

## Compression Testing Machine Series D

The D series are rugged, durable and highly reliable designed systems often the best choice for high-volume testing of concrete in the field of quality control.

These concrete 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 and well suited for the determination of the Young's modulus on concrete in accordance with EN 12390-13, ASTM C469, ISO 6784 and DIN 1048-5.

These systems come along with the latest digital closed-loop controller for force, stress, displacement or strain control modes and is compatible with a wide range of additional fixtures and devices makes these concrete testing machines also well suited for a wide range of demanding application in the field of research and product development.



## Testing of Concrete

Testing systems for brittle materials such as concrete require high stiffness load frames that minimize the amount of deformation energy that is stored in the frame.

Additionally, it is essential to have a special strengthened upper platen assembly to assure durable testing.

The concrete compression testing machines series D workhorses are the professional solution for those who regularly perform strength tests on concrete in the field of quality control or R&D.

## Designed for High-Volume Testing

The concept of the D series with high stiffness load frame, separate control console with integrated hydraulic power supply with real closed loop control in combination with servovalve is made for high-volume testing.

## Versatile, Modular & Flexible

This 4-column compression test system is designed not only for the determination of the compressive strengths in the field of quality control but also compatible with a wide range of fixtures, devices, extensometer and other accessories work tools suitable for a wide range of demanding applications for research and product development.

These test systems are flexible and can be configured to different tests with different sample types.

## 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 test 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

Our D-Series delivers repeatable and accurate test results as this test system incorporates features developed on our long experience.

- Machine equipped with accurate pressure transducer or available with direct force measurement through load cell
- Precise machined actuator with long piston minimize piston tilting and reduce friction
- High responsive control in combination with high-speed real closed loop controller in combination with high-responsive servovalve
- High system stiffness for long-term repeatable testing
- High-accurate analogue digital signal conversion with low noise
- And many others

## High Stiffness Load Frame

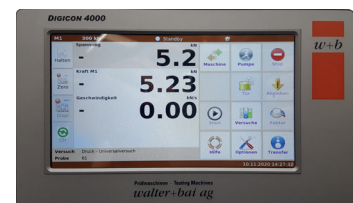
In order to obtain repeatable test results with smooth specimen breaking can be achieved and robust, durable, and long-term trouble-free operation is assured our load-frames are designed with high load frame stiffness. This high axial stiffness minimizes the stored energy in the frame that will abruptly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

The controller can be used as stand-alone unit or works through high-speed Ethernet interface with Proteus-MT application software.



## Proven Servohydraulic

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

## Low System Pressure for Long Lifetime

The D-Series features a large piston diameter in order the system pressure does not exceed 400 bar for the nominal machine capacity. The low system pressure allows us to use a real high quality servovalve instead of a proportional control valve and other high quality hydraulic valves including hydraulic pump.

This moderate system pressure makes the D-Series a long-lasting system compared with those who work with small actuators and system pressures above 500 to 700 bars.

## Spherically Seated upper Platen with Oil Filling

Another outstanding feature of these testing machines are the design of the upper compression platen.

The special design of the upper spherically seated platen with oil filling assures optimized self-alignment of the upper machine platen with the specimens surface.

## Strain Test Execution

The D 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.

## Resistant Compression Platen

The compression platens are hardened and precise flat grinded complying with ISO 409-1, BS 1881 Part 115/86, ISO 4012/2 and ISO 6507-1. For easy and productive specimen alignment the lower compression platen having etched centring rings and diagonal lines for round and cube specimens.

## Safety

These test systems are designed with operator's convenience and health in mind.

The D 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.

## 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.

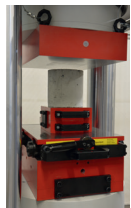


## Option Load Cell

The D-Series is available with installed high accuracy electronic compression load cell for increased machine accuracy. This option includes the strain gaged load cell that is installed between upper crosshead and upper platen. With this option the machine accuracy grade 0.5 can be reached according to ISO 7500-1.

## Option for Increased Test Space

For customers with the requirements of testing longer specimens these testing machines are also available with increased test space between compression platens.

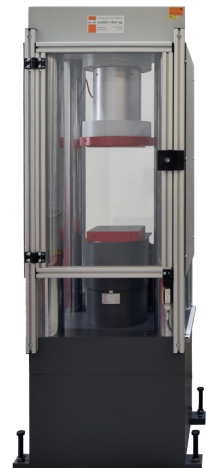


## Spacer (intermediate) Platen

We are offering the full line of hardened and grinded spacer (intermediate) platen to reduce the test space in accordance with your specimen height.

## Option for Bigger Compression Platen

For customers with the requirements of testing longer specimens these testing machines are offered also with increased test space between compression platens.



## Option for Removable Intermediate Platen

For those who have a wide variety of specimen with different heights we are offering suitable system for easy dimensions with customers with the requirements of testing longer specimens these testing machines are also available with increased test space between compression platens.



## Option for additional Piston Stroke Transducer

These testing machines can also be equipped with additional piston stroke transducer for measurement and control of the piston stroke. The piston stroke transducer is mounted on the rear side of the testing machine.



## Option for Second measuring Range

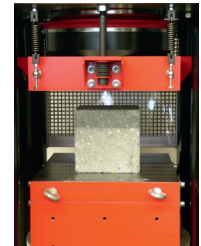
When the concrete testing machine is used for tests with lower forces requirements as for example when testing smaller specimen or for the determination of the Young's modulus on concrete in accordance with EN 12390-13, ASTM C469, ISO 6784 and DIN 1048-5 the additional measuring range increase the system resolution and accuracy when smaller forces are required.

## Option for High Strength Concrete up to 200 N/mm<sup>2</sup>

Designed for testing of high strength and ultra-high strength concrete specimens with compressive strength up to 200 N/mm<sup>2</sup>.

This option includes:

- Lower compression platen directly fixed over a distance plate with the piston
- Extra stiff straintest swinging axle for the pick-up of very high bending moments
- Distance pieces with a lateral fixing for the bolting down with the compression plate
- Distance plates are directly screwed with the compression plate
- Digital controller with a optimal measuring value scanning rate of 500 Hz for a fast breaking point detection
- Load Frame bearing over a load sharing stripe and damping elements
- Guard plates on lateral sides at the lower platen
- Electrical lockable door limit switches



## Option for High Strength Concrete above 200 N/mm<sup>2</sup>

If the expected strength (surface pressure) will be  $\geq 200$  N/mm<sup>2</sup>, we are offering compression platen made from ultra-high strength steel suitable for specimen strengths above 200 N/mm<sup>2</sup>.



