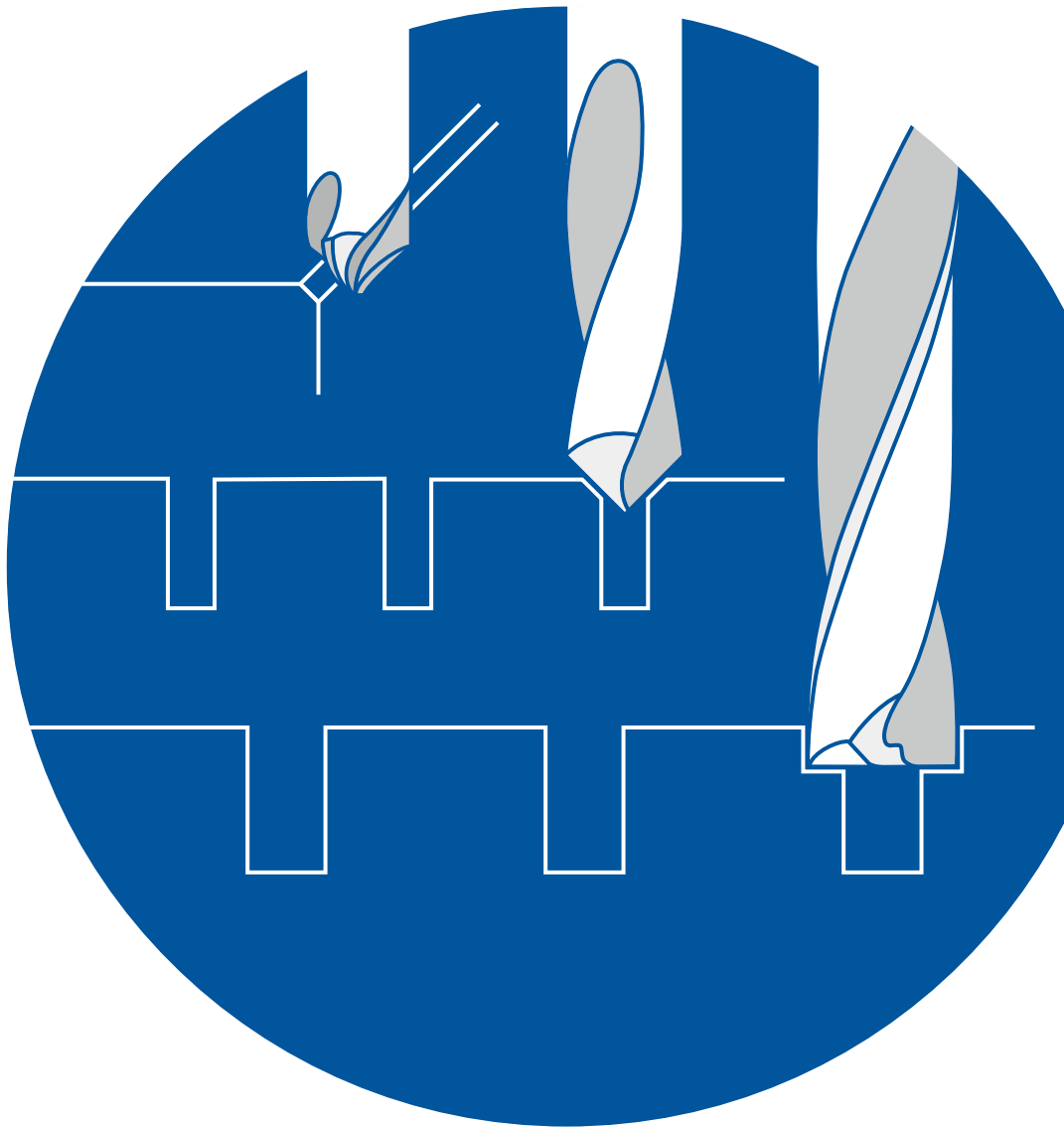




CHAMFERING COUNTERBORING

面取り・座ぐり加工用工具カタログ



アイコンの種類について Guide of (Tool Specification) Icons

1 材質 Tool Materials

| | |
|----------------|--|
| CARBIDE | 超硬合金 Tungsten Carbide 刃部材料に超硬合金を使用しています。 |
| XPM | 高級粉末ハイス High grade Powder Metallurgy HSS (XPM) コバルトを含有する材料を使用しています。 |



| | |
|------------|---|
| HSS | ハイス HSS 一部コバルトを含有する材料を使用しています。 |
|------------|---|

2 表面処理 Surface Treatment


| | |
|---------------|--|
| EgiAs | イージアスコーティング EgiAs Coating 高じん性・耐摩耗性に優れています。 |
| IchAda | イチャダコーティング IchAda Coating 平滑性、耐摩耗性、耐熱性に優れています。 |
| WXL | WXLコーティング WXL Coating 耐摩耗性、耐溶着性に優れており、幅広い被削材に適用します。 |

| | |
|------------|---|
| FX | FXコーティング (TiAlN系コーティング) FX (TiAlN) Coating 従来の被膜特性に加え極めて高い耐酸化性を有するため高速加工が可能です。 |
| V | Vコーティング (複合多層コーティング) V (composite multi-layered) Coating 耐溶着性、耐摩耗性に優れています。 |
| TiN | TiNコーティング TiN Coating 耐溶着性、耐摩耗性に優れています。 |

3 外径・直径の許容差 Tolerance for diameter

| | |
|---|--|
|  | ドリル直径の許容差を表示します。 Tolerance for drill diameter. |
|  | エンドミルの外径を表示します。 Tolerance for milling diameter. |


5 ねじれ角 Helix Angle

| | |
|--|---|
|  | ドリル、エンドミルの溝のねじれ角を表示します。 Display helix angle of flute for drills and end mills. |
|--|---|

4 シャンク Shank

| | |
|-----------------------------|---|
| SHANK h7 | シャンク精度を表示します。 Tolerance for shank diameter. |
| SHRINK FIT | シュリンクフィット(焼きばめ) システムにもお奨めします。 Suitable for the shrink holder system. |

6 テーパー半角許容差 Tolerance for Cutting Edge Incline

| | |
|---|--|
|  | テーパエンドミルのテーパ半角許容差を表示します。 Tolerance for Cutting Edge Incline of Tapered End Mills. |
|---|--|

カタログご利用の前に Information

本カタログに掲載されている製品の仕様は2018年11月現在のものです。製品については、常に研究・改良を行っておりますので、予告なく本カタログ掲載仕様を変更する場合があります。また、在庫品は場合によっては品切れとなることがあります。また、廃番記載情報は2018年11月現在のものです、本カタログ発刊後、諸事情により廃番となる製品もございます。

The information on tool specification and discontinued products on this catalogue is as of November 2018. Tool specification is subject to change without notice. Depending on the situation, some products may be sold out or get discontinued.

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| 座ぐり加工選定表の目安 | 6 |
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形状寸法表 Specification Charts














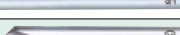

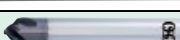

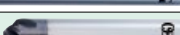
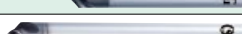
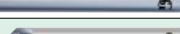
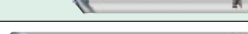






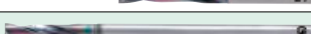

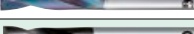
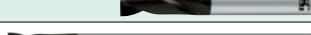
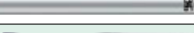
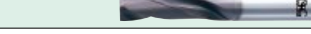
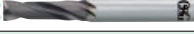




| | |
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| Corner Chamfering | |
| R面取り | 19 |
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| Counterboring | |

切削条件基準表 Cutting Conditions

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- 本カタログに掲載されている製品につきましては、在庫表記を記載しておりますが、新材種、新製品などの開発にともない改廃される場合もございます。
- 予告なく仕様、形状、表内の値等が変更となる場合がございます。
- The inventory status is indicated for respective products on this catalogue. However, the products may be improved or discontinued due to development of new materials and products, etc.
- Specifications, shapes, values in the tables, etc. are subject to change without prior notice.

選定表 Selection Chart

| | 掲載ページ Page | 製品記号 Tool Abbreviation | 形状 Appearance | センタリング Centering | 穴面取り Countersinking | コーナ面取り Corner Chamfering | R面取り Corner Rounding | 座ぐり Counterboring |
|---|---------------|---------------------------|---|---|---|--|---|---|
| | | | |  |  |  |  |  |
| センタリング・穴面取り Centering・Countersinking | 7 | AD-LDS |  | ○ | ○ | | | |
| | 8 | AD-LS-LDS |  | ○ | ○ | | | |
| | 9 | FX-LDS |  | ○ | ○ | | | |
| | 9 | FX-LS-LDS |  | ○ | ○ | | | |
| | 10 | VP-LDS |  | ○ | ○ | | | |
| | 10 | VP-LS-LDS |  | ○ | ○ | | | |
| | 11 | TIN-NC-LDS |  | ○ | ○ | | | |
| | 12 | TIN-LS-NC-LDS |  | ○ | ○ | | | |
| | 13 | NC-LDS |  | ○ | ○ | | | |
| | 14 | LS-NC-LDS |  | ○ | ○ | | | |
| コーナ面取り Corner Chamfering | 15 | W-HSCT-P |  | | | ○ | | |
| | 15 | WLS-HSCT-P |  | | | ○ | | |
| | 16 | W-HSCT-N |  | | | ○ | | |
| | 16 | WLS-HSCT-N |  | | | ○ | | |
| | 17 | HSCT-P |  | | | ○ | | |
| | 17 | LS-HSCT-P |  | | | ○ | | |
| | 18 | HSCT-N |  | | | ○ | | |
| | 18 | LS-HSCT-N |  | | | ○ | | |
| R面取り Corner Rounding | 19 | FX-ECR |  | | | | ○ | |
| | 20 | V-XP-ECR |  | | | | ○ | |
| 座ぐり Counterboring | 22 | PZAG |  | | | | | ○ |
| | 25 | ADF-2D |  | | | | | ○ |
| | 36 | ADFLS-2D |  | | | | | ○ |
| | 37 | ADFO-3D |  | | | | | ○ |
| | 40 | FX-ZDS |  | | | | | ○ |
| | 43 | FX-LS-LDS |  | | | | | ○ |
| | 45 | FX-ZDN |  | | | | | ○ |
| | 46 | FX-HO-ZDN |  | | | | | ○ |
| | 47 | CA-ZDS |  | | | | | ○ |
| | 49 | CA-LS-ZDS |  | | | | | ○ |
| | 51 | DIA-ZDS |  | | | | | ○ |
| | 52 | VP-ZDS |  | | | | | ○ |
| | 54 | VP-LS-ZDS |  | | | | | ○ |

| | 低炭素鋼 軟鋼 | 中炭素鋼 | 高炭素鋼 | 合金鋼 | 調質鋼 | | 焼入鋼 | | | ステンレス 鋼 | 工具鋼 | 鋳鉄 | ダクタイル 鋳鉄 | 銅合金 | アルミ 展伸材 | アルミ 合金鋳物 | チタン 合金 | インコネル |
|--|-----------------------------------|---------------------------|-------------------------|----------------|----------------|--------------|-----------------------------------|--------------|--------------|--------------------|------------|-----------|----------------------|-----------------|------------|------------------------------|-------------------|---------|
| | Low Carbon Steel Mild Steel | Medium Carbon Steel | High Carbon Steel | Alloy Steel | Hardened Steel | | Quenched and Tempered Steel | | | Stainless Steel | Tool Steel | Cast Iron | Ductile Cast Iron | Copper Alloy | Aluminum | Aluminum Alloy Casting | Titanium Alloy | Inconel |
| | C~0.25% | C0.25~ 0.45% | C0.45%~ | SCM | ~35 HRC | 35~45 HRC | 45~50 HRC | 50~60 HRC | 60~70 HRC | SUS | SKD SKS | FC | FCD | Cu | Al | AC | | |
| | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ○ | ○ | ○ | ◎ | ◎ | ◎ | ○ | | ◎ | ○ | ○ |
| | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | | | ○ | ◎ | ◎ | ◎ | ○ | | ◎ | ○ | ○ |
| | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ○ | ○ | ○ | ◎ | ◎ | ◎ | ○ | | ◎ | ○ | ○ |
| | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | | | ○ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ |
| | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | |
| | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | | | ○ | ○ | ○ | ◎ | ○ | ○ | ○ | | |
| | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | |
| | ○ | ○ | ○ | ○ | ◎ | | | | | ◎ | ○ | | | | ○ | ○ | | ◎ |
| | ○ | ○ | ○ | ○ | ◎ | | | | | ◎ | ○ | | | | ○ | ○ | | ◎ |
| | ◎ | ◎ | ◎ | ◎ | ○ | ◎ | ◎ | | | ○ | ◎ | | | | | | | ○ |
| | ◎ | ◎ | ◎ | ◎ | ○ | ◎ | ◎ | | | ○ | ◎ | | | | | | | ○ |
| | ○ | ○ | ○ | ○ | ○ | | | | | ◎ | ○ | | | | ◎ | ◎ | ◎ | ◎ |
| | ○ | ○ | ○ | ○ | ○ | | | | | ◎ | ○ | | | | ◎ | ◎ | ◎ | ◎ |
| | ◎ | ◎ | ◎ | ◎ | ○ | ○ | ○ | | | ○ | ◎ | | | | ○ | ○ | ○ | ○ |
| | ◎ | ◎ | ◎ | ◎ | ○ | ○ | ○ | | | ○ | ◎ | | | | ○ | ○ | ○ | ○ |
| | ○ | ○ | ○ | ○ | ○ | | | | | ○ | ○ | | | ○ | ○ | ○ | | ○ |
| | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ○ | | | ◎ | ◎ | ◎ | ◎ | ○ | ○ | ○ | ○ | ○ |
| | ◎ | ◎ | ◎ | ◎ | ◎ | ○ | | | | ○注1) | | ◎ | ◎ | | ○ | ○ | | |
| | ○ | ○ | ○ | ○ | ○ | ○ | | | | | | ○ | ○ | | ○ | ○ | | |
| | ◎ | ◎ | ◎ | ◎ | ◎ | ○ | | | | ◎ | | ◎ | ◎ | | ○ | ○ | | |
| | ◎ | ◎ | ◎ | ◎ | ◎ | ○ | ○ | | | ◎ | ◎ | ◎ | ◎ | | ○ | ○ | | |
| | ◎ | ◎ | ◎ | ◎ | ◎ | ○ | ○ | | | ◎ | ◎ | ◎ | ◎ | | ○ | ○ | | |
| | ◎ | ◎ | ◎ | ◎ | ◎ | ○ | ○ | | | ◎ | ◎ | ◎ | ◎ | | ○ | ○ | | |
| | | | | | | | | | | | | | | | ◎ | ◎ | | |
| | | | | | | | | | | | | | | | ◎ | ◎ | | |
| | ◎ | ◎ | ◎ | ◎ | | | | | | ◎ | ◎ | ◎ | ◎ | ○ | ○ | ○ | | |
| | ○ | ○ | ○ | ○ | ○ | | | | | ○ | ○ | | | ○ | ○ | ○ | | |

注1) Dc<2
Note

リーディングドリル選定表の目安 Selection Chart for Starting Drills

リーディングドリルは、ドリル穴加工前のセンタリング（もみつけ）加工と、穴面取り加工の2つの加工をすることができます。センタリング加工は穴あけ加工の位置精度を向上させる効果があり、穴面取り加工にはタップでのねじ立て加工時の端面のかえりを防止したり、穴加工にともなって発生するバリを取り除く効果があります。

Starting Drills can perform both centering and countersinking. Centering improves drilling precision. Countersinking prevents burrs on the end face during tapping and removes burrs that may occur during drilling.

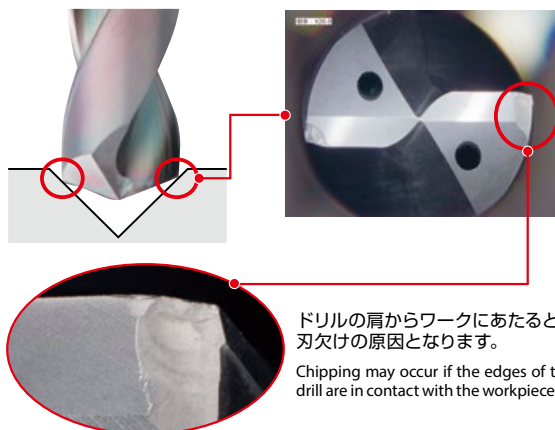
先端角による使い分け Classifying Starting Drills by Point Angle

■先端角90°

- ・C面取りとして。
- ・穴面取りを兼用したセンタリングとして。

Point angle: 90°
for 45 degree chamfering, for both centering and countersinking

穴面取りを兼用したセンタリングの場合、後工程のドリル肩部が欠ける場合があります。その場合、センタリングと穴面取りは別工程を推奨します。If the tool is used for both countersinking and centering, the edge of the drill may chip. In that case, it is recommended to perform the centering and countersinking processes separately.



■先端角120°,130°,140°

- ・ドリルを使用する際のセンタリングとして(図1)。

Point angle: 120°, 130°, 140°
for centering before drilling with Drill (See Fig. 1)

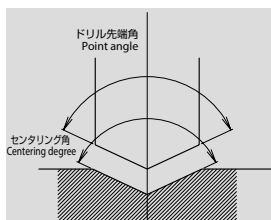


図1: センタリング
Fig. 1 Centering

■先端角60°

- ・溝なしタップでのねじ立て時の穴面取りとして。

Point angle: 60° for countersinking when tapping with Rolled Tap

溝なしタップはねじ山を盛り上げて、めねじを加工するため、口元、端面に面取りがない場合、図2のようにかえりが生じます。口元、端面のかえり防止には、先端角60°のリーディングドリルでの穴面取りをお奨めします(図3)。

When a forming tap is used, and the entrance to the hole is not chamfered, burring is likely to occur (see Fig.2). Please use a starting drill with a 60 degree chamfer to avoid this problem. (See Fig. 3)

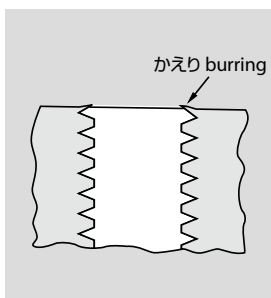


図2
Fig. 2

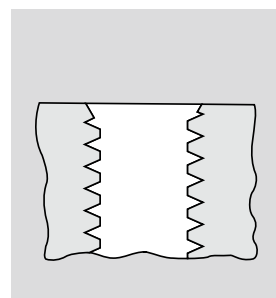
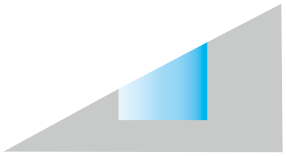




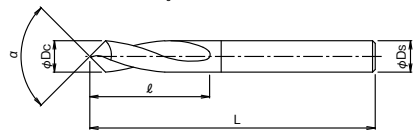
図3: 60°の穴面取り
Fig. 3 Countersinking: 60°

| | 一般座ぐり加工 General Counterboring | | 傾斜面座ぐり加工 Inclined Surface Counterboring |
|-----------|---|---|--|
| | 下穴無し Without pre-drilled hole | 下穴有り With pre-drilled hole |  |
| |  |  | |
| PZAG | — | ◎ | — |
| ADF-2D | ◎ | ◎ | ◎ |
| ADFLS-2D | ◎ | ◎ | ◎ |
| ADFO-3D | ◎ | ◎ | ◎ |
| FX-ZDS | ◎ | ◎ | ◎ $\phi 1 \leq D_c$ |
| FX-LS-ZDS | ◎ | ◎ | ○ $\phi 3 \leq D_c$ |
| FX-ZDN | ◎ | ◎ | △ $\phi 3 \leq D_c$ |
| FX-HO-ZDN | ◎ | ◎ | △ |
| CA-ZDS | ◎ | ◎ | ◎ $\phi 1 \leq D_c$ |
| CA-LS-ZDS | ◎ | ◎ | ◎ $\phi 3 \leq D_c$ |
| DIA-ZDS | ◎ | ◎ | ◎ $\phi 1 \leq D_c$ |
| VP-ZDS | ○ | ◎ | — |
| VP-LS-ZDS | ○ | ◎ | — |

超硬リーディングドリル
Carbide Starter Drill



AD-LDS



先端角の許容差は $60^\circ \pm 3^\circ$ 、 $90^\circ \pm 1^\circ$ 、 $120^\circ \pm 2^\circ$ 、 $140^\circ \begin{smallmatrix} +4^\circ \\ 0^\circ \end{smallmatrix}$ となります。
Tolerance of the point angle is $60^\circ \pm 3^\circ$, $90^\circ \pm 1^\circ$, $120^\circ \pm 2^\circ$, $140^\circ \begin{smallmatrix} +4^\circ \\ 0^\circ \end{smallmatrix}$

コーティングに色むらが発生する場合がありますが、性能上は全く問題ありません。
Drills may have some discoloration, but it does not cause any performance problems.

CARBIDE EgiAs WXL SHANK h7 12° $\phi 25^\circ$
2 \leq Dc Dc<2 3 \leq Dc Dc<3

単位:mm Unit:mm

| ツールNo. EDP No. | 直径×先端角 Dc × α | 溝長 ℓ | 全長 L | シャンク径 Ds | 最小穴径 Min. Pre-Drilled Dia. ϕ | 在庫 Stock | 重量 Weight | 標準価格 (Yen) |
|-------------------|------------------|---------|---------|-------------|--------------------------------------|-------------|--------------|---------------|
| * | 0.5 × 60° | 1 | | | 0.25 | | — | — |
| * | 1 × 60° | 2 | 38 | 3 | 0.4 | □ | — | — |
| * | 2 × 60° | 4 | | | 1 | | — | — |
| ※8688951 | 3 × 60° | 9 | 48 | | 1.2 | | — 7,300 | |
| ※8688952 | 4 × 60° | 12 | 54 | 4 | 1.5 | | — 8,300 | |
| ※8688953 | 6 × 60° | 15 | 72 | 6 | 1.9 | | — 10,500 | |
| ※8688954 | 8 × 60° | 20 | 81 | 8 | 2.1 | | — 12,600 | |
| ※8688955 | 10 × 60° | 24 | 93 | 10 | 2.5 | | — 15,200 | |
| ※8688956 | 12 × 60° | 28 | 108 | 12 | 2.5 | | — 17,500 | |
| ※8688930 | 0.5 × 90° | 1 | | | 0.25 | | — 6,290 | |
| 8688931 | 1 × 90° | 1.8 | 38 | 3 | 0.4 | B | — 6,290 | |
| 8688932 | 2 × 90° | 2.5 | | | 1 | | — 6,290 | |
| 8688933 | 3 × 90° | 9 | 48 | | 1.2 | | — 7,300 | |
| 8688934 | 4 × 90° | 12 | 54 | 4 | 1.5 | | — 8,300 | |
| 8688935 | 6 × 90° | 15 | 72 | 6 | 1.9 | | — 10,500 | |
| 8688936 | 8 × 90° | 20 | 81 | 8 | 2.1 | | — 12,600 | |
| 8688937 | 10 × 90° | 24 | 93 | 10 | 2.5 | | — 15,200 | |
| 8688938 | 12 × 90° | 28 | 108 | 12 | 2.5 | | — 17,500 | |
| * | 0.5 × 120° | 1 | | | | | — | — |
| * | 1 × 120° | 1.8 | 38 | 3 | | □ | — | — |
| * | 2 × 120° | 2.5 | | | | | — | — |
| ※8688957 | 3 × 120° | 9 | 48 | | | B | — 7,300 | |
| ※8688958 | 4 × 120° | 12 | 54 | 4 | | | — 8,300 | |

| ツールNo. EDP No. | 直径×先端角 Dc × α | 溝長 ℓ | 全長 L | シャンク径 Ds | 最小穴径 Min. Pre-Drilled Dia. ϕ | 在庫 Stock | 重量 Weight | 標準価格 (Yen) |
|-------------------|------------------|---------|---------|-------------|--------------------------------------|-------------|--------------|---------------|
| ※8688959 | 6 × 120° | 15 | 72 | 6 | | B | — | 10,500 |
| ※8688960 | 8 × 120° | 20 | 81 | 8 | | | — | 12,600 |
| ※8688961 | 10 × 120° | 24 | 93 | 10 | | | — | 15,200 |
| ※8688962 | 12 × 120° | 28 | 108 | 12 | | | — | 17,500 |
| * | 0.5 × 130° | 1 | | | | | — | — |
| * | 1 × 130° | 1.8 | 38 | 3 | | □ | — | — |
| * | 2 × 130° | 2.5 | | | | | — | — |
| * | 3 × 130° | 9 | 48 | | | | — | — |
| * | 4 × 130° | 12 | 54 | 4 | | | — | — |
| * | 6 × 130° | 15 | 72 | 6 | | | — | — |
| * | 8 × 130° | 20 | 81 | 8 | | | — | — |
| * | 10 × 130° | 24 | 93 | 10 | | | — | — |
| * | 12 × 130° | 28 | 108 | 12 | | | — | — |
| ※8688963 | 0.5 × 140° | 1 | | | | | — | 6,290 |
| ※8688964 | 1 × 140° | 1.8 | 38 | 3 | | | — | 6,290 |
| ※8688965 | 2 × 140° | 2.5 | | | | | — | 6,290 |
| ※8688966 | 3 × 140° | 9 | 48 | | | B | — | 7,300 |
| ※8688967 | 4 × 140° | 12 | 54 | 4 | | | — | 8,300 |
| ※8688968 | 6 × 140° | 15 | 72 | 6 | | | — | 11,100 |
| ※8688969 | 8 × 140° | 20 | 81 | 8 | | | — | 13,200 |
| ※8688970 | 10 × 140° | 24 | 93 | 10 | | | — | 16,100 |
| ※8688971 | 12 × 140° | 28 | 108 | 12 | | | — | 18,500 |

注1) 穴面取りを行う場合の下穴の最小値を示します。
※=2019年春発売予定 Available from Spring 2019

These minimum pre-drilled hole sizes are required before countersinking operations.

| 被削材 Work Material | 低炭素鋼 軟鋼 | 中炭素鋼 | 高炭素鋼 | 合金鋼 | 調質鋼 | 焼入鋼 | ステンレス 鋼 | 工具鋼 | 鋳鉄 | ダクタイル 鋳鉄 | 銅合金 | アルミ 展伸材 | アルミ 合金鋳物 | チタン 合金 | インコニ ル |
|---|--------------------------------|---------------------|-------------------|-------------|-------------------|-------------------------------|-----------------|------------|-----------|-------------------|--------------|------------|------------------------|----------------|-----------|
| | Low Carbon Steel Mild Steel | Medium Carbon Steel | High Carbon Steel | Alloy Steel | Hardened Steel | Quenched and Tempered Steel | Stainless Steel | Tool Steel | Cast Iron | Ductile Cast Iron | Copper Alloy | Aluminum | Aluminum Alloy Casting | Titanium Alloy | Inconel |
| 製品記号 Abbreviation | C~0.25% | C0.25~0.4% | C0.45%~ | SCM | ~35 HRC 35~45 HRC | 45~50 HRC 50~60 HRC 60~70 HRC | SUS | SKD SKS | FC | FCD | Cu | Al | AC | | |
| AD-LDS センターリング用 穴面取り用 Countersinking | ○ | ○ | ○ | ○ | ○ | ○ | | ○ | ○ | ○ | ○ | | ○ | ○ | ○ |

A, B, C, D=標準在庫品 A, B, C, D=Standard stock item. □=特定代理店在庫品 □=Stocked by specific distributors. Contact us for price & availability.

超硬リーディングドリル ロングシャンク

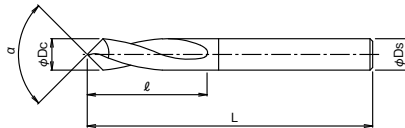
Carbide Long Shank Starter Drill



AD-LS-LDS



先端角の許容差は $90^\circ \pm 1^\circ$ となります。
Tolerance of the point angle is $90^\circ \pm 1^\circ$



コーティングに色むらが発生する場合がありますが、性能上は全く問題ありません。
Drills may have some discoloration, but it does not cause any performance problems.



| ツールNo. EDP No. | 直径×先端角 Dc × α | 溝長 ℓ | 全長 L | シャンク径 Ds | 最小下穴径 Min. Pre-Drilled Dia. | 在庫 Stock | 重量 Weight | 標準価格 (Yen) |
|-------------------|------------------|---------|---------|-------------|--------------------------------|-------------|--------------|---------------|
| 8688942 | 3 × 90° | 9 | 75 | 3 | 1.2 | B | — | 8,030 |
| 8688943 | 4 × 90° | 12 | 100 | 4 | 1.5 | | — | 9,660 |
| 8688944 | 6 × 90° | 15 | 150 | 6 | 1.9 | | — | 13,300 |

注1) 穴面取りを行う場合の下穴の最小値を示します。

単位:mm Unit:mm

| ツールNo. EDP No. | 直径×先端角 Dc × α | 溝長 ℓ | 全長 L | シャンク径 Ds | 最小下穴径 Min. Pre-Drilled Dia. | 在庫 Stock | 重量 Weight | 標準価格 (Yen) |
|-------------------|------------------|---------|---------|-------------|--------------------------------|-------------|--------------|---------------|
| 8688945 | 8 × 90° | 20 | 150 | 8 | 2.1 | B | — | 15,800 |
| 8688946 | 10 × 90° | 24 | 200 | 10 | 2.5 | | — | 21,300 |
| 8688947 | 12 × 90° | 28 | | 12 | | | — | 24,000 |

These minimum pre-drilled hole sizes are required before countersinking operations.

| 製品記号 Abbreviation | 被削材 Work Material | 低炭素鋼 軟鋼 Low Carbon Steel Mild Steel | 中炭素鋼 Medium Carbon Steel | 高炭素鋼 High Carbon Steel | 合金鋼 Alloy Steel | 調質鋼 Hardened Steel | | 焼入鋼 Quenched and Tempered Steel | | | ステンレス鋼 Stainless Steel | 工具鋼 Tool Steel | 鋳鉄 Cast Iron | ダクタイル鋳鉄 Ductile Cast Iron | 銅合金 Copper Alloy | アルミ展伸材 Aluminum | アルミ合金鋳物 Aluminum Alloy Casting | チタン合金 Titanium Alloy | インコニ Inconel | |
|----------------------|-------------------------|--|-----------------------------|---------------------------|--------------------|-----------------------|-----------|------------------------------------|-----------|-----------|---------------------------|-------------------|-----------------|------------------------------|---------------------|--------------------|-----------------------------------|-------------------------|-----------------|---|
| | | C~0.25% | 0.25~0.45% | 0.45%~ | SCM | ~35 HRC | 35~45 HRC | 45~50 HRC | 50~60 HRC | 60~70 HRC | SUS | SKD SKS | FC | FCD | Cu | Al | AC | | | |
| AD-LS-LDS | センターリング用 Centering | ○ | ○ | ○ | ○ | ○ | ○ | | | | | ○ | ○ | ○ | ○ | | | ○ | ○ | ○ |
| | 穴面取り用 Countersinking | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | ○ | ○ | ○ | ○ | | | | ○ | ○ | ○ |

A, B, C, D=標準在庫品 A, B, C, D=Standard stock item. □=特定代理店在庫品 □=Stocked by specific distributors. Contact us for price & availability.

■アイコンの説明はP.1をご覧ください。 See p.1 for explanation of icons.

形状寸法表
Specification Charts

センターリング・穴面取り
Centering · Countersinking

コーナ面取り
Corner Chamfering

R面取り
Corner Rounding

座ぶり
Countersinking

切削条件
Cutting Conditions

センターリング・穴面取り
Centering · Countersinking

コーナ面取り
Corner Chamfering

R面取り
Corner Rounding

座ぶり
Countersinking

G-LIST No. | CW1000

切削条件 Cutting Conditions | P.57

超硬FXコーティング

Fx Coated Carbide

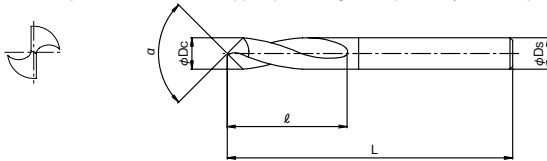
FX-LDS



単位:mm Unit:mm

| ツールNo. EDP No. | 直径×先端角 Dc × α | 溝長 ℓ | 全長 L | シャンク径 Ds | 最小下穴径 Min. Pre-Drilled Dia. φ ₂ | 在庫 Stock | 重量 Weight | 標準価格 (Yen) |
|-------------------|------------------|---------|---------|-------------|---|-------------|--------------|---------------|
| | 0.5 × 60° | 1 | 38 | 3 | 0.25 | □ | — | — |
| | 1 × 60° | 2 | | | 0.4 | | — | |
| | 2 × 60° | 4 | | | 1 | | — | |
| | 3 × 60° | 9 | 48 | 1.2 | — | — | — | |
| | 4 × 60° | 12 | 54 | 1.5 | — | — | — | |
| | 6 × 60° | 15 | 72 | 1.9 | — | — | — | |
| | 8 × 60° | 20 | 81 | 2.1 | — | — | — | |
| | 10 × 60° | 24 | 93 | 2.5 | — | — | — | |
| | 12 × 60° | 28 | 108 | 12 | — | — | — | |
| ※8561500 | 0.5 × 90° | 1 | 38 | 3 | 0.25 | D | 9 | 7,870 |
| ※8561501 | 1 × 90° | 1.8 | | | 0.4 | | 5 | 7,870 |
| ※8561502 | 2 × 90° | 2.5 | | | 1 | | 5 | 7,870 |
| ※8561503 | 3 × 90° | 9 | 48 | 1.2 | 6 | 9,140 | | |
| ※8561504 | 4 × 90° | 12 | 54 | 1.5 | 10 | 10,400 | | |
| ※8561506 | 6 × 90° | 15 | 72 | 1.9 | 28 | 13,100 | | |
| ※8561508 | 8 × 90° | 20 | 81 | 2.1 | 54 | 15,700 | | |
| ※8561510 | 10 × 90° | 24 | 93 | 2.5 | 95 | 19,000 | | |
| ※8561512 | 12 × 90° | 28 | 108 | 12 | 180 | 21,900 | | |
| 8561516 | 16 × 90° | 41 | 118 | 16 | 291 | 39,300 | | |
| 8561520 | 20 × 90° | 46 | 132 | 20 | 502 | 68,700 | | |
| 8561525 | 25 × 90° | 53 | 151 | 25 | 894 | 103,000 | | |
| | 0.5 × 130° | 1 | 38 | 3 | — | □ | — | — |
| | 1 × 130° | 1.8 | | | — | | — | |
| | 2 × 130° | 2.5 | | | — | | — | |
| | 3 × 130° | 9 | 48 | — | — | — | — | |
| | 4 × 130° | 12 | 54 | 4 | — | — | — | |
| | 6 × 130° | 15 | 72 | 6 | — | — | — | |
| | 8 × 130° | 20 | 81 | 8 | — | — | — | |
| | 10 × 130° | 24 | 93 | 10 | — | — | — | |
| | 12 × 130° | 28 | 108 | 12 | — | — | — | |

注1) 穴面取りを行う場合の下穴の最小値を示します。
These minimum pre-drilled hole sizes are required before countersinking operations.
※印はこの製品は生産中止しており、AD-LDS (p.7) へ切り替え生産させていただきます。
※ = The products have been stopped producing and replaced by AD-LDS (p.7).



先端角の許容差は60° ± 3°、90° ± 1°、130° ± 2°となります。
Tolerance of the point angle is 60° ± 3°; 90° ± 1°; 130° ± 2°

G-LIST No. | CW1001

切削条件 Cutting Conditions | P.57

超硬FXコート ロングシャンク

Fx Coated Carbide with Long Shank

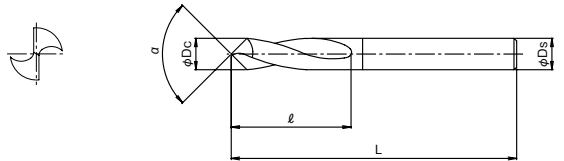
FX-LS-LDS



単位:mm Unit:mm

| ツールNo. EDP No. | 直径×先端角 Dc × α | 溝長 ℓ | 全長 L | シャンク径 Ds | 最小下穴径 Min. Pre-Drilled Dia. φ ₂ | 在庫 Stock | 重量 Weight | 標準価格 (Yen) |
|-------------------|------------------|---------|---------|-------------|---|-------------|--------------|---------------|
| ※8561603 | 3 × 90° | 9 | 75 | 3 | 1.2 | C | 9 | 10,100 |
| ※8561604 | 4 × 90° | 12 | 100 | 4 | 1.5 | | 15 | 12,100 |
| ※8561606 | 6 × 90° | 15 | 150 | 6 | 1.9 | | 105 | 16,500 |
| ※8561608 | 8 × 90° | 20 | 200 | 8 | 2.1 | | 65 | 19,700 |
| ※8561610 | 10 × 90° | 24 | 200 | 10 | 2.5 | | 210 | 26,700 |
| ※8561612 | 12 × 90° | 28 | 200 | 12 | — | | 365 | 29,900 |
| 8561616 | 16 × 90° | 41 | 250 | 16 | — | | 668 | 60,200 |
| 8561620 | 20 × 90° | 46 | 250 | 20 | 5 | | 1033 | 97,400 |
| 8561625 | 25 × 90° | 53 | 250 | 25 | — | | 1581 | 142,000 |

注1) 穴面取りを行う場合の下穴の最小値を示します。
These minimum pre-drilled hole sizes are required before countersinking operations.
※印はこの製品は生産中止しており、AD-LS-LDS (p.7) へ切り替え生産させていただきます。
※ = The products have been stopped producing and replaced by AD-LS-LDS (p.7).



先端角の許容差は90° ± 1°となります。
Tolerance of the point angle is 90° ± 1°

| 製品記号 Abbreviation | 被削材 Work Material | 低炭素鋼 軟鋼 | 中炭素鋼 | 高炭素鋼 | 合金鋼 | 調質鋼 | 焼入鋼 | | | | ステンレス 鋼 | 工具鋼 | 鋳鉄 | ダクタイル 鋳鉄 | 銅合金 | アルミ 展伸材 | アルミ 合金鋳物 | チタン 合金 | インコル |
|----------------------|----------------------|--------------------------------|---------------------|-------------------|-------------|----------------|-----------------------------|-----------------|------------|-----------|-------------------|--------------|----------|------------------------|----------------|------------|-------------|-----------|------|
| | | Low Carbon Steel Mild Steel | Medium Carbon Steel | High Carbon Steel | Alloy Steel | Hardened Steel | Quenched and Tempered Steel | Stainless Steel | Tool Steel | Cast Iron | Ductile Cast Iron | Copper Alloy | Aluminum | Aluminum Alloy Casting | Titanium Alloy | Inconel | | | |
| | | C~0.25% | 0.25~0.4% | 0.45%~ | SCM | ~35 HRC | 35~45 HRC | 45~50 HRC | 50~60 HRC | 60~70 HRC | SUS | SKD SKS | FC | FCD | Cu | Al | AC | | |
| FX-LDS | センターリング用 穴面取り用 | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| FX-LS-LDS | センターリング用 穴面取り用 | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

A, B, C, D=標準在庫品 A, B, C, D=Standard stock item. □=特定代理店在庫品 □=Stocked by specific distributors. Contact us for price & availability.

Vコート粉末ハイス

V Coated XPM

VP-LDS



単位:mm Unit:mm

| ツールNo. EDP No. | 直径×先端角 Dc × α | 溝長 ℓ | 全長 L | シャンク径 Ds | 最小穴径 Min. Pre-Drilled Dia. (注1) | 在庫 Stock | 重量 Weight | 標準価格 (Yen) |
|-------------------|------------------|---------|---------|-------------|------------------------------------|-------------|--------------|---------------|
| 63803 | 3 × 90° | 11 | 48 | 3 | 1.1 | D | 4 | 2,630 |
| 63804 | 4 × 90° | 15 | 54 | 4 | 1.3 | | 7 | 2,720 |
| 63806 | 6 × 90° | 20 | 72 | 6 | 1.5 | | 16 | 3,260 |
| 63808 | 8 × 90° | 26 | 81 | 8 | 1.6 | | 30 | 3,930 |
| 63810 | 10 × 90° | 30 | 93 | 10 | 2.1 | | 57 | 5,700 |
| 63812 | 12 × 90° | 36 | 108 | 12 | | | 91 | 7,920 |
| 63816 | 16 × 90° | 41 | 118 | 16 | 3 | | 177 | 11,100 |
| 63818 | 20 × 90° | 53 | 132 | 20 | | | 297 | 15,700 |
| 63820 | 25 × 90° | 60 | 151 | 25 | | | 521 | 24,100 |

注 1) 穴面取りを行う場合の下穴の最小値を示します。
These minimum pre-drilled hole sizes are required before countersinking operations.

Vコート粉末ハイス ロングシャンク

V Coated XPM with Long Shank

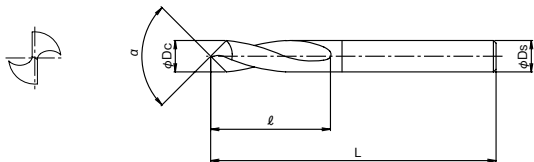
VP-LS-LDS



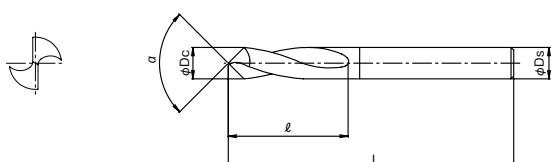
単位:mm Unit:mm

| ツールNo. EDP No. | 直径×先端角 Dc × α | 溝長 ℓ | 全長 L | シャンク径 Ds | 最小穴径 Min. Pre-Drilled Dia. (注1) | 在庫 Stock | 重量 Weight | 標準価格 (Yen) | |
|-------------------|------------------|---------|---------|-------------|------------------------------------|-------------|--------------|---------------|--------|
| 63903 | 3 × 90° | 11 | 75 | 3 | 1.1 | D | 6 | 3,800 | |
| 63904 | 4 × 90° | 15 | 100 | 4 | 1.3 | | 12 | 4,540 | |
| 63906 | 6 × 90° | 20 | 150 | 6 | 1.5 | | 35 | 5,910 | |
| 63908 | 8 × 90° | 26 | | 8 | 1.6 | | 60 | 6,470 | |
| 63910 | 10 × 90° | 30 | 200 | 10 | 2.1 | | 126 | 9,210 | |
| 63912 | 12 × 90° | 36 | | 12 | | | 2.1 | 177 | 10,500 |
| 63916 | 16 × 90° | 41 | 250 | 16 | 3 | | 382 | 17,100 | |
| 63918 | 20 × 90° | 53 | | 20 | | | 3 | 571 | 23,500 |
| 63920 | 25 × 90° | 60 | | 25 | | | 3 | 870 | 36,400 |

注 1) 穴面取りを行う場合の下穴の最小値を示します。
These minimum pre-drilled hole sizes are required before countersinking operations.



先端角の許容差は90° ± 1° となります。
Tolerance of the point angle is 90° ± 1°



先端角の許容差は90° ± 1° となります。
Tolerance of the point angle is 90° ± 1°

| 製品記号 Abbreviation | 被削材 Work Material | 低炭素鋼 | 中炭素鋼 | 高炭素鋼 | 合金鋼 | 調質鋼 | | | | | 焼入鋼 | | | | | ステンレス鋼 | 工具鋼 | 鋳鉄 | ダクタイル鋳鉄 | 銅合金 | アルミ展伸材 | アルミ合金鋳物 | チタン合金 | インコニ |
|----------------------|-------------------------|------------------|---------------------|-------------------|-------------|----------------|-----------------------------|-----------|-----------|-----------|-----|-----------------|------------|-----------|-------------------|--------------|----------|------------------------|----------------|---------|--------|---------|-------|------|
| | | Low Carbon Steel | Medium Carbon Steel | High Carbon Steel | Alloy Steel | Hardened Steel | Quenched and Tempered Steel | | | | | Stainless Steel | Tool Steel | Cast Iron | Ductile Cast Iron | Copper Alloy | Aluminum | Aluminum Alloy Casting | Titanium Alloy | Inconel | | | | |
| | | C~0.25% | 0.25~0.45% | 0.45%~ | SCM | ~35 HRC | 35~45 HRC | 45~50 HRC | 50~60 HRC | 60~70 HRC | SUS | SKD SKS | FC | FCD | Cu | Al | AC | | | | | | | |
| VP-LDS | センターリング用 Centering | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | 穴面取り用 Countersinking | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| VP-LS-LDS | センターリング用 Centering | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | 穴面取り用 Countersinking | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

A, B, C, D=標準在庫品 A, B, C, D=Standard stock item. □=特定代理店在庫品 □=Stocked by specific distributors. Contact us for price & availability.

■アイコンの説明はP.1をご覧ください。 See p.1 for explanation of icons.

形状寸法表
Specification
Charts

センターリング・穴面取り
Centering
Countersinking

コーナ面取り
Corner Chamfering

R面取り
Corner Rounding

座べり
Countersinking

切削条件
Cutting
Conditions

センターリング・穴面取り
Centering
Countersinking

コーナ面取り
Corner Chamfering

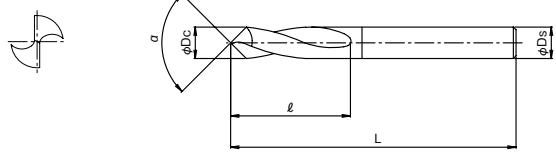
R面取り
Corner Rounding

座べり
Countersinking

TINコーティング

Tin Coated HSS

TIN-NC-LDS



先端角の許公差は60°±2°、90°±1°、120°±2°となります。
Tolerance of the point angle is 60°±2°;90°±1°;120°±2°

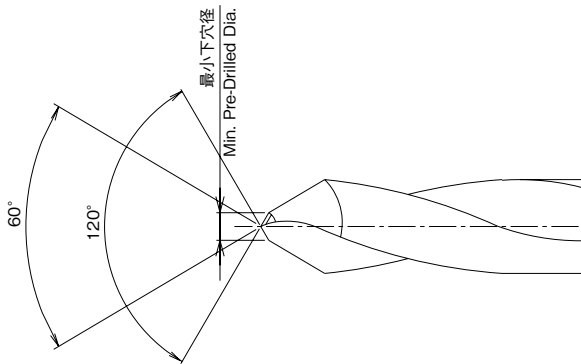
単位:mm Unit:mm

| ツールNo. EDP No. | 直径×先端角 Dc × α | 溝長 ℓ | 全長 L | シャンク径 Ds | 最小下穴径 Min. Pre-Drilled Dia. (注) | 在庫 Stock | 重量 Weight | 標準価格 (Yen) |
|-------------------|------------------|---------|---------|-------------|------------------------------------|-------------|--------------|---------------|
| 63703 | 3 × 60° | 11 | 48 | 3 | 1.5 | D | 4 | 1,970 |
| 63704 | 4 × 60° | 15 | 54 | 4 | 1.7 | | 6 | 2,110 |
| 63706 | 6 × 60° | 20 | 72 | 6 | 1.9 | | 16 | 2,680 |
| 63708 | 8 × 60° | 26 | 81 | 8 | | | 29 | 3,340 |
| 63710 | 10 × 60° | 30 | 93 | 10 | 2.1 | | 57 | 4,890 |
| 63712 | 12 × 60° | 36 | 108 | 12 | | | 88 | 7,090 |
| 63603 | 3 × 90° | 11 | 48 | 3 | 1.1 | | 6 | 1,970 |
| 63604 | 4 × 90° | 15 | 54 | 4 | 1.3 | | 6 | 2,110 |
| 63606 | 6 × 90° | 20 | 72 | 6 | 1.5 | | 16 | 2,680 |
| 63608 | 8 × 90° | 26 | 81 | 8 | 1.6 | | 30 | 3,340 |
| 63610 | 10 × 90° | 30 | 93 | 10 | 2.1 | 57 | 4,890 | |

| ツールNo. EDP No. | 直径×先端角 Dc × α | 溝長 ℓ | 全長 L | シャンク径 Ds | 最小下穴径 Min. Pre-Drilled Dia. (注) | 在庫 Stock | 重量 Weight | 標準価格 (Yen) |
|-------------------|------------------|---------|---------|-------------|------------------------------------|-------------|--------------|---------------|
| 63612 | 12 × 90° | 36 | 108 | 12 | 2.1 | D | 90 | 7,090 |
| 63616 | 16 × 90° | 41 | 118 | 16 | 3 | | 178 | 10,100 |
| 63618 | 20 × 90° | 53 | 132 | 20 | | | 298 | 14,100 |
| 63620 | 25 × 90° | 60 | 151 | 25 | | | 510 | 20,100 |
| 63653 | 3 × 120° | 11 | 48 | 3 | — | | 4 | 1,970 |
| 63654 | 4 × 120° | 15 | 54 | 4 | — | | 6 | 2,110 |
| 63656 | 6 × 120° | 20 | 72 | 6 | — | | 18 | 2,680 |
| 63658 | 8 × 120° | 26 | 81 | 8 | — | | 30 | 3,340 |
| 63660 | 10 × 120° | 30 | 93 | 10 | — | | 58 | 4,890 |
| 63662 | 12 × 120° | 36 | 108 | 12 | — | | 91 | 7,090 |

注 1) 穴面取りを行う場合の下穴の最小値を示します。

These minimum pre-drilled hole sizes are required before countersinking operations.



先端角 60° 品はセンターリング時のチゼルエッジ潰れを防止するため、最小下穴径より内側の中心部のみ 120° になっています。

The TIN-NC-LDS with point angle 60° has a 120° point angle within the minimum drill hole diameter in order to prevent the chisel edges from crashing.

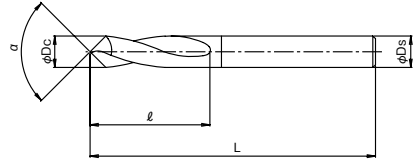
| 製品記号 Abbreviation | 被削材 Work Material | | 低炭素鋼 軟鋼 Low Carbon Steel Mild Steel | 中炭素鋼 Medium Carbon Steel | 高炭素鋼 High Carbon Steel | 合金鋼 Alloy Steel | 調質鋼 Hardened Steel | 焼入鋼 Quenched and Tempered Steel | | | ステンレス 鋼 Stainless Steel | 工具鋼 Tool Steel | 鋳鉄 Cast Iron | ダクタイル 鋳鉄 Ductile Cast Iron | 銅合金 Copper Alloy | アルミ 展伸材 Aluminum | アルミ 合金 Aluminum Alloy Casting | チタン 合金 Titanium Alloy | インコ ル Inconel |
|----------------------|-----------------------------|--|--|-----------------------------|---------------------------|--------------------|-----------------------|------------------------------------|-----------|-----------|-------------------------------|-------------------|-----------------|----------------------------------|---------------------|------------------------|-------------------------------------|-----------------------------|---------------------|
| | C~0.25% | | 0.25~0.45% | 0.45%~ | SCM | ~35 HRC | 35~45 HRC | 45~50 HRC | 50~60 HRC | 60~70 HRC | SUS | SKD SKS | FC | FCD | Cu | Al | AC | | |
| | センターリング用 Centering | | ○ | ○ | ○ | ○ | ○ | | | | ○ | ○ | ○ | ○ | ○ | | ○ | | |
| TIN-NC-LDS | 60° 穴面取り用 Countersinking | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | 90° 穴面取り用 Countersinking | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

A, B, C, D=標準在庫品 A, B, C, D=Standard stock item. □=特定代理店在庫品 □=Stocked by specific distributors. Contact us for price & availability.

TINコーティング ロングシャンク

Tin Coated HSS with Long Shank

TIN-LS-NC-LDS



先端角の許容差は90°±1°となります。
Tolerance of the point angle is 90°±1°



| ツールNo. EDP No. | 直径×先端角 Dc × α | 溝長 ℓ | 全長 L | シャンク径 Ds | 最小穴径 Min. Pre-Drilled Dia. (注1) | 在庫 Stock | 重量 Weight | 標準価格 (Yen) |
|-------------------|------------------|---------|---------|-------------|------------------------------------|-------------|--------------|---------------|
| | 3 × 90° | 11 | 75 | 3 | 1.1 | □ | — | — |
| | 4 × 90° | 15 | 100 | 4 | 1.3 | | — | — |
| | 6 × 90° | 20 | 150 | 6 | 1.5 | | — | — |

注 1) 穴面取りを行う場合の下穴の最小値を示します。

単位:mm Unit:mm

| ツールNo. EDP No. | 直径×先端角 Dc × α | 溝長 ℓ | 全長 L | シャンク径 Ds | 最小穴径 Min. Pre-Drilled Dia. (注1) | 在庫 Stock | 重量 Weight | 標準価格 (Yen) |
|-------------------|------------------|---------|---------|-------------|------------------------------------|-------------|--------------|---------------|
| | 8 × 90° | 26 | 150 | 8 | 1.6 | □ | — | — |
| | 10 × 90° | 30 | 200 | 10 | 2.1 | | — | — |
| | 12 × 90° | 36 | | 12 | | | — | — |

These minimum pre-drilled hole sizes are required before countersinking operations.

| 製品記号 Abbreviation | 被削材 Work Material | 低炭素鋼 軟鋼 Low Carbon Steel Mild Steel | 中炭素鋼 Medium Carbon Steel | 高炭素鋼 High Carbon Steel | 合金鋼 Alloy Steel | 調質鋼 Hardened Steel | 焼入鋼 Quenched and Tempered Steel | ステンレス鋼 Stainless Steel | 工具鋼 Tool Steel | 鋳鉄 Cast Iron | ダクタイル鋳鉄 Ductile Cast Iron | 銅合金 Copper Alloy | アルミ展伸材 Aluminum | アルミ合金鋳物 Aluminum Alloy Casting | チタン合金 Titanium Alloy | インコニ Inconel |
|----------------------|----------------------|--|-----------------------------|---------------------------|--------------------|-----------------------|------------------------------------|---------------------------|-------------------|-----------------|------------------------------|---------------------|--------------------|-----------------------------------|-------------------------|-----------------|
| | セタリング用 Centering | 穴面取り用 Countersinking | | | | | | | | | | | | | | |
| TIN-LS-NC-LDS | | ○ | ○ | ○ | ○ | ○ | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

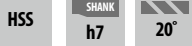
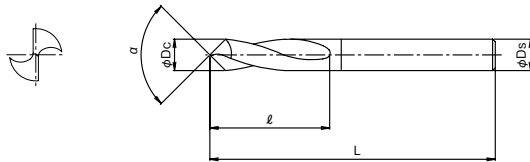
A、B、C、D=標準在庫品 A、B、C、D=Standard stock item. □=特定代理店在庫品 □=Stocked by specific distributors. Contact us for price & availability.

