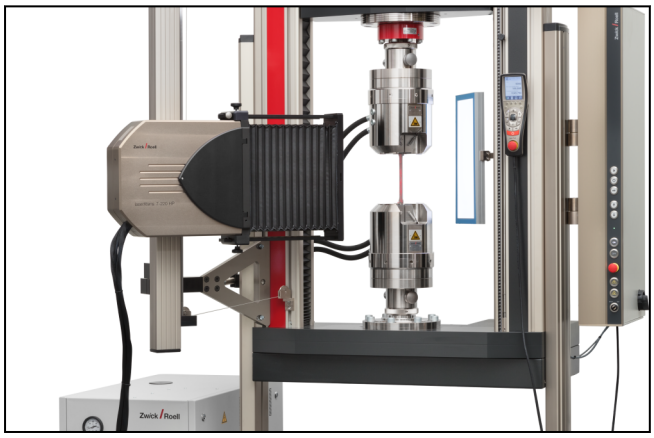
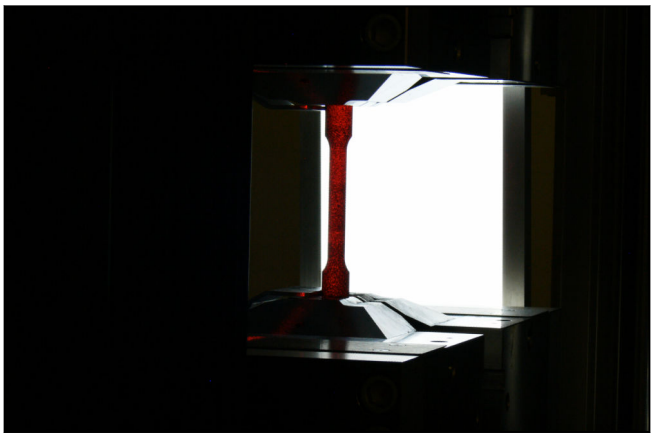
Zwick / Roell

Product Information

laserXtens 7-220 HP

CTA: 147694 217996





laserXtens 7-220 HP

Applications

Extensometers from the laserXtens systems series measure without contact and with the highest level of accuracy. The measuring principle eliminates the need to apply gauge marks. This allows the laserXtens systems to be used for a wide range of applications:

- Tensile, flexure and compression testing preferably on metals or other materials that disperse the laser light on the surface.
- Testing on contact-sensitive specimens or specimens with high fracture energy.
- Highly accurate testing in temperature chambers and high-temperature testing
- Applications in which more than two measuring points are used, e.g. biaxial deformation measurements or strain distribution.
- Measurements on small specimen geometries or components.

Due to its flexibility and easy handling the laserXtens is ideal for applications in the field of quality assurance, as well as in research and development.

Function description

laserXtens systems include one or more digital cameras and laser light sources.

The specimen surface is recorded with the full-frame digital cameras, while the laser light illuminates the specimen. The coherent laser light is dispersed on the specimen surface. This creates a speckled pattern.

Within the speckle pattern, evaluation fields are defined, which are known as virtual gauge marks. The laserXtens tracks these virtual gauge marks using a highly developed correlation algorithm. This process is known as speckle tracking.

The software calculates the strain on the specimen from the relative displacement of the virtual gauge marks from camera image to camera image.

Two or optionally more virtual gauge marks can be defined in the image, as standard, for example to record the transverse strain.

If one of the gauge marks is on the edge of the overall field of view, you can switch to flow rate mode.

laserXtens 7-220 HP system principle

The laserXtens 7-220 HP extensometer features seven fixed high-resolution cameras and five laser light sources. The overlapping fields of view of the seven cameras are pooled into one large picture. Both virtual gauge marks are also tracked here during the loading process (speckle tracking). If a gauge mark makes hits the edge of a camera's field of view, it will be transferred to the field of view of the adjacent camera. This method results in a large measurement range with high resolution.

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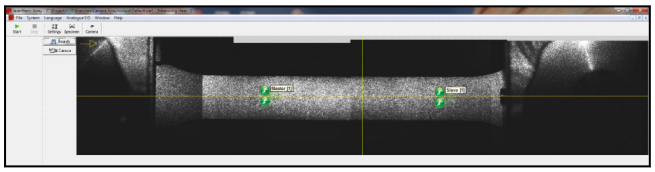
Product Information

laserXtens 7-220 HP

CTA: 43965



Combined overall image of the specimen

Advantages and features

Testing without specimen marks

- laserXtens' unique technology eliminates the need for specimen marking.
- Significant time and cost savings, particularly with high specimen throughput.
- The advantages are especially apparent with options covering multiple measuring points or entire specimen surfaces.
- Easy to use in temperature chambers, where environmental conditions can make gauge mark application really difficult.
- Ideal for automated systems - no manual specimen preparation required.

Unique

- Our patented laserXtens Array technology is unique. There is no comparable product on the market.
- The extensometer features high-accuracy measurement over a large measuring range. It also has the entire specimen in its view, enabling much more information to be obtained than simply the strain between two gauge marks.

