

walter+bai

w+b

# High-Force Test Systems Overview



## walter+bai ag Testing Machines



walter+bai ag Testing Machines supplies a wide range of material testing machines and systems for the safety and quality of materials, industrial products and buildings.

Mechanical testing is carried out in many industrial sectors, such as the automotive and aircraft industry, metal industry, plastic and rubber industry, the chemical industry, construction industry, bio mechanics as well as at institutes and universities. Serving these sectors for more than 45 years, w+b benefits from the company's extensive experience in producing material testing systems and equipment to meet this wide range of applications. Due to our considerable engineering capabilities we are able to offer not only standard testing machines but also customized solutions or complete installations for physical testing laboratories world-wide. To ensure you obtain the maximum rewards from your investment, our accredited calibration laboratory guarantees that excellent after-sale service and verification facilities are available for your installation.

### Profile

We are renowned for the production of high quality systems. Due to our continuous research and development policy as well as actively collaborating with our customers and suppliers we have always maintained the very high product standard ever since the company was founded in 1970 by Armin Walter and Alfred Bai in Löhningen - Switzerland. The sales, design and manufacturing divisions associated with testing machines has grown due to the constant interaction with a multitude of clients and the systematic realisation of their requirements. Our product range has been steadily expanded and our service sector activities extended to meet growing demands. The unique position of w+b in the field of material testing machines can be attributed to the fact that their specialised know-how related to materials testing is being constantly updated whilst offering custom designed products and services. A well qualified and highly motivated staff coupled with an efficient organisational structure forms the backbone of w+b upon which you can depend for know-how, competence and reliable performance.

### «Specific testing tasks demand appropriate testing equipment!»

This is our motto. Therefore, besides our standard range of testing machines, we have developed an extensive number of customized testing machines for static and dynamic material and component testing. w+b Testing Machines are the pacemaker for trendsetting technologies. They are a prerequisite for the safety and quality of materials, industrial products and buildings.

### Our Products and Services

- Manufacturing of materials testing machines and systems
- Customer specific testing systems
- Servohydraulic and electromechanical, static and dynamic testing machines
- Digital measuring and control systems and testing software
- Hydraulic power packs
- Static and dynamic actuator testing systems
- Accesories and fixtures for component testing
- Testing machines for construction materials
- Modernisation of existing testing machines
- Maintenance and calibration of material testing machines
- Project management and technical consulting



## High Force Test Systems

**High-Force Mechanical Testing** is critical for the determination of the mechanical properties of materials as well as the performance and durability of large components, sub-assemblies or finished goods.

Walter+Bai AG Testing Machines have long history in design and manufacture standardised to custom manufactured high-rate tests system. To meet specific customer requirements the spectrum of high-force testing systems range from static testing machines for the determination of the mechanical properties to dynamic tests systems.

