Compression Testing Machine
Series D5 up to 3000 kN

The D5 series testing machines are designed for the determination of the compressive strength of test specimens of hardened concrete according to EN 12390-3, EN 12504-1 and EN 206.
The model D5 with capacity 2500 kN is also available in a execution well suited for the additional determination of the Young's modulus on concrete in accordance with EN 12390-13, ASTM C469, ISO 6784 and DIN 1048-5.
These compression testing machines comply with the strain cylinder test requirements (straintest execution) according to ISO EN 12390-4 / DIN 51302-2.

The D5 series represents a compact and space-saving, automatic closed-loop controlled test systems. These test systems include, beside of the robust 4-column load frame the latest w+b hardware and software platform for accurate and repeatable compression test on concrete.

walter+bai ag · Industriestrasse 4 · 8224 Löhningen · Switzerland
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Reliable & Durable

Our prior goal, coupled with an experience of 50 years in the production of building materials Test Systems, is to deliver accurate and durable tests solutions to ensure that you obtain the maximum rewards from your investment.
w+b building materials Testing Machines combines proven load-frame design, reliable w+b servocontrolled hydraulic actuation combined with advanced high-speed, high-resolution digital closed loop control for trouble-free long-term operation.

Accurate

The D5 series delivers repeatable and accurate test results as this test systems incorporate features developed on our long experience.

- Machine equipped with high accurate pressure transducer
- Low friction plunger actuator
- Machine work with real closed loop control in combination with high-responsive proportional or servovalve (for model D5-2500.1)
- High system stiffness load frame for long-term repeatable testing
- High-accurate analogue digital signal conversion with low noise
- And many others

High Stiffness Load Frame

In order repeatable test results with smooth specimen breaking can be achieved and robust, durable, and long-term trouble-free operation is assured our load-frames are designed with high load frame stiffness. This high axial stiffness minimizes the stored energy in the frame that will abruptly release at specimen failure and cause shock to the specimen and machine.

Latest Control Technology

All our building materials Testing Machines are closed loop controlled through the latest digital control system DIGICON 4000. This controller represents the latest generation of digital measurement and control system tailor-made for testing of building materials including applications where high-responsive control is required.
The DIGICON 4000 features high-speed control and data acquisition and is well suited for force and stress closed-loop digital control.
The controller can be used as stand-alone unit or works through high-speed Ethernet interface with Proteus-MT application software.

Proven Servohydraulic

The D5 test systems offer reliable w+b servo-controlled hydraulic actuation through proportional valve or servovalve operation for the most reliable and accurate closed loop control in force / stress / deformation / strain or piston stroke control.

Strain Test Execution

The D5 compression testing machines comply with the strain cylinder test requirements for concrete compression testing machines according to ISO EN 12390-4 / DIN 51302-2. The strain cylinder test verification on concrete compression testing machines is carried out to verify the self-alignment of the upper machine platen and the component parts of the machine in accordance with DIN 51302-2. This German standard provides additional information on the verification of concrete testing machines for the European standard DIN EN 12390-4. For the reproducibility of the concrete compression test results, the flatness of the force application surfaces (compression platens) and the centric position, in addition to perfect functioning of the spherical seated compression platen are of critical importance. Testing machines that comply with the strain cylinder test requirements have generally recognized better standard deviation.

Compact & Space-Saving

The D5 series is designed as compact, space-saving system with integrated hydraulic power supply.

Low-Noise

The hydraulic power supply for the test system is integrated in the machine. The machine is designed in order it can operate with a system pressure below 500 bar. This and other measures helps to reduce the noise level.

Integrated Hydraulic Filter

The performance, life-time and reliability of servohyraulic test systems is acutely sensitive to the quality of the hydraulic oil. The experience of designers and users of hydraulic oil systems has verified that over 85% of all system failures are a direct result of contamination. As a consequence our power packs are equipped with hydraulic filters with absolute filtration of 10 µm to assure that clean oil. The size of the filters are large in order long service life of the elements are reached.

High Efficiency Motor

As part of a concerted effort worldwide to reduce energy consumption, CO2 emissions and the impact of industrial operations on the environment, various regulatory authorities in many countries have introduced or are planning legislation to encourage the manufacture and use of higher efficiency motors. Consequently all motors used in our test systems comply with the Premium Efficiency IE3 level according to IEC 60034-30-2008.

Designed for Permanent Operation

The hydraulic power pack of the D5 series is cooled by an air-oil cooler and can be operated permanently.

Safety

These test systems are designed with operator's convenience and health in mind.
The D5 systems fully comply with the safety requirements of the EC Machinery Directive and are supplied with the related EC Declaration.
The Test System is protected against overload, includes the piston stroke limit stop and provide the ability to set limits for any connected transducer preventing damage to your system.

Designed for Serviceability

Attention was paid to the serviceability. Parts are easy to clean and good access to hydraulic and electric installation is provided.

Ergonomically Designed

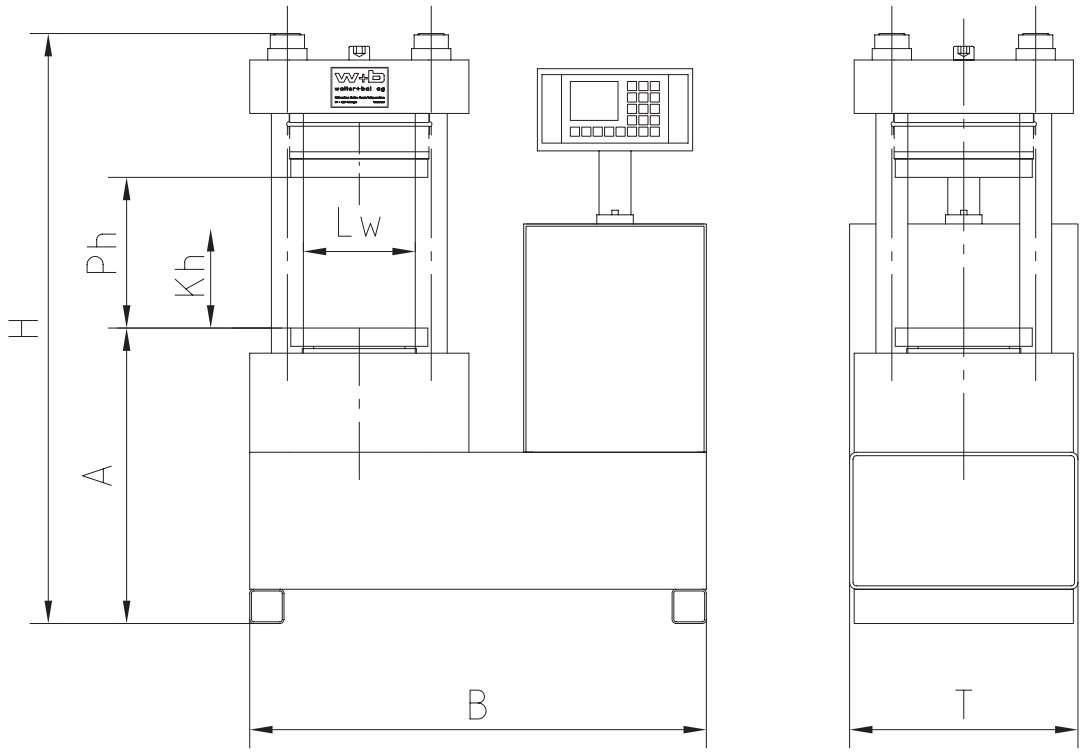
These test systems are designed with operator's convenience and health in mind. The lower compression platen is on convenient height makes specimen loading easy and convenient.

