

Creep Testing Machines Series HKB up to 1000 kN

The HKB Long-Term Creep testing machines are used to perform Creep Tests on Cement Based materials.

Creep is a time dependent viscoelastic deformation of a cement based material like concrete under permanent load. Creep can cause additional, time dependent deformations in building components. When it is needed to subtracting the shrinkage deformations another load-free specimen will be used to measure the shrinkage.

The 4-column HKB Creep Testing Machines enables creep tests to be made by means of a pressure exerted load. Tests can be carried out either on a single specimen or on samples placed in series. The test area height can be adjusted by the adjustable upper crosshead. The initial compression force is applied by the hydraulic cylinder. This cylinder can be put under pressure by simple hand-pump that can be connected to the quick coupling at the testing machine. The pump serves to produce the pressure corresponding to the required test force, as well as to correct (when different loads need to be applied) the force during the long-term test. Any number of machines can be driven by one hand-pump.

The deformation is measured by high-accurate mechanical or electronic deformation measurement unit. This enables very precise control measurements to be made any time during the tests or when needed permanent during the test with the electronic version and data acquisition system.

Specimen

Standard specimens used are cylinders with diameter up to 160 mm, cubes or prisms up to 150 mm.

System for larger specimens is available on request.

Installation

The machine is placed directly on the floor. It can be transported with any customary palletrolling device, if necessary even during a test. The machine must be housed in an air-conditioned room with constant temperature ($\Delta t \pm 3^{\circ}\text{C} \approx \Delta \text{Force} \pm 1\%$)

Features

- Rigid 4-column construction
- Upper crosshead is adjustable in height
- Upper compression platen is spherically seated with $\pm 2.5^{\circ}$ mobility
- Hydro pneumatic loading device is integrated in the base of the machine
- The force is kept constant by a compressed gas storage system
- The load cylinder is put under pressure by a hand or motor driven pump
- Intermediate platen with centring device to the columns to test two or three samples in series

Pressurized Oil Supply

- A hand pump with oil tank, connecting hose and coupling are included as standard
- The pump serves to produce the pressure corresponding to the required force, as well as to correct the force during the long-term test.
- Any number of machines can be driven by one pump

Force Read Out

- Digital: Pressure transducer and Digital read-out
- Optional data acquisition with creep testing software

Accessories / Options

- Motorized pump
- Mechanical or electronic deformation measurement systems for precise measurements during the test
- Other test chamber heights
- Extensometers



Technical Data Type HKB		100	250	400	600	1000
Compression Capacity	kN	100	250	400	600	1000
Accuracy Range Grade 1	kN	10 - 100	25 - 250	40 - 400	60 - 600	100- 1000
Max. Test Chamber Height	mm	290 - 1070	290 - 1070	290 - 1070	290 - 1070	290- 1070
Upper Compression Platen Ø	mm	200	200	200	200	200
Lower Compression Platen Ø	mm	200	200	200	200	200
Piston Stroke	mm	20	20	20	30	30
Frame Width	mm	980 / 640	710	710	677	677
Frame Depth	mm	540	562	562	550	550
Frame Height	mm	2060	2250	2250	2520	2520
Working Height	mm	700	942	942	810	810
Weight	kg	420	530	530	700	700
Load Frame Stiffness	kN/mm	500	650	650	750	750

The HKB Testing Machines were developed and tested by specialists of the Swiss Federal Laboratories for Materials Testing for industry, civil engineering and trades, EMPA in the 80's. Since then these machines are further developed, manufactured, and sold throughout the world by Walter+Bai AG.



<https://www.empa.ch/documents/55996/231904/Poster-Shrinkage+and+creep.pdf/4f062fcb-0e23-4d82-865f-e4746daf3fd1>

Deformation Measurement Systems

Along with the HKB Testing Machines we are offering mechanical or electronic deformation measurement systems. These enable very precise deformation measurements at any time during the test or online with the electronic unit in combination with data acquisition system.

Mechanical Extensometer Series TAS



This accurate units are available with standard 20 – 200 mm gauge length and digital gauge with a resolution of 0.001 mm.

Optionally the high-resolution version with a resolution of 0.0001 mm is available.

This extensometer unit measures the distance between benchmarks which are glued along the samples, for example three measuring placed (every 120 degree) around a cylindrical specimen.



Technical Data Type	TAS V2
Measuring base*	20 - 200 mm
Reading	Digital (digital gauge)
Measuring range	10 mm (+/- 5 mm)
Resolution	0.001 mm
Precision	0.003 mm
Relative Zero point	with Invar test rod possible in any position
Display	LCD, 5 mm (6 digits with sign)
Functions	nominal value, sign change, zero point/absolute value, units inch/mm
Temperature range	0°C to + 40°C
Interface	Mitutoyo interface

*Other measuring bases on request



Electronic Deformation Measurement Transducer

Alternative to the mechanical extensometer we are offering high-resolution LVDT gauges which can be used together with the digital readout and optionally with data acquisition software through computer.

The LVDTs are supplied with Invar rods and holders which are glued onto the specimen.

This spring displacement LVDT transducers employs precision linear bearings to optimise the LVDTs measurement precision and repeatability. The units are made from stainless steel.

Technical Data Type	500	1000	2500	5000
Measuring Range	±0.5 mm	±1 mm	±2.5 mm	±5 mm
Accuracy Grade according ISO 9513	Grade 0.5			
Linearity error of Sensor (% F.S.)	0.1			



The LVDT and Invar rod is fixed in holders that are glued onto the specimen surface along with the cluing device that enables you to glue the holds with desired gauge length distance.



We are also offering Tensile Creep Test Systems for time-dependent tests of concrete

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6025542/>