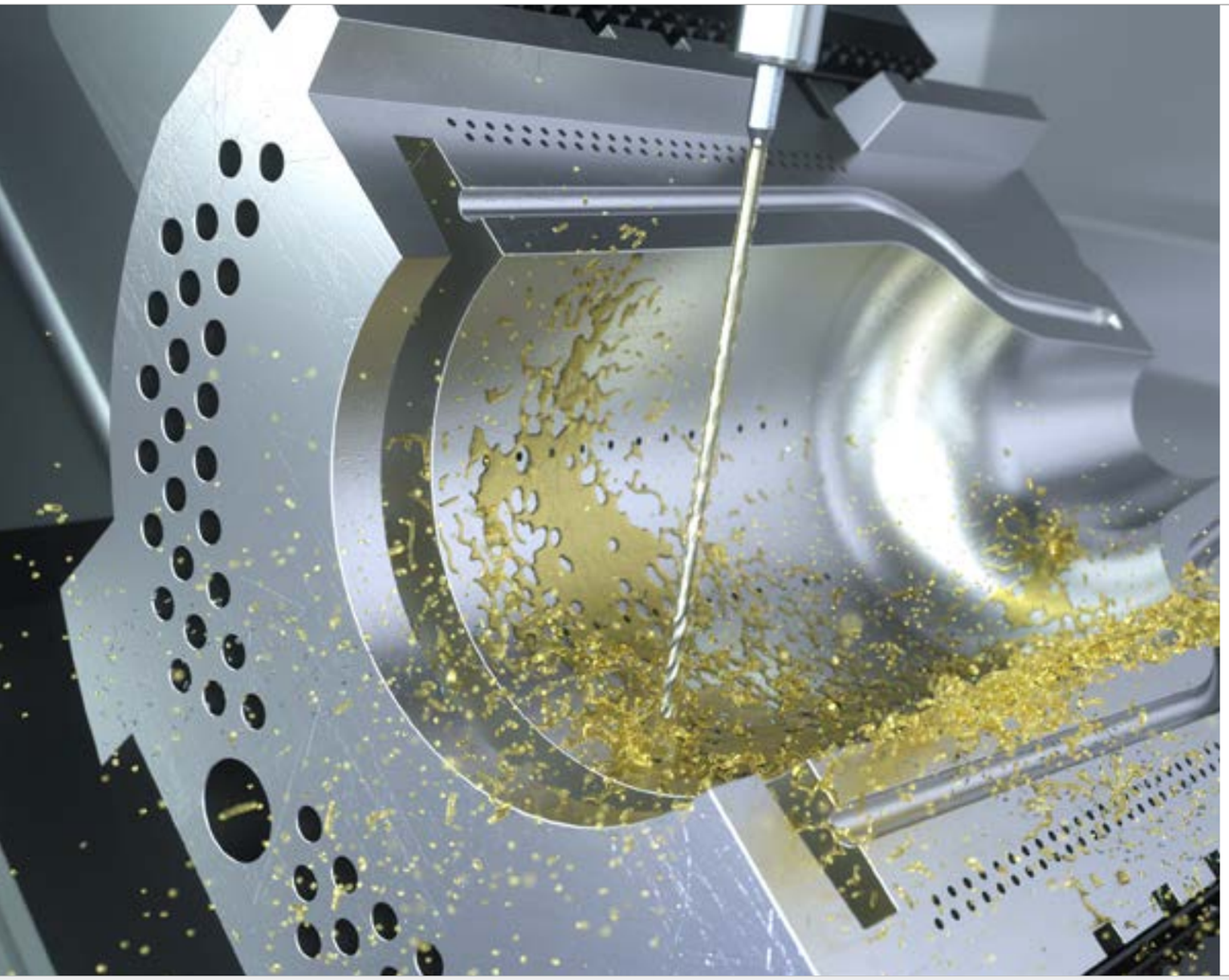
DRILLING TOOLS
CRAZYDRILL FLEX

PATENTED

# CrazyDrill Flex



CRAZYDRILL Flex

## FLEXIBILITY AND SOLID CARBIDE: NO CONTRARIETY

Mikron Tool offers with CrazyDrill Flex a solid carbide drill for deep hole drilling up to 50 x d. Diameter range from 0.1 to 2.0 mm with versions for steel, titanium and stainless materials. The drill versions 20 x d and 30 x d (for steel and titanium) are cooled externally. The drill version 50 x d has through coolant channels integrated in the shank same as the version 30 x d for stainless steel (CrazyDrill Flex SST-Inox).

The straight connecting element between the cutting body and the shaft (neck) gives the carbide drill CrazyDrill Flex the length required for drilling deep holes up to a bore depth of 50 x d and makes it very robust. It allows a much shorter drilling time than drilling with single-lip drills, micro-erosion, or laser methods.

Depending on the material processed, one of three variants with their geometries adapted to the respective materials, will work:

- The extended neck ensures the flexibility required in order to enable a reliable drilling process even under difficult conditions. It can compensate a center offset of up to 40% of its diameter. Until now, this was only possible with HSS drills. Thanks to the special web thinning, a feed force reduced by 50% is achieved. An important requirement to realize straight deep hole drilling.
- In the variant for non-corrosive materials, the degressive helical groove ensures good chip breaking and removal. The cutting geometry is specially designed for CrNi alloys. Thanks to the special web thinning, a feed force reduced by up to 50% is achieved. An important requirement to realize straight deep hole drilling.

CRAZYDRILL™ by Mikron Tool Flex

CRAZYDRILL™ by Mikron Tool Flex

DRILLING TOOLS
CRAZYDRILL FLEX

# Flexible and deep

## MICRO DEEP HOLE DRILLING UP TO 50 X D

Mikron Tool offers with CrazyDrill Flex a solid carbide drill for deep hole drilling up to 50 x d. Diameter range from 0.1 to 2.0 mm with versions for steel, titanium and stainless materials. The drill versions 20 x d and 30 x d (for steel and titanium) are cooled externally. The drill version 50 x d has through coolant channels integrated in the shank same as the version 30 x d for stainless steel (CrazyDrill Flex SST-Inox).

