We thank you very much for your visit and would be pleased to welcome you again at the testXpo 28th International Forum for Materials Testing, 14th-17th October 2019.

Exhibitors and Exhibits
We welcome you to our ZwickRoell premises!

This info will ensure you a pleasant stay at our factory premises. This is to inform you about possible dangers, our safety regulations and safety devices. Please read them carefully and adhere strictly to them. This information is valid for all our visitors and customers. We would like to wish you a pleasant and safe stay with us.

General Safety and Security Information:

- No smoking in buildings.
- No photography on the factory premises.
- Video control on the factory premises.
- No unauthorized copying.

We herewith refer to the copyright of all drawings and circuit diagrams.

When you are visiting our production facilities (mechanical manufacturing and assembly halls):

- Do not leave the indicated routes. Do not go near the machines.
- When entering the halls please make yourself familiar with the escape routes in case of emergency.
- In case of an accident please follow the instructions on the information boards.
- Please do not forget that trucks and forklifts are driving on the premises. Therefore before crossing the road please pay special attention to the moving traffic.
- Do not walk under raised loads.
testXpo
27th International Forum for Materials Testing

October 15-18, 2018
on the ZwickRoell premises in Ulm

www.testXpo.com
Visit our homepage
http://www.zwickroell.com

Visit our YouTube channel
http://www.youtube.de/ZwickRoellTV

Follow us on Twitter
http://twitter.com/ZwickRoellGroup
Welcome

Dear Visitors,

From reliable test results to significant test time savings and networking – an array of exciting topics from the world of materials testing awaits you at this year’s testXpo, where we will show you how to equip yourselves for the future with intelligent testing technology.

Welcome to the 27th testXpo at ZwickRoell in Ulm. We hope you have an exciting visit filled with interesting discussions and are inspired with great new ideas for your individual test tasks.

Thank you for coming to this year’s testXpo,

Christine Dübler
Managing Director
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Material-Prüfmaschine 250 kN, servohydraulisch

Anwendung:
Ermüdungsprüfung an einem KurbelwellenSegment

Wesentliche Merkmale:
- Servohydraulische Material-Prüfmaschine Typ HB 250 mit T-Nutenplatte
- Nennkraft, dynamisch PNenn ±250 kN, Hub 250 mm
- Digitale Mess- und Regelelektronik testControl II
- Prüfverrichtung zur Aufnahme eines KurbelwellenSegments
- Prüfsoftware testXpert II und testXpert III

Vorteile und Nutzen:
- Einsatz für Ermüdungsversuche unter schwellender oder wechselnder Beanspruchung wie auch für Versuche mit quasi-statischer bis zügiger Belastung.
- Viele Anwendungsmöglichkeiten durch variablen Aufbau der Prüfanordnung
- Große Auswahl an Werkzeugen für statische und dynamische Prüfungen
- Maßgeschneiderte, kundenspezifische Lösung bezüglich Dimensionen, Leistung und Flexibilität
- testControl II bietet zuverlässigen Schutz für Bediener, Daten, Probe und Prüfsystem
  (z. B. Kraftbegrenzung im Einrichtbetrieb, automatische Aufnahmeprogrammierung, usw.)
- Höchste Messgenauigkeit und synchroner Hochgeschwindigkeits-Erfassung bieten ausgezeichnete Datendatenqualität innerhalb extremer Messbereiche (z. B. 24 bit Auflösung, 10 kHz Abtastrate).
- Das moderne Software-Design vereinfacht die Bedienung und unterstützt bei allen Arbeitschritten.
Program

09:00 a.m.  Start of the testXpo trade fair for testing technology
11:45 a.m.  Official welcome followed by lunch in the marquee
5:00 p.m.   End of the testXpo trade fair for testing technology

Presentations:
Notable speakers from industry and research have put together interesting presentations for you on the topic of materials testing.

Contest

Win an Apple iPad Wi-Fi 128GB silver (9.7”)!  

At the front desk in the reception area you received an evaluation sheet to let us know how you liked this year’s trade fair. Since your opinion is important to us we raffle among all participants for an Apple iPad (Wi-Fi 128 GB silver, 9.7”) sponsored from the company Celos in Burlafingen after the forum for materials testing.

If you did not receive the evaluation sheet please stop by the reception. There you can also return the completed sheets.
Exhibitors, Exhibits and Applications
## Applications and exhibits

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</table>
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e-Mail: info.de@kistler.com, Web: www.kistler.com
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<th>Address</th>
<th>Phone Numbers</th>
<th>E-mail/Website</th>
</tr>
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<tr>
<td>Mahr GmbH</td>
<td>Carl-Mahr-Str. 1, D-37073 Göttingen</td>
<td>+49 (0) 711-9312 785, +49 (0) 711-9312 756</td>
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<td>Malvern Panalytical GmbH</td>
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<td><a href="mailto:at@netzsch.com">at@netzsch.com</a>, <a href="http://www.netzsch-thermal-analysis.com">www.netzsch-thermal-analysis.com</a></td>
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<tr>
<td>OLYMPUS Deutschland GmbH</td>
<td>Amsinckstraße 63, D-20097 Hamburg</td>
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<tr>
<td>polymerphys IK GmbH</td>
<td>Industriepark Hoechst - G 830, D-65926 Frankfurt am Main</td>
<td>+49 (0) 69-3660 4669, +49 (0) 69-3660 4665</td>
<td><a href="mailto:Knut.Laumen@polymerphysik.de">Knut.Laumen@polymerphysik.de</a>, <a href="http://www.polymerphysik.de">www.polymerphysik.de</a></td>
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<tr>
<td>QDA SOLUTIONS GmbH</td>
<td>Heiligen-Geist-Kamp 4a, D-23568 Lübeck</td>
<td>+49 (0) 451-61077-0, +49 (0) 451-621777</td>
<td><a href="mailto:info@qda-solutions.com">info@qda-solutions.com</a>, <a href="http://www.qda-solutions.com">www.qda-solutions.com</a></td>
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<tr>
<td>Toni Technik Baustoffprüfsysteme GmbH</td>
<td>Gustav-Meyer-Allee 25, D-13355 Berlin</td>
<td>+49 (0) 30-46 40 39-21, +49 (0) 30-46 40 39-22</td>
<td><a href="mailto:sales@tonitechnik.com">sales@tonitechnik.com</a>, <a href="http://www.tonitechnik.com">www.tonitechnik.com</a></td>
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Addresses of exhibitors

**W.S. Werkstoff Service GmbH**  
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e-Mail: info@zwickroell.com, Web: www.zwickroell.com
Lecture Plan

From Monday, 29th October 2018 you can download the lectures here

http://www.testxpo.com
# Lectures

### Monday, 15th October 2018

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| V1   | 09:30 - 10:00 | **Die Anwendung der iNDTact Sensorsysteme zur Schadenserkennung und Qualitätsprüfung an Faserverbundbauteilen im Serieneinsatz**  
*Dr. Raino Petricevic, iNDTact GmbH* |
|      | 10:15 - 10:45 | **Hochgeschwindigkeitszugversuch - Anwendungen und Besonderheiten**  
*Kai Treutler, Institut für Schweißtechnik und Trennende Fertigungsverfahren (ISAF), Technische Universität Clausthal* |
|      | 11:00 - 11:30 | **Produkt- und Materialprüfung in der Industrie 4.0 am Beispiel von Textilien**  
*Dr.-Ing. Marco Saggioro, ITA Academy GmbH* |
|      | 2:15 - 2:45 | **Joule-Thomson-Effekt zur direkten Bestimmung des physikalischen Fließbeginns als Alternative zu Rp0.2**  
*M.Sc. Simon Vitzthum, Lehrstuhl für Umformtechnik und Gießereiwesen Fakultät für Maschinenwesen Technische Universität München* |
|      | 3:00 - 3:30 | **Optische 3D Messtechnik zur Materialkennwertermittlung und Deformationsanalyse in der Bauteilprüfung**  
*Christoph Blumenthal, GOM GmbH* |
| V2   | 09:30 - 10:00 | **Kalibrierung als Grundlage für sichere Prüfergebnisse - Interpretation, Messunsicherheit und Klasseneinteilung bei der Kalibrierung**  
*Stephan Baumann, ZwickRoell GmbH & Co. KG* |
|      | 10:15 - 10:45 | **Praktische Prüfung von Kunststoffen**  
*Prof. Dr.-Ing. Achim Frick, Hochschule Aalen* |
|      | 11:00 - 11:30 | **Prüfung von langfaserverstärkten Composites**  
*Helmut Fahrenholz, ZwickRoell GmbH & Co. KG* |
|      | 1:30 - 2:00 | **Moderne Prüftechnik von ZwickRoell – Ready for Industrie 4.0**  
*Aleksander Koprivc, ZwickRoell GmbH & Co. KG* |
|      | 2:15 - 2:45 | **testXpert III – unsere Lösungen für Ihre Anforderungen**  
*Manfred Goblirsch, ZwickRoell GmbH & Co. KG* |
|      | 3:00 - 3:30 | **Ringversuch an Metallzugproben – Neue Ergebnisse aus den letzten Eignungstests**  
*Christian Weißmüller, IfEP GmbH* |
| V3   | 09:30 - 10:00 | **Polymer testing: ZwickRoell plastometers for the determination of melt flow indexes MFR and MVR**  
*Mareike Arnold, ZwickRoell GmbH & Co. KG* |
|      | 10:15 - 10:45 | **testXpert III – Our solutions for your requirements**  
*Vinay Desai, ZwickRoell GmbH & Co. KG* |
|      | 11:00 - 11:30 | **A new methodology for formability evaluation of aluminum alloy sheets over a wide range of temperatures**  
*Dr. Moisei Bruhis, McMaster University* |
|      | 1:30 - 2:00 | **Measurement uncertainty in mechanical testing**  
*Dr. Eduard Schenuit, ZwickRoell GmbH & Co. KG* |
|      | 2:15 - 2:45 | **Service reliability and upgradeability for older testing machines**  
*Vinay Desai, ZwickRoell GmbH & Co. KG* |
|      | 3:00 - 3:30 | **Nanoindentation – an application overview**  
*Dr. Erhard Reimann, ZwickRoell GmbH & Co. KG* |
## Lectures

**Tuesday, 16th October 2018**

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| V1   | 09:30 - 10:00 | Optische Oberflächenmesstechnik für Forschung, Entwicklung & Qualitäts sicherung  
Uwe Schosser, FRT GmbH |
|      | 10:15 - 10:45 | Messunsicherheit in der mechanischen Prüfung  
Dr. Eduard Schenuit, ZwickRoell GmbH & Co. KG |
|      | 11:00 - 11:30 | Wirbelstromprüfung - Schnelle und kostengünstige Qualitätssicherung in der  
Fertigung von Einzel- und Massenteilen  
Manfred Cierpinski/Lutz Lindecke, Gollub Werkstoffprüfung GmbH & Co. KG |
|      | 1:30 - 2:00 | It’s better not to touch – Anwendungsbeispiele optischer Extensometertechniken  
videoXtens - laserXtens – lightXtens  
Katja Müller, ZwickRoell GmbH & Co.KG |
|      | 2:15 - 2:45 | Viskositätsmessungen in der Qualitätssicherung – Worauf muss man achten?  
Torsten Remmler, Malvern Panalytical GmbH |
|      | 3:00 - 3:30 | Servicesicherheit und Zukunftsfähigkeit für ältere Materialprüfmaschinen  
Jürgen Seiffert, ZwickRoell GmbH & Co. KG |
| V2   | 09:30 - 10:00 | Einfluss der Temperatur-Dehnung Phasenlage auf das thermomechanische  
Ermüdungsverhalten von Ni-Basis-Legierungen  
Dr.-Ing. Karl-Heinz Lang, Karlsruher Institut für Technologie (KIT) Institut für Angewandte  
Materialien |
|      | 10:15 - 10:45 | Injektions-Kräfte am Kombinations-Produkt „Spritze/Nadel-Sicherheitsvorrichtung“  
- Entwicklung der Testmethode  
Martin Vogelmann, F.Hoffmann-La Roche Ltd |
|      | 11:00 - 11:30 | Lithium-Ionen Batteriezellproduktion – Fertigen und Messen  
Prof. Dr.-Ing. Werner Schreiber, Universität Magdeburg |
|      | 2:15 - 2:45 | testXpert III – Unsere Lösungen für Ihre Anforderungen  
Manfred Goblikisch, ZwickRoell GmbH & Co. KG |
|      | 3:00 - 3:30 | Spannungsrisskorrosion und Entzinkung an Messingbauteilen – Vorgehen bei  
der Schadensanalyse anhand von Fallbeispielen  
M. Sc. Andreas Leitner, W.S. Werkstoffservice GmbH |
| V3   | 09:30 - 10:00 | testXpert III – Our solutions for your requirements  
Vinay Desai, ZwickRoell GmbH & Co. KG |
|      | 10:15 - 10:45 | Inter laboratory test on metal tensile specimens - New results from the last  
proficiency tests  
Christian Weißmüller, IIEP GmbH |
|      | 11:00 - 11:30 | Automated testing of auto-injectors  
Daria Kotoski, Takeda Pharmaceuticals |
|      | 1:30 - 2:00 | Testing of long-fibre reinforced composites  
Helmut Fahrenholz, ZwickRoell GmbH & Co. KG |
|      | 2:15 - 2:45 | Micro Tensile Testing  
Dr. Moisei Bruhis, McMaster University |
|      | 3:00 - 3:30 | Testing Automotive Materials at Multiple Deformation Rates for Forming and  
Crash Simulations  
Fadi Abu-Farha, Ph.D, Clemson University International Center for Automotive Research |
Wednesday, 17th October 2018

### Room V1
**09:30 - 10:00**
Thermoanalytische Prüfungen von Kunststoffen und Gummi  
*Prof. Dr.-Ing. Achim Frick, Hochschule Aalen*

**10:15 - 10:45**
Kunststoffe: Der Zugversuch nach ISO 527  
*Helmut Fahrenholz, ZwickRoell GmbH & Co. KG*

**11:00 - 11:30**
Kunststoffprüfung: Die ZwickRoell Fließprüfgerätereihe zur Messung des Schmelzindexes MFR/MVR  
*Mareike Arnold, ZwickRoell GmbH & Co. KG*

**1:30 - 2:00**
Test vaskulärer Katheter - Was erfordert die Anwendung - was fordert die Norm?  
*Dr.-Ing. Axel Boese, Otto-von-Guericke-Universität Magdeburg*

**2:15 - 2:45**
Mechanische Prüfung der Dämpfungs- und Biegewiderstandseigenschaften von Schuhen  
*Dr.-Ing. Gert Schlegel, Technische Universität Chemnitz*

**3:00 - 3:30**
Bedienkraftoptimierung von Pen-Injektorsystemen: Fallstudien zu Messaufbau/Materialoptimierung und Vergleich Zugprüfmaschine zu Bedienerempfinden  
*Jakob Lange, Ypsomed AG*

### Room V2
**09:30 - 10:00**
testXpert III – Unsere Lösungen für Ihre Anforderungen  
*Manfred Goblirsch, ZwickRoell GmbH & Co. KG*

**10:15 - 10:45**
Schlag- und Kerbschlagzähigkeitsmessung zur Optimierung von 3D-Druckteilen  
*Dr.-Ing. Sören Grießbach, GS-PRO GmbH*

**11:00 - 11:30**
Tatort Bauteil - Kennwerte in der Schadensanalyse  
*Petra Feyr, GMA Group*

**1:30 - 2:00**
Anwendungen zur instrumentierten Eindringprüfung nach ISO 14577  
*Dr. Erhard Reimann, ZwickRoell GmbH & Co. KG*

**2:15 - 2:45**
Werkstoff- und Bauteilverhalten von Leichtbaustählen unter komplexen Belastungen bei hohen Dehnraten  
*Dr. Michael Luke, Fraunhofer-Institut für Werkstoffmechanik IWM*

### Room V3
**09:30 - 10:00**
How long is the fibre  
*Knut Laumen, polymerphys IK GmbH*

**10:15 - 10:45**
Atlas sets new standards in weathering technology  
*Jürgen Parr, Atlas Material Testing Technology GmbH*

**11:00 - 11:30**
It’s better not to touch – examples of application in optical extensometry  
*videoXtens - laserXtens – lightXtens*  
*Katja Müller, ZwickRoell GmbH & Co. KG*

**1:30 - 2:00**
Instrumented impact testing  
*Helmut Fahrenholz, ZwickRoell GmbH & Co. KG*

**2:15 - 2:45**
testXpert III – Our solutions for your requirements  
*Vinay Desai, ZwickRoell GmbH & Co. KG*

**3:00 - 3:30**
Capillary Rheometry – A method to predict flow properties under processing conditions  
*Torsten Remmler, Malvern Panalytical GmbH*
Thursday, 18th October 2018

**Room V1**
- **09:30 - 10:00** Wie lang ist die Faser?  
  Knut Laumen, polymerphys IK GmbH
- **10:15 - 10:45** Instrumentierte Schlagprüfungen  
  Helmut Fahrenholz, ZwickRoell GmbH & Co. KG
- **11:00 - 11:30** Kryogene Materialtests: Besondere Anforderungen an Prüfaufbau und -durchführung am Beispiel von 3D gedruckten Leichtbaulegierungen  
  Dr.-Ing. Christoph Zauner, KRP Mechatec GmbH
- **2:15 - 2:45** Standortübergreifende Laborauftragssteuerung und Zertifikatserstellung mit QDA-LIMS  
  Uwe Wachtel, QDA Solutions GmbH
- **3:00 - 3:30** Automatisierte Qualitätskontrolle von thermoplastischen Compounds mittels DSC - Über den Einsatz von Identify, einer thermoanalytischen Datenbank  
  Hans-Peter Geike, Netzsch Gerätebau GmbH

**Room V2**
- **09:30 - 10:00** testXpert III – Unsere Lösungen für Ihre Anforderungen  
  Manfred Goblirsch, ZwickRoell GmbH & Co. KG
- **10:15 - 10:45** Kraft- und Drehmomentprüfungen in der Entwicklung von Injektionsgeräten bei Sanofi  
  Martin Still, Sanofi-Aventis Deutschland GmbH
- **11:00 - 11:30** It’s better not to touch – Anwendungsbeispiele optischer Extensometer videoXtens - laserXtens – lightXtens  
  Katja Müller, ZwickRoell GmbH & Co. KG
- **1:30 - 2:00** Ermüdungsprüfung an Baugruppen in der Elektromobilität  
  Aleksander Koprivc, ZwickRoell GmbH & Co. KG
- **2:15 - 2:45** Messunsicherheit in der mechanischen Prüfung  
  Dr. Eduard Schenuit, ZwickRoell GmbH & Co. KG
- **3:00 - 3:30** Präzisionsmesstechnik für elektrisches Messen mechanischer Größen  
  Dr. André Schäfer, Hottinger Baldwin Messtechnik GmbH

**Room V3**
- **09:30 - 10:00** Nanoindentation – an application overview  
  Dr. Erhard Reimann, ZwickRoell GmbH & Co. KG
- **10:15 - 10:45** Material and component behavior of light weight steels under complex loadings at high strain rates  
  Dr. Michael Luke, Fraunhofer-Institut für Werkstoffmechanik IWM
- **11:00 - 11:30** Practical applications of an enhanced uncertainty model for build-up systems for the use of ISO 7500-1 calibrations  
  Dr. Falk Tegtmeier, Physikalisch-Technische Bundesanstalt
- **1:30 - 2:00** testXpert III – Our solutions for your requirements  
  Vinay Desai, ZwickRoell GmbH & Co. KG
- **2:15 - 2:45** Cryogenic material testing: Special requirements for test setup and test performance demonstrated on additive manufactured lightweight alloys  
  Dr.-Ing. Christoph Zauner, KRP Mechatec GmbH
- **3:00 - 3:30** Determination of Material Parameters and Component Testing using Optical 3D Metrology  
  Dominik Matschi, GOM GmbH
Exhibits
On display for universities and other higher education institutes are machine and software solutions suitable for thorough training in engineering and materials sciences. More than 500 universities and teaching institutes rely on our expertise. Also under the spotlight in this exhibition area are solutions for research and development.
### 2.5 kN zwickiLine Materials Testing Machine – teachXpert

**Application:**
Tensile tests on various plastics

**Key features:**
- Z2.5 TN materials testing machine, Fmax. 2.5 kN
- Test speed: 0.0005 to 1000 mm/min
- videoXtens extensometer
- Wedge grips, type 8201, Fmax 2.5 kN
- Upright on a mobile tool cart

**Advantages and benefits:**
- Wide application range from plastics and elastomer testing to paper, cardboard, textile, foam materials, and food testing as well as components testing
- Lively, exciting lectures thanks to live tests that can be performed in any lecture hall or classroom
- Changes in specimen properties during the test are compensated for online

### 100 kN AllroundLine Materials Testing Machine

**Application:**
Tensile tests on metals

**Key features:**
- Z100 SN materials testing machine, Fmax. 100 kN
- Test speed: 0.00005 to 1000 mm/min
- Max. return speed: 1500 mm/min
- testControl II Xtension
- Hydraulic grips type 8802, Fmax 100 kN
- makroXtens HP extensometer

**Advantages and benefits:**
- testControl II electronics provide interfaces for all applications for integration of application-specific sensor technology
- testControl II Xtension expands your testControl II and provides you with 6 or 12 additional interfaces, enabling applications with high sensor technology requirements, for example in R&D and academia

### Universal nanomechanical tester ZHN

**Application:**
- Mechanical characterization of wafers at temperatures up to 300°C
- Determination of hardness and elastic modulus of thin films and small structures according to DIN / ISO 14577 in the power range up to 2 N
- Measurement of thermal expansion coefficients and scratch tests at temperatures of up to 300°C

**Key features:**
- Very rigid and robust measuring head of a new generation
- Very stiff new frame structure based on a load frame for creep testing
- Works automatically in both the pressure and the tension region
- Suitable for all indenters: Vickers, Berkovich, sphere, cone, flat punch, cube corner
ZwickRoell GmbH & Co. KG

- Ideal solutions for the semi-conductor industry: complete enclosure in which the electronics are stored that extends to the floor
- A tri-colored lamp for displaying the instrument status, an emergency stop, and a swivelable support for the monitor and keyboard directly at the instrument

Advantages and benefits:
- With the new ZHN/E nanomechanical tester, for the first time ever, entire 12 inch wafers from the semi-conductor industry can be tested
- Unique precision in micro-and nano-scale
- Very flexible software InspecorX adaptable to customer needs

Instrumented Indentation Test with the New ZHU/zwickiLine

Application:
- Hardness tests on metals: instrumented & cyclic indentation tests, together with classical hardness tests (Vickers, Rockwell, Brinell)
- Ball indentation tests on plastics (e.g. ISO 2039 -1)
- Cyclic compression tests on paper or ceramics
- Vickers tests on ceramics
- Automated series and traverse tests in the macro range (5 N to 2500 N)
- Used in R&D, advance development, in the testing laboratory and in goods inwards checks

Key features:
- zwickiLine hardness testing machine with testControl II electronics
- 2.5 kN hardness measuring head, resolution 20 nm
- Rockwell 120° diamond cone indenter, Vickers 136° diamond pyramid indenter
- 4 lenses for 50x - 400x magnification
- Motor-driven displacement unit for hardness measuring head and optics
- Motor-driven x-y cross-table with 3-axis control
- Equipped and controlled by new testing software testXpert hardness edition

Advantages and benefits:
ZwickRoell's investment in new technologies for hardness applications has enabled an expansion of these applications, backed by enhanced operator-friendliness. The hardness testing methods most frequently used in practice are the classical Rockwell, Brinell and Vickers methods. The modern instrumented indentation test (also known as Martens hardness, ISO 14577) also continues to gain in importance and is used increasingly frequently, particularly in research and development and in industrial applications, as it supplies other parameters for determination of material properties, in addition to the hardness value. The result obtained with the test is the continuous force/indentation-depth curve during the complete test cycle; it can be used regardless of material. ZHU/zwickiLine with testControl II electronics can also be used for materials testing (e.g. tensile tests) as well as for hardness tests.
## 50 kN AllroundLine Materials Testing Machine

**Application:**
- Upper test area:
  - Tensile tests on metal
- Lower test area:
  - Flexure test on components applied with strain gauges

**Key features:**
- Z050 TH materials testing machine, Fmax. 50 kN
- Test speed 0.0005 to 600 mm/min
- Max. return speed: 1000 mm/min
- Wedge grips, type 8402, Fmax 50 kN
- Flexure table type A
- HBM measuring amplifier QuantumX

**Advantages and benefits:**
- Optionally expandable with additional module slots, extensometers for extension measurement direct on the specimen, safety guards, and other accessories
- All testXpert II evaluation options are available for imported HBM channels
- Optional: hardware synchronization for testControl and HBM measurement amplifier channels possible

## 2.5 kN zwickiLine Materials Testing Machine

**Application:**
Tensile tests on plastics

**Key features:**
- Z2.5 TN materials testing machine, Fmax. 2.5 kN
- Test speed: 0.0005 to 1000 mm/min
- Pneumatic grips type 8297, Fmax 2.5 kN
- zwicki longstroke extensometer

**Advantages and benefits:**
- Wide application range from plastics and elastomer testing to paper, cardboard, textile, foam materials, and food testing as well as components testing
- The zwicki Longstroke extensometer is prepared for mounting on the left side of the zwicki without extensive installation work and can be later purchased and easily installed

## 10 kN Servohydraulic Materials Testing Machine

**Application:**
Fatigue tests on rotor blades

**Key features:**
- HC 10 compact servohydraulic materials testing machine 10 kN
- Low-noise hydraulic power pack incorporated into machine base
- Hydrostatic-bearing hydraulic actuator mounted in upper crosshead
- Stiff two-column load frame with mechanical or hydraulic crosshead adjustment
- Extended, hard-chromed T-slotted platform for component testing integrated into machine base
- Test fixture for mounting a strain gauge applied rotor blade
ZwickRoell GmbH & Co. KG

• Special safety device
• Zwick Xforce dynamic load cell with integral accelerometer
• testControl II digital measurement and control electronics with 10kHz control frequency and 24-bit resolution
• testXpert R and testXpert III testing software

Advantages and benefits
• Extremely compact, space-saving testing system with small footprint
• Extra-quiet low-noise power pack
• Extra-stiff two-column load frame with integrated T-slotted platform for flexible component testing
• Uses hydrostatic-bearing, sealless actuators for virtually frictionless and maintenance-free operation
• Remote control with integrated Emergency Stop allows convenient set-up and control of test sequence, together with display of measurement channels and machine and test status
• Suitable for 10 kN and 25 kN axial actuators
• Easy to operate via testXpert R and testXpert III test programs

80 kN Servohydraulic High-Speed Testing Machine

Application
High-speed compression tests on concrete cylinders

Key features
• HTM 8020 80 kN high-speed testing machine with T-slotted platform
• Hydrostatic actuator for speeds up to 20 m/s
• Hydraulic nominal force 80 kN
• Piston stroke 250 mm plus 2 x 50mm end cushioning
• Double-rod actuator for tensile and compression loading
• Digital piston transducer
• Electronics with integrated high-speed data logging
• Safety housing and hydraulic safety-circuit
• Extremely stiff load-frame, designed for high impulse peaks
• Compression test kit with integrated transverse force support for mounting side forces in case of component failure

Advantages and benefits
• Tests can be performed over a very wide loading rate range from quasi-static to 20 m/s
• Crash tests on components can also be performed using the optional T-slotted platform
• With testXpert HTM edition a uniform software platform is available, from test definition right through to evaluation
• Easy integration of optical extensometers
• Clamping of very short tensile specimens also possible
• Machine is mounted on pneumatic springs, allowing installation almost anywhere
A1 - After Sales Center

More information

www.zwickroell.com/modernization

www.zwickroell.com/service

In this area you will learn how ZwickRoell supports you in operating your testing machine and in addressing all of your After Sales questions. Discover the benefits of our calibration offerings, learn about training opportunities, and see modernization examples for older testing machines. You will also want to visit the After Sales Center if you have specific questions regarding a current project.
A1 - After Sales Center

Plan of site After Sales Center A1
A1 - After Sales Center

**ZwickRoell GmbH & Co. KG**

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**After Sales Center**

A central contact point for services, retrofits, modernizations and training courses

Which services are important for a testing machine? Which accessories can be retrofitted? What are the benefits of modernization?

