



# ZF final finishing equipment

Generation 5 from ZF Test Systems



# Final finishing basic product types

The ZF final finishing systems are made for advanced demands in tire industry quality inspection combined with lowest life cycle costs – a wise investment. There are three basic types with various options available.

## ZF-BAL5

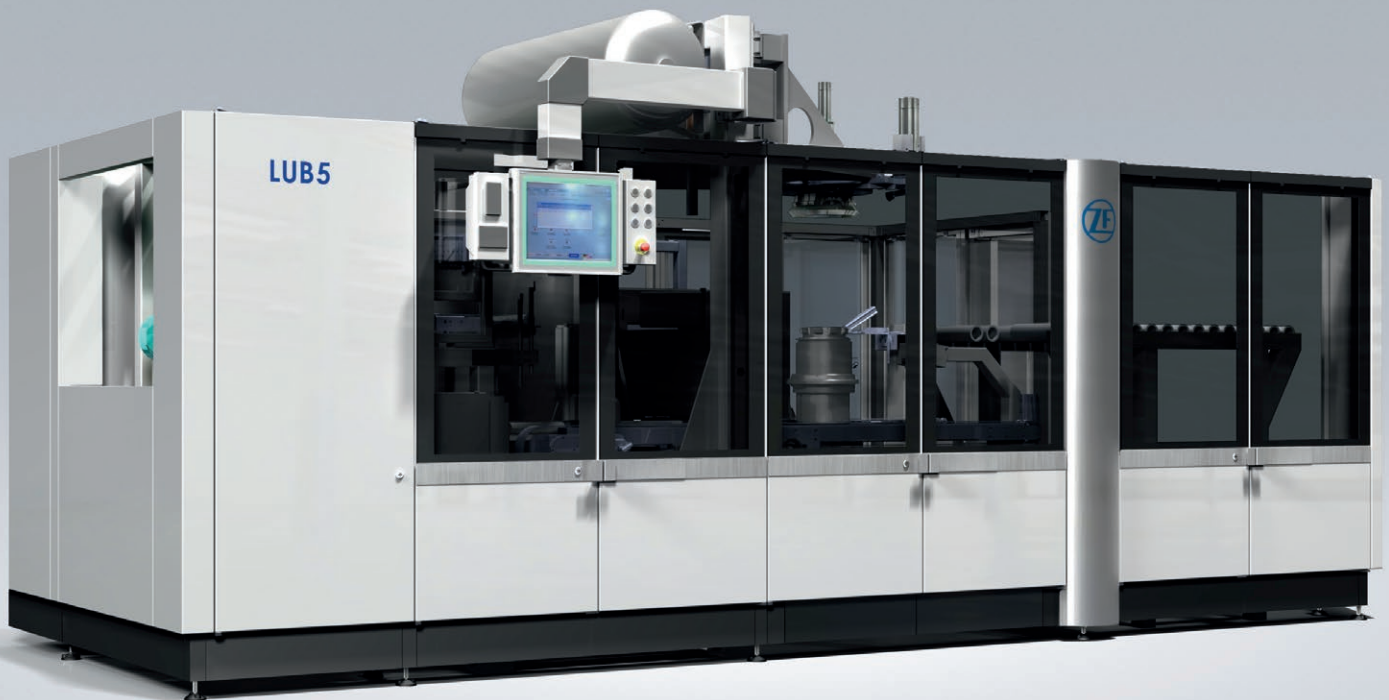
The state-of-the-art balancing machines measure tires according to static, couple, upper and lower plane unbalance. Thanks to a compact and rigid design combined with a very precise spindle drive system, values are taken with highest precision and repeatability – over years and years. A very fast throughput provides good profitability for the tire manufacturer. A wide range of options like automatic rim change or innovative marker systems are available.

## ZF-LU5

Besides balancing the low speed uniformity systems have the longest tradition in tire evaluation. With the LU5 ZF offers a standard tire uniformity final finishing machine for customers who prefer finishing systems for highest throughput. The ZF-LU5 is based on a well-known measurement technology which is already used for years. Its reliability and speed enable a best-case annual production volume of more the 1.4 million tires per year per system.

## ZF-LUB5

Low Speed Uniformity and Balancing technology combined in one system – unique and outstanding. ZF has proven this combination to be the one with least total cost of ownership for many years already. It measures weight, unbalance, uniformity and geometry in less than half a minute. The system occupies little space in your facility and consumes up to 40% less energy than separate systems. A precise and reliable innovation which pays off itself in short time.



**ZF-LUB5:** Low Speed Uniformity and Balancing technology combined in one system.

## ZF-HSU5

The HSU5 (high-speed measurement for production) is based on the standard assemblies of the modular ZF Final Finishing equipment and is compatible with all other test systems in this series. This offers significant benefits to our customers with regard to spare parts stocking, maintenance and the multifunctional use of measuring rims. Apart from high-speed measurements with a maximum speed of up to 200 km/h, the test system also enables reliable measurements in the low-speed uniformity and unbalance measurement.

