Dynamic and Fatigue Testing Systems
1 Zwick – ‘passion with competence’

For over 160 years the family-run business of the Zwick Roell Group has stood for outstanding technical achievement, innovation, quality and reliability in materials and component testing. A world leader, Zwick testing machines are used in research and development, production and quality assurance across a vast array of industries sectors.

Zwick has a long tradition of excellence in the field of testing technology in both static, quasi-static and dynamic market sectors. It is hard to imagine a laboratory engaged in fatigue testing of metallic specimens and components which is not equipped with resonance testing machines. Our servo-hydraulic product range is similarly being expanded step by step. The portfolio is rounded off by the new LTM testing machines with patented linear drive.
At Zwick, we use a number of physical drive principles for our dynamic testing machines in order to cover the largest range of dynamic applications. These include:

- Servo-Hydraulic
- Electro-Magnetic
- Electro-Mechanical

Each drive system has its own advantages and areas of application. This allows Zwick to find an optimised solution for your specific testing needs in-line with your individual industry requirements.

One of the key strengths of servo-hydraulic drive systems lies in their suitability to complement a broad range of application and testing requirements. In terms of force, amplitude and frequency, they are true all-rounders. Their modular frame and mounting designs with a comprehensive range of accessories, allows for additional features such as, torsional drives, high speed shot (up to 20m/s) or multi-axial tension/torsion fatigue tests, to be integrated.

Vibrophores employ an electro-magnetic resonance drive to generate high frequency, low amplitude dynamic loads. This provides short test times with a minimal use of energy. Thanks to their supplementary lead screw drive, they can additionally be used as static testing machines. Vibrophores are available for test loads up to 1,000 kN and are a preferred choice for tests on metallic specimens and components.

The LTM utilises a patented oil-free electro-magnetic dynamic linear drive system technology. These machines are suitable for a wide range of static and dynamic tests up to 10 kN; quasi-static tests at only 0.016 mm/s are equally possible, as are dynamic tests at a frequency of up to 100 Hz.

Our EPZ electro-mechanical testing actuators can also be used for quasi-static and slower cyclic components tests. Their flexible configuration and mounting allows them to cover many bespoke testing needs and multi-axial configurable systems, for example, foam and component testing for automotive applications.
2.1 Servo-hydraulic testing machines
HA & HB Series up to 2500 kN

The load frames and T-slot tables/beds of Zwick servo-hydraulic testing machines have been specially designed to cope with the demands and varied requirements of cyclic fatigue testing. The fundamental design principles of all servo-hydraulic machines are their high level of frame stiffness, hydrostatic-bearings and ergonomic working provisions.

Depending on your individual testing and component requirements, the testing actuator is mounted either below or above the test area on our HA & HB frames.

The HA frame represents the classical servo-hydraulic configuration with the testing actuator mounted within the lower cross-head and machine base. They are most commonly used for determining material properties of standard dog-bone or round samples under cyclic loading. This type of configuration is particularly suitable for tests requiring the use of high temperature furnaces.

The HB range has the actuator located above the test area. This configuration is especially versatile for component and bespoke testing needs with an integrated T-slot platform.

**Features**
- Convenient and ergonomic user working heights
- Hydraulic clamping and lift adjustment for easy positioning of upper crosshead using the control panel
- Seal-less hydrostatic bearings with the ability to cope with significant transverse forces prevalent in compression, flexure and component testing
- Minimal static and dynamic sliding friction on the bearings translating to negligible wear and tear or slip-stick effects
- Hard-chromed industrial plating on columns allowing for precise guidance of upper crosshead and long-term resistance to corrosive media and wear
- Utilisation of a wide range of dynamic load waveforms including sinusoidal, rectangular, triangular, trapezoidal
- The ‘two in one’ functionality of the above dynamic waveforms and more standardized quasi-static tests
- High radial and torsional frame stiffness to cope with parasitic loading

Fig.1: HA 100 for low-cycle fatigue (LCF) tests at high temperature (up to 1,000°C)

Fig.2: Fatigue tests with stranded wire according to ISO15630-3
Low-Cycle-Fatigue (LCF) testing

A typical application for servo-hydraulic testing machines is low cycle fatigue (LCF) testing. This can be characterised by high amplitude, low-frequency, recurrent plastic deformation. Tests are usually compiled to plot an S-N curve. The LCF specimens typically withstand only a few thousand loading cycles and the number of cycles to failure significantly decreases at elevated temperatures. The specimen's stiffness dramatically varies during testing. Therefore the demands placed on the testing machine and control hardware are particularly high in order to monitor and maintain a constant rate of strain control in response to the changing sample.

