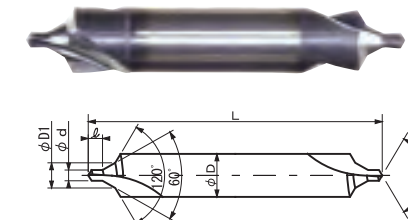
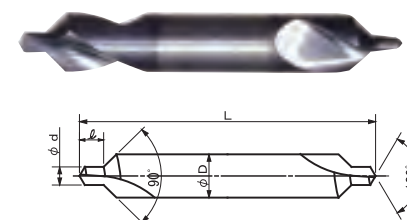
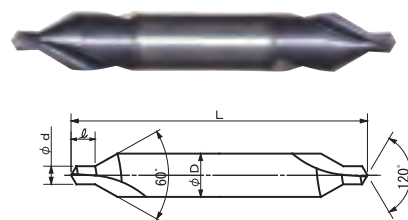
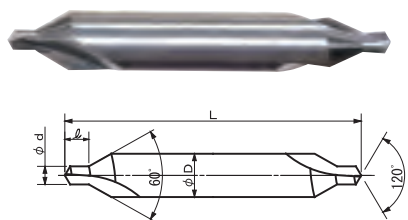


超硬 センタードリル A形 60°
Carbide Center Drill A Type 60°

超硬 センタードリル A形 強ねじれ 60° ALDコーティング
Carbide Center Drill A Type High Helix 60° ALD Coating

超硬 センタードリル A形 強ねじれ 90° ALDコーティング
Carbide Center Drill A Type High Helix 90° ALD Coating

超硬 センタードリル B形 ALDコーティング
Carbide Center Drill B Type ALD Coating



A type 60° 超硬 両刃 2枚刃 右刃

A type 60° 超硬 ALD 両刃 強ねじれ 2枚刃 右刃

A type 90° 超硬 ALD 両刃 強ねじれ 2枚刃 右刃

B type 60° 超硬 ALD 両刃 2枚刃 右刃

単位/寸法:mm 価格:円
Unit/Size:mm Price:JPY

| VAN Code No. | 刃先径 φd | シャンク径 φD | 刃長 ℓ | 全長 L | JIS | 在庫 Stock | 参考価格 Price |
|--------------|--------|----------|------|------|-------|----------|------------|
| CD1.0X3.15CB | 1 | 3.15 | 1.3 | 31.5 | JISA | ● | ¥6,600 |
| CD1.0X4CB | 1 | 4 | 1.3 | 35 | 旧JIS1 | ● | ¥7,200 |
| CD1.5X5CB | 1.5 | 5 | 1.9 | 40 | 旧JIS1 | ● | ¥8,000 |
| CD1.6X4CB | 1.6 | 4 | 2 | 35.5 | JISA | ● | ¥7,200 |
| CD2.0X5CB | 2 | 5 | 2.6 | 40 | JISA | ● | ¥8,000 |
| CD2.0X6CB | 2 | 6 | 2.6 | 45 | 旧JIS1 | ● | ¥9,800 |
| CD2.5X6CB | 2.5 | 6 | 3.2 | 45 | | ● | ¥9,800 |
| CD2.5X6.3CB | 2.5 | 6.3 | 3.2 | 45 | JISA | ● | ¥11,800 |
| CD2.5X8CB | 2.5 | 8 | 3.2 | 50 | 旧JIS1 | ● | ¥13,000 |
| CD3.0X7.7CB | 3 | 7.7 | 3.9 | 50 | | ● | ¥13,000 |
| CD3.0X8CB | 3 | 8 | 3.9 | 50 | | ● | ¥13,000 |
| CD3.0X10CB | 3 | 10 | 3.9 | 56 | 旧JIS1 | ● | ¥18,500 |
| CD3.15X8CB | 3.15 | 8 | 3.9 | 50 | JISA | ● | ¥13,000 |
| CD4.0X10CB | 4 | 10 | 5.2 | 56 | JISA | ● | ¥18,500 |
| CD4.0X12CB | 4 | 12 | 5.2 | 63 | 旧JIS1 | ● | ¥22,400 |
| CD5.0X12CB | 5 | 12 | 6.4 | 63 | | ● | ¥22,400 |
| CD6.0X16CB | 6 | 16 | 7.7 | 71 | | ● | ¥33,600 |
| CD6.3X16CB | 6.3 | 16 | 8 | 71 | JISA | ● | ¥33,600 |
| CD8.0X20CB | 8 | 20 | 10.3 | 80 | JISA | ● | ¥54,000 |

単位/寸法:mm 価格:円
Unit/Size:mm Price:JPY

| VAN Code No. | 刃先径 φd | シャンク径 φD | 刃長 ℓ | 全長 L | JIS | 在庫 Stock | 参考価格 Price |
|----------------|--------|----------|------|------|------|----------|------------|
| CD1.0X3CBSALD | 1 | 3 | 1.3 | 35 | | ● | ¥8,300 |
| CD2.0X5CBSALD | 2 | 5 | 2.6 | 40 | JISA | ● | ¥9,500 |
| CD2.5X6CBSALD | 2.5 | 6 | 3.2 | 45 | | ● | ¥11,700 |
| CD3.0X8CBSALD | 3 | 8 | 3.9 | 50 | | ● | ¥15,200 |
| CD4.0X10CBSALD | 4 | 10 | 5.2 | 56 | JISA | ● | ¥20,500 |
| CD5.0X12CBSALD | 5 | 12 | 6.4 | 63 | | ● | ¥27,500 |
| CD6.0X16CBSALD | 6 | 16 | 7.7 | 71 | | ● | ¥41,500 |
| CD8.0X20CBSALD | 8 | 20 | 10.3 | 80 | JISA | ● | ¥66,000 |

Stock ●...標準在庫品 / Stocked

単位/寸法:mm 価格:円
Unit/Size:mm Price:JPY

| VAN Code No. | 刃先径 φd | シャンク径 φD | 刃長 ℓ | 全長 L | JIS | 在庫 Stock | 参考価格 Price |
|------------------|--------|----------|------|------|------|----------|------------|
| 90CD1.0X3CBSALD | 1 | 3 | 1.3 | 35 | | ● | ¥11,000 |
| 90CD2.0X5CBSALD | 2 | 5 | 2.6 | 40 | JISA | ● | ¥12,400 |
| 90CD2.5X6CBSALD | 2.5 | 6 | 3.2 | 45 | | ● | ¥14,500 |
| 90CD3.0X8CBSALD | 3 | 8 | 3.9 | 50 | | ● | ¥18,400 |
| 90CD4.0X10CBSALD | 4 | 10 | 5.2 | 56 | JISA | ● | ¥25,400 |
| 90CD5.0X12CBSALD | 5 | 12 | 6.4 | 63 | | ● | ¥33,000 |
| 90CD6.0X16CBSALD | 6 | 16 | 7.7 | 71 | | ● | ¥49,500 |
| 90CD8.0X20CBSALD | 8 | 20 | 10.3 | 80 | JISA | ● | ¥77,000 |

単位/寸法:mm 価格:円
Unit/Size:mm Price:JPY

| VAN Code No. | 刃先径 φd | 最大径 φD1 | シャンク径 φD | 刃長 ℓ | 全長 L | JIS | 在庫 Stock | 参考価格 Price |
|-------------------|--------|---------|----------|------|------|------|----------|------------|
| BCD1.0X4CBALD | 1 | 2.12 | 4 | 1.3 | 34.5 | JISB | ● | ¥11,000 |
| BCD1.25X5CBALD | 1.25 | 2.65 | 5 | 1.9 | 40 | JISB | ● | ¥12,000 |
| BCD1.6X6.3CBALD | 1.6 | 3.35 | 6.3 | 2.1 | 45 | JISB | ● | ¥15,000 |
| BCD2.0X8CBALD | 2 | 4.25 | 8 | 2.6 | 50 | JISB | ● | ¥19,000 |
| BCD2.5X10CBALD | 2.5 | 5.3 | 10 | 3.2 | 56 | JISB | ● | ¥26,000 |
| BCD3.15X11.2CBALD | 3.15 | 6.7 | 11.2 | 4.1 | 60 | JISB | ● | ¥33,000 |
| BCD4.0X14CBALD | 4 | 8.5 | 14 | 5.2 | 67 | JISB | ● | ¥42,000 |
| BCD5.0X18CBALD | 5 | 10.6 | 18 | 6.4 | 75 | JISB | ● | ¥56,000 |
| BCD6.3X20CBALD | 6.3 | 13.2 | 20 | 8.1 | 80 | JISB | ● | ¥69,000 |

Stock ●...標準在庫品 / Stocked

■被削材適合性 Suitability for Work Materials ●...最適 The most suitable ○...適 Suitable △...可 Possible 無印 Blank...不可 Impossible

| 製品区分 Product | 軟鋼 Mild Steel | 炭素鋼 Carbon Steel | 合金鋼 Alloy Steel | 調質鋼 Heat treated Steel | 工具鋼 Tool Steel | 焼入れ鋼 Hardened Steel | ステンレス鋼 Stainless Steel | 鋳鉄 Cast Iron | ダクタイル鋳鉄 Ductile Cast Iron | チタン合金 Titanium Alloy | アルミ合金 Aluminium Alloy | 銅 Copper | プラスチック Plastic | セラミック etc. Ceramics etc. |
|--------------|---------------|------------------|-----------------|------------------------|----------------|---------------------|------------------------|--------------|---------------------------|----------------------|-----------------------|----------|----------------|--------------------------|
| CD-CB | ○ | ◎ | ◎ | ○ | ○ | ○ | ◎ | ○ | ○ | ○ | ◎ | ○ | ○ | ○ |
| CD-CBSALD | ○ | ◎ | ◎ | ◎ | ○ | ○ | ◎ | ○ | ○ | | ○ | ○ | ○ | ○ |

■被削材適合性 Suitability for Work Materials ●...最適 The most suitable ○...適 Suitable △...可 Possible 無印 Blank...不可 Impossible

| 製品区分 Product | 軟鋼 Mild Steel | 炭素鋼 Carbon Steel | 合金鋼 Alloy Steel | 調質鋼 Heat treated Steel | 工具鋼 Tool Steel | 焼入れ鋼 Hardened Steel | ステンレス鋼 Stainless Steel | 鋳鉄 Cast Iron | ダクタイル鋳鉄 Ductile Cast Iron | チタン合金 Titanium Alloy | アルミ合金 Aluminium Alloy | 銅 Copper | プラスチック Plastic | セラミック etc. Ceramics etc. |
|--------------|---------------|------------------|-----------------|------------------------|----------------|---------------------|------------------------|--------------|---------------------------|----------------------|-----------------------|----------|----------------|--------------------------|
| 90CD-CBSALD | ○ | ○ | ◎ | ◎ | ○ | ◎ | ◎ | ○ | ○ | | ○ | ○ | ○ | ○ |
| BCD-CBALD | ○ | ○ | ◎ | ◎ | ○ | ◎ | ◎ | ○ | ○ | | ○ | ○ | ○ | ○ |

- SP CENTER
- CENTER DRILL
- GSS STARTING DRILL
- GP DRILL
- TFD
- SPIRAL GUN BARREL DRILL
- TOGLON MULTI CHAMFER
- TOGLON SHARP
- TOGLON HARD
- CORNER ROUNDING CUTTER
- JIT
- SUBMARINE GATE DRILL
- MICRO TOOL
- TECHNICAL INFORMATION
- CUSTOMIZED TOOL SEMIORDER TOOL
- INST-RUCTION
- COMPANY PROFILE

- SP CENTER
- CENTER DRILL
- GSS STARTING DRILL
- GP DRILL
- TFD
- SPIRAL GUN BARREL DRILL
- TOGLON MULTI CHAMFER
- TOGLON SHARP
- TOGLON HARD
- CORNER ROUNDING CUTTER
- JIT
- SUBMARINE GATE DRILL
- MICRO TOOL
- TECHNICAL INFORMATION
- CUSTOMIZED TOOL SEMIORDER TOOL
- INSTRUCTION
- COMPANY PROFILE

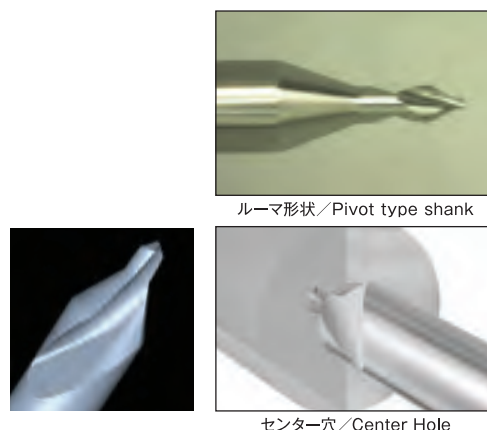
HG センタードリル



HG Center Drill

量産加工向けハイグレードセンタードリル

High-Grade Center Drills have been designed for high volume production



ルーマ形状/Pivot type shank

センター穴/Center Hole

徹底したタクトタイムの向上と、安定した寿命の実現。
 量産加工向けに改良したセンタードリル。
 特に小径サイズでは、従来センタードリルの数倍の寿命。
 HG Center Drills can be used with high cutting speeds and feeds while reaching several times the tool life of conventional center drills. This makes them ideal for high speed and high volume production in general and especially performing in the micro-size range.

| 製品区分 Product | 画像 Photo | 種類 Type | センター穴角 Countersink angle | 材質 Material | 表面処理 Coating | 形状 Geometry | シャンク Shank | 刃数 Flutes | 回転方向 Direction of rotation |
|-----------------|-------------|------------|-----------------------------|----------------|-----------------|----------------|---------------|--------------|-------------------------------|
| CDH | | A type | 60° | P-HSS | | 片刃 | SHANK h7 | 2枚刃 | 右刃 |
| CDH-TICN | | A type | 60° | P-HSS | TiCN | 片刃 | SHANK h7 | 2枚刃 | 右刃 |
| CDH-CB | | A type | 60° | 超硬 | | 片刃 | SHANK h6 | 2枚刃 | 右刃 |
| 90CDH-CB | | A type | 90° | 超硬 | | 片刃 | SHANK h6 | 2枚刃 | 右刃 |
| CDH-CBALD | | A type | 60° | 超硬 | ALD | 片刃 | SHANK h6 | 2枚刃 | 右刃 |

技術レポートについては、P. 107、108をご覧ください。
 See Page 107, 108 for technical information.

アイコンについての説明は、P.125をご覧ください。
 See Page 125 for icon explanation.

HG センタードリル について

Guide to HG Center Drill

種類 Type

A type 60°

標準タイプ/最も多く使われる
Standard/Popular

A type 90°

一部のセンター穴のほか、面取りをかねた位置決めで使用される
Partly used for Center Hole, mostly used for positioning

■ センター穴加工後の断面 □ レースセンター Lathe center

形状 Geometry

HG HG
 精度の向上と形状の最適化を行い、刃先長さを極力短くした高生産性ハイグレードタイプ
 This high grade type has a shorter cutting length to improve accuracy at high processing speeds. It is optimized for high speed machining.

CDH-CB 超硬 Carbide

微粒子超硬で高速加工に適している。60° 90°の2つのセンター穴角で、刃先径をφ0.2mm-3.0mmを0.1mmとびに58サイズ。
 Micro-grain carbide suitable for high speed processing. Counter sink angles of 60° and 90° available. 58 different point diameters from 0.2mm to 3.0 mm available in steps of 0.1 mm.

ALD 超硬ALDコーティング(TiAlN) Carbide ALD (TiAlN) Coating

微粒子超硬のALDコートにより、さらに長寿命ドライ加工にも対応。φ0.2mm-1.0mmの小径を0.1mmとびにラインナップ。
 ALD coating reduces tools life and allows dry processing. Point diameters from 0.2mm-1.0mm are available in steps of 0.1 mm.

CDH P-HSS 粉末ハイス Powder Metallurgy HSS

ハイスセンタードリルのハイグレードタイプ。粉末コバルトハイスを採用し、刃先径はφ0.3mm-1.0mmの小径を0.1mmとびにラインナップ。
 High performance HSS center drills. Powder metallurgical HSS material increases tool life and allows increased processing speeds. Diameters from 0.3mm to 1.0mm available in steps of 0.1mm.

CDH P-HSS TiCN 粉末ハイスTiCNコーティング Powder Metallurgical HSS + TiCN Coating

粉末コバルトハイスに、TiCNコーティングをほどこすことで、さらに高速加工が可能になり、長寿命。
 Powder metallurgical HSS material in combination with TiCN coating increases tool life and allows increased processing speeds.

ルーマ Pivot type shank

- ・従来品に対して、溝形状が適正化され、剛性UP
- ・折れの発生の激減
- ・高速加工が可能
- ・刃先部分のねじれ角(すくい角)が向上
- ・切削速度の向上、切削抵抗の低下(切削熱発生量の減少)
- ・切削点へのクーラントの到達が容易
- ・冷却性の向上
- ・切り粉の排出性の向上
- ・工具製作時の加工が微細になり、製品精度をあげることが可能
- ・面粗度、振れ精度の向上(3μm以下)

- ・Higher hardness and stiffness compared to conventional center drills
- ・Reduced chipping on the edges
- ・Developed for high speed machining
- ・Improved rake angle in point center
- ・Less cutting resistance, lower heat generation
- ・Better cooling by improved coolant flow to cutting sections
- ・Improved chip flow by optimized flute geometry
- ・Higher tool accuracy by cutting edge production technology
- ・Very low surface roughness through minimized run-out (less than 3 μm)

工具選定の際は、面取り径に対して可能な限り小径のものを選択してください。
 工具単価が安くなるのに加え、切削抵抗、面粗度、バリの状態が良くなります。
 Please select the tool with the smallest possible chamfering diameter.
 → The cutting resistance will decrease, the surface becomes smoother and burrs are reduced. In addition to the technical advantages also the price is lower.

- SP CENTER
- CENTER DRILL
- GSS STARTING DRILL
- GP DRILL
- TFD
- SPIRAL GUN BARREL DRILL
- TOGLON MULTI CHAMFER
- TOGLON SHARP
- TOGLON HARD
- CORNER ROUNDING CUTTER
- JIT
- SUBMARINE GATE DRILL
- MICRO TOOL
- TECHNICAL INFORMATION
- CUSTOMIZED TOOL SEMIORDER TOOL
- INSTRUCTION
- COMPANY PROFILE

SP CENTER

CENTER DRILL

GSS STARTING DRILL

GP DRILL

TFD

SPIRAL GUN BARREL DRILL

TOGLON MULTI CHAMFER

TOGLON SHARP

TOGLON HARD

CORNER ROUNDING CUTTER

JIT

SUBMARINE GATE DRILL

MICRO TOOL

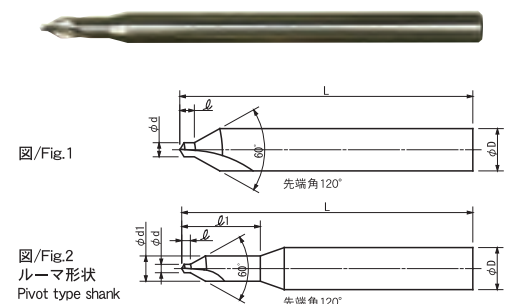
TECHNICAL INFORMATION

CUSTOMIZED TOOL SEMIORDER TOOL

INST- RUCTION

COMPANY PROFILE

HSS HG センタードリル A形 60°
HSS HG Center Drill A Type 60°

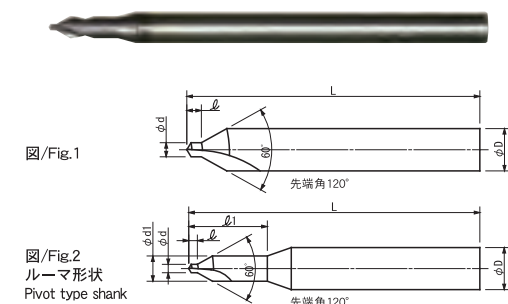


A type 60° P-HSS 片刃 SHANK h7 2枚刃 右刃

単位/寸法:mm 価格:円
Unit/Size:mm Price:JPY

| VAN Code No. | 刃先径 φd | φd1 | シャンク径 φD | 刃長 ℓ | ルーマ長 ℓ1 | 全長 L | 図 Fig. | 在庫 Stock | 参考価格 Price |
|--------------|--------|-----|----------|------|---------|------|--------|----------|------------|
| CDH0.3X0.9 | 0.3 | 0.9 | 3 | 0.3 | 2.7 | 40 | 2 | ● | ¥2,100 |
| CDH0.4X1.2 | 0.4 | 1.2 | 3 | 0.4 | 3.6 | 40 | 2 | ● | ¥1,700 |
| CDH0.5X1.5 | 0.5 | 1.5 | 3 | 0.5 | 4.5 | 40 | 2 | ● | ¥1,600 |
| CDH0.6X1.8 | 0.6 | 1.8 | 3 | 0.6 | 5.4 | 40 | 2 | ● | ¥1,500 |
| CDH0.7X2.1 | 0.7 | 2.1 | 3 | 0.7 | 6.3 | 40 | 2 | ● | ¥1,400 |
| CDH0.8X2.4 | 0.8 | 2.4 | 3 | 0.8 | 7.2 | 40 | 2 | ● | ¥1,300 |
| CDH0.9X2.7 | 0.9 | 2.7 | 3 | 0.9 | 8.1 | 40 | 2 | ● | ¥1,300 |
| CDH1.0X3 | 1 | 3 | 3 | 1 | | 40 | 1 | ● | ¥900 |

HSS HG センタードリル A形 60° TICNコーティング
HSS HG Center Drill A Type 60° TICN Coating



A type 60° P-HSS TICN 片刃 SHANK h7 2枚刃 右刃

単位/寸法:mm 価格:円
Unit/Size:mm Price:JPY

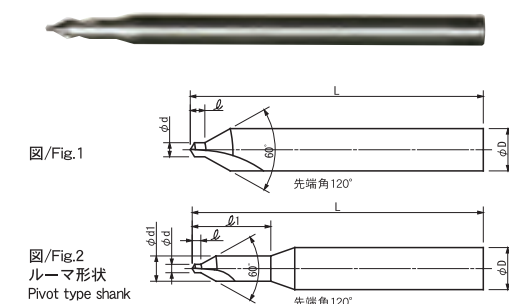
| VAN Code No. | 刃先径 φd | φd1 | シャンク径 φD | 刃長 ℓ | ルーマ長 ℓ1 | 全長 L | 図 Fig. | 在庫 Stock | 参考価格 Price |
|----------------|--------|-----|----------|------|---------|------|--------|----------|------------|
| CDH0.3X0.9TICN | 0.3 | 0.9 | 3 | 0.3 | 2.7 | 40 | 2 | ● | ¥3,000 |
| CDH0.4X1.2TICN | 0.4 | 1.2 | 3 | 0.4 | 3.6 | 40 | 2 | ● | ¥2,600 |
| CDH0.5X1.5TICN | 0.5 | 1.5 | 3 | 0.5 | 4.5 | 40 | 2 | ● | ¥2,450 |
| CDH0.6X1.8TICN | 0.6 | 1.8 | 3 | 0.6 | 5.4 | 40 | 2 | ● | ¥2,350 |
| CDH0.7X2.1TICN | 0.7 | 2.1 | 3 | 0.7 | 6.3 | 40 | 2 | ● | ¥2,250 |
| CDH0.8X2.4TICN | 0.8 | 2.4 | 3 | 0.8 | 7.2 | 40 | 2 | ● | ¥2,150 |
| CDH0.9X2.7TICN | 0.9 | 2.7 | 3 | 0.9 | 8.1 | 40 | 2 | ● | ¥2,150 |
| CDH1.0X3TICN | 1 | 3 | 3 | 1 | | 40 | 1 | ● | ¥1,750 |

Stock ●...標準在庫品/Stocked

■被削材適合性 Suitability for Work Materials ◎...最適 The most suitable ○...適 Suitable △...可 Possible 無印 Blank...不可 Impossible

| 製品区分 Product | 軟鋼 Mild Steel | 炭素鋼 Carbon Steel | 合金鋼 Alloy Steel | 調質鋼 Heat treated Steel | 工具鋼 Tool Steel | 焼入れ鋼 Hardened Steel | ステンレス鋼 Stainless Steel | 鋳鉄 Cast Iron | ダクタイル鋳鉄 Ductile Cast Iron | チタン合金 Titanium Alloy | アルミ合金 Aluminium Alloy | 銅 Copper | プラスチック Plastic | セラミック etc. Ceramics etc. |
|--------------|---------------|------------------|-----------------|------------------------|----------------|---------------------|------------------------|--------------|---------------------------|----------------------|-----------------------|----------|----------------|--------------------------|
| CDH | ○ | ◎ | ○ | △ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| CDH-TICN | ○ | ◎ | ◎ | ○ | ○ | ○ | ◎ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

超硬 HG センタードリル A形 60°
Carbide HG Center Drill A Type 60°



A type 60° 超硬 片刃 SHANK h6 2枚刃 右刃

単位/寸法:mm 価格:円
Unit/Size:mm Price:JPY

| VAN Code No. | 刃先径 φd | φd1 | シャンク径 φD | 刃長 ℓ | ルーマ長 ℓ1 | 全長 L | 図 Fig. | 在庫 Stock | 参考価格 Price |
|--------------|--------|-----|----------|------|---------|------|--------|----------|------------|
| CDH0.2X0.6CB | 0.2 | 0.6 | 3 | 0.2 | 1.8 | 40 | 2 | ● | ¥7,300 |
| CDH0.3X0.9CB | 0.3 | 0.9 | 3 | 0.3 | 2.7 | 40 | 2 | ● | ¥6,200 |
| CDH0.4X1.2CB | 0.4 | 1.2 | 3 | 0.4 | 3.6 | 40 | 2 | ● | ¥5,600 |
| CDH0.5X1.5CB | 0.5 | 1.5 | 3 | 0.5 | 4.5 | 40 | 2 | ● | ¥5,000 |
| CDH0.6X1.8CB | 0.6 | 1.8 | 3 | 0.6 | 5.4 | 40 | 2 | ● | ¥5,000 |
| CDH0.7X2.1CB | 0.7 | 2.1 | 3 | 0.7 | 6.3 | 40 | 2 | ● | ¥5,000 |
| CDH0.8X2.4CB | 0.8 | 2.4 | 3 | 0.8 | 7.2 | 40 | 2 | ● | ¥4,400 |
| CDH0.9X2.7CB | 0.9 | 2.7 | 3 | 0.9 | 8.1 | 40 | 2 | ● | ¥4,400 |
| CDH1.0X3CB | 1 | 3 | 3 | 1 | | 40 | 1 | ● | ¥3,700 |
| CDH1.1X3CB | 1.1 | 3 | 3 | 1.1 | | 40 | 1 | □ | |
| CDH1.2X3CB | 1.2 | 3 | 3 | 1.2 | | 40 | 1 | □ | |
| CDH1.3X4CB | 1.3 | 4 | 3 | 1.3 | | 40 | 1 | □ | |
| CDH1.4X4CB | 1.4 | 4 | 3 | 1.4 | | 40 | 1 | □ | |
| CDH1.5X4CB | 1.5 | 4 | 3 | 1.5 | | 40 | 1 | □ | |
| CDH1.6X5CB | 1.6 | 5 | 3 | 1.6 | | 40 | 1 | □ | |
| CDH1.7X5CB | 1.7 | 5 | 3 | 1.7 | | 40 | 1 | □ | |
| CDH1.8X5CB | 1.8 | 5 | 3 | 1.8 | | 40 | 1 | □ | |
| CDH1.9X5CB | 1.9 | 5 | 3 | 1.9 | | 40 | 1 | □ | |
| CDH2.0X5CB | 2 | 5 | 3 | 2 | | 40 | 1 | □ | |
| CDH2.1X6CB | 2.1 | 6 | 3 | 2.1 | | 50 | 1 | □ | |
| CDH2.2X6CB | 2.2 | 6 | 3 | 2.2 | | 50 | 1 | □ | |
| CDH2.3X6CB | 2.3 | 6 | 3 | 2.3 | | 50 | 1 | □ | |
| CDH2.4X6CB | 2.4 | 6 | 3 | 2.4 | | 50 | 1 | □ | |
| CDH2.5X6CB | 2.5 | 6 | 3 | 2.5 | | 50 | 1 | □ | |
| CDH2.6X8CB | 2.6 | 8 | 3 | 2.6 | | 60 | 1 | □ | |
| CDH2.7X8CB | 2.7 | 8 | 3 | 2.7 | | 60 | 1 | □ | |
| CDH2.8X8CB | 2.8 | 8 | 3 | 2.8 | | 60 | 1 | □ | |
| CDH2.9X8CB | 2.9 | 8 | 3 | 2.9 | | 60 | 1 | □ | |
| CDH3.0X8CB | 3 | 8 | 3 | 3 | | 60 | 1 | □ | |

Stock ●...標準在庫品/Stocked
Stock □...特定商社在庫品/Stocked by Specific Distributors

■被削材適合性 Suitability for Work Materials ◎...最適 The most suitable ○...適 Suitable △...可 Possible 無印 Blank...不可 Impossible

| 製品区分 Product | 軟鋼 Mild Steel | 炭素鋼 Carbon Steel | 合金鋼 Alloy Steel | 調質鋼 Heat treated Steel | 工具鋼 Tool Steel | 焼入れ鋼 Hardened Steel | ステンレス鋼 Stainless Steel | 鋳鉄 Cast Iron | ダクタイル鋳鉄 Ductile Cast Iron | チタン合金 Titanium Alloy | アルミ合金 Aluminium Alloy | 銅 Copper | プラスチック Plastic | セラミック etc. Ceramics etc. |
|--------------|---------------|------------------|-----------------|------------------------|----------------|---------------------|------------------------|--------------|---------------------------|----------------------|-----------------------|----------|----------------|--------------------------|
| CDH-CB | ○ | ◎ | ◎ | ○ | ○ | △ | ◎ | ○ | ○ | ◎ | ◎ | ○ | ○ | ○ |
| 90CDH-CB | ○ | ◎ | ◎ | ○ | ○ | △ | ◎ | ○ | ○ | ◎ | ◎ | ○ | ○ | ○ |

SP CENTER

CENTER DRILL

GSS STARTING DRILL

GP DRILL

TFD

SPIRAL GUN BARREL DRILL

TOGLON MULTI CHAMFER

TOGLON SHARP

TOGLON HARD

CORNER ROUNDING CUTTER

JIT

SUBMARINE GATE DRILL

MICRO TOOL

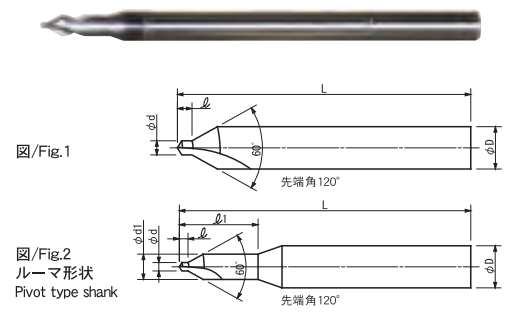
TECHNICAL INFORMATION

CUSTOMIZED TOOL SEMIORDER TOOL

INST- RUCTION

COMPANY PROFILE

超硬 HG センタードリル A形 60° ALDコーティング
Carbide HG Center Drill A Type 60° ALD Coating



A type 60° 超硬 ALD 片刃 SHANK h6 2枚刃 右刃

単位/寸法:mm 価格:円
Unit/Size:mm Price:JPY

| VAN Code No. | 刃先径 φd | φd1 | シャンク径 φD | 刃長 ℓ | ルーマ長 ℓ1 | 全長 L | 図 Fig. | 在庫 Stock | 参考価格 Price |
|-----------------|-----------|-----|-------------|---------|------------|---------|-----------|-------------|---------------|
| CDH0.2X0.6CBALD | 0.2 | 0.6 | 3 | 0.2 | 1.8 | 40 | 2 | ● | ¥8,800 |
| CDH0.3X0.9CBALD | 0.3 | 0.9 | 3 | 0.3 | 2.7 | 40 | 2 | ● | ¥7,700 |
| CDH0.4X1.2CBALD | 0.4 | 1.2 | 3 | 0.4 | 3.6 | 40 | 2 | ● | ¥7,100 |
| CDH0.5X1.5CBALD | 0.5 | 1.5 | 3 | 0.5 | 4.5 | 40 | 2 | ● | ¥6,600 |
| CDH0.6X1.8CBALD | 0.6 | 1.8 | 3 | 0.6 | 5.4 | 40 | 2 | ● | ¥6,600 |
| CDH0.7X2.1CBALD | 0.7 | 2.1 | 3 | 0.7 | 6.3 | 40 | 2 | ● | ¥6,600 |
| CDH0.8X2.4CBALD | 0.8 | 2.4 | 3 | 0.8 | 7.2 | 40 | 2 | ● | ¥6,000 |
| CDH0.9X2.7CBALD | 0.9 | 2.7 | 3 | 0.9 | 8.1 | 40 | 2 | ● | ¥6,000 |
| CDH1.0X3.0CBALD | 1 | 3 | 1 | | | 40 | 1 | ● | ¥5,300 |

Stock ●...標準在庫品/ Stocked

■被削材適合性 Suitability for Work Materials ●...最適 The most suitable ○...適 Suitable △...可 Possible 無印 Blank...不可 Impossible

| 製品区分 Product | 軟鋼 Mild Steel | 炭素鋼 Carbon Steel | 合金鋼 Alloy Steel | 調質鋼 Heat treated Steel | 工具鋼 Tool Steel | 焼入れ鋼 Hardened Steel | ステンレス鋼 Stainless Steel | 鋳鉄 Cast Iron | ダクタイル鋳鉄 Ductile Cast Iron | チタン合金 Titanium Alloy | アルミ合金 Aluminium Alloy | 銅 Copper | プラスチック Plastic | セラミック etc. Ceramics etc. |
|-----------------|------------------|---------------------|--------------------|---------------------------|-------------------|------------------------|---------------------------|-----------------|------------------------------|-------------------------|--------------------------|-------------|-------------------|-----------------------------|
| CDH-CBALD | ○ | ◎ | ◎ | ○ | ○ | △ | ◎ | ○ | ○ | ◎ | ◎ | ○ | ○ | ○ |

センタードリル 切削条件表 Center Drill Recommended Drilling Condition

ALD, TiCN coatingは切削速度(回転数)について下記条件の30%アップを推奨します。
Cutting speed may be increased by 30% for ALD and TiCN coated tools.

