

ラジアス Radius

ボール Ball

ロングネック Long Neck

ラフィング Roughing

面取り加工作 Chamfering

ドリル Drill

## CX500 マイクロドリル

CX500 Micro Drill

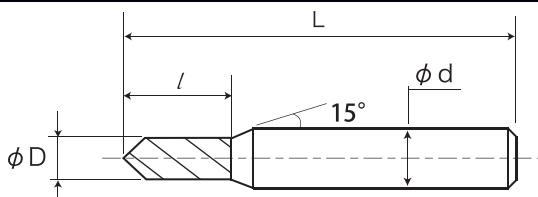
## CX500-MD



CX500-MD 0.1

Model

D



## 特性 Features

- Stable long-lived machining can achieved for precision small hole drilling of steels.
- Wide Drilling application is available from Wrought steel to hardness steel (HRC50)

| 直径 D    | 公差 (h6)      |
|---------|--------------|
| 0.1~0.5 | 0<br>- 0.005 |
| 0.5~0.9 | 0<br>- 0.01  |
| 1       | 0<br>- 0.015 |



| 炭素鋼<br>Carbon<br>Steel | 合金鋼<br>Alloy Steel | 調質鋼<br>Prehardened<br>Steel | 焼き入れ鋼 Hardened Steel |   |   |  | 鋳鉄<br>Cast Iron | ステンレス鋼<br>Stainless<br>Steels | アルミ合金<br>Aluminium<br>Alloys | 銅合金<br>Copper<br>Alloys | チタン合金<br>耐熱合金<br>Ti/Ni Alloy | グラファイト<br>Graphite | 樹脂<br>Resin |
|------------------------|--------------------|-----------------------------|----------------------|---|---|--|-----------------|-------------------------------|------------------------------|-------------------------|------------------------------|--------------------|-------------|
| ~45HRC                 | ~55HRC             | ~60HRC                      | ~65HRC               |   |   |  |                 |                               |                              |                         |                              |                    |             |
| ◎                      | ◎                  | ◎                           | ◎                    | ◎ | ○ |  | ○               | ◎                             |                              |                         | ◎                            |                    |             |

◎ = Best ○ = Good

| MODEL 型番     | D 直径 | / 刃長 | L 全長 | d 柄径 |
|--------------|------|------|------|------|
| CX500-MD0.1  | 0.1  | 1.2  |      |      |
| CX500-MD0.11 | 0.11 |      |      |      |
| CX500-MD0.12 | 0.12 | 1.4  |      |      |
| CX500-MD0.13 | 0.13 |      |      |      |
| CX500-MD0.14 | 0.14 |      |      |      |
| CX500-MD0.15 | 0.15 | 1.8  |      |      |
| CX500-MD0.16 | 0.16 |      |      |      |
| CX500-MD0.17 | 0.17 |      |      |      |
| CX500-MD0.18 | 0.18 | 2.1  |      |      |
| CX500-MD0.19 | 0.19 |      |      |      |
| CX500-MD0.2  | 0.2  | 2.4  |      |      |
| CX500-MD0.21 | 0.21 |      |      |      |
| CX500-MD0.22 | 0.22 |      |      |      |
| CX500-MD0.23 | 0.23 | 2.6  |      |      |
| CX500-MD0.24 | 0.24 |      |      |      |
| CX500-MD0.25 | 0.25 |      |      |      |
| CX500-MD0.26 | 0.26 | 3    |      |      |
| CX500-MD0.27 | 0.27 |      |      |      |
| CX500-MD0.28 | 0.28 | 3.3  |      |      |
| CX500-MD0.29 | 0.29 |      |      |      |
| CX500-MD0.3  | 0.3  |      |      |      |
| CX500-MD0.31 | 0.31 |      |      |      |
| CX500-MD0.32 | 0.32 |      |      |      |
| CX500-MD0.33 | 0.33 |      |      |      |
| CX500-MD0.34 | 0.34 |      |      |      |
| CX500-MD0.35 | 0.35 |      |      |      |
| CX500-MD0.36 | 0.36 |      |      |      |
| CX500-MD0.37 | 0.37 |      |      |      |
| CX500-MD0.38 | 0.38 |      |      |      |
| CX500-MD0.39 | 0.39 |      |      |      |
| CX500-MD0.4  | 0.4  |      |      |      |
| CX500-MD0.41 | 0.41 |      |      |      |
| CX500-MD0.42 | 0.42 |      |      |      |
| CX500-MD0.43 | 0.43 |      |      |      |
| CX500-MD0.44 | 0.44 |      |      |      |
| CX500-MD0.45 | 0.45 |      |      |      |
| CX500-MD0.46 | 0.46 |      |      |      |
| CX500-MD0.47 | 0.47 |      |      |      |
| CX500-MD0.48 | 0.48 |      |      |      |
| CX500-MD0.49 | 0.49 |      |      |      |
| CX500-MD0.5  | 0.5  |      |      |      |
| CX500-MD0.51 | 0.51 |      |      |      |
| CX500-MD0.52 | 0.52 |      |      |      |
| CX500-MD0.53 | 0.53 |      |      |      |
| CX500-MD0.54 | 0.54 |      |      |      |
| CX500-MD0.55 | 0.55 |      |      |      |

