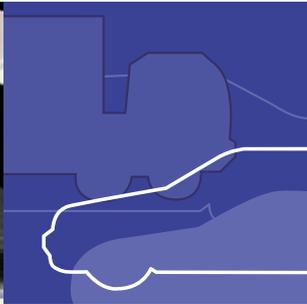


IABG. The Future.



Test Centre

Wheel Assemblies

Test Centre for Tyres, Wheels and Brake Discs

We have been testing the components of wheel assemblies in our facilities for over 30 years. Our highly qualified and competent experts develop and operate test systems for qualifying wheels, tyres, wheel bearings, drive flange hubs and brakes as well as the wheel assembly as a whole.

On our Flat Trac tyre test bench (Flat-Trac® III CT), tyres are exactly measured, characterised and parameterised. Cycles as per the standards of the working group for wheels (AKR) or individual operating load simulation tests (BLNV) are run on the High-Speed External Drum Test Bench (ZWARP on HATOR). With supported speeds of up to 300 km/h HATOR enables the examination of half-axle components under conditions close to reality (operating load simulation test).

Specially developed test benches such as the impact test bench are used for pre-damaging wheels and testing failure behaviour (in compliance with AKR specifications). The drop height and applicable drop masses for this test bench allow for all kinds of impact and crash. Our test bench portfolio is completed by three rotating bending test machines for wheels.

Our Test Benches

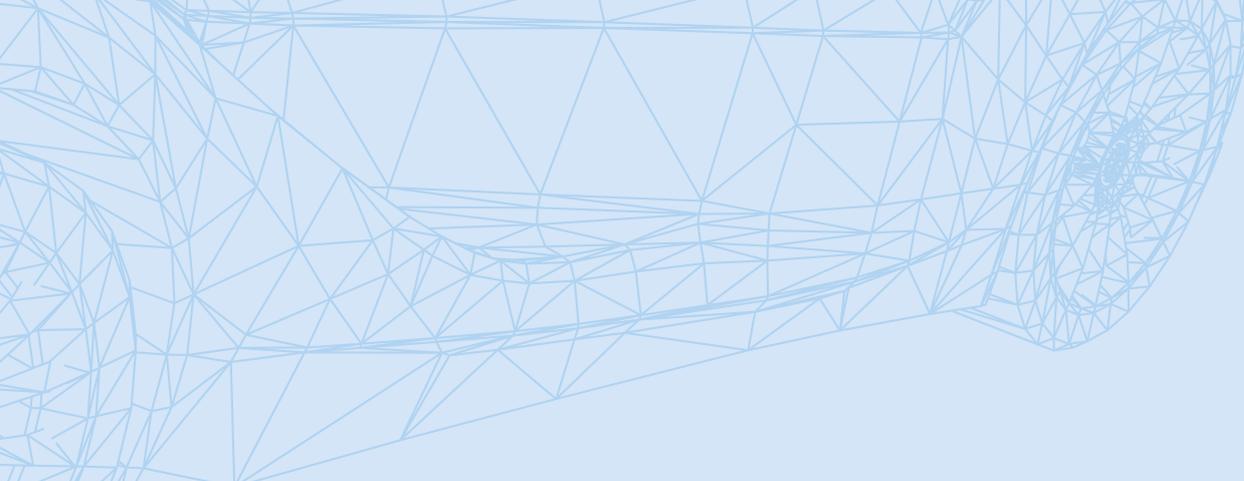
- **Tyres:** Flat-Trac® III CT tyre test bench
- **Brake discs:** High-speed external drum test bench (HATOR)
- **Wheels:** High-speed external drum test bench (ZWARP on HATOR); radial impact test bench (RADIUS); impact test bench; rotating bending test machines

Our material and fatigue strength testing laboratory is equipped with leading-edge technology for damage analysis and the determination of material parameters.

Please contact us for customer-specific adaptations or new tailored solutions. We would be glad to advise you personally and find an individual solution for you.



Our seal stands for the quality of our accredited and certified test facilities.



