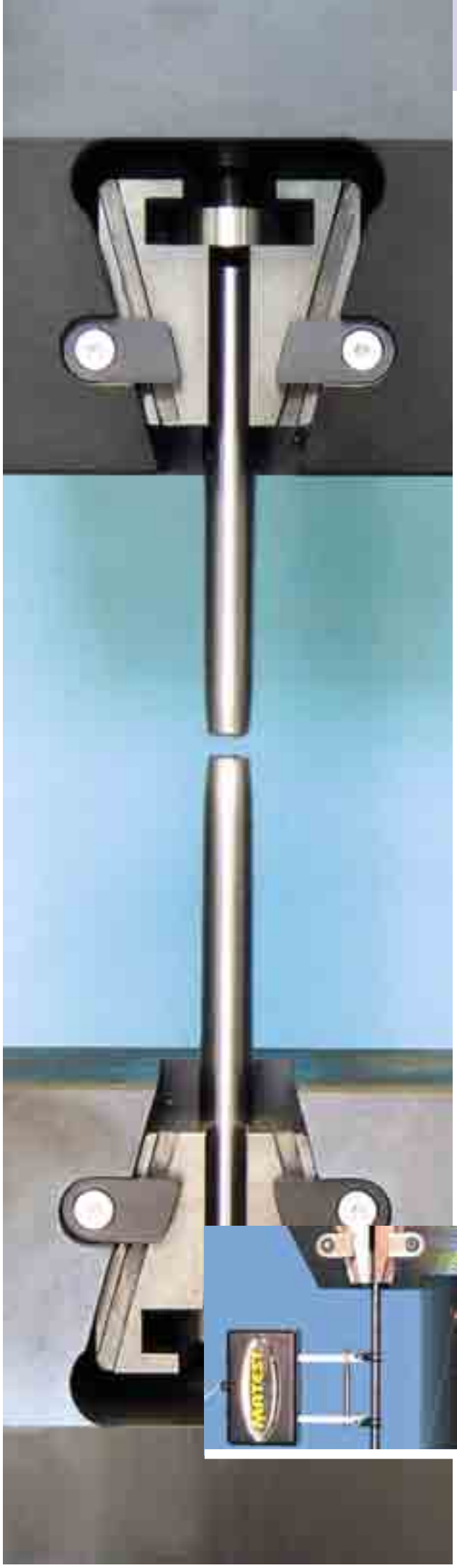


Section H STEEL

In this section Matest proposes a wide range of universal electro-mechanical and hydraulic machines to perform tensile, elongation, flexural, bending, resilience tests on metallic materials, with the possibility to extend these test applications on plastics, rubber, composed materials, wires, ropes, paper, textiles etc.
This range of machines satisfies both control tests on steel bars for reinforced concrete, and quality tests in the iron metallurgy, metals, plastics etc.

H003

Universal hydraulic servo-controlled machine 600 kN capacity with computerized control system, to perform static tensile tests on metallic materials

STANDARDS: **EN 10002** / ASTM A370

It basically consists of:
- Strong loading frame with a reading cell built into the piston
- Hydraulic servo-controlled unit, for the data acquisition, control and processing. The whole is built in a console.

The frame is designed to carry out tensile tests using the grips placed in the clamping heads. In the upper part, between the head and traverse, it is possible to carry out flexion, compression, bending, hardness, dishing tests, according to the International Standards by using the suitable (see accessories) devices.
The hydraulic servocontrolled unit regulates the load rate by the Computer. An emergency device stops the machine in any moment as per the International Safety Standards.
A control pedal situated on the frame governs the movement of the lower tensile head for an easier positioning of the specimen according to its length. The machine is supplied complete with loading frame, control console and bed frame, while the software (mod. H009, H009-02), the PC (mod. H009-01), the extensometers (mod. H014) the grips and the printer **"are options and must be ordered separately"** according to the needs of the user.

TECHNICAL FEATURES:

Capacity	600kN
Max. crosshead stroke	200 mm
Max. distance between the jaws	465 mm
Width flexion joke	190 mm
Max. distance between Flexion knives	1000 mm
Distance between Compression plates	235 mm
Load reading	Sensing by loading cell. Resolution 0,01% U.V.
Accuracy	Class 1 EN 10002/2 Only reading scale 1:1-1:20 U.V.
Stroke reading	Sensing by linear transducer Resolution 0,01 mm
Deformation reading	Sensing by electronic extensometer Resolution 0,001 mm
Accuracy	Class B 2 (B 1 for base up to 50 mm) ASTM E83
Needed height	3900 mm
Frame weight	2600 kg approx.
Rack dimensions	610x630xh.1600 mm
Power supply	400 V 3ph+Neutral+Earth 50 Hz 2 kW

H003 + H009-01

H003-99
KIT FOR MACHINE DELIVERY
The kit is composed by different mechanical devices to flatwise the machine allowing its transport. The amount of this kit is fully reimbursed to the customer if the kit is returned to Matest after the delivery.

ACCESSORIES FOR MOD. H003:

ROUND AND FLAT GRIPS. One set consists of two double pairs that must be placed into the upper and lower tensile heads.

