////EXCALIBUR

EXCALIBUR

Next-Generation PCD Tools

////TOOL
Collection

LOUIS BELET
Swiss Cutting tools

EXCALIBUR

Facing New Challenges with Your Expertise

//// Ref. 45600
Thread Whirling Tool

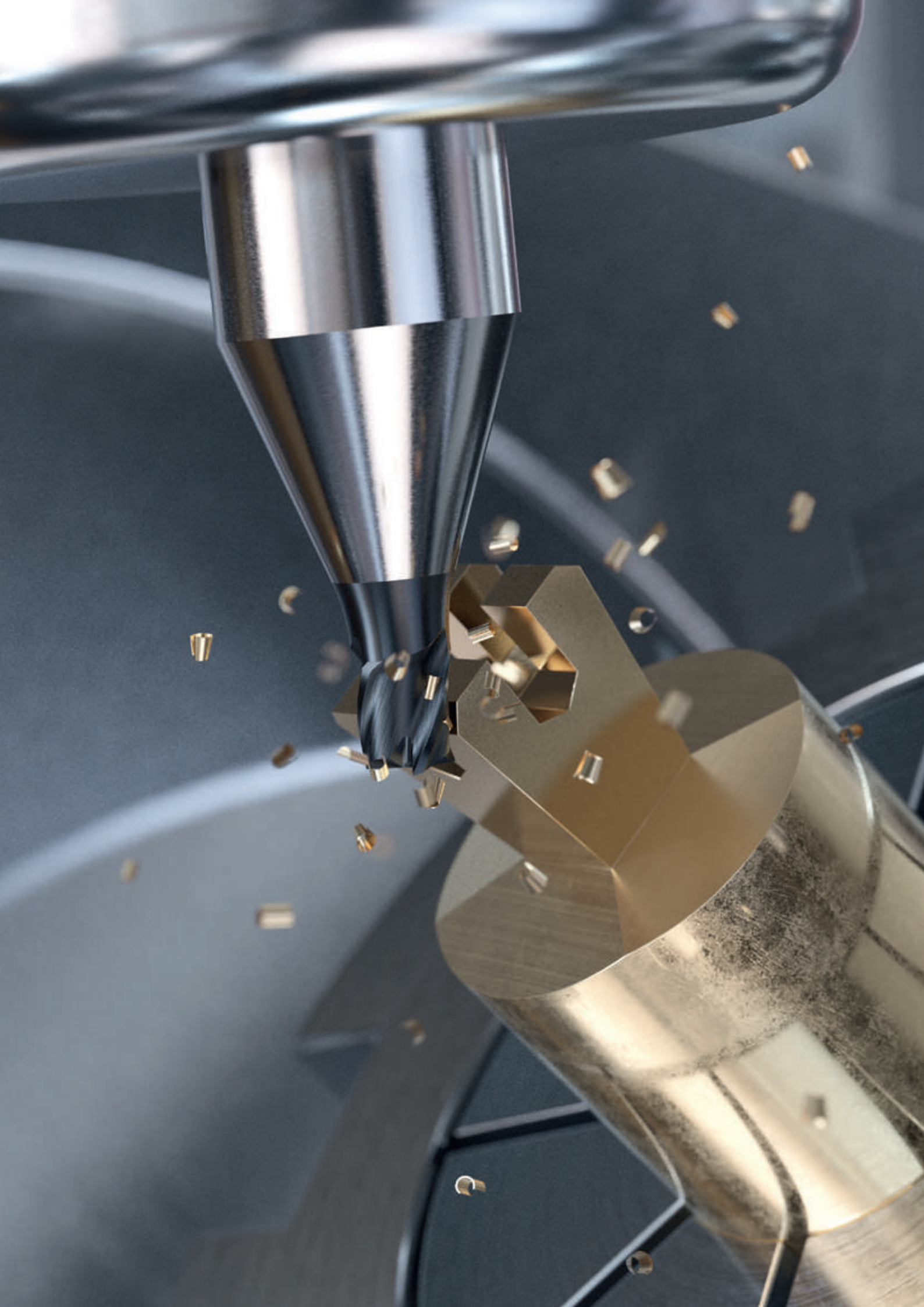
YOUR EXPERTISE MEETS NEW CHALLENGES

*//// **You are at the heart of excellence :** as a manufacturer of watchmaking, medical, and microtechnology components, your expertise is renowned, built on years of experience and a deep mastery of complex processes.*

You continually push the boundaries of precision and miniaturization, meeting the strictest requirements for quality and reliability. Your customers rely on your ability to turn bold ideas into flawless components.