| MODEL 型番     | D 直径 | / 刃長 | L 全長 | d 柄径 |
|--------------|------|------|------|------|
| CX500-MD0.56 | 0.56 |      |      |      |
| CX500-MD0.57 | 0.57 | 6    |      |      |
| CX500-MD0.58 | 0.58 |      |      |      |
| CX500-MD0.59 | 0.59 |      |      |      |
| CX500-MD0.6  | 0.6  |      |      |      |
| CX500-MD0.61 | 0.61 |      |      |      |
| CX500-MD0.62 | 0.62 |      |      |      |
| CX500-MD0.63 | 0.63 |      |      |      |
| CX500-MD0.64 | 0.64 |      |      |      |
| CX500-MD0.65 | 0.65 |      |      |      |
| CX500-MD0.66 | 0.66 |      |      |      |
| CX500-MD0.67 | 0.67 |      |      |      |
| CX500-MD0.68 | 0.68 |      |      |      |
| CX500-MD0.69 | 0.69 |      |      |      |
| CX500-MD0.7  | 0.7  |      |      |      |
| CX500-MD0.71 | 0.71 |      |      |      |
| CX500-MD0.72 | 0.72 |      |      |      |
| CX500-MD0.73 | 0.73 |      |      |      |
| CX500-MD0.74 | 0.74 |      |      |      |
| CX500-MD0.75 | 0.75 |      |      |      |
| CX500-MD0.76 | 0.76 |      |      |      |
| CX500-MD0.77 | 0.77 |      |      |      |
| CX500-MD0.78 | 0.78 |      |      |      |
| CX500-MD0.79 | 0.79 |      |      |      |
| CX500-MD0.8  | 0.8  |      |      |      |
| CX500-MD0.81 | 0.81 |      |      |      |
| CX500-MD0.82 | 0.82 |      |      |      |
| CX500-MD0.83 | 0.83 |      |      |      |
| CX500-MD0.84 | 0.84 |      |      |      |
| CX500-MD0.85 | 0.85 |      |      |      |
| CX500-MD0.86 | 0.86 |      |      |      |
| CX500-MD0.87 | 0.87 |      |      |      |
| CX500-MD0.88 | 0.88 |      |      |      |
| CX500-MD0.89 | 0.89 |      |      |      |
| CX500-MD0.9  | 0.9  |      |      |      |
| CX500-MD0.91 | 0.91 |      |      |      |
| CX500-MD0.92 | 0.92 |      |      |      |
| CX500-MD0.93 | 0.93 |      |      |      |
| CX500-MD0.94 | 0.94 |      |      |      |
| CX500-MD0.95 | 0.95 |      |      |      |
| CX500-MD0.96 | 0.96 |      |      |      |
| CX500-MD0.97 | 0.97 |      |      |      |
| CX500-MD0.98 | 0.98 |      |      |      |
| CX500-MD0.99 | 0.99 |      |      |      |
| CX500-MD1    | 1    | 10   |      |      |

## 推奨切削条件 Standard Milling Condition

## CX500-MD

| 被削材<br>Work Material   | 炭素鋼<br>Carbon Steel<br>S50C               |                               | 合金鋼<br>Alloy Steel<br>SCM.SKS             |                               | 調質鋼<br>Prehardend steel<br>HPM.NAK        |                               | アルミニウム合金<br>Aluminium Alloy               |                               | ステンレス鋼<br>Stainless Steel<br>SUS303.SUS304 |                               |
|------------------------|-------------------------------------------|-------------------------------|-------------------------------------------|-------------------------------|-------------------------------------------|-------------------------------|-------------------------------------------|-------------------------------|--------------------------------------------|-------------------------------|
| 直径<br>(mm)<br>Diameter | 回転数<br>(min <sup>-1</sup> )<br>Revolution | 送り速度<br>(mm/min)<br>Feed rate | 回転数<br>(min <sup>-1</sup> )<br>Revolution | 送り速度<br>(mm/min)<br>Feed rate | 回転数<br>(min <sup>-1</sup> )<br>Revolution | 送り速度<br>(mm/min)<br>Feed rate | 回転数<br>(min <sup>-1</sup> )<br>Revolution | 送り速度<br>(mm/min)<br>Feed rate | 回転数<br>(min <sup>-1</sup> )<br>Revolution  | 送り速度<br>(mm/min)<br>Feed rate |
| 0.10                   | 25000                                     | 50                            | 20000                                     | 40                            | 17000                                     | 35                            | 25000                                     | 50                            | 15000                                      | 30                            |
| 0.15                   | 25000                                     | 50                            | 20000                                     | 40                            | 17000                                     | 35                            | 25000                                     | 50                            | 15000                                      | 30                            |
| 0.20                   | 25000                                     | 75                            | 20000                                     | 60                            | 17000                                     | 50                            | 25000                                     | 100                           | 15000                                      | 45                            |
| 0.25                   | 25000                                     | 75                            | 20000                                     | 60                            | 17000                                     | 50                            | 25000                                     | 100                           | 15000                                      | 45                            |
| 0.30                   | 20000                                     | 120                           | 15000                                     | 60                            | 13000                                     | 50                            | 22000                                     | 400                           | 11000                                      | 45                            |
| 0.35                   | 20000                                     | 120                           | 15000                                     | 60                            | 13000                                     | 50                            | 22000                                     | 400                           | 11000                                      | 45                            |
| 0.40                   | 20000                                     | 160                           | 15000                                     | 75                            | 13000                                     | 65                            | 22000                                     | 700                           | 8500                                       | 45                            |
| 0.45                   | 20000                                     | 160                           | 15000                                     | 75                            | 13000                                     | 65                            | 22000                                     | 700                           | 8500                                       | 45                            |
| 0.50                   | 18000                                     | 180                           | 13000                                     | 100                           | 10000                                     | 80                            | 20000                                     | 1000                          | 7000                                       | 55                            |
| 0.55                   | 18000                                     | 180                           | 13000                                     | 100                           | 10000                                     | 80                            | 20000                                     | 1000                          | 7000                                       | 55                            |
| 0.60                   | 18000                                     | 360                           | 13000                                     | 100                           | 10000                                     | 80                            | 20000                                     | 1000                          | 7000                                       | 55                            |
| 0.65                   | 18000                                     | 360                           | 13000                                     | 100                           | 10000                                     | 80                            | 20000                                     | 1000                          | 7000                                       | 55                            |
| 0.70                   | 16000                                     | 480                           | 11000                                     | 110                           | 8000                                      | 80                            | 18000                                     | 1100                          | 6000                                       | 60                            |
| 0.75                   | 16000                                     | 480                           | 11000                                     | 110                           | 8000                                      | 80                            | 18000                                     | 1100                          | 6000                                       | 60                            |
| 0.80                   | 16000                                     | 640                           | 11000                                     | 220                           | 8000                                      | 160                           | 18000                                     | 1100                          | 6000                                       | 120                           |
| 0.85                   | 16000                                     | 640                           | 11000                                     | 220                           | 8000                                      | 160                           | 18000                                     | 1100                          | 6000                                       | 120                           |
| 0.90                   | 15000                                     | 750                           | 9000                                      | 270                           | 7000                                      | 210                           | 16000                                     | 1200                          | 5000                                       | 150                           |
| 0.95                   | 15000                                     | 750                           | 9000                                      | 270                           | 7000                                      | 210                           | 16000                                     | 1200                          | 5000                                       | 150                           |
| 1.00                   | 15000                                     | 750                           | 9000                                      | 270                           | 7000                                      | 210                           | 16000                                     | 1200                          | 5000                                       | 150                           |