## Option for Brick Testing

This option includes reinforcements for masonry units, bricks and (clay) blocks testing and includes:

- Four (4) bearings at the upper platen
- Four (4) bearings at the machine's head
- Four (4) absorbing elements with shock-resistant springs made of PVC
- Lower platen screwed to the piston
- Cylinder screwed to the machine's foot
- Piston with shoulder or flange ring
- Platen with additional borings
- High strength friction screws
- Splitted ring for the screwing of the cylinder
- Machine on rubber-metal rails
- Reinforced flow control valve to absorb the hydraulic impact

## Option for Chromium Plated Column

These test systems are available with painted or polished and hard chromium-plated columns.

The columns offer accurate straightness for increased machine alignment.

The chromium-plated columns further are easy to clean and must not be lubricated with oil.

## Option for Platens Surface Hardness and Roughness Certificate

Our accredited calibration laboratory supplies the official calibration certificate for the machines and intermediate compression platen for hardness and roughness.



## D-Series 19" Operation Control Console with integrated Hydraulic Power Supply

This space saving and ergonomic operation Control Consoles are modular designed and available for all D-Series machines, provide closed loop servocontrolled hydraulic actuation in combination with high-resolution and high-speed digital control system, servovalve and load-cell, piston stroke transducer, extensometer or any other external transducer.

The Control Console offers ergonomic and space-saving operation that includes in the upper part integrated necessary periphery equipment like personal computer with running material testing software, screen, keyboard, digital controller and electrical switch board. The hydraulic power supply which furnish the necessary pressurised oil for the D-machine is integrated in the base of the Control Console. Due to the used internal gear pumps the system base a very low noise level. The tank is put on anti-vibration elements to avoid any vibrations on the console. The hydraulic part includes oil tank, pump, safety controls, pressure limited, oil filter, oil/water cooler or oil/air cooler (external) etc, filter glogged indicator, temperature limit switch, low oil level switch and more.

### Features

- Compact and ergonomically unit
- Integrated large oil tank
- Low noise internal gear pump as main pump
- Oil filter with electrical indication when filter is glogged
- Oil/water cooler with thermostatic regulation water-valve for minimum water consumption or oil/air cooling
- Electrical maximum temperature protection
- Electrical minimum oil level protection
- Electrical motor protection

### Low-Noise

The hydraulic power supply for the test system is integrated in the base of the machine. The machine is designed in order it can operate with a system pressure below 300 bar. The hydraulic pressure and oil-flow is generated by a low-noise internal gear pump that works with low pulsations. The motor-pump group is mounted vertical on the tank so that the pump submerged into the oil. This compact design helps to reduce the noise level.

### Integrated In-Line Hydraulic High Pressure Filter.

The performance, life-time and reliability of servohydraulic 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 In-Line Hydraulic Pressure 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(s)

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

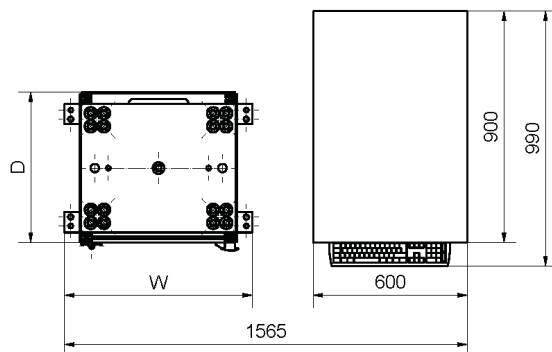
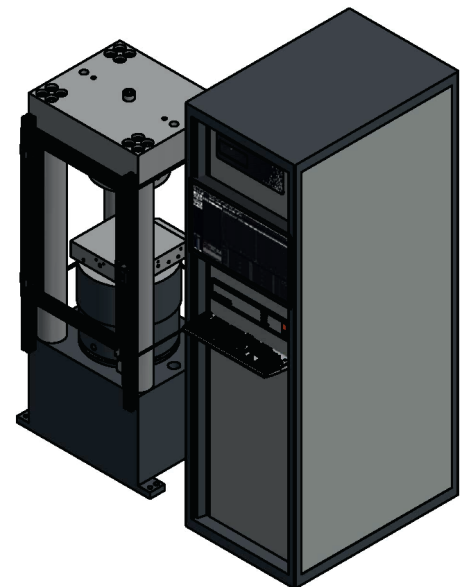
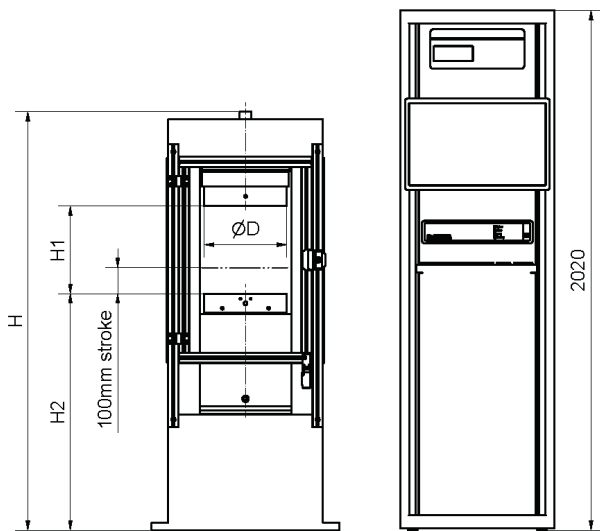
The hydraulic power pack of the testing machine is cooled by an air-oil cooler or alternative available with oil-water cooling system and can be operated in permanently. Integrated control and monitoring of the oil-temperature, filter element and oil-level is also provided.

### Designed for Serviceability

Special attention was paid to the serviceability of our Cement Testing Machines. Parts are easy to clean and good access to hydraulic and electric installation is provided.



