

# LEUCO

MAGENTIFY COMPOSITE PROCESSING

## COMPOSITE MACHINING CP 05



Precision tools for milling, drilling  
and cutting of fiber-reinforced plastics

[www.leuco.com/composite-processing](http://www.leuco.com/composite-processing)

# FIBER-REINFORCED PLASTICS & WOOD

## WHY LEUCO?

### → DRILL BITS & COUNTERSINKS

Drilling into fiber-reinforced plastics leads to significant wear of common carbide drill bits or delamination of the component. LEUCO offers a special patented drill bit geometry in tungsten carbide, combining long tool life with excellent machining quality. Its range also includes diamond-tipped drill bits for long edge life in abrasive materials.

### → MILLING CUTTERS

Milling of fiber-reinforced plastics is done in many industries, with very different requirements for milling tools. What material is to be machined? What machining method is to be used? Using robust and rigid CNC machines or more unstable robots? LEUCO offers a vast range of shank-type cutters for machining composites. The range of tools extends from simple double-edge shank-type cutters for standard applications to the patented p-System cutter featuring excellent edge life and cutting quality. This range is supplemented by cutters with a large number of teeth, which allow high cutting speeds and can therefore be used very economically.

### → SAW BLADES

Sawing is the most effective machining method for long straight contours. This method is still rather unknown for fiber-reinforced plastics. LEUCO saw blades achieve good cutting quality at high feed rates. This combination is made possible by the saw tooth geometry of LEUCO nn-System and g5-System tools, which allows for scoring.

### → ACCESSORIES

But tools are not alone responsible for successful machining. Often, it is only by intelligently combining tools, chucks and, if applicable, aggregate technology that the optimal and most economical machining results are achieved. Clamping elements for CNC technology at LEUCO: Collet chucks are devices of the past. These are mechanical clamping elements with all the disadvantages of wear and loss of accuracy. LEUCO relies on modern and highly accurate clamping elements for precision tools such as „LEUCO ps-System“ (hydraulic expansion clamping technology) or shrink chucks. State-of-the-art clamping chucks also contribute to your tool's edge life. LEUCO offers all you need.

## COMMON GROUND BETWEEN FIBER-REINFORCED PLASTICS & WOOD-BASED MATERIALS

Wood is the oldest fiber material known in the world. Machining this material is part of LEUCO's everyday business. It suggests itself to transfer our expertise in milling and drilling of wood-based materials to fiber-reinforced materials such as CFRP and benefit from it. This is what LEUCO does, bringing in additional features such as cutting and many more.

**More than 65 years of experience in providing solutions for the machining of fiber-reinforced materials – tool solutions for many industries**

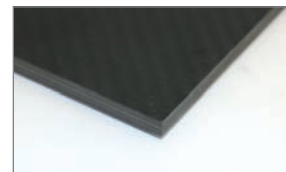


# MATERIALS & TOOLS

Many composite materials have been designed to match application-specific needs and satisfy the corresponding requirements. Fiber-reinforced materials can be categorized according to the fiber used and the matrix. Sandwich constructions are distinguished by their core layer: honeycomb core or foam core.

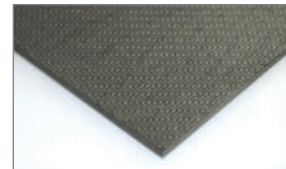
## CFRP – CARBON-FIBER REINFORCED PLASTIC

Highest strength and rigidity combined with very low density make CFRP the lightweight construction material of the future. The positive characteristics of carbon fiber materials stand in conflict with their difficult machining properties. Cutting tools must be able to resist the material's extreme abrasiveness – **here LEUCO offers diamond-tipped tools combining maximum edge life and excellent cutting quality.**



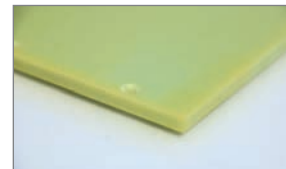
## CFRC – CARBON-FIBER REINFORCED CARBON

CFRC is characterized by high heat resistance. Due to the carbon matrix, the fiber-matrix adhesion is significantly worse than with CFRP, which often leads to delamination and cutting edge breakage. **This can be efficiently prevented by using LEUCO's p-System shank-type cutter.**



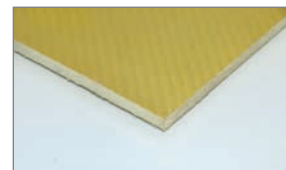
## GFRP – GLASS-FIBER REINFORCED PLASTIC

GRP is used in many applications because this material is relatively cheap, while still significantly improving, thanks to the glass fibers, the technical properties of plastic. Glass fibers are also characterized by high abrasiveness – **diamond-tipped tools provide for long edge life.**



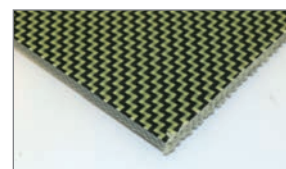
## AFRP – ARAMID-FIBER REINFORCED PLASTIC

Their low density makes aramid fibers extremely light, and they also feature high tensile strength. In contrast to carbon fibers and glass fibers, aramid fibers exhibit ductile behavior instead of brittleness. When machining AFRP, extreme fraying of the fibers frequently occurs. **The p-System shank-type cutter from LEUCO guarantees best cutting and drilling results.**



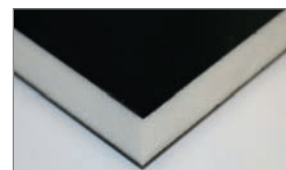
## VARIOUS FIBERS (HYBRID FABRICS) IN PLASTIC

Different fibers are often interwoven to combine the positive properties of the individual fibers. However, this even increases the challenges of machining. **For such composites as well, LEUCO offers individual tool solutions.**



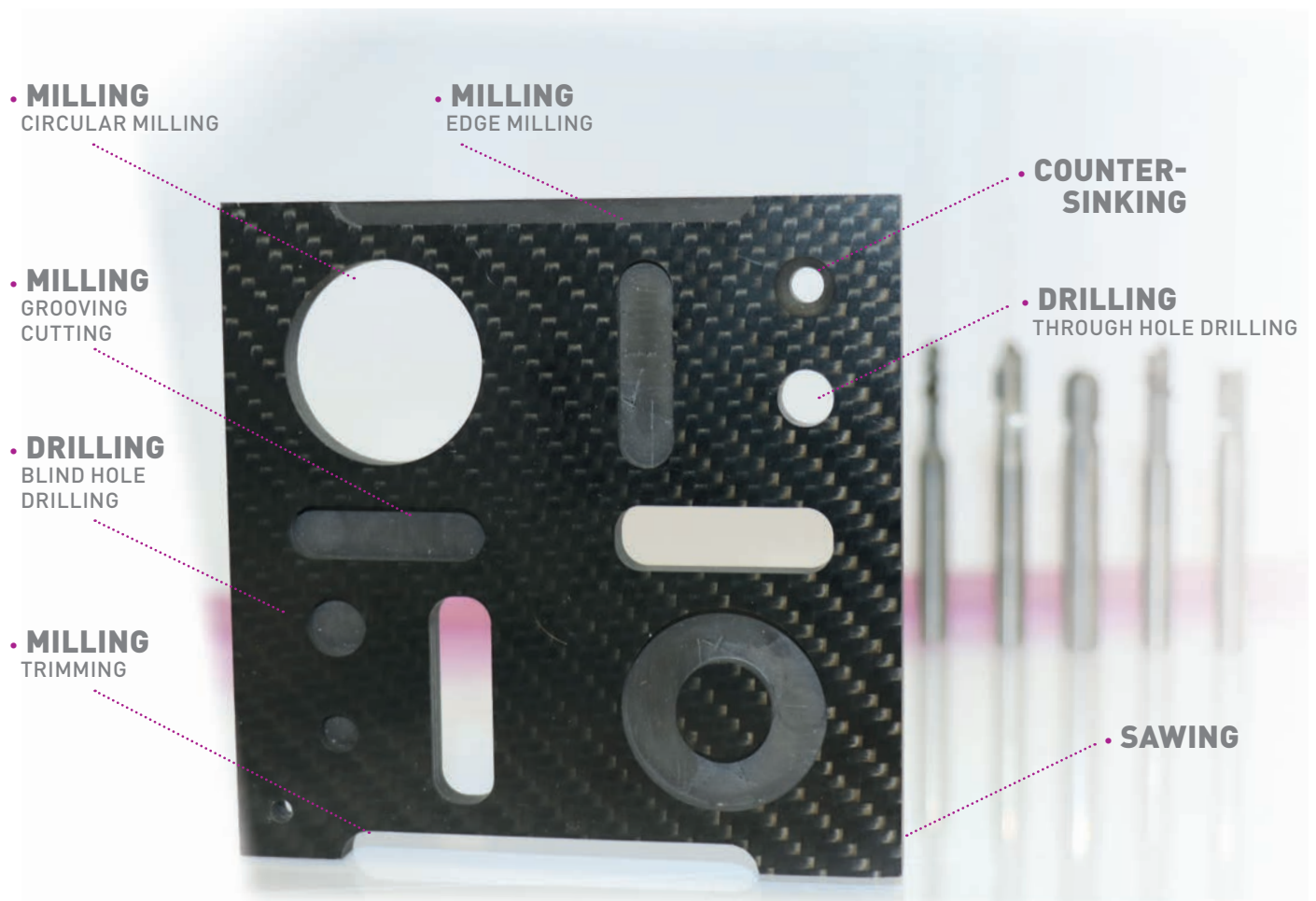
## SANDWICH CONSTRUCTIONS

Sandwich constructions with honeycomb core or foam core are frequently used in the aviation and automotive industries. The challenge with machining is not to destroy the delicate honeycomb or foam cores. **LEUCO provides special cutters and drill bits as well as circular saw blades for this purpose.**



# → APPLICATIONS

Components made of fiber-reinforced plastics and other composites are produced with a near net shape, but reworking is almost always necessary. Machining processes are very often applied for such rework tasks. They have proven to provide higher dimensional accuracy and flexibility compared to water jet cutting and laser processing.