Ready for your Test Demands of Today & Tomorrow

To be prepared for the future, Proteus-MT is available with communication interface to several Laboratory Information Management Systems (LIMS) as: • LIMS or CIMS of ABB • Sauter • La strada • Lisa Lims • Cobet • Jouaux • Limsophya • FireQ • Dorner • LIS or PDV Dyckerhoff • Limsophy • and others Our digital controller can control monotonic servohydraulic as well as electromechanical AC or DC driven testing machines. In combination with servohydraulic test systems, this controller can control up to 4 testing machines / frames in alternating mode with one servovalve. This assures you, that you will be able to connect additional load frames to your cement test systems as for examples concrete compression test frame to be operated with the control system of your cement testing machine.

Technical Data Model D5		1200	2500	2500.1*	3000
Compression Capacity	kN	1200	2500	2500	3000
Accuracy Range	kN	10 - 1200	30 - 3000	30 - 3000	30 - 3000
Test Chamber Height (Ph)	mm	330			
Horizontal Daylight (Lw)	mm	240 x 120	230 x 175	230 x 175	230 x 175
Upper Compression Platen Ø	mm	300			
Lower Compression Platen W x D	mm	210 x 210			
Piston Stroke (Kh)	mm	50			
System Oil Pressure	bar	597	510	510	612
Overall Width (B)	mm	1000			
Overall Depth (T)	mm	600			
Overall Height (H)	mm	1220			
Working Height (A)	mm	625			
Weight	kg	690			

*Model suitable also for the determination of the Young's Modulus according to EN 12390-13, ASTM C469, ISO 6784 and DIN 1048-5



Digital Control System DIGICON 4000

for Building Materials Testing Machines

DIGICON 4000 is the latest generation of digital measurement and control system tailor-made for testing of building materials including cement, concrete, rocks, asphalt and soils.

The DIGICON 4000 is the direct replacement of the DIGICON 4000 controller with consequent enhancement and continuous implementations of new standards, customer inputs, feedbacks and hundredfold successful installations across the globe.
The controller can be used in standalone operation, in combination with its large 7" color touch screen with intuitive pre-defined test templates or in combination with the comprehensive Proteus application software.

The DIGICON 4000 can control monotonic servohydraulic as well as electromechanical AC or DC driven testing machines.
In combination with servohydraulic test systems, this controller can control up to 4 testing machines / frames in alternating mode with one servovalve. Typical applications are machine combination like cement testing machine together with a concrete testing machine controlled with one controller and one hydraulic system.

Features:

- Application-Designed for closed loop control of building materials testing machines
- Simple operation as standalone unit with pre-defined test templates according to related standards with USB-Interface for Data export
- Advanced functionality in combination with Proteus Software Package.
- Latest controller generation provides long life-cycle
- Provides accurate closed loop control with closed loop control rate of up to 2000 Hz (2 kHz)
- High data acquisition rate on all channels
- Controller can be equipped with up to 8 amplifier cards with 18-bit resolution for data acquisition and control of force, displacement, strain and other sensors.
- Machine interlock direct from controller including protection device, quick piston drawdown, unpressurized circulation etc.

Reliable
This latest generation of data acquisition and control unit reflect the knowledge and best practices gained from decades of experience. The unit includes consequent enhancement and continuous implementation of hundredfolds successful installation across the globe since early 1970's..

Versatile
The DIGICON 4000 can be configured to control servohydraulic as well as electromechanical testing machines.
With its up to 8 available channels for data acquisition and control this controller can be configured to meet your unique needs of today and can be extended in the future when your test needs would change.

Accurate
The DIGICON 4000 digital controller offers 2000 Hz closed loop control rate and 1000 Hz data collection on all channels. This enables you to generate high resolution test data for analyses. The high speed closed-loop control rate assures high control accuracy and repeatable tests.

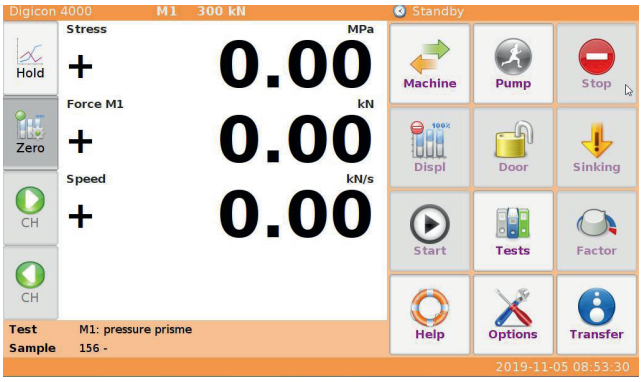
Compatible with Digicon 2000
The DIGICON 4000 is designed to direct replace the Digicon 2000. This makes it easy to upgrade your existing test system with this latest generation of digital control system.

Flexibility through Electronic Data Sheet (TEDS)
The DIGICON 4000 features and intelligent transducer plug system featuring an incorporated electronic data sheet that will be automatically recognized and read by the digital controller. The characteristics as electronic label, specifying sensor type,
operating range, coefficients for linearization, transducer calibration etc. are stored in the form of an electronic data sheet.
Once the transducer is connected to the amplifier card of the DIGICON 4000 the information will be read and imported. It gives the laboratory the flexibility to connect and transducer with electronic data sheet to any available DIGICON 4000 controller in the laboratory without quick plug and play installation and without the need of execute a calibration of verification procedure.

