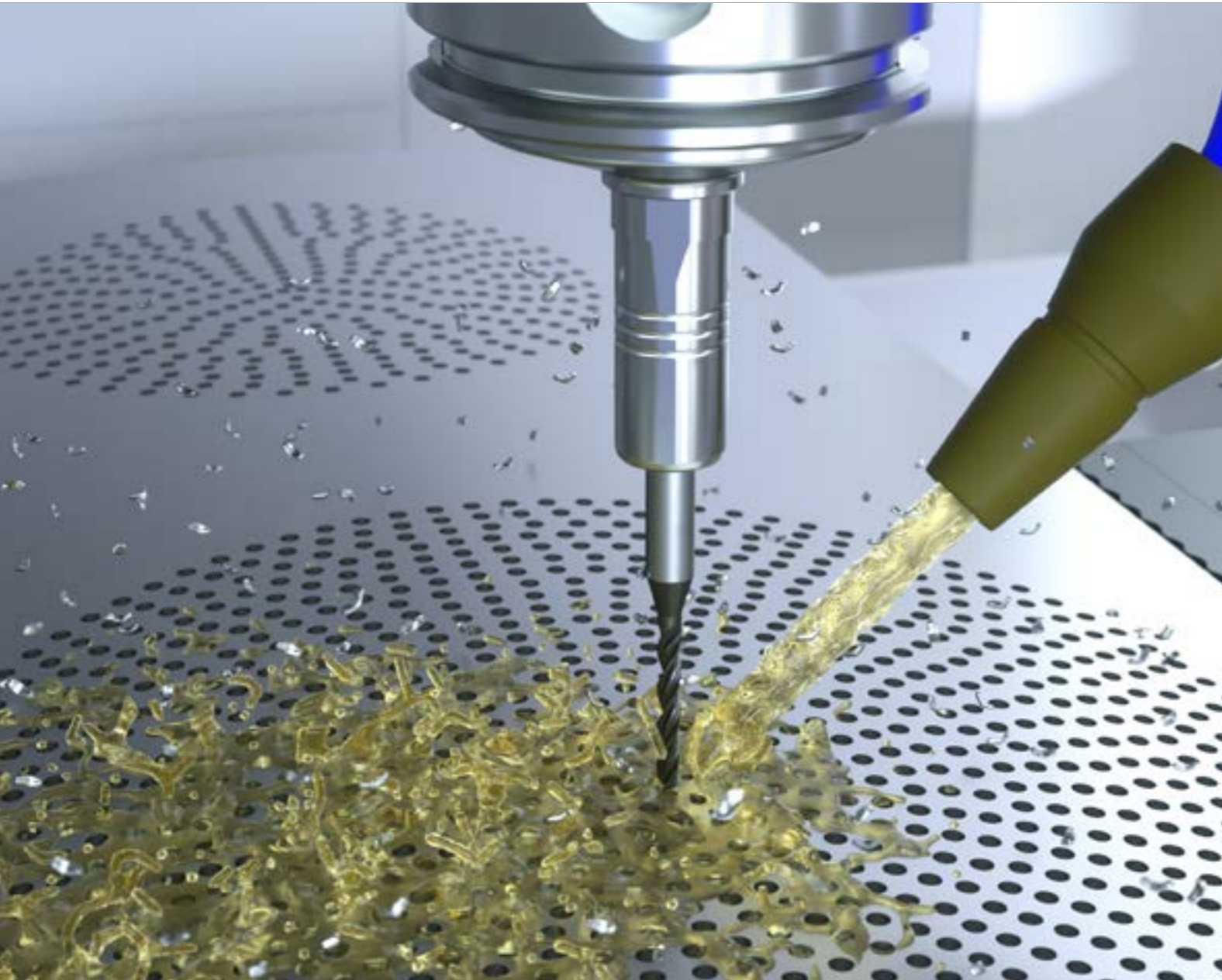


## CrazyDrill Alu

**CRAZYDRILL**  
Alu

**SPEED, PRECISION AND TOOL LIFE: THREE QUALITIES IN ONE DRILL**



Mikron Tool offers with CrazyDrill Alu a program of small coated drills capable of highest performance in all aluminum alloys. The application range covers hole diameters of 0.4 mm up to 3.0 mm and depth of cut up to 10 x d.