| 回転数 SPEED min ⁻¹ | ALD, TiCN coatingは切削速度(回転数)について下記条件の30%アップを推奨します。 Cutting speed may be increased by 30% for ALD and TiCN coated tools. | | | | | | | | | | | | | |
|-----------------------------|---|-------|------------------|-------|-----------------|-------|--------------------|------|--------------|-------|-----------------|------|-----------------|-------|
| 被削材 WORK MATERIAL | 軟鋼 MILD STEEL | | 炭素鋼 CARBON STEEL | | 合金鋼 ALLOY STEEL | | 調質鋼 HARDENED STEEL | | 鋳鋼 CAST IRON | | ステンレス STAINLESS | | アルミニウム ALUMINUM | |
| 切削速度 m/min CUTTING SPEED | 65 | 35 | 50 | 25 | 40 | 20 | 25 | 12 | 70 | 30 | 30 | 15 | 150 | 60 |
| 最大径mm Max. Dia. | CB | HSS | CB | HSS | CB | HSS | CB | HSS | CB | HSS | CB | HSS | CB | HSS |
| 0.6 | 34000 | 19000 | 27000 | 13000 | 21000 | 11000 | 13000 | 6400 | 37000 | 16000 | 16000 | 8000 | 80000 | 32000 |
| 1 | 21000 | 11000 | 16000 | 8000 | 13000 | 6400 | 8000 | 3800 | 22000 | 9500 | 9500 | 4800 | 48000 | 19000 |
| 2 | 10000 | 5600 | 8000 | 4000 | 6400 | 3200 | 4000 | 1900 | 11000 | 4800 | 4800 | 2400 | 24000 | 9500 |
| 3 | 6900 | 3700 | 5300 | 2700 | 4200 | 2100 | 2700 | 1300 | 7400 | 3200 | 3200 | 1600 | 16000 | 6400 |
| 4 | 5200 | 2800 | 4000 | 2000 | 3200 | 1600 | 2000 | 950 | 5600 | 2400 | 2400 | 1200 | 12000 | 4800 |
| 5 | 4100 | 2200 | 3200 | 1600 | 2500 | 1300 | 1600 | 770 | 4500 | 1900 | 1900 | 950 | 9500 | 3800 |
| 6 | 3400 | 1900 | 2700 | 1300 | 2100 | 1100 | 1300 | 640 | 3700 | 1600 | 1600 | 800 | 8000 | 3200 |
| 8 | 2600 | 1400 | 2000 | 990 | 1600 | 800 | 990 | 480 | 2800 | 1200 | 1200 | 600 | 6000 | 2400 |
| 10 | 2100 | 1100 | 1600 | 800 | 1300 | 640 | 800 | 380 | 2200 | 950 | 950 | 480 | 4800 | 1900 |
| 12 | 1700 | 930 | 1300 | 660 | 1100 | 530 | 660 | 320 | 1900 | 800 | 800 | 400 | 4000 | 1600 |
| 16 | 1300 | 700 | 990 | 500 | 800 | 400 | 500 | 240 | 1400 | 600 | 600 | 300 | 3000 | 1200 |
| 20 | | 560 | | 400 | | 320 | | 190 | | 480 | | 240 | | 950 |
| 22 | | 510 | | 360 | | 290 | | 170 | | 430 | | 220 | | 870 |
| 25 | | 450 | | 320 | | 250 | | 150 | | 380 | | 190 | | 760 |

送り量 mm/rev ALD, TiCN coatingは切削速度(回転数)について下記条件の30%アップを推奨します。
Cutting speed may be increased by 30% for ALD and TiCN coated tools.

| 被削材 WORK MATERIAL | 軟鋼/炭素鋼/合金鋼/ステンレス MILD/CARBON/ALLOY/STAINLESS | | 調質鋼 HARDENED STEEL | 鋳鋼 CAST IRON | | アルミニウム ALUMINUM | |
|-------------------|--|------------|--------------------|--------------|------------|-----------------|------------|
| 刃先径mm POINT DIA. | CB | HSS | CB | CB | HSS | CB | HSS |
| 0.3 | 0.01-0.03 | 0.005-0.02 | 0.005-0.02 | 0.01-0.03 | 0.005-0.02 | 0.01-0.03 | 0.005-0.02 |
| 0.5 | 0.02-0.04 | 0.01-0.03 | 0.01-0.03 | 0.02-0.04 | 0.01-0.03 | 0.02-0.04 | 0.01-0.03 |
| 0.8 | 0.03-0.06 | 0.02-0.04 | 0.02-0.04 | 0.03-0.06 | 0.02-0.04 | 0.03-0.06 | 0.02-0.04 |
| 1 | 0.04-0.07 | 0.03-0.06 | 0.03-0.06 | 0.05-0.09 | 0.04-0.07 | 0.05-0.09 | 0.04-0.07 |
| 1.5 | 0.05-0.09 | 0.04-0.07 | 0.04-0.07 | 0.06-0.11 | 0.05-0.09 | 0.06-0.11 | 0.05-0.09 |
| 2 | 0.06-0.11 | 0.05-0.09 | 0.05-0.09 | 0.07-0.13 | 0.06-0.11 | 0.07-0.13 | 0.06-0.11 |
| 2.5 | 0.07-0.13 | 0.06-0.11 | 0.06-0.11 | 0.08-0.14 | 0.07-0.13 | 0.08-0.14 | 0.07-0.13 |
| 3 | 0.08-0.14 | 0.07-0.13 | 0.07-0.13 | 0.10-0.16 | 0.08-0.14 | 0.10-0.16 | 0.08-0.14 |
| 4 | 0.10-0.16 | 0.08-0.14 | 0.08-0.14 | 0.11-0.18 | 0.10-0.16 | 0.11-0.18 | 0.10-0.16 |
| 5 | 0.11-0.18 | 0.10-0.16 | 0.10-0.16 | 0.14-0.25 | 0.11-0.18 | 0.14-0.25 | 0.11-0.18 |
| 6 | 0.14-0.25 | 0.11-0.18 | 0.11-0.18 | 0.15-0.25 | 0.14-0.25 | 0.15-0.25 | 0.14-0.25 |
| 8 | | 0.14-0.25 | | | 0.15-0.25 | | 0.15-0.25 |
| 10 | | 0.15-0.25 | | | 0.20-0.35 | | 0.20-0.35 |
| 12 | | 0.20-0.35 | | | 0.25-0.40 | | 0.25-0.40 |

切削条件設定上の注意点 Please observe when choosing the cutting conditions

- 1.上記はあくまでも目安です。状況に応じて変更してください。
 - 2.十分な水溶性クーラント、オイルミストを使用して下さい。
 - 3.次の場合は送り条件を下げて下さい。
・傾斜面への加工
・ワーク、チャッキング、機械剛性の悪い場合
 - 4.加工面取径が最大面取径より大幅に小さい場合、回転数計算時は胴径を加工面取径に変更して下さい。
 - 5.上記切削条件が加工機械の上限回転数を超える場合は、ご使用のスピンドル精度が安定する領域での高い回転数でご使用下さい。
- 1.The above values are standard conditions. They need to be adapted for optimal use of the tools.
 - 2.For drilling and chamfering please use ample water soluble coolant or oil mist.
 - 3.Please lower the speed when drilling into a slope or when working conditions are not stable (vibrations, moving of work piece, etc.)
 - 4.If the actual chamfering diameter is much smaller than the maximum chamfering diameter of the tool please use the actual processing diameter to calculate the cutting speed.
 - 5.If the recommended cutting speed exceeds the maximum speed of the machine used please use the maximum speed of the machine and adjust the other work parameters accordingly.

GSSスターティングドリル



GSS Starting Drill

2段平面とシンニングの採用により、位置精度向上

The hole position is improved by adopting tow step plane and the thinning.



面取り用の90度と、チップングの防止が可能な角度の大きい135°の2種類
スムーズな穴あけが可能
また、直進性に優れ深穴加工も安心

There are 2 types of drills, 90° is for chamfering and 135° is for preventing chippings.
GSS Starting Drill can make holes smoothly.
Brilliant straightness, and deep hole processing can be made successfully.



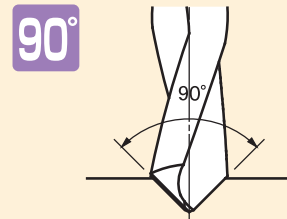
| 製品区分 Product | 画像 Photo | 材質 Material | 表面処理 Coating | シャンク Shank | 刃数 Flutes | 回転方向 Direction of rotation | 先端角 Point angle |
|-----------------|-------------|----------------|-----------------|---------------|--------------|-------------------------------|--------------------|
| 90GSS-ALT | | HSS | ALT | SHANK h7 | 2枚刃 | 右刃 | 90° |
| 135GSS-ALT | | HSS | ALT | SHANK h7 | 2枚刃 | 右刃 | 135° |

アイコンについての説明は、P.125をご覧ください。
See Page 125 for icon explanation.

GSSスターティングドリルについて

Guide to GSS Starting Drill

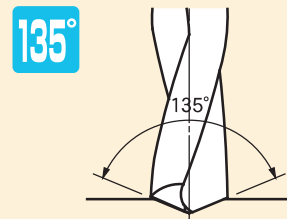
先端角 Point angle



位置決め/Spot Drilling



穴面取り/Hole Chamfering



V溝ミーリング/V Grooving



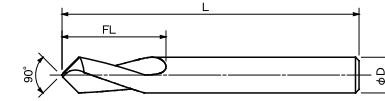
面取りミーリング/Chamfering

GSSスターティングドリル 90° ALTコーティング

GSS Starting Drill 90° ALT coating



90° 面取り用
90° for Chamfering



HSS ALT SHANK h7 2枚刃 右刃 90°

| VAN Code No. | シャंक径 φD | | 有効溝長 FL | 全長 L | 在庫 Stock | 参考価格 Price |
|--------------|-------------|----|------------|---------|-------------|---------------|
| | φD | FL | | | | |
| 90GSS3ALT | 3 | 12 | 50 | □ | | |
| 90GSS4ALT | 4 | 15 | 55 | □ | | |
| 90GSS5ALT | 5 | 18 | 60 | □ | | |
| 90GSS6ALT | 6 | 20 | 65 | □ | | |
| 90GSS8ALT | 8 | 25 | 80 | □ | | |
| 90GSS10ALT | 10 | 30 | 90 | □ | | |
| 90GSS12ALT | 12 | 35 | 100 | □ | | |
| 90GSS16ALT | 16 | 40 | 115 | □ | | |
| 90GSS20ALT | 20 | 50 | 130 | □ | | |

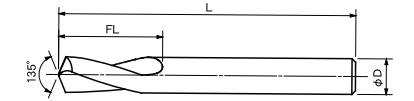
単位/寸法:mm 価格:円
Unit/Size:mm Price:JPY

GSSスターティングドリル 135° ALTコーティング

GSS Starting Drill 135° ALT coating



135° 位置決め用
135° for Starting



HSS ALT SHANK h7 2枚刃 右刃 135°

| VAN Code No. | シャंक径 φD | | 有効溝長 FL | 全長 L | 在庫 Stock | 参考価格 Price |
|--------------|-------------|----|------------|---------|-------------|---------------|
| | φD | FL | | | | |
| 135GSS3ALT | 3 | 12 | 50 | □ | | |
| 135GSS4ALT | 4 | 15 | 55 | □ | | |
| 135GSS5ALT | 5 | 18 | 60 | □ | | |
| 135GSS6ALT | 6 | 20 | 65 | □ | | |
| 135GSS8ALT | 8 | 25 | 80 | □ | | |
| 135GSS10ALT | 10 | 30 | 90 | □ | | |
| 135GSS12ALT | 12 | 35 | 100 | □ | | |
| 135GSS16ALT | 16 | 40 | 115 | □ | | |
| 135GSS20ALT | 20 | 50 | 130 | □ | | |

単位/寸法:mm 価格:円
Unit/Size:mm Price:JPY

Stock □... 特定商社在庫品 / Stocked by Specific Distributors

GSSスターティングドリル 切削条件表 GSS Starting Drill Recommended Drilling Condition

| 被削材 WORK MATERIAL | 軟鋼 MILD STEEL | | 炭素鋼 CARBON STEEL | | 合金鋼 ALLOY STEEL | | 調質鋼 HARDENED STEEL | | 鋳鋼 CAST STEEL | | ステンレス鋼 STAINLESS STEEL | | アルミニウム合金 ALUMINUM | |
|------------------------------------|-----------------------------------|-----------------------|-----------------------------------|-----------------------|-----------------------------------|-----------------------|-----------------------------------|-----------------------|-----------------------------------|-----------------------|-----------------------------------|-----------------------|-----------------------------------|-----------------------|
| | 切削速度 CUTTING SPEED | 40~60m/min | 30~50m/min | 20~30m/min | 10~15m/min | 30~50m/min | 10~20m/min | 60~80m/min | | | | | | |
| 最大面取径 Max Chamfering Dia. mm | 回転数 SPEED min ⁻¹ | 送り量 FEED mm/rev | 回転数 SPEED min ⁻¹ | 送り量 FEED mm/rev | 回転数 SPEED min ⁻¹ | 送り量 FEED mm/rev | 回転数 SPEED min ⁻¹ | 送り量 FEED mm/rev | 回転数 SPEED min ⁻¹ | 送り量 FEED mm/rev | 回転数 SPEED min ⁻¹ | 送り量 FEED mm/rev | 回転数 SPEED min ⁻¹ | 送り量 FEED mm/rev |
| 3 | 5300 | 0.05-0.06 | 4200 | 0.03-0.05 | 2700 | 0.02-0.04 | 1300 | 0.02-0.04 | 4200 | 0.03-0.05 | 1600 | 0.05-0.06 | 7400 | 0.05-0.07 |
| 4 | 4000 | 0.06-0.08 | 3200 | 0.04-0.06 | 2000 | 0.03-0.05 | 1000 | 0.03-0.05 | 3200 | 0.04-0.06 | 1200 | 0.06-0.08 | 5600 | 0.07-0.09 |
| 6 | 3200 | 0.08-0.1 | 2500 | 0.05-0.08 | 1600 | 0.04-0.06 | 800 | 0.04-0.06 | 2500 | 0.05-0.08 | 1000 | 0.08-0.1 | 4500 | 0.09-0.11 |
| 8 | 2700 | 0.09-0.12 | 2100 | 0.06-0.09 | 1300 | 0.05-0.08 | 700 | 0.05-0.08 | 2100 | 0.06-0.09 | 800 | 0.09-0.12 | 3700 | 0.11-0.14 |
| 10 | 2000 | 0.12-0.16 | 1600 | 0.08-0.12 | 1000 | 0.06-0.1 | 500 | 0.06-0.1 | 1600 | 0.08-0.12 | 600 | 0.12-0.16 | 2800 | 0.14-0.18 |
| 12 | 1600 | 0.15-0.2 | 1300 | 0.1-0.15 | 800 | 0.08-0.13 | 400 | 0.08-0.13 | 1300 | 0.1-0.15 | 500 | 0.15-0.2 | 2200 | 0.18-0.23 |
| 16 | 1300 | 0.18-0.24 | 1100 | 0.12-0.18 | 700 | 0.09-0.15 | 300 | 0.09-0.15 | 1100 | 0.12-0.18 | 400 | 0.18-0.24 | 1900 | 0.21-0.27 |

切削条件設定上の注意点 Please observe when choosing the cutting conditions

- 上記はあくまでも目安です。状況に応じて変更して下さい。
- 十分な水溶性クーラント、オイルミストを使用して下さい。
- 次の場合は送り条件を下げて下さい。
・傾斜面への加工
・ワーク、チャッキング、機械剛性の悪い場合
- 加工面取径が最大面取径より大幅に小さい場合、回転数計算時は胴径を加工面取径に変更して下さい。
- 上記切削条件が加工機械の上限回転数を超える場合は、ご使用のスピンドル精度が安定する領域での高い回転数でご使用下さい。
- 90GSS-ALTで位置決め加工を行う際は、上記切削条件表の送りを50%にして使用して下さい。
- 本工具のコーティングは通電性が悪いいため、通電方式の工具長測定装置をご使用の際はご注意ください。

■被削材適合性 Suitability for Work Materials

| 製品区分 Product | 軟鋼 Mild Steel | 炭素鋼 Carbon Steel | 合金鋼 Alloy Steel | 調質鋼 Heat treated Steel | 工具鋼 Tool Steel | 焼入れ鋼 Hardened Steel | ステンレス鋼 Stainless Steel | 鋳鉄 Cast Iron | ダクタイル鋳鉄 Ductile Cast Iron | チタン合金 Titanium Alloy | アルミ合金 Aluminum Alloy | 銅 Copper | プラスチック Plastic | セラミック etc. Ceramics etc. |
|-----------------|------------------|---------------------|--------------------|---------------------------|-------------------|------------------------|---------------------------|-----------------|------------------------------|-------------------------|-------------------------|-------------|-------------------|-----------------------------|
| | SS | S45C | SCM SCR | SKD SKS | ~40 HRC | ~45 HRC | 45~ HRC | SUS | FC | FDC | Al | Cu | | マシナブル Machinable |
| 90GSS-ALT | ◎ | ◎ | ◎ | ○ | ◎ | ○ | ◎ | ◎ | ◎ | ○ | ◎ | ◎ | △ | |
| 135GSS-ALT | ◎ | ◎ | ◎ | ○ | ◎ | ○ | ◎ | ◎ | ◎ | ○ | ◎ | ◎ | △ | |

超高速ドリル Ultra high speed drill

GPドリル



GP Drill Great Performance Drill

鋼に世界最速の小径穴加工

Available for Hardened steel drilling
smallest hole by world speed

超高速加工への挑戦
1穴0.25秒 寿命40000穴以上*

Drill for Ultra high speed manufacturing
Speed: 0.25 sec/hole - Tool life 40,000 holes.*

ステンレス、HRC40までの調質鋼にも
安定した加工が可能

Processing on heat-treated steel is possible.

3Dまでノンステップで加工可能
(状況により7Dまで加工可能)
超寿命

Non-step drilling up to L/D3
(Up to L/D7, depending on situation)
Long tool life.

*GPDS1CBALT
被削材: S50C Work Material: S50C
加工径: φ1mm Diameter: φ1mm
加工深さ: 4mm Processing depth: 4mm



| 製品区分 Product | 画像 Photo | 材質 Material | 表面処理 Coating | 特長 Special Features | シャンク Shank | 刃数 Flutes | 回転方向 Direction of rotation | 先端角 Point angle | 刃径 φD |
|-----------------|-------------|----------------|-----------------|------------------------|---------------|--------------|-------------------------------|--------------------|-------------|
| GPDS-CBALT | | 超硬 | ALT | Hi-SPEED | SHANK h6 | 2枚刃 | 右刃 | 140° 100° | 0.3~ 3.0 |
| GPDR-CBALT | | 超硬 | ALT | Hi-SPEED | SHANK h6 | 2枚刃 | 右刃 | 140° 100° | 0.3~ 3.0 |

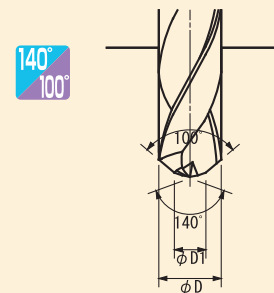
技術レポートについては、P.109、110をご覧ください。
See Page 109, 110 for technical information.

アイコンについての説明は、P.125をご覧ください。
See Page 125 for icon explanation.

GPドリルについて

Guide to GP Drill

先端角 Point angle



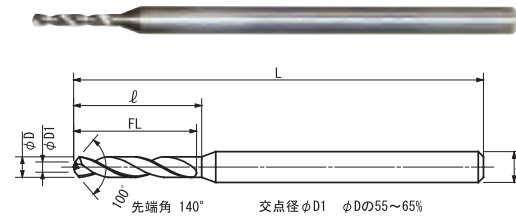
交点径φD1 φDの55~65%



穴加工/Hole Processing

GPドリル ショート5D ALTコーティング

GP Drill Short 5D ALT coating



超硬 ALT Hi-SPEED SHANK h6 2枚刃 右刃 140° 100° 0.3~ 3.0

| VAN Code No. | 直径 φD | 有効溝長 FL | 刃長 ℓ | 全長 L | シャンク径 φd | 在庫 Stock | 参考価格 Price |
|---------------|----------|------------|---------|---------|-------------|-------------|---------------|
| GPDS0.3CBALT | 0.3 | 1.8 | 1.9 | 40 | 3 | ● | ¥4,000 |
| GPDS0.31CBALT | 0.31 | 1.8 | 1.9 | 40 | 3 | ● | ¥5,000 |
| GPDS0.32CBALT | 0.32 | 1.8 | 1.9 | 40 | 3 | ● | ¥5,000 |
| GPDS0.33CBALT | 0.33 | 1.8 | 1.9 | 40 | 3 | ● | ¥5,000 |
| GPDS0.34CBALT | 0.34 | 1.8 | 1.9 | 40 | 3 | ● | ¥5,000 |
| GPDS0.35CBALT | 0.35 | 2.1 | 2.2 | 40 | 3 | ● | ¥5,000 |
| GPDS0.36CBALT | 0.36 | 2.1 | 2.2 | 40 | 3 | ● | ¥5,000 |
| GPDS0.37CBALT | 0.37 | 2.1 | 2.2 | 40 | 3 | ● | ¥5,000 |
| GPDS0.38CBALT | 0.38 | 2.1 | 2.2 | 40 | 3 | ● | ¥5,000 |
| GPDS0.39CBALT | 0.39 | 2.1 | 2.2 | 40 | 3 | ● | ¥5,000 |
| GPDS0.4CBALT | 0.4 | 2.4 | 2.5 | 40 | 3 | ● | ¥4,000 |
| GPDS0.41CBALT | 0.41 | 2.4 | 2.5 | 40 | 3 | ● | ¥5,000 |
| GPDS0.42CBALT | 0.42 | 2.4 | 2.5 | 40 | 3 | ● | ¥5,000 |
| GPDS0.43CBALT | 0.43 | 2.4 | 2.5 | 40 | 3 | ● | ¥5,000 |
| GPDS0.44CBALT | 0.44 | 2.4 | 2.5 | 40 | 3 | ● | ¥5,000 |
| GPDS0.45CBALT | 0.45 | 2.7 | 2.8 | 40 | 3 | ● | ¥5,000 |
| GPDS0.46CBALT | 0.46 | 2.7 | 2.8 | 40 | 3 | ● | ¥5,000 |
| GPDS0.47CBALT | 0.47 | 2.7 | 2.8 | 40 | 3 | ● | ¥5,000 |
| GPDS0.48CBALT | 0.48 | 2.7 | 2.8 | 40 | 3 | ● | ¥5,000 |
| GPDS0.49CBALT | 0.49 | 2.7 | 2.8 | 40 | 3 | ● | ¥5,000 |
| GPDS0.5CBALT | 0.5 | 3 | 3.2 | 40 | 3 | ● | ¥3,500 |
| GPDS0.51CBALT | 0.51 | 3 | 3.2 | 40 | 3 | ● | ¥4,500 |
| GPDS0.52CBALT | 0.52 | 3 | 3.2 | 40 | 3 | ● | ¥4,500 |
| GPDS0.53CBALT | 0.53 | 3 | 3.2 | 40 | 3 | ● | ¥4,500 |
| GPDS0.54CBALT | 0.54 | 3 | 3.2 | 40 | 3 | ● | ¥4,500 |
| GPDS0.55CBALT | 0.55 | 3 | 3.2 | 40 | 3 | ● | ¥4,500 |
| GPDS0.56CBALT | 0.56 | 3 | 3.2 | 40 | 3 | ● | ¥4,500 |
| GPDS0.57CBALT | 0.57 | 3 | 3.2 | 40 | 3 | ● | ¥4,500 |
| GPDS0.58CBALT | 0.58 | 3 | 3.2 | 40 | 3 | ● | ¥4,500 |
| GPDS0.59CBALT | 0.59 | 3 | 3.2 | 40 | 3 | ● | ¥4,500 |
| GPDS0.6CBALT | 0.6 | 3.6 | 3.8 | 40 | 3 | ● | ¥3,500 |
| GPDS0.61CBALT | 0.61 | 3.6 | 3.8 | 40 | 3 | ● | ¥4,500 |
| GPDS0.62CBALT | 0.62 | 3.6 | 3.8 | 40 | 3 | ● | ¥4,500 |
| GPDS0.63CBALT | 0.63 | 3.6 | 3.8 | 40 | 3 | ● | ¥4,500 |
| GPDS0.64CBALT | 0.64 | 3.6 | 3.8 | 40 | 3 | ● | ¥4,500 |
| GPDS0.65CBALT | 0.65 | 3.6 | 3.8 | 40 | 3 | ● | ¥4,500 |
| GPDS0.66CBALT | 0.66 | 3.6 | 3.8 | 40 | 3 | ● | ¥4,500 |
| GPDS0.67CBALT | 0.67 | 3.6 | 3.8 | 40 | 3 | ● | ¥4,500 |
| GPDS0.68CBALT | 0.68 | 3.6 | 3.8 | 40 | 3 | ● | ¥4,500 |
| GPDS0.69CBALT | 0.69 | 3.6 | 3.8 | 40 | 3 | ● | ¥4,500 |

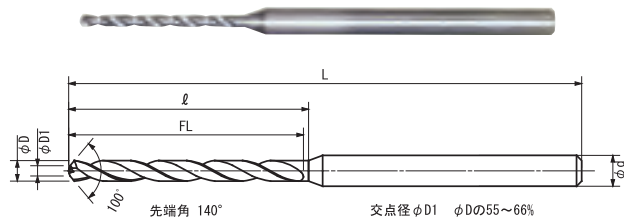
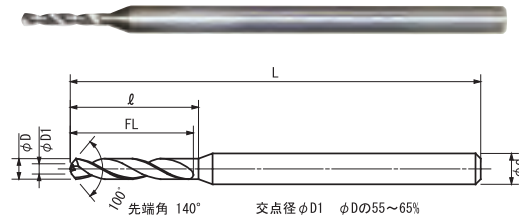
■被削材適合性 Suitability for Work Materials ●...最適 The most suitable ○...適 Suitable △...可 Possible 無印 Blank...不可 Impossible

| 製品区分 Product | 軟鋼 Mild Steel | 炭素鋼 Carbon Steel | 合金鋼 Alloy Steel | 調質鋼 Heat treated Steel | 工具鋼 Tool Steel | 焼入れ鋼 Hardened Steel | ステンレス鋼 Stainless Steel | 鋳鉄 Cast Iron | グダタル鋳鉄 Ductile Cast Iron | チタン合金 Titanium Alloy | アルミ合金 Aluminium Alloy | 銅 Copper | プラスチック Plastic | セラミック etc. Ceramics etc. |
|-----------------|------------------|---------------------|--------------------|---------------------------|-------------------|------------------------|---------------------------|-----------------|-----------------------------|-------------------------|--------------------------|-------------|-------------------|-----------------------------|
| GPDS-CBALT | ◎ | ◎ | ◎ | ◎ | ◎ | ○ | ◎ | ○ | ○ | ○ | △ | △ | △ | ○ |

Stock ●... 標準在庫品 / Stocked

GPドリル ショート5D ALTコーティング
GP Drill Short 5D ALT coating

GPドリル レギュラー10D ALTコーティング
GP Drill Regular 10D ALT coating



超硬 ALT Hi-SPEED SHANK h6 2枚刃 右刃 140° 100° 0.3~3.0

超硬 ALT Hi-SPEED SHANK h6 2枚刃 右刃 140° 100° 0.3~3.0

単位/寸法:mm 価格:円
Unit/Size:mm Price:JPY

単位/寸法:mm 価格:円
Unit/Size:mm Price:JPY

単位/寸法:mm 価格:円
Unit/Size:mm Price:JPY

単位/寸法:mm 価格:円
Unit/Size:mm Price:JPY

| VAN Code No. | 直径φD | 有効溝長FL | 刃長ℓ | 全長L | シャンク径φd | 在庫Stock | 参考価格Price |
|---------------|------|--------|------|-----|---------|---------|-----------|
| GPDS2.3CBALT | 2.3 | 13.8 | 14.3 | 60 | 4 | ● | ¥5,000 |
| GPDS2.35CBALT | 2.35 | 13.8 | 14.3 | 60 | 4 | ● | ¥6,000 |
| GPDS2.4CBALT | 2.4 | 13.8 | 14.3 | 60 | 4 | ● | ¥5,000 |
| GPDS2.45CBALT | 2.45 | 13.8 | 14.3 | 60 | 4 | ● | ¥6,000 |
| GPDS2.5CBALT | 2.5 | 13.8 | 14.3 | 60 | 4 | ● | ¥5,000 |
| GPDS2.55CBALT | 2.55 | 13.8 | 14.3 | 60 | 4 | ● | ¥6,000 |
| GPDS2.6CBALT | 2.6 | 15.6 | 16.1 | 60 | 4 | ● | ¥5,000 |
| GPDS2.65CBALT | 2.65 | 15.6 | 16.1 | 60 | 4 | ● | ¥6,000 |
| GPDS2.7CBALT | 2.7 | 15.6 | 16.1 | 60 | 4 | ● | ¥5,000 |
| GPDS2.75CBALT | 2.75 | 15.6 | 16.1 | 60 | 4 | ● | ¥6,000 |
| GPDS2.8CBALT | 2.8 | 16.8 | 17.3 | 60 | 4 | ● | ¥5,000 |
| GPDS2.85CBALT | 2.85 | 16.8 | 17.3 | 60 | 4 | ● | ¥6,000 |
| GPDS2.9CBALT | 2.9 | 16.8 | 17.3 | 60 | 4 | ● | ¥5,000 |
| GPDS2.95CBALT | 2.95 | 16.8 | 17.3 | 60 | 4 | ● | ¥6,000 |
| GPDS3CBALT | 3 | 18 | 18.5 | 60 | 4 | ● | ¥4,500 |

| VAN Code No. | 直径φD | 有効溝長FL | 刃長ℓ | 全長L | シャンク径φd | 在庫Stock | 参考価格Price |
|---------------|------|--------|-----|-----|---------|---------|-----------|
| GPDR0.3CBALT | 0.3 | 3.6 | 3.7 | 40 | 3 | ● | ¥4,500 |
| GPDR0.31CBALT | 0.31 | 3.6 | 3.7 | 40 | 3 | ● | ¥5,500 |
| GPDR0.32CBALT | 0.32 | 3.6 | 3.7 | 40 | 3 | ● | ¥5,500 |
| GPDR0.33CBALT | 0.33 | 3.6 | 3.7 | 40 | 3 | ● | ¥5,500 |
| GPDR0.34CBALT | 0.34 | 3.6 | 3.7 | 40 | 3 | ● | ¥5,500 |
| GPDR0.35CBALT | 0.35 | 4.2 | 4.3 | 40 | 3 | ● | ¥5,500 |
| GPDR0.36CBALT | 0.36 | 4.2 | 4.3 | 40 | 3 | ● | ¥5,500 |
| GPDR0.37CBALT | 0.37 | 4.2 | 4.3 | 40 | 3 | ● | ¥5,500 |
| GPDR0.38CBALT | 0.38 | 4.2 | 4.3 | 40 | 3 | ● | ¥5,500 |
| GPDR0.39CBALT | 0.39 | 4.2 | 4.3 | 40 | 3 | ● | ¥5,500 |
| GPDR0.4CBALT | 0.4 | 4.8 | 4.9 | 40 | 3 | ● | ¥4,500 |
| GPDR0.41CBALT | 0.41 | 4.8 | 4.9 | 40 | 3 | ● | ¥5,500 |
| GPDR0.42CBALT | 0.42 | 4.8 | 4.9 | 40 | 3 | ● | ¥5,500 |
| GPDR0.43CBALT | 0.43 | 4.8 | 4.9 | 40 | 3 | ● | ¥5,500 |
| GPDR0.44CBALT | 0.44 | 4.8 | 4.9 | 40 | 3 | ● | ¥5,500 |
| GPDR0.45CBALT | 0.45 | 5.4 | 5.5 | 40 | 3 | ● | ¥5,500 |
| GPDR0.46CBALT | 0.46 | 5.4 | 5.5 | 40 | 3 | ● | ¥5,500 |
| GPDR0.47CBALT | 0.47 | 5.4 | 5.5 | 40 | 3 | ● | ¥5,500 |
| GPDR0.48CBALT | 0.48 | 5.4 | 5.5 | 40 | 3 | ● | ¥5,500 |
| GPDR0.49CBALT | 0.49 | 5.4 | 5.5 | 40 | 3 | ● | ¥5,500 |
| GPDR0.5CBALT | 0.5 | 6 | 6.2 | 40 | 3 | ● | ¥4,000 |
| GPDR0.51CBALT | 0.51 | 6 | 6.2 | 40 | 3 | ● | ¥5,000 |
| GPDR0.52CBALT | 0.52 | 6 | 6.2 | 40 | 3 | ● | ¥5,000 |
| GPDR0.53CBALT | 0.53 | 6 | 6.2 | 40 | 3 | ● | ¥5,000 |
| GPDR0.54CBALT | 0.54 | 6 | 6.2 | 40 | 3 | ● | ¥5,000 |
| GPDR0.55CBALT | 0.55 | 6 | 6.2 | 40 | 3 | ● | ¥5,000 |
| GPDR0.56CBALT | 0.56 | 6 | 6.2 | 40 | 3 | ● | ¥5,000 |
| GPDR0.57CBALT | 0.57 | 6 | 6.2 | 40 | 3 | ● | ¥5,000 |
| GPDR0.58CBALT | 0.58 | 6 | 6.2 | 40 | 3 | ● | ¥5,000 |
| GPDR0.59CBALT | 0.59 | 6 | 6.2 | 40 | 3 | ● | ¥5,000 |
| GPDR0.6CBALT | 0.6 | 7.2 | 7.4 | 40 | 3 | ● | ¥4,000 |
| GPDR0.61CBALT | 0.61 | 7.2 | 7.4 | 40 | 3 | ● | ¥5,000 |
| GPDR0.62CBALT | 0.62 | 7.2 | 7.4 | 40 | 3 | ● | ¥5,000 |
| GPDR0.63CBALT | 0.63 | 7.2 | 7.4 | 40 | 3 | ● | ¥5,000 |
| GPDR0.64CBALT | 0.64 | 7.2 | 7.4 | 40 | 3 | ● | ¥5,000 |
| GPDR0.65CBALT | 0.65 | 7.2 | 7.4 | 40 | 3 | ● | ¥5,000 |
| GPDR0.66CBALT | 0.66 | 7.2 | 7.4 | 40 | 3 | ● | ¥5,000 |