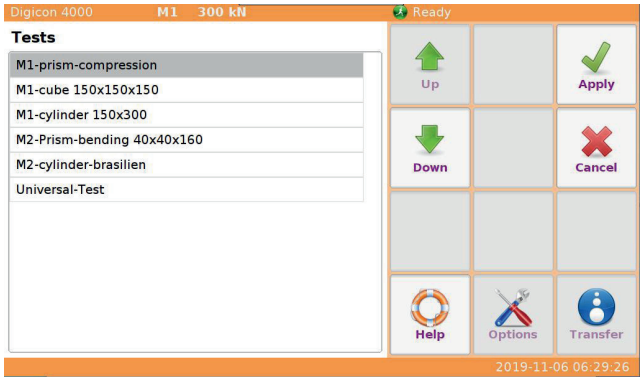
Operator Safey
The controller fully comply with current safety requirements. Protection devices can be connected direct to the controller.

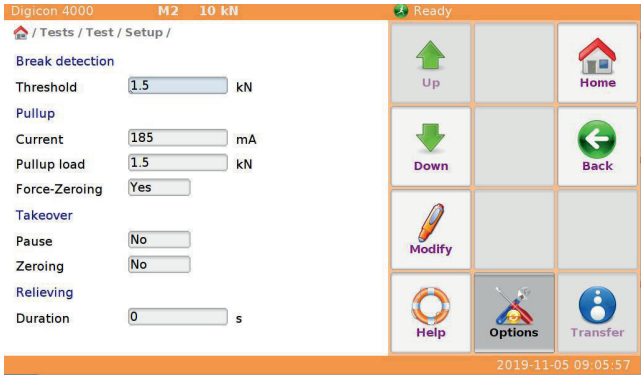
Standalone Operation
The controller can be used in easy-to-use standalone operation, in combination with its large 7" color touch screen with intuitive pre-defined test templates.

The DIGICO 4000 offers an extensive and growing library of standards-compliant test methods and free to program sequences and full complement of accessories for cement, concrete, asphalt, wood and other materials testing.



Main Screen





Export

This controller offers the test data export even when used at standalone unit without application software Proteus. The test data are saved as XML-File and can be exported via USB port to your host system for data backup, data processing, creating your own reports or import into an existing laboratory information management system (LIMS).

External Remote Touch Unit

The DIGICON 4000 can be supplied with external Remote 7" color touch screen that allows to install the operating touch screen up to 2.5 meter away from the controller.

Technical Data	
Closed-loop control rate	2 kHz
Data acquisition rate	1kHz
Measurement channels	max. 8
Analogous resolution	18Bit with SAR-Technology
Control Inputs	6 Optocoupler configurable
Control Outputs	9 Relais configurable
Signal Inputs	10V, SSI and Increment
Valve	24V Proportinal Valve Servovalves
Electromechanical drive	Module for DC and AC motors
PC-Interface	Ethernet / LAN
I/O-Interfaces	USB
Intelligent Display	intern or remote
Capacitive Touch-Screen	7inch HDMI 1024x 600 Pixel
Options	
Amplifiers Type	4 Dual MV11 DMS-LVDT-SSI or Potentiometric
Teds-Connector	1-wire EEPROM for the Linearisation

Testing Software for Building Materials

PROTEUS-MT

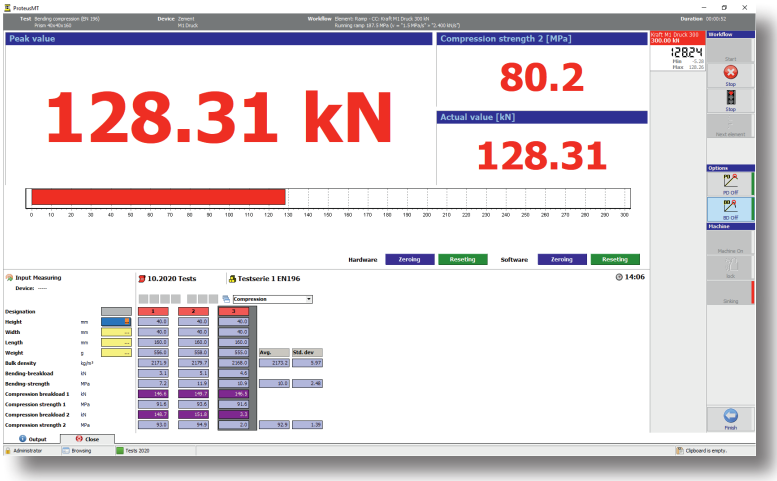
We offer flexible and powerful building materials testing software. Available are different software packages in accordance with the relevant international standards.
The packages offers fully automatic control of the test procedure and data collection of results including analysis and reporting.
Control and evaluation has never been as user-friendly as it is now when using these application packages.
These packages offers you both, rapid and productive testing but also specialized applications for advanced testing requirements.

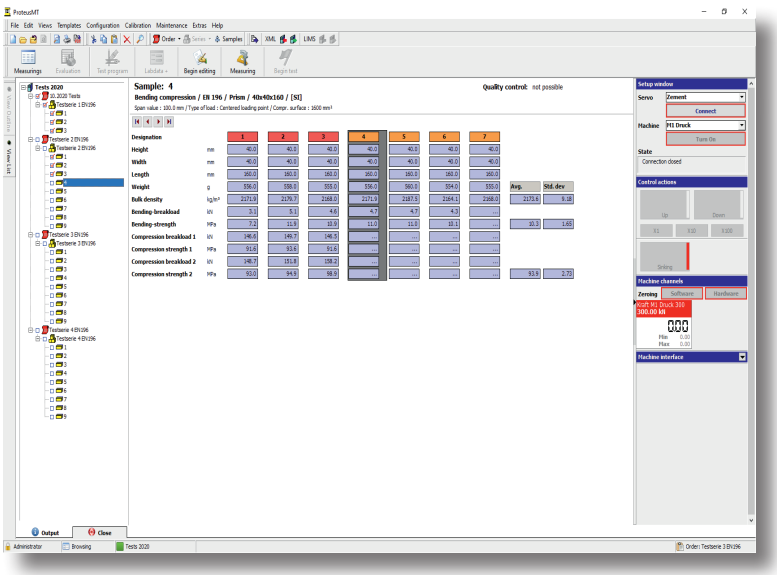
Testing Software for Building Materials
PROTEUS-MT

PROTEUS-MT offers many advantages in the field of building materials testing. Test control, data collection and evaluation and reporting capabilities have never been as user-friendly. PROTEUS-MT offers both, rapid and productive testing but also specialised applications for advanced testing.

