PILOT DRILLING AND SHORT DRILLING TOOLS
CRAZYDRILL FLEXPILOT

CrazyDrill Flexpilot

CRAZYDRILL Flexpilot

SHORT AND PRECISE: THE PREPARATION OF DEEP HOLES

Mikron Tool offers with CrazyDrill Flexpilot a pilot drill for the preparation of deep-hole drilling with CrazyDrill Flex. With drilling depths up to 3 x d this drill is also adapted for micro-short drilling.

The diameter range from 0.1 to 2.0 mm corresponds to the deep-hole drills of the CrazyDrill Flex family.

With CrazyDrill Flexpilot centering and pilot drilling up to 3 x d is done in one single step. The follow-up drill is guided cylindrically in the pilot hole, therefore high straightness of the follow-up drilling is assured. The geometry of this pilot drill corresponds to the various versions of the micro deep-hole drills CrazyDrill Flex (Steel and Titanium) thus assuring the perfect starting position for deep-hole drilling in a wide range of materials.

Optimally matched diameter tolerances and tip angles guarantee accurate deep-hole drilling without measurable transition from pilot to follow-up hole, assure process reliability and increase also substantially tool life of the follow-up drill.

The special high-performance geometry of CrazyDrill Flexpilot ensures high cutting speed, the optimal coating high wear resistance.

CRAZYDRILL™ by Mikron Tool Flexpilot

CRAZYDRILL™ by Mikron Tool Flexpilot

PILOT DRILLING AND SHORT DRILLING TOOLS
CRAZYDRILL FLEXPILOT

Micro-drilling well prepared

FOR PILOT DRILLING OR SHORT DRILLING FROM Ø 0.1 MM

Mikron Tool offers with CrazyDrill Flexpilot a pilot drill for the preparation of deep-hole drilling with CrazyDrill Flex. With drilling depths up to 3 x d this drill is also adapted for micro-short drilling. The diameter range from 0.1 to 2.0 mm corresponds to the deep-hole drills of the CrazyDrill Flex family.

- CrazyDrill Flexpilot Steel, drilling depth 3 x d, external cooling, coated and uncoated
- CrazyDrill Flexpilot Titanium, drilling depth 3 x d, external cooling, uncoated

Steel

- Coated / Uncoated
- External cooling

- Ø 0.2 - 2.0 mm - coated
  Ø 0.1 - 1.2 mm - uncoated

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Titanium

- Uncoated
- External cooling

- Ø 0.1 - 1.2 mm - uncoated

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1 | SHANK
The reinforced solid carbide shaft guarantees stability, high concentricity and therefore highest drilling accuracy.

2 | HELICAL FLUTE
The geometry of the flutes is adapted to the materials to be machined (steel or long-chip materials as titanium or copper). Thus guarantees good chip breakage and quick chip evacuation.

3 | COATING
Depending on the version, the drills are coated with eXedur RIP. Especially developed for highest performance, this coating is wear and heat resistant, avoids nesting of chips and ensures chip evacuation. The result is a long tool life.

4 | TIP GEOMETRY
Thanks to the innovative drill point geometry, only a reduced penetration force is necessary for drilling (feed force reduction up to 50%), therefore low heat development and best position accuracy. Highest cutting speed is possible.

5 | CUTTING EDGE PROTECTION / CUTTING GEOMETRY
The solid carbide drill has a special cutting geometry. This permits quick drilling without damaging the cutting edges.

6 | DIAMETER RANGE
Adapted to the diameters of the CrazyDrill Flex family, each deep-hole drill has the proper pilot drill.

