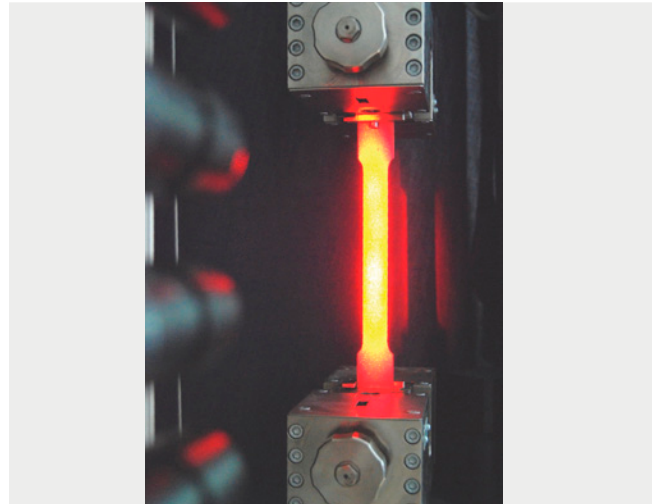


Product Information

laserXtens Array: non-contact measurement in a large measuring range



Applicational range

The laserXtens Array can be used to measure strain or deformation on a wide range of materials. Using the latest laser speckle technology means that there is no contact with the specimen during the test and no need to attach marks. This enables the laserXtens to work in a wide range of applications:

- Tensile, compression and flexure tests on metals and plastics
- From tests on micro-specimens with micro-strains to testing specimens with a large initial gage length and large strain
- Tests on components and subassemblies
- Applications where a contact extensometer might be unsuitable due to its physical contact with the specimen and which might be damaged by the whiplash experienced at specimen failure.
- Tests in temperature chambers
- High temperature tests
- Where non contact biaxial strain measurement is necessary

High measuring range, precision and resolution

- The laserXtens Array features a very large measuring range
- The laserXtens Array provides high precision in micro and macro measurement ranges
- The resolution is 0.15 μm
- The laserXtens Array meets or exceeds class 1 of ISO 9513 (Class B2 of ASTM E83).

No specimen contact, no specimen markings

- The laserXtens makes no contact with the specimen and there is no influence on the test caused by the laser light
- The laserXtens does not require specimen markings which results in several advantages:
 - Saving of time - especially at high specimen throughput
 - Simple use in temperature chambers
 - The system can plainly be used in robotic testing systems, as no manual specimen preparation is needed prior to the test

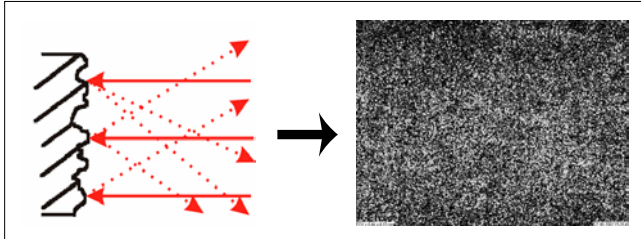
Unrivalled functions and options

- The laserXtens Array has no moving parts and is completely free from wear
- Different gage lengths are set in fractions of a second.
- Measurement of transverse strain or flexion without the need of additional specimen marks or hardware extensions for the system (software option)
- Measurement of r&n values on metals according to ISO 10113 and ISO 10275 via option
- Measurement in two dimensions, up to 100 measuring points in any desired configuration or arranged in matrix form on a plane specimen surface can be dimensioned (option 2D dot-matrix)
- Determination of the strain distribution and the strain at break according to ISO 6892-1 annex H

Product Information

laserXtens Array: non-contact measurement in a large measuring range

Function description



The speckle pattern can be thought of as a 'virtual measuring mark' or 'digital fingerprint' on the surface of the specimen and is monitored with full frame digital cameras. The laserXtens Array software tracks this virtual measuring mark in consecutive images taken during the test, and this procedure is called speckle tracking.

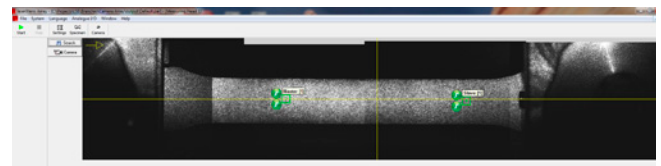
As load is applied to the specimen by the testing machine the speckle pattern moves and the laserXtens Array software tracks the speckle pattern iteratively from image to image in real-time and determines the strain in the specimen.

The extensometer is mechanically and securely connected to the testing machine and follows the crosshead at half the test speed. This ensures that the laserXtens Array is always in the middle of the test area and as a result the effective measuring range for speckle tracking is increased.

