

SEMI-AUTOMATIC STRENGTH TESTERS

TENSO-LAB



Tenso-Lab series is one of the most widespread and flexible model of UT machines worldwide.

- Different types available (single and dual column) to suit the most exigent requirements:
 - **for a variety of testing** (tensile strength, elongation, tear, seam slippage, compression, puncture, etc.)
 - **in different industries** (textiles, non-wovens, cardboard, leather, plastics, etc.)
 - **for various material** (yarn, tapes, fabrics, garment accessories, felts, cord/twines, ropes, etc.)
- very strong structure, built according to CRE (Constant Rate of Extension) testing principle
- versatile, interchangeable load cells & clamps/jaws
- standard compliance, conforms to major testing methods (ISO, ASTM, JIS, BS, IWS, NEXT, M&S, etc.)
- easy to operate, the software includes a wide choice of ready-made testing routines; they can also be created by the end user (no special skills are needed)
- **equipped with a comprehensive range of jaws/grips and tools**
- top quality components, made in Italy



COMPANY WITH
MANAGEMENT SYSTEM
CERTIFIED BY DNV GL
= ISO 9001 =
= ISO 14001 =

Single Column

Strength testers, up to 5000 N capacity,
code 2512E, 2512F

Tenso-Lab 4 series is the latest generation of the well-known Tenso-Lab semi-automatic tensile testers. The new models are distinguished by:

- **New hardware:** high sensibility and robustness (can be used to test both fibres and high tenacity fabrics), direct-drive ball bearing screw, low speed operation available, extended capacity to 5000 N, ...
- **New components:** improved load cells performances (higher accuracy level and new capacity load cell added), quick load cell & clamps/jaws exchange, ...
- **New open software:** more intuitive and easy to operate, SQL database and standard Ethernet machine connection to data export, no restriction on testing routines (can be created by the enduser, no special skills needed).

Available models:

- **Tenso-Lab 4 Plus**, code **2512E**, with integrated PC
- **Tenso-Lab 4**, code **2512F**, with optional external PC



Dual Column

Universal tensile strength testers, up to 50 kN capacity,
code 2515, 2516

Developed to meet the highest quality testing standards of the industry, research institutes, testing houses, vocational institutions. Distinguished by its robust structure: two ball bearing screws combined with the strengthened guiding columns prevent any strain or buckling when the machine is exposed to heavy load ensuring smooth movement.

A variety of available interchangeable clamps (mechanical and pneumatic) and a rich menu of preloaded testing methods enable the use of the Dual Column tester in a variety of industries like textile, automotive, medical, geotextiles, cardboard, plastic/rubber, nonwovens.

Designed to handle different kind of materials like yarns, cords, ropes, hanks, ribbons, fabrics, etc.

The tensile tester can perform a full range of tests including traction, compression, tearing, seam slippage, bending, hysteresis/fatigue cycles, all in compliance with the main international testing methods.

Available models:

- **Tenso-Lab, Code 2516**, maximum capacity up to 1 kN (10.000 N)
- **Tenso-Lab, Code 2515**, maximum capacity up to 50 kN (50.000 N)



Software

The control software of our Strength Testers, available in several languages, has been designed, and constantly updated, in close co-operation with the most important textile laboratories and end users, hence it is:

- effective;
- easy to operate;
- open towards the most common application softwares;
- in compliance with the relevant textile standards;
- able to run with the most recent operating systems.

The software is composed of three main sections: control program (of machine functions), data storage program, program to run the different application modules. The operator can perform generic tests, which can be set as desired at all parameters, or perform guided tests choosing the module related to a specific standard, allowing selection of the only parameters referred to in that standard, and making reports and graphs in accordance to the same.