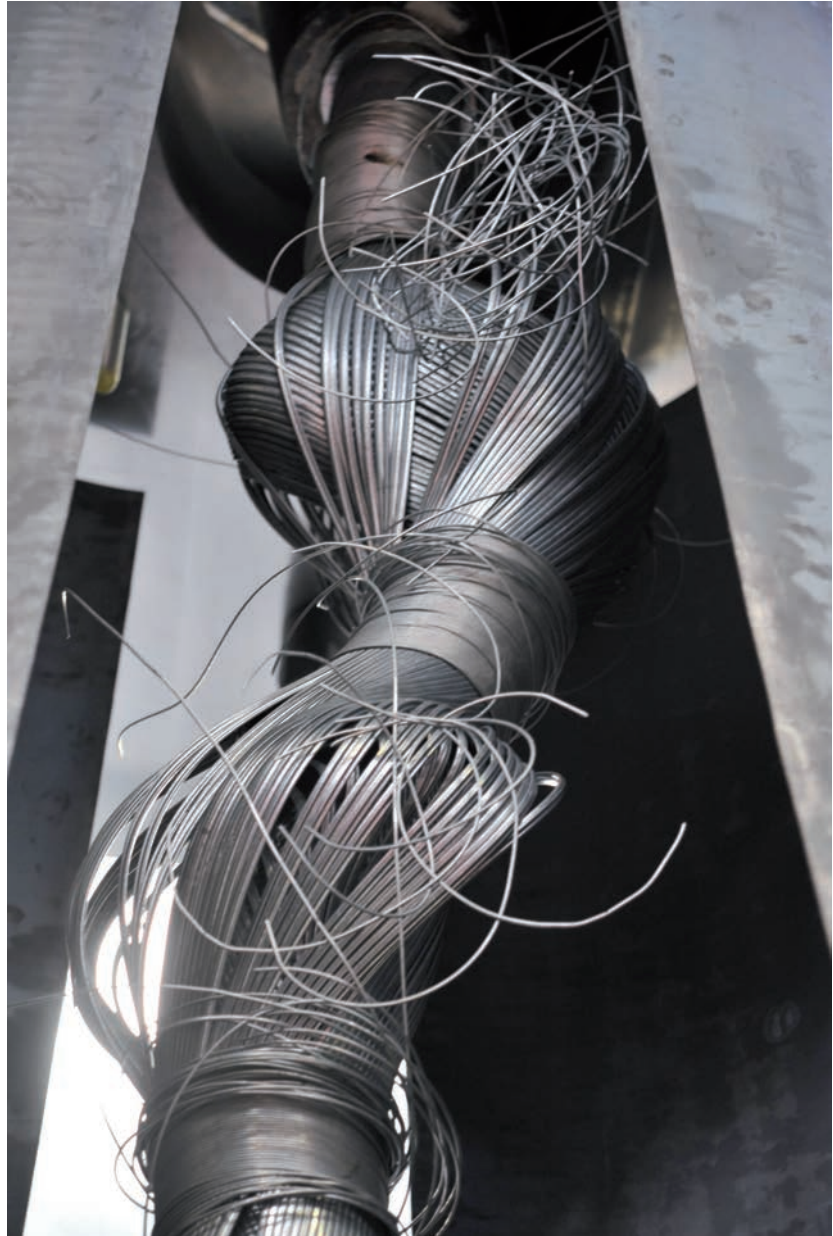
### Typical applications includes

- Testing of Metals as sheet, plate, bar, cables or chain
- Civil components as reinforced concrete, columns, beams, rebar or bearings
- Fastener Testing
- Aerospace components as sub-structures
- Rails structures and components
- Marine structures and components

High Force Test Systems for components testing and dynamic applications often are custom optimized engineered to meet the full spectrum of customers testing demands. Due to the extensive know-how in development and production as well as the modular design of our material testing systems, w+b can meet even the most extreme and challenging high-force materials, component or sub-assembly testing needs.

Most high-force test systems include high-stiff load frame, accurate load cell, high resolution digital control system for servocontrols and hydraulic power supply.

Static and dynamic rated grips and fixtures are available or can be custom engineered.



## Static Universal Testing Machines

TTM High Force Test Systems for testing of metals as sheet, plate, rebars, strands, cables or chains, fasteners and so on

The Series TTM® Testing Machines are state-of-the-art, rugged and durable designed especially suitable for high capacity testing, capable to provide accurate, repeatable and reliable results meeting the needs of the metals, aerospace, automotive and fastener industries.

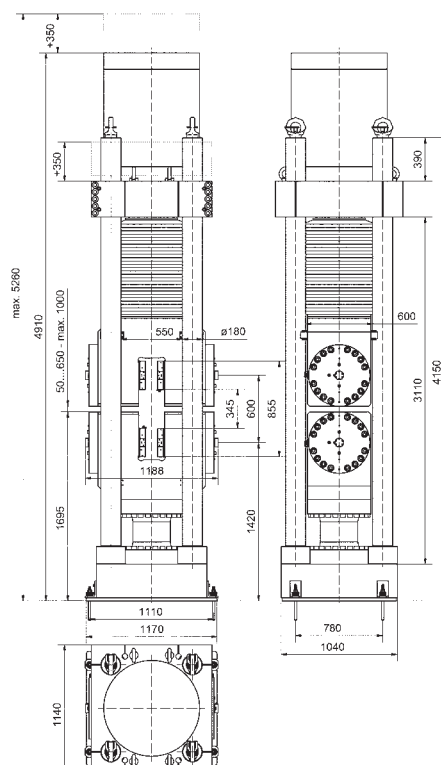
For tensile, compression, flexure, peel, shear, tear or friction tests on a wide range of different materials such as round, flat and profile specimens for quality control, product development, research or process development. Testing systems for brittle materials such as steel or fasteners requires high stiffness load frames that minimize the amount of deformation energy that is stored in the frame. It is essential to minimize the released energy from the frame for minimum maintenance and low reaction at specimens failure. TTM® feature high rigid load frames in four column construction with superior axial and lateral stiffness and precision aligned for advanced static testing to meet the wide variety of testing needs of laboratories and manufacturers in the field of metals, automotive, aerospace, fastener industries.

### Features Load Frame:

- Single workspace-design provides high load frame stiffness and ergonomically working height
- Rigid machine frame in 4-column construction providing superior axial and lateral stiffness and guarantees robust, durable and long-term operation
- High machine stiffness and appropriate machine mass reduces shock at sample failure and provides smooth breaking
- The 4-column are polished and hard chromium-plated
- Movable upper crosshead with manual clamping to adjust optimum grip separation in relation to shortest / longest samples and sample deformation
- It also makes it easier transport and install the machine in the laboratory
- Double acting (no plunger) actuator in Servo-Quality mounted on upper crosshead
- Long piston stroke for universal testing without changing the crosshead position even when testing according the extreme requirements of JIS G3112 or BS 4449
- Leather bellow over complete piston rod protects piston rod from dust, dirt and scale
- Anti-rotation system for the actuator to prevent the natural tendency of the actuator to rotate
- Precision tension / compression rated strain gauge load cell mounted between lower grip and base platen
- High resolution digital displacement transducer
- Servovalve with manifold attached direct onto Actuator
- Machine supplied with anti-shock pads below the machine to effectively reduce and isolate vibrations
- Supplied with anchors to fix onto laboratories floor
- Durable structured coating (paint)
- Use of high quality components and assemblies of reputable companies
- Bolts for lifting the machine
- The machine is free-standing on shock absorbers, requiring no special foundations
- Ergonomically working height with unchanged height of lower grip makes sample insertion easy



