MIKRON TOOL

crazy about drilling titanium

CRAZYDRILL COOL TITANIUM

English

FOR EACH TITANIUM ITS DRILL!

Drilling titanium is highly demanding. One of the reasons is the combination of its high elasticity and tensile strength. Because of its high toughness, chip breaking is difficult to realize and due to the low thermal conductivity of titanium, heat diffuses directly into the tool. In addition, titanium tends to form built-up edges. This all leads to higher wear, low surface quality and insufficient process reliability.

In addition, not all titanium is the same. Depending on the pure or alloyed titanium, very different machining behavior results. Mikron Tool responds to this with two new product developments:

- **CrazyDrillCool Titanium PTC for pure titanium**
- **CrazyDrillCool Titanium ATC for titanium alloys**

These drills, which are perfectly matched to the respective titanium grades, achieve maximum drilling performance combined with high process reliability. It is now even possible to drill titanium alloys up to 10xd in a single step without multiple pecking for chip removal.

INDEX

NEW Product overview

Geometry ATC
Titanium alloys
Ti Gr.5 / Ti Gr.5 ELI / Ti Gr.Nb

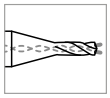
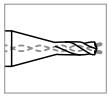
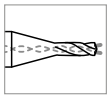
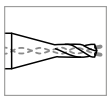
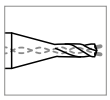
CRAZYDRILL™ Coolpilot Titanium ATC

CRAZYDRILL™ Cool Titanium ATC

Geometry PTC
Pure titanium
Ti Gr.2 - Ti Gr.4

CRAZYDRILL™ Cool Titanium PTC

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

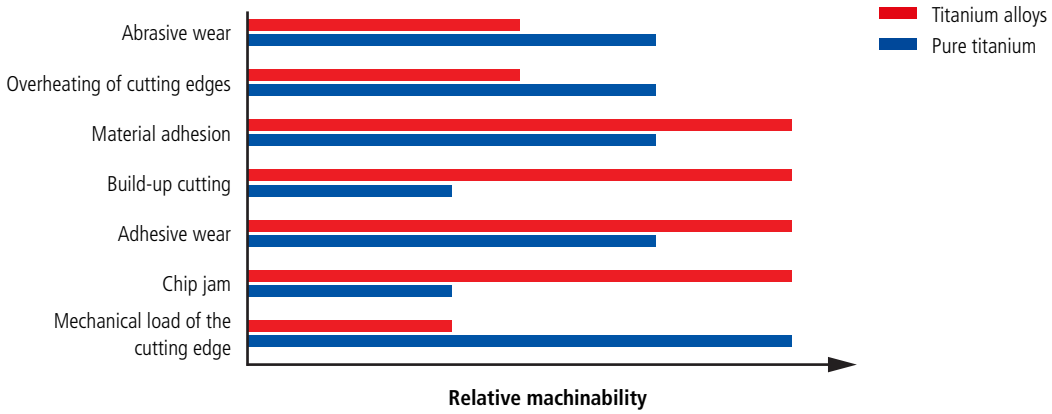
	ø - range [inch] | [mm]	Max. depth	Cooling	S_2 Pure titanium Ti Gr.2 - Ti Gr.4	S_2 Titanium alloys Ti Gr.5 / Ti Gr.5 ELI / Ti Gr.Nb	Item table page
	.039" – 1/4" 1.0 – 6.35 mm	3 x d +90° countersink		⊠	●	**14**
	.039" – 1/4" 1.0 – 6.35 mm	6 x d		⊠	●	**16**
	.039" – 1/4" 1.0 – 6.35 mm	10 x d		⊠	●	**18**
	.039" – 1/4" 1.0 – 6.35 mm	3 x d		●	⊠	**20**
	.039" – 1/4" 1.0 – 6.35 mm	6 x d		●	⊠	**22**

NEW CrazyDrill Cool Titanium

THE NEW HIGH-PERFORMANCE DRILLS FOR TITANIUM

1. Challenge

Different properties of pure titanium and titanium alloys

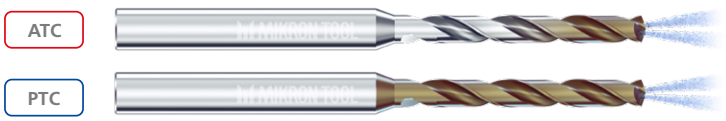


The material properties of pure and alloyed titanium differ significantly, which is of utmost importance for their industrial machining. Especially for drilling, the demands on the tools in terms of machinability are very high.

Solution

Material-specific cutting edge geometries

Mikron Tool's solution for drilling the different types of titanium consists of two material-specific cutting edge geometries. This is the only way to achieve controlled chip evacuation, high drilling speeds and repeatable processes with excellent hole quality can be achieved.



Geometry ATC S2
Titanium alloys
Ti Gr.5 / Ti Gr.5 ELI / Ti Gr.Nb

Geometry PTC S2
Pure Titan
Ti Gr.2 - Ti Gr.4

NEW

2. Challenge

High temperature load and chip jam

When drilling titanium, the high temperature load on the cutting is a challenge. This can lead to micro-chipping and ultimately to cutting edge chipping.
In addition, titanium chips tend to compact in the head area and prevent further chips from flowing out. The result is uncontrolled drill breakage.

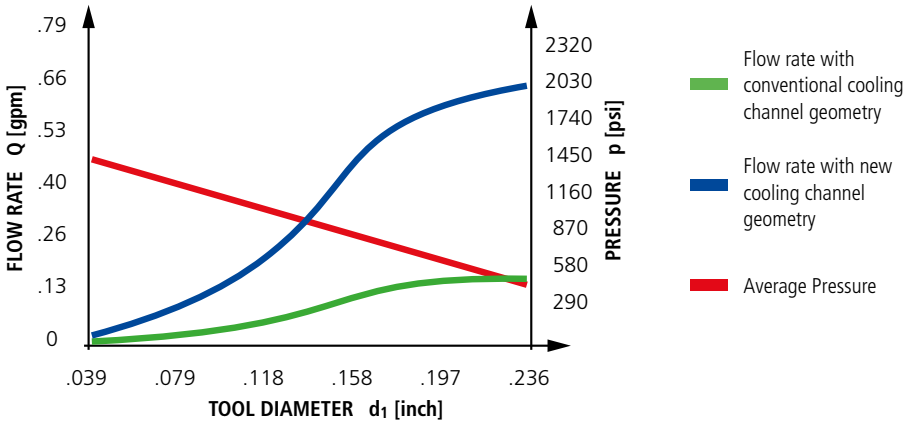
Material	Thermal conductivity
Aluminum	1158 BTU / (h·ft·°F) | 167 W/mK
Stainless steel	146 BTU / (h·ft·°F) | 21 W/mK
Titanium alloy	**49 BTU / (h·ft·°F) | 7 W/mK**

Solution

Innovative cooling concept

Conventional

New



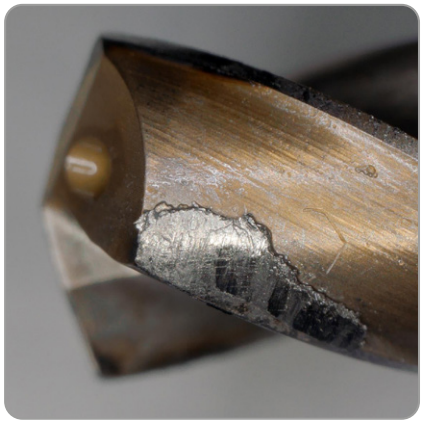
Two specially designed cooling channels with a very large cross-section guide massive amounts of cooling lubricant to the drill tip to prevent excessive temperature loads on the cutting edges. The patented special shape of the cooling channels enables up to 4 times higher coolant quantity (compared to conventional cooling channels) at the same pressure.
At the same time, the massive coolant jet flushes the chips through the flutes and prevents any form of chip jam.

NEW CrazyDrill Cool Titanium

THE NEW HIGH-PERFORMANCE DRILLS FOR TITANIUM

3. Challenge

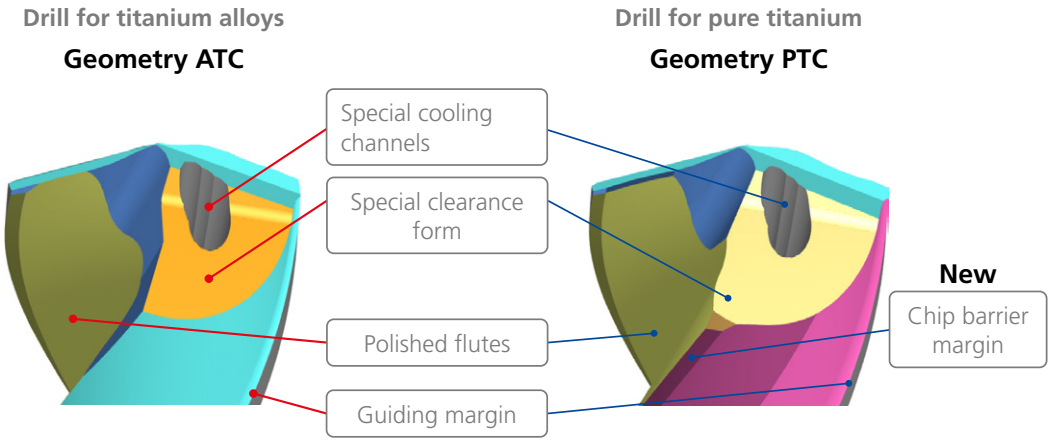
Material adhesion



Material adhesions on guiding margin and the secondary margin have a negative effect on the hole quality.

Solution

Guiding margin and the newly designed chip barrier margin

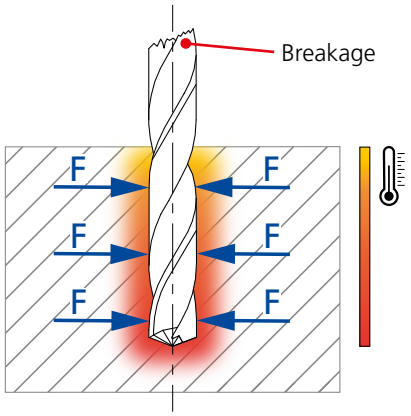


The particularly smooth surfaces of the guiding margin and the newly designed chip barrier margin on the PTC drill prevent material sticking and reduce the load on the tool.

NEW

4. Challenge

Tool jamming with increasing drilling depth



As the drilling depth increases, the extreme viscoplasticity of the titanium leads to jamming of the tool. The consequence is tool breakage.

Solution

Special cutting edge geometry with optimum cutting ability and stability

Cutting edge geometry	Cutting ability	Cutting edge stability
Scharp	●	●
Rounded	●	●
CrazyDrill Cool Titanium	●	●

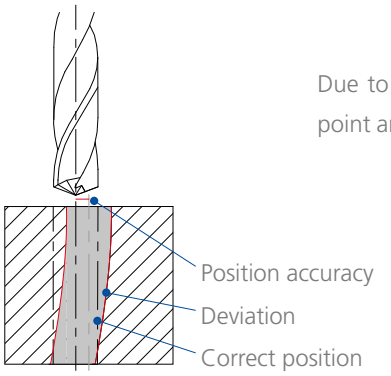
The solution is sharply ground cutting edges that must be stable at the same time - a contradiction in terms. For the titanium drills, a unique specific cutting edge geometry was developed that masters this balancing act. As a result, cutting pressures and temperature are significantly reduced.