Stock ●...標準在庫品/Stocked

| VAN Code No. | 直径φD | 有効溝長FL | 刃長ℓ | 全長L | シャンク径φd | 在庫Stock | 参考価格Price |
|---------------|------|--------|------|-----|---------|---------|-----------|
| GPDR0.67CBALT | 0.67 | 7.2 | 7.4 | 40 | 3 | ● | ¥5,000 |
| GPDR0.68CBALT | 0.68 | 7.2 | 7.4 | 40 | 3 | ● | ¥5,000 |
| GPDR0.69CBALT | 0.69 | 7.2 | 7.4 | 40 | 3 | ● | ¥5,000 |
| GPDR0.7CBALT | 0.7 | 8.4 | 8.6 | 40 | 3 | ● | ¥4,000 |
| GPDR0.71CBALT | 0.71 | 8.4 | 8.6 | 40 | 3 | ● | ¥5,000 |
| GPDR0.72CBALT | 0.72 | 8.4 | 8.6 | 40 | 3 | ● | ¥5,000 |
| GPDR0.73CBALT | 0.73 | 8.4 | 8.6 | 40 | 3 | ● | ¥5,000 |
| GPDR0.74CBALT | 0.74 | 8.4 | 8.6 | 40 | 3 | ● | ¥5,000 |
| GPDR0.75CBALT | 0.75 | 8.4 | 8.6 | 40 | 3 | ● | ¥5,000 |
| GPDR0.76CBALT | 0.76 | 8.4 | 8.6 | 40 | 3 | ● | ¥5,000 |
| GPDR0.77CBALT | 0.77 | 8.4 | 8.6 | 40 | 3 | ● | ¥5,000 |
| GPDR0.78CBALT | 0.78 | 8.4 | 8.6 | 40 | 3 | ● | ¥5,000 |
| GPDR0.79CBALT | 0.79 | 8.4 | 8.6 | 40 | 3 | ● | ¥5,000 |
| GPDR0.8CBALT | 0.8 | 9.6 | 9.8 | 40 | 3 | ● | ¥4,000 |
| GPDR0.81CBALT | 0.81 | 9.6 | 9.8 | 40 | 3 | ● | ¥5,000 |
| GPDR0.82CBALT | 0.82 | 9.6 | 9.8 | 40 | 3 | ● | ¥5,000 |
| GPDR0.83CBALT | 0.83 | 9.6 | 9.8 | 40 | 3 | ● | ¥5,000 |
| GPDR0.84CBALT | 0.84 | 9.6 | 9.8 | 40 | 3 | ● | ¥5,000 |
| GPDR0.85CBALT | 0.85 | 9.6 | 9.8 | 40 | 3 | ● | ¥5,000 |
| GPDR0.86CBALT | 0.86 | 9.6 | 9.8 | 40 | 3 | ● | ¥5,000 |
| GPDR0.87CBALT | 0.87 | 9.6 | 9.8 | 40 | 3 | ● | ¥5,000 |
| GPDR0.88CBALT | 0.88 | 9.6 | 9.8 | 40 | 3 | ● | ¥5,000 |
| GPDR0.89CBALT | 0.89 | 9.6 | 9.8 | 40 | 3 | ● | ¥5,000 |
| GPDR0.9CBALT | 0.9 | 10.8 | 11.1 | 40 | 3 | ● | ¥4,000 |
| GPDR0.91CBALT | 0.91 | 10.8 | 11.1 | 40 | 3 | ● | ¥5,000 |
| GPDR0.92CBALT | 0.92 | 10.8 | 11.1 | 40 | 3 | ● | ¥5,000 |
| GPDR0.93CBALT | 0.93 | 10.8 | 11.1 | 40 | 3 | ● | ¥5,000 |
| GPDR0.94CBALT | 0.94 | 10.8 | 11.1 | 40 | 3 | ● | ¥5,000 |
| GPDR0.95CBALT | 0.95 | 10.8 | 11.1 | 40 | 3 | ● | ¥5,000 |
| GPDR0.96CBALT | 0.96 | 10.8 | 11.1 | 40 | 3 | ● | ¥5,000 |
| GPDR0.97CBALT | 0.97 | 10.8 | 11.1 | 40 | 3 | ● | ¥5,000 |
| GPDR0.98CBALT | 0.98 | 10.8 | 11.1 | 40 | 3 | ● | ¥5,000 |
| GPDR0.99CBALT | 0.99 | 10.8 | 11.1 | 40 | 3 | ● | ¥5,000 |
| GPDR1CBALT | 1 | 12 | 12.3 | 50 | 3 | ● | ¥4,000 |
| GPDR1.05CBALT | 1.05 | 12 | 12.3 | 50 | 3 | ● | ¥5,500 |
| GPDR1.1CBALT | 1.1 | 12 | 12.3 | 50 | 3 | ● | ¥4,500 |
| GPDR1.15CBALT | 1.15 | 12 | 12.3 | 50 | 3 | ● | ¥5,500 |

Stock ●...標準在庫品/Stocked

| VAN Code No. | 直径φD | 有効溝長FL | 刃長ℓ | 全長L | シャンク径φd | 在庫Stock | 参考価格Price |
|---------------|------|--------|------|-----|---------|---------|-----------|
| GPDR1.2CBALT | 1.2 | 14.4 | 14.8 | 50 | 3 | ● | ¥4,500 |
| GPDR1.25CBALT | 1.25 | 14.4 | 14.8 | 50 | 3 | ● | ¥5,500 |
| GPDR1.3CBALT | 1.3 | 14.4 | 14.8 | 50 | 3 | ● | ¥4,500 |
| GPDR1.35CBALT | 1.35 | 14.4 | 14.8 | 50 | 3 | ● | ¥5,500 |
| GPDR1.4CBALT | 1.4 | 16.8 | 17.2 | 50 | 3 | ● | ¥4,500 |
| GPDR1.45CBALT | 1.45 | 16.8 | 17.2 | 50 | 3 | ● | ¥5,500 |
| GPDR1.5CBALT | 1.5 | 16.8 | 17.2 | 50 | 3 | ● | ¥4,500 |
| GPDR1.55CBALT | 1.55 | 16.8 | 17.2 | 50 | 3 | ● | ¥5,500 |
| GPDR1.6CBALT | 1.6 | 19.2 | 19.7 | 50 | 3 | ● | ¥4,500 |
| GPDR1.65CBALT | 1.65 | 19.2 | 19.7 | 50 | 3 | ● | ¥5,500 |
| GPDR1.7CBALT | 1.7 | 19.2 | 19.7 | 50 | 3 | ● | ¥4,500 |
| GPDR1.75CBALT | 1.75 | 19.2 | 19.7 | 50 | 3 | ● | ¥5,500 |
| GPDR1.8CBALT | 1.8 | 21.6 | 22.1 | 50 | 3 | ● | ¥4,500 |
| GPDR1.85CBALT | 1.85 | 21.6 | 22.1 | 50 | 3 | ● | ¥5,500 |
| GPDR1.9CBALT | 1.9 | 21.6 | 22.1 | 50 | 3 | ● | ¥4,500 |
| GPDR1.95CBALT | 1.95 | 21.6 | 22.1 | 50 | 3 | ● | ¥5,500 |
| GPDR2CBALT | 2 | 24 | 24.5 | 60 | 3 | ● | ¥4,500 |
| GPDR2.05CBALT | 2.05 | 24 | 24.5 | 60 | 3 | ● | ¥6,000 |
| GPDR2.1CBALT | 2.1 | 24 | 24.5 | 60 | 3 | ● | ¥5,000 |
| GPDR2.15CBALT | 2.15 | 24 | 24.5 | 60 | 3 | ● | ¥6,000 |
| GPDR2.2CBALT | 2.2 | 24 | 24.5 | 60 | 3 | ● | ¥5,000 |
| GPDR2.25CBALT | 2.25 | 24 | 24.5 | 60 | 3 | ● | ¥6,000 |
| GPDR2.3CBALT | 2.3 | 27.6 | 28.1 | 60 | 4 | ● | ¥5,500 |
| GPDR2.35CBALT | 2.35 | 27.6 | 28.1 | 60 | 4 | ● | ¥6,500 |
| GPDR2.4CBALT | 2.4 | 27.6 | 28.1 | 60 | 4 | ● | ¥5,500 |
| GPDR2.45CBALT | 2.45 | 27.6 | 28.1 | 60 | 4 | ● | ¥6,500 |
| GPDR2.5CBALT | 2.5 | 27.6 | 28.1 | 60 | 4 | ● | ¥5,500 |
| GPDR2.55CBALT | 2.55 | 27.6 | 28.1 | 60 | 4 | ● | ¥6,500 |
| GPDR2.6CBALT | 2.6 | 31.2 | 31.7 | 60 | 4 | ● | ¥5,500 |
| GPDR2.65CBALT | 2.65 | 31.2 | 31.7 | 60 | 4 | ● | ¥6,500 |
| GPDR2.7CBALT | 2.7 | 31.2 | 31.7 | 60 | 4 | ● | ¥5,500 |
| GPDR2.75CBALT | 2.75 | 31.2 | 31.7 | 60 | 4 | ● | ¥6,500 |
| GPDR2.8CBALT | 2.8 | 33.6 | 34.1 | 60 | 4 | ● | ¥5,500 |
| GPDR2.85CBALT | 2.85 | 33.6 | 34.1 | 60 | 4 | ● | ¥6,500 |
| GPDR2.9CBALT | 2.9 | 33.6 | 34.1 | 60 | 4 | ● | ¥5,500 |
| GPDR2.95CBALT | 2.95 | 33.6 | 34.1 | 60 | 4 | ● | ¥6,500 |
| GPDR3CBALT | 3 | 36 | 36.5 | 60 | 4 | ● | ¥5,000 |

■被削材適合性 Suitability for Work Materials ●...最適 The most suitable ○...適 Suitable △...可 Possible 無印 Blank...不可 Impossible

| 製品区分 Product | 軟鋼 Mild Steel | 炭素鋼 Carbon Steel | 合金鋼 Alloy Steel | 調質鋼 Heat treated Steel | 工具鋼 Tool Steel | 焼入れ鋼 Hardened Steel | ステンレス鋼 Stainless Steel | 鋳鉄 Cast Iron | ダクタイル鋳鉄 Ductile Cast Iron | チタン合金 Titanium Alloy | アルミ合金 Aluminium Alloy | 銅 Copper | プラスチック Plastic | セラミック etc. Ceramics etc. |
|--------------|---------------|------------------|-----------------|------------------------|----------------|---------------------|------------------------|--------------|---------------------------|----------------------|-----------------------|----------|----------------|--------------------------|
| GPDS-CBALT | ◎ | ◎ | ◎ | ◎ | ◎ | ○ | ◎ | ○ | ○ | ○ | △ | △ | △ | ○ |
| GPDR-CBALT | ◎ | ◎ | ◎ | ◎ | ◎ | ○ | ◎ | ○ | ○ | ○ | △ | △ | △ | ○ |

■被削材適合性 Suitability for Work Materials ●...最適 The most suitable ○...適 Suitable △...可 Possible 無印 Blank...不可 Impossible

| 製品区分 Product | 軟鋼 Mild Steel | 炭素鋼 Carbon Steel | 合金鋼 Alloy Steel | 調質鋼 Heat treated Steel | 工具鋼 Tool Steel | 焼入れ鋼 Hardened Steel | ステンレス鋼 Stainless Steel | 鋳鉄 Cast Iron | ダクタイル鋳鉄 Ductile Cast Iron | チタン合金 Titanium Alloy | アルミ合金 Aluminium Alloy | 銅 Copper | プラスチック Plastic | セラミック etc. Ceramics etc. |
|--------------|---------------|------------------|-----------------|------------------------|----------------|---------------------|------------------------|--------------|---------------------------|----------------------|-----------------------|----------|----------------|--------------------------|
| GPDR-CBALT | ◎ | ◎ | ◎ | ◎ | ◎ | ○ | ◎ | ○ | ○ | ○ | △ | △ | △ | ○ |

| GPドリル 切削条件表 GP Drill Recommended Drilling Condition | | | | | | | | | | | | | | | | | |
|---|------------------------|--------------------------------|-----------------------------------|-------------------|------------------------------|--------------------------------|-----------------------------------|-------------------|------------------------------|--------------------------------|-----------------------------------|-------------------|------------------------------|--------------------------------|-----------------------------------|-------------------|------------------------------|
| 被削材 WORK MATERIAL | S55C High speed mode | | | | NAK55 HRC37 | | | | SUS | | | | SCM440 | | | | |
| | ドリル径 DIAMETER mm | 切削速度 CUTTING SPEED m/min | 回転数 SPEED min ⁻¹ | 送り量 FEED mm | 送り速度 FEED SPEED mm/min | 切削速度 CUTTING SPEED m/min | 回転数 SPEED min ⁻¹ | 送り量 FEED mm | 送り速度 FEED SPEED mm/min | 切削速度 CUTTING SPEED m/min | 回転数 SPEED min ⁻¹ | 送り量 FEED mm | 送り速度 FEED SPEED mm/min | 切削速度 CUTTING SPEED m/min | 回転数 SPEED min ⁻¹ | 送り量 FEED mm | 送り速度 FEED SPEED mm/min |
| CENTER DRILL | 0.3 | 55 | 58,400 | 0.01 | 580 | 17 | 18,000 | 0.005 | 90 | 17 | 18,000 | 0.01 | 110 | 45 | 47,700 | 0.01 | 480 |
| | 0.4 | 60 | 47,700 | 0.02 | 720 | 18 | 14,300 | 0.007 | 100 | 18 | 14,300 | 0.01 | 110 | 50 | 39,800 | 0.02 | 600 |
| | 0.5 | 65 | 41,400 | 0.02 | 830 | 20 | 12,700 | 0.01 | 130 | 20 | 12,700 | 0.01 | 150 | 55 | 35,000 | 0.02 | 700 |
| GSS STARTING DRILL | 0.7 | 70 | 31,800 | 0.05 | 1,590 | 22 | 10,000 | 0.016 | 160 | 22 | 10,000 | 0.02 | 200 | 60 | 27,300 | 0.04 | 960 |
| | 1 | 80 | 25,500 | 0.08 | 2,040 | 25 | 8,000 | 0.025 | 200 | 25 | 8,000 | 0.03 | 240 | 70 | 22,300 | 0.05 | 1,120 |
| | 1.5 | 80 | 17,000 | 0.1 | 1,700 | 25 | 5,300 | 0.035 | 190 | 25 | 5,300 | 0.04 | 210 | 70 | 14,900 | 0.07 | 970 |
| GP DRILL | 2 | 80 | 12,700 | 0.12 | 1,520 | 25 | 4,000 | 0.04 | 160 | 25 | 4,000 | 0.06 | 220 | 70 | 11,100 | 0.08 | 890 |
| | 3 | 80 | 8,500 | 0.15 | 1,280 | 25 | 2,700 | 0.05 | 140 | 25 | 2,700 | 0.07 | 190 | 70 | 7,400 | 0.11 | 810 |

切削条件設定上の注意点 Please observe when choosing the cutting conditions

- 上記はあくまでも目安です。状況に応じて変更して下さい。
 - 高速加工用のドリルです。一般的な加工条件で加工することは可能ですが、高速加工を行うことにより、最大1.5~2倍の寿命が得られます。
 - 上記最大回転数の60%を超えるような条件で使用する場合は、水溶性切削油剤をご使用ください。それ以下の場合はオイルミストでも対応可能です。
 - 上記切削条件が加工機械の上限回転数を超える場合は、ご使用のスピンドル精度が安定する領域での高い回転数でご使用下さい。
 - 次の場合は送り条件を下げて下さい。
 - ワーク、チャッキング、機械剛性の悪い場合
 - 工具径0.5mm以下の場合や、ステンレス鋼、調質鋼を加工の際は、必要に応じてステップ加工を行ってください。
 - 炭素鋼、合金鋼の高速加工（切削速度が60m/min、送り量が加工径の10%を超える条件）を行う場合、穴深さが径の3倍までの加工ではノンステップ加工を推奨します。
 - 本工具のコーティングは通電性が悪いいため、通電方式の工具長測定装置をご使用の際はご注意ください。
- The above values are standard conditions. They need to be adapted for optimal use of the tools.
 - This drill is for high speed processing. It is possible to process by general cutting condition, however, tool life will be 1.5~2times when you do high speed processing.
 - When the condition is over 60% of upon max speed, please use water-soluble cutting oil. If the speed is lower, you are possible to use oil mist.
 - If the recommended cutting speed exceeds the maximum speed of the machine used please use the maximum speed of the machine and adjust the other work parameters accordingly.
 - Please lower the speed when working conditions are not stable (vibrations, moving of work piece, etc.)
 - Please do step drilling method; diameter 1/10~1/2 as appropriate if the tool diameter is under 0.5mm, processing stainless steel or Heat treated steel.
 - When Carbon steel, Alloy steel is high-speed processed (cutting speed 60m/min, feed rate is over 10% of processing diameter), we recommend non-step processing if the depth is 3times of diameter.
 - Please give it attention when you use measuring instrument which is electric current supply system, because coating of this tool is difficult to turn on electricity.

SP CENTER

CENTER DRILL

GSS STARTING DRILL

GP DRILL

TFD

SPIRAL GUN BARREL DRILL

TOGLON MULTI CHAMFER

TOGLON SHARP

TOGLON HARD

CORNER ROUNDING CUTTER

JIT

SUBMARINE GATE DRILL

MICRO TOOL

TECHNICAL INFORMATION

CUSTOMIZED TOOL SEMIORDER TOOL

INSTRUCTION

COMPANY PROFILE

SP CENTER

CENTER DRILL

GSS STARTING DRILL

GP DRILL

TFD

SPIRAL GUN BARREL DRILL

TOGLON MULTI CHAMFER

TOGLON SHARP

TOGLON HARD

CORNER ROUNDING CUTTER

JIT

SUBMARINE GATE DRILL

MICRO TOOL

TECHNICAL INFORMATION

CUSTOMIZED TOOL SEMIORDER TOOL

INSTRUCTION

COMPANY PROFILE

小径3枚刃ドリル Small diameter three flute drill

TFD



Three Flute Drill

高い精度で、安定した加工
High precision and stable processing.



真円度がよくなり、穴あけ後のリーマー加工が不要
高剛性溝形状とスタブ溝長により、
高能率・高精度加工が可能
タップの下穴加工用としても最適

Minimal run-out and maximal roundness of the drilled hole.
High efficiency and accuracy can be achieved by special flute geometry and short flute length.
Ideal for pre-hole drilling when tapping.

| 製品区分 Product | 画像 Photo | 材質 Material | 表面処理 Coating | シャンク Shank | 刃数 Flutes | 回転方向 Direction of rotation | 先端角 Point angle | 刃径 φD |
|-----------------|-------------|----------------|-----------------|---------------|--------------|-------------------------------|--------------------|----------|
| TFDS-CBTICN | | 超硬 | TiCN | SHANK h6 | 3枚刃 | 右刃 | 140° | 0.3~3.0 |

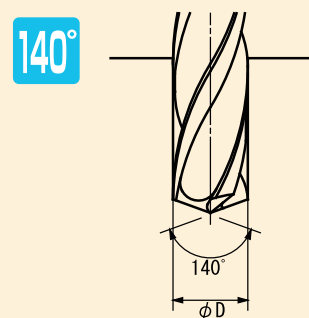
技術レポートについては、P.106、119をご覧ください。
See Page 119 for technical information.

アイコンについての説明は、P.125をご覧ください。
See Page 125 for icon explanation.

TFD について

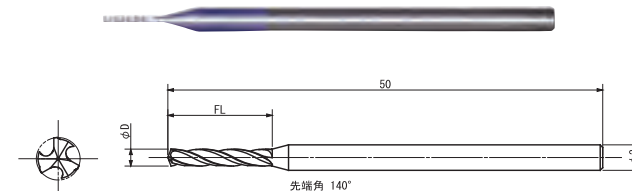
Guide to TFD

先端角 Point angle



穴加工 / Hole Processing

TFD 超硬 TiCNコーティング Three Flute Drill Carbide TiCN coating



超硬 TiCN SHANK h6 3枚刃 右刃 140° 0.3~3.0

| VAN Code No. | 直径 φD | 有効溝長 FL | 在庫 Stock | 参考価格 Price |
|----------------|-------|---------|----------|------------|
| TFDS0.3CBTICN | 0.3 | 1.8 | □ | |
| TFDS0.31CBTICN | 0.31 | 1.8 | □ | |
| TFDS0.32CBTICN | 0.32 | 1.8 | □ | |
| TFDS0.33CBTICN | 0.33 | 1.8 | □ | |
| TFDS0.34CBTICN | 0.34 | 1.8 | □ | |
| TFDS0.35CBTICN | 0.35 | 2.1 | □ | |
| TFDS0.36CBTICN | 0.36 | 2.1 | □ | |
| TFDS0.37CBTICN | 0.37 | 2.1 | □ | |
| TFDS0.38CBTICN | 0.38 | 2.1 | □ | |
| TFDS0.39CBTICN | 0.39 | 2.1 | □ | |
| TFDS0.4CBTICN | 0.4 | 2.4 | □ | |
| TFDS0.41CBTICN | 0.41 | 2.4 | □ | |
| TFDS0.42CBTICN | 0.42 | 2.4 | □ | |
| TFDS0.43CBTICN | 0.43 | 2.4 | □ | |
| TFDS0.44CBTICN | 0.44 | 2.4 | □ | |
| TFDS0.45CBTICN | 0.45 | 2.7 | □ | |
| TFDS0.46CBTICN | 0.46 | 2.7 | □ | |
| TFDS0.47CBTICN | 0.47 | 2.7 | □ | |
| TFDS0.48CBTICN | 0.48 | 2.7 | □ | |
| TFDS0.49CBTICN | 0.49 | 2.7 | □ | |
| TFDS0.5CBTICN | 0.5 | 3 | □ | |
| TFDS0.51CBTICN | 0.51 | 3 | □ | |
| TFDS0.52CBTICN | 0.52 | 3 | □ | |
| TFDS0.53CBTICN | 0.53 | 3 | □ | |
| TFDS0.54CBTICN | 0.54 | 3 | □ | |
| TFDS0.55CBTICN | 0.55 | 3 | □ | |
| TFDS0.56CBTICN | 0.56 | 3 | □ | |
| TFDS0.57CBTICN | 0.57 | 3 | □ | |
| TFDS0.58CBTICN | 0.58 | 3 | □ | |
| TFDS0.59CBTICN | 0.59 | 3 | □ | |
| TFDS0.6CBTICN | 0.6 | 3.6 | □ | |
| TFDS0.61CBTICN | 0.61 | 3.6 | □ | |
| TFDS0.62CBTICN | 0.62 | 3.6 | □ | |
| TFDS0.63CBTICN | 0.63 | 3.6 | □ | |
| TFDS0.64CBTICN | 0.64 | 3.6 | □ | |
| TFDS0.65CBTICN | 0.65 | 3.6 | □ | |
| TFDS0.66CBTICN | 0.66 | 3.6 | □ | |
| TFDS0.67CBTICN | 0.67 | 3.6 | □ | |
| TFDS0.68CBTICN | 0.68 | 3.6 | □ | |
| TFDS0.69CBTICN | 0.69 | 3.6 | □ | |

■被削材適合性 Suitability for Work Materials ●...最適 The most suitable ○...適 Suitable △...可 Possible 無印 Blank...不可 Impossible

| 製品区分 Product | 軟鋼 Mild Steel | 炭素鋼 Carbon Steel | 合金鋼 Alloy Steel | 調質鋼 Heat treated Steel | 工具鋼 Tool Steel | 焼入れ鋼 Hardened Steel | ステンレス鋼 Stainless Steel | 鋳鉄 Cast Iron | ダクタイル鋳鉄 Ductile Cast Iron | チタン合金 Titanium Alloy | アルミ合金 Aluminium Alloy | 銅 Copper | プラスチック Plastic | セラミック etc. Ceramics etc. |
|-----------------|------------------|---------------------|--------------------|---------------------------|-------------------|------------------------|---------------------------|-----------------|------------------------------|-------------------------|--------------------------|-------------|-------------------|-----------------------------|
| TFDS-CBTICN | ◎ | ◎ | ◎ | ○ | ○ | △ | ◎ | ○ | ○ | ○ | ○ | ○ | △ | マシナブル Machinable |

単位/寸法:mm 価格:円
Unit/Size:mm Price:JPY

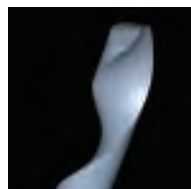
| VAN Code No. | 直径 φD | 有効溝長 FL | 在庫 Stock | 参考価格 Price |
|----------------|-------|---------|----------|------------|
| TFDS0.7CBTICN | 0.7 | 4.2 | □ | |
| TFDS0.71CBTICN | 0.71 | 4.2 | □ | |
| TFDS0.72CBTICN | 0.72 | 4.2 | □ | |
| TFDS0.73CBTICN | 0.73 | 4.2 | □ | |
| TFDS0.74CBTICN | 0.74 | 4.2 | □ | |
| TFDS0.75CBTICN | 0.75 | 4.2 | □ | |
| TFDS0.76CBTICN | 0.76 | 4.2 | □ | |
| TFDS0.77CBTICN | 0.77 | 4.2 | □ | |
| TFDS0.78CBTICN | 0.78 | 4.2 | □ | |
| TFDS0.79CBTICN | 0.79 | 4.2 | □ | |
| TFDS0.8CBTICN | 0.8 | 4.8 | □ | |
| TFDS0.81CBTICN | 0.81 | 4.8 | □ | |
| TFDS0.82CBTICN | 0.82 | 4.8 | □ | |
| TFDS0.83CBTICN | 0.83 | 4.8 | □ | |
| TFDS0.84CBTICN | 0.84 | 4.8 | □ | |
| TFDS0.85CBTICN | 0.85 | 4.8 | □ | |
| TFDS0.86CBTICN | 0.86 | 4.8 | □ | |
| TFDS0.87CBTICN | 0.87 | 4.8 | □ | |
| TFDS0.88CBTICN | 0.88 | 4.8 | □ | |
| TFDS0.89CBTICN | 0.89 | 4.8 | □ | |
| TFDS0.9CBTICN | 0.9 | 5.4 | □ | |
| TFDS0.91CBTICN | 0.91 | 5.4 | □ | |
| TFDS0.92CBTICN | 0.92 | 5.4 | □ | |
| TFDS0.93CBTICN | 0.93 | 5.4 | □ | |
| TFDS0.94CBTICN | 0.94 | 5.4 | □ | |
| TFDS0.95CBTICN | 0.95 | 5.4 | □ | |
| TFDS0.96CBTICN | 0.96 | 5.4 | □ | |
| TFDS0.97CBTICN | 0.97 | 5.4 | □ | |
| TFDS0.98CBTICN | 0.98 | 5.4 | □ | |
| TFDS0.99CBTICN | 0.99 | 5.4 | □ | |
| TFDS1CBTICN | 1 | 6 | □ | |
| TFDS1.1CBTICN | 1.1 | 6.6 | □ | |
| TFDS1.2CBTICN | 1.2 | 7.2 | □ | |
| TFDS1.3CBTICN | 1.3 | 7.8 | □ | |
| TFDS1.4CBTICN | 1.4 | 8.4 | □ | |
| TFDS1.5CBTICN | 1.5 | 9 | □ | |
| TFDS1.6CBTICN | 1.6 | 9.6 | □ | |
| TFDS1.7CBTICN | 1.7 | 10.2 | □ | |
| TFDS1.8CBTICN | 1.8 | 10.8 | □ | |
| TFDS1.9CBTICN | 1.9 | 11.4 | □ | |
| TFDS2CBTICN | 2 | 12 | □ | |
| TFDS2.1CBTICN | 2.1 | 12 | □ | |
| TFDS2.2CBTICN | 2.2 | 13.2 | □ | |
| TFDS2.3CBTICN | 2.3 | 13.2 | □ | |
| TFDS2.4CBTICN | 2.4 | 14.4 | □ | |
| TFDS2.5CBTICN | 2.5 | 14.4 | □ | |
| TFDS2.6CBTICN | 2.6 | 15.6 | □ | |
| TFDS2.7CBTICN | 2.7 | 15.6 | □ | |
| TFDS2.8CBTICN | 2.8 | 16.8 | □ | |
| TFDS2.9CBTICN | 2.9 | 16.8 | □ | |
| TFDS3CBTICN | 3 | 16.8 | □ | |

Stock □...特定商社在庫品 / Stocked by Specific Distributors

ねじれ半月ドリル



Spiral Gun Barrel Drill



アルミ・真鍮・樹脂に最適
 強ねじれ設計により、バリの発生を劇的に減少
 従来の半月ドリルに対し、
 切れ粉のはけ、切削性、寿命を大幅に向上
 1枚刃設計により抜群の加工精度

Designed for aluminum, brass and resin
 The high helix creates a very smooth cutting surface and reduces burrs.
 Tool life is improved
 Outstanding process accuracy is obtained through the one flute design

| 製品区分 Product | 画像 Photo | 材質 Material | 表面処理 Coating | 特長 Special Features | シャンク Shank | 刃数 Flutes | 回転方向 Direction of rotation | 先端角 Point angle | 刃径 φD |
|------------------|-------------|----------------|-----------------|------------------------|---------------|--------------|-------------------------------|--------------------|----------|
| SHD-CB | | 超硬 | | シャープ | SHANK h5 | 1枚刃 | 右刃 | 140° | 0.1~3.0 |
| SHD-CBDLC | | 超硬 | DLC | シャープ | SHANK h5 | 1枚刃 | 右刃 | 140° | 0.1~3.0 |

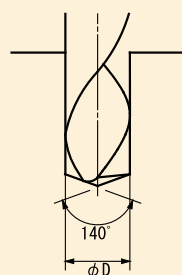
技術レポートについては、P.111、119をご覧ください。
 See Page 111, 119 for technical information.

アイコンについての説明は、P.125をご覧ください。
 See Page 125 for icon explanation.

ねじれ半月ドリル について Guide to Spiral Gun Barrel Drill

先端角 Point angle

140°



穴加工 / Hole Processing

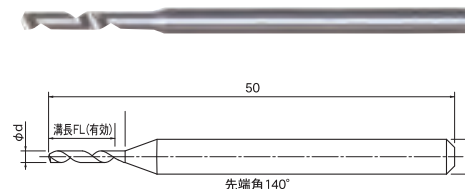
| 被削材 WORK MATERIAL | アルミ合金 ALUMINUM ALLOY | | 銅合金 COPPER ALLOY | | プラスチック PLASTIC | | 軟鋼 MILD STEEL | |
|----------------------|-------------------------|-------------|---------------------|-------------|-----------------------------|-------------|------------------|-------------|
| | 切削速度 CUTTING SPEED | 送り量 FEED | 切削速度 SPEED | 送り量 FEED | 切削速度 ^{※1} SPEED | 送り量 FEED | 切削速度 SPEED | 送り量 FEED |
| 0.1 | 20000-50000 | 0.001-0.005 | 20000-50000 | 0.001-0.003 | 20000-50000 | 0.001-0.005 | 20000-50000 | 0.001-0.002 |
| 0.5 | 13000-50000 | 0.005-0.02 | 13000-50000 | 0.005-0.01 | 13000-50000 | 0.005-0.02 | 6000-32000 | 0.002-0.004 |
| 1 | 6000-50000 | 0.001-0.04 | 6000-48000 | 0.01-0.02 | 6000-48000 | 0.01-0.04 | 3000-16000 | 0.004-0.008 |
| 2 | 3000-32000 | 0.02-0.08 | 3000-24000 | 0.02-0.04 | 3000-24000 | 0.02-0.08 | 2000-8000 | 0.008-0.016 |
| 3 | 2000-21000 | 0.03-0.12 | 2000-16000 | 0.03-0.06 | 2000-16000 | 0.03-0.12 | 1000-5000 | 0.01-0.024 |

切削条件設定上の注意点 Please observe when choosing the cutting conditions

- 上記はあくまでも目安です。状況に応じて変更して下さい。
- 十分な水溶性クーラント、オイルミストを使用して下さい。
- 次の場合は送り条件を下げて下さい。
 ・ワーク、チャッキング、機械剛性の悪い場合
- 上記切削条件が加工機械の上限回転数を超える場合は、ご使用のスピンドル精度が安定する領域での高い回転数でご使用下さい。
- ワーク面粗度を上げたい場合は、上記条件より送り量を減らしても問題ありません。その際、工具寿命が短くなる可能性があります。
- 必要に応じて径の1/10~1/2でステップ加工を行って下さい。
- 鉄系材料を加工の際はDLCコーティングは適しません。
- ※1.プラスチック材料を加工の際、熔融などにより、加工面が悪くなる場合は、回転数を上記切削条件の下限より下げてご使用下さい。

- The above values are standard conditions. They need to be adapted for optimal use of the tools.
- For drilling please use ample water soluble coolant or oil mist.
- Please lower the speed when working conditions are not stable (vibrations, moving of work piece, etc.)
- If the recommended cutting speed exceeds the maximum speed of the machine used please use the maximum speed of the machine and adjust the other work parameters accordingly.
- For smoother surfaces please decrease the feed rate (this may cause shorter tool life).
- Please do step drilling method; diameter 1/10-1/2 as appropriate.
- DLC coating is not stable for processing iron material.
- ※1.If the worked surface becomes worse by melting in processing plastic material, please decrease revolution speed less than the lowest cutting condition above.

