



Process safety,
cost savings and
flexible manufacturing.
Laser solutions for the tire industry

Here's how lasers help putting power into motion

Last year, the volume in the replacement business for passenger car tires was over 1.2 billion units worldwide. If you add truck tires, motorcycle tires and tires for special vehicles, this figure increases significantly. Every single tire has to do its job safely and reliably - people's health and lives depend on it.



Your challenge: Produce sustainably, safely and efficiently

Sustainability and environmental awareness

The tire industry is under pressure to develop more environmentally friendly and sustainable solutions. On the one hand, tires must be manufactured more efficiently, and on the other hand, there are demands to reduce energy consumption and CO2 emissions during production.

Competition and market dynamics

The tire industry is a highly competitive market with many global and regional players. Companies face the challenge of differentiating themselves through product innovation, quality, customer service and competitiveness. In addition, changing consumer trends, such as the increasing demand for online sales channels, are influencing market dynamics.



Technological change

The rapid pace of technological development is presenting tire manufacturers with new challenges. This includes, among other things, the development of special tires for autonomous vehicles and electric vehicles.

Your advantages with laser solutions from Z-LASER



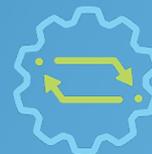
Secure processes

Highest precision in application ensures maximum safety.



Less cost

Minimized human error and reduced scrap will lower your expenses.



Flexible manufacturing

Respond to new requirements within production at short notice.

Our solution: With lasers, your business runs smoothly

Sustainability and environmental awareness

Laser solutions from Z-LASER make it possible to produce tires significantly more efficiently, with less scrap and in higher quality. This means, among other things, that the required raw materials such as rubber and oil are used more sparingly.

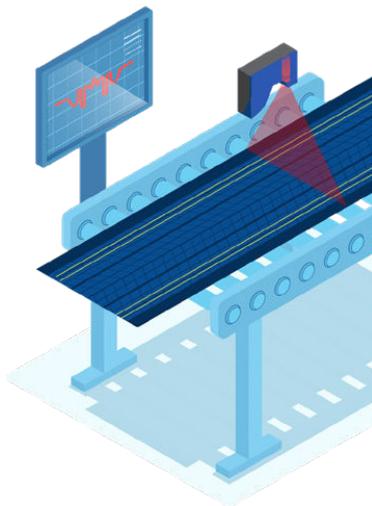
Competition and market dynamics

The targeted use of laser-based inspection systems along the entire process chain ensures that you detect defects at an early stage, which guarantees the quality of the end products.

Technological change

Particularly in the case of tires for electric vehicles and autonomous driving, safety is decisive. Z-LASER ensures that you can safely and reliably detect any defects in the manufactured tires.



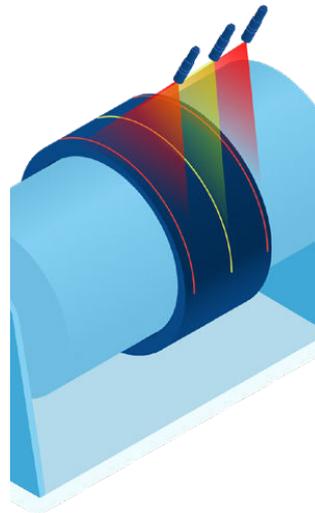


Measurement of web width, web edge and web geometry

Precise monitoring of the width and edges of the rubber webs is realized with the aid of laser light. This guarantees that all subsequent process steps can be carried out efficiently. Time-consuming changeover times are reduced to a minimum by early error correction.

When measuring web geometry, it is not only a matter of a uniformly bright projection, but also of precise line straightness and thermal stability. The laser modules used for this purpose are robustly processed and ideally tailored to these specific requirements, ensuring high precision and reliability

Laser for Machine Vision

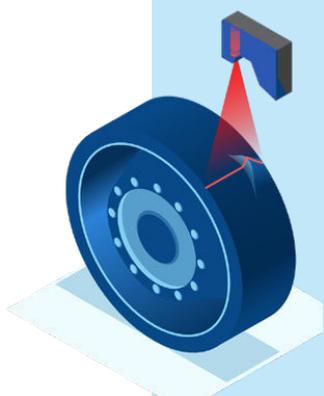


Tire building machine

Three, five or seven laser lines are usually used for correct positioning of the rubber layers on the drum. Green laser light has proven to be particularly advantageous, as it is optimally visible on black rubber. In terms of module wavelengths, Z-LASER covers both 520 nm and 532 nm.

In addition to the visibility of the laser lines, their precise positioning during tire mounting is also important. This precision can be achieved with Z-LASER's special mounts.

Positioning Laser



Splice inspection and measurement

Visual inspection of tire splices for potential defects such as open spots, overlapping layers or other irregularities is crucial to ensuring the safety and longevity of tires. Here, the laser plays a central role within the inspection system, consisting of camera and machine vision.

