



# TNC ensures excellent surfaces with hard machining

TNC controls master dynamic performance in HSC milling for toolmaking

Surface imperfections not tolerated: tools for drop forging

*In car manufacturing, the power transmission components—like crankshafts and gear parts—are usually produced from hot-formed blanks. Processes like drop forging and extrusion make these components tougher and more resistant to be able to withstand high dynamic loads. The lightweight construction trend greatly increases the significance of massive forming. The Hirschvogel Automotive Group is outstanding in its enormous experience in combined forming processes for the automotive industry. The Klartext editors visited the toolmaking facility of*

*Hirschvogel at their headquarters in Denklingen in Upper Bavaria. Here, small lot sizes of tools and forging dies are produced for manufacturing on Mikron high-speed machining centers from GF Machining Solutions, controlled with high accuracy by HEIDENHAIN TNC controls.*

"High accuracy at high speeds is our greatest challenge," says Manfred Dunderer, Head of HSC milling at Hirschvogel-Werkzeugbau. In the case of forming tools made of tempered tool steel the demands are constantly rising: when forming they are subjected to temperatures of up to almost 1200 °C;

they have to withstand sudden loads and at the same time produce the exact forms. Surface imperfections are simply not tolerated. For toolmaking at Hirschvogel the HSM machining centers from GF Machining Solutions are utilized for HSC milling because of their high rigidity at high dynamic performance. Precisely with continuously increasing degrees of hardness—at Hirschvogel they mill hardnesses of up to 66 HRC—these machines, combined with the highly accurate motion control of the HEIDENHAIN TNC controls, achieve outstanding surface quality.



A powerful team:  
HEM 500 U machining centers from GF Machining Solutions with TNC control

## Hirschvogel parts in practically every car

With sites throughout the world, the Hirschvogel Automotive Group is one of the largest suppliers to the automotive industry. Each of their own developments is optimum in its own right with regard to function, strength and size. A wealth of experience in massive forming processes makes it easy for Hirschvogel to take new developments into account and implement combined processes. In this way Hirschvogel succeeds in manufacturing parts in large numbers at an economically viable price. On the topic of lightweight construction, forming processes—with the corresponding part design—have a great potential for saving weight.

## Forging die quality is decisive for good workpieces

"For milling, we use HEIDENHAIN controls across the board," explains Ralph Schramme, Production Manager for Tool-making. "This makes us very flexible." Operators change the machine or an order changes the machine: with the same control everywhere this is a simple process. Here the TNC is accurate and—de-

pending on the machining job—particularly fast. This is thanks to the Operator Support System (OSS) that Hirschvogel uses, a function which GF Machining Solutions provides as an extension of the HEIDENHAIN Cycle 32. The machine operator simply has to set the dynamic ma-

pressures make it expedient to minimize set-up times. Georg Gebler, Director of Hirschvogel-Werkzeugbau explains: "We have to have a new tool ready in 3 to 4 weeks, which means that we have to drastically reduce our run times." The pallet changing sys-

**" We achieve the hard machining with HSC milling using a combination of machines from GF Machining Solutions and controls from HEIDENHAIN."**

Ralph Schramme, Production Manager, Hirschvogel-Werkzeugbau

chine behavior as required: more accurate or faster despite the high dynamic performance. The CTC and AVD functions from HEIDENHAIN's Dynamic Precision package come into play here to reduce the dynamic deviations of the machine.

## Small lot sizes with short run times

At Hirschvogel-Werkzeugbau the lot sizes are typically from 1 to 10—and a challenge too. Cost and deadline

tems from GF Machining Solutions are essential for this. This compact and integrated automation solution permits machine operators to prepare the next jobs outside the machine in zero-point clamping systems. The pallet changer can take up to 20 workpieces—with its own access to make loading easier. The familiar user-friendly TNC control from HEIDENHAIN handles the management. The machine operator has a clear overview of the jobs to be processed thanks to convenient table views.

*Fast machining with lot sizes of 1 to 10:  
increased throughput with pallet changers.*



Hirschvogel has problems filling unmanned shifts because the typical machining operations do not take long. The solution was the idea of switching to two shifts with 4 hours between each of them: from 6:00 a.m. to 2:00 p.m. and from 6:00 p.m. to 2:00 a.m. "We can easily fill the 4 unmanned hours with the pallet changers and we keep the big jobs for the weekend," says Manfred Donderer.



*Massive forming processes are the specialties of the Hirschvogel Automotive Group.*

## The best of support from GF Machining Solutions and HEIDENHAIN

"We enjoy excellent support from GF who are well in tune with our needs and requirements," Ralph Schramme says in praise of the good cooperation with the Swiss machine makers. Customer-specific solutions are also made possible because the control manufacturer

HEIDENHAIN readily joins in and actively supports the machine manufacturer. For example, a custom cycle was created specially for Hirschvogel-Werkzeugbau for a travel range limitation. This was done using CycleDesign, the HEIDENHAIN software for creating cycle structures. On request it is even possible to define a special soft key.

In this way the Mikron high-speed machining centers from GF Machining Solutions fit perfectly into the spectrum of parts and machining tasks. Furthermore there is the good unit productivity rate including automation solutions—the best choice for Hirschvogel in combination with HEIDENHAIN controls.

## Hirschvogel Automotive Group

As a premium partner of the automotive industry the Hirschvogel Automotive Group develops and produces parts for engines, injection systems, gears, power trains and chassis. As a specialist in massive forming and cutting processes Hirschvogel has over 4000 employees worldwide.

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*HSC professionals: Ralph Schramme,  
Production Manager for Toolmaking, with  
machine operators Norbert Teicht and  
Alexander Raabe as well as Manfred Donderer,  
Head of HSC milling (left to right)*