Technical Data Model D		3000	3000/1000	4000	5000	6000	10000
Force Range	kN	3000	3000	4000	5000	6000	10000
Force Measurement Accuracy Grade 1 ISO 7500-1	kN	60-3000	60-3000	80-4000	100-5000	120-6000	200-10000
Piston Stroke	mm	100					200
Operating Pressure	bar	397	397	372.02	378.72	361.30	353.67
Test Chamber Height (H1)	mm	340	1000	340	340	340	500
Test Area Width	mm	355 x 255	450 x 450	450 x 450	450 x 450	450 x 450	800 x 600
Column Diameter	mm	Ø 120	Ø 120	Ø 150	Ø 150	Ø 160	Ø 180
Upper Compression Plate	mm	Ø 320	400 x 400	Ø 415	Ø 415	Ø 415	500 x 500
Lower Compression Platen	mm	320 x 320	400 x 400	420 x 420	420 x 420	420 x 420	500 x 500
Hardness of Compression Platen	HRC	55					
Working Height (H2)	mm	920	920	920	949	982	1520
Frame Stiffness	kN/mm	3650	3000	4200	4800	6000	9800
Overall Width (W)	mm	730	890	890	890	905	1325
Overall Depth (D)	mm	500	760	760	760	775	1125
Overall Height (H)	mm	1685	2270	1704	1900	1900	3375
Frame Weight	kg	1730	3000	4240	4840	5150	17500
Power Requirements		400 V, 50 Hz, 3 PH, E, N (60 Hz on request available)					
Power Rating	kW	2.2	2.2	2.5	2.5	2.5	2.5
Operating Temperature Range with Oil/air cooling with optional Oil/Water cooling	°C	+15 to +30 +15 to +40					
Humidity Range	%	20-92% Non-condensing					



## Control console with Measuring and Weighing System for Increased Productivity and Ergonomic Working

For customers that requires high specimen throughput combined with ergonomic workflow the control console with measuring and weighing system can be added to the D series instead of the 19" Control Console.

This system allows the quick and accurate determination of the weight and dimensions of cubes and cylinders.

A high reproducibility of these measurements are obtained because operator influences are reduced and measuring data are sent direct into the Proteus Test Software. The specimen weighing and measuring process is quick so that your qualified laboratory staff is relieved of routine jobs and is thus available for more complex activities.

### Measuring Process

The sample is shifted over the rollers against the front stop. Then the measuring-bow with incremental measuring system is pulled manually forward against the sample. The bottom on top of the handle releases the measuring. The integrated high precision balance determines the weight of the sample. The specimen height is automatically measured in the compression testing machine at a small pre-load. All measuring values are automatically transferred into the testing software via interface.

### Features

- Upper Part:
  - 19" rack with integrated electrical control and digital controller
  - PC, Monitor and Printer
  - Balance control display
- Middle Part:
  - Integrated high precision balance
  - Digital measuring device
  - Roller path for easy entering of the specimen into the testing machine
- Lower Part:
  - Front doors and cabinets
  - Integrated low noise hydraulic power pack to furnish the pressurized oil for the testing machines

### Control

- Servo-controlled test procedure in closed loop mode in connection with servovalve and digital controller DIGICON 4000
- PC with building material testing software PROTEUS-MT

### Options / Accessories

- Models with 1, 2 or 3 corpus
- Additional 1 meter roller to put on the side of the system
- Automatic measuring of the dimensions by pressing a release switch and with hydraulic linear actuator
- Digital vernier
- Extensometers

### Specimens

- Cylinders            Ø 95 - 160 mm
- Cubes             95 - 210 mm

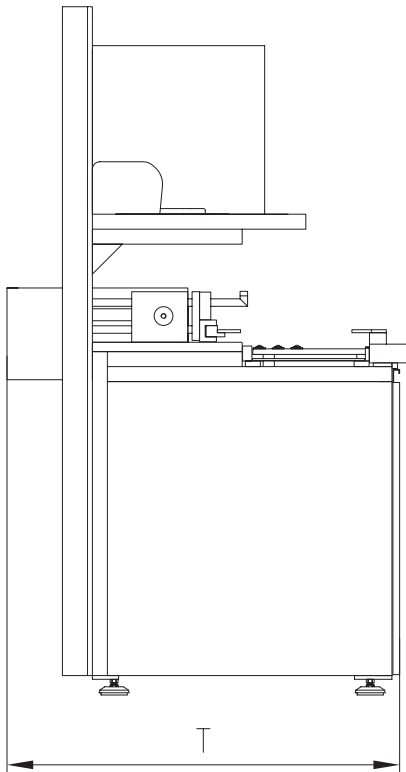
### Available with Machines

- Series D
- Series DV
- Series DB
- Any other testing machine can be connected on the other side of the console.



