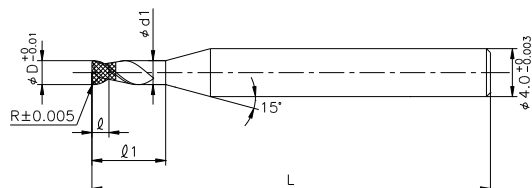


# SBREF-2

CBN 2枚刃スパイラルコーナーR付エンドミル  
CBN 2 Flutes Spiral Corner R Endmill

- 高硬度材・焼入れ鋼の直彫り加工  
Direct cutting for Highly hardened material and Quenching steel
- 高送りで高能率加工が可能  
Possible to cut by High Feed and High Efficiency



| 被削材 Workpiece              |                  |                |
|----------------------------|------------------|----------------|
| ～HRC55<br>NAK80<br>STAVAX等 | ～HRC60<br>SKD11等 | ～HRC65<br>SKH等 |
|                            |                  |                |

- 切削条件表はP61に記載
- Cutting conditions are recommended on page 61.

単位 [寸法: mm]  
Unit [size: mm]

| 品番<br>Code No.  | 刃径 D<br>Flute Diameter | コーナー R<br>Corner R | 有効長 $l_1$<br>Effective Length | 刃長 $l$<br>Flute Length | 首下径 d1<br>Neck Diameter | CBN層<br>CBN Length | 全長 L<br>Total Length | 柄径<br>Shank Diameter |
|-----------------|------------------------|--------------------|-------------------------------|------------------------|-------------------------|--------------------|----------------------|----------------------|
| SBREF-203003009 | 0.3                    | R 0.03             | 0.9                           | 0.3                    | 0.26                    | 0.6                | 50                   | 4                    |
| SBREF-203003018 | 0.3                    | R 0.03             | 1.8                           | 0.3                    | 0.26                    | 0.6                | 50                   | 4                    |
| SBREF-203005009 | 0.3                    | R 0.05             | 0.9                           | 0.3                    | 0.26                    | 0.6                | 50                   | 4                    |
| SBREF-203005018 | 0.3                    | R 0.05             | 1.8                           | 0.3                    | 0.26                    | 0.6                | 50                   | 4                    |
| SBREF-204003012 | 0.4                    | R 0.03             | 1.2                           | 0.4                    | 0.36                    | 0.6                | 50                   | 4                    |
| SBREF-204003024 | 0.4                    | R 0.03             | 2.4                           | 0.4                    | 0.36                    | 0.6                | 50                   | 4                    |
| SBREF-204010012 | 0.4                    | R 0.1              | 1.2                           | 0.4                    | 0.36                    | 0.6                | 50                   | 4                    |
| SBREF-204010024 | 0.4                    | R 0.1              | 2.4                           | 0.4                    | 0.36                    | 0.6                | 50                   | 4                    |
| SBREF-205003015 | 0.5                    | R 0.03             | 1.5                           | 0.5                    | 0.46                    | 0.6                | 50                   | 4                    |
| SBREF-205003030 | 0.5                    | R 0.03             | 3                             | 0.5                    | 0.46                    | 0.6                | 50                   | 4                    |
| SBREF-205010015 | 0.5                    | R 0.1              | 1.5                           | 0.5                    | 0.46                    | 0.6                | 50                   | 4                    |
| SBREF-205010030 | 0.5                    | R 0.1              | 3                             | 0.5                    | 0.46                    | 0.6                | 50                   | 4                    |
| SBREF-210003030 | 1                      | R 0.03             | 3                             | 1                      | 0.95                    | 1                  | 50                   | 4                    |
| SBREF-210003040 | 1                      | R 0.03             | 4                             | 1                      | 0.95                    | 1                  | 50                   | 4                    |
| SBREF-210003050 | 1                      | R 0.03             | 5                             | 1                      | 0.95                    | 1                  | 50                   | 4                    |
| SBREF-210003060 | 1                      | R 0.03             | 6                             | 1                      | 0.95                    | 1                  | 50                   | 4                    |
| SBREF-210003080 | 1                      | R 0.03             | 8                             | 1                      | 0.95                    | 1                  | 50                   | 4                    |
| SBREF-210003100 | 1                      | R 0.03             | 10                            | 1                      | 0.95                    | 1                  | 50                   | 4                    |
| SBREF-210010030 | 1                      | R 0.1              | 3                             | 1                      | 0.95                    | 1                  | 50                   | 4                    |
| SBREF-210010040 | 1                      | R 0.1              | 4                             | 1                      | 0.95                    | 1                  | 50                   | 4                    |
| SBREF-210010050 | 1                      | R 0.1              | 5                             | 1                      | 0.95                    | 1                  | 50                   | 4                    |
| SBREF-210010060 | 1                      | R 0.1              | 6                             | 1                      | 0.95                    | 1                  | 50                   | 4                    |
| SBREF-210010080 | 1                      | R 0.1              | 8                             | 1                      | 0.95                    | 1                  | 50                   | 4                    |
| SBREF-210010100 | 1                      | R 0.1              | 10                            | 1                      | 0.95                    | 1                  | 50                   | 4                    |
| SBREF-210020030 | 1                      | R 0.2              | 3                             | 1                      | 0.95                    | 1                  | 50                   | 4                    |
| SBREF-210020040 | 1                      | R 0.2              | 4                             | 1                      | 0.95                    | 1                  | 50                   | 4                    |