ドリル Drill

スクエア  
Squareラジアス  
Radiusボール  
Ballロングネック  
Long Neckラフニング  
Roughing面取り加工用  
Chamferingドリル  
Drill



## 高速加工用ドリル

High Speed Drill

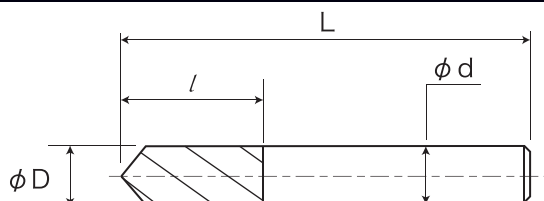
## TA-HSD



TA-HSD 5

Model

D



## 特性 Features

- Suitable for S45C/SCM440 until hardness steel (HRC45)
- Special design of character and then have merit for flow of cutting

| 直径 D    | 柄径 d | 公差 (h6)      |
|---------|------|--------------|
| 3       |      | 0<br>- 0.010 |
| 3.3~6   |      | 0<br>- 0.012 |
| 6.5~10  |      | 0<br>- 0.015 |
| 10.3~13 |      | 0<br>- 0.018 |

MG  
超微粒

30°

Point Angle  
140°TiAlN  
Coat

| 炭素鋼<br>Carbon Steel | 合金鋼<br>Alloy Steel | 調質鋼<br>Prehardened Steel | 焼き入れ鋼 Hardened Steel |   |   |   | 鋳鉄<br>Cast Iron | ステンレス鋼<br>Stainless Steels | アルミ合金<br>Aluminium Alloys | 銅合金<br>Copper Alloys | チタン合金<br>耐熱合金<br>Ti/Ni Alloy | グラファイト<br>Graphite | 樹脂<br>Resin |
|---------------------|--------------------|--------------------------|----------------------|---|---|---|-----------------|----------------------------|---------------------------|----------------------|------------------------------|--------------------|-------------|
| ◎                   | ◎                  | ◎                        | ◎                    | ◎ | ◎ | ◎ | ◎               | ◎                          |                           |                      |                              |                    |             |

◎ = Best ○ = Good

| MODEL 型番  | D 直径 | / 刃長 | L 全長 | d 柄径 |
|-----------|------|------|------|------|
| TA-HSD3   | 3    | 25   | 50   | 3    |
| TA-HSD3.1 | 3.1  |      |      |      |
| TA-HSD3.2 | 3.2  | 27   |      |      |
| TA-HSD3.3 | 3.3  |      |      |      |
| TA-HSD3.4 | 3.4  |      |      |      |
| TA-HSD3.5 | 3.5  | 30   | 60   | 4    |
| TA-HSD3.6 | 3.6  |      |      |      |
| TA-HSD3.7 | 3.7  |      |      |      |
| TA-HSD3.8 | 3.8  |      |      |      |
| TA-HSD3.9 | 3.9  | 33   |      |      |
| TA-HSD4   | 4    |      |      |      |
| TA-HSD4.1 | 4.1  |      |      |      |
| TA-HSD4.2 | 4.2  |      |      |      |
| TA-HSD4.3 | 4.3  | 36   | 70   | 4    |
| TA-HSD4.4 | 4.4  |      |      |      |
| TA-HSD4.5 | 4.5  |      |      |      |
| TA-HSD4.6 | 4.6  |      |      |      |
| TA-HSD4.7 | 4.7  |      |      |      |
| TA-HSD4.8 | 4.8  |      |      |      |
| TA-HSD4.9 | 4.9  | 39   |      | 6    |
| TA-HSD5   | 5    |      |      |      |
| TA-HSD5.1 | 5.1  |      |      |      |
| TA-HSD5.2 | 5.2  |      |      |      |
| TA-HSD5.3 | 5.3  |      |      |      |
| TA-HSD5.4 | 5.4  | 43   | 80   | 6    |
| TA-HSD5.5 | 5.5  |      |      |      |
| TA-HSD5.6 | 5.6  |      |      |      |
| TA-HSD5.7 | 5.7  |      |      |      |
| TA-HSD5.8 | 5.8  |      |      |      |
| TA-HSD5.9 | 5.9  |      |      |      |
| TA-HSD6   | 6    |      |      |      |
| TA-HSD6.1 | 6.1  |      |      |      |
| TA-HSD6.2 | 6.2  | 47   | 90   | 8    |
| TA-HSD6.3 | 6.3  |      |      |      |
| TA-HSD6.4 | 6.4  |      |      |      |
| TA-HSD6.5 | 6.5  |      |      |      |
| TA-HSD6.6 | 6.6  |      |      |      |
| TA-HSD6.7 | 6.7  |      |      |      |
| TA-HSD6.8 | 6.8  | 52   |      |      |
| TA-HSD6.9 | 6.9  |      |      |      |