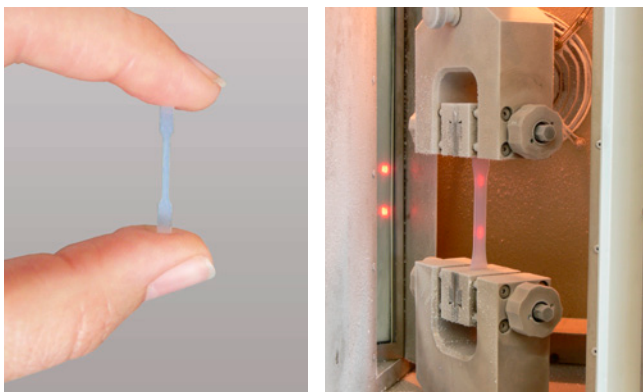
Innovative, patented technology

Unlike the standard laserXtens, on which two digital cameras mounted on motorized slides can be used to set different initial gage lengths, the laserXtens Array measuring head consists of four fixed high-resolution cameras.

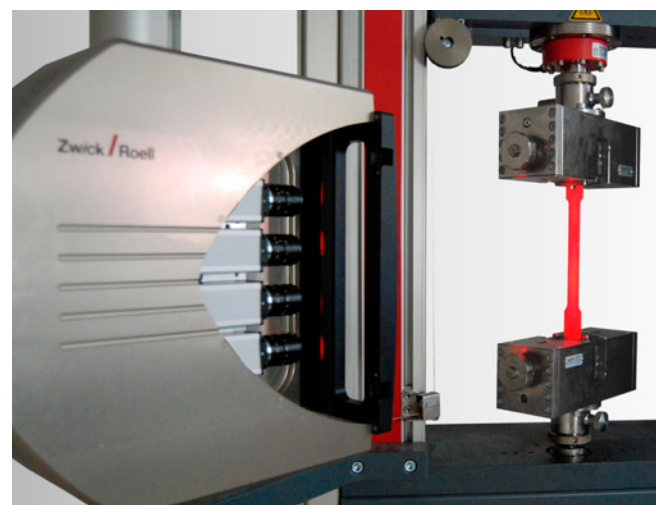
The overlapping fields of view of the four cameras are combined to form a single, large image. Here too, the two virtual gage marks are followed during the loading process (speckle tracking). When a gage mark meets the edge of one camera's field of view, it is forwarded to the adjacent camera's field of view. This method provides the laserXtens Array with an extra wide measuring range.



Only when one of the gage marks reaches the edge of the total field of view does the system switch to flow mode, in which the flow of the material below the evaluation window is measured to determine the measured value. Depending on the material and/or the deformation of the specimen, good results (i.e. accuracy grade 1) are also obtained with this non-standard method.



Strengths of the laserXtens systems: testing short specimen lengths and testing under temperature conditions



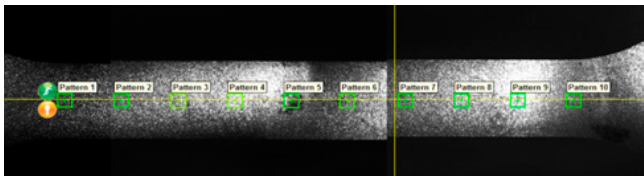
Product Information

laserXtens Array: non-contact measurement in a large measuring range

Software options

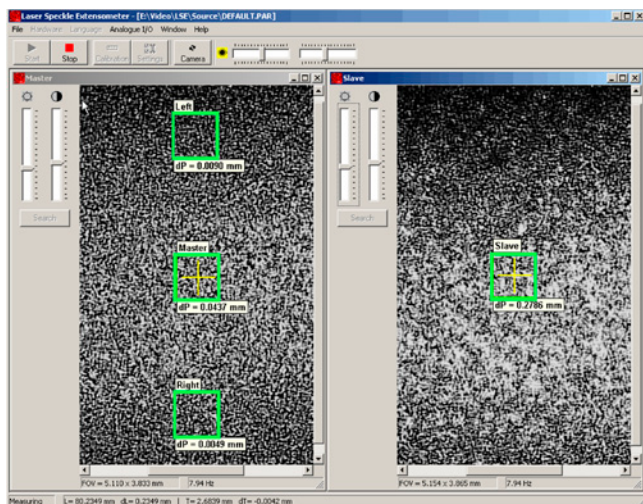
Strain distribution

The option strain distribution is used to determine localized strains at several measuring locations along the gage length on the specimen. The evaluation of up to 16 measurement marks is possible. In addition, a balancing of the beginning gage length can be performed in order to follow the necking-in automatically in real time (according to ISO 6892-1, annex H).



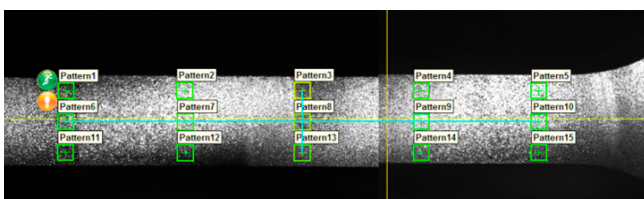
Second measurement axis

This option enables the determination of extension and local transverse strain at the same time.