RADIAL AND LATERAL IMPACT SIMULATOR



Flat-Trac® III CT
FLAT TRAC TYRE TEST BENCH



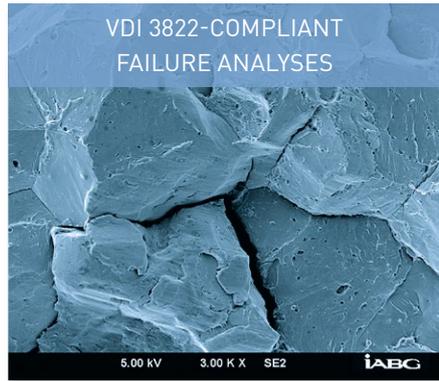
ROTATING BENDING TEST MACHINE
FOR WHEELS



HIGH-SPEED EXTERNAL DRUM
TEST BENCH (HATOR)



VDI 3822-COMPLIANT
FAILURE ANALYSES



ACCREDITED LABORATORY FOR
SAMPLE TESTING (AS PER DIN 17025)





Flat-Trac® III CT Tyre Test Bench

The test bench permits high-level precision tyre measurements under stationary and dynamic operating conditions and thus optimises the model quality of tyre and vehicle simulation models. The test bench is located in a separate, enclosed test hall including office, assembly zone and storage rooms to ensure absolute confidentiality for all customers. IABG handles test operations, quality management, service and maintenance and provides a wide range of further services.

Task • Service

- Determination of characteristics, stationary and dynamic measurements
- Standardised test procedures (e.g. TIME)
- Definition of tyre parameters
- Special tyre measurements
- Customer-specific assignments

Technical Data

Max. setting values

Tyre diameter	910 ± 0.25 mm
Tyre width	450 ± 0.25 mm
Speed	250 ± 1 km/h
Spindle drive	2,800 ± 20 Nm 1,100 ± 13 rpm
Slip Angle	± 30 ± 0.01°
Adjustment speed	50 ± 1°/s
Inclination Angle	-12...45 ± 0.01°
Adjustment speed	5 ± 0.1°/s
Wheel load Fz	25,000 ± 1% N
Movement speed vz	300 ± 3 mm/s
Tyre pressure	700 ± 5 kPa

Max. measured values

Longitudinal force Fx	10,000 ± 1% N
Lateral force Fy	15,000 ± 1% N
Camber torque Mx	10,000 ± 1% Nm
Driving and braking torque / Rolling resistance torque My	3,000 ± 1% Nm
Bore or self-aligning torque Mz	3,000 ± 5 Nm



High-Speed External Drum Test Bench (HATOR)

A multiaxial test bench (radial, slip angle and camber angle) for testing wheels, brake discs, wheel assemblies and tyres

Task • Service

Tests in compliance with the following regulations:

- AK-LH 08
- PV-5608
- Wheel rolling test
- SAE J-328
- FIAT Standard
- Ford Standard
- Land Rover Engineering Standard
- Japanese Industrial Standard JIS D 4103:1998
- Cleat test
- Customer-specific assignments

Special Features

- Real-time signals (e.g. Nürburgring) with original wheel bearings, wheel mounts and brake system possible
- Integrated measuring of up to eight DMS using telemetry
- Four supplementary thermocouples
- Integrated pre-damaging
- Two stations operating in parallel

Technical Data

Speed	up to 300 km/h
Brake pressure	up to 150 bar dynamic
Max. axial load	40 kN
Max. radial load	40 kN
Slip angle	± 15°
Camber angle	± 5°
Drum diameter	2,000 mm
Drum width	500 mm



Radial and Lateral Impact Simulator

The simulator for radial impact is for testing the fatigue strength and failure behaviour of wheels under load from driving over obstacles and lateral impact. This provides manufacturers valuable information about the properties of their products right at the development stage.

Task • Service

- Radial impact test on car wheels
- Impact test in compliance with AK-LH 08 and JIS D4103, 13° method
- Impact test on truck wheels, 30° method
- Safeguarding the fatigue strength of rims from fracture (e.g. when driving through potholes)
- Preloading of wheels with impact loads for subsequent fatigue strength tests
- Impact loading on motorcycle forks
- Impact loading on axle carriers
- Impact tests for a variety of applications and components

Technical Data	
Drop weight	150 kg – 1000 kg
Max. drop height	8 m
Impact energy at a drop height of 1 m (150 kg)	1,471.5 J
Velocity at a drop height of 1 m	4,43 m/s
Max. impact force with force measured at centre of fin	100 kN (extensible)
Fin angle	150° (variable)
Mounting position of wheel	Radial impact: 1° (variable) Impact: 13° or 30° Special mounting positions and different impactor geometries and drop masses on request



