



# Coro Drill® DS20

New Generation 刃先交換式ドリル

4×DC, 5×DC, 6×DC, 7×DC のアプリケーション



- よりスムーズな食い付きと高いボディ剛性
- パイロット穴無しで7×DCの加工が可能
- 4コーナ全て使用可能

ISO13399  
対応

# 刃先交換式ドリルの新しいベンチマーク CoroDrill® DS20

DS20は従来の持つ特徴を改善し、さらに性能アップを計るよう開発した刃先交換式高性能ドリルです。新しいチップ形状、中心刃と外周刃のレイアウト設計により、従来よりスムーズな食いつきが可能になります。独自のドリルフルート設計によりボディ剛性がアップし、刃先交換式の領域において、初めてパイロット穴無で7×DCまでの突出し加工ができます。

## 独自のフルート設計

MDIシャンク、アダプタ  
ISO9766シャンク



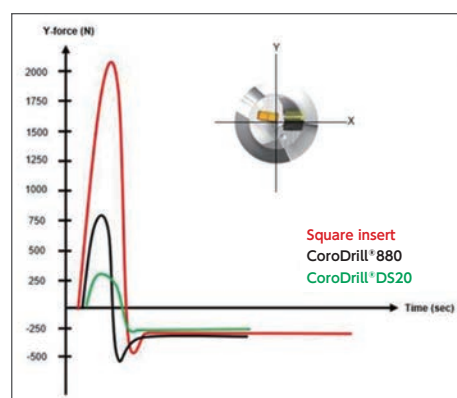
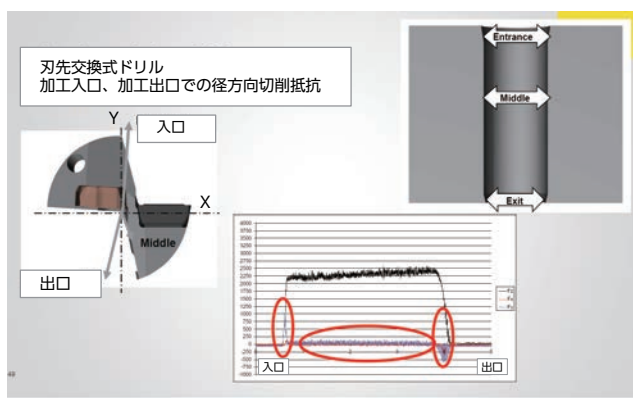
新しいチップ形状と豊富なブレーカ

## ダブルステップテクノロジー

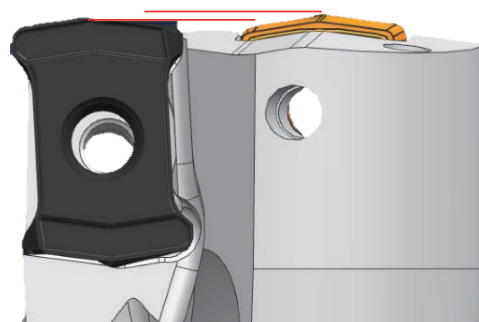
## 特 長

### ▶ダブルステップテクノロジー

刃先交換式ドリルでは、穴入口で径方向(Y軸)に大きな切削抵抗がかかり穴の拡大代が大きくなります。突出しの長い加工では、これが要因で生じた振れにより、ビビリが発生します。この問題をDS20は解決し、7×DCの加工が可能になります。



従来のドリルでは、中心刃→外周刃→中心刃の順で食いつき(ステップテクノロジー)、振れの少ないスムーズな加工が開始されますが、5×DCよりも突出しが長くなると、このバランスがくずれて振れ、ビビリ発生し安定した加工ができません。DS20は、中心刃→外周刃の順に食いつきその間隔が従来と比較して小さくなります。そのためよりスムーズな食いつきで加工が開始されます。7×DCの加工においてパイロット穴無しで加工を開始することができます。



### ダブルステップテクノロジー

スムーズな食いつき  
→食いつき時の径方向(Y軸)切削抵抗が  
小さくなる

## ▶独自のフルート設計

- 4×DCを超える突出しでは、ボディ本体の剛性（曲げ、ねじり）を高くしなければいけません。
- －スパイラルフルート（ねじれ）の長さが剛性に大きく影響しています
- －DS20は剛性の観点から、スパイラル+直線フルートを採用しています



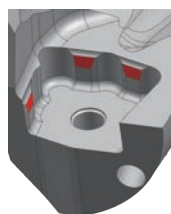
## ▶フルート断面形状

- DS20はたわみが最小限になるよう設計されています。
  - －径方向切削抵抗をフルート断面で支持しています
  - －フルート断面が均一で広がっています
  - －断面の中心がドリル中心と一致しています
- DS20は、台形断面の中心刃と外周刃フルートで異なった形状をしており、ドリル径毎にこれらは剛性、切屑処理の観点から最適化されています。

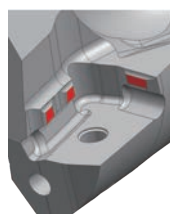


## ▶チップ設計

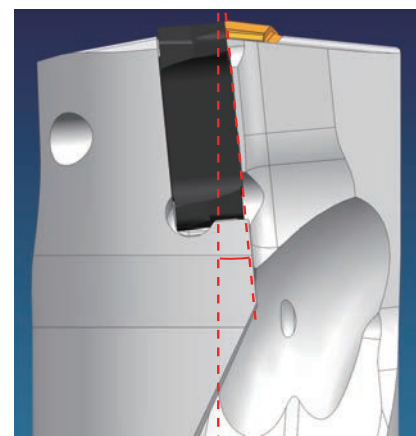
- 中心刃、外周刃とも4コーナ使用できます。
- －外周刃は5°ネガのすくい角で設計されていますが、ブレーカによって低い切削抵抗を実現します
- －剛性の高いクランプにより、加工中チップが動くという従来の問題が改善されます
- －外周刃は研磨されたワイパー切れ刃を備えており加工面粗さが良好です



中心刃チップシート

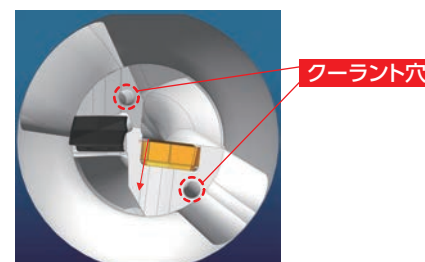


外周刃チップシート



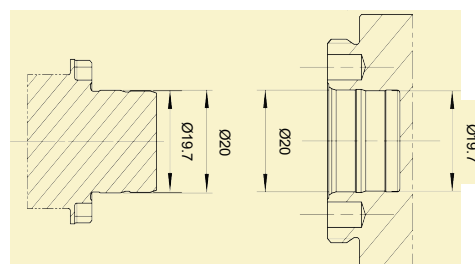
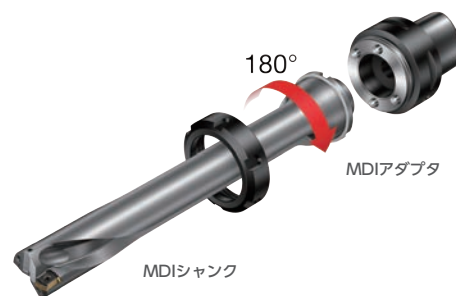
## ▶ダブルクーラントホール

- －中心刃、外周刃のクーラント穴がトップ面に配置されているため、切屑排出を高めます



## DS20-MDI (Modular Drilling Interface)

- ダブルセンタリングにより高精度
- フランジコンタクトにより高剛性
- 位置決めピンによるトルク伝達（180°位相変換可能）



## DS20-従来との比較

### ▶工具剛性の比較

DS20は従来と比較して加工径のバラツキが少なくなり、穴径がプラス側に安定しています。

#### ◆立型マシニングセンタ BT50

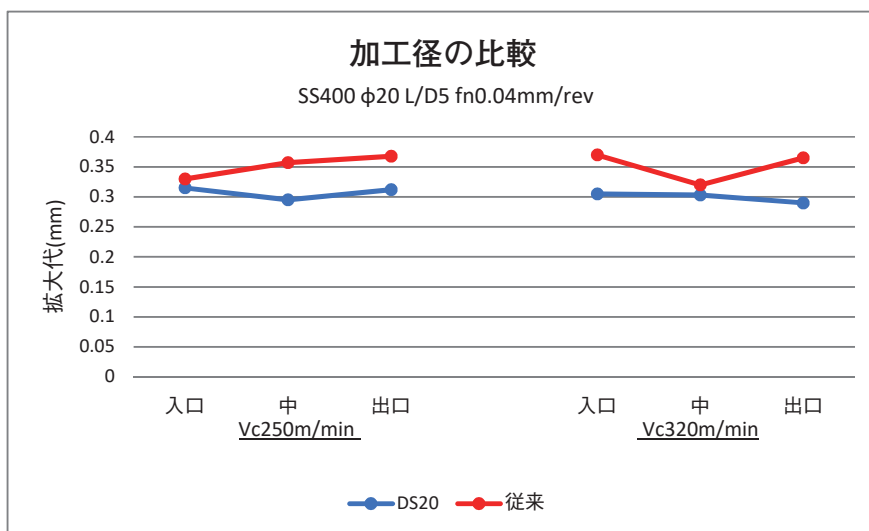
ワーク：低炭素鋼（SS400）

ドリル径：φ20mm

ドリル長：5×DC

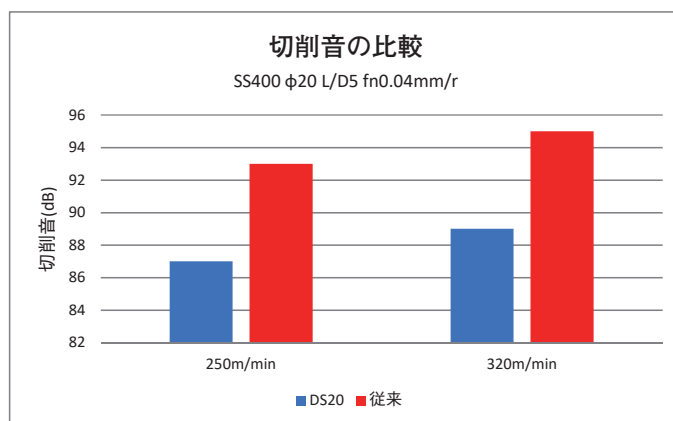
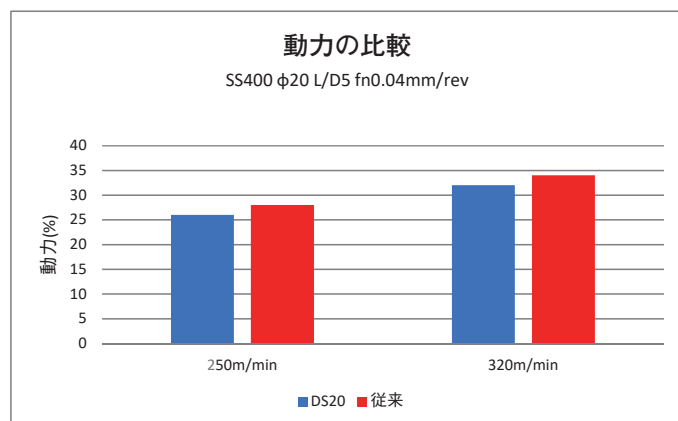
切削速度：250m/min, 320m/min

回転送り：0.04mm/rev



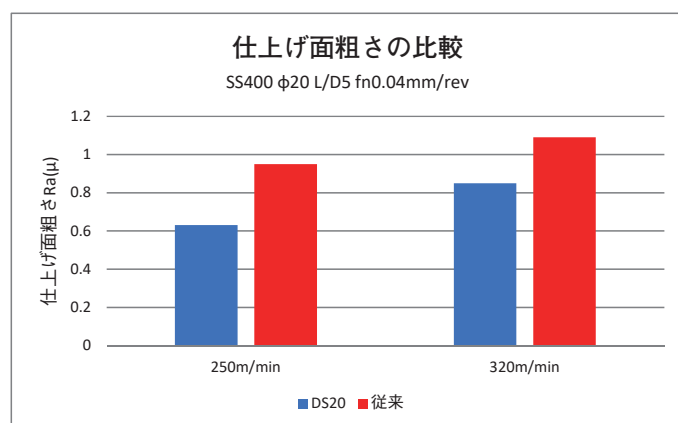
## ▶動力、切削音の比較

DS20は外周刃が両面チップに関わらず、従来と比較してスピンドル動力、切削音を低減できます。



## ▶仕上げ面粗さの比較

DS20は加工精度が向上します。

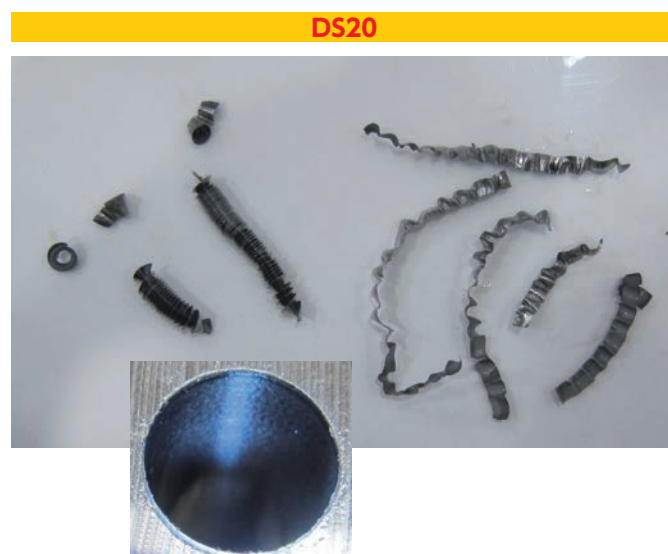


## ▶切りくず処理、加工面 (出口部) の比較

Vc: 320m/min

$f_n$ : 0.04mm/rev

高速低送りで良好な切りくず処理、良好な仕上げ面が得られます。



# CoroDrill® DS20用チップ

## ■チップブレーカの使い分け

### 外周刃

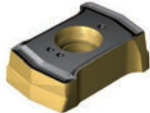
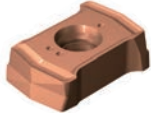
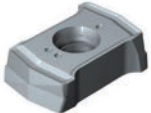
|                                                                                                               |                                                                                                          |                                                                                                             |                                                                                         |                                                                                                             |
|---------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|
|                              |                         |                            |      |                          |
| <b>-S5W</b>                                                                                                   | <b>-L5W</b>                                                                                              | <b>-L6W</b>                                                                                                 | <b>-M7W</b>                                                                             | <b>-H5W</b>                                                                                                 |
| <b>N S</b>                                                                                                    | <b>P M</b>                                                                                               | <b>S H</b>                                                                                                  | <b>P K</b>                                                                              | <b>P M</b>                                                                                                  |
| <ul style="list-style-type: none"> <li>・耐熱合金、アルミ合金</li> <li>・シャープエッジ</li> <li>・低送り</li> <li>・低切削抵抗</li> </ul> | <ul style="list-style-type: none"> <li>・切屑難削材<br/>SS材、ステンレス鋼、</li> <li>・低～中送り</li> <li>・低切削抵抗</li> </ul> | <ul style="list-style-type: none"> <li>・耐熱合金、高硬度鋼</li> <li>・第一推奨</li> <li>・低～中送り</li> <li>・低切削抵抗</li> </ul> | <ul style="list-style-type: none"> <li>・鋼、鋳鉄</li> <li>・低～中送り</li> <li>・刃先強化型</li> </ul> | <ul style="list-style-type: none"> <li>・切屑難削材</li> <li>・低～中送り</li> <li>・ネガ T-ランド</li> <li>・高切削抵抗</li> </ul> |

