Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>ZWARP I</th>
<th>ZWARP II</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drum diameter</td>
<td>920 mm (840, 920, 1050 mm)*</td>
<td>970 mm (840, 920, 1050 mm)*</td>
</tr>
<tr>
<td>Tire width</td>
<td>max. 335 mm</td>
<td>max. 335 mm</td>
</tr>
<tr>
<td>Free drum width</td>
<td>340 mm</td>
<td>340 mm</td>
</tr>
<tr>
<td>Vertical load</td>
<td>40 kN</td>
<td>max. 55 kN</td>
</tr>
<tr>
<td>Lateral load</td>
<td>40 kN</td>
<td>max. 40 kN</td>
</tr>
<tr>
<td>Actuator stroke</td>
<td>250 mm</td>
<td>330 / 250 mm</td>
</tr>
<tr>
<td>Tilt angle</td>
<td>max. ± 15º (±25º)**</td>
<td>max. +30º / -15º</td>
</tr>
<tr>
<td>Drive engine</td>
<td>55 kW</td>
<td>190 kW</td>
</tr>
<tr>
<td>Speed</td>
<td>max. 150 km/h</td>
<td>max. 200 km/h</td>
</tr>
<tr>
<td>Weight</td>
<td>approx. 6.500 kg</td>
<td>approx. 7.500 kg</td>
</tr>
<tr>
<td>Drive events (Triaxial Mode)</td>
<td>------</td>
<td>up to 3500 Nm</td>
</tr>
</tbody>
</table>

*) different drum types available
**) on request

References

- Stahlschmidt & Maiworm, Germany 2001
- RW-TÜV, Germany 2001
- Ford USA (2 rigs) 2001
- Ronal, Germany 2001
- ITS, USA 1991
- Lemmerz, Germany 1991
- Michelin, France 1990
- GM Opel, Germany 1990
- Kronprinz, Germany 1989
- BMW (2 rigs), Germany 1989
- Volvo Car, Sweden 1988
- Südrad, Germany 1988
- Audi, Germany 1988
- DaimlerChrysler, Germany 1987

ZWARP II

Additional Features

- Simulation of braking events with original wheel/hub/brake assembly
- Simulation of drive torque
- Axial fan for cooling air and dust removal

Intron Structural Testing Systems Corporation
28700 Cabot Drive, Suite 100
Novi, MI 48377, USA
Tel: +1 248 553 4630
Toll free: +1 800 651 0924
Fax: +1 248 553 6869

Intron Structural Testing Systems GmbH
Landwehrstrasse 65
D-64293 Darmstadt
Germany
Tel: +49 6151 3917-0
Fax: +49 6151 3917-500

Intron Structural Testing Systems Limited
Coronation Road, High Wycombe
Buckinghamshire, HP12 3SY
United Kingdom
Tel: +44 1494 456789
Fax: +44 1494 456777

Pod: IST0032 AE

Intron, RS LabSite, Labtronic, Hydropuls are trademarks of Instron Corporation. Microsoft, Windows and Windows NT are U.S. registered trademarks of Microsoft Corporation.

Copyright © Intron 2003. All rights reserved. All of the specifications shown in this brochure are subject to change without notice.
Biaxial Hydropuls™ test rigs for automotive wheels and hubs

About the product

Brake systems and wheel/hub assemblies are critical safety-relevant components of the vehicle chassis which are exposed to severe loads. Their reliability can only be safeguarded by performing tests in the laboratory under conditions which resemble actual loading conditions as closely as possible. A ZWARP test rig enables the simulation of all loads acting on the wheel/brake assembly which have a bearing on its service strength.

Applications

- Fatigue testing of wheels as part of a design validation process for release into production
- Rim roll accelerated durability testing; vertical input of high dynamic loads caused by road roughness and vehicle manoeuvring, superimposed on the car weight component acting on a wheel
- Grist mill fatigue tests simulating severe cornering conditions, i.e. series of high lateral inbound and outbound loads superimposed on the corresponding vertical loads
- Specific service strength tests of wheel fastening and braking elements (bolts, discs etc.), hub units and truck twin wheel designs using supplementary rig equipment

Features

- Simultaneous radial and lateral loading of wheels using an original tire for load transfer from the rig to the test object.
- Variable wheel rotation, speeds up to 150 km/h
- Variable wheel camber positioning allows true in-service stress distribution within various fatigue sensitive wheel sections
- Low tire wear
- Compact sturdy design requires a minimum of floor space and no special foundation
- Handling comfort. Changing the wheels is a quick and easy operation

Benefits

- Optimum use of working space
- High basic seismic mass and extremely stiff frame design with low number of parts to avoid resonance
- Hydraulic crosshead positioning for fast installation and removal of specimens or application of a static preload
- Low moving mass and high stiffness make real-time simulation possible
- Full digital control with 19-bit resolution and outstanding repeatability

About the product

Brake systems and wheel/hub assemblies are critical safety-relevant components of the vehicle chassis which are exposed to severe loads. Their reliability can only be safeguarded by performing tests in the laboratory under conditions which resemble actual loading conditions as closely as possible. A ZWARP test rig enables the simulation of all loads acting on the wheel/brake assembly which have a bearing on its service strength.

Applications

- Fatigue testing of wheels as part of a design validation process for release into production
- Rim roll accelerated durability testing; vertical input of high dynamic loads caused by road roughness and vehicle manoeuvring, superimposed on the car weight component acting on a wheel
- Grist mill fatigue tests simulating severe cornering conditions, i.e. series of high lateral inbound and outbound loads superimposed on the corresponding vertical loads
- Specific service strength tests of wheel fastening and braking elements (bolts, discs etc.), hub units and truck twin wheel designs using supplementary rig equipment

Features

- Simultaneous radial and lateral loading of wheels using an original tire for load transfer from the rig to the test object.
- Variable wheel rotation, speeds up to 150 km/h
- Variable wheel camber positioning allows true in-service stress distribution within various fatigue sensitive wheel sections
- Low tire wear
- Compact sturdy design requires a minimum of floor space and no special foundation
- Handling comfort. Changing the wheels is a quick and easy operation

Benefits

- Optimum use of working space
- High basic seismic mass and extremely stiff frame design with low number of parts to avoid resonance
- Hydraulic crosshead positioning for fast installation and removal of specimens or application of a static preload
- Low moving mass and high stiffness make real-time simulation possible
- Full digital control with 19-bit resolution and outstanding repeatability

Fig. 1: ZWARP I

Drum with Internal Curb Rings
Swivel Head Camber Angle
Drum Drive Support Bearing
Sliding Unit Vertical Force
Sliding Unit Radial Force
Test Rig Base Frame
Drum with Internal Curb Rings