

# Wheel-Axle Test Bench



## Main Application

- Angling Behavior, transient Tire Behavior
- Tire Behavior during extreme Maneuvers
- Analysis of the Axle Influence on Tire Behavior
- Determination of Characteristic Parameters during Vehicle Dynamics Maneuvers
- Determination of the Transmission Behavior with harmonic Excitations, single Obstacles and stochastic Roadways
- Strength Testing
- Vibration Behavior under combined Stress
- Suspension Sensitivity to Rad, Brake or Tire excited Vibration

## Technical Data

### static:

- Wheel Load: max. 15 kN
- Speed: max. 250 km/h
- Steering Wheel Angle Gradient: max. 900°/s
- Drum Diameter: 2000 mm
- Drum Width: 50 mm

### dynamic:

- Dynamic Wheel Load: Wheel Load Control up to 12 kN

## Specime

- complete Chassis incl. Tires for light Trucks and Passenger Cars

## Characteristics

- max. Dimensions of the Test Specimens: Clamping Table Dimensions: L x W: 1500 mm x 1300 mm
- Presetting of any Wheel Load and Steering Wheel Angle Curve possible
- Various Excitation Profiles can be applied to the Drum (corrugated Profile 5 mm, Beater Bars, rough Surface)

### Measured Values

- Tire Force: lengthwise, crosswise, vertical
- Tire Recovery Torque
- Longitudinal Speed
- Steering Wheel Angle
- cutting Forces at all bolt-on Points of the Axles on the Chassis
- Change of the Wheel Center in vertical Direction
- Equipment with Measuring Track Rod possible

### Measuring Devices

- CAESAR Measuring Wheel with 17", 18" and 19" Rims
- KEYENCE Laser Displacement Measurement System
- Acceleration Sensor: - 1 - axial: 500g  
- 3 - axial: 5g, 50g, 5000g
- PCB 1: Acceleration and Force Sensor
- linear Displacement Measuring System attached to the Test Bench

### Test Bench Components

- Measuring Wheel CAESAR: 17'', 18'', 19''  
(Measuring Range:  $F_x = \pm 30$  kN,  $F_y = \pm 15$  kN,  $F_z = \pm 30$  kN  
 $M_x = \pm 4000$  Nm,  $M_y = \pm 5600$  Nm,  $M_z = \pm 4000$  Nm)
- Rims for the Measuring Wheel: 8 J x 17, 8 ½ J x 18, 8 ½ J x 19
- Segments with different Road Surface
- Steel Drum
- Corundum Coating on the
- Drum: Ø 2000 mm, Width: 50 mm
- hydraulic Cylinder: Wheel Load Control up to 12 kN
- electric Motor to drive the Drum ( $U = 400$  V,  $I = 281$  A,  $P = 100$  kW,  $n = 1250$  min<sup>-1</sup>)
- Measuring Computer Tire Test Bench in the Rest Control Room
- Control Computer in the Test Control Room
- Motor for the Steering Angle Gear
- Steering Angle Sensor
- linear Displacement Encoder
- KEYENCE Laser Displacement Measuring System with Measuring Head (Measuring Range: 28 mm) and Measuring Amplifier (analog Output)

### Software for Control and Data Acquisition

- Measurement and Control System: PXI 8196 - RT from National Instrument, real-time
- Control: LabVIEW
- Evaluation: DIAdem, Matlab

### Available Supplies

- electrical Connection 16 A (32 A if necessary)
- compressed Air 6 bar