■アイコンの説明はP.1をご覧ください。 See p.1 for explanation of icons.

スタンダード

HSS General Type

NC-LDS



先端角の許容差は90°±1°、120°±2°、130°±2°となります。
Tolerance of the point angle is 90°±1°; 120°±2°; 130°±2°

単位:mm Unit:mm

| ツールNo. EDP No. | 直径×先端角 Dc × α | 溝長 ℓ | 全長 L | シャンク径 Ds | 最小穴径 Min. Pre-Drilled Dia. 注1) | 在庫 Stock | 重量 Weight | 標準価格 (Yen) |
|-------------------|------------------|---------|---------|-------------|-----------------------------------|-------------|--------------|---------------|
| | 1 × 90° | | 38 | | 0.4 | | — | — |
| | 1.5 × 90° | 6 | 41 | 3 | 0.5 | □ | — | — |
| | 2 × 90° | 8 | 44 | | 0.7 | — | — | |
| 62903 | 3 × 90° | 11 | 48 | | 1.1 | — | 4 | 1,280 |
| 62904 | 4 × 90° | 15 | 54 | 4 | 1.3 | B | 7 | 1,460 |
| 62906 | 6 × 90° | 20 | 72 | 6 | 1.5 | □ | 16 | 1,780 |
| | 7 × 90° | 24 | 78 | 7 | 1.6 | □ | — | — |
| 62908 | 8 × 90° | 26 | 81 | 8 | | B | 30 | 2,200 |
| | 9 × 90° | 29 | 91 | 9 | 1.8 | □ | — | — |
| 62910 | 10 × 90° | 30 | 93 | 10 | 2.1 | B | 57 | 3,400 |
| 62912 | 12 × 90° | 36 | 108 | 12 | | | 90 | 4,870 |
| 62916 | 16 × 90° | 41 | 118 | 16 | | | 179 | 6,480 |
| 62918 | 20 × 90° | 53 | 132 | 20 | 3 | — | 299 | 9,260 |
| 62920 | 25 × 90° | 60 | 151 | 25 | — | — | 512 | 13,600 |
| | 1 × 120° | 6 | 38 | 3 | — | □ | — | — |
| | 1.5 × 120° | 6 | 41 | | | | — | — |
| | 2 × 120° | 8 | 44 | | | | — | — |
| 62923 | 3 × 120° | 11 | 48 | — | — | B | 4 | 1,280 |

| ツールNo. EDP No. | 直径×先端角 Dc × α | 溝長 ℓ | 全長 L | シャンク径 Ds | 最小穴径 Min. Pre-Drilled Dia. 注1) | 在庫 Stock | 重量 Weight | 標準価格 (Yen) |
|-------------------|------------------|---------|---------|-------------|-----------------------------------|-------------|--------------|---------------|
| 62924 | 4 × 120° | 15 | 54 | 4 | — | B | 7 | 1,460 |
| 62926 | 6 × 120° | 20 | 72 | 6 | | | 17 | 1,780 |
| 62928 | 8 × 120° | 26 | 81 | 8 | | | 30 | 2,200 |
| 62930 | 10 × 120° | 30 | 93 | 10 | | | 58 | 3,400 |
| 62932 | 12 × 120° | 36 | 108 | 12 | | | 91 | 4,870 |
| 62936 | 16 × 120° | 41 | 118 | 16 | | | 182 | 6,480 |
| 62938 | 20 × 120° | 53 | 132 | 20 | | | 302 | 9,260 |
| 62940 | 25 × 120° | 60 | 151 | 25 | | | 526 | 13,600 |
| 62943 | 3 × 130° | 11 | 48 | 3 | | | 4 | 1,280 |
| 62944 | 4 × 130° | 15 | 54 | 4 | | | 8 | 1,460 |
| 62946 | 6 × 130° | 20 | 72 | 6 | 17 | 1,780 | | |
| 62948 | 8 × 130° | 26 | 81 | 8 | 30 | 2,200 | | |
| 62950 | 10 × 130° | 30 | 93 | 10 | 58 | 3,400 | | |
| 62952 | 12 × 130° | 36 | 108 | 12 | 92 | 4,870 | | |
| 62956 | 16 × 130° | 41 | 118 | 16 | 180 | 6,480 | | |
| 62958 | 20 × 130° | 53 | 132 | 20 | 296 | 9,260 | | |
| 62960 | 25 × 130° | 60 | 151 | 25 | 516 | 13,600 | | |

注 1) 穴面取りを行う場合の下穴の最小値を示します。

These minimum pre-drilled hole sizes are required before countersinking operations.

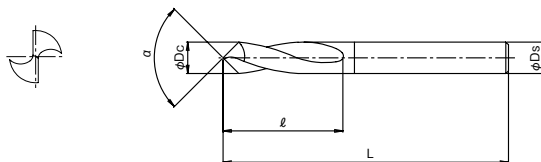
| 製品記号 Abbreviation | 被削材 Work Material | 低炭素鋼 軟鋼 | 中炭素鋼 | 高炭素鋼 | 合金鋼 | 調質鋼 | 焼入鋼 | | | | ステンレス 鋼 | 工具鋼 | 鋳鉄 | ダクタイル 鋳鉄 | 銅合金 | アルミ 展伸材 | アルミ 合金鑄物 | チタン 合金 | インコニ ル |
|----------------------|-------------------------|--------------------------------|---------------------|-------------------|-------------|----------------|-----------------------------|-----------|-----------|-----------|-----------------|------------|-----------|-------------------|--------------|------------|------------------------|----------------|-----------|
| | | Low Carbon Steel Mild Steel | Medium Carbon Steel | High Carbon Steel | Alloy Steel | Hardened Steel | Quenched and Tempered Steel | | | | Stainless Steel | Tool Steel | Cast Iron | Ductile Cast Iron | Copper Alloy | Aluminum | Aluminum Alloy Casting | Titanium Alloy | Inconel |
| | | C~0.25% | C0.25~0.45% | C0.45%~ | SCM | ~35 HRC | 35~45 HRC | 45~50 HRC | 50~60 HRC | 60~70 HRC | SUS | SKD SKS | FC | FCD | Cu | Al | AC | | |
| NC-LDS | センターリング用 Centering | ○ | ○ | ○ | ○ | | | | | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | |
| | 穴面取り用 Countersinking | ○ | ○ | ○ | ○ | ○ | ○ | | | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | |

A, B, C, D=標準在庫品 A, B, C, D=Standard stock item. □=特定代理店在庫品 □=Stocked by specific distributors. Contact us for price & availability.

ロングシャンク

HSS General Type with Long Shank

LS-NC-LDS



先端角の許容差は $90^\circ \pm 1^\circ$ となります。
Tolerance of the point angle is $90^\circ \pm 1^\circ$



単位:mm Unit:mm

| ツールNo. EDP No. | 直径×先端角 Dc × α | 溝長 l | 全長 L | シャンク径 Ds | 最小下穴径 Min. Pre-Drilled Dia. (注1) | 在庫 Stock | 重量 Weight | 標準価格 (Yen) |
|-------------------|------------------|---------|---------|-------------|-------------------------------------|-------------|--------------|---------------|
| 63503 | 3 × 90° | 11 | 75 | 3 | 1.1 | D | 6 | 2,110 |
| 63504 | 4 × 90° | 15 | 100 | 4 | 1.3 | | 12 | 2,880 |
| 63506 | 6 × 90° | 20 | 150 | 6 | 1.5 | | 34 | 3,930 |
| 63508 | 8 × 90° | 26 | | 8 | 1.6 | | 60 | 4,200 |
| 63510 | 10 × 90° | 30 | 200 | 10 | 2.1 | | 124 | 6,210 |

注 1) 穴面取りを行う場合の下穴の最小値を示します。

| ツールNo. EDP No. | 直径×先端角 Dc × α | 溝長 l | 全長 L | シャンク径 Ds | 最小下穴径 Min. Pre-Drilled Dia. (注1) | 在庫 Stock | 重量 Weight | 標準価格 (Yen) |
|-------------------|------------------|---------|---------|-------------|-------------------------------------|-------------|--------------|---------------|
| 63512 | 12 × 90° | 36 | 200 | 12 | 2.1 | D | 174 | 7,010 |
| 63516 | 16 × 90° | 41 | 250 | 16 | 3 | | 384 | 11,500 |
| 63518 | 20 × 90° | 53 | | 20 | | | 589 | 15,700 |
| 63520 | 25 × 90° | 60 | 25 | 884 | | | 23,500 | |

These minimum pre-drilled hole sizes are required before countersinking operations.

| 製品記号 Abbreviation | 被削材 Work Material | 低炭素鋼 軟鋼 Low Carbon Steel Mild Steel | 中炭素鋼 Medium Carbon Steel | 高炭素鋼 High Carbon Steel | 合金鋼 Alloy Steel | 調質鋼 Hardened Steel | | 焼入鋼 Quenched and Tempered Steel | | | ステンレス鋼 Stainless Steel | 工具鋼 Tool Steel | 鋳鉄 Cast Iron | ダクタイル 鋳鉄 Ductile Cast Iron | 銅合金 Copper Alloy | アルミ 展伸材 Aluminum | アルミ 合金鋳物 Aluminum Alloy Casting | チタン 合金 Titanium Alloy | インコニ Inconel |
|----------------------|-------------------------|--|-----------------------------|---------------------------|--------------------|-----------------------|-----------|------------------------------------|-----------|-----------|---------------------------|-------------------|-----------------|----------------------------------|---------------------|------------------------|---------------------------------------|-----------------------------|-----------------|
| | | C~0.25% | 0.25~0.45% | 0.45%~ | SCM | ~35 HRC | 35~45 HRC | 45~50 HRC | 50~60 HRC | 60~70 HRC | SUS | SKD SKS | FC | FCD | Cu | Al | AC | | |
| LS-NC-LDS | センタリング用 Centering | ○ | ○ | ○ | ○ | | | | | | ○ | ○ | ○ | ○ | | ○ | ○ | | |
| | 穴面取り用 Countersinking | ○ | ○ | ○ | ○ | ○ | ○ | | | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | |

A、B、C、D=標準在庫品 A、B、C、D=Standard stock item. □=特定代理店在庫品 □=Stocked by specific distributors. Contact us for price & availability.

■アイコンの説明はP.1をご覧ください。 See p.1 for explanation of icons.

G-LIST No. | **CW1021** | 切削条件 Cutting Conditions | P.59
WXLコート 面取りカッタ ポジティブ レギュラ
 WXL Coating Carbide Chamfering Cutter-Positive type-Regular
W-HSCT-P



G-LIST No. | **CW1023** | 切削条件 Cutting Conditions | P.59
WXLコート 面取りカッタ ポジティブ ロングシャンク
 WXL Coating Carbide Chamfering Cutter-Positive type-Long Shank
WLS-HSCT-P

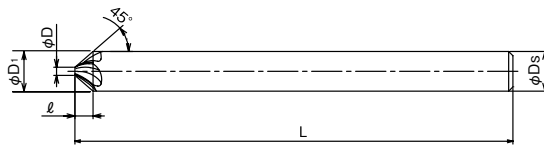


単位:mm Unit:mm

| ツール No. EDP No. | 先端径×テーパ半角×大端径 D × α × D1 | 全長 L | 刃長 ℓ | シャンク径 Ds | 在庫 Stock | 重量 Weight | 標準価格 (Yen) |
|--------------------|-----------------------------|---------|---------|-------------|-------------|--------------|---------------|
| 9200106 | 1 × 45° × 6 | 50 | 2.5 | 6 | C | 22 | 11,200 |
| 9200108 | 1 × 45° × 8 | 60 | 3.5 | 8 | | 45 | 13,400 |
| 9200110 | 2 × 45° × 10 | 70 | 4 | 10 | | 81 | 17,400 |
| 9200112 | 2 × 45° × 12 | 75 | 5 | 12 | | 121 | 22,200 |
| 9200116 | 2 × 45° × 16 | 100 | 7 | 16 | | 286 | 35,600 |

単位:mm Unit:mm

| ツール No. EDP No. | 先端径×テーパ半角×大端径 D × α × D1 | 全長 L | 刃長 ℓ | シャンク径 Ds | 在庫 Stock | 重量 Weight | 標準価格 (Yen) |
|--------------------|-----------------------------|---------|---------|-------------|-------------|--------------|---------------|
| 9200126 | 1 × 45° × 6 | 100 | 2.5 | 6 | C | 46 | 11,800 |
| 9200128 | 1 × 45° × 8 | | 3.5 | 8 | | 76 | 15,000 |
| 9200130 | 2 × 45° × 10 | 4 | 10 | 117 | | 19,000 | |
| 9200132 | 2 × 45° × 12 | 105 | 5 | 12 | | 172 | 24,100 |
| 9200136 | 2 × 45° × 16 | 140 | 7 | 16 | | 406 | 42,700 |



| 被削材 Work Material | 低炭素鋼 軟鋼 | 中炭素鋼 | 高炭素鋼 | 合金鋼 | 調質鋼 | 焼入鋼 | | | | ステンレス 鋼 | 工具鋼 | 鋳鉄 | タタイル 鋳鉄 | 銅合金 | アルミ 展伸材 | アルミ 合金鋳物 | チタン 合金 | インコネル |
|-------------------------|--------------------------------|---------------------------|-------------------------|----------------|----------------|--------------------------------|--------------|--------------|--------------|--------------------|------------|-----------|----------------------|-----------------|------------|------------------------------|-------------------|---------|
| | Low Carbon Steel Mild Steel | Medium Carbon Steel | High Carbon Steel | Alloy Steel | Hardened Steel | Quenched and Tempered Steel | | | | Stainless Steel | Tool Steel | Cast Iron | Ductile Cast Iron | Copper Alloy | Aluminum | Aluminum Alloy Casting | Titanium Alloy | Inconel |
| 製品記号 Abbreviation | C~0.25% | C0.25~0.4% | C0.45%~ | SCM | ~35 HRC | 35~45 HRC | 45~50 HRC | 50~60 HRC | 60~70 HRC | SUS | SKD SKS | FC | FCD | Cu | Al | AC | | |
| W-HSCT-P | ○ | ○ | ○ | ○ | ○ | ○ | | | | ○ | ○ | | | | ○ | ○ | | ○ |
| WLS-HSCT-P | ○ | ○ | ○ | ○ | ○ | ○ | | | | ○ | ○ | | | | ○ | ○ | | ○ |

A, B, C, D=標準在庫品 A, B, C, D=Standard stock item. □=特定代理店在庫品 □=Stocked by specific distributors. Contact us for price & availability.

WXLコート 面取りカッタ ネガタイプ レギュラ
 WXL Coating Carbide Chamfering Cutter-Negative type-Regular

W-HSCT-N

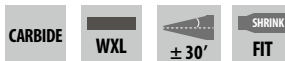


単位:mm Unit:mm

| ツール No. EDP No. | 先端径×テーパ半角×大端径 D × α × D1 | 全長 L | 刃長 ℓ | シャン径 Ds | 在庫 Stock | 重量 Weight | 標準価格 (Yen) |
|--------------------|-----------------------------|---------|---------|------------|-------------|--------------|---------------|
| 9200156 | 1 × 45° × 6 | 50 | 2.5 | 6 | | | |
| 9200158 | 1 × 45° × 8 | 60 | 3.5 | 8 | 45 | 13,400 | |
| 9200160 | 2 × 45° × 10 | 70 | 4 | 10 | 80 | 17,400 | |
| 9200162 | 2 × 45° × 12 | 75 | 5 | 12 | 120 | 22,200 | |
| 9200166 | 2 × 45° × 16 | 100 | 7 | 16 | 284 | 35,600 | |

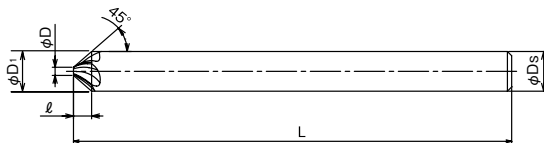
WXLコート 面取りカッタ ネガタイプ ロングシャンク
 WXL Coating Carbide Chamfering Cutter-Negative type-Long Shabk

WLS-HSCT-N



単位:mm Unit:mm

| ツール No. EDP No. | 先端径×テーパ半角×大端径 D × α × D1 | 全長 L | 刃長 ℓ | シャン径 Ds | 在庫 Stock | 重量 Weight | 標準価格 (Yen) |
|--------------------|-----------------------------|---------|---------|------------|-------------|--------------|---------------|
| 9200176 | 1 × 45° × 6 | 100 | 2.5 | 6 | | | |
| 9200178 | 1 × 45° × 8 | | 3.5 | 8 | 75 | 15,000 | |
| 9200180 | 2 × 45° × 10 | | 4 | 10 | 117 | 19,000 | |
| 9200182 | 2 × 45° × 12 | | 5 | 12 | 171 | 24,100 | |
| 9200186 | 2 × 45° × 16 | | 7 | 16 | 406 | 42,700 | |

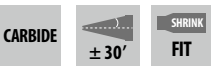


| 被削材 Work Material | 低炭素鋼 軟鋼 Low Carbon Steel Mild Steel | 中炭素鋼 Medium Carbon Steel | 高炭素鋼 High Carbon Steel | 合金鋼 Alloy Steel | 調質鋼 Hardened Steel | 焼入鋼 Quenched and Tempered Steel | ステンレス 鋼 Stainless Steel | 工具鋼 Tool Steel | 鋳鉄 Cast Iron | ダクタイル 鋳鉄 Ductile Cast Iron | 銅合金 Copper Alloy | アルミ 展伸材 Aluminum Alloy | アルミ 合金鋳物 Aluminum Alloy Casting | チタン 合金 Titanium Alloy | インコニ ル Inconel |
|-------------------------|--|-----------------------------|---------------------------|--------------------|-----------------------|-------------------------------------|-------------------------------|-------------------|-----------------|----------------------------------|---------------------|------------------------------|---------------------------------------|-----------------------------|----------------------|
| | C~0.25% | 0.25~0.45% | 0.45%~ | SCM | ~35 HRC 35~45 HRC | 45~50 HRC 50~60 HRC 60~70 HRC | SUS | SKD SKS | FC | FCD | Cu | Al | AC | | |
| 製品記号 Abbreviation | | | | | | | | | | | | | | | |
| W-HSCT-N | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | | | | | | ○ |
| WLS-HSCT-N | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | | | | | | ○ |

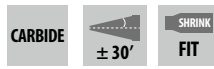
A, B, C, D=標準在庫品 A, B, C, D=Standard stock item. □=特定代理店在庫品 □=Stocked by specific distributors. Contact us for price & availability.

■アイコンの説明はP.1をご覧ください。 See p.1 for explanation of icons.

G-LIST No. | **CW1017** | 切削条件 Cutting Conditions | P.59
面取りカッタ ポジティブ レギュラ
 Carbide Chamfering Cutter-Positive type-Regular
HSCT-P



G-LIST No. | **CW1019** | 切削条件 Cutting Conditions | P.59
面取りカッタ ポジティブ ロングシャンク
 Carbide Chamfering Cutter-Positive type-Long Shank
LS-HSCT-P

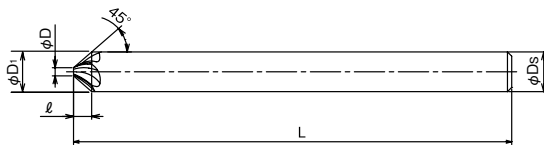


単位:mm Unit:mm

| ツール No. EDP No. | 先端径×テーパ(半角)×大端径 D × α × D1 | 全長 L | 刃長 ℓ | シャンク径 Ds | 在庫 Stock | 重量 Weight | 標準価格 (Yen) |
|--------------------|-------------------------------|---------|---------|-------------|-------------|--------------|---------------|
| 9200006 | 1 × 45° × 6 | 50 | 2.5 | 6 | C | 22 | 9,980 |
| 9200008 | 1 × 45° × 8 | 60 | 3.5 | 8 | | 45 | 12,100 |
| 9200010 | 2 × 45° × 10 | 70 | 4 | 10 | | 81 | 16,000 |
| 9200012 | 2 × 45° × 12 | 75 | 5 | 12 | | 121 | 20,400 |
| 9200016 | 2 × 45° × 16 | 100 | 7 | 16 | | 286 | 32,900 |

単位:mm Unit:mm

| ツール No. EDP No. | 先端径×テーパ(半角)×大端径 D × α × D1 | 全長 L | 刃長 ℓ | シャンク径 Ds | 在庫 Stock | 重量 Weight | 標準価格 (Yen) |
|--------------------|-------------------------------|---------|---------|-------------|-------------|--------------|---------------|
| 9200026 | 1 × 45° × 6 | 100 | 2.5 | 6 | C | 46 | 10,700 |
| 9200028 | 1 × 45° × 8 | | 3.5 | 8 | | 76 | 13,700 |
| 9200030 | 2 × 45° × 10 | | 4 | 10 | | 117 | 17,600 |
| 9200032 | 2 × 45° × 12 | | 5 | 12 | | 172 | 22,700 |
| 9200036 | 2 × 45° × 16 | | 7 | 16 | | 406 | 39,900 |

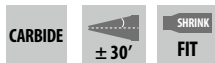


| 製品記号 Abbreviation | 被削材 Work Material | | 低炭素鋼 軟鋼 Low Carbon Steel Mild Steel | 中炭素鋼 Medium Carbon Steel | 高炭素鋼 High Carbon Steel | 合金鋼 Alloy Steel | 調質鋼 Hardened Steel | 焼入鋼 Quenched and Tempered Steel | | | ステンレス 鋼 Stainless Steel | 工具鋼 Tool Steel | 鋳鉄 Cast Iron | ダクタイル 鋳鉄 Ductile Cast Iron | 銅合金 Copper Alloy | アルミ 展伸材 Aluminum | アルミ 合金鋳物 Aluminum Alloy Casting | チタン 合金 Titanium Alloy | インコネル Inconel | |
|----------------------|----------------------|-----------|--|-----------------------------|---------------------------|--------------------|-----------------------|------------------------------------|-----------|-----------|-------------------------------|-------------------|-----------------|----------------------------------|---------------------|------------------------|---------------------------------------|-----------------------------|------------------|---|
| | HSCT-P | LS-HSCT-P | C~0.25% | 0.25~0.45% | 0.45%~ | SCM | ~35 HRC | 35~45 HRC | 45~50 HRC | 50~60 HRC | 60~70 HRC | SUS | SKD SKS | FC | FCD | Cu | Al | AC | | |
| HSCT-P | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | | | | ○ | ○ | | | | ○ | ○ | ○ | ○ |
| LS-HSCT-P | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | | | | ○ | ○ | | | | ○ | ○ | ○ | ○ |

A, B, C, D=標準在庫品 A, B, C, D=Standard stock item. □=特定代理店在庫品 □=Stocked by specific distributors. Contact us for price & availability.

面取りカッタ ネガティブ レギュラ
Carbide Chamfering Cutter-Negative type-Regular

HSCT-N

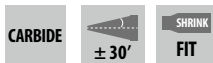


単位:mm Unit:mm

| ツール No. EDP No. | 先端径×テーパ半角×大端径 D × α × D1 | 全長 L | 刃長 ℓ | 沖径 Ds | 在庫 Stock | 重量 Weight | 標準価格 (Yen) |
|--------------------|-----------------------------|---------|---------|----------|-------------|--------------|---------------|
| 9200056 | 1 × 45° × 6 | 50 | 2.5 | 6 | C | 22 | 9,980 |
| 9200058 | 1 × 45° × 8 | 60 | 3.5 | 8 | | 45 | 12,100 |
| 9200060 | 2 × 45° × 10 | 70 | 4 | 10 | | 80 | 16,000 |
| 9200062 | 2 × 45° × 12 | 75 | 5 | 12 | | 120 | 20,400 |
| 9200066 | 2 × 45° × 16 | 100 | 7 | 16 | | 284 | 32,900 |

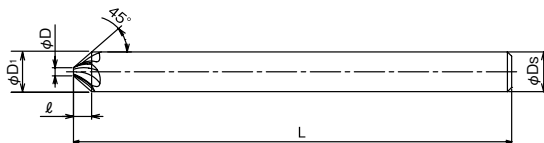
面取りカッタ ネガティブ ロングシャンク
Carbide Chamfering Cutter-Negative type-Long Shank

LS-HSCT-N



単位:mm Unit:mm

| ツール No. EDP No. | 先端径×テーパ半角×大端径 D × α × D1 | 全長 L | 刃長 ℓ | 沖径 Ds | 在庫 Stock | 重量 Weight | 標準価格 (Yen) |
|--------------------|-----------------------------|---------|---------|----------|-------------|--------------|---------------|
| 9200076 | 1 × 45° × 6 | 100 | 2.5 | 6 | C | 46 | 10,700 |
| 9200078 | 1 × 45° × 8 | | 3.5 | 8 | | 75 | 13,700 |
| 9200080 | 2 × 45° × 10 | 4 | 10 | 117 | | 17,600 | |
| 9200082 | 2 × 45° × 12 | 105 | 5 | 12 | | 171 | 22,700 |
| 9200086 | 2 × 45° × 16 | 140 | 7 | 16 | | 406 | 39,900 |



| 製品記号 Abbreviation | 被削材 Work Material | | 低炭素鋼 軟鋼 Low Carbon Steel Mild Steel | 中炭素鋼 Medium Carbon Steel | 高炭素鋼 High Carbon Steel | 合金鋼 Alloy Steel | 調質鋼 Hardened Steel | 焼入鋼 Quenched and Tempered Steel | | | ステンレス 鋼 Stainless Steel | 工具鋼 Tool Steel | 鋳鉄 Cast Iron | ダクタイル 鋳鉄 Ductile Cast Iron | 銅合金 Copper Alloy | アルミ 展伸材 Aluminum | アルミ 合金鋳物 Aluminum Alloy Casting | チタン 合金 Titanium Alloy | インコニ ル Inconel |
|----------------------|----------------------|------------|--|-----------------------------|---------------------------|--------------------|-----------------------|------------------------------------|-----------|-----|-------------------------------|-------------------|-----------------|----------------------------------|---------------------|------------------------|---------------------------------------|-----------------------------|----------------------|
| | C~0.25% | 0.25~0.45% | C0.45%~ | SCM | ~35 HRC | 35~45 HRC | 45~50 HRC | 50~60 HRC | 60~70 HRC | SUS | SKD SKS | FC | FCD | Cu | Al | AC | | | |
| HSCT-N | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | | | ○ | ○ | ○ | ○ | ○ |
| LS-HSCT-N | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | | | ○ | ○ | ○ | ○ | ○ |

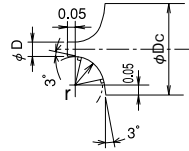
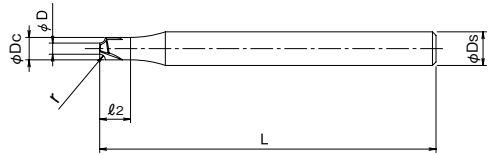
A, B, C, D=標準在庫品 A, B, C, D=Standard stock item. □=特定代理店在庫品 □=Stocked by specific distributors. Contact us for price & availability.

■アイコンの説明はP.1をご覧ください。 See p.1 for explanation of icons.

FXコート 2刃コーナラウンディング

FX Coated-2 Flutes-Corner Rounding Cutter

FX-ECR



単位:mm Unit:mm

| ツール No. EDP No. | 先端径×コーナ D×r | 外径 Dc | 全長 L | 沖径 Ds | 首下長 ℓ2 | 在庫 Stock | 重量 Weight | 標準価格 (Yen) |
|--------------------|----------------|----------|---------|----------|-----------|-------------|--------------|---------------|
| 8500602 | 0.5 × R0.1 | 0.8 | 45 | 4 | 1.2 | D | 13 | 14,600 |
| 8500603 | 0.5 × R0.15 | 0.9 | | | 1.4 | | 13 | 14,600 |
| 8500604 | 0.5 × R0.2 | 1 | | | 1.5 | | 13 | 12,600 |
| 8500605 | 0.5 × R0.25 | 1.1 | | | 1.7 | | 13 | 12,600 |
| 8500606 | 0.5 × R0.3 | 1.2 | | | 1.8 | | 13 | 12,600 |
| 8500607 | 0.5 × R0.35 | 1.3 | | | 2 | | 13 | 12,600 |
| 8500608 | 0.5 × R0.4 | 1.4 | | | 2.1 | | 13 | 11,500 |
| 8500609 | 0.5 × R0.45 | 1.5 | | | 2.3 | | 13 | 11,500 |
| 8500610 | 0.5 × R0.5 | 1.6 | | | 2.4 | | 13 | 10,100 |
| 8500611 | 0.5 × R0.55 | 1.7 | | | 2.6 | | 13 | 10,100 |
| 8500612 | 0.5 × R0.6 | 1.8 | | | 2.7 | | 13 | 9,170 |
| 8500613 | 0.5 × R0.65 | 1.9 | | | 2.9 | | 13 | 9,170 |

単位:mm Unit:mm

| ツール No. EDP No. | 先端径×コーナ D×r | 外径 Dc | 全長 L | 沖径 Ds | 首下長 ℓ2 | 在庫 Stock | 重量 Weight | 標準価格 (Yen) |
|--------------------|----------------|----------|---------|----------|-----------|-------------|--------------|---------------|
| 8500614 | 0.5 × R0.7 | 2 | 45 | 4 | 3 | D | 13 | 9,170 |
| 8500615 | 0.5 × R0.75 | 2.1 | | | 3.2 | | 13 | 9,170 |
| 8500616 | 0.8 × R0.8 | 2.5 | | | 3.8 | | 13 | 9,170 |
| 8500617 | 0.8 × R0.85 | 2.6 | | | 3.9 | | 13 | 9,170 |
| 8500618 | 0.8 × R0.9 | 2.7 | | | 4.1 | | 13 | 9,170 |
| 8500619 | 0.8 × R0.95 | 2.8 | | | 4.2 | | 14 | 9,170 |
| 8500620 | 0.8 × R1 | 2.9 | | | 4.4 | | 14 | 10,100 |
| 8500625 | 0.8 × R1.25 | 3.4 | | | 5.1 | | 13 | 10,100 |
| 8500630 | 1.5 × R1.5 | 4.6 | | | 6.9 | | 24 | 11,500 |
| 8500635 | 1.5 × R1.75 | 5.1 | | | 7.6 | | 25 | 11,500 |
| 8500640 | 1.5 × R2 | 5.6 | 8.4 | 25 | 11,500 | | | |

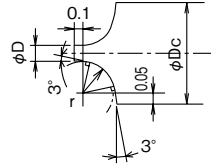
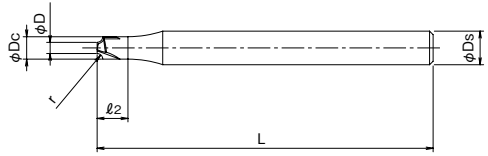
| 製品記号 Abbreviation | 被削材 Work Material | | 低炭素鋼 軟鋼 | 中炭素鋼 | 高炭素鋼 | 合金鋼 | 調質鋼 | 焼入鋼 | | | ステンレス 鋼 | 工具鋼 | 鋳鉄 | ダクタイル 鋳鉄 | 銅合金 | アルミ 展伸材 | アルミ 合金鋳物 | チタン 合金 | インコネル |
|----------------------|------------------------------|---------------------|-------------------|-------------|----------------|-----------------------------|-----------------|------------|-----------|-------------------|--------------|----------|------------------------|----------------|---------|------------|-------------|-----------|-------|
| | Low Carbon Steel Mn Steel | Medium Carbon Steel | High Carbon Steel | Alloy Steel | Hardened Steel | Quenched and Tempered Steel | Stainless Steel | Tool Steel | Cast Iron | Ductile Cast Iron | Copper Alloy | Aluminum | Aluminum Alloy Casting | Titanium Alloy | Inconel | | | | |
| FX-ECR | C~0.25% | C0.25~0.45% | C0.45%~ | SCM | ~35 HRC | 35~45 HRC | 45~50 HRC | 50~60 HRC | 60~70 HRC | SUS | SKD SKS | FC | FCD | Cu | Al | AC | | | |

A, B, C, D=標準在庫品 A, B, C, D=Standard stock item. □=特定代理店在庫品 □=Stocked by specific distributors. Contact us for price & availability.

Vコート XPM3刃コーナラウンディング

V Coated-XPM-3 Flutes-Corner Rounding Cutter

V-XPM-ECR



単位:mm Unit:mm

| ツール No. EDP No. | 先端径×コーナ半径 D×r | 外径 Dc | 全長 L | シャン径 Ds | 首下長 ℓ2 | 在庫 Stock | 重量 Weight | 標準価格 (Yen) |
|--------------------|------------------|----------|---------|------------|-----------|-------------|--------------|---------------|
| 8405121 | 2 × R0.5 | 3 | 60 | 6 | 4 | D | 16 | 13,600 |
| 8405122 | 2 × R0.75 | 3.5 | | | 5 | | 16 | 13,600 |
| 8405123 | 2 × R1 | 4 | | | 5.5 | | 16 | 13,600 |
| 8405124 | 2 × R1.25 | 4.5 | | | 6 | | 16 | 13,600 |
| 8405125 | 2 × R1.5 | 5 | | | 7 | | 17 | 13,600 |
| 8405126 | 2 × R1.75 | 5.5 | | | 7.5 | | 17 | 13,600 |
| 8405127 | 2 × R2 | 6 | | | — | | 17 | 13,600 |

単位:mm Unit:mm

| ツール No. EDP No. | 先端径×コーナ半径 D×r | 外径 Dc | 全長 L | シャン径 Ds | 首下長 ℓ2 | 在庫 Stock | 重量 Weight | 標準価格 (Yen) |
|--------------------|------------------|----------|---------|------------|-----------|-------------|--------------|---------------|
| 8405128 | 2 × R2.25 | 6.5 | 60 | 8 | 9 | D | 26 | 13,600 |
| 8405129 | 2 × R2.5 | 7 | | | 10 | | 27 | 13,600 |
| 8405130 | 2 × R2.75 | 7.5 | | | 10.5 | | 27 | 13,600 |
| 8405131 | 2 × R3 | 8 | | | — | | 26 | 13,600 |
| 8405133 | 2 × R3.5 | 9 | | 10 | 12 | | 39 | 15,800 |
| 8405135 | 2 × R4 | 10 | | | — | | 39 | 15,800 |

| 製品記号 Abbreviation | 被削材 Work Material | | 低炭素鋼 軟鋼 Low Carbon Steel Mild Steel | 中炭素鋼 Medium Carbon Steel | 高炭素鋼 High Carbon Steel | 合金鋼 Alloy Steel | 調質鋼 Hardened Steel | 焼入鋼 Quenched and Tempered Steel | | | | | ステンレス鋼 Stainless Steel | 工具鋼 Tool Steel | 鋳鉄 Cast Iron | ダクタイル鋳鉄 Ductile Cast Iron | 銅合金 Copper Alloy | アルミ展伸材 Aluminum | アルミ合金鑄物 Aluminum Alloy Casting | チタン合金 Titanium Alloy | インコニ Inconel |
|----------------------|-------------------------------------|-------------------------------------|--|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| | C~0.25% | C0.25~0.45% | C0.45%~ | SCM | ~35 HRC | 35~45 HRC | 45~50 HRC | 50~60 HRC | 60~70 HRC | SUS | SKD SKS | FC | FCD | Cu | Al | AC | | | | | |
| V-XPM-ECR | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |

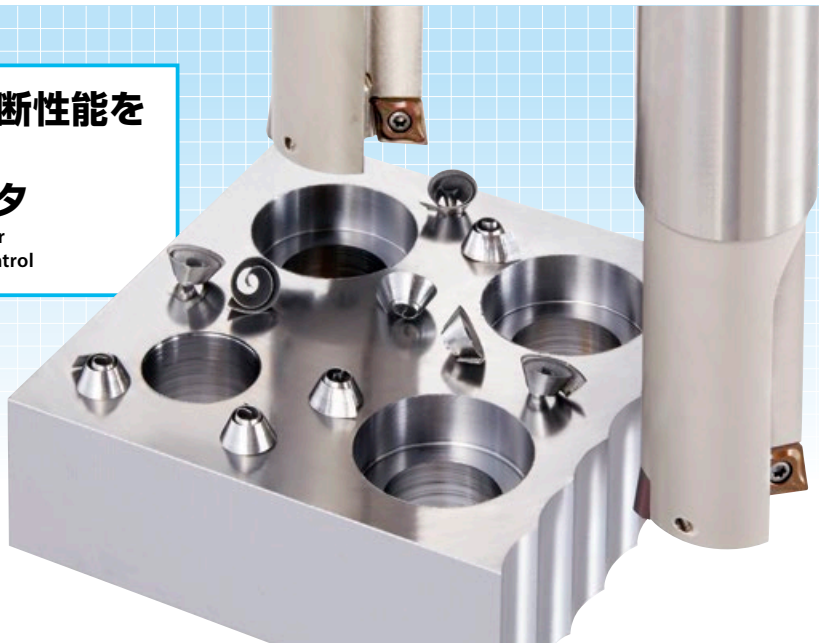
A、B、C、D=標準在庫品 A、B、C、D=Standard stock item. □=特定代理店在庫品 □=Stocked by specific distributors. Contact us for price & availability.

■アイコンの説明はP.1をご覧ください。 See p.1 for explanation of icons.

座ぐりカッタ PZAG Counterboring Cutter

切りくず分断性能を
追求した
座ぐりカッタ

Counterboring cutter
with perfect chip control



座ぐり加工は連続切削となるため、

切りくず分断性 が最重要

Since counterboring process is continuous cutting, chip breaking capability is utmost important.

切れ刃に対して大きく盛り上がった
マッスルブレーカで
抜群の切りくず分断性を実現します。

Excellent chip separation capability with the enhanced muscle breaker corresponding to each cutting edge.



豊富なラインナップ Broad size lineup

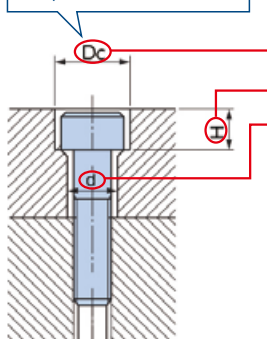
キャップボルトの座ぐり穴寸法規格に合わせたサイズラインナップ (ボルトねじサイズ M8 ~ M56 に対応)
Size lineup corresponding to the cap bolt's counterbore hole size (Corresponds to bolt screw sizes M8 to M56)

六角穴付きボルトに対する座ぐり及びボルト穴の寸法 Dimensions of counterbore and bolt hole with hexagon socket head bolt



※正面フライス(横引き加工)としては使用できません。
Cannot be used as a face milling cutter

Dc がカッタ径となります
D' represents the cutter diameter



単位:mm Unit:mm

| ねじの呼び Thread size | M8 | M10 | M12 | M14 | M16 | M18 | M20 | M22 | M24 |
|----------------------|-----|------|-----|------|------|------|------|------|------|
| Dc | 14 | 17.5 | 20 | 23 | 26 | 29 | 32 | 35 | 39 |
| H | 8.6 | 10.8 | 13 | 15.2 | 17.5 | 19.5 | 21.5 | 23.5 | 25.5 |
| d | 9 | 11 | 14 | 16 | 18 | 20 | 22 | 24 | 26 |

| ねじの呼び Thread size | M27 | M30 | M33 | M36 | M39 | M42 | M45 | M48 | M52 |
|----------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Dc | 43 | 48 | 54 | 58 | 62 | 67 | 72 | 76 | 82 |
| H | 29 | 32 | 35 | 38 | 41 | 44 | 47 | 50 | 54 |
| d | 30 | 33 | 36 | 39 | 42 | 45 | 48 | 52 | 56 |

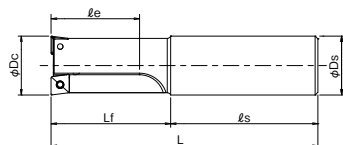
座ぐりカッタ ストレートシャクタイプ

Counterboring Cutter Straight Shank

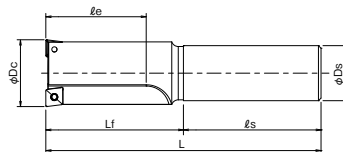
PZAG SS



Type 1



Type 2



単位:mm Unit:mm

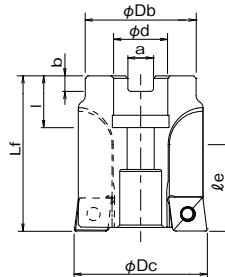
| ツールNo. EDP No. | 呼び Designation | 外径 Dc | 刃数 Z | 全長 L | 首下長 L _f | 有効加工深さ ℓ _e | シャンク径 D _s | シャンク長 ℓ _s | 最小下穴径 Min. Pre-Drilled Dia. 注1) | ae 注2) (max) | 適用インサート Applicable Inserts | 形状 Type | 標準価格 (Yen) |
|-------------------|-------------------|----------|---------|---------|-----------------------|--------------------------|-------------------------|-------------------------|------------------------------------|-----------------|-------------------------------|------------|---------------|
| 7832100 | PZAG04R014SS20-2 | 14 | 2 | 100 | 30 | 21 | 20 | 70 | 6 | 4 | ① | 1 | 25,900 |
| 7832101 | PZAG06R017SS20-2 | 17.5 | | 105 | 35 | 26 | | | 5.5 | | | | 25,900 |
| 7832102 | PZAG06R020SS20-2 | 20 | | 110 | 40 | 30 | | | 8 | | | | 27,900 |
| 7832103 | PZAG06R023SS25-2 | 23 | | 125 | 50 | 34.5 | 25 | 75 | 11 | 6 | ② | | 27,900 |
| 7832104 | PZAG09R026SS25-2 | 26 | | 130 | 55 | 39 | | | 8 | | | | 29,500 |
| 7832105 | PZAG09R029SS32-2 | 29 | | 140 | 60 | 43.5 | 32 | 80 | 11 | 9 | ③ | | 29,500 |
| 7832106 | PZAG09R032SS32-2 | 32 | | 145 | 65 | 48 | | | 14 | | | | 31,100 |
| 7832107 | PZAG09R035SS32-2 | 35 | | 150 | 70 | 52.5 | | | 17 | | | | 32,100 |
| 7832108 | PZAG09R039SS32-2 | 39 | | 160 | 80 | 58.5 | | | 21 | | | | 33,100 |
| 7832109 | PZAG09R043SS32-2 | 43 | | 170 | 90 | 64.5 | | | 25 | | | | 36,400 |
| 7832110 | PZAG09R048SS32-2 | 48 | | 180 | 100 | 72 | | | 30 | | | | 39,900 |

注1) 座ぐり加工を行う場合の下穴の最小値を示します。 These minimum pre-drilled hole sizes are required before counterboring operations.

座ぐりカッタ ボアタイプ

Counterboring Cutter Bore Type

PZAG BORE

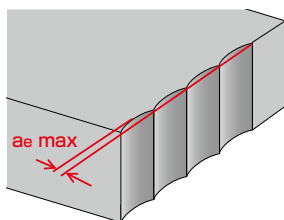


単位:mm Unit:mm

| ツールNo. EDP No. | 呼び Designation | 外径 Dc | 刃数 Z | カット高さ L _f | 有効加工深さ ℓ _e | ボス径 D _b | 穴径 d | 穴径深さ l | 端面キー溝 Key Slot 幅 a 深さ b | 最小下穴径 Min. Pre-Drilled Dia. 注1) | ae 注2) (max) | 適用インサート Applicable Inserts | 標準価格 (Yen) |
|-------------------|-------------------|----------|---------|-------------------------|--------------------------|-----------------------|---------|-----------|----------------------------|------------------------------------|-----------------|-------------------------------|---------------|
| 7832111 | PZAG13R054M22-4 | 54 | 4 | 63 | 35 | 45 | 22 | 21 | 10.4 6.3 | 29 | 12.5 | ④ | 51,800 |
| 7832112 | PZAG13R058M22-4 | 58 | | | 38 | | | | | 51,800 | | | |
| 7832113 | PZAG13R062M22-4 | 62 | | | 41 | | | | | 53,800 | | | |
| 7832114 | PZAG13R067M22-4 | 67 | | | 44 | | | | | 53,800 | | | |
| 7832115 | PZAG13R072M22-4 | 72 | | | 47 | | | | | 58,000 | | | |
| 7832116 | PZAG17R076M22-4 | 76 | | | 50 | | | | | 58,000 | | | |
| 7832117 | PZAG17R082M22-4 | 82 | | | 54 | | | | | 62,100 | | | |

注1) 座ぐり加工を行う場合の下穴の最小値を示します。 These minimum pre-drilled hole sizes are required before counterboring operations.

注2) プランジ加工時の最大切込み (ae)
Maximum depth of cut in plunge milling



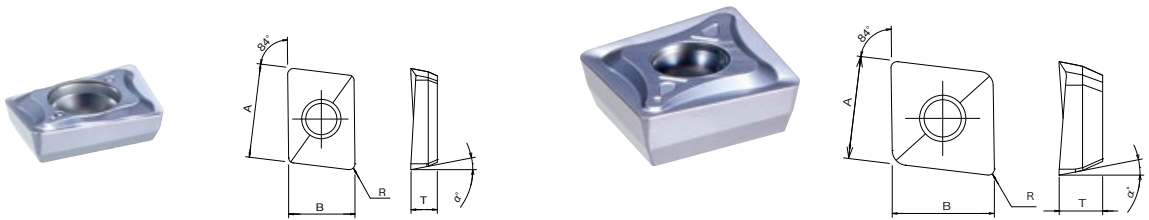
在庫区分は全てC (標準在庫品) となります。 Stock are categorized as C (Standard stock item).

座ぐりカッタ
Counterboring Cutter

PZAG インサート

Type 1

Type 2



■適用インサート Inserts

単位:mm Unit:mm

| 呼び Designation | 切れ刃数 No. of Cutting Edges | インサート寸法 Insert Size | | | | 形状 Type | 適用ボディ Applicable Body | コーティング材種 Carbide Coated Material | | 標準価格 (Yen) |
|-------------------|------------------------------|------------------------|---------|------------------|-----|------------|--------------------------|-------------------------------------|---------|---------------|
| | | AXB | 厚さ T | 逃げ角 α' | R | | | XP8030 | XC8035 | |
| ① ZPNT040104ER | 2 | 6.35 × 4.45 | 1.76 | 11 | 0.4 | 1 | φ 14 | 7814101 | 7815101 | 1,680 |
| ② ZPNT060204EN | | 6.95 × 6.95 | 2.93 | | | | φ 17.5 ~ 23 | 7814103 | 7815103 | 1,730 |
| ③ ZPNT090404EN | | 9.94 × 9.94 | 4.65 | | | φ 26 ~ 48 | 7814106 | 7815106 | 1,770 | |
| ④ ZPNT130504EN | | 13.92 × 13.92 | 5.46 | | | φ 54 ~ 72 | 7814109 | 7815109 | 2,130 | |
| ⑤ ZPNT170608EN | | 17.85 × 17.85 | 6.31 | | | φ 76, φ 82 | 7814111 | 7815111 | 2,240 | |

■被削材別推奨材質 Recommended Materials by Insert Type


| インサート材種 Insert Grades | 切削油剤 Coolant | P | M | K | N | S |
|--------------------------|-----------------|---|---|---|---|---|
| XP8030 | 有 Wet | ◎ | ◎ | ○ | ○ | ○ |
| XC8035 | 無 Dry | ○ | | ◎ | | |
| | 有 Wet | | ○ | | | |

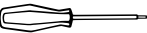
◎ 第一推奨材質 Best ○ 第二推奨材質 Good

| 被削材 Work Material | 低炭素鋼 軟鋼 | 中炭素鋼 | 高炭素鋼 | 合金鋼 | 調質鋼 | 焼入鋼 | | | | ステンレス 鋼 | 工具鋼 | 鋳鉄 | ダクタイル 鋳鉄 | 銅合金 | アルミ 展伸材 | アルミ 合金鑄物 | チタン 合金 | インコル |
|----------------------|--------------------------------|---------------------|-------------------|-------------|----------------|-----------------------------|-----------|-----------|-----------|-----------------|------------|-----------|-------------------|--------------|------------|------------------------|----------------|---------|
| | Low Carbon Steel Mild Steel | Medium Carbon Steel | High Carbon Steel | Alloy Steel | Hardened Steel | Quenched and Tempered Steel | | | | Stainless Steel | Tool Steel | Cast Iron | Ductile Cast Iron | Copper Alloy | Aluminum | Aluminum Alloy Casting | Titanium Alloy | Inconel |
| 製品記号 Abbreviation | C~0.25% | C0.25~0.45% | C0.45%~ | SCM | ~35 HRC | 35~45 HRC | 45~50 HRC | 50~60 HRC | 60~70 HRC | SUS | SKD SKS | FC | FCD | Cu | Al | AC | | |
| PZAG | ◎ | ◎ | ◎ | ◎ | ◎ | ◎ | ○ | | | ◎ | ◎ | ◎ | ◎ | ○ | ○ | ○ | ○ | ○ |

在庫区分は全てC (標準在庫品) となります。 Stock are categorized as C (Standard stock item) .

■部品 Accessories

| | ツール No. EDP No. | 呼 び Designation | 適用インサート Applicable Inserts | 適用カッタ Applicable Cutters | 推奨締め付けトルク Recommended Tightening Torque |
|---|--------------------|----------------------|-------------------------------|-----------------------------|--|
|  クランプねじ Clamping Screw | 7808096 | FS18536P (Torx 6IP) | ① ZPNT04… | PZAG SS ϕ 14 | 0.7 Nm |
| | 7808138 | FS22550P (Torx 7IP) | ② ZPNT06… | PZAG SS ϕ 17.5~23 | 1.0 Nm |
| | 7808135 | FS30570P (Torx 9IP) | ③ ZPNT09… | PZAG SS ϕ 26~48 | 2.2 Nm |
| | 7808114 | FS45510P (Torx 20IP) | ④ ZPNT13… | PZAG BORE ϕ 54~82 | 5.0 Nm |
| | | | ⑤ ZPNT17… | | |

| | ツール No. EDP No. | 呼 び Designation | 適用インサート Applicable Inserts | 適用カッタ Applicable Cutters | 標準価格 (Yen) |
|--|--------------------|--------------------|-------------------------------|-----------------------------|---------------|
|  レンチ Wrench | 7808223 | 6IP-D (Torx 6IP) | ① ZPNT04… | PZAG SS ϕ 14 | 1,460 |
| | 7808224 | 7IP-D (Torx 7IP) | ② ZPNT06… | PZAG SS ϕ 17.5~23 | 1,250 |
| | 7808226 | 9IP-D (Torx 9IP) | ③ ZPNT09… | PZAG SS ϕ 26~48 | 1,460 |
| | 7808229 | 20IP-D (Torx 20IP) | ④ ZPNT13… | PZAG BORE ϕ 54~82 | 1,770 |
| | | | ⑤ ZPNT17… | | |

レンチは別途ご購入下さい。The wrenches are sold separately from the cutters.

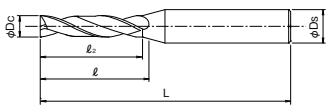
G-LIST No. | DW1071 切削条件 Cutting Conditions | P.63
超硬フラットドリル 2Dタイプ
 Carbide Flat Drill 2D Type
ADF-2D
 The A Brand



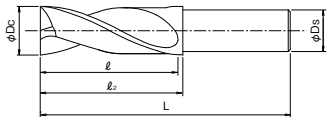
コーティングに色むらが発生する場合がありますが、性能上は全く問題ありません。
 Drills may have some discoloration, but it does not cause any performance problems.