NEW CrazyDrill Cool Titanium

THE NEW HIGH-PERFORMANCE DRILLS FOR TITANIUM

5. Challenge

Position accuracy



Due to the viscoplastic material properties of titanium, a precise entry point and constant tool guidance during drilling cannot be guaranteed.

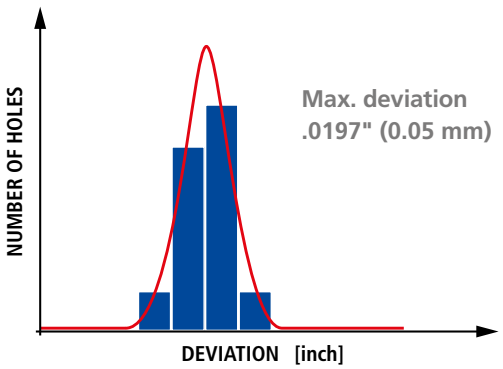
Solution

Specific pilot drill

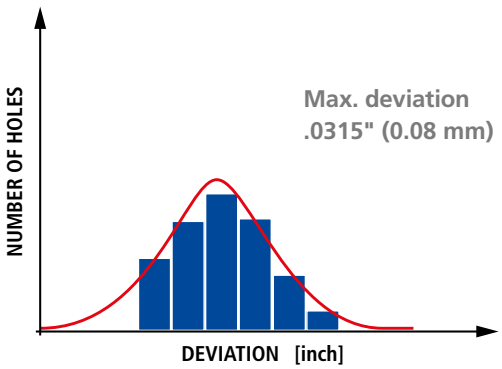
To achieve high position accuracy, the new pilot drill (with 90° chamfer) CrazyDrill Coolpilot Titanium ATC can be used.

Position accuracy

With pilot drill



Without pilot drill



Material: Ti Gr.5 / 3.7165 / ASTM F136; **Diameter:** 4 mm; **Drilling depth:** 10 x d; **Drill step:** 1;
Coolant: Emulsion 8%; **Cutting data:** vc = 197 SFM (60 m/min); f = .0031 IPR (0.08 mm/rev)

Maximum performance guaranteed

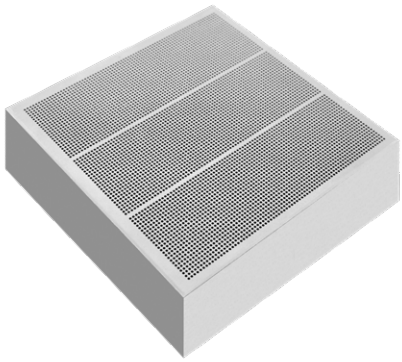
NEW

EXAMPLE IN TITANIUM MACHINING IN COMPARISON

■ Example

Longer tool life

Machining: Drilling in one shot
Drilling depth: 10 mm;
Coolant: Emulsion 8%



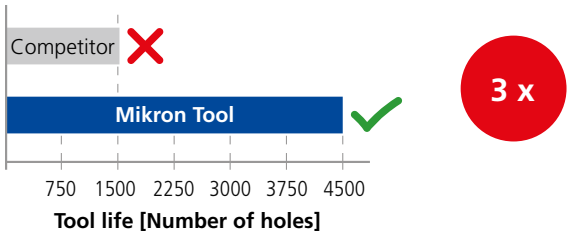
Titanium alloy: Ti Gr.5 / 3.7165 / TiAl6V4 / ASTM B348 S2

Tool: CrazyDrill Cool Titanium ATC
Diameter: 1.0 mm

Cutting data:

Conventional titanium drill		CrazyDrill Cool Titanium	
v_c = 197 SFM 60 m/min	f = .0008 IPR 0.020 mm/rev	v_c = 197 SFM 60 m/min	f = .0008 IPR 0.020 mm/rev

Results:

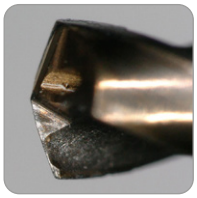


Competitor

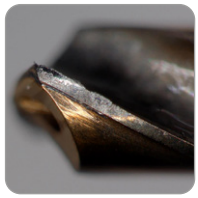
Breakage

Mikron Tool

Frontal view



Flute view



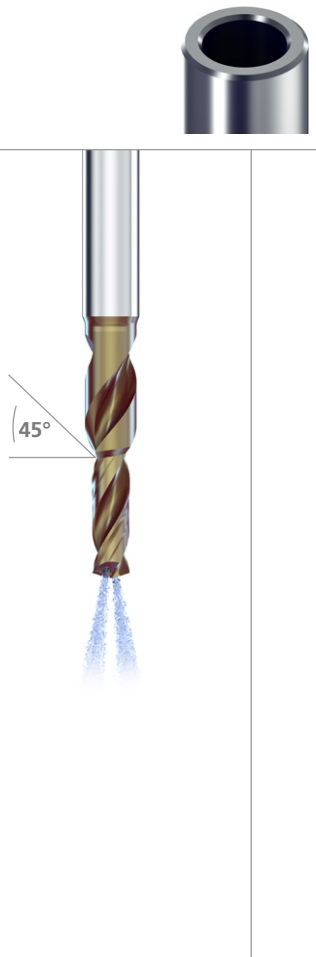
Guiding margin view

NEW

Geometry ATC

CRAZYDRILL™ by Mikron Tool Coolpilot Titanium ATC

3 x d



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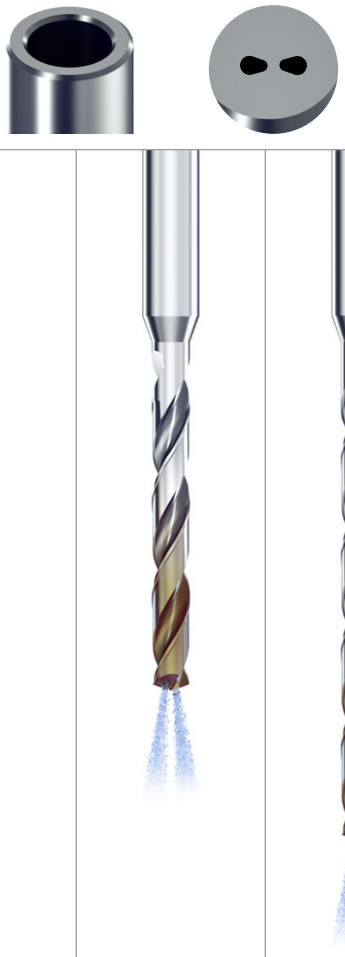
CRAZYDRILL™ by Mikron Tool Cool Titanium ATC

6 x d



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10 x d

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Geometry PTC

CRAZYDRILL™ by Mikron Tool Cool Titanium PTC

3 x d

page 20

6 x d

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Regrinding: This product can be reground starting from Ø .055" (1.4 mm).

Your benefits

The most important features

- Two specific geometries: PTC for pure titanium and ATC for titanium alloys
- Innovative flute and tip geometry
- New: with chip barrier margin for PTC drill
- Specially designed cooling concept

Your advantages

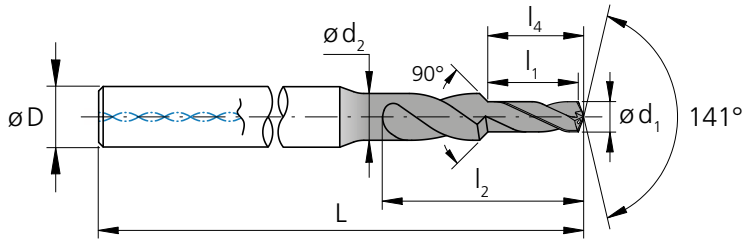
- Perfect performance for any titanium grade
- Low cutting pressure
- Avoidance of chip jam
- Excellent heat dissipation

Your benefits

- Maximum drilling speed (e.g. 10 x d in one shot drilling with ATC)
- Excellent drilling quality
- Process reliability up to 10 x d in one shot drilling
- Up to 3 times longer tool life

CrazyDrill Coolpilot Titanium ATC - 3 x d

DRILLING WITH INTERNAL COOLING



d1 [inch]	d1 [inch]	d1 [mm]	l1 [inch]	l1 [mm]	l2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.039	1.00	.118	3.0	6.5	4	1.97	50	2.PD.01000.ATC	□
	.041	1.05	.124	3.2	6.8	4	1.97	50	2.PD.01050.ATC	□
	.043	1.10	.130	3.3	7.1	4	1.97	50	2.PD.01100.ATC	□
	.045	1.15	.136	3.5	7.4	4	1.97	50	2.PD.01150.ATC	□
	.047	1.20	.142	3.6	7.8	4	1.97	50	2.PD.01200.ATC	□
	.049	1.25	.148	3.8	8.1	4	1.97	50	2.PD.01250.ATC	□
	.051	1.30	.154	3.9	8.4	4	1.97	50	2.PD.01300.ATC	□
	.053	1.35	.159	4.1	8.7	4	1.97	50	2.PD.01350.ATC	□
	.055	1.40	.165	4.2	9.1	4	1.97	50	2.PD.01400.ATC	□
	.057	1.45	.171	4.4	10.4	4	1.97	50	2.PD.01450.ATC	□
	.059	1.50	.177	4.5	10.7	4	1.97	50	2.PD.01500.ATC	□
	.061	1.55	.183	4.7	10.9	4	1.97	50	2.PD.01550.ATC	□
1/16	.0625	1.587	.189	4.8	11.2	4	1.97	50	2.PD.F116.ATC	□
	.063	1.60	.189	4.8	11.2	4	1.97	50	2.PD.01600.ATC	□
	.065	1.65	.195	5.0	11.5	4	1.97	50	2.PD.01650.ATC	□
	.067	1.70	.201	5.1	11.8	4	2.09	53	2.PD.01700.ATC	□
	.069	1.75	.207	5.3	12.0	4	2.09	53	2.PD.01750.ATC	□
	.071	1.80	.213	5.4	12.3	4	2.09	53	2.PD.01800.ATC	□
	.073	1.85	.219	5.6	12.5	4	2.09	53	2.PD.01850.ATC	□
	.075	1.90	.224	5.7	12.8	4	2.09	53	2.PD.01900.ATC	□
	.077	1.95	.230	5.9	13.0	4	2.09	53	2.PD.01950.ATC	□
	.079	2.00	.236	6.0	13.3	4	2.17	55	2.PD.02000.ATC	□

d1 [inch]	d1 [inch]	d1 [mm]	l1 [inch]	l1 [mm]	l2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.081	2.05	.242	6.2	13.6	4	2.17	55	2.PD.02050.ATC	□
	.083	2.10	.248	6.3	13.8	4	2.17	55	2.PD.02100.ATC	□
	.085	2.15	.254	6.5	14.1	4	2.17	55	2.PD.02150.ATC	□
	.087	2.20	.260	6.6	14.4	4	2.17	55	2.PD.02200.ATC	□
	.089	2.25	.266	6.8	14.6	4	2.17	55	2.PD.02250.ATC	□
	.091	2.30	.272	6.9	14.9	4	2.24	57	2.PD.02300.ATC	□
	.093	2.35	.278	7.1	15.2	4	2.24	57	2.PD.02350.ATC	□
3/32	.0937	2.381	.283	7.2	15.5	4	2.24	57	2.PD.F332.ATC	□
	.094	2.40	.283	7.2	15.5	4	2.24	57	2.PD.02400.ATC	□
	.096	2.45	.289	7.4	15.9	4	2.24	57	2.PD.02450.ATC	□
	.098	2.50	.295	7.5	16.2	4	2.24	57	2.PD.02500.ATC	□
	.100	2.55	.301	7.7	16.5	4	2.24	57	2.PD.02550.ATC	□
	.102	2.60	.307	7.8	16.8	4	2.24	57	2.PD.02600.ATC	□
	.104	2.65	.313	8.0	17.2	4	2.24	57	2.PD.02650.ATC	□
	.106	2.70	.319	8.1	17.5	4	2.24	57	2.PD.02700.ATC	□
	.108	2.75	.325	8.3	17.8	4	2.24	57	2.PD.02750.ATC	□
	.110	2.80	.331	8.4	18.1	4	2.24	57	2.PD.02800.ATC	□
	.112	2.85	.337	8.6	18.5	4	2.24	57	2.PD.02850.ATC	□
	.114	2.90	.343	8.7	18.8	4	2.24	57	2.PD.02900.ATC	□
	.116	2.95	.348	8.9	19.1	4	2.24	57	2.PD.02950.ATC	□
	.118	3.00	.354	9.0	19.4	6	2.56	65	2.PD.03000.ATC	□
	.120	3.05	.360	9.2	19.7	6	2.56	65	2.PD.03050.ATC	□