The After Sales Center is where visitors will find all the answers to questions regarding their existing testing machines. ZwickRoell Service and the After Sales team will explain in detail the advantages of the services on offer, the comprehensive calibration portfolio and which specimen grips and extensometers can be retrofitted. ZwickRoell’s software experts will similarly answer any and all questions about testXpert and offer advice on training courses to enable even more efficient use of the software.

Use your dossier/order number to discuss current projects with ZwickRoell experts directly at the computer terminal.

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**009 RetroLine testControl II zwickiLine, modernized materials testing machine**

Modernization of a 2.5 kN zwicki materials testing machine with a low test load. In addition to testing machines with high nominal loads, extremely small testing systems with nominal loads of a few kilonewtons can also be modernized.

**Key features**

- Modernization with testControl II and testXpert III
- 500 N Xforce P load cell
- Toolbox test fixtures for component testing: T-slotted base plate, 2.5 kN parallel vise and 500 N compression die
- Video Capturing Plus (testXpert III testing software option)

**Advantages and benefits**

- Renewal of outdated testing systems with current-generation testControl II electronics and the latest generation of testXpert III software make the testing machine state-of-the-art
- The latest testXpert III version is compatible with the latest Windows operating system - Windows 10
- At the same time, modernization to state-of-the-art means guaranteed spare-parts availability for a minimum of 10 years

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**010 RetroLine testControl II 1474 AllroundLine, modernized materials testing machine**

Modernization of a 100 kN AllroundLine materials testing machine for high test loads.

**Key features**

- Modernization with testControl II and testXpert III
- Modification of existing load cell
- Safety device with electrical interlocking and mechanical guard-locking
- Double-acting 250 kN hydraulic grips with T-slotted shoe connector allowing convenient installation of additional specimen grips and test fixtures
ZwickRoell GmbH & Co. KG

• Specimen grips for threaded-end specimens for straight tensile tests to EN ISO 898-1
• Hydraulic power pack with EtherCAT interface for convenient specimen grip control
• Modernized makro extensometer with innovative EtherCAT interface

Advantages and benefits
• Renewal of outdated testing systems with current-generation testControl II electronics and the latest generation of testXpert III software make the testing machine state-of-the-art
• The latest testXpert III version is compatible with the latest Windows operating system - Windows 10
• At the same time, modernization to state-of-the-art means guaranteed spare parts availability for a minimum of 10 years

RetroLine testControl II Instron 5982, modernized materials testing machine

Modernization of a 100 kN Instron 5982 using ZwickRoell technology. In addition to its own models, ZwickRoell modernizes machines by other manufacturers and retrofits them with ZwickRoell testing technology. In doing so ZwickRoell can draw on experience gained from modernizing machines from over 50 different manufacturers.

Key features
• Modernization with testControl II and testXpert III
• Conversion of existing non-ZwickRoell load cell
• 100 kN wedge screw grips
• videoXtens non-contact extensometer

Advantages and benefits
• Modernization of a non-ZwickRoell testing machine with ZwickRoell testControl II measurement and control electronics updates the machine with state-of-the-art technology
• All current ZwickRoell sensors can be retrofitted
• The latest testXpert III version is compatible with the latest Windows operating system - Windows 10
• ZwickRoell's modernization solutions include a new warranty on the entire testing machine. This also applies to non-ZwickRoell testing machines
• At the same time, modernization to state-of-the-art means guaranteed spare parts availability for a minimum of 10 years

Specimen grips and fixtures on a materials testing machine

Take advantage of the latest technical advancements for your existing testing machines

• ZwickRoell has over 500 different specimen grips available and more than 2,000 fixtures plus systems for testing at temperature for optimum implementation of testing requirements
• ZwickRoell’s wide range of accessories covers test loads from a few N right up to several MN. In conjunction with suitable extensometers and fixtures, testing machines with higher nominal loads can also be used for tests involving lower test loads.
Software Services

We offer a wide range of services in connection with our testing software:

- Upgrades from testXpert or testXpert II to testXpert III
- Updates to the latest version of the testing software
- Customized software adaptations
- Training courses

Our software engineers will assist you in implementing customized solutions, including:

- Integrating testXpert II and testXpert III into your IT environment (ERP systems, CAQ systems such as qa-STAT etc.)
- Creating or customizing test programs according to individual customer requirements
- Database-supported management of test programs
- Database connection (Oracle, MySQL, etc.)

Calibration of materials testing systems

Dependable calibration of a testing system is a fundamental requirement for reliable testing results. This is why so many customers rely on ZwickRoell as a DAkkS-accredited calibration laboratory with over 100 highly qualified service technicians. With a comprehensive calibration portfolio backed by the expertise and experience gained from over 10,000 inspections and calibrations annually, ZwickRoell is first choice for testing system calibrations, including systems by other manufacturers.

Key features:

- EN ISO/IEC 17025 accredited calibration laboratory
- Professional, traceable calibration of static and dynamic testing machines, pendulum impact testers, extrusion plastometers, hardness testers and many others, including testing systems by other manufacturers
- Independent and impartial, precise and efficient calibration, with internationally recognized calibration certificates

Advantages and benefits:

- ZwickRoell calibrations feature a large number of measuring points, covering the full force and measurement ranges (from 0.2 to 100%).
- Low measurement uncertainty delivers high-accuracy test results.
- Fast, flexible service delivered by a comprehensive support network, with over 100 service technicians providing on-the-spot assistance.
- ZwickRoell’s comprehensive calibration portfolio allows us to offer one-stop service while covering a wide range of different standards and requirements.
- Inspection and adjustment of ZwickRoell testing systems during calibration reduces the risk of malfunctions or machine downtime, securing productivity.

Training courses in the ZwickRoell Academy

The ZwickRoell Academy offers an interesting and wide-ranging training program - we will transform you and your employees into testing specialists! Our portfolio includes courses on testXpert II and testXpert III testing software, metals, plastics, extrusion and hardness testing, together with courses tailored to your organization’s individual needs.
ZwickRoell GmbH & Co. KG

Key features:
• Modular, practically based training concept
• Courses for beginners and advanced students
• Over 5,000 customers successfully trained
• Courses in various locations, including your area
• Courses headed by experienced service and laboratory engineers
• Courses can be tailored to customers’ individual needs

Advantages and benefits:
• Small teaching groups for optimum transfer of knowledge
• Both practical and theoretical content to ensure efficient handling of testing software and static testing systems
• Course exercises based on set examples to reinforce acquired knowledge
• Comprehensive course documentation, providing an ideal reference work for day-to-day operation
**RetroLine testControl II Vibrophore, modernized vibrophore**

Modernization of a 50 kN Vibrophore, Type 50 HFP 5100. ZwickRoell also supplies modernization packages for Vibrophores.

**Key features**
- Modernization with testControl II and testXpert Research
- Modified 50 kN load cell including accelerometer
- Mechanical quick-action specimen grips for threaded specimens

**Advantages and benefits**
- Renewal of outdated testing systems with current-generation testControl II electronics and the latest generation of testXpert Research software make the testing machine state-of-the-art
- At the same time, modernization to state-of-the-art means guaranteed spare parts availability for a minimum of 10 years

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**RetroLine testControl II for servohydraulic testing machines**

The modular RetroLine modernization packages for servohydraulic testing systems can easily be tailored to your individual needs and testing requirements.

**Key features**
- Modernization with testControl II and testXpert Research
- Hydraulic components can be replaced or adapted where necessary
- New hydraulic power pack or adaptation of existing hydraulic components

**Advantages and benefits**
- Renewal of outdated testing systems with current-generation testControl II electronics and the latest generation of testXpert Research software make the testing machine state-of-the-art
- At the same time, modernization to state-of-the-art means guaranteed spare parts availability for a minimum of 10 years
Among testing solutions for the automotive industry, the primary focus is on dynamic testing machines, together with static testing machines for quality control. On display here are four different drive concepts from ZwickRoell for performing fatigue tests on components and materials.

We will also present testing solutions to help you with the challenges of e-mobility. We are ready to support you with standard solutions as well as with custom testing systems.
Control Cube servo controller and Cubus testing software

Application:
Fatigue and fatigue strength testing, e.g. in the automotive and aerospace sectors

Key features
• Basic controller in 1 or 2-channel versions
• Can be expanded to up to 32 channels
• Modular design
• Large range of expansion options, including additional measurement amplifiers, analog I/O, digital I/O
• Cubuslight basic software for test-bench configuration and routine cyclic tests
• Cubus testing software for advanced requirements such as block programs, ramp tests
• QanTiM simulation software for simulation tests
• Expandable software options, e.g. Autotune function, digital displays etc. etc.

Advantages and benefits
• Simple, flexible operation of complex test benches
• Modular software structure allows optimum adaptation to testing requirements or applications
• Extremely user-friendly operating concept caters for individual test sequence requirements
Modular portal frame test bench for dynamic contract testing by ZwickRoell testing laboratories

ZwickRoell’s testing laboratories have a wide variety of systems and solutions available for both quasi-static strength analysis and cyclic dynamic fatigue tests. The modular portal-frame test bench allows cyclic dynamic fatigue strength tests up to 250 kN, both uniaxial and multiaxial, for example on large components.

The hydrostatic-bearing single testing actuator also enables biaxial (multiaxial) testing on components. Static tensile and compression tests up to 250 kN are possible.

Key features:
- Test bed with portal frame with hydrostatic-bearing single testing actuator
- Test area height 2,340 mm, clear horizontal test area 2,000 x 4,000 mm
- Dynamic nominal force Fmax ±250 kN, stroke 100 mm
- Static nominal force Fmax ±250 kN
- ControlCube measurement and control electronics
- Cubus testing software

Advantages and benefits:
- Modular test bed plus portal frame allows even large and oversized components to be tested to order in ZwickRoell’s testing laboratories
- ZwickRoell’s Materials and Component Testing Laboratory carries out tests of all types precisely, efficiently and in accordance with standards
- Contract testing on a wide range of materials and components
- Fast, standard-compliant testing overcomes capacity bottlenecks
- Accurate, repeatable test results combined with efficient testing
**GTM Testing and Metrology GmbH**

**020 Force Transducer Series DR**

**Application Industrial force measurement:**
To compensate undesired inertial forces the DR series are equipped with two accelerometers. The two acceleration sensors cover a very large acceleration and frequency range.

**Advantages:**
- Accuracy class 0.04
- For static and dynamic tensile and compressive forces
- 6-wire connection technology
- 2 built-in accelerometers
- Very high-cycle fatigue resistant up to 100 %
- Popular connection dimensions

**Options:**
- Second redundant measuring circuit
- Mounting parts for tension and compression

**Multi component Transducer Series MKA**

**Application Industrial multi-component measurement:**
The main application area for the MKA series is in component testing for the automotive, aircraft and general machine construction industries. Thanks to its compact design, the series can be integrated easily into existing structures.

**Advantages:**
- Accuracy class 0.2
- Very high-cycle fatigue resistant up to 80 % of nominal load
- Little weight
- For static an dynamic loads
- Compact construction
- Largely flexible combination of forces and moments

**Options:**
- Optional solid or plug-in connection
- As a 3-, 4- or 6-component transducer available
- With calibration certificate from our accredited multi-component calibration laboratory, on request
Multi component Transducer Series MPF

Application Precision multi-component measurement:
Thanks to their high insensitivity against interference, MPF measuring platforms can be used to solve extreme applications. Extreme conditions are found in wind tunnel applications and rolling resistance test benches, for example. Thanks to the decoupled structure, MPF measuring platforms are also ideal for use as a reference unit in multi-component standard machines.

Advantages:
• Design adjustments according to customer demands
• For the highest accuracy requirements
• For static and dynamic loads
• Many years of experience
• Integrated mechanical decoupling

Options:
• With calibration certificate from our accredited multi-component calibration laboratory, on request
250 kN Servohydraulic Materials Testing Machine

**Application:**
Fatigue tests on crankshaft segments

**Key features:**
- Type HB 250 servo-hydraulic materials testing machine with T-slotted platform
- Dynamic nominal force \(F_{\text{nom}} \pm 250 \text{ kN}, \text{stroke } 250 \text{ mm}\)
- testControl II digital measurement and control electronics
- Test fixture for mounting crankshaft elements
- testXpert R and testXpert III testing software

**Advantages and benefits:**
- Used for fatigue tests under pulsating or alternating load or for tests under quasi-static to static load
- Flexible design of test assembly covers wide range of applications
- Large selection of fixtures for static and dynamic testing
- Customized solution with regard to dimensions, capacity and flexibility
- testControl II provides reliable protection for the operator, data, specimen and testing system (e.g. load limitation in set-up mode, automatic sensor recognition etc.)
- Maximum measurement accuracy and synchronous high-speed data logging provide outstanding data quality over an extended measurement range (e.g. 24-bit resolution, 10 kHz control frequency)
- Modern software design simplifies operation and provides support for each individual test step

50 kN Servohydraulic High-Speed Testing Machine

**Application**
High-speed tensile tests on high-strength sheet metal

**Key features**
- 50kN HTM 5020 high-speed testing machine with T-slotted platform
- Hydrostatic actuator for speeds up to 20 m/s
- Hydraulic nominal force 50 kN
- Piston stroke 250 mm plus 2 x 50mm end cushioning
- Double-rod actuator for tensile and compression loading
- Digital piston transducer
- Electronics with integrated high-speed data logging
- Safety housing and hydraulic safety-circuit
- Extremely stiff load-frame, designed for high impulse peaks
- GOM with high-speed chamber

**Advantages and benefits**
- Tests can be performed over a very wide loading rate range from quasi-static to 20 m/s
- Crash tests on components can also be performed using the optional T-slotted platform
- With testXpert HTM edition a uniform software platform is available, from test definition right through to evaluation
- Easy integration of optical extensometers
- Clamping of very short tensile specimens also possible
- Machine is mounted on pneumatic springs, allowing installation almost anywhere
25 kN Servohydraulic Materials Testing Machine

Application:
Fatigue tests on composite engine mounts

Key features:
- HC 25 compact servo-hydraulic materials testing machine 25 kN
- Low-noise hydraulic power pack incorporated into machine base
- Hydrostatic-bearing hydraulic actuator mounted in upper crosshead
- Stiff two-column load frame with mechanical or hydraulic crosshead adjustment
- Hard-chromed T-slotted platform for component testing incorporated into machine base
- Test fixture for engine mounts
- ZwickRoell Xforce dynamic load cell with integral accelerometer
- testControl II digital measurement and control electronics with 10 kHz control frequency and 24-bit resolution
- testXpert R and testXpert III testing software

Advantages and benefits:
- Extremely compact, space-saving testing system with small footprint
- Extra-quiet low-noise power pack
- Extra-stiff two-column load frame with integrated T-slotted platform for flexible component testing
- Uses hydrostatic-bearing, sealless actuators for virtually frictionless and maintenance-free operation
- Suitable for 10 kN and 25 kN axial actuators
- Easy to operate via testXpert R and testXpert III test programs
Open Hybrid LabFactory

Multiaxial fabrics (NFC)

Made of two layers of glass fiber and one layer of load path optimised structure of carbon fibers.

Metal plastic hybrid backrests (structural seating component)

Weight reduction of 30% (1kg) without additional costs compared with the reference steel design.

The Research Campus – Partnership of science and industry on an equal footing
The Open Hybrid LabFactory e. V. (OHLF), TU Braunschweig and the Fraunhofer Gesellschaft provide this common platform for industrial partners and public institutions to accelerate research and development projects.

The LeichtbauCampus is one of the top facilities in Germany for research and development of future hybrid components.

The funding initiative “Research Campus – Public-Private Partnership for Innovation” from the Federal Ministry of Education and Research was the initial impulse for the Open Hybrid LabFactory, which today is one of only nine Research Campuses nationwide.
5 kN Materials Testing Machine - cLine

Application:
Cyclic compression test to DIN 53579 and ASTM D 3574

Key features:
• Z005C materials testing machine, Fmax. 5 kN
• Test speed: 0.0005 to 1000 mm/min
• Max. return speed: 1500 mm/min
• Display remote control

Advantages and benefits:
• Testing of large-scale samples such as foam boards, mattresses, car seats or boxes
• Improved ergonomics thanks to operation from the side, swiveling table extensions incorporated on both sides, an additional single-sided table extension and an optional display-equipped remote control for set-up and operating modes

100 kN AllroundLine Materials Testing Machine

Application:
• Upper test area:
  o Tensile tests on composite materials
• Lower test area:
  o Flexure tests on composite components

Key features:
• Z100 SN materials testing machine, Fmax. 100 kN
• Test speed: 0.00005 to 1000 mm/min
• Max. return speed: 1500 mm/min
• Wedge screw grips, type 8506, Fmax. 100 kN
• Flexure table type B, Fmax 50 kN
• Temperature chamber
• videoXtens 1-20 extensometer

Advantages and benefits:
• Play-free guide and ball screw ensure low-wear operation and unproblematic tension and compression operation
• The remote control can be operated with one hand and used as a remote control or control unit
• The sophisticated air-feed system used in the temperature chamber ensures extremely uniform temperature distribution
• Precise temperature control ensures a stable temperature without overheating
RKP 750 Pendulum Impact Tester

**Application:**
Determination of notch impact or tensile impact strength; Charpy impact tests (ISO 180, ASTM D256, ASTM D4812)

**Key features:**
- 750 Joule instrumented pendulum hammer
- Digital and analog display
- Automatic lifting unit (electric motor drive)
- Height-adjustable pendulum hammer
- Safety device

**Advantages and benefits:**
- Safe impact testing in accordance with EN954-1, Category 3 requirements
- Stable, reliable test results up to 750 joules notched impact energy
- Charpy and tensile impact tests and wedge impact tests to all current DIN, EN, ASTM, ISO and BS standards

RKP 450 Pendulum Impact Tester

**Application:**
Determination of notch impact or tensile impact strength; Charpy impact tests (ISO 148, (EN 10045), ASTM E 23)

**Key features:**
- 450 Joule instrumented pendulum hammer
- Digital and analog display
- Automatic lifting unit (electric motor drive)
- Height-adjustable pendulum hammer
- Safety device

**Advantages and benefits:**
- Safe impact testing in accordance with EN954-1, Category 3 requirements
- Stable, reliable test results up to 750 joules notched impact energy
- Charpy, Izod, Brugger tests, tensile impact tests and wedge impact tests to all current DIN, EN, ASTM, ISO and BS standards
250 kN Vibrophore Materials Testing Machine

Application:
Fatigue tests on gear wheels

Key features:
• Vibrophore 250 Two in One materials testing machine, Fmax. 250 kN
• With Vibrophore Two in One option for upgrading to a full-fledged static testing machine
• 250 kN Xforce dynamic load cell with integral accelerometer
• testControl II digital measurement and control electronics with 10kHz control frequency and 24-bit resolution
• Test fixture for gear wheels
• testXpert R and testXpert III testing software

Advantages and benefits:
• Two in One function creates a full-fledged static and dynamic testing machine with stiff four-column load frame
• Easy to install - no ancillary units or systems (e.g. hydraulics, coolant) needed
• Maintenance free system thanks to wear-free components
• Clamping table at convenient working height for operator-friendly testing
• Remote control with color display showing measurement channels, machine and test status; also used for machine setup
• Easy to operate via testXpert R and testXpert III test programs

500 kN Vibrophore Materials Testing Machine

Application:
Fatigue tests on connecting rods

Key features:
• Vibrophore 500 Two in One materials testing machine, Fmax. 500 kN
• With Vibrophore Two in One option for upgrading to a full-fledged static testing machine
• 500 kN Xforce dynamic load cell with integral accelerometer
• testControl II digital measurement and control electronics with 10 kHz control frequency and 24-bit resolution
• Connecting rod test fixture
• testXpert R and testXpert III testing software

Advantages and benefits:
• Full-fledged static and dynamic testing machine with stiff four-column load frame
• Easy to install - no ancillary units or systems (e.g. hydraulics, coolant) needed
• Maintenance free system thanks to wear-free components
• Clamping table at convenient working height for operator-friendly testing
• Remote control with color display showing measurement channels, machine and test status; also used for machine setup
• Easy to operate via testXpert R and testXpert III test programs
Multi-sensor technology creates maximum flexibility

You want to measure roughness, topography or film thickness of your sample? And this without contact. The versatile MicroProf® 100 is universally applicable thanks to optical multi-sensor technology.

A variety of point, field of view and film thickness sensors can be integrated. This makes it possible to measure a wide range of surfaces from smooth to rough, from matt to reflective to transparent. Depending on the dimensions, up to three sensors and one camera can be installed.

The MicroProf® 100 can also be upgraded for double-sided sample inspection. This allows users to measure the top and bottom of their sample simultaneously and also determine the sample thickness in the same measuring process. If a new measuring task arises at a later date, our surface measuring tool can be flexibly retrofitted at any time. The inhouse software is also of modular design and can perform either manual or fully automated measurements of the sample.

The travel range of the xy table is 150 mm x 100 mm. The MicroProf® 100 is ideally suited for the measurement of small samples. Several samples in workpiece carriers, which are very popular in production, can also be measured optimally. The MicroProf® 100 is also popular in R&D, as it can be integrated almost anywhere as a tabletop tool.
To proof that determined parameters for the assembly are correct it is necessary to previously perform a laboratory test which guarantees that torque and clamping force are balanced to an optimum. For the analysis of these two parameters it needs precise transducers with multi-component collection, a laboratory system with controlled motors and a flexible and easy-to-use software for control the processes and for the evaluation of measuring results.

The measuring and control unit 2777 together with the qualified software testXpert II is the heart of this high-end measuring technology. The software had been extended to allow specific control sequences and evaluations of the application for determination of friction coefficients at coated nuts and bolts. Thus, together with the specifically developed hardware, i.e. multi component transducers for separate analysis of head friction, thread friction and clamping force, a multi functional test system was created which is able to fulfill almost every requirement regarding the measuring of torque, force and rotational angle.

Beside these applications the system is also capable of performing complex test tasks which go far beyond this. For example the recording of friction torque in differential gears, function tests at adjustment elements, break tests and long-term load tests at tools. Test courses can be freely defined thus allowing the realization of even difficult test procedures. The single test tasks can be lined up with function blocks one by one and then carried out one after another.

**Technical data:**
- **Test range:** M2 to M64
- **Torque:** 0.2 to 25,000 Nm
- **Clamping force:** 2 to 2,500 kN

**Mechanical design:**
- **Vertical:** to 50 Nm and to 200 Nm
- **Drive unit:** 200 Nm to 50 rpm
  - 100 Nm to 100 rpm
  - 30 Nm to 300 rpm
  - 10 Nm to 1000 rpm
- **Horizontal:** to 1000 Nm, 3000 Nm, 5000 Nm, 6000 Nm, 15000 Nm and 25000 Nm
- **Drive unit:**
  - 25000 Nm to 10 rpm
  - 15000 Nm to 20 rpm
  - 6000 Nm to 30 rpm
  - 5000 Nm to 20 rpm
  - 3000 Nm to 35 rpm
  - 1000 Nm to 100 rpm
  - 750 Nm to 200 rpm
  - 500 Nm to 300 rpm
- **Additional spindles:** 400 rpm / 300 Nm
  - 300 rpm / 400 Nm
  - as well as connection of specific spindles from production e.g. BOSCH.

**Measuring technology:**
- Accuracy of measuring chain 0,5% related to measuring value
- Connection of passive and active transducers (0 +/- 1V, 0 +/- 10 V, 0 +/- 20 mA)
- Connection of AUTOCODE transducers with automatic identification of transducers
- Scanning rate up to 20kHz
- Resolution of up to 20000 points at nominal load
- Adjustable filter frequency between 1 Hz and 10 kHz
- Connection via serial RS 485 interface with 460 kBaud
• Optional: 8 galvanicly separated inputs 524 Vnom and 8 galvanicly OC-outputs 524 Vnom with max. 50 mA
• Optional: motor control interface for controlling of BL and asynchrony drives

Special features and advantages:
Characteristic values of a bolted joint connection can be determined by means of dynamic test and measurement of torque, rotational angle, clamping force and thread torque as well as calculation of head friction, total friction, thread friction coefficient and head friction coefficient.

The flexible programming of test sequences allows test procedures for example according to EN ISO 16047, ISO 2320 or simulation of assembly procedures as torque or angle assembly and yield point method.

The quick change adaptor for different bolt sizes allows tests with head settlement according to the required standards. By adaption of parts of the original joint measurement values can be determined under realistic conditions. In addition to the extensive evaluations of testXpert II friction coefficients can be displayed in diagrams.

Due to the flexible, modular concept the system can “grow” with your requirements. This means that the system 2777 can be extended by additional measuring channels at any time. Existing transducers and mechanical devices can be used for the extension of the system. By means of intelligent algorithms the data amount can be reduced thus allowing even long term measurements with high scanning rates.

For an analysis on site, for example in the production field, at building areas or at maintenance services the portable system INSPECT+ is a handy alternative. The INSPECT+ also helps to detect and display problems within the bolted joint on site and afterwards analyze and document the measurements at the desktop PC thus finding solutions for the detected errors.

The microprocessor controlled unit is especially capable of static and dynamic measurements of torque/angle values in connection with torque/angle transducers. Torque wrenches, pneumatic-, electronic- and impulse tools can be tested and monitored. An input of values by hand is also possible.

INSPECTpro portable instrument for torque and angle measurement

The software and hardware of new portable INSPECTpro torque and angle instrument create new opportunities for easier random-sample testing, process capability testing and graphical process analysis in assembly operations in order to ensure optimal quality of bolted joint assembly. The instrument is suitable for in-process random-sample testing, testing drivers and torque wrenches, testing joint components, and determining the process capability of already assembled bolted joints in combination with handheld torque/angle sensors.
A5 - Automotive

More information

www.zwickroell.com/automotive
QDA SOLUTIONS GmbH

033 Laboratory Information Management System (LIMS)

Linking lab with production
The intensity of competition in today's global economy mandates that manufacturers push laboratory testing and measurement device management to its absolute limits in order to squeeze every bit of performance possible out of a product. The rising number of regulatory concerns and standards and the increased volume of tests with fewer resources mean that labs need to continuously improve workflows. Optimization has to move forward without increasing staff and with minimum training.

QDA SOLUTIONS's Laboratory Information Systems Solution reduces paperwork, errors and uncertainty and optimizes laboratory workflow, from data collection to the certificate of analysis. It integrates manufacturing operations with other business areas and generates cost savings through automation and better utilization of resources.

Key Benefits
- Optimize your laboratory workflow
- Significant cost saving through automation
- Integration with your plant floor and business systems

Gage and Tool Management
Calibration, Integration and Traceability Made Easy

As parts get smaller and harder to measure, the cost of measuring them goes up. As parts get bigger and enormously expensive, the cost of scrapping them goes through the roof. As the sheer number of parts that go into a manufactured product grows, the complexity of measuring and managing them expands exponentially.

Gages control parts, tools build them. As a part's dimensions change, so must the devices that measure and make them. Poor calibration that results in large measurement uncertainty causes erroneous and expensive adjustments to the manufacturing process and degrades product quality.

QDA SOLUTIONS's Gage and Tool Management Solution improves cost control and ensures measurement, tool and process traceability through automated calibration and workflows. It integrates with other QDA SOLUTIONS quality software and solutions to meet the regulatory requirements.