- CrazyDrill Flex Steel, drilling depth 20 x d, 30 x d, 50 x d, external cooling up to 30 x d / integrated cooling for 50 x d, coated and uncoated
- CrazyDrill Flex Titanium, drilling depth 30 x d, 50 x d, external cooling up to 30 x d / through coolant channels integrated in the shank for 50 x d
- CrazyDrill Flex SST-Inox, drilling depth 30 x d, 50 x d, through coolant channels integrated in the shank

**Flexibility**

A flexible center piece ensures flexibility. Therefore the drill can compensate center offsets without breaking off.


**Drilling up to 50 x d**

The unique drill design (web thinning for low feed force, neck without flutes for high stability) enables deep hole drilling up to 50 x d.

CRAZYDRILL™ by Mikron Tool Flex

CRAZYDRILL™ by Mikron Tool Flex

DRILLING TOOLS
CRAZYDRILL FLEX

**PATENTED**

## Steel

### 20 / 30 / 50 x d

- Integrated / External cooling
- Coated / Uncoated
- Ø0.2 - 2.0 mm with coating
  Ø0.1 - 1.2 mm without coating


page 399 | page 407 | page 415

## Titanium

### 30 / 50 x d

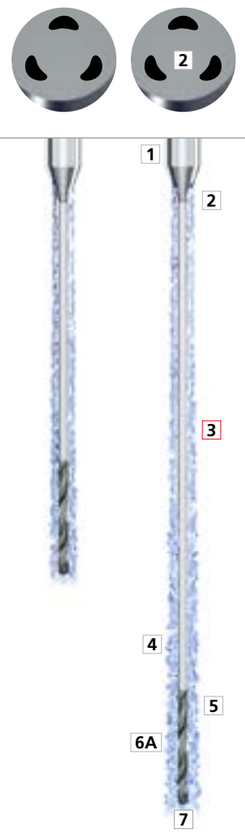
- Integrated / External cooling
- Uncoated
- Ø0.1 - 1.2 mm


page 423 | page 429

## SST-Inox

### 30 / 50 x d

- Integrated cooling
- Coated
- Ø0.2 - 2.0 mm




page 435 | page 441

**1 | SHAFT**
The sturdy carbide shaft guarantees high circular accuracy and thus top drilling precision.

**2 | COOLING**
All of the 50 x d versions and the Flex SST-Inox feature integrated cooling channels in the shaft. These guarantee continuous targeted cooling of the cutting edges from just 15 bar. The special arrangement and shape produce a concentrated jet even at high speeds, which guarantees regular and significant cooling of the drill tip and flushes the chips from the flutes.

**3 | CENTER PIECE: FLEXIBILITY AND STABILITY - PATENTED**
A flexible center piece with a reduced cross-section ensures elasticity (flection) and provides at the same time higher rigidity (torsion/compression) compared to drilling with a through flute. The micro deep-hole drill can easily compensate center offsets of up to 40% of its diameter without breaking off. Until now, this was only possible with HSS tools.

**4 | SOLID CARBIDE**
The fine grained solid carbide developed for the CrazyDrill Flex is very tough and resistant to heat shock, thus easily meeting the requirements for the machining of steels, titanium, and non-corrosive and heat-resistant alloys.

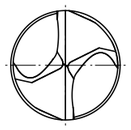
**5 | COATING**
The high-performance coating eXedur RIP is resistant to heat and wear. It prevents chips from adhering and supports their smooth removal. The result is a long tool life.

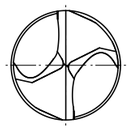
**6A | DEGRESSIVE HELICAL GROOVE - PATENTED**
The degressive helical groove of the CrazyDrill Flex SST-Inox with its unique and patented geometry guarantees high tool stability. It ensures good chip breaking in the front part and quick chip removal in the rear.

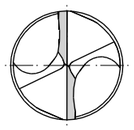
**6B | HELICAL GROOVES**
The geometry of the helical grooves for the steel and titanium versions are adapted to the materials machined. Good chip breaking and quick chip removal are guaranteed.

**7 | GEOMETRY**
The tip geometry is specially developed to guarantee high cutting stability, self-centering, and short chips. Thanks to the clever web thinning, less penetration force is required when drilling.

Drill tip


CrazyDrill Flex Steel


CrazyDrill Flex Titanium


CrazyDrill Flex SST-Inox

CRAZYDRILL™ by Mikron Tool Flex

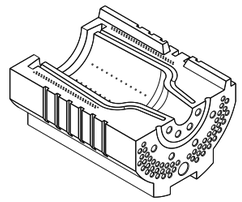
CRAZYDRILL™ by Mikron Tool Flex

DRILLING TOOLS
CRAZYDRILL FLEX

# Benefits and applications

## THE SMALL DRILL WITH INTEGRATED COOLING FOR DRILLING DEEP HOLES

- **SHORT MACHINING TIME** | up to 10 times faster
- **HIGH DEGREE OF PROCESS RELIABILITY** | due to flexible center piece
- **HIGH DEGREE OF PRECISION** | due to small tolerances



**COMPONENT**
Air vent hole for glass form mould

**MATERIAL**
CuAl11Fe4Ni4 / 2.0975 / UNS C95800

**MACHINING**
- 100 air vent holes
- d = 0.5 mm
- Drilling depth 15 mm

**DRILLING TOOL**
Mikron Tool - CrazyDrill Flex Steel - 30 x d

| DATA | MIKRON TOOL |
|---|---|
| Tool type | CrazyDrill Flex Steel<br>- Carbide<br>- Coated<br>- External cooling |
| Item number | 2.CFS.30050.1 |
| Cutting data | $v_c$ = 40 m/min<br>f = 0.012 mm/rev<br>$Q_1$ = 1.25 mm<br>$Q_x$ = 0.25 mm |
| Machining time | 30 min |

