LMT • FETTE

CHAMFERCUT

定义标准

Definition of a standard

www.lmt-tools.com.cn

CHAMFERCUT

标准的定义
Definition of a standard

利美特菲特的专利系统
ChamferCut可实现最高的倒角加工精度，为你提供精密、可靠、低成本的倒角系统。ChamferCut代表卓越的质量、更短的加工周期、高度的工艺可靠性。

Highest precision in chamfering
Precise – reliable – cost-effective. This is chamfering with the patented ChamferCut technology of LMT Fette. ChamferCut stands for uncompromising quality and short cycle times with high process reliability.

ChamferCut刀具系统
正确升级软件之后，ChamferCut可以作为一个芯轴带有滚刀的刀具系统。该系统可在芯轴上进行齿轮切削和去毛刺。因此，该技术的所有优点都可以在现有的滚铣机上实现

ChamferCut as a tool system
With an appropriate software update ChamferCut can be used as a tool system with a hob on a mandrel. This enables gear cutting and deburring on one arbor. In consequence all advantages of the technology can be taken on existing hobbing machines.

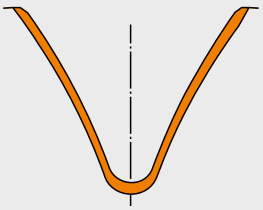
ChamferCut系统独立倒角应用
如果在独立式倒角机床中运用ChamferCut技术，则可以在主加工时间内并行完成倒角加工。最终，倒角加工不会影响加工周期时间。

ChamferCut in a separate chamfering unit
Using ChamferCut in a separate deburring unit allows main-time parallel machining. The result: chamfering without impact on cycle time.

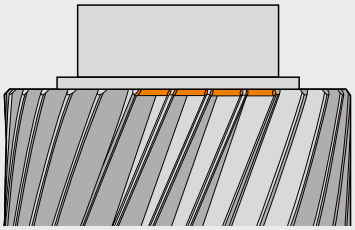
精确切削
首次使用前，应和齿轮制造商合作设计倒角形式。与成型工艺相比，ChamferCut切削工艺不影响材料结构。因此，该工艺对热处理之后的精加工表面（比如珩磨）没有不良影响。该技术定义了倒角质量的新标准 — 即使对于修整之后的倒角加工，也可以实现最高重复精度。

Exact cutting
Before first usage, the chamfer form is designed in cooperation with the gear manufacturer. Compared to forming processes, the cutting process of ChamferCut does not affect the material structure. Thus, there is no negative impact on finishing after heat treatment (e.g. honing). The chamfer quality defines a new standard – with maximum repetitive accuracy even after reconditioning.

成熟的 ChamferCut技术
Established ChamferCut quality



恒定的倒角深度
Constant chamfer depth



CHAMFERCUT /// CG

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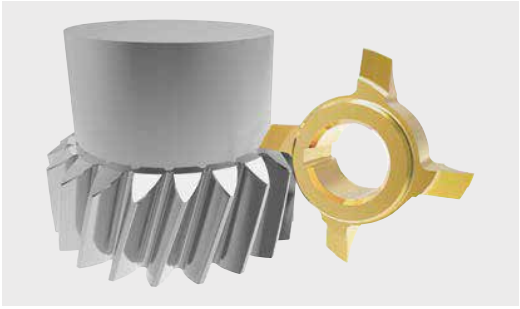
超越极限
Exceeding the limits

更紧凑结构的倒角加工
紧凑结构始终是制造商滚铣和倒角加工所面临的难题。由于碰撞问题，适用的倒角解决方案很少。ChamferCut深度改进技术可在接近干涉轮廓的条件下，完成齿根倒角加工。

When things get tight
Compact components steadily challenge manufacturers in hobbing and chamfering processes. Collision issues reduce the number of applicable chamfering solutions. The further development of the ChamferCut allows the chamfering down to the gear root even at close interference contours.



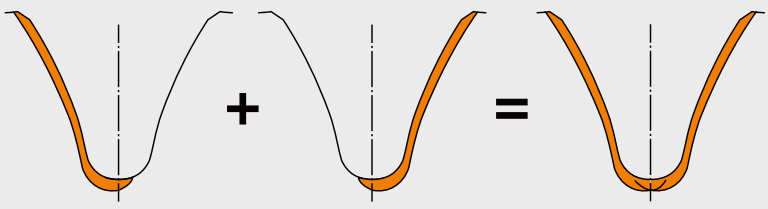
齿轮轴共轴
特别是，齿轮轴制造商非常清楚这项挑战。利美特菲特的ChamferCut–CG（碰撞齿轮）技术克服大多数限制条件，运用所有工艺优势，同时节约生产成本。因此，尽管这种最具经济效益的倒角解决方案是为批量生产而开发，但是也适合于许多其他应用。

Also on gear shafts
Especially gear shaft manufacturers know these challenges. ChamferCut-CG (Collision Gear) from LMT Fette overcomes most of the limitations and makes it possible to apply all the process advantages and cost savings. In consequence the most economical chamfering solution for series production becomes usable for even more applications.

LIEBHERR 唯一应用

ChamferCut–GC技术避开碰撞
为避免ChamferCut与干涉轮廓碰撞，该工艺采用两个独立式ChamferCut–CG。分成两次连续切削可提高参数选项设置的灵活性。通过利用成熟的ChamferCut技术（比如恒定倒角深度）可以在高难度零件上可靠地完成所要求的倒角加工。

Collision-free thanks to ChamferCut-GC
To avoid collision of the ChamferCut with interfering contours, two separate ChamferCut-CG are used. This separation into two consecutive cuts leads to a greater flexibility of the setting paramater options. The desired chamfer can now be reliably manufactured on challenging components in well-known ChamferCut quality (e.g. constant chamfer-depth).