| MODEL 型番   | D 直径 | / 刃長 | L 全長 | d 柄径 |
|------------|------|------|------|------|
| TA-HSD7    | 7    |      |      |      |
| TA-HSD7.1  | 7.1  |      |      |      |
| TA-HSD7.2  | 7.2  | 52   | 90   | 8    |
| TA-HSD7.3  | 7.3  |      |      |      |
| TA-HSD7.4  | 7.4  |      |      |      |
| TA-HSD7.5  | 7.5  |      |      |      |
| TA-HSD7.6  | 7.6  |      |      |      |
| TA-HSD7.7  | 7.7  |      |      |      |
| TA-HSD7.8  | 7.8  |      |      |      |
| TA-HSD7.9  | 7.9  | 56   | 100  | 8    |
| TA-HSD8    | 8    |      |      |      |
| TA-HSD8.1  | 8.1  |      |      |      |
| TA-HSD8.2  | 8.2  |      |      |      |
| TA-HSD8.3  | 8.3  |      |      |      |
| TA-HSD8.4  | 8.4  |      |      |      |
| TA-HSD8.5  | 8.5  |      |      |      |
| TA-HSD8.6  | 8.6  |      |      |      |
| TA-HSD8.7  | 8.7  |      |      |      |
| TA-HSD8.8  | 8.8  |      |      |      |
| TA-HSD8.9  | 8.9  |      |      |      |
| TA-HSD9    | 9    |      |      |      |
| TA-HSD9.1  | 9.1  | 61   | 100  | 10   |
| TA-HSD9.2  | 9.2  |      |      |      |
| TA-HSD9.3  | 9.3  |      |      |      |
| TA-HSD9.4  | 9.4  |      |      |      |
| TA-HSD9.5  | 9.5  |      |      |      |
| TA-HSD9.6  | 9.6  |      |      |      |
| TA-HSD9.7  | 9.7  |      |      |      |
| TA-HSD9.8  | 9.8  |      |      |      |
| TA-HSD9.9  | 9.9  |      |      |      |
| TA-HSD10   | 10   |      |      |      |
| TA-HSD10.1 | 10.1 | 65   | 110  | 12   |
| TA-HSD10.2 | 10.2 |      |      |      |
| TA-HSD10.3 | 10.3 |      |      |      |
| TA-HSD10.4 | 10.4 |      |      |      |
| TA-HSD10.5 | 10.5 |      |      |      |
| TA-HSD10.6 | 10.6 |      |      |      |
| TA-HSD10.7 | 10.7 |      |      |      |
| TA-HSD10.8 | 10.8 | 71   | 120  | 12   |
| TA-HSD10.9 | 10.9 |      |      |      |

## TA-HSD

| MODEL 型番   | D 直径 | / 刃長 | L 全長 | d 柄径 |
|------------|------|------|------|------|
| TA-HSD11   | 11   | 71   | 120  | 12   |
| TA-HSD11.1 | 11.1 |      |      |      |
| TA-HSD11.2 | 11.2 |      |      |      |
| TA-HSD11.3 | 11.3 |      |      |      |
| TA-HSD11.4 | 11.4 |      |      |      |
| TA-HSD11.5 | 11.5 |      |      |      |
| TA-HSD11.6 | 11.6 |      |      |      |
| TA-HSD11.7 | 11.7 |      |      |      |
| TA-HSD11.8 | 11.8 |      |      |      |
| TA-HSD11.9 | 11.9 |      |      |      |
| TA-HSD12   | 12   | 76   | 130  | 16   |
| TA-HSD12.1 | 12.1 |      |      |      |
| TA-HSD12.2 | 12.2 |      |      |      |
| TA-HSD12.3 | 12.3 |      |      |      |
| TA-HSD12.4 | 12.4 |      |      |      |
| TA-HSD12.5 | 12.5 |      |      |      |
| TA-HSD12.6 | 12.6 |      |      |      |
| TA-HSD12.7 | 12.7 |      |      |      |
| TA-HSD12.8 | 12.8 |      |      |      |
| TA-HSD12.9 | 12.9 |      |      |      |
| TA-HSD13   | 13   | 80   | 135  | 16   |
| TA-HSD13.1 | 13.1 |      |      |      |
| TA-HSD13.2 | 13.2 |      |      |      |
| TA-HSD13.3 | 13.3 |      |      |      |
| TA-HSD13.4 | 13.4 |      |      |      |
| TA-HSD13.5 | 13.5 |      |      |      |
| TA-HSD13.6 | 13.6 |      |      |      |
| TA-HSD13.7 | 13.7 |      |      |      |
| TA-HSD13.8 | 13.8 |      |      |      |
| TA-HSD13.9 | 13.9 |      |      |      |

