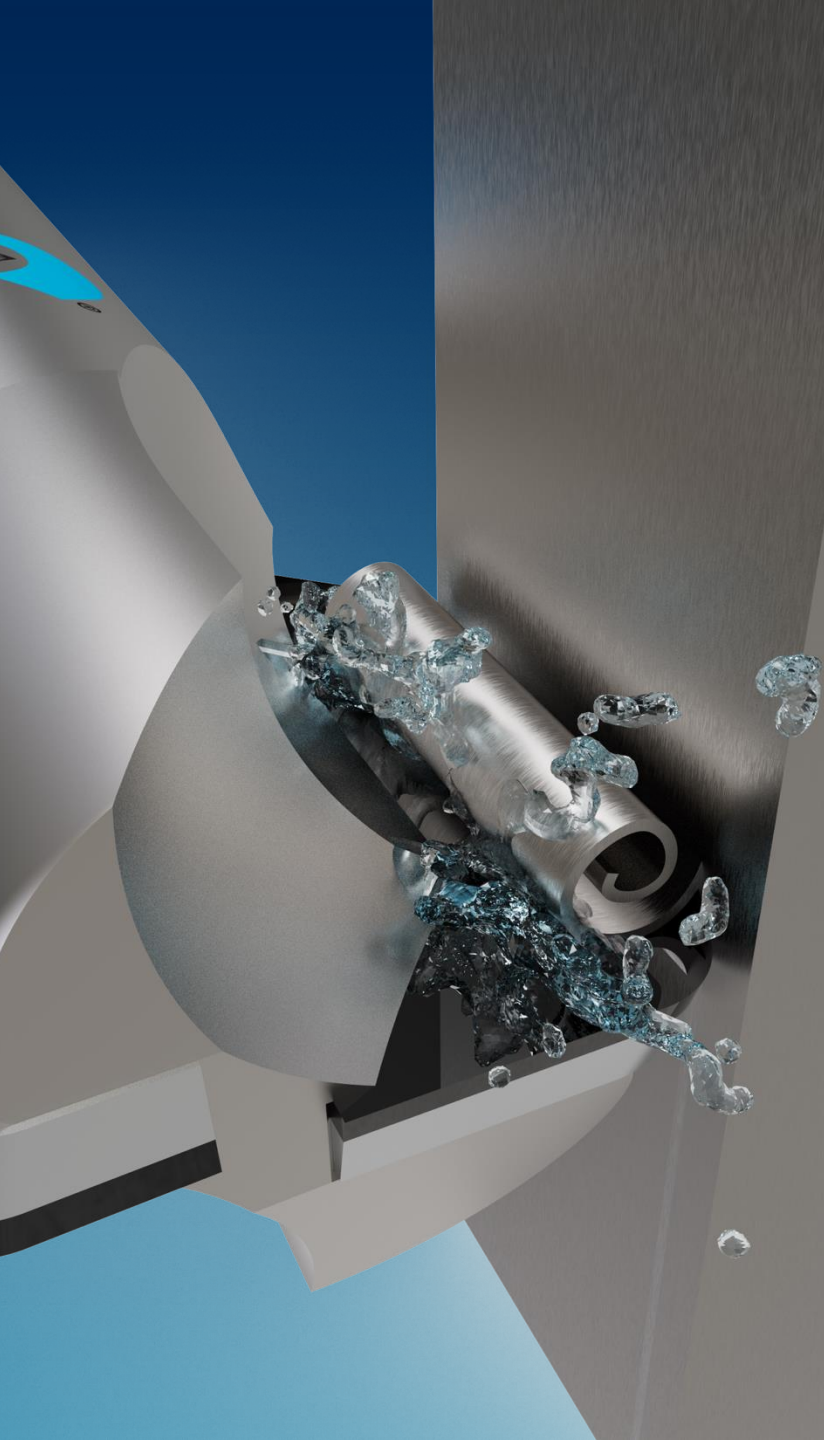


LACH
DIAMOND

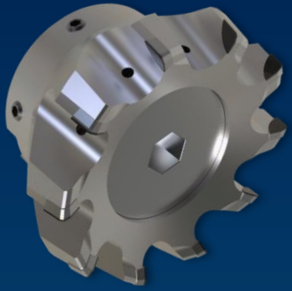


PCD & CBN Tooling and Service in Grand Rapids, MI since 1982



About LACH DIAMOND

- ◆ Our focus: manufacturing PCD tools (polycrystalline diamond)
- ◆ Tool portfolio
- ◆ PCD tools in various industries
- ◆ Get in touch with us



Pioneering PCD, diamond & CBN tooling

– over 100 years of know-how



Economical solutions to advance your performance

High-level cutting operations requiring PCD do not always need new systems.
We recondition your used tooling into highly advanced PCD tools.



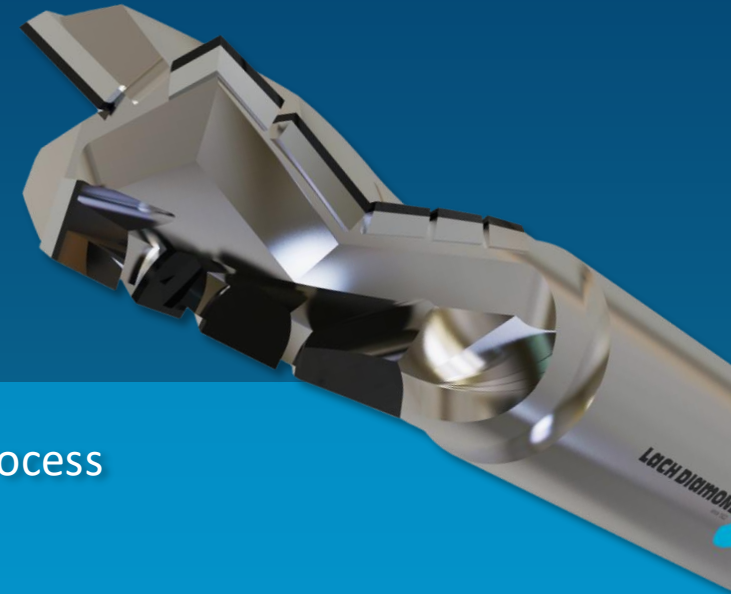
Servicing of all PCD

For our tools and for other manufacturers' products



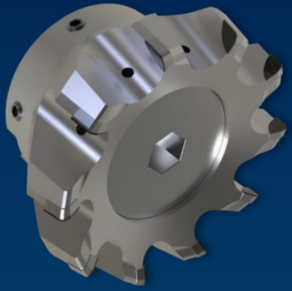
Production of all new tooling

For non-ferrous metals, wood, and composite materials



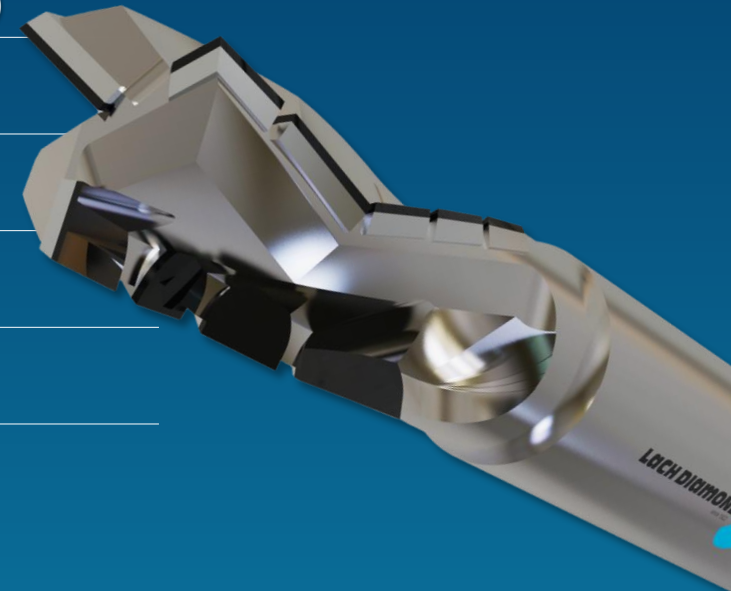
Our mission: Being an **active** partner in your application process

