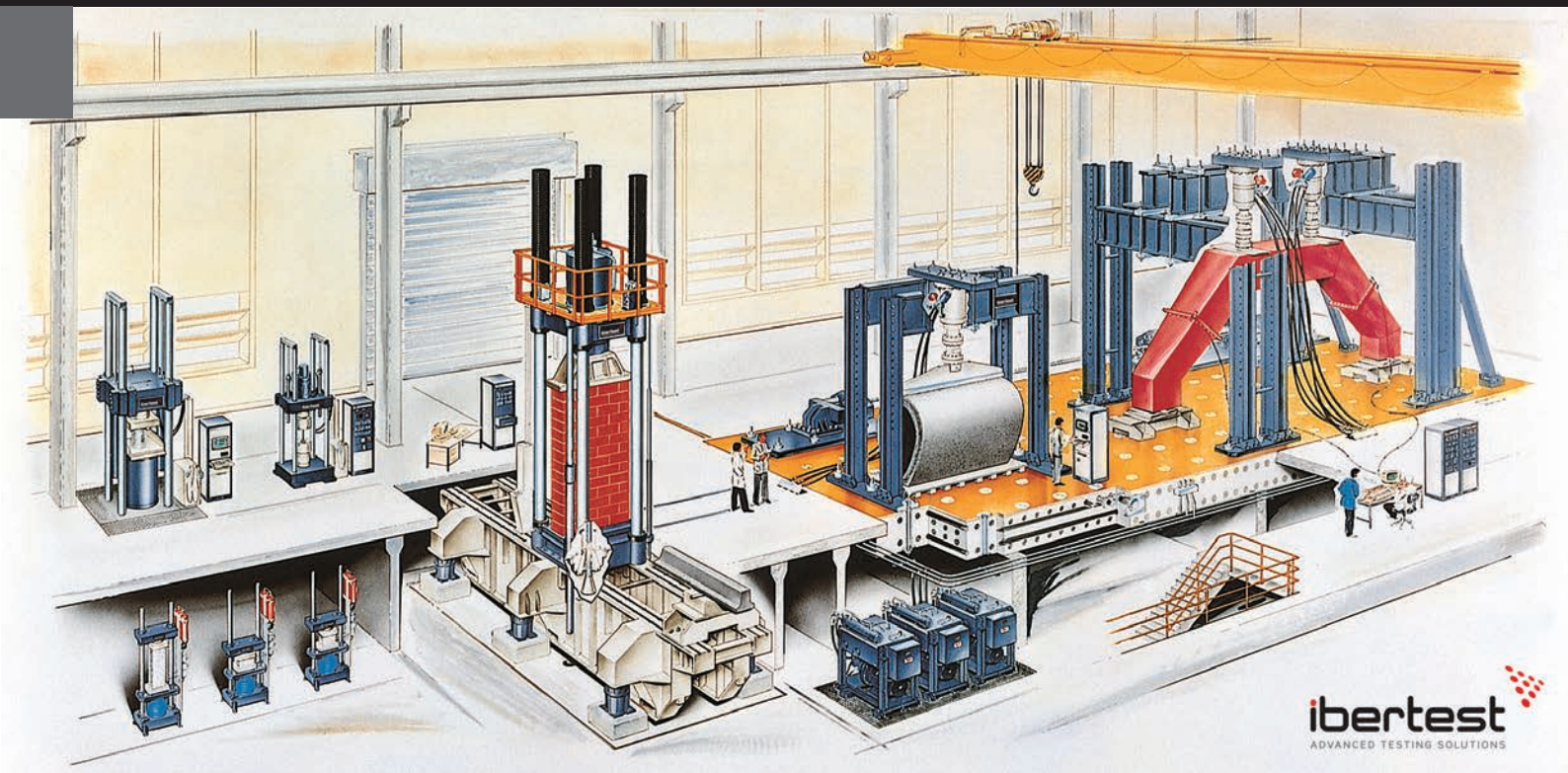
ibertest

ADVANCED TESTING SOLUTIONS

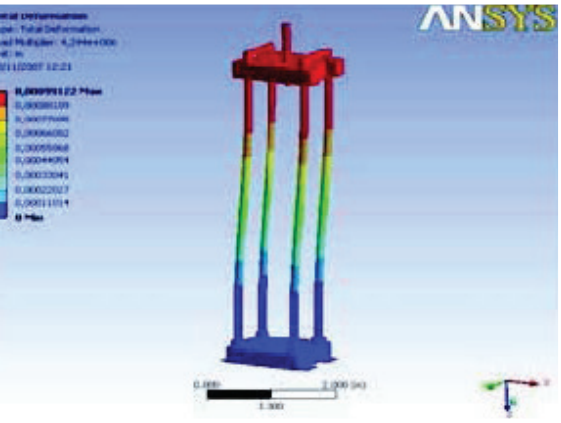
Test solutions for structural elements



SYSTEM CERTIFICATION
ISO 9001:2000 SGS
ACREDITADO POR ENAC
Certificado Nº ES04/0611

UNIÓN EUROPEA
FONDO EUROPEO DE DESARROLLO REGIONAL
UNA MANERA DE HACER EUROPA

Testing solution for structural elements



IBERTEST Highlights

- **Spanish manufacturer**: with real know-how, since 1970
- **R+D+Innovation**: 43 years of innovation and permanent improvement of our products.
- **Tailor-made designs**: highly technological and costumizable solutions adapted to your requirements.
- **Reliability**: manufacturing based on the most demanding quality criteria and according to international testing standards.
- **Real value**: excelent quality doesn´t have to have a high price.
- **Pre-sale service**: consultory services for new clients.
- **After-sale services**: calibrations, preventive and corrective maintenance, spare parts, upgrades and modernizations.
- **Export**: more than 4000 equipments sold in 67 countries
- **Full service**: flexible and complete solutions, from initial design to final instalation in the user laboratory
- **Warranty**: Global technical support is guaranteed

- **CE Marking**: Made in Europe.
- **Calibration laboratory**
  Accredited by ENAC internationally recognized by ILAC (International Laboratory Accreditation Cooperation)
- **Quality Management System.** ISO 9001:2000
  Accredited by SGS

CE

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Testing solution for structural elements

Testing portal frames and servo-hydraulics actuators, for testing of structures and components used in Civil Engineering and Building

S.A.E. IBERTEST provides several portal frames and servo-hydraulics actuators for static, wavy (pseudo-dynamic) and dynamic testing.

Used with suitable digital control systems and software applications, these systems enable to perform real scale testing, of either simple components (as premanufactured elements) or structures through complex multi-axis simulations.

Main Applications:

- Compression tests on pillars, retaining walls, etc
- Bending tests on beams, lintels, plates, slabs, floors, domes, etc.
- Flexural and compression tests of prefabricated concrete elements: kerbs, drainage channels, blocks, manholes, lids, pipes, collectors, etc.
- Strength tests for masonry: bricks, paving stones, tiles, coves, blocks ceramic, etc.
- Dynamic tests on all types of structural elements

The IBERTEST portal frames allow almost any maximum load to be applied, type of test (static or dynamic) or any dimension of the element to be tested.

The application of the load on the test element is performed by a hydraulic cylinder or actuator, with closed loop control.

To read the applied force, pressure transducers installed in the circuit hydraulic can be used or, load cells mounted in line with the actuator.