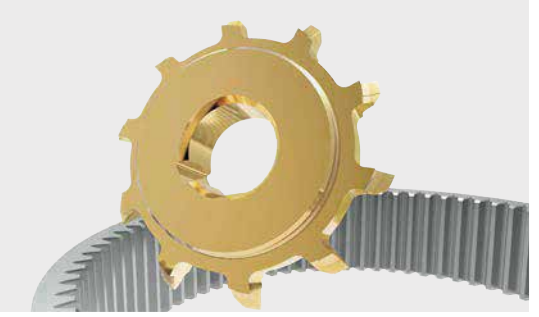


CHAMFERCUT IG

新的标杆
Off to new shores

内齿的倒角加工
内齿轮的齿轮切削加工、倒角加工均被视为一种特殊加工应用。特别是斜齿轮，倒角加工难度很高。目前为数不多的内齿轮去毛刺解决方案，要么精度太低，要么无法盈利。利美特菲特的ChamferCut–IG（内齿轮）技术现在可为您解决这项难题。

Chamfering gets internal
Internal gears can be considered as a special case, not only in gear cutting, but especially in chamfering. In particular helical gears are hard to chamfer. The few available deburring solutions for internal gears are either not precise or unprofitable. With ChamferCut-IG (Internal Gear) LMT Fette now faces this challenge.



每组行星齿轮需要一个环形齿轮
ChamferCut–IG（内齿轮）技术可完成内齿轮的倒角切削加工。比如，相比行星齿轮和恒星齿轮，行星齿轮传动装置制造商被迫使用竞争力较弱的倒角技术加工环形齿轮。引入ChamferCut–IG技术后，我们可在外齿轮和内齿轮加工领域同时享受ChamferCut的成本和质量优势。

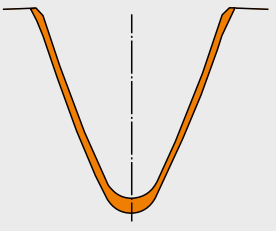
Every planet needs a ring gear
With ChamferCut-IG (Internal Gear) the cutting of a chamfer on internal gears becomes possible. For example manufacturers of planetary drives had to stick with less competitive chamfering technologies for the ring gears compared to the planet and sun gears. With ChamferCut-IG, the cost and quality advantages of the ChamferCut technology are now available for both external and internal gears.

LIEBHERR 唯一应用

典型对称效果
利美特菲特工程部门成功运用成熟的ChamferCut技术，内齿轮倒角深度保持恒定，并且倒角形状保持对称。新工艺的加工方法与传统ChamferCut工艺相似：一次切削，两侧均被倒角。这意味着该技术可节约内齿轮批量生产的成本。

A classic mirrored
LMT Fette engineering department sucessfully adapted the well-known ChamferCut quality with its constant chamfer depth and symmetrical chamfer form on internal gears. The new process works in a similar way as the conventional ChamferCut process: The tooth gap is chamfered on both sides during one cut. This means extensive cost-savings for mass production of internal gears.

成熟的ChamferCut技术
Established
ChamferCut quality



Service

利美特将成为您所用刀具整个寿命周期内的合作伙伴
Your Partner over the whole tool life

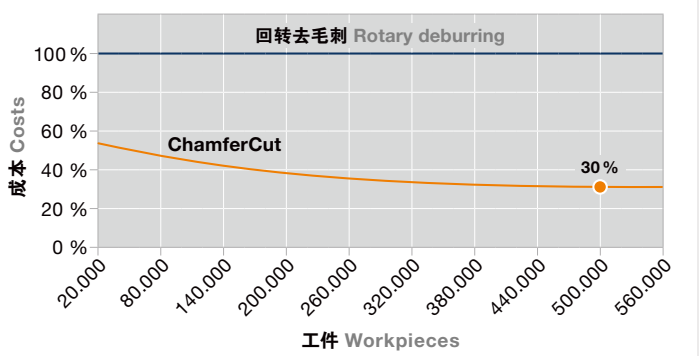
确保长期受益
通过结合所有工艺优势、更低的刀具成本，ChamferCut成为市场上最具有经济效益的去毛刺和倒角加工系统。
利美特菲特在整个刀具使用寿命周期内提供服务，保证始终一致的低成本和高质量。

Ensure lasting benefits
The combination of all the process benefits along with low tool costs makes the ChamferCut the most economic deburring and chamfering process on the market.
LMT Fette offers service over the whole tool life cycle. Consistent low costs per part and high quality are ensured.

ChamferCut的生产优势
Your production benefits with ChamferCut

- 降低单件成本
  Reduce costs per part
- 优化倒角质量
  Optimize chamfer quality
- 提升工艺可靠性
  Enlarge process reliability

500.000个工件 500.000 workpieces	回转去毛刺 Rotary deburring	ChamferCut
刀具最大工作周期次数 Tool cycles max.	100 %	**600 %**
新刀具成本 New tool costs	100 %	**55 %**
修整成本 Reconditioning costs	100 %	**5 %**
总成本 **Tool costs**	**100 %**	**30 %**



生产效率的回报
简化计算模型清楚表明，客户甚至可能从刀具成本方面大幅节约生产成本；并且该简化计算实例尚未考虑该工艺带来的更良好的齿轮切削成本效益（不需要第二次切削）、提升的精加工工艺可靠性（比如珩磨）。

Efficiency that pays off
The simplified calculation clearly shows: Even tool costs offer a great potential for savings in production. The better cost-effectiveness in gear cutting (no second cut required) as well as increased process reliability in finishing (e.g. honing) are not taken into account in this example.

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