Fig. 1: Low-cycle fatigue (LCF) tests at high temperature
HC and HC Compact Series 10 kN & 25 kN
The HC Series frames are smaller table-top or stand-alone hydraulic test machines, either with an integral power pack or mass compensating base for use with external pumps.

With all HC models the actuator is positioned above the test area with a 2 column frame design and equipped with a T-slotted platform.

The unique feature of HC Compact is its' integral hydraulic powerpack for stand-alone operation with a minimal system footprint. The flow rate is 11 litres per minute and ample sound insulation makes these ideal for laboratory operation or where space is at a premium.

Features
• 2-column frame for dynamic tests up to 10 kN or 25 kN
• Seal-less hydrostatic bearings with the ability to cope with significant transverse forces prevalent in compression, flexure and component testing
• Minimal static and dynamic sliding friction on the bearings translating to negligible wear and tear or slip-stick effects
• Hard-chromed industrial plating on columns allowing for precise guidance of upper crosshead and long-term resistance to corrosive media and wear
• Comprehensive accessory range available: temperature chamber, compression platens, specimen grips, flexure test kit, alignment fixture etc.
• Optional hydraulic clamping and lift adjustment for easy positioning of upper crosshead using the control panel
• High radial and torsional frame stiffness to cope with parasitic loading

Fig.1: HC25 servo-hydraulic testing machine mounted on concrete base
Fig.2: HC25-Compact servo-hydraulic testing machine with integrated hydraulic power pack and guard
These models are variations of the proven HC and HB frame series due to their exceptional radial and axial frame stiffness. Zwick can equip these models with a combined torsional drive and linear actuator. The linear and rotary drive systems can be configured independently of each other or with freely adjustable phasing. The combined actuator is mounted on the upper crosshead, therefore components can be mounted on the integrated T-slotted platform.

The HCT series is designed as a compact, laboratory model for smaller components and is available in the following combinations: 10 kN/100 Nm or 25 kN/250 Nm. The actuator stroke in both cases is 100 mm and the angle of rotation is 100°.

The floor-standing HBT series is designed for larger component parts and is available in the following combinations: 100 kN/1000 Nm or 250 kN/2000 Nm. The actuator stroke in both cases can be up to 250 mm and the angle of rotation is 100°.

**Advantages and features**
- Independent or phased control of rotary angle or linear stroke.
- Optional hydraulic clamping and lift adjustment for easy positioning of upper crosshead using the control panel.
- Special test configurations using 4 column frames with higher test loads being possible on request.

Fig.1: HCT 25 servo-hydraulic testing machine with integrated torsion drive

Fig.2: HBT 100 servo-hydraulic testing machine with integrated torsion drive
Special solutions
As well as standardized systems, Zwick also designs and produces special dynamic testing systems, so that multi-axial systems, combined tension-torsion systems, testing systems with various media environments and large-scale testing systems all form part of our product range. If you cannot find a suitable solution to meet your requirements, please get in contact with us to see what is possible with a solution from our project division.
Accessories for servo-hydraulic testing machines
Zwick manufactures a large variety of accessories and test tooling for our dynamic testing product range. The range is constantly being expanded through a program of continuous development. The inclusion of new products allows us to satisfy our customers’ most demanding test requirements whilst continuously improving our scope of supply in the dynamic marketplace.