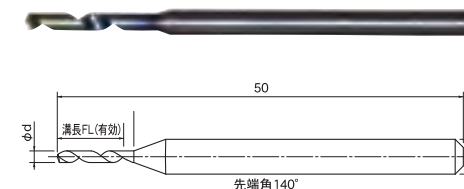
ねじれ半月ドリル 超硬 Spiral Gun Barrel Drill Carbide



超硬 シャープ SHANK h5 1枚刃 右刃 140° 0.1~3.0

| 単位/寸法:mm 価格:円 Unit/Size:mm Price:JPY | | | | 単位/寸法:mm 価格:円 Unit/Size:mm Price:JPY | | | | | |
|---|----------|-----------|-------------|---|--------------|----------|-----------|-------------|---------------|
| VAN Code No. | 直径 φD | 有効長 FL | 在庫 Stock | 参考価格 Price | VAN Code No. | 直径 φD | 有効長 FL | 在庫 Stock | 参考価格 Price |
| SHD0.1CB | 0.1 | 0.6 | ● | ¥6,000 | SHD0.43CB | 0.43 | 2.4 | □ | |
| SHD0.11CB | 0.11 | 0.6 | ● | ¥7,200 | SHD0.44CB | 0.44 | 2.4 | □ | |
| SHD0.12CB | 0.12 | 0.7 | ● | ¥7,200 | SHD0.45CB | 0.45 | 2.7 | ● | ¥4,500 |
| SHD0.13CB | 0.13 | 0.7 | ● | ¥7,200 | SHD0.46CB | 0.46 | 2.7 | □ | |
| SHD0.14CB | 0.14 | 0.7 | ● | ¥7,200 | SHD0.47CB | 0.47 | 2.7 | □ | |
| SHD0.15CB | 0.15 | 0.9 | ● | ¥6,600 | SHD0.48CB | 0.48 | 2.7 | □ | |
| SHD0.16CB | 0.16 | 0.9 | ● | ¥6,600 | SHD0.49CB | 0.49 | 2.7 | □ | |
| SHD0.17CB | 0.17 | 1 | ● | ¥6,600 | SHD0.5CB | 0.5 | 3 | ● | ¥4,000 |
| SHD0.18CB | 0.18 | 1 | ● | ¥6,600 | SHD0.6CB | 0.6 | 3.6 | ● | ¥4,500 |
| SHD0.19CB | 0.19 | 1 | ● | ¥6,600 | SHD0.7CB | 0.7 | 4.2 | ● | ¥4,500 |
| SHD0.2CB | 0.2 | 1.2 | ● | ¥5,000 | SHD0.8CB | 0.8 | 4.8 | ● | ¥4,500 |
| SHD0.21CB | 0.21 | 1.2 | ● | ¥6,000 | SHD0.9CB | 0.9 | 5.4 | ● | ¥4,500 |
| SHD0.22CB | 0.22 | 1.2 | ● | ¥6,000 | SHD1.0CB | 1 | 6 | ● | ¥4,000 |
| SHD0.23CB | 0.23 | 1.2 | ● | ¥6,000 | SHD1.1CB | 1.1 | 6.6 | ● | ¥4,800 |
| SHD0.24CB | 0.24 | 1.2 | ● | ¥6,000 | SHD1.2CB | 1.2 | 7.2 | ● | ¥4,800 |
| SHD0.25CB | 0.25 | 1.5 | ● | ¥6,000 | SHD1.3CB | 1.3 | 7.8 | ● | ¥4,800 |
| SHD0.26CB | 0.26 | 1.5 | ● | ¥6,000 | SHD1.4CB | 1.4 | 8.4 | ● | ¥4,800 |
| SHD0.27CB | 0.27 | 1.5 | ● | ¥6,000 | SHD1.5CB | 1.5 | 9 | ● | ¥4,500 |
| SHD0.28CB | 0.28 | 1.5 | ● | ¥6,000 | SHD1.6CB | 1.6 | 9.6 | ● | ¥4,800 |
| SHD0.29CB | 0.29 | 1.5 | ● | ¥6,000 | SHD1.7CB | 1.7 | 10.2 | ● | ¥4,800 |
| SHD0.3CB | 0.3 | 1.8 | ● | ¥4,000 | SHD1.8CB | 1.8 | 10.8 | ● | ¥4,800 |
| SHD0.31CB | 0.31 | 1.8 | □ | | SHD1.9CB | 1.9 | 11.4 | ● | ¥4,800 |
| SHD0.32CB | 0.32 | 1.8 | □ | | SHD2.0CB | 2 | 12 | ● | ¥4,000 |
| SHD0.33CB | 0.33 | 1.8 | □ | | SHD2.1CB | 2.1 | 12 | ● | ¥4,800 |
| SHD0.34CB | 0.34 | 1.8 | □ | | SHD2.2CB | 2.2 | 13.2 | ● | ¥4,800 |
| SHD0.35CB | 0.35 | 2.1 | ● | ¥4,500 | SHD2.3CB | 2.3 | 13.2 | ● | ¥4,800 |
| SHD0.36CB | 0.36 | 2.1 | □ | | SHD2.4CB | 2.4 | 14.4 | ● | ¥4,800 |
| SHD0.37CB | 0.37 | 2.1 | □ | | SHD2.5CB | 2.5 | 14.4 | ● | ¥4,500 |
| SHD0.38CB | 0.38 | 2.1 | □ | | SHD2.6CB | 2.6 | 15.6 | ● | ¥4,800 |
| SHD0.39CB | 0.39 | 2.1 | □ | | SHD2.7CB | 2.7 | 15.6 | ● | ¥4,800 |
| SHD0.4CB | 0.4 | 2.4 | ● | ¥4,000 | SHD2.8CB | 2.8 | 16.8 | ● | ¥4,800 |
| SHD0.41CB | 0.41 | 2.4 | □ | | SHD2.9CB | 2.9 | 16.8 | ● | ¥4,800 |
| SHD0.42CB | 0.42 | 2.4 | □ | | SHD3.0CB | 3 | 16.8 | ● | ¥4,800 |

ねじれ半月ドリル 超硬 DLCコーティング Spiral Gun Barrel Drill Carbide DLC coating



超硬 DLC シャープ SHANK h5 1枚刃 右刃 140° 0.1~3.0

| 単位/寸法:mm 価格:円 Unit/Size:mm Price:JPY | | | | 単位/寸法:mm 価格:円 Unit/Size:mm Price:JPY | | | | | |
|---|----------|-----------|-------------|---|--------------|----------|-----------|-------------|---------------|
| VAN Code No. | 直径 φD | 有効長 FL | 在庫 Stock | 参考価格 Price | VAN Code No. | 直径 φD | 有効長 FL | 在庫 Stock | 参考価格 Price |
| SHD0.1CBDLC | 0.1 | 0.6 | ● | ¥10,800 | SHD0.43CBDLC | 0.43 | 2.4 | □ | |
| SHD0.11CBDLC | 0.11 | 0.6 | ● | ¥11,800 | SHD0.44CBDLC | 0.44 | 2.4 | □ | |
| SHD0.12CBDLC | 0.12 | 0.7 | ● | ¥11,800 | SHD0.45CBDLC | 0.45 | 2.7 | ● | ¥8,000 |
| SHD0.13CBDLC | 0.13 | 0.7 | ● | ¥11,800 | SHD0.46CBDLC | 0.46 | 2.7 | □ | |
| SHD0.14CBDLC | 0.14 | 0.7 | ● | ¥11,800 | SHD0.47CBDLC | 0.47 | 2.7 | □ | |
| SHD0.15CBDLC | 0.15 | 0.9 | ● | ¥10,800 | SHD0.48CBDLC | 0.48 | 2.7 | □ | |
| SHD0.16CBDLC | 0.16 | 0.9 | ● | ¥10,800 | SHD0.49CBDLC | 0.49 | 2.7 | □ | |
| SHD0.17CBDLC | 0.17 | 1 | ● | ¥10,800 | SHD0.5CBDLC | 0.5 | 3 | ● | ¥7,000 |
| SHD0.18CBDLC | 0.18 | 1 | ● | ¥10,800 | SHD0.6CBDLC | 0.6 | 3.6 | ● | ¥8,000 |
| SHD0.19CBDLC | 0.19 | 1 | ● | ¥10,800 | SHD0.7CBDLC | 0.7 | 4.2 | ● | ¥8,000 |
| SHD0.2CBDLC | 0.2 | 1.2 | ● | ¥8,800 | SHD0.8CBDLC | 0.8 | 4.8 | ● | ¥8,000 |
| SHD0.21CBDLC | 0.21 | 1.2 | ● | ¥9,800 | SHD0.9CBDLC | 0.9 | 5.4 | ● | ¥8,000 |
| SHD0.22CBDLC | 0.22 | 1.2 | ● | ¥9,800 | SHD1.0CBDLC | 1 | 6 | ● | ¥7,000 |
| SHD0.23CBDLC | 0.23 | 1.2 | ● | ¥9,800 | SHD1.1CBDLC | 1.1 | 6.6 | ● | ¥8,000 |
| SHD0.24CBDLC | 0.24 | 1.2 | ● | ¥9,800 | SHD1.2CBDLC | 1.2 | 7.2 | ● | ¥7,800 |
| SHD0.25CBDLC | 0.25 | 1.5 | ● | ¥9,800 | SHD1.3CBDLC | 1.3 | 7.8 | ● | ¥7,800 |
| SHD0.26CBDLC | 0.26 | 1.5 | ● | ¥9,800 | SHD1.4CBDLC | 1.4 | 8.4 | ● | ¥7,800 |
| SHD0.27CBDLC | 0.27 | 1.5 | ● | ¥9,800 | SHD1.5CBDLC | 1.5 | 9 | ● | ¥7,800 |
| SHD0.28CBDLC | 0.28 | 1.5 | ● | ¥9,800 | SHD1.6CBDLC | 1.6 | 9.6 | ● | ¥7,800 |
| SHD0.29CBDLC | 0.29 | 1.5 | ● | ¥9,800 | SHD1.7CBDLC | 1.7 | 10.2 | ● | ¥7,800 |
| SHD0.3CBDLC | 0.3 | 1.8 | ● | ¥7,500 | SHD1.8CBDLC | 1.8 | 10.8 | ● | ¥7,800 |
| SHD0.31CBDLC | 0.31 | 1.8 | □ | | SHD1.9CBDLC | 1.9 | 11.4 | ● | ¥7,800 |
| SHD0.32CBDLC | 0.32 | 1.8 | □ | | SHD2.0CBDLC | 2 | 12 | ● | ¥7,000 |
| SHD0.33CBDLC | 0.33 | 1.8 | □ | | SHD2.1CBDLC | 2.1 | 12 | ● | ¥7,800 |
| SHD0.34CBDLC | 0.34 | 1.8 | □ | | SHD2.2CBDLC | 2.2 | 13.2 | ● | ¥7,800 |
| SHD0.35CBDLC | 0.35 | 2.1 | ● | ¥8,000 | SHD2.3CBDLC | 2.3 | 13.2 | ● | ¥7,800 |
| SHD0.36CBDLC | 0.36 | 2.1 | □ | | SHD2.4CBDLC | 2.4 | 14.4 | ● | ¥7,800 |
| SHD0.37CBDLC | 0.37 | 2.1 | □ | | SHD2.5CBDLC | 2.5 | 14.4 | ● | ¥7,800 |
| SHD0.38CBDLC | 0.38 | 2.1 | □ | | SHD2.6CBDLC | 2.6 | 15.6 | ● | ¥7,800 |
| SHD0.39CBDLC | 0.39 | 2.1 | □ | | SHD2.7CBDLC | 2.7 | 15.6 | ● | ¥7,800 |
| SHD0.4CBDLC | 0.4 | 2.4 | ● | ¥7,500 | SHD2.8CBDLC | 2.8 | 16.8 | ● | ¥7,800 |
| SHD0.41CBDLC | 0.41 | 2.4 | □ | | SHD2.9CBDLC | 2.9 | 16.8 | ● | ¥7,800 |
| SHD0.42CBDLC | 0.42 | 2.4 | □ | | SHD3.0CBDLC | 3 | 16.8 | ● | ¥7,800 |

Stock ●...標準在庫品 / Stocked
 Stock □...特定商社在庫品 / Stocked by Specific Distributors

被削材適合性 Suitability for Work Materials

| 製品区分 Product | 軟鋼 Mild Steel | 炭素鋼 Carbon Steel | 合金鋼 Alloy Steel | 調質鋼 Heat treated Steel | 工具鋼 Tool Steel | 焼入れ鋼 Hardened Steel | ステンレス鋼 Stainless Steel | 鋳鉄 Cast Iron | ダクタイル鋳鉄 Ductile Cast Iron | チタン合金 Titanium Alloy | アルミニウム合金 Aluminium Alloy | 銅 Copper | プラスチック Plastic | セラミック etc. Ceramics etc. | | |
|-----------------|------------------|---------------------|--------------------|---------------------------|-------------------|------------------------|---------------------------|-----------------|------------------------------|-------------------------|-----------------------------|-------------|-------------------|-----------------------------|-----------------------------------|--|
| | SS | S45C | SCM SCR | SKD SKS | ~40 HRC | ~45 HRC | 45~ HRC | SUS | FC | FDC | Al | Cu | | マシナブル Machinable | ジルコニア ガラス Zirconia Glass | |
| SHD-CB | ◎ | ○ | △ | | △ | | | | | ○ | ○ | ◎ | ◎ | | | |
| SHD-CBDLC | | | | | | | | | | ○ | ◎ | ◎ | ◎ | | | |

高速面取り工具 High speed chamfering tool

トグルン® マルチチャンファー

TOGLON Multi Chamfer



面取り速度を3~7倍に
Reduces Chamfering time by 80%.



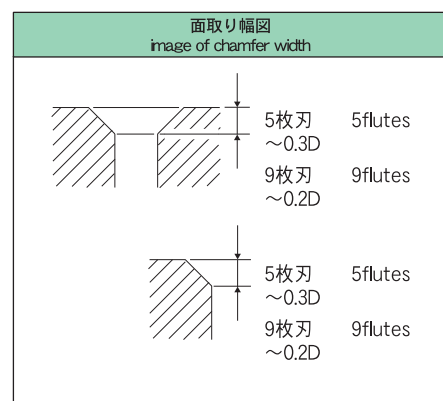
トグルン形状の5枚刃または9枚刃仕様。バリを抑えて超高速に加工ができる。

Toglon designed with 5 flutes or 9 flutes makes a great advantage avoiding burrs and high speed cutting.



| 製品区分 Product | 画像 Photo | 面取角度 Chamfering angle | 材質 Material | 表面処理 Coating | 特長 Special Features | シャンク Shank | 刃数 Flutes | 回転方向 Direction of rotation |
|-----------------|-------------|--------------------------|----------------|-----------------|------------------------|---------------|--------------|-------------------------------|
| 90TGMTCH-CB | | 90° | 超硬 | | Hi-SPEED | SHANK h6 | 5枚刃 | 右刃 |
| 90TGMTCH-CBALT | | 90° | 超硬 | ALT | Hi-SPEED | SHANK h6 | 5枚刃 9枚刃 | 右刃 |

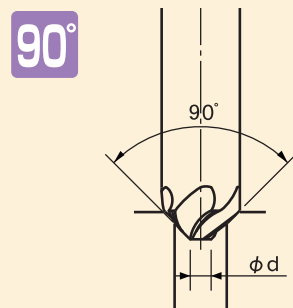
アイコンについての説明は、P.125をご覧ください。
See Page 125 for icon explanation.



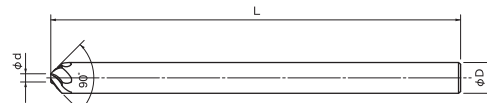
トグルン® マルチチャンファー について

Guide to TOGLON Multi Chamfer

先端角 Point angle



トグルン® マルチ チャンファー 90° 超硬 TOGLON Multi Chamfer 90° Carbide



※面取り幅は最大φDの~30%を推奨

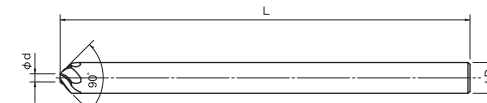
90° 超硬 Hi-SPEED SHANK h6 5枚刃 右刃

| VAN Code No. | 最小面取径 φd | シャンク径 φD | 全長 L | 刃数 No. of teeth | 在庫 Stock | 参考価格 Price |
|--------------|-------------|-------------|---------|--------------------|-------------|---------------|
| 90TGMTCH3CB | 0.8 | 3 | 40 | 5 | ● | ¥6,000 |
| 90TGMTCH4CB | 1 | 4 | 40 | 5 | ● | ¥6,600 |
| 90TGMTCH6CB | 1.5 | 6 | 50 | 5 | ● | ¥8,200 |
| 90TGMTCH8CB | 2 | 8 | 60 | 5 | ● | ¥13,200 |
| 90TGMTCH10CB | 2.5 | 10 | 70 | 5 | ● | ¥18,200 |
| 90TGMTCH12CB | 3 | 12 | 75 | 5 | ● | ¥22,000 |
| 90TGMTCH16CB | 4 | 16 | 80 | 5 | ● | ¥30,000 |

単位/寸法:mm 価格:円
Unit/Size:mm Price:JPY

Stock ●...標準在庫品/ Stocked

トグルン® マルチ チャンファー 90° 超硬 ALTコーティング TOGLON Multi Chamfer 90° Carbide ALT coating



※5枚刃の面取り幅は最大φDの~30%を推奨
※9枚刃の面取り幅は最大φDの~20%を推奨

90° 超硬 ALT Hi-SPEED SHANK h6 5枚刃 9枚刃 右刃

| VAN Code No. | 最小面取径 φd | シャンク径 φD | 全長 L | 刃数 No. of teeth | 在庫 Stock | 参考価格 Price |
|-------------------|-------------|-------------|---------|--------------------|-------------|---------------|
| 90TGMTCH3CBALT | 0.8 | 3 | 40 | 5 | ● | ¥7,800 |
| 90TGMTCH4CBALT | 1 | 4 | 40 | 5 | ● | ¥8,600 |
| 90TGMTCH6CBALT | 1.5 | 6 | 50 | 5 | ● | ¥10,800 |
| 90TGMTCH8CBALT | 2 | 8 | 60 | 5 | ● | ¥17,000 |
| 90TGMTCH8CBALT9Z | 2 | 8 | 60 | 9 | ● | NEW ¥17,800 |
| 90TGMTCH10CBALT | 2.5 | 10 | 70 | 5 | ● | ¥23,600 |
| 90TGMTCH10CBALT9Z | 2.5 | 10 | 70 | 9 | ● | NEW ¥24,500 |
| 90TGMTCH12CBALT | 3 | 12 | 75 | 5 | ● | ¥27,800 |
| 90TGMTCH12CBALT9Z | 3 | 12 | 75 | 9 | ● | NEW ¥29,000 |
| 90TGMTCH16CBALT | 4 | 16 | 80 | 5 | ● | ¥38,800 |
| 90TGMTCH16CBALT9Z | 4 | 16 | 80 | 9 | ● | NEW ¥40,000 |

単位/寸法:mm 価格:円
Unit/Size:mm Price:JPY

トグルン® マルチチャンファー 切削条件表 Toglon Multi Chamfer Recommended Milling Condition

| 被削材 WORK MATERIAL | 軟鋼 MILD STEEL | | 炭素鋼 CARBON STEEL | | 合金鋼 ALLOY STEEL | | 調質鋼 HARDENED STEEL | | 鋳鋼 CAST IRON | | ステンレス STAINLESS | | アルミニウム ALUMINUM | |
|-------------------------------------|-----------------------|----------|---------------------|----------|--------------------|----------|-----------------------|----------|-----------------|----------|--------------------|----------|--------------------|----------|
| | 切削速度 CUTTING SPEED | 75m/min | 55m/min | 50m/min | 25m/min | 80m/min | 30m/min | 150m/min | | | | | | |
| 最大面取り径 Max Chamfering Dia. mm | 3 | 4 | 6 | 8 | 10 | 12 | 16 | 3 | 4 | 6 | 8 | 10 | 12 | 16 |
| 回転数 SPEED min ⁻¹ | 8000 | 6000 | 4000 | 3000 | 2400 | 2000 | 1500 | 2700 | 2000 | 1600 | 1200 | 800 | 600 | 400 |
| 送り速度 FEED mm/min | 300-1300 | 300-1200 | 300-960 | 300-900 | 300-850 | 300-800 | 300-750 | 70-350 | 70-320 | 70-260 | 70-250 | 70-240 | 70-240 | 70-220 |
| 回転数 SPEED min ⁻¹ | 5800 | 4400 | 2900 | 180-1000 | 180-900 | 180-800 | 180-700 | 160-900 | 160-800 | 160-650 | 160-600 | 160-600 | 160-550 | 160-500 |
| 送り速度 FEED mm/min | 180-1000 | 180-900 | 180-800 | 180-700 | 180-650 | 180-600 | 180-550 | 160-900 | 160-800 | 160-650 | 160-600 | 160-550 | 160-500 | 160-500 |
| 回転数 SPEED min ⁻¹ | 2700 | 2000 | 1300 | 990 | 800 | 700 | 600 | 8500 | 6400 | 4200 | 3200 | 2500 | 2100 | 1600 |
| 送り速度 FEED mm/min | 70-350 | 70-320 | 70-260 | 70-250 | 70-240 | 70-240 | 70-220 | 330-1500 | 330-1300 | 330-1100 | 330-1000 | 330-1000 | 330-1000 | 330-1000 |
| 回転数 SPEED min ⁻¹ | 3200 | 2400 | 1600 | 100-550 | 100-500 | 100-400 | 100-350 | 3200 | 2400 | 1600 | 1000 | 800 | 600 | 400 |
| 送り速度 FEED mm/min | 100-550 | 100-500 | 100-400 | 100-350 | 100-350 | 100-320 | 100-300 | 16000 | 12000 | 8000 | 6000 | 4800 | 4000 | 3000 |
| 回転数 SPEED min ⁻¹ | 16000 | 12000 | 8000 | 600-7000 | 600-6000 | 600-5000 | 600-5000 | 600-7000 | 600-6000 | 600-5000 | 600-5000 | 600-5000 | 600-5000 | 600-5000 |
| 送り速度 FEED mm/min | 600-7000 | 600-6000 | 600-5000 | 600-5000 | 600-5000 | 600-5000 | 600-5000 | 600-7000 | 600-6000 | 600-5000 | 600-5000 | 600-5000 | 600-5000 | 600-5000 |

切削条件設定上の注意点 Please observe when choosing the cutting conditions

- 上記はあくまでも目安です。状況に応じて変更してください。
- 十分な水溶性クーラントを使用して下さい。状況により、オイルミスト・エアブローも対応可能です。
- 3次の場合は送り速度を下げて下さい。(加工時の振動により切れ刃が欠ける場合があります)
 - ・傾斜面への加工。
 - ・ワーク、チャッキング、機械剛性の悪い場合。
- 加工面取径が最大面取径より大幅に小さい場合、回転数計算時は胴径を加工面取径に変更してください。
- 上記切削条件が加工機械の上限回転数を超える場合は、ご使用のスピンドル精度が安定する領域での高い回転数でご使用ください。
- ワーク面粗度を上げたい場合は、上記条件より送り量を減らしても問題ありません。その際、工具寿命が短くなる可能性があります。
- 炭素鋼・ステンレス鋼の加工は、ワークの固定を確実にし、チャッキング時の振れを極力抑えたいので、加工してください。
 - The above values are standard conditions. They need to be adapted for optimal use of the tools.
 - Please use proper cutting fluids according to the work conditions. We recommend water soluble coolants or emulsions. In some cases oil mist and compressed air can be used as well depending on condition.
 - 3.Pleas lower the speed when working conditions are not stable (vibrations, low machine rigidity, unstable work piece fixture, etc.) or when working in a slope. (Otherwise vibration may cause breakage of cutting edge during processing.)
 - If the actual chamfering diameter is much smaller than the maximum chamfering diameter of the tool please use the actual processing diameter to calculate the cutting speed.
 - If the recommended cutting speed exceeds the maximum speed of the machine used please use the maximum speed of the machine and adjust the other work parameters.
 - For smoother surfaces please decrease the feed rate (this may cause shorter tool life).
 - When working in hard to machine materials such as carbon steels or stainless steels please pay special attention to
 - ・ provide very stable conditions (machine and fixture rigidity).
 - ・ minimize the tools runout.

■被削材適合性 Suitability for Work Materials ●...最適 The most suitable ○...適 Suitable △...可 Possible 無印 Blank...不可 Impossible

| 製品区分 Product | 軟鋼 Mild Steel | 炭素鋼 Carbon Steel | 合金鋼 Alloy Steel | 調質鋼 Hardened Steel | 工具鋼 Tool Steel | 焼入れ鋼 Quenched & Tempered Steel | ステンレス鋼 Stainless Steel | 鋳鉄 Cast Iron | タタイル鋼 Ductile Cast Iron | チタン合金 Titanium Alloy | アルミ合金 Aluminium Alloy | 銅 Copper | プラスチック Plastic | セラミック etc. Ceramics etc. |
|-----------------|------------------|---------------------|--------------------|-----------------------|-------------------|-----------------------------------|---------------------------|-----------------|----------------------------|-------------------------|--------------------------|-------------|-------------------|-----------------------------|
| 90TGMTCH-CB | ◎ | ◎ | ◎ | ○ | ○ | △ | ◎ | ○ | ○ | ○ | ◎ | ○ | ○ | ○ |
| 90TGMTCH-CBALT | ◎ | ◎ | ◎ | ◎ | ○ | ○ | ◎ | ○ | ○ | ◎ | ○ | ○ | ○ | ○ |

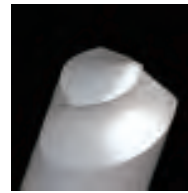
精密面取り工具 Accurate spot chamfering tool

トグルン® シャープ チャンファー



TOGLON Sharp Chamfer

バリのない面取り加工を目指す
Aiming chamfering without any burr



トグルンシャープシリーズの面取り専用モデル。
タップ加工後にネジを潰さずに穴面取りが可能。
再研磨可能。

Exclusive model of chamfering in Toglun Sharp series.
Available chamfering process without spoiling screw after tap work.
Available re-grinding.

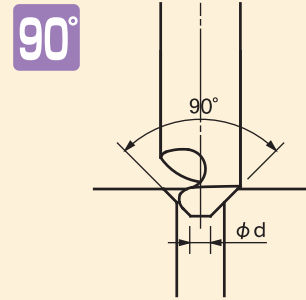
| 製品区分 Product | 画像 Photo | 面取角度 Chamfering angle | 材質 Material | 表面処理 Coating | 特長 Special Features | シャンク Shank | 刃数 Flutes | 回転方向 Direction of rotation |
|-----------------|-------------|--------------------------|----------------|-----------------|------------------------|---------------|--------------|-------------------------------|
| 90TGSCH-CB | | 90° | 超硬 | | シャープ | SHANK h6 | 1枚刃 | 右刃 |
| 90TGSCH-CBALT | | 90° | 超硬 | ALT | シャープ | SHANK h6 | 1枚刃 | 右刃 |
| 90TGSCH-CBDLC | | 90° | 超硬 | DLC | シャープ | SHANK h6 | 1枚刃 | 右刃 |

アイコンについての説明は、P.125をご覧ください。
See Page 125 for icon explanation.

トグルン® シャープ チャンファー について

Guide to TOGLON Sharp Chamfer

先端角 Point angle



面取りミーリング/Chamfering

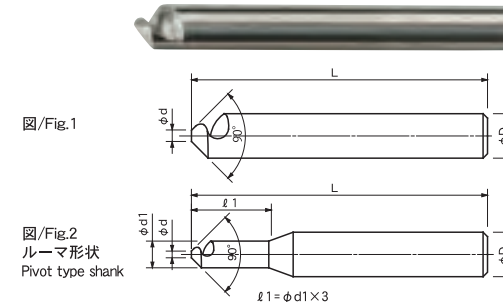


穴面取り/Hole Chamfering

| トグルン® シャープ チャンファー 切削条件表 Toglun Sharp Chamfer Recommended Milling Condition | | |
|---|-----------------------------------|---|
| 被削材 WORK MATERIAL | アルミニウム (A5052) ALUMINUM | |
| 切削速度 CUTTING SPEED | 100~200m/min | |
| 最大面取径 Max Chamfering Dia. mm | 回転数 SPEED min ⁻¹ | 送り量(面取り) FEED (CHAMFERING) mm/rev |
| 1.2 | 20,000 - 50,000 | 0.004 - 0.02 |
| 2 | 1,600 - 32,000 | 0.006 - 0.04 |
| 3 | 1,100 - 21,000 | 0.01 - 0.06 |
| 4 | 8,000 - 16,000 | 0.01 - 0.08 |
| 6 | 5,000 - 11,000 | 0.02 - 0.1 |
| 8 | 4,000 - 8,000 | 0.02 - 0.12 |
| 10 | 3,200 - 6,400 | 0.02 - 0.14 |
| 12 | 2,700 - 5,300 | 0.02 - 0.16 |
| 16 | 2,000 - 4,000 | 0.02 - 0.18 |

- 切削条件設定上の注意点** Please observe when choosing the cutting conditions
- 上記はあくまでも目安です。状況に応じて変更してください。
 - 十分な水溶性クーラントを使用して下さい。状況により、オイルミスト・エアブローも対応可能です。
 - 次の場合は送り条件を下げてください。(加工時の振動により切れ刃が欠ける場合があります)
 - ・傾斜面への加工。
 - ・ワーク、チャッキング、機械剛性の悪い場合。
 - 加工面取径が最大面取径より大幅に小さい場合、回転数計算時は胴径を加工面取径に変更してください。
 - 上記切削条件が加工機械の上限回転数を超える場合は、ご使用のスピンドル精度が安定する領域での高い回転数でご使用ください。
 - ワーク面粗度を上げたい場合は、上記条件より送り量を減らしても問題ありません。その際、工具寿命が短くなる可能性があります。
 - 炭素鋼・ステンレス鋼の加工は、ワークの固定を確実にし、チャッキング時の振れを極力抑えたいので、加工してください。
- 1.The above values are standard conditions. They need to be adapted for optimal use of the tools.
2.Please use proper cutting fluids according to the work conditions.
We recommend water soluble coolants or emulsions.
In some cases oil mist and compressed air can be used as well depending on condition.
3.Please lower the speed when working conditions are not stable (vibrations, low machine rigidity, unstable work piece fixture, etc.) or when working in a slope.
(Otherwise vibration may cause breakage of cutting edge during processing.)
4.If the actual chamfering diameter is much smaller than the maximum chamfering diameter of the tool please use the actual processing diameter to calculate the cutting speed.
5.If the recommended cutting speed exceeds the maximum speed of the machine used please use the maximum speed of the machine and adjust the other work parameters.
6.For smoother surfaces please decrease the feed rate (this may cause shorter tool life).
7.When working in hard to machine materials such as carbon steels or stainless steels please pay special attention to
- provide very stable conditions (machine and fixture rigidity).
- minimize the tools runout.

トグルン® シャープ チャンファー 90° 超硬 TOGLON Sharp Chamfer 90° Carbide

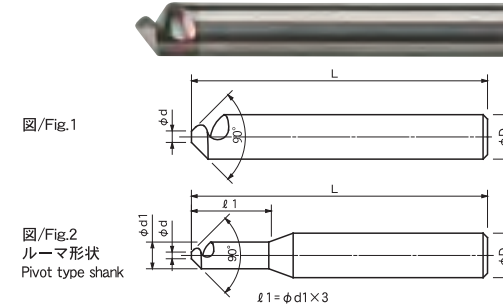


90° 超硬 シャープ SHANK h6 1枚刃 右刃

単位/寸法:mm 価格:円
Unit/Size:mm Price:JPY

| VAN Code No. | 最小面取径 φd | 最大面取径 φd1 | シャンク径 φD | 全長 L | 図 Fig. | 在庫 Stock | 参考価格 Price |
|--------------|-------------|--------------|-------------|---------|-----------|-------------|---------------|
| 90TGSCH0.9CB | 0.3 | 0.9 | 3 | 40 | 2 | ● | ¥6,600 |
| 90TGSCH1.2CB | 0.4 | 1.2 | 3 | 40 | 2 | ● | ¥5,500 |
| 90TGSCH2CB | 0.6 | 2 | 3 | 40 | 2 | ● | ¥4,400 |
| 90TGSCH3CB | 0.8 | 3 | 40 | 1 | ● | ● | ¥3,500 |
| 90TGSCH4CB | 1 | 4 | 40 | 1 | ● | ● | ¥4,200 |
| 90TGSCH6CB | 1.5 | 6 | 50 | 1 | ● | ● | ¥5,300 |
| 90TGSCH8CB | 2 | 8 | 60 | 1 | ● | ● | ¥7,500 |
| 90TGSCH10CB | 2.5 | 10 | 70 | 1 | ● | ● | ¥10,000 |
| 90TGSCH12CB | 3 | 12 | 75 | 1 | ● | ● | ¥13,200 |
| 90TGSCH16CB | 4 | 16 | 80 | 1 | ● | ● | ¥25,500 |

トグルン® シャープ チャンファー 90° 超硬 DLCコーティング TOGLON Sharp Chamfer 90° Carbide DLC coating



90° 超硬 DLC シャープ SHANK h6 1枚刃 右刃

単位/寸法:mm 価格:円
Unit/Size:mm Price:JPY

| VAN Code No. | 最小面取径 φd | 最大面取径 φd1 | シャンク径 φD | 全長 L | 図 Fig. | 在庫 Stock | 参考価格 Price |
|-----------------|-------------|--------------|-------------|---------|-----------|-------------|---------------|
| 90TGSCH0.9CBDLC | 0.3 | 0.9 | 3 | 40 | 2 | ● | ¥11,500 |
| 90TGSCH1.2CBDLC | 0.4 | 1.2 | 3 | 40 | 2 | ● | ¥10,200 |
| 90TGSCH2CBDLC | 0.6 | 2 | 3 | 40 | 2 | ● | ¥8,800 |
| 90TGSCH3CBDLC | 0.8 | 3 | 40 | 1 | ● | ● | ¥7,500 |
| 90TGSCH4CBDLC | 1 | 4 | 40 | 1 | ● | ● | ¥8,400 |
| 90TGSCH6CBDLC | 1.5 | 6 | 50 | 1 | ● | ● | ¥10,000 |
| 90TGSCH8CBDLC | 2 | 8 | 60 | 1 | ● | ● | ¥14,000 |
| 90TGSCH10CBDLC | 2.5 | 10 | 70 | 1 | ● | ● | ¥17,600 |
| 90TGSCH12CBDLC | 3 | 12 | 75 | 1 | ● | ● | ¥22,000 |
| 90TGSCH16CBDLC | 4 | 16 | 80 | 1 | ● | ● | ¥37,000 |

Stock ●...標準在庫品/Stocked

■被削材適合性 Suitability for Work Materials ◎...最適 The most suitable ○...適 Suitable △...可 Possible 無印 Blank...不可 Impossible

| 製品区分 Product | 軟鋼 Mild Steel | 炭素鋼 Carbon Steel | 合金鋼 Alloy Steel | 調質鋼 Hardened Steel | 工具鋼 Tool Steel | 焼入れ鋼 Quenched & Tempered Steel | ステンレス鋼 Stainless Steel | 鋳鉄 Cast Iron | クワイル鋼 Ductile Cast Iron | チタン合金 Titanium Alloy | アルミ合金 Aluminum Alloy | 銅 Copper | プラスチック Plastic | セラミック etc. Ceramics etc. |
|-----------------|------------------|---------------------|--------------------|-----------------------|-------------------|-----------------------------------|---------------------------|-----------------|----------------------------|-------------------------|-------------------------|-------------|-------------------|-----------------------------|
| 90TGSCH-CB | ◎ | ○ | △ | | △ | | △ | | | ○ | ○ | ◎ | ◎ | |
| 90TGSCH-CBALT | ◎ | ○ | △ | | △ | | △ | | | △ | ○ | ◎ | ◎ | |
| 90TGSCH-CBDLC | | | | | | | | | | ○ | ◎ | ◎ | ◎ | |

図/Fig.1 : φD 最大面取り径 Max. Chamfering Dia.
図/Fig.2 : φd1 最大面取り径 Max. Chamfering Dia.