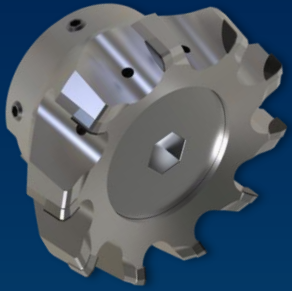
– from start to finish



Product Range

Mills		max. length 370 mm (14.50") from gage
		max. Ø (face/bore tooling) 200 mm (8")
End mills		min. Ø 5 mm (2 flutes), 2 mm (single flute)
Reamers		min. Ø 6 mm (2 flutes)
Tools needing rotary grind		max. length 370 mm (14.50") from gage
Saw blades		max. Ø 765 mm (30")
Drills		min. Ø 3 mm (special type applications)
PCD inserts		available in various dimensions



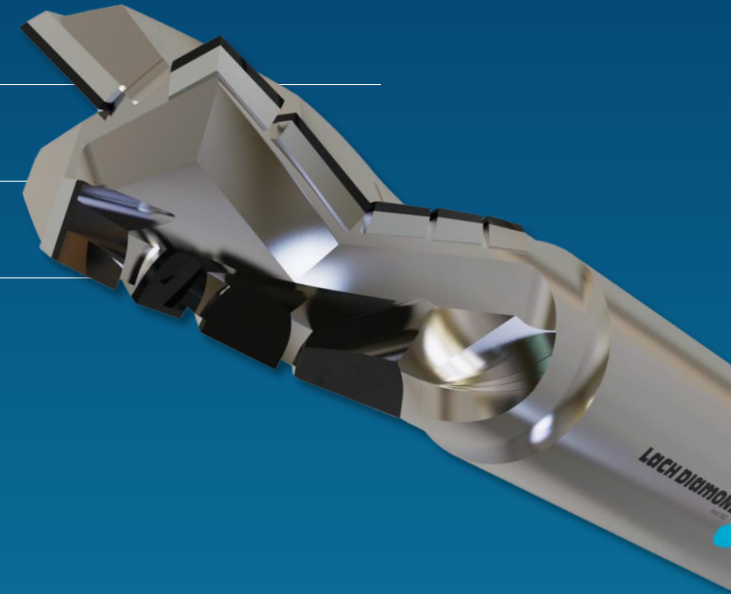


PCD Tool Servicing

Lead times

Regrinds	◆	1– 3 weeks
Retips	◆	3 weeks*
Turning/Grooving/Threading/Milling · inserts	◆	3 – 6 weeks
Milling/Drilling/Reaming/Saw Blades · steel or carbide body	◆	6 – 8 weeks
Milling/Drilling/Reaming · preform carbide body	◆	8 weeks
Milling/Drilling/Reaming · integrated shank type	◆	9 – 11 weeks

* can be as short as 1 day per circumstance



Innovative precision is in our DNA

– over 100 years of know-how

- 1922 ✦ Jakob Lach establishes Lach Diamant as a jewelry cutting and grinding workshop in Hanau, Germany
- 1932 ✦ Industrial diamonds and diamond tools are added to the portfolio
- 1973 ✦ Horst Lach, together with GE, develops the first PCD tool – true ‘pioneer of diamond tooling’
- 1982 ✦ Lach Diamond, USA, opens as a sales office for Lach Diamant, servicing the North American market
- 1986 ✦ Lach Diamond starts producing and manufacturing diamond tooling for the processing of wood, all wood-like materials and plastics for the wood, furniture and flooring industries

Innovative precision is in our DNA

– over 100 years of know-how

- 1987  Lach Diamant presents the universal diamond grinding machines EDG for spark erosion processing of PCD, initially developed for Lach's own production. These machines are now sold and used all over the world.
- 1999  Lach Diamond starts manufacturing diamond tooling for the automobile and accessory industry, aircraft and aerospace industry.

Lach Diamant introduces the patented chip breaker for the “short-chip-turning” of aluminum.

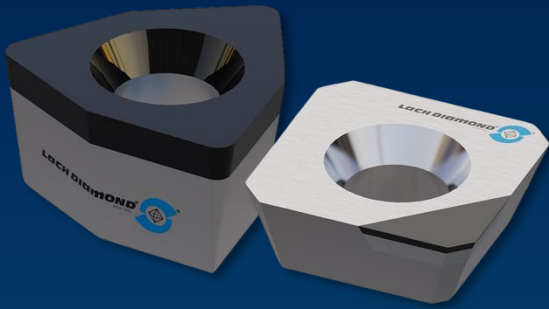


Innovative precision is in our DNA

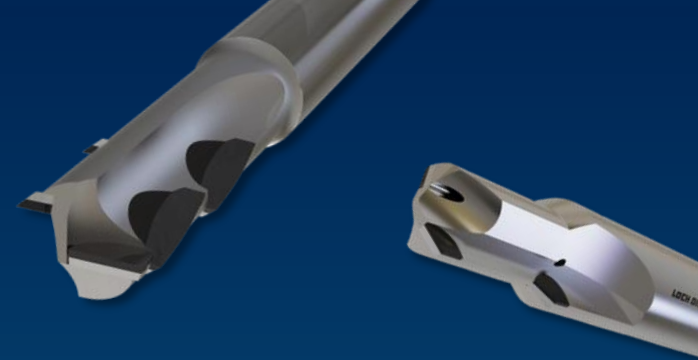
– over 100 years of know-how

- 2004 ♦ The monoblock diamond milling cutter »dia-compact« wins the Hessian Innovation prize for high-speed machining (HSM) of aluminum and plastics
- 2006 ♦ The PCD end mill »multiple cut« wins the AIRTEC Award for use in unstable elements of fiber reinforced materials
- 2010 ♦ Lach Diamond begins expanding marketplace footprint for various special non-ferrous alloys
- 2022 ♦ Lach Diamond celebrates 40 years of providing our service to help industries grow and innovate. Thankful for our customers and their input that continues to be a part of our innovational growth.



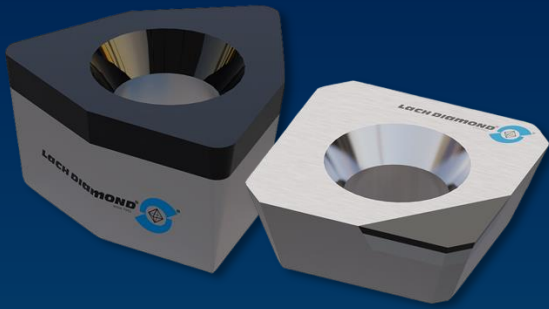


What is PCD?