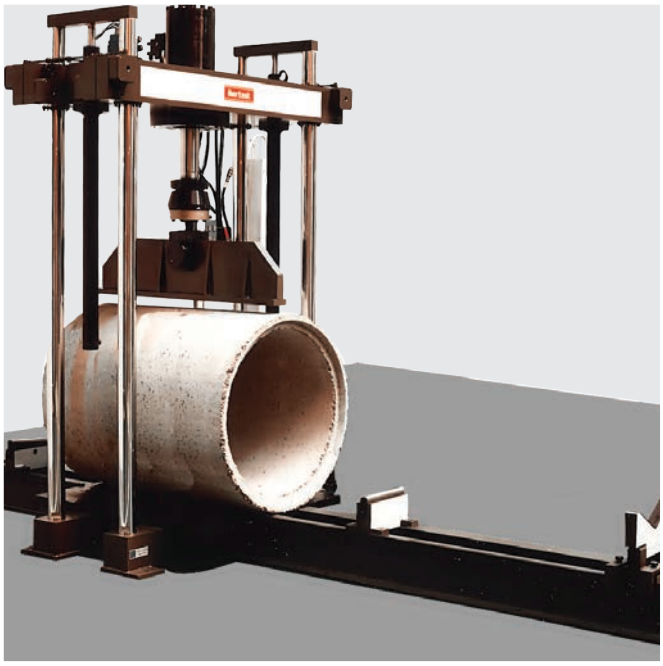
The loading force can be controlled in strength (kN/s), displacement of the actuator (mm/minute) or deformation of the testing element (mm/minute).

The load speed control is performed automatically by an electronic MD module, micro processed and latest generation independent of the computer.

Programming and execution of the tests are performed by means of the specific software IBERTEST WinTest32, which allows, among other options to:

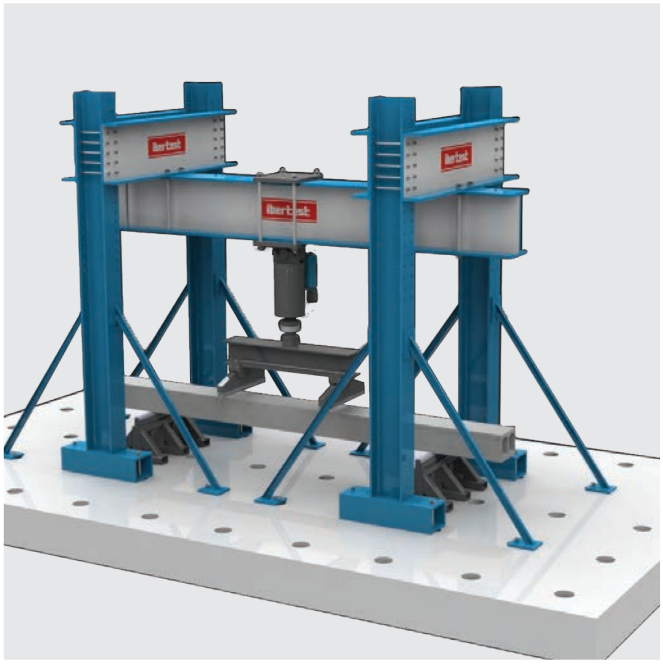
- Set load and test speed, running linear ramps, sections of maintaining load, charge and discharge cycles, etc.
- Configuring the test specimen parameters (shape, size, curing age, etc.)
- Run real-time measurements of strength and deformation (by strain gauge transducers or other extensometers) and automatic calculations of resistance, elastic modulus, etc.
- The WinTest32 version for dynamic tests, enables to configure tests according to different wave functions and define frequencies, amplitudes, limits, repetitions, etc.

Test frame options



Self-supporting universal portal frames

Self-supporting portal frames with steel profiles



Test frame to anchor to floor slab

Flexural testing machines

Testing solution for structural elements

Universal portal frames, PFIB series

Test loads up to 2000 kN can be reached with this type of portal frames.

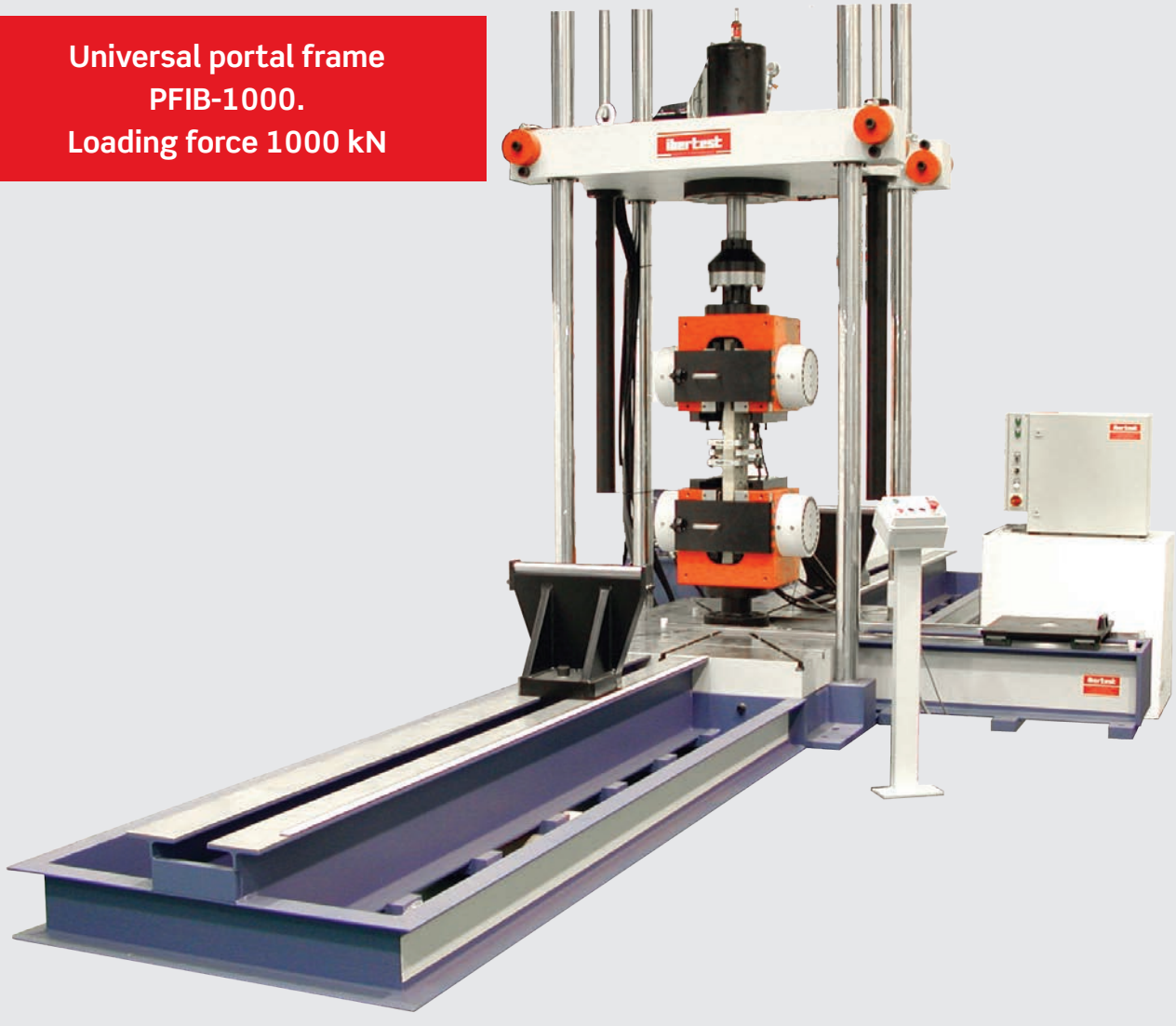
This type of portal frames is very appropriate when a high rigidity testing frame is necessary.

