

New LC 180 hobbing machine combines high chamfer quality with one-cut machining

Kempton (Germany) September 16, 2013 – The new gear hobbing machine LC 180 with integrated Chamfer Cut unit for deburring and chamfering the face edges is based on renowned technology. After hobbing with the usual one-cut strategy, the Chamfer Cut tool additionally generates precise and reproducible chamfers, that are increasingly demanded by the market.

The newly developed solution eliminates the former main disadvantage of Chamfer Cut, namely that the chamfering process prolongs machining time. In the past, hobbing and chamfering took too much time at the same setting. “We have solved this by integrating a complete second machining unit for Chamfer Cut tools – two machines in one so to speak,” is the way Dr.-Ing. Oliver Winkel, Director of Application Technology and responsible for technological development of gear cutting at Liebherr-Verzahntechnik GmbH, characterises the basic principal of the new machine. Dr.-Ing. Hansjörg Geiser, Manager Development and Design Gear Cutting Machines at Liebherr-Verzahntechnik GmbH, adds: “The main design engineering challenge was to execute the Chamfer Cut unit at a reasonable cost.” Thus, the deburring unit was integrated within the existing machine dimensions without any impact on space requirements.

Chamfering no longer prolongs machining time by having it take place in a separate unit within the same machine, whilst the next workpiece is already hobbled. Both chamfer tools are no longer located directly next to the hobbing tool, but in the separate unit. “We know from gearbox design development that the subject of ‘chamfering’ is becoming more and more important. This innovation enables the machine to combine an already undisputed high chamfering quality, provided by the proven Chamfer Cut procedure, with cycle times that correspond to the demands of the automotive industry,” says Oliver Winkel. This technology is worth considering by all users, for whom alternative procedures are too time-consuming, whose tooling costs are too high, or those who especially need to take follow-up processes such as honing into consideration.

For all chamfering processes, it is a matter of precisely chamfering the face edges of gear workpieces as consistently and reproducibly as possible – free from burrs and warps. Yet, especially with press deburring, rolling requirements at the tooth root are not optimal for the chamfer quality. With the Chamfer Cut principle and the new chamfering unit, adjustments of the chamfer to varying flank corrections are possible.

The size of the chamfer can be reduced compared to the previous standard – after all, the chamfer tool is no longer dependent on the size of the hobbing tool. Chamfering tools with diameters of 40 mm are possible, which helps solving the collision problem and facilitates accessibility. In view of further downsizing trends in industry, this technology therefore meets the technical requirements to be able to generate even smaller more precise chamfers for transmission components. After all, as the importance of a reproducibly generated chamfer increases, the smaller the gear will be.

Partnering with the tool manufacturer, it is now for the first time possible to chamfer both face edges of the workpiece without the usual change of rotation direction, creating an additional time advantage. A further advantage results from having two separate machining positions: the workpiece is machined on different devices: gear hobbing on a stable, maximum-rigidity device, chamfering on a simpler, collision-optimised fixture. Also, the length of the hobbing tool can be maximised, enabling total tool costs to be further reduced.

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About Liebherr-Verzahntechnik GmbH

The Liebherr Group has been designing and manufacturing gear-cutting machines for nearly sixty years. Since 1962, these activities have been centred at Liebherr-Verzahntechnik GmbH in Kempten, Germany. Today, Liebherr is one of the leading manufacturers of CNC gear-cutting machines and automation systems. The company manufactures gear hobbing machines, gear-shaping machines, generating and profile grinding machines and gear-cutting tools. In the field of automation systems, in cooperation with well-known machine manufacturers, Liebherr supplies machining

lines, automated machining centres, and system integration of machine tools with gantries, robot integration and pallet-handling systems.

Liebherr-Verzahntechnik GmbH is the divisional control company of the Liebherr Group's machine tools and automation systems division. This division employs about 1,300 people all over the world and has manufacturing facilities in Kempten (Germany), Ettlingen (Germany), Collegno (Italy), Saline (Michigan, USA) and Bangalore (India) along with a worldwide marketing and service organisation.

Caption

liebherr-gear-technology-lc180.jpg

Hobbing machine with separate Chamfer Cut unit for work pieces up to 180 mm

Contact person

Thomas Weber

Phone: +49 0831 786-3285

E-mail: Thomas.Weber@Liebherr.com

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www.liebherr.com