| MODEL 型番   | D 直径 | / 刃長 | L 全長 | d 柄径 |
|------------|------|------|------|------|
| TA-HSD14   | 14   | 83   | 145  | 16   |
| TA-HSD14.1 | 14.1 |      |      |      |
| TA-HSD14.2 | 14.2 |      |      |      |
| TA-HSD14.3 | 14.3 |      |      |      |
| TA-HSD14.4 | 14.4 |      |      |      |
| TA-HSD14.5 | 14.5 |      |      |      |
| TA-HSD14.6 | 14.6 |      |      |      |
| TA-HSD14.7 | 14.7 |      |      |      |
| TA-HSD14.8 | 14.8 |      |      |      |
| TA-HSD14.9 | 14.9 |      |      |      |
| TA-HSD15   | 15   | 85   | 145  | 16   |
| TA-HSD15.1 | 15.1 |      |      |      |
| TA-HSD15.2 | 15.2 |      |      |      |
| TA-HSD15.3 | 15.3 |      |      |      |
| TA-HSD15.4 | 15.4 |      |      |      |
| TA-HSD15.5 | 15.5 |      |      |      |
| TA-HSD15.6 | 15.6 |      |      |      |
| TA-HSD15.7 | 15.7 |      |      |      |
| TA-HSD15.8 | 15.8 |      |      |      |
| TA-HSD15.9 | 15.9 |      |      |      |
| TA-HSD16   | 16   |      |      |      |

## 推奨切削条件 Standard Milling Condition

| 被削材<br>Work Material   | 炭素鋼、合金鋼<br>SS400, SCM        |                                           | 特殊鋼<br>SUJ2, SUS440          |                                           | 特殊鋼、調質鋼<br>SKD61(34~43HRC)   |                                           | 特殊鋼、調質鋼<br>(43~48HRC)        |                                           | 特殊鋼、調質鋼<br>SKD11(48~53HRC)   |                                           | 鋳鉄<br>FC250                  |                                           | ダクタイル鋳鉄<br>FCD400            |                                           |
|------------------------|------------------------------|-------------------------------------------|------------------------------|-------------------------------------------|------------------------------|-------------------------------------------|------------------------------|-------------------------------------------|------------------------------|-------------------------------------------|------------------------------|-------------------------------------------|------------------------------|-------------------------------------------|
| 切削速度<br>Cutting Speed  | 25~36m/min                   |                                           | 80~125m/min                  |                                           | 25~36m/min                   |                                           | 80~125m/min                  |                                           | 25~36m/min                   |                                           | 80~125m/min                  |                                           | 63~90m/min                   |                                           |
| 直径<br>(mm)<br>Diameter | 送り量<br>(mm/min)<br>Feed Rate | 回転数<br>(min <sup>-1</sup> )<br>Revolution | 送り量<br>(mm/min)<br>Feed Rate | 回転数<br>(min <sup>-1</sup> )<br>Revolution | 送り量<br>(mm/min)<br>Feed Rate | 回転数<br>(min <sup>-1</sup> )<br>Revolution | 送り量<br>(mm/min)<br>Feed Rate | 回転数<br>(min <sup>-1</sup> )<br>Revolution | 送り量<br>(mm/min)<br>Feed Rate | 回転数<br>(min <sup>-1</sup> )<br>Revolution | 送り量<br>(mm/min)<br>Feed Rate | 回転数<br>(min <sup>-1</sup> )<br>Revolution | 送り量<br>(mm/min)<br>Feed Rate | 回転数<br>(min <sup>-1</sup> )<br>Revolution |
| 3 ~                    | 0.09 ~ 0.12                  | 9600                                      | 0.09 ~ 0.12                  | 7500                                      | 0.09 ~ 0.12                  | 5300                                      | 0.07 ~ 0.11                  | 4000                                      | 0.05 ~ 0.09                  | 3200                                      | 0.09 ~ 0.12                  | 10000                                     | 0.09 ~ 0.12                  | 7600                                      |
| 4 ~                    | 0.10 ~ 0.15                  | 8000                                      | 0.10 ~ 0.15                  | 5650                                      | 0.10 ~ 0.15                  | 4000                                      | 0.08 ~ 0.13                  | 3000                                      | 0.06 ~ 0.10                  | 2600                                      | 0.10 ~ 0.15                  | 8000                                      | 0.10 ~ 0.15                  | 6000                                      |
| 5 ~                    | 0.12 ~ 0.18                  | 6400                                      | 0.12 ~ 0.18                  | 4550                                      | 0.12 ~ 0.18                  | 3300                                      | 0.10 ~ 0.15                  | 2400                                      | 0.08 ~ 0.12                  | 2000                                      | 0.12 ~ 0.18                  | 6400                                      | 0.12 ~ 0.18                  | 4800                                      |
| 6 ~                    | 0.14 ~ 0.20                  | 5300                                      | 0.14 ~ 0.20                  | 3800                                      | 0.14 ~ 0.20                  | 2750                                      | 0.12 ~ 0.18                  | 2000                                      | 0.09 ~ 0.15                  | 1700                                      | 0.14 ~ 0.20                  | 5300                                      | 0.14 ~ 0.20                  | 4000                                      |
| 8 ~                    | 0.16 ~ 0.24                  | 4000                                      | 0.16 ~ 0.24                  | 2850                                      | 0.16 ~ 0.24                  | 2100                                      | 0.14 ~ 0.22                  | 1500                                      | 0.12 ~ 0.20                  | 1300                                      | 0.16 ~ 0.24                  | 4000                                      | 0.16 ~ 0.24                  | 3000                                      |
| 10 ~                   | 0.18 ~ 0.27                  | 3200                                      | 0.18 ~ 0.27                  | 2250                                      | 0.18 ~ 0.27                  | 1700                                      | 0.15 ~ 0.25                  | 1200                                      | 0.13 ~ 0.23                  | 1000                                      | 0.18 ~ 0.27                  | 3200                                      | 0.18 ~ 0.27                  | 2400                                      |
| 12 ~                   | 0.20 ~ 0.30                  | 2650                                      | 0.20 ~ 0.30                  | 1900                                      | 0.20 ~ 0.30                  | 1400                                      | 0.17 ~ 0.26                  | 1000                                      | 0.14 ~ 0.24                  | 850                                       | 0.20 ~ 0.30                  | 2700                                      | 0.20 ~ 0.30                  | 2000                                      |
| 14 ~                   | 0.22 ~ 0.35                  | 2300                                      | 0.22 ~ 0.35                  | 1600                                      | 0.22 ~ 0.35                  | 1200                                      | 0.18 ~ 0.30                  | 860                                       | 0.15 ~ 0.26                  | 730                                       | 0.22 ~ 0.35                  | 2300                                      | 0.22 ~ 0.35                  | 1700                                      |
| 16                     | 0.25 ~ 0.36                  | 2000                                      | 0.25 ~ 0.36                  | 1400                                      | 0.25 ~ 0.36                  | 1050                                      | 0.20 ~ 0.32                  | 760                                       | 0.16 ~ 0.26                  | 640                                       | 0.25 ~ 0.36                  | 2000                                      | 0.25 ~ 0.36                  | 1500                                      |