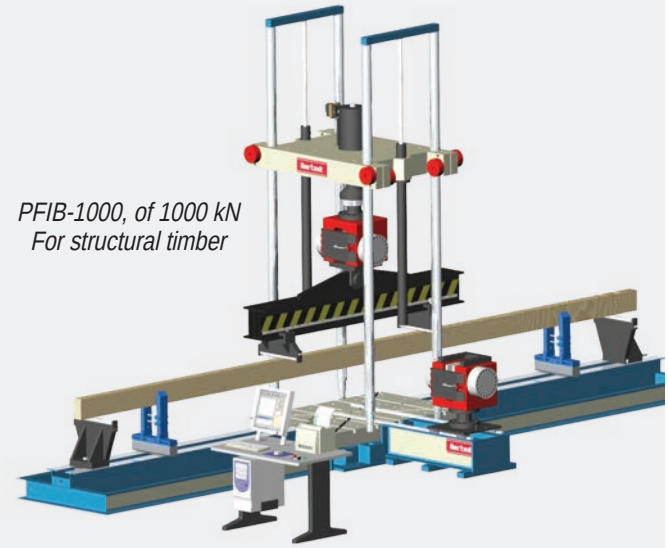
The testing frame is formed by a high rigidity base plate, four main columns and an upper crosshead, fixed or movable across columns by side hydraulic jacks.

The base plate can incorporate different types of frames, built in steel profiles, to enable the mounting of different test tools.

The main advantage of universal portal frames is its versatility as they can be equipped with lots of testing devices and can even perform tensile tests as if it were a universal testing machine.

Universal portal frame PFIB-1000. Loading force 1000 kN





PFIB-1000, of 1000 kN
For structural timber

PFIB-500, of 500 kN
For concrete railway sleepers

PFIB-600, of 600 kN
For pre-cast pipes
(up 1 meter diameter)

PFIB-750, of 750 kN
With twin side
100 kN actuators
For brick walls

PFIB-750, of 750 kN
For pre-cast pipes
(up 2 meters diameter)

PFIB-750, de 750 kN
With 100 kN frontal
and rear actuators
For precast walls

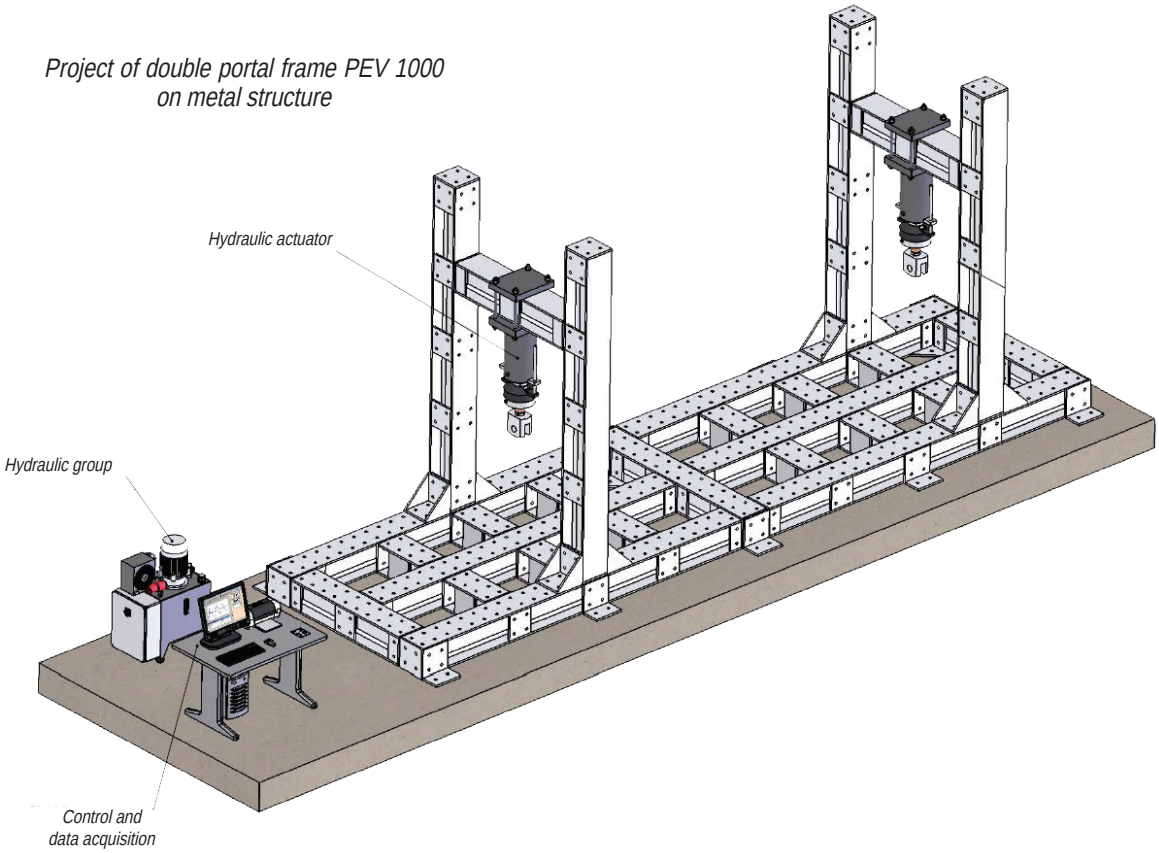
Testing solution for structural elements

Self-supporting frames, PEV Series

Portal frames manufactured with standardised steel profiles

The elements of the portal frame (columns, beams and crossheads) are steel profiles with very high stiffness, joined by means of welding or bolted joints.

This type of portal frame combines a great versatility and a very high stiffness, while maintaining an effective cost and without being anchored to a load slab.



The portal frames can be designed to perform static and dynamic tests.

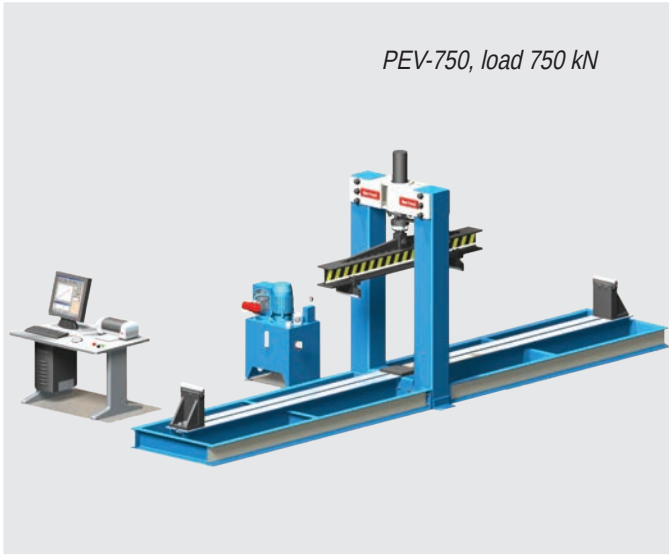
The load capacity, stiffness, horizontal and vertical clearances, are designed according to your needs.

The adjustment of vertical clearance can be done manually if the laboratory has a bridge crane or an electromechanical elevation system.

The conception of our portal frames allows configuring different types of assemblies to increase the load capacity, combining for example two frames through a lintel, in order to mount an actuator with bigger capacity.