## Advantages of the combined modular system architecture

From ZF-BAL5, ZF-LU5, ZF-LUB5 up to ZF-HSU5 there is only a minor update necessary to enable the full range of measurement possibilities. Subsystems and auxiliaries are standard modules which are well developed and proven. This is a big advantage for customer's spare parts stock. All available options like the ZF geometry measurement system M-OTI, automatic rim change, marker or sorter are used on all three machine types. The new generation of final finishing equipment can be operated from left to right or right

to left and is designed to fit easily in a standard container for shipment. Special attention was laid to short installation and commissioning time at customer's site.

## Line Concept

The ZF balancing and uniformity machines can be used as separate systems in a final finishing line concept. This guarantees the lowest cycle time and a maximum throughput. The assembly is free adjustable, this means the customer can place each machine type in front. The ZF geometry measurement system M-OTI can be added to both machine types.

# Get more with one system

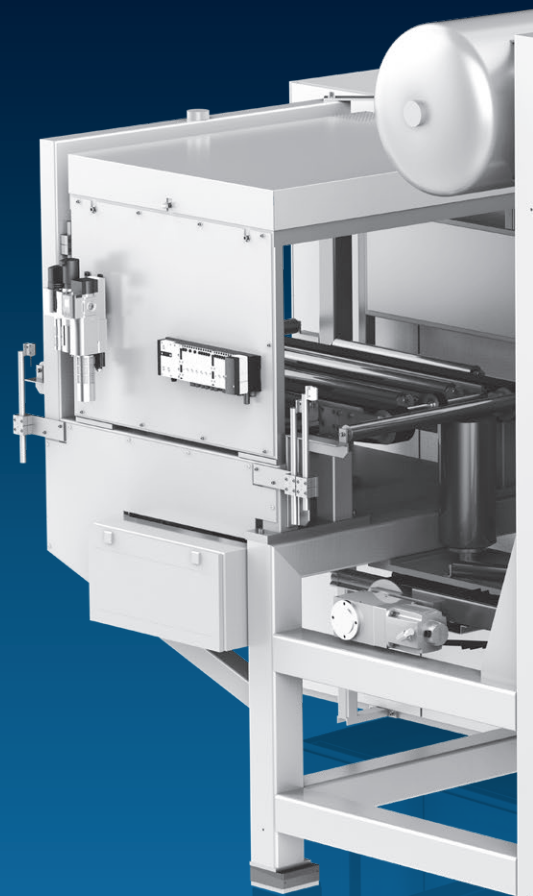
The new ZF-LUB5 comprises Low speed Uniformity and Balancing technology in one tire test system. With many options available and a compact size, it is a highly cost and space efficient system.

## 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-LUB 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.





- ... available options in each system
- ... possibilities of measurements
- ... upgrades

- ... output of tires per shift
- ... system availability
- ... investment savings per tire



The image shows a complex industrial machine for tire processing. It features a large robotic arm on the right side, which is holding a tire. The machine has various components, including a large cylindrical drum, a conveyor system, and a control panel with a screen. The background is a solid blue color. Three circular callouts with dashed borders are overlaid on the image, each containing a plus sign and a key benefit: 'flexibility', 'efficiency', and 'productivity'. Dotted lines connect these callouts to specific parts of the machine. The overall design is modern and professional.

## flexibility

for more ...

## efficiency

for more ...

## productivity

for more ...

- ... life cycle cost benefits
- ... environment protection
- ... space in shop floor

# Options for ZF final finishing test systems

The ZF final finishing product line comes with various options to meet worldwide customer demands for best tire quality inspection, e.g.



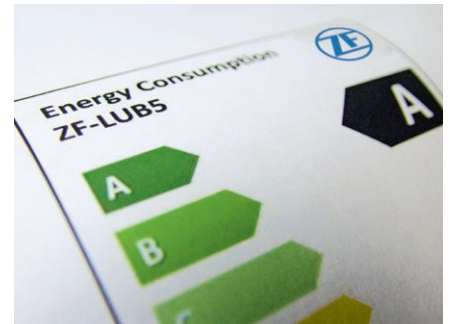
## Automatic Rim Change (ARC)

- Storage of rim pairs
- Easy access for rim cleaning during production
- Marking and sorting with robot



## MODAS – Optical Tire Inspector (M-OTI)

- Sheet of light technology
- Detection of LRO, RRO, bulges and depressions



## Energy Monitoring System

- High transparency information about power consumption and flows
- Monitoring of electrical energy and air consumption



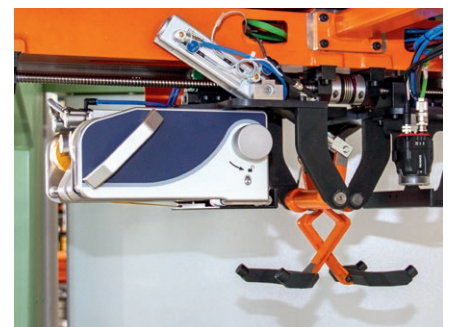
## Chuck Quality Monitoring

- Two triangulation lasers to guarantee correct position of tire for chucking
- Up Three different results (OK, NOK, Replace)
- Impact on cycle time less than 500 ms