Specimen grips & accessories
- Compression platens
- Alignment fixture
- Hydraulic parallel grips
- Hydraulic wedge grips
- Media bath
- Flexure test kits
- High-temp. furnaces
- Temperature chambers

Servo-hydraulic testing actuators

Servo-hydraulic infrastructure (distribution units, valves, hydraulic powerpacks)
2.2 Vibrophores

Modern laboratories and institutes, whether in research, training or industry, increasingly find themselves confronted with frequently changing testing requirements. The latest generation of Vibrophores (high-frequency pulsators) from Zwick can be used as both dynamic and fully-fledged static materials testing machines, a first for this type of machine and with test loads of up to 1000 kN. This makes them an attractive proposition also for laboratories which mainly perform static tests, as well as for those which mainly carry out dynamic tests, with only the occasional static test.

The intelligent testControl II measurement and control electronics have a measurement and control frequency of 10 kHz, providing rapid response to events during tests, combined with a high measured value acquisition rate. When combined with the 24-bit resolution, this enables very precise measurements.

Also new is the high quality, display equipped, remote control unit which shows measurement channels and machine and test status. This simplifies the setup procedure and enables accurate positioning of the oscillating crosshead without direct use of the PC. The result is enhanced operator convenience, particularly when PC and testing machine are installed separately, for example, in an acoustic booth.

Dynamic tests using the Zwick Vibrophore

The operating principle of the Zwick Vibrophore is based on the concept of a mechanical resonator with electromagnetic drive. The mean force is applied by displacement of the upper crosshead via the lead-screw drive, while the dynamic load is generated through an oscillating system working in full resonance mode. In this way test frequencies of up to 285 Hz are possible, provided specimens are sufficiently stiff. The two drives, for dynamic and for static testing, are controlled separately, so that stress ratios (R-ratios) of any kind are possible. Tests can be force, displacement or strain controlled.

Because testing is in the resonance range, the Vibrophore can, in addition, detect developing and growing cracks in the specimen at an early stage through minimal changes in the test frequency. The signal form of the dynamic load applied always corresponds to a sine wave. The testXpert Research software provides intuitive test definition, performance and evaluation. Typical applications include fracture mechanics investigations on CT and SEB specimens, material fatigue tests and fatigue tests on standard specimens and on components (e.g. connecting rods, crankshafts and threaded connectors), as well as production monitoring and quality control of components which are subjected to oscillating loads in service, such as concrete reinforced steel and rebars.
Typical Vibrophore applications

- CT specimens
- Chains
- Gearwheels
- Rebars
- Connecting rods
- High temperature specimens
- SENB specimens
- Flat specimens
- Screws/bolts
Static tests using the Zwick Vibrophore

Mechanical clamping of the oscillating crosshead and the deployment of testXpert II software transform the Vibrophore into a fully-fledged static materials testing machine. Generous connecting surfaces and ruggedly dimensioned components ensure high machine stiffness. This combines with precision crosshead guidance to ensure that unacceptable mechanical influences on the specimen are minimized.

By using suitable additional devices, both static and dynamic testing can be performed under various environmental conditions (temperature, aggressive media), together with torsion and flexure tests. The absence of a central lead-screw allows maximum test-area variability on the new Vibrophore, enabling testing of both very short and very large components.
Additional advantages and features

- Can be used as fully-fledged static and dynamic materials testing machine
- High test frequencies deliver short test times for high specimen throughput
- Resonance drive has very low energy consumption
  - (approx. 2% of that of servo-hydraulic testing machines)
- Stiff 4-column load frame, giving excellent guidance properties
- Clamping table at convenient working height
- Large test area

- Easy to install, no ancillary units or systems
- (e.g. hydraulics, coolant) required
- No additional vibration damping required from a structural viewpoint
- Maintenance free system and wear-free components
- Safe, reliable operating concept - ideal for research and training
- Continuously controlled servo motor for fast, accurate mean-force control
- High pulse width modulation resolution (120 MHz)
- for high control stability and low failure liability
- Easy to operate via testXpert III and testXpert Research test programs matched exactly to the testing situations
- Easy 8-step test frequency change by means of varying weights
2.3 LTM electrodynamic testing machine

