2017

MICROTEST

ECH Series

Servo Hydraulic Compression Testing Machines

MICROTEST, S.A.
Instruments and Equipments for Materials Testing
(+34) 91 796 33 32 www.microtest-sa.com

INTRODUCTION

MICROTEST ECH hydraulic Testing machines are designed to perform compression test on concrete, rock, soil or new construction materials and components. They are built in capacities ranging from **100kN** to **5000kN** or more, under demand.

These machines are designed not only to fulfill the requirements of standard tests but also the specifications related with research in mechanical properties of new materials. They are widely used in R&D Centers, Industry, Testing Laboratories, Education centers, etc.

In ECH system, the load is applied by means of a hydraulic cylinder in a two or four columns high stiffness testing frame. The computer controlled system MICROTEST SCM3000 allows for the automatic performance of a variety of test procedures and is a powerful tool for the exploitation of results in both standard and new material research tests.

MAIN FEATURES

- User friendly software for management and full automation of test by SCM3000 software. With digital display of system channels, zeroing, real time graphics, rupture detection and recording, data acquisition, configurable tests and methods, etc.
- Accurate load, displacement and strain rate control: SCM3000 servo-controlled system.
- Single of double stage hydraulic pump.
- Rupture detection with automatic stop.
- Real time processing of test data.
- Fully customizable test reports.
- Standard load frame designed in accordance with Standard EN 12390-4.
- Class 1 or better according to EN ISO 7500 and EN 12390-4.
- Performance of many types of tests and different testing fixture or accessories.

OVERVIEW

The ECH Series are automatic compression testing machines with high stability and stiffness, two or four column load frame construction in steel (depending on their load capacity) and a high-performance hydraulic actuator. The actuator is usually integrated with the lower base plate of the machine, but upon request it can also be assembled in the upper crosshead of the frame. The actuator can be simple or double acting, depending on the specifications. The load frame is designed in accordance with Standard EN 12390-4. For security reasons, the machine includes a test area protection consisting of an all-around closed cage, made of profiles with laminated polycarbonate (Makrolon or similar) panels (high-strength transparent material) or drilled steel plates, with a front door to place the samples. Under demand, the frame and the actuator can be designed according to the user individual specifications. Two or four column frames, with or without electromechanical screw driven system (for upper compression plate fast positioning).

The machine is delivered with a set of compression plates 300 mm diameter. These plates are hardened and ground (hardness min. HRC 58). The upper pressure plate is spherical seated and adjustable with hydraulic or mechanical blocking system. The center of the spherical surface is placed on the contact flat area of the plate. For standard concrete applications, the lower pressure plate is delivered with centering rings at different diameters for easy placing of specimens. Auxiliary plates and spacer discs according with the EN 12390-4 standard can also be delivered with machine.

A hydraulic power unit provides the pressure and flow rating for the machine. Depending on the frame size, the hydraulic power unit is placed in the loading frame or in a rack. It can include a high and low flow, double stage hydraulic pump to allow a fast positioning of the piston before loading, to save time during preparation of tests (optional).

Force measurement is made by means of an extensometric force transducer in the load axis or by means of a pressure sensor in the hydraulic line, measuring the pressure inside the cylinder. The test can be force controlled maintaining the load rate constant in time. The ECH/FR models has also the possibility of position or strain control by using a linear displacement sensor attached to the piston of the hydraulic actuator or an extensometer, correspondingly. The strain rate should be controlled by using auxiliary instrumentation and sensors, such as inductive LVDT sensors. or gages in compressometer, strain gages, etc. which are basically used for measuring the strain on the sample during the test.

Typical applications are in the building industry: tests on concrete, mortars, ceramics, rocks, soils, etc. but they can be also applied in other areas such as sintering, calibration systems, etc. The control system can be manual or computer controlled with MICROTEST SCM3000 electronics and there are different possibilities for the software: SCM3000, ECH3000 and ERT3000, are the more usual software. MICROTEST develops specific software for different type of tests.

ECH/FR machines make use of the **SCM3000 software** that enhances the features of the testing machine for any kind of test or material, allowing the user the full control of any of the functionalities of the machine. It's a very reliable and adaptable system. The description of the SCM3000 software specifications is shown apart. All database and controlled parameters are managed using a computer (included) with the MICROTEST **SCM3000 software**. The SCM3000 system allows the data acquisition from different sensors during the test: displacement gages, strain gages, temperature sensors, etc.