Key Benefits
- Automated calibration workflow
- Includes calibration standard templates
- Improves cost control

Non-Conformance Management
Manage Complaints Confidently and Decisively

Regulatory bodies such as ISO view complaints regarding the safety or performance of a product as a strong indicator of whether a company is in full control of its manufacturing process. Customer feedback has become an integral part of compliance requirements, and failure to manage it is the leading factor named in non-compliance citations.
Simply declaring that a broken device has been reworked does not bode well during an inspection. Many firms have complaints evolve into non-conformance issues because they fail to follow thru with analysis to determine the root cause of the issue. They also get into trouble because there is no connection to a corrective/preventive action or management review – there is no integration.

QDA SOLUTIONS’s Non-Conformance Management Solution keeps non-conformance issues under control with automated workflows and integrated data from other relevant areas. It pulls in ISO standards and FDA mandates, ties in CIP and CAPAs and rolls the consolidated and analyzed findings into intuitive focused reports that enable decisive actions.

Non-conformance management where you are.
Now with a cloud-based app, this add on to a QDA desktop, provides case driven content. With simple filtering and editing available over a secure connection, users are able to monitor the most common content when mobile.

Key Benefits
- Identify areas to improve
- Flexible non-conformance workflow integration
- Enhanced communication and escalation

Supply Chain Management
Strategic Advantage through Quality Collaboration

Manufacturing has grown globally at break-neck speed. The chain of control is increasingly stretched, creating new challenges and throwing companies into reactive mode. At the same time, regulatory bodies everywhere are taking a harder line on quality issues. Regulators are keeping the pressure on when it comes to pre-market quality and are forcing quality mandates further down the supply chain. Existing continuous process improvement systems have to be replaced or updated to align with ISO/TS 16949, FDA, GMP and other standards. “The buck stops here” is the policy, meaning that simply passing the blame onto a supplier is unacceptable. You have to take responsibility for the quality of components produced elsewhere, no matter where they come from.

First- and second-tier suppliers located thousands of miles away may operate under completely different rules and standards. It’s not just that quality practices and control regulations may not be sufficiently stringent. Expectations from material suppliers can also be vastly different.

QDA SOLUTIONS’s Supply Chain Management Solution extends your quality standards to your suppliers, integrates incoming inspection, auditing, corrective action and complaint management. It ensures compliance with ISO/TS, VDA and QS 9000 standards and allows for proactive supplier grading.

Key Benefits
- Link supply chain operations
- Supplier integration through web portal
- Automated 8D and PPM
QDA SOLUTIONS GMBH

Traceability

QDA SOLUTIONS’s Traceability Solution drives focused management decision making by integrating quality data and analyses from all angles. Traceability backed up with solid data improves first time quality, reduces defects, rework and warranty claims.

Key Benefits
- Real-time product status visibility
- Sound intelligence driving focused improvement
- Traceability linked with quality data

QDA-Upload/Download for testXpert of ZwickRoell

Essential characteristics of the interface

Using the interface between testXpert and the QDA software from QDA SOLUTIONS, it is possible to automatically transfer the values measured at the machine to the QDA-LIMS system. Here, the QDA-LIMS also undertakes the statistical assessment of the measured values compared to the specifications stored in the system. This allows the early exposure of statistical trends and deviations from the reference values. Using the interface to ERP systems, the specifications can also be read directly from there and be directly transferred to the testing machine. In every case, this method leads to a significant reduction of separate testing procedures. Using the existing interface, additional product-dependent machinery parameters such as speed, clamping length and similar data can be transferred too, which are then used dynamically in the testing procedure.

Essential characteristics of the QDA-LIMS

The general processing and assessment of the measurement data generated by the ZwickRoell machinery is carried out in QDA-LIMS. Here, the targeted assessment of test numbers, tasks, batches and ident numbers, as well as the allocation of test parameters to the corresponding test data, is possible. Primary ERP systems can be connected to the QDA-LIMS system.

The integrated statistical assessment possibilities in QDA-LIMS, which correspond with international standards, assess the data recorded from another perspective. As such observations on the capability of the manufacturing process can be made in particular, but also the statistical evaluation of Measurement System Analysis (MSA) can be carried out, and this is actually a fundamental requirement for the usage of measurement equipment.

The QDA-LIMS system can also, alongside the ZwickRoell machinery, integrate further measurement instruments into the measurement process, thereby creating traceability for all of the recorded test results. These can also be displayed on individual test certificates and factory test certificates with the integrated QDA Report Designer or with the help of standard programmes such as Microsoft Word.

Key Benefits
- Simple connection to ZwickRoell machinery
- Reduction of inspection requirement
- Using statistical methods like MSA
- Simple transfer of inspection results
- Clear design of measurement results
ZwickRoell GmbH & Co. KG

ZHN Universal Nanomechanical Tester

Application:
- Determination of hardness and Young’s modulus of thin coatings and small structures to DIN/ISO 14577 in the force range up to 20 N
- Measurement of hardness and Young’s modulus profiles perpendicular to the surface and in cross-section
- Creep and fatigue tests in the micro and nano range

Key features:
- Very rigid, robust, state-of-the-art measuring head
- Measuring heads for different force ranges can be replaced by the operator
- Extremely stiff, new frame design based on load frame for creep testing
- Fully automatic operation in both compression and tensile ranges
- Suitable for all indenters: Vickers, Berkovich, sphere, cone, flat punch, cube corner
- Excellent optical system with magnification up to 3350x
- Extremely fast, precise positioning with smallest step size of 50 nm
- Upgradeable for use as scratch and wear tester

Advantages and benefits:
- Universal and very flexible instrument over a wide power range
- Unique precision in micro-and nano-scale
- Eliminates multiple investments in different devices
- Fully automatic testing, including the generation of images of surface
- Very flexible software InspexorX adaptable to customer needs

2 kN Electrodynamic Materials Testing Machine

Application:
Fatigue tests on lithium ion cells

Key features:
- LTM 2 electrodynamic materials testing machine, Fmax. 2 kN (dynamic)
- Test frame for LTM 2 with integrated T-slotted platform
- Holder for gripping an LI cell
- Safety device for operator protection
- testControl II digital measurement and control electronics
- 2 kN Xforce dynamic load cell
- Remote control unit with display
- testXpert R and testXpert III testing software

Advantages and benefits:
- Maintenance-free system thanks to wear-free components
- No additional pneumatic, coolant, oil etc. supply feeds required
- Motor-driven crosshead adjustment plus ideal working height for convenient operation
- Safe set-up mode as per EN 60204-1 via speed reduction to 10 mm/s
- Simple manual crosshead locking via hand lever with electrical monitoring
- Long piston stroke (60 mm) enables a wide variety of tests
- Operator-friendly testXpert R testing software with preset controller settings and availability of free controller definition
- Intelligent testing software featuring intuitive operation - testXpert R for dynamic tests and testXpert III for static tests
- Standardized mechanical interface allows flexible use of specimen grips and fixtures over entire dynamic product range
100 kN AllroundLine Materials Testing Machine

Application:
Press-fitting tests on electric motors

Key features:
- Z100 SN materials testing machine, Fmax. 100 kN
- Test speed: 0.00005 to 1000 mm/min
- Max. return speed: 1500 mm/min
- Test fixture for press-fitting tests on electric motors

Advantages and benefits:
- Ergonomics are top priority when it comes to operating the new AllroundLine machine. Easily adjustable crossheads allow the test area to be moved to a convenient working height.
- The drive features maintenance-free, digitally controlled AC drive technology.
- This is combined with an innovative motor feedback system, allowing excellent constant speed characteristics to be achieved even at extremely low speeds.

50 kN Materials Testing Machine

Application:
Determination of resultant forces and their points of penetration (entry and exit points) for a helical spring under compressive load

Key features:
- Z050 SW materials testing machine, Fmax. 50 kN, floor-standing model
- Lead screw guard
- CE compliant safety device, in front and rear as manually sliding lifting door with electrical interlocking
- 3 and 6-component force measurement device (50 kN) for each
- Mechanical overload protection, 50 kN
- Compression platens with a 550 mm diameter, hardened, with a M16 x 2.0 mm central fixing thread and a centering of 40H7, 5 mm deep, with crosshairs above and central engraving rings below; mandatory for applications with risk of injury to the operator
- testControl II digital measurement and control electronics with bus extension
- Proven testXpert III testing software

Advantages and benefits:
- 3D online display of resultant forces for fast, reliable component evaluation
- Results calculated and displayed online
- Optionally available with enveloping circle measurement device

1 kN Electromechanical Servo Testing Actuator

Application:
Determination of the force/stroke and force/current characteristics of electromagnetic actuators

Key features:
- EZ001 electromechanical servo testing actuator, Fmax. 1 kN
- Test stroke 180 mm
- Load cell Fmax. 1 kN
- ZwickRoell load frame for loading up to 5 kN
**ZwickRoell GmbH & Co. KG**

- Turzer PWM current regulating device
- Shunt resistor for actual current measurement
- testXpert III testing software for solenoid testing

**Advantages and benefits:**
- Mounted in ZwickRoell load frame, but can also be used in testing benches or in product lines for a wide range of specifications
- One system for development and production
- Fast, reliable testing system for static production checks or for 100% function testing in production

### 100 kN Servohydraulic Materials Testing Machine

**Application:**
Dynamic testing on rubber-metal elements

**Key features:**
- Type HA 100 servohydraulic materials testing machine
- Dynamic nominal force $F_{nom} \pm 100$ kN, stroke 100 mm
- testControl II digital measurement and control electronics
- Test fixture for rubber-metal elements
- testXpert R and testXpert III testing software

**Advantages and benefits:**
- Used for fatigue tests under pulsating or alternating load
- Flexible design of test assembly covers wide range of applications
- Large selection of fixtures for static and dynamic testing
- Customized solution with regard to dimensions, capacity and flexibility
- testControl II provides reliable protection for the operator, data, specimen and testing system (e.g. load limitation in set-up mode, automatic sensor recognition etc.)
- Maximum measurement accuracy and synchronous high-speed data logging provide outstanding data quality over an extended measurement range (e.g. 24-bit resolution, 10 kHz control frequency)
- Modern software design simplifies operation and provides support for each individual test step

### 25 kN Servohydraulic Materials Testing Machine

**Application:**
Single stage tests on automotive transverse control arms

**Key features:**
- HC 25 compact servohydraulic materials testing machine 25kN
- Low-noise hydraulic power pack incorporated into machine base
- Hydrostatic-bearing hydraulic actuator mounted in upper crosshead
- Stiff two-column load frame with mechanical or hydraulic crosshead adjustment
- Hard-chromed T-slotted platform for component testing incorporated into machine base
- Test fixture for transverse control arms on the T-slotted platform
- ZwickRoell Xforce dynamic load cell with integral accelerometer
- testControl II digital measurement and control electronics with 10kHz control frequency and 24-bit resolution
- testXpert R and testXpert III testing software
Advantages and benefits:
• Extremely compact, space-saving testing system with small footprint
• Extra-quiet low-noise power pack
• Extra-stiff two-column load frame with integrated T-slotted platform for flexible component testing
• Uses hydrostatic-bearing, sealless actuators for virtually frictionless and maintenance-free operation
• Suitable for 10 kN and 25 kN axial actuators
• Remote control with integrated Emergency Stop allows convenient set-up and control of test sequence, together with display of measurement channels and machine and test status
• Easy to operate via testXpert R and testXpert III test programs

5 kN Electrodynamic Materials Testing Machine

Application:
Fatigue tests on decoupling elements in exhaust gas system

Key features:
• LTM 5 electrodynamic materials testing machine, Fmax. 5 kN (dynamic)
• Test frame for LTM 5 with integrated T-slotted platform
• Mechanical grips for mounting the specimen
• Safety device for operator protection
• testControl II digital measurement and control electronics
• Xforce dynamic 5 kN load cell
• Remote control unit with display
• testXpert R and testXpert III testing software

Advantages and benefits:
• Maintenance-free system thanks to wear-free components
• No additional pneumatic, coolant, oil etc. supply feeds required
• Motor-driven crosshead adjustment plus ideal working height for convenient operation
• Safe set-up mode as per EN 60204-1 via speed reduction to 10 mm/s
• Simple manual crosshead locking via hand lever with electrical monitoring
• Long piston-stroke (60 mm) enables wide variety of tests
• Operator-friendly testXpert R testing software with preset controller settings and availability of free controller definition
• Intelligent testing software featuring intuitive operation - testXpert R for dynamic tests and testXpert III for static tests
• Standardized mechanical interface allows flexible use of specimen grips and fixtures over entire dynamic product range

100 kN Vibrophore Materials Testing Machine

Application:
Fatigue tests on timing chains

Key features:
• Vibrophore 100 Two in One materials testing machine, Fmax. 100 kN
• With Vibrophore Two in One option for upgrading to a full-fledged static testing machine
• 100 kN Xforce dynamic load cell with integral accelerometer
• testControl II digital measurement and control electronics with 10 kHz control frequency and 24-bit resolution
• Test device for chains
• testXpert R and testXpert III testing software
ZwickRoell GmbH & Co. KG

Advantages and benefits:
• Full-fledged static and dynamic testing machine with stiff four-column load frame
• Easy to install - no ancillary units or systems (e.g. hydraulics, coolant) needed
• Maintenance free system thanks to wear-free components
• Clamping table at convenient working height for operator-friendly testing
• Remote control with color display showing measurement channels, machine and test status; also used for machine setup
• Easy to operate via testXpert R and testXpert III test programs

25/50 kN Vibrophore Materials Testing Machine

Application:
Fatigue tests on screws

Key features:
• Vibrophore 25/50 Two in One materials testing machine, Fmax. 50 kN
• With Vibrophore Two in One option for upgrading to a full-fledged static testing machine
• Xforce dynamic load cell with integral accelerometer
• testControl II digital measurement and control electronics with 10 kHz control frequency and 24-bit resolution
• Specimen grips for screws
• testXpert R and testXpert III testing software

Advantages and benefits:
• Full-fledged static and dynamic testing machine with stiff four-column load frame
• Easy to install - no ancillary units or systems needed (e.g. hydraulics, coolant)
• Maintenance free system thanks to wear-free components
• Clamping table at convenient working height for operator-friendly testing
• Remote control with color display showing measurement channels, machine and test status; also used for machine setup
• Easy to operate via testXpert R and testXpert III test programs

10 kN Materials Testing Machines
with ‘roboTest R’ Robotic Testing System

Application
Automatic compression tests on foam cubes

Key features
• ‘roboTest R’ robotic testing system
• Z010 10kN materials testing machine with 2 test areas, each with compression platens according to EN 826 / ISO 844 / ISO 3386 / EN 14509
• Magazines for 18 specimen stacks for foam cubes up to 100 x 100 mm
• Automatic cross-section measuring device for foams
• Scale for determination of the weight
• autoEdition 3 automation software

Advantages and benefits
• Higher throughput thanks to autonomous operation by the robotic testing system (also during breaks)
• Absence of subjective influences (body temperature, off-center or skewed insertion, etc.) ensures high reproducibility of test results
• Low per-specimen testing costs — the robotic testing system pays for itself within approx. two years
• Modular design of the robotic testing system allows manual testing whenever required
The main focus in metals testing, in addition to our static testing machines, is on the topics of Optical Strain Measurement, High-Temperature Testing and Nanoin-dentation. This exhibition area is divided into segments for metal forming, heavy plates, long products, and springs. Here you can learn more about the benefits of having ZwickRoell as your turnkey supplier for metals testing.
Proof of capability of universal testing machines using certified reference materials for the tensile test according EN ISO 6892-1

The Institut für Eignungsprüfung is a DAkkS (German Accreditation Body) accredited provider for proficiency tests and an accredited producer of certified reference materials. In the last years the question of proof of capability of a testing machine became more relevant.

What are the questions in detail?
A lab ordered a new / used testing machine. This machine was calibrated by a competent institution. The basis of the proof of capability is therefore given by the corresponding standards.

But some aspects are still unanswered:
Is the complete system, as a combination of machine, software and procedure able to fulfil its function? What is the corresponding measurement uncertainty? How stable works the machine between the calibration intervals? What is / was the exact status of the machine before important tests or in case of controversy?

The following application range is presentable:
- Acceptance tests
- Voting between different laboratories.
- Quality assurance between the calibration intervals
- Proof of stability in QA processes.
- Software validation according to EN ISO 6892, clause A.5.
- Useful completion of calibration.
- Continuous proof of homogeneity in a group of testing labs.

Range of products:
- Steel, different ranges of strength (Rm: 300 – 1,500 MPa).
- Aluminium (Rm: 250 MPa).
- Steel, round specimen (d0 = 10 mm).
- Flat specimen (b0 = 20 mm).
- Special specimen.
Coating Thickness Gauge LEPTOSKOP 2026

Application
Measurement of non-magnetic layers on (ferro)magnetic substrates (EN ISO 2178) and measurement of non-conductive layers on non-magnetic, (electrically) conductive substrates (EN ISO 2360).

Technical Data
Measuring principle: magnetic-inductive (Fe) (EN ISO 2178)
Eddy current (NFe) (EN ISO 2360)
Measuring range: Fe: 0 - 3000 µm
NFe: 0 - 1200 µm
Measurement accuracy: for coatings < 100 µm: 1% of the measured value ± 1,5 µm
for coatings > 100 µm: 1 - 3% of the measured value ± 1 µm
for coatings > 1200 µm: 3 - 5% of the measured value ± 1 µm

Special Features
• Large LC-display (25 mm x 16 mm) with illumination
• Menu-driven, intuitive operation
• Different languages selectable for menu operation
• Extremely low size and weight, ideally suitable for in-situ measurements
• Calibration function for special applications and complicated geometries
• Built-in dual-use probe for both procedures (magnetic-inductive and eddy current)
• Automatic recognition of the substrate material, switch to suitable measuring procedure
• Data interface for PC or printer
• Limit monitoring
• Statistical evaluation (minimum and maximum value, number of measured values, arithmetic mean value, standard deviation)
• Can be used with PC software STATWIN 2002

Coating Thickness Gauge LEPTOSKOP 2042

Application
Measurement of non-magnetic coatings on (ferro)magnetic substrates (EN ISO 2178) and measurement of non-conductive layers on non-magnetic, (electrically) conductive substrates (EN ISO 2360), especially for complicated geometries and testing-problems.

Technical Data
Measuring principle: Magnetic-inductive (Fe) (EN ISO 2178)
Eddy current (NFe) (EN ISO 2360)
Measuring range: 0 - 20000 µm (dependent on probe)
Measuring rate: Up to 2 readings per second
Measurement accuracy: Coating < 100 µm: 1 % of reading +/- 1 µm
Coating > 100 µm: 1..3 % of reading +/- 1 µm
Coating > 1000 µm: 3..5 % of reading +/- 10 µm
Coating > 10000 µm: 5 % of reading +/- 100 µm
Data storage: 9900 measured values in up to 140 batches

Special Features
• Large graphical display 48 mm x 24 mm, illuminated
• Modern, small, lightweight
• Large selection of intelligent probes
• Convenient user-guidance in understandable plaintext
• Individual: 10 user languages selectable
Portable Digital Ultrasonic Flaw Detector

**ECHOGRAPH 1095 Basic**

**Application**
New Portable, digital ultrasonic flaw detector with time corrected gain (TCG) and back wall echo attenuation (BEA) as well as extended memory functions.

**Technical Data**
- **Type of display:** Colour-TFT-LCD, transmissive, with LED display illumination
- **Size of display:** 152,4 x 91,44 mm
- **Time-base range:** 0,5 - 17760 mm steel
- **Sound velocity:** 200 - 15000 m/s in steps of 1 m/s
- **Frequency ranges:** 0.5 – 20 MHz
- **Weight:** 2.0 kg incl. Li-Ion-battery and protection frame
- **Data storage:** Approx. 50,000 report files
- **Outputs:**
  - 8 GB, SD card (2.. 32 GB)
  - Standard VGA connector (D-sub 15 pin)
  - USB interface
  - Level: TTL (5V), low active, ZA = 100Ohm
  - 2 x Lemo 1 Probe connection

**Portable Digital Ultrasonic Flaw Detector ECHOGRAPH 1090**

**Application**
Portable, compact digital ultrasonic flaw detector for testing all sound conductive materials, determination of wall thickness and sound velocity. Data storage and documentation via serial USB-interface.

**Technical Data**
- **Screen type:** Colour-LC-display (400x240 Pixel)
- **Image regeneration:** 50 Hz
- **Time base range:** 2.5 - 4850 mm steel in steps of 0.1 mm
- **Sound velocity:** 100 - 15000 m/s in steps of 1 m/s
- **Pulse repetition frequency:** Max. 1500 Hz
KARL DEUTSCH Prüf- und Messgerätebau GmbH + Co KG

Frequency ranges:  
Low frequency (0.5 – 5.5 MHz)  
High frequency (1.5 - 17 MHz)  
Broadband (0.5 – 31.5 MHz)

Data storage:  
224 data sets incl. a-scan, parameter, time and text

In- and outputs:  
USB interface, VGA (optional), …

Dimensions:  
190 mm x 217 mm x 64 mm (H x W x D) with protection frame

Weight:  
2.0 kg incl. Li-Ion-battery and protection frame

Special Features
- Amplitude evaluation according to DAC, DGS, AWS
- Wallthickness gauge (echo-echo-mode)
- Colour-LC-display, ideal for direct sunlight
- Easy operation, windows menu structure
- Three frequency ranges
- Hardware realisation for both monitors
- Five freely programmable function keys
- Probe data base for up to 99 probes
- Different colour-maps in measurement and menu operation
- Pulse repetition frequency up to 1500 Hz
- On-board Li-Ion-battery for approx. 13 h operation
- Software ECOM 90 for data transfer to PC

Digital Field Strength Meter DEUTROMETER 3873

Application
Measuring of tangential field strength during magnetisation to ensure the values required by specification or by the customers.
Measuring of residual field strength resp. induction (normal component) after demagnetisation to ensure that no chips adhere to the workpiece which disturb a successive machining.

Technical Data
Screen type:  
LCD illuminated

Measuring principle:  
Hall sensor

Measuring range:  
0.0 to 80 kA/m

Accuracy:  
± 0.01 kA/m ± 2% (DC)  
± 0.05 kA/m ± 4% (AC)

Scale:  
mT, A/cm, kA/m, Gauss

Dimensions:  
65 mm x 120 mm x 23 mm (W x H x D)

Weight:  
150 g incl. batteries

Special Features
- Automatic detection of dc or ac field
- No range selection required, each measurement is displayed instantly
- Display: capable of graphical representation and back-illuminated
- Membrane keypad: fluorescent under uv light
- Probes: each with paraffin consistency for oil-based examination
- Maximum value is carried automatically and is always readable
- Audible and visual threshold monitoring
Crack Depth Gauge RMG 4015

Application
Measurement of the depth of vertical and inclined cracks in all magnetic and non-magnetic steels, with limitations for non-ferrous metals as well. After the determination of the crack depth it can be decided if and how the crack should be removed.

Technical Data
- Measuring principle: AC electrical potential drop method
- Measuring range: 0 - 99.9 mm
- Measuring accuracy: depending on material and measuring range
  - Fe: 1 to 15 %
  - NFe: 1 to 25 %
- Reproducibility: ± 0.1 mm (bei Fe)
- Data Storage: 3850 measured values in up to 300 batches

Special Features
- Menu-driven operation
- Multiple point material correction function (up to 300 individual characteristics with up to 20 reference points can be stored in order to adapt measurement to material and geometry)
- Determination of the projected depth of inclined cracks possible with special probe
- Exchangeable contact pins, three different types available
- Data interface (RS 232C) for PC or printer
- Operation with primary cells or rechargeable batteries, built-in charger socket

Ultrasonic Wall Thickness and Sound Velocity Gauge – also for Coated Material ECHOMETER 1076 TC

Application
Determination of wall thickness and sound velocity in nearly all sound-conductive materials – also for coated materials.

Technical Data
- Measuring principle: Time-of-flight measurement with ultrasound
  (transmitter/receiver (T/R) technique: Best method for corroded inner walls)
- Measuring range:
  - Wall thickness measurement through up to 8 mm varnish or plastic coatings: 2 to 28 mm
  - Wall thickness measurement without coating: 0.6 to 400 mm
- Sound velocity: 100 - 19999 m/s
- Display resolution: 0.1/0.01 mm, 0.001 inch resp. 1 m/s
- Data Storage: Up to 9999 readings, can be structured into files with up to 999 readings each
- Housing protection: IP 54
- Size / weight: 131 mm x 81 mm x 32 mm, 250 g

Special Features
- Measurement of wall thickness and sound velocity with one instrument
- Convenient user-guidance in easy to understand clear text
- Variable display modes for optimum adaptation to the measurement task (standard display, difference values, minimum value)
- Automatic recognition of probes
- Built-in calibration standard
- Calibration as well with unknown sound velocity (300 – 19999 m/s)
- Windows®-like storage of readings with convenient file management
• Individual memorization of calibration in the associated files
• Adaptation of sensitivity to the sound damping of different materials
• Graphic representation of the course of readings and quick navigation through the individual readings
• Large, clear graphic display with bright background illumination (50 mm x 27 mm)
• Display illumination with additional coupling control
• Limit indication and monitoring (alarm mode)
• Serial interface for data transfer (RS232C) with printer, PC and caliper
• Data transfer to PC with the PC software iCom
• Shock absorbing protective rubber holster with pop-up stand

Red Dye Penetrant KD-CHECK RDP-1

Application
Detection of surface cracks in ferrous and non-ferrous metals with the penetrant testing method (EN ISO 3452). Testing of plastics also possible after check of suitability before application.

Technical Data
• Red dye penetrant, water and solvent removable
• Approved to EN ISO 3452
• Sensitivity class (EN ISO 3452 Part 2): 2 (high)
• Sensitivity class (DIN 54152 Part 3): 4 (very high)

Special Features
• Usable in accordance with TRGS 614 (Technical regulations for hazardous materials: Restrictions for use of certain Azo-Dyes)
• Free of corrosive ingredients (sulphur, fluorine and chlorine) and may carry the label „Low content of sulphur and halogens“ according to EN ISO 3452 and ASME CODE Sec. V, Art. 6
• Free of FCKW/CKW and other ozone layer depleting substances (OLDS)

Nonaqueous Wet Developer KD-CHECK SD-1

Application
Nonaqueous Wet Developer for the penetrant testing method (EN ISO 3452). Suitable for ferrous and nonferrous metals. Suitability for plastics to be checked before application.

Technical Data
• Approved to DIN EN ISO 3452-2.
• Low sulfur and halogen content according to DIN EN ISO 3452-2 and ASME Code, Section V, Article 6.

Special Features
• Free of FCKW/CKW and other ozone layer depleting substances (OLDS)

Fluorescent Penetrant KD-CHECK FWP-1

Application
Fluorescent Penetrant for the penetrant testing method (EN ISO 3452), water-washable and solvent-removable. Suitable for ferrous and nonferrous metals. Suitability for plastics to be checked before application.
Technical Data
• Approved to DIN EN ISO 3452-2.
• Low sulfur and halogen content according to DIN EN ISO 3452-2 and ASME Code, Section V, Article 6.

Special Features
• Free of FCKW/CKW and other ozone layer depleting substances (OLDS)

UV-LED Lamp 3815

Application
A quantum leap for the generation of mobile UV light used for penetrant and magnetic particle inspection: Instead of conventional glow-discharge bulbs, four light-weight and insensitive high-power UV LEDs with more than 10,000 hours operating time are used. Another white light LED, which is located in the front centre permits to change to white light mode simply by pressing a momentary push button. The lamp is ready to operate immediately after power-on, provides a high UV intensity and a uniform distribution of intensity. The grading into risk class 2 (according to the German standard EM 6) meets the requirements of working safety for a low UV radiation exposure.