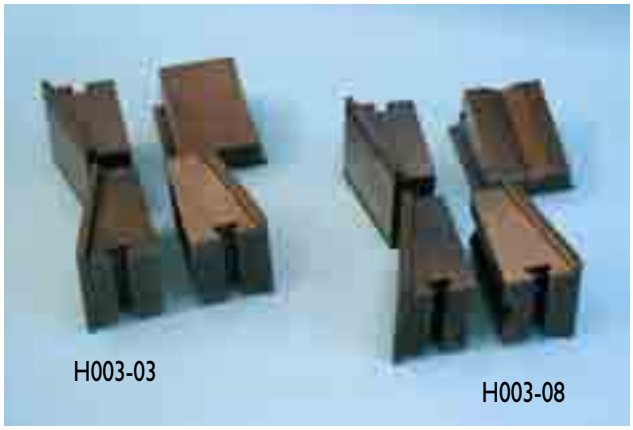
H003-03 Set of Grips for Flat specimens 2 ÷ 18 mm and Round specimens dia 5 ÷ 12 mm

H003-04 Set of Grips for Flat specimens 18 ÷ 36 mm

H003-07 Set of Grips for Round specimens dia. 12 ÷ 24 mm

H003-08 Set of Grips for Round specimens dia. 25 ÷ 40 mm

C128 Graphic Printer A4 format, for the printing of the test Diagram or Certificate.



NOTE: for the software (H009 and H009-02), the PC (H009-01) and the extensometers (H014) see next pages.

ACCESSORIES FOR TESTS ON METALS:

H003-11 Flexure test

STANDARD: UNI 559
The equipment is composed by a couple of lower bearers with adjustable supports and an upper blade.
Maximum load: 200 kN
Maximum distance between the lower bearers: 1000 mm
Width of the bearers: 120 mm
Diameter of the bearers: 50 mm
Weight: 70 Kg

H003-12 Bending test

STANDARDS: UNI 564 / ASTM E290
The equipment is composed by a couple of lower bearers with adjustable supports and an upper blade.
Maximum load: 200 kN
Maximum distance between the lower bearers: 1000 mm
Width of the bearers: 120 mm
Diameter of the bearers: 50 mm
Weight: 70 Kg
Note: bearers with different diameters are available on request.

H003-13 Compression test

STANDARD: UNI 558
The equipment is composed by an upper plate with seat ball assembly and by a lower plate.
Maximum load: 600 kN
Diameter of the compression plates: 90 mm
Weight: 25 Kg

H003-14 Test on electro welded wire nets

Device for the seizing of electro welded wire nets; this equipment must be used with the grips for flat specimens.
Weight: 5 Kg

ACCESSORIES FOR TESTS ON CONCRETE:

H003-21

Compression test on concrete cube specimens, max 150 mm side.
The appliance is composed by:
An upper compression plate 287 mm. diameter complete with seat ball assembly. A lower compression plate 287 mm. diameter
Maximum distance between the compression plates: 185 mm.
Weight: 60 Kg

H003-22

Flexure test on concrete beams with dimensions 100x100x400/500 mm. and 150x150x600/750 mm.
STANDARDS: **EN 12390-5** / BS 1881:118 / ASTM C78, C293 AASHTO T97 / NF P18-407 / UNI 6133
Composed by two lower and one upper bearers
Maximum load: 200 kN
Maximum distance between the lower bearers: 1000 mm.
Width of the bearers: 160 mm.
Weight: 40 Kg

Servo-controlled electromechanical universal testing machine

This appliance is designed to be used in Laboratories for Quality Control and Research on Metals, Plastics, Composed Materials, Wires, Ropes, Paper, Textiles etc.
The machine is suitable to make tensile and elongation tests on different materials following the **EN 10002** and ASTM A370 Standards.

The machine is composed by a strong base containing the transmission components and the Hardware control instruments.
The base carries two columns that guide the cross-bar; they are made of high resistance steel with ground hard chrome surfacing.
The big diameter and the position where the columns are fitted grant a high lateral rigidity. The system is suitable to realise both tests with single direction or dual direction.
In order to grant no clearance, the transmission of the movement to the mobile cross-bar takes place through two re-circulating spheres screws with pre-loaded female screws.
High attention is given to the assembling system of the screws and their groups - bearings put in the base and in the upper head.
The mobile cross-bar with big section together with all other elements of the machine being properly dimensioned grant a very good "Rigidity of the machine" (see UNI ISO 5893 Standards).
The moving up and down of the cross bar on the columns happens through sintered bushes with low friction coefficient.
On the mobile cross-bar there are some holes for the mounting of the load cells.

The Load Cell is made in stainless steel and reads both tensile and compression loads with a very high precision.
It is in conformity with the **EN 10002-2** Standards.
Features of the load cell referred to ISO 376 Standards.

Accuracy class	1
Repeatability error	≤ ± 0.145%
Interpolation error	≤ ± 0.090 %
Error on zero	≤ ± 0.03 %
Reversibility error	≤ ± 0.240%
Non linearity error	≤ ± 0.04 %
Maximum overload capacity	200%

In order to follow the specific needs of each single application, different load cells with different capacities within the nominal capacity of the machine can be installed on the frame.
Different connections for the installation of the seizing devices are on the mobile cross-bar and on the base (see accessories at following pages).
The machine is delivered with different safety devices limiting the maximum travel of the cross-bar. There is also an adjustable device that allows setting a personalised upper and lower travel limit following the used appliances.

The control section is made by a series of cards inside the base of the machine that are managing the control units and the reading units positioned on the machine.
The acquisition card, with a powerful microprocessor and converter AD 24 bits, takes all the working dates and through a RS232 connection it sends all these dates to the Personal Computer, which controls all the functions of the machine and makes the elaboration of all the calculations through the program UTM WIN.

On the base there are:
A device which allows an easy and speedy positioning of the mobile cross-bar. A push button to interrupt the test execution at any time. A series of connectors for the connection to the control PC and to the auxiliaries appliances (extensometer, load cells etc.)
General switch/Safety switch.

