



## New production line for E-drive components starts up

### DVS Production expands capacities for new ring gear production

A new production unit has been built at DVS Production GmbH in Krauthausen/Thuringia to produce drive components for a tier-1 supplier in the automotive industry. The ring gears manufactured here are used in plug-in hybrid and electric vehicles, with correspondingly high precision requirements from the final customers. A high-output production line was constructed in cooperation with DVS engineering and toolmaking affiliates. Machining technologies from PITTER and PRÄWEMA, tools from DVS Tooling and clamping devices from SWS Spannwerkzeuge GmbH form the basis for producing the demanding precision parts.

Just before the ground was hardened by frost, at the end of 2017 the first diggers rolled onto the DVS Production GmbH premises and started with the massive earthwork necessary to ensure that the foundations of the new unit would be on the same ground level as the existing production buildings. "About 80,000 cubic metres of soil were moved for the new unit", reports Rainer Eisel, Managing Director since the company was founded nearly 15 years ago. "Little time remained to finish the building and to ramp up production. The customer needed the parts as soon as possible", Eisel adds. In fact, the new unit covering 4,000 sqm was completed in a record time of just 8 months

#### Highlights

- Integrated production line for high efficient ring gear production in new 4000m<sup>2</sup> facility
- Complete green machining on machine series PITTER SkiveLine: turning and gear cutting at inner and outer diameter via Power Skiving
- PRÄWEMA internal gear honing for highest quality gears – and nearly noiseless transmissions

and docked onto the existing buildings.

### Production only with DVS machines

The new facility is used for manufacturing ring gears. The internal gearing components are parts of the planetary gear, which is increasingly in demand for electric drives thanks to its compact design, high efficiency and quiet running properties. "DVS Production is supplying some of the essential parts in this project", explains Mario Möller, likewise Managing Director with responsibility for the company's production activities. Engineers from DVS Production are also involved in the process design. They talk with the customers about the properties that the component needs for highly efficient machining. Time and again they detect concealed "cost drivers" which can still be eliminated without any problems during the early phase of process design.

The input quality of the forged rings that will be used later on to make the ring gears is inspected in the new building's lab facility. After lathing as the first machining process, gearing is applied to the inner and outer diameter. The ring gears made of case-hardened or nitriding steel are pressed into the transmission housing in the customer's factory, so that the outer contour needs a corresponding block gearing. The inner contour needs running gearing with high surface quality. Best requirements for using the newly developed PITTER SkiveLine machine platform for complete blank machining. In conjunction with the multifunctional automation cell PAC (PITTER Automation Center), two SkiveLine gearing units operate as OP10 to produce the external gearing and as OP20 for the inner contour. Download from

[dvs-technology.com](http://dvs-technology.com) and read more about machining ring gears with the PITTER SkiveLine on page 20 of DVSpezial 2018. Link: [www.dvs-technology.com](http://www.dvs-technology.com).

An external service provider is responsible for subsequent heat treatment with the nitriding process, which is known to ensure a high level of core strength for the workplace material. The gear honing allowances can thus be minimised with positive impacts on cycle time and costs per unit. It is therefore possible to dispense with downstream surface and cylindrical grinding of the parts.

### Higher revs in e-drives require hard-fine machining

A few years ago, the part would have gone to the customer in finished condition after hardening. But the higher revs in electric motors with the associated higher contact ratios at the tooth flanks necessitate hard fine machining of the part after the hardening process. The last machining step consists of honing the inner gearing on this surface on a PRÄWEMA SynchroForm V machine, thus optimising the surface quality of the gearing. About 50 µm of material is removed on each flank. This is a reliable process resulting in the high gearing quality 8, thus practically ruling out any acoustic anomalies in the transmission.

After honing the inner gear, a DMC code is lasered onto every part. On logging onto DVS Production's data exchange server, the customer scans in the part code to access for example the measurement records produced during the subsequent 100% quality control. The date and time of manufacture or part serial number can

also be accessed in the same way.

### Further reduction in lead times

The final steps before sending the parts to the customer consist in washing, preserving and packaging the parts. "Construction of the new unit gave us an opportunity to revise our internal logistics processes with further reductions in the lead times", Möller explains.

All in all, the company has implemented another successful future project with the new production line. In addition to drive shafts, sun and planetary gears, mass production of ring gears for electric and hybrid vehicles is now possible. 30 new jobs were created at the same time. "The next project is also ready to start"; says Rainer Eisel. "We're going to open subsidiary abroad in 2019", he adds with a smile. ■

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