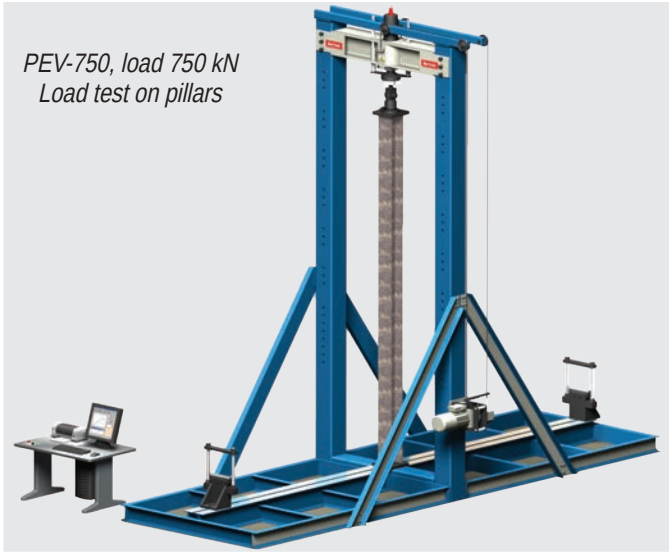
PEV-1000, load 1000 kN

PEV-600, load 600 kN

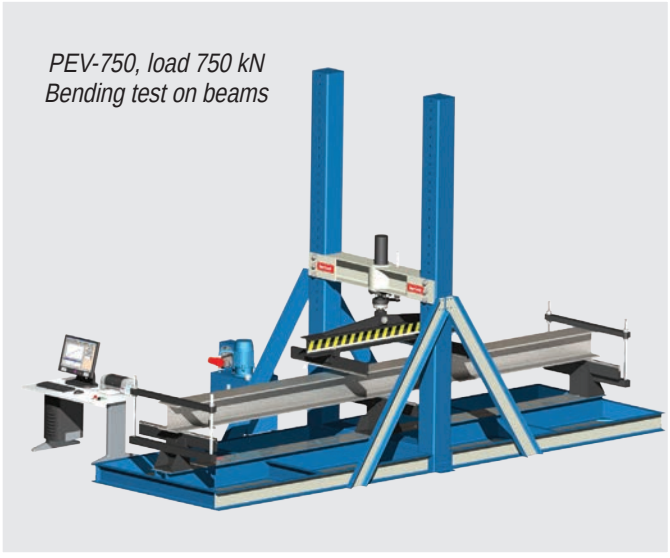


PEV-750, load 750 kN

PEV-750, load 750 kN



PEV-750, load 750 kN
Load test on pillars



PEV-750, load 750 kN
Bending test on beams

Portal frames anchored to load slabs, PIB series

Made of standard steel profiles

They are the best option for research laboratories in the construction sector universities, technological centres, etc.

The portal frames are formed basically by pillars connected by a cross beam, the pillars can incorporate rigidization elements.

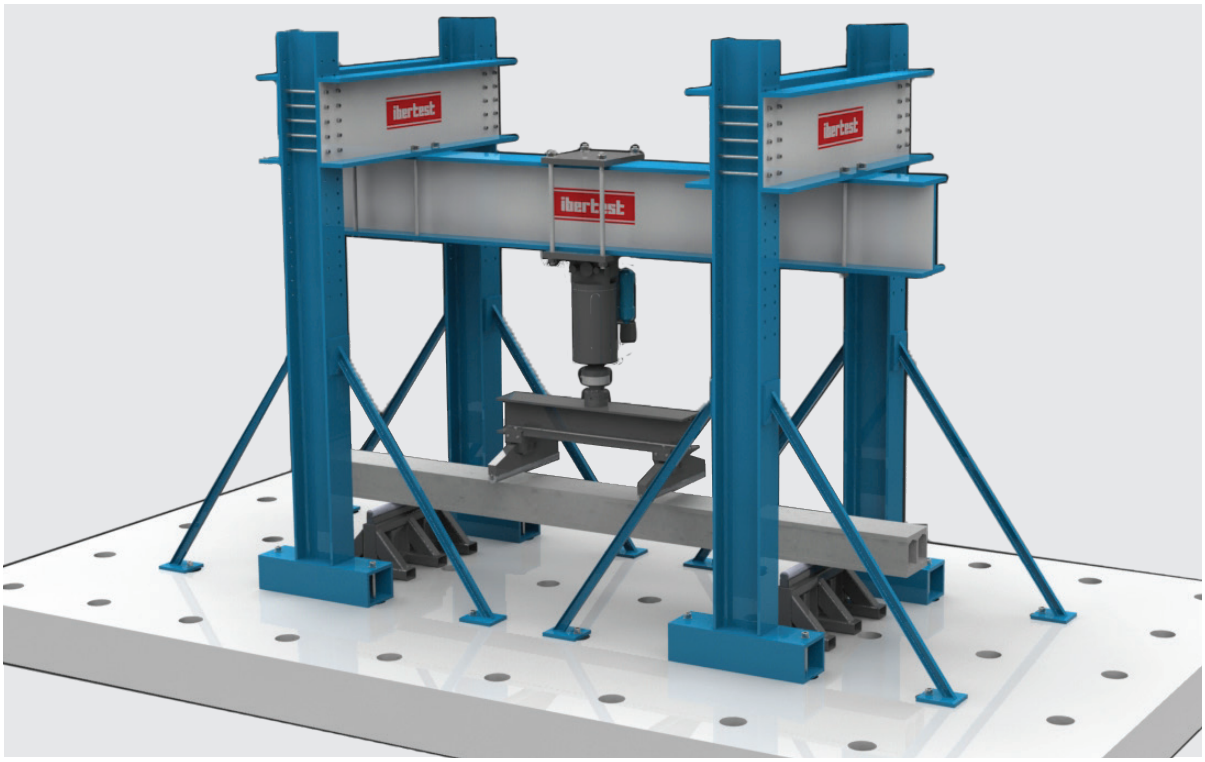
The height of the cross beam is variable to allow optimal use.

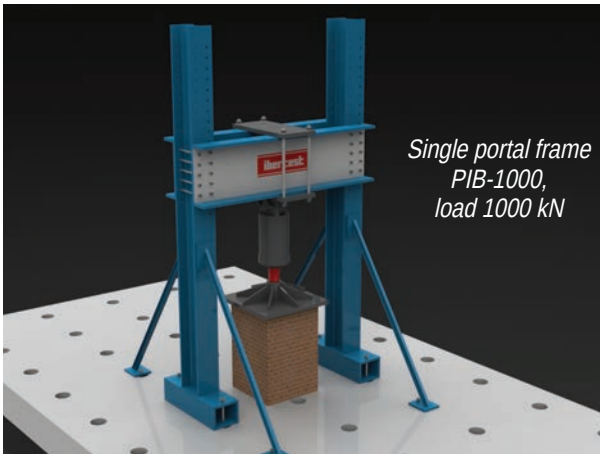
The pillars of the test frame are resting on footings that are anchored on a load slab built within the laboratory floor.

On the surface of the test slab, there should be a grid of anchor points that allows various combinations of portal frames, reaction walls, etc., in order to configure tests on complex geometry or very large dimensions elements

Every installation should be the subject of a special study to meet the needs raised in each case.