The LTM linear motor testing system is based on a patented electro-dynamic drive system (developed in-house by Zwick) which ideally satisfies the demands placed on testing technology and makes no compromises when it comes to reliable test results. During the design stage particular attention was paid to the positioning of the travel measurement system, close to the specimen and in the center of the test axis. The avoidance of tilting and bending moments that lead to travel measurement errors has enabled extraordinary positioning and repeat accuracy to be achieved, while the LTM's wide speed range allows it to be used both for dynamic fatigue tests and for quasi-static tests. An oil free drive and closed cooling circuit enable the LTM to excel as a stand-alone solution, as do its extremely simple installation requirements a power supply is all that is required. Thanks to their electrodynamic drive system, LTMs are especially light on maintenance, keeping servicing costs low, while in day-to-day testing they impress with their flexibility and ease of operation. Our linear motor testing systems are available in force levels 5 and 10 kN.

Fig.1: The LTM linear motor testing system can be used for a wide range of dynamic tests up to 100 Hz

Fig.2: LTM 10 linear testing system

Fig.3: LTM 2 as table top model
Typical medical engineering applications are tests on hip-joint, knee and dental implants. Other applications include tests on components, standard plastics and composites specimens, together with CT and SEB specimens made of aluminium and plastics.

**Features**
- Speed range from 0.016 mm/s to 1.5 m/s giving a wide range of application for static and dynamic tests
- Wide range of dynamic load forms, e.g. sinusoidal, rectangular, triangular, and trapezoidal
- High dynamic performance (up to 100 Hz)
- High transverse force stability thanks to patented motor design
- Long piston stroke (60 mm) enabling a wide variety of tests
- No additional pneumatic, coolant, oil etc. supply feeds required
- Safety and convenience assured, thanks to motor driven crosshead adjustment and electrically monitored crosshead clamping

Fig 1: The LTM can be used for a wide range of medical engineering testing applications

**Typical LTM testing applications**

- Spinal implant
- Dental implant
- Bone plate
- Flat specimens
- Components
- Sports shoes
2.4 High-speed testing machines

Strain rate up to 1,000 s⁻¹, the HTM range of high-speed testing machines are ideal for determining material behavior under crash loading. Their maximum piston speed of 20 m/s (72 km/h) is even faster than the 64 km/h test speed used in the Euro NCAP frontal impact crash test. The strain rate can easily be varied by means of the piston speed, from quasi-static to maximum speed, or it can be set via the specimen length. The relationship, as a function of specimen length \( l_0 \) and speed \( v \), is as follows:

\[
\dot{\varepsilon} = \frac{\Delta \varepsilon}{\Delta t} = \frac{dl}{l_0} \times \frac{1}{\Delta t} = \frac{v}{l_0}
\]

Rated at 25 kN and 12 m/s, the HTM 2512 is the smallest machine in the range. The testing actuator is installed below, in the machine table. The HTM 2512 is particularly suitable for testing plastics (polymers, polyurethane); high-speed tensile tests to ISO 18872 and puncture tests to ISO 6603-2 are both frequently performed using this machine.

The HTM 5020 is the most versatile machine in the range. Rated at 50 kN and with a maximum piston speed of 20 m/s, it can be used for testing both plastics and metallic specimens, e.g. sheet metal for automobile bodywork and fiber-reinforced composites. The actuator is mounted on the upper crosshead, enabling component testing in conjunction with the optional T-slotted platform. The machine is also available in an 80kN version designated HTM 8020.

The HTM 16020 is the largest machine in the range, with a static nominal force of 160 kN. The actuator is mounted on the upper crosshead of the 4-column frame and the baseplate is provided with T-slots, making the machine highly suitable for component testing. However, tensile tests on larger-dimensioned specimens or belts are also possible. The maximum tensile force at 20 m/s is 100 kN.