Drill tip

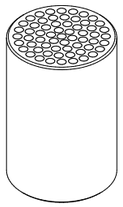
CRAZYDRILL Flexpilot

PILOT DRILLING AND SHORT DRILLING TOOLS
CRAZYDRILL FLEXPILOT

Benefits and applications

THE IDEAL COMPLEMENT TO CRAZYDRILL FLEX STEEL / TITANIUM

- **SHORT MACHINING TIME** | due to the high cutting speed
- **LONG TOOL LIFE** | up to 2 times longer
- **HIGH DEGREE OF PROCESS RELIABILITY** | due to a new cutting geometry
- **HIGH DEGREE OF PRECISION** | due to small tolerances



COMPONENT
Filter

MATERIAL
100Cr6 / 1.3505 / AISI 52100

MACHINING
- Pilot drilling
- d = 1 mm
- Drilling depth 3 mm

DRILLING TOOL
Mikron Tool - CrazyDrill Flexpilot Steel - coated

DATA	MIKRON TOOL
Tool type	CrazyDrill Flexpilot - Carbide - Coated - External cooling
Item number	2.PFS.100.1
Cutting data	v_c = 40 m/min f = 0.042 mm/rev

APPLICATION DOMAINS	COMPONENTS EXAMPLES
Dental	Dental implant
Aerospace industry	Injection nozzle
Medical technology	Surgical device
Tool and mold making	Air vent hole for glass form mould
Automotive industry	Turned part
Mechanical engineering	Nozzle
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 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
	2.0321	CuZn37 CW508L	C27400
	2.102	CuSn6	C51900
	2.096	CuAl9Mn2	C63200
Group S2 Titanium (pure and alloyed)	3.7035	Gr.2	B348 / F67
	3.7165	TiAl6V4	B348 / F136

CRAZYDRILL Flexpilot TITANIUM

PILOT DRILLING AND SHORT DRILLING TOOLS
CRAZYDRILL FLEXPILOT TITANIUM

Titanium - 3 x d

Carbide | 3xd1 | 140° | Z2 | Uncoated

Ø d_1	0.1 - 3.0 mm
Tolerance	+ 0.003 mm 0

DRILLING WITH EXTERNAL COOLING

CrazyDrill Flexpilot Titanium is adapted for pilot drilling respectively short drilling and depths up to 3 x d, for long-chip materials as titanium, titanium alloys and copper. The pilot drill guides perfectly the follow-up drill CrazyDrill Flex Titanium and thus assures straightness for the following deep-hole drilling. Thanks to the robust construction, the pilot drill ensures high position accuracy. Furthermore the drill guarantees a significantly longer tool life to the follow-up drill preventing breakage of cutting edges due to matched tip angles of 140°.

Also as short drill, where the tool reaches high drilling quality thanks to its robust construction (reinforced shaft) and precision, CrazyDrill Flexpilot proved itself. Its innovative drill point geometry guarantees high cutting speed and feed force and process reliability.

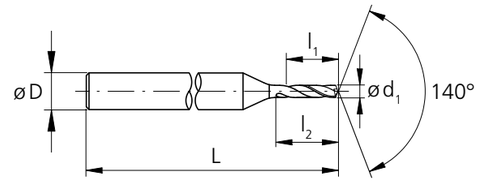
Coolant type, pressure and filtration

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

Please note

You couldn't find your suitable version of the CrazyDrill Flexpilot Titanium (diameter, length, cutting direction…)? Ask us about our customized versions!

Regrinding: This product is not suitable for regrinding.



d_1 [mm]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [mm]	Item number	Availability
0.10	0.30	0.5	3	40	2.PFT.010.0	■
0.11	0.33	0.6	3	40	2.PFT.011.0	Δ
0.12	0.36	0.6	3	40	2.PFT.012.0	Δ
0.13	0.39	0.7	3	40	2.PFT.013.0	Δ
0.14	0.42	0.7	3	40	2.PFT.014.0	Δ
0.15	0.45	0.8	3	40	2.PFT.015.0	■
0.16	0.48	0.8	3	40	2.PFT.016.0	Δ
0.17	0.51	0.9	3	40	2.PFT.017.0	Δ
0.18	0.54	0.9	3	40	2.PFT.018.0	Δ
0.19	0.57	1.0	3	40	2.PFT.019.0	Δ
0.20	0.60	1.0	3	40	2.PFT.020.0	■
0.21	0.63	1.1	3	40	2.PFT.021.0	Δ
0.22	0.66	1.1	3	40	2.PFT.022.0	Δ
0.23	0.69	1.2	3	40	2.PFT.023.0	Δ
0.24	0.72	1.2	3	40	2.PFT.024.0	Δ
0.25	0.75	1.3	3	40	2.PFT.025.0	■
0.26	0.78	1.3	3	40	2.PFT.026.0	Δ
0.27	0.81	1.4	3	40	2.PFT.027.0	Δ
0.28	0.84	1.4	3	40	2.PFT.028.0	Δ
0.29	0.87	1.5	3	40	2.PFT.029.0	Δ
0.30	0.90	1.5	3	40	2.PFT.030.0	■
0.31	0.93	1.6	3	40	2.PFT.031.0	Δ
0.32	0.96	1.6	3	40	2.PFT.032.0	Δ
0.33	0.99	1.7	3	40	2.PFT.033.0	Δ
0.34	1.02	1.7	3	40	2.PFT.034.0	Δ
0.35	1.05	1.8	3	40	2.PFT.035.0	■
0.36	1.08	1.8	3	40	2.PFT.036.0	Δ
0.37	1.11	1.9	3	40	2.PFT.037.0	Δ