Features

- The high degree of flexibility brought by template generation and by the test editor allows configuring the program according to the exact specifications needed.
- PROTEUS-MT is not only used in cement and ready-mix plants, building material test laboratories, but also for R&D in technical universities.
- Standard test types according to current standards, can be expanded in a modular way.
  Option: test editor, to define custom-specific test sequences
- Supports all widely used sample bodies with no dimensional limitations.
- Standard tests and special tests defined and stored as test templates. (Parameters set automatically according to the Standard used.)
- Custom test templates can be scaled according to the number of measurements, of decimal places, etc.
- Keying in an order and testing as separate activities.
- Mixed tests within a single test order (e.g. Elasticity Modulus and Pressure Test, etc.)
- Log output (including charts) according to type of test and of sample.
  Option: form designer for custom adaptation of log.
- Structured Database (SQL) with additional custom data that can be defined at every level (Order-Series-Sample), Object-Oriented, Modular and Network-Ready
- Data export in ASCII-format.
  Option: additional processing in external software such as your Laboratory Information Management System.
- Supports measuring devices such as measuring station, scales and slide gauges.
- Password protection for sensitive functions (H/W configuration, templetes, etc.)





Testing Software for Building Materials
PROTEUS-MT

Templates Make Testing Fast and Easy

Test templates contain all parameters needed for testing, such as Type of Sample, Type of Test, Test Standard, Quality Control, Graphical Representation and more. Several tests within a single order performed by assigning a test template to the series. Custom-made additional test templates can be defined in addition to the standard ones.

Simple to Operate

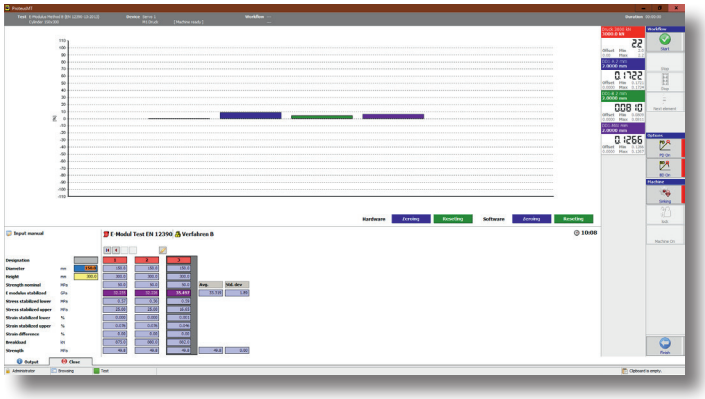
- All program functions can be selected with the mouse. The main functions may also be called with a combination of keys. Powerful object-specific functions called directly with the right mouse button to speed up operations: Copy, Paste, Clear
- Test classification in a relational database
- Database Structure: Databases can be structured according to any suitable folder hierarchy. Thus, tests can be sorted according to individual criteria, e.g. according to customers or suppliers, materials, type of test, time scales, test bodies. Each database contains any number of orders and series. A series contains at most 99 samples. Example: An order contains 3 series (Age 2, 7 and 28 days), each one with 3 samples.
- Data Export for Additional Processing: The data export function provides an interface with other external programs and stores the data in standard ASCII format. Option: Customer-specific ASCII formats.
- Logging: All series in an order can be printed out. The type of form is correctly handled by the Logging Manager, based on the test template. Option: Form Designer for custom-specific adaptation of forms.

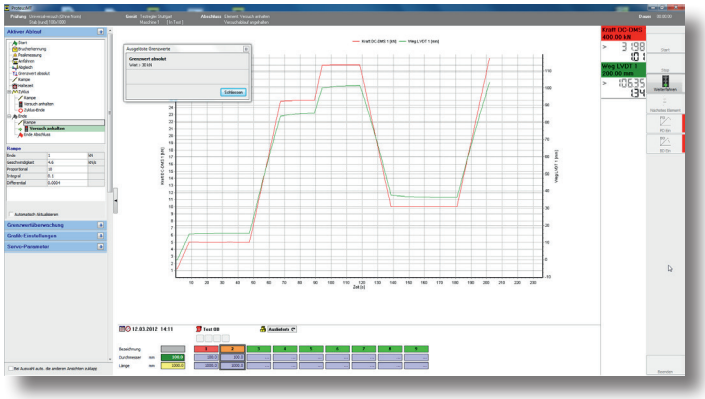
Standard Sample Bodies

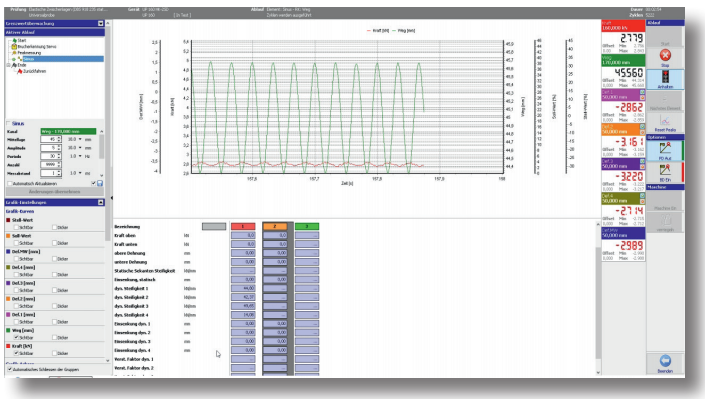
Depending on the type of test and the standard, the following approved sample bodies are available:

- Cubes:
  10, 15, 20 cm, 4, 6 inch
- Cylinders:
  10 x 20, 12 x 36, 15 x 15, 15 x 30,
  16 x 32, 20 x 20, 20 x 40 cm
- Drilling Cores:
  50 x 50, 50 x 100, 80 x 80, 80 x 160 mm
- Prisms:
  40 x 40 x 160 mm
- Bars:
  10 x 15 x 70, 12 x 12 x 36,
  15 x 15 x 70, 20 x 20 x 90 cm
- Plates:
  60 x 60 x 10 cm

Dimensions to be selected without limitations.