| APPLICATION DOMAINS | COMPONENTS EXAMPLES |
|---|---|
| **Dental** | Dental implant |
| **Aerospace industry** | Injection nozzle |
| **Medical technology** | Surgical instrument |
| **Tool and mold making** | Air vent hole for glass form mould |
| **Automotive industry** | Turned part |
| **Mechanical engineering** | Drilling holes in Plexiglass |
| **Watches** | Bracelet components |
| **Electronics / Electrical** | Solenoid contactor |

| MATERIALS GROUPS | EXAMPLES | | |
|---|---|---|---|
| | Mat. no. | DIN | AISI / ASTM / UNS |
| **Group P** Unalloyed and alloyed steel | 1.0401 | C15 | 1015 |
| | 1.3505 | 100Cr6 | 52100 |
| | 1.2436 | X210CrW12 | D4 / D6 |
| **Group M** Stainless steel | 1.4105 | X6CrMoS17 | 430F |
| | 1.4112 | X46Cr13 | 420C |
| | 1.4542 | X5CrNiCuNb 16-4 | 630 |
| | 1.4301 | X5CrNi 18-10 | 304 |
| **Group K** Cast iron | 0.7040 | GGG40 | 60-40-18 |
| **Group N** Non ferrous metals | 3.2315 | AlMgSi1 | 6351 |
| | 3.2163 | GD-AlSi9Cu3 | A380 |
| | 2.004 | Cu-OF / CW008A | C10100 |
| | 2.102 | CuSn6 | C51900 |
| | 2.096 | CuAl9Mn2 | C63200 |
| **Group S1** Super alloys | 2.4856 | | INCONEL 625 |
| | 2.4665 | NiCr22Fe18Mo | HASTELLOY X |
| **Group S2** Titanium (pure and alloyed) | 3.7035 | Gr.2 | B348 / F67 |
| | 3.7165 | TiAl6V4 | B348 / F136 |
| **Group S3** CrCo alloys | 2.4964 | CoCr20W15Ni | HAYNES 25 |
| **Group H1** Hardened steel <55 HRC | 1.2510 | 100MnCrMoW4 | O1 |

CRAZYDRILL™ by Mikron Tool Flex STEEL

CRAZYDRILL™ by Mikron Tool Flex STEEL

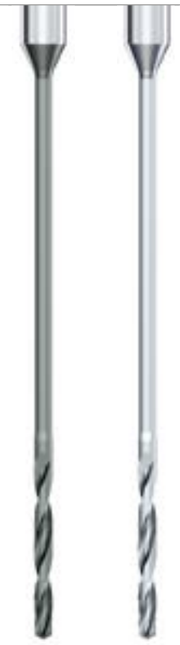
DRILLING TOOLS
CRAZYDRILL FLEX

# Steel - 30 x d - coated / uncoated

Carbide | 30xd$_1$ | 140° | Z2

| | |
|---|---|
| Ø d$_1$ | 0.1 - 1.2 mm |
| Tolerance | - 0.003 mm<br>- 0.006 mm |

## DRILLING WITH EXTERNAL COOLING



**Coated** **Uncoated**

The solid carbide micro-drill CrazyDrill Flex Steel is mainly designed for steels, cast iron, aluminum alloys, brass and bronze. It has a high flexibility thanks to a long and "flexible" section between the tip and the shaft. Therefore the tool is adapted for drilling with process reliability also under difficult conditions. It is able to flex effortlessly 40% of its diameter. This drill is also perfect for deep hole drilling from diameter 0.1 mm with a significantly shorter drilling time compared to the single-lip drill, electro-erosion or laser method.

CrazyDrill Flex Steel 30 x d is used with external cooling. The coated version (eXedur RIP), compared to the uncoated one, is perfect for drilling larger series. Also the surface quality profits from the high-performance coating.

We recommend pilot drilling with CrazyDrill Flexpilot Steel or CrazyDrill Crosspilot on inclined surfaces. For details see drilling process.

### Coolant type, pressure and filtration

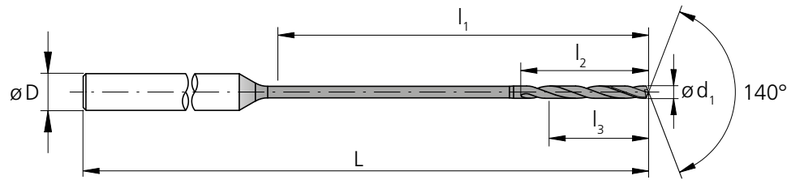
Recommendations for coolant type, pressure and filtration are on page "drilling process".

### Please note

You couldn't find your suitable version of the CrazyDrill Flex Steel - coated / uncoated (diameter, length, cutting direction…)? Ask us about our customized versions!