□ Available from Q2 - 2023

Carbide | 3xd1 | 90° | 141° | Z2 | eXedur SNP

Ø d_1	.004" - .118" (0.1 - 3.0 mm)		.122" - .236" (3.1 - 6.0 mm)		.240" - .394" (6.1 - 10.0 mm)	
Tolerance	+ .00031" + .00008"	+ 0.008 mm + 0.002 mm	+ .00047" + .00016"	+ 0.012 mm + 0.004 mm	+ .00059" + .00024"	+ 0.015 mm + 0.006 mm

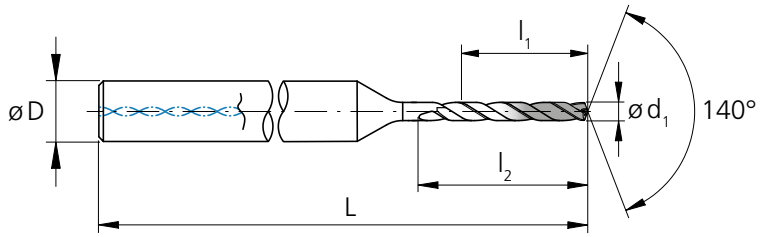
d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.122	3.10	.366	9.3	20.1	6	2.56	65	2.PD.03100.ATC	□
	.124	3.15	.372	9.5	20.4	6	2.56	65	2.PD.03150.ATC	□
1/8	.1250	3.175	.378	9.6	20.7	6	2.56	65	2.PD.F18.ATC	□
	.126	3.20	.378	9.6	20.7	6	2.56	65	2.PD.03200.ATC	□
	.128	3.25	.384	9.8	21.0	6	2.56	65	2.PD.03250.ATC	□
	.130	3.30	.390	9.9	21.4	6	2.56	65	2.PD.03300.ATC	□
	.132	3.35	.396	10.1	21.7	6	2.56	65	2.PD.03350.ATC	□
	.134	3.40	.402	10.2	22.0	6	2.56	65	2.PD.03400.ATC	□
	.136	3.45	.407	10.4	22.3	6	2.56	65	2.PD.03450.ATC	□
	.138	3.50	.413	10.5	22.7	6	2.68	68	2.PD.03500.ATC	□
	.140	3.55	.419	10.7	23.0	6	2.68	68	2.PD.03550.ATC	□
	.142	3.60	.425	10.8	23.3	6	2.68	68	2.PD.03600.ATC	□
	.144	3.65	.431	11.0	23.6	6	2.68	68	2.PD.03650.ATC	□
	.146	3.70	.437	11.1	24.0	6	2.68	68	2.PD.03700.ATC	□
	.148	3.75	.443	11.3	24.3	6	2.68	68	2.PD.03750.ATC	□
	.150	3.80	.449	11.4	24.6	6	2.68	68	2.PD.03800.ATC	□
	.152	3.85	.455	11.6	24.9	6	2.68	68	2.PD.03850.ATC	□
	.154	3.90	.461	11.7	25.3	6	2.68	68	2.PD.03900.ATC	□
	.156	3.95	.467	11.9	25.6	6	2.68	68	2.PD.03950.ATC	□
5/32	.1562	3.968	.472	12.0	25.9	6	2.68	68	2.PD.F532.ATC	□
	.157	4.00	.472	12.0	25.9	6	2.68	68	2.PD.04000.ATC	□
	.161	4.10	.484	12.3	26.5	6	2.83	72	2.PD.04100.ATC	□

d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.165	4.20	.496	12.6	27.2	6	2.83	72	2.PD.04200.ATC	□
	.169	4.30	.508	12.9	27.8	6	2.83	72	2.PD.04300.ATC	□
	.173	4.40	.520	13.2	28.5	6	2.83	72	2.PD.04400.ATC	□
	.177	4.50	.531	13.5	29.1	6	2.83	72	2.PD.04500.ATC	□
	.181	4.60	.543	13.8	29.8	6	2.83	72	2.PD.04600.ATC	□
	.185	4.70	.555	14.1	30.4	6	2.95	75	2.PD.04700.ATC	□
3/16	.1875	4.762	.567	14.4	31.1	6	2.95	75	2.PD.F316.ATC	□
	.189	4.80	.567	14.4	31.1	6	2.95	75	2.PD.04800.ATC	□
	.193	4.90	.579	14.7	31.7	6	2.95	75	2.PD.04900.ATC	□
	.197	5.00	.591	15.0	32.4	6	2.95	75	2.PD.05000.ATC	□
	.201	5.10	.602	15.3	33.0	6	2.95	75	2.PD.05100.ATC	□
	.205	5.20	.614	15.6	33.7	6	2.95	75	2.PD.05200.ATC	□
	.209	5.30	.626	15.9	34.3	6	2.95	75	2.PD.05300.ATC	□
	.213	5.40	.638	16.2	35.0	6	3.15	80	2.PD.05400.ATC	□
	.217	5.50	.650	16.5	35.6	6	3.15	80	2.PD.05500.ATC	□
7/32	.2189	5.560	.661	16.8	36.3	6	3.15	80	2.PD.F732.ATC	□
	.220	5.60	.661	16.8	36.3	6	3.15	80	2.PD.05600.ATC	□
	.224	5.70	.673	17.1	36.9	6	3.15	80	2.PD.05700.ATC	□
	.228	5.80	.685	17.4	37.5	6	3.15	80	2.PD.05800.ATC	□
	.232	5.90	.697	17.7	38.2	6	3.15	80	2.PD.05900.ATC	□
	.236	6.00	.709	18.0	38.8	6	3.15	80	2.PD.06000.ATC	□
1/4	.2500	6.350	.750	19.1	41.1	8	3.54	90	2.PD.F14.ATC	□

□ Available from Q2 - 2023

CrazyDrill Cool Titanium ATC - 6 x d

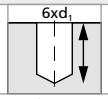
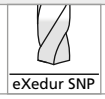
DRILLING WITH INTERNAL COOLING



d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.039	1.00	**.236**	6.0	9.0	4	**2.17**	55	2.CD.060100.ATC	■
	.041	1.05	**.248**	6.3	9.5	4	**2.17**	55	2.CD.060105.ATC	■
	.043	1.10	**.260**	6.6	9.9	4	**2.17**	55	2.CD.060110.ATC	■
	.045	1.15	**.272**	6.9	10.4	4	**2.17**	55	2.CD.060115.ATC	■
	.047	1.20	**.283**	7.2	10.8	4	**2.24**	57	2.CD.060120.ATC	■
	.049	1.25	**.295**	7.5	11.3	4	**2.24**	57	2.CD.060125.ATC	■
	.051	1.30	**.307**	7.8	11.7	4	**2.24**	57	2.CD.060130.ATC	■
	.053	1.35	**.319**	8.1	12.2	4	**2.24**	57	2.CD.060135.ATC	■
	.055	1.40	**.331**	8.4	12.6	4	**2.24**	57	2.CD.060140.ATC	■
	.057	1.45	**.343**	8.7	13.1	4	**2.28**	58	2.CD.060145.ATC	■
	.059	1.50	**.354**	9.0	13.5	4	**2.28**	58	2.CD.060150.ATC	■
	.061	1.55	**.366**	9.3	14.0	4	**2.28**	58	2.CD.060155.ATC	■
1/16	**.0625**	1.587	**.378**	9.6	14.4	4	**2.28**	58	2.CD.060F116.ATC	■
	.063	1.60	**.378**	9.6	14.4	4	**2.28**	58	2.CD.060160.ATC	■
	.065	1.65	**.390**	9.9	14.9	4	**2.28**	58	2.CD.060165.ATC	■
	.067	1.70	**.402**	10.2	15.3	4	**2.36**	60	2.CD.060170.ATC	■
	.069	1.75	**.413**	10.5	15.8	4	**2.36**	60	2.CD.060175.ATC	■
	.071	1.80	**.425**	10.8	16.2	4	**2.36**	60	2.CD.060180.ATC	■
	.073	1.85	**.437**	11.1	16.7	4	**2.36**	60	2.CD.060185.ATC	■
	.075	1.90	**.449**	11.4	17.1	4	**2.36**	60	2.CD.060190.ATC	■
	.077	1.95	**.461**	11.7	17.6	4	**2.36**	60	2.CD.060195.ATC	■
	.079	2.00	**.472**	12.0	18.0	4	**2.48**	63	2.CD.060200.ATC	■

d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.081	2.05	**.484**	12.3	18.5	4	**2.48**	63	2.CD.060205.ATC	■
	.083	2.10	**.496**	12.6	18.9	4	**2.48**	63	2.CD.060210.ATC	■
	.085	2.15	**.508**	12.9	19.4	4	**2.48**	63	2.CD.060215.ATC	■
	.087	2.20	**.520**	13.2	19.8	4	**2.48**	63	2.CD.060220.ATC	■
	.089	2.25	**.531**	13.5	20.3	4	**2.48**	63	2.CD.060225.ATC	■
	.091	2.30	**.543**	13.8	20.7	4	**2.56**	65	2.CD.060230.ATC	■
	.093	2.35	**.555**	14.1	21.2	4	**2.56**	65	2.CD.060235.ATC	■
3/32	**.0937**	2.381	**.567**	14.4	21.6	4	**2.56**	65	2.CD.060F332.ATC	■
	.094	2.40	**.567**	14.4	21.6	4	**2.56**	65	2.CD.060240.ATC	■
	.096	2.45	**.579**	14.7	22.1	4	**2.56**	65	2.CD.060245.ATC	■
	.098	2.50	**.591**	15.0	22.5	4	**2.56**	65	2.CD.060250.ATC	■
	.100	2.55	**.602**	15.3	23.0	4	**2.56**	65	2.CD.060255.ATC	■
	.102	2.60	**.614**	15.6	23.4	4	**2.68**	68	2.CD.060260.ATC	■
	.104	2.65	**.626**	15.9	23.9	4	**2.68**	68	2.CD.060265.ATC	■
	.106	2.70	**.638**	16.2	24.3	4	**2.68**	68	2.CD.060270.ATC	■
	.108	2.75	**.650**	16.5	24.8	4	**2.68**	68	2.CD.060275.ATC	■
	.110	2.80	**.661**	16.8	25.2	4	**2.68**	68	2.CD.060280.ATC	■
	.112	2.85	**.673**	17.1	25.7	4	**2.68**	68	2.CD.060285.ATC	■
	.114	2.90	**.685**	17.4	26.1	4	**2.68**	68	2.CD.060290.ATC	■
	.116	2.95	**.697**	17.7	26.6	4	**2.68**	68	2.CD.060295.ATC	■
	.118	3.00	**.709**	18.0	27.0	6	**2.91**	74	2.CD.060300.ATC	■
	.120	3.05	**.720**	18.3	27.5	6	**2.91**	74	2.CD.060305.ATC	■

