

MULTI-AXIAL WHEEL TEST

ZWARP



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ZWARP (AZN)

The multi-axial test machine is used for fatigue and endurance tests on aluminium wheels for cars and light trucks, by rim-rolling them on a coated load drum

This wheel fatigue test simulates wheel road loads by applying variable radial and lateral loads through a tire and wheel assembly. The scaleable test load sequence is developed for individual wheels based on data obtained while running established vehicle durability schedules.

The machine is equipped with up to 2 individual load stations, located on both sides of the vertical load drum.

Your advantages

▶ CERTIFIED TEST EQUIPMENT SUPPLIER

The test machine from MAKRA are accepted and certified by all german car manufacturer (BMW, AUDI, Daimler, Volkswagen, Porsche, ...)

▶ SAFETY DEVICES FOR THE TEST MACHINE AND THE TIRE / WHEEL

The test machine is equipped with several independently operating safety devices to protect the wheels and the machine:

Monitoring of travelled distance, bubble and burst monitoring, inner rim flange monitoring (laser sensor), measurement and monitoring of tyre compression, limit value monitoring (force, angle, pressure, and temperatures), tyre pressure monitoring (optional), tyre temperature monitoring (option)

▶ OPERATION

Intuitive Software with real time monitoring

▶ TELEMETRY

For wireless data transfer of the wheel

▶ USER FRIENDLY WHEEL CHANGE POSITION

Which crane support for heavy wheels



LOAD UNITS

The forward feed of the load unit is measured and continuously monitored. This allows to individually limit axis travelling distances in respect of the actual test wheel size to avoid any collision at a breakdown incident of the wheel. The load forces, tilt angles and camber angles are applied by servomotors via motion control, with the exact force and angle. A load cell between the wheel and load unit is used to monitor and control the applied forces.

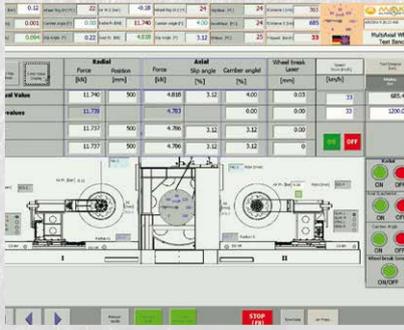


LOAD DRUM

The load drum has a circumferential jacket of welded steel with welded-in side walls. The steel jacket is inspected for cracks, and the corresponding certificate is supplied with the machine. The load drum is internally reinforced with welded stiffeners. The load roller is balanced in two planes for $n_{max} = 400$ rpm with a balancing precision of $Q = 2,5$. The running surface of the drum is made of turned steel that is subsequently coated. The load roller is driven by a laterally positioned AC drive motor. It is driven with a poly V-belt. A tightening mechanism is provided. The adjustable test speed is controlled with a frequency converter and a closed control loop.

TEST RECORD

The recorded data can be printed as a test record. The standard test record contains the general header data as well as testing time, load step and the associated or reached cycle numbers, the respective kilometerage and also the load values (forces, angles, speed). In the event of a fault, a corresponding message is displayed on the screen and an error log can be printed out.



VISUALISATION / TEST SOFTWARE

Visualisation is carried out with WinCC Flexible from Siemens. The visualised and acquired data are stored and logged. The test data are stored under the test number as Excel and PDF files (or in a database). The stored data can be selected by test number and can be used for repeat test. The current measurement data, test duration and test distance are permanently stored. In the event of failures during the test, data consistency is always guaranteed.