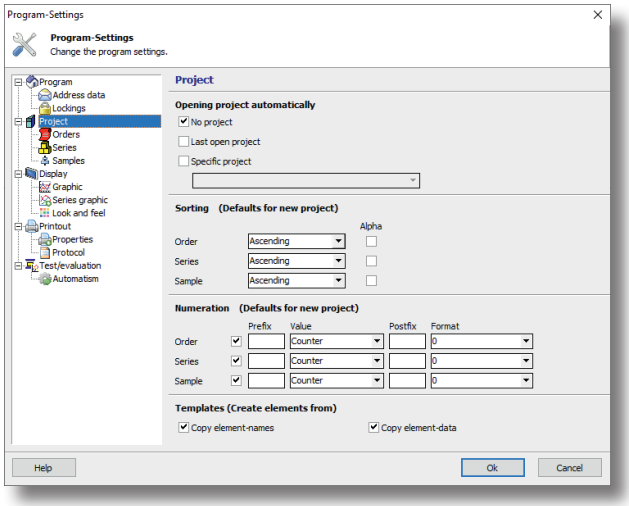


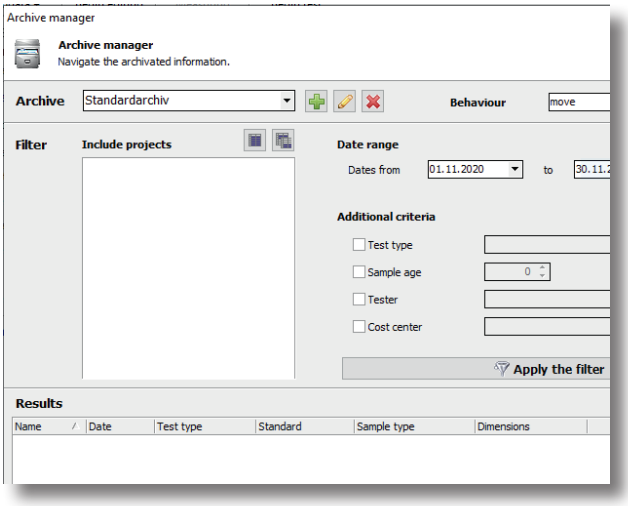


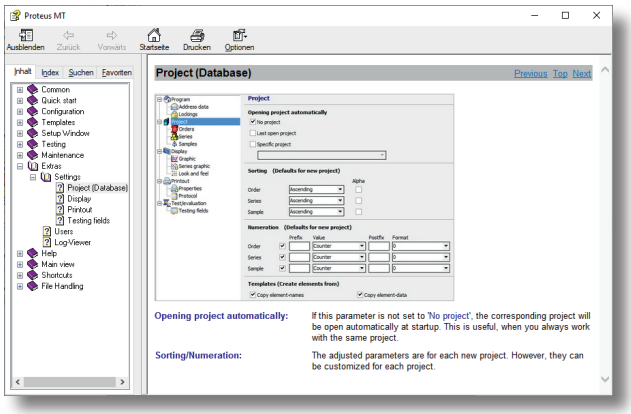
Testing Software for Building Materials
PROTEUS-MT

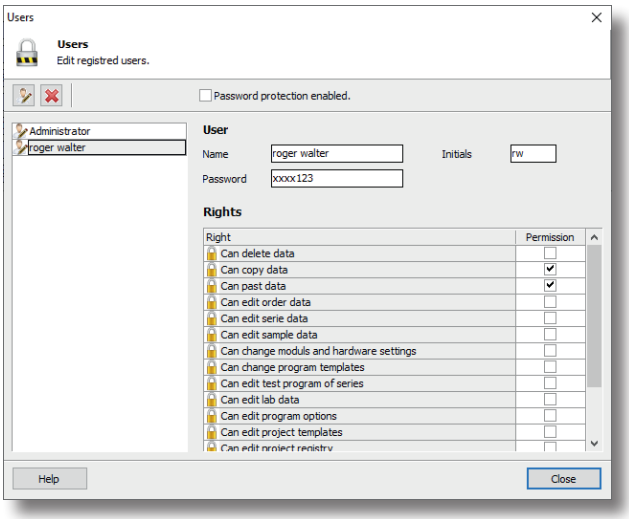
PROTEUS-MT Basis Module

- Data base contains a sample administration.
- Actual test and printer list with calendar make the daily work easier
- Connection of several controllers or measurements with up to 4 machines each
- is possible.
- For the combination bending-compression test 2 controllers are simultaneously in operation.
- Works with sliding gauge, balance, dial gauge and digital measuring station.
- Templates simplify the tests fundamentally. They are made with help of an assistant.
- Universal and special tests can be arranged on a graphically surface.
- Automated routine tests are easily created
- Password protection for the laboratory head for templates and hardware adjustments
- Standard export of the results in the ASCII-format for further processing in other programs
- Standard protocols for all tests, optional with or without graphic.
- Number of digits and rounding of the results can be indicated in the templates.
- Laboratory data base for further data fields in the order or series with choice of data, text and numeric fields with description and sorting
- Program for the calibration of the machine with DIGICON 4000







