

AZN

Multi-axial wheel test





Fatigue tests and durability tests of passenger car and truck aluminum wheels

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The multi-axial test bench is used to carry out fatigue tests or durability tests on passenger car and truck aluminum wheels by rolling them on a coated load roller.

The real radial, tangential and lateral forces occurring are simulated by adjusting the skew and camber

during rolling. The test loads are applied on the wheel through an air-filled tire that rests on the load roller. The load spectrums are specified by the automotive industry and test institutes. One or two individually loadable stations are installed on the load roller. The load roller is arranged upright.

YOUR ADVANTAGES

- » **Renowned test machine manufacturer**
AMT Makra is a manufacturer of test machines for the automotive industry. They are used at AUDI, BMW, Daimler, Volkswagen and Porsche and other auto makers.
- » **Protective devices**
Travel distance monitoring, bulge and burst monitoring, monitoring of the inner rim flange (laser sensor), measurement and monitoring of the deflection depth of the tire, limit value monitoring (force and angle).
- » **HMI**
Intuitive software with real-time display
- » **Remote maintenance**
Rapid response time in the case of machine faults by means of online service
- » **Telemetry (optional)**
Wireless data transfer for the transmission of comparison measurements (strain gauge wheel)
- » **User-friendly wheel change position**
All drives are electrical; no hydraulics
- » **Tire monitoring (optional)**
Tire pressure monitoring and tire temperature monitoring

FEATURES

Load station

The feed movement of the load carriage is measured and continuously monitored. In this way, the travel distances are recorded and limited with regard to interfering contours and tire deflection in the event of pressure loss. The application of load forces and the angle of inclination as well as the camber angle is implemented true to force and angle by means of servo motors and motion control. A multi-component load cell between the test wheel and the load carriage is used to record the load forces and control them.



Load roller

The load roller is balanced at two levels for $n \max. = 400 \text{ rpm}$ with a balance quality of $Q = 2.5$. The roller surface is made of steel, lathe-turned and coated.



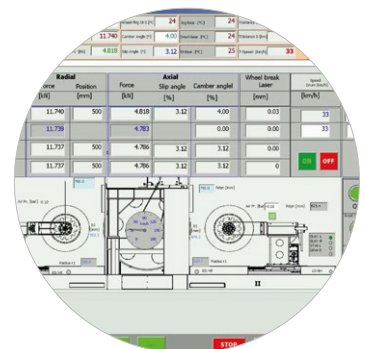
Test log

The logged data can be printed out as a test log. The standard test log contains the general header data as well as the test duration, the load level and associated or achieved number of cycles, the respective mileage as well as the Actual values (forces, angles, speed). In the event of a fault, an error log can be printed out.

Zeit	Wirtsch_Zeit [s]	Skimal_Sch_KHz	Sk_Rollsch_KHz
6	1602	7	1602
Winkelkanal	Erfassungskanal	Erfassungskanal	Erfassungskanal
0:41:25	0.9799999999999999	2.00020275	2.004
0:41:25	0.8000000000000000	2.00060175	2.004
0:41:25	0.6000000000000000	2.12015625	2.004
0:41:25	1.0099999999999999	2.16081	2.004
0:41:25	1.0200000000000000	2.16091	2.004
0:41:25	1.0299999999999999	2.21503275	2.004
0:41:25	1.0300000000000000	2.21511175	2.004
0:41:25	1.0399999999999999	2.24771625	2.004
0:41:25	1.0399999999999999	2.24771625	2.004
0:41:25	1.0700000000000000	2.29554	2.004
0:41:25	1.0700000000000000	2.34258275	2.004
0:41:25	1.1099999999999999	2.37521625	2.004
0:41:25	1.1099999999999999	2.37521625	2.004
0:41:25	1.1299999999999999	2.42097	2.004
0:41:25	1.1299999999999999	2.47093275	2.004
0:41:25	1.1599999999999999	2.47093275	2.004
0:41:25	1.1599999999999999	2.50277625	2.004
0:41:25	1.1599999999999999	2.50277625	2.004
0:41:25	1.1899999999999999	2.51926	2.004
0:41:25	1.1899999999999999	2.5506	2.004

Visualization and inspection program

The visualization of the control system is implemented with WinCC Flexible. The captured data is archived and logged. The test data is archived via DiaDEM according to test number and saved in EXCEL or PDF format (or in a database). The saved data can be retrieved again after entering the test number and be used for repeat tests. The ongoing measurement data, test duration and test distance are continuously saved.