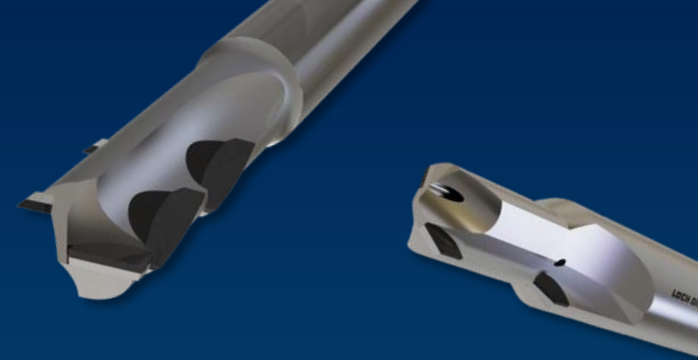


- ❖ PCD stands for **P**oly**C**rystalline **D**iamond
 - ❖ synthetic diamond produced by compressing diamond powder under high pressure and temperature
 - ❖ exceptional hardness, wear resistance, and thermal conductivity
- ❖ PCD is excellent for cutting, milling and turning
 - ❖ non-ferrous metals, wood, foams and various composite materials
 - ❖ ceramic, hi-silicon, glass, or abrasive materials

There are several grades of PCD from several manufacturers. Each has their own usage and special applications.



PCD grade examples



- ◆ $< .002$ – Finishing Grade: < 2 micron in size.
A standard finishing application diamond in most all materials. Even small grain versions are available.
- ◆ $.010$ – General Purpose Grade: < 10 micron in size.
A standard use application diamond in most all materials.
- ◆ $> .025$ – Rough service / abrasive applications: This is a 25 micron size.
A standard product in high silicon aluminum and also rough turning and milling applications.
- ◆ Bi-Modal/ Multi-Modal - a special product that is a mix of different diamond size grains.
This allows the best compromise of finish for production and wear resistance in manufacturing.
It is not used in all applications, only special applications.

We are happy to recommend the ideal PCD grade for your application



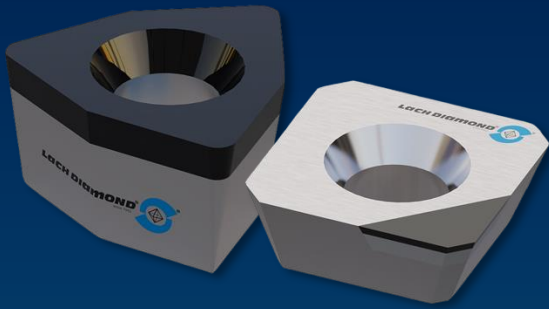
What is CBN?

- ❖ CBN stands for **Cubic Boron Nitride**
 - ❖ synthetic crystalline substance consisting of boron and nitrogen and structurally similar to diamond
- ❖ CBN is suited for cutting, milling and turning
 - ❖ hardened and tempered steel
 - ❖ cast iron
 - ❖ cemented carbides and other difficult to machine materials

LACH
DIAMOND



for which materials?



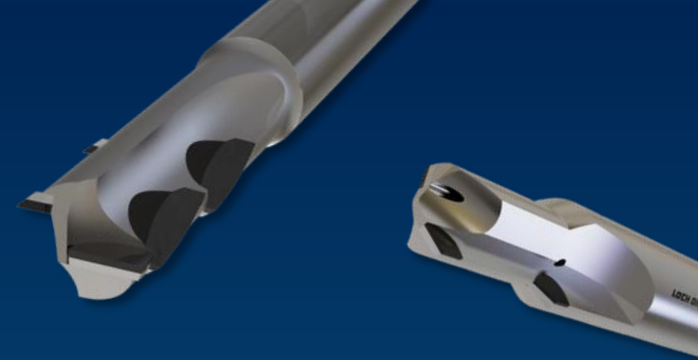
Materials for machining with PCD

Non-ferrous metals

- ❖ Aluminum
- ❖ Brass
- ❖ Bronze
- ❖ Copper
- ❖ Magnesium

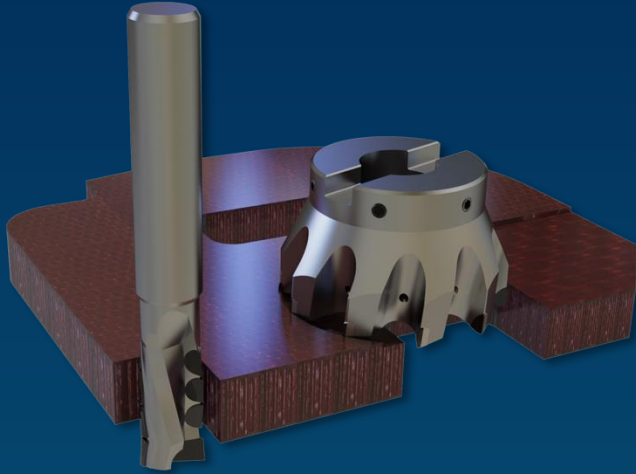


The significance of Silicon (Si) content in aluminum:
The higher the silicon content in aluminum, the more abrasive it is and, therefore, reduces tool life.

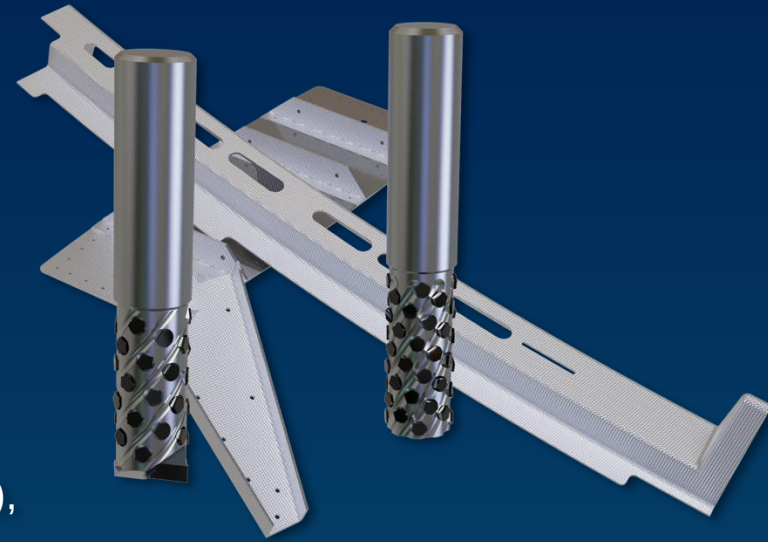


Materials for machining with PCD

Composites



- ❖ Carbon fiber (CFRP)
- ❖ Reinforced Fiberglass (GRFP), also with injected resin
- ❖ Graphite
- ❖ Green Ceramic & Green Carbide
- ❖ Fiberglass (ex: G10)
- ❖ Kevlar