Type 1



Type 2



単位:mm Unit:mm

| ツールNo. EDP No. | 直径 Dc | 溝長 ℓ | 全長 L | シャン径 Ds | φ ₂ | 形状 Type | 在庫 Stock | 重量 Weight | 標準価格 (Yen) | | |
|-------------------|----------|---------|---------|------------|----------------|------------|-------------|--------------|---------------|-------|-------|
| ※3330020 | 0.2 | 0.6 | 40 | 3 | 0.7 | 1 | B | — | 6,420 | | |
| ※3330025 | 0.25 | 0.8 | | | 0.9 | | | — | 6,800 | | |
| ※3330030 | 0.3 | 0.9 | | | 1 | | | — | 6,420 | | |
| ※3330035 | 0.35 | 1.1 | | | 1.2 | | | — | 6,800 | | |
| ※3330040 | 0.4 | 1.2 | | | 1.3 | | | — | 6,420 | | |
| ※3330045 | 0.45 | 1.4 | | | 1.5 | | | — | 6,800 | | |
| ※3330050 | 0.5 | 1.7 | | | 1.9 | | | — | 5,840 | | |
| ※3330055 | 0.55 | 1.9 | | | 2.1 | | | — | 6,320 | | |
| ※3330060 | 0.6 | 2.0 | | | 2.2 | | | — | 5,840 | | |
| ※3330065 | 0.65 | 2.2 | | | 2.4 | | | — | 6,320 | | |
| ※3330070 | 0.7 | 2.4 | 45 | 3 | 2.6 | — | 5,840 | | | | |
| ※3330071 | 0.71 | | | | 2.7 | — | 7,300 | | | | |
| ※3330072 | 0.72 | | | | 2.7 | — | 7,300 | | | | |
| ※3330074 | 0.74 | | | | 2.5 | 2.7 | — | 7,300 | | | |
| ※3330075 | 0.75 | | | | 2.6 | 2.8 | — | 6,320 | | | |
| ※3330080 | 0.8 | | | | 2.7 | 2.9 | — | 5,840 | | | |
| ※3330081 | 0.81 | | | | 2.8 | 3 | — | 7,300 | | | |
| ※3330085 | 0.85 | | | | 2.9 | 3.1 | — | 6,320 | | | |
| ※3330089 | 0.89 | | | | 3.0 | 3.2 | — | 7,300 | | | |
| ※3330090 | 0.9 | | | | 3.1 | 50 | 3 | 3.3 | — | 5,840 | |
| ※3330091 | 0.91 | 3.4 | — | 7,300 | | | | | | | |
| ※3330092 | 0.92 | 3.4 | — | 7,300 | | | | | | | |
| ※3330095 | 0.95 | 3.2 | 3.4 | — | | | | 6,320 | | | |
| ※3330100 | 1 | 4.0 | 4.3 | — | | | | 5,450 | | | |
| ※3330109 | 1.09 | 4.4 | 55 | 3 | | | | 4.7 | — | 6,820 | |
| ※3330110 | 1.1 | | | | | | | 4.7 | — | 5,450 | |
| ※3330111 | 1.11 | | | | | | | 4.8 | — | 6,820 | |
| ※3330112 | 1.12 | | | | | | | 4.5 | 4.8 | — | 6,820 |
| ※3330120 | 1.2 | | | | | | | 4.8 | 5.1 | — | 5,450 |
| ※3330125 | 1.25 | | | | 5.0 | 5.3 | — | 6,250 | | | |
| ※3330126 | 1.26 | | | | 5.1 | 60 | 3 | 5.4 | — | 6,820 | |
| ※3330127 | 1.27 | | | | | | | 5.4 | — | 6,820 | |
| ※3330128 | 1.28 | | | | | | | 5.5 | — | 6,820 | |
| ※3330129 | 1.29 | | | | | | | 5.2 | 5.5 | — | 6,820 |
| ※3330130 | 1.3 | 5.4 | 5.7 | — | | | | 5,450 | | | |
| ※3330135 | 1.35 | 5.4 | 5.9 | — | | | | 6,250 | | | |
| ※3330140 | 1.4 | 5.6 | 5.9 | — | | | | 5,450 | | | |
| ※3330144 | 1.44 | 5.8 | 65 | 3 | | | | 6.1 | — | 6,820 | |
| ※3330145 | 1.45 | | | | | | | 6.1 | — | 6,250 | |
| ※3330146 | 1.46 | | | | | | | 6.2 | — | 6,820 | |
| ※3330147 | 1.47 | | | | 6.2 | — | 6,820 | | | | |
| ※3330148 | 1.48 | | | | 6.3 | — | 6,820 | | | | |
| ※3330150 | 1.5 | | | | 6.0 | 6.3 | — | 5,450 | | | |
| ※3330153 | 1.53 | | | | 6.1 | 6.4 | — | 6,820 | | | |
| ※3330154 | 1.54 | | | | 6.2 | 6.5 | — | 6,820 | | | |

*=2019年春発売予定 Available from Spring 2019

| ツールNo. EDP No. | 直径 Dc | 溝長 ℓ | 全長 L | シャン径 Ds | φ ₂ | 形状 Type | 在庫 Stock | 重量 Weight | 標準価格 (Yen) | | |
|-------------------|----------|---------|---------|------------|----------------|------------|-------------|--------------|---------------|---|-------|
| ※3330155 | 1.55 | 6.2 | 45 | 3 | 6.5 | B | — | — | 6,250 | | |
| ※3330156 | 1.56 | | | | — | | — | 6,820 | | | |
| ※3330157 | 1.57 | | | | 6.6 | | — | 6,820 | | | |
| ※3330158 | 1.58 | | | | 6.3 | | — | 6,820 | | | |
| ※3330160 | 1.6 | | | | 6.4 | | — | 5,450 | | | |
| ※3330170 | 1.7 | | | | 6.8 | | — | 5,450 | | | |
| ※3330175 | 1.75 | | | | 7.0 | | — | 6,250 | | | |
| ※3330180 | 1.8 | | | | 7.2 | | — | 5,450 | | | |
| ※3330182 | 1.82 | | | | 7.3 | | — | 6,820 | | | |
| ※3330183 | 1.83 | | | | 7.3 | | — | 6,820 | | | |
| ※3330184 | 1.84 | 7.4 | 50 | 3 | 7.6 | — | 6,820 | | | | |
| ※3330185 | 1.85 | | | | 7.7 | — | 6,250 | | | | |
| ※3330186 | 1.86 | | | | 7.9 | — | 6,820 | | | | |
| ※3330190 | 1.9 | | | | 7.6 | — | 5,450 | | | | |
| ※3330195 | 1.95 | | | | 7.8 | — | 6,250 | | | | |
| 3330200 | 2 | | | | 10 | 55 | 3 | 8.1 | — | 9 | 5,450 |
| | 2.01 | | | | | | | 10.3 | — | — | |
| | 2.02 | | | | | | | — | — | — | |
| | 2.03 | | | | | | | — | — | — | |
| | 2.04 | | | | | | | — | — | — | |
| | 2.05 | — | — | — | | | | | | | |
| | 2.06 | — | — | — | | | | | | | |
| | 2.07 | — | — | — | | | | | | | |
| | 2.08 | — | — | — | | | | | | | |
| | 2.09 | 10.4 | — | — | | | | | | | |
| 3330210 | 2.1 | 10.5 | 60 | 3 | 10.4 | — | — | — | | | |
| | 2.11 | | | | — | — | — | | | | |
| | 2.12 | | | | — | — | — | | | | |
| | 2.13 | | | | — | — | — | | | | |
| | 2.14 | | | | — | — | — | | | | |
| | 2.15 | | | | — | — | — | | | | |
| | 2.16 | | | | — | — | — | | | | |
| | 2.17 | | | | — | — | — | | | | |
| | 2.18 | | | | — | — | — | | | | |
| | 2.19 | | | | 10.6 | — | — | | | | |
| 3330220 | 2.2 | 10.7 | 65 | 3 | 10.6 | — | — | — | | | |
| | 2.21 | | | | — | — | — | | | | |
| | 2.22 | | | | — | — | — | | | | |
| | 2.23 | | | | — | — | — | | | | |
| | 2.24 | | | | — | — | — | | | | |
| | 2.25 | | | | — | — | — | | | | |
| | 2.26 | | | | — | — | — | | | | |
| | 2.27 | | | | — | — | — | | | | |
| | 2.28 | | | | 10.8 | — | — | | | | |
| | 2.29 | | | | — | — | — | | | | |

次ページへ
 直径 Dc 2.3 ~ 3.19 NEXT

A, B, C, D=標準在庫品 A, B, C, D=Standard stock item. □=特定代理店在庫品 □=Stocked by specific distributors. Contact us for price & availability.

| 製品記号 Abbreviation | 被削材 Work Material | 低碳素鋼 軟鋼 Low Carbon Steel Mild Steel | 中炭素鋼 Medium Carbon Steel | 高炭素鋼 High Carbon Steel | 合金鋼 Alloy Steel | 調質鋼 Hardened Steel | 焼入鋼 Quenched and Tempered Steel | ステンレス 鋼 Stainless Steel | 工具鋼 Tool Steel | 鑄鉄 Cast Iron | ダクタイル 鑄鉄 Ductile Cast Iron | 銅合金 Copper Alloy | アルミ 展伸材 Aluminum | アルミ 合金鋳物 Aluminum Alloy Casting | チタン 合金 Titanium Alloy | インコル Inconel | |
|----------------------|-------------------------|--|-----------------------------------|---------------------------------|-----------------------|-----------------------|---------------------------------------|----------------------------------|-------------------|-----------------|-------------------------------------|------------------------|------------------------|---|--------------------------------|-----------------|--|
| | C~0.25% | C0.25~0.45% | C0.45%~ | SCM | ~35 HRC | 35~45 HRC | 45~50 HRC | 50~60 HRC | 60~70 HRC | SUS | SKD SKS | FC | FCD | Cu | Al | AC | |
| ADF-2D | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | |

注1) Dc<2
Note

形状寸法表
Specification
Charts

センターリング穴面取り
Centering -
Countersinking

コーナ面取り
Corner Chamfering

R面取り
Corner Rounding

座ぐり
Counterboring

切削条件
Cutting
Conditions

センターリング穴面取り
Centering -
Countersinking

コーナ面取り
Corner Chamfering

R面取り
Corner Rounding

座ぐり
Counterboring

前ページより

FROM 直径 Dc 0.2 ~ 2.29

| ツールNo. EDP No. | 直径 Dc | 溝長 ℓ | 全長 L | シャンク径 Ds | ℓ ₂ | 形状 Type | 在庫 Stock | 重量 Weight | 標準価格 (Yen) | | | | | | | | | | |
|-------------------|----------|---------|---------|-------------|----------------|------------|-------------|--------------|---------------|---|------|----|----|-------|---|------|---|---|-------|
| 3330230 | 2.3 | 11 | 50 | 4 | 1 | 10.8 | B | 9 | 5,450 | | | | | | | | | | |
| | 2.31 | | | | | | □ | — | — | | | | | | | | | | |
| 3330232 | 2.32 | | | | | | B | 9 | 5,450 | | | | | | | | | | |
| | 2.33 | | | | | | □ | — | — | | | | | | | | | | |
| | 2.34 | | | | | | — | — | — | | | | | | | | | | |
| | 2.35 | | | | | | — | — | — | | | | | | | | | | |
| | 2.36 | | | | | | □ | — | — | | | | | | | | | | |
| | 2.37 | | | | | | — | — | — | | | | | | | | | | |
| | 2.38 | | | | | | — | — | — | | | | | | | | | | |
| | 2.39 | | | | | | — | — | — | | | | | | | | | | |
| 3330240 | 2.4 | 12 | 50 | 4 | 1 | 11.1 | B | 9 | 5,450 | | | | | | | | | | |
| | 2.41 | | | | | | □ | — | — | | | | | | | | | | |
| 3330242 | 2.42 | | | | | | B | 9 | 5,450 | | | | | | | | | | |
| | 2.43 | | | | | | □ | — | — | | | | | | | | | | |
| | 2.44 | | | | | | — | — | — | | | | | | | | | | |
| | 2.45 | | | | | | — | — | — | | | | | | | | | | |
| | 2.46 | | | | | | □ | — | — | | | | | | | | | | |
| | 2.47 | | | | | | — | — | — | | | | | | | | | | |
| | 2.48 | | | | | | — | — | — | | | | | | | | | | |
| | 2.49 | | | | | | — | — | — | | | | | | | | | | |
| 3330250 | 2.5 | 13 | 50 | 4 | 1 | 11.2 | B | 9 | 5,450 | | | | | | | | | | |
| | 2.51 | | | | | | □ | — | — | | | | | | | | | | |
| | 2.52 | | | | | | — | — | — | | | | | | | | | | |
| | 2.53 | | | | | | — | — | — | | | | | | | | | | |
| 3330254 | 2.54 | | | | | | 14 | 50 | 4 | 1 | 11.3 | B | 9 | 5,450 | | | | | |
| | 2.55 | | | | | | | | | | | □ | — | — | | | | | |
| | 2.56 | | | | | | | | | | | — | — | — | | | | | |
| | 2.57 | | | | | | | | | | | — | — | — | | | | | |
| 3330258 | 2.58 | | | | | | | | | | | 15 | 55 | 6 | 1 | 11.4 | B | 9 | 5,450 |
| | 2.59 | | | | | | | | | | | | | | | | □ | — | — |
| 3330260 | 2.6 | 16 | 60 | 8 | 1 | 11.5 | | | | | | | | | | | B | 9 | 5,450 |
| | 2.61 | | | | | | | | | | | | | | | | □ | — | — |
| | 2.62 | | | | | | | | | | | | | | | | — | — | — |
| | 2.63 | | | | | | | | | | | | | | | | — | — | — |
| | 2.64 | | | | | | □ | — | — | | | | | | | | | | |
| | 2.65 | | | | | | — | — | — | | | | | | | | | | |
| | 2.66 | | | | | | — | — | — | | | | | | | | | | |
| | 2.67 | | | | | | □ | — | — | | | | | | | | | | |
| | 2.68 | | | | | | — | — | — | | | | | | | | | | |
| | 2.69 | | | | | | — | — | — | | | | | | | | | | |
| 3330270 | 2.7 | 17 | 65 | 10 | 1 | 11.6 | B | 9 | 5,450 | | | | | | | | | | |
| | 2.71 | | | | | | □ | — | — | | | | | | | | | | |
| | 2.72 | | | | | | — | — | — | | | | | | | | | | |
| | 2.73 | | | | | | — | — | — | | | | | | | | | | |
| | 2.74 | | | | | | — | — | — | | | | | | | | | | |

単位:mm Unit:mm

| ツールNo. EDP No. | 直径 Dc | 溝長 ℓ | 全長 L | シャンク径 Ds | ℓ ₂ | 形状 Type | 在庫 Stock | 重量 Weight | 標準価格 (Yen) | | | | | |
|-------------------|----------|---------|---------|-------------|----------------|------------|-------------|--------------|---------------|---|------|---|----|-------|
| | 2.75 | 14 | 50 | 4 | 1 | 11.7 | □ | — | — | | | | | |
| 3330276 | 2.76 | | | | | | B | 9 | 5,450 | | | | | |
| | 2.77 | | | | | | □ | — | — | | | | | |
| 3330278 | 2.78 | | | | | | B | 9 | 5,450 | | | | | |
| | 2.79 | | | | | | □ | — | — | | | | | |
| 3330280 | 2.8 | | | | | | 15 | 55 | 6 | 1 | 11.8 | B | 9 | 5,450 |
| | 2.81 | | | | | | | | | | | □ | — | — |
| | 2.82 | | | | | | | | | | | — | — | — |
| | 2.83 | | | | | | | | | | | — | — | — |
| | 2.84 | | | | | | | | | | | □ | — | — |
| | 2.85 | — | — | — | | | | | | | | | | |
| | 2.86 | — | — | — | | | | | | | | | | |
| | 2.87 | □ | — | — | | | | | | | | | | |
| | 2.88 | — | — | — | | | | | | | | | | |
| | 2.89 | — | — | — | | | | | | | | | | |
| 3330290 | 2.9 | 16 | 60 | 8 | 1 | 11.9 | B | 9 | 5,450 | | | | | |
| | 2.91 | | | | | | □ | — | — | | | | | |
| | 2.92 | | | | | | — | — | — | | | | | |
| | 2.93 | | | | | | — | — | — | | | | | |
| | 2.94 | | | | | | □ | — | — | | | | | |
| | 2.95 | | | | | | — | — | — | | | | | |
| | 2.96 | | | | | | — | — | — | | | | | |
| | 2.97 | | | | | | □ | — | — | | | | | |
| | 2.98 | | | | | | — | — | — | | | | | |
| | 2.99 | | | | | | — | — | — | | | | | |
| 3330300 | 3 | 17 | 65 | 10 | 1 | 12.0 | B | 19 | 5,450 | | | | | |
| | 3.01 | | | | | | □ | — | — | | | | | |
| | 3.02 | | | | | | — | — | — | | | | | |
| 3330303 | 3.03 | | | | | | 18 | 70 | 12 | 1 | 12.1 | B | 19 | 5,860 |
| | 3.04 | | | | | | | | | | | □ | — | — |
| | 3.05 | | | | | | | | | | | — | — | — |
| | 3.06 | | | | | | | | | | | □ | — | — |
| | 3.07 | | | | | | | | | | | — | — | — |
| | 3.08 | | | | | | | | | | | □ | — | — |
| | 3.09 | | | | | | | | | | | — | — | — |
| 3330310 | 3.1 | 19 | 75 | 14 | 1 | 12.2 | | | | | | B | 19 | 5,860 |
| | 3.11 | | | | | | | | | | | □ | — | — |
| | 3.12 | | | | | | | | | | | — | — | — |
| | 3.13 | | | | | | □ | — | — | | | | | |
| | 3.14 | | | | | | — | — | — | | | | | |
| 3330315 | 3.15 | | | | | | 20 | 80 | 16 | 1 | 12.3 | B | 19 | 5,860 |
| | 3.16 | | | | | | | | | | | □ | — | — |
| | 3.17 | | | | | | | | | | | — | — | — |
| | 3.18 | | | | | | | | | | | □ | — | — |
| | 3.19 | | | | | | | | | | | — | — | — |

次ページへ

直径 Dc 3.2 ~ 4.09 NEXT

A、B、C、D=標準在庫品 A、B、C、D=Standard stock item. □=特定代理店在庫品 □=Stocked by specific distributors. Contact us for price & availability.

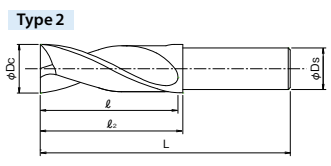
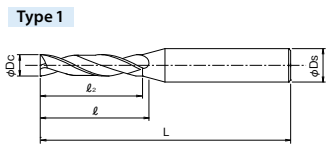
G-LIST No. | DW1071 切削条件 Cutting Conditions | P.63
超硬フラットドリル 2Dタイプ
 Carbide Flat Drill 2D Type **A**
 The A Brand
ADF-2D



コーティングに色むらが発生する場合がありますが、性能上は全く問題ありません。
 Drills may have some discoloration, but it does not cause any performance problems.

CARBIDE EgiAs IchAda h8 0~-0.009 SHRINK FIT #s20° ABOUT20°
 2≤Dc Dc<2 2≤Dc Dc<2

前ページより FROM 直径 Dc 2.3~3.19



単位:mm Unit:mm

| ツールNo. EDP No. | 直径 Dc | 溝長 ℓ | 全長 L | シャン径 Ds | φ2 | 形状 Type | 在庫 Stock | 重量 Weight | 標準価格 (Yen) | | | | | | | | | |
|-------------------|----------|---------|---------|------------|----|------------|-------------|--------------|---------------|---|------|---|----|-------|--|--|--|--|
| 3330320 | 3.2 | 15 | 55 | 6 | 1 | 11.8 | B | 19 | 5,860 | | | | | | | | | |
| | 3.21 | | | | | | | | | | | | | | | | | |
| | 3.22 | | | | | | | | | | | | | | | | | |
| | 3.23 | | | | | | | | | | | | | | | | | |
| | 3.24 | | | | | | | | | | | | | | | | | |
| | 3.25 | | | | | | | | | | | | | | | | | |
| | 3.26 | | | | | | | | | | | | | | | | | |
| | 3.27 | | | | | | | | | | | | | | | | | |
| | 3.28 | | | | | | | | | | | | | | | | | |
| | 3.29 | | | | | | | | | | | | | | | | | |
| 3330330 | 3.3 | 16 | 60 | 6 | 1 | 11.9 | B | 19 | 5,860 | | | | | | | | | |
| | 3.31 | | | | | | | | | | | | | | | | | |
| | 3.32 | | | | | | | | | | | | | | | | | |
| | 3.33 | | | | | | | | | | | | | | | | | |
| | 3.34 | | | | | | | | | | | | | | | | | |
| | 3.35 | | | | | | | | | | | | | | | | | |
| | 3.36 | | | | | | | | | | | | | | | | | |
| | 3.37 | | | | | | | | | | | | | | | | | |
| | 3.38 | | | | | | | | | | | | | | | | | |
| | 3.39 | | | | | | | | | | | | | | | | | |
| 3330340 | 3.4 | 16 | 60 | 6 | 1 | 12 | B | 19 | 5,860 | | | | | | | | | |
| | 3.41 | | | | | | | | | | | | | | | | | |
| | 3.42 | | | | | | | | | | | | | | | | | |
| | 3.43 | | | | | | | | | | | | | | | | | |
| | 3.44 | | | | | | | | | | | | | | | | | |
| | 3.45 | | | | | | | | | | | | | | | | | |
| | 3.46 | | | | | | | | | | | | | | | | | |
| | 3.47 | | | | | | | | | | | | | | | | | |
| | 3.48 | | | | | | | | | | | | | | | | | |
| | 3.49 | | | | | | | | | | | | | | | | | |
| 3330350 | 3.5 | 16 | 60 | 6 | 1 | 12.1 | B | 19 | 5,860 | | | | | | | | | |
| | 3.51 | | | | | | | | | | | | | | | | | |
| | 3.52 | | | | | | | | | | | | | | | | | |
| 3330353 | 3.53 | | | | | | 16 | 60 | 6 | 1 | 12.2 | B | 19 | 6,160 | | | | |
| | 3.54 | | | | | | | | | | | | | | | | | |
| | 3.55 | | | | | | | | | | | | | | | | | |
| | 3.56 | | | | | | | | | | | | | | | | | |
| | 3.57 | | | | | | | | | | | | | | | | | |
| | 3.58 | | | | | | | | | | | | | | | | | |
| | 3.59 | | | | | | | | | | | | | | | | | |
| 3330360 | 3.6 | 16 | 60 | 6 | 1 | 12.3 | | | | | | B | 19 | 6,160 | | | | |
| | 3.61 | | | | | | | | | | | | | | | | | |
| | 3.62 | | | | | | | | | | | | | | | | | |
| | 3.63 | | | | | | | | | | | | | | | | | |
| | 3.64 | | | | | | | | | | | | | | | | | |

| ツールNo. EDP No. | 直径 Dc | 溝長 ℓ | 全長 L | シャン径 Ds | φ2 | 形状 Type | 在庫 Stock | 重量 Weight | 標準価格 (Yen) | | | | |
|-------------------|----------|---------|---------|------------|----|------------|-------------|--------------|---------------|--|--|--|--|
| | 3.65 | 16 | 55 | 6 | 1 | 12.4 | | | | | | | |
| 3330366 | 3.66 | | | | | | | | | | | | |
| | 3.67 | | | | | | | | | | | | |
| 3330368 | 3.68 | | | | | | | | | | | | |
| | 3.69 | | | | | | | | | | | | |
| 3330370 | 3.7 | | | | | | | | | | | | |
| | 3.71 | | | | | | | | | | | | |
| | 3.72 | | | | | | | | | | | | |
| | 3.73 | | | | | | | | | | | | |
| | 3.74 | | | | | | | | | | | | |
| | 3.75 | 16 | 55 | 6 | 1 | 12.5 | | | | | | | |
| | 3.76 | | | | | | | | | | | | |
| | 3.77 | | | | | | | | | | | | |
| | 3.78 | | | | | | | | | | | | |
| | 3.79 | | | | | | | | | | | | |
| 3330380 | 3.8 | | | | | | | | | | | | |
| | 3.81 | | | | | | | | | | | | |
| | 3.82 | | | | | | | | | | | | |
| | 3.83 | | | | | | | | | | | | |
| | 3.84 | | | | | | | | | | | | |
| | 3.85 | 16 | 55 | 6 | 1 | 12.6 | | | | | | | |
| | 3.86 | | | | | | | | | | | | |
| | 3.87 | | | | | | | | | | | | |
| | 3.88 | | | | | | | | | | | | |
| | 3.89 | | | | | | | | | | | | |
| 3330390 | 3.9 | | | | | | | | | | | | |
| | 3.91 | | | | | | | | | | | | |
| | 3.92 | | | | | | | | | | | | |
| | 3.93 | | | | | | | | | | | | |
| | 3.94 | | | | | | | | | | | | |
| | 3.95 | 16 | 55 | 6 | 1 | 12.7 | | | | | | | |
| | 3.96 | | | | | | | | | | | | |
| | 3.97 | | | | | | | | | | | | |
| | 3.98 | | | | | | | | | | | | |
| | 3.99 | | | | | | | | | | | | |
| 3330400 | 4 | | | | | | | | | | | | |
| | 4.01 | | | | | | | | | | | | |
| | 4.02 | | | | | | | | | | | | |
| 3330403 | 4.03 | | | | | | | | | | | | |
| | 4.04 | | | | | | | | | | | | |
| | 4.05 | 16 | 55 | 6 | 1 | 12.8 | | | | | | | |
| | 4.06 | | | | | | | | | | | | |
| | 4.07 | | | | | | | | | | | | |
| | 4.08 | | | | | | | | | | | | |
| | 4.09 | | | | | | | | | | | | |

次ページへ
 直径 Dc 4.1 ~ 4.99 NEXT

A, B, C, D=標準在庫品 A, B, C, D=Standard stock item. □=特定代理店在庫品 □=Stocked by specific distributors. Contact us for price & availability.

| 製品記号 Abbreviation | 被削材 Work Material | 低炭素鋼 軟鋼 Low Carbon Steel Mild Steel | 中炭素鋼 Medium Carbon Steel | 高炭素鋼 High Carbon Steel | 合金鋼 Alloy Steel | 調質鋼 Hardened Steel | 焼入鋼 Quenched and Tempered Steel | ステンレス 鋼 Stainless Steel | 工具鋼 Tool Steel | 鋳鉄 Cast Iron | ダクタイル 鋳鉄 Ductile Cast Iron | 銅合金 Copper Alloy | アルミ 展伸材 Aluminum | アルミ 合金鋳物 Aluminum Alloy Casting | チタン 合金 Titanium Alloy | インコル Inconel |
|----------------------|-------------------------|--|-----------------------------------|---------------------------------|-----------------------|-------------------------|--|----------------------------------|-------------------|-----------------|-------------------------------------|------------------------|------------------------|---|--------------------------------|-----------------|
| | | C~0.25% | 0.25~0.45% | 0.45%~ | SCM | ~35 HRC 35~45 HRC | 45~50 HRC 50~60 HRC 60~70 HRC | SUS | SKD SKS | FC | FCD | Cu | Al | AC | | |
| ADF-2D | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | ○ | ○ | | ○ | ○ | | |

注1) Dc<2
Note

形状寸法表
Specification
Charts

センターリング面取り
Centering -
Countersinking
面取り

コーナ面取り
Corner Chamfering

R面取り
Corner Rounding

座ぐり
Counterboring

切削条件
Cutting
Conditions

センターリング面取り
Centering -
Countersinking
面取り

コーナ面取り
Corner Chamfering

R面取り
Corner Rounding

座ぐり
Counterboring

前ページより

FROM 直径 Dc 3.2~4.09

| ツールNo. EDP No. | 直径 Dc | 溝長 ℓ | 全長 L | シャンク径 Ds | ℓ ₂ | 形状 Type | 在庫 Stock | 重量 Weight | 標準価格 (円) |
|-------------------|----------|---------|---------|-------------|----------------|------------|-------------|--------------|-------------|
| 3330410 | 4.1 | 19 | | | | | B | 20 | 6,610 |
| | 4.11 | | | | 18.5 | | | — | — |
| | 4.12 | | | | | | | — | — |
| | 4.13 | | | | | | | — | — |
| | 4.14 | | | | | | | — | — |
| | 4.15 | | | | | □ | | — | — |
| | 4.16 | | | | | | | — | — |
| | 4.17 | | | | | | | — | — |
| | 4.18 | | | | 18.6 | | | — | — |
| | 4.19 | | | | | | | — | — |
| 3330420 | 4.2 | | | | | | B | 20 | 6,610 |
| | 4.21 | | | | | | | — | — |
| | 4.22 | | | | | | | — | — |
| | 4.23 | | | | | | | — | — |
| | 4.24 | | | | | | | — | — |
| | 4.25 | | | | | □ | | — | — |
| | 4.26 | | | | | | | — | — |
| | 4.27 | | | | | | | — | — |
| | 4.28 | | | | | | | — | — |
| | 4.29 | | | | | | | — | — |
| 3330430 | 4.3 | | | | | | B | 20 | 6,610 |
| | 4.31 | | | | | | | — | — |
| | 4.32 | | | | | | | — | — |
| | 4.33 | | | | | | | — | — |
| | 4.34 | | | | | | | — | — |
| | 4.35 | | | | | | | — | — |
| | 4.36 | | | | | □ | | — | — |
| | 4.37 | | | | | | | — | — |
| | 4.38 | | | | | | | — | — |
| | 4.39 | | | | | | | — | — |
| 3330440 | 4.4 | | | | | | B | 20 | 6,610 |
| | 4.41 | | | | | | | — | — |
| | 4.42 | | | | | | | — | — |
| | 4.43 | | | | | | | — | — |
| | 4.44 | | | | | | | — | — |
| | 4.45 | | | | | □ | | — | — |
| | 4.46 | | | | | | | — | — |
| | 4.47 | | | | | | | — | — |
| | 4.48 | | | | | | | — | — |
| | 4.49 | | | | | | | — | — |
| 3330450 | 4.5 | | | | | | B | 20 | 6,610 |
| | 4.51 | | | | | | | — | — |
| | 4.52 | | | | | □ | | — | — |
| 3330453 | 4.53 | | | | | | B | 21 | 7,070 |
| | 4.54 | | | | | | | — | — |

単位:mm Unit:mm

| ツールNo. EDP No. | 直径 Dc | 溝長 ℓ | 全長 L | シャンク径 Ds | ℓ ₂ | 形状 Type | 在庫 Stock | 重量 Weight | 標準価格 (円) |
|-------------------|----------|---------|---------|-------------|----------------|------------|-------------|--------------|-------------|
| | 4.55 | | | | | | | — | — |
| | 4.56 | | | | 19.3 | | | — | — |
| | 4.57 | | | | | | □ | — | — |
| | 4.58 | | | | | | | — | — |
| | 4.59 | | | | | | | — | — |
| 3330460 | 4.6 | | | | | | B | 20 | 7,070 |
| | 4.61 | | | | | | | — | — |
| 3330462 | 4.62 | | | | | | B | 21 | 7,070 |
| | 4.63 | | | | | | | — | — |
| 3330464 | 4.64 | | | | | | B | 20 | 7,070 |
| | 4.65 | | | | | | | — | — |
| | 4.66 | | | | | | | — | — |
| | 4.67 | | | | | | | — | — |
| | 4.68 | | | | | | | — | — |
| | 4.69 | | | | | | | — | — |
| 3330470 | 4.7 | | | | | | B | 21 | 7,070 |
| | 4.71 | | | | | | | — | — |
| | 4.72 | | | | | | | — | — |
| | 4.73 | | | | | | | — | — |
| | 4.74 | | | | | | | — | — |
| | 4.75 | | | | | | | — | — |
| | 4.76 | | | | | | | — | — |
| | 4.77 | | | | | | | — | — |
| | 4.78 | | | | | | | — | — |
| | 4.79 | | | | | | | — | — |
| 3330480 | 4.8 | | | | | | B | 21 | 7,070 |
| | 4.81 | | | | | | | — | — |
| | 4.82 | | | | | | | — | — |
| | 4.83 | | | | | | | — | — |
| | 4.84 | | | | | | | — | — |
| | 4.85 | | | | | | | — | — |
| | 4.86 | | | | | | | — | — |
| | 4.87 | | | | | | | — | — |
| | 4.88 | | | | | | | — | — |
| | 4.89 | | | | | | | — | — |
| 3330490 | 4.9 | | | | | | B | 21 | 7,070 |
| | 4.91 | | | | | | | — | — |
| | 4.92 | | | | | | | — | — |
| | 4.93 | | | | | | | — | — |
| | 4.94 | | | | | | | — | — |
| | 4.95 | | | | | | | — | — |
| | 4.96 | | | | | | | — | — |
| | 4.97 | | | | | | | — | — |
| | 4.98 | | | | | | | — | — |
| | 4.99 | | | | | | | — | — |

次ページへ
直径 Dc 5~5.89 NEXT

超硬フラットドリル 2Dタイプ
Carbide Flat Drill 2D Type

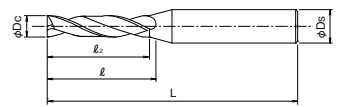


ADF-2D

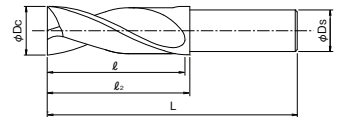


コーティングに色むらが発生する場合がありますが、性能上は全く問題ありません。
Drills may have some discoloration, but it does not cause any performance problems.

Type 1



Type 2



- CARBIDE
- EgiAs 2 ≤ Dc
- IchAda Dc < 2
- h8 2 ≤ Dc
- 0 ~ -0.009 Dc < 2
- SHRINK FIT
- ±20° ABOUT 20°

前ページより FROM 直径 Dc 4.1 ~ 4.99

単位:mm Unit:mm

| ツールNo. EDP No. | 直径 Dc | 溝長 ℓ | 全長 L | シャン径 Ds | ℓ2 | 形状 Type | 在庫 Stock | 重量 Weight | 標準価格 (Yen) |
|-------------------|----------|---------|---------|------------|----|------------|-------------|--------------|---------------|
| 3330500 | 5 | 24 | 65 | 6 | 1 | 1 | B | 22 | 7,070 |
| | 5.01 | | | | | | □ | — | — |
| | 5.02 | | | | | | □ | — | — |
| 3330503 | 5.03 | | | | | | B | 22 | 7,460 |
| | 5.04 | | | | | | □ | — | — |
| | 5.05 | | | | | | □ | — | — |
| | 5.06 | | | | | | □ | — | — |
| | 5.07 | | | | | | □ | — | — |
| | 5.08 | | | | | | □ | — | — |
| | 5.09 | | | | | | □ | — | — |
| 3330510 | 5.1 | B | 22 | 7,460 | | | | | |
| | 5.11 | □ | — | — | | | | | |
| | 5.12 | □ | — | — | | | | | |
| | 5.13 | □ | — | — | | | | | |
| | 5.14 | □ | — | — | | | | | |
| | 5.15 | □ | — | — | | | | | |
| | 5.16 | □ | — | — | | | | | |
| | 5.17 | □ | — | — | | | | | |
| | 5.18 | □ | — | — | | | | | |
| | 5.19 | □ | — | — | | | | | |
| 3330520 | 5.2 | B | 22 | 7,460 | | | | | |
| | 5.21 | □ | — | — | | | | | |
| | 5.22 | □ | — | — | | | | | |
| | 5.23 | □ | — | — | | | | | |
| | 5.24 | □ | — | — | | | | | |
| | 5.25 | □ | — | — | | | | | |
| | 5.26 | □ | — | — | | | | | |
| | 5.27 | □ | — | — | | | | | |
| | 5.28 | □ | — | — | | | | | |
| | 5.29 | □ | — | — | | | | | |
| 3330530 | 5.3 | B | 22 | 7,460 | | | | | |
| | 5.31 | □ | — | — | | | | | |
| | 5.32 | □ | — | — | | | | | |
| | 5.33 | □ | — | — | | | | | |
| | 5.34 | □ | — | — | | | | | |
| | 5.35 | □ | — | — | | | | | |
| | 5.36 | □ | — | — | | | | | |
| | 5.37 | □ | — | — | | | | | |
| | 5.38 | □ | — | — | | | | | |
| | 5.39 | □ | — | — | | | | | |
| 3330540 | 5.4 | B | 22 | 7,460 | | | | | |
| | 5.41 | □ | — | — | | | | | |
| | 5.42 | □ | — | — | | | | | |
| | 5.43 | □ | — | — | | | | | |
| | 5.44 | □ | — | — | | | | | |

| ツールNo. EDP No. | 直径 Dc | 溝長 ℓ | 全長 L | シャン径 Ds | ℓ2 | 形状 Type | 在庫 Stock | 重量 Weight | 標準価格 (Yen) |
|-------------------|----------|---------|---------|------------|----|------------|-------------|--------------|---------------|
| | 5.45 | 27 | 65 | 6 | 1 | 1 | □ | — | — |
| | 5.46 | | | | | | □ | — | — |
| | 5.47 | | | | | | □ | — | — |
| | 5.48 | | | | | | □ | — | — |
| | 5.49 | | | | | | □ | — | — |
| 3330550 | 5.5 | | | | | | B | 22 | 7,460 |
| | 5.51 | | | | | | □ | — | — |
| 3330552 | 5.52 | | | | | | B | 22 | 7,820 |
| | 5.53 | | | | | | □ | — | — |
| | 5.54 | | | | | | B | 22 | 7,820 |
| | 5.55 | □ | — | — | | | | | |
| | 5.56 | □ | — | — | | | | | |
| | 5.57 | □ | — | — | | | | | |
| | 5.58 | □ | — | — | | | | | |
| | 5.59 | □ | — | — | | | | | |
| 3330560 | 5.6 | B | 22 | 7,820 | | | | | |
| | 5.61 | □ | — | — | | | | | |
| | 5.62 | □ | — | — | | | | | |
| | 5.63 | □ | — | — | | | | | |
| | 5.64 | □ | — | — | | | | | |
| | 5.65 | □ | — | — | | | | | |
| | 5.66 | □ | — | — | | | | | |
| | 5.67 | □ | — | — | | | | | |
| | 5.68 | □ | — | — | | | | | |
| | 5.69 | □ | — | — | | | | | |
| 3330570 | 5.7 | B | 23 | 7,820 | | | | | |
| | 5.71 | □ | — | — | | | | | |
| | 5.72 | □ | — | — | | | | | |
| | 5.73 | □ | — | — | | | | | |
| | 5.74 | □ | — | — | | | | | |
| | 5.75 | □ | — | — | | | | | |
| | 5.76 | □ | — | — | | | | | |
| | 5.77 | □ | — | — | | | | | |
| | 5.78 | □ | — | — | | | | | |
| | 5.79 | □ | — | — | | | | | |
| 3330580 | 5.8 | B | 23 | 7,820 | | | | | |
| | 5.81 | □ | — | — | | | | | |
| | 5.82 | □ | — | — | | | | | |
| | 5.83 | □ | — | — | | | | | |
| | 5.84 | □ | — | — | | | | | |
| | 5.85 | □ | — | — | | | | | |
| | 5.86 | □ | — | — | | | | | |
| | 5.87 | □ | — | — | | | | | |
| | 5.88 | □ | — | — | | | | | |
| | 5.89 | □ | — | — | | | | | |

次ページへ
直径 Dc 5.9 ~ 6.79 NEXT

A, B, C, D=標準在庫品 A, B, C, D=Standard stock item. □=特定代理店在庫品 □=Stocked by specific distributors. Contact us for price & availability.

| 製品記号 Abbreviation | 被削材 Work Material | 低碳素鋼 軟鋼 Low Carbon Steel Mild Steel | 中炭素鋼 Medium Carbon Steel | 高炭素鋼 High Carbon Steel | 合金鋼 Alloy Steel | 調質鋼 Hardened Steel | 焼入鋼 Quenched and Tempered Steel | ステンレス 鋼 Stainless Steel | 工具鋼 Tool Steel | 鑄鉄 Cast Iron | ダクタイル 鑄鉄 Ductile Cast Iron | 銅合金 Copper Alloy | アルミ 展伸材 Aluminum | アルミ 合金鑄物 Aluminum Alloy Casting | チタン 合金 Titanium Alloy | インコル Inconel | |
|----------------------|-------------------------|--|-----------------------------------|---------------------------------|-----------------------|-----------------------|---------------------------------------|----------------------------------|-------------------|-----------------|-------------------------------------|------------------------|------------------------|---|--------------------------------|-----------------|--|
| | C~0.25% | 0.25~0.45% | 0.45%~ | SCM | ~35 HRC | 35~45 HRC | 45~50 HRC | 50~60 HRC | 60~70 HRC | SUS | SKD SKS | FC | FCD | Cu | Al | AC | |
| ADF-2D | | ○ | ○ | ○ | ○ | ○ | ○ | | ○(ま) | | ○ | ○ | | ○ | ○ | | |

注1) Dc<2
Note

形状寸法表
Specification
Charts

センターリング面取り
Centering -
Countersinking
Countersinking

コーナ面取り
Corner Chamfering

R面取り
Corner Rounding

座ぐり
Counterboring

切削条件
Cutting
Conditions

センターリング面取り
Centering -
Countersinking
Countersinking

コーナ面取り
Corner Chamfering

R面取り
Corner Rounding

座ぐり
Counterboring

前ページより

FROM 直径 Dc 5~5.89

| ツールNo. EDP No. | 直径 Dc | 溝長 ℓ | 全長 L | シャンク径 Ds | φ ₂ | 形状 Type | 在庫 Stock | 重量 Weight | 標準価格 標準価格 (Yen) | | | | | |
|-------------------|----------|---------|---------|-------------|----------------|------------|-------------|--------------|-----------------------|--|--|---|----|-------|
| 3330590 | 5.9 | 27 | 65 | 6 | 26.8 | 1 | B | 23 | 7,820 | | | | | |
| | 5.91 | | | | | | | | | | | | | |
| | 5.92 | | | | | | | | | | | | | |
| | 5.93 | | | | | | | | | | | | | |
| | 5.94 | | | | | | | | | | | | | |
| | 5.95 | | | | | | | | | | | | | |
| | 5.96 | | | | | | | | | | | | | |
| | 5.97 | | | | | | | | | | | | | |
| | 5.98 | | | | | | | | | | | | | |
| | 5.99 | | | | | | | | | | | | | |
| 3330600 | 6 | 30 | 70 | 6 | 26.9 | 1 | B | 23 | 7,820 | | | | | |
| | 6.01 | | | | | | | | | | | | | |
| | 6.02 | | | | | | | | | | | | | |
| 3330603 | 6.03 | | | | | | | | | | | B | 28 | 7,820 |
| | 6.04 | | | | | | | | | | | | | |
| | 6.05 | | | | | | | | | | | | | |
| | 6.06 | | | | | | | | | | | | | |
| | 6.07 | | | | | | | | | | | | | |
| | 6.08 | | | | | | | | | | | | | |
| | 6.09 | | | | | | | | | | | | | |
| 3330610 | 6.1 | | | | | | B | 28 | 7,820 | | | | | |
| | 6.11 | | | | | | | | | | | | | |
| | 6.12 | | | | | | | | | | | | | |
| | 6.13 | | | | | | | | | | | | | |
| | 6.14 | | | | | | | | | | | | | |
| | 6.15 | | | | | | | | | | | | | |
| | 6.16 | | | | | | | | | | | | | |
| | 6.17 | | | | | | | | | | | | | |
| | 6.18 | | | | | | | | | | | | | |
| | 6.19 | | | | | | | | | | | | | |
| 3330620 | 6.2 | | | | | | B | 28 | 7,820 | | | | | |
| | 6.21 | | | | | | | | | | | | | |
| | 6.22 | | | | | | | | | | | | | |
| | 6.23 | | | | | | | | | | | | | |
| | 6.24 | | | | | | | | | | | | | |
| | 6.25 | | | | | | | | | | | | | |
| | 6.26 | | | | | | | | | | | | | |
| | 6.27 | | | | | | | | | | | | | |
| | 6.28 | | | | | | | | | | | | | |
| | 6.29 | | | | | | | | | | | | | |
| 3330630 | 6.3 | | | | | | B | 28 | 7,820 | | | | | |
| | 6.31 | | | | | | | | | | | | | |
| | 6.32 | | | | | | | | | | | | | |
| | 6.33 | | | | | | | | | | | | | |
| | 6.34 | | | | | | | | | | | | | |

単位:mm Unit:mm

| ツールNo. EDP No. | 直径 Dc | 溝長 ℓ | 全長 L | シャンク径 Ds | φ ₂ | 形状 Type | 在庫 Stock | 重量 Weight | 標準価格 標準価格 (Yen) | | | | | |
|-------------------|----------|---------|---------|-------------|----------------|------------|-------------|--------------|-----------------------|--|--|---|----|-------|
| | 6.35 | 30 | 70 | 6 | 32 | 2 | | | | | | | | |
| | 6.36 | | | | | | | | | | | | | |
| | 6.37 | | | | | | | | | | | | | |
| | 6.38 | | | | | | | | | | | | | |
| | 6.39 | | | | | | | | | | | | | |
| 3330640 | 6.4 | | | | | | | | | | | B | 29 | 7,820 |
| | 6.41 | | | | | | | | | | | | | |
| | 6.42 | | | | | | | | | | | | | |
| | 6.43 | | | | | | | | | | | | | |
| | 6.44 | | | | | | | | | | | | | |
| | 6.45 | | | | | | | | | | | | | |
| | 6.46 | | | | | | | | | | | | | |
| | 6.47 | | | | | | | | | | | | | |
| | 6.48 | | | | | | | | | | | | | |
| | 6.49 | | | | | | | | | | | | | |
| 3330650 | 6.5 | | | | | | B | 29 | 7,820 | | | | | |
| | 6.51 | | | | | | | | | | | | | |
| | 6.52 | | | | | | | | | | | | | |
| 3330653 | 6.53 | | | | | | B | 29 | 8,320 | | | | | |
| | 6.54 | | | | | | | | | | | | | |
| | 6.55 | | | | | | | | | | | | | |
| | 6.56 | | | | | | | | | | | | | |
| | 6.57 | | | | | | | | | | | | | |
| | 6.58 | | | | | | | | | | | | | |
| | 6.59 | | | | | | | | | | | | | |
| 3330660 | 6.6 | | | | | | B | 29 | 8,320 | | | | | |
| | 6.61 | | | | | | | | | | | | | |
| | 6.62 | | | | | | | | | | | | | |
| | 6.63 | | | | | | | | | | | | | |
| | 6.64 | | | | | | | | | | | | | |
| | 6.65 | | | | | | | | | | | | | |
| | 6.66 | | | | | | | | | | | | | |
| | 6.67 | | | | | | | | | | | | | |
| | 6.68 | | | | | | | | | | | | | |
| | 6.69 | | | | | | | | | | | | | |
| 3330670 | 6.7 | | | | | | B | 29 | 8,320 | | | | | |
| | 6.71 | | | | | | | | | | | | | |
| | 6.72 | | | | | | | | | | | | | |
| | 6.73 | | | | | | | | | | | | | |
| | 6.74 | | | | | | | | | | | | | |
| | 6.75 | | | | | | | | | | | | | |
| | 6.76 | | | | | | | | | | | | | |
| | 6.77 | | | | | | | | | | | | | |
| | 6.78 | | | | | | | | | | | | | |
| | 6.79 | | | | | | | | | | | | | |

次ページへ

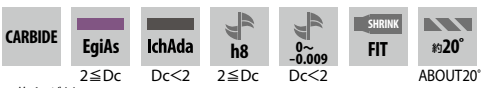
直径 Dc 6.8~7.69 NEXT

A、B、C、D=標準在庫品 A、B、C、D=Standard stock item. □=特定代理店在庫品 □=Stocked by specific distributors. Contact us for price & availability.

G-LIST No. | DW1071 切削条件 Cutting Conditions | P.63
超硬フラットドリル 2Dタイプ
 Carbide Flat Drill 2D Type **A**
 The A Brand
ADF-2D

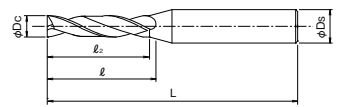


コーティングに色むらが発生する場合がありますが、性能上は全く問題ありません。
 Drills may have some discoloration, but it does not cause any performance problems.