### 中心刃

|                                                                                                                                  |                                                                                         |
|----------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
|                                                 |        |
| <b>-L5</b>                                                                                                                       | <b>-M7</b>                                                                              |
| <b>P M S H</b>                                                                                                                   | <b>P K</b>                                                                              |
| <ul style="list-style-type: none"> <li>・切屑難削材<br/>SS材、ステンレス鋼、<br/>耐熱合金</li> <li>・高硬度材</li> <li>・低～中送り</li> <li>・低切削抵抗</li> </ul> | <ul style="list-style-type: none"> <li>・鋼、鋳鉄</li> <li>・低～中送り</li> <li>・刃先強化型</li> </ul> |

## ■チップ材種の使い分け

### 外周刃

|                                                                                              |                                                                                              |                                                                                                                     |                                                                                                            |                                                                                       |
|----------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|           |           |                                  |                        |  |
| <b>GC4334</b>                                                                                | <b>GC2044</b>                                                                                | <b>GC4344</b>                                                                                                       | <b>GC4324</b>                                                                                              | <b>H13A</b>                                                                           |
| <b>P K</b>                                                                                   | <b>M S</b>                                                                                   | <b>S H</b>                                                                                                          | <b>P K</b>                                                                                                 | <b>N S</b>                                                                            |
| <ul style="list-style-type: none"> <li>・CVD Inveio®</li> <li>・耐摩耗性</li> <li>・鋼、鋳物</li> </ul> | <ul style="list-style-type: none"> <li>・PVD</li> <li>・耐チッピング</li> <li>・ステンレス、耐熱合金</li> </ul> | <ul style="list-style-type: none"> <li>・PVD</li> <li>・Zertivo®</li> <li>・靱性</li> <li>・信頼性</li> <li>・耐熱合金</li> </ul> | <ul style="list-style-type: none"> <li>・MT-CVD</li> <li>・Inveio®</li> <li>・安定状況化</li> <li>・鋼、鋳物</li> </ul> | <ul style="list-style-type: none"> <li>・超硬</li> <li>・アルミ合金チタン合金</li> </ul>            |

### 中心刃

|                                                                                                                  |                                                                                     |                                                                                     |
|------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                               |  |  |
| <b>GC1344</b>                                                                                                    | <b>GC1144</b>                                                                       | <b>H13A</b>                                                                         |
| <b>P K S H</b>                                                                                                   | <b>M S</b>                                                                          | <b>N S</b>                                                                          |
| <ul style="list-style-type: none"> <li>・PVD</li> <li>・鋼、鋳物</li> <li>・Zertivo® テクノロジー</li> <li>・刃先の信頼性</li> </ul> | <ul style="list-style-type: none"> <li>・PVD</li> <li>・ステンレス、耐熱合金</li> </ul>         | <ul style="list-style-type: none"> <li>・超硬</li> <li>・アルミ合金チタン合金</li> </ul>          |

## ■推奨チップおよび材種

| 被削材 |            | 第一推奨     |                                    | 第二推奨     |                                     |
|-----|------------|----------|------------------------------------|----------|-------------------------------------|
|     |            | 中心刃      | 外周刃                                | 中心刃      | 外周刃                                 |
| P   | 低炭素鋼       | -L5 1344 | -L5W 4334                          | -L5 1344 | -H5W 4344<br>-L5W 4324<br>-L5W 4344 |
| P   | 低合金鋼       | -M7 1344 | -M7W 4334                          | -M7 1344 | -M7W 4324<br>-M7W 4344              |
| M   | ステンレス鋼     | -L5 1144 | -L5W 2044                          | -L5 1144 | -H5W 4344<br>-L5W 4344              |
| K   | 鋳鉄         | -M7 1344 | -M7W 4334                          | -M7 1344 | -M7W 4324<br>-M7W 4344              |
| N   | 非鉄材料       | -L5 H13A | -S5W H13A                          | -L5 1344 | -L5W 4344                           |
| S   | 耐熱合金(HRSA) | -L5 1344 | -L6W 4344(インコネル)<br>-S5W 4344(チタン) | -L5 H13A | -L5W H13A<br>-S5W H13A              |
| H   | 高硬度鋼       | -L5 1344 | -L6W 4344                          | -M7 1344 | -M7W 4344                           |

## DS20のメリットは何ですか？

### ▶従来のスローアウェイドリルに比べて

- ・加工径のバラツキが小さくなります
- ・振れが小さく仕上げ面がより優れています
- ・動力、切削音が小さくなります
- ・生産性をアップできます
- ・チップ寿命が延びます
- ・6×DCの加工でより安定した加工ができます

### ▶ヘッド交換式ドリルと比べて(6-7×DC)

- ・生産性は同等です (DS20は高速低送り、ヘッド交換式ドリルは低速高送り)
- ・傾斜、断続ワークで使用できます
- ・再研磨の手間を省き、再研磨後の工具トラブルをなくします
- ・工具費の大幅削減ができます
- ・加工公差は違います (ヘッド交換式IT9→スローアウェイドリルIT12)

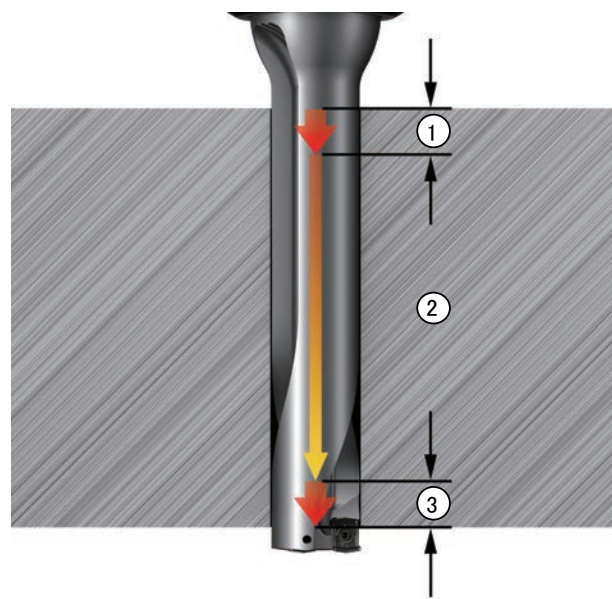
### ▶ツイストドリル (HSS/WC) と比べて(6-7×DC)

- ・高速加工ができ加工コストを大幅に低減できます
- ・再研磨の手間を省き、再研磨後の工具トラブルをなくします
- ・前加工のセンター穴や下穴加工が不要です
- ・傾斜、断続ワークで使用できます

# DS20-使用上のガイド

## ▶6-7×DCの加工

1. 食いつき時①の送り： $f_n \times 75\%$  ①の位置：1 mm
2. 通常推奨送り
3. 出口③の送り：0.05 mm/rev ③の位置：3-5 mm
4. 速度は変更無



## ▶機械について

工具回転および工具固定の両方で使用できる

## ▶切削油について

切 削 油：エマルジョン

供給方法：必ず内部給油

切削油量：ドリル径×1L/分（ドリル先端）**推奨**

## ▶工具取り付けについて

### ◆工具固定で使用する場合

機械スピンドルとホルダの芯ずれは0.03mm以内に抑える

ドリルの外周刃を平行にする

ドリル中心と機械センターラインとの芯ずれ許容値

- ・中心刃の芯下がり大（0.2mm以上）の場合は振動発生、径のバラツキ、コアが発生する
- ・中心刃が芯上がりの場合、中心刃コーナ部のチッピングが発生する

### ◆芯ずれの確認について（旋盤、マシニングセンタ）

テストバーにてドリル先端での振れを0.03mm以内に作る

## ▶ドリル径の調整

中心刃と外周刃がオーバーラップして設計されている。このためドリルを機械中心からずらすことで加工径をセットできる。

### ◆旋盤加工の場合

刃物台のx軸を移動させるだけでドリル径を調整できる

ドリルの外周刃が刃物台のx軸に平行になるように取り付けること

### ◆マシニングセンタの場合

専用ホルダーで工具径の調整ができる

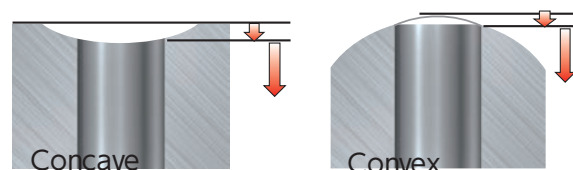
公称ドリル径より大きく設定すること

# DS20-使用上のガイド

## ▶ワークの形状

### ◆加工面に凹凸がある場合

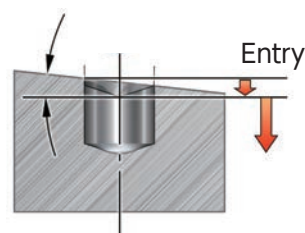
- ・凹凸のRがドリルR以下の加工は推奨できない。



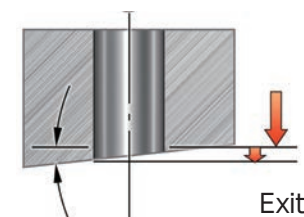
加工面に凹凸がある場合

### ◆加工面に勾配がある場合（入口）

- ・食い付き送りを推奨値の1/3まで下げる。
- ・4-5×DC適用領域：勾配15°まで
- ・6-7×DC適用領域：勾配5°まで



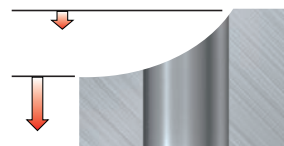
加工面入口に傾斜がある場合



加工面出口に傾斜がある場合

### ◆加工面に勾配がある場合（出口）

- ・出口の送りを最小まで下げる。
- ・4-5×DC適用領域：勾配15°まで
- ・6-7×DC適用領域：勾配5°まで



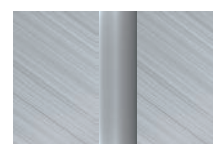
加工面にRがある場合

### ◆加工面にRがある場合

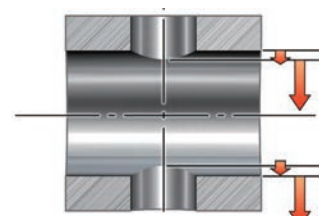
- ・食い付き送りを推奨値の1/3まで下げる。
- ・加工面RがドリルR以下の加工は推奨できない。
- ・6-7×DCの加工は推奨できない。

### ◆下穴のある場合

- ・下穴径はドリル径の1/4以下にする



加工面に下穴がある場合



加工面に交差穴がある場合

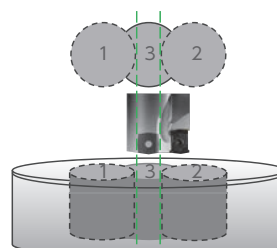
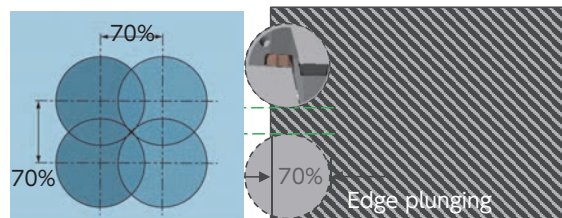
### ◆交差穴のある場合

- ・異なる径の交差穴を加工する場合、先ず大きな径の穴を加工する（バリの発生を抑えるため）
- ・貫通入口と出口の送りを下げる

### ◆プランジドリル

- ・切削条件は通常穴あけと同じ
- ・Step-over rateはドリル径のMax70%
- ・エッジプランジングはドリル径の70%をかける
- ・ポケットプランジングでは最初に穴あけ(1,2)、次にその間（中心刃がフルにかかる間隔）のプランジ加工が推奨

プランジ加工



Pocket plunging

# ▶ CoroDrill® DS20 切削条件

| ISO                | MC No.<br>CMC     | 被削材                 | HB<br>外周刃<br>チップ材種   |                      | 切削速度 (V <sub>c</sub> ) m/min |     |     |       |     |             | ドリル径<br>mm  |
|--------------------|-------------------|---------------------|----------------------|----------------------|------------------------------|-----|-----|-------|-----|-------------|-------------|
|                    |                   |                     |                      |                      | 4-5xD                        |     |     | 6-7xD |     |             |             |
| P                  | P1.0.Z.AN<br>01.1 | 炭素鋼<br>C=0.05-0.10% | 110                  | 4324<br>4334<br>4344 | Min                          | 推奨  | Max | Min   | 推奨  | Max         | 15.00-18.00 |
|                    |                   |                     |                      |                      | 230                          | 340 | 400 | 230   | 305 | 360         | 18.01-22.00 |
|                    |                   |                     |                      |                      | 210                          | 285 | 325 | 210   | 255 | 295         | 22.01-27.00 |
|                    |                   |                     |                      |                      | 190                          | 225 | 245 | 190   | 205 | 220         | 27.01-33.00 |
|                    | P1.1.Z.AN<br>01.1 | 炭素鋼<br>C=0.05-0.25% | 125                  | 4324<br>4334<br>4344 | 230                          | 320 | 370 | 230   | 290 | 335         | 33.01-40.00 |
|                    |                   |                     |                      |                      | 200                          | 270 | 305 | 200   | 245 | 275         | 40.01-52.00 |
|                    |                   |                     |                      |                      | 170                          | 210 | 235 | 170   | 190 | 210         | 52.01-65.00 |
|                    |                   |                     |                      |                      |                              |     |     |       |     |             |             |
|                    | P1.2.Z.AN<br>01.2 | 炭素鋼<br>C=0.25-0.55% | 190                  | 4324<br>4334<br>4344 | 190                          | 265 | 305 | 190   | 240 | 275         | 15.00-18.00 |
|                    |                   |                     |                      |                      | 155                          | 215 | 250 | 155   | 195 | 225         | 18.01-22.00 |
|                    |                   |                     |                      |                      | 120                          | 165 | 190 | 120   | 150 | 170         | 22.01-27.00 |
|                    |                   |                     |                      |                      |                              |     |     |       |     |             |             |
|                    | P1.3.Z.AN<br>01.3 | 炭素鋼<br>C=0.55-0.80% | 190                  | 4324<br>4334<br>4344 | 170                          | 250 | 290 | 170   | 225 | 260         | 27.01-33.00 |
|                    |                   |                     |                      |                      | 140                          | 205 | 240 | 140   | 185 | 215         | 33.01-40.00 |
|                    |                   |                     |                      |                      | 105                          | 155 | 185 | 105   | 140 | 165         | 40.01-52.00 |
|                    |                   |                     |                      |                      |                              |     |     |       |     |             |             |
| P1.5.C.UT<br>06.1  | 鋳鋼 (炭素鋼)          | 150                 | 4324<br>4334<br>4344 | 140                  | 260                          | 325 | 140 | 235   | 295 | 52.01-65.00 |             |
|                    |                   |                     |                      | 135                  | 220                          | 265 | 135 | 200   | 240 | 15.00-18.00 |             |
|                    |                   |                     |                      | 125                  | 175                          | 200 | 125 | 160   | 180 | 18.01-22.00 |             |
|                    |                   |                     |                      |                      |                              |     |     |       |     |             |             |
| P2.1.Z.AN<br>02.1  | 低合金鋼              | 175                 | 4324<br>4334<br>4344 | 180                  | 260                          | 305 | 180 | 235   | 275 | 22.01-27.00 |             |
|                    |                   |                     |                      | 150                  | 215                          | 250 | 150 | 195   | 225 | 27.01-33.00 |             |
|                    |                   |                     |                      | 115                  | 165                          | 190 | 115 | 150   | 170 | 33.01-40.00 |             |
|                    |                   |                     |                      |                      |                              |     |     |       |     |             |             |
| P2.2.Z.AN          | 低合金鋼              | 240                 | 4324<br>4334<br>4344 | 180                  | 250                          | 290 | 180 | 225   | 260 | 40.01-52.00 |             |
|                    |                   |                     |                      | 150                  | 200                          | 225 | 150 | 180   | 205 | 52.01-65.00 |             |
|                    |                   |                     |                      | 115                  | 175                          | 205 | 115 | 160   | 185 | 15.00-18.00 |             |
|                    |                   |                     |                      |                      |                              |     |     |       |     |             |             |
| P2.5.Z.HT<br>02.2  | 低合金鋼              | 330                 | 4324<br>4334<br>4344 | 90                   | 190                          | 245 | 90  | 170   | 220 | 18.01-22.00 |             |
|                    |                   |                     |                      | 85                   | 155                          | 195 | 85  | 140   | 175 | 22.01-27.00 |             |
|                    |                   |                     |                      | 75                   | 125                          | 150 | 75  | 115   | 135 | 27.01-33.00 |             |
|                    |                   |                     |                      |                      |                              |     |     |       |     |             |             |
| P2.6.C.UT<br>06.2  | 低合金鋼<br>鋳鋼        | 200                 | 4324<br>4334<br>4344 | 110                  | 210                          | 265 | 110 | 190   | 240 | 33.01-40.00 |             |
|                    |                   |                     |                      | 105                  | 175                          | 210 | 105 | 160   | 190 | 40.01-52.00 |             |
|                    |                   |                     |                      | 100                  | 140                          | 160 | 100 | 125   | 145 | 52.01-65.00 |             |
|                    |                   |                     |                      |                      |                              |     |     |       |     |             |             |
| P3.0.Z.AN<br>03.11 | 高合金鋼              | 200                 | 4324<br>4334<br>4344 | 160                  | 245                          | 290 | 160 | 220   | 260 | 15.00-18.00 |             |
|                    |                   |                     |                      | 130                  | 200                          | 240 | 130 | 180   | 215 | 18.01-22.00 |             |
|                    |                   |                     |                      | 100                  | 150                          | 180 | 100 | 135   | 160 | 22.01-27.00 |             |
|                    |                   |                     |                      |                      |                              |     |     |       |     |             |             |