精密位置決め面取り工具 Accurate spot drilling / chamfering tool

トグロン® シャープSP

TOGLON Sharp SP



バリ・ビビりが少なく、面粗度がきれい
Outstanding surface finish and minimal burrs



1本で複数径の面取りが可能。
仕上がりは、高品質・最高の面粗度。

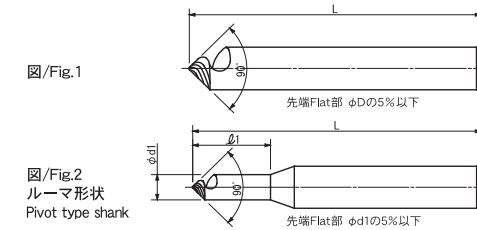
The high spiral flute of TOGLON Sharp SP guarantees superior sharpness even in the tools center. All diameters chamfered with one tool reach the same superior surface finish and minimal roughness.

| 製品区分 Product | 画像 Photo | 面取り角度 Chamfering angle | 材質 Material | 表面処理 Coating | 特長 Special Features | シャンク Shank | 刃数 Flutes | 回転方向 Direction of rotation |
|-----------------|-------------|---------------------------|----------------|-----------------|------------------------|---------------|--------------|-------------------------------|
| 90TG-CB | | 90° | 超硬 | | シャープ | SHANK h6 | 1枚刃 | 右刃 |
| 90TG-CBDLC | | 90° | 超硬 | DLC | シャープ | SHANK h6 | 1枚刃 | 右刃 |
| 90LTG-CB | | 90° | 超硬 | | シャープ | SHANK h6 | 1枚刃 | 右刃 |
| 90LTG-CBDLC | | 90° | 超硬 | DLC | シャープ | SHANK h6 | 1枚刃 | 右刃 |
| 60TG-CB | | 60° | 超硬 | | シャープ | SHANK h6 | 1枚刃 | 右刃 |
| 60TG-CBDLC | | 60° | 超硬 | DLC | シャープ | SHANK h6 | 1枚刃 | 右刃 |

技術レポートについては、P.113をご覧ください。
See Page 113 for technical information.

アイコンについての説明は、P.125をご覧ください。
See Page 125 for icon explanation.

トグロン® シャープSP 90° 超硬 TOGLON Sharp SP 90° Carbide



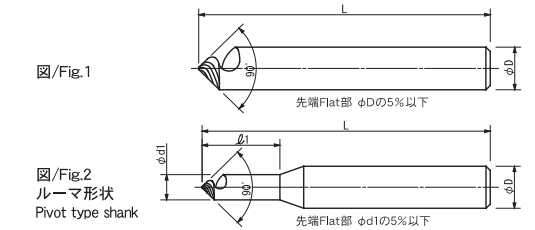
図/Fig.1 : φD 最大面取り径 Max. Chamfering Dia.
図/Fig.2 : φd1 最大面取り径 Max. Chamfering Dia.

90° 超硬 シャープ SHANK h6 1枚刃 右刃

| VAN Code No. | 最大面取り径 | | シャンク径 | ルーマ長 | 全長 | 図 | 在庫 | 参考価格 |
|--------------|--------|----|-------|------|----|---|----|---------|
| | φd1 | φD | | | | | | |
| 90TG1.2CB | 1.2 | 3 | 3.6 | 40 | 2 | ● | ● | ¥13,200 |
| 90TG2CB | 2 | 3 | 6 | 40 | 2 | ● | ● | ¥10,500 |
| 90TG3CB | | 3 | | 40 | 1 | ● | ● | ¥8,200 |
| 90TG4CB | | 4 | | 40 | 1 | ● | ● | ¥8,200 |
| 90TG6CB | | 6 | | 50 | 1 | ● | ● | ¥10,200 |
| 90TG8CB | | 8 | | 60 | 1 | ● | ● | ¥14,400 |
| 90TG10CB | | 10 | | 70 | 1 | ● | ● | ¥22,600 |
| 90TG12CB | | 12 | | 75 | 1 | ● | ● | ¥28,500 |
| 90TG16CB | | 16 | | 80 | 1 | ● | ● | ¥41,000 |

単位/寸法:mm 価格:円
Unit/Size:mm Price:JPY

トグロン® シャープSP 90° 超硬 DLCコーティング TOGLON Sharp SP 90° Carbide DLC coating



図/Fig.1 : φD 最大面取り径 Max. Chamfering Dia.
図/Fig.2 : φd1 最大面取り径 Max. Chamfering Dia.

90° 超硬 DLC シャープ SHANK h6 1枚刃 右刃

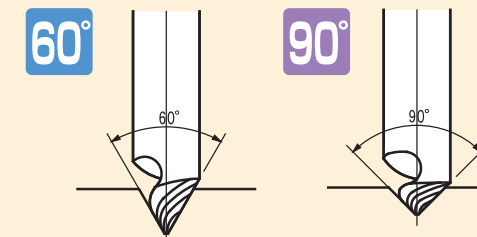
| VAN Code No. | 最大面取り径 | | シャンク径 | ルーマ長 | 全長 | 図 | 在庫 | 参考価格 |
|--------------|--------|----|-------|------|----|---|----|---------|
| | φd1 | φD | | | | | | |
| 90TG1.2CBDLC | 1.2 | 3 | 3.6 | 40 | 2 | ● | ● | ¥20,000 |
| 90TG2CBDLC | 2 | 3 | 6 | 40 | 2 | ● | ● | ¥16,800 |
| 90TG3CBDLC | | 3 | | 40 | 1 | ● | ● | ¥13,800 |
| 90TG4CBDLC | | 4 | | 40 | 1 | ● | ● | ¥13,800 |
| 90TG6CBDLC | | 6 | | 50 | 1 | ● | ● | ¥16,500 |
| 90TG8CBDLC | | 8 | | 60 | 1 | ● | ● | ¥23,800 |
| 90TG10CBDLC | | 10 | | 70 | 1 | ● | ● | ¥33,000 |
| 90TG12CBDLC | | 12 | | 75 | 1 | ● | ● | ¥40,500 |
| 90TG16CBDLC | | 16 | | 80 | 1 | ● | ● | ¥54,000 |

Stock ●...標準在庫品/Stocked

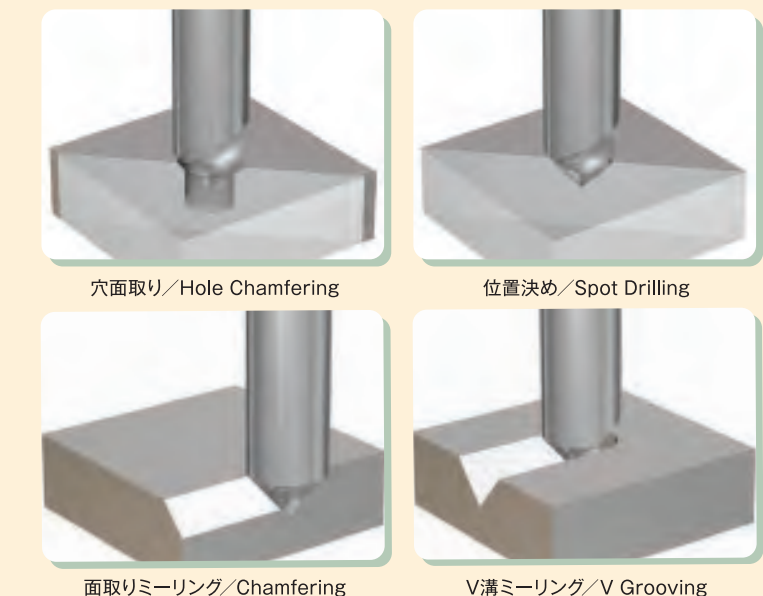
トグロン® シャープSP について

Guide to TOGLON Sharp SP

面取り角度 Chamfering angle



先端 Flat部 シャンク径の5%以下
The cutting edge's center flat is ≤5% of the cutting diameter.



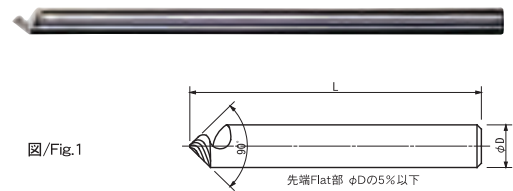
■被削材適合性 Suitability for Work Materials ●...最適 The most suitable ○...適 Suitable △...可 Possible 無印 Blank...不可 Impossible

| 製品区分 Product | 軟鋼 Mid Steel | 炭素鋼 Carbon Steel | 合金鋼 Alloy Steel | 調質鋼 Heat treated Steel | 工具鋼 Tool Steel | 焼入れ鋼 Hardened Steel | ステンレス鋼 Stainless Steel | 鋳鉄 Cast Iron | ダクタイル鋳鉄 Ductile Cast Iron | チタン合金 Titanium Alloy | アルミ合金 Aluminium Alloy | 銅 Copper | プラスチック Plastic | セラミック etc. Ceramics etc. |
|-----------------|-----------------|---------------------|--------------------|---------------------------|-------------------|------------------------|---------------------------|-----------------|------------------------------|-------------------------|--------------------------|-------------|-------------------|-----------------------------|
| 90TG-CB | ◎ | ○ | △ | | △ | | △ | | | ○ | ○ | ◎ | ◎ | |
| 90TG-CBDLC | ◎ | ○ | △ | | △ | | △ | | | ○ | ◎ | ◎ | ◎ | |

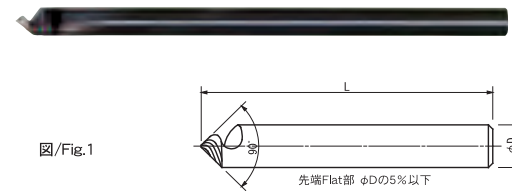
- SP CENTER
- CENTER DRILL
- GSS STARTING DRILL
- GP DRILL
- TFD
- SPIRAL GUN BARREL DRILL
- TOGLON MULTI CHAMFER
- TOGLON SHARP
- TOGLON HARD
- CORNER ROUNDING CUTTER
- JIT
- SUBMARINE GATE DRILL
- MICRO TOOL
- TECHNICAL INFORMATION
- CUSTOMIZED TOOL SEMIORDER TOOL
- INST- RUCTION
- COMPANY PROFILE

トグルン® シャープSP 90° 超硬 ロングタイプ
TOGLON Sharp SP 90° Carbide Long type

トグルン® シャープSP 90° 超硬 ロングタイプ DLCコーティング
TOGLON Sharp SP 90° Carbide Long type DLC coating



図/Fig.1: φD 最大面取り径 Max. Chamfering Dia.



図/Fig.1: φD 最大面取り径 Max. Chamfering Dia.

90° 超硬 シヤープ SHANK h6 1枚刃 右刃 ロング

90° 超硬 DLC シヤープ SHANK h6 1枚刃 右刃 ロング

| VAN Code No. | 最大面取り径 φd1 | シャンク径 φD | ルーマ長 ℓ1 | 全長 L | 図 Fig. | 在庫 Stock | 参考価格 Price |
|--------------|------------|----------|---------|------|---------|----------|------------|
| 90LTG3CB | 3 | 100 | 1 | ● | ¥11,000 | | |
| 90LTG4CB | 4 | 100 | 1 | ● | ¥11,000 | | |
| 90LTG6CB | 6 | 100 | 1 | ● | ¥15,500 | | |
| 90LTG8CB | 8 | 150 | 1 | ● | ¥24,000 | | |
| 90LTG10CB | 10 | 150 | 1 | ● | ¥35,000 | | |
| 90LTG12CB | 12 | 150 | 1 | ● | ¥44,000 | | |

| VAN Code No. | 最大面取り径 φd1 | シャンク径 φD | ルーマ長 ℓ1 | 全長 L | 図 Fig. | 在庫 Stock | 参考価格 Price |
|--------------|------------|----------|---------|------|---------|----------|------------|
| 90LTG3CBDLC | 3 | 100 | 1 | ● | ¥18,000 | | |
| 90LTG4CBDLC | 4 | 100 | 1 | ● | ¥18,000 | | |
| 90LTG6CBDLC | 6 | 100 | 1 | ● | ¥22,000 | | |
| 90LTG8CBDLC | 8 | 150 | 1 | ● | ¥35,000 | | |
| 90LTG10CBDLC | 10 | 150 | 1 | ● | ¥48,000 | | |
| 90LTG12CBDLC | 12 | 150 | 1 | ● | ¥58,000 | | |

Stock ●...標準在庫品/Stocked

トグルン® シャープSP 切削条件表 Toglon Sharp SP Recommended Milling Condition

| 被削材 WORK MATERIAL | アルミニウム (A5052) ALUMINIUM | | | |
|-------------------------------------|-----------------------------------|---|---|--|
| 切削速度 CUTTING SPEED | 100~200m/min | | | |
| 最大面取り径 Max Chamfering Dia. mm | 回転数 SPEED min ⁻¹ | 送り量(位置決め) FEED (SPOT DRILLING) mm/rev | 送り量(V溝・面取り) FEED (V GROOVING・CHAMFERING) mm/rev | |
| 1.2 | 20,000 - 50,000 | 0.004 - 0.008 | 0.004 - 0.015 | |
| 2 | 16,000 - 32,000 | 0.006 - 0.015 | 0.006 - 0.02 | |
| 3 | 11,000 - 21,000 | 0.01 - 0.02 | 0.01 - 0.03 | |
| 4 | 8,000 - 16,000 | 0.01 - 0.03 | 0.01 - 0.04 | |
| 6 | 5,000 - 11,000 | 0.02 - 0.04 | 0.02 - 0.06 | |
| 8 | 4,000 - 8,000 | 0.03 - 0.05 | 0.02 - 0.08 | |
| 10 | 3,200 - 6,400 | 0.03 - 0.06 | 0.02 - 0.09 | |
| 12 | 2,700 - 5,300 | 0.04 - 0.08 | 0.02 - 0.12 | |
| 16 | 2,000 - 4,000 | 0.05 - 0.1 | 0.02 - 0.16 | |

切削条件設定上の注意点 Please observe when choosing the cutting conditions

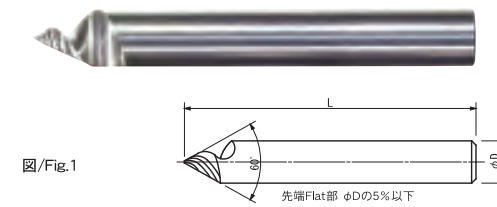
- 上記はあくまでも目安です。状況に応じて変更してください。
- 十分な水溶性クーラントを使用して下さい。状況により、オイルミスト・エアブローも対応可能です。
- 3次の場合は送り条件を下げて下さい。(加工時の振動により切れ刃が欠ける場合があります)
 - ・傾斜面への加工。
 - ・ワーク、チャッキング、機械剛性の悪い場合。
- 加工面取り径が最大面取り径より大幅に小さい場合、回転数計算時は鋼径を加工面取り径に変更してください。
- 上記切削条件が加工機械の上限回転数を超える場合は、ご使用のスピンドル精度が安定する領域での高い回転数でご使用下さい。
- ワーク面粗度を上げたい場合は、上記条件より送り量を減らしても問題ありません。その際、工具寿命が短くなる可能性があります。
- 炭素鋼・ステンレス鋼の加工は、ワークの固定を確実にし、チャッキング時の振れを極力抑えたいので、穴面取り加工に限定してください。(V溝・面取り加工などの連続切削・位置決め加工は推奨いたしません)
- The above values are standard conditions. They need to be adapted for optimal use of the tools.
- Please use proper cutting fluids according to the work conditions. We recommend water soluble coolants or emulsions. In some cases oil mist and compressed air can be used as well depending on condition.
- Please lower the speed when working conditions are not stable (vibrations, low machine rigidity, unstable work piece fixture, etc.) or when working in a slope.
 - (Otherwise vibration may cause breakage of cutting edge during processing.)
- If the actual chamfering diameter is much smaller than the maximum chamfering diameter of the tool please use the actual processing diameter to calculate the cutting speed.
- If the recommended cutting speed exceeds the maximum speed of the machine used please use the maximum speed of the machine and adjust the other work parameters.
- For smoother surfaces please decrease the feed rate (this may cause shorter tool life).
- When working in hard to machine materials such as carbon steels or stainless steels please pay special attention to
 - ・ provide very stable conditions (machine and fixture rigidity).
 - ・ minimize the tools runoff
 - ・ use only for hole chamfering (avoid spot drilling and interrupted cuts such as chamfering and V grooving)

被削材適合性 Suitability for Work Materials ●...最適 The most suitable ○...適 Suitable △...可 Possible 無印 Blank...不可 Impossible

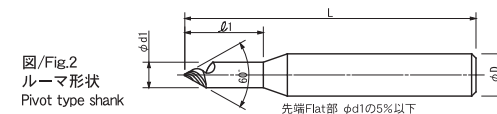
| 製品区分 Product | 軟鋼 Mild Steel | 炭素鋼 Carbon Steel | 合金鋼 Alloy Steel | 調質鋼 Heat treated Steel | 工具鋼 Tool Steel | 焼入れ鋼 Hardened Steel | ステンレス鋼 Stainless Steel | 鋳鉄 Cast Iron | ダクタイル鋳鉄 Ductile Cast Iron | チタン合金 Titanium Alloy | アルミ合金 Aluminium Alloy | 銅 Copper | プラスチック Plastic | セラミック etc. Ceramics etc. |
|-----------------|------------------|---------------------|--------------------|---------------------------|-------------------|------------------------|---------------------------|-----------------|------------------------------|-------------------------|--------------------------|-------------|-------------------|-----------------------------|
| | SS | S45C | SCM SCR | SKD SKS | ~40 HRC | ~45 HRC | 45~ HRC | SUS | FC | FDC | | Al | Cu | |
| 90LTG-CB | ◎ | ○ | △ | | △ | | | | | ○ | ○ | ◎ | ◎ | |
| 90LTG-CBDLC | | | | | | | | | | ○ | ◎ | ◎ | ◎ | |

トグルン® シャープSP 60° 超硬
TOGLON Sharp SP 60° Carbide

トグルン® シャープSP 60° 超硬 DLCコーティング
TOGLON Sharp SP 60° Carbide DLC coating

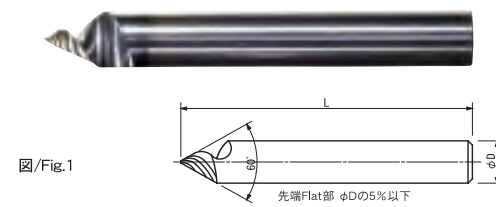


図/Fig.1

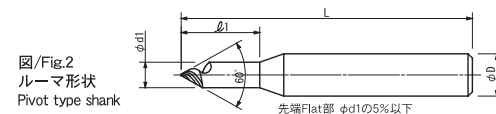


図/Fig.2
ルーマ形状
Pivot type shank

図/Fig.1: φD 最大面取り径 Max. Chamfering Dia.
図/Fig.2: φd1 最大面取り径 Max. Chamfering Dia.



図/Fig.1



図/Fig.2
ルーマ形状
Pivot type shank

図/Fig.1: φD 最大面取り径 Max. Chamfering Dia.
図/Fig.2: φd1 最大面取り径 Max. Chamfering Dia.

60° 超硬 シヤープ SHANK h6 1枚刃 右刃

60° 超硬 DLC シヤープ SHANK h6 1枚刃 右刃

| VAN Code No. | 最大面取り径 φd1 | シャンク径 φD | ルーマ長 ℓ1 | 全長 L | 図 Fig. | 在庫 Stock | 参考価格 Price |
|--------------|------------|----------|---------|------|--------|----------|------------|
| 60TG1.2CB | 1.2 | 3 | 3.6 | 40 | 2 | ● | ¥17,000 |
| 60TG2CB | 2 | 3 | 6 | 40 | 2 | ● | ¥14,000 |
| 60TG3CB | | 3 | | 40 | 1 | ● | ¥11,000 |
| 60TG4CB | | 4 | | 40 | 1 | ● | ¥11,000 |
| 60TG6CB | | 6 | | 50 | 1 | ● | ¥13,200 |
| 60TG8CB | | 8 | | 60 | 1 | ● | ¥20,500 |
| 60TG10CB | | 10 | | 70 | 1 | ● | ¥30,000 |
| 60TG12CB | | 12 | | 75 | 1 | ● | ¥39,000 |
| 60TG16CB | | 16 | | 80 | 1 | ● | ¥53,000 |

単位/寸法:mm 価格:円
Unit/Size:mm Price:JPY

| VAN Code No. | 最大面取り径 φd1 | シャンク径 φD | ルーマ長 ℓ1 | 全長 L | 図 Fig. | 在庫 Stock | 参考価格 Price |
|--------------|------------|----------|---------|------|--------|----------|------------|
| 60TG1.2CBDLC | 1.2 | 3 | 3.6 | 40 | 2 | ● | ¥23,600 |
| 60TG2CBDLC | 2 | 3 | 6 | 40 | 2 | ● | ¥20,200 |
| 60TG3CBDLC | | 3 | | 40 | 1 | ● | ¥16,800 |
| 60TG4CBDLC | | 4 | | 40 | 1 | ● | ¥16,800 |
| 60TG6CBDLC | | 6 | | 50 | 1 | ● | ¥19,500 |
| 60TG8CBDLC | | 8 | | 60 | 1 | ● | ¥29,500 |
| 60TG10CBDLC | | 10 | | 70 | 1 | ● | ¥40,000 |
| 60TG12CBDLC | | 12 | | 75 | 1 | ● | ¥51,000 |
| 60TG16CBDLC | | 16 | | 80 | 1 | ● | ¥66,000 |

単位/寸法:mm 価格:円
Unit/Size:mm Price:JPY

Stock ●...標準在庫品/Stocked

被削材適合性 Suitability for Work Materials ●...最適 The most suitable ○...適 Suitable △...可 Possible 無印 Blank...不可 Impossible

| 製品区分 Product | 軟鋼 Mild Steel | 炭素鋼 Carbon Steel | 合金鋼 Alloy Steel | 調質鋼 Heat treated Steel | 工具鋼 Tool Steel | 焼入れ鋼 Hardened Steel | ステンレス鋼 Stainless Steel | 鋳鉄 Cast Iron | ダクタイル鋳鉄 Ductile Cast Iron | チタン合金 Titanium Alloy | アルミ合金 Aluminium Alloy | 銅 Copper | プラスチック Plastic | セラミック etc. Ceramics etc. |
|-----------------|------------------|---------------------|--------------------|---------------------------|-------------------|------------------------|---------------------------|-----------------|------------------------------|-------------------------|--------------------------|-------------|-------------------|-----------------------------|
| | SS | S45C | SCM SCR | SKD SKS | ~40 HRC | ~45 HRC | 45~ HRC | SUS | FC | FDC | | Al | Cu | |
| 60TG-CB | ◎ | ○ | △ | | △ | | | | | ○ | ○ | ◎ | ◎ | |
| 60TG-CBDLC | | | | | | | | | | ○ | ◎ | ◎ | ◎ | |

高硬度用位置決め面取り工具 Spot drilling / chamfering tool for high hardness

トグルン®ハードSP トグルン®ミニチュアハードSP



TOGLON Hard SP
TOGLON Miniature Hard SP

HRC40~72の焼き入れ鋼を加工可能!!
Available for HRC40-72 Hardened steel



90TGHSP-CBALD
60TGHSP-CBALD

焼き入れ後の鋼・ダイス鋼、コバルト、ハステロイ等
従来と比較にならない性能を発揮
強ねじれ形状により、最高の面粗度を達成
3枚刃と長い切れ刃により驚異的な寿命

For hardened steel (40-72 HRC) such as die steel, Kovar, Hastelloy, etc.
Outstanding surface finish and tool life impossible to reach with conventional tools.
The high helix cutting edge achieves premium surface finishing near polishing quality.
Extremely long tool life due to the three flute design and the long cutting edge.



TGHMSP-CBALT

| 製品区分 Product | 画像 Photo | 面取角度 Chamfering angle | 材質 Material | 表面処理 Coating | 形状 Geometry | シャンク Shank | 刃数 Flutes | 回転方向 Direction of rotation |
|-----------------|-------------|--------------------------|----------------|-----------------|----------------|---------------|--------------|-------------------------------|
| 60TGHSP-CBALD | | 60° | 超硬 | ALD | ネガ刃 | SHANK h6 | 3枚刃 | 右刃 |
| 90TGHSP-CBALD | | 90° | 超硬 | ALD | ネガ刃 | SHANK h6 | 3枚刃 | 右刃 |
| 90LTGHSP-CBALD | | 90° | 超硬 | ALD | ネガ刃 ロング | SHANK h6 | 3枚刃 | 右刃 |
| TGHMSP-CBALT | | 90° | 超硬 | ALT | ネガ刃 | SHANK h6 | 2枚刃 | 右刃 |

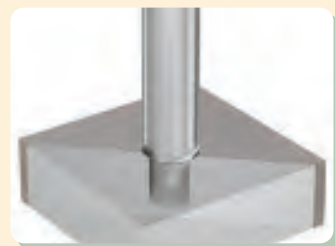
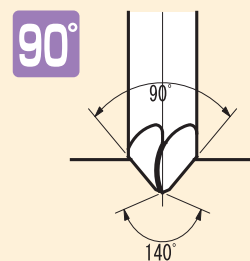
技術レポートについては、P.113、114をご覧ください。
See Page 113, 114 for technical information.

アイコンについての説明は、P.125をご覧ください。
See Page 125 for icon explanation.

トグルン®ハードSPについて

Guide to TOGLON Hard SP

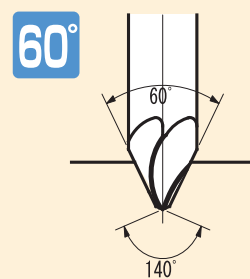
面取り角度 Chamfering angle



穴面取り/Hole Chamfering



位置決め/Spot Drilling



面取りミーリング/Chamfering

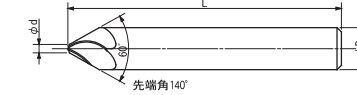


V溝ミーリング/V Grooving

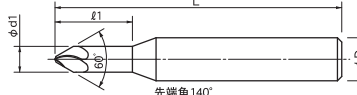
トグルン®ハードSP 60° ALDコーティング TOGLON Hard SP 60° ALD coating



図/Fig.1



図/Fig.2
ルーマ形状
Pivot type shank



図/Fig.1 : φD 最大面取り径 Max. Chamfering Dia.
図/Fig.2 : φd1 最大面取り径 Max. Chamfering Dia.

60° 超硬 ALD ネガ刃 SHANK h6 3枚刃 右刃

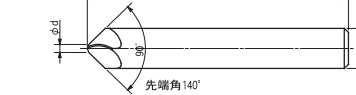
単位/寸法:mm 価格:円
Unit/Size:mm Price:JPY

| VAN Code No. | 最大面取り径 φd1 | 最小面取り径 φd | シャンク径 φD | ルーマ長 ℓ1 | 全長 L | 在庫 Stock | 参考価格 Price |
|-----------------|---------------|--------------|-------------|------------|---------|-------------|---------------|
| 60TGHSP1CBALD | 1 | 0.2 | 3 | 3 | 40 | ● | ¥18,000 |
| 60TGHSP1.5CBALD | 1.5 | 0.3 | 3 | 4.5 | 40 | ● | ¥18,000 |
| 60TGHSP2CBALD | 2 | 0.4 | 3 | 6 | 40 | ● | ¥15,500 |
| 60TGHSP3CBALD | 0.6 | 0.6 | 3 | | 40 | ● | ¥13,000 |
| 60TGHSP4CBALD | 0.8 | 0.8 | 4 | | 40 | ● | ¥13,000 |
| 60TGHSP6CBALD | 1.2 | 1.2 | 6 | | 50 | ● | ¥16,500 |
| 60TGHSP8CBALD | 1.6 | 1.6 | 8 | | 60 | ● | ¥26,000 |
| 60TGHSP10CBALD | 2 | 2 | 10 | | 70 | ● | ¥35,000 |
| 60TGHSP12CBALD | 2.4 | 2.4 | 12 | | 75 | ● | ¥42,000 |
| 60TGHSP16CBALD | 3 | 3 | 16 | | 80 | ● | ¥56,000 |
| 60TGHSP20CBALD | 4 | 4 | 20 | | 100 | ● | ¥72,000 |

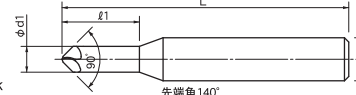
トグルン®ハードSP 90° ALDコーティング TOGLON Hard SP 90° ALD coating



図/Fig.1



図/Fig.2
ルーマ形状
Pivot type shank



図/Fig.1 : φD 最大面取り径 Max. Chamfering Dia.
図/Fig.2 : φd1 最大面取り径 Max. Chamfering Dia.