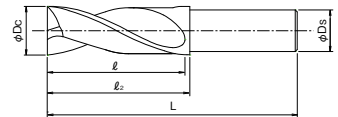


前ページより FROM 直径 Dc 5.9 ~ 6.79

Type 1



Type 2



単位:mm Unit:mm

| ツールNo. EDP No. | 直径 Dc | 溝長 ℓ | 全長 L | シャン径 Ds | ℓ2 | 形状 Type | 在庫 Stock | 重量 Weight | 標準価格 (Yen) | | | | | |
|-------------------|----------|---------|---------|------------|----|------------|-------------|--------------|---------------|---|---|----|-------|--|
| 3330680 | 6.8 | 30 | 70 | 32 | | B | 30 | 8,320 | | | | | | |
| 6.81 | — | | | | | | — | | | | | | | |
| 6.82 | — | | | | | | — | | | | | | | |
| 6.83 | — | | | | | | — | | | | | | | |
| 6.84 | — | | | | | | — | | | | | | | |
| 6.85 | □ | | | | | | — | — | | | | | | |
| 6.86 | — | | | | | | — | | | | | | | |
| 6.87 | — | | | | | | — | | | | | | | |
| 6.88 | — | | | | | | — | | | | | | | |
| 6.89 | — | | | | | | — | | | | | | | |
| 3330690 | 6.9 | 30 | 70 | 32 | | B | 30 | 8,320 | | | | | | |
| 6.91 | — | | | | | | — | | | | | | | |
| 6.92 | — | | | | | | — | | | | | | | |
| 6.93 | — | | | | | | — | | | | | | | |
| 6.94 | — | | | | | | — | | | | | | | |
| 6.95 | □ | | | | | | — | — | | | | | | |
| 6.96 | — | | | | | | — | | | | | | | |
| 6.97 | — | | | | | | — | | | | | | | |
| 6.98 | — | | | | | | — | | | | | | | |
| 6.99 | — | | | | | | — | | | | | | | |
| 3330700 | 7 | 34 | 75 | 36 | 2 | B | 30 | 8,320 | | | | | | |
| 7.01 | □ | | | | | | — | — | | | | | | |
| 7.02 | — | | | | | | — | | | | | | | |
| 3330703 | 7.03 | | | | | | 34 | 75 | 36 | 2 | B | 32 | 8,820 | |
| 7.04 | — | | | | | | | | | | | — | | |
| 7.05 | — | | | | | | | | | | | — | | |
| 7.06 | □ | | | | | | | | | | | — | — | |
| 7.07 | — | | | | | | | | | | | — | | |
| 7.08 | — | | | | | | | | | | | — | | |
| 7.09 | — | | | | | | | | | | | — | | |
| 3330710 | 7.1 | 34 | 75 | 36 | 2 | B | | | | | | 33 | 8,820 | |
| 7.11 | — | | | | | | | | | | | — | | |
| 7.12 | — | | | | | | | | | | | — | | |
| 7.13 | — | | | | | | — | | | | | | | |
| 7.14 | — | | | | | | — | | | | | | | |
| 7.15 | □ | | | | | | — | — | | | | | | |
| 7.16 | — | | | | | | — | | | | | | | |
| 7.17 | — | | | | | | — | | | | | | | |
| 7.18 | — | | | | | | — | | | | | | | |
| 7.19 | — | | | | | | — | | | | | | | |
| 3330720 | 7.2 | 34 | 75 | 36 | 2 | B | 33 | 8,820 | | | | | | |
| 7.21 | □ | | | | | | — | — | | | | | | |
| 7.22 | — | | | | | | — | | | | | | | |
| 7.23 | — | | | | | | — | | | | | | | |
| 7.24 | — | | | | | | — | | | | | | | |
| 7.24 | — | | | | | | — | | | | | | | |

| ツールNo. EDP No. | 直径 Dc | 溝長 ℓ | 全長 L | シャン径 Ds | ℓ2 | 形状 Type | 在庫 Stock | 重量 Weight | 標準価格 (Yen) | | | | | |
|-------------------|----------|---------|---------|------------|----|------------|-------------|--------------|---------------|----|---|---|----|-------|
| 7.25 | — | 34 | 75 | 6 | 36 | 2 | — | — | | | | | | |
| 7.26 | — | | | | | | — | | | | | | | |
| 7.27 | □ | | | | | | — | — | | | | | | |
| 7.28 | — | | | | | | — | | | | | | | |
| 7.29 | — | | | | | | — | | | | | | | |
| 3330730 | 7.3 | | | | | | 34 | 75 | 6 | 36 | 2 | B | 33 | 8,820 |
| 7.31 | — | | | | | | | | | | | — | | |
| 7.32 | — | | | | | | | | | | | — | | |
| 7.33 | — | | | | | | | | | | | — | | |
| 7.34 | — | | | | | | | | | | | — | | |
| 7.35 | □ | — | — | | | | | | | | | | | |
| 7.36 | — | — | | | | | | | | | | | | |
| 7.37 | — | — | | | | | | | | | | | | |
| 7.38 | — | — | | | | | | | | | | | | |
| 7.39 | — | — | | | | | | | | | | | | |
| 3330740 | 7.4 | 34 | 75 | 6 | 36 | 2 | B | 34 | 8,820 | | | | | |
| 7.41 | — | | | | | | — | | | | | | | |
| 7.42 | — | | | | | | — | | | | | | | |
| 7.43 | — | | | | | | — | | | | | | | |
| 7.44 | — | | | | | | — | | | | | | | |
| 7.45 | □ | | | | | | — | — | | | | | | |
| 7.46 | — | | | | | | — | | | | | | | |
| 7.47 | — | | | | | | — | | | | | | | |
| 7.48 | — | | | | | | — | | | | | | | |
| 7.49 | — | | | | | | — | | | | | | | |
| 3330750 | 7.5 | 34 | 75 | 6 | 36 | 2 | B | 34 | 8,820 | | | | | |
| 7.51 | — | | | | | | — | | | | | | | |
| 7.52 | — | | | | | | — | | | | | | | |
| 7.53 | — | | | | | | — | | | | | | | |
| 7.54 | — | | | | | | — | | | | | | | |
| 7.55 | □ | | | | | | — | — | | | | | | |
| 7.56 | — | | | | | | — | | | | | | | |
| 7.57 | — | | | | | | — | | | | | | | |
| 7.58 | — | | | | | | — | | | | | | | |
| 7.59 | — | | | | | | — | | | | | | | |
| 3330760 | 7.6 | 34 | 75 | 6 | 36 | 2 | B | 34 | 9,280 | | | | | |
| 7.61 | — | | | | | | — | | | | | | | |
| 7.62 | — | | | | | | — | | | | | | | |
| 7.63 | — | | | | | | — | | | | | | | |
| 7.64 | — | | | | | | — | | | | | | | |
| 7.65 | □ | | | | | | — | — | | | | | | |
| 7.66 | — | | | | | | — | | | | | | | |
| 7.67 | — | | | | | | — | | | | | | | |
| 7.68 | — | | | | | | — | | | | | | | |
| 7.69 | — | | | | | | — | | | | | | | |

次ページへ
 直径 Dc 7.7 ~ 8.59 NEXT

A, B, C, D=標準在庫品 A, B, C, D=Standard stock item. □=特定代理店在庫品 □=Stocked by specific distributors. Contact us for price & availability.

| 製品記号 Abbreviation | 被削材 Work Material | 低炭素鋼 軟鋼 Low Carbon Steel Mild Steel | 中炭素鋼 Medium Carbon Steel | 高炭素鋼 High Carbon Steel | 合金鋼 Alloy Steel | 調質鋼 Hardened Steel | 焼入鋼 Quenched and Tempered Steel | ステンレス 鋼 Stainless Steel | 工具鋼 Tool Steel | 鋳鉄 Cast Iron | ダクタイル 鋳鉄 Ductile Cast Iron | 銅合金 Copper Alloy | アルミ 展伸材 Aluminum | アルミ 合金鋳物 Aluminum Alloy Casting | チタン 合金 Titanium Alloy | インコル Inconel |
|----------------------|-------------------------|--|-----------------------------------|---------------------------------|-----------------------|-------------------------|--|----------------------------------|-------------------|-----------------|-------------------------------------|------------------------|------------------------|---|--------------------------------|-----------------|
| | | C~0.25% | 0.25~0.45% | 0.45%~ | SCM | ~35 HRC 35~45 HRC | 45~50 HRC 50~60 HRC 60~70 HRC | SUS | SKD SKS | FC | FCD | Cu | Al | AC | | |
| ADF-2D | | ○ | ○ | ○ | ○ | ○ | ○ | ○ ¹⁾ | | ○ | ○ | | ○ | ○ | | |

注1) Dc<2
Note

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Charts

センターリング面取り
Centering -
Countersinking
Face

コーナ面取り
Corner Chamfering

R面取り
Corner Rounding

座ぐり
Counterboring

切削条件
Cutting
Conditions

センターリング面取り
Centering -
Countersinking
Face

コーナ面取り
Corner Chamfering

R面取り
Corner Rounding

座ぐり
Counterboring

前ページより

FROM 直径 Dc 6.8 ~ 7.69

| ツールNo. EDP No. | 直径 Dc | 溝長 ℓ | 全長 L | シャンク径 Ds | ℓ ₂ | 形状 Type | 在庫 Stock | 重量 Weight | 標準価格 (Yen) | | | | | |
|-------------------|----------|---------|---------|-------------|----------------|------------|-------------|--------------|---------------|----|---|---|----|-------|
| 3330770 | 7.7 | 34 | 75 | 6 | 36 | 2 | B | 35 | 9,280 | | | | | |
| 7.71 | — | | | | | | — | | | | | | | |
| 7.72 | — | | | | | | — | | | | | | | |
| 7.73 | — | | | | | | — | | | | | | | |
| 7.74 | — | | | | | | — | | | | | | | |
| 7.75 | □ | | | | | | — | — | | | | | | |
| 7.76 | — | | | | | | — | | | | | | | |
| 7.77 | — | | | | | | — | | | | | | | |
| 7.78 | — | | | | | | — | | | | | | | |
| 7.79 | — | | | | | | — | | | | | | | |
| 3330780 | 7.8 | 34 | 75 | 6 | 36 | 2 | B | 34 | 9,280 | | | | | |
| 7.81 | — | | | | | | — | | | | | | | |
| 7.82 | — | | | | | | — | | | | | | | |
| 7.83 | — | | | | | | — | | | | | | | |
| 7.84 | — | | | | | | — | | | | | | | |
| 7.85 | □ | | | | | | — | — | | | | | | |
| 7.86 | — | | | | | | — | | | | | | | |
| 7.87 | — | | | | | | — | | | | | | | |
| 7.88 | — | | | | | | — | | | | | | | |
| 7.89 | — | | | | | | — | | | | | | | |
| 3330790 | 7.9 | 34 | 75 | 6 | 36 | 2 | B | 35 | 9,280 | | | | | |
| 7.91 | — | | | | | | — | | | | | | | |
| 7.92 | — | | | | | | — | | | | | | | |
| 7.93 | — | | | | | | — | | | | | | | |
| 7.94 | — | | | | | | — | | | | | | | |
| 7.95 | □ | | | | | | — | — | | | | | | |
| 7.96 | — | | | | | | — | | | | | | | |
| 7.97 | — | | | | | | — | | | | | | | |
| 7.98 | — | | | | | | — | | | | | | | |
| 7.99 | — | | | | | | — | | | | | | | |
| 3330800 | 8 | 38 | 80 | 8 | 40 | 2 | B | 49 | 9,280 | | | | | |
| 8.01 | □ | | | | | | — | — | | | | | | |
| 8.02 | — | | | | | | — | | | | | | | |
| 3330803 | 8.03 | | | | | | 38 | 80 | 8 | 40 | 2 | B | 50 | 9,780 |
| 8.04 | — | | | | | | | | | | | — | | |
| 8.05 | — | | | | | | | | | | | — | | |
| 8.06 | □ | | | | | | | | | | | — | — | |
| 8.07 | — | | | | | | | | | | | — | | |
| 8.08 | — | | | | | | | | | | | — | | |
| 8.09 | — | | | | | | | | | | | — | | |
| 3330810 | 8.1 | 38 | 80 | 8 | 40 | 2 | | | | | | B | 50 | 9,780 |
| 8.11 | — | | | | | | | | | | | — | | |
| 8.12 | □ | | | | | | | | | | | — | — | |
| 8.13 | — | | | | | | — | | | | | | | |
| 8.14 | — | | | | | | — | | | | | | | |

単位:mm Unit:mm

| ツールNo. EDP No. | 直径 Dc | 溝長 ℓ | 全長 L | シャンク径 Ds | ℓ ₂ | 形状 Type | 在庫 Stock | 重量 Weight | 標準価格 (Yen) | | | | | |
|-------------------|----------|---------|---------|-------------|----------------|------------|-------------|--------------|---------------|----|---|---|----|--------|
| | 8.15 | 38 | 80 | 8 | 40 | 2 | | — | — | | | | | |
| | 8.16 | | | | | | — | — | | | | | | |
| | 8.17 | | | | | | □ | — | — | | | | | |
| | 8.18 | | | | | | — | — | | | | | | |
| | 8.19 | | | | | | — | — | | | | | | |
| 3330820 | 8.2 | | | | | | 38 | 80 | 8 | 40 | 2 | B | 51 | 9,780 |
| | 8.21 | | | | | | | | | | | — | — | |
| | 8.22 | | | | | | | | | | | — | — | |
| | 8.23 | | | | | | | | | | | — | — | |
| | 8.24 | | | | | | | | | | | — | — | |
| | 8.25 | □ | — | — | | | | | | | | | | |
| | 8.26 | — | — | | | | | | | | | | | |
| | 8.27 | — | — | | | | | | | | | | | |
| | 8.28 | — | — | | | | | | | | | | | |
| | 8.29 | — | — | | | | | | | | | | | |
| 3330830 | 8.3 | 38 | 80 | 8 | 40 | 2 | B | 51 | 9,780 | | | | | |
| | 8.31 | | | | | | — | — | | | | | | |
| | 8.32 | | | | | | — | — | | | | | | |
| | 8.33 | | | | | | — | — | | | | | | |
| | 8.34 | | | | | | — | — | | | | | | |
| | 8.35 | | | | | | □ | — | — | | | | | |
| | 8.36 | | | | | | — | — | | | | | | |
| | 8.37 | | | | | | — | — | | | | | | |
| | 8.38 | | | | | | — | — | | | | | | |
| | 8.39 | | | | | | — | — | | | | | | |
| 3330840 | 8.4 | 38 | 80 | 8 | 40 | 2 | B | 52 | 9,780 | | | | | |
| | 8.41 | | | | | | — | — | | | | | | |
| | 8.42 | | | | | | — | — | | | | | | |
| | 8.43 | | | | | | — | — | | | | | | |
| | 8.44 | | | | | | — | — | | | | | | |
| | 8.45 | | | | | | □ | — | — | | | | | |
| | 8.46 | | | | | | — | — | | | | | | |
| | 8.47 | | | | | | — | — | | | | | | |
| | 8.48 | | | | | | — | — | | | | | | |
| | 8.49 | | | | | | — | — | | | | | | |
| 3330850 | 8.5 | 38 | 80 | 8 | 40 | 2 | B | 52 | 9,780 | | | | | |
| | 8.51 | | | | | | □ | — | — | | | | | |
| | 8.52 | | | | | | — | — | | | | | | |
| 3330853 | 8.53 | | | | | | 38 | 80 | 8 | 40 | 2 | B | 53 | 10,300 |
| | 8.54 | | | | | | | | | | | — | — | |
| | 8.55 | □ | — | — | | | | | | | | | | |
| | 8.56 | — | — | | | | | | | | | | | |
| | 8.57 | — | — | | | | | | | | | | | |
| | 8.58 | — | — | | | | | | | | | | | |
| | 8.59 | — | — | | | | | | | | | | | |

次ページへ
直径 Dc 8.6 ~ 9.49 NEXT

A、B、C、D=標準在庫品 A、B、C、D=Standard stock item. □=特定代理店在庫品 □=Stocked by specific distributors. Contact us for price & availability.

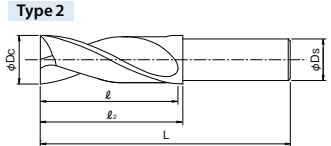
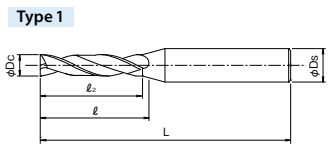
G-LIST No. | DW1071 切削条件 Cutting Conditions | P.63
超硬フラットドリル 2Dタイプ
 Carbide Flat Drill 2D Type **A**
 The A Brand
ADF-2D



コーティングに色むらが発生する場合がありますが、性能上は全く問題ありません。
 Drills may have some discoloration, but it does not cause any performance problems.

CARBIDE EgiAs 2 ≤ Dc IchAda Dc < 2 h8 2 ≤ Dc 0 ~ -0.009 Dc < 2 SHRINK FIT ±20° ABOUT20°

前ページより FROM 直径 Dc 7.7 ~ 8.59



| ツールNo. EDP No. | 直径 Dc | 溝長 ℓ | 全長 L | シャン径 Ds | ℓ ₂ | 形状 Type | 在庫 Stock | 重量 Weight | 標準価格 (Yen) | | | | |
|-------------------|----------|---------|---------|------------|----------------|------------|-------------|--------------|---------------|--|--|--|--|
| 3330860 | 8.6 | 38 | 80 | 8 | 40 | 2 | B | 53 | 10,300 | | | | |
| | 8.61 | | | | | | | | | | | | |
| | 8.62 | | | | | | | | | | | | |
| | 8.63 | | | | | | | | | | | | |
| | 8.64 | | | | | | | | | | | | |
| | 8.65 | | | | | | | | | | | | |
| | 8.66 | | | | | | | | | | | | |
| | 8.67 | | | | | | | | | | | | |
| | 8.68 | | | | | | | | | | | | |
| | 8.69 | | | | | | | | | | | | |
| 3330870 | 8.7 | | | | | | B | 53 | 10,300 | | | | |
| | 8.71 | | | | | | | | | | | | |
| | 8.72 | | | | | | | | | | | | |
| | 8.73 | | | | | | | | | | | | |
| | 8.74 | | | | | | | | | | | | |
| | 8.75 | | | | | | | | | | | | |
| | 8.76 | | | | | | | | | | | | |
| | 8.77 | | | | | | | | | | | | |
| | 8.78 | | | | | | | | | | | | |
| | 8.79 | | | | | | | | | | | | |
| 3330880 | 8.8 | | | | | | B | 54 | 10,300 | | | | |
| | 8.81 | | | | | | | | | | | | |
| | 8.82 | | | | | | | | | | | | |
| | 8.83 | | | | | | | | | | | | |
| | 8.84 | | | | | | | | | | | | |
| | 8.85 | | | | | | | | | | | | |
| | 8.86 | | | | | | | | | | | | |
| | 8.87 | | | | | | | | | | | | |
| | 8.88 | | | | | | | | | | | | |
| | 8.89 | | | | | | | | | | | | |
| 3330890 | 8.9 | | | | | | B | 54 | 10,300 | | | | |
| | 8.91 | | | | | | | | | | | | |
| | 8.92 | | | | | | | | | | | | |
| | 8.93 | | | | | | | | | | | | |
| | 8.94 | | | | | | | | | | | | |
| | 8.95 | | | | | | | | | | | | |
| | 8.96 | | | | | | | | | | | | |
| | 8.97 | | | | | | | | | | | | |
| | 8.98 | | | | | | | | | | | | |
| | 8.99 | | | | | | | | | | | | |
| 3330900 | 9 | | | | | | B | 55 | 10,300 | | | | |
| | 9.01 | | | | | | | | | | | | |
| | 9.02 | | | | | | | | | | | | |
| 3330903 | 9.03 | 42 | 85 | | 44 | | B | 58 | 10,900 | | | | |
| | 9.04 | | | | | | | | | | | | |
| | 9.05 | | | | | | | | | | | | |

単位:mm Unit:mm

| ツールNo. EDP No. | 直径 Dc | 溝長 ℓ | 全長 L | シャン径 Ds | ℓ ₂ | 形状 Type | 在庫 Stock | 重量 Weight | 標準価格 (Yen) |
|-------------------|----------|---------|---------|------------|----------------|------------|-------------|--------------|---------------|
| | 9.06 | | | | | | | | |
| | 9.07 | | | | | | | | |
| | 9.08 | | | | | | | | |
| | 9.09 | | | | | | | | |
| 3330910 | 9.1 | | | | | | B | 59 | 10,900 |
| | 9.11 | | | | | | | | |
| | 9.12 | | | | | | | | |
| | 9.13 | | | | | | | | |
| | 9.14 | | | | | | | | |
| | 9.15 | | | | | | | | |
| | 9.16 | | | | | | | | |
| | 9.17 | | | | | | | | |
| | 9.18 | | | | | | | | |
| | 9.19 | | | | | | | | |
| 3330920 | 9.2 | | | | | | B | 60 | 10,900 |
| | 9.21 | | | | | | | | |
| | 9.22 | | | | | | | | |
| | 9.23 | | | | | | | | |
| | 9.24 | | | | | | | | |
| | 9.25 | | | | | | | | |
| | 9.26 | | | | | | | | |
| | 9.27 | | | | | | | | |
| | 9.28 | | | | | | | | |
| | 9.29 | | | | | | | | |
| 3330930 | 9.3 | | | | | | B | 60 | 10,900 |
| | 9.31 | | | | | | | | |
| | 9.32 | | | | | | | | |
| | 9.33 | | | | | | | | |
| | 9.34 | | | | | | | | |
| | 9.35 | | | | | | | | |
| | 9.36 | | | | | | | | |
| | 9.37 | | | | | | | | |
| | 9.38 | | | | | | | | |
| | 9.39 | | | | | | | | |
| 3330940 | 9.4 | | | | | | B | 61 | 10,900 |
| | 9.41 | | | | | | | | |
| | 9.42 | | | | | | | | |
| | 9.43 | | | | | | | | |
| | 9.44 | | | | | | | | |
| | 9.45 | | | | | | | | |
| | 9.46 | | | | | | | | |
| | 9.47 | | | | | | | | |
| | 9.48 | | | | | | | | |
| | 9.49 | | | | | | | | |

次ページへ
 直径 Dc 9.5 ~ 13.8 NEXT

A, B, C, D=標準在庫品 A, B, C, D=Standard stock item. □=特定代理店在庫品 □=Stocked by specific distributors. Contact us for price & availability.

| 製品記号 Abbreviation | 被削材 Work Material | 低炭素鋼 軟鋼 Low Carbon Steel Mild Steel | 中炭素鋼 Medium Carbon Steel | 高炭素鋼 High Carbon Steel | 合金鋼 Alloy Steel | 調質鋼 Hardened Steel | 焼入鋼 Quenched and Tempered Steel | ステンレス 鋼 Stainless Steel | 工具鋼 Tool Steel | 鋳鉄 Cast Iron | ダクタイル 鋳鉄 Ductile Cast Iron | 銅合金 Copper Alloy | アルミ 展伸材 Aluminum | アルミ 合金鋳物 Aluminum Alloy Casting | チタン 合金 Titanium Alloy | インコル Inconel | |
|----------------------|-------------------------|--|-----------------------------------|---------------------------------|-----------------------|-----------------------|---------------------------------------|----------------------------------|-------------------|-----------------|-------------------------------------|------------------------|------------------------|---|--------------------------------|-----------------|--|
| | C~0.25% | 0.25~0.45% | 0.45%~ | SCM | ~35 HRC | 35~45 HRC | 45~50 HRC | 50~60 HRC | 60~70 HRC | SUS | SKD SKS | FC | FCD | Cu | Al | AC | |
| ADF-2D | | ○ | ○ | ○ | ○ | ○ | | | | ○ま1 | | ○ | ○ | | | | |

注1) Dc<2
Note

形状寸法表
Specification
Charts

センターリング面取り
Centering -
Countersinking
Face

コーナ面取り
Corner Chamfering

R面取り
Corner Rounding

座ぐり
Counterboring

切削条件
Cutting
Conditions

センターリング面取り
Centering -
Countersinking
Face

コーナ面取り
Corner Chamfering

R面取り
Corner Rounding

座ぐり
Counterboring

前ページより

FROM 直径 Dc 8.6 ~ 9.49

| ツールNo. EDP No. | 直径 Dc | 溝長 ℓ | 全長 L | シャンク径 Ds | ℓ ₂ | 形状 Type | 在庫 Stock | 重量 Weight | 標準価格 (Yen) |
|-------------------|----------|---------|---------|-------------|----------------|------------|-------------|--------------|---------------|
| 3330950 | 9.5 | | | | | | B | 62 | 10,900 |
| | 9.51 | | | | | | | | |
| | 9.52 | | | | | | | | |
| | 9.53 | | | | | | | | |
| | 9.54 | | | | | | | | |
| | 9.55 | | | | | □ | | | |
| | 9.56 | | | | | □ | | | |
| | 9.57 | | | | | | | | |
| | 9.58 | | | | | | | | |
| | 9.59 | | | | | | | | |
| 3330960 | 9.6 | | | | | | B | 62 | 11,300 |
| | 9.61 | | | | | | | | |
| | 9.62 | | | | | | | | |
| | 9.63 | | | | | | | | |
| | 9.64 | | | | | | | | |
| | 9.65 | | | | | □ | | | |
| | 9.66 | | | | | | | | |
| | 9.67 | | | | | | | | |
| | 9.68 | | | | | | | | |
| | 9.69 | | | | | | | | |
| 3330970 | 9.7 | | | | | | B | 63 | 11,300 |
| | 9.71 | | | | | | | | |
| | 9.72 | | | | | | | | |
| | 9.73 | | | | | | | | |
| | 9.74 | | | | | | | | |
| | 9.75 | | | | | | | | |
| | 9.76 | | | | | □ | | | |
| | 9.77 | | | | | | | | |
| | 9.78 | | | | | | | | |
| | 9.79 | | | | | | | | |
| 3330980 | 9.8 | | | | | | B | 64 | 11,300 |
| | 9.81 | | | | | | | | |
| | 9.82 | | | | | | | | |
| | 9.83 | | | | | | | | |
| | 9.84 | | | | | | | | |
| | 9.85 | | | | | □ | | | |
| | 9.86 | | | | | | | | |
| | 9.87 | | | | | | | | |
| | 9.88 | | | | | | | | |
| | 9.89 | | | | | | | | |
| 3330990 | 9.9 | | | | | | B | 63 | 11,300 |
| | 9.91 | | | | | | | | |
| | 9.92 | | | | | | | | |
| | 9.93 | | | | | □ | | | |
| | 9.94 | | | | | | | | |
| | 9.95 | | | | | | | | |

単位:mm Unit:mm

| ツールNo. EDP No. | 直径 Dc | 溝長 ℓ | 全長 L | シャンク径 Ds | ℓ ₂ | 形状 Type | 在庫 Stock | 重量 Weight | 標準価格 (Yen) |
|-------------------|----------|---------|---------|-------------|----------------|------------|-------------|--------------|---------------|
| | 9.96 | | | | | | | | |
| | 9.97 | | | | | | | | |
| | 9.98 | | | | | | | | |
| | 9.99 | | | | | | | | |
| 3331000 | 10 | | | | | | | 81 | 11,300 |
| 3331003 | 10.03 | | | | | | | 85 | 11,800 |
| 3331010 | 10.1 | | | | | | | 85 | 11,800 |
| 3331020 | 10.2 | | | | | | | 86 | 11,800 |
| 3331030 | 10.3 | | | | | | | 86 | 11,800 |
| 3331040 | 10.4 | | | | | | | 86 | 11,800 |
| 3331050 | 10.5 | | | | | | | 88 | 11,800 |
| 3331060 | 10.6 | | | | | | | 88 | 12,200 |
| 3331070 | 10.7 | | | | | | | 89 | 12,200 |
| 3331080 | 10.8 | | | | | | | 89 | 12,200 |
| 3331090 | 10.9 | | | | | | | 90 | 12,200 |
| 3331100 | 11 | | | | | | | 90 | 12,200 |
| 3331103 | 11.03 | | | | | | | 93 | 12,800 |
| 3331110 | 11.1 | | | | | | | 95 | 12,800 |
| 3331120 | 11.2 | | | | | | | 96 | 12,800 |
| 3331130 | 11.3 | | | | | | | 97 | 12,800 |
| 3331140 | 11.4 | | | | | | | 97 | 12,800 |
| 3331150 | 11.5 | | | | | | | 99 | 12,800 |
| 3331160 | 11.6 | | | | | | | 99 | 13,200 |
| 3331170 | 11.7 | | | | | | | 100 | 13,200 |
| 3331180 | 11.8 | | | | | | | 100 | 13,200 |
| 3331190 | 11.9 | | | | | | | 101 | 13,200 |
| 3331200 | 12 | | | | | | | 123 | 13,200 |
| 3331203 | 12.03 | | | | | | | 131 | 15,400 |
| 3331210 | 12.1 | | | | | | | 130 | 15,400 |
| 3331220 | 12.2 | | | | | | | 131 | 15,400 |
| 3331230 | 12.3 | | | | | | | 132 | 15,400 |
| 3331240 | 12.4 | | | | | | | 135 | 15,400 |
| 3331250 | 12.5 | | | | | | | 133 | 15,400 |
| 3331260 | 12.6 | | | | | | | 134 | 15,400 |
| 3331270 | 12.7 | | | | | | | 135 | 15,400 |
| 3331280 | 12.8 | | | | | | | 136 | 15,400 |
| 3331290 | 12.9 | | | | | | | 138 | 15,400 |
| 3331300 | 13 | | | | | | | 138 | 15,400 |
| 3331310 | 13.1 | | | | | | | 147 | 18,700 |
| 3331320 | 13.2 | | | | | | | 148 | 18,700 |
| 3331330 | 13.3 | | | | | | | 151 | 18,700 |
| 3331340 | 13.4 | | | | | | | 152 | 18,700 |
| 3331350 | 13.5 | | | | | | | 153 | 18,700 |
| 3331360 | 13.6 | | | | | | | 152 | 18,700 |
| 3331370 | 13.7 | | | | | | | 153 | 18,700 |
| 3331380 | 13.8 | | | | | | | 155 | 18,700 |

次ページへ

直径 Dc 13.9 ~ 20 NEXT

A、B、C、D=標準在庫品 A、B、C、D=Standard stock item. □=特定代理店在庫品 □=Stocked by specific distributors. Contact us for price & availability.

G-LIST No. | DW1071 切削条件 Cutting Conditions | P.63
超硬フラットドリル 2Dタイプ
 Carbide Flat Drill 2D Type **A**
 The A Brand
ADF-2D

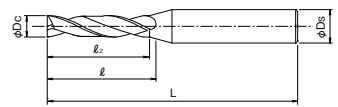


コーティングに色むらが発生する場合がありますが、性能上は全く問題ありません。
 Drills may have some discoloration, but it does not cause any performance problems.

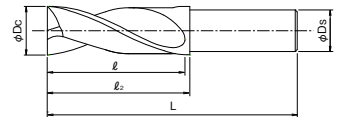
- CARBIDE**
- EgiAs**
2 ≤ Dc
- IchAda**
Dc < 2
- h8**
2 ≤ Dc
- 0~-0.009**
Dc < 2
- SHRINK FIT**
- ±20°**
ABOUT 20°

前ページより FROM 直径 Dc 9.5 ~ 13.8

Type 1



Type 2



単位:mm Unit:mm

| ツールNo. EDP No. | 直径 Dc | 溝長 ℓ | 全長 L | シャン径 Ds | ℓ ₂ | 形状 Type | 在庫 Stock | 重量 Weight | 標準価格 (Yen) | | | |
|-------------------|----------|---------|---------|------------|----------------|------------|-------------|--------------|---------------|--------|--------|--|
| 3331390 | 13.9 | 60 | 105 | 12 | 62 | B | | 157 | 18,700 | | | |
| 3331400 | 14 | | | | | | | 157 | 18,700 | | | |
| 3331410 | 14.1 | | | | | | | 165 | 20,800 | | | |
| 3331420 | 14.2 | | 165 | | 20,800 | | | | | | | |
| 3331430 | 14.3 | | 166 | | 20,800 | | | | | | | |
| 3331440 | 14.4 | 64 | 110 | | 66 | | | 168 | 20,800 | | | |
| 3331450 | 14.5 | | | | | | 169 | 20,800 | | | | |
| 3331460 | 14.6 | | | | | | 168 | 20,800 | | | | |
| 3331470 | 14.7 | | 169 | 20,800 | | | | | | | | |
| 3331480 | 14.8 | | 172 | 20,800 | | | | | | | | |
| 3331490 | 14.9 | 68 | 115 | 70 | | | 176 | 20,800 | | | | |
| 3331500 | 15 | | | | | | 174 | 20,800 | | | | |
| 3331510 | 15.1 | | | | | 181 | 23,500 | | | | | |
| 3331520 | 15.2 | | 184 | 23,500 | | | | | | | | |
| 3331530 | 15.3 | | 185 | 23,500 | | | | | | | | |
| 3331540 | 15.4 | | 188 | 23,500 | | | | | | | | |
| 3331550 | 15.5 | | 188 | 23,500 | | | | | | | | |
| 3331560 | 15.6 | | 189 | 23,500 | | | | | | | | |
| 3331570 | 15.7 | | 189 | 23,500 | | | | | | | | |
| 3331580 | 15.8 | | 191 | 23,500 | | | | | | | | |
| 3331590 | 15.9 | | 192 | 23,500 | | | | | | | | |
| 3331600 | 16 | | 252 | 23,500 | | | | | | | | |
| | 16.1 | 74 | 125 | 76 | 2 | | | — | — | | | |
| | 16.2 | | | | | | | | | | | |
| | 16.3 | | | | | | | | | | | |
| | 16.4 | | | | | | | | | | | |
| 3331650 | 16.5 | | | | | | | | B | 284 | 32,100 | |
| | 16.6 | | | | | | | | | | | |
| | 16.7 | | | | | | | | | | | |
| | 16.8 | | | | | | | | | | | |
| | 16.9 | | | | | | | | | | | |
| 3331700 | 17 | 78 | 130 | 80 | | | B | 293 | 32,100 | | | |
| | 17.1 | | | | | | | | | | | |
| | 17.2 | | | | | | | | | | | |
| | 17.3 | | | | | | | | | | | |
| | 17.4 | | | | | | | | | | | |
| 3331750 | 17.5 | | | | | | | B | 309 | 33,200 | | |
| | 17.6 | | | | | | | | | | | |
| | 17.7 | | | | | | | | | | | |
| | 17.8 | | | | | | | | | | | |
| | 17.9 | | | | | | | | | | | |
| 3331800 | 18 | 84 | 135 | 86 | | B | 320 | 33,200 | | | | |
| | 18.1 | | | | | | | | | | | |
| | 18.2 | | | | | | | | | | | |
| | 18.3 | | | | | | | | | | | |
| | 18.4 | | | | | | | | | | | |

| ツールNo. EDP No. | 直径 Dc | 溝長 ℓ | 全長 L | シャン径 Ds | ℓ ₂ | 形状 Type | 在庫 Stock | 重量 Weight | 標準価格 (Yen) | | | | |
|-------------------|----------|---------|---------|------------|----------------|------------|-------------|--------------|---------------|--|---|-----|--------|
| 3331850 | 18.5 | 84 | 135 | 20 | 86 | 2 | B | 336 | 36,400 | | | | |
| | 18.6 | | | | | | | | | | | | |
| | 18.7 | | | | | | | | | | | | |
| | 18.8 | | | | | | | | | | | | |
| | 18.9 | | | | | | | | | | | | |
| 3331900 | 19 | 88 | 140 | 90 | 90 | | B | 346 | 36,400 | | | | |
| | 19.1 | | | | | | | | | | | | |
| | 19.2 | | | | | | | | | | | | |
| | 19.3 | | | | | | | | | | | | |
| | 19.4 | | | | | | | | | | | | |
| 3331950 | 19.5 | | | | | | | | | | B | 367 | 41,200 |
| | 19.6 | | | | | | | | | | | | |
| | 19.7 | | | | | | | | | | | | |
| | 19.8 | | | | | | | | | | | | |
| | 19.9 | | | | | | | | | | | | |
| 3332000 | 20 | | | | | B | 458 | 41,200 | | | | | |

A, B, C, D=標準在庫品 A, B, C, D=Standard stock item. □=特定代理店在庫品 □=Stocked by specific distributors. Contact us for price & availability.

超硬フラットドリル ロングシャंक 2Dタイプ
Carbide Flat Drill · Long Shank 2D Type



ADFLS-2D

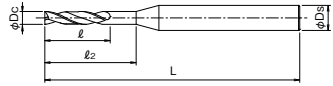


コーティングに色むらが発生する場合がありますが、性能上は全く問題ありません。

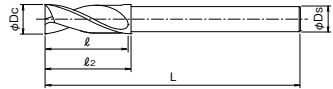
Drills may have some discoloration, but it does not cause any performance problems.



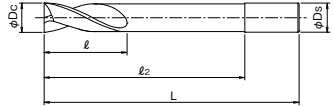
Type 1



Type 2



Type 3



単位:mm Unit:mm

| ツールNo. EDP No. | 直径 Dc | 溝長 ℓ | 全長 L | シャंक径 Ds | ℓ ₂ | 形状 Type | 在庫 Stock | 重量 Weight | 標準価格 (¥) |
|-------------------|----------|---------|---------|-------------|----------------|------------|-------------|--------------|-------------|
| 3332300 | 3 | 15 | 100 | 6 | 30 | 1 | B | 32 | 7,680 |
| 3332310 | 3.1 | | | | | | | 31 | 8,190 |
| 3332320 | 3.2 | | | | | | | 32 | 8,190 |
| 3332330 | 3.3 | 16 | 100 | 6 | 33 | 1 | B | 32 | 8,190 |
| 3332340 | 3.4 | | | | | | | 34 | 8,190 |
| 3332350 | 3.5 | | | | | | | 35 | 8,190 |
| 3332360 | 3.6 | 19 | 100 | 6 | 36 | 1 | B | 32 | 8,590 |
| 3332370 | 3.7 | | | | | | | 37 | 8,590 |
| 3332380 | 3.8 | | | | | | | 38 | 8,590 |
| 3332390 | 3.9 | 21 | 100 | 6 | 39 | 1 | B | 32 | 8,590 |
| 3332400 | 4 | | | | | | | 40 | 8,590 |
| 3332410 | 4.1 | | | | | | | 41 | 8,890 |
| 3332420 | 4.2 | 24 | 110 | 6 | 42 | 1 | B | 32 | 8,890 |
| 3332430 | 4.3 | | | | | | | 43 | 8,890 |
| 3332440 | 4.4 | | | | | | | 44 | 8,890 |
| 3332450 | 4.5 | 27 | 110 | 6 | 45 | 1 | B | 32 | 8,890 |
| 3332460 | 4.6 | | | | | | | 46 | 9,460 |
| 3332470 | 4.7 | | | | | | | 47 | 9,460 |
| 3332480 | 4.8 | 24 | 110 | 6 | 48 | 1 | B | 33 | 9,460 |
| 3332490 | 4.9 | | | | | | | 49 | 9,460 |
| 3332500 | 5 | | | | | | | 50 | 9,460 |
| 3332510 | 5.1 | 27 | 110 | 6 | 51 | 1 | B | 37 | 10,200 |
| 3332520 | 5.2 | | | | | | | 52 | 10,200 |
| 3332530 | 5.3 | | | | | | | 53 | 10,200 |
| 3332540 | 5.4 | 27 | 110 | 6 | 54 | 1 | B | 39 | 10,200 |
| 3332550 | 5.5 | | | | | | | 55 | 10,200 |
| 3332560 | 5.6 | | | | | | | 56 | 10,600 |
| 3332570 | 5.7 | 27 | 110 | 6 | 57 | 1 | B | 40 | 10,600 |
| 3332580 | 5.8 | | | | | | | 58 | 10,600 |
| 3332590 | 5.9 | | | | | | | 59 | 10,600 |
| 3332600 | 6 | 27 | 110 | 6 | 29 | 2 | B | 41 | 10,600 |
| 3334060 | | | | | | | | 60 | 3 |

| ツールNo. EDP No. | 直径 Dc | 溝長 ℓ | 全長 L | シャंक径 Ds | ℓ ₂ | 形状 Type | 在庫 Stock | 重量 Weight | 標準価格 (¥) |
|-------------------|----------|---------|---------|-------------|----------------|------------|-------------|--------------|-------------|
| 3332650 | 6.5 | 30 | 120 | 6 | 32 | 2 | B | 51 | 11,100 |
| 3332680 | 6.8 | | | | | | | 53 | 11,700 |
| 3332700 | 7 | | | | | | | 53 | 11,700 |
| 3332750 | 7.5 | 34 | 130 | 6 | 36 | 2 | B | 58 | 12,800 |
| 3332780 | 7.8 | | | | | | | 59 | 13,600 |
| 3332800 | 8 | | | | | | | 90 | 13,600 |
| 3334080 | 8.5 | 38 | 140 | 8 | 40 | 2 | B | 90 | 13,600 |
| 3332850 | | | | | | | | 98 | 14,400 |
| 3332880 | | | | | | | | 99 | 14,900 |
| 3332900 | 9 | 42 | 150 | 10 | 44 | 2 | B | 99 | 14,900 |
| 3332950 | 110 | | | | | | | 16,000 | |
| 3332980 | 113 | | | | | | | 17,900 | |
| 3333000 | 10 | 46 | 160 | 10 | 48 | 2 | B | 157 | 17,900 |
| 3334100 | | | | | | | | 160 | 17,900 |
| 3333050 | | | | | | | | 169 | 18,700 |
| 3333080 | 10.8 | 50 | 170 | 12 | 52 | 2 | B | 172 | 19,300 |
| 3333100 | 11 | | | | | | | 173 | 19,300 |
| 3333180 | 11.8 | | | | | | | 188 | 22,900 |
| 3333200 | 12 | 56 | 180 | 12 | 58 | 2 | B | 248 | 22,900 |
| 3334120 | | | | | | | | 240 | 22,900 |
| 3333250 | | | | | | | | 269 | 25,600 |
| 3333300 | 13 | 60 | 190 | 12 | 62 | 2 | B | 271 | 26,700 |
| 3333350 | 303 | | | | | | | 31,800 | |
| 3333400 | 305 | | | | | | | 32,000 | |
| 3333500 | 15 | 68 | 210 | 16 | 66 | 3 | B | 333 | 37,400 |
| 3333600 | 535 | | | | | | | 49,800 | |
| 3334160 | 530 | | | | | | | 49,800 | |
| 3333700 | 17 | 78 | 230 | 16 | 76 | 2 | B | 578 | 55,200 |
| 3333750 | 615 | | | | | | | 75,400 | |
| 3333800 | 620 | | | | | | | 75,400 | |
| 3334000 | 18 | 88 | 250 | 20 | 90 | 3 | B | 963 | 82,700 |
| 3334200 | 950 | | | | | | | 82,700 | |

| 製品記号 Abbreviation | 被削材 Work Material | 低炭素鋼 軟鋼 Low Carbon Steel Mild Steel | 中炭素鋼 Medium Carbon Steel | 高炭素鋼 High Carbon Steel | 合金鋼 Alloy Steel | 調質鋼 Hardened Steel | 焼入鋼 Quenched and Tempered Steel | ステンレス鋼 Stainless Steel | 工具鋼 Tool Steel | 鋳鉄 Cast Iron | ダクタイル鋳鉄 Ductile Cast Iron | 銅合金 Copper Alloy | アルミ展伸材 Aluminum | アルミ合金鑄物 Aluminum Alloy Casting | チタン合金 Titanium Alloy | インコニ Inconel |
|----------------------|----------------------|--|-----------------------------|---------------------------|--------------------|-----------------------|------------------------------------|---------------------------|-------------------|-----------------|------------------------------|---------------------|--------------------|-----------------------------------|-------------------------|-----------------|
| | ADFLS-2D | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

A, B, C, D=標準在庫品 A, B, C, D=Standard stock item. □=特定代理店在庫品 □=Stocked by specific distributors. Contact us for price & availability.

■アイコンの説明はP.1をご覧ください。 See p.1 for explanation of icons.

形状寸法表
Specification Charts

センターリング穴面取り
Centering · Countersinking

コーナ面取り
Corner Chamfering

R面取り
Corner Rounding

座ぐり
Counterboring

切削条件
Cutting Conditions

センターリング穴面取り
Centering · Countersinking

コーナ面取り
Corner Chamfering

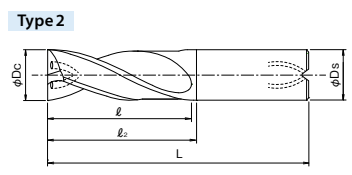
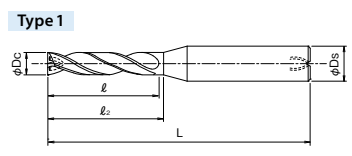
R面取り
Corner Rounding

座ぐり
Counterboring

G-LIST No. | DW1110 切削条件 Cutting Conditions | P.65
超硬フラットドリル(油穴付き)
 Carbide Flat Drill (with oil hole)
ADFO-3D



コーティングに色むらが発生する場合がありますが、性能上は全く問題ありません。
 Drills may have some discoloration, but it does not cause any performance problems.



単位:mm Unit:mm

| ツールNo. EDP No. | 直径 Dc | 溝長 l | 全長 L | シャンク径 Ds | φ ₂ | 形状 Type | 在庫 Stock | 重量 Weight | 標準価格 (Yen) |
|-------------------|----------|---------|---------|-------------|----------------|------------|-------------|--------------|---------------|
| 3334300 | 3 | 15 | 55 | 4 | 16 | 1 | B | — | 7,070 |
| 3334301 | 3.03 | | | | | | | — | 7,620 |
| 3334302 | 3.1 | | | | | | | — | 7,620 |
| 3334303 | 3.15 | | | | | | | — | 7,620 |
| 3334304 | 3.2 | | | | | | | — | 7,620 |
| 3334305 | 3.3 | | | | | | | — | 7,620 |
| 3334306 | 3.4 | 16 | 55 | 4 | 17 | 1 | B | — | 7,620 |
| 3334307 | 3.5 | | | | | | | — | 8,020 |
| 3334308 | 3.53 | | | | | | | — | 8,020 |
| 3334309 | 3.6 | 19 | 60 | 6 | 20 | 2 | B | — | 8,020 |
| 3334310 | 3.66 | | | | | | | — | 8,020 |
| 3334311 | 3.68 | | | | | | | — | 8,020 |
| 3334312 | 3.7 | | | | | | | — | 8,020 |
| 3334313 | 3.8 | 21 | 65 | 6 | 22 | 1 | B | — | 8,020 |
| 3334314 | 3.9 | | | | | | | — | 8,020 |
| 3334315 | 4 | | | | | | | — | 8,020 |
| 3334316 | 4.03 | | | | | | | — | 8,590 |
| 3334317 | 4.1 | | | | | | | — | 8,590 |
| 3334318 | 4.2 | | | | | | | — | 8,590 |
| 3334319 | 4.3 | 24 | 70 | 8 | 31 | 1 | B | — | 8,590 |
| 3334320 | 4.4 | | | | | | | — | 8,590 |
| 3334321 | 4.5 | | | | | | | — | 8,590 |
| 3334322 | 4.53 | 24 | 75 | 8 | 35 | 1 | B | — | 9,200 |
| 3334323 | 4.6 | | | | | | | — | 9,200 |
| 3334324 | 4.62 | | | | | | | — | 9,200 |
| 3334325 | 4.64 | | | | | | | — | 9,200 |
| 3334326 | 4.7 | | | | | | | — | 9,200 |
| 3334327 | 4.8 | | | | | | | — | 9,200 |
| 3334328 | 4.9 | 24 | 75 | 8 | 35 | 1 | B | — | 9,200 |
| 3334329 | 5 | | | | | | | — | 9,200 |
| 3334330 | 5.03 | | | | | | | — | 9,690 |

| ツールNo. EDP No. | 直径 Dc | 溝長 l | 全長 L | シャンク径 Ds | φ ₂ | 形状 Type | 在庫 Stock | 重量 Weight | 標準価格 (Yen) |
|-------------------|----------|---------|---------|-------------|----------------|------------|-------------|--------------|---------------|
| 3334331 | 5.1 | 24 | 65 | 6 | 25 | 1 | B | — | 9,690 |
| 3334332 | 5.2 | | | | | | | — | 9,690 |
| 3334333 | 5.3 | | | | | | | — | 9,690 |
| 3334334 | 5.4 | 27 | 70 | 8 | 28 | 2 | B | — | 9,690 |
| 3334335 | 5.5 | | | | | | | — | 9,690 |
| 3334336 | 5.52 | | | | | | | — | 10,200 |
| 3334337 | 5.54 | | | | | | | — | 10,200 |
| 3334338 | 5.6 | | | | | | | — | 10,200 |
| 3334339 | 5.7 | | | | | | | — | 10,200 |
| 3334340 | 5.8 | 30 | 75 | 10 | 31 | 1 | B | — | 10,200 |
| 3334341 | 5.9 | | | | | | | — | 10,200 |
| 3334342 | 6 | | | | | | | — | 10,200 |
| 3334343 | 6.03 | | | | | | | — | 10,200 |
| 3334344 | 6.1 | 34 | 80 | 12 | 35 | 1 | B | — | 10,200 |
| 3334345 | 6.2 | | | | | | | — | 10,200 |
| 3334346 | 6.3 | | | | | | | — | 10,200 |
| 3334347 | 6.4 | | | | | | | — | 10,200 |
| 3334348 | 6.5 | | | | | | | — | 10,200 |
| 3334349 | 6.53 | | | | | | | — | 10,900 |
| 3334350 | 6.6 | 34 | 85 | 14 | 35 | 1 | B | — | 10,900 |
| 3334351 | 6.7 | | | | | | | — | 10,900 |
| 3334352 | 6.8 | | | | | | | — | 10,900 |
| 3334353 | 6.9 | 34 | 90 | 16 | 35 | 1 | B | — | 10,900 |
| 3334354 | 7 | | | | | | | — | 10,900 |
| 3334355 | 7.03 | | | | | | | — | 11,500 |
| 3334356 | 7.1 | | | | | | | — | 11,500 |
| 3334357 | 7.2 | | | | | | | — | 11,500 |
| 3334358 | 7.3 | | | | | | | — | 11,500 |
| 3334359 | 7.4 | 34 | 95 | 18 | 35 | 1 | B | — | 11,500 |
| 3334360 | 7.5 | | | | | | | — | 11,500 |
| 3334361 | 7.6 | | | | | | | — | 12,100 |

次ページへ
 直径 Dc 7.7 ~ 13.2 NEXT

A, B, C, D=標準在庫品 A, B, C, D=Standard stock item. □=特定代理店在庫品 □=Stocked by specific distributors. Contact us for price & availability.

| 製品記号 Abbreviation | 被削材 Work Material | 低碳素鋼 軟鋼 Low Carbon Steel Mild Steel | 中炭素鋼 Medium Carbon Steel | 高炭素鋼 High Carbon Steel | 合金鋼 Alloy Steel | 調質鋼 Hardened Steel | 焼入鋼 Quenched and Tempered Steel | | | ステンレス鋼 Stainless Steel | 工具鋼 Tool Steel | 鑄鉄 Cast Iron | ダクタイル鑄鉄 Ductile Cast Iron | 銅合金 Copper Alloy | アルミ展伸材 Aluminum | アルミ合金鑄物 Aluminum Alloy Casting | チタン合金 Titanium Alloy | インコル Inconel |
|----------------------|-------------------------|--|-----------------------------|---------------------------|--------------------|-----------------------|------------------------------------|-----------|-----------|---------------------------|-------------------|-----------------|------------------------------|---------------------|--------------------|-----------------------------------|-------------------------|-----------------|
| | C~0.25% | 0.25~0.45% | 0.45%~ | SCM | ~35 HRC | 35~45 HRC | 45~50 HRC | 50~60 HRC | 60~70 HRC | SUS | SKD SKS | FC | FCD | Cu | Al | AC | | |
| ADFO-3D | | ○ | ○ | ○ | ○ | ○ | ○ | | | ○ | | ○ | ○ | | ○ | ○ | | |

形状寸法表
Specification Charts

センターリング穴面取り
Centering - Countersinking

コーナ面取り
Corner Chamfering

R面取り
Corner Rounding

座ぐり
Counterboring

切削条件
Cutting Conditions

センターリング穴面取り
Centering - Countersinking

コーナ面取り
Corner Chamfering

R面取り
Corner Rounding

座ぐり
Counterboring

前ページより

FROM 直径 Dc 3~7.6

| ツールNo. EDP No. | 直径 Dc | 溝長 ℓ | 全長 L | シャンク径 Ds | ℓ ₂ | 形状 Type | 在庫 Stock | 重量 Weight | 標準価格 (Yen) |
|-------------------|----------|---------|---------|-------------|----------------|------------|-------------|--------------|---------------|
| 3334362 | 7.7 | 34 | 75 | 8 | 35 | 1 | B | - | 12,100 |
| 3334363 | 7.8 | | | | | - | | 12,100 | |
| 3334364 | 7.9 | | | | | - | | 12,100 | |
| 3334365 | 8 | | | | | 2 | | - | 12,100 |
| 3334366 | 8.03 | 38 | 80 | 10 | 39 | 1 | - | 12,800 | |
| 3334367 | 8.1 | | | | | | - | 12,800 | |
| 3334368 | 8.2 | | | | | | - | 12,800 | |
| 3334369 | 8.3 | | | | | | - | 12,800 | |
| 3334370 | 8.4 | | | | | | - | 12,800 | |
| 3334371 | 8.5 | | | | | | - | 12,800 | |
| 3334372 | 8.53 | | | | | | - | 13,400 | |
| 3334373 | 8.6 | | | | | | - | 13,400 | |
| 3334374 | 8.7 | | | | | | - | 13,400 | |
| 3334375 | 8.8 | | | | | | - | 13,400 | |
| 3334376 | 8.9 | | | | | | - | 13,400 | |
| 3334377 | 9 | | | | | | - | 13,400 | |
| 3334378 | 9.03 | - | 14,100 | | | | | | |
| 3334379 | 9.1 | 42 | 85 | 12 | 43 | 1 | - | 14,100 | |
| 3334380 | 9.2 | | | | | | - | 14,100 | |
| 3334381 | 9.3 | | | | | | - | 14,100 | |
| 3334382 | 9.4 | | | | | | - | 14,100 | |
| 3334383 | 9.5 | | | | | | - | 14,100 | |
| 3334384 | 9.6 | | | | | | - | 14,700 | |
| 3334385 | 9.7 | | | | | | - | 14,700 | |
| 3334386 | 9.8 | | | | | | - | 14,700 | |
| 3334387 | 9.9 | | | | | | - | 14,700 | |
| 3334388 | 10 | | | | | | 2 | - | 14,700 |
| 3334389 | 10.03 | 46 | 90 | 12 | 47 | 1 | - | 15,400 | |
| 3334390 | 10.1 | | | | | | - | 15,400 | |
| 3334391 | 10.2 | | | | | | - | 15,400 | |
| 3334392 | 10.3 | | | | | | - | 15,400 | |

単位:mm Unit:mm

| ツールNo. EDP No. | 直径 Dc | 溝長 ℓ | 全長 L | シャンク径 Ds | ℓ ₂ | 形状 Type | 在庫 Stock | 重量 Weight | 標準価格 (Yen) | | | | |
|-------------------|----------|---------|---------|-------------|----------------|------------|-------------|--------------|---------------|----|---|---|--------|
| 3334393 | 10.4 | 46 | 90 | 12 | 47 | 1 | - | 15,400 | | | | | |
| 3334394 | 10.5 | | | | | | - | 15,400 | | | | | |
| 3334395 | 10.6 | | | | | | - | 15,900 | | | | | |
| 3334396 | 10.7 | | | | | | - | 15,900 | | | | | |
| 3334397 | 10.8 | | | | | | - | 15,900 | | | | | |
| 3334398 | 10.9 | | | | | | - | 15,900 | | | | | |
| 3334399 | 11 | | | | | | - | 15,900 | | | | | |
| 3334400 | 11.03 | | | | | | - | 16,500 | | | | | |
| 3334401 | 11.2 | | | | | | - | 16,500 | | | | | |
| 3334402 | 11.3 | | | | | | - | 16,500 | | | | | |
| 3334403 | 11.3 | 50 | 95 | 14 | 51 | 1 | - | 16,500 | | | | | |
| 3334404 | 11.4 | | | | | | - | 16,500 | | | | | |
| 3334405 | 11.5 | | | | | | - | 16,500 | | | | | |
| 3334406 | 11.6 | | | | | | - | 17,200 | | | | | |
| 3334407 | 11.7 | | | | | | - | 17,200 | | | | | |
| 3334408 | 11.8 | | | | | | - | 17,200 | | | | | |
| 3334409 | 11.9 | | | | | | - | 17,200 | | | | | |
| 3334410 | 12 | | | | | | 2 | - | 17,200 | | | | |
| ※3334411 | 12.03 | | | | | | 56 | 100 | 14 | 57 | 1 | - | 20,100 |
| ※3334412 | 12.1 | | | | | | | | | | | - | 20,100 |
| ※3334413 | 12.2 | - | 20,100 | | | | | | | | | | |
| ※3334414 | 12.3 | - | 20,100 | | | | | | | | | | |
| ※3334415 | 12.4 | - | 20,100 | | | | | | | | | | |
| ※3334416 | 12.5 | - | 20,100 | | | | | | | | | | |
| ※3334417 | 12.6 | - | 20,100 | | | | | | | | | | |
| ※3334418 | 12.7 | - | 20,100 | | | | | | | | | | |
| ※3334419 | 12.8 | - | 20,100 | | | | | | | | | | |
| ※3334420 | 12.9 | - | 20,100 | | | | | | | | | | |
| ※3334421 | 13 | 60 | 105 | 16 | 61 | 1 | - | 20,100 | | | | | |
| ※3334422 | 13.1 | | | | | | - | 24,300 | | | | | |
| ※3334423 | 13.2 | | | | | | - | 24,300 | | | | | |

※=2019年1月発売予定 Available from January 2019

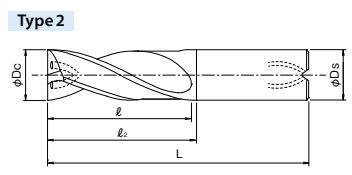
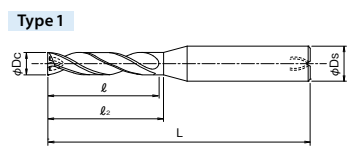
次ページへ
直径 Dc 13.3~20 NEXT

A、B、C、D=標準在庫品 A、B、C、D=Standard stock item. □=特定代理店在庫品 □=Stocked by specific distributors. Contact us for price & availability.

G-LIST No. | DW1110 切削条件 Cutting Conditions | P.65
超硬フラットドリル(油穴付き)
 Carbide Flat Drill (with oil hole)
ADFO-3D



コーティングに色むらが発生する場合がありますが、性能上は全く問題ありません。
 Drills may have some discoloration, but it does not cause any performance problems.