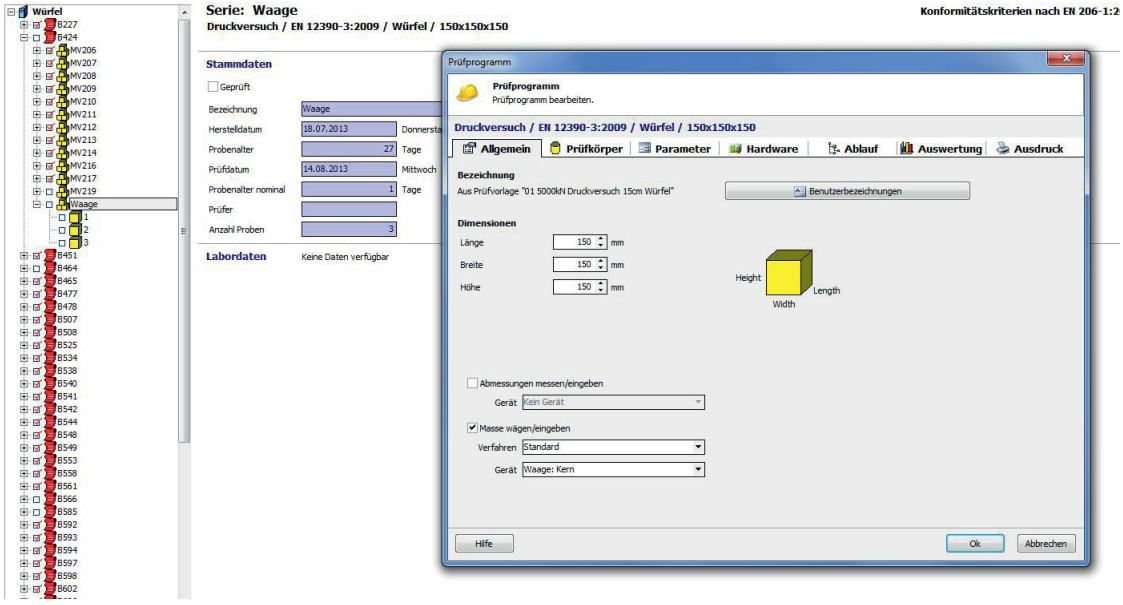


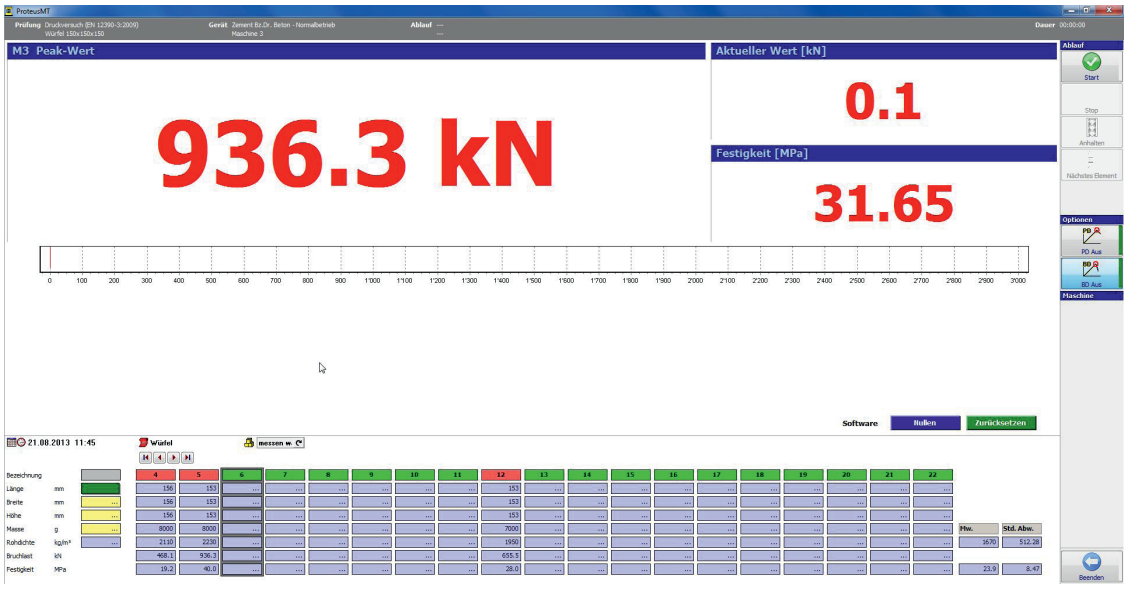
Testing Software for Concrete Testing
PROTEUS-MT

Proteus offers an extensive and growing library of standards-compliant test methods the field of concrete testing. These templates offer fast and easy operation and automatic test control, data collection, evaluation, and reporting capabilities.

These templates contain all parameters needed for testing, such as type of sample, type of test, test standard, quality control, graphical representation and more. Analysis including mean value and standard deviation of a series or group of tests.
Custom-made additional test templates can be defined in addition to the standard ones.

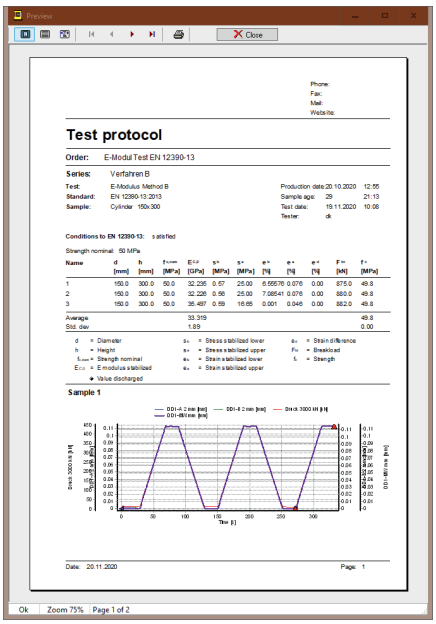
Entering of definable laboratory information data as production data, production place, delivery date and so on as well as integral calibration and linearisation.

