Future mobility. Tested now.

ZF Test Systems
Your products on our test system

We cannot imagine research and development, production and quality assurance or service without efficient test facilities. They help save time and money and ensure an ever increasing quality.

System supplier for many business fields

Powerful test facilities are essential in research and development but also in current production. They allow the development cycles to be shortened, cost to be lowered, series production to be controlled reliably and they enable you to offer the service required by your customers.

ZF Test Systems develops and produces test systems for on- and off-road mobility. As specialists for validation and development test facilities, we improve the quality of driveline, active chassis, tires and wheels as well as brakes and thus contribute to enhanced safety and comfort for the driver. Our product range covers the full span from individual test benches to complete test lines, focusing on applications like e-mobility, transmissions and axles, tires and wheels, brakes, transmission components and oils.

30 years of experience

The business unit Test Systems which is located at Passau relies on more than 30 years of experience in the construction of turnkey test facilities. Meanwhile over 1200 test
systems have been supplied to satisfied customers in 40 countries worldwide. For us, there is no conflict between well-proven technology and innovative solutions. Rather these are the recipe for a reliable, customized test rig technology exactly tailored to the customer’s specific requirements. We see ourselves as a complete system supplier and problem solver; with the experience and creativity of our employees we know the customer’s needs and requirements, and find the ideal solution together.

Part of a strong group

Test Systems is a business unit of the ZF division Industrial Technology. In this division, ZF bundles its activities for “Off-Road” applications. It comprises the development and production of transmissions and axles for agricultural- and construction machinery as well as driveline technology for material handling systems, rail- and special vehicles. The division is also responsible for the worldwide business of marine propulsion systems, aviation technology as well as the development and production of gearboxes for multi-megawatt wind turbines. The business units of the Industrial Technology Division thus cover a wide range of products and markets. The Division employs a total workforce of approx. 10,000 persons at 26 locations worldwide.

All ZF corporate divisions have production systems which are matched to the market-specific requirements. The six principles of these production systems are standardization and flexibility, process orientation in customer-supplier-relationships, just-in-time, employee and team orientation, zero-error, as well as innovation and continuous improvement. The strict focusing of the company towards value-added processes along with the upgrading of all processes and products by innovations are the basis for customer benefit by leading technology.

Future mobility. Tested now.

Driven by the force and competence of a globally active engineering group, we are developing solutions for the future mobility and are prepared for the forthcoming requirements like autonomous driving and E-mobility. We recognize sustainable trends early, and are providing our customers with solutions to secure competitiveness also in the future.
Tailor-made turnkey solutions ready for use

As a specialist for driveline and chassis technology we know what is important in practical application. We deliver turnkey test facilities, including all peripheral systems and software, so they are immediately ready for use and operable.

One source for everything

As a systems supplier our product range covers the full span from standard test benches to complete customized test lines. We are taking care of everything, from development and planning via manufacture, assembly and programming of the test benches, right through to their equipment with peripheral and supply technology. We offer our customers an individual, flexible and rapid project management. All facilities are manufactured and tested in ready-for-use condition in our assembly workshop.

Tailor-made solutions

Depending on the customer’s requirements we create individually tailored test systems after having developed a matching concept in coordination with the customer. Thanks to many years of experience ZF can use well-tried basic modules for most projects. This does not only accelerate the development time but guarantees highest functional safety. So the customer benefits twice: Within shortest time he gets a sophisticated test system at low cost which includes components that have proven themselves in thousands of applications.

Immediately ready for use

As a specialist for driveline and chassis technology we know what is important in practical application. We deliver turnkey test facilities, including all peripheral systems and software, so they are immediately ready for use and operable. The customer gets comprehensive instructions and an in-depth training of all test procedures. After commissioning of the test systems, the customer can further rely on the expertise of ZF. A remote connection allows wide maintenance. Additional support is offered by the ZF-Helpdesk, with our experts from the fields of mechanical engineering, electrical engineering and software programming providing assistance on the phone and on site.