Technical Data
Lamp
Weight / length (incl. handle) 1.2 kg / 110 mm
Wavelength 365 nm
LEDs 4 crosswise arranged UV-LEDs and 1 white light LED
UV-Intensity (400 mm distance) 60 W/m²
UV-Illuminated field (400 mm distance) 120 mm Ø
White light intensity 1,500 Lux
Risk class 2 (acc. EM 6)
Protection class IP 65 (EN 60529)
Mains voltage (AC) 80 - 264 V

Rechargeable battery
Capacity 2,700 mAh / 12 V
Housing size (l x w x h) 154 mm x 96 mm x 33 mm
Weight 375 g
Permanent operation 2.25 hours
Charging time approx. 3.5 hours
Special Features
- No UV-B and UV-C radiation
- Long operating time acc. To UV-LED technology (more than 10,000 h power consumption)
- No warm up – ready to operate immediately
- The battery operated lamp can be used in closed containers and vessels
- High intensity (65 W/m²) and a great illuminated field (Ø = 120 mm) in a 40 mm distance
- High UV intensity of 60 W/m² approx. and an illuminated field of 120 mm Ø (in each case at a distance of 400 mm)
- Complies with all conventional standards and guidelines
- Comes in a sturdy carrying case with a detailed instruction manual and quality test certificate

UV LED large area lamp 3846

The multifunctional UV LED large area lamps are ideally suited for stationary use with fluorescent penetrant and magnetic particle testing.

At a glance
- considerably longer service life of the illuminants (life > 10,000 hours) compared to conventional gas discharge lamps
- 20 high-power UV LED’s ensure high UV intensity
- no measurable portion of white light in the UV light
- risk class 2 (according to EM 6)
- selectable UV or white light
- instantly ready to operate
- no hazard by UV B and UV C irradiation (no filter glass required)
- complies with all DGZfP requirements especially with respect to wave length and intensity
- sturdy aluminium housing made from system profile elements
- standard mains unit for power supply of up to two lamps - a mains unit for up to six lamps is available optionally.

Technical data
Weight 7.5 kgs
Size (W x H x D) 662 mm x 224 mm x 65 mm
Power supply via mains unit: input voltage 100 V – 240 V, 50/60 Hz, 55 Watt power consumption
UV intensity ca. 40 W/m² resp. 4000 µW/cm² at a distance of 400 mm
Intensity of white light 2500 Lux approx. at a distance of 400 mm
Illuminated area 650 mm x 260 mm at a distance of 400 mm
Wave length of the UVA irradiation 365 nm

Portable ultrasonic Phased Array Testing Instrument GEKKKO

New portable digital ultrasonic testing instrument for Phased Array, TFM, TOFD and conventional ultrasonic testing techniques
2.5 kN zwickiLine Materials Testing Machine

Application:
Compression test on coil springs

Key features:
- Z2.5 TN materials testing machine, Fmax. 2.5 kN
- Test speed: 0.0005 to 1000 mm/min
- Xforce HP load cell, capacity 2.5 kN incl. load bypass unit from 2.5 kN
- Test instrument for coil springs with spring safety guard

Advantages and benefits:
- Large support width gives the force measurement system high axial and flexural stiffness
- Large overtravel (longer than testing machine braking distance) ensures safety

2.5 kN zwickiLine Materials Testing Machine

Application:
Compression test on coil springs

Key features:
- Z2.5 TN materials testing machine, Fmax. 2.5 kN
- Test speed: 0.0005 to 1000 mm/min
- Includes a precision installation unit and mechanical protection against overload or overtravel
- Compression spring test frame with precision compression platens

Advantages and benefits:
- Compression spring testing device especially for tests on precision springs from 1 to 2500 N (Accuracy class 0.5) or 0.5 to 2500 N
- Parallelism of the precision compression platens (optional with measurement transducer) with no load is max. 1 µm per 10 mm diameter
- Platen have ground surfaces and are demagnetized

2.5 kN zwickiLine Materials Testing Machine

Application:
Tensile test on coil springs

Key features:
- Z2.5 TN materials testing machine, Fmax. 2.5 kN
- Test speed: 0.0005 to 1000 mm/min
- Grips for tensile springs, Fmax 10 kN

Advantages and benefits:
- Simple suspension of the specimen on the suspension bolts freely accessible from the front
- Moving crosshead is driven by a play-free precision ball screw and is guided by a linear guide via two carriages on ball bearings
High-Resolution upright motorized opto-digital microscope
DSX510

Application:
2D and 3D observation

Highlights:
Automatic observation with Best Image Function

IPLEX GL – versatile compact videoscope

Application:
documentation with brilliant and detailed images

Highlights:
4 mm and 6 mm diameter, 2 m to 10 m length

Inspection-Microscope BX53M with documentation system
STREAM

Application:
Digital Materialographie

Highlights:
Datamangement-System, developed for microscopy applications

IPLEX RX – versatile compact videoscope

Application:
documentation with brilliant and detailed images

Highlights:
4 mm and 6 mm diameter, 2 m to 7.5 m length

IPLEX NX - The world smallest articulating videoscope

Application:
documentation with brilliant and detailed images, measurement function

Highlights:
4 mm and 6 mm diameter, 2 m to 7.5 m length and interchangeable scope units

Vanta – Handheld XRF Analyzer

Application:
Non-destructive elemental analysis of materials

Highlights:
Handheld X-Ray Fluorescence
Olympus Deutschland GmbH

**Omniscan MX2 - advanced portable UT Phased Array**

**Application:**
Weld Inspection, CFRP Inspection

**Highlights:**
Portability, Modularity, Colour imaging, Data storage

**Epoch650 – Ultrasonic Flaw Detector**

**Application:**
Material Testing

**Highlights:**
Rugged and compact design, EN12668 certified

**38DLP - Ultrasonic Thickness Gage**

**Application:**
Corrosion and Precision Thickness gaging

**Highlights:**
Dual- and Single Element Transducers

**MagnaMike 8600 - Magnetic Method Precision Thickness gage**

**Application:**
For nonferrous Materials

**Highlights:**
Range: 0-25 mm

**SZX16 – Stereomicroscope**

**Application:**
Quality Insurance

**Highlights:**
Optical Superiority, Versatile Illumination Solutions
## Type ZHVµ-A Fully Automatic Micro Vickers Hardness Tester

**Application:**
- Vickers and Knoop hardness testing to EN ISO 6507, ISO 4545 and ASTM E384 in the micro range (HV0.01 to HV2)
- Automated series and traverse tests in the micro range
- For use in testing laboratories for quality control and for production checks

**Key features:**
- Motorized deadweight load-change
- Motorized 6-compartment turret for up to 4 lenses and up to 2 indenters
- Vickers 136° diamond pyramid indenter; Knoop 172° diamond pyramid indenter
- Lenses options for: 2.5x, 5x, 10x, 20x, 40x, 50x, and 100x magnification
- 1.3 megapixel camera
- Motor-driven x-y cross-table with 3-axis control

**Advantages and benefits:**
- Fully automatic test sequence and evaluation via HD Software
- Auto-measurement, auto-focus, multiple traverse tests with HD SW
- Overview function via automatic image stitching
- Automatic illumination adjustment and shading correction

## Type ZHVµ-M Manual Micro Vickers Hardness Tester

**Application:**
- Vickers and Knoop hardness testing to EN ISO 6507, ISO 4545 and ASTM E384 in the micro range (HV0.01 to HV2)
- Simple hardness tests in the micro range
- For production checks

**Key features:**
- Motorized deadweight load-change
- Motorized 6-compartment turret for up to 4 lenses and up to 2 indenters
- Vickers 136° diamond pyramid indenter and/or Knoop 172° diamond pyramid indenter
- Lenses for 2.5x, 20x, and 50x magnification

**Advantages and benefits:**
- Semi-automatic test sequence and evaluation via a manual measurement microscope
- testXpert III connection for free report generation, standard conversion and database connection
- Conversions into alternative hardness scales
- Tolerance setting
5 kN ZwickiLine Materials Testing Machine

**Application:**
Tensile test on thin wires

**Key features:**
- Z5.0 TN materials testing machine, Fmax. 5 kN
- Test speed: 0.0005 to 600 mm/min
- Screw grips type 8253, Fmax. 1 kN
- videoXtens 1-120 extensometer

**Advantages and benefits:**
- High degree of stiffness at low weights
- Low weight and space-saving installation on a table enables the site of operation/testing to be varied as required
- Specially developed lighting provides high-quality contrast ratios on the specimen at all times, even with varying environmental conditions

50 KN ProLine Materials Testing Machine

**Application:**
Tensile tests on spring steel

**Key features:**
- Z050 TH materials testing machine, Fmax. 50 kN
- Testing speed: 0.0005 to 600 mm/min
- Wedge screw grips type 8406, Fmax. 50 kN

**Advantages and benefits:**
- Attractively priced test solutions for routine and standard applications
- A high standard of comfort and user ergonomics is created in synergy with the test software testXpert III

100 kN AllroundLine Materials Testing Machine

**Application:**
Tensile tests on wire strand and Bowden cable

**Key features:**
- Z100 THW materials testing machine, Fmax. 100 kN
- Test speed: 0.0001 to 1500 mm/min
- Max. return speed: 2500 mm/min
- Hydraulic grips type 8592, Fmax. 100 kN with T-shoe connector
- Grips for steel tire cord to BISFA, type 8397, Fmax. 10 kN
- videoXtens 3-300 extensometer

**Advantages and benefits:**
- High crosshead travel and a wide test area for mounting accessories such as temperature chambers, mounting platforms or customer-specific accessories
- With the optional mounting unit small load cells, grips, tools and testing instruments can be connected quickly and efficiently without the need for exchanging grips
- Easy alignment to the specimen: videoXtens is centrally aligned with the gauge marks via the connection to the crosshead
**100 kN AllroundLine Materials Testing Machine**

**Application:**
Tensile tests round specimen with determination of the Young's modulus

**Key features:**
- Z100 THW materials testing machine, Fmax. 100 kN
- Test speed: 0.0001 to 1500 mm/min
- Max. return speed: 2500 mm/min
- Hydraulic grip type 8594, Fmax. 100 kN
- makroXtens HP extensometer
- transverse strain extensometer

**Advantages and benefits:**
- Position, speed and acceleration control for fast, highly dynamic reaction to rapid changes in specimen properties
- Excellent, reproducible gripping position and alignment of specimen to test axis
- Ideal for tests on specimens sensitive to transverse forces

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**250 kN AllroundLine Materials Testing Machine**

**Application:**
- Centric test area:
  - Tensile test on concrete reinforcement steel
- Lateral test area:
  - Tensile test on lock-woven mesh (weld point)

**Key features:**
- Z250 SNS materials testing machine, Fmax. 250 kN
- Nominal force of lateral test area: 50 kN
- Test speed: 0.00005 to 600 mm/min
- Max. return speed: 1000 mm/min
- Hydraulic grips, type 8594, Fmax. 250 kN
- videoXtens 3-300 extensometer
- Shear test device for tests to DIN EN 1737

**Advantages and benefits:**
- Side test area accommodates numerous applications and requires little space
- Save time and money – no need for retrofitting
- Innovative pattern-recognition algorithm allows virtual gauge marks to be applied to the specimen or gauge marks changed retrospectively and re-calculated (test re-run option)
ELOTEST M2 V3 - Hand-held Eddy Current Test Instrument

Areas of Application:
- New Areas of Application: Measuring of conductivity and layer thickness (Lite Version M2 without Measuring of conductivity and layer thickness)
- Crack detection, determination of the depth of cracks, hardness check, tests for soft spots and the tendency to chill, material mix-up.

Technical Data:
- One-hand operation
- for static and dynamic application
- Frequencies: 10 Hz – 10 MHz
- Dual-frequency inspections with mix
- Operation in 6 languages
- Operation with rotating probes possible
- Adjustable threshold with and without alarm
- Digital display in an impedance plane (x/y display)
- Programmable function key
- Battery operating time: 5 hours
- Weight: 870 g (approx. 1.85lbs)
- Strip-chart recorder mode with a storage capability of up to 5 hours
- Reference parts integrated in the instrument
- 30 storage locations for settings

Special Features:
It is the smallest universal hand-held eddy current test instrument and features x/y signal display with separat amplification, automatic adjustment to other materials or test parts with just the push of a button. It records the test result during a period of up to 5 hours in the strip-chart mode with print-out via an interface.

ELOTEST B300 - Universal Eddy Current Test Instrument

Application:
Preferably for labority und service applications. Especially, if the user need multifrequency or multi-channel work-stations. All documentation can be stored internal.

Interfaces:
parallel printer interface (D-Sub 25), Ethernet (10/100 Mbit/sec; RJ45, 100 Base T), RS232 (D-sub 9) (mouse/PC) VGA, USB-Port

Technical Data:
- Activ-TFT -color display 210 mm (8.4") across.
- 1/2/4 channels, frequeny 10 Hz – 10 MHz simultaneous up to 8-frequency multiplex
- All probe types can be used
- Phase 360° in 0.5° steps, auto-lift off
- Filter LP/HP both 0 Hz resp. 1.3 Hz to 10 kHz in 40 steps
- Data exchange via internet browser
- Complete remote operation e.g. Lab-View or X-Server
- 32/64 MB RAM featuring a minimum 128 MB silicon disk to process and monitor the instrument parameters, the position and measuring data and documentation files
- Linux-operation system
Ultrasonic measurement of hardness depth with P 3121

Area of Application:
Measurement of hardness depth of inductive hardened parts with ultrasonic systems. Application in labortory and in-line.

Technical Data:
- Ultrasonic transmitter and receiver
- Receiver frequency 20 MHz +/- 30 % (-3dB)
- Power supply: 220 V or battery powered 12 V
- MS Windows based user interface
- Complete reporting and documentation features

Special Features:
Fast and exact measurement (approx. 1 sec) of hardness depth (results shown in mm. Reporting and documentation features.

ELOTEST PL500

The ultimate eddy current test instrument for use in the production line.

Faster, higher, stronger – the new family of eddy current test instruments featuring the latest digital signal-processing technology has got what it takes to be the winner in all categories with a very high rate of inspection, very high sensitivity and very high resolution and dynamics!

The ELOTEST PL500 is the first eddy current test instrument of a family that is „specially designed for inline-testing“. It comes in a 19“ industrial housing with 4 HU and may be expanded to 16 channels. With additional racks it may be expanded to up to 256 fully synchronized channels/modules. In addition to the channel modules there are distance compensation, multiplexing and various I/O-modules available.

The focus of the new instrument family is the fully digitized signal processing chain on the NF-side (after demodulation) with an extremely great bandwidth of 100 kHz and ultrafast multiplexing capability featuring a multiplexing rate of 50 kHz (probe to probe featuring up to 64 sensors. At frequencies below 100 kHz a direct digital demodulation is also possible.

Here technology tests the limits of what is possible: the PL500 is the fastest instrument of its class in the market. The full dynamics of 96 dB (digital) across the frequency range from 10 Hz to 12.5 MHz speak for themselves – extreme dynamics and low noise but ensure clear and meaningful eddy current signals. The display is something special, too:

The display of an analog tube is simulated in a digital manner with adjustable persistence and so far unmatched definition and brilliance– simply the best analog display, if it wasn’t digital and thus a low-key combination of traditionally proven and modern technology!

The ELOTEST PL500 facilitates the easy integration into customer systems by supporting current bus-based I/O-concepts (e. g. Profi-Bus).
ELOTEST PL500 Q Sorting channel module

Innovative test instrument of the new PL500-instrument family for sorting. Channel module for the automatic self-learning structural and sorting inspection with up to 8 frequencies.

A sorting module is available for multi-batch and multi-frequency sorting. The module’s self-learning bubble gates automatically adapt to distribution of the good parts. The sorting criteria may be optimized by retroactively adding/removing good/bad parts (RetroTeach). An optional multi-channel mode with automatic determination of the reversal point is available for very fast inspection e. g. of free-falling parts. The sorting may of course be combined with the other PL500-components as needed.

These are the special features of this innovative eddy current inspection system:

- MultiLot – Multi-batch multi-frequency sorting with
- RetroTeach – Retroactive modification of the sorting criteria by adding/removing good/bad parts.
- FastSort – Fast multi-channel sorting that determines the reversal point for free-falling parts.
- Sort’n Crack - Simultaneous sorting and crack detection in random combinations.

Elotest M3 - Handy eddy with 5.7 „display

Application:
Crack Inspection, Hardness testing, material mix, conductivity and coating thickness measurement

Technical specifications:
- Static and dynamic testing
- Frequency range 10Hz to 12MHz
- Two frequency test with Mix
- Operation in 6 languages
- Rotating probe testing is possible
- Adjustable error threshold with or without alarm
- Signal display in the impedance plane (x / y-Darstlg.)
- Battery 4.5 hours / charging time 1,5 hours (80%)
- 99 User Settings
- . 32 latches including test parameters and logging
- Long-term recording possible from 20 seconds to 24 hours

Special features:
Handy 2-frequency eddy with great flexibility for a variety of applications

Elotest IS500 - Full digital Eddy for industrial use

Application:
- Crack detection, microstructure testing, error compensation, multiplex mode, sorting channel module
- More batches structural and screening inspection, Late teaching

Technical specifications:
- Fully digital 2-channel Wirbelstroprüfgerät
- Simultaneous display of 8 signals possible
- Frequency range 10Hz to 12MHz
GOLLUB GmbH & Co. KG + CNS UG

- Error compensation (optional)
- Parameter Multiplex (optional)
- Sensor Multiplex (optional)
- Fast Sort - Options for sorting tasks (optional)
- Integration possible in all kinds of controls
- Available in 19 „version or as a box version

Special features:
Digital eddy for crack detection and / or multi-frequency testing of materials directly in the production line

Elotest PL600 - Pioneering eddy of the latest generation

Application:
Suitable for all types of eddy current testing; Crack detection, heat treatment testing, material mix, Grinding burn, harmonic analysis

Technical specifications:
- Modular construction with licensing system
- Solid spare parts - and service concept
- 16 slots for function modules (plug-in cards of PL500 are compatible)
- Widescreen Color TFT Display
- HDMI output
- Frequency range from 10Hz to 12MHz
- Measurement and control of the sensor current
- Ongoing monitoring of the transmitter coil
- Two input channels per module
- Low noise and multiplex capable preamplifier
- Distance prior compensation without supplementary channel (option „Advance“)
- Versatile realtime Auswerteschwellen depending on application and license
- Connection of external multiplexer with up to 64 sensors per channel
- Intelligent Trigger All input for processing various trigger signals
- Central high speed I / O processor integrates
- Configurable I / O functions
- Remote control via Touchpanal, PC client or custom software

Special features:
Application-specific user interfaces for ease of use,
Highest test reliability through comprehensive system and sensor monitoring,
Full integration with extensive I / O capabilities with field bus connection
Modular construction enables flexible expansion with the best serviceability

FAST SORT

„FastSort“ - the ultrafast single frequency sorting (up to 200 parts per SECOND !!!) with reversal point determining the operating mode „fast single-frequency sorting“ (FastSort) is the microstructure or material identification testing at moving test piece with comprehensive absolute coils or absolute scanning probes. In contrast to the multi-frequency sorting inspection, it is not necessary here, the test piece to stop the sensor, since is not checked, multi-band time division multiplexed in a row. the turning point of the XY signal is FastSort In the operating mode by means of two parts detection thresholds determined. At this point, the test object fills the Growler maximum of, or has the shortest distance to the probe transducer. Only this point is evaluated and compared with up to 4 thresholds. So each test object is tested at a reproducible position. When set correctly, the test is largely independent of the speed of a single part (number of parts per time interval).
EMDC - Contactless distance control to 15mm shape deviation
(Electro-Mechanic Distance Control) on cam or forgings

The EMDC technology Rohmann even difficult inspection tasks solve, for example in:
• Non-circular test pieces
• Test parts with complex geometries
• Concentricity problems

The distance between the sensor test piece is electro-mechanically controlled and offers a:
• Consistently high test sensitivity even with non-circular and bad centrable parts and
• An almost perfect compensation even with large changes in distance

Rohmann EMDC is designed to meet demanding tests in the fully automated eddy current testing. Bundled with our digital instruments ELOTEST IS500 and ELOTEST PL500 an integrated distance control is implemented, that holds the sensor throughout the test at a constant nominal distance from the sample surface.

The model EMDC-15 has a control range of up to 15 mm and a maximum control bandwidth of 500 Hz. Ultralight replaceable sensors in carbon tube can be optimized to meet inspection back. The control of the EMDC-15 completely by plug-in card in ELOTEST tester, parameterisation is fully integrated in the device software and is done through the GUI. Control signals for integration into automatic test are provided via the IO-card of the tester available.

An integrated in the control electronics safety circuit pulls the sensor back quickly when a selectable minimum distance is undershot.

Dovetail guides on all three sides allow flexible installation in the testing machine.
FLEXI TEST - Flexible 2-axis eddy current testing machine - vertically or horizontally clamped test piece

This compact and modular system bridges the gap between a handheld device and a fully automatic testing system.

The operator or the automatic handling inserts the test part. After pressing the start button of the automated test sequence begins: The spindle offset the test piece in rotation and a probe moves by two interpolating propelled servo axes along the Prüfteil. The lateral surface is scanned following in one or more areas, including along the contour. Then stop the spindle, the servo axes return to starting position. The sorting result is indicated by optical and audible signal, and the operator or the linked handling system removes and sorts the tested part.

- Countertop, weight 30 kg, terminal 100 - 230 V, integrated PLC, spindle speed 60-600 min⁻¹ (adjustable), axis feed 1-100 mm/s (optional faster)
- Test pieces up to diameter max. 50 mm, length max. 120 mm
- Buildable Within minutes of new process and new test positions
- Available variants for voltage of the test (quick change system)
- Mandrel for placing the test pieces
- Tailstock (manual or motorized) for clamping between centers and for centering
- Supporting prism or bezel
- Examples of other options
- Footswitch connection to automation
- Direct integration Rohmann tester - ELOTEST IS3, IS500, PL500 etc.
Amsler Rotary Bending Machine (ARBM)

**Application:**
Rotating bar bending fatigue test on metallic round specimens as per DIN 50113, ISO1143-2010 and GB/T 4337-2008

**Key features:**
- Rotary bending machine for bending moments from 2.5 Nm to 120 Nm
- Rotational speed steplessly adjustable up to 5000 rpm
- Angle of rotation up to 7°
- Deadweights for application of bending moment in variable steps
- Specimen diameter 2 to 20 mm
- Constant bending moment over test length

**Advantages and benefits:**
- Simple design makes the rotatory bending machine a commercially attractive entry into fatigue testing
- Rotating bar bending fatigue test enables fast, easy, cost-effective fatigue testing
- Fast, easy set-up

ZwickRoell GmbH & Co. KG
059
HBM’s modular QuantumX data acquisition system comprises an extensive range of amplifiers and specialized modules. It is the ideal choice for typical test and measurement systems used for the testing of functionality, durability, overload behavior, efficiency, life, wear, and temperature behavior. QuantumX acquires mechanical, electrical and thermal quantities such as force, torque, displacement, acceleration, rotational speed, pressure, temperatures, voltage, current, etc. The amplifiers’ compact size makes them the first choice for test benches where space is very limited.

Every amplifier is a small, standalone measuring system and can be expanded with additional modules and synchronized to suit any application. In addition to amplifiers providing universal inputs, specialized modules for highly dynamic signals, strain, and temperature or CANbus are available. Gateway modules enable acquired quantities to be output in real time, for example, analog, CAN signal or EtherCAT. With the new QuantumX data recorder (also with WiFi) measurement data can be collected, evaluated and stored without a PC connection. An extensive range of transducer technologies is supported: bridge circuits (strain-gage or inductive half and full bridges), voltage, current, thermocouples, resistance thermometers, as well as frequency or pulse counting. Transducers featuring innovative TEDS technology are automatically identified by QuantumX upon connection. Transducers without TEDS functionality are easily configured via the expandable sensor database.

Since processes are becoming faster and faster, as for example in dynamic and fatigue testing of materials, the force measurand changes very greatly over time. This „dynamic condition“ thus requires a corresponding frequency response from the measurement chain that represents the force independently of the frequency in which it occurs. As the result of elaborate optimization measures for digital filter functions in the context of a research program, the MX410B module, a four-channel universal amplifier of the QuantumX DAQ series, meets these requirements, making it suitable for dynamic calibration.

Digital measuring system MGCplus

MGCplus is a modular amplifier system with plug-in cards for universal applications in industry, in the laboratory and the research field. The MGCplus is expandable up to 128 channels in one 19" housing. To measure dynamic and static quantities, the measuring system is offering independent sampling rates, thus reducing noticeably the amount of data to be transmitted. The ML70 computing module gives you the option to process your measurement data in real time and make your computing results available to other systems over a wide choice of connections. The module uses programs based on the international standard PLC language IEC61131-3.

Specifications

• Accuracy class: 0.0025/0.03
• Menu-controlled transducer adaptation for easy device operation
• Definable function keys
• Display resolution: 1 000 000 digit
• Self-reliant carrier frequency and DC amplifiers for all usual types of transducers: strain gauge, inductive piezoelectric and piezoresistive transducers, potentiometers, thermocouples, DC voltage and DC current
• 19200 values/s per channel, synchronous daq (20 bit)
• Up to 128 channels in one 19” housing
• Simultaneous and parallel measurement with all channels
• Each unit: 2 analogue outputs, 4 limit value switches, 2 peak value buffers, 8 remote control
Measurement software catman®AP

catman®AP is an integrated software package for acquiring, visualizing, and analyzing measurement data from HBM that has several new modules to enhance the easy-to-use catman®Easy base module. EasyMath, EasyPlan, EasyLog, EasyScript, AutoSequence, and video analysis are all included in the software.

EasyMath provides many mathematical functions for evaluating measurement data while EasyPlan simplifies the preparation of measurement tasks without having to connect an amplifier. EasyLog is used with the MGCplus amplifier system to automatically save measurement data to a Flash card or hard disk and EasyScript creates customized scripts for individual measurement tasks. Each of these new modules allows the software to be quickly and easily programmed for special solutions with customized functions.

The advantage of the AutoSequence module is that all the steps in a measurement sequence, including data evaluation, can be easily automated. Function blocks that are organized graphically define recurring measurement and analysis steps. This readily understood method allows customized solutions, for example for function test benches, to be found without requiring any programming knowledge.

The video analysis enables measurement data to be visualized synchronously with video sequences that are recorded at the same time. The cursor visualizes and controls the current video sequence in the measurement data. Any time offset between video and data can be graphically corrected.

Vibration-proof force transducer U10M

The U10M force transducer from HBM is constructed according to the „pancake“ system. This design combines a number of advantages: low overall height, high vibration load capacity, and excellent overload capability.

The U10M offers additional advantages: The force transducer is made entirely of rustless materials (aluminum or stainless steel). In addition to its outstanding mechanical properties, it is therefore extremely sturdy, even under harsh ambient conditions. U10Ms are available with nominal forces of from 1.25 kN to 500 kN. In addition to standard versions, which are available very quickly, force transducers can also be configured to specific requests. This also allows for calibration at 200% of the nominal load for static applications with a high output signal of up to 4 m/V. A version equipped with two Wheatstone bridges is also available to supply two measuring systems with one transducer. Of course TEDS (Transducer Electronic Data Sheet) is also optionally available. Plug variants can also be selected or mechanical plug protection can be ordered.

Another special feature is bending moment alignment. This is performed mechanically with conventional pancakes. The process is electrical for the U10M, so that in cases where a force transducer has two Wheatstone bridges (double bridge) both measuring bridges are adjusted to compensate for bending moments. The U10M is hermetically welded with a nominal force of 12.5 kN and up.
Werkstoff Service GmbH located in Essen (Germany) has its professional main focus in the division of materials, material testing, heat treatment and material engineering as well as conventional rail and rolling stock.