LIFTING DEVICE

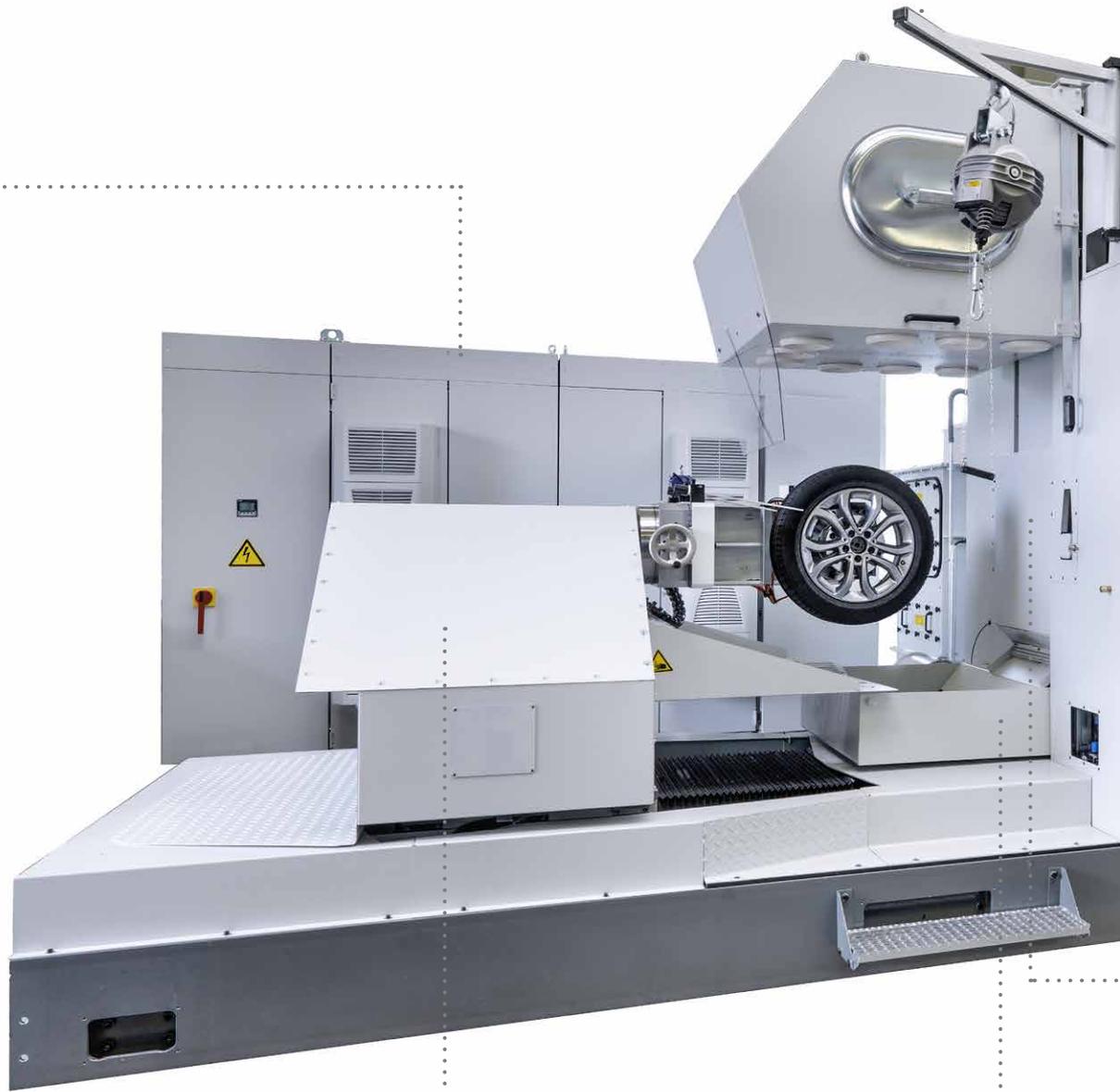
Lifting device to facilitate the wheel mounting (especially on large and heavy wheels)