Fig.1: HTM 5020 high-speed testing machine

Fig.2: Test device for puncture tests

Fig.3: High-speed tensile test with optical measurement system
2.5 Electromechanical testing actuator

Electromechanical testing actuators are all-purpose screw-drive machines. They are suitable for tensile and compression tests and can be integrated into testing devices in various configurations. Areas of use range from materials and component testing to testing finished end-products. They also enable testing of production steps (e.g. assembling/joining, force-fitting and assembly) and are equally ideal for long-stroke cyclic tests, such as fatigue tests on flexible foams to ISO 3385. A typical test sequence is described below.

1. Indentation hardness and specimen thickness are first measured on an unloaded seat cushion.
2. In the second step the foam is loaded several tens of thousands of times. This loading can take place in a standard climate or under specified humidity and temperature conditions.
3. After continuous loading and following expiry of waiting time, the specimen thickness and compression stress value are measured again.
4. The results obtained are hardness loss and thickness loss.

The electromechanical testing actuator range is available from 1 - 100 kN and can be supplied with the new display-equipped remote control on request.

Features

- Variable mounting via head or foot flange or side trunnion
- testControl II measurement and control electronics located in separate housing and can be positioned as required
- Free test sequence configuration via various programming interfaces
- Force or displacement control with smooth switching between operating modes
- Easy to install - no additional infrastructure required
- (e.g. hydraulic power pack, compressed air supply)
- Ideal for use in clean rooms
- Low maintenance costs combined with high life expectancy

Fig.1: Electro-mechanical testing actuator for fatigue tests on foam materials

Fig.2: Biaxial testing machine consisting of 4 testing actuators

Fig.3: Electro-mechanical testing actuator for fatigue tests on steering linkage
3.1 testControl II control electronics and testXpert® R testing software

The first choice for single-axis standard applications

Due to their design, servo-hydraulic testing machines and Vibrophores in particular have, up to now, been used exclusively as dynamic materials testing machines for determining the fatigue strength of materials and components with regard to fatigue life and fatigue limit in the tensile, compression, pulsating load and alternating load ranges.

Switching from testXpert R to testXpert II allows Zwick servo-hydraulic standard testing machines and the new generation of Vibrophores to be used for both dynamic and static applications. These Vibrophores have therefore also been designated "two in one". The crucial advantage is that both types of machines can be utilized as fully fledged static and dynamic materials testing machines capable of exploiting the full scope of Zwick’s well-proven testXpert II testing software and application-specific testXpert Research dynamic testing software.

testControl II measurement and control electronics

The first Zwick measurement and control electronics for dynamic testing machines to be developed entirely in-house, testControl II provides a new hardware and software platform for all Zwick testing machines. Users now have access to a uniform testing environment for both static and dynamic testing machines. The intelligent testControl II measurement and control electronics have a control frequency of 10 kHz, providing rapid response to events during tests combined with a high measured value acquisition rate. When combined with the 24-bit resolution, this enables very precise measurements.

testXpert® R testing software

testXpert Research intelligent testing software for fatigue and component testing provides the user with a uniform operating concept, from sensor calibration, setting PID parameters and specifying set values, right through to the evaluation and report stages. The software's modular design allows easy addition of test programs for specific tests or standardized test sequences as per ISO/DIN or ASTM.
testControl II - powerful modular electronics with state-of-the-art hardware architecture

- 24-bit measurement signal resolution over the entire measurement range for maximum data accuracy
- Synchronous 10 kHz measured-value acquisition-rate delivering precise measurement regardless of number of measurement channels
- 10 kHz control frequency for precise control - e.g. rapid reaction to spontaneous events
- Proven industry-standard Gigabit Ethernet interface enabling very high data throughput to test-bench computer

One testing system for dynamic and quasi-static tests
testXpert® R's conveniently laid-out user interface at a glance

**Workflow**
Process-oriented structuring of test definition and performance.

**Sidebar**
Central control panel showing all key machine status information. The sidebar is always active and cannot be hidden by other desktop applications.

