Gear Research

The ZPP working group on «Gear Technology» at the Centre for Product and Process Development at Zurich University of Applied Sciences conducts research in the area of transmission systems and gearwheels made from steel and plastic. Numerous test benches, measuring machines and suitable calculation software are available for carrying out research and service projects.

Services
- Design of gearwheels with KISSsoft
- Creation of KISSsoft material files
- FEM calculations with Ansys
- Structural optimisation of the gear body with TOSCA
- Customer-specific test benches
- Measurement of gearwheels (double-flank composite testing, tooth width measurement, imaging measurement)
- Testing and analysis of damage types
- Scuffing load capacity specification as given in the FZG test
- Metallurgical analyses
- Tests in conformity with VDI 2736

Test benches
19.5 kW run test bench
- Power: 19.5 kW each
- Torque: 15 to 150 Nm
- Speed range: 10 to 6000 rpm
- Centre distances: 91.5 mm, further dimensions on request
- Efficiency measurement
- Option of internal gearwheel lubrication or internal gearwheel cooling
- Analysis of housing vibrations and structure-borne sound
Sensor technology
- Temperature monitoring and control via a thermo-graphic camera
- Options for tooth-root temperature monitoring in a lubricated state via PT100 and a slip ring.

Lubrication
- Numerous types of lubrication (oil bath, oil injection, drip lubrication) with customer-specific oils possible
- Oil temperatures up to 150°C are possible

Pulsator test
- Various tension-compression testing machines available for pulsator tests with forces up to 15 kN and frequencies up to 100 Hz.

5 kW run test bench
- Power: 5 kW each
- Torque: 2 to 25 Nm
- Speed range: 10 to 6000 rpm
- Centre distance: 60 mm (VDI 2736 size 2), further dimensions on request
- Temperature control unit to regulate the tooth-root and tooth-flank temperature

VDI 2736
Plastic gears can be tested in accordance with VDI 2736. Size 2 is available as standard with a centre distance of 60 mm. Customer-specific gearwheels can be tested in this size range. The test temperatures and lubrication conditions are defined together with the customer. During the running test, the tooth-root and tooth-flank temperature is controlled via an IR camera. A KISSsoft material file can be created on request.

Production possibilities
The ZPP is equipped with numerous production facilities for setting up test benches and machining gearwheels. Specifically:
- Additive manufacturing by means of selective laser melting (SLM) on two Renishaw AM250 and AM400 systems
- High-performance cutting with a Hermle C800U 5-axis CNC milling centre and a DMG Mori NTX 2000sz 9-axis turn & mill machining centre

In addition, our large network of partners and suppliers can assist in the manufacture of gearwheels.

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