## 高速切削条件 High Speed Milling Condition

| 被削材<br>Work Material   | 炭素鋼、合金鋼<br>SS400, SCM        |                                           | 特殊鋼<br>SUJ2, SUS440          |                                           | 鋳鉄<br>FC250                  |                                           | ダクタイル鋳鉄<br>FCD400            |                                           |
|------------------------|------------------------------|-------------------------------------------|------------------------------|-------------------------------------------|------------------------------|-------------------------------------------|------------------------------|-------------------------------------------|
| 切削速度<br>Cutting Speed  | 125~150m/min                 |                                           | 80~100m/min                  |                                           | 125~150m/min                 |                                           | 90~125m/min                  |                                           |
| 直径<br>(mm)<br>Diameter | 送り量<br>(mm/min)<br>Feed Rate | 回転数<br>(min <sup>-1</sup> )<br>Revolution | 送り量<br>(mm/min)<br>Feed Rate | 回転数<br>(min <sup>-1</sup> )<br>Revolution | 送り量<br>(mm/min)<br>Feed Rate | 回転数<br>(min <sup>-1</sup> )<br>Revolution | 送り量<br>(mm/min)<br>Feed Rate | 回転数<br>(min <sup>-1</sup> )<br>Revolution |
| 3 ~                    | 0.09 ~ 0.12                  | 13000                                     | 0.09 ~ 0.12                  | 9500                                      | 0.09 ~ 0.12                  | 14000                                     | 0.09 ~ 0.12                  | 11000                                     |
| 4 ~                    | 0.10 ~ 0.15                  | 10000                                     | 0.10 ~ 0.15                  | 7100                                      | 0.10 ~ 0.15                  | 11000                                     | 0.10 ~ 0.15                  | 8700                                      |
| 5 ~                    | 0.12 ~ 0.18                  | 8000                                      | 0.12 ~ 0.18                  | 5700                                      | 0.12 ~ 0.18                  | 9000                                      | 0.12 ~ 0.18                  | 7000                                      |
| 6 ~                    | 0.14 ~ 0.20                  | 6650                                      | 0.14 ~ 0.20                  | 4700                                      | 0.14 ~ 0.20                  | 7500                                      | 0.14 ~ 0.20                  | 5800                                      |
| 8 ~                    | 0.16 ~ 0.24                  | 5000                                      | 0.16 ~ 0.24                  | 3600                                      | 0.16 ~ 0.24                  | 5600                                      | 0.16 ~ 0.24                  | 4400                                      |
| 10 ~                   | 0.18 ~ 0.27                  | 4000                                      | 0.18 ~ 0.27                  | 2900                                      | 0.18 ~ 0.27                  | 4500                                      | 0.18 ~ 0.27                  | 3500                                      |
| 12 ~                   | 0.20 ~ 0.30                  | 3300                                      | 0.20 ~ 0.30                  | 2400                                      | 0.20 ~ 0.30                  | 3800                                      | 0.20 ~ 0.30                  | 3000                                      |
| 14 ~                   | 0.22 ~ 0.35                  | 2900                                      | 0.22 ~ 0.35                  | 2100                                      | 0.22 ~ 0.35                  | 3200                                      | 0.22 ~ 0.35                  | 2500                                      |
| 16                     | 0.25 ~ 0.36                  | 2500                                      | 0.25 ~ 0.36                  | 1800                                      | 0.25 ~ 0.36                  | 2800                                      | 0.25 ~ 0.36                  | 2200                                      |