**Toolbar**
Key functions at a glance.

**Online graphics**
Synchronous display of the curve graph.

**Input field**
All test-related parameters can be input directly in the test layout.

**Digital display**
All key measurement channels are displayed clearly. The display is freely configurable.

**Status display**
The status display provides the operator with detailed information on the current test sequence.

**Sequencer**
Individually tailored configuration of a block program.
testXpert® R's modern software design simplifies operating and provides support for each individual operation.

**testXpert® R - Sequencer**
The freely programmable block program for generating freely definable loading cycles.

**testXpert® R - Fracture mechanics**
Determination of $K_{IC}$ value as per ASTM E399.

**testXpert® R - Low Cycle Fatigue (LCF)**
For strain-controlled determination of low cycle fatigue as per ASTM E606.

**testXpert® R - Multiple Stage for Vibrophore**
For testing sequences with load alteration in stages.

**testXpert® R - Sequencer for Torsion**
The block program for generating freely definable loading cycles for torsion applications.

**testXpert® R - Single Stage for Vibrophore**
Single stage tests set up quickly.
3.2 Control Cube control electronics and Cubus testing software

The Control Cube servo controller and Cubus testing software are employed with multichannel and/or complex testing systems. The Control Cube servo controller is also the optimum solution where frequent test arrangement changes are involved. As well as established standard tests, Control Cube is also used in conjunction with component and assembly testing. The system’s modularity and flexibility make it ideal for multi-channel applications and simulation tests.

Added to this is a multitude of helpful functions to simplify everyday use of the testing system. These include automatic optimization of control parameters, together with adaptive control which allows control parameters to adapt automatically to changing requirements during the course of the test. There is also a wide range of useful options for data acquisition, measured value display and data export. To enable interface with the testing environment, connections for servo valves, hydraulic supply, remote control and Emergency STOP are available. These are complemented by universal measurement amplifiers and analog and digital inputs and outputs. These can naturally also be retrofitted.

Advantages of Control Cube technology

- 19-bit resolution for reliable, highly accurate test data acquisition
- Optimized 4kHz data acquisition frequency for precise measurements
- 4 kHz control frequency plus up to 32 control channels delivering precision control for rapid response
- Reliable PC connection and high data transfer rate via Ethernet

Control Cube interfaces and functions at a glance

- **PC connection**: Industry-standard Ethernet port
- **Multi-channel connection**: CNet connects up to 32 Control channels
- **Digital I/O connection**: Digital inputs and outputs
- **Channel identification**: LED indicates channel currently configured
- **Universal measurement amplifier**: For AC or DC sensors (strain gage, inductive etc.) Fully synchronized data acquisition for control and monitor channels.
- **Interface panel for expansion Options**: Here for example with two analog outputs and four analog inputs
- **System connection**: e.g. for safety door or flow-limiting valve
- **Remote control**: Change to Setup or Testing mode using key switch
- **Jog wheel**: The jog wheel can be used to change the position of the actuator in the relevant control mode
- **Channel switching**: With multi-axis systems user-friendly switching between individual channels is possible
Cubus testing software and test options

Whether you wish to test a complete product, a component or a single material specimen, Cubus testing software provides professional, highly efficient support. Cubus is a modular software environment specifically developed for single and multi-channel servo-hydraulic testing situations. It is available in two versions 1) Cubus-light basic software for routine cyclic tests and 2) Cubus testing programs for a wide variety of customized testing situations. Thanks to the simple, intuitive, well-structured user interface, only a short familiarization period is required. In a single integrated application Cubus enables full configuration of the testing environment, at the same time meeting all the demands placed on modern test-bench control systems.

Cyclic Pro
- Cyclic constant amplitude fatigue tests
- Peak-value control, acquisition, trend monitor

Durability test
- Playback of iteration data
- Dynamic and quasi-static trend monitoring

Testing applications with Control Cube

Fig. 1: Multiaxial test bench for simulation tests (Image: © IABG)

Fig. 2: Multiaxial test bench (Image: © Ford)
4 Modernization of dynamic testing machines

The advantages of modernizing with Zwick
- Warranty for newly installed components
- Renewed long-term service reliability
- testControl II measurement and control electronics to satisfy the most demanding safety requirements
- Enables validation of the testing machine in accordance with the latest quality standards
- Expert, long-term service partner with over 20 years’ experience of manufacturer independent modernization of materials testing machines

4.1 RetroLine modernization packages for resonance pulsators

The standardized RetroLine modernization packages for resonance pulsators are manufacturer independent and can easily be tailored to individual needs and testing requirements. Modernization includes renewal of the static drive motor, new testControl II measurement and control electronics plus installation of current testXpert Research testing software. Modernization is generally carried out directly on-site at the customer’s premises and is undertaken by our service technicians.