■ Stock item

Carbide |  |  | Z2 |  | 

Ø d_1	**.004" - .118"** (0.1 - 3.0 mm)		**.122" - .236"** (3.1 - 6.0 mm)		**.240" - .394"** (6.1 - 10.0 mm)	
Tolerance	**+ .00031"** **0**	+ 0.006 mm 0	**+ .00035"** **+ .00004"**	+ 0.009 mm + 0.001 mm	**+ .00039"** **+ .00004"**	+ 0.010 mm + 0.001 mm

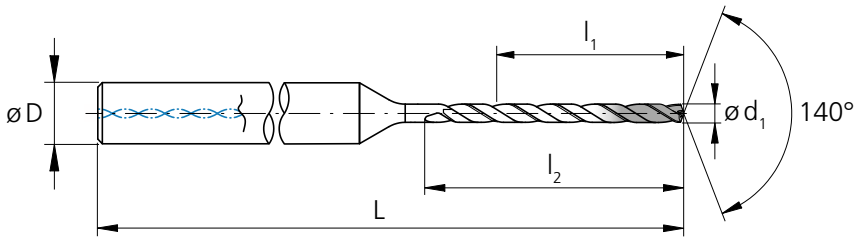
d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.122	3.10	**.732**	18.6	27.9	6	**2.91**	74	2.CD.060310.ATC	■
	.124	3.15	**.744**	18.9	28.4	6	**2.91**	74	2.CD.060315.ATC	■
1/8	**.1250**	3.175	**.756**	19.2	28.8	6	**2.91**	74	2.CD.060F18.ATC	■
	.126	3.20	**.756**	19.2	28.8	6	**2.91**	74	2.CD.060320.ATC	■
	.128	3.25	**.768**	19.5	29.3	6	**2.91**	74	2.CD.060325.ATC	■
	.130	3.30	**.780**	19.8	29.7	6	**2.91**	74	2.CD.060330.ATC	■
	.132	3.35	**.791**	20.1	30.2	6	**2.91**	74	2.CD.060335.ATC	■
	.134	3.40	**.803**	20.4	30.6	6	**2.91**	74	2.CD.060340.ATC	■
	.136	3.45	**.815**	20.7	31.1	6	**2.91**	74	2.CD.060345.ATC	■
	.138	3.50	**.827**	21.0	31.5	6	**3.07**	78	2.CD.060350.ATC	■
	.140	3.55	**.839**	21.3	32.0	6	**3.07**	78	2.CD.060355.ATC	■
	.142	3.60	**.850**	21.6	32.4	6	**3.07**	78	2.CD.060360.ATC	■
	.144	3.65	**.862**	21.9	32.9	6	**3.07**	78	2.CD.060365.ATC	■
	.146	3.70	**.874**	22.2	33.3	6	**3.07**	78	2.CD.060370.ATC	■
	.148	3.75	**.886**	22.5	33.8	6	**3.07**	78	2.CD.060375.ATC	■
	.150	3.80	**.898**	22.8	34.2	6	**3.07**	78	2.CD.060380.ATC	■
	.152	3.85	**.909**	23.1	34.7	6	**3.07**	78	2.CD.060385.ATC	■
	.154	3.90	**.921**	23.4	35.1	6	**3.07**	78	2.CD.060390.ATC	■
	.156	3.95	**.933**	23.7	35.6	6	**3.07**	78	2.CD.060395.ATC	■
5/32	**.1562**	3.968	**.945**	24.0	36.0	6	**3.07**	78	2.CD.060F532.ATC	■
	.157	4.00	**.945**	24.0	36.0	6	**3.07**	78	2.CD.060400.ATC	■
	.161	4.10	**.969**	24.6	36.9	6	**3.15**	80	2.CD.060410.ATC	■

d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.165	4.20	**.992**	25.2	37.8	6	**3.15**	80	2.CD.060420.ATC	■
	.169	4.30	**1.02**	25.8	38.7	6	**3.15**	80	2.CD.060430.ATC	■
	.173	4.40	**1.04**	26.4	39.6	6	**3.15**	80	2.CD.060440.ATC	■
	.177	4.50	**1.06**	27.0	40.5	6	**3.15**	80	2.CD.060450.ATC	■
	.181	4.60	**1.09**	27.6	41.4	6	**3.15**	80	2.CD.060460.ATC	■
	.185	4.70	**1.11**	28.2	42.3	6	**3.31**	84	2.CD.060470.ATC	■
3/16	**.1875**	4.762	**1.13**	28.8	43.2	6	**3.31**	84	2.CD.060F316.ATC	■
	.189	4.80	**1.13**	28.8	43.2	6	**3.31**	84	2.CD.060480.ATC	■
	.193	4.90	**1.16**	29.4	44.1	6	**3.31**	84	2.CD.060490.ATC	■
	.197	5.00	**1.18**	30.0	45.0	6	**3.31**	84	2.CD.060500.ATC	■
	.201	5.10	**1.20**	30.6	45.9	6	**3.31**	84	2.CD.060510.ATC	■
	.205	5.20	**1.23**	31.2	46.8	6	**3.31**	84	2.CD.060520.ATC	■
	.209	5.30	**1.25**	31.8	47.7	6	**3.31**	84	2.CD.060530.ATC	■
	.213	5.40	**1.28**	32.4	48.6	6	**3.46**	88	2.CD.060540.ATC	■
	.217	5.50	**1.30**	33.0	49.5	6	**3.46**	88	2.CD.060550.ATC	■
7/32	**.2189**	5.560	**1.32**	33.6	50.4	6	**3.46**	88	2.CD.060F732.ATC	■
	.220	5.60	**1.32**	33.6	50.4	6	**3.46**	88	2.CD.060560.ATC	■
	.224	5.70	**1.35**	34.2	51.3	6	**3.46**	88	2.CD.060570.ATC	■
	.228	5.80	**1.37**	34.8	52.2	6	**3.46**	88	2.CD.060580.ATC	■
	.232	5.90	**1.39**	35.4	53.1	6	**3.46**	88	2.CD.060590.ATC	■
	.236	6.00	**1.42**	36.0	54.0	6	**3.46**	88	2.CD.060600.ATC	■
1/4	**.2500**	6.350	**1.50**	38.1	57.2	8	**3.86**	98	2.CD.060F14.ATC	■

■ Stock item

CrazyDrill Cool Titanium ATC - 10 x d

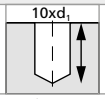
DRILLING WITH INTERNAL COOLING



d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.039	1.00	**.394**	10.0	13.0	4	**2.32**	59	2.CD.100100.ATC	■
	.041	1.05	**.413**	10.5	13.7	4	**2.32**	59	2.CD.100105.ATC	■
	.043	1.10	**.433**	11.0	14.3	4	**2.32**	59	2.CD.100110.ATC	■
	.045	1.15	**.453**	11.5	15.0	4	**2.32**	59	2.CD.100115.ATC	■
	.047	1.20	**.472**	12.0	15.6	4	**2.44**	62	2.CD.100120.ATC	■
	.049	1.25	**.492**	12.5	16.3	4	**2.44**	62	2.CD.100125.ATC	■
	.051	1.30	**.512**	13.0	16.9	4	**2.44**	62	2.CD.100130.ATC	■
	.053	1.35	**.531**	13.5	17.6	4	**2.44**	62	2.CD.100135.ATC	■
	.055	1.40	**.551**	14.0	18.2	4	**2.44**	62	2.CD.100140.ATC	■
	.057	1.45	**.571**	14.5	18.9	4	**2.56**	65	2.CD.100145.ATC	■
	.059	1.50	**.591**	15.0	19.5	4	**2.56**	65	2.CD.100150.ATC	■
	.061	1.55	**.610**	15.5	20.2	4	**2.56**	65	2.CD.100155.ATC	■
1/16	**.0625**	1.587	**.630**	16.0	20.8	4	**2.56**	65	2.CD.100F116.ATC	■
	.063	1.60	**.630**	16.0	20.8	4	**2.56**	65	2.CD.100160.ATC	■
	.065	1.65	**.650**	16.5	21.5	4	**2.56**	65	2.CD.100165.ATC	■
	.067	1.70	**.669**	17.0	22.1	4	**2.64**	67	2.CD.100170.ATC	■
	.069	1.75	**.689**	17.5	22.8	4	**2.64**	67	2.CD.100175.ATC	■
	.071	1.80	**.709**	18.0	23.4	4	**2.64**	67	2.CD.100180.ATC	■
	.073	1.85	**.728**	18.5	24.1	4	**2.64**	67	2.CD.100185.ATC	■
	.075	1.90	**.748**	19.0	24.7	4	**2.64**	67	2.CD.100190.ATC	■
	.077	1.95	**.768**	19.5	25.4	4	**2.64**	67	2.CD.100195.ATC	■
	.079	2.00	**.787**	20.0	26.0	4	**2.76**	70	2.CD.100200.ATC	■

d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.081	2.05	**.484**	12.3	18.5	4	**2.48**	63	2.CD.060205.ATC	■
	.083	2.10	**.496**	12.6	18.9	4	**2.48**	63	2.CD.060210.ATC	■
	.085	2.15	**.508**	12.9	19.4	4	**2.48**	63	2.CD.060215.ATC	■
	.087	2.20	**.520**	13.2	19.8	4	**2.48**	63	2.CD.060220.ATC	■
	.089	2.25	**.531**	13.5	20.3	4	**2.48**	63	2.CD.060225.ATC	■
	.091	2.30	**.543**	13.8	20.7	4	**2.56**	65	2.CD.060230.ATC	■
	.093	2.35	**.555**	14.1	21.2	4	**2.56**	65	2.CD.060235.ATC	■
3/32	**.0937**	2.381	**.567**	14.4	21.6	4	**2.56**	65	2.CD.060F332.ATC	■
	.094	2.40	**.567**	14.4	21.6	4	**2.56**	65	2.CD.060240.ATC	■
	.096	2.45	**.579**	14.7	22.1	4	**2.56**	65	2.CD.060245.ATC	■
	.098	2.50	**.591**	15.0	22.5	4	**2.56**	65	2.CD.060250.ATC	■
	.100	2.55	**.602**	15.3	23.0	4	**2.56**	65	2.CD.060255.ATC	■
	.102	2.60	**.614**	15.6	23.4	4	**2.68**	68	2.CD.060260.ATC	■
	.104	2.65	**.626**	15.9	23.9	4	**2.68**	68	2.CD.060265.ATC	■
	.106	2.70	**.638**	16.2	24.3	4	**2.68**	68	2.CD.060270.ATC	■
	.108	2.75	**.650**	16.5	24.8	4	**2.68**	68	2.CD.060275.ATC	■
	.110	2.80	**.661**	16.8	25.2	4	**2.68**	68	2.CD.060280.ATC	■
	.112	2.85	**.673**	17.1	25.7	4	**2.68**	68	2.CD.060285.ATC	■
	.114	2.90	**.685**	17.4	26.1	4	**2.68**	68	2.CD.060290.ATC	■
	.116	2.95	**.697**	17.7	26.6	4	**2.68**	68	2.CD.060295.ATC	■
	.118	3.00	**.709**	18.0	27.0	6	**2.91**	74	2.CD.060300.ATC	■
	.120	3.05	**.720**	18.3	27.5	6	**2.91**	74	2.CD.060305.ATC	■