H007 + H009 + H009-01

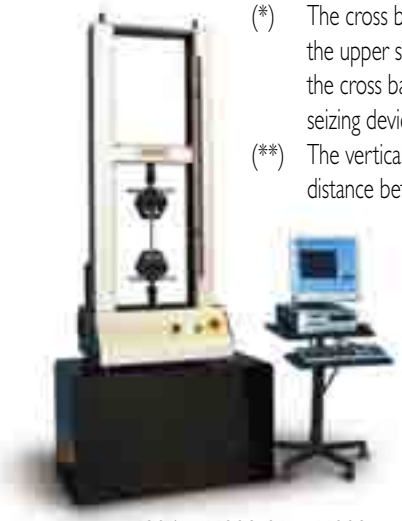
The frames protecting the columns and the screws are made of anodised aluminium, the internal sides are closed with anti-dust bellows and all the outside and internal parts are properly treated against the corrosion.
Following equipments are not delivered with the machine and have consequently to be ordered separately (see following pages):

- Personal computer model H009-01 (indispensable for the working of the machine).
- Standard UTM 2 software model H009 (indispensable for the working of the appliance).
- Software model H009-02 for the connection to the telephone net and the servicing through it.
- Special personalised programs (following the customer demand)
- Accessories for the seizing of the specimens.
- Printer model C128
- Extensometers model H014
- Other accessories

H008 + H009-01 + H009

- The voltage must not have peaks of tension, over-tensions and transitory over-currents or drops of voltage higher than 10% of the nominal voltage.
- Working temperature from +10° C. up to +38° C.
- Humidity range from +10% up to +90%, without condensation.

H005 + H009-01 + H009



H004 + H009-01 + H009

AVAILABLE MODELS:

MODEL	H004	H005	H006	H007	H008
LOAD CAPACITY kN	10	50	100	200	600
TEST SPEED mm/min					
Minimum	0,01	0,01	0,01	0,01	0,01
Maximum	500	500	500	480	300
POSITIONING SPEED mm/min.	500	500	500	480	250
CROSS BAR TRAVEL (*) mm	1130	1130	1180	1150	1500
OPENING OF THE TESTING CHAMBER					
Vertical mm (**)	1253	1251	1310	1280	1510
Horizontal mm	421	421	600	600	713
MAXIMUM DISTANCE BETWEEN THE TENSILE HEADS mm (***)	630	612	510	480	550
DIMENSIONS mm					
height	1708	1845	2340	2340	3000
width	550	810	1370	1370	1465
depth	683	670	700	700	930
WEIGHT Kg	250	370	1000	1150	2600
POWER SUPPLY	230V 1ph 50 Hz	230V 1ph 50 Hz	400V 3ph 50 Hz	400V 3ph 50 Hz	400V 3ph 50 Hz
ABSORBED POWER W	1000	1200	2000	3000	3000

(*) The cross bar travel is referred to the distance between the upper surface of the base and the lower surface of the cross bar and it doesn't include the load cell, the seizing devices, the different equipments etc.

(**) The vertical opening of the testing chamber is the distance between the upper surface of the base and the lower surface of the crossbar, without load cells, seizing devices and other devices.

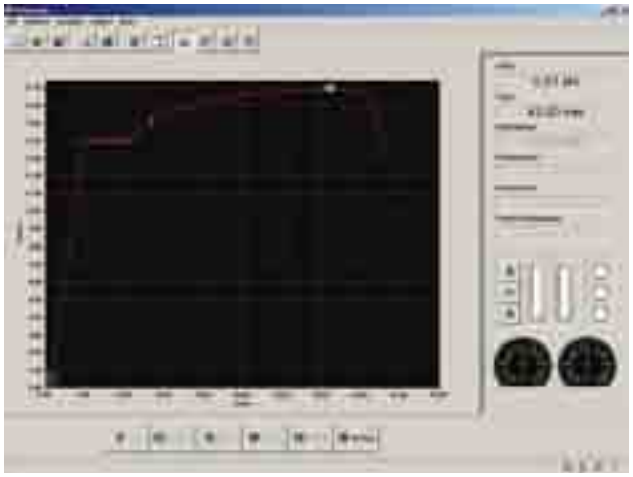
(***) The maximum distance between the tensile heads is the distance between the grips when the crossbar is at its upper dead point (load cell is installed). Practically it is the free length of the specimen between the tensile heads.

ACCESSORIES FOR MOD. H003 TO H008

H009
LICENSE FOR UTM2 SOFTWARE

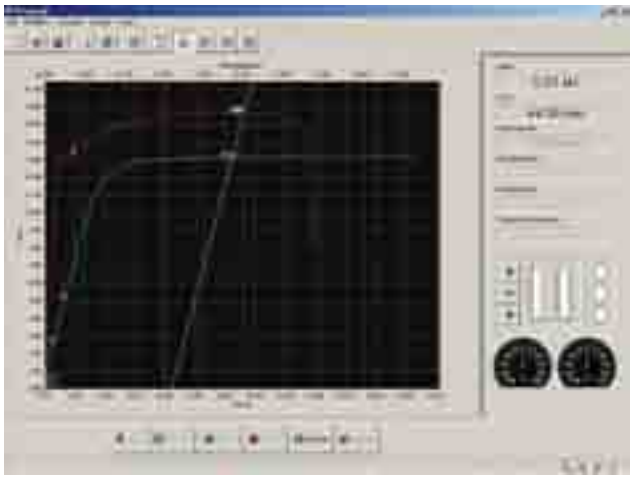
STANDARDS: **EN 10002-1 /** ISO 527, 178, 604, 10113, 12275, ASTM A370.