Rotating Bending Test Machine for Wheels

Task • Service

Tests to evaluate the fatigue strength of vehicle wheels, in particular the dynamic fatigue strength of wheel discs exposed to extreme lateral force:

- Loading through rotating bending torque until failure becomes apparent through cracks and/or fracture
- Prerequisite for approval by TÜV and DEKRA material test centres
- Rotating bending tests for geometrically similar components (e.g. flywheels) possible

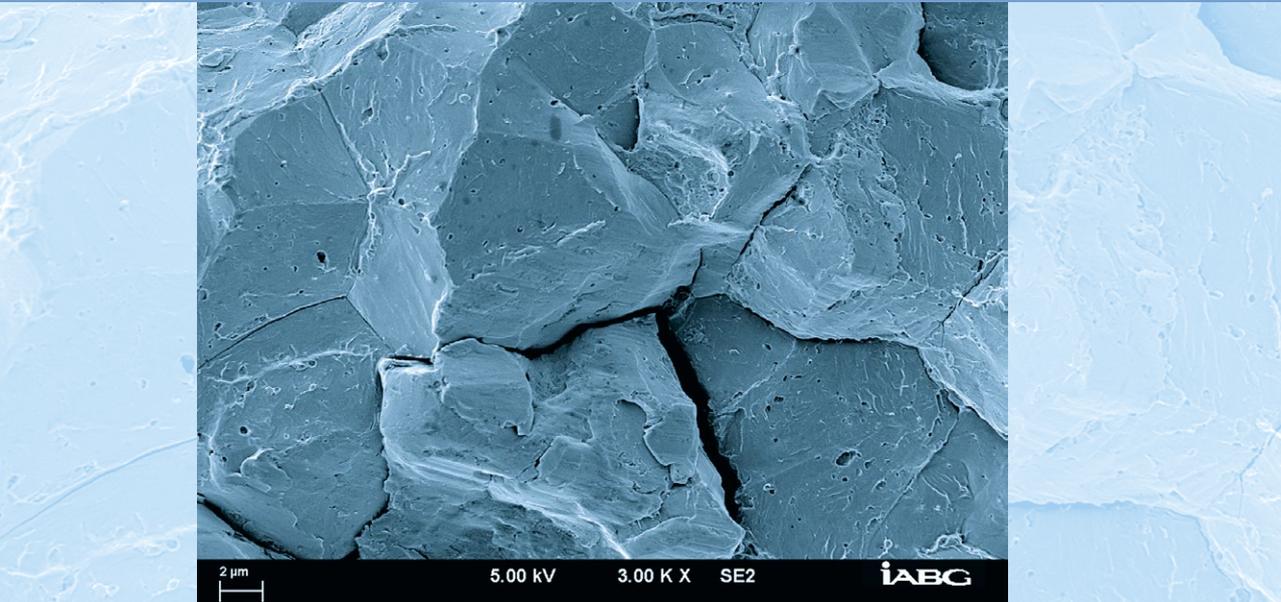
Technical Data

Rotating flyweight to implement different bending torques (up to 16 kNm)

Wheel bolt control with embedded torque measurement system

Velocity range 500 rpm to 2,400 rpm

Nominal wheel diameter 10 to 28 inches



Systematic Failure Analysis

Tests and Analyses in an Accredited Materials Testing Laboratory

Failure Analysis acc. to VDI 3822

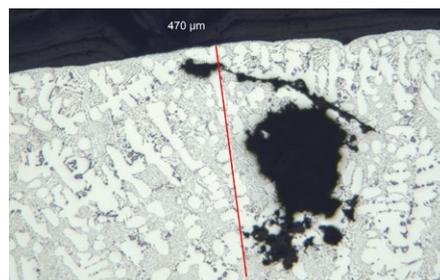
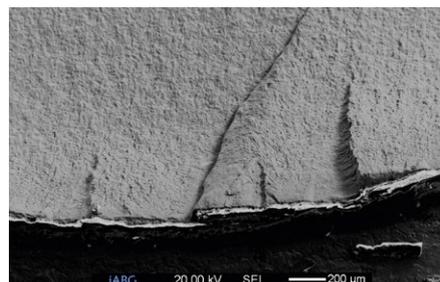
- Determination of the failure mechanisms
- Deduction of possible failure causes
- Creation of evaluative failure reports
- Failure reconstruction by simulation tests
- Recommendation/Definition of failure corrective actions
- Consulting on failure prevention and on the design, construction and testing of components
- Component testing on-site and in the laboratory