Application example LEUCO p-System milling cutter:  
 Left and right – common bad machining quality in AFRP produced by uncoated and coated solid carbide milling cutters.  
 Middle - excellent machining quality even with aramid fibers produced by p-System milling cutter.



## → MILLING

Milling is used to create perfect external and internal contours and functional surfaces. Furthermore, circular milling or wave milling processes can be used to produce holes in the required quality. Frequent problems related to milling are insufficient cutting quality (protruding fibers, delamination, bevel inconsistencies) and short edge life.

**LEUCO's diamond-tipped p-System shank-type cutters combine the good cutting quality and sharpness of solid tungsten carbide cutters with the long edge life of diamond cutting material.**

## → DRILLING AND COUNTERSINKING

Drilling and countersinking are mainly used for preparing joints such as riveted joints, for example. Problems occur when the drill bit enters and exits the material. Pressure and tensile forces of the drill separate the individual composite layers from each other, thus causing delamination or chipping.

**The special tip geometry of LEUCO's high-performance drill bit with centering point and spurs effectively reduces the forces created during drilling, preventing delamination and protruding fibers.**

## → SAWING

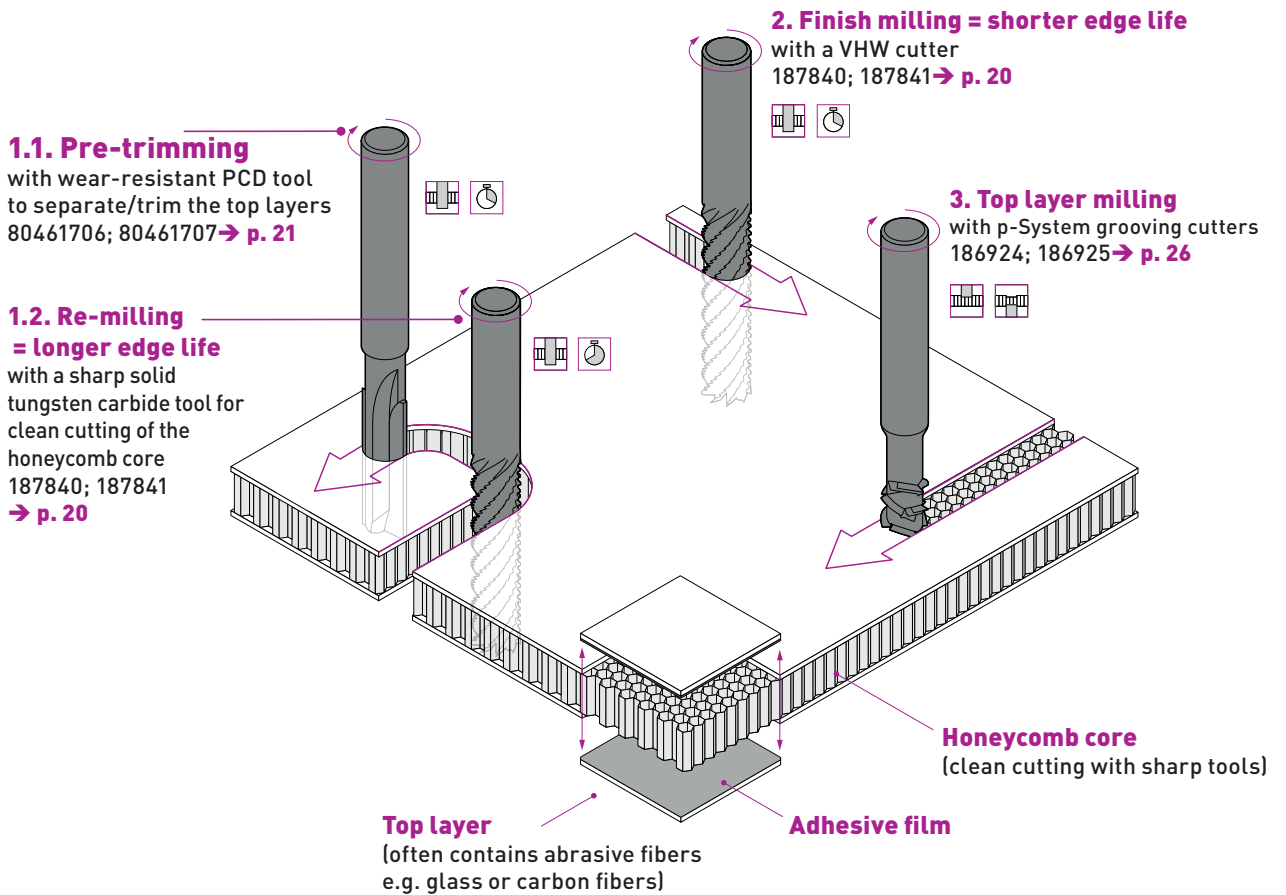
Sawing is used for similar purposes as peripheral milling. It can replace trimming with a milling cutter and is highly effective and economical for straight dividing cuts.

**LEUCO's diamond-tipped nn-system DP flex saw blades and DIAREX sizing saw blades guarantee best cutting quality for materials such as CFRP, GFRP and AFRP.**

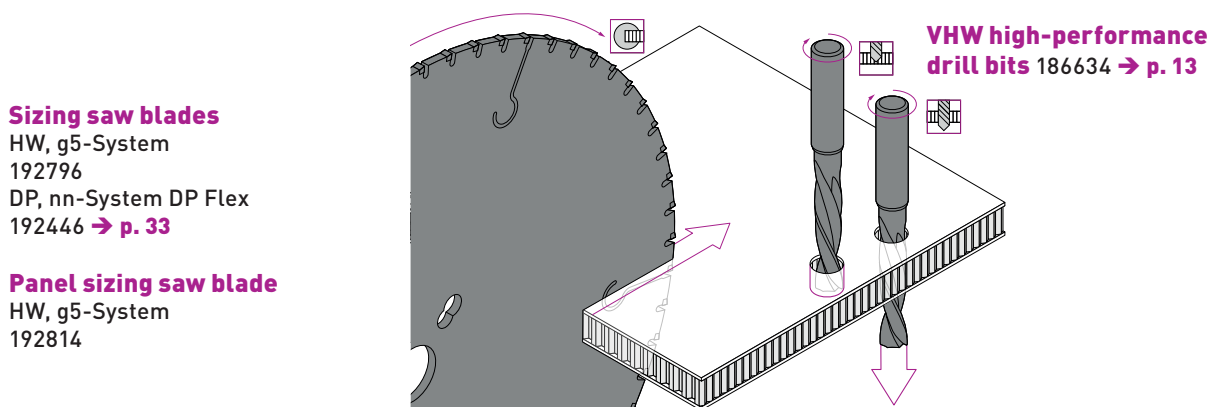


# → HONEYCOMB PANEL MACHINING

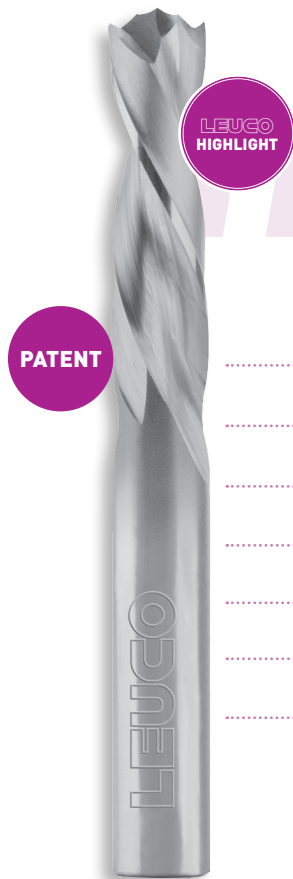
## → Milling - 3 variants



## → Sawing and drilling



# → LEUCO HIGHLIGHTS



## VHW high-performance drill bits

- Patented bit geometry
- Precise centering
- No push-out or peel-up delamination
- No protruding fibers
- No chipping
- Long edge life
- Universal application

### A guarantee for high drilling quality and long edge lives

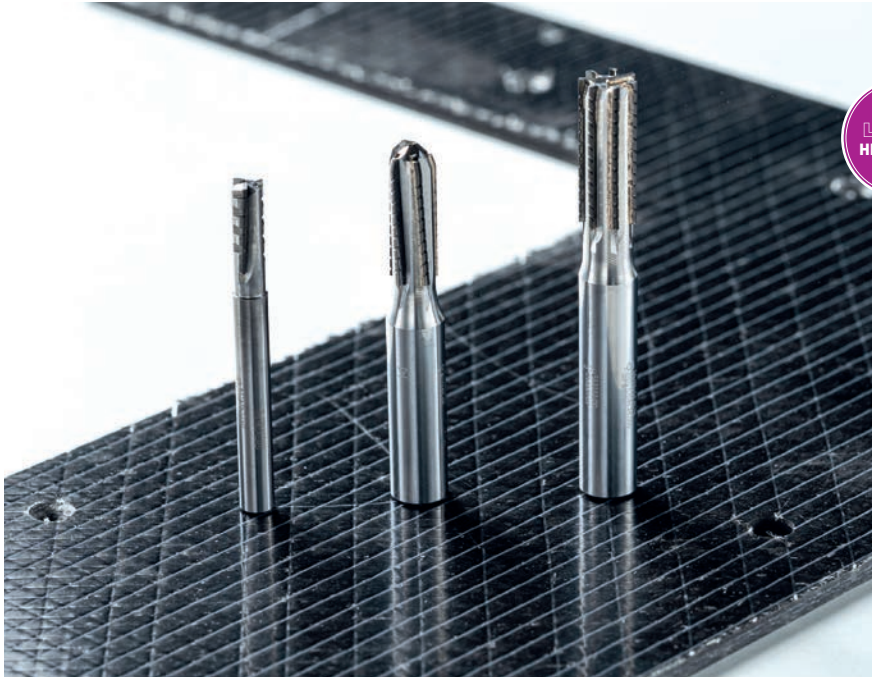
For the machining of CFRP, GFRP and AFRP, LEUCO therefore relies on the patented "high-performance drill bit VHW". Due to the special geometry of the drill bit tip, the cutting forces during drilling are reduced significantly, the fibers of the top layers to be cut are set under pretension and are scored before the main drilling operation. This prevents delamination, chipping and protruding fibers and ensures a uniform high quality of the borehole and, at the same time, a longer edge life compared with conventional drill bits.