PIB-1000, load 1000 kN





Double portal frame GDP-400, 400 kN, moveable on rails

Bending testing machines (up to 200 kN)

To test beams, joists, plates, fibre cement pipes, slabs, kerbs, etc. The different test fixtures are analysed individually according to customer requirements, the needs for the elements to be tested and standards of application in each case.

These test frames are often part of a combined installation together with a compression testing machine for concrete or a servohydraulic universal testing machine (bending / compression), to perform the tests element and its components.

For example in a beam of reinforced concrete the assay is performed separately from constituent concrete (compression) and reinforcing steel (tensile) plus corresponding testing bending and/or shear

FIB Machines

Capacity 100, 150 and 200 kN

In these machines the load piston is normally located at the top of the test frame. If the load piston is single effect, the load piston return is carried out by springs located coaxially. If the piston load is double effect, the piston return is carried out hydraulically.

Test height may be fixed or variable depending on the type of machine. If the height is fixed, the piston will have more stroke to position itself at the appropriate test height. Spacing elements located below the element to be tested may also be used.

FCIB Machines

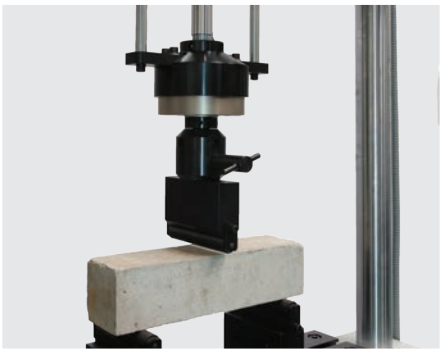
Capacity 100, 150 and 200 kN

Built in bracket, also called “gooseneck” type.

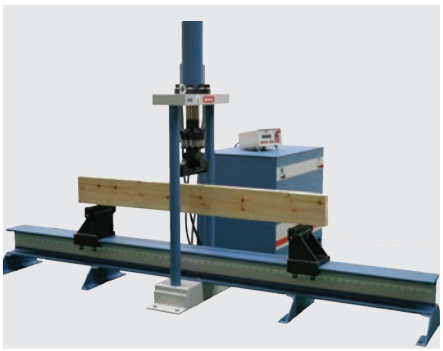
They have the great advantage of an open structure, which greatly facilitates the positioning of the specimens in the test zone.

However, its design has limitations on the maximum load that can be applied (Up to 200 kN) without compromising its structural integrity..

100 kN load machine FIB-100

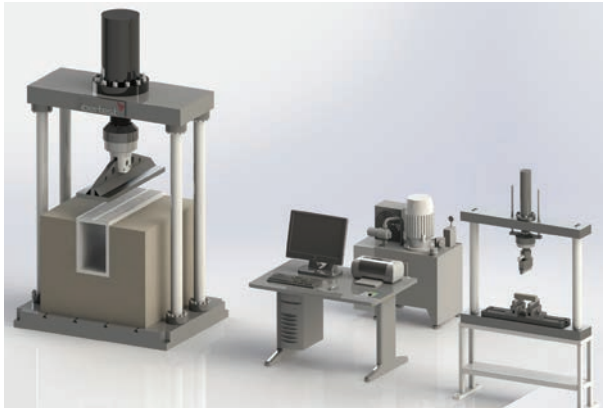


FIB-100 detail



200 kN load machine FIB-200

Combined Installation
FIB-100 / MEH 2000
Load 100 kN and 2000 kN, respectively



Combined Installation
PFIB-500 / FIB 100
load 500 and 100 kN, respectively

200 kN load FCIB-200 machine

Combined installation FCIB-200 / MEH 2000
load 200 and 2000 kN, respectively

Testing solution for structural elements

HYDRAULIC ACTUATORS

SAE IBERTEST offers several solutions of servo-hydraulic actuators for static, wavy (pseudo-dynamic) and dynamic tests.

Used with the appropriate digital control systems and software applications such systems enable full-scale testing of both single components (eg prefabricated elements) as well as structural elements by means of complex multi-axis simulations.

Available in almost any maximum load to be applied, type of test (static or dynamic), with bearings, front and rear flanges, etc.

The applied force can be read by pressure transducers installed in the hydraulic group or load cells mounted in line with the actuator.

The measure of the actuator displacement can be carried out by displacement transducers:

- Wire type, digital.
- Magnetostrictive type, digital, SSI protocole.

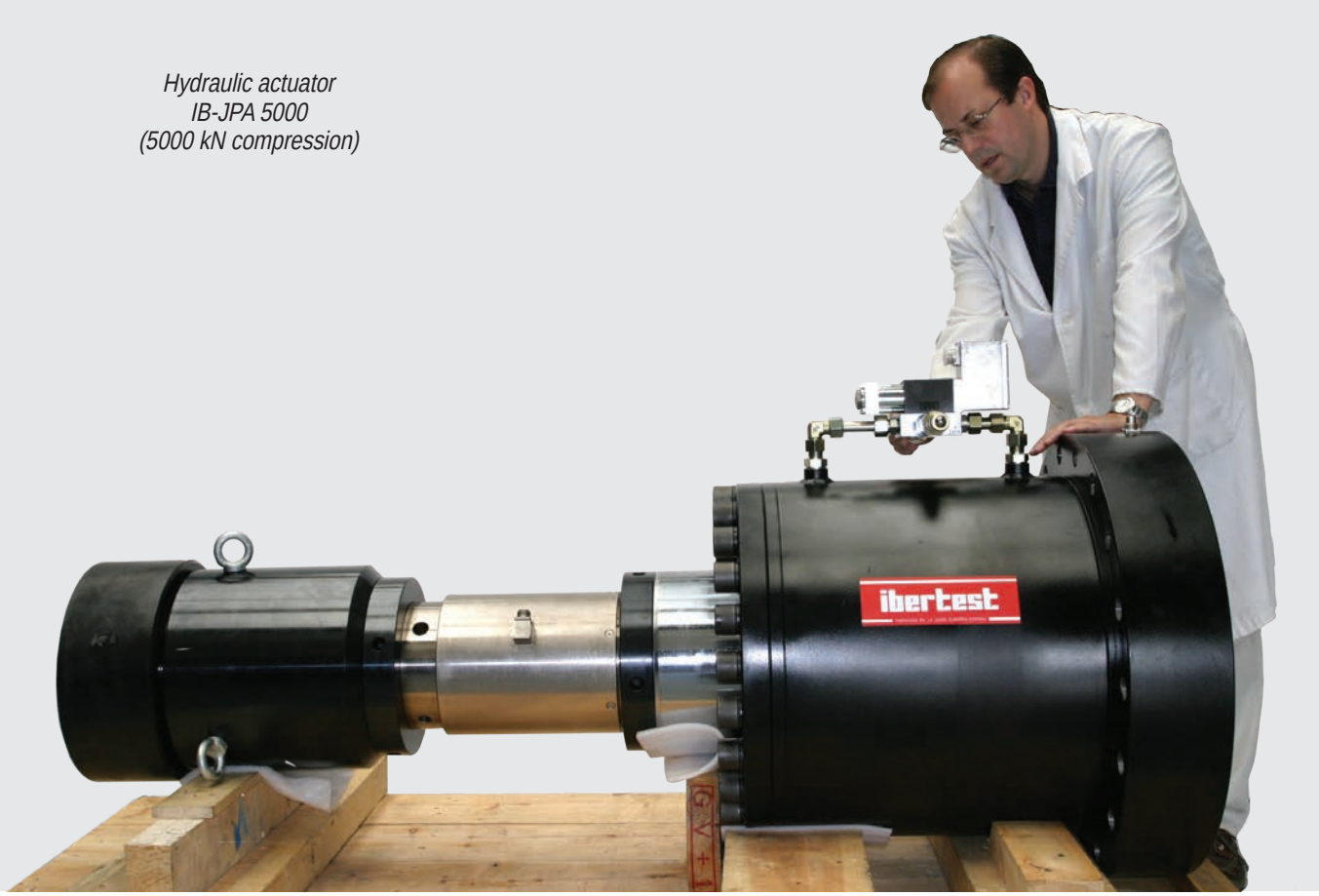
The speed at which the load is applied can be controlled in strength (kN/s), actuator displacement (mm/minute) or deformation of the tested specimen (mm/minute).