d_1 [mm]	l_1 [mm]	l_2 [mm]	D (h6) [mm]	L [mm]	Item number	Availability
0.38	1.14	1.9	3	40	2.PFT.038.0	Δ
0.39	1.17	2.0	3	40	2.PFT.039.0	Δ
0.40	1.20	2.0	3	40	2.PFT.040.0	■
0.41	1.23	2.1	3	40	2.PFT.041.0	Δ
0.42	1.26	2.1	3	40	2.PFT.042.0	Δ
0.43	1.29	2.2	3	40	2.PFT.043.0	Δ
0.44	1.32	2.2	3	40	2.PFT.044.0	Δ
0.45	1.35	2.3	3	40	2.PFT.045.0	■
0.46	1.38	2.3	3	40	2.PFT.046.0	Δ
0.47	1.41	2.4	3	40	2.PFT.047.0	Δ
0.48	1.44	2.4	3	40	2.PFT.048.0	Δ
0.49	1.47	2.5	3	40	2.PFT.049.0	Δ
0.50	1.50	2.5	3	40	2.PFT.050.0	■
0.51	1.53	2.6	3	40	2.PFT.051.0	Δ
0.52	1.56	2.6	3	40	2.PFT.052.0	Δ
0.53	1.59	2.7	3	40	2.PFT.053.0	Δ
0.54	1.62	2.7	3	40	2.PFT.054.0	Δ
0.55	1.65	2.8	3	40	2.PFT.055.0	■
0.56	1.68	2.8	3	40	2.PFT.056.0	Δ
0.57	1.71	2.9	3	40	2.PFT.057.0	Δ
0.58	1.74	2.9	3	40	2.PFT.058.0	Δ
0.59	1.77	3.0	3	40	2.PFT.059.0	Δ
0.60	1.80	3.0	3	40	2.PFT.060.0	■
0.61	1.83	3.1	3	40	2.PFT.061.0	Δ
0.62	1.86	3.1	3	40	2.PFT.062.0	Δ
0.63	1.89	3.2	3	40	2.PFT.063.0	Δ
0.64	1.92	3.2	3	40	2.PFT.064.0	Δ
0.65	1.95	3.3	3	40	2.PFT.065.0	■