4.2 RetroLine modernization packages for servo-hydraulic testing systems

Modernization with testControl II measurement and control electronics is an ideal match for single-channel testing machines. Our modular, manufacturer independent modernization packages include new testControl II measurement and control electronics plus the current version of our testXpert Research testing software. If necessary, modernization can involve a complete solution with replacement and modification of the hydraulic components.

Additional sensors, specimen grips and test fixtures from the comprehensive Zwick accessory range can be retrofitted.
5 Zwick Services

5.1 Contract Testing Laboratory

If you have a testing requirement but no suitable testing option, our contract testing service is ready to provide expert assistance.

We can also help you out in the event of capacity bottlenecks or perform cross-validation tests. It makes no difference whether just a single test is involved or an entire test series.

With the latest technology and modern testing machines, we guarantee fast, standard-compliant testing. Naturally we can also perform tests in accordance with your factory standards.

Our contract testing laboratories perform testing services of all kinds, on all static and dynamic materials testing machines. Our testing is individually tailored to each industry and material, whether metals, plastics, rubber, composites, automotive, medical engineering - with us you’re in good hands!

Contact us: +49 (0)7305 10 440 or e-mail: contract-testing@zwick.de
5.2 Applications technology

In addition to our technical consultants, our experienced applications engineers are ready to help with expert advice.

Whatever your needs, our qualified engineers will draw on their solid expertise to provide support during the planning and implementation of all or any test sequences and projects.

Our Applications Test Laboratories possess a full-time array of materials testing machines and instruments, together with a comprehensive assortment of accessories including specimen grips, test fixtures, sensors and temperature chambers.

5.3 Overview of services

Our service technicians guarantee successful, trouble-free commissioning from pre-acceptance and installation, to initial calibration, to instruction on hardware and software, including full safety briefing.

Inspection and calibration

Naturally we will also carry out the required annual inspection and calibration. Our checklist based inspections and calibrations provide a sound basis for reliable test results. They also extend the life of your materials testing machines and instruments, saving operating costs in the long term.

Customer support

Whenever our customers need additional support; we will be there! Our Hotline staff will assist you in questions relating to hardware and software malfunctions, while our Support Desk guarantees individually tailored advice or rapid assistance, including via remote access.
Software services
Once you have purchased your testing software we are ready to provide additional software services whenever you need them. Software to trial, updates, upgrades, training - whatever you need!

Training courses in the ZwickAcademy
Our ZwickAcademy offers a comprehensive, modular training program, whether here at Zwick’s base in Ulm, at a location near you or directly on-site at your premises. This ranges from courses on our testing software, to applications courses and workshops, to courses tailored to your company’s individual requirements.

Other services
Particularly for testing systems in the medical and pharmaceutical industries, Zwick provides assistance with DQ/IQ/OQ qualification in the form of comprehensive qualification documentation (individually tailored if required) and through on-site performance of qualification.

Alf you wish to move your materials testing machine to a different location, Zwick’s removal and relocation service will assist with technical and organizational planning, together with transport and full recommissioning.

Professional verification of the alignment of your testing machine using standardized alignment transducers is a fundamental component of our service portfolio. The alignment of the test axis is documented, ensuring reliable test results. We can also produce a customized alignment transducer for individual geometry data.

**Fig. 1:** Zwick provides continuous support throughout the entire life-cycle of materials testing systems.

**Fig. 2:** The ZwickAcademy offers an interesting and wide-ranging training program, for new students and advanced learners alike!