Control mode: **load**, **displacement (stroke)** and **strain (deformation).** It is possible, therefore, to use of the ECH Series compression testing machines for determination of the elastic modulus or the Poisson coefficient of the material under test. It is also possible to employ a great variety of testing devices or fixtures in ECH Series compression testing machines to perform bending, indirect tensile tests. Special

measuring system such as video extensometers, thermographic cameras, etc. are also compatible with ECH Series compression testing machines.

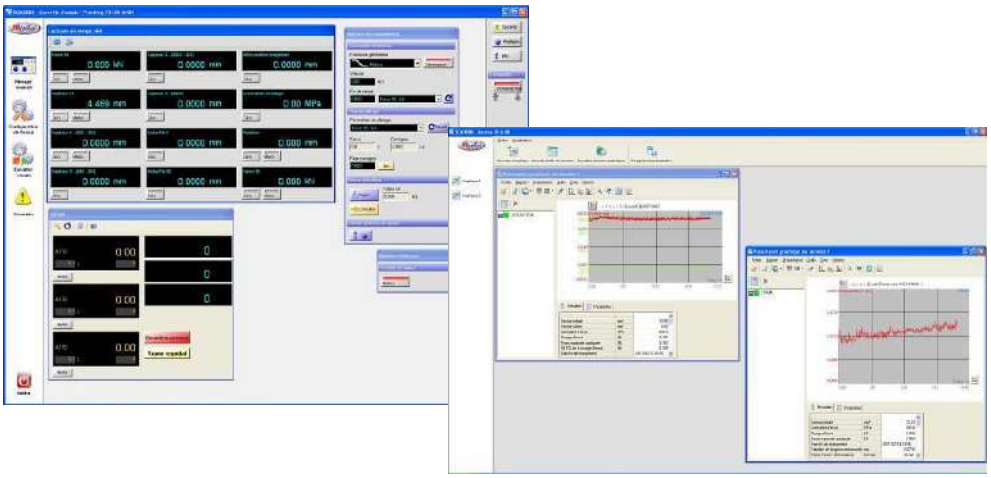
CONTROL, MEASUREMENT AND DATA RECORDING

The control and measurement is performed by the SCM3000 electronic board developed by MICROTEST. This electronic board provides a closed loop control of the machine and analogue to digital conversion for at least 8 channels.

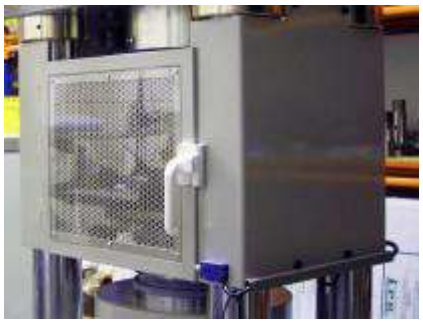
The control includes digital input/output lines connected with the machine and the hydraulic power unit covering the rest of the control and security functions of the control system. The machine control can be monitored by means of a computer via USB connection. The software SCM3000 allows also the recording of the different quantities data during the test.

ECH/FR machines make use of this **SCM3000 software** that enhances the features of the machine for any kind of test or material, allowing the user the full control of any of the functionalities of the machine. It's a very reliable and adaptable system. The description of the SCM3000 software specifications is shown apart. All database and controlled parameters are managed using a computer (included) with the MICROTEST **SCM3000 software**.

SCM3000 software helps the user to automate his operations, providing a powerful Method and Result Editor, with the possibility of exportation of data to Excel ® or ASCII files that allows the generation of customized reports. The test curves can also be rescale, recall and re-plot by a Graphics Editor.