前ページより FROM 直径 Dc 7.7~13.2

単位:mm Unit:mm

| ツールNo. EDP No. | 直径 Dc | 溝長 ℓ | 全長 L | シャンク径 Ds | ℓ ₂ | 形状 Type | 在庫 Stock | 重量 Weight | 標準価格 (Yen) | |
|-------------------|----------|---------|---------|-------------|----------------|------------|-------------|--------------|---------------|--------|
| *3334424 | 13.3 | 60 | 105 | 14 | 61 | 1 | B | - | 24,300 | |
| *3334425 | 13.4 | | | | | | | - | 24,300 | |
| *3334426 | 13.5 | | | | | | | - | 24,300 | |
| *3334427 | 13.6 | | | | | | | - | 24,300 | |
| *3334428 | 13.7 | | | | | | | - | 24,300 | |
| *3334429 | 13.8 | | | | | | | - | 24,300 | |
| *3334430 | 13.9 | 64 | 110 | 16 | 65 | 1 | | - | 24,300 | |
| *3334431 | 14 | | | | | | | 2 | - | 24,300 |
| *3334432 | 14.1 | | | | | | | - | 27,000 | |
| *3334433 | 14.2 | | | | | | | - | 27,000 | |
| *3334434 | 14.3 | | | | | | | - | 27,000 | |
| *3334435 | 14.4 | | | | | | | - | 27,000 | |
| *3334436 | 14.5 | 64 | 110 | 16 | 65 | 1 | - | 27,000 | | |
| *3334437 | 14.6 | | | | | | - | 27,000 | | |
| *3334438 | 14.7 | | | | | | - | 27,000 | | |
| *3334439 | 14.8 | | | | | | - | 27,000 | | |
| *3334440 | 14.9 | | | | | | - | 27,000 | | |
| *3334441 | 15 | | | | | | - | 27,000 | | |

| ツールNo. EDP No. | 直径 Dc | 溝長 ℓ | 全長 L | シャンク径 Ds | ℓ ₂ | 形状 Type | 在庫 Stock | 重量 Weight | 標準価格 (Yen) | | | | | |
|-------------------|----------|---------|---------|-------------|----------------|------------|-------------|--------------|---------------|----|----|--------|--------|--------|
| *3334442 | 15.1 | 68 | 115 | 16 | 69 | 1 | B | - | 30,500 | | | | | |
| *3334443 | 15.2 | | | | | | | - | 30,500 | | | | | |
| *3334444 | 15.3 | | | | | | | - | 30,500 | | | | | |
| *3334445 | 15.4 | | | | | | | - | 30,500 | | | | | |
| *3334446 | 15.5 | | | | | | | - | 30,500 | | | | | |
| *3334447 | 15.6 | | | | | | | - | 30,500 | | | | | |
| *3334448 | 15.7 | | | | | | | - | 30,500 | | | | | |
| *3334449 | 15.8 | | | | | | | - | 30,500 | | | | | |
| *3334450 | 15.9 | | | | | | | - | 30,500 | | | | | |
| *3334451 | 16 | | | | | | | 74 | 125 | 18 | 75 | 1 | - | 41,800 |
| *3334452 | 16.5 | | | | | | | | | | | | - | 41,800 |
| *3334453 | 17 | | | | | | | | | | | | - | 43,100 |
| *3334454 | 17.5 | 78 | 130 | 79 | 2 | - | 43,100 | | | | | | | |
| *3334455 | 18 | | | | | - | 47,100 | | | | | | | |
| *3334456 | 18.5 | 84 | 135 | 20 | 85 | 1 | - | | | | | | 47,100 | |
| *3334457 | 19 | | | | | | - | 47,100 | | | | | | |
| *3334458 | 19.5 | | | | | | 88 | 140 | 89 | 2 | - | 53,500 | | |
| *3334459 | 20 | | | | | | | | | | - | 53,500 | | |

*=2019年1月発売予定 Available from January 2019

| 被削材 Work Material | 低炭素鋼 | 中炭素鋼 | 高炭素鋼 | 合金鋼 | 調質鋼 | 焼入鋼 | | | | ステンレス鋼 | 工具鋼 | 鋳鉄 | タタイル 鋳鉄 | 銅合金 | アルミ 展伸材 | アルミ 合金鋳物 | チタン 合金 | インコネル |
|-------------------------|------------------------------|---------------------|-------------------|-------------|----------------|-----------------------------|-----------|-----------|-----------|-----------------|------------|-----------|-------------------|--------------|------------|------------------------|----------------|---------|
| | Low Carbon Steel Mn/Steel | Medium Carbon Steel | High Carbon Steel | Alloy Steel | Hardened Steel | Quenched and Tempered Steel | | | | Stainless Steel | Tool Steel | Cast Iron | Ductile Cast Iron | Copper Alloy | Aluminum | Aluminum Alloy Casting | Titanium Alloy | Inconel |
| 製品記号 Abbreviation | C~0.25% | C0.25~0.45% | C0.45%~ | SCM | ~35 HRC | 35~45 HRC | 45~50 HRC | 50~60 HRC | 60~70 HRC | SUS | SKD SKS | FC | FCD | Cu | Al | AC | | |
| ADFO-3D | ○ | ○ | ○ | ○ | ○ | ○ | | | | ○ | | ○ | ○ | | ○ | ○ | | |

A, B, C, D=標準在庫品 A, B, C, D=Standard stock item. □=特定代理店在庫品 □=Stocked by specific distributors. Contact us for price & availability.

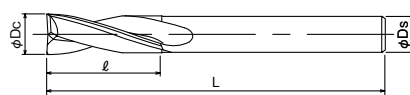
FXコート 座ぐり加工用 2刃ショート

FX Coated・2Flutes・Short・for Counterboring

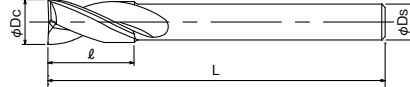
FX-ZDS



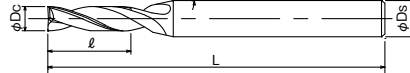
Type 1



Type 2



Type 3



単位:mm Unit:mm

| ツールNo. EDP No. | 外径 Dc | 全長 L | 有効溝長 ℓ | シャンク径 Ds | 形状 Type | 在庫 Stock | 重量 Weight | 標準価格 (Yen) |
|-------------------|----------|---------|-----------|-------------|------------|-------------|--------------|---------------|
| | 0.5 | 40 | 1 | 4 | 3 | □ | — | — |
| | 0.6 | | 1.2 | | | | — | — |
| | 0.7 | | 1.4 | | | | — | — |
| | 0.8 | | 1.6 | | | | — | — |
| | 0.9 | | 2 | | | | — | — |
| | 1 | | 2.5 | | | | — | — |
| | 1.1 | | | | | | — | — |
| | 1.2 | | 4 | | | | — | — |
| | 1.3 | | | | | | — | — |
| | 1.4 | | | | | | — | — |
| | 1.5 | | | | | | — | — |
| | 1.6 | | | | | | — | — |
| | 1.7 | | | | | | 5 | — |
| | 1.8 | | — | | | | | — |
| | 1.9 | 45 | — | — | | | | |
| | 2 | | — | — | | | | |
| | 2.1 | | 6 | — | — | | | |
| | 2.2 | | | — | — | | | |
| | 2.3 | | 8 | — | — | | | |
| | 2.4 | | | — | — | | | |
| | 2.5 | | | — | — | | | |
| | 2.6 | | | — | — | | | |
| | 2.7 | | | — | — | | | |
| | 2.8 | | | — | — | | | |
| | 2.9 | 10 | — | — | | | | |
| 8530630 | 3 | | — | D 18 8,400 | | | | |
| | 3.1 | | — | □ — — | | | | |
| | 3.2 | 11 | — | — | | | | |
| 8530633 | 3.3 | | — | D 18 8,770 | | | | |
| | 3.4 | 50 | — | — | | | | |
| 8530635 | 3.5 | | — | D 18 8,770 | | | | |
| | 3.6 | | — | — | | | | |
| | 3.7 | | — | — | | | | |
| | 3.8 | | — | — | | | | |
| | 3.9 | | — | — | | | | |
| 8530640 | 4 | | — | D 18 8,770 | | | | |
| | 4.1 | | 11 | — | — | | | |
| 8530642 | 4.2 | | | — | D 18 8,770 | | | |
| | 4.3 | | | — | — | | | |
| | 4.4 | — | | — | | | | |
| 8530645 | 4.5 | 50 | — | — | | | | |
| | 4.6 | | — | D 19 8,770 | | | | |

| ツールNo. EDP No. | 外径 Dc | 全長 L | 有効溝長 ℓ | シャンク径 Ds | 形状 Type | 在庫 Stock | 重量 Weight | 標準価格 (Yen) |
|-------------------|----------|---------|-------------|-------------|------------|-------------|--------------|---------------|
| | 4.7 | 50 | 11 | 3 | 3 | — | — | — |
| | 4.8 | | | | | — | — | |
| | 4.9 | | | | | — | — | |
| 8530650 | 5 | | | | | — | D 23 9,460 | |
| | 5.1 | | | | | — | — | |
| | 5.2 | 60 | 13 | 3 | — | — | — | |
| | 5.3 | | | | — | — | | |
| | 5.4 | | | | — | — | | |
| 8530655 | 5.5 | | | | — | D 23 9,820 | | |
| | 5.6 | | | | — | — | | |
| | 5.7 | | | | — | — | | |
| | 5.8 | 70 | 16 | 6 | — | — | — | |
| | 5.9 | | | | — | — | | |
| 8530660 | 6 | | | | — | D 23 9,820 | | |
| | 6.1 | | | | — | — | | |
| | 6.2 | | | | — | — | | |
| | 6.3 | | | | — | — | | |
| | 6.4 | | | | — | — | | |
| 8530665 | 6.5 | | | | — | D 29 12,900 | | |
| | 6.6 | | | | — | — | | |
| | 6.7 | | | | — | — | | |
| 8530668 | 6.8 | — | D 29 12,900 | | | | | |
| | 6.9 | 70 | 19 | 8 | — | — | — | |
| 8530670 | 7 | | | | — | D 29 12,900 | | |
| | 7.1 | | | | — | — | | |
| | 7.2 | | | | — | — | | |
| | 7.3 | | | | — | — | | |
| | 7.4 | | | | — | — | | |
| 8530675 | 7.5 | | | | — | D 30 12,900 | | |
| | 7.6 | | | | — | — | | |
| | 7.7 | | | | — | — | | |
| | 7.8 | | | | — | — | | |
| | 7.9 | 80 | 8 | 2 | — | — | — | |
| 8530680 | 8 | | | | — | D 45 14,700 | | |
| | 8.1 | | | | — | — | | |
| | 8.2 | | | | — | — | | |
| | 8.3 | | | | — | — | | |
| | 8.4 | | | | — | — | | |
| 8530685 | 8.5 | | | | — | D 55 17,000 | | |
| | 8.6 | | | | — | — | | |
| | 8.7 | | | | — | — | | |
| | 8.8 | | | | — | — | | |

・横引き不可です。Specialized for plunging.

次ページへ

外径Dc 8.9~17.2 NEXT

| 被削材 Work Material | 低炭素鋼 軟鋼 Low Carbon Steel Mild Steel | 中炭素鋼 Medium Carbon Steel | 高炭素鋼 High Carbon Steel | 合金鋼 Alloy Steel | 調質鋼 Hardened Steel | 焼入鋼 Quenched and Tempered Steel | ステンレス鋼 Stainless Steel | 工具鋼 Tool Steel | 鋳鉄 Cast Iron | ダクタイル鋳鉄 Ductile Cast Iron | 銅合金 Copper Alloy | アルミ展伸材 Aluminum | アルミ合金鋳物 Aluminum Alloy Casting | チタン合金 Titanium Alloy | インコネル Inconel |
|----------------------|--|-----------------------------|---------------------------|--------------------|-----------------------|------------------------------------|-------------------------------------|-------------------|-----------------|------------------------------|---------------------|--------------------|-----------------------------------|-------------------------|------------------|
| | 製品記号 Abbreviation | C~0.25% | 0.25~0.45% | 0.45%~ | SCM | ~35 HRC 35~45 HRC | 45~50 HRC 50~60 HRC 60~70 HRC | SUS | SKD SKS | FC | FCD | Cu | Al | AC | |
| FX-ZDS | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | |

A、B、C、D=標準在庫品 A、B、C、D=Standard stock item. □=特定代理店在庫品 □=Stocked by specific distributors. Contact us for price & availability.

■アイコンの説明はP.1をご覧ください。 See p.1 for explanation of icons.

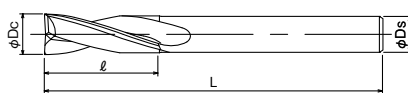
FXコート 座ぐり加工用 2刃ショート

FX Coated・2Flutes・Short for Counterboring

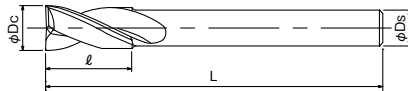
FX-ZDS



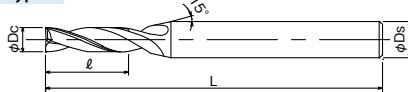
Type 1



Type 2



Type 3



前ページより

FROM 外径 Dc 0.5 ~ 8.8

単位:mm Unit:mm

| ツールNo. EDP No. | 外径 Dc | 全長 L | 有効溝長 ℓ | シャンク径 Ds | 形状 Type | 在庫 Stock | 重量 Weight | 標準価格 (Yen) | | | | |
|-------------------|----------|--------------------------|-----------|-------------|------------|--------------------------|--------------|---------------|---|--------------------------|-----|--------|
| | 8.9 | 80 | 19 | 8 | 2 | <input type="checkbox"/> | - | - | | | | |
| 8530690 | 9 | | | | | <input type="checkbox"/> | 55 | 17,000 | | | | |
| | 9.1 | | | | | <input type="checkbox"/> | - | - | | | | |
| | 9.2 | | | | | <input type="checkbox"/> | - | - | | | | |
| | 9.3 | | | | | <input type="checkbox"/> | - | - | | | | |
| | 9.4 | | | | | <input type="checkbox"/> | - | - | | | | |
| 8530695 | 9.5 | 90 | 22 | 10 | 2 | D | 55 | 17,600 | | | | |
| | 9.6 | | | | | <input type="checkbox"/> | - | - | | | | |
| | 9.7 | | | | | <input type="checkbox"/> | - | - | | | | |
| | 9.8 | | | | | <input type="checkbox"/> | - | - | | | | |
| | 9.9 | | | | | <input type="checkbox"/> | - | - | | | | |
| 8530700 | 10 | | | | | 90 | 22 | 10 | 1 | D | 77 | 17,000 |
| | 10.1 | <input type="checkbox"/> | - | - | | | | | | | | |
| | 10.2 | <input type="checkbox"/> | - | - | | | | | | | | |
| 8530703 | 10.3 | 100 | 26 | 12 | 2 | | | | | D | 93 | 21,100 |
| | 10.4 | | | | | | | | | <input type="checkbox"/> | - | - |
| 8530705 | 10.5 | | | | | | | | | 100 | 26 | 12 |
| | 10.6 | | | | | <input type="checkbox"/> | - | - | | | | |
| | 10.7 | | | | | <input type="checkbox"/> | - | - | | | | |
| | 10.8 | | | | | <input type="checkbox"/> | - | - | | | | |
| | 10.9 | <input type="checkbox"/> | - | - | | | | | | | | |
| 8530710 | 11 | 90 | 22 | 10 | 2 | D | 94 | 21,100 | | | | |
| | 11.1 | | | | | <input type="checkbox"/> | - | - | | | | |
| | 11.2 | | | | | <input type="checkbox"/> | - | - | | | | |
| | 11.3 | | | | | <input type="checkbox"/> | - | - | | | | |
| | 11.4 | | | | | <input type="checkbox"/> | - | - | | | | |
| 8530715 | 11.5 | | | | | 100 | 26 | 12 | 2 | D | 96 | 21,300 |
| | 11.6 | <input type="checkbox"/> | - | - | | | | | | | | |
| | 11.7 | <input type="checkbox"/> | - | - | | | | | | | | |
| | 11.8 | <input type="checkbox"/> | - | - | | | | | | | | |
| | 11.9 | <input type="checkbox"/> | - | - | | | | | | | | |
| 8530720 | 12 | 100 | 26 | 12 | 2 | | | | | D | 125 | 24,900 |
| | 12.1 | | | | | <input type="checkbox"/> | - | - | | | | |
| | 12.2 | | | | | <input type="checkbox"/> | - | - | | | | |
| | 12.3 | | | | | <input type="checkbox"/> | - | - | | | | |
| | 12.4 | | | | | <input type="checkbox"/> | - | - | | | | |
| 8530725 | 12.5 | | | | | 100 | 26 | 12 | 2 | D | 142 | 29,200 |
| | 12.6 | <input type="checkbox"/> | - | - | | | | | | | | |
| | 12.7 | <input type="checkbox"/> | - | - | | | | | | | | |
| | 12.8 | <input type="checkbox"/> | - | - | | | | | | | | |
| | 12.9 | <input type="checkbox"/> | - | - | | | | | | | | |
| 8530730 | 13 | | | | | | | | | D | 145 | 29,200 |

| ツールNo. EDP No. | 外径 Dc | 全長 L | 有効溝長 ℓ | シャンク径 Ds | 形状 Type | 在庫 Stock | 重量 Weight | 標準価格 (Yen) | | | | |
|-------------------|----------|--------------------------|-----------|-------------|------------|--------------------------|--------------|---------------|---|--------------------------|-----|--------|
| | 13.1 | 100 | 26 | 12 | 2 | <input type="checkbox"/> | - | - | | | | |
| | 13.2 | | | | | <input type="checkbox"/> | - | - | | | | |
| | 13.3 | | | | | <input type="checkbox"/> | - | - | | | | |
| | 13.4 | | | | | <input type="checkbox"/> | - | - | | | | |
| 8530735 | 13.5 | | | | | 105 | 26 | 12 | 2 | D | 156 | 35,400 |
| | 13.6 | | | | | | | | | <input type="checkbox"/> | - | - |
| | 13.7 | <input type="checkbox"/> | - | - | | | | | | | | |
| | 13.8 | <input type="checkbox"/> | - | - | | | | | | | | |
| | 13.9 | <input type="checkbox"/> | - | - | | | | | | | | |
| 8530740 | 14 | 115 | 32 | 16 | 2 | | | | | D | 158 | 35,400 |
| | 14.1 | | | | | <input type="checkbox"/> | - | - | | | | |
| | 14.2 | | | | | <input type="checkbox"/> | - | - | | | | |
| | 14.3 | | | | | <input type="checkbox"/> | - | - | | | | |
| | 14.4 | | | | | <input type="checkbox"/> | - | - | | | | |
| 8530745 | 14.5 | | | | | 115 | 32 | 16 | 2 | D | 167 | 40,900 |
| | 14.6 | <input type="checkbox"/> | - | - | | | | | | | | |
| | 14.7 | <input type="checkbox"/> | - | - | | | | | | | | |
| | 14.8 | <input type="checkbox"/> | - | - | | | | | | | | |
| | 14.9 | <input type="checkbox"/> | - | - | | | | | | | | |
| 8530750 | 15 | 115 | 32 | 16 | 2 | | | | | D | 167 | 40,900 |
| | 15.1 | | | | | <input type="checkbox"/> | - | - | | | | |
| | 15.2 | | | | | <input type="checkbox"/> | - | - | | | | |
| | 15.3 | | | | | <input type="checkbox"/> | - | - | | | | |
| | 15.4 | | | | | <input type="checkbox"/> | - | - | | | | |
| 8530755 | 15.5 | | | | | 115 | 32 | 16 | 2 | D | 188 | 41,500 |
| | 15.6 | <input type="checkbox"/> | - | - | | | | | | | | |
| | 15.7 | <input type="checkbox"/> | - | - | | | | | | | | |
| | 15.8 | <input type="checkbox"/> | - | - | | | | | | | | |
| | 15.9 | <input type="checkbox"/> | - | - | | | | | | | | |
| 8530760 | 16 | 115 | 32 | 16 | 2 | | | | | D | 285 | 41,800 |
| | 16.1 | | | | | <input type="checkbox"/> | - | - | | | | |
| | 16.2 | | | | | <input type="checkbox"/> | - | - | | | | |
| | 16.3 | | | | | <input type="checkbox"/> | - | - | | | | |
| | 16.4 | | | | | <input type="checkbox"/> | - | - | | | | |
| 8530765 | 16.5 | | | | | 115 | 32 | 16 | 2 | D | 289 | 69,300 |
| | 16.6 | <input type="checkbox"/> | - | - | | | | | | | | |
| | 16.7 | <input type="checkbox"/> | - | - | | | | | | | | |
| | 16.8 | <input type="checkbox"/> | - | - | | | | | | | | |
| | 16.9 | <input type="checkbox"/> | - | - | | | | | | | | |
| 8530770 | 17 | 115 | 32 | 16 | 2 | | | | | D | 292 | 69,300 |
| | 17.1 | | | | | <input type="checkbox"/> | - | - | | | | |
| | 17.2 | | | | | <input type="checkbox"/> | - | - | | | | |
| | 17.2 | | | | | <input type="checkbox"/> | - | - | | | | |

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次ページへ

外径 Dc 17.3 ~ 20 NEXT

A, B, C, D=標準在庫品 A, B, C, D=Standard stock item. =特定代理店在庫品 =Stocked by specific distributors. Contact us for price & availability.

| | | | | | | | | | | | | | | | | |
|----------------------|-------------------------|--|-----------------------------------|---------------------------------|-----------------------|-------------------------|--|----------------------------------|-------------------|-----------------|-------------------------------------|------------------------|------------------------|---|--------------------------------|---------------------|
| 製品記号 Abbreviation | 被削材 Work Material | 低炭素鋼 軟鋼 Low Carbon Steel Mild Steel | 中炭素鋼 Medium Carbon Steel | 高炭素鋼 High Carbon Steel | 合金鋼 Alloy Steel | 調質鋼 Hardened Steel | 焼入鋼 Quenched and Tempered Steel | ステンレス 鋼 Stainless Steel | 工具鋼 Tool Steel | 鑄鉄 Cast Iron | ダクタイル 鑄鉄 Ductile Cast Iron | 銅合金 Copper Alloy | アルミ 展伸材 Aluminum | アルミ 合金鑄物 Aluminum Alloy Casting | チタン 合金 Titanium Alloy | インコ ル Inconel |
| | FX-ZDS | C~0.25% | C0.25~0.45% | C0.45%~ | SCM | ~35 HRC 35~45 HRC | 45~50 HRC 50~60 HRC 60~70 HRC | SUS | SKD SKS | FC | FCD | Cu | Al | AC | | |

形状寸法表
Specification
Charts

センターリング穴面取り
Centering -
Countersinking

コーナ面取り
Corner Chamfering

R面取り
Corner Rounding

座ぐり
Counterboring

切削条件
Cutting
Conditions

センターリング穴面取り
Centering -
Countersinking

コーナ面取り
Corner Chamfering

R面取り
Corner Rounding

座ぐり
Counterboring

前ページより

FROM 外径 Dc 8.9 ~ 17.2

| ツールNo. EDP No. | 外径 Dc | 全長 L | 有効溝長 ℓ | シャンク径 Ds | 形状 Type | 在庫 Stock | 重量 Weight | 標準価格 (Yen) |
|-------------------|----------|--------------------------|-----------|-------------|------------|--------------------------|--------------|---------------|
| | 17.3 | 115 | 32 | 16 | 2 | <input type="checkbox"/> | — | — |
| | 17.4 | | | | | <input type="checkbox"/> | — | — |
| 8530775 | 17.5 | | | | | D | 295 | 69,300 |
| | 17.6 | | | | | <input type="checkbox"/> | — | — |
| | 17.7 | | | | | <input type="checkbox"/> | — | — |
| | 17.8 | | | | | <input type="checkbox"/> | — | — |
| | 17.9 | | | | | <input type="checkbox"/> | — | — |
| 8530780 | 18 | | | | | D | 304 | 69,300 |
| | 18.1 | | | | | <input type="checkbox"/> | — | — |
| | 18.2 | | | | | <input type="checkbox"/> | — | — |
| | 18.3 | <input type="checkbox"/> | — | — | | | | |
| | 18.4 | <input type="checkbox"/> | — | — | | | | |
| 8530785 | 18.5 | D | 307 | 69,300 | | | | |
| | 18.6 | <input type="checkbox"/> | — | — | | | | |

単位:mm Unit:mm

| ツールNo. EDP No. | 外径 Dc | 全長 L | 有効溝長 ℓ | シャンク径 Ds | 形状 Type | 在庫 Stock | 重量 Weight | 標準価格 (Yen) |
|-------------------|----------|---------|-----------|-------------|------------|--------------------------|--------------|---------------|
| | 18.7 | 115 | 32 | 16 | 2 | <input type="checkbox"/> | — | — |
| | 18.8 | | | | | <input type="checkbox"/> | — | — |
| | 18.9 | | | | | D | 307 | 69,300 |
| 8530790 | 19 | | | | | <input type="checkbox"/> | — | — |
| | 19.1 | 125 | 38 | 16 | 2 | <input type="checkbox"/> | — | — |
| | 19.2 | | | | | <input type="checkbox"/> | — | — |
| | 19.3 | | | | | <input type="checkbox"/> | — | — |
| | 19.4 | | | | | <input type="checkbox"/> | — | — |
| 8530795 | 19.5 | | | | | D | 330 | 70,100 |
| | 19.6 | | | | | <input type="checkbox"/> | — | — |
| | 19.7 | | | | | <input type="checkbox"/> | — | — |
| | 19.8 | | | | | <input type="checkbox"/> | — | — |
| | 19.9 | | | | | <input type="checkbox"/> | — | — |
| 8530800 | 20 | | | | | 20 | 1 | D |

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A、B、C、D=標準在庫品 A、B、C、D=Standard stock item. =特定代理店在庫品 =Stocked by specific distributors. Contact us for price & availability.

G-LIST No. | CW1008

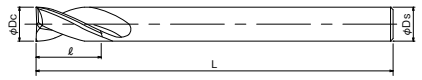
切削条件 Cutting Conditions | P.66

FXコート 座ぐり加工用 ロングシャンク 2刃ショート
FX Coated・2Flutes・Short・with Long Shank・for Counterboring

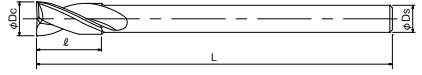
FX-LS-ZDS



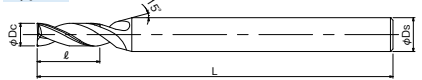
Type 1



Type 2



Type 3



単位:mm Unit:mm

| ツールNo. EDP No. | 外径 Dc | 全長 L | 有効溝長 ℓ | シャンク径 Ds | 形状 Type | 在庫 Stock | 重量 Weight | 標準価格 (Yen) |
|-------------------|----------|---------|----------------|-------------|------------|-------------|--------------|---------------|
| 3 | 3.1 | 100 | 8 | 3 | 1 | | | |
| 3.2 | 3.3 | | | | | | | |
| 3.4 | 3.5 | | 10 | | | | | |
| 3.6 | 3.7 | | | | | | | |
| 3.8 | 3.9 | | | | | | | |
| 4 | 4.1 | | | | | | | |
| 4.2 | 4.3 | | 11 | | | | | |
| 4.4 | 4.5 | | | | | | | |
| 4.6 | 4.7 | | | | | | | |
| 4.8 | 4.9 | | | | | | | |
| 5 | 5.1 | 110 | 13 | 6 | 1 | | | |
| 5.2 | 5.3 | | | | | | | |
| 5.4 | 5.5 | | 10 | | | | | |
| 5.6 | 5.7 | | | | | | | |
| 5.8 | 5.9 | | | | | | | |
| 6 | 6.1 | | | | | | | |
| 6.2 | 6.3 | | 16 | | | | | |
| 6.4 | 6.5 | | | | | | | |
| 6.6 | 6.7 | | | | | | | |
| 6.8 | 6.9 | | | | | | | |
| 7 | 7.1 | 120 | 16 | 2 | 1 | | | |
| 7.2 | 7.3 | | | | | | | |

| ツールNo. EDP No. | 外径 Dc | 全長 L | 有効溝長 ℓ | シャンク径 Ds | 形状 Type | 在庫 Stock | 重量 Weight | 標準価格 (Yen) |
|-------------------|----------|---------|----------------|-------------|------------|-------------|--------------|---------------|
| 7.3 | 7.4 | 120 | 16 | 6 | 2 | | | |
| 7.5 | 7.6 | | | | | | | |
| 7.7 | 7.8 | | 19 | | | | | |
| 7.9 | 8 | | | | | | | |
| 8.1 | 8.2 | | | | | | | |
| 8.3 | 8.4 | | | | | | | |
| 8.5 | 8.6 | | 130 | | | | | |
| 8.7 | 8.8 | | | | | | | |
| 8.9 | 9 | | | | | | | |
| 9.1 | 9.2 | | | | | | | |
| 9.3 | 9.4 | 150 | 2 | 8 | 2 | | | |
| 9.5 | 9.6 | | | | | | | |
| 9.7 | 9.8 | | 22 | | | | | |
| 9.9 | 10 | | | | | | | |
| 10.1 | 10.2 | | | | | | | |
| 10.3 | 10.4 | | | | | | | |
| 10.5 | 10.6 | | 10 | | | | | |
| 10.7 | 10.8 | | | | | | | |
| 10.9 | 11 | | | | | | | |
| 11.1 | 11.2 | | | | | | | |
| 11.3 | 11.4 | 1 | 2 | 10 | 2 | | | |
| 11.5 | 11.6 | | | | | | | |

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次ページへ

外径 Dc 11.6 ~ 20 NEXT

A, B, C, D=標準在庫品 A, B, C, D=Standard stock item. □=特定代理店在庫品 □=Stocked by specific distributors. Contact us for price & availability.

| | | | | | | | | | | | | | | | | |
|----------------------|-------------------------|--|-----------------------------|---------------------------|--------------------|-----------------------|-------------------------------------|---------------------------|-------------------|-----------------|------------------------------|---------------------|--------------------|-----------------------------------|-------------------------|-----------------|
| 製品記号 Abbreviation | 被削材 Work Material | 低碳素鋼 軟鋼 Low Carbon Steel Mild Steel | 中炭素鋼 Medium Carbon Steel | 高炭素鋼 High Carbon Steel | 合金鋼 Alloy Steel | 調質鋼 Hardened Steel | 焼入鋼 Quenched and Tempered Steel | ステンレス鋼 Stainless Steel | 工具鋼 Tool Steel | 鋳鉄 Cast Iron | ダクタイル鋳鉄 Ductile Cast Iron | 銅合金 Copper Alloy | アルミ展伸材 Aluminum | アルミ合金鑄物 Aluminum Alloy Casting | チタン合金 Titanium Alloy | インコル Inconel |
| | FX-LS-ZDS | C~0.25% | C0.25~0.45% | C0.45%~ | SCM | ~35 HRC 35~45 HRC | 45~50 HRC 50~60 HRC 60~70 HRC | SUS | SKD SKS | FC | FCD | Cu | Al | AC | | |

形状寸法表
Specification
Charts

センターリング穴面取り
Centering -
Countersinking

コーナ面取り
Corner Chamfering

R面取り
Corner Rounding

座ぐり
Counterboring

切削条件
Cutting
Conditions

センターリング穴面取り
Centering -
Countersinking

コーナ面取り
Corner Chamfering

R面取り
Corner Rounding

座ぐり
Counterboring

前ページより

FROM 外径 Dc 3~11.5

単位:mm Unit:mm

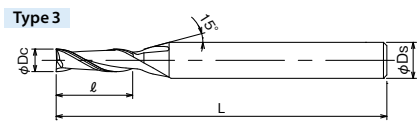
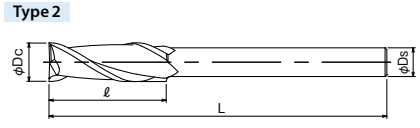
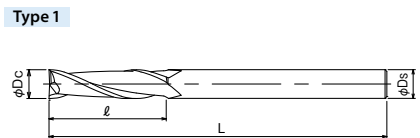
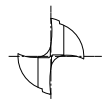
| ツールNo. EDP No. | 外径 Dc | 全長 L | 有効溝長 ℓ | シャンク径 Ds | 形状 Type | 在庫 Stock | 重量 Weight | 標準価格 (Yen) | | | |
|-------------------|----------|---------|-----------|-------------|------------|-------------|--------------|---------------|---|---|---|
| 11.6 | | 150 | 22 | 10 | 2 | | — | — | | | |
| 11.7 | | | | | | | | | | — | — |
| 11.8 | | | | | | | | | | — | — |
| 11.9 | | | | | | | | | | — | — |
| 12 | | | | | | | | | 1 | — | — |
| 12.1 | | | | | | | | | | — | — |
| 12.2 | | | | | | | | | | — | — |
| 12.3 | | | | | | | | | | — | — |
| 12.4 | | | | | | | | | | — | — |
| 12.5 | | | | | | | | | | — | — |
| 12.6 | | | | | | | | | | — | — |
| 12.7 | | | | | | | | | | — | — |
| 12.8 | | | | | | — | — | | | | |
| 12.9 | | | | | | — | — | | | | |
| 13 | | | | | | — | — | | | | |
| 13.1 | | | | | | — | — | | | | |
| 13.2 | | | | | | — | — | | | | |
| 13.3 | | | | | | — | — | | | | |
| 13.4 | | | 26 | | | | — | — | | | |
| 13.5 | | | | | | | | | — | — | |
| 13.6 | | | | | | | | | — | — | |
| 13.7 | | | | | | | | | — | — | |
| 13.8 | | | | | | | | | — | — | |
| 13.9 | | | | | | | | | — | — | |
| 14 | | | | | | | | | — | — | |
| 14.1 | | | | | | | | | — | — | |
| 14.2 | | | | | | | | | — | — | |
| 14.3 | | | | | | | | | — | — | |
| 14.4 | | | | | | | | | — | — | |
| 14.5 | | | | | | | | | — | — | |
| 14.6 | | | | | | — | — | | | | |
| 14.7 | | | | | | — | — | | | | |
| 14.8 | | | | | | — | — | | | | |
| 14.9 | | | | | | — | — | | | | |
| 15 | | | | | | — | — | | | | |
| 15.1 | | | | | | — | — | | | | |
| 15.2 | | | | | | — | — | | | | |
| 15.3 | | | | | | — | — | | | | |
| 15.4 | | | | | | — | — | | | | |
| 15.5 | | | 32 | | | | — | — | | | |
| 15.6 | | | | | | | | | — | — | |
| 15.7 | | | | | | | | | — | — | |
| 15.8 | | | | | | | | | — | — | |

| ツールNo. EDP No. | 外径 Dc | 全長 L | 有効溝長 ℓ | シャンク径 Ds | 形状 Type | 在庫 Stock | 重量 Weight | 標準価格 (Yen) | | | |
|-------------------|----------|---------|-----------|-------------|------------|-------------|--------------|---------------|---|---|---|
| 15.9 | | 180 | | | 2 | | — | — | | | |
| 16 | | | | | | | | | | — | — |
| 16.1 | | | | | | | | | | — | — |
| 16.2 | | | | | | | | | | — | — |
| 16.3 | | | | | | | | | | — | — |
| 16.4 | | | | | | | | | | — | — |
| 16.5 | | | | | | | | | | — | — |
| 16.6 | | | | | | | | | | — | — |
| 16.7 | | | | | | | | | | — | — |
| 16.8 | | | | | | | | | | — | — |
| 16.9 | | | | | | | | | | — | — |
| 17 | | | | | | | | | | — | — |
| 17.1 | | | | | | — | — | | | | |
| 17.2 | | | | | | — | — | | | | |
| 17.3 | | | 32 | | 1 | | — | — | | | |
| 17.4 | | | | | | | | | — | — | |
| 17.5 | | | | | | | | | — | — | |
| 17.6 | | | | | | | | | — | — | |
| 17.7 | | | | | | | | | — | — | |
| 17.8 | | | | | | | | | — | — | |
| 17.9 | | | | | | | | | — | — | |
| 18 | | | | | | | | | — | — | |
| 18.1 | | | | | | | | | — | — | |
| 18.2 | | | | | | | | | — | — | |
| 18.3 | | | | | | | | | — | — | |
| 18.4 | | | | | | | | | — | — | |
| 18.5 | | | | | | — | — | | | | |
| 18.6 | | | | | | — | — | | | | |
| 18.7 | | | | | | — | — | | | | |
| 18.8 | | | | | | — | — | | | | |
| 18.9 | | | | | | — | — | | | | |
| 19 | | | | | | — | — | | | | |
| 19.1 | | | | | | — | — | | | | |
| 19.2 | | | | | | — | — | | | | |
| 19.3 | | | | | | — | — | | | | |
| 19.4 | | | | | | — | — | | | | |
| 19.5 | | | | | | — | — | | | | |
| 19.6 | | | | | | — | — | | | | |
| 19.7 | | | | | | — | — | | | | |
| 19.8 | | | | | | — | — | | | | |
| 19.9 | | | | | | — | — | | | | |
| 20 | | 220 | | | 1 | | — | — | | | |

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A、B、C、D=標準在庫品 A、B、C、D=Standard stock item. □=特定代理店在庫品 □=Stocked by specific distributors. Contact us for price & availability.

G-LIST No. | CW1010 切削条件 Cutting Conditions | P.66
FXコート 座ぐり加工用 2刃ミディアム
 FX Coated・2Flutes・Medium・for Counterboring
FX-ZDN



単位:mm Unit:mm

| ツールNo. EDP No. | 外径 Dc | 全長 L | 有効溝長 ℓ | シャンク径 Ds | 形状 Type | 在庫 Stock | 重量 Weight | 標準価格 (Yen) |
|-------------------|----------|---------|-----------|-------------|------------|-------------|--------------|---------------|
| 3 | | 55 | 11 | | | | - | - |
| 3.1 | | | | | | | | |
| 3.2 | | | | | | | | |
| 3.3 | | | | | | | | |
| 3.4 | | | | | | | | |
| 3.5 | | | | | | | | |
| 3.6 | | | | | | | | |
| 3.7 | | 60 | 13 | | | | - | - |
| 3.8 | | | | | | | | |
| 3.9 | | | | | | | | |
| 4 | | | | | | | | |
| 4.1 | | | | | | | | |
| 4.2 | | | | | | | | |
| 4.3 | | 65 | 16 | 3 | | | - | - |
| 4.4 | | | | | | | | |
| 4.5 | | | | | | | | |
| 4.6 | | | | | | | | |
| 4.7 | | | | | | | | |
| 4.8 | | | | | | | | |
| 4.9 | | 70 | 19 | 6 | | | - | - |
| 5 | | | | | | | | |
| 5.1 | | | | | | | | |
| 5.2 | | | | | | | | |
| 5.3 | | | | | | | | |
| 5.4 | | | | | | | | |
| 5.5 | | 75 | 22 | 1 | | | - | - |
| 5.6 | | | | | | | | |
| 5.7 | | | | | | | | |
| 5.8 | | | | | | | | |
| 5.9 | | | | | | | | |
| 6 | | | | | | | | |
| 6.1 | | | | | | | | |
| 6.2 | | | | | | | | |
| 6.3 | | | | | | | | |
| 6.4 | | | | | | | | |
| 6.5 | | | | | | | | |
| 6.6 | | 85 | 29 | 1 | | | - | - |
| 6.7 | | | | | | | | |
| 6.8 | | | | | | | | |
| 6.9 | | | | | | | | |
| 7 | | | | | | | | |
| 7.1 | | | | | | | | |
| 7.2 | | 90 | 32 | 2 | | | - | - |
| 7.3 | | | | | | | | |
| 7.4 | | | | | | | | |
| 7.5 | | | | | | | | |
| 7.6 | | | | | | | | |
| 7.7 | | | | | | | | |
| 7.8 | | 95 | 35 | 1 | | | - | - |
| 7.9 | | | | | | | | |
| 8 | | | | | | | | |
| 8.1 | | | | | | | | |
| 8.2 | | | | | | | | |
| 8.3 | | | | | | | | |

| ツールNo. EDP No. | 外径 Dc | 全長 L | 有効溝長 ℓ | シャンク径 Ds | 形状 Type | 在庫 Stock | 重量 Weight | 標準価格 (Yen) |
|-------------------|----------|---------|-----------|-------------|------------|-------------|--------------|---------------|
| 8.4 | | 80 | 26 | 8 | 2 | | - | - |
| 8.5 | | | | | | | | |
| 8.6 | | | | | | | | |
| 8.7 | | | | | | | | |
| 8.8 | | | | | | | | |
| 8.9 | | | | | | | | |
| 9 | | 90 | 32 | 10 | 2 | | - | - |
| 9.1 | | | | | | | | |
| 9.2 | | | | | | | | |
| 9.3 | | | | | | | | |
| 9.4 | | | | | | | | |
| 9.5 | | | | | | | | |
| 9.6 | | 100 | 38 | 12 | 1 | | - | - |
| 9.7 | | | | | | | | |
| 9.8 | | | | | | | | |
| 9.9 | | | | | | | | |
| 10 | | | | | | | | |
| 10.1 | | | | | | | | |
| 10.2 | | 105 | 41 | 16 | 2 | | - | - |
| 10.3 | | | | | | | | |
| 10.4 | | | | | | | | |
| 10.5 | | | | | | | | |
| 10.6 | | | | | | | | |
| 10.7 | | | | | | | | |
| 10.8 | | 110 | 44 | 20 | 1 | | - | - |
| 10.9 | | | | | | | | |
| 11 | | | | | | | | |
| 11.1 | | | | | | | | |
| 11.2 | | | | | | | | |
| 11.3 | | | | | | | | |
| 11.4 | | 115 | 47 | 24 | 2 | | - | - |
| 11.5 | | | | | | | | |
| 11.6 | | | | | | | | |
| 11.7 | | | | | | | | |
| 11.8 | | | | | | | | |
| 11.9 | | | | | | | | |
| 12 | | 120 | 50 | 28 | 1 | | - | - |
| 12.5 | | | | | | | | |
| 13 | | | | | | | | |
| 13.5 | | | | | | | | |
| 14 | | | | | | | | |
| 14.5 | | | | | | | | |
| 15 | | 125 | 53 | 32 | 2 | | - | - |
| 15.5 | | | | | | | | |
| 16 | | | | | | | | |
| 16.5 | | | | | | | | |
| 17 | | | | | | | | |
| 17.5 | | | | | | | | |
| 18 | | 130 | 56 | 36 | 1 | | - | - |
| 18.5 | | | | | | | | |
| 19 | | | | | | | | |
| 19.5 | | | | | | | | |
| 20 | | | | | | | | |

・横引き不可です。Specialized for plunging.

A, B, C, D=標準在庫品 A, B, C, D=Standard stock item. □=特定代理店在庫品 □=Stocked by specific distributors. Contact us for price & availability.

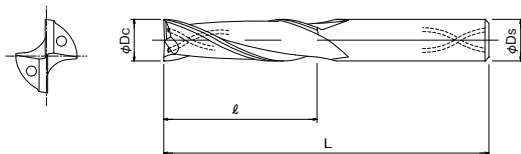
FXコート 油穴付き座ぐり加工用 2刃ミディアム

FX Coated 2Flutes Medium for Counterboring with Internal Coolant Supply

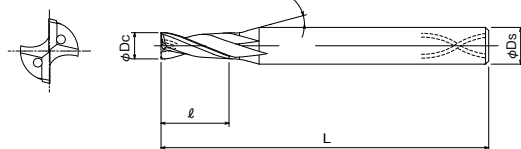
FX-HO-ZDN



Type 1



Type 2



| ツールNo. EDP No. | 外径 Dc | 全長 L | 有効溝長 ℓ | シャンク径 Ds | 形状 Type | 在庫 Stock | 重量 Weight | 標準価格 (Yen) |
|-------------------|----------|---------|-----------|-------------|------------|-------------|--------------|---------------|
| | 3 | 60 | 11 | | | | - | - |
| | 3.1 | | | | | | | |
| | 3.2 | | | | | | | |
| | 3.3 | | | | | | | |
| | 3.4 | | | | | | | |
| | 3.5 | | | | | | | |
| | 3.6 | | | | | | | |
| | 3.7 | | | | | | | |
| | 3.8 | | | | | | | |
| | 3.9 | | | | | | | |
| | 4 | | | | | | | |
| | 4.1 | | | | | | | |
| | 4.2 | | | | | | | |
| | 4.3 | | | | | | | |
| | 4.4 | | | | | | | |
| | 4.5 | | | | | | | |
| | 4.6 | | | | | | | |
| | 4.7 | | | | | | | |
| | 4.8 | | | | | | | |
| | 4.9 | | | | | | | |
| | 5 | | | | | | | |
| | 5.1 | | | | | | | |
| | 5.2 | | | | | | | |
| | 5.3 | | | | | | | |
| | 5.4 | | | | | | | |
| | 5.5 | | | | | | | |
| | 5.6 | | | | | | | |
| | 5.7 | | | | | | | |
| | 5.8 | | | | | | | |
| | 5.9 | | | | | | | |
| | 6 | | | | | | | |
| | 6.1 | | | | | | | |
| | 6.2 | | | | | | | |
| | 6.3 | | | | | | | |
| | 6.4 | | | | | | | |
| | 6.5 | | | | | | | |
| | 6.6 | | | | | | | |
| | 6.7 | | | | | | | |
| | 6.8 | | | | | | | |
| | 6.9 | | | | | | | |
| | 7 | | | | | | | |
| | 7.1 | | | | | | | |
| | 7.2 | | | | | | | |
| | 7.3 | | | | | | | |
| | 7.4 | | | | | | | |
| | 7.5 | | | | | | | |

単位:mm Unit:mm

| ツールNo. EDP No. | 外径 Dc | 全長 L | 有効溝長 ℓ | シャンク径 Ds | 形状 Type | 在庫 Stock | 重量 Weight | 標準価格 (Yen) |
|-------------------|----------|---------|-----------|-------------|------------|-------------|--------------|---------------|
| | 7.6 | 80 | | 8 | 2 | | - | - |
| | 7.7 | | | | | | | |
| | 7.8 | | | | | | | |
| | 7.9 | | | | | | | |
| | 8 | | | | | | | |
| | 8.1 | | | | | | | |
| | 8.2 | | | | | | | |
| | 8.3 | | | | | | | |
| | 8.4 | | | | | | | |
| | 8.5 | | | | | | | |
| | 8.6 | | | | | | | |
| | 8.7 | | | | | | | |
| | 8.8 | | | | | | | |
| | 8.9 | | | | | | | |
| | 9 | | | | | | | |
| | 9.1 | | | | | | | |
| | 9.2 | | | | | | | |
| | 9.3 | | | | | | | |
| | 9.4 | | | | | | | |
| | 9.5 | | | | | | | |
| | 9.6 | | | | | | | |
| | 9.7 | | | | | | | |
| | 9.8 | | | | | | | |
| | 9.9 | | | | | | | |
| | 10 | | | | | | | |
| | 10.1 | | | | | | | |
| | 10.2 | | | | | | | |
| | 10.3 | | | | | | | |
| | 10.4 | | | | | | | |
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| | 10.6 | | | | | | | |
| | 10.7 | | | | | | | |
| | 10.8 | | | | | | | |
| | 10.9 | | | | | | | |
| | 11 | | | | | | | |
| | 11.1 | | | | | | | |
| | 11.2 | | | | | | | |
| | 11.3 | | | | | | | |
| | 11.4 | | | | | | | |
| | 11.5 | | | | | | | |
| | 11.6 | | | | | | | |
| | 11.7 | | | | | | | |
| | 11.8 | | | | | | | |
| | 11.9 | | | | | | | |
| | 12 | | | | | | | |

・横引き不可です。Specialized for plunging.

| 被削材 Work Material | 低炭素鋼 軟鋼 | 中炭素鋼 | 高炭素鋼 | 合金鋼 | 調質鋼 | 焼入鋼 | ステンレス 鋼 | 工具鋼 | 鋳鉄 | ダクタイル 鋳鉄 | 銅合金 | アルミ 展伸材 | アルミ 合金鋳物 | チタン 合金 | インコル |
|--------------------------|------------------|---------------------|-------------------|-------------|----------------------|-------------------------------------|-----------------|------------|-----------|-------------------|--------------|------------|------------------------|----------------|---------|
| | Low Carbon Steel | Medium Carbon Steel | High Carbon Steel | Alloy Steel | Hardened Steel | Quenched and Tempered Steel | Stainless Steel | Tool Steel | Cast Iron | Ductile Cast Iron | Copper Alloy | Aluminum | Aluminum Alloy Casting | Titanium Alloy | Inconel |
| 製品記号 Abbreviation | C~0.25% | 0.25~0.45% | 0.45%~ | SCM | ~35 HRC 35~45 HRC | 45~50 HRC 50~60 HRC 60~70 HRC | SUS | SKD SKS | FC | FCD | Cu | Al | AC | | |
| FX-ZDN, FX-HO-ZDN | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | ○ | ○ | | |

A、B、C、D=標準在庫品 A、B、C、D=Standard stock item. □=特定代理店在庫品 □=Stocked by specific distributors. Contact us for price & availability.

■アイコンの説明はP.1をご覧ください。 See p.1 for explanation of icons.