This solid carbide drill impresses mostly with its extraordinary high drilling speed and tool life. Due to the special coating, it affords a considerably longer tool life not only in pure aluminum but also in aluminum alloys with high silicon content.

With a three flutes and a reduced chisel geometry, self-centering upon tool entry is guaranteed. Spot or pilot drilling are not necessary. Highest hole straightness, roundness and surface quality are guaranteed.

## Highest degree of performance in Alu

5 x d

10 x d

### THREE FLUTES FOR PERFECT SELF-CENTERING

- External cooling
- Coated

- External cooling
- Coated

Mikron Tool offers with CrazyDrill Alu a program of small coated drills capable of highest performance in all aluminum alloys. The application range covers hole diameters of 0.4 mm up to 3.0 mm and depth of cut up to 10 x d.

- CrazyDrill Alu, depth of cut available in 5 x d and 10 x d.



#### 1 | SHAFT

The robust carbide shaft guarantees a high degree of concentric accuracy and reliability.

#### 2 | SOLID CARBIDE

The use of latest generation carbide grades allows highest machining speed and feed.

#### 3 | THREE FLUTES WITH REDUCED CHISEL GEOMETRY

Allows stable self-centering, spot drilling or pilot drilling are not necessary.

#### 4 | COATING

The DLC (diamond-like carbon) coating protects the tool from premature wear and guarantees a longer tool life.

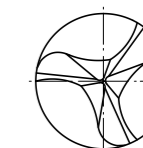
#### 5 | HELICAL FLUTE GEOMETRY

Provides optimal chip evacuation, only limited pecking is needed on drilling depths up to 10 x d.

#### 6 | TIP ANGLE OF 130°

Burr free drilling is assured by the 130° tip angle and sharp cutting edges. Highest drilling accuracy is guaranteed.

Drill tip



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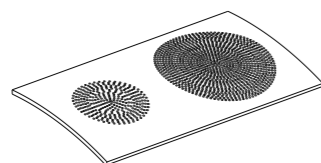
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## Benefits and applications



### REPEAT ACCURACY AND PRODUCTIVITY

- **SHORT MACHINING TIME** | due to highest cutting parameters
- **LONG TOOL LIFE** | due to the high performance DLC coating
- **HIGH DEGREE OF PROCESS RELIABILITY** | due to the high quality
- **HIGH DEGREE OF PRECISION** | due to small tolerances
- **LOW PRODUCTION COSTS** | no pilot drilling or centering needed



**COMPONENT**

Speaker cover

**MATERIAL**

AlMgSi 0.5 / 3.3206 / ASTM B221

**MACHINING**

- 2'000 holes
- d = 1.2 mm
- Drilling depth 5 mm

**DRILLING TOOL**

Mikron Tool - CrazyDrill Alu - 5 x d

DATA	MIKRON TOOL
Tool type	CrazyDrill Alu - Carbide - Coated - External cooling
Item number	2.CD.050120.A
Cutting data	$v_c = 150$ m/min $f = 0.07$ mm/rev $Q_1 = 5$ mm

APPLICATION DOMAINS	COMPONENTS EXAMPLES
Aerospace industry	Bracket to aircraft body
Mold making	Drilling of blind holes for various cast aluminum parts
Automotive industry	Component to gearbox
Mechanical engineering	Filter plate
Electronics / Electrics	Contact pin
Hydraulics / Pneumatics	Valve body

MATERIALS GROUPS	EXAMPLES		
	Mat. no.	DIN	AISI / ASTM / UNS
Group N Aluminium alloy wrought and cast	3.2315	AlMgSi 1	6351

## CrazyDrill Alu 10 x d

Carbide



Z3



Ød<sub>1</sub> 0.1 - 3.0 mm  
Tolerance + 0.004 mm  
0

### DRILLING WITH FLOOD COOLING



This small solid carbide drill specially developed for aluminum, is designed for cast and wrought aluminum alloys. Drilling depths up to 10 x d will not require any centering due to its three flutes and reduced chisel geometry. The tool is self-centering providing a straight hole, best roundness and excellent surface quality. Spot drilling or starter drilling is only recommended on irregular, rough or inclined surfaces. Most notably the drill impresses with its extraordinary high drilling parameters and long tool life. For details see "drilling process".