**Regrinding:** This product is not suitable for regrinding.

.1 eXedur RIP | .0 Uncoated




| d$_1$ [mm] | d$_1$ [inch] | l$_1$ [mm] | l$_2$ [mm] | l$_3$ [mm] | D (h6) [mm] | L [mm] | Item number | Coated | Uncoated | Availability |
|---|---|---|---|---|---|---|---|---|---|---|
| 0.10 | | 3.0 | 1.1 | 0.8 | 3 | 45 | 2.CFS.30010 | - | .0 | ◪ |
| 0.11 | | 3.3 | 1.2 | 0.9 | 3 | 45 | 2.CFS.30011 | - | .0 | Δ |
| 0.12 | | 3.6 | 1.3 | 1.0 | 3 | 45 | 2.CFS.30012 | - | .0 | Δ |
| 0.13 | | 3.9 | 1.4 | 1.0 | 3 | 45 | 2.CFS.30013 | - | .0 | Δ |
| 0.14 | | 4.2 | 1.5 | 1.1 | 3 | 45 | 2.CFS.30014 | - | .0 | Δ |
| 0.15 | | 4.5 | 1.6 | 1.2 | 3 | 45 | 2.CFS.30015 | - | .0 | ◪ |
| 0.16 | | 4.8 | 1.7 | 1.3 | 3 | 45 | 2.CFS.30016 | - | .0 | Δ |
| 0.17 | | 5.1 | 1.8 | 1.4 | 3 | 45 | 2.CFS.30017 | - | .0 | Δ |
| 0.18 | | 5.4 | 1.9 | 1.4 | 3 | 45 | 2.CFS.30018 | - | .0 | Δ |
| 0.19 | | 5.7 | 2.0 | 1.5 | 3 | 45 | 2.CFS.30019 | - | .0 | Δ |
| 0.20 | | 6.0 | 2.1 | 1.6 | 3 | 45 | 2.CFS.30020 | .1 | .0 | ■ |
| 0.21 | | 6.3 | 2.2 | 1.7 | 3 | 45 | 2.CFS.30021 | .1 | .0 | Δ |
| 0.22 | | 6.6 | 2.3 | 1.8 | 3 | 45 | 2.CFS.30022 | .1 | .0 | Δ |
| 0.23 | | 6.9 | 2.4 | 1.8 | 3 | 45 | 2.CFS.30023 | .1 | .0 | Δ |
| 0.24 | | 7.2 | 2.5 | 1.9 | 3 | 45 | 2.CFS.30024 | .1 | .0 | Δ |
| 0.25 | | 7.5 | 2.6 | 2.0 | 3 | 45 | 2.CFS.30025 | .1 | .0 | ■ |
| 0.26 | | 7.8 | 2.7 | 2.1 | 3 | 45 | 2.CFS.30026 | .1 | .0 | Δ |
| 0.27 | | 8.1 | 2.8 | 2.2 | 3 | 45 | 2.CFS.30027 | .1 | .0 | Δ |
| 0.28 | | 8.4 | 2.9 | 2.2 | 3 | 45 | 2.CFS.30028 | .1 | .0 | Δ |
| 0.29 | | 8.7 | 3.0 | 2.3 | 3 | 45 | 2.CFS.30029 | .1 | .0 | Δ |
| 0.30 | | 9.0 | 3.2 | 2.4 | 3 | 50 | 2.CFS.30030 | .1 | .0 | ■ |
| 0.31 | | 9.3 | 3.3 | 2.5 | 3 | 50 | 2.CFS.30031 | .1 | .0 | Δ |
| 0.32 | | 9.6 | 3.4 | 2.6 | 3 | 50 | 2.CFS.30032 | .1 | .0 | Δ |
| 0.33 | | 9.9 | 3.5 | 2.6 | 3 | 50 | 2.CFS.30033 | .1 | .0 | Δ |
| 0.34 | | 10.2 | 3.6 | 2.7 | 3 | 50 | 2.CFS.30034 | .1 | .0 | Δ |
| 0.35 | | 10.5 | 3.7 | 2.8 | 3 | 50 | 2.CFS.30035 | .1 | .0 | ■ |
| 0.36 | | 10.8 | 3.8 | 2.9 | 3 | 50 | 2.CFS.30036 | .1 | .0 | Δ |
| 0.37 | | 11.1 | 3.9 | 3.0 | 3 | 50 | 2.CFS.30037 | .1 | .0 | Δ |
| 0.38 | | 11.4 | 4.0 | 3.0 | 3 | 50 | 2.CFS.30038 | .1 | .0 | Δ |
| 0.39 | | 11.7 | 4.1 | 3.1 | 3 | 50 | 2.CFS.30039 | .1 | .0 | Δ |
| 0.396 | **1/64** | 12.0 | 4.2 | 3.2 | 3 | 50 | 2.CFS.30F164 | .1 | - | ◪ |
| 0.40 | | 12.0 | 4.2 | 3.2 | 3 | 50 | 2.CFS.30040 | .1 | .0 | ■ |
| 0.41 | | 12.3 | 4.3 | 3.3 | 3 | 50 | 2.CFS.30041 | .1 | .0 | Δ |
| 0.42 | | 12.6 | 4.4 | 3.4 | 3 | 50 | 2.CFS.30042 | .1 | .0 | Δ |
| 0.43 | | 12.9 | 4.5 | 3.4 | 3 | 50 | 2.CFS.30043 | .1 | .0 | Δ |
| 0.44 | | 13.2 | 4.6 | 3.5 | 3 | 50 | 2.CFS.30044 | .1 | .0 | Δ |
| 0.45 | | 13.5 | 4.7 | 3.6 | 3 | 50 | 2.CFS.30045 | .1 | .0 | ■ |
| 0.46 | | 13.8 | 4.8 | 3.7 | 3 | 50 | 2.CFS.30046 | .1 | .0 | Δ |

■ Stock item
◪ Stock item only in one version
Δ Delivery term upon request, minumum purchase order quantity 5 pcs.