This Software, that has been developed following the UTM2, has been realised following the way of working of Microsoft windows operating system.
The software has been conceived realised in an interactive way and is the ideal solution for an effective and complete management of the material testing.
It is composed by many test procedures in conformity with the International Standards for metal, plastic, cement, wood and composed materials.



Tensile test on a steel specimen without extensometer; it visualises the starting of the specimen breaking with the possibility to increase the dimensions of the area of the graph by means of the zoom function.

The conception of this software supports a wide range of calculation needs and tensile, compression, flexure test profiles.
The user can realise new personalised test profiles: definition of the test data as the date of the test, the certificate number, the lot of the material delivered, the origin of the specimen, the test temperature… and definition of the specific dates of the specimen as type, dimensions measuring unit…



Tensile test on a steel specimen using tan extensometer, showing the symbols of the considered dimensions and the relative tracing in different colours selectable by the user.

The user can select and set the calculation corresponding to the activated standard. As an example for the Standard EN 10002/1 he can select the initial length, the initial section of the specimen, the calculation of the maximum load, the unit load, the elastic limits (ReH, ReL, Rp%), the restriction, the Young's Modulus….
For some calculations the end user can set the test execution parameters corresponding to the calculation algorithms as an example for the deviation of the Rp proportionality he can introduce the percentage %.

The software allows a speedy and easy management of all the machine parameters as the management of the load acquisition by means of a load cell, the specimen deformations by means of an extensometer and the crossbar displacement. For each one of the analogical channels the user can set the calibration and visualisation measuring unit, the limits of use: alarm, value of starting of the test calculation….
The test setting happens by dividing the process in different phases or speed charts, for each one of these charts the user can set the required kind of control (pace rate, load/time, deformation/time), the tare and the zero option , the limits and the phase or speed changes.
The end of test mode or the breaking limit can also be selected.
The software allows personalising and setting the visualising parameters of the test graph as the colour, the title of the Cartesian axis, the colours of the load/deformation limits and the certificate parameters as titles, margins….

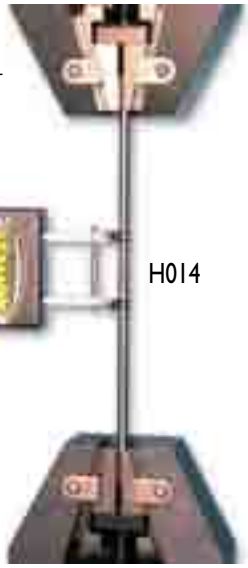
Example of test certificate

At the end of the test the user can decide if the selected calculations must be effected and/or if he wants to save the test in the file. In any moment all the tests made are available to make an analysis of the results or to print their certificate.
Graphic analysis of the test can be made by means of the zoom function.

H014

Electronic extensometer

Measuring base 50 mm, Deformation range +1 mm / -0.2 mm
Maximum percent measurable deformation: +2%
It gives the possibility to take the longitudinal deformations of the specimen during the tensile test.
A graph load/deformation is obtained and from this graph the coefficient of elasticity together with the loads RP0.1 - RP0.2 - Rt1 can be identified even on materials that are not presenting a yield point that can be clearly identified. The appliance is delivered complete with connection cables.



H014

H014-07

Electronic Extensometer for tensile deformation strength tests until breakage

This electronic coaxial extensometer is used to measure the deformation of a specimen under tensile test until breakage.
The extensometer is directly fixed to the test specimen and it remains connected until breakage, by measuring the deformation both in the elastic and in the plastic phases.
Measuring base for round specimens: 5 x specimen diameter.
Supplied complete with 4 spacers for the intermediate sample diameters of the specific measuring range, connection cable, accessories, carrying case.

Models:

H014-06 Extensometer for round specimens from 4,5 to 11 mm diameter. Transducer stroke: 25 mm

H014-07 Extensometer for round specimens from 10 to 19 mm diameter. Transducer stroke: 50 mm

H014-08 Extensometer for round specimens from 18 to 27 mm diameter. Transducer stroke: 50 mm

H014-09 Extensometer for round specimens from 26 to 36 mm diameter. Transducer stroke: 100 mm

H014-10 Extensometer for flat specimens, width max. 25 mm; thickness max. 10 mm
Measuring base: 25 – 50 – 60 – 790 mm. Transducer stroke: 50 mm

H014-06
with accessories

ACCESSORIES for mod. H003 to H008

H009-01
PERSONAL COMPUTER complete with LCD monitor 17", keyboard, mouse, connection cables.
The supply of the PC includes the installation of the purchased software.

H009-01

H009-02
Software for on line technical support. It allows maintaining the software without physical intervention of an After Sale specialist. Also gives the possibility to the customer to receive programs upgrading.

C128
PRINTER, A4 format, for the printing of the test diagram or Certificate.