## Specifications

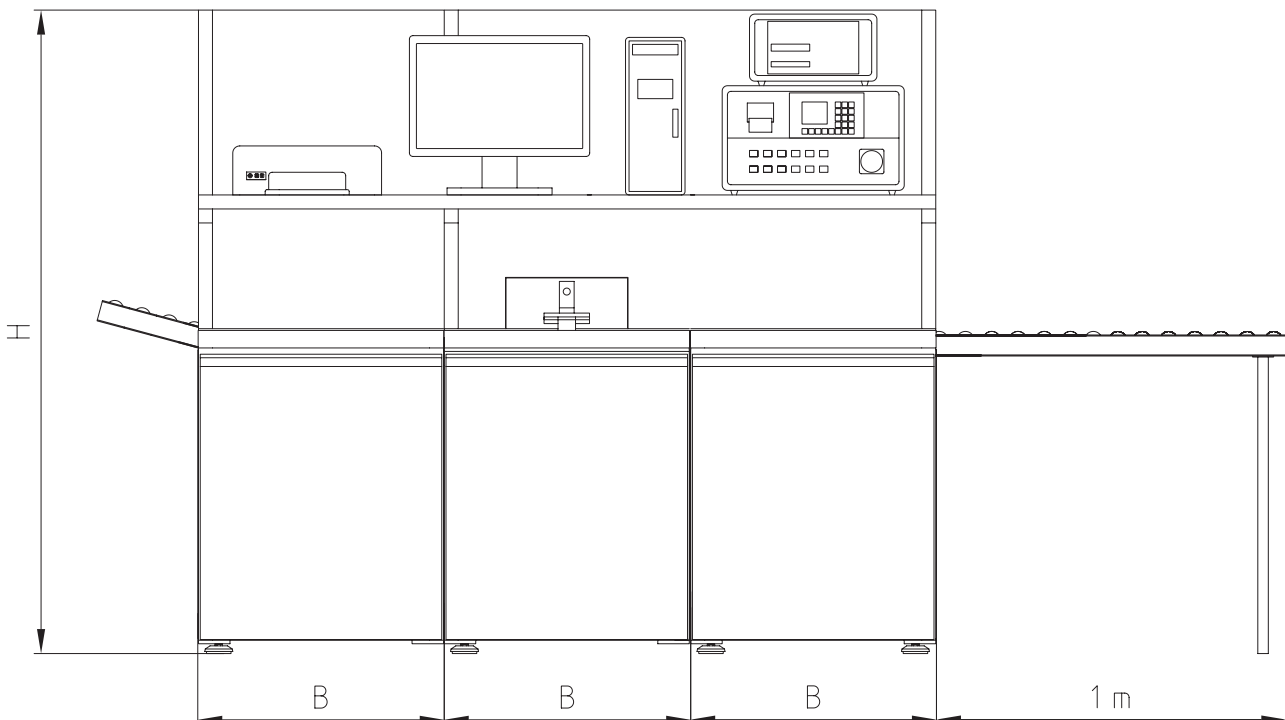
<b>Models</b>	SP SP - WMS SP - WMS2	Control console with measuring and weighing system with additional 3rd corpus
<b>Accuracy</b>	Balance 1 g Measuring Device 0.1 mm	
<b>Colour</b>	Stainless steel and white board on the back	
<b>Power Requirements</b>	3 x 400 V, 50 Hz. Others upon request	



Technical Data		1.5	2.5	4.0
<b>System Corpus</b>	No.	1	2	3
<b>Console Width (B)</b>	mm	700	1400	2100
<b>Console Depth (T)</b>	mm	840	1025	
<b>Console Height (H)</b>	mm	1900		
<b>Roller Width</b>	mm	300		
<b>Working Height</b>	mm	900		

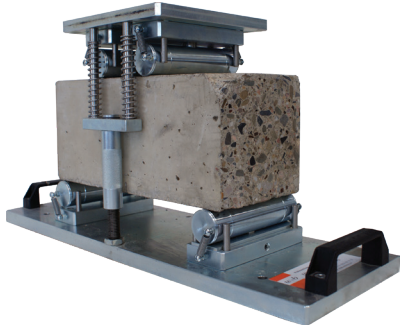
### Available Integrated Hydraulic Power Packs

Power Pack	PA	1.5	2.5	4.0	5.0	6.5
<b>Pump Delivery</b>	l/min.	1.5	2.5	4.0	5.0	6.5
<b>System Pressure</b>	bar	400				
<b>Tank Capacity</b>	Litres	25		40		50
<b>Cooling Requirement</b>	l/min.	0.2	0.4	0.6	0.8	1.0
<b>Power Consumption</b>	kW	1.0	1.5	2.5	3.0	4.0
<b>Weight with Oil fill</b>	kg	300	310	340	360	380
<b>Noise level at 1 m</b>	dBA	58			59	





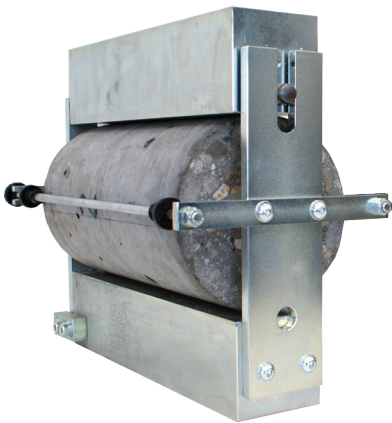
## Concrete Testing Devices for Compression Testing Machines



### Flexural Test Device Series BV

Specially designed for 3- and 4-point bending tests on concrete beams. Equipped with two lower rollers, one of them articulated and two upper rollers for 4-point bending tests. It is possible to place in the centre only one upper roller for 3-point bending tests. To perform the flexural tests, the device can directly be placed into compression testing machines.

Technical Data	BV 150
Standards	EN 12390 - 5 and ASTM C78, C293
Sample Dimensions	100 x 100 x 400/500 mm, 150 x 150 x 600/750 mm
Device Dimensions W x D x H	610 x 200 x 320 mm
Weight	27 kg



### Splitting Tensile Test Device for Cylinders Series SPV 100 - 102

Specially designed for splitting tensile tests on cylindrical specimens. The device can directly be placed into compression testing machines.

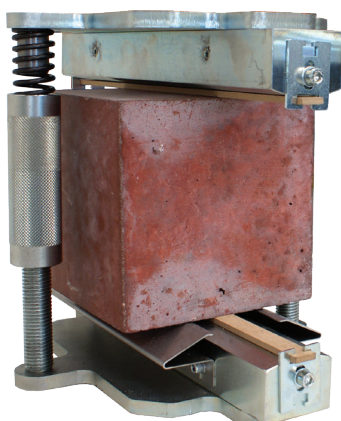
Technical Data	SPV 100	SPV 101	SPV 102
Standards	EN 12390-6, ASTM C496		
Sample Dimensions Diameter x Height	150 x 300 mm 160 x 320 mm 6" x 12"	100 x 200 mm 110 x 220 mm 4" x 8"	40 x 80 mm
Device Dimensions W x D x H			
Weight	30 kg	15 kg	1 kg



### Splitting Tensile Test Device for Cylinders Series SPV 200

Specially designed for splitting tensile tests on cylindrical specimens or cubes and block pavers. The base is equipped with flat springs centring and keeping the specimen in position. Two columns with adjustable height sustain the upper plate by two springs. The device can directly be placed into compression testing machines.