Complementary products

CrazyDrill Flexpilot Steel p.129
CrazyDrill Crosspilot p.175

CRAZYDRILL™ by Mikron Tool Flex STEEL

CRAZYDRILL™ by Mikron Tool Flex STEEL

DRILLING TOOLS
CRAZYDRILL FLEX

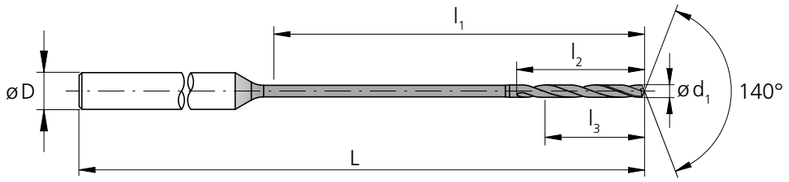
# Steel - 30 x d - coated / uncoated

Carbide | 30xd$_1$ | 140° | Z2

Ø d$_1$ 0.1 - 1.2 mm
Tolerance - 0.003 mm - 0.006 mm

## DRILLING WITH EXTERNAL COOLING

.1 eXedur RIP | .0 Uncoated




| d$_1$ [mm] | d$_1$ [inch] | l$_1$ [mm] | l$_2$ [mm] | l$_3$ [mm] | D (h6) [mm] | L [mm] | Item number | Coated | Uncoated | Availability |
|---|---|---|---|---|---|---|---|---|---|---|
| 0.47 | | 14.1 | 4.9 | 3.8 | 3 | 50 | 2.CFS.30047 | .1 | .0 | Δ |
| 0.48 | | 14.4 | 5.0 | 3.8 | 3 | 50 | 2.CFS.30048 | .1 | .0 | Δ |
| 0.49 | | 14.7 | 5.1 | 3.9 | 3 | 50 | 2.CFS.30049 | .1 | .0 | Δ |
| 0.50 | | 15.0 | 5.3 | 4.0 | 3 | 53 | 2.CFS.30050 | .1 | .0 | ■ |
| 0.51 | | 15.3 | 5.4 | 4.1 | 3 | 53 | 2.CFS.30051 | .1 | .0 | Δ |
| 0.52 | | 15.6 | 5.5 | 4.2 | 3 | 53 | 2.CFS.30052 | .1 | .0 | Δ |
| 0.53 | | 15.9 | 5.6 | 4.2 | 3 | 53 | 2.CFS.30053 | .1 | .0 | Δ |
| 0.54 | | 16.2 | 5.7 | 4.3 | 3 | 53 | 2.CFS.30054 | .1 | .0 | Δ |
| 0.55 | | 16.5 | 5.8 | 4.4 | 3 | 53 | 2.CFS.30055 | .1 | .0 | ■ |
| 0.56 | | 16.8 | 5.9 | 4.5 | 3 | 53 | 2.CFS.30056 | .1 | .0 | Δ |
| 0.57 | | 17.1 | 6.0 | 4.6 | 3 | 53 | 2.CFS.30057 | .1 | .0 | Δ |
| 0.58 | | 17.4 | 6.1 | 4.6 | 3 | 53 | 2.CFS.30058 | .1 | .0 | Δ |
| 0.59 | | 17.7 | 6.2 | 4.7 | 3 | 53 | 2.CFS.30059 | .1 | .0 | Δ |
| 0.60 | | 18.0 | 6.3 | 4.8 | 3 | 53 | 2.CFS.30060 | .1 | .0 | ■ |
| 0.61 | | 18.3 | 6.4 | 4.9 | 3 | 53 | 2.CFS.30061 | .1 | .0 | Δ |
| 0.62 | | 18.6 | 6.5 | 5.0 | 3 | 53 | 2.CFS.30062 | .1 | .0 | Δ |
| 0.63 | | 18.9 | 6.6 | 5.0 | 3 | 53 | 2.CFS.30063 | .1 | .0 | Δ |
| 0.64 | | 19.2 | 6.7 | 5.1 | 3 | 53 | 2.CFS.30064 | .1 | .0 | Δ |
| 0.65 | | 19.5 | 6.8 | 5.2 | 3 | 53 | 2.CFS.30065 | .1 | .0 | ■ |
| 0.66 | | 19.8 | 6.9 | 5.3 | 3 | 53 | 2.CFS.30066 | .1 | .0 | Δ |
| 0.67 | | 20.1 | 7.0 | 5.4 | 3 | 53 | 2.CFS.30067 | .1 | .0 | Δ |
| 0.68 | | 20.4 | 7.1 | 5.4 | 3 | 53 | 2.CFS.30068 | .1 | .0 | Δ |
| 0.69 | | 20.7 | 7.2 | 5.5 | 3 | 53 | 2.CFS.30069 | .1 | .0 | Δ |
| 0.70 | | 21.0 | 7.4 | 5.6 | 3 | 60 | 2.CFS.30070 | .1 | .0 | ■ |
| 0.71 | | 21.3 | 7.5 | 5.7 | 3 | 60 | 2.CFS.30071 | .1 | .0 | Δ |
| 0.72 | | 21.6 | 7.6 | 5.8 | 3 | 60 | 2.CFS.30072 | .1 | .0 | Δ |
| 0.73 | | 21.9 | 7.7 | 5.8 | 3 | 60 | 2.CFS.30073 | .1 | .0 | Δ |
| 0.74 | | 22.2 | 7.8 | 5.9 | 3 | 60 | 2.CFS.30074 | .1 | .0 | Δ |
| 0.75 | | 22.5 | 7.9 | 6.0 | 3 | 60 | 2.CFS.30075 | .1 | .0 | ■ |
| 0.76 | | 22.8 | 8.0 | 6.1 | 3 | 60 | 2.CFS.30076 | .1 | .0 | Δ |
| 0.77 | | 23.1 | 8.1 | 6.2 | 3 | 60 | 2.CFS.30077 | .1 | .0 | Δ |
| 0.78 | | 23.4 | 8.2 | 6.2 | 3 | 60 | 2.CFS.30078 | .1 | .0 | Δ |
| 0.79 | | 23.7 | 8.3 | 6.3 | 3 | 60 | 2.CFS.30079 | .1 | .0 | Δ |
| 0.793 | **1/32** | 24.0 | 8.4 | 6.4 | 3 | 60 | 2.CFS.30F132 | .1 | - | ◪ |
| 0.80 | | 24.0 | 8.4 | 6.4 | 3 | 60 | 2.CFS.30080 | .1 | .0 | ■ |
| 0.81 | | 24.3 | 8.5 | 6.5 | 3 | 60 | 2.CFS.30081 | .1 | .0 | Δ |
| 0.82 | | 24.6 | 8.6 | 6.6 | 3 | 60 | 2.CFS.30082 | .1 | .0 | Δ |
| 0.83 | | 24.9 | 8.7 | 6.6 | 3 | 60 | 2.CFS.30083 | .1 | .0 | Δ |

■ Stock item
◪ Stock item only in one version
Δ Delivery term upon request, minumum purchase order quantity 5 pcs.