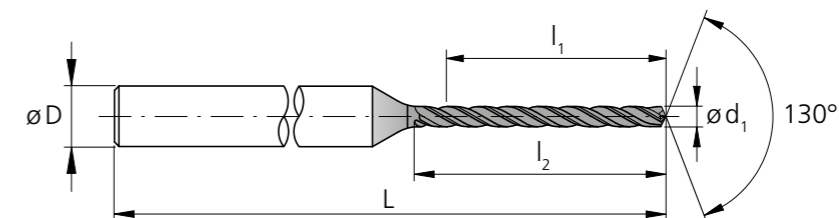
#### Coolant type, pressure and filtration

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

#### Please note

You couldn't find your suitable version of the CrazyDrill Alu (diameter, length, cutting direction...)?

Ask us about our customized versions!



d <sub>1</sub>	l <sub>1</sub>	l <sub>2</sub>	D (h6)	L	Item number	Availability
[mm]	[mm]	[mm]	[mm]	[mm]		
0.40	4.00	4.9	3	45.0	2.CD.100040.A	■
0.45	4.50	5.5	3	45.0	2.CD.100045.A	■
0.50	5.00	6.1	3	45.0	2.CD.100050.A	■
0.55	5.50	6.7	3	45.0	2.CD.100055.A	■
0.60	6.00	7.3	3	47.0	2.CD.100060.A	■
0.65	6.50	8.0	3	47.0	2.CD.100065.A	■
0.70	7.00	8.6	3	47.0	2.CD.100070.A	■
0.75	7.50	9.2	3	49.0	2.CD.100075.A	■
0.80	8.00	9.8	3	49.0	2.CD.100080.A	■
0.85	8.50	10.4	3	49.0	2.CD.100085.A	■
0.90	9.00	11.0	3	49.0	2.CD.100090.A	■
0.95	9.50	11.6	3	50.5	2.CD.100095.A	■
1.00	10.00	12.2	3	50.5	2.CD.100100.A	■
1.05	10.50	12.8	3	52.0	2.CD.100105.A	■
1.10	11.00	13.5	3	52.0	2.CD.100110.A	■
1.15	11.50	14.1	3	53.5	2.CD.100115.A	■
1.20	12.00	14.7	3	53.5	2.CD.100120.A	■
1.25	12.50	15.3	3	53.5	2.CD.100125.A	■
1.30	13.00	15.9	3	55.5	2.CD.100130.A	■
1.35	13.50	16.5	3	55.5	2.CD.100135.A	■
1.40	14.00	17.1	3	55.5	2.CD.100140.A	■
1.45	14.50	17.7	3	55.5	2.CD.100145.A	■
1.50	15.00	18.4	4	64.5	2.CD.100150.A	■
1.55	15.50	19.0	4	64.5	2.CD.100155.A	■
1.60	16.00	19.6	4	64.5	2.CD.100160.A	■
1.65	16.50	20.2	4	64.5	2.CD.100165.A	■
1.70	17.00	20.8	4	67.0	2.CD.100170.A	■

■ Stock item

d <sub>1</sub>	l <sub>1</sub>	l <sub>2</sub>	D (h6)	L	Item number	Availability
[mm]	[mm]	[mm]	[mm]	[mm]		
1.75	17.50	21.4	4	67.0	2.CD.100175.A	■
1.80	18.00	22.0	4	67.0	2.CD.100180.A	■
1.85	18.50	22.6	4	68.5	2.CD.100185.A	■
1.90	19.00	23.2	4	68.5	2.CD.100190.A	■
1.95	19.50	23.9	4	68.5	2.CD.100195.A	■
2.00	20.00	24.5	4	70.0	2.CD.100200.A	■
2.05	20.50	25.1	4	70.0	2.CD.100205.A	■
2.10	21.00	25.7	4	70.0	2.CD.100210.A	■
2.15	21.50	26.3	4	72.0	2.CD.100215.A	■
2.20	22.00	26.9	4	72.0	2.CD.100220.A	■
2.25	22.50	27.5	4	72.0	2.CD.100225.A	■
2.30	23.00	28.1	4	73.5	2.CD.100230.A	■
2.35	23.50	28.7	4	73.5	2.CD.100235.A	■
2.40	24.00	29.4	4	73.5	2.CD.100240.A	■
2.45	24.50	30.0	4	75.0	2.CD.100245.A	■
2.50	25.00	30.6	4	75.0	2.CD.100250.A	■
2.55	25.50	31.2	4	75.0	2.CD.100255.A	■
2.60	26.00	31.8	4	76.5	2.CD.100260.A	■
2.65	26.50	32.4	4	76.5	2.CD.100265.A	■
2.70	27.00	33.0	4	76.5	2.CD.100270.A	■
2.75	27.50	33.6	4	78.0	2.CD.100275.A	■
2.80	28.00	34.3	4	78.0	2.CD.100280.A	■
2.85	28.50	34.9	4	78.0	2.CD.100285.A	■
2.90	29.00	35.5	4	80.0	2.CD.100290.A	■
2.95	29.50	36.1	4	80.0	2.CD.100295.A	■
3.00	30.00	36.7	4	80.0	2.CD.100300.A	■