**Our offer of services:**

- certified advanced training on destructive and non-destructive testing
- material testing by our accredited test laboratory
- failure analysis, consulting services, expert reports and audits by our accredited inspection body
- approval of non-destructive test methods and test techniques in conventional rail and rolling stock
- maintenance by our technical appropriated body (Fachlich zuständige Stelle) of DIN 27201-7
More information

www.zwickroell.com/metals
### Materials Testing Machine 100 kN, AllroundLine

**Application:**
Tensile test at ambient and high temperature up to +1,200 °C

**Essential Characteristics:**
- Z100 TEW materials testing machine, Fmax 100 kN
- Test speed 0.0001 to 1500 mm/min
- Max. positioning and return speed 2500 mm/min
- High-temperature furnace with three heating zones +200 °C to +1,200 °C
- Non-contacting extensometer laserXtens 2-120 HP/TZ

**Advantages and Benefits:**
- No mechanical influences on the specimen with optical measurement
- The intelligent control algorithms minimize the controller parameterization and ensure a standards-compliant sample temperature without overshooting

### Kappa 50 LA-Spring lever-arm creep-testing machine (patented)

**Application:**
High-temperature tensile creep test up to +1,150 °C

**Essential Characteristics:**
- Strain and force controlled applications
- Load 50kN; load range class 1: 250N ... 50kN
- Temperature range up to +1,150 °C
- For creep tests of more than 10,000 h

**Advantages and Benefits:**
- Multiple test options: relaxation tests, definition of individual stepless sequences of load and temperature, tests with constant load and intermediate intervals (only with spring loaded system)
- High stiffness, precision and durability by 4-column-design
- No friction, no wear and homogeneous loading
- Patented lever arm bearing with wear free, elastic hinges
- Use of worldwide proven software and hardware components from ZwickRoell
- Precise and automated high-temperature-controller for large temperature range

**Accessories:**
- Contacting high-temperature extensometer up to 1,200 °C for accurate measurement of axial strain with two digital gauges
- Conversion kit to Kappa LA-Dead Weight

### Kappa 50 SS-CF electro-mechanical creep-testing machine (patented)

**Application:**
Thermo-mechanical fatigue test with induction heating unit

**Essential Characteristics:**
- Load frame Kappa 50 SS-CF, Load cell Fmax 50 kN
- Strain and force controlled applications (closed loop)
ZwickRoell AG - Messphysik Materials Testing GmbH

- Hydraulic grips for cyclic through-zero tests
- Temperature range from 50 °C up to 900 °C
- Induction heating unit 10 kW in cooperation with exhibitor i ew
- Heating rate 0,1 °C/sec. … 25 °C/sec.
- Contacting high-temperature side entry extensometer

Advantages and Benefits:
- Synchronized force and temperature load
- Simple, safe, reliable operation of entire system via testXpert III
- Fast and controlled heating and cooling rates
- Active cooling ramps with air cooling
- Local and direct heat input to specimen
- Less temperature load on specimen grips
- Specimen temperature measurement with thermocouples or pyrometer (thermography)
- Tests according to European Code-of-Practice for thermo-mechanical tests and ASTM E 2368

Kappa 50 SS electro-mechanical creep-testing machine

Application:
High-temperature creep crack growth (CCG) test up to +1,150 °C - determination of load line deflection and crack length

Essential Characteristics:
- Strain and force controlled applications (closed loop)
- Load 50 kN, load range in class 1: 100N … 50 kN
- Test speed: 0,001 …100 mm/min
- Temperature range: +200 °C … +1,150 °C
- For creep tests up to 10,000 h

Advantages and Benefits:
- Highest flexibility in use: creep and creep fatigue tests, relaxation tests, definition of individual stepless sequences of load and temperature, tests with constant load and cyclic intervals
- Creep fatigue tests (tensile/tensile)
- Central screw design for ideal alignment
- High axial and lateral stiffness by 4-column-design
- Use of worldwide proven soft- and hardware components from ZwickRoell
- Precise and automated high-temperature-controller for large temperature range

Accessories:
- Rod-in-tube extensometer for measurement of load line deflection of CT-specimen
- DCPD-System for measurement of crack growth of CT specimen
- Electrically insulated ceramic-coated pull rods

Kappa 100 DS electro-mechanical creep-testing machine

Application:
Creep test for hydrogen embrittlement evaluation according to ASTM F 519

Essential Characteristics:
- Four specimens in series in one testing axis
- Step loading functionality according to ASTM F 519 (block loading)
- Load 100 kN, load range in class 1: 200N … 100kN
- Temperature range: ambient temperature
- Suitable for creep tests up to 10,000 h
ZwickRoell AG - Messphysik Materials Testing GmbH

Advantages and Benefits:
• High stiffness, precision and flexibility by 4-columns-design
• Precise axial alignment according to ASTM E 292 by precision crosshead guiding and special seating of load train
• High resolution crosshead resolver and high resolution load channel permit excellent control characteristics
• Large crosshead travel allows machine to accommodate a wide range of specimens and tests
• Use of worldwide proven soft- and hardware components from ZwickRoell
• Tensile test according to ASTM E8 for determination of Notch Fracture Strength (NFS) with the same testing machine possible

Accessories:
Safety shield to protect the operator from specimen remains that may be projected out of the test area
TTH10 incl. PLC sequence control integrated in a testing machine of ZwickRoell to simulate a hot tensile test of electrical conductive specimen with forced air cooling for defined heating and cooling processes.

TTH10 (TIP THERM INDUCTION HEATING UNIT)
The induction heating unit TTH10 consists of two components, the high frequency generator and the stationary heating station with the corresponding inductor. The TTH10 has been designed with state of the art semiconductor technology and therefore enables an optimal overall efficiency of the unit. The generator automatically selects the resonance frequency for any inductor and thereby always achieves maximum output.

Generator
- TTH10 HF-output: 10kW
- Total input power: 12kVA
- Power supply 3 x 400 V/N+PE 32A, 50-60 Hz
- Internal control voltage 230 V/N AC 50-60 Hz
- Amount of heating stations 1 (stationary)
- Power-on time 100% (= continuous operation)
- Frequency 70 kHz to 450 kHz
- Dimensions [W x H x D] 450 x 150 x 650 mm
- Dimensions [W x H x D] with handles 450 x 150 x 690 mm
- Weight approx. 20 kg

Heating station
- Dimensions [W x H x D] 230 x 230 x 400 mm
- Mounting holes [W1 x D1] 180 x 380 mm
- Inductor level h 110 (± 5mm)
- Connecting system inductor [a x b] 4 x M6, 30 x 30 mm
- Weight approx. 25 kg

PLC-Automatic sequence control
The automatic sequence control of the iew GmbH enables you to realize induction heating processes with up to 100 different programs (10 in quick dial) with an alphanumeric input of the program name as well as the corresponding temperature profiles (set temperature, ramp rate, hold time, etc.). The automatic sequence control consists of a 7" TFT-Touch-Panel where the desired parameters can be set up. But this PLC is not only suitable for fully automated production facilities but also for small and manual workplaces where peripheral devices such as hoist cylinders and magnetic valves should be activated.

The advantages at a glance
- contact-free heating method
- low space requirements
- high efficiency
- exact temperature control
ARAMIS: Optical 3D Deformation Analysis

Task
Non contact measurement of 3D deformations (3D displacements and strains) in material testing and testing of components

Applications
• Deformation analysis under mechanical and thermal load of specimens
• Measurement of material parameters
• Verification of finite element calculations

Features
• Non contact and non invasive
• Point-based and full-field results
• Adaptation to any testing machine
• Easy to use
• Useful also at extreme specimen temperatures (-100°C…1500°C)
• High accuracy and spacial resolution
• Import of FE data / tomography data and full-field comparison
• Vibration analysis
• Positioning of components

ARAMIS FLC: Optical 3D Deformation Analysis

Task
Non contact measurement of 3D deformations (3D displacements and strains) adapted to sheet metal testing machine (BUP)

Applications
• Deformation analysis under mechanical and thermal load of specimens
• Forming-Limit-Curve (FLC) by ISO-12004
• Yield curve from bulge test

Features
• Non contact and non invasive
• Full field results
• Adaptation to any testing machine
• Easy to use
• High accuracy and spacial resolution

ARGUS: Optical sheet metal forming measuring system

Task
Measurement of deformations on metal sheet in the stamping process

Applications
• Failure analysis in the stamping process
• Verification of numerical simulations in sheet metal forming
• Support of the try out process on dies
• Determination of forming limit curves and diagrams (FLD)
Features
• Full field results
• Easy to use
• High reproducibility
• High accuracy and spacial resolution

ATOS: Optical 3D Digitizing

Task
Non contact and full field measurement (3D Digitizing) on any objects (styling models, dies, sheet metal parts, mould injection parts, etc.)

Applications
• Reverse Engineering
• Quality control, Inspection
• Rapid Prototyping, Milling

Features
• Full field results
• Non contact measurement
• Fast data acquisition
• High accuracy and lateral density of data
• Mobile system
• ATOS ScanBox as a fully automated system variant

TRITOP: Optical 3D Coordinate Measurement

Task
Fast, non contact measurement of 3D point coordinates on any objects (styling models, dies, sheet metal parts, mould injection parts, etc.)

Applications
• 3D coordinate measurement
• Deformation analysis
• Quality control, inspection
• Measurement of contours and hole patterns

Features
• Non contact measurement
• Fast data acquisition
• High accuracy and spacial resolution
• Flexible and exceptionally mobile system
ZwickRoell GmbH & Co. KG

069 600 kN Sheet Metal Testing Machine

Application
Testing the ductility of sheet metals - forming limit curve (FLC) to ISO 12004

Key features
• BUP 600 sheet metal testing machine with testControl II electronics
• Covers all established sheet-metal testing standards (e.g. EN ISO 20482, EN 1669)
• Testing effects of surface treatments, coatings and lubricants
• Maximum punching and clamping force 600 kN
• Deep drawing speed 1000 mm/min
• Ram stroke 120 mm
• Stepless electronic adjustment of clamping force and deep drawing speed via proportional valves

Advantages and benefits
• Triple safety concept for risk-free operation
• Easy operation - illuminated push-buttons guide the operator intuitively through the test sequence
• Low piston-actuator friction, proportional valve technology and non-contact digital travel sensor positioned centrally enable accurate measurement recording and outstanding reproducibility
• Position-controlled deep drawing speed

070 200 kN Sheet Metal Testing Machine

Application
Hole expansion test on metal sheets to ISO 16630 with optical detection of the crack and subsequent evaluation

Key features
• BUP 200 sheet metal testing machine with testControl II electronics
• Covers all established sheet-metal testing standards (e.g. EN ISO 20482, EN 1669)
• Testing effects of surface treatments, coatings and lubricants
• Maximum punching and clamping force 275 kN
• Deep drawing speed 1200 mm/min
• Ram stroke 80 mm
• Stepless electronic adjustment of clamping force and deep drawing speed via proportional valves

Advantages and benefits
• videoXtens delivers reliable test results free without operator influence
• Innovative testControl II with 500Hz measured-value acquisition-rate for high data transmission rate, together with 24-bit resolution and 2-channel safety circuit
• Position-controlled deep drawing speed
• Two-handed operation for opening and closing tool head - no risk of accident due to tool head falling through accidental jolt
250 kN AllroundLine Materials Testing Machine

Application:
Tensile test on high-strength steel to ISO 6892-1

Key features:
• Z250 SN materials testing machine, Fmax. 250 kN
• Test speed: 0.00005 to 600 mm/min
• Max. return speed: 1000 mm/min
• Hydraulic grips, type 8589, Fmax. 250 kN
• laserXtens 7-220 HP extensometer

Advantages and benefits:
• Robust component dimensioning and precise crosshead guidance ensure high degree of machine stiffness and prevent undesired mechanical influences on the specimen
• Non-contact and mark-free length measurement
• Also suitable for short clamping lengths (limiting factor is the maximum permitted surface pressure of 1000 N/mm² on the gripped surfaces) thanks to gripping principle (patent application filed)

100 kN AllroundLine Materials Testing Machine

Application:
3 Point flexure test to company standard Daimler PAPP PWT 4104, VDA 238-100

Key features:
• Z100 THW materials testing machine, Fmax. 100 kN
• Testing speed: 0.0001 to 1500 mm/min
• Max. return speed: 2500 mm/min
• 3-point flexure test kit for Daimler PAPP PWT
• videoXtens 1-120 extensometer

Advantages and benefits:
• High crosshead travel and a wide test area for mounting accessories such as temperature chambers, mounting platforms or customer specific accessories
• Compact optical system for easy testing without specimen contact
• videoXtens has no effect on material characteristic values

100 kN AllroundLine Materials Testing Machine

Application:
Tensile test on welded steel sheets

Key features:
• Z100 THW materials testing machine, Fmax. 100 kN
• Testing speed: 0.0001 to 1500 mm/min
• Max. return speed: 2500 mm/min
• Hydraulic grips type 8802, Fmax. 100 kN
• videoXtens extensometer
Advantages and benefits:
• A bellows cover integrated in the guide profile protects the lead screws and guide even against large amounts of fibrous remains, slivers and dust
• Hydraulic grips type 8802 are single actuating and thus can be used for both symmetrical and asymmetrical gripping of specimens
• Entire test can be observed on the monitor. Also the video sequence can be stored for subsequent usage

074 100 kN AllroundLine Materials Testing Machine

Application:
Tensile test on aluminum sheets

Key features:
• Z100 THW materials testing machine, Fmax. 100 kN
• Testing speed: 0.0001 to 1500 mm/min
• Max. return speed: 2500 mm/min
• Wedge screw grips type 8506, Fmax. 100 kN
• makroXtens HP extensometer
• videoXtens transverse strain extensometer

Advantages and benefits:
• T-slots enable simple fitting of accessories (with no obstruction of the moving crosshead)
• Jaws can be easily changed without requiring any tools
• No specimen marking is required - videoXtens uses a sophisticated edge-detection algorithm

075 50 KN ProLine Materials Testing Machine

Application:
Tensile tests on aluminum sheets

Key features:
• Z050 TN materials testing machine, Fmax. 50 kN
• Testing speed: 0.0005 to 600 mm/min
• Body over wedge grips, type 8404, Fmax. 50 kN
• ProLine makroXtens extensometer

Advantages and benefits:
• High resolution extensometer
• Attractively priced test solutions for routine and standard applications

076 50 kN ProLine Materials Testing Machine

Application:
Tensile tests on thin steel sheets

Key features:
• Z050 TN materials testing machine, Fmax. 50 kN
• Testing speed: 0.0005 to 600 mm/min
• Wedge grips type 8402, Fmax. 50 kN
• Clip-on extensometer 5025-1
ZwickRoell GmbH & Co. KG

Advantages and benefits:
- A high standard of comfort and user ergonomics is created in synergy with the test software testXpert II
- Attractively priced test solutions for routine and standard applications
- Cost-effective but highly precise extensometer for determining strain in metals

500 N zwicxiLine Materials Testing Machine 077

Application:
Tensile test on metal foil

Key features:
- Z0.5 TN materials testing machine, Fmax. 500 N
- Test speed: 0.0005 to 2000 mm/min
- Screw grips, type 8133, Fmax. 1 kN
- videoXtens 1-120 extensometer

Advantages and benefits:
- High degree of stiffness at low weights
- A prestressed spring disk induces automatic retightening in smaller areas. Specimens with lower thickness reduction can also be gripped securely over the course of the entire test. Specially developed lighting provides high-quality contrast ratios on the specimen at all times, even with varying environmental conditions
Indentec Hardness Testing Machines Limited

078 Type ZHR8150SK Rockwell Hardness Tester with automatic multiple specimen testing system

Application:
Automated testing system for Rockwell and superficial Rockwell test methods to EN ISO 6508 and ASTM E18, incorporating an automated sample feeding system for testing up to 36 samples. Shape and size of samples can vary to suit customer specific requirements.

Key features:
• Stand-alone hardness testing instrument, integrated into a sample feeding system for up to 36 samples
• Able to test using any 1 of the 30 Rockwell and superficial Rockwell test methods
• Friction free load application for guaranteed long term test stability
• Depth measurement system with 10 nm resolution
• Rockwell 120° diamond indenter and Rockwell 1/16” carbide ball indenter
• Systems can be configured to suit specific customer samples
• Supplied with a special diamond anvil to guarantee compliance when testing thin samples.

Advantages and benefits:
• Automated sample feeding system, once the samples have been loaded onto the rotary fixture, there is no requirement for operator input
• Touch-screen operation with Windows imbedded operating system
• Intelligent software programmed to suit customer’s testing requirements
• Statistical analysis of results will determine the number of tests per sample
• Samples of different material and thickness can be tested together. The control system is able to store hardness results against specific samples
• Compliant with CE safety requirements
• System enclosed in a CE compliant safety cage to provide protection for the users

079 Type ZHU250CL-S Universal Hardness tester

Application:
Universal hardness tester offering Rockwell, superficial Rockwell, Vickers, Knoop and Brinell testing - capability to relevant ISO and ASTM standards

Key features:
• The innovative system of the force application enables a significantly low signal to noise ratio in comparison to conventional load cells and provides an extremely wide test load range from 0.5 kg to 250 kg
• The unique 4-plus-4’ turret provides enough space for up to four indenters and four lenses at the same time. Change your test method in the software with a single click
• Supplied with full UKAS certification for the instrument, indenters and test blocks
• Manufactured in the UK within an ISO 17025:2005 Quality Assurance system
• Compliant with all relevant ISO, ASTM and Nadcap requirements

Advantages and benefits:
• Intuitive operation via touch screen
• Automatic indentation measurement with shadow correction eliminates operator influence during determination of hardness values
• Ability to perform automatic case depth determinations and welded sample investigations, Option to design bespoke component fixturing
Type ZHR8150CLK Rockwell Hardness Tester with closed loop technology

Application:
- Rockwell hardness tests for classical Rockwell method (HRA, HRB, HRC) and superficial Rockwell to EN ISO 6508 and ASTM E18 for testing metal samples
- Rockwell hardness tests for carbon and graphite materials to DIN 51917

Key features:
- Stand-alone hardness tester with closed loop force application
- Depth measurement system with 10 nm resolution
- For tests on a batch of specimens, the unique automatic sequence system saves a significant amount of time.

Advantages and benefits:
- One instrument for all indentation test methods on metal samples
- High precision direct force and indentation depth calibration guarantees excellent test result reproducibility
- testXpert III connection for free report generation, standard conversion and database connection

Type ZHR4150LK Rockwell Hardness Tester

Application:
Rockwell hardness tests for classical Rockwell method (HRA, HRB, HRC) and superficial Rockwell to EN ISO 6508 and ASTM E18 for testing metal samples

Key features:
- Stand-alone hardness tester with deadweights and friction free load application
- Depth measurement system with 10 nm resolution
- Rockwell 120° diamond cone indenter, Rockwell 1/16” hardened steel ball indenter
- 70 mm diameter support table for flat specimens
- V test table for round specimens

Advantages and benefits:
- Special indenter carrier for testing at difficult-to-access points
- Easy to operate
- Automatic test sequence and evaluation
- testXpert III connection for free report generation, standard conversion and database connection
MarSurf M 400

Applications
Mobile Surface Measuring Station in measuring room and/or production area

- On shafts, housing components, large machines
- In automotive engineering
- On large workpieces
- On milled and turned parts
- On ground and honed workpieces
- At the production site on the machine for fast testing of roughness depth, waviness and profile parameter of the workpiece in or on the machine
- Can be expanded to a small measuring station in the workshop with the measuring stand

Features:
- Free tracing with high precision probe system
- Fast probe change due to magnetic probe arm holder
- Protection for damage
- Flexible movement due to cable-free Bluetooth connection
- Mobile use due to operation with power supply or storage battery
- International up to date due to all common parameters as per ISO, JIS, ASME, many integrated languages

MarSurf XR 1

Applications
- PC-based mobile surface measuring station
- The MarSurf XR 1 combines mobile surface metrology with the advantages of a MarWin evaluation software. This means, for a roughness or waviness measurement, a simple all-in-one PC as well as the suitable drive unit suffice. Depending upon the customer’s needs, laptops or industrial PCs can also be implemented.
- On shafts, housing components, large machines
- In automotive engineering
- On large workpieces
- On milled and turned parts
- On ground and honed workpieces
- At the production site on the machine for fast testing of roughness depth, waviness and profile parameter of the workpiece in or on the machine
- Can be expanded to a small measuring station in the workshop with the measuring stand

Features:
- Over 80 parameters selectable for R, P, W profile as per current standards ISO/JIS or MOTIF (ISO 12085) Comprehensive recording records
- Quick and Easy measuring programs can be quickly created in the teach-in procedure
- Automatic function for the standardized selection of cutoff and probe length (patented)
- Support of different calibration methods (static and dynamic) with specificaiton of the parameter Ra or Rz
- Band-pass filter Ls according to current standard, LS can also be switched off or freely varied
MarForm MMQ100

Portable measuring instrument for assessing form and location deviations as per DIN ISO 1101, more easy and more accurate thanks to EasyForm software

Applications:
- Satisfies most form analysis situations
- Roundness (also in a sector)
- Flatness (out of one circle)
- Concentricity
- Coaxiality
- Radial run-out
- Axial run-out
- Circular parallelism of top and bottom faces
- Harmonic Analysis

Features:
- Simplest to use roundness gage on the market
- Touch Screen user interface
- No keyboard or mouse required
- Precise and fast measurement results
- Mobile due to its low weight and convenient size
- Fast workpiece alignment thanks to computer support
- Centering and tilting screws for rough and fine adjustment
- Suitable for use in workshop since no compressed air connection is required
- Encoders in X and Z feed position directly to the sw
## Materials testing

GMA-Werkstoffprüfung GmbH is a certified and accredited testing service company with 30 years of expertise in materials testing and quality assurance. GMA offers testing services in line with approvals of goods receipt, quality assurance, damage analysis and individual requests. Additionally to quality assurance in manufacturing and along the production chain, our testing services include metal as well as CFRP and GFRP parts.

**GMA-Testing Portfolio:**
- Non-Destructive Materials Testing: Ultrasonic, surface crack, x-ray or eddy current testing, etc.
- Destructive Materials Testing: Mechanical-technological testing, physical-chemical testing, materialographic testing (picture analysis, light microscopy) and analysis, sample preparation as well as damage analysis etc.
- Advanced NDT: Mechanical ultrasonic testing (ToFD, Phased Array, Guided Waves, IRIS, LSI), acoustic emission testing and tank inspection also according to EEMUA 159
Pneumatic Cutting Press 7108

Application:
Cutting press are used to manufacture specimens from rubber, elastomers, foam rubber, plastic foils, and paper with a hardness up to 85 Shore A (according to ISO 868). The primary specimen shape classifications are as follows:
- Rectangular specimen
- Dumbbell specimen
- Round specimen
- Special specimen

Technical Data:
- Max compressive force: 35 kN
- Max distance between cutting table and push-rod: 93 mm
- Projection: 110 mm
- Cutting table: 350 x 215 mm
- Compressed air supply: 6 bar
- Dimensions: 350 x 450 x 650 mm (width x depth x height)
- Weight: 75 kg

Special Features:
- Specimen production in accordance with standards
- Can be used flexibly for different materials with hardness up to 85 Shore A
- Easy operation
- High operational safety due to integrated ejector system
- Long tool lifetime
- Two-handed operation with a safety interlock

High Precision CNC Measuring Microscope for CT-Specimens, Impact Test Specimens & other complex components for material testing

Application:
The Measuring Microscope delivers high precision repeatable measurement of CT Specimens, Impact Test Specimens & complex components of all materials. The 3-axis-CNC-control is realized via servomotors and joystick and can be used for automatic measurement of multiple complex components.

Technical Data:
- Measuring Range X-, Y-Axis: 250 x 170 mm
- Length Deviation: 1.9µm + L/100 (L in mm)
- Measuring Range Z-Axis: 200 mm
- Camera: USB 25 images/s 1,3 megapixels
- Object Lens: Fixed lens / Zoom lens 0,7x-4,5x motorized
- Magnification: 35x – 225x
- Field of view: 9mm – 1,5mm
- Surface Light: 4 segment LED ring light (optional coaxial surface light)
- Transmitted Light: LED (optional telecentric)
- Positioning: Laserpointer
- Max. Table Load Capacity: max. 20 kg
- Included in Delivery: 23" touchscreen PC, keyboard, mouse, calibration certificate, instruction manual
Cooling Thermostat

Application:
Bath cooling thermostats enable the most accurate temperature control of specimens.

Technical Data:
- Operating temperature range: -40...200°C
- Heating power: 1.5 kW
- Cooling power at 100°C: 0.7 kW
- Cooling power at -40°C: 0.03 kW
- Bath volume: 5 l
- Width bath opening W x D / bath depth: 120 x 110 / 150 mm
- Power supply requirement: 230V

Hardness Tester Pusey & Jones

Application:
It serves for determination of the penetration depth and elasticity on rubber and rubberlike materials, such as rubber rollers and standard blocks made of rubber with a minimum material thickness of 13 mm, as well as paper rollers. The hardness tester works according to ISO 7267-3 and ASTM D 531.

Technical Data:
- Indentor: Ball Ø 3.175 mm
- Total force: 9.8 N
- Loading weight: 1000 +/- 2g
- Reading of the measured values (in Pusey & Jones): 0-300, 1 Wert = 0.01mm
- Net weight: 3.30 kg
- Dimensions: 250 x 90 x 130mm (h x w x d)
Hall plan Metal A5

123
400 kN Materials Testing Machine with ‘roboTest L’ Robotic Testing System

Application
Automatic tensile tests on metals to ISO 6892-1

Key features
• New-generation ZwickRoell automation software, autoEdition 3
• 400 kN materials testing machine Z400E
• makro HP extensometer
• videoXtens transverse strain extensometer
• ‘roboTest L’ robotic testing system
• Total magazine capacity 160 specimens
• Automatic cross-section measuring device
• 2D code reader for specimen identification

Customer advantages and benefits
• New autoEdition 3 software includes various Industry 4.0 functions.
• autoEdition 3 enables flexible integration into customer’s network regardless of operating system.
• Integrated traceability and expanded user management make testing system safe and secure in use.
• Robotic testing system requires no supervision (e.g. during breaks), allowing high specimen throughput.
• Subjective influences (hand temperature/moisture, off-center or angled specimen insertion etc.) are eliminated for high test-result reproducibility.
• Low per-specimen testing costs - robotic testing system covers costs within approximately two years.
• Modular design of the robotic testing system allows manual testing whenever required.

250 kN Materials Testing Machine with ‘roboTest L’ Robotic Testing System

Application
Automatic tensile tests on metals to ISO 6892-1

Key features
• autoEdition 3 new-generation ZwickRoell automation software
• 250 kN Z250SR materials testing machine
• makro HP extensometer
• videoXtens transverse strain extensometer
• ‘roboTest L’ robotic testing system
• Magazine capacity for up to 160 specimens
• Automatic cross-section measuring device

Advantages and benefits
• New autoEdition 3 automation software includes various Industry 4.0 functions.
• autoEdition 3 enables flexible integration into customer’s network regardless of operating system.
• Integrated traceability and expanded user management for safe and efficient use of the testing system.
• Higher throughput thanks to autonomous operation by the robotic testing system (also during breaks).
• Absence of subjective influences (body temperature, body moisture, off-center or skewed insertion, etc.) ensures high reproducibility of test results.
ZwickRoell GmbH & Co. KG

- Low per-specimen testing costs — the robotic testing system pays for itself within approx. two years
- Modular design of the robotic testing system allows manual testing whenever required

CMU30 automatic stand-alone cross-section measurement device with software for distribution of dimensional data

Application
Determination of thickness and width of flat specimens

Key features
- Color touch-panel for operation and for displaying measured values; includes language swapping
- Direct import of measured values to testXpert II
- Optionally available CMUshare deployment software makes measured values for any desired number of testing machines within the network available
- Manual width centering, automatic thickness centering
- Including reference block
- Connection via RS232 interface
- For specimens with the following dimensions:
  - shoulder width max. 40 mm
  - parallel length min. 60 mm
  - specimen length min. 100 mm
- Thickness measurement data
  - measuring range 0.2 to 30 mm
  - resolution < 0.1 µm
- Width measurement data
  - measuring range 6 to 40 mm
  - resolution < 0.1 µm

Customer advantages and benefits
- Accurate: two measuring transducers each for thickness and width (differential measurement method) deliver correct and precise measured values.
- Repeatable: periodic comparative measurements with a measurement standard guarantee repeatable results.
- Reproducible: centering spigots and an automatic measuring sequence ensure repeatable results free from operator influence.
- Traceable: in conjunction with CMUshare deployment software, specimens can be identified from their barcodes / 2D codes for error-free result assignment.