Cross-Industry Activities

- Examination methods
- Macroscopy
- Light microscopy
- Hardness measurement
- Scanning electron microscopy
- Chemical analysis of materials
- X-ray inspection (2D/ μ CT)
- Residual stress measurements by x-ray
- On-site examinations

Your Advantages

- Short reaction times
- Immediate processing
- Failure analysis hotline:
schadensanalyse@iabg.de





Materials Testing

Methods

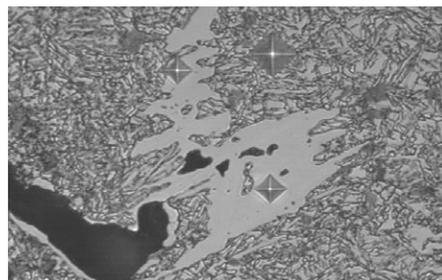
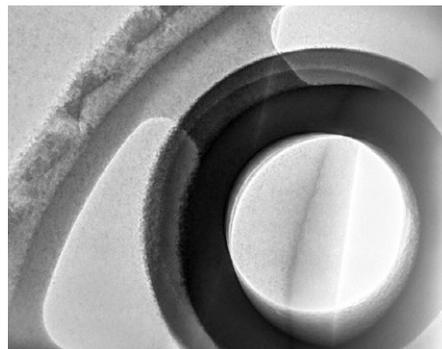
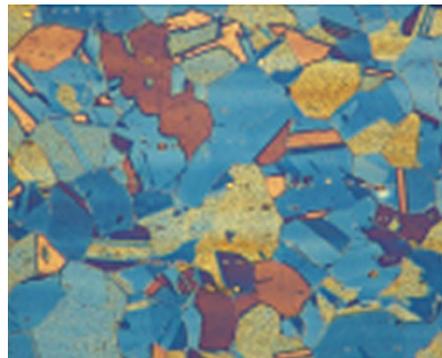
- Light microscopy
- Scanning electron microscopy
- Hardness measurement
- Chemical analyses of materials
- X-ray inspections (2D, μ Ct)
- Fluorescent dye penetrant testing
- Residual stress measurements by x-ray
- Exposure and corrosion tests