The pressure and flow required for the actuator are provided by a servo controlled hydraulic group, the control on the servovalve is performed in closed loop through a last generation electronic control unit MD type.

The operation and programming of the tests is performed by a computer system composed by a computer and WinTest32 testing software.

Types of hydraulic actuators

Designation	Chambers area	Joints between jacket and piston
IB-HE	Equal: symmetrical actuator	Hydrostatic
IB-JPS	Equal: symmetrical actuator	Polymer
IB-JPA	Different: asymmetric actuator	Polymer



Hydraulic actuator
IB-JPA 5000
(5000 kN compression)

Hydraulic actuator - IB-JPA 500
(Detail of manifold with servo-valve)

IB-JPS 400

IB-JPA 1000

Actuators for static tests, series IB-JPA

Capacities from 50 to5000 kN

Asymmetric double effect actuators (different areas in both chambers). Such actuators are the right solution for all type of static and low frequency cyclical tests.

Common features:

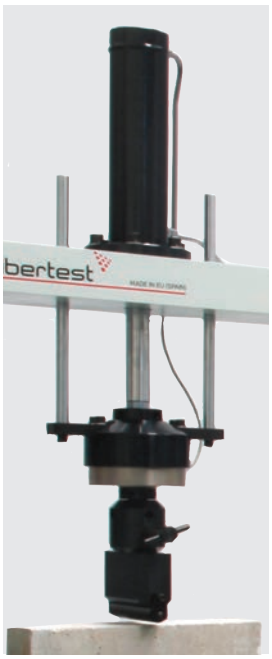
- Accuracy: Class 0.5, according to ISO 7500-1
- Control type: force and displacement in closed loop.
- Available with strokes: 100 or 250 mm. (Longer strokes are possible under demand).
- Contactless displacement transducer, magnetostrictive type, built-in in rod actuator.
- Manifold for the servovalve mounting
- Possibility to mount low profile load cells (standard) or double flange (high stiffness) in the piston rod.
- Possibility to mount hinges or joints, to protect the actuator from possible side loads.

Serie IB-JPA		50	100	250	500	750	1000	2000	3000	5000
Max. load (compresión)	kN	50	100	250	500	750	1000	2000	3000	5000
Max. load (tensile)	kN	30	60	150	300	500	600	1300	2000	4000

Accessories

- High precision load cells, ring type or double flange.
- High-response servo-valves.
- Differential pressure transducers.
- Ball joints.
- Bearings with ball joints.
- Compression platens.
- Hydraulic connections by means of quick couplings.

1000 kN actuator IB-JPA-1000
Mounted on rear flange



100 kN actuator IB-JPA-100
Mounted on front flange

IB-JPA 3x100 Portal frame with three actuators

Actuadores for Dynamic Tests.
Series IB-JPS and IB-HE. Capacities from 10 to 1000 kN

Symmetrical double effect actuators (identical in both houses areas)
Such actuators are the right solution for all types of fatigue tests

Common features

- Accuracy: Class 0.5, according to ISO 7500-1
- Control type: force and displacement in closed loop.
- Available with strokes: 100 or 250 mm. (Longer strokes are possible under demand).
- Contactless displacement transducer, magnetostrictive type, built-in in rod actuator.
- Manifold for the servovalve mounting, with high and low built-in accumulators.
- Possibility to mount low profile load cells (standard) or double flange (high stiffness) in the piston rod.
- Possibility to mount hinges or joints, to protect the actuator from possible side loads.

IB-HE 250 dynamic actuator

IB-JPS series

Mid Range

For low frequency dynamic tests (Less than 5 Hz) in which a high number of cycles is not required (less than 100,000 cycles).

Joints and special guides are used to ensure an operation under low friction, lengthening the actuator life to the most.

IB-HE series

High End

For all types of high frequency dynamic tests (greater than 5 Hz) in which a high number of cycles is required (greater than 100,000 cycles)

Hydrostatic bearings are used to maintain the rod centred for an operation free of mechanical friction, which, by accurate maintenance guarantees a long life of the actuator.

IB-JPS 400

Details actuators IB-JPS

Serie IB-JPS		10	25	50	100	160	250	400	600	1000
Max load in static	kN	10	25	50	100	160	250	400	600	1000
Max load in dynamic	kN	8	20	40	80	120	200	320	480	800

Serie IB-HE		10	25	50	100	160	250	400	600	1000
Max load in static	kN	10	25	50	100	160	250	400	600	1000
Max load in dynamic	kN	8	20	40	80	120	200	320	480	800

Accessories

- High precision load cells, ring type or double flange.
- High-response servo-valves.
- Differential pressure transducers.
- Ball joints.
- Bearings with ball joints.
- Compression platens.
- Hydraulic connections by means of quick couplings.

Ball joints and bearings for servo-actuators

These accessories enable to remove misalignments and minimize side loads between the servo-actuators and the load cells, which can occur during testing structures and may damage and reduce the life of the actuators.

Depending on the type of test and mounting position, the actuators can be provided with spherical ball joints in one end and bearings in one or both ends.

Fork head joint

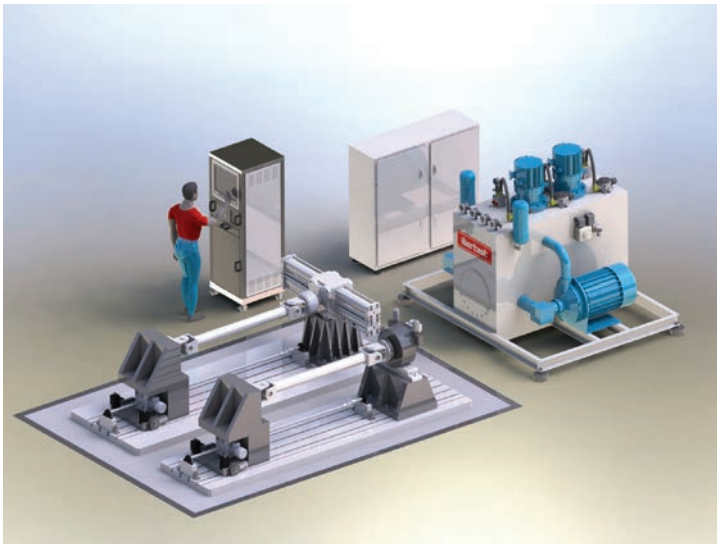
Spherical ball joing

Special solutions

Additionally SAE IBERTEST can provide special solutions for particular applications:

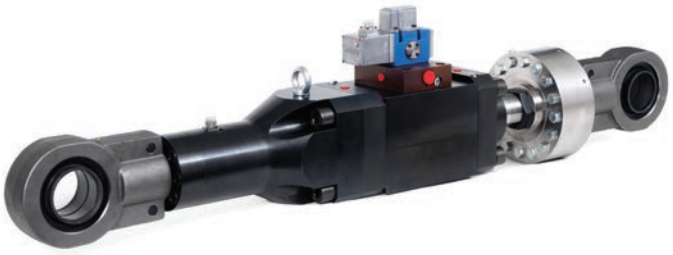
- Rotary actuators (torque) to apply rotation angles or angular moments.
- Pneumatic electromechanical actuators
- Linear motor type actuators, low loads
- Hollow shaft actuators
- Hydraulic accumulators for impact testing.