■ Stock item

Carbide |  |  | Z2 |  | 

Ø d_1	**.004" - .118"** (0.1 - 3.0 mm)		**.122" - .236"** (3.1 - 6.0 mm)		**.240" - .394"** (6.1 - 10.0 mm)	
Tolerance	**+ .00031"** **0**	+ 0.006 mm 0	**+ .00035"** **+ .00004"**	+ 0.009 mm + 0.001 mm	**+ .00039"** **+ .00004"**	+ 0.010 mm + 0.001 mm

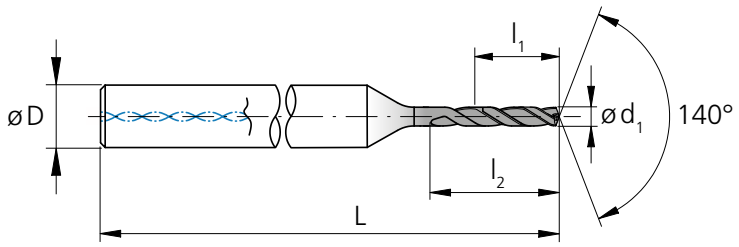
d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.122	3.10	**.807**	20.5	26.7	4	**2.76**	70	2.CD.100205.ATC	■
	.124	3.15	**.827**	21.0	27.3	4	**2.76**	70	2.CD.100210.ATC	■
1/8	**.1250**	3.175	**.846**	21.5	28.0	4	**2.76**	70	2.CD.100215.ATC	■
	.126	3.20	**.866**	22.0	28.6	4	**2.76**	70	2.CD.100220.ATC	■
	.128	3.25	**.886**	22.5	29.3	4	**2.76**	70	2.CD.100225.ATC	■
	.130	3.30	**.906**	23.0	29.9	4	**2.95**	75	2.CD.100230.ATC	■
	.132	3.35	**.925**	23.5	30.6	4	**2.95**	75	2.CD.100235.ATC	■
	.134	3.40	**.945**	24.0	31.2	4	**2.95**	75	2.CD.100F332.ATC	■
	.136	3.45	**.945**	24.0	31.2	4	**2.95**	75	2.CD.100240.ATC	■
	.138	3.50	**.965**	24.5	31.9	4	**2.95**	75	2.CD.100245.ATC	■
	.140	3.55	**.984**	25.0	32.5	4	**2.95**	75	2.CD.100250.ATC	■
	.142	3.60	**1.00**	25.5	33.2	4	**2.95**	75	2.CD.100255.ATC	■
	.144	3.65	**1.02**	26.0	33.8	4	**3.15**	80	2.CD.100260.ATC	■
	.146	3.70	**1.04**	26.5	34.5	4	**3.15**	80	2.CD.100265.ATC	■
	.148	3.75	**1.06**	27.0	35.1	4	**3.15**	80	2.CD.100270.ATC	■
	.150	3.80	**1.08**	27.5	35.8	4	**3.15**	80	2.CD.100275.ATC	■
	.152	3.85	**1.10**	28.0	36.4	4	**3.15**	80	2.CD.100280.ATC	■
	.154	3.90	**1.12**	28.5	37.1	4	**3.15**	80	2.CD.100285.ATC	■
	.156	3.95	**1.14**	29.0	37.7	4	**3.15**	80	2.CD.100290.ATC	■
5/32	**.1562**	3.968	**1.16**	29.5	38.4	4	**3.15**	80	2.CD.100295.ATC	■
	.157	4.00	**1.18**	30.0	39.0	6	**3.43**	87	2.CD.100300.ATC	■
	.161	4.10	**1.20**	30.5	39.7	6	**3.43**	87	2.CD.100305.ATC	■

d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.165	4.20	**1.65**	42.0	54.6	6	**3.94**	100	2.CD.100420.ATC	■
	.169	4.30	**1.69**	43.0	55.9	6	**3.94**	100	2.CD.100430.ATC	■
	.173	4.40	**1.73**	44.0	57.2	6	**3.94**	100	2.CD.100440.ATC	■
	.177	4.50	**1.77**	45.0	58.5	6	**3.94**	100	2.CD.100450.ATC	■
	.181	4.60	**1.81**	46.0	59.8	6	**3.94**	100	2.CD.100460.ATC	■
	.185	4.70	**1.85**	47.0	61.1	6	**4.13**	105	2.CD.100470.ATC	■
3/16	**.1875**	4.762	**1.89**	48.0	62.4	6	**4.13**	105	2.CD.100F316.ATC	■
	.189	4.80	**1.89**	48.0	62.4	6	**4.13**	105	2.CD.100480.ATC	■
	.193	4.90	**1.93**	49.0	63.7	6	**4.13**	105	2.CD.100490.ATC	■
	.197	5.00	**1.97**	50.0	65.0	6	**4.13**	105	2.CD.100500.ATC	■
	.201	5.10	**2.01**	51.0	66.3	6	**4.13**	105	2.CD.100510.ATC	■
	.205	5.20	**2.05**	52.0	67.6	6	**4.13**	105	2.CD.100520.ATC	■
	.209	5.30	**2.09**	53.0	68.9	6	**4.13**	105	2.CD.100530.ATC	■
	.213	5.40	**2.13**	54.0	70.2	6	**4.41**	112	2.CD.100540.ATC	■
	.217	5.50	**2.17**	55.0	71.5	6	**4.41**	112	2.CD.100550.ATC	■
7/32	**.2189**	5.560	**2.20**	56.0	72.8	6	**4.41**	112	2.CD.100F732.ATC	■
	.220	5.60	**2.20**	56.0	72.8	6	**4.41**	112	2.CD.100560.ATC	■
	.224	5.70	**2.24**	57.0	74.1	6	**4.41**	112	2.CD.100570.ATC	■
	.228	5.80	**2.28**	58.0	75.4	6	**4.41**	112	2.CD.100580.ATC	■
	.232	5.90	**2.32**	59.0	76.7	6	**4.41**	112	2.CD.100590.ATC	■
	.236	6.00	**2.36**	60.0	78.0	6	**4.41**	112	2.CD.100600.ATC	■
1/4	**.2500**	6.350	**2.50**	63.5	82.6	8	**4.92**	125	2.CD.100F14.ATC	■

■ Stock item

CrazyDrill Cool Titanium PTC - 3 x d

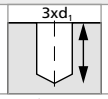
DRILLING WITH INTERNAL COOLING



d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.039	1.00	**.118**	3.0	6.0	4	**1.97**	50	2.CD.030100.PTC	□
	.041	1.05	**.124**	3.2	6.3	4	**1.97**	50	2.CD.030105.PTC	□
	.043	1.10	**.130**	3.3	6.6	4	**1.97**	50	2.CD.030110.PTC	□
	.045	1.15	**.136**	3.5	6.9	4	**1.97**	50	2.CD.030115.PTC	□
	.047	1.20	**.142**	3.6	7.2	4	**1.97**	50	2.CD.030120.PTC	□
	.049	1.25	**.148**	3.8	7.5	4	**1.97**	50	2.CD.030125.PTC	□
	.051	1.30	**.154**	3.9	7.8	4	**1.97**	50	2.CD.030130.PTC	□
	.053	1.35	**.159**	4.1	8.1	4	**1.97**	50	2.CD.030135.PTC	□
	.055	1.40	**.165**	4.2	8.4	4	**1.97**	50	2.CD.030140.PTC	□
	.057	1.45	**.171**	4.4	8.7	4	**1.97**	50	2.CD.030145.PTC	□
	.059	1.50	**.177**	4.5	9.0	4	**1.97**	50	2.CD.030150.PTC	□
	.061	1.55	**.183**	4.7	9.3	4	**1.97**	50	2.CD.030155.PTC	□
1/16	**.0625**	1.587	**.189**	4.8	9.6	4	**1.97**	50	2.CD.030F116.PTC	□
	.063	1.60	**.189**	4.8	9.6	4	**1.97**	50	2.CD.030160.PTC	□
	.065	1.65	**.195**	5.0	9.9	4	**1.97**	50	2.CD.030165.PTC	□
	.067	1.70	**.201**	5.1	10.2	4	**2.09**	53	2.CD.030170.PTC	□
	.069	1.75	**.207**	5.3	10.5	4	**2.09**	53	2.CD.030175.PTC	□
	.071	1.80	**.213**	5.4	10.8	4	**2.09**	53	2.CD.030180.PTC	□
	.073	1.85	**.219**	5.6	11.1	4	**2.09**	53	2.CD.030185.PTC	□
	.075	1.90	**.224**	5.7	11.4	4	**2.09**	53	2.CD.030190.PTC	□
	.077	1.95	**.230**	5.9	11.7	4	**2.09**	53	2.CD.030195.PTC	□
	.079	2.00	**.236**	6.0	12.0	4	**2.17**	55	2.CD.030200.PTC	□

d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.081	2.05	**.242**	6.2	12.3	4	**2.17**	55	2.CD.030205.PTC	□
	.083	2.10	**.248**	6.3	12.6	4	**2.17**	55	2.CD.030210.PTC	□
	.085	2.15	**.254**	6.5	12.9	4	**2.17**	55	2.CD.030215.PTC	□
	.087	2.20	**.260**	6.6	13.2	4	**2.17**	55	2.CD.030220.PTC	□
	.089	2.25	**.266**	6.8	13.5	4	**2.17**	55	2.CD.030225.PTC	□
	.091	2.30	**.272**	6.9	13.8	4	**2.24**	57	2.CD.030230.PTC	□
	.093	2.35	**.278**	7.1	14.1	4	**2.24**	57	2.CD.030235.PTC	□
3/32	**.0937**	2.381	**.283**	7.2	14.4	4	**2.24**	57	2.CD.030F332.PTC	□
	.094	2.40	**.283**	7.2	14.4	4	**2.24**	57	2.CD.030240.PTC	□
	.096	2.45	**.289**	7.4	14.7	4	**2.24**	57	2.CD.030245.PTC	□
	.098	2.50	**.295**	7.5	15.0	4	**2.24**	57	2.CD.030250.PTC	□
	.100	2.55	**.301**	7.7	15.3	4	**2.24**	57	2.CD.030255.PTC	□
	.102	2.60	**.307**	7.8	15.6	4	**2.24**	57	2.CD.030260.PTC	□
	.104	2.65	**.313**	8.0	15.9	4	**2.24**	57	2.CD.030265.PTC	□
	.106	2.70	**.319**	8.1	16.2	4	**2.24**	57	2.CD.030270.PTC	□
	.108	2.75	**.325**	8.3	16.5	4	**2.24**	57	2.CD.030275.PTC	□
	.110	2.80	**.331**	8.4	16.8	4	**2.24**	57	2.CD.030280.PTC	□
	.112	2.85	**.337**	8.6	17.1	4	**2.24**	57	2.CD.030285.PTC	□
	.114	2.90	**.343**	8.7	17.4	4	**2.24**	57	2.CD.030290.PTC	□
	.116	2.95	**.348**	8.9	17.7	4	**2.24**	57	2.CD.030295.PTC	□
	.118	3.00	**.354**	9.0	18.0	6	**2.56**	65	2.CD.030300.PTC	□
	.120	3.05	**.360**	9.2	18.3	6	**2.56**	65	2.CD.030305.PTC	□