#### Complementary products

CrazyDrill Twicenter	p.85
CrazyDrill Pilot	p.161
CrazyDrill Crosspilot	p.175

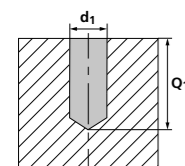
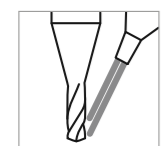
**Regrinding:** This product can be reground starting from Ø 1.4 mm.

# CrazyDrill Alu 10 x d

RECOMMENDATION FOR USE  
● Excellent | ● Good | ○ Acceptable | ☒ Not recommended

P	N	S <sub>3</sub>
M	S <sub>1</sub>	H <sub>1</sub>
K	S <sub>2</sub>	H <sub>2</sub>

## DRILLING WITH EXTERNAL COOLING | CUTTING DATA OVERVIEW



Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	v <sub>c</sub> [m/min]	Q <sub>1</sub>	Q <sub>2</sub>	f [mm/rev]							
								Ød1							
								0.5 mm f	1.0 mm f	1.5 mm f	2.0 mm f	2.5 mm f	3.0 mm f		
P	Unalloyed carbon steel Rm < 800 N/mm <sup>2</sup>	1.0301	C10	AISI 1010											
		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/mm <sup>2</sup>	1.5752	15NiCr13	ASTM 3415 / AISI 3310											
		1.7131	16MnCr5	AISI 5115											
		1.3505	100Cr6	AISI 52100											
		1.7225	42CrMo4	AISI 4140											
		1.2842	90MnCrV8	AISI O2											
		1.2379	X153CrMoV12	AISI D2											
	High alloyed tool steel Rm < 1200 N/mm <sup>2</sup>	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									
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												
K	Cast iron	0.6020	GG20	ASTM 30											
		0.6030	GG30	ASTM 40B											
		0.7040	GGG40	ASTM 60-40-18											
		0.7060	GGG60	ASTM 80-60-03											
N	Aluminium alloy wrought	3.2315	AlMgSi1	ASTM 6351	300	5xd1	1xd1		0.03	0.04	0.10	0.20	0.25	0.30	
		3.4365	AlZnMgCu1.5	ASTM 7075											
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380	200	5xd1	1xd1		0.07	0.10	0.15	0.25	0.30	0.40	
		3.2381	GD-AlSi10Mg	UNS A03590											
	Copper	2.004	Cu-OF / CW008A	UNS C10100											
		2.0065	Cu-ETP / CW004A	UNS C11000											
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400											
		2.036	CuZn40 CW509L	UNS C28000											
	Brass, Bronze Rm < 400 N/mm <sup>2</sup>	2.0401	CuZn39Pb3 / CW614N	UNS C38500											
		2.102	CuSn6	UNS C51900											
Bronze Rm < 600 N/mm <sup>2</sup>	2.0966	CuAl10Ni5Fe4	UNS C63000												
	2.096	CuAl9Mn2	UNS C63200												
S <sub>1</sub>	Super alloys	2.4856		Inconel 625											
		2.4668		Inconel 718											
		2.4617	NiMo28	Hastelloy B-2											
		2.4665	NiCr22Fe18Mo	Hastelloy X											
S <sub>2</sub>	Titanium pure	3.7035	Gr.2	ASTM B348 / F67											
		3.7065	Gr.4	ASTM B348 / F68											
S <sub>3</sub>	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136											
		9.9367	TiAl6Nb7	ASTM F1295											
H <sub>1</sub>	Hardened steel < 55 HRC	2.4964	CoCr20W15Ni	Haynes 25											
			CrCoMo28	ASTM F1537											
H <sub>2</sub>	Hardened steel ≥ 55 HRC	1.2510	100MnCrMoW4	AISI O1											
		1.2379	X153CrMoV12	AISI D2											