By using laser solutions that produce precisely straight and contrast-independent highly visible lines on dark material such as rubber, even anomalies that would not be visible to the naked eye can be detected. This increases the accuracy of the inspection and helps to ensure the quality and reliability of the tires.

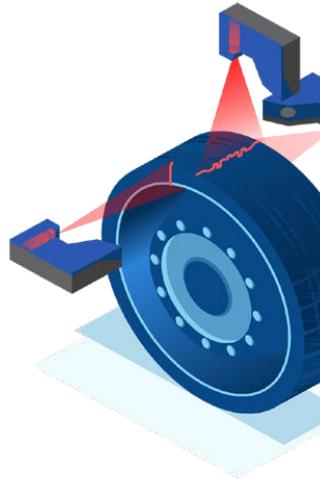
Laser for Machine Vision



Tire press

In this application, the exact positioning of the tire blanks in the tire presses plays a crucial role. To ensure this, Z-LASER products project a clearly visible cross marking. When using the tire press, it is also essential that the lasers used are highly robust. In addition, the laser light should be clearly visible and eye-safe at the same time.

Positioning Laser

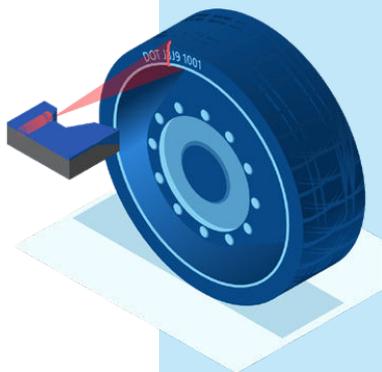


Checking the tire geometry

In this step of tire production, the tire is inspected for possible radial run-out, dents and other discrepancies. Here, too, solutions from Z-LASER are used, which act as an illumination source and are combined with a camera and a machine vision unit.

The strengths of Z-LASER in inspecting tire geometry lie in the exact straightness of the lines and the uniformly bright projection. This can ensure accurate and efficient inspection of tire quality, which significantly supports quality assurance and productivity in the tire manufacturing process.

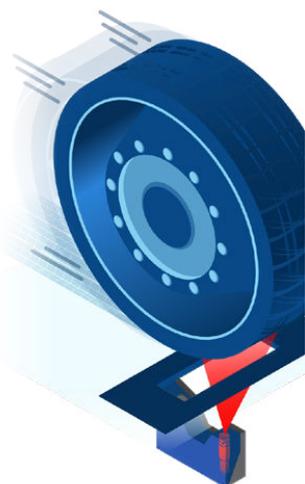
Laser for Machine Vision



Code reading and character recognition (DOT-CODE / OCR*)

By using 3D measurement technology based on laser triangulation, cast-in or embossed numbers and letters on the tire wall can be detected. In this application, the laser module acts as an illumination source and is part of an overall solution that includes an industrial camera and a machine vision unit. This can be used to automatically detect tire type and serial or batch numbers, which automates subsequent steps in quality inspection or further processing. Laser modules from Z-LASER are characterized in this work step by a uniformly bright projection and the exact straightness of the laser lines, which enables precise and reliable detection.

Laser for Machine Vision

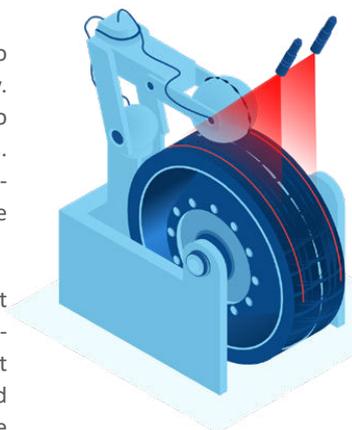


Tire tread measurement

Measuring a tire tread is critical to ensuring tire safety and integrity. Triangulation systems are used to automate and speed up this process. These consist of a line laser, an industrial camera, and a powerful machine vision unit.

Z-LASER offers laser modules that are not only characterized by homogeneous and very straight lines, but also by their high robustness and reliability. These features contribute significantly to the efficiency and precision of tire tread measurement.

Laser for Machine Vision



Tire retreading

Precise alignment of the tire tread is crucial for successful renewal. The use of one or more laser lines can ensure that the old tread is completely removed, and the new tread is perfectly placed. The following applies: All work steps should be carried out quickly and with maximum precision to ensure seamless coordination of the processing steps.

Laser for Machine Vision

ZM18

The perfect all-rounders

The ZM18 laser modules are real all-rounders for industrial applications in positioning and machine vision. They are characterized by manual focusability, IP67, wavelengths from 520 to 685 nm and a maximum output power of 120 mW. The variants for image processing are also equipped with TTL modulation up to 500 kHz and analog intensity control.