| 加工深さ 4xD              |                       |                       |                       |                       | 加工深さ 5xD              |                       |                       |                       |                       |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| -S5W                  | -L5W                  | -L6W                  | -M7W                  | -H5W                  | -S5W                  | -L5W                  | -L6W                  | -M7W                  | -H5W                  |
| スタートは範囲の中央値           |                       |                       |                       |                       |                       |                       |                       |                       |                       |
| f <sub>n</sub> mm/rev | f <sub>n</sub> mm/rev | f <sub>n</sub> mm/rev | f <sub>n</sub> mm/rev | f <sub>n</sub> mm/rev | f <sub>n</sub> mm/rev | f <sub>n</sub> mm/rev | f <sub>n</sub> mm/rev | f <sub>n</sub> mm/rev | f <sub>n</sub> mm/rev |
| 0.04-0.08             | 0.04-0.08             | 0.04-0.08             | -                     | 0.04-0.1              | 0.04-0.07             | 0.04-0.07             | 0.04-0.07             | -                     | 0.04-0.09             |
| 0.04-0.09             | 0.04-0.09             | 0.04-0.09             | -                     | 0.04-0.11             | 0.04-0.08             | 0.04-0.08             | 0.04-0.08             | -                     | 0.04-0.1              |
| 0.04-0.1              | 0.04-0.1              | 0.04-0.1              | -                     | 0.04-0.12             | 0.04-0.09             | 0.04-0.09             | 0.04-0.09             | -                     | 0.04-0.11             |
| 0.05-0.11             | 0.05-0.11             | 0.05-0.11             | -                     | 0.05-0.13             | 0.05-0.1              | 0.05-0.1              | 0.05-0.1              | -                     | 0.05-0.12             |
| 0.05-0.12             | 0.05-0.12             | 0.05-0.12             | -                     | 0.05-0.16             | 0.05-0.11             | 0.05-0.11             | 0.05-0.11             | -                     | 0.05-0.14             |
| 0.06-0.12             | 0.06-0.12             | 0.06-0.12             | -                     | 0.06-0.16             | 0.06-0.11             | 0.06-0.11             | 0.06-0.11             | -                     | 0.06-0.14             |
| 0.06-0.12             | 0.06-0.12             | 0.06-0.12             | -                     | 0.06-0.16             | 0.06-0.11             | 0.06-0.11             | 0.06-0.11             | -                     | 0.06-0.14             |
| 0.04-0.1              | 0.04-0.1              | 0.04-0.1              | -                     | 0.04-0.1              | 0.04-0.09             | 0.04-0.09             | 0.04-0.09             | -                     | 0.04-0.09             |
| 0.04-0.11             | 0.04-0.11             | 0.04-0.11             | -                     | 0.04-0.11             | 0.04-0.1              | 0.04-0.1              | 0.04-0.1              | -                     | 0.04-0.1              |
| 0.04-0.12             | 0.04-0.12             | 0.04-0.12             | -                     | 0.04-0.12             | 0.04-0.11             | 0.04-0.11             | 0.04-0.11             | -                     | 0.04-0.11             |
| 0.05-0.13             | 0.05-0.13             | 0.05-0.13             | -                     | 0.05-0.13             | 0.05-0.12             | 0.05-0.12             | 0.05-0.12             | -                     | 0.05-0.12             |
| 0.05-0.14             | 0.05-0.14             | 0.05-0.14             | -                     | 0.05-0.16             | 0.05-0.13             | 0.05-0.13             | 0.05-0.13             | -                     | 0.05-0.14             |
| 0.06-0.14             | 0.06-0.14             | 0.06-0.14             | -                     | 0.06-0.16             | 0.06-0.13             | 0.06-0.13             | 0.06-0.13             | -                     | 0.06-0.14             |
| 0.06-0.14             | 0.06-0.14             | 0.06-0.14             | -                     | 0.06-0.16             | 0.06-0.13             | 0.06-0.13             | 0.06-0.13             | -                     | 0.06-0.14             |
| -                     | 0.05-0.12             | 0.06-0.14             | 0.06-0.16             | -                     | -                     | 0.05-0.1              | 0.06-0.12             | 0.06-0.14             | -                     |
| -                     | 0.05-0.14             | 0.06-0.16             | 0.06-0.18             | -                     | -                     | 0.05-0.12             | 0.06-0.14             | 0.06-0.15             | -                     |
| -                     | 0.05-0.18             | 0.06-0.2              | 0.06-0.22             | -                     | -                     | 0.05-0.15             | 0.06-0.17             | 0.06-0.19             | -                     |
| -                     | 0.07-0.22             | 0.08-0.24             | 0.08-0.26             | -                     | -                     | 0.07-0.19             | 0.08-0.2              | 0.08-0.22             | -                     |
| -                     | 0.07-0.24             | 0.08-0.26             | 0.08-0.28             | -                     | -                     | 0.07-0.2              | 0.08-0.22             | 0.08-0.24             | -                     |
| -                     | 0.09-0.24             | 0.1-0.26              | 0.1-0.28              | -                     | -                     | 0.09-0.2              | 0.1-0.22              | 0.1-0.24              | -                     |
| -                     | 0.09-0.24             | 0.1-0.26              | 0.1-0.28              | -                     | -                     | 0.09-0.2              | 0.1-0.22              | 0.1-0.24              | -                     |
| -                     | 0.05-0.12             | 0.06-0.14             | 0.06-0.16             | -                     | -                     | 0.05-0.1              | 0.06-0.12             | 0.06-0.14             | -                     |
| -                     | 0.05-0.14             | 0.06-0.16             | 0.06-0.18             | -                     | -                     | 0.05-0.12             | 0.06-0.14             | 0.06-0.15             | -                     |
| -                     | 0.05-0.18             | 0.06-0.2              | 0.06-0.22             | -                     | -                     | 0.05-0.15             | 0.06-0.17             | 0.06-0.19             | -                     |
| -                     | 0.07-0.22             | 0.08-0.24             | 0.08-0.26             | -                     | -                     | 0.07-0.19             | 0.08-0.2              | 0.08-0.22             | -                     |
| -                     | 0.07-0.24             | 0.08-0.26             | 0.08-0.28             | -                     | -                     | 0.07-0.2              | 0.08-0.22             | 0.08-0.24             | -                     |
| -                     | 0.09-0.24             | 0.1-0.26              | 0.1-0.28              | -                     | -                     | 0.09-0.2              | 0.1-0.22              | 0.1-0.24              | -                     |
| -                     | 0.09-0.24             | 0.1-0.26              | 0.1-0.28              | -                     | -                     | 0.09-0.2              | 0.1-0.22              | 0.1-0.24              | -                     |
| -                     | 0.04-0.12             | 0.04-0.12             | 0.04-0.12             | -                     | -                     | 0.04-0.1              | 0.04-0.1              | 0.04-0.1              | -                     |
| -                     | 0.04-0.13             | 0.04-0.13             | 0.04-0.13             | -                     | -                     | 0.04-0.11             | 0.04-0.11             | 0.04-0.11             | -                     |
| -                     | 0.04-0.14             | 0.04-0.14             | 0.04-0.14             | -                     | -                     | 0.04-0.12             | 0.04-0.12             | 0.04-0.12             | -                     |
| -                     | 0.05-0.15             | 0.05-0.15             | 0.05-0.15             | -                     | -                     | 0.05-0.13             | 0.05-0.13             | 0.05-0.13             | -                     |
| -                     | 0.05-0.16             | 0.05-0.16             | 0.05-0.16             | -                     | -                     | 0.05-0.14             | 0.05-0.14             | 0.05-0.14             | -                     |
| -                     | 0.06-0.16             | 0.06-0.16             | 0.06-0.16             | -                     | -                     | 0.06-0.14             | 0.06-0.14             | 0.06-0.14             | -                     |
| -                     | 0.06-0.16             | 0.06-0.16             | 0.06-0.16             | -                     | -                     | 0.06-0.14             | 0.06-0.14             | 0.06-0.14             | -                     |
| -                     | -                     | 0.06-0.14             | 0.06-0.16             | -                     | -                     | -                     | 0.06-0.12             | 0.06-0.14             | -                     |
| -                     | -                     | 0.06-0.16             | 0.06-0.18             | -                     | -                     | -                     | 0.06-0.14             | 0.06-0.15             | -                     |
| -                     | -                     | 0.06-0.2              | 0.06-0.22             | -                     | -                     | -                     | 0.06-0.17             | 0.06-0.19             | -                     |
| -                     | -                     | 0.08-0.24             | 0.08-0.26             | -                     | -                     | -                     | 0.08-0.2              | 0.08-0.22             | -                     |
| -                     | -                     | 0.08-0.26             | 0.08-0.28             | -                     | -                     | -                     | 0.08-0.22             | 0.08-0.24             | -                     |
| -                     | -                     | 0.1-0.26              | 0.1-0.28              | -                     | -                     | -                     | 0.1-0.22              | 0.1-0.24              | -                     |
| -                     | -                     | 0.1-0.26              | 0.1-0.28              | -                     | -                     | -                     | 0.1-0.22              | 0.1-0.24              | -                     |
| -                     | -                     | 0.06-0.14             | 0.06-0.16             | -                     | -                     | -                     | 0.06-0.12             | 0.06-0.14             | -                     |
| -                     | -                     | 0.06-0.16             | 0.06-0.18             | -                     | -                     | -                     | 0.06-0.14             | 0.06-0.15             | -                     |
| -                     | -                     | 0.06-0.2              | 0.06-0.22             | -                     | -                     | -                     | 0.06-0.17             | 0.06-0.19             | -                     |
| -                     | -                     | 0.08-0.24             | 0.08-0.26             | -                     | -                     | -                     | 0.08-0.2              | 0.08-0.22             | -                     |
| -                     | -                     | 0.08-0.26             | 0.08-0.28             | -                     | -                     | -                     | 0.08-0.22             | 0.08-0.24             | -                     |
| -                     | -                     | 0.1-0.26              | 0.1-0.28              | -                     | -                     | -                     | 0.1-0.22              | 0.1-0.24              | -                     |
| -                     | -                     | 0.1-0.26              | 0.1-0.28              | -                     | -                     | -                     | 0.1-0.22              | 0.1-0.24              | -                     |
| -                     | -                     | 0.06-0.16             | 0.06-0.18             | -                     | -                     | -                     | 0.06-0.14             | 0.06-0.15             | -                     |
| -                     | -                     | 0.06-0.18             | 0.06-0.2              | -                     | -                     | -                     | 0.06-0.15             | 0.06-0.17             | -                     |
| -                     | -                     | 0.06-0.22             | 0.06-0.24             | -                     | -                     | -                     | 0.06-0.19             | 0.06-0.2              | -                     |
| -                     | -                     | 0.08-0.26             | 0.08-0.28             | -                     | -                     | -                     | 0.08-0.22             | 0.08-0.24             | -                     |
| -                     | -                     | 0.08-0.28             | 0.08-0.3              | -                     | -                     | -                     | 0.08-0.24             | 0.08-0.26             | -                     |
| -                     | -                     | 0.1-0.28              | 0.1-0.3               | -                     | -                     | -                     | 0.1-0.24              | 0.1-0.26              | -                     |
| -                     | -                     | 0.1-0.28              | 0.1-0.3               | -                     | -                     | -                     | 0.1-0.24              | 0.1-0.26              | -                     |
| -                     | -                     | 0.06-0.14             | 0.06-0.16             | -                     | -                     | -                     | 0.06-0.12             | 0.06-0.14             | -                     |
| -                     | -                     | 0.06-0.16             | 0.06-0.18             | -                     | -                     | -                     | 0.06-0.14             | 0.06-0.15             | -                     |
| -                     | -                     | 0.06-0.2              | 0.06-0.22             | -                     | -                     | -                     | 0.06-0.17             | 0.06-0.19             | -                     |
| -                     | -                     | 0.08-0.24             | 0.08-0.26             | -                     | -                     | -                     | 0.08-0.2              | 0.08-0.22             | -                     |
| -                     | -                     | 0.08-0.26             | 0.08-0.28             | -                     | -                     | -                     | 0.08-0.22             | 0.08-0.24             | -                     |
| -                     | -                     | 0.1-0.26              | 0.1-0.28              | -                     | -                     | -                     | 0.1-0.22              | 0.1-0.24              | -                     |
| -                     | -                     | 0.1-0.26              | 0.1-0.28              | -                     | -                     | -                     | 0.1-0.22              | 0.1-0.24              | -                     |