Technical Data	SPV 200
Standards	EN 12390 - 6, EN 1338
Sample Dimensions Diameter x Height	100 x 200 mm, 160 x 320 mm, 4" x 8", 6" x 12"
Device Dimensions W x D x H	350 x 250 x 264 mm
Weight	17 kg



### Splitting Tensile Test Device for Cubes Series SPV 300

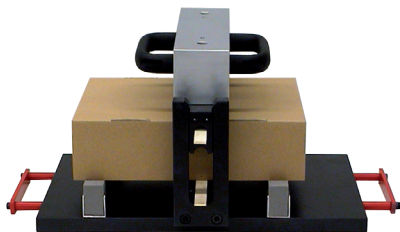
Specially designed for splitting tensile tests on cylindrical specimens or cubes and block pavers. The base is equipped with flat springs centring and keeping the specimen in position. Two columns with adjustable height sustain the upper plate by two springs. The device can directly be placed into compression testing machines.

Technical Data	SPV 300
Standards	EN 12390 - 6, EN 1338
Sample Dimensions	100 mm, 150 mm
Device Dimensions W x D x H	350 x 250 x 264 mm
Weight	17 kg

## Further Testing Devices for Concrete Testing Machines

### Splitting Tensile (Brazilian) Test Device Series SPV 1338

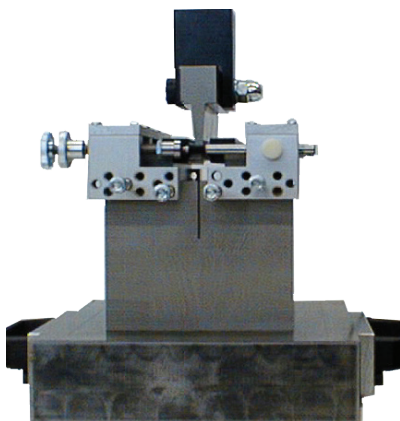
Specially designed to test paving stones according to EN 1338 and other international standards. This splitting device can be placed into the compression area of concrete testing machines. Accessories: hardboard strips 4 x 10 x 285 or 320 mm (100 pcs.) in accordance with EN 1338.



Technical Data Type SPV	1338-1	1338-2	1338-3
Standards	EN 1338		
Sample Width max.	265 mm	265 mm	300 mm
Sample Length	unlimited	unlimited	unlimited
Sample Height	25 - 125 mm	40 - 140 mm	40 - 140 mm
Dimensions Device W x D x H	330 x 430 x 310 mm	330 x 430 x 310 mm	330 x 430 x 310 mm

### Wedge Splitting Test Device Series WST

For the determination of the specific rupture energy of notched cubes of 100 or 150 mm side length in existing testing machines with closed loop control. Consisting of splitting edge, angular holders with rolls, 2 LVDT displacement transducers with fixtures, digital display with integrated measuring amplifier for value true display of averaged deformation. Devices for larger samples as cubes 200 mm or cylinders Ø 150 x 300 or 160 x 320 mm upon request.



Technical Data	WST 100
Standards	-
Sample Dimensions Cube Length	100 or 150 mm

## Axial Extensometer (Compressometer) Type BD 25/50

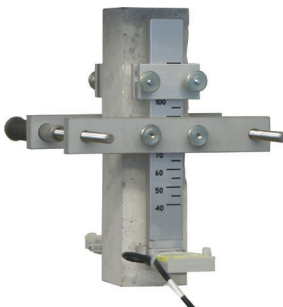
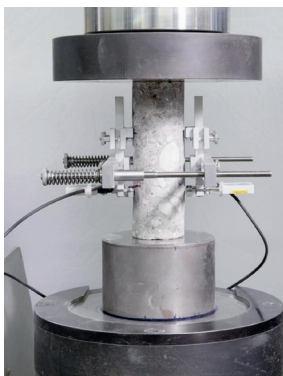
The BD 25/50 axial extensometer is designed for the determination of the modulus of elasticity in compression of mortar, cement, concrete, rock and other materials.

The extensometer can be configured to be attached to cylinder, cores, and prisms in different dimensions.

This model measures axial strain on opposite sides of the test specimen with independent outputs making the BD 25/50 suitable for the determination of the Young's modulus on concrete in accordance with EN 12390-13, ASTM C469, ISO 6784 and DIN 1048-5.

The test procedure according to EN 12390-13 assess that the specimen centring should be controlled twice. The first time after the second loading and unloading cycle, and the second time after the third loading. After the second cycle of lading and unloading the deviation of the strain values of the two sides cannot excel +/-20% of the mean strain values. When the difference is greater, the specimen should be centred again. In the case of a second control, the difference may not exceed 10% of the strain average value.

When this extensometer is used with our Proteus application software, beside of the average value also both single values are displayed with automatic observation of the deviation in accordance with EN 12390-13.



### Features

- Full bridge 350 ohm strain gaged design for compatibility with nearly any test system
- High accuracy unit
- Dual independent output (averaging box optional available)
- Suitable for large range of specimen sizes and shapes
- Easy mounting
- Self-supporting on the specimen
- Adjustable clamping force
- Supplied in high quality wood lined case

### Technische Daten

Measuring Range	±2 mm (⇒2 mV/V)
Measuring Accuracy	Grade 0.5 according to ISO 9513 ASTM class B-1
Linearity Error including Hysteresis	≤ 0.05 %
Gauge Length (adjustable)	40 – 220 mm
Quickset clamps for specimen	∅ and □: 30-160 mm
Sensor Type	2 x HBM – DD1
Temperature range	-10°C up to +60°C
Includes high quality wood lined case	

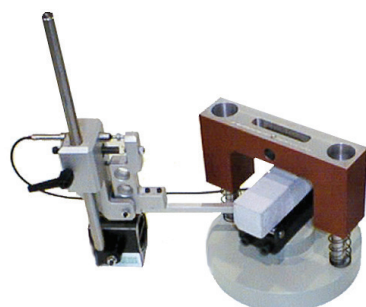
## Precision Universal Extensometer Type DBA 10

Designed for use where deformations must be measured in bending tests or where unusual geometries are involved. This extensometer can be connected to existing machines or to a separate digital display.

This precision extensometer is designed for the precision measurements until specimens failure where the extensometer is in contact against the specimen. The gauge arm is over-travel protected.

### Features

- Adjustable mounting block with magnet and precision displacement transducer
- Digital read-out in portable box for universal use on different testing machines or with signal conditioner integrated in the digital controller
- Including set of cables.