→ VHW high-performance drill bits. Excellent drilling quality in detail. See video.



→ Product range, page 12

# → LEUCO HIGHLIGHTS



The LEUCO UniType (left) and ProType cutters (right and in the middle) are designed especially for thin-walled composite components.

## PCD MILLING TOOLS FROM LEUCO

### OPPORTUNITIES THROUGH USE OF DIAMOND-TIPPED CUTTERS

**In the automotive industry, polycrystalline diamond (PCD) is still a rarely used cutting material when machining fiber-reinforced plastics. However, for those who need long edge life and the best surface quality, LEUCO offers the right solution with its PCD-tipped UniType or ProType cutters.**

When milling fiber-reinforced plastics (FRP), most cutting materials quickly reach their limits. The cutting edges of carbide cutters can be so worn after only a few running meters of material that they no longer cut cleanly or the dimensional accuracy of the component can no longer be maintained. Even the most modern CVD diamond coatings offer only a limited remedy here.

In the automotive industry in particular, very thin-walled and geometrically complex components, which are produced in medium to large series using the RTM process, usually have to be processed. The classic PCD cutters, which are otherwise used on a large scale in engine block production, for exam-

ple, are unsuitable for this purpose because they do not meet the requirements for smooth running. Negative consequences include vibrations, tool failure as well as poor cutting quality and, at the same time, insufficient edge life.

In contrast, LEUCO offers PCD cutters that are adapted to the special requirements of machining FRP in the automotive industry. Through use of cutters with many teeth and sophisticated tool geometries, it is also possible to cut unstable and thin components without vibration and with minimal cutting forces. Only in this way can the advantages of the extremely wear-resistant PCD cutting edges be used fully.

In other fields of application as well, PCD cutters from LEUCO are always adapted to the individual requirements so that the diamond-tipped blades can be utilized to their full potential. As a result, LEUCO has an economical solution for companies that require long edge lives in conjunction with high quality when processing FRP.

LEUCO is a leader when it comes to manufacturing machine tools for woodworking – with decades of experience. Since both wood and FRP are inhomogeneous composite materials that behave in an amazingly similar way in terms of machining, LEUCO can offer almost unrivaled possibilities with its PCD cutters optimized for FRP.

An important advantage here is LEUCO's process consulting. This is because there are many basic conditions to be observed when economically finishing or roughing with milling tools: What is the application? Do you want to cut, trim, groove or is copy milling the main task? What is the primary material to be processed? Which machine and which clamping devices will be used? Cycle time requirements, workpiece clamping and much more. LEUCO offers various types of milling cutters, some of which can be used universally while others are designed for special applications, such as machining aramid fiber-reinforced plastics (AFK).

→ **Product range, page 23**



## PANELING AND STRUCTURAL PARTS WITH ACCURATE VISIBLE EDGES AND VERY LONG EDGE LIVES

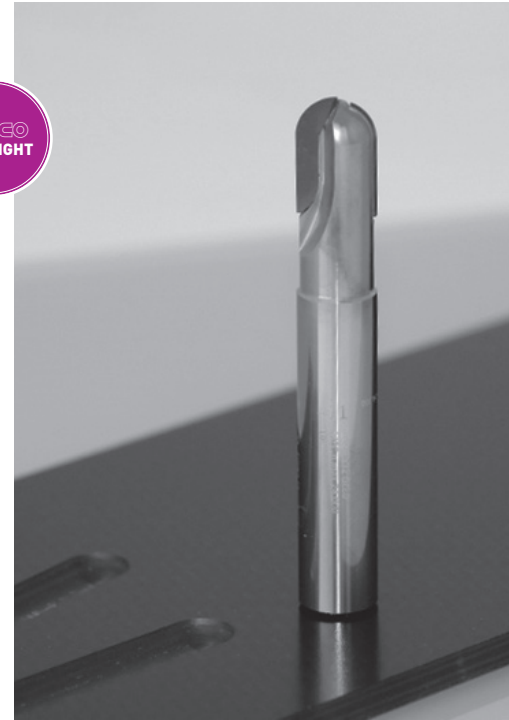
### BALL END MILL DP

**In the last few years, fiber-reinforced plastics have gained an increasingly higher significance in the automotive industry. Whether as visible paneling parts in sports cars or as structural parts in electric vehicles, the former secondary characters become main characters and are more and more often presented as distinguishing features by many manufacturers. This transformational change does not take place without impact on the processing – many companies know the challenges to cope with during the machining process.**

Thanks to the range of ball end mills, LEUCO is able to offer a tool solution which allows not only the processing of block materials in the mold making industry but also the machining of composite materials with abrasive fibers.

These milling tools are used, for example, to process connection points or surfaces of CFRP RTM parts of a car manufacturer. In order to achieve a reliably consistent milling quality, LEUCO uses a particularly wear-resistant PCD type. State-of-the-art techniques are used in the LEUCO production in order to obtain the required sharpness of the ball end mills for a clear cut of the fibers. A good surface quality can be achieved by a minimally alternating shear angle of the edges which does not affect the smooth running. Due to the sum of these small details, an apparently simple tool becomes a sophisticated and target-oriented industry solution.

→ Product range, page 22



Diamond-tipped cutter for chip-free paneling and structural parts with long edge lives.

## PCD CUTTERS FROM LEUCO

### FINE FINISH PLUS LONG EDGE LIFE

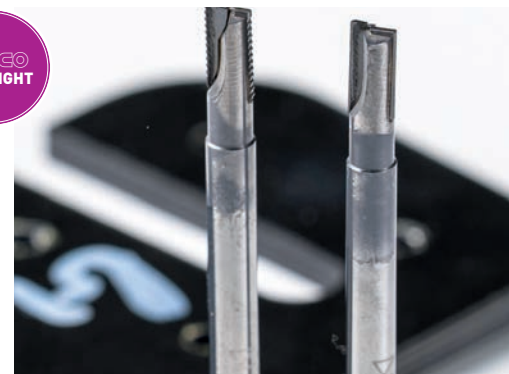
**A supplier to the aircraft industry is now achieving its goals in the production of CFRP stringers: exceptionally smooth surfaces with long cutter edge life. The solution: two complementary PCD tools from LEUCO. They easily meet both requirements.**

Stringers are long, profile-like braces that reinforce aircraft fuselages, among other things. The stringers consist of CF-PEEK – carbon fibers with a thermoplastic PEEK matrix. The challenge here is to achieve the required extremely smooth surface with a surface roughness value (Ra) of less than 3.2 µm. This surface quality can certainly be achieved with some tools available on the market. However,

the cutting edge wear is then too high to meet the quality requirements over a n extended period of time.

The supplier tested a combination of a roughing and a finishing tool recommended by LEUCO. This brought the breakthrough: Combined machining with these PCD tools significantly extended tool life. The surface roughness value of less than 3.2 µm was no problem for the roughing and finishing tool combination.

→ Product range, page 24



The combination of roughing and finishing with PCD cutters achieves the goal in stringer production.

# → DRILL BITS & COUNTERSINKS

PRODUCT	PICTURE	MATERIAL		
		CFRP	GFRP	AFRP
Solid Carbide High-Performance Drill		+	++	
Drill bit 90/30 VHW				+
DP Drill		+		+
Solid-DP Drill			+	+
Full-Nib-DP Drill			+	+
Cone Countersink DP		+	+	+
Counterbore DP		++	++	+
Flat Countersink DP		+	+	+
Countersink DP		++	++	

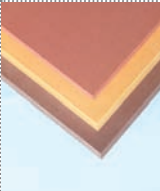
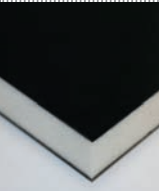
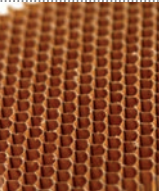



Recommended by LEUCO

++ well suited

+ suitable

✓ possible

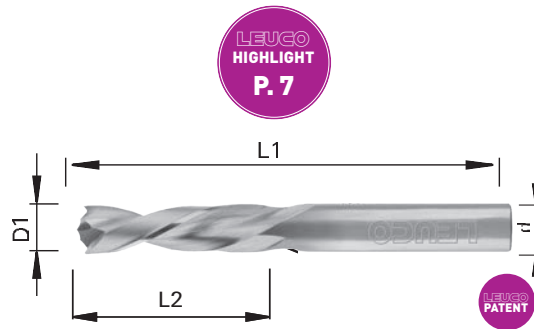
MATERIAL			APPLICATION		MACHINE			PAGE
Block material	Sandwich Foam	Honeycomb	Drilling	Countersinking	CNC / Gantry	Drill feed units	Hand-held machines	
								
	++	++	✓		✓	✓	✓	12
++	++	+	✓		✓	✓		14
+	++	+	✓		✓			14
+	++	+	✓		✓			15
+	++	+	✓		✓			15
+	+			✓	✓	✓	✓	16
+	+	+	✓	✓	✓			16
+	+			✓		✓	✓	17
+	+			✓		✓	✓	17

# → DRILL BITS & COUNTERSINKS

135692

## → Solid Carbide High-Performance Drill

- | Patented grind with extremely "aggressive" tooth geometry.
- | Very good quality at the entry and exit area of the drill due to the low cutting pressure.
- | Due to this, significantly higher edge life compared with conventional solid carbide drill bits.
- | For all fiber-reinforced materials, such as CFRP, GFRP, but also AFRP and honeycomb.