形状寸法表
Specification
Charts

センターリング穴面取り
Centering
Countersinking

コーナ面取り
Corner Chamfering

R面取り
Corner Rounding

座ぐり
Counterboring

切削条件
Cutting
Conditions

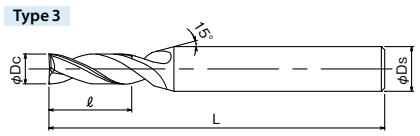
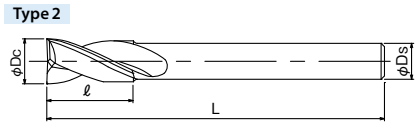
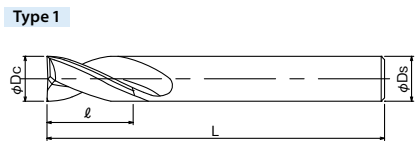
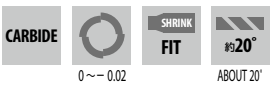
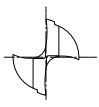
センターリング穴面取り
Centering
Countersinking

コーナ面取り
Corner Chamfering

R面取り
Corner Rounding

座ぐり
Counterboring

G-LIST No. | CW1012 切削条件 Cutting Conditions | P.67
座ぐり加工用 2刃ショート(銅・アルミ加工)
 2Flutes Short for Counterboring (for Copper Alloys, Aluminum Alloys)
CA-ZDS



単位:mm Unit:mm

| ツールNo. EDP No. | 外径 Dc | 全長 L | 有効溝長 ℓ | シャンク径 Ds | 形状 Type | 在庫 Stock | 重量 Weight | 標準価格 (Yen) | | | | |
|-------------------|----------|---------|-----------|-------------|------------|-------------|--------------|---------------|---|---|----|---|
| 0.5 | | 40 | 1 | 4 | 3 | □ | — | — | | | | |
| 0.6 | | | 1.2 | | | | — | — | | | | |
| 0.7 | | | 1.4 | | | | — | — | | | | |
| 0.8 | | | 1.6 | | | | — | — | | | | |
| 0.9 | | | 2 | | | | — | — | | | | |
| 1 | | | 2.5 | | | | — | — | | | | |
| 1.1 | | 45 | 4 | | | | — | — | | | | |
| 1.2 | | | | | | | 4 | — | — | | | |
| 1.3 | | | | | | | | 5 | — | — | | |
| 1.4 | | | | | | | | | 6 | — | — | |
| 1.5 | | | | | | | | | | 8 | — | — |
| 1.6 | | | | | | | | | | | 10 | — |
| 1.7 | | 6 | — | — | | | | | | | | |
| 1.8 | | | 11 | — | — | | | | | | | |
| 1.9 | | | | 11 | — | — | | | | | | |
| 2 | | | | | 11 | — | — | | | | | |
| 2.1 | | | | | | 11 | — | — | | | | |
| 2.2 | | | | | | | 11 | — | — | | | |
| 2.3 | | 11 | | | | | | — | — | | | |
| 2.4 | | | 11 | | | | | — | — | | | |
| 2.5 | | | | 11 | | | | — | — | | | |
| 2.6 | | | | | 11 | | | — | — | | | |
| 2.7 | | | | | | 11 | | — | — | | | |
| 2.8 | | | | | | | 11 | — | — | | | |
| 2.9 | | 11 | | | | | | — | — | | | |
| 3 | | | 11 | | | | | — | — | | | |
| 3.1 | | | | 11 | | | | — | — | | | |
| 3.2 | | | | | 11 | | | — | — | | | |
| 3.3 | | | | | | 11 | | — | — | | | |
| 3.4 | | | | | | | 11 | — | — | | | |
| 3.5 | | 11 | | | | | | — | — | | | |
| 3.6 | | | 11 | | | | | — | — | | | |
| 3.7 | | | | 11 | | | | — | — | | | |
| 3.8 | | | | | 11 | | | — | — | | | |
| 3.9 | | | | | | 11 | | — | — | | | |
| 4 | | | | | | | 11 | — | — | | | |
| 4.1 | | 11 | | | | | | — | — | | | |
| 4.2 | | | 11 | | | | | — | — | | | |
| 4.3 | | | | 11 | | | | — | — | | | |
| 4.4 | | | | | 11 | | | — | — | | | |
| 4.5 | | | | | | 11 | | — | — | | | |
| 4.6 | | | | | | | 11 | — | — | | | |

| ツールNo. EDP No. | 外径 Dc | 全長 L | 有効溝長 ℓ | シャンク径 Ds | 形状 Type | 在庫 Stock | 重量 Weight | 標準価格 (Yen) | | | | | | | | |
|-------------------|----------|---------|-----------|-------------|------------|-------------|--------------|---------------|----|----|----|----|---|---|---|---|
| 4.7 | | 50 | 11 | 4 | 3 | □ | — | — | | | | | | | | |
| 4.8 | | | | | | | 60 | 13 | — | — | | | | | | |
| 4.9 | | | | | | | | | 70 | 16 | — | — | | | | |
| 5 | | | | | | | | | | | 80 | 19 | — | — | | |
| 5.1 | | | | | | | | | | | | | 8 | 8 | — | — |
| 5.2 | | | | | | | | | | | | | | | 8 | 8 |
| 5.3 | | 8 | 8 | | | | | | | | | | | | | |
| 5.4 | | | | | | | 8 | 8 | | | | | | | | |
| 5.5 | | | | | | | | | 8 | 8 | | | | | | |
| 5.6 | | | | | | | | | | | 8 | 8 | | | | |
| 5.7 | | | | | | | | | | | | | 8 | 8 | | |
| 5.8 | | | | | | | | | | | | | | | 8 | 8 |
| 5.9 | | 8 | 8 | — | — | | | | | | | | | | | |
| 6 | | | | 8 | 8 | — | — | | | | | | | | | |
| 6.1 | | | | | | 8 | 8 | — | — | | | | | | | |
| 6.2 | | | | | | | | 8 | 8 | — | — | | | | | |
| 6.3 | | | | | | | | | | 8 | 8 | — | — | | | |
| 6.4 | | | | | | | | | | | | 8 | 8 | — | — | |
| 6.5 | | 8 | 8 | | | | | | | | | | | — | — | |
| 6.6 | | | | 8 | 8 | | | | | | | | | — | — | |
| 6.7 | | | | | | 8 | 8 | | | | | | | — | — | |
| 6.8 | | | | | | | | 8 | 8 | | | | | — | — | |
| 6.9 | | | | | | | | | | 8 | 8 | | | — | — | |
| 7 | | | | | | | | | | | | 8 | 8 | — | — | |
| 7.1 | | 8 | 8 | | | | | | | | | | | — | — | |
| 7.2 | | | | 8 | 8 | | | | | | | | | — | — | |
| 7.3 | | | | | | 8 | 8 | | | | | | | — | — | |
| 7.4 | | | | | | | | 8 | 8 | | | | | — | — | |
| 7.5 | | | | | | | | | | 8 | 8 | | | — | — | |
| 7.6 | | | | | | | | | | | | 8 | 8 | — | — | |
| 7.7 | | 8 | 8 | | | | | | | | | | | — | — | |
| 7.8 | | | | 8 | 8 | | | | | | | | | — | — | |
| 7.9 | | | | | | 8 | 8 | | | | | | | — | — | |
| 8 | | | | | | | | 8 | 8 | | | | | — | — | |
| 8.1 | | | | | | | | | | 8 | 8 | | | — | — | |
| 8.2 | | | | | | | | | | | | 8 | 8 | — | — | |
| 8.3 | | 8 | 8 | | | | | | | | | | | — | — | |
| 8.4 | | | | 8 | 8 | | | | | | | | | — | — | |
| 8.5 | | | | | | 8 | 8 | | | | | | | — | — | |
| 8.6 | | | | | | | | 8 | 8 | | | | | — | — | |
| 8.7 | | | | | | | | | | 8 | 8 | | | — | — | |
| 8.8 | | | | | | | | | | | | 8 | 8 | — | — | |

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次ページへ

外径 Dc 8.9 ~ 20 NEXT

A, B, C, D=標準在庫品 A, B, C, D=Standard stock item. □=特定代理店在庫品 □=Stocked by specific distributors. Contact us for price & availability.

| | | | | | | | | | | | | | | | | |
|----------------------|-------------------------|--|-----------------------------------|---------------------------------|-----------------------|-------------------------|--|----------------------------------|-------------------|-----------------|-------------------------------------|------------------------|------------------------|---|--------------------------------|-----------------|
| 製品記号 Abbreviation | 被削材 Work Material | 低碳素鋼 軟鋼 Low Carbon Steel Mild Steel | 中炭素鋼 Medium Carbon Steel | 高炭素鋼 High Carbon Steel | 合金鋼 Alloy Steel | 調質鋼 Hardened Steel | 焼入鋼 Quenched and Tempered Steel | ステンレス 鋼 Stainless Steel | 工具鋼 Tool Steel | 鑄鉄 Cast Iron | ダクタイル 鑄鉄 Ductile Cast Iron | 銅合金 Copper Alloy | アルミ 展伸材 Aluminum | アルミ 合金鑄物 Aluminum Alloy Casting | チタン 合金 Titanium Alloy | インコル Inconel |
| | CA-ZDS | C~0.25% | 0.25~0.45% | 0.45%~ | SCM | ~35 HRC 35~45 HRC | 45~50 HRC 50~60 HRC 60~70 HRC | SUS | SKD SKS | FC | FCD | Cu | Al | AC | | |

形状寸法表
Specification
Charts

センターリング穴面取り
Centering -
Countersinking

コーナ面取り
Corner Chamfering

R面取り
Corner Rounding

座ぐり
Countersporing

切削条件
Cutting
Conditions

センターリング穴面取り
Centering -
Countersinking

コーナ面取り
Corner Chamfering

R面取り
Corner Rounding

座ぐり
Countersporing

前ページより

FROM 外径 Dc 0.5 ~ 8.8

| ツールNo. EDP No. | 外径 Dc | 全長 L | 有効溝長 ℓ | シャンク径 Ds | 形状 Type | 在庫 Stock | 重量 Weight | 標準価格 (Yen) |
|-------------------|----------|---------|-----------|-------------|------------|-------------|--------------|---------------|
| 8.9 | | 80 | 19 | 8 | 2 | | — | — |
| 9 | | | | | | | — | — |
| 9.1 | | | | | | | — | — |
| 9.2 | | | | | | | — | — |
| 9.3 | | | | | | | — | — |
| 9.4 | | | | | | | — | — |
| 9.5 | | | | | | | — | — |
| 9.6 | | | | | | | — | — |
| 9.7 | | | | | | | — | — |
| 9.8 | | | | | | | — | — |
| 9.9 | | — | — | | | | | |
| 10 | | 90 | 22 | 10 | 2 | □ | — | — |
| 10.1 | | | | | | | — | — |
| 10.2 | | | | | | | — | — |
| 10.3 | | | | | | | — | — |
| 10.4 | | | | | | | — | — |
| 10.5 | | | | | | | — | — |
| 10.6 | | | | | | | — | — |
| 10.7 | | | | | | | — | — |
| 10.8 | | | | | | | — | — |
| 10.9 | | | | | | | — | — |
| 11 | | — | — | | | | | |
| 11.1 | | — | — | | | | | |
| 11.2 | | — | — | | | | | |

単位:mm Unit:mm

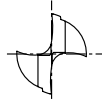
| ツールNo. EDP No. | 外径 Dc | 全長 L | 有効溝長 ℓ | シャンク径 Ds | 形状 Type | 在庫 Stock | 重量 Weight | 標準価格 (Yen) | | | | | |
|-------------------|----------|---------|-----------|-------------|------------|-------------|--------------|---------------|----|---|--|---|---|
| 11.3 | | 90 | 22 | 10 | 2 | | — | — | | | | | |
| 11.4 | | | | | | | — | — | | | | | |
| 11.5 | | | | | | | — | — | | | | | |
| 11.6 | | | | | | | — | — | | | | | |
| 11.7 | | | | | | | — | — | | | | | |
| 11.8 | | | | | | | — | — | | | | | |
| 11.9 | | | | | | | — | — | | | | | |
| 12 | | | | | | | — | — | | | | | |
| 12.5 | | | | | | | — | — | | | | | |
| 13 | | | | | | | — | — | | | | | |
| 13.5 | | 100 | 26 | 12 | 2 | □ | — | — | | | | | |
| 14 | | | | | | | — | — | | | | | |
| 14.5 | | | | | | | — | — | | | | | |
| 15 | | | | | | | — | — | | | | | |
| 15.5 | | | | | | | — | — | | | | | |
| 16 | | | | | | | — | — | | | | | |
| 16.5 | | | | | | | — | — | | | | | |
| 17 | | | | | | | — | — | | | | | |
| 17.5 | | | | | | | — | — | | | | | |
| 18 | | | | | | | — | — | | | | | |
| 18.5 | | 115 | 32 | 16 | 2 | | — | — | | | | | |
| 19 | | | | | | | — | — | | | | | |
| 19.5 | | | | | | | — | — | | | | | |
| 20 | | | | | | | — | — | | | | | |
| 20 | | | | | | | 125 | 38 | 20 | 1 | | — | — |
| 20 | | | | | | | | | | | | — | — |
| 20 | | | | | | | | | | | | — | — |
| 20 | | | | | | | | | | | | — | — |
| 20 | | | | | | | | | | | | — | — |
| 20 | | | | | | | | | | | | — | — |
| 20 | | — | — | | | | | | | | | | |
| 20 | | — | — | | | | | | | | | | |
| 20 | | — | — | | | | | | | | | | |
| 20 | | — | — | | | | | | | | | | |

・横引き不可です。Specialized for plunging.

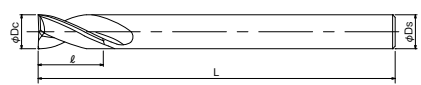
A、B、C、D=標準在庫品 A、B、C、D=Standard stock item. □=特定代理店在庫品 □=Stocked by specific distributors. Contact us for price & availability.

座ぐり加工用 ロングシャンク 2刃ショート(銅・アルミ加工用)
2 Flutes Long Shank Short for Counterboring (for Copper & Aluminum Alloys)

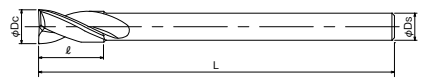
CA-LS-ZDS



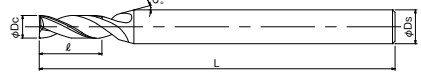
Type 1



Type 2



Type 3



単位:mm Unit:mm

| ツールNo. EDP No. | 外径 Dc | 全長 L | 有効溝長 ℓ | シャンク径 Ds | 形状 Type | 在庫 Stock | 重量 Weight | 標準価格 (Yen) |
|-------------------|----------|---------|-----------|-------------|------------|-------------|--------------|---------------|
| 3 | 3.1 | 100 | 8 | 3 | □ | | | |
| 3.2 | 3.3 | | | | | | | |
| 3.4 | 3.5 | | | | | | | |
| 3.6 | 3.7 | | | | | | | |
| 3.8 | 3.9 | | | | | | | |
| 4 | 4.1 | | | | | | | |
| 4.2 | 4.3 | | | | | | | |
| 4.4 | 4.5 | | | | | | | |
| 4.6 | 4.7 | | | | | | | |
| 4.8 | 4.9 | | | | | | | |
| 5 | 5.1 | 110 | 13 | 6 | □ | | | |
| 5.2 | 5.3 | | | | | | | |
| 5.4 | 5.5 | | | | | | | |
| 5.6 | 5.7 | | | | | | | |
| 5.8 | 5.9 | | | | | | | |
| 6 | 6.1 | | | | | | | |
| 6.2 | 6.3 | | | | | | | |
| 6.4 | 6.5 | | | | | | | |
| 6.6 | 6.7 | | | | | | | |
| 6.8 | 6.9 | | | | | | | |
| 7 | 7.1 | | | | | | | |

| ツールNo. EDP No. | 外径 Dc | 全長 L | 有効溝長 ℓ | シャンク径 Ds | 形状 Type | 在庫 Stock | 重量 Weight | 標準価格 (Yen) |
|-------------------|----------|---------|-----------|-------------|------------|-------------|--------------|---------------|
| 7.2 | 7.3 | 120 | 16 | 6 | 2 | | | |
| 7.4 | 7.5 | | | | | | | |
| 7.6 | 7.7 | | | | | | | |
| 7.8 | 7.9 | | | | | | | |
| 8 | 8.1 | | | | | | | |
| 8.2 | 8.3 | | | | | | | |
| 8.4 | 8.5 | | | | | | | |
| 8.6 | 8.7 | | | | | | | |
| 8.8 | 8.9 | | | | | | | |
| 9 | 9.1 | | | | | | | |
| 9.2 | 9.3 | 130 | 8 | 8 | 2 | | | |
| 9.4 | 9.5 | | | | | | | |
| 9.6 | 9.7 | | | | | | | |
| 9.8 | 9.9 | | | | | | | |
| 10 | 10.1 | | | | | | | |
| 10.2 | 10.3 | | | | | | | |
| 10.4 | 10.5 | | | | | | | |
| 10.6 | 10.7 | | | | | | | |
| 10.8 | 10.9 | | | | | | | |
| 11 | 11.1 | | | | | | | |
| 11.2 | 11.3 | | | | | | | |

・横引き不可です。Specialized for plunging.

次ページへ

外径 Dc 11.4 ~ 20 NEXT

A, B, C, D=標準在庫品 A, B, C, D=Standard stock item. □=特定代理店在庫品 □=Stocked by specific distributors. Contact us for price & availability.

| | | | | | | | | | | | | | | | | |
|----------------------|-------------------------|--|-----------------------------------|---------------------------------|-----------------------|-------------------------|--|----------------------------------|-------------------|-----------------|-------------------------------------|------------------------|------------------------|---|--------------------------------|-----------------|
| 製品記号 Abbreviation | 被削材 Work Material | 低碳素鋼 軟鋼 Low Carbon Steel Mild Steel | 中炭素鋼 Medium Carbon Steel | 高炭素鋼 High Carbon Steel | 合金鋼 Alloy Steel | 調質鋼 Hardened Steel | 焼入鋼 Quenched and Tempered Steel | ステンレス 鋼 Stainless Steel | 工具鋼 Tool Steel | 鑄鉄 Cast Iron | ダクタイル 鑄鉄 Ductile Cast Iron | 銅合金 Copper Alloy | アルミ 展伸材 Aluminum | アルミ 合金鑄物 Aluminum Alloy Casting | チタン 合金 Titanium Alloy | インコル Inconel |
| | CA-LS-ZDS | C~0.25% | 0.25~0.45% | 0.45%~ | SCM | ~35 HRC 35~45 HRC | 45~50 HRC 50~60 HRC 60~70 HRC | SUS | SKD SKS | FC | FCD | Cu | Al | AC | | |

形状寸法表
Specification
Charts

センターリング穴面取り
Centering -
Countersinking

コーナ面取り
Corner Chamfering

前ページより

FROM 外径 Dc 3 ~ 11.3

| ツールNo. EDP No. | 外径 Dc | 全長 L | 有効溝長 ℓ | シャンク径 Ds | 形状 Type | 在庫 Stock | 重量 Weight | 標準価格 (Yen) |
|-------------------|----------|---------|-----------|-------------|------------|-------------|--------------|---------------|
| 11.4 | | 150 | 22 | 10 | 2 | □ | — | — |
| 11.5 | | | | | | | — | — |
| 11.6 | | | | | | | — | — |
| 11.7 | | | | | | | — | — |
| 11.8 | | | | | | | — | — |
| 11.9 | | | | | | | — | — |
| 12 | | 180 | 26 | 12 | 2 | □ | — | — |
| 12.5 | | | | | | | — | — |
| 13 | | | | | | | — | — |
| 13.5 | | | | | | | — | — |
| 14 | | | | | | | — | — |
| 14.5 | | | | | | | — | — |

・横引き不可です。Specialized for plunging.

単位:mm Unit:mm

| ツールNo. EDP No. | 外径 Dc | 全長 L | 有効溝長 ℓ | シャンク径 Ds | 形状 Type | 在庫 Stock | 重量 Weight | 標準価格 (Yen) |
|-------------------|----------|---------|-----------|-------------|------------|-------------|--------------|---------------|
| 15 | | 180 | 26 | 12 | 2 | □ | — | — |
| 15.5 | | | | | | | — | — |
| 16 | | | | | | | — | — |
| 16.5 | | | | | | | — | — |
| 17 | | | | | | | — | — |
| 17.5 | | | | | | | — | — |
| 18 | | 200 | 32 | 16 | 2 | □ | — | — |
| 18.5 | | | | | | | — | — |
| 19 | | | | | | | — | — |
| 19.5 | | | | | | | — | — |
| 20 | | | | | | | — | — |
| 20 | | | | | | | 220 | 38 |

R面取り
Corner Rounding

座ぐり
Counterboring

切削条件
Cutting
Conditions

センターリング穴面取り
Centering -
Countersinking

コーナ面取り
Corner Chamfering

R面取り
Corner Rounding

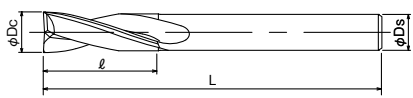
座ぐり
Counterboring

A、B、C、D=標準在庫品 A、B、C、D=Standard stock item. □=特定代理店在庫品 □=Stocked by specific distributors. Contact us for price & availability.

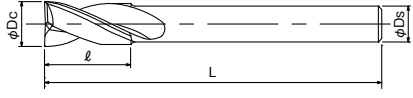
G-LIST No. | CW1009 切削条件 Cutting Conditions | P.68
DIAコート 座ぐり加工用 2刃ショート
 Dia Coated · 2Flutes · Short · for Counterboring
DIA-ZDS



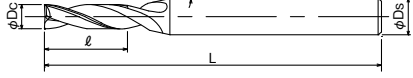
Type 1



Type 2



Type 3



CARBIDE DIA 0 ~ 0.02 SHRINK FIT #920° ABOUT 20°

単位:mm Unit:mm

| ツールNo. EDP No. | 外径 Dc | 全長 L | 有効溝長 ℓ | シャンク径 Ds | 形状 Type | 在庫 Stock | 重量 Weight | 標準価格 (Yen) | |
|-------------------|----------|---------|-----------|-------------|------------|-------------|--------------|---------------|---|
| 0.5 | | 40 | 1 | 4 | 3 | □ | — | — | |
| 0.6 | | | 1.2 | | | | — | — | |
| 0.7 | | | 1.4 | | | | — | — | |
| 0.8 | | | 1.6 | | | | — | — | |
| 0.9 | | | 2 | | | | — | — | |
| 1 | | | 2.5 | | | | — | — | |
| 1.1 | | | 2.5 | | | | — | — | |
| 1.2 | | | 2.5 | | | | — | — | |
| 1.3 | | | 2.5 | | | | — | — | |
| 1.4 | | | 2.5 | | | | — | — | |
| 1.5 | | 2.5 | — | — | | | | | |
| 1.6 | | 45 | 4 | 3 | □ | — | — | | |
| 1.7 | | | | | | 5 | — | — | |
| 1.8 | | | | | | 5 | — | — | |
| 1.9 | | | | | | 5 | — | — | |
| 2 | | | | | | 5 | — | — | |
| 2.1 | | | 6 | | | 8 | — | — | |
| 2.2 | | | | | | | 8 | — | — |
| 2.3 | | | | | | | 8 | — | — |
| 2.4 | | | | | | | 8 | — | — |
| 2.5 | | | | | | | 8 | — | — |
| 2.6 | | 8 | — | — | | | | | |
| 2.7 | | 8 | — | — | | | | | |
| 2.8 | | 8 | — | — | | | | | |

| ツールNo. EDP No. | 外径 Dc | 全長 L | 有効溝長 ℓ | シャンク径 Ds | 形状 Type | 在庫 Stock | 重量 Weight | 標準価格 (Yen) |
|-------------------|----------|---------|-----------|-------------|------------|-------------|--------------|---------------|
| 2.9 | | 45 | 8 | 4 | 3 | □ | — | — |
| 3 | | | | | | | — | — |
| 3.3 | | | | | | | — | — |
| 3.5 | | 50 | 10 | — | | | — | |
| 4 | | | | — | | | — | |
| 4.2 | | 60 | 11 | — | | | — | |
| 4.5 | | | | — | | | — | |
| 5 | | 70 | 13 | 6 | | | — | — |
| 5.5 | | | | | | | — | — |
| 6 | | | | | | | — | — |
| 6.5 | | | | | — | — | | |
| 6.8 | | | | | — | — | | |
| 7 | | 80 | 16 | 2 | — | — | | |
| 7.5 | | | | | — | — | | |
| 8 | | | | | — | — | | |
| 8.5 | | 90 | 19 | 8 | — | — | | |
| 9 | | | | | — | — | | |
| 9.5 | | | | | — | — | | |
| 10 | | 22 | 10 | 2 | — | — | | |
| 10.3 | | | | | — | — | | |
| 10.5 | | | | | — | — | | |
| 11 | | | | | — | — | | |
| 11.5 | | | | | — | — | | |
| 12 | | 26 | 12 | 1 | — | — | | |

・横引き不可です。Specialized for plunging.

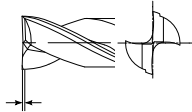
| 製品記号 Abbreviation | 被削材 Work Material | | 低炭素鋼 軟鋼 Low Carbon Steel Mild Steel | 中炭素鋼 Medium Carbon Steel | 高炭素鋼 High Carbon Steel | 合金鋼 Alloy Steel | 調質鋼 Hardened Steel | 焼入鋼 Quenched and Tempered Steel | | | ステンレス 鋼 Stainless Steel | 工具鋼 Tool Steel | 鋳鉄 Cast Iron | ダクタイル 鋳鉄 Ductile Cast Iron | 銅合金 Copper Alloy | アルミ 展伸材 Aluminum | アルミ 合金鑄物 Aluminum Alloy Casting | チタン 合金 Titanium Alloy | インコネル Inconel |
|----------------------|----------------------|---------|--|-----------------------------|---------------------------|--------------------|-----------------------|------------------------------------|-----------|-----------|-------------------------------|-------------------|-----------------|----------------------------------|---------------------|------------------------|---------------------------------------|-----------------------------|------------------|
| | DIA-ZDS | C~0.25% | 0.25~0.4% | 0.45%~ | SCM | ~35 HRC | 35~45 HRC | 45~50 HRC | 50~60 HRC | 60~70 HRC | SUS | SKD SKS | FC | FCD | Cu | Al | AC | | |
| | | | | | | | | | | | | | | | | ◎ | ◎ | | |

A, B, C, D=標準在庫品 A, B, C, D=Standard stock item. □=特定代理店在庫品 □=Stocked by specific distributors. Contact us for price & availability.

Vコート CPM 座ぐり加工用 2刃ショート

V Coated • CPM•2Flutes• Short• For Counterboring

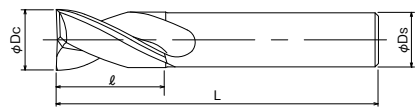
VP-ZDS



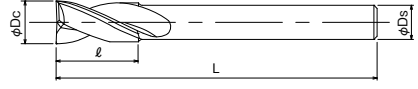
平坦度0.05mm以下
Flatness ≤ 0.05mm



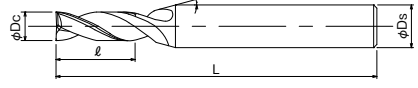
Type 1



Type 2



Type 3



| ツールNo. EDP No. | 外径 Dc | 全長 L | 有効溝長 ℓ | シャンク径 Ds | 形状 Type | 在庫 Stock | 重量 Weight | 標準価格 (Yen) |
|-------------------|----------|---------|-----------|-------------|------------|-------------|--------------|---------------|
| 8463030 | 3 | 50 | 8 | 6 | D | D | 13 | 7,880 |
| 8463031 | 3.1 | | | | | | 13 | 7,880 |
| 8463032 | 3.2 | | | | | | 13 | 7,880 |
| 8463033 | 3.3 | | | | | | 13 | 7,880 |
| 8463034 | 3.4 | | | | | | 13 | 7,880 |
| 8463035 | 3.5 | | 13 | | | | 7,880 | |
| 8463036 | 3.6 | | 13 | | | | 7,880 | |
| 8463037 | 3.7 | | 13 | | | | 7,880 | |
| 8463038 | 3.8 | | 13 | | | | 7,880 | |
| 8463039 | 3.9 | | 13 | | | | 7,880 | |
| 8463040 | 4 | 60 | 10 | 6 | D | D | 13 | 7,880 |
| 8463041 | 4.1 | | | | | | 13 | 7,880 |
| 8463042 | 4.2 | | | | | | 13 | 7,880 |
| 8463043 | 4.3 | | | | | | 13 | 7,880 |
| 8463044 | 4.4 | | | | | | 13 | 7,880 |
| 8463045 | 4.5 | | 13 | | | | 7,880 | |
| 8463046 | 4.6 | | 13 | | | | 7,880 | |
| 8463047 | 4.7 | | 13 | | | | 7,880 | |
| 8463048 | 4.8 | | 15 | | | | 8,420 | |
| 8463049 | 4.9 | | 15 | | | | 8,420 | |
| 8463050 | 5 | 70 | 11 | 6 | D | D | 15 | 8,420 |
| 8463051 | 5.1 | | | | | | 15 | 8,420 |
| 8463052 | 5.2 | | | | | | 16 | 8,420 |
| 8463053 | 5.3 | | | | | | 15 | 8,420 |
| 8463054 | 5.4 | | | | | | 15 | 8,420 |
| 8463055 | 5.5 | | 16 | | | | 8,420 | |
| 8463056 | 5.6 | | 16 | | | | 8,420 | |
| 8463057 | 5.7 | | 15 | | | | 8,420 | |
| 8463058 | 5.8 | | 16 | | | | 8,420 | |
| 8463059 | 5.9 | | 16 | | | | 8,420 | |
| 8463060 | 6 | 80 | 13 | 6 | D | D | 16 | 8,420 |
| 8463061 | 6.1 | | | | | | 18 | 8,990 |
| 8463062 | 6.2 | | | | | | 18 | 8,990 |
| 8463063 | 6.3 | | | | | | 18 | 8,990 |
| 8463064 | 6.4 | | | | | | 18 | 8,990 |
| 8463065 | 6.5 | | 19 | | | | 8,990 | |
| 8463066 | 6.6 | | 19 | | | | 8,990 | |
| 8463067 | 6.7 | | 19 | | | | 8,990 | |
| 8463068 | 6.8 | | 19 | | | | 8,990 | |
| 8463069 | 6.9 | | 19 | | | | 8,990 | |
| 8463070 | 7 | 90 | 16 | 6 | D | D | 19 | 8,990 |
| 8463071 | 7.1 | | | | | | 19 | 8,990 |
| | | | | | | | 19 | 8,990 |

| ツールNo. EDP No. | 外径 Dc | 全長 L | 有効溝長 ℓ | シャンク径 Ds | 形状 Type | 在庫 Stock | 重量 Weight | 標準価格 (Yen) | | | | |
|-------------------|----------|---------|-----------|-------------|------------|-------------|--------------|---------------|---|---|----|--------|
| 8463072 | 7.2 | 70 | 16 | 6 | 2 | D | 19 | 8,990 | | | | |
| 8463073 | 7.3 | | | | | | 19 | 8,990 | | | | |
| 8463074 | 7.4 | | | | | | 19 | 8,990 | | | | |
| 8463075 | 7.5 | | | | | | 19 | 8,990 | | | | |
| 8463076 | 7.6 | | | | | | 19 | 8,990 | | | | |
| 8463077 | 7.7 | | 19 | | | | 8,990 | | | | | |
| 8463078 | 7.8 | | 19 | | | | 8,990 | | | | | |
| 8463079 | 7.9 | | 19 | | | | 8,990 | | | | | |
| 8463080 | 8 | | 80 | | | | 19 | 6 | 2 | D | 28 | 8,990 |
| 8463081 | 8.1 | | | | | | | | | | 34 | 10,300 |
| 8463082 | 8.2 | 34 | | 10,300 | | | | | | | | |
| 8463083 | 8.3 | 34 | | 10,300 | | | | | | | | |
| 8463084 | 8.4 | 34 | | 10,300 | | | | | | | | |
| 8463085 | 8.5 | 34 | | 10,300 | | | | | | | | |
| 8463086 | 8.6 | 34 | | 10,300 | | | | | | | | |
| 8463087 | 8.7 | 34 | | 10,300 | | | | | | | | |
| 8463088 | 8.8 | 35 | | 10,300 | | | | | | | | |
| 8463089 | 8.9 | 34 | | 10,300 | | | | | | | | |
| 8463090 | 9 | 90 | 22 | 6 | 2 | D | 35 | 10,300 | | | | |
| 8463091 | 9.1 | | | | | | 34 | 10,300 | | | | |
| 8463092 | 9.2 | | | | | | 35 | 10,300 | | | | |
| 8463093 | 9.3 | | | | | | 34 | 10,300 | | | | |
| 8463094 | 9.4 | | | | | | 36 | 10,300 | | | | |
| 8463095 | 9.5 | | 36 | | | | 10,300 | | | | | |
| 8463096 | 9.6 | | 36 | | | | 10,300 | | | | | |
| 8463097 | 9.7 | | 36 | | | | 10,300 | | | | | |
| 8463098 | 9.8 | | 36 | | | | 10,300 | | | | | |
| 8463099 | 9.9 | | 38 | | | | 10,300 | | | | | |
| 8463100 | 10 | 90 | 10 | 6 | 2 | D | 57 | 10,300 | | | | |
| 8463101 | 10.1 | | | | | | 57 | 12,800 | | | | |
| 8463102 | 10.2 | | | | | | 57 | 12,800 | | | | |
| 8463103 | 10.3 | | | | | | 58 | 12,800 | | | | |
| 8463104 | 10.4 | | | | | | 58 | 12,800 | | | | |
| 8463105 | 10.5 | | 58 | | | | 12,800 | | | | | |
| 8463106 | 10.6 | | 59 | | | | 12,800 | | | | | |
| 8463107 | 10.7 | | 59 | | | | 12,800 | | | | | |
| 8463108 | 10.8 | | 59 | | | | 12,800 | | | | | |
| 8463109 | 10.9 | | 62 | | | | 12,800 | | | | | |
| 8463110 | 11 | 60 | 12,800 | | | | | | | | | |
| 8463111 | 11.1 | 60 | 12,800 | | | | | | | | | |
| 8463112 | 11.2 | 61 | 12,800 | | | | | | | | | |
| 8463113 | 11.3 | 61 | 12,800 | | | | | | | | | |

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次ページへ
外径Dc 11.4 ~ 32 NEXT

| 被削材 Work Material | 低炭素鋼 軟鋼 Low Carbon Steel Mild Steel | 中炭素鋼 Medium Carbon Steel | 高炭素鋼 High Carbon Steel | 合金鋼 Alloy Steel | 調質鋼 Hardened Steel | 焼入鋼 Quenched and Tempered Steel | ステンレス 鋼 Stainless Steel | 工具鋼 Tool Steel | 鋳鉄 Cast Iron | ダクタイル 鋳鉄 Ductile Cast Iron | 銅合金 Copper Alloy | アルミ 展伸材 Aluminum | アルミ 合金鋳物 Aluminum Alloy Casting | チタン 合金 Titanium Alloy | インコル Inconel |
|----------------------|--|-----------------------------|---------------------------|--------------------|-----------------------|-------------------------------------|-------------------------------|-------------------|-----------------|----------------------------------|---------------------|------------------------|---------------------------------------|-----------------------------|-----------------|
| | C~0.25% | 0.25~0.45% | 0.45%~ | SCM | ~35 HRC 35~45 HRC | 45~50 HRC 50~60 HRC 60~70 HRC | SUS | SKD SKS | FC | FCD | Cu | Al | AC | | |
| 製品記号 Abbreviation | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| VP-ZDS | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

A, B, C, D=標準在庫品 A, B, C, D=Standard stock item. □=特定代理店在庫品 □=Stocked by specific distributors. Contact us for price & availability.

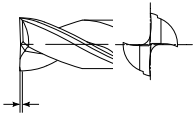
■アイコンの説明はP.1をご覧ください。 See p.1 for explanation of icons.

G-LIST No. | **CH1008** | 切削条件 Cutting Conditions | P.69

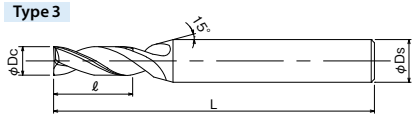
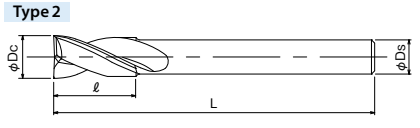
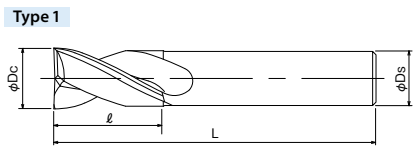
コート CPM 座ぐり加工用 2刃ショート

V Coated · CPM · 2Flutes · Short · For Countersinking

VP-ZDS



平坦度0.05mm以下
Flatness ≤ 0.05mm



前ページより
FROM 外径 Dc 3 ~ 11.3

| ツールNo. EDP No. | 外径 Dc | 全長 L | 有効溝長 ℓ | シャンク径 Ds | 形状 Type | 在庫 Stock | 重量 Weight | 標準価格 (Yen) |
|-------------------|----------|---------|-----------|-------------|------------|-------------|--------------|---------------|
| 8463114 | 11.4 | 90 | 22 | 10 | 2 | D | 61 | 12,800 |
| 8463115 | 11.5 | | | | | | 61 | 12,800 |
| 8463116 | 11.6 | | | | | | 61 | 12,800 |
| 8463117 | 11.7 | | | | | | 61 | 12,800 |
| 8463118 | 11.8 | | | | | | 61 | 12,800 |
| 8463119 | 11.9 | | | | | | 61 | 12,800 |
| 8463120 | 12 | 100 | 26 | 12 | 2 | D | 78 | 12,800 |
| 8463125 | 12.5 | | | | | | 89 | 16,100 |
| 8463130 | 13 | | | | | | 94 | 16,100 |
| 8463135 | 13.5 | | | | | | 97 | 16,100 |
| 8463140 | 14 | | | | | | 99 | 16,100 |
| 8463145 | 14.5 | | | | | | 103 | 17,900 |
| 8463150 | 15 | 115 | 32 | 16 | 2 | D | 105 | 17,900 |
| 8463155 | 15.5 | | | | | | 121 | 19,100 |
| 8463160 | 16 | | | | | | 181 | 20,200 |
| 8463165 | 16.5 | | | | | | 182 | 23,800 |
| 8463170 | 17 | | | | | | 183 | 23,800 |
| 8463175 | 17.5 | | | | | | 184 | 23,800 |
| 8463180 | 18 | 125 | 38 | 20 | 1 | D | 187 | 23,800 |
| 8463185 | 18.5 | | | | | | 189 | 27,100 |
| 8463190 | 19 | | | | | | 191 | 27,100 |
| 8463195 | 19.5 | | | | | | 250 | 27,900 |
| 8463200 | 20 | | | | | | 288 | 27,900 |
| 20.5 | 20.5 | | | | | | — | — |

・横引き不可です。Specialized for plunging.

単位:mm Unit:mm

| ツールNo. EDP No. | 外径 Dc | 全長 L | 有効溝長 ℓ | シャンク径 Ds | 形状 Type | 在庫 Stock | 重量 Weight | 標準価格 (Yen) |
|-------------------|----------|---------|-----------|-------------|------------|-------------|--------------|---------------|
| 21 | 21 | 125 | 38 | 20 | 2 | □ | — | — |
| 21.5 | 21.5 | | | | | | — | — |
| 22 | 22 | | | | | | — | — |
| 22.5 | 22.5 | | | | | | — | — |
| 23 | 23 | | | | | | — | — |
| 23.5 | 23.5 | | | | | | — | — |
| 24 | 24 | 135 | 45 | 25 | 2 | □ | — | — |
| 24.5 | 24.5 | | | | | | — | — |
| 25 | 25 | | | | | | — | — |
| 25.5 | 25.5 | | | | | | — | — |
| 26 | 26 | | | | | | — | — |
| 26.5 | 26.5 | | | | | | — | — |
| 27 | 27 | 140 | 48 | 25 | 2 | □ | — | — |
| 27.5 | 27.5 | | | | | | — | — |
| 28 | 28 | | | | | | — | — |
| 28.5 | 28.5 | | | | | | — | — |
| 29 | 29 | | | | | | — | — |
| 29.5 | 29.5 | | | | | | — | — |
| 30 | 30 | 145 | 50 | 25 | 2 | □ | — | — |
| 30.5 | 30.5 | | | | | | — | — |
| 31 | 31 | | | | | | — | — |
| 31.5 | 31.5 | | | | | | — | — |
| 32 | 32 | | | | | | — | — |
| 32 | 32 | | | | | | — | — |
| 32 | 32 | 150 | 53 | 25 | 2 | □ | — | — |
| 32 | 32 | | | | | | — | — |
| 32 | 32 | | | | | | — | — |
| 32 | 32 | | | | | | — | — |
| 32 | 32 | | | | | | — | — |
| 32 | 32 | | | | | | — | — |
| 32 | 32 | 160 | 60 | 32 | 1 | □ | — | — |
| 32 | 32 | | | | | | — | — |
| 32 | 32 | | | | | | — | — |
| 32 | 32 | | | | | | — | — |
| 32 | 32 | | | | | | — | — |
| 32 | 32 | | | | | | — | — |

| 被削材 Work Material | 低炭素鋼 | 中炭素鋼 | 高炭素鋼 | 合金鋼 | 調質鋼 | 焼入鋼 | | | | ステンレス鋼 | 工具鋼 | 鋳鉄 | タタイル 鋳鉄 | 銅合金 | アルミ 展伸材 | アルミ 合金鋳物 | チタン 合金 | インコネル |
|----------------------|------------------------------|---------------------|-------------------|-------------|----------------|-----------------------------|-------------|-------------|-------------|-----------------|------------|-----------|-------------------|--------------|------------|------------------------|----------------|---------|
| | Low Carbon Steel Mn/Steel | Medium Carbon Steel | High Carbon Steel | Alloy Steel | Hardened Steel | Quenched and Tempered Steel | | | | Stainless Steel | Tool Steel | Cast Iron | Ductile Cast Iron | Copper Alloy | Aluminum | Aluminum Alloy Casting | Titanium Alloy | Inconel |
| 製品記号 Abbreviation | C~0.25% | C0.25~0.4% | C0.45%~ | SCM | ~35 HRC | 35 ~ 45 HRC | 45 ~ 50 HRC | 50 ~ 60 HRC | 60 ~ 70 HRC | SUS | SKD SKS | FC | FCD | Cu | Al | AC | | |
| VP-ZDS | ○ | ○ | ○ | ○ | | | | | | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | |

A, B, C, D=標準在庫品 A, B, C, D=Standard stock item. □=特定代理店在庫品 □=Stocked by specific distributors. Contact us for price & availability.

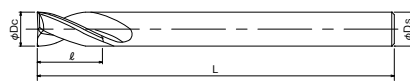
Vコート CPM座ぐり加工用ロングシャンク 2刃ショート

V Coated・CPM・2Flutes・Long Shank・Short・ for Counterboring

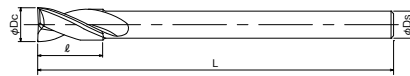
VP-LS-ZDS



Type 1



Type 2



単位:mm Unit:mm

| ツールNo. EDP No. | 外径 Dc | 全長 L | 有効溝長 ℓ | シャンク径 Ds | 形状 Type | 在庫 Stock | 重量 Weight | 標準価格 (Yen) |
|-------------------|----------|---------|-----------|-------------|------------|-------------|--------------|---------------|
| 6 | 6 | 120 | 13 | 6 | 1 | □ | — | — |
| 6.1 | — | | | | | | — | |
| 6.2 | — | | | | | | — | |
| 6.3 | — | | | | | | — | |
| 6.4 | — | | | | | | — | |
| 6.5 | — | | — | | | | | |
| 6.6 | — | | — | | | | | |
| 6.7 | — | | — | | | | | |
| 6.8 | — | | — | | | | | |
| 6.9 | — | | — | | | | | |
| 7 | 7 | 130 | 16 | 6 | 2 | — | — | |
| 7.1 | — | | | | | — | | |
| 7.2 | — | | | | | — | | |
| 7.3 | — | | | | | — | | |
| 7.4 | — | | | | | — | | |
| 7.5 | — | | — | | | | | |
| 7.6 | — | | — | | | | | |
| 7.7 | — | | — | | | | | |
| 7.8 | — | | — | | | | | |
| 7.9 | — | | — | | | | | |
| 8 | 8 | 130 | 19 | 8 | 2 | — | — | |
| 8.1 | — | | | | | — | | |
| 8.2 | — | | | | | — | | |
| 8.3 | — | | | | | — | | |
| 8.4 | — | | | | | — | | |
| 8.5 | — | | — | | | | | |
| 8.6 | — | | — | | | | | |
| 8.7 | — | | — | | | | | |
| 8.8 | — | | — | | | | | |
| 8.9 | — | | — | | | | | |
| 9 | 9 | 130 | 22 | 8 | 2 | — | — | |
| 9.1 | — | | | | | — | | |
| 9.2 | — | | | | | — | | |
| 9.3 | — | | | | | — | | |
| 9.4 | — | | | | | — | | |
| 9.5 | — | | — | | | | | |
| 9.6 | — | | — | | | | | |
| 9.7 | — | | — | | | | | |
| 9.8 | — | | — | | | | | |

・横引き不可です。Specialized for plunging.

| ツールNo. EDP No. | 外径 Dc | 全長 L | 有効溝長 ℓ | シャンク径 Ds | 形状 Type | 在庫 Stock | 重量 Weight | 標準価格 (Yen) | | | |
|-------------------|----------|---------|-----------|-------------|------------|-------------|--------------|---------------|---|---|---|
| 9.9 | 9.9 | 130 | 22 | 10 | 2 | □ | — | — | | | |
| 10 | — | | | | | | — | | | | |
| 10.1 | — | | | | | | — | | | | |
| 10.2 | — | | | | | | — | | | | |
| 10.3 | — | | | | | | — | | | | |
| 10.4 | — | | | | | | — | | | | |
| 10.5 | — | | | | | | — | | | | |
| 10.6 | — | | | | | | — | | | | |
| 10.7 | — | | | | | | — | | | | |
| 10.8 | — | | | | | | — | | | | |
| 10.9 | 10.9 | 150 | 26 | 12 | 2 | — | — | | | | |
| 11 | — | | | | | — | | | | | |
| 11.1 | — | | | | | — | | | | | |
| 11.2 | — | | | | | — | | | | | |
| 11.3 | — | | | | | — | | | | | |
| 11.4 | — | | | | | — | | | | | |
| 11.5 | — | | | | | — | | | | | |
| 11.6 | — | | | | | — | | | | | |
| 11.7 | — | | | | | — | | | | | |
| 11.8 | — | | | | | — | | | | | |
| 11.9 | 11.9 | 180 | 32 | 16 | 2 | — | — | | | | |
| 12 | — | | | | | — | | | | | |
| 12.5 | — | | | | | — | | | | | |
| 13 | — | | | | | — | | | | | |
| 13.5 | — | | | | | — | | | | | |
| 14 | — | | | | | — | | | | | |
| 14.5 | — | | | | | — | | | | | |
| 15 | — | | | | | — | | | | | |
| 15.5 | — | | | | | — | | | | | |
| 16 | — | | | | | — | | | | | |
| 16.5 | 16.5 | 200 | 38 | 20 | 1 | — | — | | | | |
| 17 | — | | | | | — | | | | | |
| 17.5 | — | | | | | — | | | | | |
| 18 | — | | | | | — | | | | | |
| 18.5 | — | | | | | — | | | | | |
| 19 | — | | | | | — | | | | | |
| 19.5 | 19.5 | | | | | — | — | | | | |
| 20 | 20 | | | | | 220 | — | — | — | — | — |

| 被削材 Work Material | 低炭素鋼 | 中炭素鋼 | 高炭素鋼 | 合金鋼 | 調質鋼 | 焼入鋼 | ステンレス鋼 | 工具鋼 | 鋳鉄 | ダクタイル鋳鉄 | 銅合金 | アルミ展伸材 | アルミ合金鋳物 | チタン合金 | インコニ |
|-------------------------|--------------------------------|---------------------|-------------------|-------------|----------------------|-------------------------------------|-----------------|------------|-----------|-------------------|--------------|----------|------------------------|----------------|---------|
| | Low Carbon Steel Mild Steel | Medium Carbon Steel | High Carbon Steel | Alloy Steel | Hardened Steel | Quenched and Tempered Steel | Stainless Steel | Tool Steel | Cast Iron | Ductile Cast Iron | Copper Alloy | Aluminum | Aluminum Alloy Casting | Titanium Alloy | Inconel |
| 製品記号 Abbreviation | C~0.25% | C0.25~0.45% | C0.45%~ | SCM | ~35 HRC 35~45 HRC | 45~50 HRC 50~60 HRC 60~70 HRC | SUS | SKD SKS | FC | FCD | Cu | Al | AC | | |
| VP-LS-ZDS | ○ | ○ | ○ | ○ | ○ | | ○ | ○ | | | ○ | ○ | ○ | | |

A、B、C、D=標準在庫品 A、B、C、D=Standard stock item. □=特定代理店在庫品 □=Stocked by specific distributors. Contact us for price & availability.

■アイコンの説明はP.1をご覧ください。 See p.1 for explanation of icons.

切削条件基準表 Cutting Conditions

AD-LDS・AD-LS-LDS ^{注1) Note} センタリング Centering

| 被削材 Work Material | 低炭素鋼・軟鋼 Low Carbon Steel Mild Steel S5400 ~500N/mm ² | | 炭素鋼 Carbon Steel S50C 500 ~710N/mm ² | | 合金鋼 Alloy Steel SCM 710 ~900N/mm ² | | 特殊鋼・調質鋼 Special Alloy Steel Hardened Steel SKD61・~900N/mm ² 28HRC | | 特殊鋼・調質鋼 Special Alloy Steel Hardened Steel SKD11・~1060N/mm ² 34HRC | | 工具鋼 Tool Steel | | 鑄鉄・ダクタイル鑄鉄 Cast Iron・Ductile Cast Iron FCD250・FC400 ~500N/mm ² | | アルミニウム 合金鑄物 Aluminum Alloy Casting ADC・AC4D | |
|--------------------------|---|------------------------------|--|------------------------------|--|------------------------------|--|------------------------------|---|------------------------------|---------------------------------------|------------------------------|--|------------------------------|---|------------------------------|
| | 切削速度 Cutting Speed | 63 ~ 80m/min | 40 ~ 63m/min | 32 ~ 50m/min | 20 ~ 30m/min | 16 ~ 22m/min | 16 ~ 22m/min | 16 ~ 22m/min | 63 ~ 100m/min | 80 ~ 160m/min | | | | | | |
| 直径 Drill Dia. (mm) | 回転速度 Speed (min ⁻¹) | 送り量 Feed Rate (mm/rev) | 回転速度 Speed (min ⁻¹) | 送り量 Feed Rate (mm/rev) | 回転速度 Speed (min ⁻¹) | 送り量 Feed Rate (mm/rev) | 回転速度 Speed (min ⁻¹) | 送り量 Feed Rate (mm/rev) | 回転速度 Speed (min ⁻¹) | 送り量 Feed Rate (mm/rev) | 回転速度 Speed (min ⁻¹) | 送り量 Feed Rate (mm/rev) | 回転速度 Speed (min ⁻¹) | 送り量 Feed Rate (mm/rev) | 回転速度 Speed (min ⁻¹) | 送り量 Feed Rate (mm/rev) |
| | 0.5 | 20,000 | 0.005 ~ 0.02 | 25,000 | 0.005 ~ 0.02 | 20,000 | 0.005 ~ 0.02 | 16,000 | 0.005 ~ 0.02 | 12,000 | 0.005 ~ 0.02 | 12,000 | 0.005 ~ 0.02 | 注2) Note | 0.005 ~ 0.015 | 注2) Note |
| 1 | 10,000 | 0.01 ~ 0.03 | 16,000 | 0.01 ~ 0.03 | 10,000 | 0.01 ~ 0.03 | 8,000 | 0.01 ~ 0.03 | 6,000 | 0.01 ~ 0.03 | 6,000 | 0.01 ~ 0.03 | 20,000 | 0.01 ~ 0.03 | 注2) Note | 0.04 ~ 0.07 |
| 2 | 5,000 | 0.03 ~ 0.06 | 8,000 | 0.03 ~ 0.06 | 5,000 | 0.03 ~ 0.06 | 4,000 | 0.03 ~ 0.06 | 3,000 | 0.03 ~ 0.06 | 3,000 | 0.03 ~ 0.06 | 12,000 | 0.03 ~ 0.06 | 15,000 | 0.06 ~ 0.14 |
| 3 | 7,500 | 0.04 ~ 0.08 | 5,500 | 0.04 ~ 0.08 | 4,500 | 0.04 ~ 0.08 | 2,700 | 0.04 ~ 0.08 | 2,000 | 0.04 ~ 0.08 | 2,000 | 0.04 ~ 0.08 | 8,000 | 0.05 ~ 0.09 | 12,000 | 0.1 ~ 0.22 |
| 4 | 5,700 | 0.05 ~ 0.1 | 4,100 | 0.05 ~ 0.1 | 3,300 | 0.05 ~ 0.1 | 2,000 | 0.05 ~ 0.1 | 1,500 | 0.05 ~ 0.1 | 1,500 | 0.05 ~ 0.1 | 6,500 | 0.07 ~ 0.12 | 9,500 | 0.12 ~ 0.25 |
| 6 | 3,800 | 0.06 ~ 0.12 | 2,700 | 0.06 ~ 0.12 | 2,300 | 0.06 ~ 0.12 | 1,300 | 0.06 ~ 0.12 | 1,000 | 0.06 ~ 0.12 | 1,000 | 0.06 ~ 0.12 | 4,300 | 0.12 ~ 0.18 | 6,400 | 0.14 ~ 0.28 |
| 8 | 2,800 | 0.08 ~ 0.15 | 2,000 | 0.08 ~ 0.15 | 1,700 | 0.08 ~ 0.15 | 1,000 | 0.08 ~ 0.15 | 750 | 0.08 ~ 0.15 | 750 | 0.08 ~ 0.15 | 3,200 | 0.13 ~ 0.2 | 4,800 | 0.18 ~ 0.32 |
| 10 | 2,300 | 0.1 ~ 0.18 | 1,700 | 0.1 ~ 0.18 | 1,400 | 0.1 ~ 0.18 | 800 | 0.1 ~ 0.18 | 600 | 0.1 ~ 0.18 | 600 | 0.1 ~ 0.18 | 2,600 | 0.17 ~ 0.25 | 3,800 | 0.22 ~ 0.36 |
| 12 | 1,900 | 0.12 ~ 0.21 | 1,400 | 0.12 ~ 0.21 | 1,200 | 0.12 ~ 0.21 | 650 | 0.12 ~ 0.21 | 500 | 0.12 ~ 0.21 | 500 | 0.12 ~ 0.21 | 2,200 | 0.21 ~ 0.3 | 3,200 | 0.25 ~ 0.4 |

- AD-LS-LDS (ロングシャンク)を使用する場合は、送り量を低目にご使用下さい。
 - 回転数が十分に上がらない場合は、出来る限り高回転でご使用下さい。
 - この切削条件基準表は、水溶性切削油剤を使用する場合のものです。
 - 不水溶性切削油剤を使用する場合は、切削速度を20%下げて下さい。
 - 曲面・傾斜面等へのセンタリングは、送り量を低目にご使用下さい。
 - ステンレス鋼へのセンタリングは推奨しません。
TIN-NC-LDSまたはNC-LDSをご使用下さい。
- When using AD-LS-LDS, reduce the feed rate accordingly.
 - For machines that cannot achieve the speeds indicated in the table please set rotation as high as possible.
 - The indicated speeds and feeds are for drilling with water-soluble coolant.
 - When using non-water-soluble coolant, reduce the drilling speed by 20%.
 - When centering on a curved or inclined surface, reduce the feed rate accordingly.
 - Centering on Stainless Steels is not recommended. For these procedures, use the TIN-NC-LDS or the NC-LDS.

切削条件基準表 Cutting Conditions

AD-LDS・AD-LS-LDS^{注1)} Note 穴面取り Countersinking

| 被削材 Work Material | 低炭素鋼・軟鋼 Low Carbon Steel Mild Steel SS400 ~500N/mm ² | | 炭素鋼 Carbon Steel S50C 500 ~710N/mm ² | | 合金鋼 Alloy Steel SCM 710 ~900N/mm ² | | 特殊鋼・調質鋼 Special Alloy Steel Hardened Steel SKD61・~900N/mm ² 28HRC | | 特殊鋼・調質鋼 Special Alloy Steel Hardened Steel SKD11・~1060N/mm ² 34HRC | | 焼入れ鋼 Quenched and Tempered Steel 45 ~50HRC | | 鑄鉄・ダクタイル鑄鉄 Cast Iron・Ductile Cast Iron FCD250・FC400 ~500N/mm ² | | アルミニウム 合金鑄物 Aluminum Alloy Casting ADC・AC4D | |
|--------------------------|---|------------------------------|--|------------------------------|--|------------------------------|--|------------------------------|---|------------------------------|--|------------------------------|--|------------------------------|---|------------------------------|
| | 切削速度 Cutting Speed | 63 ~80m/min | | 40 ~63m/min | | 32 ~50m/min | | 20 ~30m/min | | 20 ~30m/min | | 20 ~30m/min | | 63~100m/min | | 80~160m/min |
| 直径 Drill Dia. (mm) | 回転速度 Speed (min ⁻¹) | 送り量 Feed Rate (mm/rev) | 回転速度 Speed (min ⁻¹) | 送り量 Feed Rate (mm/rev) | 回転速度 Speed (min ⁻¹) | 送り量 Feed Rate (mm/rev) | 回転速度 Speed (min ⁻¹) | 送り量 Feed Rate (mm/rev) | 回転速度 Speed (min ⁻¹) | 送り量 Feed Rate (mm/rev) | 回転速度 Speed (min ⁻¹) | 送り量 Feed Rate (mm/rev) | 回転速度 Speed (min ⁻¹) | 送り量 Feed Rate (mm/rev) | 回転速度 Speed (min ⁻¹) | 送り量 Feed Rate (mm/rev) |
| 0.5 | 20,000 | 0.005 ~ 0.05 | 25,000 | 0.005 ~ 0.05 | 20,000 | 0.005 ~ 0.05 | 16,000 | 0.005 ~ 0.05 | 16,000 | 0.005 ~ 0.05 | 16,000 | 0.005 ~ 0.02 | 注2) Note | 0.005 ~ 0.05 | 注2) Note | 0.005 ~ 0.05 |
| 1 | 10,000 | 0.01 ~ 0.1 | 16,000 | 0.01 ~ 0.1 | 10,000 | 0.01 ~ 0.1 | 8,000 | 0.01 ~ 0.1 | 8,000 | 0.01 ~ 0.1 | 8,000 | 0.01 ~ 0.03 | 20,000 | 0.01 ~ 0.1 | 注2) Note | 0.01 ~ 0.1 |
| 2 | 5,000 | 0.02 ~ 0.18 | 8,000 | 0.02 ~ 0.18 | 5,000 | 0.02 ~ 0.18 | 4,000 | 0.02 ~ 0.18 | 4,000 | 0.02 ~ 0.18 | 4,000 | 0.03 ~ 0.06 | 12,000 | 0.02 ~ 0.18 | 15,000 | 0.02 ~ 0.18 |
| 3 | 7,500 | 0.04 ~ 0.24 | 5,500 | 0.04 ~ 0.24 | 4,500 | 0.04 ~ 0.24 | 2,700 | 0.04 ~ 0.24 | 2,700 | 0.04 ~ 0.24 | 2,700 | 0.04 ~ 0.08 | 8,000 | 0.04 ~ 0.24 | 12,000 | 0.04 ~ 0.24 |
| 4 | 5,700 | 0.04 ~ 0.24 | 4,100 | 0.04 ~ 0.24 | 3,300 | 0.04 ~ 0.24 | 2,000 | 0.04 ~ 0.24 | 2,000 | 0.04 ~ 0.24 | 2,000 | 0.05 ~ 0.1 | 6,500 | 0.04 ~ 0.24 | 9,500 | 0.04 ~ 0.24 |
| 6 | 3,800 | 0.06 ~ 0.36 | 2,700 | 0.06 ~ 0.36 | 2,300 | 0.06 ~ 0.36 | 1,300 | 0.06 ~ 0.36 | 1,300 | 0.06 ~ 0.36 | 1,300 | 0.06 ~ 0.12 | 4,300 | 0.06 ~ 0.36 | 6,400 | 0.06 ~ 0.36 |
| 8 | 2,800 | 0.08 ~ 0.38 | 2,000 | 0.08 ~ 0.38 | 1,700 | 0.08 ~ 0.38 | 1,000 | 0.08 ~ 0.38 | 1,000 | 0.08 ~ 0.38 | 1,000 | 0.08 ~ 0.15 | 3,200 | 0.08 ~ 0.38 | 4,800 | 0.08 ~ 0.38 |
| 10 | 2,300 | 0.1 ~ 0.4 | 1,700 | 0.1 ~ 0.4 | 1,400 | 0.1 ~ 0.4 | 800 | 0.1 ~ 0.4 | 800 | 0.1 ~ 0.4 | 800 | 0.1 ~ 0.18 | 2,600 | 0.1 ~ 0.4 | 3,800 | 0.1 ~ 0.4 |
| 12 | 1,900 | 0.12 ~ 0.42 | 1,400 | 0.12 ~ 0.42 | 1,200 | 0.12 ~ 0.42 | 650 | 0.12 ~ 0.42 | 650 | 0.12 ~ 0.42 | 650 | 0.12 ~ 0.21 | 2,200 | 0.12 ~ 0.42 | 3,200 | 0.12 ~ 0.42 |

- AD-LS-LDS (ロングシャンク)を使用する場合は、送り量を低目にご使用下さい。
- 回転数が十分に上がらない場合は、出来る限り高回転でご使用下さい。
- この切削条件基準表は、水溶性切削油剤を使用する場合のものです。
- 不水溶性切削油剤を使用する場合は、切削速度を20%下げて下さい。
- 曲面・傾斜面等へのセンタリングは、送り量を低目にご使用下さい。
- 高速加工をする場合は、上記切削速度の中央値の2倍を上限として下さい。
- ステンレス鋼への穴面取りは、低炭素鋼の数値を参考にして下さい。

- When using AD-LS-LDS, reduce the feed rate accordingly.
- For machines that cannot achieve the speeds indicated in the table please set rotation as high as possible.
- The indicated speeds and feeds are for drilling with water-soluble coolant.
- When using non-water-soluble coolant, reduce the drilling speed by 20%.
- When centering on a curved or inclined surface, reduce the feed rate accordingly.
- For high-speed machining, double the median value of the above cutting condition to use as upper limit.
- When countersinking on Stainless Steels, use a condition of Low Carbon Steel.