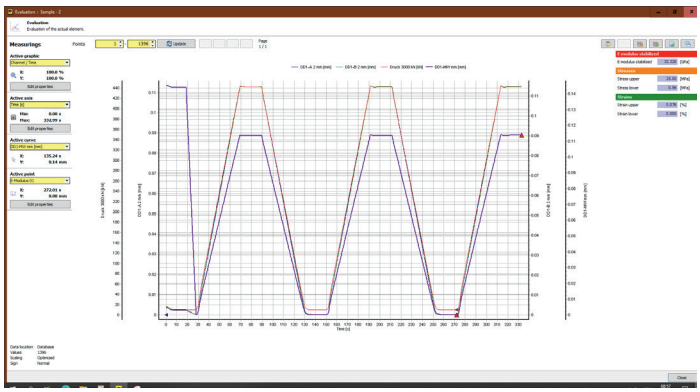


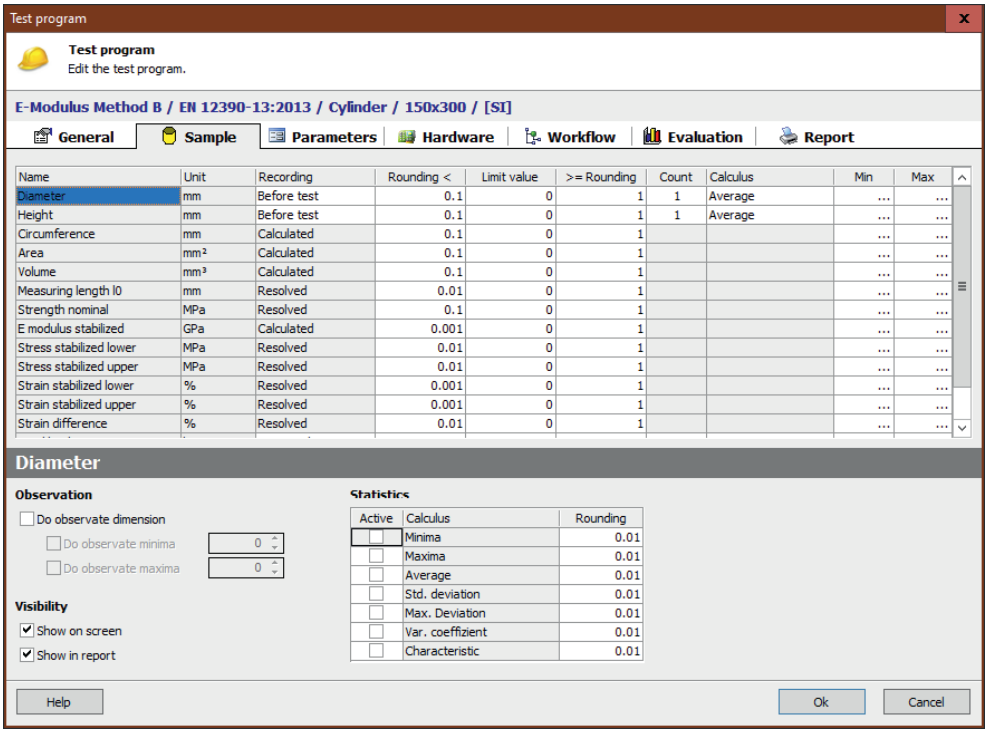


Available Templates

- Compression Tests according to EN 12390-3, ASTM C39, ASTM C873, ASTM D7012, ASSHTO T22, EN 12504-1, EN 206, DIN 1048, SIA 162-1, ÖNB 3303, NFP 18406, BS 1881
- Flexural (Bending) Tests according to EN 12390-5, ASTM C293, ASTM C78, AASHTO T97, DIN 1048, ÖNB 3303, NFP 18406
- Tensile Splitting (Brazilian Test) Template according to EN 12390-6, ASTM D3967, ISRM, DIN 1048, BS 1881, NPF 18-406, ÖNB 3303
- Modulus of Elasticity in Compression according to EN 12390-13, ASTM C469, ISO 6784, DIN 1048-5, ÖNB 3303, SIA 262, EN 13286-43, NS 676
- Modulus of Elasticity in Flexure (Bending)
- Compression and Tensile E-Modulus Testing according to EN 13286-43
- Axial and Diametral Deformation with E-Modulus according to DIN 18555
- E-Modulus on Cores in Horizontal Position
- Flexural Test with bending deformation
- Splitting Tensile Test with Radial Strain
- Paving Stone Splitting Test (Brazilian Test) according to EN 1338
- Plate Bending Test according to EN 1339
- Curb Bending Test on curb stones according to EN 1340
- Fibre Reinforced Concrete Test (Energy Absorption Test)
- Energy Test of sprayed Concrete according to DBV Data Sheet or SIO 262-6
- Bending Test of Sprayed Concrete according to NFP 18409
- Testing of Fibre Metallic Reinforce Concrete according to EN 14651
- Testing of sprayed Concrete on reinforced platens according to EN 14651
- Pipe Testing according to EN 1916
- Masonry Testing according to EN 1052
- Testing of Brick according to EN 772-1
- Gully Top Testing according to EN 124
- And others







Name	Unit	Recording	Rounding <	Limit value	>= Rounding	Count	Calculus	Min	Max
Diameter	mm	Before test	0.1	0	1	1	Average	...	...
Height	mm	Before test	0.1	0	1	1	Average	...	...
Circumference	mm	Calculated	0.1	0	1			...	...
Area	mm²	Calculated	0.1	0	1			...	...
Volume	mm³	Calculated	0.1	0	1			...	...
Measuring length l0	mm	Resolved	0.01	0	1			...	...
Strength nominal	MPa	Resolved	0.1	0	1			...	...
E modulus stabilized	GPa	Calculated	0.001	0	1			...	...
Stress stabilized lower	MPa	Resolved	0.01	0	1			...	...
Stress stabilized upper	MPa	Resolved	0.01	0	1			...	...
Strain stabilized lower	%	Resolved	0.001	0	1			...	...
Strain stabilized upper	%	Resolved	0.001	0	1			...	...
Strain difference	%	Resolved	0.01	0	1			...	...

Active	Calculus	Rounding
	Minima	0.01
	Maxima	0.01
	Average	0.01
	Std. deviation	0.01
	Max. Deviation	0.01
	Var. coeffizient	0.01
	Characteristic	0.01

After Sales Service

The world-wide network of w+b highly qualified factory trained support stuff provides customers with comprehensive after sales solutions for *w+b* testing systems.

We are focused on the individual customer support and the offered services include on-site installations, repairs and maintenance throughout the entire life cycle of your testing equipment. Customers of *w+b* know they can benefit a maximum from the acquired testing equipment, and with provided after sales service they are in good hands – now and in the future.

Over 50 Years of Experience

- Customers prefer w+b becauseof our individual customer approach coupled with flexibility and versatility in developing the most customized and specific testing systems.
- However there is more. By choosing a testing system from w+b you start a long-term partnership with us.
- With our world-wide network of w+b highly qualified support and maintenance engineers provides you with an optimum after sales support, to make sure you get the most from your investment.
- w+b constantly invests in hiring and training service engineers and local representatives.
- w+b provides customers with comprehensive free of charge telephone support of all specialists for the lifetime of the product.
- Our large stock of spare parts from the most w+b equipment helps you to minimize the idle time in case of problems with equipment.
- w+b test systems are designed forstable and long term operation. With the provided constant comprehensive service and support you will profit the maximumfrom your ystems throughout their entire life cycle.

Instruction Manual

At w+b a comprehensive customer support starts with a detailed instruction manual. To each system we deliver a complete technical manual including information about safety, system installation, machine setup, technical drawings of testing system, hydraulic and electric schemes with items list, software and hardware manuals, maintenance information, a.s.o. By providing from very beginning this technical information to our clients, which is later on demand complemented by telephone support, enables us to have practically more than 90% of all shut-downs solved instantly.

Installation and Warranty

Our qualified field service engineers are available in short terms to install and to commission your testing system on site after its delivery. All our field service engineers are factory trained and complete the installation in a timely manner.Our service guarantees the reliable commission and operation of your testing system according to the technical specification. All w+b products are covered by a factory warranty.