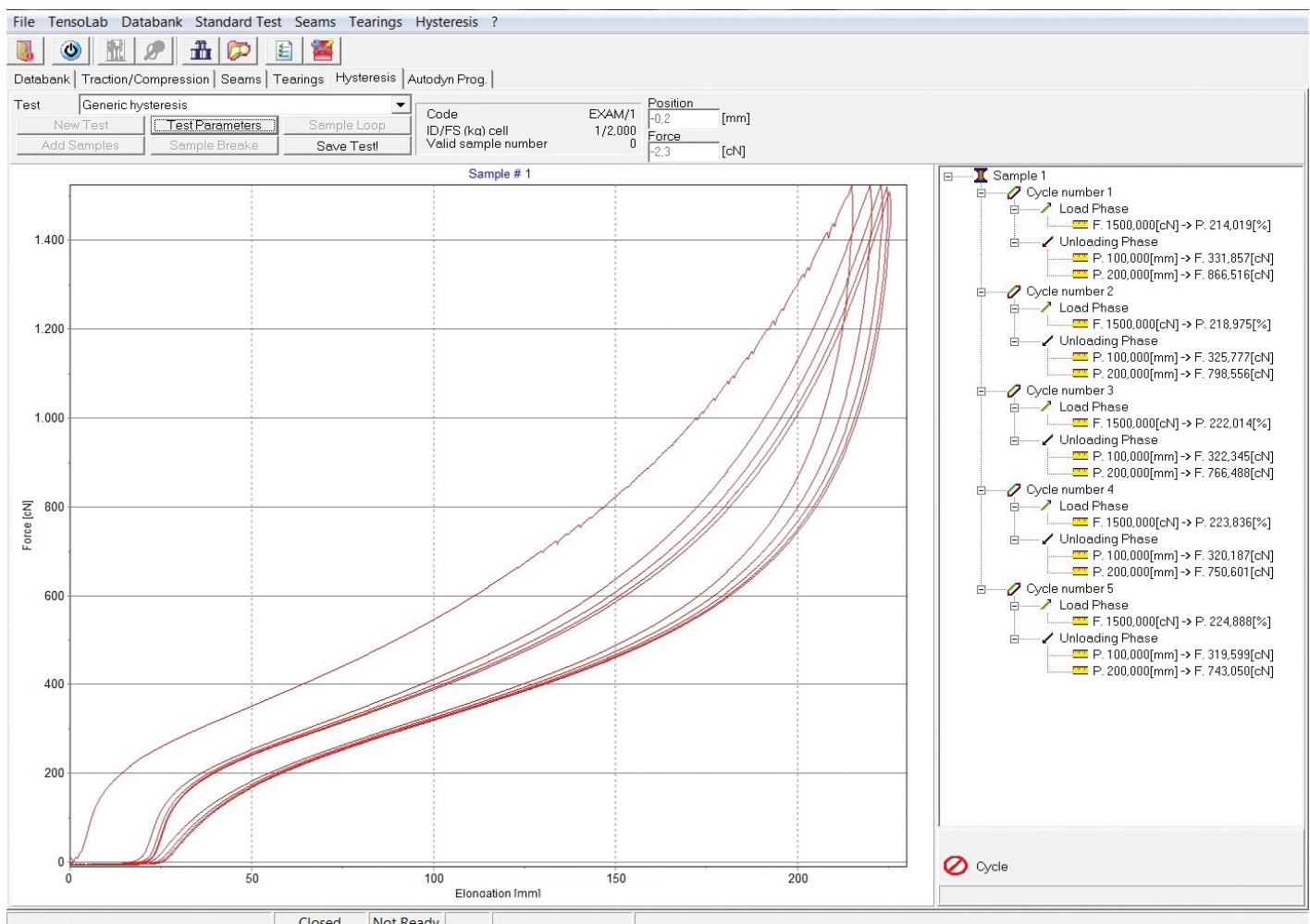
Currently, the available modules allow the performance of:

- traction tests, elongation
- compression, perforation tests
- seam slippage tests, peel off, bending
- tearing
- hysteresis cycle tests

in compliance with ISO, ASTM, BS, DIN, IWS, UNI and M&S standards.