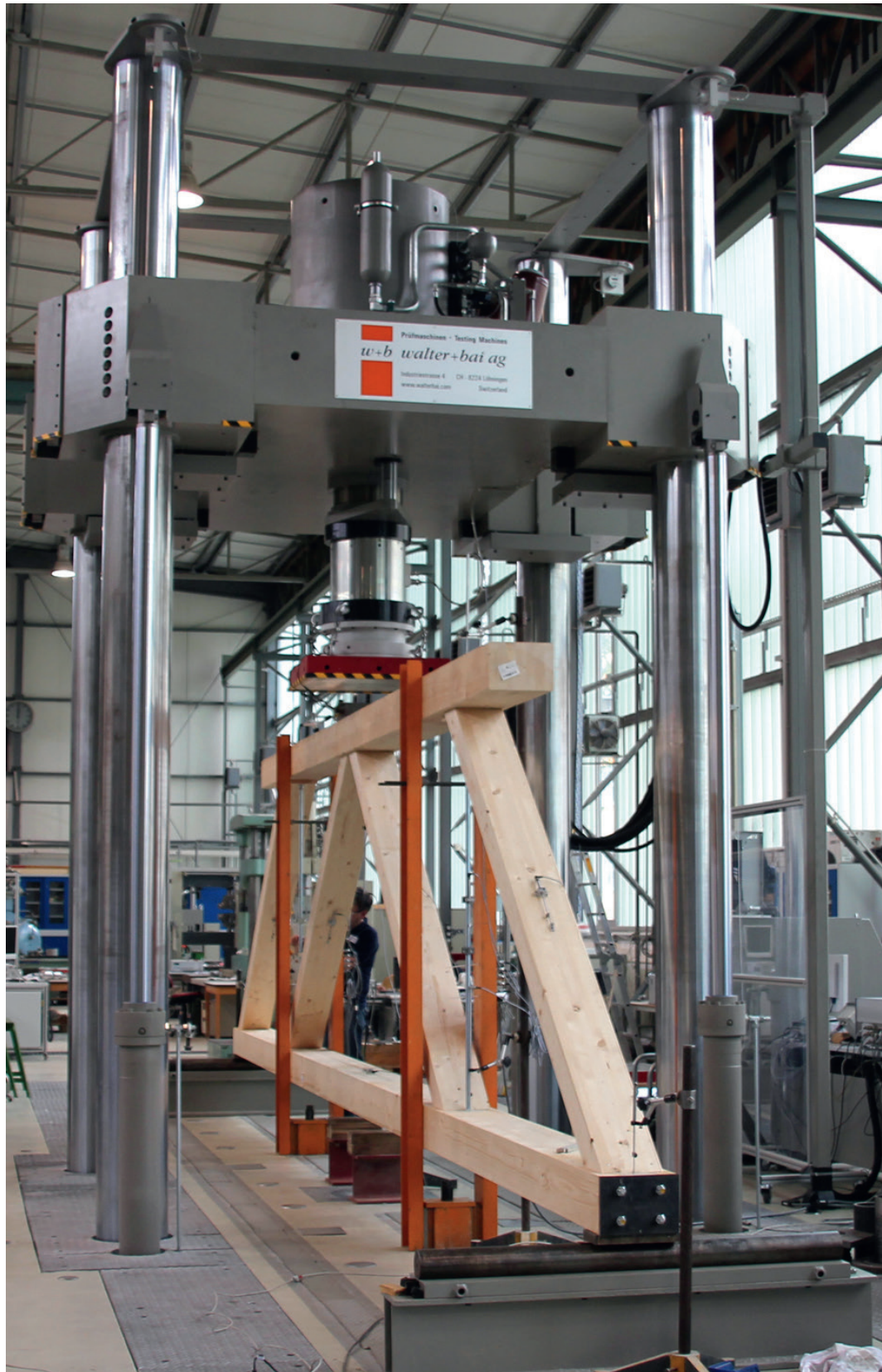
### 5000 kN Tensile Testing Machine (TTM-Series)





## 10 MN Large-Scale Bending & Compression Testing Machine

This high-force, large-scale test system is designed for static to cyclic testing of components with a maximum span width of 17 m and maximum load up to 10 MN.