High accuracy down to the last detail

- laserXtens possesses high precision in the micro and macro measurement ranges.
- ZwickRoell extensometers exceed the requirements of the standards and are calibrated over the entire measurement range to Accuracy Class 0.5, ISO 9513.
- Calibration in Accuracy Class 0.5 to ISO 9513 with first calibration point from as early as 20 µm.
- Industrial-quality cameras and high-quality, low-distortion lenses.
- Specimens from 1 mm in width/diameter can be tested; even smaller specimens may be possible following pre-testing.
- In contrast to contact-type extensometers or pure video instruments, laserXtens can measure strain on short specimens (gauge lengths from 3 mm) with high accuracy.
- Extensometer mounted using stable, low-vibration mounting arms.
- Housing provides protection against dirt and dust and inadvertent loss of adjustment of components.
- Exact synchronization of all measurement channels.
- A tunnel minimizes environmental influences such as air currents.

Obtain more information from testing

- Strain distribution: Measurement of strain distribution on the specimen. Automatic symmetrical adjustment of the initial gauge length at the point of break reduces specimen waste.
- Test Re-Run: Due to recording an image series during a test, the initial gauge length can be subsequently changed and the test can be recalculated.
- 2D dot matrix measurement allows for the determination of local strain and inhomogeneities on a planar specimen surface in two directions (2D).
- Flexure testing: Measurement of deflection in 3- and 4-point flexure tests.
- Video capturing: Recording or the test, synchronized with the measurement curve.
- Biaxial strain–determination of the transverse strain and reduction in area. Since backlight is used for measurement, there is no need for markings. The width can be determined at one or more locations.
- Strain rate controlled tests to ISO 6892-1 Method A1 “Closed Loop” can be performed

Automatic centering increases measurement travel and measuring accuracy.

- laserXtens tracks at half crosshead speed via the connection to the crosshead, keeping the testing operation automatically in focus and making optimum use of the measuring range.
- This results in increased system accuracy; the gauge marks shift less in the image and are captured in the (more accurate) center of the lens.

All data at ambient temperature.

Subject to change in the course of further development.

Product Information

laserXtens 7-220 HP

Highly accurate testing in the ZwickRoell temperature chamber

- The optical extensometers and the ZwickRoell temperature chambers are optimally adapted to each other. Temperature control and air distribution in the temperature chamber are optimized in such a way that the laserXtens resolution is only minimally affected, even at temperature.
- Even the comparatively slight influence of the side panel on the measuring system scaling is compensated for. Compensation can be switched on when in temperature chamber mode by simply clicking in the software.
- The entire system is closed: laserXtens is connected to the temperature chamber through a tunnel. Influences due to air turbulence are thereby also minimized outside of the temperature chamber.

Easy operation

- Tamper-proof: The housing of the complete systems are lacquered; nothing can be adjusted on the lenses. This is an important requirement for reliable test results.
- Simple alignment to the specimen: Through the connection to the crosshead, the laserXtes is aligned centrally to the gauge marks. This can be done very quickly due to the ease of height-adjustment. (not for laserXtens 1-15 HP).
- Compensation of various specimen thicknesses and testing of shear specimens.
- Wear-free system, and as a result also low-maintenance. The systems have an extremely long service life.

Product Information
laserXtens 7-220 HP

Technical data

laserXtens 7-220 HP

Can be mounted on an AllroundLine materials testing machine

Type	**laserXtens 7-220 HP**	
Item No.	**1043974**	
Initial gauge length	3 ... 200	mm
Measurement travel with speckle tracking	210 mm - initial gauge length	
Measurement travel for flow measurement	After measurement travel via speckle tracking, laserXtens switches to flow measurement.	
Strain rate control to ISO 6892-1 Method A1	From 30[1)]	mm
Resolution	0.07	µm to EN ISO 9513
Accuracy class		
To EN ISO 9513	0.5	
To ASTM E83	B2	
Field of view, FOV (L x W)	220 x 28	mm
Typical measurement frequency (adjustable)	70	Hz
Measurement speed, max. at the measuring point	500	mm/min
Specimen dimensions		
Flat specimen, thickness	1 ... 30	mm
Round specimen, Ø	1 ... 30	mm
Dimensions:		
Height	460	mm
Width	485 ... 745	mm
Depth	140	mm
Minimum version	testXpert II V 3.71 and testXpert III	
Laser safety class to DIN EN 60825-1 (11-2001)	2[2)]	
Scope of delivery:	Measuring head with seven high resolution digital cameras including lenses, five red laser light sources, tunnel for minimizing signal interference, INC module (for tC: RS module), software license, accessory case with scale aid.	

1) Not in temperature chamber
2) No safety measures required.

laserXtens resolution in ZwickRoell temperature chamber

	laserXtens 7-220 HP / laserXtens 2-220 HP
Resolution at + 80 °C	Max. 0.2 µm
Resolution at + 120 °C	Max. 0.3 µm
Resolution at + 180 °C	Max. 0.5 µm
Resolution at + 250 °C	Max. 0.8 µm

All data at ambient temperature.