Hysteresis

The hysteresis module stands out for its flexibility: the operator can set the number of cycles giving limits for strength and/or elongation with pauses under loading or unloading and decide how and when sampling data. The set cycle can be stored in a Data Bank ready to be recalled and used, if necessary.



Example of Hysteresis test

Indicative images / graphics, that may vary depending on the type of test (if performed by Single or Dual Column)

Work Area

The “work area” or “work done to break” data are mainly used for weaving yarns.

If we have two yarns with the same breaking strength, but one stretches more than the other, the actual performance of the latter on a weaving loom will surely be better, compared to the former yarn with less elongation. This superior yarn performance can be measured in both terms of quality and efficiency.

For experienced weavers it is therefore fundamental to know this parameter, which in practice is represented by the area below the curve (up to the maximum peak force).

Elongation at Break

The strength tester standard data are referred to the maximum force and the elongation at the maximum force peak. Some customers, especially those testing composite materials, are interested in measuring the real breaking point of a specimen, in addition to the standard data.

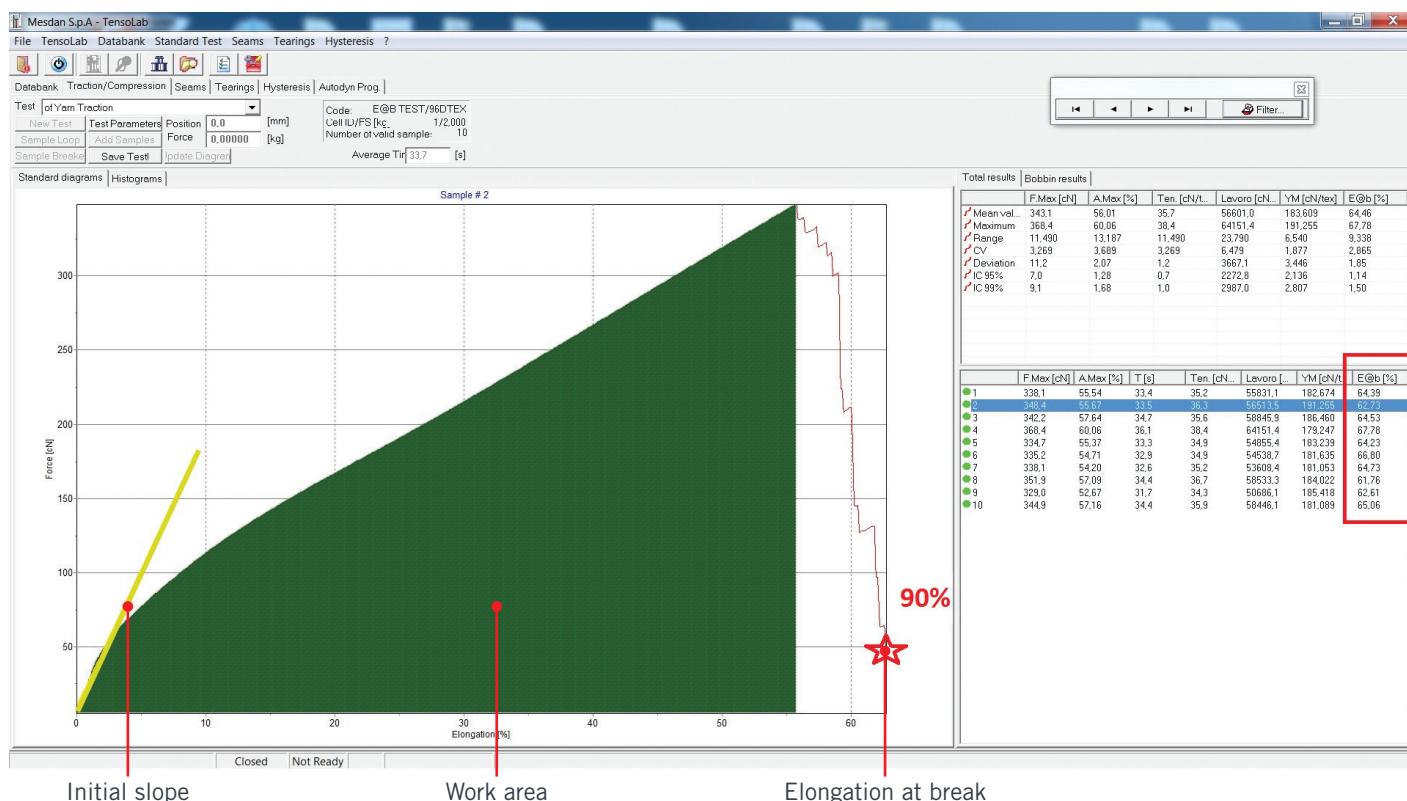
Basically, it is referred to the point after the force has reached its peak value and tends to decrease slowly towards the total and real specimen rupture.