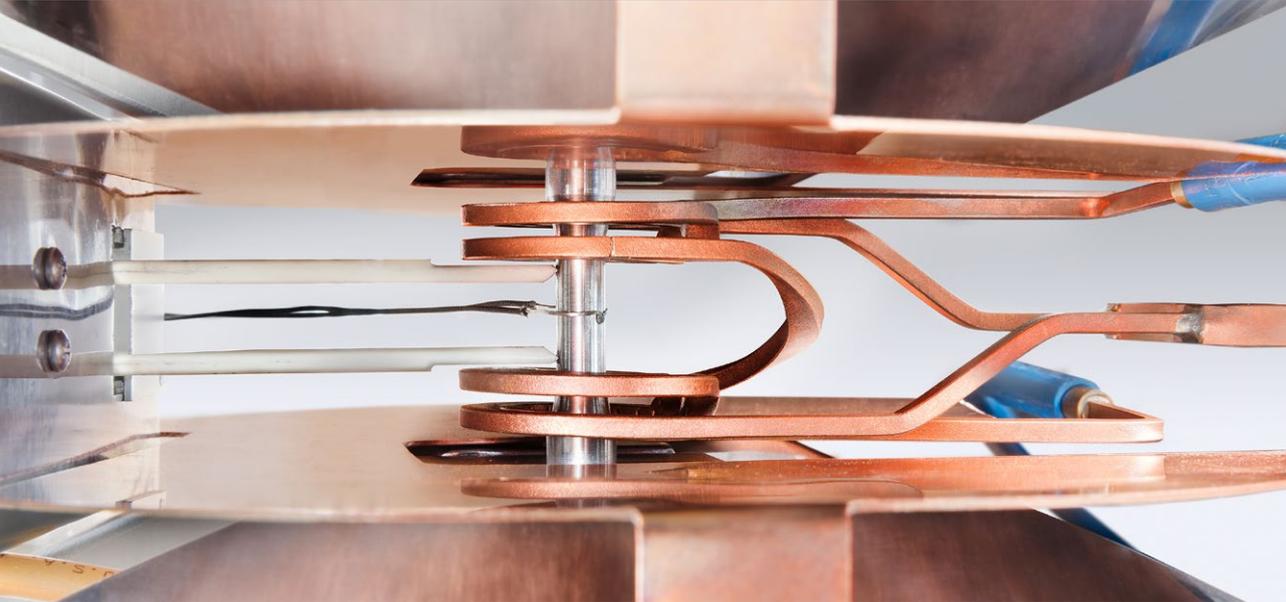
Applications

- Examination of macrostructures and microstructures
- Determination of material strength at macrostructure and microstructure levels
- Evaluation of casting, additive manufacturing and forming processes
- Evaluation of manufacturing processes
- Surface roughness measurements
- Fractography
- Non-destructive material testing
- Testing of chemical resistance and environmental testing

Method Development

- Cross-sector and cross-material materials testing
- Creation of specifications
- Consulting on QA measures
- Development of incoming inspections
- Consulting on material selection and optimisation





Accredited Laboratory for structural durability and Specimen testing (as per DIN EN ISO/IEC 17025)

Testing Services

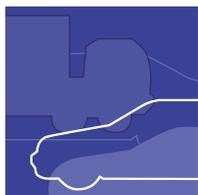
- Application or problem-related extraction of specimens from components
- Specimens manufacture with internal quality assurance
- Quasi-static and cyclic testing of metals and composite materials
- Tests under the influence of high and low temperatures and environmental conditions (corrosion, etc.)
- Thermo-mechanical fatigue tests
- Component tests
- Development of test methods
- Performing of customer-specific quality assurance tests

Simulation and Method Development Services

- Fatigue life calculation
- Method development for structural durability assessment
- FEM simulation and component optimisation
- Method development for CAE
- Material qualification of rims and brakes
- Evaluation of quality assurance concepts

Technical Data

- Spindle testing machine for quasi-static tests up to 100 kN
- Servohydraulic test machines for dynamic material testing in the range of 0.1 kN to 100 kN and test frequencies of up to 40 Hz
- Resonance test machines for load-controlled cyclic material testing in the range of 1 kN to 100 kN and test frequencies of up to 150 Hz
- Rotating bending test machines for load-controlled rotating bending fatigue tests with a bending torque in the range of 0.1 kNm to 2.5 kNm and test frequencies of up to 50 Hz
- Thermo-mechanical test bench with independent cyclic temperature and strain control with heating and cooling rates of up to 10 K/s
- Tests at temperatures ranging between -196°C and 950°C



AUTOMOTIVE



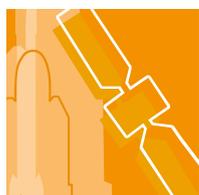
INFOCOM



MOBILITY, ENERGY & ENVIRONMENT



AERONAUTICS



SPACE



DEFENCE & SECURITY

IABG. The Future.

IABG was founded in 1961 as a result of an initiative of the Federal Republic of Germany to establish a central analysis and test facility for the aerospace industry and Ministry of Defence. Today, IABG is a leading European provider of technical and scientific services.

Approximately 1,000 highly qualified employees at 12 locations in Germany and other EU countries develop analytical, technical and operational solutions for Automotive, InfoCom, Mobility, Energy & Environment, Aeronautics, Space and Defence & Security customers.

IABG was privatised in 1993 and is now an owner-managed business. We are independent and act exclusively on behalf of the interests of our clients, including both national and international companies as well as organisations in the public sector.

For more than 50 years we have been providing support for the complete lifecycle of technical systems, in particular during development, qualification and implementation phases, leveraging synergies derived from the expertise of our company.

For more information please contact:

Phone +49 89 6088-4454

sales@iabg.de

www.iabg.de



Further information about
Test Centre Wheel Assemblies



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