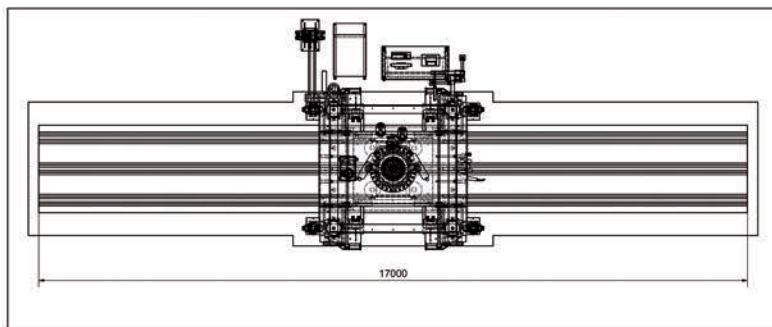
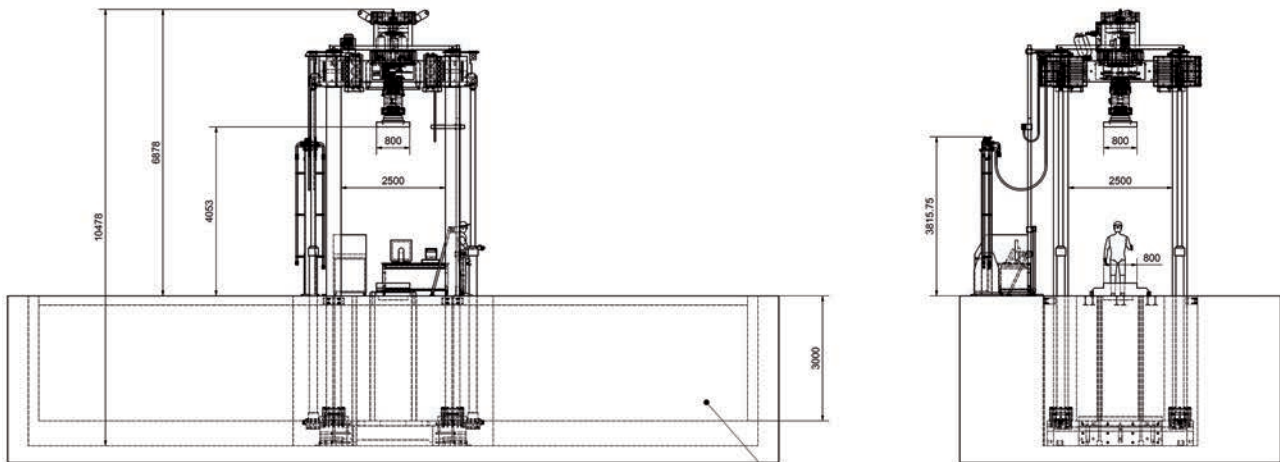
# w+b High Force Test Systems



Photo: Installation at the lower concrete bending table

# w+b High Force Test Systems

Technical Data		
Maximum Compression Force	kN	10000 (10 MN)
Maximum Tension Force	kN	3500 (3.5 MN)
Installed Servo Valve (280 bar)	l/min.	750
Clear Test Space between installed Compression Platen	mm	up to 4000
Length of lower Bending Table	mm	17000
Clear distance between columns (front x depth)	mm	2500 x 2500
Columns	mm	4 x Ø400
Compression Platen	mm	800 x 800
Weight of Load Frame without Bending Table	kg	125.000
<b>Load Frame Dimension without bending table</b>		
Width	mm	3500
Depth	mm	3600
Height	mm	10000
<b>Bending Table</b>		
Length	mm	17000
Width	mm	2100
Height	mm	3000
Weight	kg	300000





## Dynamic Test Systems

### Example 30000 kN Dynamic Testing Machine

**Fatigue Rated High Capacity Test System for testing of post-tensioning kits according to ETAG 013.**

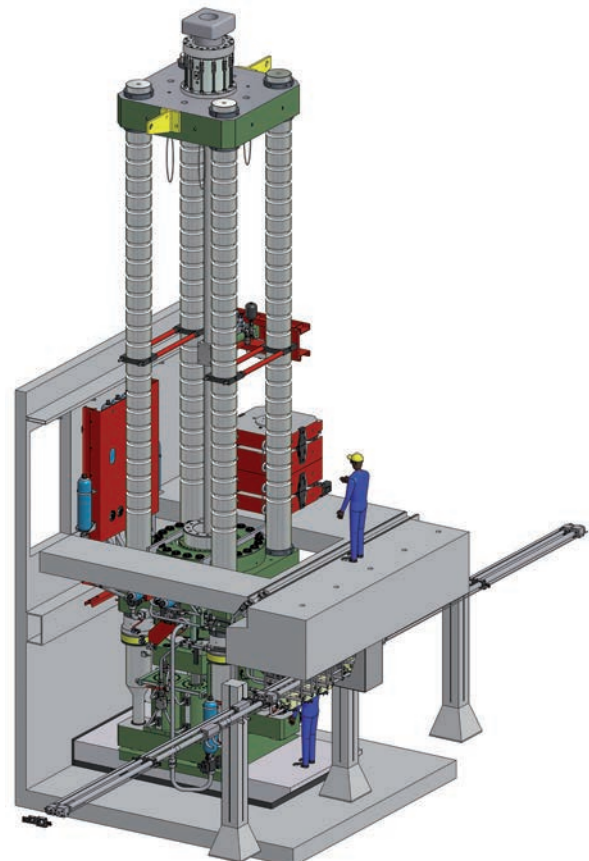
**Post-tensioning kits typically comprise of (or just some as needed):**