Subject to change in the course of further development.

Product Information
laserXtens 7-220 HP

	laserXtens 7-220 HP / laserXtens 2-220 HP
Resolution at -20 °C	Max. 0.4 µm
Resolution at -40 °C	Max. 0.6 µm
Resolution at -80 °C	Max. 0.9 µm

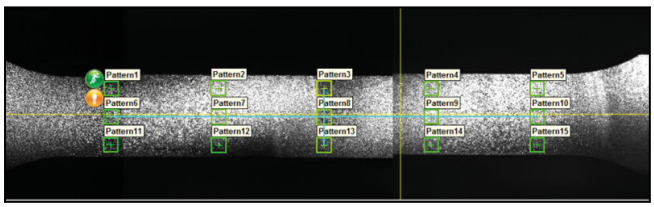
Hardware option for determination of change in width
This option is used for highly accurate determination of change in width on the specimen edge, for example for determining the r-value. An additional camera is either integrated into the housing or mounted to the housing so that the camera looks at the specimen width side. A backlight screen behind the specimen makes the edges of the specimen clearly visible, allowing the change in width to be measured optically–without making any contact or using gauge marks. Via the software, 1 to 10 measuring lines can be placed on the specimen.

Software options

Software option–second measurement axis
For the determination of transverse strain on the specimen, the software option “Second measurement axis” is sufficient. It is used to define virtual gauge marks not for longitudinal strain but rather also for transverse strain on the specimen.
The hardware option for determination of change in width is available for measurement of the change in width on the specimen edge.

2D Dot Matrix software-option
This option allows two-dimensional measurement of dots on a planar specimen surface. This enables determination of local strains and inhomogeneities of the specimen under load. X and Y co-ordinates plus the distances between dots are available as measured values.
Up to 100 measurement dots can be measured in any desired arrangement or in matrix form.
Display in testXpert III is limited to 15 channels.

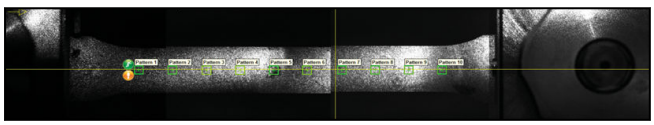
CTA: 44011



Component specimen with virtual gauge marks for measurement via 2D dot matrix

Software option Test Re-Run and strain distribution
The optional Test ReRun module enables subsequent recalculation of strain on the basis of an image series recorded during a test, using a different initial gauge-length (provided multiple markings are present). This can be particularly advantageous in component testing, for example, when it is necessary to evaluate local strain at different locations, or in standard tensile tests when specimen necking has occurred outside the original initial gauge-length.

CTA: 44010



Automatic symmetrical adjustment of strain around necking to ISO 6892-1, Annex I

The recalculated strain can, of course, be synchronized subsequently with the other measurement values via the testXpert testing software.

All data at ambient temperature.

Subject to change in the course of further development.

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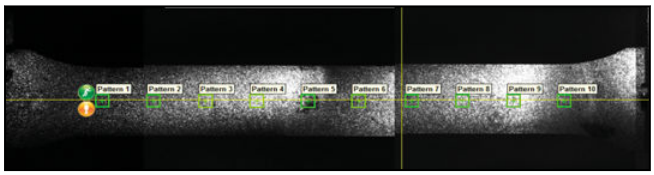
The Strain Distribution option enables determination of local strains at multiple measuring locations along the specimen gauge-length. These are available as channels in testXpert. Up to 16 measuring locations are automatically recognized and evaluated during the test. This option also allows automatic real-time symmetrical adjustment of the initial gauge-length around the necking (to ISO 6892-1, Annex I).

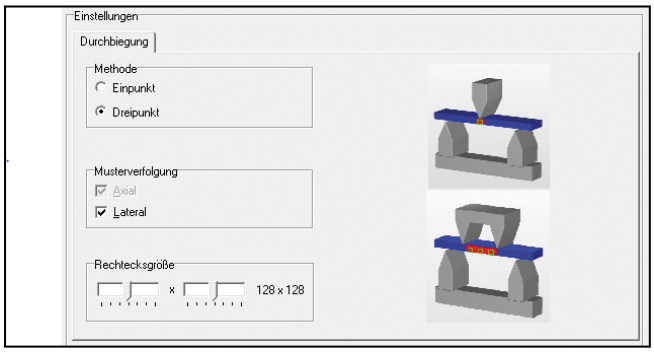
CTA: 44010



Automatic symmetrical adjustment of the initial gauge-length around the necking to ISO 6892-1, Annex I

Measurement of deflection in 3- and 4-point flexure tests
laserXtens also determines the deflection for 3- or 4-point flexure tests. Measurement can be performed at one point (displacement of a measuring point) or at three points (relative displacement of the middle measuring point to the two outside measuring points) with a maximum measurement basis of 15 mm (laserXtens 7-220 HP 20 mm).

CTA: 44009



Deflection measurement