This value is indicated with the word “E @ b”.

Young Modulus

The young modulus is used above all on synthetic yarn filaments and fibers.

It is referred to the point on the strength curve beyond which the fiber/yarn begins to lose elasticity and does not return into its initial position (becomes inelastic). Namely, the end of the elastic range of the yarn. Before reaching this point, the yarn/fiber can go back to zero elongation without changing its molecular structure and therefore behaving as a genuine, “undamaged” yarn/fiber. Comparing two yarns of the same composition and count, the one with the higher YM will perform better than the other. It is based on the inclination of the starting curve, called the “initial slope” (“I / S”) which is referred to the yellow line of the strength/elongation curve.



Indicative images / graphics, that may vary depending on the type of test (if performed by Single or Dual Column)

All values can be printed, or directly exported in an Excel sheet for a further elaboration and for statistical calculations. Thanks to this method, the operator can set the hysteresis test according to the specific procedures of his company, and/or perform tests according to the international standards. The program is available in several languages, and many fields of the Data Bank can be customised by the end users according to their specific needs.

Load Cells

The choice of the load cell and clamps is of the utmost importance for a correct performance of the test according to the strength of the samples and to the reference standard.

Load cells are interchangeable and can be replaced in a fast and easy way (in a couple of minutes), since they need to be calibrated only the first time before testing; then they are automatically identified by the Strength Tester at the subsequent changes.

Main features:

- easily interchangeable;
- high quality (manufactured by HBM);
- high precision;
- dual accuracy range.

Load cells are manufactured by HBM - Hottinger Baldwin Messtechnik (accuracy class up to 50.000N: 0,02%).

Example of load cell:



Load cell (N)	Accuracy X1 (cN)	Maximum capacity X1
20	0,4	full range of load cells
100	2	
500	10	
1.000	20	
5.000	100	
10.000	200	
50.000	1.000	

Clamps & Jaws

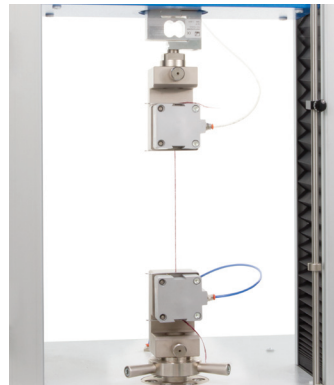
Our Strength Testers fit a huge range of mechanical and pneumatic clamps to test yarns and fabrics in accordance with the relevant standards. Clamps and jaws are interchangeable, and designed to be mounted in an easy and fast way.

The unique design and the robust construction guarantee an effective clamping of the sample to test without altering its characteristics, even in case of slippery samples.

The instruments are already equipped with connections for compressed air.