CMU80 Automatic Stand-Alone Cross-Section Measuring Device with Software for Distribution of Dimensional Data

Application
Determination of thickness and width of dimensionally stable flat and round specimens

Key features
- Color touch-panel for operation and for displaying measured values; includes language swapping
- Direct import of measured values to testXpert III
- Automatic sequence for single or triple measurement
- Optionally available CMUshare deployment software enables measured values to be available for any required number of testing machines within the network
Advantages and Benefits
- Accurate: Two measuring transducers each for thickness and width, which follow a differential method, provide correct and precise measured values
- Repeatable: Periodic comparative measurements with a strain-gauged alignment transducer guarantee repeatable results
- Reproducible: Centering and an automatic measurement sequence ensure repeatable results without operator influence
- Traceable: Together with the CMUshare software, specimens can be identified by their barcodes/2D codes and results are assigned without the risk of errors.

1200 kN Materials Testing Machine with Side Test Area

Application
Tensile tests on metal specimens to EN ISO 6892-1

Key features
- Z1200ES 1200kN materials testing machine with side test area
- 1200 kN and 300 kN load cells
- Test speed 0.00005 to 400 mm/min at full load, return speed 520 mm/min
- testControl II digital measurement and control electronics
- testXpert III testing software
- Hydraulically operated double-acting 1200 kN specimen grips
- Hydraulically operated double-acting 300 kN specimen grips
- makroXtens II HP extensometer with shift unit

Advantages and benefits
- Additional side test-area reduces the need for reconfiguration and re-equipping, saving costs
- testXpert III’s intelligent System Configuration Builder concept reduces setup times and increases productivity
- Shift unit allows extensometer to be used in both test areas
600 kN Materials Testing Machine

Application
- Tensile tests on pipes and pipe-sections according to EN ISO 6892-1
- Compression tests on pipes

Key features
- Z600E 600 kN materials testing machine
- 600 kN load cell
- Test speed from 0.00005 to 400 mm/min under full load
- Return speed 520 mm/min
- testControl II digital measurement and control electronics
- testXpert III testing software
- Hydraulically operated double-acting 600 kN specimen grips
- Special jaws for larger extensometer gauge lengths
- makroXtens HP extensometer

Advantages and benefits
- Large measurement range also allows precise determination of low test loads with no need to re-equip the testing machine
- Safe gripping of pipe specimens due to double-sided clamping and adjustable gripping pressure
- Convenient setup and control of test sequence via remote control independent of computer

Pendulum Impact Tester, RKP 450

Application:
Determination of notch impact or tensile impact strength; Charpy impact tests (ISO 148, (EN 10045), ASTM E 23)

Key features:
- 450 Joule instrumented pendulum hammer
- Digital and analog display
- Automatic lifting unit (electric motor drive)
- Height-adjustable pendulum hammer
- Safety device

Advantages and benefits:
- Safe impact testing in accordance with EN954-1, Category 3 requirements
- Stable, reliable test results up to 750 joules notched impact energy
- Charpy, Izod, Brugger tests, tensile impact tests and wedge impact tests to all current DIN, EN, ASTM, ISO and BS standards
- Reduced operating costs thanks to four way-reversible anvils
- Workflow-optimized operation through centrally arranged operating elements
ZHU250 Universal Hardness Tester

Application:
- Universal classical hardness tester (with focusing screen) for production checks, goods inwards checks and laboratory testing
- Universal range of application for all standardized hardness test methods in the 5 N to 2500 N load-range
- Vickers, Knoop, Brinell and Rockwell hardness testing and ball-indentation hardness to EN ISO 6507; ISO 4545, EN ISO 6506, EN ISO 6508 and ISO 2039

Key features:
- Motorized positioning of indenter and lens
- Classical interchangeable lenses with fixed magnification
- Rockwell 120° diamond cone indenter
- Vickers 136° diamond pyramid indenter
- Brinell 2.5 mm hardened steel ball indenter
- Lenses for 90x and 185x magnification

Advantages and benefits:
- Intuitive operation
- Focusing screen with integrated digital caliper system
- Large test area (250x300 mm)
- testXpert III connection for free report generation, standard revaluation and database connection
Type ZHU250CL-S Universal Hardness Tester

Application:
Universal hardness tester offering Rockwell, superficial Rockwell, Vickers, Knoop and Brinell testing - capability to relevant ISO and ASTM standards

Key features:
- The innovative system of the force application enables a significantly low signal to noise ratio in comparison to conventional load cells and provides an extremely wide test load range from 0.5 kg to 250 kg
- The unique 4-plus-4’ turret provides enough space for up to four indenters and four lenses at the same time. Change your test method in the software with a single click
- Supplied with full UKAS certification for the instrument, indenters and test blocks
- Manufactured in the UK within an ISO 17025:2005 Quality Assurance system
- Compliant with all relevant ISO, ASTM and Nadcap requirements

Advantages and benefits:
- Intuitive operation via touch screen
- Automatic indentation measurement with shadow correction eliminates operator influence during determination of hardness values
- Ability to perform automatic case depth determinations and welded sample investigations, Option to design bespoke component fixturing

Type ZHV30-A Fully Automatic Vickers Hardness Tester

Application:
- Vickers and Knoop hardness testing to EN ISO 6507, ISO 4545 and ASTM E 384 (HV0.2 to HV30)
- Automated series and traverse tests in the micro and macro range
- For use in testing laboratories for quality control and for production checks

Key features:
- Motorized deadweight load-change
- Motorized 5-compartment turret for up to 4 lenses and 1 indenter
- Vickers 136° diamond pyramid indenter; Knoop 172° diamond pyramid indenter
- Lenses options for: 2.5x, 5x, 10x, 20x, 40x, 50x, and 100x magnification
- 1.3 megapixel camera
- Motor-driven x-y cross-table with 3-axis control

Advantages and benefits:
- Fully automatic test sequence and evaluation via HD Software
- Auto-measurement, auto-focus, multiple traverse tests with HD SW
- Overview function via automatic image stitching
- Automatic illumination adjustment and shading correction
- Option for automatic testing of etched surfaces (weld seams)
Type ZHR8150SK Rockwell Hardness Tester with automatic triple axis Jominy fixture

Application:
Production-oriented Rockwell hardness tester for classical Rockwell method (HRA, HRB, HRC) to EN ISO 6508 and ASTM E18

Key features:
• Stand-alone hardness tester with deadweights
• Depth measurement system with 10 nm resolution
• Rockwell 120° diamond cone indenter, Rockwell 1/16” carbide ball indenter
• Automatic triple axis Jominy system

Advantages and benefits:
• Rockwell hardness tester for traverse testing: Pre-programmed to ISO and ASTM standards or for up to 100 user defined test traverse patterns
• Touch-screen operation
• Firmware with expanded functions for statistical evaluations
ZwickRoell has developed a wide range of specimen grips and accessories specifically for the textile industry, which are easy to change according to application. In this exhibition area we will present these solutions and show how they can support you in achieving reliable test results and reducing test times.
Our center offers a textile learning factory of the future.

The factory is a central location to deliver capability building in a real-life demonstration and learning environment as well as a test base for piloting and scaling-up new digital solutions. We are offering management workshops for managers and technicians across all industries who are responsible for operations. Our aim is to support your company during your digital transformation to increase productivity and efficiency.
ZwickRoell GmbH & Co. KG

1 kN zwickiLine Materials Testing Machine

Application:
Tensile tests on elastic cloth tape

Key features:
• Z1.0 TN materials testing machine, Fmax. 1 kN
• Test speed: 0.0005 to 2000 mm/min
• Grips, type 8275 for loop specimens (C-clamp), Fmax 500 N
• Pneumatic grips type 8195, Fmax 1 kN

Advantages and benefits:
• Fast, easy gripping of specimen into the specimen support
• Workflow is structured from left to right and the icons are expressive, making navigation fast and easy.

50 kN AllroundLine Materials Testing Machine

Application:
Tensile tests on seat belts

Key features:
• Z050 TH materials testing machine, Fmax. 50 kN
• Testing speed: 0.0005 to 600 mm/min
• Max. return speed: 1000 mm/min
• Roller grips, type 8464, Fmax. 50 kN
• lightXtens 2-1000 extensometer

Advantages and benefits:
• Specimens can be easily inserted into the gripping area, which is easily accessible from the front.
• Gripping force is generated by self-gripping via multiple looping around the specimen
• Automatic determination of initial gauge-length, with transmission to testXpert testing software III
• Reliable automatic identification of gauge marks
• Tracking of gauge marks and transmission of all data to testXpert III testing software

100 kN AllroundLine Materials Testing Machine

Application:
Tensile tests on geotextiles

Key features:
• Z100 SN materials testing machine, Fmax. 100 kN
• Test speed: 0.00005 to 1000 mm/min
• Max. return speed: 1500 mm/min
• Hydraulic grips, type 8493, Fmax. 100 kN
• videoXtens 1-120 extensometer

Advantages and benefits:
• Large force/measurement range and a comprehensive range of accessories encompass a wide spectrum of applications
• Operator safety combined with rapid positioning when inserting the specimen via a special work panel and positioning telescope rails into the gripping area.
• Ideal test system for technical textiles and geotextiles in conjunction with a non-contact optical extensometer
Materials Testing Machine 10 kN, ProLine

Application:
Tensile tests on various textiles

Key features:
- Z010 TN materials testing machine, Fmax. 10 kN
- Test speed: 0.0005 to 1000 mm/min
- Pneumatic grips, type 8397, Fmax 10 kN
- Pneumatic grips, type 8197, Fmax 1 kN
- Pair of grips for textile tire cords, type 8297, 2.5 kN

Advantages and benefits:
- Unique System Configuration Builder makes it possible to define reproducible test conditions and offers maximum safety for the user and testing system
- All system configuration parameters are loaded automatically for the corresponding application
- Connected sensors are automatically checked and the test can be started only if parameters match the requirements
A3 - Tested for Life

What options does the zwickiLine testing machine offer for testing applications from our everyday lives? Discover more about our solutions, from electronics to packaging materials to food products. Learn more about the benefits of high-performance, space-saving testing machines.
101 1 kN zwickiLine Materials Testing Machine

**Application:**
Tensile tests on stuffed animals

**Key features:**
- Z1.0 TN materials testing machine, Fmax. 1 kN
- Test speed: 0.0005 to 2000 mm/min
- Screw grips, type 8133, Fmax 1 kN

**Advantages and benefits:**
- Wide application range from plastics and elastomer testing to paper, cardboard, textile, foam materials, and food testing as well as components testing
- Adjustable opposing jaw enables off-center specimen gripping, allowing asymmetrical specimens to be held also

2.5 kN zwickiLine Materials Testing Machine

**Application:**
Puncture tests on pacifiers

**Key features:**
- Z2.5 TN materials testing machine, Fmax. 2.5 kN
- Test speed: 0.0005 to 1000 mm/min
- Screw grips, type 8133, Fmax 1 kN
- Test fixture for pacifiers (EN 1400, 5.3 and 5.4)

**Advantages and benefits:**
- Simple and straightforward structure of the intuitive testXpert III interface mirrors a lab’s work processes
- Workflow is structured from left to right and the icons are expressive, making navigation fast and easy

103 1 kN zwickiLine Materials Testing Machine

**Application:**
Tensile tests on CEE 7/7 plugs

**Key features:**
- Z1.0 TN materials testing machine, Fmax. 1 kN
- Test speed: 0.0005 to 2000 mm/min
- Screw grips type 8133, Fmax 1 kN
- Mold jaws, steel for receiving a Schucko plug
- Toolbox, T-slotted base plate

**Advantages and benefits:**
- Adjustable opposing jaw enables off-center specimen gripping, allowing asymmetrical specimens to be held also
- All test-relevant settings can be made using the intelligent wizard, which shows the user which test parameters must still be configured
**500 N zwickiLine Materials Testing Machine**

**Application:**
Tensile tests on tab fasteners

**Key features:**
- Z0.5 TN materials testing machine, Fmax. 500 N
- Test speed: 0.0005 to 2000 mm/min
- Toolbox, T-slotted base plate
- Parallel vice
- Testing fixture for opening tab fasteners

**Advantages and benefits:**
- Wide application spectrum from plastics and elastomer testing to paper, cardboard, textile, foam materials, and food testing as well as components testing
- testXpert III provides traceable results that cannot be manipulated

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**2.5 kN zwickiLine Materials Testing Machine**

**Application:**
Tensile tests on guitar strings

**Key features:**
- Z2.5 TN materials testing machine, Fmax. 2.5 kN
- Test speed: 0.0005 to 1000 mm/min
- Grips, type 8375 for tensile springs, Fmax 10 kN
- I/O module for analog and digital signal processing

**Advantages and benefits:**
- Digital technology drive system features a high control range
- Position, speed and acceleration control for fast, highly dynamic reaction to rapid changes in specimen properties
- Graphical Sequence Editor is ideal for testing components, for use in research and anywhere where complex, individually tailored test sequences need to be reproduced
- In/Out measurement module has a high resolution analog 0-10 V measurement input whose signals can be used for control purposes

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**500 N zwickiLine Materials Testing Machine**

**Application:**
Viscosity tests on smoothies

**Key features:**
- Z0.5 TN materials testing machine, Fmax. 500 N
- Test speed: 0.0005 to 2000 mm/min
- Back extrusion cell
- Interlocked safety guard

**Advantages and benefits:**
- Interlocked safety guard can be moved clear of working area when changing to large devices, leaving entire test area available
- Wide application range from plastics and elastomer testing to paper, cardboard, textile, foam materials, and food testing as well as components testing
ZwickRoell GmbH & Co. KG

2.5 kN zwickiLine Materials Testing Machine

Application:
- Upper test area:
  - Compression tests on Smartphone Displays
- Lower test area:
  - Flexure tests on Smartphone Displays

Key features:
- Z2.5 TS materials testing machine, Fmax. 2.5 kN
- Test speed: 0.0005 to 1000 mm/min
- Compression test kit
- Flexure test kit

Advantages and benefits:
- In/Out measurement module is used to connect a variety of test arrangements with several digital inputs/outputs and analog outputs to the testControl II machine electronics
- In/Out measurement module has a high resolution analog 0-10 V measurement input that can be used for the time synchronized measurement of conditioned signals, such as strain gauges
- Simple and straightforward structure of the intuitive testXpert III interface mirrors a lab’s work processes

1 kN zwickiLine Materials Testing Machine

Application:
Compression tests on Lego Mindstorm

Key features:
- Z1.0 TS materials testing machine, Fmax. 1 kN
- Test speed: 0.0005 to 2000 mm/min
- Screw grips type 8253, Fmax 2.5 kN
- Compression die

Advantages and benefits:
- Various test arrangements with several digital and analog inputs/outputs can be connected to the testControl II machine electronics via the multifunction module
- Together with the shielded cables, the SCB-68 provides a robust signal connection that produces a very small amount of noise.
- Simple and straightforward structure of the intuitive testXpert III interface mirrors a lab’s work processes
The ‘ZwickRoell Junior’ division was established in 1995 to provide training in an appealing and realistic setting.

What is ZwickRoell Junior?

Around 70 highly motivated young people enthusiastically undergoing training or following a course of study at ZwickRoell.

In this independently run division, all the commercial activities of a ‘full-sized’ company are carried out on a smaller scale. This helps to provide a better understanding of business management processes and relationships within the company.

Individual products available include:

- models of testing machines in different types
- business card case
- napkin rings
- candlesticks
- memo tree
- pinboard
- Nine Men’s Morris, Peg Solitaire, Ludo; Super Six and different types of puzzle
- rings
- picture ladder
- bottle-holders + bottle-openers
- metal birds (large or small)

Visit our Online Shop at www.zwickjunior.de.
A3 - Building Materials
Toni Technik Baustoffprüfsysteme GmbH

110 ToniZEM

300 kN Compression testing machine with controller ToniTROL II and test software testXpert III

Application:
Testing for compressive strength of cement and other binders according to international standards.

Main Features:
- closed looped controlled, fully automatic test procedure
- compact design
- easy and user-friendly operation

Advantages and Benefits for the customer:
- very good value for money
- document-safe test results with testXpert III
- accurate testing with high availability and reliability
- state-of-the-art safety standards

111 ToniPRAX

300/20 kN Compression and bending test plant with controller ToniTROL II and test software testXpert III

Application:
Testing for compressive and flexural strength of cement and other binders according to international standards.

Main Features:
- closed looped controlled, fully automatic test procedure
- upgradable with all relevant additional applications; Elastic Modulus; deformation control;
  connection of additional load frames for further applications possible, e.g. concrete testing

Advantages and Benefits for the customer:
- customers, e.g. from the cement industry, are able to modify this system over a long period of
time in case of changing market requirements
- cost effective investment, reliability through the extensive possibility of application enhancements
- accurate testing with high availability and reliability
- optimized ergonomics
- state-of-the-art safety standards

112 ToniCON

2000 kN Concrete compression test machine with strain-cylinder ball seat design according EN 12390 Part 4 with controller ToniTROL II and test software testXpert III

Application:
Testing for compressive strength of concrete for the quality monitoring preferably acc. ASTM standard with different ball seat.

Main Features:
- closed looped controlled, fully automatic test procedure
- compact design
- easy and user-friendly operation
Advantages and Benefits for the customer:

- very good value for money
- document-safe test results with testXpert III
- accurate testing with high availability and reliability
- by the strain-cylinder ball seat design this machine can be used to test according to EN & ASTM standard up to 2000 kN
- state-of-the-art safety standards

ToniNORM

300 kN Universal bending test plant with accessories for testing fiber reinforced concrete and video capturing

Application:
Determination of the equivalent bending test according all relevant standards with deflection or crack mouth opening control on slotted beams according EN 13412, Procedure 1 and 2, as well as other international standards.

Main Features:
- Load-, displacement- and deformation-controlled fully automatic test procedures
- Extremely rigid load frame for sophisticated control after initial fracture of the sample
- Video capturing by camera of the complete test procedure in testXpert III

Advantages and Benefits for the customer:
- relevant test procedures are preset in testXpert III
- international standards can be adapted by usage of additional relevant accessories
- fully automatic testing procedure
- flexible system for further subsequent enhancements to adapt other or new test procedures at any time

ToniVIB Model 5543

Closed-loop vibrating table for the professional sample consolidation with improved electronic for easier parameterization and touch screen

Application:
For the quality control a reproducible consolidation of cement is mandatory to avoid high standard deviations when testing for final strength caused by the sample preparation procedure.

Main Features:
- digital control by touchscreen and display for frequency, amplitude, acceleration and elapsed time
- closed-loop control to confirm the preset test parameters with fast MEMS sensor technology
- database with storable test sequences/operators and individual parameterization
- compliant to standard DIN EN 196-1 and ASTM C109

Advantages and Benefits for the customer:
- the built-in control and regulation electronics generates clearly reproducible test conditions for the compaction of cement samples acc. EN 196-1 and ASTM C109 through the elimination of external influences related to local power supply sources
- State-of-the-Art technology for the highest grade of reproducible consolidation results and therefore lower scattering of measured final strength values
Toni Performance Units

Laboratory furniture for the rational and ergonomic sample preparation and testing of physical properties with integrated performance units in the professional laboratory for testing building materials.

Application:
The continuously repeated working steps during the sample preparation in the building materials laboratory require high standards for the planning, execution, as well as for the durability of the installed components.

Main Features:
- individual planning according customers’ requirements
- integrated functions like sedimentation tanks and sample storage, etc.
- extreme durability through optimal corrosion protection
- expandable over many years in the same design with laboratory extensions

Advantages and Benefits for the customer:
- high efficiency in the repetitive work processes
- safety of work by ergonomic planned working stations
- durability with minimum maintenance effort

ToniMIX Visco -EXPERT -

Automatic, freely programmable mortar mixer with integrated viscosity measurement function, individual water dosage system, speed adjustment and intuitive menu navigation with touch screen operation.

Application:
In addition to the standard mixtures, the mixing requirements are increasing enormously due to highly-specialized formulations of construction chemistry and admixtures. These formulations for example for lightweight additives such as foam glass or expanded clay, special additives, and others require in the course of development and production monitoring, material-specific mixing sequences, which can be stored and reproducibly repeated with this mixer.

Main Features:
- freely programmable in the mixing sequences, speed and water dosage
- integrated control system for automatic water dosing to achieve a specific final viscosity
- robust high quality design for professional use

Advantages and Benefits for the customer:
- reproducible mixing conditions due to stored automatic sequences
- maximum availability and reproducibility due to high quality and durability
- preset standard mixing procedures (EN/ASTM)

ToniMIX 6224 Standard

The reliable standard mixer is now equipped with modern electronics and a redesigned user interface. The mixer masters the standard compliant test procedures according to the relevant EN and ASTM standards. The menu navigation now takes place via a touch screen operation.

Application:
For the sample preparation of mortar prisms according to EN 196, Part 1, ISO 679, ASTM C 305 and other standards.
Toni Technik Baustoffprüfsysteme GmbH

Main Features:
• clear program selection via touch screen
• manually adjustable amount of water according to EN or ASTM standard
• robust high quality design for continuous use

Advantages and Benefits for the customer:
• reproducible mixing conditions due to stored automatic sequences
• maximum availability and reproducibility due to high quality and durability
• preset standard mixing procedures (EN/ASTM) in order to use this type of mixer for preparing mortar samples according to both standards by a simple integrated switch

ToniCAL HEXA - with new software: ToniCAL DCA-Analytics

6-station online calorimeter for the quantitative determination of the heat of hydration of cement and other binders.

Application:
In many binders and concrete applications, the quantity of hydration heat and the heat dissipation over time play the decisive role for the construction progress and thus the cost-effectiveness. For this, exact knowledge about these parameters is required, which can be determined by the various Toni Technik calorimeters at the highest level of quality.

Main Features:
• all 6 measuring stations with integrated feature of internal mixing can be operated individually and are located in a common temperature block which allows to test under standard laboratory conditions
• for each measuring station a module for the after-injection can be used to exactly monitor and determine the effects of chemical admixtures (e.g. retarder and accelerator) during the current hydration process

Advantages and Benefits for the customer:
• visualization of the hydration energy in a J/g vs time diagram with interpolation function to reduce the necessary test time
• very high accuracy by possibility of mixing components in the inside of the tempered calorimeter vessel (Initial Peak determination)
• older ToniCAL models can be updated with the new ToniCAL DCA-Analytics software
• data from previous TT software versions can easily be transferred to the new software database
• sophisticated analysis functions for further interpretation of the recorded data

ToniLIME

Automatic free lime analyzer for cement and clinker

Application:
In the cement processing industry, the free lime value of the clinker and cements represents an important characteristic, e.g. soundness, setting time. With this instrument, the free lime value can be determined in the application laboratory easily and reliable with a minimum effort of time and work.

Main Features:
• automatic test procedure with reproducible test conditions
• very quickly available results
• measuring of the conductivity of the dissolved sample, no handling of critical chemicals as by the wet chemical method
120 ToniCHAT

Automatic Le Chatelier water bath for the determination of the soundness acc. EN 196-3 (microprocessor-controlled water bath)

Application:
For the reliable measurement of the soundness of cement an exact compliance with the standard requirements is mandatory. The ToniCHAT confirms reproducible results through its automatic and microprocessor controlled test processing.

Main Features:
- exact and standard compliant sequence control system
- high quality level testing with high availability and reliability

Advantages and Benefits for the customer:
- safe and ergonomic sample handling
- minimal personnel efforts
- exact reproducible test conditions and thus test results

121 ToniPERM STANDARD

Automatic Blaine device for the determination of the grinding fineness/specific surface acc. EN 196-6 and ASTM C204

Application:
The grinding fineness of cement and other materials plays an essential role in the production process and requires regular monitoring. The standard provides a manual method for the air permeability measurement.

Main Features:
- automatic and exact standard compliant test setup
- database with storage function for repeatable test procedures

Advantages and Benefits for the customer:
- less personnel effort in comparison to the manual method
- reproducible test results
- documentation and storage of test parameters for a long period of time
- automatic export of the test parameters and results to an existing LIMS
Toni Technik Baustoffprüfsysteme GmbH

ToniPERM II

The new Blaine device „System Dyckerhoff“ for the determination of the grinding fineness/specific surface following the requirements of EN 196-6 and ASTM C204

Application:
The grinding fineness of cement and other materials plays an essential role in the production process and requires regular monitoring. This device has been developed especially for users who want to determine reliable and reproducible measuring results parallel to the production process using simple means and without individual testing knowledge.

Main Features:
• fully automatic test procedure
• touchscreen with maximum overview and intuitive operation
• automatic determination of the mean value from two separately prepared samples in one procedure
• second measuring cell is part of the standard delivery scope

Advantages and Benefits for the customer:
• easy sample preparation by weighing in gr instead origins of mg
• very low standard deviation by minimized errors during the sample preparation
• ensured test preparation by means of the possibility to correct the height of the sample volume bed (automatic calculation of the correct sample volume)
• simple and safe automatic calibration with reference material
• Data export function via USB
• optimized ergonomics
• simple and user friendly operation

ToniSET EXPERT

Automatic 12-station Vicat unit for the determination of the setting time of cement, gypsum, mortar and other binders according to international standards like EN 196-3, EN 13279-2, EN 480-2, ASTM C187 and ASTM C191.

Application:
In the cement testing, the determination of the setting time is a central characteristic value, according to standard it is a manual test. With a variety of multi-station automatic Vicat devices from Toni Technik, the personnel costs can be significantly reduced and the complete time intensive evaluation can be automated.

Main Features:
• fully automatic operation with needle cleaning device and drying function (for gypsum)
• preset test procedures for specific cement types, minimum need for data input
• digital capture of the relevant test parameters with data base function and export possibility (LIMS)

Advantages and Benefits for the customer:
• reproducible test results with smallest possible personnel expenses
• the conduction of tests according different standards can be quickly and safely realized by simple adjustment of test settings
• autonomous determination of test results during non-working hours
• automatic evaluation of all desired characteristic test parameters by means of VicatDB software
**ToniSET CLASSIC**

Automatic 8-station Vicat unit for the determination of the setting time of cement or gypsum according to standards like EN 196-3 and EN 13279-2

**Main Additional Features:**
- especially optimized for the testing of cement

**Additional Advantages and Benefits for the customer:**
- compact design
- very good value for money

**ToniSET COMPACT**

Automatic 6-station Vicat unit for the determination of the setting time of cement and gypsum according standards like EN 196-3, EN 13279-2, ASTM C191 and ASTM C472

**Main Additional Features:**
- small space requirement

**Additional Advantages and Benefits for the customer:**
- very good value for money

**ToniSET ONE/TWO**

Automatic 1- or 2-station Vicat unit for the determination of the setting time of cement, gypsum or mortar according to all relevant international standards like EN 196-3, EN 13279-2, EN 480-2, ASTM C187 and ASTM C191.

**Main Additional Features:**
- independent temperature control +/-3°C of room temperature, adjustable +/-0.1°C

**Additional Advantages and Benefits for the customer:**
- exact standard compliant test conditions with integrated thermostat compensating e.g. lab temperature changes
- quick change between applications for cement, gypsum or mortar through simple exchange of the falling rod and needle

**ToniVICAT „tempcontrol“**

The new ToniSET temperature control unit is designed for use with all Toni Technik Vicat devices, especially when monitoring and compliance with standard conditions is required, and is intended as an alternative to the available cryostats, which have been proven to be successful over many years on our devices, in cases where the requested temperature range exceeds the standard requirements.