切削条件基準表 Cutting Conditions

FX-LDS センタリング Centering

| 被削材 Work Material | 低炭素鋼・軟鋼 Low Carbon Steel Mild Steel S5400 ~500N/mm ² | | 炭素鋼 Carbon Steel S50C 500~710N/mm ² | | 合金鋼 Alloy Steel SCM 710~900N/mm ² | | 特殊鋼・調質鋼 Special Alloy Steel Hardened Steel SKD61~900N/mm ² 28HRC | | 特殊鋼・調質鋼 Special Alloy Steel Hardened Steel SKD11~1060N/mm ² 34HRC | | 鑄鉄・ダクタイル鑄鉄 Cast Iron・Ductile Cast Iron FCD250・FC400 ~500N/mm ² | | アルミニウム 合金鑄物 Aluminum Alloy Casting ADC・AC4D | |
|--------------------------|---|------------------------------|---|------------------------------|---|------------------------------|---|------------------------------|--|------------------------------|--|------------------------------|---|------------------------------|
| | 切削速度 Cutting Speed | 63~80m/min | | 40~63m/min | | 32~50m/min | | 20~28m/min | | 16~22m/min | | 63~100m/min | | 80~160m/min |
| 直径 Drill Dia. (mm) | 回転速度 Speed (min ⁻¹) | 送り量 Feed Rate (mm/rev) | 回転速度 Speed (min ⁻¹) | 送り量 Feed Rate (mm/rev) | 回転速度 Speed (min ⁻¹) | 送り量 Feed Rate (mm/rev) | 回転速度 Speed (min ⁻¹) | 送り量 Feed Rate (mm/rev) | 回転速度 Speed (min ⁻¹) | 送り量 Feed Rate (mm/rev) | 回転速度 Speed (min ⁻¹) | 送り量 Feed Rate (mm/rev) | 回転速度 Speed (min ⁻¹) | 送り量 Feed Rate (mm/rev) |
| 0.5 | 20,000 | 0.005 ~ 0.02 | 25,000 | 0.005 ~ 0.02 | 20,000 | 0.005 ~ 0.02 | 15,000 | 0.005 ~ 0.02 | 9,000 | 0.005 ~ 0.02 | 注6) Note | 0.005 ~ 0.015 | 注6) Note | 0.02 ~ 0.05 |
| 1 | 10,000 | 0.01 ~ 0.03 | 16,000 | 0.01 ~ 0.03 | 10,000 | 0.01 ~ 0.03 | 7,500 | 0.01 ~ 0.03 | 4,500 | 0.01 ~ 0.03 | 20,000 | 0.01 ~ 0.03 | 注6) Note | 0.04 ~ 0.1 |
| 2 | 5,000 | 0.03 ~ 0.06 | 8,000 | 0.03 ~ 0.06 | 5,000 | 0.03 ~ 0.06 | 3,800 | 0.03 ~ 0.06 | 2,200 | 0.03 ~ 0.06 | 12,000 | 0.03 ~ 0.06 | 15,000 | 0.06 ~ 0.2 |
| 3 | 7,500 | 0.04 ~ 0.08 | 5,500 | 0.04 ~ 0.08 | 4,500 | 0.04 ~ 0.08 | 2,500 | 0.04 ~ 0.08 | 1,500 | 0.04 ~ 0.08 | 8,000 | 0.05 ~ 0.09 | 12,000 | 0.1 ~ 0.22 |
| 4 | 5,700 | 0.05 ~ 0.1 | 4,100 | 0.05 ~ 0.1 | 3,300 | 0.05 ~ 0.1 | 1,900 | 0.05 ~ 0.1 | 1,100 | 0.05 ~ 0.1 | 6,500 | 0.07 ~ 0.12 | 9,500 | 0.12 ~ 0.25 |
| 6 | 3,800 | 0.06 ~ 0.12 | 2,700 | 0.06 ~ 0.12 | 2,300 | 0.06 ~ 0.12 | 1,300 | 0.06 ~ 0.12 | 750 | 0.06 ~ 0.12 | 4,300 | 0.12 ~ 0.2 | 6,400 | 0.14 ~ 0.28 |
| 8 | 2,800 | 0.08 ~ 0.15 | 2,000 | 0.08 ~ 0.15 | 1,700 | 0.08 ~ 0.15 | 1,000 | 0.08 ~ 0.15 | 550 | 0.08 ~ 0.15 | 3,200 | 0.13 ~ 0.2 | 4,800 | 0.18 ~ 0.32 |
| 10 | 2,300 | 0.1 ~ 0.18 | 1,700 | 0.1 ~ 0.18 | 1,400 | 0.1 ~ 0.18 | 750 | 0.1 ~ 0.18 | 450 | 0.1 ~ 0.18 | 2,600 | 0.17 ~ 0.25 | 3,800 | 0.22 ~ 0.36 |
| 12 | 1,900 | 0.12 ~ 0.21 | 1,400 | 0.12 ~ 0.21 | 1,200 | 0.12 ~ 0.21 | 650 | 0.12 ~ 0.21 | 370 | 0.12 ~ 0.21 | 2,200 | 0.21 ~ 0.3 | 3,200 | 0.25 ~ 0.4 |
| 16 | 1,400 | 0.16 ~ 0.28 | 1,000 | 0.16 ~ 0.28 | 900 | 0.16 ~ 0.28 | 480 | 0.16 ~ 0.28 | 280 | 0.16 ~ 0.28 | 1,600 | 0.24 ~ 0.32 | 2,400 | 0.32 ~ 0.48 |
| 20 | 1,150 | 0.2 ~ 0.34 | 820 | 0.2 ~ 0.34 | 700 | 0.2 ~ 0.34 | 380 | 0.2 ~ 0.34 | 220 | 0.2 ~ 0.34 | 1,300 | 0.26 ~ 0.4 | 1,900 | 0.4 ~ 0.6 |
| 25 | 900 | 0.25 ~ 0.45 | 650 | 0.25 ~ 0.45 | 560 | 0.25 ~ 0.45 | 300 | 0.25 ~ 0.45 | 180 | 0.25 ~ 0.45 | 1,000 | 0.3 ~ 0.5 | 1,500 | 0.5 ~ 0.75 |

1. この切削条件基準表は、**水溶性切削油剤**を使用する場合のものです。
2. 不水溶性切削油剤を使用する場合は、切削速度を20%下げて下さい。
3. 曲面・傾斜面等へのセンタリングは、送り量を低目にご使用下さい。
4. ロングシャンクのFX-LS-LDSをご使用する場合、送り量を低目でご使用下さい。
5. **オーステナイト系ステンレス鋼**へのセンタリングは推奨しません。
TIN-NC-LDSまたはNC-LDSをご使用下さい。
6. 回転数が十分に上がらない場合は、出来る限り高回転でご使用下さい。

1. The indicated speeds and feeds are for drilling with **water-soluble coolant**.
2. When using non-water-soluble coolant, reduce the drilling speed by 20%.
3. When centering on a curved or inclined surface, reduce the feed rate accordingly.
4. "When using FX-LS-LDS, reduce the feed rate accordingly."
5. Centering on **Austenitic Stainless Steels** is not recommended. For these procedures, use the TIN-NC-LDS or the NC-LDS.
6. For machines that cannot achieve the speeds indicated in the table please set rotation as high as possible.

FX-LDS 穴面取り(鋼用) Countersinking For Steels

| 直径 Drill Dia. (mm) | 0.5 | 1 | 2 | 3 | 4 | 6 | 8 | 10 | 12 | 16 | 20 | 25 |
|----------------------------------|--|------------|-------------|-------------|-------------|-------------|-------------|-----------|-------------|-------------|------------|-------------|
| 切削速度 Cutting Speed (m/min) | 切削速度は、センタリング条件時の2倍程度を上限にして下さい Cutting speed can be up to 2 times the limit shown above for centering. | | | | | | | | | | | |
| 送り量 Feed Rate (mm/rev) | 0.005 ~ 0.05 | 0.01 ~ 0.1 | 0.02 ~ 0.18 | 0.04 ~ 0.24 | 0.04 ~ 0.24 | 0.06 ~ 0.36 | 0.08 ~ 0.38 | 0.1 ~ 0.4 | 0.12 ~ 0.42 | 0.16 ~ 0.48 | 0.2 ~ 0.55 | 0.25 ~ 0.63 |

FX-LS-LDS 穴面取り(鋼用) Countersinking For Steels

| 直径 Drill Dia. (mm) | 0.5 | 1 | 2 | 3 | 4 | 6 | 8 | 10 | 12 | 16 | 20 | 25 |
|----------------------------------|--|-------------|-------------|-------------|-------------|-------------|-------------|-----------|-------------|-------------|-----------|------------|
| 切削速度 Cutting Speed (m/min) | 切削速度は、センタリング条件時の2倍程度を上限にして下さい Cutting speed can be up to 2 times the limit shown above for centering. | | | | | | | | | | | |
| 送り量 Feed Rate (mm/rev) | 0.005 ~ 0.02 | 0.01 ~ 0.04 | 0.02 ~ 0.08 | 0.04 ~ 0.12 | 0.05 ~ 0.16 | 0.06 ~ 0.24 | 0.08 ~ 0.28 | 0.1 ~ 0.3 | 0.12 ~ 0.32 | 0.16 ~ 0.36 | 0.2 ~ 0.4 | 0.25 ~ 0.5 |

1. この切削条件基準表は、**水溶性切削油剤**を使用する場合のものです。
2. 不水溶性切削油剤を使用する場合は、切削速度を20%下げて下さい。
3. 曲面・傾斜面等への面取りは、送り量を低目にご使用下さい。
4. **焼入鋼**への面取り時は、切削速度を20~40m/minとし、低目の送り量でご使用下さい。
5. **ステンレス鋼**への面取り時は、切削速度を63~100m/minとしてご使用下さい。

1. The indicated speeds and feeds are for drilling with **water-soluble coolant**.
2. When using non-water-soluble coolant, reduce the drilling speed by 20%.
3. When counter sinking on a curved or inclined surface, reduce the feed rate accordingly.
4. When counter sinking on **hardened steels**, use a drilling speed of 20-40m/min and lower the feed rate accordingly.
5. When counter sinking on **Stainless Steels**, use a drilling speed of 63-100m/min.

切削条件基準表 Cutting Conditions

VP-LDS・VP-LS-LDS・TIN-NC-LDS・TIN-LS-NC-LDS・NC-LDS・LS-NC-LDS センタリング Centering

| 被削材 Work Material | 低炭素鋼・軟鋼 Low Carbon Steel Mild Steel S15C・S5400 ~500N/mm ² | | 炭素鋼 Carbon Steel S45C | | 合金鋼 Alloy Steel SCM440 | | 特殊鋼・調質鋼 Special Alloy Steel Hardened Steel SKD61 35HRC | | 特殊鋼 Special Alloy Steel SKD11 | | 鑄鉄・ダクタイル鑄鉄 Cast Iron・Ductile Cast Iron FCD250・FC400 ~500N/mm ² | | ステンレス鋼 Stainless Steel SUS304 | | アルミニウム 合金鑄物 Aluminium Alloy Casting ADC・AC4D | |
|--------------------------|--|------------------------------|---------------------------------------|------------------------------|---------------------------------------|------------------------------|--|------------------------------|---------------------------------------|------------------------------|--|------------------------------|---------------------------------------|------------------------------|--|------------------------------|
| 切削速度 Cutting Speed | 32 ~ 40m/min | | 22 ~ 30m/min | | 20 ~ 25m/min | | 10 ~ 13m/min | | 8 ~ 12m/min | | 25 ~ 32m/min | | 8 ~ 12m/min | | 51 ~ 100m/min | |
| 直径 Drill Dia. (mm) | 回転速度 Speed (min ⁻¹) | 送り量 Feed Rate (mm/rev) | 回転速度 Speed (min ⁻¹) | 送り量 Feed Rate (mm/rev) | 回転速度 Speed (min ⁻¹) | 送り量 Feed Rate (mm/rev) | 回転速度 Speed (min ⁻¹) | 送り量 Feed Rate (mm/rev) | 回転速度 Speed (min ⁻¹) | 送り量 Feed Rate (mm/rev) | 回転速度 Speed (min ⁻¹) | 送り量 Feed Rate (mm/rev) | 回転速度 Speed (min ⁻¹) | 送り量 Feed Rate (mm/rev) | 回転速度 Speed (min ⁻¹) | 送り量 Feed Rate (mm/rev) |
| 3 | 3,850 | 0.04 ~ 0.08 | 2,800 | 0.04 ~ 0.08 | 2,400 | 0.04 ~ 0.08 | 1,220 | 0.04 ~ 0.08 | 1,060 | 0.04 ~ 0.08 | 3,100 | 0.04 ~ 0.09 | 1,060 | 0.04 ~ 0.08 | 8,000 | 0.1 ~ 0.22 |
| 4 | 2,900 | 0.05 ~ 0.1 | 2,100 | 0.05 ~ 0.1 | 1,800 | 0.05 ~ 0.1 | 910 | 0.05 ~ 0.1 | 800 | 0.05 ~ 0.1 | 2,400 | 0.05 ~ 1.12 | 800 | 0.05 ~ 0.1 | 6,000 | 0.12 ~ 0.25 |
| 6 | 1,900 | 0.06 ~ 0.12 | 1,320 | 0.06 ~ 0.12 | 1,180 | 0.06 ~ 0.12 | 610 | 0.06 ~ 0.12 | 530 | 0.06 ~ 0.12 | 1,600 | 0.06 ~ 0.18 | 530 | 0.06 ~ 0.12 | 4,000 | 0.14 ~ 0.28 |
| 8 | 1,400 | 0.08 ~ 0.15 | 1,000 | 0.08 ~ 0.15 | 900 | 0.08 ~ 0.15 | 450 | 0.08 ~ 0.15 | 400 | 0.08 ~ 0.15 | 1,200 | 0.08 ~ 0.2 | 400 | 0.08 ~ 0.15 | 3,000 | 0.18 ~ 0.32 |
| 10 | 1,120 | 0.1 ~ 0.18 | 800 | 0.1 ~ 0.18 | 710 | 0.1 ~ 0.18 | 360 | 0.1 ~ 0.18 | 320 | 0.1 ~ 0.18 | 950 | 0.1 ~ 0.25 | 320 | 0.1 ~ 0.18 | 2,400 | 0.22 ~ 0.36 |
| 12 | 950 | 0.12 ~ 0.21 | 670 | 0.12 ~ 0.21 | 600 | 0.12 ~ 0.21 | 300 | 0.12 ~ 0.21 | 270 | 0.12 ~ 0.21 | 800 | 0.12 ~ 0.3 | 270 | 0.12 ~ 0.21 | 2,000 | 0.25 ~ 0.4 |
| 16 | 720 | 0.16 ~ 0.28 | 520 | 0.16 ~ 0.28 | 450 | 0.16 ~ 0.28 | 220 | 0.16 ~ 0.28 | 200 | 0.16 ~ 0.28 | 600 | 0.16 ~ 0.32 | 200 | 0.16 ~ 0.28 | 1,500 | 0.32 ~ 0.48 |
| 20 | 560 | 0.2 ~ 0.34 | 400 | 0.2 ~ 0.34 | 360 | 0.2 ~ 0.34 | 180 | 0.2 ~ 0.34 | 160 | 0.2 ~ 0.34 | 480 | 0.2 ~ 0.4 | 160 | 0.2 ~ 0.34 | 1,200 | 0.4 ~ 0.6 |
| 25 | 450 | 0.25 ~ 0.45 | 320 | 0.25 ~ 0.45 | 290 | 0.25 ~ 0.45 | 150 | 0.25 ~ 0.45 | 130 | 0.25 ~ 0.45 | 380 | 0.25 ~ 0.5 | 130 | 0.25 ~ 0.45 | 960 | 0.5 ~ 0.75 |

- この切削条件基準表は、**水溶性切削油剤**を使用する場合のものです。
- 不水溶性切削油剤を使用する場合は、切削速度を20%下げてください。
- 曲面・傾斜面等への面取り時は、送り量を低目にご使用下さい。
- ロングシャクのVP-LDS・TIN-LS-LDS・TIN-LS-NC-LDS・LS-NC-LDSを使用する場合は、送り量を低目にご使用下さい。
- TIN-NC-LDS・VP-LDSを使用する場合は、切削速度を20%程度上げても十分な性能を発揮します。

- The indicated speeds and feeds are for drilling with **water-soluble coolant**.
- When using non-water-soluble coolant, reduce the drilling speed by 20%.
- If counter sinking on a curved or inclined surface, reduce the feed rate accordingly.
- When using the long shank version, reduce the feed rate accordingly.
- When using TIN-NC-LDS, VP-LDS, the drilling speed can be increased 1.2 times the speed listed above.

VP-LDS・TIN-NC-LDS・NC-LDS 穴面取り Countersinking

| 直径 Drill Dia. (mm) | 3 | 4 | 6 | 8 | 10 | 12 | 16 | 20 | 25 |
|----------------------------------|---|-------------|-------------|-------------|-----------|-------------|-------------|------------|------------|
| 切削速度 Cutting Speed (m/min) | 切削速度は、センタリング条件時の2倍程度を上限にして下さい Drilling speed can be up to 2 times the limit shown above for centering. | | | | | | | | |
| 送り量 Feed Rate (mm/rev) | 0.04 ~ 0.1 | 0.05 ~ 0.12 | 0.06 ~ 0.18 | 0.08 ~ 0.24 | 0.1 ~ 0.3 | 0.12 ~ 0.36 | 0.16 ~ 0.48 | 0.2 ~ 0.55 | 0.25 ~ 0.6 |

VP-LS-LDS・TIN-LS-NC-LDS・LS-NC-LDS 穴面取り Countersinking

| 直径 Drill Dia. (mm) | 3 | 4 | 6 | 8 | 10 | 12 | 16 | 20 | 25 |
|----------------------------------|---|------------|-------------|-------------|------------|-------------|-------------|------------|-------------|
| 切削速度 Cutting Speed (m/min) | 切削速度は、センタリング条件時の2倍程度を上限にして下さい Drilling speed can be up to 2 times the limit shown above for centering. | | | | | | | | |
| 送り量 Feed Rate (mm/rev) | 0.04 ~ 0.08 | 0.05 ~ 0.1 | 0.06 ~ 0.12 | 0.08 ~ 0.15 | 0.1 ~ 0.18 | 0.12 ~ 0.21 | 0.16 ~ 0.28 | 0.2 ~ 0.34 | 0.25 ~ 0.45 |

- この切削条件基準表は、**水溶性切削油剤**を使用する場合のものです。
- 不水溶性切削油剤を使用する場合は、切削速度を20%下げてください。
- 曲面・傾斜面等への面取り時は、送り量を低目にご使用下さい。
- 焼入鋼への面取りは、超硬リーディングドリルをご使用下さい。

- The indicated speeds and feeds are for drilling with **water-soluble coolant**.
- When using non-water-soluble coolant, reduce the drilling speed by 20%.
- If counter sinking on a curved or inclined surface, reduce the feed rate accordingly.
- For countersinking in hardened steels, please use a carbide starter drill.

切削条件基準表 Cutting Conditions

W-HSCT-P/N・WLS-HSCT-P/N・HSCT-P/N・LS-HSCT-P/N

| 被削材 Work Material | 一般構造用鋼・炭素鋼・鋳鉄 Mild Steel·Carbon Steel·Cast Iron SS400、S55C、FC250 (~750N/mm ²) | | | 合金鋼・工具鋼 Alloy Steel·Tool Steel SCM、SKT、SKS、SKD (~30HRC) | | | 調質鋼・プリハードン鋼(快削) Hardened Steel·Prehardened Steel (Free-Cutting) SKT、SKD、NAK55、HPM1 (30~38HRC) | | | アルミニウム合金 Aluminum Alloy | | | ステンレス鋼 Stainless Steel SUS304 | | | 耐熱合金 Heat Resistant Alloy Steel Titanium, Inconel | | |
|--------------------------|--|--------------------------|-----------------|--|--------------------------|-----------------|---|--------------------------|-----------------|---------------------------------------|--------------------------|-----------------|---------------------------------------|--------------------------|-----------------|---|--------------------------|-----------------|
| | 切削速度 Cutting Speed | | | 35~65m/min | | | 20~40m/min | | | 150~230m/min | | | 30~50m/min | | | 15~30m/min | | |
| 大端径 Mill Dia. (mm) | 回転速度 Speed (min ⁻¹) | 送り速度 Feed (mm/min) | 刃当り送り (mm/t) | 回転速度 Speed (min ⁻¹) | 送り速度 Feed (mm/min) | 刃当り送り (mm/t) | 回転速度 Speed (min ⁻¹) | 送り速度 Feed (mm/min) | 刃当り送り (mm/t) | 回転速度 Speed (min ⁻¹) | 送り速度 Feed (mm/min) | 刃当り送り (mm/t) | 回転速度 Speed (min ⁻¹) | 送り速度 Feed (mm/min) | 刃当り送り (mm/t) | 回転速度 Speed (min ⁻¹) | 送り速度 Feed (mm/min) | 刃当り送り (mm/t) |
| | 6 | 4,250 | 445 | 0.035 | 2,650 | 160 | 0.02 | 1,590 | 95 | 0.02 | 10,000 | 1,200 | 0.04 | 2,100 | 255 | 0.04 | 1,150 | 70 |
| 8 | 3,200 | 380 | 0.04 | 2,000 | 120 | 0.02 | 1,200 | 70 | 0.02 | 7,550 | 1,000 | 0.045 | 1,600 | 190 | 0.04 | 900 | 60 | 0.022 |
| 10 | 2,550 | 305 | 0.04 | 1,600 | 95 | 0.02 | 955 | 55 | 0.02 | 6,050 | 815 | 0.045 | 1,250 | 155 | 0.04 | 700 | 55 | 0.025 |
| 12 | 2,100 | 255 | 0.04 | 1,350 | 90 | 0.022 | 795 | 55 | 0.022 | 5,050 | 680 | 0.045 | 1,050 | 125 | 0.04 | 585 | 55 | 0.03 |
| 16 | 1,600 | 190 | 0.04 | 995 | 70 | 0.024 | 595 | 45 | 0.024 | 3,800 | 510 | 0.045 | 795 | 105 | 0.045 | 440 | 45 | 0.033 |
| 切込深さ Depth Of Cut | | | | | | | | | | | | | | | | | | |

- この切削条件基準表は、水溶性切削油剤を使用する場合のものです。
1. The indicated speeds and feeds are for milling with water-soluble coolant.
- 不水溶性切削油剤を使用する場合は、切削速度を20%下げてください。
2. When using non-water-soluble coolant, reduce the milling speed by 20%.

切削条件基準表 Cutting Conditions

FX-ECR

| 被削材 Work Material | 一般構造用鋼・炭素鋼 Mild Steel・Carbon Steel S5400, S45C (~750N/mm ²) | | 合金鋼・工具鋼 Alloy Steel・Tool Steel SCM, SUJ, SKS (~30HRC) | | 調質鋼・ステンレス鋼 Hardened Steel・Stainless Steel SKD, SKT, SUS (30~40HRC) | |
|-------------------------|--|--------------------------|--|--------------------------|---|--------------------------|
| | 回転速度 Speed (min ⁻¹) | 送り速度 Feed (mm/min) | 回転速度 Speed (min ⁻¹) | 送り速度 Feed (mm/min) | 回転速度 Speed (min ⁻¹) | 送り速度 Feed (mm/min) |
| 外径×コーナ半径 Dc×r | | | | | | |
| 0.5×R0.1 | 14,500 | 55 | 12,000 | 40 | 9,750 | 30 |
| 0.5×R0.15 | 13,500 | 55 | 11,500 | 40 | 9,050 | 30 |
| 0.5×R0.2 | 12,500 | 55 | 10,500 | 40 | 8,450 | 30 |
| 0.5×R0.25 | 12,000 | 55 | 9,900 | 40 | 7,950 | 30 |
| 0.5×R0.3 | 11,000 | 55 | 9,350 | 40 | 7,450 | 30 |
| 0.5×R0.35 | 10,500 | 55 | 8,800 | 40 | 7,050 | 30 |
| 0.5×R0.4 | 10,000 | 55 | 8,350 | 40 | 6,700 | 30 |
| 0.5×R0.45 | 9,500 | 55 | 7,950 | 40 | 6,350 | 30 |
| 0.5×R0.5 | 9,000 | 55 | 7,550 | 40 | 6,050 | 30 |
| 0.5×R0.55 | 8,600 | 55 | 7,200 | 40 | 5,750 | 30 |
| 0.5×R0.6 | 8,300 | 55 | 6,900 | 40 | 5,500 | 30 |
| 0.5×R0.65 | 7,950 | 55 | 6,600 | 40 | 5,300 | 30 |
| 0.5×R0.7 | 7,600 | 55 | 6,350 | 40 | 5,050 | 30 |
| 0.5×R0.75 | 7,300 | 55 | 6,100 | 40 | 4,850 | 30 |
| 0.8×R0.8 | 5,750 | 55 | 4,800 | 40 | 3,850 | 30 |
| 0.8×R0.85 | 5,600 | 55 | 4,650 | 40 | 3,700 | 30 |
| 0.8×R0.9 | 5,450 | 55 | 4,500 | 40 | 3,600 | 30 |
| 0.8×R0.95 | 5,300 | 55 | 4,400 | 40 | 3,500 | 30 |
| 0.8×R1 | 5,150 | 55 | 4,300 | 40 | 3,400 | 30 |
| 0.8×R1.25 | 4,500 | 55 | 3,750 | 40 | 3,000 | 30 |
| 1.5×R1.5 | 3,100 | 55 | 2,600 | 40 | 2,050 | 30 |
| 1.5×R1.75 | 2,850 | 55 | 2,400 | 40 | 1,900 | 30 |
| 1.5×R2 | 2,650 | 55 | 2,200 | 40 | 1,750 | 30 |

1. 機械、ホルダは剛性のある精度の高いものをご使用下さい。
2. 加工物の形状や保持方法の状況によって切削条件を調整して下さい。
3. 切削油剤は被削材に適したものをご使用いただき、十分に注油下さい。
4. びびりや振動を生ずる場合は切込み回数を数回に分けて下さい。

1. Use a rigid and precise machine and holder.
2. Please adjust the speed, feed and cutting depth according to actual cutting conditions.
3. Use suitable cutting fluids, supply enough amount.
4. When chattering or vibration occurs, reduce cutting depth with multiple passes.

切削条件基準表 Cutting Conditions

V-XPM-ECR

| 被削材 Work Material | 一般構造用鋼・炭素鋼 Mild Steel・Carbon Steel S5400・S45C (~750N/mm ²) | | 合金鋼・工具鋼 Alloy Steel・Tool Steel SCM・SUJ・SKS (~30HRC) | | 調質鋼・ステンレス鋼 Hardened Steel・Stainless Steel SKD・SKT・SUS (30~40HRC) | |
|-------------------------|--|---------------------------------------|---|---------------------------------------|--|---------------------------------------|
| | R | 回転速度 Speed (min ⁻¹) | 送り速度 Feed (mm/min) | 回転速度 Speed (min ⁻¹) | 送り速度 Feed (mm/min) | 回転速度 Speed (min ⁻¹) |
| 2×R0.5 | 3,800 | 50 | 3,150 | 40 | 2,500 | 30 |
| 2×R0.75 | 3,450 | 50 | 2,850 | 40 | 2,300 | 30 |
| 2×R1 | 3,150 | 50 | 2,650 | 40 | 2,100 | 30 |
| 2×R1.25 | 2,900 | 50 | 2,400 | 40 | 1,950 | 30 |
| 2×R1.5 | 2,700 | 50 | 2,250 | 40 | 1,800 | 30 |
| 2×R1.75 | 2,500 | 50 | 2,100 | 40 | 1,650 | 30 |
| 2×R2 | 2,350 | 50 | 1,950 | 40 | 1,550 | 30 |
| 2×R2.25 | 2,200 | 50 | 1,850 | 40 | 1,450 | 30 |
| 2×R2.5 | 2,100 | 50 | 1,750 | 40 | 1,400 | 30 |
| 2×R2.75 | 2,000 | 50 | 1,650 | 40 | 1,300 | 30 |
| 2×R3 | 1,900 | 50 | 1,550 | 40 | 1,250 | 30 |
| 2×R3.5 | 1,700 | 50 | 1,400 | 40 | 1,150 | 30 |
| 2×R4 | 1,550 | 50 | 1,300 | 40 | 1,050 | 30 |

1. 機械、ホルダは剛性のある精度の高いものをご使用下さい。
2. 加工物の形状や保持方法の状況によって切削条件を調整して下さい。
3. 切削油剤は被削材に適したものをご使用いただき、十分に注油下さい。
4. びびりや振動を生ずる場合は切込み回数を数回に分けて下さい。

1. Use a rigid and precise machine and holder.
2. Please adjust the speed, feed and cutting depth according to actual cutting conditions.
3. Use suitable cutting fluids, supply enough amount.
4. When chattering or vibration occurs, reduce cutting depth with multiple passes.

形状寸法表
Specification Charts

センターリブ・穴面取り
Centering・Counterinking

コーナ面取り
Corner Chamfering

R面取り
Corner Rounding

座へり
Counterboring

切削条件
Cutting Conditions

センターリブ・穴面取り
Centering・Counterinking

コーナ面取り
Corner Chamfering

R面取り
Chamfering Edges

座へり
Counterboring

切削条件基準表 Cutting Conditions

PZAG 座ぐり加工・プランジ加工共通 For both counterboring and plunge milling

| 被削材 Work Material | 引張強さ・固さ成分 Tensile Strength · Hardness | 切削速度 Vc Cutting Speed (mm/min) | 回転当たりの送り量 f Feed Rate (mm/rev) | | | | | |
|--|---|-----------------------------------|--------------------------------|------------------|------------------|------------------|-----------------|----------------|
| | | | φ 14 ~ φ 17.5 | φ 20 ~ φ 23 | φ 26 ~ φ 48 | φ 54 ~ φ 72 | φ 76 ~ φ 82 | |
| P 軟鋼、低炭素鋼 Mild Steel, Carbon Steel (SS400, S10C) | ~180HB | 160 (100~200) | 0.14 (0.08~0.2) | 0.18 (0.1~0.25) | 0.2 (0.12~0.3) | 0.4 (0.2~0.6) | 0.4 (0.2~0.6) | |
| | 炭素鋼、合金鋼 Carbon Steel, Alloy Steel (S50C, SCM440) | ~280HB | 150 (100~200) | 0.14 (0.08~0.2) | 0.18 (0.1~0.25) | 0.2 (0.12~0.3) | 0.4 (0.2~0.6) | 0.4 (0.2~0.6) |
| | ダイス鋼 Die Steel (SKD11, SKD61) | ~280HB | 120 (80~180) | 0.12 (0.08~0.15) | 0.14 (0.1~0.2) | 0.18 (0.12~0.25) | 0.4 (0.2~0.5) | 0.4 (0.2~0.5) |
| M ステンレス鋼 Stainless Steel (SUS304, SUS420) | ~250HB | 130 (80~180) | 0.1 (0.08~0.15) | 0.12 (0.1~0.2) | 0.16 (0.12~0.25) | 0.35 (0.2~0.5) | 0.35 (0.2~0.5) | |
| K 鑄鉄 Cast Iron (FC250) | ~350N/mm ² | 200 (150~280) | 0.16 (0.08~0.25) | 0.2 (0.1~0.3) | 0.3 (0.15~0.4) | 0.6 (0.3~0.8) | 0.6 (0.3~0.8) | |
| | ダクタイル鑄鉄 Ductile Cast Iron (FCD400) | ~800N/mm ² | 160 (100~220) | 0.14 (0.08~0.2) | 0.18 (0.1~0.25) | 0.2 (0.15~0.3) | 0.4 (0.3~0.6) | 0.4 (0.3~0.6) |
| N アルミニウム合金 Aluminum Alloy | ~13%Si | 200 (100~800) | 0.16 (0.08~0.25) | 0.2 (0.1~0.3) | 0.3 (0.15~0.4) | 0.6 (0.3~0.8) | 0.6 (0.3~0.8) | |
| S 超耐熱合金 (湿式) Superalloy (Wet) (Inconel718) | — | 50 (30~60) | 0.08 (0.05~0.14) | 0.08 (0.06~0.14) | 0.12 (0.08~0.2) | 0.25 (0.16~0.4) | 0.25 (0.16~0.4) | |
| | チタン合金 (湿式) Titanium Alloy (Wet) (Ti-6AL-4V) | — | 60 (30~100) | 0.08 (0.05~0.14) | 0.1 (0.06~0.16) | 0.14 (0.08~0.2) | 0.3 (0.16~0.5) | 0.3 (0.16~0.5) |

1. この切削条件基準表は、実切削速度における一般的な値を示したものです。加工環境に合わせて適宜調整して下さい。
2. インサートの装着に際しては、傷や汚れを取り除いた状態でしっかりと取り付けて下さい。
3. 被削材の保持はしっかりと行い、変形、たわみ、振動が起らない状態にして下さい。

1. The above cutting conditions are to be used as general guidelines. Adjustments may be necessary depending on actual cutting condition.
2. When installing an insert, please remove any scratches or dirt and attach firmly.
3. Fasten the work material to reduce the possibility of work deformation, deflection of machined surface, or vibration.

被削材別推奨材質 Recommended Materials by Insert Type

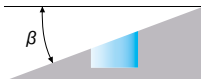
| インサート材種 Insert Grades | 切削油剤 Coolant | P | M | K | N | S |
|--------------------------|-----------------|---|---|---|---|---|
| XP8030 | 有 Wet | ◎ | ◎ | ○ | ○ | ○ |
| XC8035 | 無 Dry | ○ | | ◎ | | |
| | 有 Wet | | ○ | | | |

◎ 第一推奨材質 Best ○ 第二推奨材質 Good

切削条件基準表 Cutting Conditions

ADF-2D

| 被削材 Work Material | 低炭素鋼・軟鋼 合金鋼 Low Carbon Steel- Mild Steel- Alloy Steel (C<0.3%) SS400・SCM ~710N/mm ² | | 炭素鋼 Carbon Steel S35C・S50C ~210HB ~710N/mm ² | | 合金鋼 Alloy Steel SCM・SCR・SNCM 28~35HRC 900~1,100N/mm ² | | プラスチック成型用鋼 Plastic Mold Steel NAK80 ~40HRC | | ステンレス鋼 Stainless Steel SUS304 480~800N/mm ² | | 特殊鋼・調質鋼 プリハードン鋼 Special Alloy Steel- Hardened Steel- Prehardened Steel ~45HRC | | 鑄鉄 Cast Iron FC250 ~350N/mm ² | | ダクタイル鑄鉄 Ductile Cast Iron FCD600 400~600N/mm ² | | アルミニウム 展伸材 Aluminum A5052・A7075 | | アルミニウム 合金鑄物 Aluminum Alloy AC4C・ADC | |
|--------------------------|--|------------------------------|---|------------------------------|--|------------------------------|---|------------------------------|---|------------------------------|--|------------------------------|---|------------------------------|--|------------------------------|--|------------------------------|--|------------------------------|
| | 切削速度 Cutting Speed | 30~100m/min | 30~100m/min | 30~100m/min | 30~90m/min | 20~40m/min | 10~30m/min | 20~30m/min | 30~120m/min | 30~80m/min | 30~200m/min | 30~200m/min | | | | | | | | |
| 直径 Drill Dia. (mm) | 回転速度 Speed (min ⁻¹) | 送り量 Feed Rate (mm/rev) | 回転速度 Speed (min ⁻¹) | 送り量 Feed Rate (mm/rev) | 回転速度 Speed (min ⁻¹) | 送り量 Feed Rate (mm/rev) | 回転速度 Speed (min ⁻¹) | 送り量 Feed Rate (mm/rev) | 回転速度 Speed (min ⁻¹) | 送り量 Feed Rate (mm/rev) | 回転速度 Speed (min ⁻¹) | 送り量 Feed Rate (mm/rev) | 回転速度 Speed (min ⁻¹) | 送り量 Feed Rate (mm/rev) | 回転速度 Speed (min ⁻¹) | 送り量 Feed Rate (mm/rev) | 回転速度 Speed (min ⁻¹) | 送り量 Feed Rate (mm/rev) | 回転速度 Speed (min ⁻¹) | 送り量 Feed Rate (mm/rev) |
| 0.2 | 40,000 | 0.001~0.006 | 40,000 | 0.001~0.006 | 40,000 | 0.001~0.006 | 40,000 | 0.001~0.004 | 40,000 | 0.001~0.004 | 40,000 | 0.001~0.004 | 40,000 | 0.001~0.006 | 40,000 | 0.001~0.006 | 40,000 | 0.001~0.006 | 40,000 | 0.001~0.006 |
| 0.5 | 28,700 | 0.003~0.015 | 28,700 | 0.003~0.015 | 25,500 | 0.003~0.015 | 19,000 | 0.003~0.01 | 15,900 | 0.003~0.01 | 15,900 | 0.003~0.01 | 32,000 | 0.003~0.015 | 25,500 | 0.003~0.015 | 35,000 | 0.003~0.015 | 35,000 | 0.003~0.015 |
| 1 | 17,500 | 0.005~0.03 | 17,500 | 0.005~0.03 | 15,900 | 0.005~0.03 | 9,550 | 0.005~0.02 | 8,000 | 0.005~0.02 | 7,950 | 0.005~0.02 | 22,500 | 0.005~0.03 | 15,900 | 0.005~0.03 | 30,000 | 0.005~0.03 | 30,000 | 0.005~0.03 |
| 1.5 | 13,800 | 0.008~0.045 | 13,800 | 0.008~0.045 | 12,700 | 0.008~0.045 | 6,350 | 0.008~0.03 | 5,300 | 0.008~0.03 | 5,300 | 0.008~0.03 | 17,000 | 0.008~0.045 | 11,500 | 0.008~0.045 | 25,000 | 0.008~0.045 | 25,000 | 0.008~0.045 |
| 2 | 12,700 | 0.01~0.06 | 12,700 | 0.01~0.06 | 9,550 | 0.01~0.06 | 4,750 | 0.01~0.04 | - | - | 4,000 | 0.01~0.03 | 14,300 | 0.01~0.06 | 10,350 | 0.01~0.06 | 22,300 | 0.01~0.06 | 22,300 | 0.01~0.06 |
| 3 | 8,500 | 0.015~0.09 | 8,500 | 0.015~0.09 | 6,350 | 0.015~0.09 | 3,200 | 0.015~0.06 | - | - | 2,650 | 0.015~0.045 | 9,550 | 0.015~0.09 | 6,900 | 0.015~0.09 | 14,850 | 0.015~0.09 | 14,850 | 0.015~0.09 |
| 4 | 6,350 | 0.02~0.12 | 6,350 | 0.02~0.12 | 4,750 | 0.02~0.12 | 2,400 | 0.02~0.08 | - | - | 2,000 | 0.02~0.06 | 7,150 | 0.02~0.12 | 5,150 | 0.02~0.12 | 11,150 | 0.02~0.12 | 11,150 | 0.02~0.12 |
| 6 | 4,250 | 0.03~0.18 | 4,250 | 0.03~0.18 | 3,200 | 0.03~0.18 | 1,600 | 0.03~0.12 | - | - | 1,350 | 0.03~0.09 | 4,750 | 0.03~0.18 | 3,450 | 0.03~0.18 | 7,450 | 0.03~0.18 | 7,450 | 0.03~0.18 |
| 8 | 3,200 | 0.04~0.24 | 3,200 | 0.04~0.24 | 2,400 | 0.04~0.24 | 1,200 | 0.04~0.16 | - | - | 1,000 | 0.04~0.12 | 3,600 | 0.04~0.24 | 2,600 | 0.04~0.24 | 5,550 | 0.04~0.24 | 5,550 | 0.04~0.24 |
| 10 | 2,550 | 0.05~0.3 | 2,550 | 0.05~0.3 | 1,900 | 0.05~0.3 | 950 | 0.05~0.2 | - | - | 800 | 0.05~0.15 | 2,850 | 0.05~0.3 | 2,050 | 0.05~0.3 | 4,450 | 0.05~0.3 | 4,450 | 0.05~0.3 |
| 12 | 2,100 | 0.06~0.3 | 2,100 | 0.06~0.3 | 1,600 | 0.06~0.3 | 800 | 0.06~0.24 | - | - | 650 | 0.06~0.18 | 2,400 | 0.06~0.3 | 1,700 | 0.06~0.3 | 3,700 | 0.06~0.36 | 3,700 | 0.06~0.36 |
| 14 | 1,800 | 0.07~0.35 | 1,800 | 0.07~0.35 | 1,350 | 0.07~0.35 | 700 | 0.07~0.28 | - | - | 550 | 0.07~0.21 | 2,050 | 0.07~0.35 | 1,500 | 0.07~0.35 | 3,200 | 0.07~0.42 | 3,200 | 0.07~0.42 |
| 16 | 1,600 | 0.08~0.36 | 1,600 | 0.08~0.36 | 1,200 | 0.08~0.36 | 600 | 0.08~0.32 | - | - | 500 | 0.08~0.24 | 1,800 | 0.08~0.36 | 1,300 | 0.08~0.36 | 2,800 | 0.08~0.48 | 2,800 | 0.08~0.48 |
| 18 | 1,400 | 0.09~0.38 | 1,400 | 0.09~0.38 | 1,050 | 0.09~0.38 | 550 | 0.09~0.36 | - | - | 450 | 0.09~0.27 | 1,600 | 0.09~0.38 | 1,150 | 0.09~0.38 | 2,500 | 0.09~0.54 | 2,500 | 0.09~0.54 |
| 20 | 1,250 | 0.1~0.4 | 1,250 | 0.1~0.4 | 950 | 0.1~0.4 | 500 | 0.1~0.4 | - | - | 400 | 0.1~0.3 | 1,450 | 0.1~0.4 | 1,050 | 0.1~0.4 | 2,250 | 0.1~0.6 | 2,250 | 0.1~0.6 |

- 上表は、ワーク上面が平坦でフライス前加工がしてあること、水溶性切削油剤の使用を前提としたものです。
- 不水溶性切削油剤または20倍を超える水溶性切削油剤の時は、切削速度を30%下げてください。
- 機械、ホルダは剛性のある精度の高いものをご使用下さい。
- ご使用の際は工具突出し量が必要最小限で保持下さい。
- 加工物の形状や保持方法の状況によって切削条件を調整下さい。
- ドリル取り付け時の刃先の振れは、0.01mm以下に抑えて下さい。
- 斜面部への加工の場合は、加工面傾斜角度(β)により、回転速度、送り量を調整下さい。

 - 加工面傾斜角度(β)が30°以下の斜面への加工では、上表の送り量40~60%を目安にご使用下さい。
 - 加工面傾斜角度(β)が30°を超える斜面への加工では、上表の回転速度60~80%、送り量40~60%を目安にご使用下さい。
- 下穴がある時は、切りくずが分断されませんのでステップ加工を行って下さい。
- 加工穴の位置決め精度を必要とする場合は、加工精度に合わせて上記回転速度、送り量を調整下さい。
- φ5以下のサイズはスピンドル回転精度が良好な機械でご使用下さい。
- 機械回転数が上記切削速度を満たさない場合、なるべく高回転でご使用下さい。なお、この場合、耐久が落ちる可能性があります。

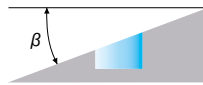
- Water-soluble coolant may be applied as noted in the above table only under the premise that the work surface has been flattened by milling.
- When using non-water-soluble or water-soluble coolant (over 20 times dilution), reduce cutting speed by 30%.
- Use a rigid and precise machine and holder.
- Please minimize tool hang over as much as possible during machining.
- Adjust the rotational speed and the feed rate in accordance with conditions such as the machining shape, machine rigidity, or work holding.
- Please set up the drill so that the runout of the cutting edge is under 0.01 mm.
- When machining an inclined plane, adjust the rotational speed and the feed in accordance with the angle of the incline (β).
 - When the machining incline angle (β) is less than 30°, please reduce the feed to 40~60%.
 - When the machining incline angle (β) is over 30°, please reduce the speed to 60~80%, the feed to 40~60%.
- Please use step drilling in pre-drilled holes to improve cutting chip separation.
- If it is necessary to ensure the locating precision of the hole to be machined, adjust the rotational speed and the feed as indicated above (in accordance with the machining precision requirement).
- For sizes under φ5, please use a machine with good spindle rotation accuracy.
- If the machine in use cannot meet the specified values above, please set the rotation speed as high as possible. In this case, please note that durability may decrease.

切削条件基準表 Cutting Conditions

ADFLS-2D

| 被削材 Work Material | 低炭素鋼・軟鋼 合金鋼 Low Carbon Steel·Mild Steel·Alloy Steel (C<0.3%) SS400・SCM ~710N/mm ² | | 炭素鋼 Carbon Steel S35C・S50C ~210HB ~710N/mm ² | | 合金鋼 Alloy Steel SCM・SCr・SNM 28~35HRC 900~1,100N/mm ² | | プラスチック金型用鋼 Plastic Mold Steel NAK80 ~40HRC | | 特殊鋼・調質鋼 プリハードン鋼 Special Alloy Steel·Hardened Steel·Prehardened Steel ~45HRC | | 鑄鉄 Cast Iron FC250 ~350N/mm ² | | ダクタイル鑄鉄 Ductile Cast Iron FCD600 400~600N/mm ² | | アルミニウム 展伸材 Aluminum A5052・A7075 | | アルミニウム 合金鑄物 Aluminum Alloy AC4C・ADC | |
|--------------------------|---|------------------------------|---|------------------------------|---|------------------------------|---|------------------------------|--|------------------------------|---|------------------------------|--|------------------------------|--|------------------------------|--|------------------------------|
| | 切削速度 Cutting Speed | 60~100m/min | 60~100m/min | 30~90m/min | 20~40m/min | 20~30m/min | 60~120m/min | 50~80m/min | 80~200m/min | 80~200m/min | | | | | | | | |
| 直径 Drill Dia. (mm) | 回転速度 Speed (min ⁻¹) | 送り量 Feed Rate (mm/rev) | 回転速度 Speed (min ⁻¹) | 送り量 Feed Rate (mm/rev) | 回転速度 Speed (min ⁻¹) | 送り量 Feed Rate (mm/rev) | 回転速度 Speed (min ⁻¹) | 送り量 Feed Rate (mm/rev) | 回転速度 Speed (min ⁻¹) | 送り量 Feed Rate (mm/rev) | 回転速度 Speed (min ⁻¹) | 送り量 Feed Rate (mm/rev) | 回転速度 Speed (min ⁻¹) | 送り量 Feed Rate (mm/rev) | 回転速度 Speed (min ⁻¹) | 送り量 Feed Rate (mm/rev) | 回転速度 Speed (min ⁻¹) | 送り量 Feed Rate (mm/rev) |
| 3 | 8,500 | 0.045~0.075 | 8,500 | 0.045~0.075 | 6,350 | 0.045~0.075 | 3,200 | 0.045~0.06 | 2,650 | 0.03~0.06 | 9,550 | 0.06~0.09 | 6,900 | 0.06~0.09 | 14,850 | 0.015~0.09 | 14,850 | 0.015~0.09 |
| 4 | 6,350 | 0.06~0.1 | 6,350 | 0.06~0.1 | 4,750 | 0.06~0.1 | 2,400 | 0.06~0.08 | 2,000 | 0.04~0.08 | 7,150 | 0.08~0.12 | 5,150 | 0.08~0.12 | 11,150 | 0.02~0.12 | 11,150 | 0.02~0.12 |
| 6 | 4,250 | 0.09~0.15 | 4,250 | 0.09~0.15 | 3,200 | 0.09~0.15 | 1,600 | 0.09~0.12 | 1,350 | 0.06~0.12 | 4,750 | 0.12~0.18 | 3,450 | 0.12~0.18 | 7,450 | 0.03~0.18 | 7,450 | 0.03~0.18 |
| 8 | 3,200 | 0.12~0.2 | 3,200 | 0.12~0.2 | 2,400 | 0.12~0.2 | 1,200 | 0.12~0.16 | 1,000 | 0.08~0.16 | 3,600 | 0.16~0.24 | 2,600 | 0.16~0.24 | 5,550 | 0.04~0.24 | 5,550 | 0.04~0.24 |
| 10 | 2,550 | 0.15~0.25 | 2,550 | 0.15~0.25 | 1,900 | 0.15~0.25 | 950 | 0.15~0.2 | 800 | 0.1~0.2 | 2,850 | 0.2~0.3 | 2,050 | 0.2~0.3 | 4,450 | 0.05~0.3 | 4,450 | 0.05~0.3 |
| 12 | 2,100 | 0.18~0.3 | 2,100 | 0.18~0.3 | 1,600 | 0.18~0.3 | 800 | 0.18~0.24 | 650 | 0.12~0.24 | 2,400 | 0.24~0.36 | 1,700 | 0.24~0.36 | 3,700 | 0.06~0.36 | 3,700 | 0.06~0.36 |
| 14 | 1,800 | 0.21~0.35 | 1,800 | 0.21~0.35 | 900 | 0.21~0.35 | 700 | 0.21~0.28 | 550 | 0.14~0.28 | 2,050 | 0.28~0.42 | 1,500 | 0.28~0.42 | 3,200 | 0.07~0.42 | 3,200 | 0.07~0.42 |
| 16 | 1,600 | 0.24~0.4 | 1,600 | 0.24~0.4 | 800 | 0.24~0.4 | 600 | 0.24~0.32 | 500 | 0.16~0.32 | 1,800 | 0.32~0.48 | 1,300 | 0.32~0.48 | 2,800 | 0.08~0.48 | 2,800 | 0.08~0.48 |
| 18 | 1,400 | 0.27~0.45 | 1,400 | 0.27~0.45 | 700 | 0.27~0.45 | 550 | 0.27~0.36 | 450 | 0.18~0.36 | 1,600 | 0.36~0.54 | 1,150 | 0.36~0.54 | 2,500 | 0.09~0.54 | 2,500 | 0.09~0.54 |
| 20 | 1,250 | 0.3~0.5 | 1,250 | 0.3~0.5 | 650 | 0.3~0.5 | 500 | 0.3~0.4 | 400 | 0.2~0.4 | 1,450 | 0.4~0.6 | 1,050 | 0.4~0.6 | 2,250 | 0.1~0.6 | 2,250 | 0.1~0.6 |

1. 平面加工の際は、径より大きいセンターリング穴が必要です。
2. 上表は、ワーク上面が平坦でフライス前加工がしてあること、水溶性切削油剤の使用を前提としたものです。
3. 不水溶性切削油剤または20倍を超える水溶性切削油剤の時は、切削速度を30%下げてください。
4. 機械、ホルダは剛性のある精度の高いものをご使用下さい。
5. ご使用の際は工具突出し量を必要最小限で保持下さい。
6. 加工物の形状や保持方法の状況によって切削条件を調整下さい。
7. ドリル取り付け時の刃先の振れは、0.01mm以下に抑えて下さい。
8. 斜面部への加工の場合は、加工面傾斜角度(β)により、回転速度、送り量を調整下さい。
 - ・加工面傾斜角度(β)が30°以下の斜面への加工では、上表の送り量40~60%を目安にご使用下さい。
 - ・加工面傾斜角度(β)が30°を超える斜面への加工では、上表の回転速度60~80%、送り量40~60%を目安にご使用下さい。
9. 下穴がある時は、切りくずが分断されませんのでステップ加工を行って下さい。
10. 加工穴の位置決め精度を必要とする場合は、加工精度に合わせ上記回転速度、送り量を調整下さい。



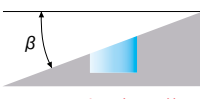
1. To process flat surfaces, prior center-drilling with a larger diameter is required.
2. Water-soluble coolant may be applied as noted in the above table only under the premise that the work surface has been flattened by milling.
3. When using non-water-soluble or water-soluble coolant (over 20 times dilution), reduce cutting speed by 30%.
4. Use a rigid and precise machine and holder.
5. Please minimize tool hang over as much as possible during machining.
6. Adjust the rotational speed and the feed rate in accordance with conditions such as the machining shape, machine rigidity, or work holding.
7. Please set up the drill so that the runout of the cutting edge is under 0.01 mm.
8. When machining an inclined plane, adjust the rotational speed and the feed in accordance with the angle of the incline (β).
 - ・When the machining incline angle (β) is less than 30°, please reduce the feed to 40~60%.
 - ・When the machining incline angle (β) is over 30°, please reduce the speed to 60~80%, the feed to 40~60%.
9. Please use step drilling in pre-drilled holes to improve cutting chip separation.
10. If it is necessary to ensure the locating precision of the hole to be machined, adjust the rotational speed and the feed as indicated above (in accordance with the machining precision requirement).