D1	D2	∠	α	L3	L2	L1	d	Z	R/L	Ident-No.	LKZ
2			30	17	50	6	2	2	RH	187001	o
2,1			30	17	50	6	2	2	RH	187002	o
2,2			30	17	50	6	2	2	RH	187003	o
2,3			30	17	50	6	2	2	RH	187004	o
2,4			30	17	50	6	2	2	RH	187005	o
2,5			30	20	50	6	2	2	RH	187006	o
2,6			30	20	50	6	2	2	RH	187007	o
2,7			30	20	50	6	2	2	RH	187008	o
2,8			30	20	50	6	2	2	RH	187009	o
2,9			30	20	50	6	2	2	RH	187010	o
3			30	20	50	6	2	2	RH	186584	●
3,1			30	20	50	6	2	2	RH	186585	o
3,2			30	20	50	6	2	2	RH	186586	●
3,3			30	20	50	6	2	2	RH	186587	●
3,4			30	20	50	6	2	2	RH	186588	o
3,5			30	20	50	6	2	2	RH	186589	o
3,6			30	20	50	6	2	2	RH	186590	o
3,7			30	20	50	6	2	2	RH	186591	o
3,8			30	20	50	6	2	2	RH	186592	o
3,9			30	20	50	6	2	2	RH	186593	o
4			30	26	57,5	6	2	2	RH	186594	●
4,1			30	26	57,5	6	2	2	RH	186595	o
4,2			30	26	57,5	6	2	2	RH	186596	●
4,3			30	26	57,5	6	2	2	RH	186597	o
4,4			30	26	57,5	6	2	2	RH	186598	o
4,5			30	26	57,5	6	2	2	RH	186599	o
4,6			30	26	57,5	6	2	2	RH	186600	o
4,7			30	26	57,5	6	2	2	RH	186601	o
4,8			30	26	57,5	6	2	2	RH	186602	o
4,9			30	26	57,5	6	2	2	RH	186603	o
5			30	31	70	6	2	2	RH	186604	●
5,1			30	31	70	6	2	2	RH	186605	o
5,2			30	31	70	6	2	2	RH	186606	●
5,3			30	31	70	6	2	2	RH	186607	o
5,4			30	31	70	6	2	2	RH	186608	o
5,5			30	31	70	6	2	2	RH	186609	o
5,6			30	31	70	6	2	2	RH	186610	o
5,7			30	31	70	6	2	2	RH	186611	o
[mm]	[mm]	[°]	[°]	[mm]	[mm]	[mm]	[mm]			Continuation see next page	

Continuation Solid Carbide High-Performance Drill

D1	D2	∠	α	L3	L2	L1	d	Z	R/L	Ident-No.	LKZ
5,8			30		31	70	6	2	RH	186612	o
5,9			30		31	70	6	2	RH	186613	o
6			30		31	70	6	2	RH	186614	●
6,1			30		31	70	8	2	RH	186615	o
6,2			30		31	70	8	2	RH	186616	●
6,3			30		31	70	8	2	RH	186617	o
6,4			30		31	70	8	2	RH	186618	o
6,5			30		31	70	8	2	RH	186619	o
6,6			30		31	70	8	2	RH	186620	o
6,7			30		31	70	8	2	RH	186621	o
6,8			30		31	70	8	2	RH	186622	o
6,9			30		31	70	8	2	RH	186623	o
7			30		31	70	8	2	RH	186624	●
7,1			30		31	70	8	2	RH	186625	o
7,2			30		31	70	8	2	RH	186626	o
7,3			30		31	70	8	2	RH	186627	o
7,4			30		31	70	8	2	RH	186628	o
7,5			30		31	70	8	2	RH	186629	o
7,6			30		31	70	8	2	RH	186630	o
7,7			30		31	70	8	2	RH	186631	o
7,8			30		31	70	8	2	RH	186632	o
7,9			30		31	70	8	2	RH	186633	o
8			30		31	70	8	2	RH	186634	●
8,1			30		31	70	10	2	RH	186635	o
8,2			30		31	70	10	2	RH	186636	●
8,3			30		31	70	10	2	RH	186637	o
8,4			30		31	70	10	2	RH	186638	o
8,5			30		31	70	10	2	RH	186639	●
8,6			30		31	70	10	2	RH	186640	o
8,7			30		31	70	10	2	RH	186641	o
8,8			30		31	70	10	2	RH	186642	o
8,9			30		31	70	10	2	RH	186643	o
9			30		31	70	10	2	RH	186644	●
9,1			30		31	70	10	2	RH	186645	o
9,2			30		31	70	10	2	RH	186646	o
9,3			30		31	70	10	2	RH	186647	o
9,4			30		31	70	10	2	RH	186648	o
9,5			30		31	70	10	2	RH	186649	o
9,6			30		31	70	10	2	RH	186650	o
9,7			30		31	70	10	2	RH	186651	o
9,8			30		31	70	10	2	RH	186652	o
9,9			30		31	70	10	2	RH	186653	o
10			30		31	70	10	2	RH	186654	●
11			30		36	80	12	2	RH	186655	o
12			30		36	80	12	2	RH	186656	o
13			30		41	90	14	2	RH	186657	o
14			30		41	90	14	2	RH	186658	o
15			30		41	90	16	2	RH	186659	o
16			30		41	90	16	2	RH	186660	o
17			30		46	100	18	2	RH	187011	o
18			30		46	100	18	2	RH	187012	o
19			30		46	100	20	2	RH	187013	o
20			30		46	100	20	2	RH	187014	o
21			30		51	110	25	2	RH	187015	o
22			30		51	110	25	2	RH	187016	o
23			30		51	110	25	2	RH	187017	o
24			30		51	110	25	2	RH	187018	o
25			30		51	110	25	2	RH	187019	o
[mm]	[mm]	[°]	[°]	[mm]	[mm]	[mm]	[mm]				

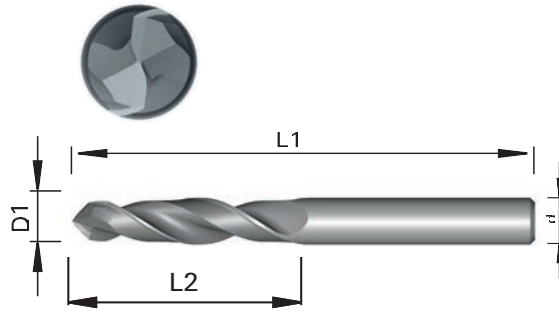
Other dimensions and configurations on request.

Delivery status: ● available from stock ○ Delivery time upon request | LKZ: Delivery sign  
 R/L: RH right LH left | ∠: tip angle/countersink angle/step angle | α: spiral angle/shear angle

135192

→ **Drill bit 90/30 VHW**

- | Optimized tip geometry for chip-free through holes.
- | Long edge life due to reduced cutting forces and micrograin carbide.
- | Very well suited for für UD laminates for example CFRP.



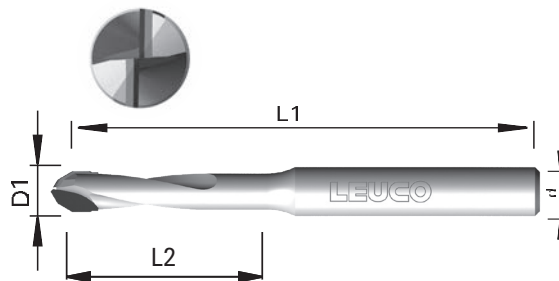
D1	D2	∠	α	L3	L2	L1	d	Z	R/L	Ident-No.	LKZ
4		90/30	30		22	55	4	2	RH	187816	●
6		90/30	30		25	60	6	2	RH	187818	●
8		90/30	30		35	80	8	2	RH	187825	●
10		90/30	30		40	90	10	2	RH	187827	●
[mm]	[mm]	[°]	[°]	[mm]	[mm]	[mm]	[mm]				

Intermediate dimensions continuously from diameter 2.0 mm to 12.0 mm as well as diamond coatings on request.

235142

→ **DP Drill**

- | Long edge life when machining extremely hard and abrasive materials thanks to two DP cutting edges.
- | Simple drill bit geometries for less challenging materials to be drilled.



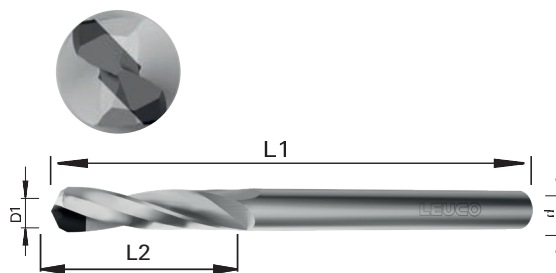
D1	D2	∠	α	L3	L2	L1	d	Z	R/L	Ident-No.	LKZ
4		120/60			20	50	4	2	RH	187175	●
5		120/60			20	60	6	2	RH	187176	●
6		120/60			25	60	6	2	RH	187177	●
8		120/60			30	70	8	2	RH	187178	●
10		120/60			35	80	10	2	RH	187179	●
[mm]	[mm]	[°]	[°]	[mm]	[mm]	[mm]	[mm]				

Other dimensions and configurations on request.

235122

→ **Solid-DP Drill**

- | Continuous DP cutting edge for more design options of the drill bit geometry as well as higher edge lives.
- | Can be designed individually according to the requirements of the material/desired machining quality.



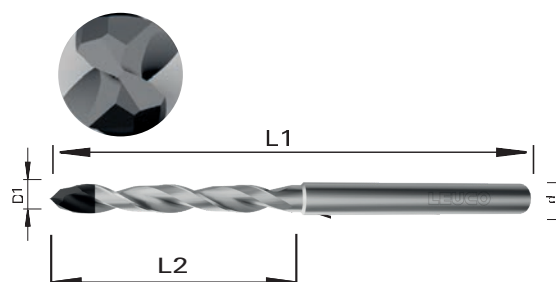
D1	D2	∠	α	L3	L2	L1	d	Z	R/L	Ident-No.	LKZ
4		130/60	20		26	60	4	2	RH	187180	●
6		130/60	20		26	70	6	2	RH	187181	●
8		130/60	20		31	70	8	2	RH	187182	●
[mm]	[mm]	[°]	[°]	[mm]	[mm]	[mm]	[mm]				

Other dimensions and configurations on request.

235112

→ **Full-Nib-DP Drill**

- | The complete full-nib-DP drill bit offers maximum freedom when choosing the drill bit geometry.
- | Therefore a number of teeth higher than two is possible.
- | Also possible with very small diameters.
- | Can be designed individually according to the requirements of the material/desired machining quality.