Tire cooling and exhaust

The tread of the tire is cooled by means of an air flow; the exhaust air is cleaned with filters and fed back into the test room.



Tire pressure measurement (optional)

The tire pressure is continuously monitored in order to prevent damage



Bubble monitoring

Safety shut-off if bubbles form (necessary especially if the AZN is used as a roll test bench)



Interface

Interface for analog measured value recording (load cells). Radial and lateral forces can be output on an analog basis.



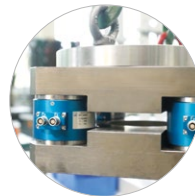
Temperature monitoring (optional)

Checking the tire temperature using an infrared sensor. Limit value monitoring with a variably adjustable limit value.



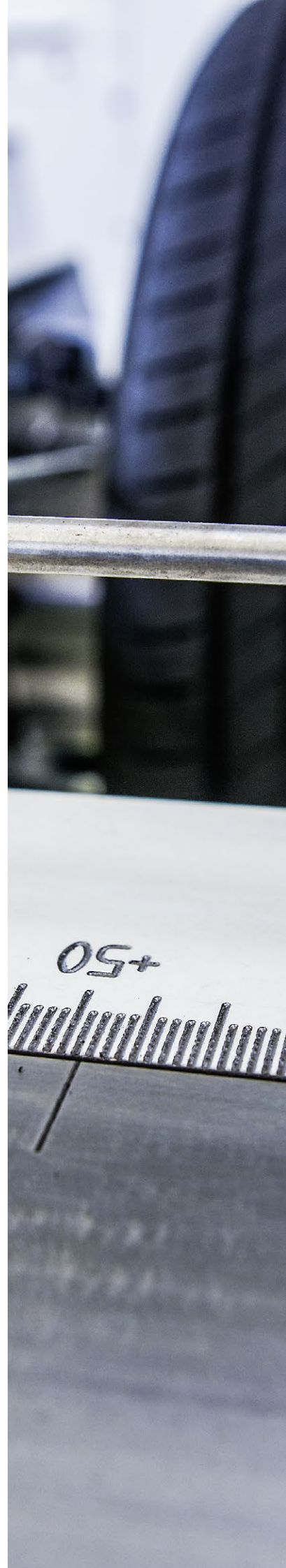
Load cells

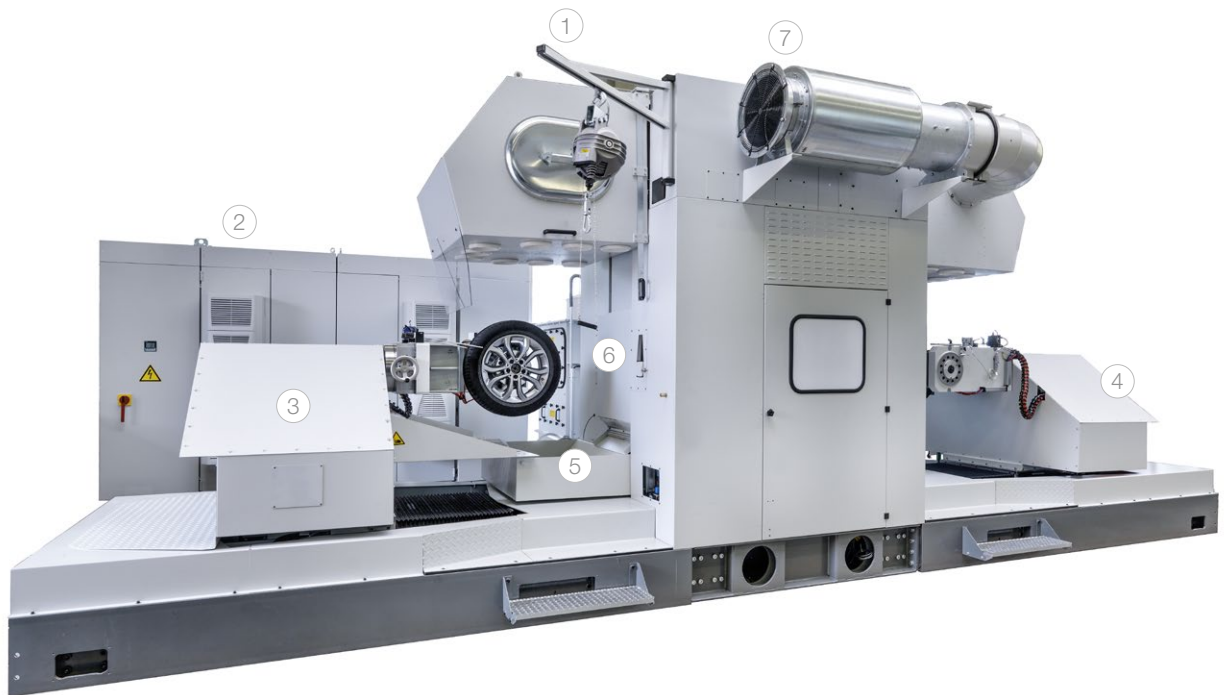
The occurring forces are recorded directly at the wheel mounting by a measuring system.



