

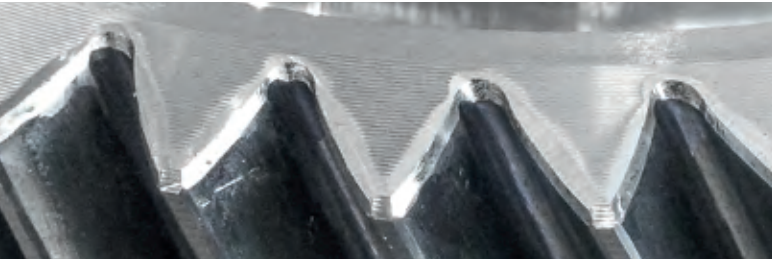
Fast. Economic. Precise.

## **The ChamferCut process**

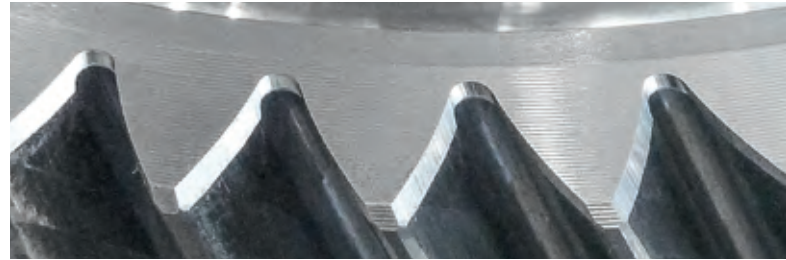


**LIEBHERR**

# The ChamferCut technology



Chamfer form with the traditional chamfering method



Chamfer form with ChamferCut

## Precise – reliable – cost-effective.

### This is the chamfering process

After chamfering with the patented ChamferCut technology, no additional machining is necessary. There is no need for a second cut, which is often required during the deformation-based deburring process for the removal of build-up material. With the chamfering process, the exact chamfer form is produced. In contrast to deformation-based processes, the material structure is not affected. An optimal starting point is created for the subsequent finishing of hardened gears, particularly gear honing. The quality of such chamfers defines a new standard – with maximum repetitive accuracy.

### Advantages of this process

- Very precise chamfer geometry
- Premium chamfer quality and reproducibility
- No bulging or material deformation
- Standard tooth-root chamfering
- Established process in gear production
- Very long tool life
- ChamferCut tools can be re-sharpened approx. 20 times easily and cost-effectively
- Lower tool costs compared to alternative processes
- Short amortization period due to low tool costs
- Applications for gears with module 0.8–42 mm
- 2<sup>nd</sup> cut not needed for gear hobbing – longer tool life for the hobbing tool
- Short setup times

## Profitability analysis



### Workpiece (chamfering)

Workpiece	speed gear
Module	2.7 mm
Number of teeth	41
Helix angle	24.5°

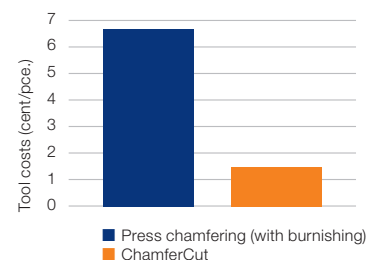
### Press chamfering (with burnishing)

Press chamfering tool	€ 4,700
Number of re-sharpenings	1
Total workpieces	95,445
Tool costs/workpiece	6.7 cents

### CHAMFERCUT

Chamfer cutter (set)	€ 3,600
Number of re-sharpenings	23
Total workpieces	468,293
Tool costs/workpiece	1.5 cents

**23,400 €**  
Savings per year  
(with 450,000 units)



# The Liebherr solution: Simultaneous chamfering

## Chamfering made easy:

- User-friendly software
- Simple adjustment of corrections via CNC axes
- Simple corrections at varying flank modifications
- Dry and wet machining possible
- Automatic loading with flexible loader principle (robot loading also possible)
- Flexible automation, e.g. via plastic chain conveyor, palletizing cell



### Gear hobbing machine LC 180 DC

The established LC 180 DC with integrated ChamferCut unit is a very compact gear hobbing machine. This integrated automation solution enables hobbing and simultaneous chamfering of workpieces with a maximum diameter of 180 mm and a module of 3.5 mm.



### Gear hobbing machine LC 300 DC

With the LC 300 DC gear hobbing machine workpieces with a maximum diameter of 300 mm can be produced very economically, with a high gear cutting quality and precise chamfer quality. Workpieces up to module 6.5 mm can be hobbled and simultaneously chamfered.



### Chamfering machines LD 180 C and LD 300 C

The LD 180 C and LD 300 C are compact stand-alone machines whose main task is the chamfering of gears. They can be integrated easily, quickly and cost-effectively into all existing production/manufacturing lines.



### Chamfering in the work area

The classic ChamferCut process with the chamfer cutters on the hob arbour can be retrofitted on all existing Liebherr gear hobbing machines with Siemens 840 D control and higher.



# Machine Tools and Automation Systems from Liebherr

Liebherr employs roughly 1200 staff in the area of machine tools and automation technology and has production facilities in Kempten and Ettlingen (Germany), Collegno (Italy), Saline (Michigan, USA) and Bangalore (India). They are supported by expert and reliable marketing and service specialists at a large number of locations worldwide.

With over sixty years of industrial experience, Liebherr is one of the world's leading manufacturers of CNC gear cutting machines, gear cutting tools and automation systems. The company's innovative products are the result of pioneering ideas, highly qualified staff and state-of-the-art manufacturing systems at each of their locations. They are characterised by economy, ease of use, quality and reliability in combination with a high degree of flexibility.



## System Solutions in the Area of Machine Tools

Included in the production programme are gear hobbing machines, gear shaping machines and generating- and profile grinding-machines, all noted for their high degree of stability and availability. Particular importance is attached to the energy efficiency of the machines.

Gear cutting machines from Liebherr are supplied to renowned manufacturers of gears and gearboxes and large-scale slewing rings worldwide. They are in demand primarily from the automotive and construction machinery industries and also increasingly from the wind power industry for the manufacture of gears for wind turbines.

## High Quality Gear Cutting Tools

Liebherr manufactures high quality, precision tools for the soft and hard machining of gears and all Liebherr gear cutting machines are fitted with Liebherr tools. The range also includes Lorenz shaping tools and products customised for specific customer applications.

## Automation Systems for a Broad Range of Applications

Liebherr has a wide range of products for linear robots, pallet-handling systems, conveying systems and robot integration for projects in all areas of production and can provide above-average availability of systems.

[www.liebherr.com](http://www.liebherr.com)

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