# ▶ CoroDrill® DS20 切削条件

| ISO | MC No.<br>CMC      | 被削材  | HB  | 外周刃<br>チップ材種 | 切削速度 (V <sub>c</sub> ) m/min |     |     |       |     |     | ドリル径<br>mm  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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|     |                    |      |     |              | 4-5xD                        |     |     | 6-7xD |     |     |             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| P   | P3.0.Z.HT<br>03.21 | 高合金鋼 | 380 | 4324         | 80                           | 165 | 210 | 80    | 150 | 190 | 15.00-18.00 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|     |                    |      |     | 4334         | 75                           | 140 | 175 | 75    | 125 | 160 | 18.01-22.00 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|     |                    |      |     | 4344         | 70                           | 110 | 130 | 70    | 100 | 115 | 22.01-27.00 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|     |                    |      |     |              |                              |     |     |       |     |     |             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

| 加工深さ 4xD    |           |           |           |           | 加工深さ 5xD  |           |           |           |           |
|-------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| -S5W        | -L5W      | -L6W      | -M7W      | -H5W      | -S5W      | -L5W      | -L6W      | -M7W      | -H5W      |
| スタートは範囲の中央値 |           |           |           |           |           |           |           |           |           |
| -           | -         | 0.06-0.14 | 0.06-0.16 | -         | -         | -         | 0.06-0.12 | 0.06-0.14 | -         |
| -           | -         | 0.06-0.16 | 0.06-0.18 | -         | -         | -         | 0.06-0.14 | 0.06-0.15 | -         |
| -           | -         | 0.06-0.2  | 0.06-0.22 | -         | -         | -         | 0.06-0.17 | 0.06-0.19 | -         |
| -           | -         | 0.08-0.24 | 0.08-0.26 | -         | -         | -         | 0.08-0.2  | 0.08-0.22 | -         |
| -           | -         | 0.08-0.26 | 0.08-0.28 | -         | -         | -         | 0.08-0.22 | 0.08-0.24 | -         |
| -           | -         | 0.1-0.26  | 0.1-0.28  | -         | -         | -         | 0.1-0.22  | 0.1-0.24  | -         |
| -           | -         | 0.1-0.26  | 0.1-0.28  | -         | -         | -         | 0.1-0.22  | 0.1-0.24  | -         |
| 0.05-0.13   | 0.05-0.13 | 0.05-0.13 | -         | 0.05-0.12 | 0.05-0.11 | 0.05-0.11 | 0.05-0.11 | -         | 0.05-0.1  |
| 0.05-0.14   | 0.05-0.14 | 0.05-0.14 | -         | 0.05-0.13 | 0.05-0.12 | 0.05-0.12 | 0.05-0.12 | -         | 0.05-0.11 |
| 0.05-0.15   | 0.05-0.15 | 0.05-0.15 | -         | 0.05-0.14 | 0.05-0.13 | 0.05-0.13 | 0.05-0.13 | -         | 0.05-0.12 |
| 0.07-0.16   | 0.07-0.16 | 0.07-0.16 | -         | 0.07-0.15 | 0.07-0.14 | 0.07-0.14 | 0.07-0.14 | -         | 0.07-0.13 |
| 0.07-0.18   | 0.07-0.18 | 0.07-0.18 | -         | 0.07-0.16 | 0.07-0.15 | 0.07-0.15 | 0.07-0.15 | -         | 0.07-0.14 |
| 0.09-0.18   | 0.09-0.18 | 0.09-0.18 | -         | 0.09-0.16 | 0.09-0.15 | 0.09-0.15 | 0.09-0.15 | -         | 0.09-0.14 |
| 0.09-0.18   | 0.09-0.18 | 0.09-0.18 | -         | 0.09-0.16 | 0.09-0.15 | 0.09-0.15 | 0.09-0.15 | -         | 0.09-0.14 |
| 0.05-0.13   | 0.05-0.13 | 0.05-0.13 | -         | 0.05-0.12 | 0.05-0.11 | 0.05-0.11 | 0.05-0.11 | -         | 0.05-0.1  |
| 0.05-0.14   | 0.05-0.14 | 0.05-0.14 | -         | 0.05-0.13 | 0.05-0.12 | 0.05-0.12 | 0.05-0.12 | -         | 0.05-0.11 |
| 0.05-0.15   | 0.05-0.15 | 0.05-0.15 | -         | 0.05-0.14 | 0.05-0.13 | 0.05-0.13 | 0.05-0.13 | -         | 0.05-0.12 |
| 0.07-0.16   | 0.07-0.16 | 0.07-0.16 | -         | 0.07-0.15 | 0.07-0.14 | 0.07-0.14 | 0.07-0.14 | -         | 0.07-0.13 |
| 0.07-0.18   | 0.07-0.18 | 0.07-0.18 | -         | 0.07-0.16 | 0.07-0.15 | 0.07-0.15 | 0.07-0.15 | -         | 0.07-0.14 |
| 0.09-0.18   | 0.09-0.18 | 0.09-0.18 | -         | 0.09-0.16 | 0.09-0.15 | 0.09-0.15 | 0.09-0.15 | -         | 0.09-0.14 |
| 0.09-0.18   | 0.09-0.18 | 0.09-0.18 | -         | 0.09-0.16 | 0.09-0.15 | 0.09-0.15 | 0.09-0.15 | -         | 0.09-0.14 |
| 0.05-0.12   | 0.05-0.12 | 0.05-0.12 | -         | 0.05-0.11 | 0.05-0.11 | 0.05-0.11 | 0.05-0.11 | -         | 0.05-0.1  |
| 0.05-0.13   | 0.05-0.13 | 0.05-0.13 | -         | 0.05-0.12 | 0.05-0.12 | 0.05-0.12 | 0.05-0.12 | -         | 0.05-0.11 |
| 0.05-0.14   | 0.05-0.14 | 0.05-0.14 | -         | 0.05-0.13 | 0.05-0.13 | 0.05-0.13 | 0.05-0.13 | -         | 0.05-0.12 |
| 0.07-0.15   | 0.07-0.15 | 0.07-0.15 | -         | 0.07-0.14 | 0.07-0.14 | 0.07-0.14 | 0.07-0.14 | -         | 0.07-0.13 |
| 0.07-0.16   | 0.07-0.16 | 0.07-0.16 | -         | 0.07-0.15 | 0.07-0.14 | 0.07-0.14 | 0.07-0.14 | -         | 0.07-0.14 |
| 0.09-0.16   | 0.09-0.16 | 0.09-0.16 | -         | 0.09-0.15 | 0.09-0.14 | 0.09-0.14 | 0.09-0.14 | -         | 0.09-0.14 |
| 0.09-0.16   | 0.09-0.16 | 0.09-0.16 | -         | 0.09-0.15 | 0.09-0.14 | 0.09-0.14 | 0.09-0.14 | -         | 0.09-0.14 |
| 0.05-0.12   | 0.05-0.12 | 0.05-0.12 | -         | 0.05-0.11 | 0.05-0.11 | 0.05-0.11 | 0.05-0.11 | -         | 0.05-0.1  |
| 0.05-0.13   | 0.05-0.13 | 0.05-0.13 | -         | 0.05-0.12 | 0.05-0.12 | 0.05-0.12 | 0.05-0.12 | -         | 0.05-0.11 |
| 0.05-0.14   | 0.05-0.14 | 0.05-0.14 | -         | 0.05-0.13 | 0.05-0.13 | 0.05-0.13 | 0.05-0.13 | -         | 0.05-0.12 |
| 0.07-0.15   | 0.07-0.15 | 0.07-0.15 | -         | 0.07-0.14 | 0.07-0.14 | 0.07-0.14 | 0.07-0.14 | -         | 0.07-0.13 |
| 0.07-0.16   | 0.07-0.16 | 0.07-0.16 | -         | 0.07-0.15 | 0.07-0.14 | 0.07-0.14 | 0.07-0.14 | -         | 0.07-0.14 |
| 0.09-0.16   | 0.09-0.16 | 0.09-0.16 | -         | 0.09-0.15 | 0.09-0.14 | 0.09-0.14 | 0.09-0.14 | -         | 0.09-0.14 |
| 0.09-0.16   | 0.09-0.16 | 0.09-0.16 | -         | 0.09-0.15 | 0.09-0.14 | 0.09-0.14 | 0.09-0.14 | -         | 0.09-0.14 |
| 0.05-0.12   | 0.05-0.12 | 0.05-0.12 | -         | 0.05-0.11 | 0.05-0.11 | 0.05-0.11 | 0.05-0.11 | -         | 0.05-0.1  |
| 0.05-0.13   | 0.05-0.13 | 0.05-0.13 | -         | 0.05-0.12 | 0.05-0.12 | 0.05-0.12 | 0.05-0.12 | -         | 0.05-0.11 |
| 0.05-0.14   | 0.05-0.14 | 0.05-0.14 | -         | 0.05-0.13 | 0.05-0.13 | 0.05-0.13 | 0.05-0.13 | -         | 0.05-0.12 |
| 0.07-0.15   | 0.07-0.15 | 0.07-0.15 | -         | 0.07-0.14 | 0.07-0.14 | 0.07-0.14 | 0.07-0.14 | -         | 0.07-0.13 |
| 0.07-0.16   | 0.07-0.16 | 0.07-0.16 | -         | 0.07-0.15 | 0.07-0.14 | 0.07-0.14 | 0.07-0.14 | -         | 0.07-0.14 |
| 0.09-0.16   | 0.09-0.16 | 0.09-0.16 | -         | 0.09-0.15 | 0.09-0.14 | 0.09-0.14 | 0.09-0.14 | -         | 0.09-0.14 |
| 0.09-0.16   | 0.09-0.16 | 0.09-0.16 | -         | 0.09-0.15 | 0.09-0.14 | 0.09-0.14 | 0.09-0.14 | -         | 0.09-0.14 |
| 0.05-0.12   | 0.05-0.12 | 0.05-0.12 | -         | 0.05-0.11 | 0.05-0.11 | 0.05-0.11 | 0.05-0.11 | -         | 0.05-0.1  |
| 0.05-0.13   | 0.05-0.13 | 0.05-0.13 | -         | 0.05-0.12 | 0.05-0.12 | 0.05-0.12 | 0.05-0.12 | -         | 0.05-0.11 |
| 0.05-0.14   | 0.05-0.14 | 0.05-0.14 | -         | 0.05-0.13 | 0.05-0.13 | 0.05-0.13 | 0.05-0.13 | -         | 0.05-0.12 |
| 0.07-0.15   | 0.07-0.15 | 0.07-0.15 | -         | 0.07-0.14 | 0.07-0.14 | 0.07-0.14 | 0.07-0.14 | -         | 0.07-0.13 |
| 0.07-0.16   | 0.07-0.16 | 0.07-0.16 | -         | 0.07-0.15 | 0.07-0.14 | 0.07-0.14 | 0.07-0.14 | -         | 0.07-0.14 |
| 0.09-0.16   | 0.09-0.16 | 0.09-0.16 | -         | 0.09-0.15 | 0.09-0.14 | 0.09-0.14 | 0.09-0.14 | -         | 0.09-0.14 |
| 0.09-0.16   | 0.09-0.16 | 0.09-0.16 | -         | 0.09-0.15 | 0.09-0.14 | 0.09-0.14 | 0.09-0.14 | -         | 0.09-0.14 |
| 0.05-0.12   | 0.05-0.12 | 0.05-0.12 | -         | 0.05-0.11 | 0.05-0.11 | 0.05-0.11 | 0.05-0.11 | -         | 0.05-0.1  |
| 0.05-0.13   | 0.05-0.13 | 0.05-0.13 | -         | 0.05-0.12 | 0.05-0.12 | 0.05-0.12 | 0.05-0.12 | -         | 0.05-0.11 |
| 0.05-0.14   | 0.05-0.14 | 0.05-0.14 | -         | 0.05-0.13 | 0.05-0.13 | 0.05-0.13 | 0.05-0.13 | -         | 0.05-0.12 |
| 0.07-0.15   | 0.07-0.15 | 0.07-0.15 | -         | 0.07-0.14 | 0.07-0.14 | 0.07-0.14 | 0.07-0.14 | -         | 0.07-0.13 |
| 0.07-0.16   | 0.07-0.16 | 0.07-0.16 | -         | 0.07-0.15 | 0.07-0.14 | 0.07-0.14 | 0.07-0.14 | -         | 0.07-0.14 |
| 0.09-0.16   | 0.09-0.16 | 0.09-0.16 | -         | 0.09-0.15 | 0.09-0.14 | 0.09-0.14 | 0.09-0.14 | -         | 0.09-0.14 |
| 0.09-0.16   | 0.09-0.16 | 0.09-0.16 | -         | 0.09-0.15 | 0.09-0.14 | 0.09-0.14 | 0.09-0.14 | -         | 0.09-0.14 |
| 0.04-0.08   | 0.04-0.08 | 0.04-0.08 | -         | -         | 0.04-0.07 | 0.04-0.07 | 0.04-0.07 | -         | -         |
| 0.04-0.09   | 0.04-0.09 | 0.04-0.09 | -         | -         | 0.04-0.08 | 0.04-0.08 | 0.04-0.08 | -         | -         |
| 0.04-0.1    | 0.04-0.1  | 0.04-0.1  | -         | -         | 0.04-0.09 | 0.04-0.09 | 0.04-0.09 | -         | -         |
| 0.05-0.11   | 0.05-0.11 | 0.05-0.11 | -         | -         | 0.05-0.1  | 0.05-0.1  | 0.05-0.1  | -         | -         |
| 0.05-0.12   | 0.05-0.12 | 0.05-0.12 | -         | -         | 0.05-0.11 | 0.05-0.11 | 0.05-0.11 | -         | -         |
| 0.06-0.12   | 0.06-0.12 | 0.06-0.12 | -         | -         | 0.06-0.11 | 0.06-0.11 | 0.06-0.11 | -         | -         |
| 0.06-0.12   | 0.06-0.12 | 0.06-0.12 | -         | -         | 0.06-0.11 | 0.06-0.11 | 0.06-0.11 | -         | -         |
| 0.06-0.14   | 0.06-0.14 | 0.06-0.14 | -         | -         | 0.06-0.12 | 0.06-0.12 | 0.06-0.12 | -         | -         |
| 0.06-0.15   | 0.06-0.15 | 0.06-0.15 | -         | -         | 0.06-0.13 | 0.06-0.13 | 0.06-0.13 | -         | -         |
| 0.06-0.16   | 0.06-0.16 | 0.06-0.16 | -         | -         | 0.06-0.14 | 0.06-0.14 | 0.06-0.14 | -         | -         |
| 0.08-0.17   | 0.08-0.17 | 0.08-0.17 | -         | -         | 0.08-0.14 | 0.08-0.14 | 0.08-0.14 | -         | -         |
| 0.08-0.18   | 0.08-0.18 | 0.08-0.18 | -         | -         | 0.08-0.15 | 0.08-0.15 | 0.08-0.15 | -         | -         |
| 0.1-0.18    | 0.1-0.18  | 0.1-0.18  | -         | -         | 0.1-0.15  | 0.1-0.15  | 0.1-0.15  | -         | -         |
| 0.1-0.18    | 0.1-0.18  | 0.1-0.18  | -         | -         | 0.1-0.15  | 0.1-0.15  | 0.1-0.15  | -         | -         |