90° 超硬 ALD ネガ刃 SHANK h6 3枚刃 右刃

単位/寸法:mm 価格:円
Unit/Size:mm Price:JPY

| VAN Code No. | 最大面取り径 φd1 | 最小面取り径 φd | シャンク径 φD | ルーマ長 ℓ1 | 全長 L | 在庫 Stock | 参考価格 Price |
|-----------------|---------------|--------------|-------------|------------|---------|-------------|---------------|
| 90TGHSP1CBALD | 1 | 0.2 | 3 | 3 | 40 | ● | ¥15,500 |
| 90TGHSP1.5CBALD | 1.5 | 0.3 | 3 | 4.5 | 40 | ● | ¥15,500 |
| 90TGHSP2CBALD | 2 | 0.4 | 3 | 6 | 40 | ● | ¥13,200 |
| 90TGHSP3CBALD | 0.6 | 0.6 | 3 | | 40 | ● | ¥11,000 |
| 90TGHSP4CBALD | 0.8 | 0.8 | 4 | | 40 | ● | ¥11,000 |
| 90TGHSP6CBALD | 1.2 | 1.2 | 6 | | 50 | ● | ¥14,600 |
| 90TGHSP8CBALD | 1.6 | 1.6 | 8 | | 60 | ● | ¥22,000 |
| 90TGHSP10CBALD | 2 | 2 | 10 | | 70 | ● | ¥31,000 |
| 90TGHSP12CBALD | 2.4 | 2.4 | 12 | | 75 | ● | ¥38,500 |
| 90TGHSP16CBALD | 3 | 3 | 16 | | 80 | ● | ¥51,000 |
| 90TGHSP20CBALD | 4 | 4 | 20 | | 100 | ● | ¥67,000 |
| 90TGHSP25CBALD | 5 | 5 | 25 | | 100 | ● | ¥90,000 |

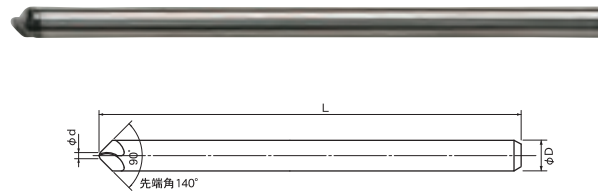
Stock ●...標準在庫品/Stocked

■被削材適合性 Suitability for Work Materials ◎...最適 The most suitable ○...適 Suitable △...可 Possible 無印 Blank...不可 Impossible

| 製品区分 Product | 軟鋼 Mild Steel | 炭素鋼 Carbon Steel | 合金鋼 Alloy Steel | 調質鋼 Heat treated Steel | 工具鋼 Tool Steel | 焼入れ鋼 Hardened Steel | ステンレス鋼 Stainless Steel | 鋳鉄 Cast Iron | ダクタイル鋳鉄 Ductile Cast Iron | チタン合金 Titanium Alloy | アルミ合金 Aluminium Alloy | 銅 Copper | プラスチック Plastic | セラミック etc. Ceramics etc. |
|-----------------|------------------|---------------------|--------------------|---------------------------|-------------------|------------------------|---------------------------|-----------------|------------------------------|-------------------------|--------------------------|-------------|-------------------|---|
| TGHSP-CBALD | SS | S45C | SCM SCR | SKD SKS | ~40 HRC | ~45 HRC 45~ HRC | SUS | FC | FDC | | Al | Cu | | マシナブル Machinable シリコニア Zirconia Glass |

SP CENTER
CENTER DRILL
GSS STARTING DRILL
GP DRILL
TFD
SPIRAL GUN BARREL DRILL
TOGLON MULTI CHAMFER
TOGLON SHARP
TOGLON HARD
CORNER ROUNDING CUTTER
JIT
SUBMARINE GATE DRILL
MICRO TOOL
TECHNICAL INFORMATION
CUSTOMIZED TOOL SEMIORDER TOOL
INST- RUCTION
COMPANY PROFILE

トグルン®ハードSP 90° ロングタイプ ALDコーティング
TOGLON Hard SP 90° Long type ALD coating

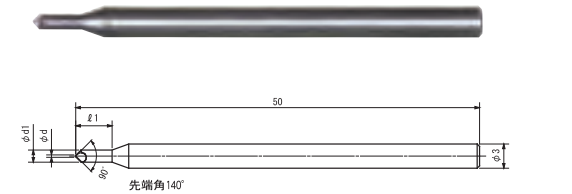


90° 超硬 ALD ネガ刃 ロング SHANK h6 3枚刃 右刃

単位/寸法:mm 価格:円
Unit/Size:mm Price:JPY

| VAN Code No. | 最小面取り径 φd | シャンク径 φD | 全長 L | 在庫 Stock | 参考価格 Price |
|-----------------|-----------|----------|------|----------|------------|
| 90LTGHSP3CBALD | 0.6 | 3 | 100 | ● | ¥15,500 |
| 90LTGHSP4CBALD | 0.8 | 4 | 100 | ● | ¥15,500 |
| 90LTGHSP6CBALD | 1.2 | 6 | 100 | ● | ¥20,000 |
| 90LTGHSP8CBALD | 1.6 | 8 | 150 | ● | ¥27,500 |
| 90LTGHSP10CBALD | 2 | 10 | 150 | ● | ¥37,500 |
| 90LTGHSP12CBALD | 2.4 | 12 | 150 | ● | ¥44,000 |

トグルン®ミニチュアハードSP 90° ALTコーティング
TOGLON Miniature Hard SP 90° ALT coating



90° 超硬 ALT ネガ刃 SHANK h6 2枚刃 右刃

単位/寸法:mm 価格:円
Unit/Size:mm Price:JPY

| VAN Code No. | 最小面取り径 φd | 最大面取り径 φd1 | ルーマ長 ℓ1 | 在庫 Stock | 参考価格 Price |
|----------------|-----------|------------|---------|----------|------------|
| TGHMSP0.1CBALT | 0.02 | 0.1 | 0.3 | ● | ¥15,000 |
| TGHMSP0.2CBALT | 0.04 | 0.2 | 0.6 | ● | ¥14,000 |
| TGHMSP0.3CBALT | 0.06 | 0.3 | 0.9 | ● | ¥13,000 |
| TGHMSP0.4CBALT | 0.08 | 0.4 | 1.2 | ● | ¥12,000 |
| TGHMSP0.5CBALT | 0.1 | 0.5 | 1.5 | ● | ¥11,500 |
| TGHMSP0.7CBALT | 0.14 | 0.7 | 2.1 | ● | ¥11,500 |
| TGHMSP1CBALT | 0.2 | 1 | 3 | ● | ¥11,500 |
| TGHMSP1.5CBALT | 0.3 | 1.5 | 4.5 | ● | ¥11,500 |

Stock ●...標準在庫品 / Stocked

トグルン®ハードSP 切削条件表 Toglion Hard SP Recommended Drilling Condition

| 被削材 WORK MATERIAL | 焼入れ鋼 (SKD, HSS) (50-60HRC) HARDENED STEEL | | |
|-------------------------------------|--|---------------------------------|--|
| 切削速度 CUTTING SPEED | 20~40m/min | | |
| 最大面取り径 Max Chamfering Dia. mm | 回転数 SPEED min ⁻¹ | 送り量(穴) FEED (HOLE) mm/rev | 送り量(V溝) FEED (V GROOVING) mm/rev |
| 1 | 3,600 - 7,200 | 0.01 - 0.03 | 0.01 - 0.03 |
| 2 | 2,800 - 5,500 | 0.015 - 0.05 | 0.015 - 0.05 |
| 3 | 2,100 - 4,200 | 0.02 - 0.06 | 0.03 - 0.08 |
| 4 | 1,600 - 3,200 | 0.02 - 0.06 | 0.03 - 0.08 |
| 6 | 1,100 - 2,100 | 0.02 - 0.06 | 0.05 - 0.1 |
| 8 | 800 - 1,600 | 0.03 - 0.08 | 0.1 - 0.2 |
| 10 | 600 - 1,300 | 0.05 - 0.13 | 0.2 - 0.3 |
| 12 | 500 - 1,100 | 0.1 - 0.2 | 0.2 - 0.5 |
| 16 | 400 - 800 | 0.1 - 0.2 | 0.3 - 0.6 |
| 20 | 300 - 600 | 0.1 - 0.2 | 0.3 - 0.6 |

トグルン®ミニチュアハードSP 切削条件表 Toglion Miniature Hard SP Recommended Drilling Condition

| 被削材 WORK MATERIAL | 焼入れ鋼 (SKD, HSS) (50-60HRC) HARDENED STEEL | | |
|-------------------------------------|--|---------------------------------|--|
| 切削速度 CUTTING SPEED | 10~30m/min | | |
| 最大面取り径 Max Chamfering Dia. mm | 回転数 SPEED min ⁻¹ | 送り量(穴) FEED (HOLE) mm/rev | 送り量(V溝) FEED (V GROOVING) mm/rev |
| 0.3 | 10,600 - 31,800 | 0.002 - 0.01 | 0.003 - 0.012 |
| 0.5 | 6,400 - 19,000 | 0.005 - 0.015 | 0.01 - 0.02 |
| 1 | 3,200 - 9,500 | 0.01 - 0.03 | 0.02 - 0.04 |
| 1.5 | 2,100 - 6,400 | 0.02 - 0.04 | 0.03 - 0.05 |

切削条件設定上の注意点 Please observe when choosing the cutting conditions

- 上記はあくまでも目安です。状況に応じて変更してください。
 - 十分な水溶性クーラント、オイルミストを使用して下さい。但し、ミーリング加工はオイルミスト、もしくはドライ加工を推奨します。
 - 次の場合は送り条件を下げて下さい。
 - 傾斜面への加工
 - ワーク、チャッキング、機械剛性の悪い場合
 - 加工面取径が最大面取径より大幅に小さい場合、回転数計算時は工具径を加工面取径に変更して下さい。
 - 上記切削条件が加工機械の上限回転数を超える場合は、ご使用のスピンドル精度が安定する領域での高い回転数でご使用下さい。
 - ワーク面粗度を上げたい場合は、上記条件より送り量を減らしても問題ありません。その際、工具寿命が短くなる可能性があります。
- 1.The above values are standard conditions. They need to be adapted for optimal use of the tools.
 2.For drilling and chamfering please use ample water soluble coolant or oil mist. For milling we recommend oil mist or dry processing.
 3.Please lower the speed when drilling into a slope or when working conditions are not stable (vibrations, moving of work piece, etc.)
 4.If the actual chamfering diameter is much smaller than the maximum chamfering diameter of the tool please use the actual processing diameter to calculate the cutting speed.
 5.If the recommended cutting speed exceeds the maximum speed of the machine used please use the maximum speed of the machine and adjust the other work parameters accordingly.
 6.For smoother surfaces please decrease the feed rate (this may cause shorter tool life).

■被削材適合性 Suitability for Work Materials ●...最適 The most suitable ○...適 Suitable △...可 Possible 無印 Blank...不可 Impossible

| 製品区分 Product | 軟鋼 Mild Steel | 炭素鋼 Carbon Steel | 合金鋼 Alloy Steel | 調質鋼 Heat treated Steel | 工具鋼 Tool Steel | 焼入れ鋼 Hardened Steel | ステンレス鋼 Stainless Steel | 鋳鉄 Cast Iron | ダクタイル鋳鉄 Ductile Cast Iron | チタン合金 Titanium Alloy | アルミ合金 Aluminium Alloy | 銅 Copper | プラスチック Plastic | セラミック etc. Ceramics etc. |
|-----------------|------------------|---------------------|--------------------|---------------------------|-------------------|------------------------|---------------------------|-----------------|------------------------------|-------------------------|--------------------------|-------------|-------------------|-----------------------------|
| LTGHSP-CBALT | SS | S45C | SCM SCR | SKD SKS | ~40 HRC | ~45 HRC 45~ HRC | SUS | FC | FDC | | Al | Cu | | マシナブル Machinable |
| TGHMSP-CBALT | | | △ | ○ | | ○ | | | | △ | △ | | | ○ |

高硬度用穴あけ工具 Drill for high hardness

トグルン®ハードドリル トグルン®ミニチュアハードドリル

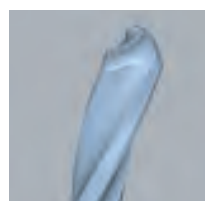


穴加工

TOGLON Hard Drill
TOGLON Miniature Hard Drill

HRC40~72の焼き入れ鋼を加工可能!!

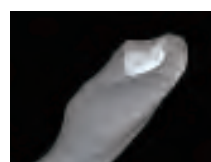
Available for HRC40-72 Hardened steel



TGHDS-CBALD
TGHDR-CBALT

従来の高硬度用に比べ抜群の性能
3枚刃設計により、
穴径精度・穴面粗度共に抜群の仕上がり
トグルン®ハードSPとの併用で穴位置精度アップ

Superior performance in comparison to conventional drills for high hardened steel (40-72 HRC).
The three flute design dramatically improves the roundness of the drill hole and the surface finish. In combination with TOGLON Hard SP highly precise positioning of the drill hole is achieved



TGHMDS-CBALD
TGHMDR-CBALT

| 製品区分 Product | 画像 Photo | 材質 Material | 表面処理 Coating | 形状 Geometry | シャンク Shank | 刃数 Flutes | 回転方向 Direction of rotation | 先端角 Point angle | 刃径 φD | 摘要 Summary |
|-----------------|-------------|----------------|-----------------|----------------|---------------|--------------|-------------------------------|--------------------|--------------|---------------|
| TGHDS-CBALD | | 超硬 | ALD | ネガ刃 | SHANK h6 | 3枚刃 | 右刃 | 140° 90° | 1.0~ 12.0 | |
| TGHDR-CBALT | | 超硬 | ALT | ネガ刃 | SHANK h6 | 3枚刃 | 右刃 | 140° 90° | 0.8~ 6.0 | |
| TGHMDS-CBALD | | 超硬 | ALT | ネガ刃 | SHANK h6 | 2枚刃 | 右刃 | 140° 90° | 0.1~ 2.0 | ミニチュア |
| TGHMDR-CBALT | | 超硬 | ALT | ネガ刃 | SHANK h6 | 2枚刃 | 右刃 | 140° 90° | 0.1~ 2.0 | ミニチュア |

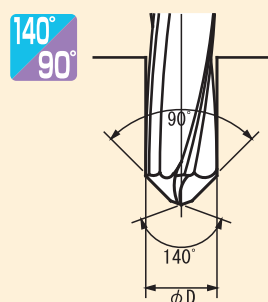
技術レポートについては、P.113、114をご覧ください。
See Page 113, 114 for technical information.

アイコンについての説明は、P.125をご覧ください。
See Page 125 for icon explanation.

トグルン®ハードドリルについて

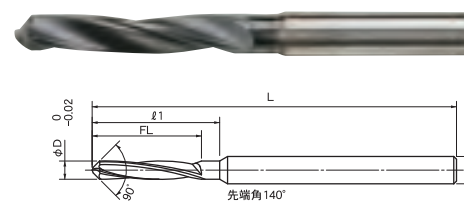
Guide to TOGLON Hard Drill

先端角 Point angle



穴加工/Hole Processing

トグルン®ハードドリル ショート ALDコーティング
TOGLON Hard Drill Short ALD coating



超硬 ALD ネガ刃 SHANK h6 3枚刃 右刃 140° 90° 1.0~ 12.0

| VAN Code No. | 直径 φD | シャンク径 φd | 有効溝長 FL | ルーマ長 ℓ1 | 全長 L | 在庫 Stock | 参考価格 Price |
|---------------|----------|-------------|------------|------------|---------|-------------|---------------|
| TGHDS1CBALD | 1 | 3 | 6 | 7.9 | 50 | ● | ¥9,000 |
| TGHDS1.1CBALD | 1.1 | 3 | 7 | 9.1 | 50 | ● | ¥10,000 |
| TGHDS1.2CBALD | 1.2 | 3 | 7 | 9.2 | 50 | ● | ¥10,000 |
| TGHDS1.3CBALD | 1.3 | 3 | 8 | 10.4 | 50 | ● | ¥10,000 |
| TGHDS1.4CBALD | 1.4 | 3 | 8 | 10.5 | 50 | ● | ¥10,000 |
| TGHDS1.5CBALD | 1.5 | 3 | 9 | 11.7 | 50 | ● | ¥10,000 |
| TGHDS1.6CBALD | 1.6 | 3 | 10 | 12.8 | 50 | ● | ¥10,000 |
| TGHDS1.7CBALD | 1.7 | 3 | 10 | 13 | 50 | ● | ¥10,000 |
| TGHDS1.8CBALD | 1.8 | 3 | 11 | 14.1 | 50 | ● | ¥10,000 |
| TGHDS1.9CBALD | 1.9 | 3 | 11 | 14.3 | 50 | ● | ¥10,000 |
| TGHDS2CBALD | 2 | 4 | 12 | 15.4 | 60 | ● | ¥8,000 |
| TGHDS2.1CBALD | 2.1 | 4 | 12 | 15.6 | 60 | ● | ¥9,000 |
| TGHDS2.2CBALD | 2.2 | 4 | 13 | 16.7 | 60 | ● | ¥9,000 |
| TGHDS2.3CBALD | 2.3 | 4 | 13 | 16.9 | 60 | ● | ¥9,000 |
| TGHDS2.4CBALD | 2.4 | 4 | 14 | 18 | 60 | ● | ¥9,000 |
| TGHDS2.5CBALD | 2.5 | 4 | 14 | 18.2 | 60 | ● | ¥9,000 |
| TGHDS2.6CBALD | 2.6 | 4 | 14 | 18.3 | 60 | ● | ¥9,000 |
| TGHDS2.7CBALD | 2.7 | 4 | 16 | 20.5 | 60 | ● | ¥9,000 |
| TGHDS2.8CBALD | 2.8 | 4 | 16 | 20.6 | 60 | ● | ¥9,000 |
| TGHDS2.9CBALD | 2.9 | 4 | 16 | 20.8 | 60 | ● | ¥9,000 |
| TGHDS3CBALD | 3 | 4 | 16 | 20.9 | 60 | ● | ¥8,000 |
| TGHDS3.1CBALD | 3.1 | 4 | 18 | 23.1 | 60 | ● | ¥10,000 |
| TGHDS3.2CBALD | 3.2 | 4 | 18 | 23.2 | 60 | ● | ¥10,000 |
| TGHDS3.3CBALD | 3.3 | 4 | 18 | 23.4 | 60 | ● | ¥10,000 |
| TGHDS3.4CBALD | 3.4 | 4 | 20 | 25.6 | 60 | ● | ¥10,000 |
| TGHDS3.5CBALD | 3.5 | 4 | 20 | 25.7 | 60 | ● | ¥10,000 |
| TGHDS3.6CBALD | 3.6 | 4 | 21 | 26.8 | 60 | ● | ¥11,000 |
| TGHDS3.7CBALD | 3.7 | 4 | 21 | 27 | 60 | ● | ¥11,000 |
| TGHDS3.8CBALD | 3.8 | 4 | 22 | 28.1 | 60 | ● | ¥11,000 |
| TGHDS3.9CBALD | 3.9 | 4 | 22 | 28.3 | 60 | ● | ¥11,000 |
| TGHDS4CBALD | 4 | 4 | 22 | 28.4 | 60 | ● | ¥10,000 |
| TGHDS4.1CBALD | 4.1 | 6 | 24 | 30.6 | 60 | ● | ¥14,000 |
| TGHDS4.2CBALD | 4.2 | 6 | 24 | 30.7 | 60 | ● | ¥14,000 |
| TGHDS4.3CBALD | 4.3 | 6 | 24 | 30.9 | 60 | ● | ¥14,000 |
| TGHDS4.4CBALD | 4.4 | 6 | 24 | 31 | 60 | ● | ¥14,000 |
| TGHDS4.5CBALD | 4.5 | 6 | 24 | 31.2 | 60 | ● | ¥14,000 |
| TGHDS4.6CBALD | 4.6 | 6 | 25 | 32.3 | 60 | ● | ¥14,000 |
| TGHDS4.7CBALD | 4.7 | 6 | 25 | 32.5 | 60 | ● | ¥14,000 |
| TGHDS4.8CBALD | 4.8 | 6 | 25 | 32.6 | 60 | ● | ¥14,000 |
| TGHDS4.9CBALD | 4.9 | 6 | 25 | 32.8 | 60 | ● | ¥14,000 |

単位/寸法:mm 価格:円
Unit/Size:mm Price:JPY

| VAN Code No. | 直径 φD | シャンク径 φd | 有効溝長 FL | ルーマ長 ℓ1 | 全長 L | 在庫 Stock | 参考価格 Price |
|----------------|----------|-------------|------------|------------|---------|-------------|---------------|
| TGHDS5CBALD | 5 | 6 | 26 | 33.9 | 60 | ● | ¥14,000 |
| TGHDS5.1CBALD | 5.1 | 6 | 26 | 34.1 | 60 | ● | ¥14,000 |
| TGHDS5.2CBALD | 5.2 | 6 | 26 | 34.2 | 60 | ● | ¥14,000 |
| TGHDS5.3CBALD | 5.3 | 6 | 26 | 34.4 | 60 | ● | ¥14,000 |
| TGHDS5.4CBALD | 5.4 | 6 | 26 | 34.5 | 60 | ● | ¥14,000 |
| TGHDS5.5CBALD | 5.5 | 6 | 28 | 36.7 | 60 | ● | ¥14,000 |
| TGHDS5.6CBALD | 5.6 | 6 | 28 | 36.8 | 60 | ● | ¥14,000 |
| TGHDS5.7CBALD | 5.7 | 6 | 28 | 37 | 60 | ● | ¥14,000 |
| TGHDS5.8CBALD | 5.8 | 6 | 28 | 37.1 | 60 | ● | ¥14,000 |
| TGHDS5.9CBALD | 5.9 | 6 | 28 | 37.3 | 60 | ● | ¥14,000 |
| TGHDS6CBALD | 6 | 6 | 28 | 37.4 | 60 | ● | ¥14,000 |
| TGHDS6.1CBALD | 6.1 | 8 | 31 | 40.6 | 80 | ● | ¥18,000 |
| TGHDS6.2CBALD | 6.2 | 8 | 31 | 40.7 | 80 | ● | ¥18,000 |
| TGHDS6.5CBALD | 6.5 | 8 | 31 | 41.2 | 80 | ● | ¥18,000 |
| TGHDS6.8CBALD | 6.8 | 8 | 34 | 44.6 | 80 | ● | ¥18,000 |
| TGHDS6.9CBALD | 6.9 | 8 | 34 | 44.8 | 80 | ● | ¥18,000 |
| TGHDS7CBALD | 7 | 8 | 34 | 44.9 | 80 | ● | ¥18,000 |
| TGHDS7.5CBALD | 7.5 | 8 | 34 | 45.7 | 80 | ● | ¥18,000 |
| TGHDS7.8CBALD | 7.8 | 8 | 37 | 49.1 | 80 | ● | ¥18,000 |
| TGHDS7.9CBALD | 7.9 | 8 | 37 | 49.3 | 80 | ● | ¥18,000 |
| TGHDS8CBALD | 8 | 8 | 37 | 49.4 | 80 | ● | ¥20,000 |
| TGHDS8.5CBALD | 8.5 | 10 | 37 | 50.2 | 100 | ● | ¥20,000 |
| TGHDS8.6CBALD | 8.6 | 10 | 40 | 53.3 | 100 | ● | ¥20,000 |
| TGHDS8.7CBALD | 8.7 | 10 | 40 | 53.5 | 100 | ● | ¥20,000 |
| TGHDS8.8CBALD | 8.8 | 10 | 40 | 53.6 | 100 | ● | ¥20,000 |
| TGHDS9CBALD | 9 | 10 | 40 | 53.9 | 100 | ● | ¥20,000 |
| TGHDS9.5CBALD | 9.5 | 10 | 40 | 54.7 | 100 | ● | ¥20,000 |
| TGHDS9.6CBALD | 9.6 | 10 | 43 | 54.8 | 100 | ● | ¥20,000 |
| TGHDS9.7CBALD | 9.7 | 10 | 43 | 58 | 100 | ● | ¥20,000 |
| TGHDS9.8CBALD | 9.8 | 10 | 43 | 58.1 | 100 | ● | ¥20,000 |
| TGHDS10CBALD | 10 | 10 | 43 | 58.4 | 100 | ● | ¥25,000 |
| TGHDS10.3CBALD | 10.3 | 12 | 43 | 58.9 | 110 | ● | ¥25,000 |
| TGHDS10.4CBALD | 10.4 | 12 | 43 | 59 | 110 | ● | ¥25,000 |
| TGHDS10.5CBALD | 10.5 | 12 | 43 | 59.2 | 110 | ● | ¥25,000 |
| TGHDS10.8CBALD | 10.8 | 12 | 47 | 63.6 | 110 | ● | ¥25,000 |
| TGHDS11CBALD | 11 | 12 | 47 | 63.9 | 110 | ● | ¥25,000 |
| TGHDS11.5CBALD | 11.5 | 12 | 47 | 64.7 | 110 | ● | ¥25,000 |
| TGHDS11.8CBALD | 11.8 | 12 | 47 | 65.1 | 110 | ● | ¥25,000 |
| TGHDS12CBALD | 12 | 12 | 51 | 69.4 | 110 | ● | ¥25,000 |

Stock ●...標準在庫品/Stocked

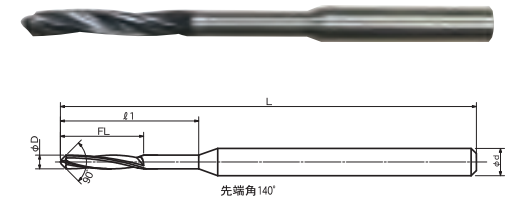
■被削材適合性 Suitability for Work Materials ●...最適 The most suitable ○...適 Suitable △...可 Possible 無印 Blank...不可 Impossible

| 製品区分 Product | 軟鋼 Mild Steel | 炭素鋼 Carbon Steel | 合金鋼 Alloy Steel | 調質鋼 Heat treated Steel | 工具鋼 Tool Steel | 焼入れ鋼 Hardened Steel | ステンレス鋼 Stainless Steel | 鋳鉄 Cast Iron | ダクタイル鋳鉄 Ductile Cast Iron | チタン合金 Titanium Alloy | アルミ合金 Aluminum Alloy | 銅 Copper | プラスチック Plastic | セラミック etc. Ceramics etc. |
|-----------------|------------------|---------------------|--------------------|---------------------------|-------------------|------------------------|---------------------------|-----------------|------------------------------|-------------------------|-------------------------|-------------|-------------------|--|
| TGHDS-CBALD | SS | S45C | SCM SCR | SKD SKS | ~40 HRC | ~45 HRC 45~ HRC | SUS | FC | FDC | | Al | Cu | | マシナブル Machinable ジルコニア Zirconia ガラス Glass |

SP CENTER
CENTER DRILL
GSS STARTING DRILL
GP DRILL
TFD
SPIRAL GUN BARREL DRILL
TOGLON MULTI CHAMFER
TOGLON SHARP
TOGLON HARD
CORNER ROUNDING CUTTER
JIT
SUBMARINE GATE DRILL
MICRO TOOL
TECHNICAL INFORMATION
CUSTOMIZED TOOL SEMIORDER TOOL
INST- RUCTION
COMPANY PROFILE

SP CENTER
CENTER DRILL
GSS STARTING DRILL
GP DRILL
TFD
SPIRAL GUN BARREL DRILL
TOGLON MULTI CHAMFER
TOGLON SHARP
TOGLON HARD
CORNER ROUNDING CUTTER
JIT
SUBMARINE GATE DRILL
MICRO TOOL
TECHNICAL INFORMATION
CUSTOMIZED TOOL SEMIORDER TOOL
INST- RUCTION
COMPANY PROFILE

トグルン®ハードドリル レギュラー ALTコーティング
TOGLON Hard Drill Regular ALT coating



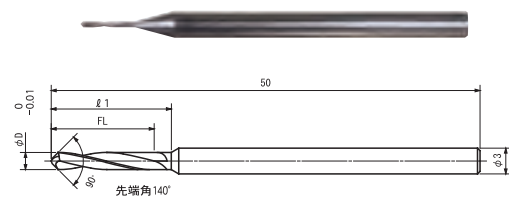
超硬 ALT ネガ刃 SHANK h6 3枚刃 右刃 140° 90° 0.8~ 6.0

| VAN Code No. | 直径 φD | シャンク径 φd | 有効溝長 FL | 有効長 ℓ1 | 全長 L | 在庫 Stock | 参考価格 Price |
|---------------|-------|----------|---------|--------|------|----------|------------|
| TGHDR0.8CBALT | 0.8 | 3 | 4.8 | 9.6 | 50 | ● | ¥14,000 |
| TGHDR0.9CBALT | 0.9 | 3 | 5.4 | 10.8 | 50 | ● | ¥14,000 |
| TGHDR1.1CBALT | 1 | 3 | 6 | 12 | 50 | ● | ¥11,000 |
| TGHDR1.1CBALT | 1.1 | 3 | 6.6 | 13.2 | 50 | ● | ¥12,000 |
| TGHDR1.2CBALT | 1.2 | 3 | 7.2 | 14.4 | 50 | ● | ¥12,000 |
| TGHDR1.3CBALT | 1.3 | 3 | 7.8 | 15.6 | 50 | ● | ¥12,000 |
| TGHDR1.4CBALT | 1.4 | 3 | 8.4 | 16.8 | 50 | ● | ¥12,000 |
| TGHDR1.5CBALT | 1.5 | 3 | 9 | 18 | 50 | ● | ¥12,000 |
| TGHDR1.6CBALT | 1.6 | 3 | 9.6 | 19.2 | 50 | ● | ¥12,000 |
| TGHDR1.7CBALT | 1.7 | 3 | 10.2 | 20.4 | 50 | ● | ¥12,000 |
| TGHDR1.8CBALT | 1.8 | 3 | 10.8 | 21.6 | 50 | ● | ¥12,000 |
| TGHDR1.9CBALT | 1.9 | 3 | 11.4 | 22.8 | 50 | ● | ¥12,000 |
| TGHDR2.1CBALT | 2 | 4 | 12 | 24 | 60 | ● | ¥10,000 |
| TGHDR2.1CBALT | 2.1 | 4 | 12.6 | 25.2 | 60 | ● | ¥11,000 |
| TGHDR2.2CBALT | 2.2 | 4 | 13.2 | 26.4 | 60 | ● | ¥11,000 |
| TGHDR2.3CBALT | 2.3 | 4 | 13.8 | 27.6 | 60 | ● | ¥11,000 |
| TGHDR2.4CBALT | 2.4 | 4 | 14.4 | 28.8 | 60 | ● | ¥11,000 |
| TGHDR2.5CBALT | 2.5 | 4 | 15 | 30 | 60 | ● | ¥11,000 |
| TGHDR2.6CBALT | 2.6 | 4 | 15.6 | 31.2 | 60 | ● | ¥11,000 |
| TGHDR2.7CBALT | 2.7 | 4 | 16.2 | 32.4 | 60 | ● | ¥11,000 |
| TGHDR2.8CBALT | 2.8 | 4 | 16.8 | 33.6 | 60 | ● | ¥11,000 |
| TGHDR2.9CBALT | 2.9 | 4 | 17.4 | 34.8 | 60 | ● | ¥11,000 |
| TGHDR3.1CBALT | 3 | 4 | 18 | 36 | 60 | ● | ¥10,000 |
| TGHDR3.1CBALT | 3.1 | 4 | 18.6 | 37.2 | 80 | ● | ¥12,000 |
| TGHDR3.2CBALT | 3.2 | 4 | 19.2 | 38.4 | 80 | ● | ¥12,000 |
| TGHDR3.3CBALT | 3.3 | 4 | 19.8 | 39.6 | 80 | ● | ¥12,000 |
| TGHDR3.4CBALT | 3.4 | 4 | 20.4 | 40.8 | 80 | ● | ¥12,000 |
| TGHDR3.5CBALT | 3.5 | 4 | 21 | 42 | 80 | ● | ¥12,000 |
| TGHDR3.6CBALT | 3.6 | 6 | 21.6 | 43.2 | 100 | ● | ¥14,000 |
| TGHDR3.7CBALT | 3.7 | 6 | 22.2 | 44.4 | 100 | ● | ¥14,000 |
| TGHDR3.8CBALT | 3.8 | 6 | 22.8 | 45.6 | 100 | ● | ¥14,000 |
| TGHDR3.9CBALT | 3.9 | 6 | 23.4 | 46.8 | 100 | ● | ¥14,000 |

| VAN Code No. | 直径 φD | シャンク径 φd | 有効溝長 FL | 有効長 ℓ1 | 全長 L | 在庫 Stock | 参考価格 Price |
|---------------|-------|----------|---------|--------|------|----------|------------|
| TGHDR4.1CBALT | 4 | 6 | 24 | 48 | 100 | ● | ¥13,000 |
| TGHDR4.1CBALT | 4.1 | 6 | 24.6 | 49.2 | 100 | ● | ¥16,000 |
| TGHDR4.2CBALT | 4.2 | 6 | 25.2 | 50.4 | 100 | ● | ¥16,000 |
| TGHDR4.3CBALT | 4.3 | 6 | 25.8 | 51.6 | 100 | ● | ¥16,000 |
| TGHDR4.4CBALT | 4.4 | 6 | 26.4 | 52.8 | 100 | ● | ¥16,000 |
| TGHDR4.5CBALT | 4.5 | 6 | 27 | 54 | 100 | ● | ¥16,000 |
| TGHDR4.6CBALT | 4.6 | 6 | 27.6 | 55.2 | 100 | ● | ¥16,000 |
| TGHDR4.7CBALT | 4.7 | 6 | 28.2 | 56.4 | 100 | ● | ¥16,000 |
| TGHDR4.8CBALT | 4.8 | 6 | 28.8 | 57.6 | 100 | ● | ¥16,000 |
| TGHDR4.9CBALT | 4.9 | 6 | 29.4 | 58.8 | 100 | ● | ¥16,000 |
| TGHDR5.1CBALT | 5 | 6 | 30 | 60 | 100 | ● | ¥15,000 |
| TGHDR5.1CBALT | 5.1 | 6 | 30.6 | 61.2 | 120 | ● | ¥16,000 |
| TGHDR5.2CBALT | 5.2 | 6 | 31.2 | 62.4 | 120 | ● | ¥16,000 |
| TGHDR5.3CBALT | 5.3 | 6 | 31.8 | 63.6 | 120 | ● | ¥16,000 |
| TGHDR5.4CBALT | 5.4 | 6 | 32.4 | 64.8 | 120 | ● | ¥16,000 |
| TGHDR5.5CBALT | 5.5 | 6 | 33 | 66 | 120 | ● | ¥16,000 |
| TGHDR5.6CBALT | 5.6 | 8 | 33.6 | 67.2 | 120 | ● | ¥20,000 |
| TGHDR5.7CBALT | 5.7 | 8 | 34.2 | 68.4 | 120 | ● | ¥20,000 |
| TGHDR5.8CBALT | 5.8 | 8 | 34.8 | 69.6 | 120 | ● | ¥20,000 |
| TGHDR5.9CBALT | 5.9 | 8 | 35.4 | 70.8 | 120 | ● | ¥20,000 |
| TGHDR6.1CBALT | 6 | 8 | 36 | 72 | 120 | ● | ¥25,000 |

Stock ●・・・標準在庫品 / Stocked
無印・・・受注生産品 / No Mark・・・Manufactured Upon Request

トグルン®ミニチュアハードドリル スタブ ALTコーティング
TOGLON Miniature Hard Drill Stub type ALT coating



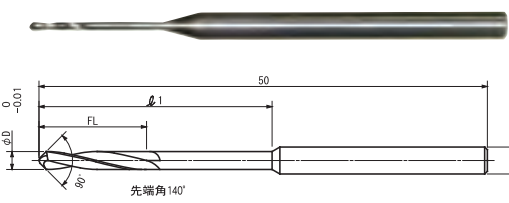
超硬 ALT ネガ刃 SHANK h6 2枚刃 右刃 140° 90° 0.1~ 2.0 ミニチュア

| VAN Code No. | 直径 φD | 有効溝長 FL | 有効長 ℓ1 | 在庫 Stock | 参考価格 Price |
|-----------------|-------|---------|--------|----------|------------|
| TGHMDS0.1CBALT | 0.1 | 0.6 | 0.7 | ● | ¥15,000 |
| TGHMDS0.15CBALT | 0.15 | 0.9 | 1.1 | ● | ¥14,200 |
| TGHMDS0.2CBALT | 0.2 | 1.2 | 1.4 | ● | ¥13,000 |
| TGHMDS0.25CBALT | 0.25 | 1.5 | 1.8 | ● | ¥12,600 |
| TGHMDS0.3CBALT | 0.3 | 1.8 | 2.1 | ● | ¥11,400 |
| TGHMDS0.4CBALT | 0.4 | 2.4 | 2.8 | ● | ¥10,200 |
| TGHMDS0.5CBALT | 0.5 | 3 | 3.5 | ● | ¥9,200 |
| TGHMDS0.6CBALT | 0.6 | 3.6 | 4.2 | ● | ¥8,600 |
| TGHMDS0.7CBALT | 0.7 | 4.2 | 4.9 | ● | ¥8,200 |
| TGHMDS0.8CBALT | 0.8 | 4.8 | 5.6 | ● | ¥7,600 |
| TGHMDS0.9CBALT | 0.9 | 5.4 | 6.3 | ● | ¥7,600 |
| TGHMDS1CBALT | 1 | 6 | 7 | ● | ¥6,500 |
| TGHMDS1.1CBALT | 1.1 | 6.6 | 7.7 | ● | ¥7,600 |
| TGHMDS1.2CBALT | 1.2 | 7.2 | 8.4 | ● | ¥7,600 |
| TGHMDS1.3CBALT | 1.3 | 7.8 | 9.1 | ● | ¥7,600 |
| TGHMDS1.4CBALT | 1.4 | 8.4 | 10.2 | ● | ¥7,600 |
| TGHMDS1.5CBALT | 1.5 | 9 | 10.5 | ● | ¥7,600 |
| TGHMDS1.6CBALT | 1.6 | 9.6 | 11.2 | ● | ¥7,600 |
| TGHMDS1.7CBALT | 1.7 | 10.2 | 11.9 | ● | ¥7,600 |
| TGHMDS1.8CBALT | 1.8 | 10.8 | 12.6 | ● | ¥7,600 |
| TGHMDS1.9CBALT | 1.9 | 11.4 | 13.3 | ● | ¥7,600 |
| TGHMDS2CBALT | 2 | 12 | 14 | ● | ¥7,000 |

トグルン®ミニチュアハードドリル 切削条件表
Toqlon Miniature Hard Drill Recommended Drilling Condition

| 被削材 WORK MATERIAL | 焼入れ鋼 (SKD, HSS) (50-60HRC) HARDENED STEEL | |
|-----------------------|--|---------------------------------|
| 切削速度 CUTTING SPEED | 10~30m/min | |
| 直径 DIAMETER mm | 回転数 SPEED min ⁻¹ | 送り量(穴) FEED (HOLE) mm/rev |
| 0.3 | 10,600 - 31,800 | 0.002 - 0.01 |
| 0.5 | 6,400 - 19,000 | 0.005 - 0.015 |
| 1 | 3,200 - 9,500 | 0.01 - 0.03 |
| 1.5 | 2,100 - 6,400 | 0.02 - 0.04 |
| 2 | 1,600 - 4,800 | 0.02 - 0.05 |