| d$_1$ [mm] | l$_1$ [mm] | l$_2$ [mm] | l$_3$ [mm] | D (h6) [mm] | L [mm] | Item number | Coated | Uncoated | Availability |
|---|---|---|---|---|---|---|---|---|---|
| 0.84 | 25.2 | 8.8 | 6.7 | 3 | 60 | 2.CFS.30084 | .1 | .0 | Δ |
| 0.85 | 25.5 | 8.9 | 6.8 | 3 | 64 | 2.CFS.30085 | .1 | .0 | ■ |
| 0.86 | 25.8 | 9.0 | 6.9 | 3 | 64 | 2.CFS.30086 | .1 | .0 | Δ |
| 0.87 | 26.1 | 9.1 | 7.0 | 3 | 64 | 2.CFS.30087 | .1 | .0 | Δ |
| 0.88 | 26.4 | 9.2 | 7.0 | 3 | 64 | 2.CFS.30088 | .1 | .0 | Δ |
| 0.89 | 26.7 | 9.3 | 7.1 | 3 | 64 | 2.CFS.30089 | .1 | .0 | Δ |
| 0.90 | 27.0 | 9.5 | 7.2 | 3 | 64 | 2.CFS.30090 | .1 | .0 | ■ |
| 0.91 | 27.3 | 9.6 | 7.3 | 3 | 64 | 2.CFS.30091 | .1 | .0 | Δ |
| 0.92 | 27.6 | 9.7 | 7.4 | 3 | 64 | 2.CFS.30092 | .1 | .0 | Δ |
| 0.93 | 27.9 | 9.8 | 7.4 | 3 | 64 | 2.CFS.30093 | .1 | .0 | Δ |
| 0.94 | 28.2 | 9.9 | 7.5 | 3 | 64 | 2.CFS.30094 | .1 | .0 | Δ |
| 0.95 | 28.5 | 10.0 | 7.6 | 3 | 64 | 2.CFS.30095 | .1 | .0 | ■ |
| 0.96 | 28.8 | 10.1 | 7.7 | 3 | 64 | 2.CFS.30096 | .1 | .0 | Δ |
| 0.97 | 29.1 | 10.2 | 7.8 | 3 | 64 | 2.CFS.30097 | .1 | .0 | Δ |
| 0.98 | 29.4 | 10.3 | 7.8 | 3 | 64 | 2.CFS.30098 | .1 | .0 | Δ |
| 0.99 | 29.7 | 10.4 | 7.9 | 3 | 64 | 2.CFS.30099 | .1 | .0 | Δ |
| 1.00 | 30.0 | 10.5 | 8.0 | 3 | 70 | 2.CFS.30100 | .1 | .0 | ■ |
| 1.01 | 30.3 | 10.6 | 8.1 | 3 | 70 | 2.CFS.30101 | .1 | .0 | Δ |
| 1.02 | 30.6 | 10.7 | 8.2 | 3 | 70 | 2.CFS.30102 | .1 | .0 | Δ |
| 1.03 | 30.9 | 10.8 | 8.2 | 3 | 70 | 2.CFS.30103 | .1 | .0 | Δ |
| 1.04 | 31.2 | 10.9 | 8.3 | 3 | 70 | 2.CFS.30104 | .1 | .0 | Δ |
| 1.05 | 31.5 | 11.0 | 8.4 | 3 | 70 | 2.CFS.30105 | .1 | .0 | ■ |
| 1.06 | 31.8 | 11.1 | 8.5 | 3 | 70 | 2.CFS.30106 | .1 | .0 | Δ |
| 1.07 | 32.1 | 11.2 | 8.6 | 3 | 70 | 2.CFS.30107 | .1 | .0 | Δ |
| 1.08 | 32.4 | 11.3 | 8.6 | 3 | 70 | 2.CFS.30108 | .1 | .0 | Δ |
| 1.09 | 32.7 | 11.4 | 8.7 | 3 | 70 | 2.CFS.30109 | .1 | .0 | Δ |
| 1.10 | 33.0 | 11.6 | 8.8 | 3 | 70 | 2.CFS.30110 | .1 | .0 | ■ |
| 1.11 | 33.3 | 11.7 | 8.9 | 3 | 70 | 2.CFS.30111 | .1 | .0 | Δ |
| 1.12 | 33.6 | 11.8 | 9.0 | 3 | 70 | 2.CFS.30112 | .1 | .0 | Δ |
| 1.13 | 33.9 | 11.9 | 9.0 | 3 | 70 | 2.CFS.30113 | .1 | .0 | Δ |
| 1.14 | 34.2 | 12.0 | 9.1 | 3 | 70 | 2.CFS.30114 | .1 | .0 | Δ |
| 1.15 | 34.5 | 12.1 | 9.2 | 3 | 70 | 2.CFS.30115 | .1 | .0 | ■ |
| 1.16 | 34.8 | 12.2 | 9.3 | 3 | 70 | 2.CFS.30116 | .1 | .0 | Δ |
| 1.17 | 35.1 | 12.3 | 9.4 | 3 | 70 | 2.CFS.30117 | .1 | .0 | Δ |
| 1.18 | 35.4 | 12.4 | 9.4 | 3 | 70 | 2.CFS.30118 | .1 | .0 | Δ |
| 1.19 | 35.7 | 12.5 | 9.5 | 3 | 70 | 2.CFS.30119 | .1 | .0 | Δ |
| 1.20 | 36.0 | 12.6 | 9.6 | 3 | 70 | 2.CFS.30120 | .1 | .0 | ■ |

■ Stock item
Δ Delivery term upon request, minumum purchase order quantity 5 pcs.