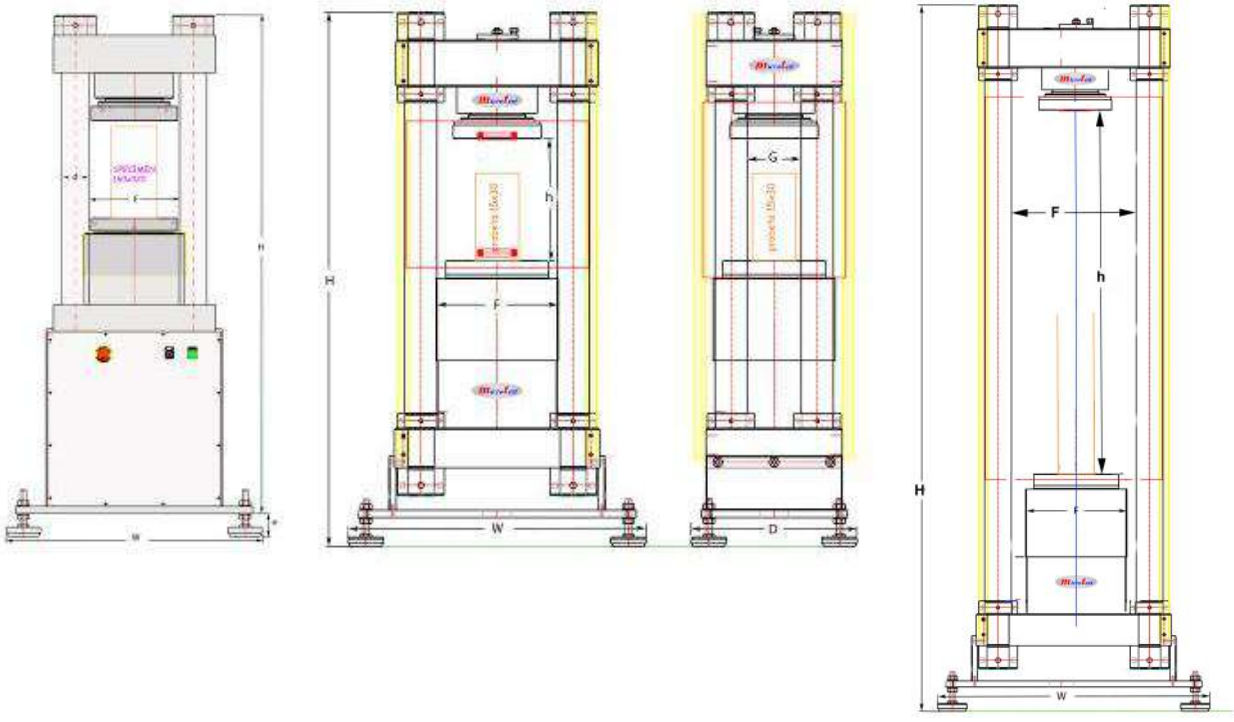
The control system also includes: software selectable servo-control by force or by displacement (or other quantity), displays for the configured channels, digital zeroing of any channel, fully configurable channels, calculated channels, configurable alarms, digital recording of every configured quantity, selectable sampling, automation of the tests (tests methods and complex sequences of movement or load), definition of test parameters, calculations, graphical display of recorded data and test results, etc.



SECURITY ELEMENTS AND PROTECTIONS

For security reasons and in order to protect the user from debris or potential hazard, the machine includes a test area protection consisting of an all-around closed cage, made of profiles with laminated polycarbonate (Makrolon or similar) panels (high-strength transparent material) or drilled steel plates, with a front door to place the samples.

MICROTEST machines have also mechanical and electric switches and limits, including an accessible emergency stop button and, in the case of position control, safety end of travel switches to prevent from any unexpected movement of the actuator or in case of emergency.



TECHNICAL SPECIFICATIONS

MODEL		ECH/ 200-1500		ECH/ 2000-3000		ECH/ 5000	
FORCE CAPACITY (**)	kN	200kN, 500kN, 1200kN, 1500kN		2000kN, 3000kN		5000kN	
STROKE (typical) (**)	mm	50-100		50-100		50-150	
Frame (typical)		2-4 columns		4 columns		4 columns	
Max. Vertical Space (**) (h)	mm	For standard samples	For Longer samples (**)	For standard samples	For Longer samples (**)	For standard samples	For Longer samples (**)
		350-620	620-2200	350-620	620-2500	350-620	620-2500
Horizontal Clearance (F) (**)	mm	315-500	500-700	370-600	600-800	450-700	700-950
Plate diameter (typical) (**)	mm	300		300		350	
Force Measuring System (Typ.)		PCH Series Load cell or pressure transducer CP400		Pressure Transducer CP400 or extensometric Force Transducer		Pressure Transducer CP400 or extensometric Force Transducer	
Accuracy Class ISO 7500 or EN 12390-4		0.5 – 1		1 or better		1 or better	
Resolution (Force)	kN	0.01 a 0.1 (depending on range)		0.1		0.2	
Std. Nominal Supply Voltage (**)	VAC	400Vac, 3 phases, +N+E		400Vac, 3 phases, +N+E		400Vac, 3 phases, +N+E	

(*) Dimensions, weights and supply voltage can be adapted to the customer's needs.
(**) Other values are possible, under demand.

NOTE: Because of our policy of continuous product improvement, MICROTEST reserves the right to change design and specifications at any time without prior notice.

MICROTEST, S.A., C/ Valle de Tobalina, 10, 28021 Madrid, Spain
Tel.: +34 91 796 33 32 - Fax: +34 91 796 32 36 | microtest@microtest-sa.com - www.microtest-sa.com