However, the constant evolution of non-ferrous materials and standards introduces new complexities. Innovative alloys, developed to meet environmental and performance constraints, are challenging established machining methods.

Even with your solid expertise, new obstacles arise, threatening the smooth flow of your production and the impeccable quality that defines your reputation. You are ready to take on these challenges, but you know you need the right tools to continue excelling.



WHEN ABRASIVE MATERIALS CHALLENGE MACHINING

//// The emergence of new new lead-free alloys, copper-beryllium alloys, or platinum alloys and their derivatives ***presents a major challenge for precision machining.***

These highly abrasive materials severely wear down traditional tungsten carbide cutting tools.

The result: drastically reduced tool life, frequent tool changes, costly machine downtime, and lost productivity. Moreover, this premature wear generates burrs from the very first machined parts, regardless of lubrication strategies.

In the microtechnology sector, where every micron counts and the visual finish is crucial, these issues are significant. Deburring miniature parts becomes a costly, time-consuming and waste-generating operation, directly impacting profitability and final quality.

LOUIS BÉLET SA, YOUR MICRO-MACHINING PARTNER

//// *Facing these challenges, you are not alone...*

For decades, Louis Bélet SA has been a pioneer in high-precision micro-machining solutions.

Our reputation is built on uncompromising quality and a deep understanding of the specific needs of our most demanding customers. We do not just manufacture tools; we design solutions. Our strength lies in the unique synergy between our R&D department, constantly seeking innovation, and our Production department, with its extensive technical expertise and state-of-the-art equipment. This close collaboration allows us to quickly turn ideas into concrete products, tested and validated to meet our customers' requirements. We understand your constraints and share your passion for precision. Our commitment: empowering you to overcome your machining challenges.

//// *Ref. 41520*
Micro end mill

////EXCALIBUR


////EXCALIBUR

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//// Ref. 41510
Micro End Mill

//// Ref. 41520
Micro End Mill

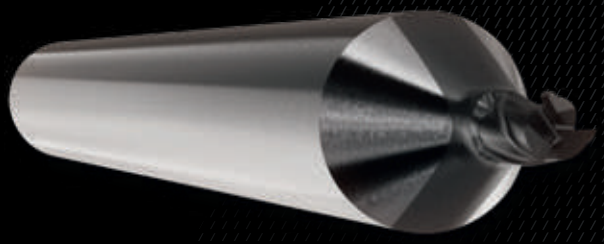
//// Ref. 45600
Thread Whirling Tool

//// Ref. 4580
Twist Drill

Fully customizable: *dimensions, tolerances, and geometries tailored to your specific needs.*

EXCALIBUR, THE NEXT-GEN LASER PCD REVOLUTION

//// To master the most challenging materials, our R&D department has developed a revolutionary solution: ***the Excalibur series.***



These exceptional tools are crafted from solid Polycrystalline Diamond (PCD), delivering unrivaled abrasion resistance and cutting performance. The secret lies in our fully controlled in-house manufacturing process: a high-quality PCD insert is brazed onto a tungsten carbide body using an optimized process. The helical cutting geometry is then meticulously sculpted using state-of-the-art laser machines, ensuring absolute precision and sharp, long-lasting cutting edges.

Born from extensive research and rigorous testing, Excalibur geometries are specifically engineered for micro-machining applications.

The range includes the 41510 and 41520 micro helical mills, as well as the 4580 micro twist drill and 45600 whirling tools, ready to take on your most complex machining challenges.

*////**6 µm** tolerance on the cutting diameter (0/-0.006)*

EXCALIBUR

Tool life is **50 à 100** times longer than coated carbide (in precious alloy)

//// Ref. 4580
Twist Drill

//// Ø 0.10 mm

minimum diameter

///EXCALIBUR

Thibaut Nicoulin
R&D Engineer

Jonathan Meister
Laser Application Engineer

THE FULLY INNOVATIVE PCD DRILL

« This project at Louis Bélet had been underway for many years. It took time and dedication to bring it to fruition, ***but today it's finally here - a true breakthrough.***

The observation was clear: when machining certain very hard-to-cut materials, carbide drills quickly reach their limits. The industry needed a more durable, more stable alternative, without compromising on precision. This need led to the development of our PCD (polycrystalline diamond) micro-drill.

Developing such a tool posed multiple challenges. We had to select a cutting geometry compatible with both PCD and the target materials, ensure consistent raw material quality, guarantee extreme manufacturing precision, and devise an optimal brazing strategy. Every detail mattered.