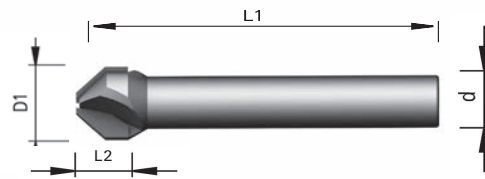
D1	D2	∠	α	L3	L2	L1	d	Z	R/L	Ident-No.	LKZ
3,3		90/30	30		27	59	4	2	RH	187183	●
5		90/30	30		27,5	76	5	2	RH	187184	●
6,35		90	25		19	76	6,35	3	RH	187185	○
[mm]	[mm]	[°]	[°]	[mm]	[mm]	[mm]	[mm]				

Other dimensions and configurations on request.

234119

## → Cone Countersink DP

Countersinks with shank for the use on CNC machines or robots.



D1	D2	∠	α	L3	L2	L1	d	Z	R/L	Ident-No.	LKZ
6,3		90			2,7	45	5	2	RH	187155	o
8,3		90			3,2	50	6	3	RH	187152	●
10,4		90			3,9	50	6	3	RH	187154	o
12,4		90			4,5	56	8	3	RH	187151	●
16,5		90			6,0	60	10	3	RH	187153	o
20,5		90			7,8	63	10	3	RH	187150	●
[mm]	[mm]	[°]	[°]	[mm]	[mm]	[mm]	[mm]				

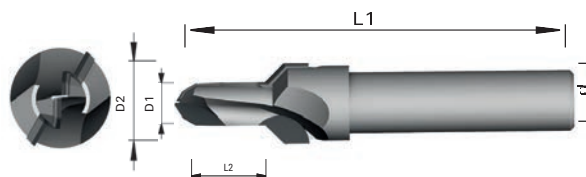
235342

## → Counterbore DP

For drilling and countersinking in one pass (one-shot).

Reduces the processing times.

Plunging tip designed according to the requirement as standard drill bit DP, as drill bit solid carbide DP or complete full-nib drill bit DP.



D1	D2	∠	α	L3	L2	L1	d	Z	R/L	Ident-No.	LKZ
12,05	16	120/30+90			45	120	12	2+2	RH	187163	o
8,2	14	120/30+90			45	120	12	2+2	RH	187164	o
8,55	16	120/30+90			14	80	12	2+2	RH	187165	o
[mm]	[mm]	[°]	[°]	[mm]	[mm]	[mm]	[mm]				

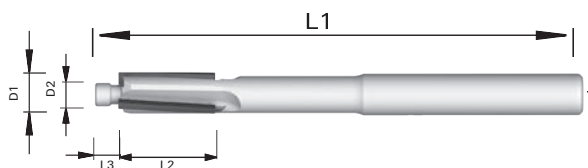
Other dimensions and configurations on request.



234211S

### → Flat Countersink DP

- | Flat countersink with cylindrical shaft and fixed guide pins according to DIN 373.
- | For the machining of countersink holes for cylinder head or hexagon head screws.

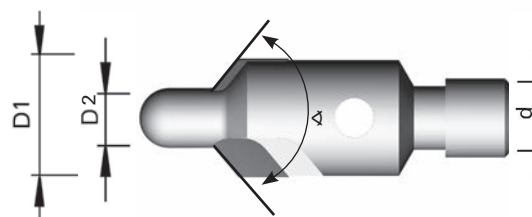


D1	D2	∠	α	L3	L2	L1	d	Z	R/L	Ident-No.	LKZ
6,5	3,4			3,4	14	71	6	3	RH	187156	o
8	4,5			4,5	14	71	8	3	RH	187157	o
10	5,5			5,5	18	80	8	3	RH	187158	o
11	6,6			6,6	18	80	8	3	RH	187159	o
15	9			9	22	100	12	3	RH	187160	o
18	11			11	22	100	12	3	RH	187161	o
20	13,5			13,5	22	100	12	3	RH	187162	o
[mm]	[mm]	[°]	[°]	[mm]	[mm]	[mm]	[mm]				

234121

### → Countersink DP

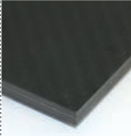






















- | Counterbore with thread for the use in hand-held machines.
- | Available with fixed or exchangeable guiding pin.
- | Interface to the machine, guiding pin and countersink angle according to customer requirements.



D1	D2	∠	α	L3	L2	L1	d	Z	R/L	Ident-No.	LKZ
10	3	100					M6	2	RH		S
12	3	100					M6	2	RH		S
14	3	100					M8	2	RH		S
17	4	100					M8	2	RH		S
19	6	100					M8	2	RH		S
22	8	100					M8	2	RH		S
25	8	100					M8	2	RH		S
[mm]	[mm]	[°]	[°]	[mm]	[mm]	[mm]	[mm]				

Other dimensions and configurations on request.

# → MILLING CUTTERS

	PRODUCT	MATERIAL		
		CFRP	GFRP	AFRP
	PICTURE			
Multi-tooth cutter VHW				+
Honeycomb milling cutter VHW				
Two-Flute End Mill DP				
Ball End Mill DP		+	++	
UniType End Mill DP				
ProType End Mill DP			+	
Spiral End Mill DP		++	+	
Roughing End Mill DP		++	++	
Multi-Tooth Compression End Mill DP		++	+	
Multi-Tooth End Mill DP		++		
p-System Compression End Mill DP		++		++
p-System Grooving End Mill DP		++		++
Disc-Type Cutter DP		+	+	+



Recommended by LEUCO

++ well suited

+ suitable

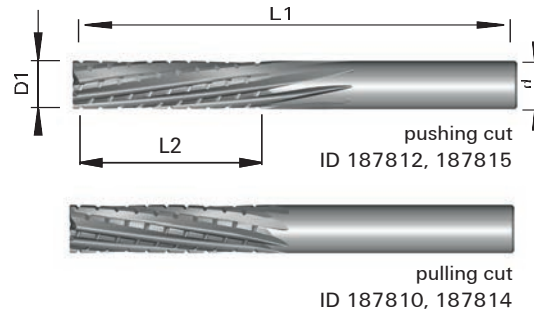
✓ possible

MATERIAL			APPLICATION							MACHINE		PAGE
Block material	Sandwich Foam	Honeycomb	Dividing	Trimming	Grooving	Copy mill.	Roughing	Finishing	Vibration-sensitive applications	CNC machining centres / gantries	Robot end effectors	
+	+		✓	✓	✓		✓	✓	+	✓	✓	20
			✓	✓	✓		✓	✓	+	✓	✓	20
++			✓	✓	✓			✓		✓		21
			✓	✓	✓	✓		✓		✓		22
	+		✓	✓	✓		✓	✓		✓	✓	22
	+		✓	✓	✓		✓	✓		✓	✓	23
+			✓	✓	✓		✓	✓	+	✓		24
++			✓	✓	✓		✓			✓	✓	24
			✓	✓				✓		✓	✓	25
			✓	✓	✓			✓		✓	✓	25
	+		✓	✓				✓		✓		26
	+				✓			✓		✓		26
+	+	+	✓	✓	✓			✓		✓		27

# → MILLING CUTTERS

## 136168 → Multi-tooth cutter VHW

- | Special tool geometry for smooth running, even for thin components and difficult workpiece clamping situations.
- | Reduced cutting forces due to chip breakers and very sharp cutting edges offer excellent results.
- | Available for pushing and pulling cuts.
- | Long edge lives due to micrograin carbide and diamond coating (on request).

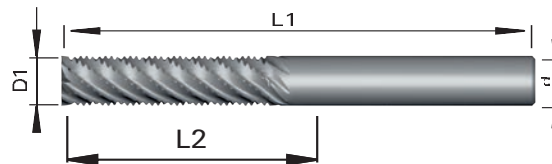


D1	D2	∠	α	L3	L2	L1	d	Z		R/L	Ident-No.	LKZ
6			10		28	75	6	8	A	RH	187810	●
6			-10		28	75	6	8	A	RH	187812	●
8			10		32	75	6	8	A	RH	187814	●
8			-10		32	75	6	8	A	RH	187815	●
[mm]	[mm]	[°]	[°]	[mm]	[mm]	[mm]	[mm]					

Other dimensions and configurations as well as diamond coating on request.

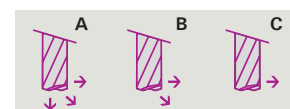
## 636168 → Honeycomb milling cutter VHW

- | Suitable for sandwich laminates with CFRP/GFRP top layers and honeycomb core.
- | Extremely sharp cutting edges ensure a clean separation of the honeycomb core.
- | Suitable for top layer cutting and for dividing cuts.
- | Micrograin carbide with DLC coating.



D1	D2	∠	α	L3	L2	L1	d	Z		R/L	Ident-No.	LKZ
6					32	76,2	6	8	A	RH	187840	●
8					32	76,2	8	8	A	RH	187841	●
[mm]	[mm]	[°]	[°]	[mm]	[mm]	[mm]	[mm]					

Other dimensions and configurations on request.



236154  
**→ Two-Flute End Mill DP**

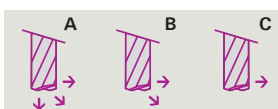


- | Smooth running due to alternating shear angle.
- | Also possible with shear angle on one side or neutral shear angle.



D1	D2	↙	α	L3	L2	L1	d	Z		R/L	Ident-No.	LKZ
3			0		4	50	3	2	A	RH	80474039	●
4			+/- 3		6	65	4	2	A	RH	186926	●
5			+/- 3		8	65	6	2	A	RH	187192	○
6			+/- 3		10	65	6	2	A	RH	186927	●
6			0		26	75	6	2	A	RH	80461706	●
8			+/- 3		12	65	8	2	A	RH	186928	●
8			0		12	65	8	2	A	RH	80472304	○
8			0		26	75	8	2	A	RH	80461707	●
10			+/- 5		15	75	10	2	A	RH	187193	●
12			+/- 5		18	75	12	2	A	RH	187194	●
12			0		25	70	12	2	A	RH	80463025	○
12			+/- 3		40	95	12	2	A	RH	80431652	○
20			+/- 5		15	100	20	2	A	RH	80468392	●
[mm]	[mm]	[°]	[°]	[mm]	[mm]	[mm]	[mm]					

Other dimensions and configurations on request.