**Main Additional Features:**
- independent temperature control +/-5°C of room temperature, adjustable +/-0.1°C
- exact standard-compliant test conditions

**Additional Advantages and Benefits for the customer:**
- very good value for money
Hosokawa Alpine AG

Air jet sieve e200LS
Smarte control – perfect results

Hosokawa Alpine developed air jet sieving and introduced the first air jet sieve on to the market 60 years ago. Each new device generation sets a milestone with the ALPINE new standards for particle size measurement.

The air jet sieve is now the device in most widespread use throughout the world for determining particle size distribution for production monitoring and quality assurance according to DIN EN ISO 9001 as well as for validation and documentation of trials in the analytical laboratory. The ALPINE air jet sieve is prescribed as test equipment in the factory standards in companies all over the world. Numerous standards, including international norms, stipulate the device for specific products.
A4 - Plastics

More information

www.zwickroell.com/plastics

Central themes for tests on plastics and rubber on our static testing machines include Extension Measurement, Testing under Temperature and Automation. Learn more about the benefits of a testing laboratory under one roof: You can see the product ranges of our extrusion plastometers, pendulum impact testers and hardness testers in action and explore more specialized test methods such as abrasion testing or rebound resilience.
Malvern Panalytical GmbH

129 Kinexus – Rheometer

Applications:
Unique rSpace software provides a user interface that offers total flexibility of test set-up for research and development, through to Standard Operating Procedure (SOP) driven testing for more routine rheological requirements. Across all material types, from solids to weakly-structured low viscosity samples to systems with critical time-dependent behaviour, Kinexus captures the true material properties.

Features:
Kinexus incorporates technological innovations in the most critical areas of rheometer design, from sample preparation and loading, through measurement set-up and operation, to data analysis and reporting. Adaptive intelligence allows Kinexus to actively guide users at every stage.

A true applications-led interface revolutionises and eases user interaction, bringing ‘expert system’ guidance and SOP-driven processes to rheological measurement. A unique and intelligent sample loading system takes all the guesswork and error out of this process, for accurate results. An intelligent software system invites users to work at the level most appropriate to them.

Environmental controllers and geometries are truly ‘plug and play’, so setting up the rheometer has never been easier. Results and analysis can be tailored specifically to a particular measurement, material type or application.

www.malvernpanalytical.com/kinexus

Rosand RH7, RH10 & RH2000 Capillary rheometers for process-relevant material testing

Application and Features:
High-pressure capillary rheometry is a well-established method for simulating the processing conditions of molten polymers at high temperatures.

Malvern Rosand capillary rheometers RH7 and RH10 are research grade, floor standing twin bore systems that enable the widest range of shear rates to be tested, as well as complex rheological properties such as die swell and melt tension. These rheometers are used extensively for a range of applications including polymers, foods, coatings and ceramics.

Malvern Rosand capillary rheometers are also available as bench top systems (RH2000) for more routine measurement of shear viscosity for QC purposes.

Low temperature control options enable capillary rheometry to be applied to an extended range of materials. They comprise cooling coils with fluids circulator for measurements from 5°C to 50°C and an option for cryogenic cooling using liquid nitrogen for measurements to minus 40°C.

Temperature control at ambient or below is ideal for low viscosity materials (such as inks, paints, paper coating emulsions, plastisols and foods) when extension of the accessible range of shear rates to more than 100,000 s⁻¹ may be necessary to simulate processing conditions, such as pumping or extrusion.

www.malvernpanalytical.com/rosand
polymerphys IK GmbH

Laboratory für plastics testing

„Whatever you give us, we will destroy. Promised!“

To imagine, we are a young, innovative, owner managed test laboratory with core competence determination of physical properties on polymers with latest equipment predominantly from Zwick Roell.

Professional consulting service at the area of production and preparation of test specimens. Longtime experiences at the sector of fiber-reinforced plastic material as soon as material identification by infrared spectroscopy.

Execution of practical seminares and workshops.

Active collaboration in executive function in national and international standards committee. The test laboratory is located centrally at the industrial park hoechst, near the airport Frankfurt on the Main / Germany.

Awarded by BG RCI with seal of approval „Sicher mit System“.

Main focus: mechanical testing methods, fibre length analysis, infrared spectroscopy

Testing methods:

- Tensile test
- Flexural test
- Creep test (tensile flexural modulus)
- Impact test
- Tensile impact test
- Puncture test instrumented
- Hardness
- Density
- Vicat softening temperature
- Heat deflection temperature
- Mineralfiller content
- Fogging behaviour
- Heat aging
- Melt flow rate MFR & MVR
- Test specimen preparation
- Light microscopy
- Picture analysis
- Fibre length analysis
- FTIR-Analysis

More information:
www.polymerphysik.de
HIT600F Drop Weight Tester for Plastic Testing

Application:
- Multi-axial impact test to ISO 6603-2
- Accelerated multi-axial impact test

Key features:
- Variable weight set max. 40 kg
- Free drop height up to 1.30 m
- Max. impact speed from free drop height 5 m/s
- Max. impact speed with acceleration 7.6 m/s at 5 kg
- Piezo load-cell for measurement of impact force

Advantages and benefits:
- Very good accessibility to the test area
- Specimen clamping and weight release from a single push-button action
- Automatic series mode in testXpert III for complete test series without needed operator interaction
- Automatic greasing position
- High data rates of 4 MHz for all measurement channels allow test curves in best resolution to safely observe material delamination and other phenomena throughout the test
- Large transient memory, able to store the test data at full resolution for brittle and ductile materials

HIT1100F Drop Weight Tester for Parts Testing

Application:
Impact testing on helmets

Key features:
- Variable weight set max. 29.4 kg
- Free drop height from 0.05m to 1.0 m
- Max. impact speed from free drop height 4.4 m/s
- Max. impact speed with acceleration 14.1 m/s
- Piezo load-cell for measurement of impact force

Advantages and Benefits:
- High-strength frame and base to ensure highly accurate test results
- Precision drop weight guiding system ensures low impact of radial forces when testing products with sloping surfaces

10 kN AllroundLine Materials Testing Machine

Application:
- Tensile tests on plastics to ISO 527-2, ASTM D 638
- Flexure tests on plastics to ISO 178

Key features:
- Z010 TEW materials testing machine, Fmax. 10 kN
- Test speed: 0.0005 to 2000 mm/min
- Max. return speed: 3000 mm/min
- Pneumatic grips, type 8304, body over wedge, Fmax. 10 kN
- Pneumatic control unit with inching mode
- Temperature chamber
ZwickRoell GmbH & Co. KG

- Remote control with display
- 3-point flexure test kit
- videoXtens 2-120 HP extensometer

Advantages and benefits:
- Non-contact strain measurement to ISO 527-2
- Reliable determination of Young’s modulus to ISO 527-2
- Universal range of application for tensile and flexure tests
- Automatic calculation of yield point and failure point
- Operator-friendly test control with testXpert

5 kN AllroundLine Materials Testing Machine

Application:
Tensile tests on plastics to ISO 18488

Key features:
- Z005 TH materials testing machine, Fmax. 5 kN
- Test speed: 0.0005 to 3000 mm/min
- Screw grips type 8253, Fmax 2.5 kN
- Temperature chamber
- lightXtens 2-1000 extensometer

Advantages and benefits:
- Short cycle times due to high return speed
- No influences to the specimen and automatic determination of the gauge length due to use of the lightXtens 2-1000 extensometer
- Calculation and display of the test results during the test sequence
- Standards-based preset standard test program in testXpert

5 kN AllroundLine Materials Testing Machine

Application:
Tensile tests on plastics to ISO 18488

Key features:
- Z005 TH materials testing machine, Fmax. 5 kN
- Test speed: 0.0005 to 3000 mm/min
- Screw grips type 8253, Fmax 2.5 kN
- Temperature chamber
- lightXtens 2-1000 extensometer

Advantages and benefits:
- Short cycle times due to high return speed
- No influences to the specimen and automatic determination of the gauge length due to use of the lightXtens 2-1000 extensometer
- Calculation and display of the test results during the test sequence
- Standards-based preset standard test program in testXpert
**DSC 214 Polyma - The System Solution for Efficient Characterization of Polymers**

**Explanation:**
Easy-to-use, robust, precise, optimized for everyday use – these are the features of the innovative DSC 214 Polyma. The unique design of this instrument encompasses everything needed for successful DSC investigations – regardless of whether the user is a beginner or an experienced professional. Above all, it is the two new software developments that are setting new standards: AutoEvaluation and Identify. These have the potential to revolutionize DSC analysis.

- New all-inclusive 360° product package for the characterization of polymers
- Easier sample preparation than ever before
- Automated measurement and evaluation
- Temperature Range: -170°C to 600°C

**DEA 288 Epsilon - Dielectric Analyzer - Optimize Your Curing Processes**

**Explanation:**
The multi-functional design of the DEA 288 Epsilon (including furnace or laboratory press) allows for the application of a great variety of different test conditions such as heat, cold or UV light. This enables the user to easily and conveniently determine the best parameters for processing the material.

**DEA 288 Slim Version**
The portable DEA 288 slim version with up to 2 DEA channels offers optimum test conditions for thermosetting resins in the lab or in an industrial process by occupying only a small footprint.

- Frequency Range: 1 mHz to 1 MHz, freely selectable values

**DMA 242 E Artemis - Dynamic Mechanical Analyzer - The Most Versatile DMA in the World**

**Explanation:**
The DMA 242 E Artemis combines ease of handling with the user-friendly Proteus® measurement and evaluation software. This makes it fast and easy to characterize the dynamic mechanical properties as a function of frequency, temperature and time. Its modular design along with a wide variety of sample holders and cooling systems allow the DMA 242 E Artemis to handle a broad range of applications and samples. Various add-on options make it the ideal device for any laboratory and a safe investment for the long-term.

- Temperature Range: -170°C to 600°C
Kappa Multistation electro-mechanical creep-testing machine

**Application:**
Creep test on plastics according to ISO 899-1 (tensile), ISO 899-2 (bending), ASTM D 2990 (tensile, compression, bending)

**Essential Characteristics:**
- 5 individually controlled test axes
- Load up to 10 kN per test axis
- Strain and force controlled applications (closed loop)
- Temperature range typically from -40 °C to +250 °C
- videoXtens accuracy class 1 according to ISO 9513
- For creep tests up to 10,000 h

**Advantages and Benefits:**
- Definition of individual stepless sequences of load and temperature
- One temperature zone for all test axes (one common conditioning device)
- High-precision electro-mechanical drive system
- High lateral and axial stiffness by 4-columns-design of base frame
- 2 guiding columns and 1 single screw for each test axis
- Requires no special base or foundation
- No mechanical influences on the specimen with optical measurement
- Each load string is equipped with a separate videoXtens camera
Aalen University, Polymer Technology

Prof. Dr.-Ing. Achim Frick is head of the Institute Polymer Science and Processing and involved in polymer technology field since more than 3 decades. He is a senior expert in Polymer Engineering, Polymer Testing and Failure Analysis, also he is an author of related books „Praktische Kunststoffprüfung“ and „DSC-Prüfung in der Anwendung“ published by Hanser.

Prof. Frick provides services for industry, cooperative research and also training courses in polymer technology field.

Contact address: Achim.Frick@htw-aalen.de
ZwickRoell GmbH & Co. KG

ZCP020 Bent Lever Cutting Press

Application:
Manufacturing specimens from rubber, elastomers and soft plastics

Key features:
- 20 kN compressive force
- 250 x 250 mm support table

Advantages and benefits:
- Easy blade-change
- Simple adjustment of point of intersection via top-mounted handwheel
- Special bent-lever length produces 30% greater cutting force than conventional presses

Rebound Resilience Tester, 5109

Application:
Testing rebound resilience of elastomers and rubber to ISO 4462, DIN 53512 and ASTM D 1054

Key features:
- Resolution 0.06 degrees
- Frictionless pendulum transducer

Advantages and benefits:
- Automatic software-controlled test sequence
- Interchangeable pendulums
- Large adjustment range for various specimen thicknesses
- Wear-free mechanism ideal for continuous operation

Type ZHR8150CLK Rockwell Hardness Tester with closed loop technology

Application:
- Rockwell hardness tests for classical Rockwell method (HRA, HRB, HRC) and superficial Rockwell to EN ISO 6508 and ASTM E18 for testing metal samples
- Ball indentation hardness tests for plastic samples to ISO 2039-1 and -2, plus ASTM D785 methods A & B, including alpha Rockwell
- Rockwell hardness tests for carbon and graphite materials to DIN 51917

Key features:
- Stand-alone hardness tester with closed loop force application
- Depth measurement system with 10 nm resolution
- For tests on a batch of specimens, the unique automatic sequence system saves a significant amount of time.

Advantages and benefits:
- One instrument for all indentation test methods on metal and plastic samples, e.g. Rockwell testing of metals and ball indentation testing of plastics
- testXpert III connection for free report generation, standard conversion and database connection
141 Analog Shore Hardness Testers, Types 3114/3115/3116/3117

Application:
Determining Shore hardness (A, D) using analog hardness testers to ISO 7619-1, ASTM D 2240, ISO 868

Key features:
• Shore hardness tester at configuration levels with/without pointer
• Operating options with/without test stands
• Ranges of application for Shore A: soft rubber, elastomers, natural rubber products, neoprene, casting resin, polyester, soft PVC, leather
• Ranges of application for Shore D: hard rubber, hard plastic materials, acrylic glass, polystyrene, rigid thermoplastics, Resopal, print rollers, vinyl records, cellulose acetate
• Additional configuration levels are available for Shore scales B, C, D0, 0, 00

Advantages and benefits:
• Robust, easy-to-operate tester for everyday use in laboratory and production environments
• High-quality mechanical components
• Certified measurement accuracy

142 Electronic Shore Hardness, Tester Type 3130/3131

Application:
Determining Shore hardness using electronic hardness testers to ISO 7619-1, ASTM D 2240, ISO 868, NFT 51109

Key features:
• Operating options with/without test stands
• Versions available: Shore A, Shore D, Shore B, Shore C, Shore D0, Shore 0, Shore 00, Shore 000
• Integrated digital electronics with 1-line display and two function keys for easy operation

Advantages and benefits:
• Safe, reliable application of standardized contact force, also without test stands
• Built-in protection against twisting
• Connection option to testXpert II / III

143 IRHD Micro Compact Hardness Tester, Type 3103

Application:
Hardness tests to ISO 48, ASTM D 1415, NFT 46003 and BS 903 Part A26 for the IRHD micro-range for elastomers, plastics, O-rings, moldings and small/thin materials

Key features:
• Basic unit with integrated electronics, display and single column with built-in measuring device
• Height-adjustable support table
• Processing of measured values via PC with testXpert
ZwickRoell GmbH & Co. KG

Advantages and benefits:
• Test results shown directly in instrument display
• Connection option to testXpert II / III

combi test Fully Automatic IRHD/Shore Hardness Tester, Type 3105

Application:
Hardness tests to IRHD and Shore standards ISO 7619-1, ISO 868, ISO 48, ASTM D 2240, ASTM D 1415, NFT 51 123, NFT 46 003 for elastomers and plastics

Key features:
• Measurement ranges: IRHD-M (micro), IRHD-ss (supersoft), IRHD-N (normal), IRHD-H, IRHD-L (soft), Shore A/B/0, Shore D/C/D0, Shore 00/000, micro Shore
• Different operating modes: standard, interval, hysteresis
• Basic unit with integrated electronics unit (2000-value memory) and 2-line display, height-adjustable support table, column with retaining arm for measuring device
• Processing of measured values via PC with testXpert

Advantages and benefits:
• Universal application for many different Shore and IRHD test methods
• Easy equipment changeovers
• Software-controlled for automatic test sequence
• Connection option to testXpert II / III
SUNTEST CPS+ - The Practical Solution

SUNTEST CPS+ is the Original since more than 40 years. It is the most compact and most widely used xenon instrument for accelerated aging testing of polymers and photostability testing of cosmetics and pharmaceuticals.

The SUNTEST is used to check in a short period of time for property changes of polymers caused by sunlight, temperature and moisture. Changes happening outdoors or indoors over months or years, such as fading, yellowing or embrittlement can often be simulated inside a SUNTEST within weeks.

Benefits:
- Premium full-spectrum sunlight according to CIE85 reference sun
- User friendly interface in 11 selectable languages
- Pre-programmed 300 hour tests for Quick-starters or as test drafts
- Black Standard Temperature Sensor (BST) according to ISO 4892-1
- Dimmable irradiance either between 30-65 W/m² (300-400 nm) or 250-765 W/m² (300-800 nm) for high testing flexibility

Accessories:
- Immersion unit for testing materials under extreme moisture conditions
- Chiller unit for testing at low temperatures (e.g. cosmetics)
- Humidity sensor for measuring relative humidity in %
- SunCal sensors for simultaneous calibration of light and BST

SUNTEST CPS+ is the xenon instrument for newcomers in weathering testing or users with only occasional testing needs.

Applications:
Plastics, Additives, Colors, Inks, Coatings, Sealants, Cosmetics, Pharmaceuticals
ZwickRoell GmbH & Co. KG

ZNO Automatic Notch-Cutting Machine

Application:
Notching plastics specimens to ASTM D 256, ASTM D 6110, EN ISO 179, EN ISO 180 and EN ISO 8256 for Charpy and Izod tests

Key features:
- Max. traverse 80 mm
- Feed rate adjustable from 70 mm to 500 mm/min
- Manual notch-depth setting via fine-pitch screw-adjuster
- Speed adjustable from 200 to 1000 rpm
- Changer-magazine for 12 specimens
- Device for measuring remaining width for notching

Advantages and benefits:
- Program-controlled cutting sequence for consistent notch results
- Individually adjustable feed and cutting rates
- Universal clamping device for all common specimen shapes

Manual notching plane

Application:
Manual notching of specimen to ISO 179, ISO 180, ASTM D256, ASTM D 6110 and ISO 8256

Key features:
- Notching of 4 specimens simultaneously possible
- Durable blade
- One-hand operation

Advantages and benefits:
- Ergonomic operation
- Low operating forces
- Interchangeable specimen magazine
- Automatic stop when reaching the remaining width
- Easy to clean

HIT25 Pendulum Impact Tester

Application:
- Charpy tests, ISO 179-1 and -2
- Dynstat test, DIN 53435

Key features:
- 7.5 Joule Charpy and 25 Joule conventional pendulum
- 2 Joule Dynstat pendulum
- Extra-stiff carbon pendulum rods
- Quick action pendulum clamping device
- USB and RS323 connection
Advantages and benefits:
- Complete security for security requirements for EN954-1, category 3
- Compact design and easy to integrate into laboratories

### HIT5.5P Pendulum Impact Tester

**Application:**
- Charpy tests to ISO 179-1 and -2
- Izod tests to ISO 180

**Key features:**
- 5 Joule Charpy pendulums, instrumented, 0.5 Joule Charpy, conventional
- 5.5 Joule Izod pendulum, instrumented
- Operator safety

**Advantages and benefits:**
- Universal application for various test methods
- Low-vibration carbon double-rod pendulum
- Quick action pendulum clamping device
- Easy, tool-free pendulum changing
- Automatic identification of method and energy rating of all pendulums
- Reliable tool guidance via dovetail mount
- High data logging-rate during instrumented impact tests

### HIT5P Pendulum Impact Tester

**Application:**
Charpy tests to ISO 179

**Key features:**
- Quick action pendulum clamping device
- Mechanical release unit
- 1 Joule and 5 Joule Charpy pendulums
- Operator safety

**Advantages and benefits:**
- Space-saving
- Low-vibration carbon pendulum-rods for concentration of mass at impact point
- Tool-free pendulum changing
- Operator-friendly testing, including at low temperatures

### Film/Foil Strip Cutter

**Application:**
Producing parallel film/foil strips

**Key features:**
Width 15 mm, length 230 mm, two cutting edges
Advantages and benefits:
• Up to 10 parallel strip specimens in one operation
• Adjustable double-cutting blade-holder enables operation both towards and away from operator

1 kN zwickiLine Materials Testing Machine

Application:
Friction test to ISO 8295

Key features:
• Z1.0 TN materials testing machine, Fmax. 1 kN
• Test speed: 0.0005 to 2000 mm/min
• Device for testing the frictional behavior of plastic foils

Advantages and benefits:
• Wide application range from plastics and elastomer testing to paper, cardboard, textile, foam materials, and food testing as well as components testing
• Automatic evaluation of test results
• High degree of stiffness at low weights

1 kN zwickiLine Materials Testing Machine

Application:
• Tensile test to ISO 37
• Tear growth test to ISO 34

Key features:
• Z1.0 TH, materials testing machine, Fmax 1 kN
• Test speed: 0.0005 to 2000 mm/min
• Pneumatic grips
• zwicki longstroke extensometer

Advantages and benefits:
• Single acting pneumatic grips can be used for both symmetrical and asymmetrical gripping of specimens (e.g. for shear tensile tests)
• Intuitive operation enables quick test configuration and produces accurate and reproducible results
• High resolution over the entire measurement range (minus L0) with the longstroke extensometer

HDT/Vicat 3-300 A1

Application:
• Determination of heat deflection temperature (HDT) to ISO 75 Part 1 - 3
• Determination of Vicat Softening Temperature (VST) to ISO 306 and ASTM D 1525

Key features:
• 3 measuring stations
• Temperature range +20 to +300 °C
• Heating rate 50 K/h, 120 K/h
Cflow Extrusion Plastometer

**Application:**
Determination of melt-mass flow-rate (MFR) to ISO 1133, ASTM D 1238 and ASTM D 3364

**Key features:**
- Extrusion plastometer with 325 g, 2.16 kg, 5 kg, 10 kg, 15 kg and 21.6 kg weights
- Piston for fluorine-free plastics
- Extrusion barrel for fluorine-free test materials
- Safety door
- Extrudate cutter
- Test-weight support
- Analytical balance

**Advantages and benefits:**
- Precise temperature distribution
- Automatic or manual extrudate-cutter
- Test temperatures up to 400 °C

Mflow Extrusion Plastometer

**Application:**
Determination of melt-mass flow-rate (MFR), and melt-volume flow-rate (MVR) to ISO 1133, ASTM D 1238, ASTM D 3364

**Key features:**
- Extrusion plastometer with 2.16 kg, 5 kg, 10 kg, 15 kg and 21.6 kg weights
- Piston for fluorine-free plastics
- Extrusion barrel for fluorine-free test materials
- Automatic extrudate cutter
- Piston transducer
- Pneumatic weight-lifting unit
- Pneumatic purge unit
- Pneumatic cleaning unit

**Advantages and benefits:**
- With the integrated user management, the operator’s input options can be reduced to a minimum
- Future-proof electronics with new functionalities open up the path to the interconnected world
- Automatic parameter control (APC)
- Can be modularly expanded and upgraded
- Precise temperature control, including to ISO 1133-2
Mflow Extrusion Plastometer

Application:
Determination of melt-mass flow-rate (MFR), and melt-volume flow-rate (MVR) to ISO 1133, ASTM D 1238, ASTM D 3364

Key features:
• Extrusion plastometer with 1.2 kg, 2.16 kg, 3.8 kg, 5 kg, 8.7 kg, 10 kg, 12.5 kg, 20 kg and 21.6 kg weights
• Piston for fluorine-free plastics
• Extrusion barrel for fluorine-free test materials
• Automatic extrudate cutter
• Piston transducer
• Pneumatic weight-lifting unit with weight selector

Advantages and benefits:
• Operator is guided through the test configuration step by step
• Saved test configuration can be easily exported and transferred to other devices
• Automatic parameter control (APC)
• Precise temperature control, including to ISO 1133-2
• testXpert III connection via USB
• Simple test-weight pegging
• Secure storage of test-weights

Aflow Extrusion Plastometer

Application:
Determination of melt-mass flow-rate (MFR), and melt-volume flow-rate (MVR) to ISO 1133, ASTM D 1238, ASTM D 3364

Key features:
• Extrusion plastometer for test loads from 0.325 g to 50 kg
• Piston for fluorine-free plastics
• Extrusion barrel for fluorine-free test materials
• Automatic extrudate-cutter
• Die plug
• Pre-compacting and cleaning device

Advantages and benefits:
• A uniform operating procedure is used across all devices
• All test-relevant settings are logically grouped and separated from higher-level system settings
• Optimized, operator-independent test sequence
• Automatic parameter control (APC) during test
• Stepless test-load adjustment up to 50 kg
• Rapid extrusion of residual materials after test
• Uniform pre-compacting and easy cleaning at the push of a button
• Time-saving multi-stage tests
• Intelligent testXpert III connection via USB
159 10 kN ProLine Materials Testing Machine

Application:
Tensile test to ISO 527-2 without Young's modulus

Key features:
- Z010 TH materials testing machine, Fmax. 10 kN
- Testing speed: 0.0005 to 1000 mm/min
- Wedge grip type 8304, body over wedge, Fmax 10 kN
- ProLine longstroke extensometer

Advantages and benefits:
- Robust and durable industrial operation
- Machine installation on industrial furniture or via base enables the test area to be positioned at an optimum height for the operator
- Robust design makes the measurement system insensitive to impact loading

160 10 kN AllroundLine Materials Testing Machine

Application:
- Tensile tests on plastics to ISO 527-2, ASTM D 638
- Flexure tests on plastics to ISO 178

Key features:
- Z010 TH materials testing machine, Fmax. 10 kN
- Test speed: 0.0005 to 2000 mm/min
- Max. return speed: 3000 mm/min
- Pneumatic grips, type 8304, body over wedge, Fmax. 10 kN
- Pneumatic control unit with inching mode
- Remote control with display
- 3-point flexure test kit
- makroXtens extensometer
- videoXtens 2-120 HP extensometer

Advantages and benefits:
- Universal range of application for tensile and flexure tests
- Reliable determination of Young's modulus to ISO 527-1
- Automatic calculation of yield point and failure point
- Extensometer with sensor arms for tensile and flexure tests
- Satisfies the exacting calibration requirements for tensile modulus values to ISO 527-1, Annex C
- High-accuracy measurement of tensile modulus
ZwickRoell GmbH & Co. KG

20 kN Materials Testing Machine with 'roboTest L' Robotic Testing System

Application
Automatic tensile tests on plastics to ISO 527

Key features
• autoEdition 3 new-generation ZwickRoell automation software
• 20 kN Z020TE materials testing machine
• multiXtens extensometers
• ‘roboTest L’ robotic testing system
• Total magazine capacity 480 specimens
• Automatic cross-section measuring device

Advantages and benefits
• New autoEdition 3 automation software includes various Industry 4.0 functions
• autoEdition 3 enables flexible integration into customer’s network regardless of operating system
• Integrated traceability and expanded user management for safe and efficient use of the testing system
• Higher throughput thanks to autonomous operation by the robotic testing system (also during breaks)
• Absence of subjective influences (body temperature, body moisture, off-center or skewed insertion, etc.) ensures high reproducibility of test results
• Low per-specimen testing costs — the robotic testing system pays for itself within approx. two years
• Modular design of the robotic testing system allows manual testing whenever required

2 kN Electrodynamic Materials Testing Machine

Application:
Fatigue tests on rubber specimens

Key features:
• LTM 2 electrodynamic materials testing machine, Fmax. 2 kN (dynamic)
• Test frame for LTM 2 with integrated T-slotted platform
• Compression platens for testing the specimen
• testControl II digital measurement and control electronics
• Xforce dynamic 2 kN load cell
• Remote control unit with display
• testXpert R and testXpert III testing software