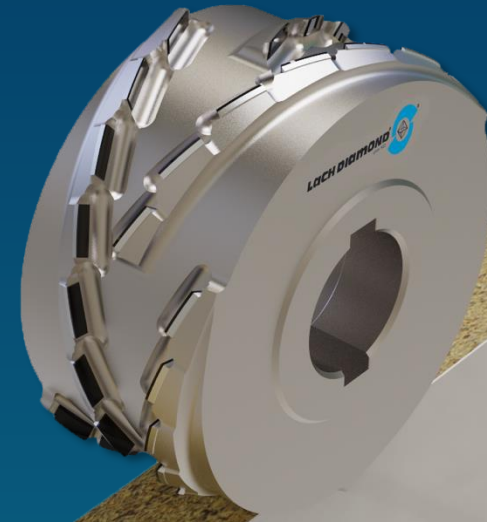
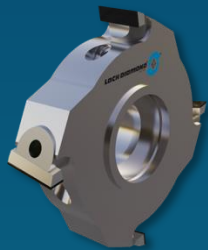
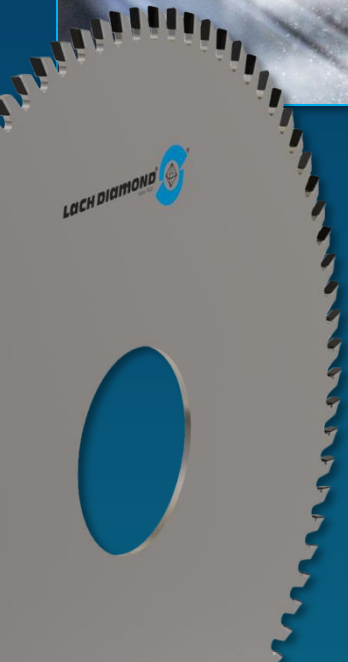
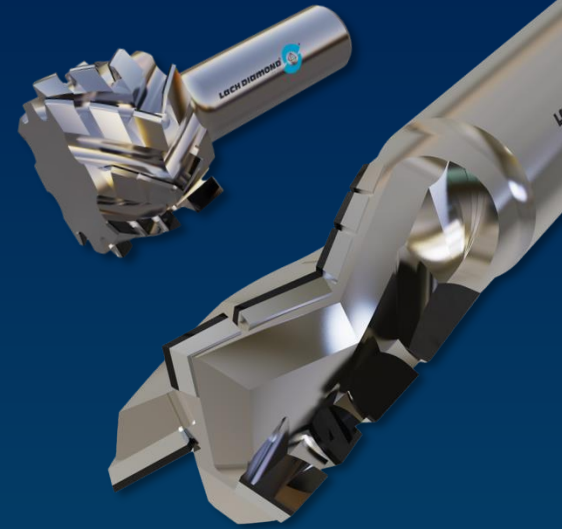


PCD tipped drills – at the center point – are suited to drill in solid composite, because there is less cutting pressure at the zero point than in non-ferrous metals.

Materials for machining with PCD

Wood

- ❖ Particle board
- ❖ High pressure laminate (HPL)
- ❖ Medium-density fiberboard (MDF)
- ❖ High-density fiberboard (HDF)
- ❖ Honeycomb core wood panels



Materials for machining with CBN

Ferrous metals



- ◇ Cemented carbide
- ◇ Hardened steel
- ◇ Cast iron



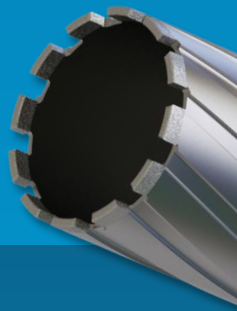
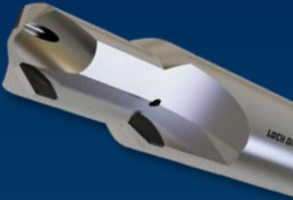
***LACH
DIAMOND***



Portfolio

PCD drilling tools

- ❖ Spiral drills
 - ❖ Step drills
 - ❖ Hollow drills
 - ❖ Drills with internal exhaustion (pat.)
-
- ❖ Drilling and reaming in one step
 - ❖ No reworking/refinishing required
 - ❖ Resharpenable
 - ❖ Design according to your requirements



PCD milling tools

- ◆ Monoblock milling cutters
- ◆ Cartridge milling cutters
- ◆ Copy milling cutters
- ◆ End mills

Innovation »Cool Injection Plus«
– With this innovation the coolant is directed through the open cutting face of the PCD edge: directly where the chip being generated.

CBN optional

for some tools
– do not hesitate
to ask!



Holder types

Mechanical
“power grip”
chuck



Hydraulic
chuck



Shrink fit
holder



Collet type
holder



PCD chip breaker inserts for turning

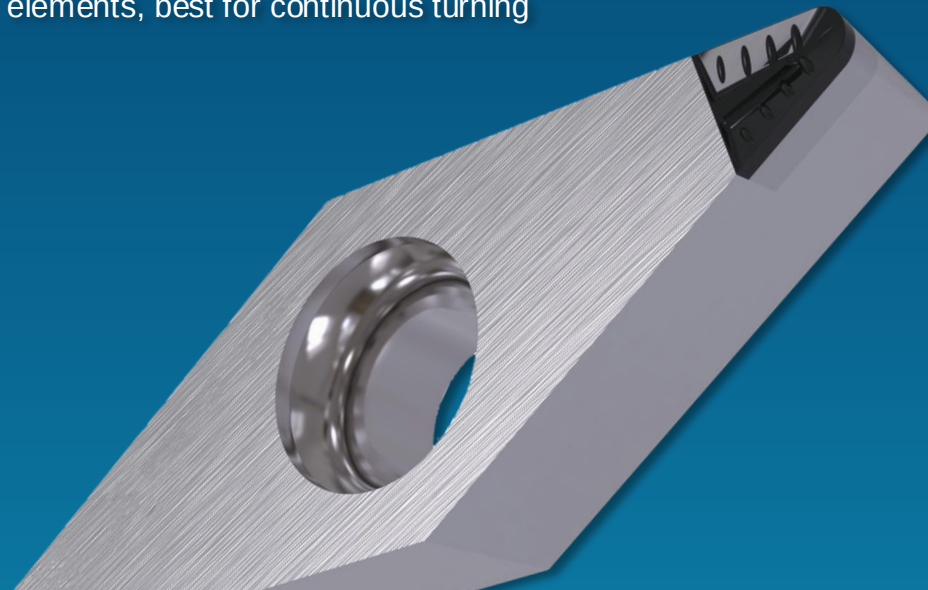


❖ »IC-plus« chip breaker (pat.)

– insert with active chip breaker and stable cutting edge for thick, stable elements and turning operations both interrupted cut and continuous turning

❖ Lach XCO chip breaker

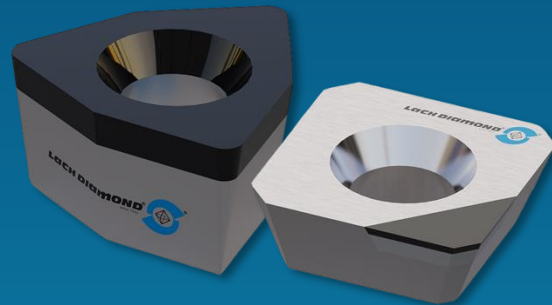
– insert with custom-tailored chip guide step and positive cut for especially thin and unstable elements, best for continuous turning