Pre-damage

Integrated pre-damage device



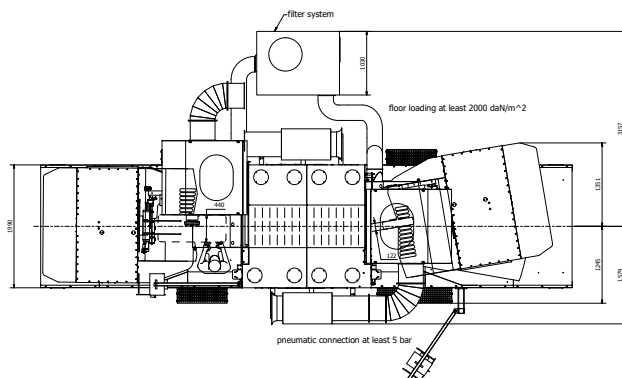
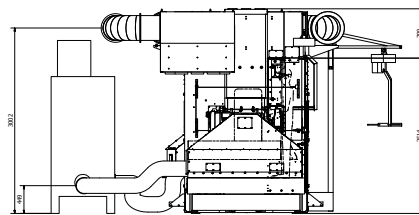
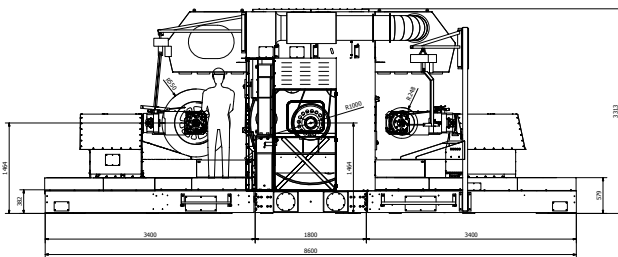


- ① Lifting device
Lifting device to facilitate wheel assembly (especially for large and heavy wheels)
- ② Control cabinet
The control cabinet can be positioned either inside or outside the protected area.
- ③ Load station 1
One or two load stations can be installed on the AZN.
- ④ Load station 2
Optional
- ⑤ Exhaust
Remove rubber particles from the test environment
- ⑥ Guard door for drum
This and other protective devices ensure the safety of your technical personnel.
- ⑦ Blower
Targeted blow nozzles for tire cooling

TECHNICAL DATA

Machine features	measurement method measuring characteristics number of load stations wheel load lateral force camber angle skew drum diameter drum width test specifications	load cells axial and lateral forces 1 or 2 units 2 – 50 kN, controlled 2 – 30 kN, controlled +/- 9° +/- 18° 2000 mm 600 mm wheels guideline section 30 StVZO (Road Traffic Licensing Regulations), SAE J328, AK-LH08, JIS D4103
Wheel parameters	tire diameter tire width wheel diameter wheel width	max. 400 x 1100 mm max. 400 mm 15" – 24" 5" – 15"
Performance characteristics	speed	10 – 150 km/h, controlled
Technical components	control system	industrial PC
Interfaces		Profinet, EtherNet/IP, Parallel I/O
Media	electric connection main drive / drive performance pneumatic connection	3 x 400 VAC, 50 Hz, 350 kVA optional 3 x 460 VAC, 60 Hz, 400 kVA 120 kW / 235 A at least 6 bar
Machine dimensions	L x W x H	approx. 9000 x 3150 x 3350 mm
Weight		21 000 kg

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