# SBREF-2

| 品 番<br>Code No. | 刃径 D<br>Flute Diameter | コーナー R<br>Corner R | 有効長 $\ell 1$<br>Effective Length | 刃長 $\ell$<br>Flute Length | 首下径 d1<br>Neck Diameter | CBN層<br>CBN Length | 全長 L<br>Total Length | 柄径<br>Shank Diameter |
|-----------------|------------------------|--------------------|----------------------------------|---------------------------|-------------------------|--------------------|----------------------|----------------------|
| SBREF-210020050 | 1                      | R 0.2              | 5                                | 1                         | 0.95                    | 1                  | 50                   | 4                    |
| SBREF-210020060 | 1                      | R 0.2              | 6                                | 1                         | 0.95                    | 1                  | 50                   | 4                    |
| SBREF-210020080 | 1                      | R 0.2              | 8                                | 1                         | 0.95                    | 1                  | 50                   | 4                    |
| SBREF-210020100 | 1                      | R 0.2              | 10                               | 1                         | 0.95                    | 1                  | 50                   | 4                    |
| SBREF-215003045 | 1.5                    | R 0.03             | 4.5                              | 1.5                       | 1.45                    | 2                  | 50                   | 4                    |
| SBREF-215003090 | 1.5                    | R 0.03             | 9                                | 1.5                       | 1.45                    | 2                  | 50                   | 4                    |
| SBREF-215010045 | 1.5                    | R 0.1              | 4.5                              | 1.5                       | 1.45                    | 2                  | 50                   | 4                    |
| SBREF-215010090 | 1.5                    | R 0.1              | 9                                | 1.5                       | 1.45                    | 2                  | 50                   | 4                    |
| SBREF-215020045 | 1.5                    | R 0.2              | 4.5                              | 1.5                       | 1.45                    | 2                  | 50                   | 4                    |
| SBREF-215020090 | 1.5                    | R 0.2              | 9                                | 1.5                       | 1.45                    | 2                  | 50                   | 4                    |
| SBREF-220003060 | 2                      | R 0.03             | 6                                | 1.5                       | 1.95                    | 2                  | 50                   | 4                    |
| SBREF-220003120 | 2                      | R 0.03             | 12                               | 1.5                       | 1.95                    | 2                  | 50                   | 4                    |
| SBREF-220010060 | 2                      | R 0.1              | 6                                | 1.5                       | 1.95                    | 2                  | 50                   | 4                    |
| SBREF-220010120 | 2                      | R 0.1              | 12                               | 1.5                       | 1.95                    | 2                  | 50                   | 4                    |
| SBREF-220020060 | 2                      | R 0.2              | 6                                | 1.5                       | 1.95                    | 2                  | 50                   | 4                    |
| SBREF-220020120 | 2                      | R 0.2              | 12                               | 1.5                       | 1.95                    | 2                  | 50                   | 4                    |
| SBREF-220030060 | 2                      | R 0.3              | 6                                | 1.5                       | 1.95                    | 2                  | 50                   | 4                    |
| SBREF-220030120 | 2                      | R 0.3              | 12                               | 1.5                       | 1.95                    | 2                  | 50                   | 4                    |
| SBREF-230003090 | 3                      | R 0.03             | 9                                | 2                         | 2.95                    | 2                  | 50                   | 4                    |
| SBREF-230003180 | 3                      | R 0.03             | 18                               | 2                         | 2.95                    | 2                  | 60                   | 4                    |
| SBREF-230010090 | 3                      | R 0.1              | 9                                | 2                         | 2.95                    | 2                  | 50                   | 4                    |
| SBREF-230010180 | 3                      | R 0.1              | 18                               | 2                         | 2.95                    | 2                  | 60                   | 4                    |
| SBREF-230020090 | 3                      | R 0.2              | 9                                | 2                         | 2.95                    | 2                  | 50                   | 4                    |
| SBREF-230020180 | 3                      | R 0.2              | 18                               | 2                         | 2.95                    | 2                  | 60                   | 4                    |
| SBREF-230030090 | 3                      | R 0.3              | 9                                | 2                         | 2.95                    | 2                  | 50                   | 4                    |
| SBREF-230030180 | 3                      | R 0.3              | 18                               | 2                         | 2.95                    | 2                  | 60                   | 4                    |
| SBREF-230050090 | 3                      | R 0.5              | 9                                | 2                         | 2.95                    | 2                  | 50                   | 4                    |
| SBREF-230050180 | 3                      | R 0.5              | 18                               | 2                         | 2.95                    | 2                  | 60                   | 4                    |

