MAKRA
ALPINE METAL TECH

ITB / RTB

Impact test | Radial impact test

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The ITB/RTB impact test evaluates the axial kerb impact collision properties of wheels.

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Impact test | Radial impact test

Accident research results require wheels which retain their functionality even under the heaviest of loads. The tests serve to check and simulate the crash behavior of vehicle wheels.
Due to different international requirements, a test facility which tests the impact resistance of the wheel must also be in a position to simulate different loads under identical testing conditions. Once the necessary or prescribed resistance value has been achieved in wheel development, the wheels are subjected to continuous in-process inspection and testing. Different material batches and alloy components make intermediate tests necessary in order to guarantee permanent sustainable manufacturing quality. The MAKRA test bench stands out on account of its simple handling and fast convertibility for a wide range of different test settings. Thanks to the built-in measuring devices, the respective test parameters and test results can be tracked and documented.

YOUR ADVANTAGES

» Certified test machine manufacturer
MAKRA measuring machines are approved and certified directly in-house by well-known German vehicle manufacturers (BMW, AUDI, Daimler, Volkswagen, Porsche etc.).

» Robust machine frame
A torsion-resistant and sturdy machine frame guarantees reliable test results.

» Different wheel clamping systems
Only one wheel chuck is needed for all common wheel sizes and types of attachment.

» Comprehensive area of application
Different impact angles, impact plates/wedges and drop-weight versions can easily be adjusted. All common impact and radial run-out tests to be carried out on the test bench.

» Protective equipment
Multiple fall protection devices and safety doors garantee the safety of the operating staff.

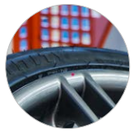
ITB

Impact test

The MAKRA impact test bench has been developed for all types of impact tests used worldwide. The scope of delivery includes all drop weights required for various tests (see Technical Data). The weights are individually loaded into the machine by the chain hoist. The drop height can be preselected using a digital scale and the required impact angles are easily adjustable.
In order to obtain even more precise data, the MAKRA impact test bench optionally offers the monitoring of the fall/impact speed in m/s or km/h.
The test procedure is trigged by an electro-pneumatic two-hand release. To guarantee the highest level of safety for the operating staff, the test procedure will not start before the mechanical fall protection has been manually unlocked. Due to the adjustable roller guide of the fall cart a smooth guidance is guaranteed.

Laser dot

Exact wheel positioning due to a laser dot



Configurations

The chain hoist allows quick and easy changes of the falling weight

Basic weight

Standard 250 kg; optionally 120 kg for small road vehicles

Drop height display

The actual drop height will be shown on the digital display

Measurement devices

Measurement devices for falling speed and impact force optionally available

1 Machine frame
Designed with test statics for the chain hoist drive

2 Adjustment of drop-height with chain hoist
Enables weight and spring exchanges and secured handling of the test weights

3 Release mechanism
Field-proven release mechanism of drop weight trigger

4 Control cabinet
Operation with display of drop height and two-handed trigger

5 Fall carriage
Adjustable roller guides insures low-friction movement

6 Control panel
Easy localization of the zero point

TECHNICAL DATA

Wheel parameter	tire outside diameter	max. 890 mm
	tire width	max. 320 mm
Machine performance	basic weight	250 kg (optional 120 kg)
	drop weight	max. total 1320 kg
		min. total 370 kg (optional 240 kg)
	additional weights	1x 500 kg, 7x 50 kg, 2x 25 kg, 5x 10 kg (optional 1 kg, 2 kg, 5 kg)
	fall carriage	120 kg
	impact fin	impact plate or 90° wedge
	impact angle	13°, 30°, 90°
Media	electric connection	3 x 400 VAC, 50 Hz, 3 kVA
		optional 3 x 480 VAC, 60 Hz, 3 kVA
	pneumatic connection	min. 6 bar
Dimensions	L x W x H	2100 x 1600 x 3340 mm
Weight		3700 kg

TEST TYPE	ISO 7141 BSAU TRIAS 09-J002-01	SAE J175 JASO C608-75/J	FORD S74EB1007CD	JASO C608-75/J (NISSAN 90°)
Falling weight	3600 N – 12 000 N	max. 9100 N	max. 9100 N	max. 9100 N
Number of springs	no springs	3 pcs.	3 pcs.	3 pcs.
Total spring rate	–	1050 kN/m	1050 kN/m	1050 kN/m
Drop height	230 mm	120 – 390 mm	40 – 100 mm	120 – 390 mm
Mounting angle	13° (spring loaded with rubber)	30° (fixed)	90° (wheel held with cardan shaft)	90° (fixed)
Impact plate	380 x 150 mm	380 x 150 mm	–	380 x 150 mm
Impact wedge	–	–	45°	–
Fin edge type	–	–	R 15	–

RTB

Radial impact test

The radial impact test prevents dents of the inner rim flange if driving over small obstacles. Additionally it is used to test the wheel's stability and resistance to breakage, for instance if driving through potholes and over larger obstacles.

For the testing procedure, the weel will be attached onto the MAKRA test bench by an elastically mounted receiving device. The drop carriage including a linear measuring system is lifted into place by an integrated lifting spindle with servo drive. The test process is triggered by a pneumatic release mechanism. To ensure the safety of the operating staff, the fall protection must be manually unlocked before the test is initiated. After the impact and rebound of the drop carriage, it is caught by a mechanical locking blade.

Wheel support

All standard wheel diameter versions from 10" to 24" are covered by the MAKRA quick clamping system (optionally up to 28").

Additional weights

The integrated drop weight of 150 kg can easily be extended with additional 315 kg (optionally additional 400 kg).

Optional data recording

With sensors and additional PC including a measuring program to record the exact force progress. The recorded data will be transferred into a detailed protocol with graphical depiction of the force during the test run.

1 Machine frame
Well dimensioned machine frame ensures reliable test results

2 Linear measuring system
For drop height adjustment

3 Wheel mounting device
Can be easily exchanged for other types of tests (e.g. motorcycle wheels)

4 Control panel
User friendly control panel layout

5 Optional tire pressure measurement
Recording of tire pressure

6 Safety locking device
For safe mounting beneath the fall carriage

7 Safety gates
Electronically protected

TECHNICAL DATA

Wheel parameter	tire outside diameter	max. 900 mm
	tire width	max. 350 mm
	rim offset	-30 / +70 mm (+100 mm with extended wheel adaptor flange)
Machine performance	drop weight	150 kg ±5 kg
	additional weights	max. 315 kg (optional 400 kg, divided in 10 kg and 5 kg weight blocks)
	fall carriage	150 kg
	impact fin	500 x 195 mm, angle 150°, radius 2 mm
	impact angle	±3°, adjustable with threaded rod
	spring rate	85 kN/mm
	impact energy	ca. 4300 J
	drop height	1400 mm (others on request)
Technical components	control system	Siemens S7-series
Media	electric connection	3 x 400 VAC, 50 Hz, 3 kVA
		optional 3 x 480 VAC, 60 Hz, 3 kVA
	pneumatic connection	min. 6 bar
Dimensions	L x W x H	2350 x 1500 x 3960 mm
Weight		4500 kg

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