Technical Data	Type DBA 10
EN ISO 9513 Accuracy Class	1.0
Measuring Travels	5, 10, 20 or 25 mm
Length of Measuring Lever	200 mm
Displacement Transducer	LVDT

## 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 an 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.

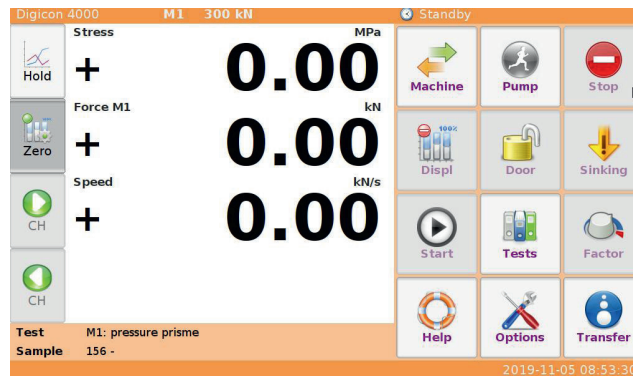
## Operator Safety

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

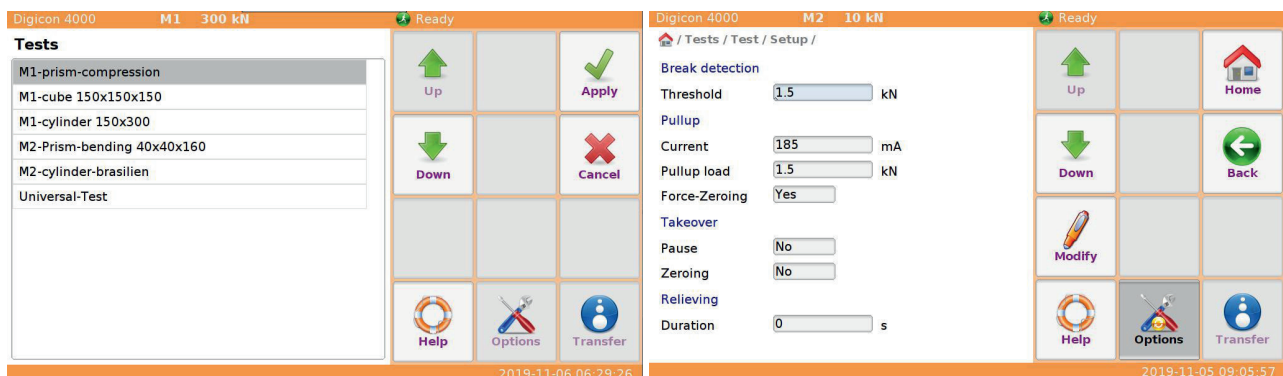
## Standalone Operation

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 Proportional 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	4 Dual MV11
Type	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.

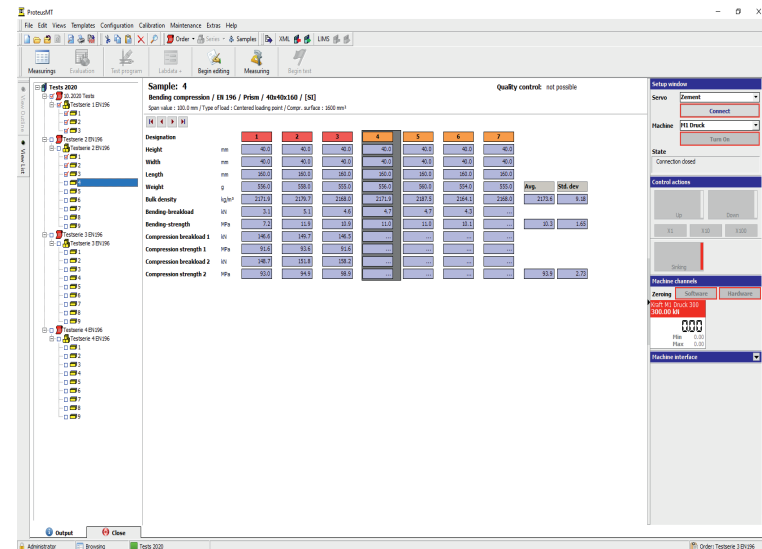
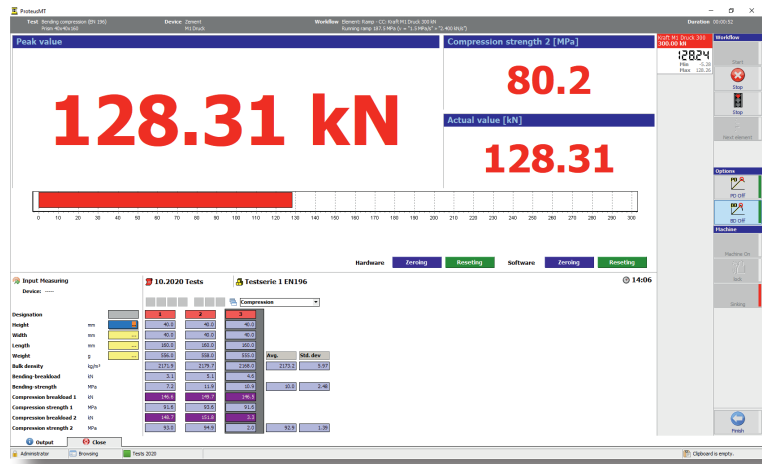


## Testing Software for Building Materials PROTEUS-MT

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 concrete 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, templates, 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