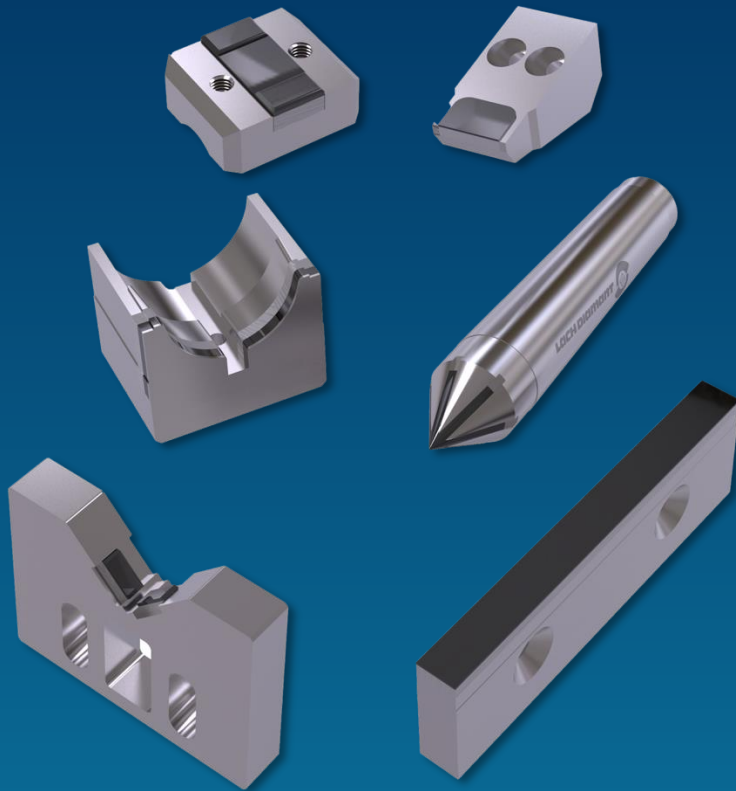
PCD & CBN cutting inserts for turning



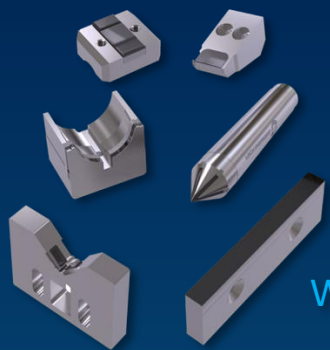
- ❖ »CBN-DUO-power«
 - insert for turning hardened steels with highest surface qualities of e.g. Ra 0,1 µm, CBN-tipped on both ends
- ❖ Cutting inserts most suitable for your application
 - we offer various inserts tipped with PCD or CBN for high-precision turning



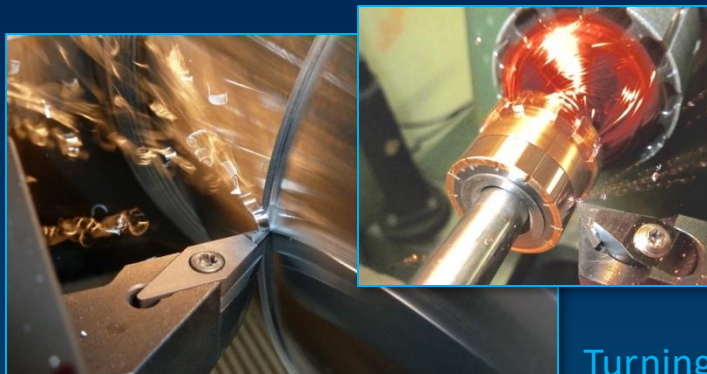
PCD and diamond wear protection



- ◆ Steady rest blocks
- ◆ Work rest blades
- ◆ Prisms
- ◆ Center points
- ◆ Bearing shells



Wear parts



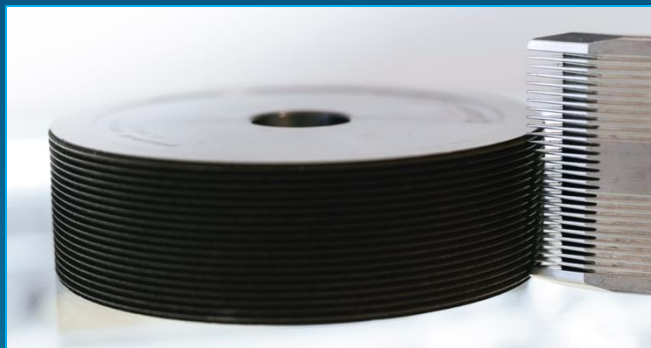
Turning



Drilling



Dressing

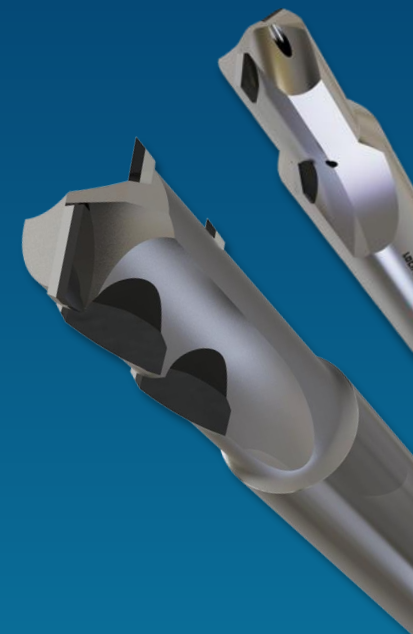


Grinding

In summary of our products



Milling

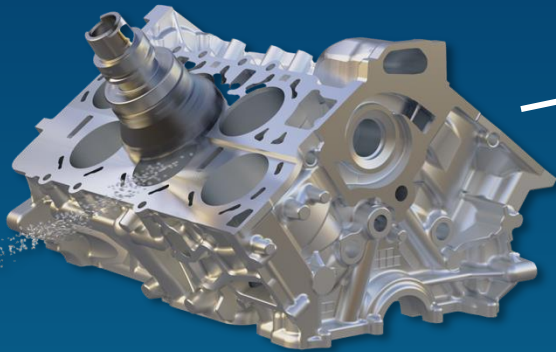


LACH
DIAMOND

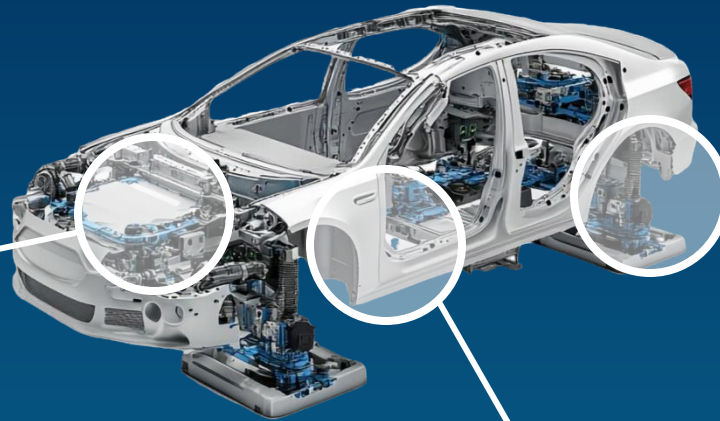


for various industries

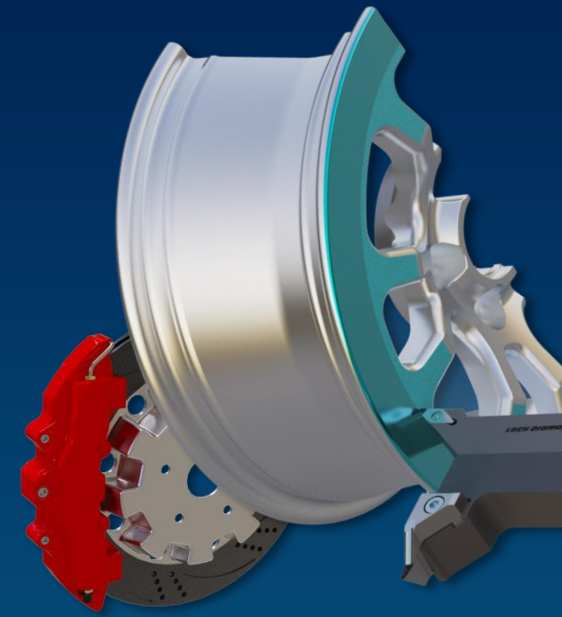
Industries machining with PCD tools
Automotive & Industrial engines