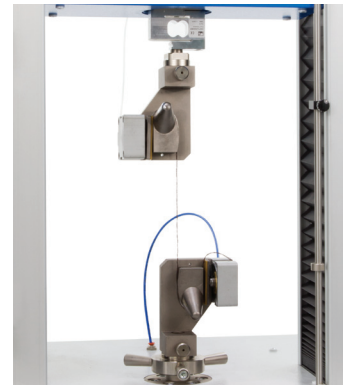
Pneumatic clamps for delicate yarns (POY, Lycra, cotton, worsted yarns), 20N max capacity, **Code 2510.978**



Pneumatic clamps for standard yarns and sewing threads, 50N max capacity, **Code 2510.982**



Mechanical clamps for normal yarns, 30N capacity, **Code 2512E.994**



Clamps for high tenacity yarns with conical introducer, **Code 2510.980**



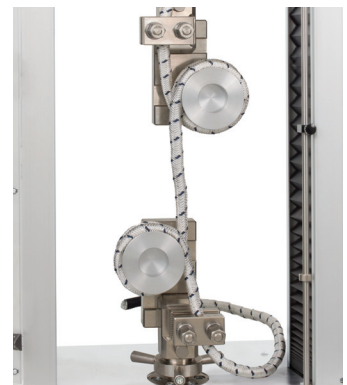
Mechanical clamps for high tenacity yarns, Scott 300, **Code 2510.996**



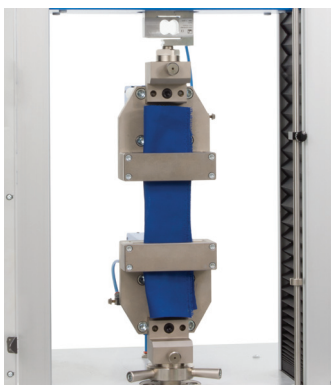
LEA clamps for hanks, **Code 2512E.990**



Self-tightening high tenacity clamps for ribbons, 100 mm wide, **Code 2512E.920**



Self-tightening high tenacity clamps for ropes, **Code 2515.988**



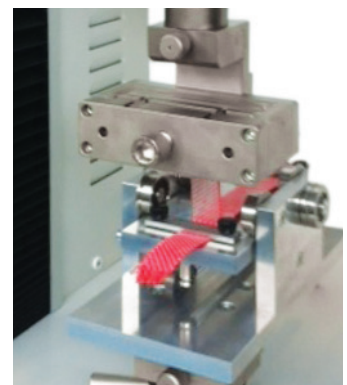
Pneumatic maxi clamps with rubber jaws for high tenacity & heavy fabrics, 100 mm wide, **Code 2510.130**



Mechanical clamps with rubber jaws, 100 mm wide, **Code 2510.846**



Mechanical clamps for non-woven and geo-textiles, (EN ISO 10319), 200 mm width, with rubber jaws, **Code 2515.142.**



Adhesion peel bond kit (roller type, UNI EN ISO 11644; IUF 470; UNI EN 388 Annex C, 2017). Available on demand.



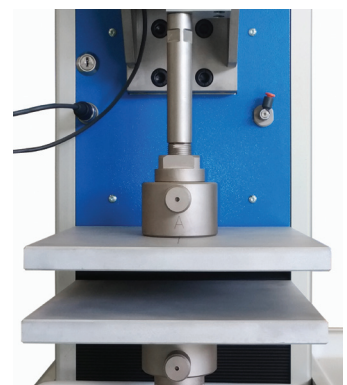
CBR perforation Testing Kit for non-wovens (EN ISO 12236, UNI 8279-14), **Code 2510.690**



Perforation Testing Kit according to EN 388 Standard, **Code 2510.681**



Perforation/punching Testing Kit (ASTM D6797, ISO 90735), **Code 2512E.799**



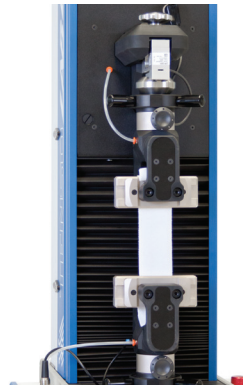
Compression Test Set. Available on demand.