▶CoroDrill® DS20 切削条件

| ISO | MC No.<br>CMC     | 被削材                   | HB    | 外周刃<br>チップ材種         | 切削速度 (V <sub>c</sub> ) m/min |                   |                   |                   |                   |                   | ドリル径<br><br>mm                                                                                        |
|-----|-------------------|-----------------------|-------|----------------------|------------------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------------------------------------------------------------------------------------------|
|     |                   |                       |       |                      | 4-5xD                        |                   |                   | 6-7xD             |                   |                   |                                                                                                       |
| K   | K1.1.C.NS<br>07.1 | 可鍛鑄鉄フェライト<br>(短い切りくず) | 200   | 4324<br>4334<br>4344 | 140<br>110<br>180            | 210<br>170<br>165 | 245<br>200<br>155 | 140<br>110<br>180 | 190<br>155<br>150 | 220<br>180<br>140 | 15.00-18.00<br>18.01-22.00<br>22.01-27.00<br>27.01-33.00<br>33.01-40.00<br>40.01-52.00<br>52.01-65.00 |
|     | K2.1.C.UT<br>08.1 | ネズミ鑄鉄<br>(低抗張力)       | 180   | 4324<br>4334<br>4344 | 210<br>170<br>130            | 285<br>235<br>180 | 325<br>270<br>205 | 210<br>170<br>130 | 255<br>210<br>160 | 295<br>245<br>185 | 15.00-18.00<br>18.01-22.00<br>22.01-27.00<br>27.01-33.00<br>33.01-40.00<br>40.01-52.00<br>52.01-65.00 |
|     | K2.2.C.UT<br>08.2 | ネズミ鑄鉄<br>(高抗張力)       | 245   | 4324<br>4334<br>4344 | 125<br>100<br>75             | 205<br>160<br>125 | 245<br>195<br>150 | 125<br>100<br>75  | 185<br>145<br>115 | 220<br>175<br>135 | 15.00-18.00<br>18.01-22.00<br>22.01-27.00<br>27.01-33.00<br>33.01-40.00<br>40.01-52.00<br>52.01-65.00 |
|     | K3.1.C.UT<br>09.1 | ダクタイル鑄鉄<br>(フェライト)    | 155   | 4324<br>4334<br>4344 | 125<br>100<br>80             | 190<br>155<br>120 | 225<br>185<br>145 | 125<br>100<br>80  | 170<br>140<br>110 | 205<br>165<br>130 | 15.00-18.00<br>18.01-22.00<br>22.01-27.00<br>27.01-33.00<br>33.01-40.00<br>40.01-52.00<br>52.01-65.00 |
|     | K3.3.C.UT<br>09.2 | ダクタイル鑄鉄<br>(パーライト)    | 265   | 4324<br>4334<br>4344 | 110<br>90<br>70              | 175<br>145<br>110 | 210<br>175<br>130 | 110<br>90<br>70   | 160<br>130<br>100 | 190<br>160<br>115 | 15.00-18.00<br>18.01-22.00<br>22.01-27.00<br>27.01-33.00<br>33.01-40.00<br>40.01-52.00<br>52.01-65.00 |
|     | K4.2.C.UT         | CGI<br>(高抗張力)         | 230   | 4324<br>4334<br>4344 | 130<br>110<br>85             | 210<br>170<br>125 | 250<br>200<br>150 | 130<br>110<br>85  | 190<br>155<br>115 | 225<br>180<br>135 | 15.00-18.00<br>18.01-22.00<br>22.01-27.00<br>27.01-33.00<br>33.01-40.00<br>40.01-52.00<br>52.01-65.00 |
|     | H                 | H1.3.Z.HA<br>04.1     | 極高硬度鋼 | 60 (HRC)             | 4324<br>4334<br>4344         | 30<br>30<br>30    | 65<br>65<br>65    | 85<br>85<br>85    | 30<br>30<br>30    | 60<br>60<br>60    | 75<br>75<br>75                                                                                        |

| ISO | MC No.<br>CMC      | 被削材    | HB  | 外周刃<br>チップ材種 | 切削速度 (V <sub>c</sub> ) m/min |            |            |            |            |            | ドリル径<br><br>mm                                                                                        |
|-----|--------------------|--------|-----|--------------|------------------------------|------------|------------|------------|------------|------------|-------------------------------------------------------------------------------------------------------|
|     |                    |        |     |              | 4-5xD                        |            |            | 6-7xD      |            |            |                                                                                                       |
| N   | N1.2.Z.AG<br>30.12 | アルミ合金  | 100 | H13A<br>4344 | 300<br>300                   | 365<br>365 | 400<br>400 | 300<br>300 | 330<br>330 | 360<br>360 | 15.00-18.00<br>18.01-22.00<br>22.01-27.00<br>27.01-33.00<br>33.01-40.00<br>40.01-52.00<br>52.01-65.00 |
|     | N1.3.C.UT<br>30.21 | アルミ合金  | 75  | H13A<br>4344 | 250<br>250                   | 350<br>350 | 400<br>400 | 250<br>250 | 315<br>315 | 360<br>360 | 15.00-18.00<br>18.01-22.00<br>22.01-27.00<br>27.01-33.00<br>33.01-40.00<br>40.01-52.00<br>52.01-65.00 |
|     | N1.3.C.AG<br>30.22 | アルミ合金  | 90  | H13A<br>4344 | 250<br>250                   | 315<br>315 | 350<br>350 | 250<br>250 | 285<br>285 | 315<br>315 | 15.00-18.00<br>18.01-22.00<br>22.01-27.00<br>27.01-33.00<br>33.01-40.00<br>40.01-52.00<br>52.01-65.00 |
|     | N3.3.U.UT<br>33.1  | 銅と銅合金  | 110 | H13A<br>4344 | 250<br>250                   | 350<br>350 | 400<br>400 | 250<br>250 | 315<br>315 | 360<br>360 | 15.00-18.00<br>18.01-22.00<br>22.01-27.00<br>27.01-33.00<br>33.01-40.00<br>40.01-52.00<br>52.01-65.00 |
|     | N3.2.C.UT<br>33.2  | 青銅、鉛黄銅 | 90  | H13A<br>4344 | 180<br>180                   | 220<br>220 | 240<br>240 | 180<br>180 | 200<br>200 | 215<br>215 | 15.00-18.00<br>18.01-22.00<br>22.01-27.00<br>27.01-33.00<br>33.01-40.00<br>40.01-52.00<br>52.01-65.00 |
|     |                    |        |     |              |                              |            |            |            |            |            |                                                                                                       |



# ▶ CoroDrill® DS20 切削条件

| ISO                | MC No.<br>CMC     | 被削材                 | HB<br>外周刃<br>チップ材種   |                      | 切削速度 (V <sub>c</sub> ) m/min |                     |                      |                      |     |             | ドリル径<br>mm  |
|--------------------|-------------------|---------------------|----------------------|----------------------|------------------------------|---------------------|----------------------|----------------------|-----|-------------|-------------|
|                    |                   |                     |                      |                      | 4-5xD                        |                     |                      | 6-7xD                |     |             |             |
| P                  | P1.0.Z.AN<br>01.1 | 炭素鋼<br>C=0.05-0.10% | 110                  | 4324<br>4334<br>4344 | Min                          | 推奨                  | Max                  | Min                  | 推奨  | Max         | 15.00-18.00 |
|                    |                   |                     |                      |                      | 230                          | 340                 | 400                  | 230                  | 305 | 360         | 18.01-22.00 |
|                    |                   |                     |                      |                      | 210                          | 285                 | 325                  | 210                  | 255 | 295         | 22.01-27.00 |
|                    |                   |                     |                      |                      | 190                          | 225                 | 245                  | 190                  | 205 | 220         | 27.01-33.00 |
|                    | P1.1.Z.AN<br>01.1 | 炭素鋼<br>C=0.05-0.25% | 125                  | 4324<br>4334<br>4344 | 230                          | 320                 | 370                  | 230                  | 290 | 335         | 33.01-40.00 |
|                    |                   |                     |                      |                      | 200                          | 270                 | 305                  | 200                  | 245 | 275         | 40.01-52.00 |
|                    |                   |                     |                      |                      | 170                          | 210                 | 235                  | 170                  | 190 | 210         | 52.01-65.00 |
|                    |                   |                     |                      |                      | P1.2.Z.AN<br>01.2            | 炭素鋼<br>C=0.25-0.55% | 190                  | 4324<br>4334<br>4344 | 190 | 265         | 305         |
|                    | 155               | 215                 | 250                  | 155                  |                              |                     |                      |                      | 195 | 225         | 18.01-22.00 |
|                    | 120               | 165                 | 190                  | 120                  |                              |                     |                      |                      | 150 | 170         | 22.01-27.00 |
|                    | P1.3.Z.AN<br>01.3 | 炭素鋼<br>C=0.55-0.80% | 190                  | 4324<br>4334<br>4344 |                              |                     |                      |                      | 170 | 250         | 290         |
|                    |                   |                     |                      |                      | 140                          | 205                 | 240                  | 140                  | 185 | 215         | 33.01-40.00 |
|                    |                   |                     |                      |                      | 105                          | 155                 | 185                  | 105                  | 140 | 165         | 40.01-52.00 |
|                    |                   |                     |                      |                      | P1.5.C.UT<br>06.1            | 鋳鋼 (炭素鋼)            | 150                  | 4324<br>4334<br>4344 | 140 | 260         | 325         |
|                    | 135               | 220                 | 265                  | 135                  |                              |                     |                      |                      | 200 | 240         | 15.00-18.00 |
|                    | 125               | 175                 | 200                  | 125                  |                              |                     |                      |                      | 160 | 180         | 18.01-22.00 |
| P2.1.Z.AN<br>02.1  | 低合金鋼              | 175                 | 4324<br>4334<br>4344 | 180                  |                              |                     |                      |                      | 260 | 305         | 180         |
|                    |                   |                     |                      | 150                  | 215                          | 250                 | 150                  | 195                  | 225 | 27.01-33.00 |             |
|                    |                   |                     |                      | 115                  | 165                          | 190                 | 115                  | 150                  | 170 | 33.01-40.00 |             |
|                    |                   |                     |                      | P2.2.Z.AN            | 低合金鋼                         | 240                 | 4324<br>4334<br>4344 | 180                  | 250 | 290         | 180         |
| 150                | 200               | 225                 | 150                  |                      |                              |                     |                      | 180                  | 205 | 52.01-65.00 |             |
| 115                | 175               | 205                 | 115                  |                      |                              |                     |                      | 160                  | 185 | 15.00-18.00 |             |
| P2.5.Z.HT<br>02.2  | 低合金鋼              | 330                 | 4324<br>4334<br>4344 |                      |                              |                     |                      | 90                   | 190 | 245         | 90          |
|                    |                   |                     |                      | 85                   | 155                          | 195                 | 85                   | 140                  | 175 | 22.01-27.00 |             |
|                    |                   |                     |                      | 75                   | 125                          | 150                 | 75                   | 115                  | 135 | 27.01-33.00 |             |
|                    |                   |                     |                      | P2.6.C.UT<br>06.2    | 低合金鋼<br>鋳鋼                   | 200                 | 4324<br>4334<br>4344 | 110                  | 210 | 265         | 110         |
| 105                | 175               | 210                 | 105                  |                      |                              |                     |                      | 160                  | 190 | 40.01-52.00 |             |
| 100                | 140               | 160                 | 100                  |                      |                              |                     |                      | 125                  | 145 | 52.01-65.00 |             |
| P3.0.Z.AN<br>03.11 | 高合金鋼              | 200                 | 4324<br>4334<br>4344 |                      |                              |                     |                      | 160                  | 245 | 290         | 160         |
|                    |                   |                     |                      | 130                  | 200                          | 240                 | 130                  | 180                  | 215 | 18.01-22.00 |             |
|                    |                   |                     |                      | 100                  | 150                          | 180                 | 100                  | 135                  | 160 | 22.01-27.00 |             |
|                    |                   |                     |                      |                      |                              |                     |                      |                      |     | 27.01-33.00 |             |
|                    |                   |                     |                      |                      |                              |                     |                      |                      |     | 33.01-40.00 |             |
|                    |                   |                     |                      |                      |                              |                     |                      |                      |     |             | 40.01-52.00 |
|                    |                   |                     |                      |                      |                              |                     |                      |                      |     |             | 52.01-65.00 |