C128

ACCESSORIES FOR:

MACHINE CODE	H004	H005	H006	H007	H008
CAPACITY	10 kN	50 kN	100 kN	200 kN	600 kN
Couplings for installation of the tensile heads or the devices	H005-40	H005-40	H007-40	H007-40	H008-40
Tensile heads	H005-11	H005-11	H007-11	H007-11	H008-11
Flat seizing grips for specimens as follows:					
Flat spec. thickness 0÷10 mm Width max 25 mm Round specimens Ø 3÷5 mm	H005-21	H005-21			
Flat spec. thickness 0÷10 mm Width max 50 mm Round specimens Ø 3÷10 mm			H007-21	H007-21	
Flat spec. thickness 11÷22 mm Width max 50 mm			H007-22	H007-22	
Flat spec. thickness 0÷12 mm Width max 70 mm Round specimens Ø 3÷10 mm					H008-21
Flat spec. thickness 12÷24 mm Width max 70 mm					H008-22
Flat spec. thickness 24÷36 mm Width max 70 mm					H008-23
"V" shape seizing grips for round specimens:					
Dia. 5 ÷ 12 mm	H005-31	H005-31			
Dia. 11 ÷ 18 mm			H007-31	H007-31	
Dia. 18 ÷ 25 mm			H007-32	H007-32	
Dia. 25 ÷ 32 mm			H007-33	H007-33	
Dia. 11 ÷ 22 mm					H008-31
Dia. 23 ÷ 34 mm					H008-32
Dia. 35 ÷ 45 mm					H008-33
Dia. 45 ÷ 55 mm					H008-34
Compression device	H005-41	H005-41	H007-41	H007-41	H008-41
Knurled roller clamping device	H005-42	H005-42			
Device for test on wire and ropes	H005-43	H005-43			
Flexural and bending device in three spots	H005-44	H005-44	H007-44	H007-44	H008-44
Device to centre the specimens		H005-51	H005-51	H005-51	

H005-11 - H007-11 - H008-11

Couple of tensile heads with different capacities. They are made of treated steel carefully worked and have a shape, which is granting an auto-tightening of the seizing grips on the specimen. A screw device allows the right operation of the seizing grips and grants a right blocking of the specimen starting from the lowest loads and reducing at the top the moving of the crossbar during the penetration of the knurling on the specimens.
Each couple of tensile Heads is delivered complete with:
- Spanner for the assembling and the disassembling of the seiwing Grips
- Pack of special grease for lubrication

H005-21

Flat Grips - Thickness 0÷10 mm
Width max 25 mm and Round Grips dia. 3÷5 mm
One set consist of a double pair of grips.

H005-21

H005-31

Round Grips with Section "V"
dia. 5÷12 mm
One set consists of a double pair of grips.

H005-31

H005-41

Compression Device
Consisting of an articulated upper plate and a lower fixed one.

H005-42

Knurled Roller Clamping Device
Consisting of a pair of grips with max. capacity 20kN suitable for test on plastic films with a considerable thickness and hardness and similar materials.

H005-41

H005-43

Device for tests on wires and ropes
Consisting of a pair of self-aligned rollers for tensile tests on wires and ropes of thin section with max. load capacity of 20 kN.

H005-42

H005-44

Flexural and Bending test device in three spots
Suitable for flexural and bending tests on round and flat specimens.

H005-43

H005-51

Device to centre the specimens
This device is composed by a pair of rollers installed on settable supports screwed on the tensile heads.
By setting the supports in relation with the dimensions of the specimen, the user will obtain a stop that allows a rapid and right positioning of the specimen in the flat grips.
This accessory can be used only on machine with 50 kN, 100 kN and 200 kN capacity (models H005, H006, H007).

H005-44


RAPPORTO DI PROVA
UNI EN 10002/1
Prova
Data : 11/11/2007
Certificato n° : 111103
Identificazione barra : 111103/1
Campione : Acciaio al C
Posizione prelievo : Centro barra
Direzione prelievo : Longitudinale
Temperatura : 25 °C
Provetta
Tipo : Tondo
Diametro : 10 mm
Sezione 78,54 mm²
MATEST

UNIVERSAL TENSILE/COMPRESSION MACHINE

- Tensile tests on steel reinforced bars, up to 500 kN max. capacity load.

- Compression tests on concrete cube and cylinder specimens up to 1500 kN max. capacity load.

STANDARDS: ASTM C39, E4 / BS 1610 / NF P 18-411 / DIN 51220 / AASHTO T22

This machine of compact design, is utilized to carry out tensile tests on steel reinforced bars from dia. 6 to 25 mm. and flat max. 25x15 mm. It can also carry out compression tests on concrete cube specimens max. side 150 mm. and cylinders max. dia. 160x320 mm.
The four columns loading frame is overdimensioned to assure high rigidity and stability. The loading piston, double action, is rectified and lapped. The piston is foreseen of an hydraulic maximum and minimum piston stroke's security device, by avoiding any damage risk due to wrong manipulations of the unit. An analogyc device is foreseen to visualize, pre-select and adjust the applied speed rate.
Also a fast ram approach is foreseen to avoid losses of time. The hydraulic pump is multipiston, so to insure continuity of oil delivery.
A displacement device visualizes instant by instant the piston's excursions during the tests.
An hydraulic selector allows to select the tensile or the compression test. The heads holding the jaws are obtained from only one block of high tungsten steel, while the jaws are hardened over 65 HRC. The "V" autoclamping form allows a quick and practical churking of the specimen. A calibration certificate is supplied along with the machine.
The machine is supplied complete with pair of jaw-holders, but without accessoires for the tensile and compression tests, which must be ordered separately (see accessories).

TECHNICAL SPECIFICATIONS:

- Maximum tensile load: 500 kN
- Maximum compression load: 1500 kN
- Distance between the jaws: min. 300 mm - max. 400 mm
- Distance between the compression platens: 340 mm
- Distance between the columns: 270 mm
- Piston's stroke: 100 mm
- Precision and repeatability: ± 1% of read value
- Power supply: 230 V 1 ph 50 Hz 750 W
- Dimensions: 780x420x1700
- Weight: 800 Kg

H012-01

H012-02

H010 with accessories

H011 with accessories

MODELS:

H010

Universal tensile/compression machine, motorized, measuring system with precision monometer dia. 250 mm. Bourdon type, double reading range, foreseen of max. load pointer.