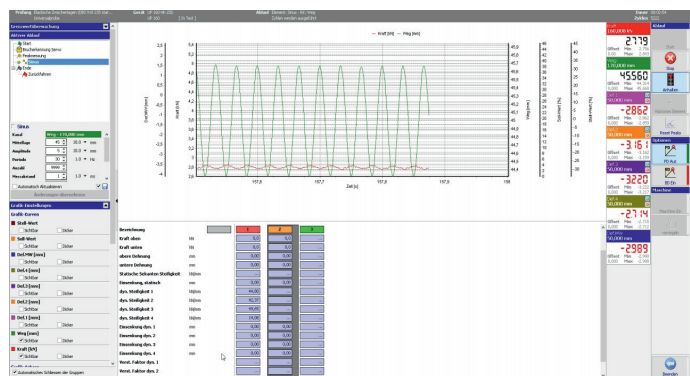
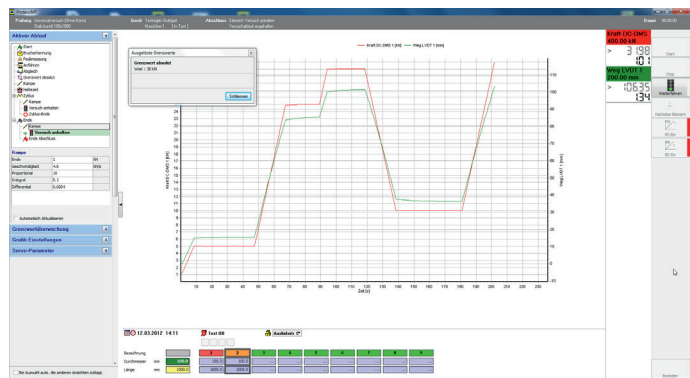
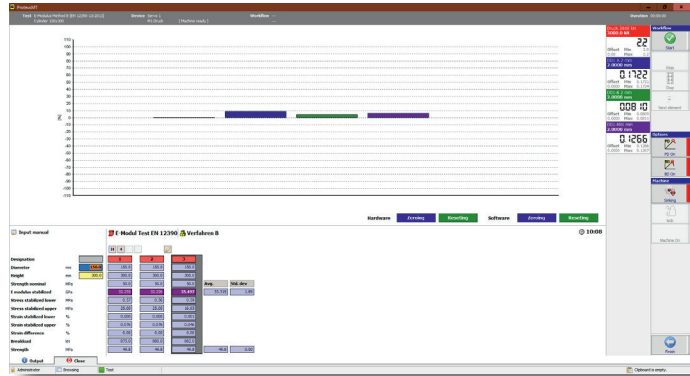
- All program functions can be selected with the mouse. The main functions may also be called with a combination of keys. Powerful object-specific functions called directly with the right mouse button to speed up operations: Copy, Paste, Clear
- Test classification in a relational database
- Database 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

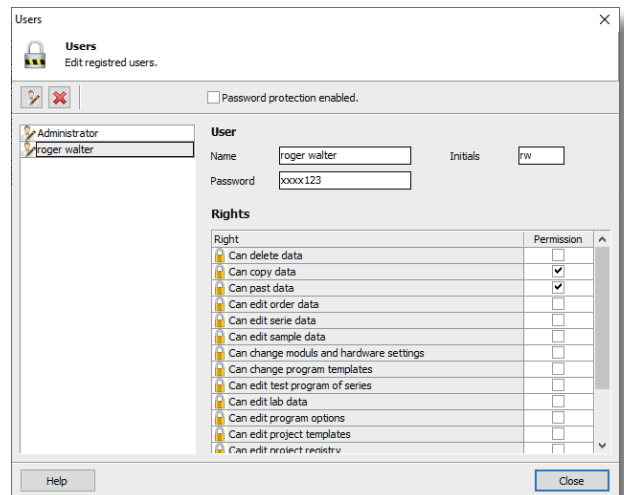
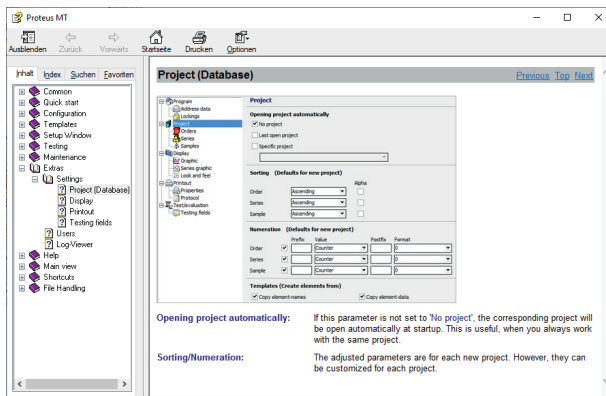
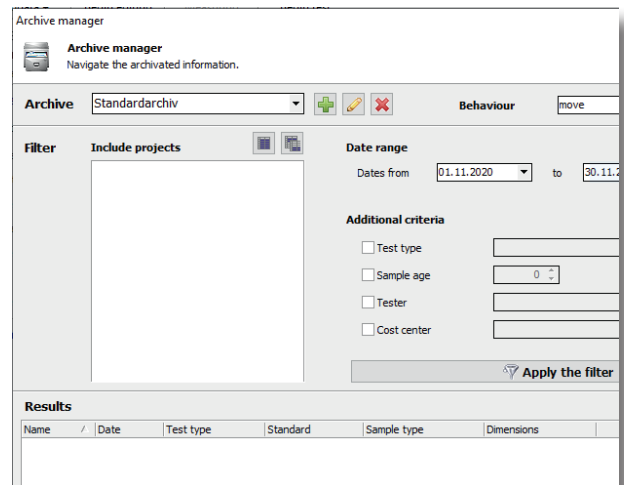
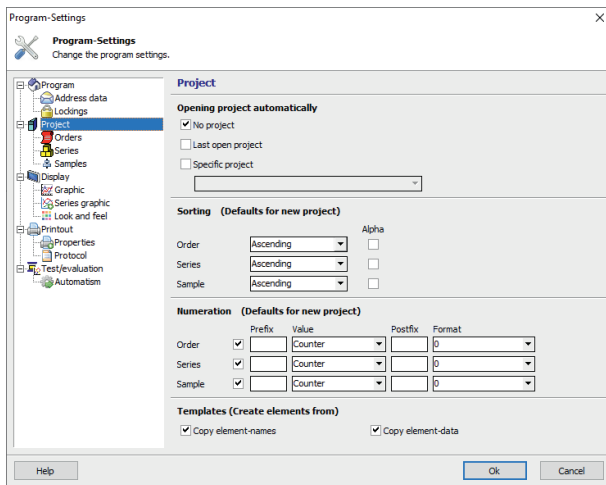
Dimensions to be selected without limitations.