□ Available from Q2 - 2023

Carbide |  |  | Z2 |  | 

Ø d_1	**.004" - .118"** (0.1 - 3.0 mm)		**.122" - .236"** (3.1 - 6.0 mm)		**.240" - .394"** (6.1 - 10.0 mm)	
Tolerance	**+ .00031"** **0**	+ 0.006 mm 0	**+ .00035"** **+ .00004"**	+ 0.009 mm + 0.001 mm	**+ .00039"** **+ .00004"**	+ 0.010 mm + 0.001 mm

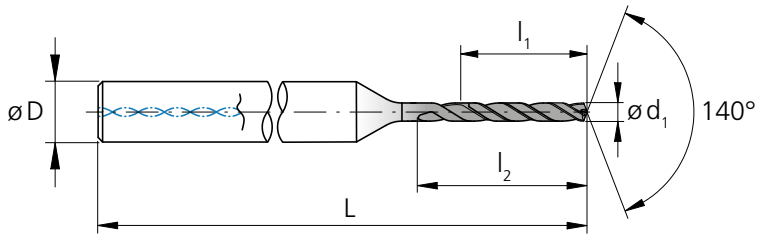
d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.122	3.10	**.366**	9.3	18.6	6	**2.56**	65	2.CD.030310.PTC	□
	.124	3.15	**.372**	9.5	18.9	6	**2.56**	65	2.CD.030315.PTC	□
1/8	**.1250**	3.175	**.378**	9.6	19.2	6	**2.56**	65	2.CD.030F18.PTC	□
	.126	3.20	**.378**	9.6	19.2	6	**2.56**	65	2.CD.030320.PTC	□
	.128	3.25	**.384**	9.8	19.5	6	**2.56**	65	2.CD.030325.PTC	□
	.130	3.30	**.390**	9.9	19.8	6	**2.56**	65	2.CD.030330.PTC	□
	.132	3.35	**.396**	10.1	20.1	6	**2.56**	65	2.CD.030335.PTC	□
	.134	3.40	**.402**	10.2	20.4	6	**2.56**	65	2.CD.030340.PTC	□
	.136	3.45	**.407**	10.4	20.7	6	**2.56**	65	2.CD.030345.PTC	□
	.138	3.50	**.413**	10.5	21.0	6	**2.68**	68	2.CD.030350.PTC	□
	.140	3.55	**.419**	10.7	21.3	6	**2.68**	68	2.CD.030355.PTC	□
	.142	3.60	**.425**	10.8	21.6	6	**2.68**	68	2.CD.030360.PTC	□
	.144	3.65	**.431**	11.0	21.9	6	**2.68**	68	2.CD.030365.PTC	□
	.146	3.70	**.437**	11.1	22.2	6	**2.68**	68	2.CD.030370.PTC	□
	.148	3.75	**.443**	11.3	22.5	6	**2.68**	68	2.CD.030375.PTC	□
	.150	3.80	**.449**	11.4	22.8	6	**2.68**	68	2.CD.030380.PTC	□
	.152	3.85	**.455**	11.6	23.1	6	**2.68**	68	2.CD.030385.PTC	□
	.154	3.90	**.461**	11.7	23.4	6	**2.68**	68	2.CD.030390.PTC	□
	.156	3.95	**.467**	11.9	23.7	6	**2.68**	68	2.CD.030395.PTC	□
5/32	**.1562**	3.968	**.472**	12.0	24.0	6	**2.68**	68	2.CD.030F532.PTC	□
	.157	4.00	**.472**	12.0	24.0	6	**2.68**	68	2.CD.030400.PTC	□
	.161	4.10	**.484**	12.3	24.6	6	**2.83**	72	2.CD.030410.PTC	□

d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.165	4.20	**.496**	12.6	25.2	6	**2.83**	72	2.CD.030420.PTC	□
	.169	4.30	**.508**	12.9	25.8	6	**2.83**	72	2.CD.030430.PTC	□
	.173	4.40	**.520**	13.2	26.4	6	**2.83**	72	2.CD.030440.PTC	□
	.177	4.50	**.531**	13.5	27.0	6	**2.83**	72	2.CD.030450.PTC	□
	.181	4.60	**.543**	13.8	27.6	6	**2.83**	72	2.CD.030460.PTC	□
	.185	4.70	**.555**	14.1	28.2	8	**2.95**	75	2.CD.030470.PTC	□
3/16	**.1875**	4.762	**.567**	14.4	28.8	8	**2.95**	75	2.CD.030F316.PTC	□
	.189	4.80	**.567**	14.4	28.8	8	**2.95**	75	2.CD.030480.PTC	□
	.193	4.90	**.579**	14.7	29.4	8	**2.95**	75	2.CD.030490.PTC	□
	.197	5.00	**.591**	15.0	30.0	8	**2.95**	75	2.CD.030500.PTC	□
	.201	5.10	**.602**	15.3	30.6	8	**2.95**	75	2.CD.030510.PTC	□
	.205	5.20	**.614**	15.6	31.2	8	**2.95**	75	2.CD.030520.PTC	□
	.209	5.30	**.626**	15.9	31.8	8	**2.95**	75	2.CD.030530.PTC	□
	.213	5.40	**.638**	16.2	32.4	8	**3.15**	80	2.CD.030540.PTC	□
	.217	5.50	**.650**	16.5	33.0	8	**3.15**	80	2.CD.030550.PTC	□
7/32	**.2189**	5.560	**.661**	16.8	33.6	8	**3.15**	80	2.CD.030F732.PTC	□
	.220	5.60	**.661**	16.8	33.6	8	**3.15**	80	2.CD.030560.PTC	□
	.224	5.70	**.673**	17.1	34.2	8	**3.15**	80	2.CD.030570.PTC	□
	.228	5.80	**.685**	17.4	34.8	8	**3.15**	80	2.CD.030580.PTC	□
	.232	5.90	**.697**	17.7	35.4	8	**3.15**	80	2.CD.030590.PTC	□
	.236	6.00	**.709**	18.0	36.0	8	**3.15**	80	2.CD.030600.PTC	□
1/4	**.2500**	6.350	**.750**	19.1	38.1	8	**3.15**	80	2.CD.030F14.PTC	□

□ Available from Q2 - 2023

CrazyDrill Cool Titanium PTC - 6 x d

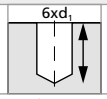
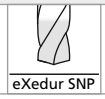
DRILLING WITH INTERNAL COOLING



d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.039	1.00	**.236**	6.0	9.0	4	**2.17**	55	2.CD.060100.PTC	□
	.041	1.05	**.248**	6.3	9.5	4	**2.17**	55	2.CD.060105.PTC	□
	.043	1.10	**.260**	6.6	9.9	4	**2.17**	55	2.CD.060110.PTC	□
	.045	1.15	**.272**	6.9	10.4	4	**2.17**	55	2.CD.060115.PTC	□
	.047	1.20	**.283**	7.2	10.8	4	**2.24**	57	2.CD.060120.PTC	□
	.049	1.25	**.295**	7.5	11.3	4	**2.24**	57	2.CD.060125.PTC	□
	.051	1.30	**.307**	7.8	11.7	4	**2.24**	57	2.CD.060130.PTC	□
	.053	1.35	**.319**	8.1	12.2	4	**2.24**	57	2.CD.060135.PTC	□
	.055	1.40	**.331**	8.4	12.6	4	**2.24**	57	2.CD.060140.PTC	□
	.057	1.45	**.343**	8.7	13.1	4	**2.28**	58	2.CD.060145.PTC	□
	.059	1.50	**.354**	9.0	13.5	4	**2.28**	58	2.CD.060150.PTC	□
	.061	1.55	**.366**	9.3	14.0	4	**2.28**	58	2.CD.060155.PTC	□
1/16	**.0625**	1.587	**.378**	9.6	14.4	4	**2.28**	58	2.CD.060F116.PTC	□
	.063	1.60	**.378**	9.6	14.4	4	**2.28**	58	2.CD.060160.PTC	□
	.065	1.65	**.390**	9.9	14.9	4	**2.28**	58	2.CD.060165.PTC	□
	.067	1.70	**.402**	10.2	15.3	4	**2.36**	60	2.CD.060170.PTC	□
	.069	1.75	**.413**	10.5	15.8	4	**2.36**	60	2.CD.060175.PTC	□
	.071	1.80	**.425**	10.8	16.2	4	**2.36**	60	2.CD.060180.PTC	□
	.073	1.85	**.437**	11.1	16.7	4	**2.36**	60	2.CD.060185.PTC	□
	.075	1.90	**.449**	11.4	17.1	4	**2.36**	60	2.CD.060190.PTC	□
	.077	1.95	**.461**	11.7	17.6	4	**2.36**	60	2.CD.060195.PTC	□
	.079	2.00	**.472**	12.0	18.0	4	**2.48**	63	2.CD.060200.PTC	□

d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.081	2.05	**.484**	12.3	18.5	4	**2.48**	63	2.CD.060205.PTC	□
	.083	2.10	**.496**	12.6	18.9	4	**2.48**	63	2.CD.060210.PTC	□
	.085	2.15	**.508**	12.9	19.4	4	**2.48**	63	2.CD.060215.PTC	□
	.087	2.20	**.520**	13.2	19.8	4	**2.48**	63	2.CD.060220.PTC	□
	.089	2.25	**.531**	13.5	20.3	4	**2.48**	63	2.CD.060225.PTC	□
	.091	2.30	**.543**	13.8	20.7	4	**2.56**	65	2.CD.060230.PTC	□
	.093	2.35	**.555**	14.1	21.2	4	**2.56**	65	2.CD.060235.PTC	□
3/32	**.0937**	2.381	**.567**	14.4	21.6	4	**2.56**	65	2.CD.060F332.PTC	□
	.094	2.40	**.567**	14.4	21.6	4	**2.56**	65	2.CD.060240.PTC	□
	.096	2.45	**.579**	14.7	22.1	4	**2.56**	65	2.CD.060245.PTC	□
	.098	2.50	**.591**	15.0	22.5	4	**2.56**	65	2.CD.060250.PTC	□
	.100	2.55	**.602**	15.3	23.0	4	**2.56**	65	2.CD.060255.PTC	□
	.102	2.60	**.614**	15.6	23.4	4	**2.68**	68	2.CD.060260.PTC	□
	.104	2.65	**.626**	15.9	23.9	4	**2.68**	68	2.CD.060265.PTC	□
	.106	2.70	**.638**	16.2	24.3	4	**2.68**	68	2.CD.060270.PTC	□
	.108	2.75	**.650**	16.5	24.8	4	**2.68**	68	2.CD.060275.PTC	□
	.110	2.80	**.661**	16.8	25.2	4	**2.68**	68	2.CD.060280.PTC	□
	.112	2.85	**.673**	17.1	25.7	4	**2.68**	68	2.CD.060285.PTC	□
	.114	2.90	**.685**	17.4	26.1	4	**2.68**	68	2.CD.060290.PTC	□
	.116	2.95	**.697**	17.7	26.6	4	**2.68**	68	2.CD.060295.PTC	□
	.118	3.00	**.709**	18.0	27.0	6	**2.91**	74	2.CD.060300.PTC	□
	.120	3.05	**.720**	18.3	27.5	6	**2.91**	74	2.CD.060305.PTC	□

□ Available from Q2 - 2023

Carbide |  |  | Z2 |  | 

Ø d_1	**.004" - .118"** (0.1 - 3.0 mm)		**.122" - .236"** (3.1 - 6.0 mm)		**.240" - .394"** (6.1 - 10.0 mm)	
Tolerance	**+ .00031"** **0**	+ 0.006 mm 0	**+ .00035"** **+ .00004"**	+ 0.009 mm + 0.001 mm	**+ .00039"** **+ .00004"**	+ 0.010 mm + 0.001 mm