Delivery status: ● available from stock ○ Delivery time upon request | LKZ: Delivery sign  
 R/L: RH right LH left | ↙: tip angle/countersink angle/step angle | α: spiral angle/shear angle

→ **236354**  
**Ball End Mill DP**



- | Smooth running due to alternating shear angle.
- | Ball radius  $R = 1/2 \times D1$
- | Suitable for Type-by-Type milling, copying shaping or grooving.
- | With shear angle on one side or shorter edge length according to customer requirements.



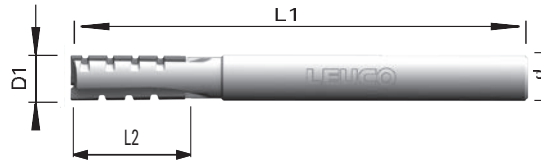
D1	D2	∠	α	L3	L2	L1	d	Z		R/L	Ident-No.	LKZ
3			0		3	50	3	2	A	RH	187171	o
4			+/- 3		6	65	4	2	A	RH	186931	o
5			+/- 3		8	65	6	2	A	RH	187172	o
6			+/- 3		10	65	6	2	A	RH	186932	•
8			+/- 3		12	65	8	2	A	RH	186933	•
10			+/- 5		15	75	10	2	A	RH	187173	•
12			+/- 5		18	75	12	2	A	RH	187170	•
[mm]	[mm]	[°]	[°]	[mm]	[mm]	[mm]	[mm]					

Other dimensions and configurations on request.

→ **236164**  
**UniType End Mill DP**

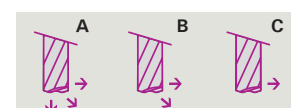


- | Long edge length for universal use and milling of 3D contours.
- | Smooth running due to high number of teeth and alternating shear angles.
- | Low heat input due to special chip breaker geometry.
- | Also possible with faceted plunge tip.



D1	D2	∠	α	L3	L2	L1	d	Z		R/L	Ident-No.	LKZ
6			+/- 2,5		15	60	6	3	A	RH	187283	•
8			+/- 3		20	70	8	4	A	RH	187284	•
8			6		10	70	8	4	A	RH	187285	o
10			+/- 2,5		20	75	10	5	A	RH	187286	o
[mm]	[mm]	[°]	[°]	[mm]	[mm]	[mm]	[mm]					

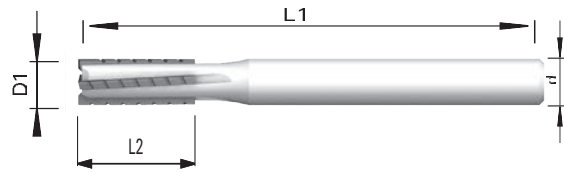
Other dimensions and configurations on request.



236168 / 136162  
**ProType End Mill DP**

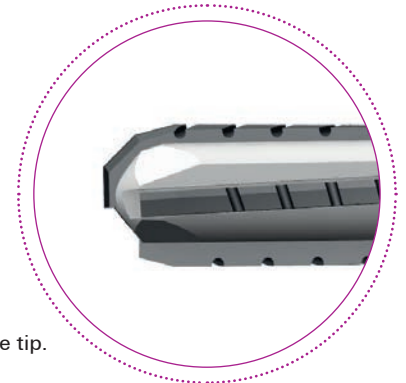


- | Long edge length for universal use and milling of 3D contours.
- | Large number of teeth in combination with division of cut for extremely smooth, low-vibration running.
- | Designed with positive, negative or neutral shear angles.
- | Also possible with faceted plunge tip.

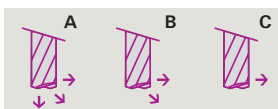


D1	D2	↙	α	L3	L2	L1	d	Z		R/L	Ident-No.	LKZ
6			-3	15	60	6	6	4	A	RH	187287	●
8			-3	20	70	8	8	5	A	RH	187288	●
6			3	15	60	6	6	4	A	RH	187289	○
6			0	15	60	6	6	4	A	RH	187290	○
8			3	20	70	8	8	5	A	RH	187291	○
8			0	20	70	8	8	5	A	RH	187292	○
10			-2	20	75	10	10	7	A	RH	187293	○
10			0	25	75	10	10	7	A	RH	187294	○
[mm]	[mm]	[°]	[°]	[mm]	[mm]	[mm]	[mm]					

Other dimensions and configurations on request.



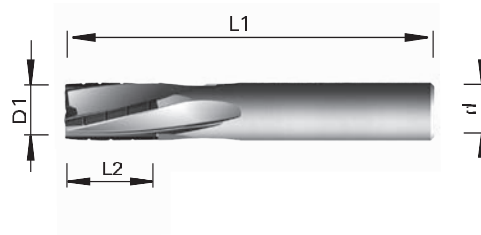
| Also possible with faceted plunge tip.



Delivery status: ● available from stock ○ Delivery time upon request | LKZ: Delivery sign  
 R/L: RH right LH left | ↙: tip angle/countersink angle/step angle | α: spiral angle/shear angle

236128  
→ **Spiral End Mill DP**

- | Smooth running and cutting surface free of tool marks due to continuous, spiral DP edges.
- | Constant hook angle along the entire edge length.
- | Large spiral angles and number of teeth are possible also for small diameters.
- | Plunge cuts into the material only possible in helix or ramping motion.
- | Standard tools (ID 80474998-80475001) in diameters 6.0 + 8.0 mm.
  - | With pushing cut and chip breaker for composites.
  - | With pulling cut without chip breaker for NF metals (aluminum, titanium, ...).
- | Can be resharpened up to 3 times.



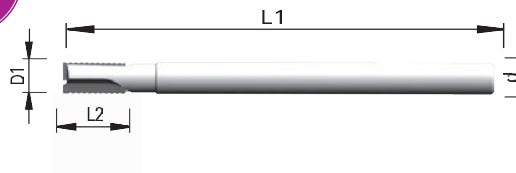
D1	D2	∠	α	L3	L2	L1	d	Z		R/L	Ident-No.	LKZ
3/16"			8		16	2"	1/4"	3	C	RH	80468652	o
6			-7		12	70	6	3	A	RH	80474998	•
6			7		12	70	6	3	A	RH	80475000	•
8			-7		16	80	8	4	A	RH	80474999	•
8			7		16	80	8	4	A	RH	80475001	•
8			20		8	80	8	3	B	RH	187198	o
10			8		30	80	10	4	B	RH	187199	o
12,7			15		20	81	12,7	4	B	RH	187200	o
[mm]	[mm]	[°]	[°]	[mm]	[mm]	[mm]	[mm]					

Face cutting edge or plunge tip and other dimensions and configurations on request.

236154 / 236168  
→ **Roughing End Mill DP**

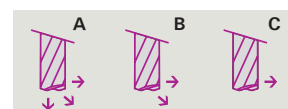


- | Wave profile for roughing with low cutting pressure.
- | Design with a high number of teeth for highest feed rates.



D1	D2	∠	α	L3	L2	L1	d	Z		R/L	Ident-No.	LKZ
4			+/-3		8	55	4	2	A	RH	187295	o
8			-5		8	60	8	4	B	RH	187296	o
8			3		17	65	8	4	A	RH	80463398	o
10			-5		10	80	10	5	A	RH	187297	o
12,7			3		22	76,2	12,7	4	A	RH	80470541	o
20			-3		31	100	20	4	A	RH	80463343	o
[mm]	[mm]	[°]	[°]	[mm]	[mm]	[mm]	[mm]					

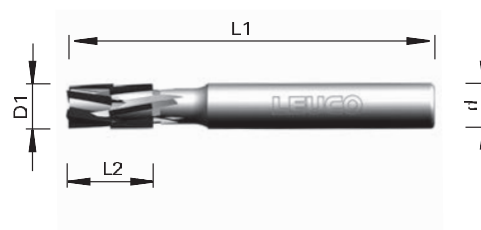
Other dimensions and configurations on request.






236166  
**→ Multi-Tooth Compression End Mill DP**

- | Compression milling cutter for delamination-free cutting quality at the top and bottom edge.
- | Must be used in the middle of the component (adhere to the compression zone).
- | High feed rates thanks to a high number of teeth.
- | Very well suited for finishing.




D1	D2	↙	α	L3	L2	L1	d	Z		R/L	Ident-No.	LKZ
6			10		13	65	6	3+3	B	RH	186929	●
8			10		15	65	8	5+5	B	RH	186930	●
10			10		17	75	10	5+5	B	RH	187195	○
12			10		18	75	12	7+7	B	RH	187196	○
[mm]	[mm]	[°]	[°]	[mm]	[mm]	[mm]	[mm]					

Other dimensions and configurations on request.

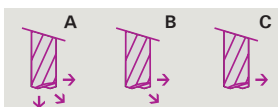
236162  
**→ Multi-Tooth End Mill DP**

- | Highest possible number of teeth with regard to the diameter.
- | Optimally suited for finishing with a high feed rate.
- | Also possible for small diameters from 6.0 mm with 5 teeth.



D1	D2	↙	α	L3	L2	L1	d	Z		R/L	Ident-No.	LKZ
8			0		15	65	8	7	A	RH	186934	○
[mm]	[mm]	[°]	[°]	[mm]	[mm]	[mm]	[mm]					

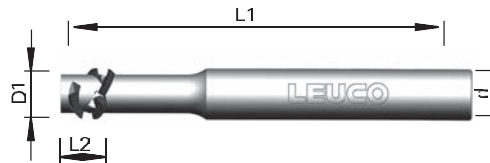
Other dimensions and configurations on request.