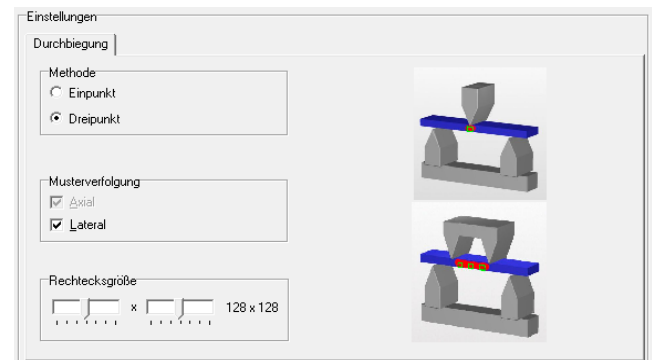
2D dot-matrix

This option enables measurement in two dimensions for measurement points on a plane specimen surface. Thereby it is possible to identify local strains and inhomogeneities of the specimen under strain. X- and Y-coordinates as well as the distances between points are available as measurement values.



Measurement of the deflection in 3- and 4-point flexure tests

The laserXtens is also used for 3- and 4-point flexure tests. The measurement can be made in one point (displacement of a measurement point) or at three points (relative displacement of the middle measurement point in relation to the outside points. Maximum measurement basis is 15 mm.



Important notice for optimal functionality

Due to physical constraints there are some conditions which must be fulfilled in order to guarantee laserXtens' optimum performance.

- In order to get good speckle patterns the specimen surface needs to adequately reflect the laser light. These conditions are easily achieved for metals and for most plastic materials. If necessary, simple tools can be used to improve the conditions on the specimen surface.
- The specimen grips must ensure that the specimen remains in good axial alignment during the test.
- For safe and accurate operation a low vibration environment is necessary (laboratory conditions).

Particularly for plastics we recommend pretests to ensure the reflection characteristics of the material. Aside from that through the pretests the Zwick test laboratory can determine the optimum configuration for your application.

Zwick guarantees reliable operation of the laserXtens based on pretested specimens and the test conditions (= process reliability).

Product Information

laserXtens Array: non-contact measurement in a large measuring range

Description	laserXtens Array 063644
laserXtens Array extensometer for mounting on an Allround-Line materials testing machine	
Measuring head with four high-resolution digital cameras, including lenses f=35 mm, four red laser light sources, software for automatic L_0 setting, image acquisition, evaluation of the cross correlation and transfer to <i>testXpert</i> ® II, accessories case with calibration tools	
Laser Class 2: no protective actions are necessary	
Class	1 in accordance with EN ISO 9513
Resolution	0.15 µm
Measurement range via speckle tracking	- 260 mm less gage length at specimen distance 465 mm - 310 mm less gage length at specimen distance 655 mm
Measurement range via flow measurement	After measurement range via speckle tracking the laserXtens Array switches to flow measurement
Gage length	-1.5 – 240 mm at specimen distance 465 mm -1.5 - 290 mm at specimen distance 655 mm
Max. following speed on the specimen	500 mm/min
Measurement frequency	70 Hz (with basic settings)
Flat specimen, measured on wide side	thickness 0 - 30 mm
Flat specimen, measured on specimen edge	thickness > 1 mm (pre-tests required for specimen with thickness < 1 mm)
Round specimen	1 - 30 mm (pre-tests required for specimen with diameter < 1 mm)

Remark: In combination with *testXpert*® II and *testControl* and *testControl* II a free slot in the electronic is required.

Description	Item number
Basic package for laserXtens	various
The basic package includes a multilingual workstation, operating system Windows XP or Windows 7 /32 bit, 23" TFT-screen and a manual in German or English	
Mounting	various
Mounting kits are available for mounting at the front left side, back left side and back central on all Allround-Line table-top and floor testing machines.	
Hardware options	
Option second measurement axis for additional determination of the transverse strain (also r-value). For use with laserXtens facing broadside of specimen and with round specimens. Includes additional camera (mounting in laserXtens housing), objective lens and software. Backlight required.	034032
Backlight 420 x 190 mm, incl. mounting unit	013593
Backlight 840 x 190 mm, incl. mounting unit	013596
videoXtens transverse strain extensometer for determination of r-values according to ISO 10113. Extra housing with 90° deflection (please see also extra product information). Extra mounting kit required.	034025
Tests in temperature chambers or ovens	on request
Software options	
Second measurement axis for measuring axial strain and a local transverse strain simultaneously	011069
Strain distribution for determination of localized strains at several measuring locations	077063
2D dot-matrix: Measurement in two dimensions for up to 100 measurement points	077070
Measurement of deflection in 3- and 4-point flexure tests in test axis	077071
Stand-alone operation	
High performance AD/DA converter 4 inputs, 2 outputs	021661
High performance D/A converter, 4 outputs	032319