## Drilling process CrazyDrill Alu

### ACCURATE AND QUICK DRILLING UP TO 10 X D

#### Coolant type, pressure and filtration

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

It is necessary that the coolant is well directed to the drill tip, thus cooling and lubricating the drill perfectly and flushing chips.

Flood coolant requires no specific parameters regarding filtration and coolant pressure.

#### Tool holders

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

#### CrazyDrill Alu up to 5 x d / 10 x d

Due to the excellent self-centering of CrazyDrill Alu, spot drilling or pilot drilling is not necessary on even and flat surfaces up to a maximum drilling depth of 10 x d.

#### Centering, pilot drilling and drilling

Mikron Tool requirements for rough or inclined surfaces:

- **CrazyDrill Twicenter** for centering
- **CrazyDrill Pilot** for pilot drilling
- **CrazyDrill Crosspilot** for pilot drilling on inclined surfaces

Centering with CrazyDrill Twicenter or pilot drilling with CrazyDrill Pilot is the perfect start for accurate drilling (position and alignment accuracy) and a consistent machining process. This is also valid for CrazyDrill Crosspilot on inclined surfaces.

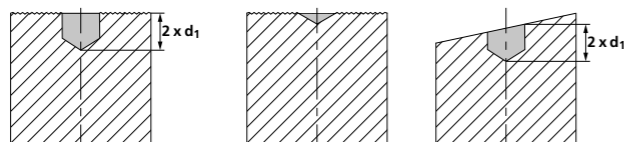
The quality of drilling (position and alignment accuracy, no measurable transition from pilot hole to the following drilling steps) and a stable machining process is guaranteed by carefully determined tool tolerances.

## Drilling process CrazyDrill Alu

### ONE STEP DRILLING UP TO 5 X D

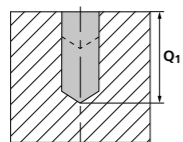
#### 1 | PILOT DRILLING

- With CrazyDrill Pilot or CrazyDrill Twicenter (irregular surfaces) or CrazyDrill Crosspilot (inclined surfaces).



#### 2 | DRILLING

- With CrazyDrill Alu at recommended cutting speed and feed rate in one step.



Note:

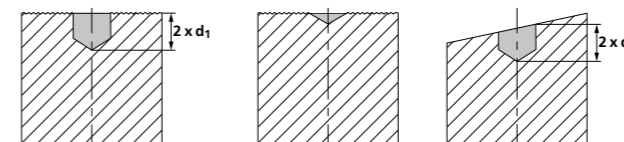
After the drill reached desired cutting depth, return at increased feed rate (or in case of perfect conditions rapid traverse) to safety position.

### DRILLING UP TO 10 X D AS PER DIN 66025 / PAL

G83 deep-drilling cycle with chip break and chip removal (pecks)  
Q = depth of the respective peck

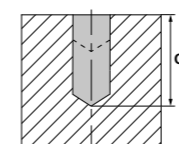
#### 1 | PILOT DRILLING

- With CrazyDrill Pilot or CrazyDrill Twicenter (irregular surfaces) or CrazyDrill Crosspilot (inclined surfaces).

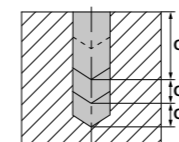


#### 2 | DRILLING

- First step  $Q_1$  with CrazyDrill Alu to maximum drilling depth  $Q_1$  in one step, followed by peck to remove chips.



- Additional pecks  $Q_x$  as per cutting data chart, afterwards followed by peck to remove chips.



Note:

Drill can be retracted completely from the hole between pecks. However if vibrations occur, we recommend that the drill is not retracted completely from the hole.

After the drill reached desired cutting depth, return at increased feed rate (or in case of perfect conditions rapid traverse) to safety position.