Delivery status: ● available from stock ○ Delivery time upon request | LKZ: Delivery sign  
 R/L: RH right LH left | ↙: tip angle/countersink angle/step angle | α: spiral angle/shear angle

→ 236116 **p-System Compression End Mill DP**

- | High cutting quality and long edge life thanks to extreme shear angles.
- | Must be used in the middle of the component (adhere to the compression zone).
- | Optionally with or without plunge tip.
- | Diagonal plunge-cutting is not possible with plunge tip.

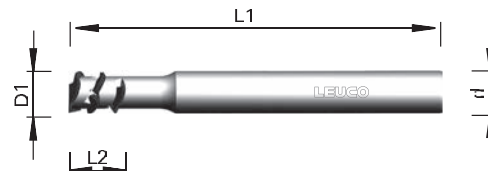


D1	D2	∠	α	L3	L2	L1	d	Z		R/L	Ident-No.	LKZ
6			70		8,7	60	6	1+1	C	RH	186920	●
6		120/30	70		8,7	60	6	1+1	A	RH	186922	●
8			70		7,4	70	8	1+1	C	RH	186921	●
8		120/30	70		7,4	70	8	1+1	A	RH	186923	●
10			70		10,3	75	10	1+1	C	RH	187186	○
10		120/30	70		10,3	75	10	1+1	A	RH	187188	○
12			70		12,6	75	12	1+1	C	RH	187187	○
12		120/30	70		12,6	75	12	1+1	A	RH	187189	○
[mm]	[mm]	[°]	[°]	[mm]	[mm]	[mm]	[mm]					

Other dimensions and configurations on request.

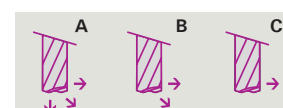
→ 236118 **p-System Grooving End Mill DP**

- | High cutting quality and long edge life thanks to extreme shear angles.
- | For grooving and scarfing operations.
- | Vertical plunge-cutting only in case of a small depth (max. 2 mm).
- | Plunge-cuts in helix or ramping motion should be preferred.



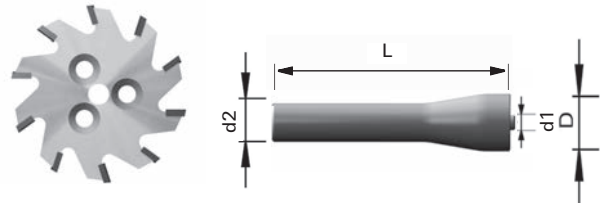
D1	D2	∠	α	L3	L2	L1	d	Z		R/L	Ident-No.	LKZ
6			70		4,6	60	6	1+1	A	RH	186924	●
8			70		10,0	70	8	1+1	A	RH	186925	●
10			70		10,8	75	10	1+1	A	RH	187190	○
12			70		12,0	75	12	1+1	A	RH	187191	○
[mm]	[mm]	[°]	[°]	[mm]	[mm]	[mm]	[mm]					

Other dimensions and configurations on request.



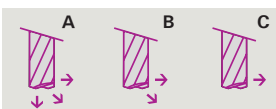
237431  
**→ Disc-Type Cutter DP**

- I Suitable for grooving and dividing.
- I Economic alternatives to conventional milling for straight cuts



D	B	b	d	Z	Zahnform	d	NL	Ident-No.	LKZ	R/L
50	2	3,3	6	5+5	FZ	6	3/M4/16	187174	o	RH
<b>Tool holder</b>										
D	d1			d2	L			Ident-No.		
24	6			16	100			187329		
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]			

Other dimensions and configurations on request.



**Delivery status:** ● available from stock ○ Delivery time upon request | LKZ: Delivery sign  
 R/L: RH right LH left | ∠: tip angle/countersink angle/step angle | α: spiral angle/shear angle

# → MICRO DRILL BITS & CUTTERS

LEUCO can offer you various individual micro tools for drilling and cutting of composites. Talk to us about your specific requirements!

## → Micro drill bit

- | Z2, Z3, Z4 with adapted helix angles
- | Different tool tip versions, for example in Z6/Z7
- | Individual selection of the tungsten carbide grades and the CVD coatings

## → Micro cutter

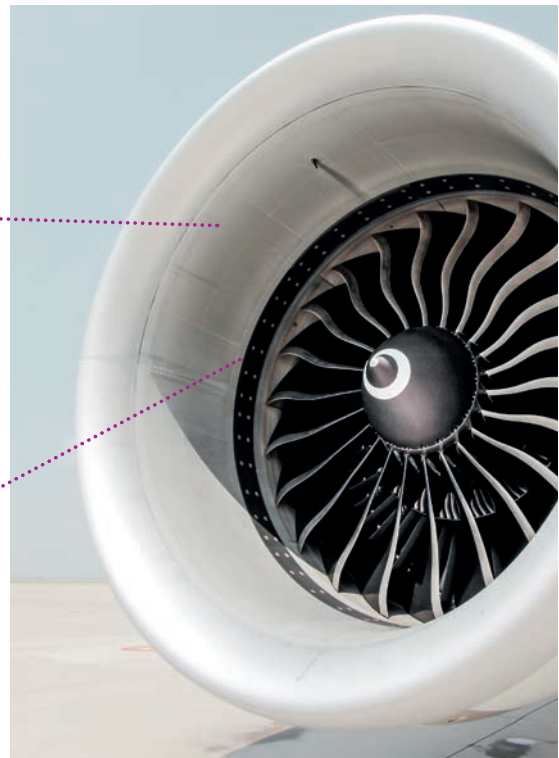
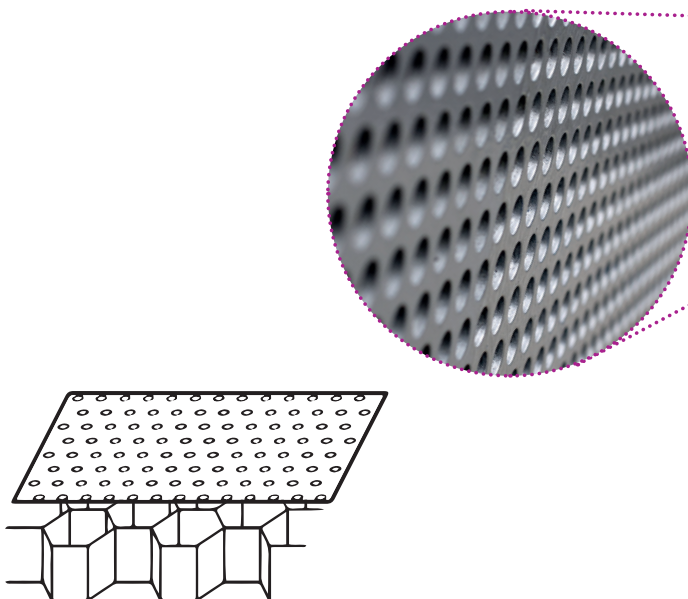
- | Helical Z2 cutters and cutters with a high number of teeth with division of cut in Z6/Z7
- | Tool tips available with different grinds, helical directions and helical angles
- | Individual selection of the tungsten carbide grades and the CVD coatings



## → Application example –

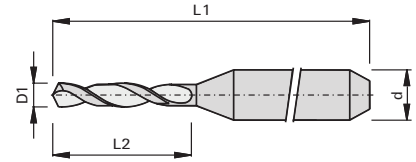
### Acoustic drilling in the engine area

- | Application for curved surfaces
- | Drilling on honeycomb ridge and honeycomb core
- | No chip evacuation into the honeycomb core
- | Burr-free tool entry over a long time





**YOUR CHECKLIST**



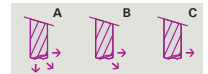
for micro drill bit:

D1	$\varphi$	$\alpha$	L2	L1	d	Z	R/L	CVD yes/no	Quantity
X	X	X	X	X	X	X	X		X
[mm]	[°]	[°]	[mm]	[mm]	[mm]				





for micro cutter:

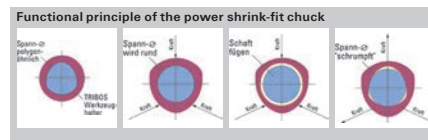
D1	$\alpha$	L2	L1	d	Z	R/L	CVD yes/no	Grind?	Direction A, B, C?	Quantity
X	X	X	X	X	X	X	X			X
[mm]	[°]	[mm]	[mm]	[mm]						

R/L: RH right LH left |  $\varphi$ : tip angle/countersink angle/step angle |  $\alpha$ : spiral angle/shear angle



# → CLAMPING SYSTEMS

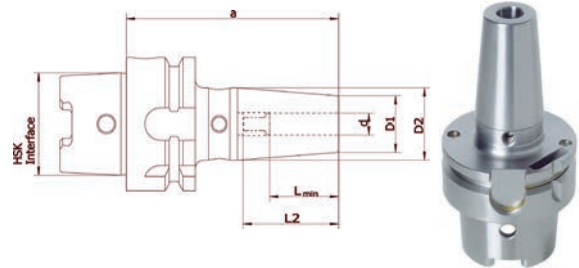
Clamping system		Rotational accuracy	Rigidity	Calming	Unbalance	Handling	Description and instructions
Collet chuck		+ 0,02-0,06 mm	++	++	++	++	Clamping systems with moderate concentricity, but still standard in many application areas. Alternative modern and accurate clamping systems offer a lot of advantages which have a significant impact on tool life and machining quality!
Hydro clamping chuck „ps-System“		++ <0,006 mm	++	+++	++	+++	The high-precision hydraulic extension chuck „ps-System“ stands for simple handling on CNC stationary machines. The shank tension is applied to the “ps-System” via the pressure introduction of the hydraulic fluid. For clamping the tools no additional device is necessary. The hydraulic chuck is vibration-absorbing due to the hydraulic tension.
Heat shrinking chuck		+++ <0,003 mm	+++	++	+++	+	In the case of the heat shrinking chuck, the shank tension results from the thermal expansion of the hot forming tool steel. It is particularly suitable when it comes to large retention forces and low clamping tolerances. Low interference contours make accessibility in 5-axis applications very good. The very small imbalance of the clamping device protects the machine spindle.
TRIBOS pressure shrinking chuck		+++ <0,003 mm	++	++	++	+	In the case of the TRIBOS pressure shrinking chuck, the shank tension is applied via the polygonal cross-section of the chuck itself. The polygonal clamping diameter is formed into a round shape by applying force with a press. Then the tool shank can be inserted. By releasing the press the clamping diameter takes its original shape and the tool shank is clamped securely. Due to the low weight and the minimal internal imbalance of the chuck, the machine spindle is spared. The pressure shrinking chuck is built very slim - the accessibility in 5-axis applications is very good.