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

Complementary products
CrazyDrill Flex Titanium p.423

CRAZYDRILL™ by Mikron Tool Flexpilot TITANIUM

CRAZYDRILL™ by Mikron Tool Flexpilot TITANIUM

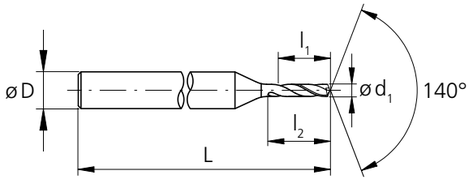
PILOT DRILLING AND SHORT DRILLING TOOLS
CRAZYDRILL FLEXPILOT TITANIUM

Titanium - 3 x d

Carbide | 3xd1 | 140° | Z2 | Uncoated

Ø d1: 0.1 - 3.0 mm
Tolerance: + 0.003 mm / 0

DRILLING WITH EXTERNAL COOLING



d1 [mm]	l1 [mm]	l2 [mm]	D (h6) [mm]	L [mm]	Item number	Availability
0.66	1.98	3.3	3	40	2.PFT.066.0	Δ
0.67	2.01	3.4	3	40	2.PFT.067.0	Δ
0.68	2.04	3.4	3	40	2.PFT.068.0	Δ
0.69	2.07	3.5	3	40	2.PFT.069.0	Δ
0.70	2.10	3.5	3	40	2.PFT.070.0	■
0.71	2.13	3.6	3	40	2.PFT.071.0	Δ
0.72	2.16	3.6	3	40	2.PFT.072.0	Δ
0.73	2.19	3.7	3	40	2.PFT.073.0	Δ
0.74	2.22	3.7	3	40	2.PFT.074.0	Δ
0.75	2.25	3.8	3	40	2.PFT.075.0	■
0.76	2.28	3.8	3	40	2.PFT.076.0	Δ
0.77	2.31	3.9	3	40	2.PFT.077.0	Δ
0.78	2.34	3.9	3	40	2.PFT.078.0	Δ
0.79	2.37	4.0	3	40	2.PFT.079.0	Δ
0.80	2.40	4.0	3	40	2.PFT.080.0	■
0.81	2.43	4.1	3	40	2.PFT.081.0	Δ
0.82	2.46	4.1	3	40	2.PFT.082.0	Δ
0.83	2.49	4.2	3	40	2.PFT.083.0	Δ
0.84	2.52	4.2	3	40	2.PFT.084.0	Δ
0.85	2.55	4.3	3	40	2.PFT.085.0	■
0.86	2.58	4.3	3	40	2.PFT.086.0	Δ
0.87	2.61	4.4	3	40	2.PFT.087.0	Δ
0.88	2.64	4.4	3	40	2.PFT.088.0	Δ
0.89	2.67	4.5	3	40	2.PFT.089.0	Δ
0.90	2.70	4.5	3	40	2.PFT.090.0	■
0.91	2.73	4.6	3	40	2.PFT.091.0	Δ
0.92	2.76	4.6	3	40	2.PFT.092.0	Δ
0.93	2.79	4.7	3	40	2.PFT.093.0	Δ

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

d1 [mm]	l1 [mm]	l2 [mm]	D (h6) [mm]	L [mm]	Item number	Availability
0.94	2.82	4.7	3	40	2.PFT.094.0	Δ
0.95	2.85	4.8	3	40	2.PFT.095.0	■
0.96	2.88	4.8	3	40	2.PFT.096.0	Δ
0.97	2.91	4.9	3	40	2.PFT.097.0	Δ
0.98	2.94	4.9	3	40	2.PFT.098.0	Δ
0.99	2.97	5.0	3	40	2.PFT.099.0	Δ
1.00	3.00	5.0	3	40	2.PFT.100.0	■
1.01	3.03	5.1	3	40	2.PFT.101.0	Δ
1.02	3.06	5.1	3	40	2.PFT.102.0	Δ
1.03	3.09	5.2	3	40	2.PFT.103.0	Δ
1.04	3.12	5.2	3	40	2.PFT.104.0	Δ
1.05	3.15	5.3	3	40	2.PFT.105.0	■
1.06	3.18	5.3	3	40	2.PFT.106.0	Δ
1.07	3.21	5.4	3	40	2.PFT.107.0	Δ
1.08	3.24	5.4	3	40	2.PFT.108.0	Δ
1.09	3.27	5.5	3	40	2.PFT.109.0	Δ
1.10	3.30	5.5	3	40	2.PFT.110.0	■
1.11	3.33	5.6	3	40	2.PFT.111.0	Δ
1.12	3.36	5.6	3	40	2.PFT.112.0	Δ
1.13	3.39	5.7	3	40	2.PFT.113.0	Δ
1.14	3.42	5.7	3	40	2.PFT.114.0	Δ
1.15	3.45	5.8	3	40	2.PFT.115.0	■
1.16	3.48	5.8	3	40	2.PFT.116.0	Δ
1.17	3.51	5.9	3	40	2.PFT.117.0	Δ
1.18	3.54	5.9	3	40	2.PFT.118.0	Δ
1.19	3.57	6.0	3	40	2.PFT.119.0	Δ
1.20	3.60	6.0	3	40	2.PFT.120.0	■