**Complementary products**

CrazyDrill Flexpilot Steel p.129
CrazyDrill Crosspilot p.175

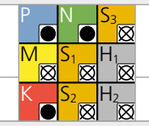
CRAZYDRILL™ by Mikron Tool Flex STEEL

CRAZYDRILL™ by Mikron Tool Flex STEEL

DRILLING TOOLS
CRAZYDRILL FLEX

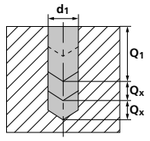
# Steel - 30 x d - coated

RECOMMENDATION FOR USE
● Excellent | ◐ Good | ○ Acceptable | ⊠ Not recommended






## DRILLING WITH EXTERNAL COOLING | CUTTING DATA OVERVIEW




| Materials group | Material | Mat. no. | DIN | AISI/ASTM/UNS | $v_c$ [m/min] Ød1 ≤ 0.4 | $v_c$ [m/min] Ød1 > 0.4 | $Q_1$ | $Q_x$ | f [mm/rev] Ød1 0.2 mm f | 0.3 mm f | 0.4 mm 1/64" f | 0.6 mm f | 0.8 mm 1/32" f | 1.0 mm – 1.2 mm f |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P | Unalloyed carbon steel Rm < 800 N/mm² | 1.0301 | C10 | AISI 1010 | 5 – 40 | 40 – 60 | 7xd1 | 0.5xd1 | 0.005 | 0.010 | 0.015 | 0.030 | 0.040 | 0.060 |
| | | 1.0401 | C15 | AISI 1015 | | | | | | | | | | |
| | | 1.1191 | C45E/CK45 | AISI 1045 | | | | | | | | | | |
| | | 1.0044 | S275JR | AISI 1020 | | | | | | | | | | |
| | | 1.0715 | 11SMn30 | AISI 1215 | | | | | | | | | | |
| | Low alloyed steel Rm > 900 N/mm² | 1.5752 | 15NiCr13 | ASTM 3415 / AISI 3310 | 5 – 25 | 25 – 50 | 7xd1 | 0.5xd1 | 0.003 – 0.005 | 0.008 – 0.010 | 0.012 – 0.015 | 0.020 – 0.025 | 0.035 | 0.050 |
| | | 1.7131 | 16MnCr5 | AISI 5115 | | | | | | | | | | |
| | | 1.3505 | 100Cr6 | AISI 52100 | | | | | | | | | | |
| | | 1.7225 | 42CrMo4 | AISI 4140 | | | | | | | | | | |
| | | 1.2842 | 90MnCrV8 | AISI O2 | | | | | | | | | | |
| | High alloyed tool steel Rm < 1200 N/mm² | 1.2379 | X153CrMoV12 | AISI D2 | 5 – 20 | 20 – 35 | 7xd1 | 1xd1 | 0.004 | 0.008 | 0.010 | 0.015 | 0.025 | 0.040 |
| | | 1.2436 | X210CrW12 | AISI D4/D6 | | | | | | | | | | |
| | | 1.3343 | HS6-5-2C | AISI M2 / UNS T11302 | | | | | | | | | | |
| | | 1.3355 | HS18-0-1 | AISI T1 / UNS T12001 | | | | | | | | | | |
| M | Stainless steel ferritic | 1.4016 | X6Cr17 | AISI 430 / UNS S43000 | | | | | Recommended: CrazyDrill Flex SST-Inox 30 x d1 | | | | | |
| | | 1.4105 | X6CrMoS17 | AISI 430F | | | | | | | | | | |
| | Stainless steel martensitic | 1.4034 | X46Cr13 | AISI 420C | | | | | | | | | | |
| | | 1.4112 | X90CrMoV18 | AISI 440B | | | | | | | | | | |
| | Stainless steel martensitic – PH | 1.4542 | X5CrNiCuNb 16-4 | AISI 630 / ASTM 17-4 PH | | | | | | | | | | |
| | | 1.4545 | X5CrNiCuNb 15-5 | ASTM 15-5 PH | | | | | | | | | | |
| | Stainless steel austenitic | 1.4301 | X5CrNi 18-10 | AISI 304 | | | | | | | | | | |
| | | 1.4435 | X2CrNiMo 18-14-3 | AISI 316L | | | | | | | | | | |
| | | 1.4441 | X2CrNiMo 18-15-3 | AISI 316LM | | | | | | | | | | |
| | | 1.4539 | X1NiCrMoCu 25-20-5 | AISI 904L | | | | | | | | | | |
| K | Cast iron | 0.6020 | GG20 | ASTM 30 | 5 – 40 | 50 – 100 | 7xd1 | 1xd1 | 0.005 | 0.010 | 0.015 | 0.020 | 0.035 | 0.050 |
| | | 0.6030 | GG30 | ASTM 40B | | | | | | | | | | |
| | | 0.7040 | GGG40 | ASTM 60-40-18 | | 40 – 80 | | | | | | | | |
| | | 0.7060 | GGG60 | ASTM 80-60-03 | | | | | | | | | | |
| N | Aluminium alloy wrought | 3.2315 | AlMgSi1 | ASTM 6351 | 5 – 40 | 60 – 120 | 7xd1 | 1xd1 | 0.015 | 0.040 | 0.050 | 0.080 | 0.100 | 0.120 |
| | | 3.4365 | AlZnMgCu1.5 | ASTM 7075 | | | | | | | | | | |
| | Aluminium alloy cast | 3.2163 | GD-AlSi9Cu3 | ASTM A380 | 5 – 40 | 50 – 80 | 7xd1 | 1xd1 | 0.015 | 0.040 | 0.050 | 0.080 | 0.100 | 0.120 |
| | | 3.2381 | GD-AlSi10Mg | UNS A03590 | | | | | | | | | | |
| | Copper | 2.004 | Cu-OF / CW008A | UNS C10100 | | | | | Recommended: CrazyDrill Flex Titanium 30 x d1 | | | | | |
| | | 2.0065 | Cu-ETP / CW004A | UNS C11000 | | | | | | | | | | |
| | Brass lead free | 2.0321 | CuZn37 CW508L | UNS C27400 | | | | | Recommended: CrazyDrill Flex SST-Inox 30 x d1 | | | | | |
| | | 2.036 | CuZn40 CW509L | UNS C28000 | | | | | | | | | | |
| | Brass, Bronze Rm < 400 N/mm² | 2.0401 | CuZn39Pb3 / CW614N | UNS C38500 | 5 – 40 | 60 – 100 | 7xd1 | 1xd1 | 0.010 | 0.030 | 0.040 | 0.060 | 0.080 | 0.100 |
| | | 2.102 | CuSn6 | UNS C51900 | | 40 – 60 | | | | | | | | |
| | Bronze Rm < 600 N/mm² | 2.0966 | CuAl10Ni5Fe4 | UNS C63000 | 5 – 20 | 20 – 40 | 2.5xd1 | 0.5xd1 | 0.004 | 0.006 | 0.010 | 0.015 | 0.025 | 0.040 |
| | | 2.096 | CuAl9Mn2 | UNS C63200 | | | | | | | | | | |
| $S_1$ | Super alloys | 2.4856 | | Inconel 625 | | | | | Recommended: CrazyDrill Flex SST-Inox 30 x d1 | | | | | |
| | | 2.4668 | | Inconel 718 | | | | | | | | | | |
| | | 2.4617 | NiMo28 | Hastelloy B-2 | | | | | | | | | | |
| | | 2.4665 | NiCr22Fe18Mo | Hastelloy X | | | | | | | | | | |
| $S_2$ | Titanium pure | 3.7035 | Gr.2 | ASTM B348 / F67 | | | | | Recommended: CrazyDrill Flex Titanium 30 x d1 | | | | | |
| | | 3.7065 | Gr.4 | ASTM B348 / F68 | | | | | | | | | | |
| | Titanium alloys | 3.7165 | TiAl6V4 | ASTM B348 / F136 | | | | | Recommended: CrazyDrill Flex Titanium 30 x d1 | | | | | |
| | | 9.9367 | TiAl6Nb7 | ASTM F1295 | | | | | | | | | | |
| $S_3$ | CrCo alloys | 2.4964 | CoCr20W15Ni | Haynes 25 | | | | | Recommended: CrazyDrill Flex SST-Inox 30 x d1 | | | | | |
| | | | CrCoMo28 | ASTM F1537 | | | | | | | | | | |
| $H_1$ | Hardened steel < 55 HRC | 1.2510 | 100MnCrMoW4 | AISI O1 | | | | | | | | | | |
| $H_2$ | Hardened steel ≥ 55 HRC | 1.2379 | X153CrMoV12 | AISI D2 | | | | | | | | | | |