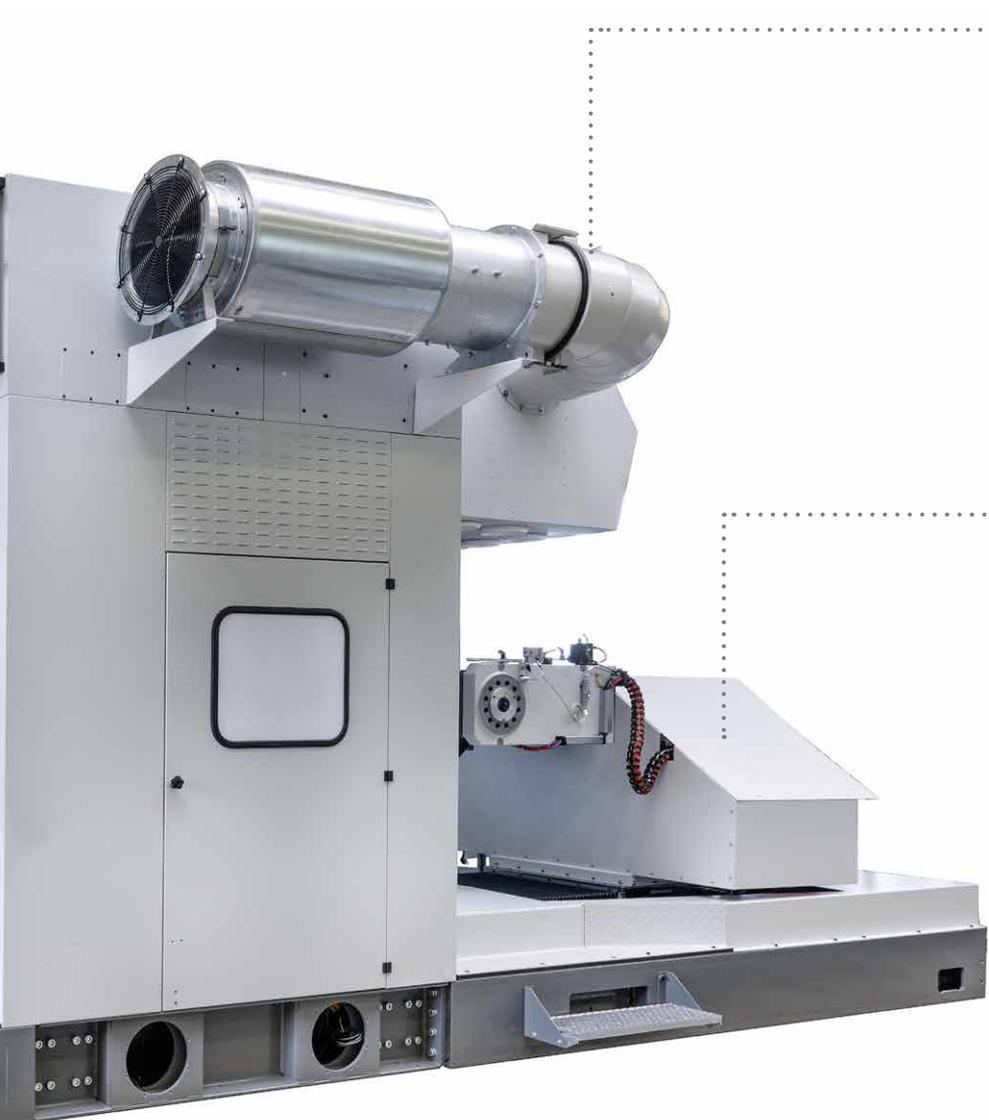
CONTROL CABINET

LOAD STATION

The multi-axial wheel test car be used with 1 or 2 load stations

EXHAUST UNIT





FAN UNIT

The nozzels are adjustable in different directions

LOAD STATION 2

optional

PROTECTING DOOR FOR DRUM

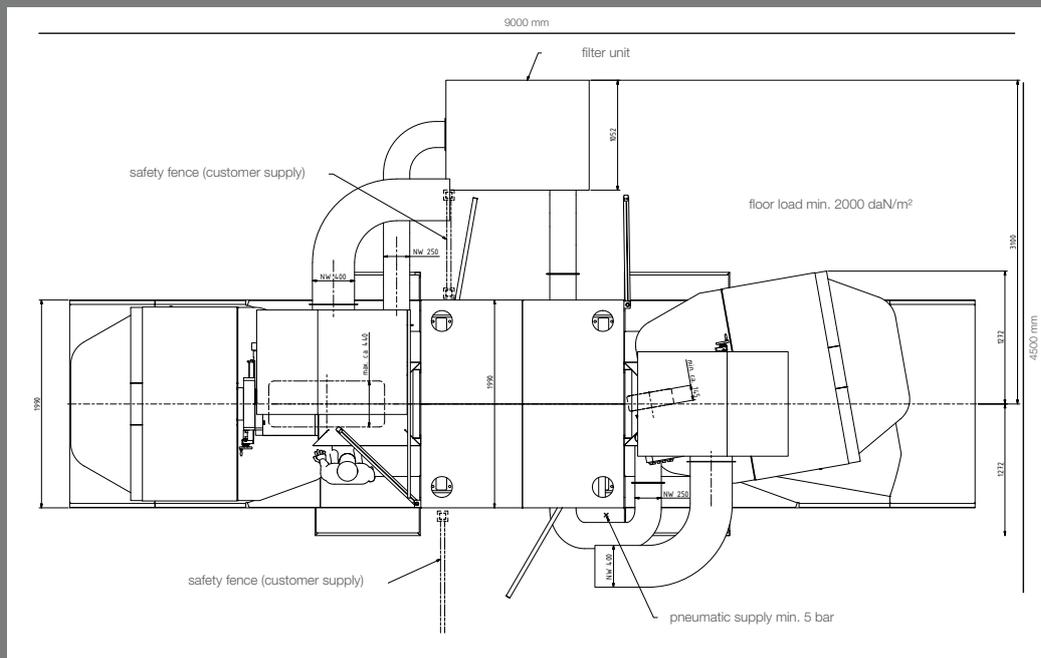
These and other protective devices ensure the safety of your specialized staff

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TECHNICAL DATA

Main drive	129 kW
Load drum diameter	2000 mm
Load drum width	600 mm
Speed	10 - 150 km/h, regulated
Number load carriages	1 or 2
Test load	2 - 50 kN, regulated
Lateral force	2 - 30 kN, regulated
<i>(Depending on test load, lateral force, camber angle, tyre geometry, profile)</i>	
Camber angle	+/- 10°
Skew	+/- 20°
Tyre, outer diameter	400 - 1100 mm
Tyre width	Max. 400 mm
Wheel diameter	Min. 14 - max. 26"
Wheel width	Min. 5 - max. 15"
Wheel offset adjustment	-40 - +100 mm
Test specification	wheel-guideline § 30 StVZO AK-load cycles AK-LH 08 SAE J 328 JIS D4103 (Nürburgring)
Floor space	with load 1 Station - approx. 5.0 x 2.8 x 3.3 m with load 2 Stations - approx. 9.0 x 2.8 x 3.3 m
Control cabinet	4.0 x 0.85 x 2.6 m





TEMPERATURE MEASUREMENT

Monitoring the tire temperature using an infrared - sensor. Limit value monitoring with a variably adjustable limit value for switching off the station and feedback on the software.