Advantages and benefits:
• Maintenance-free system thanks to wear-free components
• No additional pneumatic, coolant, oil etc. supply feeds required
• Motor-driven crosshead adjustment plus ideal working height for convenient operation
• Safe set-up mode as per EN 60204-1 via speed reduction to 10 mm/s
• Simple manual crosshead locking via hand lever with electrical monitoring
• Long piston-stroke (60 mm) enables wide variety of tests
• Operator-friendly testXpert R testing software with preset controller settings and availability of free controller definition
163 1 kN zwickiLine Materials Testing Machine

Application:
Dynstat flexure test to DIN 53435

Key features:
- Z1.0 TS, materials testing machine, Fmax 1 kN
- Test speed: 0.0005 to 2000 mm/min
- Dynstat flexure test device for 4-point bending stress

Advantages and benefits:
- Intuitive operation enables quick test configuration and produces accurate and reproducible results
- Low weight and space-saving installation on a table enables the site of operation/testing to be varied as required

164 1 kN zwickiLine Materials Testing Machine

Application:
- Tensile test to ISO 527 Part 3
- Seal seam test recline to DIN 53357

Key features:
- Z1.0 TH materials testing machine, Fmax. 1 kN
- Test speed: 0.0005 to 2000 mm/min
- Pneumatic grips type 8195, Fmax. 1 kN
- 90° peel test kit

Advantages and benefits:
- Low weight and space-saving installation on a table enables the site of operation/testing to be varied as required
- Automatic evaluation of test results
- Easy and fast changeover of the test machine for various test methods
The key themes for our static testing machines in the field of fiber composites are Reliable Test Results, Extension Measurement and Modularity. With our LTM electrodynamic testing machines, we will show you options for characterizing fatigue properties over a wide temperature range.
Plan of site Composites A7

A1: Academia
A2 & A5: Automotive
A3 & A5: Metal
A4 & A7: Textiles
A7: Composites
A8: Medical

E = Empfang
    Reception
V = Vortragersaal
    Seminar Room
A = Ausstellungsaal
    Exhibition Room

A1: Hochschulen / Academia
    After Sales Center
A2: Automotive I / Automotive I
A3: Baustoff / Building
    Geprüfte Lebensqualität / Tested for life
    Junior Firma / Junior Company
    Metall I / Metals I
    Textil / Textile
A4: Kunststoff / Plastics
A5: Automotive II / Automotive II
    Metall II / Metals II
    Kompetenzzentrum / Competence Center
A6: Werkstoffprüfzentrum / Materials Testing Lab
A7: Composite / Composites
A8: Medizin / Medical

M = Meeting point
165 10 kN AllroundLine Materials Testing Machine

Application:
In-plane shear test to ISO 14129

Key features:
• Z010 TEW materials testing machine, Fmax. 10 kN
• Test speed: 0.0005 to 2000 mm/min
• Max. return speed: 3000 mm/min
• Pneumatic grips, type 8304, body over wedge, Fmax. 10 kN
• Pneumatic control unit with inching mode
• Temperature chamber
• Remote control with display
• Biaxial clip-on extensometer

Advantages and benefits:
• Strain-gauge-based clip-on extensometer’s wide temperature range of -70 to +175 °C makes it particularly suitable for use in temperature chambers
• Temperature chamber’s sophisticated air-feed system ensures extremely uniform temperature distribution
• Precision control guarantees stable temperatures with no overshooting

166 1 kN zwickiLine Materials Testing Machine

Application:
3- and 4-point flexure test to ISO 14125

Key features:
• Z1.0 TS materials testing machine, Fmax. 1 kN
• Testing speed: 0.0005 to 2000 mm/min
• Flexure test kit
• Flexure transducer for 3- and 4-point flexure tests

Advantages and benefits:
• Low weight and space-saving installation on a table enables the site of operation/testing to be varied as required
• Direct measurement of deflection centered below the specimen by the transducer
• High measuring accuracy for the determination of flexural modulus

167 5 kN zwickiLine Materials Testing Machine

Application:
Iosipescu shear test to ASTM D 5379

Key features:
• Z5.0 TS materials testing machine, Fmax. 5 kN
• Testing speed: 0.0005 to 600 mm/min
• Iosipescu shear test fixture
• HBM QuantumX measurement amplifier
Advantages and benefits:
- High degree of stiffness at low weights
- Low weight and space-saving installation on a table enables the site of operation/testing to be varied as required
- Direct measured-value acquisition, display and many different layout options in catman®Easy

2.5 kN zwickiLine Materials Testing Machine

Application:
G1c to Airbus-Standard

Key features:
- Z2.5 TN materials testing machine, Fmax. 2.5 kN
- Testing speed: 0.0005 to 1000 mm/min
- G1c test fixture
- Video recording for GIC and GIIC tests

Advantages and benefits:
- Visual crack tracking with video recording option for GIC and GIIC tests
- Traceable measurement results thanks to subsequent, precise evaluation of the test sequence in the video
- Video camera is guided along the crack propagation via movable carriages throughout the entire test

50 kN AllroundLine Materials Testing Machine

Application:
Compression test to ISO 14126 and ASTM D 6641

Key features:
- Z050 TH materials testing machine, Fmax. 50 kN
- Test speed: 0.0005 to 600 mm/min
- Max. return speed: 1000 mm/min
- Hydraulic composite compression fixture (HCCF)

Advantages and benefits:
- Drive employs fully digital technology and features an extremely large control range
- Optionally expandable with further module slots, extensometers for extension measurement direct on the specimen, safety guards, and other accessories
- HCCF is suitable for tests in an expanded temperature range from -60 °C to +150 °C

50 kN AllroundLine Materials Testing Machine

Application:
Shear test to ASTM D7078

Key features:
- Z050 THW materials testing machine, Fmax. 50 kN
- Test speed: 0.0005 to 600 mm/min
- Max. return speed: 1000 mm/min
- V-notch rail shear test fixture
Advantages and benefits:
- Play-free guidance plus ball-screw drive ensure low wear operation and easy tensile and compression testing
- Position, speed and acceleration control for fast, highly dynamic reaction to rapid changes in specimen properties
- Mechanics, electronics and software as a modular system permit add-ons to be made as required

**10 kN Electrodynamic Materials Testing Machine**

Application:
Dynamic tensile test on composites specimens under the influence of temperature

Key features:
- LTM 10 electrodynamic materials testing machine, Fmax. 10 kN
- Test frame for LTM 10 with integrated T-slotted platform
- Specimen holder for gripping flat specimens
- Temperature chamber with guide rails
- testControl II digital measurement and control electronics
- 10 kN Xforce dynamic load cell
- Remote control unit with display
- testXpert R and testXpert III testing software

Advantages and benefits:
- Maintenance free system thanks to wear-free components
- No additional pneumatic, coolant, oil etc. supply feeds required
- Motor-driven crosshead adjustment plus ideal working height for convenient operation
- Safe set-up mode as per EN 60204-1 via speed reduction to 10 mm/s
- Simple manual crosshead locking via hand lever with electrical monitoring
- Long piston stroke (60 mm) enables a wide variety of tests
- Operator-friendly testXpert R testing software with preset controller settings and availability of free controller definition
- Intelligent testing software featuring intuitive operation - testXpert for dynamic tests and testXpert III for static tests
- Standardized mechanical interface allows flexible use of specimen grips and fixtures over entire dynamic product range

**250 kN AllroundLine Materials Testing Machine**

Application:
- Upper test area:
  - Tensile test to ISO 527-4, -5 and ASTM D 3039
- Lower test area:
  - CAI compression test

Key features:
- Z250 SN materials testing machine, Fmax. 250 kN
- Testing speed: 0.00005 to 600 mm/min
- Max. return speed: 1000 mm/min
- Alignment fixture
- Hydraulic-grips, type 8594, Fmax. 250 kN
- CAI test fixture
- markoXtens HP extensometer for composites
Advantages and benefits:
- Large force/measurement range and a comprehensive selection of accessories encompass a wide range of applications
- Play-free guidance plus ball-screw drive ensure low-wear operation and easy tensile and compression testing
- makroXtens can be used up to specimen break, even with high forces and brittle specimen material
- Intelligent tracking device (patent pending) for even greater measuring accuracy, particularly in the initial measuring range (HP versions)

Alignment verification as per Nadcap

As leading provider of calibration services for materials testing systems, ZwickRoell also carries out checks on test axis alignment. These alignment verifications to ASTM E1012 satisfy Nadcap criteria AC 7101 and AC 7122.

Key features:
- experienced, specially trained service technicians
- use of 4 standardized strain-gaged alignment transducers allows ZwickRoell to guarantee a high degree of comparability with customer-specific specimen dimensions (adaptation)

Advantages and benefits:
- complete, detailed recording of verification results as required by the standards and beyond (incorporation of images possible)
- rapid alignment verification using standardized ZwickRoell strain-gaged alignment transducers
- correction of alignment errors by adjustment using the optionally available alignment unit
- individual geometry data can also be translated to a strain-gaged alignment transducer
- everything from a single source, from advice to implementation
- alignment verification also possible on other makes of testing machine

HIT230F Drop Weight Tester for CAI Pre-Damaging

Application:
Preliminary damage of the specimens for the CAI test to ASTM D 7136, AITM 1.0010, EN 6038

Key features:
- Variable weight set 2.04 – 10.2 kg
- Free drop height up to 1 m
- Max. impact speed from free drop height 4.4 m/s
- Anti-rebound device prevents double impacts

Advantages and benefits
- Very good accessibility to the test area
- Instrumented striking-edge enables tracking of damage mechanism
- Light barrier for exact determination of actual impact energy
175

smartPREDICT

Application:
Laboratory, test bench and equipment measurement for acoustic emission, vibration and motion, customized condition monitoring solutions.

Technical Data:
- Microcontroller Unit: ARM Cortex M7, 2 MB Flash, 512 kB RAM
- LxWxH [mm]: 83 x 42 x 23 mm
- Frequency Range (Acoustic Emission): 6 ... 48,000 Hz
- Signal to Noise Ratio: 99 dB
- Temperature resistance: - 40 ... 85 °C
- Connector: RJ45 / Ethernet UDP
- Other sensors: Acceleration, Angular Velocity

Special features:
SmartPREDICT is a multi-sensor system for all kinds of measurement applications. It is used in laboratories, on test benches or customer specific applications in condition monitoring of production machines, buildings or power plants. Due to high bandwidth, the scope of industries in which condition monitoring with smartPREDICT may be used, is endless.

With smartPREDICTs vast frequency band of 6 Hz to 48 kHz and a very high sensitivity, the multi sensor system is made for precise broadband measurement. It is able to detect very low amplitude noise in through structures and materials. In the tensile test application, acoustic events can be related to stress parameters of materials which leads to a deeper understanding of component behavior.
ZwickRoell GmbH & Co. KG

100 kN AllroundLine Materials Testing Machine

Application:
Tensile test to ISO 527-4

Key features:
• Z100 THW materials testing machine, Fmax. 100 kN
• Testing speed: 0.0001 to 1500 mm/min
• Max. return speed: 2500 mm/min
• Wedge grips, type 8504, Fmax. 100 kN
• videoXtens 2-120 HP extensometer

Advantages and benefits:
• High crosshead travel and a wide test area for mounting accessories such as temperature chambers, mounting platforms or customer-specific accessories
• Specimen grips are suitable for alignment-critical applications (including for Nadcap accreditation) and for specimens which are sensitive to transverse tension, at very low weights
• Even brittle-fracturing plastics specimens can be tested without damaging the extensometer
Intelligent Testing is not just our slogan, it is the foundation for our daily work, from product development to consultation to service. In this exhibition area we will present numerous application examples where intelligent testing technology is applied to help you with your daily test tasks.
Hall plan Competence A5
20 kN AllroundLine Materials Testing Machine

**Application:**
- Upper test area:
  - Tensile tests on plastics
- Lower test area:
  - Tests on components

**Key features:**
- Z020 TN materials testing machine, Fmax. 20 kN
- Test speed 0.0005 to 1000 mm/min
- Max. return speed: 1500 mm/min
- testControl II Xtension
- Pneumatic grips type 8397, Fmax 5 kN
- lightXtens 2-1000 extensometer

**Advantages and benefits:**
- The unique System Configuration Builder makes it possible to define reproducible test conditions and offers maximum safety for the user and testing system
- Integrated user management reduces the number of operator input options, showing only what is needed. Users see only what is important to them so they can focus on the task at hand right from the start
- Tests can be performed entirely via the remote control, independent of the PC
- The measurement channels, machine and test status, and button assignments are shown on the display

50 kN AllroundLine Materials Testing Machine

**Application:**
- Tensile tests on seat belts

**Key features:**
- Z050 TH materials testing machine, Fmax. 50 kN
- Test speed 0.0005 to 600 mm/min
- Max. return speed: 1000 mm/min
- Roller grips type 8464, Fmax 50 kN
- videoXtens 1-270 extensometer

**Advantages and benefits:**
- testControl II system monitoring provides the user/laboratory manager with detailed information on the current status and level of utilization of the testing equipment. This enables further increases in testing equipment availability and greatly simplifies maintenance planning and spares/ replacement procurement
- testXpert III provides traceable results that cannot be manipulated
- testXpert III logs all test- and system-relevant actions and settings
50 kN ProLine Materials Testing Machine

Application:
Compression tests on springs

Key features:
• Z050 TN materials testing machine, Fmax. 50 kN
• Test speed 0.0005 to 600 mm/min
• Complete compression test kit

Advantages and benefits:
• Attractively priced test solutions for routine and standard applications
• A high standard of comfort and user ergonomics is created in synergy with the test software testXpert III
• Predefined actions such as saving a report or exporting test data must be set only once and then are automatically carried out
• The user can export any desired test data, whether in the usual applications (e.g. MS Office, SAP, Oracle, ASCII, qs-Stat) or in the user's own individually developed solution

100 kN AllroundLine Materials Testing Machine

Application:
Tensile tests on metals to ISO 6892-1

Key features:
• Z100 SN materials testing machine, Fmax. 100 kN
• Test speed: 0.00005 to 1000 mm/min
• Max. return speed: 1500 mm/min
• Hydraulic-grips, type 8802, Fmax. 100 kN
• laserXtens 7-220 HP extensometer

Advantages and benefits:
• Robust component dimensioning and precise crosshead guidance ensure high machine stiffness and prevent undesired mechanical influences on the specimen
• Precision strain-at-break measurement via flexible, correct extension reference
• Automatic determination and output of systemic measurement uncertainty to CWA 15261-2 supports the user in the auditing of the test system

10 kN AllroundLine Materials Testing Machine

Application:
• Tensile tests on plastics to ISO 527-2, ASTM D 638
• Flexure tests on plastics to ISO 178

Key features:
• Z010 TEW materials testing machine, Fmax. 10 kN
• Test speed: 0.0005 to 2000 mm/min
• Max. return speed: 3000 mm/min
• Pneumatic grips, type 8304, body over wedge, Fmax. 10 kN
• Pneumatic control unit with inching mode
A5 - Competence

ZwickRoell GmbH & Co. KG

• Temperature chamber
• Remote control with display
• 3-point flexure test kit
• videoXtens 2-120 HP extensometer

Advantages and benefits:
• Non-contact strain measurement to ISO 527-2
• Reliable determination of Young’s modulus to ISO 527-2
• Universal range of application for tensile and flexure tests
• Automatic calculation of yield point and failure point
• Operator-friendly test control with testXpert

www.zwickroell.com
ZwickRoell Materials and Component Testing Laboratory

The completely new built ZwickRoell’s Materials and Component Testing Laboratory performs quasi-static, cyclic and dynamic impact tests to customers’ orders. Torsion, hardness and extrusion tests also form part of the portfolio.

With over 50 testing systems, 2,000 accessory parts and experienced and competent materials testing technicians the ZwickRoell testing laboratories are the first choice when it comes to the external testing of various materials and components. Our ZwickRoell testing laboratories provide diverse systems and solutions for your static, dynamic and fatigue tests.

ZwickRoell rely on the test engineers and materials testing technicians’ many years of experience and sound expertise. With ZwickRoell testing laboratories’ expertise and comprehensive equipment, we offer the ideal solution flexibly, quickly and cost effectively relying on reliable test results.

From preparation of the specimen material, to testing, to evaluation and analysis of test results, the ZwickRoell Testing Laboratory offers an expert materials testing service from -40°C to +1,200°C.

Key features:
- ZwickRoell’s Materials and Component Testing Laboratory carries out all types of test precisely, efficiently and in accordance with standards
- Long-term experience and solid expertise in all sectors, including automotive, medicine, mechanical engineering, plastics, composites etc.
- ZwickRoell’s testing laboratories are equipped with state-of-the-art testing systems for a varied range of tests on components and materials of all kinds

Advantages and benefits:
- fast, standard-compliant testing helps to overcome capacity bottlenecks
- contract testing of a wide range of materials and components with precise test results and efficient test performance
- cost-flexibility through the possibility to outsource your tests to the ZwickRoell testing laboratories
- cross-validation to safeguard your test results
- design and modification of test devices
- interim solutions until delivery of newly acquired testing machines and accessories

Modern and comprehensive laboratory equipment for your project-related and contract tests

We perform all types of project-related and contract tests at our testing laboratories for materials and components testing. Continued investments in our laboratory equipment and further training of our staff enables us to guarantee reliable test results.

As the manufacturer, our laboratories are equipped with state-of-the-art, versatile machinery with a comprehensive range of accessories. Take advantage of our expertise for your testing of individual materials and complex components.

Key features:
- Static materials testing machines to 1,200 kN
- Hardness testing machines for all established methods
- Vibrophores up to 500 kN
- Servo-hydraulic materials testing machines up to 250 kN
- Linear motor testing machines up to 10 kN
- High speed testing machines
ZwickRoell Applications Test Laboratory

Comprehensive and expert advice is essential in finding the right materials testing machine solution for your individual testing requirements. Our experts provide you with individual consultations and we invite you to visit our fully equipped Applications Test Laboratories.

ZwickRoell supports you in planning and implementing new or modified testing requirements and with the setup or upgrading of your testing laboratory.

Our Applications Test Laboratories in Ulm are equipped with permanent materials testing machine displays and instruments including a comprehensive portfolio of accessories such as specimen grips, test tools, sensors, and temperature chambers.

**Key features:**
- Consultation and support by experienced ZwickRoell application engineers
- Demonstrations of different solution options for your test requirements
- Preliminary tests for new, altered or complex applications are possible

**Advantages and benefits:**
- Various technical solutions for your application at a glance
- Competence thanks to many years of experience and sound expertise
- Demonstrations and preliminary tests in the ZwickRoell Applications Test Laboratory are free of charge
Occupying center stage for the medical and pharmaceutical industries are testing solutions for injection systems (automated testing of autoinjectors and tests on pre-filled syringes to ISO 11040-4). Other key areas include testing systems for orthopedic implants, packaging and software solutions for extended traceability in accordance with CFR 21 Part 11 and the ZwickRoell Qualification Service (DQ/IQ/OQ).
Plan of site Medical A8

A8 - Medical

Competence

Medical

Plastics

Composites

Textile

Tested for life

After Sales

Center

Automotive

A3 & A5

Metal

Building

Composites

A4 & A7

Compliance

Laboratory

Medical

A3

A3 & A5

A1

A2 & A5

A5

A4

A8 - Medical

A8

A3

A3 & A5

A4

A5

A6
**5 kN Allround Line Materials Testing Machine, horizontal**

**Application:**
Glide force tests on catheters

**Key features:**
- Z005 körperähnlichTE material testing machine, horizontal, Fmax 5 kN
- Test speed 0.0005 to 3000 mm/min
- Heated water bath
- T-slotted mounting platform for placement of 3D-models
- Submersible grips and load cell
- VideoCapturing Plus
- testXpert III Option Expanded traceability to FDA 21 CFR Part 11

**Advantages and benefits:**
- Tests of catheter in body similar conditions
- Measurement of the coefficient of friction of catheters, guide wires or other minimally invasive instruments (flexible endoscopes)
- Multiple 3D models can be placed in or out of the water bath simultaneously
- Force sensors can be attached before and/or after the model

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**1 kN Electrodynamic Materials Testing Machine**

**Application:**
Fatigue tests on dental implants to ISO 14801

**Key features:**
- 1 kN LTM electrodynamic materials testing machine with Fmax. 1 kN (dynamic)
- Test frame for 1 kN LTM with integrated T-slotted platform
- testControl II digital measurement and control electronics
- 1 kN dynamic load cell
- Test fixture for dental implants, available with optional temperate water bath
- Remote control unit with display
- testXpert R and testXpert III testing software

**Advantages and benefits:**
- Maintenance-free system thanks to wear-free components
- No additional pneumatic, coolant, oil etc. supply feeds required
- Motor-driven crosshead adjustment plus ideal working height for convenient operation
- Safe set-up mode as per EN 60204-1 via speed reduction to 10 mm/s
- Simple manual crosshead locking via hand lever with electrical monitoring
- Long piston-stroke (60 mm) enables wide variety of tests
- Operator-friendly testXpert R testing software with preset controller settings and availability of free controller definition
- Intelligent testing software featuring intuitive operation - testXpert R for dynamic tests and testXpert for static tests
- Standardized mechanical interface allows flexible use of specimen grips and fixtures over entire dynamic product range
ZwickRoell GmbH & Co. KG

5 kN Electrodynamic Materials Testing Machine with 100 Nm Static Torsion Drive

Application:
Test fixture for bone screws to ASTM F 543 and ISO 6475 in combination with a 100 Nm static torsion drive

Key features:
- LTM 5 electrodynamic materials testing machine, Fmax. 5 kN (dynamic)
- Test frame for LTM 5 with integrated T-slotted platform
- testControl II digital measurement and control electronics
- Test fixture to ASTM F 543 A1
- 5 kN Xforce dynamic load cell
- Remote control unit with display
- testXpert R and testXpert III testing software

Advantages and benefits:
- Maintenance-free system thanks to wear-free components
- No additional pneumatic, coolant, oil etc. supply feeds required
- Motor-driven crosshead adjustment plus ideal working height for convenient operation
- Includes remote control with display unit for set-up mode
- Simple manual crosshead locking via hand lever with electrical monitoring
- Long piston stroke (60 mm) enables a wide variety of tests
- Operator-friendly testXpert R testing software with preset controller settings and availability of free controller definition
- Intelligent testing software featuring intuitive operation - testXpert R for dynamic tests and testXpert III for static tests
- Standardized mechanical interface allows flexible use of specimen grips and fixtures over entire dynamic product range

5 kN Materials Testing Machine with 20 Nm Torsion Drive

Application:
Quasi-static torsion tests on spinal implants to ASTM F 1717 and ASTM F2706

Key features:
- zwickiLine Z5.0 TN materials testing machine (5 kN) with 20Nm torsion drive
- Xforce 5kN load cell with 20Nm torque transducer
- Two test axes for independent or combined axial/torsion tests
- Flange connection system and alignment unit for optimum concentricity
- Tools to ASTM F 1717 and ASTM F2706
- testControl II digital measurement and control electronics
- Proven testXpert III testing software

Advantages and benefits:
- Available in various force (up to 5 kN) and torque (up to 20 Nm) ranges
- Flexible software for straightforward programming of expanded test programs
- Easy access to test results and simple data analysis
- Expanded Traceability option in accordance with FDA 21 CFR Part 11
- Extensive IQ/OQ experience with a wide range of customers
186 1 kN zwickiLine Materials Testing Machine

Application:
Tests to ISO 11040-4

Key features:
• Z1.0 TN materials testing machine, Fmax. 1 kN
• Testing speed: 0.0.0005 to 2000 mm/min
• Test fixture for syringe testing to ISO 11040-4

Advantages and benefits:
• Modular design allows these test fixtures to be used for various tests
• ZwickRoell has a complete range of products to satisfy the requirements of ISO 11040-4
• ZwickRoell Traceability software option meets the necessary requirements to satisfy all criteria of FDA 21 CFR Part 11

187 1 kN zwickiLine Materials Testing Machine

Application:
Testing of syringe components

Key features:
• Z1.0 TN materials testing machine, Fmax. 1 kN
• Testing speed: 0.0.0005 to 2000 mm/min
• Surrogate device for testing syringe components

Advantages and benefits:
• The drive employs fully digital technology and features an extremely large control range
• Position, speed and acceleration control for fast, highly dynamic reaction to rapid changes in specimen properties
• Using a surrogate device simulates a therapy system and allows the user to determine reproducible test results without destroying a therapy system. As a result, there will be significant cost savings during the development process.

188 1 kN zwickiLine Materials Testing Machine

Application:
Multi-station syringe test (semi-automatic)

Key features:
• Z1.0 TN materials testing machine, Fmax. 1 kN
• Testing speed: 0.0.0005 to 2000 mm/min
• Test fixture for syringe testing
• Safety guard
• Precision scale

Advantages and benefits:
• One-time filling of the syringe holder
• Determination of the ejection force
• Time saving by fitting a second pattern set during the test
• Reduction of operator influence
• High-precision weighing of the injected liquid including the last drop
• Very versatile; device can be used for different syringe diameters
• Reduction of operator influence (MSA 3 / Gauge R & R type 3)
2.5 kN Materials Testing Machine with 20 Nm Torsion Drive for Pharmaceutical Injectors

Application:
Semi-automatic pen testing with dosing range identification

Key features:
• 2.5 kN zwickiLine Z2.5 TN materials testing machine with Fmax. 2.5 kN and 20 Nm torsion drive
• Two test axes for independent or combined axial/torsion tests
• Flange connection system and alignment unit for improved concentricity
• Universal holder for pens with optical dosing range identification
• testControl II digital measurement and control electronics
• Proven testXpert III testing software

Advantages and benefits:
• Available in various force (up to 5 kN) and torque (up to 20 Nm) ranges
• Flexible software for straightforward programming of expanded test programs
• Easy access to test results and simple data analysis
• Optional software extension in accordance with FDA 21 CFR Part 11
• Extensive IQ/OQ experience with a wide range of customers

DQ/ IQ/ OQ qualification of ZwickRoell materials testing systems

For the Design Qualification (DQ), Installation Qualification (IQ) and Operational Qualification (OQ) stages in the qualification of materials testing systems, ZwickRoell assists customers by providing comprehensive qualification documentation (individually tailored if required) and through on-site performance of qualification by an experienced ZwickRoell service technician.

Customers can choose between full qualification consisting of DQ, IQ and OQ, part qualification consisting of IQ and OQ or a solution tailored to their individual requirements.

Key features:
• experience gained from over 700 successful qualifications worldwide
• professionally generated qualification documentation in accordance with current guidelines
• expert knowledge and advice plus long-term technical experience from a single source

Advantages and benefits:
• no tying up of capacity in the preparation and execution of qualification
• standardized document layout enables rapid project implementation
• customized expansion of basic ZwickRoell documentation as and when required
• qualification with ZwickRoell: complete one-stop solutions for enhanced cost-effectiveness
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A8 - Medical

Notes
We welcome you to our ZwickRoell premises!

This info will ensure you a pleasant stay at our factory premises. This is to inform you about possible dangers, our safety regulations and safety devices. Please read them carefully and adhere strictly to them. This information is valid for all our visitors and customers. We would like to wish you a pleasant and safe stay with us.

General Safety and Security Information:

- No smoking in buildings.
- No photography on the factory premises.
- Video control on the factory premises.
- No unauthorized copying.

We herewith refer to the copyright of all drawings and circuit diagrams.

When you are visiting our production facilities (mechanical manufacturing and assembly halls):

- Do not leave the indicated routes. Do not go near the machines.
- When entering the halls please make yourself familiar with the escape routes in case of emergency.
- In case of an accident please follow the instructions on the information boards.
- Please do not forget that trucks and forklifts are driving on the premises. Therefore before crossing the road please pay special attention to the moving traffic.
- Do not walk under raised loads.
Intelligent testing

We thank you very much for your visit and would be pleased to welcome you again at the testXpo 28th International Forum for Materials Testing, 14th-17th October 2019.

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