H011

Universal tensile/compression machine, motorized, measuring system with "Cybertronic", electronic digital display unit with microprocessor, to measure the load and the deformation (through the extensometers mod. H014), with graphic display of large dimensions, and possibility to be connected to PC by RS232 link. See accessories at next page.

ACCESSORIES for H010 and H011:

FOR TENSILE TESTS ON ROUND AND FLAT STEEL SPECIMENS:

H012-01
Set of 4 Jaws, upper and lower, for round steel specimens from dia. 6 to 15 mm., and flat specimens from 6 to 15 mm. thickness (max. width 25 mm).

H012-02
Set of 4 Jaws upper and lower for round specimens from dia. 15 to 25 mm

FOR COMPRESSION TESTS ON CONCRETE CUBE AND CYLINDER SPECIMENS:

H013-01
Upper compression platen foreseen of seat ball, fixing device, lower compression platen and distance pieces test cylinders max dia. 160x320 mm. and cubes 150 mm. max side.
The platens have dia. 216 mm. and are hardened and rectified as requested by Standards.

H013-02
Safety Guards to CE Directive,polycarbonate made, complete with hinges an lock.


H013-01

ACCESSORIES (only for mod. H011):

C127
Graphic printer on thermal paper

H016

Software UTM2* (Universal Testing Machine 2)
Developed for the management through PC of Matest testing machines.
Managing License: visualisation in real time of Load/ Deformation, graphic, Test Certificate etc.

C109-10

SOFTWARE UTM2* (Universal Testing Machine 2).
Developed for the managing and the remote control of the MATEST Testing machines from a PC .
License for COMPRESSION tests on concrete.
Standards: EN, UNI, BS, UNE, DIN, ASTM, NF, etc.
*Technical details of UTM2: see pag. 12

H009-01 Personal Computer, complete with LCD monitor 17", keyboard, mouse, connection cables. The supply of the PC includes the installation of the purchased Software.

H009-02 Software for on line technical support. It allows maintaining the software without physical intervention of an After Sale specialist. Also gives the possibility to the customer to receive programs upgrading.

SPARE PART for H011:

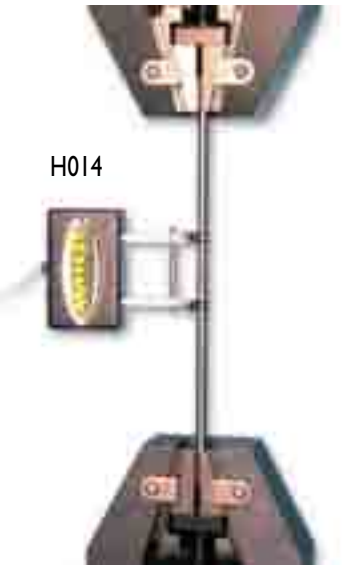
H011-11
Electronic digital display unit with microprocessor "Cybertronic" complete.

H014

Electronic extensometer

Measuring base 50 mm, Deformation range +1 mm / -0.2 mm
Maximum percent measurable deformation: +2%
It gives the possibility to take the longitudinal deformations of the specimen during the tensile test. A graph load/deformation is obtained and from this graph the coefficient of elasticity together with the loads RP0.1 - RP0.2 - Rt1 can be identified even on materials that are not presenting a yield point that can be clearly identified. The appliance is delivered complete with connection cables.


H014-07


H014

Electronic Extensometer for tensile deformation strength tests until breakage

This electronic coaxial extensometer is used to measure the deformation of a specimen under tensile test until breakage.
The extensometer is directly fixed to the test specimen and it remains connected until breakage, by measuring the deformation both in the elastic and in the plastic phases. Measuring base for round specimens: 5 x specimen diameter. Supplied complete with 4 spacers for the intermediate sample diameters of the specific measuring range, connection cable, accessories, carrying case.
Models:

H014-06 Extensometer for round specimens from 4,5 to 11 mm diameter. Transducer stroke: 25 mm

H014-07 Extensometer for round specimens from 10 to 19 mm diameter. Transducer stroke: 50 mm

H014-08 Extensometer for round specimens from 18 to 25 mm diameter. Transducer stroke: 50 mm

H014-10 Extensometer for flat specimens, width max. 25 mm; thickness max. 10 mm. Transducer stroke: 50 mm
Measuring base: 25 – 50 – 60 – 790 mm.

H020

Marking-off machine

Automatic, motorised
STANDARD: UNI 556

Used to mark off specimens with round, square shape and with improved bond for the measurement of the percentage elongation after their breaking, in accordance with the Standards.
The machine can mark specimens as follows:
- Round from 4 mm up to 50 mm. diameter.
- Flat from 4 mm. up to 50 mm thickness.
- Square from 4 mm. to 45 mm. side.

Useful length 300 mm.
Marking steps: 5 or 10 mm. selectable with lateral graduation.
Marking speed: 60 marks per minute.
Power supply 400 V 3ph 50 Hz
Dimensions: 530x480x445 mm.
Weight: approx. 58 Kg

H020

H021

Marking-off machine, same to mod. H020, but hand operated by rotating the handle.