Comprehensive customer support

We know the importance of high-tech test systems for our customers, especially when they are directly integrated into the production process. Our range of services is focusing on these requirements. We offer our customers rapid and straightforward support in case of urgent need or as part of maintenance and service contracts. Consequently a smooth operation of the test facilities after delivery is guaranteed at any time. A maintenance contract is the safest way to ensure smooth operation even after many years, since regular maintenance and calibration are the key factors to secure reliability and quality. Customers who want to carry out maintenance and repair work by themselves can attend an advance training course held by the staff of ZF Test Systems. Based on this training and using our extensive documentation they will then be able to take care of the service work. The required spare parts will be supplied by us rapidly.
Test systems for transmissions and axles

Flexible R&D test technology – fully automatic test lines. As a specialist for the development and production of transmissions and axles, we know what is important when testing drive systems. ZF serves a wide range: from passenger cars to heavy transmissions for construction and agricultural machinery, from a single test bench to a fully automatic test line for manual, automatic, CV transmissions, e-mobility or axles. ZF develops, produces and delivers R&D and production test systems for customers worldwide.

Advantages
- Fully automatic testing of various parameters as function, service life, efficiency, acoustics, ratios, shift quality and leak tightness
- R&D test systems that are flexibly controllable and variable in size enable a high reproducibility of test conditions
- Function tests, quality assurance and high operational capacity.

E-mobility test system
up to 500 kW / 700 Nm torque for e-motors, gearboxes, e-axles, e-powertrain, e-transmissions.

Production test system
Customized end of line production test system for the off-highway industry with highest grade of automation and precision.

R&D driveline test system
Fully automated R&D test system for entire drivelines up to 800 kW with high dynamic drives.
Innovations of great value

We are aware that our customers expect optimum solutions in every respect. Therefore, ZF Test Systems is continuously enhancing its test systems which will help the customers gain the advantage over their competitors under hard competitive conditions.
High Speed Drive for e-mobility

The new e-mobility test system by ZF meets all requirements that arise as a result of the transition to electromobility.

The core component of the test system is a high-performance drive module. In combination with the drive bearing module and the receiving module for the test object, it combines to a complete test system. The base for the receiving module is optionally fixed, inclinable and swiveling and available for single or multi-machine operation with or without cross table. Various optional modules complement the modular system. A receiving module for electric motors and one for coaxial test objects extend the possibilities of the test system. An acoustic cabin for the drive module and an air conditioning cabin for the receiving module for the test object are also possible.

Due to the modular design, tests of conventional car transmissions can similarly be performed. The appropriate frequency converter and measurement technology, automation and a highly dynamic control perfect the system.

One unit for all tests: tire test system ZF-LUB5

Today’s production of passenger car tires incorporates 100-percentage testing as part of the default quality assurance, including uniformity tests. In addition to this, premium manufacturers also measure the static and dynamic imbalance as well as the geometry of the tires. On the basis of the obtained measuring results the tires are categorized into different quality classes and at the same time tires with safety critical failures such as bulges, or undulations are sorted out by using modern laser measurement technology. This elaborate process has been immensely facilitated thanks to the use of the ZF-LUB test system (Low Speed Uniformity Balancing Machine).

The ZF-LUB5 enables to carry out all mentioned test requirements with only one system and at the same time reduces operating costs by up to 45 percent. Due to the fact that the production of tires is constantly increasing and in this context the requirements in terms of quality and performance are also becoming more stringent, the demand for test systems securing tire quality has also increased. For this reason, the existing test system type ZF-LUB4 has been modernized by ZF-engineers.

After an intensive development phase, the new generation of the test bench ZF-LUB5 has been born. The test system has been perfectly adapted to the market requirements of today and tomorrow and combines utmost measuring accuracy with low operating costs and a low space requirement. Special attention has also been paid to easy maintenance of the ZF-LUB5.
ZF provides for comfort, safety and quality. Tires and wheels are delicate and severely stressed parts of a vehicle. ZF supports customers in the engineering of products already during the development of basic characteristics such as durability, tread wear, rolling resistance and tire characteristics. The size uniformity (low and high speed) which is relevant for vehicle comfort can be measured in this early stage already. In tire production, the limit values of uniformity and unbalance are secured on fully-automatic ZF machines.