TIRE PRESSURE MONITORING

Wheel pressure monitor with free adjustable limit for safe stop and message via the visualization interface. The possibility of a pressure relief before release access door is provided.



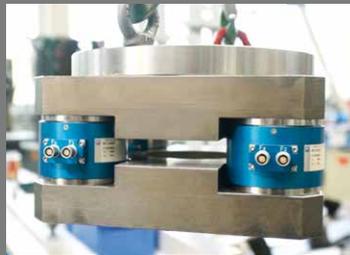
SAFETY SHUT DOWN

Safety shut down if the tire forms bubbles (particular necessary if multi-axial test machine is used as rim rolling test machine)



TYRE COOLING

Air blowing unit to cool the wheel during test from the upper side. Exhaust system below the wheel to remove air and dirt, including filter unit.



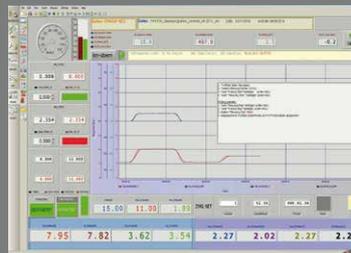
FORCE MEASURING UNIT

All loads applied onto the wheel will be measured by special load units, mounted between machine flange and wheel bearing.



PRE-DAMAGE DEVICE

Integrated pre-damage device with electrical protection and control extension for pre-damage according specification



VISUALISATION / TEST SOFTWARE

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LOAD DRUM

With surface coating similar to a road diameter: 2000 mm width: 600 mm



INTERFACE

Interface for analog data acquisition (load cells). Only radial and lateral forces (uprising and lateral forces) can be measured analog. The set camber angle and slip angle are NOT recorded analog.

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