To ensure performance and durability, we partnered with a reliable material supplier who consistently delivers uniform quality. Most importantly, we invested in advanced laser machines capable of producing tools within the exceptionally tight tolerances required by the watchmaking and medical industries. Our manufacturing strategies were adapted to continuously deliver the most optimal tools possible.

What truly sets this drill apart is the expertise behind it: perfectly adapted geometries, very small and precise diameters, and outstanding results, especially in terms of tool life. Whereas a carbide tool quickly wears out, our PCD micro-drill offers significantly greater longevity.

This drill is the result of close collaboration across all sectors of our company. Of course, the best machines are essential, but above all, it is the dedication of our colleagues that made this possible. The launch of this drill is the fruit of that collective effort.

I am proud that, after years of anticipation, we have finally introduced our own PCD tool range. And this is just the beginning! A few years ago, producing a helical micro-tool in PCD was unthinkable. Today, not only do we manufacture it, but we are among the first to offer it at this level of quality. And we will keep pushing forward. There remains a vast field to explore in terms of tool variety.

This new drill embodies our accumulated expertise. Now it's up to you to make it a tool worthy of your ambitions ».

Thibaut Nicoulin

EXPERIENCE THE POWER OF EXCALIBUR IN YOUR WORKSHOP

*//// **Excalibur tools were thoroughly tested in real-world production** at multiple partner sites, facing the same challenges as you.*

The results were immediately encouraging and even exceeded expectations. The tool life observed is so exceptional that some clients have reconsidered their production planning.

Imagine tool changes and setups becoming significantly less frequent, freeing up valuable time for both operators and machines. Thanks to the exceptionally slow wear of PCD tools, the cutting geometry remains stable over time, ensuring consistent quality and drastically reducing burr formation-even after machining thousands of parts.

//// Ref. 4580
Twist drill

////EXCALIBUR

MASTER YOUR MACHINING, SECURE YOUR PRODUCTION

*//// **With Excalibur tools, the limits are pushed further.***
By adopting this cutting-edge technology, our clients have seen a dramatic improvement in both dimensional and visual quality of their machined parts.

Burr issues have been significantly reduced, and the reject rate has dropped dramatically.

By mastering the machining of hard-to-machine materials, you secure your production, meet your commitments, and enhance your customers' satisfaction. The Excalibur range is not just a new series of tools - it is your ally for the success of your most ambitious projects and the sustainability of your excellence in a competitive market.

//// Ref. 41510
Micro End Mill


////EXCALIBUR

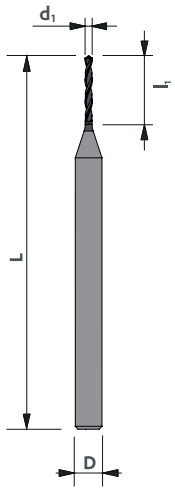
PCD Micro twist drill

4580

Material	Vc	Uncoated
Steel< 700 N/mm²	-	-
Steel > 700 N/mm²	-	-
Stainless steel	-	-
Cast iron	-	-
Copper	180	■
Brass - Bronze	280	■
Aluminium	250	■
Gold - Silver	200	■
Platinum - Palladium	100	■
Superalloys	-	-
Titanium	-	-
Composite	200	□

Tolerances 0/-0.006 D: h5

not adapted - adapted □ highly adapted ■



Art. n°	d_1	l_1	D	L	Z
4580d0.10	0.10	0.80	3	38	2
4580d0.11	0.11	0.90	3	38	2
4580d0.12	0.12	0.95	3	38	2
4580d0.13	0.13	1.05	3	38	2
4580d0.14	0.14	1.10	3	38	2
4580d0.15	0.15	1.20	3	38	2
4580d0.16	0.16	1.30	3	38	2
4580d0.17	0.17	1.35	3	38	2
4580d0.18	0.18	1.45	3	38	2
4580d0.19	0.19	1.50	3	38	2
4580d0.20	0.20	1.60	3	38	2
4580d0.21	0.21	1.70	3	38	2
4580d0.22	0.22	1.75	3	38	2
4580d0.23	0.23	1.85	3	38	2
4580d0.24	0.24	1.90	3	38	2
4580d0.25	0.25	2.00	3	38	2
4580d0.26	0.26	2.10	3	38	2
4580d0.27	0.27	2.15	3	38	2
4580d0.28	0.28	2.25	3	38	2
4580d0.29	0.29	2.30	3	38	2
4580d0.30	0.30	2.40	3	38	2
4580d0.31	0.31	2.50	3	38	2
4580d0.32	0.32	2.55	3	38	2
4580d0.33	0.33	2.65	3	38	2
4580d0.34	0.34	2.70	3	38	2
4580d0.35	0.35	2.80	3	38	2
4580d0.36	0.36	2.90	3	38	2
4580d0.37	0.37	2.95	3	38	2
4580d0.38	0.38	3.05	3	38	2
4580d0.39	0.39	3.10	3	38	2
4580d0.40	0.40	3.20	3	38	2
4580d0.41	0.41	3.30	3	38	2
4580d0.42	0.42	3.35	3	38	2
4580d0.43	0.43	3.45	3	38	2
4580d0.44	0.44	3.50	3	38	2
4580d0.45	0.45	3.60	3	38	2
4580d0.46	0.46	3.70	3	38	2
4580d0.47	0.47	3.75	3	38	2