Engine & Transmission
related products



Chassis components



Brake & Wheel
related products



Industries machining with PCD tools

Aerospace

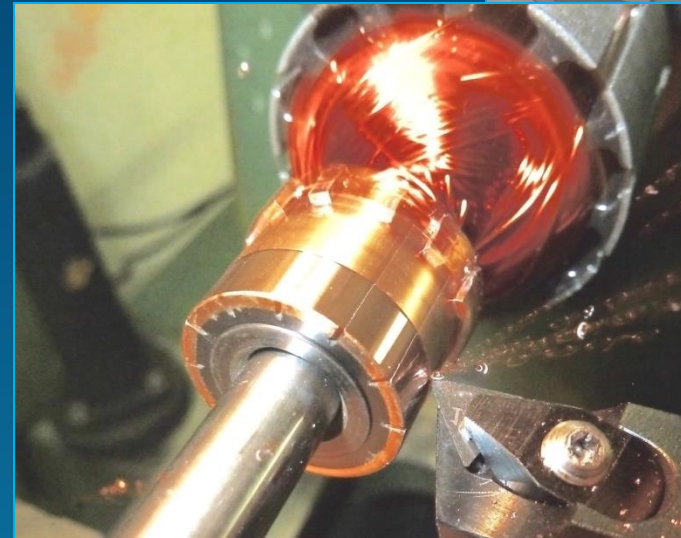
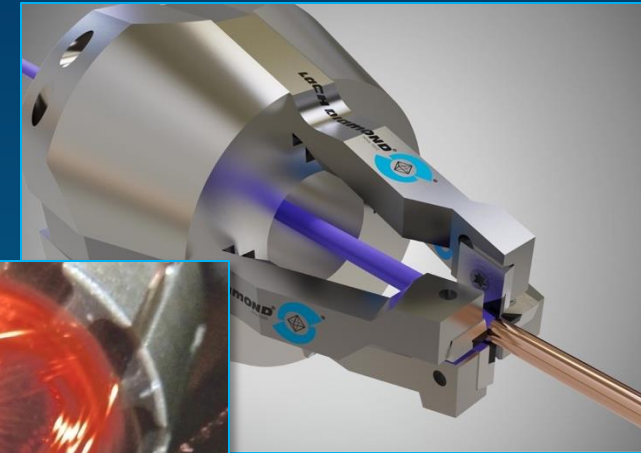


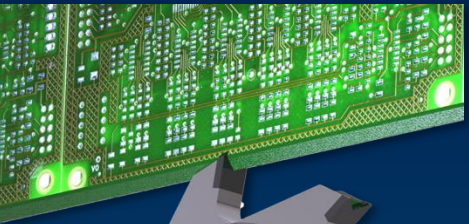
Industries machining with PCD tools

Electric motor manufacturing



- ❖ PCD inserts for corner radius- and peel turning (e.g. commutator turning)
- ❖ PCD-tipped stripping knives



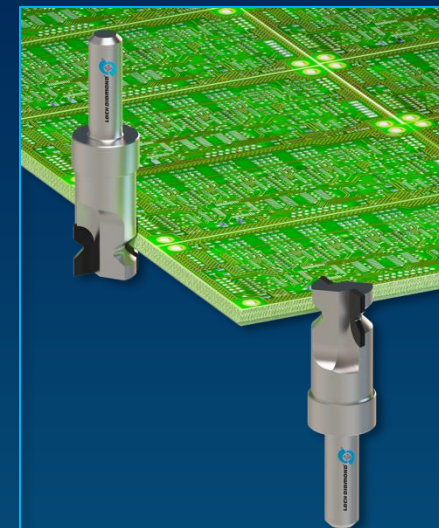


Industries machining with PCD tools

Electronics / Printed circuit boards (PCB)

PCD and carbide tools for production and depaneling of PCB

- ◆ Edge bevelling
- ◆ End milling
- ◆ Bevelling
- ◆ Cutting, scoring, sawing etc.



For various PCB materials

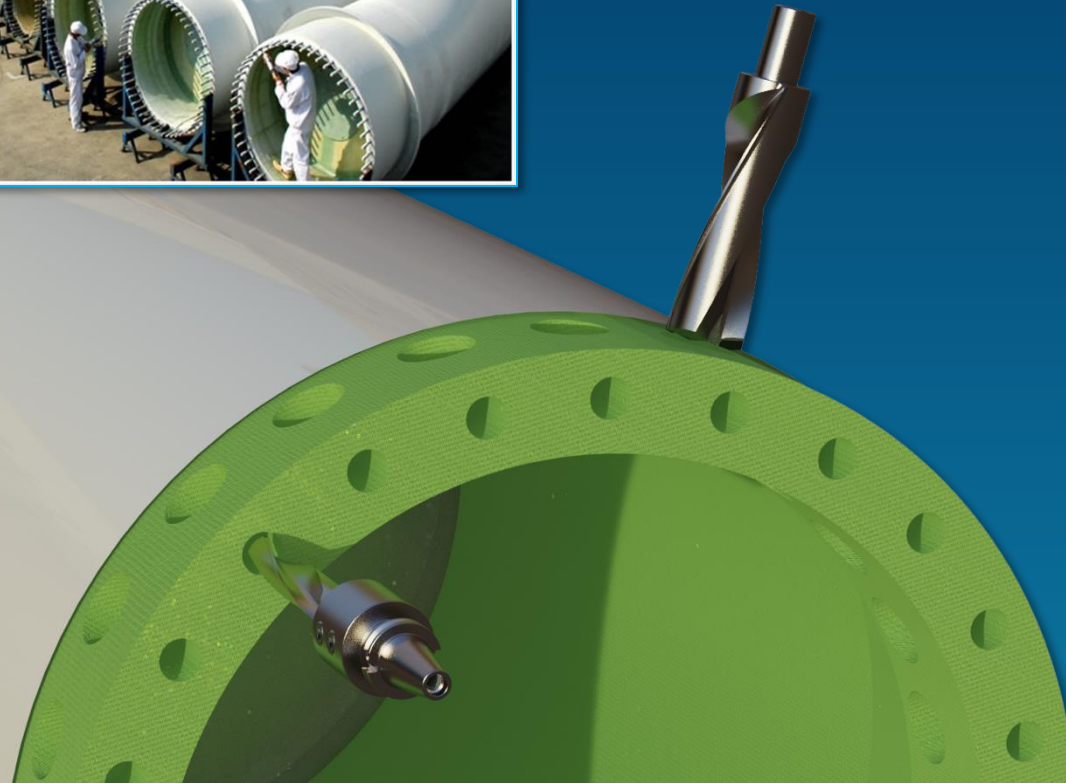
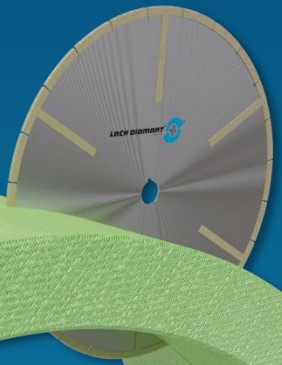
- ◆ Multilayer
- ◆ Rigid-flex