| ドリル長 6xD              |                       |                       |                       |                       | ドリル長 7xD              |                       |                       |                       |                       |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| -S5W                  | -L5W                  | -L6W                  | -M7W                  | -H5W                  | -S5W                  | -L5W                  | -L6W                  | -M7W                  | -H5W                  |
| スタートは範囲の中央値           |                       |                       |                       |                       |                       |                       |                       |                       |                       |
| f <sub>n</sub> mm/rev | f <sub>n</sub> mm/rev | f <sub>n</sub> mm/rev | f <sub>n</sub> mm/rev | f <sub>n</sub> mm/rev | f <sub>n</sub> mm/rev | f <sub>n</sub> mm/rev | f <sub>n</sub> mm/rev | f <sub>n</sub> mm/rev | f <sub>n</sub> mm/rev |
| 0.04-0.06             | 0.04-0.06             | 0.04-0.06             | -                     | 0.04-0.08             | 0.04-0.05             | 0.04-0.05             | 0.04-0.05             | -                     | 0.04-0.07             |
| 0.04-0.07             | 0.04-0.07             | 0.04-0.07             | -                     | 0.04-0.09             | 0.04-0.06             | 0.04-0.06             | 0.04-0.06             | -                     | 0.04-0.07             |
| 0.04-0.08             | 0.04-0.08             | 0.04-0.08             | -                     | 0.04-0.1              | 0.04-0.07             | 0.04-0.07             | 0.04-0.07             | -                     | 0.04-0.08             |
| 0.05-0.09             | 0.05-0.09             | 0.05-0.09             | -                     | 0.05-0.1              | 0.05-0.07             | 0.05-0.07             | 0.05-0.07             | -                     | 0.05-0.08             |
| 0.05-0.1              | 0.05-0.1              | 0.05-0.1              | -                     | 0.05-0.13             | 0.05-0.08             | 0.05-0.08             | 0.05-0.08             | -                     | 0.05-0.1              |
| 0.06-0.1              | 0.06-0.1              | 0.06-0.1              | -                     | 0.06-0.13             | 0.06-0.08             | 0.06-0.08             | 0.06-0.08             | -                     | 0.06-0.1              |
| 0.06-0.1              | 0.06-0.1              | 0.06-0.1              | -                     | 0.06-0.13             | 0.06-0.08             | 0.06-0.08             | 0.06-0.08             | -                     | 0.06-0.1              |
| 0.04-0.08             | 0.04-0.08             | 0.04-0.08             | -                     | 0.04-0.08             | 0.04-0.07             | 0.04-0.07             | 0.04-0.07             | -                     | 0.04-0.07             |
| 0.04-0.09             | 0.04-0.09             | 0.04-0.09             | -                     | 0.04-0.09             | 0.04-0.07             | 0.04-0.07             | 0.04-0.07             | -                     | 0.04-0.07             |
| 0.04-0.1              | 0.04-0.1              | 0.04-0.1              | -                     | 0.04-0.1              | 0.04-0.08             | 0.04-0.08             | 0.04-0.08             | -                     | 0.04-0.08             |
| 0.05-0.1              | 0.05-0.1              | 0.05-0.1              | -                     | 0.05-0.1              | 0.05-0.08             | 0.05-0.08             | 0.05-0.08             | -                     | 0.05-0.08             |
| 0.05-0.11             | 0.05-0.11             | 0.05-0.11             | -                     | 0.05-0.13             | 0.05-0.09             | 0.05-0.09             | 0.05-0.09             | -                     | 0.05-0.1              |
| 0.06-0.11             | 0.06-0.11             | 0.06-0.11             | -                     | 0.06-0.13             | 0.06-0.09             | 0.06-0.09             | 0.06-0.09             | -                     | 0.06-0.1              |
| 0.06-0.11             | 0.06-0.11             | 0.06-0.11             | -                     | 0.06-0.13             | 0.06-0.09             | 0.06-0.09             | 0.06-0.09             | -                     | 0.06-0.1              |
| -                     | 0.05-0.08             | 0.06-0.09             | 0.06-0.1              | -                     | -                     | 0.05-0.07             | 0.06-0.08             | 0.06-0.09             | -                     |
| -                     | 0.05-0.09             | 0.06-0.1              | 0.06-0.12             | -                     | -                     | 0.05-0.08             | 0.06-0.09             | 0.06-0.1              | -                     |
| -                     | 0.05-0.12             | 0.06-0.13             | 0.06-0.14             | -                     | -                     | 0.05-0.1              | 0.06-0.11             | 0.06-0.12             | -                     |
| -                     | 0.07-0.14             | 0.08-0.16             | 0.08-0.17             | -                     | -                     | 0.07-0.12             | 0.08-0.13             | 0.08-0.14             | -                     |
| -                     | 0.07-0.16             | 0.08-0.17             | 0.08-0.18             | -                     | -                     | 0.07-0.13             | 0.08-0.14             | 0.08-0.15             | -                     |
| -                     | 0.09-0.16             | 0.1-0.17              | 0.1-0.18              | -                     | -                     | 0.09-0.13             | 0.1-0.14              | 0.1-0.15              | -                     |
| -                     | 0.09-0.16             | 0.1-0.17              | 0.1-0.18              | -                     | -                     | 0.09-0.13             | 0.1-0.14              | 0.1-0.15              | -                     |
| -                     | 0.05-0.08             | 0.06-0.09             | 0.06-0.1              | -                     | -                     | 0.05-0.07             | 0.06-0.08             | 0.06-0.09             | -                     |
| -                     | 0.05-0.09             | 0.06-0.1              | 0.06-0.12             | -                     | -                     | 0.05-0.08             | 0.06-0.09             | 0.06-0.1              | -                     |
| -                     | 0.05-0.12             | 0.06-0.13             | 0.06-0.14             | -                     | -                     | 0.05-0.1              | 0.06-0.11             | 0.06-0.12             | -                     |
| -                     | 0.07-0.14             | 0.08-0.16             | 0.08-0.17             | -                     | -                     | 0.07-0.12             | 0.08-0.13             | 0.08-0.14             | -                     |
| -                     | 0.07-0.16             | 0.08-0.17             | 0.08-0.18             | -                     | -                     | 0.07-0.13             | 0.08-0.14             | 0.08-0.15             | -                     |
| -                     | 0.09-0.16             | 0.1-0.17              | 0.1-0.18              | -                     | -                     | 0.09-0.13             | 0.1-0.14              | 0.1-0.15              | -                     |
| -                     | 0.09-0.16             | 0.1-0.17              | 0.1-0.18              | -                     | -                     | 0.09-0.13             | 0.1-0.14              | 0.1-0.15              | -                     |
| -                     | 0.04-0.08             | 0.04-0.08             | 0.04-0.08             | -                     | -                     | 0.04-0.07             | 0.04-0.07             | 0.04-0.07             | -                     |
| -                     | 0.04-0.08             | 0.04-0.08             | 0.04-0.08             | -                     | -                     | 0.04-0.07             | 0.04-0.07             | 0.04-0.07             | -                     |
| -                     | 0.04-0.09             | 0.04-0.09             | 0.04-0.09             | -                     | -                     | 0.04-0.08             | 0.04-0.08             | 0.04-0.08             | -                     |
| -                     | 0.05-0.1              | 0.05-0.1              | 0.05-0.1              | -                     | -                     | 0.05-0.08             | 0.05-0.08             | 0.05-0.08             | -                     |
| -                     | 0.05-0.1              | 0.05-0.1              | 0.05-0.1              | -                     | -                     | 0.05-0.09             | 0.05-0.09             | 0.05-0.09             | -                     |
| -                     | 0.06-0.1              | 0.06-0.1              | 0.06-0.1              | -                     | -                     | 0.06-0.09             | 0.06-0.09             | 0.06-0.09             | -                     |
| -                     | 0.06-0.1              | 0.06-0.1              | 0.06-0.1              | -                     | -                     | 0.06-0.09             | 0.06-0.09             | 0.06-0.09             | -                     |
| -                     | -                     | 0.06-0.09             | 0.06-0.1              | -                     | -                     | -                     | 0.06-0.08             | 0.06-0.09             | -                     |
| -                     | -                     | 0.06-0.1              | 0.06-0.12             | -                     | -                     | -                     | 0.06-0.09             | 0.06-0.1              | -                     |
| -                     | -                     | 0.06-0.13             | 0.06-0.14             | -                     | -                     | -                     | 0.06-0.11             | 0.06-0.12             | -                     |
| -                     | -                     | 0.08-0.16             | 0.08-0.17             | -                     | -                     | -                     | 0.08-0.13             | 0.08-0.14             | -                     |
| -                     | -                     | 0.08-0.17             | 0.08-0.18             | -                     | -                     | -                     | 0.08-0.14             | 0.08-0.15             | -                     |
| -                     | -                     | 0.1-0.17              | 0.1-0.18              | -                     | -                     | -                     | 0.1-0.14              | 0.1-0.15              | -                     |
| -                     | -                     | 0.1-0.17              | 0.1-0.18              | -                     | -                     | -                     | 0.1-0.14              | 0.1-0.15              | -                     |
| -                     | -                     | 0.06-0.09             | 0.06-0.1              | -                     | -                     | -                     | 0.06-0.08             | 0.06-0.09             | -                     |
| -                     | -                     | 0.06-0.1              | 0.06-0.12             | -                     | -                     | -                     | 0.06-0.09             | 0.06-0.1              | -                     |
| -                     | -                     | 0.06-0.13             | 0.06-0.14             | -                     | -                     | -                     | 0.06-0.11             | 0.06-0.12             | -                     |
| -                     | -                     | 0.08-0.16             | 0.08-0.17             | -                     | -                     | -                     | 0.08-0.13             | 0.08-0.14             | -                     |
| -                     | -                     | 0.08-0.17             | 0.08-0.18             | -                     | -                     | -                     | 0.08-0.14             | 0.08-0.15             | -                     |
| -                     | -                     | 0.1-0.17              | 0.1-0.18              | -                     | -                     | -                     | 0.1-0.14              | 0.1-0.15              | -                     |
| -                     | -                     | 0.1-0.17              | 0.1-0.18              | -                     | -                     | -                     | 0.1-0.14              | 0.1-0.15              | -                     |
| -                     | -                     | 0.06-0.1              | 0.06-0.12             | -                     | -                     | -                     | 0.06-0.09             | 0.06-0.1              | -                     |
| -                     | -                     | 0.06-0.12             | 0.06-0.13             | -                     | -                     | -                     | 0.06-0.1              | 0.06-0.11             | -                     |
| -                     | -                     | 0.06-0.14             | 0.06-0.16             | -                     | -                     | -                     | 0.06-0.12             | 0.06-0.13             | -                     |
| -                     | -                     | 0.08-0.17             | 0.08-0.18             | -                     | -                     | -                     | 0.08-0.14             | 0.08-0.15             | -                     |
| -                     | -                     | 0.08-0.18             | 0.08-0.2              | -                     | -                     | -                     | 0.08-0.15             | 0.08-0.17             | -                     |
| -                     | -                     | 0.1-0.18              | 0.1-0.2               | -                     | -                     | -                     | 0.1-0.15              | 0.1-0.17              | -                     |
| -                     | -                     | 0.1-0.18              | 0.1-0.2               | -                     | -                     | -                     | 0.1-0.15              | 0.1-0.17              | -                     |
| -                     | -                     | 0.06-0.09             | 0.06-0.1              | -                     | -                     | -                     | 0.06-0.08             | 0.06-0.09             | -                     |
| -                     | -                     | 0.06-0.1              | 0.06-0.12             | -                     | -                     | -                     | 0.06-0.09             | 0.06-0.1              | -                     |
| -                     | -                     | 0.06-0.13             | 0.06-0.14             | -                     | -                     | -                     | 0.06-0.11             | 0.06-0.12             | -                     |
| -                     | -                     | 0.08-0.16             | 0.08-0.17             | -                     | -                     | -                     | 0.08-0.13             | 0.08-0.14             | -                     |
| -                     | -                     | 0.08-0.17             | 0.08-0.18             | -                     | -                     | -                     | 0.08-0.14             | 0.08-0.15             | -                     |
| -                     | -                     | 0.1-0.17              | 0.1-0.18              | -                     | -                     | -                     | 0.1-0.14              | 0.1-0.15              | -                     |
| -                     | -                     | 0.1-0.17              | 0.1-0.18              | -                     | -                     | -                     | 0.1-0.14              | 0.1-0.15              | -                     |

# ▶ CoroDrill® DS20 切削条件

| ISO | MC No.<br>CMC      | 被削材  | HB  | 外周刃<br>チップ材種 | 切削速度 (V <sub>c</sub> ) m/min |     |     |       |     |     | ドリル径<br>mm  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|-----|--------------------|------|-----|--------------|------------------------------|-----|-----|-------|-----|-----|-------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
|     |                    |      |     |              | 4-5xD                        |     |     | 6-7xD |     |     |             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| P   | P3.0.Z.HT<br>03.21 | 高合金鋼 | 380 | 4324         | 80                           | 165 | 210 | 80    | 150 | 190 | 15.00-18.00 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|     |                    |      |     | 4334         | 75                           | 140 | 175 | 75    | 125 | 160 | 18.01-22.00 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|     |                    |      |     | 4344         | 70                           | 110 | 130 | 70    | 100 | 115 | 22.01-27.00 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|     |                    |      |     |              |                              |     |     |       |     |     |             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