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

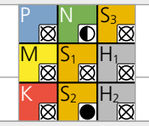
Complementary products

CrazyDrill Flex Titanium p.423

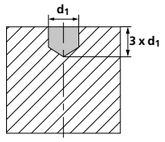
PILOT DRILLING AND SHORT DRILLING TOOLS
CRAZYDRILL FLEXPILOT TITANIUM

Titanium - 3 x d

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	f [mm/rev] Ød1 0.1 mm f	0.2 mm f	0.3 mm f	0.4 mm f	0.6 mm f	0.8 mm f	1.0 mm–1.2 mm f
P	Unalloyed carbon steel Rm < 800 N/mm²	1.0301	C10	AISI 1010			Recommended: CrazyDrill Flexpilot Steel						
		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									
		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									
		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									
		1.4539	X1NiCrMoCu 25-20-5	AISI 904L									
K	Cast iron	0.6020	GG20	ASTM 30			Recommended: CrazyDrill Flexpilot Steel						
		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			Recommended: CrazyDrill Flexpilot Steel						
		3.4365	AlZnMgCu1.5	ASTM 7075									
	Aluminium alloy cast	3.2163	GD-AlSi9Cu3	ASTM A380									
		3.2381	GD-AlSi10Mg	UNS A03590									
	Copper	2.0040	Cu-OF / CW008A	UNS C10100	5 – 40	20 – 40	0.005	0.020	0.040	0.060	0.120	0.180	0.200
		2.0065	Cu-ETP / CW004A	UNS C11000									
	Brass lead free	2.0321	CuZn37 CW508L	UNS C27400									
		2.0360	CuZn40 CW509L	UNS C28000									
	Brass, Bronze Rm < 400 N/mm²	2.0401	CuZn39Pb3 / CW614N	UNS C38500			Recommended: CrazyDrill Flexpilot Steel						
		2.1020	CuSn6	UNS C51900									
	Bronze Rm < 600 N/mm²	2.0966	CuAl10Ni5Fe4	UNS C63000									
		2.0960	CuAl9Mn2	UNS C63200									
S_1	Super alloys	2.4856		Inconel 625									
		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	5 – 20	20 – 40	0.002	0.005	0.007	0.010	0.015	0.025	0.035
		3.7065	Gr.4	ASTM B348 / F68									
	Titanium alloys	3.7165	TiAl6V4	ASTM B348 / F136	5 – 20	20 – 40	0.002	0.010	0.015	0.020	0.050	0.090	0.140
		9.9367	TiAl6Nb7	ASTM F1295									
S_3	CrCo alloys	2.4964	CoCr20W15Ni	Haynes 25									
			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									

PILOT DRILLING AND SHORT DRILLING TOOLS
CRAZYDRILL FLEXPILOT

Drilling process CrazyDrill Flexpilot

SHORT DRILLING UP TO 3 X D

Coolant type, pressure and filtration
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.

For tools with external cooling no specific parameters have to be considered concerning filter and coolant pressure and quantity. But it must be ensured that the cooling medium 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".

Pilot drilling and short drilling
Pilot drilling with CrazyDrill Flexpilot is the perfect preparation for accurate drilling (position and alignment accuracy) and stable machining process.

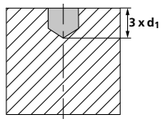
Drilling quality (position and alignment accuracy) and stable machining process are assured due to matched diameters of the tools.

CrazyDrill Flexpilot not only is the perfect preparation of deep follow-up holes with CrazyDrill Flex. Concurrently it is a short drill for highly precise and quick drilling up to 3 x d.

DRILLING PROCESS

1 | PILOT DRILLING OR SHORT DRILLING

- Drilling in one step with recommended cutting speed and feed rate (see cutting data table).



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