- ◆ IMS
- ◆ Aluminum
- ◆ Copper



Industries machining with PCD tools

Wind Power / Rotorblade root end processing



Industries machining with PCD tools

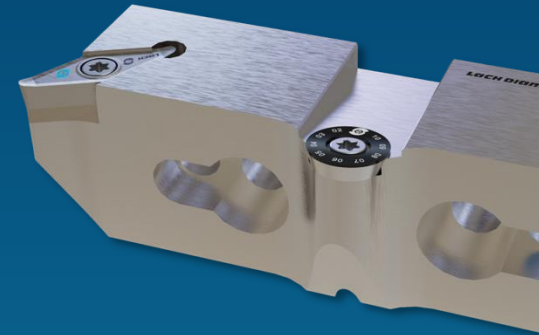
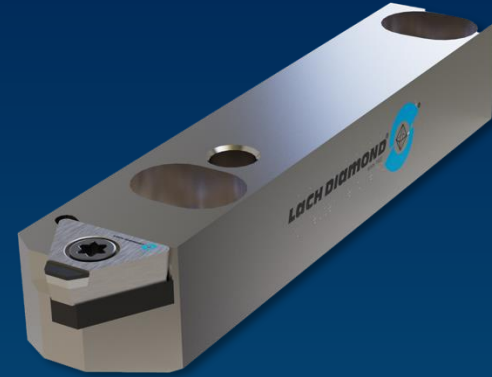
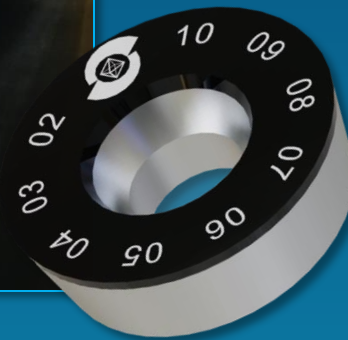
Gravure printing



◆ high-precision cylinder processing

◆ cutting tools for

- ◆ CFM machines
- ◆ Polishmaster milling machines
- ◆ Acigraf SuperPerfast machines

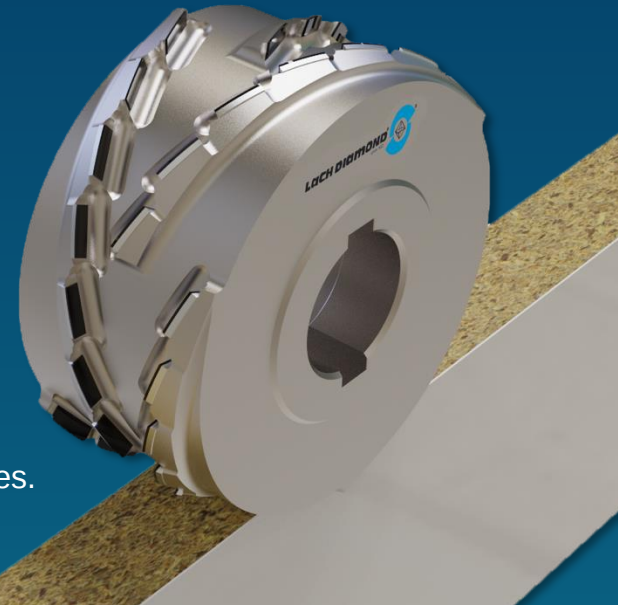
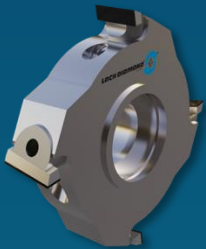
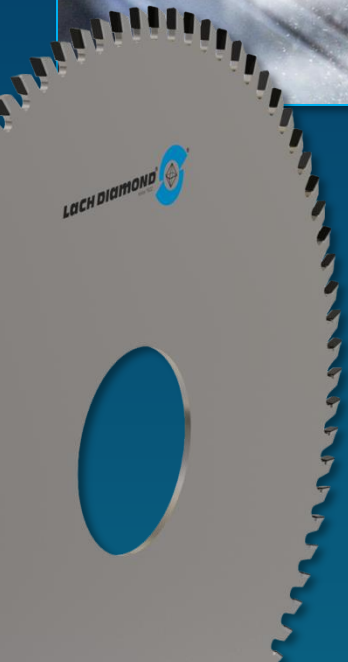
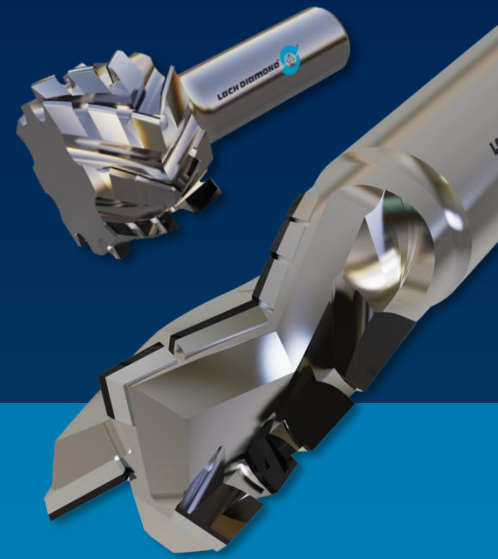


Industries machining with PCD tools

Woodworking



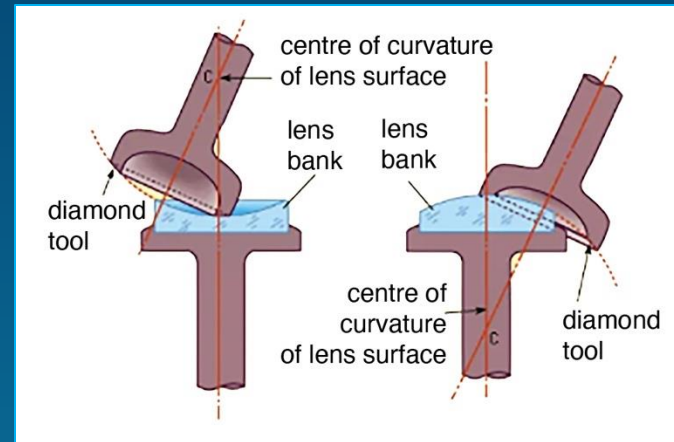
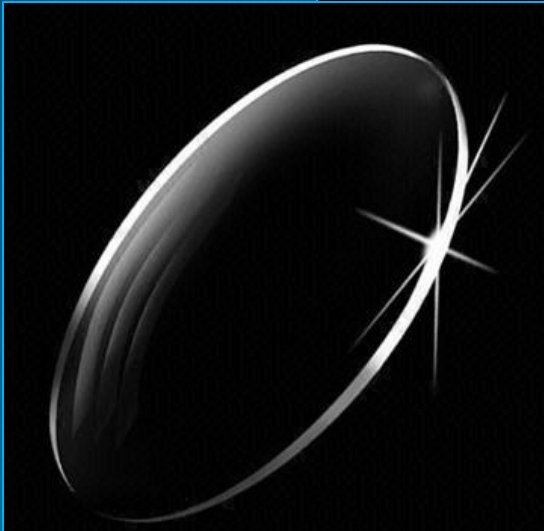
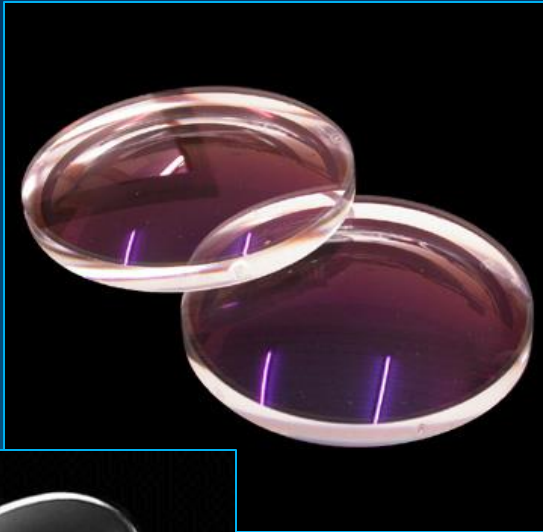
- ◆ Panel sizing
- ◆ Through-feed processing
- ◆ Stationary processing
- ◆ Jointing, edge trimming & nesting cutters
- ◆ Universal & profile routerbits
- ◆ Drills
- ◆ Hoggers
- ◆ Sawblades