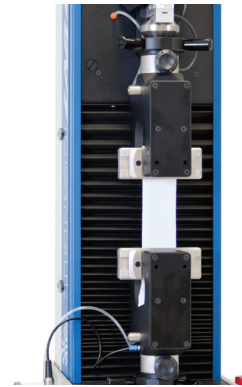
Fibre bundle 0" & 1/8" Clamps (Pressley Method), **Code 331A.2** (clamps) + **Code 331A.8** (clamps holders)



Pneumatic Clamps for yarns, complete with metal & rubber jaws, **Code 2512E.700**



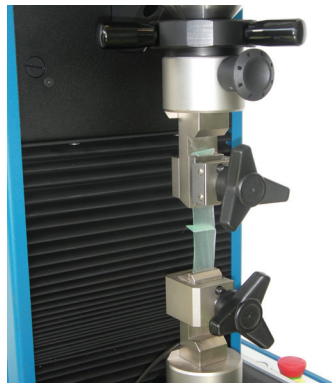
Pneumatic Clamps for fabrics, light, up to 60 Kg capacity approx, 100 mm width, **Code 2512E.705**



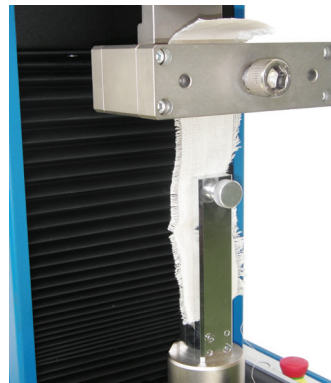
Pneumatic Clamps for fabrics, heavy, up to 300 Kg capacity approx., **Code 2512E.730**



Special Testing Kit, according to ISO 4919 Tuft withdrawal force. Available on demand.



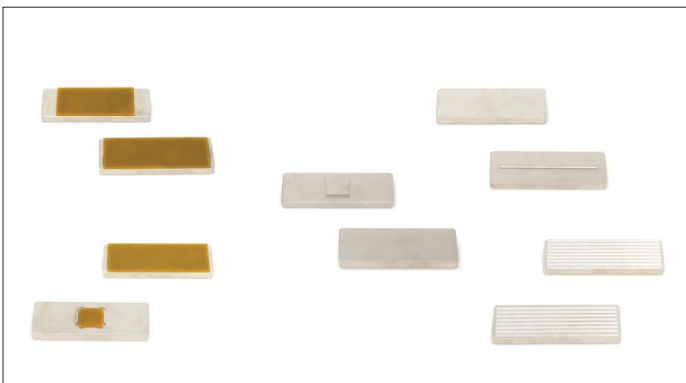
Mechanical PBF Clamps for films, width 25mm, **Code 2512A.997**



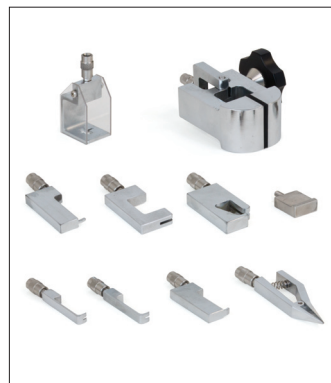
Nail tearing tool, bottom part (UNI 7275), **Code 2512A.856**



Mechanical Loop Clamps for stretch & recovery evaluation, according to ASTM D4964, **Code 2510.932**



Example of interchangeable jaws, rubber/knurled, Grab, Contact Line, etc.



Zipper testing kit (ASTM D2061), **Code 194E.28**



Upper Long Nose Vise Grip, for trousers' hooks and other accessories, according to M&S P115 (for buttons), **Code 194E.10**



Element for Zipper Kit (**Code 194E.28**), in compliance with ASTM D2061 Standard



Upper Universal Grip (**Code 194E.6**), Lower Fabric Clamp (**Code 194E.4**), for buttons, etc.