ドリル Drill

スクエア Square

ラジアス Radius

ボール Ball

ロングネック Long Neck

ラフィング Roughing

面取り加工用 Chamfering

ドリル Drill

## ダブルマージンドリル

Double Margin Drill Regular

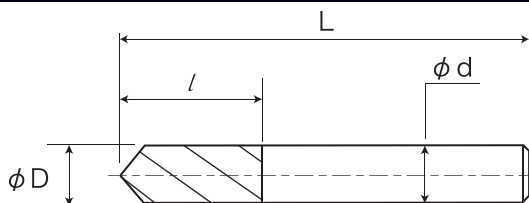
## TA-WMD



TA-WMD 5

Model

D



## 特性 Features

- Suitable for S45C/SCM440 until Alloy steel
- Special design have efficacy for flow of cutting.
- Use material micro grain carbide. And then Employs TiAlN Coating

MG  
超微粒

30°

Point Angle  
140°TiAlN  
Coat

| 炭素鋼<br>Carbon Steel | 合金鋼<br>Alloy Steel | 調質鋼<br>Prehardened Steel | 焼き入れ鋼 Hardened Steel |   |  |  | 鋳鉄<br>Cast Iron | ステンレス鋼<br>Stainless Steels | アルミ合金<br>Aluminium Alloys | 銅合金<br>Copper Alloys | チタン合金<br>耐熱合金<br>Ti/Ni Alloy | グラファイト<br>Graphite | 樹脂<br>Resin |
|---------------------|--------------------|--------------------------|----------------------|---|--|--|-----------------|----------------------------|---------------------------|----------------------|------------------------------|--------------------|-------------|
| ◎                   | ◎                  | ◎                        | ◎                    | ○ |  |  | ○               | ○                          |                           |                      |                              |                    |             |

◎ = Best ○ = Good

| MODEL 型番  | D 直径 | / 刃長 | L 全長 | d 柄径 |
|-----------|------|------|------|------|
| TA-WMD1   | 1    | 12   | 45   | 3    |
| TA-WMD1.5 | 1.5  | 16   |      |      |
| TA-WMD2   | 2    | 20   | 50   |      |
| TA-WMD2.5 | 2.5  | 22   |      |      |
| TA-WMD3   | 3    | 28   | 60   | 4    |
| TA-WMD3.3 | 3.3  |      |      |      |
| TA-WMD3.5 | 3.5  |      |      |      |
| TA-WMD4   | 4    | 36   | 80   |      |
| TA-WMD4.2 | 4.2  |      |      |      |
| TA-WMD4.5 | 4.5  |      |      |      |
| TA-WMD5   | 5    | 44   | 90   |      |
| TA-WMD5.5 | 5.5  |      |      |      |

| MODEL 型番   | D 直径 | / 刃長 | L 全長 | d 柄径 |
|------------|------|------|------|------|
| TA-WMD6    | 6    | 44   | 90   | 6    |
| TA-WMD6.5  | 6.5  |      |      |      |
| TA-WMD6.8  | 6.8  |      |      |      |
| TA-WMD7    | 7    | 53   | 110  | 8    |
| TA-WMD8    | 8    |      |      |      |
| TA-WMD8.5  | 8.5  |      |      |      |
| TA-WMD9    | 9    | 61   | 120  | 10   |
| TA-WMD10   | 10   |      |      |      |
| TA-WMD10.3 | 10.3 |      |      |      |
| TA-WMD11   | 11   | 71   | 130  | 12   |
| TA-WMD12   | 12   |      |      |      |
| TA-WMD13   | 13   |      |      |      |

## 推奨切削条件 Standard Milling Condition

| 被削材<br>Work Material               | 深さ/加工経<br>L/D | 切削速度<br>V(m/min) | N = 回転数 (min) f = 送り量 (mm/rev) |               |               |               |               |               |               |
|------------------------------------|---------------|------------------|--------------------------------|---------------|---------------|---------------|---------------|---------------|---------------|
|                                    |               |                  | 直径 D=3                         | 4             | 5             | 6             | 8             | 10            | 13            |
| 一般鋼<br>(SS, Steel)                 | 5 × D         | 100-120          | N=10620<br>f=0.110             | 7960<br>0.125 | 6370<br>0.160 | 5310<br>0.160 | 3980<br>0.250 | 3190<br>0.300 | 2450<br>0.315 |
| 合金鋼, 工具鋼<br>(SUJ2, SKD11, SKD12)   |               | 50-70            | N=5310<br>f=0.090              | 3980<br>0.125 | 3180<br>0.130 | 2650<br>0.150 | 1990<br>0.180 | 1590<br>0.200 | 1230<br>0.250 |
| ステンレス鋼<br>(SUS303, SUS304, SUS416) |               | 40-50            | N=4250<br>f=0.096              | 3180<br>0.100 | 2550<br>0.100 | 2120<br>0.120 | 1590<br>0.160 | 1270<br>0.200 | 980<br>0.21   |
| 調質鋼<br>(40~48HRC)                  |               | 35-45            | N=3720<br>f=0.060              | 2790<br>0.100 | 2230<br>0.100 | 1860<br>0.120 | 1390<br>0.160 | 1120<br>0.200 | 860<br>0.210  |
| アルミニウム合金<br>Aluminium Alloy        |               | 100-120          | N=10620<br>f=0.160             | 7960<br>0.200 | 6370<br>0.250 | 5310<br>0.300 | 3980<br>0.315 | 3190<br>0.400 | 2450<br>0.500 |

# MEMO

ドリル  
Drill

スクエア  
Square

ラジウス  
Radius

ボール  
Ball

ロングネック  
Long Neck

ラフニング  
Roughing

面取り加工用  
Chamfering

ドリル  
Drill



# MEMO

ドリル  
Drill

スクエア  
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Radius

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ラフニング  
Roughing

面取り加工用  
Chamfering

ドリル  
Drill

Handwriting practice area with horizontal dashed lines.