- Tensile elements in the form of wires, strands, or bars made of prestressing steel
- Anchorages either "stressing" or "fixed" anchorages
- Couplings used to connect adjacent sections of tensile elements which are intended to be stressed at the same time
- Ducts used to isolate, guide and protect the tensile elements
- Filling materials inside the anchorages and the ducts such as cementitious grout, grease and wax
- Pipes or special details to provide a defined deviator for external tendons at designated locations in a structure
- Bursting reinforcement to provide confinement to concrete elements which contain the tendon anchorages and/or tendon deviators

Bursting reinforcement to provide confinement to concrete elements which contain the tendon anchorages and/or tendon deviators for safe introduction of the prestressing loads at anchorages  
The test system is used to perform the static load test as well as the fatigue test.

For both the static and the fatigue test the test specimen will be assembled according to the envisaged application, using all components necessary for anchoring the tendon. The dynamic test is performed at constant load in the frequency range up to max. 10 Hz with a constant upper load of 65% of the characteristic strength of the tensile elements. Range of loads  $\Delta F = \max F - \min F$  is maintained constant throughout the testing at levels corresponding to 80 MPa stress amplitude in the tensile elements for 2 million cycles. The specimen is tested in such way that secondary oscillations are precluded with best possible even load distribution to all the tensile elements of the tendon.

Additionally



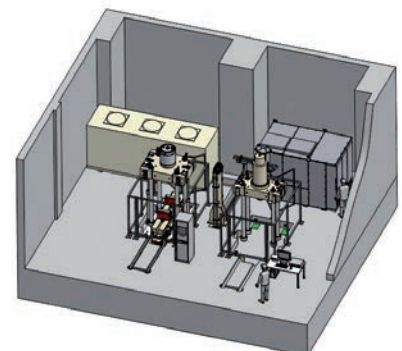
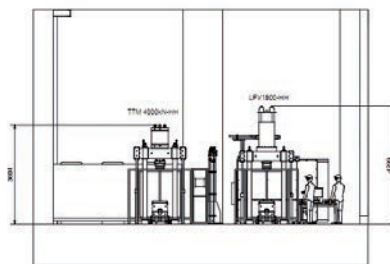
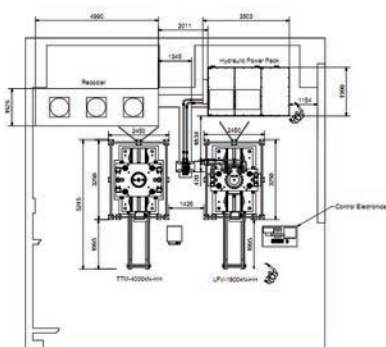


## Dynamic Test Systems for Rail Industry

Example 4000 kN & 3000 kN Static / Dynamic Test System  
Test System for Rail Component Testing as Bolster, Bogie Frame, Side Bearers etc.