H050

Dry-ice maker

This device instantaneously produces the quantity of dry ice (solid CO2) required to reach temperatures down to -80 °C.
The dry-ice maker must be connected to a liquid CO2 bottle with connecting pipe and it produces 100 g. dry-ice tablets, having mm. 75 diameter and mm. 25 thickness.
Weight: 3 Kg

H050

H052

Cooling bath for resilience tests

This apparatus is meant for Charpy tests to be carried out at low temperatures.
It is made from double chambered stainless steel with isolating cavity wall from foamed polyurethan, 65 mm. thick.
Complete with double chambered cover and specimen rack.
Internal dimensions: 125x125xh 180 mm
Weight: 12 Kg

H054

Pliers, special-shaped, to take cooled specimens from the bath and place them directly into the Charpy Pendulum.

H052

H054

H057

Broaching machine

Used to make notchings on impact test bars for resilience tests.
The piston with rack grants a correct alignment of the broach to the specimen and a perfect axial thrust.

H057

H057-10

ACCESSORIES: H057-11

H057-10
Broach for "V" notchings on specimens with square section 10x10 mm

H057-11
Broach for "U" notchings on specimens with square section 10x10 mm

C351

Specimen cutting machine

It accepts blades up to dia. 350 mm
Shear capacity: 120 mm
Complete with cutting blade for metals dia. 350 mm
Power supply: 230 V 1F 50 Hz 2000W
Dimensions: 560x460x390. Weight: 20 Kg

C351

SPARE PART:
C351-11 CUTTING BLADE for metal.

H060

Pendulum impact Charpy tester for resilience tests

STANDARDS: **EN 10045-1** / ASTM E23 / UNI 4431, 4714
ISO TC/7 / BS 131 / EURONORM 7-55

The tester is equipped with a falling pendulum hammer, able to break, with a single blow, a sample carved in the middle and positioned on two supports.
The test is carried out on a CHARPY sample in order to check the energy absorbed during the impact, which is measured in JOULE.
The value stands for the impact strenght of the material (resilience).
- Cast iron frame
- Pendulum with hardened knife
- Brake device to stop the pendulum
- Impact energy 300J with 2J graduation
- Falling angle: 140°
- Pendulum mass Kg. 21,300
- Impact speed: 5,187 m/s

Supplied complete with knife-edge to perform the test as per ASTM Standard
Dimensions: 500x1400x1900 mm
Weight: 470 Kg

H060

ACCESSORIES for H060:

H060-01
PROTECTION CAGE, to CE Safety Directive.

H060-02
KNIFE-EDGE to perform resilience tests according to EN 10045-1, BS 131 Standards.

H061

H061

Pendulum impact Charpy digital tester, "high performance" for resilience tests

STANDARDS: **EN 10045-1** / ASTM E23 / UNI 4431, 4714
ISO TC/7 / BS 131 / EURONORM 7-55

Cast iron enbloc frame.
Separate control panel with digital indicator 0,1 J resolution.
Impact energy: 300 J
Specimen size: 10x10x55 mm
Distance between bearers: 40 mm
Impact hammer mounted on ball bearings.
Electromagnetic brake mechanism to stop the pendulum.
Complete with hardened knife and holding device for specimen.
Protection cage, to CE Safety Directive, steel made, it insulates the hammer excursion in the front and rear part of the machine.
When the cage is opened to load the hammer, an electromecanic safety device does not allow to release the hammer.
Power supply: 230V 1ph 50Hz
Dimensions: 550x1400x1900 mm
Weight: 550 kg approx.

H065

Cold bend testing machine

STANDARDS: ASTM A615 - 89, ASTM A615M-89 / D.M. 09.01.96
D.M. 14.01.08 / ISO 7438, 15630-1

SPECIFICATIONS:
- Max. piston load: 16.000 Kg
- Max. piston stroke: 550 mm
- Power supply: 400V 3F 50 Hz 1500W
- Dimensions: mm 1540x800xh 1300
- Weight: 350 Kg

H065-01

H065

ACCESSORY:

H065-01
Safety guards to CE Safety Directives.

This equipment has been studied and designed to carry out bending tests on steel bars for reinforced concrete.
The test consists in bending the bar at 180° or to bend the same at 90° and then straighten if of at least 20°.
This bending machine is composed of a rugged frame supporting a beam having a cylinder with relevant load piston fixed on it, being activated by an hydraulic cell complete with speed adjuster for the piston, direction control valve, max. pressure valve, control gauge.
The whole is cased to protect every single component from the dust, and the operator from any possible danger. A small bowl has been fitted under the beam, where the steel bar is bent.
Two contrasting rollers are fitted on the beam. They may easily be adjusted in distance to be in accordance with the Standards concerning bars having diameter between 5 and 40 mm.
Fixing and changing the mandrels on top of the thrust cylinder is easy and practical and grants the operator a perfect interchangeability of the same. A device prevents the unlocking of the bar under test from the relevant rollers and the contrasting mandrel both during the bending and the staightening operation.
The machine accepts bars up to Ø 40 mm. and is supplied complete with two series of rollers, having respectively Ø mm. 50 and 100. The mandrels, the mandrel-holders and the brackets are not included in the standard supply and have to be ordered separately. (see table).