## Marking Sign Inspection

- Camera for inspection (top or/and bottom)
- Analysis of presence and quality of marking sign



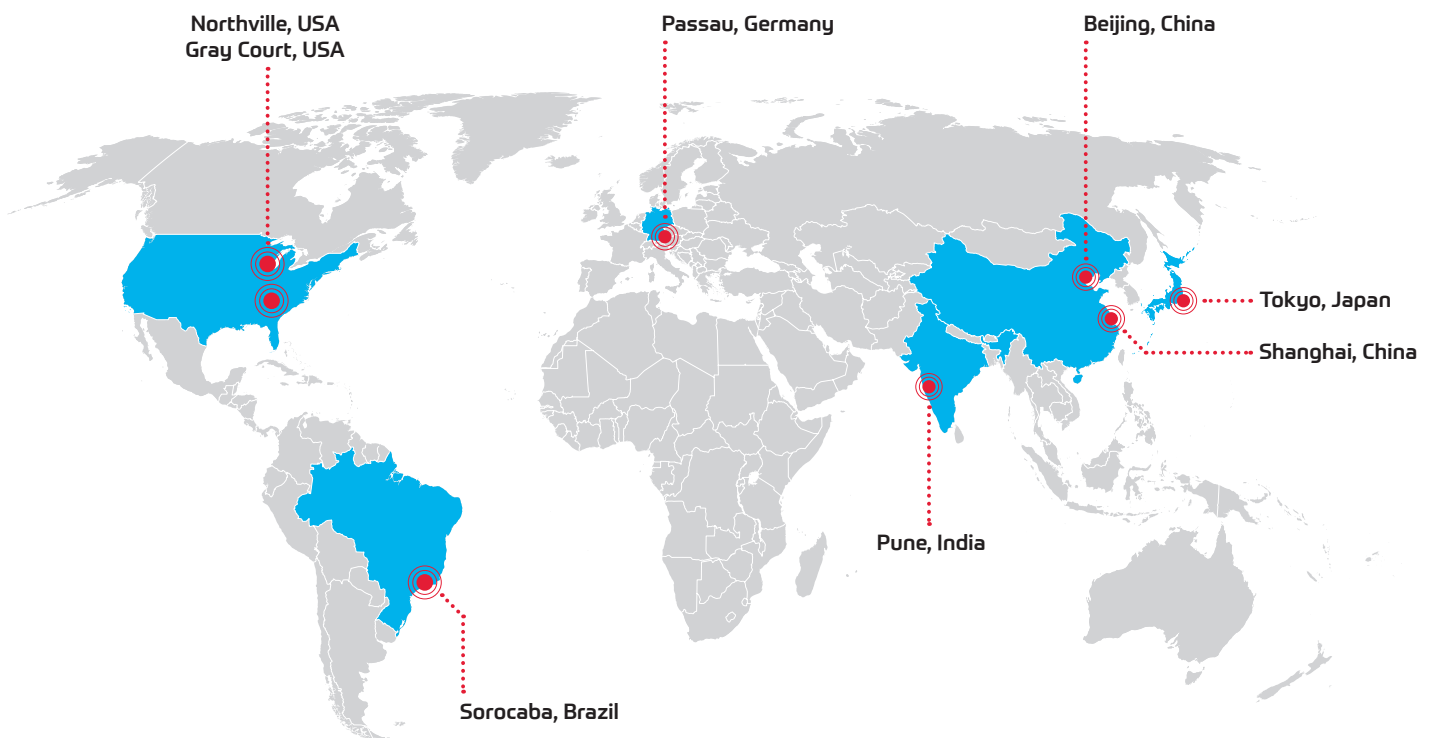
## Marker (ZF-MARK5)

- Possibility to flip tires
- Also available as stand-alone marker unit (for warehouse area)

# Worldwide presence

**Always close to the customer.** Proximity to international customers is of great significance to ZF. Worldwide, the ZF Group has some 230 production companies in almost 40 countries and 19 main development locations. In addition to that, ZF has 120 service locations as well as 650 service points. This enables ZF to provide a dense network of highly qualified contacts close to international customers at all levels and in all regions. The business unit Test Systems with its headquarters in Passau,

Germany, delivers turnkey test facilities, including all peripheral systems and software, so they are immediately ready for use and operable. ZF Test Systems is present at eight locations all over the world. More than 300 colleagues in Asia, Europe, South America, and the US work in the development, production, and sales of our test systems. With a global development network ZF is able to adapt its products to the local requirements as well as to the series production support.



# Worldwide service

**Comprehensive customer support.** All over the world the ZF service network and central sales teams are available.

- For our customers: Rapid and straightforward support in case of urgent need or as part of maintenance and service contracts
- Guaranteed at any time: a smooth operation of the test facilities after delivery at any time
- Safest way: A maintenance contract to ensure smooth operation
- Easy Access: Remote maintenance of the test facilities by gateway connection
- Courses: Customers who want to carry out maintenance and repair work by themselves get qualified training and detailed documentation.
- Additional: ZF-Helpdesk, with our experts from the fields of mechanical and electrical engineering will serve you wherever you are

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