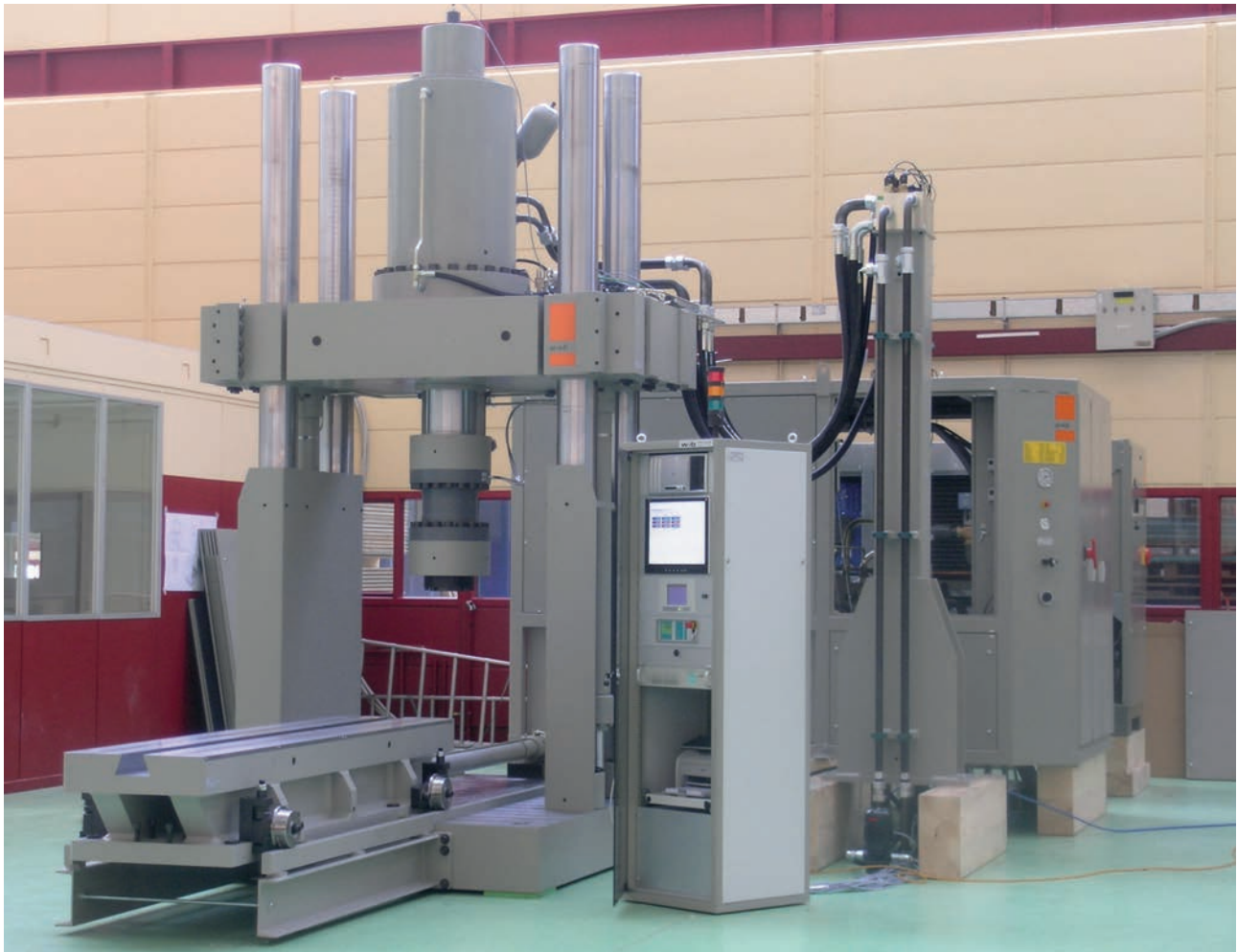


Photo: Static / Dynamic 4000 kN / 2000 kN Rail Component Test System for Static Testing up to 4000 kN and Fatigue Tests up to 2000 kN



# w+b High Force Test Systems

**Example 3000 kN Dynamic Test System**  
Test System for Rail Component Testing as Bolster, Bogie Frame, Side Bearers etc.





# w+b High Force Test Systems

**Example 1800 kN Dynamic Test System**  
Test System for Rail Component Testing as Bolster, Bogie Frame, Side Bearers etc.



## Torsion Testing Machines

Walter+Bai AG Testing Machines supplies High-Torque static and dynamic Torsion Testing Machines to determine the mechanical properties, testing of full-size parts as shafts, axles, twist drills couplings, clutches or drive line components for the Oil,- and Gas Industry, Steam & Diesel Engines, Gas Turbines, for Wind Turbines, Shipbuilding / Marine Industry or for calibration purpose of torque transducers.

**Example 80000 Nm & 12000 Nm Dynamic Dual Drive Test Stand for testing of Shipbuilding / Marine components as couplings and clutches or Joint Shaft Couplings for Wind Turbines and other industrial applications**



### Test Samples

**Couplings** with different torsional stiffnesses and damping factors used in Vessels to compensate radial, axial and angular shaft displacements of the connected machinery, where the torque is transmitted by elements loaded in shear. The essential parts of the coupling are: the torsional flexible element, the membrane package to absorb the axial displacements and the connecting parts to the drive and driven machinery.

**Clutches** as friction cone clutches, friction clutch packs, fluid couplings, slip clutches, torsional dampers or flex couplings.