トグルン®ミニチュアハードドリル レギュラー ALTコーティング
TOGLON Miniature Hard Drill Regular ALT coating



超硬 ALT ネガ刃 SHANK h6 2枚刃 右刃 140° 90° 0.1~ 2.0 ミニチュア

| VAN Code No. | 直径 φD | 有効溝長 FL | 有効長 ℓ1 | 在庫 Stock | 参考価格 Price |
|-----------------|-------|---------|--------|----------|------------|
| TGHMDR0.1CBALT | 0.1 | 0.6 | 1.3 | ● | ¥16,500 |
| TGHMDR0.15CBALT | 0.15 | 0.9 | 2 | ● | ¥15,400 |
| TGHMDR0.2CBALT | 0.2 | 1.2 | 2.6 | ● | ¥14,400 |
| TGHMDR0.25CBALT | 0.25 | 1.5 | 3.3 | ● | ¥13,800 |
| TGHMDR0.3CBALT | 0.3 | 1.8 | 3.9 | ● | ¥12,600 |
| TGHMDR0.4CBALT | 0.4 | 2.4 | 5.2 | ● | ¥11,500 |
| TGHMDR0.5CBALT | 0.5 | 3 | 6.5 | ● | ¥10,400 |
| TGHMDR0.6CBALT | 0.6 | 3.6 | 7.8 | ● | ¥10,000 |
| TGHMDR0.7CBALT | 0.7 | 4.2 | 9.1 | ● | ¥9,400 |
| TGHMDR0.8CBALT | 0.8 | 4.8 | 10.4 | ● | ¥8,800 |
| TGHMDR0.9CBALT | 0.9 | 5.4 | 11.7 | ● | ¥8,800 |
| TGHMDR1CBALT | 1 | 6 | 13 | ● | ¥7,700 |
| TGHMDR1.1CBALT | 1.1 | 6.6 | 14.3 | ● | ¥8,800 |
| TGHMDR1.2CBALT | 1.2 | 7.2 | 15.6 | ● | ¥8,800 |
| TGHMDR1.3CBALT | 1.3 | 7.8 | 16.9 | ● | ¥8,800 |
| TGHMDR1.4CBALT | 1.4 | 8.4 | 18.2 | ● | ¥8,800 |
| TGHMDR1.5CBALT | 1.5 | 9 | 19.5 | ● | ¥8,800 |
| TGHMDR1.6CBALT | 1.6 | 9.6 | 20.8 | ● | ¥8,800 |
| TGHMDR1.7CBALT | 1.7 | 10.2 | 22.1 | ● | ¥8,800 |
| TGHMDR1.8CBALT | 1.8 | 10.8 | 23.4 | ● | ¥8,800 |
| TGHMDR1.9CBALT | 1.9 | 11.4 | 24.7 | ● | ¥8,800 |
| TGHMDR2CBALT | 2 | 12 | 26 | ● | ¥8,400 |

切削条件設定上の注意点 Please observe when choosing the cutting conditions

- 上記はあくまでも目安です。状況に応じて変更してください。
- 十分な水溶性クーラント、オイルミストを使用して下さい。
- 次の場合は送り条件を下げて下さい。
・ワーク、チャッキング、機械剛性の悪い場合
- 上記切削条件が加工機械の上限回転数を超える場合は、ご使用のスピンダル精度が安定する領域での高い回転数でご使用下さい。
- ワーク面粗度を上げたい場合は、上記条件より送り量を減らしても問題ありません。その際、工具寿命が短くなる可能性があります。
- ノンステップでの穴あけ加工が可能です。但し、工具径0.5mm以下の場合や、深穴加工(径の3倍以上)で切粉が詰まる場合は、ステップを入れて下さい。
径の1/10~1/2ステップ(引き抜き動作)を入れることにより、刃先部が冷却され工具寿命が向上します。

被削材適合性 Suitability for Work Materials ●・・・最適 The most suitable ○・・・適 Suitable △・・・可 Possible 無印 Blank・・・不可 Impossible

| 製品区分 Product | 軟鋼 Mild Steel | 炭素鋼 Carbon Steel | 合金鋼 Alloy Steel | 調質鋼 Heat treated Steel | 工具鋼 Tool Steel | 焼入れ鋼 Hardened Steel | ステンレス鋼 Stainless Steel | 鋳鉄 Cast Iron | ダクタイル鋳鉄 Ductile Cast Iron | チタン合金 Titanium Alloy | アルミ合金 Aluminium Alloy | 銅 Copper | プラスチック Plastic | セラミック etc. Ceramics etc. |
|-----------------|------------------|---------------------|--------------------|---------------------------|-------------------|------------------------|---------------------------|-----------------|------------------------------|-------------------------|--------------------------|-------------|-------------------|-----------------------------|
| TGHMDS-CBALT | SS | S45C | SCM SCR | SKD SKS | ~40 HRC | ~45 HRC | SUS | FC | FDC | | Al | Cu | | マシナブル Machinable |
| TGHMDR-CBALT | | | | | | | | | | | | | | マシナブル Machinable |

被削材適合性 Suitability for Work Materials ●・・・最適 The most suitable ○・・・適 Suitable △・・・可 Possible 無印 Blank・・・不可 Impossible

| 製品区分 Product | 軟鋼 Mild Steel | 炭素鋼 Carbon Steel | 合金鋼 Alloy Steel | 調質鋼 Heat treated Steel | 工具鋼 Tool Steel | 焼入れ鋼 Hardened Steel | ステンレス鋼 Stainless Steel | 鋳鉄 Cast Iron | ダクタイル鋳鉄 Ductile Cast Iron | チタン合金 Titanium Alloy | アルミ合金 Aluminium Alloy | 銅 Copper | プラスチック Plastic | セラミック etc. Ceramics etc. |
|-----------------|------------------|---------------------|--------------------|---------------------------|-------------------|------------------------|---------------------------|-----------------|------------------------------|-------------------------|--------------------------|-------------|-------------------|-----------------------------|
| TGHDR-CBALT | SS | S45C | SCM SCR | SKD SKS | ~40 HRC | ~45 HRC | SUS | FC | FDC | | Al | Cu | | マシナブル Machinable |

高硬度用穴あけ工具 Drill for high hardness

トグロン®ハードロングドリル



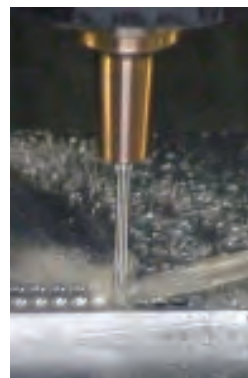
TOGLON Hard Long Drill

HRC40~72の焼き入れ鋼を加工可能!!

Available for HRC40-72 Hardened steel

高硬度材深穴加工用ドリル

Toglon Hard Long Drills, designed for drilling deep holes in hardened steel (40-72 HRC)



世界初。焼入れ鋼に20D以上の貫通穴加工を実現
真円度・円筒度・面粗度が非常に優れ、条件によりH7以上の精度も可能
金型のイジェクターピンなどの穴加工も、下穴無しで一発で加工
工程削減により、納期の短縮が可能
50Dまでの規格品に加え、それ以上の深穴用ドリルも製作可

IWATA Tool is the first company to introduce deep hole drilling exceeding 20xD in hardened steel (40-72 HRC).
Toglon Hard Long Drills produce holes with outstanding roundness, straightness and surface finish. Hole tolerance of H7 and better are commonly reached depends on condition.
In hardened steel molds, drill holes for ejector pins can be drilled directly without pilot holes.
Toglon Hard Long Drills reduce machining time reducing delivery time of molds drastically.
Drill lengths up to 50xD are available as standard items. Tools for hole depth exceeding 50xD can be made to customer request.



| 製品区分 Product | 画像 Photo | 材質 Material | 表面処理 Coating | 形状 Geometry | シャンク Shank | 刃数 Flutes | 回転方向 Direction of rotation | 先端角 Point angle | 刃径 φD | 摘要 Summary |
|---------------------------|-------------|----------------|-----------------|----------------|---------------|--------------|-------------------------------|--------------------|-------------|---------------|
| TGHDL-CBALT20D | | 超硬 | ALT | ネガ刃 | SHANK h6 | 3枚刃 | 右刃 | 140° 90° | 0.8~ 6.0 | 深穴 |
| TGHDL-CBALT30D | | 超硬 | ALT | ネガ刃 | SHANK h6 | 3枚刃 | 右刃 | 140° 90° | 0.8~ 3.0 | 深穴 |
| NEW TGHDL-CBALT50D | | 超硬 | ALT | ネガ刃 | SHANK h6 | 3枚刃 | 右刃 | 140° 90° | 0.8~ 2.0 | 深穴 |

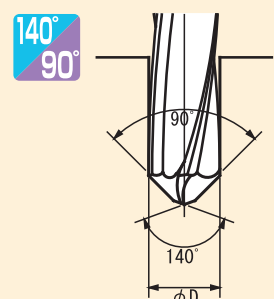
技術レポートについては、P.115、116をご覧ください。
See Page 115, 116 for technical information.

アイコンについての説明は、P.125をご覧ください。
See Page 125 for icon explanation.

トグロン®ハードロングドリルについて

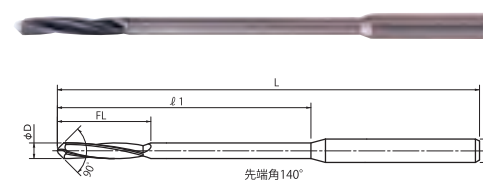
Guide to TOGLON Hard Long Drill

先端角 Point angle



穴加工/Hole Processing

トグロン®ハードロングドリル 20D ALTコーティング TOGLON Hard Long Drill 20D ALT coating



超硬 ALT ネガ刃 SHANK h6 3枚刃 右刃 140° 90° 0.8~ 6.0 深穴

| VAN Code No. | 直径 φD | シャンク径 φd | 有効溝長 FL | 有効長 ℓ1 | 全長 L | 在庫 Stock | 参考価格 |
|------------------|----------|-------------|------------|-----------|---------|-------------|---------|
| | | | | | | | Price |
| TGHDL0.8CBALT20D | 0.8 | 3 | 4.8 | 18.4 | 50 | ● | ¥20,000 |
| TGHDL0.9CBALT20D | 0.9 | 3 | 5.4 | 20.7 | 50 | ● | ¥20,000 |
| TGHDL1.0CBALT20D | 1.0 | 4 | 6.0 | 23.0 | 60 | ● | ¥15,000 |
| TGHDL1.1CBALT20D | 1.1 | 4 | 6.6 | 25.3 | 60 | ● | ¥17,000 |
| TGHDL1.2CBALT20D | 1.2 | 4 | 7.2 | 27.6 | 60 | ● | ¥17,000 |
| TGHDL1.3CBALT20D | 1.3 | 4 | 7.8 | 29.9 | 60 | ● | ¥17,000 |
| TGHDL1.4CBALT20D | 1.4 | 4 | 8.4 | 32.2 | 60 | ● | ¥17,000 |
| TGHDL1.5CBALT20D | 1.5 | 4 | 9.0 | 34.5 | 60 | ● | ¥17,000 |
| TGHDL1.6CBALT20D | 1.6 | 4 | 9.6 | 36.8 | 80 | ● | ¥17,000 |
| TGHDL1.7CBALT20D | 1.7 | 4 | 10.2 | 39.1 | 80 | ● | ¥17,000 |
| TGHDL1.8CBALT20D | 1.8 | 4 | 10.8 | 41.4 | 80 | ● | ¥17,000 |
| TGHDL1.9CBALT20D | 1.9 | 4 | 11.4 | 43.7 | 80 | ● | ¥17,000 |
| TGHDL2.0CBALT20D | 2.0 | 4 | 12.0 | 46.0 | 80 | ● | ¥15,000 |
| TGHDL2.1CBALT20D | 2.1 | 4 | 12.6 | 48.3 | 80 | ● | ¥17,000 |
| TGHDL2.2CBALT20D | 2.2 | 4 | 13.2 | 50.6 | 80 | ● | ¥17,000 |
| TGHDL2.3CBALT20D | 2.3 | 4 | 13.8 | 52.9 | 80 | ● | ¥17,000 |
| TGHDL2.4CBALT20D | 2.4 | 4 | 14.4 | 55.2 | 80 | ● | ¥17,000 |
| TGHDL2.5CBALT20D | 2.5 | 6 | 15.0 | 57.5 | 100 | ● | ¥17,000 |
| TGHDL2.6CBALT20D | 2.6 | 6 | 15.6 | 59.8 | 100 | ● | ¥20,000 |
| TGHDL2.7CBALT20D | 2.7 | 6 | 16.2 | 62.1 | 100 | ● | ¥20,000 |
| TGHDL2.8CBALT20D | 2.8 | 6 | 16.8 | 64.4 | 100 | ● | ¥20,000 |
| TGHDL2.9CBALT20D | 2.9 | 6 | 17.4 | 66.7 | 100 | ● | ¥20,000 |
| TGHDL3.0CBALT20D | 3.0 | 6 | 18.0 | 69.0 | 100 | ● | ¥18,000 |
| TGHDL3.1CBALT20D | 3.1 | 6 | 18.6 | 71.3 | 120 | ● | ¥22,000 |
| TGHDL3.2CBALT20D | 3.2 | 6 | 19.2 | 73.6 | 120 | ● | ¥22,000 |
| TGHDL3.3CBALT20D | 3.3 | 6 | 19.8 | 75.9 | 120 | ● | ¥22,000 |
| TGHDL3.4CBALT20D | 3.4 | 6 | 20.4 | 78.2 | 120 | ● | ¥22,000 |
| TGHDL3.5CBALT20D | 3.5 | 6 | 21.0 | 80.5 | 120 | ● | ¥22,000 |
| TGHDL3.6CBALT20D | 3.6 | 6 | 21.6 | 82.8 | 120 | ● | ¥22,000 |
| TGHDL3.7CBALT20D | 3.7 | 6 | 22.2 | 85.1 | 120 | ● | ¥22,000 |
| TGHDL3.8CBALT20D | 3.8 | 6 | 22.8 | 87.4 | 120 | ● | ¥22,000 |
| TGHDL3.9CBALT20D | 3.9 | 6 | 23.4 | 89.7 | 120 | ● | ¥22,000 |

| VAN Code No. | 直径 φD | シャンク径 φd | 有効溝長 FL | 有効長 ℓ1 | 全長 L | 在庫 Stock | 参考価格 |
|------------------|----------|-------------|------------|-----------|---------|-------------|---------|
| | | | | | | | Price |
| TGHDL4.0CBALT20D | 4.0 | 6 | 24.0 | 92.0 | 120 | ● | ¥20,000 |
| TGHDL4.1CBALT20D | 4.1 | 6 | 24.6 | 94.3 | 150 | ● | ¥26,000 |
| TGHDL4.2CBALT20D | 4.2 | 6 | 25.2 | 96.6 | 150 | ● | ¥26,000 |
| TGHDL4.3CBALT20D | 4.3 | 6 | 25.8 | 98.9 | 150 | ● | ¥26,000 |
| TGHDL4.4CBALT20D | 4.4 | 6 | 26.4 | 101.2 | 150 | ● | ¥26,000 |
| TGHDL4.5CBALT20D | 4.5 | 6 | 27.0 | 103.5 | 150 | ● | ¥26,000 |
| TGHDL4.6CBALT20D | 4.6 | 6 | 27.6 | 105.8 | 150 | ● | ¥26,000 |
| TGHDL4.7CBALT20D | 4.7 | 6 | 28.2 | 108.1 | 150 | ● | ¥26,000 |
| TGHDL4.8CBALT20D | 4.8 | 6 | 28.8 | 110.4 | 150 | ● | ¥26,000 |
| TGHDL4.9CBALT20D | 4.9 | 6 | 29.4 | 112.7 | 150 | ● | ¥26,000 |
| TGHDL5.0CBALT20D | 5.0 | 6 | 30.0 | 115.0 | 150 | ● | ¥24,000 |
| TGHDL5.1CBALT20D | 5.1 | 8 | 30.6 | 117.3 | 200 | ● | ¥35,000 |
| TGHDL5.2CBALT20D | 5.2 | 8 | 31.2 | 119.6 | 200 | ● | ¥35,000 |
| TGHDL5.3CBALT20D | 5.3 | 8 | 31.8 | 121.9 | 200 | ● | ¥35,000 |
| TGHDL5.4CBALT20D | 5.4 | 8 | 32.4 | 124.2 | 200 | ● | ¥35,000 |
| TGHDL5.5CBALT20D | 5.5 | 8 | 33.0 | 126.5 | 200 | ● | ¥35,000 |
| TGHDL5.6CBALT20D | 5.6 | 8 | 33.6 | 128.8 | 200 | ● | ¥35,000 |
| TGHDL5.7CBALT20D | 5.7 | 8 | 34.2 | 131.1 | 200 | ● | ¥35,000 |
| TGHDL5.8CBALT20D | 5.8 | 8 | 34.8 | 133.4 | 200 | ● | ¥35,000 |
| TGHDL5.9CBALT20D | 5.9 | 8 | 35.4 | 135.7 | 200 | ● | ¥35,000 |
| TGHDL6.0CBALT20D | 6.0 | 8 | 36.0 | 138.0 | 200 | ● | ¥35,000 |

Stock ●...標準在庫品/Stocked
無印...受注生産品/No Mark...Manufactured Upon Request

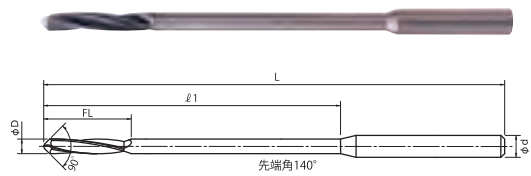
※1: 更に刃長の長いものや上記寸法以外のものも生産できます。

※1: Flute lengths (FL) and diameters (φD) not shown in this table is available upon request

■被削材適合性 Suitability for Work Materials ●...最適 The most suitable ○...適 Suitable △...可 Possible 無印 Blank...不可 Impossible

| 製品区分 Product | 軟鋼 Mid Steel | 炭素鋼 Carbon Steel | 合金鋼 Alloy Steel | 調質鋼 Heat treated Steel | 工具鋼 Tool Steel | 焼入れ鋼 Hardened Steel | ステンレス鋼 Stainless Steel | 鋳鉄 Cast Iron | ダクタイル鋳鉄 Ductile Cast Iron | チタン合金 Titanium Alloy | アルミ合金 Aluminium Alloy | 銅 Copper | プラスチック Plastic | セラミック etc. Ceramics etc. |
|-----------------|-----------------|---------------------|--------------------|---------------------------|-------------------|------------------------|---------------------------|-----------------|------------------------------|-------------------------|--------------------------|-------------|-------------------|--|
| TGHDL-CBALT | SS | S45C | SCM SCR | SKD SKS | ~40 HRC | ~45 HRC 45~ HRC | SUS | FC | FDC | | Al | Cu | | マンナブル Machinable ジルコニア Zirconia ガラス Glass |

トグルン®ハードロングドリル 30D ALTコーティング
TOGLON Hard Long Drill 30D ALT coating



超硬 ALT ネガ刃 SHANK h6 3枚刃 右刃 140° 90° 0.8~2.0 深穴

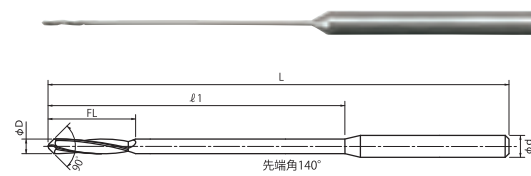
単位/寸法:mm 価格:円
Unit/Size:mm Price:JPY

| VAN Code No. | 直径 φD | シャンク径 φd | 有効溝長 FL | 有効長 ℓ1 | 全長 L | 在庫 Stock | 参考価格 Price |
|------------------|-------|----------|---------|--------|------|----------|------------|
| TGHDL0.8CBALT30D | 0.8 | 4 | 4.8 | 26.4 | 60 | ● | ¥24,000 |
| TGHDL0.9CBALT30D | 0.9 | 4 | 5.4 | 29.7 | 60 | ● | ¥24,000 |
| TGHDL1.1CBALT30D | 1.1 | 4 | 6.6 | 36.3 | 80 | ● | ¥20,000 |
| TGHDL1.2CBALT30D | 1.2 | 4 | 7.2 | 39.6 | 80 | ● | ¥20,000 |
| TGHDL1.3CBALT30D | 1.3 | 4 | 7.8 | 42.9 | 80 | ● | ¥20,000 |
| TGHDL1.4CBALT30D | 1.4 | 4 | 8.4 | 46.2 | 80 | ● | ¥20,000 |
| TGHDL1.5CBALT30D | 1.5 | 4 | 9 | 49.5 | 80 | ● | ¥20,000 |
| TGHDL1.6CBALT30D | 1.6 | 4 | 9.6 | 52.8 | 80 | ● | ¥20,000 |
| TGHDL1.7CBALT30D | 1.7 | 6 | 10.2 | 56.1 | 100 | ● | ¥22,000 |
| TGHDL1.8CBALT30D | 1.8 | 6 | 10.8 | 59.4 | 100 | ● | ¥22,000 |
| TGHDL1.9CBALT30D | 1.9 | 6 | 11.4 | 62.7 | 100 | ● | ¥22,000 |
| TGHDL2.0CBALT30D | 2 | 6 | 12 | 66 | 100 | ● | ¥20,000 |
| TGHDL2.1CBALT30D | 2.1 | 6 | 12.6 | 69.3 | 120 | ●1 | ¥24,000 |
| TGHDL2.2CBALT30D | 2.2 | 6 | 13.2 | 72.6 | 120 | ●1 | ¥24,000 |
| TGHDL2.3CBALT30D | 2.3 | 6 | 13.8 | 75.9 | 120 | ●1 | ¥24,000 |
| TGHDL2.4CBALT30D | 2.4 | 6 | 14.4 | 79.2 | 120 | ●1 | ¥24,000 |
| TGHDL2.5CBALT30D | 2.5 | 6 | 15 | 82.5 | 120 | ●1 | ¥24,000 |
| TGHDL2.6CBALT30D | 2.6 | 6 | 15.6 | 85.8 | 150 | ●1 | ¥26,000 |
| TGHDL2.7CBALT30D | 2.7 | 6 | 16.2 | 89.1 | 150 | ●1 | ¥26,000 |
| TGHDL2.8CBALT30D | 2.8 | 6 | 16.8 | 92.4 | 150 | ●1 | ¥26,000 |
| TGHDL2.9CBALT30D | 2.9 | 6 | 17.4 | 95.7 | 150 | ●1 | ¥26,000 |
| TGHDL3CBALT30D | 3 | 6 | 18 | 99 | 150 | ●1 | ¥24,000 |

Stock ●...標準在庫品/ Stocked
Stock ●1...在庫予定品/ Will be Stocked

※1: 更に刃長の長いものや上記寸法以外のものも生産できます。
※1: Flute lengths (FL) and diameters (φD) not shown in this table is available upon request

トグルン®ハードロングドリル 50D ALTコーティング
TOGLON Hard Long Drill 50D ALT coating



超硬 ALT ネガ刃 SHANK h6 3枚刃 右刃 140° 90° 0.8~2.0 深穴

単位/寸法:mm 価格:円
Unit/Size:mm Price:JPY

| VAN Code No. | 直径 φD | シャンク径 φd | 有効溝長 FL | 有効長 ℓ1 | 全長 L | 在庫 Stock | 参考価格 Price |
|------------------|-------|----------|---------|--------|------|----------|------------|
| TGHDL0.8CBALT50D | 0.8 | 4 | 4.8 | 42.4 | 80 | ●1 | ¥28,000 |
| TGHDL0.9CBALT50D | 0.9 | 4 | 5.4 | 47.7 | 80 | ●1 | ¥28,000 |
| TGHDL1.1CBALT50D | 1.1 | 4 | 6.6 | 53 | 80 | ●1 | ¥22,000 |
| TGHDL1.2CBALT50D | 1.2 | 6 | 7.2 | 63.6 | 100 | ●1 | ¥24,000 |
| TGHDL1.3CBALT50D | 1.3 | 6 | 7.8 | 68.9 | 120 | ●1 | ¥26,000 |
| TGHDL1.4CBALT50D | 1.4 | 6 | 8.4 | 74.2 | 120 | ●1 | ¥26,000 |
| TGHDL1.5CBALT50D | 1.5 | 6 | 9 | 79.5 | 120 | ●1 | ¥26,000 |
| TGHDL1.6CBALT50D | 1.6 | 6 | 9.6 | 84.8 | 120 | ●1 | ¥26,000 |
| TGHDL1.7CBALT50D | 1.7 | 6 | 10.2 | 90.1 | 150 | ●1 | ¥28,000 |
| TGHDL1.8CBALT50D | 1.8 | 6 | 10.8 | 95.4 | 150 | ●1 | ¥28,000 |
| TGHDL1.9CBALT50D | 1.9 | 6 | 11.4 | 100.7 | 150 | ●1 | ¥28,000 |
| TGHDL2.0CBALT50D | 2 | 6 | 12 | 106 | 150 | ●1 | ¥26,000 |

Stock ●1...在庫予定品/ Will be Stocked

※1: 更に刃長の長いものや上記寸法以外のものも生産できます。
※1: Flute lengths (FL) and diameters (φD) not shown in this table is available upon request

トグルン®ハードドリル トグルン®ハードロングドリル 切削条件表
Toglon Hard Drill & Toglon Hard Long Drill Recommended Drilling Condition

| 被削材 WORK MATERIAL | 40-50 (HRC) HARDENED STEEL | | | | | 50-60 (HRC) HARDENED STEEL | | | | | 60-65 (HRC) HARDENED STEEL | | | | | 65以上 (HRC) HARDENED STEEL | | | | |
|----------------------|--------------------------------|-----------------------------------|-------------------|------------------------------|-----------------------|--------------------------------|-----------------------------------|-------------------|------------------------------|-----------------------|--------------------------------|-----------------------------------|-------------------|------------------------------|-----------------------|--------------------------------|-----------------------------------|-------------------|------------------------------|-----------------------|
| | 切削速度 CUTTING SPEED m/min | 回転数 SPEED min ⁻¹ | 送り量 FEED mm | 送り速度 FEED SPEED mm/min | ステップ PECKING mm | 切削速度 CUTTING SPEED m/min | 回転数 SPEED min ⁻¹ | 送り量 FEED mm | 送り速度 FEED SPEED mm/min | ステップ PECKING mm | 切削速度 CUTTING SPEED m/min | 回転数 SPEED min ⁻¹ | 送り量 FEED mm | 送り速度 FEED SPEED mm/min | ステップ PECKING mm | 切削速度 CUTTING SPEED m/min | 回転数 SPEED min ⁻¹ | 送り量 FEED mm | 送り速度 FEED SPEED mm/min | ステップ PECKING mm |
| 0.8 | 26 | 10,300 | 0.02 | 210 | 0.2 | 20 | 8,000 | 0.015 | 120 | 0.18 | 13 | 5,200 | 0.01 | 50 | 0.15 | 10 | 4,000 | 0.006 | 20 | 0.09 |
| 1 | 30 | 9,500 | 0.025 | 240 | 0.3 | 22 | 7,000 | 0.02 | 140 | 0.24 | 15 | 4,800 | 0.015 | 70 | 0.22 | 11 | 3,500 | 0.008 | 30 | 0.12 |
| 1.5 | 35 | 7,400 | 0.035 | 260 | 0.4 | 24 | 5,100 | 0.03 | 150 | 0.36 | 18 | 3,800 | 0.02 | 80 | 0.3 | 13 | 2,800 | 0.01 | 30 | 0.15 |
| 2 | 40 | 6,400 | 0.045 | 290 | 0.5 | 30 | 4,800 | 0.035 | 170 | 0.42 | 20 | 3,200 | 0.025 | 80 | 0.38 | 15 | 2,400 | 0.012 | 30 | 0.18 |
| 3 | 40 | 4,200 | 0.06 | 250 | 0.6 | 30 | 3,200 | 0.05 | 160 | 0.6 | 20 | 2,100 | 0.035 | 70 | 0.53 | 15 | 1,600 | 0.018 | 30 | 0.27 |
| 4 | 40 | 3,200 | 0.075 | 240 | 0.8 | 30 | 2,400 | 0.06 | 140 | 0.72 | 20 | 1,600 | 0.04 | 60 | 0.6 | 15 | 1,200 | 0.025 | 30 | 0.38 |
| 6 | 40 | 2,100 | 0.1 | 210 | 1 | 30 | 1,600 | 0.08 | 130 | 0.96 | 20 | 1,100 | 0.05 | 60 | 0.75 | 15 | 800 | 0.035 | 30 | 0.53 |
| 8 | 40 | 1,600 | 0.12 | 190 | 1.2 | 30 | 1,200 | 0.1 | 120 | 1.2 | 20 | 800 | 0.05 | 40 | 0.75 | 15 | 600 | 0.04 | 20 | 0.6 |
| 10 | 40 | 1,300 | 0.13 | 170 | 1.3 | 30 | 1,000 | 0.11 | 110 | 1.32 | 20 | 600 | 0.05 | 30 | 0.75 | 15 | 500 | 0.04 | 20 | 0.6 |
| 12 | 40 | 1,100 | 0.14 | 150 | 1.4 | 30 | 800 | 0.11 | 90 | 1.32 | 20 | 500 | 0.05 | 30 | 0.75 | 15 | 400 | 0.04 | 20 | 0.6 |

切削条件設定上の注意点 Please observe when choosing the cutting conditions

- 上記はあくまでも目安です。状況に応じて変更してください。
 - 十分な水溶性クーラント、オイルミストを使用して下さい。
 - 次の場合は送り条件を下げて下さい。
・ワーク、チャッキング、機械剛性の悪い場合
 - 上記切削条件が加工機械の上限回転数を超える場合は、ご使用のスピンドル精度が安定する領域での高い回転数でご使用下さい。
 - ワーク面粗度を上げたい場合は、上記条件より送り量を減らしても問題ありません。その際、工具寿命が短くなる可能性があります。
 - ノンステップでの穴あけ加工が可能です。但し、工具径0.5mm以下の場合や、深穴加工(径の3倍以上)で切粉が詰まる場合は、ステップを入れて下さい。径の1/10~1/2ステップ(引き抜き動作)を入れることにより、刃先部が冷却され工具寿命が向上します。
- The above values are standard conditions. They need to be adapted for optimal use of the tools.
 - For drilling please use ample water soluble coolant or oil mist.
 - Please lower the speed when working conditions are not stable (vibrations, moving of work piece, etc.)
 - If the recommended cutting speed exceeds the maximum speed of the machine used please use the maximum speed of the machine and adjust the other work parameters accordingly.
 - For smoother surfaces please decrease the feed rate (this may cause shorter tool life).
 - Drilling without step cycles is possible. When drilling deeper than 3xD step drilling is recommended for better chip removal. We recommend step cycles of 1/2 to 1/10 of the tool diameter. Shorter step cycles will improve the chip removal, the cooling of the cutting edges and increase tool life.

■被削材適合性 Suitability for Work Materials ◎...最適 The most suitable ○...適 Suitable △...可 Possible 無印 Blank...不可 Impossible

| 製品区分 Product | 軟鋼 Mild Steel | 炭素鋼 Carbon Steel | 合金鋼 Alloy Steel | 調質鋼 Heat treated Steel | 工具鋼 Tool Steel | 焼入れ鋼 Hardened Steel | ステンレス鋼 Stainless Steel | 鋳鉄 Cast Iron | ダクタイル Ductile Cast Iron | チタン合金 Titanium Alloy | アルミ合金 Aluminium Alloy | 銅 Copper | プラスチック Plastic | セラミック etc. Ceramics etc. | | |
|-----------------|------------------|---------------------|--------------------|---------------------------|-------------------|------------------------|---------------------------|-----------------|----------------------------|-------------------------|--------------------------|-------------|-------------------|-----------------------------|-----------------------------------|---|
| | SS | S45C | SCM SCR | SKD SKS | ~40 HRC | ~45 HRC | 45~ HRC | SUS | FC | FDC | | Al | Cu | マシナブル Machinable | ジルコニア ガラス Zirconia Glass | |
| TGHDL-CBALT | | | | △ | | ◎ | ◎ | | | | | | | △ | | ○ |

SP
CENTERCENTER
DRILLGSS
STARTING
DRILLGP
DRILL

TFD

SPIRAL
GUN
BARREL
DRILLTOGLON
MULTI
CHAMFERTOGLON
SHARPTOGLON
HARDCORNER
ROUNDING
CUTTER

JIT

SUBMARINE
GATE
DRILLMICRO
TOOLTECHNICAL
INFOR-
MATIONCUSTOMIZED
TOOL
SEMORDER
TOOLINST-
RUCTIONCOMPANY
PROFILE

1. トグロンハードシリーズについて TOGLON® Hard guidelines

使用時の注意点 Application

A. 使用工作機械 Machine requirements

剛性の高い工作機械を使用してください。一般的な穴加工用工具に比べて2倍から5倍のスラスト力がかかります。

特に高速なスピンドルは必要ありません。

Rigid machines will make best use of TOGLON® Hard tools. Spindle torque should be at least double of the required drilling torque. Special high-speed spindles are NOT required.

B. ホルダー Tool holders

把握力の高いホルダーを選択してください。ミーリングチャック、焼き嵌めホルダーなどを推奨します。一般的に、チャッキング時の振れ精度は特別高いものは必要ありませんが、小径穴あけや高精度穴あけの場合は高い振れ精度が必要です。

Use holders capable of transmitting high torque. We recommend using shrink holders or hydrostatic holders. Generally, high run-out accuracy is not necessary. Run-out accuracy is required when drilling small diameters, high precision holes or using long tools >= 20xD

C. クーラント Coolant

水溶性又はオイルミストを推奨します。十分な圧力での供給が必要です。

クーラントを真上方向からかけると、穴の中に切粉が入ってトラブルになることがあります。そのような場合は、横方向からかけることで解消する場合があります。

We recommend oil, water-soluble oil and oil mist. Ample quantities and enough pressure are required. In case of chips re-entering the hole, try directing the coolant at an angle of 45° or less to the tool axis to ensure that the coolant removes all chips.