ドリル Drill





# MEMO

Handwriting practice area with horizontal dashed lines.

ドリル  
Drill

スクエア  
Square

ラジウス  
Radius

ボール  
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Roughing

面取り加工用  
Chamfering

ドリル  
Drill

## シー・ケイ・ケー株式会社

本社工場 〒475-0823

愛知県半田市港町2丁目27番地2

TEL(0569)21-6187

FAX(0569)23-6427

E-mail:ckk@ckk-tool.co.jp (代表)

<http://www.ckk-tool.co.jp>

山口工場 〒757-0003

山口県山陽小野田市大字山野井楠本1315-1

TEL(0836)73-2627

FAX(0836)73-0910

E-mail:yamaguchi@ckk-tool.co.jp

山形工場 〒999-3701

山形県東根市大字東根甲5600

TEL(0237)43-7471

FAX(0237)43-7472

E-mail:yamagata@ckk-tool.co.jp

## C. K. K CO.,LTD.

Head Office

2-27-2 Minatomachi Handa Aichi 475-0823

TEL(0569)21-6187

FAX(0569)23-6427

E-mail:ckk@ckk-tool.co.jp (President)

<http://www.ckk-tool.co.jp>

Factory in Yamaguchi

1315-1Kusumoto Yamanoi Onoda Sanyou

Yamaguchi 757-0003

TEL(0836)73-2627

FAX(0836)73-0910

E-mail : yamaguchi@ckk-tool.co.jp

Factory in Yamagata

5600 Higashinekou Higashine 999-3701

TEL(0237)43-7471

FAX(0237)43-7472

E-mail : yamagata@ckk-tool.co.jp

## 秀凱超硬刃具 (大連) 有限公司

大連工場 大連經濟技術開發區紅星工業園 5-2 号

TEL 86-0411-8751-3258

FAX 86-0411-8750-4256

E-mail:ckk-ch@ckk-tool.co.jp

<http://www.ckk-tool.com>

## C.K.K(DALIAN) Co.,Ltd.

C.K.K(DALIAN) Co.,Ltd.

No.5-2 Building Hong Xing Industrial Zone

Dang Bei Street Economic

& Technical Development Zone Dalian China

TEL 86-0411-8751-3258 FAX 86-0411-8750-4256

E-mail:ckk-ch@ckk-tool.co.jp

<http://www.ckk-tool.com>



## Thai CKK Trade Co.,Ltd.

Thai CKK Trade Co.,Ltd.

152 Chartered Square Building, Floor 12,

Unit 12-06 North Sathorn Road, Silom,

Bangrak, Bangkok 10500

TEL : +66-[0]2637-7304

E-mail:ckk-thai@ckk-tool.co.jp

 Thai CKK Trade Co.,Ltd.



## OFFICE LOCATION

🇯🇵 山形工場  
Yamagata Factory



🇯🇵 本社工場  
C.K.K Head office



🇯🇵 山口工場  
Yamaguchi Factory



🇨🇳 秀凱超硬刃具 (大連) 有限公司  
C.K.K (DALIAN) Co.,Ltd.

# C.K.K GROUP

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## C. K. K 株式会社

本社工場 〒475-0823

愛知県半田市港町 2 丁目 27 番地 2

TEL(0569)21-6187

FAX(0569)23-6427

E-mail:ckk@ckk-tool.co.jp ( 代表 )

http://www.ckk-tool.co.jp

山口工場 〒757-0003

山口県山陽小野田市大字山野井楠本1315-1

TEL(0836)73-2627

FAX(0836)73-0910

E-mail : yamaguchi@ckk-tool.co.jp

山形工場 〒999-3701

山形県東根市大字東根甲5600

TEL(0237)43-7471

FAX(0237)43-7472

E-mail : yamagata@ckk-tool.co.jp

---

## C. K. K CO.,LTD.

Head Office

2-27-2 Minatomachi Handa Aichi 475-0823

TEL(0569)21-6187

FAX(0569)23-6427

E-mail:ckk@ckk-tool.co.jp ( President )

http://www.ckk-tool.co.jp

Factory in Yamaguchi

1315-1Kusumoto Yamanoi Onoda Sanyou

Yamaguchi 757-0003

TEL(0836)73-2627

FAX(0836)73-0910

E-mail : yamaguchi@ckk-tool.co.jp

Factory in Yamagata

5600 Higashinekou Higashine 999-3701

TEL(0237)43-7471

FAX(0237)43-7472

E-mail : yamagata@ckk-tool.co.jp

---

## 秀凱超硬刃具 ( 大連 ) 有限公司

大連工場 大連經濟技術開發區紅星工業園 5-2 号

TEL 86-411-8751-3258

FAX 86-411-8750-4256

E-mail:ckk-ch@ckk-tool.co.jp

Web Site URL:www.ckk-tool.com

---

## C.K.K(DALIAN) Co.,Ltd.

No.5-2 Building Hong Xing Industrial Zone

Dang Bei Street Economic

& Technical Development Zone Dalian China

TEL 86-411-8751-3258

FAX 86-411-8750-4256

E-mail:ckk-ch@ckk-tool.co.jp

Web Site URL:www.ckk-tool.com

---

## Thai C K K Trade.,Co.ltd.

152 Chartered Square Building, Floor 12,

Unit 12-06 North Sathorn Road, Silom, Bangrak,

Bangkok 10500

TEL : +66-[0]2637-7304

E-mail:ckk-thai@ckk-tool.co.jp