- +++ very good
- ++ good
- + moderate

## 933297 → Heat-shrinking chuck HSK50A and HSK 63A

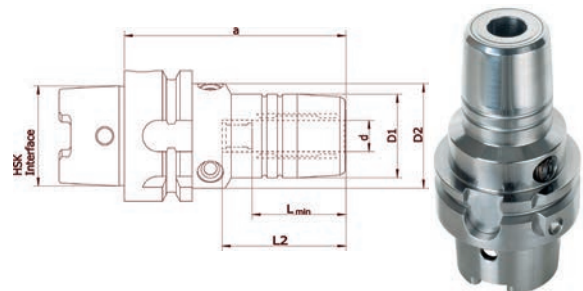
- For precise clamping of shank-type tools with cylindrical shank without additional clamping device.
- Increased process safety, long edge lives and high machining quality thanks to high concentricity and repeating accuracy combined with highest rigidity.




d	D1	D2	Interface	a	L2	Lmin		Ident-No.	LKZ
6	21	27	HSK50A	80	36	26	0,570	187201	o
8	21	27	HSK50A	80	36	26	0,570	187202	o
10	24	32	HSK50A	85	41	31	0,650	187203	o
12	24	32	HSK50A	90	46	36	0,660	187204	o
6	21	27	HSK63A	80	36	26	0,870	187205	o
8	21	27	HSK63A	80	36	26	0,830	187206	o
10	24	32	HSK63A	85	41	31	0,900	187207	o
12	24	32	HSK63A	90	46	36	0,920	187208	o
[mm]	[mm]	[mm]		[mm]	[mm]	[mm]	[kg]		

## 933240 → Hydro expansion chuck HSK50A and HSK 63A

- For precise clamping of shank-type tools with cylindrical shank without additional clamping device.
- Minimization of setup-times thanks to easy and quick tool change.
- Increased process safety, long edge lives and high machining quality thanks to very high concentricity and repeating accuracy.
- Vibration-absorbing due to hydraulic clamping.



d	D1	D2	Interface	a	L2	Lmin		Ident-No.	LKZ
12	32	40	HSK50A	85	46	36	0,800	187209	o
12	32	50	HSK63A	85	46	36	1,175	187210	o
[mm]	[mm]	[mm]		[mm]	[mm]	[mm]	[kg]		

# → SAW BLADES



Recommended by LEUCO







well suited



suitable



possible

	MATERIAL						APPLICATION			MACHINE	
	CFK	GFK	AFK	Block material	Sandwich Foam	Honeycomb	Thin materials (< 5 mm)	Thick materials (> 5 mm)	Profiles	CNC/Gantry	Table saw
DIAREX sizing saw blades DP 			+	+	+	+	✓	✓		✓	
Sizing saw blades DP „HR“ – nn-System DP flex 	+	++		+	++	++	✓			✓	✓
Sizing saw blades DP „G5“ 	+	+	+	+	+	+				✓	
Sizing saw blades DP „TR-F-FA“ pos.-neg. 	+	+	+	+	+	+					✓



## 202180 → DIAREX sizing saw blades DP

### Design and benefits

- Excellent cutting quality on the upper side thanks to prescoring effect and reduced cutting pressure.
- Special fine-grained DP grade.
- Resharpener area 2 mm.

**BEST SOLUTION**  
for materials of a thickness of 5.0 mm or higher as well as for profiles and large volumes.

HR-FA



D	B	b	d	Z	Zahnform	Ident-No.	LKZ
250	3,2	2,2	30	50	HR-FA	192956	●
303	3,2	2,2	30	65	HR-FA	192958	●
350	3,2	2,2	30	65	HR-FA	192962	●
[mm]	[mm]	[mm]	[mm]				

Other dimensions and configurations on request.

## 202289 → Sizing saw blades DP "HR" – nn-System DP flex

### Design and benefits

- Hardly perceivable noise.
- Reduced cutting pressure due to hollow back geometry, enabling best cutting quality without chipping when the saw blade enters and exits the material. Resharpener up to max. 2 times.

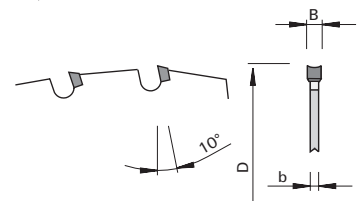
**BEST SOLUTION**  
for lower volumes of material up to a thickness of 5.0 mm.

nn system 



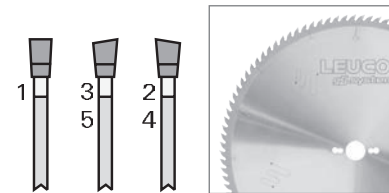
D	B	b	d	Z	Zahnform	Ident-No.	LKZ
110	2,5	2	22	24	HR	192551	●
180	2,5	2	30	36	HR	192432	●
250	2,5	2	30	50	HR	192440	●
303	2,5	2	30	60	HR	192444	●
303	2,5	2	30	95	HR	193238	●
350	2,5	2	30	72	HR	192446	●
[mm]	[mm]	[mm]	[mm]				

Other dimensions and configurations on request.



202080  
**→ Sizing saw blades DP "G5"**

*G5 system*<sup>®</sup>



**Design and benefits**

- | Reduced cutting pressure thanks to "aggressive" cutting geometry.
- | Noise reduction by laser ornaments, both during idling and cutting.
- | Resharpener area 3.5 mm.

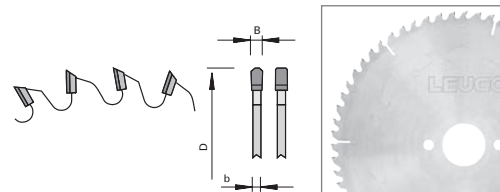
D	B	b	d	Z	Zahnform	Ident-No.	LKZ
303	3,2	2,2	30	100	G5	189633	○
350	3,2	2,2	30	100	G5	189634	○
[mm]	[mm]	[mm]	[mm]				

Other dimensions and configurations on request.

202380  
**→ Sizing saw blades DP "TR-F-FA" pos.-neg.**

**Design and benefits**

- | For sizing cuts in CFRP, GFRP, fiber cement boards, resin-impregnated panel material.
- | Asymmetric gullet geometry.
- | Tooth configuration: triple chip - flat with chamfer, with alternating positive-negative hook angle.
- | Low cutting pressure /resharpening area 3.5 mm.



D	B	b	d	Z	Zahnform	Ident-No.	LKZ
303	3,2	2,2	30	56	TR-F-FA	189560	○
350	3,5	2,5	30	63	TR-F-FA	189561	○
[mm]	[mm]	[mm]	[mm]				

Other dimensions and configurations on request.

# → VIDEOS

## CNC MACHINING OF COMPOSITE MATERIAL IN VIDEO FORMAT:

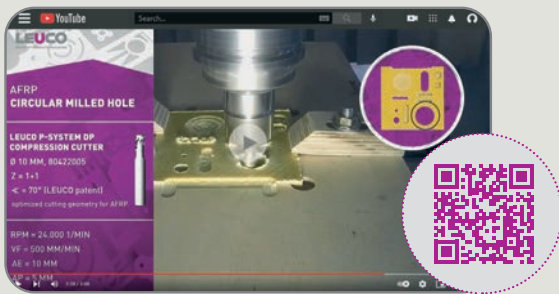


The videos show the performance of the LEUCO solutions. Drill bits and cutters are shown. The tools range from simple double-edge cutters to complex diamond-tipped multi-insert tools.

**TIP:** In many videos, sections of the processing sequence recorded with the **HIGH SPEED CAMERA** are shown.

This exclusive insight allows a detailed supervision of the tool behavior during the machining process.

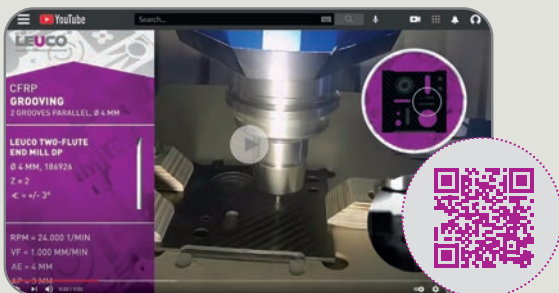
### → Tool solutions for AFRP



### → Tool solutions for GFRP



### → Tool solutions for CFRP



### → Interesting news regarding the composites



**THIS IS LEUCO**  
**MAGENTIFY COMPOSITE PROCESSING**

LEUCO is one of the world's leading suppliers of machine tools for wood, plastic and composite material processing, and is based in Horb am Neckar (Germany/Baden-Württemberg). Customers have a full range of carbide- and diamond-tipped cutters, drill bits, countersinks and clamping devices.

LEUCO tooling solutions are based on decades of experience in machining fibrous wood and fiber-reinforced materials.

They are characterized by their cost-effectiveness and innovative designs. Numerous patents

for cutters, drill bits and saw blades underline the inventiveness and the technical know-how. LEUCO has subsidiaries and 1,200 employees in Australia, Belarus, Belgium, China, Great Britain, France, Japan, Malaysia, Poland, Russia, Singapore, Switzerland, South Africa, Thailand, Ukraine, USA and Vietnam.

In more than 60 other countries, more than 90 dealers are available for advice and sales.

**MORE THAN  
65 YEARS  
OF EXPERIENCE IN  
PROVIDING SOLUTIONS  
FOR THE MACHINING OF  
FIBER-REINFORCED  
MATERIALS.**

Ledermann GmbH & Co. KG  
Willi-Ledermann-Straße 1  
72160 Horb am Neckar / Germany

T +49 (0) 74 51/93 0

marvin.knoll@leuco.com  
www.leuco.com/composite-processing

Follow us:

**LinkedIn**