D. センター穴 Center hole

2mm以下の小径、または径の5倍以上の深さの穴加工を行う場合は、トグロンハードSPを使用した位置決め穴加工が必須です。これにより穴精度のみでなく、トラブルの低減、寿命の向上が可能になります。センター穴加工には、最大面取り径が最大穴径の0.6倍～1.4倍までのサイズで、90度ものを選定してください。When drilling diameters under 2.0 mm or more than 5xD deep it is necessary to drill a center hole. The center hole will increase tool life and allow a precise positioning of the hole. For centering please use TOGLON® Hard SP drills with a 90° angle (i.e. 90TGHSP3CBALD) Chose the diameter of the center drill to be between 0.6 and 1.4 times the size of the drill.

例：穴径 3mm の場合
90TGHSP2CBALT
90TGHSP3CBALT
90TGHSP4CBALT

Example: hole diameter 3.00 mm
> minimum center drill diameter = 0.6 x 3.0 = 1.8 mm
> maximum center drill diameter = 1.4 x 3.0 = 4.2 mm

Therefore 90TGHSP2CBALD, 90TGHSP3CBALD and 90TGHSP4CBALD are all suitable for centering a 3.0 mm hole. If possible always chose the diameter closest to the drill diameter.

ドリル径の50%以上の径まで位置決め穴加工を行い、穴の周囲に90度面取り部が残るように加工してください。

また、シャンク部まで沈めるような加工は行わないでください。

Please use 50% of the drill diameter as center hole depth. In the case above, this would be 1.5 mm (50% of 3.0 mm). Avoid drilling to the diameter of the center drill.

切削条件の設定 Processing Parameters

E. 切削速度（回転数）Cutting Speed

切削条件表の中心値を初期値として設定してください。一般の高硬度材用ドリルに比べると若干周速は速めですが、エンドミルの高速ミーリングのような高回転は不要です。一般的な周速は20m/minから40m/min程度です。切削条件表は水溶性クーラントを基準に設定してあります。小径（3mm以下）の場合は、オイルミストでもほぼ同様の条件で加工出来ます。不水溶性やドライ加工の場合は20%から50%周速を落とす必要があります。

Chose the material hardness from the cutting speed table and select a speed in the middle of the values indicated

(i.e. if the chart says 20~40 m/min chose 30 m/min to start).

Cutting conditions in the table are based on water-soluble oil as coolant.

It is necessary to reduce the cutting speeds by 20%-50% in case of oil coolants or dry processing when drilling holes 3 mm and bigger.

F. 送り量（一回転あたり）Feed per revolution

切削条件表の範囲内で低めの値を初期値設定してください。

折損やチッピングがなければ徐々に上げてください。

Please select the lowest value in the range of the cutting conditions table.

Then gradually increase the feed if there is no breakage or chipping.

2. トグロンハードショートの特徴 TOGLON® HARD SHORT DRILLS TGHDS

A. 穴精度 Tolerance

トグロンハードドリルのうち、ショートタイプのみマイナス公差です。他の製品(レギュラー・ロング・オイルホール)とは公差設定が異なりますので、注意してください。TOGLON® Hard Short drills are designed with a minus tolerance as indicated in the catalog.

B. ステップ Stepping / Pecking

刃径の3D以上の穴加工の場合は、ステップ動作が必要です。(G83固定サイクル)一般的にステップはドリル溝にたまった切粉を排出するために行うものですが、高硬度材加工の場合は、ドリルを引き抜いたときにクーラントにて刃先を冷却する目的も含まれます。そのため、工具摩耗を抑えたい場合はステップ回数を多くすることが効果的です。レギュラータイプ以上の深穴加工は、ステップの考え方が大幅に変わりますので、そちらの項目を参照してください。

In the case of drilling holes deeper than 3xD or more, it is necessary to use pecking/stepping (i.e. ISO G83 canned drilling cycle). Steps are needed to discharge the chips accumulated in the drill's flutes but also to cool the drill's cutting edges. An increased number of steps (pecks) will increase tool life. When using longer versions of TOGLON® hard drills or when drilling deep holes steps are crucial to the process. Please refer to the following sections for details.

3. トグロンハードレギュラー・ロングドリルの注意点 TOGLON® Hard Regular THGDR Drills and TOGLON® Hard Long Drills TGHDL

A. 使用工作機械 Machine requirements

機械の直進度、繰返し精度、スピンドル振れ精度のよいものを使用してください。

Only precision machines are able to make full use of TOGLON® Hard Drills advantages.

High rigidity and low spindle run-out are required to obtain long tool life and highly accurate holes.

B. 穴精度 Tolerance

プラス公差です。ショートタイプとは公差設定が異なりますので、注意してください。

TOGLON® Hard regular and long drills are manufactured with a plus tolerance allowing to drill holes in H7 tolerance.

Please take note that TOGLON® Hard short and TOGLON® Hard Miniature drill have minus tolerances and CANNOT drill H7 holes.

C. 振れ Run-out

工具シャンク部で2~5µm以下にすることが重要です。振れていると穴の曲がりが発生し、寿命が極端に悪くなります。

Run-out has a strong effect on both tool life and hole accuracy.

We suggest a run-out on the tool shank (measured just below the holder) of maximum 2-5 µm.

D. 送り量（一回転あたり）Feed per revolution

長さに合わせて低下させてください。 When drilling deep holes please lower the feed according to the tool lengths:

| | |
|---------|----------|
| 20D 10% | 20xD 10% |
| 30D 20% | 30xD 20% |
| 50D 30% | 50xD 30% |

E. クーラント Coolant

ロングドリルの場合は、クーラントの圧力が高いとドリルが振れてしまうことがあるので、クーラント圧を低くするなどの調整が必要な場合があります。

The pressure of the coolant may need to be adapted when using long drills to avoid bending of the drills before entering the hole during peck cycles.

F. ステップ Step

送り量の7倍から15倍の範囲でステップ量を設定してください。ステップ量が大きいと、溝の長さより切粉の長さが長くなり、切粉つまり等のトラブルが発生して、ドリルが折損することがあります。ステップ量が小さいと、切粉が穴の中に落ちてしまいトラブルとなる場合があります。

Please chose steps of 7~15 times the feed per revolution.

Long steps will increase the chip lengths and may cause problems if chips get longer than the flute length of the tool. Chips may jam inside the flute and will cause breakage of the drill. When the step amount is small, chips get very short and may fall back into the drill hole also causing chipping or even breakage. Please chose steps creating medium long chips according to the work material.

G. 30D以上の深穴加工 Processing holes of 30xD or deeper

トグロンハードドリル レギュラーで事前に5D~10Dの穴加工を行ってください。ドリル先端が穴に挿入されていない状態で高速回転させると、先端が振れ、穴の入り口に衝突するなどして、ドリルが折損する危険性があります。そのため、穴に挿入するまでは500回転以下に抑え、ゆっくり穴に挿入してください。また、G83にて加工する場合、ワーク上面からドリル径の1倍から2倍程度下まで引き上げるとどめ、完全にドリルを引き上げないでください。可能ならば、切粉を観察して、切粉の長さがドリルの溝長さより少し短くなるように、ステップ量を調整してください。50Dドリル使用時は、位置決め、20D、50Dの3工程を推奨します。

In addition to the center hole we strongly recommend drilling pilot holes with 5D~10D Toglon Hard Regular drill before using 30xD or 50xD drills. When inserting the drill into the pilot hole decrease the spindle revolutions to approximately 500 rpm as higher values cause the drills to bend and to hit the rim of the pilot hole. When the tip of the drill is inside the pilot hole increase the spindle speed to the recommended cutting speed. If using ISO G83 canned drill cycle, set the retract value to 1-2 times of drill diameter inside the hole (R=1.5 for a TGHDL1CBALT30D drill) . Do not pull the drill out of the drill hole completely. If possible also reduce the fast feed to 50% of the machine's standard value to stabilize the movement during steps.

4. トグロンハードSPの注意事項 TOGLON® Hard SP

A. クーラント Coolant

高硬度材に面取りやV溝加工のミーリング加工を行う場合、水溶性クーラントを使用すると、ヒートショックによるクラックが発生することがあるので、オイルミスト又はエアブローを推奨します。やむを得ず不水溶性クーラントを使用する場合は、回転数を落としてご使用ください。粘度の高いものは推奨しません。When milling chamfers or V-grooves in hardened materials, the use of water-soluble oil coolant may cause cracks in the tool due to temperature shock. It is recommendable to use oil mist or air blow. If the machining conditions require water-soluble coolants, try to reduce the heat generation by reducing cutting conditions (feed, speed, depth).

SP
CENTERCENTER
DRILLGSS
STARTING
DRILLGP
DRILL

TFD

SPIRAL
GUN
BARREL
DRILLTOGLON
MULTI
CHAMFERTOGLON
SHARPTOGLON
HARDCORNER
ROUNDING
CUTTER

JIT

SUBMARINE
GATE
DRILLMICRO
TOOLTECHNICAL
INFOR-
MATIONCUSTOMIZED
TOOL
SEMORDER
TOOLINST-
RUCTIONCOMPANY
PROFILE

高硬度用穴あけ工具 Drill for high hardness

トグロン®ハードドリルOH



TOGLON Hard Drill Oil Hole

HRC40~72の焼き入れ鋼を加工可能!!

高硬度材穴加工用ドリル オイルホール付

Available for HRC40-72 Hardened steel

Toglon Hard Drills with Oil hole, designed for drilling deep holes in hardened steel (40-72 HRC)



| 製品区分 Product | 画像 Photo | 材質 Material | 表面処理 Coating | 形状 Geometry | シャンク Shank | 刃数 Flutes | 回転方向 Direction of rotation | 先端角 Point angle | 刃径 φD | 摘要 Summary |
|--------------------------|-------------|----------------|-----------------|----------------|---------------|--------------|-------------------------------|--------------------|------------|---------------|
| NEW TGHDS-CBALTOH | | 超硬 | ALT | ネガ刃 | SHANK h6 | 3枚刃 | 右刃 | 140° 90° | 3.8~ 11 | OH |

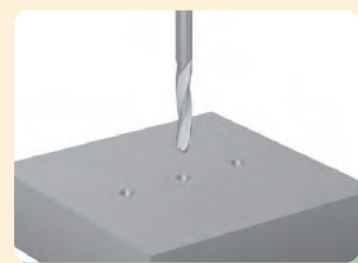
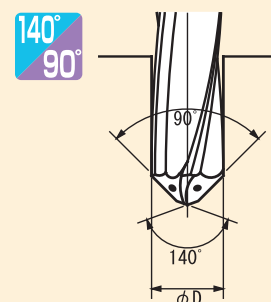
アイコンについての説明は、P.125をご覧ください。
See Page 125 for icon explanation.

| トグロン®ハードドリル OH 切削条件表 TOGLON Hard Drill Oil Hole Recommended Drilling Condition | | | | | | | | | | | | | | | | |
|---|-------------------------------|--------------------------------|-----------------------------------|-------------------|-------------------------------|--------------------------------|-----------------------------------|-------------------|-------------------------------|--------------------------------|-----------------------------------|-------------------|------------------------------|--------------------------------|-----------------------------------|-------------------|
| 被削材 WORK MATERIAL | 40-50 (HRC) HARDENED STEEL | | | | 50-60 (HRC) HARDENED STEEL | | | | 60-65 (HRC) HARDENED STEEL | | | | 65以上 (HRC) HARDENED STEEL | | | |
| | ドリル径 DIAMETER mm | 切削速度 CUTTING SPEED m/min | 回転数 SPEED min ⁻¹ | 送り量 FEED mm | 送り速度 FEED SPEED mm/min | 切削速度 CUTTING SPEED m/min | 回転数 SPEED min ⁻¹ | 送り量 FEED mm | 送り速度 FEED SPEED mm/min | 切削速度 CUTTING SPEED m/min | 回転数 SPEED min ⁻¹ | 送り量 FEED mm | 送り速度 FEED SPEED mm/min | 切削速度 CUTTING SPEED m/min | 回転数 SPEED min ⁻¹ | 送り量 FEED mm |
| 4 | 50 | 4,000 | 0.075 | 300 | 40 | 3,200 | 0.06 | 190 | 25 | 2,000 | 0.04 | 80 | 20 | 1,600 | 0.025 | 40 |
| 6 | 50 | 2,700 | 0.1 | 270 | 40 | 2,100 | 0.08 | 170 | 25 | 1,300 | 0.05 | 70 | 20 | 1,100 | 0.035 | 40 |
| 8 | 50 | 2,000 | 0.12 | 240 | 40 | 1,600 | 0.1 | 160 | 25 | 1,000 | 0.05 | 50 | 20 | 800 | 0.04 | 30 |
| 10 | 50 | 1,600 | 0.13 | 210 | 40 | 1,300 | 0.11 | 140 | 25 | 800 | 0.05 | 40 | 20 | 600 | 0.04 | 20 |

トグロン®ハードドリルOHについて

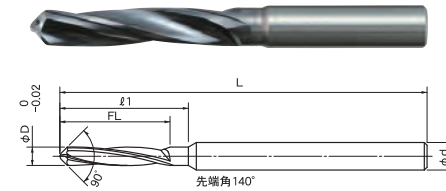
Guide to TOGLON Hard Drill Oil Hole

先端角 Point angle



穴加工/Hole Processing

トグロン®ハードドリル OH ALTコーティング TOGLON Hard Drill Oil Hole ALT coating



超硬 ALT ネガ刃 SHANK h6 3枚刃 右刃 140° 90° 3.8~ 11 OH

| VAN Code No. | 直径 φD | 有効溝長 FL | シャンク径 φd | 全長 L | 在庫 Stock | 参考価格 |
|-----------------|----------|------------|-------------|---------|-------------|---------|
| | | | | | | Price |
| TGHDS3.8CBALTOH | 3.8 | 27 | 5 | 60 | | ¥16,000 |
| TGHDS3.9CBALTOH | 3.9 | 27 | 5 | 60 | | ¥16,000 |
| TGHDS4.0CBALTOH | 4 | 27 | 5 | 60 | | ¥14,000 |
| TGHDS4.1CBALTOH | 4.1 | 27 | 5 | 60 | | ¥16,000 |
| TGHDS4.2CBALTOH | 4.2 | 27 | 5 | 60 | | ¥16,000 |
| TGHDS4.3CBALTOH | 4.3 | 27 | 5 | 60 | | ¥16,000 |
| TGHDS4.4CBALTOH | 4.4 | 27 | 5 | 60 | | ¥16,000 |
| TGHDS4.5CBALTOH | 4.5 | 31 | 6 | 60 | | ¥18,000 |
| TGHDS4.6CBALTOH | 4.6 | 31 | 6 | 60 | | ¥18,000 |
| TGHDS4.7CBALTOH | 4.7 | 31 | 6 | 60 | | ¥18,000 |
| TGHDS4.8CBALTOH | 4.8 | 31 | 6 | 60 | | ¥18,000 |
| TGHDS4.9CBALTOH | 4.9 | 31 | 6 | 60 | | ¥18,000 |
| TGHDS5.0CBALTOH | 5 | 31 | 6 | 60 | | ¥16,000 |
| TGHDS5.1CBALTOH | 5.1 | 31 | 6 | 60 | | ¥18,000 |
| TGHDS5.2CBALTOH | 5.2 | 36 | 6 | 60 | | ¥18,000 |
| TGHDS5.3CBALTOH | 5.3 | 36 | 6 | 60 | | ¥18,000 |
| TGHDS5.4CBALTOH | 5.4 | 36 | 6 | 60 | | ¥18,000 |
| TGHDS5.5CBALTOH | 5.5 | 36 | 6 | 60 | | ¥18,000 |
| TGHDS5.6CBALTOH | 5.6 | 36 | 6 | 60 | | ¥18,000 |
| TGHDS5.7CBALTOH | 5.7 | 36 | 6 | 60 | | ¥18,000 |
| TGHDS5.8CBALTOH | 5.8 | 36 | 6 | 60 | | ¥18,000 |
| TGHDS5.9CBALTOH | 5.9 | 36 | 6 | 60 | | ¥18,000 |
| TGHDS6.0CBALTOH | 6 | 40 | 8 | 80 | | ¥18,000 |
| TGHDS6.1CBALTOH | 6.1 | 40 | 8 | 80 | | ¥22,000 |
| TGHDS6.2CBALTOH | 6.2 | 40 | 8 | 80 | | ¥22,000 |
| TGHDS6.3CBALTOH | 6.3 | 40 | 8 | 80 | | ¥22,000 |
| TGHDS6.4CBALTOH | 6.4 | 40 | 8 | 80 | | ¥22,000 |
| TGHDS6.5CBALTOH | 6.5 | 40 | 8 | 80 | | ¥22,000 |
| TGHDS6.6CBALTOH | 6.6 | 40 | 8 | 80 | | ¥22,000 |
| TGHDS6.7CBALTOH | 6.7 | 46 | 8 | 80 | | ¥22,000 |
| TGHDS6.8CBALTOH | 6.8 | 46 | 8 | 80 | | ¥22,000 |
| TGHDS6.9CBALTOH | 6.9 | 46 | 8 | 80 | | ¥22,000 |
| TGHDS7.0CBALTOH | 7 | 46 | 8 | 80 | | ¥20,000 |
| TGHDS7.1CBALTOH | 7.1 | 46 | 8 | 80 | | ¥22,000 |
| TGHDS7.2CBALTOH | 7.2 | 46 | 8 | 80 | | ¥22,000 |
| TGHDS7.3CBALTOH | 7.3 | 46 | 8 | 80 | | ¥22,000 |
| TGHDS7.4CBALTOH | 7.4 | 46 | 8 | 80 | | ¥22,000 |
| TGHDS7.5CBALTOH | 7.5 | 46 | 8 | 80 | | ¥22,000 |
| TGHDS7.6CBALTOH | 7.6 | 46 | 8 | 80 | | ¥22,000 |
| TGHDS7.7CBALTOH | 7.7 | 51 | 10 | 100 | | ¥25,000 |
| TGHDS7.8CBALTOH | 7.8 | 51 | 10 | 100 | | ¥25,000 |

| VAN Code No. | 直径 φD | 有効溝長 FL | シャンク径 φd | 全長 L | 在庫 Stock | 参考価格 |
|------------------|----------|------------|-------------|---------|-------------|---------|
| | | | | | | Price |
| TGHDS7.9CBALTOH | 7.9 | 51 | 10 | 100 | | ¥25,000 |
| TGHDS8.0CBALTOH | 8 | 51 | 10 | 100 | | ¥22,000 |
| TGHDS8.1CBALTOH | 8.1 | 51 | 10 | 100 | | ¥25,000 |
| TGHDS8.2CBALTOH | 8.2 | 51 | 10 | 100 | | ¥25,000 |
| TGHDS8.3CBALTOH | 8.3 | 51 | 10 | 100 | | ¥25,000 |
| TGHDS8.4CBALTOH | 8.4 | 51 | 10 | 100 | | ¥25,000 |
| TGHDS8.5CBALTOH | 8.5 | 57 | 10 | 100 | | ¥25,000 |
| TGHDS8.6CBALTOH | 8.6 | 57 | 10 | 100 | | ¥25,000 |
| TGHDS8.7CBALTOH | 8.7 | 57 | 10 | 100 | | ¥25,000 |
| TGHDS8.8CBALTOH | 8.8 | 57 | 10 | 100 | | ¥25,000 |
| TGHDS8.9CBALTOH | 8.9 | 57 | 10 | 100 | | ¥25,000 |
| TGHDS9.0CBALTOH | 9 | 57 | 10 | 100 | | ¥22,000 |
| TGHDS9.1CBALTOH | 9.1 | 57 | 10 | 100 | | ¥25,000 |
| TGHDS9.2CBALTOH | 9.2 | 57 | 10 | 100 | | ¥25,000 |
| TGHDS9.3CBALTOH | 9.3 | 57 | 10 | 100 | | ¥25,000 |
| TGHDS9.4CBALTOH | 9.4 | 61 | 12 | 110 | | ¥28,000 |
| TGHDS9.5CBALTOH | 9.5 | 61 | 12 | 110 | | ¥28,000 |
| TGHDS9.6CBALTOH | 9.6 | 61 | 12 | 110 | | ¥28,000 |
| TGHDS9.7CBALTOH | 9.7 | 61 | 12 | 110 | | ¥28,000 |
| TGHDS9.8CBALTOH | 9.8 | 61 | 12 | 110 | | ¥28,000 |
| TGHDS9.9CBALTOH | 9.9 | 61 | 12 | 110 | | ¥28,000 |
| TGHDS10.0CBALTOH | 10 | 61 | 12 | 110 | | ¥25,000 |
| TGHDS10.1CBALTOH | 10.1 | 61 | 12 | 110 | | ¥28,000 |
| TGHDS10.2CBALTOH | 10.2 | 67 | 12 | 110 | | ¥28,000 |
| TGHDS10.3CBALTOH | 10.3 | 67 | 12 | 110 | | ¥28,000 |
| TGHDS10.4CBALTOH | 10.4 | 67 | 12 | 110 | | ¥28,000 |
| TGHDS10.5CBALTOH | 10.5 | 67 | 12 | 110 | | ¥28,000 |
| TGHDS10.6CBALTOH | 10.6 | 67 | 12 | 110 | | ¥28,000 |
| TGHDS10.7CBALTOH | 10.7 | 67 | 12 | 110 | | ¥28,000 |
| TGHDS10.8CBALTOH | 10.8 | 67 | 12 | 110 | | ¥28,000 |
| TGHDS10.9CBALTOH | 10.9 | 67 | 12 | 110 | | ¥28,000 |
| TGHDS11.0CBALTOH | 11 | 67 | 12 | 110 | | ¥25,000 |

無印・・・受注生産品 / No Mark・・・Manufactured Upon Request

※1：更に刃長の長いものや上記寸法以外のものも生産できます。

※1：Flute lengths (FL) and diameters (φD) not shown in this table is available upon request

■被削材適合性 Suitability for Work Materials ◎...最適 The most suitable ○...適 Suitable △...可 Possible 無印 Blank...不可 Impossible

| 製品区分 Product | 軟鋼 Mild Steel | 炭素鋼 Carbon Steel | 合金鋼 Alloy Steel | 調質鋼 Heat treated Steel | 工具鋼 Tool Steel | 焼入れ鋼 Hardened Steel | ステンレス鋼 Stainless Steel | 鋳鉄 Cast Iron | タタリ鋼 Ductile Cast Iron | チタン合金 Titanium Alloy | アルミ合金 Aluminum Alloy | 銅 Copper | プラスチック Plastic | セラミック etc. Ceramics etc. |
|-----------------|------------------|---------------------|--------------------|---------------------------|-------------------|------------------------|---------------------------|-----------------|---------------------------|-------------------------|-------------------------|-------------|-------------------|---|
| TGHDL-CBALT | SS | S45C | SCM SCR | SKD SKS | ~40 HRC | ~45 HRC 45~ HRC | SUS | FC | FDC | | Al | Cu | | マシナブル Machinable ジルコニア ガラス Zirconia Glass |

- SP CENTER
- CENTER DRILL
- GSS STARTING DRILL
- GP DRILL
- TFD
- SPIRAL GUN BARREL DRILL
- TOGLON MULTI CHAMFER
- TOGLON SHARP
- TOGLON HARD
- CORNER ROUNDING CUTTER
- JIT
- SUBMARINE GATE DRILL
- MICRO TOOL
- TECHNICAL INFORMATION
- CUSTOMIZED TOOL SEMIORDER TOOL
- INSTRUCTION
- COMPANY PROFILE

高硬度用リーマ reamer for high hardness

トグルン®ハードリーマ



TOGLON Hard Reamer

HRC40~72の焼き入れ鋼を加工可能!!

Available for HRC40-72 Hardened steel



HRC40~72の焼き入れ鋼に穴仕上げ可能
脅威の真円度を実現

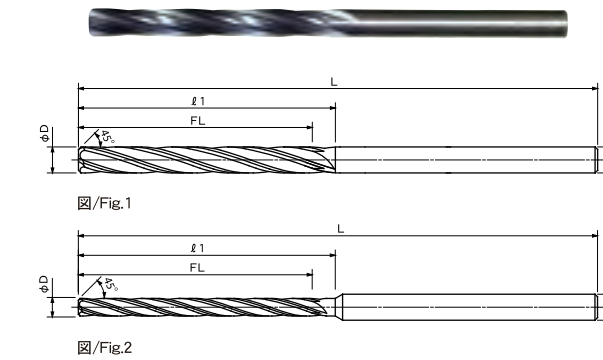
TOGLON Hard Reamer achieves superior roundness in hardened steel (40-72 HRC).

| 製品区分 Product | 画像 Photo | 材質 Material | 表面処理 Coating | 形状 Geometry | シャンク Shank | 刃数 Flutes | 回転方向 Direction of rotation | 食付角 Chamfer angle | 刃径 φD |
|-----------------|-------------|----------------|-----------------|----------------|---------------|--------------|-------------------------------|----------------------|------------|
| TGHR-CBALT | | 超硬 | ALT | ネガ刃 | SHANK h6 | 4枚刃 | 右刃 | 45° | 2.99~12.02 |
| TGHRM-CBALT | | 超硬 | ALT | ネガ刃 | SHANK h6 | 4枚刃 | 右刃 | 45° | 1.00~12.02 |

技術レポートについては、P.112をご覧ください。
See Page 106 for technical information.

アイコンについての説明は、P.125をご覧ください。
See Page 125 for icon explanation.

トグルン®ハードリーマ ALTコーティング TOGLON Hard Reamer ALT coating



超硬 ALT ネガ刃 SHANK h6 4枚刃 右刃 45° 2.99~12.02

単位/寸法:mm 価格:円
Unit/Size:mm Price:JPY

| VAN Code No. | 直径 φD | φD公差 Limit | シャンク径 φd | 有効溝長 FL | 有効長 L1 | 全長 L | 図 Fig. | 在庫 Stock | 参考価格 Price |
|---------------|----------|---------------|-------------|------------|-----------|---------|-----------|-------------|---------------|
| TGHR2.99CBALT | 2.99 | A | 4 | 40 | 44 | 80 | 2 | ● | ¥12,000 |
| TGHR3.00CBALT | 3 | A | 4 | 40 | 44 | 80 | 2 | ● | ¥8,200 |
| TGHR3.01CBALT | 3.01 | A | 4 | 40 | 44 | 80 | 2 | ● | ¥12,000 |
| TGHR3.02CBALT | 3.02 | A | 4 | 40 | 44 | 80 | 2 | ● | ¥12,000 |
| TGHR3.99CBALT | 3.99 | B | 4 | 40 | 44 | 80 | 1 | ● | ¥12,600 |
| TGHR4.00CBALT | 4 | B | 4 | 40 | 44 | 80 | 1 | ● | ¥8,800 |
| TGHR4.01CBALT | 4.01 | B | 4 | 40 | 44 | 80 | 1 | ● | ¥12,600 |
| TGHR4.02CBALT | 4.02 | B | 4 | 40 | 44 | 80 | 1 | ● | ¥12,600 |
| TGHR4.99CBALT | 4.99 | B | 6 | 50 | 57 | 100 | 2 | ● | ¥16,000 |
| TGHR5.00CBALT | 5 | B | 6 | 50 | 57 | 100 | 2 | ● | ¥12,000 |
| TGHR5.01CBALT | 5.01 | B | 6 | 50 | 57 | 100 | 2 | ● | ¥16,000 |
| TGHR5.02CBALT | 5.02 | B | 6 | 50 | 57 | 100 | 2 | ● | ¥16,000 |

単位/寸法:mm 価格:円
Unit/Size:mm Price:JPY

| VAN Code No. | 直径 φD | φD公差 Limit | シャンク径 φd | 有効溝長 FL | 有効長 L1 | 全長 L | 図 Fig. | 在庫 Stock | 参考価格 Price |
|----------------|----------|---------------|-------------|------------|-----------|---------|-----------|-------------|---------------|
| TGHR5.99CBALT | 5.99 | B | 6 | 50 | 57 | 100 | 1 | ● | ¥18,200 |
| TGHR6.00CBALT | 6 | B | 6 | 50 | 57 | 100 | 1 | ● | ¥13,800 |
| TGHR6.01CBALT | 6.01 | B | 6 | 50 | 57 | 100 | 1 | ● | ¥18,200 |
| TGHR6.02CBALT | 6.02 | B | 6 | 50 | 57 | 100 | 1 | ● | ¥18,200 |
| TGHR6.99CBALT | 6.99 | C | 8 | 50 | 60 | 100 | 2 | ● | ¥24,800 |
| TGHR7.00CBALT | 7 | C | 8 | 50 | 60 | 100 | 2 | ● | ¥19,800 |
| TGHR7.01CBALT | 7.01 | C | 8 | 50 | 60 | 100 | 2 | ● | ¥24,800 |
| TGHR7.02CBALT | 7.02 | C | 8 | 50 | 60 | 100 | 2 | ● | ¥24,800 |
| TGHR7.99CBALT | 7.99 | C | 8 | 50 | 60 | 100 | 1 | ● | ¥27,000 |
| TGHR8.00CBALT | 8 | C | 8 | 50 | 60 | 100 | 1 | ● | ¥22,000 |
| TGHR8.01CBALT | 8.01 | C | 8 | 50 | 60 | 100 | 1 | ● | ¥27,000 |
| TGHR8.02CBALT | 8.02 | C | 8 | 50 | 60 | 100 | 1 | ● | ¥27,000 |
| TGHR8.99CBALT | 8.99 | C | 10 | 60 | 73 | 120 | 2 | ● | ¥36,000 |
| TGHR9.00CBALT | 9 | C | 10 | 60 | 73 | 120 | 2 | ● | ¥29,800 |
| TGHR9.01CBALT | 9.01 | C | 10 | 60 | 73 | 120 | 2 | ● | ¥36,000 |
| TGHR9.02CBALT | 9.02 | C | 10 | 60 | 73 | 120 | 2 | ● | ¥36,000 |
| TGHR9.99CBALT | 9.99 | C | 10 | 60 | 73 | 120 | 1 | ● | ¥38,000 |
| TGHR10.00CBALT | 10 | C | 10 | 60 | 73 | 120 | 1 | ● | ¥32,000 |
| TGHR10.01CBALT | 10.01 | C | 10 | 60 | 73 | 120 | 1 | ● | ¥38,000 |
| TGHR10.02CBALT | 10.02 | C | 10 | 60 | 73 | 120 | 1 | ● | ¥38,000 |
| TGHR10.99CBALT | 10.99 | D | 12 | 70 | 86 | 140 | 2 | ● | ¥45,000 |
| TGHR11.00CBALT | 11 | D | 12 | 70 | 86 | 140 | 2 | ● | ¥38,500 |
| TGHR11.01CBALT | 11.01 | D | 12 | 70 | 86 | 140 | 2 | ● | ¥45,000 |
| TGHR11.02CBALT | 11.02 | D | 12 | 70 | 86 | 140 | 2 | ● | ¥45,000 |
| TGHR11.99CBALT | 11.99 | D | 12 | 70 | 86 | 140 | 1 | ● | ¥47,000 |
| TGHR12.00CBALT | 12 | D | 12 | 70 | 86 | 140 | 1 | ● | ¥41,000 |
| TGHR12.01CBALT | 12.01 | D | 12 | 70 | 86 | 140 | 1 | ● | ¥47,000 |
| TGHR12.02CBALT | 12.02 | D | 12 | 70 | 86 | 140 | 1 | ● | ¥47,000 |

| φD公差 Limit | A | B | C | D |
|---------------|------------------|------------------|------------------|------------------|
| | +0.007 +0.002 | +0.009 +0.003 | +0.011 +0.004 | +0.013 +0.006 |

トグルン®ハードリーマ 切削条件表 Toglon Hard Reamer Recommended Drilling Condition

| 被削材 WORK MATERIAL | 焼き入れ鋼 (SKD, HSS) (50~60HRC) HARDENED STEEL | |
|-----------------------|---|-----------------------|
| 切削速度 CUTTING SPEED | 10~20m/min | |
| 直径 DIAMETER mm | 回転数 SPEED min ⁻¹ | 送り量 FEED mm/rev |
| 3 | 1,100-2,100 | 0.02 - 0.06 |
| 4 | 800-1,600 | 0.02 - 0.07 |
| 6 | 500-1,100 | 0.02 - 0.07 |
| 8 | 400-800 | 0.02 - 0.08 |
| 10 | 320-640 | 0.03 - 0.08 |
| 12 | 270-530 | 0.03 - 0.09 |

切削条件設定上の注意点 Please observe when choosing the cutting conditions

- 上記はあくまでも目安です。状況に応じて変更して下さい。
- 十分な水溶性クーラント、オイルミストを使用して下さい。
- 次の場合は送り条件を下げて下さい。
・ワーク、チャッキング、機械剛性の悪い場合
- ワーク面粗度を上げたい場合は、上記条件より送り量を減らしても問題ありません。その際、工具寿命が短くなる可能性があります。

- The above values are standard conditions. They need to be adapted for optimal use of the tools.
- For processing please use ample water soluble coolant or oil mist.
- Please lower the speed when working conditions are not stable (vibrations, low machine rigidity, unstable work piece fixture, etc.)
- For smoother surfaces please decrease the feed rate (this may cause shorter tool life).

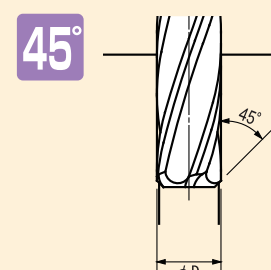
■被削材適合性 Suitability for Work Materials ◎...最適 The most suitable ○...適 Suitable △...可 Possible 無印 Blank...不可 Impossible

| 製品区分 Product | 軟鋼 Mild Steel | 炭素鋼 Carbon Steel | 合金鋼 Alloy Steel | 調質鋼 Heat treated Steel | 工具鋼 Tool Steel | 焼き入れ鋼 Hardened Steel | ステンレス鋼 Stainless Steel | 鋳鉄 Ductile Cast Iron | グダクル鋼 Ductile Cast Iron | チタン合金 Titanium Alloy | アルミ合金 Aluminium Alloy | 銅 Copper | プラスチック Plastic | セラミック etc. Ceramics etc. |
|-----------------|------------------|---------------------|--------------------|---------------------------|-------------------|-------------------------|---------------------------|-------------------------|----------------------------|-------------------------|--------------------------|-------------|-------------------|--|
| TGHR-CBALT | SS | S45C | SCM SCR | SKD SKS | ~40 HRC | ~45 HRC 45~ HRC | SUS | FC | FDC | | Al | Cu | | マシナブル Machinable ジルコニア Zirconia ガラス Glass |

トグルン®ハードリーマ について

Guide to TOGLON Hard Reamer

食付角 Chamfer angle



穴仕上/Hole Finishing