**Joint Shaft Couplings** as torsionally stiff link style coupling.

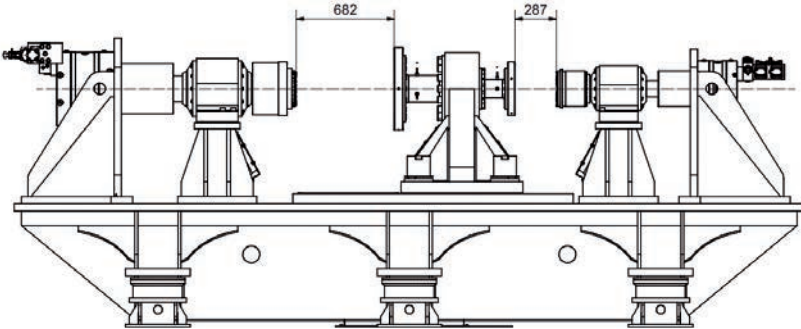
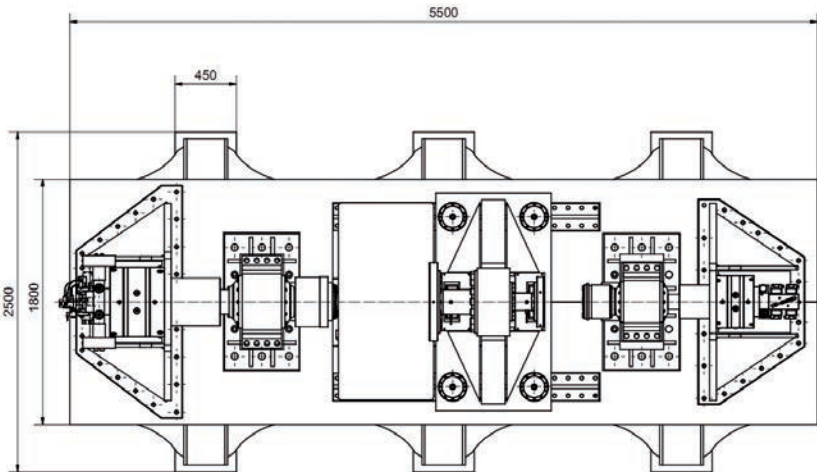
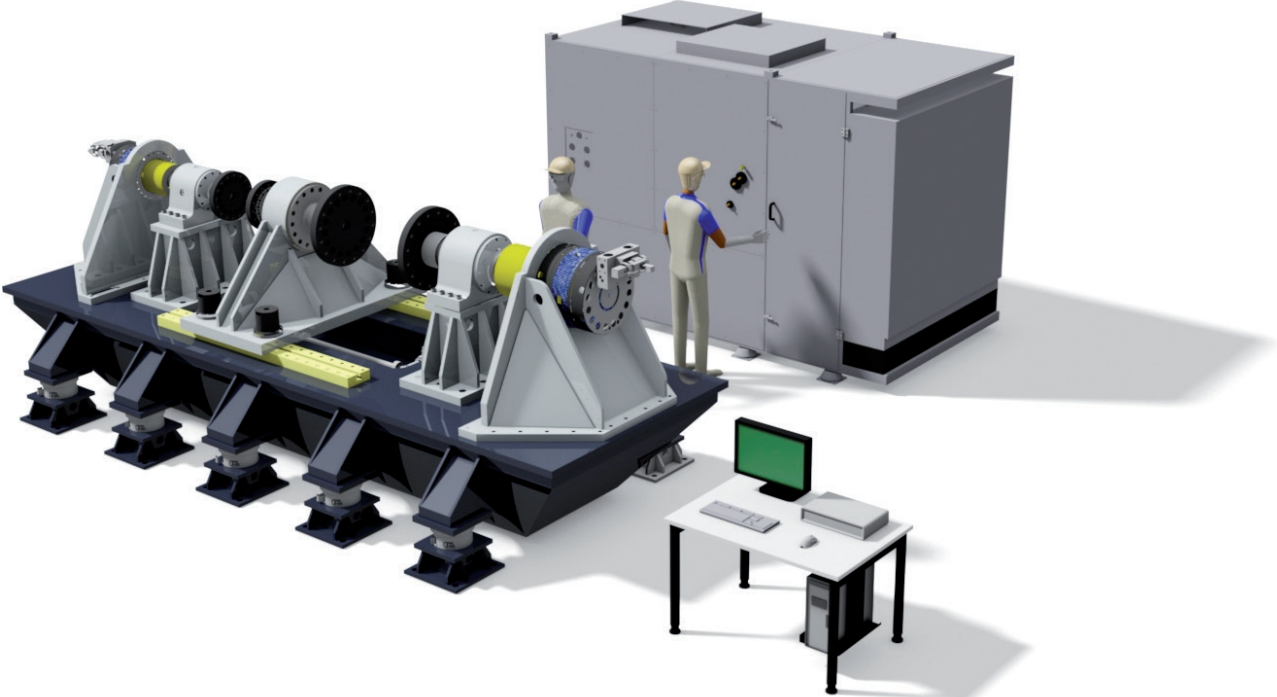
The test stand consists of two (2) working rooms, one for torque moments up to 80000 Nm, the second for 12000 Nm.

Each working room is equipped with independent dynamic rated torsional actuator and high precision torque transducer.

The middle support with attached torque transducers can be moved hydraulically to both sides in order different samples with thickness up to 1000 mm can be installed.



# w+b High Force Test Systems



## w+b After Sales Service

w+b and our network of factory trained support points providing after sale solutions of your high-quality w+b test systems. We are dedicated and have the experience to support our customers from installation throughout the entire life cycle to ensure you will reap the maximum benefit of your test system.