Positioning Laser



Laser for Machine Vision



ZX20 und ZX10

The precision laser modules

Thanks to their automated production, these modules set new quality standards in machine vision. They impress with a boresight accuracy of typically 0.8 mrad, protection class IP67/IP50 and reproducible beam quality. The output power reaches up to 200 mW at wavelengths from 405 to 830 nm. With a diameter of 10 mm (ZX10) or 20 mm (ZX20) and different lengths, both variants also offer outstanding flexibility in use.



Laser for Machine Vision



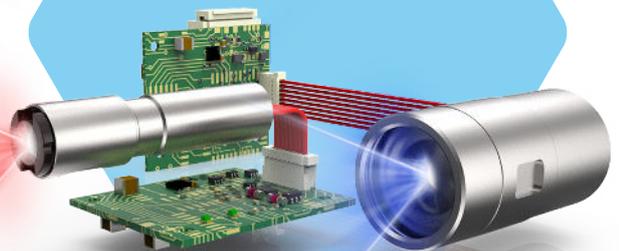
ZXS-OEM

Precision in a compact format

These laser modules impress in machine vision applications with their boresight accuracy of typically 0.8 mrad, 200 mW output power and a wavelength range of 405 to 830 nm. Thanks to the small diameters of 10 mm or 20 mm and the compact driver electronics (only 34 x 30.5 mm), they are the ideal solution for confined installation spaces.



Laser for Machine Vision



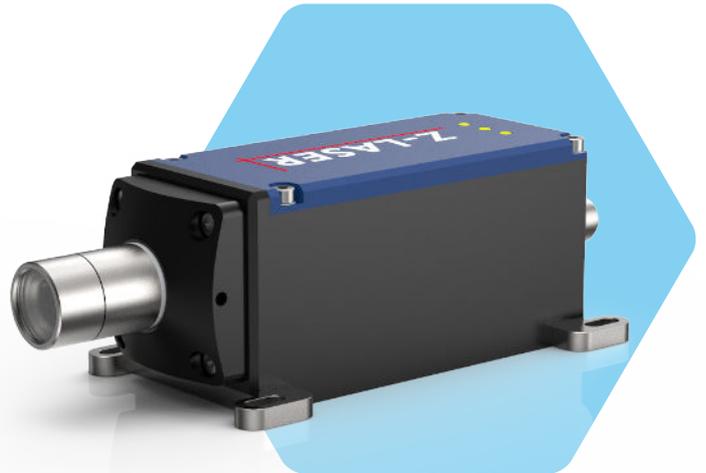
ZQ1

Compact high-performance laser

The ZQ1 series has been developed for the most demanding measurement applications in the market. Wherever a high output power, exceptional beam performance, and industrialsuited design is needed, the ZQ1 series is the right choice. The user can easily adjust the right working distance for the application with its manual focus option.



Laser for Machine Vision



Mounting MXYZ

For lasers with a Ø20 mm or M18 external thread

The Precision mounting can be adjusted in 3 axes. No tools are required for alignment. The base plate of the Precision mounting has 4 threaded holes for installation.



Accessories



Mounting H6

Für Laser mit Ø20 mm oder M18 Außengewinde

This aluminum precision mounting is suitable for all laser modules with Ø20 mm or M18 threads. The aluminum block housing ensures optimal heat transfer.



Accessories



Z-LASER

An Exaktera Company

Innovative light for better results

Providing visual guidance to people and machines with laser solutions

Z-LASER has been developing and producing innovative, high-quality laser solutions since 1985.

By providing visual guidance and orientation for people as well as machines, our lasers contribute to optimizing your production processes, ensuring quality, and to using resources carefully.



German engineering since 1985

Over 120 employees develop and manufacture completely in Freiburg, Germany.



Innovators by conviction

25 % of our workforce is involved in R&D.



Rooted locally, at home globally

Sales offices and over 60 distributors worldwide.



The right solution for every challenge

Developed in close customer exchange, our products adapt perfectly to your requirements.



Modular products for efficient processes

Modularity means less maintenance, optimized performance and better scalability.



Positioning Laser

Benefit from increased precision for more efficient processes with lower material consumption.



Laser for Machine Vision

Automate your optical quality control with structured laser light.



Laser Projectors

Replace mechanical templates with laser projections and save time, money and material.

Contact



Contact us. We would be happy to advise you!

www.z-laser.com/contact

Headquarters

Z-LASER GmbH
Merzhauser Str. 134
79100 Freiburg
Germany

Tel: +49 761 296 44-44
E-Mail: info@z-laser.de
Web: www.z-laser.com

Salesoffice

Z-LASER Italia Srl.
Via Gran Paradiso, 4
20861 Brugherio MB
Italy

Tel: +39 039 287 1860
E-Mail: info@z-laser.com
Web: www.z-laser.com