切削条件基準表 Cutting Conditions

ADFO-3D

| 被削材 Work Material | 低炭素鋼・軟鋼・合金鋼 Low Carbon Steel·Mild Steel·Alloy Steel (C<0.3%) SS400・SCM ~710N/mm ² | | 炭素鋼 Carbon Steel S35C・S50C ~210HB ~710N/mm ² | | 合金鋼 Alloy Steel SCM・SCr・SNM 28~35HRC 900~1,100N/mm ² | | プラスチック成型用鋼 Plastic Mold Steel NAK80 ~40HRC | | ステンレス鋼 Stainless Steel SUS304 480~800N/mm ² | | 特殊鋼・調質鋼 プリハードン鋼 Special Alloy Steel·Hardened Steel·Prehardened Steel ~45HRC | | 鑄鉄 Cast Iron FC250 ~350N/mm ² | | ダクタイル鑄鉄 Ductile Cast Iron FCD600 400~600N/mm ² | | アルミニウム 展伸材 Aluminum A5052・A7075 | | アルミニウム 合金鑄物 Aluminum Alloy AC4C・ADC | |
|--------------------------|--|------------------------------|---|------------------------------|---|------------------------------|---|------------------------------|---|------------------------------|--|------------------------------|---|------------------------------|--|------------------------------|--|------------------------------|--|------------------------------|
| | 切削速度 Cutting Speed | 80~120m/min | 80~120m/min | 50~90m/min | 20~40m/min | 40~60m/min | 20~30m/min | 80~120m/min | 60~100m/min | 120~200m/min | 120~200m/min | | | | | | | | | |
| 直径 Drill Dia. (mm) | 回転速度 Speed (min ⁻¹) | 送り量 Feed Rate (mm/rev) | 回転速度 Speed (min ⁻¹) | 送り量 Feed Rate (mm/rev) | 回転速度 Speed (min ⁻¹) | 送り量 Feed Rate (mm/rev) | 回転速度 Speed (min ⁻¹) | 送り量 Feed Rate (mm/rev) | 回転速度 Speed (min ⁻¹) | 送り量 Feed Rate (mm/rev) | 回転速度 Speed (min ⁻¹) | 送り量 Feed Rate (mm/rev) | 回転速度 Speed (min ⁻¹) | 送り量 Feed Rate (mm/rev) | 回転速度 Speed (min ⁻¹) | 送り量 Feed Rate (mm/rev) | 回転速度 Speed (min ⁻¹) | 送り量 Feed Rate (mm/rev) | 回転速度 Speed (min ⁻¹) | 送り量 Feed Rate (mm/rev) |
| 3 | 10,600 | 0.045~0.09 | 10,600 | 0.045~0.09 | 7,450 | 0.045~0.09 | 3,200 | 0.045~0.06 | 5,300 | 0.045~0.09 | 2,650 | 0.045~0.06 | 10,600 | 0.045~0.09 | 8,500 | 0.045~0.09 | 17,000 | 0.045~0.09 | 17,000 | 0.045~0.09 |
| 4 | 8,000 | 0.045~0.12 | 8,000 | 0.045~0.12 | 5,550 | 0.045~0.12 | 2,400 | 0.045~0.08 | 4,000 | 0.045~0.12 | 2,000 | 0.045~0.08 | 8,000 | 0.045~0.12 | 6,350 | 0.045~0.12 | 12,750 | 0.045~0.12 | 12,750 | 0.045~0.12 |
| 6 | 5,300 | 0.06~0.18 | 5,300 | 0.06~0.18 | 3,700 | 0.06~0.18 | 1,600 | 0.06~0.12 | 2,650 | 0.06~0.18 | 1,350 | 0.06~0.12 | 5,300 | 0.06~0.18 | 4,250 | 0.06~0.18 | 8,500 | 0.06~0.18 | 8,500 | 0.06~0.18 |
| 8 | 4,000 | 0.08~0.24 | 4,000 | 0.08~0.24 | 2,800 | 0.08~0.24 | 1,200 | 0.08~0.16 | 2,000 | 0.08~0.24 | 1,000 | 0.08~0.16 | 4,000 | 0.08~0.24 | 3,200 | 0.08~0.24 | 6,350 | 0.08~0.24 | 6,350 | 0.08~0.24 |
| 10 | 3,200 | 0.1~0.3 | 3,200 | 0.1~0.3 | 2,250 | 0.1~0.3 | 950 | 0.1~0.2 | 1,600 | 0.1~0.3 | 800 | 0.1~0.2 | 3,200 | 0.1~0.3 | 2,550 | 0.1~0.3 | 5,100 | 0.1~0.3 | 5,100 | 0.1~0.3 |
| 12 | 2,650 | 0.12~0.36 | 2,650 | 0.12~0.36 | 1,850 | 0.12~0.36 | 800 | 0.12~0.24 | 1,350 | 0.12~0.36 | 650 | 0.12~0.24 | 2,650 | 0.12~0.36 | 2,100 | 0.12~0.36 | 4,250 | 0.12~0.36 | 4,250 | 0.12~0.36 |
| 14 | 2,250 | 0.14~0.42 | 2,250 | 0.14~0.42 | 1,600 | 0.14~0.42 | 700 | 0.14~0.28 | 1,150 | 0.14~0.42 | 550 | 0.14~0.28 | 2,250 | 0.14~0.42 | 1,800 | 0.14~0.42 | 3,650 | 0.14~0.42 | 3,650 | 0.14~0.42 |
| 16 | 2,000 | 0.16~0.48 | 2,000 | 0.16~0.48 | 1,400 | 0.16~0.48 | 600 | 0.16~0.32 | 1,000 | 0.16~0.48 | 500 | 0.16~0.32 | 2,000 | 0.16~0.48 | 1,600 | 0.16~0.48 | 3,200 | 0.16~0.48 | 3,200 | 0.16~0.48 |
| 18 | 1,750 | 0.18~0.54 | 1,750 | 0.18~0.54 | 1,250 | 0.18~0.54 | 550 | 0.18~0.36 | 900 | 0.18~0.54 | 450 | 0.18~0.36 | 1,750 | 0.18~0.54 | 1,400 | 0.18~0.54 | 2,850 | 0.18~0.54 | 2,850 | 0.18~0.54 |
| 20 | 1,600 | 0.2~0.6 | 1,600 | 0.2~0.6 | 1,100 | 0.2~0.6 | 500 | 0.2~0.4 | 800 | 0.2~0.6 | 400 | 0.2~0.4 | 1,600 | 0.2~0.6 | 1,250 | 0.2~0.6 | 2,550 | 0.2~0.6 | 2,550 | 0.2~0.6 |

- 上表は、ワーク上面が平坦でフライス前加工がしてあること、水溶性切削油剤の使用を前提としたものです。
- 機械、ホルダは剛性のある精度の高いものをご使用下さい。
- ご使用の際は工具突出し量を必要最小限で保持下さい。
- 加工物の形状や保持方法の状況によって切削条件を調整下さい。
- ドリル取り付け時の刃先の振れは、0.02mm以下に抑えて下さい。
- 切削油剤は被削材に適したもので、発煙性の少ないものをご使用下さい。
- 斜面部への加工の場合は、加工面傾斜角度(β)により、回転速度、送り量を調整下さい。
 - 加工面傾斜角度(β)が30°以下の斜面への加工では、上表の送り量40~60%を目安にご使用下さい。
 - 加工面傾斜角度(β)が30°を超える斜面への加工では、上表の回転速度60~80%、送り量40~60%を目安にご使用下さい。
- 下穴がある時は、切りくずが分断されませんのでステップ加工を行って下さい。
- 加工穴の位置決め精度を必要とする場合は、加工精度に合わせ上記回転速度、送り量を調整下さい。
- マグネシウム合金切削において、切削油剤を使用する場合は切削油剤メーカーの推奨するものを必ずご使用下さい。また、切りくずの処理にご注意下さい。発火の恐れがあります。



- Water-soluble coolant may be applied as noted in the above table only under the premise that the work surface has been flattened by milling.
- Use a rigid and precise machine and holder.
- Please minimize overhang length as much as possible during machining.
- Adjust the rotational speed and the feed in accordance with conditions such as the machining shape, machine rigidity, or work holding.
- Please set up the drill so that the runout of the cutting edge is under 0.02 mm.
- Please select a cutting fluid that is most suitable for the work material with minimal smoke formation.
- When machining an inclined plane, adjust the rotational speed and the feed in accordance with the angle of the incline (β).
 - When the machining incline angle (β) is less than 30°, please reduce the feed to 40-60%.
 - When the machining incline angle (β) is over 30°, please reduce the speed to 60-80%, the feed to 40-60%.
- Please use step drilling in pre-drilled holes to improve cutting chip separation.
- If it is necessary to ensure the locating precision of the hole to be machined, adjust the rotational speed and the feed as indicated above (in accordance with the machining precision requirement).
- Please always use the appropriate cutting fluid recommended by the cutting fluid manufacturer in the machining of magnesium alloys. Be cautious with the cutting chips as they are highly flammable and may pose a serious fire risk if not properly handled.

切削条件基準表 Cutting Conditions

FX-ZDS・FX-LS-ZDS・FX-ZDN・FX-HO-ZDN

| 被削材 Work Material | 一般構造用鋼・炭素鋼・鋳鉄 Mild Steel・Carbon Steel・Cast Iron S5400・S55C・FC250 ~750N/mm ² | | | 合金鋼・工具鋼 Alloy Steel・Tool Steel SCM・SKT・SKS・SKD ~30HRC | | | 調質鋼・プリハードン鋼(快削材) Hardened Steel・Prehardened Steel(Free-Cutting) SKT・SKD・NAK55・HPM1 30~40HRC | | | 調質鋼・ステンレス鋼 Hardened Steel・Stainless Steel SKD・SUS304 40~45HRC | | |
|-------------------------|---|--------------------------|------------------------------|--|--------------------------|------------------------------|--|--------------------------|------------------------------|--|--------------------------|------------------------------|
| | 切削速度 Cutting Speed | 60~80m/min | | | 40~63m/min | | | 30~50m/min | | | 20~40m/min | |
| 外径 Mill Dia. (mm) | 回転速度 Speed (min ⁻¹) | 送り速度 Feed (mm/min) | 送り量 Feed Rate (mm/rev) | 回転速度 Speed (min ⁻¹) | 送り速度 Feed (mm/min) | 送り量 Feed Rate (mm/rev) | 回転速度 Speed (min ⁻¹) | 送り速度 Feed (mm/min) | 送り量 Feed Rate (mm/rev) | 回転速度 Speed (min ⁻¹) | 送り速度 Feed (mm/min) | 送り量 Feed Rate (mm/rev) |
| 0.5 | 20,000 | 150 | 0.004~0.01 | 20,000 | 150 | 0.004~0.01 | - | - | - | - | - | - |
| 1 | 19,000 | 290 | 0.012~0.018 | 19,000 | 285 | 0.012~0.018 | 15,600 | 230 | 0.012~0.018 | - | - | - |
| 2 | 11,000 | 330 | 0.024~0.036 | 9,500 | 285 | 0.024~0.036 | 7,900 | 235 | 0.024~0.036 | - | - | - |
| 3 | 7,950 | 360 | 0.035~0.055 | 6,550 | 295 | 0.035~0.055 | 5,300 | 240 | 0.035~0.055 | 4,250 | 155 | 0.028~0.044 |
| 4 | 5,950 | 360 | 0.045~0.075 | 4,900 | 295 | 0.045~0.075 | 4,000 | 240 | 0.045~0.075 | 3,200 | 155 | 0.036~0.06 |
| 5 | 4,800 | 360 | 0.055~0.095 | 3,900 | 295 | 0.055~0.095 | 3,200 | 240 | 0.055~0.095 | 2,550 | 155 | 0.044~0.076 |
| 6 | 3,950 | 360 | 0.07~0.11 | 3,250 | 295 | 0.07~0.11 | 2,600 | 240 | 0.07~0.11 | 2,100 | 155 | 0.055~0.09 |
| 8 | 3,000 | 360 | 0.09~0.14 | 2,450 | 295 | 0.09~0.14 | 2,000 | 240 | 0.09~0.14 | 1,600 | 155 | 0.07~0.11 |
| 10 | 2,350 | 360 | 0.12~0.18 | 1,950 | 295 | 0.12~0.18 | 1,600 | 240 | 0.12~0.18 | 1,250 | 155 | 0.09~0.15 |
| 12 | 1,950 | 360 | 0.15~0.21 | 1,600 | 295 | 0.15~0.21 | 1,300 | 240 | 0.15~0.21 | 1,050 | 155 | 0.12~0.18 |
| 14 | 1,700 | 360 | 0.17~0.24 | 1,400 | 295 | 0.17~0.24 | 1,150 | 240 | 0.17~0.24 | 910 | 155 | 0.13~0.2 |
| 16 | 1,500 | 360 | 0.2~0.27 | 1,200 | 295 | 0.2~0.27 | 990 | 240 | 0.2~0.27 | 795 | 155 | 0.15~0.23 |
| 18 | 1,300 | 360 | 0.21~0.3 | 1,100 | 295 | 0.21~0.3 | 880 | 240 | 0.21~0.3 | 700 | 155 | 0.16~0.25 |
| 20 | 1,200 | 360 | 0.24~0.34 | 985 | 295 | 0.24~0.34 | 795 | 240 | 0.24~0.34 | 635 | 155 | 0.19~0.28 |

切込深さ
Depth Of Cut

H

β

・ H=1D以下 H≤1D
・ 下穴無し Without pre-drilled hole

- FX-LS-ZDS、FX-ZDNをご使用の場合は、上表の回転速度、送り速度を70%~90%として下さい。
- 上表は、ワーク上面が平坦でフライス前加工がしてあることを前提としたものです。
- 上表は、穴深さが1D以下の場合のもので、2Dを超す加工深さの場合は、ステップ加工を推奨します。
- 機械、ホルダは剛性のある精度の高いものをご使用下さい。
- 加工物の形状や保持方法の状況によって切削条件を調整して下さい。
- エンドミル取り付け時の刃先の振れは、10μm以下に抑えて下さい。
- 切削油剤は被削材に適したもので、発煙性の少ないものをご使用下さい。
- 工具径の3未満を被削材【合金鋼・工具鋼】、【調質鋼・プリハードン鋼(快削材)】でご利用の場合は、水溶性切削油剤の使用環境を推奨します。水溶性環境でのご使用の際は、上表の回転速度、送り速度を60%~80%として下さい。
- 乾式の場合には、切りくず詰まりが無いよう、エアブローにて切りくずを除去して下さい。
- 工具径の1未満は、斜面へのご使用は推奨しません。
- 斜面部への加工の場合は、加工面傾斜角度(β)により、回転速度、送り速度を調整下さい。
 - 加工面傾斜角度(β)が30°以下の斜面への加工では、上表の送り速度40~60%を目安にご使用下さい。
 - 加工面傾斜角度(β)が30°を超え加工では、上表の回転速度60~80%、送り速度20~40%を目安にご使用下さい。
- 下穴がある場合、切りくずが分断されませんのでステップ加工を行って下さい。
- 加工穴の位置決め精度を必要とする場合は、加工精度に合わせて上記回転速度、送り速度を調整下さい。
- マグネシウム合金切削において、切削油剤を使用する場合は、切削油剤メーカーの推奨するものを必ずご使用下さい。また、切りくずの処理に注意下さい。発火の恐れがあります。
- When using FX-LS-ZDS or FX-ZDN, please decrease the RPM and feed rate to 70-90% of the figures in the above table.
- This machining condition table applies to milling workpieces that have been flattened at the top through the removal of the forged surface (on a milling machine).
- These machining conditions apply to hole depths of 1D or less. (D=outer diameter)
- For hole depth of 2D or more, step milling is recommended.
- Use a rigid and precise machine and holder.
- Adjust the rotational speed and the feed rate in accordance with conditions such as the machining shape, machine rigidity, or work holding.
- When chucking an end mill, keep the runout at the cutting edge below 10μm.
- Please use a suitable fluid with high smoke retardant properties.
- Water-soluble coolant is recommended when milling alloy steels, tool steels and hardened steels (free cutting steels) if the tool diameter is less than 3mm.
- During Dry (no fluid) milling, please use air blow to remove cutting chips from the milling area and to eliminate chip packing.
- Incline milling is not recommended if the tool diameter is less than 1mm.
- When machining an inclined plane, adjust the rotational speed and the feed rate in accordance with the angle of the incline (β).
 - When the machining incline angle(β) is less than 30°, please reduce the feed rate to 40~60%.
 - When the machining incline angle(β) is over 30°, please reduce the speed to 60~80%, the feed to 20~40%.
- To avoid chip packing, step milling is recommended with pilot holes.
- If it is necessary to ensure the locating precision of the hole to be machined, adjust the rotational speed and the feed rate as indicated above (in accordance with the machining precision requirement).
- When machining magnesium alloy materials, please use the coolant oil recommended by the coolant oil manufacturer. Please also properly dispose the cutting chips to prevent fire hazards.

切削条件基準表 Cutting Conditions

CA-ZDS・CA-LS-ZDS 注1) Note

| 被削材 Work Material | アルミニウム合金 Aluminum Alloy A7075 | | | アルミニウム合金鋳物 Aluminum Alloy Casting < Si 13% | | | マグネシウム合金 Magnesium Alloy AZ91・AZ80A | | |
|-------------------------|---------------------------------------|--------------------------|------------------------------|--|--------------------------|------------------------------|---|--------------------------|------------------------------|
| 切削速度 Cutting Speed | 80~200m/min | | | 50~150m/min | | | 50~100m/min | | |
| 外径 Mill Dia. (mm) | 回転速度 Speed (min ⁻¹) | 送り速度 Feed (mm/min) | 送り量 Feed Rate (mm/rev) | 回転速度 Speed (min ⁻¹) | 送り速度 Feed (mm/min) | 送り量 Feed Rate (mm/rev) | 回転速度 Speed (min ⁻¹) | 送り速度 Feed (mm/min) | 送り量 Feed Rate (mm/rev) |
| 0.5 | 20,000 | 150 | 0.004 ~ 0.011 | 20,000 | 140 | 0.004 ~ 0.01 | 20,000 | 140 | 0.004 ~ 0.01 |
| 1 | 20,000 | 350 | 0.014 ~ 0.021 | 20,000 | 300 | 0.012 ~ 0.018 | 20,000 | 300 | 0.012 ~ 0.018 |
| 2 | 20,000 | 710 | 0.028 ~ 0.043 | 19,000 | 530 | 0.022 ~ 0.034 | 15,400 | 430 | 0.022 ~ 0.034 |
| 3 | 17,000 | 915 | 0.042 ~ 0.066 | 12,500 | 575 | 0.035 ~ 0.055 | 10,000 | 450 | 0.035 ~ 0.055 |
| 4 | 12,500 | 915 | 0.054 ~ 0.09 | 9,550 | 575 | 0.045 ~ 0.075 | 7,500 | 450 | 0.045 ~ 0.075 |
| 5 | 10,000 | 915 | 0.066 ~ 0.114 | 7,650 | 575 | 0.055 ~ 0.095 | 6,000 | 450 | 0.055 ~ 0.095 |
| 6 | 8,500 | 915 | 0.08 ~ 0.13 | 6,350 | 575 | 0.07 ~ 0.11 | 5,000 | 450 | 0.07 ~ 0.11 |
| 8 | 6,350 | 915 | 0.1 ~ 0.17 | 4,750 | 575 | 0.09 ~ 0.14 | 3,750 | 450 | 0.09 ~ 0.14 |
| 10 | 5,100 | 915 | 0.14 ~ 0.22 | 3,800 | 575 | 0.12 ~ 0.18 | 3,000 | 450 | 0.12 ~ 0.18 |
| 12 | 4,250 | 915 | 0.18 ~ 0.26 | 3,200 | 575 | 0.15 ~ 0.21 | 2,500 | 450 | 0.15 ~ 0.21 |
| 14 | 3,650 | 915 | 0.2 ~ 0.29 | 2,750 | 575 | 0.17 ~ 0.24 | 2,150 | 450 | 0.17 ~ 0.24 |
| 16 | 3,200 | 915 | 0.24 ~ 0.33 | 2,400 | 575 | 0.2 ~ 0.27 | 1,850 | 450 | 0.2 ~ 0.27 |
| 18 | 2,850 | 915 | 0.25 ~ 0.36 | 2,100 | 575 | 0.21 ~ 0.3 | 1,650 | 450 | 0.21 ~ 0.3 |
| 20 | 2,550 | 915 | 0.27 ~ 0.39 | 1,900 | 575 | 0.24 ~ 0.34 | 1,450 | 450 | 0.24 ~ 0.34 |

切込深さ
Depth Of Cut

・ H = 1D以下 H ≤ 1D
・ 下穴無し Without pre-drilled hole


- CA-LS-ZDSをご使用の場合は、上表の回転速度、送り速度を70%~90%として下さい。
- 上表は、ワーク上面が平坦でフライス前加工がしてあることを前提としたものです。
- 上表は、穴深さが1D以下の場合のもので、
- 機械、ホルダは剛性のある精度の高いものをご使用下さい。
- 加工物の形状や保持方法の状況によって切削条件を調整して下さい。
- エンドミル取り付け時の刃先の振れは、10μm以下に抑えて下さい。
- 切削油剤は被削材に適したもので、発煙性の少ないものをご使用下さい。
- 乾式の場合には、切りくず詰まりが無いよう、エアブローにて切りくずを除去して下さい。
- 斜面部への加工の場合は、加工面傾斜角度(β)により、回転速度、送り速度を調整下さい。
 - 加工面傾斜角度(β)が30°以下の斜面への加工では、上表の送り速度40~60%を目安にご使用下さい。
 - 加工面傾斜角度(β)が30°を超える加工では、上表の回転速度60~80%、送り速度20~40%を目安にご使用下さい。
- 加工穴の位置決め精度を必要とする場合は、加工精度に合わせて上記回転速度、送り速度を調整下さい。
- マグネシウム合金切削において、切削油剤を使用する場合は、切削油剤メーカーの推奨するものを必ずご使用下さい。また、切りくずの処理に注意下さい。発火の恐れがあります。
- When using CA-LS-ZDS, please decrease the RPM and feed rate to 70-90% of the figures in the above table.
- This machining condition table applies to milling workpieces that have been flattened at the top through the removal of the forged surface (on a milling machine).
- These machining conditions apply to hole depths of 1D or less. (D=outer diameter)
- Use a rigid and precise machine and holder.
- Adjust the rotational speed and the feed rate in accordance with conditions such as the machining shape, machine rigidity, or work holding.
- When chucking an end mill, keep the runout at the cutting edge below 10μm.
- Please use a suitable fluid with high smoke retardant properties.
- During Dry (no fluid) milling, please use air blow to remove cutting chips from the milling area and to eliminate chip packing.
- When machining an inclined plane, adjust the rotational speed and the feed rate in accordance with the angle of the incline (β).
 - When the machining incline angle(β) is less than 30°, please reduce the feed to 40~60%.
 - When the machining incline angle(β) is over 30°, please reduce the speed to 60~80%, the feed to 20~40%.
- If it is necessary to ensure the locating precision of the hole to be machined, adjust the rotational speed and the feed rate as indicated above (in accordance with the machining precision requirement).
- When machining magnesium alloy materials, please use the coolant oil recommended by the coolant oil manufacturer. Please also properly dispose the cutting chips to prevent fire hazards.

切削条件基準表 Cutting Conditions

DIA-ZDS

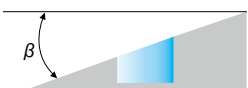
| 被削材 Work Material | アルミニウム合金 Aluminum Alloy A7075 | | | アルミニウム合金鋳物 Aluminum Alloy Casting < Si 13% | | | アルミニウム合金鋳物 Aluminum Alloy Casting ≥ Si 13% | | | マグネシウム合金 Magnesium Alloy AZ91・AZ80A | | | 複合材(CFRP)・脆性材(マシナブルセラミックス・グラファイト) Composite Material・Brittle Material (Machinable Ceramic-Graphite) | | |
|-------------------------|---------------------------------------|--------------------------|------------------------------|--|--------------------------|------------------------------|--|--------------------------|------------------------------|---|--------------------------|------------------------------|---|--------------------------|------------------------------|
| 切削速度 Cutting Speed | 80~200m/min | | | 50~150m/min | | | 30~130m/min | | | 50~100m/min | | | 30~120m/min | | |
| 外径 Mill Dia. (mm) | 回転速度 Speed (min ⁻¹) | 送り速度 Feed (mm/min) | 送り量 Feed Rate (mm/rev) | 回転速度 Speed (min ⁻¹) | 送り速度 Feed (mm/min) | 送り量 Feed Rate (mm/rev) | 回転速度 Speed (min ⁻¹) | 送り速度 Feed (mm/min) | 送り量 Feed Rate (mm/rev) | 回転速度 Speed (min ⁻¹) | 送り速度 Feed (mm/min) | 送り量 Feed Rate (mm/rev) | 回転速度 Speed (min ⁻¹) | 送り速度 Feed (mm/min) | 送り量 Feed Rate (mm/rev) |
| 0.5 | 20,000 | 180 | 0.004~0.011 | 20,000 | 150 | 0.004~0.01 | 20,000 | 140 | 0.004~0.01 | 20,000 | 150 | 0.004~0.01 | 20,000 | 100 | 0.002~0.01 |
| 1 | 20,000 | 360 | 0.014~0.021 | 20,000 | 300 | 0.012~0.018 | 20,000 | 300 | 0.012~0.018 | 20,000 | 300 | 0.012~0.018 | 20,000 | 200 | 0.005~0.02 |
| 2 | 20,000 | 720 | 0.028~0.043 | 19,000 | 570 | 0.024~0.036 | 15,000 | 450 | 0.022~0.034 | 15,400 | 450 | 0.024~0.036 | 13,000 | 250 | 0.01 ~0.04 |
| 3 | 17,000 | 915 | 0.042~0.066 | 12,500 | 575 | 0.035~0.055 | 10,000 | 450 | 0.035~0.055 | 10,000 | 450 | 0.035~0.055 | 8,500 | 250 | 0.01 ~0.06 |
| 4 | 12,500 | 915 | 0.054~0.09 | 9,550 | 575 | 0.045~0.075 | 7,550 | 450 | 0.045~0.075 | 7,500 | 450 | 0.045~0.075 | 6,350 | 250 | 0.02 ~0.07 |
| 5 | 10,000 | 915 | 0.066~0.114 | 7,650 | 575 | 0.055~0.095 | 6,000 | 450 | 0.055~0.095 | 6,000 | 450 | 0.055~0.095 | 5,100 | 250 | 0.03 ~0.08 |
| 6 | 8,500 | 915 | 0.08 ~0.13 | 6,350 | 575 | 0.07 ~0.11 | 5,000 | 450 | 0.07 ~0.11 | 5,000 | 450 | 0.07 ~0.11 | 4,250 | 250 | 0.04 ~0.09 |
| 7 | 7,250 | 915 | 0.09 ~0.16 | 5,450 | 575 | 0.08 ~0.13 | 4,300 | 450 | 0.08 ~0.13 | 4,300 | 450 | 0.07 ~0.12 | 3,650 | 250 | 0.05 ~0.1 |
| 8 | 6,350 | 915 | 0.1 ~0.17 | 4,750 | 575 | 0.09 ~0.14 | 3,800 | 450 | 0.09 ~0.14 | 3,750 | 450 | 0.09 ~0.14 | 3,200 | 250 | 0.06 ~0.11 |
| 9 | 5,650 | 915 | 0.12 ~0.2 | 4,250 | 575 | 0.11 ~0.17 | 3,350 | 450 | 0.11 ~0.17 | 3,350 | 450 | 0.1 ~0.16 | 2,850 | 250 | 0.07 ~0.12 |
| 10 | 5,100 | 915 | 0.14 ~0.22 | 3,800 | 575 | 0.12 ~0.18 | 3,000 | 450 | 0.12 ~0.18 | 3,000 | 450 | 0.12 ~0.18 | 2,550 | 250 | 0.08 ~0.13 |
| 11 | 4,600 | 915 | 0.16 ~0.24 | 3,500 | 575 | 0.13 ~0.19 | 2,750 | 450 | 0.13 ~0.19 | 2,750 | 450 | 0.13 ~0.19 | 2,300 | 250 | 0.09 ~0.14 |
| 12 | 4,250 | 915 | 0.18 ~0.26 | 3,200 | 575 | 0.15 ~0.21 | 2,500 | 450 | 0.15 ~0.21 | 2,500 | 450 | 0.14 ~0.22 | 2,150 | 250 | 0.1 ~0.15 |

切込深さ
Depth Of Cut



H

• H=1D以下 H≤1D
• 下穴無し Without pre-drilled hole



β

1. 上表は、ワーク上面が平坦でフライス前加工がしてあることを前提としたものです。
 2. 上表は、穴深さが1D以下の場合のものであります。
 3. 機械、ホルダは剛性のある精度の高いものをご使用下さい。
 4. 加工物の形状や保持方法の状況によって切削条件を調整して下さい。
 5. エンドミル取り付け時の刃先の振れは、10μm以下に抑えて下さい。
 6. 切削油剤は被削材に適したもので、発煙性の少ないものをご使用下さい。
 7. 乾式の場合には、切りくず詰まりが無いよう、エアブローにて切りくずを除去して下さい。
 8. 斜面部への加工の場合は、加工面傾斜角度(β)により、回転速度、送り速度を調整下さい。
 - ・加工面傾斜角度(β)が30°以下の斜面への加工では、上表の送り速度40~60%を目安にご使用下さい。
 - ・加工面傾斜角度(β)が30°を超える加工では、上表の回転速度60~80%、送り速度20~40%を目安にご使用下さい。
 9. 加工穴の位置決め精度を必要とする場合は、加工精度に合わせて上記回転速度、送り速度を調整下さい。
 10. マグネシウム合金切削において、切削油剤を使用する場合は、切削油剤メーカーの推奨するものをご使用下さい。また、切りくずの処理に注意下さい。発火の恐れがあります。
 11. 脆性材の加工の場合は、粉塵対策を必ず行って下さい。舞い上がった粉塵は、引火、爆発の恐れがあります。吸引をすると人体に影響を及ぼす危険があります。
 12. CFRP等の被削性は、レジン(樹脂)の性質やその含有量によって大きく影響を受けます。切削状況を見ながら回転速度、送り速度を調整下さい。
1. This machining condition table applies to milling workpieces that have been flattened at the top through the removal of the forged surface (on a milling machine).
 2. These machining conditions apply to hole depths of 1D or less. (D=outer diameter)
 3. Use a rigid and precise machine and holder.
 4. Adjust the rotational speed and the feed rate in accordance with conditions such as the machining shape, machine rigidity, or work holding.
 5. When chucking an end mill, keep the runout at the cutting edge below 10μm.
 6. Please use a suitable fluid with high smoke retardant properties.
 7. During Dry (no fluid) milling, please use air blow to remove cutting chips from the milling area and to eliminate chip packing.
 8. When machining an inclined plane, adjust the rotational speed and the feed rate in accordance with the angle of the incline (β).
 - When the machining incline angle(β) is less than 30°, please reduce the feed to 40~60%.
 - When the machining incline angle(β) is over 30°, please reduce the speed to 60~80%, the feed to 20~40%.
 9. If it is necessary to ensure the locating precision of the hole to be machined, adjust the rotational speed and the feed rate as indicated above (in accordance with the machining precision requirement).
 10. When machining magnesium alloy materials, please use the coolant oil recommended by the coolant oil manufacturer. Please also properly dispose the cutting chips to prevent fire hazards.
 11. When machining brittle materials, please take proper measures to eliminate the dust. Airborne dust is flammable, may cause fire, and is a health hazard if inhaled.
 12. The machinability of materials like CFRP is heavily dependent on the composition of the resin. Please adjust the RPM and feed rate accordingly based on cutting conditions.

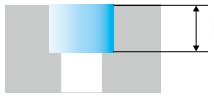
形状寸法表 Specification Charts
 センタリング・穴面取り Countersinking
 コーナ面取り Corner Chamfering
 R面取り Corner Rounding
 座べり Counterboring
 切削条件 Cutting Conditions
 センタリング・穴面取り Countersinking
 コーナ面取り Corner Chamfering
 R面取り Corner Rounding
 座べり Counterboring

切削条件基準表 Cutting Conditions

VP-ZDS・VP-LS-ZDS 注1) Note

| 被削材 Work Material | 一般構造用鋼・炭素鋼・鋳鉄 Mild Steel・Carbon Steel・Cast Iron S5400・S45C・FC250 ~750N/mm ² | | | 合金鋼・工具鋼 Alloy Steel・Tool Steel SCM・SKJ・SKS ~30HRC | | | 調質鋼・ステンレス鋼 Hardened Steel・Stainless Steel SKD・SKT・SUS 30 ~ 40HRC | | | アルミニウム合金・アルミニウム合金鋳物 Aluminum Alloy・Aluminum Alloy Casting A7075・<Si 13% | | |
|-------------------------|---|--------------------------|------------------------------|--|--------------------------|------------------------------|---|--------------------------|------------------------------|---|--------------------------|------------------------------|
| 切削速度 Cutting Speed | 16~30m/min | | | 12~25m/min | | | 10~20m/min | | | 30~80m/min | | |
| 外径 Mill Dia. (mm) | 回転速度 Speed (min ⁻¹) | 送り速度 Feed (mm/min) | 送り量 Feed Rate (mm/rev) | 回転速度 Speed (min ⁻¹) | 送り速度 Feed (mm/min) | 送り量 Feed Rate (mm/rev) | 回転速度 Speed (min ⁻¹) | 送り速度 Feed (mm/min) | 送り量 Feed Rate (mm/rev) | 回転速度 Speed (min ⁻¹) | 送り速度 Feed (mm/min) | 送り量 Feed Rate (mm/rev) |
| 3 | 2,700 | 80 | 0.01 ~ 0.05 | 2,200 | 65 | 0.01 ~ 0.05 | 1,600 | 48 | 0.01 ~ 0.05 | 5,300 | 180 | 0.01 ~ 0.06 |
| 4 | 2,000 | 80 | 0.02 ~ 0.06 | 1,600 | 65 | 0.02 ~ 0.06 | 1,200 | 48 | 0.02 ~ 0.06 | 4,000 | 180 | 0.02 ~ 0.07 |
| 5 | 1,600 | 80 | 0.03 ~ 0.08 | 1,300 | 65 | 0.03 ~ 0.08 | 960 | 48 | 0.03 ~ 0.08 | 3,200 | 180 | 0.03 ~ 0.09 |
| 6 | 1,350 | 80 | 0.04 ~ 0.09 | 1,100 | 65 | 0.04 ~ 0.09 | 800 | 48 | 0.04 ~ 0.09 | 2,700 | 180 | 0.04 ~ 0.1 |
| 8 | 1,000 | 80 | 0.05 ~ 0.1 | 800 | 65 | 0.05 ~ 0.1 | 630 | 48 | 0.05 ~ 0.1 | 2,000 | 180 | 0.05 ~ 0.11 |
| 10 | 840 | 80 | 0.06 ~ 0.12 | 680 | 65 | 0.06 ~ 0.12 | 500 | 48 | 0.06 ~ 0.12 | 1,600 | 180 | 0.06 ~ 0.13 |
| 12 | 700 | 80 | 0.09 ~ 0.15 | 550 | 65 | 0.09 ~ 0.15 | 400 | 48 | 0.09 ~ 0.15 | 1,350 | 180 | 0.09 ~ 0.17 |
| 14 | 570 | 80 | 0.11 ~ 0.17 | 460 | 65 | 0.11 ~ 0.17 | 360 | 48 | 0.11 ~ 0.17 | 1,150 | 180 | 0.11 ~ 0.19 |
| 16 | 500 | 80 | 0.12 ~ 0.19 | 400 | 65 | 0.12 ~ 0.19 | 300 | 48 | 0.12 ~ 0.19 | 1,000 | 180 | 0.12 ~ 0.21 |
| 18 | 450 | 80 | 0.14 ~ 0.22 | 360 | 65 | 0.14 ~ 0.22 | 280 | 48 | 0.14 ~ 0.22 | 900 | 180 | 0.14 ~ 0.25 |
| 20 | 400 | 80 | 0.15 ~ 0.25 | 320 | 65 | 0.15 ~ 0.25 | 240 | 48 | 0.15 ~ 0.25 | 795 | 180 | 0.15 ~ 0.28 |
| 21 | 380 | 80 | 0.16 ~ 0.26 | 300 | 65 | 0.16 ~ 0.26 | 230 | 48 | 0.16 ~ 0.26 | 760 | 180 | 0.16 ~ 0.29 |
| 22 | 360 | 80 | 0.17 ~ 0.27 | 290 | 65 | 0.17 ~ 0.27 | 220 | 48 | 0.17 ~ 0.27 | 730 | 180 | 0.17 ~ 0.3 |
| 23 | 350 | 80 | 0.18 ~ 0.28 | 280 | 65 | 0.18 ~ 0.28 | 210 | 48 | 0.18 ~ 0.28 | 690 | 180 | 0.18 ~ 0.31 |
| 24 | 330 | 80 | 0.19 ~ 0.29 | 270 | 65 | 0.19 ~ 0.29 | 200 | 48 | 0.19 ~ 0.29 | 660 | 180 | 0.19 ~ 0.32 |
| 25 | 320 | 80 | 0.2 ~ 0.3 | 260 | 65 | 0.2 ~ 0.3 | 190 | 48 | 0.2 ~ 0.3 | 640 | 180 | 0.2 ~ 0.33 |
| 26 | 310 | 80 | 0.21 ~ 0.31 | 250 | 65 | 0.21 ~ 0.31 | 185 | 48 | 0.21 ~ 0.31 | 610 | 180 | 0.22 ~ 0.35 |
| 27 | 300 | 80 | 0.22 ~ 0.32 | 240 | 65 | 0.22 ~ 0.32 | 180 | 48 | 0.22 ~ 0.32 | 590 | 180 | 0.23 ~ 0.36 |
| 28 | 290 | 80 | 0.23 ~ 0.33 | 230 | 65 | 0.23 ~ 0.33 | 170 | 48 | 0.23 ~ 0.33 | 570 | 180 | 0.24 ~ 0.37 |
| 29 | 280 | 80 | 0.24 ~ 0.34 | 220 | 65 | 0.24 ~ 0.34 | 165 | 48 | 0.24 ~ 0.34 | 550 | 180 | 0.25 ~ 0.38 |
| 30 | 270 | 80 | 0.25 ~ 0.35 | 210 | 65 | 0.25 ~ 0.35 | 160 | 48 | 0.25 ~ 0.35 | 530 | 180 | 0.26 ~ 0.39 |
| 31 | 260 | 80 | 0.26 ~ 0.36 | 205 | 65 | 0.26 ~ 0.36 | 155 | 48 | 0.26 ~ 0.36 | 510 | 180 | 0.27 ~ 0.4 |
| 32 | 250 | 80 | 0.27 ~ 0.37 | 200 | 65 | 0.27 ~ 0.37 | 150 | 48 | 0.27 ~ 0.37 | 500 | 180 | 0.28 ~ 0.41 |

切込深さ
Depth of Cut



- ・ H = 1D以下 H ≤ 1D
- ・ 下穴有り With pre-drilled hole

1. VP-LS-ZDSをご使用の場合は、上表の回転速度、送り速度を60%~80%として下さい。
 2. 上表は、ドリルによる下穴加工があることを前提としたものです。下穴径は、使用工具の外径50%以上を推奨します。
 3. 上表は、穴深さが1D以下の場合のものです。
 4. 下穴無しの加工の場合は、送り速度を上表の40~70%を目安として下さい。
 5. 機械、ホルダは剛性のある精度の高いものをご使用下さい。
 6. 加工物の形状や保持方法の状況によって切削条件を調整して下さい。
 7. 切削油剤は被削材に適したものをご使用いただき、十分に注油下さい。
 8. 加工穴の拡大が問題となるときは、回転速度、送り量を上表の値より下げてください。
 9. 切りくずを分断する必要があるときは必ずステップ送りを実施して下さい。
 10. 横形マシニングセンタで加工される場合は、特に切りくずの排出に注意下さい。
 11. マグネシウム合金切削において、切削油剤を使用する場合は、切削油剤メーカーの推奨するものを必ずご使用下さい。また、切りくずの処理に注意下さい。発火の恐れがあります。
 12. 斜面のドリリング前加工には、ADFシリーズや超硬ZDSシリーズを推奨します。選定の目安(p.6)を参考にして下さい。
1. When using VP-LS-ZDS, please decrease the RPM and feed rate to 60 - 80% of the figures in the above table.
 2. The chart above is based on the assumption that pilot holes are processed. For the diameter of the pilot hole, a value of over 50% of the selected tool's outer diameter is recommended.
 3. These machining conditions apply to hole depths of 1D or less. (D=outer diameter)
 4. For machining without pilot holes, set the feed rate to between 40 and 70% of the values indicated in the table above.
 5. Use a rigid and precise machine and holder.
 6. Adjust the rotational speed and the feed rate in accordance with conditions such as the machining shape, machine rigidity, or work holding.
 7. Please use a suitable coolant for the work material and apply sufficiently.
 8. If the problem of hole oversizing occurs, reduce the spindle RPM and feed amount lower than the amounts shown above.
 9. We recommend step feeding when you require better chip breakage.
 10. Pay particular attention to chip evacuation when using a horizontal machining center.
 11. When machining magnesium alloy materials, please use the coolant oil recommended by the coolant oil manufacturer. Please also properly dispose the cutting chips to prevent fire hazards.
 12. The ADF series or the ZDS carbide series are recommended for pre-drilling on inclined surfaces. Please refer to the selection guide (p.6) for details.

法令一部改正によるコバルトの特定化学物質指定について

About the designation of cobalt as a specified chemical substance by the revision of the law

2014年10月30日

October 30, 2014

お客様各位

下記に記載の通り、コバルトが特定化学物質に指定されました。工具を通常使用する場合は健康障害を引き起こすことはありませんが、お客様に安心して弊社の製品をご使用いただく為にも、弊社製品のコバルト含有の有無を総合カタログへ記載することにいたしました。ご確認くださいませようお願い申し上げます。

1. 法改正内容について

労働安全衛生法施行令等一部改正により特定化学物質の第2類物質として「コバルト及びその無機化合物」が新たに追加指定され、2012年9月20日公布、2013年1月1日施行されております。

法改正に伴い、特定化学物質による健康障害防止措置として下記対策を講じる必要があります。

- 製品（粉末・合金・工具）への表示 ※
- 発散抑制措置（コバルト濃度として0.02mg/m³以下）
- 漏洩のための措置
- 作業主任者の選任
- 作業環境測定（6ヶ月毎）
- 健康診断（6ヶ月毎）、記録の30年保管
- 保護具装備、作業記録30年保管、休憩室設置、洗浄設備設置、取扱注意表示

※「製品への表示」のうち「工具への表示」につきましては、以下の通りです。

当業界の工具は、労働者による取扱いの過程において工具等の摩耗により作業者が健康障害を生じるコバルト粉じん等の飛散はないため表示対象外製品であると判断されました。従いまして表示に関しましても今まで通り変更ございません。

2. 法改正に伴う対応について

(1) 工具をご使用いただくお客様

工具を通常で使用いただく場合は、工具等の摩耗により作業者が健康障害を引き起こすコバルト粉じん等の発散は生じないことから、特定化学物質による健康障害防止措置を実施する対象となりません。今までどおりご使用いただきますよう、お願い申し上げます。

(2) コバルトを含む工具を購入され、それを研削などにより追加加工をされるお客様

コバルトを含む工具の追加加工および再研削工程などでは、上記1項の対策を講じる必要があると思われまます。なお、詳細は所轄の労働基準監督署または法令等でご確認ください。

Dear Customers

As described below, cobalt has been listed as specified chemical substances. Although it does not cause health problems in regular use of tools, however, for our customers to be able to use our products with confidence, we put a notice on our catalog about which tool contains cobalt. We ask you to refer it for your information.

1. The amendments of the law

"Cobalt and its inorganic compounds" are newly added as second type of specific chemical substances by the partial revision of Ordinance for Enforcement of the Act on Occupational Safety and Health, issued on September 20, 2012, and enforced from January 1, 2013.

According to the amendments to the Act, we must take following actions to prevent health problems caused by specific chemical substances.

- Marking on the tools (Powder, Alloys, Tools) ※
- Divergence control measures (Less than 0.02mg / m³ as cobalt concentration)
- Measures for leakage
- Appointment of Operations Chief
- Measurement and working environment (every 6 months)
- Keeping health diagnosis records for 30 years (every 6 months)
- Wearing protective equipment, Keep work records for 30 years, Set up a break room, Installation of cleaning equipment, handling notices

※Details of "Marking on Tools" found in "Marking on Product" are as below:

Scattering of cobalt dust which causes health disorders are not recognized during the machining process using tools of our industry. Therefore, it is judged that the marks indicating cobalt is unnecessary and no changes are made with the marks on products.

2. The correspondence with the revision of the law

(1) Customers who use the tool

Ordinal usage of tools does not cause the scattering of cobalt dust which causes the health disorders. Therefore, it is not subject to take actions preventing the health impairment of workers. Please use our product as before.

(2) Customers who purchase the tool contain cobalt, and make any alterations to it such as by grinding

It is required for the processes as re-grinding and alteration to the tool contains cobalt to take measures above Section 1. Since there is a setting of the grace period, please check the laws of regulations of the competent or Labor Standards Inspection Office for more information.



安全にお使いいただくために

Observe These Precautions For Safe Use

加工前の注意 Prior to Operations:

- 鋭利な切れ刃を素手で触るとけがの危険があります。切れ刃を素手で触らないで下さい。特にケースからの取り出し時や機械への操着時には、保護手袋等を使用して下さい。
- 重量の重い工具を扱う時は、落下によるけがの危険があります。適切な運搬機具やチェーンブロック等を使用し、安全靴を着用して下さい。
- 工具に傷、割れ等があると使用中に破損し飛び散ることがあります。使用前に傷、割れ等のないことを確認して下さい。
- 使用前に工具および加工物の寸法を確認して下さい。
- 回転方向を誤ると工具が破損、飛散しけがをする危険があります。使用前に回転方向を確認して下さい。
- 工作機械保持具を含めた回転部のバランスが悪いと、振れ振動により工具が破損しけがをする危険があります。試運転を必ず実施し、バランスの確認をして下さい。
- 工具の保持が不十分ですと破損、飛散を招きけがをする危険があります。ホルダ等は、工具および加工内容に見合ったものを使用して下さい。工具はホルダにしっかりと固定し、振れを抑えるようにして下さい。インデキサブル工具では、インサートや部品が確実にクランプされている事も確認して下さい。
- 加工物の保持が不十分ですと、工具や加工物が破損し飛散する危険があります。加工物の保持は確実にこなして下さい。
- Touching sharp cutting edges with bare hands can cause injury. Never touch the cutting edges with bare hands. Wear protective gloves, especially when removing tools from the case and attaching them to the machine.
- When handling heavy tools, dropping poses danger. Use appropriate transport equipment or chain block and wear safety shoes.
- Scratches or cracks in the tools can cause breakage and flying debris during operation. Ensure that there are no scratches or cracks prior to using the tools.
- Check if the tools and the work materials are correct prior to use.
- If the tool is rotating in the wrong direction, it can cause breakage or flying debris, leading to injury. Check the rotation direction prior to use.
- If the rotational balance is poor (including that for the retainer of the machine tools), the shaking vibration could cause breakage and lead to accidents. Ensure that you always carry out a test operation and check the balance.
- Insufficient retention of the tool can lead to breakage or flying debris, causing injuries. Ensure you use holders, etc. that match the tools and the nature of the processing operations. The tool should be firmly attached to the holder to prevent shaking. When using indexable tools ensure you check before-hand that indexable inserts and parts are securely clamped.
- Insufficient retention of the work materials can cause tools and work materials to break or cause flying debris. Ensure that the work materials are firmly secured.

加工する時の注意 During Operations:

- 回転中の工具、加工物等に触るとけがをします。回転中の工具、加工物等には絶対に触らないで下さい。また、衣服にたるみがあると巻き込まれる危険があります。たるみのない衣服を着用して下さい。
- 工具が加工中に衝撃的な負荷を受けると破損、飛散しけがをする危険があります。また、高温の切りくずが飛散し、けがや火傷をする危険があります。必ず安全カバーや保護めがね等の保護具を使用して下さい。
- 工具を改造したり、本来の使用目的以外で使用すると、工具が破損、飛散しけがをする危険があります。工具は改造しないで下さい。本来の使用目的で使用して下さい。
- 切削条件基準表の数値は、新しく作業を立ち上げる時の目安として下さい。加工物の形状や機械剛性に合わせて切削条件を調節する必要があります。
- 加工中に異常な振動等が発生した場合は、直ちに加工を中止して下さい。そのまま続けると工具が破損、飛散しけがをする危険があります。異常の原因を取り除いてから加工を再開して下さい。
- 摩耗が進んだり、痛んだ状態の工具を使用し続けると破損、飛散の原因となります。切れ味が悪くなったなら工具を交換して下さい。
- 用途に応じ切削油を選定して下さい。不水溶性切削油剤を使用する時は、加工時に発生する火花や破損による発熱で引火、火災の危険があります。防火対策を必ずおこなして下さい。
- Touching the tools or the work materials during rotation can cause injury. Never touch tools or work materials during rotation. As loose clothing can become caught in mechanisms, ensure that you wear work clothes that can not become caught.
- If the tool receives a shock load during processing, this can cause breakage or flying debris, leading to injury. As hot flying cutting chips cause injury or burns, ensure you use protective equipment including safety covers and eye protection.
- Modifying the tool or attempting to use it for purposes other than the original purpose can cause breakage or flying debris, leading to possible injury. Never attempt to modify the tool and never use it for any purpose other than the designated purpose.
- The numerical value listed in the table of recommended cutting conditions should be used as a general guide when starting new operations. It is necessary to adjust conditions according to the dimensions of work materials and the rigidity of the machine.
- If abnormal vibration, etc. occurs during processing, stop processing immediately. Attempting to continue processing can cause tool breakage or flying debris, leading to possible injury. Ensure that you eliminate the cause of the abnormality before resuming processing.
- Attempting to use tools with considerable wear can cause breakage or flying debris. Replace the tool when it no longer cuts well.
- Select a cutting oil appropriate to the particular usage. Using a non-water-soluble cutting oil could lead to fires due to sparks generated during processing or heat caused by breakage. Ensure that you take proper fire-prevention measures.

加工後の注意 After Use:

- 加工直後の工具、加工物は、高温になっているため火傷をする危険があります。加工物を素手で触らないで下さい。
- 加工物に生じたバリでけがをする危険があります。素手で触らないで下さい。
- 加工後は必ず加工物の寸法を確認して下さい。
- 工具を再研削すると粉塵が発生します。粉塵は健康を害する危険があるので、必ず防塵マスク、吸塵機等の粉塵対策をして下さい。
- Tools and work materials are very hot immediately after processing. Never touch them with your bare hands.
- The burrs generated during processing can cause injury. Never touch them with your bare hands.
- Ensure that you check the measurements of the work materials after processing.
- When the tool is reground, grinding dust is generated which is dangerous to your health. Ensure that you take proper safety measures such as wearing a dustproof mask or using a respirator.

以上は、当社製品を安全にお使いいただくための基本的注意です。その他の詳細につきましては、当社までお問い合わせ下さい。

This completes the basic precautions for safe use of this company's equipment. Please feel free to contact us at any time if you have any further questions.



shaping your dreams

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〈工具の技術的なご相談は…〉

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安全にお使いいただくために

- 工具を使用する時は、破損する危険があるので、必ずカバー・保護眼鏡・安全靴等を使用して下さい。
- 切れ刃は素手で触らないで下さい。
- 切りくずは素手で触らないで下さい。
- 工具の切れ味が悪くなったら使用を中止して下さい。
- 異常音・異常振動が発生したら、直ちに使用を中止して下さい。
- 工具には手を加えないで下さい。
- 加工前に工具の寸法確認を行って下さい。

Safe use of cutting tools

- Use safety cover, safety glasses and safety shoes during operation.
- Do not touch cutting edges with bare hands.
- Do not touch cutting chips with bare hands. Chips will be hot after cutting.
- Stop cutting when the tool becomes dull.
- Stop cutting operation immediately if you hear any strange cutting sounds.
- Do not modify tools.
- Please use correct tools for the operation. Check dimensions to ensure proper selection.

◆ 製品については、常に研究・改良を行っておりますので、予告なく本カタログ掲載仕様を変更する場合があります。

◆ Tool specifications are subject to change without notice.

OSG代理店

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