# SBREF-2、SBRE-2

## 切削条件参考

Referential Cutting Conditions

| 硬 度<br>Hardness<br>被削材<br>Workpiece | ～HRC55            |              |                       |       | ～HRC60            |              |                       |       | ～HRC65            |              |                       |       |
|-------------------------------------|-------------------|--------------|-----------------------|-------|-------------------|--------------|-----------------------|-------|-------------------|--------------|-----------------------|-------|
|                                     | NAK80、STAVAX等     |              |                       |       | SKD11等            |              |                       |       | SKH等              |              |                       |       |
| 刃径<br>Flute Diameter                | 回転数<br>Revolution | 送り速度<br>Feed | 切 込 量<br>Depth of Cut |       | 回転数<br>Revolution | 送り速度<br>Feed | 切 込 量<br>Depth of Cut |       | 回転数<br>Revolution | 送り速度<br>Feed | 切 込 量<br>Depth of Cut |       |
| mm                                  | min <sup>-1</sup> | mm/min       | Ad mm                 | Rd mm | min <sup>-1</sup> | mm/min       | Ad mm                 | Rd mm | min <sup>-1</sup> | mm/min       | Ad mm                 | Rd mm |
| 0.3                                 | 50,000            | 200～ 400     | 0.003～0.01            | 0.03  | 50,000            | 150～ 300     | 0.004～0.015           | 0.03  | 50,000            | 100～250      | 0.003～0.01            | 0.03  |
| 0.4                                 | 50,000            | 350～ 600     | 0.005～0.01            | 0.04  | 50,000            | 200～ 400     | 0.004～0.015           | 0.04  | 50,000            | 150～300      | 0.005～0.01            | 0.04  |
| 0.5                                 | 50,000            | 600～ 900     | 0.01 ～0.03            | 0.07  | 50,000            | 600～ 900     | 0.01 ～0.03            | 0.07  | 50,000            | 500～800      | 0.005～0.01            | 0.07  |
| 1                                   | 45,000            | 800～1,100    | 0.02 ～0.04            | 0.3   | 40,000            | 800～1,100    | 0.01 ～0.03            | 0.3   | 32,000            | 600～900      | 0.01 ～0.04            | 0.1   |
| 1.5                                 | 30,000            | 800～1,100    | 0.03 ～0.05            | 0.5   | 26,500            | 800～1,100    | 0.02 ～0.04            | 0.5   | 22,000            | 600～900      | 0.015～0.05            | 0.2   |
| 2                                   | 23,000            | 800～1,100    | 0.04 ～0.06            | 0.6   | 20,000            | 800～1,100    | 0.02 ～0.06            | 0.6   | 16,000            | 600～900      | 0.015～0.05            | 0.4   |
| 3                                   | 15,000            | 700～1,000    | 0.05 ～0.1             | 0.8   | 13,000            | 700～1,000    | 0.03 ～0.05            | 0.8   | 10,500            | 600～900      | 0.02 ～0.05            | 0.6   |
| 4                                   | 12,000            | 600～ 800     | 0.05 ～0.1             | 1.0   | 10,000            | 500～ 700     | 0.04 ～0.06            | 1.0   | 8,500             | 400～700      | 0.04 ～0.08            | 0.8   |
| 5                                   | 9,000             | 600～ 800     | 0.06 ～0.1             | 1.2   | 8,000             | 500～ 700     | 0.06 ～0.1             | 1.2   | 7,500             | 350～600      | 0.04 ～0.08            | 1     |
| 6                                   | 8,000             | 600～ 800     | 0.06 ～0.1             | 1.3   | 7,000             | 500～ 700     | 0.06 ～0.1             | 1.3   | 6,000             | 350～600      | 0.05 ～0.08            | 1.2   |

### 備 考

- (1) オイルミストまたはエアブローをお奨めします。
- (2) 回転数と送り速度は、同じ割合で調整してください。
- (3) 切込量は荒加工、中仕上加工の最大値を示しております。  
必要とする面粗度に応じて切込量及びピックフィード・ピッチを調整してください。
- (4) 切込量は、Adは深さ方向、Rdはピックフィード・ピッチを示しております。
- (5) この切削条件表は目安を示すものですので、加工形状、機械の剛性等によって都度調整してください。
- (6) 工具突き出し量は、必要最低限でご使用ください。

### Remark

- (1) Oil mist or Air blow is recommendable.
- (2) Adjust Revolution and Feed Speed at the same rate.
- (3) Depth of cut is shown the maximum value in rough cutting and semi finish  
Adjust Depth of cut and Pick feed pitch according to required surface roughness.
- (4) Depth of cut is shown as Ad : Axial depth and Rd : Pick feed pitch.
- (5) Adjust the cutting conditions respectively according to Cutting shape and Machine rigidity  
since these conditions are shown just as Standard.
- (6) Shorten overhang as much as possible is recommendable.