### Over 45 Years of Experience

- Customers choose w+b because we meet your specific testing needs with optimum testing solutions.
- But there is more. After choosing a testing system from w+b it means that this is the starting point of a long-term partnership with us.
- Our network of experienced support and qualified engineers provides you an optimum after sale support to make sure you get the most from your investment.
- Due to this target, w+b continue to invest in hiring and training service engineers or local representatives.
- To cut cost of field service a full staff of application engineers is available for telephone support, which is free for as long as you own your system.
- Our large stock of spare parts from the most w+b equipment helps you to minimise the shut down time in case of problems.
- w+b test systems are designed for hard and long term use. With the w+b service and support, you'll be sure to reap the maximum benefit of your systems throughout their entire life cycle.

### Instruction Manual

For us a reliable support starts with a proper instruction manual. To each system we deliver a complete users manual including information about safety, system installation, machine setup, technical drawings of testing structure, hydraulic and electric drawings with part legend, soft and hardware manuals, maintenance information a.s.o. Due to we give the fully information to our clients and in connection with our experienced telephone support more than 90% of all shut downs can be solved by telephone.

### Installation and Warranty

Our Field Service Engineers are available to install and commission your system upon delivery. All our Field Service Engineers are factory trained to complete the installation in a timely manner, to ensure the system operates to specification and to commission the system. All new w+b products carry a factory warranty.

### Customer Training

It is essential that our clients can use the full potential of our testing systems. This requires that the system works properly and that system operators are thoroughly trained in its operation. The instruction provided by our Engineer at the time of commissioning, enables your personnel to operate a system competently. Continued training ensures that new staff are brought up to speed on installed systems, that existing operators retain their skills and that occasional users retain the skills necessary to operate the system. We offer a wide array of regularly scheduled system training courses at our facilities or at your site.

### Hardware & Software Support

To make sure your investment lasts as long as possible even if your requirements change, our Soft- and Hardware engineers or local representatives will provide you advice on how you can benefit from our steady developing in soft and hardware. This will guarantee you, that your system maintain at peak performance. Through planned service visits for preventative maintenance and calibration any potential system problems are identified and resolved thereby avoiding unnecessary machine downtime.

### Calibration

Our calibration laboratory is accredited according to the latest ISO EN IEC 17025 (formerly EN 45001) standard. The calibration and verification of your material testing machines is part of our service capability. Our Field Service Engineers are not only trained to complete maintenance and calibration service on w+b machines, they also can do it on other testing machines in a timely manner. The calibration certificate will prove the verification of your system with ISO 9001 a.s.o standards.



### Application Service

We can provide test methods, report templates or graphic presentations precisely to your specification, developed within w+b standard software packages. Our application experts have many years experience in materials testing applications and will work with your representative to meet your requirements.



## Maintenance and Calibration of Your Material Testing Installations through the w+b Accredited Calibration Laboratory

The maintenance and service work on your material test equipment is executed by our specialists with highest attention. With the experience of 45 years! Highly precise computer-aided calibration equipment guarantees a calibration according to the latest standards.

Our calibration laboratory is certified according to ISO/IEC 17025 which is recognised through the Multilateral Agreement (MLA) for EA - European Cooperation for Accreditation.

The maintenance and calibration through one hand by our specialists with many years of experience assure a reliable execution.

Your savings: no extra costs for an additional calibration by a further official calibration institute, since we are an accredited calibration laboratory.

We calibrate your test equipment independently of type and manufacturer. We offer excellent conditions as well as appointed dates.

The accreditation according to ISO/IEC 17025 is recognised through all signatories of the EA (European Cooperation for Accreditation) multilateral agreement of calibration. With over 40 years of experience! Please do not hesitate to ask for a quote!



**SCS 0068**

### We are accredited Calibration Laboratory for:

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







# walter+bai

## walter + bai ag Testing Machines

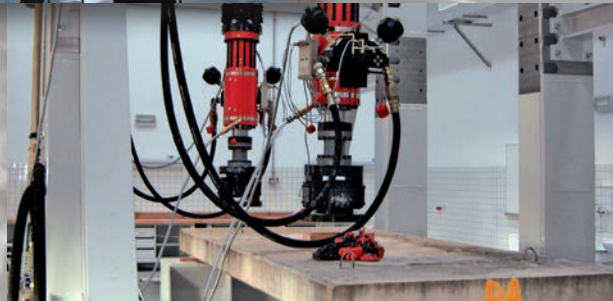
Industriestrasse 4  
CH-8224 Löhningen · Switzerland

Tel. +41 (0)52 687 25 25  
Fax +41 (0)52 687 25 20

info@walterbai.com · www.walterbai.com



- Static Universal Testing Machines, Electromechanically or Servohydraulically driven
- Dynamic Multipurpose Testing Systems for Advanced Material and Component Testing
- Torsion, Rotary Bending, Impact Pendulum Testing Machines
- Hydrostatic Pressure Testing Systems
- Customer Specific Testing Machines, Modernisation of Existing Testing Machines



- Accessories for Material Testing, incl. Digital Controllers, Application Software, Hydraulic Power Supply, Grips and Fixtures, Extensometers, Furnaces and Climatic Chambers, a.s.o.
- After-Sale Service at Customers Laboratory
- Calibration of Material Testing Machines