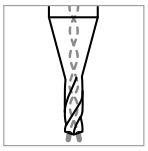
d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.122	3.10	**.732**	18.6	27.9	6	**2.91**	74	2.CD.060310.PTC	□
	.124	3.15	**.744**	18.9	28.4	6	**2.91**	74	2.CD.060315.PTC	□
1/8	**.1250**	3.175	**.756**	19.2	28.8	6	**2.91**	74	2.CD.060F18.PTC	□
	.126	3.20	**.756**	19.2	28.8	6	**2.91**	74	2.CD.060320.PTC	□
	.128	3.25	**.768**	19.5	29.3	6	**2.91**	74	2.CD.060325.PTC	□
	.130	3.30	**.780**	19.8	29.7	6	**2.91**	74	2.CD.060330.PTC	□
	.132	3.35	**.791**	20.1	30.2	6	**2.91**	74	2.CD.060335.PTC	□
	.134	3.40	**.803**	20.4	30.6	6	**2.91**	74	2.CD.060340.PTC	□
	.136	3.45	**.815**	20.7	31.1	6	**2.91**	74	2.CD.060345.PTC	□
	.138	3.50	**.827**	21.0	31.5	6	**3.07**	78	2.CD.060350.PTC	□
	.140	3.55	**.839**	21.3	32.0	6	**3.07**	78	2.CD.060355.PTC	□
	.142	3.60	**.850**	21.6	32.4	6	**3.07**	78	2.CD.060360.PTC	□
	.144	3.65	**.862**	21.9	32.9	6	**3.07**	78	2.CD.060365.PTC	□
	.146	3.70	**.874**	22.2	33.3	6	**3.07**	78	2.CD.060370.PTC	□
	.148	3.75	**.886**	22.5	33.8	6	**3.07**	78	2.CD.060375.PTC	□
	.150	3.80	**.898**	22.8	34.2	6	**3.07**	78	2.CD.060380.PTC	□
	.152	3.85	**.909**	23.1	34.7	6	**3.07**	78	2.CD.060385.PTC	□
	.154	3.90	**.921**	23.4	35.1	6	**3.07**	78	2.CD.060390.PTC	□
	.156	3.95	**.933**	23.7	35.6	6	**3.07**	78	2.CD.060395.PTC	□
5/32	**.1562**	3.968	**.945**	24.0	36.0	6	**3.07**	78	2.CD.060F532.PTC	□
	.157	4.00	**.945**	24.0	36.0	6	**3.07**	78	2.CD.060400.PTC	□
	.161	4.10	**.969**	24.6	36.9	6	**3.15**	80	2.CD.060410.PTC	□

d_1 [inch]	d_1 [inch]	d_1 [mm]	l_1 [inch]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [inch]	L [mm]	Item number	Availability
	.165	4.20	**.992**	25.2	37.8	6	**3.15**	80	2.CD.060420.PTC	□
	.169	4.30	**1.02**	25.8	38.7	6	**3.15**	80	2.CD.060430.PTC	□
	.173	4.40	**1.04**	26.4	39.6	6	**3.15**	80	2.CD.060440.PTC	□
	.177	4.50	**1.06**	27.0	40.5	6	**3.15**	80	2.CD.060450.PTC	□
	.181	4.60	**1.09**	27.6	41.4	6	**3.15**	80	2.CD.060460.PTC	□
	.185	4.70	**1.11**	28.2	42.3	6	**3.31**	84	2.CD.060470.PTC	□
3/16	**.1875**	4.762	**1.13**	28.8	43.2	6	**3.31**	84	2.CD.060F316.PTC	□
	.189	4.80	**1.13**	28.8	43.2	6	**3.31**	84	2.CD.060480.PTC	□
	.193	4.90	**1.16**	29.4	44.1	6	**3.31**	84	2.CD.060490.PTC	□
	.197	5.00	**1.18**	30.0	45.0	6	**3.31**	84	2.CD.060500.PTC	□
	.201	5.10	**1.20**	30.6	45.9	6	**3.31**	84	2.CD.060510.PTC	□
	.205	5.20	**1.23**	31.2	46.8	6	**3.31**	84	2.CD.060520.PTC	□
	.209	5.30	**1.25**	31.8	47.7	6	**3.31**	84	2.CD.060530.PTC	□
	.213	5.40	**1.28**	32.4	48.6	6	**3.46**	88	2.CD.060540.PTC	□
	.217	5.50	**1.30**	33.0	49.5	6	**3.46**	88	2.CD.060550.PTC	□
7/32	**.2189**	5.560	**1.32**	33.6	50.4	6	**3.46**	88	2.CD.060F732.PTC	□
	.220	5.60	**1.32**	33.6	50.4	6	**3.46**	88	2.CD.060560.PTC	□
	.224	5.70	**1.35**	34.2	51.3	6	**3.46**	88	2.CD.060570.PTC	□
	.228	5.80	**1.37**	34.8	52.2	6	**3.46**	88	2.CD.060580.PTC	□
	.232	5.90	**1.39**	35.4	53.1	6	**3.46**	88	2.CD.060590.PTC	□
	.236	6.00	**1.42**	36.0	54.0	6	**3.46**	88	2.CD.060600.PTC	□
1/4	**.2500**	6.350	**1.50**	38.1	57.2	8	**3.86**	98	2.CD.060F14.PTC	□

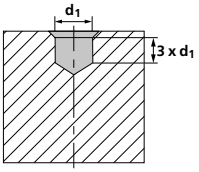
□ Available from Q2 - 2023

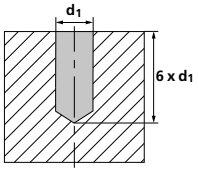
NEW ATC - 3 x d - 6 x d - 10 x d

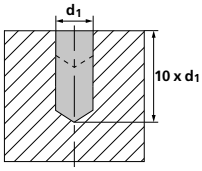
DRILLING WITH INTERNAL COOLING | CUTTING DATA OVERVIEW



Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	v_c [m/min] | [SFM] Mittel	v_c [m/min] | [SFM] Hoch
S_2	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136	40 | **131**	60 | **197**
		9.9367	TiAl6Nb7	ASTM F1295		

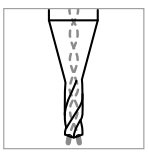






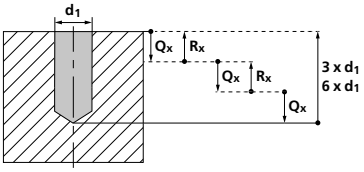
NEW PTC - 3 x d - 6 x d

DRILLING WITH INTERNAL COOLING | CUTTING DATA OVERVIEW



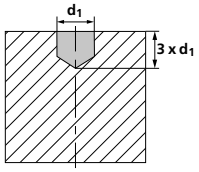
Materials group	Material	Mat. no.	DIN	AISI/ASTM/UNS	v_c [m/min] | [SFM] Mittel	v_c [m/min] | [SFM] Hoch	Q_x [mm] | [inch]	R_x [mm] | [inch]
S_2	Reintitan	3.7035	TiAl6V4	ASTM B348 / F136	40 | **131**	60 | **197**	0.5 x d1	0.5 x d1
		3.7065	TiAl6Nb7	ASTM F1295			-	-

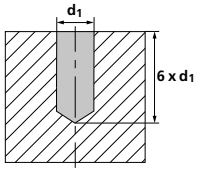
For Ti Gr.2



Chip breaking cycle

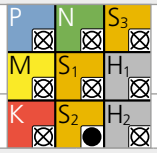
For Ti Gr.4





ANWENDUNGSEMPFEHLUNG

● Sehr gut geeignet | ◐ Gut geeignet | ○ bedingt geeignet | ⊠ Nicht empfohlen



f [mm/rev] **| [IPR]**

Ød1	1.0 mm | .039"		1.25 mm | .049"		1/16" 1.5 mm | .059"		3/32" 2.0 mm | .079"		2.5 mm | .098"		1/8" 3.0 mm | .118"		5/32" 4.0 mm | .158"		3/16" - 7/32" 5.0 mm | .197"		1/4" 6.0 mm | .236"	
	Mittel	Hoch	**Mittel**	Hoch	**Mittel**	Hoch	**Mittel**	Hoch	**Mittel**	Hoch	**Mittel**	Hoch	**Mittel**	Hoch	**Mittel**	Hoch	**Mittel**	Hoch
	0.020 **.0008**	0.025 **.0010**	0.025 **.0010**	0.030 **.0012**	0.030 **.0012**	0.035 **.0014**	0.035 **.0014**	0.045 **.0018**	0.045 **.0018**	0.055 **.0022**	0.050 **.0020**	0.065 **.0026**	0.060 **.0024**	0.075 **.0030**	0.070 **.0028**	0.085 **.0033**	0.075 **.0030**	0.090 **.0035**

f [mm/rev] **| [IPR]**

Ød1	1.0 mm | .039"		1.25 mm | .049"		1/16" 1.5 mm | .059"		3/32" 2.0 mm | .079"		2.5 mm | .098"		1/8" 3.0 mm | .118"		5/32" 4.0 mm | .158"		3/16" - 7/32" 5.0 mm | .197"		1/4" 6.0 mm | .236"	
	Mittel	Hoch	**Mittel**	Hoch	**Mittel**	Hoch	**Mittel**	Hoch	**Mittel**	Hoch	**Mittel**	Hoch	**Mittel**	Hoch	**Mittel**	Hoch	**Mittel**	Hoch
	0.010 **.0004**	0.020 **.0008**	0.013 **.0005**	0.025 **.0010**	0.015 **.0006**	0.030 **.0012**	0.020 **.0008**	0.040 **.0016**	0.025 **.0010**	0.050 **.0020**	0.030 **.0012**	0.060 **.0024**	0.040 **.0016**	0.080 **.0031**	0.050 **.0020**	0.100 **.0039**	0.060 **.0024**	0.120 **.0047**
	0.010 **.0004**	0.020 **.0008**	0.013 **.0005**	0.025 **.0010**	0.015 **.0006**	0.030 **.0012**	0.020 **.0008**	0.040 **.0016**	0.025 **.0010**	0.050 **.0020**	0.030 **.0012**	0.060 **.0024**	0.040 **.0016**	0.080 **.0031**	0.050 **.0020**	0.100 **.0039**	0.060 **.0024**	0.120 **.0047**

CRAZYDRILL by Mikron Tool
Cool Titanium

NEW Drilling process CrazyDrill Cool Titanium

PRECISE AND FAST DRILLING UP TO 10 X D IN TITANIUM ALLOYS

Coolant type, pressure and filtration

Coolant type

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

Filtration: Good filter quality is very important when using through coolant drills. Dirt particles or residual chips can clog the coolant holes and consequently reduce dramatically the flowrate.
The following filter qualities must be adhered especially in small diameters:

- Drill with Ø < .079" (2 mm) filter quality ≤ .0004" (0.010 mm).
- Drill with Ø < .118" (3 mm) filter quality ≤ .0008" (0.020 mm).
- Drill with Ø < .236" (6 mm) filter quality ≤ .0020" (0.050 mm).

Coolant pressure: At least the coolant pressure mentioned in the chart is required for the CrazyDrill Cool Titanium to achieve reliable drilling. Higher pressure is generally better for the cooling and flushing effect.