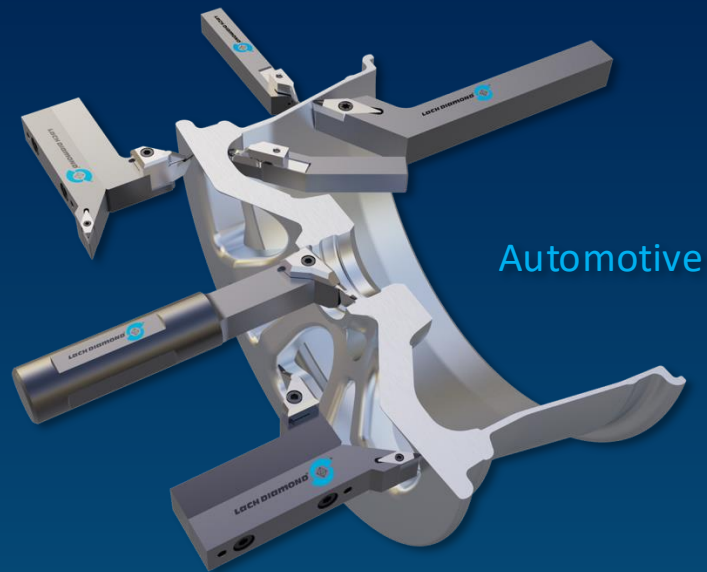
Maximum tool lives and extremely stable cutting edges due to adapted PCD qualities.

Industries machining with PCD tools

Optics



Eye glass machining tools
for the polycarbonate lens



Automotive



Electric motor manufacturing

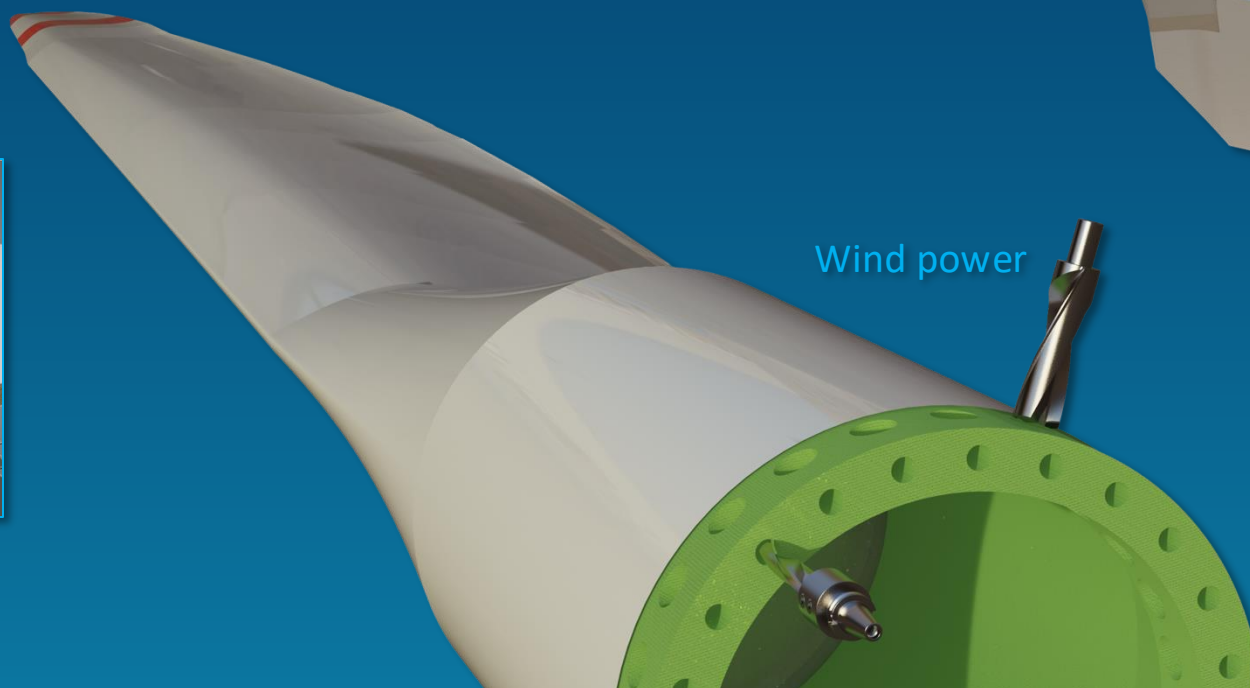


Electronics

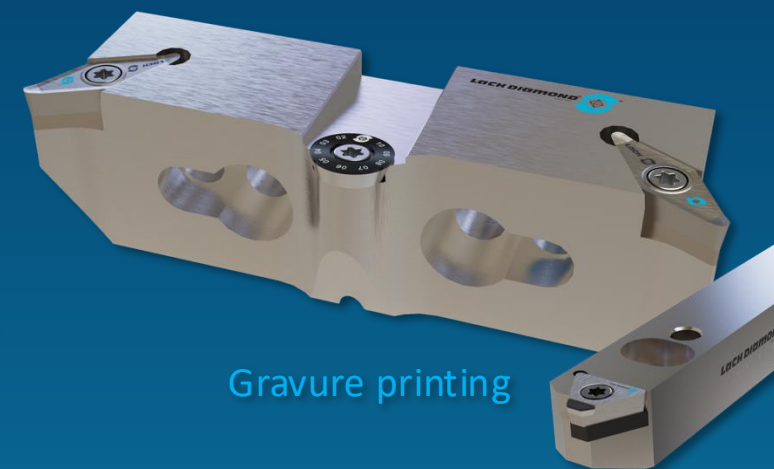
In summary of industries



Woodworking



Wind power



Gravure printing

Get in touch with us



Amber Clisso, Sales Assistant aclisso@lachdiamond.com

She has been with Lach Diamond for 24 years. Works directly with salesmen, assists with quoting and handles all orders and processing.



Randy Prafke, Manager of Operations rprafke@lachdiamond.com

He has been with Lach Diamond for 39 years. Oversees all production, works with the Lach Diamond sales team, and advises on engineering.



P. J. Agnew, National Sales Manager pagnew@lachdiamond.com

He has been in the industrial tooling industry for 25 years – 15 years with Lach Diamond. Oversees sales with team member, distributors, manufacturer's reps, and end-users.



Jim Johnson, Sales (woodworking industry) jjohnson@lachdiamond.com

He has been with Lach Diamond for 35 years. Specialty in woodworking sales & related aspects, quotes, and provides support/technical assistance to reps and end users.



Mike Kruisenga, Sales (metal/woodworking industry) mkruisenga@lachdiamond.com

Our newest employee with an industrial background in manufacturing and sheet metal. Assists in tooling applications, quotes, technical inquires and service to distributors and end users.



Annabelle Lach, Vice President alach@lachdiamond.com

Together with her father Horst Lach, she continues Lach's commitment to innovation and long-term growth as a family business.

Explore our website



LACH DIAMOND INC.



Products

Industries

Custom Solutions

Service

News

Downloads

Company

Contact

***PCD tools
made in Grand Rapids, MI***

manufactured and serviced in high precision

www.lachdiamond.com





Thank you!