Please, contact us

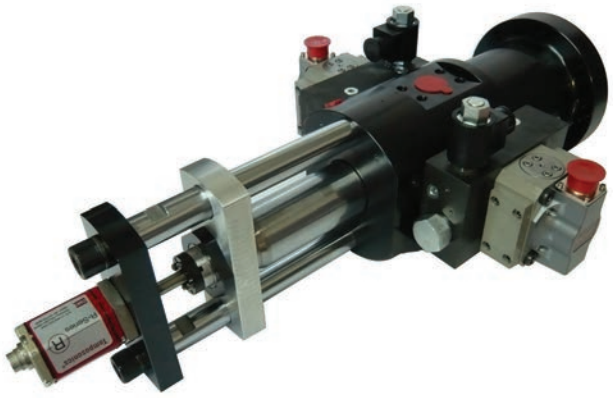


Project 2 rotary actuators for torsion testing
Up to 50.000 N/m in static and 16000 N/m in dynamic

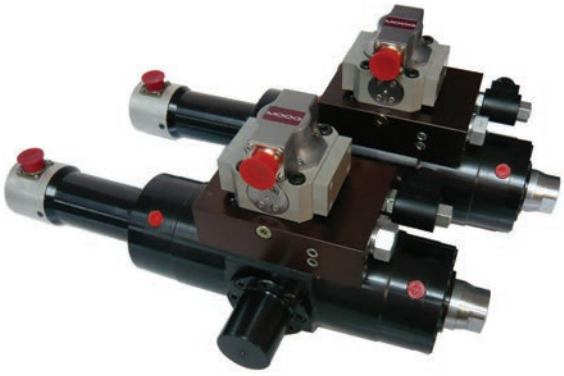
Stainless steel actuators with adjustable clearance spherical bearings



High performance actuator with double articulation



Shock absorber testing actuator with anti-rotation system



Low-friction actuators

High frequency vibrator

Hydrodynamic bearing actuator

Hydraulic Power Units (HPU)

Its function is to provide the hydraulic pressure and flow required for the movement of actuators.

The motor pump generates pressure in the hydraulic system and the flow is controlled by a servo valve or a high-performance servo-distribution.

Basically, the hydraulic circuit is completed by an oil tank, heat exchangers for cooling, secondary valves, filters, monitoring elements, security systems, etc.

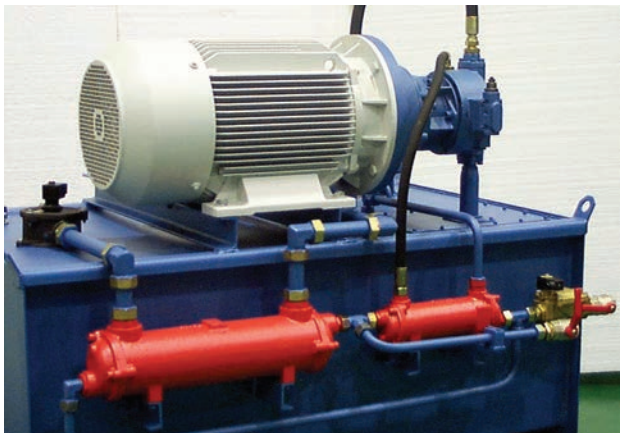
Low flow hydraulic group
Q: 4 - 10 l/min

Distribution block

Medium flow hydraulic group
Q: 40 - 60 l/min

Cooling system air-oil

High-flow large hydraulic group
Q > 200 l/min



Cooling system water-oil

Determination of dynamic performance

For static and quasi-static tests, the use of high pressure motor pump units with slightly elevated constant flow is enough (up to 10 l/min).

However, for dynamic tests the group requires higher flow rates

To assess, approximately, the hydraulic flow required for a dynamic solicitation with a determined frequency and amplitude, the following relationship can be used:

$$Q\ (l/min) = 3{,}7 \cdot 10^{-2} \cdot a_0 \cdot A$$

Where

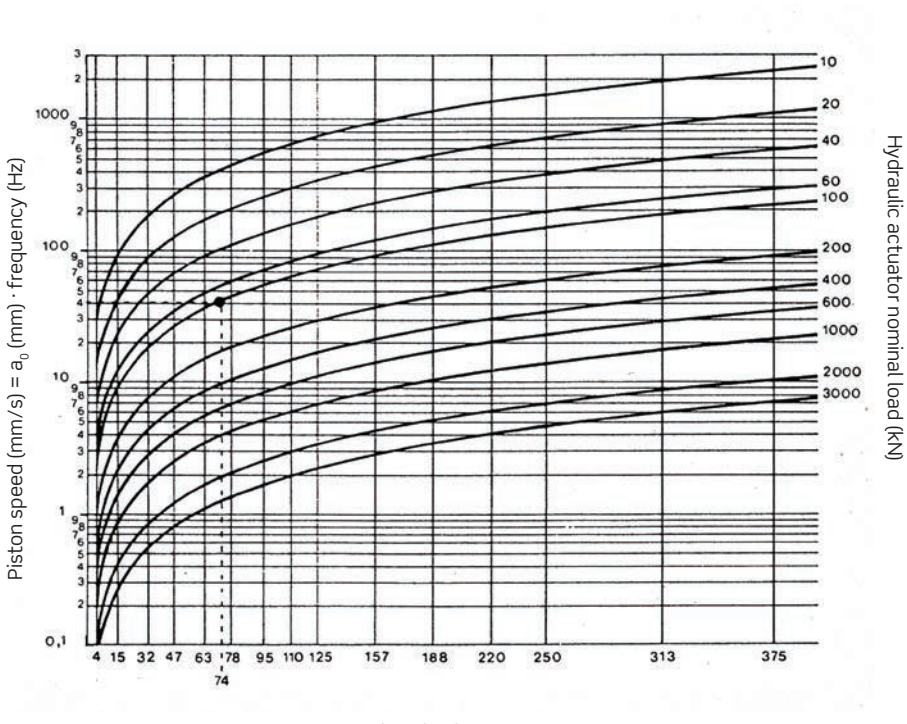
- a_0 = amplitude (mm)
- A = piston active cross section area (cm^2)

Notes:

The formula is an approximation to the real needs, since it does not take into account factors such as oil compressibility, the pressure drop in the pipes or the servo valve, the beneficial effect of hydraulic accumulators, etc.

Example: Flow calculation necessary for a double effect actuator of ± 100 kN nominal load

- a_0: Amplitude: ± 2 mm
- f: Frequency of solicitation: 20 Hz
- $a_0 \cdot f$: Piston speed: 40 mm/sec
- Q: Flow required: 74 litres/min



Measurement and control systems

ELECTRONIC CONTROL SYSTEM MD

Modular electronics, independent of computer, based on last generation microprocessors, and specifically designed for data acquisition and closed-loop control of high performance testing machines.