| ドリル長 6xD    |           |           |           |           | ドリル長 7xD  |           |           |           |           |
|-------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| -S5W        | -L5W      | -L6W      | -M7W      | -H5W      | -S5W      | -L5W      | -L6W      | -M7W      | -H5W      |
| スタートは範囲の中央値 |           |           |           |           |           |           |           |           |           |
| -           | -         | 0.06-0.09 | 0.06-0.1  | -         | -         | -         | 0.06-0.08 | 0.06-0.09 | -         |
| -           | -         | 0.06-0.1  | 0.06-0.12 | -         | -         | -         | 0.06-0.09 | 0.06-0.1  | -         |
| -           | -         | 0.06-0.13 | 0.06-0.14 | -         | -         | -         | 0.06-0.11 | 0.06-0.12 | -         |
| -           | -         | 0.08-0.16 | 0.08-0.17 | -         | -         | -         | 0.08-0.13 | 0.08-0.14 | -         |
| -           | -         | 0.08-0.17 | 0.08-0.18 | -         | -         | -         | 0.08-0.14 | 0.08-0.15 | -         |
| -           | -         | 0.1-0.17  | 0.1-0.18  | -         | -         | -         | 0.1-0.14  | 0.1-0.15  | -         |
| -           | -         | 0.1-0.17  | 0.1-0.18  | -         | -         | -         | 0.1-0.14  | 0.1-0.15  | -         |
| 0.05-0.08   | 0.05-0.08 | 0.05-0.08 | -         | 0.05-0.08 | 0.05-0.07 | 0.05-0.07 | 0.05-0.07 | -         | 0.05-0.07 |
| 0.05-0.09   | 0.05-0.09 | 0.05-0.09 | -         | 0.05-0.08 | 0.05-0.08 | 0.05-0.08 | 0.05-0.08 | -         | 0.05-0.07 |
| 0.05-0.1    | 0.05-0.1  | 0.05-0.1  | -         | 0.05-0.09 | 0.05-0.08 | 0.05-0.08 | 0.05-0.08 | -         | 0.05-0.08 |
| 0.07-0.1    | 0.07-0.1  | 0.07-0.1  | -         | 0.07-0.1  | 0.07-0.09 | 0.07-0.09 | 0.07-0.09 | -         | 0.07-0.08 |
| 0.07-0.12   | 0.07-0.12 | 0.07-0.12 | -         | 0.07-0.1  | 0.07-0.1  | 0.07-0.1  | 0.07-0.1  | -         | 0.07-0.09 |
| 0.09-0.12   | 0.09-0.12 | 0.09-0.12 | -         | 0.09-0.1  | 0.09-0.1  | 0.09-0.1  | 0.09-0.1  | -         | 0.09-0.09 |
| 0.09-0.12   | 0.09-0.12 | 0.09-0.12 | -         | 0.09-0.1  | 0.09-0.1  | 0.09-0.1  | 0.09-0.1  | -         | 0.09-0.09 |
| 0.05-0.08   | 0.05-0.08 | 0.05-0.08 | -         | 0.05-0.08 | 0.05-0.07 | 0.05-0.07 | 0.05-0.07 | -         | 0.05-0.07 |
| 0.05-0.09   | 0.05-0.09 | 0.05-0.09 | -         | 0.05-0.08 | 0.05-0.08 | 0.05-0.08 | 0.05-0.08 | -         | 0.05-0.07 |
| 0.05-0.1    | 0.05-0.1  | 0.05-0.1  | -         | 0.05-0.09 | 0.05-0.08 | 0.05-0.08 | 0.05-0.08 | -         | 0.05-0.08 |
| 0.07-0.1    | 0.07-0.1  | 0.07-0.1  | -         | 0.07-0.1  | 0.07-0.09 | 0.07-0.09 | 0.07-0.09 | -         | 0.07-0.08 |
| 0.07-0.12   | 0.07-0.12 | 0.07-0.12 | -         | 0.07-0.1  | 0.07-0.1  | 0.07-0.1  | 0.07-0.1  | -         | 0.07-0.09 |
| 0.09-0.12   | 0.09-0.12 | 0.09-0.12 | -         | 0.09-0.1  | 0.09-0.1  | 0.09-0.1  | 0.09-0.1  | -         | 0.09-0.09 |
| 0.09-0.12   | 0.09-0.12 | 0.09-0.12 | -         | 0.09-0.1  | 0.09-0.1  | 0.09-0.1  | 0.09-0.1  | -         | 0.09-0.09 |
| 0.05-0.1    | 0.05-0.1  | 0.05-0.1  | -         | 0.05-0.09 | 0.05-0.08 | 0.05-0.08 | 0.05-0.08 | -         | 0.05-0.07 |
| 0.05-0.1    | 0.05-0.1  | 0.05-0.1  | -         | 0.05-0.1  | 0.05-0.08 | 0.05-0.08 | 0.05-0.08 | -         | 0.05-0.08 |
| 0.05-0.11   | 0.05-0.11 | 0.05-0.11 | -         | 0.05-0.1  | 0.05-0.09 | 0.05-0.09 | 0.05-0.09 | -         | 0.05-0.08 |
| 0.07-0.12   | 0.07-0.12 | 0.07-0.12 | -         | 0.07-0.11 | 0.07-0.1  | 0.07-0.1  | 0.07-0.1  | -         | 0.07-0.09 |
| 0.07-0.13   | 0.07-0.13 | 0.07-0.13 | -         | 0.07-0.12 | 0.07-0.1  | 0.07-0.1  | 0.07-0.1  | -         | 0.07-0.1  |
| 0.09-0.13   | 0.09-0.13 | 0.09-0.13 | -         | 0.09-0.12 | 0.09-0.1  | 0.09-0.1  | 0.09-0.1  | -         | 0.09-0.1  |
| 0.09-0.13   | 0.09-0.13 | 0.09-0.13 | -         | 0.09-0.12 | 0.09-0.1  | 0.09-0.1  | 0.09-0.1  | -         | 0.09-0.1  |
| 0.05-0.1    | 0.05-0.1  | 0.05-0.1  | -         | 0.05-0.09 | 0.05-0.08 | 0.05-0.08 | 0.05-0.08 | -         | 0.05-0.07 |
| 0.05-0.1    | 0.05-0.1  | 0.05-0.1  | -         | 0.05-0.1  | 0.05-0.08 | 0.05-0.08 | 0.05-0.08 | -         | 0.05-0.08 |
| 0.05-0.11   | 0.05-0.11 | 0.05-0.11 | -         | 0.05-0.1  | 0.05-0.09 | 0.05-0.09 | 0.05-0.09 | -         | 0.05-0.08 |
| 0.07-0.12   | 0.07-0.12 | 0.07-0.12 | -         | 0.07-0.11 | 0.07-0.1  | 0.07-0.1  | 0.07-0.1  | -         | 0.07-0.09 |
| 0.07-0.13   | 0.07-0.13 | 0.07-0.13 | -         | 0.07-0.12 | 0.07-0.1  | 0.07-0.1  | 0.07-0.1  | -         | 0.07-0.1  |
| 0.09-0.13   | 0.09-0.13 | 0.09-0.13 | -         | 0.09-0.12 | 0.09-0.1  | 0.09-0.1  | 0.09-0.1  | -         | 0.09-0.1  |
| 0.09-0.13   | 0.09-0.13 | 0.09-0.13 | -         | 0.09-0.12 | 0.09-0.1  | 0.09-0.1  | 0.09-0.1  | -         | 0.09-0.1  |
| 0.05-0.1    | 0.05-0.1  | 0.05-0.1  | -         | 0.05-0.09 | 0.05-0.08 | 0.05-0.08 | 0.05-0.08 | -         | 0.05-0.07 |
| 0.05-0.1    | 0.05-0.1  | 0.05-0.1  | -         | 0.05-0.1  | 0.05-0.08 | 0.05-0.08 | 0.05-0.08 | -         | 0.05-0.08 |
| 0.05-0.11   | 0.05-0.11 | 0.05-0.11 | -         | 0.05-0.1  | 0.05-0.09 | 0.05-0.09 | 0.05-0.09 | -         | 0.05-0.08 |
| 0.07-0.12   | 0.07-0.12 | 0.07-0.12 | -         | 0.07-0.11 | 0.07-0.1  | 0.07-0.1  | 0.07-0.1  | -         | 0.07-0.09 |
| 0.07-0.13   | 0.07-0.13 | 0.07-0.13 | -         | 0.07-0.12 | 0.07-0.1  | 0.07-0.1  | 0.07-0.1  | -         | 0.07-0.1  |
| 0.09-0.13   | 0.09-0.13 | 0.09-0.13 | -         | 0.09-0.12 | 0.09-0.1  | 0.09-0.1  | 0.09-0.1  | -         | 0.09-0.1  |
| 0.09-0.13   | 0.09-0.13 | 0.09-0.13 | -         | 0.09-0.12 | 0.09-0.1  | 0.09-0.1  | 0.09-0.1  | -         | 0.09-0.1  |
| 0.05-0.1    | 0.05-0.1  | 0.05-0.1  | -         | 0.05-0.09 | 0.05-0.08 | 0.05-0.08 | 0.05-0.08 | -         | 0.05-0.07 |
| 0.05-0.1    | 0.05-0.1  | 0.05-0.1  | -         | 0.05-0.1  | 0.05-0.08 | 0.05-0.08 | 0.05-0.08 | -         | 0.05-0.08 |
| 0.05-0.11   | 0.05-0.11 | 0.05-0.11 | -         | 0.05-0.1  | 0.05-0.09 | 0.05-0.09 | 0.05-0.09 | -         | 0.05-0.08 |
| 0.07-0.12   | 0.07-0.12 | 0.07-0.12 | -         | 0.07-0.11 | 0.07-0.1  | 0.07-0.1  | 0.07-0.1  | -         | 0.07-0.09 |
| 0.07-0.13   | 0.07-0.13 | 0.07-0.13 | -         | 0.07-0.12 | 0.07-0.1  | 0.07-0.1  | 0.07-0.1  | -         | 0.07-0.1  |
| 0.09-0.13   | 0.09-0.13 | 0.09-0.13 | -         | 0.09-0.12 | 0.09-0.1  | 0.09-0.1  | 0.09-0.1  | -         | 0.09-0.1  |
| 0.09-0.13   | 0.09-0.13 | 0.09-0.13 | -         | 0.09-0.12 | 0.09-0.1  | 0.09-0.1  | 0.09-0.1  | -         | 0.09-0.1  |
| 0.04-0.06   | 0.04-0.06 | 0.04-0.06 | -         | -         | 0.04-0.05 | 0.04-0.05 | 0.04-0.05 | -         | -         |
| 0.04-0.07   | 0.04-0.07 | 0.04-0.07 | -         | -         | 0.04-0.06 | 0.04-0.06 | 0.04-0.06 | -         | -         |
| 0.04-0.08   | 0.04-0.08 | 0.04-0.08 | -         | -         | 0.04-0.07 | 0.04-0.07 | 0.04-0.07 | -         | -         |
| 0.05-0.09   | 0.05-0.09 | 0.05-0.09 | -         | -         | 0.05-0.07 | 0.05-0.07 | 0.05-0.07 | -         | -         |
| 0.05-0.1    | 0.05-0.1  | 0.05-0.1  | -         | -         | 0.05-0.08 | 0.05-0.08 | 0.05-0.08 | -         | -         |
| 0.06-0.1    | 0.06-0.1  | 0.06-0.1  | -         | -         | 0.06-0.08 | 0.06-0.08 | 0.06-0.08 | -         | -         |
| 0.06-0.1    | 0.06-0.1  | 0.06-0.1  | -         | -         | 0.06-0.08 | 0.06-0.08 | 0.06-0.08 | -         | -         |
| 0.06-0.11   | 0.06-0.11 | 0.06-0.11 | -         | -         | 0.06-0.09 | 0.06-0.09 | 0.06-0.09 | -         | -         |
| 0.06-0.12   | 0.06-0.12 | 0.06-0.12 | -         | -         | 0.06-0.1  | 0.06-0.1  | 0.06-0.1  | -         | -         |
| 0.06-0.13   | 0.06-0.13 | 0.06-0.13 | -         | -         | 0.06-0.1  | 0.06-0.1  | 0.06-0.1  | -         | -         |
| 0.08-0.14   | 0.08-0.14 | 0.08-0.14 | -         | -         | 0.08-0.11 | 0.08-0.11 | 0.08-0.11 | -         | -         |
| 0.08-0.14   | 0.08-0.14 | 0.08-0.14 | -         | -         | 0.08-0.12 | 0.08-0.12 | 0.08-0.12 | -         | -         |
| 0.1-0.14    | 0.1-0.14  | 0.1-0.14  | -         | -         | 0.1-0.12  | 0.1-0.12  | 0.1-0.12  | -         | -         |
| 0.1-0.14    | 0.1-0.14  | 0.1-0.14  | -         | -         | 0.1-0.12  | 0.1-0.12  | 0.1-0.12  | -         | -         |

# ▶ CoroDrill® DS20 切削条件

| ISO | MC No.<br>CMC     | 被削材                   | HB       |      | 外周刃<br>チップ材種 |     | 切削速度 (V <sub>c</sub> ) m/min |     |     |       |             |  | ドリル径 |
|-----|-------------------|-----------------------|----------|------|--------------|-----|------------------------------|-----|-----|-------|-------------|--|------|
|     |                   |                       |          |      |              |     | 4-5xD                        |     |     | 6-7xD |             |  | mm   |
| K   | K1.1.C.NS<br>07.1 | 可鍛鑄鉄フェライト<br>(短い切りくず) | 200      | 4324 | 140          | 210 | 245                          | 140 | 190 | 220   | 15.00-18.00 |  |      |
|     |                   |                       |          | 4334 | 110          | 170 | 200                          | 110 | 155 | 180   | 18.01-22.00 |  |      |
|     |                   |                       |          | 4344 | 180          | 165 | 155                          | 180 | 150 | 140   | 22.01-27.00 |  |      |
|     | K2.1.C.UT<br>08.1 | ネズミ鑄鉄<br>(低抗張力)       | 180      | 4324 | 210          | 285 | 325                          | 210 | 255 | 295   | 27.01-33.00 |  |      |
|     |                   |                       |          | 4334 | 170          | 235 | 270                          | 170 | 210 | 245   | 33.01-40.00 |  |      |
|     |                   |                       |          | 4344 | 130          | 180 | 205                          | 130 | 160 | 185   | 40.01-52.00 |  |      |
|     | K2.2.C.UT<br>08.2 | ネズミ鑄鉄<br>(高抗張力)       | 245      | 4324 | 125          | 205 | 245                          | 125 | 185 | 220   | 52.01-65.00 |  |      |
|     |                   |                       |          | 4334 | 100          | 160 | 195                          | 100 | 145 | 175   | 15.00-18.00 |  |      |
|     |                   |                       |          | 4344 | 75           | 125 | 150                          | 75  | 115 | 135   | 18.01-22.00 |  |      |
|     | K3.1.C.UT<br>09.1 | ダクタイル鑄鉄<br>(フェライト)    | 155      | 4324 | 125          | 190 | 225                          | 125 | 170 | 205   | 22.01-27.00 |  |      |
|     |                   |                       |          | 4334 | 100          | 155 | 185                          | 100 | 140 | 165   | 27.01-33.00 |  |      |
|     |                   |                       |          | 4344 | 80           | 120 | 145                          | 80  | 110 | 130   | 33.01-40.00 |  |      |
|     | K3.3.C.UT<br>09.2 | ダクタイル鑄鉄<br>(パーライト)    | 265      | 4324 | 110          | 175 | 210                          | 110 | 160 | 190   | 40.01-52.00 |  |      |
|     |                   |                       |          | 4334 | 90           | 145 | 175                          | 90  | 130 | 160   | 52.01-65.00 |  |      |
|     |                   |                       |          | 4344 | 70           | 110 | 130                          | 70  | 100 | 115   | 15.00-18.00 |  |      |
|     | K4.2.C.UT         | CGI<br>(高抗張力)         | 230      | 4324 | 130          | 210 | 250                          | 130 | 190 | 225   | 18.01-22.00 |  |      |
|     |                   |                       |          | 4334 | 110          | 170 | 200                          | 110 | 155 | 180   | 22.01-27.00 |  |      |
|     |                   |                       |          | 4344 | 85           | 125 | 150                          | 85  | 115 | 135   | 27.01-33.00 |  |      |
| H   | H1.3.Z.HA<br>04.1 | 極高硬度鋼                 | 60 (HRC) | 4324 | 30           | 65  | 85                           | 30  | 60  | 75    | 33.01-40.00 |  |      |
|     |                   |                       |          | 4334 | 30           | 65  | 85                           | 30  | 60  | 75    | 40.01-52.00 |  |      |
|     |                   |                       |          | 4344 | 30           | 65  | 85                           | 30  | 60  | 75    | 52.01-65.00 |  |      |
|     |                   |                       |          |      |              |     |                              |     |     |       | 15.00-18.00 |  |      |
|     |                   |                       |          |      |              |     |                              |     |     |       | 18.01-22.00 |  |      |
|     |                   |                       |          |      |              |     |                              |     |     |       | 22.01-27.00 |  |      |