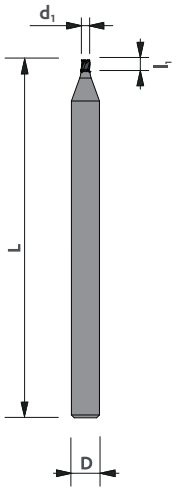
Art. n°	d_1	l_1	D	L	Z
4580d0.48	0.48	3.85	3	38	2
4580d0.49	0.49	3.90	3	38	2
4580d0.50	0.50	4.00	3	38	2
4580d0.51	0.51	4.10	3	38	2
4580d0.52	0.52	4.15	3	38	2
4580d0.53	0.53	4.25	3	38	2
4580d0.54	0.54	4.30	3	38	2
4580d0.55	0.55	4.40	3	38	2
4580d0.56	0.56	4.50	3	38	2
4580d0.57	0.57	4.55	3	38	2
4580d0.58	0.58	4.65	3	38	2
4580d0.59	0.59	4.70	3	38	2
4580d0.60	0.60	4.80	3	38	2
4580d0.61	0.61	4.90	3	38	2
4580d0.62	0.62	4.95	3	38	2
4580d0.63	0.63	5.00	3	38	2
4580d0.64	0.64	5.10	3	38	2
4580d0.65	0.65	5.20	3	38	2
4580d0.66	0.66	5.30	3	38	2
4580d0.67	0.67	5.35	3	38	2
4580d0.68	0.68	5.45	3	38	2
4580d0.69	0.69	5.50	3	38	2
4580d0.70	0.70	5.60	3	38	2
4580d0.71	0.71	5.70	3	38	2
4580d0.72	0.72	5.75	3	38	2
4580d0.73	0.73	5.85	3	38	2
4580d0.74	0.74	5.90	3	38	2
4580d0.75	0.75	6.00	3	38	2
4580d0.76	0.76	6.10	3	38	2
4580d0.77	0.77	6.15	3	38	2
4580d0.78	0.78	6.25	3	38	2
4580d0.79	0.79	6.30	3	38	2
4580d0.80	0.80	6.40	3	38	2
4580d0.81	0.81	6.50	3	38	2
4580d0.82	0.82	6.55	3	38	2
4580d0.83	0.83	6.65	3	38	2
4580d0.84	0.84	6.70	3	38	2
4580d0.85	0.85	6.80	3	38	2

Brut uniquement
Raw only - Nur rohe
Solo grezzo

Z2 **PCD**

λ **30°**

41510 PCD Micro Helical Mill



Material	Vc	Uncoated
Steel< 700 N/mm²	-	-
Steel > 700 N/mm²	-	-
Stainless steel	-	-
Cast iron	-	-
Copper	350	■
Brass - Bronze	500	■
Aluminium	1000	■
Gold - Silver	300	■
Platinum - Palladium	130	■
Superalloys	-	-
Titanium	-	-
Composite	200	□

Tolerances D_1 < 1mm - 0/-0.01 D_1 > 1mm - 0/-0.02 D: h5

not adapted - adapted □ highly adapted ■

Brut uniquement
Raw only - Nur rohe
Solo grezzo

PCD

Z2-3

γ 8-10°

λ 30°

ap

ap ae

Art. n°	d_1	pitch	D	L	Z
41510d0.20	0.20	0.20	3	38	2
41510d0.30	0.30	0.30	3	38	2
41510d0.40	0.40	0.40	3	38	2
41510d0.50	0.50	0.50	3	38	3
41510d0.60	0.60	0.60	3	38	3
41510d0.70	0.70	0.70	3	38	3
41510d0.80	0.80	0.80	3	38	3
41510d0.90	0.90	0.90	3	38	3
41510d1.00	1.00	1.00	3	38	3
41510d1.10	1.10	1.10	3	38	3
41510d1.20	1.20	1.20	3	38	3
41510d1.30	1.30	1.30	3	38	3
41510d1.40	1.40	1.40	3	38	3
41510d1.50	1.50	1.50	3	38	3