Upper (**Code 194E.16**) & Lower (**Code 194E.14**), Grasp Button Kit, & Lower Fabric Clamp (**Code 194E.4**), for buttons, etc.



Upper Stud Grip (**Code 194E.12**), Lower Fabric Clamp (**Code 194E.4**), to test male parts of baby snaps, etc.

TENSO-LAB

TECHNICAL FEATURES

Technical Features	Code			
	2512E	2512F	2515	2516
Model	Single Column Tensile Strength Tester		Dual Column Tensile Strength Tester	
Load Capacity	5000 N		50000 N	10000 N
Available load cells	20 - 100 - 500 - 1000 - 5000 N		20 - 100 - 1000 5000 - 10000 - 50000 N	20 - 100 - 1000 5000 - 10000 N
Load cells accuracy class	$\pm 0.02\%$ (5000 division) HBM 6 wire load cell system with high sensitivity (2mV/V)		$\pm 0.02\%$ (5000 division) HBM 6 wire load cell system with high sensitivity (2mV/V)	
Speed accuracy	$\pm 0.005\%$ under stable conditions		-	
Testing speed range	from 0.001 to 1500 mm/m		from 0,5 to 500 mm/min	
Max force at full speed	5000 N		1000 N	5000 N
Max speed at full load	1000 mm/min		500 mm/min	
Max returning speed	1500 mm/min		500 mm/min	
Force measure accuracy	$\pm 0.03\%$		$\pm 0.03\%$	
Overload	avoided via control software		avoided via control software	
Force maximum resolution (load cell of 20 N)	0.0002 cN		0.0002 cN	
Force minimum resolution (load cell of 5000 N)	0.05 cN		0.05 cN	
Frame stiffness	5000 N/mm		-	
Testing principle	CRE (Constant Rate of Extension)		CRE (Constant Rate of Extension)	
Crosshead travel (1)	900 mm		1200 mm	
Crosshead guidance	double linear slide with 4 skates integrated within the column		double round bar with linear ball bearings	
Position accuracy	0.0001 mm		-	
Inner distance between columns	-		400 mm	
Operating temperature	from 0°C to +50°C		from 0°C to +50°C	
Operating humidity	from +10 to +90% non-condensing		from +10 to +70% non-condensing	
Machine Configuration	table top; adjustable support base available		floor standing machine	
User interface	user interface for Windows/Linux PC with universal test program		user interface for Windows	
Machine control	a full machine control via dedicated controller with real-time operating system		a full machine control via dedicated controller with real-time operating system	
Dimensions	(L) 480 x (W) 370 x (H) 1415 mm		(L) 900 x (W) 600 x (H) 1900 mm	
Weight	75 kg		322 kg	280 kg
Power supply	115 or 230 Vac, single-phase, 50/60 Hz, 700 W		115 or 230 Vac, single-phase, 50/60 Hz, 300 W	
Calibration Certificate	ISO 17025 Calibration Certificate (Accredia - ILAC) available on demand		ISO 17025 Calibration Certificate (Accredia - ILAC) available on demand	

(1) Maximum extension, load cell & clamps excluded (800 mm of usable test space)

Available software languages: German, English, Spanish, French, Italian, Portuguese, Chinese (for information about PC minimum requirements, please contact Mesdan S.p.A.)

OPTIONAL / ACCESSORIES

- A wide range of interchangeable load cells (see above table)
- A wide range of interchangeable pneumatic and mechanical clamps complying with relevant international standards
- Foot switch (necessary for pneumatic clamps)
- PC and printer
- Compressor
- UPS

REFERENCE STANDARDS

Tenso-Lab series complies with a variety of testing methods (ISO, EN ISO, ASTM, M&S, IWS, NEXT, BS, GB, JIS, etc...)

Officially approved by Marks & Spencer

Photographs and descriptions of the present leaflet have to be considered as purely indicative and not binding