Ø d_1 Tool	[mm] **| [inch]**	1.0 mm - 2.0 mm **| .039" - .079"**	2.0 mm - 4.0 mm **| .079" - .156"**	4.0 mm - 6.35 mm **| .156" - 1/4"**
Version		**3 - 6 - 10 x d**	**3 - 6 - 10 x d**	**3 - 6 - 10 x d**
Minimal pressure	[bar]	40	30	30
	[psi]	**580**	**435**	**435**

CrazyDrill Cool Titanium ATC 6 x d

Because of the high degree of self-centering capability, CrazyDrill Cool Titanium 6 x d can be used on regular and straight surfaces without a centering or pilot hole.

Higher requirements: For irregular, respectively rough or inclined surfaces or for the highest degree of position accuracy, Mikron Tool recommends:

- **CrazyDrill Pilot** as pilot drill
- **CrazyDrill Coolpilot Titanium ATC** as pilot drill from Q2 - 2023
- **CrazyDrill Crosspilot** as pilot drill for inclined surfaces

CrazyDrill Cool Titanium ATC 10 x d

We recommend pilot drilling with CrazyDrill Pilot (from Q2 - 2023 CrazyDrill Coolpilot Titanium ATC) or CrazyDrill Crosspilot on inclined surfaces.

Pilot drilling and drilling

Pilot drilling with CrazyDrill Pilot (from Q2 - 2023 CrazyDrill Coolpilot Titanium ATC) or CrazyDrill Crosspilot (on inclined surfaces) is the perfect starting point for accurate drilling (position and alignmentaccuracy). The drilling quality (no measurable transition from pilot drilling to follow-up drilling) is guaranteed due to predetermined tool tolerances.

CrazyDrill Cool Titanium PTC 3 x d, 6 x d

Because of the high degree of self-centering capability, CrazyDrill Cool Titanium PTC can be used on regular and straight surfaces without a centering or pilot hole.

Higher requirements: For inclined surfaces Mikron Tool recommends:

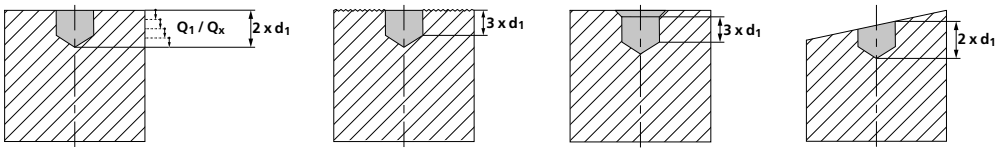
- **CrazyDrill Crosspilot** as pilot drill for inclined surfaces

CRAZYDRILL™ by Mikron Tool
Cool Titanium

NEW Drilling process of titanium alloy Gr.5 / Gr.Nb

1 | PILOT DRILLING

- Turn on internal coolant.
- With CrazyDrill Pilot up to 2 x d (from Q2 - 2023 CrazyDrill Coolpilot Titanium ATC up to 3 x d), on irregular or rough surfaces. With simultaneous chamfer of 90°.
  With CrazyDrill Crosspilot on inclined surfaces.

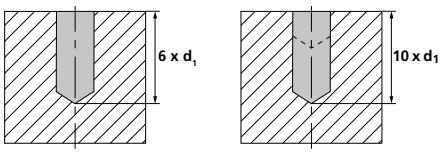


Cutting data for CrazyDrill Pilot and CrazyDrill Crosspilot

	v_C **[SFM] |** [m/min]	f **[IPR] |** [mm/rev]	Q1 / Qx **[inch] |** [mm]
CrazyDrill Pilot	**66 - 82 |** 20 - 25	0.01 - 0.02 x d	0.5 x d
CrazyDrill Crosspilot	**66 - 82 |** 20 - 25	0.01 - 0.02 x d	1-Shot

2 | DRILLING

- Turn on internal coolant.
- Drill with CrazyDrill Cool Titanium ATC in one step with recommended drilling speed and feed (see cutting data chart).

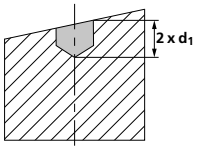


Note:
After the drill reached desired cutting depth, return at rapid traverse to safety position. With CrazyDrill Cool Titanium ATC up to 10 x d is possible immediately get into the material and drill using the recommended cutting speed and feed.

Drilling process of pure titanium Gr.2

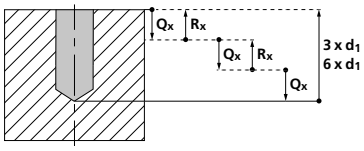
1 | PILOT DRILLING (ONLY ON INCLINED SURFACES)

- Drill with CrazyDrill Crosspilot on inclined surfaces.

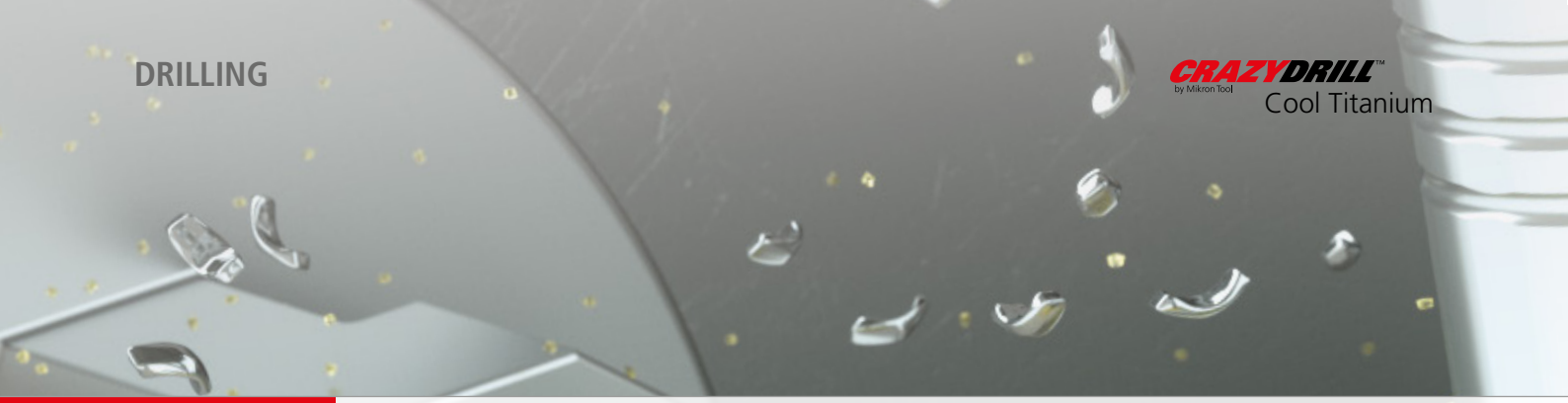


2 | DRILLING

- Turn on internal coolant.
- Drill with CrazyDrill Cool Titanium PTC in a chip breaking drilling cycle with recommended drilling speed and feed (see cutting data chart).



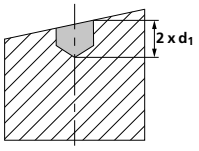
Note:
After the drill reached desired cutting depth, return at rapid traverse to safety position. With CrazyDrill Cool Titanium PTC up to 6 x d is possible immediately get into the material and drill using the recommended cutting speed and feed.



NEW Drilling process of pure titanium Gr.4

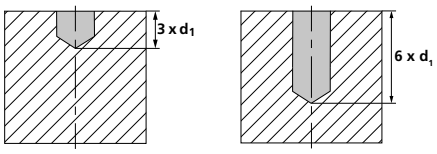
1 | PILOT DRILLING (ONLY ON INCLINED SURFACES)

- Drill with CrazyDrill Crosspilot on inclined surfaces.



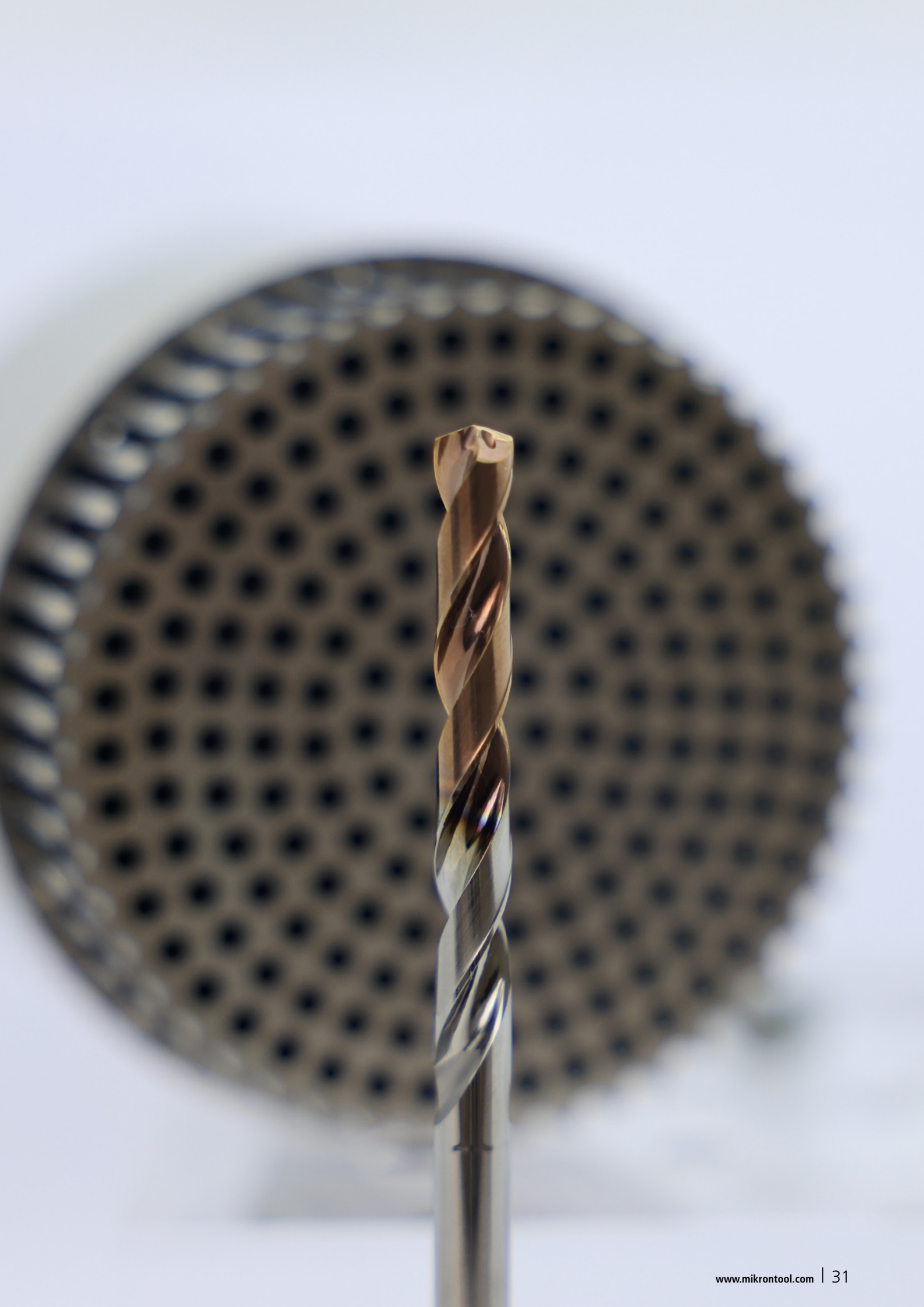
2 | DRILLING

- Turn on internal coolant.
- Drill with CrazyDrill Cool Titanium PTC in one step with recommended drilling speed and feed (see cutting data chart).



Note:

After the drill reached desired cutting depth, return at rapid traverse to safety position. With CrazyDrill Cool Titanium PTC up to 6 x d is possible immediately get into the material and drill using the recommended cutting speed and feed.



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