Customer Training

It is essential that our clients use w+b testing systems to its full extent, i.e. by employing all possible features and capabilities of the acquired equipment. Additionally, as a well-known fact the comprehensive knowledge of machine operation practically reduces the instrumental setup times, also prevents possible mistakes and in turn increases your testing efficiency. Therefore, the technical instruction and extensive operation training are provided by w+b engineer at the time of system's commissioning. Further repetitive training, organized either on site or at w+b premises, ensures that new system's operators from customer side are properly instructed on the operation capabilities of the installed system, likewise the skills of already trained operators are refreshed and retained. We provide an extensive range of comprehensive training courses focused on complete machine operation, software usage, sample alignment, all types of materials tests, and many others. These courses can be scheduled with a short notice and given either at w+b or at your premises.

Hardware & Software Support

To ensure that the acquired system can be steadily employed even though your testing requirements are changing with the time, our software and hardware engineers, including w+b local representatives, will assist you with these tasks, as well as you will receive the detailed information on w+b continuous development of software and hardware. This will guarantee that your system is maintained at peak performance. Through planned and systematic service visits of our engineers for preventive maintenance and calibration of your testing system, any potential problems can be identified beforehand and resolved immediately avoiding unnecessary machine's idle time.

Calibration

w+b calibration laboratory is accredited according to the latest ISO EN IEC 17025 (formerly EN 45001) standard. The calibration and verification of your materials testing machine is a part of our provided service. Our field service engineers are not only trained to perform maintenance and calibration service on w+b machines, also the testing machines of other producers are successfully verified and calibrated in a daily manner. The calibration certificate will prove the verification of your system conforming to ISO 9001 and other standards.

Application Service

We consult customers concerning testing techniques and provide with necessary tools, as well as we create report templates or graphic presentations precisely suited to your specification, developed based on w+b standard software packages. Our application experts have many years of experience in development of materials testing applications and will create a product to fully meet your requirements.

Maintenance and Calibration of Materials Testing Systems

by *w+b* Accredited Calibration Laboratory

The maintenance and service works on your materials testing equipment is executed by our specialists with highest attention and precision, and with experience of over 45 years. Highly precise computer-aided calibration equipment guarantees a calibration according to the latest international standards.

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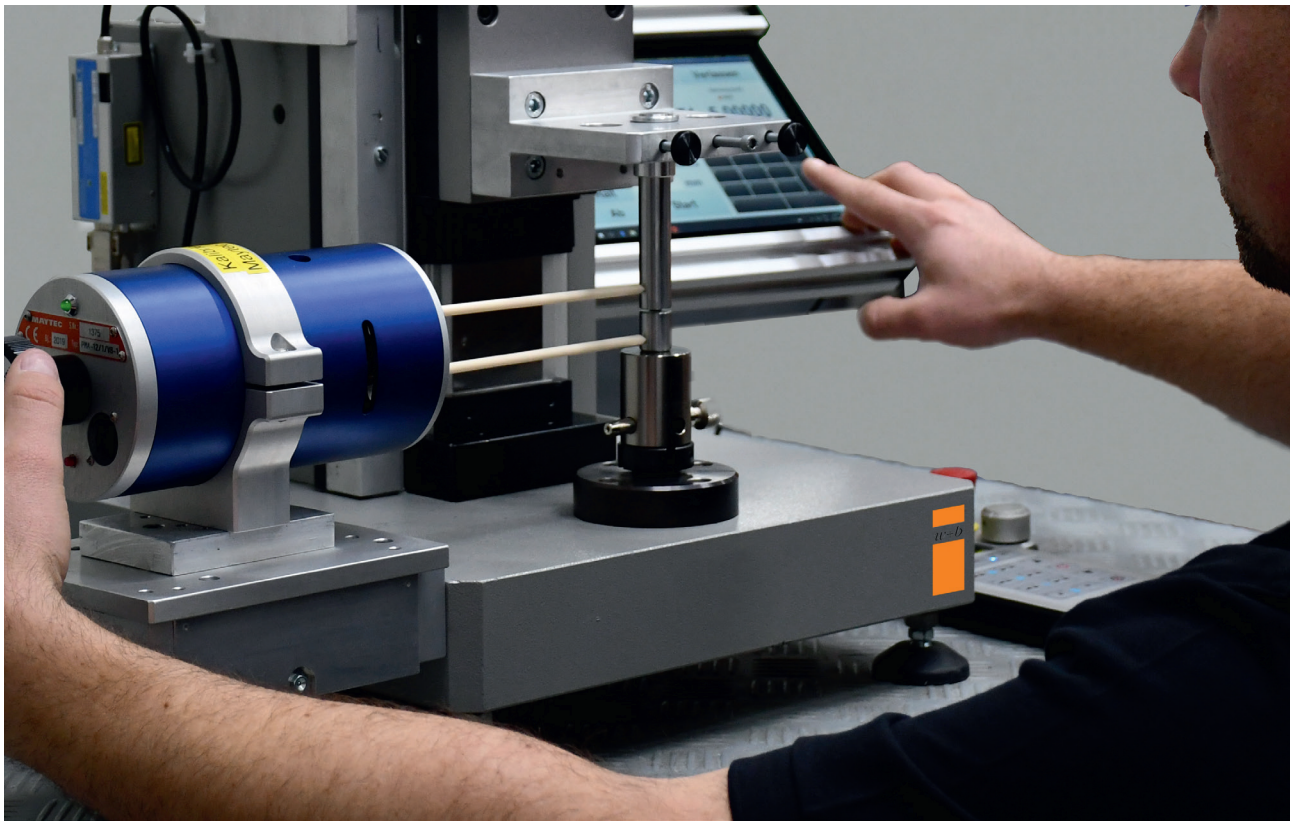
Our calibration laboratory is certified according to ISO/IEC 17025 which is recognized through the Multilateral Agreement (MLA) for EA - European Cooperation for Accreditation. The maintenance and calibration performed by our specialists with 45 years of experience assure a reliable execution of the service. Your savings: there are no extra costs for an additional calibration by a further official calibration institute, since we are an accredited calibration laboratory.
We will calibrate your test equipment independently of the type and manufacturer. We offer excellent conditions together with flexible dates. The accreditation according to ISO/IEC 17025 is recognized through all signatories of the EA (European Cooperation for Accreditation) multilateral agreement of calibration.

w+b Calibration Laboratory is accredited for:

- Force - Tension, Compression
- Pressure
- Length - Displacement, Deformation
- Hardness
- Energy - Impact Tester



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