| ドリル長 6xD    |           |           |           |      | ドリル長 7xD |           |           |           |      |
|-------------|-----------|-----------|-----------|------|----------|-----------|-----------|-----------|------|
| -S5W        | -L5W      | -L6W      | -M7W      | -H5W | -S5W     | -L5W      | -L6W      | -M7W      | -H5W |
| スタートは範囲の中央値 |           |           |           |      |          |           |           |           |      |
| -           | 0.08-0.1  | 0.08-0.1  | 0.08-0.13 | -    | -        | 0.08-0.08 | 0.08-0.08 | 0.08-0.11 | -    |
| -           | 0.08-0.12 | 0.08-0.12 | 0.08-0.15 | -    | -        | 0.08-0.1  | 0.08-0.1  | 0.08-0.13 | -    |
| -           | 0.08-0.14 | 0.08-0.14 | 0.08-0.17 | -    | -        | 0.08-0.12 | 0.08-0.12 | 0.08-0.14 | -    |
| -           | 0.1-0.16  | 0.1-0.16  | 0.1-0.19  | -    | -        | 0.1-0.13  | 0.1-0.13  | 0.1-0.16  | -    |
| -           | 0.1-0.18  | 0.1-0.18  | 0.1-0.21  | -    | -        | 0.1-0.15  | 0.1-0.15  | 0.1-0.18  | -    |
| -           | 0.12-0.18 | 0.12-0.18 | 0.12-0.21 | -    | -        | 0.12-0.15 | 0.12-0.15 | 0.12-0.18 | -    |
| -           | 0.12-0.18 | 0.12-0.18 | 0.12-0.21 | -    | -        | 0.12-0.15 | 0.12-0.15 | 0.12-0.18 | -    |
| -           | 0.08-0.1  | 0.08-0.1  | 0.08-0.13 | -    | -        | 0.08-0.08 | 0.08-0.08 | 0.08-0.11 | -    |
| -           | 0.08-0.12 | 0.08-0.12 | 0.08-0.15 | -    | -        | 0.08-0.1  | 0.08-0.1  | 0.08-0.13 | -    |
| -           | 0.08-0.14 | 0.08-0.14 | 0.08-0.17 | -    | -        | 0.08-0.12 | 0.08-0.12 | 0.08-0.14 | -    |
| -           | 0.1-0.16  | 0.1-0.16  | 0.1-0.19  | -    | -        | 0.1-0.13  | 0.1-0.13  | 0.1-0.16  | -    |
| -           | 0.1-0.18  | 0.1-0.18  | 0.1-0.21  | -    | -        | 0.1-0.15  | 0.1-0.15  | 0.1-0.18  | -    |
| -           | 0.12-0.18 | 0.12-0.18 | 0.12-0.21 | -    | -        | 0.12-0.15 | 0.12-0.15 | 0.12-0.18 | -    |
| -           | 0.12-0.18 | 0.12-0.18 | 0.12-0.21 | -    | -        | 0.12-0.15 | 0.12-0.15 | 0.12-0.18 | -    |
| -           | 0.08-0.08 | 0.08-0.08 | 0.08-0.12 | -    | -        | 0.08-0.07 | 0.08-0.07 | 0.08-0.1  | -    |
| -           | 0.08-0.1  | 0.08-0.1  | 0.08-0.14 | -    | -        | 0.08-0.09 | 0.08-0.09 | 0.08-0.12 | -    |
| -           | 0.08-0.12 | 0.08-0.12 | 0.08-0.16 | -    | -        | 0.08-0.1  | 0.08-0.1  | 0.08-0.13 | -    |
| -           | 0.1-0.14  | 0.1-0.14  | 0.1-0.18  | -    | -        | 0.1-0.12  | 0.1-0.12  | 0.1-0.15  | -    |
| -           | 0.1-0.16  | 0.1-0.16  | 0.1-0.2   | -    | -        | 0.1-0.14  | 0.1-0.14  | 0.1-0.17  | -    |
| -           | 0.12-0.16 | 0.12-0.16 | 0.12-0.2  | -    | -        | 0.12-0.14 | 0.12-0.14 | 0.12-0.17 | -    |
| -           | 0.12-0.16 | 0.12-0.16 | 0.12-0.2  | -    | -        | 0.12-0.14 | 0.12-0.14 | 0.12-0.17 | -    |
| -           | 0.08-0.08 | 0.08-0.08 | 0.08-0.12 | -    | -        | 0.08-0.07 | 0.08-0.07 | 0.08-0.1  | -    |
| -           | 0.08-0.1  | 0.08-0.1  | 0.08-0.14 | -    | -        | 0.08-0.09 | 0.08-0.09 | 0.08-0.12 | -    |
| -           | 0.08-0.12 | 0.08-0.12 | 0.08-0.16 | -    | -        | 0.08-0.1  | 0.08-0.1  | 0.08-0.13 | -    |
| -           | 0.1-0.14  | 0.1-0.14  | 0.1-0.18  | -    | -        | 0.1-0.12  | 0.1-0.12  | 0.1-0.15  | -    |
| -           | 0.1-0.16  | 0.1-0.16  | 0.1-0.2   | -    | -        | 0.1-0.14  | 0.1-0.14  | 0.1-0.17  | -    |
| -           | 0.12-0.16 | 0.12-0.16 | 0.12-0.2  | -    | -        | 0.12-0.14 | 0.12-0.14 | 0.12-0.17 | -    |
| -           | 0.12-0.16 | 0.12-0.16 | 0.12-0.2  | -    | -        | 0.12-0.14 | 0.12-0.14 | 0.12-0.17 | -    |
| -           | 0.08-0.08 | 0.08-0.08 | 0.08-0.12 | -    | -        | 0.08-0.07 | 0.08-0.07 | 0.08-0.1  | -    |
| -           | 0.08-0.1  | 0.08-0.1  | 0.08-0.14 | -    | -        | 0.08-0.09 | 0.08-0.09 | 0.08-0.12 | -    |
| -           | 0.08-0.12 | 0.08-0.12 | 0.08-0.16 | -    | -        | 0.08-0.1  | 0.08-0.1  | 0.08-0.13 | -    |
| -           | 0.1-0.14  | 0.1-0.14  | 0.1-0.18  | -    | -        | 0.1-0.12  | 0.1-0.12  | 0.1-0.15  | -    |
| -           | 0.1-0.16  | 0.1-0.16  | 0.1-0.2   | -    | -        | 0.1-0.14  | 0.1-0.14  | 0.1-0.17  | -    |
| -           | 0.12-0.16 | 0.12-0.16 | 0.12-0.2  | -    | -        | 0.12-0.14 | 0.12-0.14 | 0.12-0.17 | -    |
| -           | 0.12-0.16 | 0.12-0.16 | 0.12-0.2  | -    | -        | 0.12-0.14 | 0.12-0.14 | 0.12-0.17 | -    |
| -           | 0.08-0.08 | 0.08-0.08 | 0.08-0.12 | -    | -        | 0.08-0.07 | 0.08-0.07 | 0.08-0.1  | -    |
| -           | 0.08-0.1  | 0.08-0.1  | 0.08-0.14 | -    | -        | 0.08-0.09 | 0.08-0.09 | 0.08-0.12 | -    |
| -           | 0.08-0.12 | 0.08-0.12 | 0.08-0.16 | -    | -        | 0.08-0.1  | 0.08-0.1  | 0.08-0.13 | -    |
| -           | 0.1-0.14  | 0.1-0.14  | 0.1-0.18  | -    | -        | 0.1-0.12  | 0.1-0.12  | 0.1-0.15  | -    |
| -           | 0.1-0.16  | 0.1-0.16  | 0.1-0.2   | -    | -        | 0.1-0.14  | 0.1-0.14  | 0.1-0.17  | -    |
| -           | 0.12-0.16 | 0.12-0.16 | 0.12-0.2  | -    | -        | 0.12-0.14 | 0.12-0.14 | 0.12-0.17 | -    |
| -           | 0.12-0.16 | 0.12-0.16 | 0.12-0.2  | -    | -        | 0.12-0.14 | 0.12-0.14 | 0.12-0.17 | -    |
| -           | 0.06-0.08 | 0.06-0.08 | 0.06-0.08 | -    | -        | 0.06-0.07 | 0.06-0.07 | 0.06-0.07 | -    |
| -           | 0.06-0.09 | 0.06-0.09 | 0.06-0.09 | -    | -        | 0.06-0.08 | 0.06-0.08 | 0.06-0.08 | -    |
| -           | 0.06-0.1  | 0.06-0.1  | 0.06-0.1  | -    | -        | 0.06-0.08 | 0.06-0.08 | 0.06-0.08 | -    |
| -           | 0.08-0.1  | 0.08-0.1  | 0.08-0.1  | -    | -        | 0.08-0.09 | 0.08-0.09 | 0.08-0.09 | -    |
| -           | 0.08-0.12 | 0.08-0.12 | 0.08-0.12 | -    | -        | 0.08-0.1  | 0.08-0.1  | 0.08-0.1  | -    |
| -           | 0.1-0.12  | 0.1-0.12  | 0.1-0.12  | -    | -        | 0.1-0.1   | 0.1-0.1   | 0.1-0.1   | -    |
| -           | 0.1-0.12  | 0.1-0.12  | 0.1-0.12  | -    | -        | 0.1-0.1   | 0.1-0.1   | 0.1-0.1   | -    |

▶CoroDrill® DS20 切削条件

| ISO | MC No.<br>CMC      | 被削材    | HB  | 外周刃<br>チップ材種 | 切削速度 (V <sub>c</sub> ) m/min |            |            |            |            |            | ドリル径<br><br>mm                                                                                        |
|-----|--------------------|--------|-----|--------------|------------------------------|------------|------------|------------|------------|------------|-------------------------------------------------------------------------------------------------------|
|     |                    |        |     |              | 4-5xD                        |            |            | 6-7xD      |            |            |                                                                                                       |
| N   | N1.2.Z.AG<br>30.12 | アルミ合金  | 100 | H13A<br>4344 | 300<br>300                   | 365<br>365 | 400<br>400 | 300<br>300 | 330<br>330 | 360<br>360 | 15.00-18.00<br>18.01-22.00<br>22.01-27.00<br>27.01-33.00<br>33.01-40.00<br>40.01-52.00<br>52.01-65.00 |
|     | N1.3.C.UT<br>30.21 | アルミ合金  | 75  | H13A<br>4344 | 250<br>250                   | 350<br>350 | 400<br>400 | 250<br>250 | 315<br>315 | 360<br>360 | 15.00-18.00<br>18.01-22.00<br>22.01-27.00<br>27.01-33.00<br>33.01-40.00<br>40.01-52.00<br>52.01-65.00 |
|     | N1.3.C.AG<br>30.22 | アルミ合金  | 90  | H13A<br>4344 | 250<br>250                   | 315<br>315 | 350<br>350 | 250<br>250 | 285<br>285 | 315<br>315 | 15.00-18.00<br>18.01-22.00<br>22.01-27.00<br>27.01-33.00<br>33.01-40.00<br>40.01-52.00<br>52.01-65.00 |
|     | N3.3.U.UT<br>33.1  | 銅と銅合金  | 110 | H13A<br>4344 | 250<br>250                   | 350<br>350 | 400<br>400 | 250<br>250 | 315<br>315 | 360<br>360 | 15.00-18.00<br>18.01-22.00<br>22.01-27.00<br>27.01-33.00<br>33.01-40.00<br>40.01-52.00<br>52.01-65.00 |
|     | N3.2.C.UT<br>33.2  | 青銅、鉛黄銅 | 90  | H13A<br>4344 | 180<br>180                   | 220<br>220 | 240<br>240 | 180<br>180 | 200<br>200 | 215<br>215 | 15.00-18.00<br>18.01-22.00<br>22.01-27.00<br>27.01-33.00<br>33.01-40.00<br>40.01-52.00<br>52.01-65.00 |
|     |                    |        |     |              |                              |            |            |            |            |            |                                                                                                       |

| ドリル長 6xD    |           |           |      |      | ドリル長 7xD  |           |           |      |      |
|-------------|-----------|-----------|------|------|-----------|-----------|-----------|------|------|
| -S5W        | -L5W      | -L6W      | -M7W | -H5W | -S5W      | -L5W      | -L6W      | -M7W | -H5W |
| スタートは範囲の中央値 |           |           |      |      |           |           |           |      |      |
| 0.06-0.1    | 0.06-0.1  | 0.06-0.1  | -    | -    | 0.06-0.09 | 0.06-0.09 | 0.06-0.09 | -    | -    |
| 0.06-0.12   | 0.06-0.12 | 0.06-0.12 | -    | -    | 0.06-0.1  | 0.06-0.1  | 0.06-0.1  | -    | -    |
| 0.06-0.13   | 0.06-0.13 | 0.06-0.13 | -    | -    | 0.06-0.11 | 0.06-0.11 | 0.06-0.11 | -    | -    |
| 0.08-0.14   | 0.08-0.14 | 0.08-0.14 | -    | -    | 0.08-0.12 | 0.08-0.12 | 0.08-0.12 | -    | -    |
| 0.08-0.16   | 0.08-0.16 | 0.08-0.16 | -    | -    | 0.08-0.14 | 0.08-0.14 | 0.08-0.14 | -    | -    |
| 0.1-0.16    | 0.1-0.16  | 0.1-0.16  | -    | -    | 0.1-0.14  | 0.1-0.14  | 0.1-0.14  | -    | -    |
| 0.1-0.16    | 0.1-0.16  | 0.1-0.16  | -    | -    | 0.1-0.14  | 0.1-0.14  | 0.1-0.14  | -    | -    |
| 0.06-0.09   | 0.06-0.09 | 0.06-0.09 | -    | -    | 0.06-0.08 | 0.06-0.08 | 0.06-0.08 | -    | -    |
| 0.06-0.1    | 0.06-0.1  | 0.06-0.1  | -    | -    | 0.06-0.09 | 0.06-0.09 | 0.06-0.09 | -    | -    |
| 0.06-0.12   | 0.06-0.12 | 0.06-0.12 | -    | -    | 0.06-0.1  | 0.06-0.1  | 0.06-0.1  | -    | -    |
| 0.08-0.13   | 0.08-0.13 | 0.08-0.13 | -    | -    | 0.08-0.11 | 0.08-0.11 | 0.08-0.11 | -    | -    |
| 0.08-0.14   | 0.08-0.14 | 0.08-0.14 | -    | -    | 0.08-0.12 | 0.08-0.12 | 0.08-0.12 | -    | -    |
| 0.1-0.14    | 0.1-0.14  | 0.1-0.14  | -    | -    | 0.1-0.12  | 0.1-0.12  | 0.1-0.12  | -    | -    |
| 0.1-0.14    | 0.1-0.14  | 0.1-0.14  | -    | -    | 0.1-0.12  | 0.1-0.12  | 0.1-0.12  | -    | -    |
| 0.06-0.09   | 0.06-0.09 | 0.06-0.09 | -    | -    | 0.06-0.08 | 0.06-0.08 | 0.06-0.08 | -    | -    |
| 0.06-0.1    | 0.06-0.1  | 0.06-0.1  | -    | -    | 0.06-0.09 | 0.06-0.09 | 0.06-0.09 | -    | -    |
| 0.06-0.12   | 0.06-0.12 | 0.06-0.12 | -    | -    | 0.06-0.1  | 0.06-0.1  | 0.06-0.1  | -    | -    |
| 0.08-0.13   | 0.08-0.13 | 0.08-0.13 | -    | -    | 0.08-0.11 | 0.08-0.11 | 0.08-0.11 | -    | -    |
| 0.08-0.14   | 0.08-0.14 | 0.08-0.14 | -    | -    | 0.08-0.12 | 0.08-0.12 | 0.08-0.12 | -    | -    |
| 0.1-0.14    | 0.1-0.14  | 0.1-0.14  | -    | -    | 0.1-0.12  | 0.1-0.12  | 0.1-0.12  | -    | -    |
| 0.1-0.14    | 0.1-0.14  | 0.1-0.14  | -    | -    | 0.1-0.12  | 0.1-0.12  | 0.1-0.12  | -    | -    |
| 0.06-0.1    | 0.06-0.1  | 0.06-0.1  | -    | -    | 0.06-0.09 | 0.06-0.09 | 0.06-0.09 | -    | -    |
| 0.06-0.12   | 0.06-0.12 | 0.06-0.12 | -    | -    | 0.06-0.1  | 0.06-0.1  | 0.06-0.1  | -    | -    |
| 0.06-0.13   | 0.06-0.13 | 0.06-0.13 | -    | -    | 0.06-0.11 | 0.06-0.11 | 0.06-0.11 | -    | -    |
| 0.08-0.14   | 0.08-0.14 | 0.08-0.14 | -    | -    | 0.08-0.12 | 0.08-0.12 | 0.08-0.12 | -    | -    |
| 0.08-0.16   | 0.08-0.16 | 0.08-0.16 | -    | -    | 0.08-0.14 | 0.08-0.14 | 0.08-0.14 | -    | -    |
| 0.1-0.16    | 0.1-0.16  | 0.1-0.16  | -    | -    | 0.1-0.14  | 0.1-0.14  | 0.1-0.14  | -    | -    |
| 0.1-0.16    | 0.1-0.16  | 0.1-0.16  | -    | -    | 0.1-0.14  | 0.1-0.14  | 0.1-0.14  | -    | -    |
| 0.06-0.1    | 0.06-0.1  | 0.06-0.1  | -    | -    | 0.06-0.09 | 0.06-0.09 | 0.06-0.09 | -    | -    |
| 0.06-0.12   | 0.06-0.12 | 0.06-0.12 | -    | -    | 0.06-0.1  | 0.06-0.1  | 0.06-0.1  | -    | -    |
| 0.06-0.13   | 0.06-0.13 | 0.06-0.13 | -    | -    | 0.06-0.11 | 0.06-0.11 | 0.06-0.11 | -    | -    |
| 0.08-0.14   | 0.08-0.14 | 0.08-0.14 | -    | -    | 0.08-0.12 | 0.08-0.12 | 0.08-0.12 | -    | -    |
| 0.08-0.16   | 0.08-0.16 | 0.08-0.16 | -    | -    | 0.08-0.14 | 0.08-0.14 | 0.08-0.14 | -    | -    |
| 0.1-0.16    | 0.1-0.16  | 0.1-0.16  | -    | -    | 0.1-0.14  | 0.1-0.14  | 0.1-0.14  | -    | -    |
| 0.1-0.16    | 0.1-0.16  | 0.1-0.16  | -    | -    | 0.1-0.14  | 0.1-0.14  | 0.1-0.14  | -    | -    |