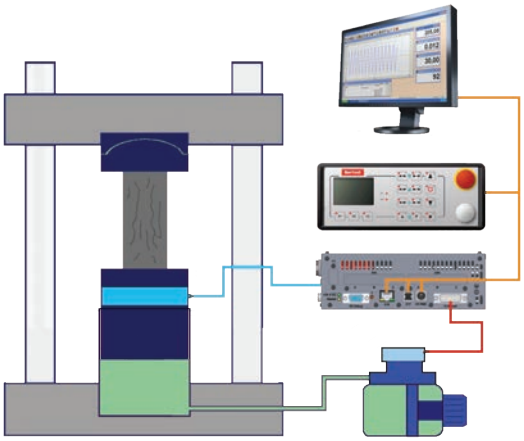
It allows maximum performance as for reading test variable, accurately and in real-time, closed loop control and data export for processing in WINTEST32 software.

The system replaces the usual electronic control cards mounted inside the computer, considerably improving the control possibilities, the reliability and data acquisition speed.

The data received from the measurement transducers are exported through USB port (or Ethernet) to your computer that performs real-time acquisition to compose and display graphs and test results through software WinTest32.

Thanks to the external modular configuration, the standard computer supplied with the machine can be replaced, very quickly and easily, by the other PC or compatible laptop.

Very useful in case of an eventual PC breakdown or when the replacement of obsolete computers is desired.



Servohydraulic control diagram

MD2 unit, in safety box, to be included in the electric board of the installation

Hand-held remote control unit

Table top units
(rear view with data acquisition channels)

Vertical control console, which integrates the switchboard, control electronics and computer software WinTest32

SOFTWARE TESTING WINTEST32

32-bit software package under Windows™, specially developed by IBERTEST to be used in material testing machines and portal frames.

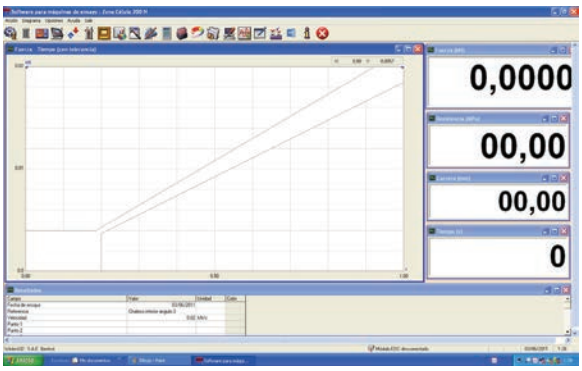
WinTest32 enables the user to configure tests according to the main international standards used in materials engineering (UNE, EN, ASTM, ISO, etc.).

IBERTEST can also adapt software WinTest32 to particular or special needs for your laboratory.

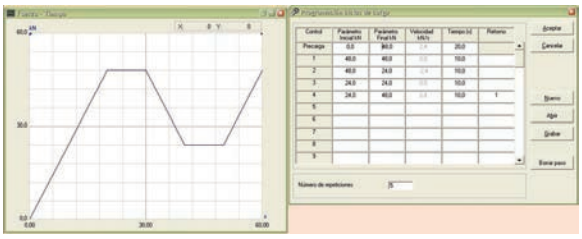
During the design phase, IBERTEST has paid special attention to ease of use, so that it can be used even for users with little experience using computers.

The main screen in WinTest32 software includes a simple selection menu and an intuitive icon bar therefore it is possible to use the program without the necessity to check the user manual.

WinTest32 shows the user the available options at each time (and their setting possibilities) guiding the user step by step interactively, to complete the test setup.



Start screen. The graph indicates, by lines, the tolerances on the test load application



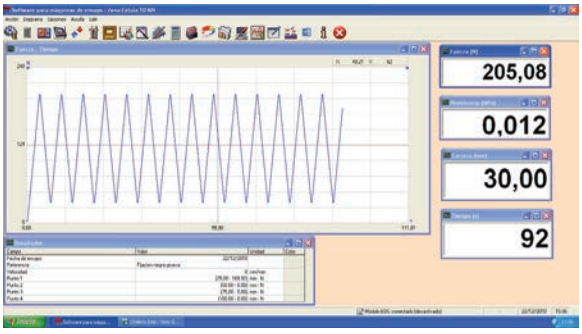
Execution of test cycles

The Structural WinTest32 software version allows additionally:

· Simultaneous and independent tests in each of the installation actuators.

· Synchronized tests between the actuators according to the control philosophies: phase control or phase shift (depending on the type of test to be performed) with display in real-time of graphical curves F-t, F-S and S-t

· Acquisition and data processing of the measurement system channels.



Special software for performing dynamic tests

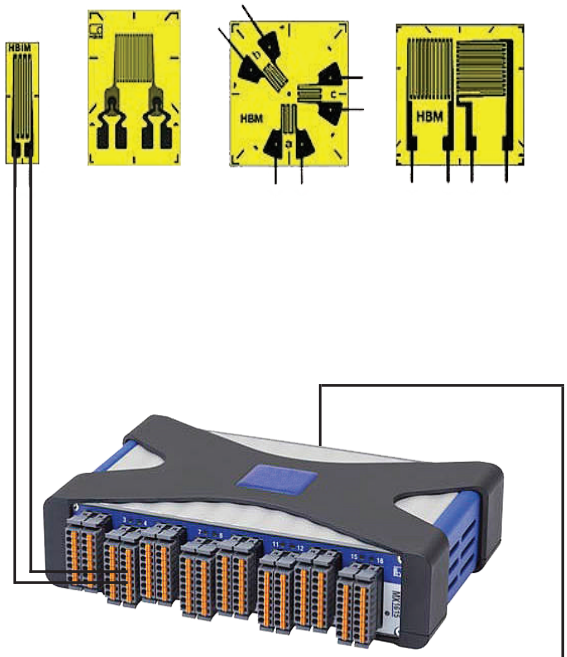
Additional Equipments

Connecting deformation transducers in MD control units.

The electronic MD control units have several free channels for the acquisition of deformation signals.

Depending on the deformation transducer you want to use (LVDT, potentiometric, digital, etc.), a signal conditioning card is used, installed in the corresponding expansion slot.

The MD units have the option to include an analogue output 0-10 V to send the strength or displacement signal to an external data acquisition system.



Display of external signals of deformation in software WinTest32

Software WinTest32 for display and graphs in real time of up to 16 deformation external signals from electronic data acquisition units can be used. They connect to the computer through a USB or Ethernet connection.

This requires the installation of a communication library between the software and the electronic acquisition data system.

Please contact us for specific information

Strain transducers

The measurement of the tested element deformation can be carried out using different systems:

- Strain gauges

Linear displacement transducers:

- Wire type (encoder)
- Digital transducers TTL
- Potentiometric transducers
- LVDTs

Etc.

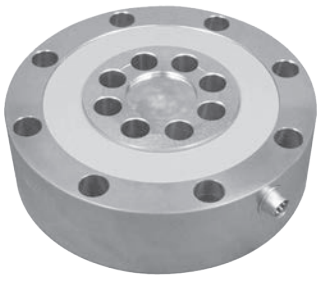
Calibration with load cells

Regardless of your After Sales Service and ENAC Calibration Laboratory, IBERTEST can offer its customers a wide range of load cells to measure compression force, with high accuracy.

The load cells are transducers that convert the force applied into a proportional electrical signal.

Its measurement principle is through strain gauges fixed to a body of special steel body, which is deformed under the action of the force to be measured.

Strain gauges, made from a film plot, follow the deformation of the steel body, generating an electrical response amplified and measured by an electronic measuring bridge.



Ask for more specific information

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