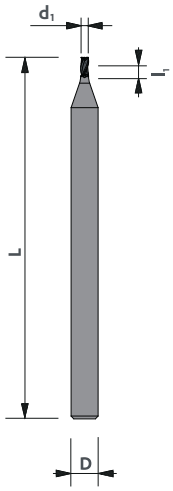
ap=0.15xd1 ae=0.03xd_1
ap=1xd_1

PCD Micro Helical Mill 41520

Material	Vc	Uncoated
Steel< 700 N/mm²	-	-
Steel > 700 N/mm²	-	-
Stainless steel	-	-
Cast iron	-	-
Copper	350	■
Brass - Bronze	500	■
Aluminium	1000	■
Gold - Silver	300	■
Platinum - Palladium	130	■
Superalloys	-	-
Titanium	-	-
Composite	200	□

Tolerances D_1 < 1mm - 0/-0.01 D: h5
D_1 > 1mm - 0/-0.02

not adapted - adapted □ highly adapted ■



Art. n°	d_1	pitch	D	L	Z
41520d0.20	0.20	0.40	3	38	2
41520d0.30	0.30	0.60	3	38	2
41520d0.40	0.40	0.80	3	38	2
41520d0.50	0.50	1.00	3	38	3
41520d0.60	0.60	1.20	3	38	3
41520d0.70	0.70	1.40	3	38	3
41520d0.80	0.80	1.60	3	38	3
41520d0.90	0.90	1.80	3	38	3
41520d1.00	1.00	2.00	3	38	3
41520d1.10	1.10	2.20	3	38	3
41520d1.20	1.20	2.40	3	38	3
41520d1.30	1.30	2.60	3	38	3
41520d1.40	1.40	2.80	3	38	3
41520d1.50	1.50	3.00	3	38	3

Brut uniquement
Raw only - Nur rohe
Solo grezzo

PCD

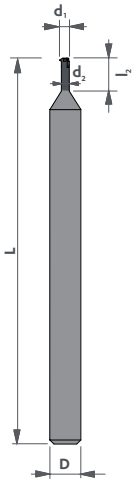
Z2-3

γ 8-10°

λ 30°

ap=0.15xd1 ae=0.03xd_1
ap=1xd_1

45600 PCD Whirling tools



Material	Vc	Uncoated
Steel< 700 N/mm²	Vitesse broche max	-
Steel > 700 N/mm²	Vitesse broche max	-
Stainless steel	Vitesse broche max	-
Cast iron	Vitesse broche max	-
Copper	Vitesse broche max	■
Brass - Bronze	Vitesse broche max	■
Aluminium	Vitesse broche max	■
Gold - Silver	Vitesse broche max	■
Platinum - Palladium	Vitesse broche max	■
Superalloys	Vitesse broche max	-
Titanium	Vitesse broche max	-
Composite	Vitesse broche max	□

Tolerances D: h5

not adapted - adapted □ highly adapted ■

Z3

PCD

Art. n°	Ø nominal	pitch	d_1	l_2	d_2	D	L
45600S0.60	S0.60	**0.150**	0.45	1.50	0.29	3	38
45600S0.70	S0.70	**0.175**	0.54	1.75	0.34	3	38
45600S0.80	S0.80	**0.200**	0.60	2.00	0.38	3	38
45600S0.90	S0.90	**0.225**	0.68	2.25	0.43	3	38
45600S1.00	S1.00	**0.250**	0.76	2.50	0.48	3	38
45600S1.20	S1.20	**0.250**	0.94	2.50	0.66	3	38
45600S1.40	S1.40	**0.300**	1.10	3.00	0.76	3	38
45600M1.00	M1.00	**0.250**	0.76	2.50	0.48	3	38
45600M1.20	M1.20	**0.250**	0.94	2.50	0.66	3	38
45600M1.40	M1.40	**0.300**	1.10	3.00	0.76	3	38
45600M1.60	M1.60	**0.350**	1.25	3.50	0.85	3	38
45600M1.80	M1.80	**0.350**	1.45	3.50	1.05	3	38
45600M2.00	M2.00	**0.400**	1.60	4.00	1.15	3	38
45600M2.20	M2.20	**0.450**	1.70	4.50	1.19	3	38
45600M2.50	M2.50	**0.450**	2.00	5.00	1.49	3	38
45600M3.00	M3.00	**0.500**	2.40	5.50	1.84	3	38

Other dimensions, CVD/CBN available upon request.

Options

MCU ≤ ø3

701S ≤ ø6

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