Test systems for tires and wheels

Advantages

- Highest quality of measurements at speeds up to 400 km/h
- Reproducible simulation of real environmental conditions
- Simulation of real driving conditions for optimization of performance and durability
- Low energy and maintenance requirement during production controls
- Quick and reliable final inspection since all significant quality characteristics can be tested with one single test system

Multi axial wheel tester

The state-of-the-art multi axial wheel tester (MARP) allows extremely realistic simulations of test piece characteristics. As a result, completely new areas in the dynamic response and in the qualification of measured values can be tested.

Force and moment tester

It is highly dynamic on all axles and allows a very fast positioning at high precision. It offers drive file simulation.

Balancing machine BAL

It offers fully automated dynamic balancing test. The rim is changed by robot, allowing the lowest cycle and rim change time.
Test systems for brakes

More safety thanks to ZF precision. There is a great potential for development in the field of brake technology – just think of electronic control systems, enhanced low-wear materials, or reduced brake noise. To bring new product developments up to an economical and reliable series production level, precise high-tech test systems are required, tailored to the individual needs of our customers. ZF supplies brake test systems for passenger cars, motorcycles, commercial vehicles, construction machinery and heavy rail vehicles.

Compact brake dynamometer
A compact standard test bench for brake development up to a vehicle weight of 3,500 kg and a vehicle speed of 300 km/h.

Brake noise test system
Installation of the test brake with original chassis parts and drive via road wheel and wheel for an identification of brake noises in accordance with the vehicle.

Rail-bound vehicle and truck brake test system
Simulation of great vehicle inertias of up to 4,000 kgm² and high vehicle speed of up to 450 km/h.

Advantages
• Testing of complete brake systems, including corresponding control unit
• Real-time simulation of drag forces, vehicle masses and speeds
• Reproducible simulation of real environmental condition
• Performance testing to performance limit of materials used

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Perfect units into the last detail.
Single components of drive units must also be carefully checked to avoid hidden errors. On the one hand, components must be tested separately with regard to their operability, load capacity or perfect functioning; on the other hand, it is important to analyze their functioning within the complete drive system. ZF offers concepts for a separate component check, but also for function tests of complete systems under realistic conditions.

Test systems for transmission components and oils

Advantages
- Simulation of real conditions
- Standard test systems allow comparable test results with uniform general conditions (ZF GK test system, ZF FZG standard synchronizer test system SSP180)
- Individual, with the customer coordinated solutions for a wide variety of applications and test parameters

ZF GK4 test system
Automated wet clutch test system with lated torque and high dynamic drive technology.

ZF synchronizer test system
The SSP180 allows standardized synchronizer parts tests for all needs of R&D component testing.

ZF GLP2 wet clutch test system
A wide range of single or multiple wet clutches can be tested of ZF Stands. GLP2 tests for large sized friction discs.
Your value with data analytics

Increased quality and efficiency thanks to data analytics

An improved and more effective evaluation of a product’s data during its life cycle can reduce costs while at the same time enhancing quality of both the current product and its successor. This requires a linkage between the data from the fields of R+D, production, EOL test as well as the evaluation of customer data.

**DA1**
End-of-line function test with analysis of all available test run information (e.g., measurement data, log files, PLC data)
- Quality optimization
- Automated determination of meaningful test limits
- Time savings through avoidance of test redundancies in multi-stage manufacturing processes

**DA2**
Merging the results from DA1 with data from production
- Identification of influencing variables for process optimization
- Time and material savings through targeted improvement measures
- Increased delivery capability through reduction of the internal return rate

**DA3**
Analysis of data from EOL testing, production and development
- Derivation of the performance capability allows new variants to be defined without them having to be 100% field tested
- Time and cost savings
- Added value for product quality and processes

**DA4**
Integration of customer usage data in data analytics
- Knowledge gain for the development of the next product generation
- Determination of real load spectrums allows for optimized service intervals (Example: ZF TraXon Predictive Maintenance)
- Added value for product quality and processes