H065 DETAIL

DIAMETERS TABLE OF THE AVAILABLE MANDRELS AND BARCKETS FROM Ø 5 TO Ø 40

Ø SPECIMEN mm	MATERIAL	SURFACE L=plain AD=adherence	Ø MANDREL mm	MOD.	BRACKET MOD.
5	Fe B 22 K	L	10	**H066-01**	**H068-11**
	Fe B 32 K	L	15	**H066-03**	**H068-12**
	Fe B 38 K	AD	15	**H066-03**	**H068-12**
	Fe B 44 K	AD	20	**H066-06**	**H068-13**
6	Fe B 22 K	L	12	**H066-02**	**H068-12**
	Fe B 32 K	L	18	**H066-05**	**H068-14**
	Fe B 38 K	AD	18	**H066-05**	**H068-14**
	Fe B 44 K	AD	24	**H066-07**	**H068-16**
8	Fe B 22 K	L	16	**H066-04**	**H068-15**
	Fe B 32 K	L	24	**H066-07**	**H068-17**
	Fe B 38 K	AD	24	**H066-07**	**H068-17**
	Fe B 44 K	AD	32	**H066-10**	**H068-19**
10	Fe B 22 K	L	20	**H066-06**	**H068-18**
	Fe B 32 K	L	30	**H066-09**	**H068-20**
	Fe B 38 K	AD	30	**H066-09**	**H068-20**
	Fe B 44 K	AD	40	**H066-12**	**H068-21**
12	Fe B 22 K	L	24	**H066-07**	**H068-11**
	Fe B 32 K	L	36	**H066-11**	**H068-13**
	Fe B 38 K	AD	36	**H066-11**	**H068-13**
	Fe B 44 K	AD	48	**H066-15**	**H068-15**
14	Fe B 22 K	L	28	**H066-08**	**H068-12**
	Fe B 32 K	L	42	**H066-13**	**H068-15**
	Fe B 38 K	AD	84	**H066-23**	**H068-19**
	Fe B 44 K	AD	112	**H066-28**	**H068-21**
16	Fe B 22 K	L	32	**H066-10**	**H068-14**
	Fe B 32 K	L	48	**H066-15**	**H068-17**
	Fe B 38 K	AD	96	**H066-24**	**H068-20**
	Fe B 44 K	AD	128	**H066-30**	**H068-12**
18	Fe B 22 K	L	36	**H066-11**	**H068-16**
	Fe B 32 K	L	54	**H066-17**	**H068-18**
	Fe B 38 K	AD	108	**H066-26**	**H068-11**
	Fe B 44 K	AD	144	**H066-33**	**H068-13**
20	Fe B 22 K	L	40	**H066-12**	**H068-01**
	Fe B 32 K	L	60	**H066-19**	**H068-03**
	Fe B 38 K	AD	160	**H066-35**	**H068-09**
	Fe B 44 K	AD	200	**H066-38**	**H068-06**

Ø SPECIMEN mm	MATERIAL	SURFACE L=plain AD=adherence	Ø MANDREL mm	MOD.	BRACKET MOD.
22	Fe B 22 K	L	44	**H066-14**	**H068-02**
	Fe B 32 K	L	66	**H066-21**	**H068-05**
	Fe B 38 K	AD	176	**H066-36**	**H068-05**
	Fe B 44 K	AD	220	**H066-39**	**H068-10**
24	Fe B 22 K	L	48	**H066-15**	**H068-03**
	Fe B 32 K	L	72	**H066-48**	**H068-07**
	Fe B 38 K	AD	192	**H066-49**	**H068-07**
	Fe B 44 K	AD	240	**H066-50**	**H068-01**
25	Fe B 22 K	L	50	**H066-16**	**H068-04**
	Fe B 32 K	L	75	**H066-22**	**H068-08**
	Fe B 38 K	AD	200	**H066-38**	**H068-08**
	Fe B 44 K	AD	250	**H066-41**	**H068-02**
26	Fe B 22 K	L	52	**H066-51**	**H068-09**
	Fe B 32 K	L	78	**H066-52**	**H068-10**
	Fe B 38 K	AD	260	**H066-53**	**H068-03**
	Fe B 44 K	AD	312	**H066-54**	**H068-09**
28	Fe B 22 K	L	56	**H066-18**	**H068-06**
	Fe B 32 K	L	84	**H066-23**	**H068-02**
	Fe B 38 K	AD	280	**H066-43**	**H068-04**
	Fe B 44 K	AD	336	**H066-46**	**H068-06**
30	Fe B 22 K	L	60	**H066-19**	**H068-08**
	Fe B 32 K	L	90	**H066-55**	**H068-03**
	Fe B 38 K	AD	300	**H066-56**	**H068-09**
	Fe B 44 K	AD	360	**H066-57**	**H068-07**
32	Fe B 22 K	L	64	**H066-20**	**H068-01**
	Fe B 32 K	L	96	**H066-24**	**H068-04**
	Fe B 38 K	AD	320	**H066-45**	**H068-05**
	Fe B 44 K	AD	384	**H066-47**	**H068-08**
34		AD	340	**H066-58**	**H068-22**
36		AD	360	**H066-57**	**H068-23**
38		AD	380	**H066-59**	**H068-22**
40		AD	400	**H066-60**	**H068-23**
14		AD	70	**H066-61**	**H068-02**
16		AD	80	**H066-62**	**H068-04**

All mandrels have been produced from quality steel and cadmium plated for rust protection, and from Ø 10 mm. up to Ø 96 mm. included have been hardened to make them wearproof.

AVAILABLE MANDREL-HOLDERS

H067-01 Mandrel-holder Ø 10 a 12 mm
H067-02 Mandrel-holder Ø 15 a 20 mm
H067-03 Mandrel-holder Ø 24 a 50 mm
H067-04 Mandrel-holder Ø 54 a 96 mm

From Ø 100 to 400 mm. the mandrel is directly fitted to the piston without using a mandrel-holder.