CRAZYDRILL Flex

DRILLING TOOLS
CRAZYDRILL FLEX

# Drilling process CrazyDrill Flex

## PRECISE AND EFFICIENT DRILLING FROM Ø 0.1 MM

### Coolant type, pressure and filtration

**Coolant type:** For best results, Mikron Tool recommends the use of cutting oil as coolant fluid. Alternatively, emulsion of 8% or more with EP-Additives (Extreme-Pressure-Additives) can be used with good results as well.

**Filter:** The large cooling channels allow a standard filter. Filter quality ≤ 0.050 mm.

For tools with external cooling no specific parameters have to be considered concerning filter.

**Coolant pressure:** To ensure a reliable drilling process, the following minimal pressures are needed (see chart). Higher pressure is generally better for the cooling and flushing effect.

| **Revolution** | [giri/min] | ≤ 10'000 | > 10'000 |
|---|---|---|---|
| **Minimal pressure** | [bar] | 15 | 30 |

For tools with external cooling no specific parameters have to be considered concerning coolant pressure. But it must be ensured that the coolant is conducted directly to the drill tip, thus cooling and lubricating the drill perfectly and flushing away the chips.

### Tool holders

For detailed indications for tool holders see chapter "Technical information".

CRAZYDRILL Flex

DRILLING TOOLS
CRAZYDRILL FLEX

# Drilling process CrazyDrill Flex

## PRECISE AND EFFICIENT DRILLING FROM Ø 0.1 MM

**CrazyDrill Flex 20 x d, 30 x d, 50 x d**

Mikron Tool recommends pilot drilling for all types of CrazyDrill Flex:

**CrazyDrill Flex SST-Inox**

- **CrazyDrill Pilot SST-Inox** as pilot drill
- **CrazyDrill Crosspilot** as pilot drill on inclined surfaces

**CrazyDrill Flex Steel**

- **CrazyDrill Flexpilot Steel** as pilot drill
- **CrazyDrill Crosspilot** as pilot drill on inclined surfaces

**CrazyDrill Flex Titanium**

- **CrazyDrill Flexpilot Titanium** as pilot drill
- **CrazyDrill Crosspilot** as pilot drill on inclined surfaces

**Pilot drilling and drilling**

Pilot drilling with CrazyDrill Flexpilot / CrazyDrill Pilot SST-Inox is the perfect starting point for accurate drilling (position and alignment accuracy) and a stable machining process. This is also valid for the pilot drill CrazyDrill Crosspilot on inclined surfaces.

The quality of drilling (position and alignment accuracy, no measurable transition from pilot hole to follow-up hole) and a stable machining process are guaranteed by means of a predetermined tool.

## DRILLING PROCESS

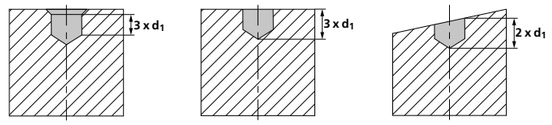
**Drilling as per DIN 66025 / PAL**

G83 deep-drilling cycle with chip break and chip removal (pecks)

Q = depth of the respective peck

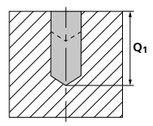
**1 | PILOT DRILLING**

- With CrazyDrill Pilot SST-Inox (straight surfaces) or CrazyDrill Crosspilot (inclined surfaces) for the version CrazyDrill Flex SST-Inox.
- With CrazyDrill Flexpilot Steel resp. Titanium (straight surfaces) or CrazyDrill Crosspilot (inclined surfaces) for the version CrazyDrill Flex Steel resp. Titanium.

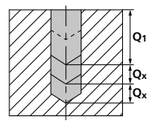



**2 | DRILLING**

- Drilling with CrazyDrill Flex SST-Inox / CrazyDrill Flex Steel / Titanium up to maximum drilling depth $Q_1$ in one step (see cutting data table),with subsequent chip removal.




- Further drilling steps $Q_X$ as per cutting data table, with subsequent chip removal.




Note:

Between the drilling steps, the drill may exit completely from the bore. Do not take the drill completely out from the bore in case of resonant vibration. After the drill reached desired cutting depth, return at increased feed rate (or in case of perfect conditions rapid traverse) to safety position.