## 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

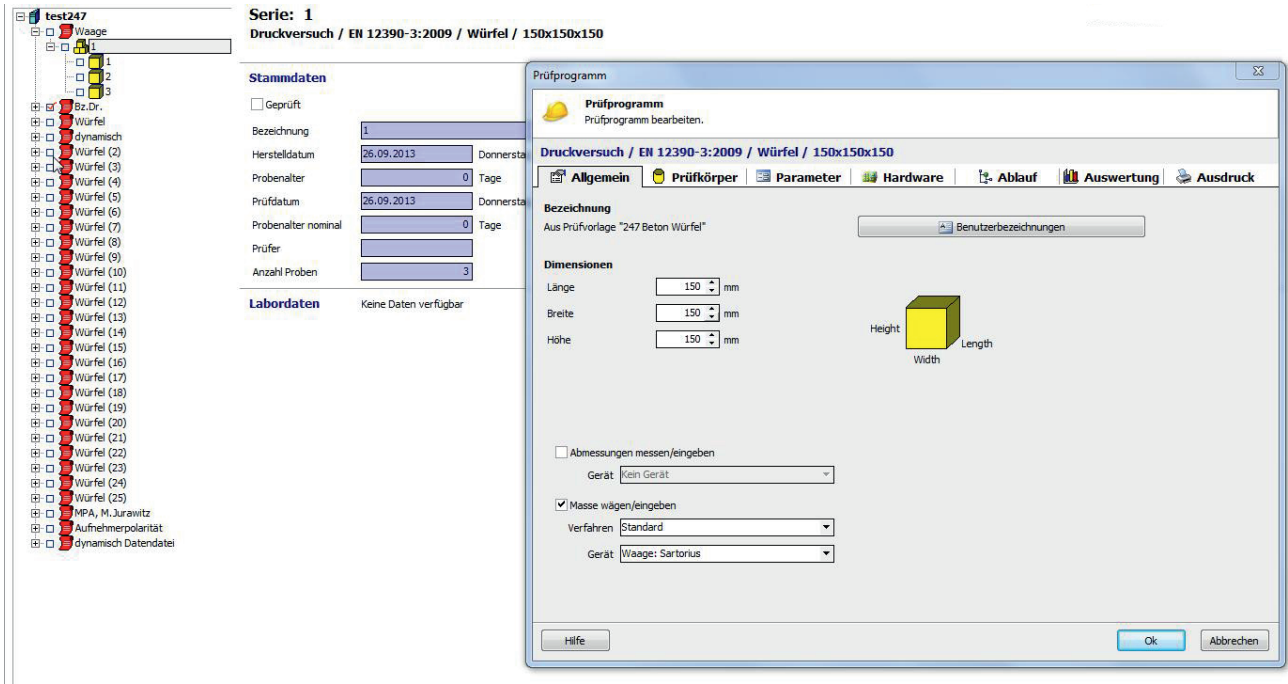


## Concrete Testing

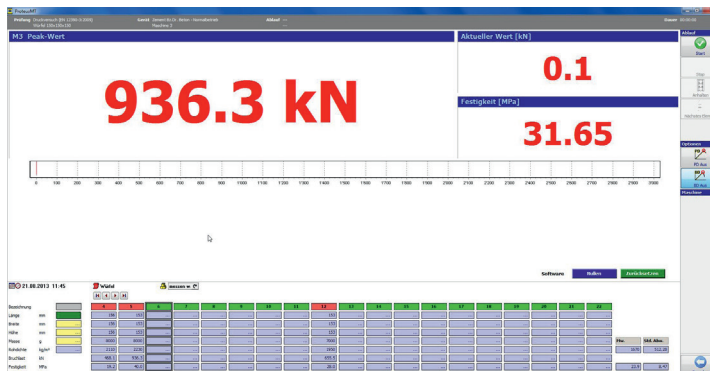
For the automatic determination of the compressive strength of concrete in accordance with EN 12390-3 and ASTM C39/C39M.

Proteus pre-defined templates makes testing of concrete fast and efficient.

These templates offer automatic, event-controlled test procedure with test definition, test editor, analysis, reporting and import & export in a structured, intuitive, and user-friendly graphical interface

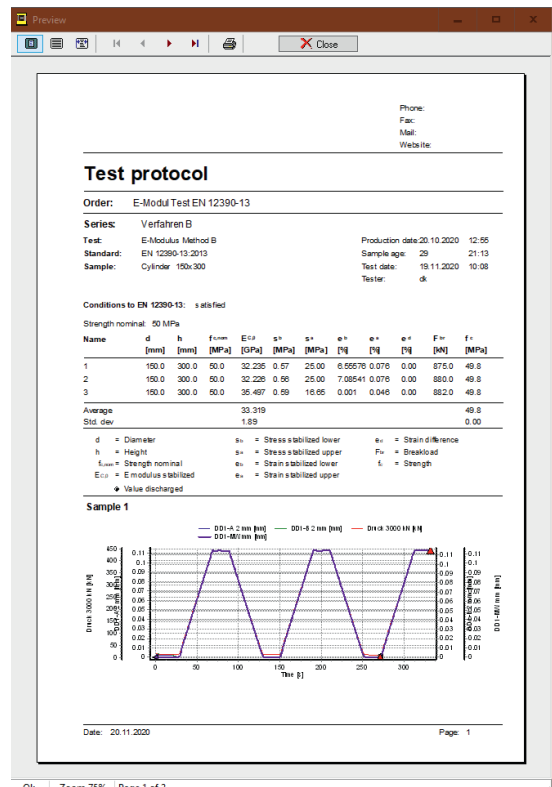


The test templates contain all parameters needed for standard-compliant testing with editable default settings. Sample measurements as dimension and weight can be transferred into the software via interface reducing the operators access and time. Beside of the minimum input designation additional, free settable, inputs can be generated and stored under the template or under a certain test series.



When testing series with a certain number of samples the average values and the standard deviation is calculated. Minimum tolerances can be set with visualization when they are out of tolerance. Additional information / Labdata to a specimen or test series can be defined and loaded to have all relevant information related with your tests in the database and your test report.

Our templates are the result of more than 30 years of enhancements with continuous implementation of customers input and feedback.



## After Sales Service

The world-wide network of w+b highly qualified factory trained support staff 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 because of 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 for stable and long term operation. With the provided constant comprehensive service and support you will profit the maximum from your systems 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.



SCS 0068

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

